

Interface

ROBA®-DS

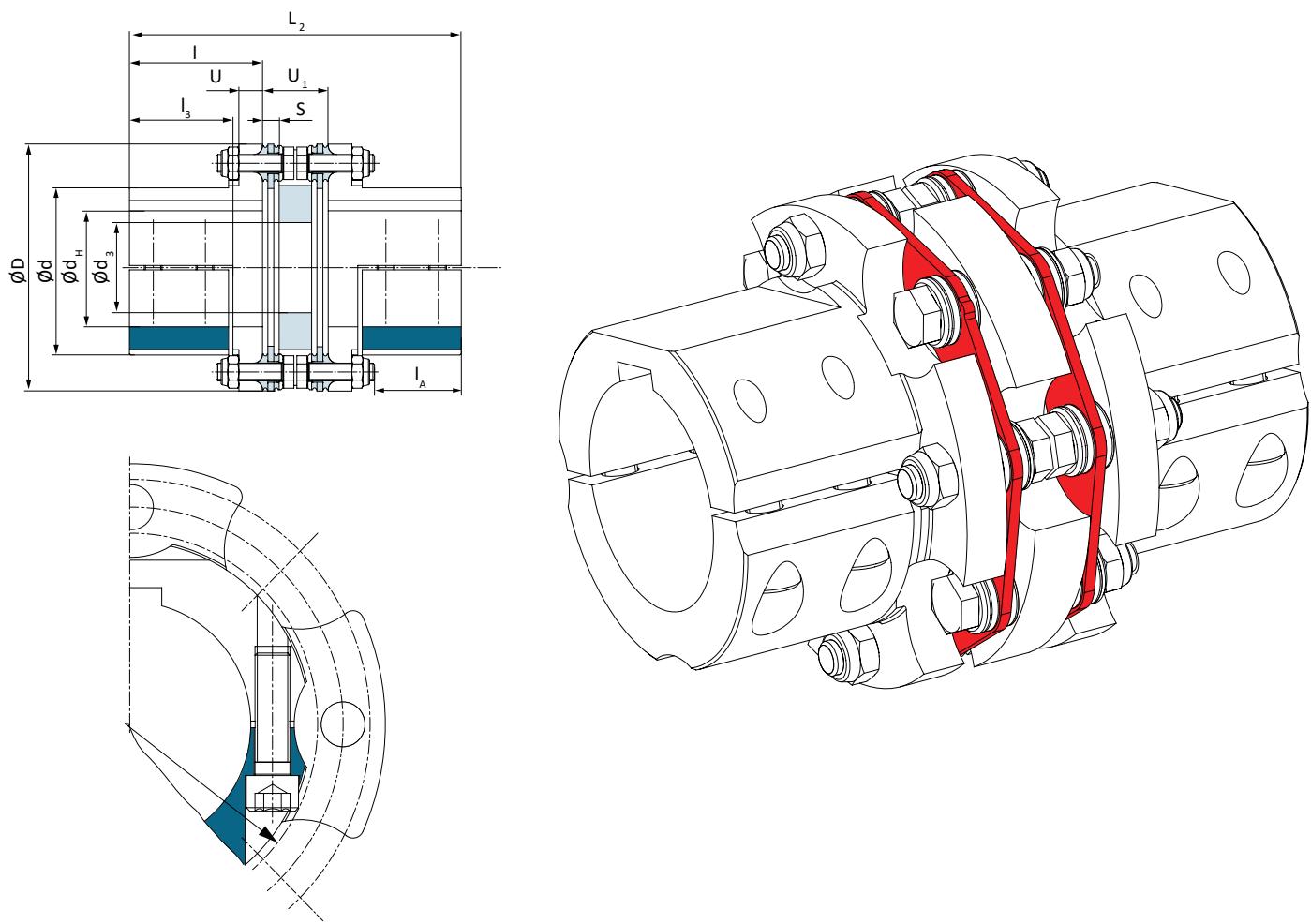


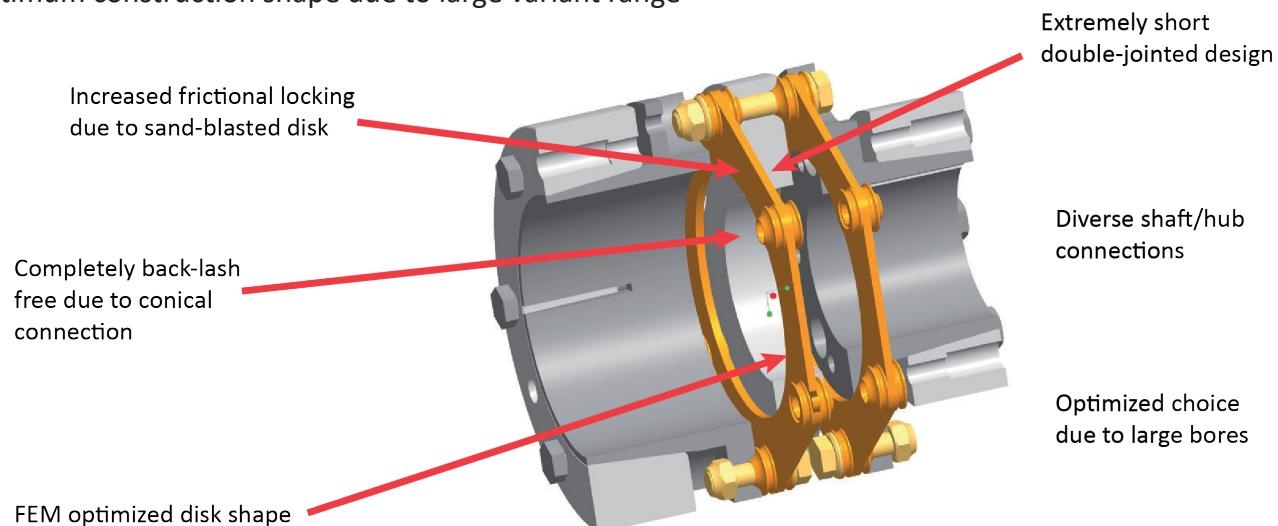
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Torsionally Rigid Shaft Couplings

Technologically Superior

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



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

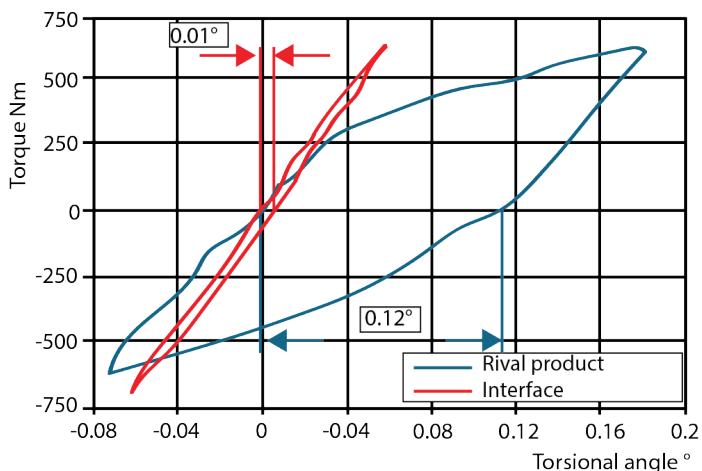


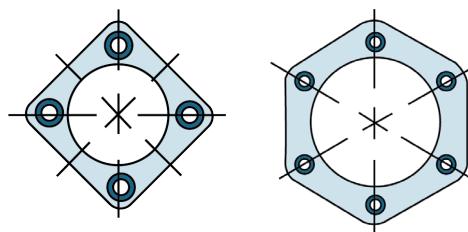
Diagram: Torsionally Rigid Shaft Couplings characteristics curve in comparison to a typical rival product with frictionally-locking/positively-locking torque transmission.

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

BACKLASH- FREE SERVO COUPLINGS (ALUMINUM)

Sizes 3 to 15
Nominal Torques
35 to 150 Nm
Bores
10 to 45
Angular
Misalignment 1°

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



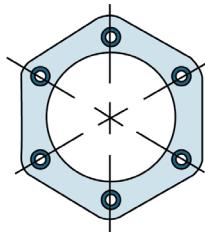
Shaft Connection

Clamping hub	8
Hub with tapered bore	8
Shrink Disk Hub	11

BACKLASH- FREE ALL STEEL COUPLINGS

Sizes 16 to 160
Nominal Torques
190 to 1600 Nm
Bores
14 to 110
Angular
Misalignment 1°

Disk pack-HF with 6x divisions

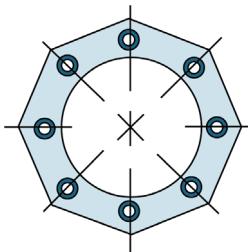


Shaft Connection

Key hub.....	12
Key hub Large.....	15
Clamping hub.....	16
Clamping ring hub.....	18
Shrink Disk Hub external clamping.....	20
Shrink disk hub external/internal clamping.....	22
Shrink Disk Hub large.....	24
Split clamping hub.....	26
Flange.....	28

Sizes 180 to 2200
Nominal Torques
2100 to 24000 Nm
Bores
40 to 170
Angular
Misalignment 0.5°

Disk pack-HF with 8x divisions



Shaft Connection

Key hub.....	30
Key hub Large.....	31
Shrink Disk Hub external clamping.....	32
External shrunk disk hub.....	33
Split clamping hub.....	34
Flange.....	36

COUPLINGS PART NUMBER CONFIGURATION

Backlash-free Aluminum Servo Couplings

EXAMPLE OF THE CONFIGURATION FROM A MAYR PART NUMBERS TO AN INTERFACE PART NUMBER

Interface Part Number:

951 E 321-M18-075

Mayr Part Number:

16 / 951. 3 2 1 / hub1-dia. 18mm / hub 2 diam 0.75 inch

NOTE*

Interface part numbers use a letter code to designate coupling size and abbreviated hub bore call out.

The "XXX" will be a unique code to a specific SQ key (square key)

LETTER

SIZE

CODES

A = 3

B = 6

C = 10

D = 15

E = 16

F = 25

G = 40

H = 64

J = 100

K = 160

KL = 180

L = 300

M = 500

N = 850

P = 1400

Q = 2200

Hub1 Hub2 Style

0* = keyway std
1* = keyway large

2* = shrink disk ext

3* = shrink disk int

4* = clamping ring

6* = flange

8* = split clamping

9* = shrink disk large

- 0 = Single flex
- 1 = Connecting plate
- 2 = Sleeve 1
- 3 = Sleeve S
- 4 = Sleeve GKR
- 5 = Sleeve CRP

HUB BORE ABBREVIATIONS

Metric (mm)

6 mm = M6

20 mm = M20

100 mm = M100

US (in)

0.25in = 025

0.875in = 088

1.50in = 150

Hub 1 = transducer side

Hub 2 = customer side

NOTE FOR KEYED HUBS*

1. Metric bores have keyways per DIN 6885.1 Form A

2. Inch size bores need to have key dimensions called out

Example: 0.5 inch bored with 0.125

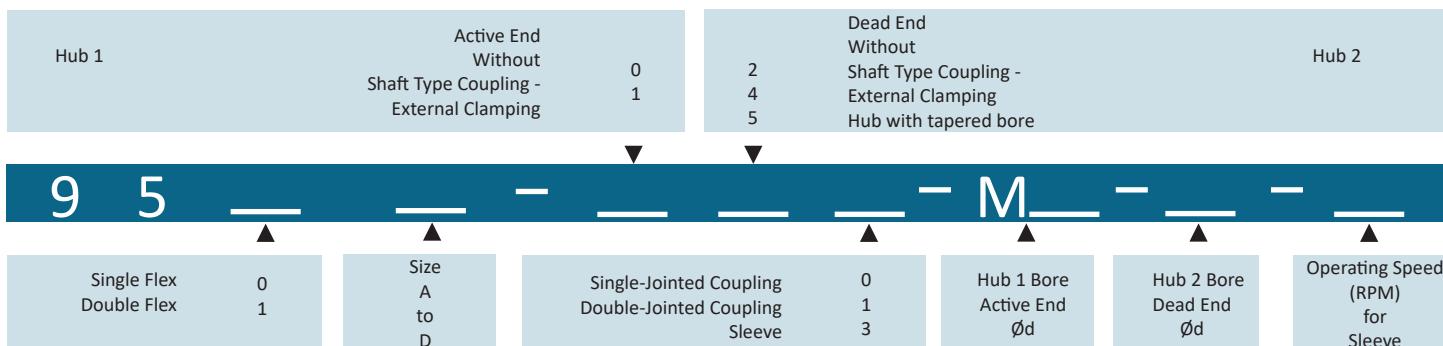
inch SQ key

MODEL NUMBER

950 = single flex

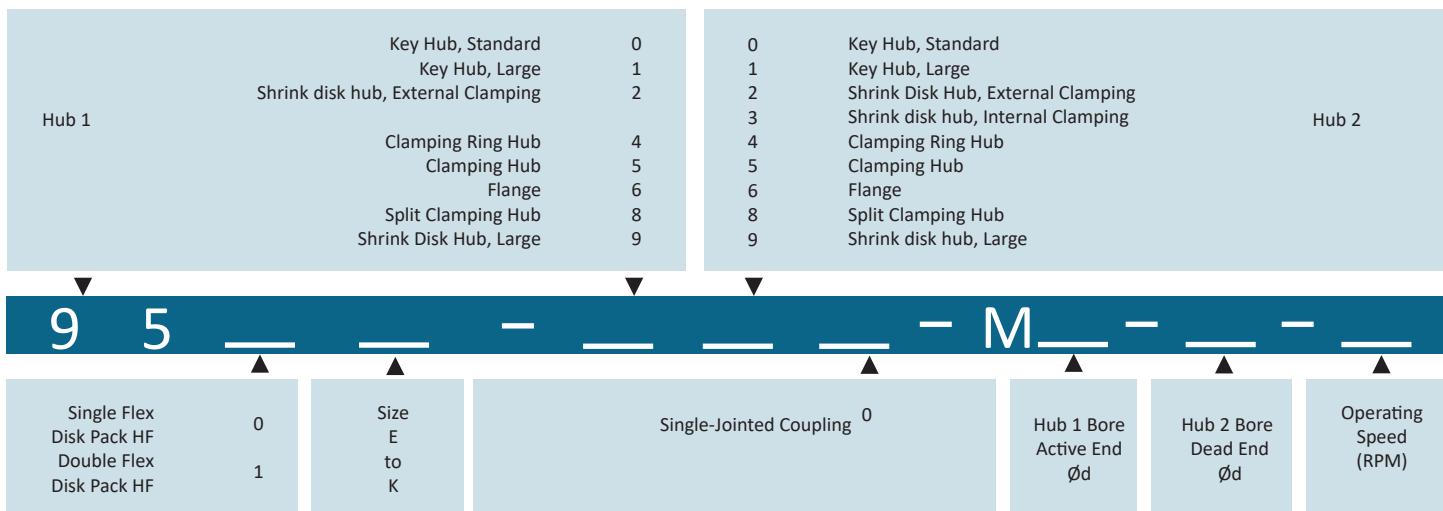
951 = double flex

PART NUMBER SIZES 3-15



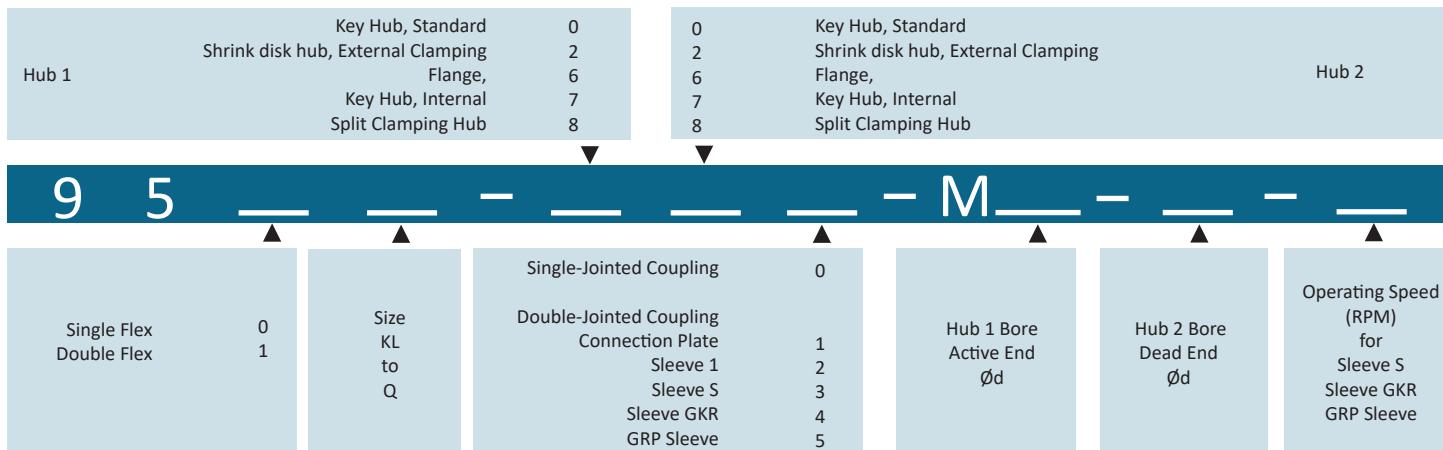
PART NUMBER SIZES 16-160

Backlash-free All-Steel Couplings



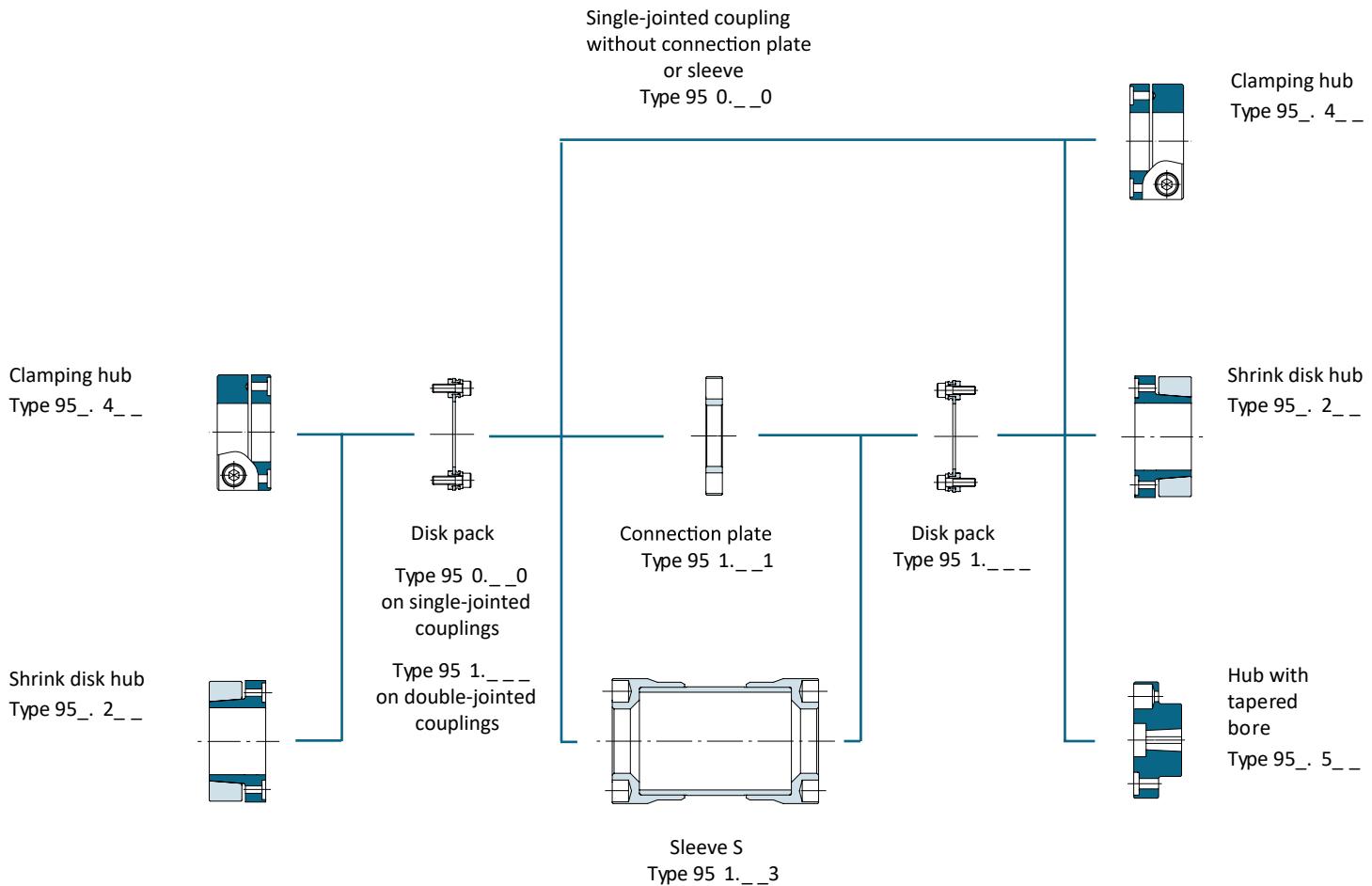
PART NUMBER SIZES 180-2200

Backlash-free All-Steel Couplings



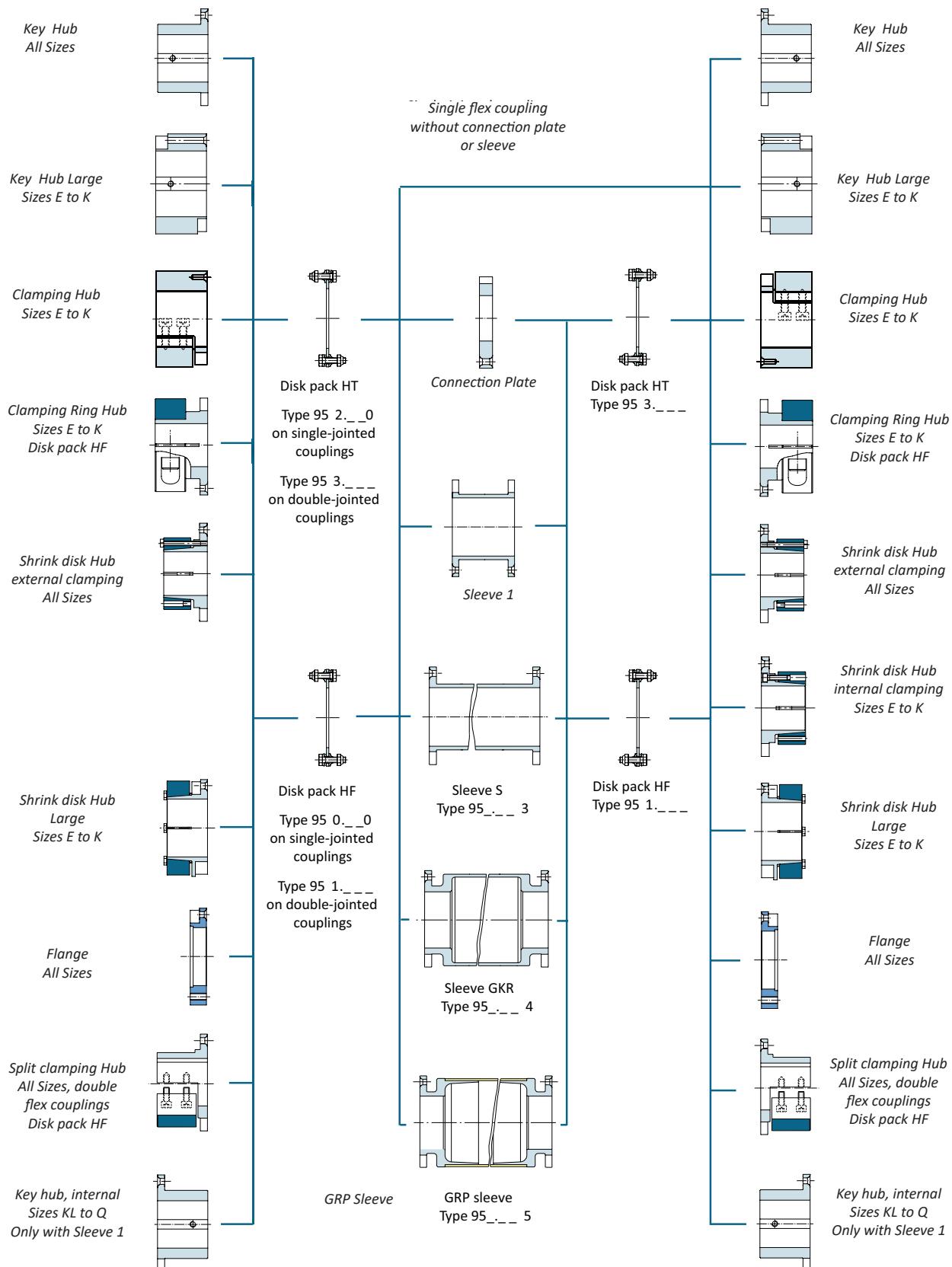
CONFIGURATION POSSIBILITIES/STANDARD DESIGNS

Backlash-free Aluminum Servo Couplings (Size 3-15)



CONFIGURATION POSSIBILITIES/STANDARD DESIGNS

Backlash-free All-Steel Couplings (Size E-Q)



ROBA SIZES 3 TO 15 SINGLE JOINTED WITH CLAMPING HUBS

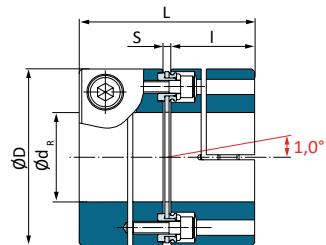
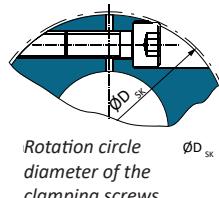
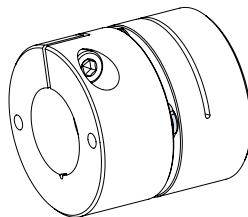


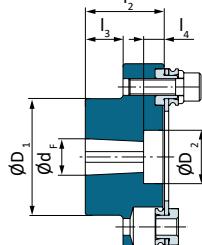
Fig 1. 950E440-MX-XXX



Rotation circle
diameter of the
clamping screws
 ϕD_{SK}



Alternative shaft connection
Hub with tapered bore



(Only for sizes A and B)

TECHNICAL DATA AND MAIN DIMENSIONS

DIN Size	3	6	10	15	
Nominal torque ¹⁾	T_{KN} [Nm]	35	60	100	150
Peak torque ²⁾	T_{KS} [Nm]	52	90	150	225
Alternating torque	T_{KW} [Nm]	21	36	60	90
Outer diameter	D [mm]	45	56	69	79
Minimum hub bore ^{3) 4)}	d_R^{H7} min [mm]	10	14	19	25
Maximum hub bore ^{3) 4)}	d_R^{H7} max [mm]	20	28	35	42
Maximum speed ⁵⁾	with clamping hub n_{max} [rpm]	135,000	108,000	15,000	13,000
	with hub with tampered red bore n_{max} [rpm]	135,000	108,000	15,000	13,000
Permitted misalignments ⁶⁾	Perm. axial misalignment ^{7) 8)} ΔK_a [mm]	0.5	0.7	0.9	1.1
	Perm. radial misalignment ^{4) 5)} with connecting plate ΔK_r [mm]	0.15	0.15	0.2	0.2
	with sleeve S ΔK_{rH} [mm]	1.6	1.1	1.1	1.1
Spring Rigidities	Torsion ⁹⁾ disk pack C_{TLP} [10 ³ Nm/rad]	17	35	60	145
		$C_{TH rel.}$ [10 ⁶ Nm mm/rad]	3.3	6.8	12

DIMENSIONS [mm]								
Size	3	6	10	15				
D_{SK}	47	-	71	-				
d_3	17	22.5	33.5	40				
H_s	acc. customer specs							
h_2	40	50	60	70				
L	48.5	52.6	66.9	69.9				
L_2	59	64.7	79.3	82.8				
L_6	dependent on H_s							
I	23	25	32	33.5				
S	2.5	2.6	2.9	2.9				
U	28	32	40	46				
U_1	13	14.7	15.5	15.8				
Hub with tapered bore	$d_F \pm 0.05$	11	14	11	14	16	-	-
	D_1	27	27	35	35	35	-	-
	D_2	16	21	16	25	25	-	-
	I_2	23	30	23	30	40	-	-
	I_3	13	20	11	18	28	-	-
	I_4	6	10	6	10	10	-	-

MASS MOMENTS OF INERTIA J [10 ⁻³ kgm ²]				
Size	3	6	10	15
Disk Pack ¹¹⁾	0.006	0.018	0.035	0.077
Clamping Hub ¹²⁾	0.021	0.054	0.164	0.295
Hub with tape red bore ¹²⁾	0.012	0.039	-	-
Connecting plate	0.018	0.050	0.121	0.208
Sleeve S with $H_s = 1000$ mm	0.349	0.755	1.373	2.341
Sleeve S per 1000 mm tube	0.323	0.682	1.175	1.981

WEIGHT [kg]				
Size	3	6	10	15
Disk Pack ¹¹⁾	0.023	0.041	0.050	0.077
Clamping Hub ¹²⁾	0.070	0.112	0.221	0.297
Hub with tape red bore ¹²⁾	0.053	0.121	-	-
Connecting plate	0.063	0.111	0.161	0.218
Sleeve S with $H_s = 1000$ mm	1.009	1.361	1.678	2.079
Sleeve S per 1000 mm tube	0.938	1.231	1.443	1.762

ROBA SIZES 3 TO 15 DOUBLE-JOINTED WITH CONNECTION PLATE AND CLAMPING HUBS

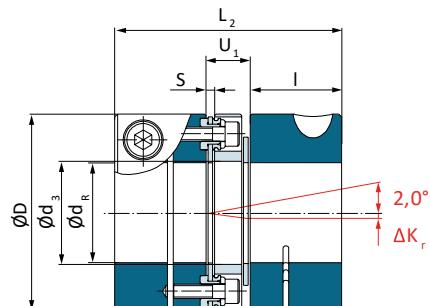
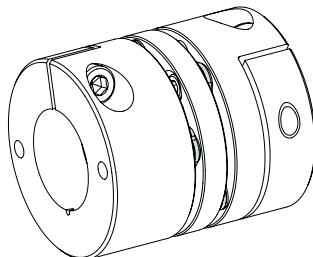


Fig 3. 951E441-MX-XXX



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

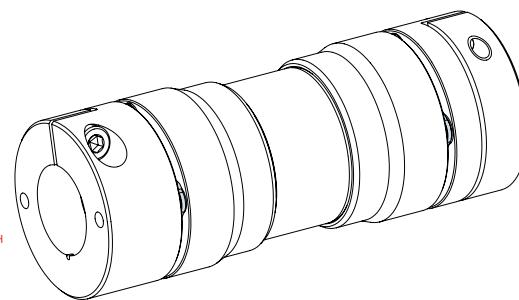
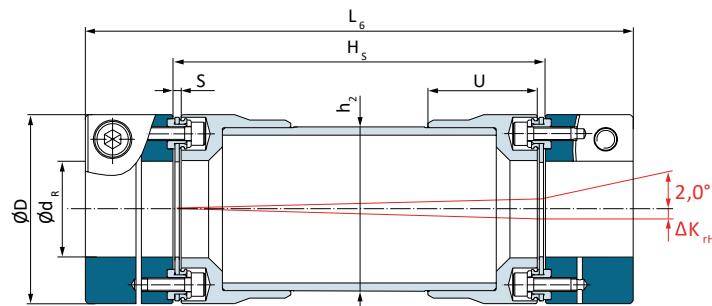


Fig 4. 951E443-MX-XXX (Sleeve S)

ORDER NUMBER

9	5	—	—	4	—	—	M	—	XXX	
Single Flex Double Flex	0 1	—	—	Single-Jointed Coupling Double-Jointed Coupling Sleeve S	0 1 3	4	Hub 1 Bore Active End Ød	Hub 2 Bore Dead End Ød	Sleeve length Hs (mm)	Operating Speed (RPM) for Sleeve

Example: 10 / 951.441 / Hub 1 - Ø 25^{H7} / Hub 2 - Ø 25^{H7}

*Standard H7, other tolerances possible

** Clamping hub also available with keyway

*** Only sizes 3 and 6

1. Valid for max. permitted shaft misalignment.
2. Valid for one rotational direction, max. stress $\leq 10^5$.
3. Recommended hub/shaft tolerance: H7/k6
4. Preferred bores and transmittable torques dependent on bore see page 57.
5. Not valid for coupling with sleeve S.
6. The permitted may not simultaneously reach their maximum values.

7. The values refer to couplings with 2 disk packs.
8. Only permitted as a static or virtually static value.
9. The C- value of double jointed coupling can be roughly calculated as follows: $C_{T \text{ tot.}} = \frac{1}{\frac{H}{C_{TLP}} + \frac{s [\text{mm}] \cdot 2S [\text{mm}]}{T_{\text{rel.}}}}$
10. The values refer to 1 disk pack.
11. Mass moments of inertia and weights are valid for 1 disk pack.
12. Mass moments of inertia and weights are valid for maximum bore.

ROBA SIZES 3 TO 15 DOUBLE-JOINTED WITH SHRINK DISK HUBS

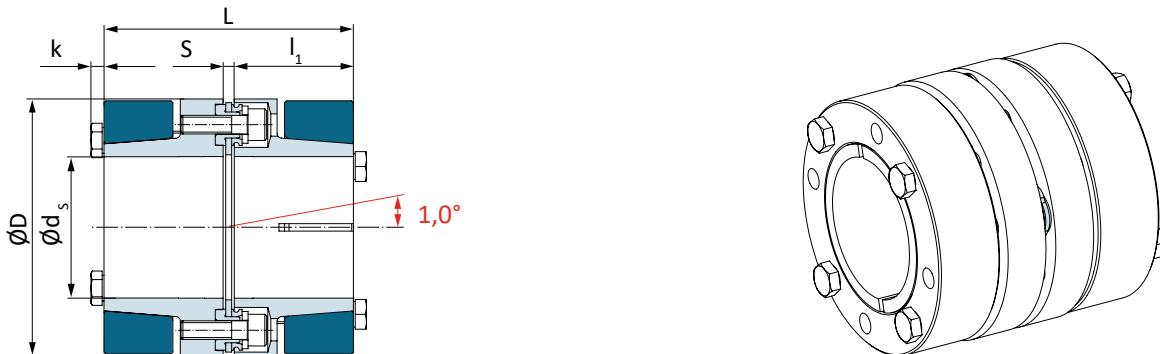


Fig 5. 950E220-MX-XXX

TECHNICAL DATA AND MAIN DIMENSIONS								
DIN Size				3	6	10	15	
Nominal torque ¹⁾		T_{KN}	[Nm]	35	60	100	150	
Peak torque ²⁾		T_{KS}	[Nm]	52	90	150	225	
Alternating torque		T_{KW}	[Nm]	21	36	60	90	
Outer diameter		D	[mm]	45	56	69	79	
Minimum hub bore ^{3) 4) 5)}		$d_{S \ min}^{H7}$	[mm]	10	14	19	25	
Maximum hub bore ^{3) 4)}		$d_{S \ max}^{H7}$	[mm]	20	28	35	42	
Maximum speed ⁶⁾		n_{max}	[rpm]	22,500	18,000	15,000	13,000	
Permitted misalignments ⁷⁾	Perm. axial misalignment ^{8) 9)}		ΔK_a	[mm]	0.5	0.7	0.9	1.1
	Perm. radial misalignment ⁸⁾	with connecting plate	ΔK_r	[mm]	0.15	0.15	0.2	0.2
Spring Rigidities		with sleeve S	ΔK_{RH}	[mm]	$(H_s - S) \times 0.0174$			
Torsion ¹⁰⁾	disk pack	C_{TLP}	[10^3 Nm/rad]	17	35	60	145	
	tube sleeve S	$C_{TH \ rel.}$	[10^6 Nm mm/rad]	3.3	6.8	12	19	
Angular Spring Rigidity			[Nm/rad]	43	64	76	229	

DIMENSIONS [mm]				
Size	3	6	10	15
d_3	17	22.5	35.5	40
H_s	acc. customer specs			
h_2	40	50	60	70
k	2.8	3.5	3.5	3.5
L	50.5	58.6	66.9	77.9
L_2	61	70.7	79.3	90.8
L_6	dependent on H_s			
I_1	24	28	32	37.5
S	2.5	2.6	2.9	2.9
U	28	32	40	46
U_1	13	14.7	15.3	15.8

MASS MOMENTS OF INERTIA J [10^{-3} kgm ²]				
Size	3	6	10	15
Disk Pack ¹²⁾	0.006	0.018	0.035	0.077
Shrink Disk Hub ¹³⁾	0.043	0.129	0.303	0.605
Connecting plate	0.018	0.050	0.121	0.208
Sleeve S with $H_s = 1000$ mm	0.349	0.755	1.373	2.341
Sleeve S per 1000 mm tube	0.323	0.682	1.175	1.981

WEIGHT [kg]				
Size	3	6	10	15
Disk Pack ¹²⁾	0.023	0.041	0.050	0.077
Clamping Hub ¹³⁾	0.142	0.254	0.379	0.570
Connecting plate	0.063	0.111	0.161	0.218
Sleeve S with $H_s = 1000$ mm	1.009	1.361	1.678	2.079
Sleeve S per 1000 mm tube	0.938	1.231	1.443	1.762

1. Valid for max. permitted shaft misalignment.
2. Valid for one rotational direction, max. stress $\leq 10^5$.
3. Recommended hub/shaft tolerance: H7/g6
4. On shrink disk hubs, the preferred bores are identical to the preferred bores on the clamping hubs see page 57.
5. $\phi 10$: frictionally locking transmittable torque = 80% of T
6. Not valid for coupling with sleeve S.
7. The permitted misalignments may not simultaneously reached their maximum values.

$$\frac{C_{T \ tot.}}{2} = \frac{H}{\frac{C_{TLP}}{C_{TH \ rel.}} + \frac{s \ [mm] - 2S \ [mm]}{T_{Hrel.}}}$$

8. The values refer to couplings with 2 disk packs.
 9. Only permitted as a static or virtually static value.
 10. The C_r -value of a double jointed coupling can be roughly calculated as follows:
 11. The values refer for 1 disk pack.
 12. Mass moments of inertia and weights are valid for 1 disk pack.
 13. Mass moments of inertia and weights are valid for maximum bore.

ROBA SIZES 3 TO 15 DOUBLE-JOINTED WITH CONNECTION PLATE AND SHRINK DISK HUBS

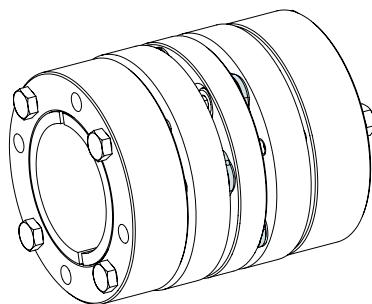
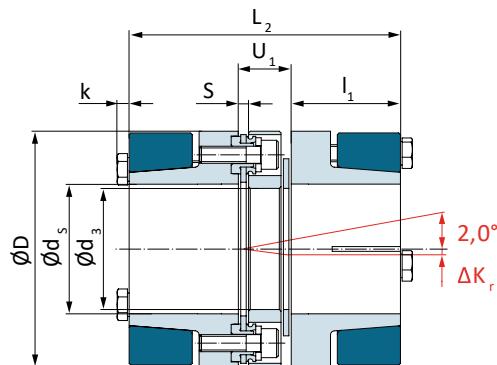


Fig 6. 951E221-MX-XXX

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

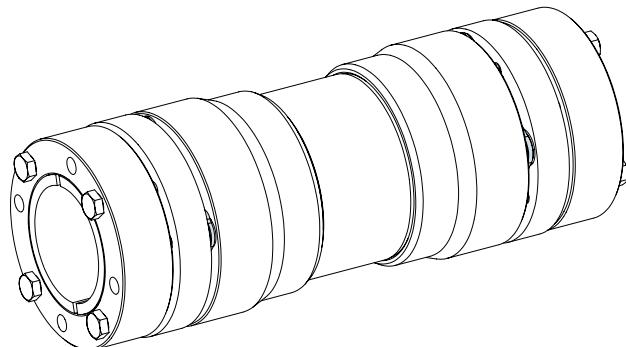
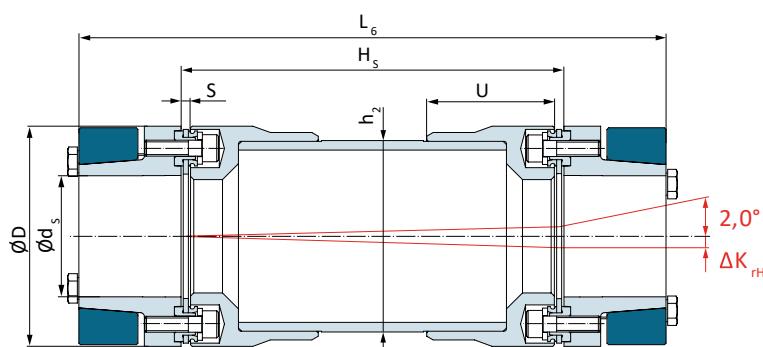
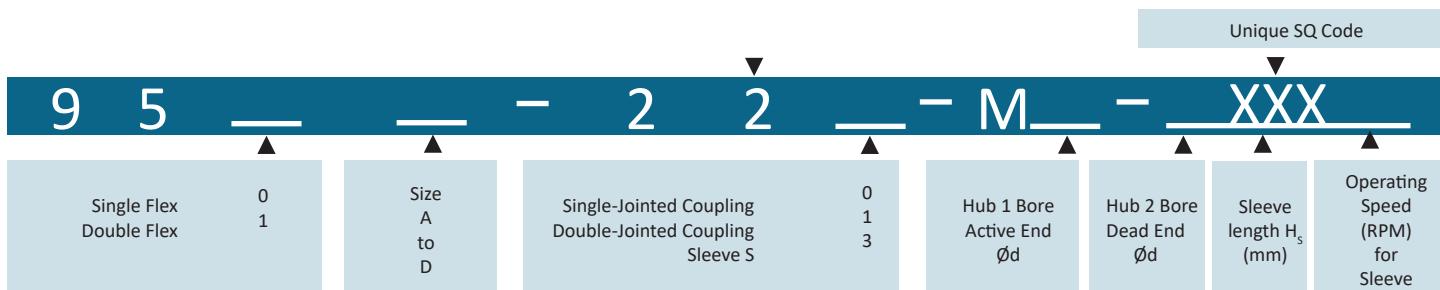


Fig 7. 951E223-MX-XXX (Sleeve S)

ORDER NUMBER



Example: 951C221-M25-25

*Standard H7, other tolerances possible

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE-JOINTED WITH CONNECTION PLATE AND KEY HUBS

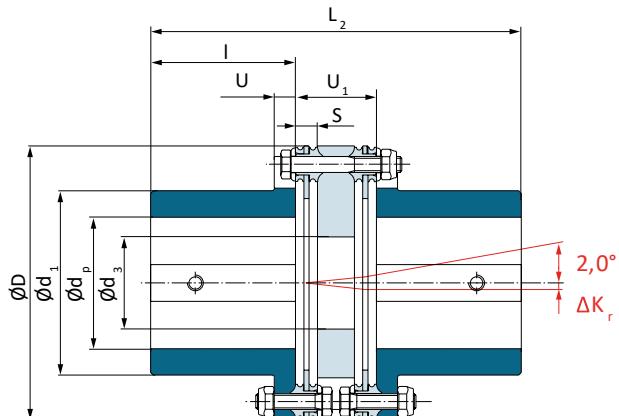
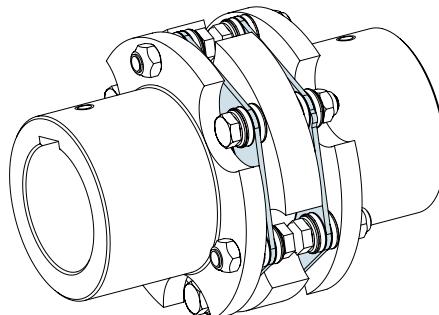


Fig 30. 951E001-MX-XXX



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

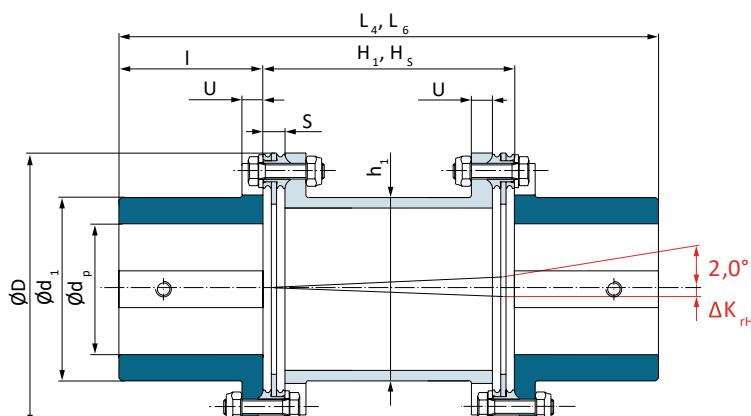
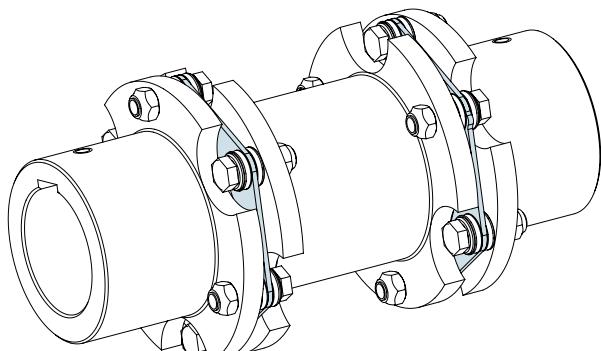


Fig 31. 951E002-MX-XXX (Sleeve 1)

951E003-MX-XXX (Sleeve S)



ORDER NUMBER

ORDER NUMBER									
Unique SQ Code									
9	5	—	—	—	0	0	—	M	—
Single Flex Double Flex	0 1	—	—	—	Single-Jointed Coupling Connecting Plate Sleeve 1 Sleeve S Sleeve GKR Sleeve CRP	0 1 2 3 4 5	—	Hub 1 Bore Active End $\varnothing d$	Hub 2 Bore Dead End $\varnothing d$
		Size E to K					—	Sleeve length H_s (mm) for special sleeves S / GKR / CRP	Operating Speed (RPM) for Sleeve

Example: 16 / 951. 001 / Hub 1 – $\varnothing 25^{H7}$ / Hub 2 - $\varnothing 25^{H7}$

*Standard H7, other tolerances possible

ROBA SIZES 16 TO 160 DISK PACK HF- SINGLE JOINTED WITH KEY HUBS, LARGE

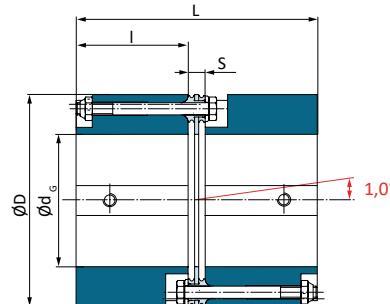
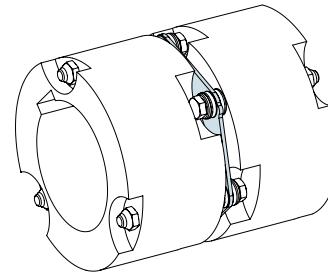


Fig 32. 950E110-MX-XXX



TECHNICAL DATA AND MAIN DIMENSIONS											
DIN Size				16	25	40	64	100	160		
Nominal torque ¹⁾		T _{KN}	[Nm]	190	290	450	720	1000	1600		
Peak torque ²⁾		T _{KS}	[Nm]	285	435	675	1080	1500	2400		
Outer diameter		D	[Nm]	77	89	104	123	143	167		
Minimum hub bore		d _{p min}	[mm]	30	35	45	55	65	75		
Maximum hub bore		d _{p max}	[mm]	45	55	65	75	95	100		
Maximum speed ³⁾		n _{max}	[rpm]	13,600	11,800	10,100	8,500	7,300	6,200		
Permitted misalignments ⁴⁾	Perm. axial misalignment ^{5) 6)}			ΔK _a	[mm]	1.1	1.3	1.5	1.8	2.1	2.5
	Perm. radial misalignment ⁵⁾	with connecting plate		ΔK _r	[mm]	0.3	0.3	0.4	0.45	0.45	0.55
		with sleeve 1		ΔK _{RH}	[mm]	1.0	1.2	1.5	1.8	2.1	2.2
		with sleeve S		ΔK _{RH}	[mm]	(H _s -S) x 0.0174					
Spring Rigidities	Torsion ¹⁰⁾		disk pack	C _{TLP}	[10 ³ Nm/rad]	145	280	301	748	1135	1920
			tube sleeve S	C _{TH rel.}	[10 ⁶ Nm mm/rad]	19	34	71	108	217	415
	Angular Spring Rigidity ⁷⁾				[Nm/rad]	229	248	298	876	1089	1990

DIMENSIONS [mm]						
Size	16	25	40	64	100	160
d ₃	33	41	46	51	66	76
H ₁	70	80	96	116	136	140
H _S	acc. customer specs					
h ₁	50	60	70	80	100	110
L	87.1	97.2	118.4	139.6	160	181.6
L ₂	106.2	116.4	140.8	167.2	188	215.2
L ₄	150	170	206	246	286	310
L ₆	dependent on H _S					
I	40	45	55	65	75	85
S	7.1	7.2	8.4	9.6	10	11.6
U	7	7	8	10	10	12
U ₄	26.2	26.4	30.8	37.2	38	45.2

MASS MOMENTS OF INERTIA J[10 ⁻³ kgm ²]						
Size	16	25	40	64	100	160
Disk Pack ⁸⁾	0.08	0.12	0.26	0.74	1.19	3.27
Hub ⁹⁾	0.86	1.71	3.89	8.98	18.12	36.00
Connecting plate	0.23	0.44	0.95	2.30	4.60	9.72
Sleeve 1	0.32	0.61	1.38	3.02	6.10	12.96
Sleeve S with H _S =1000 mm	2.11	3.77	7.81	12.62	24.98	49.43
Sleeve S per 1000 mm tube	1.93	3.43	7.12	10.86	21.86	41.61

WEIGHT [kg]						
Size	16	25	40	64	100	160
Disk Pack ⁸⁾	0.08	0.09	0.15	0.29	0.35	0.67
Clamping Hub ⁹⁾	0.87	1.26	2.08	3.47	4.94	7.23
Connecting plate	0.31	0.43	0.68	1.19	1.96	2.96
Sleeve 1	0.39	0.54	0.93	1.46	2.04	3.38
Sleeve S with H _S =1000 mm	3.63	4.42	6.82	8.09	10.22	16.83
Sleeve S per 1000 mm tube	3.48	4.22	6.51	7.50	9.47	15.34

- Valid for alternating loads as well as max. permitted shaft alignment.
- Valid for one rotational direction, max. stress ≤ 10°.
- Not valid for coupling with sleeve S.
- The permitted misalignments may not simultaneously reach their maximum values.
- The values refer to couplings with 2 disk packs.
- Only permitted as a static or virtually static value.

- The C_T-value of a double jointed coupling can be roughly calculated as follows: $C_{T \text{ tot.}} = \frac{1}{\frac{H}{C_{TLP}} + \frac{s \text{ [mm]} - 2S \text{ [mm]}}{C_{TLP} C_{TH \text{ rel.}}}}$
- The values refer to 1 disk pack.
- Mass moments of inertia and weights are valid for 1 disk pack.
- Mass moments of inertia and weights are valid for maximum bore.

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE-JOINTED WITH CONNECTION PLATE AND KEY HUBS, LARGE

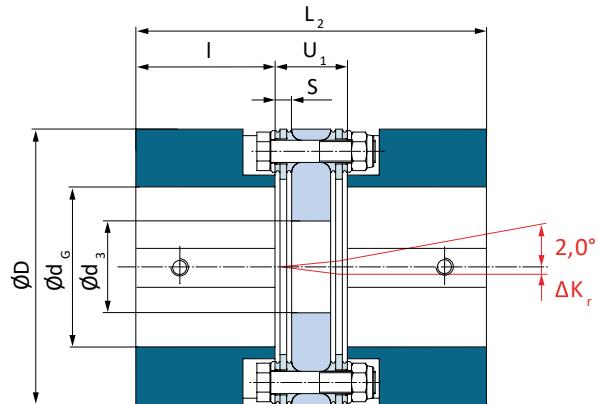


Fig 33. 951E111-MX-XXX

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

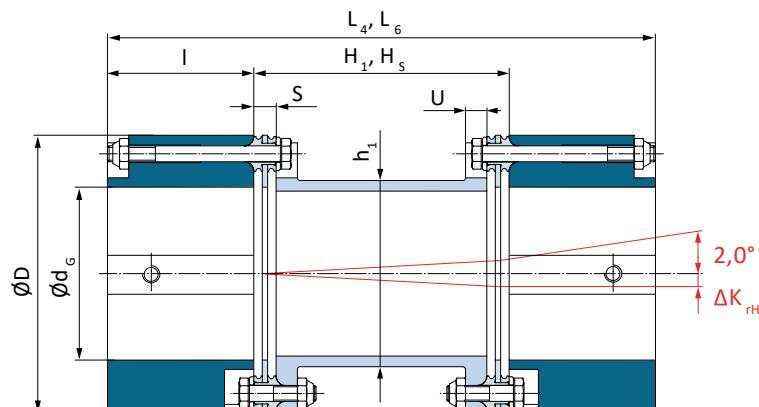
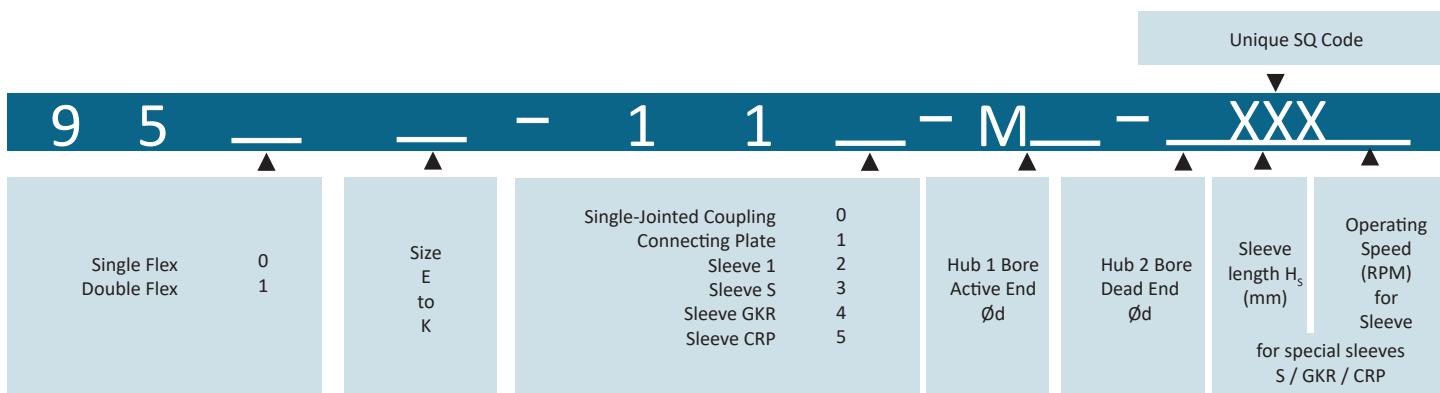


Fig 34. 951E112-MX-XXX (Sleeve 1)

951E113-MX-XXX (Sleeve S)

ORDER NUMBER



Example: 951E110-M45-045

*Standard H7, other tolerances possible

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE JOINTED WITH CONNECTION PLATE AND CLAMPING HUBS

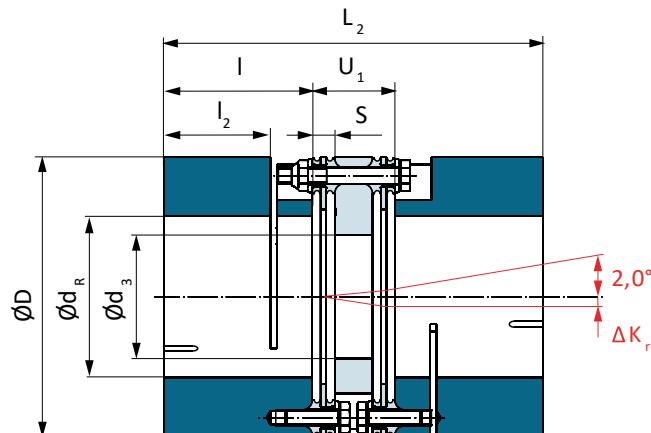
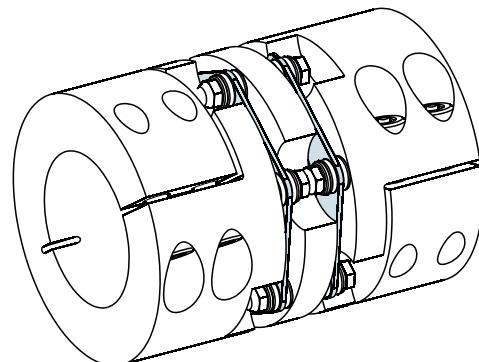


Fig 36. 951E551-MX-XXX



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

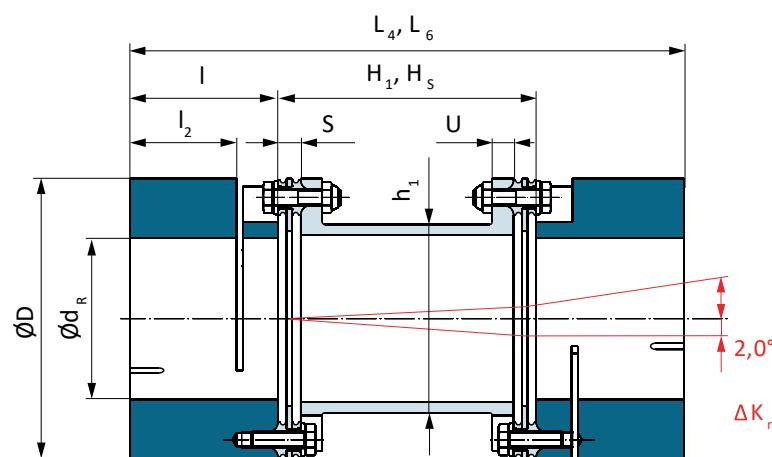
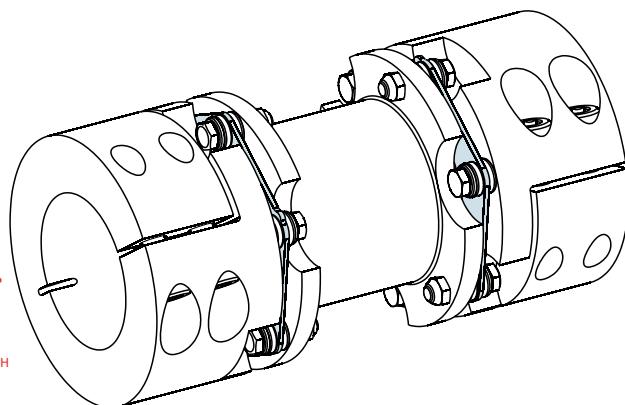
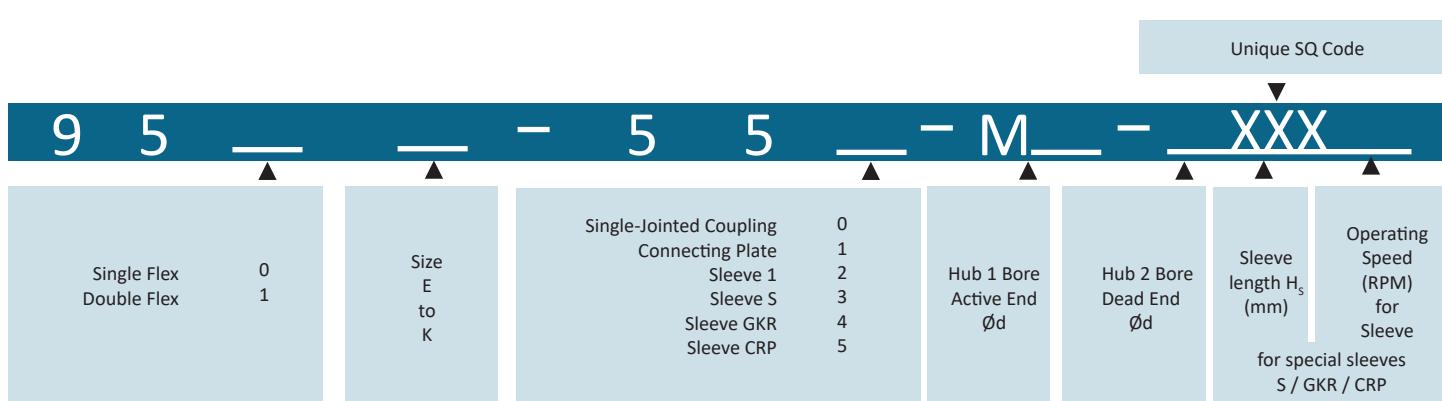


Fig 37. 951E552-MX-XXX (Sleeve 1)



951E553-MX-XXX (Sleeve S)

ORDER NUMBER



Example: 951E551-M45-045

*Standard H7, other tolerances possible

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE JOINTED WITH CONNECTION PLATE AND CLAMPING RING HUBS

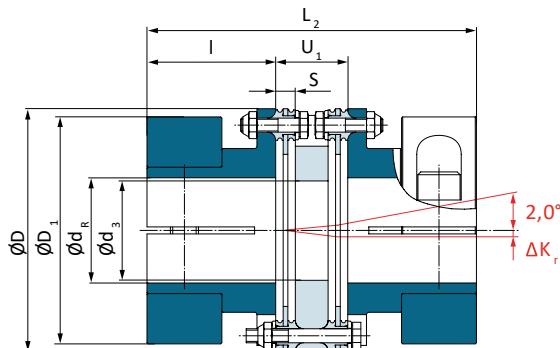


Fig 39. 951E441-MX-XXX

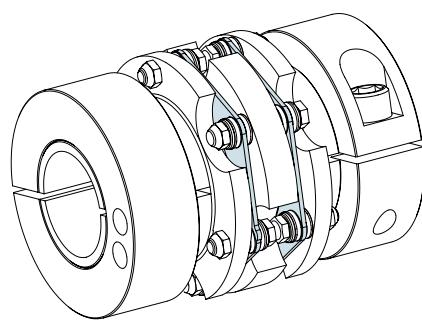


Fig 39. 951E441-MX-XXX

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

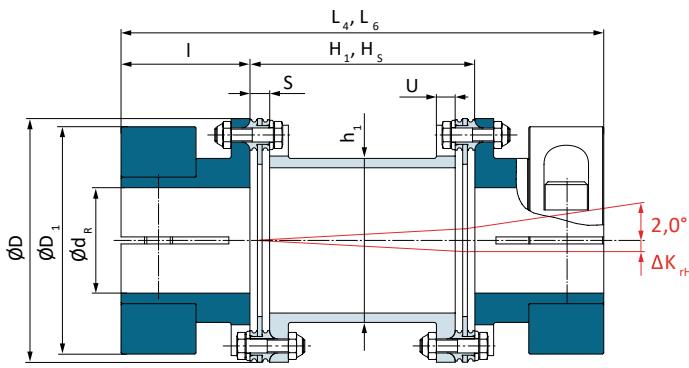
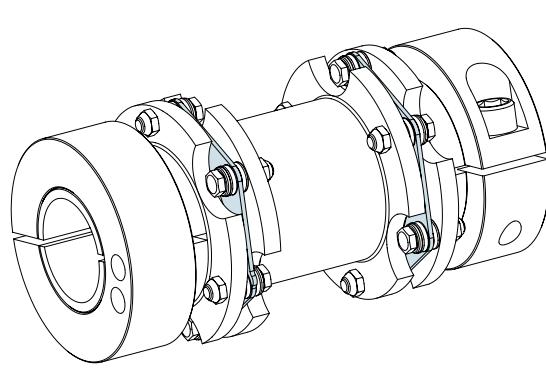
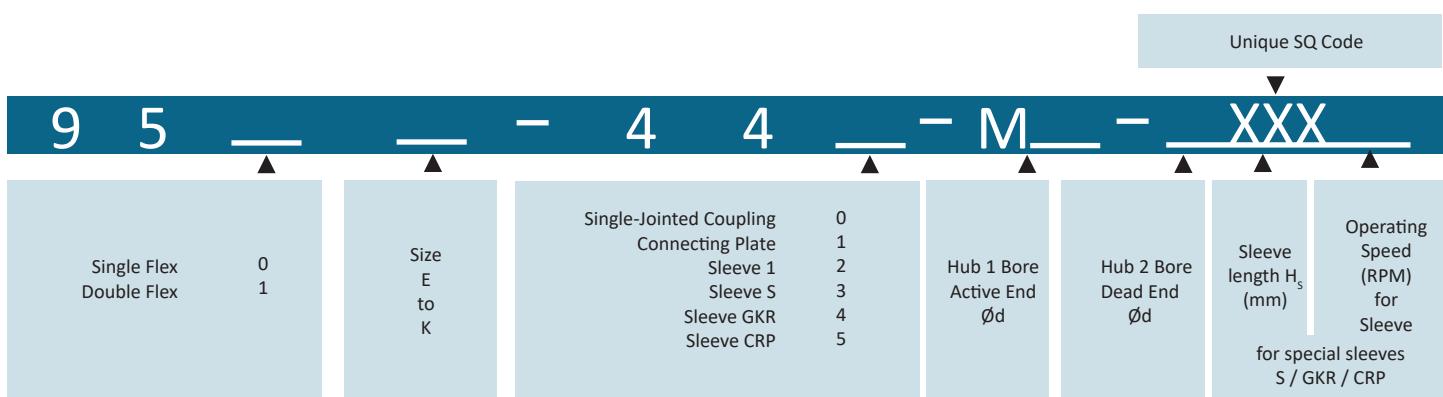


Fig 40. 951E442-MX-XXX (Sleeve 1)



951E443-MX-XXX (Sleeve S)

ORDER NUMBER



Example: 951E441-M25-025

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.

2. Valid for one rotational direction, max. stress $\leq 10^{\circ}$.

3. Transmittable torques dependent on bore see page - ?

4. Not valid for coupling with sleeve S.

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

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

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

8. The $C_{f, \text{tot}}$ -value of a double jointed coupling can be roughly calculated as follows:
$$\frac{1}{2} C_{f, \text{tot}} = \frac{1}{\frac{H}{C_{TLP}} + \frac{s [\text{mm}] - 2S [\text{mm}]}{C_{Trel}}}$$

9. The values refer to 1 disk pack.
10. Mass moments of inertia and weights are valid for 1 disk pack.
11. Mass moments of inertia and weights are valid for maximum bore.

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE JOINTED WITH CONNECTION PLATE AND SHRINK DISK HUBS, EXTERNAL CLAMPING

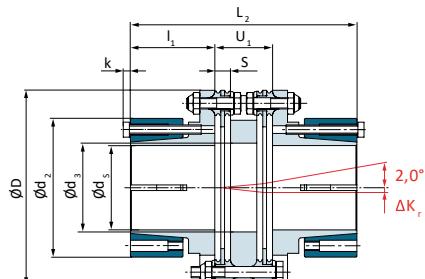
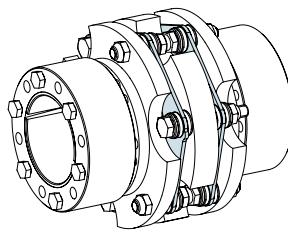


Fig 42. 951E221-MX-XXX



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

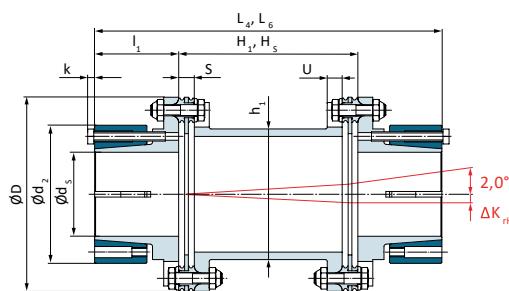


Fig 43. 951E222-MX-XXX (Sleeve 1)

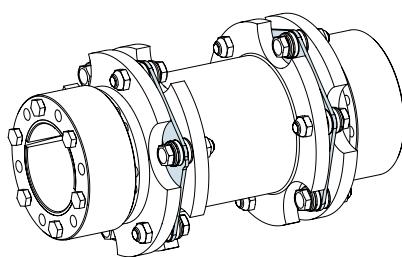
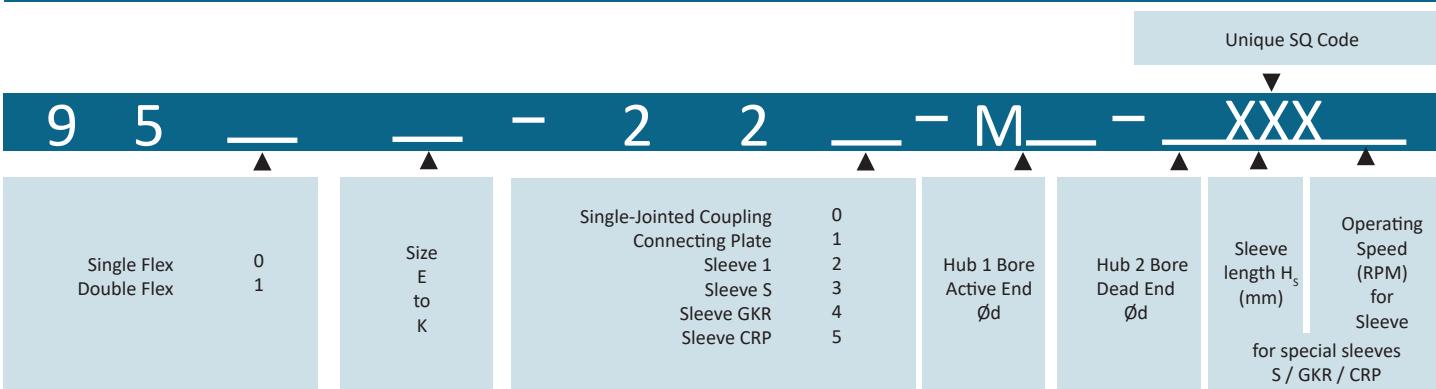
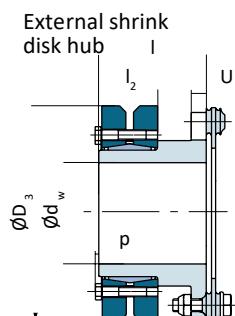


Fig 43. 951E223-MX-XXX (Sleeve S)

ORDER NUMBER



ADDITIONAL OPTION					
Size	d	D	I	I	p
16	24/25 28/30	60 72	40 40	25 27.5	- 2.5
25	32/35 38/40/42	80 90	45 45	29.5 31.5	- 1.5
40	42/45/48	100	55	34.5	-
64	50/55/60	115	65	34.5	-
100	50/55/60	138	75	38	-
160	65/70/75	155	85	44.5	-



Example: 951E221-M45-045

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^\circ$.
3. Transmittable torques dependent on bore see page - ?
4. Not valid for coupling with sleeve S.
5. The permitted misalignments may not simultaneously reach their maximum values.
6. The values refer to couplings with 2 disk packs.
7. Only permitted as a static or virtually static value.

8. The C_T -value of a double jointed coupling can be roughly calculated as follows:
The values refer to 1 disk pack.
9. Mass moments of inertia and weights are valid for 1 disk pack.
10. Mass moments of inertia and weights are valid for maximum bore.
11. Mass moments of inertia and weights are valid for maximum bore.

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

ROBA SIZES 16 TO 160 DISK PACK HF- SINGLE JOINTED WITH SHRINK DISK HUBS, EXTERNAL/INTERNAL CLAMPING

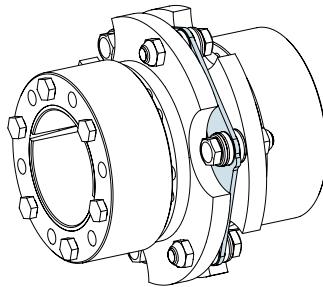
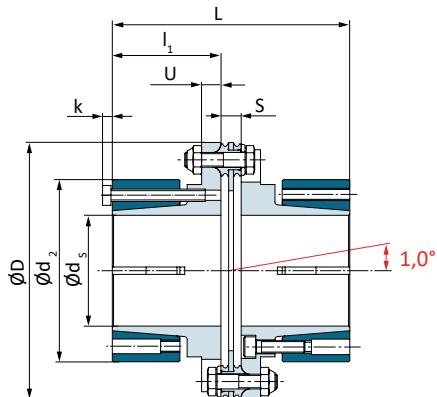


Fig 44. 951E220-MX-XXX

TECHNICAL DATA AND MAIN DIMENSIONS

DIN Size		16	25	40	64	100	160				
Nominal torque ¹⁾	T_{KN} [Nm]	190	290	450	720	1000	1600				
Peak torque ²⁾	T_{KS} [Nm]	285	435	675	1080	1500	2400				
Outer diameter	D [Nm]	77	89	104	123	143	167				
Minimum hub bore ³⁾	$d_{S\ min}$ [mm]	14	20	25	30	35	40				
Maximum hub bore ³⁾	$d_{S\ max}$ [mm]	26	36	45	45	55	65				
Maximum speed ⁴⁾	n_{max} [rpm]	13,600	11,800	10,100	8,500	7,300	6,200				
Permitted misalignments ⁵⁾	Perm. axial misalignment ⁶⁾⁷⁾			ΔK_a [mm]	1.1	1.3	1.5	1.8	2.1	2.5	
	Perm. radial misalignment ⁶⁾			ΔK_r [mm]	0.3	0.3	0.4	0.45	0.45	0.55	
	with connecting plate	ΔK_{RH} [mm]	1.0	1.2	1.5	1.8	2.1	2.2			
	with sleeve S	ΔK_{RH} [mm]	$(H_s - S) \times 0.0174$								
Spring Rigidities	Torsion ¹¹⁾			disk pack	C_{TLP} [10^3 Nm/rad]	145	280	301	748	1135	1920
	tube sleeve S	$C_{TH\ rel.}$ [10^6 Nm mm/rad]	19	34	71	108	217	415			
	Angular Spring Rigidity ⁸⁾					[Nm/rad]	229	248	298	876	1089

DIMENSIONS [mm]						
Size	16	25	40	64	100	160
d_2	53	64	74	84	104	118
d_3	33	41	46	51	66	76
H_1	70	80	96	116	136	140
H_s	acc. customer specs					
h_1	50	60	70	80	100	110
k	3.5	3.5	3.5	4	5.5	5.5
L	77.1	87.2	98.4	109.6	120	131.6
L_2	96.2	106.4	120.8	137.2	148	165.2
L_4	140	160	186	216	246	260
L_6	dependent on H_s					
I_1	35	40	45	50	55	60
S	7.1	7.2	8.4	9.6	10	11.6
U	7	7	8	10	10	12
U_1	26.2	26.4	30.8	37.2	38	45.2

MASS MOMENTS OF INERTIA J [10^{-3} kgm ²]						
Size	16	25	40	64	100	160
Disk Pack ⁹⁾	0.08	0.12	0.26	0.74	1.19	3.27
Hub ¹⁰⁾	0.27	0.57	1.15	2.46	5.59	11.14
Connecting plate	0.23	0.44	0.95	2.30	4.60	9.72
Sleeve 1	0.32	0.61	1.38	3.02	6.10	12.96
Sleeve S with $H_s = 1000$ mm	2.11	3.77	7.81	12.62	24.98	49.43
Sleeve S per 1000 mm tube	1.93	3.43	7.12	10.86	21.86	41.61

WEIGHT [kg]						
Size	16	25	40	64	100	160
Disk Pack ⁹⁾	0.08	0.09	0.15	0.29	0.35	0.67
Clamping Hub ¹⁰⁾	0.49	0.71	1.03	1.71	2.73	3.99
Connecting plate	0.31	0.43	0.68	1.19	1.96	2.96
Sleeve 1	0.39	0.54	0.93	1.46	2.04	3.38
Sleeve S with $H_s = 1000$ mm	3.63	4.42	6.82	8.09	10.22	16.83
Sleeve S per 1000 mm tube	3.48	4.22	6.51	7.50	9.47	15.34

**ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE-JOINTED WITH CONNECTION PLATE SHRINK DISK HUBS,
EXTERNAL/INTERNAL CLAMPING**

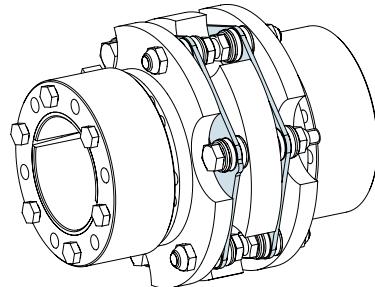
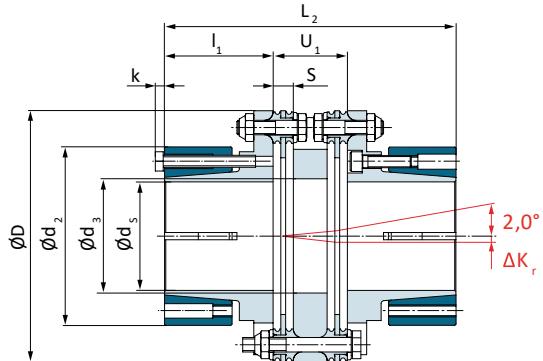


Fig 45. 951E321-MX-XXX

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

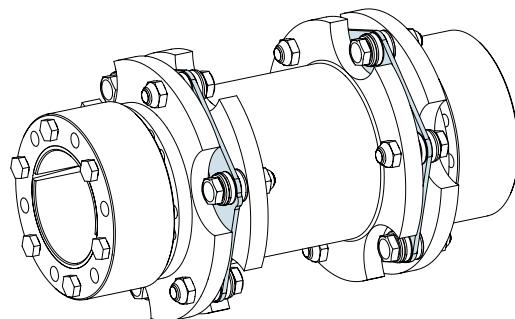
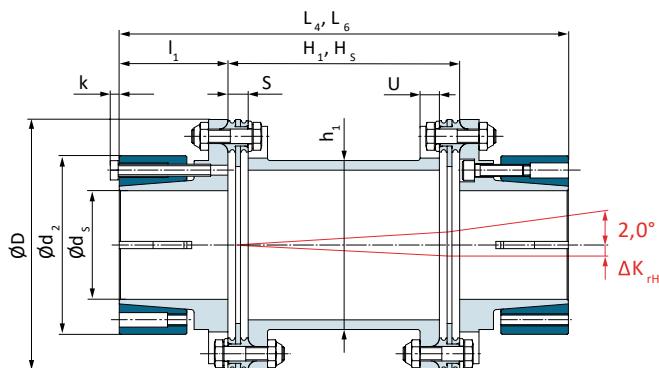
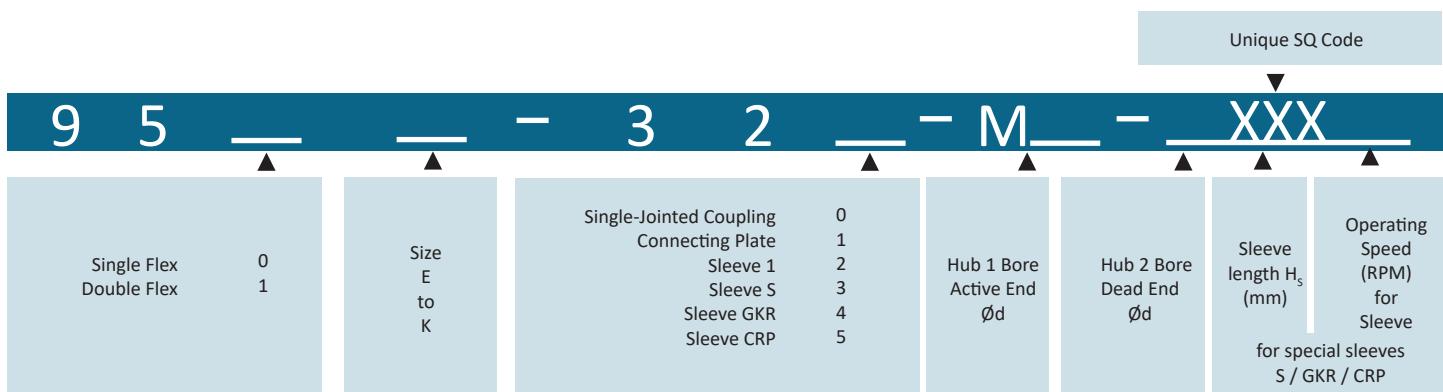


Fig 46. 951E322-MX-XXX (Sleeve 1)

951E323-MX-XXX (Sleeve S)

ORDER NUMBER



Example: 951E321-M35-035

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^{\circ}$.
3. Transmittable torques dependent on bore see page - ?
4. Not valid for coupling with sleeve S.
5. The permitted misalignments may not simultaneously reach their maximum values.
6. The values refer to couplings with 2 disk packs.
7. Only permitted as a static or virtually static value.

8. The $C_{T_{\text{tot}}}$ -value of a double jointed coupling can be roughly calculated as follows:
9. The values refer to 1 disk pack.
10. Mass moments of inertia and weights are valid for 1 disk pack.
11. Mass moments of inertia and weights are valid for maximum bore.

$$C_{T_{\text{tot}}} = \frac{1}{\frac{2}{C_{T_{LP}}} C + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{T_{HL}}}}$$

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE-JOINTED WITH CONNECTION PLATE AND SHRINK DISK HUBS, LARGE

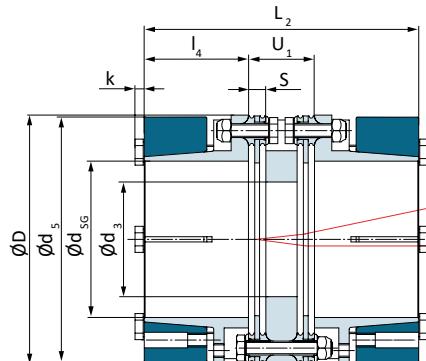
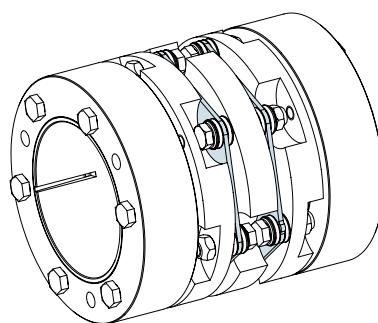


Fig 48. 951E991-MX-XXX



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

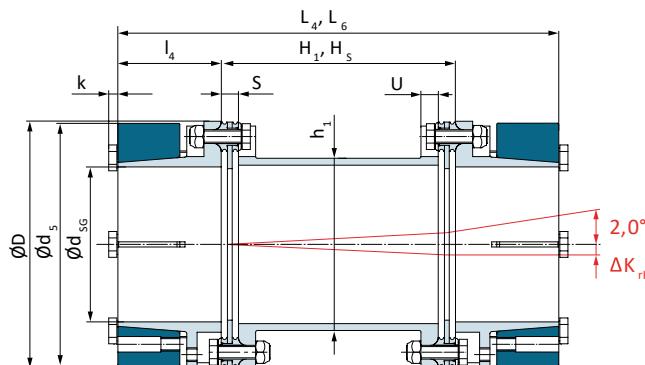
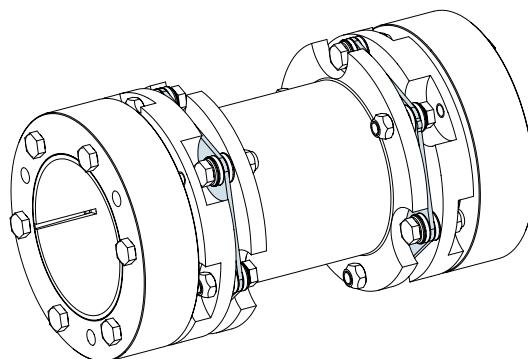
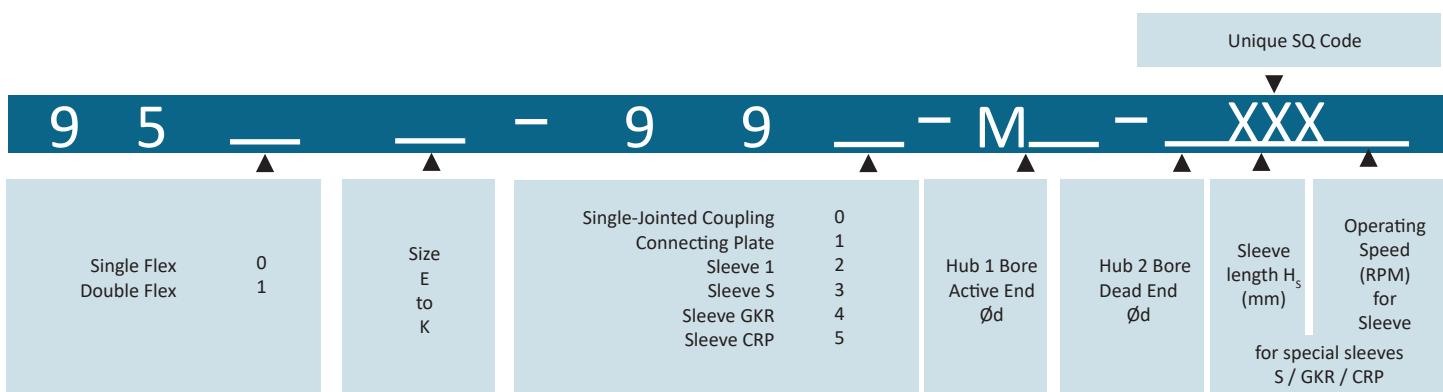


Fig 49. 951E992-MX-XXX (Sleeve 1)

951E993-MX-XXX (Sleeve S)



ORDER NUMBER



Example: 951E991-M35-035

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^5$.
3. Transmittable torques dependent on bore see page - ?
4. Not valid for coupling with sleeve S.
5. The permitted misalignments may not simultaneously reach their maximum values.
6. The values refer to couplings with 2 disk packs.
7. Only permitted as a static or virtually static value.

8. The C_T -value of a double jointed coupling can be roughly calculated as follows:
9. The values refer to 1 disk pack.
10. Mass moments of inertia and weights are valid for 1 disk pack.
11. Mass moments of inertia and weights are valid for maximum bore.

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

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE-JOINTED WITH SLEEVE 1 OR SLEEVE S AND SPLIT CLAMPING HUBS

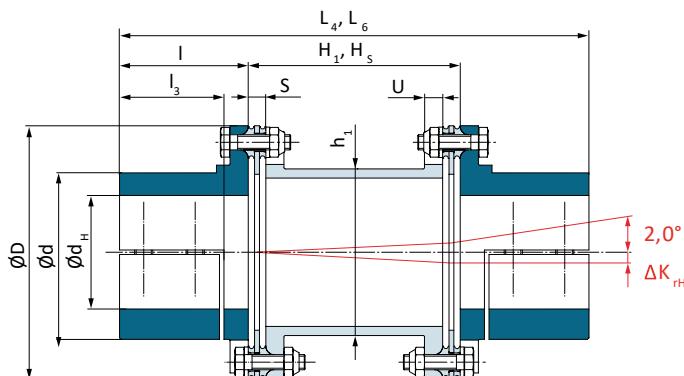
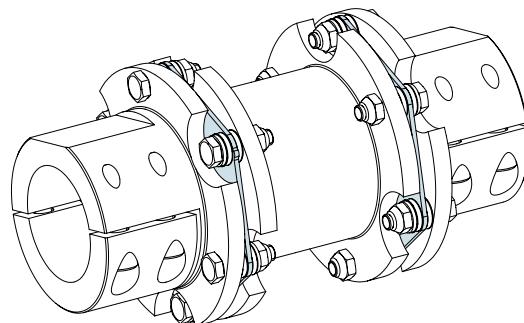


Fig 51. 951E882-MX-XXX (Sleeve 1)
951E883-MX-XXX (Sleeve S)



Option keyway design according to DIN 6885 possible

Installation coupling with split clamping hubs

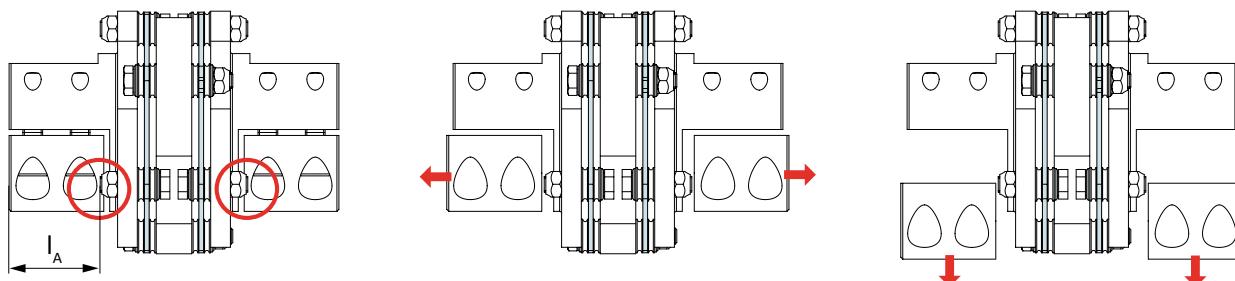


Fig 52. Axial displacement of the split clamping hubs during radial installation/dismantling (only necessary on 951E881-MX-XXX)

ORDER NUMBER

9 5 1 - 8 8 - M - XXX										Unique SQ Code
Size E to K	Single-Jointed Coupling Connecting Plate Sleeve 1 Sleeve S Sleeve GKR Sleeve CRP	0 1 2 3 4 5	Hub 1 Bore Active End $\varnothing d$	Hub 2 Bore Dead End $\varnothing d$	Sleeve length H_s (mm)	Operating Speed (RPM) for Sleeve S / GKR / CRP				

Example: 951E881-M50-050

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^\circ$.
3. Transmittable torques dependent on bore see page - ?
4. Not valid for coupling with sleeve S.
5. The permitted misalignments may not simultaneously reach their maximum values.
6. The values refer to couplings with 2 disk packs.
7. Only permitted as a static or virtually static value.

8. The C_T -value of a double jointed coupling can be roughly calculated as follows:
9. The values refer to 1 disk pack.
10. Mass moments of inertia and weights are valid for 1 disk pack.
11. Mass moments of inertia and weights are valid for maximum bore.

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

ROBA SIZES 16 TO 160 DISK PACK HF- DOUBLE-JOINTED WITH CONNECTION PLATE FLANGES

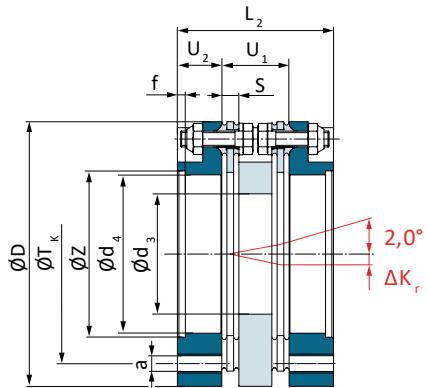
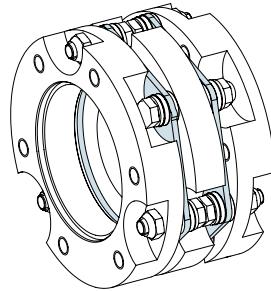


Fig 54. 951E661-MX-XXX



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

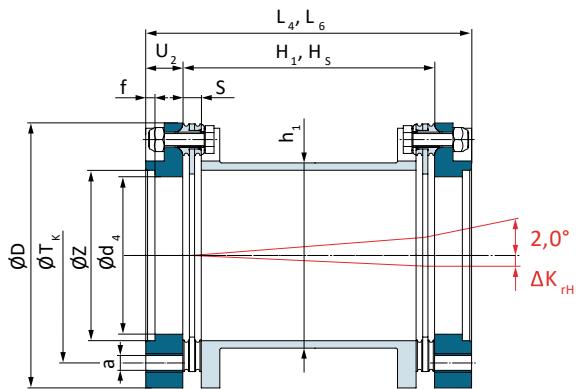


Fig 55. 951E220-MX-XXX (Sleeve 1)

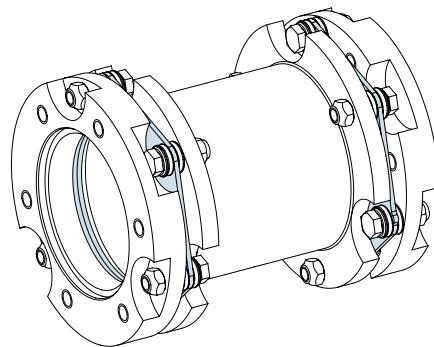
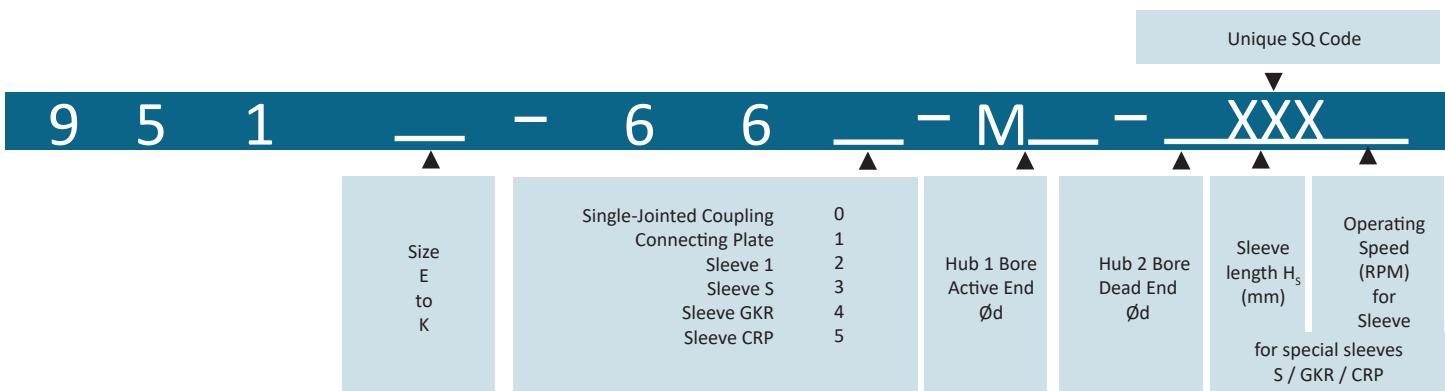


Fig 55. 951E663-MX-XXX (Sleeve S)

ORDER NUMBER



Example: 951G661

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^\circ$.
3. Not valid for coupling with sleeve S.
4. The permitted misalignments may not simultaneously reach their maximum values.
5. The values refer to couplings with 2 disk packs.
6. Only permitted as a static or virtually static value.
7. The C_T -value of a double jointed coupling can be roughly calculated as follows:

$$C_T \text{ tot.} = \frac{1}{\frac{2}{C_{T,LP}} C + \frac{H_s \text{ [mm]} - 2S \text{ [mm]}}{T_{Hrel.}}}$$

8. The values refer to 1 disk pack.
9. Mass moments of inertia and weights are valid for 1 disk pack.

ROBA SIZES 180 TO 2200- DOUBLE-JOINTED WITH CONNECTION PLATE AND KEY HUBS

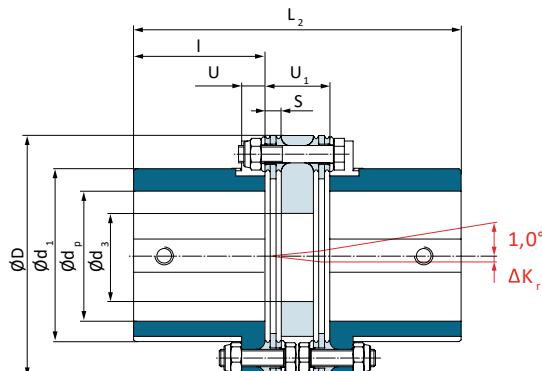


Fig 57. 951KL001-MX-XXX

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

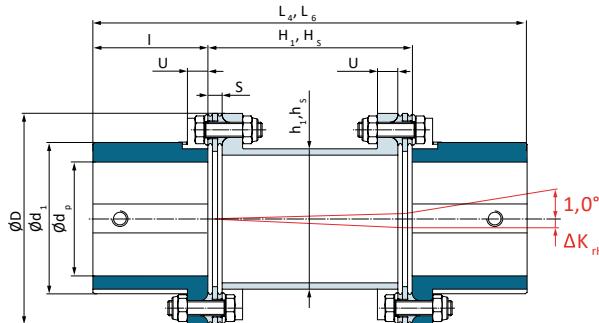
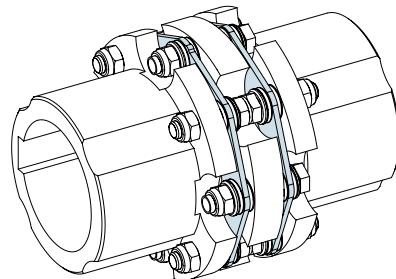


Fig 58. 951KL002-MX-XXX (Sleeve 1)
951KL032-MX-XXX (Sleeve S)

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

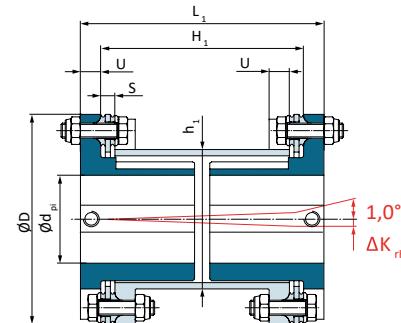
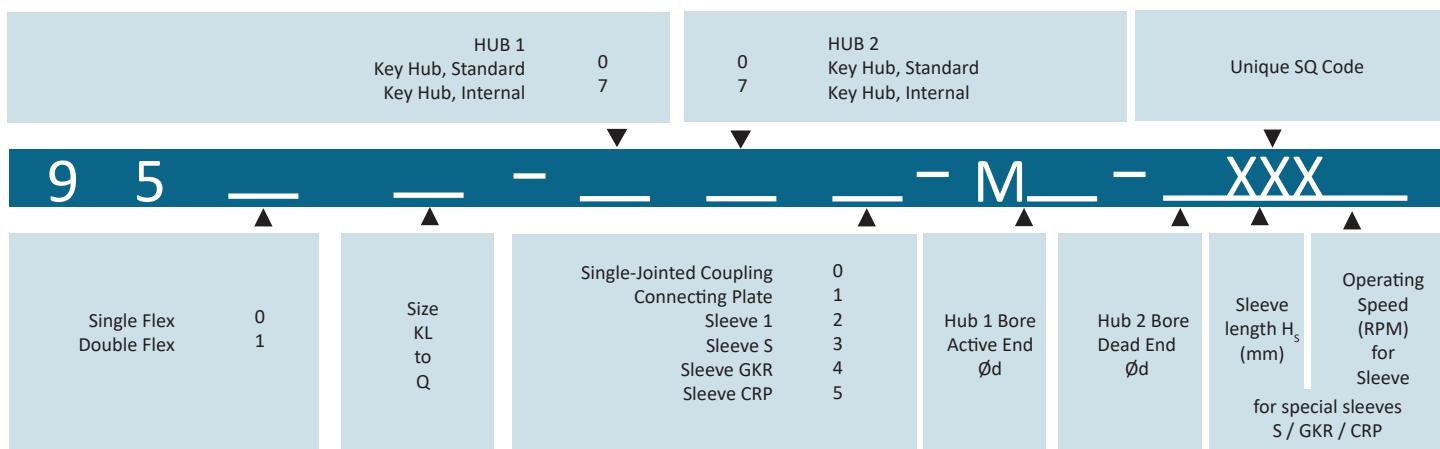


Fig 59. 951KL772-MX-XXX (Sleeve 1)

ORDER NUMBER



Example: 951L001-M50-060

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^\circ$.
3. Not valid for coupling with sleeve S.
4. The permitted misalignments may not simultaneously reach their maximum values.
5. The values refer to couplings with 2 disk packs.
6. Only permitted as a static or virtually static value.
7. The values refer to 1 disk pack.
8. Mass moments of inertia and weights are valid for 1 disk pack.
9. Mass moments of inertia and weights are valid for max. bore.
10. The C_r -value of a double jointed coupling can be roughly calculated as follows:

$$C_{T \text{ tot.}} = \frac{1}{\frac{2}{C_{TLP}} C + \frac{H_s [\text{mm}] - 2 S [\text{mm}]}{T_{\text{Rel.}}}}$$

ROBA SIZES 180 TO 2200- DOUBLE-JOINTED WITH CONNECTION PLATE AND SHRINK DISK HUBS, EXTERNAL CLAMPING

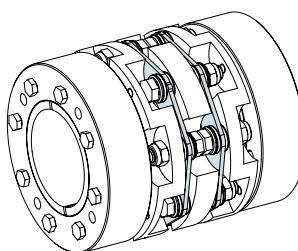
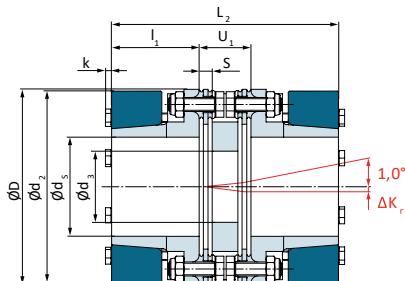


Fig 61. 951KL221-MX-XXX

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

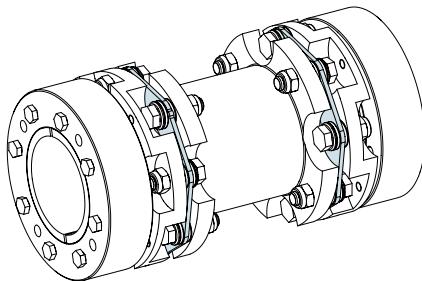
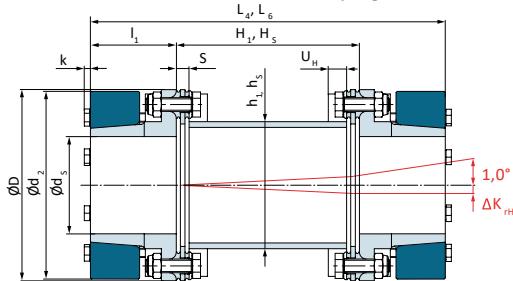
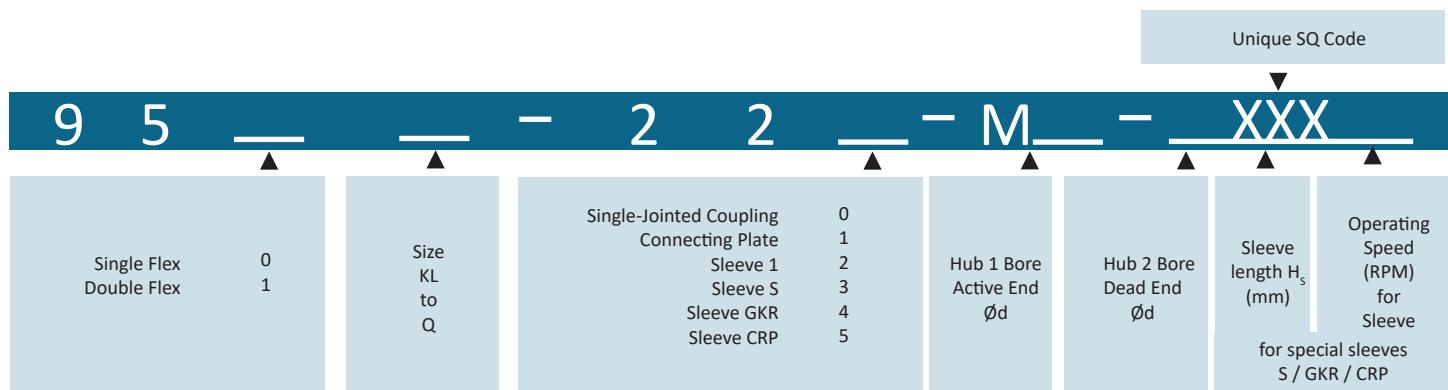


Fig 62. 951KL222-MX-XXX (Sleeve 1)

951KL223-MX-XXX (Sleeve S)

ORDER NUMBER



Unique SQ Code

Single Flex
Double Flex

0
1

Size
KL
to
Q

Single-Jointed Coupling
Connecting Plate
Sleeve 1
Sleeve S
Sleeve GKR
Sleeve CRP

0
1
2
3
4
5

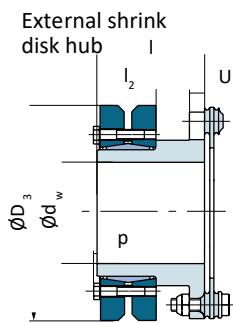
Hub 1 Bore
Active End
Ød

Hub 2 Bore
Dead End
Ød

Sleeve
length H_s
(mm)
for special sleeves
S / GKR / CRP

Operating
Speed
(RPM)
for
Sleeve
S / GKR / CRP

ADDITIONAL OPTION					
Size	d	D	I	I	p
180	65/70	145	85	39	-
300	75/80	170	900	50	-
500	80/85	185	100	57	-
850	95/100/105	230	125	82	4
1400	110/115	265	150	88	-
2200	130/135	300	180	98	-



*Standard H7, other tolerances possible

Example: 951Q221-M45-045

1. Valid for alternating loads as well as max. permitted shaft alignment.

2. Valid for one rotational direction, max. stress $\leq 10\%$.

3. Transmittable torques dependent on bore see page - ?

4. Not valid for coupling with sleeve S.

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

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

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

8. The $C_{T_{tot}}$ -value of a double jointed coupling can be roughly calculated as follows:

9. The values refer to 1 disk pack.

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

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

$$\frac{1}{C_{T_{LP}} C} + \frac{H_s [mm] - 2 S [mm]}{T_{Hrel}}$$

ROBA SIZES 180 TO 2200- DOUBLE-JOINTED WITH SLEEVE 1 OR SLEEVE S, AND SPLIT CLAMPING HUBS

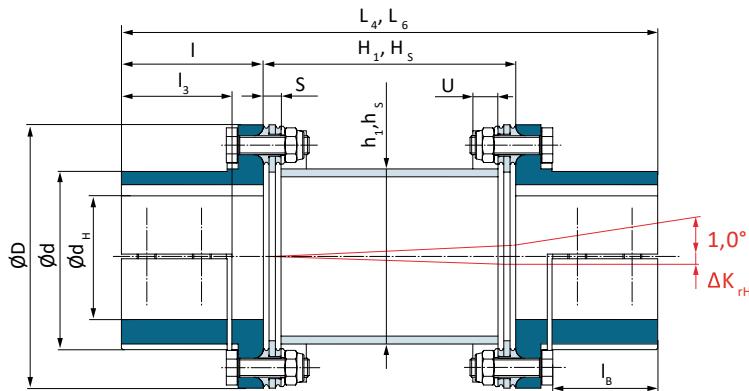
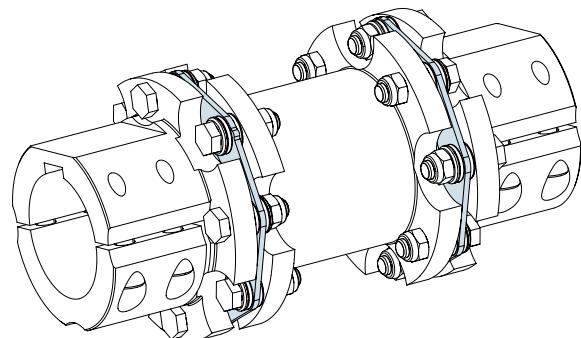


Fig 64. 951E882-MX-XXX (Sleeve 1)
951E883-MX-XXX (Sleeve S)



Only available with keyway acc. DIN 6885!

Installation coupling with split clamping hubs

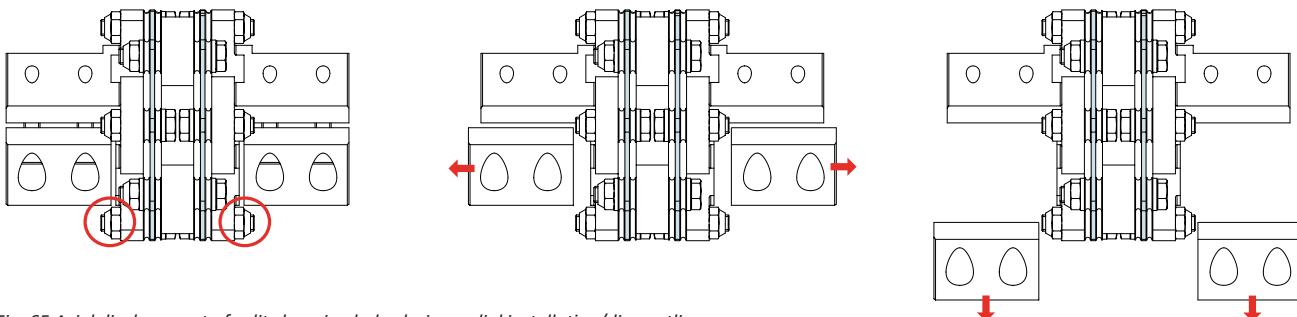


Fig. 65 Axial displacement of split clamping hubs during radial installation/dismantling

ORDER NUMBER

ORDER NUMBER										
Unique SQ Code										
9	5	1	—	—	8	8	—	M.	—	XXX
Size E to K	Single-Jointed Coupling Connecting Plate Sleeve 1 Sleeve S Sleeve GKR Sleeve CRP	0 1 2 3 4 5	Hub 1 Bore Active End Ød	Hub 2 Bore Dead End Ød	Sleeve length Hs (mm)	Operating Speed (RPM) for Sleeve S / GKR / CRP				

Example: 951E881-M50-XXX

*Standard H7, other tolerances possible

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^{\circ}$.
3. Not valid for coupling with sleeve S.
4. The permitted misalignments may not simultaneously reach their maximum values.
5. The C_T -value of a double jointed coupling can be roughly calculated as follows:

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

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

8. The values refer to 1 disk pack.

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

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

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

ROBA SIZES 180 TO 2200- SINGLE JOINTED WITH FLANGES

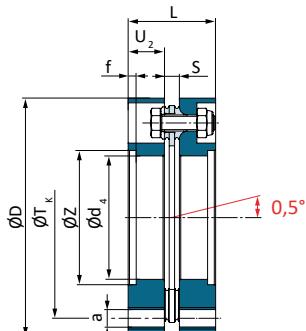
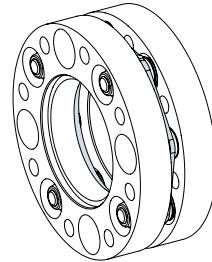


Fig 66. 950E660-MX-XXX



TECHNICAL DATA AND MAIN DIMENSIONS											
DIN Size				180	300	500	850	1400	2200		
Nominal torque ¹⁾				T _{KN}	[Nm]	2,100	3,500	5,800	9,500	15,000	24,000
Peak torque ²⁾				T _{KS}	[Nm]	3,150	5,250	8,700	14,250	22,500	36,000
Outer diameter				D	[Nm]	153	178	210	250	290	336
Centering Bore				Z ^{H7}	[mm]	85	100	120	140	160	180
Maximum speed ³⁾				n _{max}	[rpm]	7,300	6,200	5,200	4,400	3,800	3,300
Permitted misalignments ⁴⁾	Perm. axial misalignment ^{5) 6)}			ΔK _a	[mm]	1.0	1.2	1.4	1.6	1.9	2.2
	Perm. radial misalignment ⁵⁾	with connecting plate		ΔK _r	[mm]	0.25	0.25	0.35	0.4	0.5	0.55
		with sleeve 1		ΔK _{rH}	[mm]	1.2	1.25	1.35	1.7	2	2.6
		with sleeve S		ΔK _{rH}	[mm]	(H _s) x 0.00873					
Spring Rigidities	Torsion ⁷⁾	disk pack		C _{TLP}	[10 ³ Nm/rad]	3,000	3,480	11,900	20,600	30,150	46,800
		tube sleeve S		C _{TH rel.}	[10 ⁶ Nm mm/rad]	250	415	894	1,690	2,734	4,961
	Angular Spring Rigidity ⁸⁾				[Nm/rad]	3,890	6,980	11,250	18,580	26,120	28,520

DIMENSIONS [mm]						
Size	180	300	500	850	1400	
a	8xM12	8xM16	8xM16	8xM20	8xM24	8xM30
d ₃	54	61	66	76	86	110
d ₄	77	92	112	132	150	170
f	6	6	6	6	6	6
H ₁	150	160	170	220	266	320
H _s	acc. customer specs					
h ₁	92.5	111	132	150	174	206
h _s	92	110	130	150	165	190
L	57.2	65.2	84	102	118	129.8
L ₂	88.4	98.4	124	153	176	195.6
L ₄	196	214	242	308	368	432
L ₆	dependent on H _s					
S	11.2	11.2	12	14	16	17.8
T _K	125	150	175	210	240	275
U	14	16	18	20	22	25
U ₁	42.4	44.4	52	65	74	83.6
U ₂	23	27	36	44	51	56

MASS MOMENTS OF INERTIA J [10 ⁻³ kgm ²]						
Size	180	300	500	850	1400	
Disk Pack ⁹⁾	2.64	5.60	14.58	36.85	83.86	132.19
Flange	6.26	13.08	34.04	79.39	162.60	359.24
Connecting plate	3.91	8.60	21.54	53.27	114.26	241.16
Sleeve 1	6.85	14.22	29.94	67.40	149.09	341.78
Sleeve S with H _s =1000 mm	28.41	51.24	109.74	210.27	364.62	705.89
Sleeve S per 1000 mm tube	25.08	41.61	89.57	169.22	273.78	496.68

WEIGHT [kg]						
Size	180	300	500	850	1400	
Disk Pack ⁹⁾	0.73	1.15	2.14	3.92	6.52	7.51
Flange	1.70	2.61	4.79	7.88	12.24	20.54
Connecting plate	1.53	2.44	4.48	8.04	12.64	19.55
Sleeve 1	2.61	3.66	5.38	9.32	15.62	26.98
Sleeve S with H _s =1000 mm	14.37	17.45	27.01	38.66	53.84	77.23
Sleeve S per 1000 mm tube	13.64	15.34	23.97	34.36	46.78	64.41

ROBA SIZES 180 TO 2200- DOUBLE-JOINTED WITH CONNECTION PLATE AND FLANGES

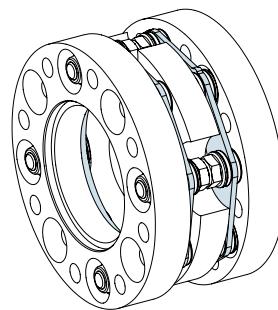
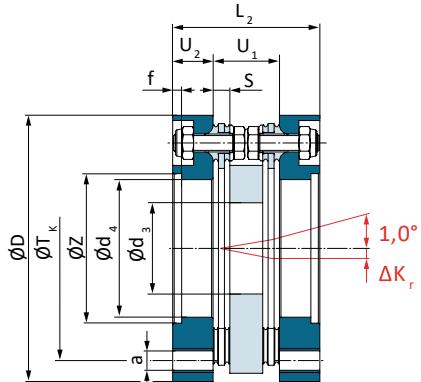


Fig 67. 951KL661-MX-XXX

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

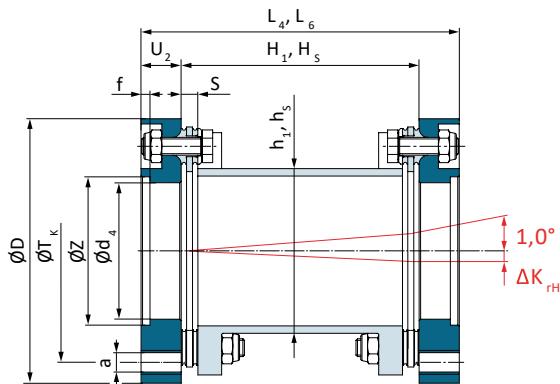


Fig 69. 951KL662-MX-XXX (Sleeve 1)

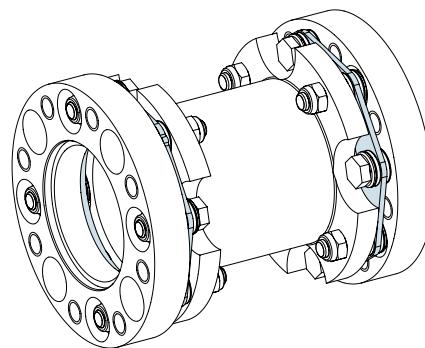


Fig 70. 951KL662-MX-XXX (Sleeve S)

ORDER NUMBER

Order Number									
Unique SQ Code									
9	5	-	-	6	6	-	M	-	XXX
Single Flex Double Flex	0 1	Size KL to Q	Single-Jointed Coupling Connecting Plate Sleeve 1 Sleeve S Sleeve GKR Sleeve CRP	0 1 2 3 4 5	Hub 1 Bore Active End ød	Hub 2 Bore Dead End ød	Sleeve length H _s (mm) for special sleeves S / GKR / CRP	Operating Speed (RPM) for Sleeve	

Example: 951KL661-MX-XXX

1. Valid for alternating loads as well as max. permitted shaft alignment.
2. Valid for one rotational direction, max. stress $\leq 10^{\circ}$.
3. Not valid for coupling with sleeve S.
4. The permitted misalignments may not simultaneously reach their maximum values.
5. The values refer to couplings with 2 disk packs.
6. Only permitted as a static or virtually static value.

7. The C_{f} -value of a double jointed coupling can be roughly calculated as follows:
 8. The values refer to 1 disk pack.
 9. Mass moments of inertia and weights are valid for 1 disk pack.
- $$C_{\text{f tot.}} = \frac{1}{\frac{2}{C_{\text{TLP}}} + \frac{H_s [\text{mm}] - 2S [\text{mm}]}{C_{\text{Hrel.}}}}$$

VARIABLE SLEEVE S

Variable Length Sleeves

(Cardan Shaft Replacement)

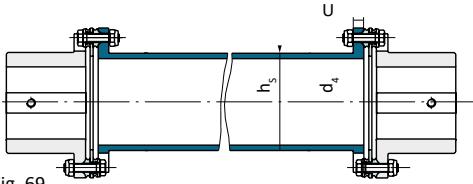
The operational demands on variable length sleeves vary greatly. Using various sleeve construction shapes, the shaft coupling ROBA ® -DS can offer the optimum solution for any problem. The product is able to fulfil the usual demands placed upon conventional cardan shafts. At the same time, the constructional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

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

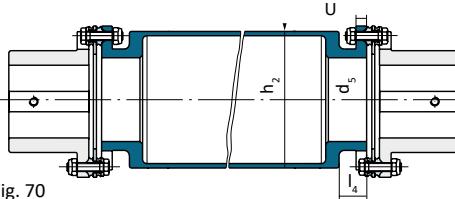
By replacing conventional disk packs, the coupling misalignment capability can be enlarged by 2 - 3° / compensating level (please contact the manufacturers about availability and Technical Data).

Type Identification and Technical Comparison - Variable Length Sleeves

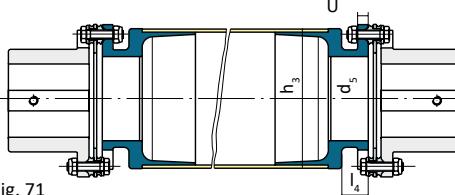
Standard design Type 951._3 / 953._3



Depressed tube (GKR) Type 951._4 / 953._4



CRP sleeve Type 951._5 / 953._5



SELECTION AID: VARIABLE LENGTH SLEEVES		
Type	95._3	95._3
Speed	+	++
Torsional Rigidity	++	+++
Weight	++	+++
Mass Moment of inertia	++	+++
Corrosion Resistance	++	++
Changes in length due to temp.	+++	+++
Costs	+	++
Operational Focuses	<ul style="list-style-type: none"> • Conventional Applications • Medium Speeds • High Torsional Rigidity • Low Mass 	<ul style="list-style-type: none"> • High Speeds

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

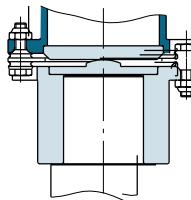


Fig. 72

Vertical support special sleeves

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

Size	DIMENSIONS											
	16	25	40	64	100	160	180	300	500	850	1400	2200
d ₄	43	54	62	71	92	98	79	95	111	127	137	157
d ₅	45	48	58	68	88	95	75	90	110	123	144	167
h _s	50	60	70	80	100	110	92	110	130	150	165	190
h ₃	x	x	x	x	x	155	130	155	170	220	250	x
l ₄	73	86	96	118	138	160	138	160	192	224	266	315
U	7	7	8	10	10	12	14	16	18	20	22	25

x = Technical Data available on demand

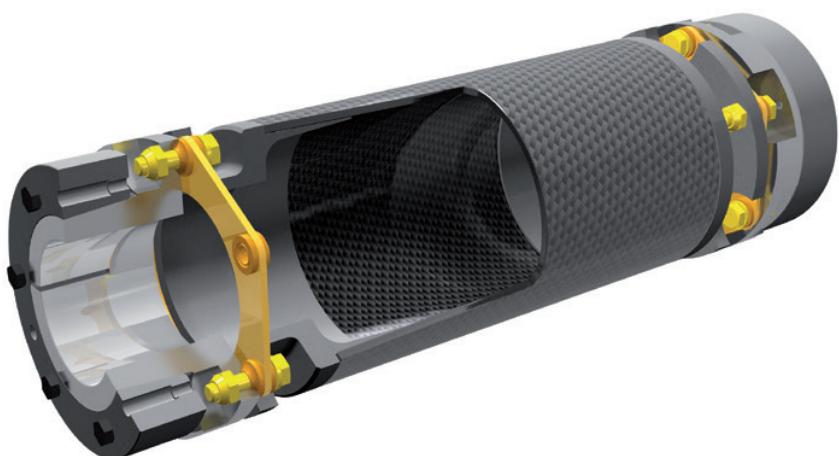
CRP SLEEVE

ROBA®-DS with CRP Sleeves

(Carbon-fibre reinforced plastic)

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

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



Low Weight

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

Reduced Inertia

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

Higher Speeds

The optimum stiffness/weight ratio sets the bend-critical speed far higher than with conventional sleeves.

Wide bearing distances

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

Low Thermal Expansion

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

Corrosion resistance

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

Low Vibration

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

Temperature resistance

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

OPTIONS AND VARIANTS ON INTERMEDIATE SHAFTS

ROBA®-DS with CRP Sleeves

Intermediate shafts

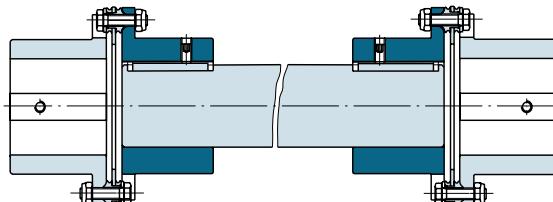


Fig. 74

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

GRP sleeves

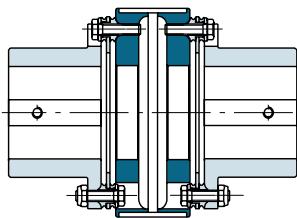


Fig. 75

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

Axial separable sleeves

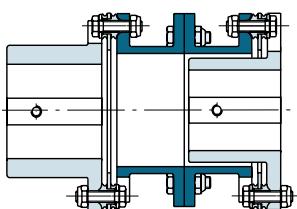


Fig. 76

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

Poly-cardanic design

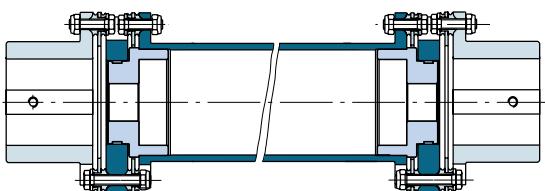


Fig. 77

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

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

SAFE AGAINST OVERLOAD DAMAGE

Safe Against Overload Damage

Combination with EAS®-compact®

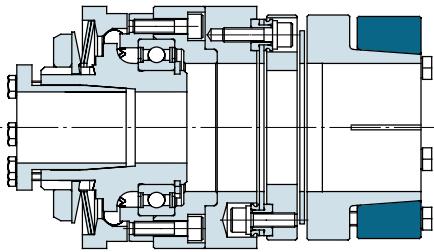


Fig. 78

Combination with EAS®-element clutch

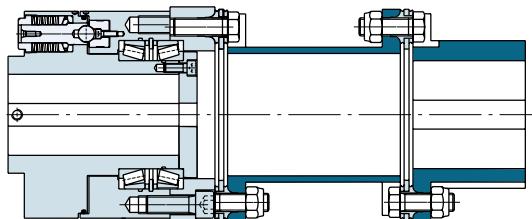


Fig. 79

Combination with ROBA®-slip hub

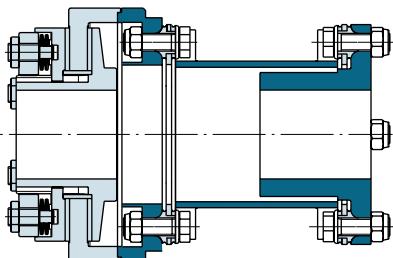


Fig. 80

Shrink disk hub with integrated overload protection

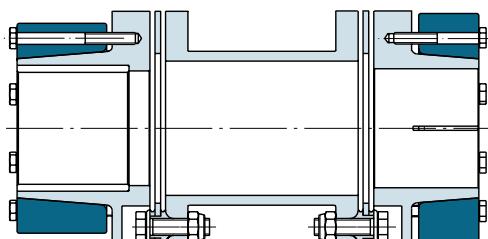


Fig. 81

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

Torque Range	5 - 3,000 Nm
Switch-off Accuracy	± 5%
Load disconnecting	
Number of overload occurrences	High
Time demand for repeat operation start-up	0
Danger of drive shaft damage	no

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

Torque Range	250 - 110,000 Nm
Switch-off Accuracy	± 5%
Load disconnecting	
Number of overload occurrences	High
Time demand for repeat operation start-up	1 minute
Danger of drive shaft damage	no

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

Torque Range	2 - 110,000 Nm
Switch-off Accuracy	± 20%
Load disconnecting	
Number of overload occurrences	Very High
Time demand for repeat operation start-up	0
Danger of drive shaft damage	no

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

Torque Range	190 - 110,000 Nm
Switch-off Accuracy	± 20% ¹⁾
Load disconnecting	
Number of overload occurrences	Very Low
Time demand for repeat operation start-up	Dismantling and installation coupling
Danger of drive shaft damage	yes

FRICTIONALLY-LOCKING TRANSMITTABLE TORQUES

SPLIT CLAMPING HUBS										
			Size	Bore	16	25	40	64	100	160
Frictionally-locking transmittable torques			Ø18	130	-	-	-	-	-	-
Split clamping hubs			Ø20	144	-	-	-	-	-	-
Suitable for H7/g6			Ø22	158	198	-	-	-	-	-
			Ø25	180	225	326	-	-	-	-
			Ø28	202	252	365	-	-	-	-
			Ø30	-	270	391	623	-	-	-
			Ø32	-	288	418	665	-	-	-
			Ø35	-	-	457	727	897	-	-
			Ø38	-	-	496	790	973	-	-
			Ø40	-	-	522	831	1025	1218	
			Ø42	-	-	-	873	1076	1279	
			Ø45	-	-	-	935	1153	1370	
			Ø50	-	-	-	-	1281	1522	
			Ø55	-	-	-	-	1409	1675	
			Ø60	-	-	-	-	1537	1827	
			Ø65	-	-	-	-	-	1979	
			Ø68	-	-	-	-	-	2071	
			Ø70	-	-	-	-	-	2131	
			Ø75	-	-	-	-	-	2284	

Please observe permitted peak transient to request for selected coupling size and Type

CLAMPING HUBS								
			Size	Bore	3	6	10	15
Frictionally-locking transmittable torques			Ø10	27	-	-	-	-
Clamping hubs			Ø12	32	-	-	-	-
Suitable for a temperature range of -20°C to +40°C, at temperatures over 40°C, reduce frictionally-locking transmittable torques by 10 % / 10°C.			Ø14	37	46	-	-	-
Suitable for H7/k6			Ø15	39	51	-	-	-
			Ø16	42	56	-	-	-
			Ø18	47	65	-	-	-
			Ø19	49	70	99	-	-
			Ø20	52	74	105	-	-
			Ø22	-	84	116	-	-
			Ø24	-	92	128	-	-
			Ø25	-	95	135	143	
			Ø28	-	107	151	163	
			Ø30	-	-	162	177	
			Ø32	-	-	173	191	
			Ø35	-	-	189	211	
			Ø38	-	-	-	229	
			Ø40	-	-	-	241	
			Ø42	-	-	-	253	

Please observe permitted peak transient to request for selected coupling size and Type

INSTALLATION EXAMPLES

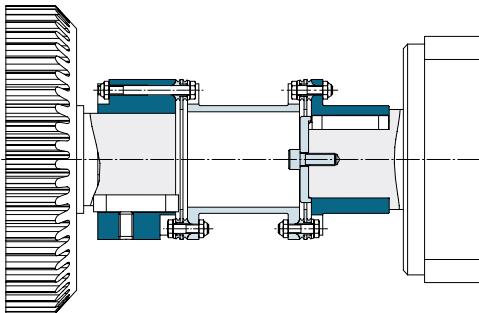


Fig. 82

Axial securing of key hubs via press cover

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

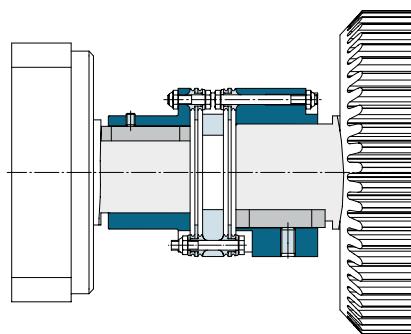


Fig. 83

Axial securing of key hubs via adjusting screw

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

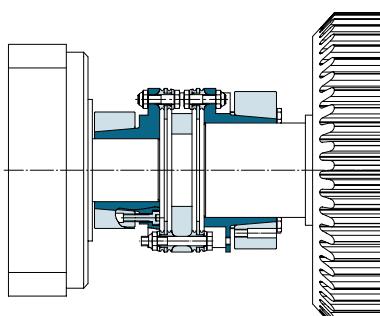


Fig. 84

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

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

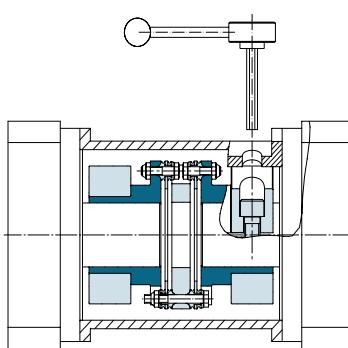


Fig. 85

Coupling installation in closed housing

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

INSTALLATION EXAMPLES

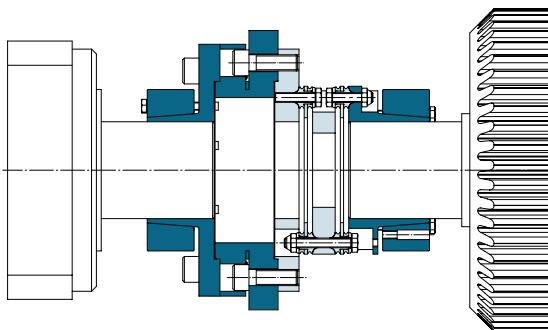


Fig. 86

Integration of measuring flange with adaptor flanges

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

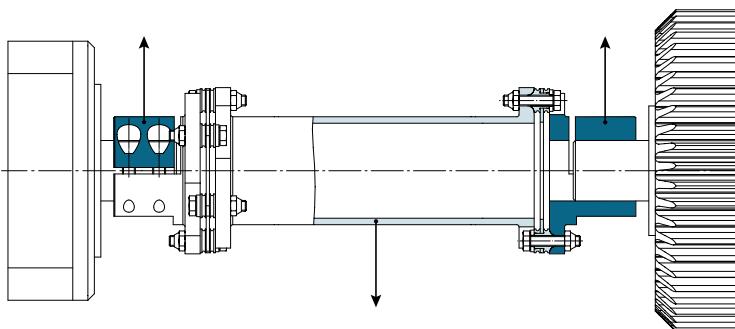


Fig. 87

Radial installation/dismantling with split clamping hubs

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

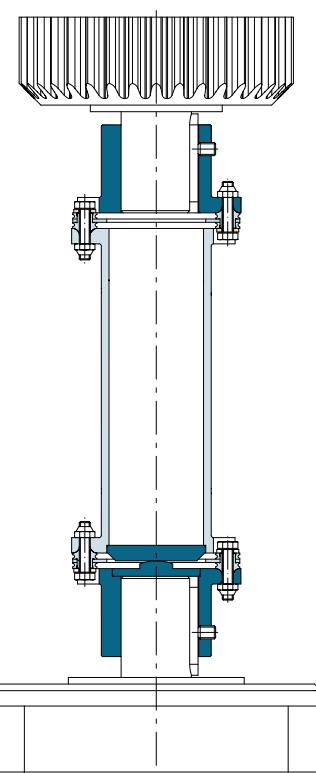


Fig. 88

Vertical support for special sleeve

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

TECHNICAL EXPLANATIONS

CLASSIFICATION OF WORK MACHINES INTO LOAD CLASSES	
Construction machinery	
- Concrete Blenders	II
- Chain conveyors	III
- Chain carriages	III
- Crushers	III
Chemical Industry	
- Mixers (thick fluids)	II
- Mixers (thin fluids)	I
- - Centrifuges	II
- - Blenders	II
Fan/Vents	II
Generators/Convertors	
- Frequency converters	I
- Generators	II
Foodstuffs machines	
- Kneading machines	II
- - Mills	III
- Packaging machines	II
Paper machines	III
Compressors	II
Conveyor systems	
- Conveyor belts	II
- Sloping elevators	III
- Goods elevators	II
- Passenger Elevators	II
Wood/plastic processing	
- Planing machines	II
- Reciprocating saws	III
- - Extruders	II
- - Blenders	II
Crane systems	II
Metal processing	
- Punching/Pressing	III
- Machine tools	II
Pumps	
- Centrifugal pump (thin fluids)	I
- Centrifugal pump (thick fluids)	II
- - Pistons/plunger pumps	III
Textile machines	II
Washing machines	II

Table 1: Load Classes

	Service Factor f_B	WORK MACHINE LOAD CLASS		
		I	II	III
Main Engine	Electromotor, turbine, hydraulic motor	1.1	1.4	1.9
	Piston machine with more than 3 cylinders	1.4	1.7	2.2
	Piston machine with up to 3 cylinders	1.7	2.0	2.5

Table 2: Service factor f_B

Technical Explanations

Permitted shaft misalignments

- ROBA ®-DS single-jointed couplings (Type 950.____ and Type 952.____) compensate for angular and axial shaft misalignments.
- ROBA ® -DS double-jointed couplings (Type 951.____ and Type 953.____) compensate for angular, radial and axial shaft misalignments (Fig. 92).
- If more than one misalignment type occurs simultaneously, they affect each other. The permitted misalignment values are dependent on one another, see Fig. 93. The sum of the actual misalignments – in percent of the maximum value– may not exceed 100 %.

Example (see Table on page 26 and Fig. 93):

ROBA ®-DS, size 40, Type 951.002

=> Axial misalignment occurrence: $\Delta K_a = 0.6 \text{ mm}$, which is 40 % of the permitted maximum value $\Delta K_a = 1.5 \text{ mm}$

=> Angular misalignment occurrence : in disk pack:

$\Delta K_w = 0.3^\circ$, which is 30 % of the permitted maximum value $\Delta K_w = 1.0^\circ$

=> Permitted radial misalignment :

$\Delta K_r = 30 \text{ %} \text{ of the permitted maximum value } \Delta K_r = 1.5 \text{ mm} \Rightarrow \Delta K_r = 0.45 \text{ mm}$

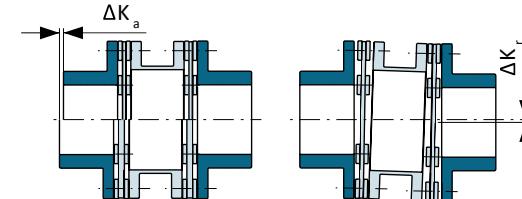


Fig. 9 2

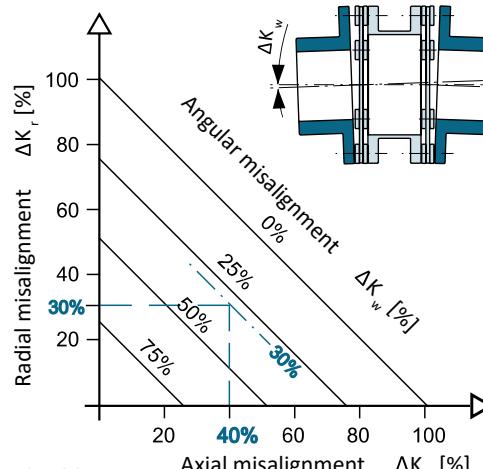


Fig. 93

TECHNICAL EXPLANATIONS

Permitted Speeds (Bend-critical Speeds) on Sleeve S, GKR Sleeve and CRP Sleeve

Permitted speed on special sleeve ROBA *-DS Type 95_._.3 (Sleeve S)

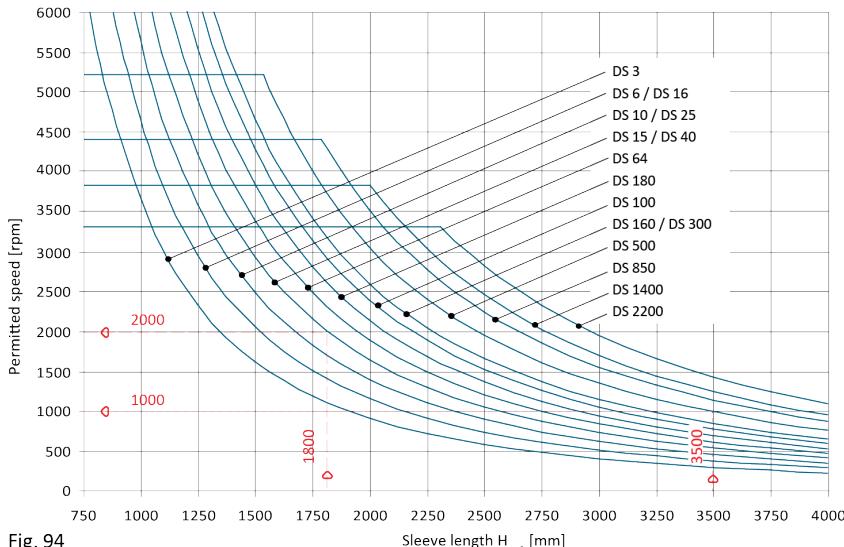


Fig. 94

Examples (Fig. 94)

- ROBA ®-DS, Size 40: Sleeve length: $HS = 1800$ mm
=> permitted speed: 2000 rpm
- ROBA ®-DS, Size 500: Sleeve length: $HS = 3500$ mm
=> permitted speed: 1000 rpm

Permitted speed on special sleeve ROBA *-DS Type 95_._.4 (Sleeve GKR)

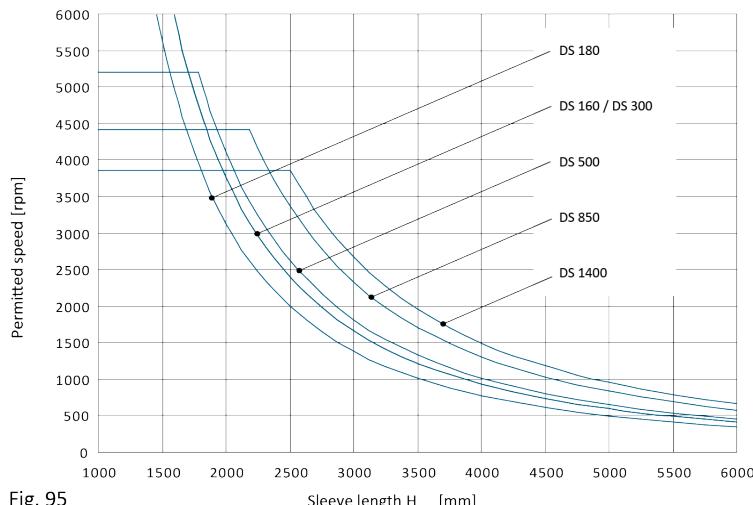


Fig. 95

Using the coupling at high speeds

- Please keep to the maximum speeds defined in the catalogue. Higher speeds are only permitted after contacting the manufacturers.
- Please operate designs with sleeve S, GKR sleeves and CRP sleeves at subcritical levels (see Figs. 94, 95 and 96).
- Both hub variants clamping hub/clamping ring hub and split clamping hub may only be used within a limited speed range. At very high speeds, shrink disk hubs and key hubs (press tolerance) should be used.
- We recommend balancing the coupling in individual parts or complete. Shafts misalignments should be kept as low as possible for smoother system running.
- When using double cardanic shafts, axial animation of the middle coupling part is possible due to operating speed and misalignment. In order to avoid this animation, please minimize the shaft misalignment.
- When connecting very high mass inertias via ROBA ®-DS couplings (in particular double-jointed couplings with long sleeves), the torsion-critical natural frequency and speeds must be observed.

Permitted speed on special sleeve ROBA *-DS Type 95_._.5 (Sleeve CFK)

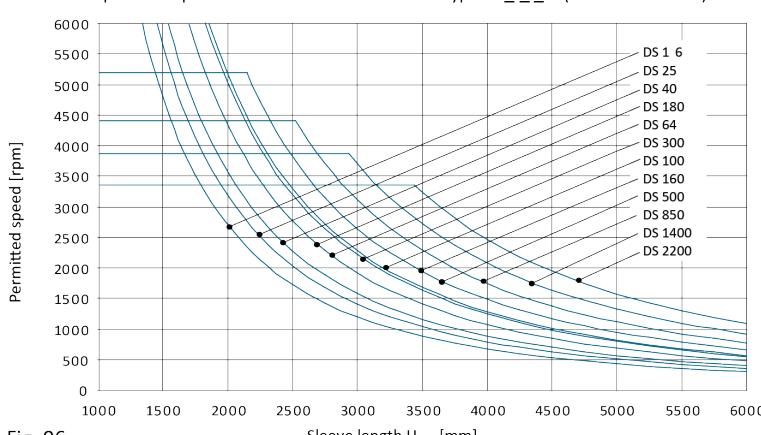


Fig. 96

TECHNICAL EXPLANATIONS

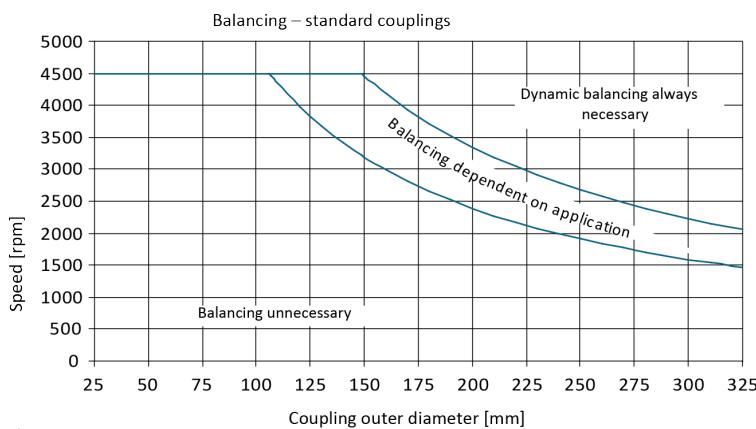


Fig. 97

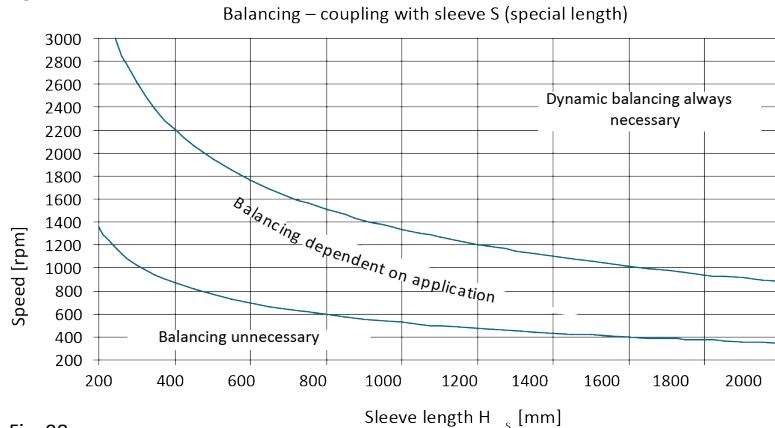


Fig. 98

State of Delivery

- Delivery in partly assembled parts and/or individual parts
- Corrosion protection: phosphation, disk pack made of rustproof steel.
- Hub designs: pilot bored or fision bore.
- Bore: tolerance H7 (other tolerances possible)
- Shaft run-out and axial run-out tolerances: 0.03 mm (Fig. 99)
- Key hub: keyway according to DIN 6885 pages 1 or 3

Temperature Resistance

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

Installation Position

- Horizontal installation
- On vertical or sloping installations and when using long sleeves, we recommend using vertical supports (Fig. 88, page 59).
- The vertical support and the hub centerings in the hub and the sleeve are produced manufacturer side.

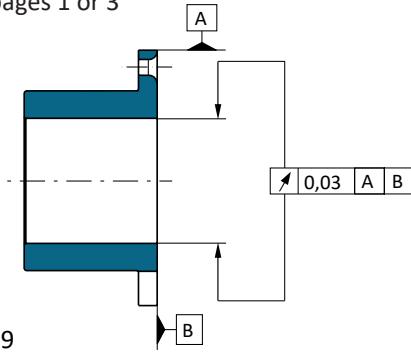


Fig. 99

TECHNICAL EXPLANATIONS

Short Description – Hub Installation

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

Hub installation 95_0_ _ or 95_1_ _ (hubs with keyway, Fig. 100)

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

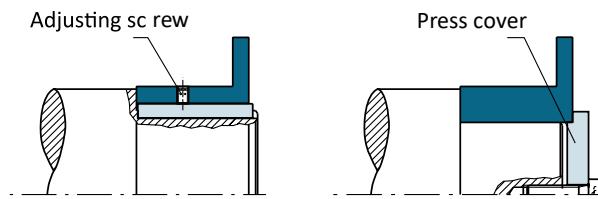


Fig. 100

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

- Mount the hubs onto the shafts using a suitable installation device and bring them into the correct position. Tighten the clamping screws one after the other in 3 to max. 6 tightening turns using a torque wrench.

Guidelines!

- The contact surfaces between the shrink disk and the hub and the clamping ring and hub have been greased manufacturer-side.
- The hub bores and shaft ends are grease-free.
- Greasy or oily bores or shafts do not transmit the maximum coupling torque!
- The shaft must not have a keyway.
- Shaft surface: finely turned or ground ($R_a = 0,8 \mu m$).
- Shaft material: yield point at least 350 N/mm², e.g. St60, St70, C45, C60.
- Recommended shaft tolerance:

Dependent on application and hub Type. See Table of frictionally-locking torques on pages 56/57.

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

- Partly assemble the coupling, observing the Point "Coupling Installation" (page 66).
- Loosen the partly assembled split shells from the hub.
- Place the coupling from above onto the shafts and partly assemble with the split shells (Fig. 101).
- Tighten the clamping screws crosswise in several procedures. Please ensure that the gap "X" on both sides of the hub is the same (Fig. 102).

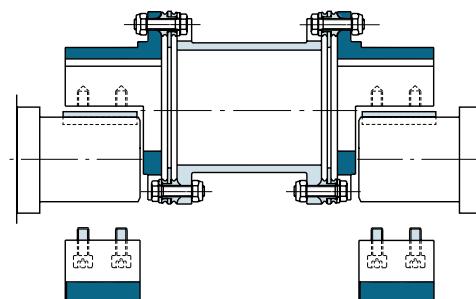


Fig. 101

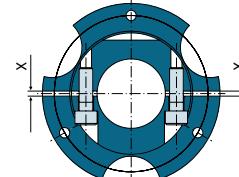


Fig. 102

Short Description – Coupling Installation

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

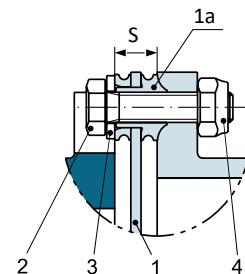
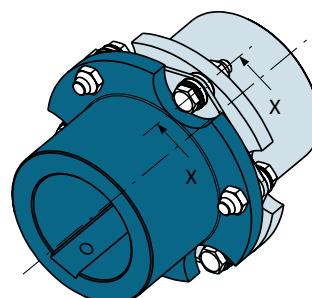


Fig. 103

Fig. 104 Detail „X“

- Screw the disk packs (1, Fig. 104) over lightly-oiled hexagon head screws (2), washers (3) and hexagon nuts (4) alternately with the sleeve and the hubs.
- Producing the pre-tension force on the disk pack (1) usually takes place* via the hexagon nut (4). Please avoid twisting the disk pack (1) (secure screw (2) against turning).
- The hexagon nuts (4) or hexagon head screws (2) must be tightened crosswise and in several sequences to the full tightening torque M a. For the appropriate tightening torques for each sequence, please see the appropriate Installation and Operational Instructions.

Please Observe!

The radius of the collar bushings (Part 1a, Fig. 104, Detail "X") must lie in the hub and sleeve grooves.

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

DIMENSIONING, SIZE SELECTION

Coupling size selection

1. Direct coupling selection

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

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

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

Please also observe the level and torsional direction of the start-up torque. This may be maximum 1.5 x the permitted coupling nominal torque. The torsional direction should remain unchanged, the maximum permitted amount of stress must be smaller than 1 x 105.

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

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

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

Term definitions:

T_{KN} [Nm]

Coupling nominal torque

P [kW]

main engine nominal performance

f_B

Service factor according to Table 2, page 48

f_t

Temperature factor according to Fig. 91, page 47

n [rpm]

Drive machine nominal speed

Calculation Example

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

Main engine: Electromotor

Nominal capacity P = 13 kW

Nominal speed n = 1450 rpm

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

Main engine: Piston pump

Maximum ambient temperature 60 °C

=> Required coupling nominal torque T_{KN} :

$$T_{KN} \geq \frac{9550 \times 13 \times 1,9 \times 1,0}{1450} \quad L \quad \text{Load class from Table 1, page 48: III}$$

$$T_{KN} \geq 162,7 \text{ Nm} \quad \text{Service factor } f_B \text{ from Table 2, page 48: 1,9}$$

$$T_{KN} \geq 162,7 \text{ Nm} \quad \text{Temperature factor } f_t \text{ from Fig. 91, page 47: 1,0}$$

=> Required coupling peak transient torque T_{KS} :

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

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

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

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

=> Selected coupling size:

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

