



Fisher&Paykel

FISHER & PAYKEL DIRECT DRIVE MOTORS

20 YEARS FOCUS ON DIRECT DRIVE MOTOR TECHNOLOGY HAS RESULTED IN SIGNIFICANT INTELLECTUAL PROPERTY. THESE INCLUDE 32 PATENTS ON MOTOR FUNCTION, CONSTRUCTION AND MANUFACTURE, 5 ON CONTROL OF MOTORS. WE HAVE 20 PATENTS PENDING WHICH WILL CONTINUE TO CEMENT US AS “THE DIRECT DRIVE MOTOR PEOPLE”.

WE HAVE MOTOR DESIGNS THAT ARE SUITABLE FOR BOTH VERTICAL AND HORIZONTAL AXIS WASHER APPLICATIONS. OUR PROPRIETARY MAGNET TECHNOLOGY ALLOWS US TO OFFER HIGHER PERFORMANCE FOR LOWER COST.

WE UNDERSTAND WASHING TECHNOLOGY. OUR DESIGN TEAM HAVE CONSISTENTLY COME UP WITH MORE EFFICIENT, COST EFFECTIVE MOTOR DESIGNS TO MEET THE EVER CHANGING WORLD OF APPLIANCES.

DESIGN SOLUTIONS

OUR COMPLETE DESIGN SOLUTION

- 1 A confidential design service**
We work with your engineering team to select the right motor from our existing range or using our advanced modeling techniques customise a motor for your needs.
 - 2 Motor Control Technology**
With our 30 years experience designing and manufacturing motor controllers, we are the ideal people to provide motor control solutions.
 - 3 Application expertise**
Provide advice on how to effectively integrate the motor into the washer to make the most of the benefits of the motor and minimise costs.
 - 4** Our flexible manufacturing facilities are designed and manufactured by our own Production Machinery Plant in New Zealand and can be placed anywhere in the world.
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ADVANTAGES OF A DIRECT DRIVE MOTOR?

Direct Drive motors are directly coupled to the drive shaft. These motors transmit the power to the application directly without the use of mechanical parts like gears, belts and pulleys. Removing these notoriously unreliable noisy mechanical parts remains a key driver for this technology.

While the low noise, low vibration advantages of Direct Drive motors are well known, many of the other performance advantages are not. Integrating the right DD motor with smart electronics facilitates precise sensing technology used to solve common wash problems. Issues such as out of balance, over-sudsing, optimising the balance between soil removal and gentleness, water use and rinse performance can all be more precisely sensed and controlled in the Direct Drive format. Direct Drive provides the speed control required to meet today's stringent water, energy and noise Standards without compromising on wash performance.

PRODUCT RANGE



	Ma Series	MB Series	Unit
Rotor Diameter	276	305	mm
Rotor Axial Height	47-68	33-64	mm
Torque	15-40	15-50	Nm
Motor Constant	-1.0-2.26	-1.0-3.37	Nm/WattsLoss ⁻²
Max Recommended Speed	1100	1300-1600	RPM
Typical Operating Voltage	325-340		Volts DC Rail
Wire Material	Copper or Aluminium		
Winding Configuration	To customer requirements		
EMF Waveshape	Sinusoidal		
UL Insulation Class	B, F		
Magnet Type	Ferrite		
Commutation Method	Sensored or Sensorless		

HISTORY

IN AUGUST OF 1992 FISHER & PAYKEL'S SMARTDRIVE™ WASHER MADE THE COVER OF APPLIANCE MAGAZINE, SHOWING THE FIRST TIME AN ELECTRONICALLY CONTROLLED DIRECT DRIVE MOTOR HAD BEEN USED IN A WASHING MACHINE.



INNOVATIVE IDEA SINCE 1992

Fisher & Paykel are the inventors of the first DD motor in a clothes washer (refer to Appliance Magazine August 1992). In 1990 we launched our first SmartDrive™ auto-washer. This was the first time a Direct Drive motor, and the Smart electronics to drive it, were used in a domestic washing machine. It set us on a path which has led us to be the world experts in Direct Drive motor technology. Today because we not only make Direct Drive Motors, but the washing machines they go into, we have an intimate understanding of the application of DD motors in auto-washers.

Today our motor plants are fully automated, designed by us around optimal material utilisation. The Plastic Rotor is key to our process capability, giving us precise control over the air-gap between the Stator and Rotor, a higher back EMF and is the benchmark in quietness. Today we design motors and provide application support for a number of manufacturers and applications.

BEING FISHER & PAYKEL

In August of 1992 Fisher & Paykel's SmartDrive™ washer made the cover of Appliance magazine, showing the first time an electronically controlled Direct Drive motor had been used in a washing machine. This breakthrough enabled F&P to do away with the belt and pulley drive of their existing washer, by attaching the motor to the agitator shaft. The resulting reliability and noise improvements were dramatic but the performance benefits facilitated by increased sensing abilities opened the way for this small company to export this washer to Australia and later USA.

BEGINNING OF THE DIRECT DRIVE

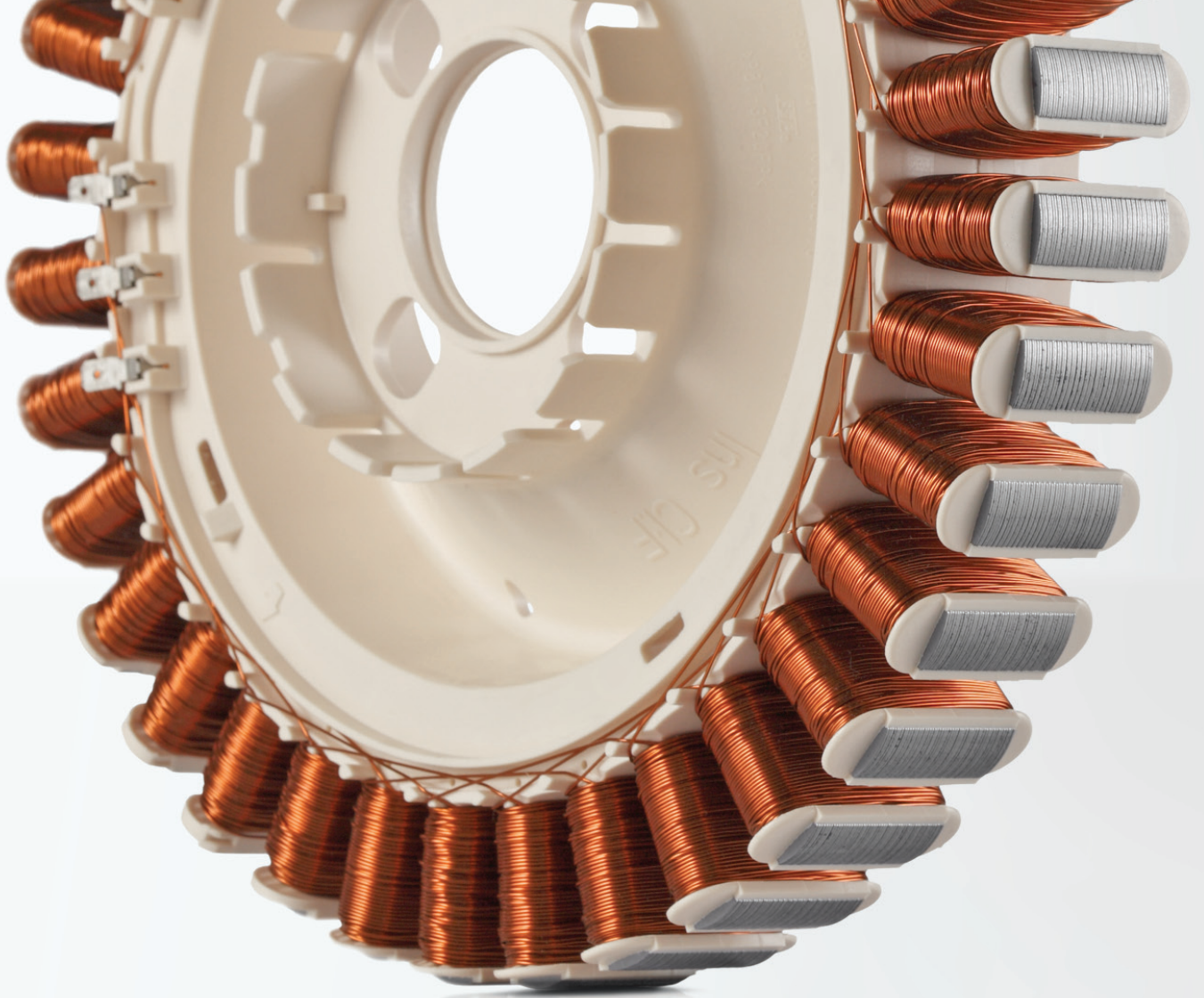
1990 First DD motor goes into SmartDrive™ washing machine. 42 pole, 56 Neodymium magnets, with copper windings.

1992 Neodymium magnets were replaced by Ferrite magnets.

2004 36 poles with 48 ferrite magnets

2008 Breakthrough Ferrite magnet technology enabled us to change to aluminium windings without sacrificing torque. Significant overall motor cost saving.

Future platform – Innovative Stator technology provides up to 30% increase in performance over similar motors.



The Motor Business Unit

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