POWER TRANSMISSION

FLEXIBLE COUPLINGS

ORPEX®

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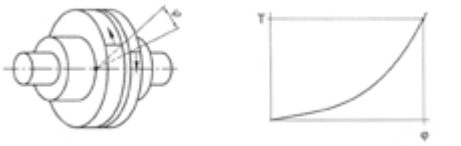
Orpex® couplings are used as compensation couplings everywhere where an absolutely reliable torque transfer is required. Orpex® couplings cover with their types a wide range of uses. With a total of 26 sizes, couplings are available for torques from 200 to 1,300,000 Nm. The coupling halves of the type WN consist of grey cast iron. With the WS type of steel it is possible to use the coupling with high speeds. With the convex elastic elements which can be moved in the holes – the buffers – it is possible to compensate for the shaft offsets in agular, radial and axial direction. Orpex® couplings damp torque impacts and offer the possibility of shifting critical speeds. Orpex® couplings are fail-safe up to the fracture moment of the metal parts, which is a multiple of the permissible impact moment, and thus offers the greatest possible operational safety. Orpex® couplings can be used for both directions of rotation and are also suitable for reversing operation. The buffers can be expected to have a long life with correct design of the coupling and correct alignment of the assembly. Orpex® couplings can also be adapted in many ways to special requirement profiles. A large number of applications already created and tried are available for this. Our Projects Department would be pleased to advise you. Orpex® couplings have proven themselves over decades in all areas of mechanical engineering, especially in the case of heavy-duty drives, as an absolutely reliable and practically maintenance-free machine element.

TYPE

- WN
- WS

FUNCTIONING

The positive torque transfer is achieved by means of elastic elements subjected exclusively to pressure which then deform elastically under compression. The progressive spring characteristic and the excellent damping properties of the buffers counteract the dangerous build-up of any rotary vibrations that occur.



Torsion spring strips and torsional angles

The optimised round convex form of the buffers favours the compensatory function where angular or radial offsets are present and minimises restoring forces. The ground bolts are fastened with no play by means of a conical seat. This effectively prevents any possible widening of the locating hole and the development of frictional corrosion. The convex buffers of the Orpex® couplings can be mounted by plugging in. It is possible to replace the bolts and buffers without any axial displacement of the motor or the machines. Uncoupled machines can be dismantled radially. The buffers can be used at ambient temperatures of –30 °C to +80 °C. They are resistant by electrical conduction against oil and many other media.

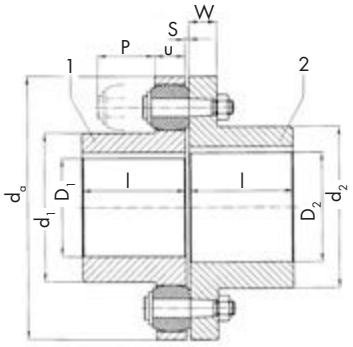
TECHNICAL DETAILS

- Perfect transfer of the torque and trouble-free functioning are only guaranteed when original Orpex® buffers are used.
- The arrangement of the coupling parts of the types WN and WS on the shaft ends to be connected is discretionary. Both horizontal and vertical installation is possible.
- Orpex® couplings are normally fitted with a feather key groove according to DIN 6885 part 1 and set screw. Design with wedge groove according to DIN 6886, tightening from inside of hub, is possible. Care must be taken here to ensure that the maximum allowable holes only amount to 60% of the maximum allowable holes with key feather groove according to DIN 6885 part 1.
- Rotating parts must be secured by the purchaser to prevent unintentional contact. When products are supplied to other countries the safety regulations applying there must be observed.
- The shaft ends to be connected must be stored immediately in front of and behind the coupling.
- We are at your service for design to DIN 740 part 2 and for vibration calculations. Vibration calculations can also be ordered from Engineering Service.
- With respect to the installation and commissioning of Orpex® couplings the installation and operating instructions must be observed.

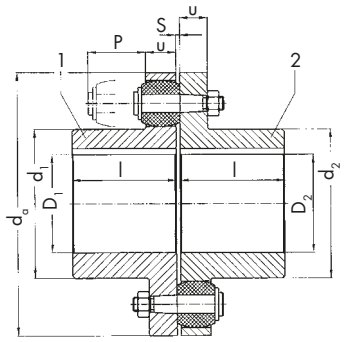
TYPE WN GREY CAST IRON

SIZE 105 TO 500

Size	$D_{1/2}$ [1]	D_1 [1]	D_2 [1]	d_a	d_1	d_2	l	P	S	W	u
	min.	max.	max.								
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
105	–	32	38	105	53	59	45	30	2...4	12	13
125	–	40	48	125	65	68	50	35	2...4	15	16
144	–	45	55	144	76	84	55	35	2...4	15	16
162	–	50	60	162	85	92	60	40	2...5	18	20
178	–	60	70	178	102	108	70	40	2...5	18	20
198	–	70	80	198	120	128	80	40	2...5	18	20
228	–	80	90	228	129	140	90	50	2...5	24	26
252	38	90	100	252	150	160	100	50	2...5	24	26
285	48	100	110	285	164	175	110	60	3...6	30	32
320	55	110	120	320	180	192	125	60	3...6	30	32
360	65	120	130	360	200	210	140	75	3...6	42	42
400	75	140	140	400	230	230	160	75	3...6	–	42
450	85	160	160	450	260	260	180	90	4...7	–	52
500	95	180	180	500	290	290	200	90	4...7	–	52

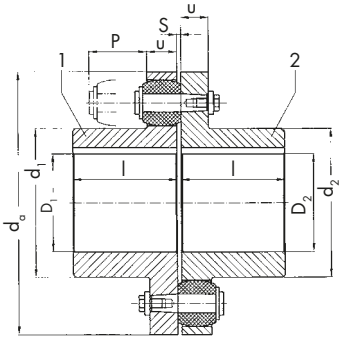


> Size 105–360



> Size 400

Size	Nominal torque [2]	Max. rotation speed	Moments of inertia [3] kgm²		Weight [3] kg	
	T_{KN} Nm	rpm	part 1	part 2	part 1	part 2
105	200	5000	0.001	0.001	0.96	1.2
125	350	5000	0.003	0.003	1.9	1.9
144	500	4900	0.004	0.006	2.2	3.1
162	750	4300	0.007	0.013	3.2	4.6
178	950	3800	0.014	0.022	4.8	6.7
198	1300	3400	0.023	0.031	7	8.6
228	2200	3000	0.04	0.074	9.1	14
252	2750	2700	0.07	0.12	13	18.5
285	4300	2400	0.13	0.22	19	26.5
320	5500	2100	0.23	0.31	27	35
360	7800	1900	0.42	0.71	37	52
400	12500	1700	0.89	0.89	60	60
450	18500	1500	1.7	1.7	89	89
500	25000	1350	2.8	2.8	115	115



> Size 450–500

1) Drill holes H7 with keyway in accordance with DIN 6885/1; tolerance zone JS9 and set screws on the keyway

2) Torques for shaft fit with keyway

3) The details of weight and moments of inertia apply for medium holes D_1, D_2.

TYPE WS STEEL

SIZE 105 TO 500

Size	$D_{1/2}$ [1] min.	D_1 [1] max.	D_2 [1] max.	d_a	d_1	d_2	l	P	S	W	u
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
105	–	32	38	105	53	59	45	30	2...4	12	13
125	–	40	48	125	65	68	50	35	2...4	15	16
144	–	50	60	144	76	84	55	35	2...4	15	16
162	–	55	65	162	85	92	60	40	2...5	18	20
178	–	70	75	178	102	108	70	40	2...5	18	20
198	–	80	85	198	120	128	80	40	2...5	18	20
228	–	85	95	228	129	140	90	50	2...5	24	26
252	38	100	110	252	150	160	100	50	2...5	24	26
285	48	110	120	285	164	175	110	60	3...6	30	32
320	55	125	130	320	180	192	125	60	3...6	30	32
360	65	135	140	360	200	210	140	75	3...6	42	42
400	75	150	150	400	230	230	160	75	3...6	–	42
450	85	170	170	450	260	260	180	90	4...7	–	52
500	95	190	190	500	290	290	200	90	4...7	–	52

Size	Nominal torque [2]	Max. rotation speed	Moments of inertia [3] kgm²		Weight [3] kg	
	T_{KN} Nm	rpm	part 1	part 2	part 1	part 2
105	200	5000	0.001	0.001	0.96	1.2
125	350	5000	0.003	0.003	1.6	1.9
144	500	5000	0.004	0.006	2.2	3.1
162	750	5000	0.007	0.013	3.2	4.6
178	950	4900	0.014	0.022	4.8	6.7
198	1300	4600	0.023	0.031	7	8.6
228	2200	4400	0.04	0.074	9.1	14
252	2750	4200	0.07	0.12	13	18.5
285	4300	3900	0.13	0.22	19	26.5
320	5500	3500	0.24	0.33	27	35
360	7800	3100	0.42	0.71	37	52
400	12500	2800	0.95	0.95	63	63
450	18500	2500	1.8	1.8	93	93
500	25000	2200	2.9	2.9	125	125

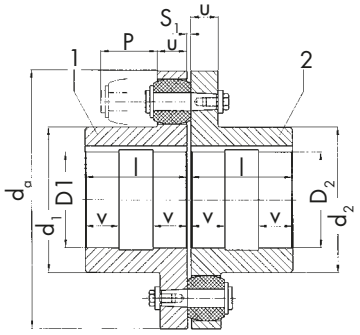
1) Drill holes H7 with keyway in accordance with DIN 6885/1; tolerance zone JS9 and set screws on the keyway

2) Torques for shaft fit with keyway

3) The details of weight and moments of inertia apply for medium holes D_1, D_2.

SIZE 560 TO 2000

Size	$D_{1/2}$ [1]				WN WS	WN	WS	WN WS	WN WS	WN WS	WN WS	WN WS
	WN min.	WN max.	WS min.	WS max.	d_a	$d_{1/2}$	$d_{1/2}$	l	v	P	S	u
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
560	100 > 140 > 180	140 180 200	100 > 165 > 200	165 200 210	560	250 300 320	250 300 320	220	70	120	4...8	68
630	100 > 140 > 180	140 180 200	100 > 165 > 200	165 200 235	630	250 300 355	250 300 355	240	80	120	4...8	68
710	110 > 160 > 200	160 200 240	110 > 190 > 220	190 220 250	710	290 330 385	290 330 385	260	80	140	5...9	80
800	125 > 180 > 220	180 220 260	125 > 210 > 240	210 240 280	800	320 360 420	320 360 420	290	90	140	5...9	80
900	140 > 220 > 260	220 260 290	140 > 210 > 240 > 280	210 240 280 310	900	360 425 465	325 360 425 465	320	100	160	5...10	90
1000	150 > 240 > 280	240 280 320	150 > 230 > 260 > 300	230 260 300 340	1000	395 460 515	355 395 460 515	350	110	160	5...10	90
1120	160 > 200 > 250 > 300	200 250 300 350	160 > 240 > 270 > 330	270 300 360 400	1120	360 410 495 560	360 410 495 560	380	120	180	6...11	100
1250	180 > 230 > 280 > 330	230 280 330 380	180 > 270 > 300 > 360	270 300 360 400	1250	410 460 540 610	410 460 540 610	420	130	180	6...11	100
1400	200 > 260 > 320 > 380	260 320 380 440	200 > 310 > 350 > 410	310 350 410 460	1400	465 525 620 700	465 525 620 700	480	145	210	6...12	120
1600	260 > 320 > 380 > 440	320 380 440 480	260 > 370 > 410 > 480	370 410 480 510	1600	565 625 720 770	565 625 720 770	540	165	210	6...12	120
1800	320 > 380 > 440 > 500	380 440 500 540	320 > 440 > 480 > 540	440 480 540 580	1800	660 720 820 870	660 720 820 870	600	185	240	8...16	140
2000	380 > 440 > 500 > 560	440 500 560 600	380 > 500 > 540 > 610	500 540 610 640	2000	760 820 920 960	760 820 920 960	660	200	240	8...16	140



> Size 560–2000

1) Drill holes H7 with keyway in accordance with DIN 6885/1; tolerance zone JS9 and set screws on the keyway
2) Torques for shaft fit with keyway
3) The details of weight and moments of inertia apply for medium holes D_1, D_2.

SIZE 560 TO 2000

Size	Nominal torque[2]	Max. rotation speed		Moments of inertia[3]		Weight[3]	
	WN / WS T_{KN} Nm	WN	WS	WN 1/2 kgm²	WS 1/2 kgm²	WN 1/2 kg	WS 1/2 kg
560	39000	1200	2000	4.6 5 5.1	4.8 5.2 5.4	145 155 150	150 155 155
630	52000	1050	1800	7.2 7.7 8.4	7.6 8 8.8	180 195 210	190 195 210
710	8000	950	1600	13 14 15	14.3 14.7 16	265 270 285	275 275 295
800	110000	850	1400	22 23 24.5	23.3 23.5 26	350 360 380	370 370 400
900	150000	750	1250	39 41 43	40 41 44 45	500 500 530	480 480 520 530
1000	195000	680	1100	60 63 68	63 64 68 71	640 650 680	620 620 670 700
1120	270000	600	1000	98 100 105 110	105 106 110 120	750 780 830 880	820 830 910 950
1250	345000	550	900	150 155 165 175	169 172 180 190	950 980 1050 1150	1050 1100 1150 1250
1400	530000	490	800	290 300 310 330	318 323 340 360	1450 1500 1600 1700	1600 1600 1750 1850
1600	750000	430	700	490 500 530 550	550 560 600 620	1950 2000 2150 2200	2250 2250 2400 2450
1800	975000	380	600	850 930 980 1050	1050 1075 1130 1150	2850 2900 3100 3200	3300 3300 3500 3600
2000	1300000	340	550	1350 1400 1500 1550	1640 1670 1750 1800	3500 3600 3800 3900	4300 4300 4600 4600

1) Drill holes H7 with keyway in accordance with DIN 6885/1; tolerance zone JS9 and set screws on the keyway
2) Torques for shaft fit with keyway
3) The details of weight and moments of inertia apply for medium holes D_1, D_2.

DESIGNS

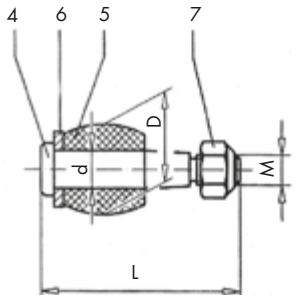
SIZE 105 TO 360

> Arrangement of the bolts and buffers on one site

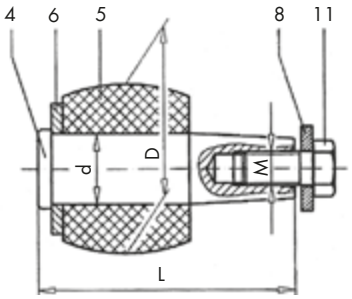
SIZE 400 TO 2000

> Arrangement of the bolts and buffers on alternating sites

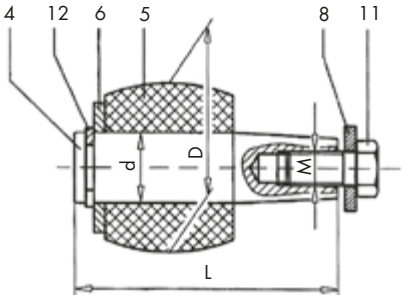
BOLTS AND BUFFERS



> 105–400



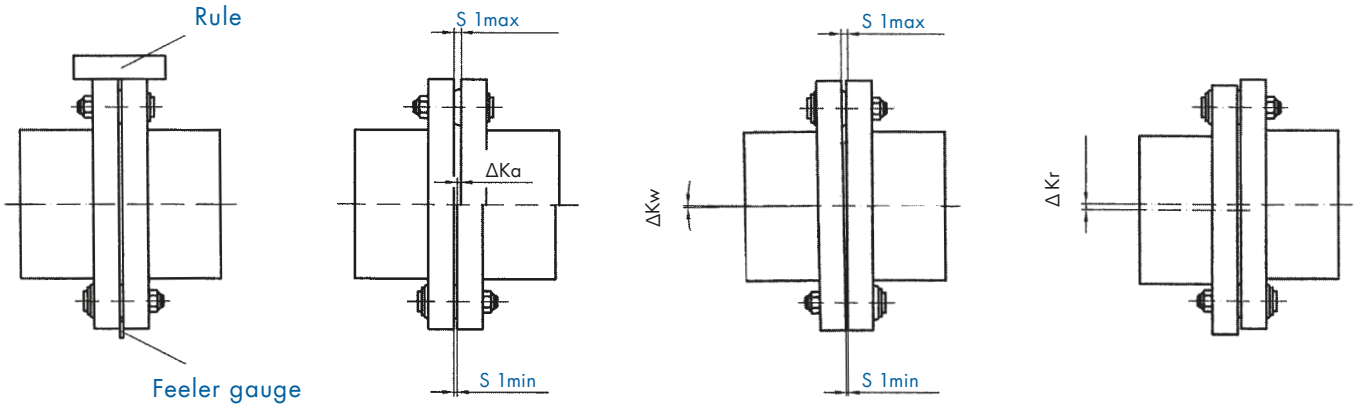
> 450–630



> 710–2000

Coupling size	Number per set	D mm	d mm	L mm	M mm
105	8	20	8	45	M6
125	8	24	10	53.5	M8
144	10	24	10	53.5	M8
162	9	30	12	64.5	M10
178	10	30	12	64.5	M10
198	12	30	12	64.5	M10
228	11	40	16	79	M12
252	12	40	16	79	M12
285	11	48	20	98	M16
320	12	48	20	98	M16
360	10	64	25	123	M18
400	14	64	25	123	M18
450	12	78	32	123	M16
500	14	78	32	123	M16
560	12	101	42	158	M20
630	14	101	42	158	M20
710	14	120	50	185.5	M24
800	16	120	50	185.5	M24
900	16	136	55	207.5	M24
1000	18	136	55	207.5	M24
1120	18	155	60	232.5	M30
1250	20	155	60	232.5	M30
1400	20	175	70	274	M30
1600	24	175	70	274	M30
1800	22	200	80	327	M36
2000	26	200	80	327	M36

ALIGNMENT



> axial offset > angular offset > radial offset

Offset of coupling parts in relation to one another may arise from an imprecise alignment during assembly, but also from operation of the machine (thermal expansion, shaft sag, excessively soft machine frame etc.).

Orpex® couplings absorb position deviations in the machines to be connected. When alignment is being performed the radial and angular offset of the shaft ends must be kept as small as possible, since this will lengthen the service life of the buffers under otherwise identical operating conditions. The coupling must be assembled and aligned in accordance with our operating instructions. The offset figures given as allowable in the table are intended for general guidance.

PERMITTED SHAFT MISALIGNMENT

The permitted shaft misalignment depends on the operating speed. As the speed increases, lower shaft misalignment values are permitted. The following table shows the correction factors for different speeds.
The maximum speed for the respective coupling size and type must be observed!

$$\Delta K_{zul} = \Delta K_{1500} \bullet FKV$$

	Speed in rpm			
	500	1000	1500	3000
Correction factor FKV	**1.60**	**1.20**	**1.0**	**0.70**

The axial misalignment may occur dynamically at frequencies up to 10 Hz.
For fitting, a maximum gap dimension $\mathbf{S_{max}}$ and a minimum gap dimension $\mathbf{S_{min}}$ according to table page 11 is permitted.

Shaft misalignment $\Delta\mathbf{K_a}$, $\Delta\mathbf{K_r}$ und $\Delta\mathbf{K_w}$ may occur simultaneously.

PERMITTED MISALIGNMENT

Size	Axial misalignment mm			Angular and radial misalignment[1] mm			
	S_{1min}	S_{1max}	ΔK_a perm. $S_{1max} - S_{1min}$	Rotation speed n rpm	ΔK_r perm.	ΔK_w $S_{1max} - S_{1min}$	ΔK_W perm. degree
105	2	4	2	1500	0.276		0.150
125	2	4	2		0.273		0.125
144	2	4	2		0.315		0.125
162	2	5	3		0.284		0.100
178	2	5	3		0.312		0.100
198	2	5	3		0.26		0.075
228	2	5	3		0.299		0.075
252	2	5	3		0.221		0.050
285	3	6	3		0.249		0.050
320	3	6	3		0.28		0.050
360	3	6	3		0.315		0.050
400	3	6	3	750	0.525		0.075
450	4	7	3		0.591		0.075
500	4	7	3		0.438		0.050
560	4	8	4		0.49		0.050
630	4	8	4		0.55		0.050
710	5	9	4		0.62		0.050
800	5	9	4		1.05		0.075
900	5	10	5	380	1.18		0.075
1000	5	10	5		0.875		0.050
1120	6	11	5		0.98		0.050
1250	6	11	5		1.09		0.050
1400	6	12	6	180	2.45		0.100
1600	6	12	6		2.1		0.075
1800	8	16	8		2.4		0.076
2000	8	16	8		2.6		0.074

1) The permitted angular and radial misalignment may be used singly, if they occur simultaneously only proportionally.