Danfoss pressure and temperature controlled water valves

Water valves are generally used on water cooled condensers, where water is used as a heat transfer method.

**Water cooled condensers are preferred because they:**
- Are used to get optimal performance as they are more effective than air cooled condensers due to more stable media temperature.
- Consumes less electricity
- Adequate water supply available from water tower or well.

**Water valves main purpose:**
- To ensure and maintain required condenser pressure
- To maintain the pressure differential across the thermostatic expansion valve
- To reduce cooling water consumption
- For heat recovery units - energy saving.

Danfoss manufactures two types: Pressure controlled valves and Temperature controlled valves.

### Pressure controlled water valves WVFX, WVS

The WVFX and WVS pressure controlled water valves were introduced in the middle 1960’s in order to control liquid flow for water cooled condensers. Valves control the liquid flow as a function of the condensing pressure, thereby keeping the condensing pressure almost constant and also save on precious water.

#### WVFX pressure controlled water valve

- **W** for: Water
- **V** for: Valve
- **F** for: Fluorinated refrigerant
- **X** for: Family

#### WVS pressure controlled water valve

- **W** for: Water
- **V** for: Valve
- **S** for: Servo operated

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**How do they work?**

- Higher condenser pressure ➔ Higher opening degree on water valves ➔ More cooling of the condenser
- Lower condenser pressure ➔ Lower opening degree on water valves ➔ Less cooling of the condenser

### WVFX Technical Data:

- **Refrigerants**: CFC / HCFC / HFC / NH3
- **Condenser side:**
  - **MWP**: 26.4 bar
  - **Setting pressure**: 3.5 to 16 bar
  - **With spec. spring**: 4 to 23 bar
  - **Offset Δp**: 2 to 3.5 bar
  - **Connections**: ¼ in. Flare, cup. Tube, weld. Connector for ammonia
- **Liquid side:**
  - **Medium**: Fresh water and neutral brine
  - **Temp. of medium**: -25 to +130 °C
  - **MWP**: 16 bar
  - **Opening diff. press.**: max 10 bar
  - **Kv value**: 1.4 to 5.5 m³/h
  - **Connections**: G/NPT (3/8 to 1 in.)

### Also available for R410A:

- **Max Working Pressure**: 45.2 bar
- **Max Test Pressure**: 60 bar
- **Control pressure**: 15 to 29 bar
Temperature controlled water valves AVTA, WVTS

The AVTA temperature controlled water valve was introduced in the late 1960’s and WVTS in the early 1970’s. Valves control liquid flow for liquid cooled condensers and other types of heat exchangers like a water cooled oil cooler on a screw compressor unit.

AVTA temperature controlled water valve
- A for: Automatic
- V for: Valve
- T for: Temperature controlled
- A for: Version (cooling)

AVTA Charge types
Absorption charge:
- Small sensor ø9,5 x 160mm
- Wide regulating range
- Limited accuracy
- Slow reaction on temperature shift
- Max. pressure on sensor 25 bar
- No orientation limit – sensor can be installed in any position
- Temperature range: 10-80°C
Mass charge:
- Small sensor ø9,5 x 190mm
- Precise temperature regulation
- Fast response on temperature changes
- Sensor must point up (15° to 175°)
- Sensor shall be installed warmer than the valve
- Max. pressure on sensor 25 bar
- Temperature range: 0-30°C, 25-65°C

Universal Charge:
- Sensor ø18 x 210 mm
- Fast and precise temperature regulation
- Wide temperature range
- Max. pressure on sensor 25 bar
- Sensor can be installed colder or warmer than valve
- Sensor must not point upwards
- Temperature range: 0-30°C, 25-65°C, 50-90°C

WVTS32 to 100
- High capacity valve
- The same design as WVS (size: 1 ¼ to 4 in.)
- Thermostatic pilot unit with universal charge
- Setting range: 0-30 °C, 25-65 °C, 50-90 °C

What makes us the best?
Product features:
- Step-less, proportional regulation of flow volume
- Self acting – needs no electricity
- Exact pressure control – very low hysteresis
- Insensitive to dirt – the reliable "fit and forget valve"
- Insensitive to water pulsating pressure
- From zero differential pressure
- Good external tightness even at high dpf Pressures
- Modular design - easy to customize
- Wide range of different body materials
  (stainless steel), connections and temperature
- Can be installed in any position

A few hints when sizing a valve:
1) Select the smallest valve capable of giving the required flow.
2) Never oversize a water valve because it will cause hunting. Below
20% the valve will act as an on/off valve. Install 2 smaller valves
instead!
3) To obtain a precise control it is recommended to use only 85% of
the valve capacity. Above 85% the ratio between the water flow and
the condensing pressure is no longer linear.
Because of that, the capacity data included in water valve
specification is in fact at 85% capacity. (OFFSET)

*For assistance in sizing of valves, please contact Danfoss

A few application examples

- Dry cleaning machines
- Ice making machines
- Ice cream machines
- Small water cooled condensing units
- Water cooled chillers and heat pumps