

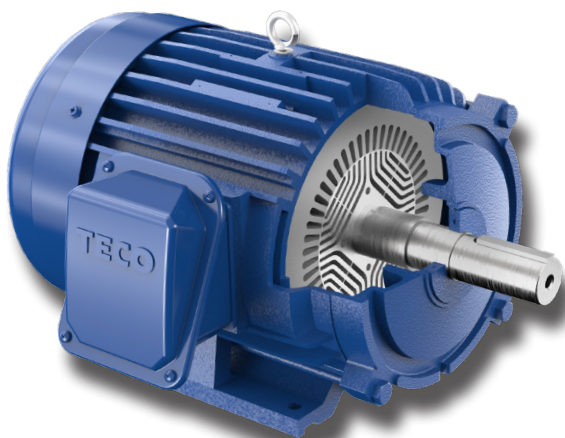
IE5 LSSynRM

# Synchronous Reluctance Motor

CEAR Series / A510s



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Energy Conservation / Emissions Reduction / Intelligence / Automation



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03	Features and Advantages
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# CEAR Synchronous Reluctance Motor


## Reduce energy loss and maintenance cost, improve efficiency and reliability

Motors are accountable for over 45% of global electricity consumption, and research is projecting motor usage will be double by 2040.

Since 2015, TECO has been researching synchronous reluctance motors (SynRM), such as rotor slot design, magnetic barrier layer, and magnetic flux. TECO IE5 SynRM industrial motors can help global energy consumption be reduced by 10%. By working with variable frequency drives (VFDs), we can achieve a 40% reduction in internal energy losses resulting in lower operating costs than IE3 induction motors.



Additionally, when combined with a variable frequency drive (VFD), this solution can replace IE3 induction motors, resulting in lower operating costs and a 40% reduction in internal motor energy losses.



Rare-earth element free motor

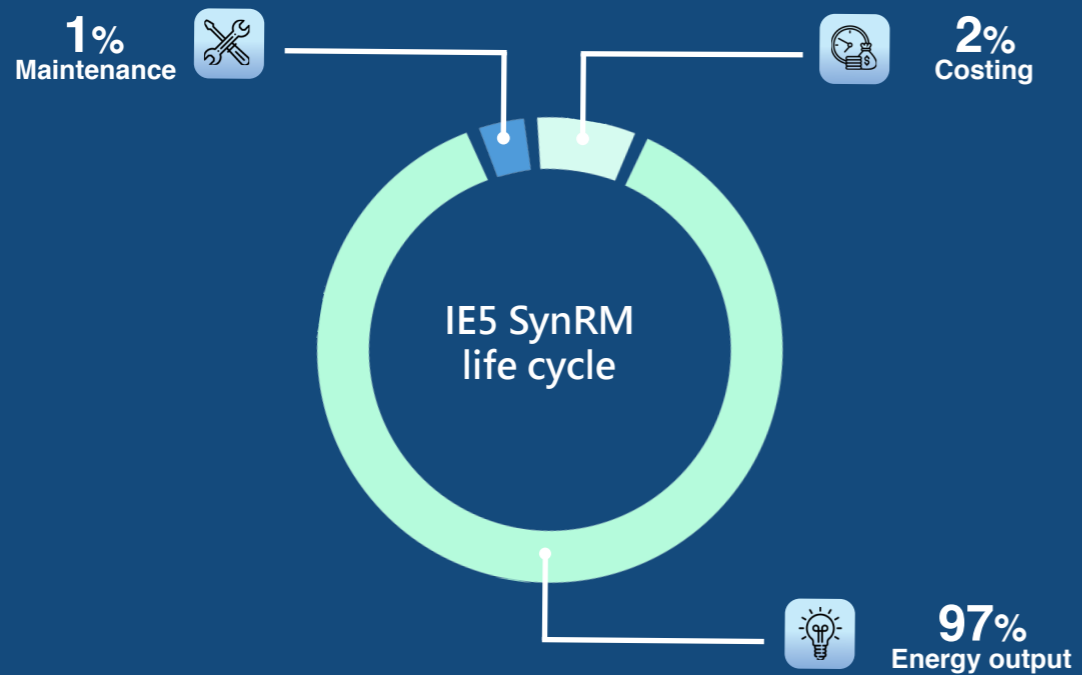


Good efficiency at low speeds



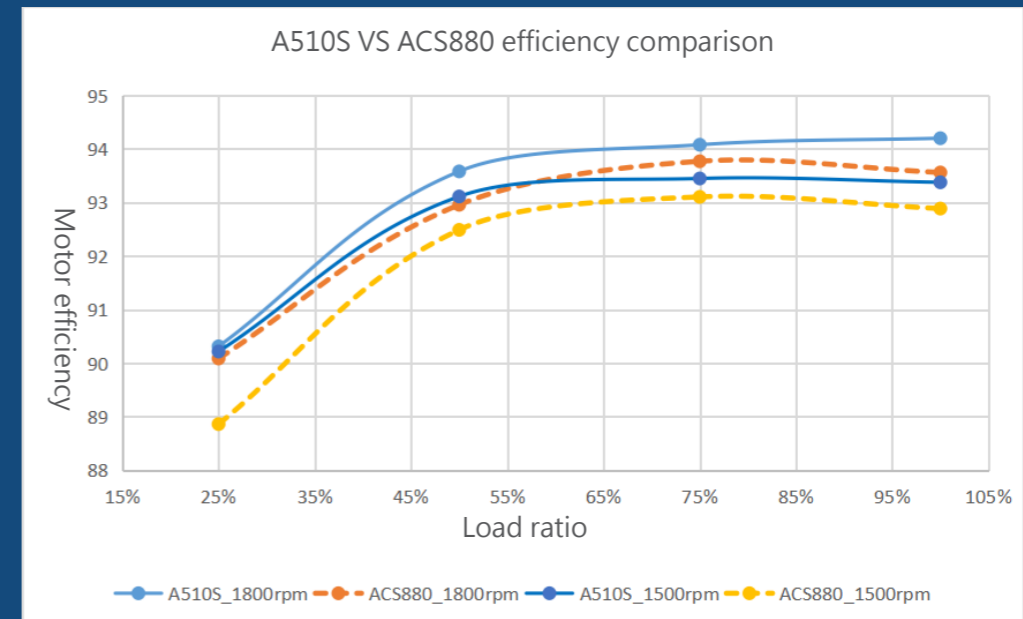
Ease of maintenance

Low maintenance costs and high efficiency >>>>



- **Excellent energy efficiency** : The IE5 SynRM has a much higher level of energy efficiency than conventional induction motors (IMs). They achieve high efficiency by using magnetoresistance instead of rare earth magnets in the rotor. Compared to IE2 motors, IE5 SynRM has significantly lower energy consumption and CO2 emissions.
- **Easy maintenance** : With no magnets in the rotor, the IE5 SynRM is as easy to maintain as an induction motor. Rare earth magnets do not require regular maintenance, so maintenance costs are lower.
- **Versatile** : IE5 SynRM is suitable for a wide range of applications, including water pumps, fans, etc. Ideal for both new installations and replacement of existing motors.

## With A510s inverter : improve energy saving efficiency >>>>



- Excellent performance when working with TECO drives
- Ultra-efficient IE5 energy efficiency rating
- Non-magnetic rotor design reduces maintenance costs and the risk of high temperatures
- No secondary loss of rotor, low bearing temperature and high tolerance
- The operation efficiency at medium and low speeds is better than induction motors, and is suitable for more energy-saving applications.

# CEAR Synchronous Reluctance Motor

One-button quick setup, easy to use

## Features and Benefits

### IE5 high efficiency

Broad efficiency range, further energy-saving benefits

### Good replaceability

Installation dimensions comply with international standards, allowing direct replacement of existing induction motors

### Synchronized speed

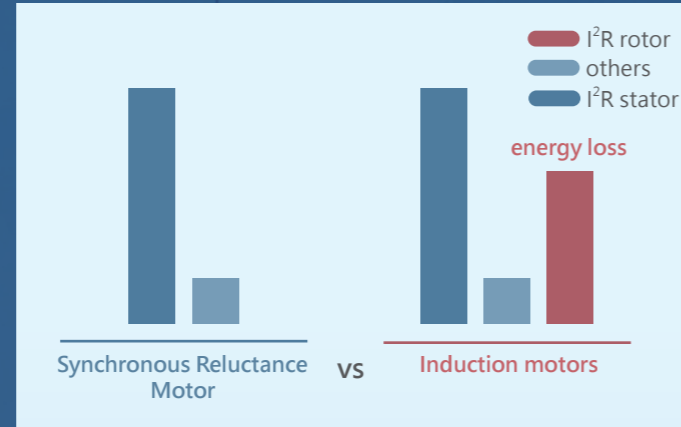
Reducing motor losses further enhances efficiency

### Cost-effective

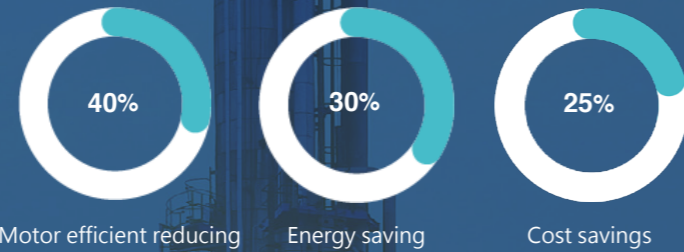
The ultra-high-efficiency motor does not use rare-earth magnets

### Long usage life time

Low rotor and bearing temperatures contribute to increased motor durability

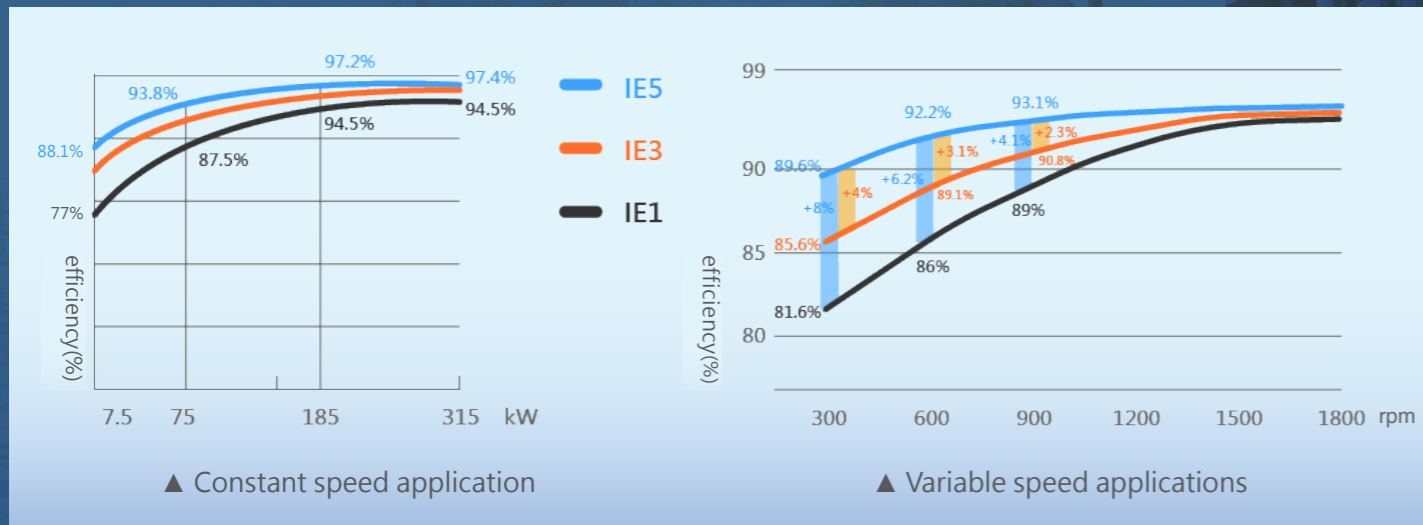


▲ Compared with induction motors, reluctance motors do not have a second stage of energy loss



▲ Reluctance motor performance diagram

## Motor speed comparison



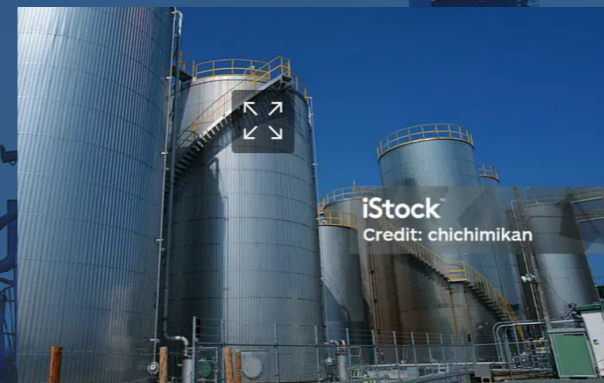
## Application



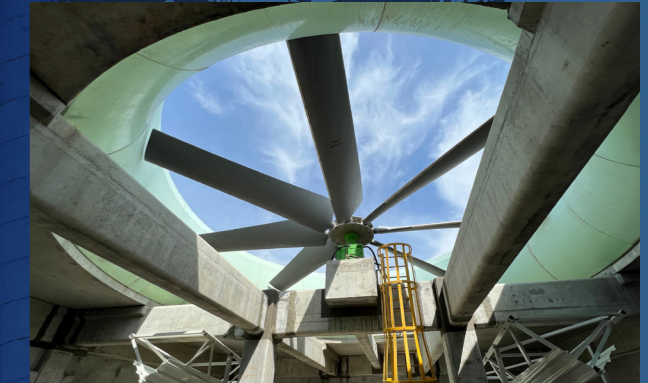
Petrochemical industry



Conveying equipment



Water treatment pumps



Industrial fans

## Energy-saving system optimization

### A510s inverter

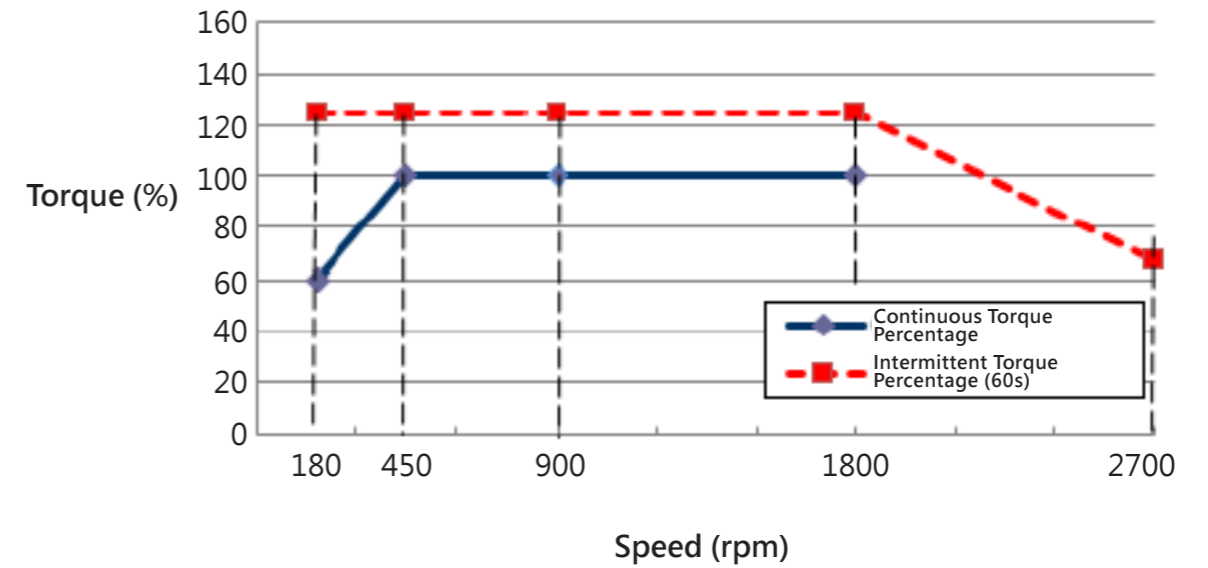
In addition to the advantages of automatic measurement technology (auto-tuning and high-order current vector technology supporting permanent magnet motor drive), the core operation capacity of A510s is increased by 60%, making the inverter respond more quickly.

- Compatible with high-power models(>315kW)
- Built-in PLC controller
- Built-in Modbus (RS-485) communication
- Bluetooth remote control
- A variety of communication expansion functions
- Reloadable handling

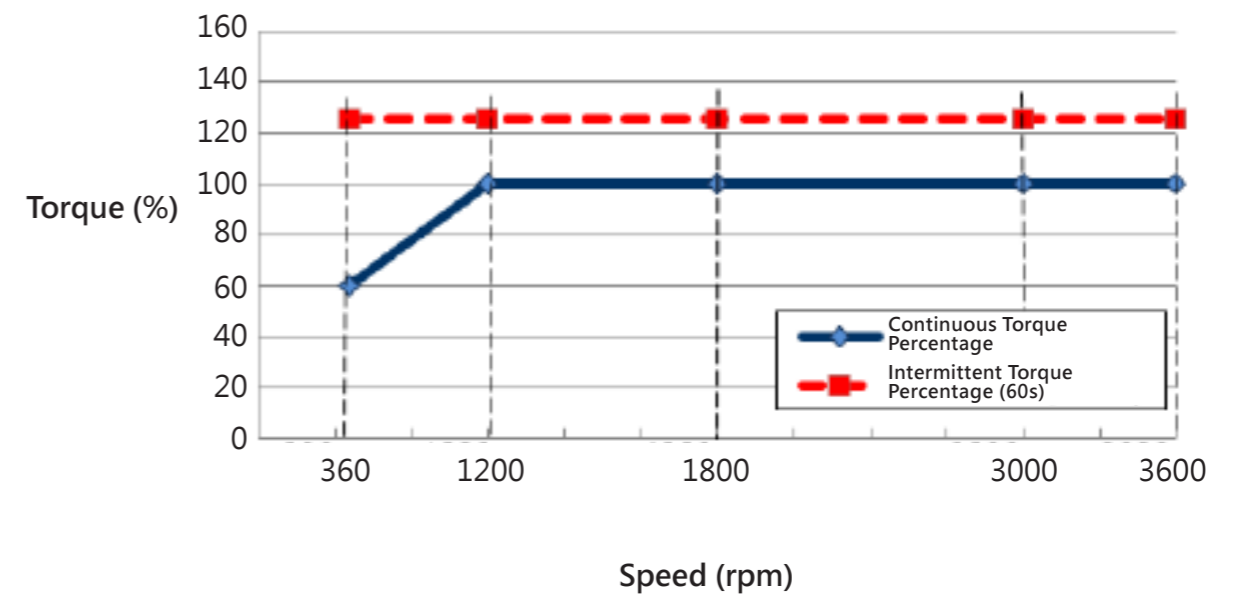


RATING	Kind of Motors	IEC
	Voltage	380V ~ 480V
	R.P.M.	Rated 1800 ~ 3600 R.P.M.
	Output Range	5.5kW - 22kW
	Time rating	Continuous Use Rating, S.F. 1.0 ( S1)
	Frame Size	Fr#132S - Fr#180M
	Protection Enclosure	Totally Enclosed ( IP 55 )
	Cooling Method	Built-in fan cooling (IC 411)
	Mounting	Horizontal Foot Mounting B3(IM1001)
	APPLICATION	Environment Conditions
-15°C ~ 40°C		
Relative Humidity: Less than 90%RH ( Non - Condensation )		
Altitude: Less than 1,000 Meters		
Power Supply	voltage fluctuation rate: ±5% · frequency fluctuation rate:±5%	
Starting Method	Drive controllers for controllable synchronous reluctance motors (TECO A510s, E710, F510)	
Drive Method	Direct link or belt drive	
CONSTRUCTION	Frame	High-strength cast iron
	End bracket type bearing	High-strength cast iron
	Bearing	Pre-greased, shielded ball bearings
	Stator Insulation	Class F insulation
PERFORMANCE	Name Plate	Stainless steel
	Winding Temperature Rise	Temperature rise not exceeding 80° C (using resistance method, S.F.1.0)
	Max. Torque	100-140% rated torque sustained for 60 seconds at 1800 rpm 100-150% rated torque sustained for 60 seconds at 3600 rpm

Torque-Speed Curve at Rated Speed 1800 rpm



Torque-Speed Curve at Rated Speed 3600 rpm



Frame 132S/132M

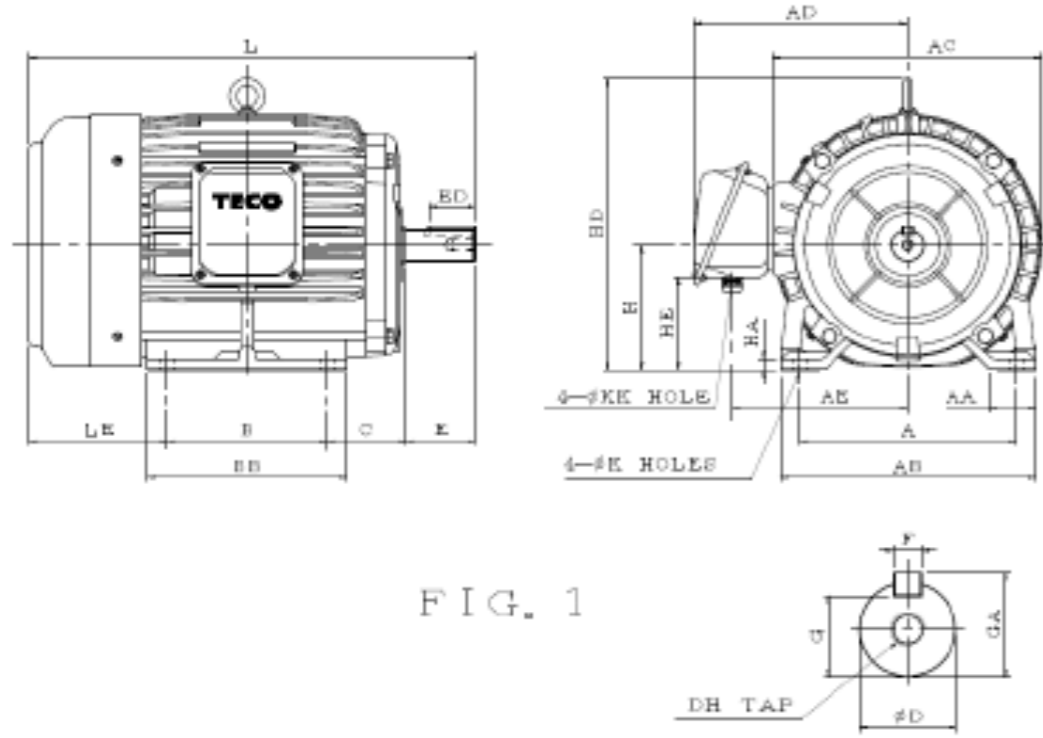


FIG. 1

(mm)

Output (HP)		FRAME SIZE	FIG. NO.	A	AA	AB	AC	AD	AE	B	BB	C	H	HA	HC	HD	HE
1800 rpm	3600 rpm																
7.5	7.5	132S	FIG.1	216	42	250	273	225	180	140	175	89	132	11.0	-	308	83
10	10	132M		216	42	250	273	225	180	178	212	89	132	11.0	-	308	83
-	20																

FRAME SIZE	K	KK	L	LE	SHAFT EXTENSION							BEARING	
					D	E	ED	F	G	GA	DH	DRIVE END	OPPOSITE DRIVE END
132S	ψ12	18~25	454.0	145.0	38	80	64	10	33.0	41.0	M12X24	6308ZZ	6306ZZ
132M	ψ12	18~25	492.0	145.0	38	80	64	10	33.0	41.0	M12X24	6308ZZ	6306ZZ

Note:  
 1.Tolerance of shaft end diameter D : ψ19~ψ28 : J6 , ψ38 : K6  
 2.Tolerance for shaft center height H : +0 · -0.5

Frame 160L/180MC

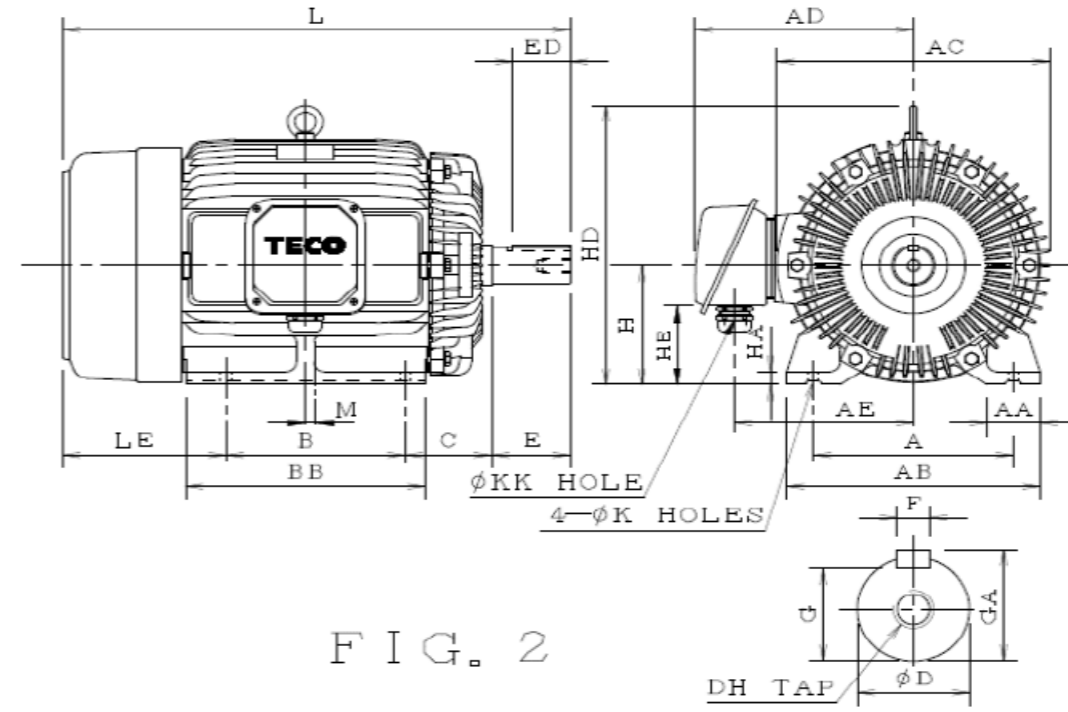


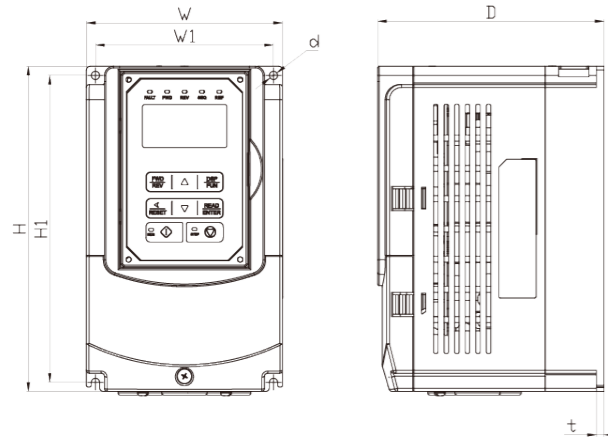
FIG. 2

(mm)

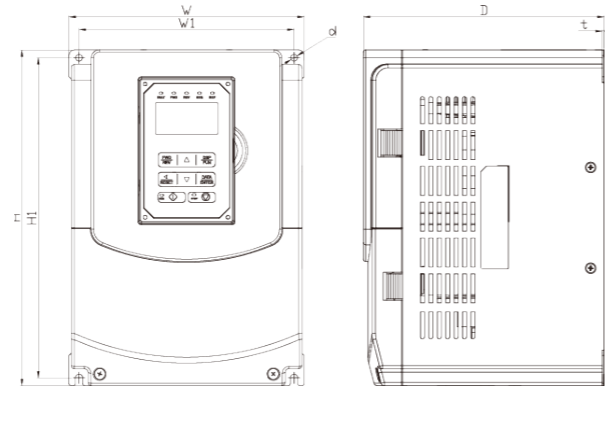
Output (HP)		FRAME SIZE	FIG. NO.	A	AA	AB	AC	AD	AE	B	BB	C	H	HA	HD	HE
1800 rpm	3600 rpm															
15	15	160L	FIG.2	254	50	300	334	263	218	254	300	108	160	18	377	108
20	20	180MC		254	50	300	334	263	218	254	300	108	160	18	377	108
25	25			279	75	355	382	305	250	241	335	121	180	22	431	119
30	30															

FRAME SIZE	K	KK	L	LE	M	SHAFT EXTENSION							BEARING	
						D	E	ED	F	G	GA	DH	DRIVE END	OPPOSITE DRIVE END
160L	ψ14.5	18~25	652.0	180.0	0.0	42	110	80	12	37.0	45.0	M16X32	6309ZZ	6307ZZ
180MC	ψ14.5	31~41	710.0	238.0	19.0	48	110	80	14	42.5	51.5	M16X32	6311ZZ	6310ZZ

Note:  
 1.Tolerance of shaft end diameter D : ψ42~ψ48 : k6 , ψ55~ψ65 : m6  
 2.Tolerance for shaft center height H : +0 · -0.5



Outline Dimension Sheet A



Outline Dimension Sheet B

FIG.	FRAME SIZE	Models	Dimensions(mm)							Protection Level	Inverter Capacity (kW)	Rated Output (A)
			W	H	D	W1	H1	t	d			
A	Frame 1	A510-4001-S□3	130	215	150	118	203	5	M5	IP20	0.75	3.4
		A510-4002-S□3									1.5	4.2
		A510-4003-S□3									2.2	5.5
B	Frame 2	A510-4005-□3	140	279	181	122	267	1.2	M6	IP20	3.7	9.2
		A510-4008-□3									5.5	14.8
	Frame 3	A510-4010-□3	210	300	215	192	286	1.6	M6	IP20	11	24
		A510-4015-□3									15	31
		A510-4020-□3									18.5	39



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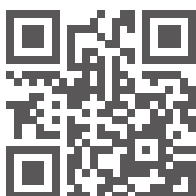
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