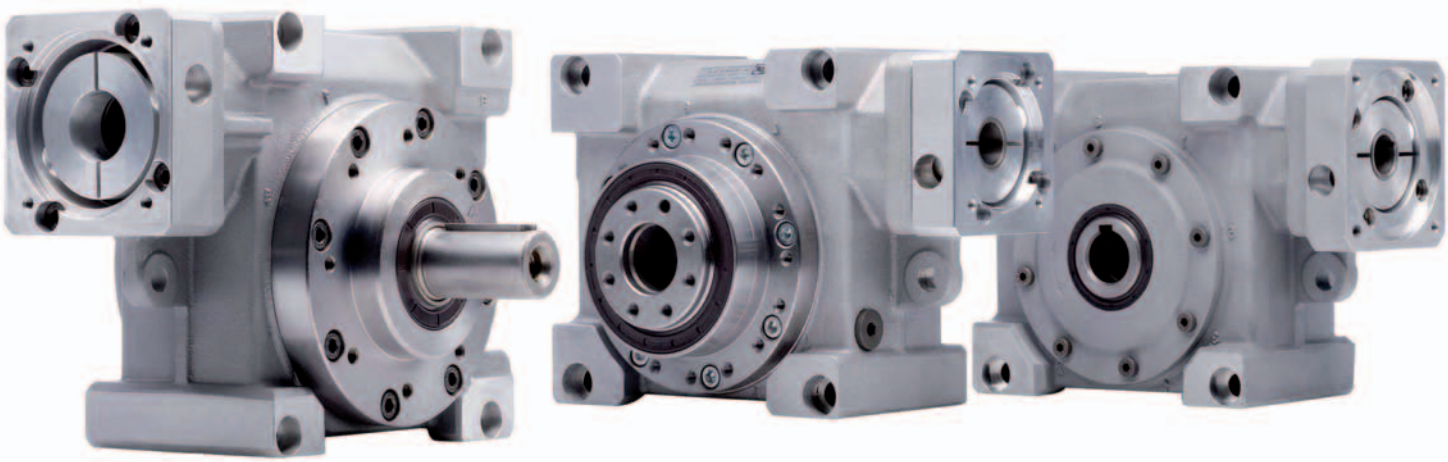
V-DRIVE® – Low backlash servo worm gearhead

The servo worm gearhead with solid shaft, hollow shaft and hollow shaft flange outputs

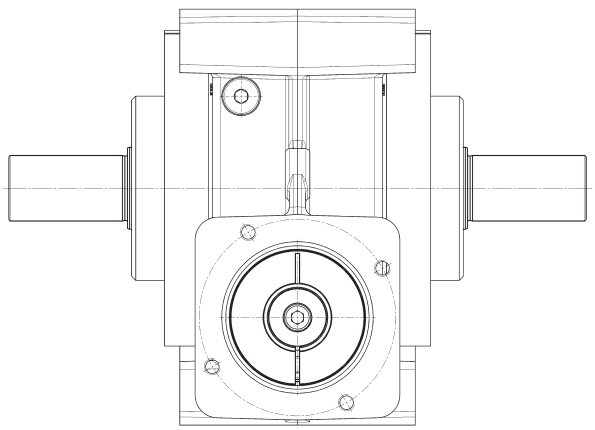


V-DRIVE®

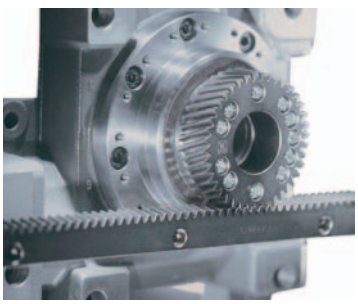
Specifications \ Version	VDS+/VDT+/VDH+		
	+	++	+++
Positioning accuracy			
Rigidity		VDT VDS/VDH	
Smooth-running			
Speed capacity			
Power density			
Max. axial/radial forces			

Shrink disc

Couplings



Shaft on both sides



Rack / Pinion

Options

Washdown version
Food-grade grease
Shaft on both sides Shaft on both sides
i > 40 (on request)

Accessories

Rack / Pinion (see page 236)
Shrink disc (see page 202)
Couplings (see page 268)

Technical specifications VDH+ 100

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_1=1000 1/min	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_1=2000 1/min	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_1=3000 1/min	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_1=3500 1/min	T_{2Max}	Nm	-	-	-	-	-	-
		in.lb						
	T_{2Servo}	Nm	-	-	-	-	-	-
		in.lb						
	η	%	-	-	-	-	-	-
Emergency stop tourque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Nominal input speed	n_{1N}	rpm	3000	3000	3000	3000	3000	3000
Maximum input speed	n_{1Max}	rpm	3500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	153					
		in.lb/arcmin	1354					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	50					
		lb_m	110,5					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 70					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	$kgcm^2$	65,82	56,27	54,34	55,19	52,72	53,04
refering to the drive		10^3 in.lb.s2	58,25	49,80	48,09	48,84	46,66	46,94

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDH+ 080

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	93	91	87	80	76
n_1=1000 1/min	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_1=2000 1/min	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_1=3000 1/min	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_1=3500 1/min	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop tourque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Nominal input speed	n_{1N}	rpm	3500	3500	3500	3500	3500	3500
Maximum input speed	n_{1Max}	rpm	4000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	78					
		in.lb/arcmin	690					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	26					
		lb_m	57,5					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 66					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	21,31	17,76	17,80	16,38	16,27	16,91
refering to the drive		10^3 in.lb.s2	18,86	15,72	15,75	14,49	14,40	14,97

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDH+ 063

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_1=1000 1/min	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_1=2000 1/min	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_1=3000 1/min	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_1=4000 1/min	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop tourque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Nominal input speed	n_{1N}	rpm	4000	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	4500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	12					
		lb_m	26,5					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 64					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	6,68	5,77	5,53	5,44	5,40	5,35
refering to the drive		10^3 in.lb.s2	5,91	5,11	4,89	4,81	4,78	4,74

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDH+ 050

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_1=1000 1/min	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_1=2000 1/min	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_1=3000 1/min	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_1=4000 1/min	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop tourque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Nominal input speed	n_{1N}	rpm	4000	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	6000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	7,4					
		lb_m	16,4					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 62					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	2,31	2,02	1,93	1,84	1,81	1,86
refering to the drive		10^3 in.lb.s2	2,04	1,79	1,71	1,63	1,60	1,64

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDS+ 100

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_1=1000 1/min	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_1=2000 1/min	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_1=3000 1/min	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_1=3500 1/min	T_{2Max}	Nm	-	-	-	-	-	-
		in.lb						
	T_{2Servo}	Nm	-	-	-	-	-	-
		in.lb						
	η	%	-	-	-	-	-	-
Emergency stop tourque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Nominal input speed	n_{1N}	rpm	3000	3000	3000	3000	3000	3000
Maximum input speed	n_{1Max}	rpm	3500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	153					
		in.lb/arcmin	1354					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	61					
		lb_m	134,8					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 70					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	$kgcm^2$	65,59	56,20	54,30	55,17	52,71	53,04
refering to the drive		10^3 in.lb.s2	58,05	49,73	48,06	48,83	46,65	46,94

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDS+ 080

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_1=1000 1/min	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_1=2000 1/min	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_1=3000 1/min	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_1=3500 1/min	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop tourque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Nominal input speed	n_{1N}	rpm	3500	3500	3500	3500	3500	3500
Maximum input speed	n_{1Max}	rpm	4000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	78					
		in.lb/arcmin	690					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	32					
		lb_m	70,7					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 66					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	$kgcm^2$	20,74	17,57	17,70	16,34	16,25	16,91
refering to the drive		10^3 in.lb.s2	18,36	15,55	15,67	14,46	14,38	14,96

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDS+ 063

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_1=1000 1/min	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_1=2000 1/min	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_1=3000 1/min	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_1=4000 1/min	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop tourque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Nominal input speed	n_{1N}	rpm	4000	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	4500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	15					
		lb_m	33,2					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 64					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	$kgcm^2$	6,72	5,79	5,54	5,44	5,41	5,35
refering to the drive		10^3 in.lb.s2	5,95	5,12	4,90	4,82	4,78	4,74

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDS+ 050

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_1=1000 1/min	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_1=2000 1/min	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_1=3000 1/min	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_1=4000 1/min	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop tourque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Nominal input speed	n_{1N}	rpm	4000	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	6000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	8,5					
		lb_m	18,8					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 62					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	2,27	2,03	1,94	1,84	1,81	1,86
refering to the drive		10^3 in.lb.s2	2,01	1,80	1,72	1,63	1,60	1,64

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDT+ 100

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_1=1000 1/min	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_1=2000 1/min	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_1=3000 1/min	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_1=3500 1/min	T_{2Max}	Nm	-	-	-	-	-	-
		in.lb						
	T_{2Servo}	Nm	-	-	-	-	-	-
		in.lb						
	η	%	-	-	-	-	-	-
Emergency stop tourque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Nominal input speed	n_{1N}	rpm	3000	3000	3000	3000	3000	3000
Maximum input speed	n_{1Max}	rpm	3500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	213					
		in.lb/arcmin	1885					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Tilting rigidity	C_{2K}	Nm/arcmin	2309					
		in.lb/arcmin	20435					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	62					
		lb_m	137					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 70					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	$kgcm^2$	83,51	64,27	59,95	59,40	56,32	56,49
refering to the drive		10^3 in.lb.s2	73,90	56,88	53,06	52,56	49,85	50,00

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDT+ 080

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_1=1000 1/min	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_1=2000 1/min	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_1=3000 1/min	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_1=3500 1/min	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop tourque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Nominal input speed	n_{1N}	rpm	3500	3500	3500	3500	3500	3500
Maximum input speed	n_{1Max}	rpm	4000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	113					
		in.lb/arcmin	1000					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Tilting rigidity	C_{2K}	Nm/arcmin	1178					
		in.lb/arcmin	10425					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	31					
		lb_m	68,5					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 66					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	23,99	18,64	18,23	16,54	16,32	16,94
refering to the drive		10^3 in.lb.s2	21,23	16,49	16,13	14,64	14,44	14,99

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDT+ 063

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_1=1000 1/min	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_1=2000 1/min	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_1=3000 1/min	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_1=4000 1/min	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop tourque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Nominal input speed	n_{1N}	rpm	4000	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	4500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	50					
		in.lb/arcmin	443					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Tilting rigidity	C_{2K}	Nm/arcmin	603					
		in.lb/arcmin	5337					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	14,5					
		lb_m	32					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 64					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	7,45	6,02	5,65	5,49	5,42	5,36
refering to the drive		10^3 in.lb.s2	6,60	5,33	5,00	4,86	4,80	4,75

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDT+ 050

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_1=1000 1/min	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_1=2000 1/min	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_1=3000 1/min	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_1=4000 1/min	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop tourque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Nominal input speed	n_{1N}	rpm	4000	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	6000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t12}	Nm/arcmin	17					
		in.lb/arcmin	150					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Tilting rigidity	C_{2K}	Nm/arcmin	504					
		in.lb/arcmin	4460					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	8,8					
		lb_m	19,4					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	≤ 62					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia refering to the drive	J_1	kgcm²	2,59	2,12	1,98	1,86	1,82	1,86
		10^3 in.lb.s2	2,29	1,87	1,75	1,64	1,61	1,65

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDHe 063

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	-	264	270	279	301	282
		in.lb		2336	2390	2469	2664	2496
	T_{2Servo}	Nm	-	183	195	198	215	201
		in.lb		1620	1726	1752	1903	1779
	η	%	-	91	88	83	74	68
n_1=1000 1/min	T_{2Max}	Nm	-	256	265	276	299	280
		in.lb		2266	2345	2443	2646	2478
	T_{2Servo}	Nm	-	197	208	212	230	215
		in.lb		1743	1841	1876	2036	1903
	η	%	-	93	91	86	78	73
n_1=2000 1/min	T_{2Max}	Nm	-	234	252	263	277	269
		in.lb		2071	2230	2328	2451	2381
	T_{2Servo}	Nm	-	188	203	212	224	217
		in.lb		1664	1797	1876	1982	1920
	η	%	-	94	93	89	83	78
n_1=3000 1/min	T_{2Max}	Nm	-	183	198	209	230	224
		in.lb		1620	1752	1850	2036	1982
	T_{2Servo}	Nm	-	145	163	181	182	177
		in.lb		1283	1443	1602	1611	1566
	η	%	-	95	94	91	85	81
n_1=4000 1/min	T_{2Max}	Nm	-	146	162	175	196	193
		in.lb		1292	1434	1549	1735	1708
	T_{2Servo}	Nm	-	114	134	152	152	149
		in.lb		1009	1186	1345	1345	1319
	η	%	-	96	94	92	86	83
Emergency stop tourque	T_{2Not}	Nm	-	484	491	494	518	447
		in.lb		4283	4345	4372	4584	3956
Nominal input speed	n_{1N}	rpm	-	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	4500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	-	1,9	1,8	1,7	1,6	1,4
		in.lb		16,8	15,9	15,0	14,2	12,4
Torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t12}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	12					
		lb_m	26,5					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	< 64					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	$kgcm^2$	-	5,77	5,53	5,44	5,40	5,35
refering to the drive		10^3 in.lb.s2		5,11	4,89	4,81	4,78	4,74

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDHe 050

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	-	102	111	118	128	158
		in.lb		903	982	1044	1133	1398
	T_{2Servo}	Nm	-	62	64	70	78	64
		in.lb		549	566	620	690	566
	η	%	-	89	86	82	72	64
n_1=1000 1/min	T_{2Max}	Nm	-	103	108	114	124	112
		in.lb		912	956	1009	1097	991
	T_{2Servo}	Nm	-	66	70	76	84	70
		in.lb		584	620	673	743	620
	η	%	-	91	89	85	77	69
n_1=2000 1/min	T_{2Max}	Nm	-	92	97	105	117	103
		in.lb		814	858	929	1035	912
	T_{2Servo}	Nm	-	68	71	77	86	72
		in.lb		602	628	681	761	637
	η	%	-	93	91	88	75	75
n_1=3000 1/min	T_{2Max}	Nm	-	82	88	97	105	95
		in.lb		726	779	858	929	841
	T_{2Servo}	Nm	-	67	70	76	84	70
		in.lb		593	620	673	743	620
	η	%	-	94	93	90	83	78
n_1=4000 1/min	T_{2Max}	Nm	-	77	81	90	99	88
		in.lb		681	717	797	876	779
	T_{2Servo}	Nm	-	64	69	75	83	69
		in.lb		566	611	664	735	611
	η	%	-	95	93	91	85	80
Emergency stop tourque	T_{2Not}	Nm	-	242	242	250	262	236
		in.lb		2142	2142	2213	2319	2089
Nominal input speed	n_{1N}	rpm	-	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	6000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	-	1,2	1,2	1,1	1	0,9
		in.lb		10,6	10,6	9,7	8,9	8,0
Torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t12}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	7,4					
		lb_m	16,4					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	< 62					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	-	2,02	1,93	1,84	1,81	1,86
refering to the drive		10^3 in.lb.s2		1,79	1,71	1,63	1,60	1,64

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDSe 063

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	-	264	270	279	301	282
		in.lb		2336	2390	2469	2664	2496
	T_{2Servo}	Nm	-	183	195	198	215	201
		in.lb		1620	1726	1752	1903	1779
	η	%	-	91	88	83	74	68
n_1=1000 1/min	T_{2Max}	Nm	-	256	265	276	299	280
		in.lb		2266	2345	2443	2646	2478
	T_{2Servo}	Nm	-	197	208	212	230	215
		in.lb		1743	1841	1876	2036	1903
	η	%	-	93	91	86	78	73
n_1=2000 1/min	T_{2Max}	Nm	-	234	252	263	277	269
		in.lb		2071	2230	2328	2451	2381
	T_{2Servo}	Nm	-	188	203	212	224	217
		in.lb		1664	1797	1876	1982	1920
	η	%	-	94	93	89	83	78
n_1=3000 1/min	T_{2Max}	Nm	-	183	198	209	230	224
		in.lb		1620	1752	1850	2036	1982
	T_{2Servo}	Nm	-	145	163	181	182	177
		in.lb		1283	1443	1602	1611	1566
	η	%	-	95	94	91	85	81
n_1=4000 1/min	T_{2Max}	Nm	-	146	162	175	196	193
		in.lb		1292	1434	1549	1735	1708
	T_{2Servo}	Nm	-	114	134	152	152	149
		in.lb		1009	1186	1345	1345	1319
	η	%	-	96	94	92	86	83
Emergency stop tourque	T_{2Not}	Nm	-	484	491	494	518	447
		in.lb		4283	4345	4372	4584	3956
Nominal input speed	n_{1N}	rpm	-	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	4500					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	-	1,9	1,8	1,7	1,6	1,4
		in.lb		16,8	15,9	15,0	14,2	12,4
Torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t12}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	12,5					
		lb_m	27,6					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	< 64					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	-	5,78	5,53	5,44	5,40	5,35
refering to the drive		10^3 in.lb.s2		5,12	4,90	4,82	4,78	4,74

[a] Decrease in operation

[b] In reference to the center of output flange / shaft

Technical specifications VDSe 050

			1-stage					
Ratio	**i**		**4**	**7**	**10**	**16**	**28**	**40**
n_1=500 1/min	T_{2Max}	Nm	-	102	111	118	128	158
		in.lb		903	982	1044	1133	1398
	T_{2Servo}	Nm	-	62	64	70	78	64
		in.lb		549	566	620	690	566
	η	%	-	89	86	82	72	64
n_1=1000 1/min	T_{2Max}	Nm	-	103	108	114	124	112
		in.lb		912	956	1009	1097	991
	T_{2Servo}	Nm	-	66	70	76	84	70
		in.lb		584	620	673	743	620
	η	%	-	91	89	85	77	69
n_1=2000 1/min	T_{2Max}	Nm	-	92	97	105	117	103
		in.lb		814	858	929	1035	912
	T_{2Servo}	Nm	-	68	71	77	86	72
		in.lb		602	628	681	761	637
	η	%	-	93	91	88	75	75
n_1=3000 1/min	T_{2Max}	Nm	-	82	88	97	105	95
		in.lb		726	779	858	929	841
	T_{2Servo}	Nm	-	67	70	76	84	70
		in.lb		593	620	673	743	620
	η	%	-	94	93	90	83	78
n_1=4000 1/min	T_{2Max}	Nm	-	77	81	90	99	88
		in.lb		681	717	797	876	779
	T_{2Servo}	Nm	-	64	69	75	83	69
		in.lb		566	611	664	735	611
	η	%	-	95	93	91	85	80
Emergency stop tourque	T_{2Not}	Nm	-	242	242	250	262	236
		in.lb		2142	2142	2213	2319	2089
Nominal input speed	n_{1N}	rpm	-	4000	4000	4000	4000	4000
Maximum input speed	n_{1Max}	rpm	6000					
Average no-load running torque (at n_1=3000 rpm and 20°C gearhead temperature) [a]	T_{012}	Nm	-	1,2	1,2	1,1	1	0,9
		in.lb		10,6	10,6	9,7	8,9	8,0
Torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t12}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service Life For calculation see "Technical Basics"	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	7,7					
		lb_m	17,0					
Noise level (At n_1=3000 rpm without load)	L_{PA}	dB(A)	< 62					
Max. permissible housing temperature		°C	+90					
		°F	194					
Ambient temperature		°C	-10 bis +40					
		°F	14 to 194					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawings					
Type of protection			IP 65					
Mass moment of inertia	J_1	kgcm²	-	2,01	1,93	1,84	1,81	1,86
refering to the drive		10^3 in.lb.s2		1,78	1,71	1,63	1,60	1,64

[a] Decrease in operation

[b] In reference to the center of output flange / shaft