TMEIC
We drive industry

World-Class Quality You Can Trust

TMEIC India Motor Factory

Motors & Generators
Empowering the Future

TOSHIBA MITSUBISHI-ELECTRIC INDUSTRIAL SYSTEMS CORPORATION

From Design to Quality Control – Rest assured, all made the TMEIC way

Toshiba Mitsubishi-Electric Industrial Systems Corporation (TMEIC) stands proud as a key player in ensuring the continuous operation of industrial manufacturing around the world. Our large-capacity, high-speed motors and generators are found at the core of production facilities driving equipment and systems in a diverse array of fields such as metals, paper, chemicals, oil and gas, materials handling and mining.

Combining the industrial production experience of parent companies Toshiba and Mitsubishi Electric, TMEIC products are developed based on more than 200 years of expertise, leading to the manufacture of highly reliable products that receive excellent customer evaluations for their superior quality, durability, low maintenance and long service life.

TMEIC-Made Strategic Global Motor and Drive Production in India

TMEIC expanded its global reach in 2016, with TMEIC Industrial Systems India Private Limited (TMEIC India, a 100% subsidiary of TMEIC Japan) establishing both motor and power electronics factories in Bengaluru, India, creating a strategic motor and drive base in the region.

We now manufacture the TM21-G Series of motors at our Keihin and Nagasaki factories in Japan and this new motor factory in India.

Largest motor produced:
23MW high-voltage induction motor (Photo: June 2017)

TMEIC DNA ensures Indian facilities deliver same renowned product quality and reliability

TMEIC quality

Vacuum impregnation equipment (VPI facilities)

Superior Insulation Long Service Life

TMEIC motors and generators feature insulation quality second to none, a key factor for ensuring a long and reliable service life. Eliminating the need to frequently update or repair equipment helps to reduce costs and enables smoother, more efficient operations; features that contribute to maintaining the highest level of productivity.

Installing stator in VPI tank

TM21-G Global Series – Medium-voltage Motor Production in India

Combined actual load test

Final Assembly & Testing

Testing and evaluating the performance of medium-voltage (MV) motors are an important part of the quality assurance process at TMEIC. The Tumkur works modern test facility is equipped with state-of-the-art test and measurement devices. MV motors produced at the facilities are tested using the latest international test standards. They are also subjected to TMEIC's own additional testing and conform to the requirements of the domestic market as well. Of course, special tests can be conducted to ensure products meet specific customers' needs.

The test system itself is comprised of motor-generator (MG) sets capable of delivering voltages of 3.3, 6.6 and 11kV, respectively, based on the voltage rating to be tested. The MG used is paired with excitation control systems and MV drives, and circuit breaker panels are selected with the click of an icon via the graphic user interface (GUI). This saves significant time and effort in the testing process.

Same policies, systems and management guarantee Japanese quality worldwide

TMEIC Quality Management System

Design Review (DR), Workstation System (WSS), and procurement management are the pillars of the TMEIC Quality Management System (QMS). This is known as the "Three Principal Management Policy" of TMEIC. The Indian factory applies QMS for approval of all parts and materials procured, and to verify and certify that all of the first products manufactured at the facilities are built with TMEIC quality.

QMS (Knowledge transfer to TMEIC India)

Design Review System

DR

- To be conducted at every stage, from quotation to use in the field
- Ensure that every revision requested by the customer is included.

Product quality is ensured by the First Production Certification process and our procurement management system. Each motor is produced according to a technical collaboration agreement that covers everything from design and parts procurement through manufacturing and testing.

First product (prototype) certification and process verification

Certification by TMEIC Japan

TMEIC

Vendor Evaluation Process

Procurement management

Workstation System (WSS)

Work process management

- Workstation configuration separates each manufacturing process
- Only components that pass inspection continue on to the next process

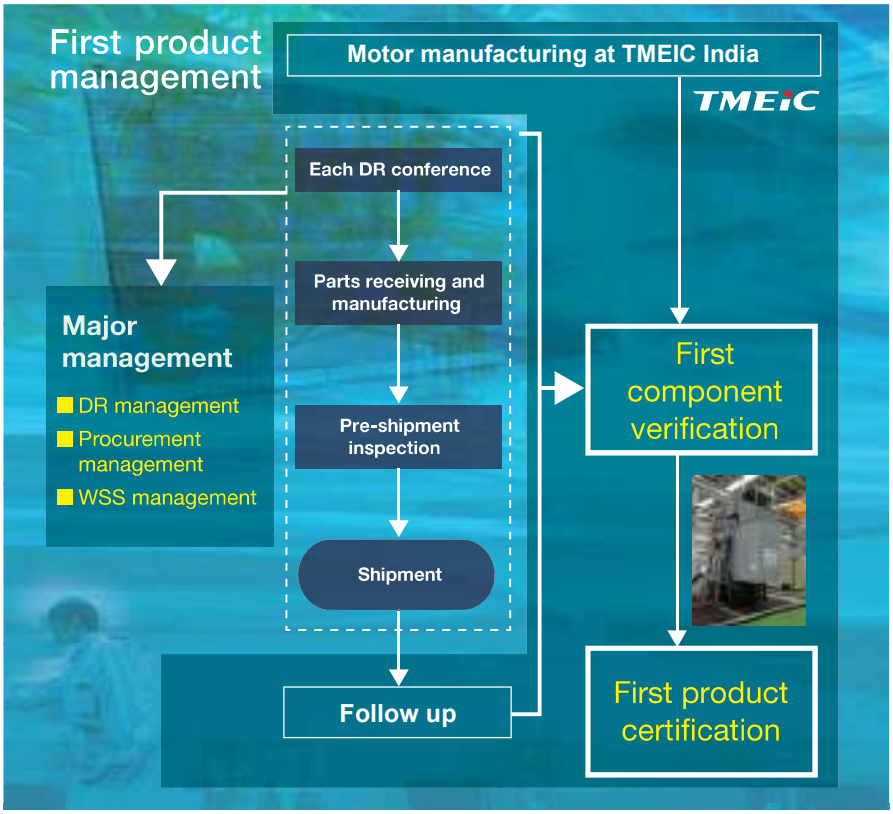
Motor components are classified and evaluated by TMEIC Japan and India, respectively, and certified by the Tokyo headquarters as the final step, thereby ensuring quality is guaranteed.

Maintaining manufacturing quality

TMEIC India has strictly defined the necessary skills and competence required to maintain the manufacturing quality synonymous with the TMEIC brand. The motor factory has introduced a certification program that evaluates each skill, and regularly re-evaluates personnel to motivate operators to hone their skill and evaluate the effectiveness of the training system. The trainers who teach subordinate employees the TMEIC manufacturing standards are supervisors that were educated in Japan.

TMEIC— Certifications and Credentials

The TMEIC motor factory has obtained ISO9001:2015 QMS certification, which is testimony to having established a viable quality system within a year of starting factory operations.



Quality Management System

TMEIC India motor factory

First product certification management

The approval to start production is not given until after manufacturing quality, performance and other parameters are comprehensively reviewed for the first product manufactured.
Additionally, verification of “Expected Value Realization”

Superior performance from compact, global-standard Japan-designed TM21-G Series

Photo of actual motor
for mining conveyor applications

1400kW-6P-6.6kV Fr.500
IC611 VFD starting

TM21-G Global Series MV Motors
Modular Motors — TEAAC Motors and TEWAC Motors

Parameters	Select	Details of Description	
		TEAAC	TEWAC
Output power	MV class	160kW ~ 23,000kW	
	~ 690V class	160kW ~ 1,500kW	
Motor voltage	MV class	2,300V ~ 11,000V	
	~ 690V class	~ 690V	
Frame range	IEC60034	400 ~ 900	
Poles	Horizontal	2 ~ 14P	
	Vertical	4 ~ 18P	
Frequency	MV class	50Hz/60Hz	
	MV variable	~ 72Hz via MV inverter	
	LV variable	~ 72Hz via LV inverter	
Enclosure protection	IEC60034	IP55/IP56	
Cooling type		IC611, IC616, IC666	IC81W, IC86W
Insulation class		Class-F (155°C)	
Temp. rise		as per Class-B 80K(R) / 90K(RTD)	
Mounting		Horizontal (IMB3), Vertical (IMV1)	
Terminal box		Segregated phases/Air insulation	
Shaft material		Carbon steel/CRMO steel	
Direction		2P/4P/6P: Unidirectional; 8P~: Bi-directional	
Area		IEC Zone2 explosive gas area with Ex ec certification IEC Zone22 non-conductive explosive dust area with Ex tc certification	
Ambient temp.		-20 ~ +40°C (based on IEC)	25°C (based on IEC)
Temp. (max)		55°C	40°C (or more on request)
Altitude		<1000m (base) (more on request)	
Location		Indoor/Outdoor	
Bearings		Anti-friction/Sleeve	
Bearing insulation		Standard: for NDE; Optional: for both NDE and DE	
Standards		IEC, IS, (standard); NEMA MG1– (option); With IEC dimensions; JEC (option)	
Temp. sensors		Winding 6 RTD; RTD Pt100Ω@0°C standard; RTD for bearings optional	

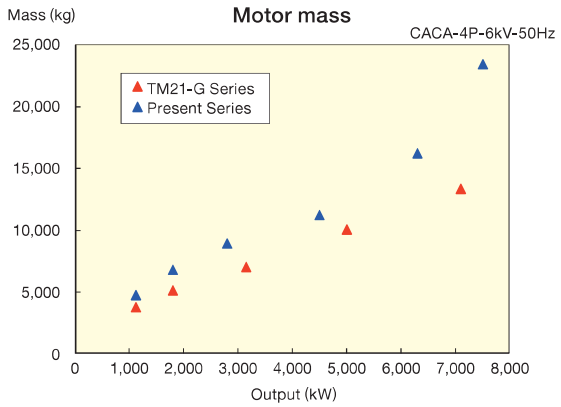
- Amazingly small footprint
- Minimizing weight
- Compliance to International Standards
- Minimal maintenance required
- Exceptional reliability

Specially designed for a small footprint and easy operation, TM21-G Series motors require less time for installation, maintenance and replacement while ensuring the high performance synonymous with the TMEIC name. All motors offer a range of benefits that answer the diversified needs of our customers today.

Nothing Quite Like It — Experience a TM21-G

Lightweight motors

World-class Lightweight Design

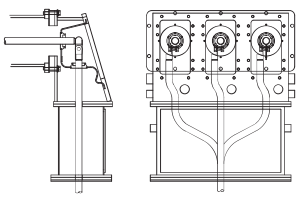


The optimal design of these world-class motors has realized a 20–30% weight reduction compared to our previous motor series. This contributes to various benefits including reduced shipping cost, lower foundation load/crane capacity and simplified maintenance.

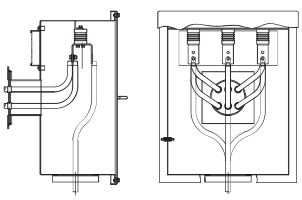
Main circuit terminal box

Choice of Terminal Boxes

Phase-segregated terminal box



Standard terminal box



A variety of terminal boxes are available as standard equipment in response to market demand. Choices include a standard terminal box, a phase-segregated terminal box and a large, a terminal box with large double terminals compliant with NEMA standards.

Junction box

Standard Material is Stainless Steel

Instrument cables are routed into a single junction box and the incorporation of clamp-type terminals as standard simplifies the cable connection process. As a result, external cable connection work is simplified reducing installation times. Furthermore, the junction box is made of stainless steel, increasing operating durability under harsh conditions.

Cable duct

Replacement So Easy a Novice Can Do It

Instrument and space heater cables pass through an IP55 cable duct that is hermetically sealed using steel plates. This helps to ensure motor operation even in harsh environments. Additionally the iron piping and armored cables required when running cables alongside the motor surface have been eliminated. As a result, less time and effort are required when replacing instruments, and it's so easy virtually anyone can do it.

Indian factory delivering superior quality in every product

Enhanced Reliability – Amazing Efficiency

TM21-GF Series Fr.315–560

Variety of models to match diversified industrial needs

TM21-GF Series Fr.315–400

TM21-GF Series Fr.450–560

Actual product

for IPP fan applications (FDF)

225kW, 4P, 6.6kV, TEFC, Fr.315

State-of-the-art heat ventilation analysis

Impressive reduction in size realizes space-saving installation and lower shipping cost. As air duct and water cooler are not required, the cost of maintenance is reduced too.

- **Space-saving installation**
- **Transportation/Shipping cost reduced**
- **Maintenance cost reduced**

Designed and built based on extensive experience

Decades of experience are applied in the production process, realizing stator windings and rotor cages of the highest quality.

- **Stable, nonstop operation**
- **Low vibration, long service life**
- **Clean/Safe work environment**
- **Low maintenance**

TM21-G Global Series MV Motors
TEFC Motors

Parameters	Select	Details of Description
Output power	MV class	160kW ~ 2,000kW
	~ 690V class	160kW ~ 1,500kW
Motor voltage	MV class	2,300V ~ 6,900V
	~ 690V class	~ 690V
Frame range	IEC	315 ~ 560
Poles	Horizontal	2 ~ 8P
	Vertical	4 ~ 8P
Frequency	MV class	50Hz/60Hz
	MV variable	~ 72Hz via MV inverter
	LV variable	~ 72Hz via LV inverter
Enclosure protection	IEC60034	IP55/IP56
Cooling type	Variable torque	IC411
	Constant torque	IC416
Insulation class		Class-F (155°C)
Temp. rise		as per Class-B 80K(R) / 90K(RTD)
Mounting		Horizontal (IMB3), Vertical (IMV1)
Terminal box		Segregated phases/Air insulation
Shaft material		Carbon steel/CRMO steel
Direction		2P: Unidirectional; 4P~: Bi-directional
Area		IEC Zone2 explosive gas area with Ex ec certification IEC Zone22 non-conductive explosive dust area with Ex tc certification
Ambient temp.		-20 ~ +40°C (based on IEC)
Temp. (max)		55°C
Altitude		<1000m (base) (more on request)
Location		Indoor/Outdoor
Bearings		Anti-friction
Bearing insulation		Standard: None Optional: for NDE
Standards		IEC, IS, (standard); NEMA MG1– (option); With IEC dimensions; JEC (option)
Temp. sensors		Winding 6 RTD; RTD Pt100Ω@0°C standard; RTD for bearings optional

Hazardous Area Motors

Hazardous Area Motor Lineup for Major Industrial Markets – Global-standard performance, safety and reliability from India

Ex ec
Increased Safety

Ex tc
Dust Exclusion

Degree of protection
IP54/IP55

Cooling method
IC411/IC416

Construction
IM B3/IM V1

Totally Enclosed Fan-Cooled
TEFC

TEFC	
Motor type	IM
Rated voltage	up to 6.9kV
Hazardous area classification	Zone2/Zone22
Stator winding insulation	Thermal class 155 (F)
Shaft height	315 to 560mm
Bearings	Antifriction
Cage material	Aluminum/Copper
Frame material	Cast iron
Standards	IEC Ex, ATEX

Degree of protection
IP54/IP55

Cooling method
IC611/IC616
IC81W/IC86W

Construction
IM B3/IM V1

Totally Enclosed Air-to-Air-Cooled
TEAAC

TEWAC
Totally Enclosed Water-to-Air-Cooled

TEAAC, TEWAC	
Motor type	IM
Rated voltage	up to 11kV
Hazardous area classification	Zone2/Zone22
Stator winding insulation	Thermal class 155 (F)
Shaft height	400 to 900mm
Bearings	Antifriction/Sleeve
Cage material	Copper
Frame material	Steel
Standards	IEC Ex, ATEX

Power Electronics Factory

Power electronics factory next to motor factory enables TMEIC to offer both motors and drives. TMEIC's superior productivity delivers machinery that contributes to reducing energy costs and CO_2

India plant capable of supplying TMdrive-MVe2.

TMdrive-MVe2

VFD features

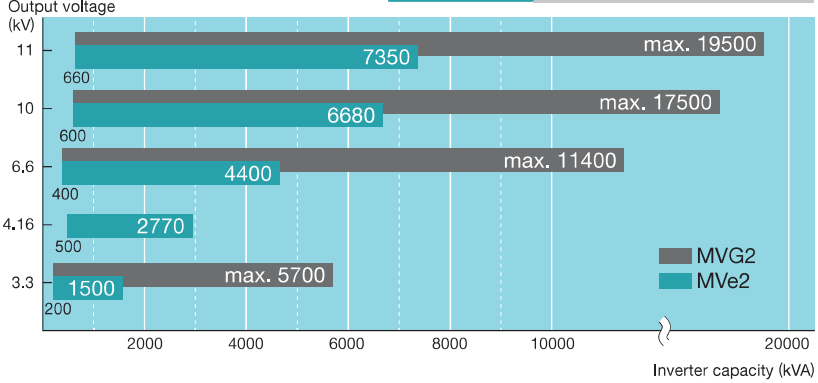
Combined test with motor and VFD

- Up to 100% for starting current
- High power factor
- High efficiency
- Less maintenance work
- Ultrahigh-speed operation
- Power regeneration (TMdrive-MVe2)
- Reactive power compensation (TMdrive-MVe2)

Combined test with inverter drive

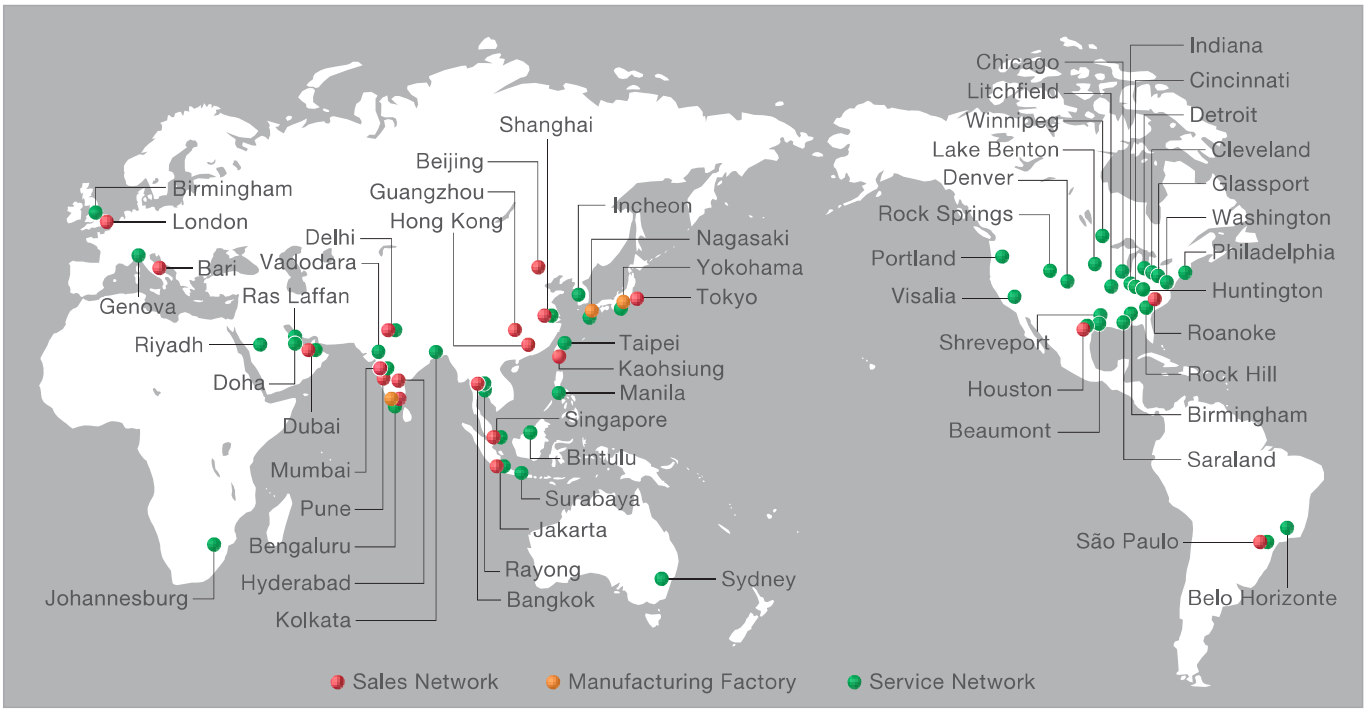
Energy-Saving MV Inverter Family

Voltage/capacity range: MVG2 200kVA to 19500kVA; MVe2 200kVA to 8360kVA



TMEIC also manufactures PV-PCS and UPS products in its Indian power electronics factory.

Global Sales/Manufacturing/Service Network



Corporate Profile

TOSHIBA
Toshiba Corporation

1875 Tanaka Seisaku-sho (Tanaka Engineering Works) established

MITSUBISHI
Mitsubishi Electric Corporation

1921 Mitsubishi Electric Corporation established

Industrial Systems Department

TMEIC
Toshiba Mitsubishi-Electric Industrial Systems Corporation

2003 The industrial systems departments of Toshiba Corporation and Mitsubishi Electric Corporation merged to create Toshiba Mitsubishi-Electric Industrial Systems Corporation (TMEIC).

www.tmeic.com

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