



# **Fiber-optic & Liquid Rotary Joint**

User Manual

Version 1.0.1

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## Overview

### 1.1 Fiber-optic & Liquid Rotary Joint

The *Fiber-optic & Liquid Rotary Joint (HRJ-OL)* (Fig. 1.1b) is a hybrid rotary joint that allows the transmission of light & fluid during rotation. These rotary joints are ideal for use with *Opto-fluid Cannulas (OFC)*. Two different models exist, one using 22 gauge tubing, the other 25 gauge. The system uses 8 interchangeable metal tubes for the transmission of fluid.



Figure 1.1: Fiber-optic & Liquid Rotary Joint

This system is provided with a *Insteck Solomon Stainless Steel Fluid Swivel* to allow fluid rotation. The system is compatible with all 1 & 2 channel fluid swivel models using compatible tubing. See the [Supplier Product Line](#) for more information on specific models. The fluid swivel comes with all necessary attachments.

The system includes output fiber-optic patch cords, as well as 50 spare interchangeable metal tubes and 1 m of plastic tubing.

The rotary joint contains the following elements.

- The **Stator** (Fig. 1.1b) is the fixed part of the HRJ-OL.
  - The **Instech Fluid swivel**<sup>1</sup> (Fig. 1.2a) is used for rotation-insensitive fluid transmission.
  - The **Fluid Swivel** is secured in the **Fluid Swivel Clamp** (Fig. 1.2a) using the **Thumb Screw**.
  - Any patch cords are linked to the **Input FC Connector** (Fig. 1.2a).
  - The **#4-40 Screw-Holes** (Fig. 1.2b) are used to secure the rotary joint into any experimental system.

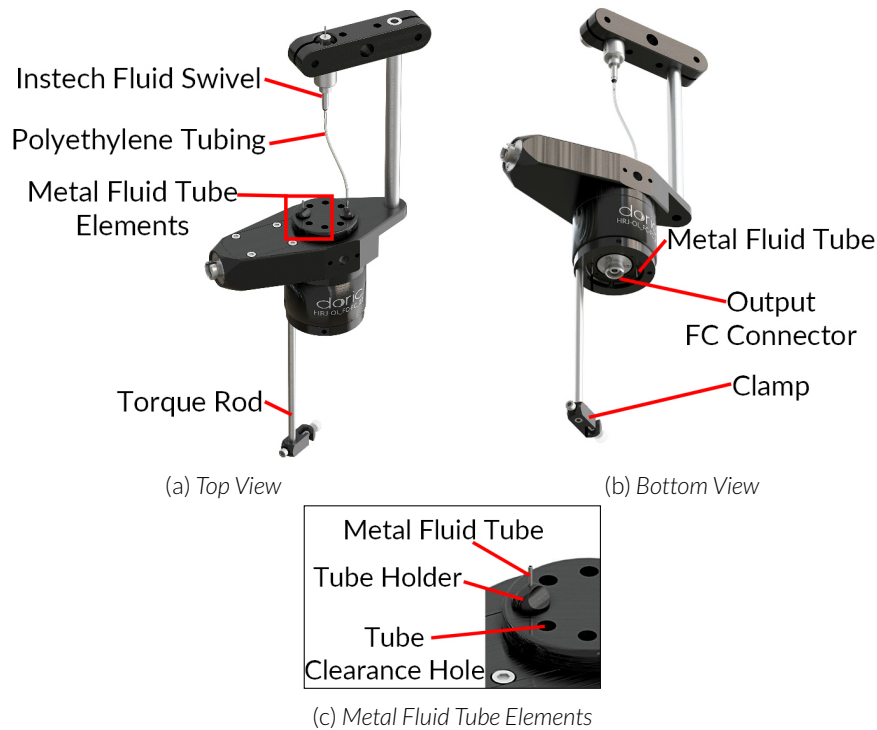


Figure 1.2: HRJ-OL Elements

- The **Rotor** (Fig. 1.1b) is the rotating part of the HRJ-OL.
  - The **Metal Fluid Tubes (and associated elements)** (Fig. 1.2a, 1.2b, 1.2c) transmit fluid through the rotary joint. They are connected to the **Instech Fluid Swivel** (at the top) or any **OFC** using a short length of **Polyethylene Tubing**.
    - \* The **Metal Fluid Tubes** (Fig. 1.2c) are 22 or 25 Gauge 60 mm long stainless steel tubes that are used to transmit fluid. These should be removed and cleaned (or replaced) after each use, to avoid contamination.
    - \* The **Metal Fluid Tubes** are held in place by the **Tube Holder** (Fig. 1.2c). The lower part of the **Tube Holder** is threaded, so that it may be firmly secured in the **Tube Clearance Holes**. The tubes can be glued or wedged into the **Tube Holder**.
    - \* The **Tube Clearance Holes** (Fig. 1.2c) are where the **Tube Holders** are screwed into and the **Metal Fluid Tubes** are passed.
  - The **Torque Rod** (Fig. 1.2a) is used to secure any **Polyethylene tubing** coming from the **Metal Fluid Tubes** and provide extra torque on the rotary joint. Up to two **Torque Rods** can be installed.
  - The **Output FC connector** (Fig. 1.2b) is used to connect to an **OFC** using the required *Patch Cord*.

<sup>1</sup>See supplier specifications on the [INSTECH website](#)

## Operations Guide

### 2.1 Getting Started

Secure the *HRJ-OL* in a system setup.

#### 2.1.1 Fluid System Setup

1. Install the **Instech Fluid Swivel** in the **Fluid Swivel Clamp** at the top of the **Stator** (Fig. 1.2a). The fluid swivel must be installed securely in the clamp or it will move.
2. On the lower side of the **Metal Fluid Tubes**, attach a length of polyethylene tubing sufficient to reach the animal.
3. After attaching the polyethylene tube, secure it in the **Torque Rod Clamp**.
4. On the upper side of the **Metal Fluid Tubes**, attach a short length (4cm) of polyethylene tubing. Connect this tube to the bottom outlet of the **Instech Fluid Swivel**.
5. Attach the upper outlet of the **Instech Fluid Swivel** to a fluid injection system using an appropriate length of polyethylene tubing.
  - a) Attach a length of **Polyethylene Tubing** to the upper end of the **Fluid Swivel** (Fig. 1.2a).
  - b) Insert the **Fluid Swivel** into the **Fluid Swivel Clamp**. The clamp is secured using the thumb nut.
  - c) Use the short length of **Polyethylene Tubing** to connect the **Fluid Swivel** and the **Metal Fluid Tubes**.
  - d) On the opposite side of the **Metal Fluid Tubes**, use the already placed length of polyethylene tubing to connect the tube to any cannula currently in use.
  - e) Secure the **Polyethylene Tubing** in the clamp of the **Torque Rod**.
  - f) Adjust the **Clamp** orientation and ensure it is pointed towards the center of the rotary joint. Should the clamp not be properly oriented, the rotary joint can become unbalanced which will increase the start-up torque.

#### 2.1.2 FC Connector Installation

1. Clean the optical fiber connector before insertion. Use isopropanol and a lint-free wipe.
2. With an FC connector, the connector key must be oriented to enter within the receptacle slot to ensure proper connection (Fig. 2.1).

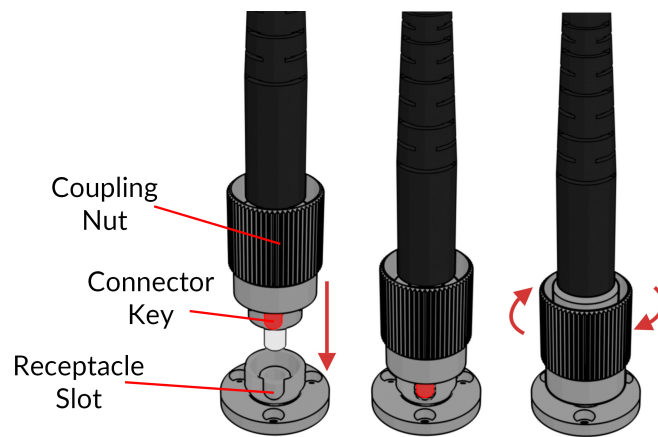


Figure 2.1: FC connector, Fiber Installation

**⚠** To reduce the risk of eye injury, **it is sound practice to NOT CONNECT/DISCONNECT OPTICAL FIBERS when the light source is turned on.**

## Specifications

Table 3.1: *General Specifications*

SPECIFICATIONS	VALUE	NOTES
Transmission	60-65%	With 200 $\mu\text{m}$ core, 0.22 NA optical fiber
Maximum Variation	$\pm 5\%$	additional +10% power drop when tubing crosses light path
Start-up Torque	$\approx 150 \mu\text{N}\cdot\text{m}$	Without Fluid Swivel
	$\approx 600 \mu\text{N}\cdot\text{m}$	With 1-channel Fluid Swivel <sup>1</sup>
Input/Output NA	0.22	-

<sup>1</sup>See supplier specifications on the [INSTECH website](#)

## Support

### 4.1 Maintenance

The product does not require any maintenance. Do not open the enclosure. Contact Doric Lenses for return instructions if the unit does not work properly and needs to be repaired.

### 4.2 Warranty

This product is under warranty for a period of 12 months. Contact Doric Lenses for return instructions. This warranty will not be applicable if the unit is damaged or needs to be repaired as a result of improper use or operation outside the conditions stated in this manual. For more information, see our [Website](#).

### 4.3 Contact us

For any questions or comments, do not hesitate to contact us by:

**Phone** 1-418-877-5600

**Email** [sales@doriclenses.com](mailto:sales@doriclenses.com)



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