TAKEX

OPTICAL FIBER HMD

INSTRUCTION MANUAL

TYPE FD-A320 SERIES

- Use it properly in accordance with the instruction manual and the delivery specification.
- Keep an instruction manual carefully.
- Approve the specification of this product and a contour dimension because it may be changed to the one without the notice.
- The guarantee period of this product is one year after the delivery.
- When a problem by out responsibility arises in the quarantee period of this product. It lets me do only the repair of the part of the problem or the exchange of the problem product.
- Each our product doesn't have a control function such as the prevention of disasters and the prevention of the accident as a product's own function.
- Approve it because our company isn't responsible for the damages due to the disaster if it occurred in the one related to the machine which these products were used for, the accident, and so on and others.

TAKENAKA ELECTRONIC INDUSTRIAL CO.,LTD.

OPTICAL FIBER TYPE HOT METAL DETECTOR

TYPE FD-A320 SERIES

INSTRUCTION MANUAL
SPECIFICATIONS

Read this manual carefully before use.

MODEL INTRODUCTION

UNIT NAME			TYPE	NOTE
AMPLIFIER UNIT			FD-A320	MINI POWER REAY OUTPUT
				PhotoMOS RELAY OUTPUT
			FD-A320H	HERMETICALLY SEALED CONTACT BESTACTRELAY OUTPUT
				PhotoMOS RELAY OUTPUT
OPTICAL HEAD			OHA	Basic View Type
			OHAN OHAN10	Narrow View Type
			OHW1 OHW2	Wide View Type
HOOD	AIRLESS HOOD	For OHA OHAN OHAN10	F38A	Small and light length : 120mm
			F38A-03	length : 300mm
			F38A-04	length : 400mm
			F38A-05	length : 500mm
		For OHW1.OHW2	F38W	For OHW1/OHW2 only
	AIR PARGE HOOD	For OHA OHAN OHAN10	F38PC-02	length : 200mm
			F38PC-03	length : 300mm
			F38PC-04	length : 400mm
			F38PC-05	length : 500mm
		For OHW1.OHW2	302W	For OHW1/OHW2 only
OPTICAL FIBER UNIT			FG2	length : 2m
			FG3	length : 3m
			FG4	length : 4m
			FG5	length : 5m
			FG7	length : 7m
			FG10	length : 10m
			FG15	length : 15m
			FG20	length : 20m
			FG30	length : 30m

PhotoMOS Relay is a registered trademark of the Panasonic Electric Works Co., Ltd.
Bestact Relay is a registered trademark of the Yaskawa Controls Co., Ltd.

CONTENTS

1 OUTLINE

This photoelectric switch is an optical fiber type HMD, which directly detects infrared radiation emitted from a hot object (ex. heated steel material) and then generates an ON-OFF output.
The unit adopts glass fiber of high heat resistant with excellent transparency.
Detected infrered radiation is transferred to the amplifier via the glass fiber and amplified, and a signal is generated.
There are two models.

FD-A320 : Mini power relay and PhotoMOS relay output.
FD-A320H : Hermetically sealed contact "BESTACT RELAY" and PhotoMOS relay output.

The output type can be selected by its response time and load requirements.

2 FEATURES

■ Two-screen display
Numerical display of threshold value of amount of light received and performance
Amount of light received when hot material is detected is displayed in real time in figure of 0.0～12.0, and threshold value of output performance is simultaneously displayed.

■ Wide dynamic range by adoption of logarithmic amplifier circuit
Different from convertional HMD, dynamic range of amplifier is wide (about 300 times as wide as conventional one), and wide temperature range of hot material is numerically displayed in analog amount.

■ Equipment of 4-20mA current output
This sensor is equipped with a voltage-current conversion transmitter for line monitoring, which outputs amount of light received when hot material is detected in analog current.

■ From low to high temperature with a single sensor
Two temperature ranges, for low and high temperature are available. The range can be changed over by an external input and the unit will cover from low to high temperature.

■ Adoption of highly-reliable hermetically sealed contact Bestact relay (FD-A320H)
Bestact relay incorporating hermetically sealed contacts manufactured by Yasukawa Controls Co. Ltd. is adopted in order to correspond to upgrading of control systems.

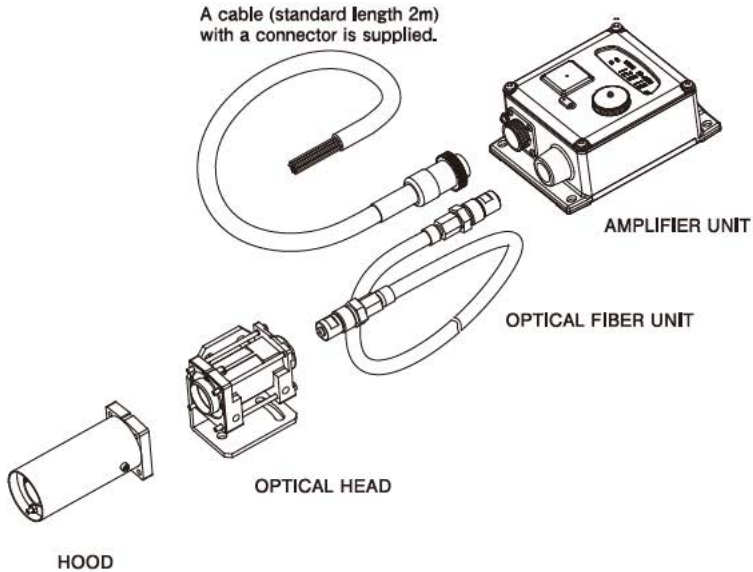
■ Equipment of simulation function
This sensor is equipped with a simulation circuit for hot material detection, with which same output as hot material detection is obtained by forcibly having it go through false detection by means of external input.

■ No cooling
The detector unit consists of optical lens and optical fiber, without any electronic parts.
Therefore, it can be used up to 200℃ of ambient temperature without water cooling.

■ Highly durable detector unit
The outer sheath of the optical fiber unit is stainless steel blade fitted flexible tube, which is strong, highly heat and corrosion resistive and durable.

■ No selection of power supply
The power supply will accept 100VAC to 240VAC, no setting up required.

3 CONSTRUCTION



■ OPTICAL HEAD

The optical head detects infrared radiated from the hot material and focuses it onto the optical fiber unit. There are two types, ie. a basic view type or a wide view type.

■ HOOD

The hood is supplied to prevent the lens from getting dirty.
An airless hood and an air purge hood are available.

■ OPTICAL FIBER UNIT

The optical fiber unit is a light guide to transmit the infrared, detected by the optical head unit, to the amplifier unit. It is armored with stainless steel blade fitted flexible tube.

■ AMPLIFIER UNIT

The amplifier unit detects the infrared transmitted by the optical fiber unit and amplifies it, and generates an output.
A cable (standard length : 2m) with a connector is supplied.

4 SPECIFICATIONS

4－1 DETECTABLE MATERIAL TEMPERATURE

Temperature criteria of object for detection. (Fe : Emissive ε =0.8)

Low Temperature Range	350 to 800℃
High Temperature Range	490 to 1300℃

*1) when detecting object is bigger than detection view, the above is temperature criteria of object for detection.

*2) these detection temperatures change by the emissive of the object. Please make more than this this temperature a standard when actually using it.

4－2 MINIMUM DETECTABLE MATERIAL TEMPERATURE

The lowest temperature criteria of object for detection. (Fe : Emissive ε =0.8)

This depends on the length of Optical Fiber unit used, and detection view difference of Optical Head. Refer to the following table. These detection temperatures apply only when hot material is bigger than detection view. When the hot material is smaller than the detection view, the minumum detection temperature will become higher.

Refer to the chapter DATA.

The temperatures in the table below are criteria of the minimum temperature of object for detection. The figures have about 4 times margin against the actual figure.

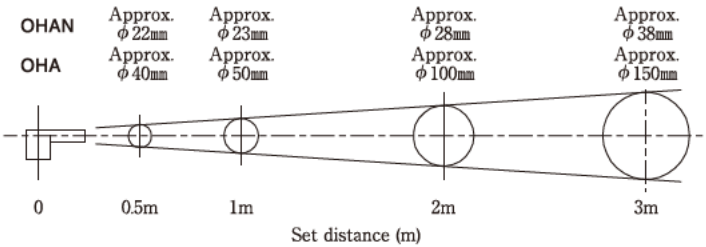
Detection temperature of the actual figure is referred to Detection temperature Output characteristics in the chapter DATA.

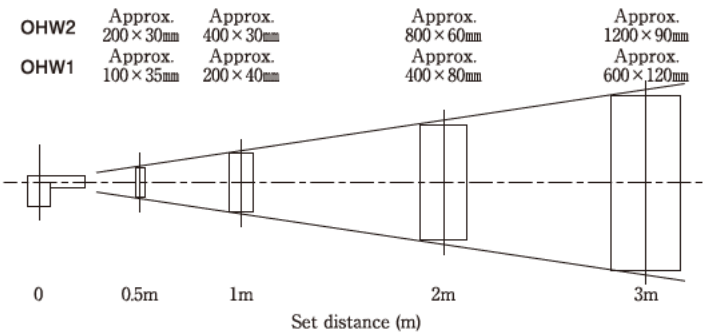
	Low Temperature Range			High Temperature Range		
Optical Fiber Unit Length	Optical Head			Optical Head		
	Basic View OHA	Narrow View OHAN OHAN10	Wide View OHW1 OHW2	Basic View OHA	Narrow View OHAN OHAN10	Wide View OHW1 OHW2
2 m	350℃ Min.	480℃ Min.	415℃ Min.	490℃ Min.	685℃ Min.	590℃ Min.
3 m	365℃ Min.	500℃ Min.	430℃ Min.	510℃ Min.	705℃ Min.	610℃ Min.
4 m	375℃ Min.	515℃ Min.	445℃ Min.	525℃ Min.	720℃ Min.	625℃ Min.
5 m	385℃ Min.	530℃ Min.	450℃ Min.	540℃ Min.	735℃ Min.	635℃ Min.
7 m	400℃ Min.	550℃ Min.	475℃ Min.	560℃ Min.	760℃ Min.	660℃ Min.
10m	445℃ Min.	600℃ Min.	520℃ Min.	610℃ Min.	850℃ Min.	725℃ Min.
15m	480℃ Min.	640℃ Min.	555℃ Min.	655℃ Min.	920℃ Min.	775℃ Min.
20m	500℃ Min.	665℃ Min.	580℃ Min.	680℃ Min.	960℃ Min.	800℃ Min.
30m	530℃ Min.	705℃ Min.	610℃ Min.	720℃ Min.	1030℃ Min.	850℃ Min.

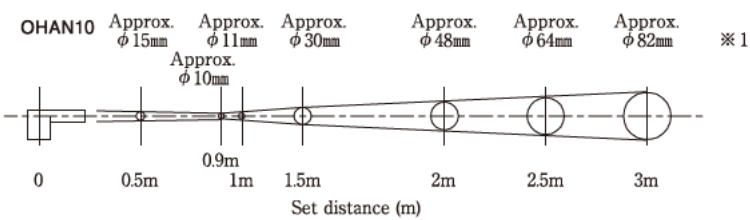
4－3 DETECTION FIELD OF VIEW

Detection distance	Basic View	Narrow View		Wide View	
	OHA	OHAN	OHAN10	OHW1	OHW2
0.5m	Approx. ϕ 40mm	Approx. ϕ 22mm	Approx. ϕ 15mm	Approx.100×35mm	Approx.200×30mm
1m	Approx. ϕ 50mm	Approx. ϕ 23mm	Approx. ϕ 11mm	Approx.200×40mm	Approx.400×30mm
2m	Approx. ϕ 100mm	Approx. ϕ 28mm	Approx. ϕ 48mm	Approx.400×80mm	Approx.800×60mm
3m	Approx. ϕ 150mm	Approx. ϕ 38mm	Approx. ϕ 82mm	Approx.600×120mm	Approx.1200×90mm

※1 *) Narrowness view type optical head OHAN10 is a spot view type of which it is minimum is view at the position of the detection distance 0.9m.







4－4 SPECIFICATIONS OF THE AMPLIFIER UNIT

Sensitivity Wave Length	0.8 to 1.8 μ m		
Detection Temperature Range	Low Temp. Range / High Temp. Range Switch with operation panel		
Display	Figure display	Received light level : 3 digit display Red LED	
		Threshold value : 2 digit display Green LED	
	Operation display light	Output [OP.L] : Orange LED	
		Stability [STB] : Green LED	
		Simulation input [SIMU] : Orange LED	
		Temperature range display	High temperature range side (Ht) : Orange LED
			Low temperature range side (Lt) : Orange LED
Received light level display range	0.0 to 12.0 (0.1 step)		
Operation Light Level Set-up Range	1.0 to 9.0 (0.1 step)		
Simulation Input	ON : Short-circuit (Outflow current 5mA max) OFF : Open-circuit		

4－5 OUTPUT SPECIFICATIONS

CONTROL OUTPUT

FD－A320

Operation Mode	ON–OFF control
	Light ON
Rating	Relay Output : Transfer contact 1c MAX 5A 250V AC (Resistive Load)
	PhotoMOS Relay Output : 1a MAX 0.1A 250V AC/DC (Resistive Load)
Response time	Relay Output : 17ms or less PhotoMOS Relay Output : 4ms or less

FD－A320H

Operation Mode	ON–OFF control
	Light ON
Rating	Bestact Relay Output : 1a 0.5A 220V AC 0.3A 110VDC (Inductive Load)
	PhotoMOS Relay Output : 1a MAX 0.1A 250V AC/DC (Resistive Load)
Response time	Bestact Relay Output : 6ms or less PhotoMOS Relay Output : 4ms or less

STABILITY OUTPUT

Operation Mode	After seven consecutive runs with less margin for the threshold light intensity.
Rating	Relay Output : 1a MAX 5A 250V AC (Resistive Load)
	PhotoMOS Relay Output : 1a MAX 0.1A 250V AC/DC (Resistive Load)

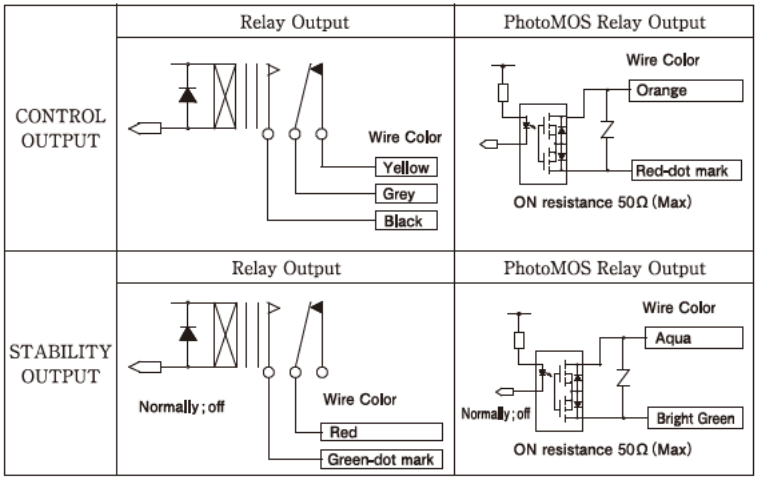
4mA–20mA OUTPUT

Operation Mode	4mA to 20mA analog signals (Allowable load resistance : 0 to 500Ω)
Response time	4ms or less F.S

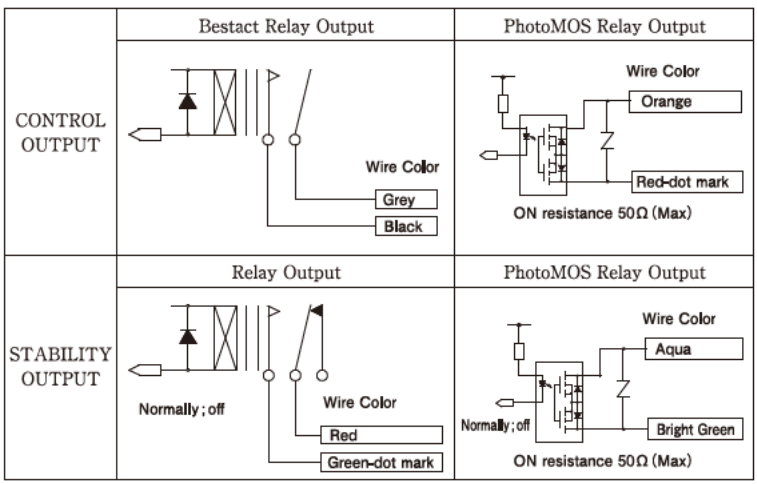
4－6 OUTPUT CIRCUIT

There are two outputs, relay output and photoMOS relay output, for both control output and stability (STB) output. Choose them in accordance with your purpose.
Both outputs can also be used.

■ FD－A320



■ FD－A320H



4－7 GENERAL SPECIFICATIONS

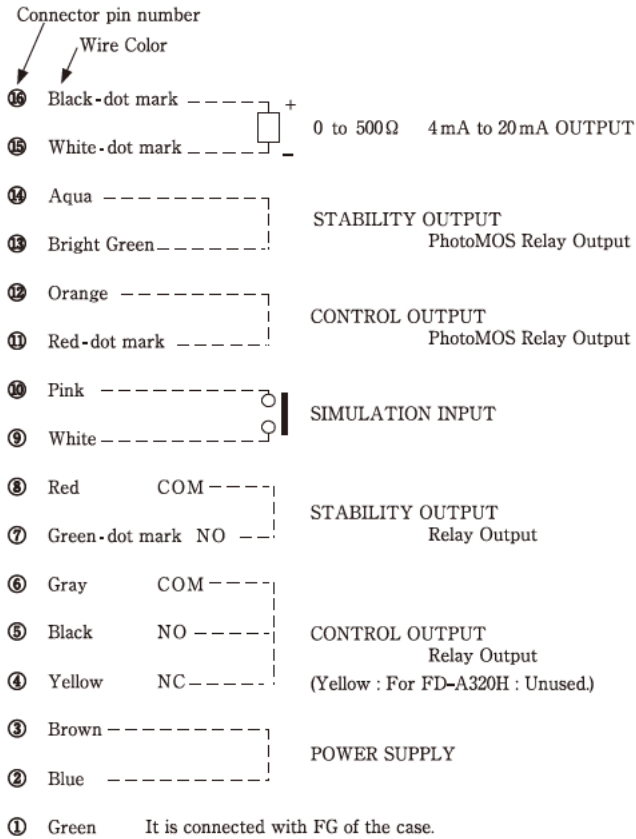
Valid Lens Aperture		28㎜ DIA (OHA/OHAN/OHAN10)
Power supply		AC100 to 240V ＋10% －15% 50/60Hz
Power Consumption		6 W or less
Connection Method		Connector type leaded 2m wire (VCTF 0.75㎟×16c)
Ambient temperature		Optical head / Optical Fiber Unit : －25 to ＋200℃ Amplifier unit : －25 to ＋50℃ (with no icing)
Storage temperature		－40 to ＋70℃ (with no condensation and no icing)
Ambient humidity		35 to 85%RH (with no condensation)
Bending limit of optical fiber unit		50㎜ radius
Insulation resistance	20MΩ or more at 500VDC	Power supply to Case, Control Output・Stability Output to Case Power supply to Control Output・Stability Output Case to 4mA-20mA Output, Power supply to 4mA-20mA Output Case to Simulation Input, Power supply to 4mA-20mA Input
Dielectric strength	1500V AC 1min (10mA)	Power supply to Case, Case to Control Output・Stability Output Power supply to Control Output・Stability Output
	500V AC 1min (20mA)	Case to 4mA-20mA Output, Power supply to 4mA-20mA Output Case to Simulation Input, Power supply to Simulation Input
Vibration resistance		10-55Hz Single amplitude 1.5㎜ 2hours each in X.Y.Z. directions
Shock resistance		500 m/s² (Approx. 50G) Three times each in X.Y.Z. directions
Protective Construction		ＩP64
Mass	Optical Head	Standard type (OHA) : Approx. 680g Narrow type (OHAN) : Approx. 840g Narrow type (OHAN10) : Approx. 860g Wide type (OHW1/OHW2) : Approx. 1300g
	Airless Hood	F38A : Approx. 240g F38A-02 : Approx. 330g F38A-03 : Approx. 430g F38A-04 : Approx. 550g F38A-05 : Approx. 650g F38W : Approx. 600g
	Air Purge Hood	F38PC-02 : Approx. 240g F38PC-03 : Approx. 300g F38PC-04 : Approx. 370g F38PC-05 : Approx. 440g 302W : Approx. 600g
	Optical Fiber Unit (FG seried)	FG2 : Approx. 0.7kg FG3 : Approx. 0.9kg FG4 : Approx. 1.1kg FG5 : Approx. 1.3kg FG7 : Approx. 1.6kg FG10 : Approx. 2.1kg FG15 : Approx. 3.1kg FG20 : Approx. 4.1kg FG30 : Approx. 6.1kg
	Amplifier Unit	Amplifier Unit : Approx. 1100g Attached cable : Approx. 620g

4－8 AIR PURGE SPECIFICATIONS - In case of using the air purge hood

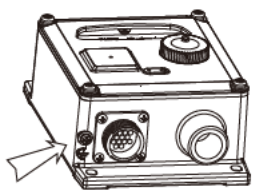
Qusntity : 200 ℓ /minute or more
Withstand pressure : 1 MPa

5 WIRING

- Cables are connected to the connector. The wire is divided depending on the color.
- The FG ① of the cable is connected to the case of the amplifier unit.
  Ground it as close as possible to the amplifier unit.



- Frame Ground : Ground it by (M4) of the terminal FG on the side of the connector outside of the case.



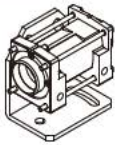
6 ASSEMBLY / INSTALLATION

6－1 PACKED COMPONENTS

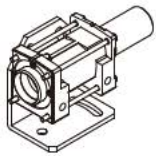
The product is roughly classified into the following four components.
Chek the quantity of the components first.

1 OPTICAL HEAD

OHA



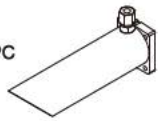
OHAN
(OHAN10)



2 HOOD (Hood may be already installed on the optical head.)

F38A

F38PC

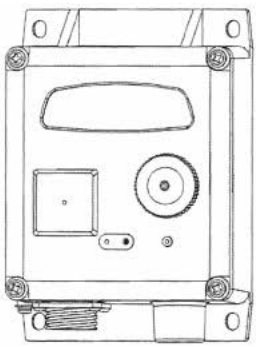


3 OPTICAL FIBER UNIT

FG＊＊

4 AMPLIFIER UNIT

FD-A320＊

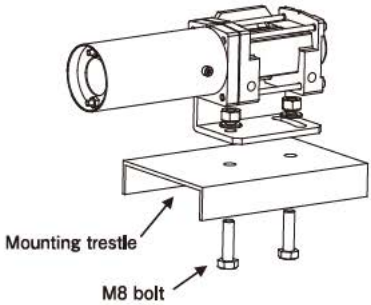


CONNECTOR
CABLE (Standard Type : 2m)

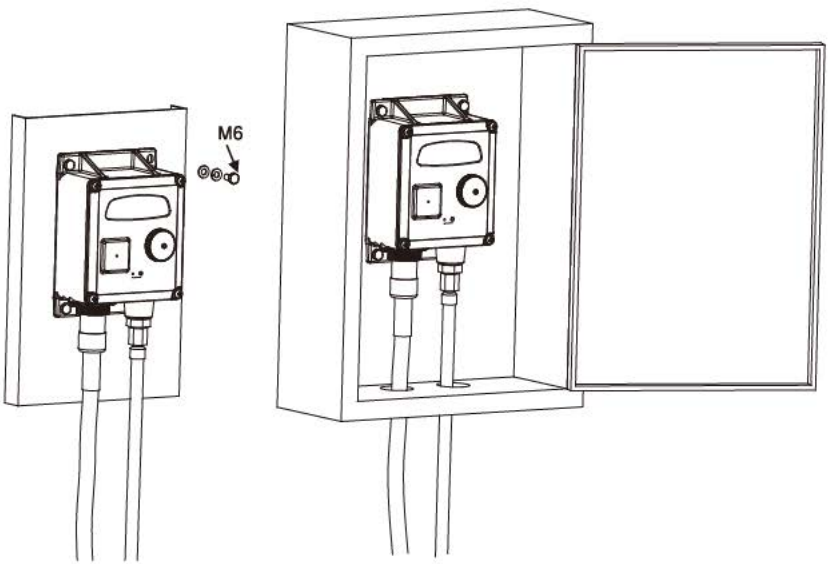
Caps are applied, for protection, to each optical fiber end connection, of the optical head unit and the amplifier unit. Also protection caps are applied to both the ends of the optical fiber unit.
The optical head unit and the optical fiber unit are opticasl systems, the performance of which will be badly affected by flaws, dust, etc.
Therefore, care must be taken with them when handling. Do not remove their protection caps until the units are to be connected. The protection caps, when removed, must be kept because they will be needed for maintenance.

6－2 INSTALLATION

Prepare a mounting trestle free from vibration.
Fix the optical head unit with two M8 bolts.
(The M8 bolts, nuts and washers are not supplied)



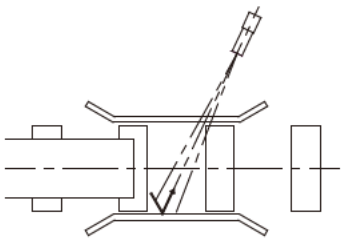
Install the amplifier unit in a place with constant temperature and free from radiant light from the hot material.
If it is installed unavoidably in a place with water splashing, enclose the unit in a splash-proof box.
installed in a place with scale scattering, enclose the unit in a scale-proof box.
Please use Spana etc. and tighten tightening the optical fiber unit firmly.
(tightening torque 10N·m or less)

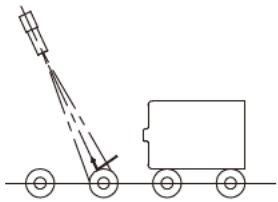


6－3 INSTALLATION POSITION

■ PLEASE PAY ATTENTION TO REFLECTED LIGHT.

When the detection material (hot material is large and has a high temperature, radiated light will be reflected by the rollers, the guides on the line sides, etc., this may cause the detector to operate even when the hot material is outside of the detection view.





Although this depends on the condition of the reflection surface, the type of the hot material and the installation position and the installation position of the detector, a reflection equivalent to hot material of 500 to 700℃ can occur with large ingots, slabs, etc. In this case, install the detector so that the reflection surfaces of rollers are outside of the detection view.

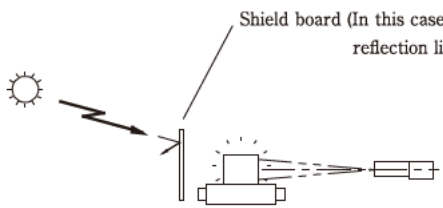
■ EXTERNAL LIGHT

Although visible light is completely cut off, avoid positions where direct or reflected sunlight or light from incandescent lamps, etc. may enter the detector.

When such position can not be avoided, shielding plates (ex. steel plates) should be used to cut off external light.

－Example－

1)



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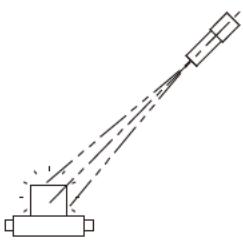
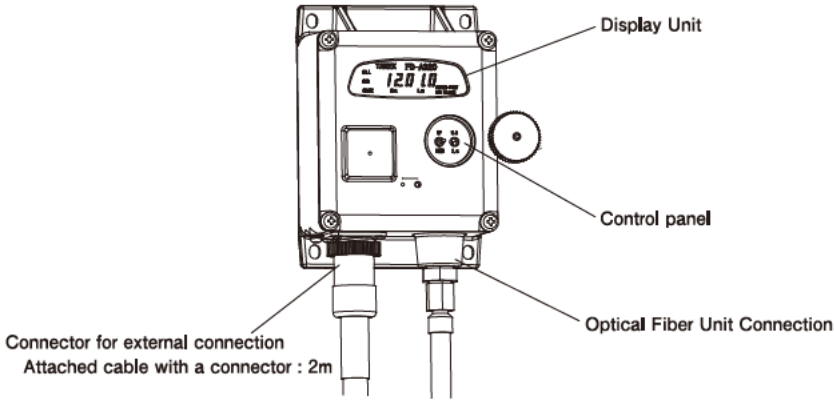


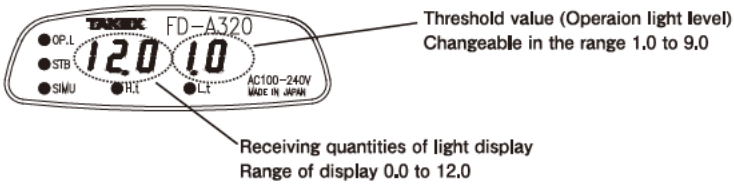
In this kind of installation, with the detector being installed looking down, the influence of the external light will be reduced.

7 DESCRIPTION – Amplifier Unit

7－1 APPEARANCE



7－2 DISPLAY UNIT



OP.L Operation Display (Red LED). Lights when the output is ON.

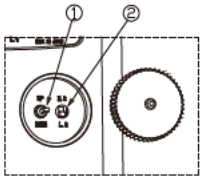
STB Stability display lamp (Green LED) Normal operation : Light ON
When the received light level is out of tolerance at detection : Flashing

SIMU Simulation display lamp (Orange LED)
It is lit when false entrance of light is given forcibly by external input.

H.t Temperature range display (high temperature range side)
It is lit when high temperature range is selected by operation switch.

L.t Temperature range display (low temperature range side)
It is lit when low temperature range is selected by operation switch.

7－3 CONTROL PANEL



① Setting switch for changing threshold value

② Switch for changing detection temperature range

Function of each part

① **Settubg switch for changing threshold value** ・Used for changing threshold values of perfomance level.

② **Switch for changing detection temperature range** ・Switch for selecting detection temperature range

・**Ht**：high temperature range

It is set on **Ht** side when temperature of detection material is high.

・**Lt**：low temperature range

It is set on **Lt** side when temperature of detection material is low.

Rough indication of setting

Set it on **Ht** side if display of amount of light received is higher than 11.0 when hot material is detected on **Lt** side.

8 OPERATION

8－1 SETTING OF THRESHOLD VALUE OF PERFORMANCE LEVEL

Threshold values of performance level is changeable in the range of 1.0 to 9.0 .

① Operate the setting switch up/down in operation portion.

To raise threshold values of performance level (raise detection temperature)

② First, push the setting switch in upper direction.
Each one push raises the performance level display by one.
Continued push of the setting switch raises the figure continuously.

To lower threshold values of performance level (lower detection temperature)

③ When the setting switch is pushed in lower direction, displayed figure becomes smaller and threshold value is set low.
Threshold values thus set are recorded, and even if power is turned off, recorded threshold values are displayed by turning power on again.

Rough indication of threshold value setting

Set threshold value of performance level as maximum of received light level minus 3 or 4 as rough indication.
Received light level minus 3 = Threshold value is about 1/5 of the amount of energy of received light level.
Received light level minus 4 = Threshold value is about 1/10 of the amount of energy of received light level.

◇ When the difference between threshold value of performance level and received light level is too small, cooled edge of work-piece may not be detected in some case.

◇ Inversely, when the difference between threshold value of performance level and received light level is too large, the sensor may act rapidly in detection of work-piece edge or performance of the sensor may delay when work-piece runs out.

8－2 TEMPERATURE RANGES

· It is equipped with two detection temperatures for the low temperature degree and the high temperature degree detection.

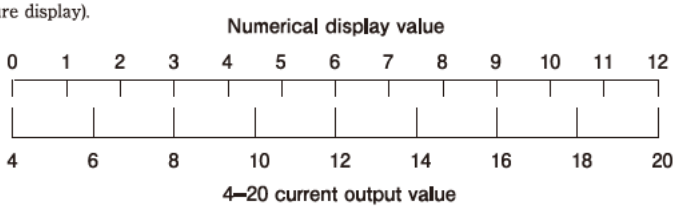
Low Temperature Range	350 to 800℃
High Temperature Range	490 to 1300℃

(Fe : Emissive ε =0.8)

The above temperature ranges are the detection object temperature when using Optical Head : **OHA** / Optical Fiber Unit : **FG2** and the detection object are bigger than the detection view. Detection temperature differs depending on the optical head type, the length of Optical Fiber Unit and the size of the detection object. Refer to the chapter **Data**

8－3 4–20mA CURRENT OUTPUT

Output of 4-20mA may be drawn corresponding to amount of light received.
Refer to the table below for the relation between current output value and displayed amount of received light (red figure display).



8－4 STABILITY (STB) FUNCTION (Function of stable display of received light)

· When seven consecutive occasions occur in which received light level cannot afford to threshold value of performance level, it is notified by stability output and blink of lamp.

· Threshold value of stability (STB) function = threshold value of performance level +1.0
The value of "threshold value of performance level +1.0" corresponds to 1.8 times as much amount of energy as threshold value of performance level.
Threshold value of STB function cannot be changed unless threshold value of performance level is changed. Threshold value of stability function is always set at "threshold value of performance level +1.0".

· When threshold value of performance level is 3.0, for example ;
Then, threshold value of stability function is set at 4.0.
When hot material was detected under this condition, if seven consecutive occasions with amount of light received of 4.0 or less occurred, STB output will be turned on.

· Stability output will be reset if its cause is removed.

Cause and countermeasures when stability output is turned on, and reset of stability output

・Cause－1 : When STB output is turned on, even if production line condition is same
Optical axis deviation of optical head or contamination of lens surface is conceivable.
Confirm condition of optical head.

・Cause－2 : Temperature of work-piece is lowered due to change of production line condition.
Lower threshold value of performance level.

8－5 SIMULATION PERFORMANCE

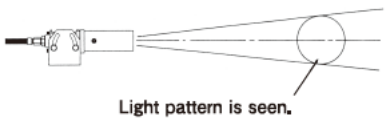
It is possible to have the sensor forcibly go through false detection by means of external input.
False light entrance performance is executed by short-circuiting pink and white lines of connection cord.

*) Aothough numerical display of amount of light received may not reach 12.0 when this apparatus is used in high temperature range (Ht), it is not a trouble.

9 OPTICAL AXIS ADJUSTMENT

◇ Adjustment by the sighting device
Adjust the optical axis by the sighting device attached to the optical head unit.

◇ Adjustment by Optical Adjuster (Adjuster available as an option)
＜Halogen lamp＞
A light pattern is directed through the lens by fitting an optical adjuster that has a halogen lamp, in the optical head.



As the light pattern becomes the detection field of view, more accurate optical adjustment can be made.
For further enquiry, refer to the following information.
Two types of adjuster are available.

＜Halogen lamp＞		＜Red semiconductor laser＞	
Optical axis adjuster	: OHF－CL	Safety class 2	
Power unit	: OHF－CLP	Optical axis adjuster	: OHF－LD
Halogen lamp (spare)	: OHF－L5	Power unit	: OHF－LDP

10 INSPECTION

■ Implement a regular inspection as follows :

1. Optical Check
Check the detecting view by the sighting device of the optical head unit.
With the special optical adjuster, the optical axis is checked more accurately.
(Refer to 10 : OPTICAL AXIS ADJUSTMENT)

2. Lens surface cleaning
Remove the hood by loosening the four bolts (M5) fixing it to the optical head unit, then the lens will be exposed.
Wipe the lens clean with a soft cloth.

11 NOTES

— Attention for PhotoMOS RELAY OUTPUT type **(FD−A320H)**

In case of connection to an inductive load, please connect a diode to prevent the back EMF from damaging the output transistor.

— Be careful with handling the optical fiber unit and its connections.

■ Note the following when having removed the optical fiber unit from the optical head unit or the amplifier unit for installation or repair.

◇ The optical fiber unit is used to transmit detected light. Therefore, its ends must always be protected from being damaged. Use rubber caps or vinyl tape, etc. to protect them.

◇ Also use rubber caps or vinyl tape to prevent scale dust, etc. From coming into the optical fiber connection end of the optical head or the amplifier unit.

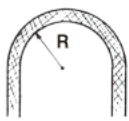
■ Be sure to tighten the tightening glands (nuts) of optical fiber unit connection by using a spanner, etc. Incomplete tightening and slackness will cause false detection. (Tightening torque ≦10N·m)

■ An O ring is used in the connection part of the optical fiber unit.
An O ring is used at the end surface of the optical fiber unit. Although it does not fall off easily while being used, if it should be lost during repair, use a preparatory O ring.
The preparatory O ring is attached in the fiber unit.

■ Correct handling of optical fiber unit.

Do not bend excessively

Glass fiber (optical fiber) is used inside the optical fiber unit.
If the optical fiber unit is bent to an excessively small diameter, it may be damaged. Keep to the permissible.



≧ 50mm
Bending diameter.

Do not pull

Do not apply a forcible pull, and keep a suitable amount of slack.

Do not twist

Twist cannot be absorbed into the optical fiber unit.
To avoid twist, firstly, temporarily mount the amplifier unit and the optical head, and then fix the optical fiber unit. Lastly, tighten mounting screws for the amplifier unit and the optical head of the optical fiber unit.

Do not allow the optical fiber to move

Fix the optical fiber when in use.
The optical fiber unit consists of about 1500 glass fiber stands ($\phi 50\,\mu$m) in a bundle. Therefore, if the unit is moved very frequently, the optical fiber strands rub each other and that may cause the strands to break.

— On performance in accordance with on/off operation power source.

■ Delay time from when power source is turned on until when the apparatus becomes usable is about 300ms.
Pay attention when it is used at the same time when power source is turned on.

■ Output may occur in a moment when power source is turned off. If it is inconvenient, turn power source of load side beforehand.

12 DATA

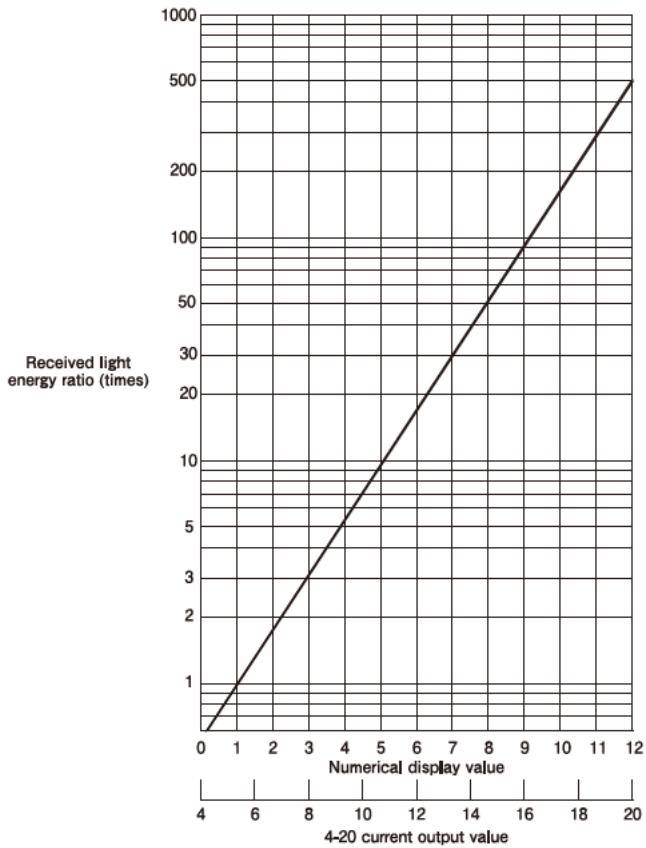
— On various data

Values written as various properties are representative values of products extracted from a certain lot. They are not intended to guarantee "rating and performance". Use them as references.
Therefore, they may be different from values in characteristic diagrams depending upon difference in transparency variation of fiber unit, use environment, etc.
(Usually figures higher than the values of characteristic diagrams may be displayed, since certain safety factors are given.)

12 — 1 Output-received light energy characteristics

Amount of energy corresponding to numerical display values representing amounts of light received on the panel surface and 4-20 current output valuesw
For example, energy difference between numerical displays of 8 and 9 is about 1.8 times.

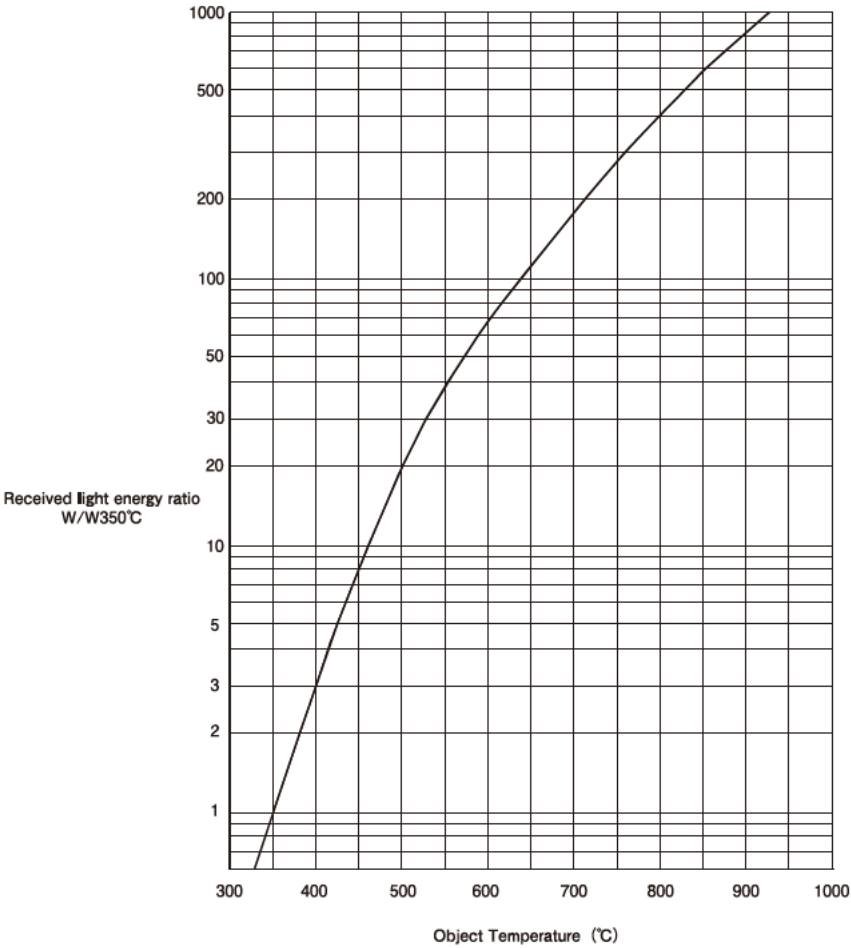
Data 1	



12 — 2 Ratio characteristics of hot material temperature and received light energy

If represents received light energy corresponding to detected material (work-piece) temperature. For example, energy difference of hot material of 500℃ against hot material of 400℃ is about 6.7 times.

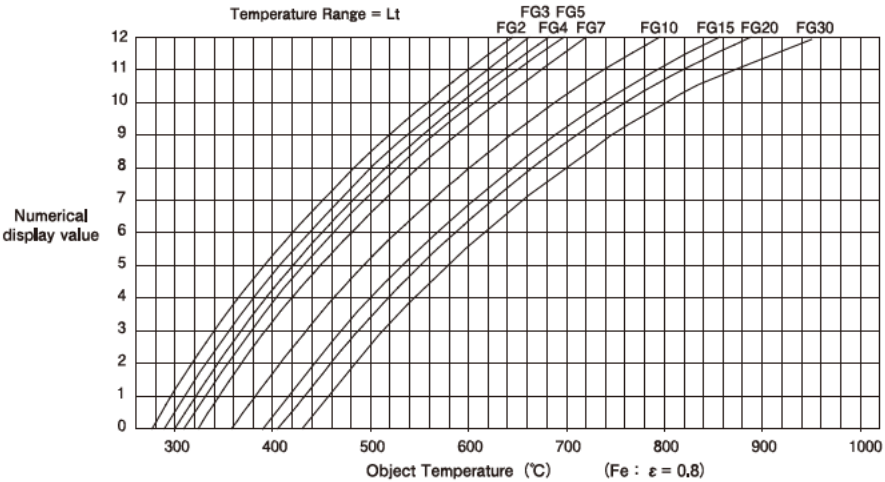
Data 2	



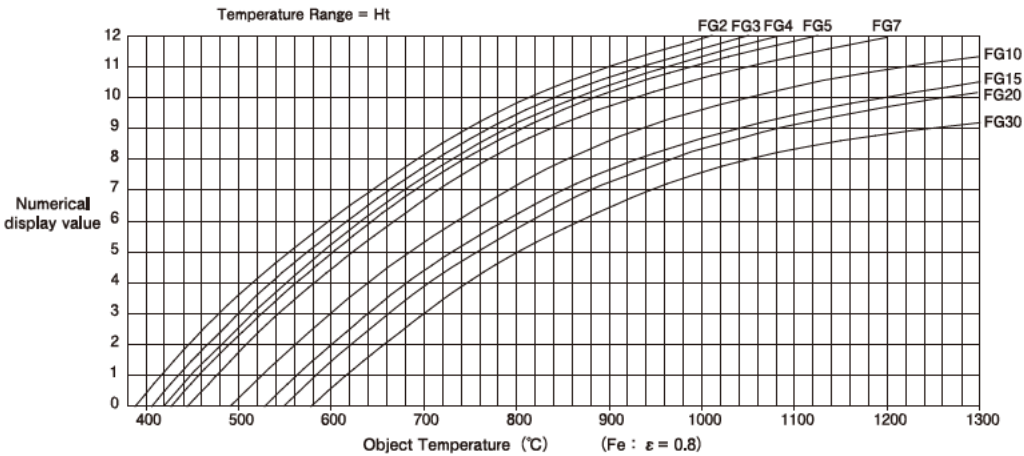
12 — 3 Detection temperature - Output characteristics

The following is data when using OHA for the optical head and the size of the detection object is bigger than the detection field of view.

Data 3	Temperature Range : Lt (Low Temperature Range)	[Example of representative]



Data 4	Temperature Range : Ht (High Temperature Range)	[Example of representative]

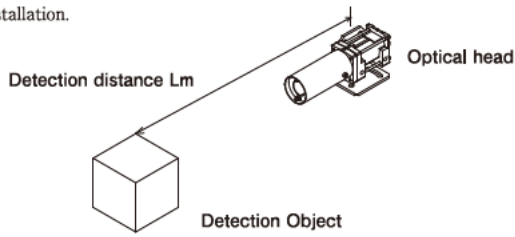


12 — 4 Minimum Detection Object Diameter and Minimum Detection Temperature

The minimum detection object diameter and its temperature can be worked out from the four graphs on the following page.

■ The minimum detection object diameter means the width of the cylinder, square bar, or board, etc. that is longer than the field of view and can be detected in any position within the detection field of view.

■ The detection distance is the distance from the surface of the detection object to the center of the optical head installation.



HOW TO USE THE GRAPHS

The graphs are drawn with a Detection distance = 1m.
In the case that the detection distance is not 1m, work out the coefficient by the following method and multiply the coefficient by the figure on the Y axis (= the figure of the detection object diameter).

When the detection distance is 1m or less, using OHA for Optical Head.

Coefficient $K = L + (0.6 - 0.6 \times L)$ L = Detection Distance m

Example When the detection distance is 50, L = 0.5m.

$K = 0.5 + (0.6 - 0.6 \times 0.5) = 0.8$

Therefore, Coefficient = 0.8

Multiply this figure by the figure on Y axis (= the figure of the detection object diameter).

$50 \times 0.8 = 40$

This means that the position of 50㎜ of the detection object diameter will be displaced with 40㎜ in the graph. In the same way, multiply the above coefficient by the other figures and complete the figures on the Y axis.

When the detection distance is 1m or less, using OHW1/OHW2 for Optical Head.

Take a distance for Coefficient.

Example When using OHW1 and the deteciton distance is 0.7m.
Coefficient is 0.7 Therefore.
Multiply the figure on the Y axis by 0.7 and complete figures on the Y axis.
This means that the deteciton object diameter = 200 will be 140 on the graph.

When the detection distance is 1m or more (for all accessible optical heads)

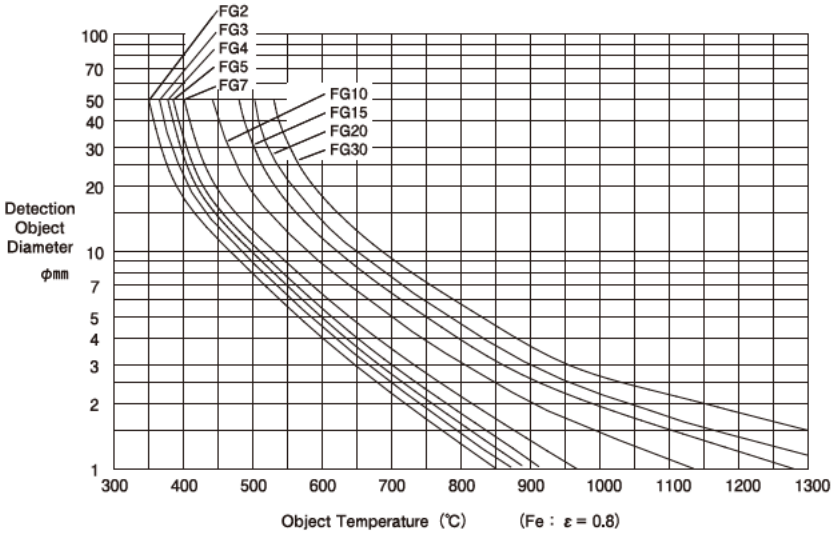
Take a distance for Coefficient.

Example When the detection distance is 2.5m.

The coefficient will be 2.5 Therefore, multiply figures on the Y axis of the graph and complete figures on the Y axis.

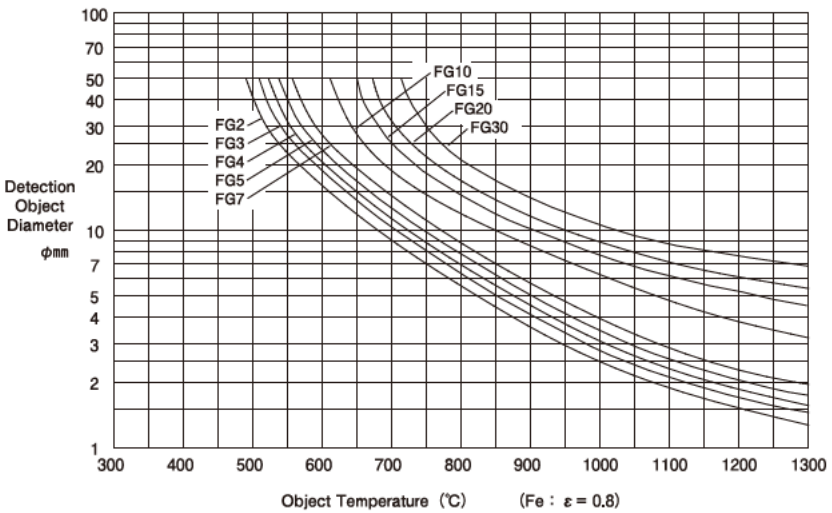
Data 5	Characteristics of Minimum Detection Object Diameter	Optical Head : OHA	Temperature Range : Lt

[Example of representative]



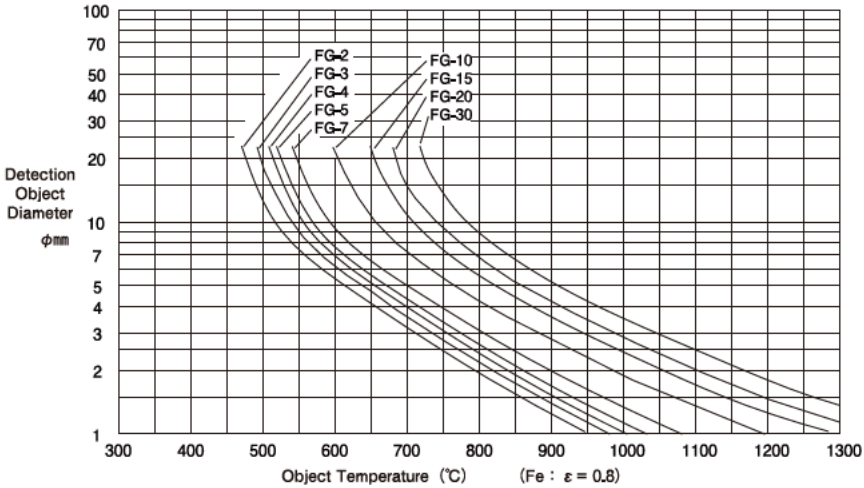
Data 6	Characteristics of Minimum Detection Object Diameter	Optical Head : OHA	Temperature Range : Ht

[Example of representative]



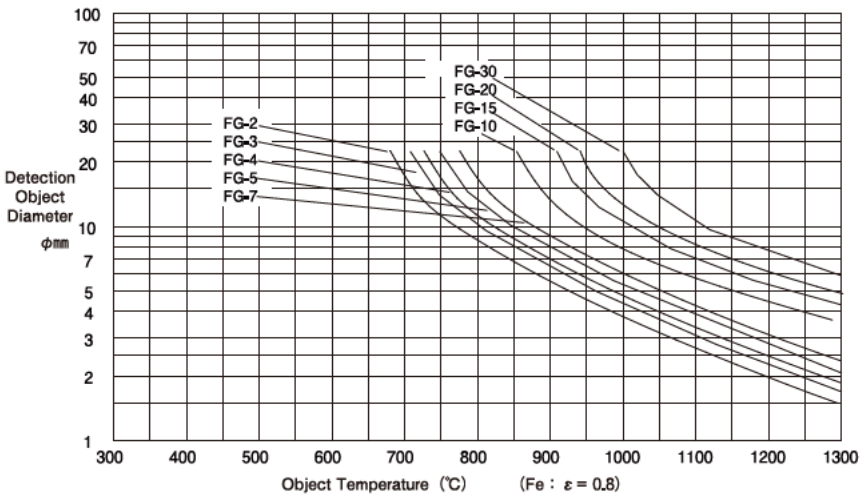
Data 7	Characteristics of Minimum Detection Object Diameter	Optical Head : OHAN Temperature Range : Lt

[Example of representative]



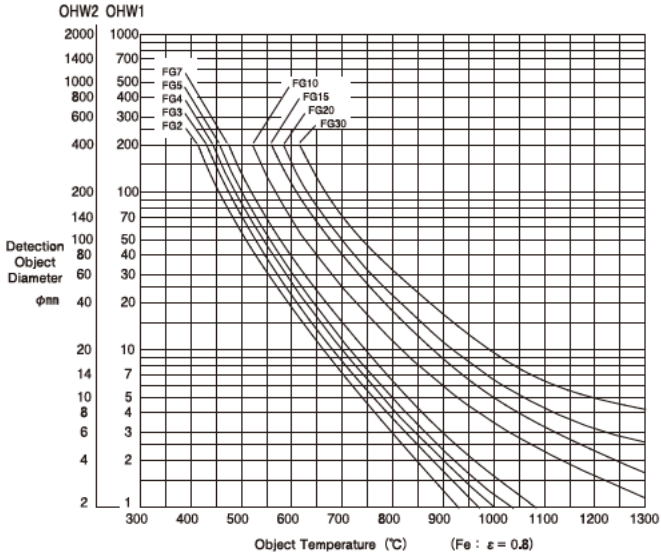
Data 8	Characteristics of Minimum Detection Object Diameter	Optical Head : OHAN Temperature Range : Ht

[Example of representative]



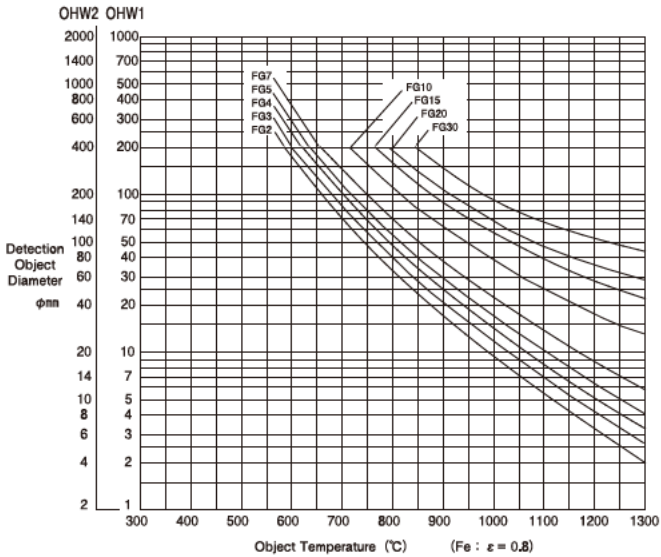
Data 9	Characteristics of Minimum Detection Object Diameter	Optical Head : OHW1/2	Temperature Range : Lt

[Example of representative]



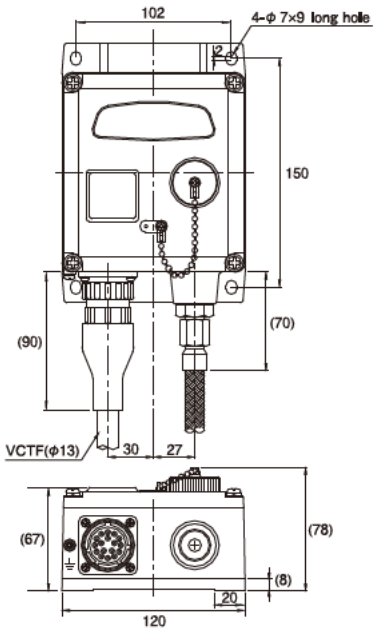
Data 10	Characteristics of Minimum Detection Object Diameter	Optical Head : OHW1/2	Temperature Range : Ht

[Example of representative]

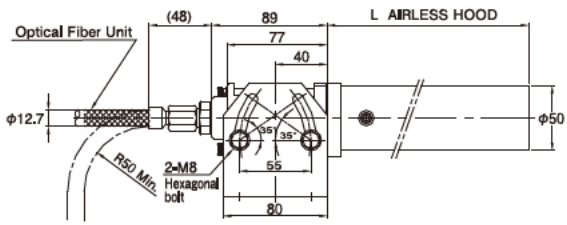


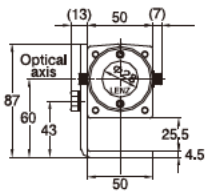
13 DIMENSIONS (in mm)

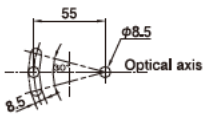
AMPLIFIER UNIT
FD—A320—＊
FD—A320H—＊



OPTICAL HEAD (OHA)
AIRLESS HOOD (F38A)





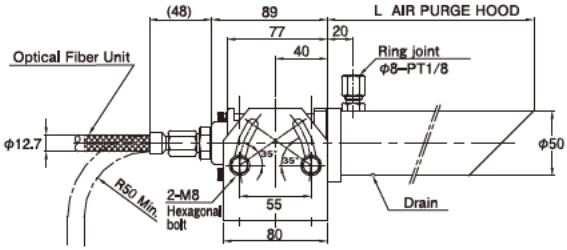


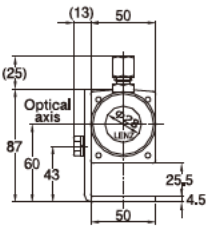
Mounting hole

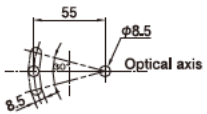
AIRLESS HOOD

Type	L mm
F38A	120
F38A—02	200
F38A—03	300
F38A—04	400
F38A—05	500

OPTICAL HEAD (OHA)
AIR PURGE HOOD (F38PC)







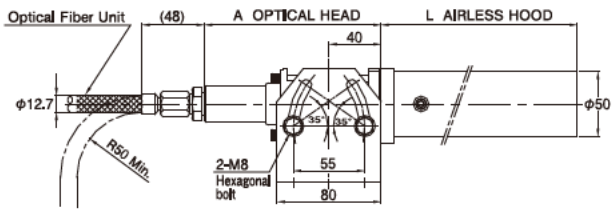
Mounting hole

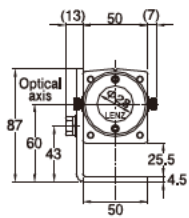
AIR PURGE HOOD

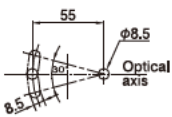
Type	L mm
F38PC–02	200
F38PC–03	300
F38PC–04	400
F38PC–05	500

AIR PURGE
QUANTITY : 200 ℓ /min
PRESSURE : 1MPa

OPTICAL HEAD (OHAN/OHAN10)
AIRLESS HOOD (F38A)







Mounting hole

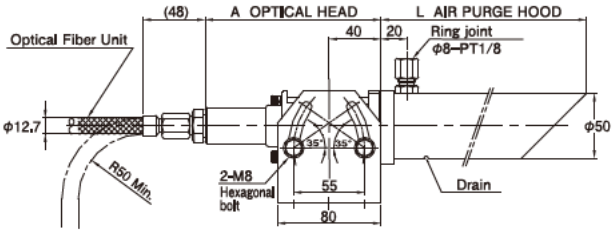
OPTICAL HEAD

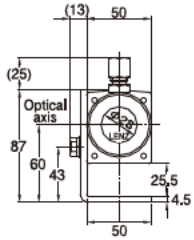
Type	A mm
OHAN	136
OHAN10	142

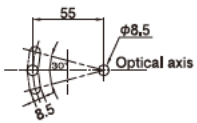
AIRLESS HOOD

Type	L mm
F38A	120
F38A–02	200
F38A–03	300
F38A–04	400
F38A–05	500

OPTICAL HEAD (OHAN/OHAN10)
AIR PURGE HOOD (F38PC)







Mounting hole

OPTICAL HEAD

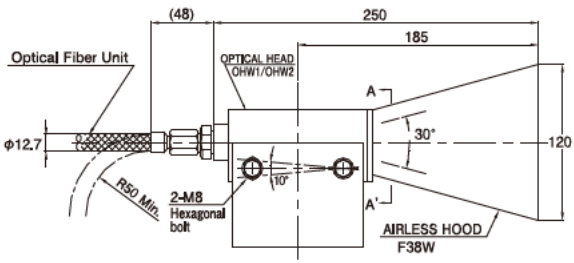
Type	A mm
OHAN	136
OHAN10	142

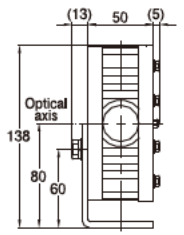
AIR PURGE HOOD

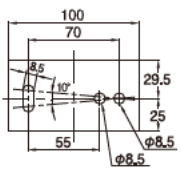
Type	L mm
F38PC–02	200
F38PC–03	300
F38PC–04	400
F38PC–05	500

AIR PURGE
QUANTITY : 200 ℓ /min
PRESSURE : 1MPa

OPTICAL HEAD (OHW1/OHW2)
AIRLESS HOOD (F38W)

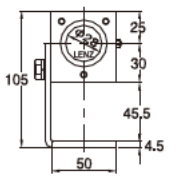






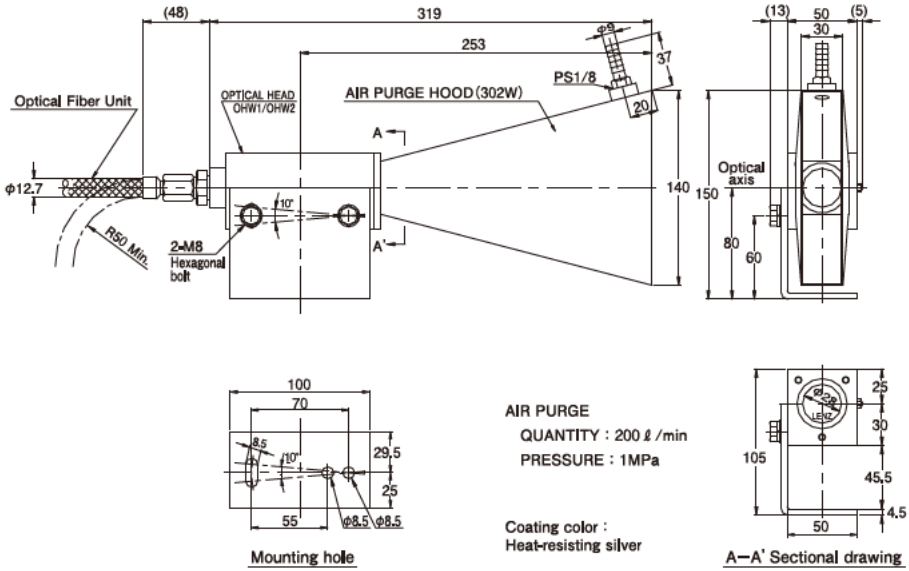
Mounting hole

Coating color :
Heat-resisting silver

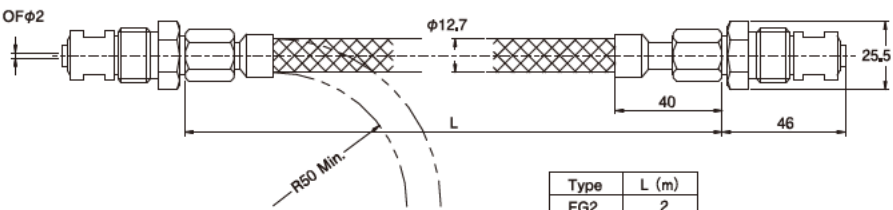


A–A' Sectional drawing

OPTICAL HEAD (OHW1/OHW2)
AIR PURGE HOOD (302W)



OPTICSAL FIBER UNIT



Type	L (m)
FG2	2
FG3	3
FG4	4
FG5	5
FG7	7
FG10	10
FG15	15
FG20	20
FG30	30

TAKENAKA ELECTRONIC INDUSTRIAL CO.,LTD.

Head office : 5-22 Higashino Kitainoue-cho, Yamashina-ku, Kyoto, 607-8141, Japan
Telephone : +81-75-581-7111
Fax : +81-75-581-7118

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