ROTOCON | BRUSHLESS SLIP RINGS

HLMX Series Slip Rings for Hazardous Locations

Product Manual

M004590

MERIDIAN LABORATORY

Product Manual
HLMX ROTOCON Brushless Slip Ring

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Safety and Warnings

The ROTOCON HLMX Series slip rings are available marked as either **IECEx Ex db IIC T6 Gb** or **ATEX II 2G Ex db T6 Gb**.

The integrator or end user is responsible for ensuring that this device is suitable for the application and environment.

¾ NPT Cable Glands must be provided and installed by the integrator or end user. Glands must be Ex d or e suitable for Zone 1 IIC installed per IEC 60079-14.

Unused ¾ NPT ports must be blocked with suitable NPT plugs meeting IEC 60079-1 requirements for blanking elements.

Caution – Replacement fasteners must have yield strength of 136 ksi / 940 MPa minimum.

Warning – Do not open or separate when energized.

Warning – Do not open when an explosive gas atmosphere is present.

Specifications

The ROTOCON HLMX Series is highly configurable. Available options include:

- Channel Count – from 2 contacts up to 30 contacts
- Maximum Voltage – 600V standard, with options up to 3500V
- Maximum Current – up to 16A per channel or 108A total device ampacity
- Data Channels – supporting many types of data signals, including RS-232, RS-485, Ethernet (up to 1 Gbps), Profinet, EtherCAT, and more with appropriate cabling
- Thermocouple Wire Pairs – all thermocouple types are supported
- Mixed Channel Types – signal and power channels can be provided in a single ROTOCON HLMX slip ring
- Cable Types and Lengths – a wide variety of cable and wire options are available and can be supplied in custom lengths
- Shaft Termination Options – flying leads or junction box
- Body Termination Options – flying leads or ring terminal studs

Calculating Total Device Ampacity

For each current-carrying channel, use the lookup table below to find the power dissipation factor based on expected application current and wire gauge.

Rules:

- If the application current falls between listed chart values, select the next highest current value.
- The sum of these power dissipation factors for all channels must be no greater than 1024.
- These values assume operation within the stated environmental temperature range, speed range, and 100% duty cycle.

	14 AWG	16 AWG	18 AWG	20 AWG	22 AWG
SIGNAL (<1A)	1	1.6	2.5	4	6.4
2A	4	6.4	10.2	16.2	25.8
4A	16	25.6	41	64.6	103
6A	36	57.6	92.2	145.4	
8A	64	102.4	163.8		
10A	100	160			
12A	144				
14A	196				
16A	256				

For high ambient temperatures (>35°C), continuous duty, or other demanding conditions, it is recommended to monitor the internal temperature of the device – contact Meridian Laboratory for additional information.

To maintain the specified ampacity, wiring to ring terminals must be the same or larger gauge than the rotor flying lead for that channel.

Example calculations:

- Scenario 1: Simple Load – HLMX-12
  - Setup: 12 channels, all 14 AWG, all running 8A
  - Power Dissipation Factor: For 8A on 14 AWG, factor is 64
  - Total: 12 channels x 64 = 768
  - Result: 768 is less than 1024. **Acceptable load**

- Scenario 2: Power plus signal – HLMX-12
  - Setup:
    - Group A: 6 channels of 14 AWG, all running 13A
    - Group B: 6 channels of 20 AWG, all running low power signals
  - Power Dissipation Factor:
    - Group A: Round up to 14A. For 14A on 14AWG, factor is 196
    - Group B: For signal level on 20 AWG, factor is 4
  - Total: (6 x 196) + (6 x 4) = 1200
  - Result: 1200 is greater than 1024. **Unacceptable load**

- Scenario 3: Mixed Load – HLMX-20
    - Setup:
        - Group A: 2 channels of 14 AWG at 15A
        - Group B: 6 channels of 18 AWG at 4A
        - Group C: 2 channels of 18 AWG at 1.7A
        - Group D: 10 channels of 22 AWG at signal level
    - Power Dissipation Factor:
        - Group A: Round up to 16A. Factor = 256
        - Group B: Factor = 41
        - Group C: Round up to 2A. Factor = 10.2
        - Group D: Factor = 6.4
    - Total:
        - (2 x 256) + (6 x 41) + (2 x 10.2) + (10 x 6.4) = 842.4
    - Result:
    - 842.4 is less than 1024. **Acceptable load**

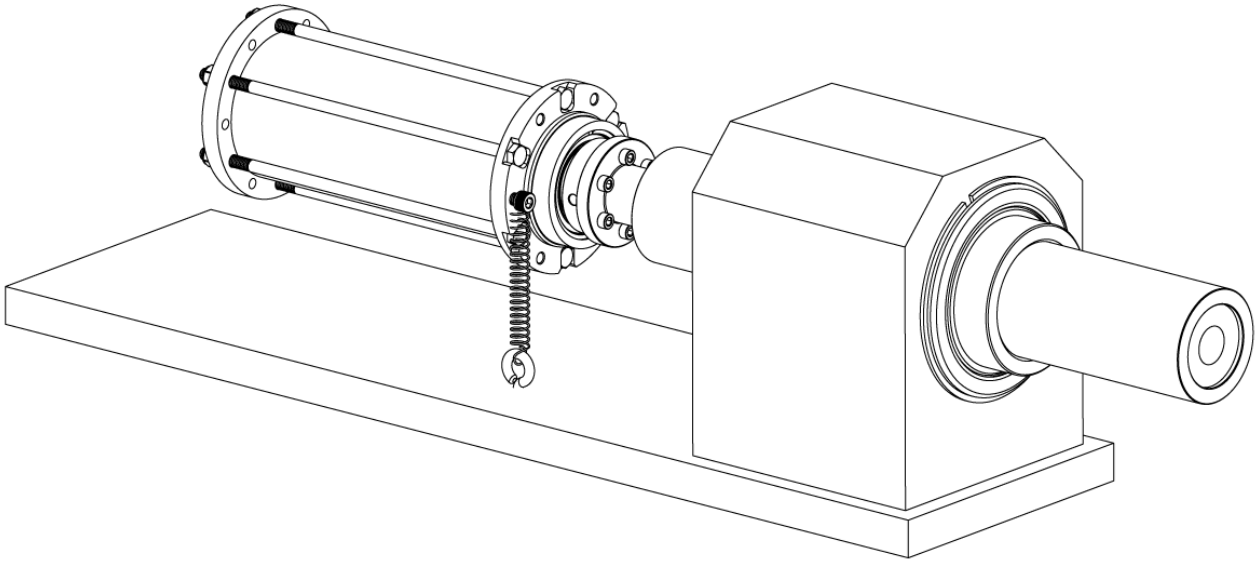
Storage

For best long-term storage, store vertically, shaft end up, and rotate by hand every six months. Recommended environment: 0-40°C, <60% humidity, noncondensing.

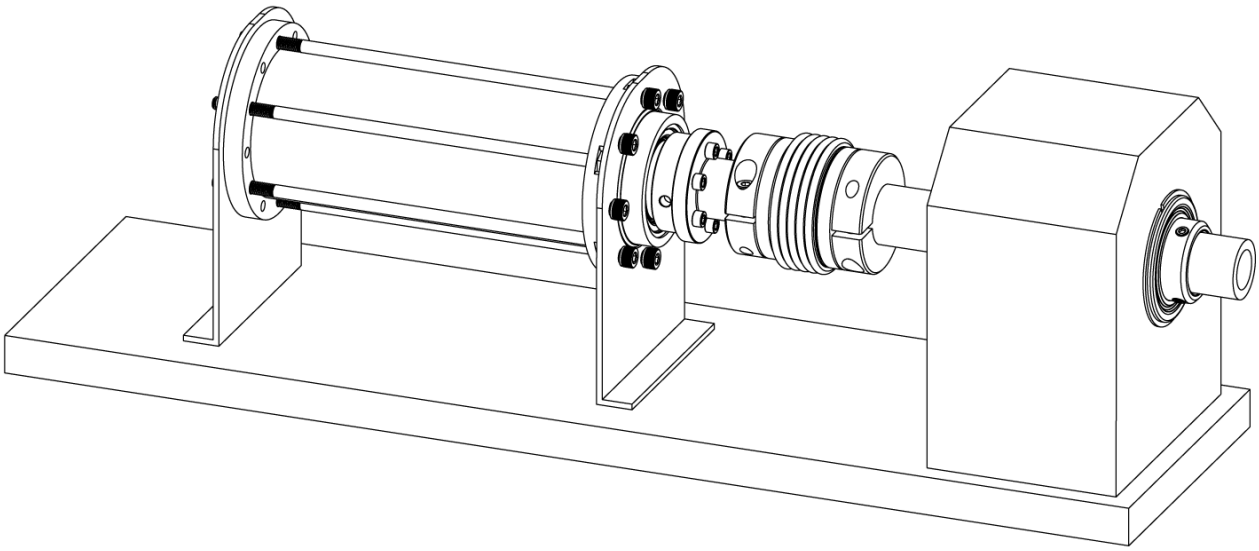
Installation

HLMX Series slip rings may be mechanically mounted in one of two ways:

1. Attachment of the shaft or junction box flange to the rotating component of the equipment. In this case, the HLMX stator is supported by the internal bearings and does not require any additional mounting support. A non-rigid mechanical connection, such as a spring or fork, is used to prevent the body from rotating.
   Example:



2. Or attachment of the housing flange(s) to the stationary structure of the equipment. The mechanical connection between the rotating component of the machine and the HLMX shaft must have sufficient compliance to accommodate any potential misalignment. Example:



Note: In any mounting orientation, it is important to not rigidly mount both the body and shaft, as this can cause excessive loading of the slip ring bearings. A flexible connection must be made instead. One connection must be flexible or have sufficient play to avoid such loading.

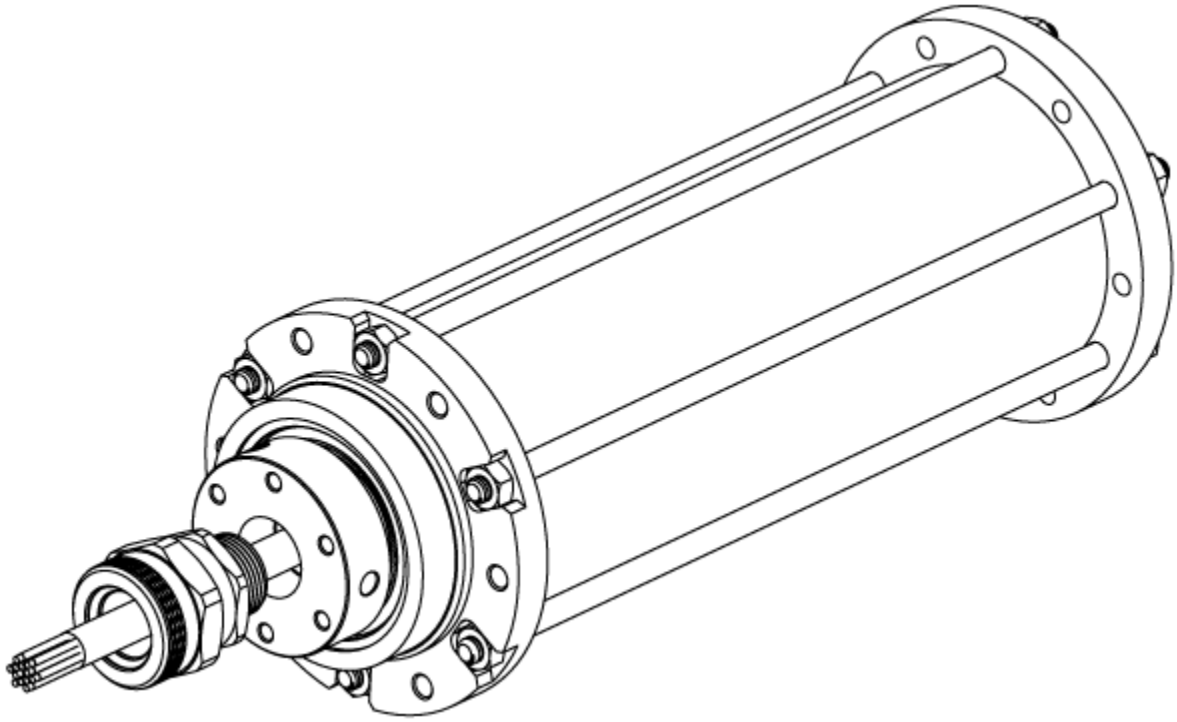
It is also possible to rotate the body and have the shaft stationary – the mounting principles are the same. For these applications, maximum speed is reduced – contact Meridian Laboratory for application-specific information.

For HLMX Series slip rings with channel counts over 15, the preferred mounting method for horizontal applications is a rigid housing mount and flexible shaft connection.

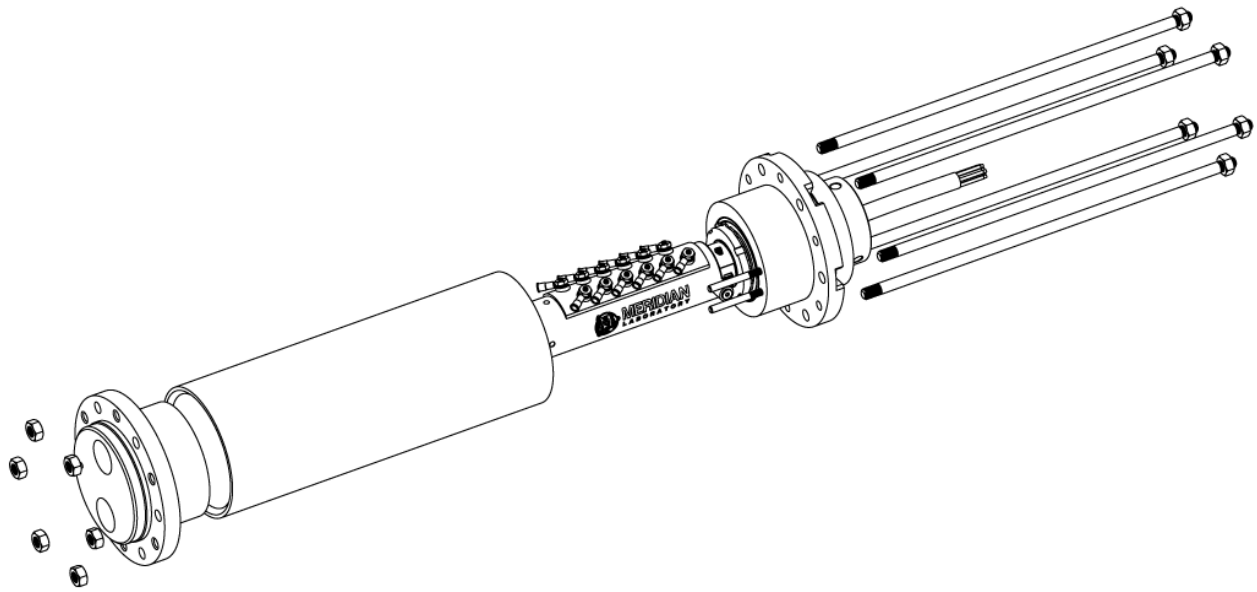
Wiring

The HLMX slip ring series is available with two options for wiring connections – premade flying leads or internal field terminations.

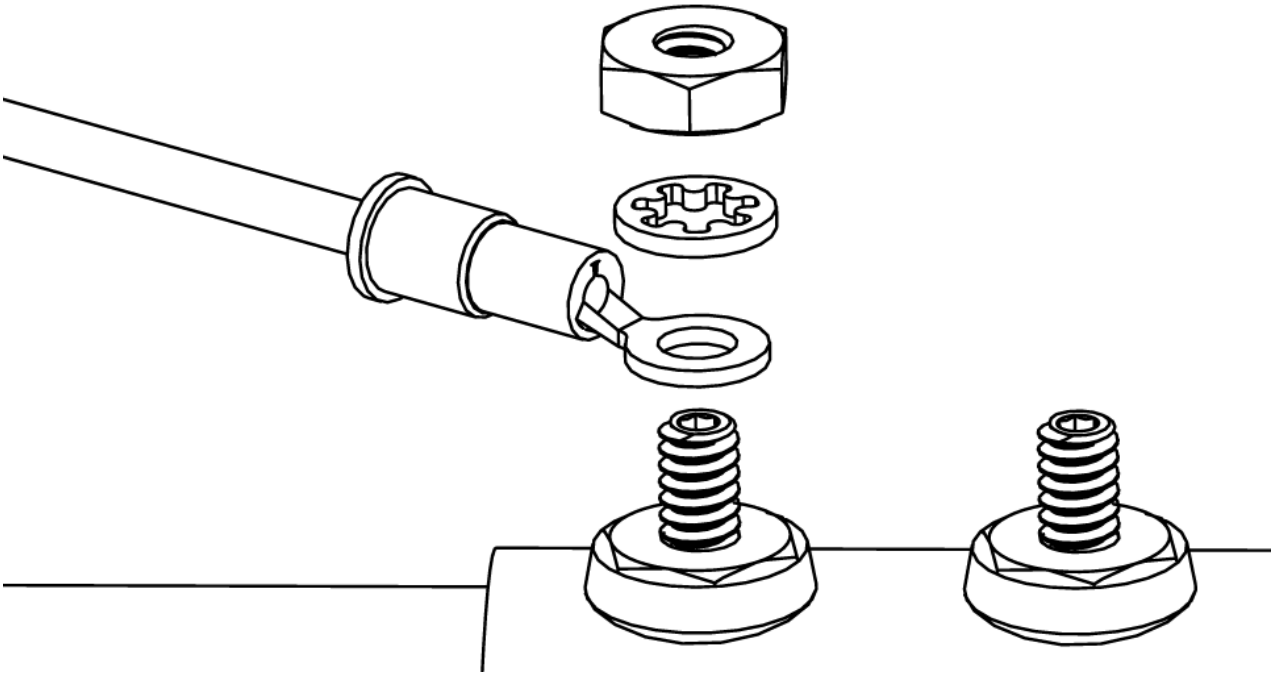
Flying leads are available on both the shaft and body sides of the slip ring. Install an appropriately rated cable gland over the flying leads and into the slip ring NPT port, route the leads to the relevant equipment, and terminate as required.



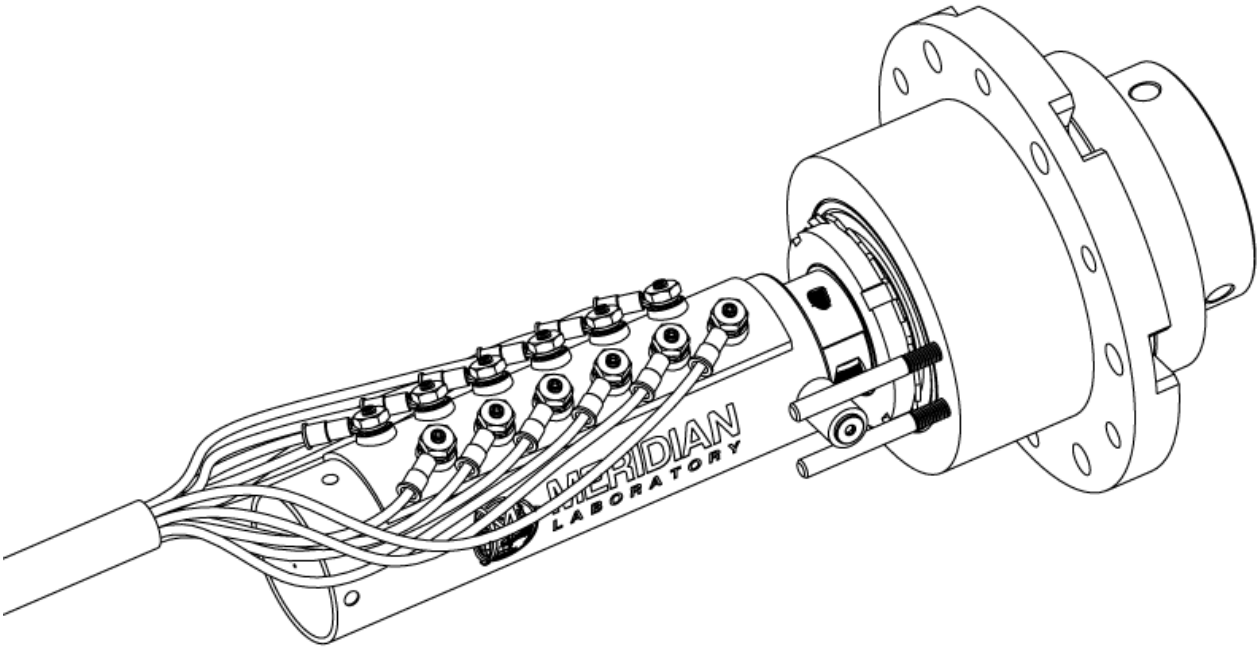
For internal field terminations on the stator side, remove the housing tension rods using a 13mm wrench or socket, then remove the rear end cap and main housing tube:



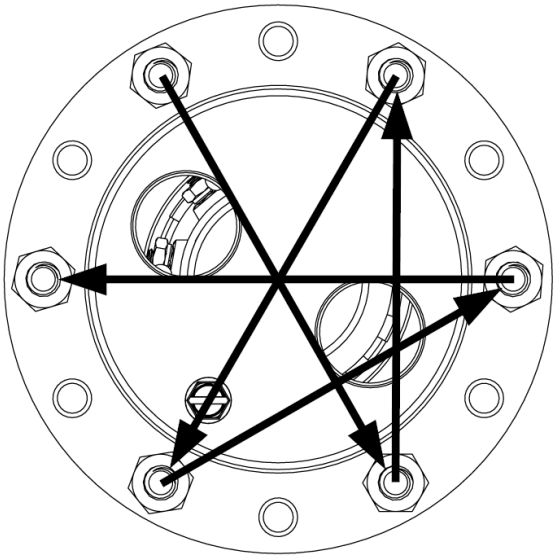
Use ring terminals to connect the body-side wiring to the slip ring studs. Place the ring terminal on the stud first, so that the terminal is in direct contact with the brass surface. Secure the ring terminal with the provided lock washer and nut.



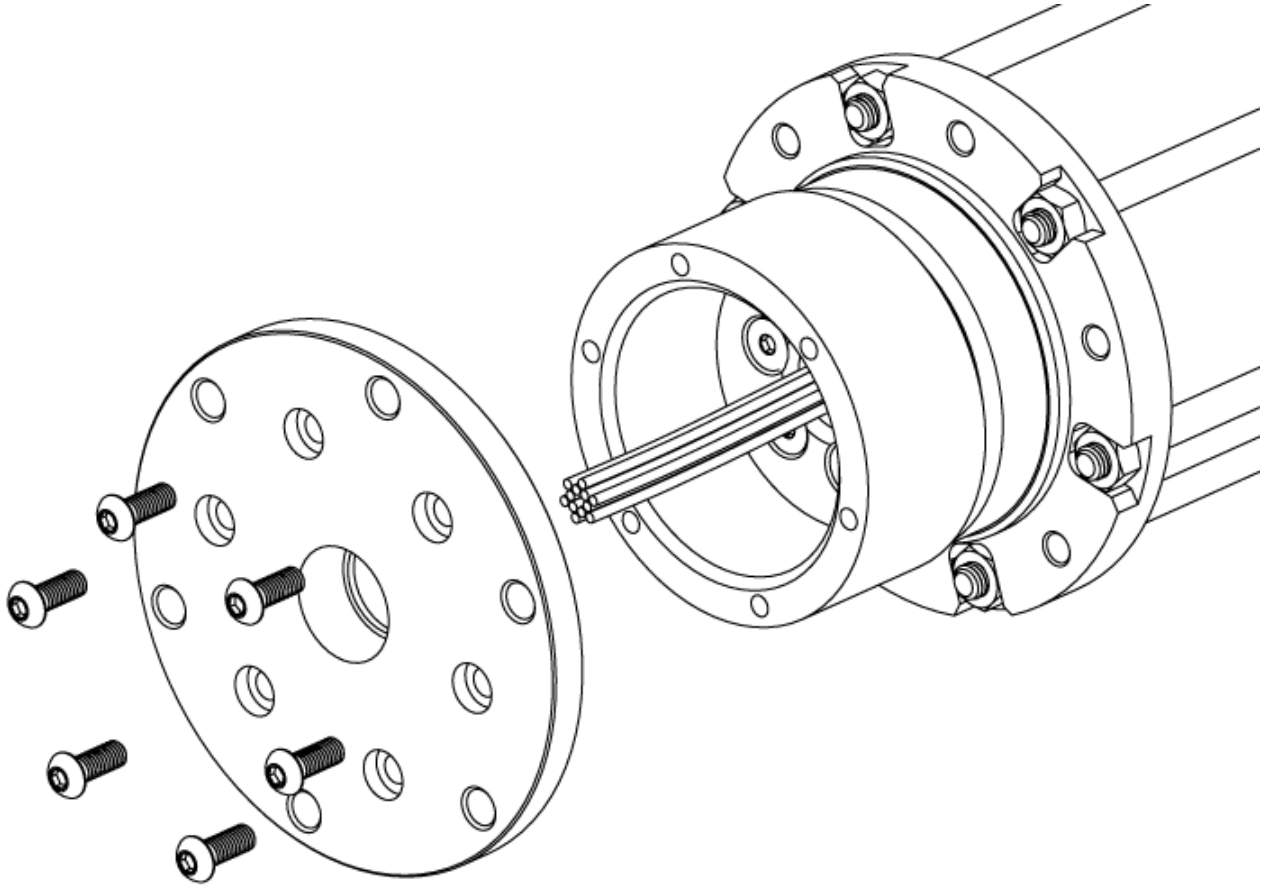
Repeat for all terminations:



Reassemble the HLMX slip ring housing and tighten the nuts for the tension rods in a star pattern. Torque sequence: first tighten to 60 in-lb / 7 Nm, then to 180 in-lb / 20 Nm.



For internal field terminations on the shaft side, remove the flange cover screws using a 4mm hex key and the flange cover. Using individual terminals or mating connectors, connect the slip ring wiring to the equipment wiring. Reinstall the flange cover and tighten the screws in a star pattern. Final torque: 90 in-lb / 10 Nm.



For both types of internal field terminations, route the equipment wiring through the NPT ports of the slip ring assembly and install appropriately rated cable glands.

Grounding

Ground wiring may be attached to the exterior and interior grounding points on the housing:

