GTR
GEAR MOTOR

Choose the model that is easiest for you to use.

NEW MODEL

Products That Meet "Top Runner" Standards

IE2 ▶ IE3

High-Efficiency IE3 Gear Motors

NISSEI CORPORATION

MID SERIES
IE3 GEAR MOTORS | **0.75kW-2.2kW**

The trend toward high-efficiency regulatory standards in Japan and other countries

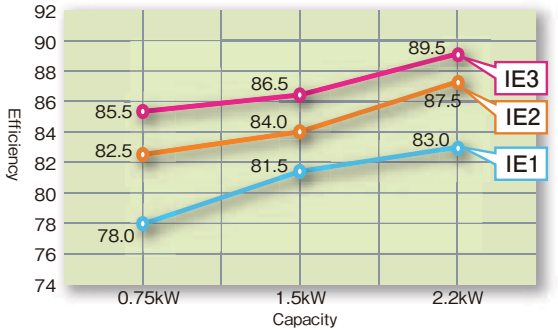
The Trend in Japan Toward Higher-Efficiency Regulations

In Japan, the Ministry of Economy, Trade and Industry (METI) enacted the Act on the Rational Use of Energy in November 2013 with the aim of improving motors. It established regulatory standards for a "top runner" class with a target enactment date of 2015*. Motor manufacturers have been obligated to meet these standards since their establishment in April 2015. At our company, we have transitioned our gear motor products to premium efficiency levels under the designation "IE3" in compliance with the new Japanese standards as well as high-efficiency standards in other countries.

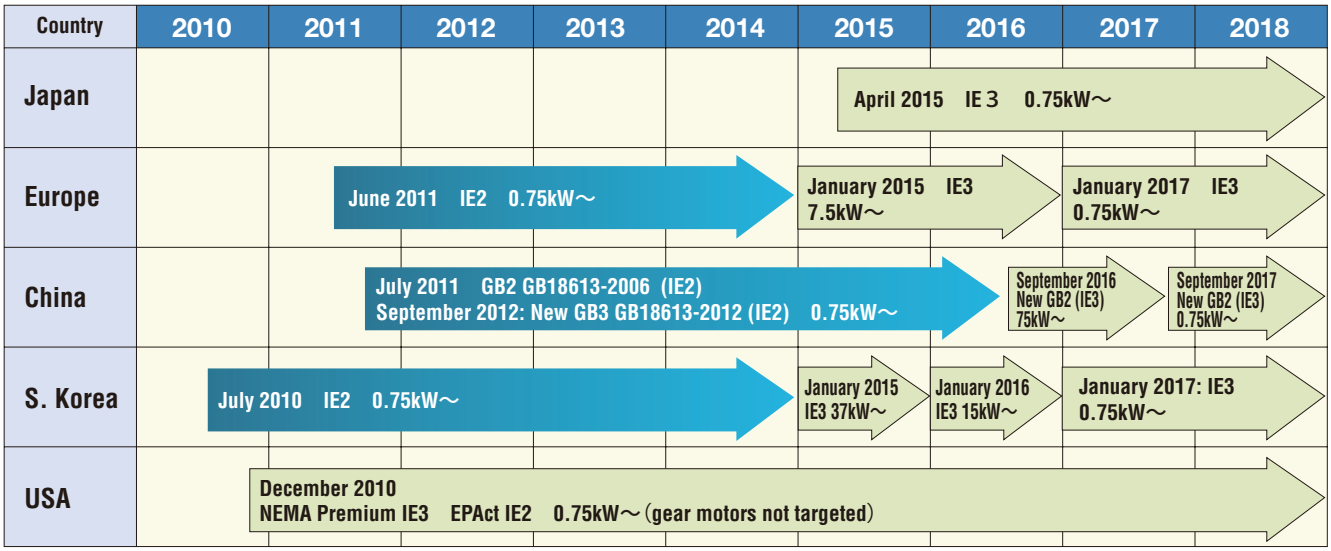
High-Efficiency Standards for Industrial Motors (Overview)

	International Standard Class	Corresponding JIS Standard	Affected Motors
High ⇧ Efficiency ⇩ Low	IE3 (Premium)	JIS C 4034-30	Single-speed three-phase squirrel-cage induction motors
	IE2 (High Efficiency)		
	IE1 (Standard Efficiency)		

IEC 60034-30 Efficiency Classes (IE Codes): Motor Efficiency Values (Quadrupole, 60 Hz)



Overview of Country-Specific Trends in High-Efficiency Regulations (as of September 2013) (compared to our company)



Top Runner Standard Motors

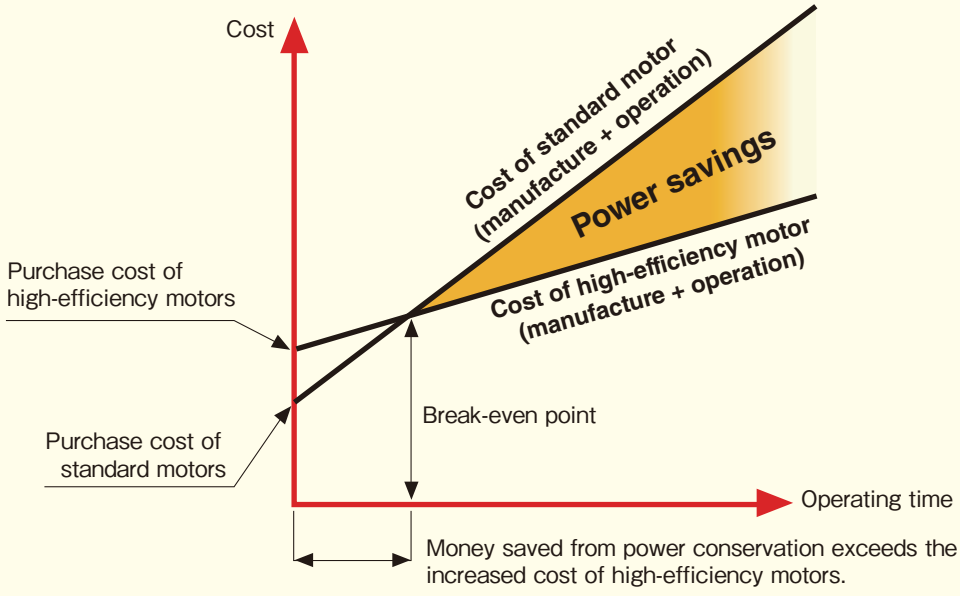
* From JEMA, the Japan Electrical Manufacturers' Association

Applicable range		Main exceptions
Single-speed, three-phase squirrel-cage induction motors		(1) Specially insulated (2) Delta-star starter motors (3) Motors used in Marine applications (4) Submerged motors (5) Explosion-proof motors (6) High slip motors (7) Gate motors (8) Canned motors (9) Motors which are used in Cryogenic environments (10) Separately ventilated motors specially driven by inverters
Output	0.75 kW – 375 kW	
Poles	2, 4, 6	
Voltage	Up to 1,000 V	
Frequency	50 Hz, 60 Hz, and 50/60 Hz	
Models used	S1 (continuous rating) and S3 (duty-cycle operation) with load time factor of 80% or more	

Lower operating costs

The Economics of High-Efficiency Motors: The More You Use Them, the More You Save

High-efficiency designs cost more to produce than standard motors, but they cost less to operate, the increased costs during introduction are absorbed within a short time. High-efficiency motors are economical in proportion to their operating cost. With large number of motor installed in particular application running for long periods will demonstrate clear benefits.



The following is a trial calculation of the energy conservation effect of high-efficiency motors.
The formula for calculating the annual monetary savings from energy conservation is as follows:

Money Saved Annually Through Energy Conservation (Yen)

$$= \text{output (kW)} \times \text{operating time (hours/year)} \times \text{power costs (yen/kWh)} \times \left[\frac{100}{\text{IE2 motor efficiency (\%)}} - \frac{100}{\text{IE3 motor efficiency (\%)}} \right]$$

This formula shows that energy savings increase in proportion to the operation cost of high-efficiency motors, making these motors ideal for applications requiring long term operation.

Trial Calculation

Calculation Conditions		Annual money saved through energy conservation: approx. ¥2,250
Output	2.2kW	
Efficiency of IE3 motors	89.5%	
Efficiency of IE2 standard motors	87.5%	
Annual operating hours	2,500 hours (10 hours/day, 250 days)	
Power costs	¥16/kWh	

The external shape and motor characteristics are changing.

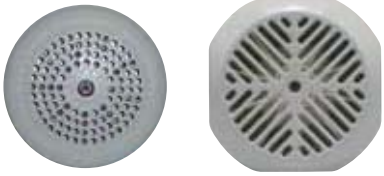
Notes regarding the adoption of top-runner motors

The external shape is changing.

POINT

The mounting dimensions are not changing.

The shape of the fan cover is changing.



Capacity	Current product	IE3
0.75kW	ϕ162	□156
1.5kW	ϕ186	□178
2.2kW	ϕ186	□192

Motor characteristics are changing.

Motor speed

Top runner motors control efficiency losses to run at a faster speed than standard motors. When a standard motor is switched with a high-efficiency motor, the motor output will increase due to higher speeds. Motor efficiency is high, but the increase in output can result in greater energy consumption, so if high-efficiency motors are used in applications for which the speed cannot be increased, you might have to review reduction ratio.

Electric current, start-up torque, and maximum torque

Top runner motors sometimes have lower coil resistance in order to reduce copper losses (primary and secondary), so the start-up current draw may be higher than with standard motors, and it might become necessary to change your breakers or other circuitry. If your motors start and stop with great frequency or the inertial moment is high, you will have to choose your motor type with regard to service factors (load coefficient).

Motor characteristics: comparison chart

Capacity	Voltage/ frequency	Rated rotation speed (r/min)		Current characteristics				Torque characteristics				Efficiency (%)	
				Rated current (A)		Start-up current (A)		Start-up torque (%)		Stopping torque (%)			
		IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3
0.75kW	200V/50Hz	1420	1440	3.5	3.2	19.1	19.1	267	246	325	305	79.6	85.3
	200V/60Hz	1690	1720	3.2	3.0	17.1	16.6	231	190	290	261	82.5	85.5
	220V/50Hz	1410	1430	3.1	2.9	15.2	15.9	242	218	289	282	79.6	82.5
	220V/60Hz	1710	1740	3.1	2.9	19.4	18.6	307	224	363	321	82.5	86.5
	380V/50Hz	1410	1430	1.75	1.65	8.59	9.0	245	221	283	276	78.0	84.6
	380V/60Hz	1710	1740	1.75	1.6	11.30	10.8	275	201	360	318	82.5	85.5
	400V/50Hz	1420	1440	1.7	1.6	9.16	9.6	279	249	316	308	79.6	85.3
	400V/60Hz	1710	1730	1.6	1.5	8.25	8.3	218	193	281	263	81.0	85.7
	440V/60Hz	1720	1740	1.5	1.4	9.25	9.3	273	243	349	323	82.5	86.6
1.5kW	200V/50Hz	1440	1450	6.8	6.4	42.0	43.5	236	243	310	338	82.8	87.1
	200V/60Hz	1730	1740	6.1	6.0	37.0	36.0	190	190	270	283	84.0	87.6
	220V/50Hz	1440	1430	5.8	5.39	34.5	33.9	217	197	292	274	82.8	85.3
	220V/60Hz	1750	1750	5.9	5.7	41.2	40.3	225	221	328	348	84.0	88.2
	380V/50Hz	1450	1440	3.55	3.3	22.1	21.7	227	206	322	302	82.0	86.7
	380V/60Hz	1740	1740	3.4	3.28	22.1	21.6	200	196	297	315	84.0	86.5
	400V/50Hz	1450	1450	3.6	3.2	23.7	23.1	265	231	359	337	82.8	86.9
	400V/60Hz	1750	1740	3.2	3.0	21.0	18.6	204	190	312	280	84.0	87.7
	440V/60Hz	1760	1750	3.1	2.85	23.3	20.7	251	219	390	335	84.0	88.3
2.2kW	200V/50Hz	1460	1450	9.9	8.8	58.8	58.5	227	236	319	337	84.3	89.2
	200V/60Hz	1750	1740	9.0	8.4	53.2	47.0	180	180	267	278	85.6	89.5
	220V/50Hz	1440	1450	8.1	7.4	49.2	49.5	239	245	311	317	84.3	86.7
	220V/60Hz	1750	1750	8.7	7.9	57.3	52.5	222	222	343	336	87.5	89.8
	380V/50Hz	1430	1440	4.9	4.5	29.8	30.0	204	209	300	306	84.3	88.9
	380V/60Hz	1750	1750	4.7	4.2	31.3	28.7	200	200	303	297	87.5	89.5
	400V/50Hz	1440	1450	4.9	4.35	32.0	32.0	242	234	349	341	84.3	89.3
	400V/60Hz	1730	1740	4.5	4.15	28.0	25.0	180	180	297	270	86.3	89.5
	440V/60Hz	1740	1750	4.3	3.9	31.7	28.0	252	210	359	331	87.5	90.1

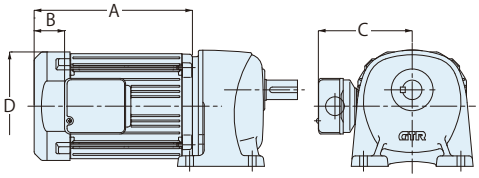
1. The output shaft allowable torque and allowable O.H.L. are unchanged.
2. Contact us about other voltages and frequencies.

The external shape is changing.

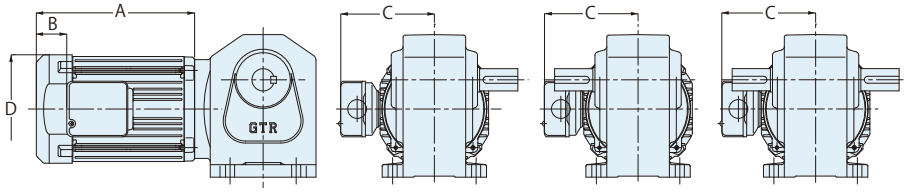
G3 Series Parallel Shaft | **H2 Series Right Angle Shaft**

The mounting dimensions are not changing.
See the comparison chart for more on external dimension differences.

Includes motor, includes brake-motor (IP65) G3: Parallel shaft H2: Right angle shaft



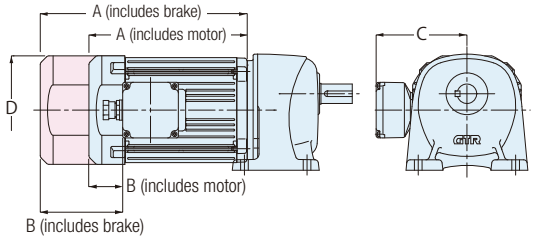
Model shown in diagram:G3L28N10-MP08TNNTN



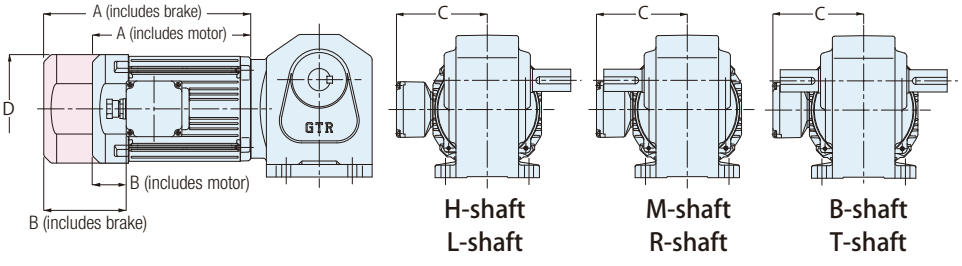
Model shown in diagram:H2L32(LRT)10-MP08TNNTN

Capacity	Motor Category	A		B		C		D		Weight
		IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	
0.75kW	Includes motor	209.5	227.5	50.5	43.5	131	135	ϕ162	□156	+2.9kg
	Includes brake	216.5	237.5	57.5	53.5	131	135	ϕ162	□156	
1.5kW	Includes motor	239	276.5	65.5	63.5	142	142	ϕ186	□178	+3.3kg
	Includes brake	260.5	301.5	87	88.5	142	142	ϕ186	□178	
2.2kW	Includes motor	279	310	65.5	64	142	153	ϕ186	□192	+5.7kg
	Includes brake	300.5	335	87	89	142	153	ϕ186	□192	

Includes waterproof motor (IP65), includes waterproof brake (IP65) G3: Parallel shaft H2: Right angle shaft



Model shown in diagram:
G3L28S10-WP08TNNEN
(G3L28S10-WP08TNNEB2)



Model shown in diagram:
H2L32(HMB)10-WP08TNNEN
(H2L32(HMB)10-WP08TNNEB2)

Capacity	Motor Category	A		B		C		D		Weight
		IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	
0.75kW	Includes waterproof motor	208	227.5	54	48.5	126.5	130.5	ϕ162	□156	+2.9kg
	Includes waterproof brake	277.5	297.5	123.5	118.5	126.5	130.5	ϕ162	□156	
1.5kW	Includes waterproof motor	239	276.5	70.5	68.5	137.5	137.5	ϕ186	□178	+3.3kg
2.2kW	Includes waterproof motor	279	310	70.5	70	137.5	148.5	ϕ186	□192	+5.7kg

* Brakes unavailable for models 1.5kW through 2.2kW.

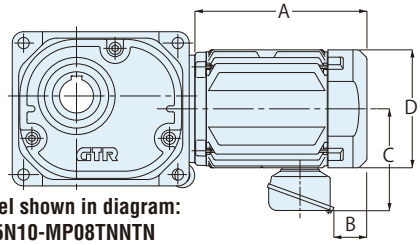
* "Weight" indicates increase in weight from current product.

F Series Hollow Shaft / Solid Shaft | **F3 Series** Concentric Hollow Shaft / Concentric Solid Shaft

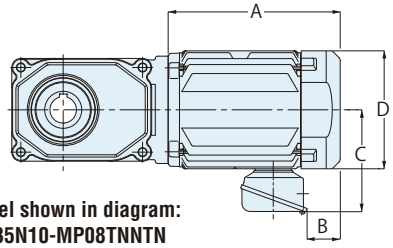
The mounting dimensions are not changing.

See the comparison chart for more on external dimension differences.

Includes motor, includes brake-motor FS:Hollow shaft F3S:Concentric hollow shaft



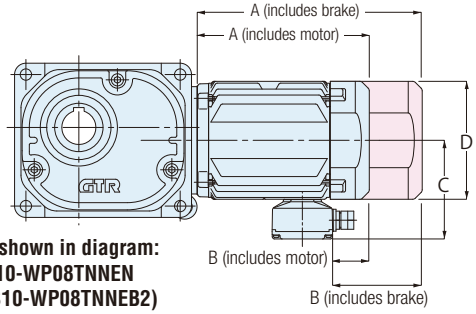
Model shown in diagram:
FS45N10-MP08TNNTN



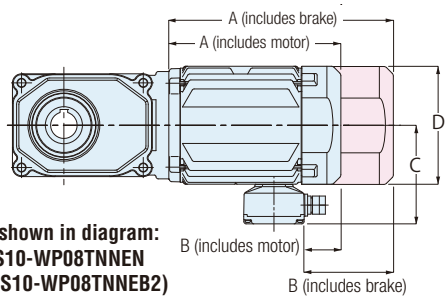
Model shown in diagram:
F3S35N10-MP08TNNTN

Capacity	Motor Category	A		B		C		D		Weight
		IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	
0.75kW	Includes motor	209.5	227.5	50.5	43.5	131	135	ϕ162	□156	+2.9kg
	Includes brake	216.5	237.5	57.5	53.5	131	135	ϕ162	□156	
1.5kW	Includes motor	239	276.5	65.5	63.5	142	142	ϕ186	□178	+3.3kg
	Includes brake	260.5	301.5	87	88.5	142	142	ϕ186	□178	
2.2kW	Includes motor	279	310	65.5	64	142	153	ϕ186	□192	+5.7kg
	Includes brake	300.5	335	87	89	142	153	ϕ186	□192	

Includes waterproof motor (IP65), includes waterproof brake (IP65) FS:Hollow shaft F3S:Concentric hollow shaft



Model shown in diagram:
FS45S10-WP08TNNEN
(FS45S10-WP08TNNEB2)

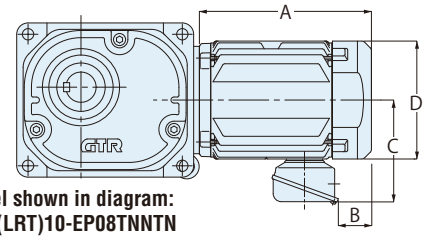


Model shown in diagram:
F3S35S10-WP08TNNEN
(F3S35S10-WP08TNNEB2)

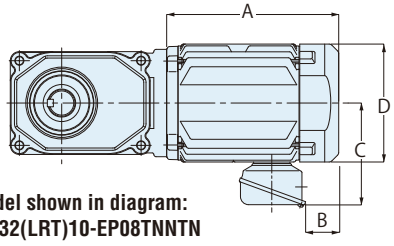
Capacity	Motor Category	A		B		C		D		Weight
		IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	
0.75kW	Includes waterproof motor	208	227.5	54	48.5	126.5	130.5	ϕ162	□156	+2.9kg
	Includes waterproof brake	277.5	297.5	123.5	118.5	126.5	130.5	ϕ162	□156	
1.5kW	Includes waterproof motor	239	276.5	70.5	68.5	137.5	137.5	ϕ186	□178	+3.3kg
2.2kW	Includes waterproof motor	279	310	70.5	70	137.5	148.5	ϕ186	□192	+5.7kg

* Brakes unavailable for models 1.5kW through 2.2kW.

Includes motor, includes brake-motor FF: Solid shaft F3F: Concentric solid shaft



Model shown in diagram:
FF40(LRT)10-EP08TNNTN



Model shown in diagram:
F3F32(LRT)10-EP08TNNTN

Capacity	Motor Category	A		B		C		D		Weight
		IE2	IE3	IE2	IE3	IE2	IE3	IE2	IE3	
0.75kW	Includes motor	209.5	227.5	50.5	43.5	131	135	ϕ162	□156	+2.9kg
	Includes brake	216.5	237.5	57.5	53.5	131	135	ϕ162	□156	
1.5kW	Includes motor	239	276.5	65.5	63.5	142	142	ϕ186	□178	+3.3kg
	Includes brake	260.5	301.5	87	88.5	142	142	ϕ186	□178	
2.2kW	Includes motor	279	310	65.5	64	142	153	ϕ186	□192	+5.7kg
	Includes brake	300.5	335	87	89	142	153	ϕ186	□192	

FF (solid shaft) only 0.75Kw.

Model codes are changing.

Main changes

- Models are differentiated according to reducer, motor, and brake specifications.
- Waterproof (IP65: output shafts made of SUS) and outdoor (IP65: output shafts made of S43C) motor categories have been combined into waterproof motors, and models are differentiated according to output shaft material code.
- Representation of the motor capacity changes. 0.75kW:075→08 1.5kW:150→15 2.2kW:220→22

Table of model code changes (examples)

Series	Mounting type	Frame No.	Shaft arrangement	Reduction ratio		Motor version	Motor category	Capacity	Phase	Voltage	Specification code	Terminal box
Parallel shaft (foot mount) • 0.75kW • 380V/50Hz (CCC-certified for China) • Reduction ratio: 1/10 • No brake												
G3	L	28	N	10	–	HE	M	075	T	W	C	T
Right angle shaft (foot mount) • 0.75kW • 200V/50Hz, 200V/60Hz, 220V/60Hz • Reduction ratio: 1/80 • Waterproof motor (output shaft material: SUS420J2) • With 200V brake												
H2	L	40	R	80	–	HE	V	075	T	N	N	E
Right angle shaft (foot mount) • 1.5kW • 200V/50Hz, 200V/60Hz, 220V/60Hz • Reduction ratio: 1/100 • Waterproof motor (output shaft material: S43C) • No brake												
H2	L	50	T	100	–	HE	G	150	T	N	N	E
Hollow shaft (flange mount) • 2.2kW • 220V/50Hz (for China) • Reduction ratio: 1/12.5 • With 200V brake												
F	S	55	N	12	–	HE	B	220	T	B	C	T
Concentric solid shaft (flange mount) • 1.5kW • 380V/60Hz (for S. Korea) • Reduction ratio: 1/7.5 • No brake												
F3	F	40	T	7	–	HE	M	150	T	F	K	T

Series	Mount type	Frame No.	Shaft arrangement/ material	Reduction ratio		Motor category	Motor specifications	Capacity	Phase	Voltage	Standard	Terminal box	Brake
G3	L	28	N	10	–	M	P	08	T	W	C	T	N
H2	L	50	M	80	–	W	P	08	T	N	N	E	B2
H2	S	55	N	100	–	W	P	15	T	N	N	E	N
F	S	35	N	12	–	M	P	22	T	B	C	T	B2
F3	F	40	T	7	–	M	P	15	T	F	K	T	N
①	②	③	④	⑤		⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

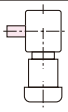
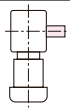
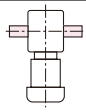
(1) Series name (reducer type)
(2) Mount type (foot, flange)
(3) Frame No. (output shaft diameter)
(4) Output shaft arrangement code. Categorized by material.
Standard motor: Parallel shaft and hollow shaft are N. Right angle shaft has arrangement codes L, R or T.
Waterproof motor: If output shaft material is S43C, parallel shaft is N; right angle and solid shaft have arrangement codes L, R or T.
Waterproof motor: If output shaft material is SUS420J2, parallel shaft and hollow shaft are S; right angle shaft has arrangement codes H, M or B.
(Note: Because codes are differentiated according to output shaft material, waterproof motor and outdoor motor categories are not differentiated; all are classified as waterproof motors.)
(5) Reduction ratio (Note that 1/7.5 is shown as 7, and 1/12.5 is shown as 12.)
(6) Note that motor categories are divided according to motor type and the presence of brakes.
(7) Premium high-efficiency IE3
(8) This code is changing. 0.75kW: 075 → 08 1.5kW: 150 → 15 2.2kW: 220 → 22
(9) Phase has been given a code.
(10) Voltage has been given a code.
(11) Standard
(12) This specifies the terminal box code.
(13) Brake type has been given a code. If there is no brake, the code is N.

* See the product model codes on the next page for more details.

Model codes

Product model

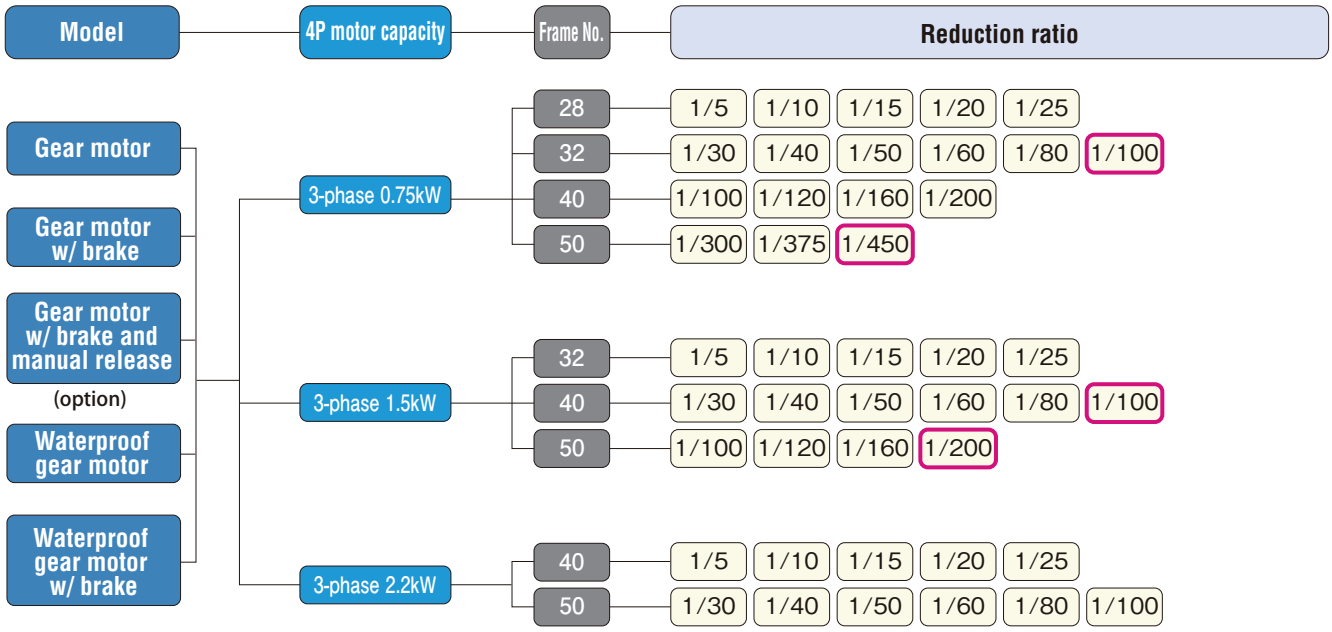
Gear head model					Motor model							Brake	Options	
Series	Mount	Frame No.	Shaft arrangement/ material	Reduction ratio	Motor category	Motor spec	Capacity	Phase	Voltage	Standard	Terminal box		Supplemental code	Box position, power lead position
G3	L	28	N	5	M	P	08	T	N	N	T	B2	X	T9HZ
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮

Reducer	①Series		G3 : Parallel shaft			
			H2 : Right angle shaft			
			F : Hollow shaft / solid shaft			
			F3 : Concentric hollow shaft / concentric solid shaft			
	②Mount		L : Foot mount (G3, H2)			
			F : Flange mount (G3), solid shaft (F), concentric solid shaft (F3)			
			K : Small flange mount (G3) (frames 28 and 32 only)			
			S : Hollow shaft (F), concentric hollow shaft (F3)			
	③Frame No.		Output shaft diameter (inner diameter for hollow shafts, outer diameter for other types)			
	④Shaft arrangement/ material	Shaft type	Parallel shaft, hollow shaft, concentric hollow shaft	Right angle shaft, solid shaft, concentric solid shaft		
				 L: Seen from the input shaft side, the output shaft protrudes on the left.	 R: Seen from the input shaft side, the output shaft protrudes on the right.	 T: Seen from the input shaft side, the output shaft protrudes on both sides.
		Material: S43C	N	L	R	T
		Material: SUS420J2	S	H	M	B
	⑤Reduction ratio		5: 1/5 – 450: 1/450 (for example, 7 = 1/7.5, 12 = 1/12.5, 200 = 1/200)			
Motor model	⑥Motor category		M : Standard induction motor (IP44)			
			W : Waterproof induction motor (IP65)			
	⑦ Motor specifications		P : IE3 efficiency (Premium Efficiency)			
	⑧Capacity		08 : 0.75kW			
			15 : 1.5kW			
			22 : 2.2kW			
	⑨Phase		T : Three-phase			
	⑩Voltage	Three-phase	N : Standard Voltage	200V/50Hz(for Chinese and European efficiency regulations), 200V/60Hz 220V/60Hz(for South Korean efficiency regulations)		
			W : Double Voltage	380V/50Hz(for Chinese and European efficiency regulations), 400V/50Hz(for European efficiency regulations), 400V/60Hz, 440V/60Hz(for South Korean efficiency regulations)		
			F : Non-Standard Voltage	380V/60Hz(for South Korean efficiency regulations)		
			B : Non-Standard Voltage	220V/50Hz(for Chinese efficiency regulations)		
	⑪Standard		N : Standard (for Japan and Europe)			
			K : For South Korea			
			C : For China			
	⑫ Terminal box		T : Type T terminal box (steel)			
			E : Type E terminal box (aluminum) (specifically for waterproof motors)			
Brake model	⑬Brake		N : No brake			
			B2 : 200V brake			
			B4 : 400V brake			
			J2 : 200V brake with manual release mechanism			
			J4 : 400V brake with manual release mechanism			
			V2 : Waterproof 200V brake			
			V4 : Waterproof 400V brake			
Supplemental code	⑭Supplemental code		Blank : Standard specifications			
			X : Code to indicate addition of special specifications			
Supplemental number	⑮Terminal box position indicator number, rectifier wiring specification number		* Indicated in supplemental number space on name plate			

Note 1: Brake lead wires run into the terminal box as standard.

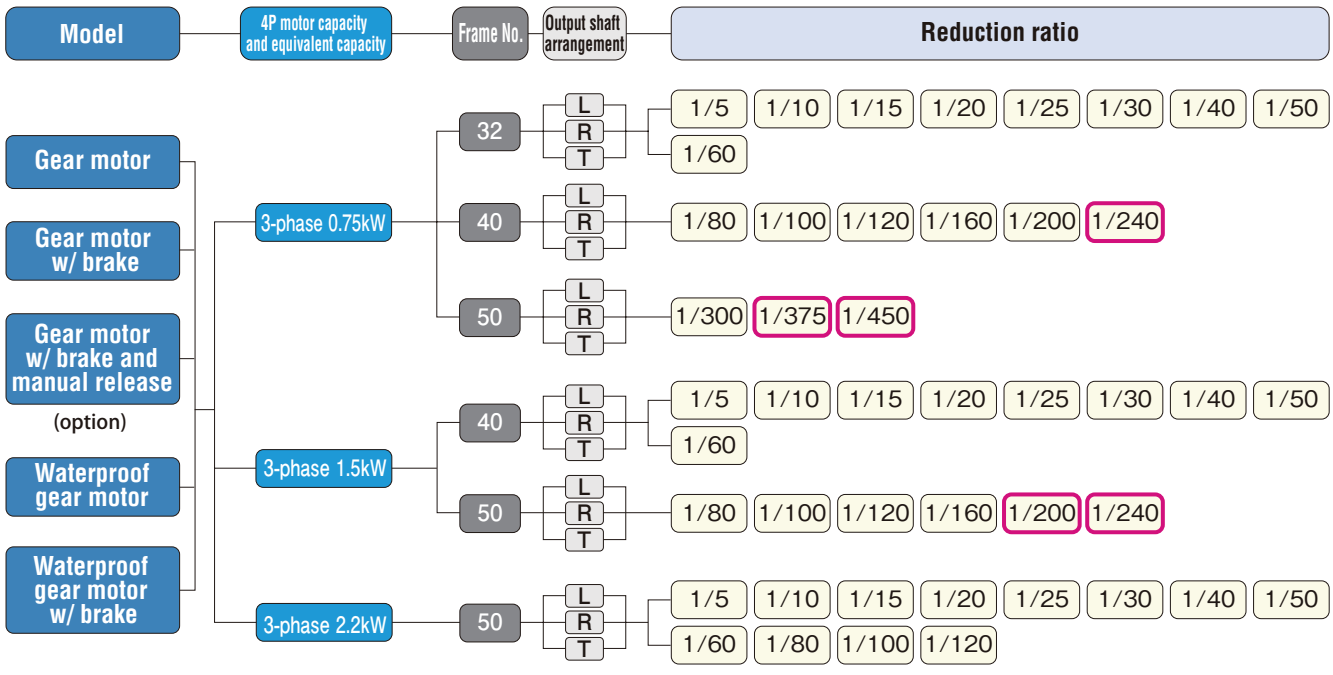
Our model make-up is not changing.

G3 Series G3L (foot mount) / G3F (flange mount) / G3K (small flange mount)



(Notes) 1. The G3 series comes in three types: foot mount, flange mount, and small flange mount.
(Small flange mount is available for frames 28–32 only.)
2. Ratios outlined in ▭ indicate models with torque limits. Please take careful note of the allowable torque in the characteristics table.
3. Outdoor gear motors have been combined into waterproof gear motors.
4. Reducer types may vary according to model.
5. See our GTR Mid Series catalog for more details.

H2 Series H2L (foot mount)



(Notes) 1. Ratios outlined in ▭ indicate models with torque limits. Please take careful note of the allowable torque in the characteristics table.
2. Outdoor gear motors have been combined into waterproof gear motors.
3. Reducer types may vary according to model.
4. See our GTR Mid Series catalog for more details.

F Series FS (hollow shaft) / FF (solid shaft)

Model	4P motor capacity	Frame No.	Reduction ratio
Gear motor Gear motor w/ brake Gear motor w/ brake and manual release (option) Waterproof gear motor Waterproof gear motor w/ brake	3-phase 0.75kW	45 (40)	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30 1/40 1/50 1/60 1/80 1/100 1/120 **1/160** **1/200** **1/240**
		55	**1/300** **1/375** **1/450**
	3-phase 1.5kW	55	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30 1/40 1/50 1/60 1/80 1/100 1/120 **1/160** **1/200** **1/240**
	3-phase 2.2kW	55	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30 1/40 1/50 1/60 1/80 **1/100** **1/120**

(Notes) 1. Ratios outlined in ▭ indicate models with torque limits. Please take careful note of the allowable torque in the characteristics table.
2. Frame numbers given in parentheses indicate solid shaft frame numbers.
3. Outdoor gear motors have been combined into waterproof gear motors.
4. Waterproof gear motors are available only with hollow shaft.
5. Reducer types may vary according to model.
6. See our GTR Mid Series catalog for more details.

F3 Series F3S (concentric hollow shaft) / F3F (concentric solid shaft)

Model	4P motor capacity	Frame No.	Reduction ratio
Gear motor Gear motor w/ brake Gear motor w/ brake and manual release (option) Waterproof gear motor Waterproof gear motor w/ brake	3-phase 0.75kW	(Notes 1) 30 (28)	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30
		35 (32)	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30 1/40 1/50 1/60
		45 (40)	1/80 1/100 1/120 **1/160** **1/200** **1/240**
		55	1/300
	3-phase 1.5kW	(Notes 1) 35 (32)	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30
		45 (40)	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30 1/40 1/50 1/60
		55	1/80 1/100 1/120 1/160 **1/200** **1/240**
	3-phase 2.2kW	45 (40)	1/5 1/7.5 1/10 1/12.5 1/15 1/20 1/25 1/30
		50	1/40 1/50 1/60
		55	1/80 1/100 **1/120**

(Notes) 1. These are small frame number types.
2. Ratios outlined in ▭ indicate models with torque limits. Please take careful note of the allowable torque in the characteristics table.
3. Frame numbers given in parentheses indicate solid shaft frame numbers.
4. Outdoor gear motors have been combined into waterproof gear motors.
5. Waterproof gear motors are available only with hollow shaft.
6. Reducer types may vary according to model.
7. See our GTR Mid Series catalog for more details.

High-Efficiency Brushless DC Gearmotors

*Brushless DC gearmotors are not compatible with high-efficiency regulations.

GTR-AR Brushless DC gearmotor APQ

RoHS

Capacity	Reduction Ratio	Backlash Precision
100 to 750 W	1/5 to 1/240 (Parallel Shaft: 1/200)	30 arcmin (some models excluded)/Normal

Mounting Category

Parallel Shaft **AG3**

Right Angle Shaft **AH2**

Concentric Hollow Shaft/ Solid Shaft **AF3**

Includes Motor | Includes Brake | IP65 Compatible

AC Servo Gearmotor AEF

RoHS

Capacity	Reduction Ratio	Backlash Precision
100 to 750 W	1/5 to 1/240 (Parallel Shaft: 1/200)	30 arcmin (some models excluded)/Normal

Mounting Category

Parallel Shaft **AG3**

Right Angle Shaft **AH2**

Concentric Hollow Shaft/ Solid Shaft **AF3**

Includes Motor | Includes Brake | IP65 Compatible

Battery-Powered Gearmotors

RoHS

Capacity	Reduction Ratio	Voltage
50 to 400 W	1/5 to 1/240 (some models excluded)	12V・24V・48V

Mounting Category

Parallel Shaft **VG**

Right Angle Shaft **VH**

Concentric Hollow Shaft/ Solid Shaft **VF3**

Includes Motor | Includes Brake

GTR-eco IPM Gearmotor

RoHS

Capacity	Reduction Ratio
0.1kW to 2.2kW	1/5 to 1/1500 (some models excluded)

Mounting Category

Parallel Shaft **G3**

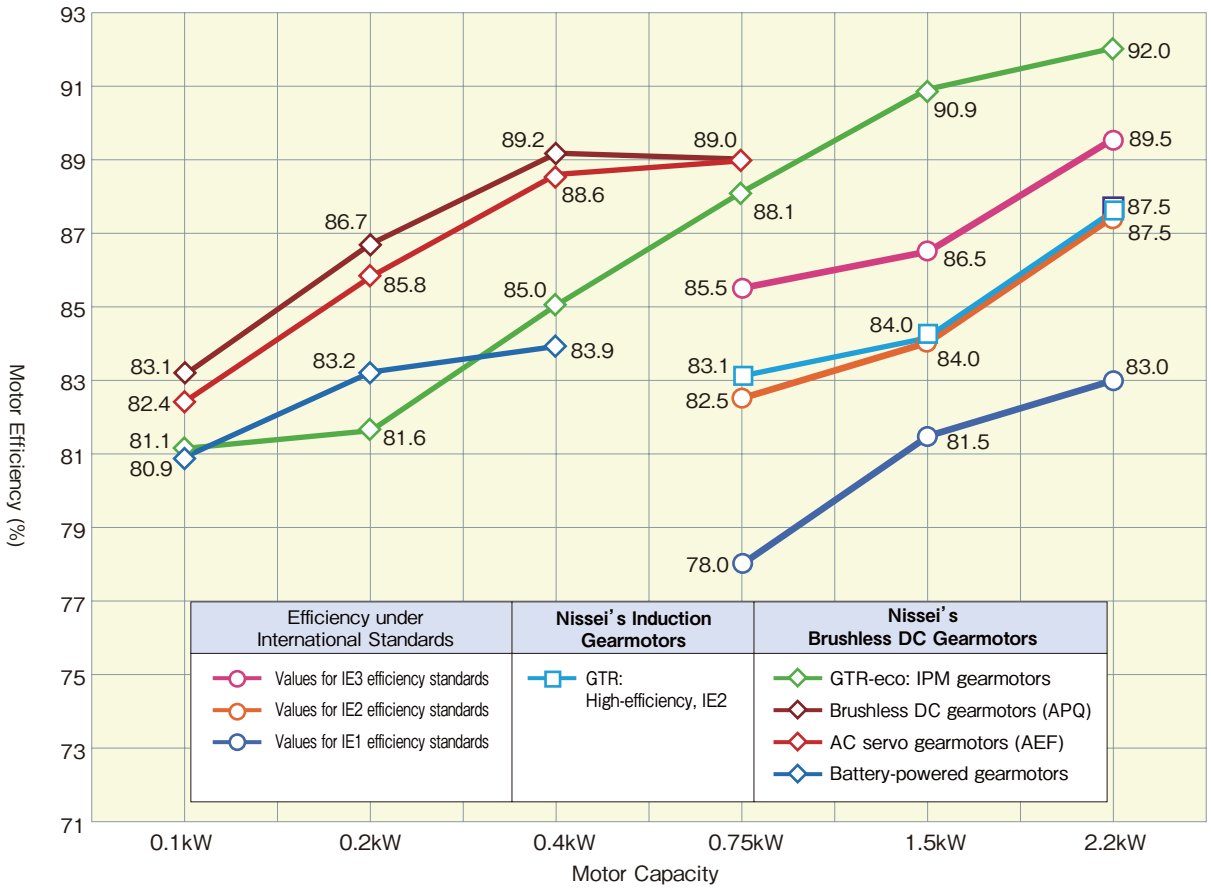
Right Angle Shaft **H2**

Hollow Shaft/Solid Shaft **F**

Concentric Hollow Shaft/ Solid Shaft **F3**

Includes Motor | Includes Brake | Outdoor Use (IP65)

Comparison of Nissei High-Efficiency Gearmotors with High-Efficiency Standards Classes



(Notes) 1. The values for IE1 to IE3 are the efficiency values for direct-drive 60 Hz quadrupole motors. (IEC 60034-30)
2. Brushless DC gearmotors are not compatible with high-efficiency regulations.
3. Values given for battery-powered gearmotors apply at voltages of 24V DC. (reference values)
4. Values given for IPM gearmotors, Brushless DC gearmotors (APQ), AC servo gearmotors (AEF), and battery-powered gearmotors are for the motor unit. (These are reference values that apply to rated rotation speeds. They are not a guarantee.)

Comparison of GTR Gearmotors (IE2) with Nissei's Various High-Efficiency Gearmotors

Operating Conditions

Capacity	0.75 kW
Units Used	1 unit
Power Costs	¥16/kWh
CO2 Emission Volume	0.555 CO_2/kWh
Operating Hours	10 hours/day
Operating Days	250 days/year
Operating Hours per Year	2,500 hours/year
Efficiency of Current Nissei Products (IE1)	79%

Annual power consumption costs (yen)
= output (kW) × operating time (hours/year) × power costs (yen/kWh) ×
{100/(IE2) motor efficiency (%) − 100/high-efficiency motor efficiency (%)}
Annual CO2 emission volume (kg) = annual power consumption × CO2 emission coefficient

*The CO2 emission coefficient of 0.555 kg CO2/kWh is the default value determined by Decree No. 3 of the Ministry of Economy, Trade and Industry and Ministry of the Environment, 2006.

Nissei High-Efficiency Gearmotors	Annual Reduction		
	Power (kWh)	**Power Costs (Yen)**	**CO_2 (kg)**
GTR High-Efficiency IE3 Gearmotors	75	**1,200**	**42**
Brushless DC Gearmotors (APQ)	169	**2,700**	**94**
AC Servo Gearmotors (AEF)	169	**2,700**	**94**
GTR-eco IPM Gearmotors	131	**2,100**	**73**

*This data provides reference values only. They are not guaranteed values. They indicate motor power consumption but do not include power consumption by inverters or drivers.

Nissei High-Efficiency Gear Motors

IPM Gear motors

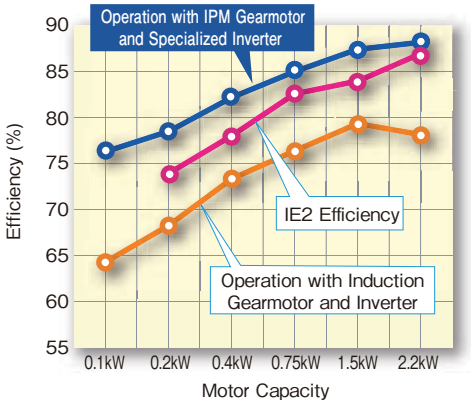
Speed Control

Inverter for speed control models: VF-nC3M

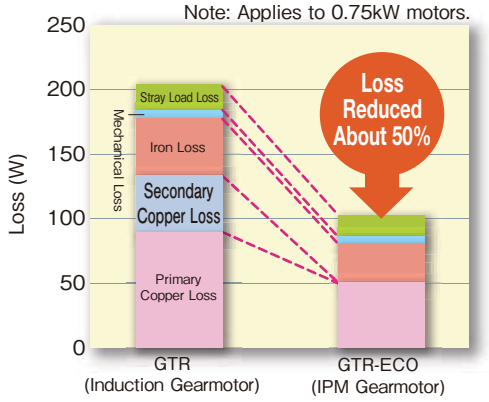
Parallel Shaft / Right Angle Shaft
Hollow Shaft / Solid Shaft
Concentric Hollow Shaft / Solid Shaft

0.1kW～2.2kW

Efficiency Comparison



Internal Motor Loss Comparison



High-Efficiency IPM Gearmotor

IPM is short for “interior permanent magnet” and refers to motors with built-in magnets.

- Since electricity does not flow through the rotor, there is no secondary copper loss.
- Magnetic flux is generated by permanent magnets, so the motor requires little electricity.
- Efficiency clears IE3 at the motor unit level.

IE3 (Super-High Efficiency): IEC60034-30 induction motor efficiency level

High-Efficiency

IPM High-Efficiency Control

The inverter unit’s rotational speed is set through output voltage and current without using an encoder. In order to also achieve optimal efficiency with an IPM motor, electrical current is reduced to the minimum possible when a load is applied, resulting in an IE2-surpassing efficiency rating, even including inverter loss.

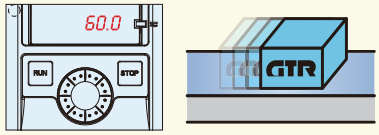
Energy-Saving

Environmental friendliness plus ease of use!

- Synchronous motor free from slips
  Since it eliminates slips common on induction gear motors, the motor runs at the specified frequency command, regardless of load fluctuation.
- No need of dedicated cable
  In comparison with a brushless DC motor having an equivalent high efficiency, the wiring is simplified because no dedicated cable is required. Signal cable is also eliminated because no magnetic pole position sensor is used. Owing to these features, the friendliness to environment has been enhanced to the level comparable with induction motors. (By our comparison)
  Elimination of dedicated cable and signal cable contributes to the cost reduction.

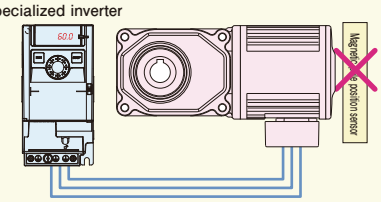
Ease of use & cost reduction

Synchronous motor



Rotation speed as specified by frequency

Without dedicated cable
Without hole element (Sensor-less)

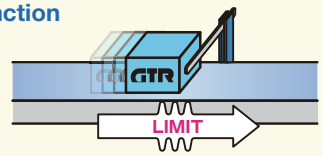


Total cost reduction
Environmental performance comparable with induction gear motors

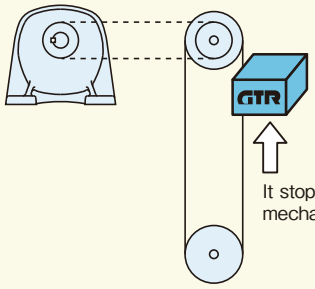
① Contact stop/contact thrust function

With the torque limiting function

Contact stop/
contact thrust



② Brake sequence function

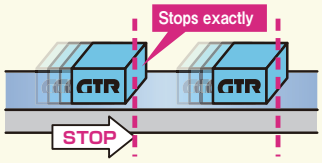


Maintenance free by reducing abrasion on the mechanical brake!!

It stops with the servo lock and then the mechanical brake is applied.

③ Simplified servo lock

With the simplified servo lock function



No need of brake for horizontal operation (Cost reduction)
Frequency of start/stop is 30 times/min.

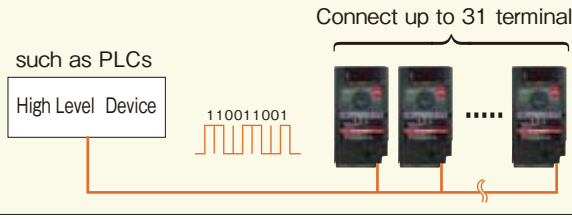
④ Torque limiting function

It restricts torques generated by the motor in order to protect the mechanical system. (It cannot limit instantaneous torques.)

・Torque limit value can be switched in 2 steps via the input terminal.

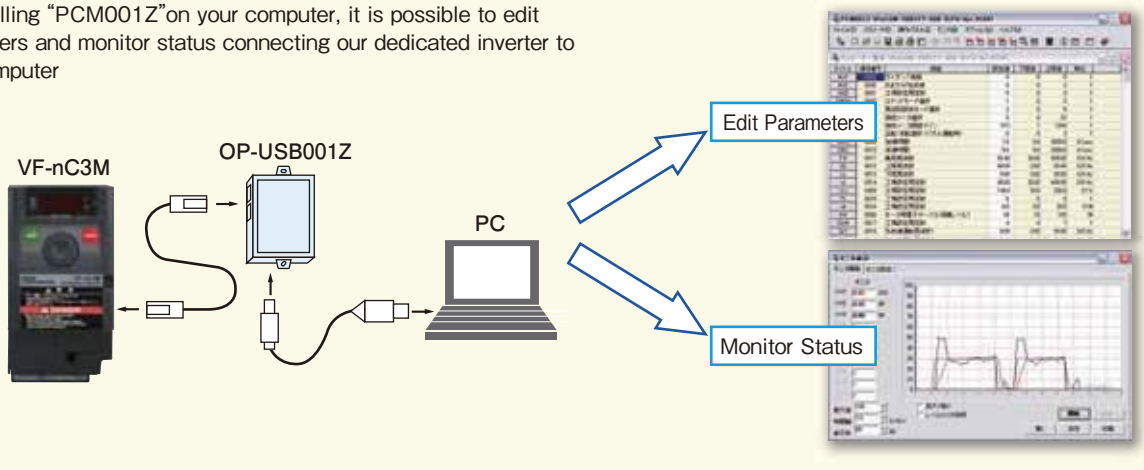
⑤ RS 485 Interface included as Standard

- Easy to access through Inverter or Networkcommunications links
- Communication speed: Max 38.4 kbps
- Can support Modbus RTU Protocol/ TOSHIBA Protocol (Please contact us in case of using CC-Link or other Network Protocols)



⑥ Inverter Console Software [PCM001Z]

By installing “PCM001Z”on your computer, it is possible to edit parameters and monitor status connecting our dedicated inverter to your computer



* The specifications of the products in this catalogue are subject to change by modification or other reasons without notice, therefore, we recommend you to contact us for confirmation, before start designing.
* In case the end-user of products is military organization or the purpose of products is for manufacturing weapons, or the country you export products is the restricted country stipulated in the "Foreign Exchange and Foreign Trade Law", execute prior investigations and take proper measures for export.

NISSEI CORPORATION
http://www.nissei-gtr.co.jp

For orders and/or inquiries about products in this catalogue,
please contact the dealer mentioned below:

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