Modular integrated Robot Joint
High torque and low cogging for excellent performance
Robot Joint Overview

Introduction
maxon's compact EC frameless motors combined with an EPOS4 positioning controller delivers a highly dynamic, powerful drive package with field-oriented control (FOC), high efficiency, and maintenance-free components in a high-quality industrial housing. High torque and low cogging effect provide excellent performance. Zero backlash gearhead in combination with a double feedback system allows for excellent positioning movements. To ensure safety during operation a brake system can be added.

Design of the Robot Joint
The compact modular design of the robot joint series is optimal for performance and size. Various options are available such as a hollow shaft, torque sensor, brake and electronics.

Positioning Controller (optional)
The next generation of positioning controllers after impressively superior dynamics and outstanding power density. The modular design opens up a wide range of opportunities regarding communication and feedback encoders. The CANopen and EtherCAT field busses, as well as the adjustable digital and analog Inputs and outputs, are matched optimally to the various functions and operating modes of the CI4-402 device profile. In addition to the intuitive commissioning software, there are libraries available free of charge for integration into a wide variety of master systems. With the graphic user interface of the EPOS Studio, the configurable drive system automatically searches for ideal control parameters (auto-tuning) and is ready for use at the press of a button.

Commissioning
maxon preconfigures the robot joints before shipping. Motor, encoder, and brake parameters are stored on the positioning controller at the factory. For commissioning at the customer site, maxon provides the auto tuning function via the EPOS Studio. This reduces the installation time dramatically.

Gearhead
The customized zero backlash gearhead with its high positioning accuracy and zero backlash can achieve high precision and optimal position control. Various gearhead ratios can be selected.

Brake (optional)
The drive can be combined with an optional holding brake; this increases the length of the drive. The brake is active when disconnected from power. It is a holding brake, which is not suitable for deceleration. The brake is controlled by the integrated controller.

Encoders
The Robot Joint series has two integrated encoders. The two different encoder signals can be evaluated simultaneously. This allows for dual-loop control which can be tuned automatically to compensate for mechanical backlash and elasticity.

Torque Sensor (optional)
The torque sensor can be used to measure torque at the output shaft of the robotic joint.

Robot Joint Selection
maxon Robot Joints are integrated systems and can be build according to the customer requirements. The base joints on the following pages are containing motor, gearheads, brake, hollow shaft and double feedback system. An optional positioning controller and torque sensor can be added. Detailed dimensional drawings based on the selected options are available upon request.

Customizations are available. 
For details, contact us at: maxontech.cn@maxonmotor.com

Product components

- maxon brushless EC frameless motor
- Customized zero backlash gearhead
- Double feedback system
- Brake
- Positioning Controller
- Torque sensor
- Hollow shaft
High torque and low cogging effect provide excellent performance.

Zero backlash gearhead in combination with a double feedback system allows for excellent positioning movements.
**Robot Joint 45**  \(\Phi 70\) mm, 70 Watt

**Modular Integrated Robotic Joint**

### Gear Motor Data

<table>
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<tr>
<th>Gear Ratio</th>
<th>X: 1</th>
<th>5:1</th>
<th>8:1</th>
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<tr>
<td>Voltage</td>
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<tr>
<td>RPM</td>
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<td>3.5</td>
<td>5</td>
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</tbody>
</table>

### Encoder Specifications

- **Incremental Encoder**: 500 (for RJ45), 2048 (for RJ45, RJ60, RJ90), 2080 (for RJ110)
- **Absolute Encoder**: None, 19:1 Single turn

### Technical Specifications

- **Brake**: Step Circle fix
- **Controller**: CANopen (only for RJ45, RJ60, RJ90) EtherCAT (only for RJ45, RJ60, RJ90)
- **Output Voltage**: 24 V, 48 V
- **Electrical Connection**: Cable gland, Controller interface (for RJ45, RJ60, RJ90)

### Ordering Information

- **Type**: 4507, 6010, 9016, 9026, 11050
- **Ratio**: 51, 81, 101, 121 (for RJ60, RJ90), 161 (for RJ90)

### Operating Range

- **Cable/Magnetic Encoder**: Absolute SSI encoder
- **V magnetics**: 24 V, 48 V
- **Cable**: 500, 1500, 2000 mm

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**Note**: RJ6010-101-2048-19S-01-10-S0-00-24-CA