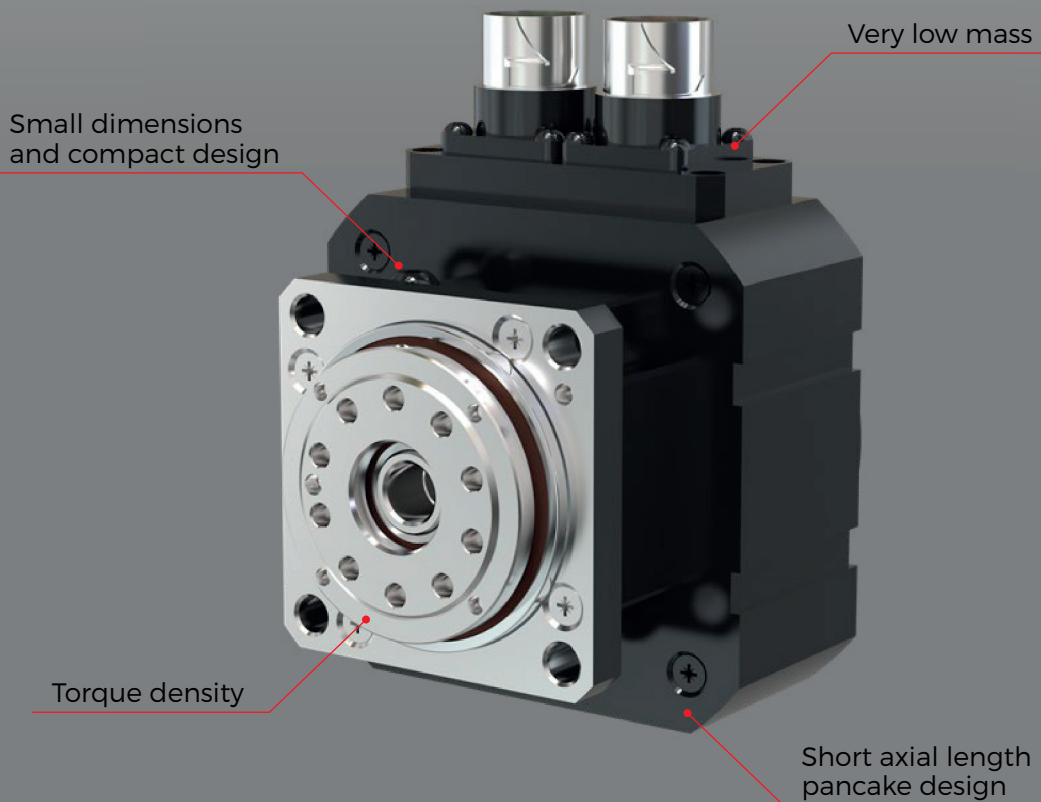


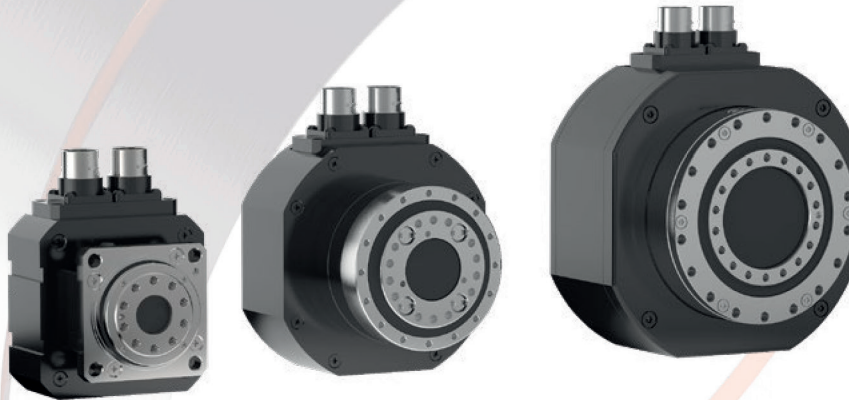


# DSF series



AND YET IT IS FLAT

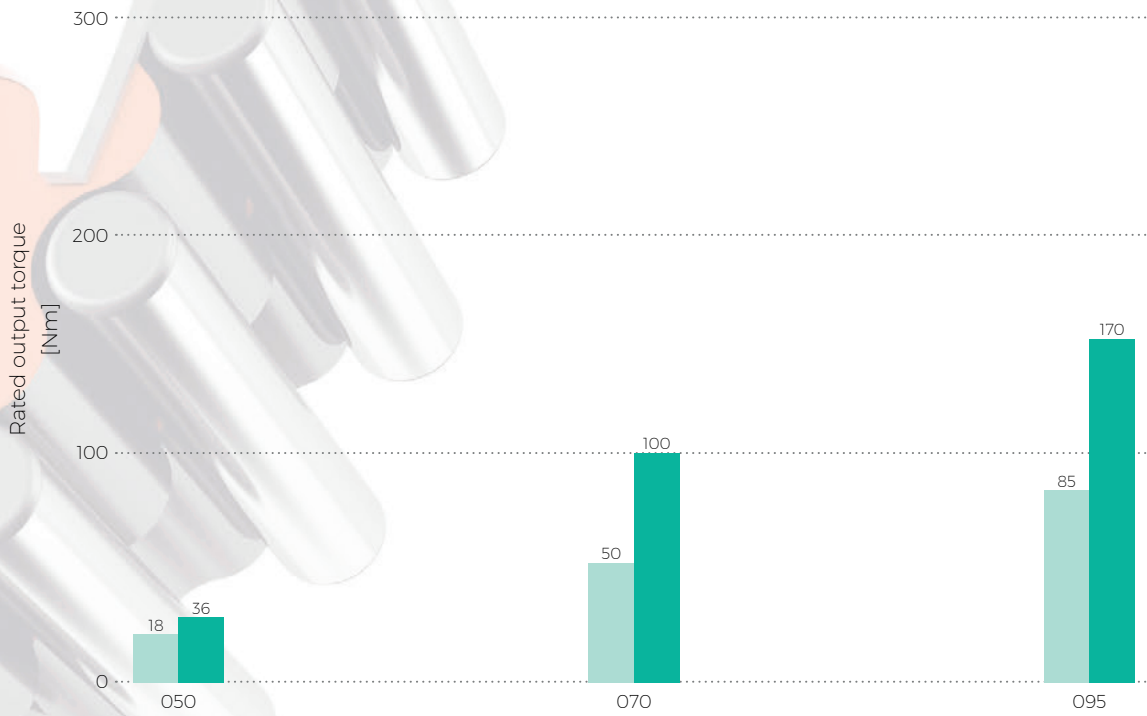
## 8.4 DSF series



### Advantages

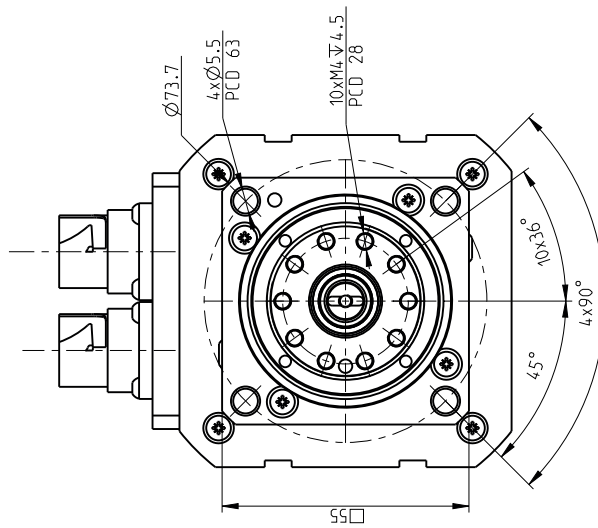
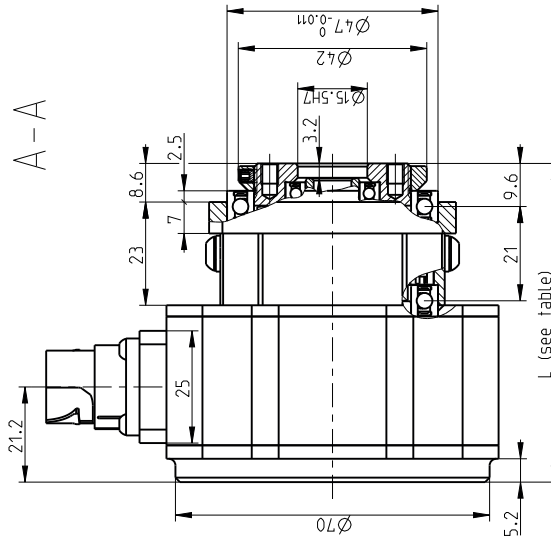
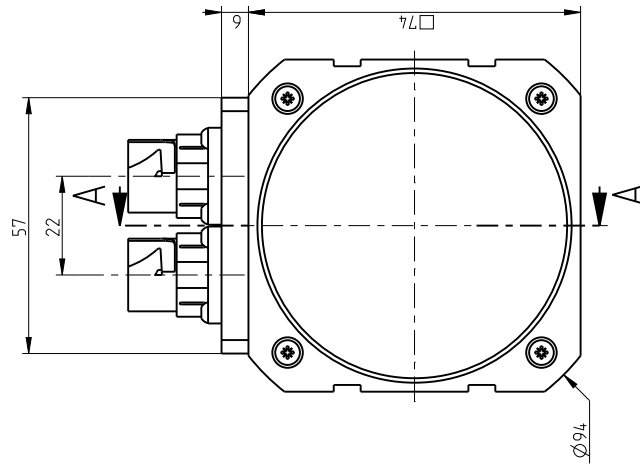
- low mass
- compact design
- extremely short axial length
- high torque density
- high dynamic performance
- high moment overload capacity

The **DriveSpin® DSF** "flat" series of electric actuators is characterized by the extremely short axial length with focus on maintaining the key features of the DriveSpin®. The DSF series was designed to be the most compact solution with very low mass and small dimensions. The DS "Flat" series consists of TwinSpin® reduction gear, servomotor and various feedback systems to be fully compatible with customer requirements. The TwinSpin® reduction gear used in the DSF actuators secures high accuracy, positioning repeatability, torsional stiffness as well as high carrying load due to the implemented bearing systems. Rated torque range of the DSF series is from 12Nm to the 85 Nm.



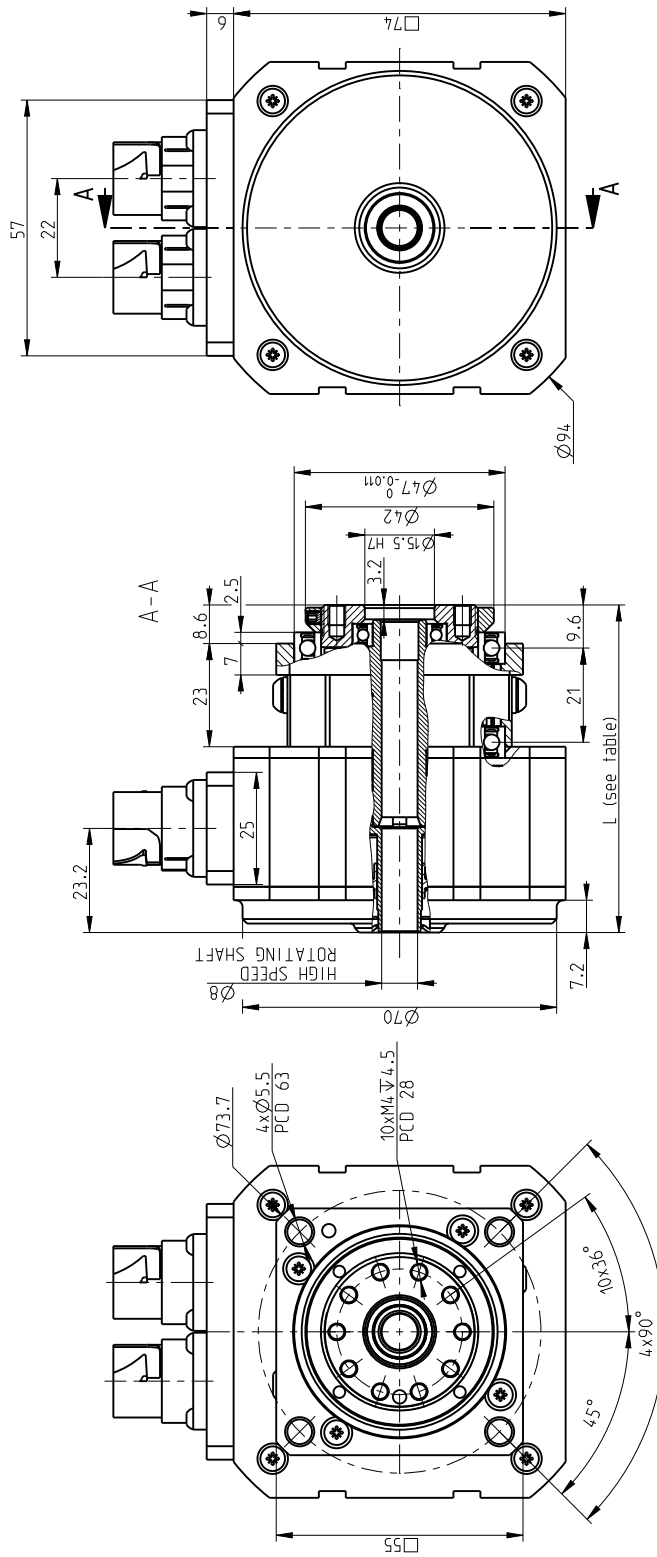
Tab. 8.4.a: Rated output torque

Size		050	070	095
<b>Rated output torque</b>	$T_R$ [Nm]	18	50	85
<b>Acceleration/braking output torque</b>	$T_{acc}$ [Nm]	36	100	170

**DSF 050 - i - abcde-fg-xy**


Size	Feedback type (d)	Without brake		With brake	
		Dimension L ± 0.5 [mm]	Weight m [kg] *	Dimension L ± 0.5 [mm]	Weight m [kg] *
<b>DSF 050</b>	OD,OE	71	1.2	94	1.4
	OJ	71	1.2	94	1.4
	ON	71	1.2	94	1.4

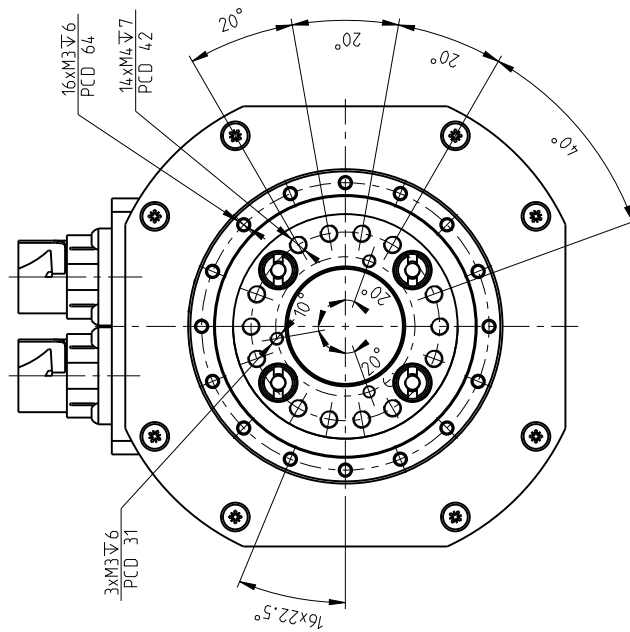
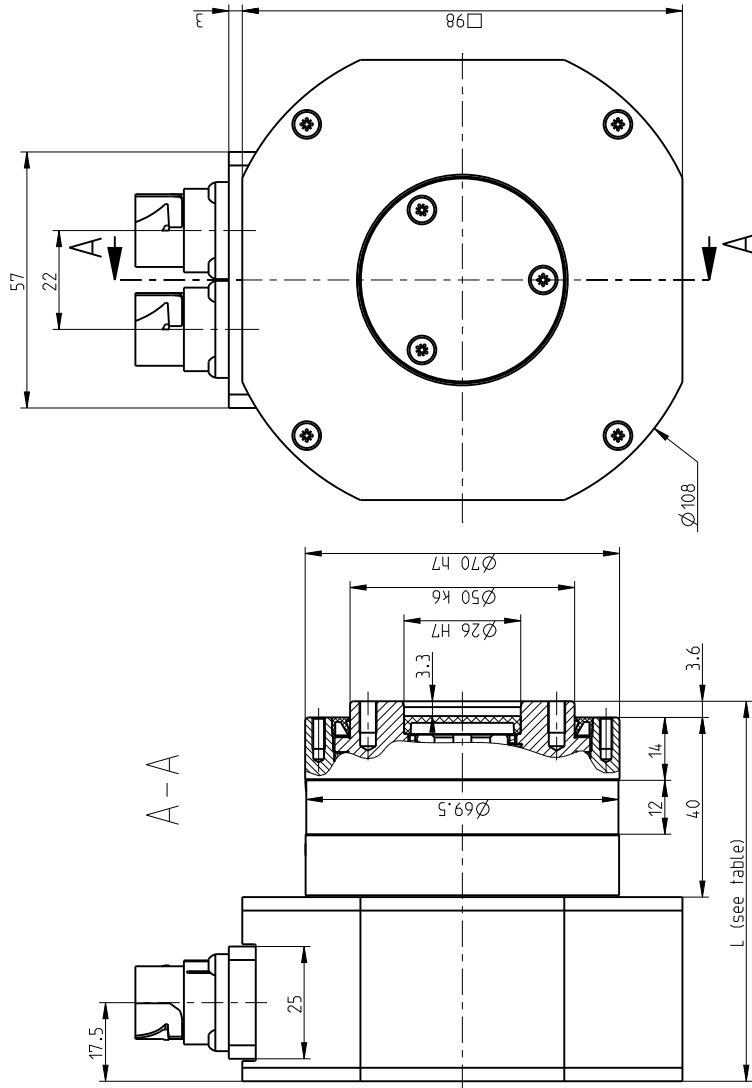
**DSF 050 - i - abcde-fg-xy**

**DSF 050 - i - abcde-fg-xy**
**DSF 050 - i - abcde-fg-xy**  
 with hollowshaft


Size	Feedback type (d)	Without brake		With brake	
		Dimension L $\pm 0.5$ [mm]	Weight m [kg] *	Dimension L $\pm 0.5$ [mm]	Weight m [kg] *
<b>DSF 050</b>	OA	75	1.2	100	1.4
	OJ	73	1.2	100	1.4
	ON	75	1.2	105	1.4

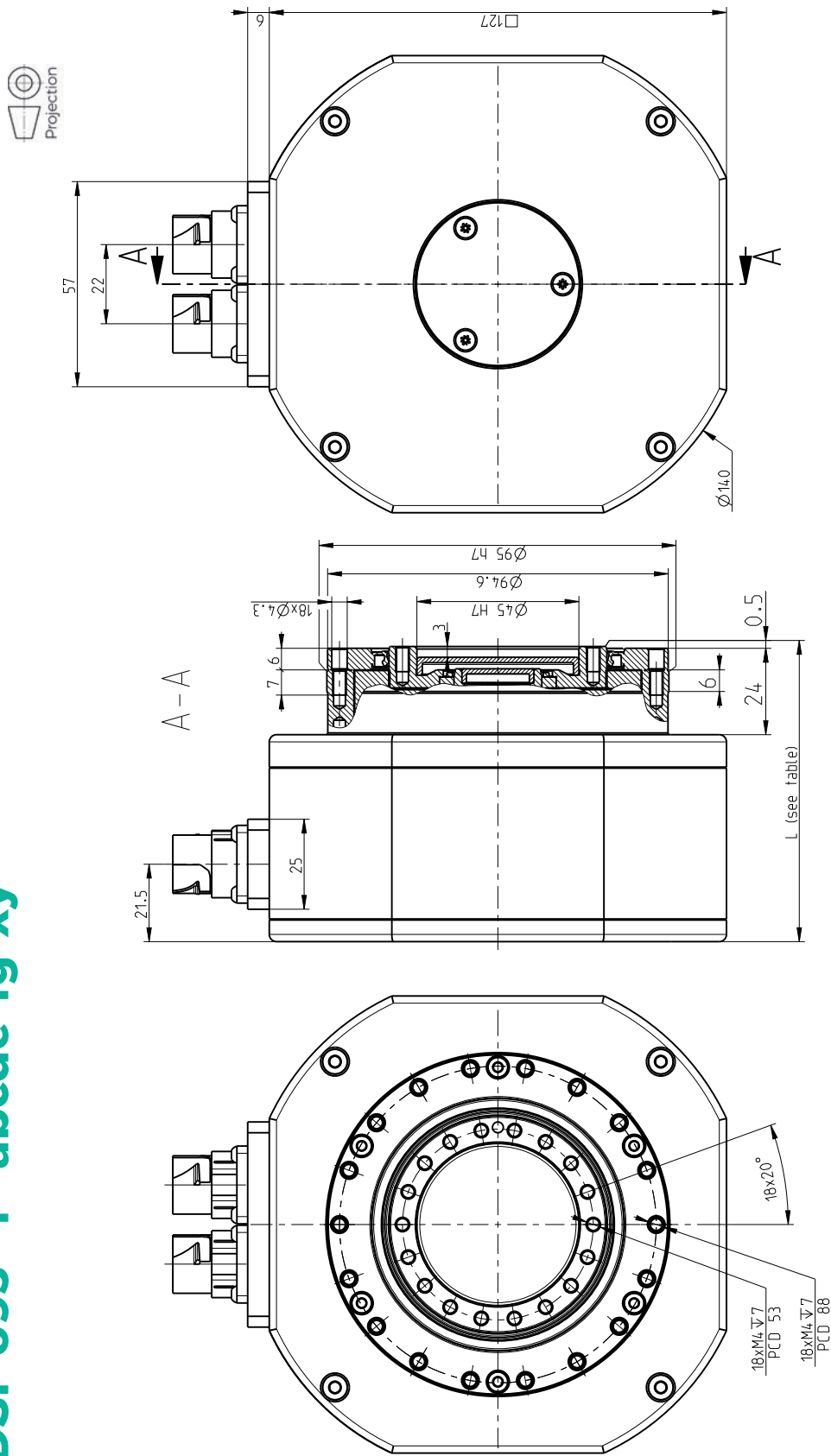
Hollowshaft rotates at motor speed

# DSF 070 - i - abcde-fg-xy



Size	Feedback type (d)	Without brake		With brake	
		Dimension L ± 0.5 [mm]	Weight m [kg] *	Dimension L ± 0.5 [mm]	Weight m [kg] *
<b>DSF 070</b>	OA	92	3.5	-	-
	OB,OC	97	3.5	-	-
	OD,OE	92	3.5	-	-
	OM,ON	85	3.5	-	-

# DSF 070 - i - abcde-fg-xy

**DSF 095 - i - abcde-fg-xy**
**DSF 095 - i - abcde-fg-xy**


Size	Feedback type (d)	Without brake		With brake	
		Dimension L $\pm 0.5$ [mm]	Weight m [kg] *	Dimension L $\pm 0.5$ [mm]	Weight m [kg] *
<b>DSF 095</b>	OA	93	4.5	-	-
	OB,OC	93	4.5	-	-
	OD,OE	93	4.5	-	-
	OJ	93	4.5	-	-
	OM,ON	82	4.5	-	-

Tab. 8.4.b: DSF series technical data table

Reduction Gear parameters		Tolerance		DSF 050	
Reduction ratio	$i$			63	
Rated output torque	$T_R$ [Nm]			18	
Acceleration/braking output torque	$T_{acc}$ [Nm]			36	
Rated input speed	$n_r$ [rpm]			2 000	
Maximum allowable input speed <sup>8)</sup>	$n_{max}$ [rpm]			5 000	
Allowable moment <sup>2)3)</sup>	$M_{cmax}$ [Nm]			44	
Tilting stiffness <sup>1)5)</sup>	$M_t$ [Nm/arcmin]			4	
Torsional stiffness <sup>1)6)</sup>	$k_t$ [Nm/arcmin]			2.5	
Lost motion	LM [arcmin]			< 1.5	
Hysteresis	H [arcmin]			< 1.5	
Rated radial force <sup>2)</sup>	$F_{rR}$ [kN]			1.44 <sup>7)</sup>	
Maximum axial force <sup>2)4)</sup>	$F_{amax}$ [kN]			1.9	
Gear lubrication				Grease Castrol TRIBOL GR TT 1 PD	
Reduction gear limit temperature	[°C]			60 °C	
Standard ambient temperature range	[°C]			-10 °C to +40 °C	
Motor parameters					
DC BUS voltage	$U_{dc}$ [V <sub>dc</sub> ]	+/- 10%	24	320	560
Motor rated speed	$n_n$ [rpm]		On request	3 500	3 500
Motor rated torque	$M_n$ [Nm]	+/- 10%		0.3	0.3
Motor rated current	$I_n$ [A <sub>rms</sub> ]			2	2
Motor stall torque	$M_o$ [Nm]	+/- 10%		0.3	0.3
Motor stall current	$I_o$ [A <sub>rms</sub> ]			2	2
Motor peak torque	$M_{max}$ [Nm]	+/- 10%		1.2	1.2
Motor peak current	$I_{max}$ [A]			8	8
Motor back-EMF constant	$K_E$ [V <sub>peak</sub> /krpm]	+/- 10%		12	12
Motor torque constant	$K_T$ [Nm/A <sub>rms</sub> ]	+/- 10%		0.15	0.15
Terminal resistance (L-L)	$R_{2ph}$ [Ω]	+/- 10%		4.4	4
Terminal inductance (L-L)	$L_{2ph}$ [mH]	+/- 20%		6	6
Number of poles	2p			10	10
Electromagnetic brake DC supply	[V <sub>dc</sub> ]			24. Special	
Electromagnetic brake torque at input	[Nm]			0.4	
Protection class			IP 64		
Motor Insulation class			F		
Paint			RAL 9005		
Motor number of phases			3		
Motor type of connection			Y(star-configuration)		

1) Mean statistical value

2) Load at output speed 32 rpm for size 050, other sizes at 15 rpm

 3) Moment  $M_c$  max at  $F_a=0$ . If  $F_a \neq 0$  see Glossary

 4) Axial force  $F_a$  max for  $M_c=0$  (In case of size 050 also  $F_r=0$  condition has to be fulfilled). If  $M_c \neq 0$  see Glossary

5) The parameter depends on the version of high precision reduction gear.

6) The parameter depends on the version, ratio and lost motion of the high precision reduction gear.

 7) For size 050 this is value of MAXIMUM RADIAL FORCE  $F_{rmax}$  for  $a_2=0$ ;  $F_a=0$  and at 32 rpm output speed. For  $a_2>0$ ;  $F_a=0$  at 32 rpm output speed

 $F_{rmax} = 0.044/(a_2+0.0305)$  [kN].  $a_2$  represents the distance of the radial force centre from the front of the output flange in meters see Glossary.

8) Instantaneous speed peak that may occur within the working cycle. Note please the temperature on the gear case that should not exceed significantly 60°C

9) 4 500 rpm for ratio 73 ; 4 800 rpm for ratio 95



Tab. 8.4.b. DSF series technical data table - continued

DSF 070			DSF 095		
57.75			73.95		
50			85		
100			170		
2 000			2 000		
5 000			4 500 / 4 800 <sup>9)</sup>		
142			410		
35			120		
7			15		
< 1.5			< 1		
< 1.5			< 1		
2.8			3.5		
4.1			11.1		
Grease Castrol TRIBOL GR TT 1 PD			Grease Castrol TRIBOL GR TT 1 PD		
60 °C			60 °C		
-10 °C to +40 °C			-10 °C to +40 °C		
24	320	560	24	320	560
On request	3 000	3 000	On request	2 500	2 500
	1	1		1.8	1.8
	2	1.12		2.6	1.5
	1.08	1.08		1.8	1.8
	2.2	1.2		2.6	1.5
	3	3		4.3	4.3
	6	3.4		6.2	3.6
	44.37	84		61.2	111
	0.5	0.89		0.692	1.2
	5.2	14.5		3.9	14
	9.8	30		7.8	26
16	16	20	20		
-	-	-	-	-	
-	-	-	-	-	
IP 64			IP 64		
F			F		
RAL 9005			RAL 9005		
3			3		
Y(star-configuration)			Y(star-configuration)		

**IMPORTANT NOTES:**

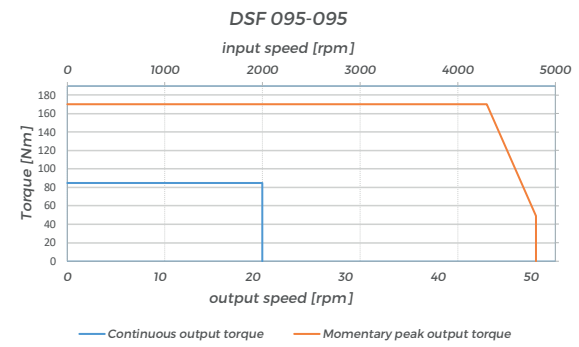
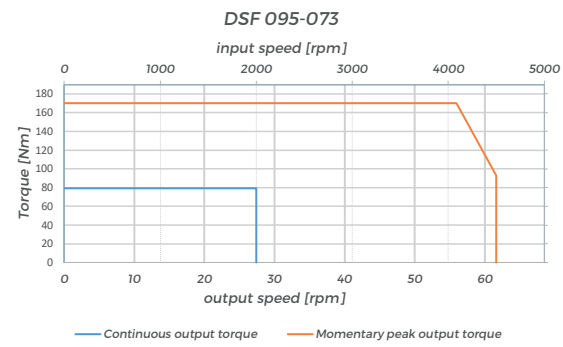
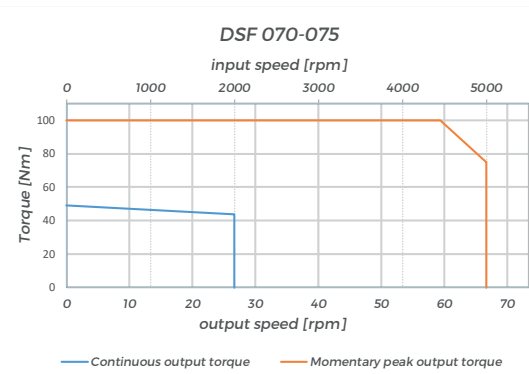
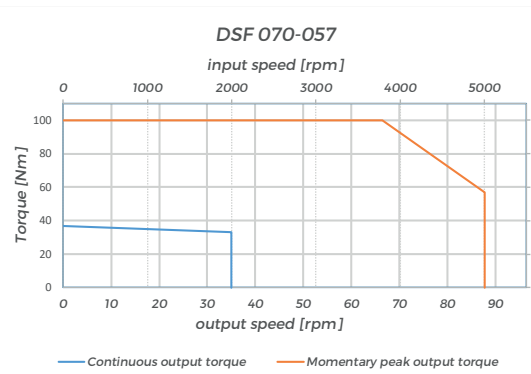
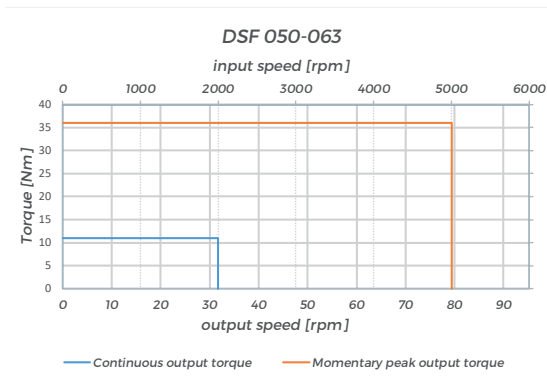
- Load values in the table are valid for the nominal life of  $L_{10} = 6\,000$  hours. Service life for average torque  $T_a$  and average speed  $n_a$  other than  $T_p, n_p$  can be calculated. Please contact manufacturer with estimated duty cycle.
- High precision reduction gears are preferred for intermittent duty cycles (S3-S8); the output speed in applications is inverted-variable. The S1 continuous duty cycle needs to be consulted with manufacturer
- Please consult the maximum speed in duty cycle with the manufacturer
- The values in the table refer to the ambient temperature of 20°C to 25°C
- For ambient temperatures lower than -10°C pre-heating might be considered please consult manufacturer

Tab. 8.4.c: Inertia at input (DSF actuator without brake)

Feedback type (d)	$J_{w/o\ brake}$	DSF 050	DSF 070	DSF 095
OA	$10^{-4} \text{ kgm}^2$	-	0.637	3.349
OB	$10^{-4} \text{ kgm}^2$	-	0.615	3.330
OC	$10^{-4} \text{ kgm}^2$	-	0.615	3.330
OD	$10^{-4} \text{ kgm}^2$	0.094	0.617	3.332
OE	$10^{-4} \text{ kgm}^2$	0.094	0.617	3.332
OJ	$10^{-4} \text{ kgm}^2$	0.091	-	3.330
OM	$10^{-4} \text{ kgm}^2$	-	0.630	3.346
ON	$10^{-4} \text{ kgm}^2$	0.105	0.630	3.346

Tab. 8.4.d: Inertia at input (DSF actuator with brake)

Feedback type (d)	$J_{w/o\ brake}$	DSF 050	DSF 070	DSF 095
OA	$10^{-4} \text{ kgm}^2$	-	-	-
OB	$10^{-4} \text{ kgm}^2$	-	-	-
OC	$10^{-4} \text{ kgm}^2$	-	-	-
OD	$10^{-4} \text{ kgm}^2$	0.104	-	-
OE	$10^{-4} \text{ kgm}^2$	0.104	-	-
OJ	$10^{-4} \text{ kgm}^2$	0.102	-	-
OM	$10^{-4} \text{ kgm}^2$	-	-	-
ON	$10^{-4} \text{ kgm}^2$	0.118	-	-



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