Battery-powered Gear Motor V Series (50W to 0.4kW)

Encoder-mounted Option

Applicable models

Parallel shaft

Perpendicular shaft

Concentric hollow shaft

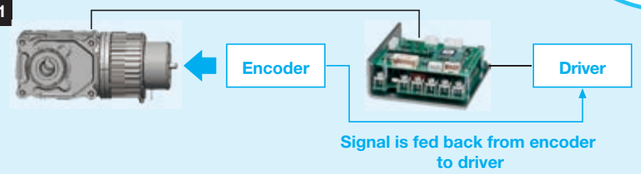
Capacity: 50W to 0.4kW
Reduction ratio: 1/5 to 1/240 (some excluded)
Voltage: 12V / 24V / 48V

Encoder-mounted battery-powered gear motors capable of higher precision feedback control.

The encoder-mounted option allows the motor shaft to penetrate from the back of the product. The customer can mount the encoder to the motor shaft.

Configuration example 1

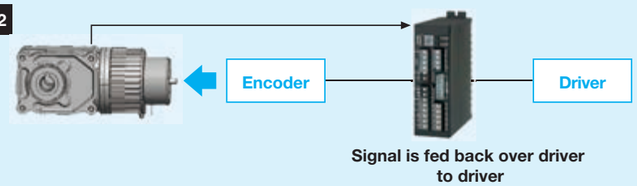
Encoder-mounted battery-powered gear motor
+
dedicated driver



Enables simple positioning (adjustment, etc.) by feeding back the encoder signal to the driver.

Configuration example 2

Encoder-mounted battery-powered gear motor
+
customer-made driver or driver sold by other manufacturer



Improves the speed controllability (stability at low-speed and uneven rotation) by feeding back the encoder signal to the driver. It can also provide position control depending on the selected driver.

Get the latest product information and catalogs from the website!

Access the site to select products and download CAD data and other information.

Each product page provides access to the gear motor page, which allows you to select a gear motor by product name or application. You can also filter conditions or enter usage condition values to select a product, and can even download CAD data or explanatory materials.

Select a product to gain access to downloads

Calculation selection tool

https://english.nissei-gtr.co.jp/

NISSEI CORPORATION URL https://english.nissei-gtr.co.jp/

Overseas Sales Department
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TEL: 0566-92-5312 (main number) FAX: 0566-92-7002 E-mail: oversea@nissei-gtr.co.jp

2021.11.0/0-1

Battery-powered Gear Motor
SD Series
Concentric Hollow Shaft Type
Battery Powerd Gear Motor SD series F3 type

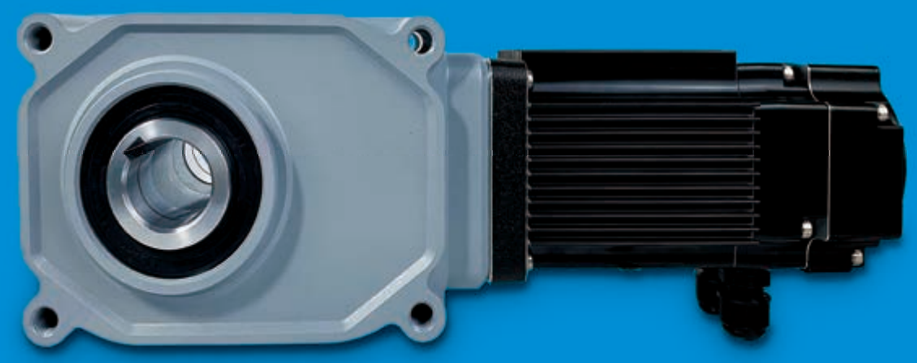
NEW

F3 Type

0.75kW
Concentric hollow shaft

Even more features, now at a new size.

Power



Advanced features with improved performance for AGVs and compact robots.

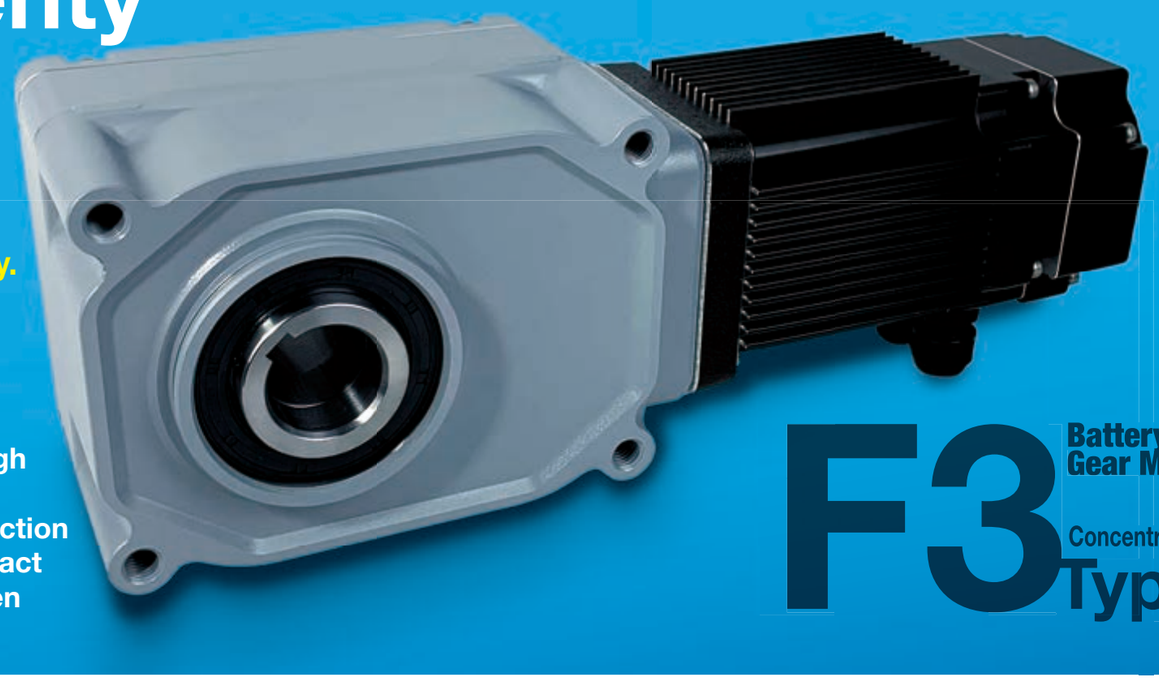
Compact / Waterproof / Support 2G / Additional reduction ratios / Compliance for standards

NISSEI CORPORATION

Compact, plenty of features.

Additional functionality in a compact body.

**F3 Type battery-powered gear motors (concentric hollow shaft type gear motors) offer additional features over AFC type products in a compact size.
With the same 48 VDC input voltage and high 0.75kW output, this product also offers waterproofing, 2G support, and a 1/10 reduction ratio to expand the types of AGV and compact robot applications possible, and deliver even better performance.**

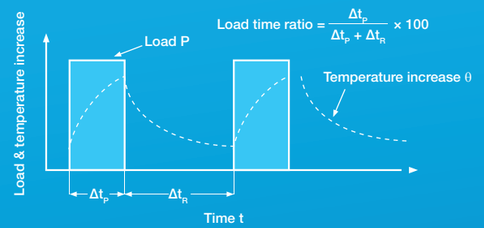


F3 Battery Powerd Gear Motor

Concentric hollow shaft Type

Rated values

The rated value class for this product is an intermittent periodic rating (S3 25%).
Intermittent periodic rating (S3) describes a specification where a cycle, consisting of an operation period under a certain load and a stop period where no voltage is applied, is repeated.
The load time ratio of this product is 25%.



Safety certification, high efficiency regulation

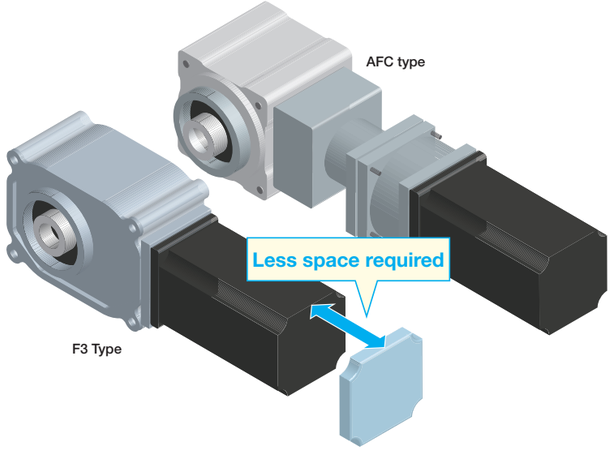
Safety certification
Standard: GB/T12350-2009
Safety Requirement for Low-power Motors
Capacity: 0.75kW

High efficiency regulation
Standard: GB30253-2013
Motor High Efficiency Standard Values and High Efficiency Class
Capacity: 0.75kW

Feature 1

More compact

The total length has been reduced approximately 80mm compared with the current AFC type. This frees up internal space for low crawling AGVs and allows more space for adding new features.



Feature 2

2G vibration resistance

Vibration resistance has been expanded from 0.5G to 2G. This is ideal for AGVs and other mobile devices that are subject to continuous vibration from the ground, and allows for stable operation through even or uneven outdoor road surfaces such as over gaps and bumps.

Feature 3

Waterproof

An outdoor model with IP65* waterproofing is now available. It can be used safely outdoors in the rain or when transporting between buildings. *IP65: A completely dust-proof structure that will not be negatively impacted even if directly sprayed with water from any direction.

Feature 4

Additional reduction ratio

A reduction ratio of 1/10 has been added. This increases the types of possible applications. For example, the speed at which devices move within a distribution warehouse (in high-speed travel zones separate from human workers) could be increased.

Case Study 1

Low-floor AGVs

Space-saving design and advanced operation performance.

These low-floor AGVs take full advantage of their compact sizes. The left/right wheel two-motor design saves space and allows the AGV to turn when stopped, making advanced operation with tight turns possible. It also runs at high 0.75kW output at an input voltage of 48 VDC. F3 Type is both fast and powerful, even during low crawling transport.

Case Study 2

Outdoor vehicle

Waterproof and 2G empower advanced outdoor operations.

IP65 class waterproofing and 2G vibration resistance drastically improve AGV operation outdoors. This allows for stable operation on asphalt, over bumps, and on wet roads in the rain, for speedy transport even across spacious factory sites.

F3 Type Battery-powered Gear Motor

Model code

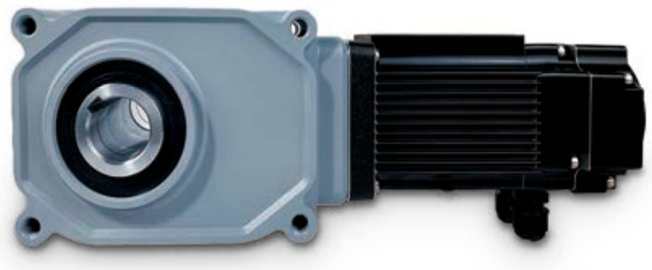
Mounting Type	Frame Size	Shaft Arrangement	Reduction Ratio	—	Motor Type	Motor Specification	Motor Power	Supply Voltage	Standards	Brake Specification	Option
F3S	30	N	20	—	SD	M	080	L4	A	N	
①	②	③	④		⑤	⑥	⑦	⑧	⑨	⑩	⑪

① Mounting Type	FS3: Perpendicular shaft with flanges installed on both surfaces	
② Frame Size	Output shaft diameter	
③ Shaft Arrangement	Material	Shaft category
		Hollow shaft
	Carbon steel	N
	Stainless steel	S
④ Reduction Ratio	10: 1/10 to 60: 1/60	
⑤ Motor Type	SD: SD series brushless motor	
⑥ Motor Specification	M: IP44	
	W: IP65	
⑦ Motor Power	080: 0.75kW	
⑧ Supply Voltage	L4: DC48V	
⑨ Standards	A: CCC	
⑩ Brake Specification	N: No brake	
	B: Brake	
⑪ Option	Blank: Standard specification	
	X: Special specification additional identification code	

Model composition

Motor Power	Supply Voltage DC	Brake Specification	Motor Specification	Frame Size	Reduction Ratio
0.75kW	48V	N	M	30	10
		B	W		15
					20
					25
					30
					40
					50
					60

F3 Battery Powerd Gear Motor
Concentric hollow shaft Type

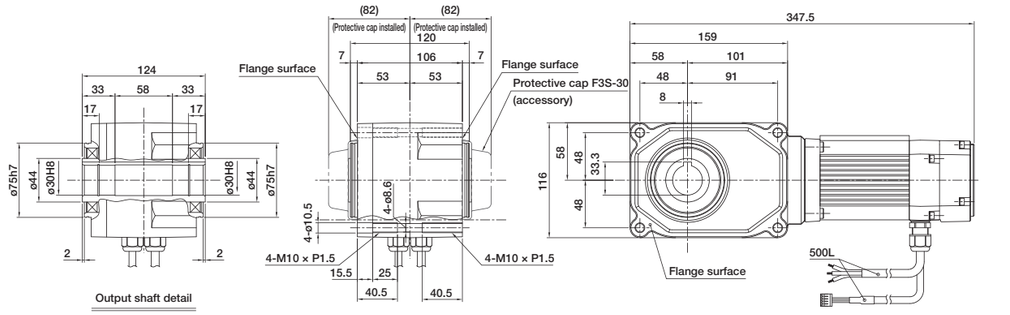


Performance table

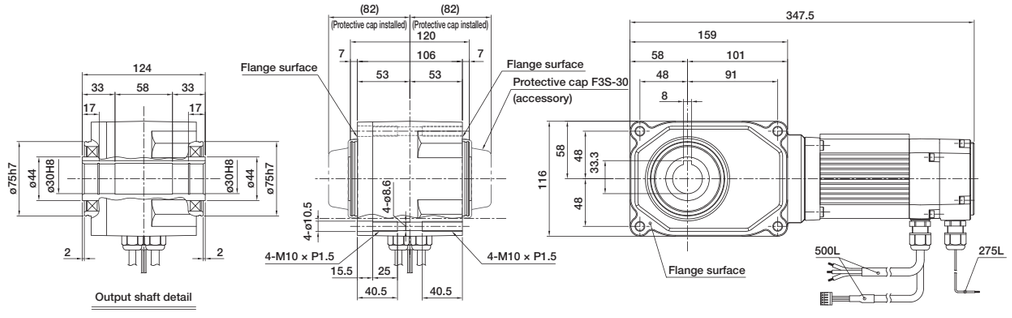
Series	Motor capacity	Voltage (V)	Frame size	Reduction ratio	Output shaft rotation speed (r/min)	Output shaft allowable torque (N·m)	Output shaft allowable O.H.L. (N)	Output shaft allowable thrust load (N)
SD	0.75kW	48	30	1/10	8.0 to 400	21.5	1910	475
				1/15	5.5 to 270	32.2	2160	539
				1/20	4.0 to 200	43.0	2400	600
				1/25	3.2 to 160	53.7	2550	637
				1/30	2.7 to 130	64.5	2650	662
				1/40	2.0 to 100	85.9	2840	711
				1/50	1.6 to 80	107.4	2990	747
				1/60	1.3 to 67	128.9	3090	767

Dimensional diagram

<Figure 1>



<Figure 2>



Capacity	Power supply voltage	Frame size	Model	Motor specification	Reduction ratio	Figure	Brake	Approximate mass (kg)
0.75kW	DC48V	30	F3S30N***-SDM080L4AN	IP44	10,15,20,25,30,40,50,60	1	No	8.1
			F3S30N***-SDM080L4AB	IP44		2	Yes	8.5
			F3S30S***-SDW080L4AN	IP65		1	No	8.1
			F3S30S***-SDW080L4AB	IP65		2	Yes	8.5

* The *** placeholder in the model will be the reduction ratio.

F3 Type Battery-powered Gear Motor

Motor specification

Series		SD
Capacity		0.75kW
Voltage (V)		48
Rated current (A)		19.5
Rated value class		S3 25%
Motor lead wire (mm²)		2(AWG14)
Max. extension distance (m)		5
Start/stop frequency		-
Ambient operating temperature (°C)		0 to 40°C
Ambient operating humidity (% RH)	IP44	85% RH or less (no condensation)
	IP65	100% RH or less (no condensation)
Ambient storage temperature (°C)		-10 to 60°C (no freezing)
Ambient storage humidity (% RH)	IP44	85% RH or less (no condensation)
	IP65	100% RH or less (no condensation)
Vibration resistance		2G
Altitude		1000m or less
Installation environment	IP44	No corrosive gas, explosive gas, steam, etc. A well-ventilated location with no dust.
	IP65	No corrosive gas, explosive gas, steam, etc. Cannot be used submerged in water or in areas subject to high-pressure water.
Setup location	IP44	Indoors
	IP65	Outdoors

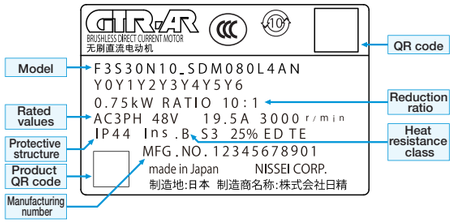
* The rated current value above is a reference value with no gear head (motor only).
  Refer to the current characteristics by load ratio in the figure below for use with a gear motor.

Electromagnetic brake specification

Series	SD
Capacity	0.75kW
Brake method	Non-excitation operation (spring close)
Holding torque (N·m) (motor shaft)	3.0
Excitation voltage (V) (±10%)	48
Current consumption (A) (20°C)	0.21
Power consumption (W) (20°C)	10.0
Lead wire (mm²)	0.3(AWG22)

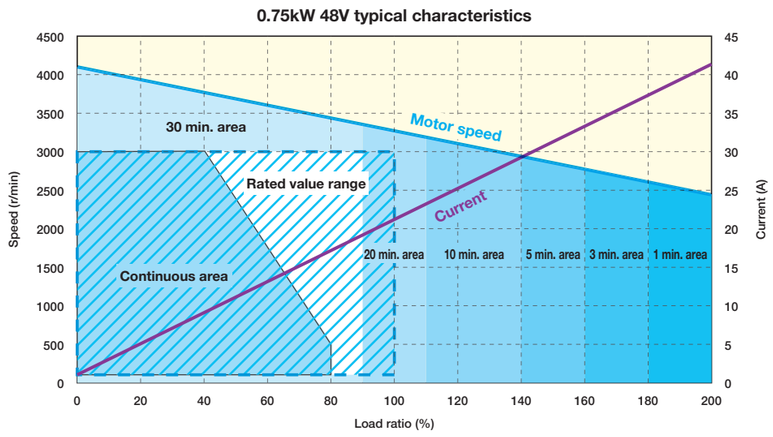
* The electromagnetic brake is for holding only. It cannot be used for braking.
* Make sure to use a surge suppressor to protect the driver from surges generated when the electromagnetic brake turns ON/OFF.
* Use the included varistor (82V, 1J or above) or a diode (100V, 1A or above).
* A scraping noise may be heard from the disc when the motor is operating. This is due to the structure of the brake and will not affect brake performance.

Rating plate



Gear motor characteristics

* These are typical gear motor characteristics. Refer to this data when manufacturing your own driver.



[Notes]
Typical speed characteristics by load ratio and current characteristics by load ratio are shown for the gear motor only.
The rated value range is the area bounded by a speed of 80r/min to 3000r/min and a 100% load ratio.
Approximate values (cold start) are shown when used at each time rating (5min., 30min., etc.). However, this must ultimately be confirmed on the actual device.
1. Speeds are motor shaft converted values in the above graph. Refer to the gear ratio for the output shaft speed.
2. A value of 100% in the graph above corresponds to the output shaft allowable torque in the performance table.
3. Use outside of the rated value range could reduce the life span of the reducer or could result in brake force issues with the electromagnetic brake.
   Please contact us for details.
4. Do not allow the surface temperature of the motor to exceed 90°C.

Dedicated Driver

An even smaller battery-powered gear motor dedicated driver that is also easy to use.

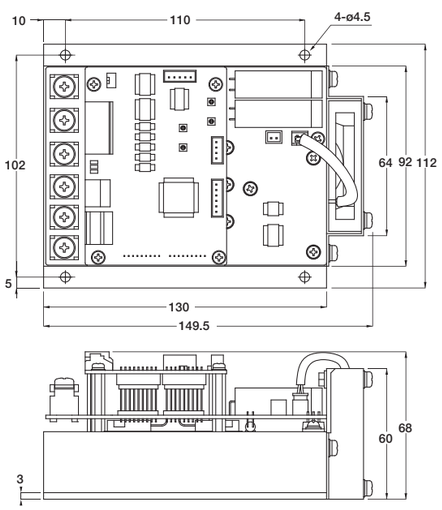
A dedicated driver developed for use together with a battery-powered gear motor. It provides a compact design while achieving a wide range of speed control and improved acceleration. Can be installed in a small space.

Model code

Series		Motor Type	Brake Specification	Power	Supply Voltage	Option
A	—	SD	NB	080	L4	X
①		②	③	④	⑤	⑥

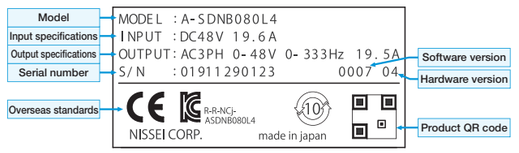
① Series	A	: GTR-AR
② Motor Type	SD	: SD series brushless motor
③ Brake Specification	NB	: SD series for both brake and no brake
④ Power	080	: 0.75kW
⑤ Supply Voltage	L4	: 48V
⑥ Option	Blank	: Standard specification
	X	: Special specification additional identification code

Dimensional diagram



Series	Capacity	Voltage	Model	Approximate mass (kg)
SD	0.75kW	DC48V	A-SDNB080L4	0.73

Rating plate



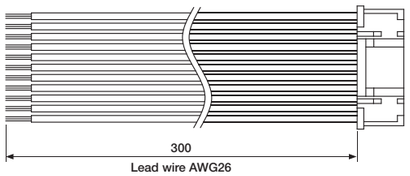
* Refer to pages 865 through 884 in the General Catalog for driver part names, controller specifications, and wiring diagrams.

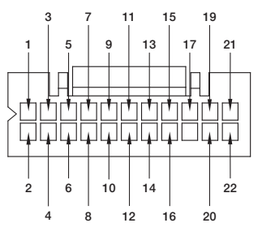
Accessories

I/O cable (connected with CN1)

No.	Use	Color
1	IN-COM	Yellow
2	I1	
3	I2	
4	I3	
5	I4	
6	I5	
7	I6	
8	I7	
9	I8	
10	C1	Green
11	E1	

No	Use	Color
12	C2	Green
13	E2	
14	C3	
15	E3	
16	C4	
17	E4	
18	-	-
19	+5V	Orange
20	AIN	
21	AOUT	
22	TGND	

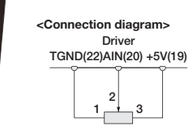




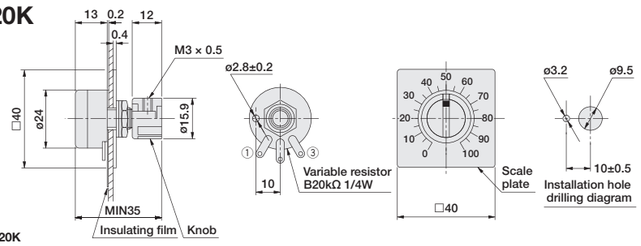
Symbol	Manufacturer	Circuit board model	I/O cable format
CN1	J.S.T. Mfg. Co., Ltd.	S22B-PUDSS-1	Compatible housing: PUDP-22V-S
			Compatible crimp terminal: SPUD-001T-P0.5

Options

External speed setter/OP-RV-24B20K



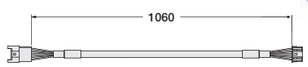
External speed setter OP-RV-24B20K



Extension cord/OP-ACDSG1 (for signal)

A signal cable used between the driver and gear motor.

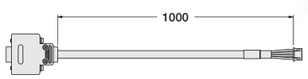
- Shipped with connectors connected on both ends.
- Only the signal wire from the motor is extended.
- No cord for extending the motor power wire or brake lead wire is available. Use a cord of at least the wire diameter indicated in the Motor Specifications Table (page 7) in the General Catalog to extend within 5m.



Part #: OP-ACDSG1, extension cord length: 1m

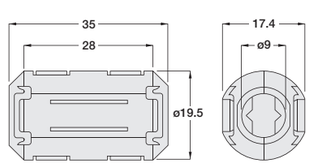
Communication cable/OP-ACDCOM1 (for communication)

A communication cable for connection to a PC. Use an RS-232C-USB conversion cable to connect to a USB port.
Dedicated software can be used to numerically set the speed command value, acceleration time, and torque limit value.
"ACD-PSTool" may be downloaded free of charge from our homepage.



Part #: OP-ACDCOM1, cable length: 1m

Clamp filter/OP-ZCAT



Manufacturer: TDK, Model: ZCAT2035-0930A

Allowable inertia moment and acceleration torque, braking torque (motor shaft converted value) Tp

Allowable inertia moment J (JA)

Intermittently operating a device with a large load inertia could generate a momentarily large torque when starting or stopping, which could result in an unexpected accident.
Ensure that the inertia of the connected machine is within the allowable values in the table below, according to the connection method and start frequency.

Allowable inertia moment J by capacity

(Motor shaft converted value) [Table-1]

Capacity	Allowable inertia moment J (kg/m²)
0.75kW	13.8×10^{-4}

Note: Motor shaft converted inertia moment = Output shaft inertia moment J × (Reduction ratio)2

Allowable inertia moment J calibration coefficient according to operation conditions

[Table-2]

Connection method	Start frequency	Calibration coefficient
Not loose (directly connected, etc.)	70 times per day or less	1
	More than 70 times per day	1.5
Loose (chained, etc.)	70 times per day or less	2
	More than 70 times per day	3

Gear motor unit inertia moment (motor shaft converted value) Jr

Motor category	No brake	Brake
Motor capacity	0.75kW	
Frame size	30	
Inertia moment (kg/m²)	1.2×10^{-4}	1.3×10^{-4}

Acceleration torque, braking torque (motor shaft converted value) TP

Motor category	Common for both brake and no brake
Motor capacity	0.75kW
Acceleration torque (N·m)	4.77
Braking torque (N·m)	4.77

Overhang load (O.H.L.)

$$\text{O.H.L.} = \frac{T_{LE} \times K_1 \times K_2}{R} \text{(N)}$$

- T_{LE} : Equivalent output torque on reducer shaft (N·m)
- R : Pitch radius of sprocket, pulley, gear, etc. attached to reducer shaft (m)
- K_1 : Coefficient due to connection method (refer to [Table-3])
- K_2 : Coefficient due to load position (refer to [Table-4])

Ensure that the O.H.L. determined above is smaller than the allowable O.H.L. listed in the performance table.

Coefficient K_1 [Table-3]

Connection method	K_1
Chain or timing belt	1.00
Gear	1.25
V-belt	1.50

Coefficient K_2 [Table-4]

Load position	K_2
Base of shaft	0.75
Center of shaft	1.00
End of shaft	1.50

[Load position]

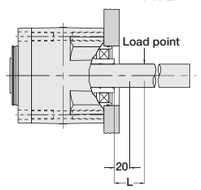
Calibration of allowable value according to O.H.L. position

(1) O.H.L. load position
The allowable O.H.L. load position is calculated 20mm from the output shaft edge.

(2) Calibration of output shaft allowable O.H.L. load
Use the following equations to calibrate the output shaft allowable O.H.L. based on the usage conditions.

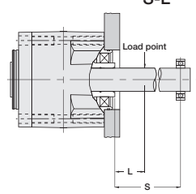
a. When you do not receive one side with a pillow block bearing.
If the O.H.L. load position will be greater than 20mm

$$\text{Usable O.H.L. (N)} = \frac{A+20}{A+L} \times \text{Allowable O.H.L. (N)}$$



b. One side received by pillow

$$\text{Usable O.H.L. (N)} = \frac{S}{S-L} \times \text{Allowable O.H.L. (N)}$$



Constant A

Frame size	A(mm)
30	91

Thrust load

Use only in conditions that satisfy the following equation.

Thrust load (N) × fw ≤ Output shaft allowable thrust load (N)
[fw: Coefficient according to load amount]

* Please contact your nearest sales office or the CS Center if an excessive thrust load will be generated within your usage conditions.

Load coefficient fw

Load amount	fw
Smooth operation with no impact	1.2
Normal operation	1.3
Operation subject to vibration/impact	2

Try our Motor Selection tool from our Homepage.
Simply enter your usage conditions and series to calculate capacity online. https://sentei.nissei-gtr.co.jp/english/servo_calculation

* Refer to page 896 of the General Catalog for information on how to calculate the inertia moment.