

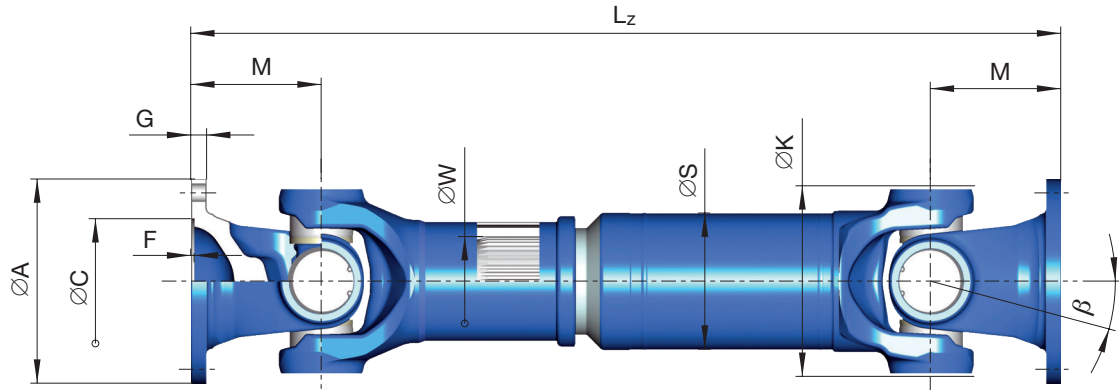
# Data sheet series 687/688

0.02 with length compensation, tubular design  
 0.03 without length compensation, tubular design  
 9.01 with length compensation, short design

9.03 with length compensation, short design  
 9.04 without length compensation, double flange shaft design

## Design

0.02



Shaft size		687/688.15	687/688.20	687/688.25	687/688.30		687/688.35		687/688.40			
T <sub>CS</sub>	kNm	2,4	3,5	5	6,5		10		14			
T <sub>DW</sub>	kNm	0,7	1,0	1,6	1,9		2,9		4,4			
L <sub>c</sub>	-	1,79 x 10 <sup>-4</sup>	5,39 x 10 <sup>-4</sup>	1,79 x 10 <sup>-3</sup>	2,59 x 10 <sup>-3</sup>		0,0128		0,0422			
β	°	25	25	25	25		25		25	44	25	44
A	mm	100	120	120	120	150	150	180	150	150	180	180
K	mm	90	98	113	127	127	144	144	160	160	160	160
B ± 0,1 mm	mm	84	101,5	101,5	101,5	130	130	155,5	130	130	155,5	155,5
C H7	mm	57	75	75	75	90	90	110	90	90	110	110
F <sup>1)</sup>	mm	2,5	2,5	2,5	2,5	3	3	3	3	3	3	3
G	mm	7	8	8	8	10	10	12	10	10	12	12
H + 0,2 mm	mm	8,25	10,25	10,25	10,25	12,25	12,1	14,1	12,1	12,1	14,1	14,1
I <sup>2)</sup>	-	6	8	8	8	8	8	8	8	8	8	8
M	mm	48	54	70	72	78	95	90	102	102	102	102
S	mm	63,5 x 2,4	76,2 x 2,4	89 x 2,4	90 x 3	90 x 3	100 x 3	100 x 3	120 x 3	100 x 4,5	120 x 3	100 x 4,5
W DIN 5480	mm	36 x 1,5	40 x 1,5	45 x 1,5	48 x 1,5	48 x 1,5	54 x 1,5	54 x 1,5	62 x 1,75			

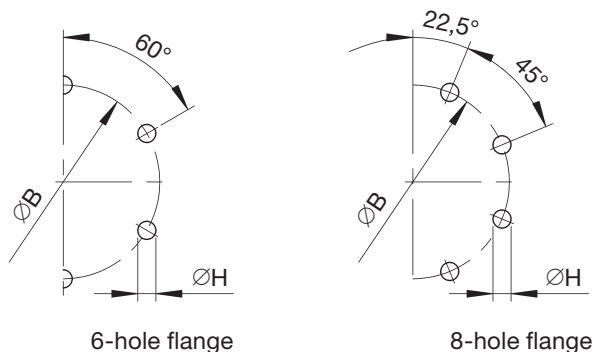
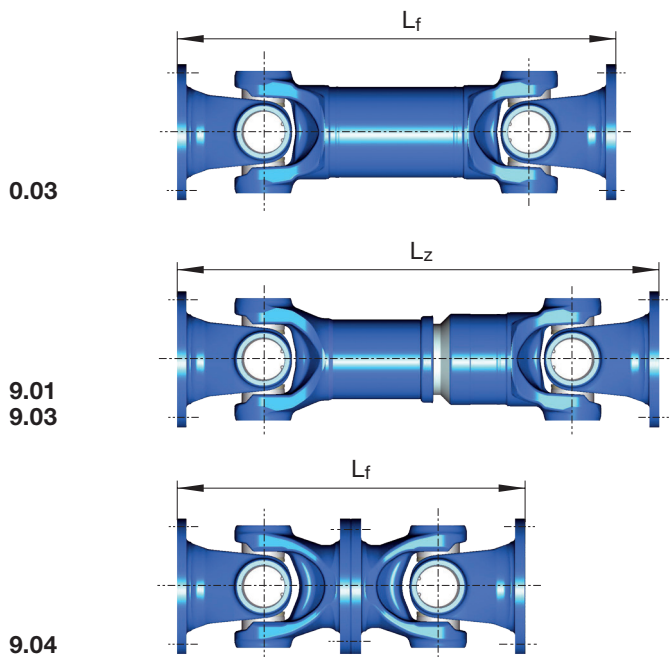
**T<sub>CS</sub>** = Functional limit torque\*  
 If the permissible functional limit torque T<sub>CS</sub> is to be fully utilized, the flange connection must be reinforced.

**T<sub>DW</sub>** = Reversing fatigue torque\*  
**L<sub>c</sub>** = Bearing capacity factor\*  
 \* See specifications of driveshafts.  
 β = Maximum deflection angle per joint

Tubular shafts with welded-on balancing plates have lower fatigue torques T<sub>DW</sub>  
 1) Effective spigot depth  
 2) Number of flange holes

# Data sheet series 687/688

## Design



**NOTE: Hole patterns are not optional.  
Each driveshaft size has a specific hole pattern.**

Design	Shaft size	687/688.15		687/688.20		687/688.25		687/688.30		687/688.35		687/688.40	
<b>0.02</b>	L <sub>z min</sub>	mm	346	379	458	492	504	582	572	586	693	586	693
	L <sub>a</sub>	mm	60	70	100	110	110	110	110	110	180	110	180
	G	kg	5,7	8,4	12,0	13	14,2	24,0	25,6	28,7	30,3	29,4	30,9
	G <sub>R</sub>	kg	3,62	4,37	5,13	6,44	6,44	7,18	7,18	8,66	10,6	8,66	10,6
	J <sub>m</sub>	kgm <sup>2</sup>	0,0043	0,0089	0,0144	0,0245	0,0245	0,043	-	0,0676	0,0706	0,0776	0,0806
	J <sub>mR</sub>	kgm <sup>2</sup>	0,0034	0,0059	0,0096	0,0122	0,0122	0,0169	0,0169	0,0296	0,0242	0,0296	0,0242
	C	Nm/rad.	0,26 x 10 <sup>5</sup>	0,42 x 10 <sup>5</sup>	0,71 x 10 <sup>5</sup>	0,78 x 10 <sup>5</sup>	0,78 x 10 <sup>5</sup>	1,18 x 10 <sup>5</sup>	-	2,17 x 10 <sup>5</sup>	1,61 x 10 <sup>5</sup>	2,17 x 10 <sup>5</sup>	1,61 x 10 <sup>5</sup>
C <sub>R</sub>	Nm/rad.	0,34 x 10 <sup>5</sup>	0,60 x 10 <sup>5</sup>	0,98 x 10 <sup>5</sup>	1,25 x 10 <sup>5</sup>	1,25 x 10 <sup>5</sup>	1,72 x 10 <sup>5</sup>	1,72 x 10 <sup>5</sup>	3,02 x 10 <sup>5</sup>	2,47 x 10 <sup>5</sup>	3,02 x 10 <sup>5</sup>	2,47 x 10 <sup>5</sup>	
<b>0.03</b>	L <sub>f min</sub>	mm	221	239	282	310	322	379	369	423	449	423	449
	G	kg	4,1	5,8	8,6	8,6	9,8	18,0	19,6	22,8	21,0	23,4	21,6
	J <sub>m</sub>	kgm <sup>2</sup>	0,0038	0,0085	0,0129	0,0238	0,0238	0,04	-	0,066	0,0628	0,076	0,0728
	C	Nm/rad.	0,44 x 10 <sup>5</sup>	0,86 x 10 <sup>5</sup>	1,44 x 10 <sup>5</sup>	1,74 x 10 <sup>5</sup>	1,74 x 10 <sup>5</sup>	1,81 x 10 <sup>5</sup>	-	3,35 x 10 <sup>5</sup>	2,78 x 10 <sup>5</sup>	3,35 x 10 <sup>5</sup>	2,78 x 10 <sup>5</sup>
<b>9.01</b>	L <sub>z min</sub>	mm	296	322	361	379	391	510	500	505	525	505	525
	L <sub>a min</sub>	mm	38	41	36	36	36	70	70	70	60	70	60
	L <sub>z max</sub>	mm	348	381	425	453	465	550	540	545	645	545	645
	L <sub>a max</sub>	mm	90	100	100	110	110	110	110	110	180	110	180
<b>9.03</b>	L <sub>z min</sub>	mm	245	274	313	331	343	419	409	441	-	441	-
	L <sub>a min</sub>	mm	25	27	28	29	29	45	45	45	-	45	-
	L <sub>z max</sub>	mm	280	317	355	397	409	484	474	506	-	506	-
	L <sub>a max</sub>	mm	60	70	70	95	95	110	110	110	-	110	-
<b>9.04</b>	L <sub>f min</sub>	mm	192	216	280	288	312	380	360	408	408	408	408

L<sub>z min</sub> = Shortest possible compressed length  
 L<sub>a</sub> = Length compensation  
 L<sub>f min</sub> = Shortest fixed length  
 L<sub>z</sub> + L<sub>a</sub> = Maximum operating length

G = Weight of shaft  
 G<sub>R</sub> = Weight per 1.000 mm tube  
 J<sub>m</sub> = Moment of inertia  
 J<sub>mR</sub> = Moment of inertia per 1.000 mm tube

C = Torsional stiffness of shaft without tube  
 C<sub>R</sub> = Torsional stiffness per 1.000 mm tube

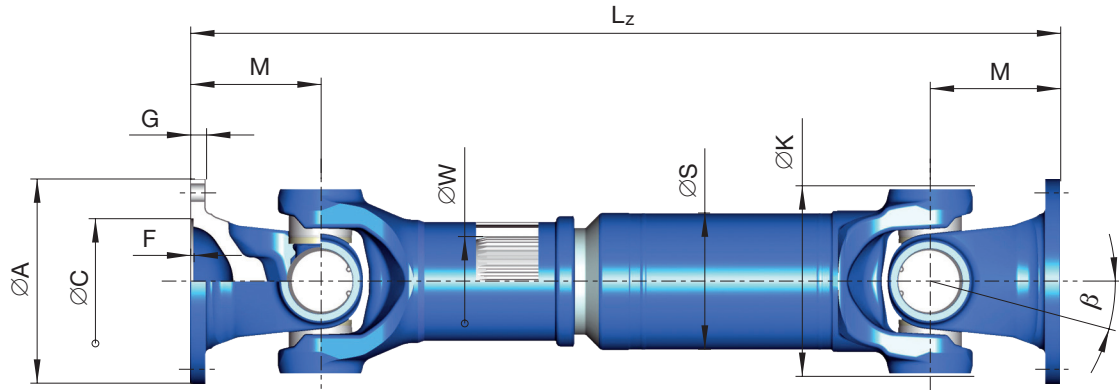
# Data sheet series 687/688

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 0.03 without length compensation, tubular design  
 9.01 with length compensation, short design

9.03 with length compensation, short design  
 9.04 without length compensation, double flange shaft design

## Design

0.02



Shaft size		687/688.45			687/688.55			687/688.65	
T <sub>CS</sub>	kNm	17			25			35	
T <sub>DW</sub>	kNm	5,1			7,3			11	
L <sub>c</sub>	-	0,13			0,29			0,82	
β	°	25	35	25	25	35	25	25	25
A	mm	180	180	225	180	180	225	180	225
K	mm	174	174	174	178	178	178	204	204
B ± 0,1 mm	mm	155,5	155,5	196	155,5	155,5	196	155,5	196
C H7	mm	110	110	140	110	110	140	110	140
F <sup>1)</sup>	mm	3	3	5	3	3	5	3	5
G	mm	12	12	15	14	14	15	15	15
H + 0,2 mm	mm	14,1	14,1	16,1	16,1	16,1	16,1	16,1	16,1
I <sup>2)</sup>	-	8	8	8	10	10	8	10	8
M	mm	95	95	90	115	115	95	110	110
S	mm	120 x 4	110 x 5	120 x 4	120 x 6	120 x 6	120 x 6	142 x 6	142 x 6
W DIN 5480	mm	68 x 1,75			78 x 2			88 x 2,5	

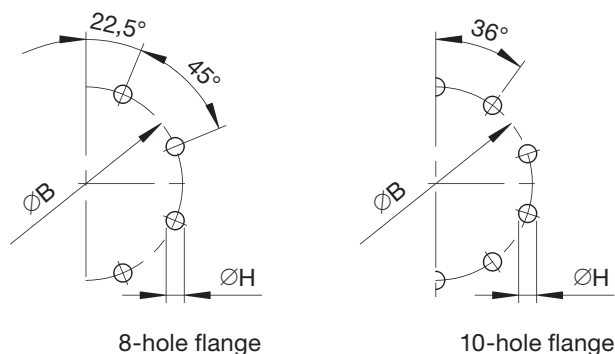
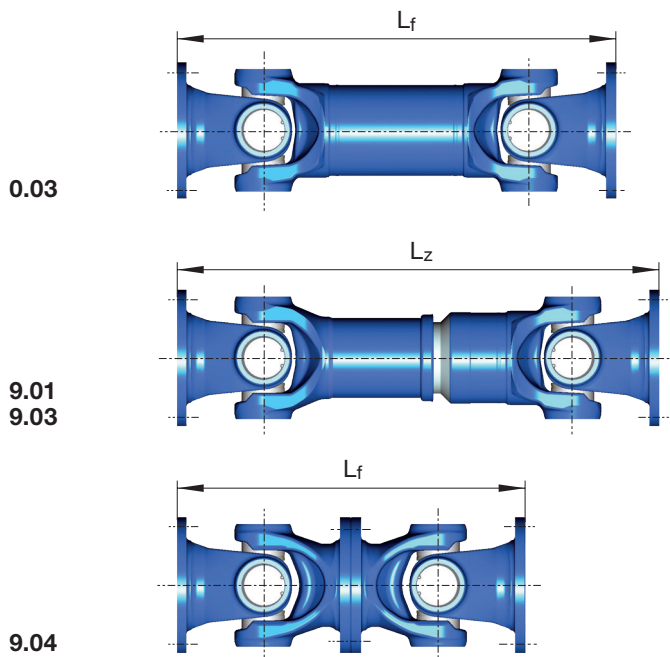
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## Design



**NOTE: Hole patterns not optional.  
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Design	Shaft size	687/688.45			687/688.55			687/688.65		
		0.02	$L_{z \text{ min}}$	mm	595	703	585	662	681	622
	$L_a$	mm	110	180	110	110	110	110	110	110
	G	kg	35,7	38,4	37,7	44,0	49,2	47,0	60,6	64,6
	$G_R$	kg	11,44	12,95	11,44	16,87	16,87	16,87	20,12	20,12
	Jm	kgm <sup>2</sup>	0,1002	0,1242	0,1342	0,131	0,146	0,151	0,2224	0,2614
	$J_{mR}$	kgm <sup>2</sup>	0,0385	0,0358	0,0385	0,055	0,055	0,055	0,0932	0,0932
	C	Nm/rad.	$3,10 \times 10^5$	$2,18 \times 10^5$	$3,10 \times 10^5$	$4,05 \times 10^5$	$3,86 \times 10^5$	$4,05 \times 10^5$	$5,63 \times 10^5$	$5,63 \times 10^5$
	$C_R$	Nm/rad.	$3,93 \times 10^5$	$3,65 \times 10^5$	$3,93 \times 10^5$	$5,60 \times 10^5$	$5,60 \times 10^5$	$5,60 \times 10^5$	$9,50 \times 10^5$	$9,50 \times 10^5$
0.03	$L_{f \text{ min}}$	mm	425	425	415	475	495	435	491	491
	G	kg	28,0	27,8	30	33,1	34,8	36,1	47,3	51,3
	Jm	kgm <sup>2</sup>	0,0954	0,0976	0,1294	0,1176	0,1235	0,1376	0,2032	0,2422
	C	Nm/rad.	$4,82 \times 10^5$	$3,71 \times 10^5$	$4,82 \times 10^5$	$5,39 \times 10^5$	$5,13 \times 10^5$	$5,39 \times 10^5$	$7,17 \times 10^5$	$7,17 \times 10^5$
9.01	$L_{z \text{ min}}$	mm	517	538	507	587	606	547	601	601
	$L_a \text{ min}$	mm	70	60	70	70	70	70	70	70
	$L_{z \text{ max}}$	mm	557	658	547	617	636	577	641	641
	$L_a \text{ max}$	mm	110	180	110	100	100	100	110	110
9.03	$L_{z \text{ min}}$	mm	447	-	437	513	-	473	524	524
	$L_a \text{ min}$	mm	50	-	50	50	-	50	50	50
	$L_{z \text{ max}}$	mm	507	-	497	563	-	523	584	584
	$L_a \text{ max}$	mm	110	-	110	110	-	110	110	110
9.04	$L_{f \text{ min}}$	mm	380	380	360	460	460	380	440	440

$L_{z \text{ min}}$  = Shortest possible compressed length  
 $L_a$  = Length compensation  
 $L_{f \text{ min}}$  = Shortest fixed length  
 $L_z + L_a$  = Maximum operating length

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