

DC-Micromotors

Graphite Commutation

12 mNm
11 W

Series 2237 ... CXR

Values at 22°C and nominal voltage	2237 S	006 CXR	012 CXR	018 CXR	024 CXR	036 CXR	048 CXR	
1 Nominal voltage	U_N	6	12	18	24	36	48	V
2 Terminal resistance	R	0,85	3,92	8,5	15,7	33	62,8	Ω
3 Efficiency, max.	η_{max}	68,1	70,8	72,2	72,6	73,6	73,5	%
4 No-load speed	n_0	6 900	6 800	7 000	6 900	7 200	7 000	min ⁻¹
5 No-load current, typ. (with shaft \varnothing 3 mm)	I_0	0,124	0,058	0,039	0,029	0,02	0,015	A
6 Stall torque	M_H	47,2	45,7	47,1	46,6	48,7	47,1	mNm
7 Friction torque	M_R	0,92	0,92	0,92	0,92	0,92	0,92	mNm
8 Speed constant	k_n	1 283	601	409	301	207	150	min ⁻¹ /V
9 Back-EMF constant	k_E	0,78	1,66	2,44	3,33	4,83	6,65	mV/min ⁻¹
10 Torque constant	k_M	7,44	15,9	23,3	31,8	46,2	63,5	mNm/A
11 Current constant	k_I	0,134	0,063	0,043	0,032	0,022	0,016	A/mNm
12 Slope of n-M curve	$\Delta n / \Delta M$	146	148	149	149	148	149	min ⁻¹ /mNm
13 Rotor inductance	L	35	150	320	590	1 240	2 340	μ H
14 Mechanical time constant	τ_m	5	5	5	5	5	5	ms
15 Rotor inertia	J	3,1	3,1	3,1	3,1	3,1	3,1	gcm ²
16 Angular acceleration	α_{max}	152	147	152	150	157	152	$\cdot 10^3$ rad/s ²
17 Thermal resistance	R_{th1} / R_{th2}	8 / 17						K/W
18 Thermal time constant	τ_{w1} / τ_{w2}	13 / 500						s
19 Operating temperature range:								
– motor		-30 ... +100						°C
– winding, max. permissible		+125						°C
20 Shaft bearings		sintered bearings (standard)			ball bearings, preloaded (optional version)			
21 Shaft load max.:								
– with shaft diameter		3			3			mm
– radial at 3 000 min ⁻¹ (3 mm from bearing)		2,5			15			N
– axial at 3 000 min ⁻¹		0,3			2			N
– axial at standstill		20			20			N
22 Shaft play:								
– radial	\leq	0,03			0,015			mm
– axial	\leq	0,15			0			mm
23 Housing material		steel, zinc galvanized and passivated						
24 Mass		68						g
25 Direction of rotation		clockwise, viewed from the front face						
26 Speed up to	n_{max}	8 000						min ⁻¹
27 Number of pole pairs		1						
28 Magnet material		NdFeB						
Rated values for continuous operation								
29 Rated torque	M_N	11	12	12	12	12	12	mNm
30 Rated current (thermal limit)	I_N	1,9	0,9	0,61	0,46	0,31	0,23	A
31 Rated speed	n_N	4 750	4 450	4 700	4 560	4 880	4 630	min ⁻¹

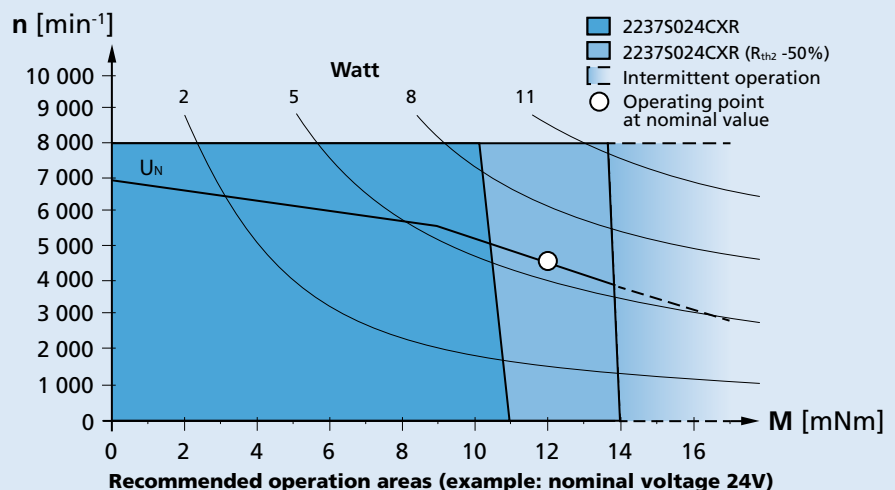
Note: Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The R_{th2} value has been reduced by 25%.

Note:

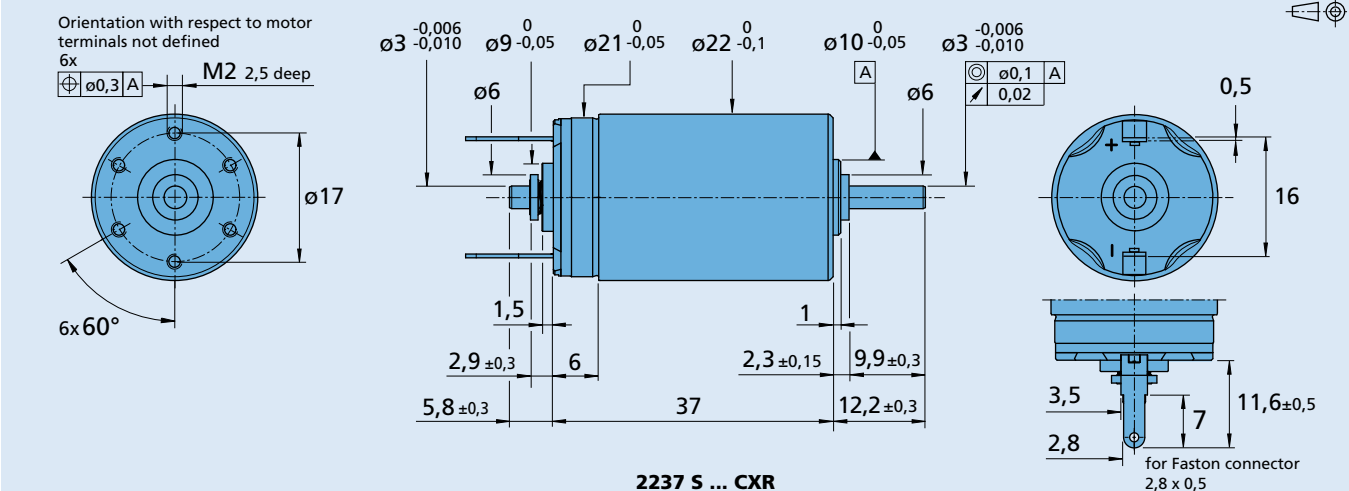
The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

The diagram shows the motor in a completely insulated as well as thermally coupled condition (R_{th2} 50% reduced).

The nominal voltage (U_N) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



Dimensional drawing



Options

Example product designation: **2237S012CXR-275**

Option	Type	Description
U	Single Leads	For motors with single leads (PTFE), length 160 mm, red (+) / black (-)
158	Shaft end	No second shaft end
275	Ball bearings	Motor with 2 preloaded ball bearings.

Product combination

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
22E	IE3-1024	SC 1801 P	To view our large range of accessory parts, please refer to the "Accessories" chapter.
22EKV	IE3-1024 L	SC 1801 S	
22F	IERS3-500	SC 2402 P	
22/7	IERS3-500 L	SC 2804 S	
23/1	IER3-10000	SC 5004 P	
26A	IER3-10000 L	SC 5008 S	
BS22-1.5		MCDC 3002 P	
		MCDC 3002 S	
		MCDC 3003 P	
		MCDC 3006 S	
		MC 5004 P	
		MC 5005 S	

Planetary Gearheads

0,7 Nm

For combination with
DC-Micromotors
Brushless DC-Motors
Stepper Motors

Series 23/1

	23/1
Housing material	metal
Geartrain material	steel
Recommended max. input speed for:	
– continuous operation	4 000 min ⁻¹
Backlash, at no-load	≤ 1 °
Bearings on output shaft	ball bearings, preloaded
Shaft load, max.:	
– radial (10 mm from mounting face)	≤ 170 N
– axial	≤ 150 N
Shaft press fit force, max.	≤ 150 N
Shaft play	
– radial (10 mm from mounting face)	≤ 0,03 mm
– axial	≤ 0,1 mm
Operating temperature range	- 30 ... + 100 °C

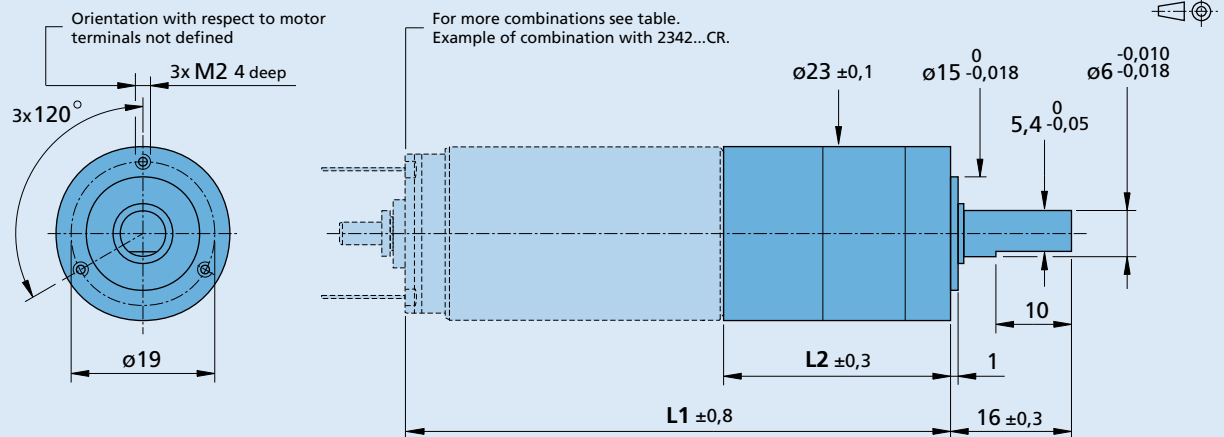
Specifications

	1	2	3	4	5
Number of gear stages					
Continuous torque	mNm 200	300	700	700	700
Intermittent torque	mNm 400	600	1 000	1 000	1 000
Mass without motor, ca.	g 60	70	90	100	110
Efficiency, max.	% 88	80	70	60	55
Direction of rotation, drive to output	=	=	=	=	=
Reduction ratio ¹⁾ (rounded)	3,71:1	9,7:1 14:1	43:1 66:1	94:1 112:1 134:1 159:1 190:1 246:1	415:1 592:1 989:1 1 526:1
L2 [mm] = length without motor ²⁾	27,9	34,1	40,3	46,4	52,6
L1 [mm] = length with motor	2224U...SR 48,2	2230U...S 54,4	2232U...SR 60,6	2233U...S 66,7	2237S...CXR 72,9
	2342S...CR 54,0	2057S...B 60,2	2057S...BHS 66,4	2444S...B 72,5	AM2224...-10 78,7
	2342S...CR 56,2	2057S...B 62,4	2057S...BHS 68,6	2444S...B 74,7	AM2224...-10 80,9
	2233U...S 56,6	2237S...CXR 62,8	2342S...CR 69,0	2057S...B 75,1	AM2224...-10 81,3
	2237S...CXR 64,9	2342S...CR 71,1	2057S...B 77,3	2057S...BHS 83,4	AM2224...-10 89,6
	2342S...CR 69,9	2057S...B 76,1	2057S...BHS 82,3	2444S...B 88,4	AM2224...-10 94,6
	2057S...B 84,9	2444S...B 91,1	2444S...B 97,3	AM2224...-10 103,4	AM2224...-10 109,6
	2057S...BHS 84,9	2444S...B 91,1	2444S...B 97,3	AM2224...-10 103,4	AM2224...-10 109,6
	2444S...B 71,9	AM2224...-10 78,1	AM2224...-10 84,3	AM2224...-10 90,4	AM2224...-10 96,6
	AM2224...-10 55,6	AM2224...-10 61,8	AM2224...-10 68,0	AM2224...-10 74,1	AM2224...-10 80,3

¹⁾ The reduction ratios are rounded, the exact values are available on request or at www.faulhaber.com.

²⁾ L2 - 3,9 mm, in combination with 2224U...SR, 2230U...S, 2232U...SR, 2233U...S and AM2224.

Note: Reduction ratio 3,71:1 with motor types 2224U...SR, 2230U...S, 2232U...SR, 2233U...S and AM2224 shall be ordered as 23/1 3,71:1 - K288.



23/1