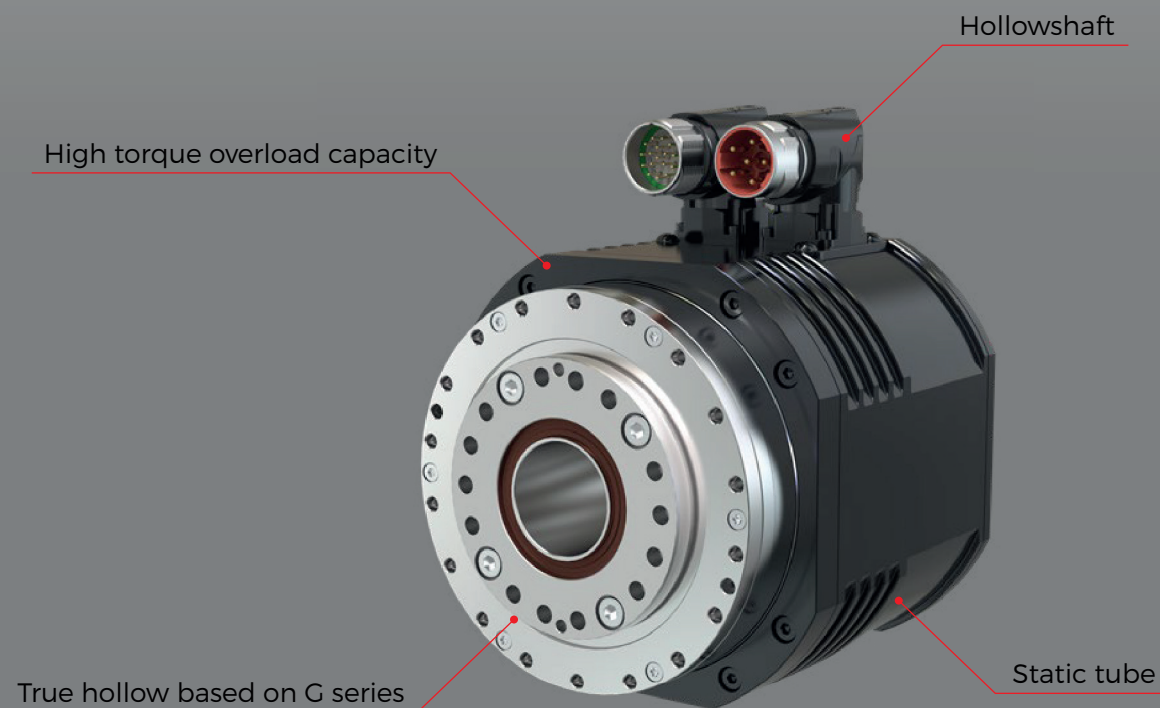




# DSH series



WHEN AIR IS BETTER THAN STEEL

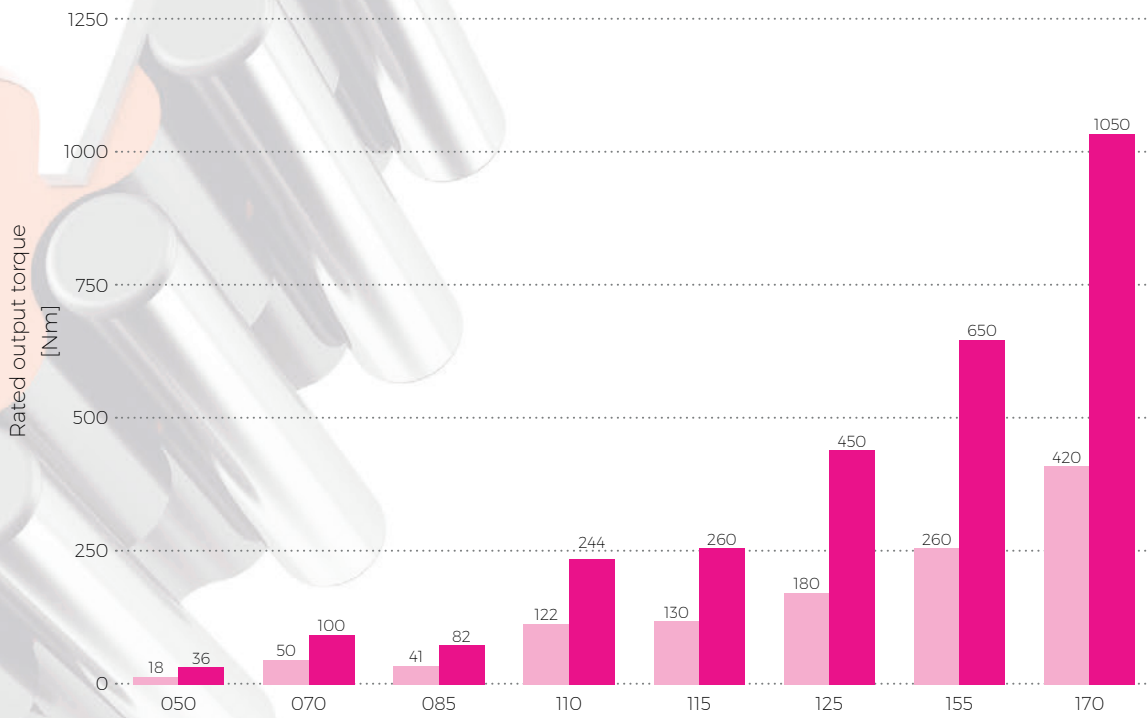
## 8.2 DSH series



### Advantages

- low lost motion
- low moment of inertia
- high reduction ratio
- high kinematic accuracy
- high moment overload capacity
- high capacity of the integrated radial-axial output bearings
- high dynamic performance

The **DriveSpin® DSH** electric actuators are characterized by the short axial length and by the possibility to use a through hole for routing cables, pipes, and drive shafts. Fully sealed compact actuators equipped with zero-backlash reduction gears have high power density, large hole inner diameter, from 8 to 40mm. Excellent positioning accuracy and positioning repeatability. DSH maintain radial-axial and torque load capacity and are characteristic with high overload capacity of reduction gear and of AC servomotor, featuring high dynamics. The voltage and feedback variability will widely satisfy all of customers requirements. This allows even demanding tasks such as exact positioning or fast movement of heavy loads to be performed with a high degree of repetitive accuracy. Rated output torque is from 18 Nm to 420 Nm.

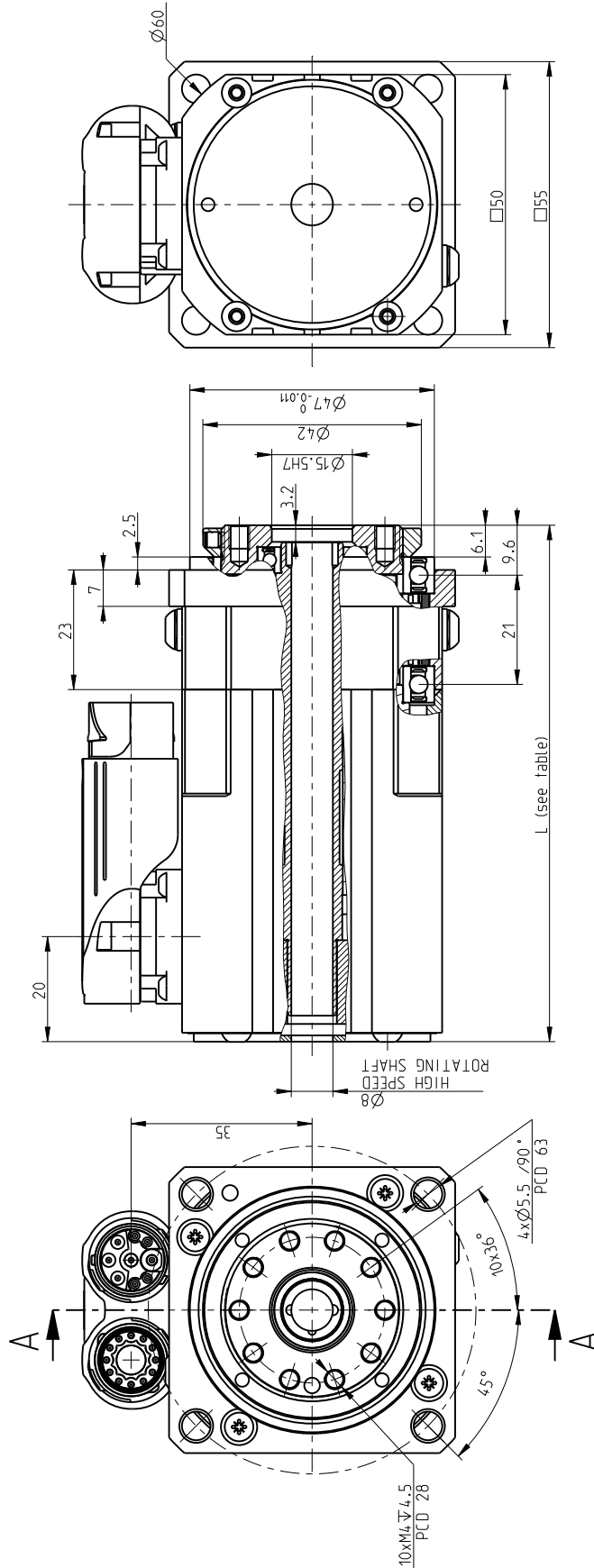


DSH

Tab. 8.2a: Rated output torque

Size		050	070	085	110	115	125	155	170
<b>Rated output torque</b>	$T_R$ [Nm]	18	50	41	122	130	180	260	420
<b>Acceleration/ braking output torque</b>	$T_{acc}$ [Nm]	36	100	82	244	260	450	650	1050

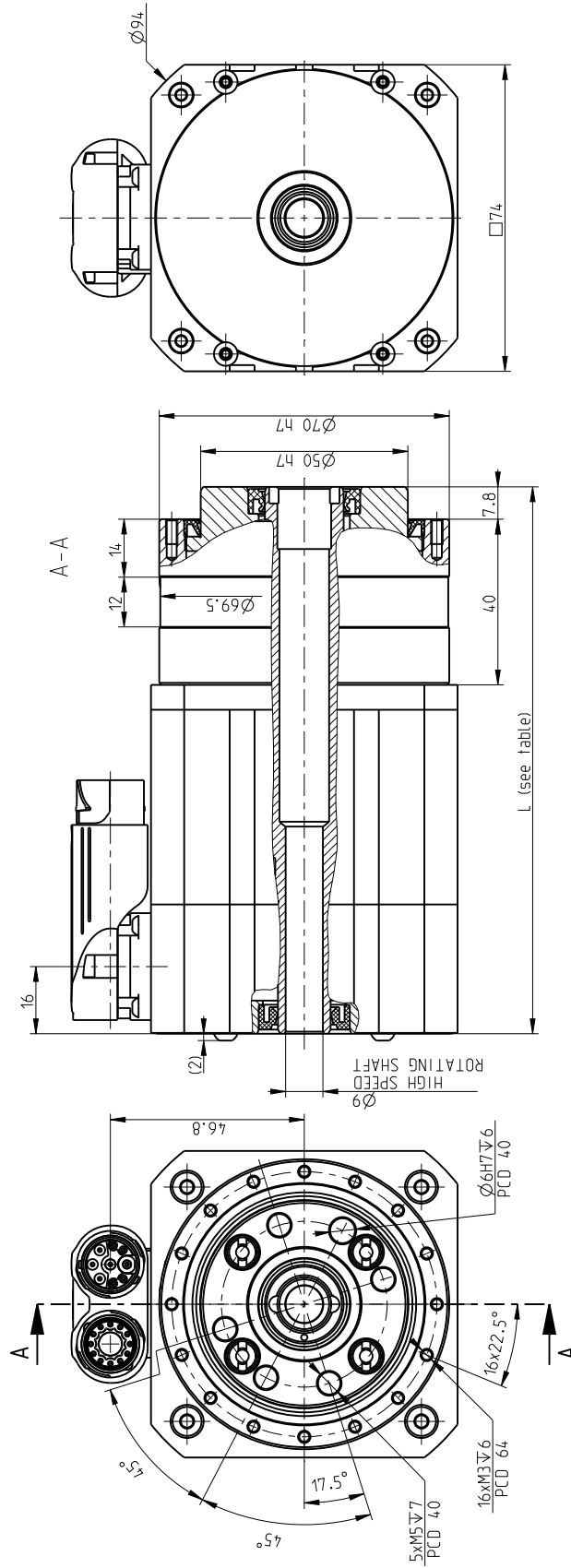
## DSH 050 - i - abcde-fg-xy



## DSH 050 - 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>DSH 050</b>	OA	107	1.2	-	-

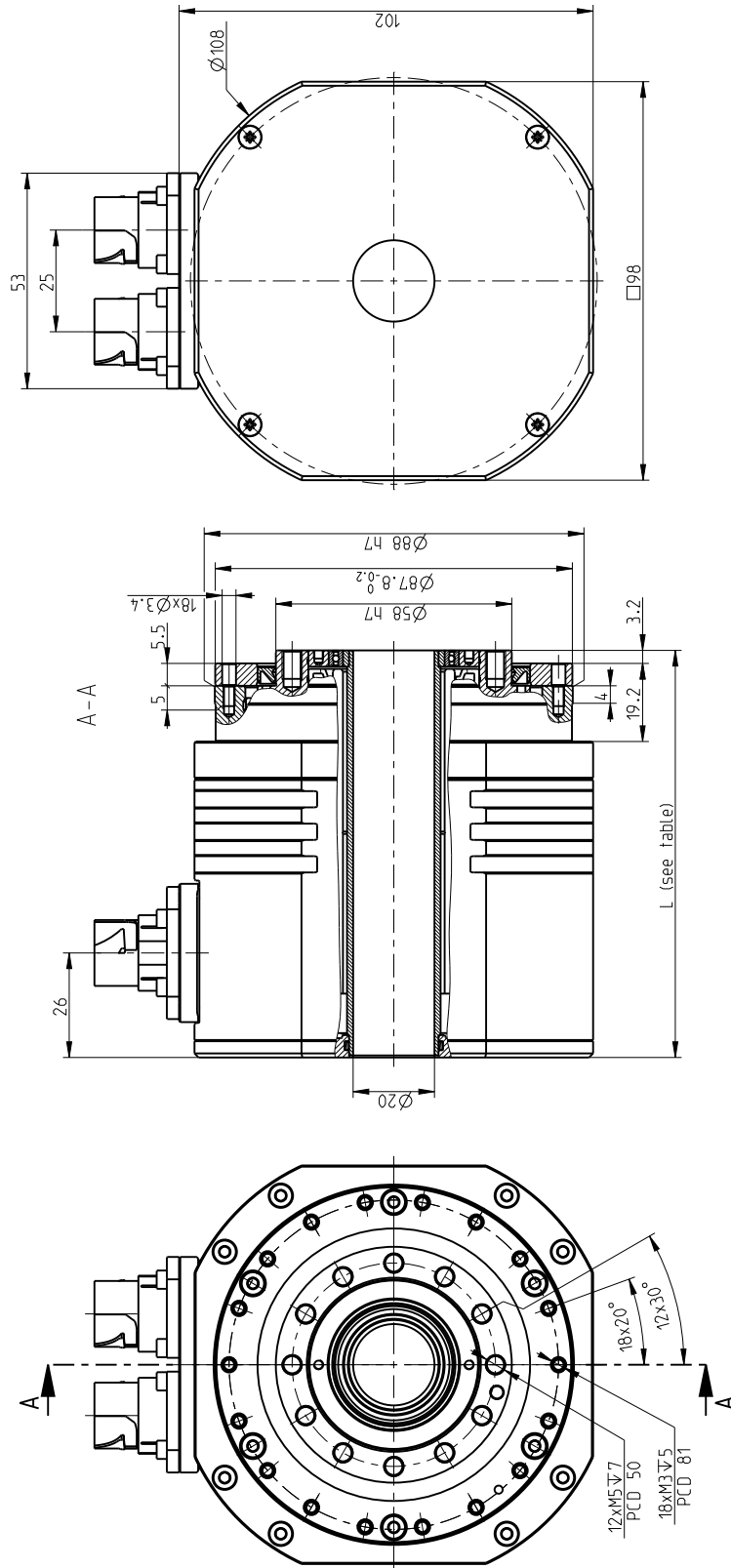
Hollowshaft rotates at motor speed

**DSH 070 - i - abcde-fg-xy**
**DSH 070 - 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>DSH 070</b>	OA	153	2,3		
	OB,OC	133	2,1		

Hollowshaft rotates at motor speed

# DSH 085 - i - abcde-fg-xy

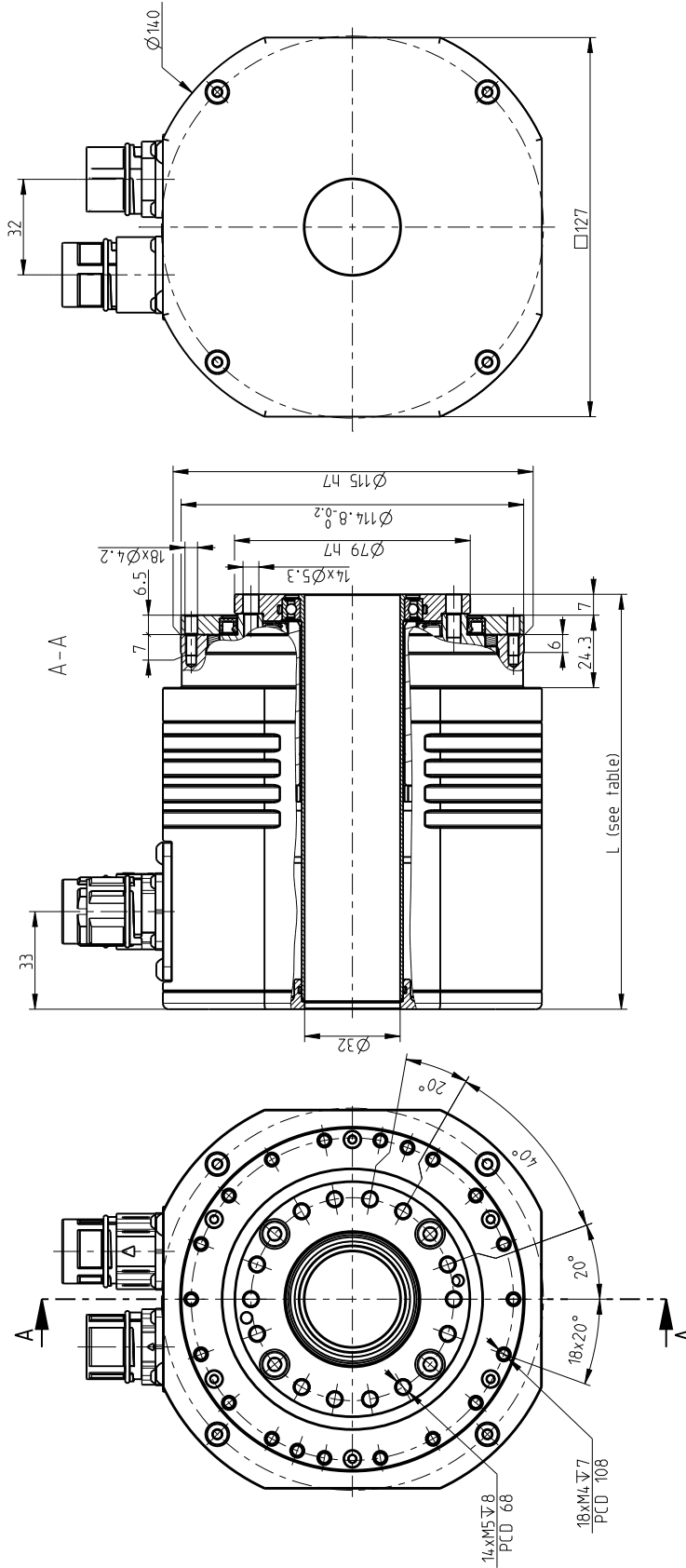


Size	Feedback type (d)	Without brake		With brake	
		Dimension L ± 0,5 [mm]	Weight m [kg]	Dimension L ± 0,5 [mm]	Weight m [kg]
<b>DSH 085</b>	OA	120	4,2	150	4,6
	OB,OC	120	3,8	150	4,4
	OD,OE	120	3,7	150	4,5
	ON	120	3,5	150	4,3

# DSH 085 - i - abcde-fg-xy

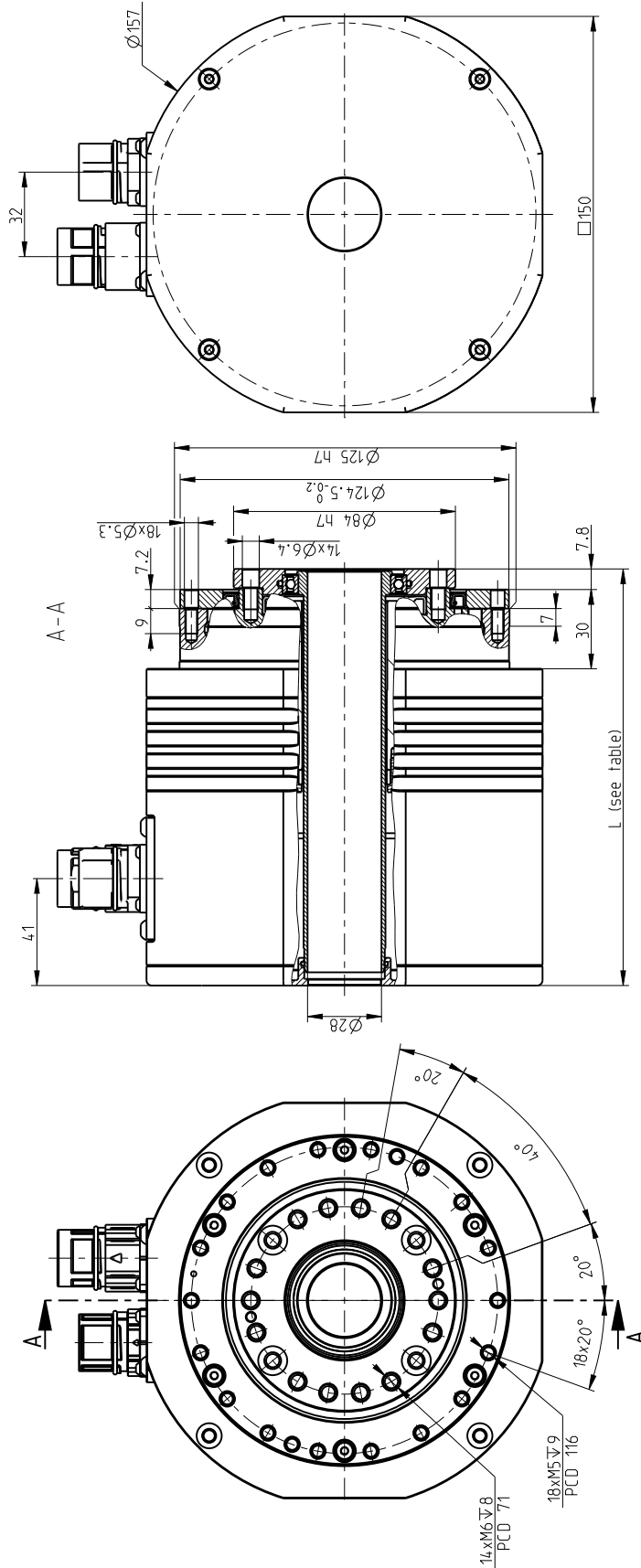


**DSH 115 - i - abcde-fg-xy**



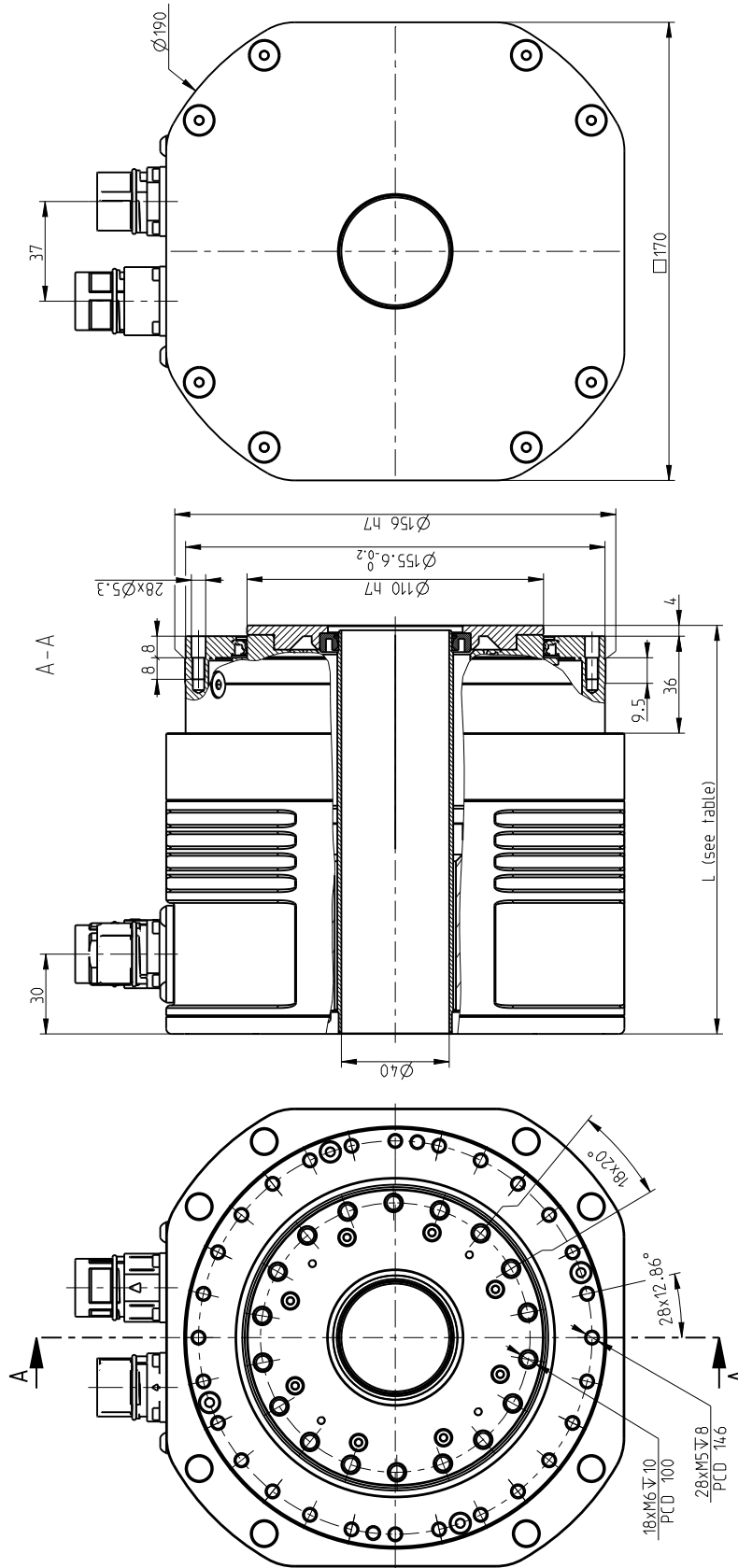
Size	Feedback type (d)	Without brake		With brake	
		Dimension L $\pm 0,5$ [mm]	Weight m [kg]	Dimension L $\pm 0,5$ [mm]	Weight m [kg]
<b>DSH 115</b>	OA	144	7,3	168	8,3
	OB	139	6,5	165	7,5
	OD,OE	139	6,5	165	7,5
	OF	139	6,5	165	7,5



**DSH 125 - i - abcde-fg-xy**
**DSH 125 - i - abcde-fg-xy**


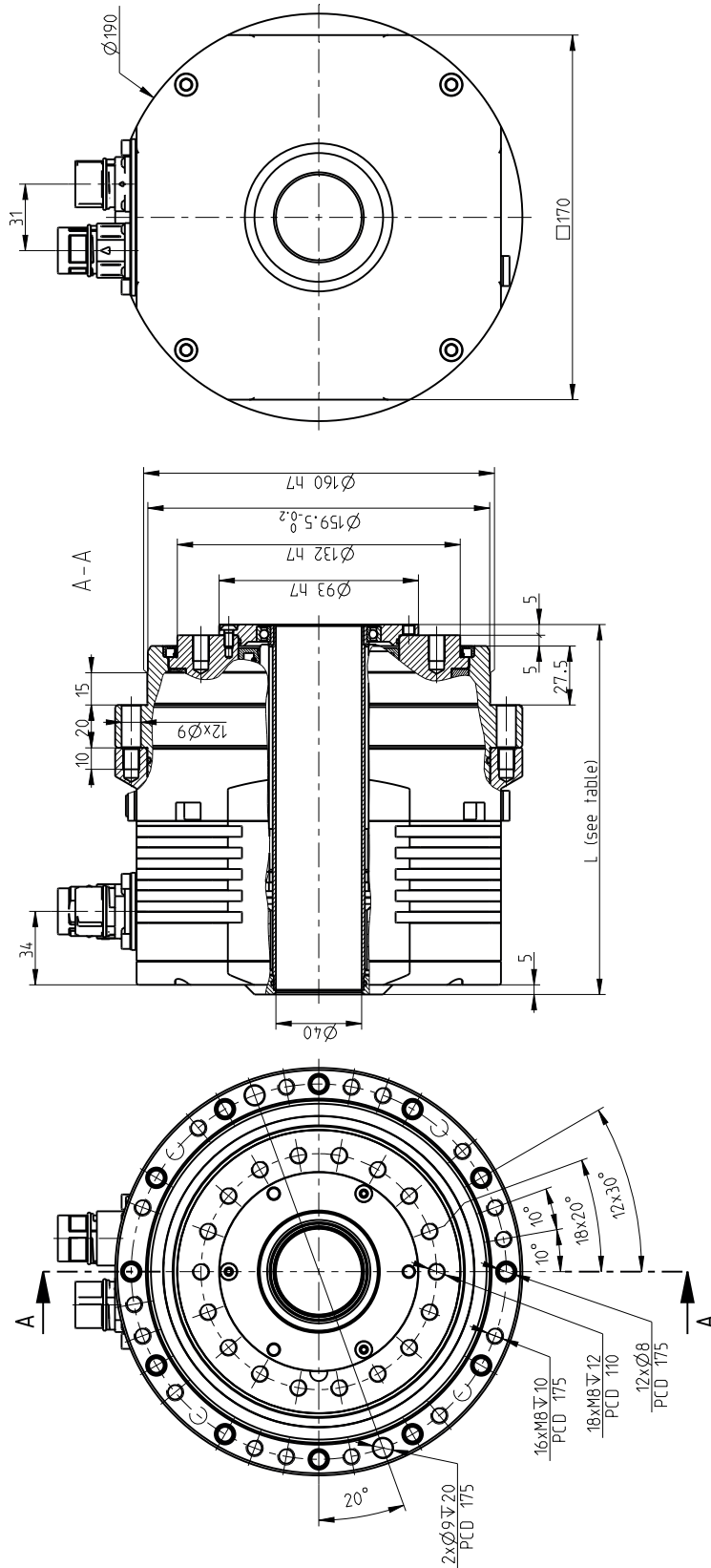
Size	Feedback type (d)	Without brake		With brake	
		Dimension L ± 0.5 [mm]	Weight m [kg] *	Dimension L ± 0.5 [mm]	Weight m [kg] *
<b>DSH 125</b>	OA	158	11.2	186	12.9
	OB,OC	158	10.4	186	11.7
	OD,OE	158	10.4	186	11.7
	ON	158	9.0	186	10.3

**DSH 155 - i - abcde-fg-xy**



**DSH 155 - 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>DSH 155</b>	OA	152	13.1	175	14.3
	OB	152	11.8	175	13.0
	OD,OE	152	11.6	175	13.7
	OF	152	11.65	175	13.7

**DSH 170 - 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>DSH 170</b>	OA	188	26.0	235	27.0
	OB,OC	172	24.5	219	25.5
	OD,OE	172	24.0	219	25.0
	ON	172	22.0	219	23.0

**DSH 170 - i - abcde-fg-xy**

DSH

Tab. 8.2b: DSH series technical data table

Reduction Gear parameters		Tolerance		DSH 050		
Reduction ratio	i			63		
Hollowshaft diameter	$\phi d$ [mm]			8 <sup>14)</sup>		
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>9)</sup>	$n_{max}$ [rpm]			5 000		
Allowable moment <sup>2)3)</sup>	$M_{cmax}$ [Nm]			44		
Tilting stiffness <sup>1)6)</sup>	$M_t$ [Nm/arcmin]			4		
Torsional stiffness <sup>1)7)</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>8)</sup>		
Maximum axial force <sup>2)4)</sup>	$F_{a max}$ [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]		3 500	3 500	3 500	
Motor rated torque	$M_n$ [Nm]	+/- 10%	0.23	0.23	0.23	
Motor rated current	$I_n$ [A <sub>rms</sub> ]		7.1	0.58	0.58	
Motor stall torque	$M_o$ [Nm]	+/- 10%	0.24	0.24	0.24	
Motor stall current	$I_o$ [A <sub>rms</sub> ]		7.4	0.6	0.6	
Motor peak torque	$M_{max}$ [Nm]	+/- 10%	1	1	1	
Motor peak current	$I_{max}$ [A]		30.8	2.5	2.5	
Motor back-EMF constant	$K_E$ [V <sub>peak</sub> /krpm]	+/- 10%	2.7	36	36	
Motor torque constant	$K_T$ [Nm/A <sub>rms</sub> ]	+/- 10%	0.032	0.4	0.4	
Terminal resistance (L-L)	$R_{2ph}$ [Ω]	+/- 10%	0.2	36	36	
Terminal inductance (L-L)	$L_{2ph}$ [mH]	+/- 20%	0.2	36	36	
Number of poles	2p		6	6	6	
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) 3 900 rpm for ratio 67 ; 4 500 rpm for ratios 89, 119

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

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

 8) For size 050 this is value of MAXIMUM RADIAL FORCE  $F_{r max}$  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  $F_{r max} = 0.044/(a_2+0.0305)$  [kN].  $a_2$  represents the distance of the radial force centre from the front of the output flange in meters see Glossary.

9) 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

10) 3 200 rpm for ratio 69 ; 3 700 rpm for ratio 125

11) 3 800 rpm for ratio 47 ; 4 500 rpm for ratio 85

12) 2 500 rpm for ratio 55 ; 3 400 rpm for ratio 103

13) 2 400 rpm for ratio 49 ; 3 800 rpm for ratio 99

14) Hollowshaft rotates at motor speed

Tab. 8.2b: DSH series technical data table - continued

DSH 070			DSH 085			DSH 110		
57, 75			47, 85			67, 89, 119		
9 <sup>14)</sup> or 12 <sup>14)</sup>			14 or 20			12 <sup>14)</sup>		
50			41			122		
100			82			244		
2 000			2 000			2000		
5 000			3 800 / 4 500 <sup>11)</sup>			3900 / 4500 <sup>5)</sup>		
142			220			740		
35			85			150		
7			10			22		
< 1.5			< 1			< 1		
< 1.5			< 1			< 1		
2.8			2			9.3		
4.1			6					
Grease Castrol TRIBOL GR TT 1 PD			Grease Castrol TRIBOL GR TT 1 PD			Grease Castrol TRIBOL GR TT 1 PD		
60 °C			60 °C			60 °C		
-10 °C to +40 °C			-10 °C to +40 °C			-10 °C to +40 °C		
24	320	560	24	320	560	24	320	560
2 500	4 500	4 500	2 500	3 000	3 000	2 500	3 000	3 000
0.88	0.76	0.76	2.1	2.1	2.1	3.4	3.2	3.2
13	1.2	0.7	42	4.2	2.1	37	4.9	2.8
0.9	0.9	0.9	2.3	2.3	2.3	3.8	3.8	3.8
13.3	1.42	0.83	46	4.6	2.3	41	6	3
3	3	3	5.8	5.8	5.8	11	11	11
44.3	4.7	2.8	130	13.03	6.52	120	17	10
5.7	68.3	105.6	4.37	49.1	87.4	8	57	103
0.0677	0.63	1.09	0.05	0.5	1	0.09	0.65	1.14
0.13	17	40.5	0.017	2.1	6.7	0.027	1.4	4.5
0.25	34.4	87	0.04	5.2	17	0.15	7.4	24
10	10	10	16	16	16	10	10	10
24. Special			24. Special			24. Special		
4.5			1.5			4.5		
IP 64			IP 64			IP 64		
F			F			F		
RAL 9005			RAL 9005			RAL 9005		
3			3			3		
Y (star-configuration)			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  $T_R, n_R$  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. 8.2b: DSH series technical data table - continued

Reduction Gear parameters		Tolerance		DSH 115	
Reduction ratio	i			55, 103	
Hollowshaft diameter	$\phi d$ [mm]			32	
Rated output torque	$T_R$ [Nm]			130	
Acceleration/braking output torque	$T_{acc}$ [Nm]			260	
Rated input speed	$n_r$ [rpm]			2 000	
Maximum allowable input speed <sup>9)</sup>	$n_{max}$ [rpm]			2 500 / 3 400 <sup>12)</sup>	
Allowable moment <sup>2)3)</sup>	$M_{cmax}$ [Nm]			550	
Tilting stiffness <sup>16)</sup>	$M_t$ [Nm/arcmin]			220	
Torsional stiffness <sup>17)</sup>	$k_t$ [Nm/arcmin]			23	
Lost motion	LM [arcmin]			< 1	
Hysteresis	H [arcmin]			< 1	
Rated radial force <sup>2)</sup>	$F_{rR}$ [kN]			4	
Maximum axial force <sup>2)4)</sup>	$F_{a max}$ [kN]			12.5	
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]		3 500	3 500	3 500
Motor rated torque	$M_n$ [Nm]	+/- 10%	2.9	2.9	2.9
Motor rated current	$I_n$ [A <sub>rms</sub> ]		46	3.5	2
Motor stall torque	$M_o$ [Nm]	+/- 10%	3	3	3
Motor stall current	$I_o$ [A <sub>rms</sub> ]		47.6	3.6	2
Motor peak torque	$M_{max}$ [Nm]	+/- 10%	8.5	8.5	8.5
Motor peak current	$I_{max}$ [A]		135	10.1	5.8
Motor back-EMF constant	$K_E$ [V <sub>peak</sub> /krpm]	+/- 10%	5.6	75	131
Motor torque constant	$K_T$ [Nm/A <sub>rms</sub> ]	+/- 10%	0.06	0.84	1.47
Terminal resistance (L-L)	$R_{2ph}$ [Ω]	+/- 10%	0.011	2	6
Terminal inductance (L-L)	$L_{2ph}$ [mH]	+/- 20%	0.03	5	16
Number of poles	2p		20	20	20
Electromagnetic brake DC supply	[V <sub>dc</sub> ]			24. Special	
Electromagnetic brake torque at input	[Nm]			5	
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) 3 900 rpm for ratio 67 ; 4 500 rpm for ratios 89, 119

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

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

 8) For size 050 this is value of MAXIMUM RADIAL FORCE  $F_{r max}$  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  $F_{r max} = 0.044/(a_2+0.0305)$  [kN].  $a_2$  represents the distance of the radial force centre from the front of the output flange in meters see Glossary.

9) 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

10) 3 200 rpm for ratio 69 ; 3 700 rpm for ratio 125

11) 3 800 rpm for ratio 47 ; 4 500 rpm for ratio 85

12) 2 500 rpm for ratio 55 ; 3 400 rpm for ratio 103

13) 2 400 rpm for ratio 49 ; 3 800 rpm for ratio 99

14) Hollowshaft rotates at motor speed

Tab. 8.2b: DSH series technical data table - continued

DSH 125			DSH 155			DSH 170		
49.99			109			69.125		
27			40			40		
180			260			420		
450			650			1 050		
2 000			2 000			2 000		
2 400 / 3 800 <sup>13)</sup>			3 000			3 200 / 3 700 <sup>10)</sup>		
880			1 640			2 000		
280			900			1 100		
29			67			110		
<1			<1			<1		
<1			<1			<1		
4.4			8			19.2		
13.8			26			27.9		
Grease Castrol TRIBOL GR TT 1 PD			Grease Castrol TRIBOL GR TT 1 PD			Grease Castrol TRIBOL GR TT 1 PD		
60 °C			60 °C			60 °C		
-10 °C to +40 °C			-10 °C to +40 °C			-10 °C to +40 °C		
24	320	560	24	320	560	24	320	560
4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000	4 000
4	4	4	3.8	3.8	3.8	5	5	5
74.1	5.6	3.2	67.2	5	3	133	10	6
4.5	4.5	4.5	5	5	5	11	11	11
83.3	6.3	3.6	88	6.6	4	293	21.9	6
13.5	13.5	13.5	16	16	16	23	23	23
250	18.8	11	283	21.2	14	612	45.9	27.6
4.76	63	111	5	67	112	3.3	44	77
0.054	0.72	1.26	0.057	0.75	1.27	0.038	0.5	0.83
0.0055	1	3.3	0.005	1	2.5	0.00085	0.15	0.4
0.04	7	22	0.014	2	7	0.0032	0.57	1.7
10	10	10	24	24	24	24	24	24
24, Special			24, Special			24, Special		
5			5			19		
IP 64			IP 64			IP 64		
F			F			F		
RAL 9005			RAL 9005			RAL 9005		
3			3			3		
Y (star-configuration)			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  $T_R, n_R$  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

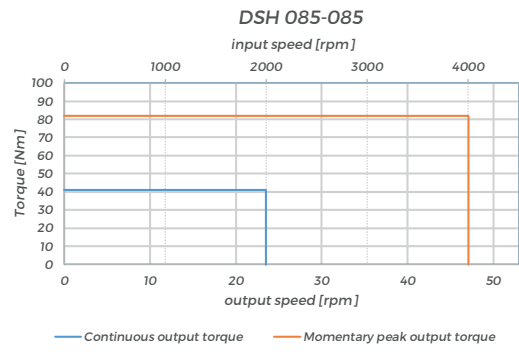
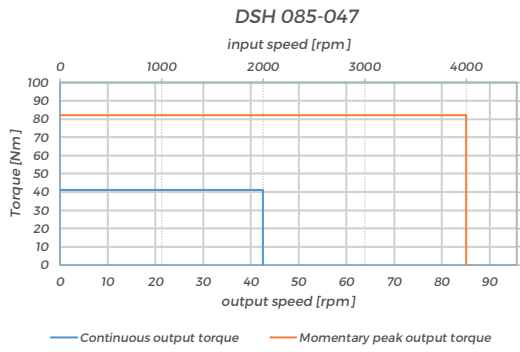
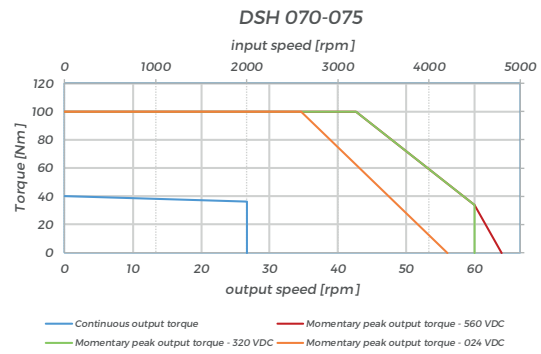
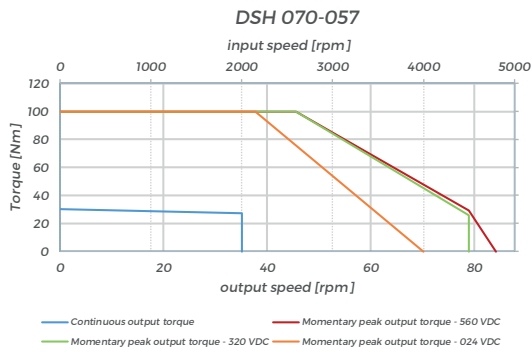
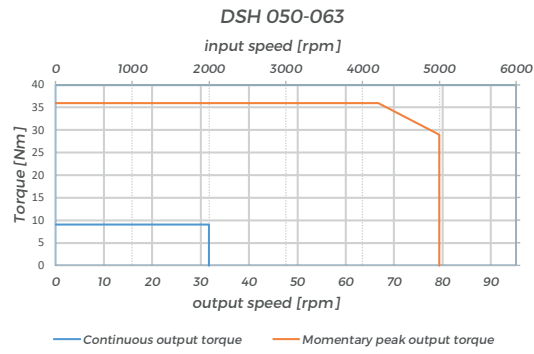
Tab. 8.2c: Inertia at input (DSH actuator without brake)

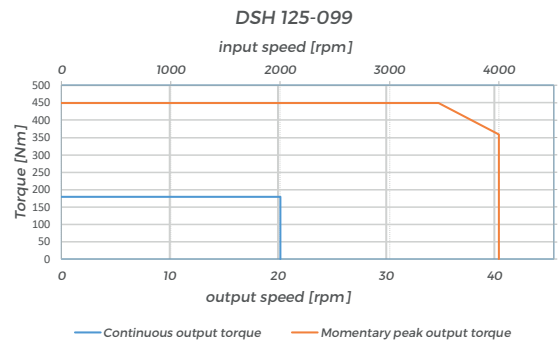
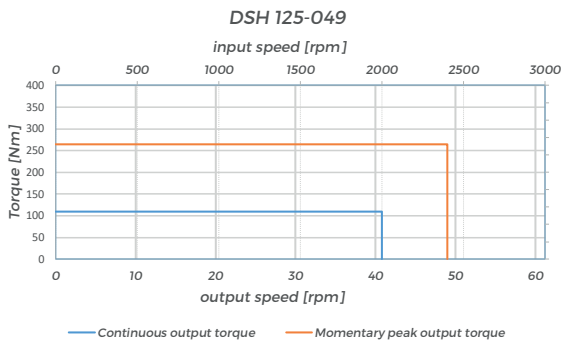
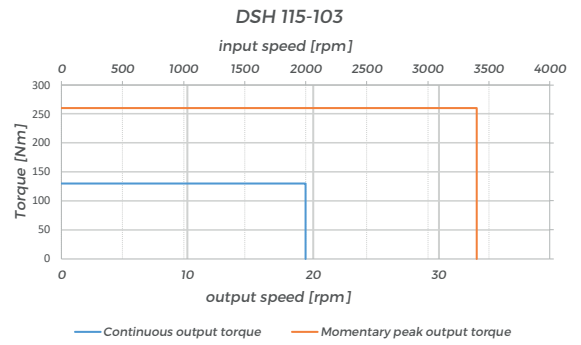
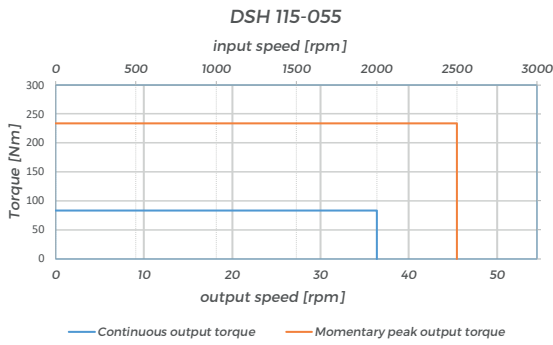
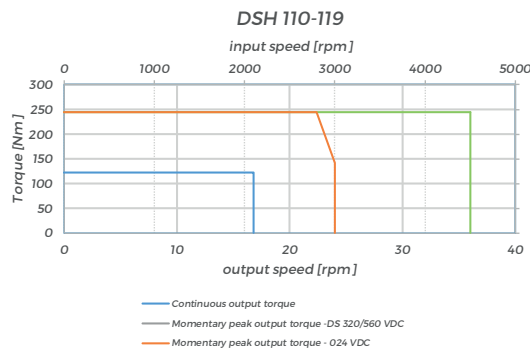
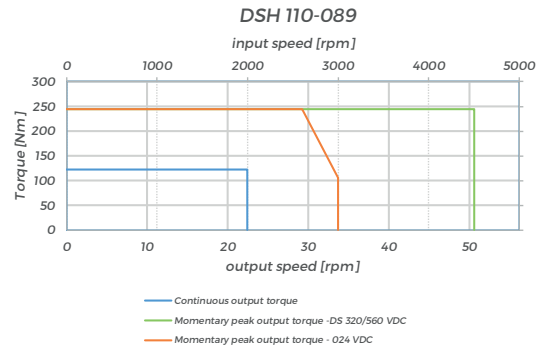
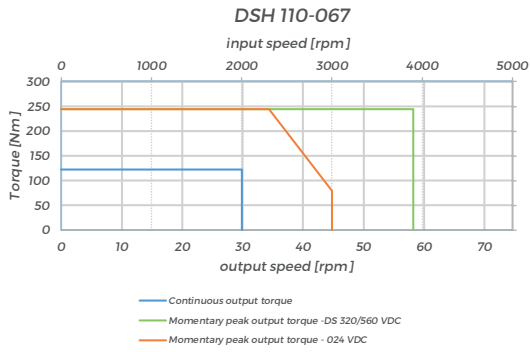
Feedback type (d)	$J_{w/o\ brake}$	DSH 050	DSH 070	DSH 085	DSH 110	DSH 115	DSH 125	DSH 155	DSH 170
OA	$10^{-4} \text{ kgm}^2$	0.110	0.630	1.960	2.040	13.977	14.516	19.340	6.370
OB	$10^{-4} \text{ kgm}^2$	–	0.483	1.840	–	8.757	9.336	10.600	6.300
OC	$10^{-4} \text{ kgm}^2$	–	0.483	1.840	–	8.757	9.336	10.600	6.300
OD	$10^{-4} \text{ kgm}^2$	–	–	2.360	–	9.097	9.636	10.460	6.280
OE	$10^{-4} \text{ kgm}^2$	–	–	2.360	–	9.097	9.636	10.460	6.280
OF	$10^{-4} \text{ kgm}^2$	–	–	–	–	9.097	9.636	10.460	–
OJ	$10^{-4} \text{ kgm}^2$	0.091	–	–	–	–	–	–	–
ON	$10^{-4} \text{ kgm}^2$	0.105	–	2.060	–	–	10.624	–	6.270

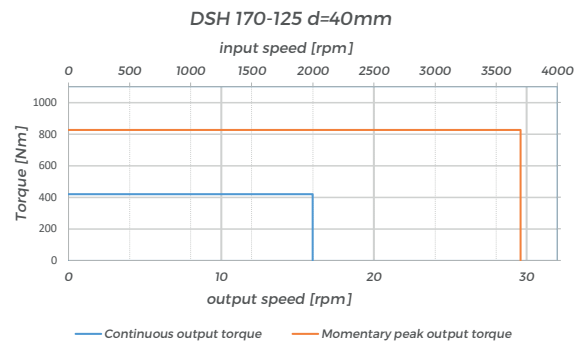
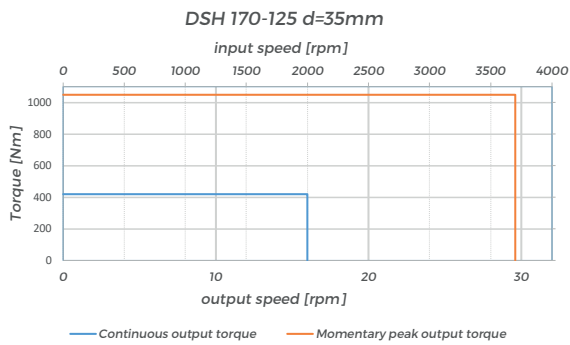
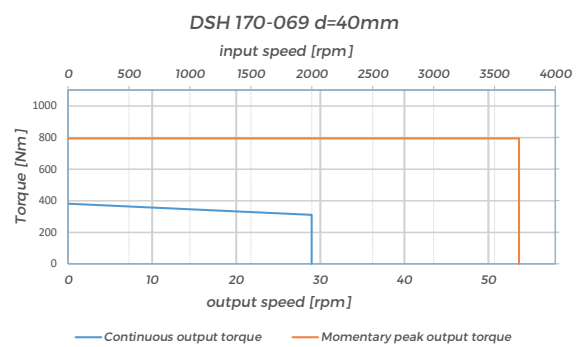
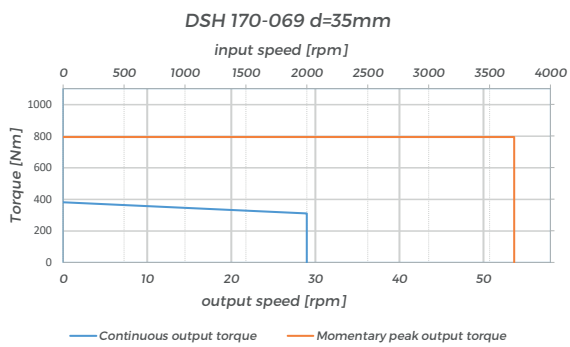
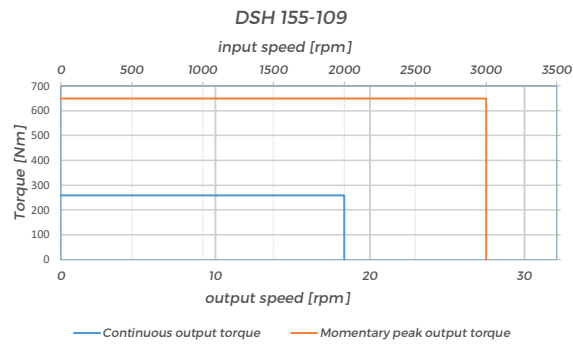
Tab. 8.2d: Inertia at input (DSH actuator with brake)

Feedback type (d)	$J_{w/o\ brake}$	DSH 050	DSH 070	DSH 085	DSH 110	DSH 115	DSH 125	DSH 155	DSH 170
OA	$10^{-4} \text{ kgm}^2$	0.143	–	2.380	–	15.080	15.937	24.428	6.430
OB	$10^{-4} \text{ kgm}^2$	–	–	2.200	–	9.860	15.757	15.249	6.430
OC	$10^{-4} \text{ kgm}^2$	–	–	2.200	–	9.860	10.757	15.249	6.430
OD	$10^{-4} \text{ kgm}^2$	–	–	2.810	–	10.200	11.057	15.550	6.430
OE	$10^{-4} \text{ kgm}^2$	–	–	2.810	–	10.200	11.057	15.550	6.430
OF	$10^{-4} \text{ kgm}^2$	–	–	–	–	10.200	11.057	15.550	–
OJ	$10^{-4} \text{ kgm}^2$	0.125	–	–	–	–	–	–	–
ON	$10^{-4} \text{ kgm}^2$	0.138	–	2.520	–	–	12.044	–	6.420









Schweiz

**Nozag AG**

Barzloostrasse 1  
CH-8330 Pfäffikon/ZH

Telefon +41 44 805 17 17

Aussendienst Westschweiz  
Telefon +41 79 886 76 83

[www.nozag.ch](http://www.nozag.ch)  
[info@nozag.ch](mailto:info@nozag.ch)