

YASKAWA

Permanent-Magnet Synchronous Motor Flat-Type Eco PM Motor

200 V/400 V Class, 1.5 to 15 kW



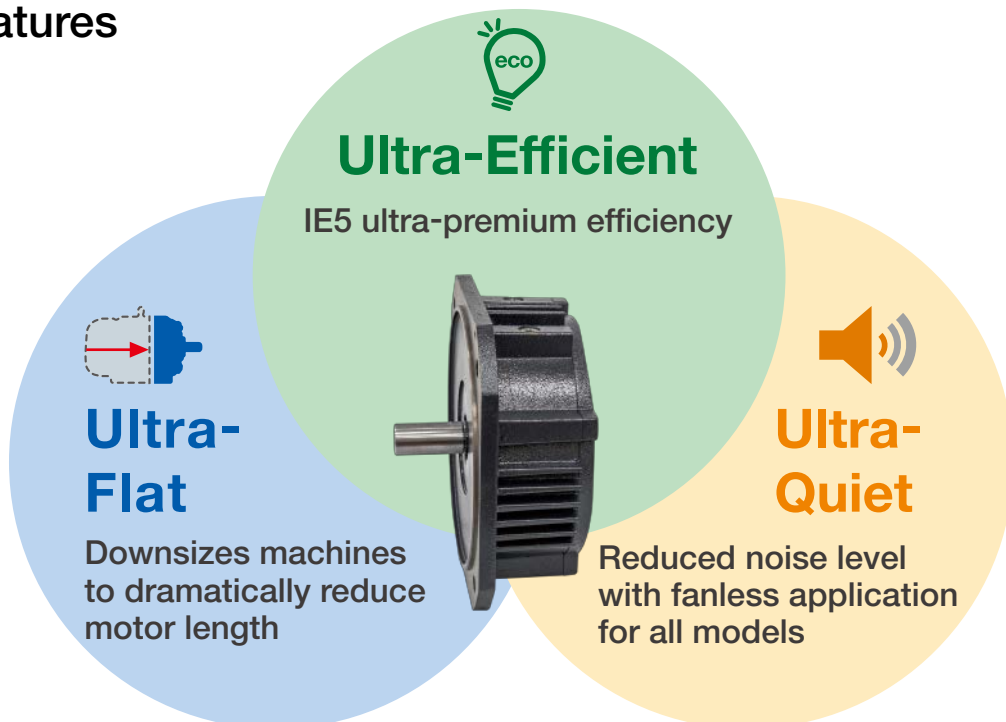
Next-generation, ultra-advanced technology for achieving carbon neutral goals

Today, the creation of a decarbonized society is a common global goal. For over a century since our founding, Yaskawa has been supplying energy-saving products that utilize motor and power conversion technologies. We are trying to dramatically improve the productivity and energy efficiency of our customers' facilities and to reduce CO₂ emissions.

The Flat-Type Eco PM Motor is highly efficient with an IE5 level of energy efficiency, and its flat structure also enables machines to be downsized. When used in combination with the compact, high-performance drive GA500, innovative solutions can add even more value to customers' machines and equipment.



Features





INDEX

Flat Type	
· Features	4
· Motor Lineup	6
· Model Designations	6
· Combinations with AC Drive GA500	7
· Specifications	8
· Characteristics	8
· Dimensions	9
Applicable AC Drive GA500	
· Features	10
· Specifications	10
· Dimensions	12
Application Notes	14
Warranty Information	15

Applications

Versatile and efficient for use in a wide range of applications



- Air handling unit
- Fan filter unit
- Pumps and other equipment

Adds value to machines with a wide range of solutions.

Predictive detection of fan filter clogging*1

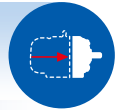
Predictive detection of air entrainment in pumps*1

Remote management with network options*2

*1: For details, refer to the Predictive Failure Detection with YASKAWA AC Drives (Catalog No. CHEPC71061738).
 *2: For details, refer to the Multi-Protocol Ethernet Option Card (Catalog No. CHEPC7306000H).

Next-Generation, Ultra-Advanced Technology

Contributes to carbon neutral goals & improved environment of use.

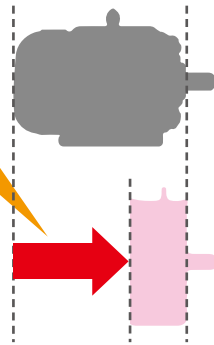


Ultra-Flat

Ultimate flat structure

Up to **70%***
shorter length
Up to 50% lighter weight

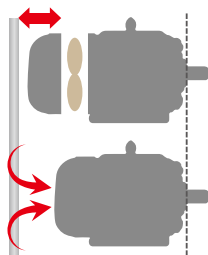
*: Compared to IE3 motor, excluding motor shaft length



Maintenance space can be reduced.

For IE3 motor

- Requires maintenance space for fan replacement
- Requires space for cooling air

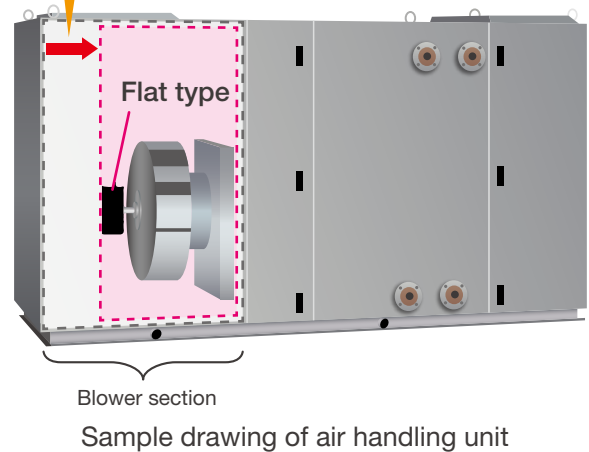


Reduce equipment footprint

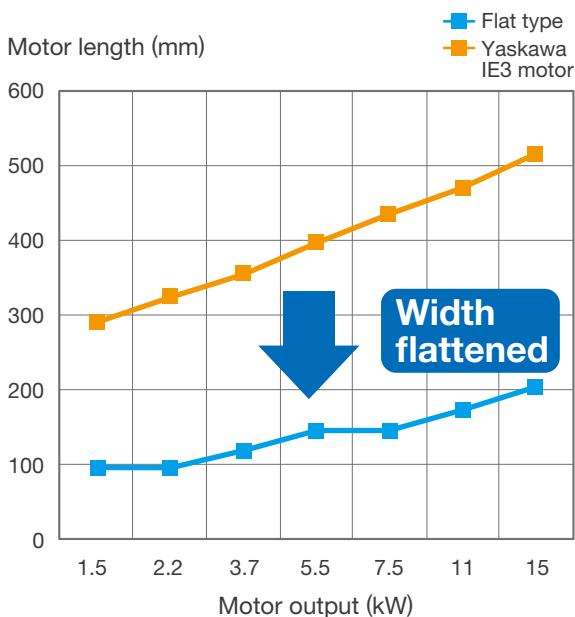
Save space for equipment

Reduce installation area by **25%***

*: Example of blower section (7.5 kW motor), comparison with IE3 motor installation

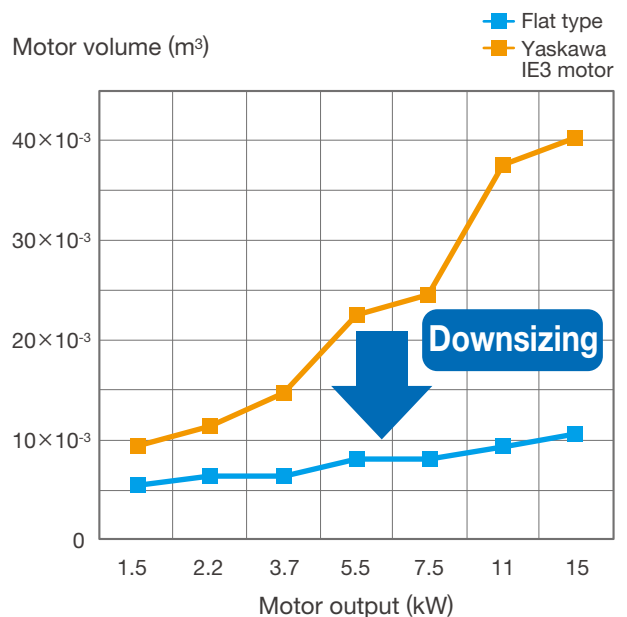


Motor length comparison



Note: Data for 1800 min⁻¹ model, excluding motor shaft length

Motor volume comparison



Note: Data for 1800 min⁻¹ model

[Yaskawa's Carbon Neutral Actions]

Yaskawa is working to achieve carbon neutrality. To realize this, we supply products that help reduce CO₂ emissions and control CO₂ emissions throughout the manufacturing process.

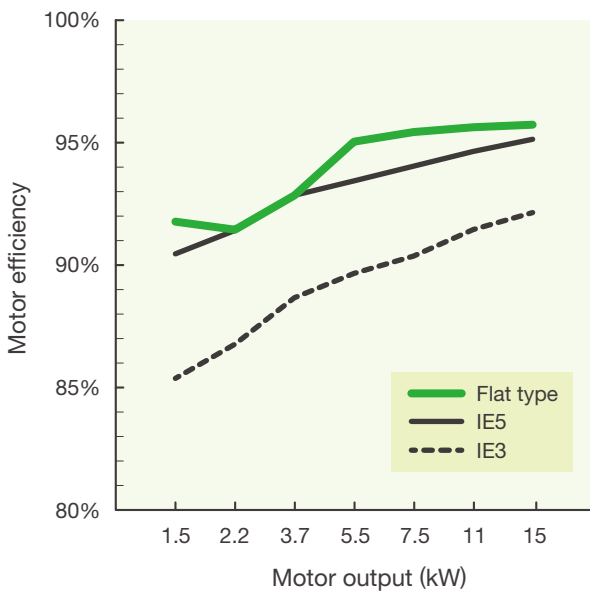


Ultra-Efficient



High efficiency that clears IE5 standards for all motor capacities

The Flat-type motor is a World-class IE5 motor, offering outstanding energy-saving performance.

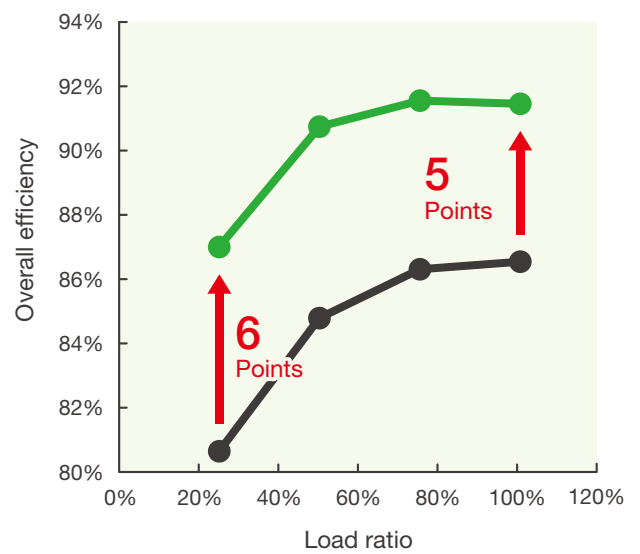


Note: Calculated values for 1800 min⁻¹ model

Improved overall efficiency (when combined with an AC drive)

The combination of GA500 and flat type improves the overall efficiency at all load ratio.

GA500+Flat type vs V1000+ Yaskawa IE3 motor



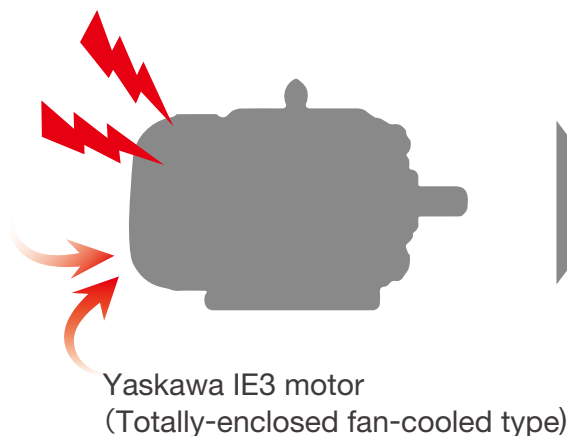
Note: Calculated values for 3.7 kW/1800 min⁻¹ model

Ultra-Quiet



Low noise with fanless structure

All models feature a fanless structure achieved with the latest thermal design. Noise levels have been reduced by 3 to 5 dB in high-speed models.



Approx. 60 dB*

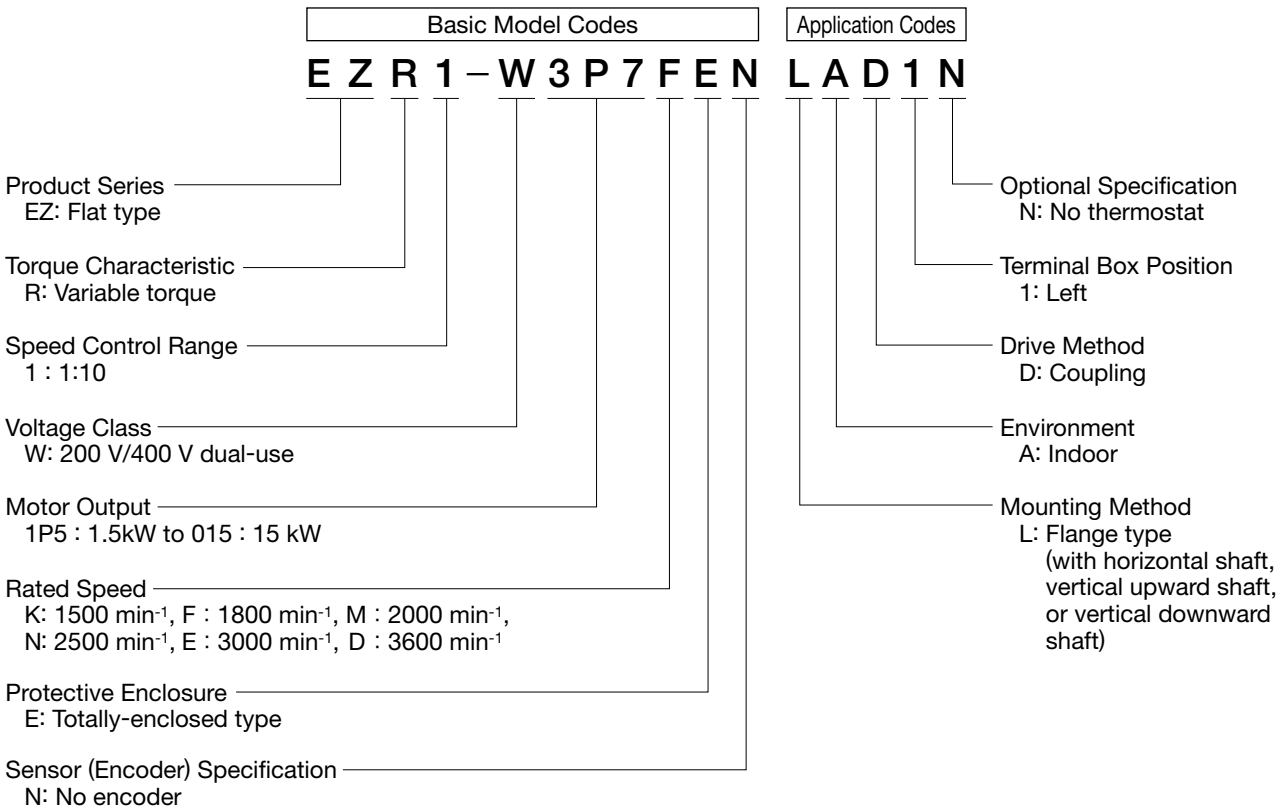
*: Data for 3.7 kW/
3600 min⁻¹ model

● Motor Lineup (200 V/400 V class, dual-use)

Motor Output and Frame No.							
Rated Speed	1.5 kW	2.2 kW	3.7 kW	5.5 kW	7.5 kW	11 kW	15 kW
1500 min ⁻¹	200FSA	200FMA	200FMB	250FSA	250FSB	250FMA	250FLA
1800 min ⁻¹	200FSA	200FSA	200FMB	250FSA	250FSB	250FMA	250FLA
2000 min ⁻¹	200FSA	200FSA	200FMA	250FSA	250FSA	250FSB	250FMA
2500 min ⁻¹	200FSA	200FSA	200FMA	200FMB	250FSA	250FSB	250FMA
3000 min ⁻¹	200FSA	200FSA	200FSA	200FMA	250FSA	250FSB	250FSB
3600 min ⁻¹	200FSA	200FSA	200FSA	200FMA	250FSA	250FSB	250FSB

Note. 1 The flat-type motor can be used for both 200 V/400 V, but the terminals must be rewired. Refer to the instruction manual (No. TOEPC45030400) for details. The AC drive must be prepared according to the power supply voltage to be used.
 2 Models (200FSA and 250FSB) with the same frame number but different shaft dimensions and moment of inertia values are indicated by different colors. For details, refer to page 9.

● Model Designations



Combinations with AC Drive GA500

Combinations with AC Drive GA500

Rated Speed 1500 min⁻¹

Voltage	Output kW	Motor Model	AC Drive Model	AC Drive Rated Current A	Carrier Frequency
200 V Class	1.5	EZR1-W1P5KEN	GA50A2010	8	4 kHz
	2.2	EZR1-W2P2KEN	GA50A2012	11	
	3.7	EZR1-W3P7KEN	GA50A2021	17.6	
	5.5	EZR1-W5P5KEN	GA50A2030	25	
	7.5	EZR1-W7P5KEN	GA50A2042	33	
	11	EZR1-W011KEN	GA50A2056	47	
	15	EZR1-W015KEN	GA50A2070	60	
400 V Class	1.5	EZR1-W1P5KEN	GA50A4005	4.8	
	2.2	EZR1-W2P2KEN	GA50A4007	5.6	
	3.7	EZR1-W3P7KEN	GA50A4012	9.2	
	5.5	EZR1-W5P5KEN	GA50A4018	14.8	
	7.5	EZR1-W7P5KEN	GA50A4023	18	
	11	EZR1-W011KEN	GA50A4031	24	
	15	EZR1-W015KEN	GA50A4038	31	

Rated Speed 1800 min⁻¹

Voltage	Output kW	Motor Model	AC Drive Model	AC Drive Rated Current A	Carrier Frequency
200 V Class	1.5	EZR1-W1P5FEN	GA50A2010	8	4 kHz
	2.2	EZR1-W2P2FEN	GA50A2012	11	
	3.7	EZR1-W3P7FEN	GA50A2021	17.6	
	5.5	EZR1-W5P5FEN	GA50A2030	25	
	7.5	EZR1-W7P5FEN	GA50A2042	33	
	11	EZR1-W011FEN	GA50A2056	47	
	15	EZR1-W015FEN	GA50A2070	60	
400 V Class	1.5	EZR1-W1P5FEN	GA50A4005	4.8	
	2.2	EZR1-W2P2FEN	GA50A4007	5.6	
	3.7	EZR1-W3P7FEN	GA50A4012	9.2	
	5.5	EZR1-W5P5FEN	GA50A4018	14.8	
	7.5	EZR1-W7P5FEN	GA50A4023	18	
	11	EZR1-W011FEN	GA50A4031	24	
	15	EZR1-W015FEN	GA50A4038	31	

Rated Speed 2000 min⁻¹

Voltage	Output kW	Motor Model	AC Drive Model	AC Drive Rated Current A	Carrier Frequency
200 V Class	1.5	EZR1-W1P5MEN	GA50A2010	8	4 kHz
	2.2	EZR1-W2P2MEN	GA50A2012	11	
	3.7	EZR1-W3P7MEN	GA50A2021	17.6	
	5.5	EZR1-W5P5MEN	GA50A2030	25	
	7.5	EZR1-W7P5MEN	GA50A2042	33	
	11	EZR1-W011MEN	GA50A2056	47	
	15	EZR1-W015MEN	GA50A2070	60	
400 V Class	1.5	EZR1-W1P5MEN	GA50A4005	4.8	
	2.2	EZR1-W2P2MEN	GA50A4007	5.6	
	3.7	EZR1-W3P7MEN	GA50A4012	9.2	
	5.5	EZR1-W5P5MEN	GA50A4018	14.8	
	7.5	EZR1-W7P5MEN	GA50A4023	18	
	11	EZR1-W011MEN	GA50A4031	24	
	15	EZR1-W015MEN	GA50A4038	31	

Rated Speed 2500 min⁻¹

Voltage	Output kW	Motor Model	AC Drive Model	AC Drive Rated Current A	Carrier Frequency
200 V Class	1.5	EZR1-W1P5NEN	GA50A2010	8	4 kHz
	2.2	EZR1-W2P2NEN	GA50A2012	11	
	3.7	EZR1-W3P7NEN	GA50A2021	17.6	
	5.5	EZR1-W5P5NEN	GA50A2030	25	
	7.5	EZR1-W7P5NEN	GA50A2042	33	
	11	EZR1-W011NEN	GA50A2056	47	
	15	EZR1-W015NEN	GA50A2070	60	
400 V Class	1.5	EZR1-W1P5NEN	GA50A4005	4.8	
	2.2	EZR1-W2P2NEN	GA50A4007	5.6	
	3.7	EZR1-W3P7NEN	GA50A4012	9.2	
	5.5	EZR1-W5P5NEN	GA50A4018	14.8	
	7.5	EZR1-W7P5NEN	GA50A4023	18	
	11	EZR1-W011NEN	GA50A4031	24	
	15	EZR1-W015NEN	GA50A4038	31	

Rated Speed 3000 min⁻¹

Voltage	Output kW	Motor Model	AC Drive Model	AC Drive Rated Current A	Carrier Frequency
200 V Class	1.5	EZR1-W1P5EEN	GA50A2010	8	4 kHz
	2.2	EZR1-W2P2EEN	GA50A2012	11	
	3.7	EZR1-W3P7EEN	GA50A2021	17.6	
	5.5	EZR1-W5P5EEN	GA50A2030	25	
	7.5	EZR1-W7P5EEN	GA50A2042	33	
	11	EZR1-W011EEN	GA50A2056	47	
	15	EZR1-W015EEN	GA50A2070	60	
400 V Class	1.5	EZR1-W1P5EEN	GA50A4005	4.8	
	2.2	EZR1-W2P2EEN	GA50A4007	5.6	
	3.7	EZR1-W3P7EEN	GA50A4012	9.2	
	5.5	EZR1-W5P5EEN	GA50A4018	14.8	
	7.5	EZR1-W7P5EEN	GA50A4023	18	
	11	EZR1-W011EEN	GA50A4031	24	
	15	EZR1-W015EEN	GA50A4038	31	

Rated Speed 3600 min⁻¹

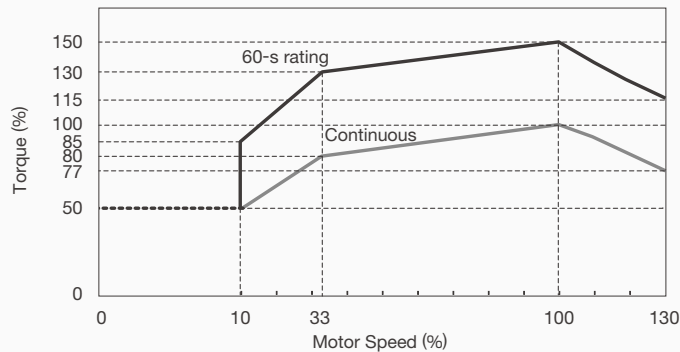
Voltage	Output kW	Motor Model	AC Drive Model	AC Drive Rated Current A	Carrier Frequency
200 V Class	1.5	EZR1-W1P5DEN	GA50A2010	8	4 kHz
	2.2	EZR1-W2P2DEN	GA50A2012	11	
	3.7	EZR1-W3P7DEN	GA50A2021	17.6	
	5.5	EZR1-W5P5DEN	GA50A2030	25	
	7.5	EZR1-W7P5DEN	GA50A2042	33	
	11	EZR1-W011DEN	GA50A2056	47	
	15	EZR1-W015DEN	GA50A2070	60	
400 V Class	1.5	EZR1-W1P5DEN	GA50A4005	4.8	
	2.2	EZR1-W2P2DEN	GA50A4007	5.6	
	3.7	EZR1-W3P7DEN	GA50A4012	9.2	
	5.5	EZR1-W5P5DEN	GA50A4018	14.8	
	7.5	EZR1-W7P5DEN	GA50A4023	18	
	11	EZR1-W011DEN	GA50A4031	24	
	15	EZR1-W015DEN	GA50A4038	31	

Note: If the carrier frequency is set to 8 kHz to reduce motor operation noise, select an AC drive one frame larger than shown in the table above. When the carrier frequency is set to 8 kHz in the combinations shown in the table above, use a continuous rating of 85% or less.

Specifications

Output Range	1.5 to 15 kW	
Frame No.	200F□□/250F□□	
Mounting Method	Flange type (with horizontal shaft, vertical upward shaft, or vertical downward shaft)	
Cooling Method	Self-cooled type (IC410) (Always check the motor temperature with the actual equipment.)	
Enclosure	Totally-enclosed type (IP44) (except for shaft opening and lead drawer part)	
Rated Speed	1500 min ⁻¹ , 1800 min ⁻¹ , 2000 min ⁻¹ , 2500 min ⁻¹ , 3000 min ⁻¹ , 3600 min ⁻¹	
Power Supply	Drive Input	200 V Class
	Power Supply	400 V Class
	Motor Nominal Rated Voltage	200 V class : 200 V*1, 400 V class : 400 V*1
Motor Poles	8-pole	
Speed Control Range	1:10 (variable torque), 1:1.3 (constant output)*2	
Time Rating	S1 continuous*3	
Thermal Class	155 (F)	
Application Site	Indoor, non-explosion-proof location (Outdoors, Class 2 corrosion protection is not acceptable.)	
Ambient Conditions	Temperature	-20°C to +40°C
	Humidity	90% RH max. (with no condensation)
	Altitude	1000 m max.
Rotation Direction	Counterclockwise viewed from the drive end (Rotation in both directions is also possible.)	
Drive Method	Coupling	
Coating Color	Indoor usage: Munsell N1.5 (glossy coating)	
Compliant Standards	JEC-2100	
Applicable AC Drives	Yaskawa GA500 series	

Allowable Load Characteristics*2
(Based on AC drive GA500.)



Note: The bold dotted line indicates the momentary operation region.

*1: Flat-type motors are designed for use with both 200 V/400 V. Refer to the instruction manual (No. TOEPC45030400) for details.
*2: Models 3000 min⁻¹ and 3600 min⁻¹ are not available for constant output.

*3: Time rating S1 is based on the assumption that a steel plate heatsink of the following specified size is installed.
(Frame No. 200F□□ : 400×400×20 mm,
Frame No. 250F□□ : 600×600×25 mm)

Characteristics

Voltage	Output kW	Full Load Current*1 A					
		1500 min ⁻¹	1800 min ⁻¹	2000 min ⁻¹	2500 min ⁻¹	3000 min ⁻¹	3600 min ⁻¹
200 V Class*2	1.5	5.8	5.9	5.8	5.8	5.9	5.8
	2.2	8.4	8.6	8.4	8.4	8.6	8.5
	3.7	15	14	15	14	15	15
	5.5	21	20	20	21	22	21
	7.5	28	27	27	28	27	28
	11	41	40	41	40	40	40
	15	56	55	56	54	56	54
400 V Class*2	1.5	2.9	3	2.9	2.9	3	2.9
	2.2	4.2	4.3	4.2	4.2	4.3	4.3
	3.7	7.2	7	7.2	7	7.2	7.1
	5.5	11	10	9.8	11	11	11
	7.5	14	14	15	14	14	14
	11	21	20	21	20	20	20
	15	28	28	28	27	28	27

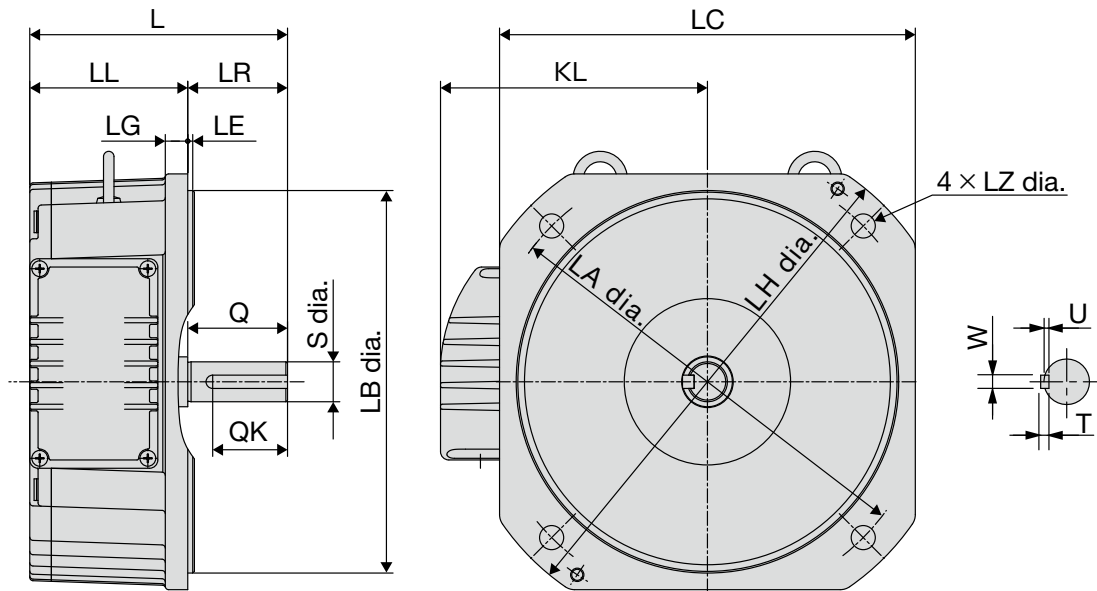
*1: The full load currents of the motors are for the following motor input voltages. For other voltages, calculate the characteristics using the inverse proportion to the voltage.
200 V Class: 190 V, 400 V Class: 380 V

*2: Flat-type motors are designed for use with both 200 V/400 V. Refer to the instruction manual (No. TOEPC45030400) for details.

Dimensions mm

Dimensions

	1.5 kW	2.2 kW	3.7 kW	5.5 kW	7.5 kW	11 kW	15 kW
1500 min ⁻¹		3	4			8	9
1800 min ⁻¹			4	5	6	8	9
2000 min ⁻¹	1	2	3				8
2500 min ⁻¹			3	4	5	7	
3000 min ⁻¹		1	2	3			7
3600 min ⁻¹							7



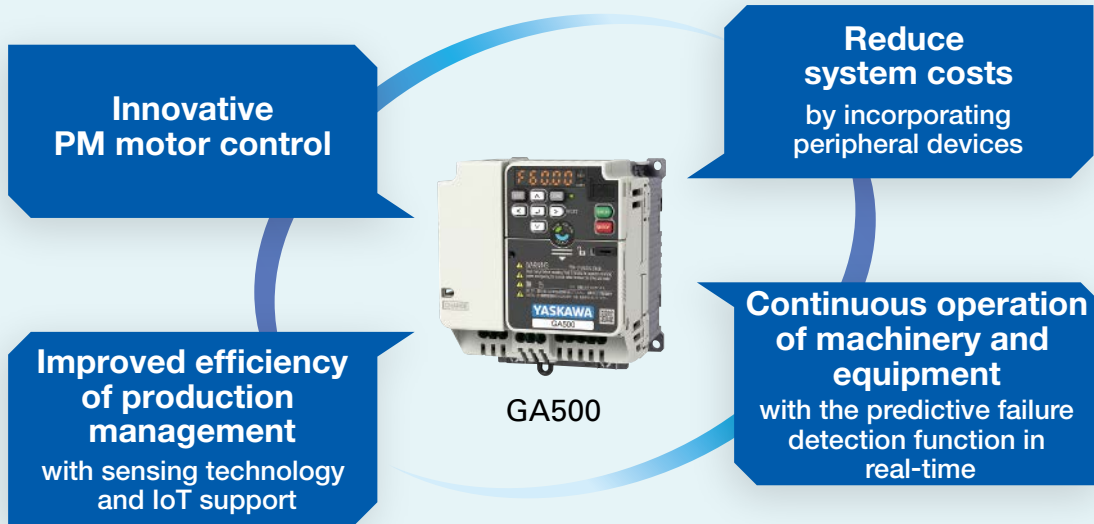
No.	Frame No.	Dimensions mm																	Approx. Mass kg	Moment of Inertia GD ² /4 kg·m ²
		L	LL	LR	KL	Flange Dimensions					Shaft End Dimensions									
						LA	LB	LC	LE	LG	LH	LZ	S	Q	QK	W	T	U		
1	200FSA	156	96	60	161	265	230 ^{+0.016} _{-0.013}	250	4	13.5	300	14.5	24 ^{+0.009} _{-0.004}	60	45	8	7	4	21	0.004
2	200FSA	156	96	60	161	265	230 ^{+0.016} _{-0.013}	250	4	13.5	300	14.5	28 ^{+0.009} _{-0.004}	60	45	8	7	4	21	0.004
3	200FMA	178	118	60	161	265	230 ^{+0.016} _{-0.013}	250	4	13.5	300	14.5	28 ^{+0.009} _{-0.004}	60	45	8	7	4	25	0.005
4	200FMB	178	118	60	161	265	230 ^{+0.016} _{-0.013}	250	4	13.5	300	14.5	28 ^{+0.009} _{-0.004}	60	45	8	7	4	27	0.007
5	250FSA	233	148	85	213	300	250 ^{+0.016} _{-0.013}	300	5	14	350	18.5	38 ^{+0.018} _{-0.002}	80	60	10	8	5	49	0.017
6	250FSB	233	148	85	213	300	250 ^{+0.016} _{-0.013}	300	5	14	350	18.5	38 ^{+0.018} _{-0.002}	80	60	10	8	5	55	0.023
7	250FSB	263	148	115	213	300	250 ^{+0.016} _{-0.013}	300	5	14	350	18.5	42 ^{+0.018} _{-0.002}	110	90	12	8	5	55	0.024
8	250FMA	290	175	115	213	300	250 ^{+0.016} _{-0.013}	300	5	14	350	18.5	42 ^{+0.018} _{-0.002}	110	90	12	8	5	67	0.033
9	250FLA	317	202	115	213	300	250 ^{+0.016} _{-0.013}	300	5	14	350	18.5	42 ^{+0.018} _{-0.002}	110	90	12	8	5	79	0.043

Note: Models (200FSA and 250FSB) with the same frame number but different shaft dimensions and moment of inertia values are indicated by different colors.

Versatile Compact Drive GA500



Compact, high-performance drive featuring a lineup of small to medium-capacity models, developed for versatility, ease of use, and stability.



Note: For details, refer to the GA500 catalog (No. KAEP71061740).

Standard Specifications

Parameter C6-01 sets the drive for Normal Duty or Heavy Duty performance (default).

		GA50A[](Three-phase)	2001	2002	2004	2006	2008	2010	2012	2018	2021	2030	2042	2056	2070	
		GA50A[](Single-phase)	B001	B002	B004	B006	-	B010	B012	-	B018*3	-	-	-	-	
200 V Class	Max. Applicable Motor Output*1, *2	kW	HD	0.1	0.2	0.4	0.75	1.1	1.5	2.2	3	3.7	5.5	7.5	11	15
		ND	0.2	0.4	0.75	1.1	1.5	2.2	3	3.7	5.5	7.5	11	15	18.5	
	Rated Output Current	A	HD	0.8	1.6	3	5	6.9	8	11	14	17.6	25	33	47	60
		ND	1.2	1.9	3.5	6	8	9.6	12.2	17.5	21	30	42	56	70	
	Output	Max. Output Voltage	Three-phase 200 to 240 V Note: The maximum output voltage is in proportion to the input voltage.													
		Max. Output Frequency	590 Hz The frequencies that can be set vary depending on the control mode used.													
400 V Class	GA50A[]		4001	4002	4004	4005	4007	4009	4012	4018	4023	4031	4038			
	Max. Applicable Motor Output*1	kW	HD	0.2	0.4	0.75	1.5	2.2	3	3.7	5.5	7.5	11	15		
		ND	0.4	0.75	1.5	2.2	3	3.7	5.5	7.5	11	15	18.5			
	Rated Output Current	A	HD	1.2	1.8	3.4	4.8	5.6	7.3	9.2	14.8	18	24	31		
		ND	1.2	2.1	4.1	5.4	7.1	8.9	11.9	17.5	23.4	31	38			
	Output	Max. Output Voltage	Three-phase 380 to 480 V Note: The maximum output voltage is in proportion to the input voltage.													
Max. Output Frequency		590 Hz The frequencies that can be set vary depending on the control mode used.														

*1: The rated output current of the drive output amps should be equal to or greater than the motor rated current.

*2: Drives with a single-phase power supply input have three-phase output. Single-phase motors cannot be used.

*3: Heavy Duty only

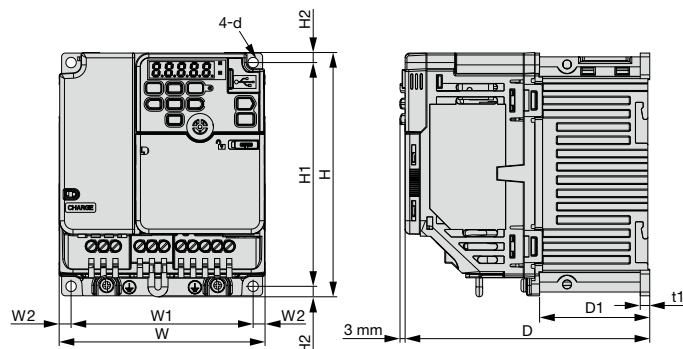
Note: HD = Heavy Duty, ND = Normal Duty

Common Specifications

Item	Specifications
Control Method	The following controls are selected by parameters. <ul style="list-style-type: none"> • V/f Control (V/f) • Open Loop Vector Control (OLV) • Open Loop Vector Control for PM (OLV/PM) • Advanced Open Loop Vector Control for PM (AOLV/PM) • EZ Open Loop Vector Control (EZOLV)
Frequency Control Range	<ul style="list-style-type: none"> • EZ Open Loop Vector Control: 0.01 Hz to 120 Hz • Advanced Open Loop Vector Control for PM: 0.01 Hz to 270 Hz • V/f Control, Open Loop Vector Control, Open Loop Vector Control for PM: 0.01 Hz to 590 Hz
Frequency Accuracy (Temperature Fluctuation)	Digital reference: within $\pm 0.01\%$ of the max. output frequency (-10°C to $+40^{\circ}\text{C}$) Analog reference: within $\pm 0.1\%$ of the max. output frequency ($25^{\circ}\text{C} \pm 10^{\circ}\text{C}$)
Frequency Setting Resolution	Digital reference: 0.01 Hz Analog reference: 1/2048 of the maximum output frequency setting (11 bit)
Output Frequency Resolution	0.001 Hz
Frequency Setting Signal	Main frequency reference: 0 to 10 Vdc (20 k Ω), 4 to 20 mA (250 Ω), 0 to 20 mA (250 Ω) Main speed reference: Pulse train input (max. 32 kHz)
Starting Torque*	<ul style="list-style-type: none"> • V/f Control: 150%/3 Hz • Open Loop Vector Control: 150%/0.6 Hz*¹ • Open Loop Vector Control for PM: 100%/10% speed • Advanced Open Loop Vector Control for PM: 100%/0 min⁻¹*¹ • EZ Open Loop Vector Control: 100%/10% speed <p>Note: To achieve specifications listed for Advanced Open Loop Vector Control for PM; Set n8-57 to 1 (High frequency injection is enabled), and perform Rotational Auto-Tuning to drive a non-Yaskawa PM motor.</p>
Speed Control Range*	<ul style="list-style-type: none"> • V/f Control: 1:40 • Open Loop Vector Control: 1:100 • Open Loop Vector Control for PM: 1:10 • Advanced Open Loop Vector Control for PM: 1:100 • EZ Open Loop Vector Control: 1:10 <p>Note: 1. To achieve specifications listed for Advanced Open Loop Vector Control for PM; Set n8-57 to 1 (High frequency injection is enabled), and perform Rotational Auto-Tuning to drive a non-Yaskawa PM motor. 2. Advanced Open Loop Vector Control for PM 1:100 is valid in the momentary operation region. When using the motor continuously, it is necessary to consider the capacity of the GA500 and the motor.</p>
Zero Speed Control	Possible in Advanced Open Loop Vector Control for PM.
Torque Limit	Parameter settings allow separate limits in four quadrants in Open Loop Vector Control, Advanced Open Loop Vector Control for PM, and EZ Open Loop Vector Control.
Accel/Decel Time	0.0 s to 6000.0 s The drive allows four selectable combinations of independent acceleration and deceleration settings.
Braking Torque	<p>Approx. 20% Approx. 125% with a dynamic braking option</p> <ul style="list-style-type: none"> • Short-time average deceleration torque Motor capacity 0.1/0.2 kW: 150% minimum Motor capacity 0.4/0.75 kW: 100% minimum Motor capacity 1.5 kW: 50% minimum Motors 2.2 kW and larger: 20% minimum, Overexcitation Braking / High Slip Braking allow for approx. 40% <p>Note: 1. Set L3-04 = 0 [Stall Prevention during Decel = Disabled] when using a regenerative converter, regenerative unit, braking unit, braking resistor, or braking resistor unit. Failure to obey could prevent the drive from stopping in the specified deceleration time and cause serious injury or death. 2. Short-time deceleration torque refers to the torque required to decelerate the motor (uncoupled from the load) from the rated speed to zero. Actual specifications may vary depending on motor characteristics. 3. Continuous regenerative torque and short-time deceleration torque for motors 2.2 kW and larger vary depending on motor characteristics.</p>
V/f Characteristics	User-selected programs, V/f preset patterns possible
Main Control Functions	Feed Forward Control, Momentary Power Loss Ride-Thru, Speed Search, Overtorque detection, torque limit, 17 Step Speed (max.), accel/decel switch, S-curve accel/decel, 3-wire sequence, Auto-Tuning (rotational, stationary), Dwell, cooling fan on/off switch, slip compensation, torque compensation, Frequency Jump, Upper/lower limits for frequency reference, DC Injection Braking at start and stop, Overexcitation Deceleration, High Slip Braking, PID control (with Sleep function), Energy Saving Control, MEMOBUS/Modbus (RTU mode) Communications (RS-485/422, max. 115.2 kbps), Fault Restart, Application Presets, DriveWorksEZ (customized functions), Parameter Backup Function, Online Tuning, KEB, Overexcitation Deceleration, Overvoltage Suppression, High Frequency Injection, etc.

*: The table above shows the standard specifications for the GA500. For the combinations with the flat-type motor, refer to the allowable load characteristics on page 8.

● IP20/UL Open Type (without Built-in EMC Filter)



200 V Class, Three-Phase Input

Catalog Code GA50A	Max. Applicable Motor Capacity kW		Dimensions mm										Weight kg
	HD	ND	W	H	D	D1	W1	W2	H1	H2	t1	d	
2001	0.1	0.2	68	128	76	6.5	56	6	118	5	3	M5	0.5
2002	0.2	0.4											
2004	0.4	0.75	68	128	108	38.5	56	6	118	5	5	M5	0.8
2006	0.75	1.1	68	128	128	58.5	56	6	118	5	5	M5	0.9
2008	1.1	1.5	108	128	129	56.5	96	6	118	5	5	M5	1.5
2010	1.5	2.2											
2012	2.2	3	108	128	137.5	56.5	96	6	118	5	5	M5	1.5
2018	3	3.7	140	128	143	65	128	6	118	5	5	M5	2.0
2021	3.7	5.5											
2030	5.5	7.5	140	260	140	55	122	9	248	6	5	M5	3.4
2042	7.5	11	140	260	140	55	122	9	248	6	5	M5	3.6
2056	11	15	180	300	143	55	160	10	284	8	5	M5	5.5
2070	15	18.5	220	350	187	78	192	14	336	7	5	M6	7.5

200 V Class, Single-Phase Input

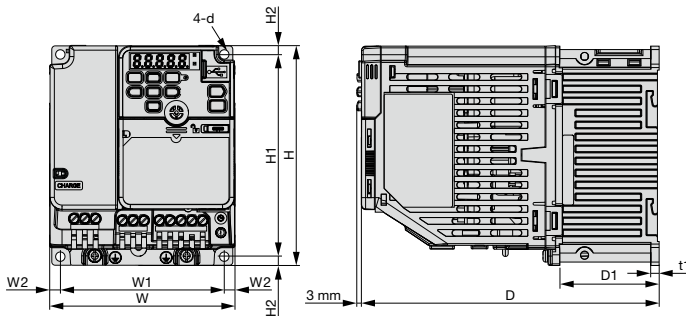
Catalog Code GA50A	Max. Applicable Motor Capacity kW		Dimensions mm										Weight kg
	HD	ND	W	H	D	D1	W1	W2	H1	H2	t1	d	
B001	0.1	0.2	68	128	76	6.5	56	6	118	5	3	M5	0.5
B002	0.2	0.4											
B004	0.4	0.75	68	128	118	38.5	56	6	118	5	5	M5	0.8
B006	0.75	1.1	108	128	137.5	56.5	96	6	118	5	5	M5	1.5
B010	1.5	2.2	108	128	154	56.5	96	6	118	5	5	M5	1.5
B012	2.2	3	140	128	163	65	128	6	118	5	5	M5	2.1
B018	3.7	5.5	170	128	180	65	158	6	118	5	5	M5	2.9

400 V Class, Three-Phase Input

Catalog Code GA50A	Max. Applicable Motor Capacity kW		Dimensions mm										Weight kg
	HD	ND	W	H	D	D1	W1	W2	H1	H2	t1	d	
4001	0.2	0.4	108	128	81	8.5	96	6	118	5	5	M5	0.8
4002	0.4	0.75											
4004	0.75	1.5	108	128	137.5	56.5	96	6	118	5	5	M5	1.5
4005	1.5	2.2	108	128	154	56.5	96	6	118	5	5	M5	1.5
4007	2.2	3											
4009	3	3.7											
4012	3.7	5.5	140	128	143	65	128	6	118	5	5	M5	2.0
4018	5.5	7.5	140	260	140	55	122	9	248	6	5	M5	3.0
4023	7.5	11	140	260	140	55	122	9	248	6	5	M5	3.2
4031	11	15	180	300	143	55	160	10	284	8	5	M5	4.6
4038	15	18.5	180	300	143	55	160	10	284	8	5	M5	4.8

Note: External and mounting dimensions are different for standard mounting and panel through mounting.
For details, refer to GA500 catalog (No. KAEP71061740).

● IP20/UL Open Type (with Built-in EMC Filter)



200 V Class, Three-Phase Input

Catalog Code GA50A	Max. Applicable Motor Capacity kW		Dimensions mm										Weight kg
	HD	ND	W	H	D	D1	W1	W2	H1	H2	t1	d	
2001	0.1	0.2	68	128	116	6.5	56	6	118	5	3	M5	0.6
2002	0.2	0.4			168	58.5	56	6	118	5	5	M5	
2004	0.4	0.75			174	56.5	96	6	118	5	5	M5	
2006	0.75	1.1	108	128	182.5	56.5	96	6	118	5	5	M5	1.6
2008	1.1	1.5			193	65	128	6	118	5	5	M5	
2010	1.5	2.2			196	55	122	9	248	6	5	M5	
2012	2.2	3	140	128	196	55	122	9	248	6	5	M5	3.9
2018	3	3.7			196	55	122	9	248	6	5	M5	
2021	3.7	5.5			196	55	122	9	248	6	5	M5	
2030	5.5	7.5	180	300	196	55	160	10	284	8	5	M5	6.0
2042	7.5	11											
2056	11	15	220	350	216	78	192	14	336	7	5	M6	8.5
2070	15	18.5											

200 V Class, Single-Phase Input

Catalog Code GA50A	Max. Applicable Motor Capacity kW		Dimensions mm										Weight kg
	HD	ND	W	H	D	D1	W1	W2	H1	H2	t1	d	
B001	0.1	0.2	68	128	116	6.5	56	6	118	5	3	M5	0.7
B002	0.2	0.4			158	38.5	56	6	118	5	5	M5	
B004	0.4	0.75	108	128	182.5	56.5	96	6	118	5	5	M5	1.8
B006	0.75	1.1			199	56.5	96	6	118	5	5	M5	
B010	1.5	2.2			203	65	128	6	118	5	5	M5	
B012	2.2	3	140	128	193	65	128	6	118	5	5	M5	2.7

400 V Class, Three-Phase Input

Catalog Code GA50A	Max. Applicable Motor Capacity kW		Dimensions mm										Weight kg
	HD	ND	W	H	D	D1	W1	W2	H1	H2	t1	d	
4001	0.2	0.4	108	128	126	8.5	96	6	118	5	5	M5	1.4
4002	0.4	0.75			144	26.5	96	6	118	5	5	M5	
4004	0.75	1.5			182.5	56.5	96	6	118	5	5	M5	
4005	1.5	2.2	108	128	199	56.5	96	6	118	5	5	M5	1.9
4007	2.2	3											
4009	3	3.7											
4012	3.7	5.5	140	128	193	65	128	6	118	5	5	M5	2.6
4018	5.5	7.5											
4023	7.5	11	180	300	196	55	160	10	284	8	5	M5	3.9
4031	11	15											
4038	15	18.5											

Note: External and mounting dimensions are different for standard mounting and panel through mounting.
For details, refer to GA500 catalog (No. KAEP71061740).

Application Notes

Variable-speed drives for PM motors are synchronous motors that use a permanent magnet for the rotor. Observe the following precautions when using this type of motor.

- 1 Synchronous motors cannot be started directly from line power. Applications requiring line power to start should use an induction motor with the drive.
- 2 A single drive is not capable of running multiple synchronous motors at the same time. Use a standard induction motors for such setups.
- 3 When the power to a drive running a PM motor is shut off, voltage continues to be generated at the motor terminals while the motor coasts to stop. Take the precautions described below when handling charged sections.
 - Make sure that the motor is stopped before performing maintenance, inspections, or wiring.
 - Applications where the load can rotate the motor even when the power to the drive is shut off (e.g., fans or blowers) should have a load switch installed to the output side of the drive. Yaskawa recommends manual load switches from the AICUT LB Series by Aichi Electric Works Co., Ltd. When you inspect the drive, electrically isolate the motor.
 - Do not connect to a load that could potentially rotate the motor faster than the maximum allowable speed even when the drive has been shut off.
- 4 Do not use a sensorless drive in applications that require restarting a coasting motor at 50% or greater of the rated speed. Restarting a coasting motor at 50% to 100% of the rated speed will activate overcurrent or overvoltage protection, and operation cannot be continued. If restarting a coasting motor at a speed that exceeds the rating of the sensorless drive, the drive may be damaged.
- 5 When you use a sensorless drive, confirm the motor starting torque, allowable load characteristics, impact load tolerance, and speed control range in advance and use the drive within the specified ranges. If using a sensorless drive for general machines other than machines for fluid-type application, you must check the load moment of inertia and other machine specifications. For example, for loads with high inertia and high starting torque, such as centrifuges, startup failure may occur even for applications within the motor's allowable load characteristics. In such cases, you must use a drive with a PG. If these machine specifications are not known, use a drive with a PG, or combine an induction motor with a general-purpose drive. Inquire for details.
- 6 If the drive input voltage is high (i.e., over 440 V) or the wiring distance is long, you must consider the motor's insulation voltage. For details, contact your Yaskawa representative.
- 7 In applications involving constant speed over long periods, such as fans, pumps, extruders, and textile machinery, the life of the motor bearing may be shortened. The installation of a zero-phase reactor between the drive and motor, and the utilization of a motor with insulated bearings are effective countermeasures. Details can be found in the technical documentation. Contact your YASKAWA representative for more information.

Warranty Information

■ Warranty Period

The period is 12 months from the date the product is first used by the buyer, or 18 months from the date of shipment, whichever occurs first.

■ Post-Warranty Repair Period

The post-warranty repair period applies to products that are not in the standard warranty period.

During the post-warranty repair period, Yaskawa will repair or replace damaged parts for a fee.

There is a limit to the period during which Yaskawa will repair or replace damaged parts.

Contact Yaskawa or your nearest sales representative for more information.

■ Warranty Scope

Failure diagnosis

The primary failure diagnosis shall be performed by your company as a rule.

By your company's request, however, we or our service sector can execute the work for your company for pay.

In such a case, if the cause of the failure is in our side, the work is free.

Repairs

If a Yaskawa product is found to be defective due to Yaskawa workmanship or materials and the defect occurs during the warranty period, Yaskawa will provide a replacement, repair the defective product, and provide shipping to and from the site free of charge.

If repairs are performed by Yaskawa or a Yaskawa-specified company, the repairs will be warranted for a period of 6 months after the repaired product is accepted by the customer.

This warranty is applicable only if the standard warranty period is expired or if there are less than 6 months remaining in the standard warranty period.

However, if the Yaskawa Authorized Service Center determines that the problem with the motor is not due to defective workmanship or materials, the customer will be responsible for the cost of any necessary repairs. Some problems that are outside the scope of this warranty are:

- Problems due to improper maintenance or handling, carelessness, or other reasons where the customer is determined to be responsible.
- Problems due to additions or modifications made to a Yaskawa product without Yaskawa's understanding.
- Problems due to the use of a Yaskawa product under conditions that do not meet the recommended specifications.
- Problems caused by natural disaster or fire.
- After the free warranty period elapses.
- Replenishment or replacement of consumables or expendables such as grease, batteries, bearings, cooling fans, electrolytic capacitors.
- Defective products due to packaging, fumigation, or transportation by the customer.
- Malfunction or problems caused by program that has been made by customers.
- Requests for additional or replacement manuals, warning labels, or other printed materials because they are dirty or damaged.
- Other problems not due to defects in Yaskawa workmanship or materials.

The services described above are available in Japan only. Please understand that failure diagnosis is not available outside of Japan. If overseas after-sales service is desired, consider registering for the optional overseas after-sales service contract.

Exception of Guaranteed Duty

Lost business opportunities and damage to your property, including your customers and other compensation for work, is not covered by the warranty regardless of warranty eligibility, except when caused by product failure of Yaskawa products.

■ Definition of Delivery

For standard products that are not set or adjusted for a specified application, Yaskawa considers the product delivered when it arrives at your company and Yaskawa is not responsible for on-site adjustments or test runs.

Flat-Type Eco PM Motor

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YASKAWA ELECTRIC CORPORATION

In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply. Specifications are subject to change without notice for ongoing product modifications and improvements.

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