

STANDARD CENTRIFUGAL VS. MAGNETIC DRIVE PUMPS

Key Differences Explained

Many centrifugal pumps look similar, but one key design difference can significantly impact reliability, maintenance, and leak prevention. Standard centrifugal pumps use a rotating shaft with a mechanical seal to keep fluid contained. Magnetic drive pumps eliminate the shaft seal by using a magnetic coupling to transfer power from the motor to the impeller. Understanding this difference can help you choose the right pump for your application while reducing maintenance and the risk of leaks.

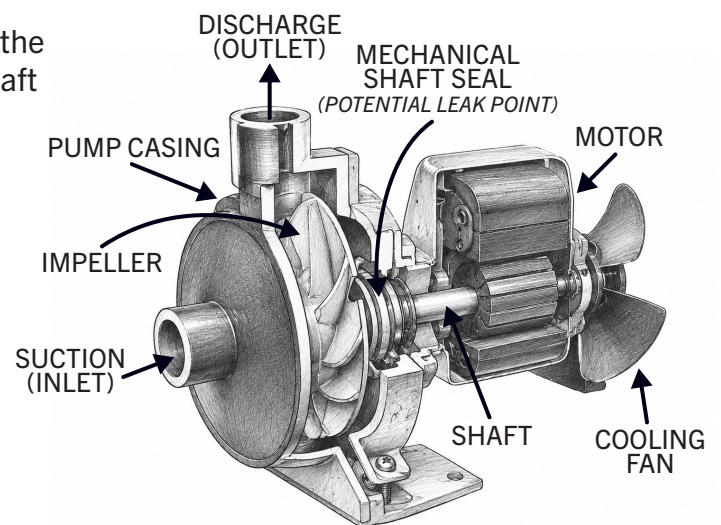
How a Standard Centrifugal Pump Works

A standard centrifugal pump uses a motor connected directly to the impeller through a rotating shaft. Because the shaft passes through the pump housing, a mechanical shaft seal is required to prevent liquid from escaping.

As the motor rotates:

1. The shaft spins
2. The impeller rotates
3. Fluid enters the inlet
4. Centrifugal force moves fluid outward
5. Fluid exits through the discharge

While mechanical seals are effective, they are also one of the most common wear items in any centrifugal pump.



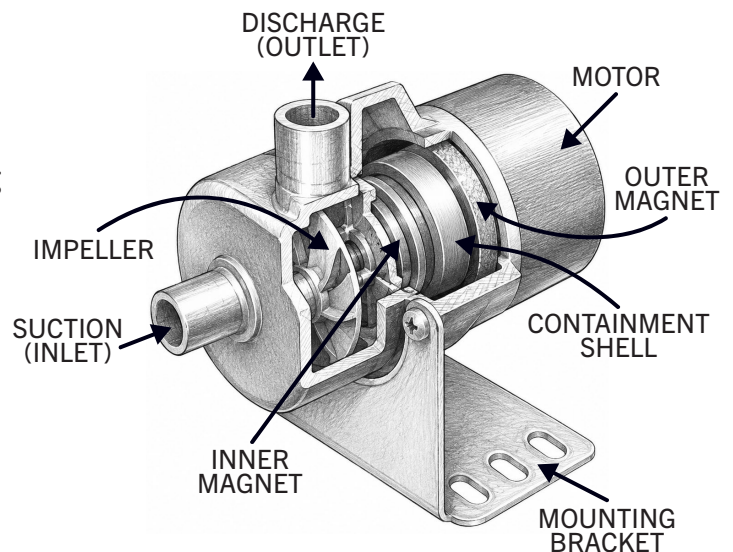
How a Magnetic Drive Pump Works

A magnetic drive centrifugal pump operates like a standard centrifugal pump, but uses magnetic coupling instead of a shaft passing through the pump housing. The motor drives an outer magnet assembly, transferring rotational force to an inner magnet attached to the impeller through a sealed containment shell.

With no rotating shaft or mechanical seal, magnetic drive pumps eliminate seal-related leaks while reducing maintenance.

Over time, shaft seals can wear due to:

- Normal friction
- Heat
- Dry running
- Improper installation
- Abrasive fluids
- Chemical attack



When a seal fails, fluid escapes from the pump. Magnetic drive pumps eliminate this failure point entirely.

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Magnetic Drive Pumps Require Flooded Suction

Unlike many standard centrifugal pumps, magnetic drive pumps must operate with flooded suction. Because the pump housing is completely sealed, magnetic drive pumps are not self-priming. The pump must already be filled with liquid before operation.

If operated dry:

- Internal components are not lubricated
- Heat builds rapidly
- Damage can occur

For this reason, magnetic drive pumps should always be installed where liquid naturally flows into the pump inlet.

Magnetic Drive Pump Common Applications:

- Medical equipment
- Beverage dispensing
- Laser cooling
- Chillers and coolers
- Fuel cells & Hydronic systems
- Recreational vehicles
- Marine systems
- Alternative energy
- Thermal management
- Printing and imaging
- Water and glycol circulation

Feature	STANDARD CENTRIFUGAL	MAGNETIC DRIVE
Mechanical Shaft Seal	Yes	No
Leak Risk	Moderate	Minimal
Maintenance	Moderate	Low
Reliability	Good	Excellent
Corrosion Resistance	Good	Excellent
Noise Level	Good	Excellent
Hydraulic Efficiency	Good	Excellent
Current Draw	Moderate	Low
Mounting Flexibility	Good	Excellent
Flooded Suction Required	No	Yes
Best For	General-purpose pumping	Leak-sensitive, low-maintenance applications

GRI Magnetic Drive Pumps

GRI designs and manufactures magnetic drive centrifugal pumps specifically for OEMs.

Available features include:

- Flow rates to **35 GPM (132 LPM)**
- Heads to **70 feet (21.3 m)**
- Fluid temperatures up to **203°F (95°C)**
- AC and DC motor options
- Continuous-duty motors
- Thermally protected designs
- Corrosion-resistant materials
- NSF-certified models available

Every application is different. If a standard catalog model doesn't meet your requirements, GRI can customize an existing pump or engineer a new solution specifically for your equipment.