

# Torsion Proof Multi-Disk Coupling for Torque Measurement Flange Type 4551A...

Type 2300A...

Torsion proof multi-disk coupling for efficient, space-saving connection of torque sensor Type 4551A... into the shaft assembly.

- High torsion resistance
- Absolutely free of wear and maintenance
- Non-sensitive to alternating loads
- Low moment of inertia due to high performance density
- Completely backlash-free up to the nominal torque
- High misalignment compensation capability at low restoring forces

## Description

The steel multi-disk coupling Type 2300A... is especially designed for use with the Type 4551A... torque sensors. The coupling can be screwed directly onto the torque sensor. For additional connection of the shaft assembly, there is a choice of tension ring hub or a standard flange.

## Application

The multi-disk coupling is used to compensate for axial, radial, and angle misalignment when incorporating the torque sensor into the shaft assembly. Compensation of these misalignments is always needed to avoid measurement error and damage to the sensor.

Different variants eliminate most problems integrating the torque sensor into nearly any application.



## General Technical Data

| Type 2300A...                     |           |                             | 10...  | 25...  | 40...  | 100... | 300... | 500... | 850... |
|-----------------------------------|-----------|-----------------------------|--------|--------|--------|--------|--------|--------|--------|
| for sensors Type 4551A...         | N·m       |                             | 50/100 | 200... | 500... | 1K...  | 2K...  | 3K...  | 5K...  |
| Nominal torque                    | $T_{KN}$  | N·m                         | 100    | 420    | 650    | 1 600  | 3 500  | 5 800  | 9 500  |
| Peak transient torque             | $T_{KS}$  | N·m                         | 150    | 630    | 975    | 2 400  | 5 250  | 8 700  | 14 250 |
| Coupling outer diameter           | D         | mm                          | 69     | 89     | 104    | 143    | 167    | 198    | 234    |
| Torsion resistance (per assembly) | $C_L$     | $10^3 \cdot \text{N·m/rad}$ | 60     | 290    | 320    | 1 900  | 3 480  | 11 900 | 20 600 |
| Torsion resistance overall        | $C_{ges}$ | $10^3 \cdot \text{N·m/rad}$ | 30     | 145    | 160    | 950    | 1 740  | 5 950  | 10 300 |

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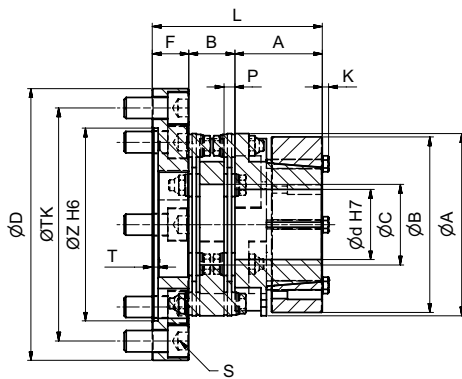
**Coupling Type 2300A... with Tension Ring Hub (Variant S)**

- for adapting a specimen with straight shaft end to the sensor Type 4551A... on the measurement side
- for high speed applications with low axial misalignment



| Type 2300A...                   |  |                                      | 10...       | 25...     | 40...     | 100...    | 300...    | 500...     | 850...     |
|---------------------------------|--|--------------------------------------|-------------|-----------|-----------|-----------|-----------|------------|------------|
| for sensors Type 4551A...       |  | N·m                                  | 50/100      | 200...    | 500...    | 1K...     | 2K...     | 3K...      | 5K...      |
| Hole diameter (min. ... max.)   |  | mm                                   | 19 ... 38   | 32 ... 52 | 40 ... 60 | 55 ... 90 | 50 ... 85 | 60 ... 100 | 70 ... 120 |
| Permitted axial offset          |  | ΔK <sub>a</sub> mm                   | 0,25        | 0,25      | 0,3       | 0,45      | 0,35      | 0,4        | 0,45       |
| Permitted radial offset         |  | ΔK <sub>r</sub> mm                   | 0,05        | 0,05      | 0,06      | 0,07      | 0,07      | 0,1        | 0,12       |
| Perm. angle offset (1 package)  |  | ΔK <sub>w</sub> °                    | 0,3         | 0,2       | 0,2       | 0,2       | 0,15      | 0,15       | 0,15       |
| Max. speed                      |  | n <sub>max</sub> 1/min               | 15 000      | 15 000    | 12 000    | 12 000    | 10 000    | 10 000     | 8 000      |
| Balance quality                 |  | G                                    | 2,5 / 3 000 |           |           |           |           |            |            |
| Moment of inertia <sup>1)</sup> |  | J kgm <sup>2</sup> ·10 <sup>-3</sup> | 0,81        | 3,38      | 11,6      | 46,65     | 81,96     | 166,38     | 408,7      |
| Mass <sup>1)</sup>              |  | m kg                                 | 0,85        | 2,05      | 4,1       | 9,92      | 14,69     | 23,75      | 40         |
| Clamping screw torque           |  | N·m                                  | 6           | 6,5       | 8,5       | 25        | 35        | 56         | 93         |

<sup>1)</sup> Moment of inertia and mass relate to hubs with maximum hole size.

**Dimensions**


| Type 2300A...             |        | 10...     | 25...     | 40...     | 100...    | 300...    | 500...     | 850...     |
|---------------------------|--------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| for sensors Type 4551A... |        | 50/100    | 200...    | 500...    | 1K...     | 2K...     | 3K...      | 5K...      |
| øA                        | mm     | 69        | 89        | 104       | 143       | 167       | 198        | 234        |
| øB                        | mm     | 68        | 82        | 100       | 143       | 164       | 198        | 234        |
| øC                        | mm     | 35,5      | 41        | 46        | 66        | 61        | 66         | 76         |
| ød H7 *                   | mm     | 19 ... 38 | 32 ... 52 | 40 ... 60 | 55 ... 90 | 50 ... 85 | 60 ... 100 | 70 ... 120 |
| øD                        | mm     | 100       | 120       | 155       | 185       | 210       | 232        | 284        |
| øTK                       | mm     | 87        | 105       | 133       | 133       | 165       | 165        | 206        |
| øZ H6                     | mm     | 75        | 90        | 110       | 110       | 140       | 140        | 174        |
| A                         | mm     | 32        | 45        | 50        | 60        | 75        | 95         | 115        |
| B                         | mm     | 15,5      | 22        | 26,2      | 35,2      | 44,4      | 52         | 65         |
| F                         | mm     | 15        | 17        | 21        | 42        | 39        | 45         | 51         |
| K                         | mm     | 3,5       | 3,5       | 3,5       | 5,3       | 5,3       | 6,4        | 7,5        |
| L                         | mm     | 62,5      | 84        | 97,2      | 137,2     | 158,4     | 192        | 231        |
| P                         | mm     | 3         | 5         | 6,1       | 8,6       | 11,2      | 12         | 14         |
| S                         | 8x45 ° | M6        | M8        | M12       | M12       | M14       | M14        | M18        |
| T                         | mm     | 3,5       | 3,5       | 3,5       | 4         | 4         | 4          | 4          |

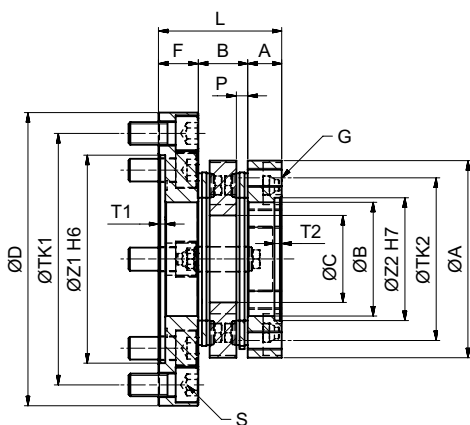
\* shaft tolerance g6

**Coupling Type 2300A... with Flange (Variant F)**

- for adapting a specimen with flange connection to the sensor Type 4551A... on the measurement side
- for high speed applications with low axial misalignment



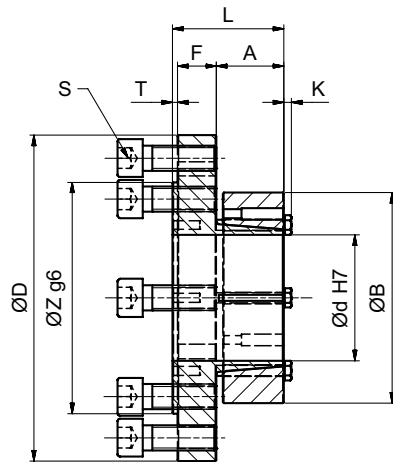
| Type 2300A...                     |                                      | 10...       | 25...  | 40...  | 100... | 300... | 500... | 850... |
|-----------------------------------|--------------------------------------|-------------|--------|--------|--------|--------|--------|--------|
| for sensors Type 4551A...         | N·m                                  | 50/100      | 200... | 500... | 1K...  | 2K...  | 3K...  | 5K...  |
| Screws                            |                                      | 8xM6        | 6xM8   | 6xM10  | 6xM12  | 8xM16  | 8xM16  | 8xM20  |
| Permitted axial offset            | $\Delta K_a$ mm                      | 0,25        | 0,25   | 0,3    | 0,45   | 0,35   | 0,4    | 0,45   |
| Permitted radial offset           | $\Delta K_r$ mm                      | 0,05        | 0,05   | 0,06   | 0,07   | 0,07   | 0,1    | 0,12   |
| Perm. angle offset (per assembly) | $\Delta K_w$ °                       | 0,3         | 0,2    | 0,2    | 0,2    | 0,15   | 0,15   | 0,15   |
| Max. speed                        | $n_{max}$ 1/min                      | 15 000      | 15 000 | 12 000 | 12 000 | 10 000 | 10 000 | 8 000  |
| Balance quality                   | G                                    | 2,5 / 3 000 |        |        |        |        |        |        |
| Moment of inertia                 | J kgm <sup>2</sup> ·10 <sup>-3</sup> | 0,56        | 2,97   | 9,61   | 36,75  | 63,4   | 116,6  | 295,86 |
| Mass                              | m kg                                 | 0,54        | 1,37   | 2,9    | 7,16   | 9,69   | 14,42  | 24,88  |
| Clamping screw torque             | N·m                                  | 10          | 42     | 71     | 143    | 200    | 300    | 590    |

**Dimensions**


| Type 2300A...             |        | 10...  | 25...  | 40...  | 100... | 300... | 500... | 850... |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| for sensors Type 4551A... |        | 50/100 | 200... | 500... | 1K...  | 2K...  | 3K...  | 5K...  |
| øA                        | mm     | 69     | 89     | 104    | 143    | 178    | 210    | 250    |
| øB                        | mm     | 30     | 50     | 60     | 85     | 92     | 112    | 132    |
| øC                        | mm     | 35,5   | 41     | 46     | 66     | 61     | 66     | 76     |
| øD                        | mm     | 100    | 120    | 155    | 185    | 210    | 232    | 284    |
| øTK1                      | mm     | 87     | 105    | 133    | 133    | 165    | 165    | 206    |
| øTK2                      | mm     | 55     | 75     | 86     | 116    | 150    | 175    | 210    |
| øZ1 H6                    | mm     | 75     | 90     | 110    | 110    | 140    | 140    | 174    |
| øZ2 H7                    | mm     | 35     | 55     | 65     | 92     | 100    | 120    | 140    |
| A                         | mm     | 11     | 15     | 18     | 20     | 27     | 36     | 44     |
| B                         | mm     | 15,5   | 22     | 26,2   | 35,2   | 44,4   | 52     | 65     |
| F                         | mm     | 15     | 17     | 21     | 42     | 39     | 45     | 51     |
| G                         |        | 8xM6   | 6xM8   | 6xM10  | 6xM12  | 8xM16  | 8xM16  | 8xM20  |
| L                         | mm     | 41,5   | 54     | 65,2   | 97,2   | 110,4  | 133    | 160    |
| P                         | mm     | 3      | 5      | 6,1    | 8,6    | 11,2   | 12     | 14     |
| S                         | 8x45 ° | M6     | M8     | M12    | M12    | M14    | M14    | M18    |
| T1                        | mm     | 3,5    | 3,5    | 3,5    | 4      | 4      | 4      | 4      |
| T2                        | mm     | 3      | 4      | 4      | 5      | 6      | 6      | 6      |

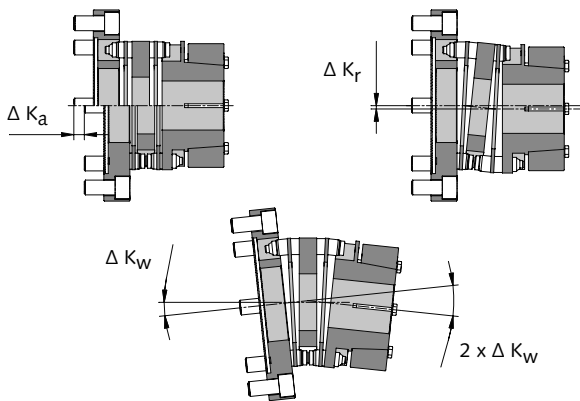
**Adapter Flange Type 2300A... with Tension Ring Hub  
 (Variant A)**

- for rigid drive-side adaptation of the sensor Type 4551A... to a drive or loading machine



| Type 2300A...                | 10...     | 25...     | 40...     | 100...    | 300...    | 500...     | 850...     |
|------------------------------|-----------|-----------|-----------|-----------|-----------|------------|------------|
| for sensors<br>Type 4551A... | 50/100    | 200...    | 500...    | 1K...     | 2K...     | 3K...      | 5K...      |
| øB mm                        | 68        | 82        | 100       | 143       | 164       | 198        | 234        |
| ød H7 * mm                   | 19 ... 38 | 32 ... 52 | 40 ... 60 | 55 ... 90 | 50 ... 85 | 60 ... 100 | 70 ... 120 |
| øD mm                        | 100       | 120       | 155       | 155       | 190       | 190        | 238        |
| øZ g6 mm                     | 75        | 90        | 110       | 110       | 140       | 140        | 174        |
| A mm                         | 20,5      | 30        | 32        | 40        | 48        | 55         | 68         |
| F mm                         | 11,5      | 13        | 18,5      | 18,5      | 21        | 21         | 26,5       |
| K mm                         | 3,5       | 3,5       | 3,5       | 5,3       | 5,3       | 6,4        | 7,5        |
| L mm                         | 34        | 45        | 53        | 61        | 72        | 79         | 98         |
| S 8x45 °                     | M6        | M8        | M12       | M12       | M14       | M14        | M18        |
| T mm                         | 2         | 2         | 2,5       | 2,5       | 3         | 3          | 3,5        |

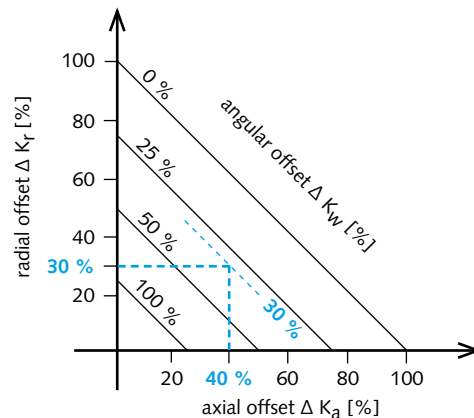
\* shaft tolerance g6

**Permissible Shaft Displacements**


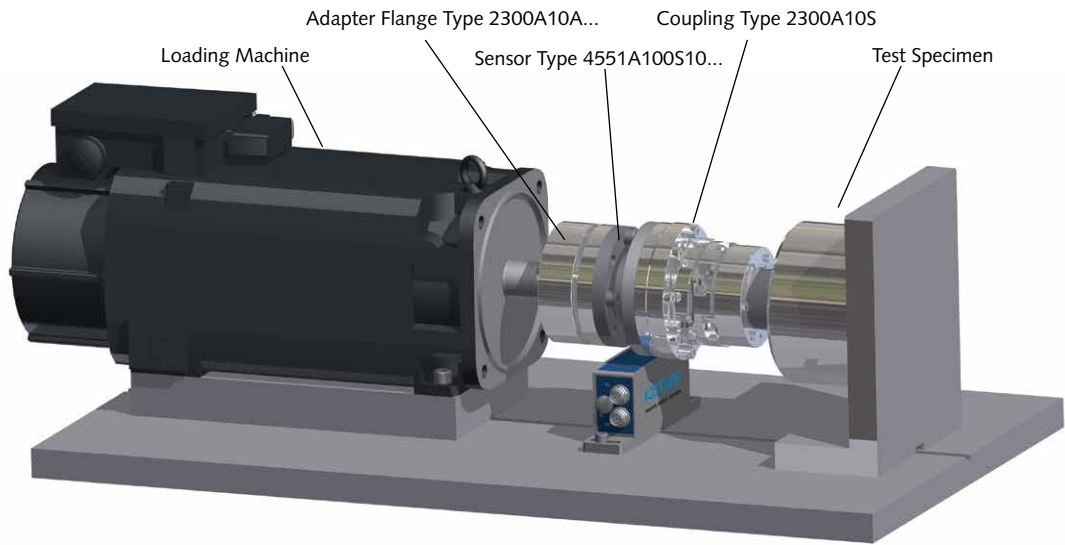
The multi-disc coupling uses a two disc assembly to compensate for angular, axial, and radial shaft offsets. If multiple offsets occur simultaneously, they influence one another. The permissible values for displacement are therefore depending on each other. The sum of the actual displacements – in percent of the maximum values – may not exceed 100 %.

**Example Calculation for Type 2300A40...**

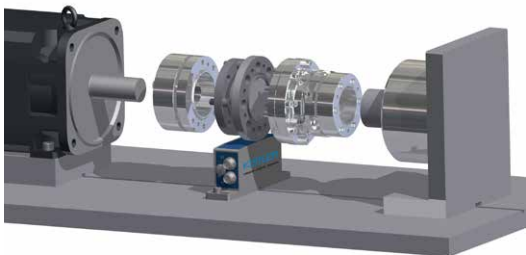
- **Axial offset** occurring:  $\Delta K_a = 0,44$  mm (e.g. corresponds to **40 %** of permissible maximum value  $\Delta K_a = 1,1$  mm)
- **Angular offset** occurring:  $\Delta K_w = 0,21^\circ$  (e.g. corresponds to **30 %** of maximum value  $\Delta K_w = 0,7^\circ$ )
- Yields a **permissible radial offset** (see diagram below):  
 $\Delta K_r = 30\%$  of maximum value  $\Delta K_r = 0,25$  mm  
 $\Rightarrow \Delta K_r = 0,08$  mm



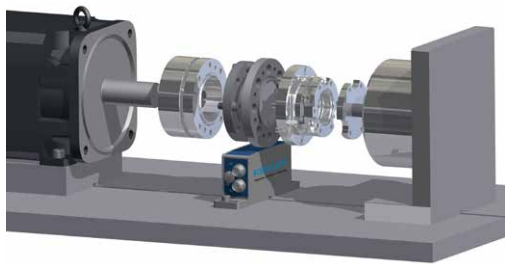
Example of Application



Possible Adaptations



Adapter Flange + Coupling Type 2300A... Variant S: Tension Ring Hub



Adapter Flange + Coupling Type 2300A... Variant F: Flange

Included Accessories

- Necessary bolts for the coupling assembly of the sensor Type 4551A...

Ordering Key

Type 2300A

Coupling Size

|                                  |     |
|----------------------------------|-----|
| for sensor Type 4551A..., 50/100 | 010 |
| for sensor Type 4551A..., 200    | 025 |
| for sensor Type 4551A..., 500    | 040 |
| for sensor Type 4551A..., 1K     | 100 |
| for sensor Type 4551A..., 2K     | 300 |
| for sensor Type 4551A..., 3K     | 500 |
| for sensor Type 4551A..., 5K     | 850 |

Variant

|                                      |   |
|--------------------------------------|---|
| Coupling with tension ring hub       | S |
| Coupling with flange                 | F |
| Adapter flange with tension ring hub | A |

|                         |      |
|-------------------------|------|
| Hole diameter øH7 in mm | xxx* |
|-------------------------|------|

\*Only option S and A

Observe min. and max. diameters (see dimensions table).

Ordering Example:

Typ 2300A025S-035

Torsion proof multi-disk coupling Type 2300A, size 025, variant S: tension ring hub, Hole diameter ødH7 = 35 mm: 035.

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