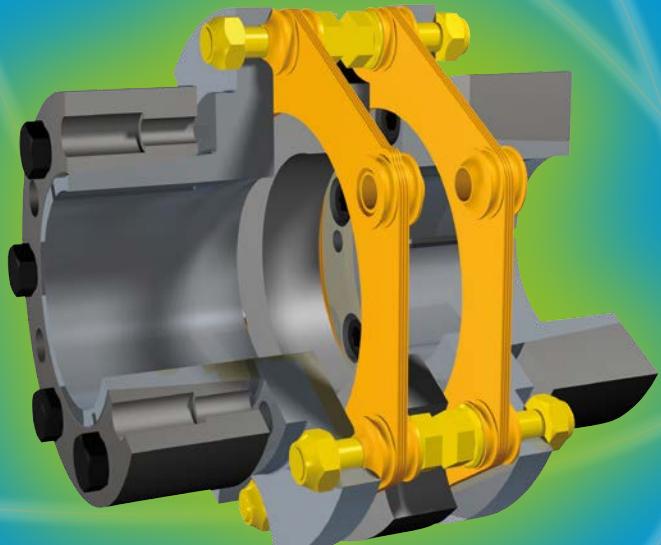




your reliable partner

ROBA[®]-DS

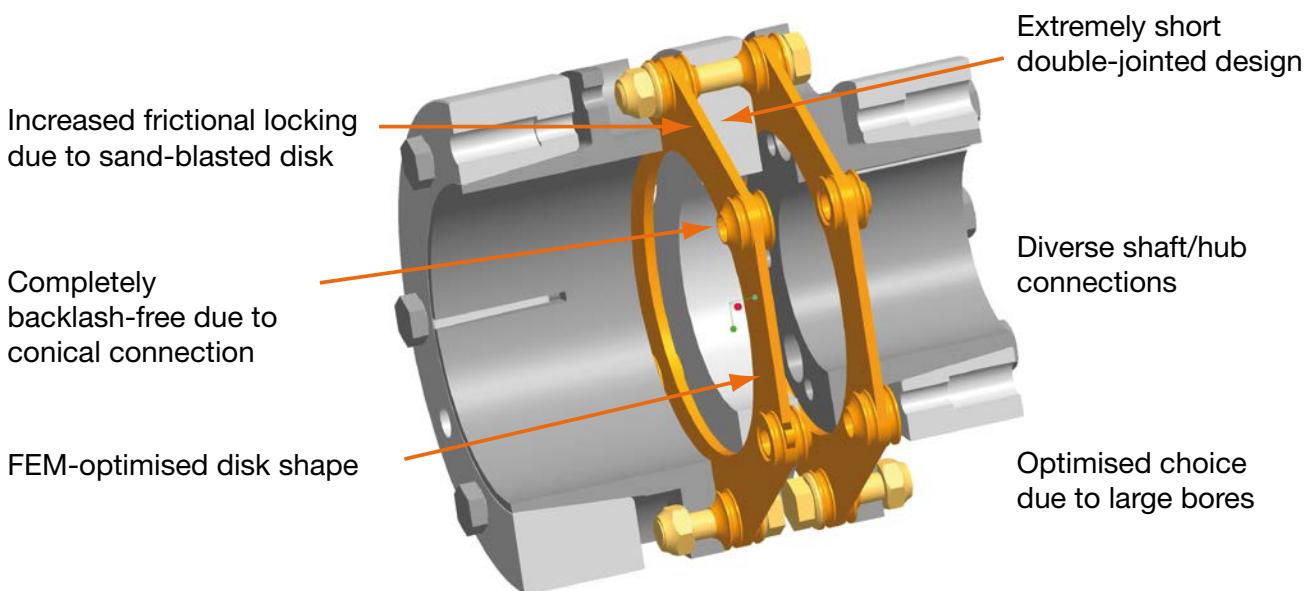
Torsionally Rigid Shaft Couplings



ROBA®-DS

Technologically superior

- Non-sensitive to alternating loads of up to 100 % of the nominal torque
- Low mass inertia due to high performance density
- Completely backlash-free up to nominal torque
- High misalignment compensation capability at low restoring forces
- High torsional rigidity up to nominal torque
- Completely wear and maintenance-free
- Optimum construction shape due to large variant range



The ROBA®-DS transmits drive torques up to the nominal torque completely backlash-free and with permanently high torsional spring rigidity. Problems to be found on other commercially available couplings, such as denting the disks or overcoming the frictional locking, are not a problem on our couplings. The specified shaft misalignments can be 100 % utilized without affecting the transmittable torque. This guarantees unlimited use.



ROBA®-DS couplings are also available in ATEX design according to the directive 94/9 EC (ATEX 95).



ROBA®-DS couplings are also available in rustproof design.

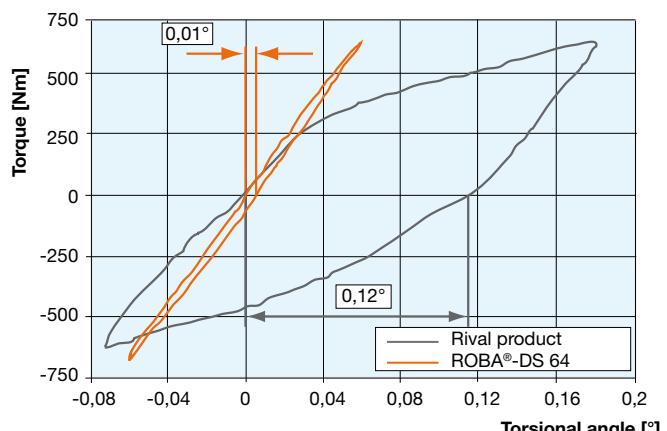


Diagram: A ROBA®-DS coupling rigidity characteristic curve in comparison to a typical rival product with frictionally-locking/positively-locking torque transmission.



According to German notation, decimal points in this catalogue are represented with a comma (e.g. 0,5 instead of 0.5). We reserve the right to make dimensional and constructional alterations.

Backlash-free servo couplings (Aluminium)

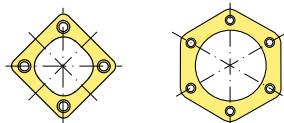
Page 8 ▶

Sizes 3 to 15

Nominal torques
35 to 150 Nm
Bores
10 to 45

Angular misalignment 1°

Disk pack-Servo with 4x divisions and 6x divisions



Shaft connection

Clamping hub
Hub with tapered bore
Split clamping hub
Shrink disk hub

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Page 8 ▶
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Backlash-free all-steel couplings

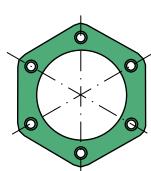
Page 14 ▶

Sizes 16 to 160

Nominal torques
300 to 2600 Nm
Bores
14 to 110

Angular misalignment 0,7°

Disk pack-HT with 6x divisions



Shaft connection

Key hub
Key hub large
Clamping hub
Shrink disk hub external clamping
External shrink disk hub
Shrink disk hub external/internal clamping
Shrink disk hub large
Flange

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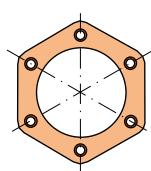
Sizes 16 to 160

Nominal torques
190 to 1600 Nm

Bores
14 to 110

Angular misalignment 1°

Disk pack-HF with 6x divisions



Shaft connection

Key hub
Key hub large
Clamping hub
Clamping ring hub
Shrink disk hub external clamping
External shrink disk hub
Shrink disk hub external/internal clamping
Shrink disk hub large
Split clamping hub
Flange

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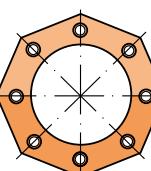
Sizes 180 to 2200

Nominal torques
2100 to 24000 Nm

Bores
40 to 170

Angular misalignment 0,5°

Disk pack with 8x divisions



Shaft connection

Key hub
Shrink disk hub external clamping
External shrink disk hub
Split clamping hub
Flange

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Page 50 ▶
Page 52 ▶

Sizes 2200 to 11000

Nominal torques
22 to 110 kNm

Angular misalignment 0,4°

Shaft connection

Customer-specific adaptations
e. g. :
key hub, shrink disk hub, flange

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Variable Length Sleeve S/CFRP Sleeve/Options and variants on intermediate shafts

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Safe Against Overload

Page 59 ▶

Transmittable Torques for Shrink disk, Split clamping, Clamping ring, Clamping and Key hubs

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Installation Examples

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Integrated Torque Measurement

Page 64 ▶

Dimensioning, Size Selection

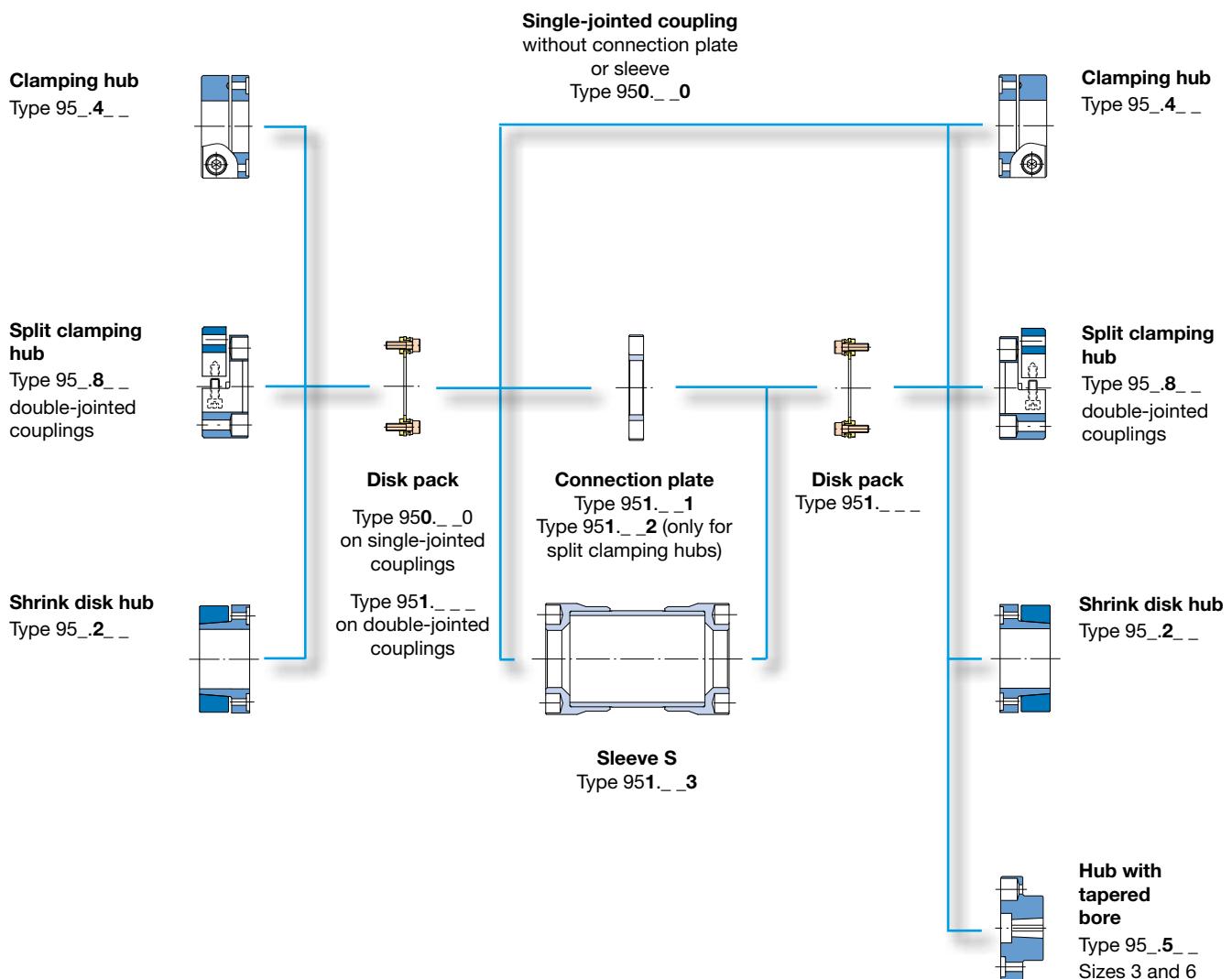
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Technical Explanations

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ROBA®-DS backlash-free servo couplings

Configuration Possibilities/Standard Designs



ROBA®-DS backlash-free servo couplings

Type Key/Order Number

Sizes 3 to 15

Type Key/Order Number

| | Hub 1 | Hub 2 | |
|--------------------|-------|-------|-----------------------|
| Shrink disk hub | 2 | 2 | Shrink disk hub |
| Clamping hub | 4 | 4 | Clamping hub |
| | | 5 | Hub with tapered bore |
| Split clamping hub | 8 | 8 | Split clamping hub |

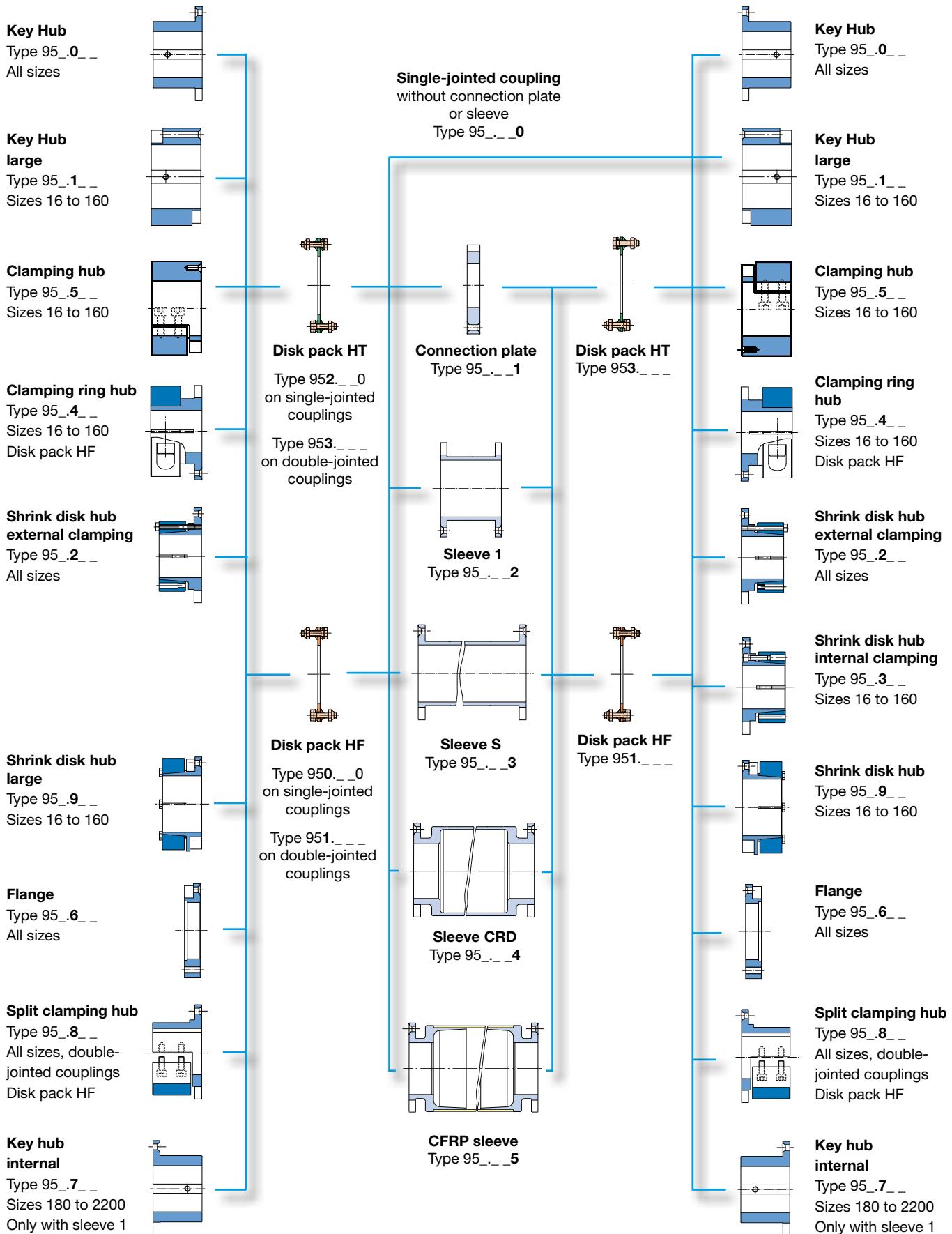
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| — | / | 9 | 5 | — | . | — | — | / | — | / | — | / | — |
| ▲ | | | | ▲ | | | ▲ | | ▲ | | ▲ | | ▲ |

| | | | | | | | |
|---|--|----------------------|--|--|---------------------|---------------------|--|
| Size 3 6 10 15 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Double-jointed coupling Connection plate Connection plate HSK Sleeve S | 0 1 2 3 | Bore Hub 1 ø | Bore Hub 2 ø | Operating Speed [rpm] for Sleeve S |
|---|--|----------------------|--|--|---------------------|---------------------|--|



ROBA®-DS backlash-free all-steel couplings

Configuration Possibilities/Standard Designs



ROBA®-DS backlash-free all-steel couplings

Type Key/Order Number

Sizes 16 to 160

Type Key/Order Number

| | | | Hub 1 | Hub 2 | |
|------------------------------------|---------------------------|---------------------------|------------------------------------|--------------|-----------------------|
| Key hub, standard | 0 | | Key hub, standard | 0 | |
| Key hub, large | 1 | | Key hub, large | 1 | |
| Shrink disk hub, external clamping | 2 | | Shrink disk hub, external clamping | 2 | |
| Clamping ring hub | 4 | | Shrink disk hub, internal clamping | 3 | |
| Clamping hub | 5 | | Clamping ring hub | 4 | |
| Flange | 6 | | Clamping hub | 5 | |
| Split clamping hub | 8 | | Flange | 6 | |
| Shrink disk hub, large | 9 | | Split clamping hub | 8 | |
| | | ▼ | | ▼ | |
| — / 9 5 — . — | | | | | |
| ▲ ▲ | | | ▲ ▲ | ▲ ▲ | ▲ ▲ |
| Size 16 25 40 64 100 160 | Single-jointed coupling 0 | Single-jointed coupling 0 | Bore Hub 1 ø | Bore Hub 2 ø | Operating Speed [rpm] |
| | Disk pack HF | | | | for Sleeve S |
| | Double-jointed coupling 1 | Double-jointed coupling | Connection plate 1 | | Sleeve CRD |
| | Disk pack HF | Double-jointed coupling | Sleeve 1 2 | | CFRP sleeve |
| | | Connection plate | Sleeve S 3 | | |
| | | Sleeve 1 2 | Sleeve CRD 4 | | |
| | | Sleeve S 3 | CFRP sleeve 5 | | |
| | | | | | |

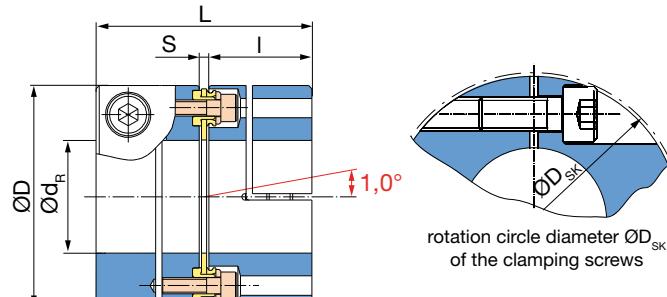
Sizes 180 to 2200

Type Key/Order Number

| | | Hub 1 | Hub 2 | |
|------------------------------------|---------------------------|---------------------------|------------------------------------|-----------------------|
| Key hub, standard | 0 | 0 | Key hub, standard | |
| Shrink disk hub, external clamping | 2 | 2 | Shrink disk hub, external clamping | |
| Flange | 6 | 6 | Flange | |
| Key hub, internal | 7 | 7 | Key hub, internal | |
| Split clamping hub | 8 | 8 | Split clamping hub | |
| — / 9 5 — . — | | | | |
| ▲ ▲ | | | ▲ ▲ | |
| Size 180 300 500 850 1400 2200 | Single-jointed coupling 0 | Single-jointed coupling 0 | Bore Hub 1 ø | Bore Hub 2 ø |
| | Double-jointed coupling 1 | Double-jointed coupling | Connection plate 1 | Operating Speed [rpm] |
| | | Double-jointed coupling | Sleeve 1 2 | for Sleeve S |
| | | Connection plate | Sleeve S 3 | Sleeve CRD |
| | | Sleeve 1 2 | Sleeve CRD 4 | CFRP sleeve |
| | | Sleeve S 3 | CFRP sleeve 5 | |
| | | | | |

ROBA®-DS Sizes 3 to 15

Single-jointed coupling with clamping hubs



Alternative shaft connection Hub with tapered bore

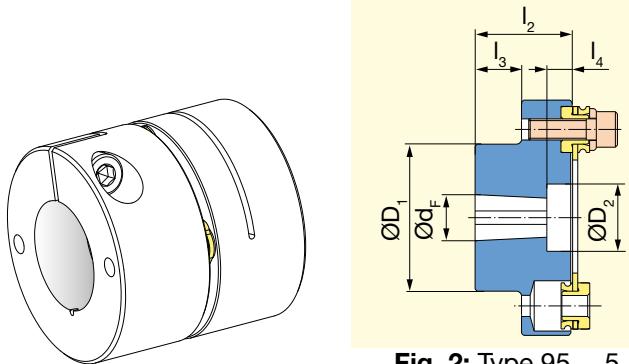


Fig. 2: Type 95..._5
(only Sizes 3 and 6)
e.g. for Fanuc motors

Technical Data and Main Dimensions

| | | Size | | | | | |
|--|---|-----------------------|-----------------------------|-------------------------------|-------|-------|-------|
| | | 3 | 6 | 10 | 15 | | |
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 35 | 60 | 100 | 150 | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 52 | 90 | 150 | 225 | |
| Alternating torque | T _{KW} | [Nm] | 21 | 36 | 60 | 90 | |
| Outer diameter | D | [mm] | 45 | 56 | 69 | 79 | |
| Minimum hub bore ^{3) 4)} | d _R ^{H7} min | [mm] | 10 | 14 | 19 | 25 | |
| Maximum hub bore ^{3) 4)} | d _R ^{H7} max | [mm] | 20 | 28 | 35 | 42 | |
| Maximum speed ⁵⁾ | with clamping hub | n _{max} | [rpm] | 13500 | 10800 | 9000 | 7800 |
| | with hub with tapered bore | n _{max} | [rpm] | 22500 | 18000 | 15000 | 13000 |
| Permitted misalignments ⁶⁾ | permitted axial displacement ^{7) 8)} | ΔK _a | [mm] | 0,5 | 0,7 | 0,9 | 1,1 |
| | permitted radial misalignment ⁷⁾ | ΔK _r | [mm] | 0,15 | 0,15 | 0,2 | 0,2 |
| | with connection plate | ΔK _{rH} | [mm] | (H _S - S) × 0,0174 | | | |
| Spring rigidity | torsion ⁹⁾ | C _{T LP} | [10 ³ Nm/rad] | 17 | 35 | 60 | 145 |
| | disk pack | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 3,3 | 6,8 | 12 | 19 |
| | tube sleeve S | | [Nm/rad] | 43 | 64 | 76 | 229 |
| angular spring rigidity ¹⁰⁾ | | | | | | | |

Dimensions [mm]

| Size | 3 | 6 | 10 | 15 | |
|-----------------------|------------------------------|------|------|------|----|
| D _{SK} | 47 | - | 71 | - | |
| d ₃ | 17 | 22,5 | 35,5 | 40 | |
| H _S | acc. customer specifications | | | | |
| h ₂ | 40 | 50 | 60 | 70 | |
| L | 48,5 | 52,6 | 66,9 | 69,9 | |
| L ₂ | 59 | 64,7 | 79,3 | 82,8 | |
| L ₆ | dependent on H _S | | | | |
| I | 23 | 25 | 32 | 33,5 | |
| S | 2,5 | 2,6 | 2,9 | 2,9 | |
| U | 28 | 32 | 40 | 46 | |
| U ₁ | 13 | 14,7 | 15,3 | 15,8 | |
| Hub with tapered bore | d _F ± 0,05 | 11 | 14 | 11 | 14 |
| | D ₁ | 27 | 27 | 35 | 35 |
| | D ₂ | 16 | 21 | 16 | 25 |
| | I ₂ | 23 | 30 | 23 | 30 |
| | I ₃ | 13 | 20 | 11 | 18 |
| | I ₄ | 6 | 10 | 6 | 10 |

1) Valid for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles ≤ 10⁵.

3) Recommended hub/shaft tolerance: H7/k6

4) Preferred bores and transmittable torques dependent on bore see page 61.

5) Not valid for coupling with sleeve S.

6) The permitted misalignments may not simultaneously reach their maximum values.

7) The values refer to couplings with 2 disk packs.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 3 | 6 | 10 | 15 |
|--|-------|-------|-------|-------|
| Disk pack ¹¹⁾ | 0,006 | 0,018 | 0,035 | 0,077 |
| Clamping hub ¹²⁾ | 0,021 | 0,054 | 0,164 | 0,295 |
| Hub with tapered bore ¹²⁾ | 0,012 | 0,039 | - | - |
| Connection plate | 0,018 | 0,050 | 0,121 | 0,208 |
| Sleeve S with H _S = 1000 mm | 0,349 | 0,755 | 1,373 | 2,341 |
| Sleeve S per 1000 mm tube | 0,323 | 0,682 | 1,175 | 1,981 |

Weight [kg]

| Size | 3 | 6 | 10 | 15 |
|--|-------|-------|-------|-------|
| Disk pack ¹¹⁾ | 0,023 | 0,041 | 0,050 | 0,077 |
| Clamping hub ¹²⁾ | 0,070 | 0,112 | 0,221 | 0,297 |
| Hub with tapered bore ¹²⁾ | 0,053 | 0,121 | - | - |
| Connection plate | 0,063 | 0,111 | 0,161 | 0,218 |
| Sleeve S with H _S = 1000 mm | 1,009 | 1,361 | 1,678 | 2,079 |
| Sleeve S per 1000 mm tube | 0,938 | 1,231 | 1,443 | 1,762 |

8) Only permitted as a static or virtually static value.

9) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_S [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

10) The values refer to 1 disk pack.

11) Mass moments of inertia and weights are valid for 1 disk pack.

12) Mass moments of inertia and weights are valid for maximum bore.

ROBA®-DS Sizes 3 to 15

Double-jointed coupling with connection plate and clamping hubs

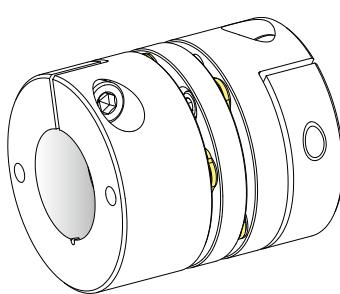
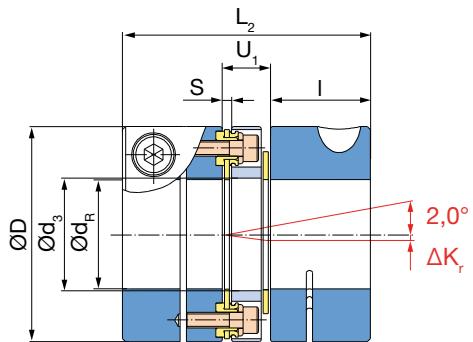


Fig. 3: Type 951.441

Double-jointed coupling with sleeve S (special length) and clamping hubs

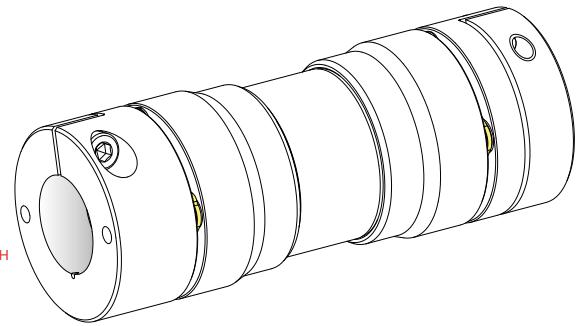
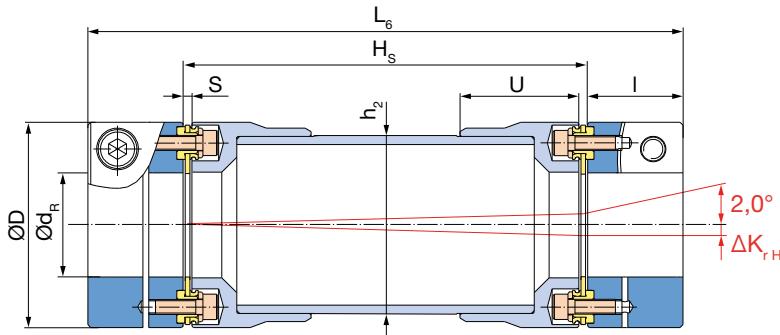


Fig. 4: Type 951.443 (Sleeve S: H_s, L₆)

Order Number

HUB 2

- 4 Clamping hub**
- 5 Hub with tapered bore***



— / 9 5 — . 4 — / — / — / — / —



Sizes
3
to
15

Single-jointed
coupling
Double-jointed
coupling



0

Single-jointed
coupling
Connection plate
Sleeve S



0

**Bore*
Hub 1 ø**
(Dim.
page 8)



1

**Bore*
Hub 2 ø**
(Dim.
page 8)



3

**Sleeve
length**
H_s
[mm]



n_s
[rpm]

for special sleeve S

Example: 10 / 951.441 / Hub 1 – ø 25 ^{H7} / Hub 2 – ø 25 ^{H7}

* Standard H7, other tolerances possible

** Clamping hub also available with keyway

*** Only Sizes 3 and 6

Backlash-free All-steel Couplings

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Safe Against Overload

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Transmittable Torques for Clamping Hubs

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Installation Examples

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Dimensioning, Size Selection

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Technical Explanations

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ROBA®-DS Sizes 3 to 15

Double-jointed coupling with connection plate and split clamping hubs

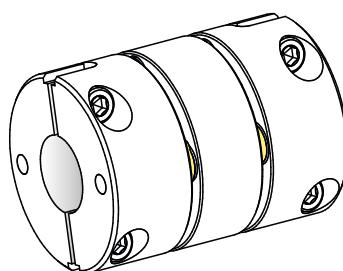
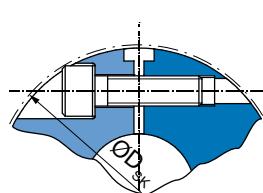
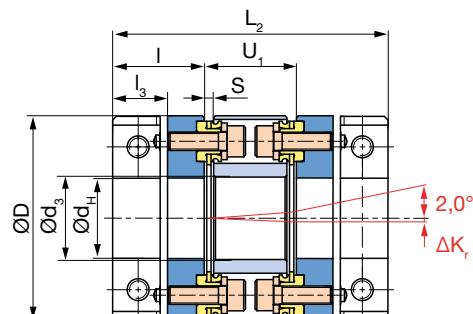


Fig. 5: Type 951.882

Optional keyway design
according to DIN 6885/1 possible
(up to bore $d_H = 18$ mm on Size 3,
up to bore $d_H = 22$ mm on Size 6,
for all bores on Sizes 10 and 15)

| Technical Data and Main Dimensions | | Size | | | | | |
|---------------------------------------|--|--|---|-------------|------------|-------------|------------|
| | | 3 | 6 | 10 | 15 | | |
| Nominal torque ¹⁾ | T_{KN} | [Nm] | 35 | 60 | 100 | 150 | |
| Peak torque ²⁾ | T_{KS} | [Nm] | 52 | 90 | 150 | 225 | |
| Alternating torque | T_{KW} | [Nm] | 21 | 36 | 60 | 90 | |
| Outer diameter | D | [mm] | 45 | 56 | 69 | 79 | |
| Minimum hub bore ^{3) 4)} | $d_H^{\text{H7 min}}$ | [mm] | 10 | 14 | 19 | 25 | |
| Maximum hub bore ^{3) 4)} | $d_H^{\text{H7 max}}$ | [mm] | 20 | 28 | 35 | 42 | |
| Maximum speed ⁵⁾ | n_{max} | [rpm] | 3000 | 3000 | 3000 | 3000 | |
| Permitted misalignments ⁶⁾ | permitted axial displacement ^{7) 8)} permitted radial misalignment ⁷⁾ | ΔK_a $\Delta K_{\text{r HSK}}$ | [mm] | 0,5 0,35 | 0,7 0,4 | 0,9 0,45 | 1,1 0,5 |
| Spring rigidity | torsion ⁹⁾ disk pack tube sleeve S | $C_{T \text{ LP}}$ $C_{T \text{ H rel.}}$ | [10^3 Nm/rad] [10^6 Nm mm/rad] | 17 3,3 | 35 6,8 | 60 12 | 145 19 |
| | angular spring rigidity ¹⁰⁾ | | [Nm/rad] | 43 | 64 | 76 | 229 |

Dimensions [mm]

| Size | 3 | 6 | 10 | 15 |
|-----------------|------------------------------|------|------|-------|
| D_{SK} | 47 | - | 71 | - |
| d_3 | 17 | 22,5 | 35,5 | 40 |
| H_s | acc. customer specifications | | | |
| h_2 | 40 | 50 | 60 | 70 |
| L_2 | 69 | 75,2 | 93,8 | 100,8 |
| L_6 | dependent on H_s | | | |
| I | 23 | 25 | 32 | 33,5 |
| S | 2,5 | 2,6 | 2,9 | 2,9 |
| U | 28 | 32 | 40 | 46 |
| U_1 | 23 | 25,2 | 29,8 | 33,8 |

Mass Moments of Inertia J [10^{-3} kgm²]

| Size | 3 | 6 | 10 | 15 |
|-----------------------------------|-------|-------|-------|-------|
| Disk pack ¹¹⁾ | 0,006 | 0,018 | 0,035 | 0,077 |
| Split clamping hub ¹²⁾ | 0,018 | 0,048 | 0,143 | 0,266 |
| Connection plate HSK | 0,017 | 0,044 | 0,119 | 0,264 |
| Sleeve S with $H_s = 1000$ mm | 0,349 | 0,755 | 1,373 | 2,341 |
| Sleeve S per 1000 mm tube | 0,323 | 0,682 | 1,175 | 1,981 |

Weight [kg]

| Size | 3 | 6 | 10 | 15 |
|-----------------------------------|-------|-------|-------|-------|
| Disk pack ¹¹⁾ | 0,023 | 0,041 | 0,050 | 0,077 |
| Split clamping hub ¹²⁾ | 0,060 | 0,098 | 0,195 | 0,270 |
| Connection plate HSK | 0,057 | 0,096 | 0,161 | 0,270 |
| Sleeve S with $H_s = 1000$ mm | 1,009 | 1,361 | 1,978 | 2,079 |
| Sleeve S per 1000 mm tube | 0,938 | 1,231 | 1,443 | 1,762 |

1) Valid for unchanging load direction as well as for max. permitted shaft misalignment. When the load direction changes, max. 60% of the stated nominal torque is permitted.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Recommended hub/shaft tolerance: H7/g6

4) Preferred bores and transmittable torques dependent on bore see page 60.

5) Not valid for coupling with sleeve S.

6) The permitted misalignments may not simultaneously reach their maximum values.

7) The values refer to couplings with 2 disk packs.

8) Only permitted as a static or virtually static value.

9) The C_T -value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ ges.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

10) The values refer to 1 disk pack.

11) Mass moments of inertia and weights are valid for 1 disk pack.

12) Mass moments of inertia and weights are valid for maximum bore.

ROBA®-DS Sizes 3 to 15

Double-jointed coupling with sleeve S (special length) and split clamping hubs

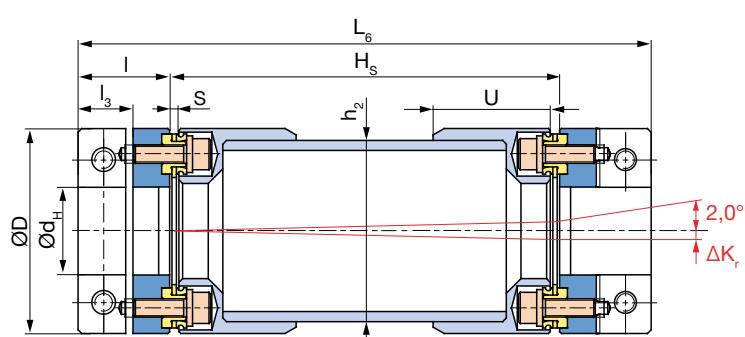
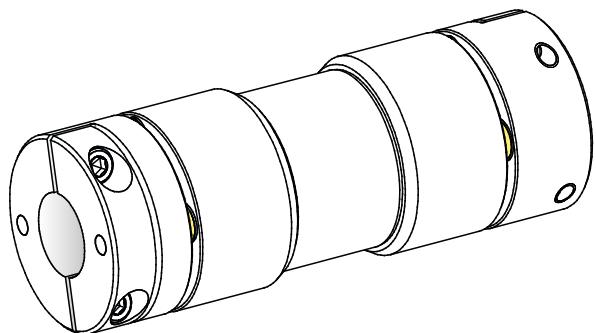


Fig. 6: Type 951.883 (Sleeve S: L_s , L_6)



Optional keyway design
according to DIN 6885/1 possible
(up to bore $d_H = 18$ mm on Size 3,
up to bore $d_H = 22$ mm on Size 6,
for all bores on Sizes 10 and 15)

Order Number

| | | | | | |
|--|---|--|----------------------|---|--|
| — / 9 | 5 | 1 . 8 | 8 | — / — / — / — / — | |
| ▲ | | | ▲ | ▲ | ▲ |
| Sizes 3 to 15 | | Connection plate HSK Sleeve S | 2 3 | Bore* Hub 1 ø (Dim. page 10) | Bore* Hub 2 ø (Dim. page 10) Sleeve length H_s [mm] Operating speed n_s [rpm] |

Example: 10 / 951.882 / Hub 1 – ø 25^{H7} / Hub 2 – ø 25^{H7}

* Standard H7, other tolerances possible

| | |
|---|-----------|
| Backlash-free All-steel Couplings | Page 14 ▶ |
| Safe Against Overload | Page 59 ▶ |
| Transmittable Torques for Split Clamping Hubs | Page 60 ▶ |
| Installation Examples | Page 62 ▶ |
| Dimensioning, Size Selection | Page 68 ▶ |
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ROBA®-DS Sizes 3 to 15

Single-jointed coupling with shrink disk hubs

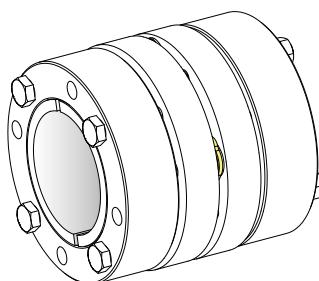
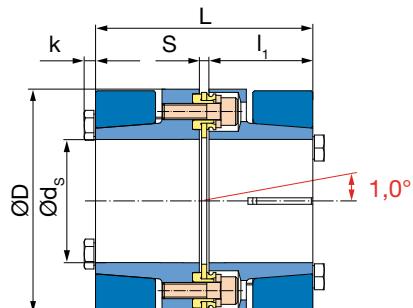


Fig. 7: Type 950.220

| Technical Data and Main Dimensions | | | Size | | | | |
|---------------------------------------|---|-----------------------|-----------------------------|-------------------------------|-------|-------|-----|
| | | | 3 | 6 | 10 | 15 | |
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 35 | 60 | 100 | 150 | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 52 | 90 | 150 | 225 | |
| Alternating torque | T _{KW} | [Nm] | 21 | 36 | 60 | 90 | |
| Outer diameter | D | [mm] | 45 | 56 | 69 | 79 | |
| Minimum hub bore ^{3) 4) 5)} | d _S ^{H7} min | [mm] | 10 | 14 | 19 | 25 | |
| Maximum hub bore ^{3) 4)} | d _S ^{H7} max | [mm] | 20 | 28 | 38 | 45 | |
| Maximum speed ⁶⁾ | n _{max} | [rpm] | 22500 | 18000 | 15000 | 13000 | |
| Permitted misalignments ⁷⁾ | permitted axial displacement ^{8) 9)} | ΔK _a | [mm] | 0,5 | 0,7 | 0,9 | 1,1 |
| | permitted radial misalignment ⁸⁾ with connection plate | ΔK _r | [mm] | 0,15 | 0,15 | 0,2 | 0,2 |
| Spring rigidity | with sleeve S | ΔK _{rH} | [mm] | (H _S - S) × 0,0174 | | | |
| | torsion ¹⁰⁾ disk pack | C _{T LP} | [10 ³ Nm/rad] | 17 | 35 | 60 | 145 |
| | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 3,3 | 6,8 | 12 | 19 |
| | angular spring rigidity ¹¹⁾ | | [Nm/rad] | 43 | 64 | 76 | 229 |

Dimensions [mm]

| Size | 3 | 6 | 10 | 15 |
|----------------|------------------------------|------|------|------|
| d ₃ | 17 | 22,5 | 35,5 | 40 |
| H _s | acc. customer specifications | | | |
| h ₂ | 40 | 50 | 60 | 70 |
| k | 2,8 | 3,5 | 3,5 | 3,5 |
| L | 50,5 | 58,6 | 66,9 | 77,9 |
| L ₂ | 61 | 70,7 | 79,3 | 90,8 |
| L ₆ | dependent on H _s | | | |
| I ₁ | 24 | 28 | 32 | 37,5 |
| S | 2,5 | 2,6 | 2,9 | 2,9 |
| U | 28 | 32 | 40 | 46 |
| U ₁ | 13 | 14,7 | 15,3 | 15,8 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 3 | 6 | 10 | 15 |
|--|-------|-------|-------|-------|
| Disk pack ¹²⁾ | 0,006 | 0,018 | 0,035 | 0,077 |
| Shrink disk hub ¹³⁾ | 0,043 | 0,129 | 0,303 | 0,605 |
| Connection plate | 0,018 | 0,050 | 0,121 | 0,208 |
| Sleeve S with H _s = 1000 mm | 0,349 | 0,755 | 1,373 | 2,341 |
| Sleeve S per 1000 mm tube | 0,323 | 0,682 | 1,175 | 1,981 |

Weight [kg]

| Size | 3 | 6 | 10 | 15 |
|--|-------|-------|-------|-------|
| Disk pack ¹²⁾ | 0,023 | 0,041 | 0,050 | 0,077 |
| Shrink disk hub ¹³⁾ | 0,142 | 0,254 | 0,379 | 0,570 |
| Connection plate | 0,063 | 0,111 | 0,161 | 0,218 |
| Sleeve S with H _s = 1000 mm | 1,009 | 1,361 | 1,678 | 2,079 |
| Sleeve S per 1000 mm tube | 0,938 | 1,231 | 1,443 | 1,762 |

1) Valid for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Recommended hub/shaft tolerance: H7/g6

4) On shrink disk hubs, the preferred bores are identical to the preferred bores on the clamping hubs (see preferred bores clamping hubs page 61).

5) ø10: frictionally locking transmittable torque = 80 % of T_{KS}.

6) Not valid for coupling with sleeve S.

7) The permitted misalignments may not simultaneously reach their maximum values.

8) The values refer to couplings with 2 disk packs.

9) Only permitted as a static or virtually static value.

10) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

11) The values refer to 1 disk pack.

12) Mass moments of inertia and weights are valid for 1 disk pack.

13) Mass moments of inertia and weights are valid for maximum bore.

ROBA®-DS Sizes 3 to 15

Double-jointed coupling with connection plate and shrink disk hubs

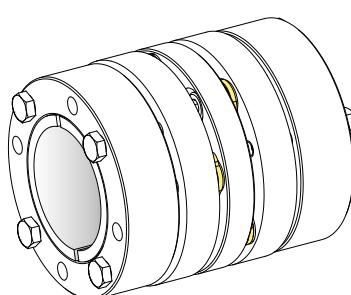
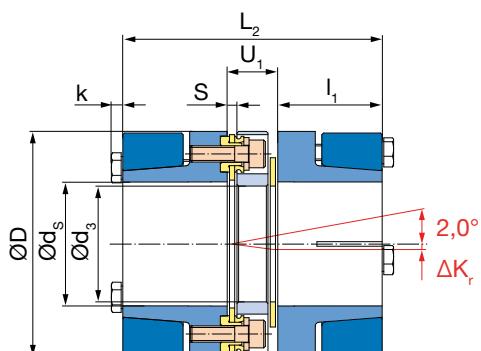


Fig. 8: Type 951.221

Double-jointed coupling with sleeve S (special length) and shrink disk hubs

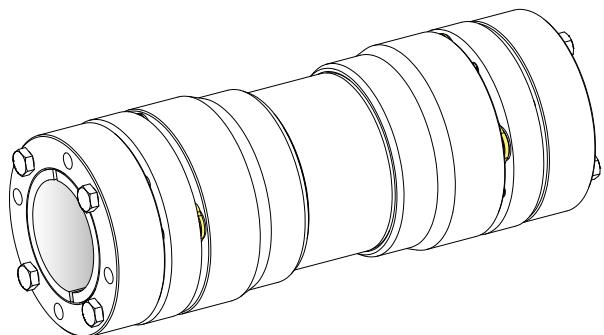
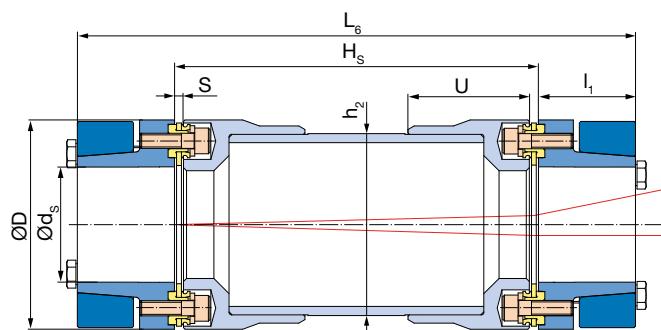


Fig. 9: Type 951.223 (Sleeve S: H_s, L₆)

Order Number

| | | | | | | | | |
|--|--|----------------------|---|----------------------------------|---|---|--|---|
| — / 9 | 5 | — . 2 | 2 | — / — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | |
| Sizes 3 to 15 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve S | 0 1 3 | Bore* Hub 1 ø (Dim. page 12) | Bore* Hub 2 ø (Dim. page 12) | Sleeve length H_s [mm] for special sleeve S | Operating speed n_s [rpm] |

Example: 10 / 951.221 / Hub 1 – ø 25 ^{H7} / Hub 2 – ø 25 ^{H7}

* Standard H7, other tolerances possible

Backlash-free All-steel Couplings

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Safe Against Overload

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Installation Examples

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Dimensioning, Size Selection

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Technical Explanations

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ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with key hubs

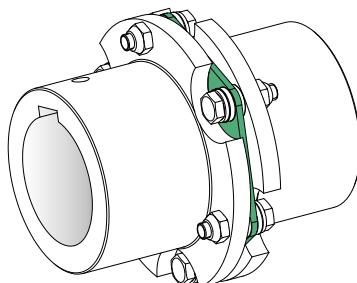
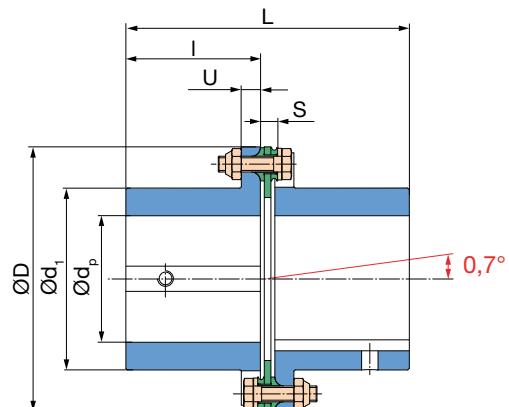


Fig. 10: Type 952.000

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|-------------------------------|-------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 300 | 420 | 650 | 1100 | 1600 | 2600 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | | d _{p min} | [mm] | 16 | 20 | 25 | 30 | 35 | 40 | |
| Maximum hub bore ³⁾ | | d _{p max} | [mm] | 32 | 40 | 50 | 55 | 70 | 80 | |
| Maximum speed ⁴⁾ | | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 |
| | | with sleeve 1 | ΔK _{rH} | [mm] | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 |
| Spring rigidity | torsion ⁸⁾ | with sleeve S | ΔK _{rH} | [mm] | (H _s - S) x 0,0122 | | | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 |
| | | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁹⁾ | | | [Nm/rad] | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|-------|-------|-------|-------|-------|
| d ₁ | 50 | 60 | 70 | 80 | 100 | 115 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 84,6 | 95 | 116,1 | 138 | 158,6 | 179,2 |
| L ₂ | 101,2 | 112 | 136,2 | 164 | 185,2 | 210,4 |
| L ₄ | 145 | 165,6 | 201,4 | 242,8 | 283,2 | 305,2 |
| L ₆ | dependent on H _s | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 61.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ¹⁰⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Hub ¹¹⁾ | 0,27 | 0,55 | 1,16 | 2,58 | 6,18 | 12,51 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ¹⁰⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Hub ¹¹⁾ | 0,46 | 0,69 | 1,02 | 1,72 | 2,83 | 4,25 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

9) The values refer to 1 disk pack.

10) Mass moments of inertia and weights are valid for 1 disk pack.

11) Mass moments of inertia and weights are valid for maximum bore.

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and key hubs

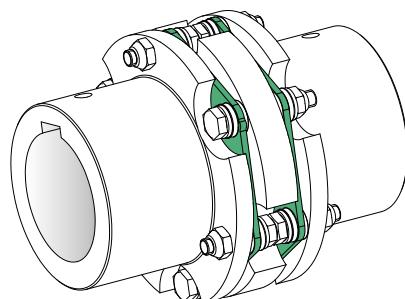
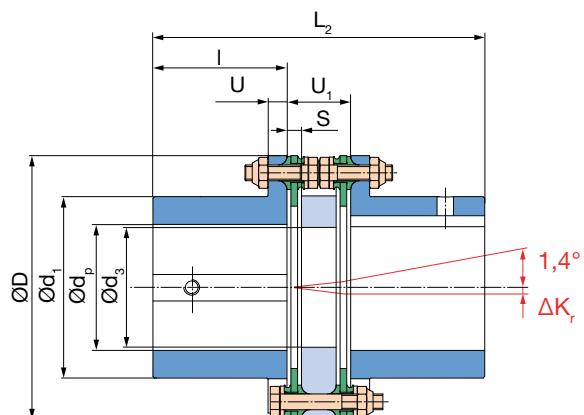


Fig. 11: Type 953.001

Double-jointed coupling with sleeve 1 or sleeve S (special length) and key hubs

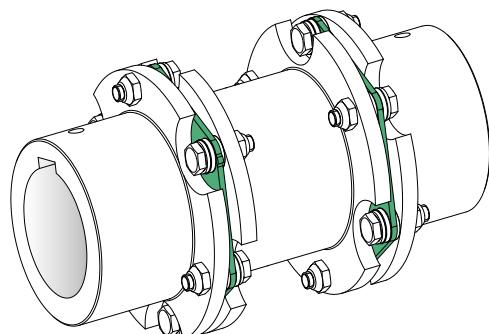
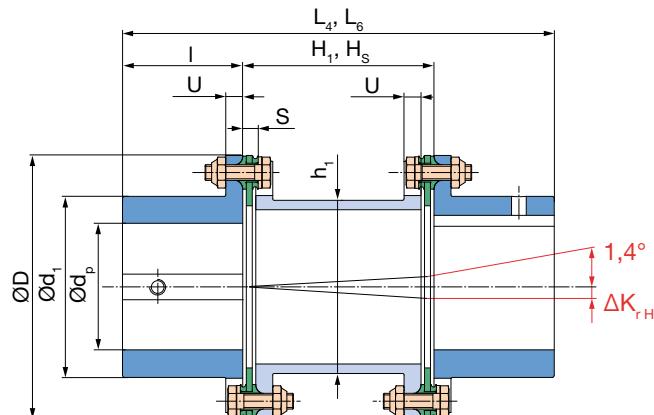


Fig. 12: Type 953.002 (Sleeve 1: H_1 , L_4), Type 953.003 (Sleeve S: H_s , L_6)

Order Number

| | | | | |
|--|--|----------------------|--|--|
| — / 9 | 5 | — . 0 0 | — / — / — / — / — | |
| ▲ | ▲ | ▲ | ▲ | ▲ |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 2 3 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 |
| | | | Bore* Hub 1 ø (Dim. page 14) | Bore* Hub 2 ø (Dim. page 14) |
| | | | Sleeve length H_s [mm] | Operating speed n_s [rpm] |
| | | | for special sleeves S / CRD / CFRP | |

Example: 100 / 952.000 / Hub 1– ø 50 ^{H7} / Hub 2 – ø 60 ^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Transmittable Torques for Key Hubs | Page 61 ▶ |
| Installation Examples | Page 62 ▶ |
| Integrated Torque Measurement | Page 64 ▶ |
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| Technical Explanations | Page 69 ▶ |
| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with key hubs, large

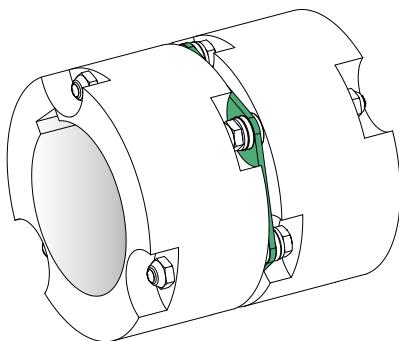
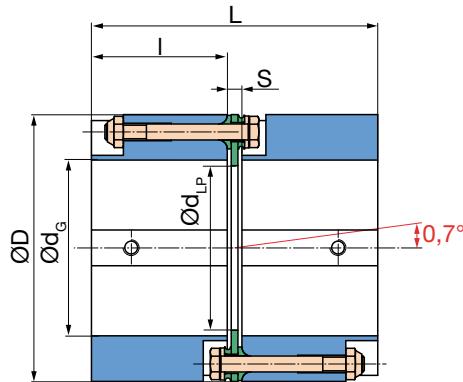


Fig. 13: Type 952.110

| Technical Data and Main Dimensions | | | Size | | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|----------|-------------------------------|------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 300 | 420 | 650 | 1100 | 1600 | 2600 | | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Minimum hub bore | | d _G min | [mm] | 30 | 35 | 45 | 55 | 65 | 75 | | |
| Maximum hub bore | | d _G max | [mm] | 45 | 55 | 65 | 75 | 95 | 110 | | |
| Maximum speed ³⁾ | | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | | |
| Permitted misalignments ⁴⁾ | permitted axial displacement ^{5) 6)} | | | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 |
| | permitted radial misalignment ⁵⁾ | with connection plate | ΔK _r | | [mm] | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 |
| | | with sleeve 1 | ΔK _{rH} | | [mm] | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 |
| Spring rigidity | torsion ¹⁰⁾ | with sleeve S | ΔK _{rH} | | [mm] | (H _s - S) × 0,0122 | | | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 | |
| | angular spring rigidity ⁷⁾ | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 | |
| | | | | | [Nm/rad] | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|-------|-------|
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d _{H1} | 43 | 54 | 62 | 71 | 92 | 98 |
| d _{LP} | 45 | 55 | 65 | 74 | 88 | 103 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 84,6 | 95 | 116,1 | 138 | 158,6 | 179,2 |
| L ₂ | 101,2 | 112 | 136,2 | 164 | 185,2 | 210,4 |
| L ₄ | 145 | 165,6 | 201,4 | 242,8 | 283,2 | 305,2 |
| L ₆ | dependent on H _s | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁸⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Hub ⁹⁾ | 0,86 | 1,71 | 3,89 | 8,98 | 18,12 | 36,00 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁸⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Hub ⁹⁾ | 0,87 | 1,26 | 2,08 | 3,47 | 4,94 | 7,23 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The values refer to couplings with 2 disk packs.

6) Only permitted as a static or virtually static value.

7) The values refer to 1 disk pack.

8) Mass moments of inertia and weights are valid for 1 disk pack.

9) Mass moments of inertia and weights are valid for maximum bore.

10) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and key hubs, large

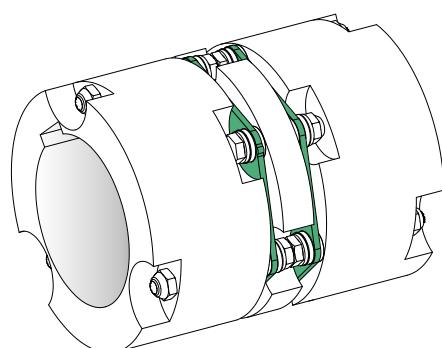
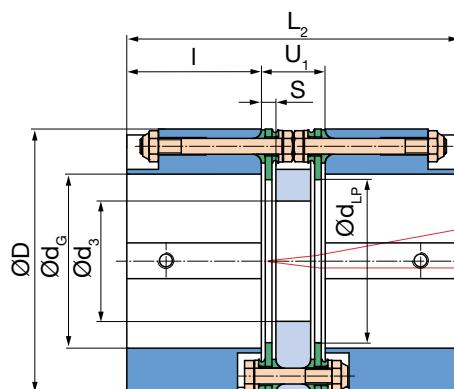


Fig. 14: Type 953.111

Double-jointed coupling with sleeve 1 or sleeve S (special length) and key hubs large

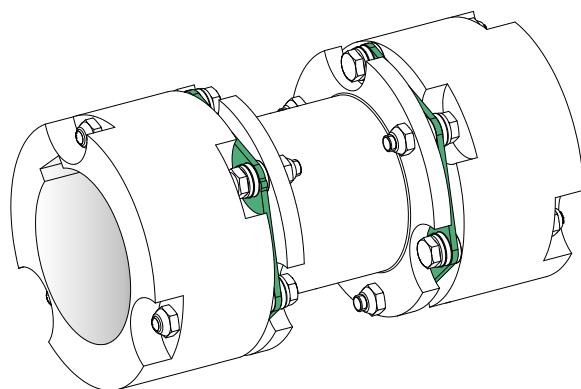
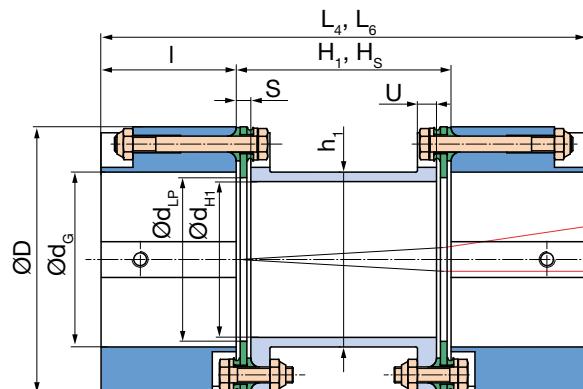


Fig. 15: Type 953.112 (Sleeve 1: H_1 , L_4), Type 953.113 (Sleeve S: H_s , L_6)

Order Number

| | | | | |
|------------------------------------|--|----------------------|---|--|
| — / 9 | 5 | — . 1 | — / — / — / — / — | |
| ▲ | ▲ | ▲ | ▲ | ▲ |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 2 3 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 |
| | | | Bore* Hub 1 ø (Dim. page 16) | Bore* Hub 2 ø (Dim. page 16) |
| | | | | Sleeve length H_s [mm] |
| | | | | Operating speed n_s [rpm] |
| | | | | for special sleeves S / CRD / CFRP |

Example: 100 / 952.110 / Hub 1 – ø 70 ^{H7} / Hub 2 – ø 80 ^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Safe Against Overload | Page 59 ▶ |
| Installation Examples | Page 62 ▶ |
| Integrated Torque Measurement | Page 64 ▶ |
| Dimensioning, Size Selection | Page 68 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with clamping hubs

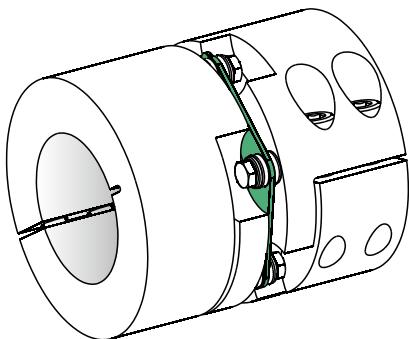
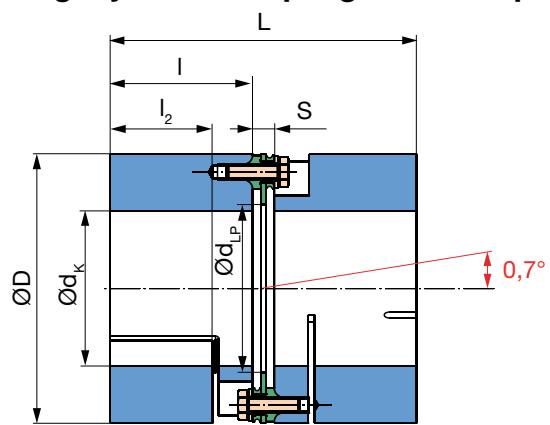


Fig. 16: Type 952.550

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|-------------------------------|------|------|------|------|------|
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Minimum hub bore ³⁾ | d _{K min} | [mm] | 20 | 22 | 25 | 28 | 32 | 40 | | |
| Maximum hub bore ³⁾ | d _{K max} | [mm] | 45 | 52 | 60 | 70 | 90 | 100 | | |
| Maximum speed ⁴⁾ | n _{max} | [rpm] | 9500 | 8200 | 7000 | 6000 | 5100 | 4300 | | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 |
| | with sleeve 1 | | ΔK _{rH} | [mm] | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 |
| Spring rigidity | with sleeve S | | ΔK _{rH} | [mm] | (H _S - S) x 0,0122 | | | | | |
| | torsion ¹¹⁾ | | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 |
| | disk pack | | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| angular spring rigidity ⁸⁾ | | | | [Nm/rad] | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|-------|-------|
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d _{H1} | 43 | 54 | 62 | 71 | 92 | 98 |
| d _{LP} | 45 | 55 | 65 | 74 | 88 | 103 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 84,6 | 95 | 116,1 | 138 | 158,6 | 179,2 |
| L ₂ | 101,2 | 112 | 136,2 | 164 | 185,2 | 210,4 |
| L ₄ | 145 | 165,6 | 201,4 | 242,8 | 283,2 | 305,2 |
| L ₆ | dependent on H _S | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| I ₂ | 27 | 32 | 39,6 | 44,8 | 54,5 | 60 |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 61.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Hub ¹⁰⁾ | 0,74 | 1,49 | 3,64 | 8,42 | 16,94 | 34,32 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Hub ¹⁰⁾ | 0,73 | 1,11 | 2,05 | 3,43 | 4,82 | 6,94 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

10) Mass moments of inertia and weights are valid for maximum bore.

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T LP}} + \frac{H_S [\text{mm}] - 2S [\text{mm}]}{C_{T H \text{ rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and clamping hubs

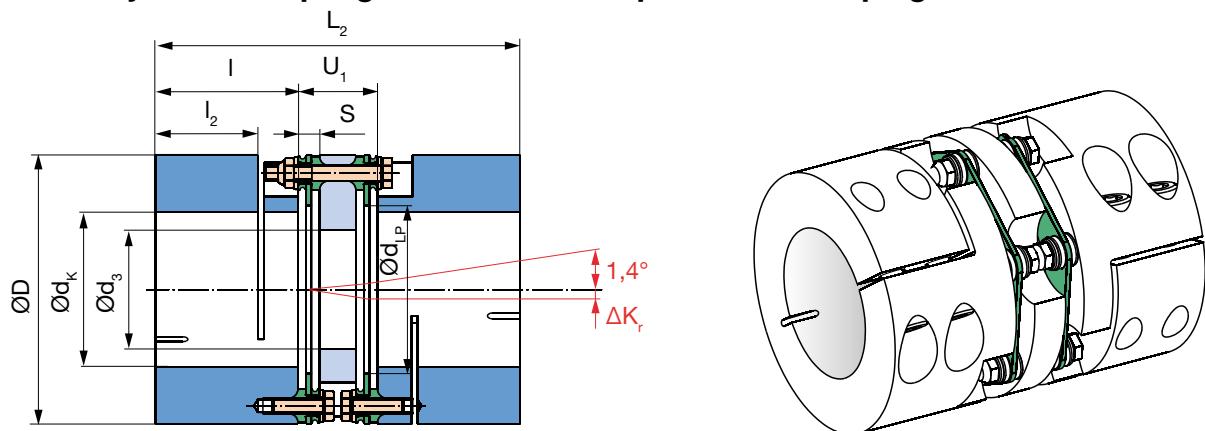


Fig. 17: Type 953.551

Double-jointed coupling with sleeve 1 or sleeve S (special length) and clamping hubs

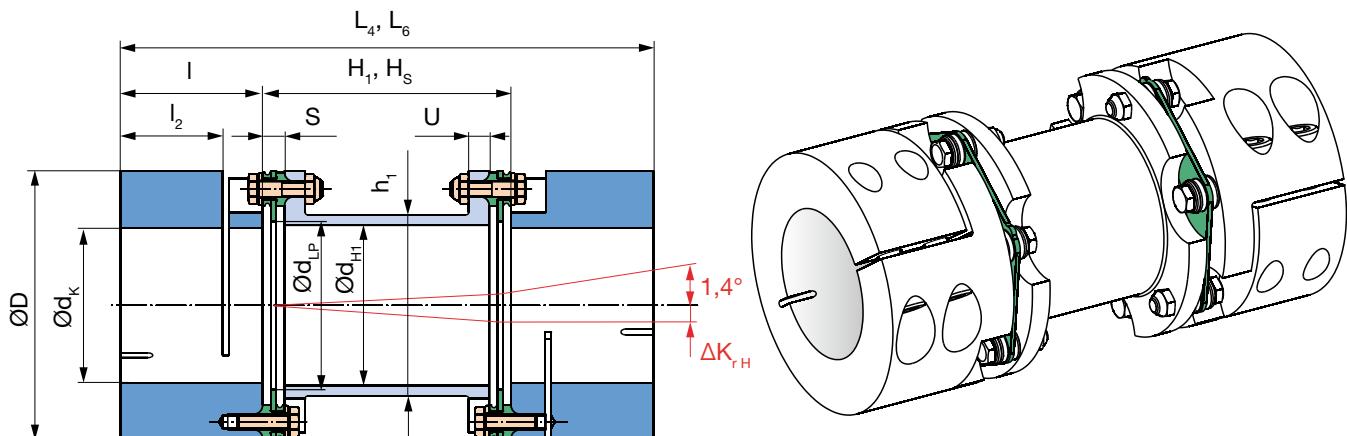


Fig. 18: Type 953.552 (Sleeve 1: H₁, L₄), Type 953.553 (Sleeve S: H_s, L₆)

Order Number

| | | | | | | | | |
|--|--|--------|--|----------------------------|---|---|---|---|
| — / 9 | 5 | — . 5 | 5 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 2 3 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 18) | Bore* Hub 2 ø (Dim. page 18) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 100 / 952.550 / Hub 1- ø 75 ^{H7} / Hub 2 - ø 90 ^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Transmittable Torques for Clamping Hubs | Page 61 ▶ |
| Installation Examples | Page 62 ▶ |
| Integrated Torque Measurement | Page 64 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with shrink disk hubs, external clamping

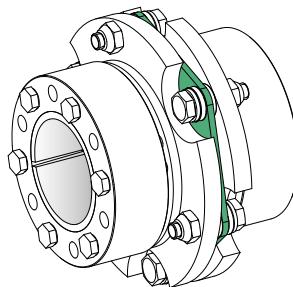
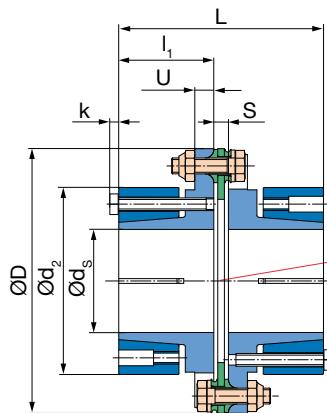


Fig. 19: Type 952.220

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|-------------------------------|------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 300 | 420 | 650 | 1100 | 1600 | 2600 | | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Minimum hub bore ³⁾ | d _{S min} | [mm] | 14 | 20 | 25 | 30 | 35 | 40 | | |
| Maximum hub bore ³⁾ | d _{S max} | [mm] | 26 | 36 | 45 | 45 | 55 | 65 | | |
| Maximum speed ⁴⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 |
| | | with sleeve 1 | ΔK _{rH} | [mm] | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 |
| Spring rigidity | torsion ¹¹⁾ | with sleeve S | ΔK _{rH} | [mm] | (H _S - S) x 0,0122 | | | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 |
| | tube sleeve S | | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|-------|-------|-------|-------|-------|
| d ₂ | 53 | 64 | 74 | 84 | 104 | 118 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _S | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| k | 3,5 | 3,5 | 3,5 | 4 | 5,5 | 5,5 |
| L | 74,6 | 85 | 96,1 | 108 | 118,6 | 129,2 |
| L ₂ | 91,2 | 102 | 116,2 | 134 | 145,2 | 160,4 |
| L ₄ | 135 | 155,6 | 181,4 | 212,8 | 243,2 | 255,2 |
| L ₆ | dependent on H _S | | | | | |
| I ₁ | 35 | 40 | 45 | 50 | 55 | 60 |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Hub ¹⁰⁾ | 0,27 | 0,57 | 1,15 | 2,46 | 5,59 | 11,14 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Hub ¹⁰⁾ | 0,49 | 0,71 | 1,03 | 1,71 | 2,73 | 3,99 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_S [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and shrink disk hubs, external clamping

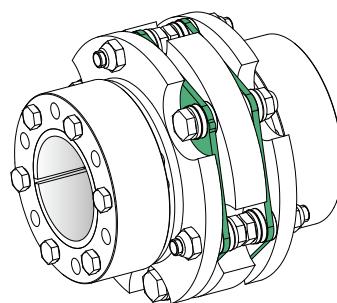
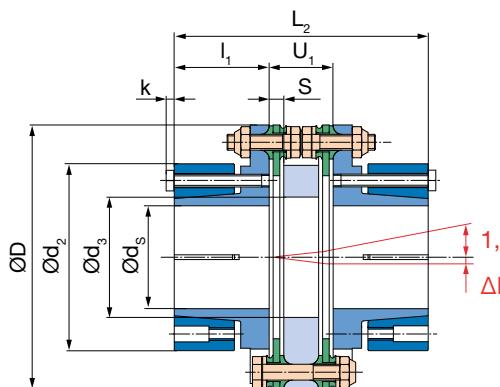


Fig. 20: Type 953.221

Double-jointed coupling with sleeve 1 or sleeve S (special length) and shrink disk hubs, external clamping

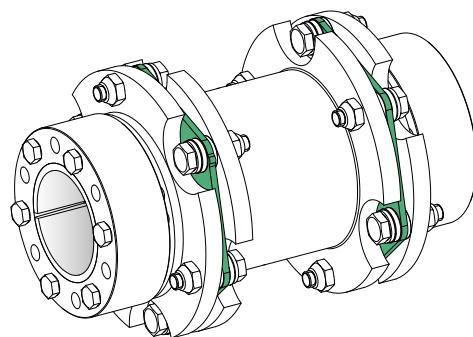
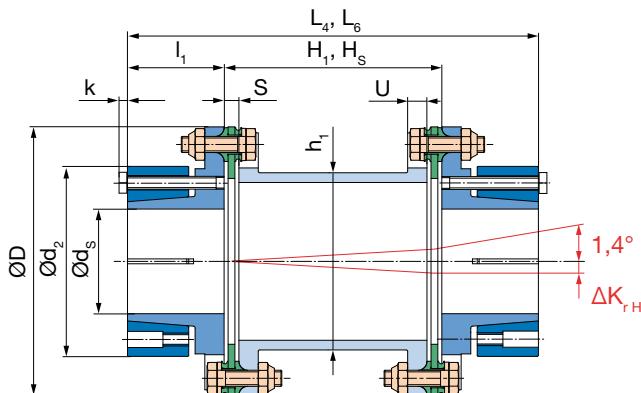


Fig. 21: Type 953.222 (Sleeve 1: H₁, L₄), Type 953.223 (Sleeve S: H_S, L₆)

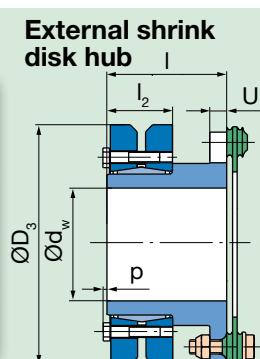
Order Number

| | | | | | | | | |
|--|--|----------------------|--|--|---|---|---|---|
| — / 9 | 5 | — . 2 | 2 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ ▲ ▲ ▲ ▲ | | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 2 3 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 20) | Bore* Hub 2 ø (Dim. page 20) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 40 / 953.221 / Hub 1 – ø 30 ^{H7} / Hub 2 – ø 30 ^{H7}

*Standard H7, other tolerances possible

| Additional Option: | | | | | | External shrink disk hub |
|--------------------|----------------|----------------|----|----------------|-----|--------------------------|
| Size | d _w | D _s | I | I ₂ | p | |
| 16 | 28/30 | 72 | 40 | 27,5 | 2,5 | |
| | 32 | 75 | 40 | 28,5 | 3,5 | |
| 25 | 32/35 | 80 | 45 | 29,5 | - | |
| | 38/40/42 | 90 | 45 | 31,5 | 1,5 | |
| 40 | 42/45/48 | 100 | 55 | 34,5 | - | |
| 64 | 50/55/60 | 115 | 65 | 34,5 | - | |
| 100 | 55/60/65 | 138 | 75 | 38 | - | |
| 160 | 65/70/75 | 155 | 85 | 44,5 | - | |



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- ◀ Backlash-free Servo Couplings Page 8

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with shrink disk hubs, external clamping and internal clamping

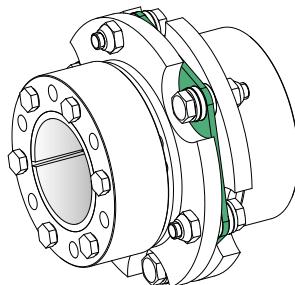
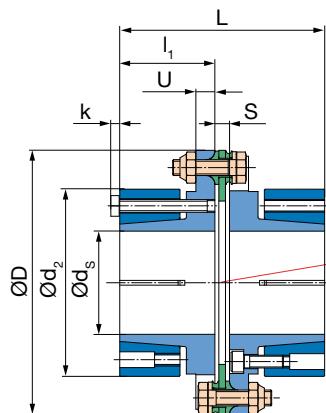


Fig. 22: Type 952.230

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|-------|-------|-------------------------------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 300 | 420 | 650 | 1100 | 1600 | 2600 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | | d _{S min} | [mm] | 14 | 20 | 25 | 30 | 35 | 40 | |
| Maximum hub bore ³⁾ | | d _{S max} | [mm] | 26 | 36 | 45 | 45 | 55 | 65 | |
| Maximum speed ⁴⁾ | | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 | |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 | |
| | | with sleeve 1 | ΔK _{rH} | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 | |
| Spring rigidity | torsion ¹¹⁾ | with sleeve S | ΔK _{rH} | | | | (H _s - S) x 0,0122 | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 |
| | tube sleeve S | | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|-------|-------|-------|-------|-------|
| d ₂ | 53 | 64 | 74 | 84 | 104 | 118 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| k | 3,5 | 3,5 | 3,5 | 4 | 5,5 | 5,5 |
| L | 74,6 | 85 | 96,1 | 108 | 118,6 | 129,2 |
| L ₂ | 91,2 | 102 | 116,2 | 134 | 145,2 | 160,4 |
| L ₄ | 135 | 155,6 | 181,4 | 212,8 | 243,2 | 255,2 |
| L ₆ | dependent on H _s | | | | | |
| I ₁ | 35 | 40 | 45 | 50 | 55 | 60 |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Hub ¹⁰⁾ | 0,27 | 0,57 | 1,15 | 2,46 | 5,59 | 11,14 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Hub ¹⁰⁾ | 0,49 | 0,71 | 1,03 | 1,71 | 2,73 | 3,99 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and shrink disk hubs, external clamping and internal clamping

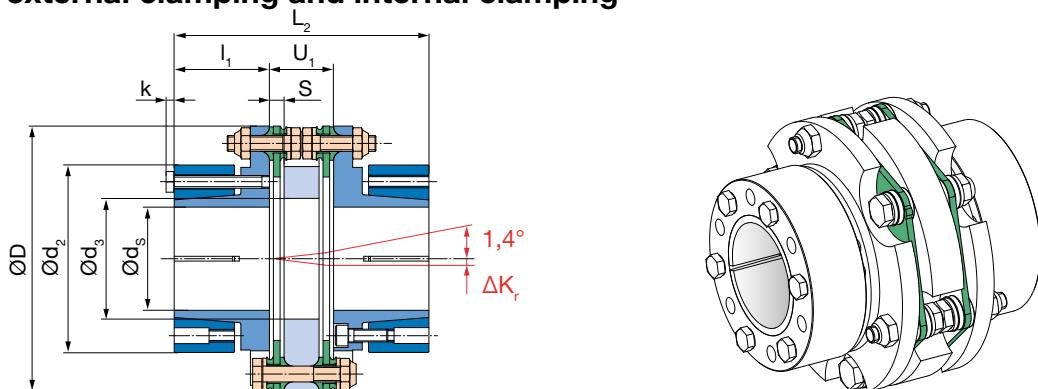


Fig. 23: Type 953.231

Double-jointed coupling with sleeve 1 or sleeve S (special length) and shrink disk hubs, external clamping and internal clamping

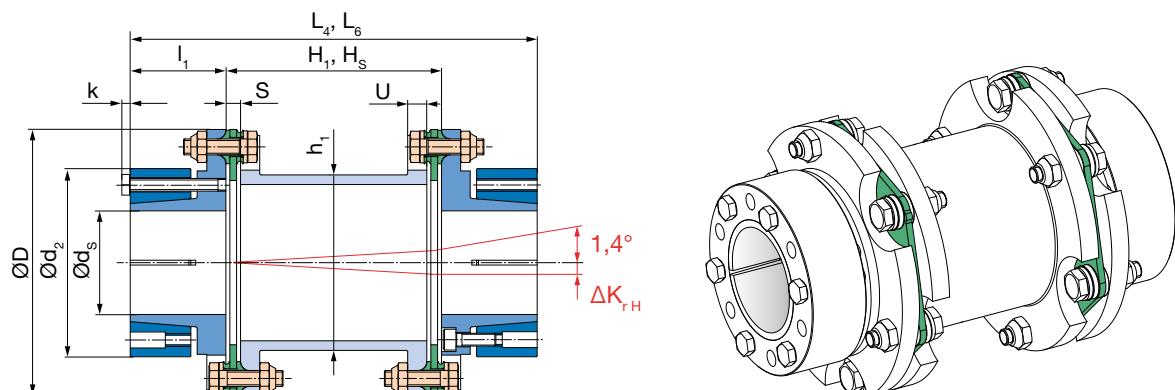


Fig. 24: Type 953.232 (Sleeve 1: H_1 , L_4), Type 953.233 (Sleeve S: H_s , L_6)

Order Number

| | | | | | | | | |
|--|--|----------------------|--|--|---|---|--|--|
| — / 9 | 5 | — . 2 | 3 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 2 3 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 22) | Bore* Hub 2 ø (Dim. page 22) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 64 / 953.231 / Hub 1 – ø 35 ^{H7} / Hub 2 – ø 40 ^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Transmittable Torques for Shrink Disk Hubs | Page 60 ▶ |
| Installation Examples | Page 62 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with shrink disk hubs, large

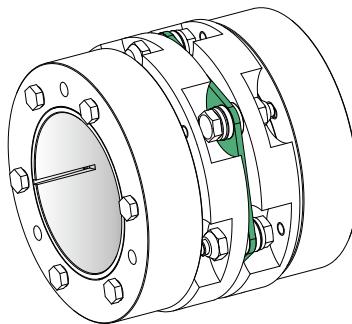
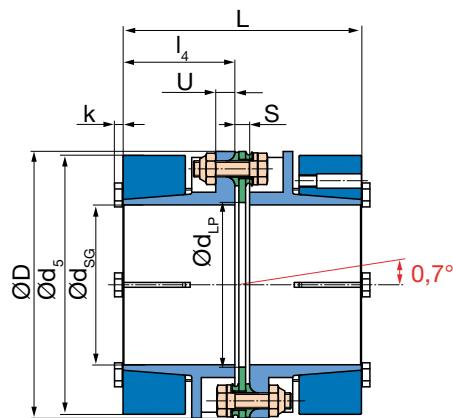


Fig. 25: Type 952.990

| Technical Data and Main Dimensions | | | Size | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------------|-------------------------------|-------|------|------|------|------|
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 16 | 25 | 40 | 64 | 100 | 160 | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | d _{SG min} | [mm] | 25 | 32 | 40 | 45 | 55 | 65 | |
| Maximum hub bore ³⁾ | d _{SG max} | [mm] | 45 | 52 | 60 | 70 | 90 | 100 | |
| Maximum speed ⁴⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 |
| | permitted radial misalignment ⁶⁾ | ΔK _r | [mm] | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 |
| | with connection plate | ΔK _{rH} | [mm] | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 |
| Spring rigidity | with sleeve 1 | ΔK _{rH} | [mm] | (H _s - S) × 0,0122 | | | | | |
| | with sleeve S | ΔK _{rH} | [mm] | | | | | | |
| | torsion ¹¹⁾ | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 |
| | disk pack | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | [Nm/rad] | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|-------|-------|
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d ₅ | 77 | 82 | 100 | 115 | 143 | 162 |
| d _{H1} | 43 | 54 | 62 | 71 | 92 | 98 |
| d _{LP} | 45 | 55 | 65 | 74 | 88 | 103 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| k | 3,5 | 3,5 | 3,5 | 4 | 5,5 | 5,5 |
| L | 84,6 | 95 | 106,1 | 118 | 128,6 | 149,2 |
| L ₂ | 101,2 | 112 | 126,2 | 144 | 155,2 | 180,4 |
| L ₄ | 145 | 165,6 | 191,4 | 222,8 | 253,2 | 275,2 |
| L ₆ | dependent on H _s | | | | | |
| I ₄ | 40 | 45 | 50 | 55 | 60 | 70 |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Hub ¹⁰⁾ | 0,78 | 1,23 | 2,88 | 5,81 | 13,77 | 27,35 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Hub ¹⁰⁾ | 0,79 | 1,02 | 1,71 | 2,53 | 3,92 | 6,08 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and shrink disk hubs, large

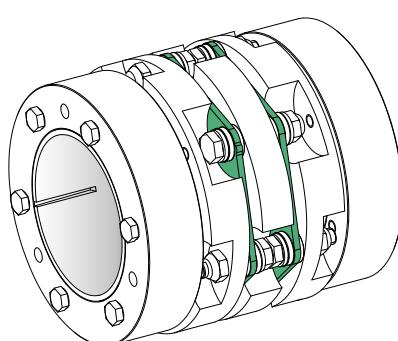
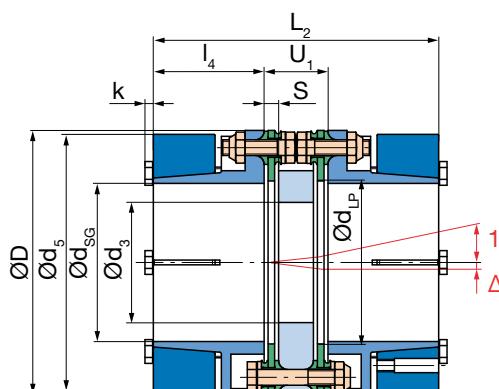


Fig. 26: Type 953.991

Double-jointed coupling with sleeve 1 or sleeve S (special length) and shrink disk hubs, large

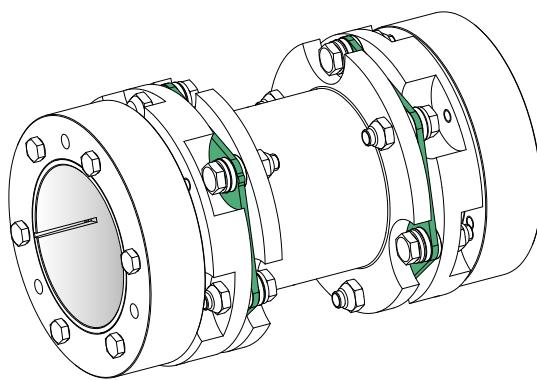
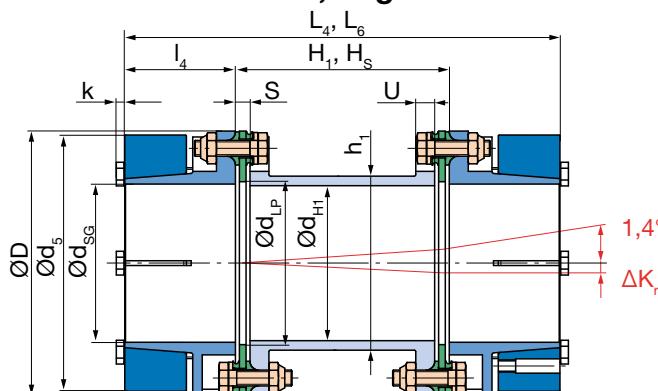


Fig. 27: Type 953.992 (Sleeve 1: H₁, L₄), Type 953.993 (Sleeve S: H_s, L₆)

Order Number

| | | | | | | | | |
|--|--|----------------------|--|--|---|---|---|---|
| — / 9 | 5 | — . 9 | 9 | — / — / — / — / — | | | | |
| | | | | | | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 2 3 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 24) | Bore* Hub 2 ø (Dim. page 24) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 16 / 953.991 / Hub 1 – ø 35 H⁷ / Hub 2 – ø 35 H⁷

*Standard H7, other tolerances possible

| | |
|--|-----------|
| Variable length Sleeve/CFRP sleeve/Options | Page 56 ▶ |
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| Transmittable Torques for Shrink Disk Hubs | Page 60 ▶ |
| Installation Examples | Page 62 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Single-jointed coupling with flanges

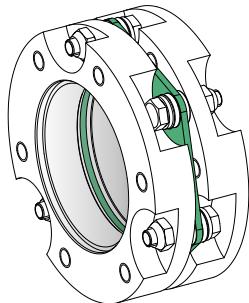
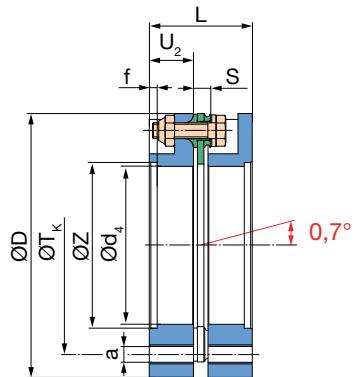


Fig. 28: Type 952.660

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---|---|-----------------------|-----------------------------|-------------------------------|-------|------|------|------|------|------|
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 450 | 630 | 975 | 1650 | 2400 | 3900 | | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Centering bore | Z ^{H7} | [mm] | 45 | 55 | 65 | 75 | 92 | 105 | | |
| Maximum speed ³⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | | |
| permitted axial displacement ^{5) 6)} | ΔK _a | [mm] | 0,8 | 0,9 | 1,1 | 1,3 | 1,5 | 1,7 | | |
| Permitted misalignments ⁴⁾ | permitted radial misalignment ⁵⁾ | with connection plate | ΔK _r | [mm] | 0,2 | 0,2 | 0,25 | 0,3 | 0,3 | 0,35 |
| | with sleeve 1 | ΔK _{rH} | [mm] | 0,7 | 0,8 | 1 | 1,25 | 1,45 | 1,5 | |
| | with sleeve S | ΔK _{rH} | [mm] | (H _S - S) × 0,0122 | | | | | | |
| Spring rigidity | torsion ⁷⁾ | disk pack | C _{T LP} | [10 ³ Nm/rad] | 180 | 290 | 320 | 1350 | 1900 | 2950 |
| | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | [Nm/rad] | | 285 | 305 | 875 | 1285 | 2025 | 3260 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|--------|---------|---------|---------|---------|
| a | 6 x M8 | 6 x M8 | 6 x M10 | 6 x M10 | 6 x M12 | 6 x M14 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d ₄ | 40 | 50 | 60 | 70 | 85 | 100 |
| f | 4 | 4 | 4 | 5 | 5 | 5 |
| H ₁ | 65 | 75,6 | 91,4 | 112,8 | 133,2 | 135,2 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 34,6 | 35 | 42,1 | 48 | 48,6 | 66,2 |
| L ₂ | 51,2 | 52 | 62,2 | 74 | 75,2 | 97,4 |
| L ₄ | 95 | 105,6 | 127,4 | 152,8 | 173,2 | 192,2 |
| L ₆ | dependent on H _s | | | | | |
| S | 4,6 | 5 | 6,1 | 8 | 8,6 | 9,2 |
| T _K | 62 | 75 | 86 | 103 | 116 | 140 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 21,2 | 22 | 26,2 | 34 | 35,2 | 40,4 |
| U ₂ | 15 | 15 | 18 | 20 | 20 | 28,5 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,13 | 0,30 | 0,81 | 1,36 | 3,43 |
| Flange | 0,23 | 0,43 | 0,89 | 1,95 | 3,87 | 9,48 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,16 | 0,32 | 0,39 | 0,71 |
| Flange | 0,26 | 0,34 | 0,52 | 0,82 | 1,16 | 2,10 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The values refer to couplings with 2 disk packs.

6) Only permitted as a static or virtually static value.

7) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel}}}}$$

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

ROBA®-DS Sizes 16 to 160 – disk pack-HT

Double-jointed coupling with connection plate and flanges

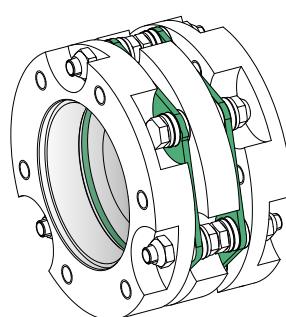
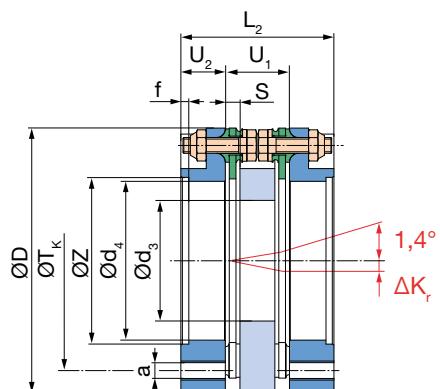


Fig. 29: Type 953.661

Double-jointed coupling with sleeve 1 or sleeve S (special length) and flanges

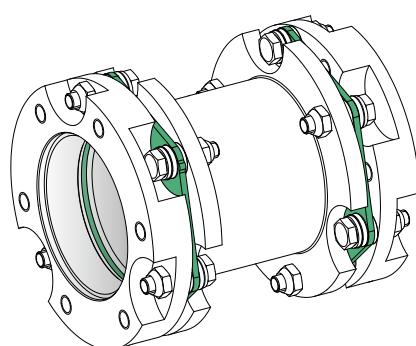
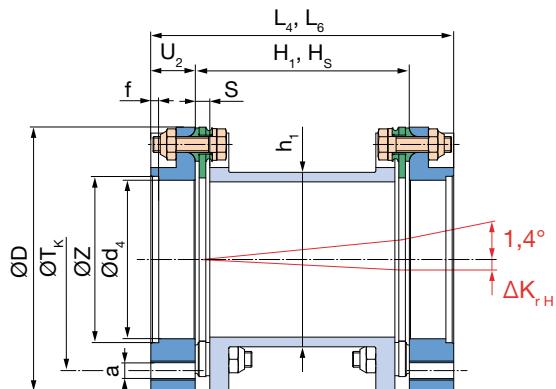


Fig. 30: Type 953.662 (Sleeve 1: H_1 , L_4), Type 953.663 (Sleeve S: H_s , L_6)

Order Number

| | | | | | | | | | | | | |
|--|----------------------------|---|-------------------------|---|--------------------------|---------------|----------------------------|----------------|---|---|---|---|
| — | / | 9 | 5 | — | . | 6 | 6 | — | / | — | / | — |
| ▲ | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ |
| Sizes 16 to 160 | Single-jointed coupling | 2 | Single-jointed coupling | 0 | Sleeve length | H_s [mm] | Operating speed | n_s [rpm] | | | | |
| | Double-jointed coupling | 3 | Connection plate | 1 | for special sleeves | | | | | | | |
| | | | Sleeve 1 | 2 | S / CRD / CFRP | | | | | | | |
| | | | Sleeve S | 3 | | | | | | | | |
| | | | Sleeve CRD (page 56) | 4 | | | | | | | | |
| | | | Sleeve CFRP (page 56) | 5 | | | | | | | | |

Example: 40 / 953.661

| | |
|--|-----------|
| Variable length Sleeve S/CFRP sleeve/Options | Page 56 ▶ |
| Safe Against Overload | Page 59 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with key hubs

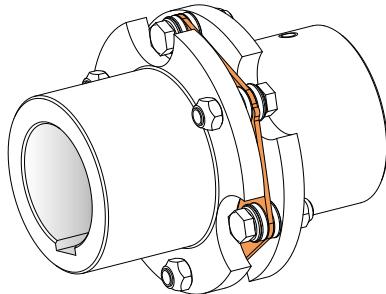
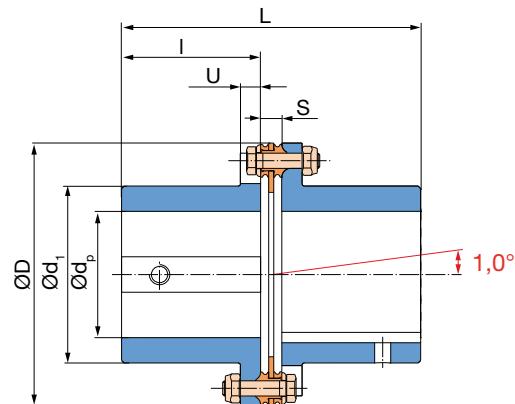


Fig. 31: Type 950.000

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|----------------------------------|-----------------------------|-------------------------------|------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 190 | 290 | 450 | 720 | 1000 | 1600 | | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Minimum hub bore ³⁾ | d _p _{min} | [mm] | 16 | 20 | 25 | 30 | 35 | 40 | | |
| Maximum hub bore ³⁾ | d _p _{max} | [mm] | 32 | 40 | 50 | 55 | 70 | 80 | | |
| Maximum speed ⁴⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 |
| | with sleeve 1 | ΔK _{rH} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 | |
| Spring rigidity | with sleeve S | | ΔK _{rH} | [mm] | (H _S - S) × 0,0174 | | | | | |
| | torsion ⁸⁾ | | C _T _{LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | tube sleeve S | | C _T _{H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁹⁾ | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|-------|-------|-------|-----|-------|
| d ₁ | 50 | 60 | 70 | 80 | 100 | 115 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 87,1 | 97,2 | 118,4 | 139,6 | 160 | 181,6 |
| L ₂ | 106,2 | 116,4 | 140,8 | 167,2 | 188 | 215,2 |
| L ₄ | 150 | 170 | 206 | 246 | 286 | 310 |
| L ₆ | dependent on H _s | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 61.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ¹⁰⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ¹¹⁾ | 0,27 | 0,55 | 1,16 | 2,58 | 6,18 | 12,51 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ¹⁰⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ¹¹⁾ | 0,46 | 0,69 | 1,02 | 1,72 | 2,83 | 4,25 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

9) The values refer to 1 disk pack.

10) Mass moments of inertia and weights are valid for 1 disk pack.

11) Mass moments of inertia and weights are valid for maximum bore.

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and key hubs

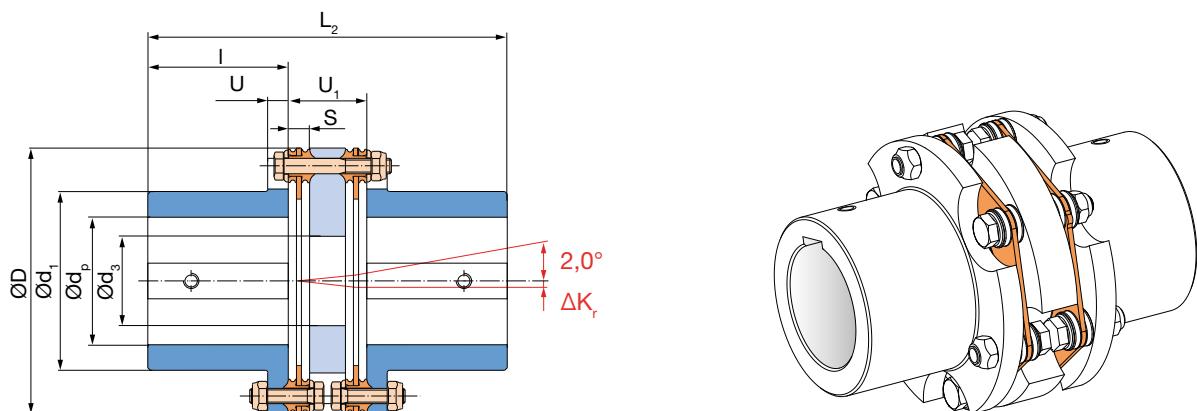


Fig. 32: Type 951.001

Double-jointed coupling with sleeve 1 or sleeve S (special length) and key hubs

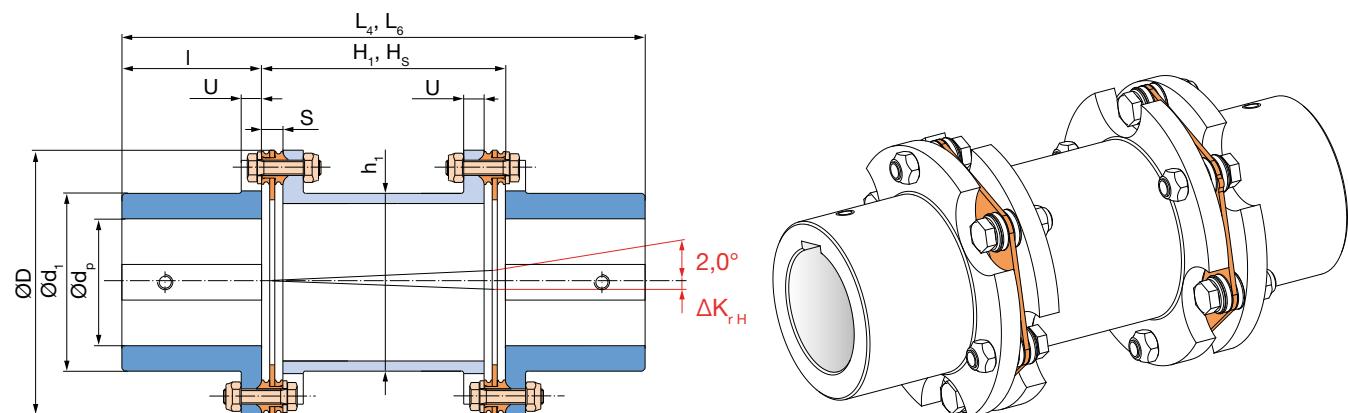


Fig. 33: Type 951.002 (Sleeve 1: H_1, L_4), Type 951.003 (Sleeve S: H_s, L_6)

Order Number

| | | | | |
|--|--|----------------------|--|--|
| — / 9 | 5 | — . 0 0 | — / — / — / — / — | |
| ▲ | ▲ | ▲ | ▲ | ▲ |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 |
| | | | Bore* Hub 1 ø (Dim. page 28) | Bore* Hub 2 ø (Dim. page 28) |
| | | | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 16 / 951.001 / Hub 1 – ø 25^{H7} / Hub 2 – ø 25^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Safe Against Overload | Page 59 ▶ |
| Transmittable Torques for Key Hubs | Page 61 ▶ |
| Installation Examples | Page 62 ▶ |
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| Technical Explanations | Page 69 ▶ |
| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with key hubs, large

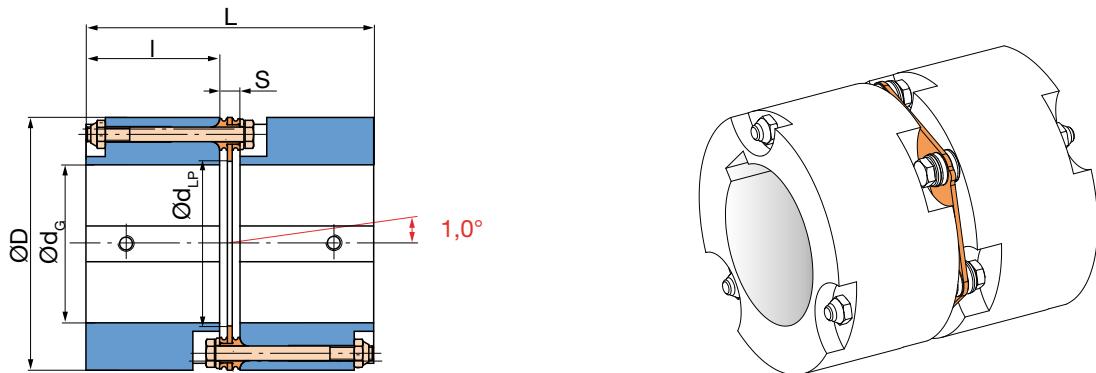


Fig. 34: Type 950.110

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|-------------------------------|------|------|------|------|------|
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Minimum hub bore | d _{G min} | [mm] | 30 | 35 | 45 | 55 | 65 | 75 | | |
| Maximum hub bore | d _{G max} | [mm] | 45 | 55 | 65 | 75 | 95 | 110 | | |
| Maximum speed ³⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | | |
| Permitted misalignments ⁴⁾ | permitted axial displacement ^{5) 6)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 | |
| | permitted radial misalignment ⁵⁾ | with connection plate | ΔK _r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 |
| | | with sleeve 1 | ΔK _{r,H} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 |
| Spring rigidity | torsion ¹⁰⁾ | with sleeve S | ΔK _{r,H} | [mm] | (H _S - S) × 0,0174 | | | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁷⁾ | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|-----|-------|
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d _{H1} | 43 | 54 | 62 | 71 | 92 | 98 |
| d _{LP} | 45 | 55 | 65 | 74 | 88 | 103 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _S | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 87,1 | 97,2 | 118,4 | 139,6 | 160 | 181,6 |
| L ₂ | 106,2 | 116,4 | 140,8 | 167,2 | 188 | 215,2 |
| L ₄ | 150 | 170 | 206 | 246 | 286 | 310 |
| L ₆ | dependent on H _S | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁸⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ⁹⁾ | 0,86 | 1,71 | 3,89 | 8,98 | 18,12 | 36,00 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁸⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ⁹⁾ | 0,87 | 1,26 | 2,08 | 3,47 | 4,94 | 7,23 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The values refer to couplings with 2 disk packs.

6) Only permitted as a static or virtually static value.

7) The values refer to 1 disk pack.

8) Mass moments of inertia and weights are valid for 1 disk pack.

9) Mass moments of inertia and weights are valid for maximum bore.

10) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_S [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and key hubs, large

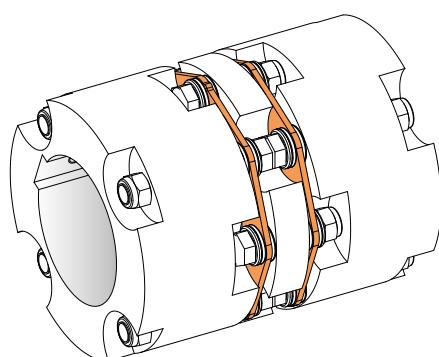
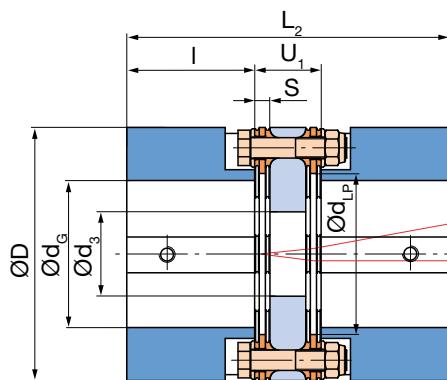


Fig. 35: Type 951.111

Double-jointed coupling with sleeve 1 or sleeve S (special length) and key hubs, large

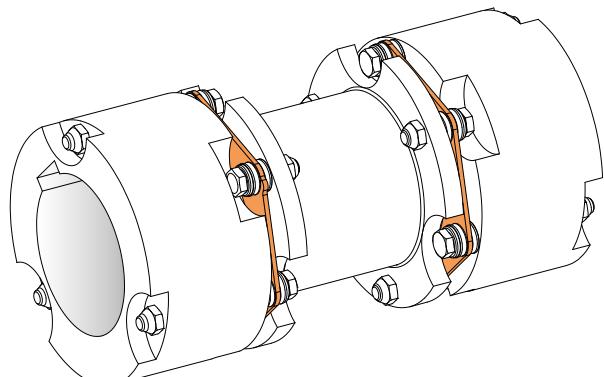
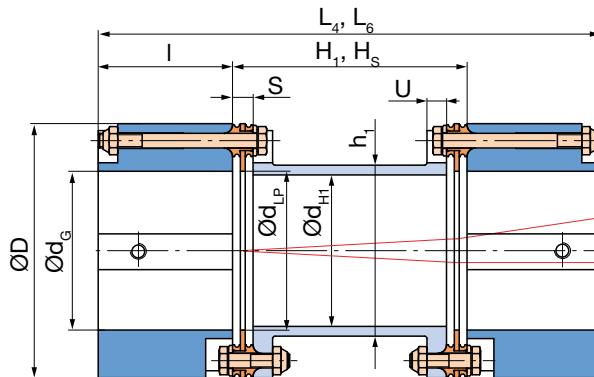


Fig. 36: Type 951.112 (Sleeve 1: H₁, L₄), Type 951.113 (Sleeve S: H_S, L₆)

Order Number

| | | | | | | | | |
|--|--|---------|--|----------------------------|---------------------------------------|---------------------------------------|---|---|
| — / 9 | 5 | — . 1 1 | — / — / — / — / — | | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 30) | Bore* Hub 2 ø (Dim. page 30) | Sleeve length H _S [mm] for special sleeves S / CRD / CFRP | Operating speed n _s [rpm] |

Example: 25 / 950.110 / Hub 1 – ø 45^{H7} / Hub 2 – ø 45^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Integrated Torque Measurement | Page 64 ▶ |
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ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with clamping hubs

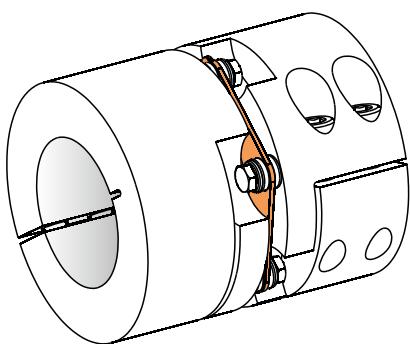
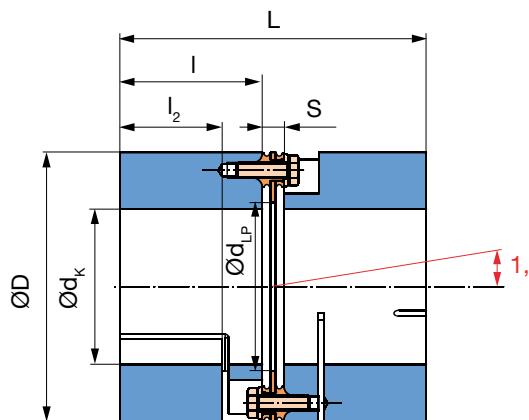


Fig. 37: Type 950.550

| Technical Data and Main Dimensions | | | Size | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|---------------------------|------|------|------|------|
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 16 | 25 | 40 | 64 | 100 | 160 | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | d _{K min} | [mm] | 20 | 22 | 25 | 28 | 32 | 40 | |
| Maximum hub bore ³⁾ | d _{K max} | [mm] | 45 | 52 | 60 | 70 | 90 | 100 | |
| Maximum speed ⁴⁾ | n _{max} | [rpm] | 9500 | 8200 | 7000 | 6000 | 5100 | 4300 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 |
| | | with sleeve 1 | ΔK _{rH} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 |
| Spring rigidity | torsion ¹¹⁾ | with sleeve S | ΔK _{rH} | [mm] | $(H_s - S) \times 0,0174$ | | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 |
| | tube sleeve S | | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 |
| angular spring rigidity ⁸⁾ | | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 |
| | | | | | | | | 1990 | |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|------|-------|
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d _{H1} | 43 | 54 | 62 | 71 | 92 | 98 |
| d _{LP} | 45 | 55 | 65 | 74 | 88 | 103 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 87,1 | 97,2 | 118,4 | 139,6 | 160 | 181,6 |
| L ₂ | 106,2 | 116,4 | 140,8 | 167,2 | 188 | 215,2 |
| L ₄ | 150 | 170 | 206 | 246 | 286 | 310 |
| L ₆ | dependent on H _s | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| I ₂ | 27 | 32 | 39,6 | 44,8 | 54,5 | 60 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 61.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ¹⁰⁾ | 0,74 | 1,49 | 3,64 | 8,42 | 16,94 | 34,32 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ¹⁰⁾ | 0,73 | 1,11 | 2,05 | 3,43 | 4,82 | 6,94 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and clamping hubs

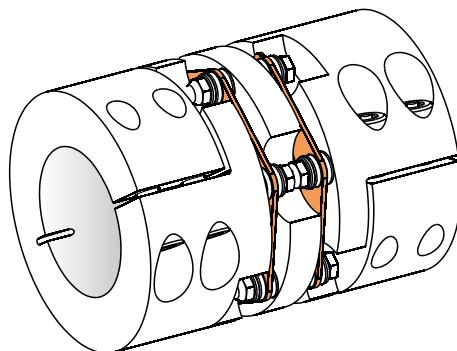
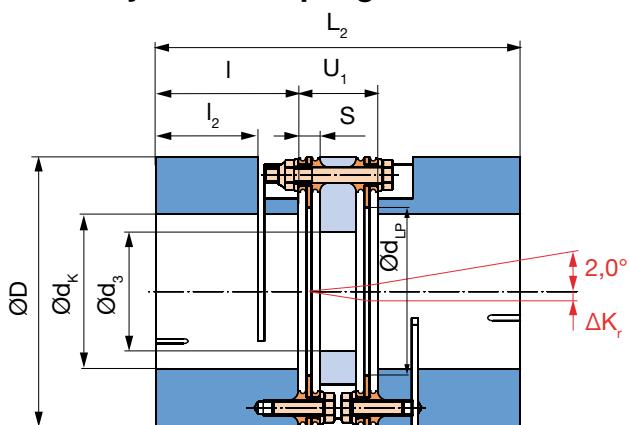


Fig. 38: Type 951.551

Double-jointed coupling with sleeve 1 or sleeve S (special length) and clamping hubs

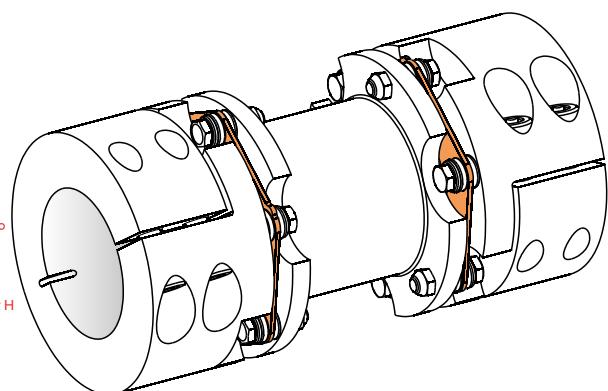
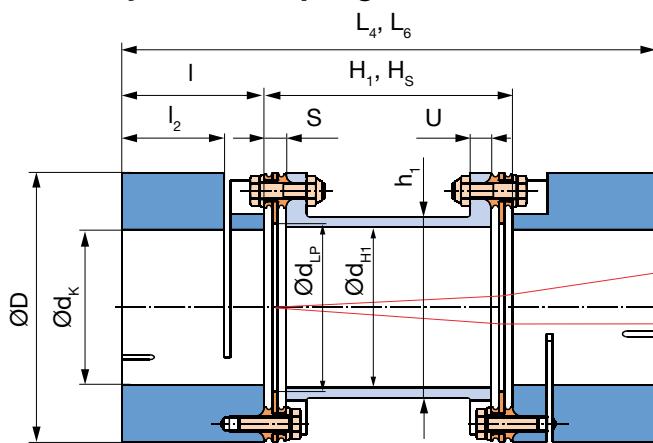


Fig. 39: Type 951.552 (Sleeve 1: H₁, L₄), Type 951.553 (Sleeve S: H_s, L₆)

Order Number

| | | | | | | | | |
|--|--|--------|--|----------------------------|---|---|---|---|
| — / 9 | 5 | — . 5 | 5 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 32) | Bore* Hub 2 ø (Dim. page 32) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 16 / 951.551 / Hub 1 – ø 45^{H7} / Hub 2 – ø 45^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with clamping ring hubs

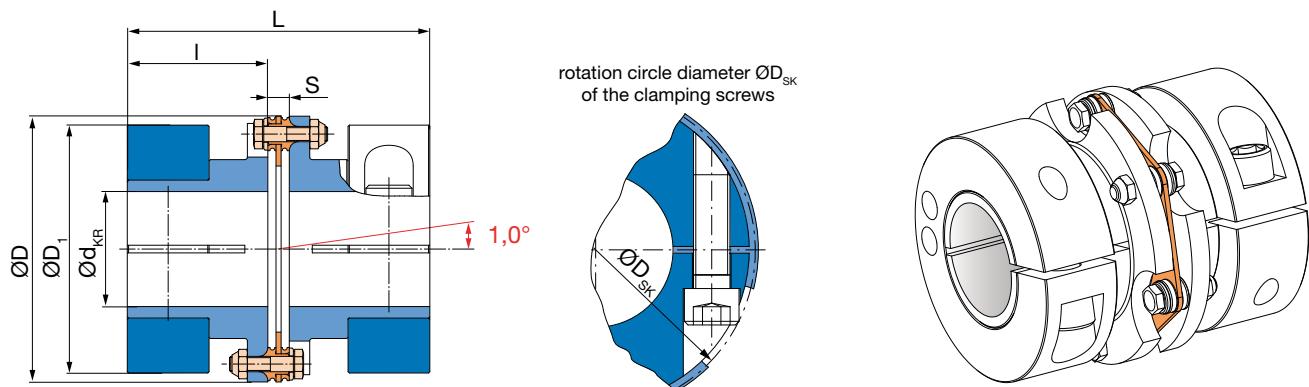


Fig. 40: Type 950.440

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|------|------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 190 | 290 | 450 | 720 | 1000 | 1600 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | | d _{KR min} | [mm] | 20 | 22 | 25 | 28 | 32 | 40 | |
| Maximum hub bore ³⁾ | | d _{KR max} | [mm] | 35 | 40 | 45 | 55 | 68 | 80 | |
| Maximum speed ⁴⁾ | | n _{max} | [rpm] | 9500 | 8200 | 7000 | 6000 | 5100 | 4300 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 | |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 |
| | | with sleeve 1 | ΔK _{rH} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 |
| Spring rigidity | torsion ¹¹⁾ | disk pack | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|-----|-------|
| D ₁ | 73 | 84 | 97 | 115 | 135 | 158 |
| D _{SK} | 77 | 89 | 103 | 122 | 143 | 167 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _S | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 87,1 | 97,2 | 118,4 | 139,6 | 160 | 181,6 |
| L ₂ | 106,2 | 116,4 | 140,8 | 167,2 | 188 | 215,2 |
| L ₄ | 150 | 170 | 206 | 246 | 286 | 310 |
| L ₆ | dependent on H _S | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ¹⁰⁾ | 0,63 | 1,29 | 2,84 | 6,3 | 13,49 | 28,71 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ¹⁰⁾ | 0,76 | 1,20 | 2,00 | 3,17 | 4,90 | 7,61 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

11) The C_T-value of a double-jointed coupling can be roughly calculated

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_S [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and clamping ring hubs

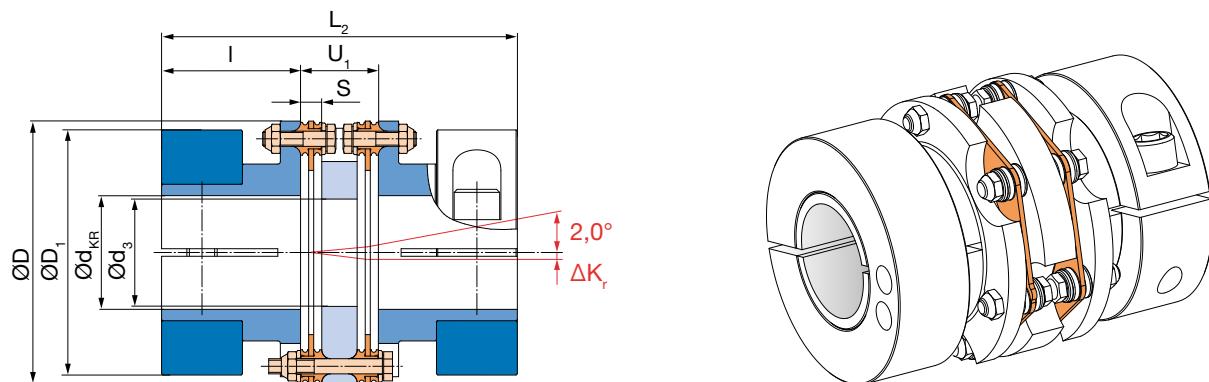


Fig. 41: Type 951.441

Double-jointed coupling with sleeve 1 or sleeve S (special length) and clamping ring hubs

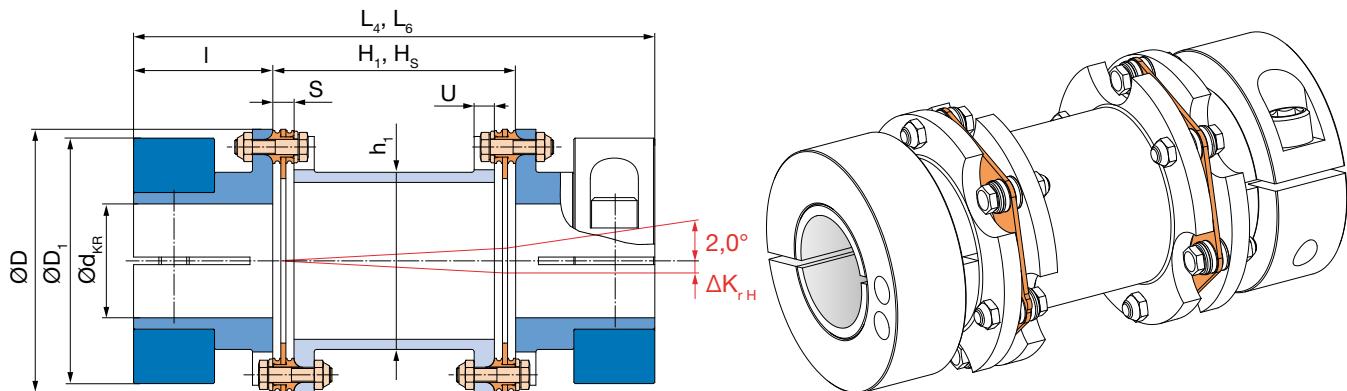


Fig. 42: Type 951.442 (Sleeve 1: H₁, L₄), Type 951.443 (Sleeve S: H_s, L₆)

Order Number

| | | | | | | | | |
|--|--|----------------------|--|--|---|---|---|---|
| — / 9 | 5 | — . 4 | 4 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 34) | Bore* Hub 2 ø (Dim. page 34) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 16 / 951.441 / Hub 1 – ø 25 ^{H7} / Hub 2 – ø 25 ^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with shrink disk hubs, external clamping

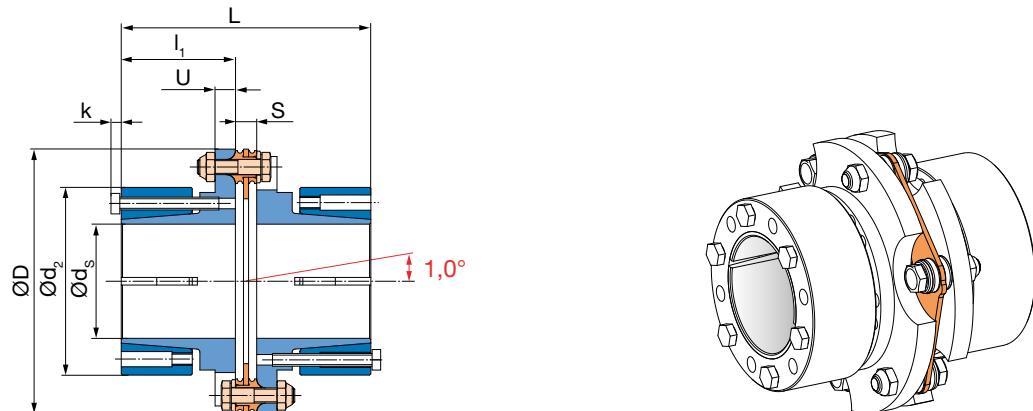


Fig. 43: Type 950.220

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|-------|-------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 190 | 290 | 450 | 720 | 1000 | 1600 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | | d _{S min} | [mm] | 14 | 20 | 25 | 30 | 35 | 40 | |
| Maximum hub bore ³⁾ | | d _{S max} | [mm] | 26 | 36 | 45 | 45 | 55 | 65 | |
| Maximum speed ⁴⁾ | | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 | |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 |
| | | with sleeve 1 | ΔK _{rH} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 |
| Spring rigidity | torsion ¹¹⁾ | disk pack | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|-------|-------|-------|-----|-------|
| d ₂ | 53 | 64 | 74 | 84 | 104 | 118 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| k | 3,5 | 3,5 | 3,5 | 4 | 5,5 | 5,5 |
| L | 77,1 | 87,2 | 98,4 | 109,6 | 120 | 131,6 |
| L ₂ | 96,2 | 106,4 | 120,8 | 137,2 | 148 | 165,2 |
| L ₄ | 140 | 160 | 186 | 216 | 246 | 260 |
| L ₆ | dependent on H _s | | | | | |
| I ₁ | 35 | 40 | 45 | 50 | 55 | 60 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ¹⁰⁾ | 0,27 | 0,57 | 1,15 | 2,46 | 5,59 | 11,14 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ¹⁰⁾ | 0,49 | 0,71 | 1,03 | 1,71 | 2,73 | 3,99 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and shrink disk hubs, external clamping

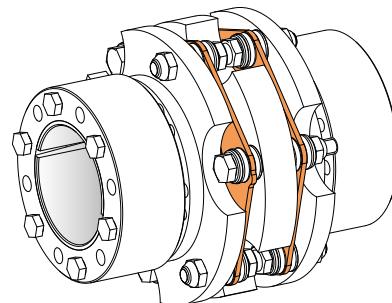
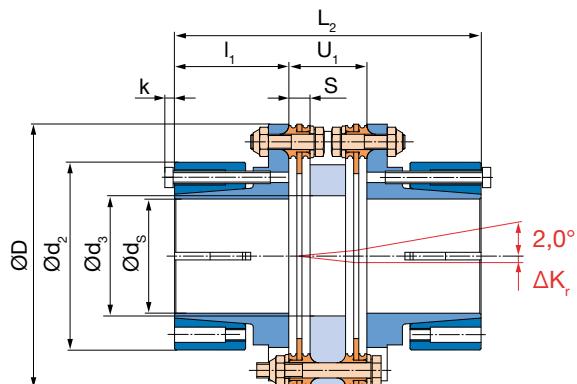


Fig. 44: Type 951.221

Double-jointed coupling with sleeve 1 or sleeve S (special length) and shrink disk hubs, external clamping

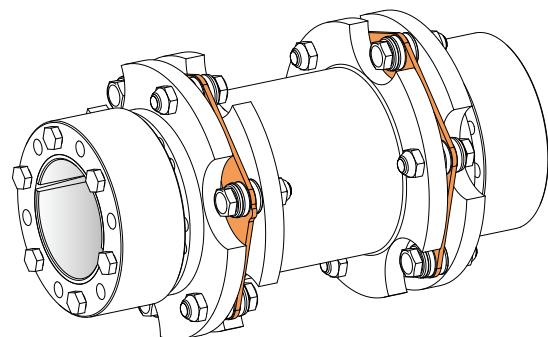
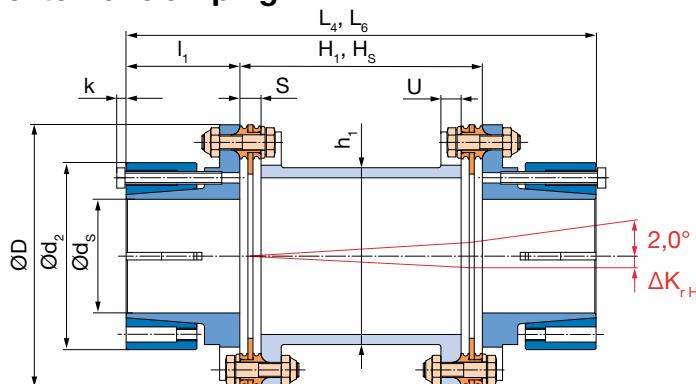


Fig. 45: Type 951.222 (Sleeve 1: H₁, L₄), Type 951.223 (Sleeve S: H_s, L₆)

Order Number

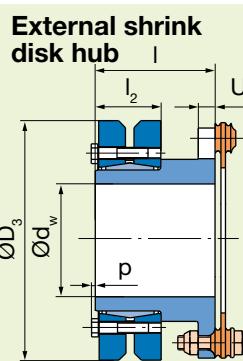
| | | | | | |
|--------------------------|--|--------|--|----------------------------|---|
| — / 9 | 5 | — . 2 | 2 | — / — / — / — / — | |
| ▲ | ▲ | ▲ | ▲ | ▲ | ▲ |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 36) |
| | | | | | Bore* Hub 2 ø (Dim. page 36) |
| | | | | | Sleeve length H _s [mm] for special sleeves S / CRD / CFRP |
| | | | | | Operating speed n _s [rpm] |

Example: 100 / 951.221 / Hub 1 – ø 45^{H7} / Hub 2 – ø 45^{H7}

*Standard H7, other tolerances possible

Additional Option:

| Size | d _w | D ₃ | I | I ₂ | p |
|------|----------------|----------------|----|----------------|-----|
| 16 | 24/25 | 60 | 40 | 25 | - |
| | 28/30 | 72 | 40 | 27,5 | 2,5 |
| 25 | 32/35 | 80 | 45 | 29,5 | - |
| | 38/40/42 | 90 | 45 | 31,5 | 1,5 |
| 40 | 42/45/48 | 100 | 55 | 34,5 | - |
| 64 | 50/55/60 | 115 | 65 | 34,5 | - |
| 100 | 55/60/65 | 138 | 75 | 38 | - |
| 160 | 65/70/75 | 155 | 85 | 44,5 | - |



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ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with shrink disk hubs, external clamping and internal clamping

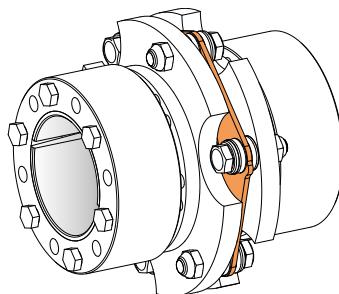
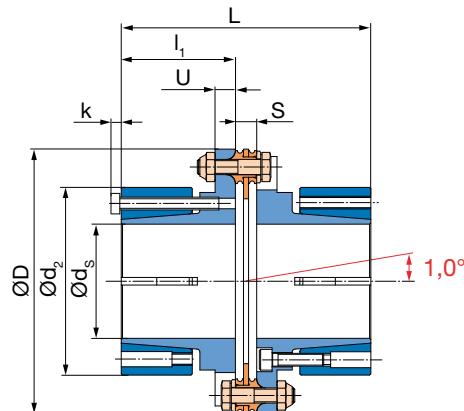


Fig. 46: Type 950.230

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-------------------------------|-------|-------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 190 | 290 | 450 | 720 | 1000 | 1600 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | | d _{S min} | [mm] | 14 | 20 | 25 | 30 | 35 | 40 | |
| Maximum hub bore ³⁾ | | d _{S max} | [mm] | 26 | 36 | 45 | 45 | 55 | 65 | |
| Maximum speed ⁴⁾ | | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 | |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 | |
| | | with sleeve 1 | ΔK _{rH} | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 | |
| Spring rigidity | torsion ¹¹⁾ | with sleeve S | ΔK _{rH} | (H _s - S) x 0,0174 | | | | | | |
| | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | tube sleeve S | | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|-------|-------|-------|-----|-------|
| d ₂ | 53 | 64 | 74 | 84 | 104 | 118 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| k | 3,5 | 3,5 | 3,5 | 4 | 5,5 | 5,5 |
| L | 77,1 | 87,2 | 98,4 | 109,6 | 120 | 131,6 |
| L ₂ | 96,2 | 106,4 | 120,8 | 137,2 | 148 | 165,2 |
| L ₄ | 140 | 160 | 186 | 216 | 246 | 260 |
| L ₆ | dependent on H _s | | | | | |
| I ₁ | 35 | 40 | 45 | 50 | 55 | 60 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ¹⁰⁾ | 0,27 | 0,57 | 1,15 | 2,46 | 5,59 | 11,14 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ¹⁰⁾ | 0,49 | 0,71 | 1,03 | 1,71 | 2,73 | 3,99 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

11) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and shrink disk hubs, external clamping and internal clamping

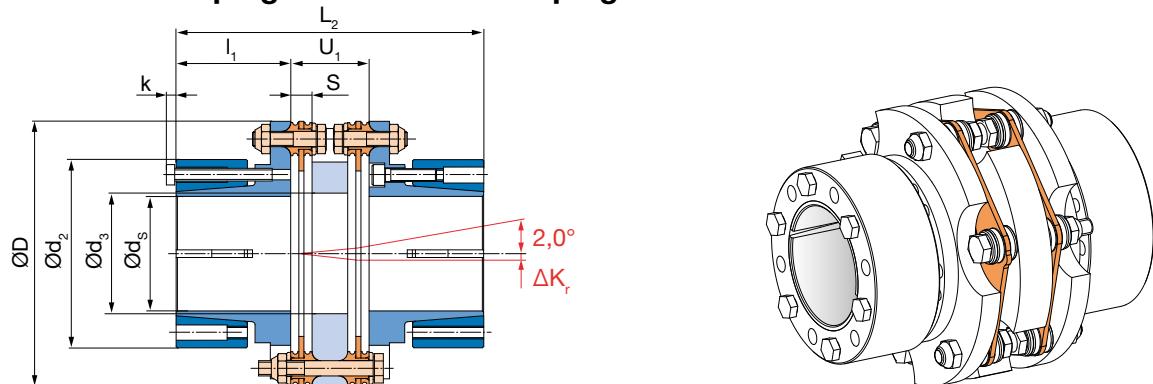


Fig. 47: Type 951.231

Double-jointed coupling with sleeve 1 or sleeve S (special length) and shrink disk hubs, external clamping and internal clamping

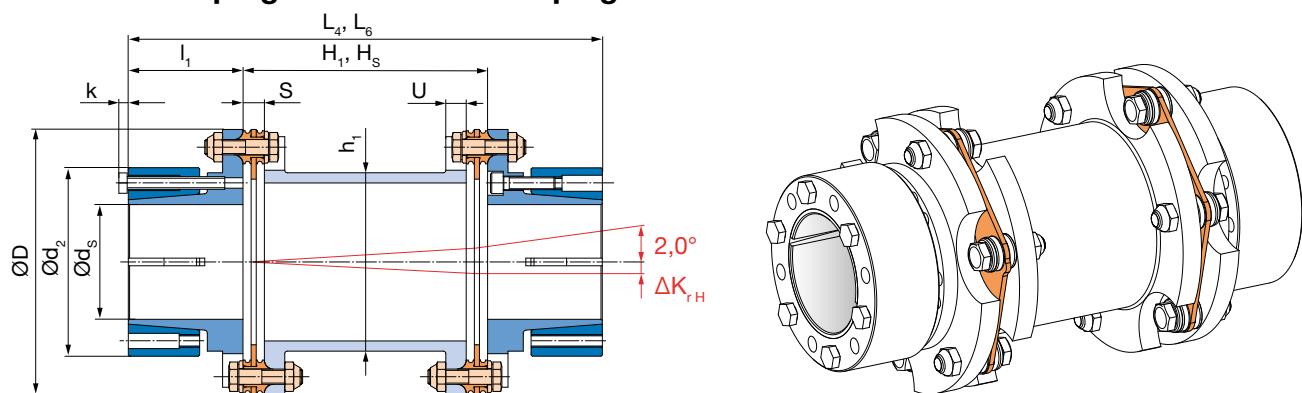


Fig. 48: Type 951.232 (Sleeve 1: H₁, L₄), Type 951.233 (Sleeve S: H_s, L₆)

Order Number

| | | | | | | | | |
|--|--|----------------------|--|--|---|---|---|---|
| — / 9 | 5 | — . 2 | 3 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 38) | Bore* Hub 2 ø (Dim. page 38) | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP | Operating speed n_s [rpm] |

Example: 64 / 951.231 / Hub 1 – ø 35^{H7} / Hub 2 – ø 40^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Transmittable Torques for Shrink Disk Hubs | Page 60 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with shrink disk hubs, large

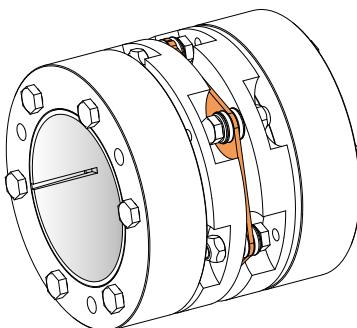
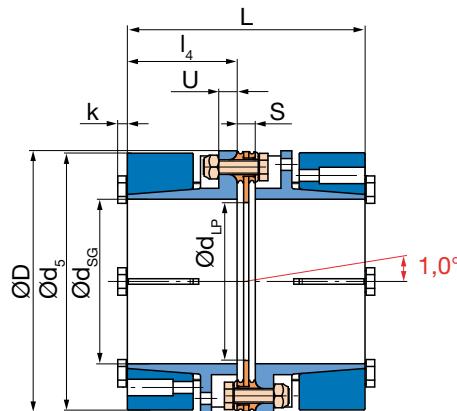


Fig. 49: Type 950.990

| Technical Data and Main Dimensions | | | Size | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------------|-------|-------|------|-------------------------------|------|------|
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 16 | 25 | 40 | 64 | 100 | 160 | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore | d _{SG min} | [mm] | 25 | 32 | 40 | 45 | 55 | 65 | |
| Maximum hub bore | d _{SG max} | [mm] | 45 | 52 | 60 | 70 | 90 | 100 | |
| Maximum speed ³⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | |
| Permitted misalignments ⁴⁾ | permitted axial displacement ^{5) 6)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 |
| | permitted radial misalignment ⁵⁾ | ΔK _r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 |
| | with connection plate | ΔK _{rH} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 |
| Spring rigidity | with sleeve 1 | ΔK _{rH} | [mm] | | | | | | |
| | with sleeve S | ΔK _{rH} | [mm] | | | | | | |
| | | | | | | | (H _s - S) x 0,0174 | | |
| Spring rigidity | torsion ¹⁰⁾ | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁷⁾ | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-----------------|------------------------------|-------|-------|-------|-----|-------|
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d ₅ | 77 | 82 | 100 | 115 | 143 | 162 |
| d _{H1} | 43 | 54 | 62 | 71 | 92 | 98 |
| d _{Lp} | 45 | 55 | 65 | 74 | 88 | 103 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| k | 3,5 | 3,5 | 3,5 | 4 | 5,5 | 5,5 |
| L | 87,1 | 97,2 | 108,4 | 119,6 | 130 | 151,6 |
| L ₂ | 106,2 | 116,4 | 130,8 | 147,2 | 158 | 185,2 |
| L ₄ | 150 | 170 | 196 | 226 | 256 | 280 |
| L ₆ | dependent on H _s | | | | | |
| I ₄ | 40 | 45 | 50 | 55 | 60 | 70 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The values refer to couplings with 2 disk packs.

6) Only permitted as a static or virtually static value.

7) The values refer to 1 disk pack.

8) Mass moments of inertia and weights are valid for 1 disk pack.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁸⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ⁹⁾ | 0,78 | 1,23 | 2,88 | 5,81 | 13,77 | 27,35 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _s = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁸⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ⁹⁾ | 0,79 | 1,02 | 1,71 | 2,53 | 3,92 | 6,08 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _s = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

9) Mass moments of inertia and weights are valid for maximum bore.

10) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and shrink disk hubs, large

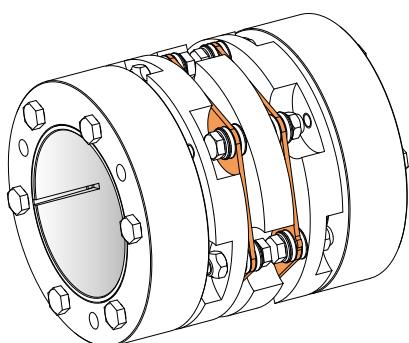
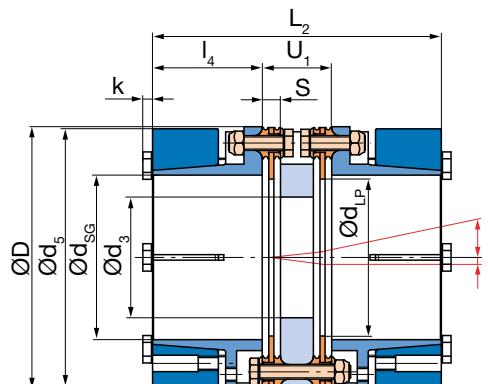


Fig. 50: Type 951.991

Double-jointed coupling with sleeve 1 or sleeve S (special length) and shrink disk hubs, large

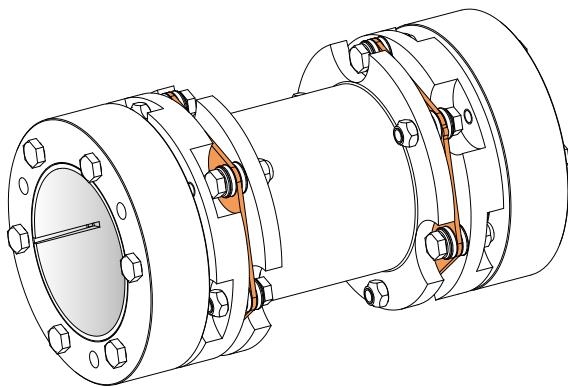
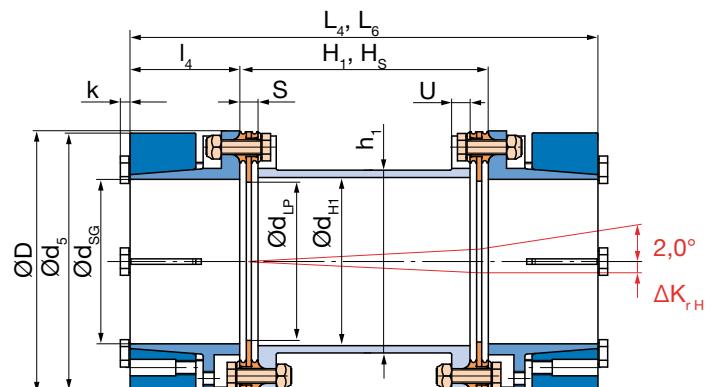


Fig. 51: Type 951.992 (Sleeve 1: H_1 , L_4), Type 951.993 (Sleeve S: H_s , L_6)

Order Number

| | | | | | |
|--|--|--------|--|----------------------------|--|
| — / 9 | 5 | — . 9 | 9 | — / — / — / — / — | |
| ▲ | | ▲ | | ▲ | ▲ |
| Sizes 16 to 160 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 40) |
| | | | | | Bore* Hub 2 ø (Dim. page 40) |
| | | | | | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP |
| | | | | | Operating speed n_s [rpm] |

Example: 16 / 951.991 / Hub 1 – ø 35 $H7$ / Hub 2 – ø 35 $H7$

*Standard H7, other tolerances possible

| | |
|--|-----------|
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| Safe Against Overload | Page 59 ▶ |
| Installation Examples | Page 62 ▶ |
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and split clamping hub

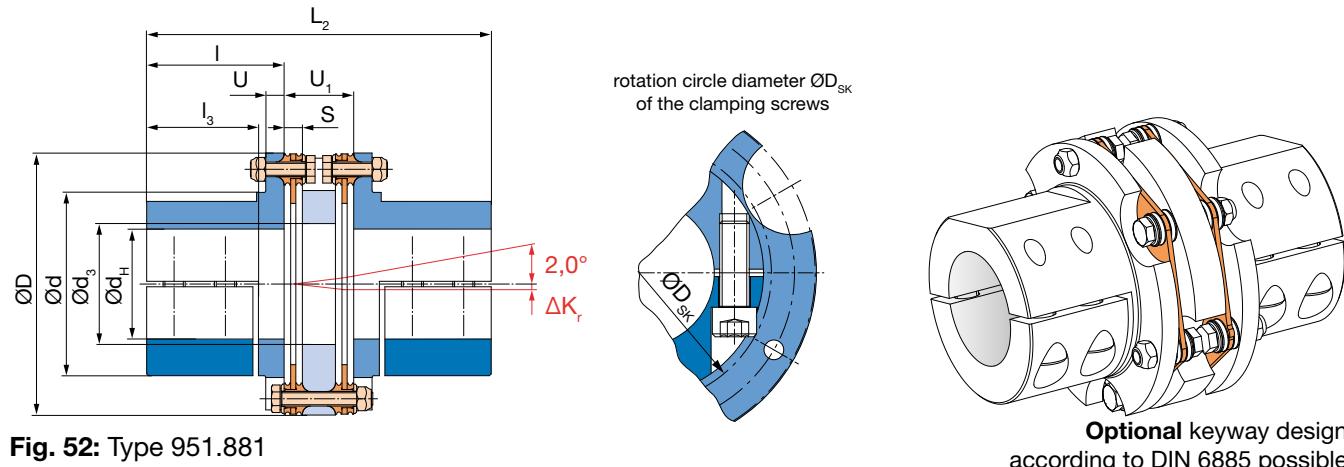


Fig. 52: Type 951.881

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|------------------|-----------------------------|---------------------------|------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T_{KN} | [Nm] | 190 | 290 | 450 | 720 | 1000 | 1600 | |
| Peak torque ²⁾ | | T_{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | |
| Minimum hub bore ³⁾ | | $d_{H\min}$ | [mm] | 18 | 22 | 25 | 30 | 35 | 40 | |
| Maximum hub bore ³⁾ | | $d_{H\max}$ | [mm] | 28 | 32 | 40 | 45 | 60 | 75 | |
| Maximum speed ⁴⁾ | | n_{\max} | [rpm] | 9500 | 8200 | 7000 | 6000 | 5100 | 4300 | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | | ΔK_a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK_r | [mm] | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 |
| | | with sleeve 1 | ΔK_{rH} | [mm] | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 |
| Spring rigidity | torsion ¹¹⁾ | with sleeve S | ΔK_{rH} | [mm] | $(H_s - S) \times 0,0174$ | | | | | |
| | | disk pack | $C_{T\ LP}$ | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | | tube sleeve S | $C_{T\ H\ rel.}$ | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------|------------------------------|-------|-------|-------|------|-------|
| D_{SK} | 55 | 67 | 76 | 87 | 108 | 122 |
| d | 50 | 60 | 70 | 80 | 100 | 115 |
| d_3 | 33 | 41 | 46 | 51 | 66 | 76 |
| H_1 | 70 | 80 | 96 | 116 | 136 | 140 |
| H_s | acc. customer specifications | | | | | |
| h_1 | 50 | 60 | 70 | 80 | 100 | 110 |
| L_2 | 106,2 | 116,4 | 140,8 | 167,2 | 188 | 215,2 |
| L_4 | 150 | 170 | 206 | 246 | 286 | 310 |
| L_6 | dependent on H_s | | | | | |
| I | 40 | 45 | 55 | 65 | 75 | 85 |
| I_3 | 31 | 35 | 43 | 51 | 61 | 69 |
| I_A | 25,7 | 30,8 | 40 | 51,2 | 56,6 | 58,6 |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U_1 | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |

1) Valid for unchanging load direction as well as for max. permitted shaft misalignment. When the load direction changes, max. 60% of the stated nominal torque is permitted.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-------------------------------|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Hub ¹⁰⁾ | 0,25 | 0,54 | 1,20 | 2,63 | 6,31 | 12,49 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with $H_s = 1000$ mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|-------------------------------|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Hub ¹⁰⁾ | 0,47 | 0,76 | 1,21 | 1,96 | 3,17 | 4,45 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with $H_s = 1000$ mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

10) Mass moments of inertia and weights are valid for maximum bore.

11) The C_T -value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T\ tot.} = \frac{1}{\frac{2}{C_{T\ LP}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T\ H\ rel.}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with sleeve 1 or sleeve S (special length) and split clamping hubs

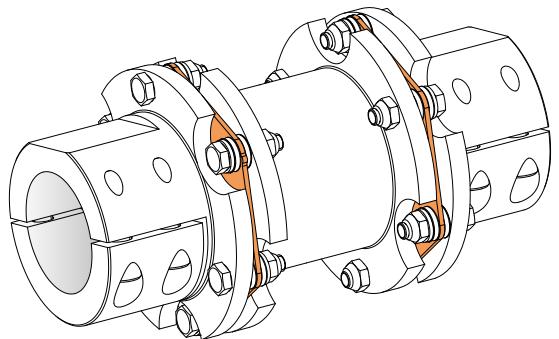
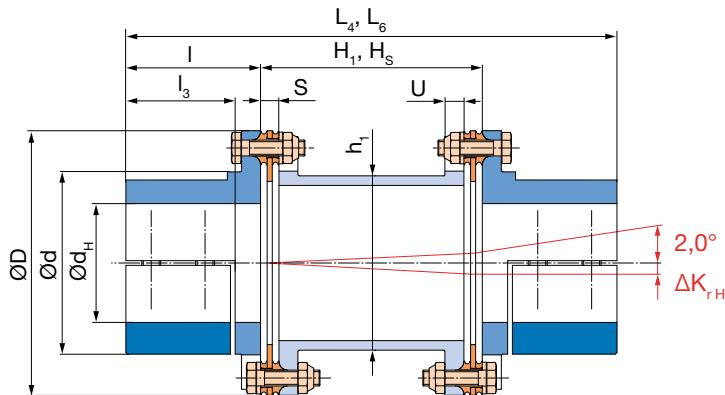


Fig. 53: Type 951.882 (Sleeve 1: H_1, L_4),
Type 951.883 (Sleeve S: H_S, L_6)

Optional keyway design according to DIN 6885 possible

Installation coupling with split clamping hubs

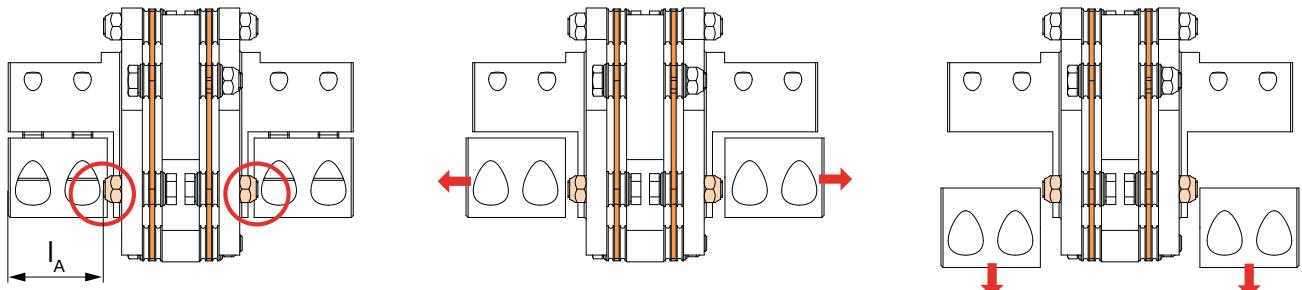


Fig. 54: Axial displacement of the half-shells during radial assembly/disassembly (only necessary on Type 951.881).

Order Number

| | | | | | | | | |
|--|---|-------|---|------------------------------|--|--|---------------------------------------|--|
| — / 9 | 5 | 1 . 8 | 8 | — / — | / — | / — | / — | / — |
| ▲ | | | | ▲ | ▲ | ▲ | ▲ | ▲ |
| Sizes 16 to 160 | | | | Connection plate 1 | Bore* Hub 1 ø (Dim. page 42) | Bore* Hub 2 ø (Dim. page 42) | Sleeve length H_s [mm] | Operating speed n_s [rpm] |
| | | | | 2 Sleeve 1 | 3 Sleeve S | 4 Sleeve CRD (page 56) | 5 Sleeve CFRP (page 56) | for special sleeves S / CRD / CFRP |

Example: 100 / 951.881 / Hub 1 – $\varnothing 50\text{ H}7$ / Hub 2 – $\varnothing 50\text{ H}7$

*Standard H7, other tolerances possible

| | |
|---|-----------|
| Variable length Sleeve/CFRP sleeve/Options | Page 56 ▶ |
| Safe Against Overload | Page 59 ▶ |
| Transmittable Torques for Split Clamping Hubs | Page 60 ▶ |
| Installation Examples | Page 62 ▶ |
| Integrated Torque Measurement | Page 64 ▶ |
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| Technical Explanations | Page 69 ▶ |
| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Single-jointed coupling with flanges

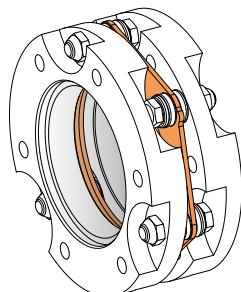
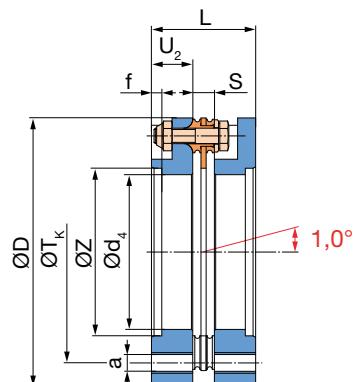


Fig. 55: Type 950.660

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-------------------------------|--------------------------|-------|------|------|------|------|------|
| | | | 16 | 25 | 40 | 64 | 100 | 160 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 190 | 290 | 450 | 720 | 1000 | 1600 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 285 | 435 | 675 | 1080 | 1500 | 2400 | |
| Outer diameter | D | [mm] | 77 | 89 | 104 | 123 | 143 | 167 | | |
| Centering bore | Z ^{H7} | [mm] | 45 | 55 | 65 | 75 | 92 | 105 | | |
| Maximum speed ³⁾ | n _{max} | [rpm] | 13600 | 11800 | 10100 | 8500 | 7300 | 6200 | | |
| Permitted misalignments ⁴⁾ | permitted axial displacement ^{5) 6)} | ΔK _a | [mm] | 1,1 | 1,3 | 1,5 | 1,8 | 2,1 | 2,5 | |
| Permitted misalignments ⁴⁾ | permitted radial misalignment ⁵⁾ | with connection plate | ΔK _r | 0,3 | 0,3 | 0,4 | 0,45 | 0,45 | 0,55 | |
| | with sleeve 1 | ΔK _{rH} | 1,0 | 1,2 | 1,5 | 1,8 | 2,1 | 2,2 | | |
| | with sleeve S | ΔK _{rH} | (H _S - S) x 0,0174 | | | | | | | |
| Spring rigidity | torsion ⁷⁾ | disk pack | C _{T LP} | [10 ³ Nm/rad] | 145 | 280 | 301 | 748 | 1135 | 1920 |
| | tube sleeve S | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 19 | 34 | 71 | 108 | 217 | 415 | |
| | | | [Nm/rad] | 229 | 248 | 298 | 876 | 1089 | 1990 | |

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|----------------|------------------------------|--------|---------|---------|---------|---------|
| a | 6 x M8 | 6 x M8 | 6 x M10 | 6 x M10 | 6 x M12 | 6 x M14 |
| d ₃ | 33 | 41 | 46 | 51 | 66 | 76 |
| d ₄ | 40 | 50 | 60 | 70 | 85 | 100 |
| f | 4 | 4 | 4 | 5 | 5 | 5 |
| H ₁ | 70 | 80 | 96 | 116 | 136 | 140 |
| H _s | acc. customer specifications | | | | | |
| h ₁ | 50 | 60 | 70 | 80 | 100 | 110 |
| L | 37,1 | 37,2 | 44,4 | 49,6 | 50 | 68,6 |
| L ₂ | 56,2 | 56,4 | 66,8 | 77,2 | 78 | 102,2 |
| L ₄ | 100 | 110 | 132 | 156 | 176 | 197 |
| L ₆ | dependent on H _s | | | | | |
| S | 7,1 | 7,2 | 8,4 | 9,6 | 10 | 11,6 |
| T _K | 62 | 75 | 86 | 103 | 116 | 140 |
| U | 7 | 7 | 8 | 10 | 10 | 12 |
| U ₁ | 26,2 | 26,4 | 30,8 | 37,2 | 38 | 45,2 |
| U ₂ | 15 | 15 | 18 | 20 | 20 | 28,5 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,12 | 0,26 | 0,74 | 1,19 | 3,27 |
| Flange | 0,23 | 0,43 | 0,89 | 1,95 | 3,87 | 9,48 |
| Connection plate | 0,23 | 0,44 | 0,95 | 2,30 | 4,60 | 9,72 |
| Sleeve 1 | 0,32 | 0,61 | 1,38 | 3,02 | 6,10 | 12,96 |
| Sleeve S with H _S = 1000 mm | 2,11 | 3,77 | 7,81 | 12,62 | 24,98 | 49,43 |
| Sleeve S per 1000 mm tube | 1,93 | 3,43 | 7,12 | 10,86 | 21,86 | 41,61 |

Weight [kg]

| Size | 16 | 25 | 40 | 64 | 100 | 160 |
|--|------|------|------|------|-------|-------|
| Disk pack ⁹⁾ | 0,08 | 0,09 | 0,15 | 0,29 | 0,35 | 0,67 |
| Flange | 0,26 | 0,34 | 0,52 | 0,82 | 1,16 | 2,10 |
| Connection plate | 0,31 | 0,43 | 0,68 | 1,19 | 1,96 | 2,96 |
| Sleeve 1 | 0,39 | 0,54 | 0,93 | 1,46 | 2,04 | 3,38 |
| Sleeve S with H _S = 1000 mm | 3,63 | 4,42 | 6,82 | 8,09 | 10,22 | 16,83 |
| Sleeve S per 1000 mm tube | 3,48 | 4,22 | 6,51 | 7,50 | 9,47 | 15,34 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The values refer to couplings with 2 disk packs.

6) Only permitted as a static or virtually static value.

7) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 16 to 160 – disk pack-HF

Double-jointed coupling with connection plate and flanges

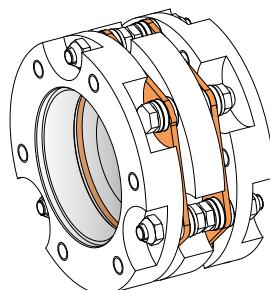
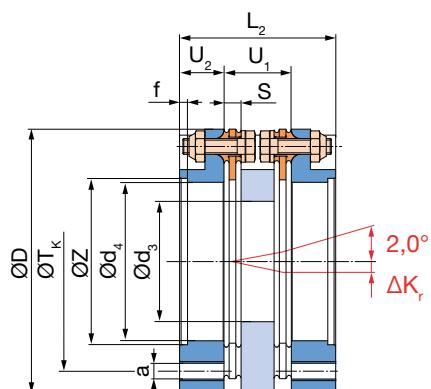


Fig. 56: Type 951.661

Double-jointed coupling with sleeve 1 or sleeve S (special length) and flanges

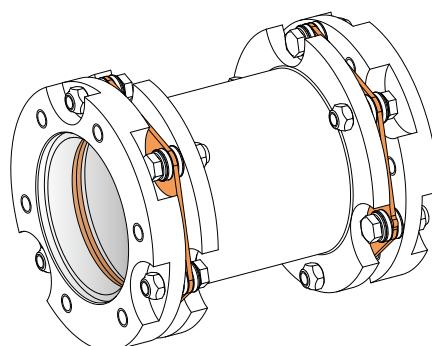
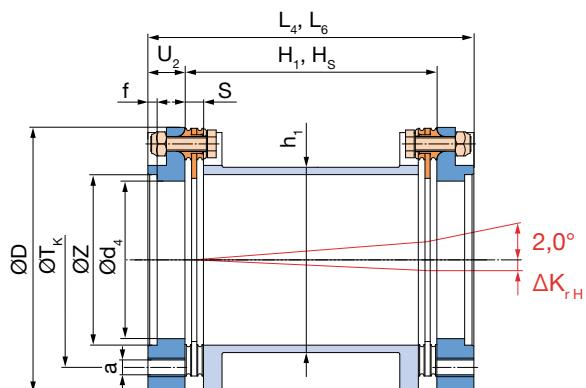


Fig. 57: Type 951.662 (Sleeve 1: H_1 , L_4), Type 951.663 (Sleeve S: H_s , L_6)

Order Number

| | | | | | | | | | | | | |
|--|----------------------------|---|-------------------------|---|--|---|---|---|---|---|---|---|
| — | / | 9 | 5 | — | . | 6 | 6 | — | / | — | / | — |
| ▲ | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ |
| Sizes 16 to 160 | Single-jointed coupling | 0 | Single-jointed coupling | 0 | Sleeve length H_s [mm] | | Operating speed n_s [rpm] | | | | | |
| | Double-jointed coupling | 1 | Connection plate | 1 | for special sleeves | | | | | | | |
| | | | Sleeve 1 | 2 | S / CRD / CFRP | | | | | | | |
| | | | Sleeve S | 3 | | | | | | | | |
| | | | Sleeve CRD (page 56) | 4 | | | | | | | | |
| | | | Sleeve CFRP (page 56) | 5 | | | | | | | | |

Example: 40 / 951.661

| | |
|--|-----------|
| Variable length Sleeve S/CFRP sleeve/Options | Page 56 ▶ |
| Safe Against Overload | Page 59 ▶ |
| Installation Examples | Page 62 ▶ |
| Integrated Torque Measurement | Page 64 ▶ |
| Dimensioning, Size Selection | Page 68 ▶ |
| Technical Explanations | Page 69 ▶ |
| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 180 to 2200

Single-jointed coupling with key hubs

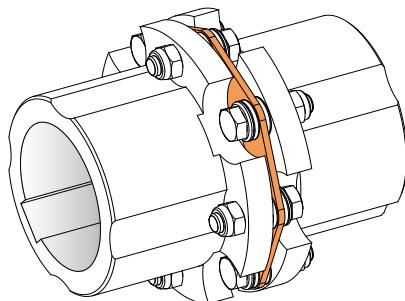
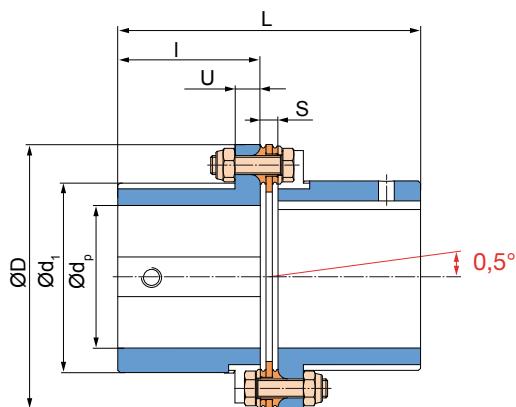


Fig. 58: Type 950.000

Technical Data and Main Dimensions

| | | | 180 | 300 | 500 | 850 | 1400 | 2200 | | |
|---------------------------------------|---|-----------------|----------------|-----------------------------|------|-------|-------|-------|----------------------------|-------|
| Nominal torque ¹⁾ | T_{KN} | [Nm] | 2100 | 3500 | 5800 | 9500 | 15000 | 24000 | | |
| Peak torque ²⁾ | T_{KS} | [Nm] | 3150 | 5250 | 8700 | 14250 | 22500 | 36000 | | |
| Outer diameter | D | [mm] | 143 | 167 | 198 | 234 | 274 | 314 | | |
| Minimum hub bore ³⁾ | $d_{p\min}$ | [mm] | 40 | 45 | 55 | 65 | 75 | 90 | | |
| Maximum hub bore ³⁾ | $d_{p\max}$ | [mm] | 75 | 90 | 105 | 120 | 140 | 170 | | |
| Maximum speed ⁴⁾ | n_{\max} | [rpm] | 7300 | 6200 | 5200 | 4400 | 3800 | 3300 | | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | ΔK_a | [mm] | 1,0 | 1,2 | 1,4 | 1,6 | 1,9 | 2,2 | |
| | permitted radial misalignment ⁶⁾ | ΔK_r | [mm] | 0,25 | 0,25 | 0,35 | 0,4 | 0,5 | 0,55 | |
| | with connection plate | ΔK_{rH} | [mm] | 1,2 | 1,25 | 1,35 | 1,7 | 2 | 2,6 | |
| Spring rigidity | with sleeve 1 | ΔK_{rH} | [mm] | | | | | | $(H_s - S) \times 0,00873$ | |
| | with sleeve S | ΔK_{rH} | [mm] | | | | | | | |
| | torsion ¹¹⁾ | disk pack | $C_{T LP}$ | [10 ³ Nm/rad] | 3000 | 3480 | 11900 | 20600 | 30150 | 46800 |
| | | tube sleeve S | $C_{T H rel.}$ | [10 ⁶ Nm mm/rad] | 250 | 415 | 894 | 1690 | 2734 | 4961 |
| | angular spring rigidity ⁸⁾ | | | [Nm/rad] | 3890 | 6980 | 11250 | 18580 | 26120 | 28520 |

Dimensions [mm]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|--------------|------------------------------|-------|-----|-----|------|-------|
| d_1 | 104 | 121 | 141 | 164 | 190 | 230 |
| d_3 | 54 | 61 | 66 | 76 | 86 | 110 |
| $d_{pi\min}$ | 40 | 45 | 55 | 65 | 75 | 90 |
| $d_{pi\max}$ | 55 | 70 | 85 | 95 | 110 | 130 |
| H_1 | 150 | 160 | 170 | 220 | 266 | 320 |
| H_s | acc. customer specifications | | | | | |
| h_1 | 92,5 | 111 | 132 | 150 | 174 | 206 |
| h_s | 92 | 110 | 130 | 150 | 165 | 190 |
| L | 181,2 | 191,2 | 212 | 264 | 316 | 377,8 |
| L_1 | 178 | 192 | 206 | 260 | 310 | 370 |
| L_2 | 212,4 | 224,4 | 252 | 315 | 374 | 443,6 |
| L_4 | 320 | 340 | 370 | 470 | 566 | 680 |
| L_6 | dependent on H_s | | | | | |
| I | 85 | 90 | 100 | 125 | 150 | 180 |
| S | 11,2 | 11,2 | 12 | 14 | 16 | 17,8 |
| U | 14 | 16 | 18 | 20 | 22 | 25 |
| U_1 | 42,4 | 44,4 | 52 | 65 | 74 | 83,6 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 61.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

Mass Moments of Inertia J [10⁻³ kgm²]

| | Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|----------------------------------|------|-------|-------|--------|--------|--------|--------|
| Disk pack ⁹⁾ | | 2,64 | 5,60 | 14,58 | 36,85 | 83,86 | 132,19 |
| Hub key ¹⁰⁾ | | 6,45 | 13,14 | 28,21 | 63,01 | 134,49 | 323,57 |
| Hub key: internal ¹⁰⁾ | | 4,26 | 9,18 | 20,64 | 46,85 | 95,76 | 207,12 |
| Connection plate | | 3,91 | 8,60 | 21,54 | 53,27 | 114,26 | 241,16 |
| Sleeve 1 | | 6,85 | 14,22 | 29,94 | 67,40 | 149,09 | 341,78 |
| Sleeve S with $H_s = 1000$ mm | | 28,41 | 51,24 | 109,74 | 210,27 | 364,62 | 705,89 |
| Sleeve S per 1000 mm tube | | 25,08 | 41,61 | 89,57 | 169,22 | 273,78 | 496,68 |

Weight [kg]

| | Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|----------------------------------|------|-------|-------|-------|-------|-------|-------|
| Disk pack ⁹⁾ | | 0,73 | 1,15 | 2,14 | 3,92 | 6,52 | 7,51 |
| Hub key ¹⁰⁾ | | 2,80 | 4,01 | 6,25 | 10,51 | 16,62 | 28,46 |
| Hub key: internal ¹⁰⁾ | | 2,38 | 3,32 | 5,36 | 9,00 | 14,44 | 23,26 |
| Connection plate | | 1,53 | 2,44 | 4,48 | 8,04 | 12,64 | 19,55 |
| Sleeve 1 | | 2,61 | 3,66 | 5,38 | 9,32 | 15,62 | 26,98 |
| Sleeve S with $H_s = 1000$ mm | | 14,37 | 17,45 | 27,01 | 38,66 | 53,84 | 77,23 |
| Sleeve S per 1000 mm tube | | 13,64 | 15,34 | 23,97 | 34,36 | 46,78 | 64,41 |

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

11) The C_T value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T LP}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T H rel.}}}$$

ROBA®-DS Sizes 180 to 2200

Double-jointed coupling with connection plate and key hubs

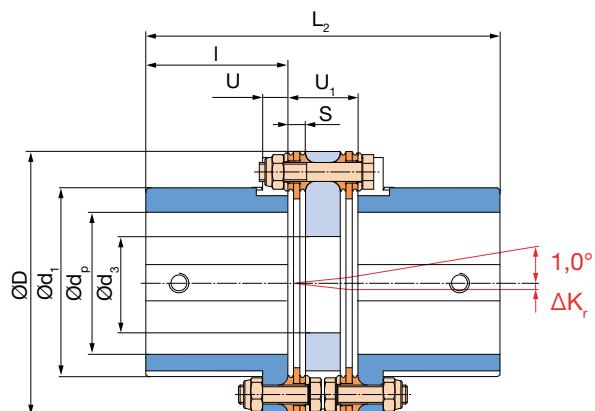


Fig. 59: Type 951.001

Double-jointed coupling with sleeve 1 or sleeve S (special length) and key hubs

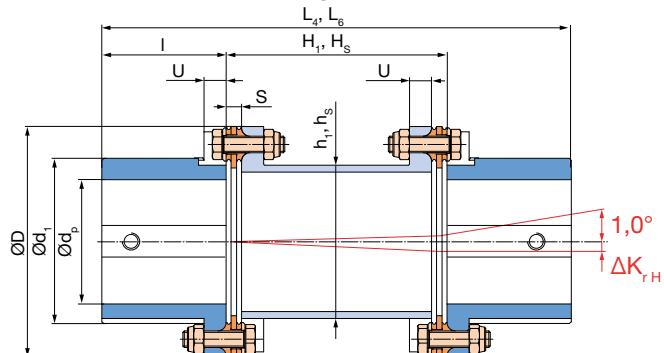
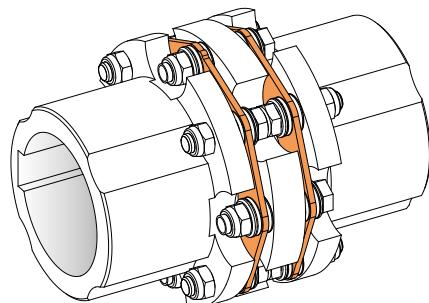


Fig. 60: Type 951.002 (Sleeve 1: H_1, h_1, L_4),
Type 951.003 (Sleeve S: H_s, h_s, L_6)



Double-jointed coupling with sleeve 1 and key hubs (internal/internal)

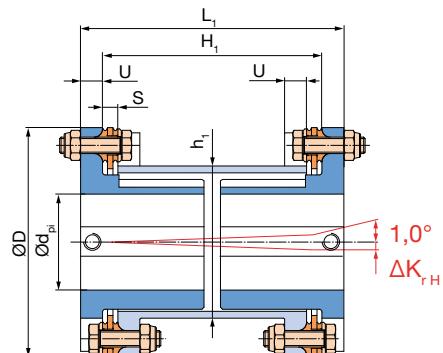


Fig. 61: Type 951.772 (Sleeve 1: H_1, L_1)

Order Number

| | | | | |
|--|----------------------------|----------|---------------------------------------|--|
| | | HUB 1 | HUB 2 | |
| Key hub Standard | 0 | 0 | Key hub Standard | |
| Key hub internal (Fig. 61) | 7 | 7 | Key hub internal (Fig. 61) | |
| | ▼ | ▼ | | |
| — / 9 5 — . — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ |
| Sizes 180 to 2200 | Single-jointed coupling | 0 | Single-jointed coupling | 0 |
| | Double-jointed coupling | 1 | Connection plate | 1 |
| | | | Sleeve 1 | 2 |
| | | | Sleeve S | 3 |
| | | | Sleeve CRD (page 56) | 4 |
| | | | Sleeve CFRP (page 56) | 5 |
| | | | Bore* Hub 1 ø (Dim. page 46) | Bore* Hub 2 ø (Dim. page 46) |
| | | | | Sleeve length H_s [mm] for special sleeves S / CRD / CFRP |
| | | | | Operating speed n_s [rpm] |

Example: 300 / 951.001 / Hub 1 – ø 50 ^{H7} / Hub 2 – ø 60 ^{H7}

*Standard H7, other tolerances possible

| | |
|--|-----------|
| Variable length Sleeve S/CFRP sleeve/Options | Page 56 ▶ |
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| Transmittable Torques for Key Hubs | Page 61 ▶ |
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| Dimensioning, Size Selection | Page 68 ▶ |
| Technical Explanations | Page 69 ▶ |
| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS Sizes 180 to 2200

Single-jointed coupling with shrink disk hubs, external clamping

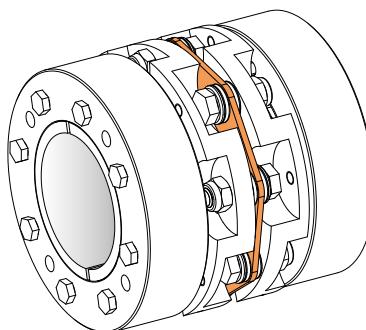
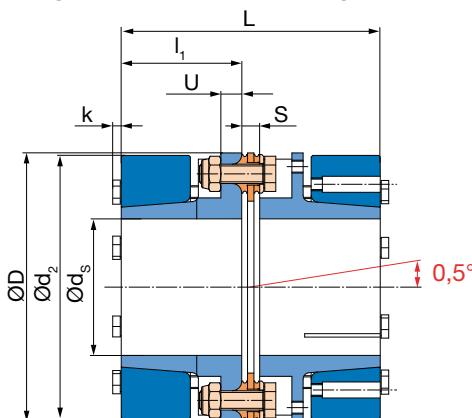


Fig. 62: Type 950.220

| Technical Data and Main Dimensions | | | Size | | | | | | | | |
|---------------------------------------|---|-------|-----------------------|-----------------------------|--------------------------------|-------|-------|-------|-------|-------|-------|
| | | | 180 | 300 | 500 | 850 | 1400 | 2200 | | | |
| Nominal torque ¹⁾ | T _{KN} | [Nm] | 2100 | 3500 | 5800 | 9500 | 15000 | 24000 | | | |
| Peak torque ²⁾ | T _{KS} | [Nm] | 3150 | 5250 | 8700 | 14250 | 22500 | 36000 | | | |
| Outer diameter | D | [mm] | 143 | 167 | 198 | 234 | 274 | 314 | | | |
| Minimum hub bore ³⁾ | d _{S min} | [mm] | 42 | 50 | 60 | 70 | 80 | 100 | | | |
| Maximum hub bore ³⁾ | d _{S max} | [mm] | 75 | 85 | 100 | 120 | 140 | 170 | | | |
| Maximum speed ⁴⁾ | n _{max} | [rpm] | 7300 | 6200 | 5200 | 4400 | 3800 | 3300 | | | |
| Permitted misalignments ⁵⁾ | permitted axial displacement ^{6) 7)} | | ΔK _a | [mm] | 1,0 | 1,2 | 1,4 | 1,6 | 1,9 | 2,2 | |
| | permitted radial misalignment ⁶⁾ | | with connection plate | ΔK _r | [mm] | 0,25 | 0,25 | 0,35 | 0,4 | 0,5 | 0,55 |
| | with sleeve 1 | | ΔK _{rH} | [mm] | 1,2 | 1,25 | 1,35 | 1,7 | 2 | 2,6 | |
| Spring rigidity | with sleeve S | | ΔK _{rH} | [mm] | (H _S - S) x 0,00873 | | | | | | |
| | torsion ¹¹⁾ | | disk pack | C _{T LP} | [10 ³ Nm/rad] | 3000 | 3480 | 11900 | 20600 | 30150 | 46800 |
| | tube sleeve S | | C _{T H rel.} | [10 ⁶ Nm mm/rad] | 250 | 415 | 894 | 1690 | 2734 | 4961 | |
| angular spring rigidity ⁸⁾ | | | | [Nm/rad] | 3890 | 6980 | 11250 | 18580 | 26120 | 28520 | |

Dimensions [mm]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|----------------|------------------------------|-------|-----|-----|------|-------|
| d ₂ | 141 | 164 | 198 | 234 | 274 | 314 |
| d ₃ | 54 | 61 | 66 | 76 | 86 | 110 |
| H ₁ | 150 | 160 | 170 | 220 | 266 | 320 |
| H _S | acc. customer specifications | | | | | |
| h ₁ | 92,5 | 111 | 132 | 150 | 174 | 206 |
| h _S | 92 | 110 | 130 | 150 | 165 | 190 |
| k | 5,3 | 5,3 | 6,4 | 7,5 | 8,8 | 8,8 |
| L | 141,2 | 161,2 | 202 | 244 | 276 | 317,8 |
| L ₂ | 172,4 | 194,4 | 242 | 295 | 334 | 383,6 |
| L ₄ | 280 | 310 | 360 | 450 | 526 | 620 |
| L ₆ | dependent on H _S | | | | | |
| I ₁ | 65 | 75 | 95 | 115 | 130 | 150 |
| S | 11,2 | 11,2 | 12 | 14 | 16 | 17,8 |
| U | 10 | 13 | 18 | 20 | 22 | 25 |
| U ₁ | 42,4 | 44,4 | 52 | 65 | 74 | 83,6 |
| U _H | 14 | 16 | 18 | 20 | 22 | 25 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Transmittable torques dependent on bore, see page 60.

4) Not valid for coupling with sleeve S.

5) The permitted misalignments may not simultaneously reach their maximum values.

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|--|-------|-------|--------|--------|--------|--------|
| Disk pack ⁹⁾ | 2,64 | 5,60 | 14,58 | 36,85 | 83,86 | 132,19 |
| Hub ¹⁰⁾ | 14,41 | 31,64 | 83,82 | 192,23 | 409,20 | 723,01 |
| Connection plate | 3,91 | 8,60 | 21,54 | 53,27 | 114,26 | 241,16 |
| Sleeve 1 | 6,85 | 14,22 | 29,94 | 67,40 | 149,09 | 341,78 |
| Sleeve S with H _S = 1000 mm | 28,41 | 51,24 | 109,74 | 210,27 | 364,62 | 705,89 |
| Sleeve S per 1000 mm tube | 25,08 | 41,61 | 89,57 | 169,22 | 273,78 | 496,68 |

Weight [kg]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|--|-------|-------|-------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,73 | 1,15 | 2,14 | 3,92 | 6,52 | 7,51 |
| Hub ¹⁰⁾ | 4,65 | 7,61 | 14,12 | 23,00 | 35,72 | 49,20 |
| Connection plate | 1,53 | 2,44 | 4,48 | 8,04 | 12,64 | 19,55 |
| Sleeve 1 | 2,61 | 3,66 | 5,38 | 9,32 | 15,62 | 26,98 |
| Sleeve S with H _S = 1000 mm | 14,37 | 17,45 | 27,01 | 38,66 | 53,84 | 77,23 |
| Sleeve S per 1000 mm tube | 13,64 | 15,34 | 23,97 | 34,36 | 46,78 | 64,41 |

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

11) The C_T value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_S [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

ROBA®-DS Sizes 180 to 2200

Double-jointed coupling with connection plate and shrink disk hubs, external clamping

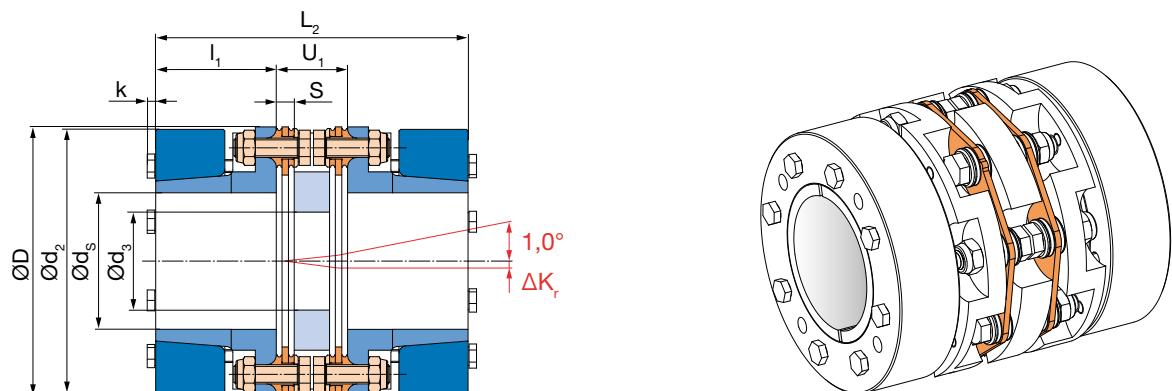


Fig. 63: Type 951.221

Double-jointed coupling with sleeve 1 or sleeve S (special length)
and shrink disk hubs, external clamping

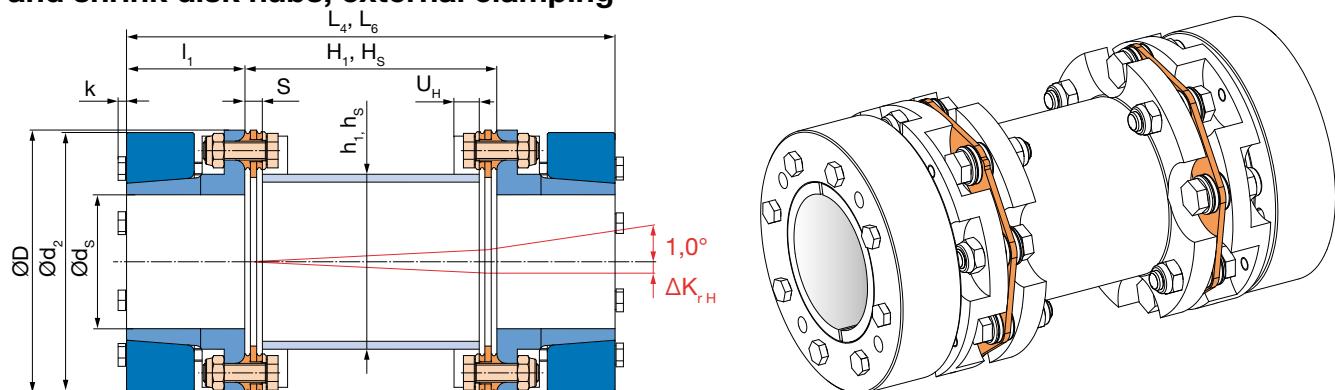


Fig. 64: Type 951.222 (Sleeve 1: H₁, h₁, L₄), Type 951.223 (Sleeve S: H_s, h_s, L₆)

Order Number

| | | | | | | | | |
|----------------------------|--|--------|--|----------------------------|---------------------------------------|---------------------------------------|---|---|
| — / 9 | 5 | — . 2 | 2 | — / — / — / — / — | | | | |
| ▲ | ▲ | ▲ | ▲ | ▲ | ▲ | | | |
| Sizes 180 to 2200 | Single-jointed coupling Double-jointed coupling | 0 1 | Single-jointed coupling Connection plate Sleeve 1 Sleeve S Sleeve CRD (page 56) Sleeve CFRP (page 56) | 0 1 2 3 4 5 | Bore* Hub 1 ø (Dim. page 48) | Bore* Hub 2 ø (Dim. page 48) | Sleeve length H _s [mm] for special sleeves S / CRD / CFRP | Operating speed n _s [rpm] |

Example: 100 / 951.221 / Hub 1 – ø 45^{H7} / Hub 2 – ø 45^{H7}

*Standard H7, other tolerances possible

Additional Option:

| Size | d _w | D ₃ | I | I ₂ | p | External shrink disk hub | |
|------|----------------|----------------|-----|----------------|---|--------------------------|---|
| | | | | | | L ₂ | U |
| 180 | 65/70 | 145 | 85 | 39 | - | | |
| 300 | 75/80 | 170 | 90 | 50 | - | | |
| 500 | 80/85 | 185 | 100 | 57 | - | | |
| 850 | 95/100/105 | 230 | 125 | 82 | 4 | | |
| 1400 | 110/115 | 265 | 150 | 88 | - | | |
| 2200 | 130/135 | 300 | 180 | 98 | - | | |

- Variable length Sleeve/CFRP sleeve/Options Page 56 ▶
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- Transmittable Torques for Shrink Disk Hubs Page 60 ▶
- Installation Examples Page 62 ▶
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- Technical Explanations Page 69 ▶
- ◀ Backlash-free Servo Couplings Page 8

ROBA®-DS Sizes 180 to 2200

Double-jointed coupling with connection plate and split clamping hub

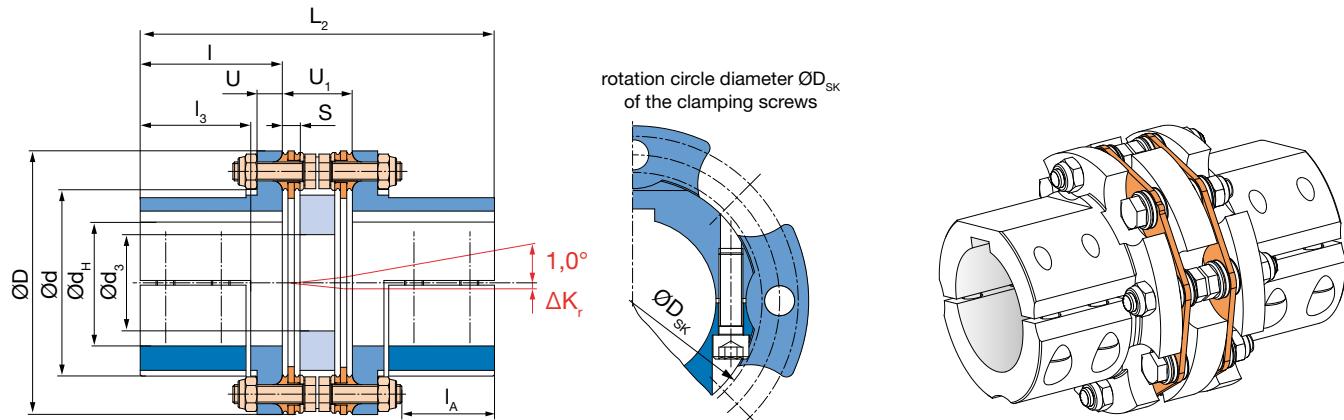


Fig. 65: Type 951.881

Only available with keyway acc. DIN 6885!

| Technical Data and Main Dimensions | | | Size | | | | | | | |
|---------------------------------------|---|-----------------------|-----------------------|-----------------------------|--------------------------------|------|-------|-------|-------|-------|
| | | | 180 | 300 | 500 | 850 | 1400 | 2200 | | |
| Nominal torque ¹⁾ | | T _{KN} | [Nm] | 2100 | 3500 | 5800 | 9500 | 15000 | 24000 | |
| Peak torque ²⁾ | | T _{KS} | [Nm] | 3150 | 5250 | 8700 | 14250 | 22500 | 36000 | |
| Outer diameter | | D | [mm] | 143 | 167 | 198 | 234 | 274 | 314 | |
| Minimum hub bore | | d _H min | [mm] | 42 | 50 | 60 | 70 | 80 | 100 | |
| Maximum hub bore | | d _H max | [mm] | 65 | 80 | 95 | 110 | 120 | 150 | |
| Maximum speed ³⁾ | | n _{max} | [rpm] | 5100 | 4300 | 3600 | 3100 | 2600 | 2300 | |
| Permitted misalignments ⁴⁾ | permitted axial displacement ^{6) 7)} | | ΔK _a | [mm] | 1,0 | 1,2 | 1,4 | 1,6 | 1,9 | 2,2 |
| | permitted radial misalignment ⁶⁾ | with connection plate | ΔK _r | [mm] | 0,25 | 0,25 | 0,35 | 0,4 | 0,5 | 0,55 |
| | | with sleeve 1 | ΔK _{rH} | [mm] | 1,2 | 1,25 | 1,35 | 1,7 | 2 | 2,6 |
| Spring rigidity | torsion ⁵⁾ | with sleeve S | ΔK _{rH} | [mm] | (H _S - S) x 0,00873 | | | | | |
| | | disk pack | C _T LP | [10 ³ Nm/rad] | 3000 | 3480 | 11900 | 20600 | 30150 | 46800 |
| | angular spring rigidity ⁸⁾ | tube sleeve S | C _T H rel. | [10 ⁶ Nm mm/rad] | 250 | 415 | 894 | 1690 | 2734 | 4961 |
| | | | | [Nm/rad] | 3890 | 6980 | 11250 | 18580 | 26120 | 28520 |

Dimensions [mm]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|-----------------|------------------------------|-------|------|------|-------|-------|
| D _{SK} | 107 | 128 | 150 | 173 | 200 | - |
| d | 102 | 121 | 141 | 164 | 190 | 230 |
| d ₃ | 54 | 61 | 66 | 76 | 86 | 110 |
| H ₁ | 150 | 160 | 170 | 220 | 266 | 320 |
| H _S | acc. customer specifications | | | | | |
| h ₁ | 92,5 | 111 | 132 | 150 | 174 | 206 |
| h _s | 92 | 110 | 130 | 150 | 165 | 190 |
| L ₂ | 212,4 | 224,4 | 252 | 315 | 374 | 443,6 |
| L ₄ | 320 | 340 | 370 | 470 | 566 | 680 |
| L ₆ | dependent on H _S | | | | | |
| I | 85 | 90 | 100 | 125 | 150 | 180 |
| I ₃ | 68 | 70 | 77 | 97 | 117 | 147 |
| I _A | 58,7 | 58,7 | 65,1 | 83,2 | 100,6 | 127,3 |
| I _B | 64,6 | 66,5 | 72 | 92,5 | 113 | 140 |
| S | 11,2 | 11,2 | 12 | 14 | 16 | 17,8 |
| U | 14 | 16 | 18 | 20 | 22 | 25 |
| U ₁ | 42,4 | 44,4 | 52 | 65 | 74 | 83,6 |

1) Valid for unchanging load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The C_T-value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{T \text{ LP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T \text{ H rel.}}}}$$

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|--|-------|-------|--------|--------|--------|--------|
| Disk pack ⁹⁾ | 2,64 | 5,60 | 14,58 | 36,85 | 83,86 | 132,19 |
| Hub ¹⁰⁾ | 6,61 | 14,02 | 30,01 | 65,69 | 146,71 | 352,20 |
| Connection plate | 3,91 | 8,60 | 21,54 | 53,27 | 114,26 | 241,16 |
| Sleeve 1 | 6,85 | 14,22 | 29,94 | 67,40 | 149,09 | 341,78 |
| Sleeve S with H _S = 1000 mm | 28,41 | 51,24 | 109,74 | 210,27 | 364,62 | 705,89 |
| Sleeve S per 1000 mm tube | 25,08 | 41,61 | 89,57 | 169,22 | 273,78 | 496,68 |

Weight [kg]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|--|-------|-------|-------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,73 | 1,15 | 2,14 | 3,92 | 6,52 | 7,51 |
| Hub ¹⁰⁾ | 3,19 | 4,66 | 7,20 | 11,70 | 20,26 | 33,95 |
| Connection plate | 1,53 | 2,44 | 4,48 | 8,04 | 12,64 | 19,55 |
| Sleeve 1 | 2,61 | 3,66 | 5,38 | 9,32 | 15,62 | 26,98 |
| Sleeve S with H _S = 1000 mm | 14,37 | 17,45 | 27,01 | 38,66 | 53,84 | 77,23 |
| Sleeve S per 1000 mm tube | 13,64 | 15,34 | 23,97 | 34,36 | 46,78 | 64,41 |

6) The values refer to couplings with 2 disk packs.

7) Only permitted as a static or virtually static value.

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

ROBA®-DS Sizes 180 to 2200

Double-jointed coupling with sleeve 1 or sleeve S (special length) and split clamping hubs

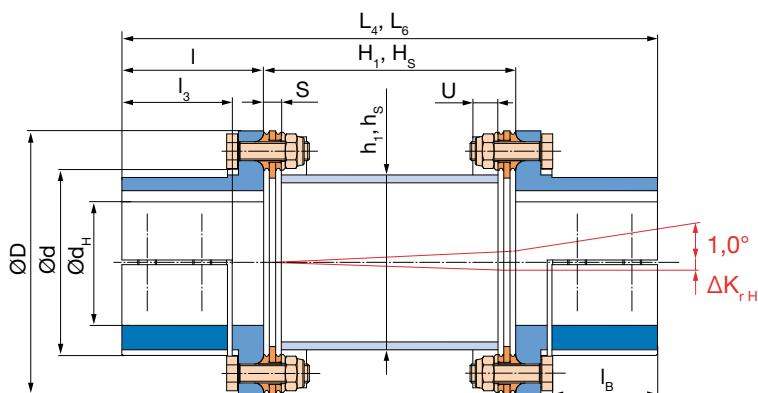
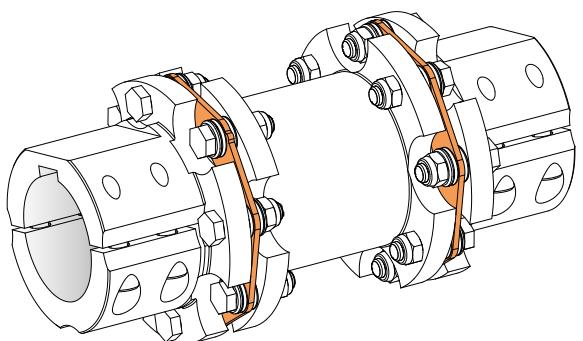


Fig. 66: Type 951.882 (Sleeve 1: H_1 , h_1 , L_4)
Type 951.883 (Sleeve S: H_s , h_s , L_6)



Only available with keyway acc. DIN 6885!

Installation coupling with split clamping hubs

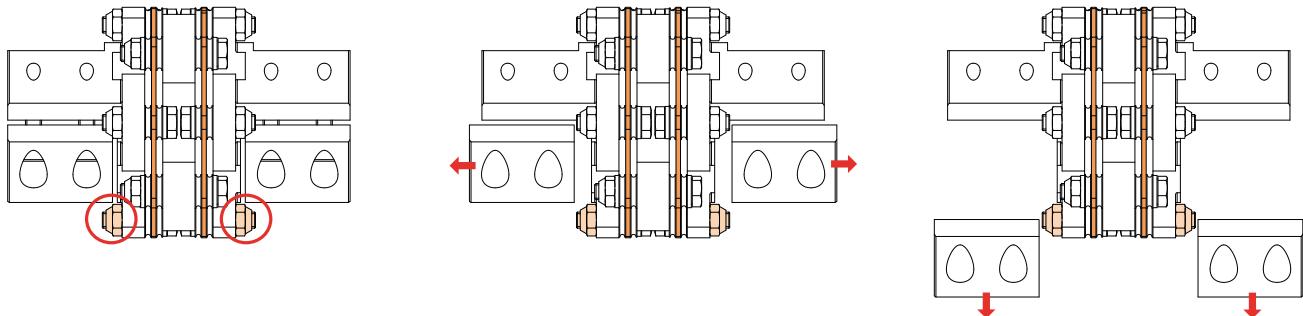


Fig. 67: Axial displacement of the half-shells during radial assembly/disassembly
Please observe dimensions I_A and I_B !

Order Number

| | | | | | |
|--|---|-------|------------------------------|--|--|
| — / 9 | 5 | 1 . 8 | — / — | — / — | — / — |
| ▲ | | | ▲ | ▲ | ▲ |
| Sizes 180 to 2200 | | | Connection plate 1 | Bore* Hub 1 ø (Dim. page 50) | Bore* Hub 2 ø (Dim. page 50) |
| | | | Sleeve 1 2 | | Sleeve length H_s [mm] |
| | | | Sleeve S 3 | | Operating speed n_s [rpm] |
| | | | Sleeve CRD (page 56) 4 | | for special sleeves S / CRD / CFRP |
| | | | Sleeve CFRP (page 56) 5 | | |

Example: 100 / 951.881 / Hub 1 – ø 50^{H7} / Hub 2 – ø 50^{H7}

*Standard H7, other tolerances possible



Only available with keyway acc. DIN 6885! The hubs transmit only 30 – 40 % of the value T_{KN} using frictional locking. Larger torques are transmitted via positive locking with the key.
The hubs are not suitable for changing load direction.

| | |
|--|-----------|
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| Page 8 | |

ROBA®-DS Sizes 180 to 2200

Single-jointed coupling with flanges

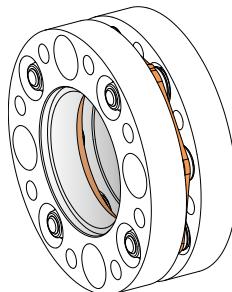
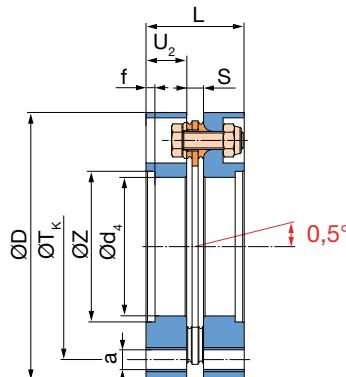


Fig. 68: Type 950.660

| | Nominal torque ¹⁾ | T_{KN} [Nm] | Size | | | | | |
|---------------------------------------|--|--|--------------------|---------------------|---------------------|-------------------|-----------------|--------------------|
| | | | 180 | 300 | 500 | 850 | 1400 | 2200 |
| Peak torque ²⁾ | T_{KS} [Nm] | 3150 | 5250 | 8700 | 14250 | 22500 | 36000 | |
| Outer diameter | D [mm] | 153 | 178 | 210 | 250 | 290 | 336 | |
| Centering bore | Z^H [mm] | 85 | 100 | 120 | 140 | 160 | 180 | |
| Maximum speed ³⁾ | n_{max} [rpm] | 7300 | 6200 | 5200 | 4400 | 3800 | 3300 | |
| Permitted misalignments ⁴⁾ | permitted axial displacement ^{5) 6)} with connection plate with sleeve 1 with sleeve S | ΔK_a [mm] ΔK_r [mm] ΔK_{rH} [mm] | 1,0 0,25 1,2 | 1,2 0,25 1,25 | 1,4 0,35 1,35 | 1,6 0,4 1,7 | 1,9 0,5 2 | 2,2 0,55 2,6 |
| Spring rigidity | torsion ⁷⁾ disk pack tube sleeve S | $C_{T\ LP}$ [10 ³ Nm/rad] $C_{T\ H\ rel.}$ [10 ⁶ Nm mm/rad] | 3000 250 | 3480 415 | 11900 894 | 20600 1690 | 30150 2734 | 46800 4961 |
| | angular spring rigidity ⁸⁾ | | | | [Nm/rad] | 3890 6980 | 11250 18580 | 26120 28520 |

Dimensions [mm]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|-------|------------------------------|---------|---------|---------|---------|---------|
| a | 8 x M12 | 8 x M16 | 8 x M16 | 8 x M20 | 8 x M24 | 8 x M30 |
| d_3 | 54 | 61 | 66 | 76 | 86 | 110 |
| d_4 | 77 | 92 | 112 | 132 | 150 | 170 |
| f | 6 | 6 | 6 | 6 | 6 | 6 |
| H_1 | 150 | 160 | 170 | 220 | 266 | 320 |
| H_s | acc. customer specifications | | | | | |
| h_1 | 92,5 | 111 | 132 | 150 | 174 | 206 |
| h_s | 92 | 110 | 130 | 150 | 165 | 190 |
| L | 57,2 | 65,2 | 84 | 102 | 118 | 129,8 |
| L_2 | 88,4 | 98,4 | 124 | 153 | 176 | 195,6 |
| L_4 | 196 | 214 | 242 | 308 | 368 | 432 |
| L_6 | dependent on H_s | | | | | |
| S | 11,2 | 11,2 | 12 | 14 | 16 | 17,8 |
| T_K | 125 | 150 | 175 | 210 | 240 | 275 |
| U | 14 | 16 | 18 | 20 | 22 | 25 |
| U_1 | 42,4 | 44,4 | 52 | 65 | 74 | 83,6 |
| U_2 | 23 | 27 | 36 | 44 | 51 | 56 |

Mass Moments of Inertia J [10⁻³ kgm²]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|-------------------------------|-------|-------|--------|--------|--------|--------|
| Disk pack ⁹⁾ | 2,64 | 5,60 | 14,58 | 36,85 | 83,86 | 132,19 |
| Flange | 6,26 | 13,08 | 34,04 | 79,39 | 162,60 | 359,24 |
| Connection plate | 3,91 | 8,60 | 21,54 | 53,27 | 114,26 | 241,16 |
| Sleeve 1 | 6,85 | 14,22 | 29,94 | 67,40 | 149,09 | 341,78 |
| Sleeve S with $H_s = 1000$ mm | 28,41 | 51,24 | 109,74 | 210,27 | 364,62 | 705,89 |
| Sleeve S per 1000 mm tube | 25,08 | 41,61 | 89,57 | 169,22 | 273,78 | 496,68 |

Weight [kg]

| Size | 180 | 300 | 500 | 850 | 1400 | 2200 |
|-------------------------------|-------|-------|-------|-------|-------|-------|
| Disk pack ⁹⁾ | 0,73 | 1,15 | 2,14 | 3,92 | 6,52 | 7,51 |
| Flange | 1,70 | 2,61 | 4,79 | 7,88 | 12,24 | 20,54 |
| Connection plate | 1,53 | 2,44 | 4,48 | 8,04 | 12,64 | 19,55 |
| Sleeve 1 | 2,61 | 3,66 | 5,38 | 9,32 | 15,62 | 26,98 |
| Sleeve S with $H_s = 1000$ mm | 14,37 | 17,45 | 27,01 | 38,66 | 53,84 | 77,23 |
| Sleeve S per 1000 mm tube | 13,64 | 15,34 | 23,97 | 34,36 | 46,78 | 64,41 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

2) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

3) Not valid for coupling with sleeve S.

4) The permitted misalignments may not simultaneously reach their maximum values.

5) The values refer to couplings with 2 disk packs.

6) Only permitted as a static or virtually static value.

7) The C_T -value of a double-jointed coupling can be roughly calculated as follows:

$$C_{T\ tot.} = \frac{1}{\frac{2}{C_{T\ LP}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T\ H\ rel.}}}$$

8) The values refer to 1 disk pack.

9) Mass moments of inertia and weights are valid for 1 disk pack.

ROBA®-DS Sizes 180 to 2200

Double-jointed coupling with connection plate and flanges

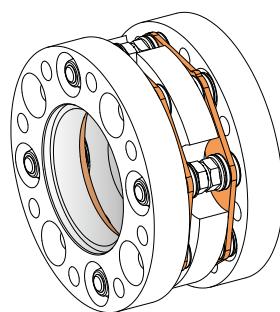
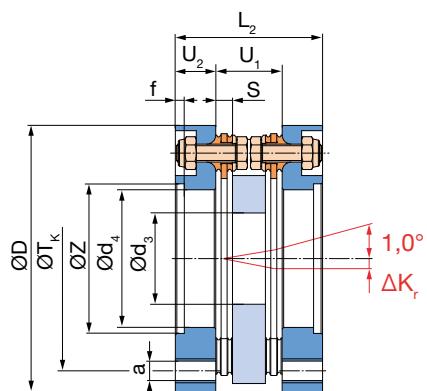


Fig. 69: Type 951.661

Double-jointed coupling with sleeve 1 or sleeve S (special length) and flanges

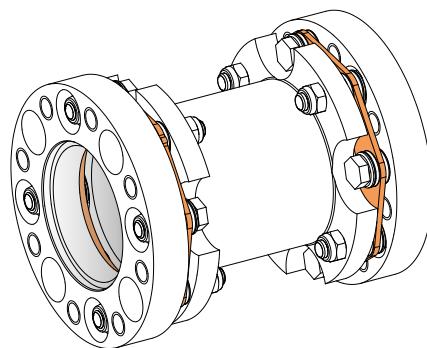
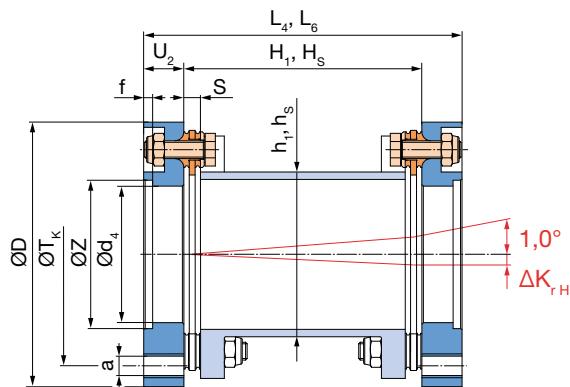


Fig. 70: Type 951.662 (Sleeve 1: H_1 , h_1 , L_4), Type 951.663 (Sleeve S: H_s , h_s , L_6)

Order Number

| | | | | | | | | | | | | |
|--|----------------------------|---|-------------------------|---|---|---|--|---|---|---|---|---|
| — | / | 9 | 5 | — | . | 6 | 6 | — | / | — | / | — |
| ▲ | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ | | ▲ |
| Sizes 180 to 2200 | Single-jointed coupling | 0 | Single-jointed coupling | 0 | Sleeve length H_s [mm] | | Operating speed n_s [rpm] | | | | | |
| | Double-jointed coupling | 1 | Connection plate | 1 | for special sleeves | | S / CRD / CFRP | | | | | |
| | | | Sleeve 1 | 2 | | | | | | | | |
| | | | Sleeve S | 3 | | | | | | | | |
| | | | Sleeve CRD (page 56) | 4 | | | | | | | | |
| | | | Sleeve CFRP (page 56) | 5 | | | | | | | | |

Example: 40 / 950.661

| | |
|--|-----------|
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| ◀ Backlash-free Servo Couplings | Page 8 |

ROBA®-DS for high torques - Sizes 2200 to 11000

ROBA®-DS with cone connection

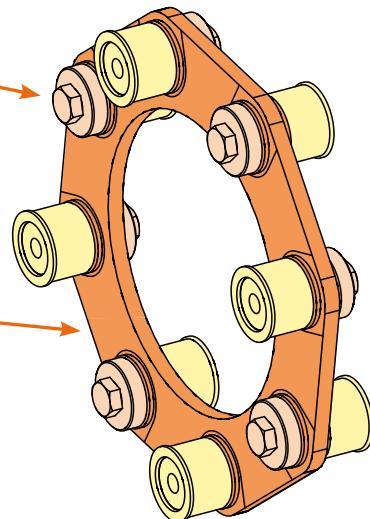


On the ROBA®-DS with cone connection, the disk pack is connected via positive locking with the hubs, flanges or sleeves. On the outside conical bolts are pulled through tensioning screws into cone-shaped holes on the mounting parts and the collar bushings on the disk packs. The cone shape causes forces to be generated, which widen the collar bushings and mounting parts radially flexibly, thus guaranteeing backlash-free connection of the disk pack.

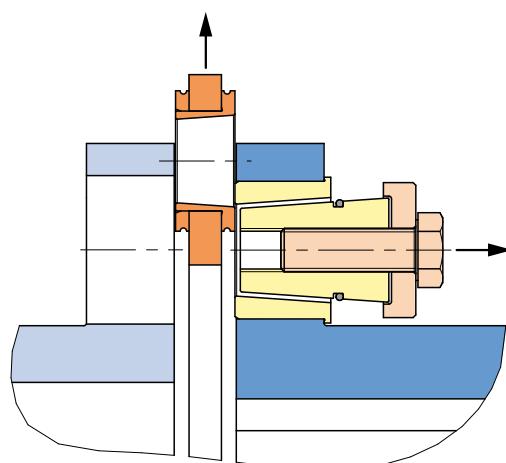
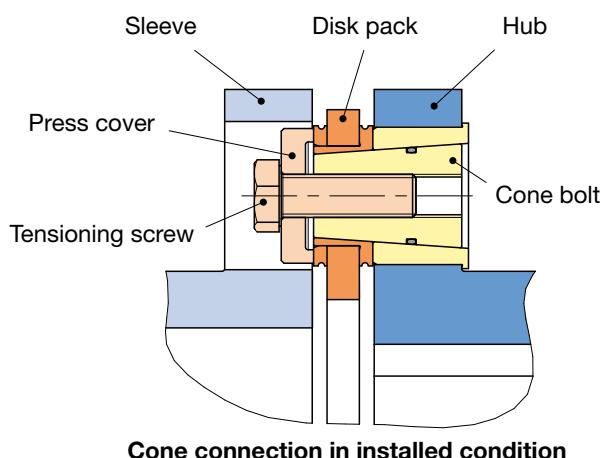
For this backlash-free, positive locking connection, far lower screw tightening torques are required in comparison to standard frictionally locking connections. This makes installation substantially easier.

The disk packs and sleeves can be radially installed or de-installed without having to move the respective aggregates.

- Low screw tightening torques
- Can be installed / de-installed radially
- Easy and quick installation / de-installation
- No hydraulic installation tools required; can be installed with a torque wrench
- Backlash-free torque transmission
- FEM-optimized disk shape
- High torsional rigidity
- High performance density
- Compensation of axial, angular and radial misalignments
- Wear and maintenance-free
- High flexibility through customer-specific hubs and sleeves



Easy installation and de-installation



In installed condition, the cone bolt is pulled through the tensioning screw into the conical bores. In order to de-install the disk pack, the tensioning screw is screwed out and then screwed in with the press cover onto the opposite side of the cone bolt. This loosens the cone bolt and allows it to be pulled back axially. Disk packs and sleeves can be de-installed radially in this way.

ROBA®-DS for high torques - Sizes 2200 to 11000

Single-jointed coupling with key hubs

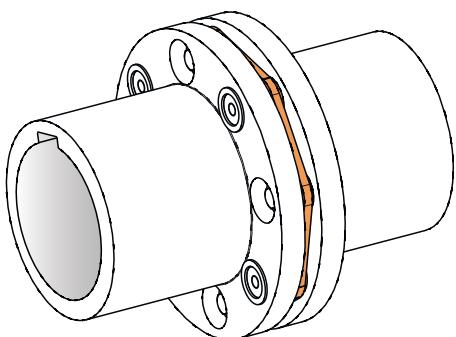
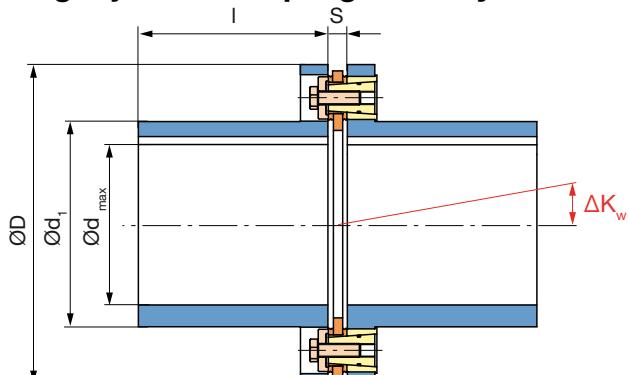


Fig. 71

Double-jointed coupling with sleeve and key hubs

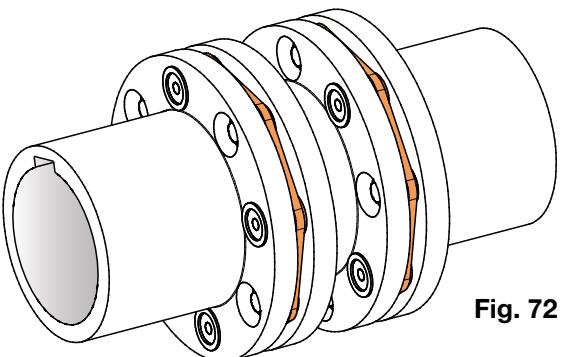
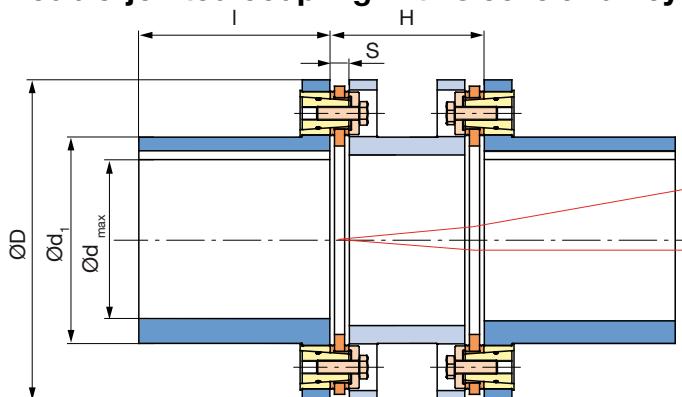


Fig. 72

Backlash-free shaft-hub connection with a shrink disk is possible.

| Technical Data | Size | | | | | |
|---------------------------------------|---|------------------------|-----------------------------------|---------|---------|---------|
| | 2200 | 3300 | 5000 | 7300 | 11000 | |
| Alternating torque ¹⁾ | T _{KW} [Nm] | 14 700 | 22 000 | 33 300 | 48 700 | 73 300 |
| Nominal torque ²⁾ | T _{KN} [Nm] | 22 000 | 33 000 | 50 000 | 73 000 | 110 000 |
| Peak torque ³⁾ | T _{KS} [Nm] | 44 000 | 66 000 | 100 000 | 146 000 | 220 000 |
| Outer diameter | D [mm] | 290 | 332 | 378 | 431 | 492 |
| Maximum hub bore ⁶⁾ | d _{max} [mm] | 150 | 170 | 190 | 220 | 250 |
| Maximum speed | n _{max} [rpm] | 3600 | 3100 | 2700 | 2400 | 2100 |
| Hub | d ₁ [mm] | 186 | 215 | 243 | 279 | 321 |
| Minimum sleeve length | H _{min} [mm] | 156 | 166 | 182 | 208 | 223 |
| Distance dimension | S [mm] | 17,8 | 19 | 23 | 24,2 | 26,5 |
| Permitted misalignments ⁴⁾ | perm. axial displacement ⁵⁾ | ΔK _a [mm] | 1,6 | 1,7 | 2,1 | 2,3 |
| misalignments ⁴⁾ | perm. radial misalignment with special sleeve | ΔK _{r_H} [mm] | (H - S) × 6,98 × 10 ⁻³ | | | |
| | perm. angular misalignment | ΔK _w [°] | 0,4 | 0,4 | 0,4 | 0,3 |

1) Valid for changing load direction as well as for max. permitted shaft misalignment.

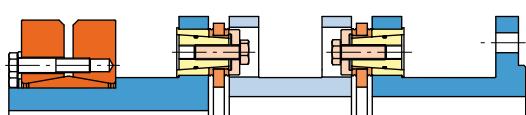
4) The permitted misalignments may not simultaneously reach their maximum values.

2) Valid for unchanging load direction as well as for max. permitted shaft misalignment.

5) The values refer to couplings with 2 disk packs.

3) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

6) Transmittable torques dependent on bore, see page 61.



Design example

Double-jointed coupling with shrink disk hub and flange

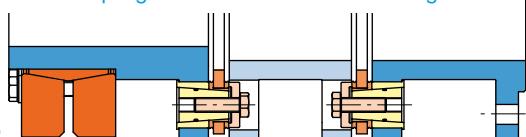


Fig. 73

Order Number

— / 9 5 6 . —



Size
2200
to
11000

The design of the hubs and sleeves is carried out according to the customer's requirements.

Please contact the manufacturer.

| | |
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Variable Sleeve S

Variable Length Sleeves (Cardan Shaft Replacement)

The operational demands on variable length sleeves vary greatly. Using various sleeve construction shapes, the shaft coupling ROBA®-DS can offer the optimum solution for any problem. The product is able to fulfil the usual demands placed upon conventional cardan shafts. At the same time, the constructional shape all-steel coupling presents decided advantages:

- Backlash-free function
- Completely maintenance-free function
- Suitable for high speeds

By replacing conventional disk packs, the coupling misalignment capability can be enlarged by 2 – 3° / compensating level (please contact the manufacturers about availability and Technical Data).

Type Identification and Technical Comparison – Variable Length Sleeves

Standard design Type 951._ _3 / 953._ _3

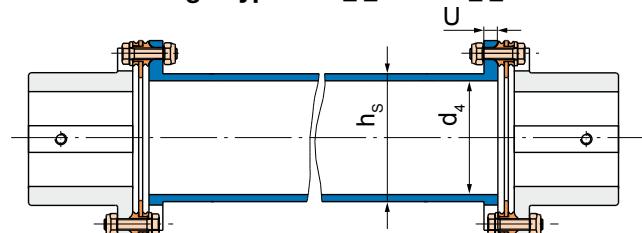


Fig. 74

Cranked tube (CRD) Type 951._ _4 / 953._ _4

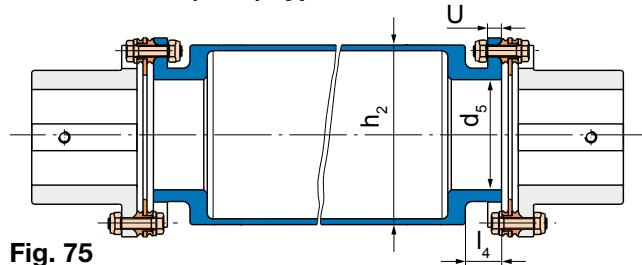


Fig. 75

CFRP sleeve Type 951._ _5 / 953._ _5

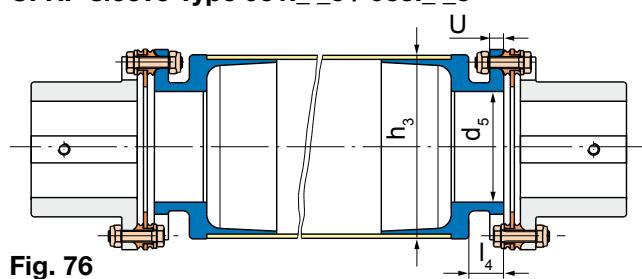


Fig. 76

Dimensions [mm]

| Size | 16 | 25 | 40 | 64 | 100 | 160 | 180 | 300 | 500 | 850 | 1400 | 2200 |
|-------|------|------|----|-----|-----|-----|-----|-----|-----|-----|------|------|
| d_4 | 43 | 54 | 62 | 71 | 92 | 98 | 79 | 95 | 111 | 127 | 137 | 157 |
| d_5 | 45 | 48 | 58 | 68 | 88 | 95 | 75 | 90 | 110 | 123 | 144 | 167 |
| h_s | 50 | 60 | 70 | 80 | 100 | 110 | 92 | 110 | 130 | 150 | 165 | 190 |
| h_2 | x | x | x | x | x | 155 | 130 | 155 | 170 | 220 | 250 | x |
| h_3 | 73 | 86 | 96 | 118 | 138 | 160 | 138 | 160 | 192 | 224 | 266 | 315 |
| l_4 | 15,5 | 15,5 | 20 | 24 | 24 | 30 | 32 | 36 | 40 | 48 | 54 | 61 |
| U | 7 | 7 | 8 | 10 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 25 |

Selection Aid: Variable Length Sleeves

| Type | 95._ _3 | 95._ _4 | 95._ _5 |
|--------------------------------------|---|-----------------------------|---------|
| Speed | + | ++ | +++ |
| Torsional rigidity | ++ | +++ | + |
| Weight | ++ | +++ | + |
| Mass moment of inertia | ++ | +++ | + |
| Corrosion resistance | ++ | ++ | +++ |
| Changes in length due to temperature | +++ | +++ | + |
| Costs | + | ++ | +++ |
| Operational focuses | • conventional applications • medium speeds • high torsional rigidity | • high speeds • low mass | |

+ = low, ++ = medium, +++ = high

Vertical support special sleeves

Attention!

On vertically installed ROBA®-DS couplings with long sleeves, it is necessary to provide a vertical support for absorbing the sleeve's own weight.

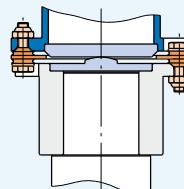


Fig. 77

CFRP sleeve

ROBA®-DS with CFRP sleeves

(Carbon-fibre reinforced plastic)

Sleeves made of CFRP offer unique advantages and open up new application possibilities for torsionally rigid disk pack couplings.

- Up to 80 % lower own weight
- Reduced mass inertia
- High speeds
- Wide bearing distances
- Low thermal expansion
- Corrosion resistance
- Low vibration
- Temperature resistance

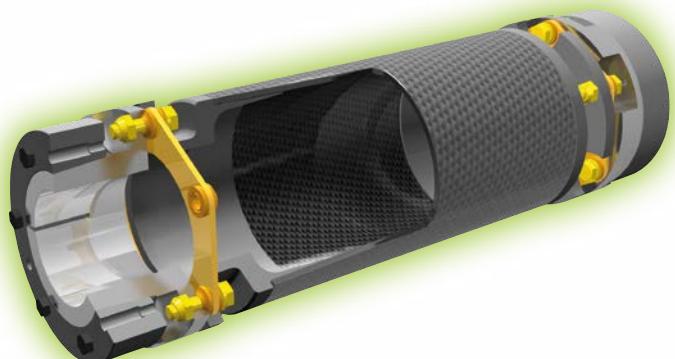


Fig. 78

Low weight

The lower own weight (up to 80 %) of CFRP material in comparison to steel makes handling and installation much easier and safer.

Reduced inertia

The reduction in weight is combined with a large reduction in mass inertia. Braking and accelerating procedures are quicker or require lower drive performance.

Higher speeds

The optimum rigidity / weight ratio sets the critical bending speed far higher than with conventional sleeves.

Wide bearing distances

Due to the high critical bending speed, large bearing distances can be bridged without further intermediate bearings being necessary.

Low thermal expansion

CFRP sleeves expand approx. 90 % less than steel in response to temperature fluctuations. The disk packs are therefore placed under far less strain, especially when using long sleeves.

Corrosion resistance

Additional corrosion protection for hubs and sleeve parts ensure a very high corrosion resistance for the entire coupling.

Low vibration

The far higher self-damping capacity of CFRP material minimises production of vibrations and damps existing vibrations more effectively.

Temperature resistance

Couplings with CFRP sleeves can be used at temperatures of -20 °C up to +80 °C

| | |
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| ◀ Backlash-free All-steel Couplings | Page 14 |

ROBA®-DS Options

Options and Variants on Intermediate Shafts

Intermediate shafts

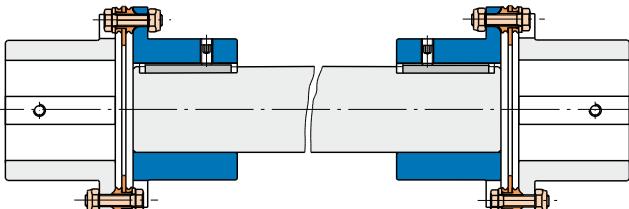


Fig. 79

Variable bridges over any shaft distances via adapted steel solid shafts, mounted between two standard hubs.
Please observe the critical bending speeds!

GFRP sleeves

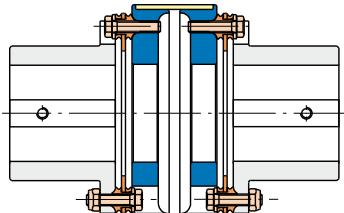


Fig. 80

Glass-fibre reinforced plastic sleeves for couplings in leakage current-isolated design.
Fulfils the highest demands on insulation quality (CTI 600).

Axial separable sleeves

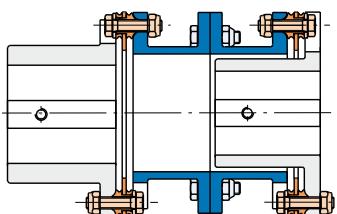


Fig. 81

This design allows radial disassembling of input and output without axial displacement.
Preferred solution on large coupling in connection with inner key hubs

Poly-cardanic design

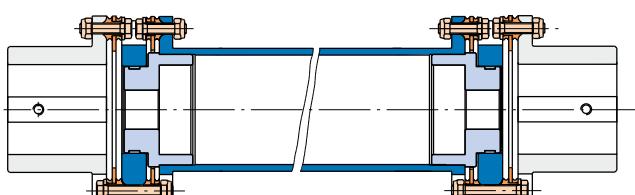


Fig. 82

For applications with large axial displacement, e.g. caused by:

- Normal load or overload on the connected system parts
- Ground changes between the foundations
- Temperature differences
- Axial backlash due to wear on the bearing

Safe Against Overload

Safe Against Overload Damage

Combination with EAS®-Compact®

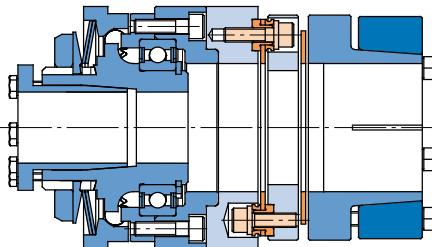


Fig. 83

- Safety clutches in the construction Types Ratchetting, Synchronous or Overload
- Flexible adaptation of construction length for connection of shafts with different shaft distances
- Perfectly suited for demands of high torsional rigidity or high speeds

| | |
|---|--------------|
| Torque range | 5 – 3 000 Nm |
| Switch-off accuracy | ± 5 % |
| Load disconnecting | |
| Number of overload occurrences | high |
| Time demand for repeat operation start-up | 0 |
| Danger of drive shaft damage | no |

Combination with EAS®-element coupling

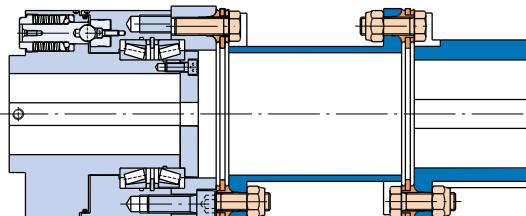


Fig. 84

- Complete separation of input and output on overload
- Particularly suitable for heavy, fast-running drives with large rotating masses
- Maximum torsional rigidity at highest performance density

| | |
|---|------------------|
| Torque range | 250 – 110 000 Nm |
| Switch-off accuracy | ± 5 % |
| Load disconnecting | |
| Number of overload cases | high |
| Time demand for repeat operation start-up | 1 minute |
| Danger of drive shaft damage | no |

Combination with ROBA®-slip hub

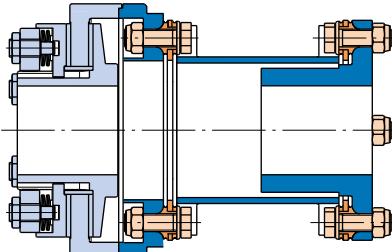


Fig. 85

- Overload protection with load holding function
- Compensation of individual dynamic peaks (resonances, start-up peaks) without operational interruptions
- Slip control recommended for protection against thermic overload

| | |
|---|----------------|
| Torque range | 2 – 110 000 Nm |
| Switch-off accuracy | ± 20 % |
| Load holding | |
| Number of overload cases | very high |
| Time demand for repeat operation start-up | 0 |
| Danger of drive shaft damage | no |

Shrink disk hub with integrated overload protection

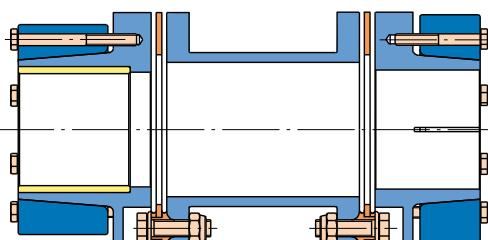


Fig. 86

- Modified shrink disk hub with integrated slip bushing
- Suitable for protection against individual, very short dynamic torque peaks
- Not suitable for longer slipping times / high slipping speeds

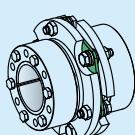
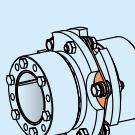
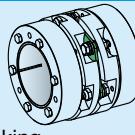
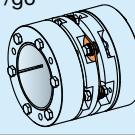
| | |
|---|--|
| Torque range | 190 – 110 000 Nm |
| Switch-off accuracy | ± 20 % ¹⁾ |
| Load holding | |
| Number of overload cases | very low |
| Time demand for repeat operation start-up | de-installation and installation of coupling |
| Danger of drive shaft damage | yes |

1) Tolerance only in limited application conditions – please contact the manufacturer.

| | |
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| ◀ Variable length Sleeve S/CFRP sleeve/Options | Page 56 |

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Transmittable Torques

| Shrink disk hubs | | Bore | 16 | 25 | 40 | 64 | 100 | 160 | 180 | 300 | 500 | 850 | 1400 | 2200 |
|---|--|------|---------------------------------------|-----|------|------|------|------|------|-------|-------|-------|-------|-------|
|  | | 014 | 158 | - | - | - | - | - | - | - | - | - | - | - |
|  | | 016 | 186 | - | - | - | - | - | - | - | - | - | - | - |
| Frictionally-locking transmittable torques | | 020 | 240 | 283 | - | - | - | - | - | - | - | - | - | - |
| Shrink disk hubs | | 022 | 269 | 320 | - | - | - | - | - | - | - | - | - | - |
| Suitable for H7/g6 | | 025 | 312 | 375 | 429 | - | - | - | - | - | - | - | - | - |
| | | 028 | - | 428 | 495 | - | - | - | - | - | - | - | - | - |
| | | 030 | - | 468 | 546 | 704 | - | - | - | - | - | - | - | - |
| | | 032 | - | 509 | 600 | 769 | - | - | - | - | - | - | - | - |
| | | 035 | - | 568 | 669 | 863 | 1057 | - | - | - | - | - | - | - |
| | | 038 | - | - | 741 | 960 | 1176 | - | - | - | - | - | - | - |
| | | 040 | - | - | 796 | 1031 | 1269 | 1783 | - | - | - | - | - | - |
| | | 042 | - | - | 852 | 1104 | 1366 | 1919 | 2234 | - | - | - | - | - |
| | | 045 | - | - | 932 | 1206 | 1500 | 2107 | 2453 | - | - | - | - | - |
| | | 050 | - | - | - | - | 1692 | 2400 | 2794 | 3569 | - | - | - | - |
| | | 055 | - | - | - | - | 1889 | 2680 | 3150 | 4024 | - | - | - | - |
| | | 060 | - | - | - | - | 2967 | 3488 | 4500 | 5970 | - | - | - | - |
| | | 065 | - | - | - | - | 3263 | 3835 | 5177 | 6629 | - | - | - | - |
| | | 068 | - | - | - | - | - | 4072 | 5658 | 7108 | - | - | - | - |
| | | 070 | - | - | - | - | - | 4255 | 6334 | 7500 | 10723 | - | - | - |
| | | 075 | - | - | - | - | - | 4627 | 7348 | 8156 | 11719 | - | - | - |
| | | 080 | - | - | - | - | - | - | 8453 | 8830 | 12750 | 17942 | - | - |
| | | 085 | - | - | - | - | - | - | 9652 | 9523 | 13750 | 19444 | - | - |
| | | 090 | - | - | - | - | - | - | - | 10234 | 14777 | 21000 | - | - |
| | | 095 | - | - | - | - | - | - | - | - | 11542 | 16665 | 23683 | 29036 |
| | | 100 | - | - | - | - | - | - | - | - | - | 18607 | 26442 | 32418 |
| | | 110 | - | - | - | - | - | - | - | - | - | 20603 | 29279 | 35896 |
| | | 120 | - | - | - | - | - | - | - | - | - | - | 32195 | 39471 |
| | | 130 | Attention! | - | - | - | - | - | - | - | - | - | - | - |
| | | 140 | Please observe permitted peak torques | | - | - | - | - | - | - | - | - | 35191 | 43144 |
| | | 150 | for selected coupling size and Type | | - | - | - | - | - | - | - | - | 46920 | - |
| | | 160 | - | | - | - | - | - | - | - | - | - | 50798 | - |
| | | 170 | - | | - | - | - | - | - | - | - | - | - | 54783 |
| Shrink disk hubs, large | | Bore | 16 | 25 | 40 | 64 | 100 | 160 | Size | | | | | |
|  | | 025 | 339 | - | - | - | - | - | - | | | | | |
| Frictionally-locking transmittable torques | | 028 | 404 | - | - | - | - | - | - | | | | | |
| Shrink disk hubs, large | | 030 | 448 | - | - | - | - | - | - | | | | | |
| Suitable for H7/g6 | | 032 | 492 | 526 | - | - | - | - | - | | | | | |
|  | | 035 | 558 | 602 | - | - | - | - | - | | | | | |
| | | 038 | 620 | 679 | - | - | - | - | - | | | | | |
| | | 040 | 659 | 730 | 873 | - | - | - | - | | | | | |
| | | 042 | 694 | 780 | 937 | - | - | - | - | | | | | |
| | | 045 | 738 | 851 | 1036 | 1268 | - | - | - | | | | | |
| | | 048 | - | 913 | 1132 | 1394 | - | - | - | | | | | |
| | | 050 | - | 948 | 1195 | 1480 | - | - | - | | | | | |
| | | 052 | - | 978 | 1255 | 1565 | - | - | - | | | | | |
| | | 055 | - | - | 1338 | 1691 | 2074 | - | - | | | | | |
| | | 060 | - | - | 1454 | 1890 | 2366 | - | - | | | | | |
| | | 065 | - | - | - | 2065 | 2658 | 3246 | - | | | | | |
| | | 070 | - | - | - | 2204 | 2943 | 3618 | - | | | | | |
| | | 075 | Attention! | - | - | - | - | - | - | | | | | |
| | | 080 | Please observe permitted peak torques | | - | - | - | - | - | | | | | |
| | | 085 | for selected coupling size and Type | | - | - | - | - | - | | | | | |
| | | 090 | - | - | - | - | - | - | - | | | | | |
| Clamping ring hubs | | Bore | 16 | 25 | 40 | 64 | 100 | 160 | Size | | | | | |
|  | | 020 | 126 | - | - | - | - | - | - | | | | | |
| Frictionally-locking transmittable torques | | 022 | 138 | 199 | - | - | - | - | - | | | | | |
| Clamping ring hubs | | 025 | 168 | 226 | 327 | - | - | - | - | | | | | |
| Suitable for H7/h6 | | 028 | 201 | 253 | 366 | 523 | - | - | - | | | | | |
|  | | 030 | 216 | 290 | 420 | 561 | - | - | - | | | | | |
| | | 032 | 230 | 325 | 470 | 598 | 785 | - | - | | | | | |
| | | 035 | 251 | 355 | 515 | 700 | 859 | - | - | | | | | |
| | | 038 | - | 386 | 559 | 798 | 932 | - | - | | | | | |
| | | 040 | - | 406 | 588 | 840 | 1050 | 1256 | - | | | | | |
| | | 045 | - | - | 661 | 945 | 1240 | 1413 | - | | | | | |
| | | 050 | - | - | - | 1050 | 1378 | 1680 | - | | | | | |
| | | 055 | Attention! | - | - | 1155 | 1516 | 1940 | - | | | | | |
| | | 060 | Please observe permitted peak torques | | - | - | - | - | - | | | | | |
| | | 065 | for selected coupling size and Type | | - | - | - | - | - | | | | | |
| | | 070 | - | - | - | - | - | - | - | | | | | |
| | | 080 | - | - | - | - | - | - | - | | | | | |
| Split clamping hubs (Sizes 3 – 15) | | Bore | 3 | 6 | 10 | 15 | Size | | | | | | | |
|  | | 010 | 31 | - | - | - | - | | | | | | | |
| Frictionally-locking transmittable torques | | 012 | 38 | - | - | - | - | | | | | | | |
| Split clamping hubs | | 014 | 44 | 44 | - | - | - | | | | | | | |
| Suitable for H7 / g6 | | 015 | 47 | 47 | - | - | - | | | | | | | |
| | | 016 | 50 | 50 | - | - | - | | | | | | | |
| | | 018 | 57 | 57 | - | - | - | | | | | | | |
| | | 019 | 60 | 60 | 115 | - | - | | | | | | | |
| | | 020 | 63 | 63 | 121 | - | - | | | | | | | |
| | | 022 | - | 69 | 133 | - | - | | | | | | | |
| | | 024 | - | 75 | 145 | - | - | | | | | | | |
| | | 025 | - | 79 | 151 | 151 | - | | | | | | | |
| | | 028 | 88 | 169 | 169 | 169 | - | | | | | | | |
| | | 032 | Please observe | | 181 | 181 | - | | | | | | | |

Transmittable Torques

| Clamping hubs (Sizes 3 – 15) | | Bore | 3 | 6 | Size | 10 | 15 |
|------------------------------|------|------|---------------------------------------|-----|------|-----|----|
| T _R | [Nm] | Ø10 | 27 | - | - | - | - |
| | | Ø12 | 32 | - | - | - | - |
| | | Ø14 | 37 | 46 | - | - | - |
| | | Ø15 | 39 | 51 | - | - | - |
| | | Ø16 | 42 | 56 | - | - | - |
| | | Ø18 | 47 | 65 | - | - | - |
| | | Ø19 | 49 | 70 | 99 | - | - |
| | | Ø20 | 52 | 74 | 105 | - | - |
| | | Ø22 | - | 84 | 116 | - | - |
| | | Ø24 | - | 92 | 128 | - | - |
| | | Ø25 | - | 95 | 135 | 143 | - |
| | | Ø28 | - | 107 | 151 | 163 | - |
| | | Ø30 | Attention! | | 162 | 177 | - |
| | | Ø32 | Please observe permitted peak torques | | 173 | 191 | - |
| | | Ø35 | for selected coupling size and Type | | 189 | 211 | - |
| | | Ø38 | - | | - | 229 | - |
| | | Ø40 | - | | - | 241 | - |
| | | Ø42 | - | | - | 253 | - |

| Clamping hubs (Sizes 16 – 160) | | Bore | 16 | 25 | 40 | 64 | 100 | 160 |
|--------------------------------|------|------|---------------------------------------|-----|------|------|------|------|
| T _R | [Nm] | Ø20 | 183 | - | - | - | - | - |
| | | Ø22 | 202 | 354 | - | - | - | - |
| | | Ø25 | 229 | 402 | 604 | - | - | - |
| | | Ø28 | 257 | 450 | 677 | 821 | - | - |
| | | Ø30 | 275 | 483 | 725 | 880 | - | - |
| | | Ø32 | 293 | 515 | 773 | 938 | 1102 | - |
| | | Ø35 | 321 | 563 | 846 | 1026 | 1205 | - |
| | | Ø38 | 348 | 611 | 918 | 1114 | 1309 | - |
| | | Ø40 | 367 | 643 | 967 | 1173 | 1378 | 1839 |
| | | Ø42 | 385 | 676 | 1015 | 1232 | 1447 | 1931 |
| | | Ø45 | 412 | 724 | 1087 | 1319 | 1550 | 2069 |
| | | Ø48 | - | 772 | 1160 | 1407 | 1653 | 2207 |
| | | Ø50 | - | 804 | 1208 | 1466 | 1722 | 2299 |
| | | Ø52 | - | 836 | 1257 | 1525 | 1791 | 2391 |
| | | Ø55 | - | - | 1329 | 1613 | 1894 | 2529 |
| | | Ø60 | - | - | 1450 | 1759 | 2066 | 2759 |
| | | Ø65 | - | - | - | 1906 | 2239 | 2989 |
| | | Ø68 | - | - | - | 1994 | 2342 | 3127 |
| | | Ø70 | - | - | - | 2053 | 2411 | 3219 |
| | | Ø75 | - | - | - | - | 2583 | 3449 |
| | | Ø80 | Attention! | | - | - | 2755 | 3679 |
| | | Ø85 | Please observe permitted peak torques | | - | - | 2927 | 3909 |
| | | Ø90 | for selected coupling size and Type | | - | - | 3100 | 4139 |
| | | Ø95 | - | | - | - | 4369 | - |
| | | Ø100 | - | | - | - | 4599 | - |

| Key hubs (Sizes 16 – 2200) | | Bore | 16 | 25 | 40 | 64 | 100 | 160 | 2200 |
|----------------------------|------|------|---|-----|-------|-------|-------------------|------|-------|
| T _{PN} | [Nm] | Ø16 | 121 | - | - | - | - | - | - |
| | | Ø19 | 225 | - | - | - | - | - | - |
| | | Ø20 | 247 | 243 | - | - | - | - | - |
| | | Ø22 | 279 | 289 | - | - | - | - | - |
| | | Ø24 | 425 | 446 | - | - | - | - | - |
| | | Ø25 | 446 | 469 | 487 | - | - | - | - |
| | | Ø28 | 510 | 540 | 590 | - | - | - | - |
| | | Ø30 | 551 | 588 | 645 | 663 | - | - | - |
| | | Ø32 | 595 | 637 | 705 | 749 | - | - | - |
| | | Ø35 | - | 697 | 781 | 840 | 858 | - | - |
| | | Ø38 | 757 | 857 | 926 | 983 | - | - | - |
| | | Ø40 | - | 893 | 1005 | 1095 | 1165 | 1181 | 1202 |
| | | Ø42 | - | - | 1054 | 1157 | 1233 | 1282 | 1304 |
| | | Ø45 | - | - | 1447 | 1595 | 1708 | 1794 | 1823 |
| | | Ø48 | - | - | 1549 | 1701 | 1835 | 1935 | 1963 |
| | | Ø50 | - | - | 1618 | 1772 | 1923 | 2028 | 2088 |
| | | Ø55 | - | - | 2411 | 2609 | 2777 | 2825 | 2865 |
| | | Ø60 | - | - | - | 3061 | 3281 | 3332 | 3401 |
| | | Ø65 | - | - | - | 3316 | 3553 | 3609 | 3691 |
| | | Ø70 | - | - | - | 3971 | 4234 | 4325 | 4401 |
| | | Ø75 | - | - | - | - | 4533 | 4657 | 4705 |
| | | Ø80 | - | - | - | - | 5694 | - | 5899 |
| | | Ø85 | - | - | - | - | - | 6287 | 6611 |
| | | Ø90 | - | - | - | - | - | 7253 | 7589 |
| | | Ø100 | - | - | - | - | - | - | 10695 |
| | | Ø110 | - | - | - | - | - | - | 12247 |
| | | Ø115 | - | - | - | - | - | - | 13634 |
| | | Ø120 | - | - | - | - | - | - | 14827 |
| | | Ø125 | - | - | - | - | - | - | 18457 |
| | | Ø130 | Attention! | | - | - | - | - | 22262 |
| | | Ø140 | Please observe permitted nominal and peak torques | | - | - | - | - | 24737 |
| | | Ø150 | for selected coupling size and Type | | - | - | - | - | 26883 |
| | | Ø160 | - | | - | - | - | - | 31889 |
| | | Ø170 | - | | - | - | - | - | 40667 |
| | | Ø180 | Attention! | | 80941 | 83439 | Attention! | | 43557 |

| Key hubs (Sizes 2200 – 11000) | | Bore | 2200 | 3300 | 5000 | 7300 | 11000 | Size | | |
|-------------------------------|------|--|---|-------------------|-------|-------|-------|---|--|--|
| T _{PN} | [Nm] | transmittable nominal torque T _{PN} | transmittable peak torque T _{PS} | | | | | transmittable peak torque T _{PS} | | |
| | | | Ø 110 | 17558 | - | - | - | 21758 | | |
| | | | Ø 120 | 25337 | - | - | - | 31397 | | |
| | | | Ø 130 | 29353 | 28523 | - | - | 36374 | | |
| | | | Ø 140 | 36455 | 36098 | - | - | 45175 | | |
| | | | Ø 150 | 39572 | 40912 | 39949 | - | 49037 | | |
| | | | Ø 160 | - | 53337 | 53203 | - | 66094 | | |
| | | | Ø 170 | - | 57373 | 59457 | 58021 | 71095 | | |
| | | | Ø 180 | - | 75822 | 75519 | - | 93958 | | |
| | | | Ø 190 | Attention! | | 80941 | 83439 | 100303 | | |
| | | | Please observe permitted peak torques for selected coupling size and Type | | | | | 103396 | | |
| | | | nominal torques for selected coupling size and Type | | | | | 110599 | | |
| | | | 120749 | | | | | 149630 | | |
| | | | 122742 | | | | | 152100 | | |
| | | | 149904 | | | | | 185759 | | |
| | | | coupling size and Type | | | | | 195298 | | |

ROBA®-DS Installation Examples

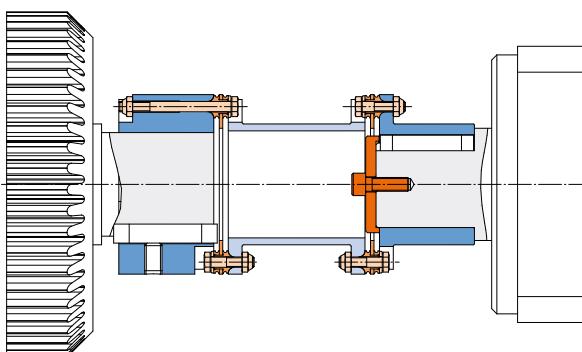


Fig. 87

Axial securing of key hubs via press cover

When using key hubs with transition fit and clearance fit, additional securing of the hubs is necessary. A positive-locking, extremely robust securing is achieved via press cover and clamping screw.

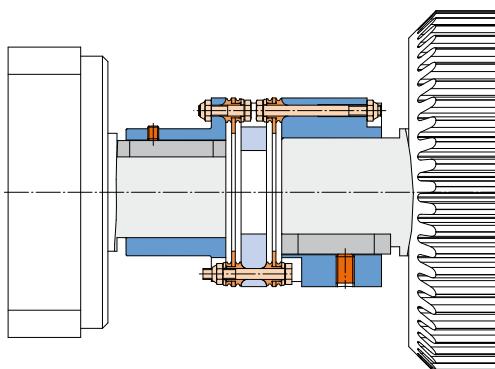


Fig. 88

Axial securing of key hubs via adjusting screw

When using adjusting screws, radial force is achieved on the key via positive locking. This securing is of advantage in particular for partly assembled couplings and limited space conditions.

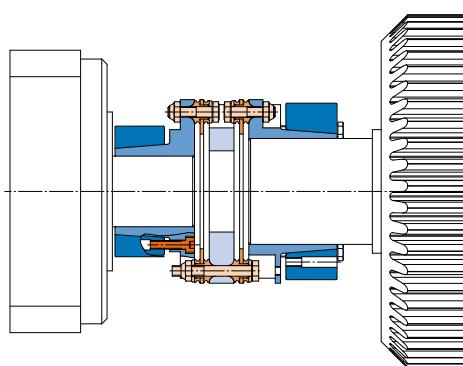
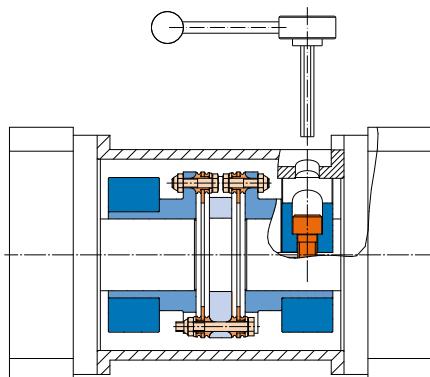


Fig. 89

Hub installation directly next to the housing wall with internally-clamping shrink disk hub

The ROBA®-DS coupling can be installed directly next to the housing wall by using an internally-clamping shrink disk hub. For this, a backlash-free shaft/hub connection is achieved in very limited space conditions.



Coupling installation in closed housing

By using clamping ring hubs, ROBA®-DS couplings can even be installed in areas very difficult to reach. A positive-locking connection to the shaft is achieved via a radial socket set screw. An opening in the gear bell housing is to be designed for the Allen wrench.

ROBA®-DS Installation Examples

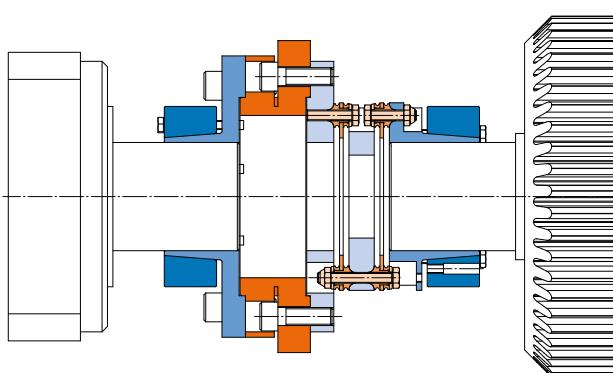


Fig. 91

Integration of measuring flange with adaptor flanges

By using special adaptor flanges, different measuring flanges (for torque measurement) can be integrated into ROBA®-DS couplings.

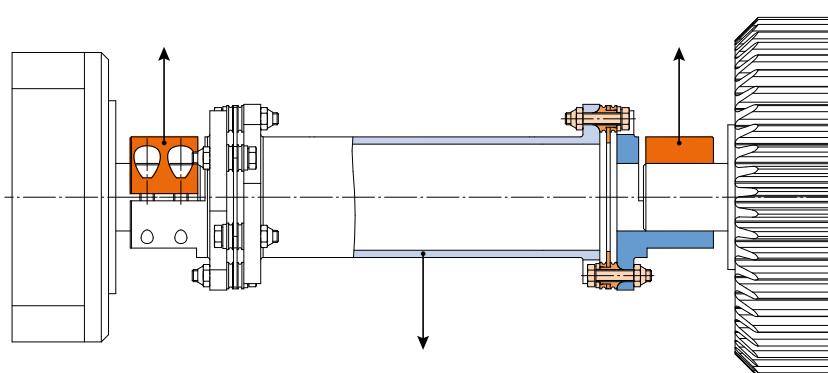
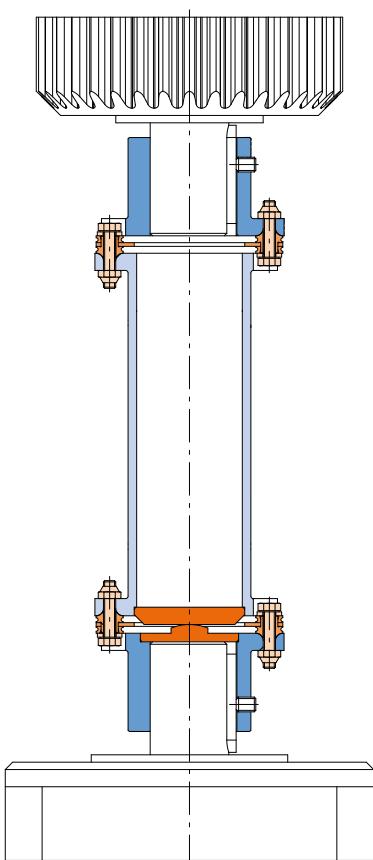


Fig. 92

Radial assembly/disassembly with split clamping hubs

By using split clamping hubs, it is possible to assemble or disassemble ROBA®-DS couplings radially without misaligning the motor or gear box.



Vertical support for special sleeve

For vertical or sloping installation of ROBA®-DS couplings with long intermediate sleeves, a “vertical support” is required. Using this device, the sleeve weight force is transferred directly from the sleeve onto the hub instead of via the disk packs onto the hub.

Fig. 93

| | |
|--|-----------|
| Integrated Torque Measurement | Page 64 ▶ |
| Dimensioning, Size Selection | Page 68 ▶ |
| Technical Explanations | Page 69 ▶ |
| ◀ Backlash-free Servo Couplings | Page 8 |
| ◀ Backlash-free All-steel Couplings | Page 14 |
| ◀ Variable length Sleeve S/CFRP sleeve/Options | Page 56 |
| ◀ Safe Against Overload | Page 59 |

ROBA®-DSM – the Measuring Machine Element

The torque measuring shaft coupling ROBA®-DSM is based on the tried and tested backlash-free ROBA®-DS disk pack coupling. The areas of application for this torque measurement coupling range from test stand construction through use in serial production machines right up to condition monitoring. The system permits uncomplicated condition monitoring of machines and systems. Machines can be optimally utilised through evaluation of the coupling data.

Valuable data for maximum productivity

The ROBA®-DSM monitors machines and records the measurement values¹⁾. From this data, important information can be obtained for the user:

- Machine performance data
- Unpermitted operating conditions lying outside the specifications (in case of a defect or reclaim)
- Utilisation or runtime of the machine
- Current operating conditions and condition changes to the machine for preventative maintenance purposes
- Dynamic maintenance intervals dependent on the utilisation

Highlights and system advantages

- Direct PC connection possible (USB connection)
- Software for visualisation of the measurement values available as an option
- Use without bearings
- Wide temperature range from -20 °C to +70 °C
- Simple installation and set-up
- Low space requirements on the drive line, no torque support required
- Resistant to vibrations and distance changes on the energy transmitter
- Housing and plug-in connector suitable for industrial purposes (protected against water spray)
- High measuring rate of 7000 measurements per second permits the recording of highly-dynamic loads
- Operation of strain sensor without battery via contactless power supply



Fig. 94

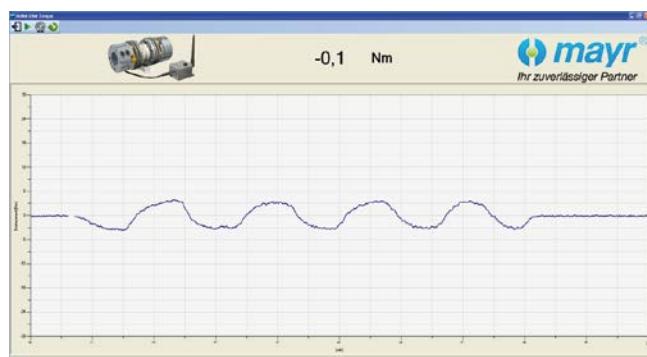


Fig. 95

Order Number

| | Hub 1 | Hub 2 | |
|---|-------|-------|---|
| Key hub, standard (page 28) | 0 | 0 | Key hub, standard (page 28) |
| Key hub, large (page 30) | 1 | 1 | Key hub, large (page 30) |
| Shrink disk hub / external clamping (page 36) | 2 | 2 | Shrink disk hub / external clamping (page 36) |
| Clamping ring hub (page 34) | 4 | 4 | Clamping ring hub (page 34) |
| Clamping hub (Figs. 94, 96 and page 32) | 5 | 5 | Clamping hub (Figs. 94, 96 and page 32) |
| Flange (page 44) | 6 | 6 | Flange (page 44) |
| Split clamping hub ³⁾ (page 42) | 8 | 8 | Split clamping hub ³⁾ (page 42) |
| Shrink disk hub, large (page 40) | 9 | 9 | Shrink disk hub, large (page 40) |

| | |
|--|--|
| ▼ ▲ | ▼ ▲ |
| — / 9 7 1 . — | — / 5 / — / — |

| | | |
|---------------------------|---|---|
| Sizes 16 to 160 | Bore²⁾ Hub 1 ø (See Dimensions sheets pages 28 – 44) | Bore²⁾ Hub 2 ø (See Dimensions sheets pages 28 – 44) |
|---------------------------|---|---|

Example: 16 / 971.005 / Hub 1 – ø 25^{H7} / Hub 2 – ø 30^{H7}



For detailed information, detailed technical data and dimensions, please see our brochure P.971.005.V_._ _

1) Recording of the measurement values possible only with the aid of appropriate software

2) Standard H7, other tolerances possible

3) For Type 971.885 (double-sided split clamping hub), radial assembly/disassembly is not possible as the hubs are offset at an angle.

ROBA®-DSM

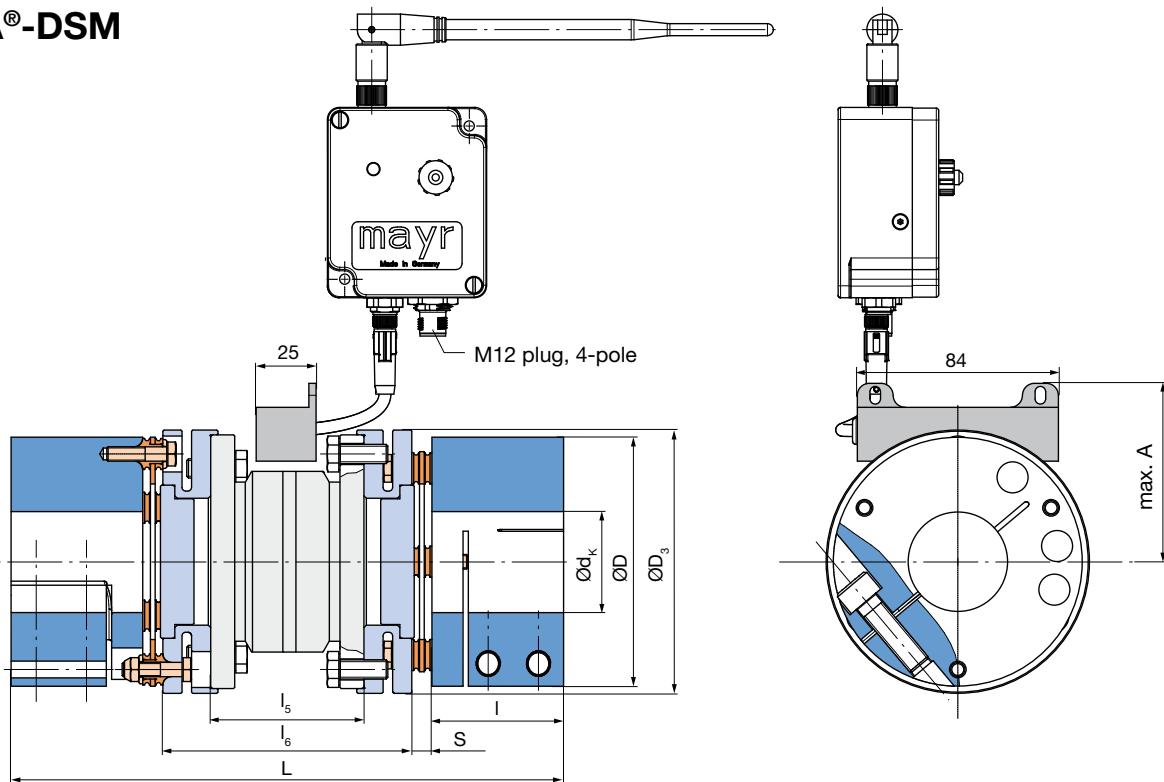


Fig. 96: Type 971.555 (for other mounting variants, see pages 28 – 44)

| Technical Data and Main Dimensions | | | Size | | | | |
|--|---|------------------|------|-------|------|------|-----|
| | | | 16 | 40 | 100 | 160 | |
| Nominal torque ^{1) 2)} | T_{KN} | [Nm] | 190 | 450 | 800 | 1600 | |
| Peak torque ³⁾ | T_{KS} | [Nm] | 285 | 675 | 1200 | 2400 | |
| Ultimate torque | T_{KB} | [Nm] | 570 | 1350 | 2400 | 4800 | |
| Minimum hub bore Type 971.555 (Figs. 94 and 96) ^{4) 5)} | $d_{K\min}$ | [mm] | 20 | 25 | 32 | 40 | |
| Maximum hub bore Type 971.555 (Figs. 94 and 96) ^{4) 5)} | $d_{K\max}$ | [mm] | 45 | 60 | 90 | 100 | |
| Maximum speed | n_{\max} | [rpm] | 9500 | 7000 | 5100 | 4300 | |
| Permitted misalignments ⁶⁾ | Permitted axial displacement ^{7) 8)} | ΔK_a | [mm] | 0,8 | 1,1 | 1,5 | 1,7 |
| | Permitted angular misalignment ⁹⁾ | ΔK_w | [mm] | 0,7 | 0,7 | 0,7 | 0,7 |
| | Permitted radial misalignment ⁷⁾ | ΔK_r | [mm] | 1,1 | 1,3 | 1,6 | 1,8 |
| Spring rigidities | Total torsional rigidity | [10^3 Nm/rad] | 36,2 | 114,3 | 320 | 585 | |
| | Angular spring rigidity ⁹⁾ | [Nm/rad] | 229 | 298 | 1089 | 1990 | |

Mass Moments of Inertia J [10^{-3} kgm²]

| Size | 16 | 40 | 100 | 160 |
|--------------------------------|------|------|-------|-------|
| Clamping hub ^{5) 10)} | 0,74 | 3,64 | 16,94 | 34,32 |
| Disk pack | 0,08 | 0,26 | 1,19 | 3,27 |
| Adaptor flange | 0,38 | 1,67 | 7,06 | 15,36 |
| Strain sensor | 0,51 | 2,21 | 7,97 | 20,04 |

Weights [kg]

| Size | 16 | 40 | 100 | 160 |
|--------------------------------|------|------|------|------|
| Clamping hub ^{5) 10)} | 0,73 | 2,05 | 4,82 | 6,94 |
| Disk pack | 0,08 | 0,15 | 0,35 | 0,67 |
| Adaptor flange | 0,43 | 1,11 | 2,44 | 3,89 |
| Strain sensor | 0,58 | 1,34 | 2,91 | 4,27 |

Dimensions [mm]

| Size | A | D | D ₃ | I ⁵⁾ | I ₅ | I ₆ | L ⁵⁾ | S |
|------|------|-----|----------------|-----------------|----------------|----------------|-----------------|------|
| 16 | 55,5 | 77 | 82 | 40 | 54 | 84 | 178,2 | 7,1 |
| 40 | 63,7 | 104 | 110 | 55 | 64 | 104 | 230,8 | 8,4 |
| 100 | 74,3 | 143 | 150 | 75 | 72 | 122 | 292 | 10 |
| 160 | 87,5 | 167 | 175 | 85 | 78 | 136 | 329,2 | 11,6 |

1) Other torques and construction sizes available on request.

2) Valid for changing load direction as well as for max. permitted shaft misalignment. The following applies for split clamping hubs (Type 971.8-5):

Valid for unchanging load direction as well as for max. permitted shaft misalignment. When the load direction changes, max. 60% of the stated nominal torque is permitted.

3) Valid for unchanging load direction, max. load cycles $\leq 10^5$.

4) Transmittable torques dependent on bore, see page 61.

5) For technical data on alternative mounting variations, see pages 28 – 44.

6) The permitted misalignments must not simultaneously reach their maximum values.

7) The values refer to couplings with 2 disk packs.

8) Only permitted as a static or virtually static value.

9) The values refer to 1 disk pack.

10) Mass moments of inertia and weights are valid for maximum bore.

Dimensioning, Size Selection

Page 68 ▶

Technical Explanations

Page 69 ▶

◀ Backlash-free Servo Couplings

Page 8

◀ Backlash-free All-steel Couplings

Page 14

◀ Safe Against Overload

Page 59

◀ Installation Examples

Page 62

ROBA®-DSM measuring system

ROBA®-DSM receiver

The ROBA®-DSM receiver establishes the contactless connection to the strain sensor and supplies it with energy via the ROBA®-DSM stator.

ROBA®-DSM stator

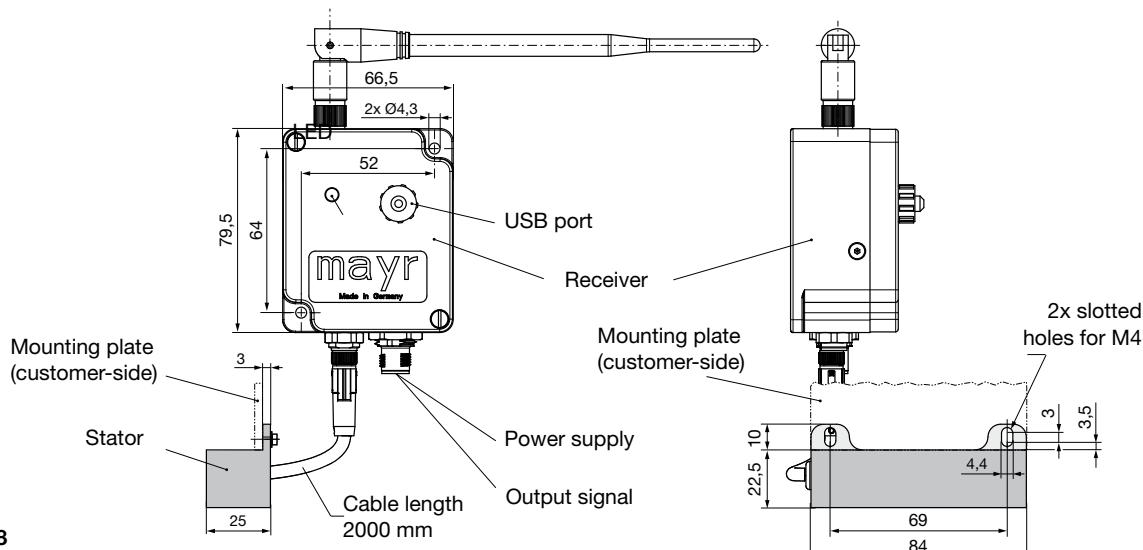
The stator must be aligned centrally to the strain sensor. The radial distance can total between 1 mm and 5 mm. If installed correctly, the LED on the ROBA®-DSM receiver lights up green and indicates that the data transmission works. The strain sensor is rotated slowly by 360° for inspection purposes.

If the LED lights up red at different angular positions, please select a different mounting place for the ROBA®-DSM receiver.

Technical data

| | |
|------------------------------------|--|
| Supply voltage: | 24 VDC ($\pm 10\%$) |
| Max. current consumption: | 1 A |
| Measuring signal output: | 0 ... ± 10 V (rotational direction right positive, 10 V refers to T_{KN}) |
| Nominal temperature range: | -20 °C to +70 °C |
| Temperature drift, zero point: | 0,04 % of final value / K |
| Temperature drift, measured value: | 0,03 % of final value / K |
| Max. total errors: | < 1 % of final value (< 0,5 % via USB) |
| Bandwidth: | 3 kHz (-3 dB) |
| Max. dyn. load: | 100 % of T_{KN} |
| Protection: | Receiver / stator IP65 Strain sensor IP52 |
| Permitted speed: | 0 ... n_{max} (Techn. data, page 65) |

Detail drawing



Electrical connection (Fig. 97)

- The ROBA®-DSM receiver is equipped manufacturer-side with a firmly installed 4-pole, A-encoded M12 plug.
- The voltage supply takes place via
 - Pin 1 = +24 V $\pm 10\%$ and
 - Pin 3 = GND.
- The output signal is provided to
 - Pin 4 = U_a torque 0 ... ± 10 V and
 - Pin 2 = GND
- The digital measurement data can be read into a PC directly via the USB port using the mayr®-software.
- The radio ID and the radio channel can be set and the offset compensation can be carried out via the USB port using the service software.

Recommended accessories (please include in your order)

Connection cable, 4-wire, shielded, 3 m long

Article-No. 8233264

USB cable, bayonet lock, IP65, 2 m long

Article-No. 8233265

Only when using original accessories, the receiver has Protection IP65 also when the USB cable is connected. Non-original mini USB plugs might not be compatible mechanically.

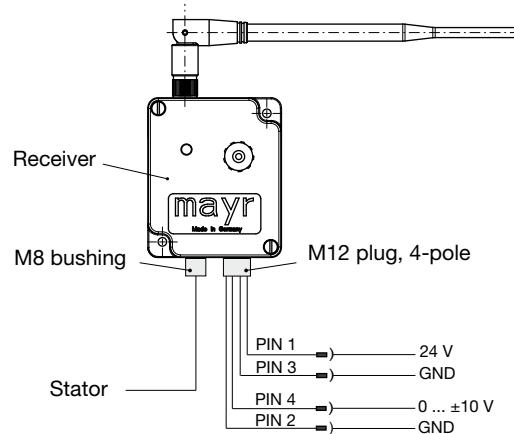


Fig. 97

ROBA®-DSM configuration possibilities/standard designs

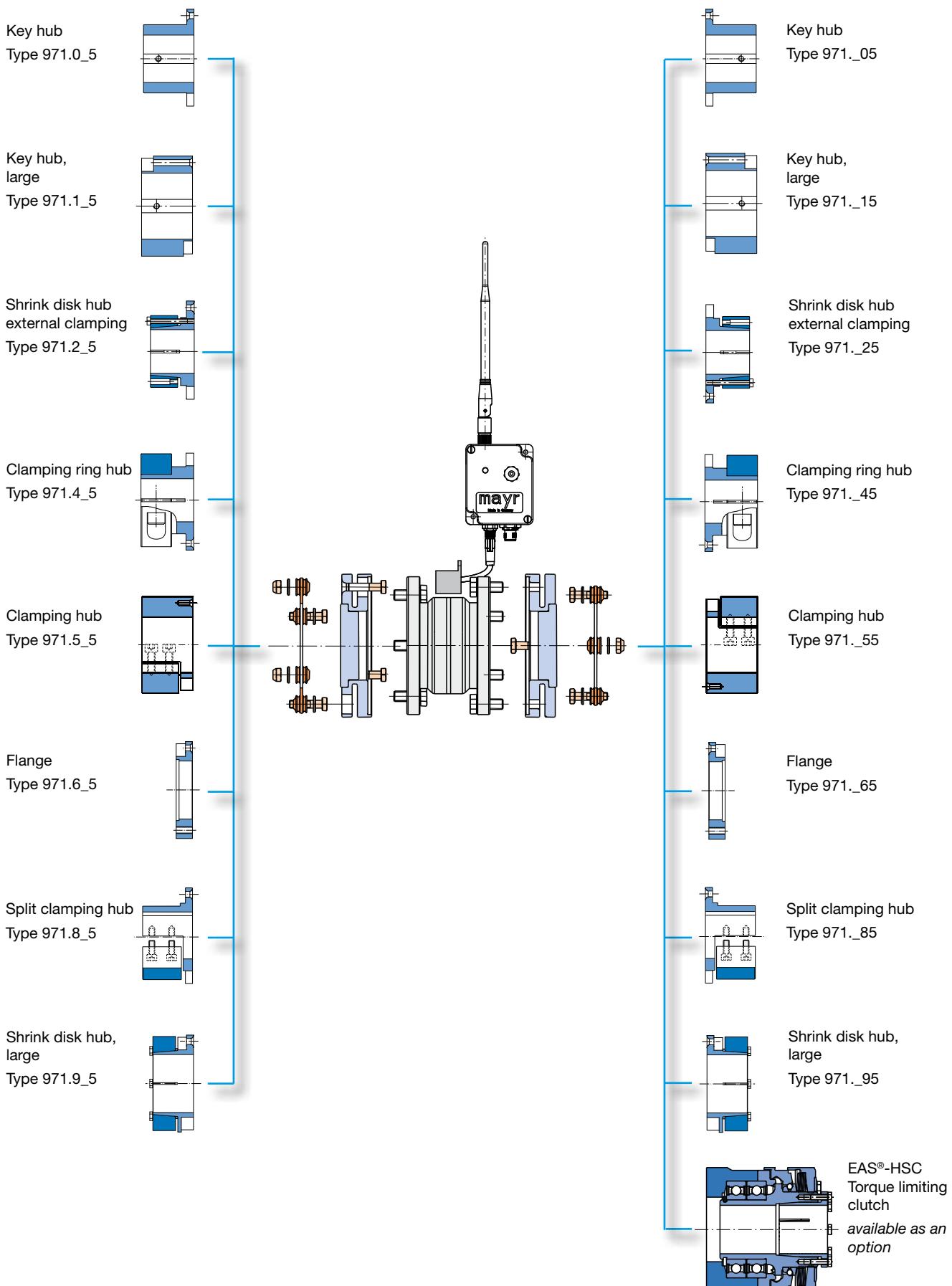


Fig. 99

Dimensioning, Size Selection

Coupling size selection

1. Direct coupling selection

If the user knows all the torques affecting the coupling during operation and if temperatures do not rise above 175 °C (100 °C on sizes 3 to 15), a coupling should be selected whose nominal torque lies above the maximum in-operation torques according to the catalogue.

If shaft misalignment is present, no further limitations are necessary.

For ROBA®-DS couplings from size 16 onwards, no further limitations are necessary if alternating torques are present.

Please observe the alternating torques shown on page 4 for coupling sizes 3 to 15.

Please also observe the level and torsional direction of the start-up torque. This may be maximum 1,5 x the permitted coupling nominal torque. The torsional direction should remain unchanged, the maximum permitted amount of load cycles must be smaller than 1×10^5 .

2. Calculation for coupling selection using drive performance and service factor f_B

If the user knows the application data of his drive line, we recommend dimensioning using performance and speed of the main engine as well as the service and temperature factors.

$$T_{KN} \geq \frac{9550 \times P \times f_B \times f_t}{n}$$

Term definitions:

| | |
|---------------|---|
| T_{KN} [Nm] | Coupling nominal torque |
| P [kW] | Main engine nominal performance |
| f_B | Service factor according to Table 2, page 69 |
| f_t | Temperature factor according to Fig. 100, page 68 |
| n [rpm] | Drive machine nominal speed |

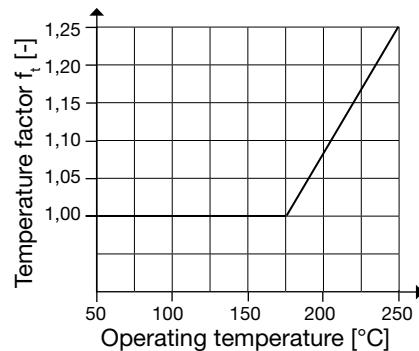


Fig. 100: Temperature factor f_t

Calculation Example

The ROBA®-DS coupling is to be dimensioned for a piston pump drive run via an electromotor. The following application data is available:

Main engine: Electromotor

Nominal capacity $P = 13 \text{ kW}$

Nominal speed $n = 1450 \text{ rpm}$

Max. start-up torque $T_{Amax} = 2,5 \times \text{the motor nominal torque}$

Main engine: Piston pump

Maximum ambient temperature 60 °C

=> Required coupling nominal torque T_{KN} :

$$T_{KN} \geq \frac{9550 \times 13 \times 1,9 \times 1,0}{1450}$$

$$T_{KN} \geq 162,7 \text{ Nm}$$

Load class from Table 1, page 69:

III

Service factor f_B from Table 2, page 69:

1,9

Temperature factor f_t from Fig. 100, page 68:

1,0

=> Required coupling peak torque T_{KS} :

$$T_{Nom} = \frac{9550 \times 13}{1450}$$

$$T_{Nom} = 85,6 \text{ Nm}$$

$$T_{Amax} = 2,5 \times T_{Nom}$$

Max. start-up torque: $T_{Amax} = 2,5 \times \text{the motor nominal torque}$

$$T_{KS} \geq T_{Amax} \geq 214,1 \text{ Nm}$$

=> Selected coupling size:

ROBA®-DS 16 with a nominal torque T_{KN} of **190 Nm** and a peak torque T_{KS} of **285 Nm**.

Classification of Work Machines into Load Classes

Construction machinery

- Concrete blenders II
- Chain conveyors III
- Chain carriages III
- Crushers III

Chemical industry

- Mixers (thick fluids) II
- Mixers (thin fluids) I
- Centrifuges II
- Blenders II

Fans/vents

II

Generators/convertors

- Frequency convertors I
- Generators II

Foodstuffs machines

- Kneading machines II
- Mills III
- Packaging machines II

Paper machines

III

Compressors

II

Conveyor systems

- Conveyor belts II
- Sloping elevators III
- Goods elevators II
- Passenger elevators II

Wood/plastic processing

- Planing machines II
- Reciprocating saws III
- Extruders II
- Blenders II

Crane systems

II

Metal processing

- Punching/Pressing III
- Machine tools II

Pumps

- Centrifugal pump (thin fluids) I
- Centrifugal pump (thick fluids) II
- Pistons/plunger pumps III

Textile machines

II

Washing machines

II

Table 1: Load Classes

| | Work Machine Load Class | | |
|--|-------------------------|-----|-----|
| | I | II | III |
| Electromotor, turbine, hydraulic motor | 1,1 | 1,4 | 1,9 |
| Piston machine with more than 3 cylinders | 1,4 | 1,7 | 2,2 |
| Piston machine with up to 3 cylinders | 1,7 | 2,0 | 2,5 |

Table 2: Service factor f_B

Technical Explanations

Permitted shaft misalignments

- ROBA®-DS single-jointed couplings (Type 950._ _ _ and Type 952._ _ _) compensate for angular and axial shaft misalignments.
- ROBA®-DS double-jointed couplings (Type 951._ _ _ and Type 953._ _ _) compensate for angular, radial and axial shaft misalignments (Fig. 101).
- If more than one kind of misalignment takes places simultaneously, they influence each other. The permitted misalignment values are dependent on one another, see Fig. 102. The sum total of the actual misalignments – in percent of the maximum value – may not exceed 100 %.

Example (see Table on page 28 and Fig. 102):

ROBA®-DS, size 40, Type 951.002

=> **Axial displacement** occurrence: $\Delta K_a = 0,6 \text{ mm}$
equals **40 %** of the permitted maximum value
 $\Delta K_a = 1,5 \text{ mm}$

=> **Angular misalignment** occurrence in the disk pack: $\Delta K_w = 0,3^\circ$ equals **30 %** of the permitted maximum value $\Delta K_w = 1,0^\circ$

=> **Permitted radial misalignment:**
 $\Delta K_r = 30 \text{ %}$ of the permitted maximum value
 $\Delta K_r = 1,5 \text{ mm} \Rightarrow \Delta K_r = 0,45 \text{ mm}$

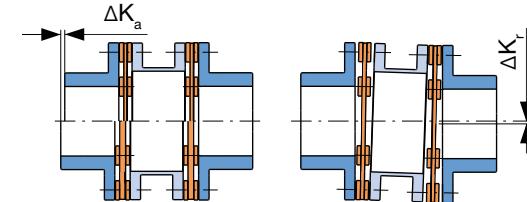


Fig. 101

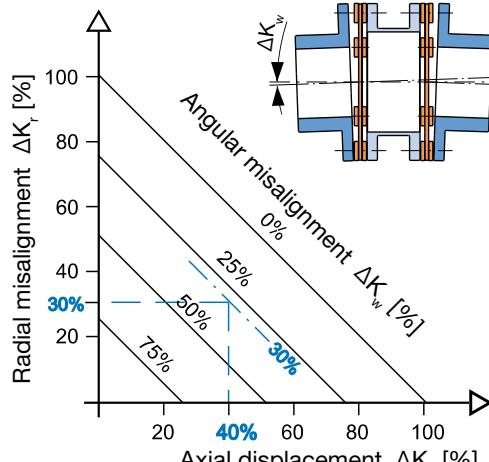


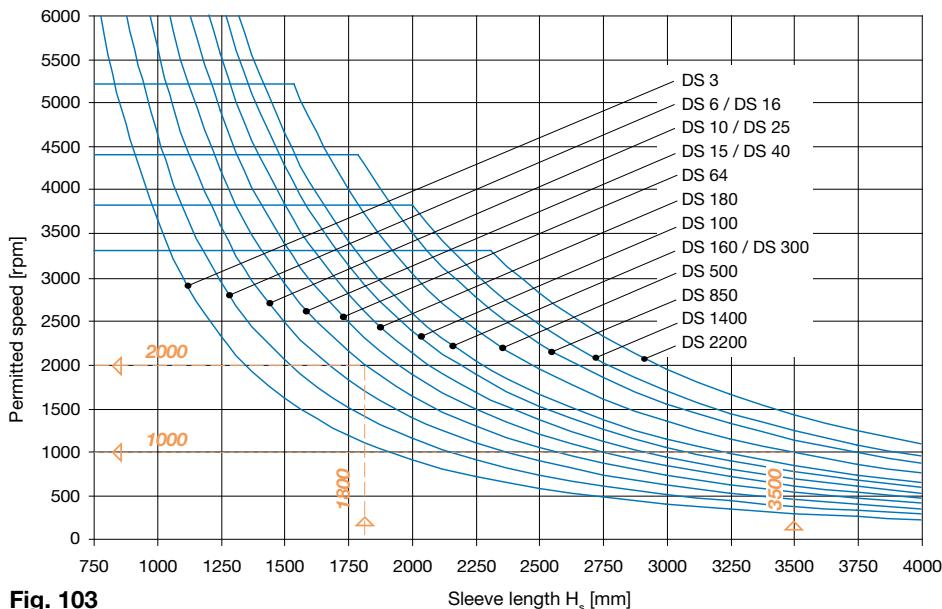
Fig. 102

- ◀ Backlash-free servo couplings Page 8
- ◀ Backlash-free All-steel couplings Page 14
- ◀ Variable length Sleeve S/CFRP sleeve/Options Page 56
- ◀ Safe Against Overload Page 59
- ◀ Installation Examples Page 62
- ◀ Integrated Torque Measurement Page 64
- ◀ Dimensioning, Size Selection Page 68

Technical Explanations

Permitted Speeds (Critical Bending Speeds) on Sleeve S, CRD Sleeve, CFRP Sleeve (Figs. 103, 104, 105)

Permitted speed on special sleeve ROBA®-DS Type 95..._3 (Sleeve S)



Examples (Fig. 103)

- ROBA®-DS, Size 40:

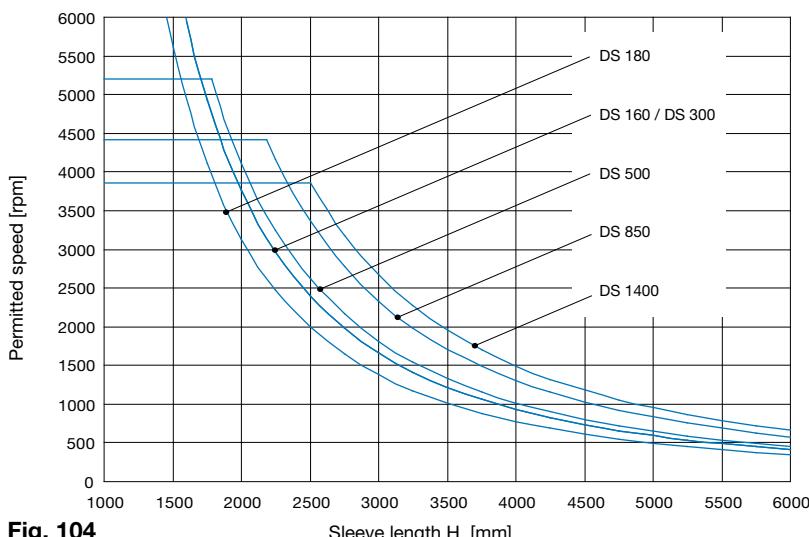
Sleeve length: $H_s = 1800 \text{ mm}$
 \Rightarrow permitted speed:

2000 rpm

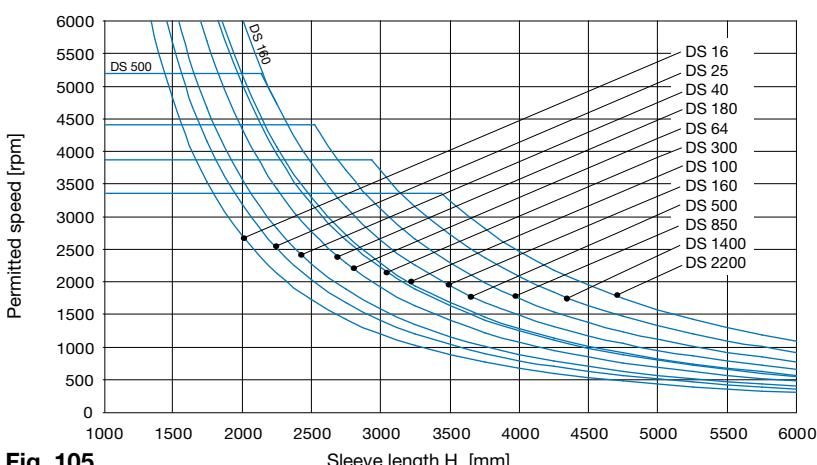
- ROBA®-DS, Size 500:

Sleeve length: $H_s = 3500 \text{ mm}$
 \Rightarrow permitted speed:
1000 rpm

Permitted speed on special sleeve ROBA®-DS Type 95..._4 (Sleeve CRD)



Permitted speed on special sleeve ROBA®-DS Type 95..._5 (Sleeve CFRP)



Using the coupling at high speeds

- Please keep to the maximum speeds defined in the catalogue. Higher speeds are only permitted after contacting the manufacturers.
- Please operate designs with sleeve S, CRD sleeves and CFRP sleeves at subcritical levels (see Figs. 103, 104 and 105).
- Both hub variants clamping hub/clamping ring hub and split clamping hub may only be used within a limited speed range. At very high speeds, shrink disk hubs and key hubs (press fit) should be used.
- We recommend balancing the coupling in individual parts or complete.
- Shafts misalignments should be kept as low as possible for smoother system running.
- When using double cardanic shafts, axial animation of the middle coupling part is possible due to operating speed and misalignment. In order to avoid this animation, please minimise the shaft misalignment.
- When connecting very high mass inertias via ROBA®-DS couplings (in particular double-jointed couplings with long sleeves), the torsion-critical natural frequency and speeds must be observed.

Technical Explanations

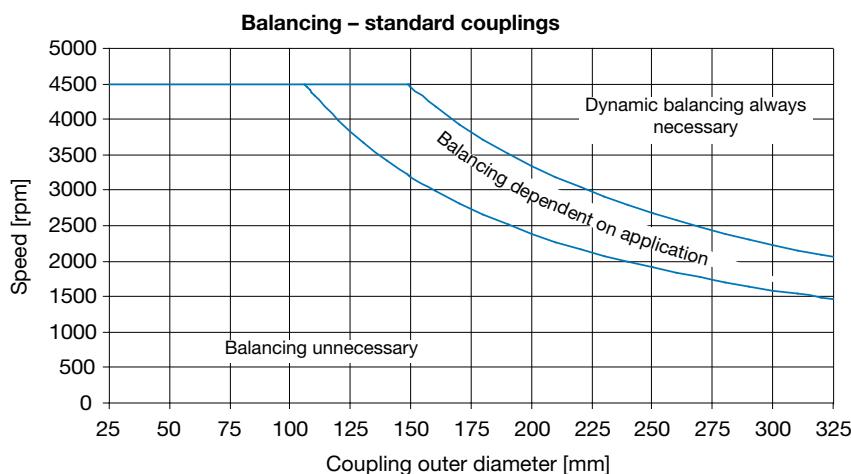


Fig. 106

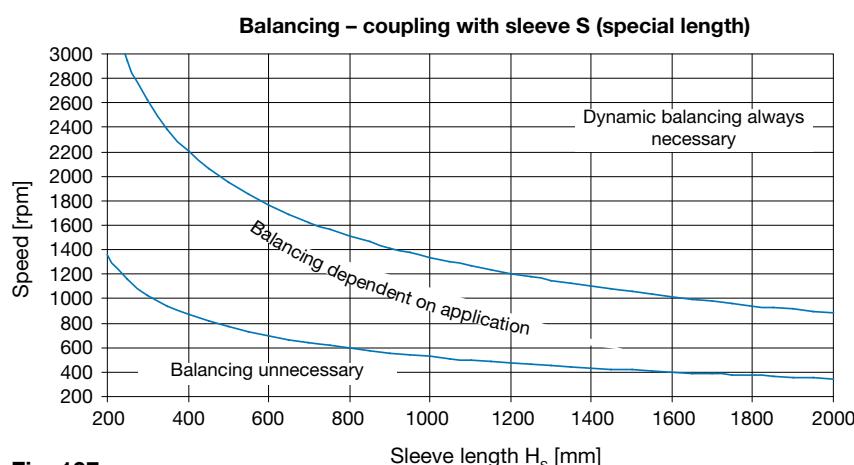


Fig. 107

State of Delivery

- Delivery in partly assembled parts and /or individual parts
- Corrosion protection: phosphation, disk pack made of rustproof steel.
- Hub designs: pilot bored or finish bored.
- Bore: tolerance H7 (other tolerances possible)
- Shaft run-out and axial run-out tolerances: 0,03 mm (Fig. 108)
- Key hub: keyway according to DIN 6885 pages 1 or 3

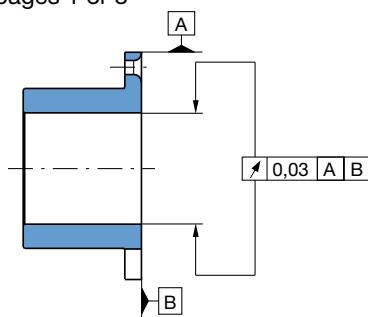


Fig. 108

Temperature Resistance

- Temperature resistant in range -40 °C up to +250 °C (-20 °C up to +100 °C for sizes 3 to 15).
- At temperatures above +120 °C, the self-locking hexagon nuts should be replaced by self-locking all-steel nuts according to EN ISO 7042.
- Couplings with CFRP sleeves can be used at temperatures of -20 °C up to +80 °C

Balancing the Coupling

- Not necessary for most applications.
- The following points are crucial when deciding whether the coupling needs balancing:
 - Coupling circumferential speed (Fig. 106)
 - Length of special sleeve (Fig. 107)
 - Required balance quality
- The smooth running of a machine is not only ensured by the coupling balance quality, but is influenced, to at least the same extent, by parameters such as:
 - rigidity and distance to the adjacent bearing,
 - sensitivity and mass of the entire construction

Figs. 106 or 107 only show reference values as recommendations for balancing.

- All parts of the ROBA®-DS couplings, except for the sleeve S are machined on all sides. They are therefore in the range G 6.3 according to ISO DIN 1940 at medium speeds.
- When ordering the coupling with a special sleeve, please always state the coupling operating speed.
- If higher demands are placed on the balance quality, it is possible to balance individual parts or the entire installed coupling. The hubs should be designed with a finish bore.

Installation Position

- Horizontal installation
- On vertical or sloping installations and when using long sleeves, we recommend using vertical supports (Fig. 93, page 63).
- The vertical support and the hub centerings in the hub and the sleeve are produced manufacturer-side.

| | |
|--|---------|
| ◀ Backlash-free Servo Couplings | Page 8 |
| ◀ Backlash-free All-steel Couplings | Page 14 |
| ◀ Variable length Sleeve S / CFRP sleeve / Options | Page 56 |
| ◀ Safe Against Overload | Page 59 |
| ◀ Installation Examples | Page 62 |
| ◀ Integrated Torque Measurement | Page 64 |
| ◀ Dimensioning, Size Selection | Page 68 |

Technical Explanations

Short Description – Hub Installation

Please find a detailed installation description in the Installation and Operational Instructions for the product.

Hub installation Types 95_0_ _ or 95_1_ _ (hubs with keyway, Fig. 109)

- Mount the hubs onto the shaft using a suitable device.
- Axial securing:
 - a set screw (adjusting screw) presses radially onto the key,
 - a press cover and screw are screwed into the shaft threaded centre hole.
- The shaft tolerance should be adapted to the application:
 - alternating rotational direction: press fit,
 - operation in one direction: transition fit or clearance fit

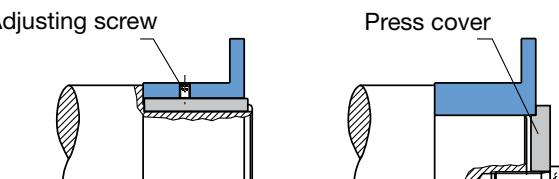


Fig. 109

Hub installation Types 95_2_ _ / 95_3_ _ / 95_9_ _ (hubs with shrink disk) / 95_4_ _ (hubs with clamping ring) / 95_5_ _ (clamping hubs)

- Mount the hubs onto the shafts using a suitable device and bring them into the correct position.
- **Types 95_2_ _ / 95_3_ _ / 95_9_ _ :**
Tighten the tensioning screws one after the other in 3 to max. 6 tightening sequences using a torque wrench.
- **Types 95_4_ _ / 95_5_ _ :**
Tighten the clamping screws using a torque wrench.



- The contact surfaces between the shrink disk and the hub and the clamping ring and hub have been greased manufacturer-side.
- The hub bores and shaft ends are grease-free.
- Greasy or oily bores or shafts do not transmit the maximum coupling torque.
- The shaft must not have a keyway.
- Shaft surface: finely turned or ground ($R_a = 0,8 \mu\text{m}$).
- Shaft material: yield point at least 350 N/mm^2 , e.g. St60, St70, C45, C60.
- Recommended shaft tolerance:
Dependent on application and hub Type.
See Table of frictionally-locking transmittable torques on pages 60/61.

Hub or coupling installation Type 95_8_ _ (split clamping hubs)

- Partly assemble the coupling, observing the Point "Coupling Installation" (page 72).
- Loosen the partly assembled half shells from the hub.
- Place the coupling from above onto the shafts and partly assemble with the half shells (Fig. 110).
- Tighten the tensioning screws crosswise in several procedures. Please ensure that the gap "X" on both sides of the hub is the same (Fig. 111).

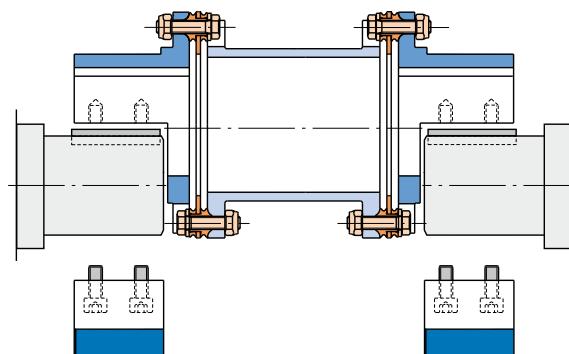


Fig. 110

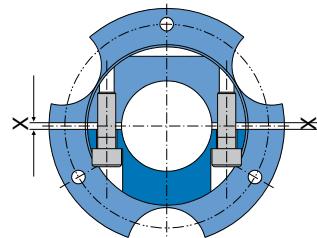


Fig. 111

Short Description – Coupling Installation

Please find a detailed installation description in the Installation and Operational Instructions for the product. The following installation description is for the ROBA®-DS couplings from size 16 up to size 2200.

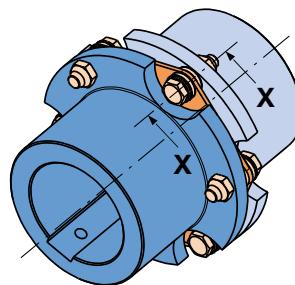


Fig. 112

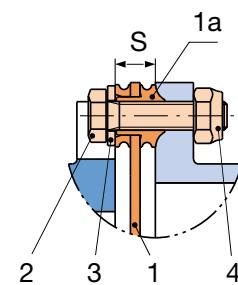


Fig. 113 Detail „X“

- Screw the disk packs (1, Fig. 113) over lightly-oiled hexagon head screws (2), washers (3) and hexagon nuts (4) alternately with the sleeve and the hubs.
- The generation of pre-tension force on the disk pack (1) generally takes place* via the hexagon nut (4). The disk pack (1) must not be distorted when applying the pre-tension force (secure screw (2) against turning).
- The hexagon nuts (4) or hexagon head screws (2) must be tightened crosswise and in several sequences to the full tightening torque M_a . For the appropriate tightening torques for each sequence, please see the appropriate Installation and Operational Instructions.



The radius of the collar bushings (Part 1a, Fig. 113, Detail "X") must lie in the grooves of hubs and sleeves.

*The head of the hexagon head screw (2) with the washer (3) must always lie against the disk pack (1).

System solution for machine tools

ROBA®-DS spindle coupling with integrated cooling lubricant feedthrough

A new development on the ROBA®-DS allows cooling lubricant to be fed directly into the tool, even over long distances, thereby increasing the lifetime, the cutting speed as well as the cutting performance.

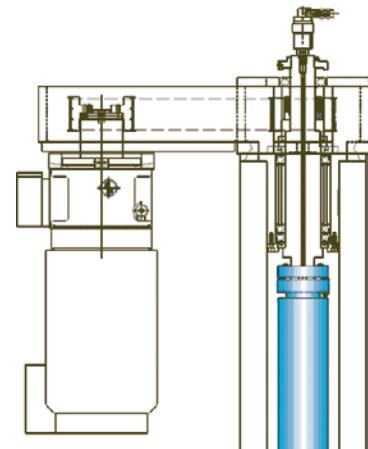
ROBA-DS® spindle couplings have proved their worth for years in manifold ways in large machining centres. They impress in particular with their high performance density, which allows the application of both high torques and high speeds. Complex constructions with multiple bearing-supported intermediate shafts are often replaced by the substantially more torsionally-rigid, but nevertheless lighter sleeves, resulting in easier installation and increased running smoothness.

Due to the long spindle construction on these machines, the cooling lubricant is in most cases applied to the tool from the outside. In particular in deep drilling applications, this limits the cutting speed and the lifetime of the tool. A new development on the ROBA-DS® allows cooling lubricant to be fed into the spindle and therefore into the tool, even over long distances.

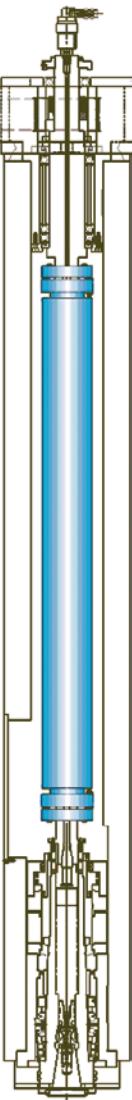
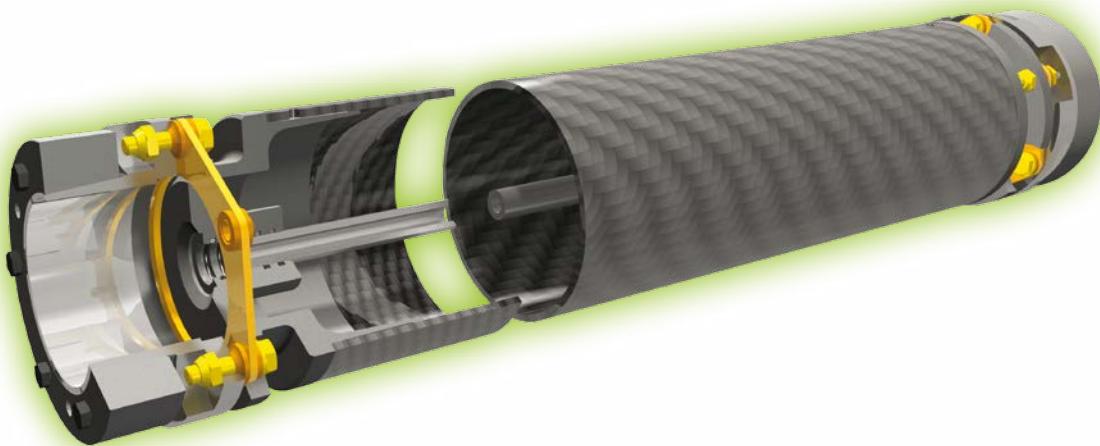
The integrated cooling lubricant feedthrough consists of an inner tube with multiple supports, and only needs to be plugged into the shaft-side adaptor on the upper and lower ends.

It is possible to pump cooling lubricant through the entire spindle into the tool using high pressure. It cools the blade directly, supports chip breaking and removes the chips. The machining times are shortened, the tool lifetime is extended.

This design has proved its worth already in numerous applications. Due to the reduced weight of the carbon fibre reinforced sleeves, even high speeds are not problematic. The new ROBA-DS® spindle coupling therefore opens up new possibilities in the race for technology leadership.



ROBA®-DS with 2,5 m long sleeve (CFRP), with integrated cooling lubricant feedthrough, suitable for speeds up to 10.000 rpm.



System solution for wind power plants

ROBA®-DS Wind power module

The *mayr*® company's decades of experience in shaft couplings and overload systems for all areas of mechanical engineering forms a strong basis for our wind power module. The wind power module has the following characteristics:

● Safe overload protection

An integrated ROBA®-slip bushing produced from a specially-developed bushing material ensures reliable overload protection against short-circuit torques due to its minimal torque tolerance.

● Electrical insulation

The electrical insulation through the sleeve made of glass fibre-reinforced plastic prevents damage to bearings and toothings.

● Compensation of shaft misalignments

Specially-developed rustproof steel disks allow compensation of extremely high axial, radial and angular shaft misalignments. This means that only low restoring forces are generated.

● Integrated brake disk

A brake disk can be integrated into the wind power module according to customer-specific requirements.

● Ease of installation

The disk packs and the intermediate sleeve can be mounted and de-installed radially without axial displacement of the hubs being required.

It is possible to install the disk packs with low tightening torques by using special clamping nuts.



Product Summary

Safety Clutches/Overload Clutches

- EAS®-Compact®/EAS®-NC**
Positive locking and completely backlash-free torque limiting clutches
- EAS®-smartic®**
Cost-effective torque limiting clutches, quick installation
- EAS®-element clutch/EAS®-elements**
Load-disconnecting protection against high torques
- EAS®-axial**
Exact limitation of tensile and compressive forces
- EAS®-Sp/EAS®-Sm/EAS®-Zr**
Load-disconnecting torque limiting clutches with switching function
- ROBA®-slip hub**
Load-holding, frictionally locked torque limiting clutches
- ROBA®-contitorque**
Magnetic continuous slip clutches



Shaft Couplings

- smartflex®/primeflex®**
Perfect precision couplings for servo and stepping motors
- ROBA®-ES**
Backlash-free and damping for vibration-sensitive drives
- ROBA®-DS/ROBA®-D**
Backlash-free, torsionally rigid all-steel couplings
- ROBA®-DSM**
Cost-effective torque-measuring couplings



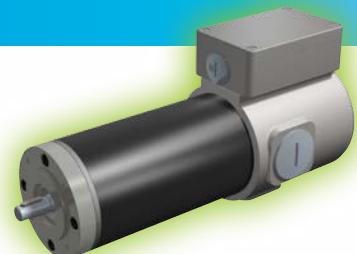
Electromagnetic Brakes/Clutches

- ROBA-stop® standard**
Multifunctional all-round safety brakes
- ROBA-stop®-M motor brakes**
Robust, cost-effective motor brakes
- ROBA-stop®-S**
Water-proof, robust monoblock brakes
- ROBA-stop®-Z/ROBA-stop®-silenzio®**
Doubly safe elevator brakes
- ROBA®-diskstop®**
Compact, very quiet disk brakes
- ROBA®-topstop®**
Brake systems for gravity loaded axes
- ROBA®-linearstop**
Backlash-free brake systems for linear motor axes
- ROBA®-guidestop**
Backlash-free holding brake for profiroll rail guides
- ROBATIC®/ROBA®-quick/ROBA®-takt**
Electromagnetic clutches and brakes, clutch brake units



DC Drives

- tendo®-PM**
Permanent magnet-excited DC motors
- tendo®-SC**
1 quadrant and 4 quadrant transistor controllers





Headquarters

Chr. Mayr GmbH + Co. KG
Eichenstrasse 1, D-87665 Mauerstetten
Tel.: +49 83 41/8 04-0, Fax: +49 83 41/80 44 21
www.mayr.com, E-Mail: info@mayr.com



Service Germany

Baden-Württemberg
 Esslinger Straße 7
 70771 Leinfelden-Echterdingen
 Tel.: 07 11/45 96 01 0
 Fax: 07 11/45 96 01 10

Bavaria
 Eichenstrasse 1
 87665 Mauerstetten
 Tel.: 0 83 41/80 41 04
 Fax: 0 83 41/80 44 23

Chemnitz
 Bornaeer Straße 205
 09114 Chemnitz
 Tel.: 03 71/4 74 18 96
 Fax: 03 71/4 74 18 95

Franken
 Unterer Markt 9
 91217 Hersbruck
 Tel.: 0 91 51/81 48 64
 Fax: 0 91 51/81 62 45

Hagen
 Im Langenstück 6
 58093 Hagen
 Tel.: 0 23 31/78 03 0
 Fax: 0 23 31/78 03 25

Kamen
 Lünener Strasse 211
 59174 Kamen
 Tel.: 0 23 07/23 63 85
 Fax: 0 23 07/24 26 74

North
 Schiefer Brink 8
 32699 Extertal
 Tel.: 0 57 54/9 20 77
 Fax: 0 57 54/9 20 78

Rhine-Main
 Hans-Böckler-Straße 6
 64823 Groß-Umstadt
 Tel.: 0 60 78/7 82 53 37
 Fax: 0 60 78/9 30 08 00

Branch office

China
 Mayr Zhangjiagang
 Power Transmission Co., Ltd.
 Changxing Road No. 16,
 215600 Zhangjiagang
 Tel.: 05 12/58 91-75 65
 Fax: 05 12/58 91-75 66
 info@mayr-ptc.cn

Great Britain
 Mayr Transmissions Ltd.
 Valley Road, Business Park
 Keighley, BD21 4LZ
 West Yorkshire
 Tel.: 0 15 35/66 39 00
 Fax: 0 15 35/66 32 61
 sales@mayr.co.uk

France
 Mayr France S.A.
 Z.A.L. du Minopole
 Rue Nungesser et Coli
 62160 Bally-Les-Mines
 Tel.: 03.21.72.91.91
 Fax: 03.21.29.71.77
 contact@mayr.fr

Italy
 Mayr Italia S.r.l.
 Viale Veneto, 3
 35020 Saonara (PD)
 Tel.: 0498/79 10 20
 Fax: 0498/79 10 22
 info@mayr-italia.it

Singapore
 Mayr Transmission (S) PTE Ltd.
 No. 8 Boon Lay Way Unit 03-06,
 TradeHub 21
 Singapore 609964
 Tel.: 00 65/65 60 12 30
 Fax: 00 65/65 60 10 00
 info@mayr.com.sg

Switzerland
 Mayr Kupplungen AG
 Tobeläckerstrasse 11
 8212 Neuhausen am Rheinfall
 Tel.: 0 52/6 74 08 70
 Fax: 0 52/6 74 08 75
 info@mayr.ch

USA
 Mayr Corporation
 4 North Street
 Waldwick
 NJ 07463
 Tel.: 2 01/4 45-72 10
 Fax: 2 01/4 45-80 19
 info@mayrcorp.com

Representatives

Australia
 Regal Beloit Australia Pty Ltd.
 19 Corporate Ave
 03178 Rowville, Victoria
 Australien
 Tel.: 0 3/92 37 40 00
 Fax: 0 3/92 37 40 80
 salesAUvic@regalbeloit.com

India
 National Engineering
 Company (NENCO)
 J-225, M.I.D.C.
 Bhosari Pune 411026
 Tel.: 0 20/27 13 00 29
 Fax: 0 20/27 13 02 29
 nenco@nenco.org

Japan
 MATSUI Corporation
 2-4-7 Azabudai
 Minato-ku
 Tokyo 106-8641
 Tel.: 03/35 86-41 41
 Fax: 03/32 24 24 10
 k.goto@matsui-corp.co.jp

Netherlands
 Groneman BV
 Amarstraat 11
 7554 TV Hengelo OV
 Tel.: 074/2 55 11 40
 Fax: 074/2 55 11 09
 aandrijftechniek@groneman.nl

Poland
 Wamex Sp. z o.o.
 ul. Pozaryskiego, 28
 04-703 Warszawa
 Tel.: 0 22/6 15 90 80
 Fax: 0 22/8 15 61 80
 wamex@wamex.com.pl

South Korea
 Mayr Korea Co. Ltd.
 Room No.1002, 10th floor,
 Nex Zone, SK TECHNOPARK,
 77-1, SungSan-Dong,
 SungSan-Gu, Changwon, Korea
 Tel.: 0 55/2 62-40 24
 Fax: 0 55/2 62-40 25
 info@mayrkorea.com

Taiwan
 German Tech Auto Co., Ltd.
 No. 28, Fenggong Zhong Road,
 Shengang Dist.,
 Taichung City 429, Taiwan R.O.C.
 Tel.: 04/25 15 05 66
 Fax: 04/25 15 24 13
 abby@zfgta.com.tw

Czech Republic
 BMC - TECH s.r.o.
 Hvězdoslavova 29 b
 62700 Brno
 Tel.: 05/45 22 60 47
 Fax: 05/45 22 60 48
 info@bmc-tech.cz

More representatives:

Austria, Belgium, Brazil, Canada, Denmark, Finland, Greece, Hongkong, Hungary, Indonesia, Israel, Luxembourg, Malaysia, New Zealand, Norway, Philippines, Romania, Russia, Slovakia, Slovenia, South Africa, Spain, Sweden, Thailand, Turkey

You can find the complete address for the representative responsible for your area under www.mayr.com in the internet.