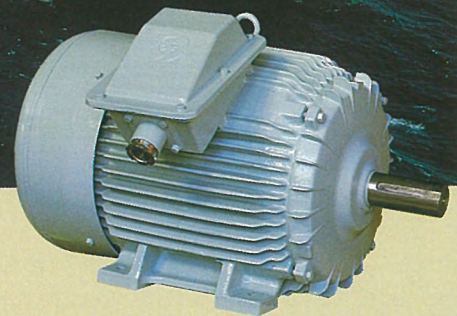


# TAIYO **LOW VOLTAGE** MARINE THREE-PHASE INDUCTION MOTOR **SUMMARY**





## TAIYO MARINE THREE-PHASE INDUCTION MOTORS

TAIYO MARINE MOTORS have all been designed and manufactured for strictly marine applications upon the basis of long years of experience and up-to-date techniques of our company as a specialized manufacturer of marine use electrical equipment.

The functional design and wide range of application of the respective models for all types of usage conditions, capacities, specifications etc., allow the user to have the model that is precisely suited to the need, thus TAIYO MARINE MOTORS having high performance and top quality are greatly relied upon in the shipping and shipbuilding industries world-widely.

### STANDARD SPECIFICATIONS

Protection, construction & cooling	Drip-proof (IP-22), Splash-proof (IP-44) Water-proof (IP-55 or 56), Explosion-proof (Flame-proof type or Increased safety type), Horizontal, Vertical, Fan cool, Natural cool, Air stream cool.
Voltage & Frequency	AC440 or 220V for 60Hz, AC380V for 50Hz.
Insulation class	B or F
Bearing	Sealed ball bearings or open ball bearings
Grease	Multemp SRL (Lithium type)
Type of rotor	Squirrel cage or wound rotor.
Terminals & gland	Compressed terminals and Marine cable gland
Output	0.4kw ~ 1,500kw
* Refer to the pamphlet of each model for the details.	

### APPLICABLE STANDARDS & RULES

TAIYO MARINE MOTORS comply with the specification of the following Classification Societies and Standards.

- \* Classification Societies:
  - NK Nippon Kaiji Kyokai
  - LR Lloyd's Register of Shipping
  - ABS American Bureau of Shipping
  - DNV Det Norske Veritas
  - BV Bureau Veritas
  - GL Germanischer Lloyd
  - KR Korean Register of Shipping
  - KI P.T. (Persero) Klasifikasi Indonesia
  - CCS China Classification Society
  - CR China Corporation Resister of Shipping
- \* Standards:
  - ISO International Organization for Standardization
  - IEC International Electrotechnical Commission
  - JIS Japanese Industrial Standards
  - JEC Japanese Electronical Committee
  - JEM The standard of Japan Electrical Manufacturers' Association

Other Classification Societies and Standards not listed above may also be complied by the consultation.

# FEATURES

## **P**erfect Insulation

Motors for use in ships are especially liable to deterioration of insulations due to high humidity etc. With this in mind, Taiyo employs class B insulation materials composed mainly of mica and class F insulating materials composed mainly of Nomex, so that satisfactory insulating characteristics are ensured.

## **A**pplication system matching Marine Environment

Up to 55kw 4 poles at 60Hz, totally enclosed fan cooled (IP-44) type is used even for drip-proof (IP-22) type request without extras. Users have commented highly upon this totally enclosed fan cooled (IP-44) system for small motors best suited for particular marine environment abounding with moisture, water drips, water splashes, oils, heat, salt, dust, etc.

## **A**pplication of IEC Dimensions

Taiyo marine motors have been designed and manufactured to meet the standards of the International Electrotechnical Commission (IEC), thus having world-wide high adaptability and interchangeability. So, you can employ any of them with a sense of security.

## **A**pproved products by LR, ABS, CR, NK and JG

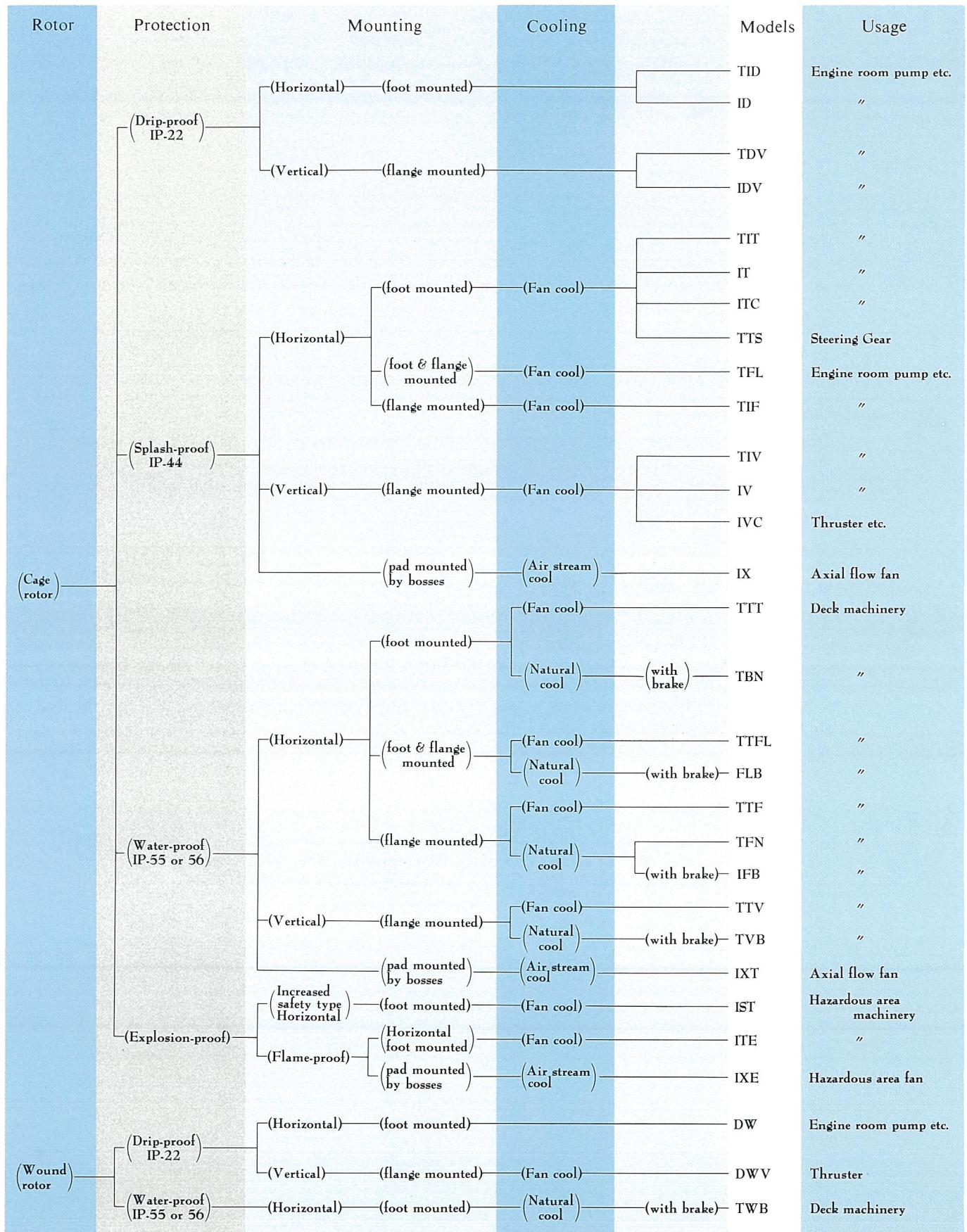
Taiyo marine motors have been approved by Lloyd's Register of Shipping (LR), American Bureau of Shipping (ABS), Maritime Transportation Bureau of the Ministry of Transportation of Japan (JG), China Corporation Resister of Shipping (CR) and Nippon Kaiji Kyokai (NK) under their each quality assurance scheme. The products manufactured by the factories only having a high level of technology and conducting overall quality control system can be qualified and approved by these system.

## **W**ide Variety of Models

As Taiyo marine motors are exclusively used in ships, a wide variety of model matching the uses and characteristics of various auxiliary machineries have been prepared upon the basis of our long years of experience. Employment of our motors will therefore allow various auxiliary machineries to display higher and stabler performances



# MODEL APPLICATION





# MAJOR MODELS

## Common specification

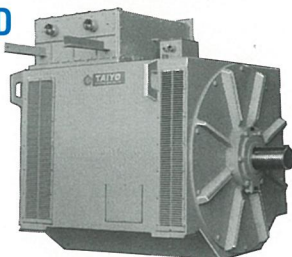
AC440V or 220V for 60Hz, or AC380V for 50Hz, three phase,  
Sealed ball bearings or open ball bearings  
Type symbols refer to IEC34.

### Model TID



Horizontal, foot mounted, squirrel cage type rotor, IM1001 IP-22  
IC01, continuous rating,  
Outline dimensions : IEC72, JEM1410  
Characteristics : JEM1277  
Usage : various pumps in engine room  
Output : 75 kw ~ 200kw

### Model ID



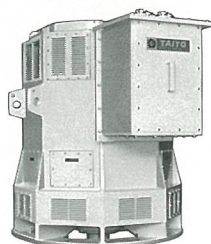
Horizontal, foot mounted, squirrel cage type rotor, IM1001 IP-22  
IC01, continuous rating,  
Usage : various pumps in engine room  
Output : 220kw ~ 1,500kw

### Model TDV



Vertical, flange mounted, squirrel cage type rotor, IM3011 IP-22  
IC01, continuous rating,  
Outline dimensions : IEC72, JEM1410  
Characteristics : JEM1277  
Usage : various pumps in engine room  
Output : 75 kw ~ 200kw

### Model IDV DWV



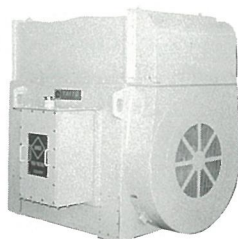
Vertical, flange mounted, IM3011 IP-22 IC01, continuous or  
30min. or 60min. rating,  
Usage : various pump in engine room or thruster  
Output : 220kw ~ 1,500kw  
Model IDV : Squirrel cage type rotor  
Model DWV : Wound type rotor

### Model TIT, IT, TTS, TTT



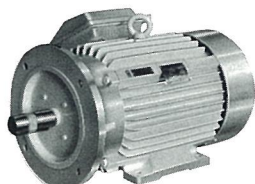
Horizontal, foot mounted, squirrel cage type rotor, IM1001, IP-44  
IC411, continuous rating,  
Outline dimensions : IEC72, JEM1410,  
Characteristics : JEM1277  
Usage : various pumps in engine room  
Model TIT : IP-44, 0.4kw ~ 200kw  
Model IT : IP-44, 220kw ~ 250kw  
Model TTS : IP-44, for steering gear, angular contact ball  
bearing, 1.5kw ~ 200kw  
Model TTT : IP-55 or 56, 0.4kw ~ 200kw

### Model ITC



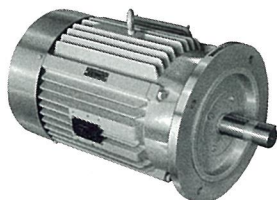
Horizontal, foot mounted, squirrel cage type rotor, IM1001, IP-44  
IC611, with top mounted air cooled air cooler, self air circulation,  
Usage : various pumps in engine room  
Output : 280kw ~ 1,500kw

Model **TFL, TTFL**



Horizontal, foot and flange mounted, squirrel cage type rotor, IM2001 IP-44 IC411, continuous rating,  
Outline dimensions : IEC72, JEM1410  
Characteristics : JEM1277  
Usage : various pumps in engine room  
Output : 0.4kw ~ 15kw  
Model TFL : IP-44  
Model TTFL : IP-55 or 56

Model **TIF, TTF**



Horizontal, flange mounted without feet, squirrel cage type rotor, IM3001 IP-44 IC411, continuous rating,  
Outline dimensions : IEC72, JEM1410  
Characteristics : JEM1277  
Usage : various pumps in engine room,  
Model TIF : IP-44, 0.4kw ~ 30kw  
Model TTF : IP-55 or 56, 0.4kw ~ 30kw

Model **TIV  
IV  
TTV**



Vertical, flange mounted, squirrel cage type rotor, IM3011, IP-44 IC411, continuous rating,  
Outline dimensions : IEC72, JEM1410  
Characteristics : JEM1277  
Usage : various pumps in engine room  
Model TIV : IP-44, 0.4kw ~ 200kw  
Model IV : IP-44, 220kw ~ 250kw  
Model TTV : IP-55 or 56, 0.4kw ~ 200kw

Model **IVC**



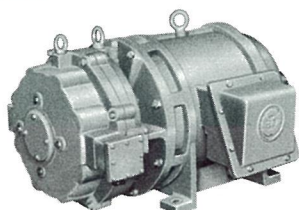
Vertical, flange mounted, squirrel cage type rotor, IM3011 IP-44 IC511, with air cooled air cooler, self air circulation, continuous or 30min. or 60min. rating,  
Usage : various pumps in engine room or thruster  
Output : 280kw ~ 1,500kw

Model **IX, IXT**

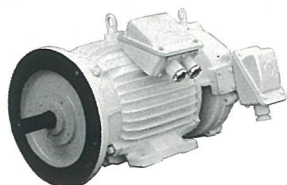


Air stream cool, pad mounted by bosses, squirrel cage type rotor, IM9201 or 9211 or 9231 IC410, IP-44 continuous rating,  
Usage : Axial flow fan in engine room, cargo hold and accommodation space.  
Model IX : IP-44, 0.4kw ~ 45kw  
Model IXT : IP-55 or 56, 0.4kw ~ 45kw

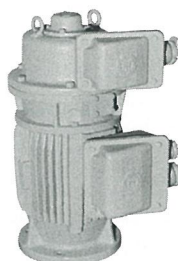
Model **TBN**



Horizontal, foot mounted, squirrel cage type rotor, IM1001 IP-56 IC410, natural cool, with magnetic brake, 30min. or 60min. rating,  
Usage : windlass, capstan or mooring winch  
Model TBN : 1.5kw ~ 90kw

Model **FLB**


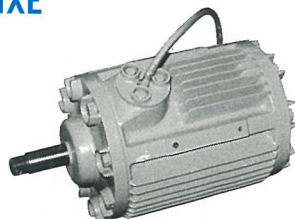
Horizontal, foot and flange mounted, squirrel cage type rotor, IM2001 IP-56 IC410, natural cool, with magnetic brake, continuous or 30min. or 60min. rating,  
Usage : windlass, capstan, deck crane.  
Output : 1.5kw ~ 15kw

Model **IFB**  
**TVB**


Flange mounted without foot, squirrel cage type rotor, IP-56 IC410, natural cool, with magnetic brake, continuous or 30min. or 60min. rating,  
Usage : windlass, capstan, deck crane etc.

Model IFB : horizontal (IM3001) 1.5kw ~ 22kw

Model TVB : vertical (IM3011) 0.4kw ~ 22kw

Model **IXE**


Air stream cool, pad mounted by bosses, squirrel cage type rotor, IM9201 or 9211 or 9231 IP-44 IC410, continuous rating, flame-proof  
Ignition degree : IIB (JIS F 8009)  
Explosion class : T4 (JIS F 8009)  
Usage : axial flow fan for cargo hold  
Output : 0.4kw ~ 45kw



# CHARACTERISTICS

## Temperature & Humidity

The standard ambient temperature shall be limited to 50°C when the coolant is air, and the relative humidity shall be under 95%.

## Inclination

All motors will operate satisfactorily with the inclination of below table 1. Where motor belongs to emergency electrical equipment, the orderer shall previously specify to the effect.

Table 1. (Unit: degree)

	List	Trim	Rolling	Pitching
Ordinal equipment	15	5	22.5	7.5
Emergency equipment	22.5	10	22.5	10

## Rating

Standard motors are rated for continuous operation in ambient temperatures of specified classification society except the motors having special short time rating such as deck machinery motor, thruster motor and the like.

The motors will withstand a momentary overload of 160% excess rated torque.

Standard rating outputs are in accordance with the recommendation of IEC72 and JEM1277 as below table 2.

Table 2. (output in KW)

0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
18.5	22	30	37	45	55	75	90	110
132	160	200	220	250	280	300	315	335
355	375	400	425	450	475	500	530	560
600	630	670	710	750	800	850	900	950
1000	—	—	—	—	—	—	—	1500

## Voltage Variation

Standard motors will operate satisfactorily with a voltage variation of not exceeding  $\pm 10\%$  of the rated voltage.

## Frequency Variation

Motors will operate satisfactorily at rated voltage with a variation in frequency not exceeding  $\pm 5\%$  of the rated frequency.

## Simultaneous Variation of Voltage and Frequency

In the case where the voltage and frequency of the power source vary at the same time, motor will satisfactorily operate at the rated output when the voltage varies within the limits 10% above and below the rated value, the frequency varies within the limits 5% above and below the rated value, and the sum of the absolute values of both variation percentages is within 10%.

## Vibration

Vibration is in accordance with or better than the recommendations of JEM1277 as below values.

Horizontal motor : 3/100 mm  
Vertical motor : 2/100 mm

## Temperature Rise Limits

The temperature rise of standard motors, as measured by the resistance method, is generally limited to the values indicated in Table 3 as standard, however the details of each part shall be in accordance with the requirement of applied classification societies.

Table 3. (by the resistance method)

Coolant	45°C Air		50°C Air	
Insulation class	B	F	B	F
Max. allowable temp.	130	155	130	155
Temperature Rise Limits	75	95	70	90

## Noise Level

The noise which is produced when motor is operated at our factory under no load shall not exceed 100 dBA. And detail figures on each capacity, type and r.p.m. are in accordance with or better than the recommendations of IEC34-9 and JEM 1277.

## Other Characteristics

Other characteristics values such as efficiency, power factor at rated output, no-load current, slip, full-load current, starting current, starting torque, stalling torque and etc. on each output, type and r.p.m. are in accordance with or better than the recommendation of JEM 1277. And for the detail figures, refer to separate technical data of each model respectively.



# OPTIONALS

## ● Anti-condensation Heater

Sheathed wire type element (AC100, 110 or 200, 220V single phase) is installed in the stator frame, however for the motors smaller than 3.7kw, it is recommendable that low voltage winding heating type should be used because of its heating efficiency.

## ● Thermister & Relay Unit for Stator Winding

6 pcs (3 for working, 3 for spare) of PTC thermistor sensors and one set of electronic type relay unit are provided for each motor to cause alarm in case of abnormal high temperature.

## ● Embedded Temperature Detector for Stator Winding

6 pcs (3 for working, 3 for spare) of PT100 ohm sensors are provided for large capacity motor such as thruster motor to read remotely the stator winding temperature.

## ● Tandem Shaft Extension

## ● F class insulation utilized B class Temperature rise

## ● Terminals & Terminal box for Star-Delta starting

## ● Multi-Speed Winding (Pole change type)

## ● Slide rail for belt driving





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