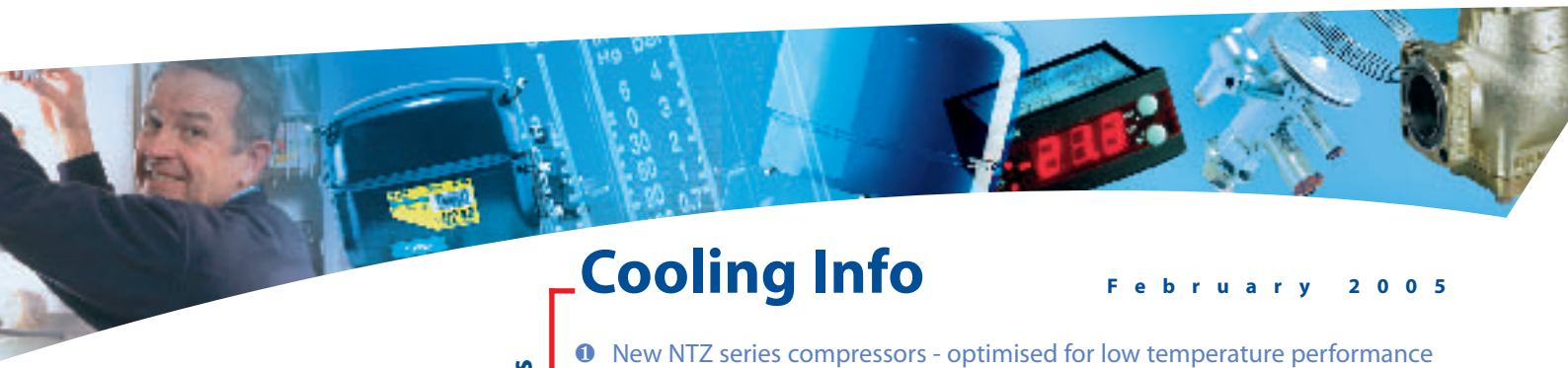


Cooling Info

February 2005

Contents

Compressors and Condensing Units

New NTZ series compressors - optimised for low temperature performance

Danfoss has designed a new range of low temperature reciprocating compressors. The key feature of the new NTZ range, which comprises 8 models, is the optimised performance at -35°C. The result is a highly energy efficient compressor, which can be easily applied in the toughest of applications without any need of additional liquid injection set up.

Versatile solution

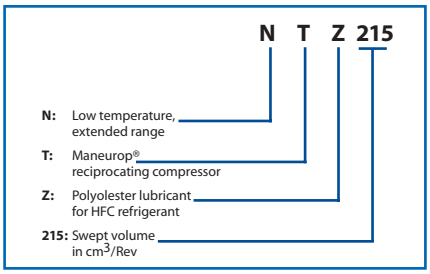
With an application envelope from -10°C down to -45°C, the NTZ compressor can be used in a much wider range of applications compared to other hermetic designs. The high evaporating temperature limit makes the NTZ extremely versatile to use, a significant advantage in systems where fast efficient temperature pull down is required.

Compressor designation

Important to note is the new full compressor designation. The compressor size is now indicated by using the swept volume in cm^3 /rev. rather than a nominal capacity, thus making it easier to understand each compressor size.

Performance

Based on proven suction gas cooled motor design, with integrated motor protection, the NTZ range offers the installer many years of reliable cost effective performance - a true winner in its class. In addition, from early 2005 the 3 phase NTZ compressors will also feature in a new range of single and two fan condensing units, extending application possibilities even further.



NTZ New models	NTZ Cooling Capacity in W
NTZ 048	995
NTZ 068	1515
NTZ 096	2000
NTZ 108	2370
NTZ 136	3225
NTZ 215	4950
NTZ 271	6955

-35/+40°C - RGT 20°C - SC 0K - R404A/R507

So for a simple, reliable, straightforward solution for all your low temperature applications look no further than the new NTZ range. Available now from your local Danfoss wholesaler.

Widest range in expansion valves

Danfoss has been a pioneer in expansion valves since 1933. Since then, the range of thermostatic expansion valves has been extending, both with regard to capacity and as to technology applied. Below you will find an overview of valves suitable for the most occuring refrigerants and an indication of the nominal capacity per valve type.

A range with many possibilities

	BRASS VALVES			STAINLESS STEEL VALVES		BRASS VALVE
	T/TE2	T5/55	PHT	TU	TC	TRE
R404A	0,4 - 14 kW	15 - 229 kW	99 - 1610 kW	0,5 - 12 kW	13 - 20 kW	21 - 190 kW
R407C	0,6 - 20 kW	21 - 385 kW	117 - 2026 kW	0,6 - 17 kW	18 - 28 kW	28 - 246 kW
	Valves with copper connections			Valves with CU-plated connections		

R404A: to= +10°C tc= +45°C tu= 4k
R407C: to= + 5°C tc= +40°C tu= 4k

The nominal capacity range of Danfoss expansion valves is exceptionally large and extends from 0.4 to 1610 kW (with R404A). There are several material and style options:

- brass valves with copper connections of types TE and PHT;
- stainless steel valves with Cu-plated connections type TU/TC;
- and brass valves with Cu-plated connections type TRE.

Brass valves with copper connections

Types TE5/12/20/55

Danfoss is a trend setter. About three decades ago, the basis for the standard range TE5/12/20/55 valves was set using the unique "modular components design". Even today this concept still offers the installer flexibility and a range of service friendly characteristics:

- For capacity adjustment, it is simple to choose and install another orifice;
- Large choice of solder or flare valve housings, in straight or angle way (a TE12 even has solder flanges);
- The thermal element is easy to change when using a different refrigerant or because of an MOP element.

The series cover a capacity range from 15 to 229 kW (with R404A).

Type T/TE2

The successful series of T/TE2 valves is also based on the modular components design with the practical advantages of interchangeable orifices. The big difference is that with the T/TE2 it is only possible to change the orifice, whilst with the TE5/12/20/55 series both the orifice and the thermal elements can be changed. The T/TE2 series covers a capacity range from 0.4 to 14 kW (with R404A).

Type PHT

For very large capacities from 99 to 1610 kW (with R404A) the PHT programme is available. The design also consists of modular components. The PHT series consists of 4 components:

- An orifice assembly for pilot valve;
- A valve body with its own integral main orifice;
- A thermostatic element with a double contact bulb;
- And a flange set (solder- or weld).

The PHT series works on a different design principle, in contrast to the TE series. PHT valves are servo-assisted, proportional regulators for injection of a refrigerant into the evaporator, based on superheat. With larger capacities "servo-operation" is a condition for accurate functioning. With PHT the possibility exists to change the P-band by changing the main spring. This means that a valve can sized and matched to specifically suit the system design requirement. (e.g. for water coolers that have to work with a lower superheat).

Stainless steel valves with Cu-plated connections

Type TU/TC

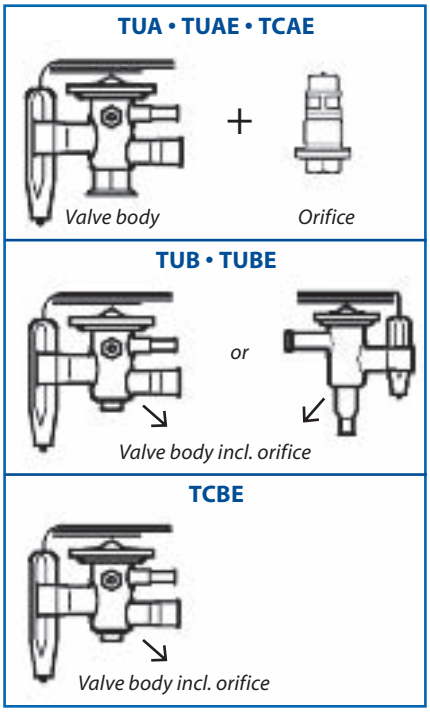
The Kyoto protocol and the planned F-gas regulation have led to a situation where energy-efficiency and maintenance of systems has become even more important. In this respect not only the refrigerants used, but also the valves play an important role. Expansion valves are one of the 'sensitive points' of a refrigeration plant, where leakage can occur. Installation into the system is of major importance, which is why flare connections have been replaced more and more by

solder connections. In the mid '90s Danfoss surprised everyone with the totally new concept of stainless steel (SS) expansion valves type TU/TC, with a capacity of 0.5 to 20 kW for R404A (a large capacity range in small steps).

Typically the whole valve is made from stainless steel and the principle advantages are:

- A compact, light and robust design, which is especially suitable for mobile applications;
- Bimetal connections, enabling quick solder connection without the need for a wet cloth;
- Highly corrosion resistant;
- A stable regulation;
- A SS double contact bulb, which gives optimal heat transfer from pipe to bulb, allowing fast and accurate superheat measurement & control.
- Available with MOP;

Overview TU/TC valves:

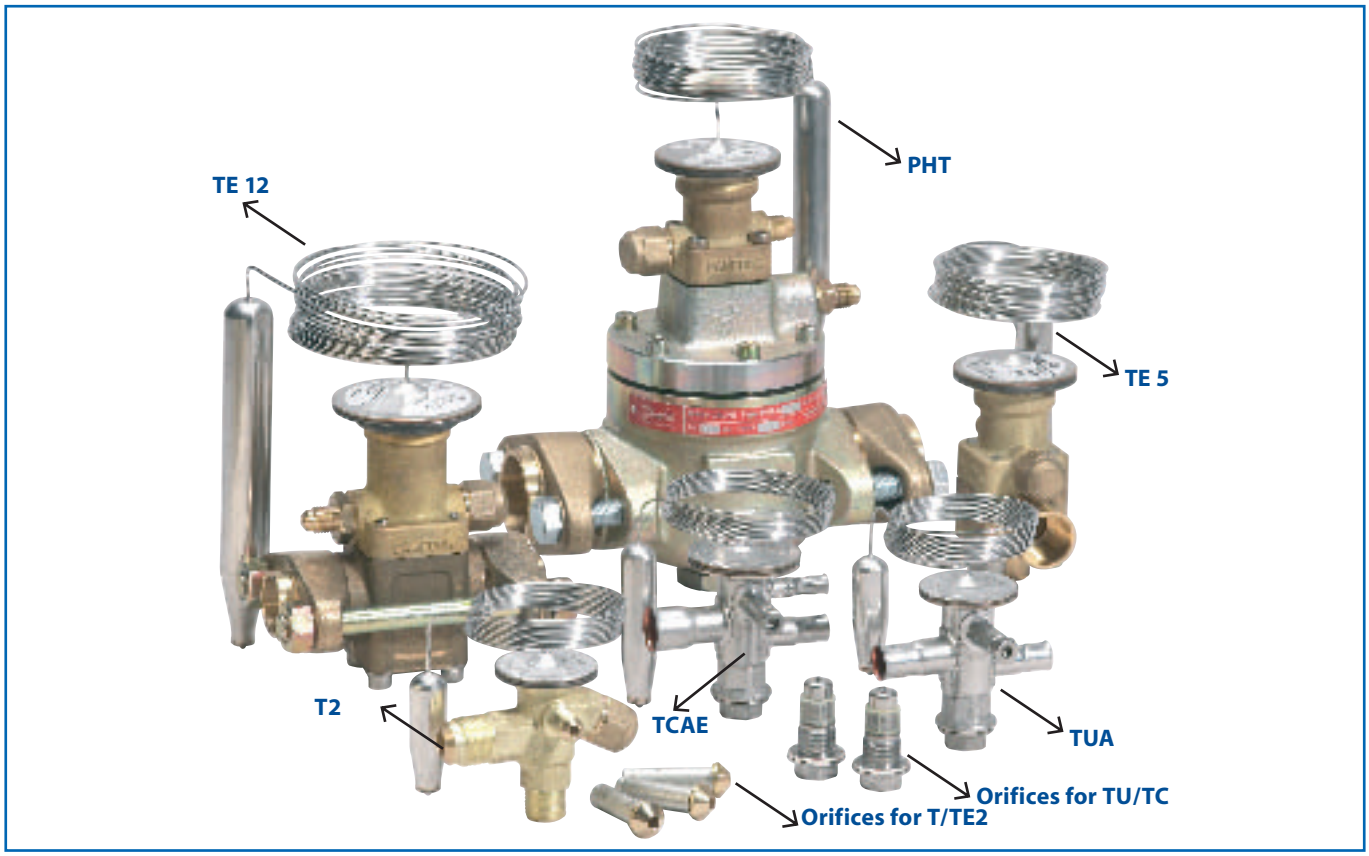


Type TRE

TRE valves share many of the design features of the TU/TC valves: bimetal connections, laser-welded diaphragm element, SS capillary tube and double contact bulb; available for high pressure refrigerants (such as R410A etc). This also gives TRE valves the same advantages: quick assembly, stable regulation, fast and accurate superheat measurement, long lifespan,… Furthermore, they are designed for bi-flow operation. This means that the superheat is independent of the high pressure, for both directions of flow. TRE valves cover a capacity range from 21 to 190 kW (with R404A).

Other valves

In addition to the above mentioned valve types, Danfoss also offers electronic expansion valves type AKV and valve designs suitable for NH3 (liquid injection in "dry" evaporators).



If you require more information about our extensive range of expansion valves, please fill out the enclosed reply form.

Refrigeration and Air Conditioning Controls

ICV: breakthrough in control solutions

During the last IKK trade fair in Nuremberg, Danfoss introduced the latest generation of control valves type ICV. In time, these valves will replace the successful PMs. The new, intelligent modular design makes the construction more flexible and makes service easier. The valves can be operated using pilot valves or stepper motors.

The design

The brand-new concept consists of a valve body, a function module and a top cover. Together with the familiar pilot valves from Danfoss (CVT, EVM and CVP), many different functions can be realized with only one type of main valve.

The valve body

The valve body, made from low-temperature resistant cast steel and suitable for a maximum working pressure of 52 bar, is welded or soldered into the pipes to create a fully hermetic coupling. The valve body will never have to be replaced, because it does not suffer any wear. The function module replaces all the internal parts, so that its simple replacement results, in principle, in a new valve.

The function module

The function module determines the capacity of the valve. This module is a ready-made insert which is simply pushed into the valve body. It consists of a moveable control cone with V ports, and an orifice including the valve seat. The function module is manufactured using the most modern production techniques and guarantees a long, reliable life span with excellent control characteristics. It is sufficient to only exchange the function module to carry out a complete repair. This makes service easier and considerably reduces costs. The modular ICV concept, therefore, offers a high degree of flexibility when constructing a main valve.

Two families

The ICV concept consists of two families: the ICS and the ICM. The ICS is servo operated and can be used with the existing range of pilot valves. Just like the PM valve, the ICS can have 1 or 3 control ports, where the P port is parallel to serial ports SI and SII.

The ICM uses the same valve body as the ICS, but is controlled by a stepper motor. The transmission from the stepper motor to the orifice occurs via a hermetically sealed magnetic coupling. Since the speed of the digital stepper motor can be adjusted, the opening and closing times of the ICM are very flexible. Together with the specific design of the orifice, this guarantees excellent control. Furthermore, the special cavitation-resistant valve seat makes the ICM suitable for use with direct expansion or, for example, hot gas defrosting.

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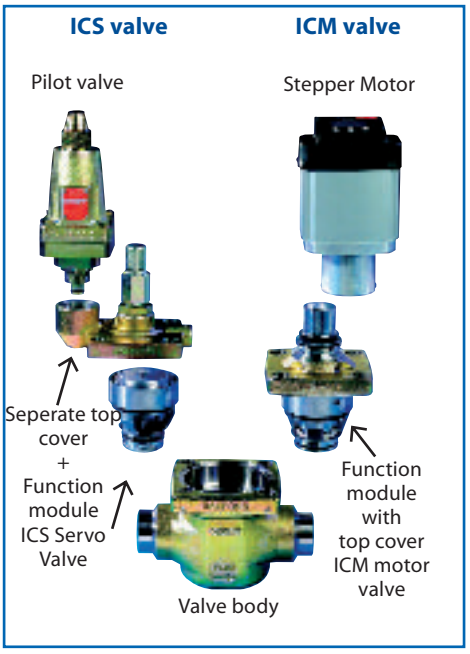

For more information please return the enclosed reply form.