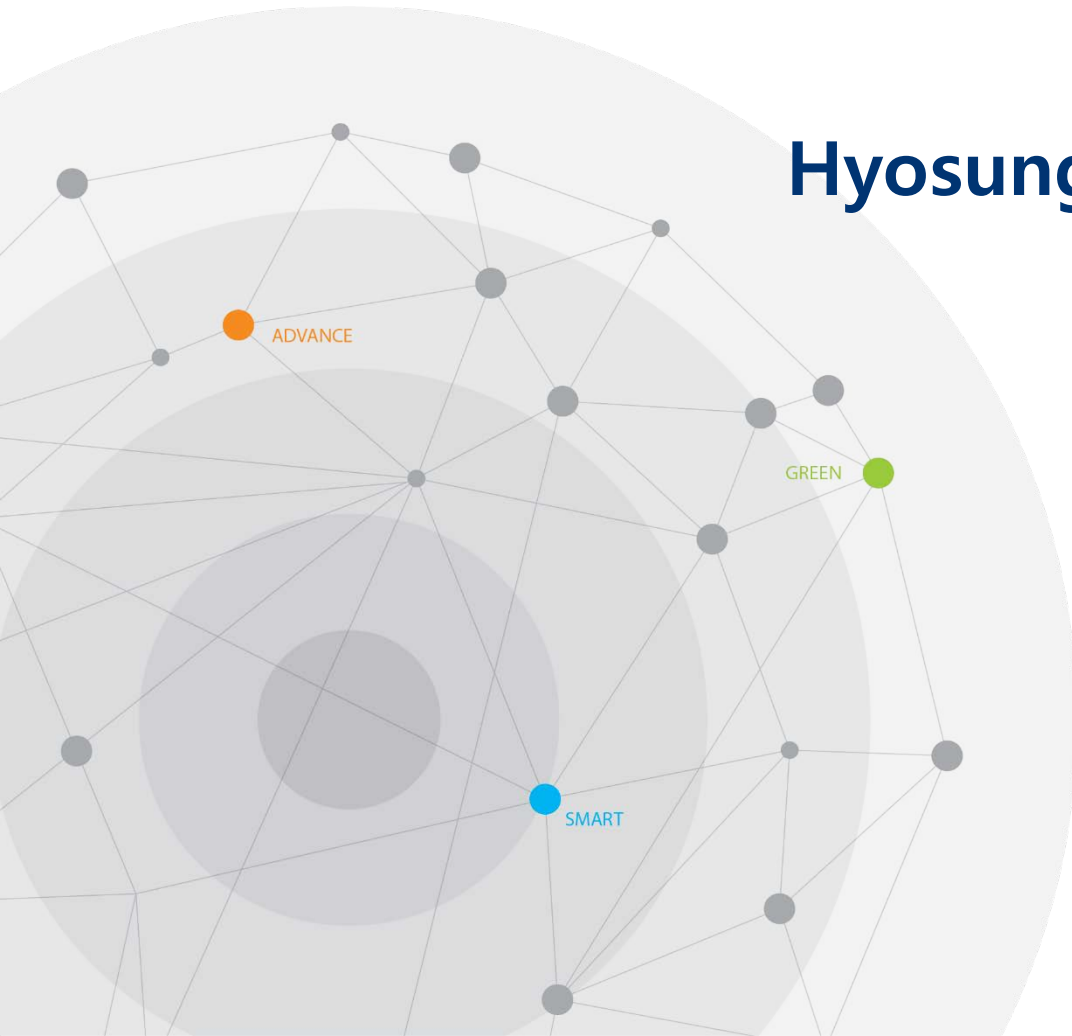


creativity inspired **HYOSUNG**

The Introduction of Hyosung Electric Motor Businesses

Hyosung Heavy Industries



50
YEARS

HYOSUNG

Hyosung Motor Business Overview



- **Hyosung** has been in electric motor business for more than half a century
- We are **#1** electric motor maker in Korea
- **Daily 1000 units** of electric motors delivered to customers.
- **0% Defect** motor quality
- Start production in a **new factory, Vietnam**

Motor Business History

1957 – Hyosung was founded

1964 – Formed technical alliance with WESTINGHOUSE

1978 – Established New factory in Korea

1988 – Formed technical alliance with HITACHI

1993 – Attained ISO 9001 certification

1994 – Developed 13.2kV motor

1999 – Developed Class 1E motors for nuclear plants

2002 – Supplied NEMA motor to USA

2013 – Launched IE4 motor in European market

2018 – Start motor production in Vietnam

Hyosung Electric motor lines-up



Standard 3 Phase Motor



MV/HV



M/V Explosion Proof



DC Motor



Helical Geared



Bevel Geared



Explosion Proof



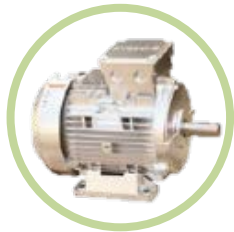
KS/JIS IE3 60Hz

Product line up of LV Motors



Standard Efficiency Motor / IE1

- IEC Standard
- Frame : 80~315
- 0.75~200kW, 2~6P, 50/60Hz



High Efficiency Motor / IE2

- IEC Standard
- Frame : 80~315
- 0.75~200kW, 2~6P, 50/60Hz



Premium Efficiency Motor / IE3

- IEC Standard/NEMA
- Frame : 80~315
- 0.75~200kW, 2~6P, 50/60Hz



Super Premium Motor / IE4

- Permanent Magnet Motor
- Frame : 80 and more
- 1.5~45kW, 2~6P, 50/60Hz

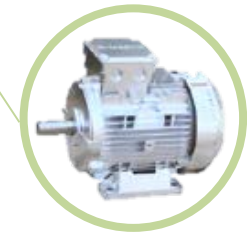
IEC Explosion Proof – EX D

- Flameproof type
- IECEx/ATEX/TR-CU/KCS
- Frame : 71~315
- 0.4~200kW, ~690V



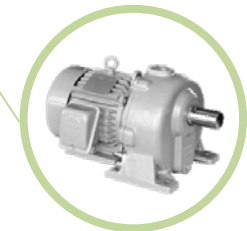
IEC Explosion Proof – EX N

- Non-sparking type
- IECEx/ATEX/TR-CU/KCS
- Frame : 80~315
- 0.4~200kW, ~690V



Geared Motor

- Parallel shaft type
- Right angle type
- Planetary type



DC motor

Motors for tunnel fan, cooling tower, nuclear plant, military, vector inverter control (1:1500), etc

Product Line-up of MV&HV Motors



TEFC (LF/LFV)

- Fan cooled: IC411
- Frame : 280~560, Horizontal/Vertical
- Up to 2,350kW, 13.8kV
- Up to 16P, 50/60Hz



TEAAC (LT/LTV/GT)

- Air to air cooled: IC611
- Frame : 400~1500, Horizontal/Vertical
- Up to 20,000kW, 13.8kV
- Up to 40P, 50/60Hz



TEWAC (LC)

- Water cooled: IC81W
- Frame : 400~1500, Horizontal/Vertical
- Up to 25,000kW, 13.8kV
- Up to 40P, 50/60Hz



ODP/WPI/WPII (LD/LW)

- ODP/WPI/WPII: IC01
- Frame : 315~1500, Horizontal/Vertical
- Up to 20,000kW, 2~13.8kV
- Up to 40P, 50/60Hz

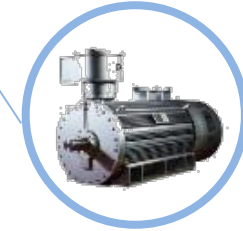
Wound Rotor Motor

- All cooling types
- Frame : 400~1500, Horizontal/Vertical
- Up to 10,000MW, 13.8kV
- Up to 20P, 50/60Hz



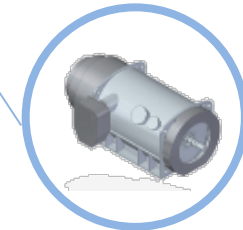
Ex d – IC411 (ED/LFD)

- Ex d/de IIB/IIC T4
- Frame : 315~560
- Up to 2,590kW, 13.8kV
- Up to 16P, 50/60Hz
- IECEx/ATEX/TR-CU/KCS



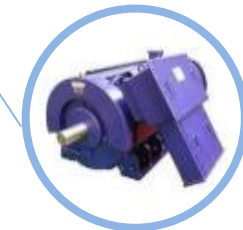
Ex d – IC511

- Ex d/de IIB T4
- Frame : 630~800
- Up to 6,160kW, 13.8kV
- Up to 16P, 50/60Hz
- IECEx/ATEX/KCS



Ex n (EN/LFN)

- Ex n II T3
- Frame : 315~1500
- Up to 20,000kW, 13.8kV
- Up to 20P, 50/60Hz
- IECEx/ATEX/TR-CU/KCS



* Ex p motors are also available with TEFC and TEAAC type.

Motor factory



Low voltage motor capacity (from 3Q 2019)

	Small motor	Annual capacity
Units	10,000/month	120,000/year

Motor supply record in Indonesia



Project	Site	End User	EPC/Contractor	Application	Description and Brief Specification						Q'ty	Time
					TEWAC	B3	4,750kW	4P	11kV	2sets		
Cirebon 2 CFPP (1x1000MW)	Indonesia	PT Cirebon	Hyundai E&C / Toshiba	Pump (BFP)	TEWAC	B3	4,750kW	4P	11kV	2sets	2020	
Tanjung Jati-B - Unit 5&6 (Jawa-4 / 2x1000MW)	Indonesia	PT Bhumi Jati Power (BJP)	Toshiba	Pump (BFP)	TEWAC (Tandem)	B3	7,250kW	4P	10kV	4sets	2020	
Kalselteng-2 CFPP (2x100MW)	Indonesia	PT PLN	Hyundai Engineering	Pump (BFP)	TEAAC	B3	2,100kW	2P	6kV	6sets	2018	
				Pump (CWP)	TEFC	V1	540kW	8P	6kV	4sets		
Central Java TPP (2x950MW)	Indonesia	PT PLN	Black & Veatch	Pump (CWP)	TEAAC	V1	5,600kW	24P	13.2kV	4sets	2017	
Muara Tawar CCPP (Block 2,3&4 Add-on PJT / 1,800MW)	Indonesia	PT PLN	Doosan Heavy Industries + PT Hutama Karya	Pump (CWP)	WP II	V1	2,400kW	16P	6kV	4sets	2018	
					WP II	V1	1,300kW	16P	6kV	2sets		
Haltim Ferronickel Plant Development Project (P3FH)	Indonesia	PT ANTAM	Kawasaki Heavy Industries	Mill	Wound TEAAC	B3	500kW	6P	6.6kV	1set	2018	
					Wound TEAAC	B3	880kW	8P	6.6kV	1set		
					Ex d IIB T4	B3	450kW	6P	6.6kV	1set		
					TEAAC	B3	340kW	6P	6.6kV	1set		
					TEFC	B3	250kW	8P	6.6kV	1set		
Asahimas Project	Indonesia	PT Asahimas Chemicals	AGC (Japan)	Pump (Ex)	TEAAC	V1	1,500kW	14P	6.6kV	1set	2017	
ASCP Project	Indonesia	PT. Asahimas Chemical	Hyundai E&C	Fan (Ex nA II T3)	TEAAC	B3	2,250kW	4P	3.3kV	2sets	2015	
Petrokimia Butadiene Indonesia (PBI) Project	Indonesia	PT Chandra Asri Petrochemical	TOYO Engineering	Pump (Ex n II T3)	EP		560kW	2P	6.6kV	2sets	2012	
					EP		400kW	4P	6.6kV	3sets		
					EP		310kW	4P	6.6kV	2sets		
					EP		230kW	4P	6.6kV	2sets		
					EP		210kW	4P	6.6kV	2sets		
					EP		165kW	4P	6.6kV	2sets		
Technical Asia	Indonesia			Motor Supply (Ex n)	TEAAC		800kW	2P	6.6kV	2sets	2011	
MUARA TAWAR	Indonesia	PLN	MARUBENI (Japan)	Pump	DP	V1	580kW	12P	6kV	2sets	2010	