

Fact Sheet | Models TT, TG, and VTT

# The Danfoss Turbocor®

## Portfolio of Oil Free Compressors

Highly efficient compressors that reduce OEMs operating and maintenance costs

Capacity range from 140 to 1400 kW / 40 to 400 tons



Up to **55%**

more efficient  
than equivalent  
compressors in their  
size range

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

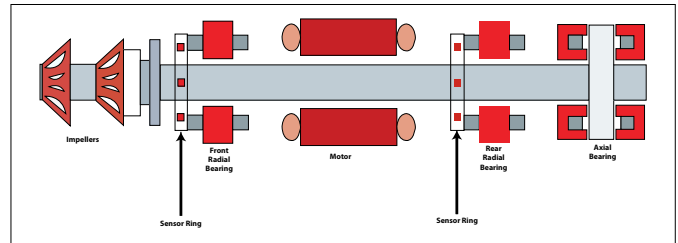
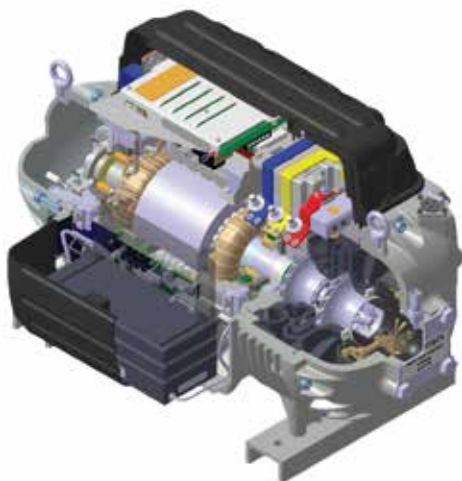
Danfoss Turbocor® oil-free centrifugal compressors are specifically designed for the HVAC industry, utilizing magnetic bearings, two stage centrifugal compression, variable speed permanent magnet motor and intelligent electronic controls resulting in the highest efficiencies in the industry in a light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



### Technology Overview

Danfoss Turbocor® offers 3 Portfolio 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 Portfolio 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.



- 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 CO<sub>2</sub> emissions by reducing kWh as a result of a 31% improvement in Integrated Part Load Value (IPLV) vs a typical screw chiller.

	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) <sup>1</sup>	5,820	5,820	–
Total annual consumption (kWh) <sup>2</sup>	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	CO <sub>2</sub> Savings
Average annual CO <sub>2</sub> emissions (metric Tons) <sup>3</sup>	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 CO<sub>2</sub> emission factor of 7.18x10<sup>-4</sup> metric Tons
4. [CO<sub>2</sub> / kWh] (eGRID2007 v. 1.1, US annual non-based load CO<sub>2</sub> output emission rate, year 2005 data) from U.S. EPA website.

### Conversions:

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

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

The Danfoss Turbocor® Portfolio of Oil Free Compressors

# Models TT300, TT350, TT400 and TT700



### The TT Compressor

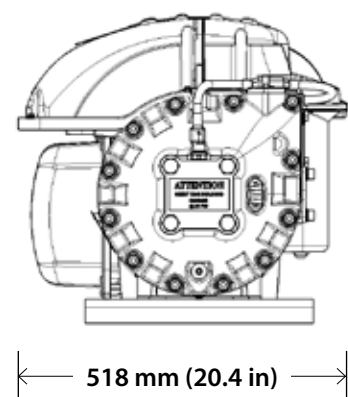
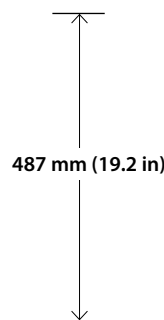
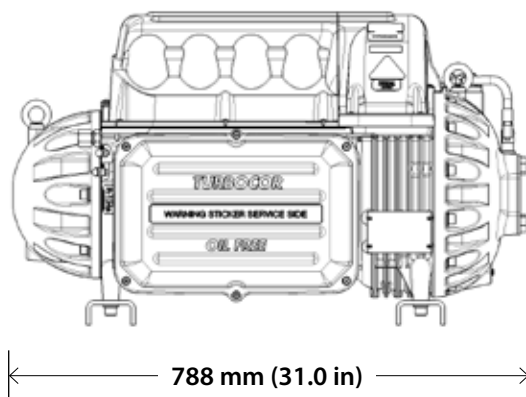
**Efficient:** Danfoss Turbocor® model TT oil free compressors are available in four different models ranging from 60 tons / 200 kW to 200 tons / 700 kW. The TT compressor Portfolio offers industry leading efficiency with integrated part load values (IPLV) up to 50% better than a comparable size screw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

**Flexible:** 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 °C (between 32 and 14 °F).

**Quiet:** The low sound levels of the TT compressor reduces customer complaints in noise sensitive applications and 3 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 Portfolio is available with environmentally friendly refrigerant HFC-134a with no Ozone Depletion Potential. All TT compressor models are compatible with the non-flammable R-513A refrigerant with low Global Warming Potential (GWP) as standard.

Model	TT300	TT350	TT400	TT700
Refrigerants	R134a or R513A			
Capacity	60 to 90 tons	70 to 120 tons	90 to 150 tons	130 to 200 tons
Operating map	Air and Water Cooled		Water Cooled	
Voltage	380 V, 400 V, 460 V, 575 V	380 V, 400 V, 460 V	380 V, 400 V, 460 V, 575 V	380 V, 400 V, 460 V
Dimensions	788 mm (31.0 in) – 518 mm (20.4 in) – 487 mm (19.2 in)			
Weight	120 kg (265 lbs)	132 kg (290 lbs)	132 kg (290 lbs)	144 kg (318 lbs)



The Danfoss Turbocor® Portfolio of Oil Free Compressors

# Models TG230, TG310, TG390 and TG520



### The TG Compressor

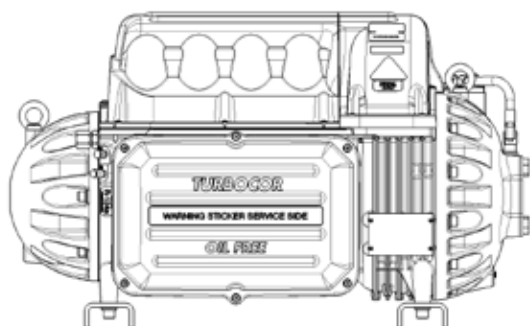
**Efficient:** Danfoss Turbocor® model TG oil free compressors are available in four different models ranging from 40 tons / 140 kW to 150 tons / 540 kW. The TG compressor Portfolio offers industry leading efficiency with integrated part load values (IPLV) up to 50% better than a comparable size screw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

**Flexible:** 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 °C or 32 and 14 °F .

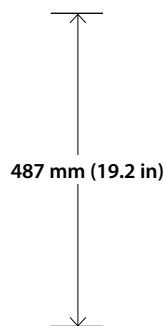
**Quiet:** The low sound levels of the TG compressor reduces customer complaints in noise sensitive applications and reduces the cost of expensive sound treatment typically required of noisy screw compressors. The TG Series compressors have sound pressure levels as low as 70.0 dBA at 1.5m (5ft), resulting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

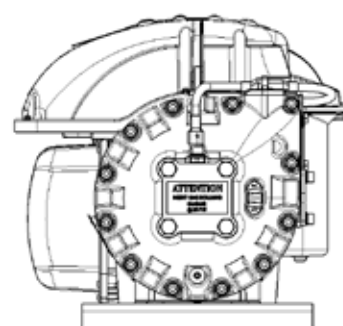
Model	TG230	TG310	TG390	TG520
Refrigerants	HFO-1234ze			
Capacity	40 to 70 tons	60 to 90 tons	70 to 120 tons	90 to 150 tons
Operating map	Air and Water Cooled		Water Cooled	
Voltage	380, 400, 460, 575 V	380, 400, 460 V	380, 400, 460, 575 V	380, 400, 460 V
Dimensions	788 mm (31.0 in) – 518 mm (20.4 in) – 487 mm (19.2 in)			
Weight	120 kg (265 lbs)	132 kg (290 lbs)	132 kg (290 lbs)	144 kg (318 lbs)



788 mm (31.0 in)



487 mm (19.2 in)



518 mm (20.4 in)

The Danfoss Turbocor® Portfolio of Oil Free Compressors

# Model VTT1200



## The VTT Compressor

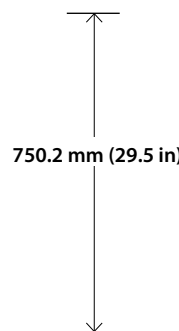
**Efficient:** The Danfoss Turbocor® VTT (Variable Twin Turbo) series of oil free compressors takes all benefits of magnetic bearing technology into larger capacity ranges above the TT/TG models. Available up to 400 tons / 1430 kW capacity using an economizer, the VTT offers industry leading full and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

Model	VTT1200
Refrigerants	R134a
Capacity	325 to 400 tons
Operating map	Water Cooled
Sound	77 dBA at 1.5m (5')
Voltage	380, 400, 460 V
Dimensions	1130.2 mm (44.5 in) – 683.9 mm (26.9 in) – 750.2 mm (29.5 in)
Weight	433 kg (977 lbs)



# Giving you an inside advantage

## Global Manufacturing and Support



Danfoss 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.

Danfoss Turbocor® compressor experts provide applications support for OEMs, their agents, and enduser customers. In addition, compressor service centers are located Tallahassee, Frankfurt, Shanghai and Melbourne.

## Training Support



Danfoss experts provide comprehensive training programs to customers around the world through a series of training classes designed to provide the necessary information for selling, operating and servicing Danfoss Turbocor® products and their applications. Highly qualified and field-experienced instructors of the Danfoss Turbocor® Learning Center will provide you with a high level of training.

## TurboTool® App



The Danfoss TurboTool® App makes it easy for field service technicians to troubleshoot Danfoss Turbocor® compressor issues on site. Field service technicians can utilize this App to identify symptoms, work through the possible causes, and find remedies through suggested required actions. Instantly access the TurboTool® App for compressor troubleshooting and quick reference charts.

**ISO 9001: 2015 Certified**

**ISO 14001: 2015 Certified**



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