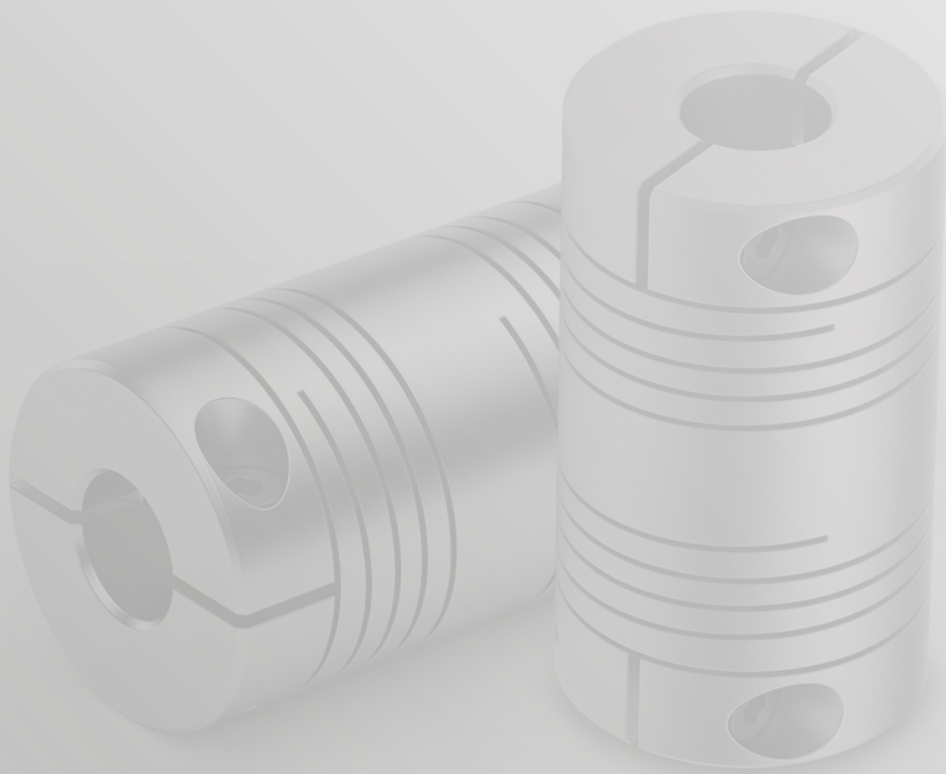
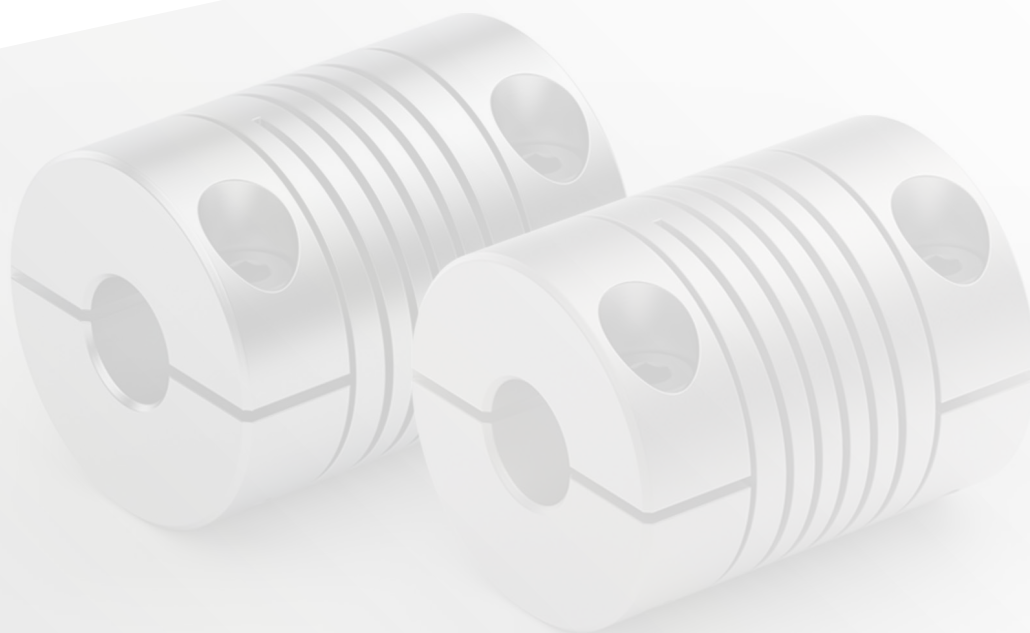


# HELIX COUPLINGS



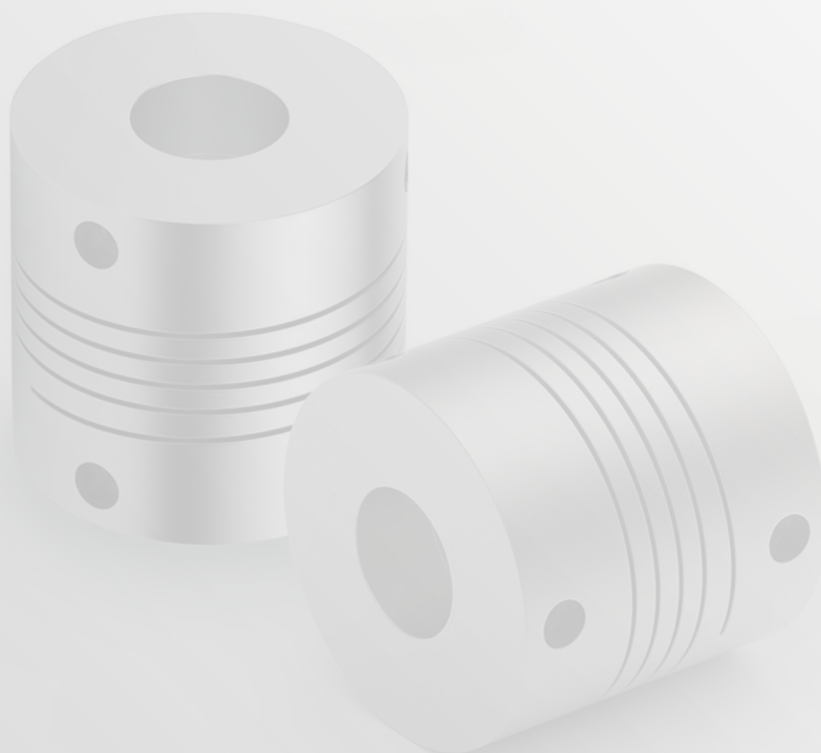
# Helix Couplings





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## Helix Couplings

Helix couplings are one-piece shaft couplings made of homogeneous materials. A cylindrical body with a helical slot forms a defined flex zone with precisely calculable elastic properties.

Due to their one-piece design without additional moving components, helix couplings operate wear-free and require little maintenance. At the same time, they ensure high dynamic stability and low-vibration bearing loads, even with significant shaft misalignments.

For the shaft connection, standard versions are available with clamping hubs or set screws. For custom designs, connection geometries and materials can be flexibly selected. Helix couplings are used wherever rotational movements must be precisely transmitted and controlled.

Examples of application areas:

- Encoders
- Tachogenerators
- Spindle drives
- General mechanical engineering
- Apparatus engineering
- Servo motors
- Control systems
- Positioning systems
- Stepper motors



## Design Features

Helix couplings can be custom-designed and manufactured to meet the specific requirements of an application. Various design parameters influence the mechanical properties of the coupling:

- Helix design
- Helix length
- Number of helical threads (multi-start)
- Bore diameter
- Helix coil cross-section
- Material

### Bore diameter

For the same helical geometry and outer diameter, different bore diameters affect the torque, torsional stiffness, and spring behavior.



### Helical length

Changing the helix pitch alters the thickness of the helix coil. This affects the transmissible torque, torsional stiffness, and axial mobility of the coupling.



### Helix coil thickness

Changing the helix pitch alters the thickness of the helix coil. This affects the transmissible torque, torsional stiffness, and axial mobility of the coupling.



### Number of helix starts

In addition to the standard single-start design, two-start and three-start variants are also available.

- Single-start spiral (standard design)
- Two-start spiral with a 180° offset start
- Three-start spiral with a 120° offset start

Multi-start helices increase torque, torsional stiffness, and concentricity, but reduce the ability to compensate for misalignment.

### Materials

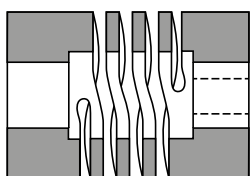
As standard, Helix couplings are manufactured from aluminum alloys or corrosion-resistant chrome-nickel steel. For customer-specific applications, other materials such as plastic or titanium are also possible, provided they can be machined.



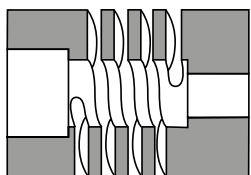
## Variety of Types

There are essentially two types of Helix couplings: couplings with a through-bore and couplings with a blind bore (or non-through-bore).

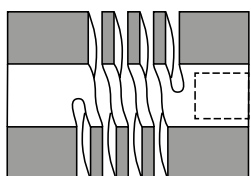
### Couplings with a Through-Bore



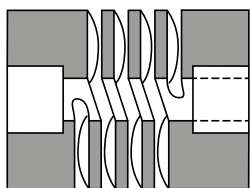
- **Coupling with back-rotation:**  
The inner diameter is larger than the shaft diameter, which means the shaft ends may come into contact.



- **Stepped arrangement:**  
The inner diameter lies between the large and small shaft diameters. Here, too, the shafts may come into contact.

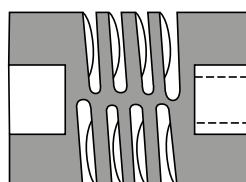


- **Limited shaft length:**  
The inner diameter and shaft diameter are equal. The shaft length is therefore limited to the length of the coupling hub. Installation is performed by axially sliding the coupling onto a shaft.



- **Offset shaft diameter:**  
The inner diameter is smaller than the shaft diameter, so the shafts cannot come into contact. This design offers high torsional stiffness, especially for small couplings.

### Blind bore/non-through bore



Couplings with a blind bore allow for the transmission of higher torques and greater torsional stiffness while featuring a smaller outer diameter and shorter overall length. However, they are axially rigid and compensate exclusively for angular misalignment.

### Mounting Types

In addition to standard mountings with set screws or clamping hubs, other connection types are possible, such as:

- Set screw or clamping connections
- Pins, bolts, or studs
- Keyways
- Flange connections
- Threaded pins or bores
- Tapered or flattened bores
- Spline teeth

With clamping connections, the friction generated is generally sufficient to transmit the required torque, so no additional key is necessary. For special applications, however, a combination of a clamping connection and a key can also be used.

## Custom Couplings

The possible applications for a precision shaft coupling are not limited to the series listed in the catalog. Custom solutions are one of our core competencies. A key advantage of Helix couplings is the freedom to choose the material. This allows for optimal adaptation to a wide range of applications.

### Customer Benefits

Integrating multiple functions into a single component increases service life and operational reliability. At the same time, overall costs—such as those for components, assembly, and procurement—can be reduced.

### Advantages:

#### Cost Reduction

- Fewer individual parts per function
- Shorter assembly times
- Reduced procurement effort

#### Increased Safety

- Only one component with clearly defined interfaces
- A single point of contact for multiple functions
- Greater system and quality reliability

#### Optimized Inventory and Administrative Costs

- Fewer components in stock
- Fewer orders and suppliers



# HELIX COUPLING MHS

## Specifications (Aluminum alloy)

| Model   | Max. Torque      |                 |                 | Misalignment  |             |            | Stiffness                |                           |                          | Max. rotation speed [min <sup>-1</sup> ] | Moment of inertia [kg·m <sup>2</sup> ] | Mass [kg] |
|---------|------------------|-----------------|-----------------|---------------|-------------|------------|--------------------------|---------------------------|--------------------------|------------------------------------------|----------------------------------------|-----------|
|         | Short-term [N·m] | One-sided [N·m] | Reversing [N·m] | Parallel [mm] | Angular [°] | Axial [mm] | Max. Torsional [N·m/rad] | Max. Radial spring [N/mm] | Max. Axial spring [N/mm] |                                          |                                        |           |
| MHS 015 | 0.71             | 0.36            | 0.18            | ±0.25         | 5           | ±0.25      | 11.2                     | 169                       | 44                       | 10,000                                   | $0.23 \times 10^{-6}$                  | 0.008     |
| MHS 020 | 1.3              | 0.7             | 0.4             | ±0.25         | 5           | ±0.25      | 21.2                     | 179                       | 29                       | 10,000                                   | $0.78 \times 10^{-6}$                  | 0.015     |
| MHS 025 | 2.9              | 1.5             | 0.8             | ±0.25         | 5           | ±0.25      | 38.2                     | 236                       | 34                       | 10,000                                   | $2.31 \times 10^{-6}$                  | 0.028     |
| MHS 030 | 4.6              | 2.3             | 1.2             | ±0.25         | 5           | ±0.25      | 44.1                     | 192                       | 25                       | 10,000                                   | $5.50 \times 10^{-6}$                  | 0.047     |

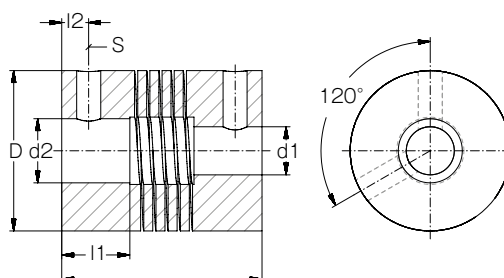
• Other sizes available on request.  
• Version with blind bore possible on request.

## Specifications (Stainless steel)

| Model   | Max. Torque      |                 |                 | Misalignment  |             |            | Stiffness                |                           |                          | Max. rotation speed [min <sup>-1</sup> ] | Moment of inertia [kg·m <sup>2</sup> ] | Mass [kg] |
|---------|------------------|-----------------|-----------------|---------------|-------------|------------|--------------------------|---------------------------|--------------------------|------------------------------------------|----------------------------------------|-----------|
|         | Short-term [N·m] | One-sided [N·m] | Reversing [N·m] | Parallel [mm] | Angular [°] | Axial [mm] | Max. Torsional [N·m/rad] | Max. Radial spring [N/mm] | Max. Axial spring [N/mm] |                                          |                                        |           |
| MHS 015 | 1.3              | 0.65            | 0.33            | ±0.25         | 5           | ±0.25      | 22.0                     | 368                       | 81                       | 10,000                                   | $0.67 \times 10^{-6}$                  | 0.023     |
| MHS 020 | 2.5              | 1.3             | 0.7             | ±0.25         | 5           | ±0.25      | 44.1                     | 418                       | 58                       | 10,000                                   | $2.13 \times 10^{-6}$                  | 0.041     |
| MHS 025 | 5.7              | 2.9             | 1.5             | ±0.25         | 5           | ±0.25      | 101                      | 662                       | 95                       | 10,000                                   | $6.45 \times 10^{-6}$                  | 0.078     |
| MHS 030 | 8.9              | 4.5             | 2.3             | ±0.25         | 5           | ±0.25      | 119.4                    | 538                       | 71                       | 10,000                                   | $16.2 \times 10^{-6}$                  | 0.132     |

• Other sizes available on request.  
• Version with blind bore possible on request.

## Dimensions



| Model   | d1 · d2 |      | D    | L    | l1  | l2  | S  | Tightening torque of screws [N·m] |
|---------|---------|------|------|------|-----|-----|----|-----------------------------------|
|         | Min.    | Max. |      |      |     |     |    |                                   |
| MHS 015 | 3.0     | 5.0  | 15.0 | 20.0 | 4.8 | 2.5 | M3 | 1.0                               |
| MHS 020 | 4.0     | 6.0  | 20.0 | 20.0 | 4.8 | 2.5 | M3 | 1.0                               |
| MHS 025 | 6.0     | 10.0 | 25.0 | 24.0 | 5.9 | 3.0 | M4 | 2.1                               |
| MHS 030 | 10.0    | 12.0 | 30.0 | 30.0 | 6.8 | 3.5 | M5 | 4.7                               |

• Other sizes available on request.  
• Version with blind bore possible on request.

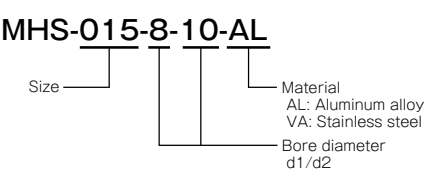
Standard Bore Diameter (Aluminum alloy)

| Standard bore diameter, d1/d2 [mm] and short term torque [N·m] |         |    |      |      |      |     |     |     |     | Unit [mm] |
|----------------------------------------------------------------|---------|----|------|------|------|-----|-----|-----|-----|-----------|
| Nominal bore diameter                                          |         |    | 3    | 4    | 5    | 6   | 8   | 10  | 11  | 12        |
| Supported bore diameter for each model                         | MHS 015 | 3  | 0.71 | 0.66 | 0.59 |     |     |     |     |           |
|                                                                |         | 4  | 0.66 | 0.66 | 0.59 |     |     |     |     |           |
|                                                                |         | 5  | 0.59 | 0.59 | 0.59 |     |     |     |     |           |
|                                                                | MHS 020 | 4  |      | 1.3  | 1.2  | 1.1 |     |     |     |           |
|                                                                |         | 5  |      | 1.2  | 1.2  | 1.1 |     |     |     |           |
|                                                                |         | 6  |      | 1.1  | 1.1  | 1.1 |     |     |     |           |
|                                                                | MHS 025 | 6  |      |      |      | 2.9 | 2.6 | 2.2 |     |           |
|                                                                |         | 8  |      |      |      | 2.6 | 2.6 | 2.2 |     |           |
|                                                                |         | 10 |      |      |      | 2.2 | 2.2 | 2.2 |     |           |
|                                                                | MHS 030 | 10 |      |      |      |     |     | 4.6 | 4.3 | 4.0       |
|                                                                |         | 11 |      |      |      |     |     | 4.3 | 4.3 | 4.0       |
|                                                                |         | 12 |      |      |      |     |     | 4.0 | 4.0 | 4.0       |

Standard Bore Diameter (Stainless steel)

| Standard bore diameter, d1/d2 [mm] and short term torque [N·m] |         |    |     |     |     |     |     |     |  | Unit [mm] |
|----------------------------------------------------------------|---------|----|-----|-----|-----|-----|-----|-----|--|-----------|
| Nominal bore diameter                                          |         |    | 4   | 5   | 6   | 8   | 10  | 12  |  |           |
| Supported bore diameter for each model                         | MHS 015 | 4  | 1.3 | 1.2 |     |     |     |     |  |           |
|                                                                |         | 5  | 1.2 | 1.2 |     |     |     |     |  |           |
|                                                                | MHS 020 | 5  |     | 2.5 | 2.3 |     |     |     |  |           |
|                                                                |         | 6  |     | 2.3 | 2.3 |     |     |     |  |           |
|                                                                | MHS 025 | 6  |     |     | 5.7 | 5.1 | 4.3 |     |  |           |
|                                                                |         | 8  |     |     | 5.1 | 5.1 | 4.3 |     |  |           |
|                                                                |         | 10 |     |     | 4.3 | 4.3 | 4.3 |     |  |           |
|                                                                | MHS 030 | 10 |     |     |     |     | 8.9 | 7.7 |  |           |
|                                                                |         | 12 |     |     |     |     | 7.7 | 7.7 |  |           |

How to Place an Order



# HELIX COUPLING MHC

## Specifications (Aluminum alloy)

| Model   | Max. Torque      |                 |                 | Misalignment  |             |            | Stiffness                |                           |                          | Max. rotation speed [min <sup>-1</sup> ] | Moment of inertia [kg·m <sup>2</sup> ] | Mass [kg] |
|---------|------------------|-----------------|-----------------|---------------|-------------|------------|--------------------------|---------------------------|--------------------------|------------------------------------------|----------------------------------------|-----------|
|         | Short-term [N·m] | One-sided [N·m] | Reversing [N·m] | Parallel [mm] | Angular [°] | Axial [mm] | Max. Torsional [N·m/rad] | Max. Radial spring [N/mm] | Max. Axial spring [N/mm] |                                          |                                        |           |
| MHC 015 | 0.71             | 0.36            | 0.18            | ±0.25         | 5           | ±0.25      | 11.2                     | 169                       | 44                       | 10,000                                   | $0.26 \times 10^{-6}$                  | 0.009     |
| MHC 020 | 1.3              | 0.7             | 0.4             | ±0.25         | 5           | ±0.25      | 21.2                     | 179                       | 29                       | 10,000                                   | $1.09 \times 10^{-6}$                  | 0.021     |
| MHC 025 | 2.9              | 1.5             | 0.8             | ±0.25         | 5           | ±0.25      | 38.2                     | 236                       | 34                       | 10,000                                   | $2.89 \times 10^{-6}$                  | 0.035     |
| MHC 030 | 4.9              | 2.5             | 1.3             | ±0.25         | 5           | ±0.25      | 52.1                     | 219                       | 81                       | 10,000                                   | $7.02 \times 10^{-6}$                  | 0.060     |

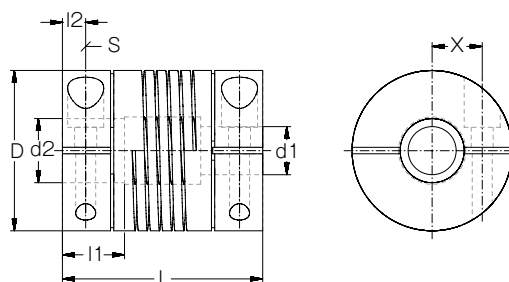
• Other sizes available on request.  
• Version with blind bore possible on request.

## Specifications (Stainless steel)

| Model   | Max. Torque      |                 |                 | Misalignment  |             |            | Stiffness                |                           |                          | Max. rotation speed [min <sup>-1</sup> ] | Moment of inertia [kg·m <sup>2</sup> ] | Mass [kg] |
|---------|------------------|-----------------|-----------------|---------------|-------------|------------|--------------------------|---------------------------|--------------------------|------------------------------------------|----------------------------------------|-----------|
|         | Short-term [N·m] | One-sided [N·m] | Reversing [N·m] | Parallel [mm] | Angular [°] | Axial [mm] | Max. Torsional [N·m/rad] | Max. Radial spring [N/mm] | Max. Axial spring [N/mm] |                                          |                                        |           |
| MHC 020 | 2.5              | 1.3             | 0.7             | ±0.25         | 5           | ±0.25      | 44.1                     | 418                       | 58                       | 10,000                                   | $3.02 \times 10^{-6}$                  | 0.058     |
| MHC 025 | 5.7              | 2.9             | 1.5             | ±0.25         | 5           | ±0.25      | 101                      | 662                       | 95                       | 10,000                                   | $8.02 \times 10^{-6}$                  | 0.097     |
| MHC 030 | 8.9              | 4.5             | 2.3             | ±0.25         | 5           | ±0.25      | 119.4                    | 538                       | 71                       | 10,000                                   | $20.5 \times 10^{-6}$                  | 0.167     |

• Other sizes available on request.  
• Version with blind bore possible on request.

## Dimensions



| Model   | d1 - d2 |      | D    | L    | I1   | I2  | S  | Tightening torque of screws [N·m] |
|---------|---------|------|------|------|------|-----|----|-----------------------------------|
|         | Min.    | Max. |      |      |      |     |    |                                   |
| MHC 015 | 3.0     | 5.0  | 15.0 | 22.0 | 6.0  | 2.5 | M2 | 0.5                               |
| MHC 020 | 4.0     | 6.0  | 20.0 | 28.0 | 8.6  | 3.7 | M3 | 2.0                               |
| MHC 025 | 6.0     | 10.0 | 25.0 | 30.0 | 8.6  | 3.7 | M3 | 2.0                               |
| MHC 030 | 10.0    | 12.0 | 30.0 | 38.0 | 11.0 | 5.0 | M4 | 4.7                               |

• Other sizes available on request.  
• Version with blind bore possible on request.

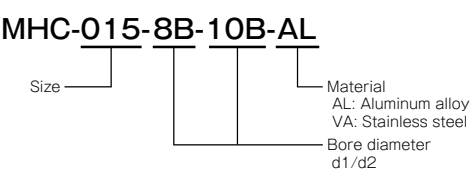
■ Standard Bore Diameter (Aluminum alloy)

| Standard bore diameter, d1/d2 [mm] and short term torque [N·m] |         |    |      |      |      |     |     |     | Unit [mm] |
|----------------------------------------------------------------|---------|----|------|------|------|-----|-----|-----|-----------|
| Nominal bore diameter                                          |         |    | 3    | 4    | 5    | 6   | 8   | 10  | 12        |
| Supported bore diameter for each model                         | MHC 015 | 3  | 0.71 | 0.66 | 0.59 |     |     |     |           |
|                                                                |         | 4  | 0.66 | 0.66 | 0.59 |     |     |     |           |
|                                                                |         | 5  | 0.59 | 0.59 | 0.59 |     |     |     |           |
|                                                                | MHC 020 | 4  |      | 1.3  | 1.2  | 1.1 |     |     |           |
|                                                                |         | 5  |      | 1.2  | 1.2  | 1.1 |     |     |           |
|                                                                |         | 6  |      | 1.1  | 1.1  | 1.1 |     |     |           |
|                                                                | MHC 025 | 6  |      |      |      | 2.9 | 2.6 | 2.2 |           |
|                                                                |         | 8  |      |      |      | 2.6 | 2.6 | 2.2 |           |
|                                                                |         | 10 |      |      |      | 2.2 | 2.2 | 2.2 |           |
|                                                                | MHC 030 | 8  |      |      |      |     | 4.9 | 4.6 | 4.0       |
|                                                                |         | 10 |      |      |      |     | 4.6 | 4.6 | 4.0       |
|                                                                |         | 12 |      |      |      |     | 4.0 | 4.0 | 4.0       |

■ Standard Bore Diameter (Stainless steel)

| Standard bore diameter, d1/d2 [mm] and short term torque [N·m] |         |    |     |     |     |     |     |     | Unit [mm] |
|----------------------------------------------------------------|---------|----|-----|-----|-----|-----|-----|-----|-----------|
| Nominal bore diameter                                          |         |    | 5   | 6   | 8   | 10  | 11  | 12  |           |
| Supported bore diameter for each model                         | MHC 020 | 5  | 2.5 | 2.3 |     |     |     |     |           |
|                                                                |         | 6  | 2.3 | 2.3 |     |     |     |     |           |
|                                                                | MHC 025 | 6  |     | 5.7 | 5.1 | 4.3 |     |     |           |
|                                                                |         | 8  |     | 5.1 | 5.1 | 4.3 |     |     |           |
|                                                                |         | 10 |     | 4.3 | 4.3 | 4.3 |     |     |           |
|                                                                | MHC 030 | 10 |     |     |     | 8.9 | 8.3 | 7.7 |           |
|                                                                |         | 11 |     |     |     | 8.3 | 8.3 | 7.7 |           |
|                                                                |         | 12 |     |     |     | 7.7 | 7.7 | 7.7 |           |

How to Place an Order



# HELIX COUPLING MHL

## Specifications (Aluminum alloy)

| Model   | Max. Torque      |                 |                 | Misalignment  |             |            | Stiffness                |                          | Max. rotation speed [min <sup>-1</sup> ] | Moment of inertia [kg·m <sup>2</sup> ] | Mass [kg] |
|---------|------------------|-----------------|-----------------|---------------|-------------|------------|--------------------------|--------------------------|------------------------------------------|----------------------------------------|-----------|
|         | Short-term [N·m] | One-sided [N·m] | Reversing [N·m] | Parallel [mm] | Angular [°] | Axial [mm] | Max. Torsional [N·m/rad] | Max. Axial spring [N/mm] |                                          |                                        |           |
| MHL 100 | 3.2              | 1.6             | 0.8             | ±0.75         | 5           | ±0.25      | 25                       | 44                       | 3,600                                    | 4.52×10 <sup>-6</sup>                  | 0.054     |
| MHL 125 | 6.4              | 3.2             | 1.6             | ±0.75         | 5           | ±0.25      | 50                       | 29                       | 3,600                                    | 15.2×10 <sup>-6</sup>                  | 0.113     |
| MHL 150 | 12.0             | 6.0             | 3.0             | ±0.75         | 5           | ±0.25      | 91                       | 34                       | 3,600                                    | 34.1×10 <sup>-6</sup>                  | 0.180     |

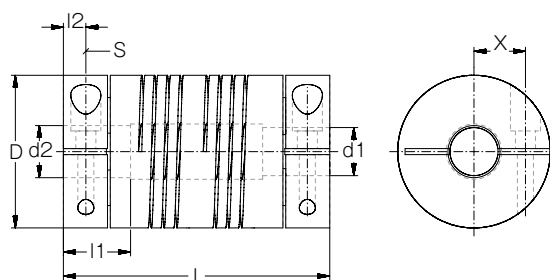
- Other sizes available on request.
- Version with blind bore possible on request.

## Specifications (Stainless steel)

| Model   | Max. Torque      |                 |                 | Misalignment  |             |            | Stiffness                |                          | Max. rotation speed [min <sup>-1</sup> ] | Moment of inertia [kg·m <sup>2</sup> ] | Mass [kg] |
|---------|------------------|-----------------|-----------------|---------------|-------------|------------|--------------------------|--------------------------|------------------------------------------|----------------------------------------|-----------|
|         | Short-term [N·m] | One-sided [N·m] | Reversing [N·m] | Parallel [mm] | Angular [°] | Axial [mm] | Max. Torsional [N·m/rad] | Max. Axial spring [N/mm] |                                          |                                        |           |
| MHL 100 | 6.8              | 3.4             | 1.7             | ±0.75         | 5           | ±0.25      | 70                       | 56                       | 3,600                                    | 12.6×10 <sup>-6</sup>                  | 0.150     |
| MHL 125 | 14.2             | 7.1             | 3.6             | ±0.75         | 5           | ±0.25      | 130                      | 64                       | 3,600                                    | 42.3×10 <sup>-6</sup>                  | 0.315     |
| MHL 150 | 23.5             | 11.8            | 5.9             | ±0.75         | 5           | ±0.25      | 190                      | 78                       | 3,600                                    | 96.1×10 <sup>-6</sup>                  | 0.507     |

- Other sizes available on request.
- Version with blind bore possible on request.

## Dimensions



| Model   | d1 • d2 |      | D    | L    | l1   | l2  | S  | Tightening torque of screws [N·m] |
|---------|---------|------|------|------|------|-----|----|-----------------------------------|
|         | Min.    | Max. |      |      |      |     |    |                                   |
| MHL 100 | 6.0     | 10.0 | 25.4 | 44.5 | 9.4  | 3.8 | M3 | 2.0                               |
| MHL 125 | 8.0     | 15.0 | 31.8 | 60.2 | 13.0 | 5.6 | M4 | 4.7                               |
| MHL 150 | 10.0    | 16.0 | 38.1 | 66.5 | 16.8 | 5.6 | M4 | 4.7                               |

- Other sizes available on request.
- Version with blind bore possible on request.

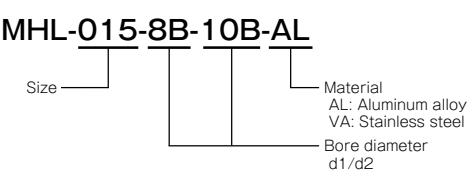
Standard Bore Diameter (Aluminum alloy)

|                                        |         | Standard bore diameter, d1/d2 [mm] and short term torque [N·m] |     |     |      | Unit [mm] |  |
|----------------------------------------|---------|----------------------------------------------------------------|-----|-----|------|-----------|--|
| Nominal bore diameter                  |         | 6                                                              | 8   | 10  | 12   |           |  |
| Supported bore diameter for each model | MHL 100 | 6                                                              | 3.2 | 2.7 | 2.3  |           |  |
|                                        |         | 8                                                              | 2.7 | 2.7 | 2.3  |           |  |
|                                        |         | 10                                                             | 2.3 | 2.3 | 2.3  |           |  |
|                                        | MHL 125 | 8                                                              |     | 6.4 | 5.5  | 4.1       |  |
|                                        |         | 10                                                             |     | 5.5 | 5.5  | 4.1       |  |
|                                        |         | 12                                                             |     | 4.1 | 4.1  | 4.1       |  |
|                                        | MHL 150 | 10                                                             |     |     | 12.0 | 10.3      |  |
|                                        |         | 12                                                             |     |     | 10.3 | 10.3      |  |
|                                        |         |                                                                |     |     |      |           |  |

Standard Bore Diameter (Stainless steel)

|                                        |         | Standard bore diameter, d1/d2 [mm] and short term torque [N·m] |     |      |      |      |    |     | Unit [mm] |
|----------------------------------------|---------|----------------------------------------------------------------|-----|------|------|------|----|-----|-----------|
| Nominal bore diameter                  |         | 6                                                              | 8   | 10   | 12   | 14   | 15 | 16  |           |
| Supported bore diameter for each model | MHL 100 | 6                                                              | 6.8 | 5.9  | 5.0  |      |    |     |           |
|                                        |         | 8                                                              | 5.9 | 5.9  | 5.0  |      |    |     |           |
|                                        |         | 10                                                             | 5.0 | 5.0  | 5.0  |      |    |     |           |
|                                        | MHL 125 | 8                                                              |     | 14.2 |      | 9.6  |    | 7.3 |           |
|                                        |         | 12                                                             |     | 9.6  |      | 9.6  |    | 7.3 |           |
|                                        |         | 15                                                             |     | 7.3  |      | 7.3  |    | 7.3 |           |
|                                        | MHL 150 | 12                                                             |     |      | 23.5 | 20.7 |    |     | 17.5      |
|                                        |         | 14                                                             |     |      | 20.7 | 20.7 |    |     | 17.5      |
|                                        |         | 16                                                             |     |      | 17.5 | 17.5 |    |     | 17.5      |

How to Place an Order





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