



The 7069A coupled with the appropriate cable forms a fiber optic sensor controller system capable of detecting objects as small as 0.01mm dia. and color marks on backgrounds of different colors. The optimum sensitivity setting and other functions are achieved automatically through push buttons.

**FIBER OPTICS**

- Self Teach Setup
- Detection of objects as small as .01 mm dia.
- Off Delay Timer Function
- 500ms response time
- Operating & stability indicators

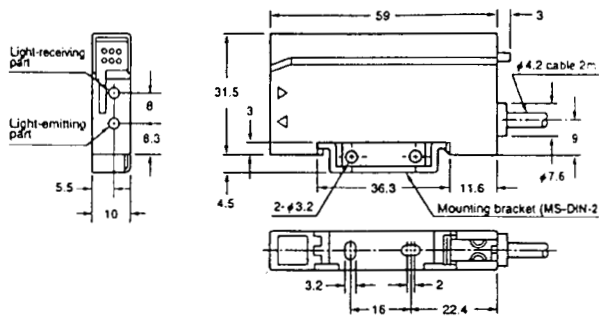


Amplifier Specifications		7069AFR4D4NLX	
Sensing*	Maximum Distance Minimum Target Size	Thru-Beam 80 to 320 mm 0.05 to 0.08 mm	Reflective 30 to 130 mm 0.01 mm
Input	Voltage Current	12 to 24 V DC ± 10%    Ripple P-P Max. 10% Maximum 30 mA	
Sensing Output	Type Capacity Output Operation	NPN open collector Transistor Short circuit protection Maximum 100 mA @ 30V DC Selectable ON Off mode set by the buttons	
Self-diagnostic Output	Type Capacity Output Operation	(Refer to Self-Diagnostic Function) NPN open collector transistor Maximum 50 mA @ 30V DC ON state (pulse) at unstable detection or when output is short-circuited (OFF when short removed)	
Response	Time	Maximum 0.5 ms (Max. 0.7 ms with Crosstalk Prevention)	
Features	Operation Indicator Stable Operation Indicator Sensitivity Shift Function Crosstalk Prevention Function Timer Function	Red LED Green LED Shifts the sensitivity for optimum condition Allows close installation of two fiber optic cables Selectable 40ms fixed off-delay timer	
Environmental	Ambient Temperature Ambient Humidity	-10 to +50 C Degrees (minimal condensation) 35 to 85% RH	
Physical	Housing Light Emitting Element Weight Wiring	Enclosure: Heat-resistant ABC, Cover: Polycarbonate, Lock lever: PPS Red LED (modulated) 65g Prewired four conductor 2M cabtyre cable	

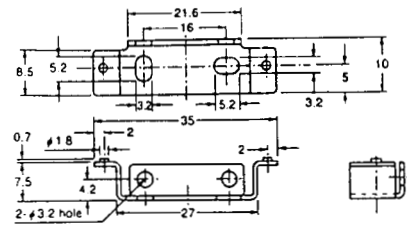
\* See Fiber Optic Specifications

## Dimensions

### Amplifier

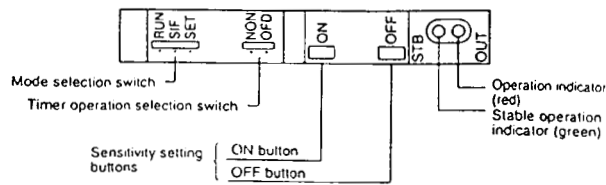


### Mounting Bracket

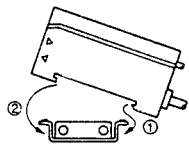
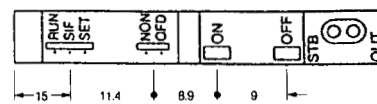


Units mm

## Control Locations



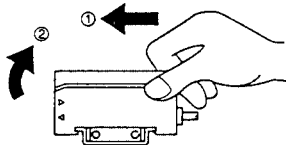
## Dimensions



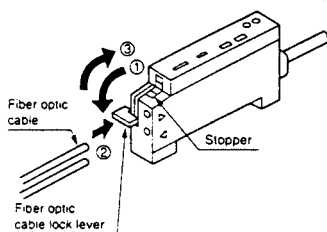
DIN rail or attached mounting bracket.

- Mount the rear part to the attached mounting bracket (7069-320-06-00) or DIN rail.
- Push the amplifier forward and mount the front part to the bracket or DIN rail.

When removing the amplifier, push it forward and lift up the front side and remove the amplifier.



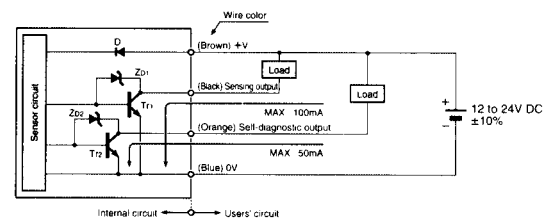
## Connection with fiber optic cable



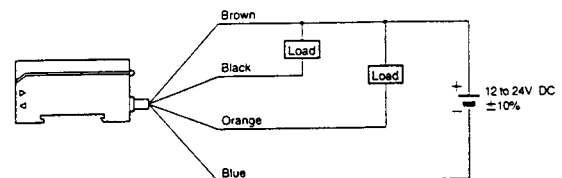
- Pull the fiber optic cable lock lever down.
- Slowly insert the fiber optic cable ends to the holes until they stop.
- Push the fiber optic cable lock lever up until a "click" is heard.

## Typical Wiring Diagrams

### Standard NPN output




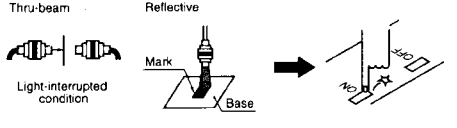

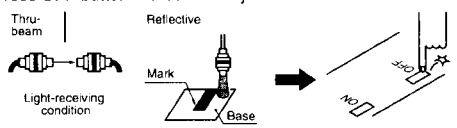

Symbol ... D : Reverse polarity protection diode  
Zd1, Zd2 : Surge absorption zener diode  
Tr1, Tr2 : NPN output transistor



## Sensitivity Setting

### Setting by the sensitivity setting button

In the case that sensing output is in the ON state when detecting an object

Step	Operation
①	Place fiber optic cable within the sensing range.
②	Set the mode selection switch to "SET". 
③	Press ON button with detecting an object. 
④	When the ON state is recognized by the sensor, the stable operation indicator (green) will blink. 
⑤	Press OFF button without the object. 
⑥	<ul style="list-style-type: none"> <li>The stable operation indicator blinks twice when the sensitivity gap between the ON state and OFF state is sufficient, and the stable detection is made.</li> <li>The stable operation indicator will blink continuously if the stable detection is not achieved. (*1)</li> </ul>
⑦	Set the mode selection switch to "RUN". Then, the setting by sensitivity setting buttons is registered. So, even if the buttons are pressed by mistake under the "RUN" condition, the registered sensitivity will remain unchanged. 

(\*1) : The sensitivity can be registered in the sensor even if a sensing condition is not stable.

In the case that sensing output is in the ON state when an object is not detected

In the operation procedures above mentioned.  
 Press ON button without detecting an object.  
 Press OFF button with detecting an object.

### How to get the maximum sensitivity

- Set the mode selection switch to "SET".
- For the Light-ON operation mode**  
Press ON and OFF buttons successively under the condition that light is not received.
  - For the Dark-ON operation mode**  
Press OFF and ON buttons successively under the condition that light is not received.
- Set the mode selection switch to "RUN".  
 <Applications>  
  - For getting a long sensing range with a reflective sensor.
  - For using thru-beam sensor in an unfavorable sensing environment.

### Stability margin indicating function

After setting the sensitivity, the margin of the set value can be visually confirmed. The stability margin can be confirmed by the number of times which the stable operation indicator (green) blinks when the mode selection switch is moved to "SIF" or "RUN" from "SET".

Number of blinks	0	1	2	3	4	5
Margin (%)		15	30	45	60	Over 75
Margin against the operation level	Under 15	to 30	to 45	to 60	to 75	



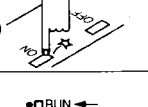

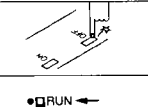

Normally, the margin should be set as large as possible.

## Setting Functions

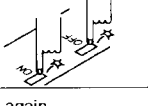
### Crosstalk prevention function

7069A series amplifiers have the crosstalk prevention function. Two fiber optic cables can be mounted closely by setting the different emitting frequencies with each other.

### Setting method

Step	Operation
①	Set the mode selection switch to "SET". 
②	Press "ON" and "OFF" buttons simultaneously for the min. 2 sec.. (The stable operation indicator (green) will blink.) 
③	Press "ON" button (The stable operation indicator will blink twice.) [Response time : Max. 0.5ms (*1)] 
④	Set the mode selection switch to "RUN" (Completes the setting for the first sensor.) 
⑤	Apply step ① and ② for another sensor.
⑥	Press "OFF" button (The stable operation indicator will blink twice.) [Response time : Max. 0.7ms (*1)] 
⑦	Set the mode selection switch to "RUN" (Completes the setting) 

### Cancel methods

Step	Operation
①	Press "ON" and "OFF" buttons simultaneously for the min. 2 sec.. The stable operation indicator (green) will blink. 
②	Press "ON" and "OFF" buttons simultaneously again. (The stable operation indicator will blink twice.)

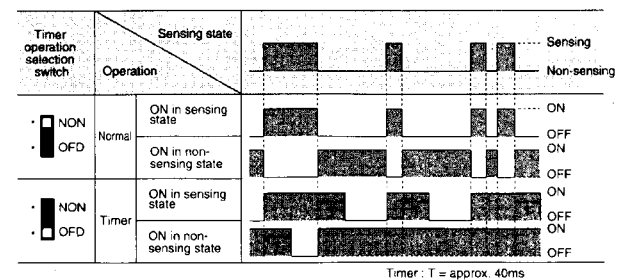
(\*1) : When using the crosstalk prevention function, the hysteresis will be greater, and the response time will be longer. Always check the operation after setting the crosstalk prevention function.

### Off-Delay Timer Function

Series 7069A includes a fixed off-delay timer of approximately 40ms.

The timer works when the timer operation selection switch is set to "OFD". The output is extended at the certain period of time, and is useful when the response time of a connecting device is slow, or when the sensing signal of a tiny object sensing is too short.

### Time chart



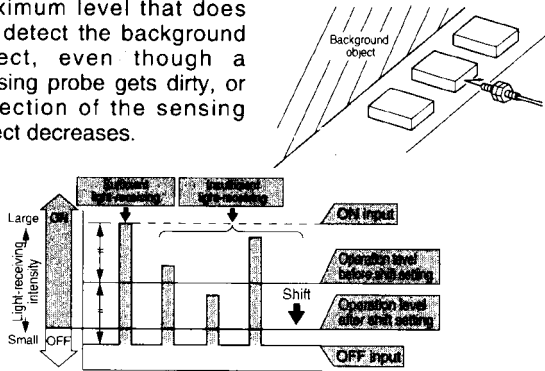
## Setting Functions

### Sensitivity setting shift function

This is used for setting of the maximum sensitivity that does not detect the background object with reflective sensing mode, or when sensing tiny objects with thru-beam sensing mode.

#### For reflective sensing mode when there is a background object

Sensing will be more reliable if the sensitivity is set at the maximum level that does not detect the background object, even though a sensing probe gets dirty, or reflection of the sensing object decreases.

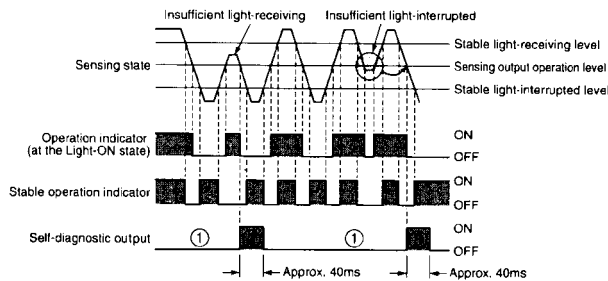


#### Setting method

Step	Operation
①	Set the sensitivity by the standard setting.
②	Set the mode selection switch to "SIF".
③	Press the sensitivity setting button again which was pressed with background object. (In case of above mentioned, press "OFF" button.)
④	Set the mode selection switch to "RUN". (Completes the setting.)

### Self-diagnostic function

The self-diagnostic output is in the ON state when the light-receiving intensity is reduced due to dirty lens and/or alignment deviation.

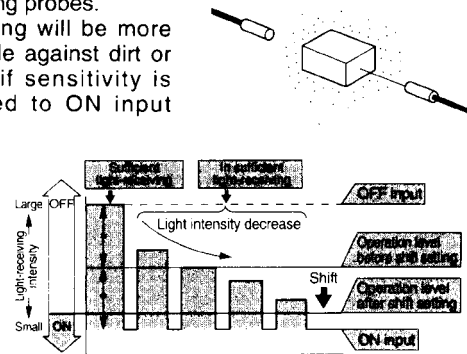


- The self-diagnostic output transistor is in the "OFF" state during the stable sensing.
- If the sensor does not arrive at either stable light-receiving level or stable light-interrupted level when the sensing output turns on or off, the self-diagnostic output turns on once and turns off in approx. 40ms.  
(The sensing output has no influence on the self-diagnostic output.)
- If the light is insufficiently interrupted, there will be a time lag before the self-diagnostic output turns on.

#### For thru-beam sensing mode when there are dirt and dust

Light beam will be interrupted without sensing an object if there is dirt or dust on sensing probes.

Sensing will be more reliable against dirt or dust if sensitivity is shifted to ON input side.

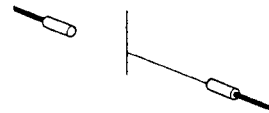


#### Setting method

Step	Operation
①	Set the sensitivity by the standard setting.
②	Set the mode selection switch to "SIF".
③	Press the sensitivity setting button again which was pressed with a sensing object. (In case of above mentioned, press "ON" button.)
④	Set the mode selection switch to "RUN". (Completes the setting.)

#### For thru-beam sensing mode when sensing of a tiny object

It is useful when detecting a tiny object like a fine thread with thru-beam fiber optic cable.



#### Setting method

Step	Operation
①	Set the mode selection switch to "SET".
②	Press "OFF" button (or ON button) without a sensing object.
③	Press "ON" button (or OFF button) when light is completely interrupted.
④	Set the mode selection switch to "SIF".
⑤	Press the button again which was pressed without a sensing object.
⑥	Set the mode selection switch to "RUN".

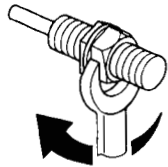
If the sensing is not possible, apply normal sensitivity setting method, or use one of small diameter fiber optic cables.

## Precautions For Proper Use

### • Tightening torque

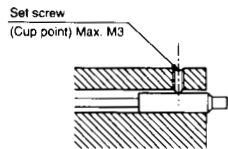
Tightening torque must not exceed the following:

Mounting with a nut (threaded type)



	Tightening torque
M3	Max. 0.39N·m
M4	Max. 0.39N·m
M6	Max. 0.98N·m

Mounting with a set screw



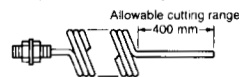
Tightening torque :  
Max. 0.29N·m {3kgf·cm}

### • How to cut fiber optic cable

Freely cuttable fiber optic cable and the straight part of inflection-resistant of coiled fiber optic cable can be cut easily.



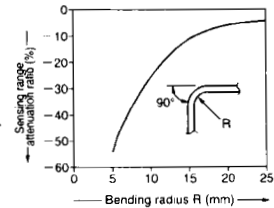
But inflection-resistant of coiled fiber optic cable may be cut max. 400mm at the end of straight part only as specified in the figure right. Do not cut the coiled part.



Note: sensing range may be reduced up to 20% depending on the condition of the cut.

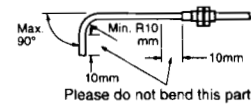
### • Fiber optic cable bending radius

Bending radius of fiber optic cable must be a minimum of R25mm. Inflection-resistant type minimum R4mm. Thru-beam of small diameter type minimum R5mm. If bending radius is smaller than specified, the sensing performance is decreased according to the graph.



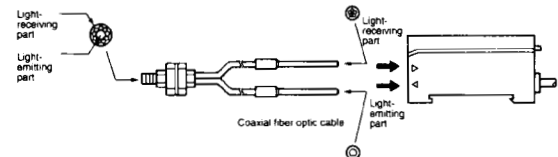
### • How to bend the sleeve

The bending radius must be a minimum of R10mm. The bend can be formed by gradually bending the sleeve on a round bar of Ø20mm minimum.



### Connection with reflective coaxial fiber optic cable

When mounting the 70622711100 or the 70622740100, the single-core fiber optic cable should be inserted into the light-emitting (lower) socket and the multiple-core fiber optic cable into the light-receiving socket of the amplifier.



## Fiber Optic Specifications

	General Detection 7069A								High Precision
	Standard Cable		Inflection-Resistant Cable		Small Diameter Cable		Curled Cable Small Diameter	Coaxial	
	Thru-Beam	Reflective	Thru-Beam	Reflective	Thru-Beam	Reflective	Thru-Beam	Reflective	
Optical fiber w/o sleeve	70622710100	70622711100	70692720100	70692721100	70692730100	70692731100	70692722100	70622740100	
Optical fiber w/90mm sleeve	70622710200	70622711200	-	-	70692730200	70692731200	-	-	
Optical fiber w/40mm sleeve	70622710300	70622711300	-	-	70692730300	70692731300	-	-	
Max. Sensing Distance (3)	320mm	130mm (1)	320mm	80mm (1)	80mm	30mm (1)	90mm	40mm (1)	
Min. Detectable Object	0.08mm dia. opaque object (2)	0.01mm dia. gold wire	0.08mm dia. opaque object (2)	0.01mm dia. gold wire	0.05mm dia. opaque object (2)	0.01mm dia. gold wire	0.05mm dia. opaque object (2)	0.01mm dia. gold wire	
Hysteresis	-	less than 15%	-	less than 15%	-	less than 15%	-	less than 15%	
Cable Length	Freely cuttable 2M						2M	500mm	
Allowable Bend Radius	Minimum Radius 25mm		Minimum Radius 4mm		Minimum Radius 5mm	Minimum Radius 25mm	-	Minimum Radius 25mm	
Operation Temp/Humidity	-40 to + 70 Degree C / 35 to 85% RH (condition must be avoided)								
Fiber Core	Acrylic								
Sheath	Polyethylene								
Accessories	4-M4 Nuts 2-Lock Washers	2-M6 Nuts 1-Lock Washer	4-M4 Nuts 2-Lock Washers	2-M6 Nuts 1-Lock Washer	4-M3 Nuts 2-Lock Washers	4-M4 Nuts 2-Lock Washers	4-M4 Nuts 2-Lock Washers	2-M4 Nuts 1-Lock Washer	

<sup>1</sup> The sensing range (reflective) is determined by using an object of non-glossy white paper (50 x 50mm for standard range, 30 x 30mm for small diameter).

<sup>2</sup> Minimum Sensing object (opaque object) is the value under the best conditions.

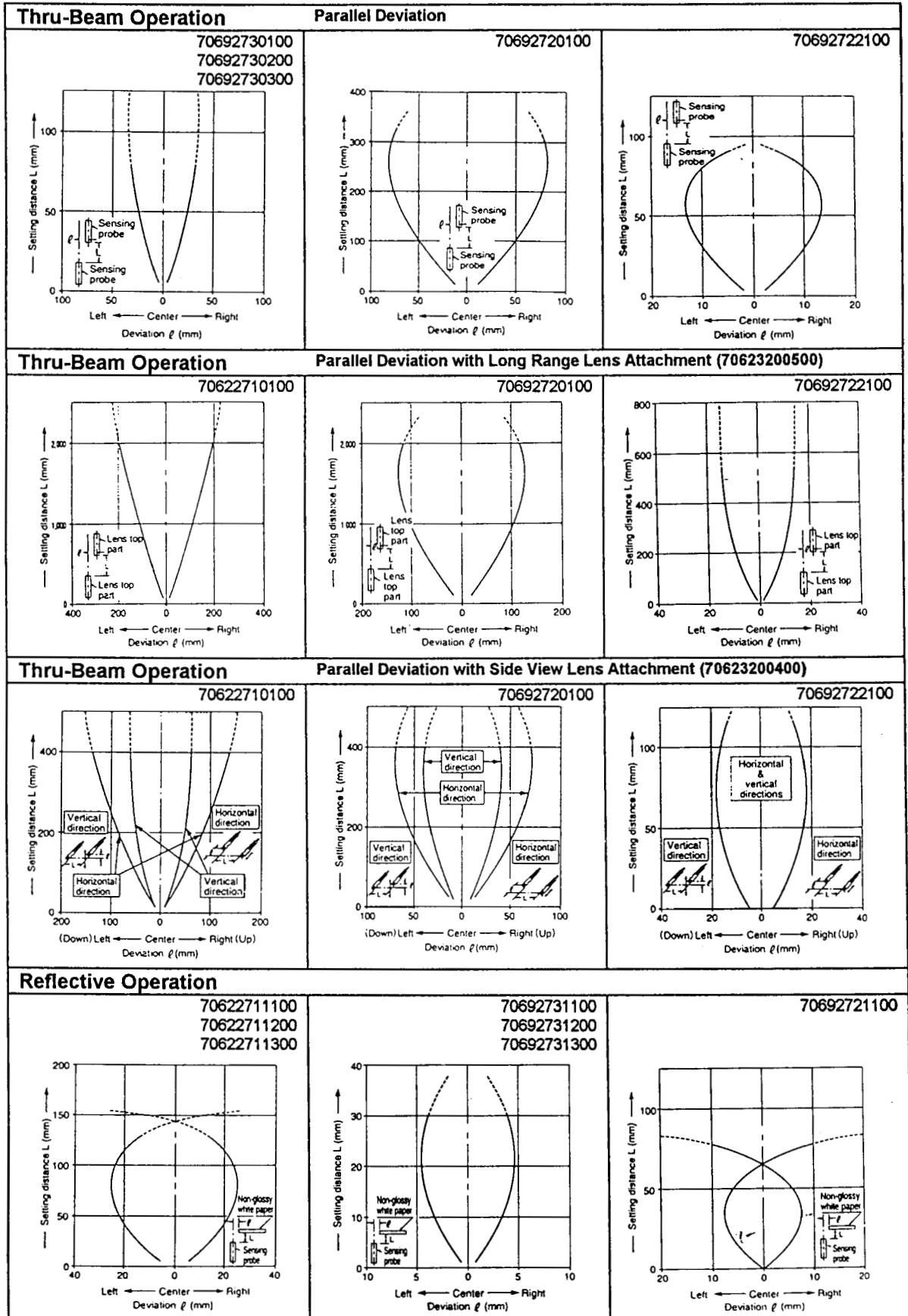
<sup>3</sup> Note that the sensing range may be reduced up to 20% depending on the condition of the cut.

# Cables and Accessories

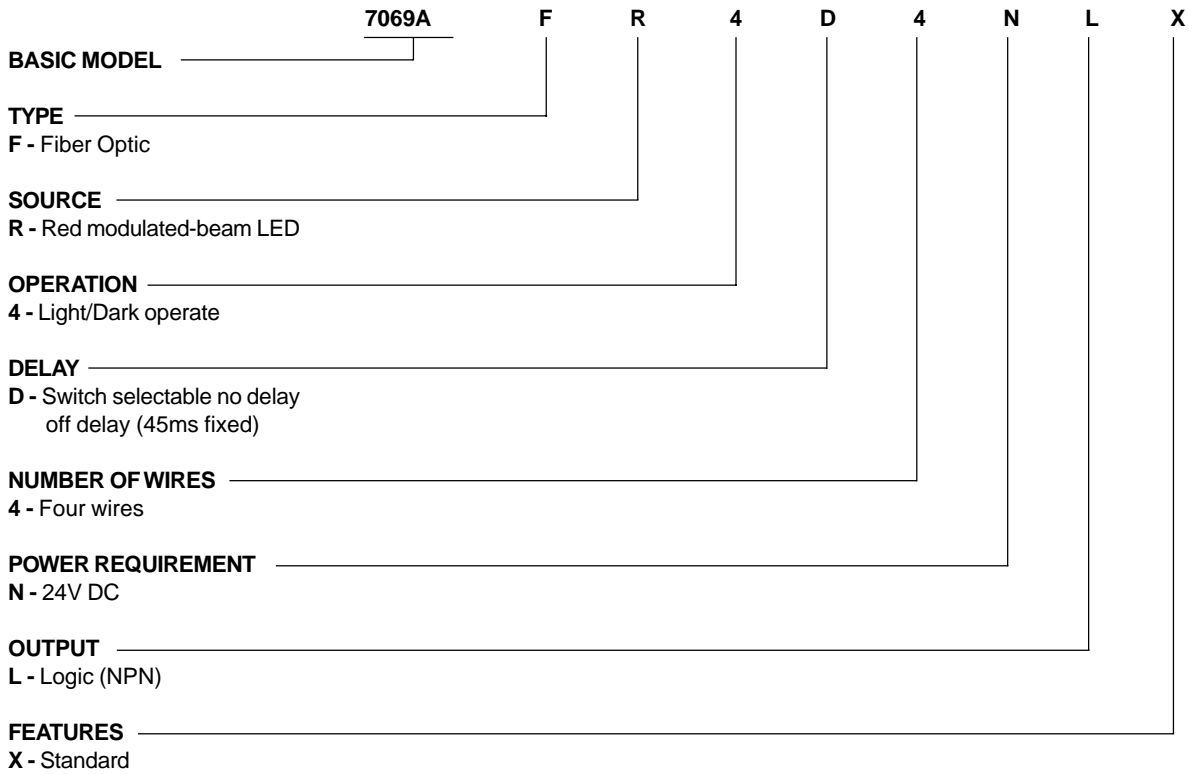
<p><b>70622710100</b></p> <p>Freely cuttable</p>	<p><b>70622711100</b></p> <p>Freely cuttable</p>								
<p><b>70622710200</b> <b>70622710300</b></p> <p>Freely cuttable</p>	<p><b>70622711200</b> <b>70622711300</b></p> <p>Freely cuttable</p>								
<p><b>70692720100</b></p> <p>Freely cuttable</p>	<p><b>70692721100</b></p> <p>Freely cuttable</p>								
<p><b>70692730100</b></p> <p>Freely cuttable With attachment</p>	<p><b>70692731100</b></p> <p>Freely cuttable With attachment</p>								
<p><b>70692730200</b> <b>70692730300</b></p> <p>Freely cuttable With attachment</p>	<p><b>70692731200</b> <b>70692731300</b></p> <p>Freely cuttable With attachment</p>								
<p><b>70692722100</b></p> <p>With attachment</p>	<p><b>70622740100</b></p> <p>With attachment</p>								
<p><b>70623200500</b></p> <p>Long Sensing Lens Attachment</p> <p>Material: Brass (nickel plating)</p>	<table border="1"> <thead> <tr> <th>Fiber Optic Cable</th> <th>Extended Sensing Range</th> </tr> </thead> <tbody> <tr> <td>70622710100</td> <td>2,000mm</td> </tr> <tr> <td>70692722100</td> <td>540mm</td> </tr> <tr> <td>70692720100</td> <td>2,000mm</td> </tr> </tbody> </table>	Fiber Optic Cable	Extended Sensing Range	70622710100	2,000mm	70692722100	540mm	70692720100	2,000mm
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70622710100	2,000mm								
70692722100	540mm								
70692720100	2,000mm								
<p><b>70623200400</b></p> <p>Side-View Lens Attachment</p> <p>Material: Brass (nickel plating)</p>	<table border="1"> <thead> <tr> <th>Fiber Optic Cable</th> <th>Extended Sensing Range</th> </tr> </thead> <tbody> <tr> <td>70622710100</td> <td>400mm</td> </tr> <tr> <td>70692722100</td> <td>120mm</td> </tr> <tr> <td>70692720100</td> <td>400mm</td> </tr> </tbody> </table>	Fiber Optic Cable	Extended Sensing Range	70622710100	400mm	70692722100	120mm	70692720100	400mm
Fiber Optic Cable	Extended Sensing Range								
70622710100	400mm								
70692722100	120mm								
70692720100	400mm								

FIBEROPTIC SENSORS

# Typical Sensing Curves



## Ordering Code



Note: Fiber optic cables must be chosen when buying 7069.

### ACCESSORIES

7062-320-05-00 Long Range Lens Attachment  
 7062-320-04-00 Side-View Lens Attachment  
 7069-320-06-00 Bracket

### FIBER OPTIC CABLES (Required for operation)

7062-271-01-00 7062-271-11-00  
 7062-271-02-00 7062-271-12-00  
 7062-271-03-00 7062-271-13-00  
 7069-272-01-00 7069-272-11-00  
 7069-273-01-00 7069-273-11-00  
 7069-273-02-00 7069-273-12-00  
 7069-273-03-00 7069-273-13-00  
 7069-272-21-00 7062-274-01-00

Before starting your design, read the safety statement on the inside back cover of the ATC catalog.