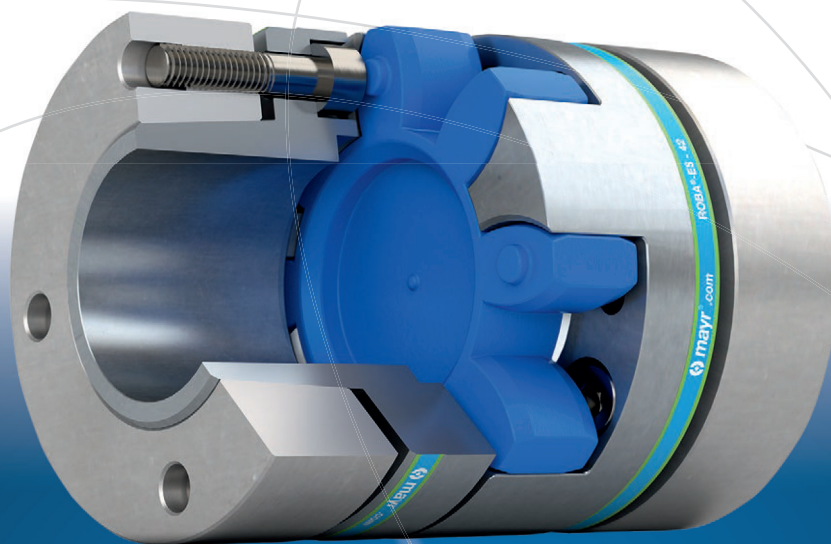




*your reliable partner*



**ROBA<sup>®</sup>-ES**

# We safeguard the movements of this world



The Christian Mayr mill-construction business – founded in 1897.



Communications Centre mayr.com – opened in 2018.

## Specialists in power transmission for more than a century

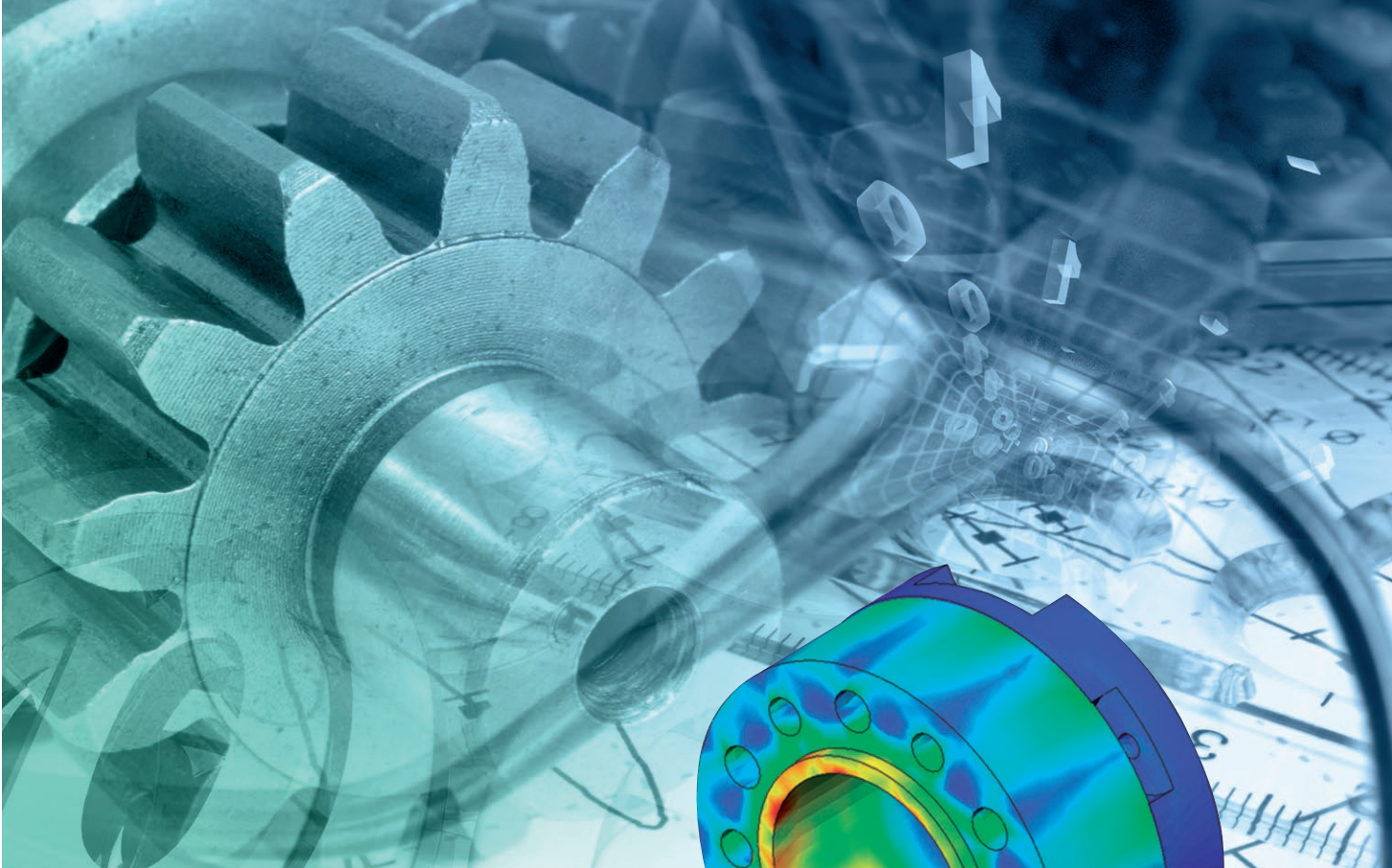
*mayr*<sup>®</sup> power transmission is one of the most traditional and yet most innovative German companies in the field of power transmission. From modest beginnings in the year 1897, the family enterprise from the Allgäu region has developed into the world market leader. Today, 700 employees work at the headquarters in Mauerstetten; more than 1200 employees work for the company worldwide.

### An unsurpassed standard product range

*mayr*<sup>®</sup> power transmission offers a wide variety of torque limiters, safety brakes, backlash-free shaft misalignment compensation couplings and high-quality DC drives. Regarding customer-specific requirements, too, the company possesses the expertise to develop customized and economical solutions. This is why numerous renowned machine manufacturers trust in holistic solutions by *mayr*<sup>®</sup> power transmission.

### Represented worldwide

With eight subsidiaries in Germany, sales offices in the USA, France, Great Britain, Italy, Singapore and Switzerland as well as 36 additional country representatives, *mayr*<sup>®</sup> is available in all important industrial areas, guaranteeing optimum customer service around the globe.



## Tradition and innovation – the best of both worlds

Tradition and innovation do not contradict each other - on the contrary. They are the two supporting pillars which have guaranteed stability and reliability for generations. Long-term stability, independence as well as a good reputation and satisfied customers are important values for a family enterprise rich in tradition.

Therefore, we place emphasis on:

- Tested product quality,
- Optimum customer service,
- Comprehensive know-how,
- Global presence,
- Successful innovations and
- Effective cost management.

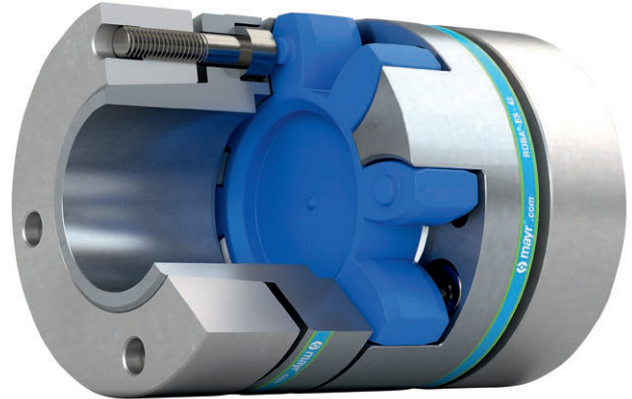
By pursuing our own objective of always offering our customers the technologically most advanced and most economical solution, we have been able to gain the trust of many leading industrial companies from all branches and from all over the world as a reliable partner.

Place your trust in our know-how and our more than 50 years of experience in the areas of torque limiters, safety brakes and shaft couplings.

# ROBA<sup>®</sup>-ES

## Backlash-free elastomer coupling

- **Vibration damping**
- **Damping behaviour can be selected through elastomeric elements in different Shore hardnesses**
- **Backlash-free torque transmission through pre-tensioned elastomeric element**
- **Compensation of shaft misalignments**
- **Plug-in connection, therefore suitable for blind assembly**
- **Maintenance-free, media-resistant, temperature-stable**
- **Torsionally flexible on a small scale, but two to four times more rigid than toothed belt drives.**



### ROBA<sup>®</sup>-ES Elastomeric Elements

The elastomeric elements are the central element of the ROBA<sup>®</sup>-ES-coupling. They define the application field as well as the shaft connection behavior via the permitted torque, the rigidity, the damping and the misalignment values.

By using a unique polyurethane material and a special injection procedure, it is possible to achieve a high dimensional accuracy and evenness in the teeth of the elastomeric element.

The elastomeric elements are available in different shore hardnesses. The teeth of the elastomeric element are chamfered at the sides. This makes blind assembly easier.

The ambient temperatures present during operation have a considerable effect on the dimensioning of a ROBA<sup>®</sup>-ES-coupling (see Dimensioning page 22).

### Dimensioning

The characteristics of ROBA<sup>®</sup>-ES couplings can be greatly varied by using different elastomeric elements. Due to different damping characteristics and the non-linear rigidity of the elastomer, this element also offers more parameters than the steel shaft connection, which should be taken into account on selection.

We therefore recommend careful, thorough coupling dimensioning (see Dimensioning page 22).

### Agent Resistance

The elastomeric elements are very resistant against

- pure mineral oils (lubricating oils)
- and anhydrous greases.

They have a similar resistance against fuels such as

- regular-grade petroleum
- diesel oil
- kerosene.

Damage may occur after longer exposure to

- alcohols or
- aromatic fuels (super/four star petrol).

The elastomeric element material used is resistant to hydrolysis. In contrast to other polyurethane materials, water (including sea water) causes, even after years of exposure, no particular changes to the mechanical characteristics. Hot water, however, reduces the mechanical strength.



**ROBA<sup>®</sup>-ES couplings are also available in ATEX design according to the directive 2014/34/EU.**

## ROBA®-ES Contents

### Designs

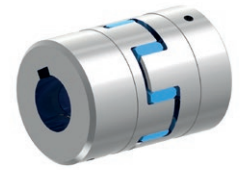
#### ROBA®-ES with key hubs

- Single-jointed coupling
- Double-jointed coupling short
- Double-jointed coupling with sleeve

ROBA®-ES couplings are delivered as un-bored hub design (further processing to be carried out customer-side) or with a finish bore and keyway JS9 (DIN 6885/1). An adjusting screw is located in the hub for axial securement.

Up to Size 38, the hubs are made of aluminium. From Size 42, they are made of steel.

Conventional bores can be delivered from stock.



Page 8

#### ROBA®-ES with clamping hubs

- Single-jointed coupling
- Double-jointed coupling short
- Double-jointed coupling with sleeve

ROBA®-ES couplings with clamping hubs are conceived for fast and safe installation or de-installation. They have no keyway. The tightening torque ( $T_A$ ) on the clamping screws must be maintained in order to ensure reliable, frictionally-locking torque transmission.

Please observe the maximum permitted torques (Page 28).

Up to Size 38, the hubs are made of aluminium. From Size 42, they are made of steel.

The clamping hub can be designed with an additional keyway on request.



Page 10

#### ROBA®-ES with clamping hubs Compact

- Single-jointed coupling
- Double-jointed coupling short
- Double-jointed coupling with sleeve

ROBA®-ES couplings with clamping hubs are conceived for fast and safe installation or de-installation. They have no keyway. The tightening torque ( $T_A$ ) on the clamping screws must be maintained in order to ensure reliable, frictionally-locking torque transmission.

Please observe the maximum permitted torques (Page 28).

The hubs are made of aluminium. The clamping hub can be designed with an additional keyway on request.

Due to the compact construction of the short clamping hubs, the couplings can be used in constricted installation conditions



Page 12

#### ROBA®-ES with split clamping hubs

- Single-jointed coupling
- Double-jointed coupling short
- Double-jointed coupling with sleeve

ROBA®-ES couplings with split clamping hubs are conceived for fast and safe installation or de-installation. Due to the orientation of the half-shells in the same direction, radial assembly/disassembly of the coupling is possible at stationary shaft ends. The tightening torque ( $T_A$ ) on the clamping screws must be maintained in order to ensure reliable, frictionally-locking torque transmission.

Please observe the maximum permitted torques (page 29).

Up to Size 38, the hubs are made of aluminium. From Size 42, they are made of steel. The split clamping hub can be designed with an additional keyway on request.



Page 14

### ROBA®-ES with aluminium shrink disk hubs

- Single-jointed coupling
- Double-jointed coupling short

On this design, the hub body is made of aluminium and the ring of phosphated, annealed steel. The design is constructionally identical to the P-design (page 19). The symmetry, the absence of keyways and radial bores produces an optimum shaft run-out. Therefore, much higher speeds are possible compared to the other hub designs (please observe Diagram 1 “Balancing the shrink disk hub”, page 31).

The torque is transmitted via frictional locking onto the shaft.

Please observe the maximum permitted torques (page 27).



Page 16

### ROBA®-ES with steel shrink disk hubs

- Single-jointed coupling
- Double-jointed coupling short

On this design, the hub body is made of steel (oiled) and the ring of phosphated, annealed steel. This design is available in a standard variant and a variant according to DIN 69002. The DIN variant has an elastomeric element with a central, standardised bore and standardised bore diameters in the hubs. The DIN variant is conceived for use in short bore spindles and multi-spindle heads. Because of the steel hubs, this DIN design combines robustness with precision. This design should be selected in preference to others, in particular on applications with heavily pulsating or alternating loads.

Please observe the maximum permitted torques (page 27).



Page 18

### ROBA®-ES with expansion hub and clamping hub

- Single-jointed coupling

ROBA®-ES couplings with an expansion hub have been designed for frictionally-locking torque transmission onto hollow shafts. The expansion hubs are combined with clamping hubs on the opposite side as a standard measure. Other combinations with other hubs are conceivable.

The stated diameters of the expansion hubs are preferred dimensions.

Other diameters can be requested at *mayr*® power transmission.

Please observe the maximum permitted torques (page 29).



Page 20

## Coupling Dimensioning

Page 22 >

## Technical Explanations

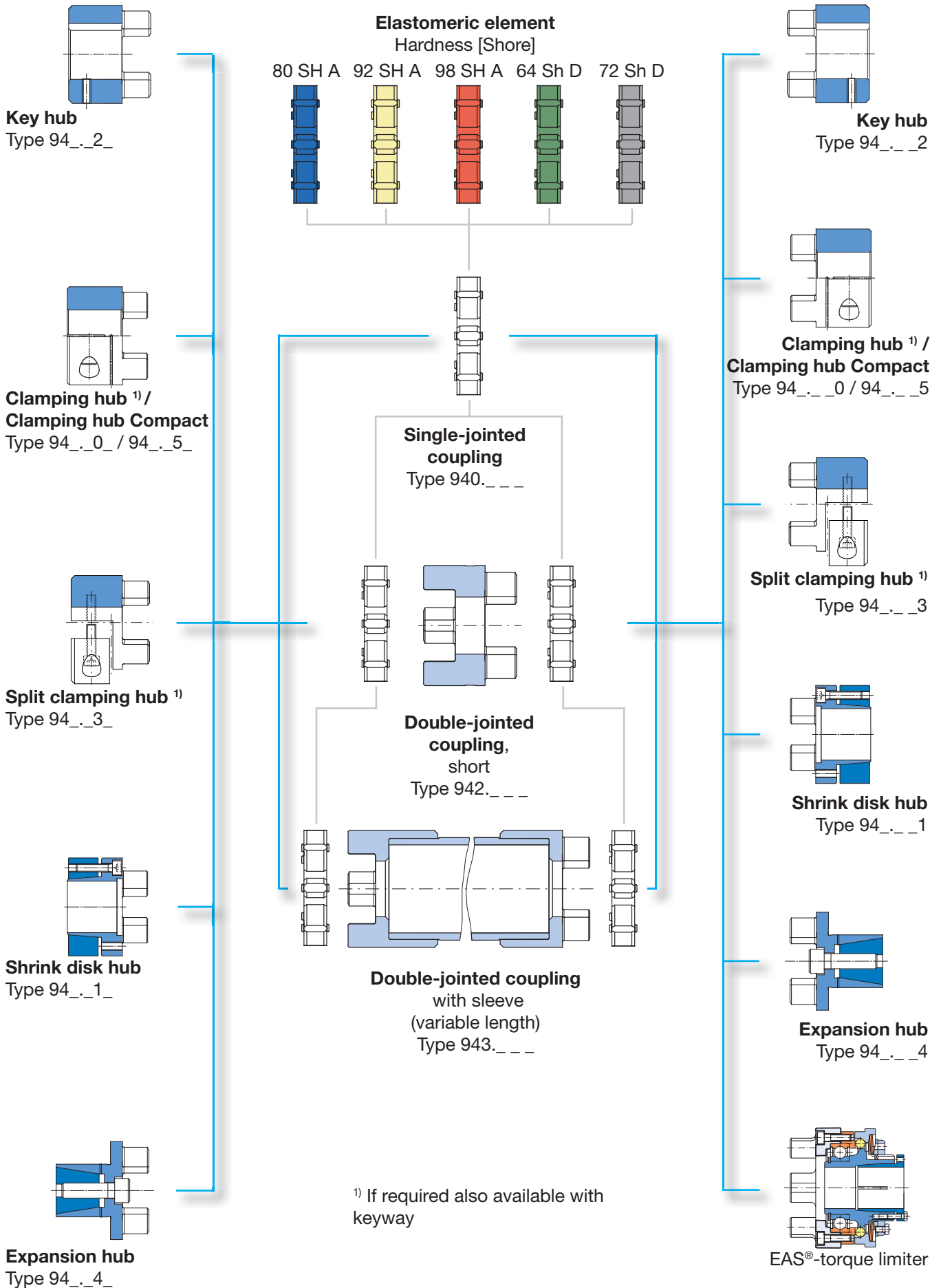
Page 24 >

| Size | Torques                      |                     |                  |                     |                  |                     |                  |                     |                  |                     |
|------|------------------------------|---------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|
|      | Elastomeric element hardness |                     |                  |                     |                  |                     |                  |                     |                  |                     |
|      | 80 Sh A (blue)               |                     | 92 Sh A (yellow) |                     | 98 Sh A (red)    |                     | 64 Sh D (green)  |                     | 72 Sh D (grey)   |                     |
|      | $T_{KN}$<br>[Nm]             | $T_{K max}$<br>[Nm] | $T_{KN}$<br>[Nm] | $T_{K max}$<br>[Nm] | $T_{KN}$<br>[Nm] | $T_{K max}$<br>[Nm] | $T_{KN}$<br>[Nm] | $T_{K max}$<br>[Nm] | $T_{KN}$<br>[Nm] | $T_{K max}$<br>[Nm] |
| 14   | 4                            | 8                   | 8                | 16                  | 13               | 26                  | 16               | 32                  | -                | -                   |
| 19   | 5                            | 10                  | 10               | 20                  | 17               | 34                  | 21               | 42                  | 27               | 54                  |
| 24   | 17                           | 34                  | 35               | 70                  | 60               | 120                 | 75               | 150                 | 95               | 190                 |
| 28   | 46                           | 92                  | 95               | 190                 | 160              | 320                 | 200              | 400                 | 260              | 520                 |
| 38   | 95                           | 190                 | 190              | 380                 | 325              | 650                 | 405              | 810                 | 525              | 1050                |
| 42   | 125                          | 250                 | 265              | 530                 | 450              | 900                 | 560              | 1120                | 725              | 1450                |
| 48   | 150                          | 300                 | 310              | 620                 | 525              | 1050                | 655              | 1310                | 850              | 1700                |
| 55   | 200                          | 400                 | 410              | 820                 | 685              | 1370                | 825              | 1650                | -                | -                   |
| 65   | 450                          | 900                 | 900              | 1800                | 1040             | 2080                | 1250             | 2500                | -                | -                   |

## Technical Explanations (transmittable torques)

Page 27 >

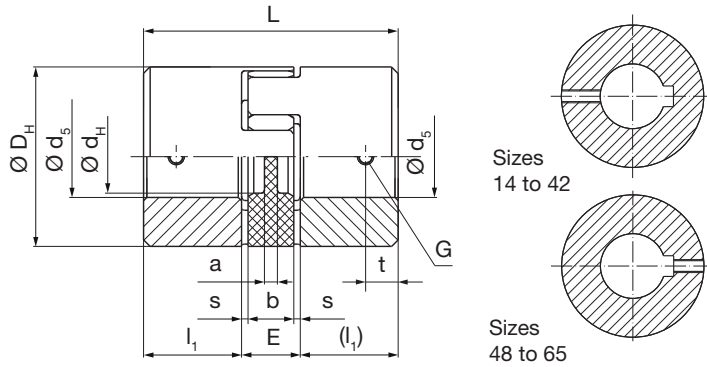
**ROBA®-ES elastomer couplings Type 94\_.\_.\_**



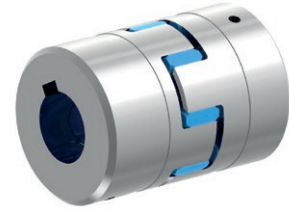
# ROBA®-ES with key hubs

Sizes 14 to 65

## Single-jointed coupling / Type 940.. 22..



The adjusting screw is offset by 180° to the keyway on Sizes 14 to 42 (see Fig. above).



| Technical Data and Main Dimensions |                  |       | Size  |       |       |      |      |      |      |      |      |
|------------------------------------|------------------|-------|-------|-------|-------|------|------|------|------|------|------|
|                                    |                  |       | 14    | 19    | 24    | 28   | 38   | 42   | 48   | 55   | 65   |
| Minimum hub bore <sup>1) 2)</sup>  | $d_5^{H7}_{min}$ | [mm]  | 6     | 6     | 8     | 10   | 12   | 14   | 20   | 20   | 38   |
| Maximum hub bore <sup>1) 2)</sup>  | $d_5^{H7}_{max}$ | [mm]  | 15    | 24    | 28    | 38   | 45   | 55   | 60   | 70   | 80   |
| Maximum speed <sup>3) 4)</sup>     | $n_{max}$        | [rpm] | 19000 | 14000 | 10600 | 8500 | 7100 | 6000 | 5600 | 5000 | 4600 |

### Mass moments of inertia J [10<sup>-3</sup> kgm<sup>2</sup>] <sup>5) 6)</sup>

|                             | Size | 14     | 19     | 24     | 28     | 38    | 42     | 48     | 55     | 65     |
|-----------------------------|------|--------|--------|--------|--------|-------|--------|--------|--------|--------|
| Elastomeric element         |      | 0.0005 | 0.0012 | 0.0067 | 0.0154 | 0.042 | 0.09   | 0.143  | 0.248  | 0.474  |
| Key hub                     |      | 0.0026 | 0.0175 | 0.0781 | 0.169  | 0.498 | 3.093  | 5.173  | 10.096 | 18.524 |
| Single-joint short          |      | 0.0057 | 0.0362 | 0.1629 | 0.3534 | 1.038 | 6.276  | 10.489 | 20.44  | 37.522 |
| Sleeve with $H_s = 1000$ mm |      | 0.075  | 0.27   | 0.74   | 1.33   | 2.42  | 14.33  | 29.7   | 48.94  | 71.43  |
| Sleeve with 1000 mm tube    |      | 0.071  | 0.236  | 0.676  | 1.202  | 1.917 | 10.676 | 24.89  | 41.167 | 54.082 |

### Weights [kg] <sup>5) 6)</sup>

|                             | Size | 14     | 19    | 24    | 28    | 38    | 42    | 48     | 55     | 65     |
|-----------------------------|------|--------|-------|-------|-------|-------|-------|--------|--------|--------|
| Elastomeric element         |      | 0.0048 | 0.007 | 0.019 | 0.037 | 0.054 | 0.081 | 0.104  | 0.149  | 0.216  |
| Key hub                     |      | 0.018  | 0.064 | 0.161 | 0.236 | 0.47  | 2.03  | 2.792  | 4.136  | 5.95   |
| Single-joint short          |      | 0.041  | 0.135 | 0.341 | 0.509 | 0.994 | 4.141 | 5.688  | 8.421  | 12.116 |
| Sleeve with $H_s = 1000$ mm |      | 0.595  | 1.036 | 1.323 | 1.631 | 2.101 | 9.429 | 15.764 | 18.009 | 21.351 |
| Sleeve with 1000 mm tube    |      | 0.574  | 0.86  | 1.22  | 1.477 | 1.705 | 7.383 | 13.561 | 15.193 | 16.622 |

| Dimensions  | Size               |      |      |      |      |      |      |      |      |  |
|-------------|--------------------|------|------|------|------|------|------|------|------|--|
|             | 14                 | 19   | 24   | 28   | 38   | 42   | 48   | 55   | 65   |  |
| a           | 2                  | 4    | 4    | 5    | 5    | 5    | 5    | 9    | 8    |  |
| b           | 10                 | 12   | 14   | 15   | 18   | 20   | 21   | 22   | 26   |  |
| $D_H$       | 30                 | 40   | 55   | 65   | 80   | 95   | 105  | 120  | 135  |  |
| $d_H$       | 10.5               | 18   | 27   | 30   | 38   | 46   | 51   | 60   | 68   |  |
| E           | 13                 | 16   | 18   | 20   | 24   | 26   | 28   | 30   | 35   |  |
| G           | M4                 | M5   | M5   | M6   | M8   | M8   | M8   | M10  | M10  |  |
| L           | 35                 | 66   | 78   | 90   | 114  | 126  | 140  | 160  | 185  |  |
| $L_2$       | 56                 | 92   | 112  | 128  | 158  | 174  | 192  | 218  | 252  |  |
| $L_3$       | dependent on $H_s$ |      |      |      |      |      |      |      |      |  |
| $l_1$       | 11                 | 25   | 30   | 35   | 45   | 50   | 56   | 65   | 75   |  |
| $l_2$       | 34                 | 42   | 52   | 58   | 68   | 74   | 80   | 88   | 102  |  |
| $H_{s,min}$ | 68                 | 87   | 101  | 115  | 143  | 162  | 178  | 200  | 230  |  |
| $H_{s,max}$ | 2000               | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 3000 | 3000 |  |
| s           | 1.5                | 2.0  | 2.0  | 2.5  | 3.0  | 3.0  | 3.5  | 4.0  | 4.5  |  |
| t           | 5                  | 10   | 10   | 15   | 15   | 20   | 25   | 20   | 20   |  |

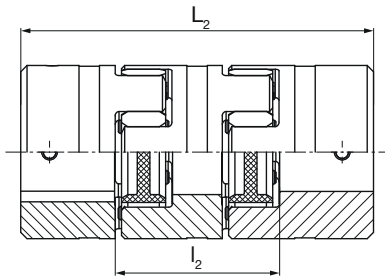
We reserve the right to make dimensional and constructional alterations.

| Stock program | Size |    |    |    |    |
|---------------|------|----|----|----|----|
|               | 14   | 19 | 24 | 28 | 38 |
| Bore          |      |    |    |    |    |
| Ø6            |      |    |    |    |    |
| Ø8            | x    |    |    |    |    |
| Ø9            |      |    |    |    |    |
| Ø10           | x    | x  |    |    |    |
| Ø11           | x    |    |    |    |    |
| Ø12           | x    | x  |    |    |    |
| Ø14           | x    | x  | x  |    |    |
| Ø15           |      | x  | x  |    |    |
| Ø16           |      | x  | x  |    |    |
| Ø17           |      |    |    |    |    |
| Ø18           |      | x  | x  |    |    |
| Ø19           |      | x  | x  | x  |    |
| Ø20           |      | x  | x  | x  | x  |
| Ø22           |      |    |    | x  |    |
| Ø24           |      |    | x  | x  |    |
| Ø25           |      |    | x  | x  | x  |
| Ø28           |      |    |    | x  |    |
| Ø30           |      |    |    | x  | x  |
| Ø32           |      |    |    | x  | x  |
| Ø35           |      |    |    |    | x  |
| Ø38           |      |    |    |    | x  |

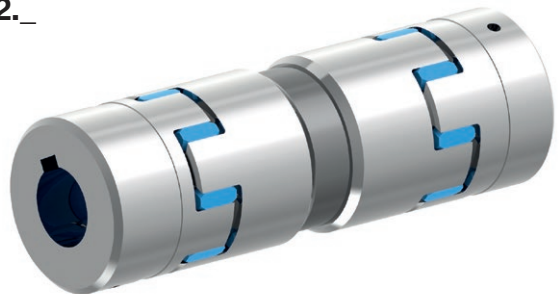
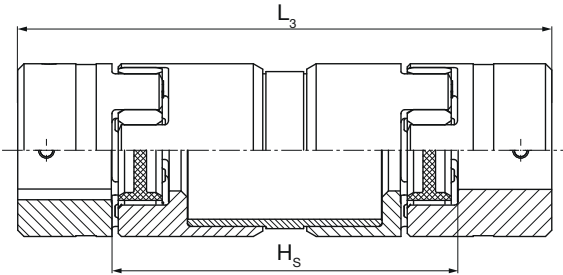
# ROBA®-ES with key hubs

Sizes 14 to 65

## Double-jointed coupling short / Type 942.\_ 22.\_



## Double-jointed coupling with sleeve / Type 943.\_ 22.\_



### Order Number

- 0 Single-jointed coupling
- 2 Double-jointed coupling short
- 3 Double-jointed coupling with sleeve

Sleeve length  
 $H_s$  [mm]

|                  |                                     |                  |        |                                |                   |   |   |  |
|------------------|-------------------------------------|------------------|--------|--------------------------------|-------------------|---|---|--|
| _ / 9            |                                     | 4                | ._ . _ | 2 2 .                          | _ / _ / _ / _ / _ |   |   |  |
| △                |                                     |                  | △      |                                | △                 | △   | △   | △  |
| <b>Size</b>      | <b>Elastomeric element hardness</b> | 98 Sh A (red)    | 0      | Aluminium design up to Size 38 | A                 | <b>Bore <math>\varnothing d_5^{H7}</math></b> (see Table) | <b>Bore <math>\varnothing d_5^{H7}</math></b> (see Table) | <b>Operating speed <math>n_s</math> [rpm]</b> for sleeve |
| 14               |                                     | 92 Sh A (yellow) | 1      | Steel design from Size 42      | F                 |   |   |  |
| to               |                                     | 80 Sh A (blue)   | 5      |                                |                   |   |   |  |
| 65 <sup>7)</sup> |                                     | 64 Sh D (green)  | 6      |                                |                   |   |   |  |
|                  |                                     | 72 Sh D (grey)   | 7      |                                |                   |   |   |  |

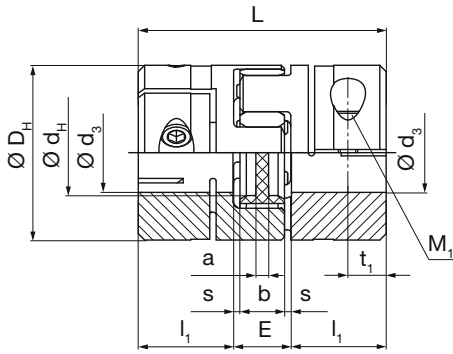
Example: 42 / 940.022.F /  $\varnothing d_5$  30 /  $\varnothing d_5$  30

- 1) Recommended hub / shaft tolerance: H7 / k6
- 2) In order to dimension the shaft-hub connection, the calculation procedure acc. DIN 6892 is to be applied. For the calculation, please take the yield point  $R_p 0.2 = 200 \text{ N/mm}^2$  for aluminium and the yield strength  $R_e = 350 \text{ N/mm}^2$  for steel.
- 3) Also applicable for double-jointed design
- 4) Not valid for designs with sleeve (see diagram: "Permitted speeds for sleeve" on page 26)
- 5) Mass moments of inertia and weights are valid for one elastomeric element
- 6) Mass moments of inertia and weights are valid for maximum bore
- 7) Further Sizes available on request

# ROBA®-ES with clamping hubs

Sizes 14 to 65

## Single-jointed coupling / Type 940.\_ 00.\_



| Technical Data and Main Dimensions |                  |       | Size  |      |      |      |      |      |      |      |      |
|------------------------------------|------------------|-------|-------|------|------|------|------|------|------|------|------|
|                                    |                  |       | 14    | 19   | 24   | 28   | 38   | 42   | 48   | 55   | 65   |
| Minimum hub bore <sup>1) 2)</sup>  | $d_3^{F7}_{min}$ | [mm]  | 6     | 10   | 15   | 19   | 20   | 28   | 35   | 40   | 45   |
| Maximum hub bore <sup>1) 2)</sup>  | $d_3^{F7}_{max}$ | [mm]  | 15    | 20   | 28   | 35   | 45   | 50   | 55   | 70   | 80   |
| Maximum speed <sup>3) 4)</sup>     | $n_{max}$        | [rpm] | 12600 | 9300 | 7000 | 5600 | 4700 | 4000 | 3700 | 3300 | 3000 |
| Tightening torque clamping screws  | $T_A$            | [Nm]  | 1.4   | 10   | 10   | 25   | 25   | 70   | 120  | 120  | 200  |

### Mass moments of inertia J [10<sup>-3</sup> kgm<sup>2</sup>] <sup>5) 6)</sup>

|                             | Size | 14     | 19     | 24     | 28     | 38    | 42     | 48     | 55     | 65     |
|-----------------------------|------|--------|--------|--------|--------|-------|--------|--------|--------|--------|
| Elastomeric element         |      | 0.0005 | 0.0012 | 0.0067 | 0.0154 | 0.042 | 0.09   | 0.143  | 0.248  | 0.474  |
| Clamping hub                |      | 0.0028 | 0.0193 | 0.076  | 0.168  | 0.481 | 3.104  | 5.176  | 9.742  | 17.985 |
| Single-joint short          |      | 0.0061 | 0.0398 | 0.1587 | 0.3514 | 1.004 | 6.298  | 10.495 | 19.732 | 36.444 |
| Sleeve with $H_s = 1000$ mm |      | 0.075  | 0.27   | 0.74   | 1.33   | 2.42  | 14.33  | 29.7   | 48.94  | 71.43  |
| Sleeve with 1000 mm tube    |      | 0.071  | 0.236  | 0.676  | 1.202  | 1.917 | 10.676 | 24.89  | 41.167 | 54.082 |

### Weights [kg] <sup>5) 6)</sup>

|                             | Size | 14     | 19    | 24    | 28    | 38    | 42    | 48     | 55     | 65     |
|-----------------------------|------|--------|-------|-------|-------|-------|-------|--------|--------|--------|
| Elastomeric element         |      | 0.0048 | 0.007 | 0.019 | 0.037 | 0.054 | 0.081 | 0.104  | 0.149  | 0.216  |
| Clamping hub                |      | 0.02   | 0.077 | 0.159 | 0.245 | 0.456 | 2.134 | 2.922  | 4.021  | 5.818  |
| Single-joint short          |      | 0.0448 | 0.161 | 0.337 | 0.527 | 0.966 | 4.349 | 5.948  | 8.191  | 11.852 |
| Sleeve with $H_s = 1000$ mm |      | 0.595  | 1.036 | 1.323 | 1.631 | 2.101 | 9.429 | 15.764 | 18.009 | 21.351 |
| Sleeve with 1000 mm tube    |      | 0.574  | 0.86  | 1.22  | 1.477 | 1.705 | 7.383 | 13.561 | 15.193 | 16.622 |

| Dimensions  | Size               |      |      |      |      |      |      |      |      |  |
|-------------|--------------------|------|------|------|------|------|------|------|------|--|
|             | 14                 | 19   | 24   | 28   | 38   | 42   | 48   | 55   | 65   |  |
| a           | 2                  | 3    | 4    | 5    | 6    | 6    | 5    | 9    | 8    |  |
| b           | 10                 | 12   | 14   | 15   | 18   | 20   | 21   | 22   | 26   |  |
| $D_H$       | 30                 | 40   | 55   | 65   | 80   | 95   | 105  | 120  | 135  |  |
| $D_K$       | 32.2               | 47   | 58.5 | 71   | 83.3 | 98.8 | 108  | 122  | 139  |  |
| $d_H$       | 10.5               | 18   | 27   | 30   | 38.5 | 46   | 51   | 60   | 68   |  |
| E           | 13                 | 16   | 18   | 20   | 24   | 26   | 28   | 30   | 35   |  |
| L           | 35                 | 66   | 78   | 90   | 114  | 126  | 140  | 160  | 185  |  |
| $L_2$       | 56                 | 92   | 112  | 128  | 158  | 174  | 192  | 218  | 252  |  |
| $L_3$       | dependent on $H_s$ |      |      |      |      |      |      |      |      |  |
| $l_1$       | 11                 | 25   | 30   | 35   | 45   | 50   | 56   | 65   | 75   |  |
| $l_2$       | 34                 | 42   | 52   | 58   | 68   | 74   | 80   | 88   | 102  |  |
| $H_{s,min}$ | 68                 | 87   | 101  | 115  | 143  | 162  | 178  | 200  | 230  |  |
| $H_{s,max}$ | 2000               | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 3000 | 3000 |  |
| $M_1$       | M3                 | M6   | M6   | M8   | M8   | M10  | M12  | M12  | M14  |  |
| s           | 1.5                | 2    | 2    | 2.5  | 3    | 3    | 3.5  | 4    | 4.5  |  |
| $t_1$       | 5.5                | 12   | 12   | 13.5 | 20   | 20   | 21   | 26   | 27.5 |  |
| $t_2$       | 11                 | 14   | 21   | 24.5 | 30   | 34   | 36   | 45   | 52   |  |

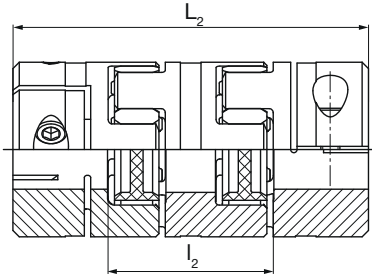
We reserve the right to make dimensional and constructional alterations.

| Stock program | Size |    |    |    |    |    |
|---------------|------|----|----|----|----|----|
|               | Bore | 14 | 19 | 24 | 28 | 38 |
| Ø6            |      |    |    |    |    |    |
| Ø7            |      |    |    |    |    |    |
| Ø8            | x    |    |    |    |    |    |
| Ø9            | x    |    |    |    |    |    |
| Ø10           | x    | x  |    |    |    |    |
| Ø11           | x    | x  |    |    |    |    |
| Ø12           | x    | x  |    |    |    |    |
| Ø14           | x    | x  |    |    |    |    |
| Ø15           | x    | x  | x  |    |    |    |
| Ø16           |      | x  | x  |    |    |    |
| Ø17           |      |    |    |    |    |    |
| Ø18           |      |    | x  |    |    |    |
| Ø19           |      | x  | x  | x  |    |    |
| Ø20           |      | x  | x  | x  |    |    |
| Ø22           |      |    | x  | x  |    |    |
| Ø24           |      |    | x  | x  |    |    |
| Ø25           |      |    | x  | x  | x  |    |
| Ø28           |      |    | x  | x  |    |    |
| Ø30           |      |    |    |    | x  |    |
| Ø32           |      |    |    |    | x  | x  |
| Ø35           |      |    |    |    |    | x  |
| Ø38           |      |    |    |    |    | x  |
| Ø40           |      |    |    |    |    | x  |

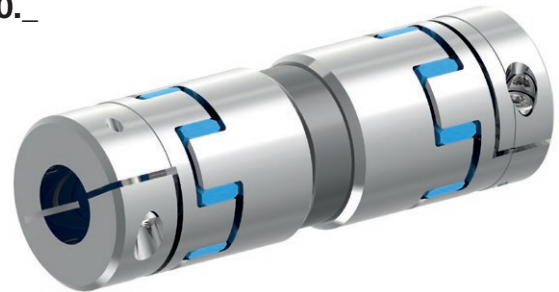
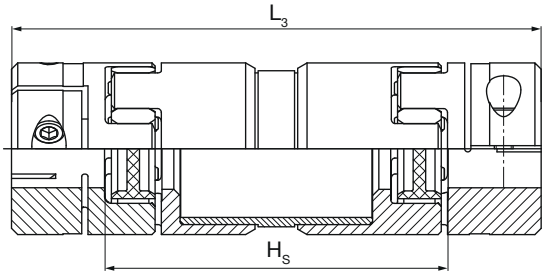
## ROBA<sup>®</sup>-ES with clamping hubs

Sizes 14 to 65

### Double-jointed coupling short / Type 942.\_ 00.\_



### Double-jointed coupling with sleeve / Type 943.\_00.\_



### Order Number

|   |                                     | 0 Single-jointed coupling<br>2 Double-jointed coupling short<br>3 Double-jointed coupling with sleeve |   |                                |   |   |   | Sleeve length<br>H <sub>s</sub> [mm]                     |
|---|-------------------------------------|---|---|--------------------------------|---|---|---|--|
|   |                                     | ▽   |   |                                |   |   |   | ▽  |
|   |                                     | _ / 9 4 _ . _ 0 0 . _ / _ / _ / _ / _ / _   |   |                                |   |   |   |  |
|   |                                     | △   |   | △                              |   | △   |   | △  |
| <b>Size</b><br>14<br>to<br>65 <sup>7)</sup> | <b>Elastomeric element hardness</b> | 98 Sh A (red)   | 0 | Aluminium design up to Size 38 | A | <b>Bore ø d<sub>3</sub><sup>F7</sup></b><br>(see Table) | <b>Bore ø d<sub>3</sub><sup>F7</sup></b><br>(see Table) | <b>Operating speed n<sub>s</sub></b> [rpm]<br>for sleeve |
|   |                                     | 92 Sh A (yellow)  | 1 | Steel design from Size 42      | F |   |   |  |
|   |                                     | 80 Sh A (blue)  | 5 |                                |   |   |   |  |
|   |                                     | 64 Sh D (green)   | 6 |                                |   |   |   |  |
|   |                                     | 72 Sh D (grey)  | 7 |                                |   |   |   |  |

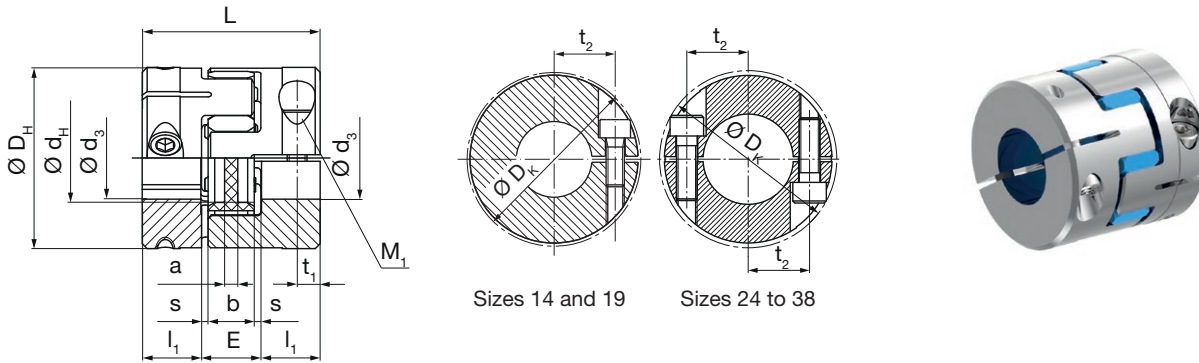
**Example: 42 / 940.000.F / Ød<sub>3</sub> 30 / Ød<sub>3</sub> 30**

- 1) Recommended hub / shaft tolerance: F7 / k6
- 2) Transmittable torques dependent on bore, see page 28.
- 3) Also applicable for double-jointed design
- 4) Not valid for designs with sleeve (see diagram: "Permitted speeds for sleeve" on page 26)
- 5) Mass moments of inertia and weights are valid for one elastomeric element
- 6) Mass moments of inertia and weights are valid for maximum bore
- 7) Further Sizes available on request

# ROBA®-ES with clamping hubs Compact

Sizes 14 to 38

## Single-jointed coupling / Type 940.\_ 55.\_



| Technical Data and Main Dimensions |                  |       | Size  |      |      |      |      |
|------------------------------------|------------------|-------|-------|------|------|------|------|
|                                    |                  |       | 14    | 19   | 24   | 28   | 38   |
| Minimum hub bore <sup>1) 2)</sup>  | $d_3^{F7}_{min}$ | [mm]  | 5     | 8    | 10   | 14   | 15   |
| Maximum hub bore <sup>1) 2)</sup>  | $d_3^{F7}_{max}$ | [mm]  | 12    | 20   | 32   | 35   | 45   |
| Maximum speed <sup>3) 4)</sup>     | $n_{max}$        | [rpm] | 12600 | 9300 | 7000 | 5600 | 4700 |
| Tightening torque clamping screws  | $T_A$            | [Nm]  | 3     | 10   | 10   | 25   | 48   |

### Mass moments of inertia J [10<sup>-3</sup> kgm<sup>2</sup>] <sup>5) 6)</sup>

|                             | Size | 14     | 19     | 24     | 28     | 38    |
|-----------------------------|------|--------|--------|--------|--------|-------|
| Elastomeric element         |      | 0.0005 | 0.0012 | 0.0067 | 0.0154 | 0.042 |
| Clamping hub                |      | 0.0025 | 0.0139 | 0.0493 | 0.1174 | 0.328 |
| Single-joint short          |      | 0.0055 | 0.029  | 0.1053 | 0.2502 | 0.698 |
| Sleeve with $H_s = 1000$ mm |      | 0.075  | 0.27   | 0.74   | 1.33   | 2.42  |
| Sleeve with 1000 mm tube    |      | 0.071  | 0.236  | 0.676  | 1.202  | 1.917 |

### Weights [kg] <sup>5) 6)</sup>

|                             | Size | 14     | 19    | 24    | 28    | 38    |
|-----------------------------|------|--------|-------|-------|-------|-------|
| Elastomeric element         |      | 0.0048 | 0.007 | 0.019 | 0.037 | 0.054 |
| Clamping hub                |      | 0.0192 | 0.055 | 0.098 | 0.173 | 0.311 |
| Single-joint short          |      | 0.0432 | 0.117 | 0.215 | 0.383 | 0.676 |
| Sleeve with $H_s = 1000$ mm |      | 0.595  | 1.036 | 1.323 | 1.631 | 2.101 |
| Sleeve with 1000 mm tube    |      | 0.574  | 0.86  | 1.22  | 1.477 | 1.705 |

| Dimensions  | Size               |      |      |      |       |
|-------------|--------------------|------|------|------|-------|
|             | 14                 | 19   | 24   | 28   | 38    |
| a           | 2                  | 3    | 4    | 5    | 6     |
| b           | 10                 | 12   | 14   | 15   | 18    |
| $D_H$       | 30                 | 40   | 55   | 65   | 80    |
| $D_K$       | 31                 | 46   | 58.5 | 71   | 86    |
| $d_H$       | 10.5               | 18   | 27   | 30   | 38.5  |
| E           | 13                 | 16   | 18   | 20   | 24    |
| L           | 32                 | 50   | 54   | 62   | 76    |
| $L_2$       | 53                 | 76   | 88   | 100  | 120   |
| $L_3$       | dependent on $H_s$ |      |      |      |       |
| $l_1$       | 9.5                | 17   | 18   | 21   | 26    |
| $l_2$       | 34                 | 42   | 52   | 58   | 68    |
| $H_{s,min}$ | 68                 | 87   | 101  | 115  | 143   |
| $H_{s,max}$ | 2000               | 2000 | 2000 | 2000 | 2000  |
| $M_1$       | M4                 | M6   | 2xM6 | 2xM8 | 2xM10 |
| s           | 1.5                | 2    | 2    | 2.5  | 3     |
| $t_1$       | 5                  | 8    | 7    | 9    | 10    |
| $t_2$       | 9.6                | 14   | 21   | 24.5 | 30.5  |

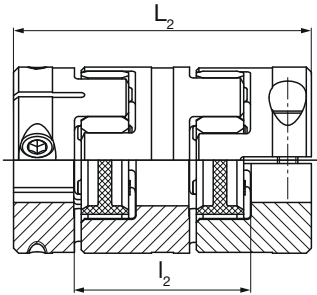
We reserve the right to make dimensional and constructional alterations.

| Stock program | Size |    |    |    |    |    |
|---------------|------|----|----|----|----|----|
|               | Bore | 14 | 19 | 24 | 28 | 38 |
| Ø6            |      |    |    |    |    |    |
| Ø7            |      |    |    |    |    |    |
| Ø8            | x    |    |    |    |    |    |
| Ø9            | x    |    |    |    |    |    |
| Ø10           | x    | x  |    |    |    |    |
| Ø11           | x    | x  |    |    |    |    |
| Ø12           | x    | x  |    |    |    |    |
| Ø14           |      | x  |    |    |    |    |
| Ø15           |      | x  | x  |    |    |    |
| Ø16           |      | x  | x  |    |    |    |
| Ø17           |      |    |    |    |    |    |
| Ø18           |      |    | x  |    |    |    |
| Ø19           |      |    | x  | x  |    |    |
| Ø20           |      |    | x  | x  |    |    |
| Ø22           |      |    | x  | x  |    |    |
| Ø24           |      |    | x  | x  |    |    |
| Ø25           |      |    | x  | x  | x  |    |
| Ø28           |      |    | x  | x  |    |    |
| Ø30           |      |    |    | x  |    |    |
| Ø32           |      |    |    | x  | x  |    |
| Ø35           |      |    |    |    | x  |    |
| Ø38           |      |    |    |    | x  |    |
| Ø40           |      |    |    |    |    | x  |

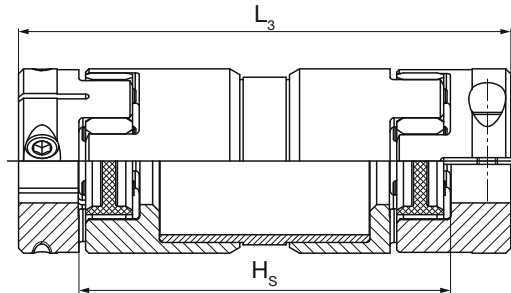
**ROBA<sup>®</sup>-ES with clamping hubs Compact**

**Sizes 14 to 38**

**Double-jointed coupling short / Type 942.\_55.\_**



**Double-jointed coupling with sleeve / Type 943.\_55.\_**

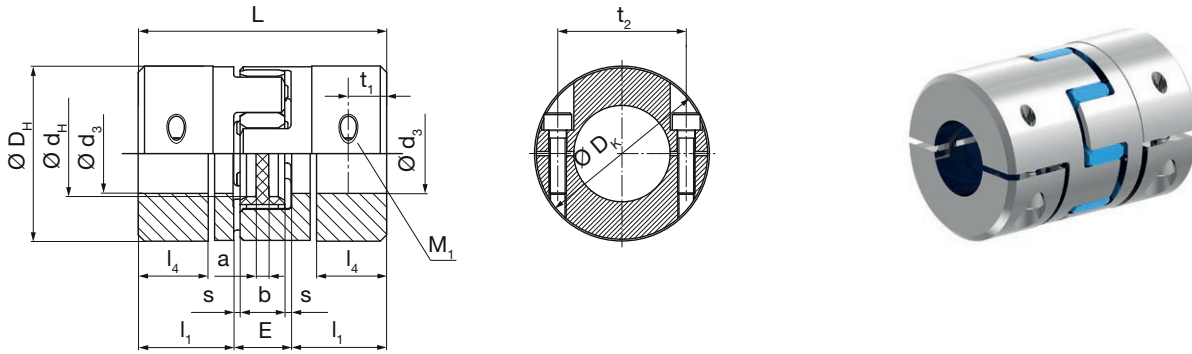


**Order Number**

|  |                                     |  |  |                                   |          |   |   |   |
|--|-------------------------------------|--|--|-----------------------------------|----------|---|---|---|
|  |                                     | <b>0</b> Single-jointed coupling<br><b>2</b> Double-jointed coupling short<br><b>3</b> Double-jointed coupling with sleeve |  |                                   |          |   | <b>Sleeve length</b><br>$H_s$ [mm]                                |   |
|  |                                     | ▼  |  |                                   |          |   | ▼   |   |
|  |                                     | _ / 9 4 _ . _ 5 5 . _ / _ / _ / _ / _  |  |                                   |          |   |   |   |
|  |                                     | ▲  |  |                                   |          |   | ▲   |   |
| <b>Size</b><br><b>14</b><br><b>to</b><br><b>38</b> <sup>7)</sup> | <b>Elastomeric element hardness</b> | 98 Sh A (red)<br>92 Sh A (yellow)<br>80 Sh A (blue)<br>64 Sh D (green)<br>72 Sh D (grey)                                   | <b>0</b><br><b>1</b><br><b>5</b><br><b>6</b><br><b>7</b> | Aluminium design<br>up to Size 38 | <b>A</b> | <b>Bore <math>\varnothing</math></b><br>$d_3^{F7}$<br>(see Table) | <b>Bore <math>\varnothing</math></b><br>$d_3^{F7}$<br>(see Table) | <b>Operating speed</b><br>$n_s$ [rpm]<br>for sleeve |

**Example: 38 / 940.055.A /  $\varnothing d_3$  30 /  $\varnothing d_3$  30**

- 1) Recommended hub / shaft tolerance: F7 / k6
- 2) Transmittable torques dependent on bore, see page 28.
- 3) Also applicable for double-jointed design
- 4) Not valid for designs with sleeve (see diagram: "Permitted speeds for sleeve" on page 26)
- 5) Mass moments of inertia and weights are valid for one elastomeric element
- 6) Mass moments of inertia and weights are valid for maximum bore
- 7) Further Sizes available on request

**ROBA®-ES with split clamping hubs**
**Sizes 14 to 65**
**Single-jointed coupling / Type 940.\_ 33.\_**


| Technical Data and Main Dimensions |                  |       | Size  |      |      |      |      |      |      |      |      |
|------------------------------------|------------------|-------|-------|------|------|------|------|------|------|------|------|
|                                    |                  |       | 14    | 19   | 24   | 28   | 38   | 42   | 48   | 55   | 65   |
| Minimum hub bore <sup>1) 2)</sup>  | $d_3^{H7}_{min}$ | [mm]  | 8     | 8    | 10   | 14   | 18   | 22   | 22   | 40   | 45   |
| Maximum hub bore <sup>1) 2)</sup>  | $d_3^{H7}_{max}$ | [mm]  | 15    | 20   | 28   | 35   | 45   | 50   | 55   | 70   | 80   |
| Maximum speed <sup>3) 4)</sup>     | $n_{max}$        | [rpm] | 12600 | 9300 | 7000 | 5600 | 4700 | 4000 | 3700 | 3300 | 3000 |
| Tightening torque clamping screws  | $T_A$            | [Nm]  | 1.4   | 10   | 10   | 25   | 25   | 48   | 84   | 84   | 84   |

**Mass moments of inertia J [10<sup>-3</sup> kgm<sup>2</sup>] <sup>5) 6)</sup>**

|                             | Size | 14     | 19     | 24     | 28     | 38     | 42     | 48     | 55     | 65     |
|-----------------------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Elastomeric element         |      | 0.0005 | 0.0012 | 0.0067 | 0.0154 | 0.042  | 0.09   | 0.143  | 0.248  | 0.474  |
| Split clamping hub          |      | 0.0041 | 0.0193 | 0.077  | 0.176  | 0.5003 | 3.045  | 5.051  | 9.536  | 17.693 |
| Single-joint short          |      | 0.0087 | 0.0398 | 0.1607 | 0.3674 | 1.0426 | 6.18   | 10.245 | 19.32  | 35.86  |
| Sleeve with $H_s = 1000$ mm |      | 0.075  | 0.27   | 0.74   | 1.33   | 2.42   | 14.33  | 29.7   | 48.94  | 71.43  |
| Sleeve with 1000 mm tube    |      | 0.071  | 0.236  | 0.676  | 1.202  | 1.917  | 10.676 | 24.89  | 41.167 | 54.082 |

**Weights [kg] <sup>5) 6)</sup>**

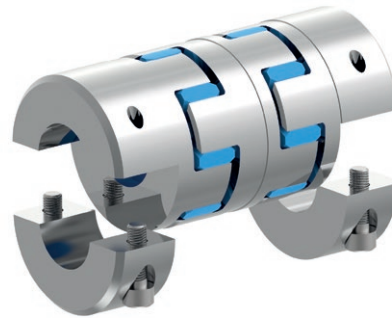
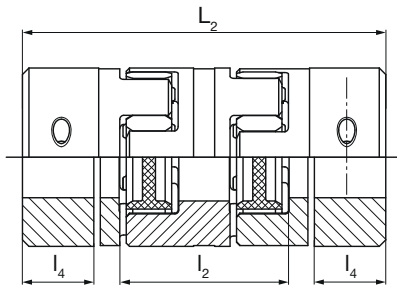
|                             | Size | 14     | 19    | 24    | 28    | 38    | 42    | 48     | 55     | 65     |
|-----------------------------|------|--------|-------|-------|-------|-------|-------|--------|--------|--------|
| Elastomeric element         |      | 0.0048 | 0.007 | 0.019 | 0.037 | 0.054 | 0.081 | 0.104  | 0.149  | 0.216  |
| Split clamping hub          |      | 0.0294 | 0.076 | 0.16  | 0.258 | 0.475 | 2.104 | 2.867  | 3.95   | 5.737  |
| Single-joint short          |      | 0.0636 | 0.159 | 0.339 | 0.553 | 1.004 | 4.289 | 5.838  | 8.049  | 11.69  |
| Sleeve with $H_s = 1000$ mm |      | 0.595  | 1.036 | 1.323 | 1.631 | 2.101 | 9.429 | 15.764 | 18.009 | 21.351 |
| Sleeve with 1000 mm tube    |      | 0.574  | 0.86  | 1.22  | 1.477 | 1.705 | 7.383 | 13.561 | 15.193 | 16.622 |

| Dimensions               | Size                        |      |      |      |      |      |       |      |      |  |
|--------------------------|-----------------------------|------|------|------|------|------|-------|------|------|--|
|                          | 14                          | 19   | 24   | 28   | 38   | 42   | 48    | 55   | 65   |  |
| <b>a</b>                 | 2                           | 3    | 4    | 5    | 6    | 6    | 5     | 9    | 8    |  |
| <b>b</b>                 | 10                          | 12   | 14   | 15   | 18   | 20   | 21    | 22   | 26   |  |
| <b>D<sub>H</sub></b>     | 30                          | 40   | 55   | 65   | 80   | 95   | 105   | 120  | 135  |  |
| <b>D<sub>K</sub></b>     | 32.2                        | 47   | 58.5 | 71   | 83   | 99   | 106.5 | 122  | 136  |  |
| <b>d<sub>H</sub></b>     | 10.5                        | 18   | 27   | 30   | 38.5 | 46   | 51    | 60   | 68   |  |
| <b>E</b>                 | 13                          | 16   | 18   | 20   | 24   | 26   | 28    | 30   | 35   |  |
| <b>L</b>                 | 50                          | 66   | 78   | 90   | 114  | 126  | 140   | 160  | 185  |  |
| <b>L<sub>2</sub></b>     | 71                          | 92   | 112  | 128  | 158  | 174  | 192   | 218  | 252  |  |
| <b>L<sub>3</sub></b>     | dependent on L <sub>R</sub> |      |      |      |      |      |       |      |      |  |
| <b>L<sub>R min</sub></b> | 76.5                        | 103  | 117  | 133  | 169  | 184  | 204   | 223  | 267  |  |
| <b>L<sub>R max</sub></b> | 2008.5                      | 2016 | 2016 | 2018 | 2026 | 2022 | 2026  | 3023 | 3037 |  |
| <b>l<sub>1</sub></b>     | 18.5                        | 25   | 30   | 35   | 45   | 50   | 56    | 65   | 75   |  |
| <b>l<sub>2</sub></b>     | 34                          | 42   | 52   | 58   | 68   | 74   | 80    | 88   | 102  |  |
| <b>H<sub>S min</sub></b> | 68                          | 87   | 101  | 115  | 143  | 162  | 178   | 200  | 230  |  |
| <b>H<sub>S max</sub></b> | 2000                        | 2000 | 2000 | 2000 | 2000 | 2000 | 2000  | 3000 | 3000 |  |
| <b>l<sub>4</sub></b>     | 14.25                       | 17   | 22   | 26   | 32   | 39   | 43    | 53.5 | 56.5 |  |
| <b>M<sub>1</sub></b>     | M3                          | M6   | M6   | M8   | M8   | M10  | M12   | M12  | M12  |  |
| <b>s</b>                 | 1.5                         | 2    | 2    | 2.5  | 3    | 3    | 3.5   | 4    | 4.5  |  |
| <b>t<sub>1</sub></b>     | 7                           | 8.5  | 12   | 13.5 | 16   | 20   | 22    | 26   | 27.5 |  |
| <b>t<sub>2</sub></b>     | 22                          | 28   | 42   | 49   | 60   | 72   | 72    | 90   | 104  |  |

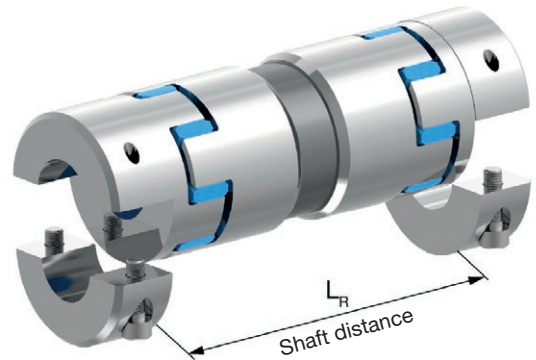
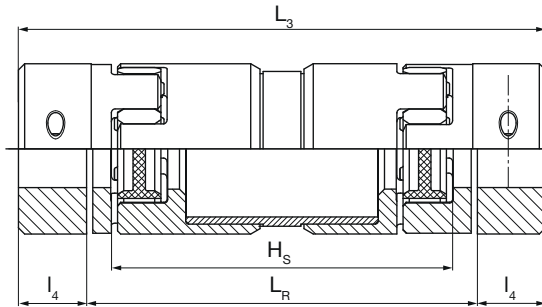
## ROBA<sup>®</sup>-ES with split clamping hubs

Sizes 14 to 65

### Double-jointed coupling short / Type 942.\_33.\_



### Double-jointed coupling with sleeve / Type 943.\_33.\_



### Order Number

- 0 Single-jointed coupling
- 2 Double-jointed coupling short
- 3 Double-jointed coupling with sleeve

Shaft distance  
 $L_R$  [mm]

|                               |                                     |                  |           |                                |   |   |   |  |
|-------------------------------|-------------------------------------|------------------|-----------|--------------------------------|---|---|---|--|
| ___ / 9                       |                                     | 4                | ___ . ___ | 3                              | 3 | ___ / ___ / ___ / ___ / ___                               |   |  |
| ▲                             |                                     |                  | ▲         |                                |   | ▲   | ▲   | ▲  |
| <b>Size</b>                   | <b>Elastomeric element hardness</b> | 98 Sh A (red)    | <b>0</b>  | Aluminium design up to Size 38 | A | <b>Bore <math>\varnothing d_3^{H7}</math></b> (see Table) | <b>Bore <math>\varnothing d_3^{H7}</math></b> (see Table) | <b>Operating speed <math>n_s</math> [rpm]</b> for sleeve |
| <b>14 to 65</b> <sup>7)</sup> |                                     | 92 Sh A (yellow) | <b>1</b>  | Steel design from Size 42      | F |   |   |  |
|                               |                                     | 80 Sh A (blue)   | <b>5</b>  |                                |   |   |   |  |
|                               |                                     | 64 Sh D (green)  | <b>6</b>  |                                |   |   |   |  |
|                               |                                     | 72 Sh D (grey)   | <b>7</b>  |                                |   |   |   |  |

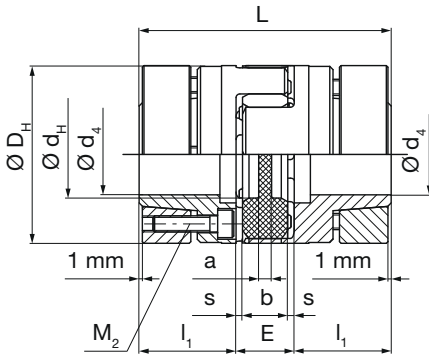
**Example: 42 / 940.033.F /  $\varnothing d_3$  30 /  $\varnothing d_3$  30**

- 1) Recommended hub / shaft tolerance: H7 / g6
- 2) Transmittable torques dependent on bore, see page 29.
- 3) Also applicable for double-jointed design
- 4) Not valid for designs with sleeve (see diagram: "Permitted speeds for sleeve" on page 26)
- 5) Mass moments of inertia and weights are valid for one elastomeric element
- 6) Mass moments of inertia and weights are valid for maximum bore
- 7) Further Sizes available on request

# ROBA®-ES with aluminium shrink disk hubs

Sizes 14 to 38

## Single-jointed coupling / Type 940.\_ 11.A



| Technical Data and Main Dimensions |                  |       | Size  |       |       |       |       |
|------------------------------------|------------------|-------|-------|-------|-------|-------|-------|
|                                    |                  |       | 14    | 19    | 24    | 28    | 38    |
| Minimum hub bore <sup>1) 2)</sup>  | $d_4^{H7}_{min}$ | [mm]  | 6     | 10    | 15    | 19    | 20    |
| Maximum hub bore <sup>1) 2)</sup>  | $d_4^{H7}_{max}$ | [mm]  | 14    | 20    | 28    | 38    | 45    |
| Maximum speed <sup>3)</sup>        | $n_{max}$        | [rpm] | 28000 | 21000 | 15500 | 13200 | 10500 |
| Tightening torque clamping screws  | $T_A$            | [Nm]  | 1.3   | 3     | 6     | 6     | 10    |

### Mass moments of inertia J [ $10^{-3} \text{ kgm}^2$ ] <sup>4) 5)</sup>

|                     | Size | 14     | 19     | 24     | 28     | 38    |
|---------------------|------|--------|--------|--------|--------|-------|
| Elastomeric element |      | 0.0005 | 0.0012 | 0.0067 | 0.0154 | 0.042 |
| Shrink disk hub     |      | 0.0065 | 0.0313 | 0.134  | 0.304  | 0.929 |
| Single-joint short  |      | 0.0135 | 0.0638 | 0.2747 | 0.6234 | 1.9   |

### Weights [kg] <sup>4) 5)</sup>

|                     | Size | 14     | 19    | 24    | 28    | 38    |
|---------------------|------|--------|-------|-------|-------|-------|
| Elastomeric element |      | 0.0048 | 0.007 | 0.019 | 0.037 | 0.054 |
| Shrink disk hub     |      | 0.046  | 0.12  | 0.271 | 0.412 | 0.852 |
| Single-joint short  |      | 0.0968 | 0.247 | 0.561 | 0.861 | 1.758 |

| Dimensions | Size |      |      |      |      |
|------------|------|------|------|------|------|
|            | 14   | 19   | 24   | 28   | 38   |
| a          | 2    | 3    | 4    | 5    | 6    |
| b          | 10   | 12   | 14   | 15   | 18   |
| $D_H$      | 30   | 40   | 55   | 65   | 80   |
| $d_H$      | 10.5 | 18   | 27   | 30   | 38.5 |
| E          | 13   | 16   | 18   | 20   | 24   |
| L          | 50   | 66   | 78   | 90   | 114  |
| $L_2$      | 71   | 92   | 112  | 128  | 158  |
| $l_1$      | 18.5 | 25   | 30   | 35   | 45   |
| $l_2$      | 34   | 42   | 52   | 58   | 68   |
| $M_2$      | 4xM3 | 6xM4 | 4xM5 | 8xM5 | 8xM6 |
| s          | 1.5  | 2    | 2    | 2.5  | 3    |

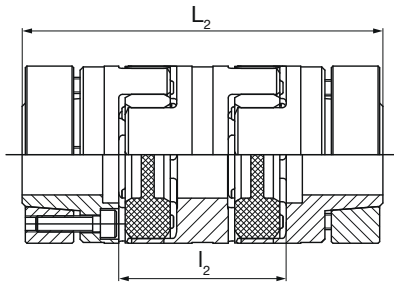
We reserve the right to make dimensional and constructional alterations.

| Stock program | Size |    |    |    |    |
|---------------|------|----|----|----|----|
|               | 14   | 19 | 24 | 28 | 38 |
| Bore          |      |    |    |    |    |
| Ø10           | x    |    |    |    |    |
| Ø11           | x    |    |    |    |    |
| Ø12           | x    | x  |    |    |    |
| Ø14           | x    | x  |    |    |    |
| Ø15           |      | x  | x  |    |    |
| Ø16           |      | x  | x  |    |    |
| Ø18           |      |    | x  |    |    |
| Ø19           |      | x  | x  |    |    |
| Ø20           |      | x  | x  | x  |    |
| Ø22           |      |    | x  | x  |    |
| Ø24           |      |    | x  | x  | x  |
| Ø25           |      |    | x  | x  | x  |
| Ø28           |      |    | x  | x  | x  |
| Ø30           |      |    |    | x  | x  |
| Ø32           |      |    |    | x  | x  |
| Ø35           |      |    |    | x  | x  |
| Ø38           |      |    |    |    | x  |
| Ø40           |      |    |    |    |    |

## ROBA<sup>®</sup>-ES with aluminium shrink disk hubs

Sizes 14 to 38

### Double-jointed coupling short / Type 942.\_ 11.A



### Order Number

- 0 Single-jointed coupling
- 2 Double-jointed coupling short

|                        |                                     |                  |          |                  |   |                                 |                                 |             |
|------------------------|-------------------------------------|------------------|----------|------------------|---|---------------------------------|---------------------------------|-------------|
| _ / 9                  |                                     | 4                | _ . _    |                  | 1 | 1                               | _ / _ / _                       |             |
| △                      |                                     |                  | △        |                  |   |                                 | △ △ △                           |             |
| <b>Size</b>            | <b>Elastomeric element hardness</b> | 98 Sh A (red)    | <b>0</b> | Aluminium design | A | <b>Bore <math>\sigma</math></b> | <b>Bore <math>\sigma</math></b> |             |
| <b>14</b>              |                                     | 92 Sh A (yellow) | <b>1</b> |                  |   | <b><math>d_4^{H7}</math></b>    | <b><math>d_4^{H7}</math></b>    |             |
| <b>to</b>              |                                     | 80 Sh A (blue)   | <b>5</b> |                  |   |                                 |                                 |             |
| <b>38<sup>6)</sup></b> |                                     | 64 Sh D (green)  | <b>6</b> |                  |   |                                 |                                 |             |
|                        |                                     | 72 Sh D (grey)   | <b>7</b> |                  |   |                                 |                                 | (see Table) |

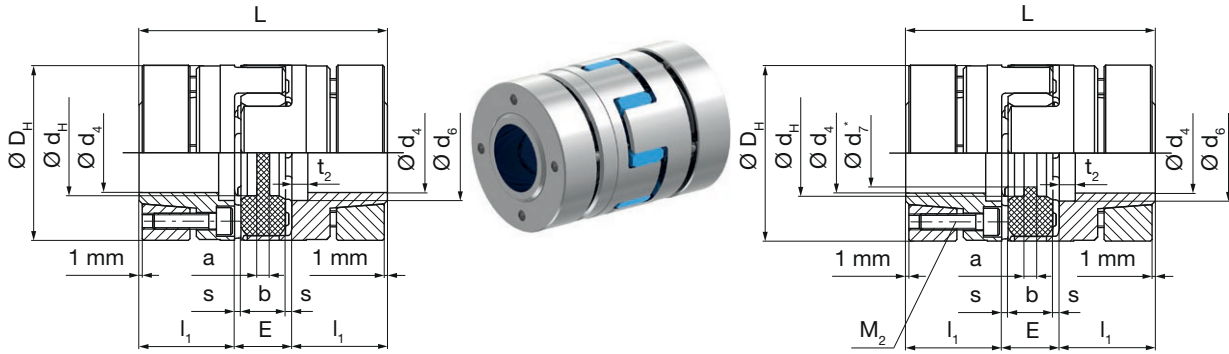
**Example: 38 / 940.011.A /  $\sigma d_4$  30 /  $\sigma d_4$  30**

- 1) Recommended hub / shaft tolerance: H7 / k6
- 2) Transmittable torques dependent on bore, see page 27.
- 3) Also applicable for double-jointed design
- 4) Mass moments of inertia and weights are valid for one elastomeric element
- 5) Mass moments of inertia and weights are valid for maximum bore
- 6) Further Sizes available on request

# ROBA®-ES with steel shrink disk hubs

Sizes 14-32 to 65

## Single-jointed coupling / Type 940.\_11.\_



Type 940.\_11.P – Sizes 14 to 38  
Type 940.\_11.F – Sizes 42 to 65

Type 940.011.P  
Sizes 14-32 to 28 acc. DIN 69002

| Technical Data and Main Dimensions |                    |                  | Size  |         |       |       |       |       |       |       |      |      |      |      |
|------------------------------------|--------------------|------------------|-------|---------|-------|-------|-------|-------|-------|-------|------|------|------|------|
|                                    |                    |                  | 14-32 | 19-37.5 | 19    | 24-50 | 24    | 28    | 38    | 42    | 48   | 55   | 65   |      |
| Minimum hub bore <sup>1)2)</sup>   | d <sub>4 min</sub> | [mm]             | 6     | 10      | 10    | 15    | 16    | 19    | 22    | 28    | 35   | 40   | 45   |      |
| Maximum hub bore <sup>1)2)</sup>   | d <sub>4 max</sub> | [mm]             | 14    | 16      | 20    | 24    | 28    | 38    | 45    | 50    | 60   | 70   | 75   |      |
| DIN-bore <sup>3)</sup>             | d <sub>4</sub>     | [mm]             | 14    | 16      | 19    | 24    | 25    | 35    | -     | -     | -    | -    | -    |      |
| Maximum speed                      | Single-joint       | n <sub>max</sub> | [rpm] | 28000   | 21000 | 21000 | 15500 | 15500 | 13200 | 10500 | 9000 | 8000 | 6300 | 5600 |
|                                    | Double-joint short | n <sub>max</sub> | [rpm] | -       | -     | -     | -     | -     | -     | -     | 9000 | 8000 | 6300 | 5600 |
| Tightening torque clamping screws  | T <sub>A</sub>     | [Nm]             | 1.3   | 3.0     | 3.0   | 6.0   | 6.0   | 6.0   | 10    | 30    | 52   | 58   | 100  |      |

## Mass moments of inertia J [10<sup>-3</sup> kgm<sup>2</sup>] <sup>4)5)</sup>

|                     | Size | 14-32  | 19-37.5 | 19     | 24-50  | 24     | 28     | 38    | 42    | 48    | 55     | 65     |
|---------------------|------|--------|---------|--------|--------|--------|--------|-------|-------|-------|--------|--------|
| Elastomeric element |      | 0.0005 | 0.0012  | 0.0012 | 0.0067 | 0.0067 | 0.0154 | 0.042 | 0.09  | 0.143 | 0.248  | 0.474  |
| Shrink disk hub     |      | 0.0128 | 0.0368  | 0.0471 | 0.136  | 0.202  | 0.433  | 1.332 | 2.948 | 4.809 | 9.099  | 17.287 |
| Single-joint short  |      | 0.0261 | 0.0748  | 0.0954 | 0.2787 | 0.4107 | 0.8814 | 2.706 | 5.986 | 9.761 | 18.446 | 35.048 |

## Weights [kg] <sup>4)5)</sup>

|                     | Size | 14-32  | 19-37.5 | 19    | 24-50 | 24    | 28    | 38    | 42    | 48    | 55    | 65     |
|---------------------|------|--------|---------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Elastomeric element |      | 0.0048 | 0.007   | 0.007 | 0.019 | 0.019 | 0.037 | 0.054 | 0.081 | 0.104 | 0.149 | 0.216  |
| Shrink disk hub     |      | 0.086  | 0.174   | 0.185 | 0.348 | 0.418 | 0.606 | 1.256 | 2.022 | 2.62  | 3.754 | 5.766  |
| Single-joint short  |      | 0.1768 | 0.355   | 0.377 | 0.715 | 0.855 | 1.249 | 2.566 | 4.125 | 5.344 | 7.657 | 11.748 |

| Dimen-<br>sions              | Size   |         |        |        |        |        |        |        |         |         |         |
|------------------------------|--------|---------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
|                              | 14-32  | 19-37.5 | 19     | 24-50  | 24     | 28     | 38     | 42     | 48      | 55      | 65      |
| a                            | 2      | 4       | 4      | 4      | 4      | 5      | 5      | 5      | 5       | 9       | 8       |
| b                            | 10     | 12      | 12     | 14     | 14     | 15     | 18     | 20     | 21      | 22      | 26      |
| D <sub>H</sub>               | 32     | 37.5    | 40     | 50     | 55     | 65     | 80     | 95     | 105     | 120     | 135     |
| d <sub>H</sub>               | 10.5   | 18      | 18     | 27     | 27     | 30     | 38     | 46     | 51      | 60      | 68      |
| d <sub>6</sub>               | 17     | 19      | 22     | 29     | 30     | 40     | 46     | 55     | 60      | 72      | 77      |
| d <sub>7</sub> <sup>3)</sup> | 8.5    | 9.5     | 9.5    | 12.5   | 12.5   | 14.5   | -      | -      | -       | -       | -       |
| E                            | 13     | 16      | 16     | 18     | 18     | 20     | 24     | 26     | 28      | 30      | 35      |
| L                            | 50     | 66      | 66     | 78     | 78     | 90     | 114    | 126    | 140     | 160     | 185     |
| L <sub>2</sub>               | -      | -       | -      | -      | -      | -      | -      | 174    | 192     | 218     | 252     |
| l <sub>1</sub>               | 18.5   | 25      | 25     | 30     | 30     | 35     | 45     | 50     | 56      | 65      | 75      |
| l <sub>2</sub>               | -      | -       | -      | -      | -      | -      | -      | 74     | 80      | 88      | 102     |
| M <sub>2</sub>               | 4 x M3 | 6 x M4  | 6 x M4 | 4 x M5 | 4 x M5 | 8 x M5 | 8 x M6 | 4 x M8 | 4 x M10 | 4 x M10 | 4 x M12 |
| s                            | 1.5    | 2.0     | 2.0    | 2.0    | 2.0    | 2.5    | 3.0    | 3.0    | 3.5     | 4.0     | 4.5     |
| t <sub>2</sub>               | 3      | 4       | 4      | 5      | 5      | 5      | 5      | 5      | 6       | 7       | 7       |

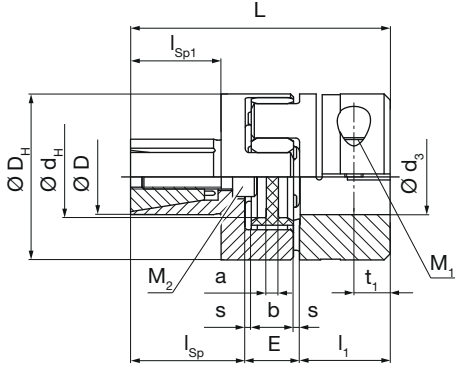
We reserve the right to make dimensional and constructional alterations.



# ROBA®-ES with expansion hub and clamping hub

Sizes 14 to 28

## Single-jointed coupling / Type 940.\_ 04.\_



| Technical Data and Main Dimensions |                  |       | Size  |      |      |      |
|------------------------------------|------------------|-------|-------|------|------|------|
|                                    |                  |       | 14    | 19   | 24   | 28   |
| Minimum hub bore <sup>1) 2)</sup>  | $d_3^{F7_{min}}$ | [mm]  | 6     | 6    | 8    | 10   |
| Maximum hub bore <sup>1) 2)</sup>  | $d_3^{F7_{max}}$ | [mm]  | 15    | 20   | 28   | 35   |
| Diameter expansion hub             | $D_{h7}$         | [mm]  | 12    | 20   | 25   | 35   |
| Maximum speed                      | $n_{max}$        | [rpm] | 12600 | 9300 | 7000 | 5600 |
| Tightening torque $M_2$            | $T_A$            | [Nm]  | 5.8   | 10.1 | 24   | 48   |

### Mass moments of inertia J [ $10^{-3} \text{ kgm}^2$ ] <sup>3) 4)</sup>

|                     | Size | 14     | 19     | 24     | 28     |
|---------------------|------|--------|--------|--------|--------|
| Elastomeric element |      | 0.0005 | 0.0012 | 0.0067 | 0.0154 |
| Clamping hub        |      | 0.0028 | 0.0193 | 0.076  | 0.168  |
| Expansion hub       |      | 0.0019 | 0.0097 | 0.043  | 0.081  |
| Single-joint short  |      | 0.0052 | 0.0302 | 0.1257 | 0.2644 |

### Weights [kg] <sup>3) 4)</sup>

|                     | Size | 14     | 19    | 24    | 28    |
|---------------------|------|--------|-------|-------|-------|
| Elastomeric element |      | 0.0048 | 0.007 | 0.019 | 0.037 |
| Clamping hub        |      | 0.02   | 0.076 | 0.159 | 0.245 |
| Expansion hub       |      | 0.023  | 0.071 | 0.188 | 0.286 |
| Single-joint short  |      | 0.0478 | 0.154 | 0.366 | 0.568 |

| Dimensions | Size |    |      |      |
|------------|------|----|------|------|
|            | 14   | 19 | 24   | 28   |
| a          | 2    | 3  | 4    | 5    |
| b          | 10   | 12 | 14   | 15   |
| $D_H$      | 30   | 40 | 55   | 65   |
| $D_K$      | 32.2 | 47 | 58.5 | 71   |
| $d_H$      | 10.5 | 18 | 27   | 30   |
| E          | 13   | 16 | 18   | 20   |
| L          | 42.5 | 69 | 86   | 99   |
| $l_1$      | 11   | 25 | 30   | 35   |
| $l_{Sp}$   | 18.5 | 28 | 38   | 44   |
| $l_{Sp1}$  | 12.5 | 20 | 30   | 36   |
| $M_1$      | M3   | M6 | M6   | M8   |
| $M_2$      | M5   | M6 | M8   | M10  |
| s          | 1.5  | 2  | 2    | 2.5  |
| $t_1$      | 5.5  | 12 | 12   | 13.5 |

## Order Number

0 Single-jointed coupling

|                                      |                                     |                  |          |                  |          |                         |                                   |
|--------------------------------------|-------------------------------------|------------------|----------|------------------|----------|-------------------------|-----------------------------------|
| <p>— / 9 4 — . — 0 4 . — / — / —</p> |                                     |                  |          |                  |          |                         |                                   |
| △                                    |                                     |                  | △        |                  | △        | △                       | △                                 |
| <b>Size</b>                          | <b>Elastomeric element hardness</b> | 98 Sh A (red)    | <b>0</b> | Aluminium design | <b>A</b> | <b>∅ D<sub>h7</sub></b> | <b>Bore ∅</b>                     |
| <b>14</b>                            |                                     | 92 Sh A (yellow) | <b>1</b> |                  |          | (see Table)             | <b>d<sub>3</sub><sup>F7</sup></b> |
| <b>to</b>                            |                                     | 80 Sh A (blue)   | <b>5</b> |                  |          |                         | (see Table)                       |
| <b>28<sup>5)</sup></b>               |                                     | 64 Sh D (green)  | <b>6</b> |                  |          |                         |                                   |
|                                      |                                     | 72 Sh D (grey)   | <b>7</b> |                  |          |                         |                                   |

**Example: 28 / 940.004.A / ∅D 35 / ∅d<sub>3</sub> 30**

- 1) Recommended fit connection for expansion hub: H7 / h7
- 2) Transmittable torques dependent on bore, see page 29.
- 3) Mass moments of inertia and weights are valid for one elastomeric element
- 4) Mass moments of inertia and weights are valid for maximum bore
- 5) Further Sizes available on request

## ROBA®-ES Coupling Dimensioning

### 1. Approximate calculation of the coupling torque:

1.1.  $T_N$  from the nominal power

$$T_N = \frac{9550 \times P_{AN/LN}}{n}$$

1.2. Dynamic torques  $T_S$  and  $T_W$  (5.1 and 5.2):

Drive-side excitation:

Peak torque:  $T_S = T_{AS} \times \frac{J_L}{J_A + J_L} \times S_A$

Alternating torque:  $T_W = T_{AW} \times \frac{J_L}{J_A + J_L} \times V_R$

Load-side excitation:

Peak torque:  $T_S = T_{LS} \times \frac{J_A}{J_A + J_L} \times S_L$

Alternating torque:  $T_W = T_{LW} \times \frac{J_A}{J_A + J_L} \times V_R$

### 2. Comparison of torques occurring in the coupling with the permitted torques

The coupling must be dimensioned so that the loads occurring do not exceed the permitted values in any operating state.

2.1. Load due to nominal torque

$$T_{KN} \geq T_N \times S_\delta$$

2.2. Load due to torque impacts (5.3)

$$T_{Kmax} \geq T_S \times S_Z \times S_\delta + T_N \times S_\delta$$

2.3. Load due to resonance passing through (5.4)

$$T_{Kmax} \geq T_S \times S_Z \times S_\delta \times V_R + T_N \times S_\delta$$

2.4. Load due to constantly alternating torque – cycle operation (5.5 and 5.6)

Permitted alternating torque on coupling:

$$T_{KW} = 0.25 \times T_{KN} \text{ (for aluminium hubs)}$$

$$T_{KW} = 0.35 \times T_{KN} \text{ (for steel hubs)}$$

$$T_{KW} \geq T_W \times S_\delta \times S_f$$

### 3. Inspection of permitted misalignments

$$\Delta K_a \geq \Delta W_a \times S_\delta$$

$$\Delta K_f \geq \Delta W_f \times S_\delta \times S_n$$

$$\Delta K_w \geq \Delta W_w \times S_\delta \times S_n$$

If more than one kind of misalignment occurs at the same time, please observe Fig. 2 (page 30).

### 4. Frictional locking inspection on hub connection

$T_R > T_{max}$  :  $T_{max}$  is the maximum torque occurring in the coupling.

Values for  $T_R$  can be found on pages 27 to 29.

### 5. Explanations

5.1. The torque determination on the coupling is applicable if the shaft coupling in the system is the torsionally softest element, and therefore the system can be considered as a double-mass oscillator. If this is not the case, the calculation of the torque on the coupling requires a more detailed calculation procedure.

5.2. The impact factors  $S_A / S_L$  describe the impact progression. A rectangular progression of the peak torque is the heaviest impact ( $S_A/S_L = 2.0$ ). A flat sinus progression of the peak torque is a light impact ( $S_A/S_L = 1.2$ ).

5.3.  $T_S$ , the peak torque in the coupling, is the maximum torque on the coupling during the impact minus the system torque having an effect on the coupling during normal operation.

$$T_S = T_{max, impact} - T_N$$

5.4. If a drive is operated supercritically, meaning that the operating speed  $n$  lies above the resonance speed  $n_R$ , then resonance passing through causes particular loads.

If the resonance passes through quickly below the operating speed, only a few resonance peaks occur. The alternating torque in resonance can therefore be compared to the maximum torque on the coupling (see also 5.6).

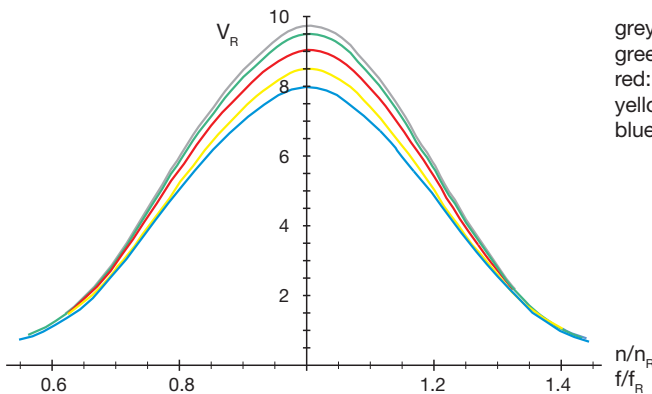
5.5.  $S_f$  takes the frequency dependency of lifetime into account. The frequency dependency is first taken into account above 5 Hz.

5.6. On appreciable vibration excitation, the resonance must be moved out of the operating range by selecting a suitable torsional spring rigidity of the coupling.

## ROBA®-ES Coupling Dimensioning

### Service Factors for Coupling Dimensioning

#### $V_R$ = Resonance factor



grey: Elastomeric element 72 Sh D  
green: elastomeric element 64 Sh D  
red: elastomeric element 98 Sh A  
yellow: elastomeric element 92 Sh A  
blue: elastomeric element 80 Sh A

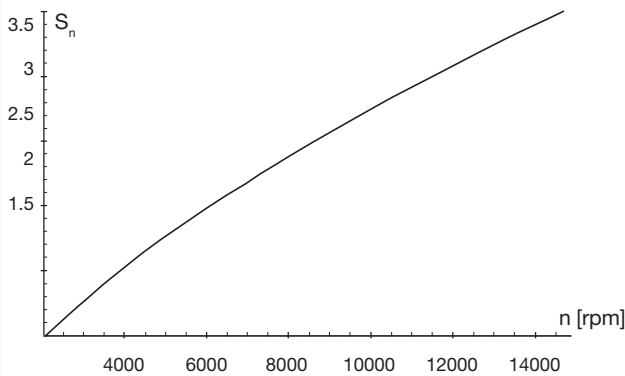
#### $n_R$ = Resonance speed

$$n_R = \frac{30}{\pi} \sqrt{C_{T \text{ dyn.}} \frac{J_A + J_L}{J_A \times J_L}} \quad [\text{rpm}]$$

#### $f_R$ = Resonance frequency

$$f_R = \frac{1}{2\pi} \sqrt{C_{T \text{ dyn.}} \frac{J_A + J_L}{J_A \times J_L}} \quad [\text{s}^{-1}]$$

#### $S_n$ = Speed factor



#### $S_z$ = Start-up factor/impact frequency

| S/h   | 0 – 100 | 101 – 200 | 201 – 400 | 401 – 800 | 801 – 1600 |
|-------|---------|-----------|-----------|-----------|------------|
| $S_z$ | 1       | 1.2       | 1.4       | 1.6       | 1.8        |

#### $S_\delta$ = Safety factor for temperature

| T [°C]     | -30 °C / +30 °C | +60 °C | +90 °C |
|------------|-----------------|--------|--------|
| $S_\delta$ | 1               | 1.5    | 2      |

#### $S_L$ or $S_A$ = Impact factor

| Impacts        | $S_A$ or $S_L$ |
|----------------|----------------|
| Light impacts  | 1.2            |
| Medium impacts | 1.6            |
| Heavy impacts  | 2.0            |

#### $S_f$ = Frequency factor

| f in Hz | ≤ 5 | > 5                  |
|---------|-----|----------------------|
| $S_f$   | 1   | $\sqrt{\frac{f}{5}}$ |

f shows the load alternation per second (Hz = s<sup>-1</sup>)

### Terms

|              |                     |  |
|--------------|---------------------|--|
| $P_{AV/LN}$  | [kW]                | Drive-side/load-side power                                       |
| $T_R$        | [Nm]                | Transmittable torque (frictional locking, Tables pages 27 to 29) |
| $T_{AS/AW}$  | [Nm]                | Excitational torque drive end                                    |
| $T_{LS/LW}$  | [Nm]                | Excitational torque load side                                    |
| $T_N$        | [Nm]                | System torque  |
| $T_W$        | [Nm]                | System alternating torque  |
| $T_S$        | [Nm]                | Peak torque  |
| $T_{max}$    | [Nm]                | Maximum torque in the coupling                                   |
| $T_{KN}$     | [Nm]                | Permitted nominal torque   |
| $T_{Kmax}$   | [Nm]                | Permitted maximum torque   |
| $T_{KW}$     | [Nm]                | Permitted permanent alternating torque                           |
| $J_A$        | [kgm <sup>2</sup> ] | Mass moment of inertia, drive end                                |
| $J_L$        | [kgm <sup>2</sup> ] | Mass moment of inertia, load side                                |
| $\Delta K_a$ | [mm]                | Permitted axial displacement                                     |
| $\Delta K_r$ | [mm]                | Permitted radial misalignment                                    |

|              |            |                                    |
|--------------|------------|------------------------------------|
| $\Delta K_w$ | [°]        | Permitted angular misalignment     |
| $\Delta W_a$ | [mm]       | Axial shaft misalignment           |
| $\Delta W_r$ | [mm]       | Radial shaft misalignment          |
| $\Delta W_w$ | [°]        | Angular shaft misalignment         |
| $c_T$        | [Nm/rad]   | Torsional spring rigidity          |
| n            | [rpm]      | Nominal speed                      |
| $n_R$        | [rpm]      | Resonance speed                    |
| $S_{AVL}$    | [-]        | Impact factor drive end /load side |
| $S_n$        | [-]        | Speed factor                       |
| $S_z$        | [-]        | Start-up factor/impact frequency   |
| $S_\delta$   | [-]        | Temperature factor                 |
| $S_f$        | [-]        | Frequency factor                   |
| $V_R$        | [-]        | Resonance factor                   |
| f            | [1/s]=[Hz] | Load factor                        |
| $f_R$        | [Hz]       | Resonance frequency                |

## Technical Explanations

### ROBA®-ES Elastomeric Elements

| Elastomeric element hardness [Shore] | Colour | Permitted temperature range |                            |
|--------------------------------------|--------|-----------------------------|----------------------------|
|                                      |        | Permanent temperature       | Temporary max. temperature |
| 80 Sh A                              | blue   | -50 to +80 °C               | -60 to +120 °C             |
| 92 Sh A                              | yellow | -40 to +90 °C               | -50 to +120 °C             |
| 98 Sh A                              | red    | -30 to +90 °C               | -40 to +120 °C             |
| 64 Sh D                              | green  | -30 to +100 °C              | -40 to +140 °C             |
| 72 Sh D                              | grey   | -20 to +110 °C              | -20 to +150 °C             |

### Torques

| Size | Torques                      |                         |                      |                         |                      |                         |                      |                         |                      |                         |
|------|------------------------------|-------------------------|----------------------|-------------------------|----------------------|-------------------------|----------------------|-------------------------|----------------------|-------------------------|
|      | Elastomeric element hardness |                         |                      |                         |                      |                         |                      |                         |                      |                         |
|      | 80 Sh A (blue)               |                         | 92 Sh A (yellow)     |                         | 98 Sh A (red)        |                         | 64 Sh D (green)      |                         | 72 Sh D (grey)       |                         |
|      | T <sub>KN</sub> [Nm]         | T <sub>K max</sub> [Nm] | T <sub>KN</sub> [Nm] | T <sub>K max</sub> [Nm] | T <sub>KN</sub> [Nm] | T <sub>K max</sub> [Nm] | T <sub>KN</sub> [Nm] | T <sub>K max</sub> [Nm] | T <sub>KN</sub> [Nm] | T <sub>K max</sub> [Nm] |
| 14   | 4                            | 8                       | 8                    | 16                      | 13                   | 26                      | 16                   | 32                      | -                    | -                       |
| 19   | 5                            | 10                      | 10                   | 20                      | 17                   | 34                      | 21                   | 42                      | 27                   | 54                      |
| 24   | 17                           | 34                      | 35                   | 70                      | 60                   | 120                     | 75                   | 150                     | 95                   | 190                     |
| 28   | 46                           | 92                      | 95                   | 190                     | 160                  | 320                     | 200                  | 400                     | 260                  | 520                     |
| 38   | 95                           | 190                     | 190                  | 380                     | 325                  | 650                     | 405                  | 810                     | 525                  | 1050                    |
| 42   | 125                          | 250                     | 265                  | 530                     | 450                  | 900                     | 560                  | 1120                    | 725                  | 1450                    |
| 48   | 150                          | 300                     | 310                  | 620                     | 525                  | 1050                    | 655                  | 1310                    | 850                  | 1700                    |
| 55   | 200                          | 400                     | 410                  | 820                     | 685                  | 1370                    | 825                  | 1650                    | -                    | -                       |
| 65   | 450                          | 900                     | 900                  | 1800                    | 1040                 | 2080                    | 1250                 | 2500                    | -                    | -                       |

Please Observe: To determine the coupling torque, observe the "ROBA®-ES Coupling Dimensioning" starting on page 22!

### Spring Rigidity <sup>1)</sup>

| Size                     | Torsional spring rigidity   |         |         |         |         |                            |         |         |         |         |                                | Radial spring rigidity |         |         |         |         |
|--------------------------|-----------------------------|---------|---------|---------|---------|----------------------------|---------|---------|---------|---------|--------------------------------|------------------------|---------|---------|---------|---------|
|                          | static C <sub>T stat.</sub> |         |         |         |         | dynamic C <sub>T dyn</sub> |         |         |         |         | relative C <sub>T H rel.</sub> | static C <sub>r</sub>  |         |         |         |         |
|                          | 80 Sh A                     | 92 Sh A | 98 Sh A | 64 Sh D | 72 Sh D | 80 Sh A                    | 92 Sh A | 98 Sh A | 64 Sh D | 72 Sh D |                                | Sleeve                 | 80 Sh A | 92 Sh A | 98 Sh A | 64 Sh D |
| [Nm/rad.]                |                             |         |         |         |         |                            |         |         |         |         | [10 <sup>6</sup> Nm mm/rad.]   | [N/mm]                 |         |         |         |         |
| 14                       | 50                          | 80      | 120     | 230     | -       | 120                        | 240     | 300     | 730     | -       | 0.65                           | 180                    | 300     | 470     | 960     | -       |
| 19                       | 350                         | 820     | 900     | 1400    | 2100    | 1050                       | 1800    | 2200    | 4200    | 3200    | 2.18                           | 700                    | 1200    | 2100    | 2700    | 4100    |
| 24                       | 820                         | 2300    | 3700    | 4500    | 7200    | 1300                       | 4800    | 7600    | 10800   | 10500   | 6.26                           | 800                    | 1900    | 2800    | 4200    | 7100    |
| 28                       | 1300                        | 3800    | 4200    | 7000    | 12500   | 2200                       | 6800    | 10100   | 17200   | 23000   | 11.15                          | 950                    | 2100    | 3500    | 4900    | 9200    |
| 38                       | 2000                        | 5600    | 7400    | 9000    | 25000   | 3400                       | 11900   | 19900   | 30500   | 45000   | 18.11                          | 1300                   | 2900    | 4800    | 5600    | 12000   |
| 42                       | 3500                        | 9800    | 13800   | 15000   | 45000   | 5950                       | 20500   | 31100   | 64900   | 80000   | 109.66                         | 3400                   | 4100    | 5400    | 6900    | 16000   |
| 48                       | 4300                        | 12000   | 15100   | 28500   | 62000   | 7300                       | 22800   | 44900   | 102800  | 110000  | 254.50                         | 3750                   | 4500    | 6200    | 8200    | 18000   |
| 55                       | 5100                        | 14200   | 20500   | 56300   | -       | 8300                       | 25800   | 48200   | 117400  | -       | 421.75                         | 4730                   | 5680    | 8200    | 22500   | -       |
| 65                       | 6800                        | 19100   | 32800   | 90200   | -       | 11500                      | 36200   | 67400   | 164000  | -       | 555.18                         | 6360                   | 7640    | 13120   | 36000   | -       |
| Only for type 940...11.P |                             |         |         |         |         |                            |         |         |         |         |                                |                        |         |         |         |         |
| 14-32                    | 50                          | 80      | 120     | 230     | -       | 120                        | 240     | 300     | 730     | -       | -                              | 180                    | 300     | 470     | 960     | -       |
| 19-37.5                  | 280                         | 660     | 720     | 1120    | -       | 840                        | 1440    | 1760    | 3360    | -       | -                              | 560                    | 960     | 1680    | 2160    | -       |
| 24-50                    | 600                         | 1700    | 2700    | 3300    | -       | 1000                       | 3600    | 5700    | 8100    | -       | -                              | 600                    | 1500    | 2100    | 3200    | -       |

1) The C<sub>r</sub>-value of a double-jointed coupling can be roughly calculated as follows:

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

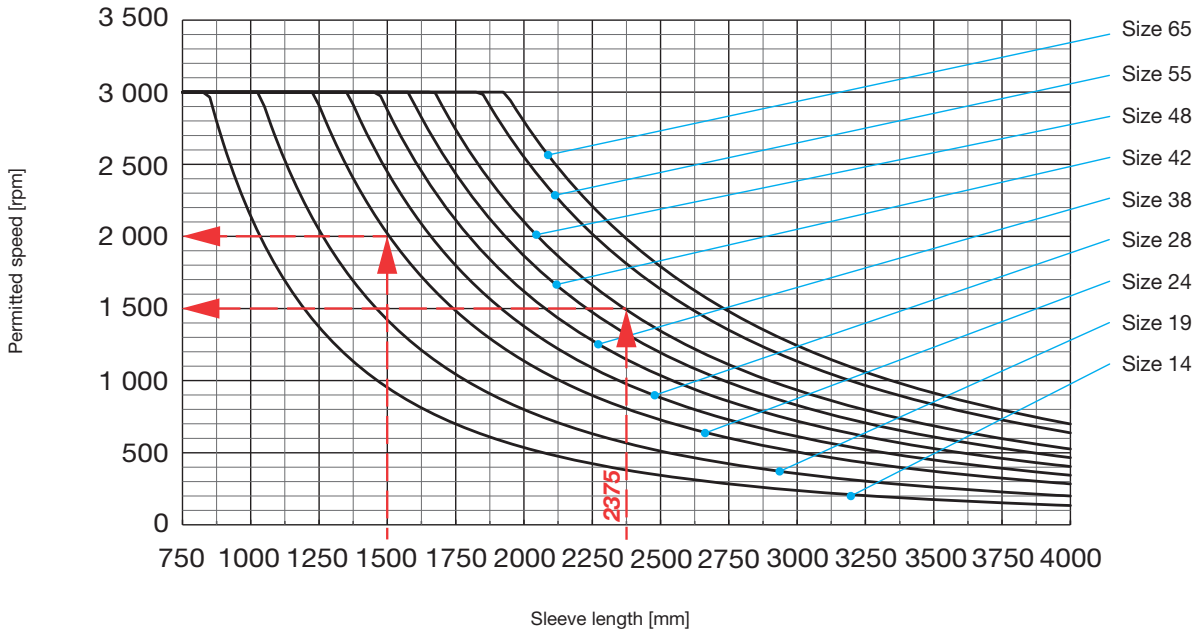
## Technical Explanations

### Permitted Misalignment Values

| Size   | Shaft misalignments Basic Type                      |  |                                 |                                 |                                 |                                 |                                |                                |                                |                                |                                |
|--|---|--|---------------------------------|---------------------------------|---------------------------------|---------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
|  | Axial   | Radial   |                                 |                                 |                                 |                                 | Angular                        |                                |                                |                                |                                |
|  | $\Delta K_a$<br>80/92/98 Sh A<br>64/72 Sh D<br>[mm] | $\Delta K_r$<br>80 Sh A<br>[mm]                          | $\Delta K_r$<br>92 Sh A<br>[mm] | $\Delta K_r$<br>98 Sh A<br>[mm] | $\Delta K_r$<br>64 Sh D<br>[mm] | $\Delta K_r$<br>72 Sh D<br>[mm] | $\Delta K_w$<br>80 Sh A<br>[°] | $\Delta K_w$<br>92 Sh A<br>[°] | $\Delta K_w$<br>98 Sh A<br>[°] | $\Delta K_w$<br>64 Sh D<br>[°] | $\Delta K_r$<br>72 Sh D<br>[°] |
| <b>Misalignment values Basic Type</b>            |   |  |                                 |                                 |                                 |                                 |                                |                                |                                |                                |                                |
| 14   | 1.0   | 0.21   | 0.15                            | 0.09                            | 0.06                            | -                               | 1.1                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 19   | 1.2   | 0.15   | 0.1                             | 0.06                            | 0.04                            | 0.03                            | 1.1                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 24   | 1.4   | 0.18   | 0.14                            | 0.1                             | 0.07                            | 0.04                            | 1.1                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 28   | 1.5   | 0.2  | 0.15                            | 0.11                            | 0.08                            | 0.05                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 38   | 1.8   | 0.22   | 0.17                            | 0.12                            | 0.09                            | 0.06                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 42   | 2.0   | 0.24   | 0.19                            | 0.14                            | 0.1                             | 0.07                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 48   | 2.1   | 0.26   | 0.21                            | 0.16                            | 0.11                            | 0.08                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 55   | 2.2   | 0.28   | 0.24                            | 0.17                            | 0.12                            | -                               | 1.3                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 65   | 2.6   | 0.3  | 0.25                            | 0.18                            | 0.13                            | -                               | 1.3                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| Only available on P-design                       |   |  |                                 |                                 |                                 |                                 |                                |                                |                                |                                |                                |
| 14-32  | 1.0   | 0.21   | 0.15                            | 0.09                            | 0.06                            | -                               | 1.1                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 19-37.5  | 1.2   | 0.15   | 0.1                             | 0.06                            | 0.04                            | -                               | 1.1                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 24-50  | 1.4   | 0.18   | 0.14                            | 0.1                             | 0.07                            | -                               | 1.1                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| <b>Misalignment values with connection piece</b> |   |  |                                 |                                 |                                 |                                 |                                |                                |                                |                                |                                |
|  |   |  |                                 |                                 |                                 |                                 | per side                       |                                |                                |                                |                                |
| 14   | 2.0   | 0.42   | 0.30                            | 0.18                            | 0.12                            | -                               | 1.1                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 19   | 2.4   | 0.3  | 0.20                            | 0.12                            | 0.08                            | 0,06                            | 1.1                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 24   | 2.8   | 0.36   | 0.28                            | 0.20                            | 0.14                            | 0,08                            | 1.1                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 28   | 3.0   | 0.4  | 0.30                            | 0.22                            | 0.16                            | 0,10                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 38   | 3.6   | 0.44   | 0.34                            | 0.24                            | 0.18                            | 0,12                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 42   | 4.0   | 0.48   | 0.38                            | 0.28                            | 0.20                            | 0,14                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 48   | 4.2   | 0.52   | 0.42                            | 0.32                            | 0.22                            | 0,16                            | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 55   | 4.4   | 0.56   | 0.48                            | 0.34                            | 0.24                            | -                               | 1.3                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 65   | 5.2   | 0.6  | 0.50                            | 0.36                            | 0.26                            | -                               | 1.3                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| <b>Misalignment values with sleeve</b>           |   |  |                                 |                                 |                                 |                                 |                                |                                |                                |                                |                                |
|  |   | $(L_3 - 2 \times l_1 - E) \times A$ (Calculation factor) |                                 |                                 |                                 |                                 | per side                       |                                |                                |                                |                                |
| 14   | 2.0   | A =<br>0.0097  | A =<br>0.0087                   | A =<br>0.0079                   | A =<br>0.0070                   | A =<br>0.0061                   | 1.1                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 19   | 2.4   |  |                                 |                                 |                                 |                                 | 1.1                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 24   | 2.8   |  |                                 |                                 |                                 |                                 | 1.1                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 28   | 3.0   | A =<br>0.0113  | A =<br>0.0087                   | A =<br>0.0079                   | A =<br>0.0070                   | A =<br>0.0061                   | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 38   | 3.6   |  |                                 |                                 |                                 |                                 | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 42   | 4.0   |  |                                 |                                 |                                 |                                 | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 48   | 4.2   |  |                                 |                                 |                                 |                                 | 1.3                            | 1.0                            | 0.9                            | 0.8                            | 0.7                            |
| 55   | 4.4   |  |                                 |                                 |                                 |                                 | 1.3                            | 1.0                            | 0.9                            | 0.8                            | -                              |
| 65   | 5.2   | 1.3  | 1.0                             | 0.9                             | 0.8                             | -                               |                                |                                |                                |                                |                                |

## Technical Explanations

### Permitted Speeds (critical bending speed) for Sleeve



#### Examples

- ROBA<sup>®</sup>-ES, Size 48:

Sleeve length:  $H_s = 2375 \text{ mm}$   
=> permitted speed: **1500 rpm**

- ROBA<sup>®</sup>-ES, Size 24:

Sleeve length:  $H_s = 1500 \text{ mm}$   
=> permitted speed: **2000 rpm**

#### 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 at subcritical levels.
- Both hub variants clamping 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.
- Shaft misalignments should be kept as low as possible to increase the smooth running of a system.
- 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.

## Technical Explanations

### Transmittable Torques

| Shrink disk hubs made of aluminium Type 940_11.A  |       |      | Bore | Size |     |     |     |     |
|---|-------|------|------|------|-----|-----|-----|-----|
|   |       |      |      | 14   | 19  | 24  | 28  | 38  |
| Frictionally-locking transmittable torques<br><b>Shrink disk hubs made of aluminium</b> | $T_R$ | [Nm] | Ø6   | 13.5 | -   | -   | -   | -   |
|   |       |      | Ø7   | 16.5 | -   | -   | -   | -   |
|   |       |      | Ø8   | 19.0 | -   | -   | -   | -   |
|   |       |      | Ø9   | 22.5 | -   | -   | -   | -   |
|   |       |      | Ø10  | 19.0 | 41  | -   | -   | -   |
|   |       |      | Ø11  | 22.5 | 48  | -   | -   | -   |
|   |       |      | Ø12  | 26.5 | 58  | -   | -   | -   |
|   |       |      | Ø14  | 34.5 | 77  | -   | -   | -   |
|   |       |      | Ø15  | -    | 87  | 67  | -   | -   |
|   |       |      | Ø16  | -    | 88  | 78  | -   | -   |
|   |       |      | Ø17  | -    | 107 | 89  | -   | -   |
|   |       |      | Ø18  | -    | 117 | 100 | -   | -   |
|   |       |      | Ø19  | -    | 126 | 109 | 194 | -   |
|   |       |      | Ø20  | -    | 136 | 121 | 214 | 247 |
|   |       |      | Ø22  | -    | -   | 143 | 255 | 299 |
|   |       |      | Ø24  | -    | -   | 166 | 296 | 352 |
|   |       |      | Ø25  | -    | -   | 178 | 317 | 379 |
|   |       |      | Ø28  | -    | -   | 212 | 381 | 463 |
|   |       |      | Ø30  | -    | -   | -   | 423 | 519 |
|   |       |      | Ø32  | -    | -   | -   | 462 | 567 |
| Ø35   | -     | -    | -    | 528  | 653 |     |     |     |
| Ø38   | -     | -    | -    | 594  | 739 |     |     |     |
| Ø40   | -     | -    | -    | -    | 797 |     |     |     |
| Ø42   | -     | -    | -    | -    | 855 |     |     |     |
| Ø45   | -     | -    | -    | -    | 942 |     |     |     |

| Shrink disk hubs made of steel Type 940_11.P  |       |      | Bore | Size  |         |     |       |     |     |
|---|-------|------|------|-------|---------|-----|-------|-----|-----|
|   |       |      |      | 14-32 | 19-37.5 | 19  | 24-50 | 24  | 28  |
| Frictionally-locking transmittable torques<br><b>Shrink disk hubs made of steel</b> | $T_R$ | [Nm] | Ø6   | 4.0   | -       | -   | -     | -   | -   |
|   |       |      | Ø7   | 8.0   | -       | -   | -     | -   | -   |
|   |       |      | Ø8   | 11.5  | -       | -   | -     | -   | -   |
|   |       |      | Ø9   | 15.0  | -       | -   | -     | -   | -   |
|   |       |      | Ø10  | 19.5  | 17      | 7   | -     | -   | -   |
|   |       |      | Ø11  | 23.5  | 25      | 13  | -     | -   | -   |
|   |       |      | Ø12  | 10.5  | 35      | 22  | -     | -   | -   |
|   |       |      | Ø14  | 21.5  | 59      | 44  | -     | -   | -   |
|   |       |      | Ø15  | -     | 72      | 56  | 18    | -   | -   |
|   |       |      | Ø16  | -     | 85      | 68  | 29    | 20  | -   |
|   |       |      | Ø17  | -     | -       | 81  | 42    | 31  | -   |
|   |       |      | Ø18  | -     | -       | 94  | 54    | 43  | -   |
|   |       |      | Ø19  | -     | -       | 106 | 66    | 54  | 71  |
|   |       |      | Ø20  | -     | -       | 120 | 79    | 67  | 91  |
|   |       |      | Ø22  | -     | -       | -   | 109   | 95  | 134 |
|   |       |      | Ø24  | -     | -       | -   | 139   | 124 | 179 |
|   |       |      | Ø25  | -     | -       | -   | -     | 139 | 203 |
|   |       |      | Ø28  | -     | -       | -   | -     | 186 | 277 |
|   |       |      | Ø30  | -     | -       | -   | -     | -   | 329 |
|   |       |      | Ø32  | -     | -       | -   | -     | -   | 375 |
| Ø35   | -     | -    | -    | -     | -       | 460 |       |     |     |
| Ø38   | -     | -    | -    | -     | -       | 548 |       |     |     |
| Ø40   | -     | -    | -    | -     | -       | 685 |       |     |     |
| Ø42   | -     | -    | -    | -     | -       | 761 |       |     |     |
| Ø45   | -     | -    | -    | -     | -       | 879 |       |     |     |

| Shrink disk hubs made of steel Type 940_11.F  |       |      | Bore | Size |      |      |      |
|---|-------|------|------|------|------|------|------|
|   |       |      |      | 42   | 48   | 55   | 65   |
| Frictionally-locking transmittable torques<br><b>Shrink disk hubs made of steel</b> | $T_R$ | [Nm] | Ø28  | 215  | -    | -    | -    |
|   |       |      | Ø30  | 285  | -    | -    | -    |
|   |       |      | Ø32  | 330  | -    | -    | -    |
|   |       |      | Ø35  | 450  | 475  | -    | -    |
|   |       |      | Ø38  | 570  | 620  | -    | -    |
|   |       |      | Ø40  | 655  | 720  | 555  | -    |
|   |       |      | Ø42  | 745  | 820  | 655  | -    |
|   |       |      | Ø45  | 875  | 980  | 825  | 1195 |
|   |       |      | Ø48  | 1010 | 1150 | 1000 | 1425 |
|   |       |      | Ø50  | 1105 | 1265 | 1120 | 1595 |
|   |       |      | Ø52  | -    | 1350 | 1245 | 1680 |
|   |       |      | Ø55  | -    | 1530 | 1430 | 1945 |
|   |       |      | Ø58  | -    | 1720 | 1625 | 2210 |
|   |       |      | Ø60  | -    | 1840 | 1755 | 2395 |
|   |       |      | Ø62  | -    | -    | 1890 | 2575 |
|   |       |      | Ø65  | -    | -    | 2090 | 2855 |
| Ø68   | -     | -    | 2295 | 3140 |      |      |      |
| Ø70   | -     | -    | 2435 | 3330 |      |      |      |
| Ø72   | -     | -    | -    | 3525 |      |      |      |
| Ø75   | -     | -    | -    | 3825 |      |      |      |

# Technical Explanations

## Transmittable Torques

| Clamping hubs<br>Type 94._.00._                                       |       |      | Bore | Size |    |    |     |     |      |     |     |     |   |
|---|-------|------|------|------|----|----|-----|-----|------|-----|-----|-----|---|
|   |       |      |      | 14   | 19 | 24 | 28  | 38  | 42   | 48  | 55  | 65  |   |
| Frictionally-locking<br>transmittable torques<br><b>Clamping hubs</b> | $T_R$ | [Nm] | Ø6   | 2.5  | -  | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø7   | 3.0  | -  | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø8   | 3.4  | -  | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø9   | 3.8  | -  | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø10  | 4.2  | 23 | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø11  | 4.7  | 25 | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø12  | 5.1  | 27 | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø14  | 6.0  | 32 | -  | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø15  | 6.4  | 34 | 34 | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø16  | -    | 36 | 36 | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø18  | -    | 41 | 41 | -   | -   | -    | -   | -   | -   | - |
|   |       |      | Ø19  | -    | 43 | 43 | 79  | -   | -    | -   | -   | -   | - |
|   |       |      | Ø20  | -    | 45 | 45 | 83  | 83  | -    | -   | -   | -   | - |
|   |       |      | Ø22  | -    | -  | 50 | 91  | 91  | -    | -   | -   | -   | - |
|   |       |      | Ø24  | -    | -  | 54 | 100 | 100 | -    | -   | -   | -   | - |
|   |       |      | Ø25  | -    | -  | 57 | 104 | 104 | -    | -   | -   | -   | - |
|   |       |      | Ø28  | -    | -  | 63 | 116 | 116 | 208  | -   | -   | -   | - |
|   |       |      | Ø30  | -    | -  | -  | 124 | 124 | 228  | -   | -   | -   | - |
|   |       |      | Ø32  | -    | -  | -  | 133 | 133 | 248  | -   | -   | -   | - |
|   |       |      | Ø35  | -    | -  | -  | 145 | 145 | 280  | 350 | -   | -   | - |
|   |       |      | Ø38  | -    | -  | -  | -   | 158 | 315  | 390 | -   | -   | - |
|   |       |      | Ø40  | -    | -  | -  | -   | 166 | 340  | 420 | 340 | -   | - |
|   |       |      | Ø42  | -    | -  | -  | -   | 174 | 365  | 455 | 365 | -   | - |
|   |       |      | Ø45  | -    | -  | -  | -   | 187 | 404  | 505 | 405 | 545 | - |
|   |       |      | Ø48  | -    | -  | -  | -   | -   | 442  | 560 | 435 | 590 | - |
|   |       |      | Ø50  | -    | -  | -  | -   | -   | 470  | 600 | 465 | 630 | - |
|   |       |      | Ø52  | -    | -  | -  | -   | -   | -    | 640 | 490 | 662 | - |
|   |       |      | Ø55  | -    | -  | -  | -   | -   | -    | 705 | 525 | 710 | - |
|   |       |      | Ø58  | -    | -  | -  | -   | -   | -    | -   | 570 | 764 | - |
|   |       |      | Ø60  | -    | -  | -  | -   | -   | -    | -   | 600 | 800 | - |
|   |       |      | Ø62  | -    | -  | -  | -   | -   | -    | -   | 625 | 840 | - |
|   |       |      | Ø65  | -    | -  | -  | -   | -   | -    | -   | 665 | 900 | - |
| Ø68   | -     | -    | -    | -    | -  | -  | -   | 700 | 954  | -   |     |     |   |
| Ø70   | -     | -    | -    | -    | -  | -  | -   | 740 | 990  | -   |     |     |   |
| Ø72   | -     | -    | -    | -    | -  | -  | -   | -   | 1032 | -   |     |     |   |
| Ø75   | -     | -    | -    | -    | -  | -  | -   | -   | 1095 | -   |     |     |   |
| Ø78   | -     | -    | -    | -    | -  | -  | -   | -   | 1158 | -   |     |     |   |
| Ø80   | -     | -    | -    | -    | -  | -  | -   | -   | 1200 | -   |     |     |   |

Suitable for F7 / k6  
With larger fit clearance, the transmittable torque is reduced.

| Clamping hubs Compact<br>Type 94._.55._                                       |       |      | Bore | Size |     |    |     |     |   |
|---|-------|------|------|------|-----|----|-----|-----|---|
|   |       |      |      | 14   | 19  | 24 | 28  | 38  |   |
| Frictionally-locking<br>transmittable torques<br><b>Clamping hubs Compact</b> | $T_R$ | [Nm] | Ø5   | 5    | -   | -  | -   | -   | - |
|   |       |      | Ø6   | 6    | -   | -  | -   | -   | - |
|   |       |      | Ø7   | 7    | -   | -  | -   | -   | - |
|   |       |      | Ø8   | 8    | 18  | -  | -   | -   | - |
|   |       |      | Ø9   | 9    | 20  | -  | -   | -   | - |
|   |       |      | Ø10  | 10   | 23  | 23 | -   | -   | - |
|   |       |      | Ø11  | 11   | 25  | 25 | -   | -   | - |
|   |       |      | Ø12  | 12   | 27  | 27 | -   | -   | - |
|   |       |      | Ø13  | -    | 29  | 29 | -   | -   | - |
|   |       |      | Ø14  | -    | 32  | 32 | 58  | -   | - |
|   |       |      | Ø15  | -    | 34  | 34 | 62  | 98  | - |
|   |       |      | Ø16  | -    | 36  | 36 | 66  | 105 | - |
|   |       |      | Ø17  | -    | 38  | 38 | 71  | 110 | - |
|   |       |      | Ø18  | -    | 41  | 41 | 75  | 118 | - |
|   |       |      | Ø19  | -    | 43  | 43 | 79  | 124 | - |
|   |       |      | Ø20  | -    | 45  | 45 | 83  | 131 | - |
|   |       |      | Ø21  | -    | -   | 48 | 87  | 137 | - |
|   |       |      | Ø22  | -    | -   | 50 | 91  | 144 | - |
|   |       |      | Ø23  | -    | -   | 52 | 95  | 150 | - |
|   |       |      | Ø24  | -    | -   | 54 | 100 | 157 | - |
|   |       |      | Ø25  | -    | -   | 57 | 104 | 163 | - |
|   |       |      | Ø26  | -    | -   | 59 | 108 | 170 | - |
|   |       |      | Ø27  | -    | -   | 61 | 112 | 176 | - |
|   |       |      | Ø28  | -    | -   | 63 | 116 | 183 | - |
| Ø29   | -     | -    | 66   | 120  | 190 | -  |     |     |   |
| Ø30   | -     | -    | 68   | 124  | 196 | -  |     |     |   |
| Ø31   | -     | -    | 70   | 129  | 203 | -  |     |     |   |
| Ø32   | -     | -    | 72   | 133  | 209 | -  |     |     |   |
| Ø33   | -     | -    | -    | 137  | 216 | -  |     |     |   |
| Ø34   | -     | -    | -    | 141  | 222 | -  |     |     |   |
| Ø35   | -     | -    | -    | 145  | 229 | -  |     |     |   |
| Ø36   | -     | -    | -    | -    | 235 | -  |     |     |   |
| Ø37   | -     | -    | -    | -    | 242 | -  |     |     |   |
| Ø38   | -     | -    | -    | -    | 248 | -  |     |     |   |
| Ø39   | -     | -    | -    | -    | 255 | -  |     |     |   |
| Ø40   | -     | -    | -    | -    | 261 | -  |     |     |   |
| Ø41   | -     | -    | -    | -    | 268 | -  |     |     |   |
| Ø42   | -     | -    | -    | -    | 274 | -  |     |     |   |
| Ø43   | -     | -    | -    | -    | 281 | -  |     |     |   |
| Ø44   | -     | -    | -    | -    | 288 | -  |     |     |   |
| Ø45   | -     | -    | -    | -    | 294 | -  |     |     |   |

Suitable for F7 / k6  
With larger fit clearance, the transmittable torque is reduced.

## Technical explanations

### Transmittable Torques

| Split clamping hubs<br>Type 94 _ . 33 _ |  |  | Bore | Size |    |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|---|--|--|------|------|----|----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|
|   |  |  |      | 14   | 19 | 24 | 28  | 38  | 42  | 48  | 55  | 65  |  |  |  |  |  |  |  |  |
|   |  |  | Ø8   | 4    | 18 |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø9   | 4.5  | 20 |    |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø10  | 5    | 23 | 23 |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø11  | 5.5  | 25 | 25 |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø12  | 6    | 27 | 27 |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø13  | 6.5  | 29 | 29 |     |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø14  | 7    | 32 | 32 | 58  |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø15  | 7.5  | 34 | 34 | 62  |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø16  |      | 36 | 36 | 66  |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø17  |      | 38 | 38 | 71  |     |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø18  |      | 41 | 41 | 75  | 75  |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø19  |      | 43 | 43 | 79  | 79  |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø20  |      | 45 | 45 | 83  | 83  |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø21  |      |    | 48 | 87  | 87  |     |     |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø22  |      |    | 50 | 91  | 91  | 144 | 210 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø23  |      |    | 52 | 95  | 95  | 150 | 220 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø24  |      |    | 54 | 100 | 100 | 157 | 229 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø25  |      |    | 57 | 104 | 104 | 163 | 239 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø26  |      |    | 59 | 108 | 108 | 170 | 248 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø27  |      |    | 61 | 112 | 112 | 176 | 258 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø28  |      |    | 63 | 116 | 116 | 183 | 267 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø29  |      |    |    | 120 | 120 | 190 | 277 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø30  |      |    |    | 124 | 124 | 196 | 287 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø31  |      |    |    | 129 | 129 | 203 | 296 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø32  |      |    |    | 133 | 133 | 209 | 306 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø33  |      |    |    | 137 | 137 | 216 | 315 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø34  |      |    |    | 141 | 141 | 222 | 325 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø35  |      |    |    | 145 | 145 | 229 | 334 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø36  |      |    |    |     | 149 | 235 | 344 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø37  |      |    |    |     | 153 | 242 | 353 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø38  |      |    |    |     | 158 | 248 | 363 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø39  |      |    |    |     | 162 | 255 | 372 |     |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø40  |      |    |    |     | 166 | 261 | 382 | 382 |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø41  |      |    |    |     | 170 | 268 | 392 | 392 |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø42  |      |    |    |     | 174 | 274 | 401 | 401 |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø43  |      |    |    |     | 178 | 281 | 411 | 411 |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø44  |      |    |    |     | 182 | 288 | 420 | 420 |     |  |  |  |  |  |  |  |  |
|   |  |  | Ø45  |      |    |    |     | 187 | 294 | 430 | 430 | 430 |  |  |  |  |  |  |  |  |
|   |  |  | Ø46  |      |    |    |     |     | 301 | 439 | 439 | 439 |  |  |  |  |  |  |  |  |
|   |  |  | Ø47  |      |    |    |     |     | 307 | 449 | 449 | 449 |  |  |  |  |  |  |  |  |
|   |  |  | Ø48  |      |    |    |     |     | 314 | 458 | 458 | 458 |  |  |  |  |  |  |  |  |
|   |  |  | Ø49  |      |    |    |     |     | 320 | 468 | 468 | 468 |  |  |  |  |  |  |  |  |
|   |  |  | Ø50  |      |    |    |     |     | 327 | 478 | 478 | 478 |  |  |  |  |  |  |  |  |
|   |  |  | Ø51  |      |    |    |     |     |     | 487 | 487 | 487 |  |  |  |  |  |  |  |  |
|   |  |  | Ø52  |      |    |    |     |     |     | 497 | 497 | 497 |  |  |  |  |  |  |  |  |
|   |  |  | Ø53  |      |    |    |     |     |     | 506 | 506 | 506 |  |  |  |  |  |  |  |  |
|   |  |  | Ø54  |      |    |    |     |     |     | 516 | 516 | 516 |  |  |  |  |  |  |  |  |
|   |  |  | Ø55  |      |    |    |     |     |     | 525 | 525 | 525 |  |  |  |  |  |  |  |  |
|   |  |  | Ø56  |      |    |    |     |     |     |     | 535 | 535 |  |  |  |  |  |  |  |  |
|   |  |  | Ø57  |      |    |    |     |     |     |     | 544 | 544 |  |  |  |  |  |  |  |  |
|   |  |  | Ø58  |      |    |    |     |     |     |     | 554 | 554 |  |  |  |  |  |  |  |  |
|   |  |  | Ø59  |      |    |    |     |     |     |     | 563 | 563 |  |  |  |  |  |  |  |  |
|   |  |  | Ø60  |      |    |    |     |     |     |     | 573 | 573 |  |  |  |  |  |  |  |  |
|   |  |  | Ø61  |      |    |    |     |     |     |     | 583 | 583 |  |  |  |  |  |  |  |  |
|   |  |  | Ø62  |      |    |    |     |     |     |     | 592 | 592 |  |  |  |  |  |  |  |  |
|   |  |  | Ø63  |      |    |    |     |     |     |     | 602 | 602 |  |  |  |  |  |  |  |  |
|   |  |  | Ø64  |      |    |    |     |     |     |     | 611 | 611 |  |  |  |  |  |  |  |  |
|   |  |  | Ø65  |      |    |    |     |     |     |     | 621 | 621 |  |  |  |  |  |  |  |  |
|   |  |  | Ø66  |      |    |    |     |     |     |     | 630 | 630 |  |  |  |  |  |  |  |  |
|   |  |  | Ø67  |      |    |    |     |     |     |     | 640 | 640 |  |  |  |  |  |  |  |  |
|   |  |  | Ø68  |      |    |    |     |     |     |     | 649 | 649 |  |  |  |  |  |  |  |  |
|   |  |  | Ø69  |      |    |    |     |     |     |     | 659 | 659 |  |  |  |  |  |  |  |  |
|   |  |  | Ø70  |      |    |    |     |     |     |     | 669 | 669 |  |  |  |  |  |  |  |  |
|   |  |  | Ø71  |      |    |    |     |     |     |     | 678 | 678 |  |  |  |  |  |  |  |  |
|   |  |  | Ø72  |      |    |    |     |     |     |     | 688 | 688 |  |  |  |  |  |  |  |  |
|   |  |  | Ø73  |      |    |    |     |     |     |     | 697 | 697 |  |  |  |  |  |  |  |  |
|   |  |  | Ø74  |      |    |    |     |     |     |     | 707 | 707 |  |  |  |  |  |  |  |  |
|   |  |  | Ø75  |      |    |    |     |     |     |     | 716 | 716 |  |  |  |  |  |  |  |  |
|   |  |  | Ø76  |      |    |    |     |     |     |     | 726 | 726 |  |  |  |  |  |  |  |  |
|   |  |  | Ø77  |      |    |    |     |     |     |     | 735 | 735 |  |  |  |  |  |  |  |  |
|   |  |  | Ø78  |      |    |    |     |     |     |     | 745 | 745 |  |  |  |  |  |  |  |  |
|   |  |  | Ø79  |      |    |    |     |     |     |     | 755 | 755 |  |  |  |  |  |  |  |  |
|   |  |  | Ø80  |      |    |    |     |     |     |     | 764 | 764 |  |  |  |  |  |  |  |  |

| Expansion hubs<br>Type 94 _ . 4 _                       |                |      | Bore | Size |      |      |     |
|---|----------------|------|------|------|------|------|-----|
|   |                |      |      | 14   | 19   | 24   | 28  |
| Frictionally-locking<br>transmittable torques           | T <sub>R</sub> | [Nm] | Ø12  | 15.7 |      |      |     |
|   |                |      | Ø20  |      | 36.6 |      |     |
| Suitable for H7 / h7<br>Expansion hubs<br>made of steel | T <sub>R</sub> | [Nm] | Ø25  |      |      | 84.4 |     |
|   |                |      | Ø35  |      |      |      | 188 |

## Technical Explanations

**ROBA<sup>®</sup>-ES** stands for flexible (E), backlash-free (S) shaft coupling. The device consists of two coupling hubs and a flexible, star-shaped intermediate ring (Fig. 1).

**ROBA<sup>®</sup>-ES couplings are conceived specially for backlash-free operation at comparatively high speeds.**

**ROBA<sup>®</sup>-ES** couplings are mainly used in measurement technology and control engineering as well as in control and procedure technology.

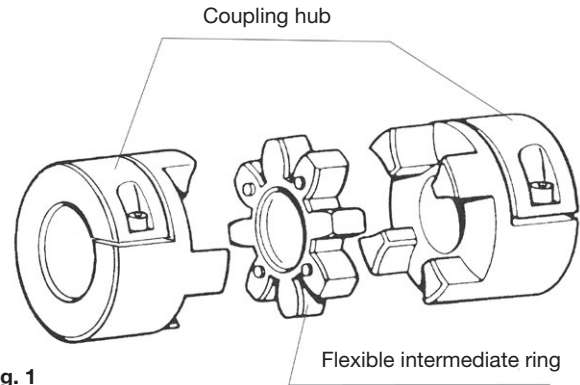


Fig. 1

### Shaft Misalignments

The ROBA<sup>®</sup>-ES coupling compensate for radial, axial and angular shaft misalignments (Fig. 3) without losing their backlash-free function. However, the permitted misalignments indicated on page 25 must not simultaneously reach their maximum value. If more than one kind of misalignment takes place simultaneously, they influence each other. This means that the permitted misalignment values are dependent on one another, see Fig. 2. The sum total of the actual misalignments – in percent of the maximum value – must not exceed 100 %.

The permitted misalignment values given on page 25 refer to coupling operation at nominal torque, an ambient temperature of +30 °C and an operating speed of 1500 rpm.

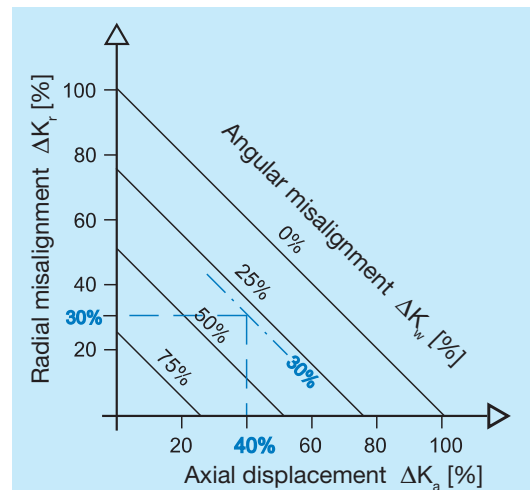


Fig. 2

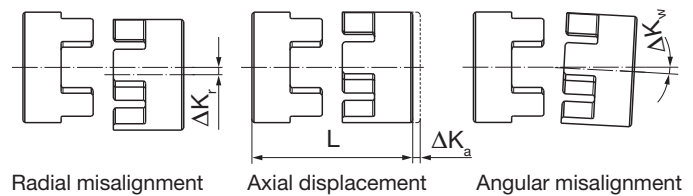


Fig. 3

## Technical Explanations

### State of Delivery

ROBA®-ES couplings are delivered manufacturer-assembled ready for installation.

The star-shaped intermediate ring is pressed into the specially designed claws (Fig. 4) under light pre-tension.

The principle of backlash-free torque transmission is possible due to this pre-tension.

ROBA®-ES couplings are delivered in four torque variations; that is with four different flexible intermediate rings varying in shore hardness and colour (see Type key page 24).

Due to the small structural dimensions and therefore the low mass moments of inertia, the device allows itself to be installed even into small installation spaces.

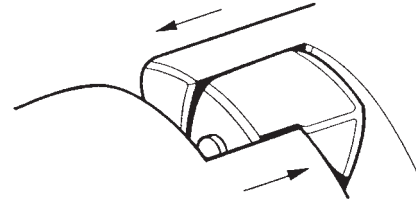


Fig. 4

### Balancing

#### Key hubs and clamping hubs:

Key hubs and clamping hubs rotate at maximum speed with a circumferential speed of 30 m/s. They are not balanced for standard delivery.

#### Shrink disk hubs:

Shrink disk hubs maintain balance quality  $G = 6.3$  up to speed  $n_G$  (equals approx. 30 m/s) without needing to be balanced. Above this speed, we recommend balancing. The hubs are balanced individually. Diagram 1 shows reference values. We recommend you use these values to balance the coupling components.

Smooth running of a machine or system is not only dependent on the balance quality of the coupling, but also on many parameters such as rigidity or distance to the adjacent bearing. Therefore there are no fixed rules in which conditions you have to balance.

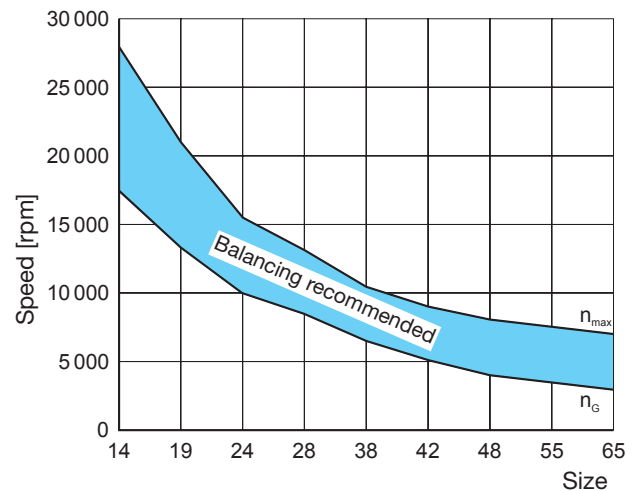


Diagram 1: Balancing the Shrink Disk Hubs

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You can find the complete contact details for the representative responsible for your area in the Contact section at [www.mayr.com](http://www.mayr.com)

