



North American Headquarters and Manufacturing Facility (Houston, TX)



TOSHIBA – Quality by Design

Toshiba’s culture and history are strongly rooted in quality. Our designs are technologically innovative, and our products are manufactured from start to end using only the highest quality domestic and foreign parts.

Product Warranty

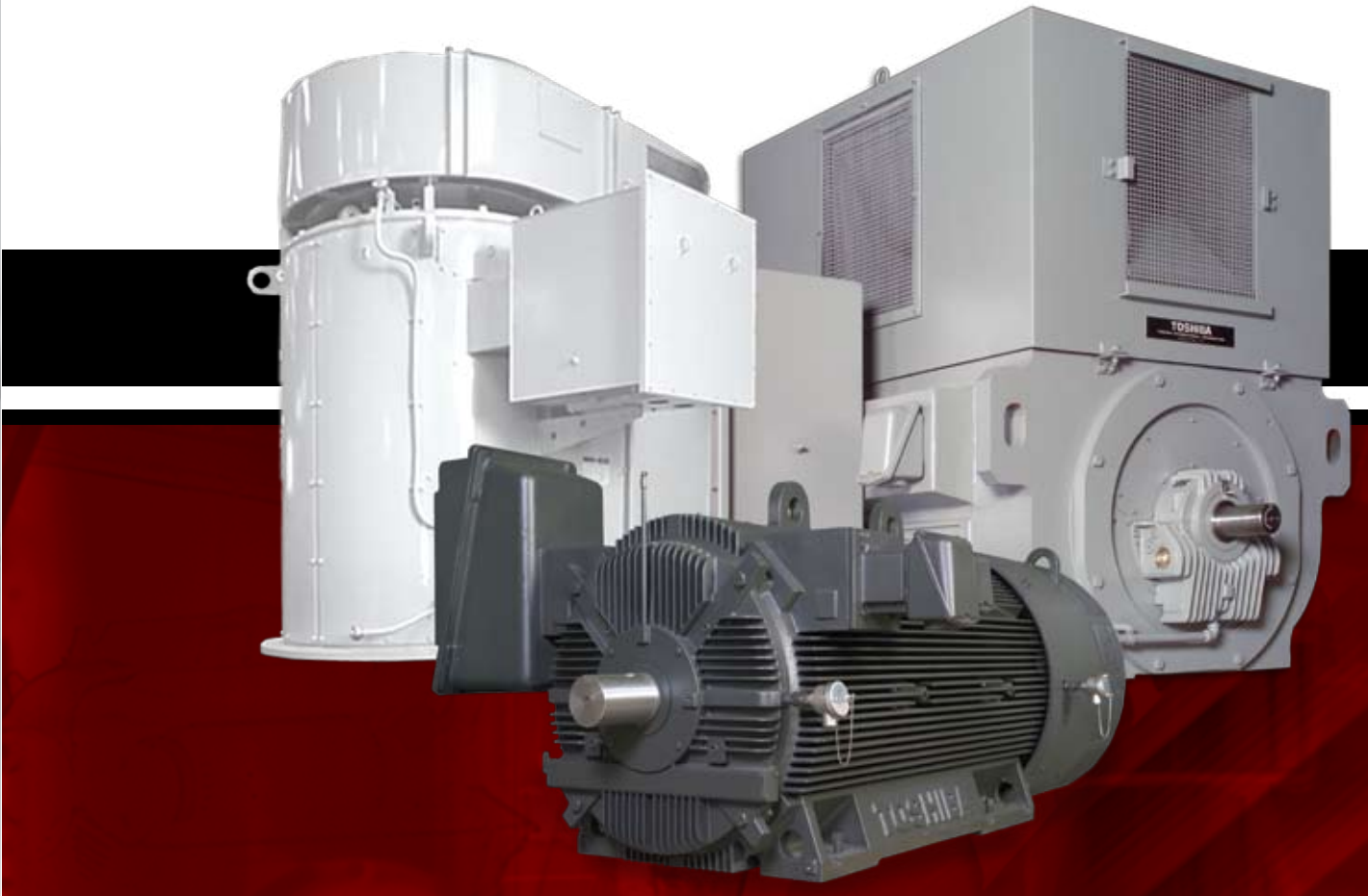
Toshiba offers a comprehensive warranty program on its full line of industrial products. Consult your salesperson or the factory for specific information.

Need to Know More?

Be sure to visit our website located at www.toshiba.com/ind for the latest information on Toshiba products and services.

Customer Support Services

Toshiba offers 24-hour service nationwide. For assistance of any type call: 1-800-231-1412.



MOTORS ADJUSTABLE SPEED DRIVES CONTROLS UPS INSTRUMENTATION PLC

TOSHIBA

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Available Through:



We Don't Just Design Motors, We Design Solutions

TIC produces a wide range of medium voltage motors ranging from 200 to 50,000 HP and 2300 to 13,800 V for countless industries and applications. In 1980 TIC began manufacturing motors in Houston, Texas and since then has developed a proud tradition of producing some of the most reliable, robust motors in the market. Combining our skilled engineering with our superior manufacturing, gives us the ultimate flexibility to customize our products to meet customer needs. At Toshiba **we don't just design motors, we design complete solutions.**

Toshiba Value

We listen to what our customers say and focus on providing motor solutions that exceed their needs and expectations. We continuously enhance our designs and manufacturing processes to offer the best value available.

- **Energy Savings**
Advanced Technology & Design for Maximum Efficiency
- **Extended Motor Life**
Low Vibration, Low Maintenance & Enhanced Cooling
- **Low Noise**
 - Advanced Frame Construction to Reduce Electrical Noise
 - Cast Iron Frames Up to 5000 HP
- **Reduced-Cycle Time**
 - Advanced Manufacturing Processes & Robotics
 - Motors Up to 2000 HP can be Custom Manufactured in Houston in 6-8 Weeks
 - Stock Motors Available
- **Reliability**
 - Conservative Engineering Designs for Specific Applications
 - Zero Defects Quality Control Program



Horizontal Induction Motors



Vertical Induction Motors

Capabilities

- Worldwide Manufacturing Up to 30,000 HP for Induction Motors/Generators
- 50,000 HP for Synchronous Motors/Generators
- Complete Range of Enclosures: Totally Enclosed Fan Cooled (TEFC), Air-to-Air Cooled (TEAAC), Water-to-Air Cooled (TEWAC), Totally Enclosed Force-Ventilated (TEFV), Open Drip Proof (ODP), Weather Protected (WP1 & WP2)
- Voltage Up to 13,800 V
- Vertical & Horizontal Mounting
- Squirrel Cage & Wound Rotor Induction Motors
- Synchronous Motors

Designed & Built for Virtually Any Application

Typical Voltage Ranges for Induction & Synchronous Motors

We offer a complete range of features and services for worldwide markets and applications.

- Manufactured to Meet Worldwide Standards (NEMA, IEC, BS, AS)
- Latest Edition to API 541, 546 & 547 General & Special Purpose
- Two-Pole Stiff Shaft (Designed for Adjustable Speed Applications - e.g. Pipelines)
- High Inertia Applications
- Two-Speed, Pole Amplitude Modulated (PAM) Motors
- Fabricated Copper & State-of-the-Art Low Pressure Die Cast Aluminum Rotor Designs
- Self-Lubricated Sleeve Bearing Capability up to 4500 HP at 3600 RPM
- ISO 9001 Certification in All Manufacturing Facilities
- TOSTIGHT II Advanced Mica Insulation System with Micro-Processed Controlled Epoxy VPI
- Complete Range of Accessories & Motor-Protection Devices
- Full Testing Capabilities (IEEE, JEC) Incorporating Temperature, Efficiency, Vibration & Noise (Complete API 541 Testing Also Available)
- Worldwide Authorized Service Facilities
- Adjustable Frequency Drive Compatibility with Extended Warranty on Toshiba Motor & Drive Systems
- Electronic Data & Software
- Field & Trouble-Shooting Services Available 24/7

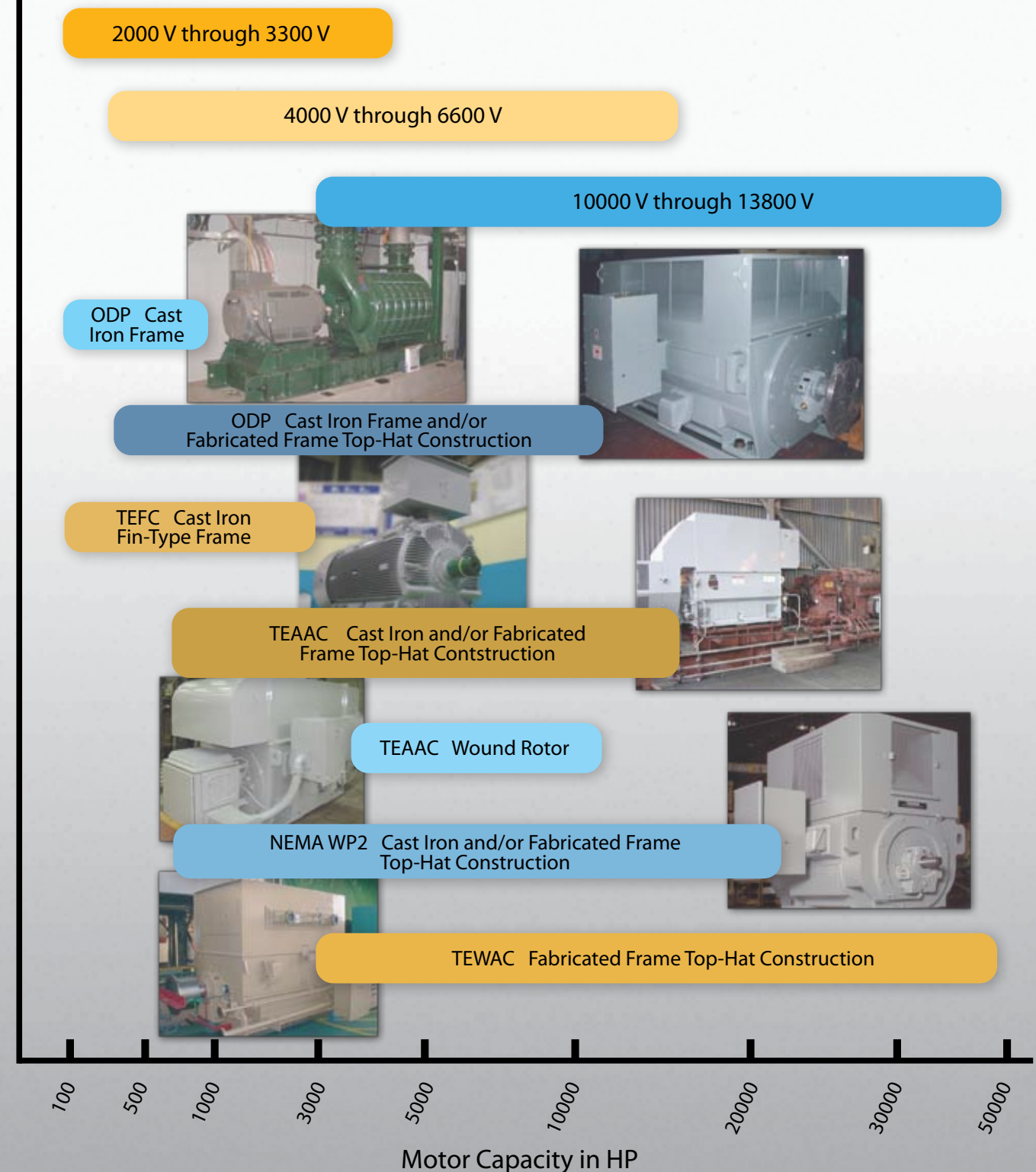


Applications & Markets

- **Pipeline** - Pumps & Compressors
- **Pulp & Paper** - Refiners, Vacuum Pumps, Chippers, Hogsers
- **Mining & Aggregate** - Ball Mills, Grinders, Crushers, Slurry Pumps, Conveyors
- **Utilities** - Pulverizers, Fans, Vertical & Horizontal Pumps
- **Petro-Chemical** - API, Low & High Speed Compressors, Various Pumps
- **Water/Wastewater** - Large Vertical High Thrust & Horizontal Pumps (Synchronous & Induction)
- **Special Applications** - Car & Metal Shredders, Banbury Mixers

Supply Voltage

Types of Motor Enclosures



Medium Voltage Motor Enclosures

NEMA Weather Protected Type I

An open drip-proof motor (IP22, IC01) is a common choice for a large, well-ventilated room. Fresh air is pulled in through the air housing's intakes by a high-performance fan, which cools the motor's core and coils. The hot air is then exhausted from the side openings.

The air housing's intakes and exhaust openings contain louvers and wire meshes which prevent the intrusion of water drips and other foreign matter into the motor (meets NEMA WP1 requirements).

Additional rainproof louvers can be provided on the air intake and exhaust openings (IP23, IC01) for an outdoor motor or an outdoor rainproof motor.

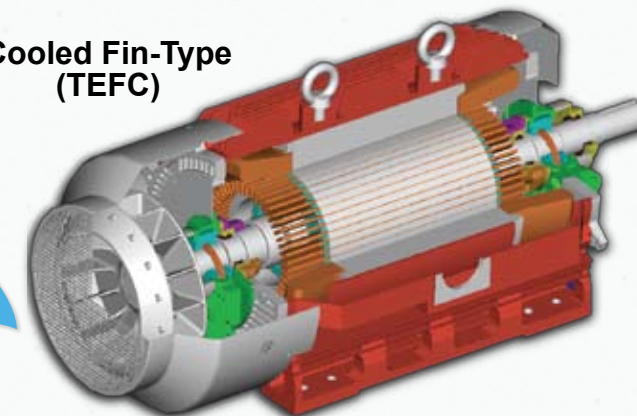
Totally Enclosed Fan Cooled

A totally-enclosed fan-cooled motor (IP54, IC611) is generally used in an environment containing corrosive or harmful gas.

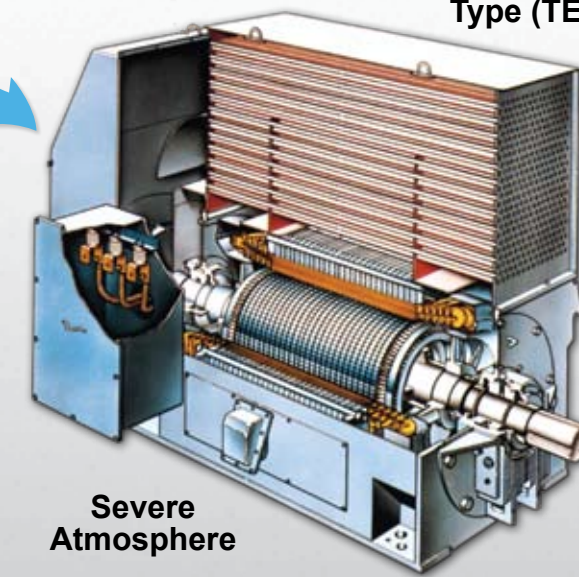
The external fan is mounted on the opposite drive directing fresh air into the air housing's pipes located on the upper part of the motor. The pipes act as a heat exchanger. Cool air passing through the pipes expels hot internal air from the motor.

This motor can be used outdoors. Cooling tubes within the air housing are easily accessible and cleaned simply by removing the fan cover.

Cooled Fin-Type (TEFC)



Air-to-Air Cooled Type (TEAAC)



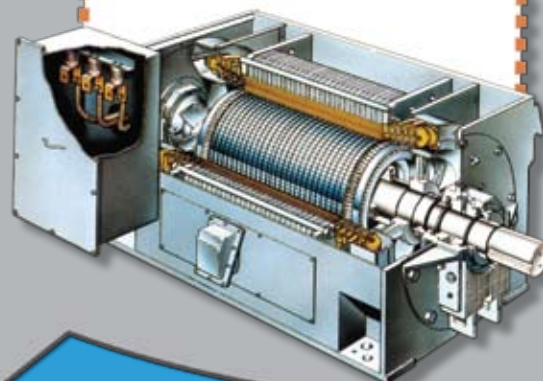
Severe Atmosphere

A Solution For Every Application

Fundamental Construction

A modular frame allows for flexibility in top-hat design for all environmental conditions.

Top-Hat Construction



NEMA Weather Protected Type II

This open drip outdoor motor (IP24W, IC01) is designed for outdoor use and incorporates an air housing in accordance with NEMA, WP2. It includes three right-angled turns for air inlets and outlets. The inlet air duct has a section where wind velocity falls below 3 m/sec (600 ft/min), causing dripping water, dust, and foreign matter to fall before air reaches the motor's electrical parts.

A section is provided in which air may blow through without being forced into the motor. Inlet air filters can be provided to prevent the ingress of particulate material.

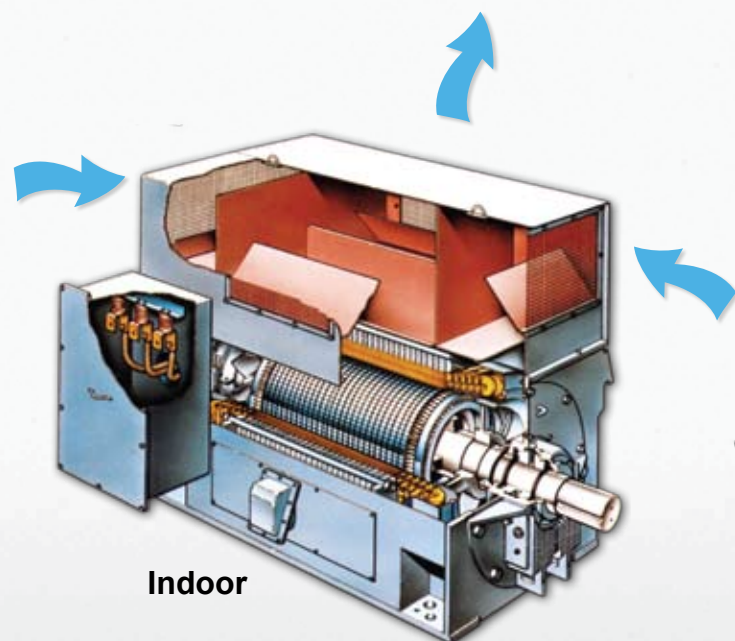
Totally Enclosed Water-to-Air Cooled

The totally enclosed water-to-air cooled motor (IP54, IC81W) is especially useful in locations where low noise operation is required or where removing heat from the motor is required.

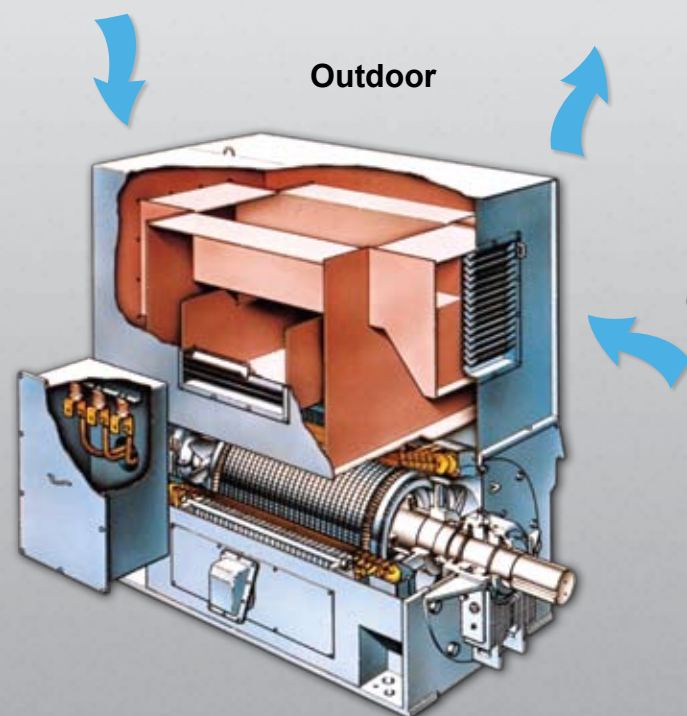
The motor accommodates a water-to-air exchanger in the air housing which is located in the upper part of the motor. Water passing through the heat exchanger efficiently cools air circulating in the motor.

A drain in the air housing protects the motor proper from damage caused by water leakage from the air cooler. Leakage alarm detectors are also available.

Quiet Operation

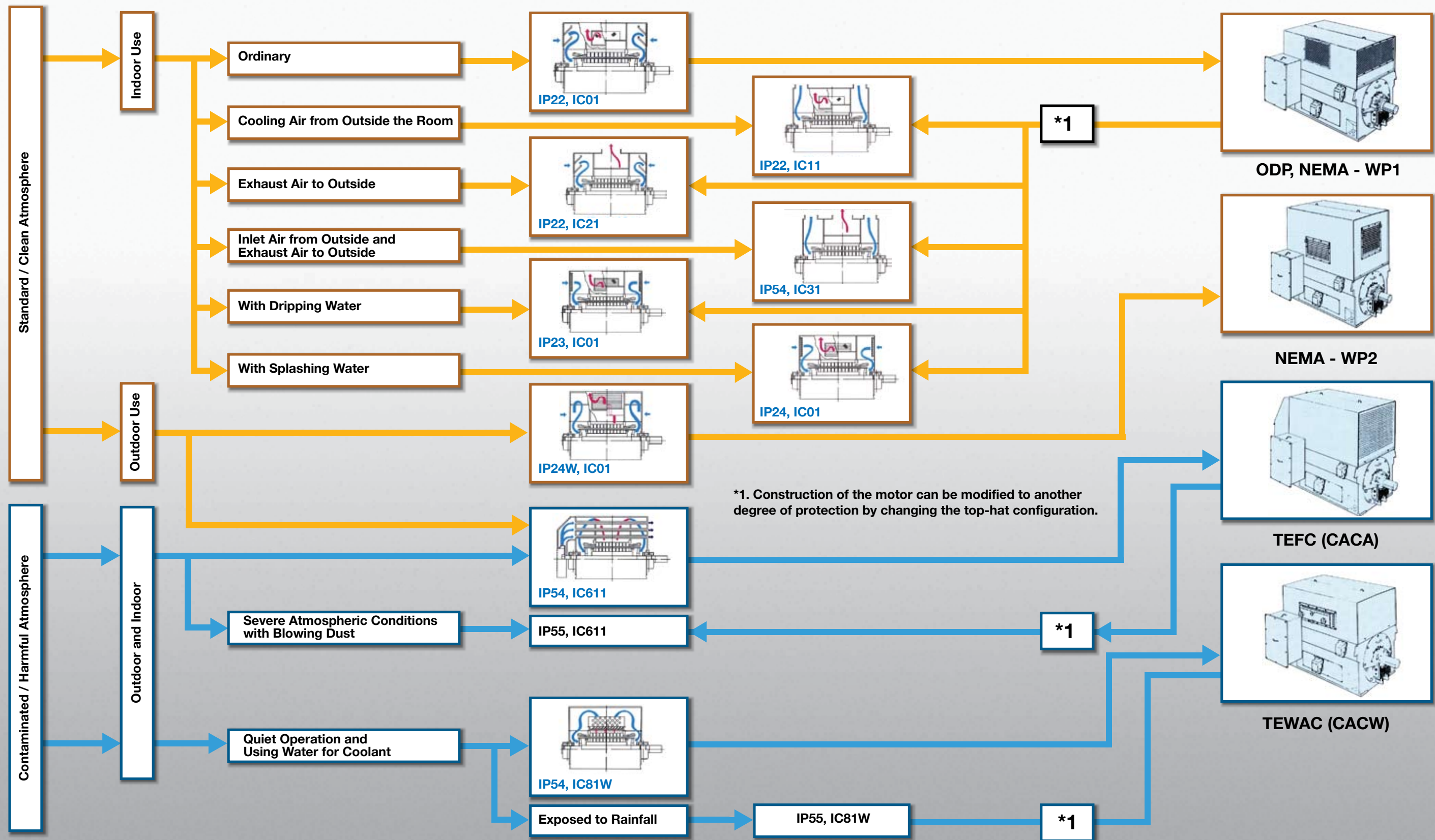


Indoor



Outdoor

Selecting the Degree of Protection and Cooling Method



Medium Voltage Motor Frame Sizes

Frame	Number of Poles	Available Enclosures	Est. Wt. (lb.)	D	2E	2F	A	B	Typical HP (Based on 1800 RPM)
445TS	2	ODP/WP1	1450	11	18	16.5	22.05	19.29	200
445T	4	ODP/WP1	1600	11	18	16.5	22.05	19.29	200
447TS	4	ODP/WP1	2110	11	18	20	22.05	22.83	250
N449TS	2, 4, 6, 8	TEFC	3800	11	18	25	22.05	34.70	350
505US	4, 6	ODP/WP1	2310	12.5	20	18	25.00	20.87	350
505USS	2	ODP/WP1	2100	12.5	20	18	25.00	20.87	300
507US	4, 6	ODP/WP1	2750	12.5	20	22	25.00	24.80	400
507USS	2	ODP/WP1	2350	12.5	20	22	25.00	24.80	350
509US	4, 6, 8	ODP/WP1	3000	12.5	20	28	25.00	30.79	500
509USS	2	ODP/WP1	2810	12.5	20	28	25.00	30.79	500
5010US	4, 6, 8	TEFC, ODP, WP1, WP2	4500	12.5	20	32	24.80	39.80	450
5010USS	2	TEFC, ODP, WP1, WP2	4500	12.5	20	32	24.80	39.80	350
5010/11/12US	4, 6, 8	ODP, WP1, WP2	5000	12.5	20	36	29.50	49.10	700
5010/11/12USS	2	ODP, WP1, WP2	5000	12.5	20	40	29.50	49.10	800
5809US	4, 6, 8	TEFC	6500	14.5	23	32	28.00	42.10	800
5810US	4, 6, 8	TEFC, ODP, WP1, WP2, TEAAC	6500	14.5	23	36	28.00	42.10	800
5810USS	2	TEFC, ODP, WP1, WP2, TEAAC	6500	14.5	23	36	28.00	42.10	600
5810/11/12US	4, 6, 8	ODP, WP1, WP2, TEAAC	8000	14.5	23	40	29.53	53.74	1500
5810/11/12USS	2	ODP, WP1, WP2, TEAAC	8000	14.5	23	45	29.53	53.74	2000
315-1000	2 and up	ODP, WP1, WP2, TEAAC	6200	12.40	24.80	39.37	29.53	49.09	700
355-1000	2 and up	ODP, WP1, WP2, TEAAC	7800	13.98	27.95	39.37	33.46	52.20	1000
355-1120	2 and up	ODP, WP1, WP2, TEAAC	8450	13.98	27.95	44.09	33.46	56.93	1500
400-1120	2 and up	ODP, WP1, WP2, TEAAC	9720	15.75	31.50	44.09	37.40	58.90	2000
400-1250	2 and up	ODP, WP1, WP2, TEAAC	10980	15.75	31.50	49.21	37.40	64.09	2500
450-1250	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	13880	17.72	35.43	49.21	41.34	67.95	3000
450-1400	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	15800	17.72	35.43	55.12	41.34	73.86	3500
500-1600	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	17090	19.69	35.43	62.99	44.09	83.86	4500
500-1800	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	18580	19.69	35.43	70.87	44.09	91.73	5000
560-1800	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	21070	22.05	39.37	70.87	49.61	91.73	6000
560-2000	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	25000	22.05	39.37	78.74	49.61	99.61	7000
630-2000	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	29800	24.80	44.09	78.74	55.91	99.61	8000
630-2240	2 and up	ODP, WP1, WP2, TEAAC, TEWAC	32000	24.80	44.09	88.19	55.91	109.06	9000

Please contact Toshiba for larger or more detailed frame dimensions.

Toshiba Metric Frame Designations



- First Three Numerals = Shaft Height in mm
- Last Four Numerals = 2F Dimension in mm
- e.g. 450 through 1250 Frame = 450 mm Shaft Height D Dimension & 1250 mm (2F) Dimension

NEMA Frame Designations



- First Two Numerals = Four x D Dimension in Inches
- Last One or Two Numerals are Obtained from Numbering System
- 2F Dimension, as Defined in NEMA MG 1 Section 4.2

