

PERMANENT MAGNET RELUCTANCE MOTOR

PRM



TMEiC

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TMEIC's NEW **TECHNOLOGY**

Based on abundant experience gathered over the years, TMEIC provides world-leading motors that meet customer requirements, leveraging the latest technology and advanced technology development power.

We offer high efficiency and high quality motors with maximum cost effectiveness, matching the varied applications of motor and drive systems, including variable-speed.



EVOLVED MOTOR TECHNOLOGY

PERMANENT MAGNET RELUCTANCE MOTOR



TMEIC has developed a new motor, the PRM, by combining a permanent magnet motor and a reluctance motor.

A reluctance motor utilizes the magnetic attractive force generated by the rotor's saliency without using a permanent magnet. For the PRM, TMEIC designed an optimum PRM rotor that uses reluctance torque and that delivers high torque and high efficiency characteristics while minimizing the use of the permanent magnet.

Using this rotor design, TMEIC has developed a hybrid rotor, which sets the torque ratio of the motor as follows:

Permanent magnet torque: 50%

Reluctance torque: 50%

The PRM is a next-generation permanent magnet motor that achieves high torque properties and excellent energy-saving performance using a small permanent magnet.

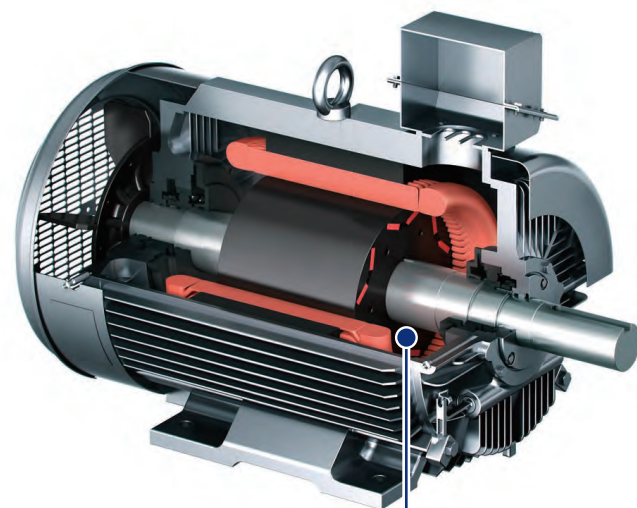
A high efficiency motor, to which the PRM is applied, delivers motor efficiency reaching IE4 class, and excellent energy-saving benefits. Furthermore, the PRM technology can make motors compact and lightweight, enabling a wide variety of motors that meet various needs.

The PRM not only exhibits excellent energy-saving effects for fans and pumps, but achieves compactness, weight savings, and energy savings for the customer.

PRM

New motor technology

As conventional permanent magnet motors use the torque generated by permanent magnets, the permanent magnet volume is large when trying to obtain high torque. The PRM technology developed by TMEIC uses reluctance torque and reduces the size of the permanent magnets. When compared with conventional permanent magnet motors, the PRM has reduced the volume of the permanent magnet to approximately 40%. This new PRM technology minimizes motor cost and provides resource and environmental- advantages.



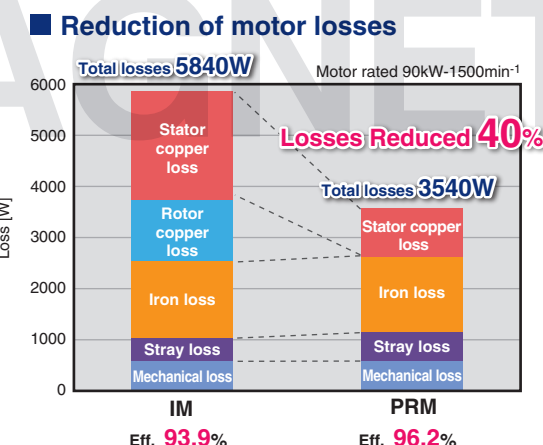
PRM rotor structure

The PRM rotor has a permanent magnet embedded in the rotor. Since the rotor does not have a conductor through which a secondary current flows, there is no loss due to secondary current, enabling high efficiency operation. In addition, the permanent magnet is mechanically and firmly held inside the rotor, thereby enhancing reliability.

Features of TMEIC's PRM

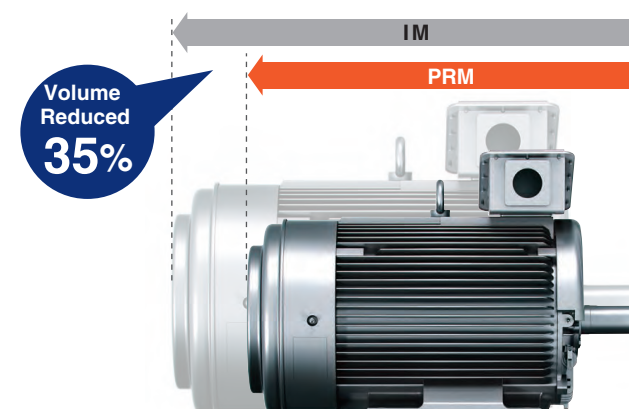
Achieving IE4 class efficiency and energy savings

As the PRM uses a permanent-magnet-type rotor with the concurrent use of reluctance torque, no loss occurs in the rotor, and thus motor loss can be reduced by approximately 40% compared with an induction motor. The PRM attains IE4 class motor efficiency. The PRM is used to power various industrial devices such as fans and pumps, and achieves an excellent energy-saving effect at an unprecedented level of high efficiency.



Providing compact and lightweight motors

As the PRM has no loss generated in the rotor, the motor can be made compact and lightweight. When compared with an induction motor (IM), the PRM can be reduced approximately 40% in weight and 35% in volume, and the motor size is one to two frame sizes smaller. For a machine incorporating a motor, the PRM provides a significant effect of saving space and weight. Furthermore, in combination with the excellent energy savings, new added value can be provided that was not possible before.



A wide variety of motors matching various applications

TMEIC has applied its PRM technology to motor development and has released various motors suited to varied applications and demands.

To meet demand for the highest level of energy conservation, we have produced **the TM21-FP series of super premium efficiency motors**, which deliver IE4 class efficiency. Since the motor size is compliant with IEC standards, the motor in a previously installed machine can be replaced with an IE4 efficiency motor. Meanwhile, for rolling mill auxiliary machinery requiring compact motors, we have produced **the TM-EP series of rolling mill auxiliary machines**, which satisfy needs for both compactness and high efficiency. TMEIC provides new motors that respond to needs for compactness and high efficiency for various applications and required specifications.



Specification



TM21-FP Series

IE4 Super premium efficiency permanent magnet motor

Rated output	75 to 300kW
Pole	6 Pole
Rated voltage	400V
Rated frequency	75 / 90Hz
Rated speed	1500 / 1800min ⁻¹
Insulation class	155(F)
Ambient temperature	-15 to 40degC
Duty type	S1 (Continuous)
Drive	VFD operation
Torque characteristic	150-1500min ⁻¹ : Reduction torque / 1500-1800min ⁻¹ : Constant output
Rotor construction	Permanent magnet
IP grade	IP44, Option: IP55
IC grade(Enclosure)	IC411 (TEFC)
Mounting method	IMB3 (Horizontal foot)
Coupling method	Direct, Belt
Shaft end specification	IM1001 (Single shaft)
Applicable standard	JIS JEC JEM

TMEIC motor line-up



Low voltage permanent magnet synchronous motor
IE4 Super premium efficiency

TM21-FP

IE4 efficiency series motors are produced by adopting the PRM technology.
Output 75 to 300 kW at 1,500 min⁻¹, frame size 250, 280
For fans and pumps (reduced torque characteristics)
These permanent magnet motors have attained the highest class IE4 efficiency.
As the installation dimensions are compliant with IEC standards, the motor can replace a previously installed machine.
VFD exclusive-use motors



Low voltage three phase induction motor
TM21-FII
Premium efficiency IE3 Series
(In accordance with IEC 60034-30)

Output : 55kW to 375kW
Frame size : 250, 280, 315, 355



Low voltage three phase induction motor
TM21-FII
China efficiency GB3 Series
(In accordance with GB 18613-2012)

Output : 55kW to 375kW
Frame size : 250, 280, 315, 355