



# INNOMAG® TB-MAG™

## Sealless Thrust-Balanced Process Pump

ASME (ANSI) B73.3 and ISO 2858

### Made for what matters

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

#### ✓ Safety

The INNOMAG TB-MAG pump 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

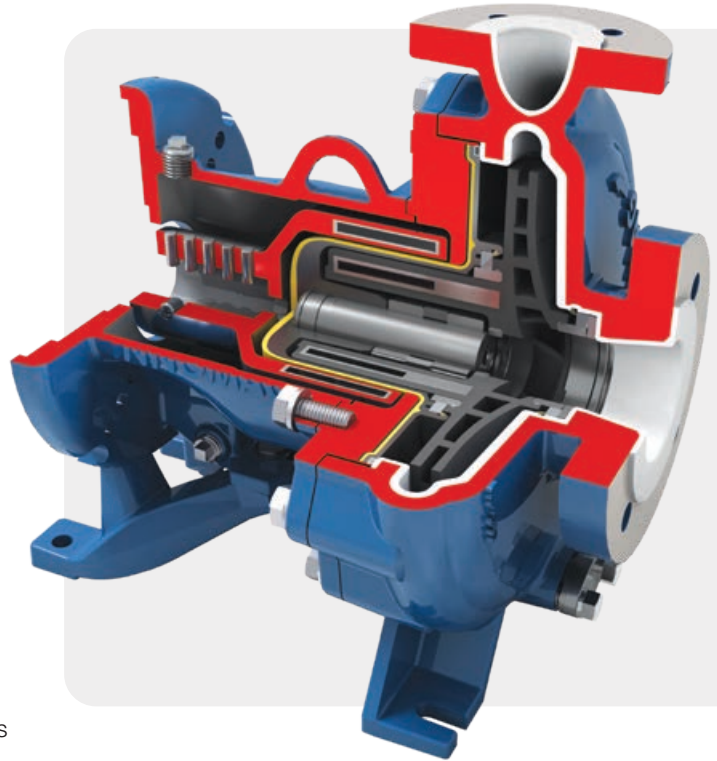
The INNOMAG TB-MAG pump is more reliable because it eliminates the two components equally responsible for nearly 80% of all pump breakdowns: mechanical seals and conventional bearings. Also, unlike the typical process pump which was designed to operate reliably only at or near a single unrealistic point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

#### ✓ Maintenance

Maintenance makes up more than 40% of the total cost of ownership, and the INNOMAG TB-MAG pump 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

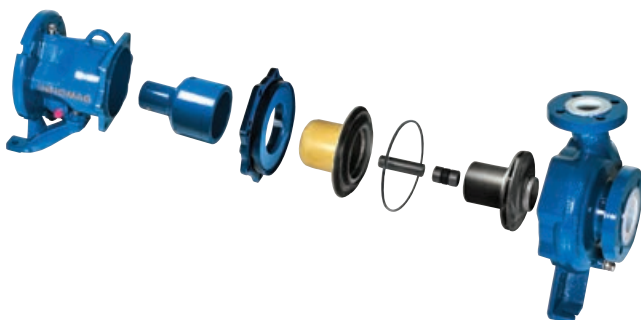
Energy makes up more than 50% of total cost of ownership. The INNOMAG TB-MAG pump is not only more energy-efficient on day one but, more important, its efficiency and reliability do not continuously degrade over time due to wear and tear or lack of attention.

#### ✓ 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

The INNOMAG TB-MAG pump is just a fraction of the cost and lead time of a metallic mag drive pump, canned motor pump, or high-alloy pump with double seals and a flush plan. Lower packaging and installation costs can also make the INNOMAG TB-MAG pump 20 to 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.

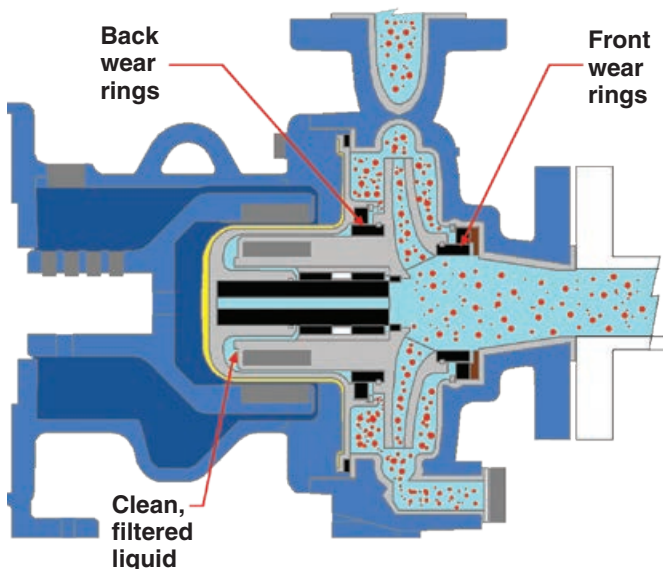
But process lubrication only works if the fluid always remains clean and always remains a liquid., i.e., ideal system conditions and perfectly clean services, both of which are impractical in the real world. Thrust balancing gives the INNOMAG TB-MAG pump unparalleled upset forgiveness and makes it the 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:

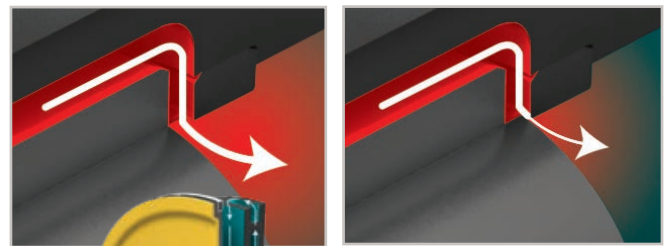
First, it completely eliminates axial thrust and axial thrust bearings. At BEP, axial thrust is 10 to 15 times greater than radial thrust and represents more than 90% of total bearing load. By eliminating it, you're in effect reducing the dependency on process lubrication (the most common root cause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

Second, for the remaining 10% (radial load), thrust balancing helps to 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.*

|                                  |  |
|----------------------------------|--|
| <b>Max. Flow Rate</b>            | 360 m <sup>3</sup> /h (1,585 gpm)                                    |
| <b>Max. Head</b>                 | 153 m (500 ft)   |
| <b>Max. Pressure</b>             | 25 bar (362 psi)   |
| <b>Max. Power</b>                | 75 kW (100 hp) @ 3,600 rpm   |
| <b>Viscosity</b>                 | 0.5 to 300 cP  |
| <b>Temperature</b>               | -29°C to 121°C (-20°F to 250°F)                                      |
| <b>Max. Solids Concentration</b> | 30% by volume  |
| <b>Max. Solids Particle Size</b> | 6.4 mm (~¼ in) — limited only by what can fit through impeller vanes |

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