Total reliability in extreme conditions.

Technical Briefing

EC motor
Ø22mm
brushless
80 / 240 watt

Proven in the world's toughest environments:

Extreme temperatures (-55ºC to 200ºC)

25 grms vibration; 100G impact forces

High pressure up to 1,700 bar

The EC22 HD is purpose-built to deliver flawless performance in the world's harshest environments.

Despite measuring just 22mm in diameter, this robust brushless motor is proven to withstand extremes of temperature and pressure, along with vibration and huge shock loads.

The motor can also run in air or fully submerged in oil. Running in oil actually trebles its power output rating due to additional heat dissipation.

Optional high-temperature Hall effect sensors can be fitted, allowing the motor to be run with sensors or in sensorless operation with electrical motor controllers.

Available from Electromate Toll Free (877) 737-8698 sales@electromate.com www.electromate.com

maxon motor
driven by precision

Media Release

September 20, 2010

EC 22 HD

200°C / 100 G / -5'000 m / 1'700 bar – maxon motor sets new benchmark.

Brushless Servo Motors made by maxon do their job under the most difficult conditions, such as, on Mars. But not only in high altitudes or in outer space, maxon DC motors also operate in harsh ambient conditions as encountered deep underneath the earth's surface – immaculate, dependable, efficient.

As the first manufacturer worldwide, maxon motor launches with its EC 22 HD (Heavy Duty) a standard motor for extremely harsh operating conditions. Developed for the exceptionally high requirements in deep drilling technology, the electronically commutated motor EC 22 HD resists even most extreme conditions in which “normal” motors call it quits.

EC 22 HD 240 Watt, Ø 22 mm, with Hall sensors

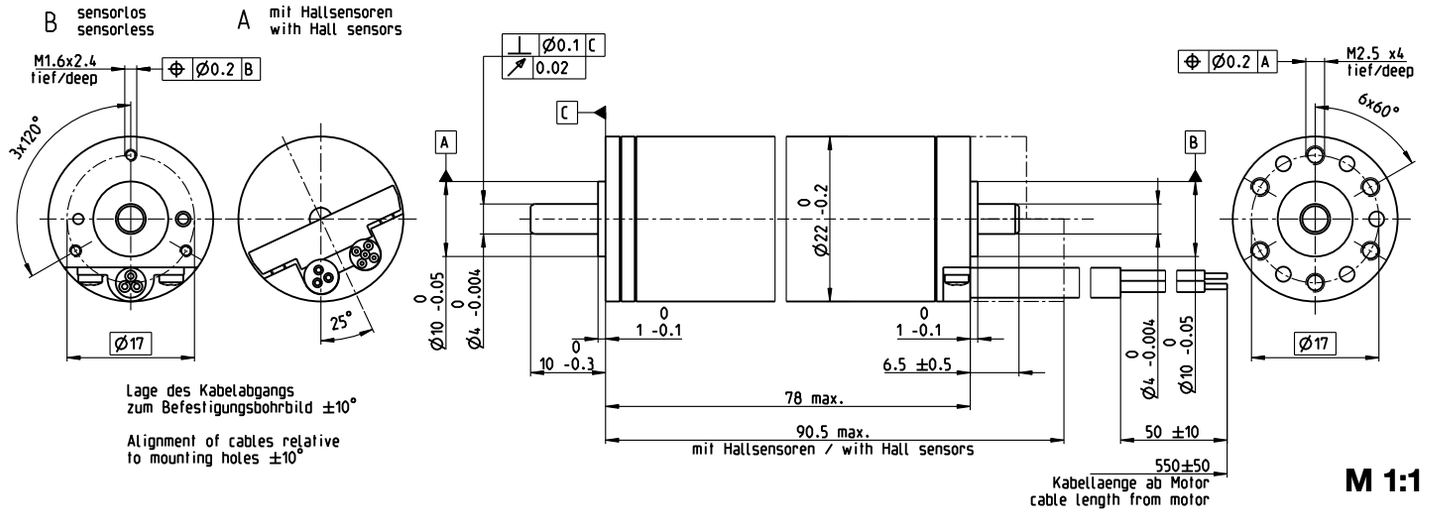
Deep drilling (in the oil and gas exploration industry called “Downhole Drilling”) permits exploration of oil and gas resources from depths beyond 2'500 meters (8'200 feet). In conjunction with directional drilling (the dynamic orientation of a borehole), it allows exploration of, so far, inaccessible deposits in drilling depths of currently about 5'000 meters (16'500 feet) and bore lengths of up to 11'000 meters (36'000 feet). Today, electronics and the respective drives permit more sophisticated monitoring and control in a multitude of functions within the drilling process. For instance, the drilling head's position and orientation can be dynamically measured and adjusted. Or, in various deep drilling tools, hydraulic valves and flaps are being operated by electro-mechanical motors.

Temperature and pressure conditions present in this depth range, in conjunction with high vibration emitted by the drilling process, make the employment of electric motors a real challenge.

The different variants of the EC 22 HD are designed for operation in air or submerged in oil (flooded in hydraulic fluid). Their assigned power rating depends on the surrounding medium and averages to 80 Watts in air and, due to remarkably higher heat dissipation, 240 Watts in oil. They are designed to cope with ambient temperatures of more than 200°C (390°F) and atmospheric pressures of up to 1'700 bar (25'000 psi). Further requirements of the 22 mm diameter motors are their capability to withstand vibration of up to 25 g_{rms} as well as impulse and impact of up to 100 G, that is 100 times gravitational acceleration – as a parallel; a Formula 1 race car encounters about 2 G, a fighter jet about 13 G. The motors feature high efficiency (in air up to 88%, in oil more than 70%) and therefore offer the best prerequisites for battery-operated applications. With their detent-free running characteristics, they possess outstanding regulation behavior and are especially suitable for high-precision positioning tasks, even at low speed. The motor unveils new possibilities in a number of applications that call for equally high requirements. It is well-prepared for the utilization in space technology or in power plants as well as in vehicle manufacturing, in the aircraft industry, in mining or in highly dynamic movements.

EC 22 ∅22 mm, brushless, 240 Watt

Heavy Duty – for applications in oil



Stock program
Standard program
Special program (on request)

Part Numbers

A with Hall Sensors	426450
B sensorless	426451

Motor Data (provisional)									
Values at nominal voltage and ambient temperature °C		**25**	**100**	**150**	**200**				
1 Nominal voltage	V	48	48	48	48				
2 No load speed	rpm	12900	13400	13600	13800				
3 No load current	mA	384	177	183	188				
4 Nominal speed[1]	rpm	8410	8510	9130	10600				
5 Nominal torque (max. continuous torque)[1]	mNm	149	120	92.2	55.8				
6 Nominal current (max. continuous current)	A	4.48	3.61	2.88	1.86				
7 Stall torque	mNm	460	346	295	256				
8 Stall current	A	13.4	10.3	8.98	7.93				
9 Max. efficiency	%	71	77	75	73				
Characteristics									
10 Terminal resistance phase to phase	Ω	3.59	4.64	5.35	6.05				
11 Terminal inductance phase to phase	mH	0.626	0.626	0.626	0.626				
12 Torque constant	mNm/A	34.4	33.5	32.9	32.3				
13 Speed constant	rpm/V	278	285	290	296				
14 Speed / torque gradient	rpm/mNm	29	39.5	47.2	55.4				
15 Mechanical time constant	ms	2.31	3.16	3.77	4.43				
16 Rotor inertia	gcm²	7.63	7.63	7.63	7.63				

[1] Values in thermal steady state.

Specifications

Thermal data

17	Thermal resistance housing-ambient	0.793 K/W
18	Thermal resistance winding-housing	0.754 K/W
19	Thermal time constant winding	4.78 s
20	Thermal time constant motor	40.2 s
21	Ambient temperature	-55…+200°C
22	Max. winding temperature	+240°C

Mechanical data (preloaded ball bearings)

23	Max. speed		20000 rpm
24	Axial play at axial load	< 5 N	0 mm
		> 5 N	max. 0.14 mm
25	Radial play		preloaded
26	Max. axial load (dynamic)		8 N
27	Max. force for press fits (static)		98 N
	(static, shaft supported)		250 N
28	Max. radial load, 5 mm from flange		16 N

Other specifications

29	Number of pole pairs	1
30	Number of phases	3
31	Weight of motor	210 g

Connection A, motor cable PTFE (AWG 19)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Connection A, sensors cable PTFE (AWG 24)

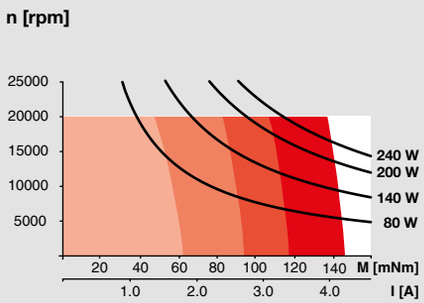
green	V_{Hall} 4.5…24 V
blue	GND
red	Hall sensor 1
black	Hall sensor 2
white	Hall sensor 3

Connection B, motor cable PTFE (AWG 19)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Wiring diagram for Hall sensors see p. 45

Operating Range



Comments

TA = 25°C
TA = 100°C
TA = 150°C
TA = 200°C

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

Application

General
– extreme temperature applications
– vibration tested according to MIL-STD810F/Jan2000 Fig. 514.5C-10
– operation in oil and high pressure (only minimal lubrication, therefore use under rated ambient conditions is not suggested)

Oil & Gas Industry
– oil, gas and geothermal wells

Notice

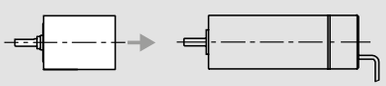
This motor contains leaded solder. It therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The motor may therefore only be used for devices that are not subject to this directive.

Reference medium: Shell Tellus oil T15
Operation in oil of different viscosity will affect the motor data.

maxon modular system

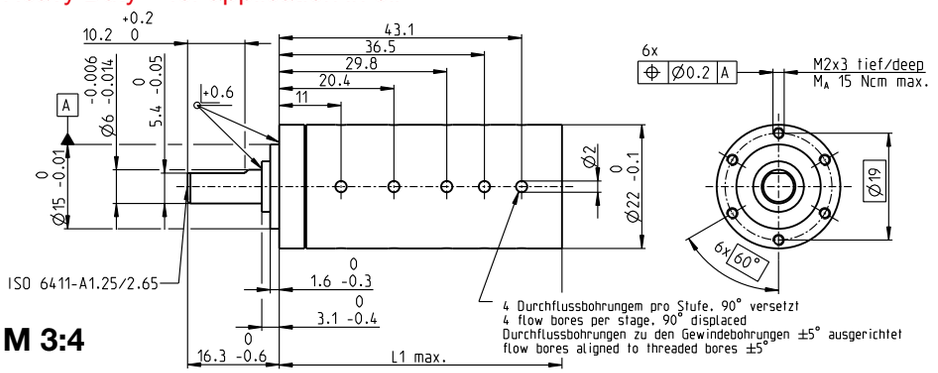
Details on catalog page 34

Planetary Gearhead
∅22 mm
2.0 - 4.0 Nm
Page 344



Planetary Gearhead GP 22 HD ∅22 mm, 2.0–4.0 Nm

Heavy Duty – for application in oil



M 3:4

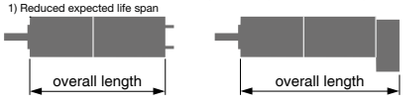
Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel, hardened
Bearing at output	ball bearing
Radial play, 10 mm from flange	max. 0.2 mm
Axial play	max. 0.1 mm
Max. axial load (dynamic)	100 N
Max. force for press fits	100 N
Direction of rotation, drive to output	=
Max. continuous input speed	11'000 rpm
Recommended temperature range	-55…+200°C
Extended range as option	-55…+260°C

Number of stages	1	2	3	4	5
Max. radial load, 10 mm from flange	55 N	85 N	100 N	110 N	110 N

Stock program
Standard program
Special program (on request)

Part Numbers	410657	410637	410558	416698	409667	416709	416738	416211	416747	416753	416760
Gearhead Data (provisional)											
1 Reduction	3.8:1	14:1	53:1	104:1	198:1	370:1	561:1	742:1	1386:1	1798:1	3027:1
2 Absolute reduction	15/4	225/16	3375/64	87723/845	50625/256	10556001/28561	2368521/4225	759375/1024	158340015/114244	373977/208	63950067/21125
3 Max. motor shaft diameter mm	4	4	4	3.2	4	3.2	3.2	4	3.2	3.2	3.2
Part Numbers	416684	416686	416693	416699	416703	416710	416739	416742	416748	416754	416762
1 Reduction	4.4:1	16:1	62:1	109:1	231:1	389:1	590:1	867:1	1460:1	1996:1	3189:1
2 Absolute reduction	57/13	855/52	12825/208	2187/20	192375/832	263169/676	59049/100	2885625/3328	3947535/2704	285012027/142805	1594323/500
3 Max. motor shaft diameter mm	3.2	3.2	3.2	4	3.2	3.2	4	3.2	3.2	3.2	4
Part Numbers		416687	416694	416701	416704	416711	416740	416743	416749	416756	416763
1 Reduction		19:1	72:1	128:1	270:1	410:1	690:1	1014:1	1538:1	2102:1	3728:1
2 Absolute reduction		3249/169	48735/676	41553/325	731025/2704	6561/16	1121931/1625	10965375/10816	98415/64	7105563/3380	30292137/8125
3 Max. motor shaft diameter mm		3.2	3.2	3.2	3.2	4	3.2	3.2	4.0	3.2	3.2
Part Numbers		416688	416695		416706	416736		416744	416751	416757	
1 Reduction		20:1	76:1		285:1	455:1		1068:1	1621:1	2214:1	
2 Absolute reduction		81/4	1215/16		18225/64	5000211/10985		273375/256	60169205/7/371293	177147/80	
3 Max. motor shaft diameter mm		4	4		4	3.2		4	3.2	4	
Part Numbers		416689	416696		416707	416737		416745	416752	416758	
1 Reduction		24:1	84:1		316:1	479:1		1185:1	1707:1	2458:1	
2 Absolute reduction		1539/65	185193/2197		2777895/8788	124659/260		41668425/35152	15000633/8788	135005697/54925	
3 Max. motor shaft diameter mm		3.2	3.2		3.2	3.2		3.2	3.2	3.2	
Part Numbers			416697		416708			416746		416759	
1 Reduction			89:1		333:1			1249:1		2589:1	
2 Absolute reduction			4617/52		69255/208			1038825/832		3365793/1300	
3 Max. motor shaft diameter mm			3.2		3.2			3.2		3.2	
4 Number of stages	1	2	3	3	4	4	4	5	5	5	5
5 Max. continuous torque Nm	2	2.4	3	3	3.4	3.4	3.4	4	4	4	4
6 Max. intermittent torque at gear output Nm	2.5	3	3.5	3.5	3.8	3.8	3.8	4.4	4.4	4.4	4.4
15 Max. overload torque[1] Nm	6	9	12	12	12	12	12	12	12	12	12
7 Max. efficiency %	95	87	78	78	65	65	65	52	52	52	52
8 Weight g	46	65	82	82	96	96	96	110	110	110	110
9 Average backlash no load °	1.0	1.2	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5	2.5
10 Mass inertia gcm²	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
11 Gearhead length L1 mm	20.6	29.7	38.2	38.2	45.0	45.0	45.0	51.8	51.8	51.8	51.8
13 Max. transmittable power (continuous) W	160	100	40	40	20	20	20	6	6	6	6
14 Max. transmittable power (intermittent) W	240	150	60	60	30	30	30	9	9	9	9

1) Reduced expected life span



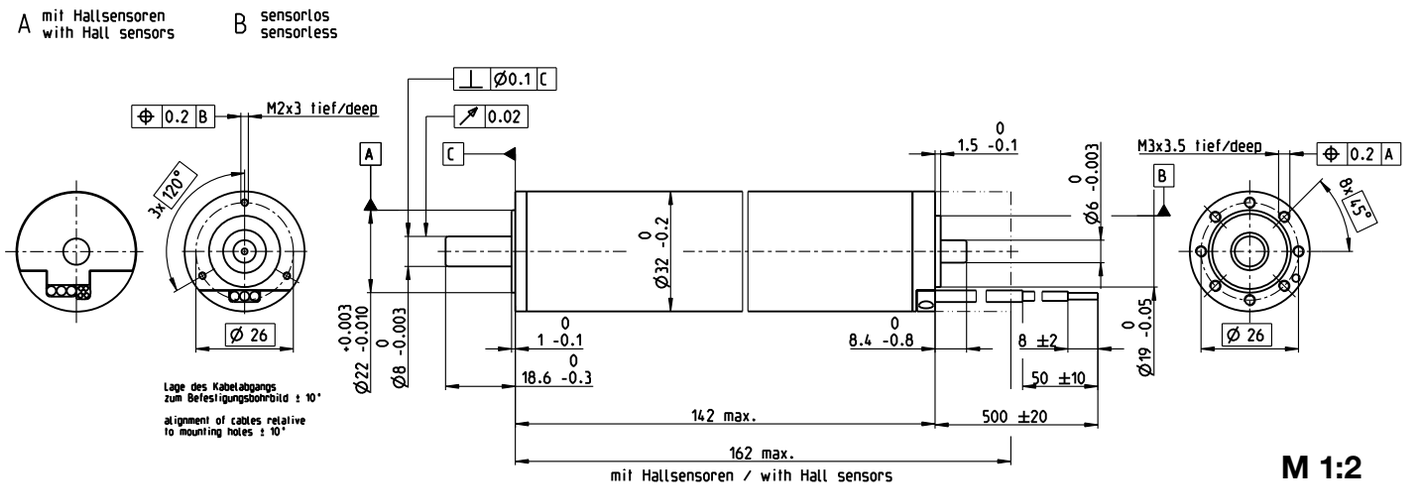
maxon Modular System

+ Motor	Page	+ Sensor/Brake	Page	Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts											
EC 22, 240 W, A	208			110.5	119.5	128.0	128.0	135.0	135.0	135.0	141.5	141.5	141.5	141.5
EC 22, 240 W, B	208			98.1	107.5	116.0	116.0	122.4	122.4	122.4	129.5	129.5	129.5	129.5

Application	Important Notice
General	This gearhead has been designed for applications in oil and is only equipped with minimum lubrication. Therefore it is not permitted to use it under normal air conditions.
– extreme temperature applications	
– vibration tested according to MIL-STD810F/ Jan2000 Fig. 514.5C-10	
– operation in oil and high pressure	
Oil & Gas Industry	
– oil, gas and geothermal wells	

EC-4pole 32 ∅32 mm, brushless, 480 Watt

Heavy Duty – for applications in oil



Stock program
Standard program
Special program (on request)

Part Numbers

A with Hall sensors	397799
B sensorless	397800

Motor Data (provisional)

Values at nominal voltage and ambient temperature °C		25	100	150	200
1 Nominal voltage	V	48	48	48	48
2 No load speed	rpm	6420	6630	6750	6860
3 No load current	mA	482	222	212	216
4 Nominal speed[1]	rpm	4670	4420	4700	5340
5 Nominal torque (max. continuous torque)[1]	mNm	804	762	596	379
6 Nominal current (max. continuous current)	A	11.4	10.9	8.75	5.78
7 Stall torque	mNm	3350	2520	2150	1860
8 Stall current	A	47.5	36.7	31.9	28.1
9 Max. efficiency	%	82	85	85	84
Characteristics					
10 Terminal resistance phase to phase	Ω	1.01	1.31	1.51	1.71
11 Terminal inductance phase to phase	mH	0.298	0.298	0.298	0.298
12 Torque constant	mNm/A	70.5	68.7	67.4	66.2
13 Speed constant	rpm/V	135	139	142	144
14 Speed / torque gradient	rpm/mNm	1.94	2.65	3.16	3.71
15 Mechanical time constant	ms	2.85	3.88	4.64	5.45
16 Rotor inertia	gcm²	140	140	140	140

[1] Values for operation in thermal equilibrium.

Specifications

Thermal data		
17 Thermal resistance housing-ambient		0.3 K/W
18 Thermal resistance winding-housing		0.53 K/W
19 Thermal time constant winding		17 s
20 Thermal time constant motor		129 s
21 Ambient temperature		-55…+200°C
22 Max. winding temperature		+240°C
Mechanical data (preloaded ball bearings)		
23 Max. speed		12000 rpm
24 Axial play at axial load	< 20 N	0 mm
	> 20 N	0.14 mm
25 Radial play		preloaded
26 Max. axial load (dynamic)		16 N
27 Max. force for press fits (static)		80 N
(static, shaft supported)		3000 N
28 Max. radial load, 5 mm from flange		75 N
Other specifications		
29 Number of pole pairs		2
30 Number of phases		3
31 Weight of motor		860 g

Connection A, motor cable PTFE (AWG 14)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Connection A, sensors cable PTFE (AWG 24)

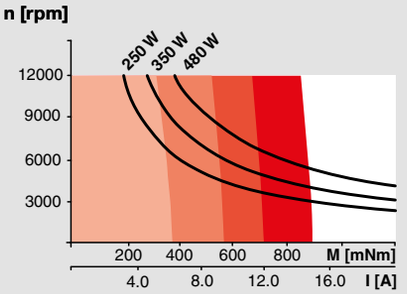
green	V_{Hall} 4.5…24 V
blue	GND
red	Hall sensor 1
black	Hall sensor 2
white	Hall sensor 3

Connection B, motor cable PTFE (AWG 14)

red	Motor winding 1
black	Motor winding 2
white	Motor winding 3

Wiring diagram for Hall sensors see p. 45

Operating Range



Comments

TA = 25°C
TA = 100°C
TA = 150°C
TA = 200°C

Continuous operation
In observation of above listed thermal resistance (lines 17 and 18) the maximum permissible winding temperature will be reached during continuous operation at 25°C ambient.
= Thermal limit.

Short term operation
The motor may be briefly overloaded (recurring).

Assigned power rating

Application

General
– extreme temperature applications
– vibration tested (according to MIL-STD810F/Jan2000 Fig. 514.5C-10)
– operation in oil and high pressure (only minimal lubrication, therefore use under rated ambient conditions is not suggested)

Oil & Gas Industry
– oil, gas and geothermal wells

Notice

This motor contains leaded solder. It therefore does not fulfill the requirements for the permitted maximum concentration of hazardous substances in accordance with the EC directive 2011/65/EC (RoHS) for all applications. The motor may therefore only be used for devices that are not subject to this directive.

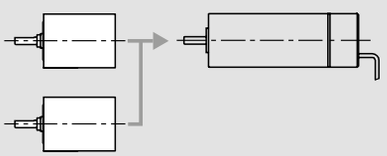
Reference medium: Shell Tellus oil T15
Operation in oil of different viscosity will affect the motor data.

maxon Modular System

Details on catalog page 34

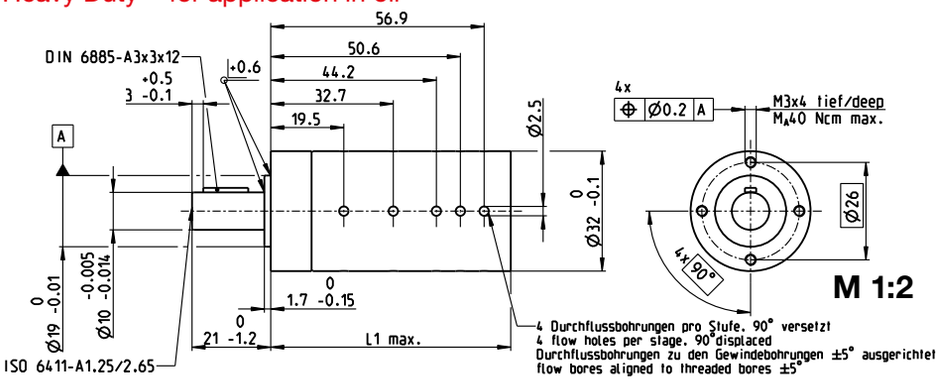
Planetary Gearhead
∅32 mm
3.0 - 8.0 Nm
Page 358

Planetary Gearhead
∅42 mm
10 - 50 Nm
Page 364



Planetary Gearhead GP 32 HD ∅32 mm, 3.0–8.0 Nm

Heavy Duty – for application in oil



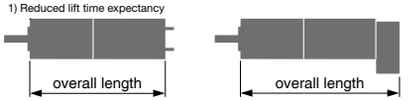
Technical Data	
Planetary Gearhead	straight teeth
Output shaft	stainless steel
Bearing at output	ball bearing
Radial play, 10 mm from flange	max. 0.14 mm
Axial play	max. 0.4 mm
Max. axial load (dynamic)	120 N
Max. force for press fits	120 N
Direction of rotation, drive to output	=
Max. continuous input speed	< 8000 rpm
Recommended temperature range	-55...+200°C
Extended range as option	-55...+260°C

Number of stages	1	2	3	4	5
Max. radial load, 10 mm from flange	120 N	200 N	250 N	300 N	300 N

Stock program
Standard program
Special program (on request)

Part Numbers		526077	526080	526086	526092	526095	526101	526106	526112	526117	526123
Gearhead Data (provisional)											
1 Reduction		3.7:1	14:1	51:1	123:1	190:1	492:1	707:1	1694:1	2548:1	4060:1
2 Absolute reduction		26/7	676/49	17576/343	6877/56	456976/2401	86112/175	11881376/16807	1162213/686	7962624/3125	3637933/896
3 Max. motor shaft diameter	mm	6	6	6	3	6	6	6	6	4	6
Part Numbers		526078	526081	526087	526093	526096	526102	526107	526113	526118	526124
1 Reduction		4.8:1	18:1	66:1	132:1	246:1	531:1	914:1	1828:1	2623:1	4380:1
2 Absolute reduction		24/5	624/35	16224/245	3312/25	421824/1715	331776/625	10967424/12005	2238912/1225	2056223/784	109503/25
3 Max. motor shaft diameter	mm	4	6	6	4	6	4	6	6	6	4
Part Numbers		526079*	526082	526088	526094*	526097	526103	526108	526114	526119	526125
1 Reduction		5.8:1	21:1	79:1	159:1	295:1	589:1	1094:1	1972:1	2829:1	5247:1
2 Absolute reduction		23/4	299/14	3887/49	1587/10	101062/343	20631/35	2627612/2401	8626176/4375	495144/175	839523/160
3 Max. motor shaft diameter	mm	3	6	6	3	6	6	6	4	6	4
Part Numbers			526083	526089		526098	526104	526109	526115	526120	526126*
1 Reduction			23:1	86:1		318:1	636:1	1181:1	2189:1	3052:1	6285:1
2 Absolute reduction			576/25	14976/175		389376/1225	79488/125	10123776/8575	536406/245	1907712/625	6436343/1024
3 Max. motor shaft diameter	mm		4	6		6	4	6	6	4	3
Part Numbers			526084	526090		526099	526105	526110	526116	526121	
1 Reduction			28:1	103:1		411:1	762:1	1414:1	2362:1	3389:1	
2 Absolute reduction			138/5	3588/35		359424/875	19044/25	2425488/1715	2066688/875	474513/140	
3 Max. motor shaft diameter	mm		4	6		6	4	6	6	6	
Part Numbers			526085*	526091		526100		526111		526122	
1 Reduction			33:1	111:1		456:1		1526:1		3656:1	
2 Absolute reduction			529/16	13824/125		89401/196		9345024/6125		457056/125	
3 Max. motor shaft diameter	mm		3	4		6		4		4	
4 Number of stages		1	2	3	3	4	4	5	5	5	5
5 Max. continuous torque	Nm	3	4	8	8	8	8	8	8	8	8
6 Max. intermittent torque at gear output	Nm	4.5	6	12	12	12	12	12	12	12	12
15 Max. overload torque[1]	Nm	9	12	24	24	24	24	24	24	24	24
7 Max. efficiency	%	95	87	78	78	65	65	53	53	53	53
8 Weight	g	176	234	277	277	309	309	340	340	340	340
9 Average backlash no load	°	0.7	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
10 Mass inertia	gcm²	1.59	1.59	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
11 Gearhead length L1	mm	32.9	45.3	55.1	55.1	61.6	61.6	68.1	68.1	68.1	68.1
13 Max. transmittable power (continuous)	W	320	200	80	80	40	40	12	12	12	12
14 Max. transmittable power (intermittent)	W	480	300	120	120	60	60	18	18	18	18

1) Reduced lift time expectancy



maxon Modular System

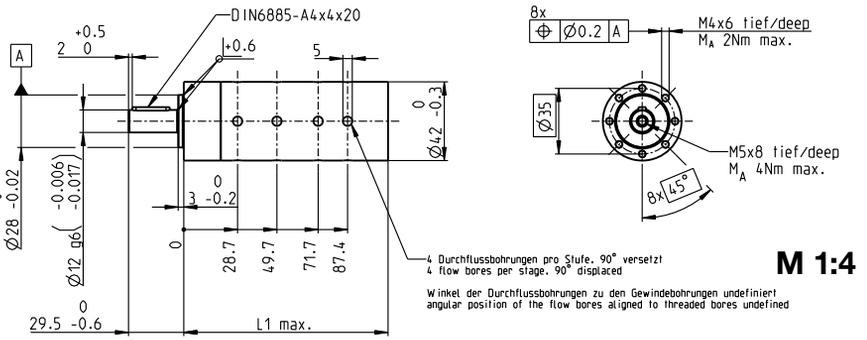
+ Motor	Page	+ Sensor/Brake	Page	Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts									
EC-4pole 32 HD oil, A	235			194.0	206.5	216.5	216.5	223.0	223.0	229.5	229.5	229.5	229.5
EC-4pole 32 HD oil, B	235			174.0	186.5	196.5	196.5	203.0	203.0	209.5	209.5	209.5	209.5

*Overall length + 2 mm

Application	Important Notice
General	This gearhead has been designed for applications in oil and is only equipped with minimum lubrication. Therefore it is not permitted to use it under normal air conditions.
– extreme temperature applications	
– vibration tested according to MIL-STD810F/ Jan2000 Fig. 514.5C-10	
– operation in oil and high pressure	
Oil & Gas Industry	
– oil, gas and geothermal wells	

Planetary Gearhead GP 42 HD ∅42 mm, 10.0–50.0 Nm

Heavy Duty – for application in oil



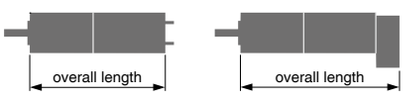
M 1:4

Technical Data					
Planetary Gearhead					straight teeth
Output shaft					stainless steel
Bearing at output					ball bearing
Radial play, 12 mm from flange					max. 0.05 mm
Axial play					max. 0.2 mm
Max. axial load (dynamic)					250 N
Max. force for press fits					450 N
Direction of rotation, drive to output					=
Max. continuous input speed					< 8000 rpm
Recommended temperature range					-55…+200°C
Extended range as option					-55…+260°C
Number of stages	1	2	3	4	
Max. radial load, 12 mm from flange	250 N	480 N	720 N	720 N	

Stock program
Standard program
Special program (on request)

Part Numbers							
	454742	454744	454745	476936	454280	476945	476949
Gearhead Data (provisional)							
1 Reduction	3.5:1	12:1	43:1	81:1	150:1	285:1	441:1
2 Absolute reduction	$^{7}/_{2}$	$^{49}/_{4}$	$^{343}/_{8}$	$^{2197}/_{27}$	$^{2401}/_{16}$	$^{15379}/_{54}$	$^{441}/_{1}$
10 Mass inertia gcm²	17.5	29	35.5	23.9	41.3	33.1	30.6
3 Max. motor shaft diameter mm	10	10	10	8	10	8	10
Part Numbers	476927	476928	476933	476937	476942	476946	476950
1 Reduction	4.3:1	15:1	53:1	91:1	186:1	319:1	488:1
2 Absolute reduction	$^{13}/_{3}$	$^{91}/_{6}$	$^{637}/_{12}$	$^{91}/_{1}$	$^{4459}/_{24}$	$^{637}/_{2}$	$^{4394}/_{9}$
10 Mass inertia gcm²	11.1	23.3	31.8	25.4	37.6	34.2	26.3
3 Max. motor shaft diameter mm	8	8	10	8	10	10	8
Part Numbers		476929	476934	476938	476943	476947	476951
1 Reduction		19:1	66:1	113:1	230:1	353:1	546:1
2 Absolute reduction		$^{169}/_{9}$	$^{1183}/_{18}$	$^{338}/_{3}$	$^{8281}/_{36}$	$^{28561}/_{81}$	$^{546}/_{1}$
10 Mass inertia gcm²		19.1	28.1	21.2	36.6	28.9	28.1
3 Max. motor shaft diameter mm		8	8	8	10	8	8
Part Numbers			454746		476944	476948	476952
1 Reduction			74:1		257:1	394:1	676:1
2 Absolute reduction			$^{147}/_{2}$		$^{1029}/_{4}$	$^{1183}/_{3}$	$^{676}/_{1}$
10 Mass inertia gcm²			28.2		37.6	30.4	23.9
3 Max. motor shaft diameter mm			10		10	8	8
4 Number of stages	1	2	3	3	4	4	4
5 Max. continuous torque Nm	10	20	40	40	50	50	50
6 Max. intermittent torque at gear output Nm	15	30	60	60	75	75	75
15 Max. overload torque[1] Nm	20	40	80	80	100	100	100
7 Max. efficiency %	95	87	78	78	65	65	65
8 Weight g	430	600	710	710	780	780	780
9 Average backlash no load °	0.6	0.8	0.8	1.0	1.0	1.0	1.0
11 Gearhead length L1 mm	57.7	79.9	102.2	102.2	116.9	116.9	116.9
13 Max. transmittable power (continuous) W	2000	880	300	300	62	62	62
14 Max. transmittable power (intermittent) W	3000	1320	450	450	93	93	93

1) Reduced lift time expectancy



maxon Modular System

+ Motor	Page	+ Sensor/Brake	Page	Overall length [mm] = Motor length + gearhead length + (sensor/brake) + assembly parts						
EC-4pole 32 HD oil, A	235			221.3	243.5	265.8	265.8	280.5	280.5	280.5
EC-4pole 32 HD oil, B	235			201.3	223.5	245.8	245.8	260.5	260.5	260.5

	Application	Important Notice
	General	This gearhead has been designed for applications in oil and is only equipped with minimum lubrication. Therefore it is not permitted to use it under normal air conditions.
	– extreme temperature applications	
	– vibration tested according to MIL-STD810F/ Jan2000 Fig. 514.5C-10	
	– operation in oil and high pressure	
	Oil & Gas Industry	
	– oil, gas and geothermal wells	

maxon motor at a glance.

maxon DC motor
maxon A-max
maxon RE-max
DC motors with moving coil rotor and strong permanent magnets:
Ø6 - 65 mm,
0.3 - 250 watts.

maxon EC motor
maxon EC-max
maxon EC-4pole
Brushless DC motors with maximum service life; autoclavable versions available:
Ø6 - 60 mm,
1.2 - 400 watts.

maxon motor control
Control electronics for DC and EC motors, servoamplifiers and positioning control units.

maxon compact drive
Intelligent compact drives with a maximum 60 watts output. maxon's compact drives feature controllers, sensors and motors in a modern aluminium casing.

maxon sensor
High-resolution digital encoders, DC tachos and resolvers.

maxon flat motor
Brushless DC motors in a flat design with outer or inner rotor:
Ø9.2 - 90 mm,
0.2 - 90 watts.

maxon gear
Customized special gears as well as standard spur and planetary gearheads.

maxon micro drive
DC and brushless DC micro drives with diameters < 10 mm:
Ø6 - 9.2 mm,
0.2 - 2 watts.

maxon spindle drive
Compact, easy to configure spindle drives as complete systems.

maxon ceramic
Innovative, customer-specific ceramic and metal injection moulding components. For drive technology – and many other applications.

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