

# ASSUN

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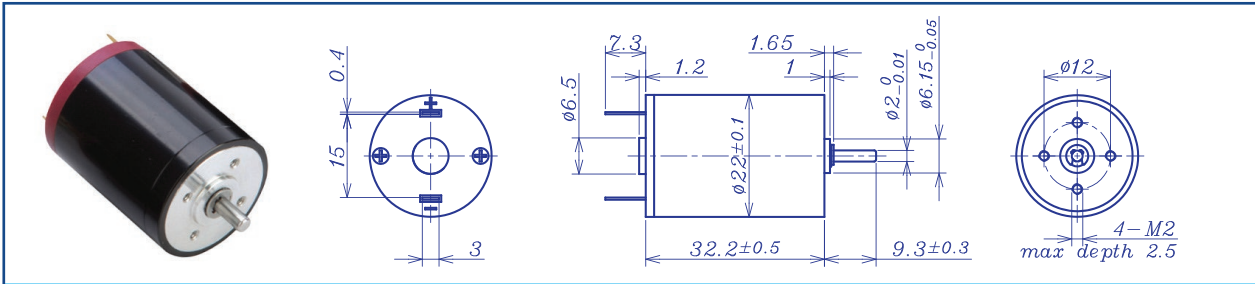
TOTAL SOLUTION for Precision  
DC Drive System 2020

DC BRUSHED CORELESS MOTOR —  
GRAPHITE BRUSH SERIES

Assun Graphite Brush Series Coreless motors are manufactured with coreless rotors and Graphite brush commutators. Benefited from the graphite brushes, these motors are more robust and can operate in higher current which lead to higher torque and power output. It's ideal for applications that need high power output and operate in harsh environments.



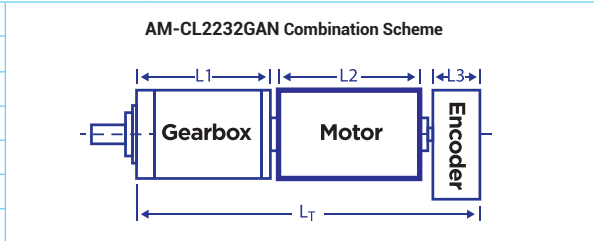
AM-CL2232GAN SERIES



		Graphite brush		Ball Bearings				
Motor Model		0609	0606	1209	1206	2409	2406	
Nominal voltage	V	6	6	12	12	24	24	
No load speed ±12%	rpm	8622	6285	8638	5735	9183	6132	
No load current Max 150%	mA	87	51	45	25	36	19	
Recommend limit for continuous operating	Max cont. torque	mN.m	5.0	6.7	7.3	8.4	7.3	8.5
	Rated Speed	rpm	7735	5093	7385	4229	7988	4627
	Rated Current	mA	850	800	600	450	320	250
	Rated Power	W	4.1	3.6	5.6	3.7	6.1	4.1
Starting current	mA	7500	4000	3871	1644	2286	960	
Stall torque	mN.m	49	36	50	32	56	34	
Maximum power output	W	11.0	5.8	11.3	4.8	13.4	5.5	
Maximum Efficiency	%	80	79	80	77	80	74	
Terminal resistance ±12%	Ω	0.8	1.5	3.1	7.3	10.5	25.0	
Inductance (1KH <sub>2</sub> )	mH	0.36	0.09	0.23	0.44	0.70	1.5	
Mechanical time constant	ms	9.5	9.5	9.3	9.7	8.9	9.6	
Moment of inertia	gcm <sup>2</sup>	5.15	5.13	5.15	5.15	5.15	5.14	
Torque constant	mN.m/A	6.6	9.0	13.1	19.7	24.7	36.6	
Speed constant	rpm/V	1454	1061	728	485	387	261	
Speed/torque gradient	rpm/mN.m	177.1	176.8	172.2	180.0	164.7	177.9	
Weight	g	57.0	57.1	56.5	57.0	56.8	57.0	

ADDITIONAL INFORMATION			
Motor thermal resistance:	24.5K/W	Motor thermal time constant:	685S
Axial (dynamic):	5.9 N	Radial (5mm from mounting face):	8.0 N
Press-fit force (static):	16(90) N	Max allowable screw depth into flange:	2.5 mm
Maximum radial play (5mm from mounting face):	≤0.02 mm	Axial play:	Preset
Maximum winding temperature:	85°C	Ambient temperature range:	-30 to 65°C
Standard rear shaft diameter:	2 mm	Standard rear shaft length "L":	0/3.7 mm

Total Length (Gearbox and Motor): L <sub>T</sub> =L <sub>1</sub> +L <sub>2</sub> +L <sub>3</sub>				
L1:20GP	L1:24GP		L2:CL22	L3:EN225
18.8	22.2		32.2	10.7
23.6	27.4			
28.4	32.6			



Remarks: Client can choose gearbox and encoder to match with this motor. Some combinations are listed here for reference.

**Recommended Gearbox:**  
Planetary Gearbox:  
AM-20GP  
AM-24GP

**Recommended Encoder:**  
Encoder S: AM-EN2211S\*\*\*  
2~3 Channels

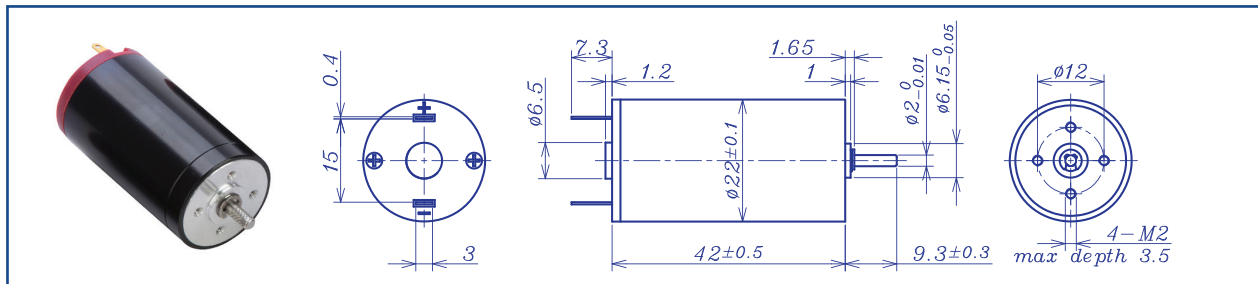
For more combination specs, visit Assun Motor website.

Motor data tested at 25°C. Motor operation exceeding continuous limits will reduce life or result in damage.  
At elevated ambient temperatures, load current must be reduced.

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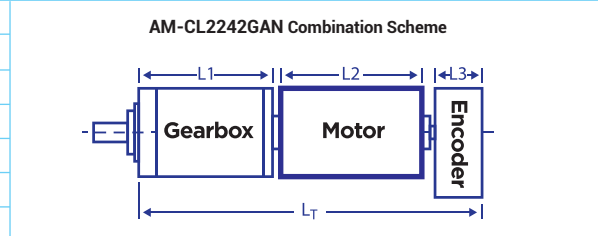
## AM-CL2242GAN Series



		Graphite brush				Ball Bearings				
Motor Model		0609	0606	1209	1206	2408	2406	4810	4805	
Nominal voltage	V	6	6	12	12	24	24	48	48	
No load speed	±12% rpm	9020	5720	9596	5818	8100	6260	9732	5260	
No load current	Max 150% mA	130	78	77	45	19	22	18	8.5	
Recommend limit for continuous operating	Max cont. torque	mN.m	7.4	11.1	7.4	11.8	12.1	11.9	9.9	14.8
	Rated Speed	rpm	8453	5019	9044	5078	7340	5501	9105	4398
	Rated Current	mA	1300	1200	700	650	450	350	230	180
	Rated Power	W	6.5	5.9	7.0	6.3	9.3	6.9	9.5	6.8
Starting current	mA	18750	9231	10909	4800	4615	2727	3310	1055	
Stall torque	mN.m	117	91	128	93	130	98	154	90	
Maximum power output	W	27.7	13.6	32.3	14.1	27.5	16.1	39.3	12.5	
Maximum Efficiency	%	84	82	84	82	88	83	86	83	
Terminal resistance	±12% Ω	0.32	0.65	1.10	2.50	5.20	8.80	14.5	45.5	
Inductance (1KHz)	mH	0.014	0.046	0.075	0.023	0.47	0.81	1.35	4.45	
Mechanical time constant	ms	7.1	5.8	6.7	5.9	5.7	6.0	5.8	5.5	
Moment of inertia	gcm <sup>2</sup>	8.86	8.73	8.61	8.99	8.73	8.99	8.79	9.06	
Torque constant	mN.m/A	6.3	9.9	11.9	19.5	28.2	36.3	46.8	86.4	
Speed constant	rpm/V	1514	961	805	489	339	263	204	110	
Speed/torque gradient	rpm/mN.m	76.8	62.9	74.7	62.7	62.5	63.7	63.1	58.2	
Weight	g	80.2	80.1	79.8	80.4	80.1	80.4	80.1	80.5	

ADDITIONAL INFORMATION			
Motor thermal resistance:	18.4 K/W	Motor thermal time constant:	798 S
Axial (dynamic):	5.9 N	Radial (5mm from mounting face):	8.0 N
Press-fit force (static):	16(70) N	Max allowable screw depth into flange:	3.5 mm
Maximum radial play (5mm from mounting face):	≤0.02 mm	Axial play:	Preset
Maximum winding temperature:	85°C	Ambient temperature range:	-30 to 65°C
Standard rear shaft diameter:	2 mm	Standard rear shaft length "L":	0/3.7 mm

Total Length (Gearbox and Motor): L <sub>T</sub> =L1+L2+L3			
L1:20GP	L1:24GP	L2:CL22	L3:EN22S
18.8	22.2	42.0	10.7
23.6	27.4		
28.4	32.6		



Remarks: Client can choose gearbox and encoder to match with this motor. Some combinations are listed here for reference.

**Recommended Gearbox:**  
 Planetary Gearbox:  
 AM-20GP  
 AM-24GP

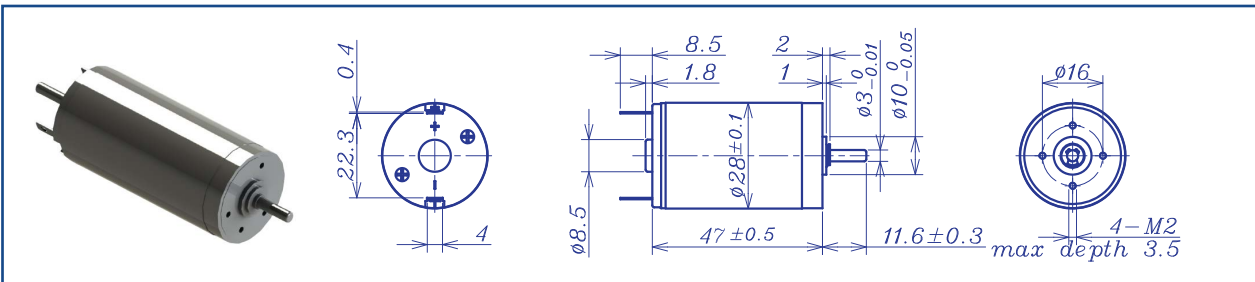
**Recommended Encoder:**  
 Encoder S: AM-EN2211S\*\*\*  
 2~3 Channels

For more combination specs, visit Assun Motor website.

Motor data tested at 25°C. Motor operation exceeding continuous limits will reduce life or result in damage.  
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AM-CL2847GAE Series



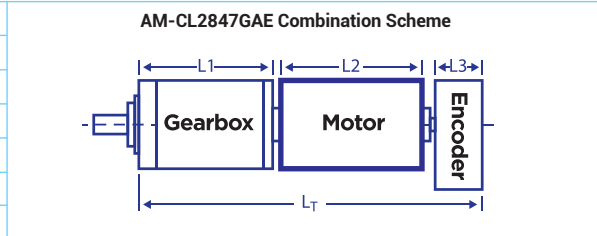
Graphite brush Ball bearings

Motor Model		1210	1810	2410	3610	4810	6010	
Nominal voltage	V	12	18	24	36	48	60	
No load speed	±12% rpm	9880	10140	10000	10140	9883	10360	
No load current	Max 150% mA	165	115	80	60	45	40	
Recommend limit for continuous operating	Max cont. torque	mN.m	27.0	26.8	29.2	25.0	24.2	
	Rated speed	rpm	9359	9602	9411	9638	9401	9887
	Rated current	mA	2500	1700	1360	800	600	480
	Rated power	W	26.4	26.9	28.8	25.2	25.2	25.1
Starting current	mA	44444	30000	21818	15000	11429	9677	
Stall torque	mN.m	511.7	504.7	496.4	504.5	525.9	530.8	
Maximum power output	W	132.3	134.0	130.0	133.9	136.1	144.0	
Maximum efficiency	%	88	88	88	88	88	88	
Terminal resistance	±12% Ω	0.27	0.6	1.1	2.4	4.2	6.2	
Inductance	(1KHZ) mH							
Mechanical time constant	ms	4.5	4.7	4.7	4.7	4.4	4.6	
Moment of inertia	gcm <sup>2</sup>	22.5	22.5	22.5	22.5	22.5	22.5	
Torque constant	mN.m/A	11.6	16.9	22.8	33.8	46.2	55.1	
Speed constant	rpm/V	826	566	418	283	207	173	
Speed/torque gradient	rpm/mN.m	19.3	20.1	20.1	20.1	18.8	19.5	
Weight	g	158	158	158	158	158	158	

**ADDITIONAL INFORMATION**

Motor thermal resistance:	15.6 K/W	Motor thermal time constant:	1086 S
Axial (dynamic):	7.3 N	Radial (5mm from mounting face):	28.0 N
Press-fit force (static):	60(120)N	Max allowable screw depth into flange:	3.5 mm
Maximum radial play (5mm from mounting face):	≤0.02 mm	Axial play:	Preset
Maximum winding temperature:	85°C	Ambient temperature range:	-30 to °C65
Standard rear shaft diameter:	1.5 mm	Standard rear shaft length "L":	0/3.7 mm

Total Length (Gearbox and Motor): L <sub>T</sub> =L <sub>1</sub> +L <sub>2</sub> +L <sub>3</sub>			
L1:28GP	L1: 32GP	L2:CL28	L3: EN16S
25.9	27.4	47.0	10.7
33.1	35.9		
40.3	44.4		



Remarks: Client can choose gearbox and encoder to match with this motor. Some combinations are listed here for reference.

**Recommended Gearbox:**  
Planetary Gearbox:  
AM-28GP  
AM-32GP

**Recommended Encoder:**  
Encoder S: AM-EN1611S\*\*\*  
2~3 Channels

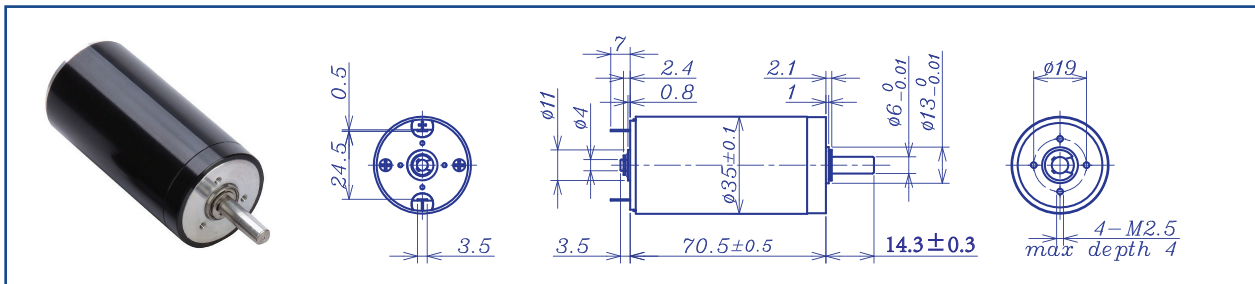
For more combination specs, visit Assun Motor website.

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## AM-CL3570GAN SERIES

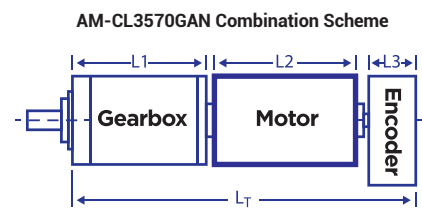


		Graphite brush				Ball Bearings					
Motor Model		1206	1204	2408	2406	2404	4806	4804	4803	4802	
Nominal voltage	V	12	12	24	24	24	48	48	48	48	
No load speed ±12%	rpm	6140	4150	7800	5930	4020	6060	4040	3240	1756	
No load current +150%	mA	190	130	135	100	70	55	33	26	12	
Recommended Limit for Continuous Running	Max cont. torque	mN.m	63.3	73.3	63.4	69.3	81.1	67.4	86.6	100.3	
	Rated Speed	rpm	5632	3695	7412	5506	3541	5686	3573	1223	
	Rated Current	mA	3600	2800	2300	1900	1500	950	800	650	400
	Rated Power	W	37.4	28.4	49.2	40.0	30.1	40.2	32.4	25.2	12.9
Starting current	mA	41379	24490	43636	25263	12060	14545	6667	4068	1290	
Stall torque	mN.m	765	669	1274	969	680	1092	749	568	331	
Max power output	W	123.0	72.7	260.2	150.4	71.5	173.2	79.2	48.2	15.2	
Maximum Efficiency	%	87	86	88	88	85	88	86	85	82	
Terminal R ±12%	Ω	0.29	0.49	0.55	0.95	1.99	3.3	7.2	11.8	37.2	
Inductance (1KHz)	mH	0.036	0.11	0.11	0.21	0.45	0.83	1.71	2.75	9.6	
Mech. time constant	ms	8.8	7.1	7.1	6.9	6.5	6.1	6.2	6.4	6.2	
Moment of inertia	gcm <sup>2</sup>	105.3	108.7	111	108.4	105.6	104.4	110.5	106.4	110.8	
Torque constant	mN.m/A	18.6	27.5	29.3	38.5	56.7	75.4	112.9	140.6	258.6	
Speed constant	rpm/V	514	348	326	248	168	127	85	68	37	
Speed/torque gradient	rpm/mN.m	8.0	6.2	6.1	6.1	5.9	5.6	5.4	5.7	5.3	
Weight	g	348.3	350.2	350.2	350.5	348.2	347.4	351.4	348.7	351.6	

### ADDITIONAL INFORMATION

Motor thermal resistance:	9.1K/W	Motor thermal time constant:	1352S
Axial (dynamic):	5.5 N	Radial (5mm from mounting face):	28.0 N
Press-fit force (static):	100(1000) N	Max allowable screw depth into flange:	4.0 mm
Maximum radial play (5mm from mounting face):	≤0.02 mm	Axial play:	Preset
Maximum winding temperature:	85°C	Ambient temperature range:	-30 to 65°C
Standard rear shaft diameter:	4 mm	Standard rear shaft length "L":	0/3.7/5.5 mm

Total Length (Gearbox and Motor) L <sub>T</sub> =L <sub>1</sub> +L <sub>2</sub> +L <sub>3</sub>				
L1:36GP	L1:40GP	L1:45GP	L2:CL35	L3:EN225
39.6	46.8	62.8	70.5	10.7
48.6	58.3	74.8		L3:EN24T
57.6	69.8			12.0



**Recommended Gearbox:**  
Planetary Gearbox:  
AM-36GP  
AM-40GP  
AM-45GP

**Recommended Encoder:**  
Encoder S: AM-EN221S\*\*\*  
2~3 Channels  
Encoder T: AM-EN241T\*\*\*  
2~3 Channels

For more combination specs, visit Assun Motor website.

Remarks: Client can choose gearbox and encoder to match with this motor. Some combinations are listed here for reference.

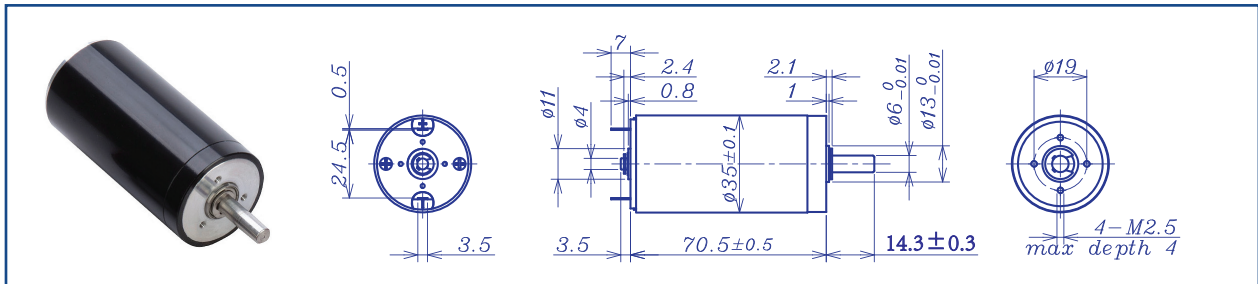
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DC BRUSHED CORELESS MOTOR \_\_\_\_  
GRAPHITE BRUSH

AM-CL3570GAF SERIES (155 °C)



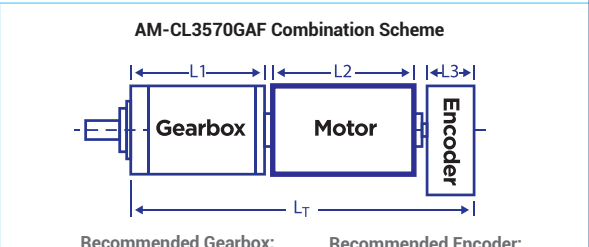
DC BRUSHED MOTOR

		Graphite brush					Ball Bearings				
<b>Motor Model</b>		1206	1204	2408	2406	2404	4806	4804	4803	4802	
Nominal voltage	V	12	12	24	24	24	48	48	48	48	
No load speed ±12%	rpm	6400	4320	8130	6180	4190	6310	4210	3380	1830	
No load current +150%	mA	182	125	130	96	67	53	32	25	12	
Recommended Limit for Continuous Running	Max cont. torque	mN.m	96.6	112.8	103.1	107.3	116.0	104.7	115.7	117.9	126.1
	Rated Speed	rpm	5558	3562	7444	5467	3445	5584	3532	2648	1103
	Rated Current	mA	5600	4400	3800	3000	2200	1500	1100	900	520
	Rated Power	W	56.2	42.1	80.4	61.4	41.9	61.2	42.8	32.7	14.6
Starting current	mA	41379	24490	43636	25263	12060	12632	6667	4068	1290	
Stall torque	mN.m	734	643	1223	930	652	910	719	545	317	
Max power output	W	123.0	72.7	260.3	150.4	71.6	150.3	79.2	48.2	15.2	
Maximum Efficiency	%	87	86	89	88	86	87	87	85	82	
Terminal R ±12%	Ω	0.29	0.49	0.55	0.95	1.99	3.8	7.2	11.8	37.2	
Inductance (1KH <sub>z</sub> )	mH	0.036	0.11	0.11	0.21	0.45	0.83	1.71	2.75	9.6	
Mech. time constant	ms	9.6	7.6	7.7	7.5	7.1	7.6	6.8	6.9	6.7	
Moment of inertia	gcm <sup>2</sup>	105.3	108.7	111	108.4	105.6	104.4	110.5	106.4	110.8	
Torque constant	mN.m/A	17.8	26.4	28.1	36.9	54.4	72.3	108.4	134.8	248.1	
Speed constant	rpm/V	536	362	340	258	176	132	88	71	38	
Speed/torque gradient	rpm/mN.m	8.7	6.7	6.6	6.6	6.4	6.9	5.9	6.2	5.8	
Weight	g	348.3	350.2	350.2	350.5	348.2	347.4	351.4	348.7	351.6	

**ADDITIONAL INFORMATION**

Motor thermal resistance:	9.1K/W	Motor thermal time constant:	1352S
Axial (dynamic):	5.5 N	Radial (5mm from mounting face):	28.0 N
Press-fit force (static):	100(1000) N	Max allowable screw depth into flange:	4.0 mm
Maximum radial play (5mm from mounting face):	≤0.02 mm	Axial play:	Preset
Maximum winding temperature:	155°C	Ambient temperature range:	-40 to 100°C
Standard rear shaft diameter:	4 mm	Standard rear shaft length "L":	0/3.7/5.5 mm

Total Length (Gearbox and Motor) L <sub>T</sub> =L <sub>1</sub> +L <sub>2</sub> +L <sub>3</sub>				
L1:36GP	L1:40GP	L1:45GP	L2:CL35	L3:EN225
39.6	46.8	62.8	70.5	10.7
48.6	58.3	74.8		L3:EN24T
57.6	69.8			12.0



Remarks: Client can choose gearbox and encoder to match with this motor. Some combinations are listed here for reference.

**Recommended Gearbox:**  
Planetary Gearbox:  
AM-36GP  
AM-40GP  
AM-45GP

**Recommended Encoder:**  
Encoder S: AM-EN2211S\*\*\*  
2~3 Channels  
Encoder T: AM-EN2412T\*\*\*  
2~3 Channels

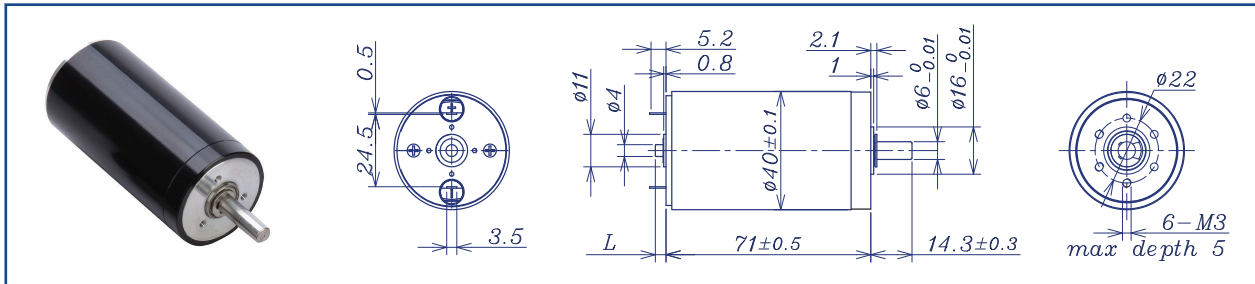
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## AM-CL4071GAE SERIES (125 °C)

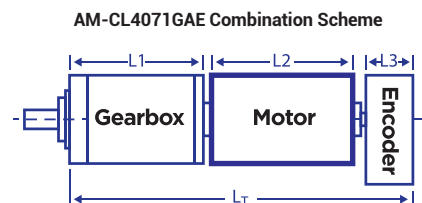


		Graphite brush			Ball Bearings					
Motor Model		1207	2408	4808	4806	4805	4804	4803	4802	
Nominal voltage	V	12	24	48	48	48	48	48	48	
No load speed ±12%	rpm	6800	7850	7870	6300	5400	3500	2450	2050	
No load current Max 150%	mA	275	160	85	65	56	36	25	22	
Recommend limit for continuous operation	Max cont. torque	mN.m	96.1	155.5	169.4	169.5	173.0	177.9	181.3	186.0
	Rated Speed	rpm	6312	7237	7247	5747	4823	2921	1874	1470
	Rated Current	mA	6000	5500	3000	2400	2100	1400	1000	860
	Rated Power	W	63.5	117.9	128.6	102.0	87.4	54.4	35.6	28.6
Starting current	mA	80000	68571	36923	26667	19200	8276	4174	2981	
Stall torque	mN.m	1339	1993	2141	1931	1620	1074	772	657	
Maximum power output	W	238.4	409.5	441.0	318.4	229.1	98.4	49.5	35.3	
Maximum Efficiency	%	89	91	91	90	89	87	85	84	
Terminal resistance ±12%	Ω	0.15	0.35	1.3	1.8	2.5	5.8	11.5	16.1	
Inductance (1KHz)	mH									
Mechanical time constant	ms	6.6	5.1	4.7	4.1	4.2	4.2	4.0	3.9	
Moment of inertia	gcm <sup>2</sup>	123.5	122.6	120.8	120.8	120.2	122.2	120.5	120.7	
Torque constant	mN.m/A	16.8	29.1	58.1	72.6	84.6	130.4	186.0	221.9	
Speed constant	rpm/V	569	328	164	132	113	73	51	43	
Speed/torque gradient	rpm/mN.m	5.1	3.9	3.7	3.3	3.3	3.3	3.2	3.1	
Weight	g	495	496	498	495	496	497	495	496	

### ADDITIONAL INFORMATION

Motor thermal resistance:	K/W	Motor thermal time constant:	S
Axial (dynamic):	5.5 N	Radial (5mm from mounting face):	29.0 N
Press-fit force (static):	100(1000) N	Max allowable screw depth into flange:	5.0 mm
Maximum radial play (5mm from mounting face):	≤0.02 mm	Axial play:	Preset
Maximum winding temperature:	125°C	Ambient temperature range:	-30 to 65°C
Standard rear shaft diameter:	4 mm	Standard rear shaft length "L":	0/3.7/5.5 mm

Total Length (Gearbox and Motor) <sub>LT=L1+L2+L3</sub>				
L1: 40GP	L1: 45GP	L2: CL40	L3:EN22S	L3:EN24T
46.8	62.8	71	10.7	12.0
58.3	74.8			
69.8				



**Recommended Gearbox:**  
Planetary Gearbox:  
AM-40GP  
AM-45GP

**Recommended Encoder:**  
Encoder S: AM-EN2211S\*\*\*  
2~3 Channels  
Encoder T: AM-EN2412T\*\*\*  
2~3 Channels

For more combination specs, visit Assun Motor website.

Remarks: Client can choose gearbox and encoder to match with this motor. Some combinations are listed here for reference.

Motor data tested at 25°C. Motor operation exceeding continuous limits will reduce life or result in damage.  
At elevated ambient temperatures, load current must be reduced.

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