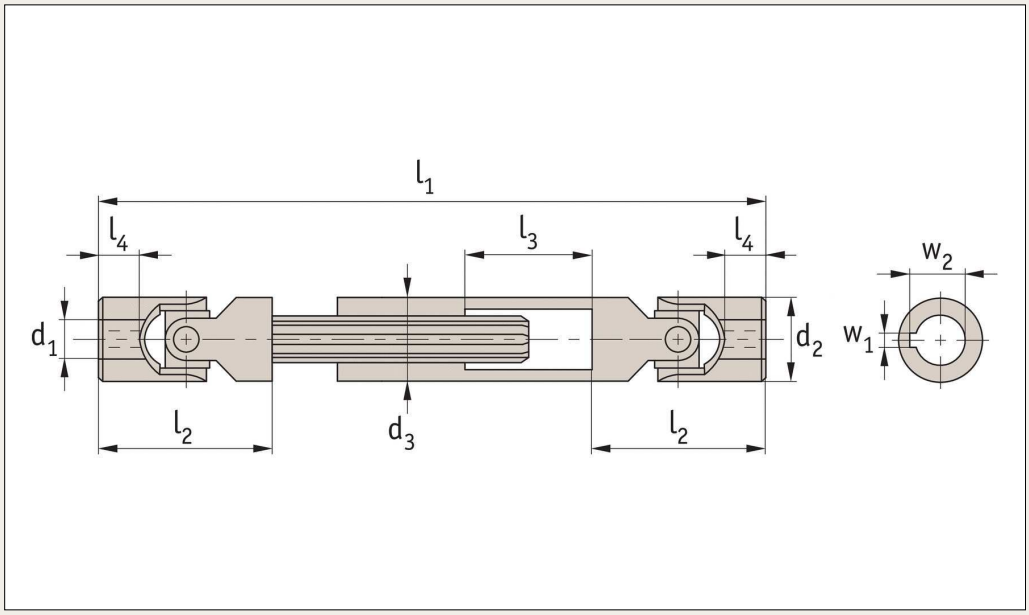
Telescopic Universal Joints



R3680

Material

Steel (9SMnPb28k, no. 10718, greased).
Bearing type: plain bearing.

Technical notes

To DIN 808.
Maximum bending angle 45° per joint. The drive speed of universal joints with journal bearings must not exceed 1000 rpm.

Tips

Double universal joints are used where large bending angles are required or where two shafts offset in relation to each other.
Zinc plated available on request.

Order No.	$d_{1\ H7}$	d_2	$l_{1\ min.}$	$l_{1\ max.}$	l_2	$l_{3\ stroke}$	l_4	$w_{1\ JS9}$	w_2	shaft	d_3	g
R3680.10-140-170	10	22	140	170	48	30	12	3	11,4	11x14x6	22	310
R3680.10-160-200	10	22	160	200	48	40	12	3	11,4	11x14x6	22	360
R3680.10-180-240	10	22	180	240	48	60	12	3	11,4	11x14x6	22	380
R3680.10-230-330	10	22	230	330	48	100	12	3	11,4	11x14x6	22	500
R3680.12-160-190	12	25	160	190	56	30	13	4	13,8	13x16x6	26	500
R3680.12-180-225	12	25	180	225	56	45	13	4	13,8	13x16x6	26	560
R3680.12-200-270	12	25	200	270	56	70	13	4	13,8	13x16x6	26	620
R3680.12-220-300	12	25	220	300	56	80	13	4	13,8	13x16x6	26	670
R3680.12-250-355	12	25	250	355	56	105	13	4	13,8	13x16x6	26	760
R3680.12-280-420	12	25	280	420	56	140	13	4	13,8	13x16x6	26	840
R3680.12-300-450	12	25	300	450	56	150	13	4	13,8	13x16x6	26	900
R3680.14-170-200	14	28	170	200	60	30	14	5	16,3	13x16x6	29	620
R3680.14-180-220	14	28	180	220	60	40	14	5	16,3	13x16x6	29	640
R3680.14-200-260	14	28	200	260	60	60	14	5	16,3	13x16x6	29	720
R3680.14-220-300	14	28	220	300	60	80	14	5	16,3	13x16x6	29	780
R3680.14-250-350	14	28	250	350	60	100	14	5	16,3	13x16x6	29	870
R3680.14-280-420	14	28	280	420	60	140	14	5	16,3	13x16x6	29	960
R3680.14-300-450	14	28	300	450	60	150	14	5	16,3	13x16x6	29	1030
R3680.14-350-550	14	28	350	550	60	200	14	5	16,3	13x16x6	29	1170
R3680.14-400-650	14	28	400	650	60	250	14	5	16,3	13x16x6	29	1330
R3680.16-190-220	16	32	190	220	68	30	16	5	18,3	16x20x6	32	900
R3680.16-210-250	16	32	210	250	68	40	16	5	18,3	16x20x6	32	980
R3680.16-240-320	16	32	240	320	68	80	16	5	18,3	16x20x6	32	1100
R3680.16-250-350	16	32	250	350	68	100	16	5	18,3	16x20x6	32	1140
R3680.16-275-390	16	32	275	390	68	115	16	5	18,3	16x20x6	32	1240
R3680.16-300-430	16	32	300	430	68	130	16	5	18,3	16x20x6	32	1330
R3680.16-380-590	16	32	380	590	68	210	16	5	18,3	16x20x6	32	1600

Order No.	$d_{1\ H7}$	d_2	$l_{1\ min.}$	$l_{1\ max.}$	l_2	$l_{3\ stroke}$	l_4	$w_{1\ JS9}$	w_2	shaft	d_3	g
R3680.16-400-630	16	32	400	630	68	230	16	5	18,3	16x20x6	32	1730
R3680.18-230-280	18	36	230	280	74	50	17	6	20,8	18x22x6	37	1350
R3680.18-250-320	18	36	250	320	74	70	17	6	20,8	18x22x6	37	1460
R3680.18-270-370	18	36	270	370	74	100	17	6	20,8	18x22x6	37	1550
R3680.18-290-400	18	36	290	400	74	110	17	6	20,8	18x22x6	37	1660
R3680.18-300-415	18	36	300	415	74	115	17	6	20,8	18x22x6	37	1710
R3680.18-400-620	18	36	400	620	74	220	17	6	20,8	18x22x6	37	2230
R3680.18-500-820	18	36	500	820	74	320	17	6	20,8	18x22x6	37	2750
R3680.20-250-300	20	42	250	300	82	50	18	6	22,8	21x25x6	42	1990
R3680.20-270-340	20	42	270	340	82	70	18	6	22,8	21x25x6	42	2120
R3680.20-290-380	20	42	290	380	82	90	18	6	22,8	21x25x6	42	2250
R3680.20-320-440	20	42	320	440	82	120	18	6	22,8	21x25x6	42	2460
R3680.20-380-560	20	42	380	560	82	180	18	6	22,8	21x25x6	42	2860
R3680.20-420-640	20	42	420	640	82	220	18	6	22,8	21x25x6	42	3130
R3680.20-500-800	20	42	500	800	82	300	18	6	22,8	21x25x6	42	3660
R3680.22-250-280	22	45	250	280	95	30	22	6	24,8	23x28x6	47	2350
R3680.22-270-320	22	45	270	320	95	50	22	6	24,8	23x28x6	47	2510
R3680.22-290-350	22	45	290	350	95	60	22	6	24,8	23x28x6	47	2670
R3680.22-330-430	22	45	330	430	95	100	22	6	24,8	23x28x6	47	3000
R3680.22-350-470	22	45	350	470	95	120	22	6	24,8	23x28x6	47	3160
R3680.22-470-710	22	45	470	710	95	240	22	6	24,8	23x28x6	47	4130
R3680.25-295-345	25	50	295	345	108	50	26	8	28,3	26x32x6	52	3390
R3680.25-310-375	25	50	310	375	108	65	26	8	28,3	26x32x6	52	3520
R3680.25-350-450	25	50	350	450	108	100	26	8	28,3	26x32x6	52	3920
R3680.25-380-500	25	50	380	500	108	120	26	8	28,3	26x32x6	52	4200
R3680.25-420-590	25	50	420	590	108	170	26	8	28,3	26x32x6	52	4590
R3680.25-460-660	25	50	460	660	108	200	26	8	28,3	26x32x6	52	4980
R3680.25-500-745	25	50	500	745	108	245	26	8	28,3	26x32x6	52	5370
R3680.30-330-380	30	58	330	380	122	50	29	8	33,3	32x38x8	58	4900
R3680.30-350-420	30	58	350	420	122	70	29	8	33,3	32x38x8	58	5170
R3680.30-370-455	30	58	370	455	122	85	29	8	33,3	32x38x8	58	5420
R3680.30-400-510	30	58	400	510	122	110	29	8	33,3	32x38x8	58	5850
R3680.30-450-620	30	58	450	620	122	170	29	8	33,3	32x38x8	58	6480
R3680.30-500-720	30	58	500	720	122	220	29	8	33,3	32x38x8	58	7140
R3680.30-540-795	30	58	540	795	122	255	29	8	33,3	32x38x8	58	7690

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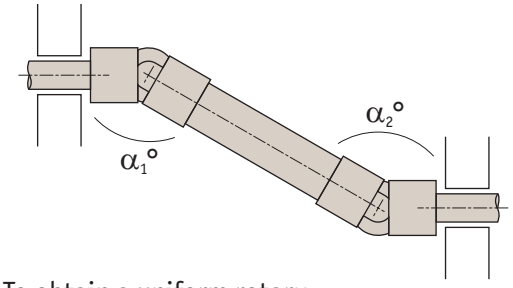
Universal Joints

When one single joint is coupled with two shafts (of which the driving one is rotating at a constant speed) forming an angle, a periodic variation of the driven shaft is caused with exactly four fluctuations per revolution.

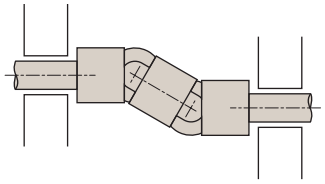
The difference between the maximum and the minimum speed of the driven shaft depends on the angle formed by the two shafts. The difference grows with the increase of the angle a°. To have a smooth transmission, either two opposite single joints (ensuring that that the two central yokes lie on the same plane and the angles are equal) or a double joint need to be fitted. The irregularity caused by the articulation of the first unisex joint is cancelled by the second unisex joint. The overall length resulting from the coupling of the two single joints can be reduced by using a double unisex joint. In other words, the double joint is to be considered as the shortest method of achieving smooth transmission.

For low speed applications (max. 1000 rpm), joints with plain bearings are recommended. They are able to support shock loads, motion reversal, irregular running and relatively high torques. The working angles must be be restricted when using at speeds between 500 - 1000 rpm. Please consult our technical department if you have such an application.

For high rotation speeds, relatively low torques or wide angles, joints with needle roller bearings are preferred. They can reach 4000 rpm dependent on the angle.

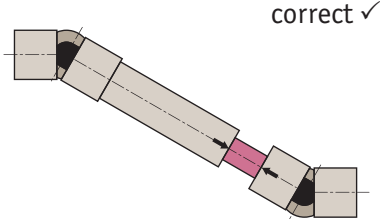


To obtain a uniform rotary motion always use either two opposite single joints or one double joint. $\alpha_1 = \alpha_2$



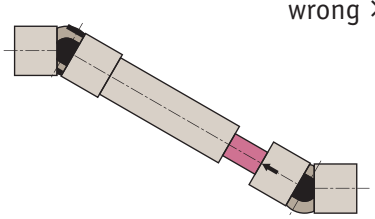
The pillow blocks supports should be positioned as close as possible to the joints

correct ✓



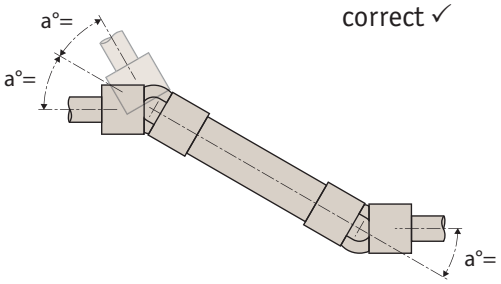
When using two opposite single joints ensure the alignment of the inside yokes

wrong ×



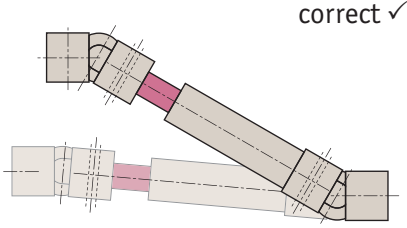
In extendable transmissions make sure that the arrows are perfectly aligned

correct ✓



It is essential that the two bending angles a° are equal

correct ✓



Technical Information

Torque Ratings for Plain Bearing Universal Joints

How to read diagrams

The joints capacity to transmit a regular torque at a constant load with no shocks, for a long period, mainly depends on the number of revolutions per minute and the inclination angle a° of the two axes. The diagrams on the following pages are based on this. Each curve corresponds to the joint size (outside diameter "D") and represents the torque that the joint can transmit depending on speed and working angle a°.

The diagrams can be directly read if angle (a°) is 10°. For wider angles, torques are reduced, these should be corrected using the correction vales (F) relating to the angle shown in the table.

IMPORTANT

Graph values are merely indicative and refer to the single joints only. When choosing a double joint, you have to consider that they can transmit a torque about 10% lower than the same sized single joints. Each application has its own particular motion characteristics, such as: shock loads, motion reversals, connected masses, kind of starting, presence of elastic joints, stops and starts, etc., that have to be considered when choosing the joint.

Working angle a°	Correction value F
5°	1,25
10°	1,00
15°	0,80
20°	0,65
25°	0,55
30°	0,45
35°	0,38
40°	0,30
45°	0,25

Torque Calculation for Plain Bearings

Power: 0,65 KW, RPM: 230

With working angle a 10° Value F = 1 we get point P. Torque = 27 Nm corresponding to joint size "D" = 25/26mm. = Types R3688.016 and R3689.012

With working angle a 30° Value F = 0.45 (Kw 0,65: 0,45 = 1,44Kw) we get point P1 Torque = 60 Nm corresponding to joint size "D" = 32mm. = Types R3688.020 and R3689.016

Consider that:

$$\text{Torque in Nm} = 9550 \times \frac{\text{Power (KW)}}{\text{RPM}}$$

$$\text{Torque in Nm} = 7020 \times \frac{\text{Power (HP)}}{\text{RPM}}$$

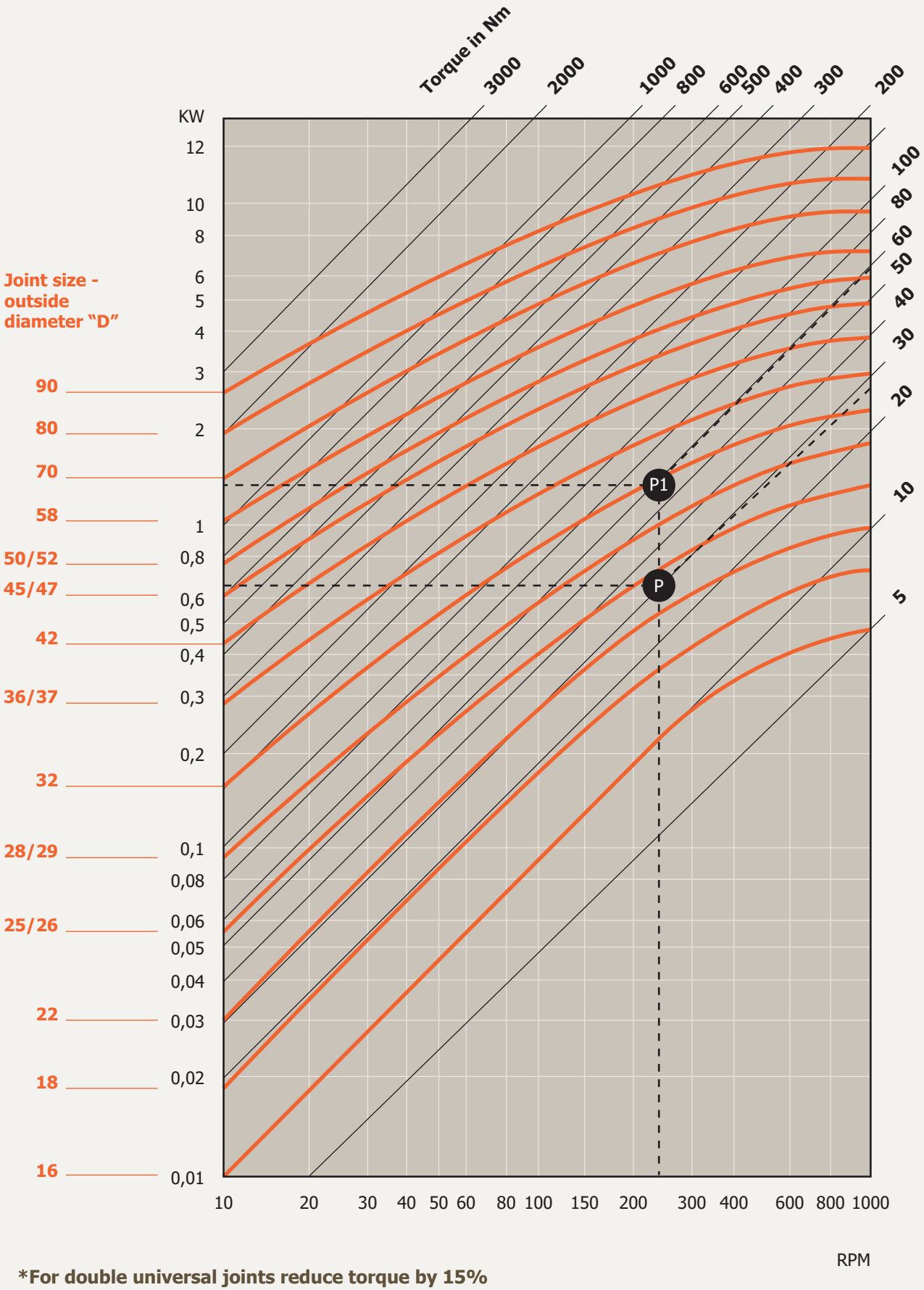
Note: 1 KW = 1,35 HP and HP = 0,736 KW
Note: 1 Kgm = 9,81 Nm and Nm = 0,102 Kgm

Technical Information

Torque Ratings for Plain Bearing Universal Joints

Plain Bearings Single & Double Universal Joints

Not applicable for stainless versions, please contact our Technical Sales Department for further details.



***For double universal joints reduce torque by 15%**

Technical Information

Torque Ratings for Needle Roller Bearings Universal Joints

Working angle a°	Correction value F
5°	1,25
10°	1,00
15°	0,90
20°	0,80
25°	0,70
30°	0,50
35°	0,40
40°	0,30
45°	0,25

Torque Calculation

Power: 0,55 KW, RPM: 2300

With working angle a 10° Value F = 1 we get point P. Torque = 23 Nm corresponding to joint size "D" = 28mm. = Type R3686.014

With working angle a 25° Value F = 0.70 (Kw 5,5: 0,70 = 7,85Kw) we get point P1 Torque = 33 Nm corresponding to joint size "D" = 32mm. = Type R3686.016

Consider that:

$$\text{Torque in Nm} = 9550 \times \frac{\text{Power (KW)}}{\text{RPM}}$$

$$\text{Torque in Nm} = 7020 \times \frac{\text{Power (HP)}}{\text{RPM}}$$

Note: 1 KW = 1,35 HP and HP = 0,736 KW
Note: 1 Kgm = 9,81 Nm and 1Nm = 0,102 Kgm

Factor in a safety factor for shock load, reciprocating methods, start-up shocks etc.

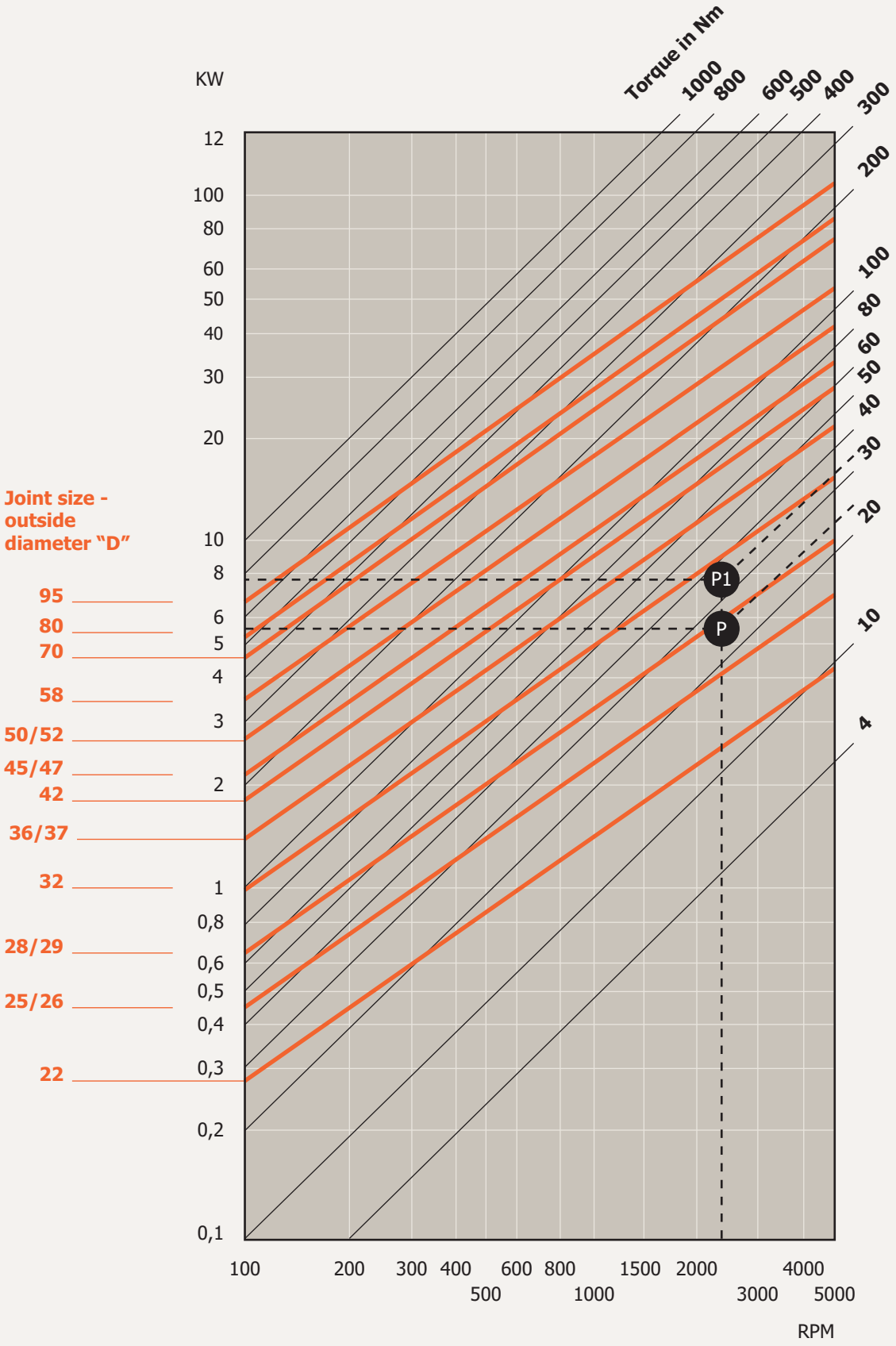
Universal Joints from Springfix Linkages

Technical Information

Torque Ratings for Needle Roller Bearings Universal Joints

Needle Roller Bearings Single & Double Universal Joints

Not applicable for stainless versions, please contact our Technical Sales Department for further details.



***For double universal joints reduce torque by 15%**