

**TOSHIBA**

Medium Voltage Motor Solutions



**Reliability *in motion***™

# We Don't Just Design Motors, We Design Solutions

Toshiba International Corporation (TIC) has supplied the North American market with medium voltage motors for over 30 years. Our motors are designed based on manufacturing experience that extends for over 100 years. Our experience, combined with innovative technology, superior quality and reliability, allows us to build motors for virtually every market and industrial application. Our engineers are dedicated to designing products for your application requirements. **We don't just design motors, we design solutions.** Our engineering, combined with our manufacturing capabilities, gives us ultimate flexibility in customizing to meet customer needs.

## 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 and design for maximum efficiency
- **Extended Motor Life**
  - Low vibration, low maintenance and enhanced cooling
- **Low Noise**
  - Advanced frame construction to reduce electrical noise
  - Cast iron frames up to 5000 HP
- **Reduced-Cycle Time**
  - Advanced manufacturing processes and robotics
  - Up to 2000 HP 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 30000 HP for induction motors/generators and 50000 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 (TEPV), Open Drip Proof (ODP), Weather Protected ( WP1 & WP2)
- Voltage up to 13800 V
- Vertical and horizontal mounting
- Squirrel cage and wound rotor induction motors
- Synchronous motors

# Designed and Built for Virtually Any Application

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

- Manufactured to worldwide standards (NEMA, IEC, BS, AS)
- Latest edition to API 541, 546 & 547 general and special purpose
- Two-pole stiff shaft (designed for variable speed applications- e.g. pipelines)
- High inertia applications
- Two-speed, Pole Amplitude Modulated (PAM) Motors
- Fabricated copper and 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 and motor-protection devices
- Full testing capability (IEEE, JEC) incorporating temperature, efficiency, vibration and noise, complete API 541 testing also available
- Worldwide authorized service facilities
- Variable frequency drive compatibility with extended warranty on Toshiba motor/drive systems
- Electronic data and software
- Field and trouble-shooting services available 24/7



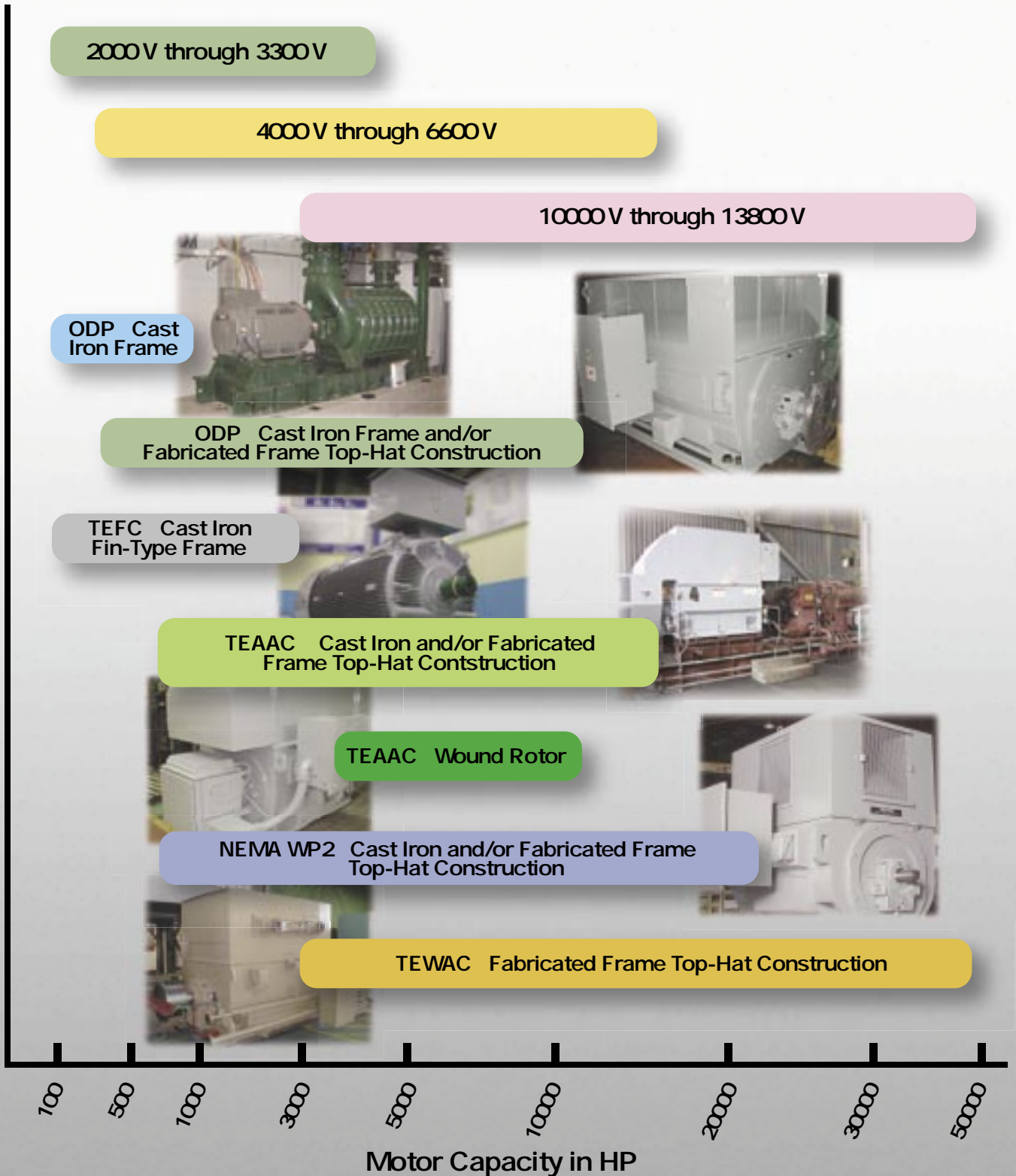
## Applications and Markets

- **Pulp and Paper** - Refiners, vacuum pumps, chippers, hoppers
- **Mining and Aggregate** - Ball mills, grinders, crushers, slurry pumps, conveyors
- **Utilities** - Pulverizers, fans, vertical and horizontal pumps
- **Petro-Chemical** - API, low and high speed compressors, various pumps
- **Water/Wastewater** - Large vertical high thrust and horizontal pumps (synchronous and induction)
- **Special Applications** - Car and metal shredders, banbury mixers
- **Pipeline** - Pumps and compressors

# Typical Voltage Ranges for Induction & Synchronous Motors

Supply Voltage

Types of Motor Enclosures



# Medium Voltage

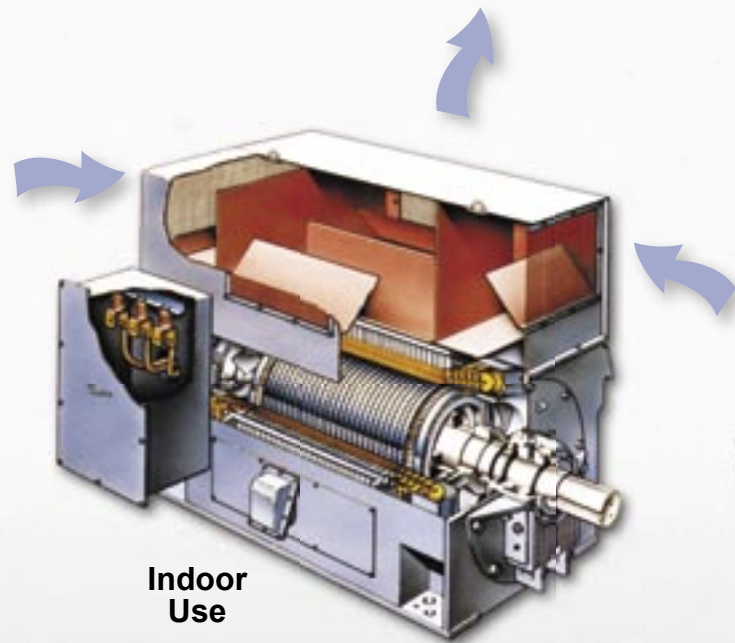
# Motor Enclosures

## NEMA Weather Protected Type I

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

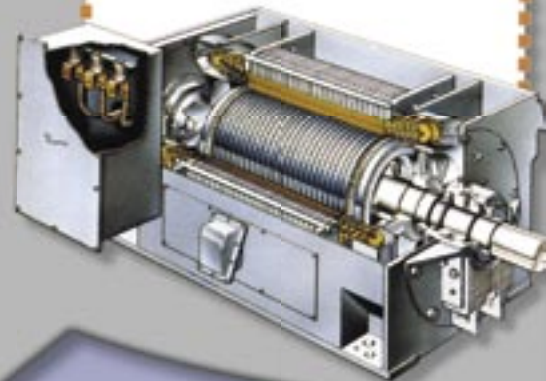
Also, the air intake and exhaust openings of the air housing are provided with louvers and wire meshes which prevent intrusion of water drips and other foreign matter into the motor (meets NEMA WP1 requirements).

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



Indoor Use

## Top-Hat Construction



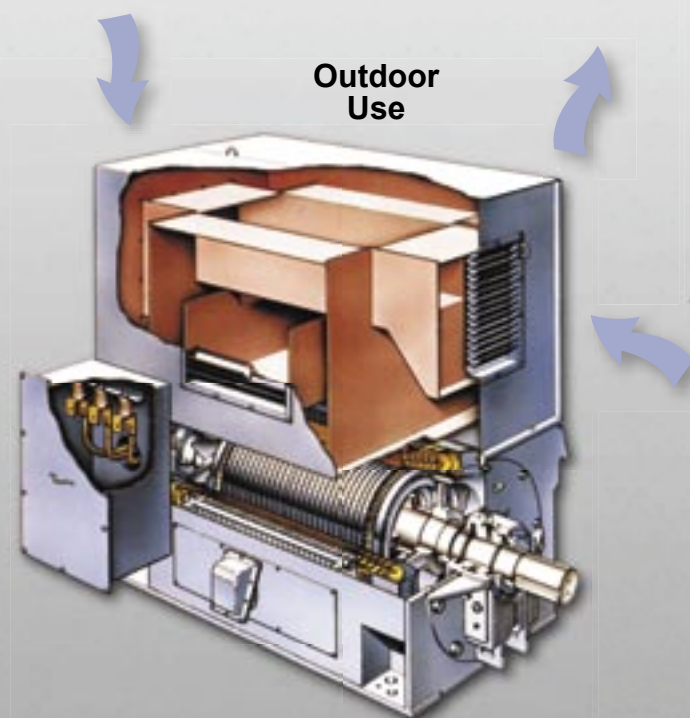
## Installation Environment and Enclosure

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

## NEMA Weather Protected Type II

This open-outdoor motor (IP24W, IC01) is 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 3m/sec (600 ft/min), causing dripping water, dust and foreign matter to fall before air reaches the electrical parts of the motor.

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.



Outdoor Use

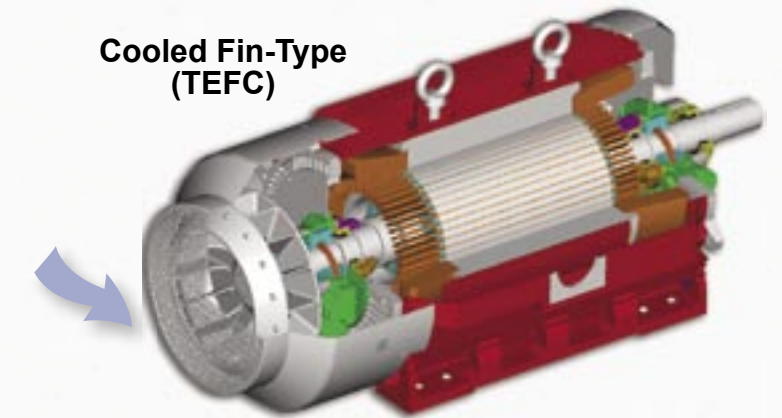
## Totally Enclosed Fan Cooled

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

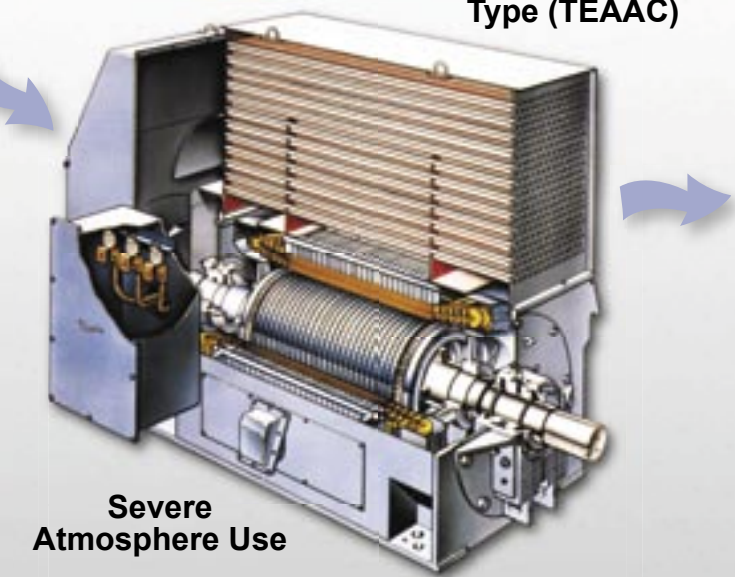
The external fan is mounted on the opposite drive directing fresh air into the pipes of the air housing located on the upper part of the motor. The pipes act as a heat exchanger in which cool air passing through the pipes expels hot internal air from the motor.

This type of motor can be used outdoors. Cooling tubes in 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 Use

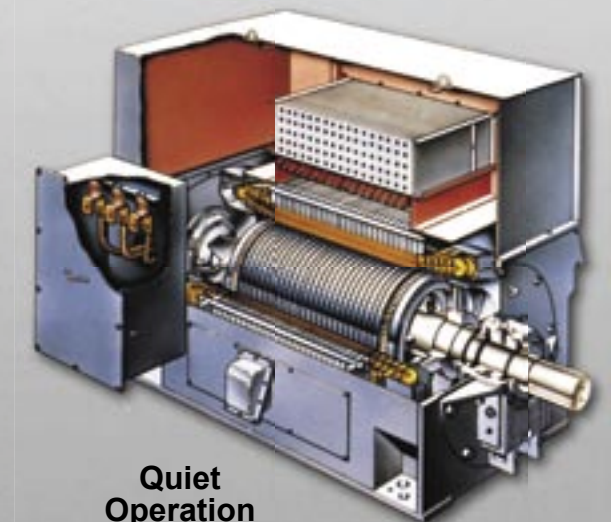
## Totally Enclosed Water-to-Air Cooled

This motor (IP54, IC81W) is especially useful in a location where low noise operation is required or where it is desired to remove heat from the motor ambient.

The motor accommodates a water-to-air exchanger in the air housing 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



# Medium Voltage Motor Frame Sizes

Frame	Number of Poles	Available Enclosure(s)	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

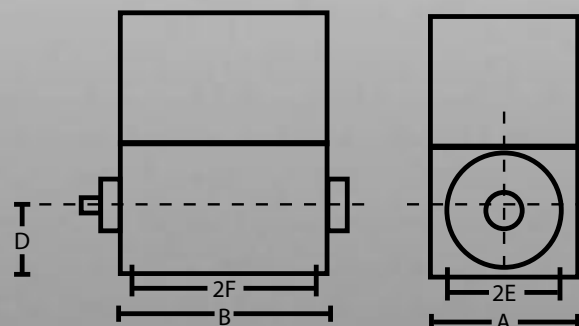


First 3 numerals = Shaft height in mm.  
Last 4 numerals = 2F dimension in mm.  
ex. 450-1250 frame = 450mm shaft height (D) dimension and 1250mm (2F) dimension

#### NEMA Frame Designations



First 2 numerals = four times the D dimension in inches  
The last 1 or 2 numerals are obtained from a numbering system for the 2F dimension, as defined in NEMA MG 1 Section 4.2.



# TOSHIBA INTERNATIONAL CORPORATION



North America Headquarters & Manufacturing Facilities (Houston, TX)

## TOSHIBA - Quality by Design

Our company culture and history is strongly rooted in quality. Our designs are technologically innovative and our products are manufactured from start to end using only the highest quality foreign and domestic 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.tic.toshiba.com](http://www.tic.toshiba.com) for the latest information on Toshiba products.

## Customer Support Services

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



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