

ENGINEERING  
TOMORROW

*Danfoss*

Motorized control valves

# Let motorized intelligence solve your **application challenges**

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



More than

**100,000**

Danfoss MVCs have  
been installed  
globally over the  
past two years.

[www.heating.danfoss.com](http://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.



## 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

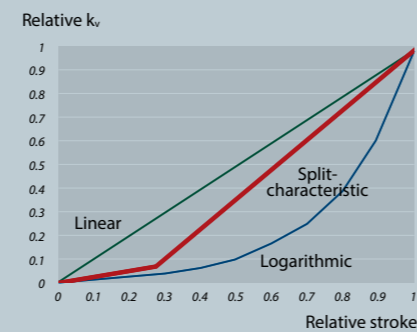
- » Easy wiring with the option to prewire the actuators
- » Selectable features available on jumpers
- » LED signalization
- » 360° installation without compromising IP
- » Top-down and side-in mounting of actuator – compact design

## 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.

### Relative characteristic comparison

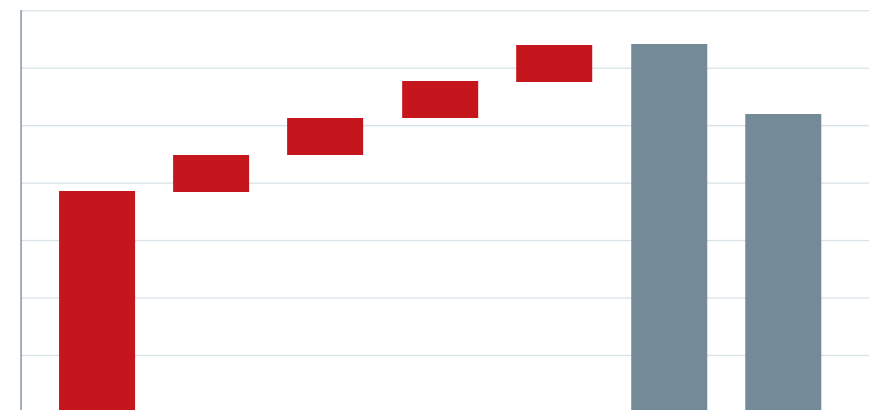


### Features

- » Anti-oscillation
- » Control ratio
- » Stroke limitation
- » Split characteristics
- » Modification of controls characteristic (65X actuators)

## 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)

# 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)\*...200°C
- Kvs 0.25 - 900 m<sup>3</sup>/h
- Media water, water with glycol, steam
- Thread / Flange
- 2 way

\*with steam heater

## 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

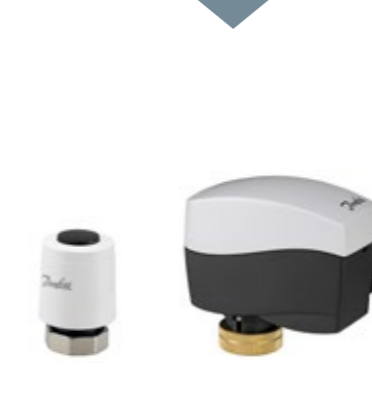


### SEATED CONTROL VALVES FUNCTIONS AND FEATURES

- DN 15 - 300 mm
- PN 6 - 16 bar
- Temperature (-10 ...2)\*...200°C
- Kvs 0.63 - 1350 m<sup>3</sup>/h
- Media water, water with glycol
- Thread / Flange
- 2 and 3 way

\*with steam heater

## FOR TERMINAL AND ZONE APPLICATIONS



### 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



### SEATED CONTROL VALVES FUNCTIONS AND FEATURES

- DN 15 - 20 mm
- PN 16 bar
- Temperature 2...120°C
- Kvs 0.25 - 4 m<sup>3</sup>/h
- Media water, water with glycol
- Thread
- 2, 3, 4 way with bypass

## FOR CENTRAL HEATING APPLICATIONS



### ELECTRICAL ACTUATORS FUNCTIONS AND FEATURES

- Power supply 24 / 230 V
- Control signal modulating / 3-point
- Speed range 15 - 480 s/90°
- Torque 5 - 15 Nm
- Rotation angle 90°
- Internal auxiliary switch available



### ROTARY VALVES FUNCTIONS AND FEATURES

- DN 15 - 150 mm
- PN 6 - 10 bar
- Temperature 2...110°C
- Kvs 0.4 - 400 m<sup>3</sup>/h
- Rotation angle 90°
- Thread / Flange
- 2, 3, 4 way

## FOR CENTRAL HEATING AND HVAC APPLICATIONS



### ZONE VALVES FUNCTIONS AND FEATURES

- Power supply 24 / 230 V
- Control signal 2-point
- Speed range 30 and 60 s/90°
- DN 15 - 50 mm
- Temperature 2...130°C
- dP 6 bar
- Thread
- 2 and 3 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

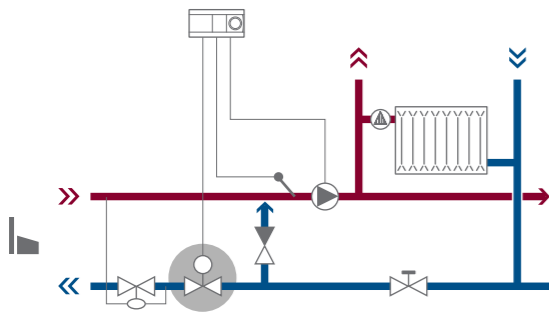
# Applicable combinations for district heating

# Applicable combinations for district heating and HVAC

## Recommended combination

## Recommended combination

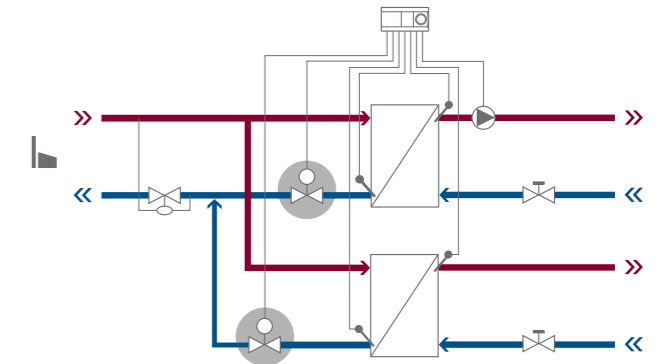
### Single house with direct system



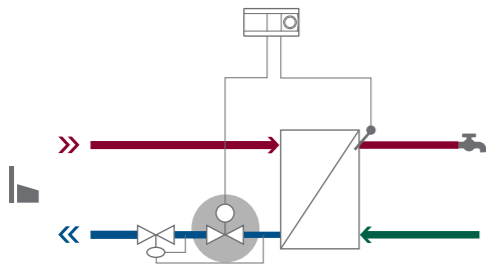
Valve type	Suitable actuators
<b>VS2</b>	AMV 150, AMV(E) 10/13, AMV(E) 20/23, AMV(E) 30/33
<b>VM2/VB2</b>	AMV(E) 10/13, AMV(E) 20/23/30/33

Valve type	Suitable actuators
<b>VFM2</b>	AMV(E) 655, 658 SD, 659 SD

### Central/distribution station system



### Single house with indirect system



Valve type	Suitable actuators
<b>VS2</b>	AMV(E) 10/13, AMV(E) 20/23, AMV(E) 30/33
<b>VM2/VB2</b>	AMV(E) 10/13, AMV(E) 20/23/30/33

### Constant flow

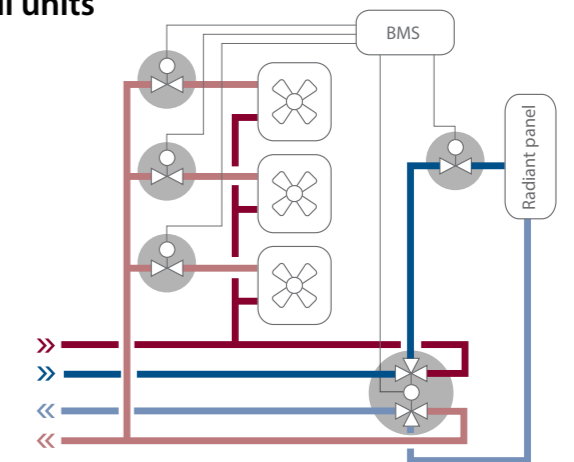
Valve type	Suitable actuators
<b>VZL3</b>	AMV(E) 130/140, AMV(E) 130H/140H
<b>6-way change-over valve*</b>	

### Variable flow

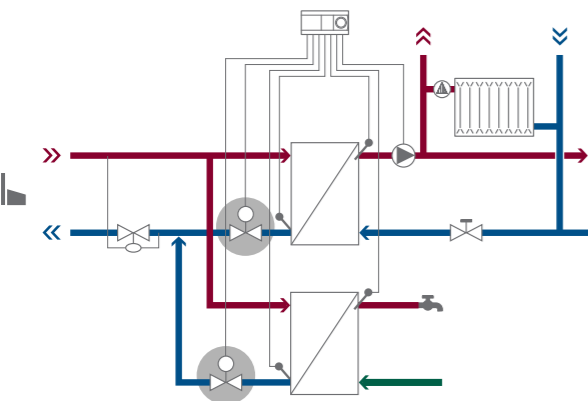
Valve type	Suitable actuators
<b>AB-QM</b>	AMV(E) 110/120NL/NovoCon*

\* Available in second half of 2015

### Fan coil units



### Residential/commercial building system



Valve type	Suitable actuators
<b>VM2/VB2</b>	AMV(E) 10/13, AMV(E) 20/23/30/33
<b>VFM2</b>	AMV(E) 655, 658 SD, 659 SD

### Constant flow

Valve type	Suitable actuators
<b>VRB3</b>	AMV(E) 435, AMV(E) 438SU
<b>VF3</b>	AMV(E) 435, AMV(E) 438SU

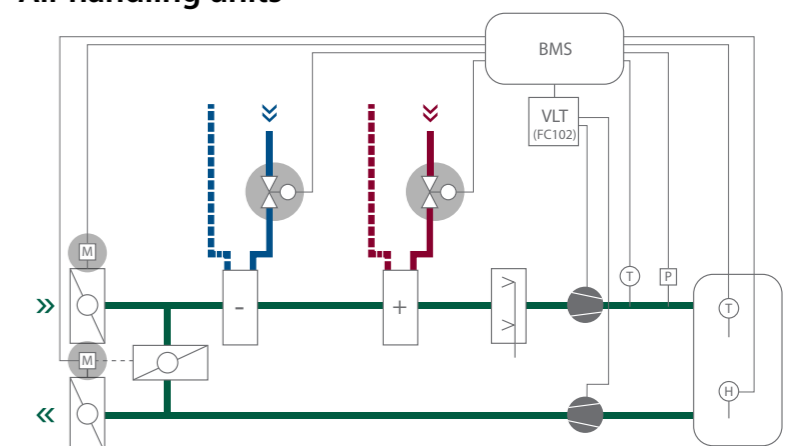
### Variable flow

Valve type	Suitable actuators
<b>AB-QM</b>	AME 110NL/435QM/NovoCon*

\* Available in second half of 2015

**AMD** – damper actuators available with or without spring return function.

### Air handling units



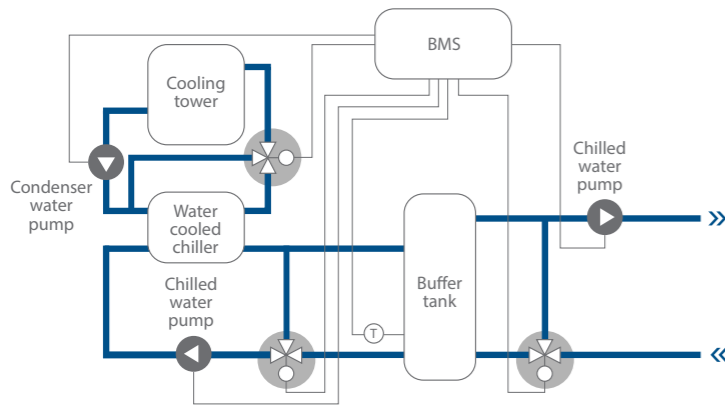
# Applicable combinations for HVAC and central heating

# Applicable combinations for central heating

## Recommended combination

## Recommended combination

### Chiller application



### Constant flow

Valve type	Suitable actuators
HRB3	AMB 162/182
HFE3	AMB 162/182
VF3	AMV(E) 435, AMV(E) 438SU, AMV(E) 55/56, AMV(E) 655, 658SU, AMV(E) 685*

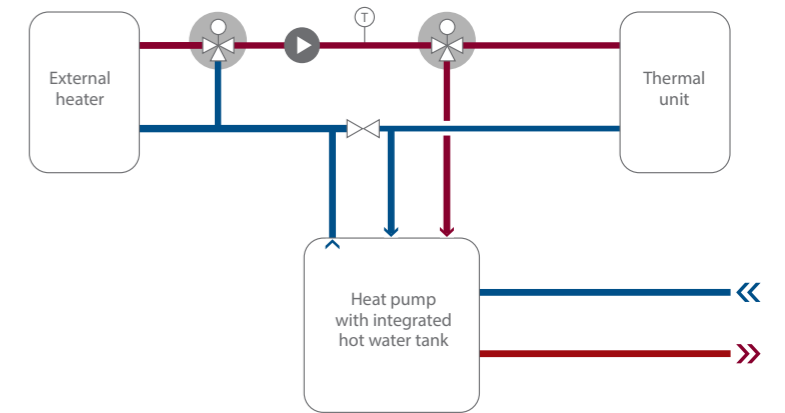
\* Available in second half of 2015

### Variable flow

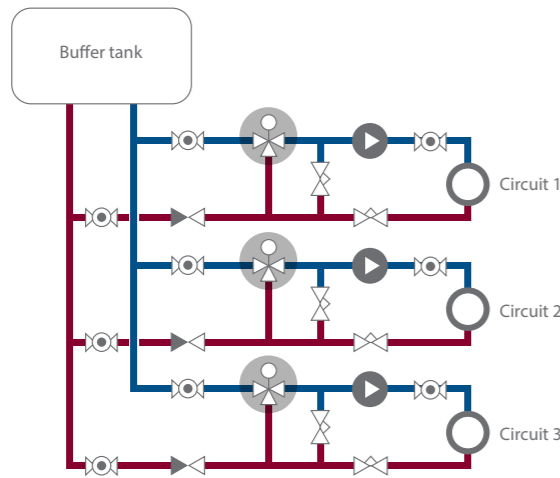
Valve type	Suitable actuators
AB-QM	AME 435, AME 55, AME 85QM

Valve type	Suitable actuators
HRB3	AMB 162/182
HFE3	AMB 162/182

### Heat pump application



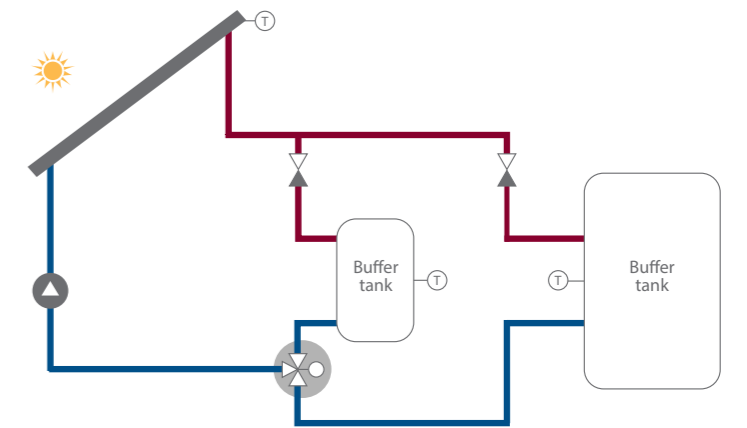
### Passive cooling application



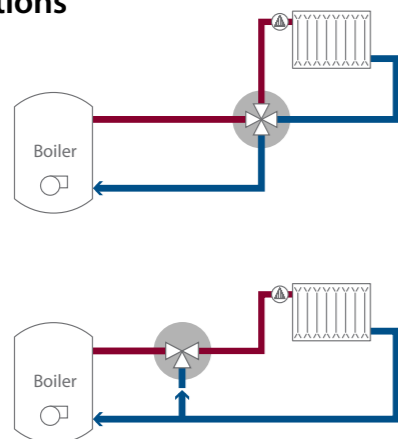
Valve type	Suitable actuators
VRB3	AMV(E) 435, AMV(E) 438SU
VF3	AMV(E) 435, AMV(E) 438SU

Valve type	Suitable actuators
HRB3	AMB 162/182
HRE3	AMB 162/182

### Solar application



### Boiler applications

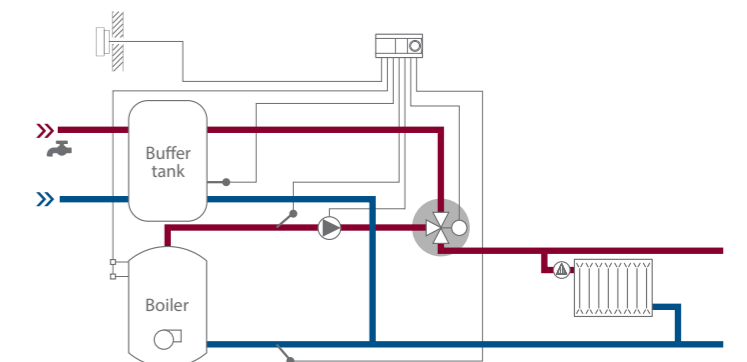


Valve type	Suitable actuators
HRB4	AMB162/182
HRE4	AMB162/182
HRB3	AMB162/182
HFE3*	AMB182

\* boiler house

Valve type	Suitable actuators
ON/OFF Zone	AMZ 113
HRB3	AMB 162/182

### Priority control of DHW and heating systems



## ACTUATORS

Type	Electrical actuators for district heating applications										Actuators for HVAC applications																
	AMV(E) 655	AMV(E) 658 SU/SD; AMV(E) 659 SD	AMV(E) 33	AMV(E) 30	AMV(E) 23(SU)	AMV(E) 20	AMV(E) 13(SU)	AMV(E) 10	AMV 150(AS)	AME 855	AMV(E) 685	AMV(E) 85(QM)/86	AMV(E) 55(QM)/56	AMV(E) 435(QM)	AMV(E) 438 SU	AMV(E) 35	AMV(E) 25 (SU/SD)	AMV(E) 130(H)/140(H) <sup>1)</sup>	TWA-ZL/Z	ABN A5	ABNM	AMV/E 110NL	AMI 140 <sup>5)</sup>	NovoCon			
<b>Voltage 24 V</b>	AC/DC	AC/DC	AC	AC	AC	AC	AC	AC	AC	AC				AC/DC	AC	AC	AC	AC	AC/DC	AC/DC	AC/DC	AC	AC	AC/DC			
<b>Voltage 230 V</b>	AC/DC	AC/DC	AC	AC	AC	AC	AC	AC	AC	AC				AC	AC	AC	AC	AC	AC	AC	no	no	AC	no			
<b>3 point control</b>	AMV	AMV	AMV	AMV	AMV	AMV	AMV	AMV	AMV	yes				AMV	AMV	AMV	AMV	AMV	no	no	no	yes	no	no			
<b>Modulating control</b>	AME	AME	AME	AME	AME	AME	AME	AME	no	AME				AME	AME	AME	AME	AME	no	no	yes	yes	no	yes <sup>6)</sup>			
<b>Safety function</b>	no	yes	yes (SD)	no	yes (SU/SD)	no	yes (SU/SD)	no	no	no				no	yes SU	no	yes (SU/SD)	no	no	yes	yes	no	no	no			
<b>Speed (s/mm)</b>	2 or 6	2 or 6	3	3	15	15	14	14	24	2				8 / 3	8 / 4	15 or 7.5	15	3	11 / 15	24 / 12	app. 60	30	30	24 / 12	12	24 / 3	
<b>Force / torque</b>	2000 N	2000 N	450 N	450 N	450 N	450 N	300 N	300 N	250 N	15000 N				5000 N	5000 N	2000 N / 1500 N	400 N	450 N	600 N	1000 N / 450 N	200 N	90	95	95	130	200	90
<b>Stroke (mm)</b>	50	50	10	10	10	10	5.5	5.5	5	80				80	40	40	20	15	15	15	5.5	2.8	5	5 / 6.5	5.5	5.5	7

- 1) H – manual operation button
- 2) Yes – with AM-PBU 25 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's, 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

## VALVES

PN (bar)	Temp. (°C)	Type	Ports	DN	Stroke (mm)	Kvs / Q (m³/h)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)	dP <sup>4)</sup> (bar)			
16	2-130	VS	2	15-25	4-5	0.25-4							10 (DN15)	10 (DN15)	10 (DN15)															
25	2-150	VM	2	15-50	5-10	0.25-25							16-25 (DN15-25)	16-25 (DN15-25)																
25	2-150	VB	2	15-50	5-10	0.25-40							16 (DN15-20)	16 (DN15-20)																
25	2(-10)-200	VFS	2	15-100	15-40	0.4-145	1.5-4.5 (DN65-100)	1.5-4.5 (DN65-100)							5-13 (DN65-100)	1.5-4.5 / 1-3 (DN65-100)			2-25 (DN15-50)											
16	2(-10)-150	VFM	2	65-250	30-50	63-900	3-8								5-10 (DN150-250)															
16	2-120	AHQM	2	15-100	5-15	0.035-38							4 (DN15-32)	4 (DN15-32)					4 (DN100)											
16, 25	2-150	AVQM	2	15-50	5-10	0.015-15							12-20 (DN15)	12-20 (DN15)	12-20 (DN15)															
16, 25	2-150	AFQM	2	40-250	8-27	2.2-420	15-20 (DN65-125)	15-20 (DN65-125)							10-12 (DN150-250)	15-16 (PN 16; DN65-125)														
16	2-120	VZ	2/3/4	15-20	5.5	0.25-4																								
16	2-120	VZL	2/3/4	15-20	2.8	0.25-3.5 (A-AB), 0.25-2.5 (B-AB)																								
16	2(-10)-130	VRB	2/3	15-50	10-15	0.63-40																								
16	2(-10)-130	VRG	2/3	15-50	10-15	0.63-40																								
6	2(-10)-120	VL	2/3	15-100	10-30	0.63-145	0.3-1 (DN100)	0.3-1 (DN100)																						
16	2(-10)-130/200 <sup>3)</sup>	VF	2/3	15-300	10-80	0.63-1350	0.5-1.5 (2-way + mixing) / 0.3-0.5 (diverting) (DN100-150)																							
16	2(-10)-120	AB-QM S	2	15-32	2.25-4.5	0.03-3.2							4	4																
16	2(-10)-120	AB-QM M/L/XL	2	40-250	10-27	7.5-370	4 (DN125-150)	4 (DN125-150)																						

ACTUATORS	Actuator for central heating			
	AMZ 112 actuator	AMZ 113 actuator	AMB 162	AMB 182
<b>Voltage 24 V</b>	AC	AC	AC and AC/DC	AC and AC/DC
<b>Voltage 230 V</b>	AC	AC	AC	AC
<b>Control</b>	2 point	2 point	3 point/modulating	3 point/modulating
<b>Safety function</b>	no	no	no	no
<b>Speed (s/90°)</b>	30, 60 <sup>2)</sup>	30, 60 <sup>2)</sup>	15, 30, 60, 90, 120, 480 <sup>3)</sup>	60, 90, 120, 240 <sup>3)</sup>
<b>Torque (Nm)</b>	5, 10 <sup>3)</sup>	5, 15 <sup>3)</sup>	5 Nm	10 or 15 Nm
<b>AUX. Switch</b>	yes	yes	yes (optional)	yes (optional)
<b>Angle of rotation</b>	90°	90°	90°	90°

## VALVES

PN (bar)	Temperature (°C)	Type	Ports	DN	Rotation angle (°)	Kvs (m³/h)	dP <sup>1)</sup> (bar)	dP <sup>1)</sup> (bar)	dP <sup>1)</sup> (bar)	dP <sup>1)</sup> (bar)
10	2 - 110	HRB	3/4	15 - 50	90	0,4 - 40			2 (diverting) / 1 (mixing)	2 (diverting) / 1 (mixing)
6	2 - 110	HRE	3/4	15 - 50		6,3 - 40			1	1
6	2 - 110	HFE	3	20 - 150		12 - 400			0,5	0,5
40	-20...130 <sup>4)</sup>	AMZ 112 valve	2	15		17	6	6		
				20		41	6	6		
				25		70	6	6		
				32		121	6	6		
25	-20...130 <sup>4)</sup>	AMZ 112 valve	2	40		200	6	6		
				50		292	6	6		
				15		17	6	6		
40	-20...130 <sup>4)</sup>	AMZ 113 valve	3	20		41	6	6		
				25		70	6	6		
				32	121	6	6			

- 1) This is a general overview: for detailed dP over different DN's, speeds, please see datasheet
- 2) **30s version** is used with 5 Nm – AMZ 112 up to DN 25 and AMZ 113 up to DN 25 – **60s 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 15-20 and AMZ 113 DN 15 – **10 Nm** only for AMZ 112 DN 25-50 and AMZ 113 DN 20-25 – **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

### DAMPER actuators – non spring return



### DAMPER actuators – with spring return



Type	AMD 210	AMD 220	AMD 310	AMD 320	AMD 420	AMD 510	AMD 520	AMD 610	AMD 620	AMD 710	AMD 720	AMD 810	AMD 820	AMD 113	AMD 123	AMD 213	AMD 223	AMD 413	AMD 423	AMD 613	AMD 623	
<b>Voltage 24 V</b>	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC	AC/DC
<b>Voltage 230 V</b>	AC/DC	no	AC/DC	no	no	AC/DC	no	AC/DC	no	AC/DC	no	AC/DC	no	AC/DC	no	AC/DC	no	AC/DC	no	AC/DC	no	no
<b>2/3 point control</b>	yes <sup>5)</sup>	no	yes <sup>5)</sup>	no	no	yes <sup>5)</sup>	no	yes <sup>5)</sup>	no	yes <sup>5)</sup>	no	yes <sup>5)</sup>	no	2 point	no	2 point	no	2 point	no	2 point	no	no
<b>Modulating control</b>	no	yes	no	yes	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	yes
<b>Safety function</b>	no	no	no	no	no	no	no	no	no	no	no	no	no	yes	yes	yes	yes	yes	yes	yes	yes	yes
<b>Speed (s/90°)</b>	60-120	100	60-120	60-120	100 or 150 <sup>6)</sup>	60-120 or 150 <sup>6)</sup>	100 or 150 <sup>6)</sup>	150	150	150	150	150	150	40/20 <sup>7)</sup>	100/20 <sup>7)</sup>	75/20 <sup>7)</sup>	100/20 <sup>7)</sup>	75/20 <sup>7)</sup>	150/20 <sup>7)</sup>	150/20 <sup>7)</sup>	150/20 <sup>7)</sup>	150/20 <sup>7)</sup>
<b>Torque (Nm)</b>	5	5	8	8	10	15	15	20	20	30	30	40	40	3	3	5	5	10	10	20	20	20
<b>AUX switch</b>	1 <sup>8)</sup>	1 <sup>8)</sup>	1 <sup>8)</sup>	1 <sup>8)</sup>	1 <sup>8)</sup>	1 <sup>8)</sup>	1 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>	2 <sup>8)</sup>

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



...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.

### About Danfoss

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 42,000 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.

Read more online at  
[www.danfoss.com](http://www.danfoss.com)



## Valve Ruler App

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



Scan QR code and  
download app.

### Danfoss A/S

Climate Solutions • [danfoss.com](http://danfoss.com) • +45 7488 2222

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