

Fact Sheet | Danfoss Turbocor Compressors

The Danfoss Turbocor®

Portfolio of Oil Free Compressors

Model TT, TG, and VTT
Capacity Ranges From 140 to 1400kW / 40 to 400 Tons



Up to **55%**

more efficient
than equivalent
compressors in their
size range

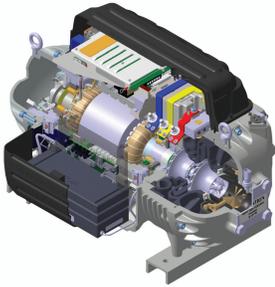
Danfoss Turbocor® family of oil free centrifugal compressors, models TT, TG and VTT, deliver innovative technology that reduces operating costs and maintenance for your air conditioning applications.

Danfoss Turbocor® oil-free centrifugal compressors are specifically designed for the HVAC industry, utilizing magnetic bearings, two stage centrifugal compression, variable speed permanent magnet motor and intelligent electronic controls resulting in the highest efficiencies in the industry in a light weight and compact footprint with low sound levels.



Technology Overview

Danfoss Turbocor offers 3 families of oil-free compressors – Model TT, TG and VTT available in capacity ranges from 40 tons/140 kW to 400 tons / 1400 kW. All 3 compressor families feature the same advanced technologies that provide the most efficient, reliable and quiet compressor in the industry.



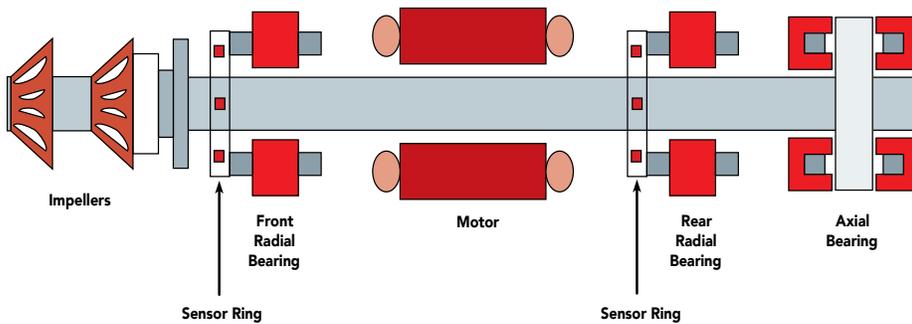
VFD (Variable Frequency Drive) as standard providing unmatched part load efficiency.

Oil Free magnetic bearings providing quiet, reliable operation. Removing oil reduces maintenance, eliminates complexity and minimizes risk of catastrophic failure compared to traditional oiled designs.

Two stage, direct drive, hermetic centrifugal compressor results in high efficiency at full and part load conditions.

Permanent magnet motor reduces size and weight while increasing efficiency.

Danfoss Turbocor’s patented compressor design features unique and highly advanced magnetic bearing design that eliminates oil from the system.



Sensor rings, located at each magnetic bearing, feed information to the bearing controller to ensure the shaft is positioned correctly.

Radial and axial bearings support the rotor when the compressor is energized, preventing contact between rotor / impeller assembly.

Performance Advantage

Using magnetic bearing technology results in the most efficient compressor in the industry. Outstanding energy efficiency reduces operating budgets and helps shrink a facility’s carbon footprint, thanks to annual energy usage 30% to 50% less than conventional compressors. In the U.S., these high efficiencies help contribute towards USGBC LEED® points. World class efficiency also reduces CO₂ emissions by reducing kWh as a result of a 31% improvement in Integrated Part Load Value (IPLV) vs a typical screw chiller.

Energy and CO₂ Emissions Savings Analysis

	Turbocor	Existing Chiller	Savings
Chiller capacity-Tons (kW)	250 (880)	250 (880)	—
IPLV (kW/Ton)	0.34	0.49	—
IPLV (COP)	10.35	5.42	—
Average annual operating hours (h)¹	5,820	5,820	—
Total annual consumption (kWh)²	296,820	567,450	270,630
Power cost (USD/kWh)	0.10	0.10	—
Average annual operating cost (USD)	29,682	56,745	27,063 48%
2-year cumulative savings (USD)			54,126
3-year cumulative savings (USD)			81,189
	Turbocor	Existing Chiller	CO₂ Savings
Average annual CO₂ emissions (metric Tons)³	213.1	407.4	194.3 48%

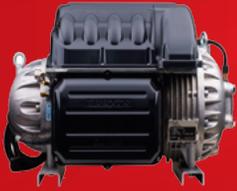
Notes:

1. Average annual operating hours includes office buildings, process cooling, data centers, etc.
2. Calculations based on average load of 60%.
3. Calculations based on CO₂ emission factor of 7.18x10⁴ metric Tons

[CO₂ / kWh] (eGRID2007 v. 1.1, US annual non-based load CO₂ output emission rate, year 2005 data) from U.S. EPA website.

Conversions:

1 [metric Ton] = 2,204.6 [lbs US]



Model TT300, TT350, TT400 and TT700

The TT Compressor

Efficient: Danfoss Turbocor model TT oil free compressors are available in four different models ranging from 60 tons / 200 kW to 200 tons / 700 kW. The TT compressor family offers industry leading efficiency with integrated part load values (IPLV) up to 50% better than a comparable size screw chiller.

Flexible: TT compressors have the flexibility to operate in a wide range of chilled water applications. All models are capable of operating under standard water cooled chiller operation while the TT300 and TT350 have the ability to operate at high lift for air cooled or heat recovery operation. In addition, the TT300 has the ability to operate in medium evaporator temperature applications with a range of 0 and -10 degrees C (between 32 and 14 degrees F).

Quiet: The low sound levels of the TT compressor reduces customer complaints in noise sensitive applications and reduces the cost of expensive sound treatment typically required of noisy screw compressors. The TT Series compressors have sound pressure levels as low as 70.0 dBA at 1.5m (5ft), resulting in up to 8 dBA lower than a typical screw compressor

Environmentally Friendly: As part of the Danfoss Turbocor long term refrigerant strategy, the TT compressor family is available with environmentally friendly refrigerant HFC-134a, with no Ozone Depletion Potential and no phase-out date per the Montreal Protocol. All TT compressor models are compatible with the next generation R-513A refrigerant with low Global Warming Potential (GWP) as standard. R513A offers high efficiency with a non-flammable A1 safety rating for customers requiring a low GWP refrigerant for their products.

Capacity

TT300 - 60 to 90 tons

TT350 - 70 to 120 tons

TT400 - 90 to 150 tons

TT700 - 130 to 200 tons

Operating Map

Air and Water Cooled

Air and Water Cooled

Water Cooled

Water Cooled

Voltage

380v, 400v, 460v, 575v

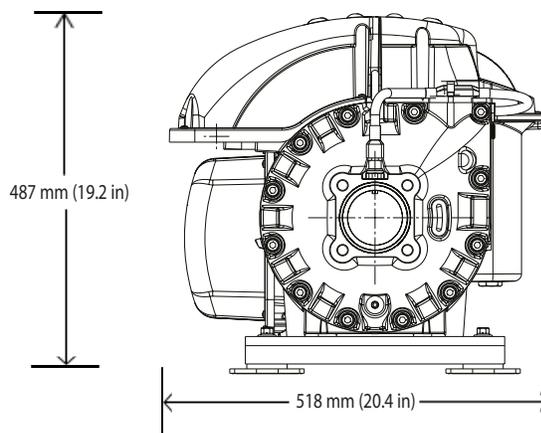
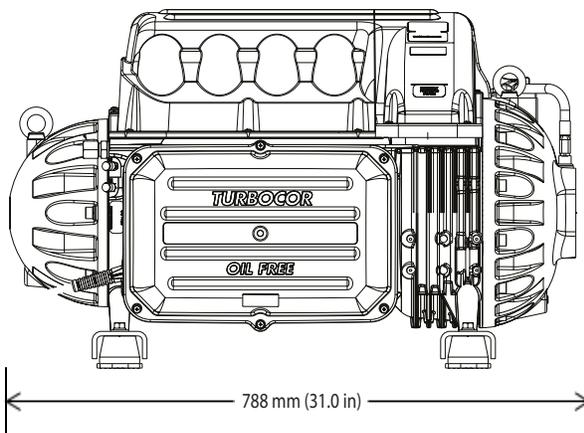
380v, 400v, 460v

380v, 400v, 460v, 575v

380v, 400v, 460v

Dimensions and Weights - All TT Models

Length	788 mm (31.0 in)	Width	518 mm (20.4 in)	Height	487 mm (19.2 in)	Refrigerant	R134a or R513A
Weight	120kg (265 lbs)		132kg (290 lbs)		132kg (290 lbs)		144kg (318 lbs)





Model TG230, TG310, TG390 and TG520

The TG Compressor

Efficient: Danfoss Turbocor model TG oil free compressors are available in four different models ranging from 40 tons / 140 kW to 150 tons / 540 kW. The TG compressor family offers industry leading efficiency with integrated part load values (IPLV) up to 50% better than a comparable size screw chiller.

Flexible: TG compressors have the flexibility to operate in a wide range of chilled water applications. All models are capable of operating under standard water cooled chiller operation while the TG230 and TG310 have the ability to operate at high lift for air cooled or heat recovery operation. In addition, the TG230 has the ability to operate in medium evaporator refrigerant temperature applications with a range of 0 and -10 degrees C or 32 and 14 degrees F.

Quiet: The low sound levels of the TG compressor reduces customer complaints in noise sensitive applications and reduces the cost of expensive sound treatment typically required of noisy screw compressors. The TG Series compressors have sound pressure levels as low as 70.0 dBA at 1.5m (5ft), resulting in up to 8 dBA lower than a typical screw compressor

Environmentally Friendly: As part of the Danfoss Turbocor long term refrigerant strategy, the TG compressor family uses the next generation refrigerant HFO-1234ze. This refrigerant offers ultra-low Global Warming Potential GWP < 1, zero Ozone Depletion Level ODP and is not subject to the hydrofluorocarbon (HFC) phasedown required by the European Union's F-gas regulation.

Capacity

TG230 - 40 to 70 tons

TG310 - 60 to 90 tons

TG390 - 70 to 120 tons

TG520 - 90 to 150 tons

Operating Map

Air and Water Cooled

Air and Water Cooled

Water Cooled

Water Cooled

Voltage

380v, 400v, 460v, 575v

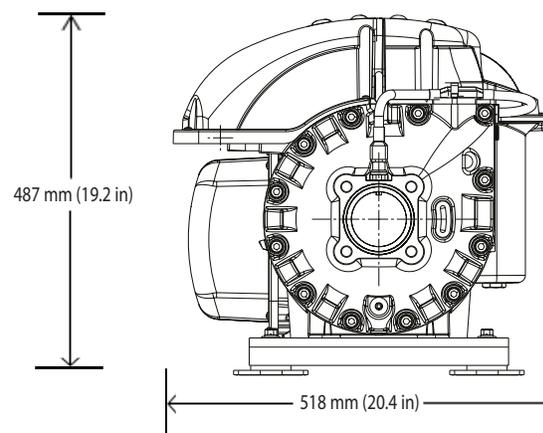
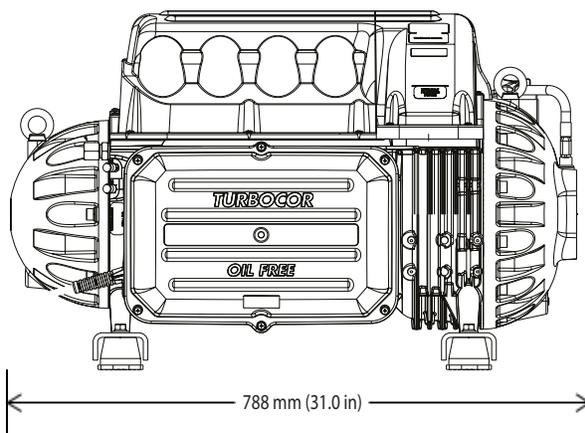
380v, 400v, 460v

380v, 400v, 460v, 575v

380v, 400v, 460v

Dimensions and Weights - All TG Models

Length	788 mm (31.0 in)	Width	518 mm (20.4 in)	Height	487 mm (19.2 in)	Refrigerant	HFO-1234ze
Weight	120kg (265 lbs)		132kg (290 lbs)		132kg (290 lbs)		144kg (318 lbs)





Model VTT1200

The VTT Compressor

Efficient: The Danfoss Turbocor VTT (Variable Twin Turbo) series of oil free compressors takes all benefits of magnetic bearing technology into larger capacity ranges above the TT/TG models. Available up to 400 tons / 1430 kW capacity using an economizer, the VTT offers industry leading full and part load operation.

Stable Operation: VTT compressors feature the patented IntraFlow® technology which extends the stable operating range and increases the turn down capability of the chiller. The result is a compressor that minimizes the risk of surge while maintaining peak full and part load efficiency.

Flexible: Designed for water and evaporative cooled chiller applications in both single and multiple compressor configurations.

Environmentally Friendly: Winner of the prestigious 2015 AHR Expo Innovation Award in the Green Building category, 2015 Alliance to Save Energy Innovative Star of Energy Efficiency award, and the 2017 Edison Bronze Award for innovation and excellence in the development of new products and services, the VTT compressor is available with environmentally friendly refrigerant HFC-134a, with no Ozone Depletion Potential and no phase-out date per the Montreal Protocol.

Capacity

VTT1200 - 325 to 400 tons

Operating Map

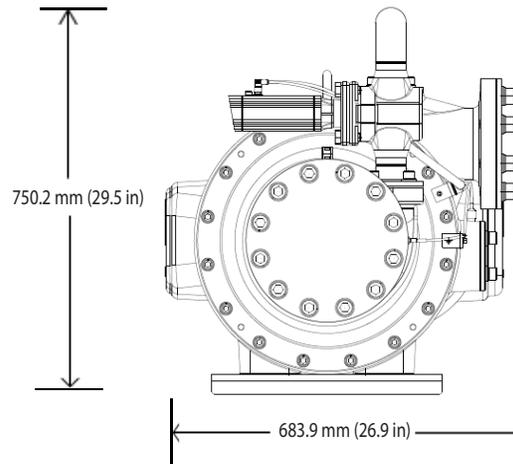
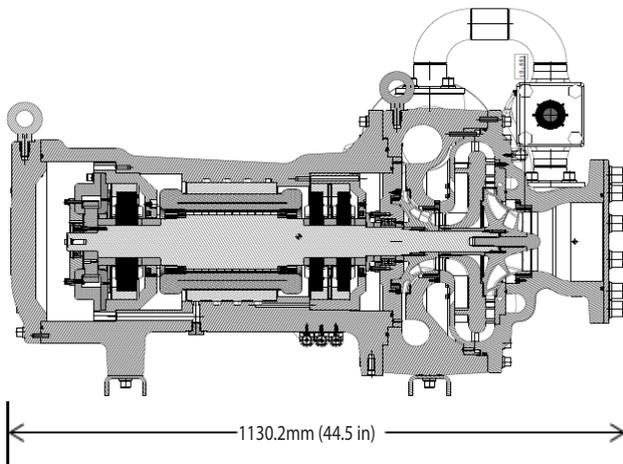
Water Cooled

Voltage

380v, 400v, 460v

Dimensions and Weights

Length	1130.2 mm (44.5 in)	Width	683.9 mm (26.9 in)	Height	750.2 mm (29.5 in)	Refrigerant	R134a
Weight	433 kg (977 lbs)	Sound	77 dBA at 1.5m (5')				



Giving you an inside advantage

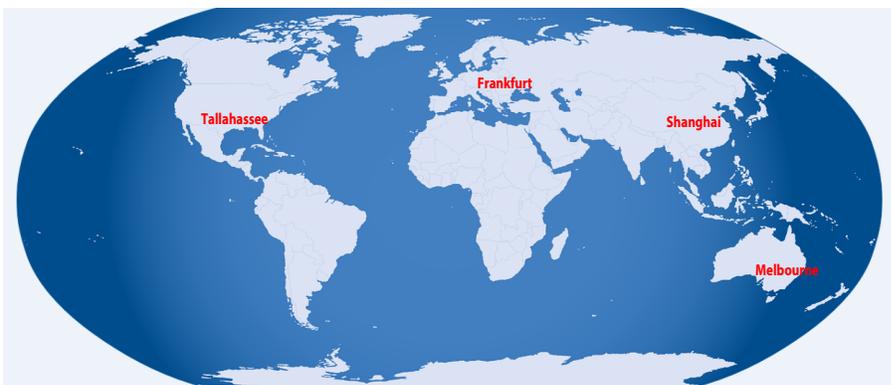
Advanced design and manufacturing

Since 1993, our international team of designers and engineers have conducted a rigorous development program to produce and improve the Danfoss Turbocor® compressor. It is our mission to continue to be the leader in developing high efficiency, oil free centrifugal compressors



Global Support

Danfoss Turbocor® experts provide comprehensive training programs to customers around the world. Applications support for OEMs and their agents, and end-user customers along with compressor service centers are located around the world to support global customers.



Strategic manufacturing locations

Danfoss Turbocor® has state of the art manufacturing facilities in Tallahassee, Florida and Shanghai, China. The Tallahassee facility houses a 73,000 square foot manufacturing plant, test facilities, engineering, R&D and administrative offices.

The Danfoss Turbocor® compressor team is dedicated to satisfying its customers by providing “Best in Class” in terms of quality, value and on-time delivery while striving for continuous improvement.



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