

**Flange System for Vacuum-Resistant Fiber
FV-FR1 · FV-FR4**

MJE-FVFR No.0066-83V

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

- The flange is heavy. Be careful when handling as it may cause bodily injury or damage to surrounding equipment due to falling, etc.

1 General Precautions

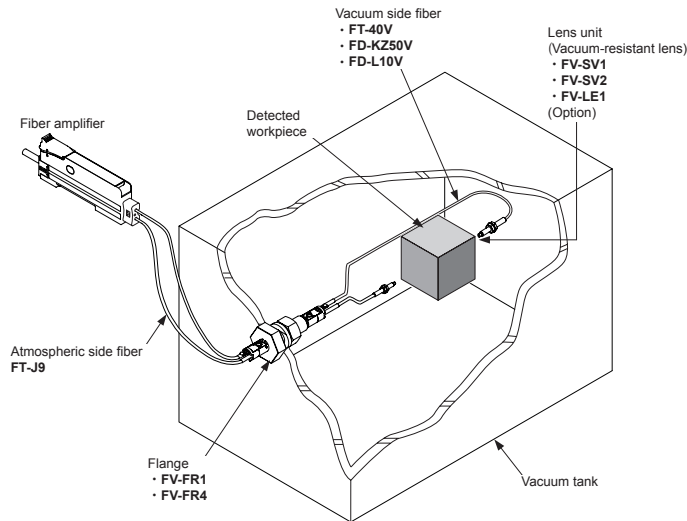
- The flange, vacuum side fiber and lens unit have been cleaned and vacuum baked. Make sure to avoid physical contact when installing this product.
- Be careful not to apply excessive tensile force to the fiber or the fiber joint of the flange.
Fiber joint section of the flange: 20.0N or less
Vacuum side fiber section: 29.4N or less
Atmospheric side fiber section: 20.0N or less
- The bent radius of the vacuum side fiber must be R25mm or more. The allowable bent radius of the atmospheric side fiber must be R4mm or more. However, when using it close to the maximum detection, set the bent radius to R10mm or more.
Bending the fiber section may cause the display value of the fiber amplifier to fluctuate. To minimize the fluctuation of the display value, we recommend that you use it at the bent radius of R25mm or more.
- Be careful when handling, as the detection performance will decrease if the detection surface and connection surface of the fiber are scratched.
- If you detach the fiber from the flange or rewire the cable after setting the sensitivity, be sure to reset the sensitivity. Detection may become unstable if the sensitivity is not reset.

2 Overview

- This is a fiber sensor that can directly detect the workpiece inside the vacuum chamber.
- The flange system has a simple structure and easy operability. It can be used in the same manner as a fiber sensor system.
- It has been vacuum baked to minimize outgassing.

3 System Configuration

- This is a fiber sensor system that can directly detect objects (such as a panel) inside a vacuum device by isolating the atmospheric and vacuum sides with a flange.

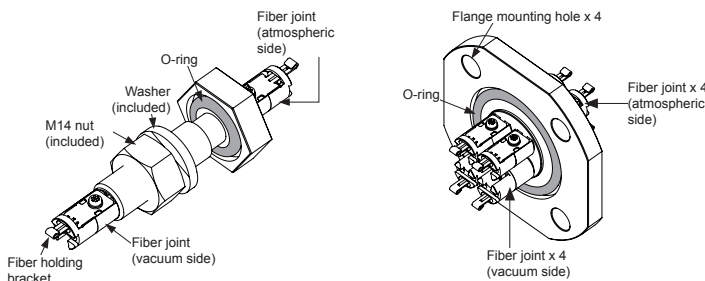


4 Name of Each Component

Flange

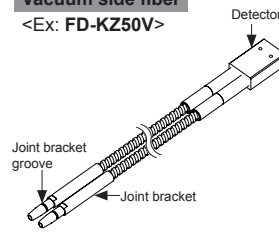
- FV-FR1 (1ch type)

- FV-FR4 (4ch type)



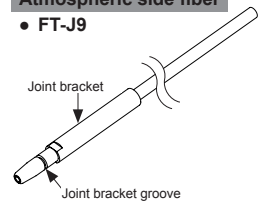
Vacuum side fiber

<Ex: FD-KZ50V>



Atmospheric side fiber

• FT-J9

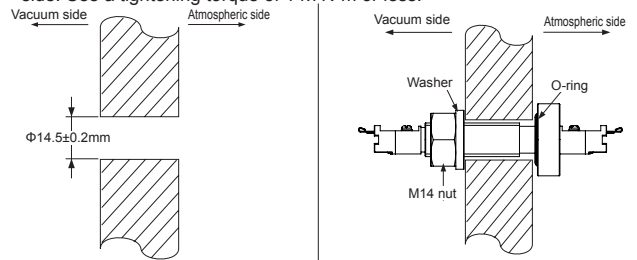


5 Flange Installation

- When installing FV-FR1, the recommended thickness of the vacuum chamber wall (chamber) is 3.0-40.0 mm. Please note that you can not install FV-FR1 if using a vacuum tank not having the recommended plate thickness. (FV-FR4 is 3.0 mm or more)
- When installing FV-FR4, if the vacuum tank wall is too thick it may not be possible to mount FV-FR4 to the vacuum side fiber. In such a case, install with the vacuum side fiber and FV-FR4 connected.

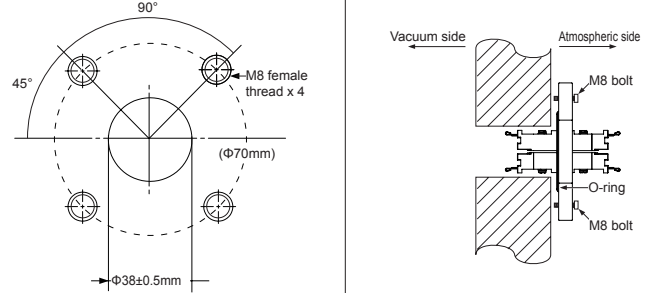
For FV-FR1

1. Drill one hole in the vacuum tank wall. Hole diameter: $\Phi 14.5 \pm 0.2$ mm.
2. Install the flange to the vacuum chamber wall.
 - (1) Make sure that the included O-ring is attached to the flange.
 - (2) Insert it from the atmospheric side such that the side on which the O-ring is attached comes into close contact with the vacuum chamber wall.
 - (3) Insert and tighten the included nut (M14 nut) and washer from the vacuum side. Use a tightening torque of 14.7N·m or less.



For FV-FR4

1. Drill one hole in the vacuum tank wall (chamber) for passing the flange. Hole diameter: $\Phi 38 \pm 0.5$ mm. Also, process the M8 female screws for attaching the flange fixing bolts in the following arrangement.
2. Install the flange to the vacuum chamber wall.
 - (1) Make sure that the included O-ring is attached to the flange.
 - (2) Insert it from the atmospheric side such that the side on which the O-ring is attached comes into close contact with the vacuum chamber wall.
 - (3) Insert and tighten M8 bolts (prepared separately) from the atmospheric side. Use a tightening torque of 9.8N·m or less.

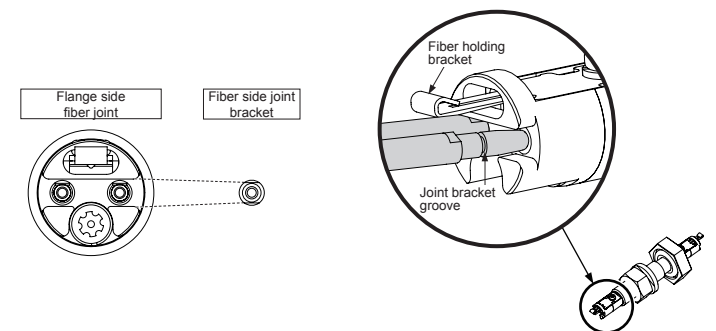


6 Fiber Head Connection

Installation/removal of the vacuum side fiber to/from the flange

<Installation Method>

Align the joint bracket of the vacuum side fiber with the joint section of the flange side (see the figure below), and insert until the fiber holding bracket fits into the joint bracket groove. After insertion, lightly pull on the joint bracket of the vacuum side fiber to make sure that it does not come off.



<Removal Method>

Remove the vacuum side fiber from the flange while the fiber holding bracket of the flange side is pulled up.

How to mount/remove the atmospheric side fiber to/from the flange

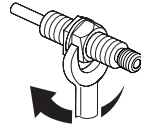
Connect the atmospheric side fiber from the atmospheric side to the flange. The installation/removal method is the same as the "vacuum side fiber".

7 Head Fixing Method

Fix each detection part of the vacuum side fiber as follows.

For FT-40V

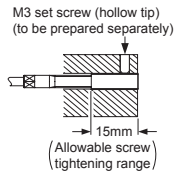
- Attach it using the included M4 nut and washer. Use a tightening torque of 0.98N·m or less.



For FD-KZ50V

<When fixing directly>

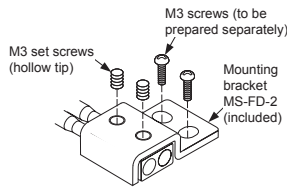
- Using a M3 set screw (hollow tip), fix it within 15mm from the tip of the fiber head as shown on the right. Use a tightening torque of 0.3N·m or less.



<When using the included mounting bracket (MS-FD-2)>

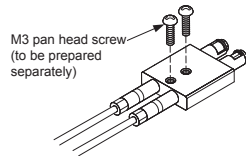
- Use M3 screws to fix the mounting bracket. Use a tightening torque of 0.3N·m or less.
- Slightly loosen the M3 screws, insert the detection part, then tighten the screws. Pull on it lightly to confirm that it is fixed.

Note: 1) When using it in an environment where vibration or the like is present, use M3 set screws (hollow tip) to fixate further. Use a tightening torque of 0.05N·m or less.



For FD-L10V

- For installation, use the mounting screws (M3 female screws) provided with the product.
- Use M3 screws (meshing length of 3mm or more) at the tightening torque of 2.0N·m or less.



8 Specifications

Flange

Product Name		Vacuum-resistant flange	
Type	1ch		4ch
Model Name	FV-FR1		FV-FR4
Amount of Leak	1.0×10 ⁻¹⁰ Pa·m ³ /sec or less (*at He detector)		
Operating Ambient Temperature	-30°C to 120°C (Same as above when storing. Up to +40°C in high humidity environment. Condensation and freezing must be avoided)		
Operating Ambient Humidity	35 to 85%RH (Same as above when storing.)		
Tightening Strength	Nut: 14.7 N·m or less 9.8N·m or less (M8 screw)		
Tensile Strength	20N or less (atmospheric side / vacuum side fiber joint)atmospheric		
Weight	100g		410g
Material	Body	SUS303	
	Holding bracket	SUS301	
	Fiber	Quartz glass	
	O-ring	Fluororubber	

Vacuum side fiber

<Thuru-beam type>

Product Name		Vacuum-resistant fiber	
Model Name			FT-40V
Detection Distance	270 mm (FX-501 STD) (Note)		
Operating Ambient Temperature	-30°C to 300°C (Same as above when storing. Up to +40°C in high humidity environment. Condensation and freezing must be avoided)		
Operating Ambient Humidity	35 to 85%RH (Same as above when storing.)		
Allowable Bent Radius	R25 mm		
Fiber Length	1m		
Tightening Strength	M4 screw section: 0.98N·m or less M2.6 screw section: 0.29N·m or less		
Material	Front bracket section / joint section	SUS303	
	Fiber	Fiber: Multi-component glass Protective tube: SUS304	

(Note): With combination of **FV-FR** and **FT-J9**.

<Reflective Type>

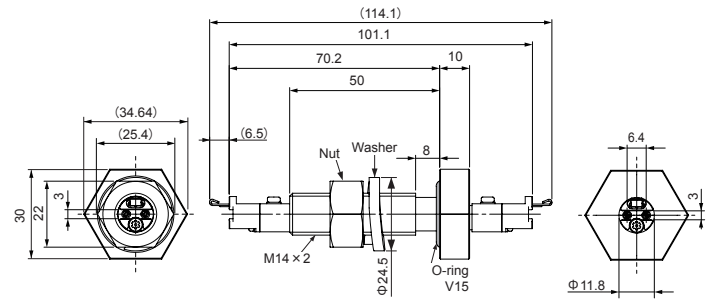
Product Name		Vacuum-resistant fiber	
Type	Convergent reflective type		Long sensing range reflective type
Model Name	FD-L10V		FD-KZ50V
Detection Distance	0 to 8 mm (FX-501 STD) (Note)		20 to 200 mm (FX-501 STD) (Note)
Angle Characteristics	Left/right inclination of detected object: ±10° (at detection distance of 2.5 to 4mm)		
Repeatability	Detection axis direction: 0.1mm or less, perpendicular to the detection axis direction: 0.06mm or less		
Operating Ambient Temperature	-30°C to 300°C (Same as above when storing. Up to +40°C in high humidity environment. Condensation and freezing must be avoided)		
Operating Ambient Humidity	35 to 85%RH (Same as above when storing.)		
Allowable Bent Radius	R25 mm		
Fiber Length	3m		1m
Tightening Strength	2.0N·m or less (M3 screw: meshing length of 3mm or more) 0.3N·m or less (M3 screw)		
Material	Front bracket section / joint section / enclosure	SUS303	
	Detector	Optical glass	
	Fiber	Fiber: Multi-component glass Protective tube: SUS304	

(Note): With combination of **FV-FR** and **FT-J9**. (Detected object: LCD glass)

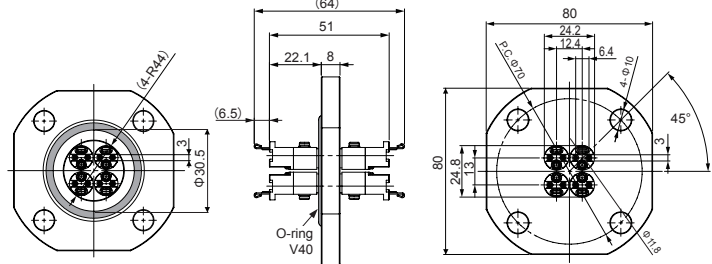
9 Dimensions Drawing

Flange

• FV-FR1

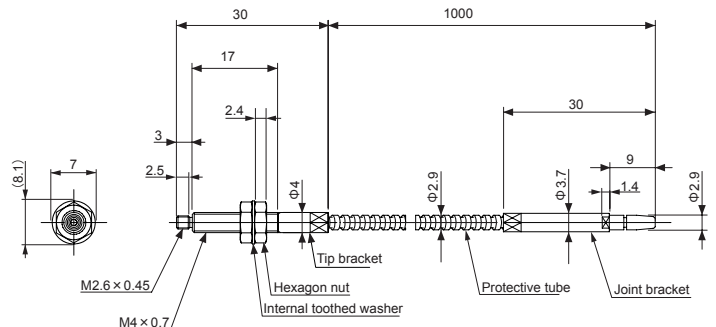


• FV-FR4

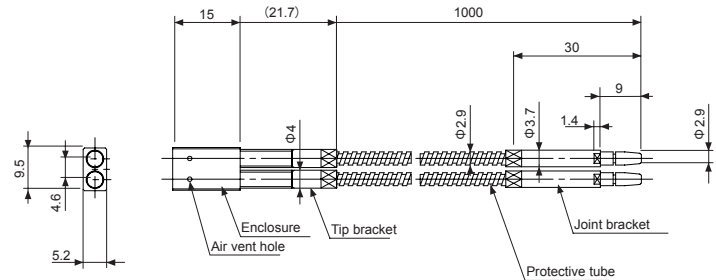


Vacuum side fiber

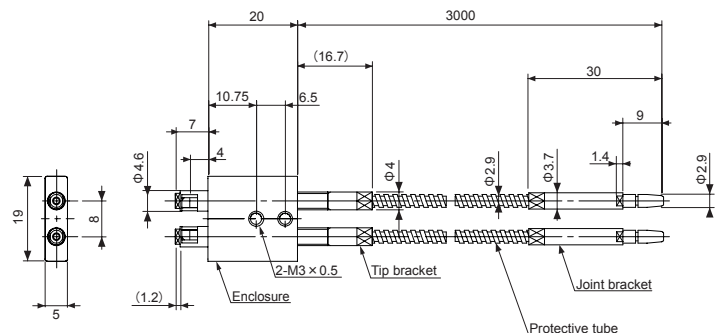
• FT-40V



• FD-KZ50V



• FD-L10V



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