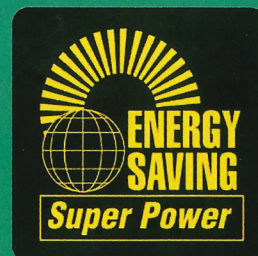


# Hitachi High-Efficiency Motors

*It contributes to the conservation of energy of various equipment.*

## *The motor* **Neo 100** *Super Power Series*



*Three Phase Series*

1/2HP(0.4kW) – 20HP(15kW)



# With a century of motor development a new generational motor. Neo100「S」

## Main Features :

### 1. Global standard

- Conformity to JIS C 4212(Japan) and EPAct (USA)

### 2. High-efficiency

- Compare to the standard motors, iron core shape is improved and material quality is raised
- Motor loss is reduced 20~30%
- This improvement realizes higher efficiency when compared with the standard motors

### 3. Long motor life

- The temperature of stator coil has been decreased at 10~20°C under a rationalization design and a high cooling effect for an electric part
- The coil insulation is achieved two times longer on operation life compared with the standard motor
- The bearings are also 2.5 times longer on operation life
- The operation life changes depending on operation conditions

### 4. Inverter operation is also available (1:10 or 1:20 constant torque)

- 0.4~1.5kW 4P is available to operate with 1:10(6~60Hz) speed under 100% constant torque operation using the inverters (In case the sensorless vector inverters are used) 1:20(3~60Hz) is also available with special design motors. These motors are adopted durable insulation system with advanced technology.

### 5. Furthermore benefit

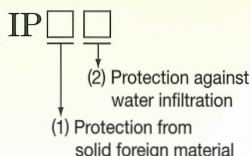
- Low noise and vibration can be realized with advanced technologies

## Strengthened compatibility with the global standard

Standard-compatible with protective structure IP 55 and heat-resistant class F as an outdoor-type series <sup>\*1</sup>

#### Protective structure IP 55

The conventional “the motor” series employed “IP 44” even for outdoor types. However, “The motor Neo 100” outdoor series employs “IP 55” based on the global standard.



#### Heat-resistant class F

“The motor Neo100” outdoor series employs heat-resistant class F (the increase in motor temperature is within the range of heat-resistant classes E and B); the reliability of which has been improved.

#### Description of the protective structure (conforming to JIS C 4034-5)

Model	(1) Degree of protection from solid foreign material	(2) Degree of housing structure protection against water infiltration
Neo100 (IP55)	5 Rotating machine protected against dust	5 Rotating machine protected against fountain flow
Conventional (IP44)	4 Rotating machine protected against solid foreign material in excess of 1 mm	4 Rotating machine protected against splashes

\*1: Indoor type is compatible with the protective structure IP 44 and has heat-resistant class E or B as a standard feature.

Heat-resistant class	A	E	B	F	H
Limit of temperature rise*2	60°C	75°C	80°C	105°C	125°C

\*2: A temperature which rises by 40°C or more is prescribed when the ambient temperature is supposed to be 40°C.

## Circumferences of the spray test (Degree of housing structure protection against water infiltration)



**(Reference) IP44 spray test**  
Rotating machine protected against splashes



**IP55 spray test**  
Rotating machine protected against fountain flow

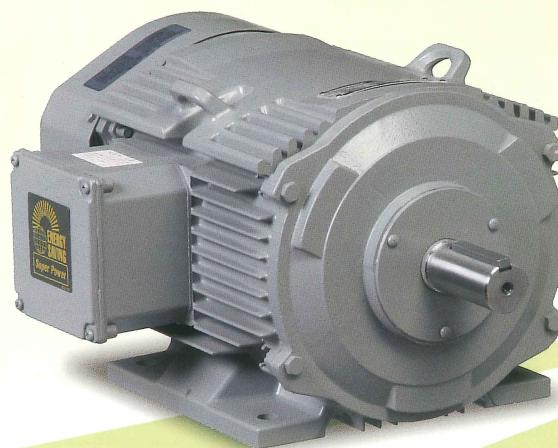
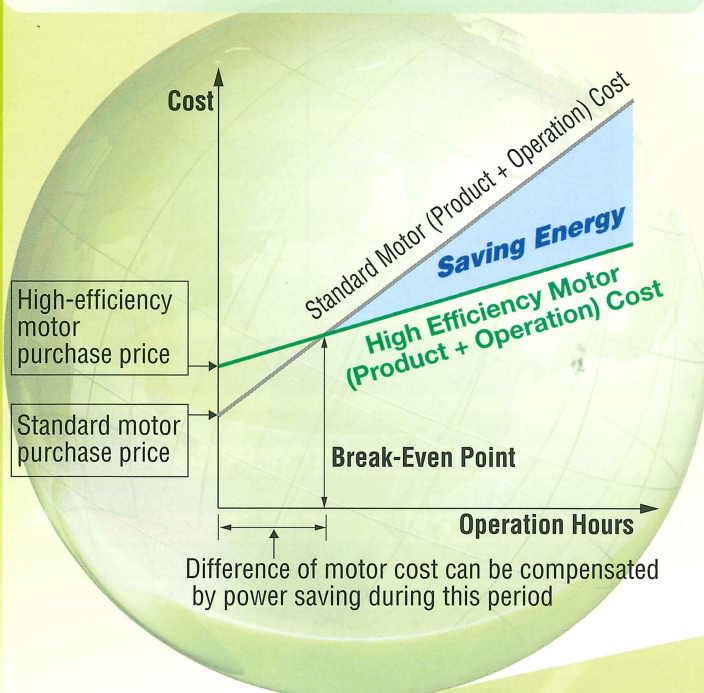
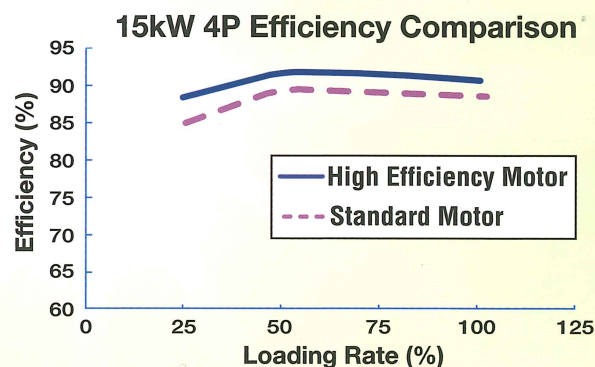


# experience, Hitachi provides Super Power Series」debuted.



## 6. Operational cost saving

- Considering the operational cost under long term period, the best idea is to adopt the high efficiency motors
- The point is just not to consider the initial cost of motor but overall cost including long term operation



- The annual energy savings with high efficiency motor can be estimated by following formula

$$\text{The annual saving fee} = \text{Output (kW)} \times \text{Operation hour (Hour/year)} \times \text{Power charge cost (Cost/kWh)} \times \left[ \frac{100}{\text{Standard Motor efficiency (\%)}} - \frac{100}{\text{High efficiency motor efficiency (\%)}} \right]$$

High efficiency motor saves energy consumption in proportion to operating hour.

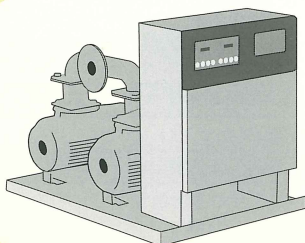
### Sample calculation

Motor output : **15kW**  
 High-efficiency motor efficiency : **90.6%**  
 Standard motor efficiency : **88.5%**  
 Annual operation hours : **4,800hours (16h/day)**  
 Electric power rate : **US\$0.15/kWh**

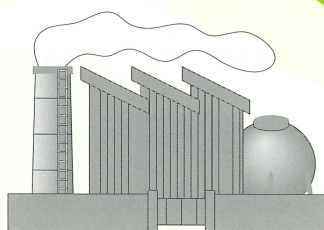
**Annual energy saving**  
**Approx. US\$282.86**

## Application examples

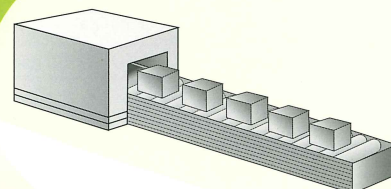
For fans, pumps and compressors.



Factories under long time operation



For process machines for non stop operation





## Model

	Former model	Neo100 series	Neo100 High-efficiency
3.7kW or less	TFO-K	TFO-FK	TFO-HK
5.5kW or larger	TFO-KK	TFO-FKK	TFO-HKK

	Indoor 200V class			Indoor 400V class			Outdoor 200V class			Outdoor 400V class		
Output	2P	4P	6P	2P	4P	6P	2P	4P	6P	2P	4P	6P
0.4kW	○	○	○	○	○	○	○	○	○	○	○	○
0.75kW	○	○	○	○	○	○	○	○	○	○	○	○
1.5kW	○	○	○	○	○	○	○	○	○	○	○	○
2.2kW	○	○	○	○	○	○	○	○	○	○	○	○
3.7kW	○	○	○	○	○	○	○	○	○	○	○	○
5.5kW	○	○	○	○	○	○	○	○	○	○	○	○
7.5kW	○	○	○	○	○	○	○	○	○	○	○	○
11kW	○	○	○	○	○	○	○	○	○	○	○	○
15kW	○	○		○	○	○	○	○		○	○	○
18.5kW	○			○			○			○		

○... Model availability

## Specifications

Item		General Specifications	
Basic construction		Totally enclosed fan-cooled type	
Protective construction		Indoor and outdoor	
Standard		JIS C4212	
Motor output	2 pole	0.4~18.5kW (1/2~25HP)	
	4 pole	0.4~15kW (1/2~20HP)	
	6 pole	0.4~11kW (1/2~15HP)	
Insulation class	Model	Indoor (Model : TFO)	Outdoor (Model : TFOA)
	0.4~3.7kW 2P	E	F (E-Rise)
	0.4~3.7kW 4P		
	0.4~2.2kW 6P		
	5.5~18.5kW 2P	B	F (B-Rise)
	5.5~15kW 4P		
	3.7~11kW 6P		
Rating		S1 (Continuous)	
Protection	Indoor	IP44	
	Outdoor	IP55	
Voltage	200V class	200V 50/60Hz, 220V 60Hz	
	400V class	380V 50Hz, 400V 50/60Hz, 415V 50Hz, 440V 60Hz	
Lead wire construction		Terminal block	
		3.7kW or less : 3 wire	
		5.5kW and larger : 6 wire (Available Y-△starting)	
Painting color		Rigail gray (Munsell 8.9Y5.1/0.3)	
Transmission method		7.5kW 2P or less and all of 4P : Direct or belt connection	
		11kW 2P and larger : Direct connection only	
Rotational direction		Clockwise when viewed from the anti-load side	
Environment	Temperature	-30~40℃	
	Humidity	95% RH or less	
	Altitude	1,000m or less	
	Placement	Indoor type : Installed indoor	
Outdoor type : Available to be used outdoor			
Atmosphere		No corrosive gas, no explosive gas, no steam, no dew condensation, and little dust	



### Efficiency value for JIS C 4212 motor

Rating output kW	Pole	2		4		6		Referece EPAAct 4P
	Frequency	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	60Hz
	Voltage	200V or 400V	220V or 440V	200V or 400V	220V or 440V	200V or 400V	220V or 440V	230V or 460V
0.2		70.0	71.0	72.0	74.0	—	—	—
0.4		76.0	77.0	76.0	78.0	73.0	76.0	—
0.75		77.5	78.5	80.5	82.5	78.5	80.0	82.5
1.5		83.0	84.0	82.5	84.0	83.0	84.5	84.0
2.2		84.5	85.5	85.5	87.0	84.5	86.0	87.5
3.7		87.0	87.5	86.0	87.5	86.0	87.0	87.5
5.5		88.0	88.5	88.5	89.5	88.0	89.0	89.5
7.5		88.5	89.0	88.5	89.5	88.5	89.5	89.5
11		90.0	90.2	90.2	91.0	89.5	90.2	91.0
15		90.0	90.2	90.6	91.0	89.5	90.2	91.0
18.5		90.6	91.0	91.7	92.4	91.0	91.7	92.4
22		91.0	91.0	91.7	92.4	91.0	91.7	92.4
30		91.4	91.7	92.4	93.0	91.7	92.4	93.0
37		92.1	92.4	92.4	93.0	91.7	92.4	93.0
45		92.4	92.7	92.7	93.0	92.4	93.0	93.6
55		92.7	93.0	93.3	93.6	93.3	93.6	94.1
75		93.6	93.6	94.1	94.5	93.6	94.1	94.5
90		94.3	94.5	94.1	94.5	93.9	94.1	94.5
110		94.3	94.5	94.1	94.5	94.5	95.0	95.0
132		94.8	95.0	94.5	95.0	94.5	95.0	95.0
160		94.8	95.0	94.8	95.0	94.5	95.0	95.0

#### Remarks:

1. The method of calculating the characteristic to which EPAAct follows IEEE std 112 Method B as prescribed by NEMA.
2. The characteristic calculation method of high efficiency motor JIS C 4212 is the actual load method though the standard motor characteristic calculation method of JIS C 4210 is the equivalent circuit method.
3. Generally the rotational speed increases compared with the standard motor because the high efficiency motor lowers the generation loss. For pump and fan applications, the motor output increases because of the rotational speed increasing when the standard motor is replaced to the high efficiency motor. This result emerges that power consumption might increase because the output increases though the motor efficiency is increased.
4. As for the high efficiency motors, the starting current might rise from lowering the resistance of the rotor to control the generation loss compared with the standard motor. From this fact the breaker might be necessary to replace to the appropriated one.

### Order process to sales channel

Please indicate the model name upon your purchase order when you request.

For new installation

Example : 2.2kW, 4 pole, Foot Mount, IP55, 380V 50Hz

Model → **2.2kW TFOA-HK 4P 380V50Hz**  
 ↑                    ↑                    ↑                    ↑  
 Output            Model           Pole           Voltage/Hertz

For replacement

Model → **2.2kW TFOA-HK 4P 380V50Hz Dxxxxx**  
 ↑                    ↑                    ↑                    ↑                    ↑  
 Output            Model           Pole           Voltage/Hertz    Manufacturing number

MFG No. (Manufacturing number) is also needed to check the specifications.



## Dimensions

Fig.1

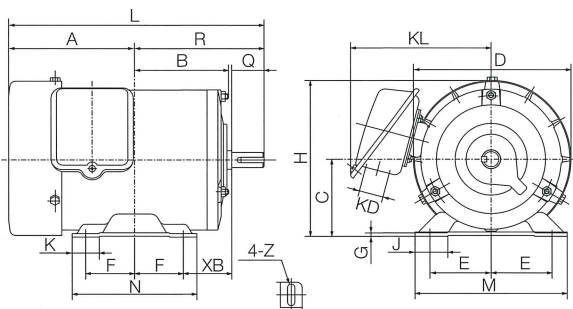
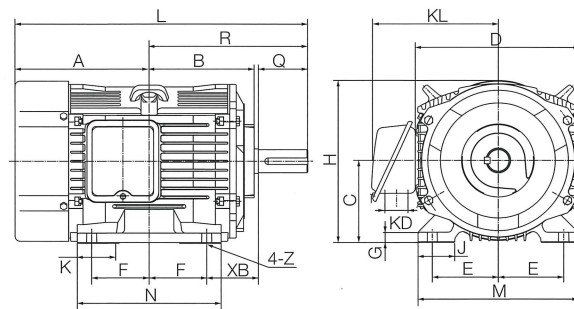


Fig.2



\* : For frame size 90, there is no hand strap.

Fig.3

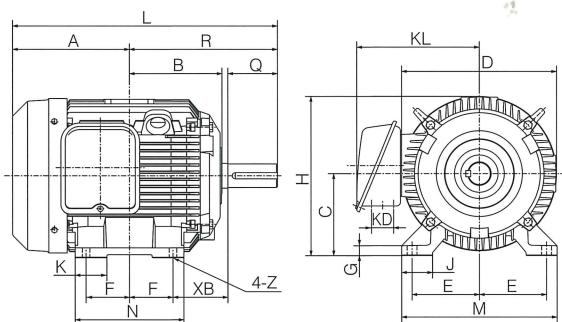
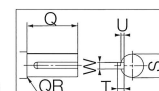
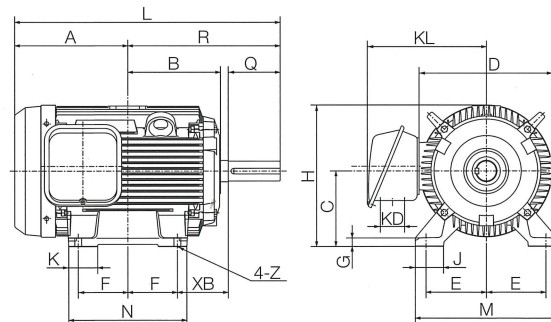


Fig.4



Figs. 1 to 4 Detailed drawings of the shaft end

Type	Frame size	Output			Heat-resistant class	Fig.No	Dimensions (mm)									
		2 pole	4 pole	6 pole			L	R	A	B	D	KL	K	J		
Totally enclosed fan-cooled types	Neo100 TFO-HK	71M	0.4	0.4	—	1	246	120	126	87	145	129	25	30		
		80M	0.75	0.75	0.4	1	268.5(2P) 280.5	140	128.5(2P) 140.5	96	163	135	25	35		
		90L	1.5 2.2	1.5	0.75	2	315	168.5	146.5	114.5	182	149	49	35.5		
		100L	—	2.2	1.5	2	356	193	163	129	198	156	51.5	45		
		112M	3.7	3.7	2.2	2	372	200	172	136	225	169	51.5	45		
	Neo100 TFO-HKK	132S	5.5 7.5	5.5	3.7	3	427.5	239	188.5	149.5	250	197	51	50		
		132M	—	7.5	5.5	3	465.5	258	207.5	168.5	250	197	51	50		
		160M	11 15	11	7.5	4	563	323	240	196.5	282	251	61	60		
		160L	18.5	15	11	4	595	345	250	206.5	282	251	61	60		
Totally enclosed fan-cooled types (outdoor types)	Neo100 TFOA-HK	71M	0.4	0.4	—	5	246	120	126	87	145	135	25	—	—	—
		80M	0.75	0.75	0.4	5	280.5	140	140.5	95	163	144	25	—	—	—
		90L	1.5 2.2	1.5	0.75	6	315	168.5	146.5	114.5	182	153	49	123	—	20
		100L	—	2.2	1.5	6	356	193	163	129	198	160	51.5	130	—	32
		112M	3.7	3.7	2.2	6	372	200	172	136	225	173	51.5	143	—	39
	Neo100 TFOA-HKK	132S	5.5 7.5	5.5	3.7	7	427.5	239	188.5	149.5	250	233.5	51	185	145	—
		132M	—	7.5	5.5	7	465.5	258	207.5	168.5	250	233.5	51	185	145	—
		160M	11 15	11	7.5	8	563	323	240	196.5	282	254.5	61	206	170	—
		160L	18.5	15	11	8	595	345	250	206.5	282	254.5	61	206	170	—

Note : Request a dimensional drawing to us for design use because the dimensions may be subject to change.



Fig.5

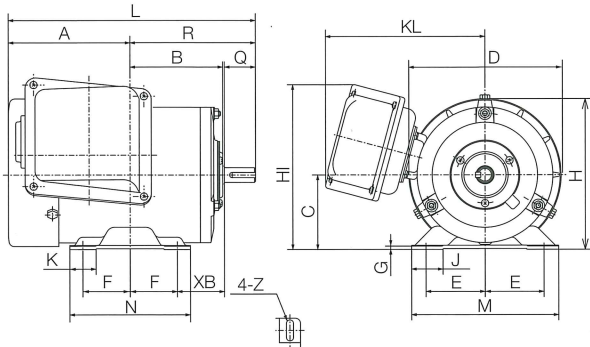
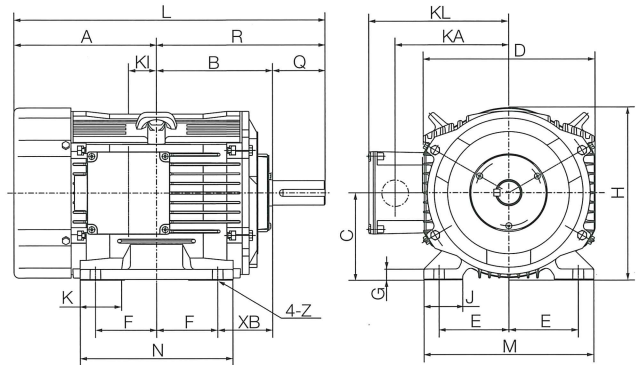


Fig.6



\* : For frame size 90, there is no hand strap.

Fig.7

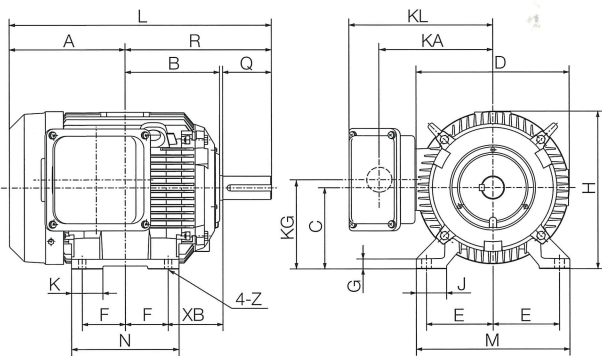
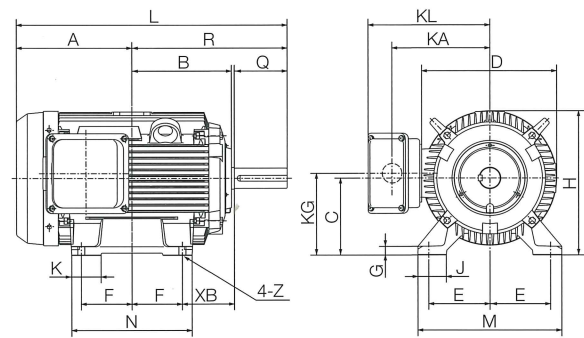
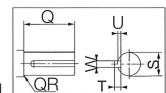


Fig.8



Figs. 5 to 8 Detailed drawings of the shaft end



Dimensions (mm)																	Approx.weight (kg)		
	H	C	F	E	N	M	G	Z	XB	S	W	U	T	Q	QR		2 pole	4 pole	6 pole
	143.5	71 <sup>-0.5</sup> <sub>0</sub>	45	56	115	140	3.2	7x20	45	14j6	5	3	5	30	1.0		9.5	8.2	—
	161.5	80 <sup>-0.5</sup> <sub>0</sub>	50	62.5	125	160	3.2	10x25	50	19j6	6	3.5	6	40	0.3		13.5	12.5	16.0
	178	90 <sup>-0.5</sup> <sub>0</sub>	62.5	70	155	170	10	10	56	24j6	8	4	7	50	0.3	17.0 <sup>0</sup> <sub>20.0</sub>	18.0	17.0	
	197.5	100 <sup>-0.5</sup> <sub>0</sub>	70	80	175	195	12.5	12	63	28j6	8	4	7	60	0.5	—	24.0	26.0	
	219.5	112 <sup>-0.5</sup> <sub>0</sub>	70	95	175	224	14	12	70	28j6	8	4	7	60	0.5	34.0	34.0	34.5	
	257	132 <sup>-0.5</sup> <sub>0</sub>	70	108	175	250	16	12x14	89	38k6	10	5	8	80	0.5	40 <sup>0</sup> <sub>44</sub>	40	40	
	257	132 <sup>-0.5</sup> <sub>0</sub>	89	108	212	250	16	12x14	89	38k6	10	5	8	80	0.5	—	46	51	
	300	160 <sup>-0.5</sup> <sub>0</sub>	105	127	250	300	18	14.5x16.5	108	42k6	12	5	8	110	1.0	66 <sup>0</sup> <sub>75</sub>	62	61	
	300	160 <sup>-0.5</sup> <sub>0</sub>	127	127	300	300	18	14.5x16.5	108	42k6	12	5	8	110	1.0	83	80	76	
	J	H <sub>H</sub> <sup>143.5</sup> <sub>150</sub>	C	F	E	N	M	G	Z	XB	S	W	U	T	Q	QR	2 pole	4 pole	6 pole
	30	143.5 <sup>0</sup> <sub>150</sub>	71 <sup>-0.5</sup> <sub>0</sub>	45	56	115	140	3.2	7x20	45	14j6	5	3	5	30	1.0	10.0	8.7	—
	35	161.5 <sup>0</sup> <sub>160</sub>	80 <sup>-0.5</sup> <sub>0</sub>	50	62.5	125	160	3.2	10x25	50	19j6	6	3.5	6	40	0.3	14.0	13.0	16.5
	35.5	178	90 <sup>-0.5</sup> <sub>0</sub>	62.5	70	155	170	10	10	56	24j6	8	4	7	50	0.3	17.5 <sup>0</sup> <sub>20.5</sub>	18.5	17.5
	45	197.5	100 <sup>-0.5</sup> <sub>0</sub>	70	80	175	195	12.5	12	63	28j6	8	4	7	60	0.5	—	24.5	26.5
	45	219.5	112 <sup>-0.5</sup> <sub>0</sub>	70	95	175	224	14	12	70	28j6	8	4	7	60	0.5	34.5	34.5	35.0
	50	257	132 <sup>-0.5</sup> <sub>0</sub>	70	108	175	250	16	12x14	89	38k6	10	5	8	80	0.5	41 <sup>0</sup> <sub>45</sub>	41	41
	50	257	132 <sup>-0.5</sup> <sub>0</sub>	89	108	212	250	16	12x14	89	38k6	10	5	8	80	0.5	—	47	52
	60	300	160 <sup>-0.5</sup> <sub>0</sub>	105	127	250	300	18	14.5x16.5	108	42k6	12	5	8	110	1.0	66 <sup>0</sup> <sub>76</sub>	63	62
	60	300	160 <sup>-0.5</sup> <sub>0</sub>	127	127	300	300	18	14.5x16.5	108	42k6	12	5	8	110	1.0	84	81	77

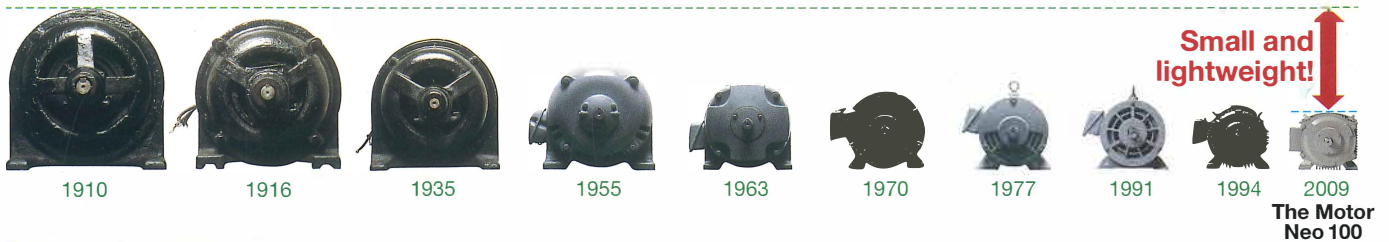
\* : For frame size 90, there is no hand strap.



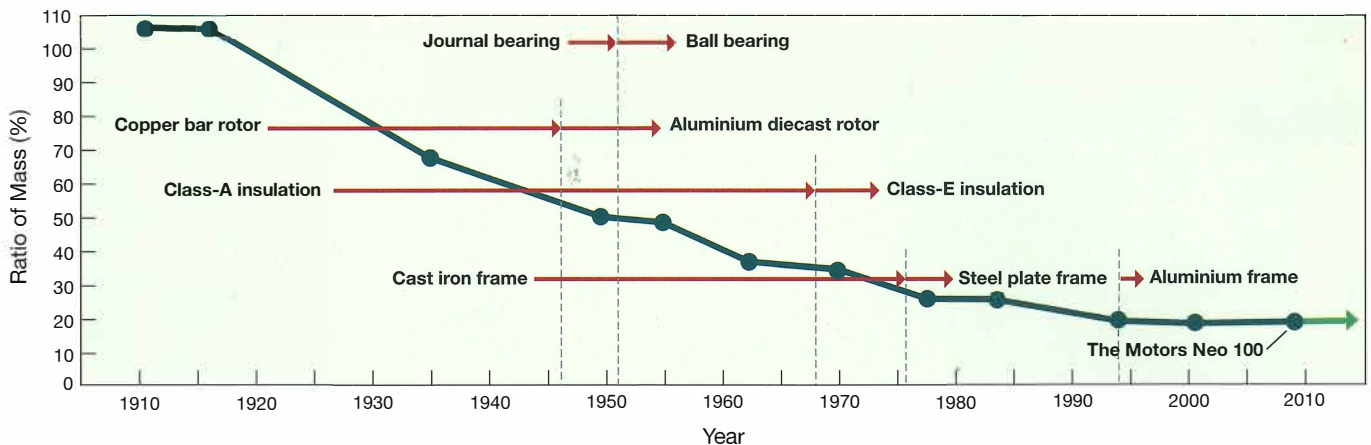
## Transition of Hitachi Motors

In 1910, the first motor was invented in Japan. Until now, 100 years of experience, Hitachi will keep continue producing high-quality motors with high performance and efficiency. "The Motor" has been developed to be small and lightweight. We are very careful from the first manufacturing process with high-quality raw materials to the final process for high-performance motors, including the aluminum alloy materials for lightweight, durability, rust free, and silent power. We are proud to present Hitachi technology with silent noise and low vibration, which developed from CAE (Computer-Aided Engineering). Hitachi motor has high precision with high performance because of continuing development of Hitachi technology team.

### Motor Size: 5HP (3.7kW 4P)



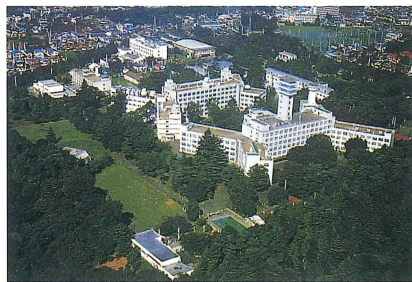
### Ratio of Weight



## Facilities of Production / Development



Hitachi Narashino Plant in Japan



Central Research Laboratory



Administrative Division



**Safety precaution**

● Read the "Instruction Manual" thoroughly to ensure proper operation before use.

**Hitachi Industrial Equipment Systems Co., Ltd.**

<http://www.hitachi-ies.co.jp/english/>

*For further information, please contact your nearest sales representative.*