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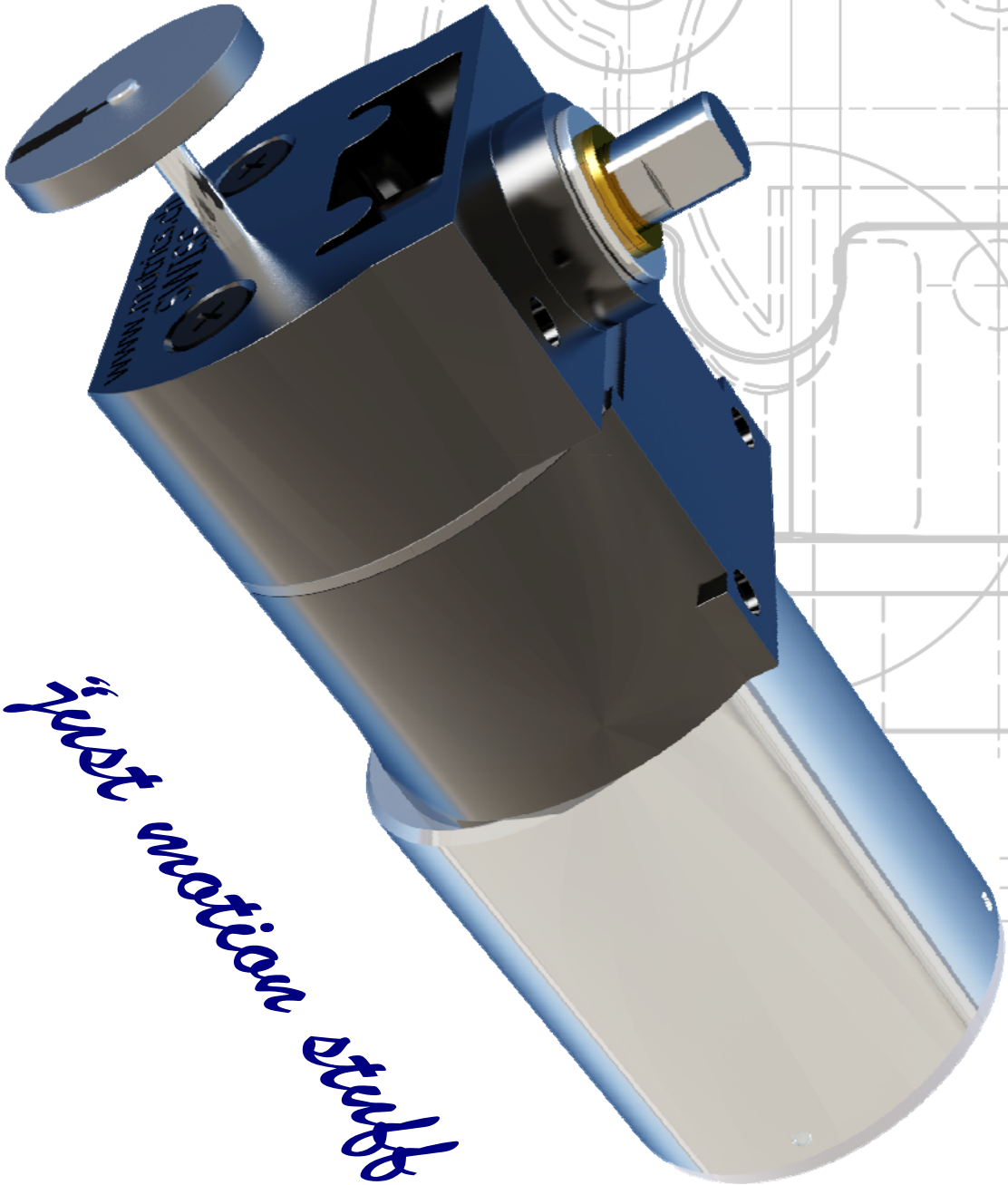
SWISS

Coreless DC motor and gearmotor

Drive Solutions



Motrics©

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Introduction

Established since 2006 in La Chaux de Fonds, Switzerland, Motrics is a producer and distributor of drive solutions in the low to medium power range (generally less than 100Watts). We specialise in custom designed solutions based on Ironless DC motors and gearmotors, such as those proposed in this catalogue, but also work with other motor and gear technologies.

C.I. Kasei Co., Ltd is a world leader in coreless DC motor design and manufacture. The C.I. Kasei group started its motor division in 1988 and has been growing ever since by addressing and satisfying an increasing number of demanding markets. We work together since 2004.

Established originally as a watch part manufacturer in the 1940s, Shinkosha Co., Ltd is a producer of various technologies of gearboxes, and gear parts. It is a major player in the extensive micromechanical industry in Japan, supplying components and assemblies to industries such as micromotor manufacturers, the servomotor and camera industrys. We work together since 2007.

Applications

Having already worked with the aeronautic and aerospace industries, we consider that the sky is not the limit. However, most of our applications are terrestrial, as are those of our partners. Our solutions are found in the watch-making industry, the Camera Industry, Industrial equipment, micropumps, laboratory and measurement instruments, Medical diagnostics and drug delivery systems, security and access devices, Industrial handtools, ATMs, office equipment, rc devices (model airplanes, drones and helicopters), PDAs.

Our Mission

Motrics was created by engineers with over 25 years of experience in the DC micromotor world. By working closely with the engineering staff of CI Kasei, Shinkosha, our other partners but above all our customers, we strive to provide reliable technical solutions combined with strong technical support and a commercial package which will place us as leader in our market.

About this catalogue

C.I. Kasei, Shinkosha and Motrics are above all interested in bringing dedicated motion solutions to our customers. This catalogue can be seen as a presentation of previous motor designs and some proposed designs, intended to help start a discussion on future designs.
We have extended the specification of the CI Kasei range of motors, starting from on the original specification, available on the CI Kasei website, and proven mathematical formulae. Additional coils, which have not been calculated by CI Kasei, are based primarily on winding machine flexibility, and the magnetic field of the stator. They are theoretically possible but used here as guides for the user to better understand CI Kasei coreless motor technology. Detailed specifications and test protocols are presented to the customer, once the specific requirement of the application is known, and the motor design agreed upon.
The gearboxes proposed are our own in-house designs, but mostly Shinkosha's range plus some other Partners' products. We look forward to start working on your solution.

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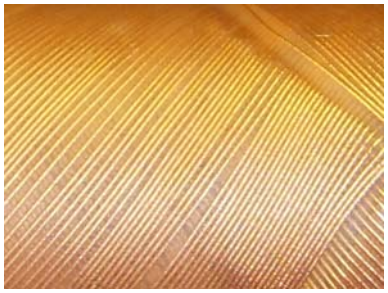

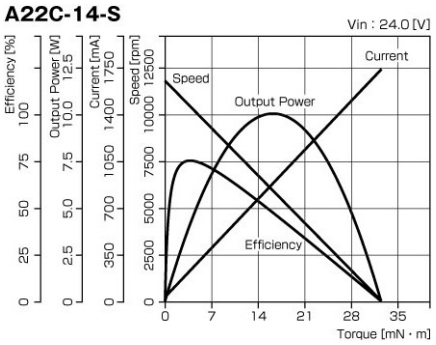

Glossary for Coreless DC motor specifications

Nominal voltage (Volts)
The voltage at which all values are measured.

No load speed (rpm)
The rotational speed of the motor on no load when Nominal voltage is applied.

Stall torque (mNm)
Also called starting torque. The torque the motor develops at stall when Nominal voltage is applied.

Stall current (mA)
The current the motor draws in the stall condition when the nominal voltage is applied.

No load current (mA)
The current the motor draws at nominal voltage due to commutation and bearing friction.

Maximum efficiency (%)
Maximum ratio of output power to input power.

Maximum power (W)
This value corresponds to the working point at 50% of stall torque, with nominal voltage applied.

Coil resistance (Ohm)
Resistance of the motor measured at its terminals. This value varies with temperature (0.4%/°C). A low resistance coil results in a high rotational speed per volt applied, and the inverse applies for a high resistance coil.

Torque Constant K (mNm/A)
This motor constant defines the relationship between torque load and current.

Motor regulation $R/K^2\ 10^3$ /Nms
A merit factor for the motor, independent of the working point or applied voltage. Linked to the slope of the loadline, the smaller the value the better, or “stiffer”, the motor.

Loadline slope (krpm/mNm)
This is another figure of merit for the motor, describing its stiffness. Again the smaller the value (rpm lost per mNm of load increase) the better the motor performance.

Back emf constant (V/1’000rpm)
Relationship between the induced voltage and rotational speed.

Rotor inertia (gcm^2)
Moment of inertia of the coil, commutation system and shaft.

Mechanical time constant (mS)
The time required for the motor to reach 63% of its final no load speed.

Angular acceleration 10^3 rads/sec^2
This is the maximum acceleration possible for the motor at start-up, on no-load.

Weight (grams)
The full weight of the motor.

Maximum recommended values
The following values are recommended as maximum continuous operation values, based on thermal constraints for the motor coil, and referenced at 22°C ambiant.

Continuous current (mA)
The maximum current that the motor coil can support on a continuous basis.

Continuous torque (mNm)
The delivered torque corresponding to maximum continuous current.

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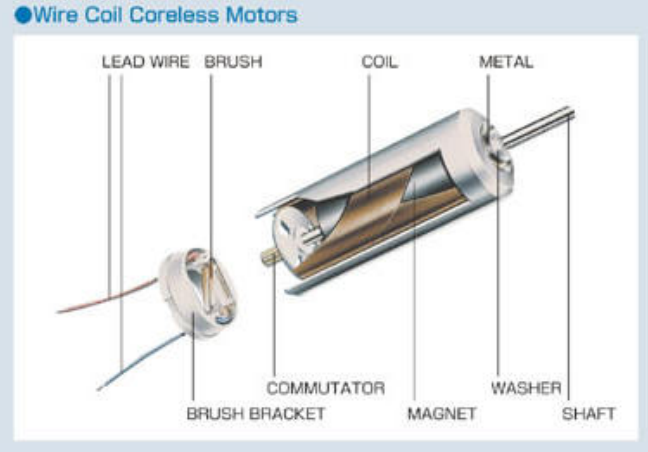
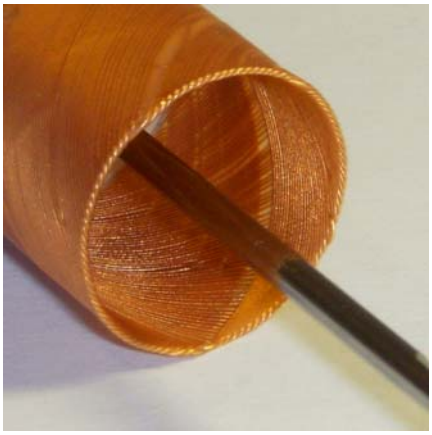
Motor overview





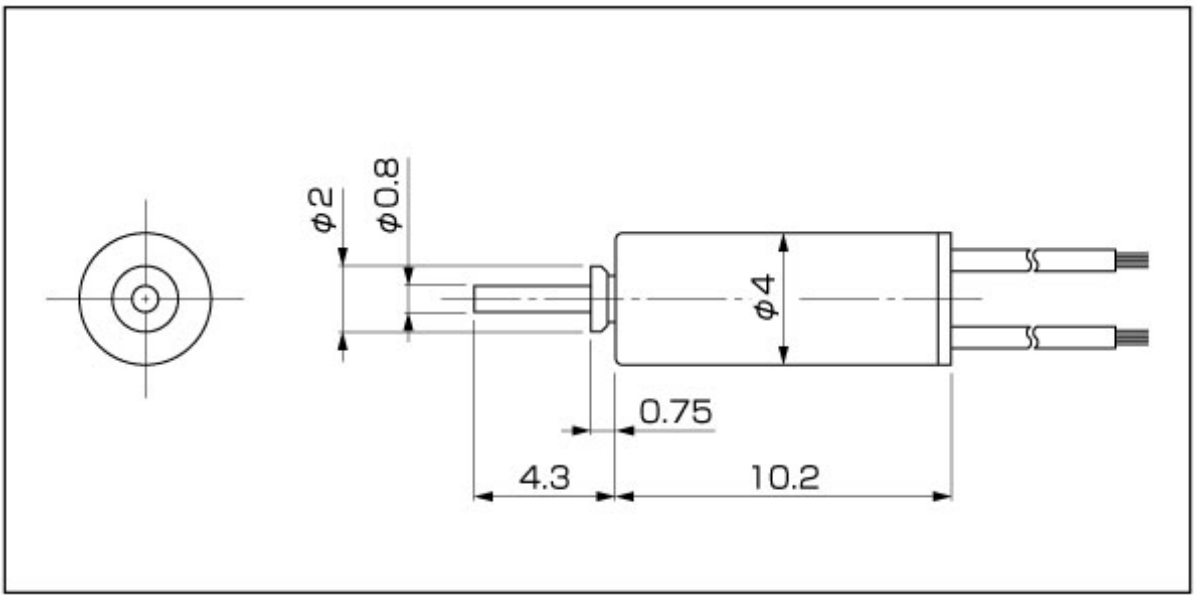
Designation		Diameter	Length	Weight	Maximum efficiency	Maximum power	R/K^2	Loadline slope
		mm	mm	grms	%	Watts	10^3/Nms	Krpm/mNm
A 4 B	0410	4	10.2	0.6	3	0.01	103094	984.47
A 4 B	0414	4	14	0.7	27	0.01	88795	847.93
A 6 B	0612	6	12	1.5	33	0.02	9034	86.26
A 6 B	0615	6	15.2	1.9	25	0.03	11283	107.75
A 10 B	1012	10	12.3	4	43	0.04	4670	44.60
A 12 B	1215	12	15.5	8.2	59	0.57	1709	16.32
A 12 B	1218	12	18.3	11	69	0.85	508	4.85
A 12 C	1222	12.4	21.5	12	71	6.35	303	3.00
A 12 C	1225	12.4	24.8	15	83	12.64	133	1.00
A 12 C	1230	12.4	30.8	19	73	2.45	110	1.05
A 16 B	1615	16	15.5	16	68	1.07	422	4.03
A 16 B	1619	16	19.2	19	80	1.77	198	1.89
A 16 C	1624	16	23.7	25	86	3.10	93	0.89
A 17 B	1716	17.4	15.8	17	77	2.84	313	2.99
A 17 B	1718	17.4	18.4	20	81	4.52	221	2.11
A17 C	1724	17.4	23.8	27	86	13.54	128	1.20
A 22 C	2225	22	25.3	52	81	4.30	80	0.76
A 22 C	2230	22	30.3	64	83	6.60	23	0.22

0410

30 mWatts

Precious metal commutation
Rare earth magnet

A4 series DC CORELESS MOTOR



CI Kasei Reference	A 4 B - - -				
Motrics Reference	**0410 - - -**	**11 S**	**05 S**	**06 S**	**12 S**
Nominal voltage	V	1.3	1.3	3	3
No load speed	rpm	28'000	33000	19'000	34'000
Stall torque	mNm	0.018	0.026	0.19	0.033
Stall current	mA	135	123	125	97
No-load current	mA	60	30	85	35
Maximum efficiency	%	11	26	3	16
Maximum power	Watts	0.01	0.02	0.01	0.03
Coil resistance	Ohm	9.6	10.6	24	31
Torque constant K	mNm/A	0.25	0.28	0.48	0.54
Motor regulation R/K^2	10^3/Nms	157'459	131'271	103'094	107'162
Loadline slope	Krpm/mNm	1'504	1'254	984	1'023
Back emf	V/1000rpm	0.03	0.03	0.05	0.06
Rotor inertia	gcm^2	0.001	0.0011	0.0007	0.0014
Mechanical time const.	mSec	15.75	14.44	7.22	15.00
Angular acceleration	$10^3 rads/s^2$	180	236	2'714	236
Weight	grms	0.5	0.5	0.6	0.5
Maximum recommended values					
Continuous current	A	0.225	0.214	0.142	0.125
Continuous torque	mNm	0.055	0.061	0.069	0.067

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: We develop special gearboxes to order

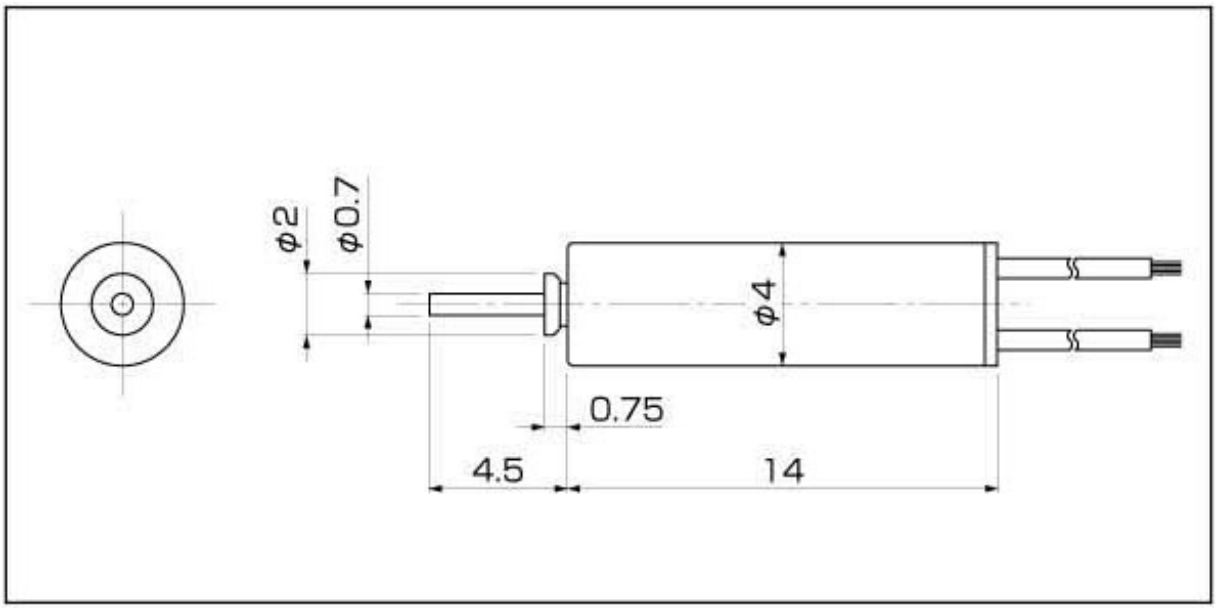
All specifications subject to modification

0414

20 mWatts

Precious metal commutation
Rare earth magnet

A4 series DC CORELESS MOTOR



CI Kasei Reference	A 4 B - - -		
Motrics Reference	**0414 - - -**	**10 S**	**03 S**
Nominal voltage	V	1.3	1.3
No load speed	rpm	16'000	29'000
Stall torque	mNm	0.02	0.024
Stall current	mA	43	100
No-load current	mA	10	25
Maximum efficiency	%	27	25
Maximum power	Watts	0.01	0.02
Coil resistance	Ohm	31	13
Torque constant K	mNm/A	0.59	0.32
Motor regulation R/K^2	10^3/Nms	88'795	126'121
Loadline slope	Krpm/mNm	848	1'204
Back emf	V/1000rpm	0.06	0.03
Rotor inertia	gcm^2	0.0018	0.0018
Mechanical time const.	mSec	15.98	22.70
Angular acceleration	$10^3 rads/s^2$	111	133
Weight	grms	0.7	0.7
Maximum recommended values			
Continuous current	A	0.125	0.193
Continuous torque	mNm	0.074	0.062

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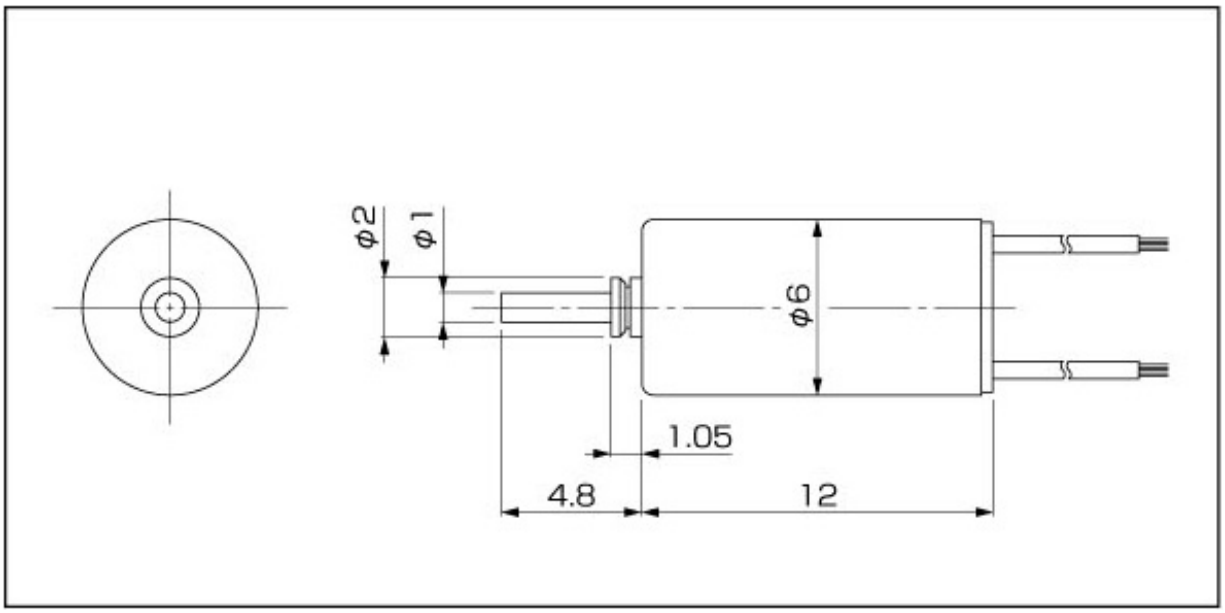
All specifications subject to modification

0612

20 mWatts

Precious metal commutation
Rare earth magnet

A6 series DC CORELESS MOTOR



CI Kasei Reference	A 6 B - - -		
Motrics Reference	**0612 - - -**	**15 S**	**19 S**
Nominal voltage	V	1.3	1.3
No load speed	rpm	9'500	9'000
Stall torque	mNm	0.51	1.04
Stall current	mA	111	112
No-load current	mA	45	20
Maximum efficiency	%	13	33
Maximum power	Watts	0.01	0.02
Coil resistance	Ohm	11.7	11.6
Torque constant K	mNm/A	0.78	1.13
Motor regulation R/K^2	10^3/Nms	19'354	9'034
Loadline slope	Krpm/mNm	185	86
Back emf	V/1000rpm	0.08	0.12
Rotor inertia	gcm^2	0.0061	0.0013
Mechanical time const.	mSec	11.81	1.17
Angular acceleration	$10^3 rads/s^2$	836	8'000
Weight	grms	1.3	1.5
Maximum recommended values			
Continuous current	A	0.212	0.213
Continuous torque	mNm	0.165	0.241

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Compatible gearboxes: We develop special gearboxes to order

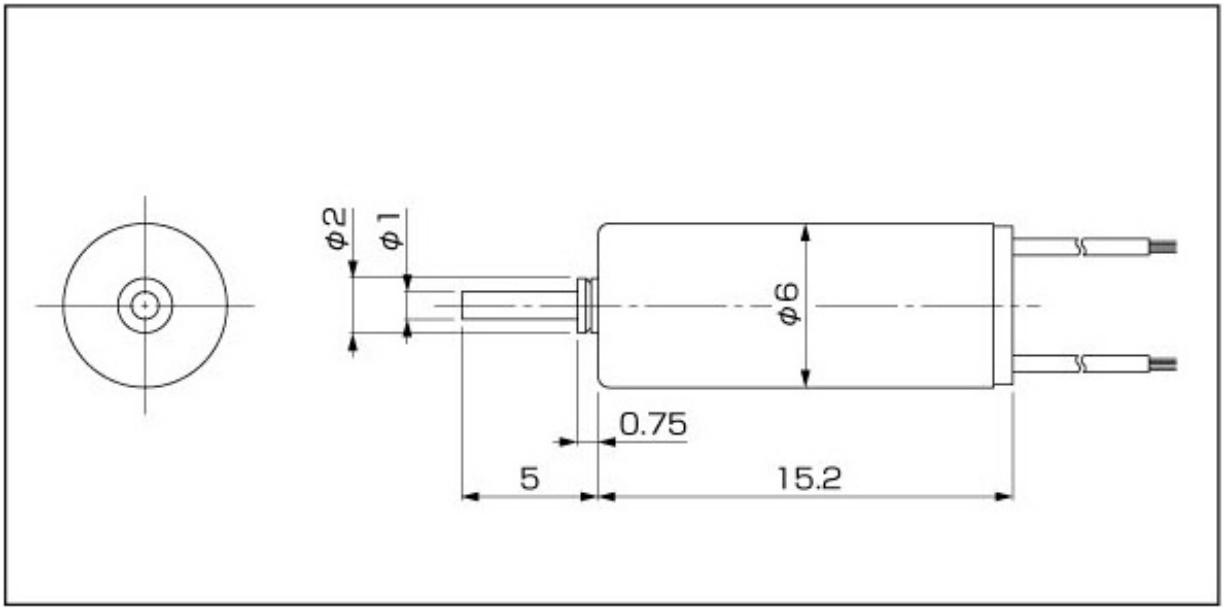
All specifications subject to modification

0615

30 mWatts

Precious metal commutation
Rare earth magnet

A6 series DC CORELESS MOTOR



CI Kasei Reference	**A 6 B - - -**	
Motrics Reference	**0615 - - -**	**09 S**
Nominal voltage	V	1.3
No load speed	rpm	11'000
Stall torque	mNm	1
Stall current	mA	160
No-load current	mA	40
Maximum efficiency	%	25
Maximum power	Watts	0.03
Coil resistance	Ohm	8.1
Torque constant K	mNm/A	0.85
Motor regulation R/K^2	10^3/Nms	11'283
Loadline slope	Krpm/mNm	108
Back emf	V/1000rpm	0.09
Rotor inertia	gcm^2	0.01
Mechanical time const.	mSec	11.28
Angular acceleration	$10^3 rads/s^2$	1'000
Weight	grms	1.9
Maximum recommended values		
Continuous current	A	0.264
Continuous torque	mNm	0.223

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
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Compatible gearboxes: We develop special gearboxes to order

All specifications subject to modification

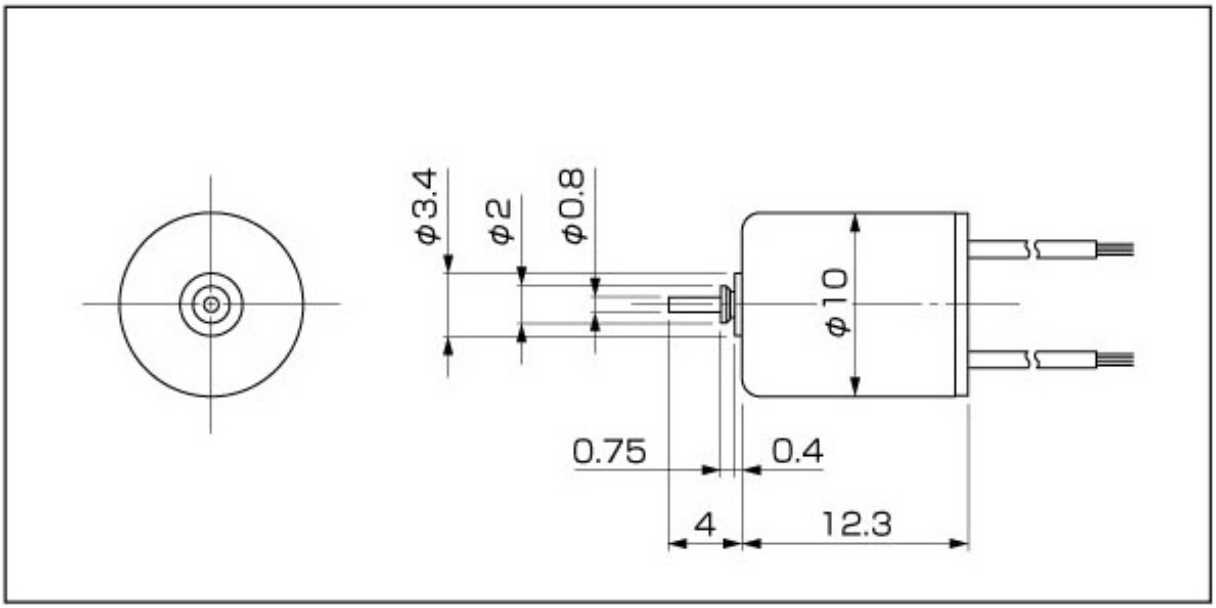
1012

50 mWatts

Precious metal commutation
Rare earth magnet

A10 series DC CORELESS MOTOR

CIK



CI Kasei Reference	A 10 B - - -				
Motrics Reference	1012 - - -	01 S	X11	X12	X13
Nominal voltage	V	1.5	3	4.5	6
No load speed	rpm	9'399	18'742	23'156	21'781
Stall torque	mNm	0.21	0.42	0.52	0.49
Stall current	mA	172	300	300	200
No-load current	mA	18	14	11	8
Maximum efficiency	%	46	62	65	64
Maximum power	Watts	0.05	0.20	0.31	0.28
Coil resistance	Ohm	8.7	10	15	30
Torque constant K	mNm/A	1.36	1.46	1.79	2.53
Motor regulation R/K^2	10^3/Nms	4'670	4'700	4'700	4'700
Loadline slope	Krpm/mNm	45	45	45	45
Back emf	V/1000rpm	0.14	0.15	0.19	0.26
Rotor inertia	gcm^2	0.047	0.047	0.047	0.047
Mechanical time const.	mSec	21.95	22.09	22.09	22.09
Angular acceleration	$10^3 rads/s^2$	45	89	110	103
Weight	grms	4	4	4	4
Maximum recommended values					
Continuous current	A	0.301	0.281	0.229	0.162
Continuous torque	mNm	0.411	0.409	0.409	0.409

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Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: We develop special gearboxes to order

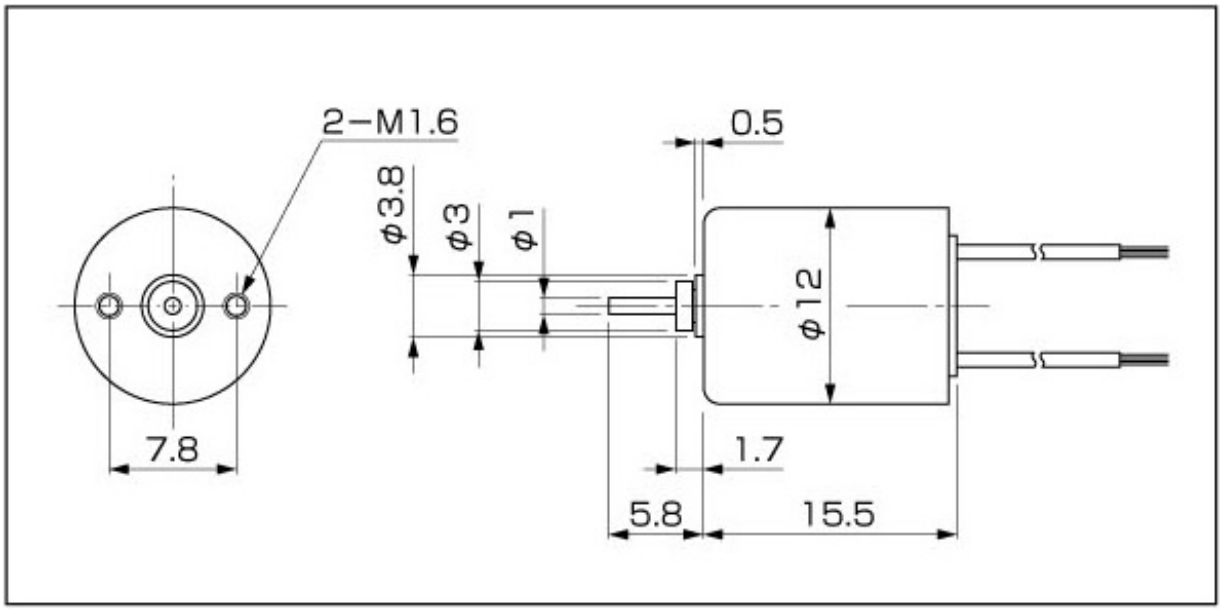
All specifications subject to modification

1215

0.57 Watts

Precious metal commutation
Rare earth magnet

A12 series DC CORELESS MOTOR



CI Kasei Reference	A 12 B - - -					
Motrics Reference	**1215 - - -**	**16 S**	**04 S**	**03 S**	**X11**	**X12**
Nominal voltage	V	3	3.5	4.5	6	9
No load speed	rpm	15'043	17'200	18'800	15'107	15'211
Stall torque	mNm	1.25	0.90	1.15	1.05	1.06
Stall current	mA	1098	522	563	333	225
No-load current	mA	40	30	30	29	19
Maximum efficiency	%	65	58	59	50	50
Maximum power	Watts	0.49	0.41	0.57	0.42	0.42
Coil resistance	Ohm	4.1	6.7	8	18	40
Torque constant K	mNm/A	1.80	1.83	2.16	3.46	5.16
Motor regulation R/K^2	10^3/Nms	1'265	1'997	1'709	1'500	1'500
Loadline slope	Krpm/mNm	12	19	16	14.324	14.324
Back emf	V/1000rpm	0.19	0.19	0.23	0.36	0.54
Rotor inertia	gcm^2	0.095	0.07	0.076	0.1	0.1
Mechanical time const.	mSec	12.02	13.98	12.99	15.00	15.00
Angular acceleration	$10^3 rads/s^2$	131	129	152	105	106
Weight	grms	8.2	8.2	8.2	8.2	8.2
Maximum recommended values						
Continuous current	A	0.506	0.396	0.362	0.242	0.162
Continuous torque	mNm	0.911	0.725	0.784	0.837	0.837

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Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: G12. We also develop special gearboxes to order

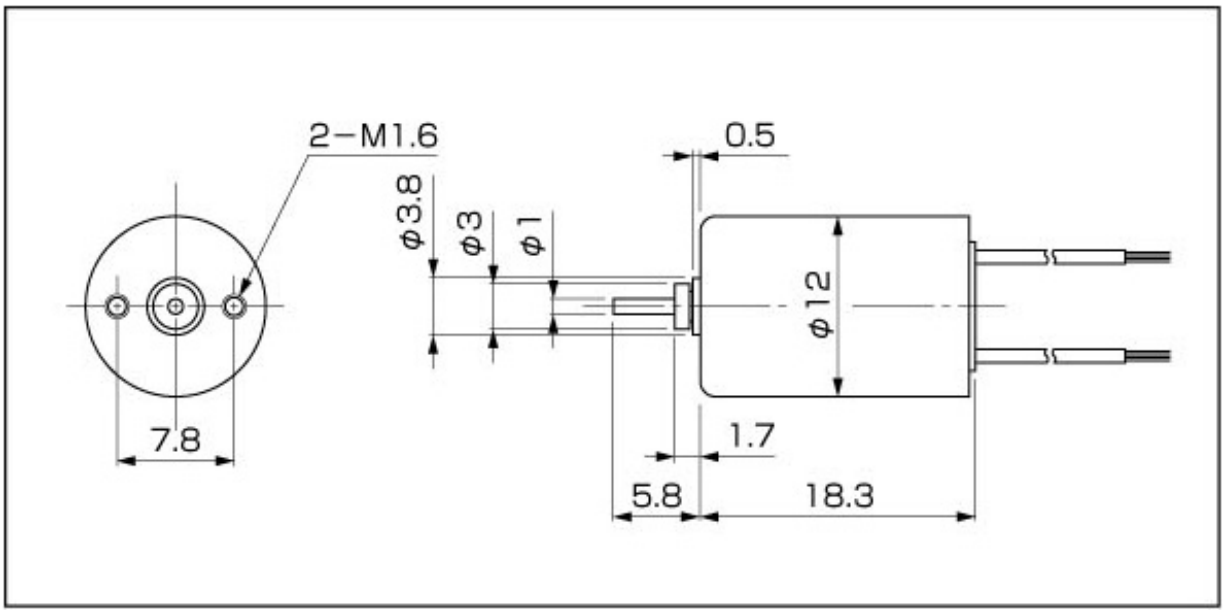
All specifications subject to modification

1218

0.85 Watts

Precious metal commutation
Rare earth magnet

A12 series DC CORELESS MOTOR



CI Kasei Reference	A 12 B - - -						
Motrics Reference	1218 - - -	11 S	12 S	08 S	09 S	06 S	X21
Nominal voltage	V	3	3	4.5	6	9	12
No load speed	rpm	12'541	10'885	12'983	13'000	13'126	15'220
Stall torque	mNm	2.58	1.61	1.45	1.45	1.47	1.69
Stall current	mA	1'200	652	479	364	240	240
No-load current	mA	35	20	20	18	8	8.2
Maximum efficiency	%	69	68	63	60	67	66
Maximum power	Watts	0.85	0.46	0.49	0.49	0.50	0.67
Coil resistance	Ohm	2.5	4.6	9.4	16.5	37.5	49.92
Torque constant K	mNm/A	2.22	2.55	3.17	4.19	6.33	7.27
Motor regulation R/K^2	10^3/Nms	508	707	935	940	936	944
Loadline slope	Krpm/mNm	4.854	6.749	8.924	8.978	8.939	9.014
Back emf	V/1000rpm	0.23	0.27	0.33	0.44	0.66	0.76
Rotor inertia	gcm^2	0.137	0.09	0.077	7.5	0.086	0.08
Mechanical time const.	mSec	6.96	6.36	7.20	705.15	8.05	7.55
Angular acceleration	$10^3 rads/s^2$	189	179	189	2	171	211
Weight	grms	11	11	11	11	11	11
Maximum recommended values							
Continuous current	A	0.677	0.499	0.349	0.263	0.175	0.151
Continuous torque	mNm	1.501	1.273	1.107	1.104	1.106	1.102

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: G12. We also develop special gearboxes to order

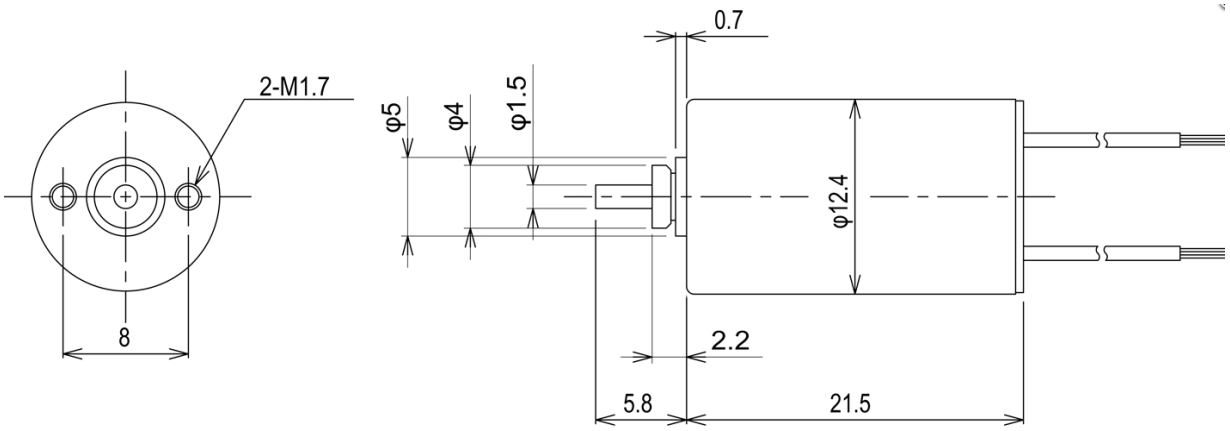
All specifications subject to modification

1222

6.35 Watts

Precious metal commutation
Rare earth magnet

A12 series DC CORELESS MOTOR



CI Kasei Reference	**A 12 C - - -**		
Motrics Reference	**1222 - - -**	**27 S**	**14 GT**
Nominal voltage	V	7.4	12
No load speed	rpm	26500	10292
Stall torque	mNm	9.15	2.51
Stall current	mA	3610	241
No-load current	mA	90	16
Maximum efficiency	%	71	55
Maximum power	Watts	6.35	0.63
Coil resistance	Ohm	2.05	49.8
Torque constant K	mNm/A	2.60	10.39
Motor regulation R/K^2	10^3/Nms	303	461
Loadline slope	Krpm/mNm	3	4
Back emf	V/1000rpm	0.27	1.09
Rotor inertia	gcm^2	0.18	0.12
Mechanical time const.	mSec	5.46	5.53
Angular acceleration	$10^3 rads/s^2$	508	209
Weight	grms	12	12
Maximum recommended values			
Continuous current	A	0.784	0.159
Continuous torque	mNm	2.038	1.653

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: ST12, PG12. We also develop special gearboxes to order

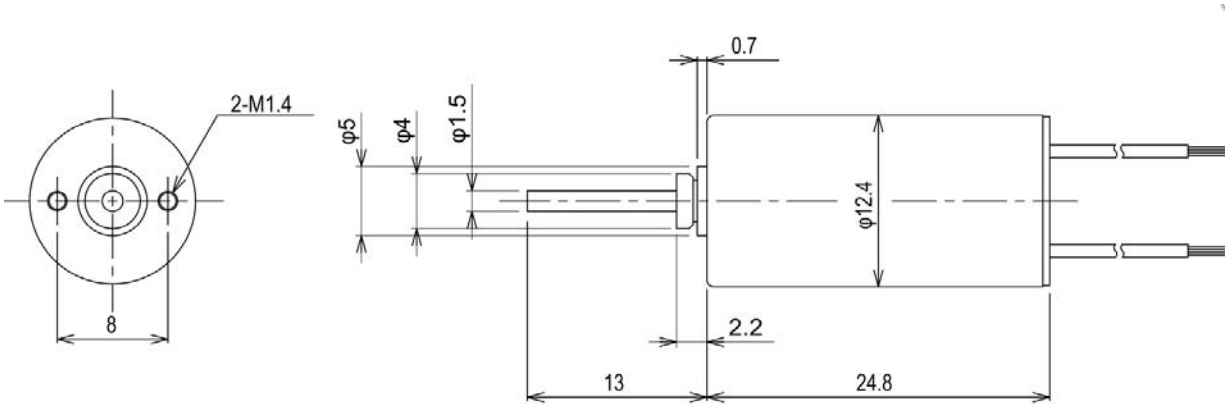
All specifications subject to modification

1225

12.64 Watts

Precious metal commutation
Rare earth magnet

A12 series DC CORELESS MOTOR



CI Kasei Reference	**A 12 C - - -**	
Motrics Reference	**1225 - - -**	**31S**

Nominal voltage	V	11.1
No load speed	rpm	24800
Stall torque	mNm	19.4
Stall current	mA	4620
No-load current	mA	35
Maximum efficiency	%	83
Maximum power	Watts	12.64
Coil resistance	Ohm	2.4
Torque constant K	mNm/A	4.24
Motor regulation R/K^2	10^3/Nms	133
Loadline slope	Krpm/mNm	1
Back emf	V/1000rpm	0.44
Rotor inertia	gcm^2	0.28
Mechanical time const.	mSec	3.73
Angular acceleration	$10^3 rads/s^2$	693
Weight	grms	15
Maximum recommended values		
Continuous current	A	0.725
Continuous torque	mNm	3.073

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: ST12, PG12. We also develop special gearboxes to order

All specifications subject to modification

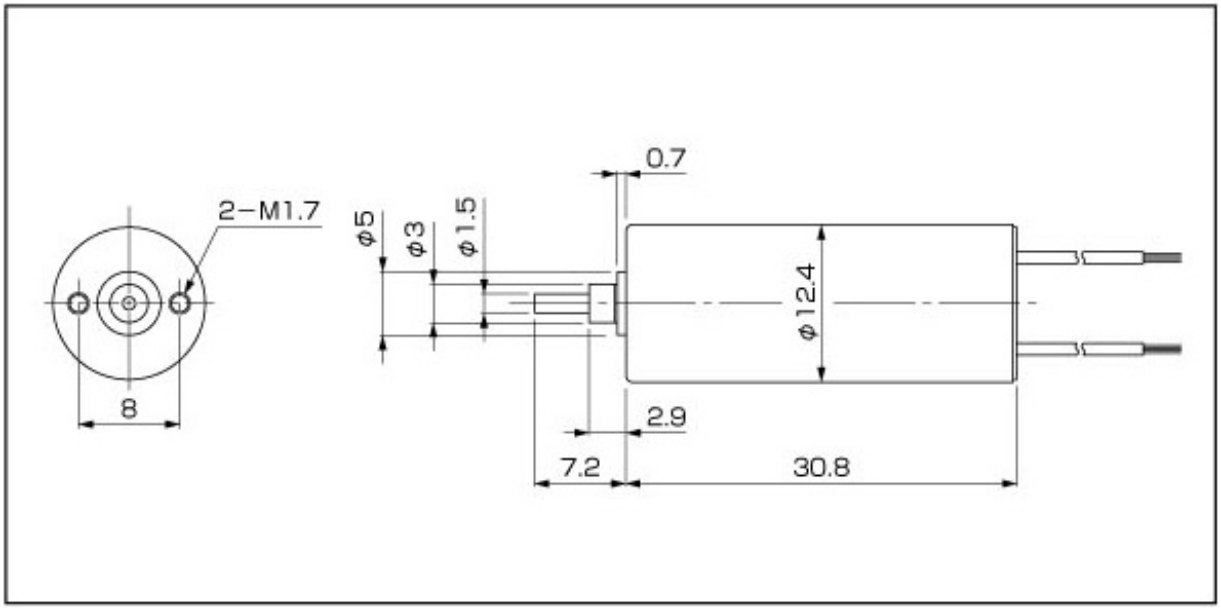
1230

2.45 Watts

Precious metal commutation
Rare earth magnet

A12 series DC CORELESS MOTOR

CIK



CI Kasei Reference	A 12 C - - -								
Motrics Reference	1230 - - -	06 S	X21	XX1	XX3	22	15 GT	29	X24
Nominal voltage	V	3	4.5	6	9	9	12	12	15
No load speed	rpm	7,491	7,655	7,127	9,862	8,760	10,200	9,909	7,694
Stall torque	mNm	10.83	8.02	11.63	8.81	5.64	6.05	9.44	8.06
Stall current	mA	3,000	1,500	744	1,050	616	545	851	455
No-load current	mA	85	37	14.7	19.88	21	16	18	11
Maximum efficiency	%	69	71	74	74.37	66	69	73	71
Maximum power	Watts	2.12	1.61	1.07	2.27	1.29	1.54	2.45	1.62
Coil resistance	Ohm	1	3	8	9	14.6	22	14	33
Torque constant K	mNm/A	3.72	5.48	7.88	8.55	9.47	10.90	11.32	18.17
Motor regulation R/K^2	10^3/Nms	72	100	129.7	117	163	185	110	100
Loadline slope	Krpm/mNm	0.692	0.955	1.239	1.119	1.553	1.767	1.050	0.955
Back emf	V/1000rpm	0.39	0.57	0.83	0.90	0.99	1.14	1.19	1.90
Rotor inertia	gcm^2	0.40	0.40	0.40	0.40	0.18	0.40	0.28	0.40
Mechanical time const.	mSec	3	4	5	5	3	7	3.1	4
Angular acceleration	$10^3 rads/s^2$	271	200	291	220	313	151	337	201
Weight	grms	19	19	19	19	19	19	19	19
Maximum recommended values									
Continuous current	A	1.1	0.7	0.3	0.3	0.2	0.2	0.2	0.1
Continuous torque	mNm	4.0	3.7	2.4	2.5	2.1	2.7	2.6	2.7

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: ST12, PG12

All specifications subject to modification

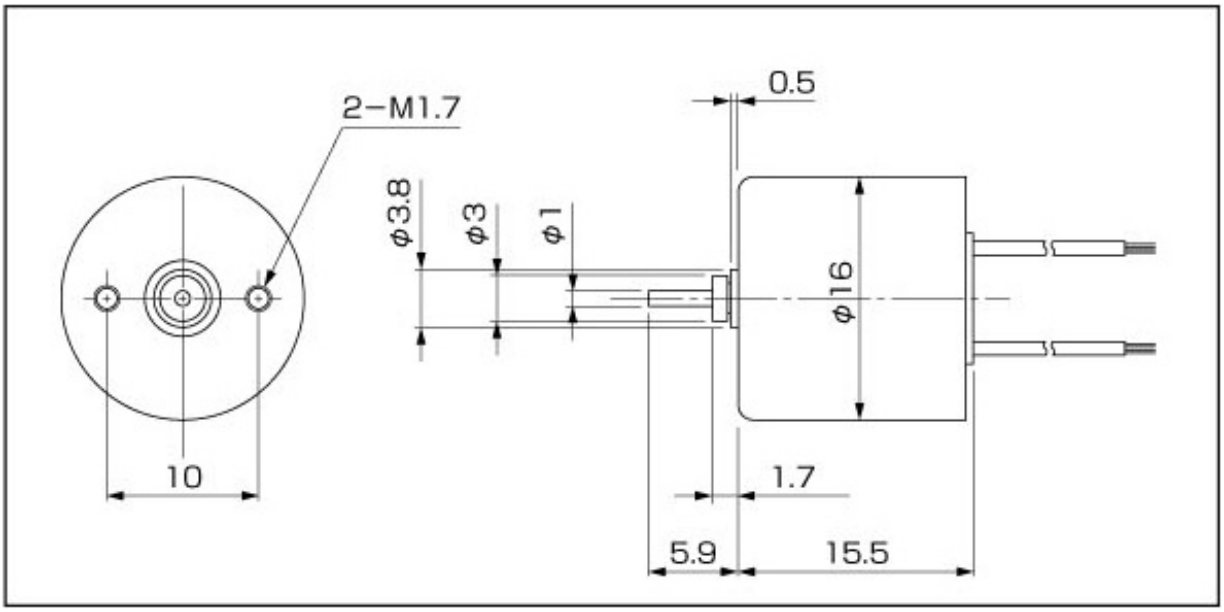
1615

1.07 Watts

Precious metal commutation
Rare earth magnet

A16 series DC CORELESS MOTOR

CIK



CI Kasei Reference	A 16 B - - -					
Motrics Reference	**1615 - - -**	**28**	**11 S**	**X12**	**X13**	**X14**
Nominal voltage	V	3	4.5	6	9	12
No load speed	rpm	12,816	13,200	11,843	11,620	12,248
Stall torque	mNm	3.18	2.47	2.21	2.17	2.29
Stall current	mA	1,515	789	500	321	267
No-load current	mA	46	16	22	14	11
Maximum efficiency	%	68	74	63	62	63
Maximum power	Watts	1.07	0.85	0.69	0.66	0.73
Coil resistance	Ohm	1.98	5.7	12	28	45
Torque constant K	mNm/A	2.17	3.19	4.63	7.07	8.96
Motor regulation R/K^2	10^3/Nms	422	560	560	560	560
Loadline slope	Krpm/mNm	4.025	5.351	5.348	5.348	5.348
Back emf	V/1000rpm	0.23	0.33	0.48	0.74	0.94
Rotor inertia	gcm^2	0.18	0.18	0.18	0.18	0.18
Mechanical time const.	mSec	8	10	10	10	10
Angular acceleration	$10^3 rads/s^2$	177	137	123	121	127
Weight	grms	16	16	16	16	16
Maximum recommended values						
Continuous current	A	0.761	0.448	0.309	0.202	0.160
Continuous torque	mNm	1.648	1.430	1.430	1.430	1.430

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: G 16, ST 16, STP 16. We also develop special gearboxes to order.

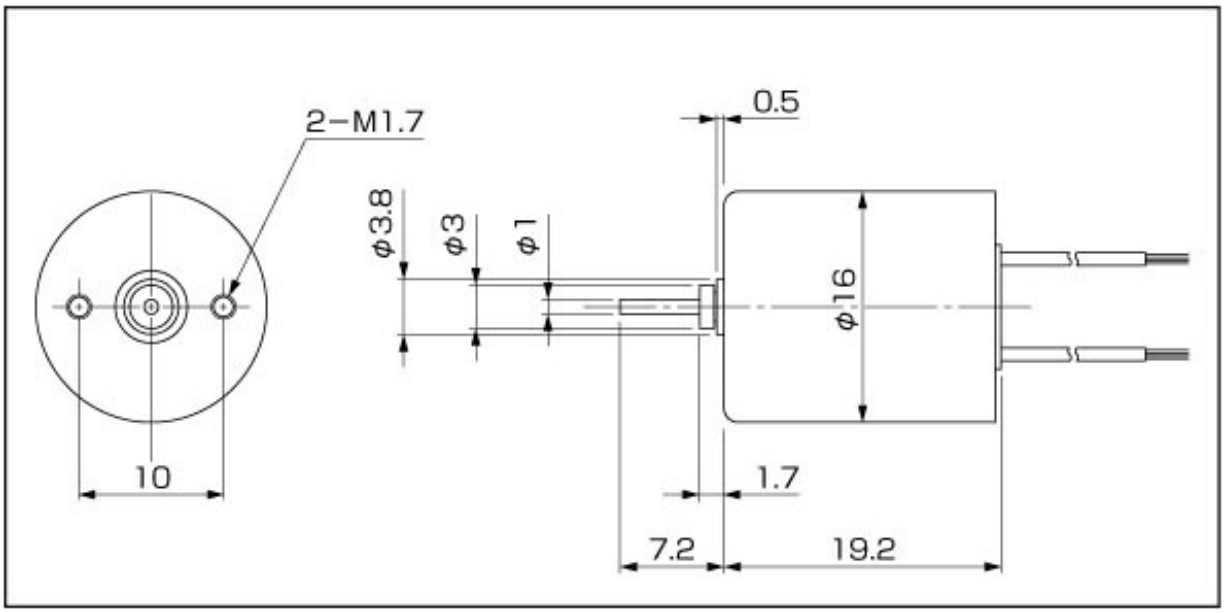
All specifications subject to modification

1619

1.77 Watts

Precious metal commutation
Rare earth magnet

A16 series DC CORELESS MOTOR



CI Kasei Référence	A 16 B - - -							
Motrics Référence	1619 - - -	17 S	07 S	13 S	10 S	01 S	22S	09 S
Tension nominale	V	4.5	4.5	6	9	12	12	15
Vitesse à vide	rpm	11,307	10,600	13,019	13,460	10,042	11,000	10,161
Couple de démarrage	mNm	5.99	3.76	4.07	3.26	1.59	3.60	2.52
Courant de démarrage	mA	1,607	957	952	529	150	369	188
Courant à vide	mA	16	15	14	10	5	18	4
Rendement max. utile	%	81	77	77	75	65	61	72
Puissance maximale	Watts	1.77	1.04	1.39	1.15	0.42	1.00	0.67
Résistance	Ohm	2.80	4.70	6.30	17	80	32.5	80
Constant de couple	mNm/A	3.76	3.99	4.34	6.27	11.00	10.25	13.77
Régulation du moteur R/k2	10^{-3}/Nms	198	295	335	432	662	309	422
Pente de la courbe	Krpm/mNm	1.889	2.819	3.198	4.130	6.318	2.954	4.029
Constante FEM	V/1000rpm	0.39	0.42	0.45	0.66	1.15	1.07	1.44
Inertie	gcm^2	0.39	0.49	0.37	0.23	0.27	0.35	0.27
Constante de temps mécanique	mSec	7.71	14.46	12.39	9.95	17.86	10.83	11.39
Accélération angulaire	10^3rads/s^2	154	77	110	142	59	103	93
Poids	grms	19	18	18	18	18	18	18
Valeurs Max recommandées								
Courant max en continu	A	0.675	0.521	0.450	0.274	0.126	0.198	0.126
Couple max en continu	mNm	2.539	2.079	1.951	1.717	1.388	2.030	1.739

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Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: G16, ST 16, STP 16. We also develop special gearboxes to order

All specifications subject to modification

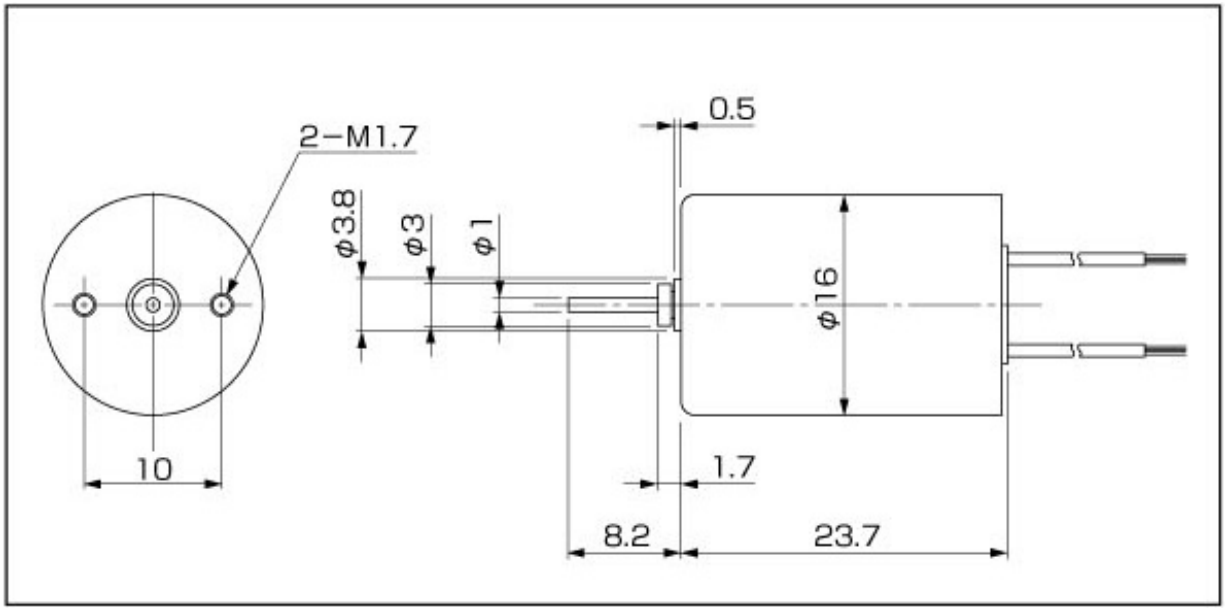
1624

3.1 Watts

Precious metal commutation
Rare earth magnet

A16 series DC CORELESS MOTOR

CIK



CI Kasei Reference	A 16 C - - -									
Motrics Reference	1624 - - -	11S	07S	01 S	06 S	09S	04 S	14S	10 S	15 G
Nominal voltage	V	3	3	4.5	6	6	9	9	12	15
No load speed	rpm	4,600	5,293	5,303	6,176	7,300	9,311	7,837	10,270	8,182
Stall torque	mNm	3.37	4.66	2.92	6.00	7.30	7.64	6.78	11.52	9.79
Stall current	mA	561	882	375	659	960	841	629	1,043	566
No-load current	mA	10	11	8	7	15	7	6	5	3
Maximum efficiency	%	75	79	74	81	77	83	82	86	85
Maximum power	Watts	0.41	0.65	0.41	0.97	1.40	1.86	1.39	3.10	2.10
Coil resistance	Ohm	5	3.40	12.00	9.10	6	10.70	14.30	11.50	26.50
Torque constant K	mNm/A	6.12	5.34	7.94	9.19	7.73	9.16	10.87	11.10	17.40
Motor regulation R/K^2	10^{-3}/Nms	143	119	190	108	105	128	121	93	88
Loadline slope	Krpm/mNm	1.365	1.14	1.82	1.03	1.000	1.22	1.156	0.89	0.84
Back emf	V/1000rpm	0.64	0.56	0.83	0.96	0.81	0.96	1.14	1.16	1.82
Rotor inertia	gcm^2	0.36	0.43	0.31	0.56	0.47	0.39	0.48	0.39	0.43
Mechanical time const.	mSec	5.1	5.12	5.90	6.04	4.9	4.97	5.81	3.64	5.1
Angular acceleration	10^3rads/s^2	94	108	94	107	155	196	141	295	228
Weight	grms	25	25	25	25	25	25	25	25	25
Maximum recommended values										
Continuous current	A	0.6	0.7	0.4	0.4	0.5	0.4	0.3	0.4	0.3
Continuous torque	mNm	3.5	3.8	3.0	4.0	4.0	3.7	3.8	4.3	4.4

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Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: G 16, ST 16, STP 16. We also develop special gearboxes to order

All specifications subject to modification

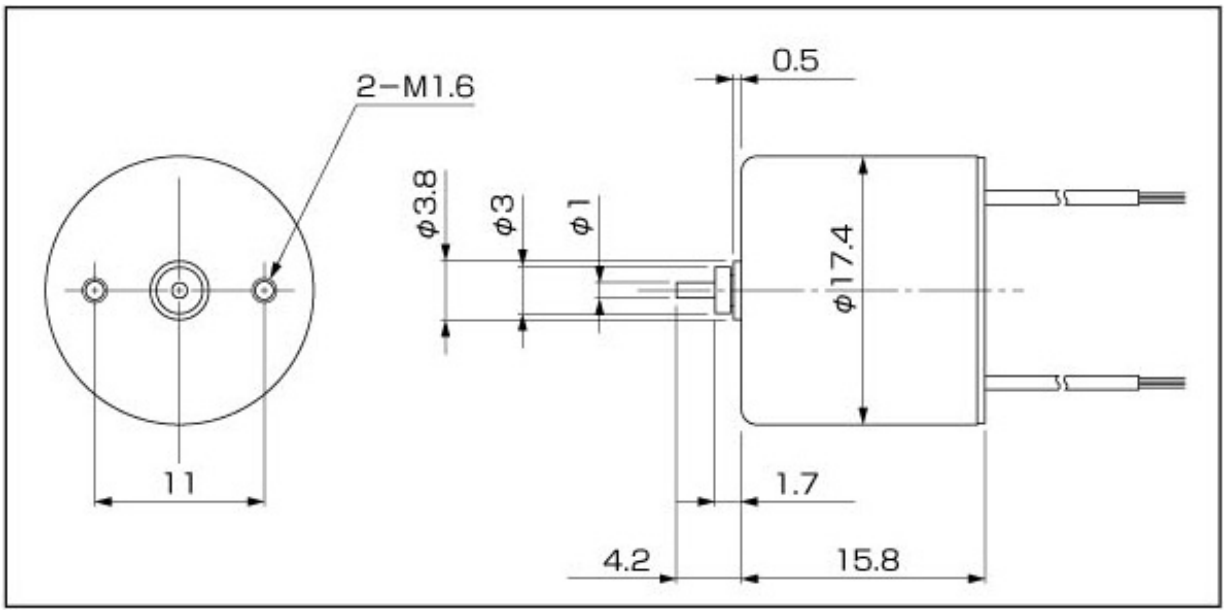
1716

2.84 Watts

Precious metal commutation
Rare earth magnet

A17 series DC CORELESS MOTOR

CIK



CI Kasei Reference	A 17 B - - -				
Motrics Reference	**1716 - - -**	**18 S**	**02 S**	**01S**	**33S**
Nominal voltage	V	3	4.5	4.5	4.5
No load speed	rpm	7,981	10,000	13100	18,000
Stall torque	mNm	2.15	2.9	3.14	6.02
Stall current	mA	638	692	1000	2,600
No-load current	mA	20	15	22	40
Maximum efficiency	%	68	73	73	77
Maximum power	Watts	0.45	0.75	1.08	2.84
Coil resistance	Ohm	4.7	6.5	4.5	1.73
Torque constant K	mNm/A	3.48	4.20	3.21	2.35
Motor regulation R/K^2	10^3/Nms	389	368	437	313
Loadline slope	Krpm/mNm	3.712	3.512	4.175	2.990
Back emf	V/1000rpm	0.36	0.44	0.34	0.25
Rotor inertia	gcm^2	0.43	0.55	0.42	0.53
Mechanical time const.	mSec	16.7	20	18.3	17
Angular acceleration	$10^3 rads/s^2$	50	53	75	114
Weight	grms	17	17	17	18
Maximum recommended values					
Continuous current	A	0.628	0.519	0.524	1.0
Continuous torque	mNm	2.183	2.181	1.681	2.3

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Compatible gearboxes: We develop special gearboxes to order

All specifications subject to modification

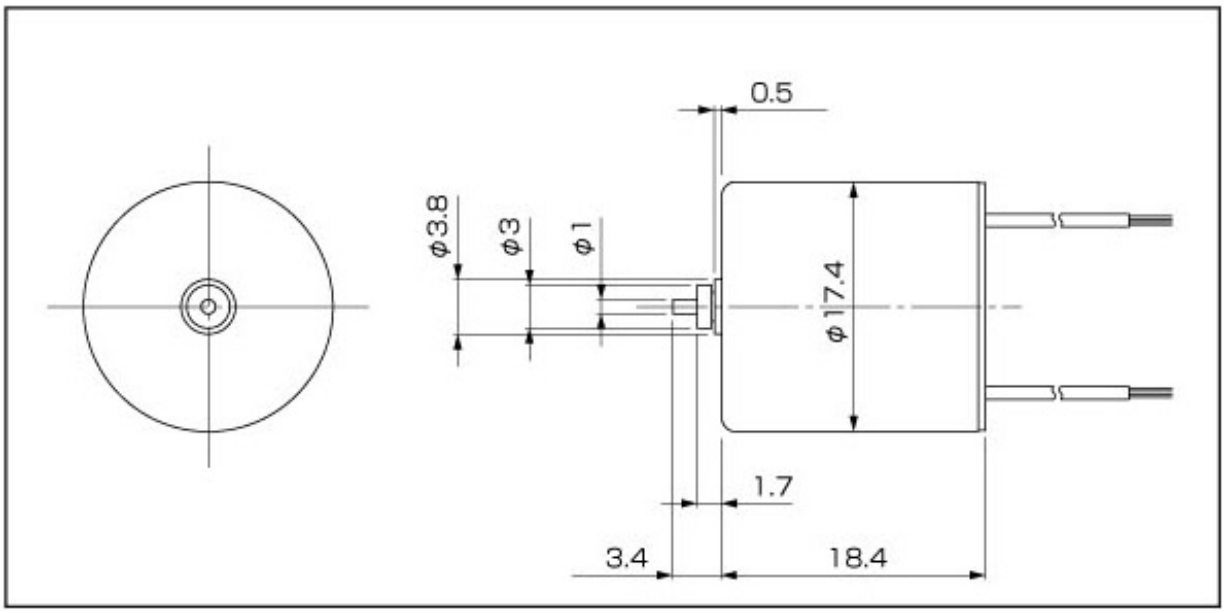
1718

4.52 Watts

Precious metal commutation
Rare earth magnet

A17 series DC CORELESS MOTOR

CIK



CI Kasei Reference	A 17 B - - -										
Motrics Reference	**1718 - - -**	**21 S**	**25 S**	**12 S**	**16 S**	**08 S**	**07S**	**11S**	**20 S**	**10 S**	**17 S**	**34 S**
Nominal voltage	V	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	9
No load speed	rpm	16,500	16,350	15,100	13,800	12,700	12100	12,000	10,600	10,500	8,900	19,100
Stall torque	mNm	8.06	9.23	3.04	6.85	7.09	3.26	5.58	5.24	3.63	7.04	9.05
Stall current	mA	3,147	3,570	1,098	2,250	2,143	957	1,607	1,324	918	1,500	2,050
No-load current	mA	26	30	15	25	24	25	25	16	16	21	20
Maximum efficiency	%	83	83	78	80	80	70	77	79	75	78	81
Maximum power	Watts	3.48	3.95	1.20	2.48	2.36	1.97	1.75	1.45	1.00	1.64	4.52
Coil resistance	Ohm	1.43	1.26	4.1	2	2.1	2.5	2.8	3.4	4.9	3	4.39
Torque constant K	mNm/A	2.58	2.61	2.81	3.08	3.35	3.50	3.53	4.00	4.02	4.76	4.46
Motor regulation R/K^2	10^3/Nms	214	186	520	211	188	204	225	212	303	132	221
Loadline slope	Krpm/mNm	2.047	1.771	4.969	2.014	1.791	1.947	2.152	2.024	2.894	1.264	2.111
Back emf	V/1000rpm	0.27	0.27	0.29	0.32	0.35	0.37	0.37	0.42	0.42	0.50	0.47
Rotor inertia	gcm^2	0.51	0.54	0.40	0.45	0.72	0.36	0.62	0.50	0.54	0.37	0.47
Mechanical time const.	mSec	11	10	14	11.4	13.5	9.8	14	11	16.3	11.8	10
Angular acceleration	$10^3 rads/s^2$	158	171	76	152	98	91	90	105	67	190	193
Weight	grms	20	21	18	20	20	20	20	20	18	20	20
Maximum recommended values												
Continuous current	A	1.138	1.213	0.672	0.963	0.939	0.861	0.813	0.738	0.615	0.786	0.650
Continuous torque	mNm	2.940	3.160	1.887	2.964	3.143	3.015	2.868	2.957	2.473	3.741	2.895

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: We develop special gearboxes to order

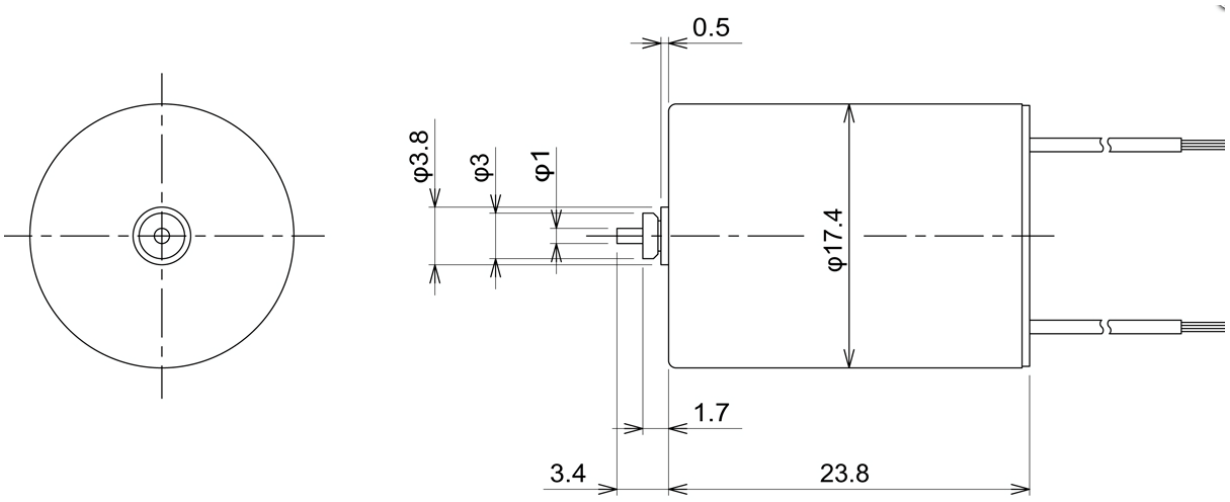
All specifications subject to modification

1724

13.54 Watts

Precious metal commutation
Rare earth magnet

A17 series DC CORELESS MOTOR



CI Kasei Reference	**A 17 C - - -**	
Motrics Reference	**1724 - - -**	**01S**

Nominal voltage	V	7.4
No load speed	rpm	25,100
Stall torque	mNm	20.60
Stall current	mA	7,400
No-load current	mA	40
Maximum efficiency	%	86
Maximum power	Watts	13.54
Coil resistance	Ohm	1
Torque constant K	mNm/A	2.80
Motor regulation R/K^2	10^3/Nms	128
Loadline slope	Krpm/mNm	1.218
Back emf	V/1000rpm	0.29
Rotor inertia	gcm^2	0.45
Mechanical time const.	mSec	5.7
Angular acceleration	$10^3 rads/s^2$	458
Weight	grms	27
Maximum recommended values		
Continuous current	A	1.361
Continuous torque	mNm	3.812

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: We develop special gearboxes to order

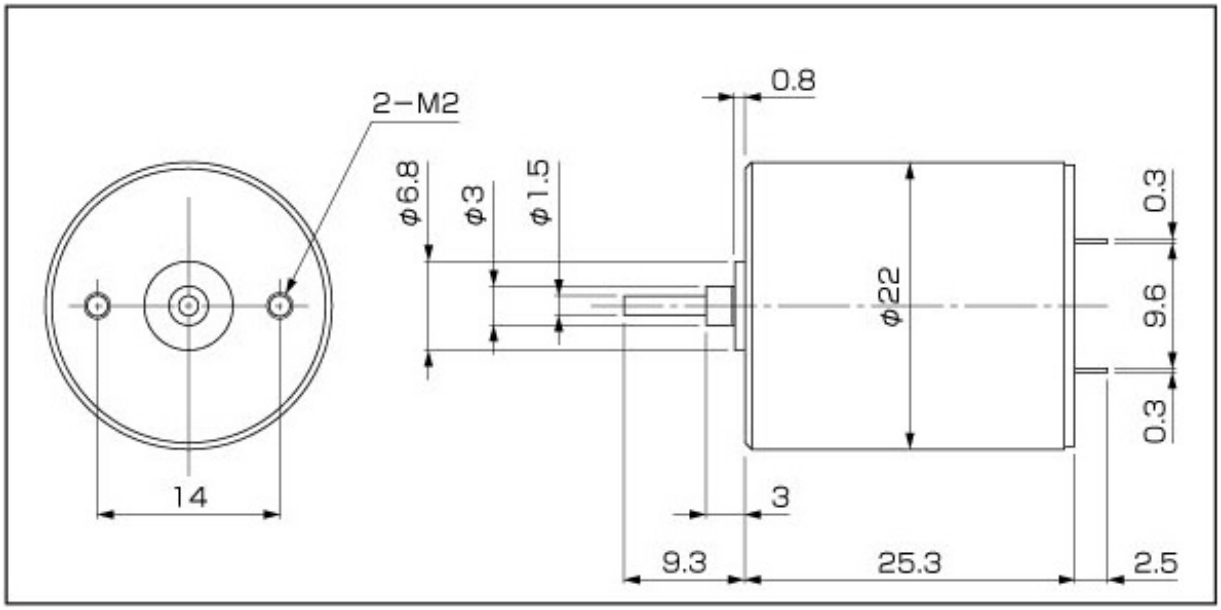
All specifications subject to modification

2225

4.3 Watts

Precious metal commutation
Rare earth magnet

A22 series DC CORELESS MOTOR



CI Kasei Reference	A 22 C - - -							
Motrics Reference	2225 - - -	05 S	12 S	03 S	13 S	01 S	X31	25 S
Nominal voltage	V	3	6	9	12	15	24	36
No load speed	rpm	10,202	10,123	8,597	9,791	11,192	8,089	7,348
Stall torque	mNm	10.23	9.99	13.33	11.81	14.70	9.67	8.08
Stall current	mA	3,750	1,818	1,364	1,034	1,172	352	179
No-load current	mA	54	27	15	13	12	5	3
Maximum efficiency	%	77	77	80	79	81	77	75
Maximum power	Watts	2.73	2.65	3.00	3.03	4.31	2.05	1.55
Coil resistance	Ohm	0.8	3.3	6.6	11.6	12.8	68.2	201
Torque constant K	mNm/A	2.77	5.58	9.89	11.56	12.67	27.90	45.93
Motor regulation R/K^2	10^3/Nms	104	106	68	87	80	88	95
Loadline slope	Krpm/mNm	0.997	1.013	0.645	0.829	0.761	0.837	0.910
Back emf	V/1000rpm	0.29	0.58	1.04	1.21	1.33	2.92	4.81
Rotor inertia	gcm^2	1.10	0.80	1.20	0.80	1.00	1.00	0.80
Mechanical time const.	mSec	12	8	8	6.7	8	8	8
Angular acceleration	$10^3 rads/s^2$	93	125	111	148	147	97	101
Weight	grms	52	52	52	52	52	53	52
Maximum recommended values								
Continuous current	A	1.708	0.841	0.595	0.448	0.427	0.185	0.108
Continuous torque	mNm	4.7	4.7	5.9	5.2	5.4	5.2	4.9

Coils marked in **red (Ex X21)** are suggested coils with tentative values. Special coils are available, please consult us.
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: S 24, PG 22, PK 22, PM 22, ST 35. We also develop special gearboxes to order.

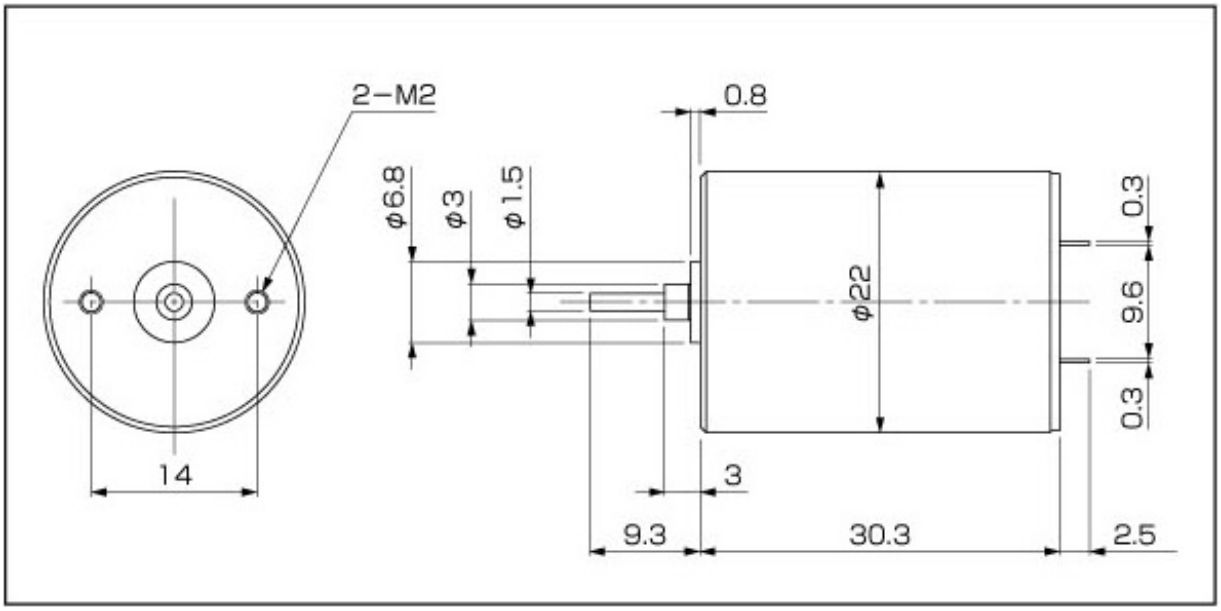
All specifications subject to modification

2230

6.6 Watts

Precious metal commutation
Rare earth magnet

A22 series DC CORELESS MOTOR



CI Kasei Reference	A 22 C - - -							
Motrics Reference	**2230 - - -**	**08 S**	**11 S 2**	**04 S**	**16S 2**	**14 S 2**	**29**	**30**
Nominal voltage	V	6	7.5	9	15	15	36	40
No load speed	rpm	6,559	7,370	8,448	8,272	7,407	7,014	7,294
Stall torque	mNm	25.8	34.2	17.9	25.6	20.5	18.9	18.3
Stall current	mA	3,000	3,571	1,800	1,500	1,087	395	357
No-load current	mA	23	28	20	12	14	4	4
Maximum efficiency	%	83	83	80	83	78	81	80
Maximum power	Watts	4.4	6.6	4.0	5.5	4.0	3.5	3.5
Coil resistance	Ohm	2.0	2.1	5.0	10.0	13.8	91.2	112.0
Torque constant K	mNm/A	8.67	9.64	10.06	17.18	19.09	48.50	51.80
Motor regulation R/K^2	10^3/Nms	27	23	49	34	38	39	42
Loadline slope	Krpm/mNm	0.254	0.216	0.472	0.323	0.362	0.370	0.398
Back emf	V/1000rpm	0.91	1.01	1.05	1.80	2.00	5.08	5.42
Rotor inertia	gcm^2	2.3	2.4	1.2	1.62	1.45	TBD	TBD
Mechanical time const.	mSec	6.0	5.4	5.9	5.5	5.5	TBD	TBD
Angular acceleration	$10^3 rads/s^2$	112	142	149	158	141	TBD	TBD
Weight	grms	64	64	64	59	58	64	64
Maximum recommended values								
Continuous current	A	1.10	1.07	0.70	0.49	0.42	0.16	0.15
Continuous torque	mNm	9.5	10.4	7.0	8.5	8.0	7.9	7.6

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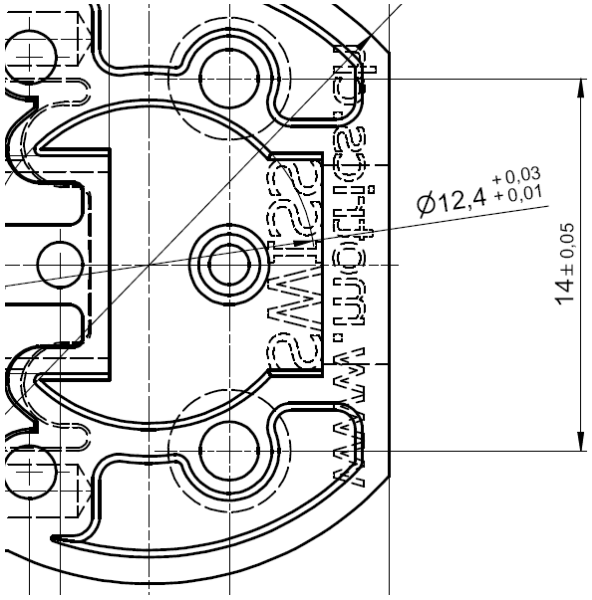
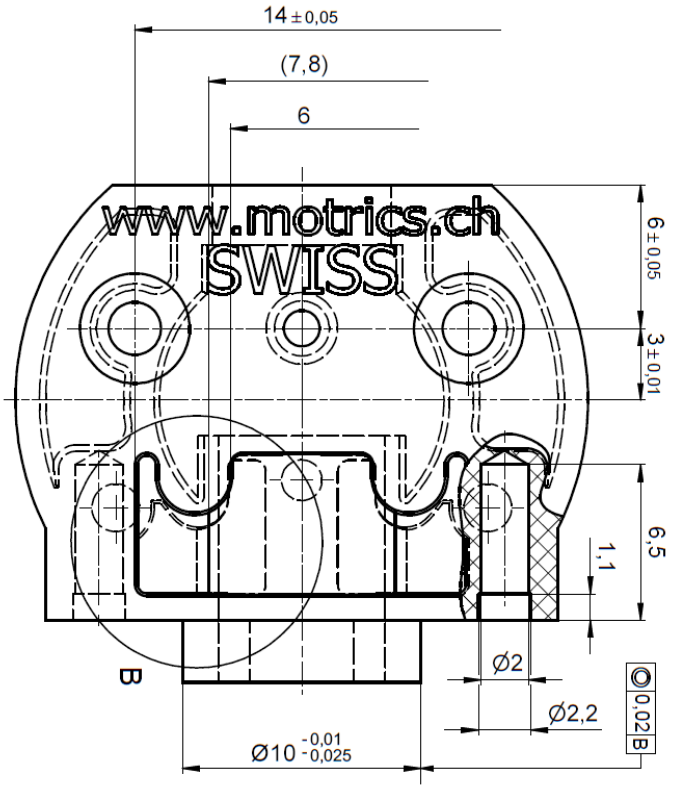
Special shafts, cables, connectors and other options are available also, on request.
Compatible gearboxes: S 24, ST 35, PG 22, PK 22, PM 22. We also develop special gearboxes to order.

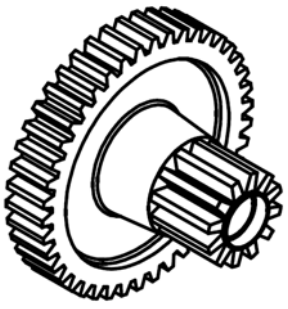
All specifications subject to modification

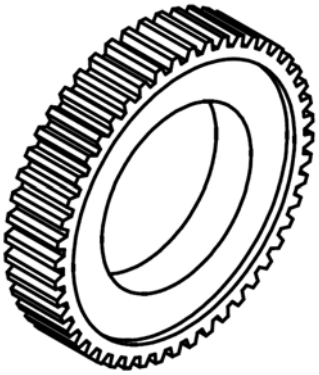
Motor-Gearbox table



Motor \ Gear	G 12	ST12	PG 12	G 16	ST 16	PG 16	ST 22	PG 22	S24	ST 35
Technology	Spur	Spur	Planetary	Spur	Spur	Planetary	Spur	Planetary	Spur	Spur
Housing	Plastic	Metal	Metal	Metal	Metal	Metal	Metal	Metal	Plastic	Metal
Gears	Metal	Metal	Metal	Metal	Metal	Metal	Metal	Metal	Plastic	Metal
Torque (Nm)	0.025	0.049	0.2	0.03	0.049	0.392	0.098	0.392	0.03	1.76
1215	X									
1218	X									
1222		X	X							
1225		X	X							
1230		X	X							
1615				X	X	X				
1619				X	X	X				
1624				X	X	X				
2225							X	X	X	X
2230							X	X	X	X







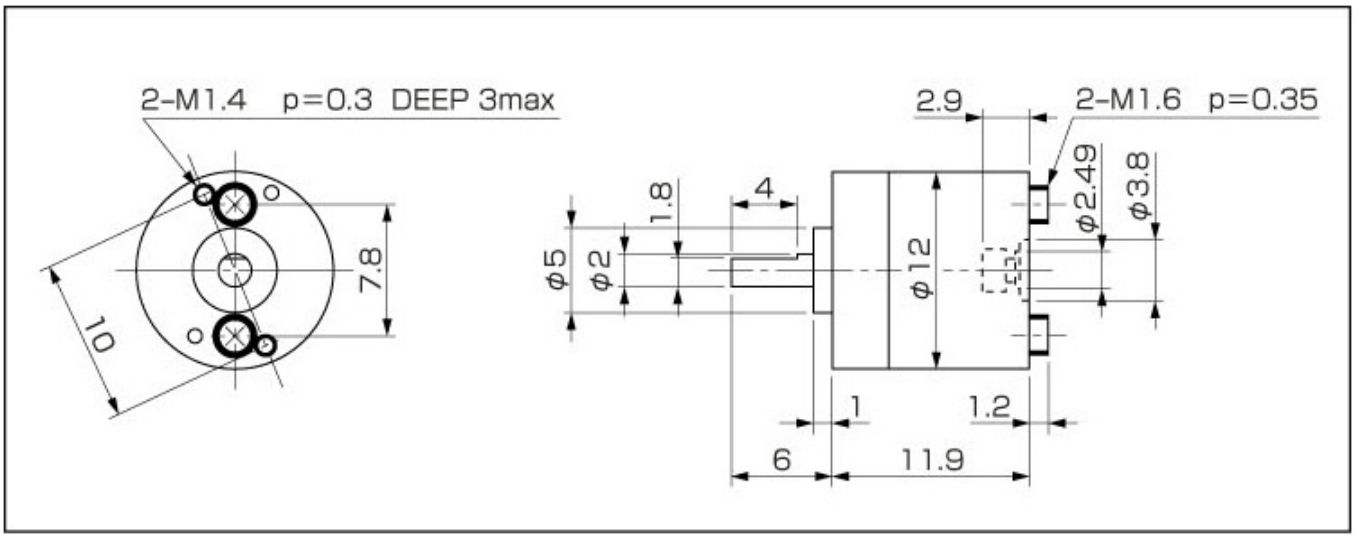
G 12

0.025 Nm

Spur Gearbox
Metal gears
Plastic housing

ϕ12 GEARHEAD series

CIK



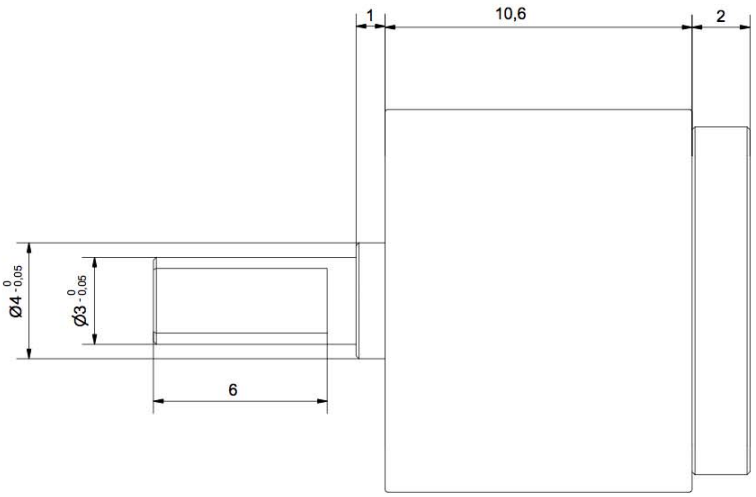
G 12 - - -		30.0	50.0	75.0	100.0	150.0	200.0	280.0
Number of gearstages		4	5	5	5	6	6	6
Efficiency %		65	59	59	59	53	53	53
Direction of rotation		=	≠	≠	≠	=	=	=
Length	mm	11.9	11.9	11.9	11.9	11.9	11.9	11.9
Weight	grms							
Typical backlash					2°			
Output bearing					Sleeve bearings			
Rated torque	mNm	5	10	10	20	20	20	25
Intermittent torque	mNm	10	20	20	40	40	40	50
Max recommended input speed	rpm				5000			
Max radial load at 5mm from the front face	N				15			
Max axial load	N				10			
Max axial load for pressfit	N				30			
Radial play	mm				0.05			
Axial play	mm				0.3			
Operating temperature range	°C				-15/+65°C			
Gearmotor lengths								
1215+	mm	27.4	27.4	27.4	27.4	27.4	27.4	27.4
1218+	mm	30.2	30.2	30.2	30.2	30.2	30.2	30.2

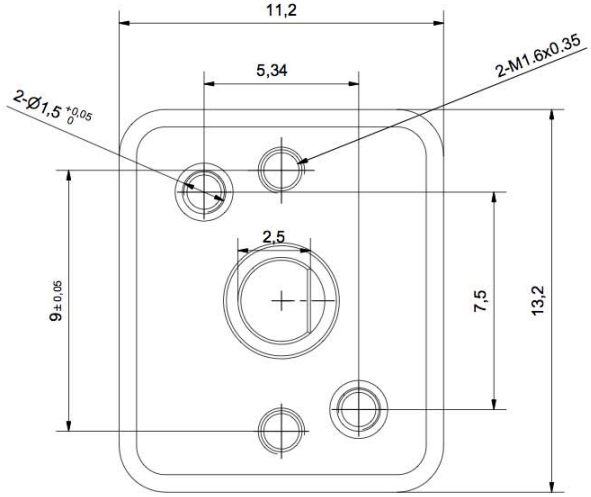
All specifications subject to modification

ST12

0.049 Nm

Spur Gearbox
Metal gears
Plastic housing





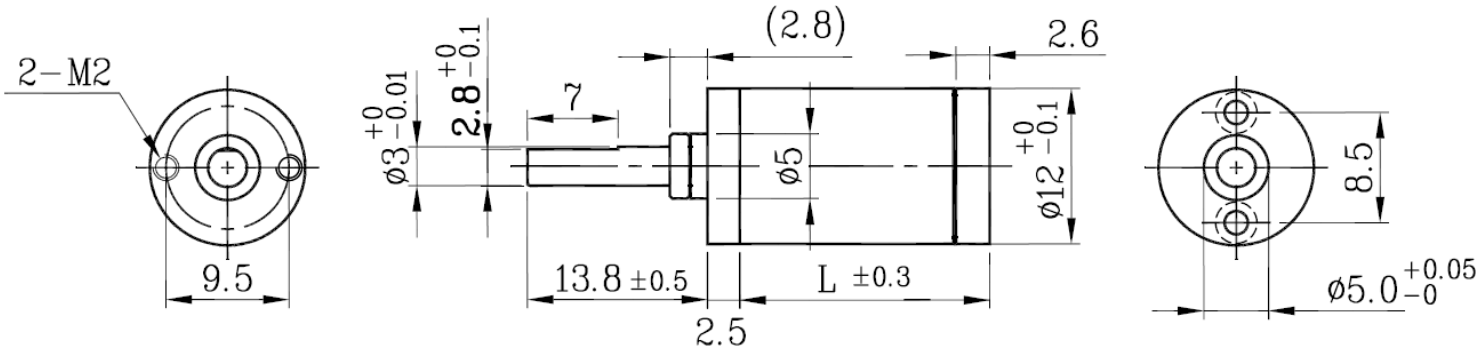
ST 12 - - -		75.0	134.0	196.0
Number of gearstages		5	5	5
Efficiency	%	0.59	0.59	0.59
Direction of rotation		≠	≠	≠
Length	mm	10.0	10.0	10.0
Weight	grms		4.0	
Typical backlash, unloaded	Deg°		2°	
Output bearing type			Sleeve bearings	
Maximum continuous torque	mNm	29.4	49	49
Intermittent torque	mNm	88.2	147	147
Max recommended input speed	rpm		5000	
Max radial load at 5mm from the front face	N		10	
Max axial load	N		10	
Max axial load for pressfit	N		30	
Radial play at 5mm from the front face	mm		0.1	
Maximum axial play	mm		0.5	
Operating temperature range			-15/+65°C	
Gearmotor lengths				
1222+	mm	34.1	34.1	34.1
1225+	mm	37.4	37.4	37.4
1230+	mm	42.9	42.9	42.9

All specifications subject to modification

PG 12

0.2Nm

Planetary Gearbox
Metal gears and housing



PG 12 - - -		4	16	64	256	1024	4096
Number of gearstages	#	1	2	3	4	5	6
Efficiency	%	85	75	65	55	45	40
Direction of rotation		=	=	=	=	=	=
Length	mm	12.5	16.1	19.4	22.7	26.0	29.3
Weight	grms	12.1	14.2	16.3	18.4	20.5	22.6
Typical backlash, unloaded	Deg°	2°					
Output bearing type		Sleeve bearings					
Maximum continuous torque	mNm	80	120	160	180	200	200
Intermittent torque	mNm	240	360	480	540	600	600
Max recommended input speed	rpm	5000					
Max radial load at 5mm from the front face	N	5					
Max axial load	N	5					
Max axial load for pressfit	N	15					
Radial play at 5mm from the front face	mm	0.05					
Maximum axial play	mm	0.2					
Operating temperature range		-10/+60°C					
Gearmotor lengths							
1222+	mm	36.5	40.1	43.4	46.7	50.0	53.3
1225+	mm	39.8	43.4	46.7	50.0	53.3	56.6
1230+	mm	45.8	49.4	52.7	56.0	59.3	62.6

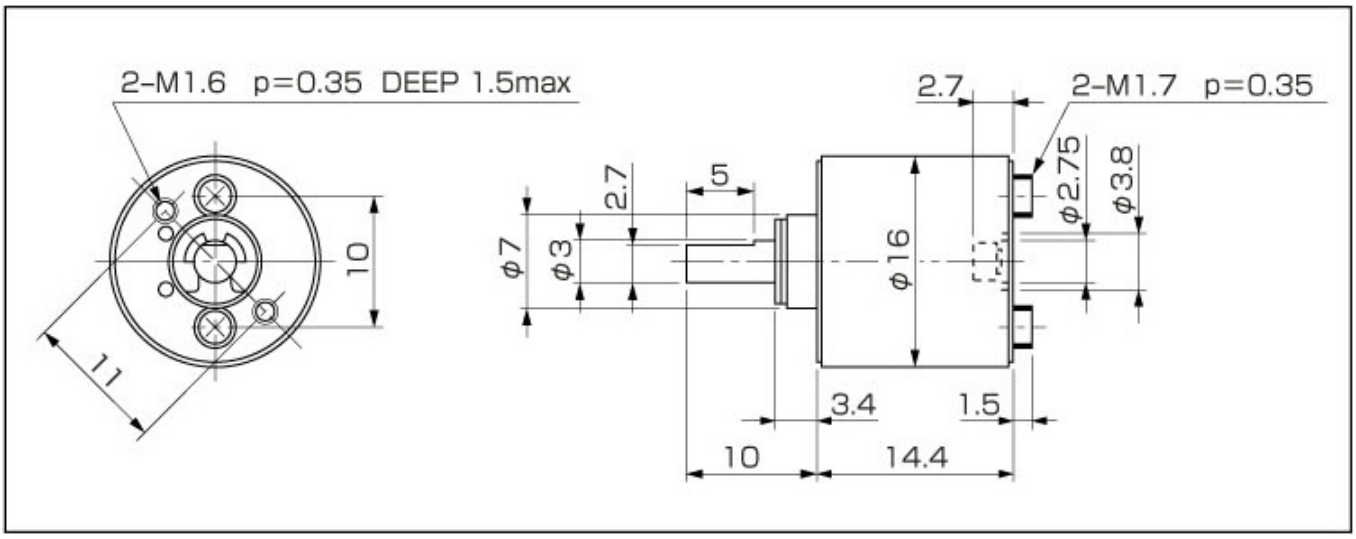
All specifications subject to modification

G 16

0.03 Nm

Spur Gearbox
Metal gears and housing

ϕ16 GEARHEAD series CIK



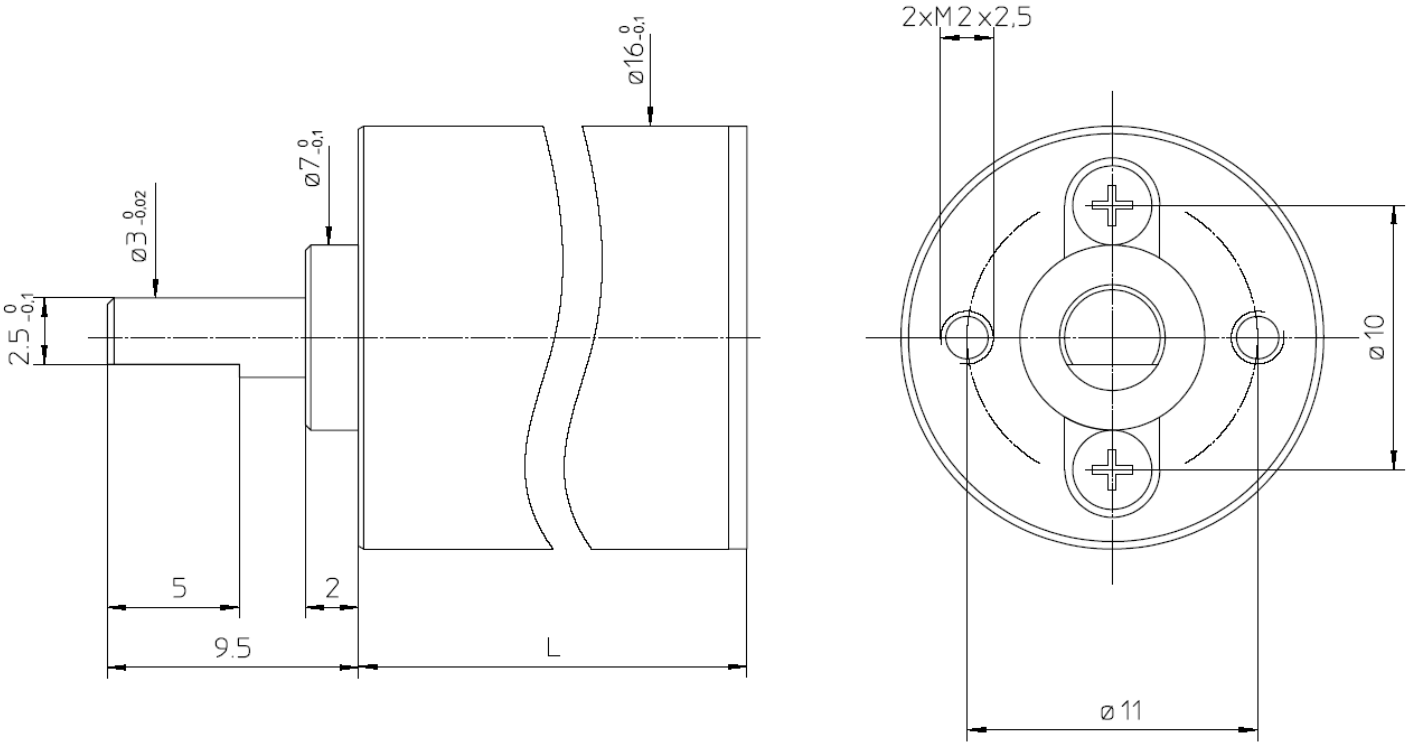
G 16 - - -		15	30	50	75	100	150
Number of gearstages		4	4	5	5	5	5
Efficiency	%	65	65	59	59	59	59
Direction of rotation		=	=	≠	≠	≠	≠
Length	mm	14.4	14.4	14.4	14.4	14.4	14.4
Weight	grms						
Typical backlash, unloaded	Deg°			2°			
Output bearing type				Sleeve bearings			
Maximum continuous torque	mNm	10	20	20	30	30	30
Intermittent torque	mNm						
Max recommended input speed	rpm			5000			
Max radial load at 5mm from the front face	N			15			
Max axial load	N			10			
Max axial load for pressfit	N			30			
Radial play at 5mm from the front face	mm			0.05			
Maximum axial play	mm			0.3			
Operating temperature range							
Gearmotor lengths							
1615+	mm	15.5	29.9	29.9	29.9	29.9	29.9	29.9
1619+	mm	19.7	34.1	34.1	34.1	34.1	34.1	34.1
1624+	mm	23.7	38.1	38.1	38.1	38.1	38.1	38.1

All specifications subject to modification

ST 16

0.049 Nm

Spur Gearbox
Metal gears and housing



Dimensions in mm

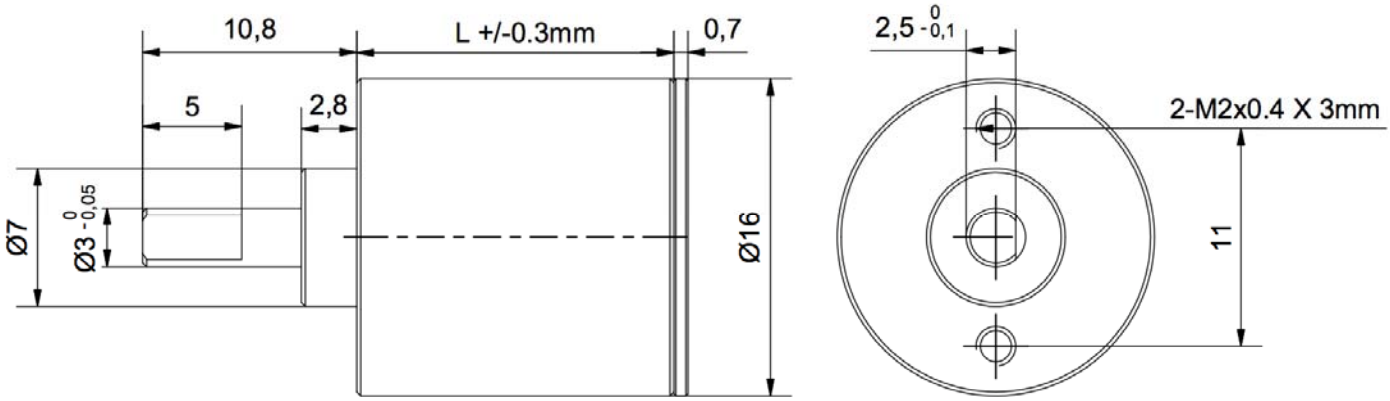
ST 16 - - -		10.6	20.4	28.1	49.4	60.6	100.2	130.1	166.0	206.3	303.5	349.1	481.3
Number of gearstages	#	3	4	4	5	5	6	6	6	6	7	7	7
Efficiency	%	0.73	0.66	0.66	0.59	0.59	0.53	0.53	0.53	0.53	0.48	0.48	0.48
Direction of rotation		≠	=	=	≠	≠	=	=	=	=	≠	≠	≠
Length	mm	14.1	15.5	15.5	16.9	16.9	18.3	18.3	18.3	18.3	19.7	19.7	19.7
Weight	grms	10.0	10.0	10.0	10.0	12.0	12.0	12.0	12.0	14.0	16.1	16.1	16.1
Typical backlash, unloaded	Deg°	2°											
Output bearing type		sleeve bearings											
Maximum continuous torque	mNm	19.6	19.6	29.4	49	49	49	49	49	49	49	49	49
Intermittent torque	mNm	58.8	58.8	88.2	147	147	147	147	147	147	147	147	147
Max recommended input speed	rpm	5000											
Max radial load at 5mm from the front face	N	15											
Max axial load	N	10											
Max axial load for pressfit	N	30											
Radial play at 5mm from the front face	mm	0.1											
Maximum axial play	mm	0.2											
Operating temperature range		-15/+65°C											
Gearmotor lengths													
1615+	mm	29.6	31.0	31.0	32.4	32.4	33.8	33.8	33.8	33.8	35.2	35.2	35.2
1619+	mm	33.8	35.2	35.2	36.6	36.6	38.0	38.0	38.0	38.0	39.4	39.4	39.4
1624+	mm	37.8	39.2	39.2	40.6	40.6	42.0	42.0	42.0	42.0	43.4	43.4	43.4

All specifications subject to modification

PG 16

0.392 Nm

Planetary Gearbox
Metal gears and housing



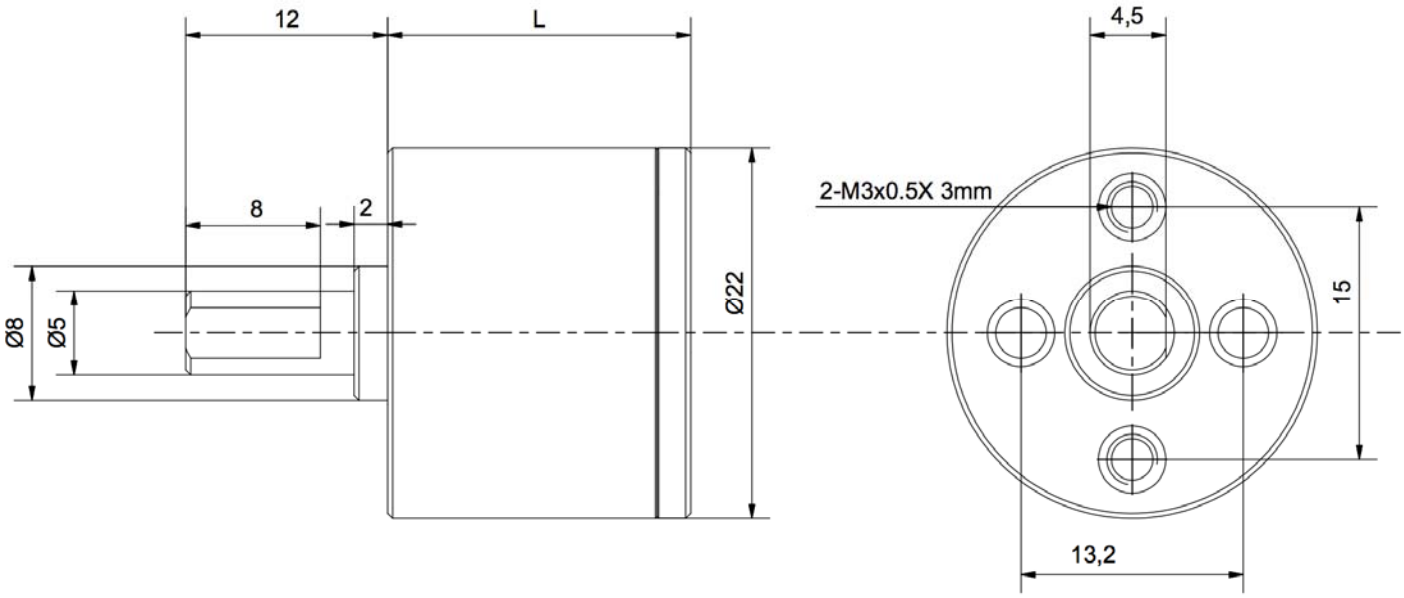
PG 16 - - -		4	16	24	36	64	96	144	216	256	384	576	864	1,296
Number of gearstages	#	1	2	2	2	3	3	3	3	4	4	4	4	4
Efficiency	%	0.85	0.72	0.72	0.72	0.61	0.61	0.61	0.61	0.52	0.52	0.52	0.52	0.52
Direction of rotation		=	=	=	=	=	=	=	=	=	=	=	=	=
Length	mm	11.4	15.5	15.5	15.5	18.6	18.6	18.6	18.6	21.7	21.7	21.7	21.7	21.7
Weight	grms	10.0	14.2	14.2	14.2	18.4	18.4	18.4	18.4	22.6	22.6	22.6	22.6	22.6
Typical backlash, unloaded	Deg°	2°												
Output bearing type		Sleeve bearings												
Maximum continuous torque	mNm	49	49	49	49	98	98	98	98	122.6	196	294	392	392
Intermittent torque	mNm	73.5	110.3	110.3	110.3	147	147	147	147	183.9	294	392	588	588
Max recommended input speed	rpm	5000												
Max radial load at 5mm from the front face	N	15												
Max axial load	N	10												
Max axial load for pressfit	N	30												
Radial play at 5mm from the front face	mm	0.1												
Maximum axial play	mm	0.2												
Operating temperature range		-15/+65°C												
Gearmotor lengths														
1615+	mm	27.6	31.7	31.7	31.7	34.8	34.8	34.8	34.8	37.9	37.9	37.9	37.9	37.9
1619+	mm	31.8	35.9	35.9	35.9	39.0	39.0	39.0	39.0	42.1	42.1	42.1	42.1	42.1
1624+	mm	35.8	39.9	39.9	39.9	43.0	43.0	43.0	43.0	46.1	46.1	46.1	46.1	46.1

All specifications subject to modification

ST 22

0.098 Nm

Spur Gearbox
Metal gears and housing



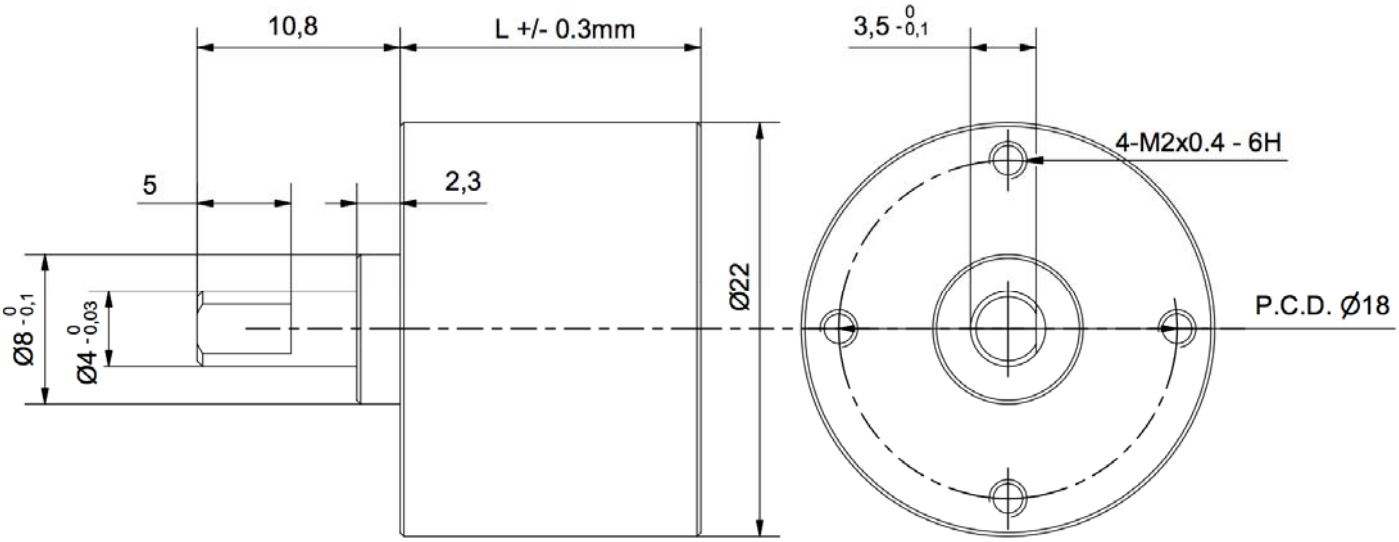
ST 22 - - -		10.0	20.0	30.0	50.0	60.0	75.0	100.0	120.0	150.0	200.0
Number of gearstages	#	4	4	4	5	5	5	6	6	6	7
Efficiency	%	0.6561	0.6561	0.6561	0.5905	0.5905	0.5905	0.5314	0.5314	0.5314	0.5314
Direction of rotation		=	=	=	≠	≠	≠	=	=	=	=
Length	mm	18.0	18.0	18.0	19.0	19.0	19.0	20.8	20.8	20.8	20.8
Weight	grms										
Typical backlash, unloaded	Deg°					2°					
Output bearing type						Sleeve bearings					
Maximum continuous torque	mNm	14.7	29.4	44.1	73.5	88.2	98	98	98	98	98
Intermittent torque	mNm	49	98	147	245	294	294	294	294	294	294
Max recommended input speed	rpm					5000					
Max radial load at 5mm from the front face	N					15					
Max axial load	N					10					
Max axial load for pressfit	N					30					
Radial play at 5mm from the front face	mm					0.1					
Maximum axial play	mm					0.2					
Operating temperature range						-15/+65°C					
Gearmotor lengths											
2225+	mm	43.3	43.3	43.3	44.3	44.3	44.3	46.1	46.1	46.1	46.1
2230+	mm	48.3	48.3	48.3	49.3	49.3	49.3	51.1	51.1	51.1	51.1

All specifications subject to modification

PG 22

0.392 Nm

Planetary Gearbox
Metal gears and housing



PG 22 - - -		4	16	24	36	64	96	144	216	256	384	576	864	1296
Number of gearstages	#	1	2	2	2	3	3	3	3	4	4	4	4	4
Efficiency	%	0.85	0.72	0.72	0.72	0.61	0.61	0.61	0.61	0.52	0.52	0.52	0.52	0.52
Direction of rotation		=	=	=	=	=	=	=	=	=	=	=	=	=
Length	mm	13.1	16.2	16.2	16.2	19.3	19.3	19.3	19.3	22.4	22.4	22.4	22.4	22.4
Weight	grms	31.6	35.8	35.8	35.8	40.0	40.0	40.0	40.0	44.2	44.2	44.2	44.2	44.2
Typical backlash, unloaded	Deg°							2°						
Output bearing type								Paliers lisses						
Maximum continuous torque	mNm	47	47	47	47	98	98	98	98	186	186	392	392	392
Intermittent torque	mNm	141	141	141	141	294	294	294	294	558	558	1176	1176	1176
Max recommended input speed	rpm							5000						
Max radial load at 5mm from the front face	N							15						
Max axial load	N							10						
Max axial load for pressfit	N							30						
Radial play at 5mm from the front face	mm							0.1						
Maximum axial play	mm							0.2						
Operating temperature range								-15/+65°C						
Gearmotor lengths														
2225+	mm	38.7	41.8	41.8	41.8	44.9	44.9	44.9	44.9	48.0	48.0	48.0	48.0	48.0
2230+	mm	43.4	46.5	46.5	46.5	49.6	49.6	49.6	49.6	52.7	52.7	52.7	52.7	52.7

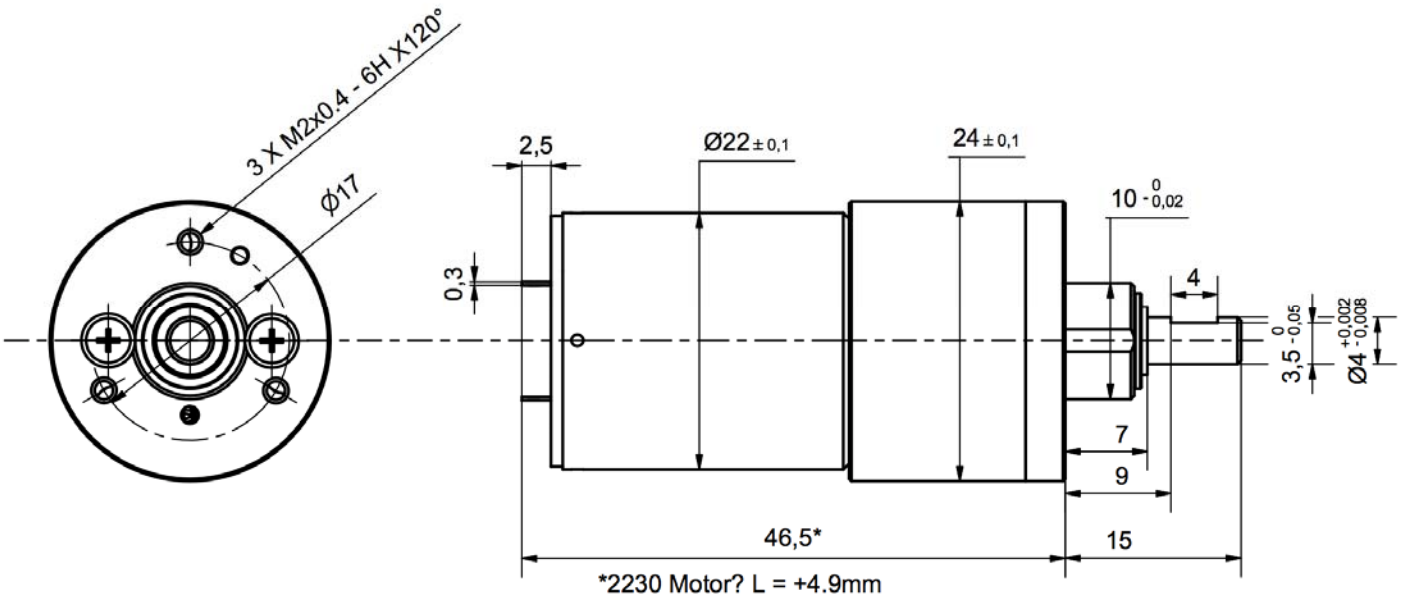
All specifications subject to modification
Options

- **Other shaft configurations**
- **Plastic input gears for noise reduction**

GM 22-S24 2R D 128

0.03 Nm

Spur gearbox
Safety clutch on output
Ironless rotor DC motor



Gearbox

Gear ratio			128		
Number of gearstages			4		
Efficiency	%		67		
Direction of rotation			=		
Typical backlash, unloaded			2°		
Output bearing type			Ball bearings		
Maximum continuous torque	Nm		0.03		
Typical slip torque	Nm		0.03		
Max radial load at 5mm from the front face	N		15		
Max axial load	N		10		
Max axial load for pressfit	N		30		
Radial play at 5mm from the front face	mm		< 0.05		
Maximum axial play	mm		< 0.05		
Max recommended input speed	rpm		3000		
Motor		2230 14G	2230 14G	2225 25G	2225 25G
Measuring voltage	Volts	3	6	3	6
No load speed	rpm	1472	2972	561	1186
Stall torque	mNm	4.15	8.30	0.69	1.37
Torque constant	mNm/A	19.1	19.1	45.9	45.9
Resistance	ohm	13.8	13.8	201	201
Back EMF	V/1'000rpm	2.00	2.00	4.81	4.81
Length	mm	30.3	30.3	25.5	25.5
Gearmotor					
No load speed	rpm	11.5	23.2	4.4	9.3
Typical no load current	mA	4.0	4.0	1.5	1.5
Operating temperature range	°C		-10/+65°C		

Options

- Special shaft, cables, connecteur etc.
- Special motor coil
- Ratio 8:1. (64:1 on request)

Specification subject to modification

MDS 03 D 00/01

0.03 Nm

Spur gearbox
Safety clutch on output.
Ironless rotor DC motor

Gearbox

Gear ratio			128		
Number of gearstages			4		
Efficiency	%		67		
Direction of rotation			=		
Typical backlash, unloaded			2°		
Output bearing type			Ball bearings		
Maximum continuous torque	Nm		0.03		
Typical slip torque	Nm		0.03		
Max radial load at 5mm from the front face	N		15		
Max axial load	N		10		
Max axial load for pressfit	N		30		
Radial play at 5mm from the front face	mm		< 0.05		
Maximum axial play	mm		< 0.05		
Max recommended input speed	rpm		3000		
Motor		2230 14G	2230 14G	2225 25G	2225 25G
Measuring voltage	Volts	3	6	3	6
No load speed	rpm	1472	2972	561	1186
Stall torque	mNm	4.15	8.30	0.69	1.37
Torque constant	mNm/A	19.1	19.1	45.9	45.9
Resistance	ohm	13.8	13.8	201	201
Back EMF	V/1'000rpm	2.00	2.00	4.81	4.81
Length	mm	30.3	30.3	25.5	25.5
Gearmotor					
No load speed	rpm	11.5	23.2	4.4	9.3
Typical no load current	mA	4.0	4.0	1.5	1.5
Operating temperature range	°C		-10/+65°C		

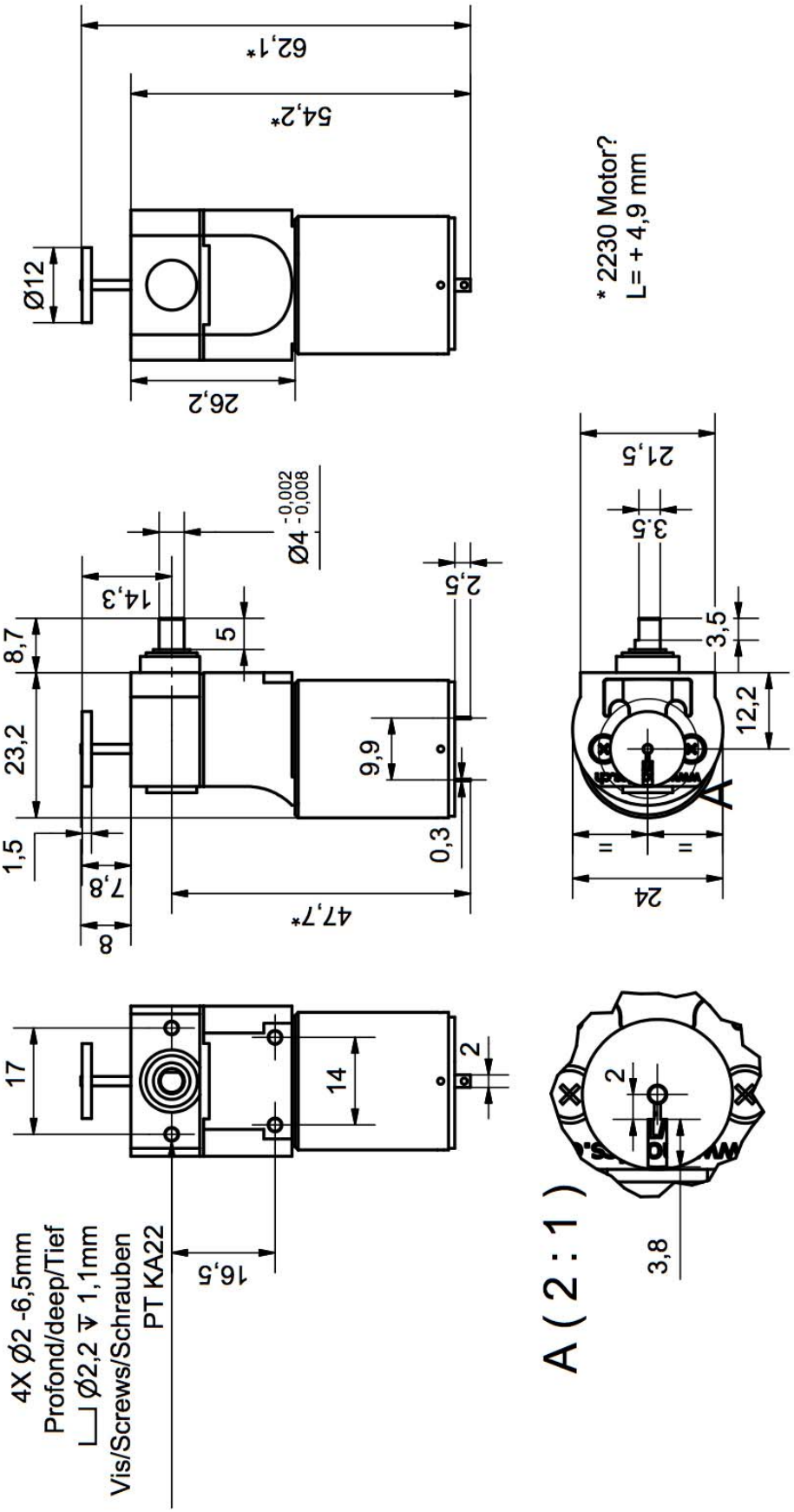
Options

Gear ratio 8:1, (64:1 on request) special shafts, special coils, cables and connector, Electronic driver card.

Specification subject to modification

MDS 03 D 00/01

Spur gearbox
Safety clutch on output
Ironless rotor DC motor

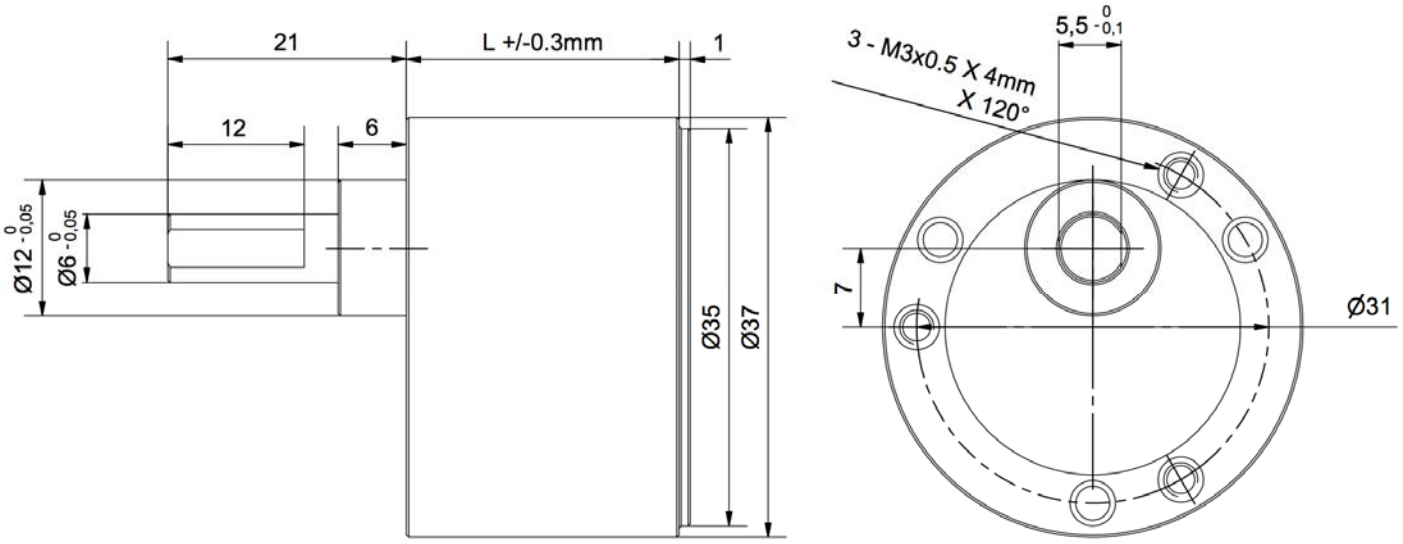


All specifications subject to modification

ST 35

1.764 Nm

Spur Gearbox
Metal gears and housing



ST 35 - - -		10	25	30	50	60	75	100	120	150	200	300	500	750	900
Number of gearstages	#	2	2	2	3	3	3	5	5	5	5	5	6	6	6
Efficiency	%	0.81	0.81	0.81	0.73	0.73	0.73	0.59	0.59	0.59	0.59	0.59	0.53	0.53	0.53
Direction of rotation		=	=	=	≠	≠	≠	≠	≠	≠	≠	≠	≠	≠	=
Length	mm	24.0	24.0	24.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0	29.0
Weight	grms	80.5													
Typical backlash, unloaded	Deg°	2°													
Output bearing type		Sleeve bearings													
Maximum continuous torque	mNm	98	196	196	294	294	294	294	588	588	588	588	588	588	588
Intermittent torque	mNm	98	196	245	392	441	588	735	882	1029	1470	1764	1764	1764	1764
Max recommended input speed	rpm	4000													
Max radial load at 5mm from the front face	N	15													
Max axial load	N	10													
Max axial load for pressfit	N	30													
Radial play at 5mm from the front face	mm	0.1													
Maximum axial play	mm	0.1 - 0.3													
Operating temperature range		-15/+65°C													
Gearmotor lengths															
2225+	mm	50.3	50.3	50.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3	55.3
2230+	mm	55.3	55.3	55.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3

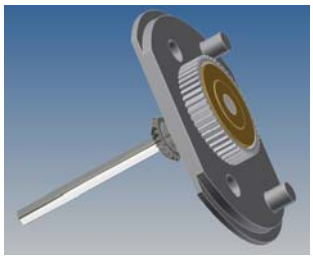
All specifications subject to modification

Specialities

What's your next move?

Roller Technology

Innovative technology based on planetary gearboxes and DC motors. With the roller ends immobilised and the motor powered up, the roller housing rotates, driving massage heads, roller blinds, banknote and card readers etc.

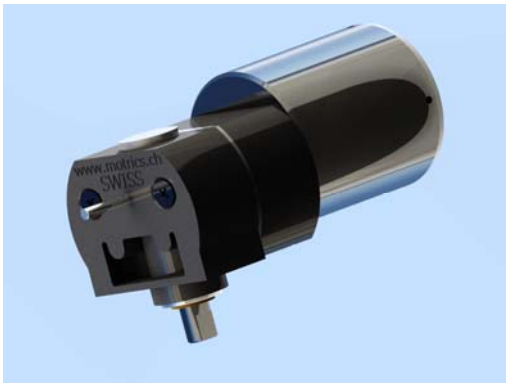


Microclutch

Clutch mechanism entirely integrated into a spur gearbox. Designed as a protection device this clutch can slip many times without degradation of its nominal slip value (for the part shown 40mNm).Available in the MDS03 & GM22-S24.

Special gearboxes

Special gearbox designs. Motrics designs special gearboxes for specific markets and applications. The example shown integrates a simple output encoder for indexing the position of the shaft, and an integrated clutch. After clutch slip the encoder stays synchronised with the output shaft.

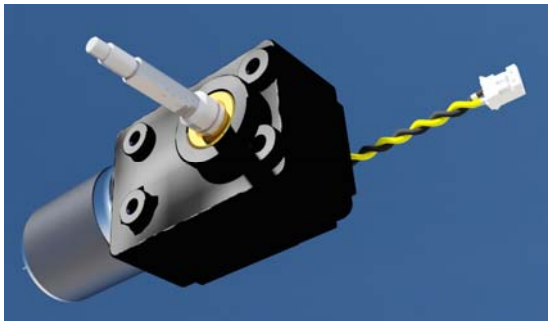


Special Motor designs

Our close relationship with the CI Kasei R&D team allows us to push our dedicated customer solutions further. This photo of a laser welded motor stator and shaft is an example of CI Kasei technology and know-how for extreme applications.

Injection moulding solutions

Internal know-how and our partnerships in Switzerland and Asia give us the possibility to develop extremely complex and cost effective solutions for our customers.
Combining this with access to assembly sites in Switzerland and Asia means our commercial offer covers small to large scale production volumes.



Head office

Motrics Drive Solutions Sàrl
Sur la Cluse 12
CH2300 La Chaux-de-Fonds

Production, R&D

Motrics Drive Solutions Sàrl
Entrepôts 37
CH2300 La Chaux-de-Fonds
Switzerland

info@motrics.ch

Tel. +41 32 968 34 25
Fax + 41 32 968 34 24

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Your contact: