

Dipl.-Ing. Herwarth Reich GmbH

## FlexDur FD-C

All steel coupling



The new series FLEXDUR FD-C is an addition to the existing series FD. The coupling uses bushed flexible disc packs of stainless spring steel as power transmitting elements.

The special shape of the precision bushes results in a uniform tension distribution of the disc pack. The high grade fitting bolts offer a backlash-free torque transmission.

The FLEXDUR FD-C has been designed with modular components. Therefore the coupling can be fitted to many different installation situations:

FLEXDUR FD-C 1 single joint coupling (e.g. type N) with one flexible disc pack to compensate axial and angular misalignment.

FLEXDUR FD-C 2 double joint coupling (e.g. type S) with two flexible disc packs to compensate axial, radial and angular misalignment and thus flexible in all directions. Different installation lengths are available as standard.

Special designs e.g. for vertical or inclined mounting are possible on request.

Designs with clamping sets can be supplied for a total backlash-free connection.

### Advantages of the FLEXDUR FD-C:

- Torsionally rigid and backlash-free torque transmission
- Compensation of axial, radial and angular shaft displacement
- Small reaction forces at shaft misalignment
- Neither maintenance, nor lubrication required
- For use at ambient temperatures from  $-25\text{ }^{\circ}\text{C}$  to  $+250\text{ }^{\circ}\text{C}$
- Compact design even suited for high speeds
- Almost unlimited lifetime and wear-free at proper shaft alignment

**Your drive is our strength. Your strength is our drive.**



# Technical data

Size	FLEXDUR FD-C 1 Single disc pack						FLEXDUR FD-C 2 Double disc pack						
	Nominal torque	Maximum torque	Maximum speed	Moment of inertia	Torsional stiffness	Weight	Spacer length	Permissible misalignment		Moment of inertia	Torsional stiffness	Weight	
	T <sub>KN</sub> [Nm]	T <sub>Kmax</sub> [Nm]	n <sup>1)</sup> [min <sup>-1</sup> ]	J [kgm <sup>2</sup> ]	C <sub>T</sub> [kNm/rad]	m [kg]	DBSE <sup>4)</sup> [mm]	ΔKr <sup>2)</sup> [mm]	ΔKa <sup>3)</sup> [± mm]	ΔKw <sup>3)</sup> [°]	J [kgm <sup>2</sup> ]	C <sub>T</sub> [kNm/rad]	m [kg]
FD-C 53-6	75	130	11500	0.00011	113.4	0.45	30 39	0.3	0.8	1.5	0.00016 0.00019	56.7 42.0	0.60 0.65
FD-C 70-6	170	295	8800	0.00049	142.5	1.24	31.2	0.3	1.1	1.5	0.00071	71.2	1.58
							60	0.7			0.00076	56.1	1.62
							100	1.2			0.00081	47.1	1.74
							140	1.4			0.00087	40.7	1.87
FD-C 88-6	320	560	7000	0.00164	200.3	2.45	37.6	0.4	1.2	1.5	0.00218	100.1	3.00
							70	0.8			0.00252	90.9	3.21
							80	0.9			0.00256	89.3	3.27
							100	1.2			0.00265	86.3	3.38
							140	1.7			0.00282	80.9	3.60
FD-C 116-6	750	1310	6200	0.00591	341.7	5.21	46.3	0.5	1.6	1.5	0.00796	170.8	6.41
							100	1.2			0.00907	154.8	6.76
							140	1.7			0.00948	147.8	7.05
							180	2.2			0.00990	141.3	7.35
FD-C 140-6	1350	2360	4600	0.0136	503.9	8.19	100	1.1	2.1	1.5	0.0209	233.0	10.6
							140	1.7			0.0217	224.1	11.1
							180	2.2			0.0226	216.0	11.5
FD-C 166-6	2400	4200	3800	0.0347	938.4	14	100	1.1	2.5	1.5	0.0517	442.5	18.6
							140	1.7			0.0538	429.3	19.3
							180	2.2			0.0558	416.9	20.0
FD-C 198-6	4000	7000	3400	0.0836	1258.7	24	140	1.6	2.8	1.5	0.124	587.0	31.5
							180	2.2			0.127	573.0	32.3
FD-C 238-6	6500	11375	3000	0.227	2268.1	48	140	1.6	3.4	1.5	0.334	1068.1	60.8
							180	2.1			0.345	1043.4	62.6
FD-C 239-6	8500	14875	3000	0.229	2835.1	48	142.4	1.6	3.4	1.5	0.337	1316.0	61.2
							182.4	2.1			0.348	1278.7	63.0
FD-C 295-8	21000	36750	2500	0.704	6159.4	93	200	2.0	2.2	1.0	1.067	2787.6	120
							250	2.5			1.098	2698.7	123
FD-C 345-8	36000	63000	2100	1.754	8680.0	163	224	2.0	2.6	1.0	2.615	3993.9	217
							250	2.5			2.635	3942.7	219
							300	3.0			2.675	3847.8	223

1) For higher speeds please consult us

3) For single disc pack: ΔKa or ΔKw = half value

2) For single disc pack: ΔKr=0

4) DBSE up to 3000 possible on request

## Coupling size selection

First the service factor (Sf) is determined, it is based on the misalignment factor (S1), the load factor (S2) and the temperature factor (S3):

$$Sf = S1 \cdot S2 \cdot S3 \text{ (refer to the following sections)}$$

The transmitted torque T multiplied by the service factor Sf may not be larger than the nominal torque TKN (acc. to table "Technical data").

$$TKN > T \cdot Sf$$

## Misalignment factor S1

The values for misalignment, which are shown in the table "Technical data", are maximum values which may not occur simultaneously. A present axial misalignment ΔKa reduces acc. to fig.1 the permissible values for the angular misalignment ΔKw and the radial misalignment ΔKr. The total misalignment ΣΔK [°] is computed:

$$\Sigma\Delta K [^\circ] = \frac{\Delta K_w}{2} + \arctan \frac{\Delta K_r}{(DBSE - S)}$$

(Values for DBSE and S per table "Standard size" on page 3) The misalignment factor (S1) is a function of ΣΔK [°] acc. to fig. 2.

## Load factor S2

For electric or hydraulic motors, gas or steam turbines

Driven machine	S2
Paper machines and textile machines	2.00
Woodworking machines, gear pumps, conveyors	1.50
Machine tools: main drives	1.75
Machine tools: auxiliary drives	1.10
Elevators and cranes	2.00
Mills, reciprocating pumps	2.50
Centrifugal pumps: small inertias and thin fluid materials	1.10
Centrifugal pumps: large inertias or semifluid materials	1.75
Presses	3.00
Blowers with low inertias	1.10
Blowers with high inertias	2.00

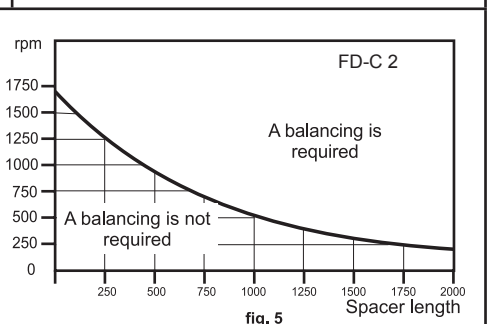
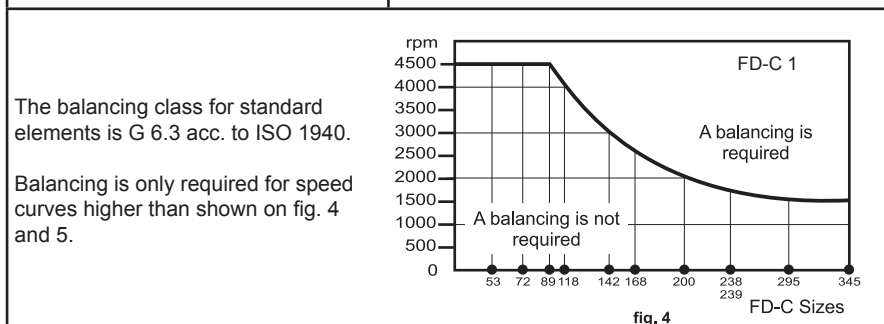
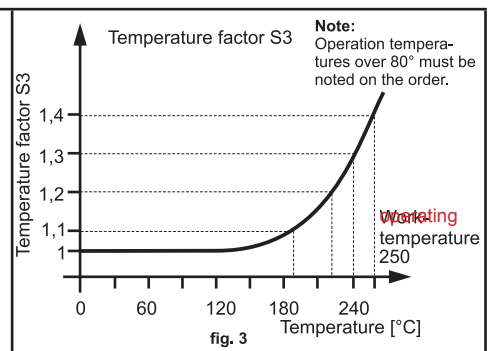
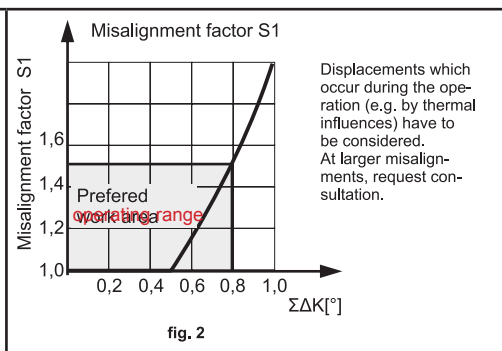
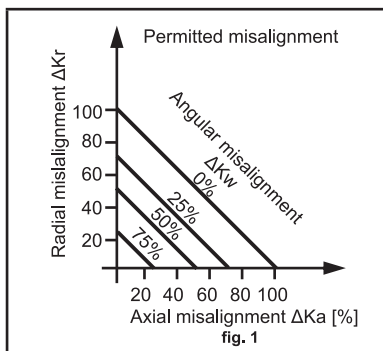
The load factor must be increased:

- S2+1: for applications with 4- or 5-cylinder engines
- S2+0.5: for applications with 6 cylinder engines or with start-up torque ≥ 2.
- Applications with repetitive large peak torques:
  - non-reversing duty: TKN > peak torque
  - reversing duty: TKN > 1.5 x peak torque

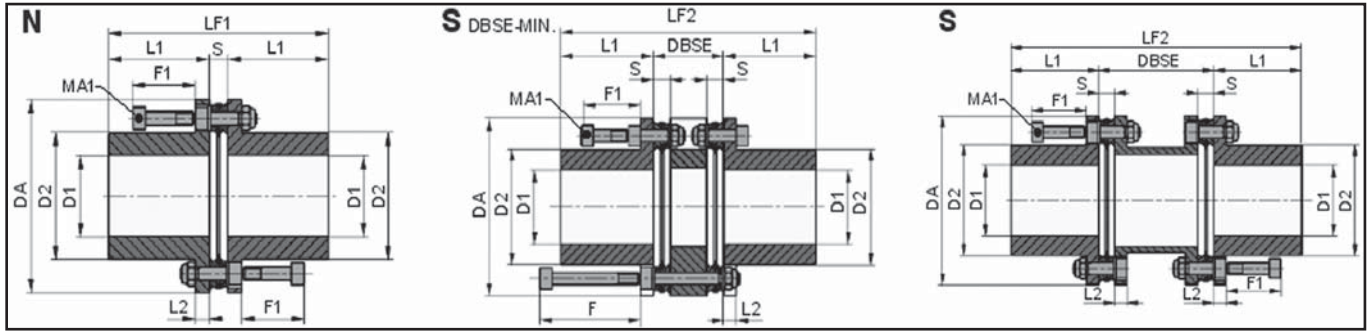
## Temperature factor S3

FLEXDUR FD-C can be used up to 80° C as a standard. Due to the use of self-locking nuts with plastic rings, higher temperatures have to be specified in the order. For temperatures above 160° C the factor S3 acc. to fig.3 must be selected

## Diagrams



# FlexDur FD-C standard types

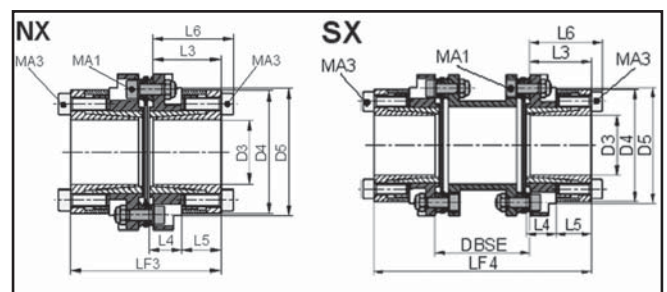
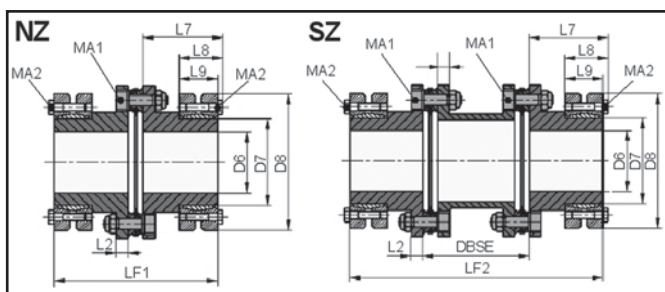


STANDARD Size	L1 [mm]	S [mm]	DA [mm]	D1 <sub>min</sub> [mm]	D1 <sub>max</sub> [mm]	D2 [mm]	F [mm]	F1 [mm]	L2 [mm]	DBSE [mm]	LF1 [mm]	LF2 [mm]	M <sub>A1</sub> [Nm]
FD-C 53-6	24.5	6.9	53	6	22	32.5	44	25	5	30 39	55.9	79 88	6
FD-C 70-6	39.5	7.5	70.5	10	35	47	44	25	5	31.2 60 100 140	86.5	110.2 139 179 219	8
FD-C 88-6	45	8.8	88	14	45	62.5	53	32	8	37.6 70 80 100 140	98.8	127.6 160 170 190 230	14
FD-C 116-6	55	10.4	116.5	15	60	82	67	40	10	46.3 100 140 180	120.4	156.3 210 250 290	31
FD-C 140-6	60	12	140.5	19	70	98	-	47	11	100 140 180	132	220 260 300	62
FD-C 166-6	75	13	166.5	25	90	118	-	56	12	100 140 180	163	250 290 330	110
FD-C 198-6	90	15	198.5	30	100	141	-	64	14	140 180	195	320 360	180
FD-C 238-6	125	20.8	238	39	120	169	-	81	16	140 180	270.8	390 430	280
FD-C 239-6	125	22	238	39	120	169	-	81	16	142.4 182.4	272	392.4 432.4	300
FD-C 295-8	160	28	295	49	150	205	-	112	22	200 250	348	520 570	540
FD-C 345-8	200	32.2	345	59	180	254	-	133	26	224 250 300	432.2	624 650 700	850

NX-SX Size	L3 [mm]	L4 [mm]	L5 [mm]	L6 [mm]	D4 [mm]	D5 [mm]	DBSE [mm]	LF3 [mm]	LF4 [mm]	M <sub>A3</sub> [-]	M <sub>A3</sub> [Nm]
FD-C 53-6 + 145	25.5	14	13.5	29.5	40.5	42	30 39	57.9	81 90	M4	5
FD-C 70-6 + 145	25	14	13.5	29	40.5	42	31.2 60 100 140	57.5	81.2 110 150 190	M4	5
FD-C 70-6 + 330	33	14	19	39	57	58	31.2 60 100 140	73.5	97.2 126 166 206	M6	17
FD-C 88-6 + 500	44.5	27	19	50.5	57	58	37.6 70 80 100 140	97.8	126.6 159 169 189 229	M6	17
FD-C 88-6 + 920	44.5	26.5	19	50.5	70.5	72	37.6 70 80 100 140	97.8	126.6 159 169 189 229	M6	17
FD-C 116-6 + 1140	35	16.5	18.5	41	74	80	46.3 100 140 180	80.4	116.3 170 210 250	M6	17
FD-C 116-6 + 1370	44	27	19	50	89.5	92	46.3 100 140 180	98.4	134.3 188 228 268	M6	17
FD-C 140-6 + 2820	59.5	36.5	23	67.5	96.5	98	100 140 180	131	219 259 299	M8	41
FD-C 166-6 + 2820	59.5	36.5	23	67.5	96.5	98	100 140 180	132	219 259 299	M8	41

NZ-SZ Size	D7 [mm]	D6 [mm]	D8 [mm]	L7 [mm]	L8 [mm]	L9 [mm]	M <sub>A2</sub>
FD-C 140-6	90	65-70-75	155	69.5	45	39	M8 30
FD-C 166-6	90	65-70-75	155	81	45	39	M8 30
	115	80-85-90	188	88	57	50	M10 59
FD-C 198-6	90	65-70-75	155	96	45	39	M8 30
	115	80-85-90	188	97	57	50	M10 59
	130	90-95-100	215	97	59	52	M10 59
FD-C 238-6	130	90-95-100	215	132	59	52	M10 59
FD-C 239-6	155	105-110-115	265	133	72	64	M12 100
	165	115-120-125	290	135	81	71	M16 250
FD-C 295-8	155	105-110-115	265	168	72	64	M12 100
	165	115-120-125	290	170	81	71	M16 250
	175	125-130-135	300	170	81	71	M16 250
	185	135-140-145	330	170	96	86	M16 250
	195	140-150-155	350	170	96	86	M16 250
FD-C 345-8	165	115-120-125	290	210	81	71	M16 250
	175	125-130-135	300	210	81	71	M16 250
	185	135-140-145	330	210	96	86	M16 250
	195	140-150-155	350	210	96	86	M16 250
	220	160-165-170	370	210	114	104	M16 250
	250	180-190-200	405	213	121	108	M20 490

Clamping elements: bore sizes D3 and transmissible torque T (with M <sub>A3</sub> )													
145	D3 [mm]	11	12	14	15	16	18	19	20				
	T [Nm]	50	55	90	95	115	130	140	145				
330	D3 [mm]	19	20	22	24	25	28	30					
	T [Nm]	195	200	240	265	275	310	330					
500	D3 [mm]	19	20	22	24	25	28	30					
	T [Nm]	310	330	360	400	410	460	500					
920	D3 [mm]	24	25	28	30	32	35	38	42				
	T [Nm]	470	490	550	590	700	770	840	920				
1140	D3 [mm]	32	35	38	40	42	45	48	50				
	T [Nm]	540	710	780	820	950	1020	1090	1140				
1370	D3 [mm]	55				60							
	T [Nm]	1250				1370							
2820	D3 [mm]	28	30	32	35	38	40	42	45	48	50	55	60
	T [Nm]	1240	1330	1420	1550	1780	1880	1970	2110	2250	2350	2590	2820

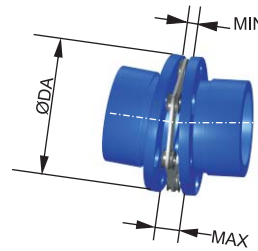
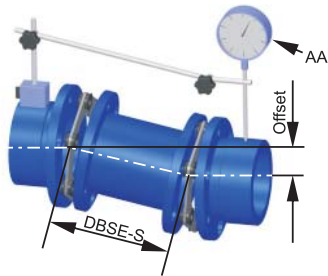


## Mounting instructions

FlexDur FD-C hub bores are machined with a H7 (ISO-286) tolerance as a standard. For clamping set connections a g6 tolerance for the shaft is recommended. For other connection types please contact REICH-KUPPLUNGEN.

AA: max. difference of the total indicator reading after one rotation in mm corresponding to twice the radial displacement.

$$AA \leq \frac{DBSE - S}{150}$$

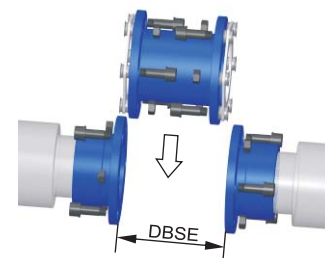
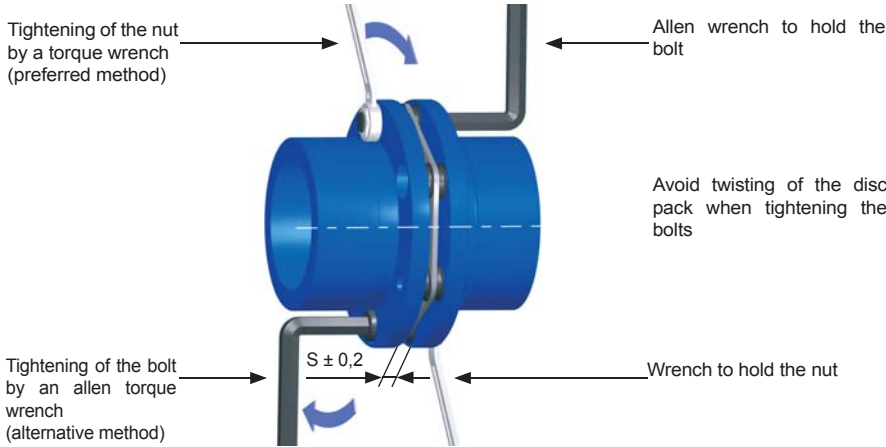


$$(MAX - MIN) \leq \frac{DA}{300}$$

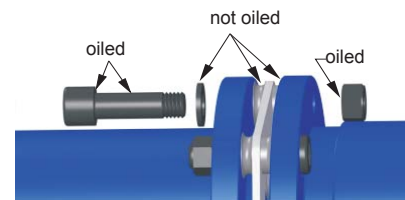
$$S = (MAX - MIN) / 2$$

The coupling has to be aligned within the prescribed limits. The service life of the disc pack is directly dependent on the amount of the displacements as they actually occur during operation. Therefore the alignment for the expected operating conditions should be performed with best possible precision. The misalignment during mounting should not exceed 25% of the max. permissible misalignment.

The only tools required are a normal and a torque wrench. The bolts should be tightened uniformly one after the other in clockwise direction in several steps (e. g. 30%, 60%, 80%, 100%) of the respective bolt tightening torque MA1, MA2 or MA3.



Mounting of the spacer



After mounting with aligned shafts the dimension S must be kept to prevent a pretensioning of the disc pack.

## Safety precautions

It is the customer's and user's responsibility to observe the national and international safety rules and laws. Check all bolted connections for proper fit preferably after the test run.

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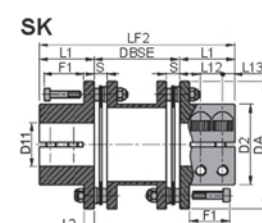
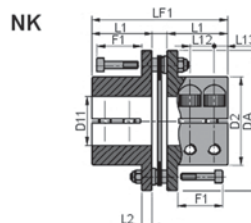
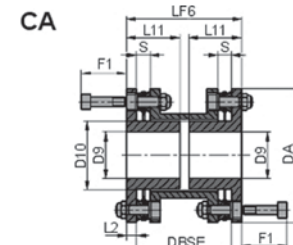
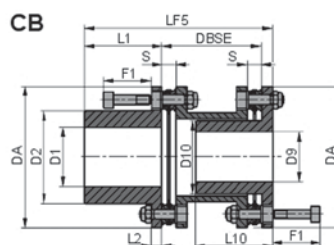
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## FlexDur FD-C Special designs



A separate catalogue is available

Edition June 2007

This FlexDur FD-C edition supercedes all previous catalogues of this coupling type. All dimensions in millimetres. We reserve the right to change dimensions and / or design details without prior notice.

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