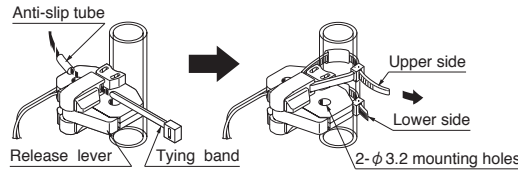


Pipe-mountable Liquid Level Detection  
**FD-F4**

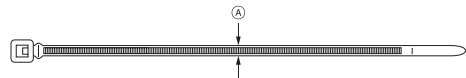
MJE-FDF4 No.0088-69V

**1 MOUNTING**

- Mount the fiber on a pipe with the attached tying bands and anti-slip tubes as shown in the figure below. Make sure that the release lever is retracted (position as shown in the figure) before mounting. Fasten two tying bands, as shown, and cut off the excess portions.



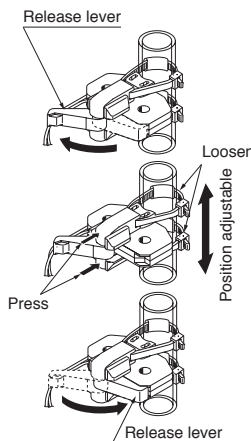
- If other tying bands are to be used, the dimension (A) shown in the figure below should be 2.5mm or less.



- In case of mounting using the two mounting holes, use M3 screws, plain washers, and spring washers. The tightening torque should be 0.3N·m or less. (Please arrange the M3 screws, plain washers, and spring washers separately.)
- In case of mounting on the pipe with tying bands, the fiber position can be easily adjusted with the release lever.

**Adjustment**

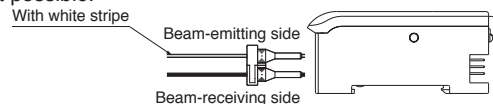
- Unlock the release lever (in the direction of the arrow).
- Press the movable center holders forward to loosen the tying bands and adjust the position.
- Lock the release lever to its original place.



Notes: 1) Whenever the mounting position is changed, adjust the sensitivity again.  
2) The lever mechanism must be used only to adjust the position, and not for tightening the tying bands. If tying bands are tightened while the lever is open, and then the lever is locked, the fiber may be damaged.

**2 CONNECTION TO AMPLIFIER**

- Put the fiber cable with white stripe into the beam-emitting side, and the fiber cable without white stripe into the beam-receiving side. If the connection is wrong, correct detection is not possible.



Thank you very much for purchasing Panasonic products. Read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

**WARNING**

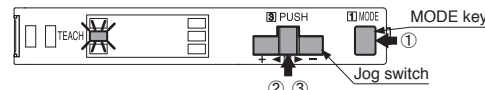
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

**3 SENSITIVITY ADJUSTMENT**

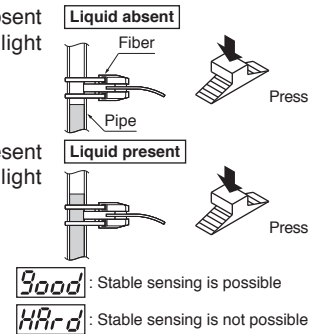
- For the amplifiers, refer to the respective amplifier's Instruction Manual.
- Do not move or bend the fiber cable after the sensitivity setting. Detection may become unstable.

**When using in combination with the FX-301(P), the FX-301(P)-HS or the FX-305(P)**

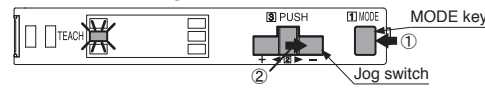
**<In case of 2-level teaching>**



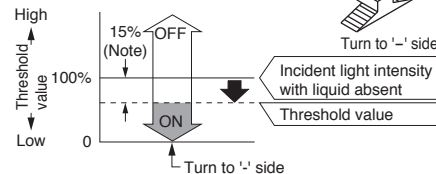
- Press MODE key to change to the teaching mode [MODE indicator/TEACH (yellow)].
- Press jog switch in the liquid absent condition to read incident light intensity.
- Press jog switch in the liquid present condition to read incident light intensity.
- The threshold value is set at the mid-value between the values of step ② and ③ and the judgment result in stability is indicated.
- The setting is complete.



**<In case of limit teaching>**



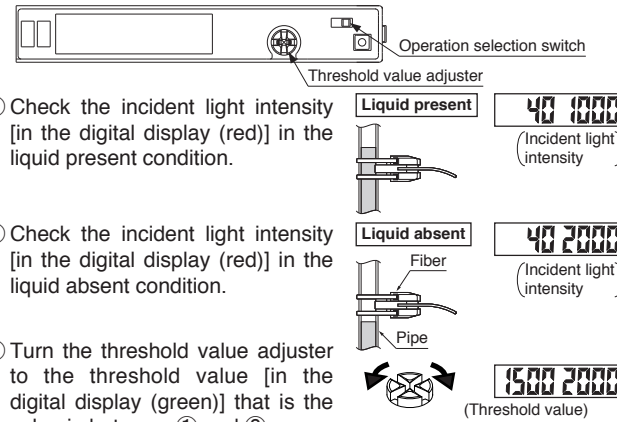
- Press MODE key to change to the teaching mode [MODE indicator/TEACH (yellow)].
- Press jog switch in the liquid absent condition to read incident light intensity.
- Turn jog switch to 'L' side to lower the threshold value (High sensitivity).
- The judgment result in stability is indicated.
- The setting is complete.



Note: The approx. 15% amount of shift is the initial value. Refer to the respective amplifier's Instruction Manual for details of the setting method.

- The judgment result in stability is indicated.
- The setting is complete.

**Combination with FX-411(P)**



- Check the incident light intensity [in the digital display (red)] in the liquid present condition.
- Check the incident light intensity [in the digital display (red)] in the liquid absent condition.
- Turn the threshold value adjuster to the threshold value [in the digital display (green)] that is the value in between ① and ②.

**<Threshold value setting method>**

- When the threshold value adjuster is turned clockwise, the threshold value increases. When the threshold value adjuster is turned counterclockwise, the threshold value decreases.



If there is a sufficient level of margin in the incident light intensity, the stability indicator (green) will light up.

**Combination with FX-311(P)**



- The operation indicator (orange) lights up depending on the combination of the sensing condition and the selected operation, as follows.

Sensing condition	Operation	Operation indicator
Light (liquid absent)	L-ON (ON when liquid absent)	☀
	D-ON (ON when liquid present)	●
Dark (liquid present)	L-ON (ON when liquid absent)	●
	D-ON (ON when liquid present)	☀

- The operation selection switch is set to L-ON (ON when liquid absent).
- Turn the sensitivity adjuster fully counterclockwise. (Minimum sensitivity)
- In the liquid absent condition, slowly turn the adjuster clockwise and find the point (A) where the sensor is switched ON.
- In the liquid present condition, slowly turn the adjuster further clockwise until the sensor goes into the ON state again. Once it is switched on, turn the adjuster counterclockwise a little and find the point (B) where it is switched OFF. (If the sensor does not go into the ON state, MAX is the point (B).)
- The position at the middle of points (A) and (B) is the optimum sensing position.
- Select either L-ON (ON when liquid absent) or D-ON (ON when liquid present) according to your application.

Notes: 1) In order to protect the mechanism, the sensitivity adjuster idles when over turned, which may result in a backlash of 1 to 2 divisions.  
2) Depending upon the sensing conditions, stable sensing may be possible at a position which is slightly shifted from the optimum sensitivity point.  
3) FX-311(P) incorporates the assist function which is useful for sensitivity adjustment. For details, refer to the instruction manual enclosed with FX-311(P).

**4 SPECIFICATIONS**

Item	Type	Standard	For PFA pipe, wall thickness 1mm
	Model No.	FD-F41	FD-F4
Applicable amplifiers	Fiber amplifiers using red light		
Sensing object	Liquid (Note 1)		
Applicable pipe diameter (Note 2)	Outer dia φ6 to φ26mm transparent pipe (PVC, fluorine resin, polycarbonate, acrylic, glass, wall thickness 1 to 3mm)	Outer dia φ6 to φ26mm transparent pipe (PFA (fluorine resin) or equivalently transparent pipe, wall thickness 1mm)	
Repeatability	1mm or less (for water)		
Fiber cable length	2m free-cut		
Ambient temperature (Note 3)	-40 to +100°C (No dew condensation or icing allowed) Storage: -40 to +100°C		
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH		
Material	Fiber head: Polyetherimide, Fiber core: Acrylic Fiber sheath: polyethylene, Tying band: Nylon Anti-slip tube: Silicone		
Accessories	Tying band: 4 pcs., Anti-slip tube: 2 pcs. FX-CT2 (Fiber cutter): 1 pc., Fiber attachment: 1 set		

Notes: 1) Unclear or highly viscous liquid may not be detected stably.  
2) Liquid in an opaque pipe cannot be detected correctly.  
3) Liquid being detected should also be kept within the rated ambient temperature range.

**5 CAUTIONS**

- Fit the fiber head to the pipe securely, otherwise the operation may be erroneous.
- Take care that no dew condenses on the pipe's sensing surface or the pipe's inside wall and that no bubble attaches on the pipe's inside wall, since it can affect the operation. If a liquid drop flows down across the sensing point or an air bubble sticks on the wall at the sensing point, the operation may be erroneous. Make sure that no bubble arises in the liquid, and that no dew or liquid drop is present on either surface of the pipe wall.
- Neither FD-F4 is waterproof or chemical-resistant. Installation should be avoided at any place where it could come in direct contact with water or chemicals.
- Do not apply excessive tensile force to the fiber cable.
- Bending radius of the fiber cable must be R10mm or more. If the bending radius is smaller than the specified value, the sensing performance may deteriorate.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance.

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December, 2022

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