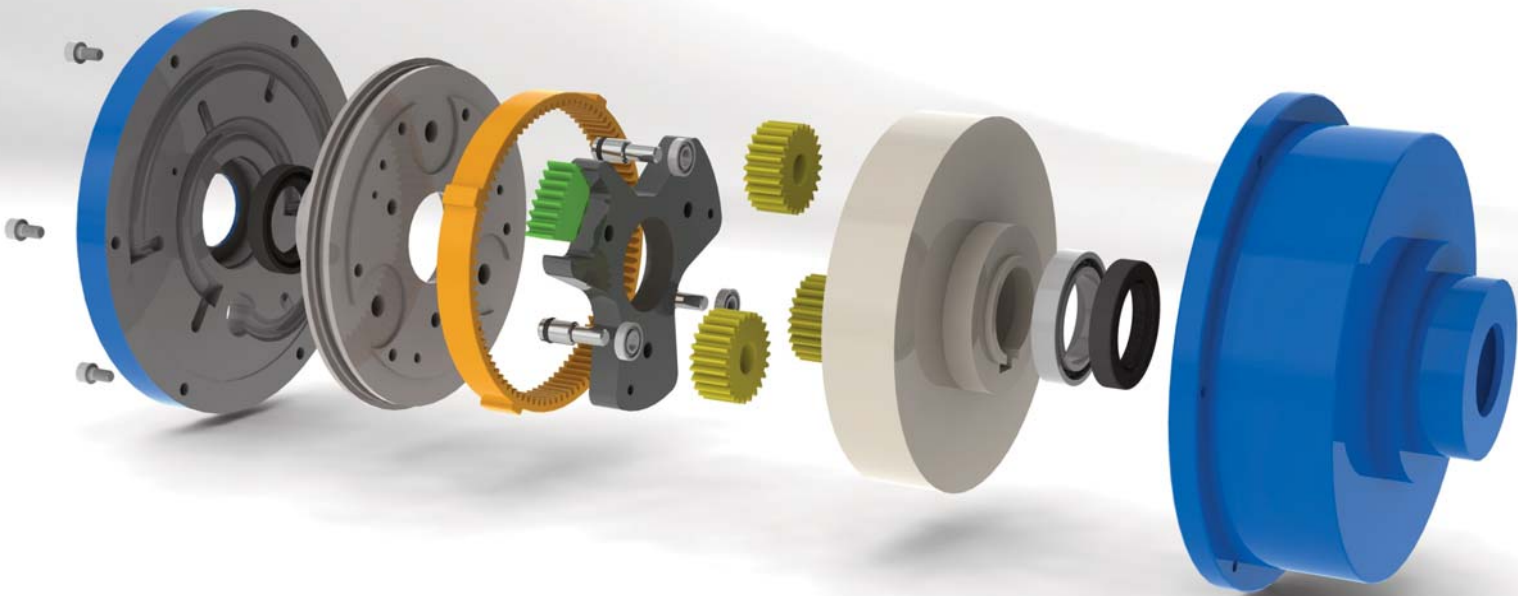


# Advanced Non-Friction Braking System



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TfI's braking system is an innovative lightweight, sealed design that revolutionises torque control technology by enabling high performance non-friction braking.

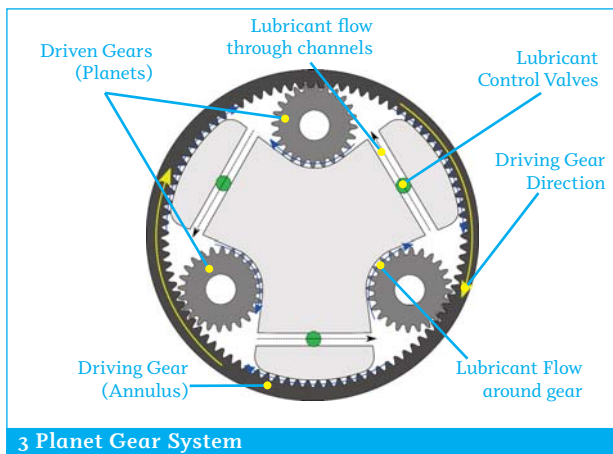
The failsafe brake system requires no brake pads and is based on fluidic resistance. Torque and braking are controlled through the use of valves with rotating cogs pumping fluid within an enclosed body.

The system is completely scalable from micro-sized devices up to very large devices of a few meters in diameter, ranging from Nms to MNms.

An important advantage of this brake is that it is an enclosed, sealed design and uses frictionless technology. It therefore requires little or no maintenance and can operate in challenging environments with high protection built into the design.

## Technical Details

In normal operation as the cogs rotate, fluid is pumped around the system as shown in the diagram of a 3 planetary gear system.

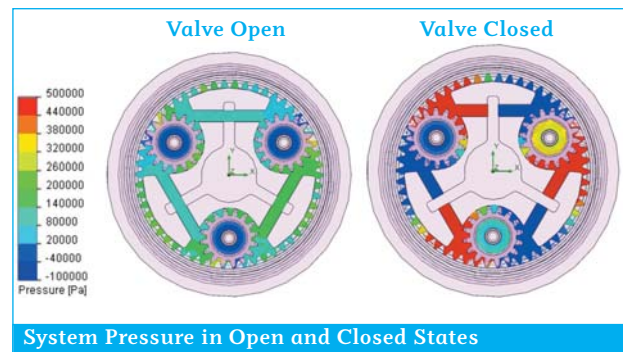


Reducing the flow channel dimensions or closing them totally, applies torque and brakes the system. The images below show how the pressure builds up in the system as the valves are closed. Variable braking torque can be achieved by adjusting the channel width through the positioning of the valves.

The TfI design encloses the entire system inside a single annulus gear thus optimising its size and form and delivering maximum performance for minimum volume.

The TfI novel braking system is attached to a fixed reference point, with the rotating shaft or device requiring braking attached to one of the rotating cogs (usually the annulus gear).

When stationary, the brake is held in place with an interlock system that also provides an extended period park function.



## Versatility

This novel design can easily be attached to a wide range of components requiring braking such as shafts, wheels or belts. The device can be configured to passively supply a fixed level of torque or uni-directional operation, requiring no active components or signals.

A more comprehensive braking system allowing for controlled braking or torque variation can be implemented with the addition of open/closed or multistate valves. A single brake design can be easily adjusted to deliver a wide range of torque performance, enabling a smaller number of brake configurations across an entire product range.

The shape of the device, number of planetary gears, number of gear teeth, channel width and valve type, number of valves, hydraulic fluid, and materials can all be optimised and tailored to meet almost any requirement and deliver specific desired performance within size, weight or shape constraints.

## Cost Effective Solutions

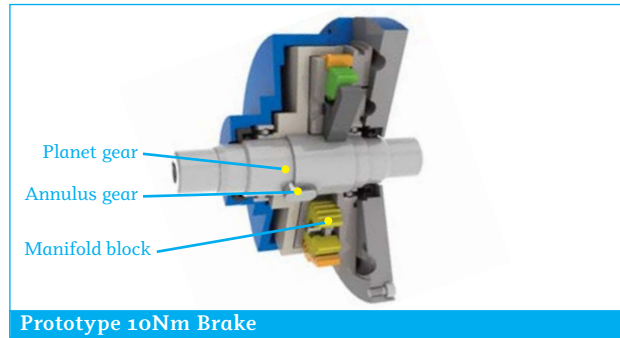
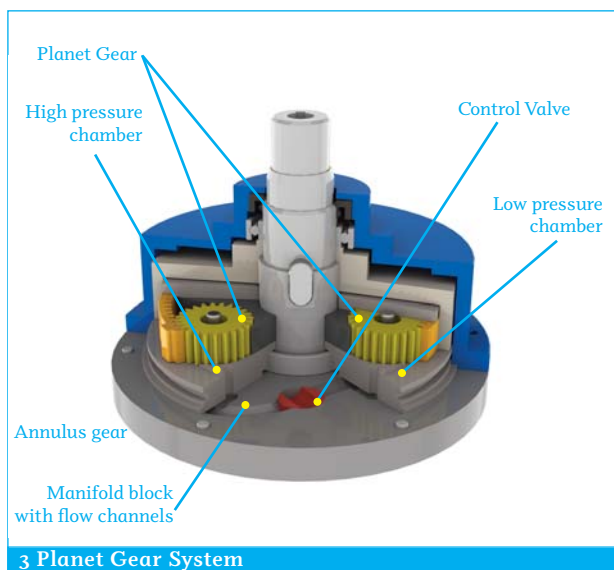
Current friction braking technology has limitations in many industrial applications, in particular its high cost of ownership due to the requirement for frequent changing of brake pads and the regular downtime of associated machinery. As the Tfl solution is based on frictionless technology, its low maintenance overhead leads to a lower total cost of ownership.

## Tailored Industrial Applications

The Tfl braking technology can be used in a wide range of light and heavy industrial applications where motors require sealed, low maintenance, high torque density brakes. The brake can also be integrated with gearboxes and used in a regenerative configuration with external hydraulic power packs.

The technology is applicable to wide range of uses/sectors including Lifts, Off-Highway Vehicles, Mobile Equipment, Process Control, Winding, Sealed Brakes, Food & Beverage, Mining, Oil & Gas, Material Handling, Conveyors, Escalators, Marine, Crane Hoists, Wind Turbines and Steel Mills.

Tfl offers a bespoke service to support customer evaluations, including fully managed projects; from feasibility study through to detailed modelling; culminating in prototype development.



## Benefits

### NON-FRICTION BRAKE

Uses fluidic resistance so there is no brake pad/disc wear .

### VARIABLE TORQUE

Torque variations can be implemented with the addition of multi-state valves

### HEAT DISSIPATION

Compared to brakes of similar size, this brake can dissipate significantly more energy.

### LOW MAINTENANCE

Fully enclosed ensuring low maintenance overhead.

### LONG LIFETIME

Greater than 10 million cycles in typical applications.

### REGENERATIVE

Regenerative functionality in certain applications.

### LOW COST OF OWNERSHIP

Low maintenance, low part replacement and longer lifetime offer a lower cost of ownership.

### LOW VOLUME & HIGH TORQUE

Low volume and high torque compared to existing technology.

## Is your business a potential partner for the TFI brake?

Are you a braking company with clients looking for alternative, better solutions for particular applications? Do you want to expand your market coverage?

Are you a Hydraulics, Gearbox, or Gear Pump manufacturer that wishes to utilise your company's knowledge and skills to expand your product offering.

Or are you an engineering service business with customers in sectors where the TFI brake may have appeal?

If your business is one of these we need to be talk.

## How we work

Tailoring our technologies for a particular application is achieved in a collaborative manner through client funded projects. We work directly with the client development teams on application specific requirements from proof of concept through to prototype development and testing.

Our long term commercial relationship is by way of licensing agreement.

## Technology from Ideas

Technology from Ideas is a technology development company, that delivers innovative technology solutions to industry. We assist our clients in sourcing technology, evaluating and/or developing technology solutions and bringing them to market.

Our technology development team is very experienced in creating and delivering valuable market ready technology. We have a particular focus on the Cleantech, Medtech and Advanced Materials sectors.

## Contact us

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