

ENGINEERING
TOMORROW

Danfoss

Brochure

Increasing reliability and reducing wear **under high pressure**



Danfoss Delta motor

The Delta motor is designed for 2-wheeled propel applications. With fewer components and potential failure points, the Delta's two-zone design improves reliability at the outset and offers more trouble-free operation throughout its life.

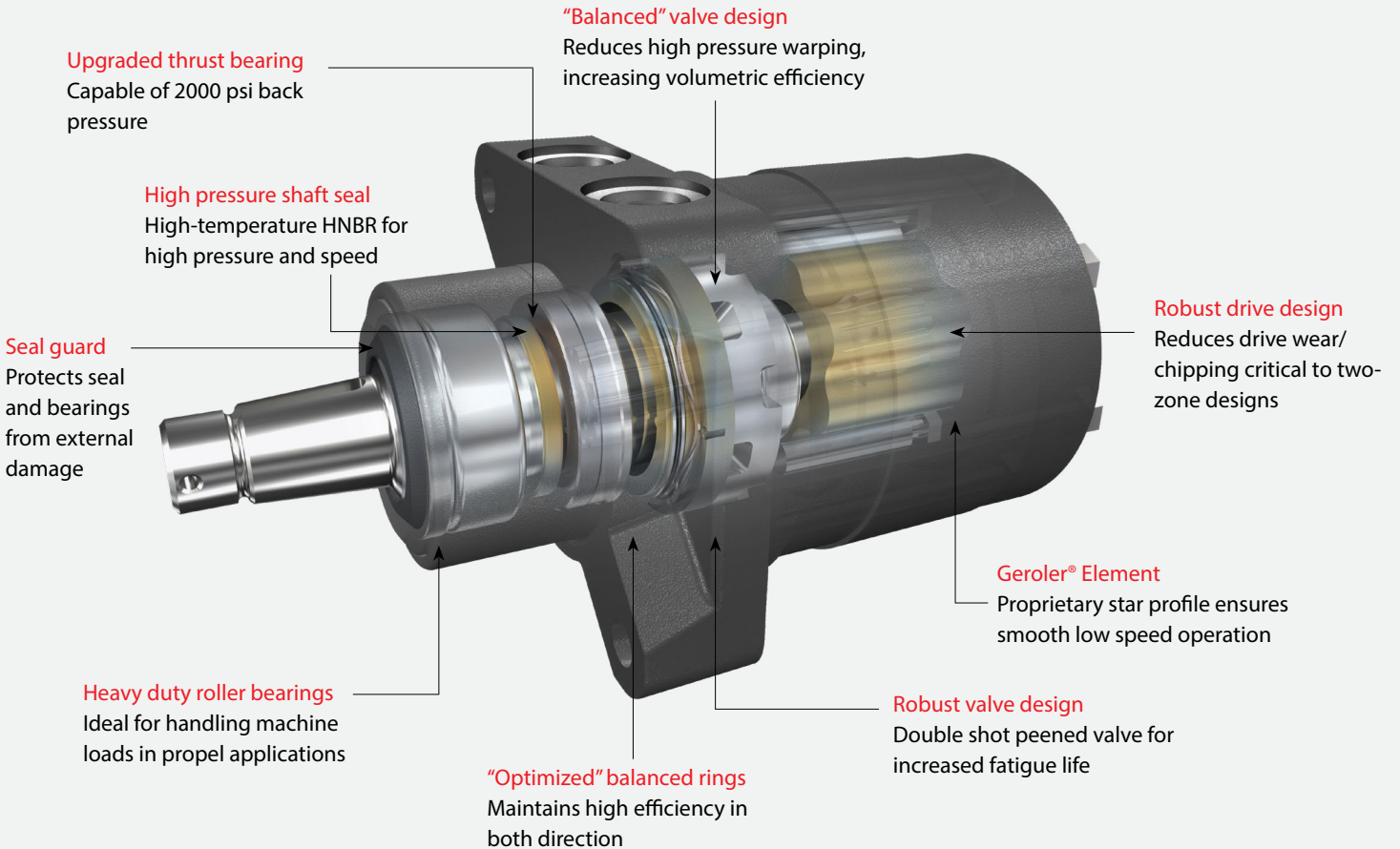
Introducing **Danfoss' Delta motor** — a low-speed, high-torque motor that sets an entirely new standard for performance and durability.

Reliability by design

Danfoss' tradition of innovative solutions and trustworthy performance under the toughest conditions continues with the Delta motor. Designed mainly for traction drives in the turf care market, this all-purpose motor features Danfoss' proven Geroler® technology and provides exceptional durability in a compact two-zone design.

The Delta motor delivers superior drive, seal, and bearing life compared to market competitors so that our customers do not have to sacrifice reliability in a cost-effective solution. In addition, the motor's balanced valve design architecture is more efficient under high pressure, preventing warping that can lead to internal leaks and motor slowdown.

Delta – built for durability



Danfoss Delta motor with brake

The Delta series motor with brake is the most compact brake on the market, giving machine designers more flexibility without sacrificing the best-in-class efficiency and speed ratings, side load curves, seal ratings, and no-load pressure drop that customers have come to expect.

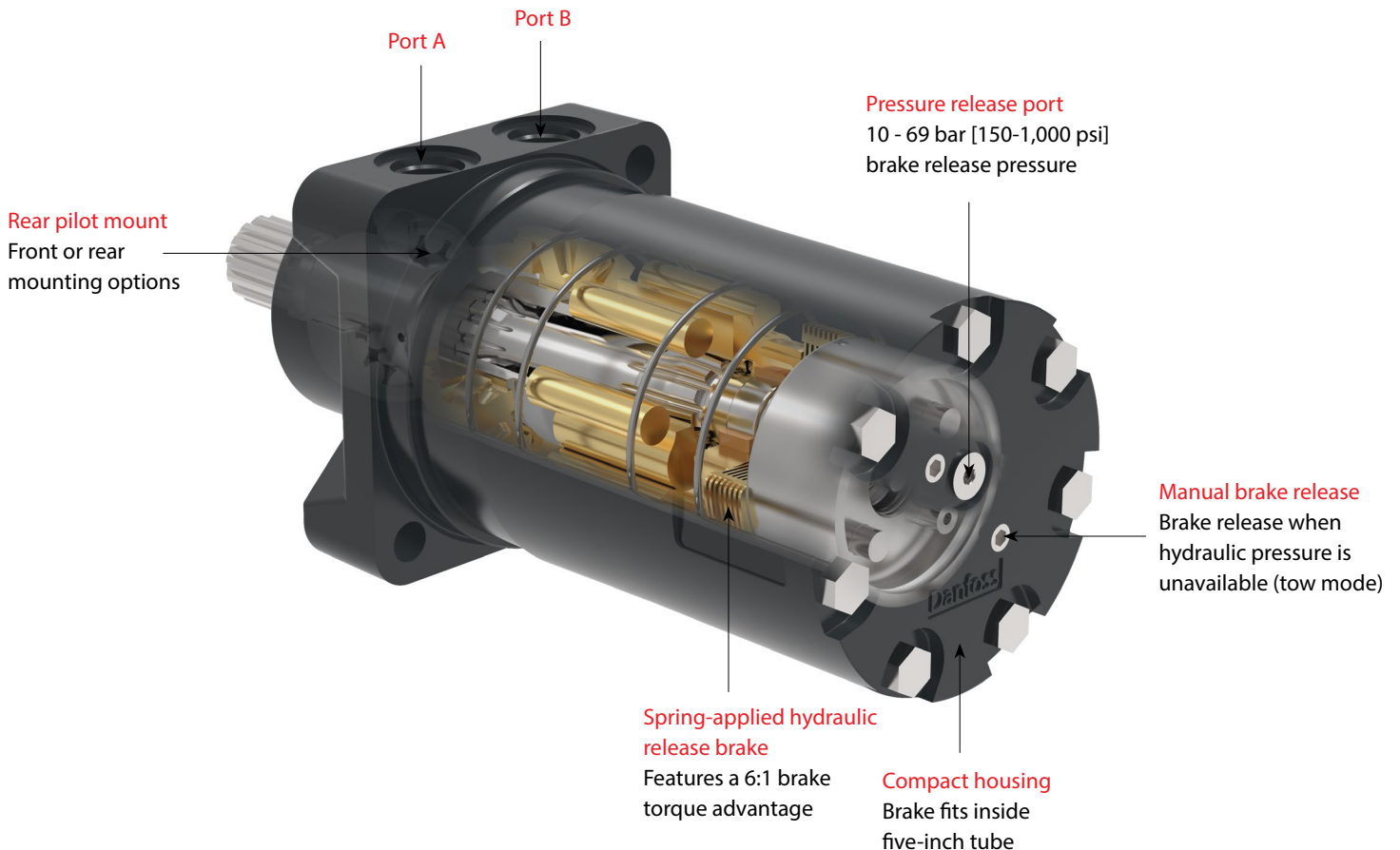
Introducing **Danfoss' Delta motor with integrated parking brake** — a compact and reliable solution that enhances design flexibility.

A compact and reliable solution

Danfoss' Delta series motor is now available with a spring-applied pressure release parking brake. This rear-mounted integrated brake features brake pads that rotate at six times the speed of the output shaft, providing a six-to-one brake torque advantage. The patented design includes a compact packaging solution with dependable load holding capabilities.

Proven Geroler® technology provides smooth, reliable operation that is ideal for propel machines under 50 horsepower, including turf mowers, stump grinders, aircraft tugs, trenchers, and mini skid steer loaders. In addition, the integrated hydraulic braking solution allows the availability to build machines that are compatible with all-electric or hybrid platforms.

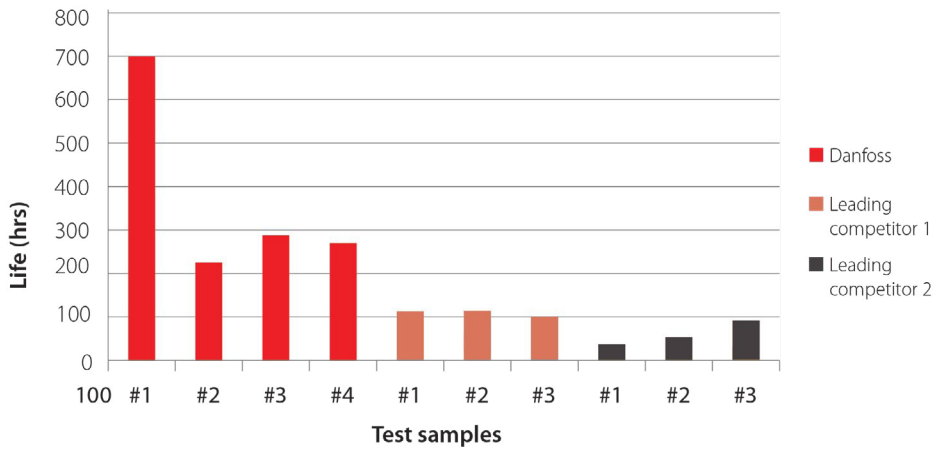
Delta – Designed for flexibility



Increased drive life

Due to their design, drive wear on most two-zone motors creates contaminants that travel back to the pump. Because pumps are highly sensitive, they fail prematurely due to excessive contamination and require costly replacement. The Delta motor's robust, proprietary drive is designed with one goal in mind: *enhance reliability to eliminate failure*. This low-speed, high-torque motor sets the new standard for performance and durability.

Delta motor accelerated life tests



Danfoss Delta motor



Competitor 2 motor

In this test, the Delta motor qualified for 200 hours* (accelerated life standard), more than four times the life of the competition in some cases. The competitors' units suffered from star and drive spline failure and excessive drive wear on the output shaft and drive, while the Delta motor showed only minor spline chipping.

* Testing stopped @ 200 hours

Seal life durability

Robust shaft seals are required to keep oil in and dirt out. A seal leak can result in an expensive and time-consuming cleanup. In accelerated durability tests, the Delta motor has a nine times lower leakage rate and three times longer time to first leak when compared to the competition. This provides a more robust seal and more time to take corrective action before a catastrophic failure occurs.

Common applications for the Delta motor:

- Turf care – traction drives
- Sweepers – brush drives
- Attachments – auger drives
- Utility – propel
- Grapples
- Tub grinders/mixers
- Spreaders

Danfoss' Delta motor benefits:

- Robust, proprietary drive design reduces wear and increases reliability
- Pressure seals resist spikes and high reversals for improved life
- Higher side load capacity due to front radial bearing
- Optional built-in shock reliefs
- Cost-effective two-zone design does not require a case drain
- Technical specifications:
 - Max Pressure: 4,000 PSI / 275 bar (intermittent)
 - Max Flow: 30 GPM / 115 LPM (intermittent)
 - Max Torque: 10,500 in-lbs / 1186 Nm (intermittent)
 - Full capacity rear brake: 1253 Nm [11,100 in-lbs.]
 - Covering 113 cm³/r [6.9 in³/r] to 754 cm³/r [46.0 in³/r]

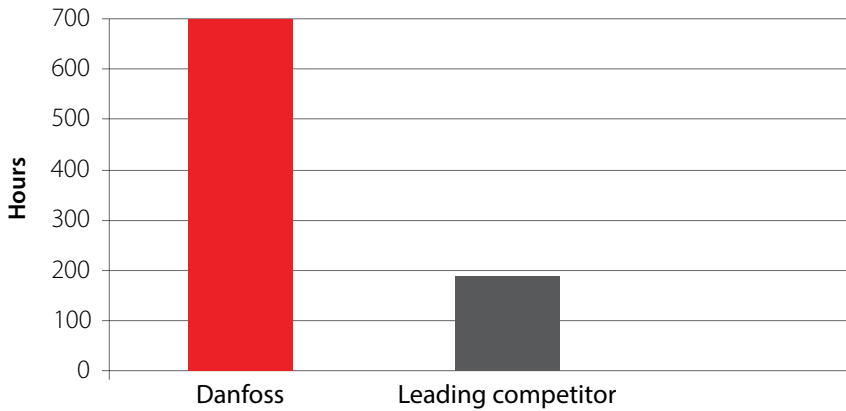
Committed to excellence:

Decision makers turn to Danfoss for an unwavering commitment to personal support that makes customer success a top priority. Each product is independently tested and backed by industry-leading warranties, and the largest engineering and technical support teams in the industry.



To learn more about Danfoss' Delta motors, visit danfoss.com or contact your Danfoss sales representative.

Delta motor shaft seal accelerated life testing



In accelerated tests, Danfoss' Delta motor lasted 3X longer than the competition.

Testing included the following conditions:

- DTE-24 @ 67°C (~12 cSt)
- CCW Direction – 95% of the time*
- 1000 psig (69 bar) on shaft seal @ 200 rpm
- CW Direction – 5% of the time
- 2000 psig (138 bar) on shaft seal @ 200 rpm

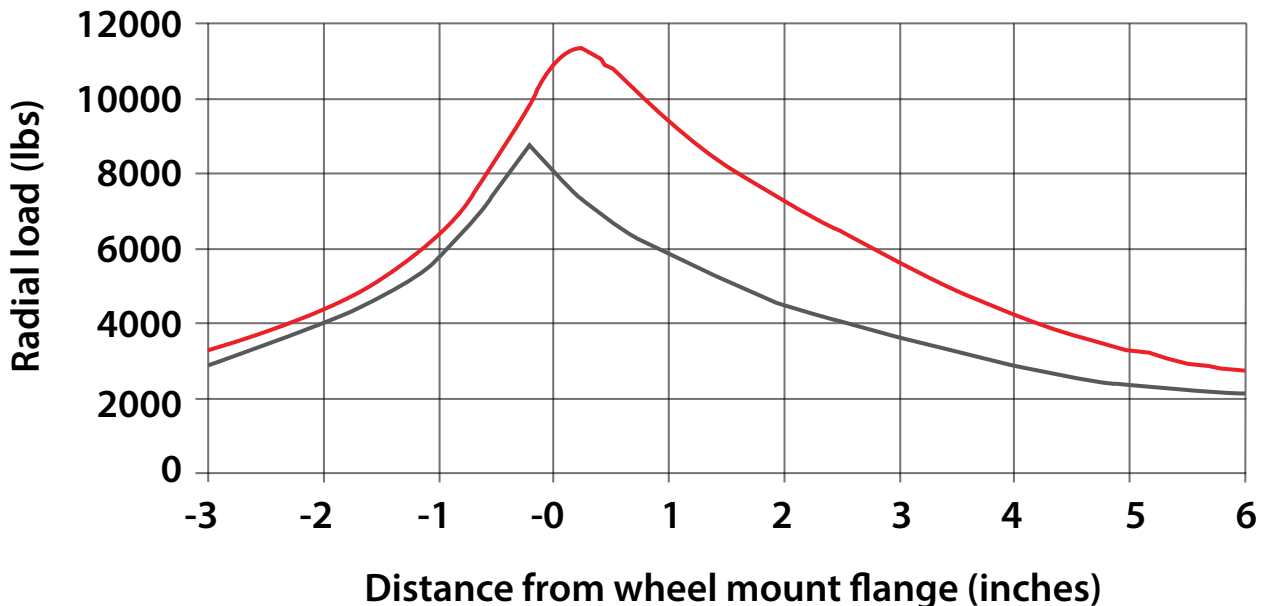
Since backing up (reverse direction) challenges motor operation, thorough testing was performed in the CCW direction.

Superior bearing life

Designed with the front bearing protecting the shaft seal, the Delta motor is leak resistant and has the highest side load capacity compared to the competition--4,500 lbs at three inches from the mount face. The superior side load ratings are due to the front radial bearing.

Delta motor radial shaft loading

L₁₀ Bearing life



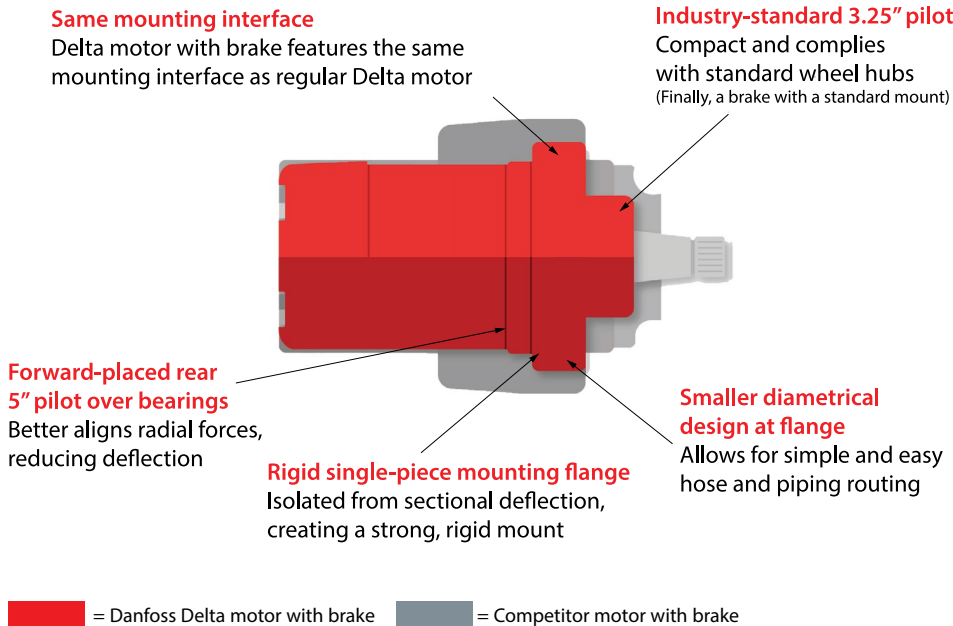
Danfoss — 3 million revolutions
 Leading competitor — 3 million revolutions

Each curve is based on B 10 bearing life (2000 hours of 12,000,000 shaft revolutions at 100 RPM) at rated output torque.

Compact packaging

Danfoss' Delta motor with brake is the most compact brake on the market, giving machine designers more flexibility without sacrificing efficiency. In addition to being at least two to three inches shorter than leading competitors, it features the same mounting interface as the regular Delta motor.

Best packaging in the industry



Common applications for the Delta motor with brake:

- Lawn mowers
- Stump grinders
- Aircraft tugs
- Trenchers
- Mini skid steer loaders
- Garbage truck loaders
- Unloading augers for combine harvesters
- Hose reels

Danfoss' Delta motor with brake benefits:

- Rear brake allows for same front mount as standard motor (universal mount with or without brake)
- Environmentally protected wet brake that provides long life and no service intervals
- Higher reliability (no cable wear)
- Electrohydraulic compatible

Competitive benchmarking

Parameter	Unit	Competitor	Danfoss	Competitor	Danfoss	Competitor	Danfoss	Competitor	Danfoss	Competitor	Danfoss
		Competitor motor with brake	Delta motor with brake	Competitor motor with brake	Delta motor with brake	Competitor motor with brake	Delta motor with brake	Competitor motor with brake	Delta motor with brake	Competitor motor with brake	Delta motor with brake
Displacement	in ³ /rev	14.5	14.3	17.1	18.3	18.9	18.3	20.6	21.2	24.7	24.1
	cc/rev	238	234	280	300	310	300	337	347	405	395
Minimum full release pressure	psi	315	150	315	150	315	150	315	150	315	150
	bar	22	10	22	10	22	10	22	10	22	10
Total motor length	in	10.32	8.3	10.51	8.46	10.65	7.76	10.76	8.7	10.59	8.94
	mm	262.13	210.82	266.95	214.88	270.51	197.10	273.30	220.98	268.99	227.08
Envelope size – wheel mount	in	7.3 x 7.18	5.35 x 5.35	7.3 x 7.18	5.35 x 5.35	7.3 x 7.18	5.35 x 5.35	7.3 x 7.18	5.35 x 5.35	7.3 x 7.18	5.35 x 5.35
	mm	185 x 182	136 x 136	185 x 182	136 x 136	185 x 182	136 x 136	185 x 182	136 x 136	185 x 182	136 x 136



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