Let motorized intelligence solve your **application challenges**

For HVAC, central heating, district heating and cooling systems.

Motorized control valves

More than **100,000** Danfoss MVCs have been installed globally over the past two years.

www.heating.danfoss.com
Perfect control and efficiency for every building and application

Based on decades of experience, changing customer needs and global energy-efficiency trends, we are developing the motorized control technology of tomorrow.

Danfoss Motorized Control Valves (MCV) for district heating and cooling, HVAC and central heating systems ensure stable and accurate control of water, glycol mixtures and steam. This in turn improves temperature control and reliability while increasing the energy efficiency of the system. All of which adds up to enhanced comfort for the end-user.

The MCV range comprises both regular and pressure-relieved control valves designed to operate in the most demanding applications.
Danfoss Commercial Controls offers a comprehensive range of control valves and actuators for virtually every application: central and decentralized heating systems, domestic hot-water systems, district heating and steam.

For maximum versatility, our control valves and actuators come in different sizes, materials and connection options. They also offer a range of different functions and features to suit each specific application.

With a global reputation for quality and reliability, our latest solutions are available at different price points to suit the budgetary needs of every project.
The benefits of choosing Danfoss Motorized Control Valves

Years of customer insights and product development for district heating, HVAC and central heating applications have enabled us to create a flawless product that perfectly complies with all current requirements and future trends. Here are some of the highlights.

Excellent control performance

The control capabilities of the MCV range are based on different characteristics, including split characteristics for DHW applications using heat exchangers, as well as linear and logarithmic characteristics. This means that even the most difficult control requirements in district heating can be met, while still providing instantaneous hot water.

For DHW systems, the low slope of the split characteristic in this part of the stroke ensures stable control of the valve in the critical area near the closing position. On the other hand, the steeper part of the curve (large flow) enables fast and stable control.

Proven lifetime cost effectiveness

Thanks to easy selection, installation, commissioning and maintenance, Danfoss MCVs simply cost you less time, money and effort.

Your benefits at a glance

» Auto detection of control signal
» Speed selection
» LED signalization
» Option to operate as either 3-point or modulating
» Fast connection
» Easy wiring procedure
» Free positioning
» Anti-oscillation function
» Split characteristic of DHW valves
Increased reliability and operational safety

All new products feature built-in thermic and overload protection of the electromotor. This radically reduces the risk of operational failure in either the valve or the system as a whole.

Features
» Thermic and overload protection
» 360° installation without compromising IP
» Direct inverse functionality
» Safety function (TUV certified) – Spring up (SU), Spring down (SD)

Easy handling and installation

Danfoss MCVs are easy to handle, easy to operate and easy to understand. Quick connection to actuator and valve is enabled by a threaded coupling, which also allows for rotation after mounting. External LED visualization and signaling save time and effort during installation and commissioning of MCVs.

Features
» Easy wiring with the option to prewire the actuators
» Selectable features available on jumpers
» LED signalization
» 360° installation without compromising IP
» Top-down and side-in mounting of actuator – compact design

Features
» Anti-oscillation
» Control ratio
» Stroke limitation
» Split characteristics
» Modification of controls characteristic (65X actuators)
Expand your perspective on motorized control valves

FOR DISTRICT HEATING APPLICATIONS

ELECTRICAL ACTUATORS
FUNCTIONS AND FEATURES
- Power supply: 24 / 230 V
- Control signal: modulating / 3-point
- Speed range: 2 - 24 s/mm
- Force range: 250 - 5000 N
- Stroke range: 5.5 - 50 mm
- Safety function with DIN TUV available

SEATED CONTROL VALVES
FUNCTIONS AND FEATURES
- DN: 15 - 250 mm
- PN: 16 - 25 bar
- Temperature: (-10 ... 2)°C ... 200°C
- Kvs: 0.25 - 900 m³/h
- Media: water, water with glycol, steam
- Thread / Flange / 2 way

FOR HEATING AND COOLING APPLICATIONS

ELECTRICAL ACTUATORS
FUNCTIONS AND FEATURES
- Power supply: 24 / 230 V
- Control signal: modulating / 3-point
- Speed range: 1 - 24 s/mm
- Force range: 200 - 15000 N
- Stroke range: 5.5 - 80 mm
- Safety function available

SEATED CONTROL VALVES
FUNCTIONS AND FEATURES
- DN: 15 - 300 mm
- PN: 6 - 16 bar
- Temperature: (-10 ... 2)°C ... 200°C
- Kvs: 0.63 - 1350 m³/h
- Media: water, water with glycol
- Thread / Flange / 2 and 3 way

* with steam heater
### ELECTRICAL ACTUATORS
**FUNCTIONS AND FEATURES**
- **Power supply**: 24 / 230 V
- **Control signal**: modulating / 2, 3-point
- **Speed range**: 12 - 24 s/mm
- **Force range**: 105 - 300 N
- **Stroke range**: 2.8 - 5.5 mm
- **Safety function**: available

### ZONE VALVES
**FUNCTIONS AND FEATURES**
- **Power supply**: 24 / 230 V
- **Control signal**: modulating / 2, 3 point
- **Speed range**: 15 - 480 s/90°
- **Torque**: 5 - 15 Nm
- **Rotation angle**: 90°
- **Internal auxiliary switch**: available

### SEATED CONTROL VALVES
**FUNCTIONS AND FEATURES**
- **DN**: 15 - 20 mm
- **PN**: 16 bar
- **Temperature**: 2…120°C
- **Kvs**: 0.25 - 4 m³/h
- **Media**: water, water with glycol
- **Thread**: 2, 3, 4 way
- **Thread / Flange**: with bypass

### ROTARY VALVES
**FUNCTIONS AND FEATURES**
- **DN**: 15 - 150 mm
- **PN**: 6 - 10 bar
- **Temperature**: 2…110°C
- **Kvs**: 0.4 - 400 m³/h
- **Rotation angle**: 90°
- **Thread / Flange**: 2, 3, 4 way

### DAMPER ACTUATORS
**FUNCTIONS AND FEATURES**
- **Power supply**: 24 / 230 V
- **Control signal**: modulating / 2, 3 point
- **Speed range**: 40 - 150 s/90°
- **Torque**: 3 - 40 Nm
- **Safety function**: available
- **Optional**: auxiliary switch
Applicable combinations for district heating

Recommended combination

<table>
<thead>
<tr>
<th>Valve type</th>
<th>Suitable actuators</th>
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<tbody>
<tr>
<td>VS2</td>
<td>AMV 150, AMV(E) 10/13, AMV(E) 20/23, AMV(E) 30/33</td>
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<td>VM2/VB2</td>
<td>AMV(E) 10/13, AMV(E) 20/23/30/33</td>
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Single house with direct system

Single house with indirect system

Residential/commercial building system

<table>
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<td>VFM2</td>
<td>AMV(E) 655, 658 SD, 659 SD</td>
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Applicable combinations for **district heating** and **HVAC**

### Recommended combination

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<th>Valve type</th>
<th>Suitable actuators</th>
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<tr>
<td>VFM2</td>
<td>AMV(E) 655, 658 SD, 659 SD</td>
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</table>

### Central/distribution station system

![Diagram of central/distribution station system]

### Fan coil units

![Diagram of fan coil units]

### Air handling units

![Diagram of air handling units]

### Valve type combinations

#### Constant flow
- **Valve type**: VZL3
- **Suitable actuators**: AMV(E) 130/140, AMV(E) 130H/140H

#### Variable flow
- **Valve type**: AB-QM
- **Suitable actuators**: AMV(E) 110/120NL/NovoCon*

#### Constant flow
- **Valve type**: VRB3
- **Suitable actuators**: AMV(E) 435, AMV(E) 438SU

#### Variable flow
- **Valve type**: AB-QM
- **Suitable actuators**: AME 110NL/435QM/NovoCon*

* Available in second half of 2015

AMD = damper actuators available with or without spring return function.
Applicable combinations for **HVAC** and central heating

### Chiller application

- **Valve type** Suitable actuators
  - **VF3**
    - AMV(E) 435, AMV(E) 438SU, AMV(E) 55/56, AMV(E) 655, 658SU, AMV(E) 685*
  - **HRB3**
    - AMB162/182
  - **HRE4**
    - AMB162/182
  - **HFE3**
    - AMB182

* Available in second half of 2015

### Variable flow

- **Valve type** Suitable actuators
  - **AB-QM**
    - AME 435, AME 55, AME 85QM

### Passive cooling application

- **Valve type** Suitable actuators
  - **VRB3**
    - AMV(E) 435, AMV(E) 438SU
  - **VF3**
    - AMV(E) 435, AMV(E) 438SU

### Boiler applications

- **Valve type** Suitable actuators
  - **HRB4**
    - AMB162/182
  - **HRE4**
    - AMB162/182
  - **HRB3**
    - AMB162/182
  - **HFE3**
    - AMB182

* boiler house
## Applicable combinations for central heating

### Recommended combination

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### Heat pump application

![Diagram of heat pump application]

### Solar application

![Diagram of solar application]

### Priority control of DHW and heating systems

![Diagram of priority control]
### Danfoss Motorized Control Valves

#### ACTUATORS

Electrical actuators for district heating applications

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<th>AMV(E) 30</th>
<th>AMV(E) 23(SU)</th>
<th>AMV(E) 20</th>
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#### VALVES

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<th>dP (bar)</th>
<th>dP (bar)</th>
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1) H – manual operation button
2) Yes – with AM-PBU 23 battery pack
3) 2(10):130 up to dimensions DN 100;
   2(10):150 from DN 125-150
4) This is a general overview; for detailed dP over different DN, please see datasheet
5) This is 2-point control
6) Hybrid version: modulating and BACnet MS/TP
   Digital version: BACnet MS/TP only
7) QM version is recommended
## Actuators for HVAC applications

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<th>AMV(E) 685</th>
<th>AMV(E) 85/QM/96</th>
<th>AMV(E) 55/QM/56</th>
<th>AMV(E) 438 SU</th>
<th>AMV(E) 33</th>
<th>AMV(E) 25 (SU/SD)</th>
<th>AMV(E) 130H(140M)</th>
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<th>AMV/E 110NL</th>
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<td>1.5-4.5 / 1-3</td>
<td>(DN65-100)</td>
<td>2.25</td>
<td>(DN15-50)</td>
<td>25: 3-25 (DN15-50)</td>
<td>25 SU/SD: 6.5-22 (DN15-50)</td>
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<td>4</td>
<td>(DN15-32)</td>
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<td>5-10</td>
<td>(DN150-250)</td>
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<tr>
<td>10-12</td>
<td>(DN150-250)</td>
<td>15-16</td>
<td>(PN 16; DN65-125)</td>
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<tr>
<td>1-2.5</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>4 (2-way + mixing) / 1 (diverting)</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>4 (2-way + mixing) / 1 (diverting)</td>
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<tr>
<td>55:</td>
<td>1 (2-way + mixing) / 0.3 (diverting) (DN 100)</td>
<td>2.5-4 (2-way + mixing) / 0.6-1 (diverting) (DN15-80)</td>
<td>4 (2-way + mixing) / 1 (diverting) (DN15-80)</td>
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<td></td>
<td></td>
<td>25SU/SD: 4 (D40-100)</td>
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</tr>
<tr>
<td>0.8-2.3</td>
<td>(2-way + mixing) / 0.7-1.5 (diverting)</td>
<td>1.5-3 (2-way + mixing) / 0.6 (diverting) (DN125s-150)</td>
<td>55: 0.5-1.5 (2-way + mixing) / 0.3 (diverting) (DN100-150)</td>
<td>2.5-4 (2-way + mixing) / 0.6-1 (diverting) (DN15-80)</td>
<td>4 (2-way + mixing) / 1 (diverting) (DN15-80)</td>
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<tr>
<td>4 (DN200-250)</td>
<td>4 (DN200-250)</td>
<td>4 (DN125-150)</td>
<td>4 (DN40-100)</td>
<td>4 (DN40-100)</td>
<td>4 (DN40-100)</td>
<td>25SU/SD: 4 (D40-100)</td>
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</table>
### DAMPER ACTUATORS

**类型的 Actuator for central heating**

<table>
<thead>
<tr>
<th>AMZ 112 actuator</th>
<th>AMZ 113 actuator</th>
<th>AMB 162</th>
<th>AMB 182</th>
</tr>
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<tbody>
<tr>
<td><strong>Voltage 24 V</strong></td>
<td>AC</td>
<td>AC</td>
<td>AC and AC/DC</td>
</tr>
<tr>
<td><strong>Voltage 230 V</strong></td>
<td>AC</td>
<td>AC</td>
<td>AC</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>2 point</td>
<td>2 point</td>
<td>3 point/modulating</td>
</tr>
<tr>
<td><strong>Safety function</strong></td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>Speed (°/90°)</strong></td>
<td>30, 60 (^{\circ})</td>
<td>30, 60 (^{\circ})</td>
<td>15, 30, 60, 90, 120, 480 (^{\circ})</td>
</tr>
<tr>
<td><strong>Torque (Nm)</strong></td>
<td>5, 10 (^{\circ})</td>
<td>5, 15 (^{\circ})</td>
<td>5 Nm</td>
</tr>
<tr>
<td><strong>AUX. Switch</strong></td>
<td>yes</td>
<td>yes</td>
<td>yes (optional)</td>
</tr>
<tr>
<td><strong>Angle of rotation</strong></td>
<td>90°</td>
<td>90°</td>
<td>90°</td>
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</table>

### VALVES

**Product range overview continued**

<table>
<thead>
<tr>
<th>PN (bar)</th>
<th>Temperature (°C)</th>
<th>Type</th>
<th>Ports</th>
<th>DN</th>
<th>Rotation angle (°)</th>
<th>dP(^{1}) (bar)</th>
<th>dP(^{1}) (bar)</th>
<th>2 (diverting) / 1 (mixing)</th>
<th>2 (diverting) / 1 (mixing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>2 - 110</td>
<td>HRB</td>
<td>3/4</td>
<td>15</td>
<td>50</td>
<td>0.4 - 40</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>6</td>
<td>2 - 110</td>
<td>HRE</td>
<td>3/4</td>
<td>15</td>
<td>50</td>
<td>6.3 - 40</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>10</td>
<td>-20...130(^{\circ})</td>
<td>HFE</td>
<td>3</td>
<td>20 - 150</td>
<td>12 - 400</td>
<td>0.5</td>
<td>0.5</td>
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</tr>
<tr>
<td>40</td>
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<td>AMZ 112 valve</td>
<td>2</td>
<td>15</td>
<td>17</td>
<td>6</td>
<td>6</td>
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<tr>
<td>25</td>
<td></td>
<td>AMZ 113 valve</td>
<td>3</td>
<td>15</td>
<td>17</td>
<td>6</td>
<td>6</td>
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<tr>
<td>40</td>
<td></td>
<td>AMZ 113 valve</td>
<td>3</td>
<td>25</td>
<td>41</td>
<td>6</td>
<td>6</td>
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<td>40</td>
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<td>AMZ 113 valve</td>
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<td>32</td>
<td>70</td>
<td>6</td>
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<td>AMZ 113 valve</td>
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<td>50</td>
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<td>6</td>
<td>6</td>
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<tr>
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<td>AMZ 113 valve</td>
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<td>15</td>
<td>17</td>
<td>6</td>
<td>6</td>
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</tr>
</tbody>
</table>

1) This is a general overview for detailed dP over different DNs, speeds, please see datasheet
2) 30s \(\text{version}\) is used with 5 Nm – AMZ 112 up to DN 25 and AMZ 113 up to DN 25 – 60s \(\text{version}\) is used with 10/15 Nm – AMZ 112 DN 32-50 and AMZ 113 DN 32
3) 5 Nm only for AMZ 112 DN 15-32 and AMZ 113 DN 15-25 – 10 Nm only for AMZ 112 DN 32-50 – 15 Nm only for AMZ 113 DN 32
4) This information is valid for valve only: for minimum temperature information about AMZ112/113 products, please contact Danfoss

### DAMPER ACTUATORS

**类型的 DAMPER actuators – non spring return**

<table>
<thead>
<tr>
<th>Type</th>
<th>AMD 210</th>
<th>AMD 220</th>
<th>AMD 310</th>
<th>AMD 320</th>
<th>AMD 410</th>
<th>AMD 420</th>
<th>AMD 610</th>
<th>AMD 620</th>
<th>AMD 710</th>
<th>AMD 720</th>
<th>AMD 810</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage 24 V</strong></td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
<td>AC/DC</td>
</tr>
<tr>
<td><strong>Voltage 230 V</strong></td>
<td>AC/DC</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td><strong>2/3 point control</strong></td>
<td>yes (^{b})</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes (^{n})</td>
<td>no</td>
<td>yes (^{n})</td>
<td>no</td>
<td>yes (^{n})</td>
<td>no</td>
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<tr>
<td><strong>Modulating control</strong></td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
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<tr>
<td><strong>Safety function</strong></td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
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<tr>
<td><strong>Speed (°/90°)</strong></td>
<td>60-120</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
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<td>40/20</td>
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<tr>
<td><strong>Torque (Nm)</strong></td>
<td>5</td>
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<td>10</td>
<td>15</td>
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<td>20</td>
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<td>4</td>
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<td><strong>AUX switch</strong></td>
<td>1 (^{m})</td>
<td>1 (^{m})</td>
<td>1 (^{m})</td>
<td>1 (^{m})</td>
<td>1 (^{m})</td>
<td>1 (^{m})</td>
<td>2 (^{m})</td>
<td>2 (^{m})</td>
<td>2 (^{m})</td>
<td>2 (^{m})</td>
<td>2 (^{m})</td>
</tr>
</tbody>
</table>

5) Depends on wiring
6) With AUX switch, lower speed is valid
7) Operational speed / safety function speed
8) Optional
Quality is...

...one of the reasons why our customers stay with us for decades
Long-lasting quality to the core
Danfoss valves

System reliability, building and occupant safety are crucial when it comes to district heating and cooling applications. This is why we give special attention to design and material selection used in our products. Valve bodies are made of high quality red bronze and cast iron or steel. Critical internal parts are made from well-proven stainless steel 1.4404 /1.4571 /1.4021. In combination with a specially designed valve seat and cone, this ensures resistance to cavitation and corrosion. Danfoss products will ensure trouble-free operation, low maintenance and operational costs.

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For more than 75 years Danfoss has been supplying innovative heating solutions that cover everything from individual components to complete district heating systems. Danfoss engineers technologies that enable the world of tomorrow to do more with less. We employ 24,000 people and serve customers in more than 100 countries. Driven by our customers’ needs, we build on years of experience to be at the forefront of innovation, continually supplying components, expertise and complete systems for climate and energy applications.

Today, our advanced, reliable and user-friendly technology helps to keep people comfortable and companies competitive across the world.

We play an active role in the main growth themes in a world that is rapidly changing: infrastructure, food, energy and climate are the focus of our business. Cities for millions that touch the sky. A richer harvest to feed a growing world. Keeping food fresh and our children warm in a world that can make more out of less. This is how we are Engineering Tomorrow.

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A selection tool that helps you choose the right combination of valve and actuator.

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