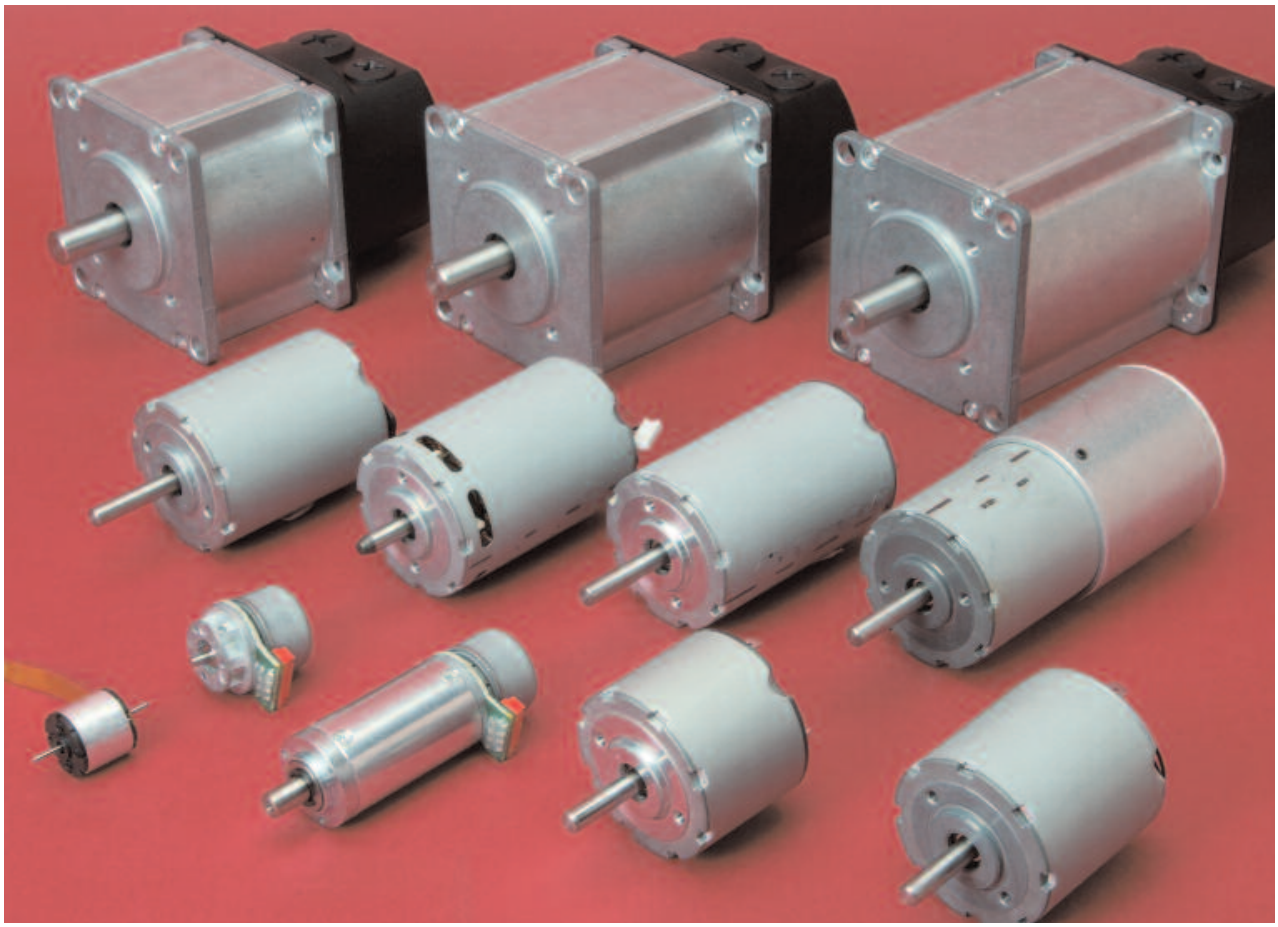
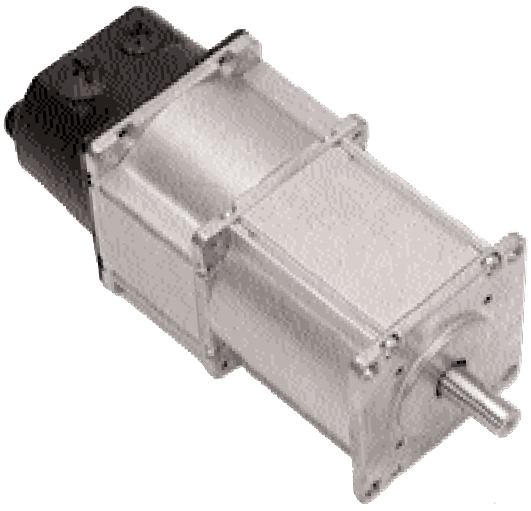
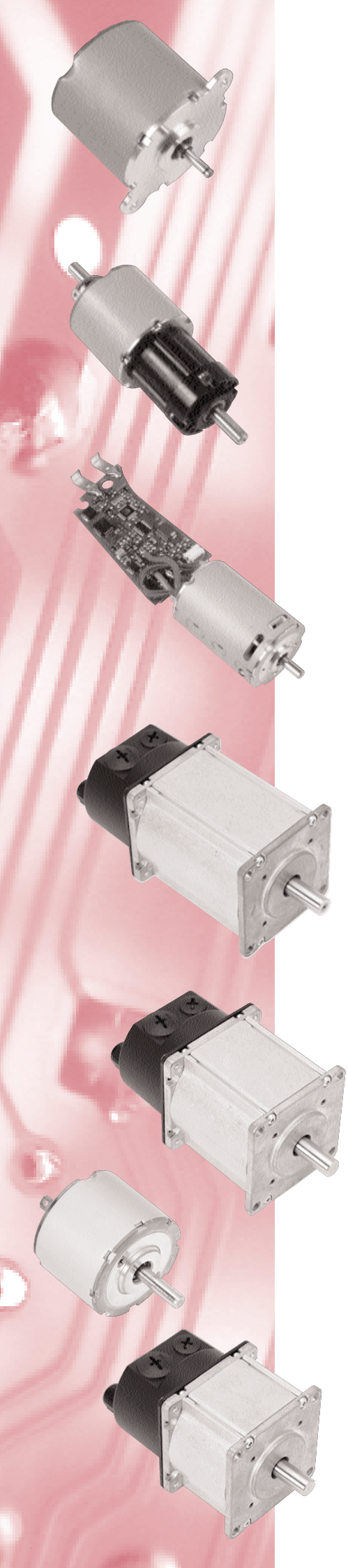
MOTORS

BRUSHLESS DC





Minebea
European Operations



Introduction

NMB Minebea is a world leader in the design and manufacture of precision brushless DC motors and stepping motors. The company offers a broad range of standard and custom designed brushless DC motors for OEM users.

New brushless DC motor series have been introduced and specified in this catalogue; They reflect efforts of the advanced engineering design center as well as leading edge production technology and on-going quality control programs that assure complete customer satisfaction.
All these brushless DC motors are developed at PM°DM GmbH (Precision-Motors-Deutsche-Minebea-GmbH) in Villingen-Schwenningen, Germany, NMB Minebea's worldwide development center for brushless DC motors.

NMB Minebea provides complete in-house volume production capabilities. These exclusive features include internal production of miniature precision bearings, die coating, lamination stamping and injection molding in addition to one of the largest tool and die centers in the industry. Such capabilities and facilities reflect the company's dedication to vertical integration and the resultant product quality at competitive prices.

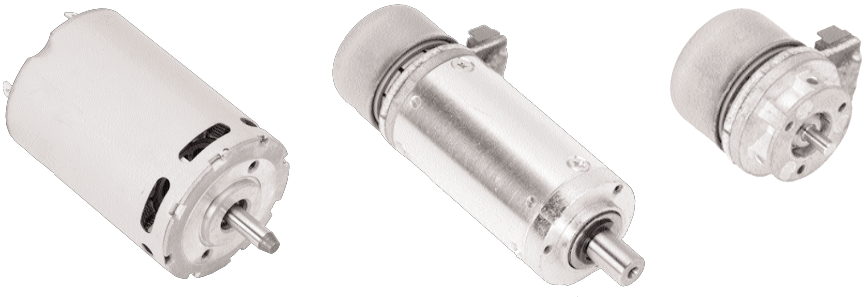
NMB Minebea is a leader in both material research and automated production technology. Since March 1993, the company is also a forerunner in the area of environmental safety. All subsidiaries and companies are CFC and trichlorethylene free.

NMB Minebea GmbH and PM°DM GmbH are subsidiaries of the Minebea Co. Ltd. Group of worldwide companies. NMB Minebea GmbH and PM°DM GmbH have access to all the extensive resources of other group companies around the globe. We offer products to satisfy the most demanding requirements of our customers worldwide. We can support your engineers to find the best possible solution.

The high quality of our products is achieved by a continuous and permanent quality control.

NMB Minebea is certified according to DIN EN ISO 9000, our manufacturing plants are DIN EN ISO 9000, DIN EN ISO 14001 and QS 9000 certified. Additional, the development center PM°DM GmbH is certified according to ISO/TS 16949. Of course, all our motors are RoHS compliant.

This catalog does not constitute a part of the product specification and is intended only as reference material in aiding with the selection of a motor. Also, please note that the contents of these pages are liable to change without notice. Even if there are any changes to the information given here, this will have no influence whatsoever on products for which specifications have already been agreed upon and which are in production. If there should be any impact on products already manufactured, we will make arrangements with the customer to deal with the matter separately through a request for approval of changes. We ask for your understanding and cooperation.



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Revision October 2007

Minebea European Operations

Key

Pin	Function
1	W
2	V
3	U
4	GND
5	Vcc
6	H1
7	H2
8	H3

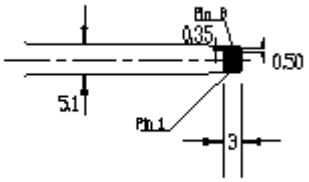
Pin	Function
1	H1
2	Vcc
3	H3
4	W
5	GND
6	U
7	H2
8	V

BLDC15

matching ZIF-connectors:
JST 08FLZ-SM1_TB
Molex 52745-0890

minimum bending radius of FPC:
3 mm

min.Vcc: 3.5V
max. Vcc: 20V



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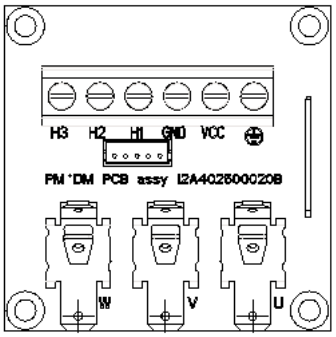
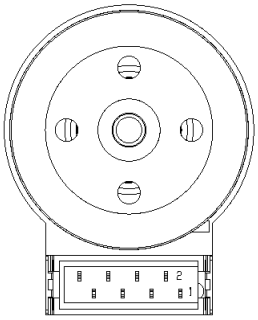


BLDC20-OR

matching connector:
Tyco 215083-08

min.Vcc: 3.5V
max. Vcc: 20V



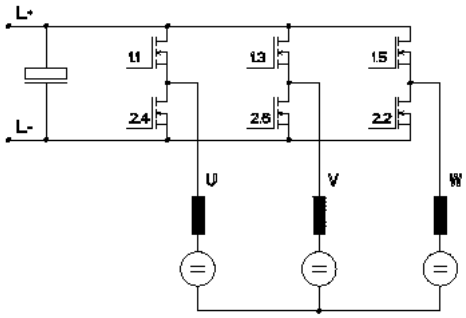
Connector AMP Micromatch
female 0-338068-8

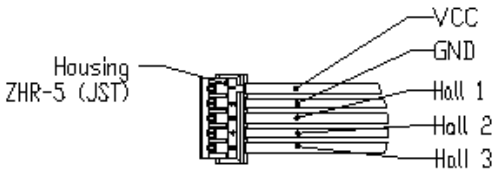
BLDC40
Hall ICs

matching connector:
JST S5B-ZR-SM3A-TF

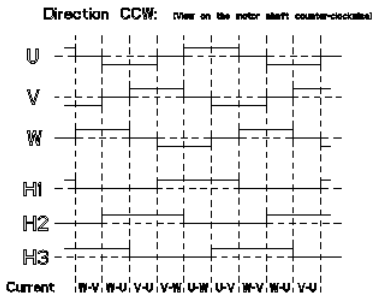
min.Vcc: 3.5V
max. Vcc: 20V

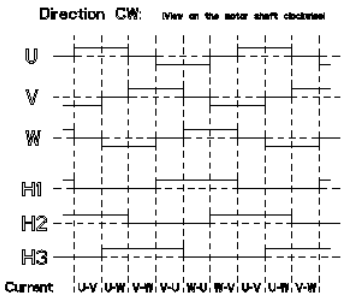
Phases: Terminals 4.8mm x 0.8 mm





BLDC15





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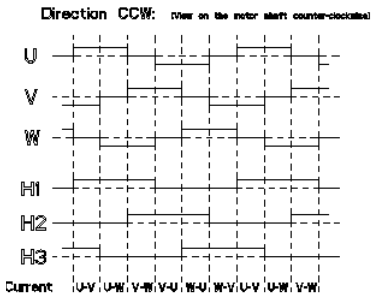
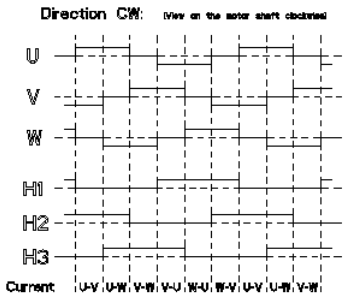
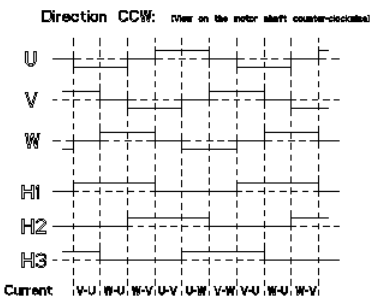




BLDC40 8-pol BLDC40 14-pol



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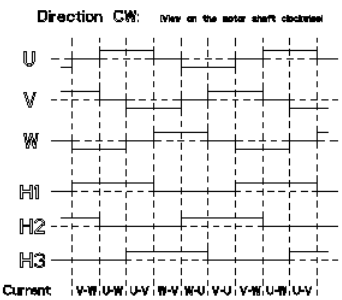
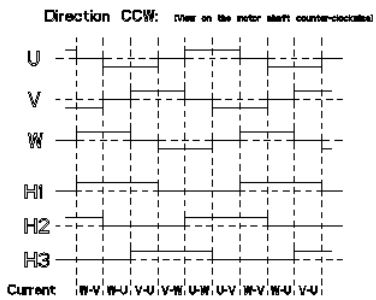
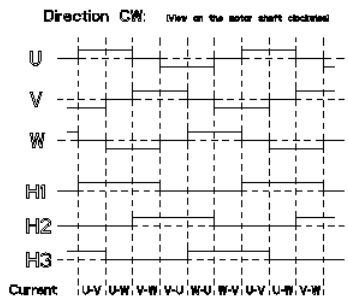


BLDC40 16-pol





Definitions

Abbr.	Unit	Characteristics
T_s	mNm	**Stall torque:** Peak torque at standstill without current limitation (very short time).
T_{max}	mNm	**Maximum usable torque:** Limited by the maximum current.
T_0	mNm	**Continuous stall torque:** Torque at standstill at a max. mean temperature of the windings of 70K.
T_n	mNm	**Continuous torque:** Motor torque at continuous power / nominal power.
P_n	W	**Continuous power:** Mechanical motor power at rated speed and continuous torque.
n_n	rpm	**Rated speed:** Motor speed at continuous power / nominal power/ rated voltage
n_0	rpm	**No load speed:** Max. achievable motor speed at rated voltage.
I_{max}	A	**Max. allowable motor current:** Limited by the heating of the windings or by the servo controller.
I_0	A	**Continuous stall current:** Winding current that produces the continuous stall torque T_0.
R_{phph}	Ohm	**Connection resistance:** Resistance measured at 20°C (68°F) ambient temperature between two phase of the motor winding.
L_{phph}	mH	**Connection inductance:** Inductance measured at 20°C (68°F) ambient temperature between two phases of the motor winding, measured at 1kHz.
J	gcm^2	**Rotor mass moment of inertia:** Polar mass moment of inertia of the rotor.
T_E	ms	**Electrical time constant:** Describes the behaviour of the motor windings in the current control loop. It is the ratio of motor inductance to resistance: $T_E = L_{phph} / R_{phph}$.
T_M	ms	**Mechanical time constant:** Describes the time to accelerate the motor to 63 % of his final speed under no load conditions
K_e	V/rpm	**Back EMF constant:** The back EMF (back electro motif force) generated by the motor is directly proportional to the angular velocity of the motor. The proportionality constant is the back EMF constant of the motor.
K_t	mNm/A	**Motor torque constant:** Ratio of motor torque to current applied to the motor windings.
K_n	rpm/V	**Speed constant:** Describes the relationship between speed and voltage of a motor.

Conversion Tables

Torque conversion factors

	Nm	Ncm	mNm	dyn cm	kgm	kgcm	gcm	oz in
Nm	1	10^{2}	10^{3}	10^{7}	0.1019716	10.19716	$1.019716\text{-}10^{4}$	$1.41612\text{-}10^{2}$
Ncm	10^{-2}	1	10^{1}	10^{5}	$1.019716\text{-}10^{-3}$	0.1019716	$1.019716\text{-}10^{2}$	1.41612
mNm	10^{-3}	10^{-1}	1	10^{4}	$1.019716\text{-}10^{-4}$	0.01019716	10.19716	0.141612
dyn cm	10^{-7}	10^{-5}	10^{-4}	1	$1.019716\text{-}10^{-8}$	$1.019716\text{-}10^{-6}$	$1.019716\text{-}10^{-3}$	$1.41612\text{-}10^{-5}$
kgm	9.80665	$9.80665\text{-}10^{2}$	$9.80665\text{-}10^{3}$	$9.80665\text{-}10^{7}$	1	10^{2}	10^{5}	$1.38874\text{-}10^{3}$
kgcm	$9.80665\text{-}10^{-2}$	9.80665	98.0665	$9.80665\text{-}10^{5}$	10^{-2}	1	10^{3}	13.8874
gcm	$9.80665\text{-}10^{-5}$	$9.80665\text{-}10^{-3}$	$9.80665\text{-}10^{-2}$	$9.80665\text{-}10^{2}$	10^{-5}	10^{-3}	1	$1.38874\text{-}10^{-2}$
oz in	$7.06155\text{-}10^{-3}$	0.706155	7.06155	$7.06155\text{-}10^{4}$	$7.20077\text{-}10^{-4}$	$7.20077\text{-}10^{-2}$	72.0077	1

Moment of inertia conversion factors

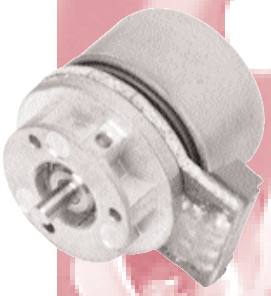
	kgm ^{2}	kgcm ^{2}	gcm ^{2}	kgm s ^{2}	kgcm s ^{2}	gcm s ^{2}	oz in ^{2}	oz in s ^{2}
kgm ^{2}	1	10^{4}	10^{7}	0.101972	10.1972	$1.01972\text{-}10^{4}$	$5.46745\text{-}10^{4}$	$1.41612\text{-}10^{2}$
kgcm ^{2}	10^{-4}	1	10^{3}	$1.01972\text{-}10^{-5}$	$1.01972\text{-}10^{-3}$	1.01972	5.46745	$1.41612\text{-}10^{-2}$
gcm ^{2}	10^{-7}	10^{-3}	1	$1.01972\text{-}10^{-8}$	$1.01972\text{-}10^{-6}$	$1.01972\text{-}10^{-3}$	$5.46745\text{-}10^{-3}$	$1.41612\text{-}10^{-5}$
kgm s ^{2}	9.80665	$9.80665\text{-}10^{-4}$	$9.80665\text{-}10^{-7}$	1	10^{2}	10^{5}	$5.36174\text{-}10^{5}$	$1.38874\text{-}10^{3}$
kgcm s ^{2}	$9.80665\text{-}10^{-2}$	$9.80665\text{-}10^{2}$	$9.80665\text{-}10^{5}$	10	1	10^{3}	$5.36174\text{-}10^{3}$	13.8874
gcm s ^{2}	$9.80665\text{-}10^{-5}$	0.980665	$9.80665\text{-}10^{2}$	10^{-5}	10^{-3}	1	5.36174	$1.38874\text{-}10^{-2}$
oz in ^{2}	$1.82901\text{-}10^{-5}$	0.182901	$1.82901\text{-}10^{2}$	$1.86506\text{-}10^{-6}$	$1.86506\text{-}10^{-4}$	0.186506	1	$2.59008\text{-}10^{-3}$
oz in s ^{2}	$7.06154\text{-}10^{-3}$	70.6154	$7.06154\text{-}10^{4}$	$7.20077\text{-}10^{-4}$	$7.20077\text{-}10^{-2}$	72.00766	$3.86089\text{-}10^{2}$	1

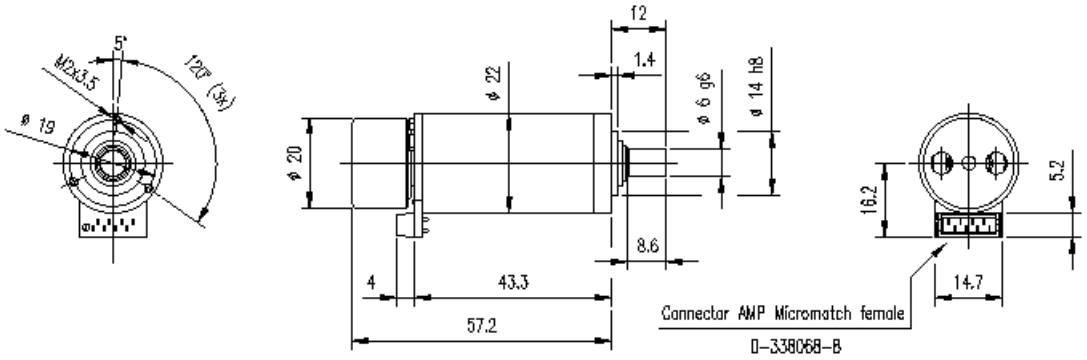
BLDC20-OR

General Specification
Insulation class B
Protection IP20
Operating temperature – 20 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 2 N (5mm from flange)
Max. axial load 2 N
12 pole design
Rated voltage 12V

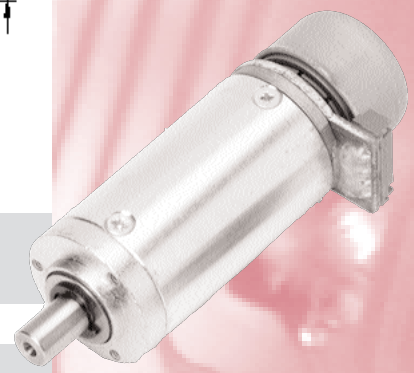
Features
Excellent power to volume ratio
High efficiency at operating point
High reliability

Options
Prepared for planetary gearbox,
e.g. IMS Gear





BLDC20-OR-GB

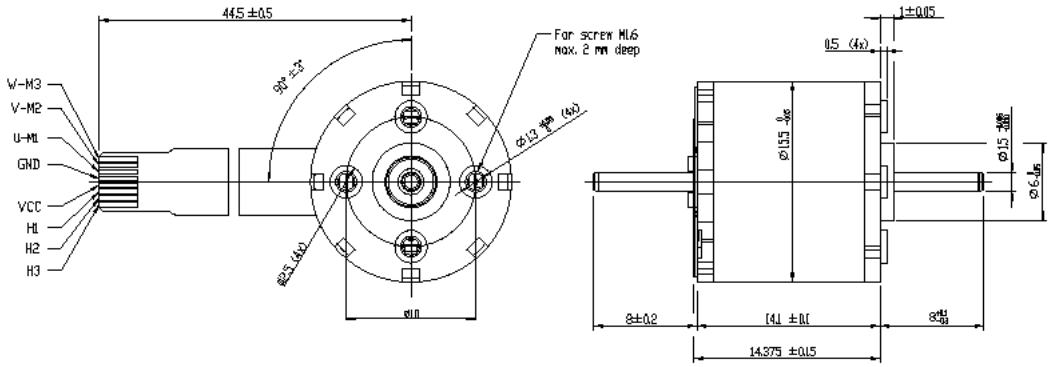


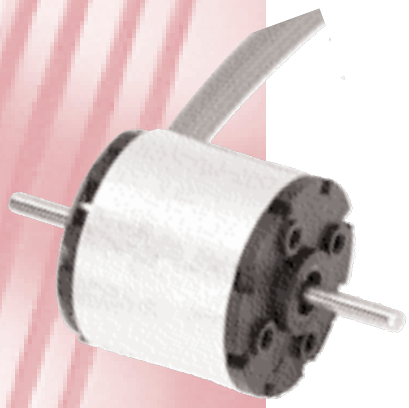
NMB-Partnumber		BLDC20-OR-GB169 46.1.014
Rated Voltage	[V]	12
Rated Speed	[rpm]	41.4
Continuous Torque	[mNm]	314
Resistance per Phase *1)	[h]	7.4
Inductance per Phase	[mH]	0.97
Rotor Inertia	[gcm²]	6.1
Number of Poles		12
Max. Radial Play	[°]	2.5
Max. Radial Load	[N]	80
Max. Axial Load	[N]	30
Weight	[g]	130

*1) resistance phase to phase at 20°C

Minebea European Operations

BLDC15





General Specification
Insulation class F
Housing protection IP30
Operating temperature – 0 ° C … + 45°C
2 NMB ballbearings for high lifetime
Max. radial load 2 N (5mm from flange)
Max. axial load 2 N

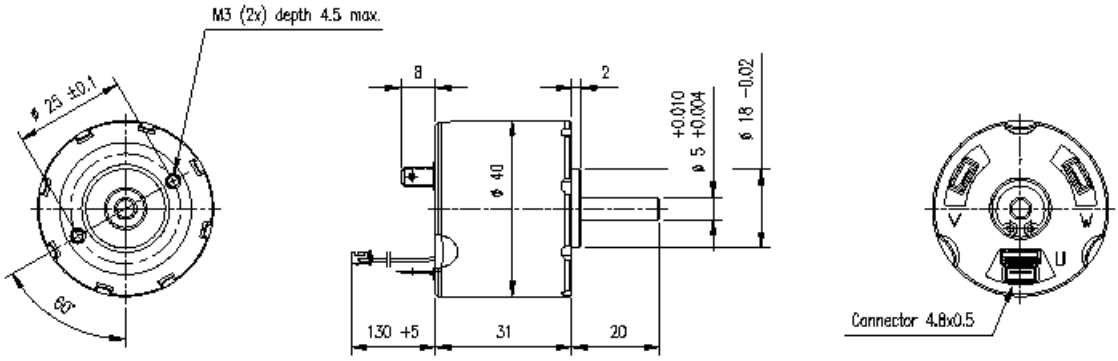
Features
Excellent power to volume ratio
High efficiency at operating point
High reliability

Options
Without rear shaft

NMB-Partnumber		BLDC15P06-6V 43.1.0106	BLDC15P06-12V 43.1.0106
Rated Voltage	[V]	6	12
Rated Speed	[rpm]	3600	10000
Continuous Power	[W]	0.84	2
Continuous Torque	[mNm]	2.2	1.96
Continous Stall Torque	[mNm]	2.8	2.8
Efficiency at Rated Speed	[%]	54.2	75.4
Current at Rated Speed	[A]	0.255	0.23
No Load Speed	[rpm]	6500	12200
Resistance per Phase *1)	[h]	9.8	9.8
Inductance per Phase	[mH]	0.51	0.51
Torque Constant	[mNm/A]	8.8	8.8
Speed Constant	[rpm/V]	1085	1085
Mech. Time Constant	[ms]	10.1	10.1
Rotor Inertia	[gcm^2]	0.8	0.8
Number of Poles		12	12
Weight	[g]	15	15
Thermal Resistance *2)	[K/W]	40	40

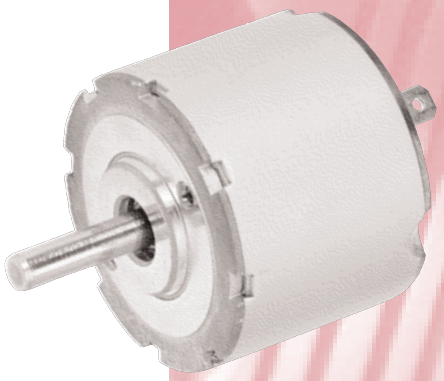
*1) resistance phase to phase at 20°C
*2) thermal resistance winding to ambient

BLDC40P10



General Specification

Insulation class F
Protection IP20
Operating temperature – 20 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N



Features

Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

Options

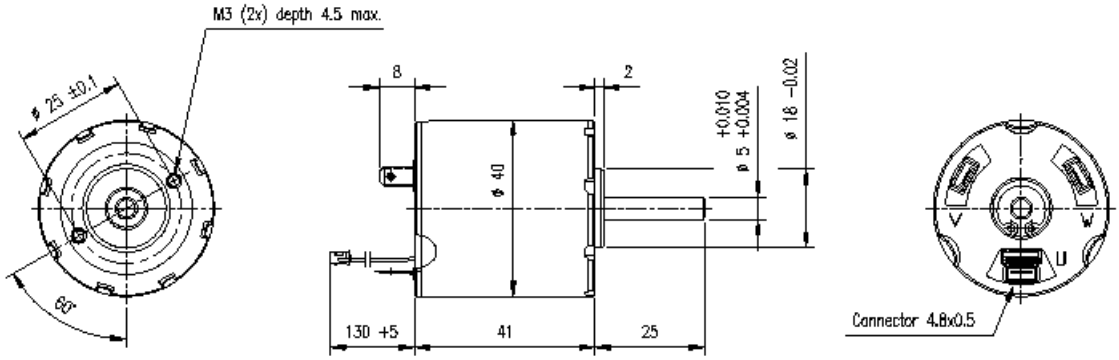
Driver

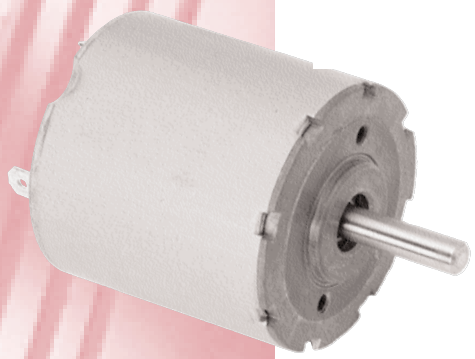
NMB-Partnumber		BLDC40P10A-12V 38.1.040	BLDC40P10A-24V 38.1.040
Rated Voltage	[V]	12	24
Rated Speed	[rpm]	3000	6000
Continuous Power	[W]	19	33
Continuous Torque *1)	[mNm]	60	52
Continuous Stall Torque	[mNm]	70	70
Efficiency at Rated Speed	[%]	79.1	84.2
Current at Rated Speed	[A]	2.0	1.7
No Load Speed	[rpm]	3600	7000
Resistance per Phase *2)	[h]	1.58	1.58
Inductance per Phase	[mH]	1.3	1.3
Torque Constant	[mNm/A]	30	30
Speed Constant	[rpm/V]	308.1	308.1
Mech. Time Constant	[ms]	1.95	1.95
Rotor Inertia	[gcm^2]	16	16
Number of Poles		14	14
Weight	[g]	160	160
Thermal Resistance *3) *4)	[K/W]	9	9

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted on a sheet metal 210 mm x 40 mm x 0.8 mm

Minebea European Operations

BLDC40P20A
BLDC40S20A





General Specification
Insulation class F
Housing protection IP20
Operating temperature – 20 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N

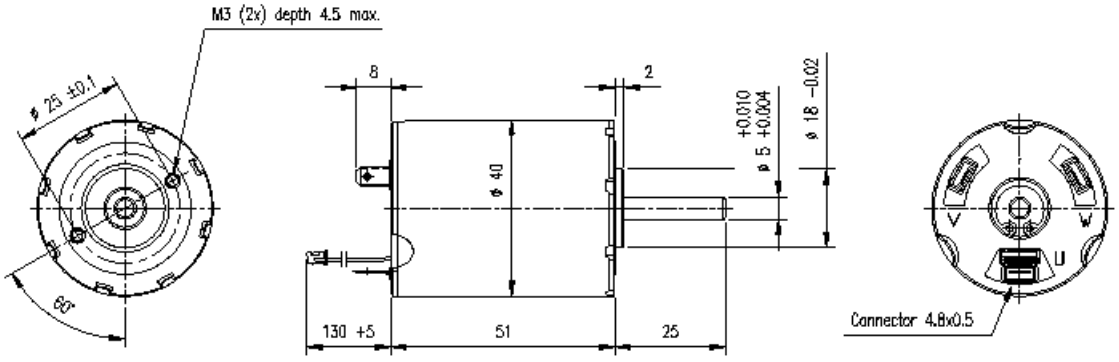
Features
Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

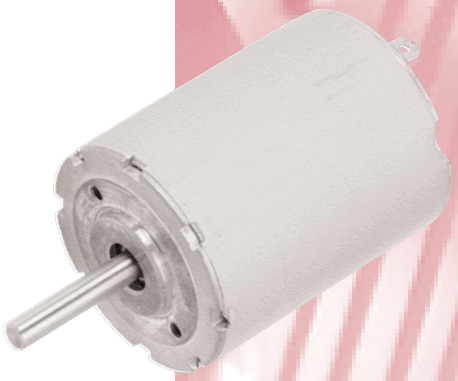
Options
Driver

NMB-Partnumber		BLDC40P20A-24V 40.1.040	BLDC40S20A-24V 39.1.040D
Rated Voltage	[V]	24	24
Rated Speed	[rpm]	3000	3000
Continuous Power	[W]	31	47
Continuous Torque *1)	[mNm]	100	150
Continuous Stall Torque	[mNm]	121	250
Efficiency at Rated Speed	[%]	82.7	84.4
Current at Rated Speed	[A]	1.6	2.2
No Load Speed	[rpm]	3400	3400
Resistance per Phase *2)	[h]	2.65	0.85
Inductance per Phase	[mH]	2.6	0.8
Torque Constant	[mNm/A]	60	70
Speed Constant	[rpm/V]	155.3	136.4
Mech. Time Constant	[ms]	1.6	0.68
Rotor Inertia	[gcm^2]	28	36
Number of Poles		14	16
Weight	[g]	220	235
Thermal Resistance *3) *4)	[K/W]	7	7

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted on a sheet metal 210 mm x 40 mm x 0.8 mm

BLDC40P30A
BLDC40S30A





General Specification

Insulation class F
Protection IP20
Operating temperature – 20 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N

Features

Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

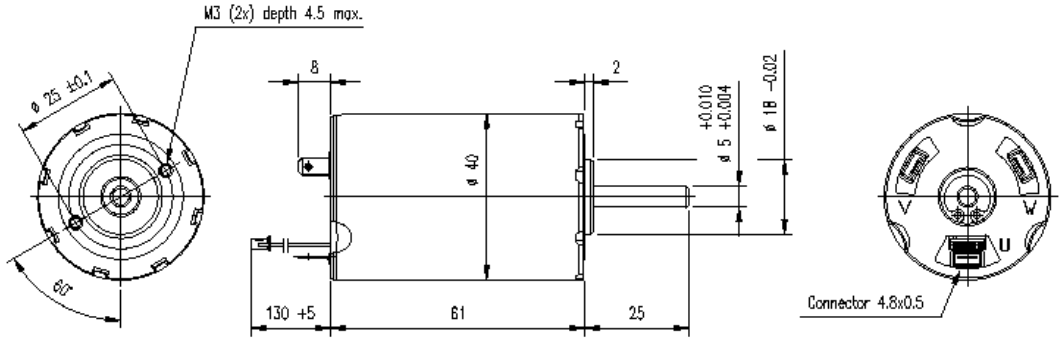
Options

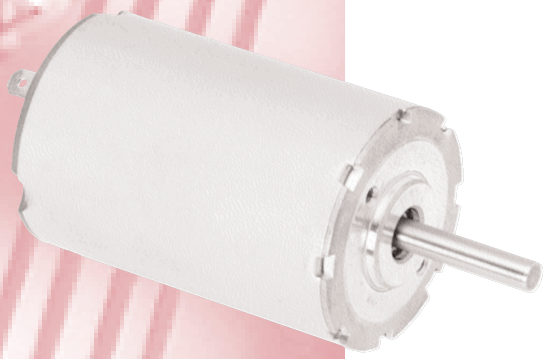
Driver

NMB-Partnumber		BLDC40P30A-24V 25.1.050	BLDC40S30A-24V 25.1.050D
Rated Voltage	[V]	24	24
Rated Speed	[rpm]	3000	3000
Continuous Power	[W]	44	63
Continuous Torque *1)	[mNm]	140	200
Continuous Stall Torque	[mNm]	155	300
Efficiency at Rated Speed	[%]	83.1	89.4
Current at Rated Speed	[A]	2.3	3.0
No Load Speed	[rpm]	3700	3400
Resistance per Phase *2)	[h]	1.46	0.50
Inductance per Phase	[mH]	1.50	0.40
Torque Constant	[mNm/A]	60	66
Speed Constant	[rpm/V]	158.4	143.6
Mech. Time Constant	[ms]	1.60	0.57
Rotor Inertia	[gcm^2]	40	50
Number of Poles		14	16
Weight	[g]	280	280
Thermal Resistance *3) *4)	[K/W]	6	6

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted on a sheet metal 210 mm x 40 mm x 0.8 mm

BLDC40S40A





General Specification
Insulation class F
Protection IP20
Operating temperature – 20 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N

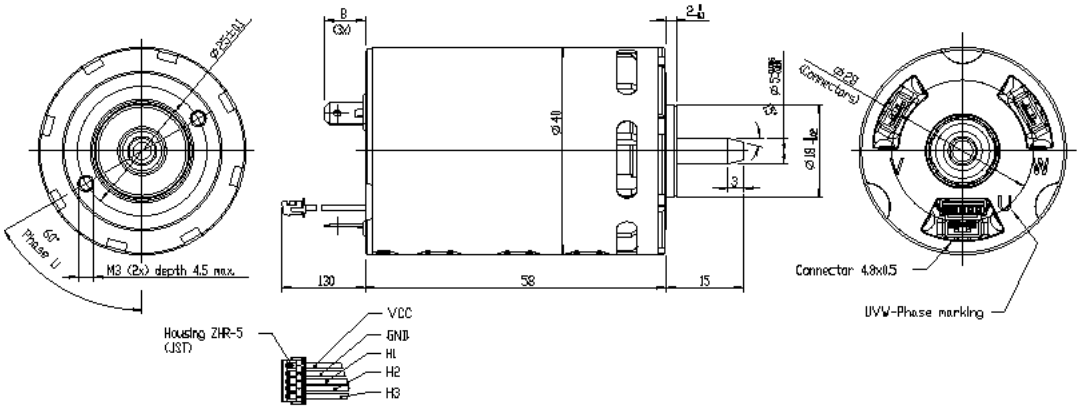
Features
Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

Options
Driver, Encoder

NMB-Partnumber		BLDC40S40A-12V 18.1.056D	BLDC40S40A-24V 18.1.056D
Rated Voltage	[V]	12	24
Rated Speed	[rpm]	1200	3000
Continuous Power	[W]	38.2	79
Continuous Torque *1)	[mNm]	300	250
Continuous Stall Torque	[mNm]	390	390
Efficiency at Rated Speed	[%]	71.7	85.4
Current at Rated Speed	[A]	4.7	3.9
No Load Speed	[rpm]	1800	3600
Resistance per Phase *2)	[h]	0.25	0.25
Inductance per Phase	[mH]	0.30	0.30
Torque Constant	[mNm/A]	63	63
Speed Constant	[rpm/V]	151.6	151.6
Mech. Time Constant	[ms]	0.58	0.58
Rotor Inertia	[gcm²]	64	64
Number of Poles		16	16
Weight	[g]	370	370
Thermal Resistance *3) *4)	[K/W]	5	5

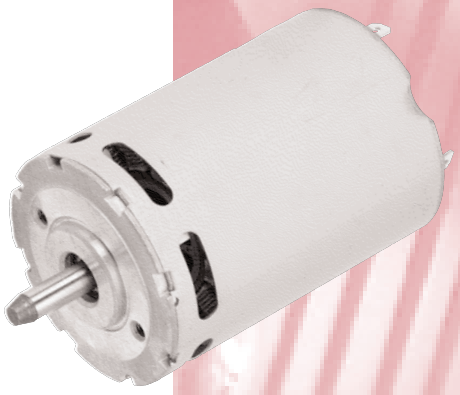
*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted on a sheet metal 210 mm x 40 mm x 0.8 mm

BLDC40P30F
High Speed



General Specification

Insulation class F
Protection IP20
Cooling fan included
Operating temperature – 20 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N



Features

Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

Options

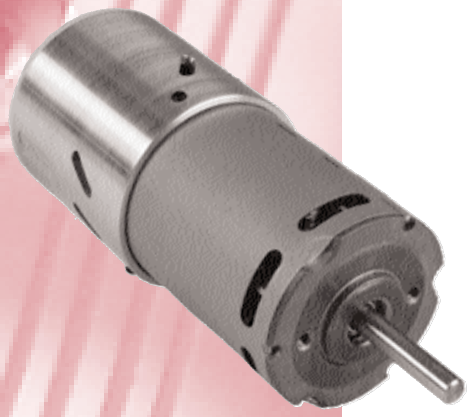
Driver

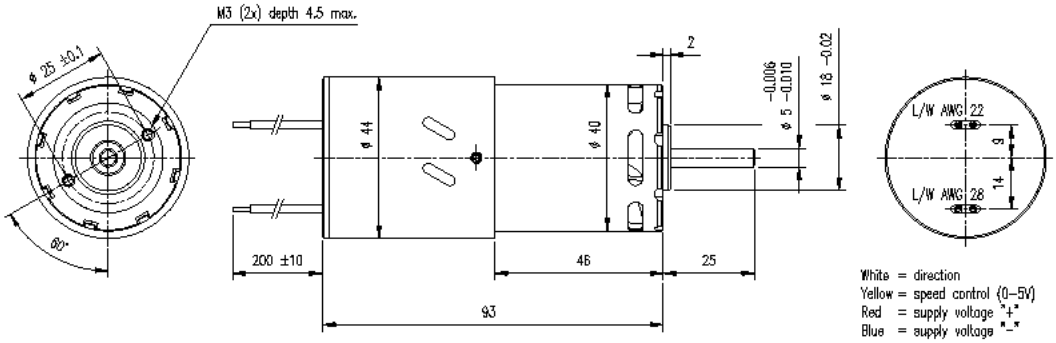
NMB-Partnumber		BLDC40P30F-12V 10P2.071D	BLDC40P30F-18V 16P2.063D
Rated Voltage	[V]	12	18
Rated Speed	[rpm]	14500	15000
Continuous Power	[W]	210	220
Continuous Torque *1)	[mNm]	140	140
Continuous Stall Torque	[mNm]	155	155
Efficiency at Rated Speed	[%]	84.7	80.4
Current at Rated Speed	[A]	23.3	15.5
No Load Speed	[rpm]	18500	18500
Resistance per Phase *2)	[h]	0.026	0.050
Inductance per Phase	[mH]	0.016	0.042
Torque Constant	[mNm/A]	6	9
Speed Constant	[rpm/V]	1592	1061
Mech. Time Constant	[ms]	3.3	2.8
Rotor Inertia	[gcm²]	60	60
Number of Poles		8	8
Weight	[g]	290	290
Thermal Resistance *3) *4)	[K/W]	3	3

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted on a sheet metal 210 mm x 40 mm x 0.8 mm

Minebea European Operations

BLDC40X-DRV-F





General Specification

Insulation class F
Protection IP20
Cooling fan included
Operating temperature – 10 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N

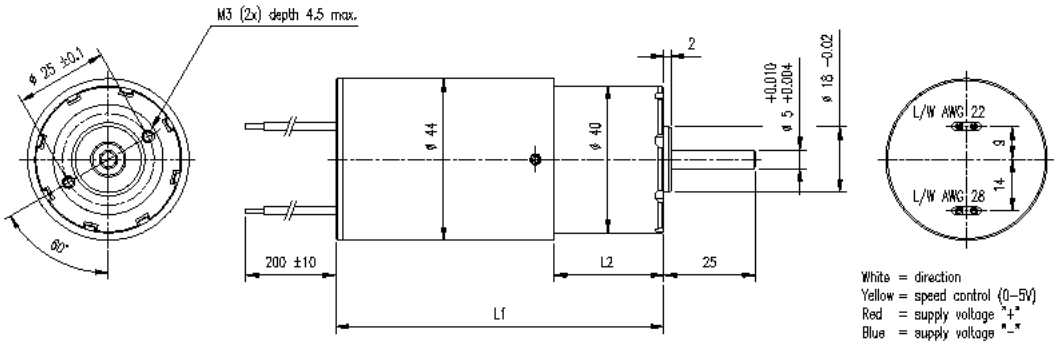
Features

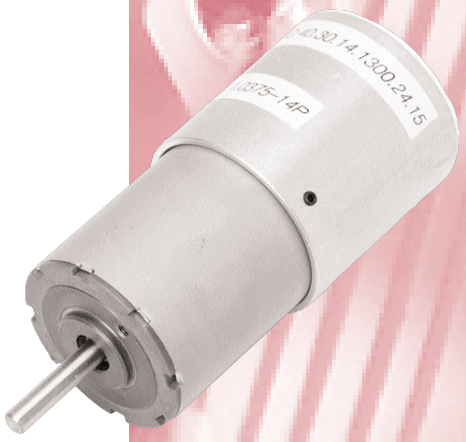
Supply voltage 12 - 48 V DC
Speed control (analogue input 0 - 5 V DC)
Bidirectional drive
Soft direction change by ramps
Temperature sensor integrated
Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

NMB-Partnumber		BLDC40P30F DRV-A2 10P2.071D	BLDC40P30F DRV-A2 16P2.063D
Rated Voltage	[V]	12	18
Rated Speed	[rpm]	14500	15000
Continuous Power	[W]	210	220
Continuous Torque *1)	[mNm]	140	140
No Load Speed	[rpm]	18500	18500
Torque Constant	[mNm/A]	6	9
Speed Constant	[rpm/V]	1592	1061
Rotor Inertia	[gcm²]	60	60
Weight	[g]	330	330
L1	[mm]	93	93
L2	[mm]	46	46

*1) motor torque at 70K temperature rising of winding

BLDC40X-DRV





General Specification

Insulation class F
Protection IP32
Operating temperature – 10 ° C … + 70°C
2 NMB ballbearings for high lifetime
Max. radial load 80 N (5mm from flange)
Max. axial load 50 N

Features

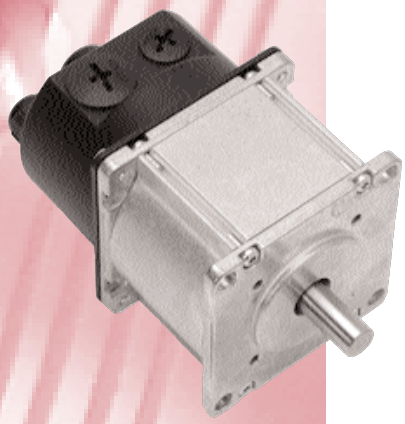
Supply voltage 12 - 48 V DC
Speed control (analogue input 0 - 5 V DC)
Bidirectional drive
Soft direction change by ramps
Temperature sensor integrated
Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

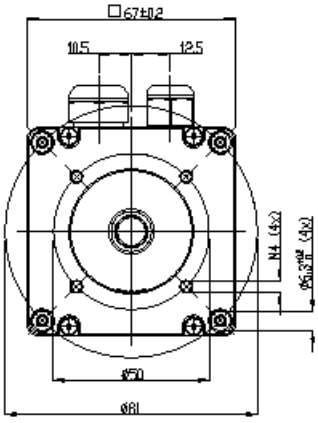
NMB-Partnumber		BLDC40P10A DRV-A2 38.1.040	BLDC40P20A DRV-A2 40.1.040	BLDC40P30A DRV-A2 25.1.050	BLDC40S40A DRV-A2 18.1.056D
Rated Voltage	[V]	24	24	24	24
Rated Speed	[rpm]	6000	3000	3000	3000
Continuous Power	[W]	33	31	44	79
Continuous Torque *1)	[mNm]	52	100	140	250
No Load Speed	[rpm]	7000	3400	3700	3600
Torque Constant	[mNm/A]	30	60	60	63
Speed Constant	[rpm/V]	308.1	155.3	158.4	151.6
Rotor Inertia	[gcm²]	16	28	40	64
Weight	[g]	230	260	320	390
L1	[mm]	66	76	86	96
L2	[mm]	19	29	39	49

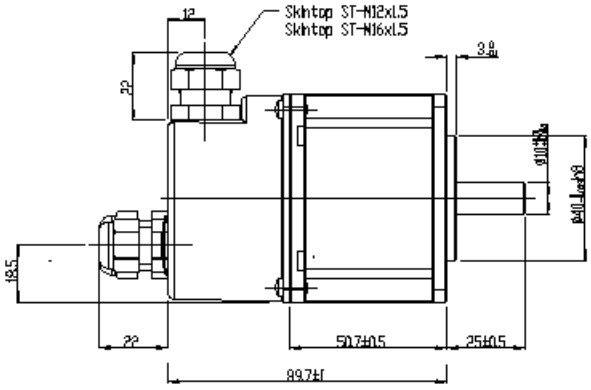
*1) motor torque at 70K temperature rising of winding

Minebea European Operations

BLDC65S18







General Specification
Insulation class F
Protection IP54
Operating temperature – 20 °C … + 70 °C
2 NMB ballbearings for high lifetime
Max. radial load 150 N (10 mm from flange)
Max. axial load 100 N

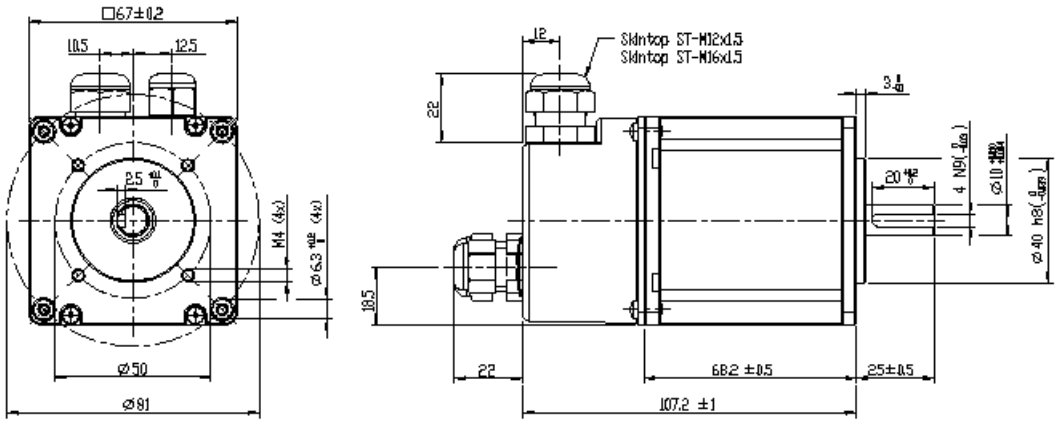
Features
Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

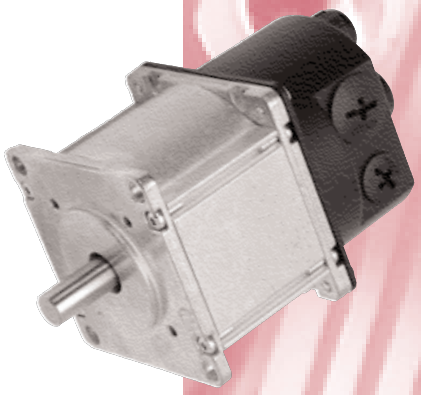
Options
Integrated driver

NMB-Partnumber		BLDC65S18A 81P040	BLDC65S18A 40.1.060
Rated Voltage	[V]	24	48
Rated Speed	[rpm]	3000	3000
Continuous Power	[W]	91	94
Continuous Torque *1)	[mNm]	290	300
Continuous Stall Torque	[mNm]	438	460
Efficiency at Rated Speed	[%]	84.5	86.1
Current at Rated Speed	[A]	4.6	2.5
No Load Speed	[rpm]	3600	3650
Resistance per Phase *2)	[h]	0.32	1.06
Inductance per Phase	[mH]	0.45	1.7
Torque Constant	[mNm/A]	63	120
Speed Constant	[rpm/V]	150	76
Mech. Time Constant	[ms]	1.3	1.2
Rotor Inertia	[gcm²]	170	170
Number of Poles		8	8
Weight	[g]	750	750
Thermal Resistance *3)	[K/W]	4	4

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted without additional cooling

BLDC65S35





General Specification

Insulation class F
Protection IP54
Operating temperature – 20 °C … + 70 °C
2 NMB ballbearings for high lifetime
Max. radial load 150 N (10 mm from flange)
Max. axial load 100 N

Features

Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

Options

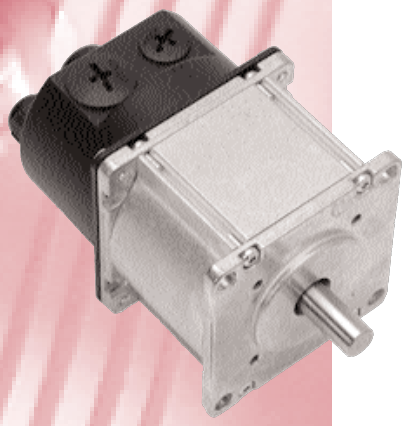
Integrated driver

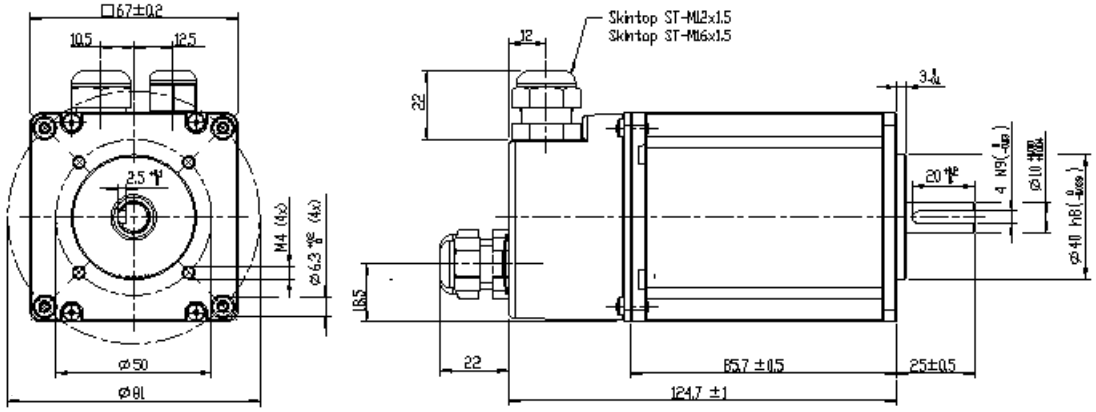
NMB-Partnumber		BLDC65S35A 41P060	BLDC65S35A 82P040
Rated Voltage	[V]	24	48
Rated Speed	[rpm]	3000	3000
Continuous Power	[W]	141	145
Continuous Torque *1)	[mNm]	450	460
Continuous Stall Torque	[mNm]	660	670
Efficiency at Rated Speed	[%]	86.6	87
Current at Rated Speed	[A]	7.1	3.7
No Load Speed	[rpm]	3550	3550
Resistance per Phase *2)	[h]	0.12	0.51
Inductance per Phase	[mH]	0.22	0.78
Torque Constant	[mNm/A]	63	124
Speed Constant	[rpm/V]	148.8	74.2
Mech. Time Constant	[ms]	0.9	0.9
Rotor Inertia	[gcm^2]	300	300
Number of Poles		8	8
Weight	[g]	1120	1120
Thermal Resistance *3)	[K/W]	3.5	3.5

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted without additional cooling

Minebea European Operations

BLDC65S53





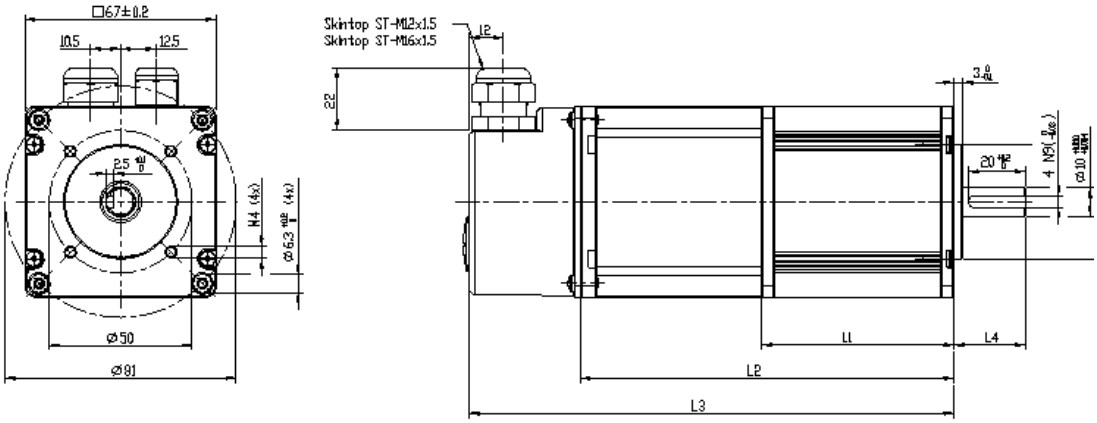
General Specification
Insulation class F
Protection IP54
Operating temperature – 20 °C … + 70 °C
2 NMB ballbearings for high lifetime
Max. radial load 150 N (10 mm from flange)
Max. axial load 100 N

Features
Low cogging torque
High power to volume ratio
High efficiency at operating point
High reliability

Options
Integrated driver

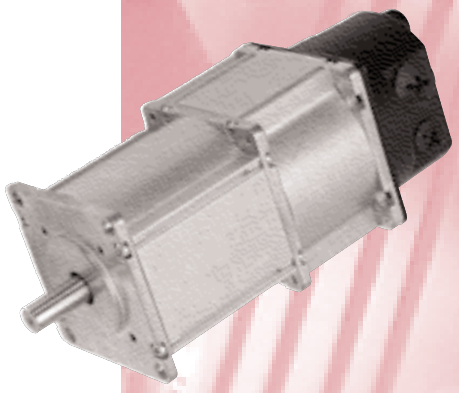
NMB-Partnumber		BLDC65S53A 30P071	BLDC65S53A 55P050
Rated Voltage	[V]	24	48
Rated Speed	[rpm]	3000	3000
Continuous Power	[W]	188	195
Continuous Torque *1)	[mNm]	600	620
Continuous Stall Torque	[mNm]	850	880
Efficiency at Rated Speed	[%]	90	91.1
Current at Rated Speed	[A]	8.8	4.9
No Load Speed	[rpm]	3250	3550
Resistance per Phase *2)	[h]	0.09	0.32
Inductance per Phase	[mH]	0.17	0.56
Torque Constant	[mNm/A]	68	126
Speed Constant	[rpm/V]	136.4	73.8
Mech. Time Constant	[ms]	0.8	0.8
Rotor Inertia	[gcm^2]	430	430
Number of Poles		8	8
Weight	[g]	1440	1440
Thermal Resistance *3)	[K/W]	3	3

*1) motor torque at 70K temperature rising of winding
*2) resistance phase to phase at 20°C
*3) thermal resistance winding to ambient
*4) motor is mounted without additional cooling



BLDC65SX0X-DRV

Brushless DC Motor with integrated Driver



Features

Supply Voltage 12-48 V DC
Bidirectional Drive
Operating Temperature -20 °C to ... + 70°C
Remote controlled or stand-alone operation
Insulation Class F
2 x Ball Bearings for high lifetime
Positioning mode

Typical Applications

Textile Machines, Pump Drive, Packaging Machines, Factory Automation, Belt Drives, Robots, Office Automation, Power Tools

Options

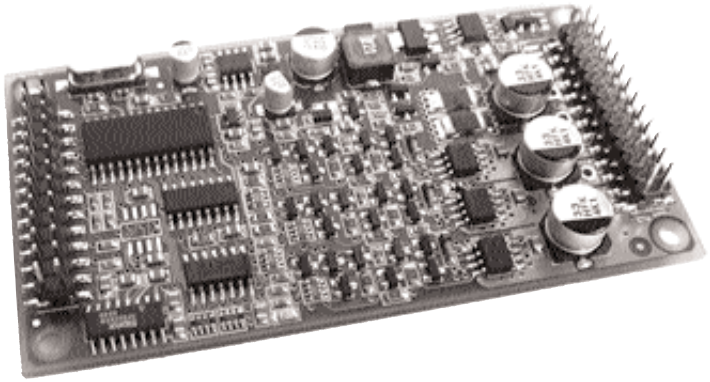
Encoder, Gearbox, Customised Shaft, Brake, Customised Winding

Basic Motor Variations

Motor	Drive	**Torque	Speed	**Power	Speed	Speed	Brake	Torque	Position	RS232	RS485	L1	L2	L3	L4
Type	Voltage	Nominal	Nominal	Nominal	Control	Loop	Function	Control	Control						
	[V DC]	[mNm]	[rpm]	[W]								[mm]	[mm]	[mm]	[mm]
BLDC65S18A- DRV-A2*	12 - 48	290	3.000	91	X							51	97	136	25
BLDC65S18A- DRV-A4*	12 - 48	290	3.000	91		X	X					51	97	136	25
BLDC65S18A- DRV-T170A*	24 - 48	290	3.000	91		X	X	X	X	X		51	114	154	25
BLDC65S18A- DRV-T170B*	24 - 48	290	3.000	91		X	X	X	X		X	51	114	154	25
BLDC65S35A-DRV-A2	12 - 48	450	3.000	141	X							68	114	154	25
BLDC65S35A-DRV-A4	12 - 48	450	3.000	141		X	X					68	114	154	25
BLDC65S35A-DRV-T170A	24 - 48	450	3.000	141		X	X	X	X	X		68	132	171	25
BLDC65S35A-DRV-T170B	24 - 48	450	3.000	141		X	X	X	X		X	68	132	171	25
BLDC65S53A-DRV-A2	12 - 48	600	3.000	188	X							86	132	171	25
BLDC65S53A-DRV-A4	12 - 48	600	3.000	188		X	X					86	132	171	25
BLDC65S53A-DRV-T170A	24 - 48	600	3.000	188		X	X	X	X	X		86	149	189	25
BLDC65S53A-DRV-T170B	24 - 48	600	3.000	188		X	X	X	X		X	86	149	189	25

* Shaft without feather key groove
** Torque and Power with 24 V winding

BLDC Motor Module TMCM-160-NMB



Features:
Intelligent economic controller/ driver for BLDC Motors
Daughterboard/ mezzanine style
High efficiency/ low heat/ low EMC power stage
RS-485, RS-232 bus interfaces
Analog and digital control I/Os
Powerful TRINAMIC BLDC control firmware
Stand alone operation or remote controlled operation
Interactive TMCL language for stand alone user program
Easy to combine with TMCM stepper motor modules
Motor stop at desired position by switching off commutation
Various commutation schemes supported
Customised OEM versions available upon request
Evaluation kit available

Technical Data:
Size: 92.5 x 50 mm^2
Supply Voltage: 9...40 V DC
Current per phase: 3 A
Two dual row 2,54 mm grid headers
Overcurrent protection
Overtemperature protection/ diagnostics
Drives BLDC motors from 5 W to 100 W
Optional: evalboard connectors

Applications:
Textile Machines, Packing Machines, Fans, Pumps, Office Automation, Power Tools, Industrial and Laboratory Automation, Highly dynamic positioning applications, Constant velocity and/ or Constant torque drives.

Sample Request Form Brushless DC

Fax to +49 - (0) - 6103 - 913 220

Attn: Engineering Dept.
Rotary Component Division

Customer		Contact	
Address		Telephone	
Enduser		Fax	
Project No.		Project Name	
Customer Part No.		NMB Part No.	

Commercial Information

Sample Qty.		Competitor	
Sample Price		Part No.	
Annual Qty.		Application	
Target Price		Application Details	
Time Schedule			

Technical Specification

Drive Condition	Drive		Torque	Rated Torque	
	Source			Max. Torque	
Voltage	Rated Voltage		Life	No. of Cycles per Hour	
	Operating Voltage			Duty Cycle	
Speed	No Load Speed		Shaft Rotation	CW	
	Rated Speed			CCW	
Current	Rated Current			Both	
	Stall Current		Ambient Temp. Range		

Mechanical Dimensions

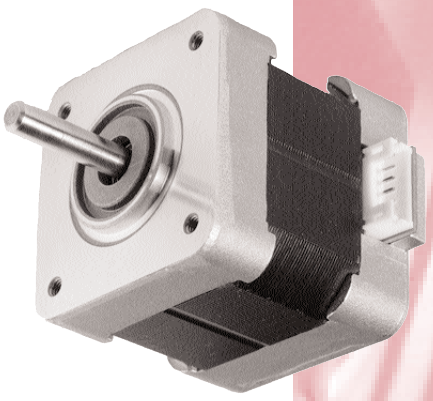
Motor Diameter		Shaft Diameter	
Motor Length		Shaft Length	

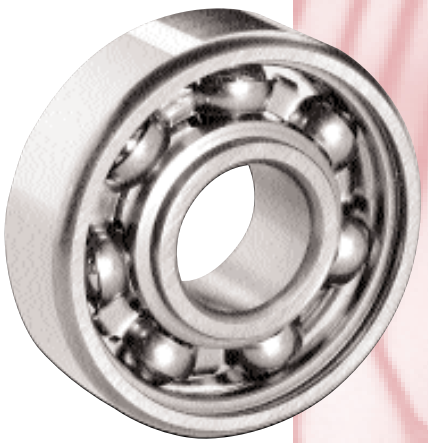
Special Requirements

Memo

Our Products:

Fans and Blowers
Controller
Miniature and Small-Sized
Ball Bearings
Rod-End and Spherical Bearings
Spindle Motors
Stepping Motors
BLDC-Motors
Speakers
Speaker Boxes
PC-Keyboards





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