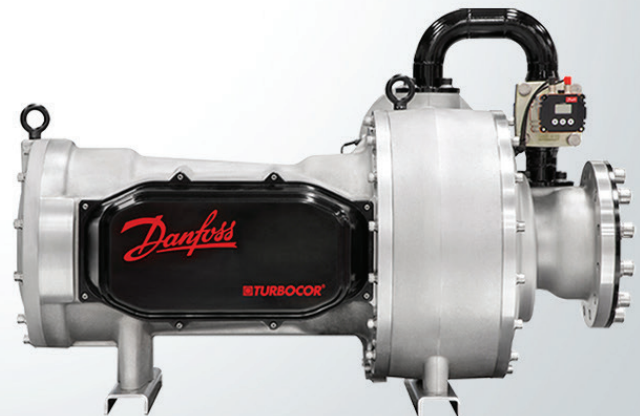
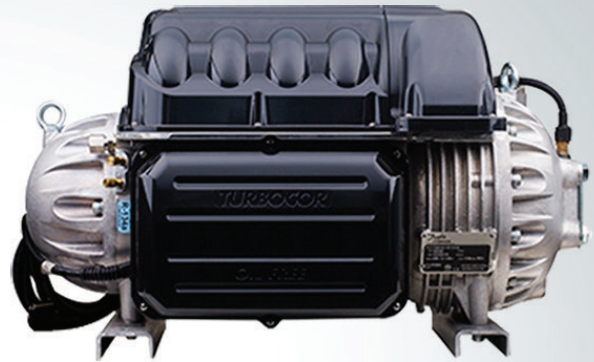
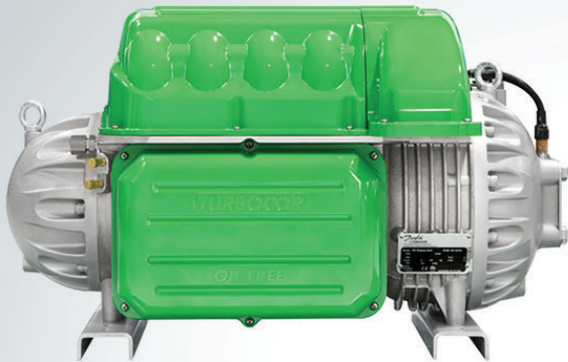


Fact Sheet | Models TT, TG, TTH, TGH, and VTT

The Danfoss Turbocor® Portfolio of Oil-Free Compressors

Highly efficient compressors that reduce operating and maintenance costs
Capacity range from 140 to 1400 kW / 40 to 400 tons



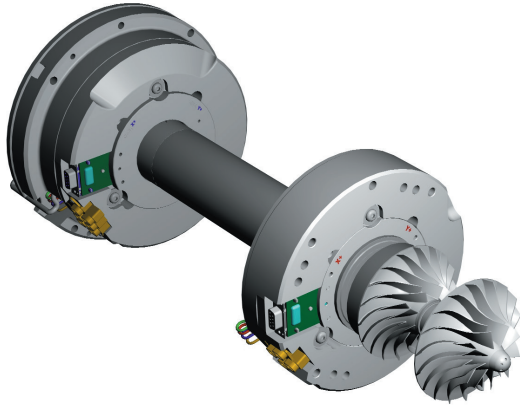
Up to

40%

more efficient than
traditional fixed
speed compressors

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

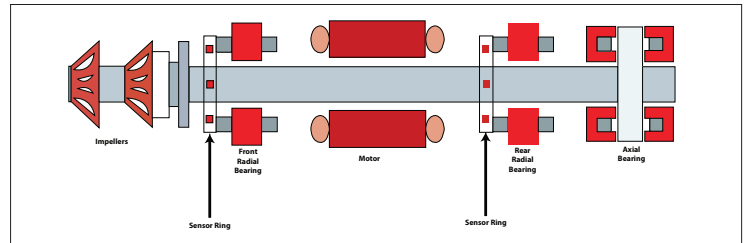
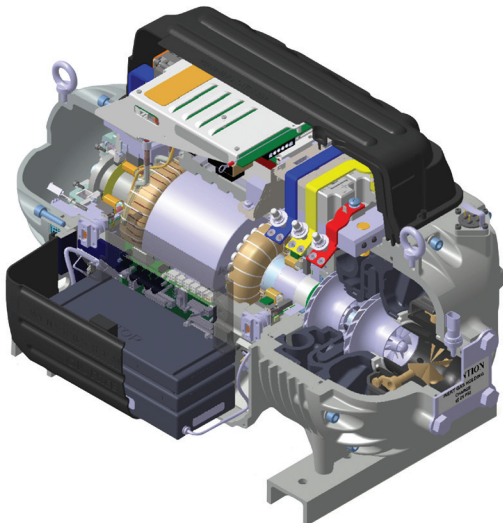
Danfoss Turbocor® oil-free centrifugal compressors are specifically designed for the HVAC industry, utilizing magnetic bearings, two-stage centrifugal compression, a variable speed permanent magnet motor, and intelligent electronic controls, resulting in the highest efficiencies in the industry in a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



Technology Overview

The Danfoss Turbocor® portfolio of oil-free compressors – models TT, TG, TTH, TGH and VTT - are available in capacity ranges from 40 tons / 140 kW to 400 tons / 1400 kW. All compressors feature the same advanced technologies that provide the most efficient, reliable and quiet compressor in the industry.

- **Standard VFD (Variable Frequency Drive) provides unmatched part load efficiency**
- **Oil-Free magnetic bearings provide quiet, reliable operation. Removing oil reduces maintenance, eliminates long term performance degradation and minimizes risk of catastrophic failure compared to traditional oiled designs.**
- **Two-stage, direct drive, semi-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 CO₂ emissions by reducing kWh as a result of the improvement in Integrated Part Load Value (IPLV) versus a typical screw chiller.

| | Turbocor® | Existing Chiller | Savings |
|---|-----------|------------------|-------------------------|
| Chiller capacity-Tons (kW) | 250 (880) | 250 (880) | – |
| IPLV (kW / Ton) | 0.34 | 0.65 | – |
| 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 | CO ₂ Savings |
| Average annual CO ₂ 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 7.18x10⁻⁴ metric Tons.
4. [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]

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

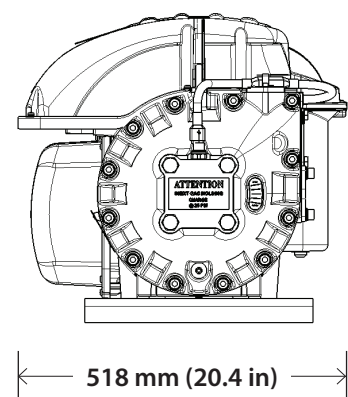
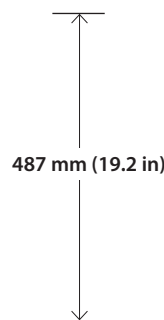
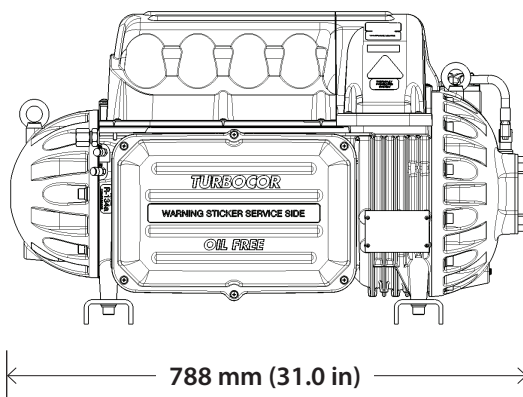
Efficient: Danfoss Turbocor® model TT oil-free compressors are available in four different models ranging from 60 tons / 200 kW to 200 tons / 700 kW. The TT compressor portfolio offers industry-leading efficiency with integrated part load values (IPLV) up to 50% better than a comparably sized screw chiller.

Flexible: All models are capable of operating under standard water cooled and low lift 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 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), or 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, Low Lift | | Water Cooled, Low Lift | |
| 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

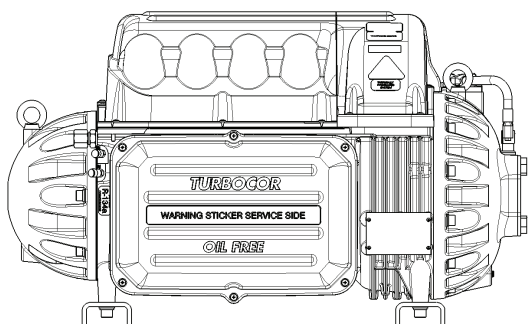
Efficient: Danfoss Turbocor® model TG oil-free compressors are available in four different models ranging from 40 tons / 140 kW to 150 tons / 540 kW. The TG compressor portfolio offers industry-leading efficiency with integrated part load values (IPLV) up to 50% better than a comparably sized screw chiller.

Flexible: All models are capable of operating under standard water cooled and low lift 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.

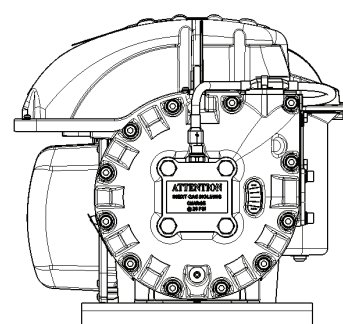
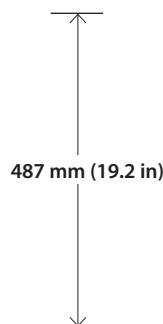
Quiet: The low sound levels of the TG compressor reduces customer complaints in noise sensitive applications and reduces the cost of expensive sound treatment typically required of noisy screw compressors. The TG Series compressors have sound pressure levels as low as 70.0 dBA at 1.5m (5ft), or up to 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 Potential (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, Low Lift | | Water Cooled, Low Lift | |
| 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)



518 mm (20.4 in)

The Danfoss Turbocor® Portfolio of Oil-Free Compressors

Models TTH375 and TGH285



The TGH and TTH Compressor

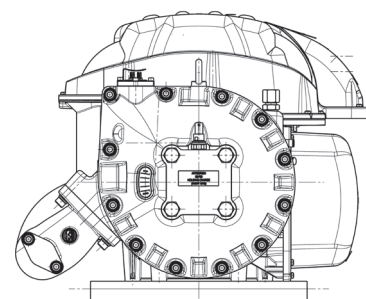
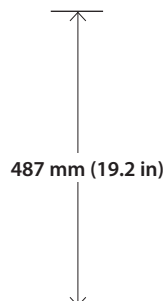
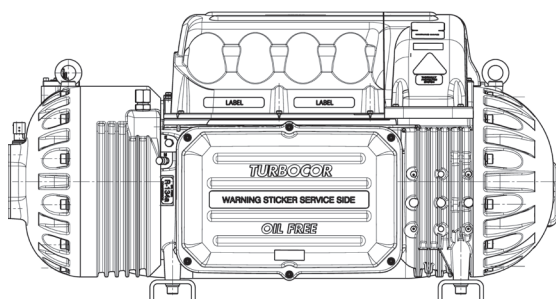
Wide Operating Map: The new Danfoss Turbocor® TTH and TGH compressor expands the benefits of oil-free technology into high lift applications with pressure ratios up to 6.2. High lift applications include air cooled chillers in hot ambient climates, hot water for heatpump or heat recovery, and low-temps for thermal storage or low-temp process applications. The compressor can operate up to a maximum saturated discharge temperature (SDT) = 156°F / 69°C which allows for air cooled chiller operation in extremely hot ambient climates and the ability to generate hot water for heat recovery.

Efficient: Two models are available: TTH375 with a nominal capacity of 107 tons / 376 kW and TGH285 with a nominal capacity of 82 tons / 288 kW. The TTH and TGH compressor portfolio offers industry-leading efficiency with integrated part load values (IPLV) up to 50% better than a comparably sized screw chiller.

Quiet: The low sound levels of the TTH and TGH compressor reduces customer complaints in noise sensitive applications and reduces the cost of expensive sound treatment typically required of noisy screw compressors. The TTH/TGH compressor has 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 long-term refrigerant strategy, the TTH and TGH compressor is available with low GWP refrigerant options. The TTH model is compatible with R134a and non-flammable R513A while the TGH model uses next-generation refrigerant HFO-1234ze. This refrigerant offers ultra-low Global Warming Potential (GWP) < 1, zero Ozone Depletion Potential (ODP) and is not subject to the hydrofluorocarbon (HFC) phasedown required by the European Union's F-gas regulation.

| Model | TTH375 | TGH285 |
|---------------|--|-----------------|
| Refrigerants | R134a and R513A | HFO-1234ze |
| Capacity | 107 tons | 82 tons |
| Operating map | Air and Water Cooled, High Lift | |
| Voltage | 380, 400, 460 V | 380, 400, 460 V |
| Dimensions | 932 mm (36.7in)– 590 mm (23.2 in) – 487 mm (19.2 in) | |
| Weight | 163 kg (360 lb) | |



The Danfoss Turbocor® Portfolio of Oil-Free Compressors

Model VTT1200



The VTT Compressor

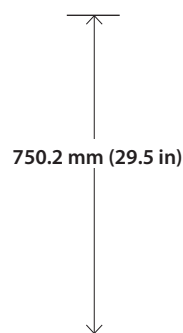
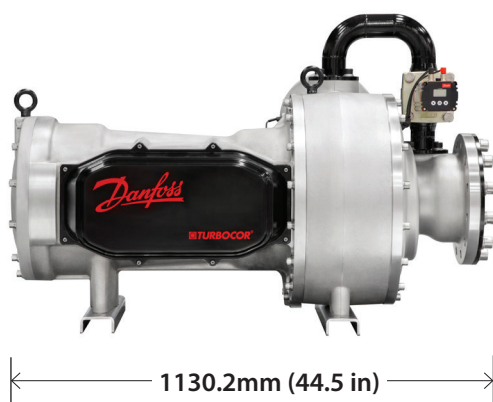
Efficient: The Danfoss Turbocor® VTT (Variable Twin Turbo) series of oil-free compressors takes all benefits of magnetic bearing technology into larger capacity ranges above the TT/TG models. Available up to 400 tons / 1430 kW capacity using an economizer, the VTT offers industry-leading full and part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

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) |



The Danfoss TurboCor® Portfolio of Oil-Free Compressors

Danfoss Mobile Apps

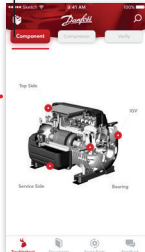


Turbotool® App

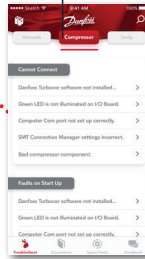
Quick Access to Danfoss TurboCor® compressor troubleshooting.



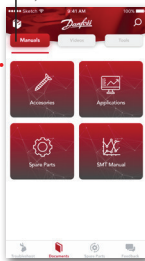
The TurboTool® app makes it easy for technicians to troubleshoot issues on Danfoss TurboCor® compressors.



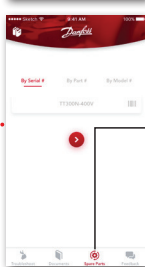
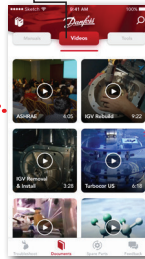
The user can select from a list of symptoms in the app that match the problems exhibited by the compressor being serviced. The app will then list potential causes, solutions to the problem, and service literature for reference for further information.



You no longer need to keep hundreds of pages of parts catalogs and training manuals. With the app, all of this information is at your fingertips on your smart device.



With the app, you can access videos made by Danfoss TurboCor® that demonstrate how to remove, install, and rebuild key components on Danfoss TurboCor® compressors.



TurboTool® helps you to quickly identify the required spare parts. A quick scan of the compressor serial # using your smartphone camera or by entering the part # or model #, and the app will display potential spare parts kits.

24/7

Access to all things Danfoss TurboCor® compressor troubleshooting on site



ChillerROI App

Simplify your chiller decision making by calculating the ROI quickly and easily.



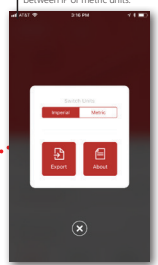
Input the efficiency (PLV) and Capex cost of the two chillers being compared - Chiller A and Chiller B.



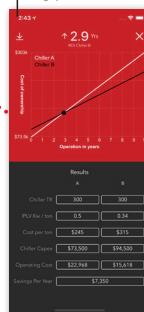
Input the capacity, operating hours and energy costs of Chiller A and B.



Export data for analysis. Switch between IP or metric units.



ChillerROI will compare the performance and operating cost of both chillers and calculate the ROI. The ROI and data are presented in an easy to read graph and table.



Fast

Easy Chiller ROI calculation

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 compressor experts provide applications support for OEMs, their agents, and end user 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.

Advanced R&D and Test Labs



Danfoss Turbocor® compressors are thoroughly tested in our advanced ADC chiller test facility and R&D labs. These labs simulate extended operating life at the job site and ensure outstanding reliability prior to operation in the field.

ISO 9001: 2015 Certified

ISO 14001: 2015 Certified



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