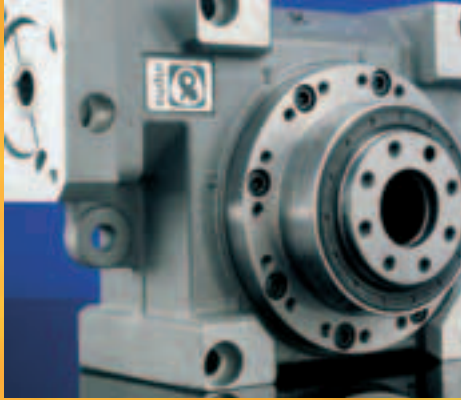




H Synchronous Precision

# alpha V-DRIVE



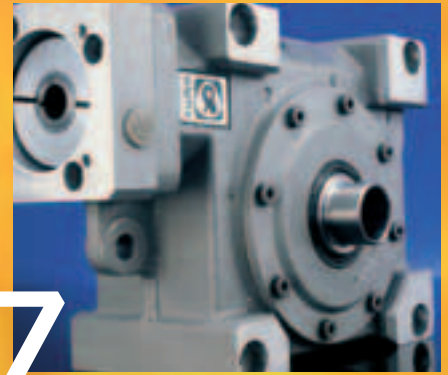
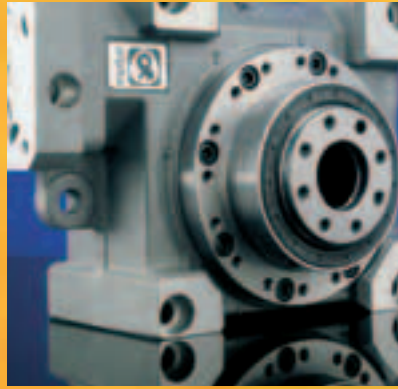
T Compact Precision



S Classic Precision

Low-Backlash Servo Gearhead





7



8



10



The "Best of TOP100 Germany" prize is among the highest-profile awards for medium-sized companies in Germany. 454 companies took part in the competition.

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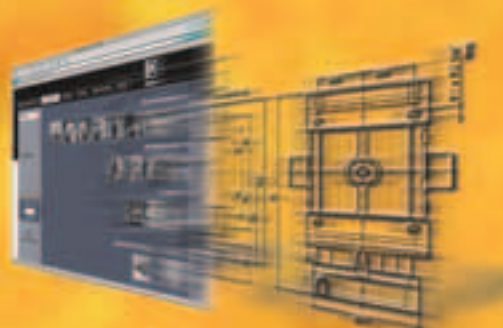
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You can find the DXF-drawings and the 3D models  
for all versions at [www.alphagear.com](http://www.alphagear.com)



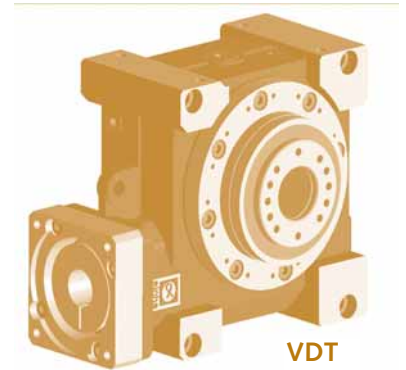
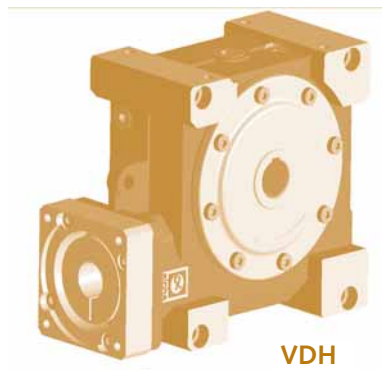
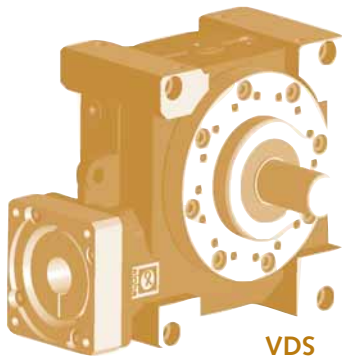


# Introduction

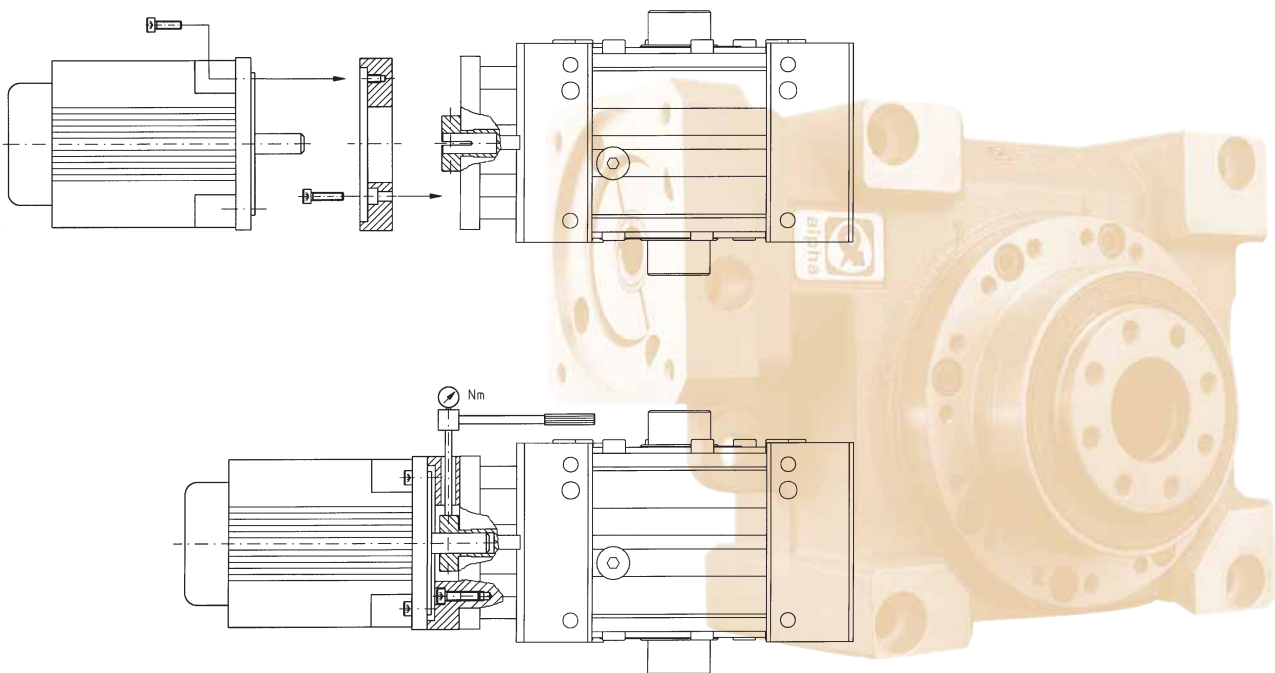
alpha's V-Drive low-backlash right-angle servo gear reducers are used as state-of-the-art components of servo systems in general automation, machine tools, packaging machinery and other applications – for highly dynamic positioning operations as well as for continuous operations.

The properties of the V-Drive gear reducers render them particularly suitable for drive systems with high standards of performance, precision and reliability:

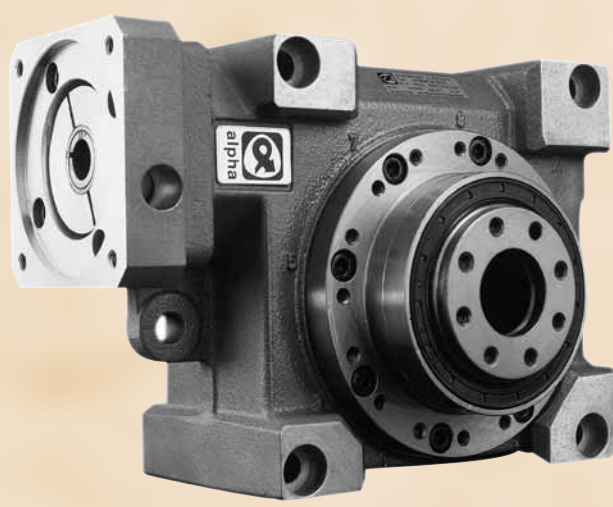
- Technology leadership in design and manufacturing ensures superior performance
- Excellent quality through advanced manufacturing technologies and 100% exit testing
- Unsurpassed product design with a modular product line and a universal motor mounting system
- Worldwide sales and service organization – a guarantee for competent support anywhere



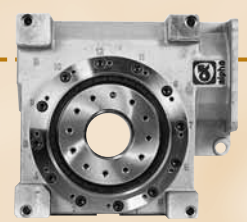
alpha's universal motor mounting system cuts the time needed to less than five minutes. The gear reducer is supplied with the parts for your particular motor.



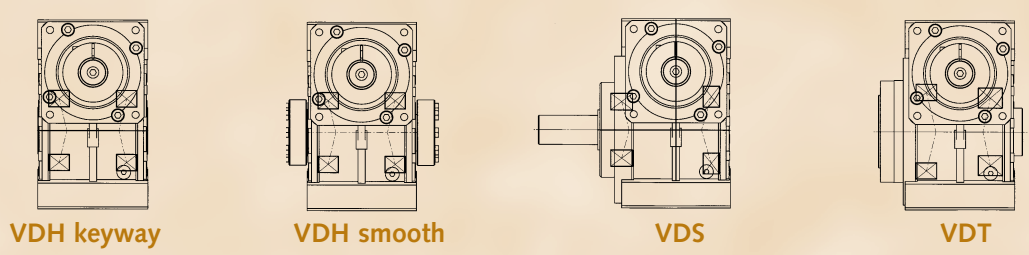
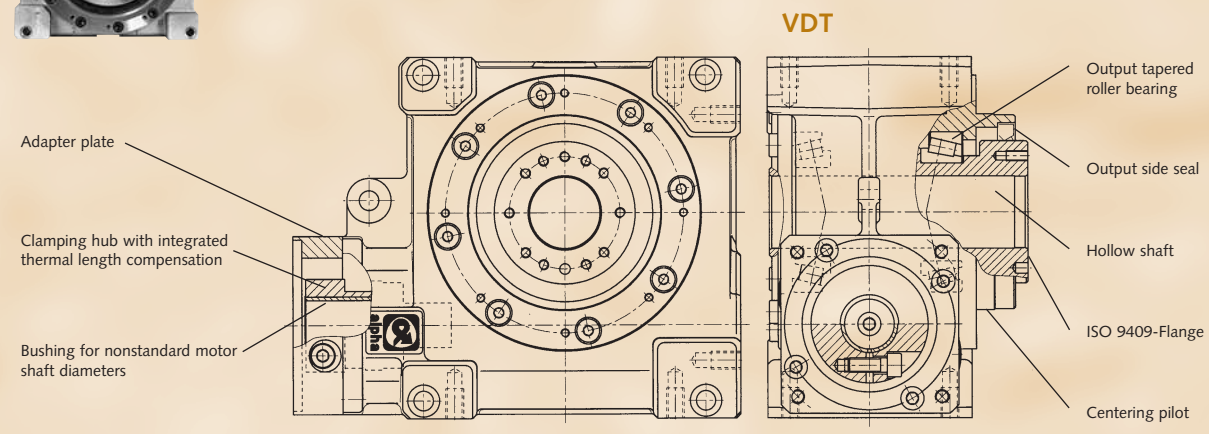
# Product Characteristics



- 6 output shaft variations allow **simple design**
- slender form** because of the compact right angle design
- high ratios** in a single stage gear reducer
- universal motor mounting** due to the alpha principle, tried and tested worldwide
- simple synchronization** of movements through the hollow output shaft combined with shrink-disks
- minimum wear** due to hollow tooth flanks
- form-fit TP flanges provide **highest safety** in lifting axes
- silent running** achieved by an optimum combination of materials
- smooth running** because of vibration absorbing characteristics
- universal mounting** due to use of synthetic oil
- optimum operating safety** due to high torque reserves
- maximum space for power transmission** through the TP hollow shaft version



## Product details



# Technical Data

			Size					
			Gear ratio	050	063	080	100	
Max. Acceleration Torque ( $n_1 = 3000$ rpm)*	$T_{2B}$	in.lb (Nm)	i = 4	522 (59)	1221 (138)	2186 (247)	3717 (420)	
			i = 7	681 (77)	1558 (176)	2832 (320)	4876 (551)	
			i = 10	717 (81)	1717 (194)	2823 (319)	5363 (606)	
			i = 16	779 (88)	1850 (209)	3372 (381)	5567 (629)	
			i = 28	858 (97)	1982 (224)	3655 (413)	6354 (718)	
			i = 40	717 (81)	1920 (217)	3204 (362)	6124 (692)	
Nominal Output Torque ( $n_1 = 3000$ rpm)*	$T_{2N}$	in.lb (Nm)	i = 4	381 (43)	770 (87)	1372 (155)	2310 (261)	
			i = 7	496 (56)	1097 (124)	1982 (224)	3398 (384)	
			i = 10	522 (59)	1248 (141)	2062 (233)	3921 (443)	
			i = 16	566 (64)	1345 (152)	2460 (278)	4062 (459)	
			i = 28	628 (71)	1460 (165)	2664 (301)	4637 (524)	
			i = 40	522 (59)	1407 (159)	2336 (264)	4469 (505)	
Max. Input Speed		rpm (min <sup>-1</sup> )		6000	4500	4000	3500	
Nominal Input Speed		rpm (min <sup>-1</sup> )		4000	4000	3500	3000	
Ratios	i			i = 4, 7, 10, 16, 28, 40				
Torsional Backlash	$j_t$	arcmin		< 3	< 3	< 3	< 3	
Torsional Rigidity	$C_{2k}$	in.lb/arcmin Nm/arcmin	VDT	i = 40	150 (17)	443 (50)	1000 (113)	1885 (213)
			VDH	i = 40	71 (8)	248 (28)	690 (78)	1354 (153)
			VDS	i = 40	71 (8)	248 (28)	690 (78)	1354 (153)
Max. Axial Load	$F_{2AMax}$	lbf. (N)		1125 (5000)	1856 (8250)	3128 (13900)	4388 (19500)	
Max. Radial Load	$F_{2RMax}$	lbf. (N)		855 (3800)	1350 (6000)	2025 (9000)	3150 (14000)	
Max. Tilting Torque	$M_{2KMax}$	in.lb (Nm)		3620 (409)	7461 (843)	13,664 (1544)	27,072 (3059)	
Tilting Rigidity	$C_{t21}$	in.lb/arcmin (Nm/arcmin)	VDT		4460 (504)	5337 (603)	10,425 (1178)	20,435 (2309)
No Load Running Torque ( $n_1 = 3000$ rpm)	$T_{021}$	in.lb (Nm)	i = 4	11.3 (1.28)	18.3 (2.07)	32.1 (3.63)	86.3 (9.75)	
			i = 7	10.9 (1.23)	16.8 (1.9)	30.8 (3.48)	71.3 (8.06)	
			i = 10	10.4 (1.18)	16.2 (1.83)	29.8 (3.37)	65.6 (7.41)	
			i = 16	9.6 (1.09)	15.3 (1.73)	27.9 (3.15)	59.5 (6.72)	
			i = 28	8.7 (0.98)	14.2 (1.6)	26.6 (3)	51.0 (5.79)	
			i = 40	7.9 (0.89)	12.7 (1.44)	24.4 (2.76)	44.2 (4.99)	
Service Life	$L_h$	hours		> 20,000				
Efficiency ( $n_1 = 3000$ rpm)	$\eta$	%	i = 4	96	96	97	97	
			i = 7	94	95	96	96	
			i = 10	93	94	94	95	
			i = 16	90	91	92	92	
			i = 28	83	85	86	87	
			i = 40	78	81	81	84	
Weight**	lb.	(kg)	VDT	18 (8)	35 (16)	66 (30)	141 (64)	
			VDH	15 (7)	29 (13)	55 (25)	104 (47)	
			VDS	18 (8)	31 (14)	59 (27)	126 (57)	
Lubrication				Synthetic Oil ISO VG220				
Paint				none				
Mounting Positions				all				
Permissible Gear Reducer Temperature		°F (°C)		14 to 194 (-10 to +90)				
Direction of Rotation				see drawings				
Protection Class				IP 64				
Noise Level ( $n_1 = 3000$ min)	$L_{PA}$	dB(A)		< 62	< 64	< 66	< 70	

\* = to be used with operating factors on page 11 - 12

\*\* = without motor mounting parts

## Moments of Inertia $J_1$ [lb.-in. s<sup>2</sup> \* 10<sup>-4</sup> (kgcm<sup>2</sup>)] applies to the input

Size	i	VDT	VDH	VDS
050	4	9.027 (1.02)	6.638 (0.75)	6.372 (0.72)
	7	4.425 (0.50)	3.540 (0.40)	3.540 (0.40)
	10	3.540 (0.40)	3.098 (0.35)	3.009 (0.34)
	16	3.009 (0.34)	2.832 (0.32)	2.832 (0.32)
	28	2.655 (0.30)	2.655 (0.30)	2.655 (0.30)
	40	3.186 (0.36)	3.186 (0.36)	3.186 (0.36)
063	4	25.931 (2.93)	19.736 (2.23)	19.736 (2.23)
	7	14.426 (1.63)	11.771 (1.33)	12.656 (1.43)
	10	10.886 (1.23)	10.001 (1.13)	10.001 (1.13)
	16	10.001 (1.13)	9.116 (1.03)	9.116 (1.03)
	28	8.850 (1.00)	8.762 (0.99)	8.762 (0.99)
	40	8.762 (0.99)	8.673 (0.98)	8.762 (0.99)

Size	i	VDT	VDH	VDS
080	4	100.005 (11.3)	74.517 (8.42)	76.287 (8.62)
	7	55.047 (6.22)	46.197 (5.22)	47.082 (5.32)
	10	52.392 (5.92)	48.852 (5.52)	48.852 (5.52)
	16	39.117 (4.42)	37.347 (4.22)	37.347 (4.22)
	28	35.577 (4.02)	35.577 (4.02)	35.577 (4.02)
	40	43.542 (4.92)	43.542 (4.92)	43.542 (4.92)
100	4	366.371 (41.4)	253.097 (28.6)	252.212 (28.5)
	7	209.734 (23.7)	173.451 (19.6)	172.566 (19.5)
	10	170.796 (19.3)	153.982 (17.4)	153.982 (17.4)
	16	174.336 (19.7)	167.256 (18.9)	167.256 (18.9)
	28	141.592 (16.0)	138.938 (15.7)	138.938 (15.7)
	40	156.637 (17.7)	155.752 (17.6)	155.752 (17.6)

# VDT Version [TP]

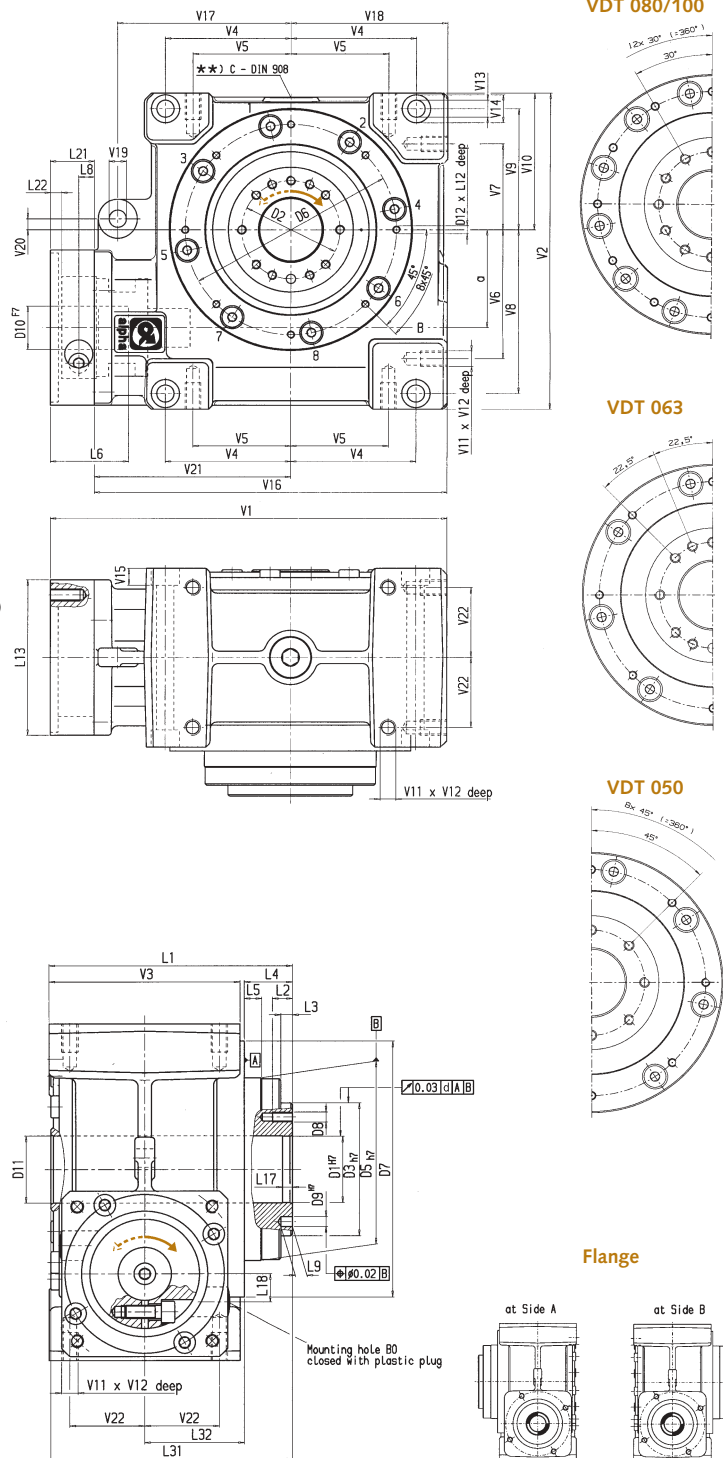
## Dimensions [in.(mm)]

Size	050	063	080	100
a	1.9687 (50)	2.4805 (63)	3.1499 (80)	3.9373 (100)
d	0.0012 (0.03)	0.0012 (0.03)	0.0012 (0.03)	0.0016 (0.04)
c	G 1/2	G 1/2	G 3/4	G 1
B0	0.5906 (15)	0.7087 (18)	0.7875 (20)	0.7875 (20)
D1 H7	1.2403 (31.5)	1.5749 (40)	1.9687 (50)	3.1499 (80)
D2	1.9687 (50)	2.4805 (63)	3.1499 (80)	4.9216 (125)
D3 h7	2.4805 (63)	3.1499 (80)	3.9373 (100)	6.2997 (160)
D5 h7	3.5436 (90)	4.3310 (110)	5.5122 (140)	7.8746 (200)
D6	4.2917 (109)	5.3154 (135)	6.6147 (168)	9.1740 (233)
D7	4.8823 (124)	6.0635 (154)	7.9534 (202)	10.1189 (257)
D8	M6	M6	M8	M10
D9 H7	0.2362 (6)	0.2362 (6)	0.3150 (8)	0.3937 (10)
D10 F7	0.7481 (19)	1.1024 (28)	1.3781 (35)	1.8899 (48)
D11	1.1812 (30)	1.5946 (40.5)	1.9883 (50.5)	2.7561 (70)
D12	M5	M5	M6	M8
L1	5.1973 (132.5)	5.7682 (146.5)	7.5006 (190.5)	9.7449 (247.5)
L2	0.3937 (10)	0.4725 (12)	0.5906 (15)	0.7875 (20)
L3	0.2756 (7)	0.2756 (7)	0.2756 (7)	0.3544 (9)
L4	1.1812 (30)	1.1418 (29)	1.4962 (38)	1.9687 (50)
L5	0.3937 (10)	0.4134 (10.5)	0.4922 (12.5)	0.6103 (15.5)
L6	0.9056(23)/1.5749(40)	1.1812(30)/1.9687(50)	1.2599(32)/2.3624(60)	1.7718(45)/3.2286(82)
L8	0.3347 (8.5)	0.3937 (10)	0.4922 (12.5)	0.5119 (13)
L9	0.2756 (7)	0.2756 (7)	0.2756 (7)	0.3937 (10)
L12	0.3347 (8.5)	0.3347 (8.5)	0.4725 (12)	0.6103 (15.5)
L13	3.1499 (80)	3.9373 (100)	5.5122 (140)	7.4809 (190)
L17	0.2362 (6)	0.2362 (6)	0.2362 (6)	0.3150 (8)
L18	0.4725 (12)	0.6693 (17)	0.7481 (19)	1.1418 (29)
L21 <sup>1)</sup>	0.8662 (22)	1.1024 (28)	1.2009 (30.5)	1.4765 (37.5)
L22	0.2638 (6.7)	0.2835 (7.2)	0.2244 (5.7)	0.3859 (9.8)
L31	5.3351 (132.5)	5.7288 (145.5)	7.5006 (190.5)	9.7055 (246.5)
L32	2.0671 (52.5)	2.3624 (60)	3.0514 (77.5)	3.9373 (100)
V1	8.6621 (220)	9.9811 (253.5)	12.7963 (325)	15.8477 (402.5)
V2	6.3981 (162.5)	7.9928 (203)	10.2370 (260)	13.1900 (335)
V3	3.9373 (100)	4.5279 (115)	5.9060 (150)	7.6778 (195)
V4	2.7561 (70)	3.1499 (80)	4.3310 (110)	5.2169 (132.5)
V5	2.0671 (52.5)	2.4608 (62.5)	3.5436 (90)	4.3310 (110)
V6	2.5593 (65)	3.2680 (83)	4.5279 (115)	6.2013 (157.5)
V7	1.6734 (42.5)	2.1655 (55)	2.7561 (70)	3.8389 (97.5)
V8	3.2483 (82.5)	4.1539 (105.5)	5.6107 (142.5)	7.2840 (185)
V9	2.3624 (60)	3.0514 (77.5)	3.8389 (97.5)	4.9216 (125)
V10	2.7561 (70)	3.4452 (87.5)	4.2326 (107.5)	5.4138 (137.5)
V11	M8	M10	M12	M12
V12	0.5315 (13.5)	0.6693 (17)	0.7678 (19.5)	0.7678 (19.5)
V13	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V14	0.7087 (18)	0.7087 (18)	0.7087 (18)	0.7875 (20)
V15	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5119 (13)
V16	7.7959 (198)	8.8787 (225.5)	11.5954 (294.5)	14.3712 (365)
V17	3.8586 (98)	4.3507 (110.5)	5.9847 (152)	7.6384 (194)
V18	3.3467 (85)	3.9373 (100)	5.0201 (127.5)	6.0044 (152.5)
V19	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V20	0.3937 (10)	0.2756 (7)	0.3937 (10)	0.7875 (20)
V21	4.4492 (113)	4.9413 (125.5)	6.5753 (167)	8.3668 (212.5)
V22	1.5749 (40)	1.7718 (45)	2.3624 (60)	3.2483 (82.5)

The dimensions L6, L13, L21, L22 and V1 depend on the mounted motor type and motor adapter.

<sup>1)</sup> Dimensions depend on the motor

\*\*\*) Oil filler and oil drain plug

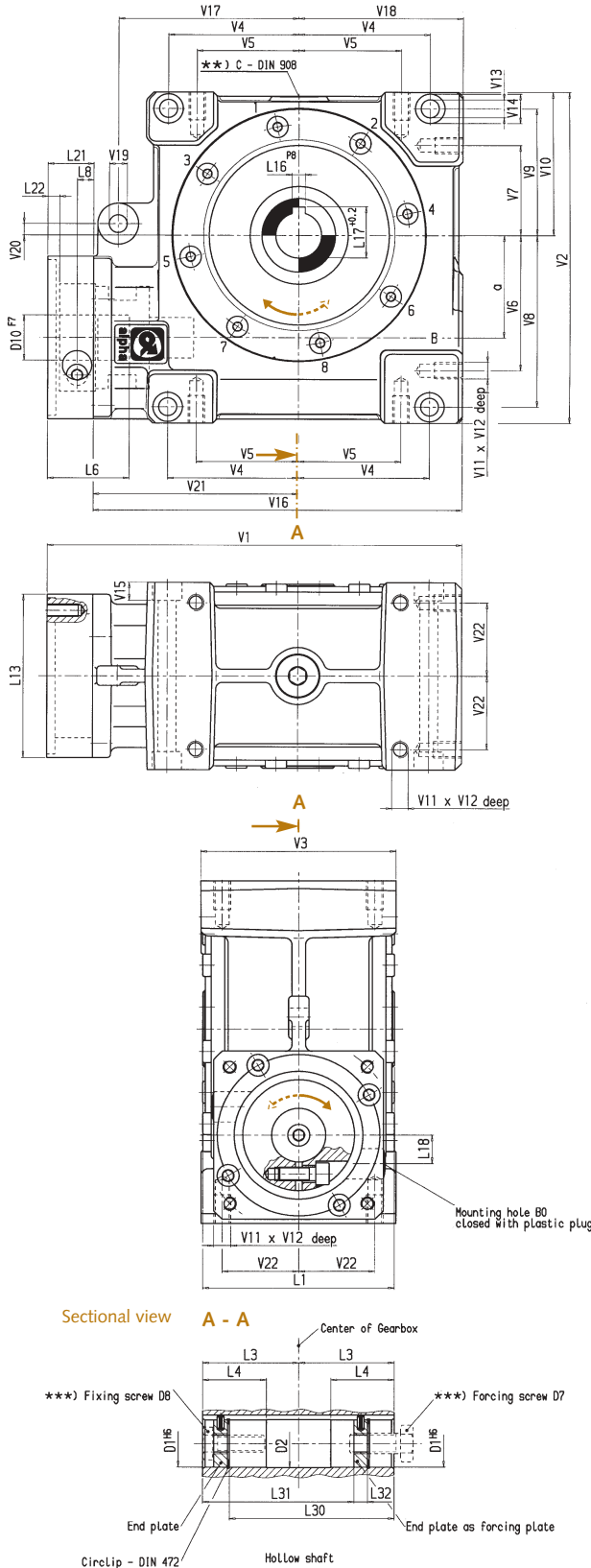


Arrows show relative direction of rotation.

See page 13 for power ratings and torques.

# VDH Version [Keyway Hollow Shaft]

Dimensions [in.(mm)]



Size	050	063	080	100
a	1.9687 (50)	2.4805 (63)	3.1499 (80)	3.9373 (100)
c	G 1/2	G 1/2	G 3/4	G 1
B0	0.5906 (15)	0.7087 (18)	0.7875 (20)	0.7875 (20)
D1 H6	0.9843 (25)	1.1024 (28)	1.4174 (36)	1.8899 (48)
D2	1.0040 (25.5)	1.1221 (28.5)	1.4371 (36.5)	1.9293 (49)
D7	M12	M12	M16	M20
D8	M10	M10	M12	M16
D10 F7	0.7481 (19)	1.1024 (28)	1.3781 (35)	1.8899 (48)
L1	3.9373 (100)	4.4492 (113)	5.9060 (150)	7.5990 (193)
L3	1.9687 (50)	2.2246 (56.5)	2.9530 (75)	3.7995 (96.5)
L4	1.1812 (30)	1.4765 (37.5)	1.7718 (45)	2.5199 (64)
L6 min / max	23/40	30/50	32/60	45/82
L8	0.3347 (8.5)	0.3937 (10)	0.4922 (12.5)	0.5119 (13)
L13	3.1499 (80)	3.9373 (100)	5.5122 (140)	7.4809 (190)
L16 P8	0.3150 (8)	0.3150 (8)	0.3937 (10)	0.5512 (14)
L17	1.1143 (28.3)	1.2324 (31.3)	1.5474 (39.3)	2.0395 (51.8)
L18	0.4725 (12)	0.6693 (17)	0.7481 (19)	1.1418 (29)
L21 <sup>1)</sup>	0.8662 (22)	1.1024 (28)	1.2009 (30.5)	1.4765 (37.5)
L22	0.2638 (6.7)	0.2835 (7.2)	0.2244 (5.7)	0.3859 (9.8)
L30	3.3270 (84.5)	3.8271 (97.2)	5.1185 (130)	6.6895 (169.9)
L31 max. <sup>2)</sup>	3.0317 (77)	3.5042 (89)	4.6854 (119)	6.2603 (159)
L32	0.2756 (7)	0.3150 (8)	0.3937 (10)	0.4331 (11)
V1	8.6621 (220)	9.9811 (253.5)	12.7963 (325)	15.8477 (402.5)
V2	6.3981 (162.5)	7.9928 (203)	10.2370 (260)	13.1900 (335)
V3	3.9373 (100)	4.5279 (115)	5.9060 (150)	7.6778 (195)
V4	2.7561 (70)	3.1499 (80)	4.3310 (110)	5.2169 (132.5)
V5	2.0671 (52.5)	2.4608 (62.5)	3.5436 (90)	4.3310 (110)
V6	2.5593 (65)	3.2680 (83)	4.5279 (115)	6.2013 (157.5)
V7	1.6734 (42.5)	2.1655 (55)	2.7561 (70)	3.8389 (97.5)
V8	3.2483 (82.5)	4.1539 (105.5)	5.6107 (142.5)	7.2840 (185)
V9	2.3624 (60)	3.0514 (77.5)	3.8389 (97.5)	4.9216 (125)
V10	2.7561 (70)	3.4452 (87.5)	4.2326 (107.5)	5.4138 (137.5)
V11	M8	M10	M12	M12
V12	0.5315 (13.5)	0.6693 (17)	0.7678 (19.5)	0.7678 (19.5)
V13	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V14	0.7087 (18)	0.7087 (18)	0.7087 (18)	0.7875 (20)
V15	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5119 (13)
V16	7.7959 (198)	8.8787 (225.5)	11.5954 (294.5)	14.3712 (365)
V17	3.8586 (98)	4.3507 (110.5)	5.9847 (152)	7.6384 (194)
V18	3.3467 (85)	3.9373 (100)	5.0201 (127.5)	6.0044 (152.5)
V19	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V20	0.3937 (10)	0.2756 (7)	0.3937 (10)	0.7875 (20)
V21	4.4492 (113)	4.9413 (125.5)	6.5753 (167)	8.3668 (212.5)
V22	1.5749 (40)	1.7718 (45)	2.3624 (60)	3.2483 (82.5)

The dimensions L6, L13, L21, L22 and V1 depend on the mounted motor type and motor adapter.

<sup>1)</sup> Dimensions depend on the motor

<sup>2)</sup> Only by using the forcing plate

\*\*\*) Oil filler and oil drain plug

\*\*\*) Not supplied by alpha

Arrows show relative direction of rotation.

See page 13 for power ratings and torques.

Tolerance h6 for the load shaft.



# VDH Version [Smooth Hollow Shaft]

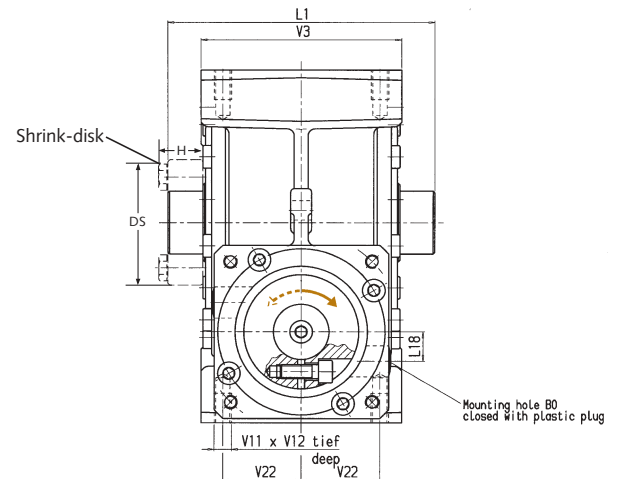
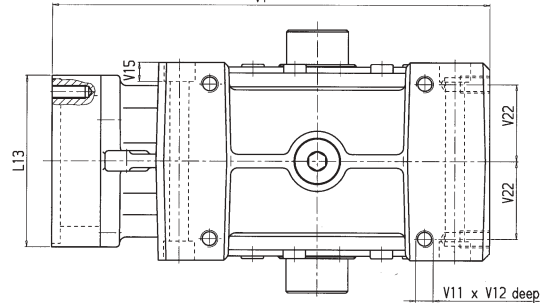
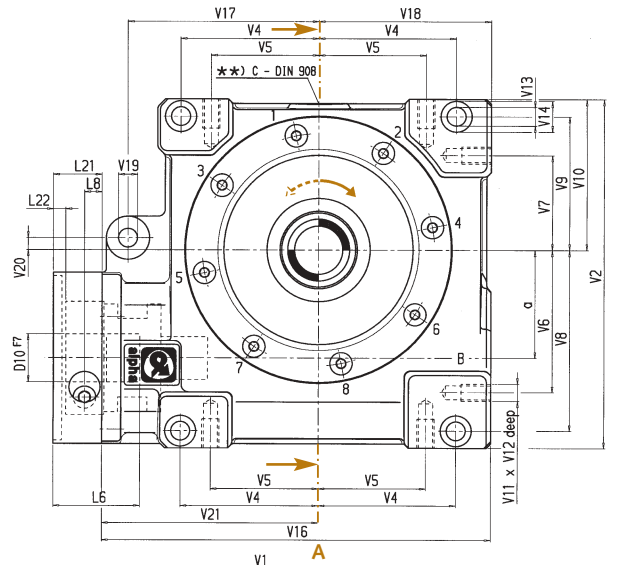
## Dimensions [in.(mm)]

Size	050	063	080	100
a	1.9687 (50)	2.4805 (63)	3.1499 (80)	3.9373 (100)
c	G 1/2	G 1/2	G 3/4	G 1
B0	0.5906 (15)	0.7087 (18)	0.7875 (20)	0.7875 (20)
D1 H6	0.9843 (25)	1.1024 (28)	1.4174 (36)	1.8899 (48)
D2 h8	1.1812 (30)	1.4174 (36)	1.9687 (50)	2.4411 (62)
D3	1.0040 (25.5)	1.1221 (28.5)	1.4371 (36.5)	1.9293 (49)
D10 F7 max	0.7481 (19)	1.1024 (28)	1.3781 (35)	1.8899 (48)
DS	2.3624 (60)	2.8349 (72)	3.5436 (90)	4.3310 (110)
H	0.9450 (24)	1.0828 (27.5)	1.2403 (31.5)	1.3584 (34.5)
L1	5.3941 (137)	6.0241 (153)	7.8746 (200)	9.9614 (253)
L2	0.7284 (18.5)	0.7875 (20)	0.9843 (25)	0.9843 (25)
L3	2.6971 (68.5)	3.0120 (76.5)	3.9373 (100)	4.9807 (126.5)
L4	0.7875 (20)	0.8268 (21)	1.0237 (26)	1.1024 (28)
L6 min / max	23/40	30/50	32/60	45/82
L8	0.3347 (8.5)	0.3937 (10)	0.4922 (12.5)	0.5119 (13)
□ L13	3.1499 (80)	3.9373 (100)	5.5122 (140)	7.4809 (190)
L18	0.4725 (12)	0.6693 (17)	0.7481 (19)	1.1417 (29)
L21 <sup>1)</sup>	0.8662 (22)	1.1024 (28)	1.2009 (30.5)	1.4765 (37.5)
L22	0.2638 (6.7)	0.2835 (7.2)	0.2244 (5.78)	0.3859 (9.8)
V1	8.6621 (220)	9.9811 (253.5)	12.7963 (325)	15.8477 (402.5)
V2	6.3981 (162.5)	7.9928 (203)	10.2370 (260)	13.1900 (335)
V3	3.9373 (100)	4.5279 (115)	5.9060 (150)	7.6778 (195)
V4	2.7561 (70)	3.1499 (80)	4.3310 (110)	5.2169 (132.5)
V5	2.0671 (52.5)	2.4608 (62.5)	3.5436 (90)	4.3310 (110)
V6	2.5593 (65)	3.2680 (83)	4.5279 (115)	6.2013 (157.5)
V7	1.6734 (42.5)	2.1655 (55)	2.7561 (70)	3.8389 (97.5)
V8	3.2483 (82.5)	4.1539 (105.5)	5.6107 (142.5)	7.2840 (185)
V9	2.3624 (60)	3.0514 (77.5)	3.8389 (97.5)	4.9216 (125)
V10	2.7561 (70)	3.4452 (87.5)	4.2326 (107.5)	5.4138 (137.5)
V11	M8	M10	M12	M12
V12	0.5315 (13.5)	0.6693 (17)	0.7678 (19.5)	0.7678 (19.5)
V13	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V14	0.7087 (18)	0.7087 (18)	0.7087 (18)	0.7875 (20)
V15	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5119 (13)
V16	7.7959 (198)	8.8787 (225.5)	11.5954 (294.5)	14.3712 (365)
V17	3.8586 (98)	4.3507 (110.5)	5.9847 (152)	7.6384 (194)
V18	3.3467 (85)	3.9373 (100)	5.0201 (127.5)	6.0044 (152.5)
V19	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V20	0.3937 (10)	0.2756 (7)	0.3937 (10)	0.7875 (20)
V21	4.4492 (113)	4.9413 (125.5)	6.5753 (167)	8.3668 (212.5)
V22	1.5749 (40)	1.7718 (45)	2.3624 (60)	3.2483 (82.5)

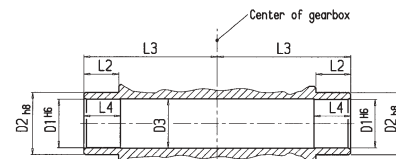
The dimensions L6, L13, L21, L22 and V1 depend on the mounted motor type and motor adapter.

<sup>1)</sup> Dimensions depend on the motor

\*\*\*) Oil filler and oil drain plug



Sectional view A - A



Hollow shaft

Arrows show relative direction of rotation.

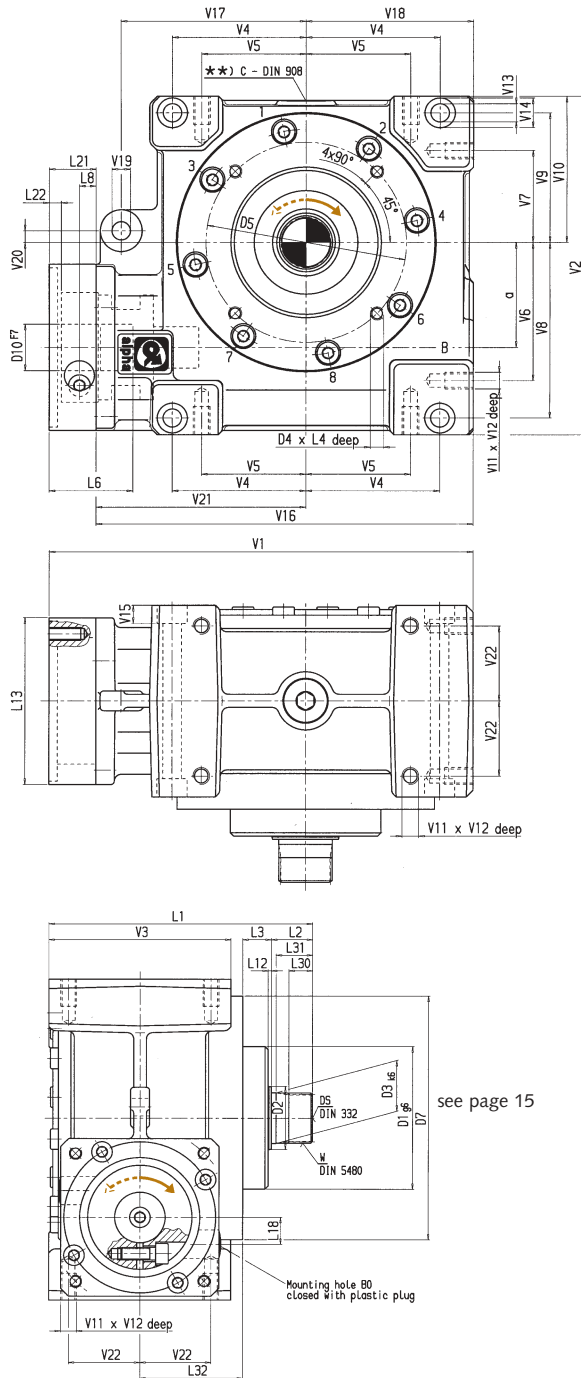
See page 13 for power ratings and torques.

Tolerance h6 for the load shaft.



# VDS Version [SP Involute]

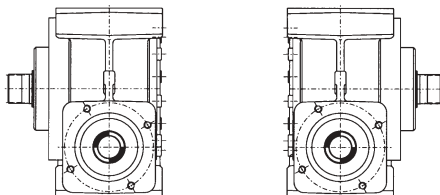
Dimensions [in.(mm)]



## Flange and output shaft

at side A

at side B



Size	050	063	080	100
a	1.9687 (50)	2.4805 (63)	3.1499 (80)	3.9373 (100)
c	G 1/2	G 1/2	G 3/4	G 1
B0	0.5906 (15)	0.7087 (18)	0.7875 (20)	0.7875 (20)
D1 g6	2.7561 (70)	3.5436 (90)	5.1185 (130)	6.2997 (160)
D3 k6	0.8662 (22)	1.2599 (32)	1.5749 (40)	2.1655 (55)
D4	M6	M8	M10	M12
D5	3.3467 (85)	4.7248 (120)	6.4966 (165)	8.4652 (215)
D7	4.8823 (124)	6.0635 (154)	7.9534 (202)	10.1189 (257)
D10 F7 max	0.7481 (19)	1.1024 (28)	1.3781 (35)	1.8899 (48)
DS	0.3150 (8)	0.4725 (12)	0.6300 (16)	0.7875 (20)
L1	5.7485 (146)	6.5556 (166.5)	8.7802 (223)	10.4733 (266)
L2	0.8859 (22.5)	0.9056 (23)	1.2599 (32)	1.3190 (33.5)
L3	0.5512 (14)	0.7087 (18)	0.9056 (23)	1.0631 (27)
L4	0.3937 (10)	0.5119 (13)	0.5906 (15)	0.9056 (23)
L6 min / max	23/40	30/50	32/60	45/82
L8	0.3347 (8.5)	0.3937 (10)	0.4922 (12.5)	0.5119 (13)
L12	0.0787 (2)	0.0787 (2)	0.1181 (3)	0.1181 (3)
L13	3.1499 (80)	3.9373 (100)	5.5122 (140)	7.4809 (190)
L18	0.4725 (12)	0.6693 (17)	0.7481 (19)	1.1418 (29)
L21 1)	0.8662 (22)	1.1024 (28)	1.2009 (30.5)	1.4765 (37.5)
L22	0.2638 (6.7)	0.2835 (7.2)	0.2244 (5.7)	0.3859 (9.8)
L30	0.5906 (15)	0.5906 (15)	0.7875 (20)	0.8465 (21.5)
L31	0.8859 (22.5)	0.9056 (23)	1.2599 (32)	1.3190 (33.5)
L32	2.2049 (56)	2.5593 (65)	3.3467 (85)	3.9373 (100)
V1	8.6621 (220)	9.9811 (253.5)	12.7963 (325)	15.8477 (402.5)
V2	6.3981 (162.5)	7.9928 (203)	10.2370 (260)	13.1900 (335)
V3	3.9373 (100)	4.5279 (115)	5.9060 (150)	7.6778 (195)
V4	2.7561 (70)	3.1499 (80)	4.3310 (110)	5.2169 (132.5)
V5	2.0671 (52.5)	2.4608 (62.5)	3.5436 (90)	4.3310 (110)
V6	2.5593 (65)	3.2680 (83)	4.5279 (115)	6.2013 (157.5)
V7	1.6734 (42.5)	2.1655 (55)	2.7561 (70)	3.8389 (97.5)
V8	3.2483 (82.5)	4.1539 (105.5)	5.6107 (142.5)	7.2840 (185)
V9	2.3624 (60)	3.0514 (77.5)	3.8389 (97.5)	4.9216 (125)
V10	2.7561 (70)	3.4452 (87.5)	4.2326 (107.5)	5.4138 (137.5)
V11	M8	M10	M12	M12
V12	0.5315 (13.5)	0.6693 (17)	0.7678 (19.5)	0.7678 (19.5)
V13	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V14	0.7087 (18)	0.7087 (18)	0.7087 (18)	0.7875 (20)
V15	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5119 (13)
V16	7.7959 (198)	8.8787 (225.5)	11.5954 (294.5)	14.3712 (365)
V17	3.8586 (98)	4.3507 (110.5)	5.9847 (152)	7.6384 (194)
V18	3.3467 (85)	3.9373 (100)	5.0201 (127.5)	6.0044 (152.5)
V19	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V20	0.3937 (10)	0.2756 (7)	0.3937 (10)	0.7875 (20)
V21	4.4492 (113)	4.9413 (125.5)	6.5753 (167)	8.3668 (212.5)
V22	1.5749 (40)	1.7718 (45)	2.3624 (60)	3.2483 (82.5)

The dimensions L6, L13, L21, L22 and V1 depend on the mounted motor type and motor adapter.

1) Dimensions depend on the motor

\*\*) Oil filler and oil drain plug

## W for size

VDS 050	22 x 1.25 x 30 x 16 x 6 m
VDS 063	32 x 1.25 x 30 x 24 x 6 m
VDS 080	40 x 2 x 30 x 18 x 6 m
VDS 100	55 x 2 x 30 x 26 x 6 m

Arrows show relative direction of rotation.

See page 13 for power ratings and torques.

# VDS Version [SP Smooth, Keyway Output Shaft]

## Dimensions [in.(mm)]

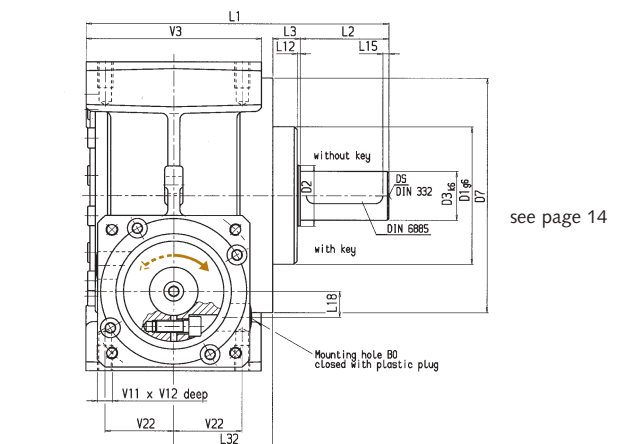
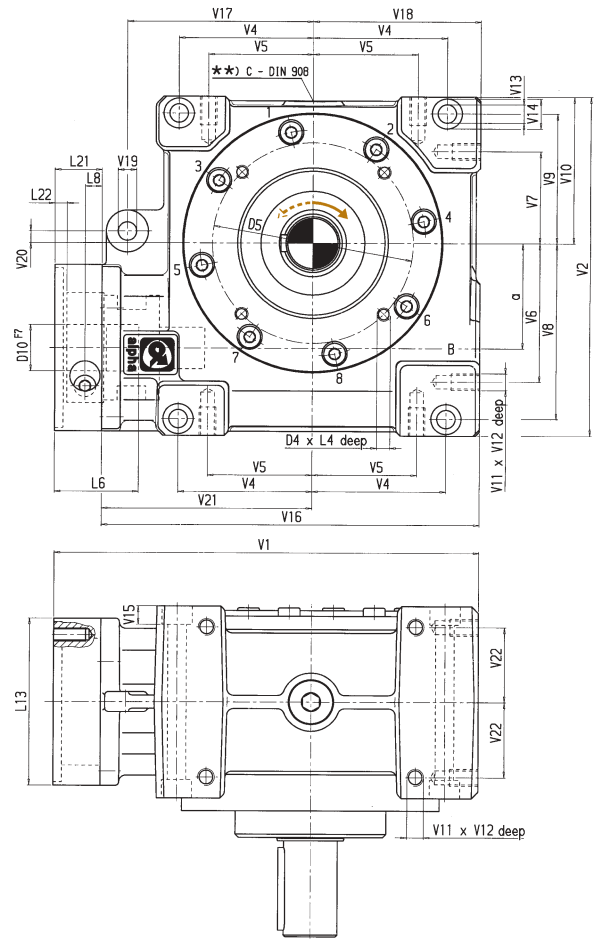
Size	050	063	080	100
a	1.9685 (50)	2.4803 (63)	3.1496 (80)	3.9370 (100)
c	G 1/2	G 1/2	G 3/4	G 1
B0	0.5906 (15)	0.7087 (18)	0.7874 (20)	0.7874 (20)
D1 g6	2.7559 (70)	3.5433 (90)	5.1181 (130)	6.2992 (160)
D2	1.1811 (30)	1.5748 (40)	2.1654 (55)	2.5591 (65)
D3 k6	0.8661 (22)	1.2598 (32)	1.5748 (40)	2.1654 (55)
D4	M6	M8	M10	M12
D5	3.3465 (85)	4.7244 (120)	6.4961 (165)	8.4646 (215)
D7	4.8819 (124)	6.0630 (154)	7.9528 (202)	10.1181 (257)
D10 F7 max	0.7480 (19)	1.1024 (28)	1.3780 (35)	1.8898 (48)
DS	0.3150 (8)	0.4724 (12)	0.6299 (16)	0.7874 (20)
L1	6.1417 (156)	7.8150 (198.5)	10.4331 (265)	12.0669 (306.5)
L2	1.4173 (36)	2.2835 (58)	3.2283 (82)	3.2283 (82)
L3	0.5512 (14)	0.7087 (18)	0.9055 (23)	1.0630 (27)
L4	0.3937 (10)	0.5118 (13)	0.5906 (15)	0.9055 (23)
L6 min / max	23/40	30/50	32/60	45/82
L8	0.3346 (8.5)	0.3937 (10)	0.4921 (12.5)	0.5118 (13)
L12	0.0787 (2)	0.0787 (2)	0.1181 (3)	0.1181 (3)
□ L13	3.1496 (80)	3.9370 (100)	5.5118 (140)	7.4803 (190)
L15	0.0787 (2)	0.1575 (4)	0.1969 (5)	0.2362 (6)
L18	0.4724 (12)	0.6693 (17)	0.7480 (19)	1.1417 (29)
L21 1)	0.8661 (22)	1.1024 (28)	1.2008 (30.5)	1.4764 (37.5)
L22	0.2638 (6.7)	0.2835 (7.2)	0.2244 (5.7)	0.3858 (9.8)
L32	2.2047 (56)	2.5591 (65)	3.3465 (85)	3.9370 (100)
V1	8.6614 (220)	9.9803 (253.5)	12.7953 (325)	15.8465 (402.5)
V2	6.3976 (162.5)	7.9921 (203)	10.2362 (260)	13.1890 (335)
V3	3.9370 (100)	4.5276 (115)	5.9055 (150)	7.6772 (195)
V4	2.7559 (70)	3.1496 (80)	4.3307 (110)	5.2165 (132.5)
V5	2.0669 (52.5)	2.4606 (62.5)	3.5433 (90)	4.3307 (110)
V6	2.5591 (65)	3.2677 (83)	4.5276 (115)	6.2008 (157.5)
V7	1.6732 (42.5)	2.1654 (55)	2.7559 (70)	3.8386 (97.5)
V8	3.2480 (82.5)	4.1535 (105.5)	5.6102 (142.5)	7.2835 (185)
V9	2.3622 (60)	3.0512 (77.5)	3.8386 (97.5)	4.9213 (125)
V10	2.7559 (70)	3.4449 (87.5)	4.2323 (107.5)	5.4134 (137.5)
V11	M8	M10	M12	M12
V12	0.5315 (13.5)	0.6693 (17)	0.7677 (19.5)	0.7677 (19.5)
V13	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V14	0.7087 (18)	0.7087 (18)	0.7087 (18)	0.7874 (20)
V15	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5118 (13)
V16	7.7953 (198)	8.8780 (225.5)	11.5945 (294.5)	14.3701 (365)
V17	3.8583 (98)	4.3504 (110.5)	5.9843 (152)	7.6378 (194)
V18	3.3465 (85)	3.9370 (100)	5.0197 (127.5)	6.0039 (152.5)
V19	0.4331 (11)	0.4331 (11)	0.4331 (11)	0.5512 (14)
V20	0.3937 (10)	0.2756 (7)	0.3937 (10)	0.7874 (20)
V21	4.4488 (113)	4.9409 (125.5)	6.5748 (167)	8.3661 (212.5)
V22	1.5748 (40)	1.7717 (45)	2.3622 (60)	3.2480 (82.5)

The dimensions L6, L13, L21, L22 and V1 depend on the mounted motor type and motor adapter.

1) Dimensions depend on the motor

\*\*\*) Oil filler and oil drain plug

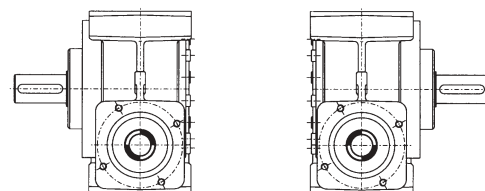
## Dimensions in mm



## Flange and output shaft

at side A

at side B

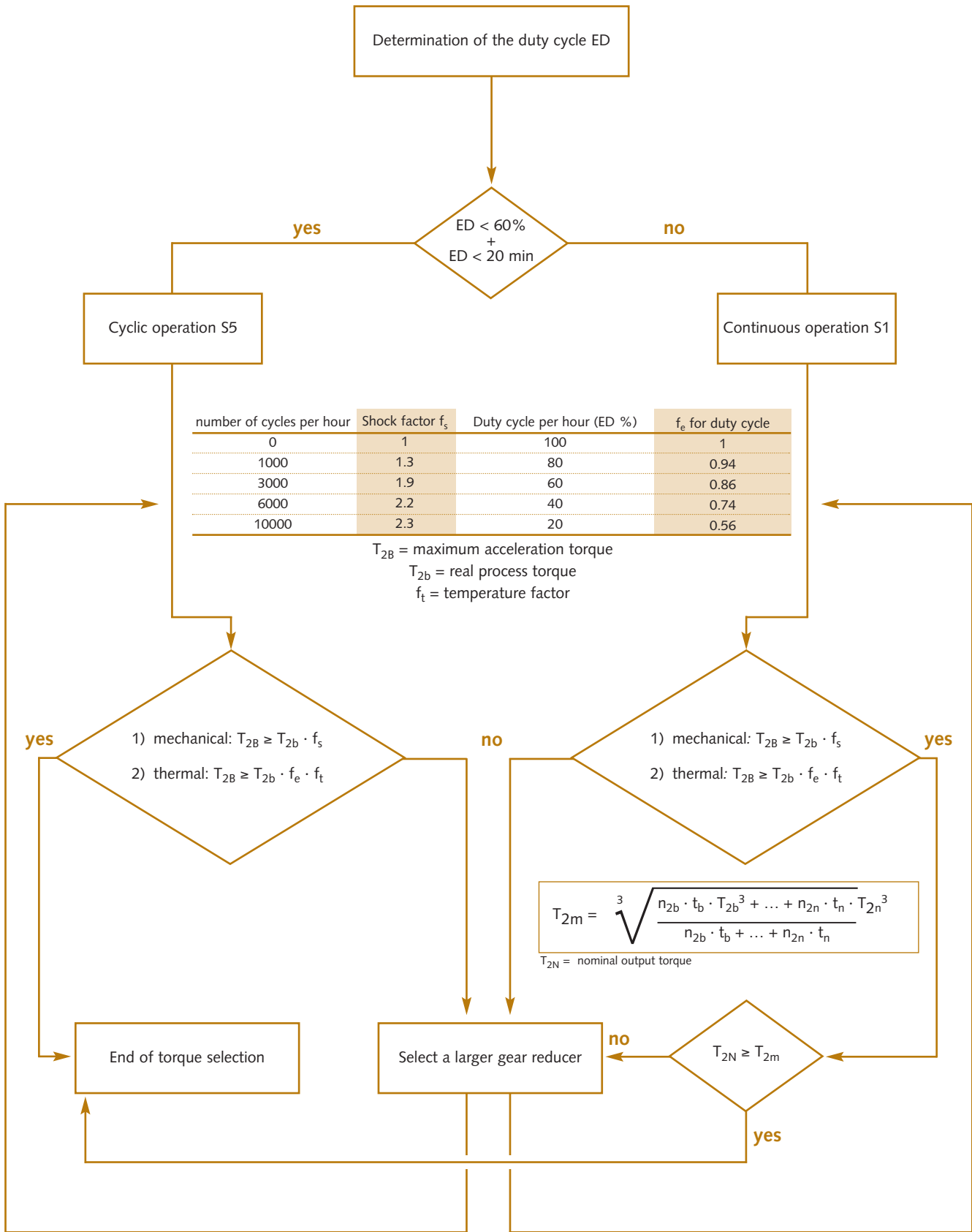


Arrows show relative direction of rotation.

See page 13 for power ratings and torques.



# Cyclic Operation S5 and Continuous Operation S1



# Speed / Torque

## VDT/VDH/VDS 050

$n_{max} = 6000 / \text{rpm}$

Ratio	i	4	7	10	16	28	40
$n_1 = 500 / \text{min}$	$T_{2Not}$ [in.lb (Nm)]	2036 (230)	2142 (242)	2142 (242)	2213 (250)	2319 (262)	2089 (236)
	$T_{2N}$ [in.lb (Nm)]	345 (39)	460 (52)	478 (54)	522 (59)	575 (65)	478 (54)
	$T_{2B}$ [in.lb (Nm)]	478 (54)	628 (71)	655 (74)	717 (81)	797 (90)	655 (74)
	$\eta$ [%]	92	89	86	82	72	64
	$f_t$ <sup>*)</sup>	0.53	0.53	0.53	0.53	0.53	0.53
$n_1 = 1000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	381 (43)	496 (56)	522 (59)	566 (64)	628 (71)	522 (59)
	$T_{2B}$ [in.lb (Nm)]	513 (58)	673 (76)	708 (80)	779 (88)	858 (97)	717 (81)
	$\eta$ [%]	94	91	89	85	77	69
	$f_t$ <sup>*)</sup>	0.53	0.53	0.53	0.53	0.53	0.53
	$T_{2N}$ [in.lb (Nm)]	389 (44)	504 (57)	531 (60)	575 (65)	637 (72)	531 (60)
$n_1 = 2000 / \text{min}$	$T_{2B}$ [in.lb (Nm)]	531 (60)	690 (78)	726 (82)	788 (89)	876 (99)	735 (83)
	$\eta$ [%]	95	93	91	88	75	75
	$f_t$ <sup>*)</sup>	0.53	0.53	0.53	0.56	0.61	0.53
	$T_{2N}$ [in.lb (Nm)]	381 (43)	496 (56)	522 (59)	566 (64)	628 (71)	522 (59)
	$T_{2B}$ [in.lb (Nm)]	522 (59)	681 (77)	717 (81)	779 (88)	858 (97)	717 (81)
$n_1 = 3000 / \text{min}$	$\eta$ [%]	96	94	93	90	83	78
	$f_t$ <sup>*)</sup>	0.57	0.75	0.78	0.86	0.95	0.79
	$T_{2N}$ [in.lb (Nm)]	327 (37)	460 (52)	513 (58)	558 (63)	620 (70)	513 (58)
	$T_{2B}$ [in.lb (Nm)]	513 (58)	673 (76)	699 (79)	770 (87)	850 (96)	708 (80)
	$\eta$ [%]	96	95	93	91	85	80
$n_1 = 4000 / \text{min}$	$f_t$ <sup>*)</sup>	0.89	1.16	1.22	1.16	1.28	1.23

## VDT/VDH/VDS 063

$n_{max} = 4500 / \text{rpm}$

Ratio	i	4	7	10	16	28	40
$n_1 = 500 / \text{min}$	$T_{2Not}$ [in.lb (Nm)]	4071 (460)	4283 (484)	4345 (491)	4372 (494)	4584 (518)	3956 (447)
	$T_{2N}$ [in.lb (Nm)]	1062 (120)	1372 (155)	1451 (164)	1540 (174)	1770 (200)	1549 (175)
	$T_{2B}$ [in.lb (Nm)]	1451 (164)	1885 (213)	1991 (225)	2106 (238)	2425 (274)	2124 (240)
	$\eta$ [%]	93	91	88	83	74	68
	$f_t$ <sup>*)</sup>	0.53	0.53	0.53	0.53	0.53	0.53
$n_1 = 1000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	1133 (128)	1469 (166)	1549 (175)	1637 (185)	1894 (214)	1673 (189)
	$T_{2B}$ [in.lb (Nm)]	1558 (176)	2009 (227)	2124 (240)	2248 (254)	2593 (293)	2292 (259)
	$\eta$ [%]	94	93	91	86	78	73
	$f_t$ <sup>*)</sup>	0.53	0.53	0.53	0.56	0.65	0.57
	$T_{2N}$ [in.lb (Nm)]	1097 (124)	1443 (163)	1558 (176)	1646 (186)	1761 (199)	1682 (190)
$n_1 = 2000 / \text{min}$	$T_{2B}$ [in.lb (Nm)]	1584 (179)	1982 (224)	2133 (241)	2257 (255)	2407 (272)	2301 (260)
	$\eta$ [%]	96	94	93	89	83	78
	$f_t$ <sup>*)</sup>	0.76	0.95	0.94	0.99	1.06	1.01
	$T_{2N}$ [in.lb (Nm)]	770 (87)	1097 (124)	1248 (141)	1345 (152)	1460 (165)	1407 (159)
	$T_{2B}$ [in.lb (Nm)]	1221 (138)	1558 (176)	1717 (194)	1850 (209)	1982 (224)	1920 (217)
$n_1 = 3000 / \text{min}$	$\eta$ [%]	96	95	94	91	85	81
	$f_t$ <sup>*)</sup>	1.00	1.11	1.23	1.32	1.42	1.38
	$T_{2N}$ [in.lb (Nm)]	566 (64)	850 (96)	1027 (116)	1133 (128)	1230 (139)	1204 (136)
	$T_{2B}$ [in.lb (Nm)]	965 (109)	1266 (143)	1416 (160)	1549 (175)	1682 (190)	1655 (187)
	$\eta$ [%]	97	96	94	92	86	83
$n_1 = 4000 / \text{min}$	$f_t$ <sup>*)</sup>	1.44	1.56	1.74	1.90	2.07	2.03

<sup>\*)</sup>  $f_t$ : Cyclic operation and continuous operation see page 12.

Ratios  $i = 28$  and  $i = 40$  are self-locking at zero speed.

The self-locking might be overcome and therefore the gear may not replace a brake.

In case of an application running continuously at 3000 rpm or faster with the mounting position F or G, please contact alpha.



# Speed / Torque

## VDT/VDH/VDS 080

$n_{max} = 4000 / \text{rpm}$

Ratio	i	4	7	10	16	28	40
$n_1 = 500 / \text{min}$	$T_{2Not}$ [in.lb (Nm)]	8301 (938)	8788 (993)	8523 (963)	8894 (1005)	9416 (1064)	8328 (941)
	$T_{2N}$ [in.lb (Nm)]	3027 (342)	3876 (438)	3965 (448)	4372 (494)	4938 (558)	4080 (461)
	$T_{2B}$ [in.lb (Nm)]	4151 (469)	5319 (601)	5425 (613)	5991 (677)	6761 (764)	5584 (631)
	$\eta$ [%]	94	92	89	86	77	70
	$f_t^*)$	0.53	0.53	0.54	0.57	0.64	0.53
$n_1 = 1000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	3168 (358)	3708 (419)	3629 (410)	4036 (456)	4301 (486)	3779 (427)
	$T_{2B}$ [in.lb (Nm)]	4345 (491)	5080 (574)	4965 (561)	5531 (625)	5885 (665)	5168 (584)
	$\eta$ [%]	95	93	91	88	81	74
	$f_t^*)$	0.70	0.82	0.80	0.83	0.88	0.78
$n_1 = 2000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	2000 (226)	2682 (303)	2655 (300)	3080 (348)	3301 (373)	2894 (327)
	$T_{2B}$ [in.lb (Nm)]	2965 (335)	3673 (415)	3637 (411)	4213 (476)	4522 (511)	3965 (448)
	$\eta$ [%]	96	95	93	89	84	79
	$f_t^*)$	0.90	1.12	1.10	1.28	1.37	1.20
$n_1 = 3000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	1372 (155)	1982 (224)	2062 (233)	2460 (278)	2664 (301)	2336 (264)
	$T_{2B}$ [in.lb (Nm)]	2186 (247)	2832 (320)	2823 (319)	3372 (381)	3655 (413)	3204 (362)
	$\eta$ [%]	97	96	94	92	86	81
	$f_t^*)$	1.22	1.58	1.57	1.88	2.03	1.78
$n_1 = 4000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	1159 (131)	1726 (195)	1850 (209)	2230 (252)	2425 (274)	2133 (241)
	$T_{2B}$ [in.lb (Nm)]	1920 (217)	2522 (285)	2531 (286)	3053 (345)	3328 (376)	2921 (330)
	$\eta$ [%]	97	96	94	92	87	82
	$f_t^*)$	1.66	1.78	1.79	2.16	2.35	2.06

## VDT/VDH/VDS 100

$n_{max} = 3500 / \text{rpm}$

Ratio	i	4	7	10	16	28	40
$n_1 = 500 / \text{min}$	$T_{2Not}$ [in.lb (Nm)]	16,098 (1819)	17,098 (1932)	17,169 (1940)	17,302 (1955)	18,346 (2073)	16,426 (1856)
	$T_{2N}$ [in.lb (Nm)]	7461 (843)	8425 (952)	8673 (980)	8779 (992)	9487 (1072)	8673 (980)
	$T_{2B}$ [in.lb (Nm)]	10,222 (1155)	11,540 (1304)	11,886 (1343)	12,027 (1359)	13,001 (1469)	11,886 (1343)
	$\eta$ [%]	95	93	91	87	80	76
	$f_t^*)$	0.62	0.70	0.72	0.73	0.79	0.69
$n_1 = 1000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	5699 (644)	6744 (762)	7071 (799)	7195 (813)	7894 (892)	7328 (828)
	$T_{2B}$ [in.lb (Nm)]	7815 (883)	9239 (1044)	9691 (1095)	9850 (1113)	10,806 (1221)	10,036 (1134)
	$\eta$ [%]	95	94	92	88	82	79
	$f_t^*)$	0.79	0.93	0.98	0.99	1.09	0.94
$n_1 = 2000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	3452 (390)	4717 (533)	5089 (575)	5230 (591)	5868 (663)	5567 (629)
	$T_{2B}$ [in.lb (Nm)]	5142 (581)	6461 (730)	6974 (788)	7169 (810)	8036 (908)	7629 (862)
	$\eta$ [%]	96	95	94	91	86	82
	$f_t^*)$	1.18	1.30	1.40	1.44	1.62	1.53
$n_1 = 3000 / \text{min}$	$T_{2N}$ [in.lb (Nm)]	2310 (261)	3398 (384)	3921 (443)	4062 (459)	4637 (524)	4469 (505)
	$T_{2B}$ [in.lb (Nm)]	3717 (420)	4876 (551)	5363 (606)	5567 (629)	6354 (718)	6124 (692)
	$\eta$ [%]	97	96	95	92	87	84
	$f_t^*)$	1.83	1.96	2.16	2.24	2.56	2.46

<sup>\*)</sup>  $f_t$ : Cyclic operation and continuous operation see page 12.

Ratios  $i = 28$  and  $i = 40$  are self-locking at zero speed.

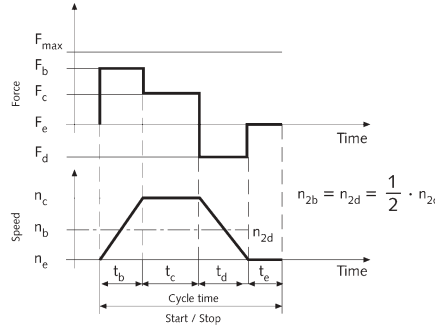
The self-locking might be overcome and therefore the gear may not replace a brake.

In case of an application running continuously at 3000 rpm or faster with the mounting position F or G, please contact alpha.

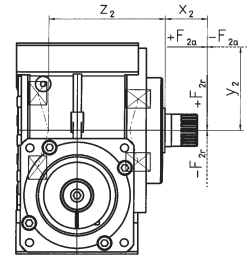


# Calculation of the Bearing Service Life

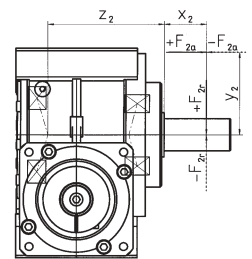
Output (VDT-, VDH- & VDS-Version)



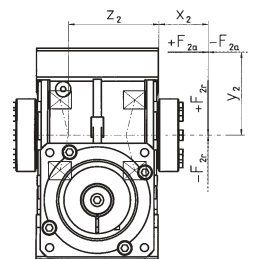
VDS Involute



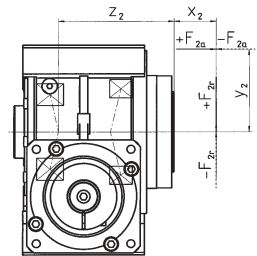
VDS Smooth, Keyway Output Shaft



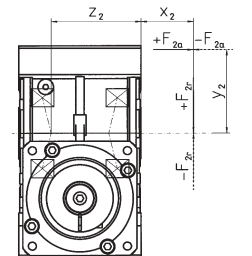
VDH Smooth



VDT



VDH with Keyway



Determination of the mean axial and radial forces  $F_{2am}$ ,  $F_{2rm}$  [N]

no  $\frac{F_{2am}}{F_{2rm}} \leq 0.4$  yes  
 $x_2 > 0$

$$F_{2am} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2ab}^3 + \dots + n_{2n} \cdot t_n \cdot F_{2an}^3}{n_{2b} \cdot t_b + \dots + n_{2n} \cdot t_n}}$$

$$F_{2rm} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2rb}^3 + \dots + n_{2n} \cdot t_n \cdot F_{2rn}^3}{n_{2b} \cdot t_b + \dots + n_{2n} \cdot t_n}}$$

Index "2"  $\hat{=}$  Output

Consult alpha!

$$M_{2km} = \frac{F_{2am} \cdot y_2 + F_{2rm} \cdot (x_2 + z_2)}{1000}$$

Determination of the mean tilting moment  $M_{2km}$  [Nm]

$Z_2$	VDT	VDH	VDS
VD050	4.0948 (104)	2.8155 (71.5)	3.6322 (92.25)
VD063	4.4689 (113.5)	3.2286 (82)	4.3901 (111.5)
VD080	5.7780 (146.75)	4.1834 (106.25)	5.6402 (143.25)
VD100	7.7171 (196)	5.7288 (145.5)	7.1265 (181)

$$M_{2kmax} = \frac{F_{2amax} \cdot y_2 + F_{2rmax} \cdot (x_2 + z_2)}{1000}$$

Determination of the max. tilting moment  $M_{2kmax}$  [Nm]

Version	VD 050	VD 063	VD 080	VD 100
$M_{2K Max}$ [in.lb(Nm)]	3619.65 (409)	7460.55 (843)	13664.4 (1544)	27072.15 (3059)
$F_{2R Max}$ [lb <sub>r</sub> (N)]	855 (3800)	1350 (6000)	2025 (9000)	3150 (14000)
$F_{2A Max}$ [lb <sub>a</sub> (N)]	1125 (5000)	1856.25 (8250)	3127.5 (13900)	4387.5 (19500)

no  $M_{2kmax} \leq M_{2K Max}$   
 $F_{2rmax} \leq F_{2R Max}$   
 $F_{2amax} \leq F_{2A Max}$

Select a larger gear reducer

$$n_{2m} = \frac{n_{2b} \cdot t_b + \dots + n_{2n} \cdot t_n}{t_b + \dots + t_n}$$

yes  
 Determination of the mean speed  $n_{2m}$  [min<sup>-1</sup>]

$K_{12}$	VDT	VDH	VDS
VD 050	26993 (3050)	20532 (2320)	22833 (2580)
VD 063	40710 (4600)	32037 (3620)	49560 (5600)
VD 080	81332 (9190)	86465 (9770)	97262 (10990)
VD 100	184,080 (20800)	135,317 (15290)	180,540 (20400)

$P_t$	T/H/S
i=4	1.5
i=7	0.72
i=10	0.6
i=16	0.5
i=28	0.4
i=40	0.36

$$L_{h2} = \frac{16666}{n_{2m}} \cdot \left[ \frac{K_{12}}{P_t \cdot T_{2m} + M_{2km}} \right]^{3.33}$$

Determination of the service life  $L_{2h}$  [h]

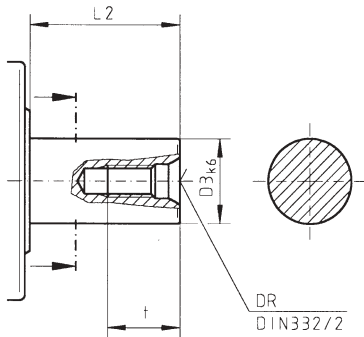
no Enough lifetime  $L_{2h}$ ?

yes

End of torque selection

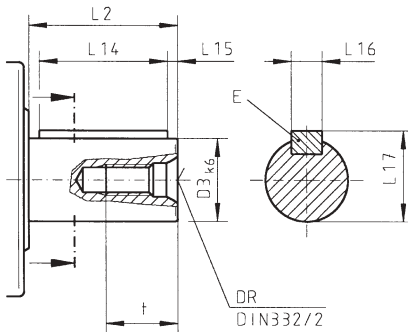
# Output Shaft Variations VDS

## Smooth output shaft [mm]



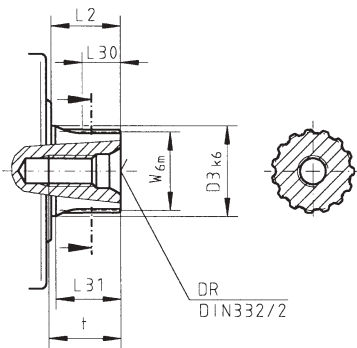
Size		VDS 050	VDS 063	VDS 080	VDS 100
Output Shaft-Ø	D3 k6	0.8661(22)	1.2598 (32)	1.5748 (40)	2.1654 (55)
Centering Bore	DR	M8	M12	M16	M20
Output Shaft Length	L2	1.4173 (36)	2.2835 (58)	3.2283 (82)	3.2283 (82)
Depth of Thread, Centering Bore	t	0.7480 (19)	1.1024 (28)	1.4173 (36)	1.6535 (42)

## Output shaft with keyway [mm]



Size		VDS 050	VDS 063	VDS 080	VDS 100
Output Shaft-Ø	D3 k6	0.8661 (22)	1.2598 (32)	1.5748 (40)	2.1654 (55)
Centering Bore	DR	M8	M12	M16	M20
Key	E	Key according to to DIN 6885 page 1 form A			
Output Shaft Length	L2	1.4173 (36)	2.2835 (58)	3.2283 (82)	3.2283 (82)
Key Length	L14	1.2598 (32)	1.9685 (50)	2.7559 (70)	2.7559 (70)
Key Location	L15	0.0787 (2)	0.1575 (4)	0.1969 (5)	0.2362 (6)
Key Width	L16 h9	0.2362 (6)	0.3937 (10)	0.4727 (12)	0.6299 (16)
Output Shaft with Key	L17	0.9646 (24.5)	1.3780 (35)	1.6929 (43)	2.3228 (59)
Depth of Thread, Centering Bore	t	0.7480 (19)	1.1024 (28)	1.4173 (36)	1.6535 (42)

## Output shaft with involute according to DIN 5480 [mm]



Size		VDS 050	VDS 063	VDS 080	VDS 100
Output Shaft-Ø	D3 k6	0.8661 (22)	1.2598 (32)	1.5748 (40)	2.1654 (55)
Centering Bore	DR	M8	M12	M16	M20
Angle for Pressure		30°	30°	30°	30°
Output Shaft Length	L2	1.0236 (26)	1.0236 (26)	1.5748 (40)	1.6339 (41.5)
Involute Effective Length	L30	0.5906 (15)	0.5906 (15)	0.7874 (20)	0.8465 (21.5)
Involute Length	L31	0.8858 (22.5)	0.9055 (23)	1.258 (32)	1.3189 (33.5)
Module	m	1.25	1.25	2	2
Depth of Thread, Centering Bore	t	0.7480 (19)	1.1024 (28)	1.4173 (36)	1.6535 (42)
Shaft DIN 5480	W 6m	0.8661 (22)	1.258 (32)	1.5748 (40)	2.1654 (55)
Number of Teeth	z	16	24	18	26

The Fit Combination 7H / 6m Results in the Following Backlash Values:

min. Backlash	$j_{t \min}$	-0.00106 (-0.027)	-0.0013 (-0.033)	-0.0013 (-0.033)	-0.0015 (-0.037)
max. Backlash	$j_{t \max}$	0.000827 (0.021)	0.0011 (0.028)	0.0011 (0.028)	0.0012 (0.031)

For  $j_{t \min}$  the Pinion should be warmed to +80° C.

We recommend smooth output shafts for reversing operation and high load at the gear reducer.



# Ordering Specifications

**VDT 050 - M F 1 - 40 - 0 3 1 AC 0 / Motor**

**Gear reducer type**

VDT =	TP flange
VDH =	Hollow shaft
VDS =	SP shaft

**Center distance**

050	063	080	100
-----	-----	-----	-----

**Reducer design**

M =	Motor-mounted "M"
-----	-------------------

**Reducer execution**

F =	Standard FPM seals (Viton®)
X =	Customized

**Number of stages**

1 =	1 stage
-----	---------

**Ratio**

4	7	10	16	28	40
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**Type of output shaft**

0 =	Smooth shaft (VDT, VDH, VDS)
1 =	Shaft with key DIN 6885 Form A (VDH, VDS)
2 =	Involute DIN 5480 (VDS)
4 =	Others

**Motor designation (type)**

**For VDH (hollow shaft smooth):  
Ordering of shrink-disks**

0 / 1 / 2 pieces
------------------

**Mounting position of input shaft**

AC/BC =	input above output
AD/BD =	input below output
AE/BE =	Horizontal
AF/BF =	Vertical upwards
AG/AG =	Vertical downwards
X =	Customized

For VDH, replace "A" and "B" respectively with "O"

**Backlash**

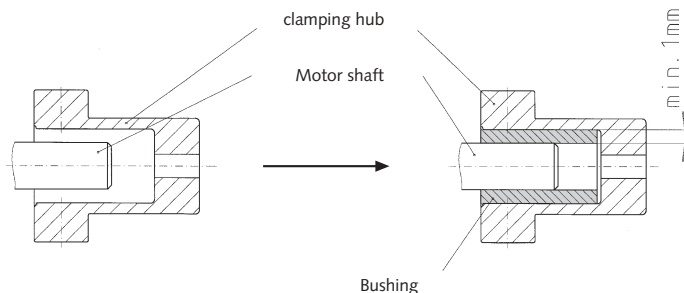
1 =	Standard (≤3 arcmin) Backlash setting possible
-----	---

**Clamping hub bore diameter**

3 =	19mm / 050	0.7480 inch / 050
4 =	28 mm / 063	1.1024 inch / 063
5 =	35 mm / 080	1.3780 inch / 080
7 =	48 mm / 100	1.8898 inch / 100

## Bushing

If the motor shaft and the clamping hub diameter do not fit together, a bushing is used.

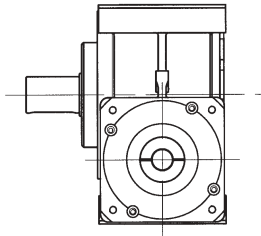


# Mounting Positions

Only applicable for VDS and VDT

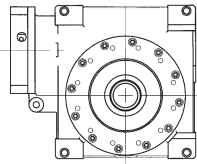
## Output shaft Position A:

View on motor connection

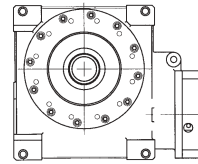


Mounting Positions (only important for oil quantity):

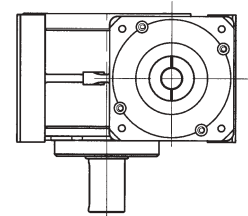
AC



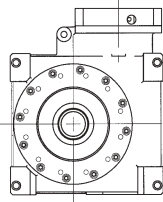
AD



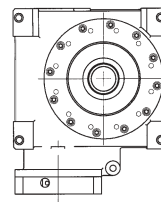
AE



AF

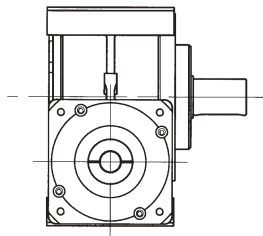


AG

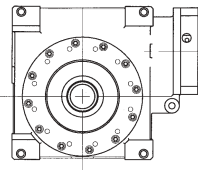


## Output shaft Position B:

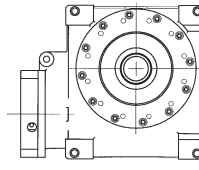
View on motor connection



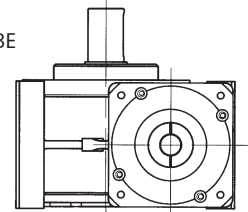
BC



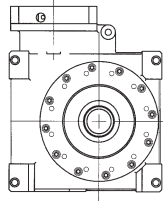
BD



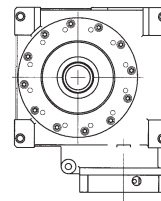
BE



BF



BG



## Length tolerances for otherwise untoleranced dimensions (from DIN ISO 2768-1, tolerance class middle)

	0,5-3 mm	More than 3-6 mm	More than 6-30 mm	More than 30-120 mm	More than 120-400 mm	More than 400-1000 mm	More than 1000-2000 mm	More than 2000-4000 mm
Tolerance (mm)	+/- 0,1	+/- 0,1	+/- 0,2	+/- 0,3	+/- 0,5	+/- 0,8	+/- 1,2	+/- 2

Nominal dimension range [in.(mm)] from - to	Tolerances			
	g6	k6	F7	h9
0.1181 - 0.2362 (3 - 6)				0 (0) -0.00118 (-0.030)
0.2362 - 0.3937 (6 - 10)				0 (0) -0.00142 (-0.036)
0.3937 - 0.7087 (10 - 18)		+0.00047 (+0.012) +0.00004 (+0.001)	+0.00134 (+0.034) +0.00063 (+0.016)	0 (0) -0.00169 (-0.043)
0.7087 - 1.1811 (18 - 30)		+0.00059 (+0.015) +0.00008 (+0.002)	+0.00161 (+0.041) +0.00079 (+0.020)	0 (0) -0.00205 (-0.052)
1.1811 - 1.9685 (30 - 50)		+0.00071 (+0.018) +0.00008 (+0.002)	+0.00197 (+0.050) +0.00098 (+0.025)	
1.9685 - 3.1496 (50 - 80)	-0.00039 (-0.010) -0.00114 (-0.029)	+0.00083 (+0.021) +0.00008 (+0.002)	+0.00236 (+0.060) +0.00118 (+0.030)	
3.1496 - 4.7244 (80 - 120)	-0.00047 (-0.012) -0.00134 (-0.034)	+0.00098 (+0.025) +0.00012 (+0.003)		
4.7244 - 7.0866 (120 - 180)	-0.00055 (-0.014) -0.00154 (-0.039)			
7.0866 - 9.8425 (180 - 250)	-0.00059 (-0.015) -0.00173 (-0.044)			

Symbol	Unit	Designation
C	in.lb(Nm)/arcmin	rigidity
ED	%	duty cycle
F	lb <sub>r</sub> (N)	force
f <sub>s</sub>	-	shock factor
i	-	ratio
j	arcmin	backlash
K1	in.lb(Nm)	bearing calculation factor
L	h	service Life
M	in.lb(Nm)	moment
n	rpm	speed
p	-	bearing calculation exponent
η	%	efficiency
t	s	time
T	in.lb(Nm)	torque
x	in.(mm)	distance of the radial load to the shaft collar
y	in.(mm)	distance of the axial load to the center of the gear reducer
z	in.(mm)	constant
Z	1/h	number of cycles per hour

Index	
capital letters	permissible values
small letters	actual values
1	input
2	output
A/a	axial
B/b	acceleration
Break	break
c	constant
d	delay
e	pause
h	hours
K/k	tilt
m	mean
Max/max	maximum
Mot	motor
N	nominal
Not/not	emergency stop
0	no-load running
R/r	radial
t	torsional





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