

# INNOMAG<sup>®</sup> TB-MAG<sup>™</sup>

## Sealless Thrust-Balanced Process Pumps

ASME (ANSI) B73.3 and ISO 2858

### Made for What Matters

From corrosive, hazardous, hard-to-seal fluids to just plain water, for applications inside its operating envelope, INNOMAG is the ultimate process pump, because it's made for what matters.

#### ✓ Safety

INNOMAG is fully contained and hermetically sealed, which means no leaks or fugitive emissions. This makes it not only cleaner and safer for operators and the environment, but also exempt from the burden of leak detection and repair (LDAR).

#### ✓ Reliability

INNOMAG is more reliable because it eliminates the two components equally responsible for nearly 80% of all pump breakdowns: mechanical seals and conventional bearings. Also, unlike the typical process pump which was designed to operate reliably only at or near a single unrealistic point (BEP), INNOMAG can operate practically anywhere on the curve.

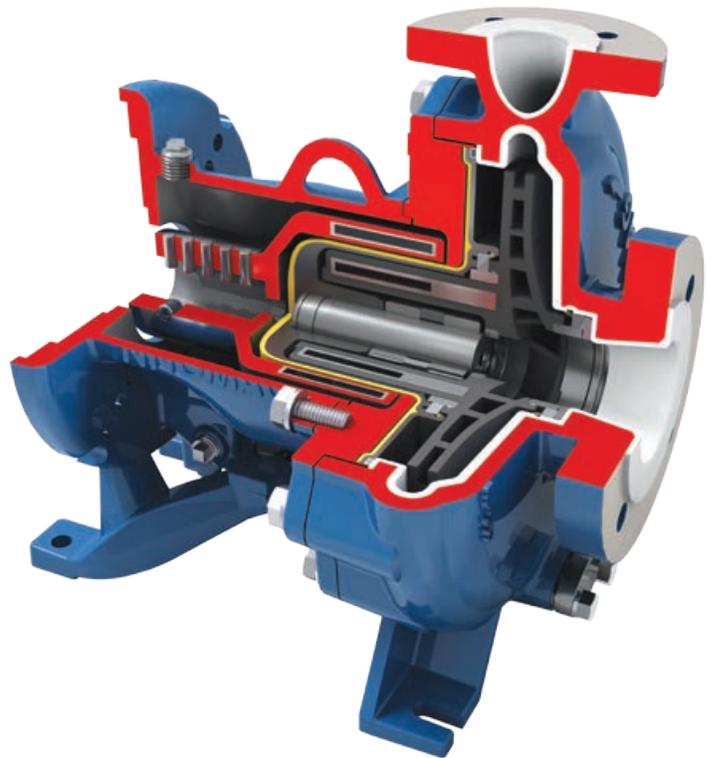
#### ✓ Maintenance

Maintenance makes up for more than 40% of the total cost of ownership, and INNOMAG all but eliminates it — no seal replacement, no shaft alignment, no impeller adjustment, no emissions testing, no lube or oil changes, and bearings that effectively never wear out.

#### ✓ Simplicity



A simple, user-friendly, design means installation, start-up, and repair can happen in a fraction of the time without special equipment or expertise.



#### ✓ Efficiency

Energy makes up for more than 50% of total cost of ownership. INNOMAG is not only more energy-efficient on day one but, more important, its efficiency and reliability do not continuously degrade over time due to wear and tear or lack of attention.

#### ✓ Versatility

Being able to operate practically anywhere on the curve with almost universal chemical resistance means that a single pump model can cover a wider range of duty points and services. This helps to standardize your pump population and reduce and simplify your spare parts inventory.

#### ✓ Cost and Time

INNOMAG is just a fraction of the cost and lead time of a metallic mag drive, canned motor pump, or high alloy pump with double seals and flush plan. Lower packaging and installation costs can also make INNOMAG 20–30% less than even a more standard process pump.

### Rethink the Mag Drive | Thrust Balancing Changes Everything

Thrust balancing improves efficiency and extends operating range, but most importantly, it takes sealless reliability to a whole new level. The root cause of nearly every sealless pump breakdown is bearing failure due to inadequate lubrication. That's because sealless pumps (being fully contained and hermetically sealed) must rely on the process fluid itself for cooling and lubrication.

But process lubrication only works if the fluid always remains clean and always remains a liquid, i.e., ideal system conditions and perfectly clean services, both of which are impractical in the real world. Thrust balancing gives INNOMAG unparalleled upset forgiveness and makes it the first and only mag drive ever with true solids handling capability.

#### Why It Works

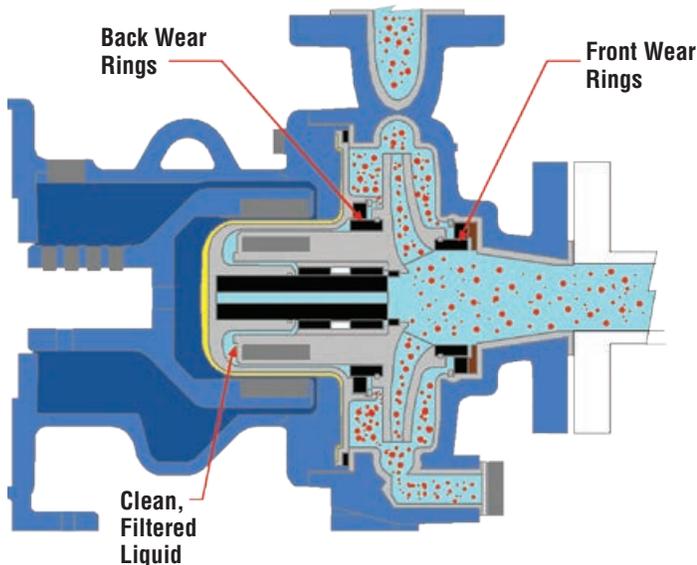
Thrust balancing works because it addresses the root cause of sealless pump failure in two distinct ways:

First, it completely eliminates axial thrust and axial thrust bearings. At BEP, axial thrust is 10–15 times larger than radial thrust and represents more than 90% of total bearing load. By eliminating it, you're in effect reducing the dependency on process lubrication (the most common root cause of failure) by 90%.

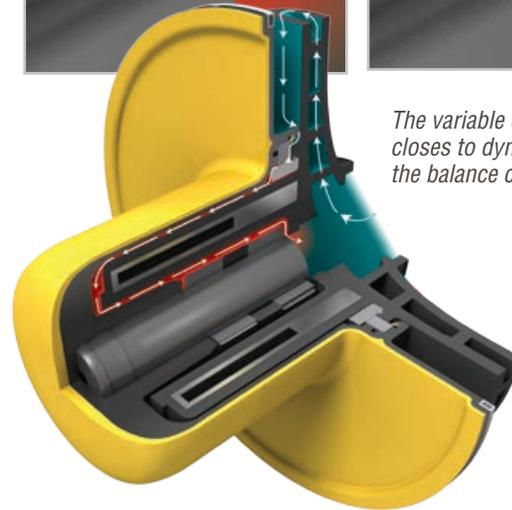
Second, for the remaining 10% (radial load), thrust balancing helps keep the fluid a clean liquid by isolating the radial bearing from suction pressure and solids. This keeps the fluid clean and pressurized at well above its vapor pressure along the entire length of the radial bearing. If the process fluid vaporizes during an upset condition, it will do so away from the loaded bearing surface.

#### How It Works

The floating action of the impeller opens and closes a variable orifice that's formed between the moving impeller and the stationary shaft. As the impeller moves back, the orifice closes, building up the pressure behind the impeller, pushing it forward. As the impeller moves forward, the variable orifice opens, relieving the pressure and letting the impeller come back. This system allows the pump to automatically regulate the pressure in order to equalize the force on either side of the impeller. The forces cancel each other out and the result is ZERO net thrust.



The variable orifice opens and closes to dynamically control the balance chamber pressure.



Bulletin PSS-10-36.1 (E) June 2017. © 2017 Flowserve Corporation.

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Max. Flow Rate	1585 gpm (360 m <sup>3</sup> /h)
Max. Head	500 ft (153 m)
Max. Pressure	362 psi (25 bar)
Max. Power	100 hp (75 kW) @ 3600 rpm
Viscosity	0.5 to 300 cP
Temperature	-29°C to 121°C (-20°F to 250°F)
Max. Solids Concentration	30% by volume
Max. Solids Particle Size	6.4 mm (~¼ in) — limited only by what can fit through impeller vanes