INDOOR NEMA TYPE 12

900 - 24000 Btu/h

		DTS 3021 900 - 1300 Btu/h	DTS 3041 2000 - 3000 Btu/h	DTS 3141 3000 - 4000 Btu/h	DTS 3141 SL 3000 - 5000 Btu/h	DTS 3145 5000 - 7000 Btu/h	DTS 3241 7000 - 8500 Btu/h	DTS 3245 10000 - 13000 Btu/h	DTS 3441 15000 - 20000 Btu/h	DTS 3641 20000 - 24000 Btu/h
		Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
Voltage	115	13383144255	13382344255	13385444255	13383444255	13383644255	13385744255	13383844255	-	-
	230	13383141255	13382341255	13385441255	13383441255	13383639255	13385741255	13383839255	13385039255	13383939255
	460	-	13382336255	13385436255	13383436255	13383636255	13385736255	13383836255	13385036255	13383936255
H x W x D (in)		15.5 x 7 x 7.6	20.2 x 10.9 x 10.8	29.5 x 15.6 x 9.3	36 x 12 x 12	36 x 12 x 12	47.6 x 15.6 x 10.6	53 x 16 x 11.9	56.8 x 16 x 16	65.5 x 19 x 20.5
Weight (lb)		30	51	84 (115V, 230V) / 88 (400V, 460V)	108	108	119 (115V, 230V) / 135.5 (400V, 460V)	150	191 (230V) / 175 (400V, 460V)	230

TOP MOUNTED COOLING UNITS

1200 - 14000 Btu/h

- **High reliability** using the best available components & design tools
- **Zero water intrusion into enclosure** due to patented condensate management system - which prevents condensate from penetrating the enclosure
- **Perfect service-friendliness** and long maintenance intervals
- **Product variety:** multiple performance levels available
- **Environmental protection** thanks to energy efficiency and recyclability
- **Easy mounting:** quick release mounting frame & quick mount design

		DTT 6101 1200 - 2000 Btu/h	DTT 6201 2500 - 4000 Btu/h	DTT 6301 4000 - 5500 Btu/h	DTT 6401 5500 - 7000 Btu/h	DTT 6601 7000 -10000 Btu/h	DTT 6801 12000 -14000 Btu/h
		Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
Voltage	115	13256144055	13256244055	13256344055	13256444055	-	-
	230	13256141055	13256241055	13256341055	13256441055	-	-
	460	-	13256249055	13256349055	13256432055	13256632055	13256832055
H x W x D (in)		17 x 23.4 x 15.6	17 x 23.4 x 15.6	17 x 23.4 x 19.5	17 x 23.4 x 19.5	19.1 x 31.3 x 22.6	19.1 x 31.3 x 22.6
Weight (lb)		73	77 (115V, 230V) / 90 (400V, 460V)	88 (115V) / 99 (230V) / 116.8 (400V, 460V)	97 (115V) / 101 (230V) / 112 (400V, 460V)	165	170

OUTDOOR NEMA TYPE 3R/4

900 - 24000 Btu/h

		DTS 3031 900 -1300 Btu/h	DTS 3061 2000 -3000 Btu/h	DTS 3161 3000 -4000 Btu/h	DTS 3161 SL 3000 -5000 Btu/h	DTS 3165 5000 -7000 Btu/h	DTS 3261 7000 -8500 Btu/h	DTS 3265 10000 -13000 Btu/h	DTS 3461 15000 - 20000 Btu/h	DTS 3661 20000 - 24000 Btu/h
		Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
Voltage	115	13383144355	13382344355	13385444355	-	13383644355	13385744355	13383844355	-	-
	230	13383141355	13382341355	13385441355	13383441355	13383639355	13385741355	13383839355	13385039355	13383939355
	460	-	13382336355	13385436355	13383436355	13383636355	13385736355	13383836355	13385036355	13383936355
H x W x D (in)		15.5 x 7 x 7.6	20.2 x 10.9 x 10.8	29.3 x 15.6 x 11.6	36 x 12 x 12	36 x 11.8 x 12	47.6 x 15.6 x 12.8	53 x 16 x 11.9	59.1 x 15.9 x 18.4	65.5 x 19 x 24.5
Weight (lb)		30	51	89 (115V, 230V) / 92 (400V, 460V)	108	108	123.5 (115V, 230V) / 139 (400V, 460V)	150	191 (230V) / 175 (400V, 460V)	238

STAINLESS STEEL/ WASHDOWN NEMA TYPE 4/4X

900–24000 Btu/h

		DTS 3031SS 900 - 1300 Btu/h	DTS 3081 2000 - 3000 Btu/h	DTS 3181 3000 - 4000 Btu/h	DTS 3181 SL 3000 - 5000 Btu/h	DTS 3185 5000 -7000 Btu/h	DTS 3281 7000 -8500 Btu/h	DTS 3285 10000 -13000 Btu/h	DTS 3481 15000 - 20000 Btu/h	DTS 3681 20000 - 24000 Btu/h
		Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number	Part Number
Voltage	115	13383144158	13382344300	13385444158	-	13383644158	13385744158	13383844158	-	-
	230	13383141158	13382341300	13385441158	13383441355	13383639158	13385741158	13383839158	13385039158	13383939158
	460	–	13382336158	13385436158	13383436158	13383636158	13385736158	13383836158	13385036158	13383936158
H x W x D (in)		15.5 x 7 x 7.6	20.2 x 10.1 x 10.8	29.3 x 15.6 x 11.6	36 x 12 x 12	36 x 11.8 x 12	47.6 x 15.6 x 12.8	53 x 16 x 11.9	59.1 x 15.9 x 18.4	65.5 x 19 x 24.5
Weight (lb)		30	55	92 (115V, 230V) / 97 (400V, 460V)	108	108	132 (115V, 230V) / 148 (400V, 460V)	150	191 (230V) / 175 (400V, 460V)	240

DTS/DTT SERIES
COOLING SOLUTIONS

The Pfannenberg Advantage - Innovative, Efficient, Reliable

Pfannenberg
ELECTRO-TECHNOLOGY FOR INDUSTRY

THE TECHNOLOGY OF COOLING

Cooling with Closed Loop Cooling Units

Pfannenberg cooling units operate on the principle of the Carnot cycle. This means that the cooling unit functions as a heat pump that "pumps" the thermal energy transferred from the electronic cabinet (heat dissipated from the components) up to a higher level of temperature (the ambient temperature can reach levels as high as + 55 °C). The air inside the enclosure is cooled down by the evaporator and at the same time dehumidified.

How do I know if a cooling unit is the right product for my application?

- If the ambient temperature is greater than the target internal temperature of the enclosure, active cooling is required.
- If a NEMA Type 12 to 4x rating is required - closed loop systems can maintain the NEMA Type rating of the cabinet.

Properly sizing a cooling unit

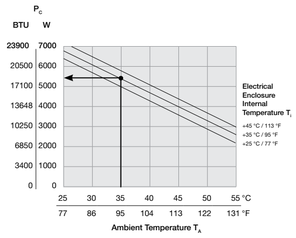
To properly size a cooling unit you must know the **required cooling capacity in Watts, mounting requirements (side, integrated or top mount) and the dimensions of the cooling unit and enclosure.**

$\{P_C = P_D - P_R\}$ $\{P_R = C \times A \times \Delta T\}$

- **P_C [Watt]:**
  Refrigeration capacity of a cooling unit.
- **P_D [Watt]:**
  Dissipation loss: Thermal power generated inside a cabinet by the dissipation loss of components.
- **P_R [Watt]:**
  Radiant heat gain/loss: Heat transfer through the skin of the enclosure (insulation factor not included).
- **C [W/m² °C]:**
  Coefficient of heat transmission.
- **A [m²]:**
  Surface area of electronics cabinet.
- **ΔT[°C]:**
  Difference in temperature between the ambient air and the air inside the electronics cabinet.

Utilizing performance curves to properly size cooling units:

Pfannenberg utilizes the DIN standard 35/35 °C when rating our cooling units. Many other companies use 50/50 °C, which provides a higher, non-usable value. Customers should use their own application temperatures to determine the proper cooling capacity of the system.



Note: Cooling capacity may vary between voltage and configurations.

Important information when utilizing cooling units:

- The refrigeration capacity should exceed the dissipation loss from the installed components by approximately 10%.
- The enclosure should be sealed to prevent the inflow of ambient air.
- Use the door contact switch to impede operation with open doors and consequent excessive accumulation of condensation.
- Use cooling units with maximum clearance between air inflow and air outflow to prevent poor circulation.
- Make sure that the air inflow and air outflow in the external circuit is not hindered, preventing proper heat exchanging at the condenser.
- When using top-mounted cooling units, make sure that components with their own fans do not expel the air directly into the cooling units cool air outflow.
- Make sure unit is level.
- Setting the temperature to the lowest setting is not the optimal solution due to the condensation issues. The value we have preset on the cooling unit is a sound compromise between cooling the inside of the enclosure and the accumulation of condensation.

THE PFANNENBERG ADVANTAGE

Cooling Units designed for maximum longevity and efficiency...

High Ambient Performance
The DTS 3000 Series was designed utilizing high temperature compressors and larger condensers to best perform in outdoor applications which require a maximum ambient temperature of 131° F - such as roadside, rooftop or desert locations. The indoor NEMA Type 12 units can also handle maximum rating and can be mounted near high temperature equipment such as industrial ovens, furnaces and boilers. High ambient options are also available to 140° F.

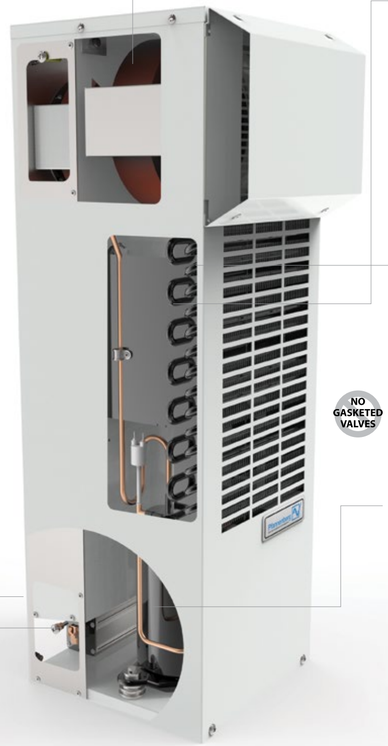
Designs for Food and Beverage Applications
Pfannenberg's DTS 3000 Series NEMA Type 4/4X models have covers made from 304, #3 polish Stainless Steel with a vertical grain for industrial and food grade applications. Non-polish finishes can attract dust and other non-desirable contaminants. The lower carbon 'variants' (316L) are also available for most designs and are considered more corrosive resistant vs. 304 stainless steel.

Active Condensate Water Management
Passive condensate management relies on the refrigeration discharge line that has high temperature gas flowing through the pipe to evaporate the moisture collected in the condensate tray. When the refrigeration cycle is off, the moisture is not being removed.

Active Condensate Management utilizes a PTC (positive temperature co-efficient) heating element. These elements need very little mounting space and feature a high power density. After the water has been removed from the condensate tray, the element reduces its power consumption automatically. The control of heating element is independent from the refrigeration control.

Rugged Metal Covers Provide Added Protection
In industrial applications, decorative plastic grills do not always withstand the rigors of the environment and show more wear and tear than metal covers. Metal covers not only create a more rugged unit, but can also be painted easier to match the design of the overall machine.

High Airflow Backward Curve Impeller Fan
A backward curved impeller fan uses one large bearing, unlike a typical blower which has two smaller bearings. The larger bearing and sealed motor provide a fan service life of over 55,000+ hours in harsh industrial environments versus a typical blower life expectancy of only 20-30,000 hours. The backward curve design creates a natural right angle for a long internal air path instead of forcing the air path from a blower or allowing a short air path that can create short cycling on the inner circuit .



Corrosion Protection
Most condenser coils are coated because they're located in a harsh natural (saltwater) or manufacturing (chemicals) environment. Corroded uncoated condenser coils lead to a rapid loss in capacity, reduced efficiency, and increased energy consumption. Unit longevity can be a serious problem in harsh environments: uncoated coils in harsh situations have been known to fail in less than a year. A coil properly coated with a quality corrosion protection system can withstand harsh environments, providing long-term and cost-effective service.

Optimized Condenser Designs for Both Performance and Limited Maintenance
Faced with limited maintenance teams many end users cannot routinely change filters on plant floors. This leads to reduced performance of the cooling unit making the compressor work harder, reducing lifespan and creating higher energy costs. Whether using wider fin spacing in our condensers for smaller cooling units or utilizing the new micro-channel condensers in our larger cooling units, Pfannenberg strives to optimize performance while maintaining a filter-less design.

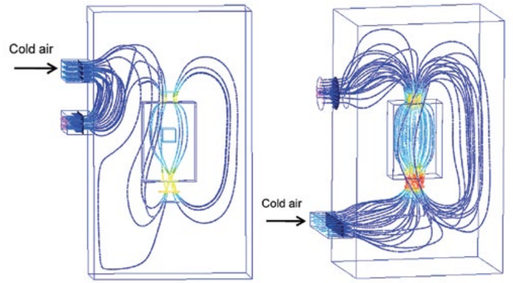
NO GASKETED VALVES

Hermetically Sealed for Longer Service Intervals
Pfannenberg uses hermetically sealed compressors. Units that use gasketed valves for "easy" re-charging need to be recharged because of the presence of the valve itself. If they are not re-charged every 2 - 3 years, the unit will not run at 100% capacity. In large industrial plants, it is very common for approximately 60% of the cooling units to be running at reduced capacity due to the loss of refrigerant with most maintenance personnel being unaware of the danger to their electronics.

Environmentally Friendly
Utilizes HFC-free R134a refrigerant versus a blended refrigerant for easier service and minimized negative impact to the environment.

c UL us CE

Internal Airflow Paths Designed to Support Natural Convection & Eliminate Hot Spots



Competitor Air Flow | Phannenberg Air Flow

As the diagram shows, Pfannenberg's approach to internal airflow paths supports both natural convection and provides cool air where needed - below key electronic components. Natural convection states that hot air rises, creating a natural airflow inside the enclosure. All of our Cooling Units pull hot air from the top of the enclosure and with the longest distance possible, pump the cool air to the bottom of the enclosure, helping eliminate "hot spots" inside the cabinet.

An Investment in Reliability and Performance...

A Expansion Valves for Full Temperature Range Performance

The Thermostatic Expansion Valve is an automatic flow control that operates in response to a change in the temperature of the refrigerant vapor leaving the evaporator. Expansion valves allow cooling units to perform over the full temperature range of the industrial applications.

Low cost units in the market utilize Capillary Tubes, which are a fixed lengths of small diameter tubing installed between the condenser and the evaporator, to act as the flow control. A capillary tube is ideally suited to smaller refrigeration units which have a relatively constant load, which is not the case with industrial cooling units that see different loads and fluctuating ambient temperatures.

B High Pressure Switches Protect Against Thermal Overload

High Pressure Switches prevent the system from operating at unsafe condensing pressures. This helps the compressor from operating at higher design pressures, increasing the operating life of the compressor by preventing thermal overload trips at the compressor, which can be as high as 165°C . The high pressure switch causes the fault circuit to open so that anyone monitoring the system is aware of a clogged condenser, filter or failed external fan. This feature is required for CE rated industrial cooling units.

C Safeguarded Inner Circuit Controller Location

Our electronic controllers are placed on the inner circuit and are protected in the same cool and dry area as the electronics being protecting inside the enclosure. Controllers which are located on the external circuit are exposed to high ambient temperatures, dust and moisture.

D 3 Phase 460V vs. Single Phase 115V

Three-phase power can be more efficient than single-phase power in certain applications. Three-phase motors, for example, are much more powerful (or efficient) than their single-phase counterparts. A three-phase circuit combines three single-phase circuits (each 120 degrees out of sync with the other) so in the same one second period there are three "pulses" or three times the work! At the same time, a control transformer can be eliminated or reduced in size to reduce the overall cost of the system for the customer. Voltage range ± 10% for international installations. All of our three-phase units include a control transformer to protect the control board and fans from transients from dirty plant power and can be easily wired for 400V, 50Hz or 460V, 60Hz (+/- 10%) for worldwide installations with the same model.

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