

doric

Electrical Rotary Joint

User Manual

Version 1.1.1

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1.1 Electrical Rotary Joint

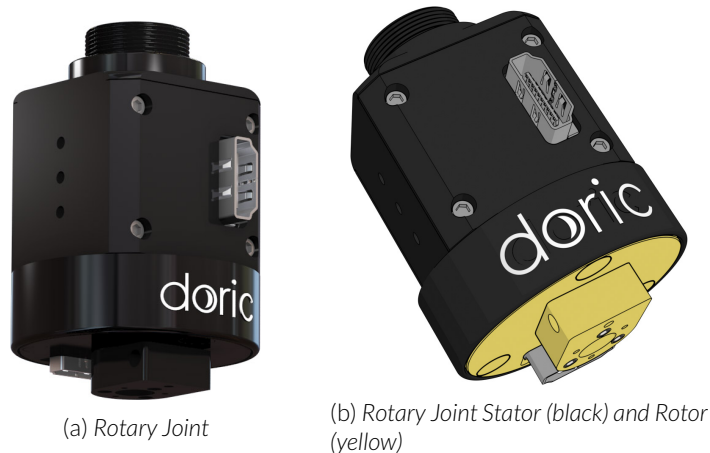


Figure 1.1: *Electrical Rotary Joint*

The Doric *Electric Rotary Joint* is used to transmit electrical signal from a moving sample to a fixed recording system. It consists of high precision ball bearings and of a slip ring to transmit signal. It is composed of a **Stator**, which stays immobile, and a **Rotor** that moves (Fig. 1.1b). The electrical signal is transmitted through 2 possible types of connectors: Male Harwin (6 or 12 contacts) or Female HDMI (*Blackrock micro* compatible pinout available). This is a device intended for fundamental research, for use with rats and larger animals. The central clearance hole is used in cases where electrical and optical signal is required. It allows for passage of one or two optical fibers with M3 or ferrule/sleeve connectors.

1.2 Electrical Rotary Joint Holders

The rotary joint is provided with 3 holders: the *Holder_ERJ*, *Holder_FRJ_large* and the *Holder_FRJ_small* (Fig. 1.1). To combine electrical and optical signal, the *Holder_ERJ* can be used in combination with the *Holder_FRJ_small* or the *Holder_FRJ_large*. If the rotary joint is used only for electric signal, the *Holder_FRJ_large* alone (Fig. 1.1). The gimbal mount *GH_FRJ* (Fig. 1.1) can also be used with the rotary joint alone, while allowing moderate rotation along 2 axes.

Table 1.1: Electrical Rotary Joint Holders

Holder_ERJ	
Holder_FRJ_small	
Holder_FRJ_large	
Gimbal Holder (GH_FRJ)	

1.3 Rotary Joint Harwin 12/Omnetics PZN12 Adapter Kit

To integrate the rotary joint within electrophysiology systems that use **Omnetics PZN-12 connectors**, an adapter kit can be provided. These elements allow a Harwin-connectorized rotary joint to serve as a rotary joint for Omnetics connectorized systems. The adapter system is composed of the following elements.

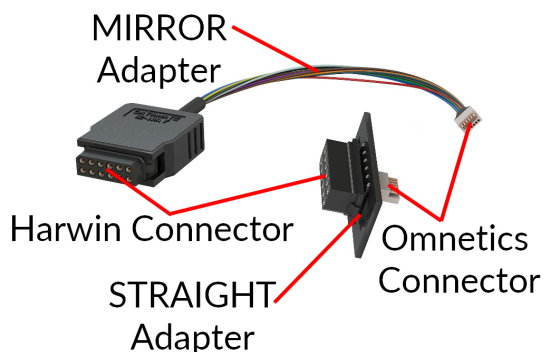


Figure 1.2: Harwin-Omnetics Adapters and Parts

- The **MIRROR Adapter** is a cable with a **Female Harwin 12-pin connector** on one side and a **Omnetics PZN12 connector** on the other. To use, simply insert the Female Harwin connector in the Male Harwin connector on the **Stator** side of the rotary joint. The pinout inside this adapter is mirrored to take into account the connector mirroring in a **Omnetics PZN12/Omnetics PZN12** cable.
- The **STRAIGHT Adapter** is a simple **Female Harwin 12-pin connector/Omnetics PZN12 connector** adapter. To use, simply insert the Female Harwin connector in the Male Harwin connector on the **Rotor** side of the rotary joint.

Operations Guide

2.1 Rotary Joint Holders

2.1.1 Holder_ERJ

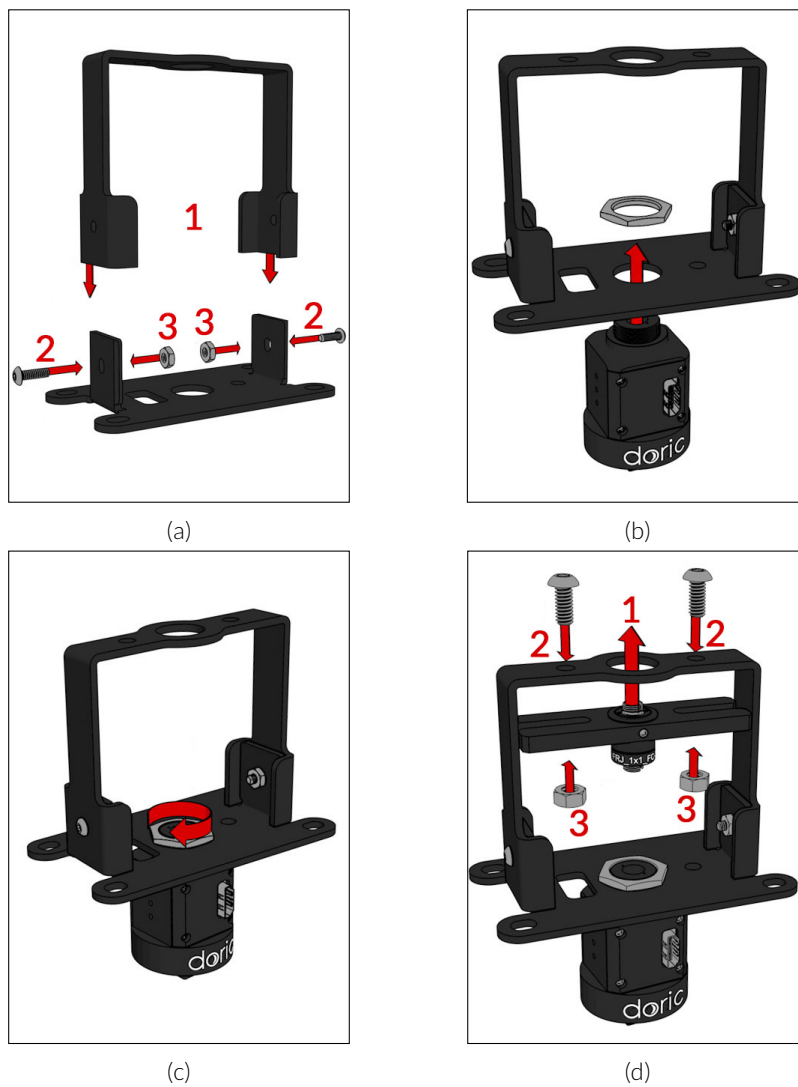


Figure 2.1: Installation of the rotary joints in the Holder_ERJ

1. Deposit the *Holder_ERJ* frame on the base (1) and secure using #8-32 or M4 screws (2) and bolts (3) (Fig. 2.1a). The holder can be installed in an experimental setup using 1/4 (or M6) screws and nuts.
2. Install the *Electrical Rotary Joint* in the *Holder_ERJ* base (Fig. 2.1b) and secure it in place using the 3/4-32 UN securing bolt (Fig. 2.1c).
3. The *1x1 Fiber-optic Rotary Joint* must first be set up in the *Holder_FRJ_small*, using the directives in the *1x1 Fiber-optic Rotary Joint User Manual*, to be installed. The *Holder_FRJ_small* is then be attached to the *Holder_ERJ* frame (1) using 1/4 (or M6) screws (2) and bolts (3) (Fig. 2.1d). See Figure 2.2a for the final result.

For installation using the *1x2 Fiber-optic Rotary Joint - Intensity division* or the *1x2 Fiber-optic Rotary Joint - Wave-length division*, the rotary joint must first be installed in the *Holder_FRJ_large* using the directives in the *1x2 Fiber-optic Rotary Joint User Manual*. The *Holder_FRJ_large* is then attached to the frame in the same fashion as with an *1x1 Fiber-optic Rotary Joint*. See Figure 2.2b for the final result.



(a) With 1x1 Fiber-optic Rotary Joint

(b) With 1x2 Fiber-optic Rotary Joint - Intensity division

Figure 2.2: *Holder_ERJ*

2.1.2 Holder_FRJ_large

The rotary joint is to be screwed into the Holder_FRJ_large (Fig. 2.3). Ensure the stability of the rotary joint in the thread to avoid slippage during use. The holder can be installed in a experimental setup using 1/4 (or M6) screws.

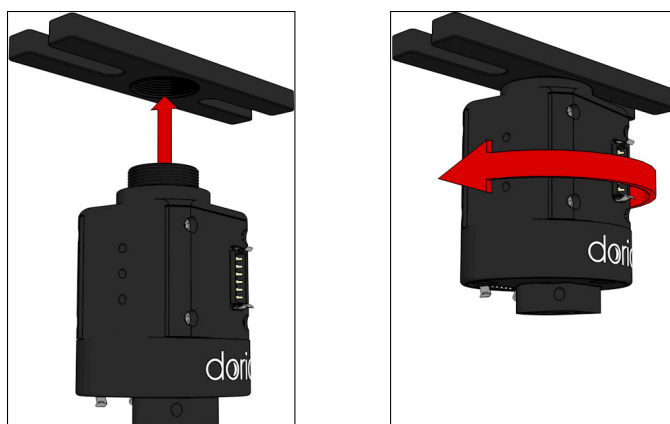


Figure 2.3: Installation of the ERJ in the Holder_FRJ_large

2.1.3 GH.FRJ

The Gimbal Holder allows swivel movement of the rotary joint along 2 axes. The rotary joint is to be threaded into the holder (Fig. 2.4). Ensure the stability of the rotary joint in the thread to avoid slippage during use. The holder can be installed in a experimental setup using #8-32 screws.



Figure 2.4: ERJ in the Gimbal Holder

2.2 Electrical & Optical Cables

2.2.1 Electrical Cables

The rotary joint is assembled using either HDMI or Harwin (6 or 12 contacts) electrical connectors. The number of electrical contacts does not necessarily equal the number of recording channels. The system requires a signal cable (connecting to a console, computer or other signaling device) and a subject cable (connecting to the experimental subject).

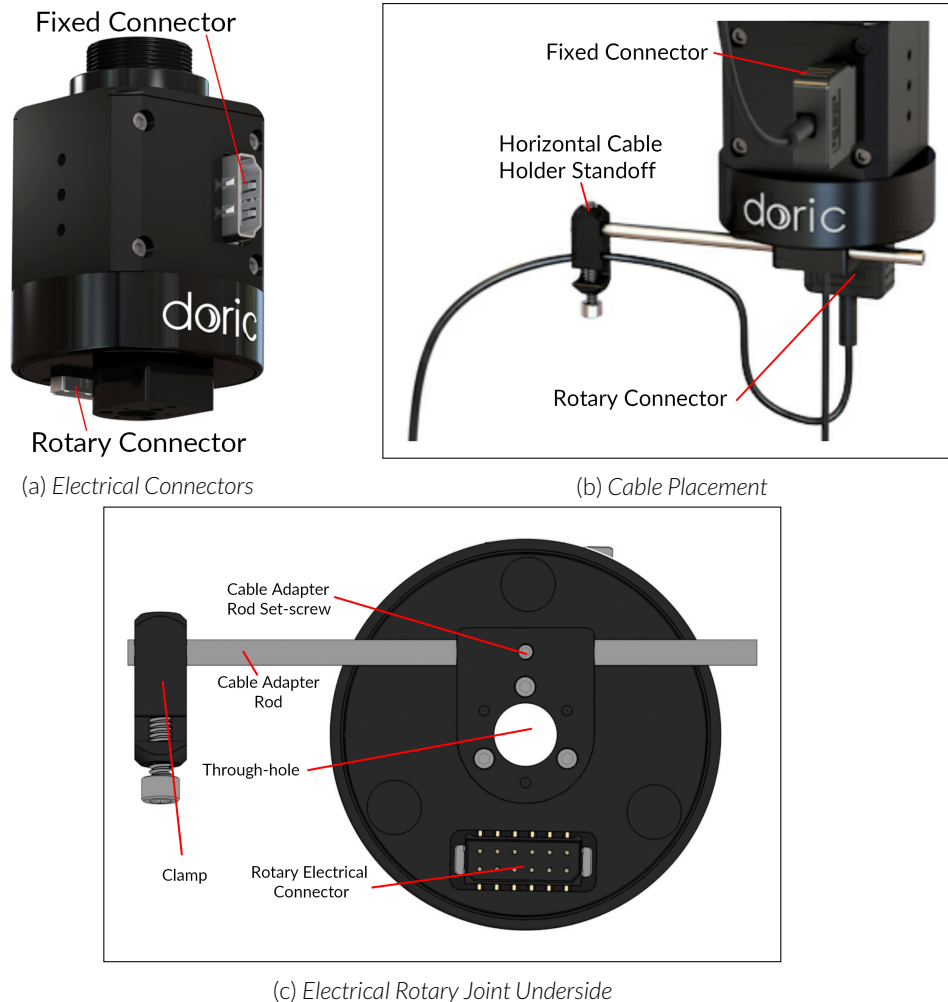


Figure 2.5: Electrical Connector Placement

1. Ensure that the electrical connectors are free of dust using an air duster before installing the cables. When not in use, install plastic caps on connectors for protection and cleanliness.
2. Connect the signal electrical cable to the fixed electrical connector (Fig. 2.5a and 2.5b).
3. Connect the subject electrical cable to the rotary connector (Fig. 2.5a and 2.5b).
4. If using the *Horizontal Cable Holder*, the subject electrical cable can be looped into the **Cable Holder Standoff** (Fig. 2.5b) to provide extra torque. The cable is secured into the clamp (Fig. 2.5c) using a #4-40 nylon socket-head cap screw. See section 2.2.2 for the installation of the *Horizontal Cable Holder*.

2.2.2 Horizontal Cable Holder

The horizontal cable holder keeping electrical cables off-center can be added to increase the effective torque applied on the rotor. To install the *Horizontal Cable Holder*:

1. Slide the cable holder rod with the cable clamp facing down into the pre-installed adapter situated under the rotary joint (Fig. 2.6). The rod is held in place using a 2-56 set-screw on the underside of the adapter.
2. Secure the clamp (facing down) onto the cable adapter rod using a #4-40 nylon set-screw (Fig. 2.6).

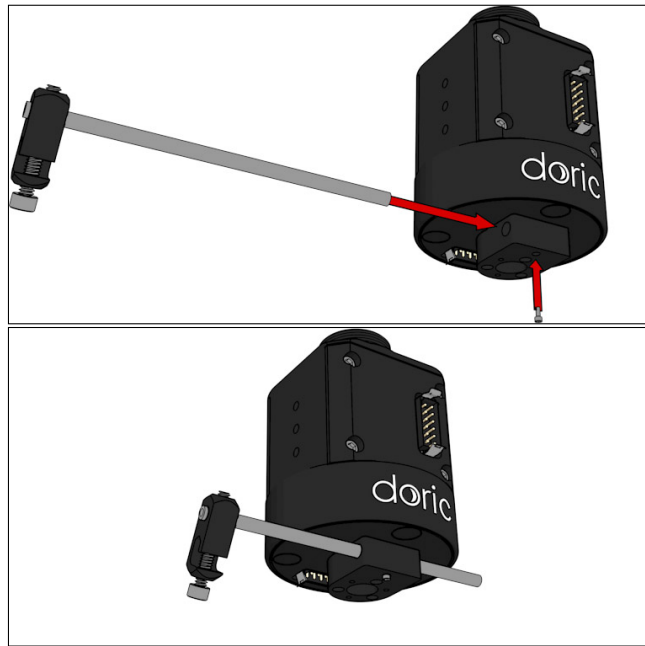


Figure 2.6: Horizontal Cable Holder Standoff Placement

2.2.3 Optical Fibers

The *ERJ* can be used alongside an optical rotary joint. If using optical fiber patch cords and a Fiber-optic Rotary Joint, follow these directions. The system requires a signal patch cord (connecting to a light source) and a subject patch cord (connecting to the experimental subject).

1. Connect the signal patch cord to the fixed connector of the optical rotary joint.
2. Install the *ERJ_Holder* as shown in section 2.1.1.
3. Select the subject patch cord(s) for usage. One side must be terminated with an **FC** connector and the other with a **M3** or **Ferrule/Sleeve** connector.
4. Connect the subject patch cord(s) **FC connector** to the rotary connector. Follow the directions in the manual of the rotary joint.
5. Pass the patch cords through the **Through-hole** (Fig. 2.5c). Only **M3** or **Ferrule-sleeve** connectors are small enough to pass through.
6. Do not secure the patch cord(s) in the **Horizontal Cable Holder**. For proper rotation, they must be hung loosely. The patch cord(s) must not rub against the side of the through-hole.



Figure 2.7: Electrical and Fiber-optic Rotary Joints - Cable Installation

Specifications

Table 3.1: Harwin Electrical Connector Configuration

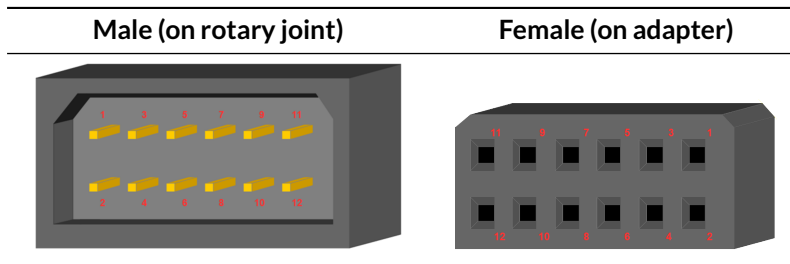


Table 3.2: HDMI Electrical Connector Configuration

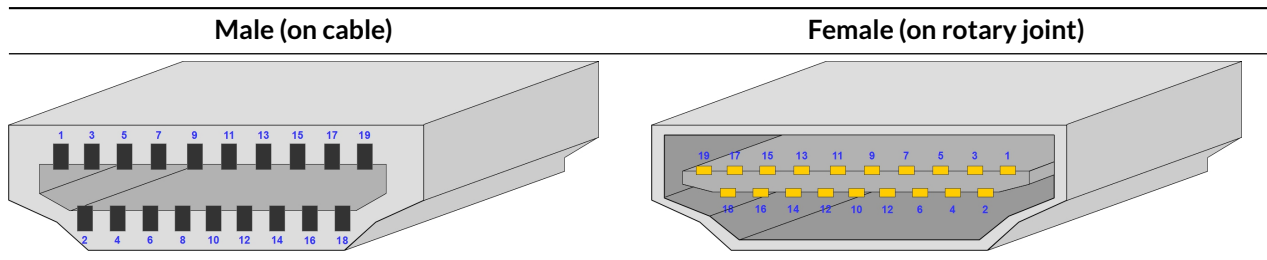


Table 3.3: HDMI Electrical Connector Pinouts

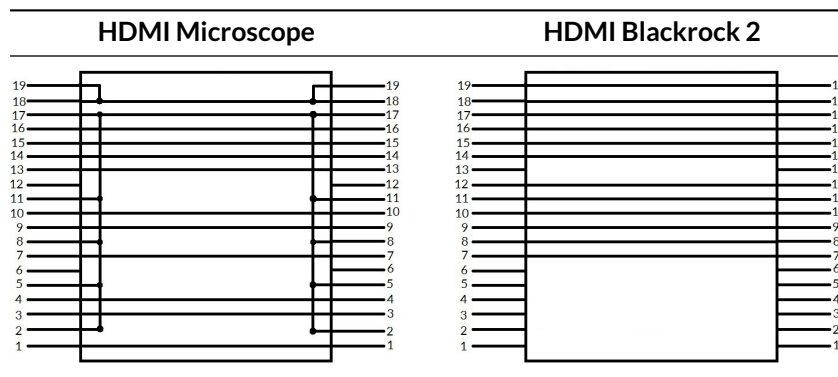


Table 3.4: General Specifications

SPECIFICATIONS	VALUE	NOTES
HDMI connector pinout type	Microscope, Blackrock 2	Female connector
Harwin connector type	Datamate L-Tek serie	Male connector, 2 mm pitch, 12 contacts, 2 rows
Number of contacts	6 or 12	-
Contact material	Gold	-
Maximum current	2 A per contact	-
Contact resistance	<500 mΩ	-
Resistance variation during rotation	<100 mΩ @ 5 VDC	During constant rotation
Start up torque	0.9 mN·m (for 6 contacts)	Typical Value
	1.9 mN·m (for 12 contacts)	Typical Value
Rotation speed	up to 300 rpm	-
Outer diameter	45.0 mm	-
Through-hole diameter	7.5 mm	-
Length	59.4 mm	-
Mass	123.0 g	-

Table 3.5: Recommended Environmental Specifications

DESCRIPTION	OPERATION	STORAGE
Use	Indoor	Indoor
Temperature	0-40 ° C	0-40 ° C
Humidity	40-60% RH, non condensing	40-60% RH, non condensing

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

The logo for Doric Lenses, featuring the word "doric" in a lowercase, sans-serif font. The letter 'o' is stylized to resemble a lens or a sphere with a highlight on its upper right side.

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