Data sheet

Other valves

ChangeOver^{6} and NovoCon ChangeOver^{6} - motorized 6-port Ball valves

Description

The ChangeOver[6] and NovoCon ChangeOver[6] are 6-port motorized ball valves that perform a diverting function between two water circuits in a 4-pipe changeover system.

This diverting function allows the cooling and heating capacity of a fan coil unit to be increased for the same compact size compared to a double coil model, where the heating and cooling water circuits each have their own coil.

The ChangeOver[6] and NovoCon ChangeOver[6] are not suitable for flow control. Flow is modulated by the AB-QM pressure independent balancing control valve to avoid overflow and reduced efficiency of the boiler or chiller.

NovoCon ChangeOver[6]:
The NovoCon® S bus actuator controls the flow and the 6-port diverting valve with actuator, switches between heating and cooling, characterized by that:

- There is only one single plug-in cable, with bus connection and power supply to the NovoCon® S actuator. One plug-in cable between the 6-port actuator NovoCon® ChangeOver[6] and the NovoCon® S actuator, which includes a 0-10V control signal, feedback signal and power connection.

- The NovoCon® S PIBCV actuator detects by means of comparing 0–10 V control & feedback signal if 6-port actuator is in manual operation or if the valve is blocked (feedback signal does not follow control signal).

- 6-port actuator is in maintenance mode able to fully close the valve to prevent any leakage.

Features & benefits

- No cross-flow between supply circuits
- Visual indication of actual valve position
- Silent and reliable operation
- Maintenance free
- Teflon seal and polished chrome valve ball to prevent valve sticking
- Manual override

Applications

Typical applications are:
- Radiant ceiling panel, supplied by 4 pipes (Heating supply and return and cooling supply and return)
- Fan coil unit, with single coil supplied by 4 pipes (Heating supply and return and cooling supply and return)

Ordering

Product code numbers

Type	Cable length (m)	Power supply	Connection	Code No.
Actuator ChangeOver6	1.5	24V AC	Open end	**003Z3152**
	5.0	24V AC	Open end	**003Z3153**
	1.5	230V AC	Open end	**003Z3154**
Actuator NovoCon ChangeOver6	1	24V AC/DC	Plug-in	**003Z8520**
Actuator NovoCon ChangeOver6 Energy	1 / Surface temperature sensors 1.5	24V AC/DC	Plug-in	**003Z8521**
Actuator NovoCon ChangeOver6 Flexible	1.5	24V AC/DC	Open end	**003Z8522**

Type	DN	k_{VS} (m^3/h)	Connection	Code No.
ChangeOver6 valve	15	2.4	Rp ½	**003Z3150**
ChangeOver6 valve	20	4.0	Rp ¾	**003Z3151**

Type	DN	Fire load class[1)]	Code No.
ChangeOver6 insulation	15	B2	**003Z3159**

1) According to DIN 4102

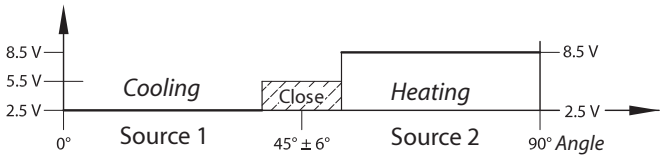
Accessories code numbers

Picture	Type	To pipe	To valve	Code No.
	Union connection (1 pcs.) (CW617N)	Rp ½	DN 15	**003Z0232**
	Union connection (1 pcs.) (CW617N)	Rp ¾	DN 20	**003Z0233**
	Long union connection (1 pcs.) (CW617N)	Rp ½	DN 15	**003Z3161**
	Long union connection (1 pcs.) (CW617N)	Rp ¾	DN 20	**003Z3162**

Functions

Operation

Control signal NovoCon ChangeOver6



Cooling connected to port 1 and 4 Heating connected to port 5 and 6

Control signal for the Actuator NovoCon ChangeOver6

	Stop moving	Cooling	Shut-off	Heating
CO6 mode	1.0 V	2.5 V	5.5 V	8.5 V

Feedback signal from the Actuator NovoCon ChangeOver6

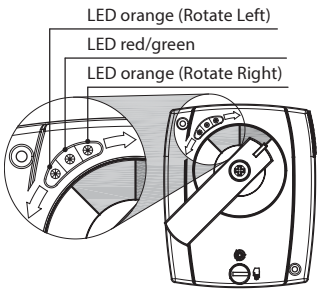
Unable to move	Cooling	Moving direction: Cooling to Heating	Shut-off	Moving direction: Heating to Cooling	Heating
1.0 V	2.5 V	4.0	5.5 V	7.0 V	8.5 V

Pump head calculation

To calculate required pump head:

- determine the critical circuit;
- calculate pump head without ChangeOver6 solution (ChangeOver6 + AB-QM);
- starting pressure for ChangeOver6 DN15 solution is ~23.3kPa (ChangeOver6 7.3kPa + AB-QM DN15 16kPa);
- add the starting pressure to the pump head.

LED signalling



LED signal	NovoCon ChangeOver6	ChangeOver
	Description of signal	Description of signal
Left/CCW yellow shining	Rotating CCW	Rotating CCW Full brightness = Turning in progress Half brightness = Reached end position
Right/CW yellow shining	Rotating CW	Rotating CW Full brightness = Turning in progress Half brightness = Reached end position
Green blinking	Normal operation / invalid signal received	-
Green shining	Normal operation	-
Red blinking	Valve stuck	-
Red shining	Break of line/no signal	-

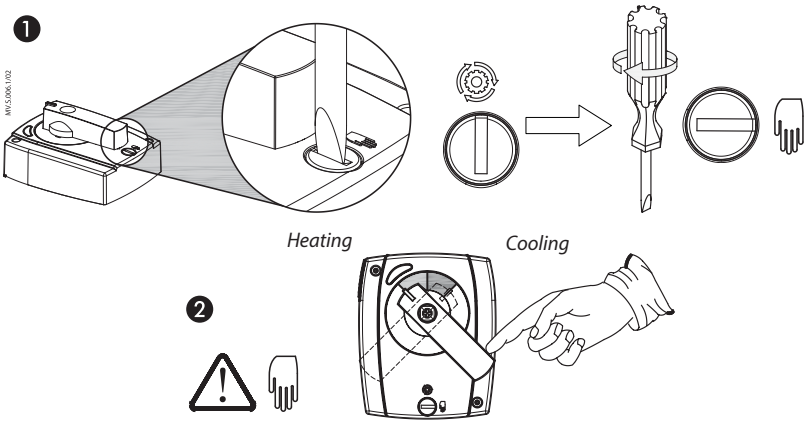
There are combinations of more than one LED possible. In such cases the actual condition is sum of all indications (for example: red blinking, left yellow shining, green shining = rotating CCW, valve stuck)

Manual override

(for service purposes only)

Caution:
Do not manually operate the drive if power is connected!

If manual override has been used when power is always return to its end position.



Settings

Design flow setting for heating and cooling

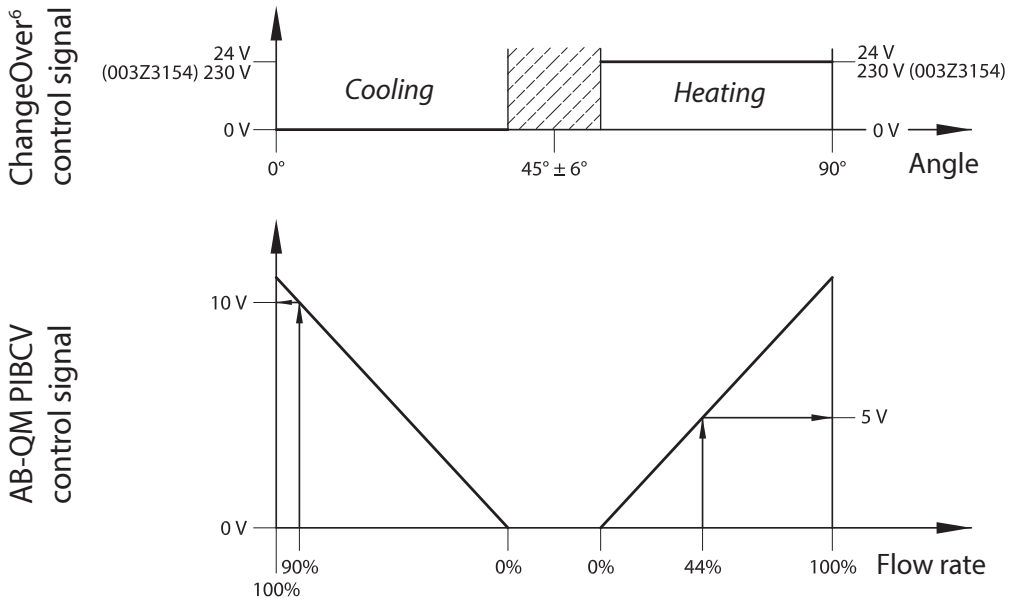
(in case of using only one AB-QM as shown on picture above)

ChangeOver6

The design flow needed for heating is generally less than for cooling. Actuator AME 110NL supports this difference by proportionately limiting the control voltage with a linear characteristic. The NovoCon® S enables different design flows to be set via fieldbus communication. See the example below.

Example:

- AB-QM 4.0 DN15 factory setting 100% = 700 l/h
- Cooling:
  - ChangeOver6 set to cooling - control signal 0 V,
  - PIBCV max. flow demand to terminal unit ~630 l/h = 90% presetting of AB-QM DN15
  - Control signal to AME = 0 - 10 V
- Heating:
  - ChangeOver6 set to heating - control signal 24 V,
  - PIBCV max. flow demand to terminal unit ~308 l/h (=44% of AB-QM DN15 flow), presetting of AB-QM DN15 equal to cooling, needed design flow achieved by voltage limitation on AME.
  - Control signal to AME = 0 - 5 V



Product details

General data

Actuator		ChangeOver6		NovoCon ChangeOver6
Power supply	V	24 AC -10%; +15%	230 AC ± 10%	24 AC/DC ±25%
Operating power consumption	VA	Running: 3 VA Standby: 0.5W	Running: 4 VA Standby: 2.6W	Running: 3.5VA@24V AC / 2.0W@24V DC Standby: 0.5W@24V AC / 0.3W@24V DC
Frequency	Hz	50/60		50/60
Running speed	sec/90°	120		120
Control input		2-point		Controlled by from NovoCon® S CO6, Energy, I/O
Feed back signal		/		Unable to move, Cooling, Moving from Cooling towards Heating, Shut-off, Moving from Heating towards Cooling, Heating
Operating torque	Nm	10		10
Rotation angle		90 °		90°
Ambient temperature	°C	0 … 50		5 … 50
Storage and transport temperature		–20 … 70		-20 … 70
Ambient humidity		95% r.h., non-condensing		95% r.h., non-condensing (according to EN 60730-1)
Protection Class		III (for 24V version) / II (for the 230V version)		III safety extra-low voltage
Grade of enclosure		IP53 according to EN 60529		IP53 according to EN 60529
Weight	g	650		600
Connection cable	m	1.5		1.0
	mm^2	3×0.5 (halogen free)		003Z8520: 5x0.32 (halogen free) 003Z8521: 5x0.32 (halogen free. Sensors PVC) 003Z8522: 4x0.5 (halogen free)

Valve

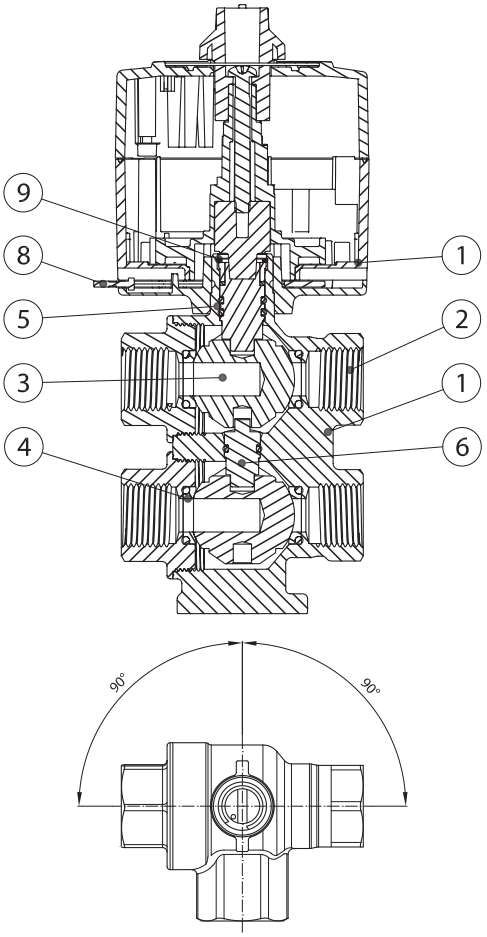
DN		**15**	**20**
Diff. pressure [1]	kPa	0.7 (at 200 l/h = 100% flow of AB-QM DN15 LF) 8.5 (at 700 l/h = 100% flow of AB-QM DN15) 25 (at 1200 l/h = 100% flow of AB-QM DN15HF)	7.6 (at 1100 l/h = 100% flow of AB-QM DN20) 22.6 (at 1900 l/h = 100% flow of AB-QM DN20HF)
k_{VS}	m^3/h	2.4	4.0
k_{VS} of one port		3.4	5.65
Nominal pressure	PN	16	
Medium temperature	°C	0 … 90	
Medium		Water and water mixture for closed heating and cooling systems according to plant type I for DIN EN 14868. When used in plant Type II for DIN EN 14868 appropriate protective measures are taken. The requirements of VDI 2035, part 1 + 2 are observed.	
Max. operating torque	Nm	3.0	
Shut off [2]	kPa	800	
Valve neck		Quick fix connection	
Connection		Internal thread : Rp 1/2" (ISO 7/1)	Internal thread : Rp 3/4" (ISO 7/1)
Certifications and standards		PED directive 2014/68/EU Art. 4§	
Weight	g	1140	1750

[1] *differential pressure for both ports*

[2] *manual override (for service purposes only)*

Design

1. Valve body
2. Connection
3. Ball with L-bore
4. Ball sealing with O-ring
5. Spindle with double O-ring
6. Connection spindle with O-ring
7. Actuator
8. Actuator connection pin
9. Snap ring



ChangeOver6 & NovoCon ChangeOver6

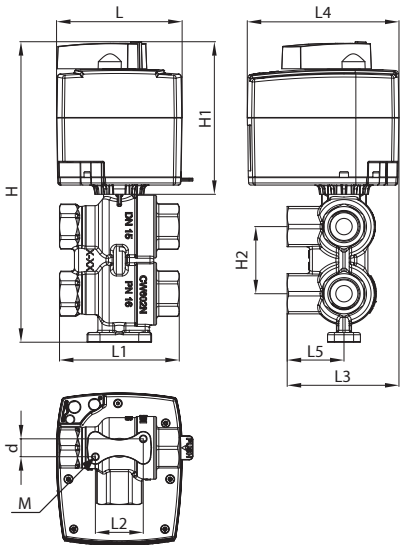
Materials

Valve

Body and connection	CW 602 N (DZR)
Ball	CW 614 N Chrome plated
Stem	CW 614 N Nickel plated
Seals	P.T.F.E. (TEFLON)
O-ring	70 EPDM 281

Dimensions

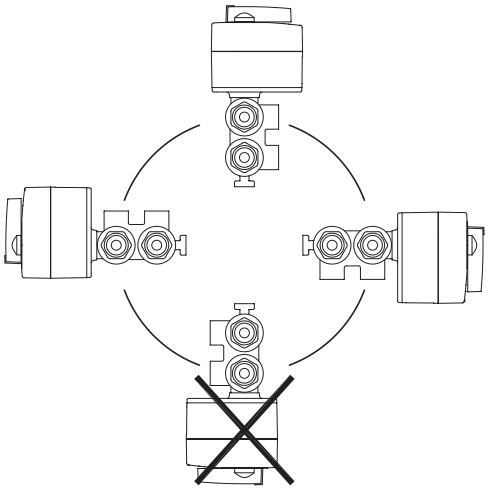
ChangeOver6 & NovoCon ChangeOver6



DN	L	L1	L2	L3	L4	L5	H	H1	H2	d	M
	mm										
15	84	80	32	82	101	38	~205	~98	45	12	M5
20		92	35	87		46	~225		60		

Installation

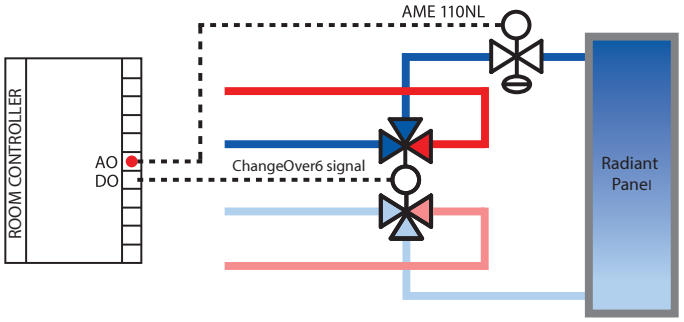
Installation positions



ChangeOver6 & NovoCon ChangeOver6

Application principles ChangeOver6

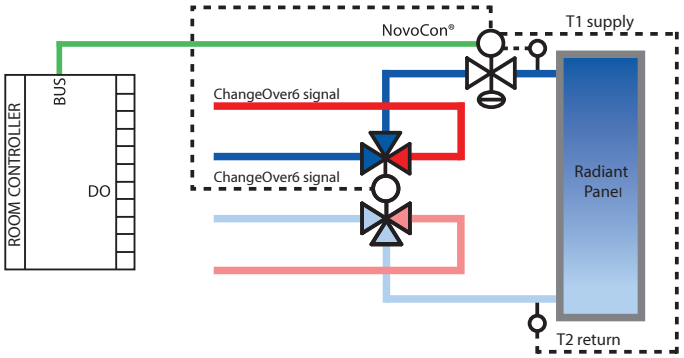
2 connections to the controller.



Application principles NovoCon ChangeOver6

Separate maximum flow presetting for cooling and heating is possible in NovoCon® S. Feedback signal and alarms are also available.

Only one connection to the controller.

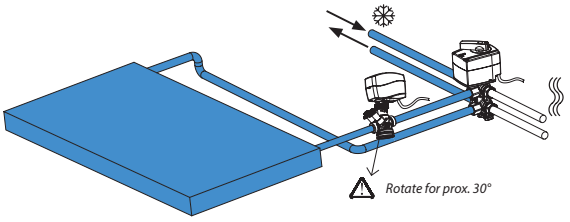


Application principles ChangeOver6

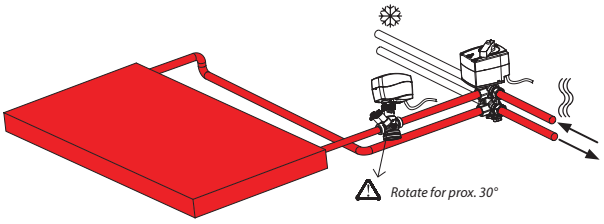
Anti-sticking requirements:
To reduce the risk of the ball valve sticking due to water quality, the valve must be partially rotated at least every 7 days. An operation at least once per week to reduce the risk of higher toque loading on the actuator. Reversing the control signal for a maximum of 60 seconds will rotate the valve through 45 degrees to the zero flow position without changing between heating and cooling.

The ChangeOver6 is a 6-port valve with rotary actuator that switches the flow between heating and cooling. An AB-QM pressure independent balancing and control valve with actuator is used to balance the system and modulate the flow. For modulating control, the AME 110NL actuator should be used. For fieldbus control (BACnet or Modbus) NovoCon® S should be used.

Cooling:



Heating:

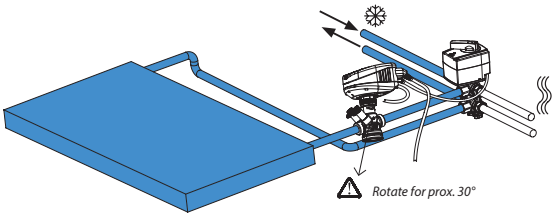


Application principles NovoCon ChangeOver6

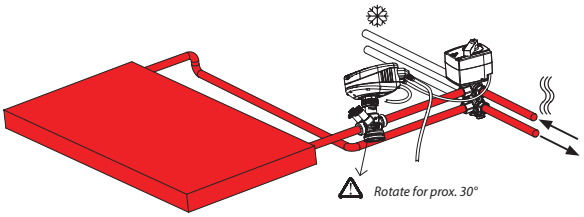
Anti-sticking requirements:
To reduce the risk of the ball valve sticking due to water quality, the valve must be partially rotated at least every 7 days. By default this is handled by NovoCon® S.

The ChangeOver6 is a 6-port valve with rotary actuator that switches the flow between heating and cooling. An AB-QM pressure independent balancing and control valve with actuator is used to balance the system and modulate the flow. When using the NovoCon® S for flow control, both NovoCon® S and the Actuator NovoCon® ChangeOver6 are controlled by one single data point.

Cooling:

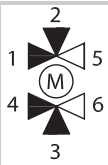
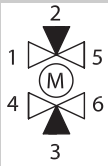


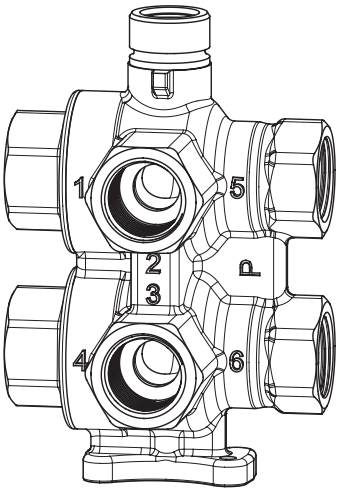
Heating:



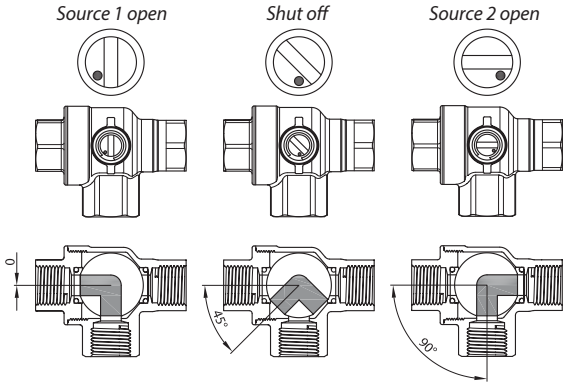
Marking

The 6 ports of the ChangeOver6 valve allow the following flow directions.

	**Control signal - 0 VAC (brown wire):**
	Port 1 to port 2 and port 3 to port 4
	**Control signal - 24(230) VAC (brown wire):**
	Port 5 to port 2 and port 3 to port 6
	**Heating or cooling distribution pipes**
	Ports 1, 4, 5 and 6
	**Terminal unit pipes**
	Ports 2 and 3



No mixing

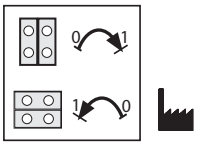


Shut off and manual override for service purposes only

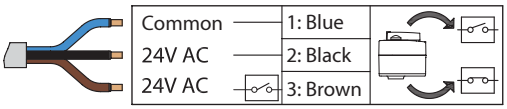
CO6 in contrary to other ball valves includes shut off function. This function can be used only during maintenance and replaces the need of four ball valves.

Wiring

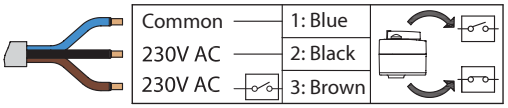
Under cover



Actuator ChangeOver6 (003Z3152 & 003Z3153)



Actuator ChangeOver6 (003Z3154)



Actuator NovoCon ChangeOver6

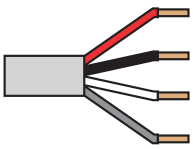
- Plug in cable to NovoCon® S

Position for heating and cooling can be inverted by changing settings in the NovoCon S actuators.

Actuator NovoCon ChangeOver6 Energy

- Plug in cable including 2xPT1000 surface temperature sensors to NovoCon® S

Actuator NovoCon® ChangeOver6 Flexible



Red	Power 24 V
Black	GND
White	CO6 Control signal
Grey	CO6 Feedback signal

Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

When you click on the link you will be directed to the latest version of the 'Declaration of Conformity'. Products developed and sold before this date of issue conform to the directives/standards in force at the time of their sale.

Approval type	Title	Certification body	Approval topic
EU Declaration	Danfoss EU BF19112021-en001.01	Danfoss	EMC, LVD, EU RoHS
Export Control Declaration	Butterfly, other valves, Manual balancing valves, one pipe solution valves and hot water balancing valves	Danfoss	
Export Control Declaration	Gear and Thermal actuators	Danfoss	
UA Declaration	Danfoss UA 10.01.23 Heat Control Valves	Danfoss	
Manufacturer's Declaration	Danfoss MD BF206986516678en-000301.01	Danfoss	PED, EU RoHS
Pressure Safety Certificate	LLC CDC EURO-TYSK UA.TR.089.1228.24-21	LLC CDC EURO TYSK - Ukraine	PED, Pressure

Tender text

ChangeOver6
The Danfoss ChangeOver6 is a 6-port motorized ball valve that switches flow between a heating and cooling water circuit in a 4-pipe system and eliminates cross-flow. A single digital signal switches between heating and cooling, and flow control must be performed by a separate pressure independent control valve that can modulate flow rates to suit the heating and cooling circuits.

ChangeOver6 valve:

- Differential pressure drop over the ChangeOver6 valve:
- Differential pressure drop over the valve DN15 is <8.5 kPa for 700 l/h, K_{VS} is fixed at 2.4 m^3/h
- Differential pressure drop over the valve DN20 is <7.6 kPa for 1100 l/h, K_{VS} is fixed at 4 m^3/h
- No cross-flow between the heating and cooling circuits
- Manual shut off up to 8 bar
- Dezincification resistant brass (DZR)
- Medium temperature range 0°C to 90°C

ChangeOver6 actuator:

- Supply Voltage: 24V AC±20% 50-60Hz, or 230V AC±10% 50Hz
- 2 point control input: 24V AC or 230V AC (seperate code)
- Manual override
- Halogen free cable: 1.5m or 5m 24V AC
- Rotation angle: 90 degrees
- Rotating torque: 10 Nm
- IP Class: 53

A separate tender text is available for the Danfoss AB-QM pressure independent balancing & control valve and the AME110NL 0-10V geared actuator and the NovoCon® S BACnet and ModBus geared actuator.

NovoCon ChangeOver6
In a 4-pipe ChangeOver6 system switching flow between heating and cooling circuits is done with a 6-port motorized ball valve, connected directly to digital PIBCV actuator.

Flow control for heating and cooling circuit is performed by a separate pressure independent control valve and modulating actuator. [1)]

6-port ball valve:

- Differential pressure drop over the valve DN15 is about 8.5 kPa for 700 l/h, K_{VS} is fixed at 2.4 m^3/h
- Differential pressure drop over the valve DN20 is about 7.6 kPa for 1100l/h, KVS is fixed at 4 m^3/h
- No cross-flow between the heating and cooling circuits up to 8 Bar
- Dezincification resistant brass (DZR)
- Medium temperature range 0°C to 90°C
- Zero leakage shut-off function for maintenance

6-port ball valve actuator:

- Supply Voltage: 24V AC/DC
- Manual and remote shut off function for maintenance
- Feedback signal for valve position
- LED status indication including alarms for valve blocked or missing signal
- Plug in cable, optional with 2x temperature sensors: 1m or open end 2m cable.
- Power consumption: <4 VA running and 0.5W standby
- Click on mounting

[1)] A separate tender text is available for the Danfoss AB-QM pressure independent balancing & control valve and NovoCon® S fieldbus actuator.

Contact details

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.

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