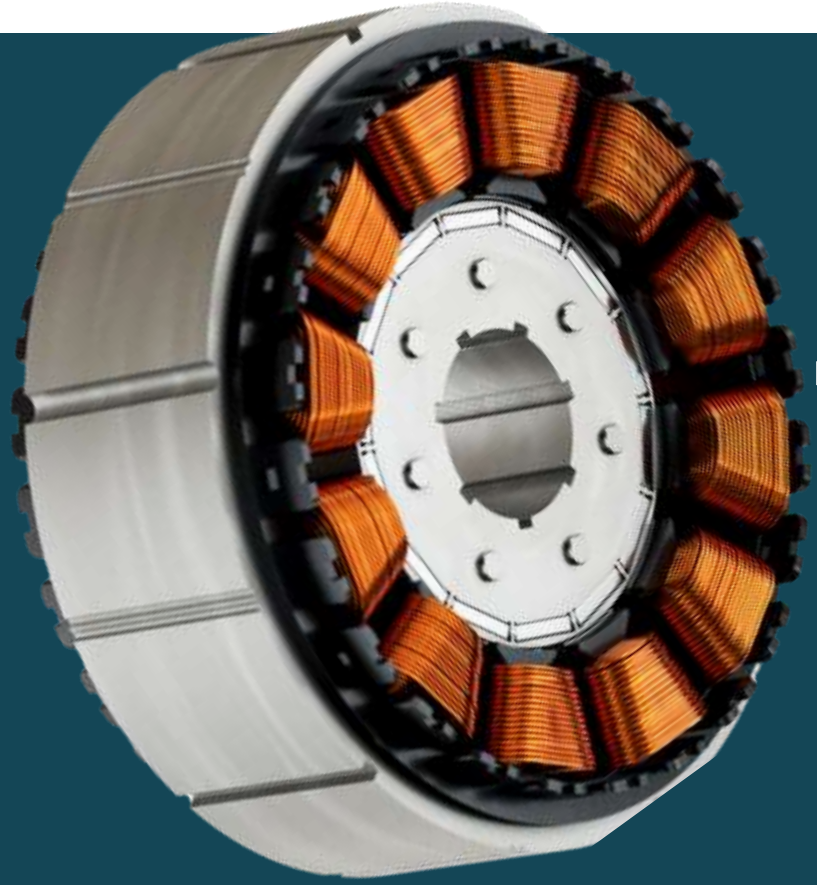
MAGNETIC
INNOVATIONS



INRUNNER TORQUE MOTOR FRAMELESS

IR-F Series Product Brochure

the direct drive
motor company

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What is direct drive?

Magnetic Innovations offers Direct Drive technology, which enhances motor dynamic performance while it reduces cost

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The IR-F Torque Motor Series

We offer our series of inrunner torque motors, suitable for a wide range of applications and industries. Read more about the advantages!

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Peak & Continuous Torque Range

The chapter compares the different IR-F Series models to help identify the best fit for various power and precision requirements.

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IR-F 52 Series

The IR-F 52-15 combines power with a compact construction, making it easy to integrate into various systems. Dynamic performance and high efficiency.

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IR-F 85 Series

The IR-F 85-25 series offers a perfect balance between power and precision, ideal for industrial applications that require high performance.

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IR-F 170 Series

Mid size motor for high dynamic applications. These motors provide the power and reliability needed for demanding tasks.

About us

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Magnetic Innovations
The Direct Drive Motor Company

Magnetic Innovations is a solid global partner for the development and supply of direct drive torque motors. With years of experience in the development of high torque motors for demanding applications, we bring the most innovative motor designs to the market.

We are headquartered in Veldhoven, The Netherlands, at the epicenter of the Dutch Brainport Region. We operate a R&D and Manufacturing facility which is considered a center of excellence for Electromechanical technology.

Magnetic Innovations offers a wide range of direct drive frameless motor designs. We also have the capability to offer full customer specific designs. Contact us for more details.

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Magnetic Innovations creates tomorrow’s technology today that will result in the best cost optimized solutions for your requirements.

Our Inrunner Torque Motors are the right motors for your systems. They offer:

- High Efficiency
- Compact and Robust Design
- High Torque Output
- Low Maintenance
- Precise Movement and Control
- Long Durability
- Low Cogging Torque

Direct Drive Torque Motors

What is direct drive?

In direct drive torque motors, the motor directly drives the load which eliminates the use of a transmission or a gearbox. As a result, the amount of moving parts in the system is reduced tremendously increasing the efficiency and creating a quiet and high dynamic operation. Therefore, direct drive technology achieves a very high lifetime.

Geared motors have a lower torque to inertia ratio. This means that high torque is required to accelerate the motor. For direct drive torque motors inertia is low, which makes the motors suitable for high acceleration/deceleration applications with many fast starts and stops.

Frameless PMSM

Our frameless motors are permanent-magnet synchronous motors (PMSM). “Frameless” refers to a motor without a frame, housing, bearing or feedback system. As a result, system suppliers can integrate it into their mechanical design and optimize their design for the application specific requirements. Reducing material content and moving parts. As such reducing the cost of ownership.

Direct drive motors are ideal for applications where a high positioning accuracy is needed and small size, low weight, minimum power and optimal speed control is desired.

Why Direct Drive Torque Motors?

1. COST OPTIMIZED SOLUTIONS

Compared to brushed motors, the absence of brushes in direct drive motors eliminates mechanical wear. The load is directly driven by the motor. No gearboxes, worm gear drives or other transmissions necessary. This reduces the moving parts in the system, resulting in high operational life and reliability, while reducing the overall system cost more size options and compact integration

2. HIGH DYNAMIC PERFORMANCE

In non-direct drive systems the control loop bandwidth and non-direct coupling of the load result in limitations of the dynamic performance. Due to very high control loop bandwidth and direct coupling, limitations such as backlash and long-term drift are eliminated. The dynamicrformance of your system enhances with direct drive technology.

3. HIGH TORQUE TO POWER RATIO

Direct drive torque motors contain a relative large number of poles. The large pole count in combination with the large air gap diameter results in high torque and power density of our motors. As a result, the power requirements and energy consumption are generally low. Direct drive torque otors enable cost optimized solutions for your applications.

4. HIGH POSITIONING ACCURACY

Due to backlash issues in geared systems, the positional accuracy is greatly decreased. The imperfect transmission component geometries result in belt stretching, gear chatter and eventually loss in accuracy. Direct drive torque motors are able to produce excellent accuracy at a wide range of speeds.

5. EASE OF USE

The motors consist of two parts: the armature assembly (stator) with windings and the rotor assembly carrying the magnets. These combined components produce torque and are to be integrated into the customer application. A major advantage is the freedom in design and choice of bearings, shaft, housing and sensors. Because of the high torque density these motors are very suitable for compact system volumes.

Why The IR-F Torque Motor Series?

Unmatched Performance

Leveraging our advanced magnetic and thermal simulation software, our frameless high torque inrunner motors in the IR-F series are engineered to deliver unmatched performance.

These motors offer high torque values, both continuous and peak, making them ideal for heavy industrial applications that require high performance and precision.

Precise Performance

Our IR-F Series are engineered for smooth and precise movements, ensuring high performance and reliability in demanding applications.

Versatile Applications

The inrunner design, where the rotor is situated within the stator, allows for a compact and sturdy construction.

Thanks to their versatile performance, inrunner PMSM torque motors can be used in a wide range of applications, from industrial automation and robotics to transportation.

Durability

The combination of high-quality materials and advanced manufacturing techniques ensures that inrunner PMSM torque motors can withstand harsh operating conditions and offer a long operational lifespan.

Low Maintenance

Due to their robust construction and the use of permanent magnets, inrunner PMSM torque motors require less maintenance.

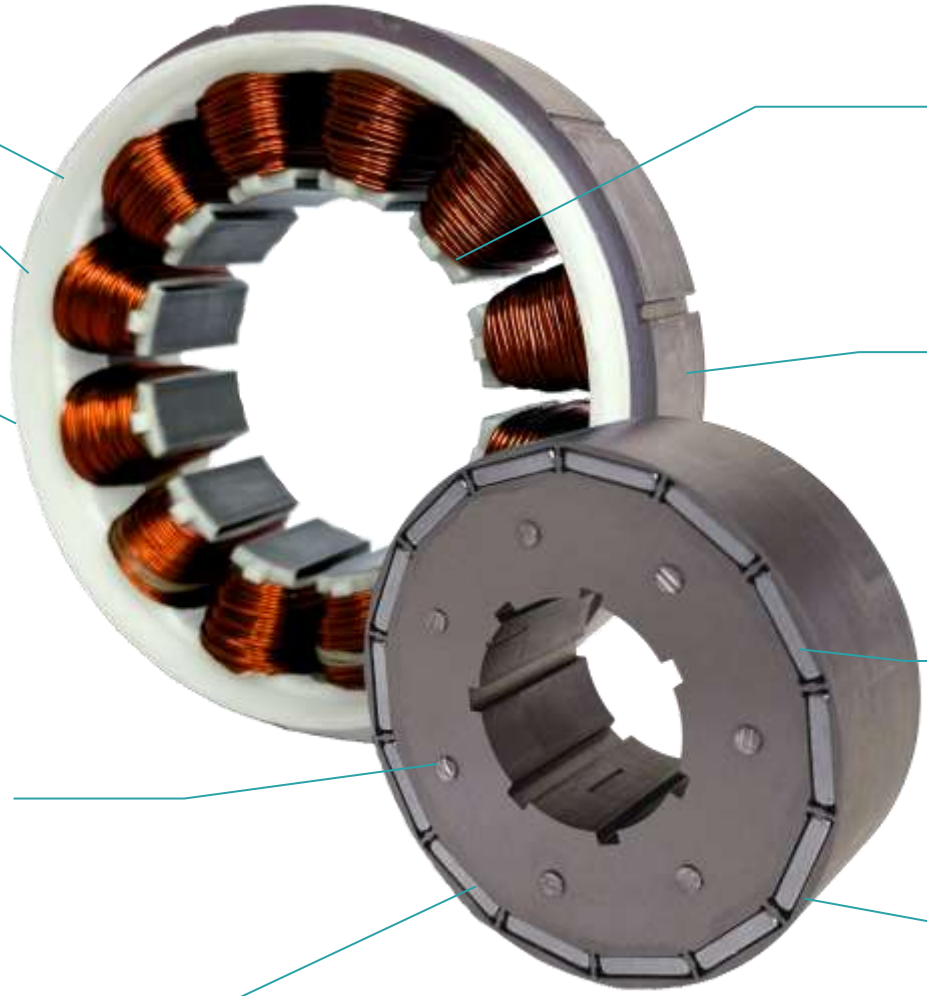
This increases reliability and reduces downtime in industrial processes.

High quality magnets

For our inrunner torque motors, we primarily use Neodymium magnets (NdFeB). These powerful high-quality permanent magnets are the strongest type commercially available.

Alternatively, we can use Samarium Cobalt (Sm-Co) magnets for applications that require higher temperature resistance.

Stator & Roter IR-F Series



Peak & Continuous Torque IR-F Series

The IR-F Series consists of three outer diameters: 52, 85 and 170mm / respectively ~2.05, 3.35 and 6.69 inch.

To maximize the torque of our direct drive motors, we use innovative winding configurations combined with optimized magnet technology. Various winding designs enable different voltage/current envelopes within the same mechanical dimensions and as such support different speed ranges under load.

PEAK & CONTINUOUS TORQUE IR-F SERIES

IR-F 52

IR-F 85

IR-F 170

Torque Motor IR-F 52 Series

Parameters	Unit	IR-F 52-15	IR-F 52-30	IR-F 52-45
		Air	Air	Air
Continuous torque (*)	Nm	0.33	0.67	0.97
Peak torque (**)	Nm	0.49	1.00	1.44
Pole pairs	-	7	7	7
Rotor Inertia	kg,mm^2	5.1	9.9	14.7
Ubus DC	VDC	60	60	60
Outer diameter	mm	52	52	52
Rotor inner diameter	mm	16-22	16-22	16-22
Total axial length	mm	26.5	41.5	56.5

* (*) @ 140 °C coil temp / (**) 5 K/sec temp increase rate”
Mounting instructions and tolerances can be found in our technical documents, manuals or 3D CAD files, which can be made available upon request.

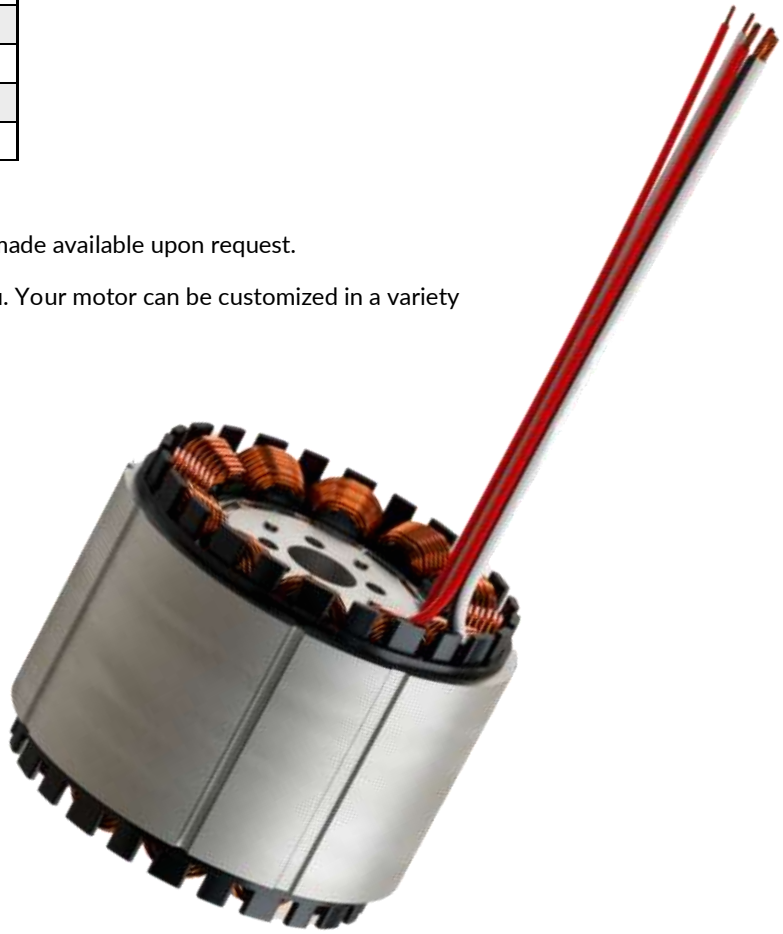
If your application requires a torque motor with different specifications, we can also develop a customized motor for you. Your motor can be customized in a variety of ways. For example, in size, cooling options, rpm and torque.

Torque Motor IR-F 85 Series

Parameters	Unit	IR-F 85-25	IR-F 85-50	IR-F 85-75
		Air	Air	Air
Continuous torque (*)	Nm	1.9	4.0	6.4
Peak torque (**)	Nm	3.5	5.3	7.9
Pole pairs	-	7	7	7
Rotor Inertia	kg,mm^2	99.5	199	298
Ubus DC	VDC	60	60	60
Outer diameter	mm	85	85	85
Rotor inner diameter	mm	15	15	15
Total axial length	mm	43.5	68.5	93.5

(*) @ 140 °C coil temp / (**) 5 K/sec temp increase rate”
Mounting instructions and tolerances can be found in our technical documents, manuals or 3D CAD files, which can be made available upon request.

If your application requires a torque motor with different specifications, we can also develop a customized motor for you. Your motor can be customized in a variety of ways. For example, in size, cooling options, rpm and torque.



Torque Motor IR-F 170 Series

Parameters	Unit	IR-F 170-25	IR-F 170-50	IR-F 170-75
		Air	Air	Air
Continuous torque (*)	Nm	17.4	37.3	56.2
Peak torque (**)	Nm	31	47	70
Pole pairs	-	7	7	7
Rotor Inertia	kg,mm^2	1136	2268	3400
Ubus DC	VDC	600	600	600
Outer diameter	mm	170	170	170
Rotor inner diameter	mm	38	38	38
Total axial length	mm	54.5	79.5	104.5

* (*) @ 140 °C coil temp / (**) 5 K/sec temp increase rate”
Mounting instructions and tolerances can be found in our technical documents, manuals or 3D CAD files, which can be made available upon request.

If your application requires a torque motor with different specifications, we can also develop a customized motor for you. Your motor can be customized in a variety of ways. For example, in size, cooling options, rpm and torque.

Our way of working

Client Support

Understanding the requirements of our clients is key.

In this first step, a joint understanding is created where needs and options are discussed.

We take time to understand your application requirement and determine what you really need.

R&D

After having a clear understanding of the requirements, an in-depth approach is taken to research and develop the best solution for your application.

We will make sure you are always informed about the status of the project.

Prototyping

With our first-time-right design philosophy we are able to build a prototype for you that is as close as possible to the final series-production product, avoiding multiple iterations. This enables you to test and optimize the application in an early stage and shorten the time-to-market.

Production

Our ISO 9001 certified production facilities ensure the high quality standards needed in the manufacturing of frameless high torque motors.

Our automated and robotized manufacturing will guarantee unique performance and reliability.

Logistics

We know that just-in-time deliveries are essential to your business.

Our quick response ensures efficient make-to-order manufacturing and logistics, while shipping from different locations around the world.

After sales

Often forgotten but very important. After a successful project, we keep a certain level of engagement with our clients to consult and understand the level of satisfaction.

We are here for you, at every step of the way.

Custom High Torque Motors

If your application requires a torque motor with different specifications, we can also develop a customized motor for you. Your motor can be customized in a variety of ways. For example, in size, cooling options, rpm and torque.

We can also completely design and build a custom motor for you. We can help at every step of the way. Our strong design and R&D team will make sure that you will get the best cost optimized solution for your requirements.

Production automation

To ensure excellent and sustainable quality of our products, we employ highly educated skilled engineers, well-trained operators and assembly personnel at our ISO 9001 certified production facility.

In recent years we have developed a fully automated and robotized production cell. With this robot unit we have automated the assembly, test, and bonding process of magnets in the rotor assembly. Automated positioning and bonding ensures higher position accuracy and better quality of our rotors and as such, of our Motors and Generators.

Magnetic Innovations is also equipped with a comprehensive test system, fully customized to the R&D and production needs of its proprietary range of electric motors.

The test system enables Magnetic Innovations to be a full-service development partner in motor design, design validation and compliance testing according to international safety standards, as well as a reliable motor manufacturer by implementing production in-line and end-of-line quality assurance tests.

MAGNETIC INNOVATIONS

the direct drive motor company

GO DIRECT DRIVE!

Choose a maintenance free and energy efficient design.

For more detailed information please contact us via
info@magneticinnovations.com

Magnetic Innovations B.V. • Habraken 2150, 5507TH Veldhoven • The Netherlands

+31 (0)40-2051718 • www.magneticinnovations.com