



**Shut-off valve with drain  
measuring function**

***Nexus Valve  
Relax***





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# 1. Safety instructions

**Please read the instructions carefully before installation**

The installation and initial operation of the assembly may be carried out only by an authorised specialist company. Prior to starting work, familiarise yourself with all parts and how they are handled. The application examples in these operating instructions are ideas sketched out. Local laws and regulations have to be observed.

**Target group:**

**These instructions are intended for authorised specialists exclusively.** Work on the heating system, the potable water as well as gas and power network may be carried out by specialists only.



**Please follow these safety instructions carefully in order to avoid hazards and damage to people and property.**

## 1.1 Rules/regulations

Please observe the applicable accident prevention regulations, the environmental legislation and the legal rules for mounting, installation and operation. Moreover, please observe the appropriate guidelines of German standard DIN, EN, DVGW, VDI and VDE (including lightning protection) as well as all current relevant country-specific standards, laws and regulations. Old and newly enforced regulations and standards shall apply, if they are relevant for the individual case. Moreover, the regulations of your local energy supply company have to be observed.

**Electrical connection:**

**Electrical wiring work may be carried out by qualified electricians only. The VDE regulations and the specifications of the relevant energy supply company have to be met.**

**Excerpt:****Installation and construction of heat generators as well as the drinking water heaters:**

DIN EN 4753, Part 1: Water heater and water heating plants for potable and process water.

DIN EN 12828 Heating systems in buildings.

DIN 18 421: Insulation work on technical plants

AV B Wa s V Regulations concerning the general conditions for the supply with water

DIN EN 806 ff.: Technical rules for potable water installation

DIN 1988 ff.: Technical rules for potable water installation (national addition)

DIN EN 1717: Protection of potable water against contaminations

DIN 4751: Safety equipment

**Electrical connection:**

VDE 0100: Erection of electrical equipment, grounding, protective conductor, potential equalisation conductor.

VDE 0701: Repair, modification and testing of electrical devices.

VDE 0185: General aspects on the erection of lightning protection systems.

VDE 0190: Main potential equalisation of electrical plants.

VDE 0855: Installation of antenna plants (shall apply mutatis mutandis).



**Additional remarks:**

VDI 6002 Sheet 1: General principles, system technology and use in house building

VDI 6002, Sheet 2: Use in students' hostels, retirement homes, hospitals, indoor swimming pools and on camping facilities

**Caution:**

**Prior to any electrical wiring work on pumps and controls, these modules have to be disconnected from voltage correctly.**

## 1.2 Intended use

Inexpert installation as well as use for a purpose not intended of the assembly shall rule out all warranty claims.

All shut-off valves may be closed by an approved specialist only in case of servicing as otherwise the safety valves are not effective.



**Do not modify the electrical components, the construction or the hydraulic components! You will impair the safe function of the plant otherwise.**

## 1.3 Initial operation

Prior to the initial operation, the plant has to be tested for tightness, correct hydraulic connection as well as accurate and correct electrical connection. In addition, the plant has to be flushed correctly and/as required in keeping with German standard DIN 4753. The initial operation has to be carried out by a trained specialist, which has to be recorded in writing. In addition, the settings have to be put down in writing. The technical documentation has to be available at the device.

## 1.4 Working on the system

**The plant has to be de-energised and to be checked for the absence of voltage (such as on the separate fuse or a master switch). Secure the plant against unintentional restart.** (If gas is used as fuel, close the gas shut-off valve and secure against unintentional opening.) Repair work on component parts with a safety-relevant function is impermissible.

## 1.5 Liability

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These installation and operating instructions shall have to be handed to the customer. The executing and/or authorised tradesperson (such as fitter) shall have to explain the function and operation of the plant to the customer in an intelligible manner.

## 2. Introduction



### 2.1 Description

The NexusValve Relax is a shut-off valve for use in heating and cooling systems as a stand alone, service or a partner valve. The NexusValve Relax is available in sizes DN 15 to DN 50 in two versions. One version with plugged P/T ports and the other with a drain valve mounted. All valves are manufactured in dezincification resistant brass (DZR). In systems where double regulating valves like NexusValve Fluctus and NexusValve Vertex, or pressure independent flow control valves like NexusValve Vivax, are installed, NexusValve Relax can be used as a service valve for terminal units, branches and zones. When installed in combination with a NexusValve Passim, differential pressure control valve, the NexusValve Relax can be used as a partner valve. Connecting the valves via a capillary tube enables differential pressure stabilization in the controlled part of the system.

The NexusValve Relax is available with various accessories like:

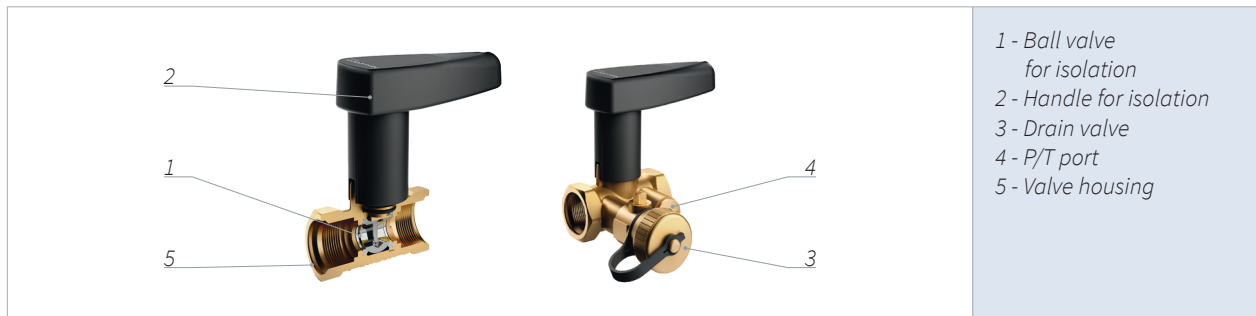
- Drain valve
- Measuring points
- Measuring points for high temperature, up to 135°C
- Cap with measuring point (installed on the drain valve)
- Combi Drain Midi (with an independent measuring point)

### 2.2 Benefits

- Product range from DN 15 to DN 50 for heating and cooling systems
- Isolation, drain and measuring functions all in one unit
- Compact design for installation in confined spaces
- Flow direction irrelevant for the valve installation
- Isolation of flow simply done using the quarter-turn handle
- Ideal as a service valve and partner valve

## 2.3 Design

The NexusValve Relax is designed for flow isolation as well as draining and measuring functions – all in one unit. Isolating the system flow is done by a simple quarter-turn of the handle. The position of the handle makes it at the same time easy to identify whether the valve is in an open or closed position. To enable flow measuring the optional measuring points need to be mounted in the valve.



- 1 - Ball valve for isolation
- 2 - Handle for isolation
- 3 - Drain valve
- 4 - P/T port
- 5 - Valve housing

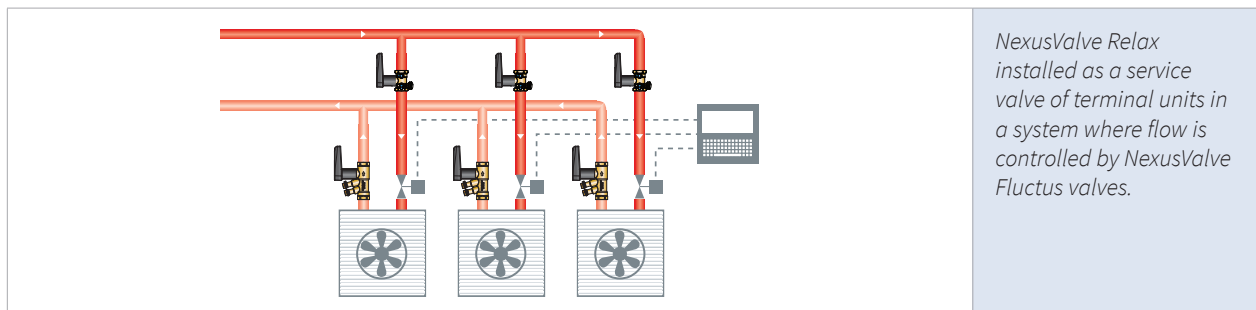
The compact design of NexusValve Relax ensures that the valve fits perfectly even in confined spaces where access to the system is restricted. The NexusValve Relax is at the same time designed for bi-directional flow making installation in any position and regardless of flow direction possible. This ensures a completely flexible and error-free installation.



*NexusValve Relax is compact and flexible in installation due to the bi-directional flow function.*

## 2.4 Service and partner valve

The NexusValve Relax can be used as a service valve, for shut-off and drain functions at terminal units or circuits, when installed together with NexusValve Fluctus, NexusValve Vertex or NexusValve Vivax valves.



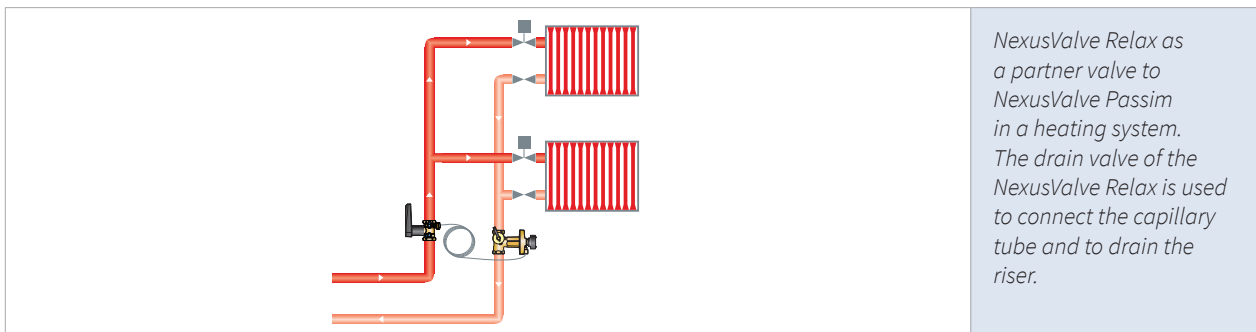
*NexusValve Relax installed as a service valve of terminal units in a system where flow is controlled by NexusValve Fluctus valves.*

## 2. Introduction

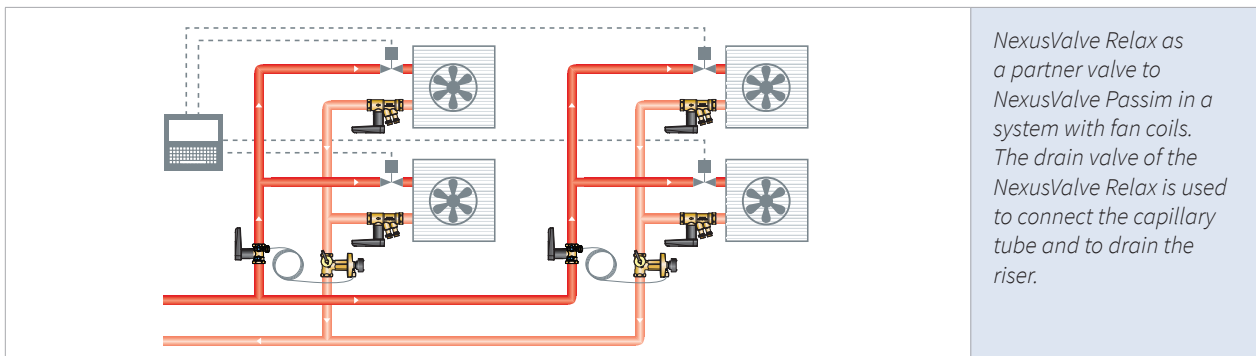
The NexusValve Relax can be used as a partner valve together with the NexusValve Passim. The capillary tube is connected from the NexusValve Passim to the drain valve of the NexusValve Relax, enabling differential pressure stabilization in the controlled part of a system.



It is recommended that the capillary tube is connected to the drain valve at the P/T port behind the shut-off ball of the NexusValve Relax when valves are installed in a system riser or in a branch with terminal units. By doing so the pressure loss across the NexusValve Relax is not included in the controlled circuit. Flow isolation and riser draining is at the same time made possible during service. This type of installation is recommended for heating systems with pre-settable thermostatic radiator valves. In such installations the required flow is achieved by pre-setting thermostatic radiator valves whereas the differential pressure stabilization keeps the flow constant.

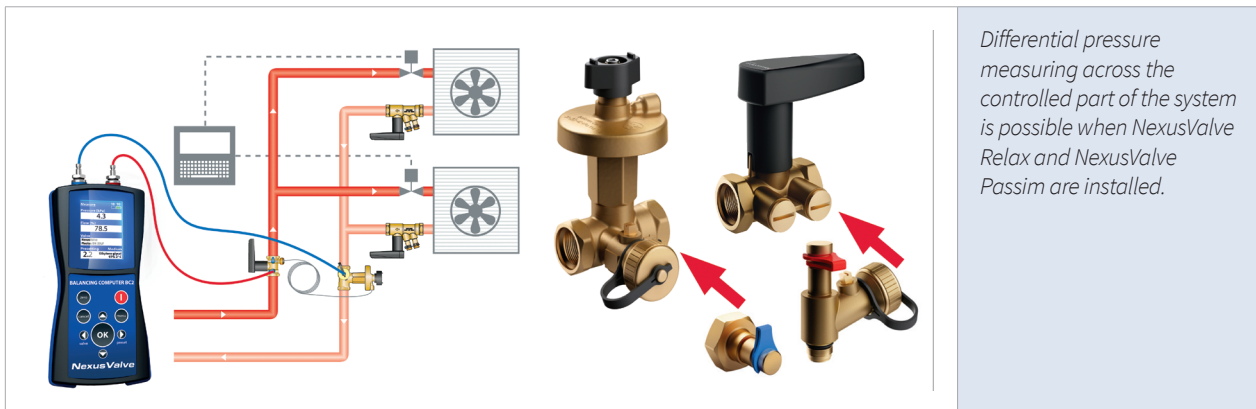


The combination of NexusValve Relax and NexusValve Passim valves can also be used in risers or branches of cooling and heating systems where balancing valves are installed at the terminal units to ensure the required flow distribution. By providing constant differential pressure in circuits, the system is divided into several smaller and independent subsystems for improved balancing. As a result the commissioning of the complete system also becomes easier.



## 2.5 Measurement

When the NexusValve Relax is used as a partner valve together with the NexusValve Passim, the differential pressure setting can be verified by connecting a balancing computer to the valves during system commissioning. To enable measuring, a cap with measuring point is installed on the drain of the NexusValve Passim valve and a combi drain (with an independent measuring point) is installed on the NexusValve Relax valve. Alternatively, when the NexusValve Relax with drain is already installed in a system and there is a need to verify the differential pressure, a measuring point can be mounted in the factory blinded P/T port. In this way differential pressure measuring can be performed.



The NexusValve Relax is provided with a restricted flow shut-off ball which is used to generate pressure loss. This allows for a flow verification across the NexusValve Relax valve when the pressure loss across the P/T ports is at least 3.0 kPa. The measuring signal is at this point strong enough to provide accurate flow measuring. To perform a flow verification, the Kvm value (measured across the P/T ports) of the NexusValve Relax needs to be typed into the flow balancing computer.



More details can be found in the sizing examples and in the data sheets.

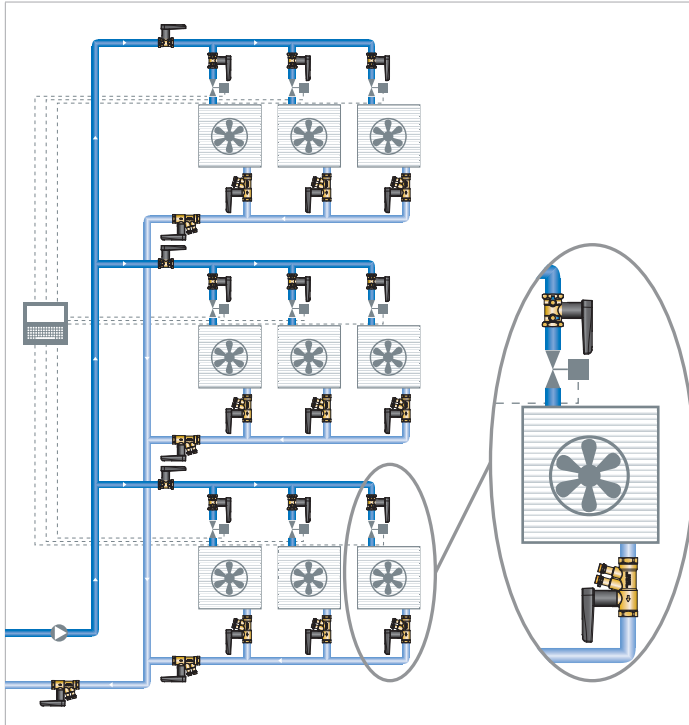
## 2. Introduction

### 2.6 Mounting

The NexusValve Relax can be installed regardless of the flow direction and in any position. When provided with drain valve the NexusValve Relax must be installed correctly: the drain valve must be mounted after the shut-off valve of the NexusValve Relax to be able to drain the terminal unit, circuit or zone. The NexusValve Relax requires the specified installation space to perform isolation by the use of the quarter-turn handle.

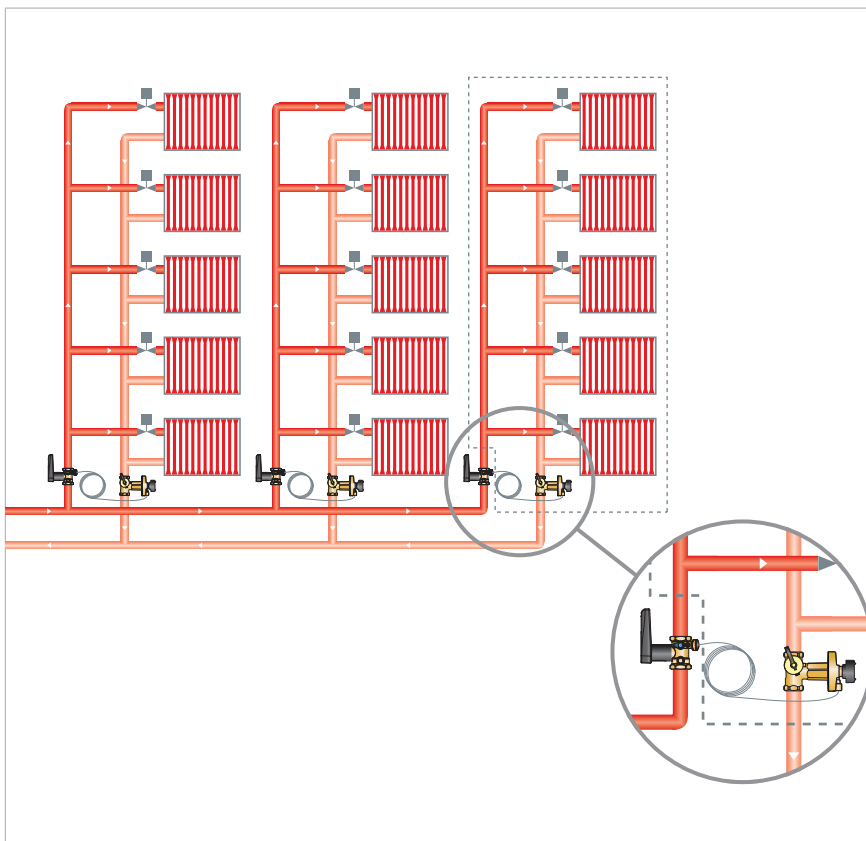
When used as a service valve the NexusValve Relax does not require straight piping – installation directly at bends, flexible hoses, etc. is possible. However when used for flow verification a straight pipe of 5 x pipe diameter is required when mounted after a bend and 2 x pipe diameter when mounted before a bend. The NexusValve Relax accessories can, after removing the plugs, be mounted into the P/T ports using a torx 27 wrench.

### 3. Applications



*Application 1 - Fan coil - terminal unit system*

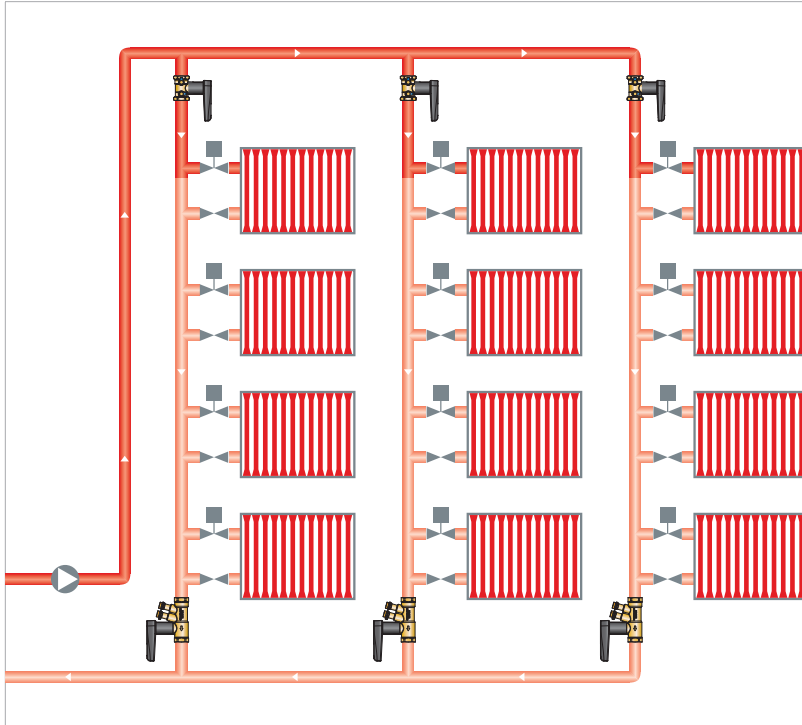
*This system with fan coils has NexusValve Relax installed along with NexusValve Fluctus. The NexusValve Relax valves enable servicing and drainage of terminal units and system zones.*



*Application 2 - Central heating system with differential pressure control valves*

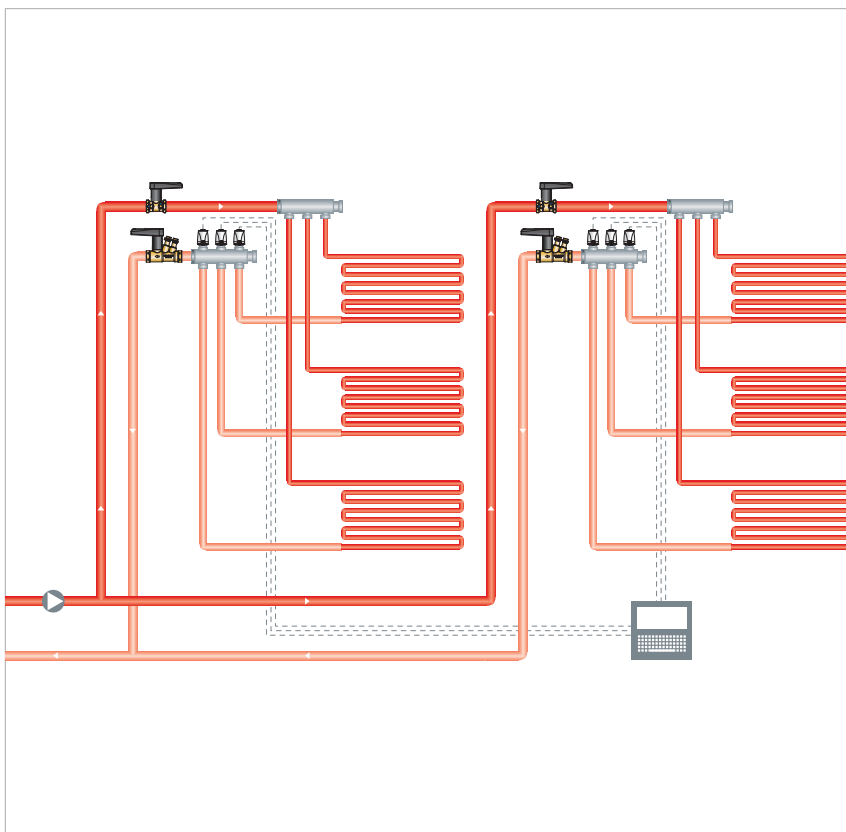
*This central heating system application has pre-settable thermostatic radiator valves installed together with NexusValve Passim, differential pressure control valves, and NexusValve Relax valves. The NexusValve Passim is installed in the return pipe and is via a capillary tube connected to the NexusValve Relax installed in the supply line. This valve arrangement ensures constant differential pressure in the zone or riser, prevents possible noise across thermostatic radiator valves, and enables system service. The capillary tube must be connected to the drain mounted in the P/T port of the NexusValve Relax as shown to avoid including the pressure loss across the NexusValve Relax valve in the controlled circuit.*

### 3. Applications



Application 3 - One-pipe heating system

In this one-pipe heating system application the flow is controlled by NexusValve Fluctus (or NexusValve Vertex) valves. The NexusValve Relax is installed as a service valve in the flow line.



Application 4 - Underfloor heating system

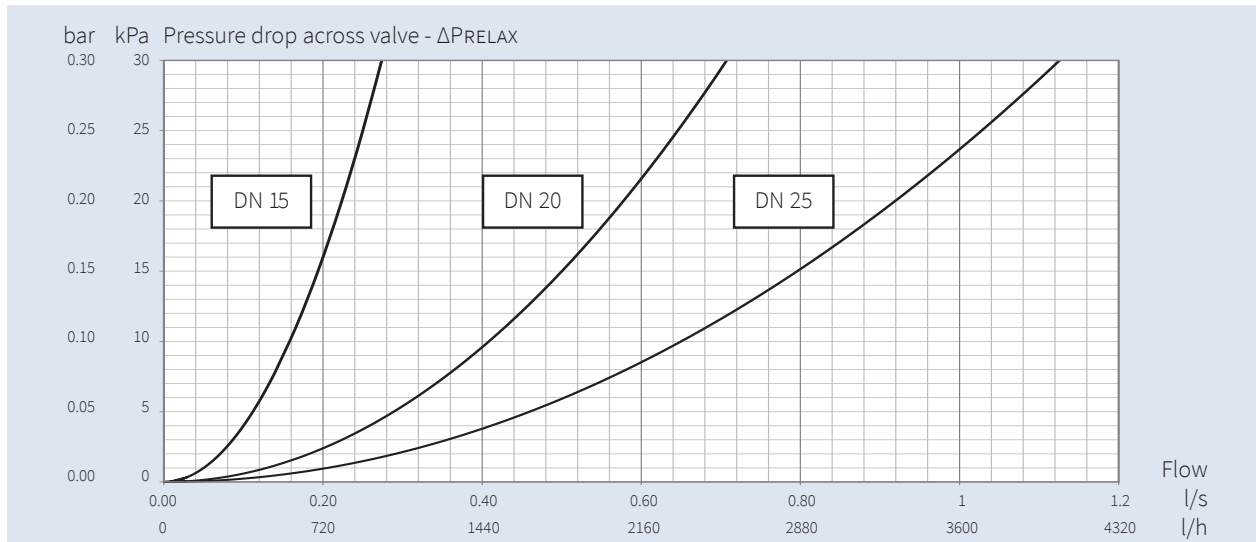
In this underfloor heating system application the NexusValve Relax is used to isolate flow to the manifolds for service purposes.



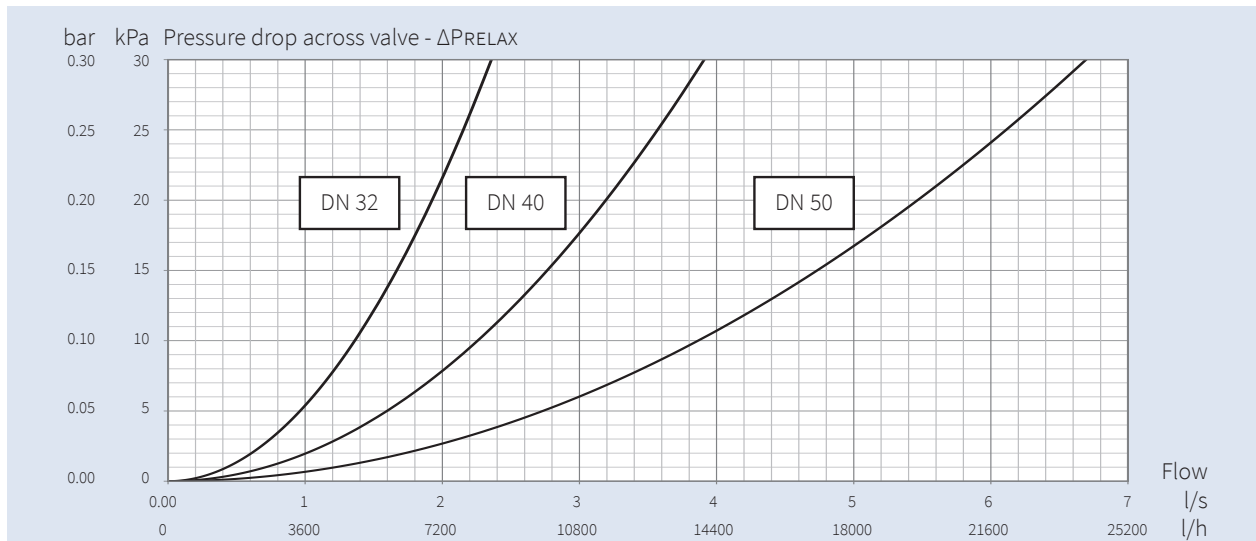
## 4. Product data sheet

### 4.1 Product finder

#### DN 15 - 25



#### DN 32 - 50

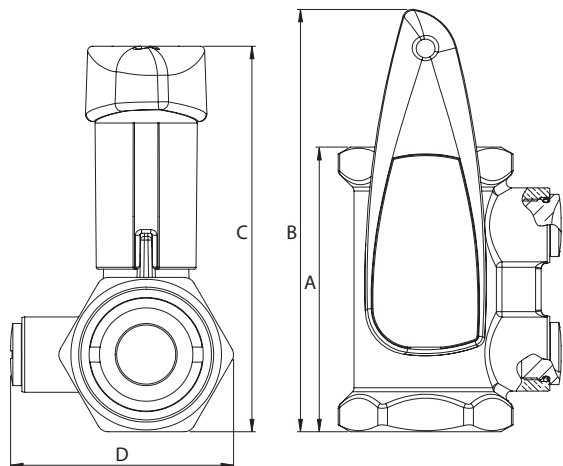


## 4. Product data sheet

Kvs m3/h	Dimension
1.80	DN 15
4.65	DN 20
7.40	DN 25
15.5	DN 32
25.7	DN 40
44.0	DN 50

### 4.2 Dimensions and Specifications

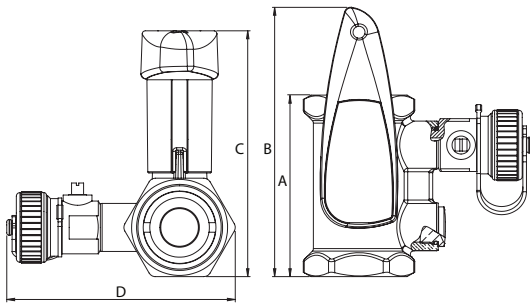
#### 4.2.1 NexusValve Vertex DN 15-50 female/female

Dimensions	Specifications
 <p>The drawing shows two views of the valve. The front view on the left shows a circular valve body with a handle on top. Dimension 'D' is the diameter of the valve body. The side view on the right shows the valve's profile. Dimension 'A' is the height from the base to the handle. Dimension 'B' is the height from the base to the top of the valve body. Dimension 'C' is the height from the base to the top of the handle.</p>	<p><b>Max. temperature</b> 120°C (135°C with P/T ports plugged or high temperature measuring points)</p> <p><b>Min. temperature</b> -20°C</p> <p><b>Max. pressure</b> 25 bar</p> <p><b>Press ends</b> 16 bar</p> <p><b>Marking on valve</b> (Handle) valve name (Valve body) DN, PN</p> <p><b>Connection</b> Female thread ISO 7/1 parallel</p> <p><b>Valve housing</b> DR Brass CW602N CuZn36Pb2As</p> <p><b>Ball &amp; needle</b> DR Brass CW602N (chrome plated)</p> <p><b>Valve handle</b> Polyamide (PA6.6 30%GF)</p> <p><b>Sealings</b> O-rings EPDM, Gaskets PTFE, Test point sealing EPDM</p>

DN	A (mm)	B (mm)	C (mm)	D (mm)
DN 15	57.6	103.2	88.9	47.2
DN 20	63.2	106.0	94.2	53.2
DN 25	75.6	112.2	102.4	59.2
DN 32	89.0	165.0	137.0	67.0
DN 40	98.0	170.0	144.0	73.0
DN 50	119.0	180.0	159.0	85.0

### 4.2.2 NexusValve Relax DN15-50 female/female with drain

#### Dimensions



#### Specifications

<b>Max. temperature</b>	120°C (135°C with P/T ports plugged or high temperature measuring points)
<b>Min. temperature</b>	-20°C
<b>Max. pressure</b>	25 bar
<b>Press ends</b>	16 bar
<b>Marking on valve</b>	(Handle) valve name (Valve body) DN, PN
<b>Connection</b>	Female thread ISO 7/1 parallel
<b>Valve housing</b>	DR Brass CW602N CuZn36Pb2As
<b>Ball &amp; needle</b>	DR Brass CW602N (chrome plated)
<b>Valve handle</b>	Polyamide (PA6.6 30%GF)
<b>Sealings</b>	O-rings EPDM, Gaskets PTFE, Test point sealing EPDM

DN	A (mm)	B (mm)	C (mm)	D (mm)
DN 15	57.6	103.2	88.9	83.2
DN 20	63.2	106.0	94.2	89.2
DN 25	75.6	112.2	102.4	95.2
DN 32	89.0	165.0	137.0	103.0
DN 40	98.0	170.0	144.0	109.0
DN 50	119.0	180.0	159.0	121.0

**Note!** Information on insulation jackets, press adaptors and other is provided in the chapter Accessories.

## 4. Product data sheet

Valve Dimension	Article	Article with drain	Norm. Inch	Kvs m <sup>3</sup> /h	Kvm m <sup>3</sup> /h
DN 15	MN80597.720 	MN80597.726 	1/2"	1.80	1.70
DN 20	MN80597.721 	MN80597.727 	3/4"	4.65	4.20
DN 25	MN80597.722 	MN80597.728 	1"	7.40	6.65
DN 32	MN80597.723 	MN80597.729 	1 1/4"	15.5	13.4
DN 40	MN80597.724 	MN80597.730 	1 1/2"	25.7	21.1
DN 50	MN80597.725 	MN80597.731 	2"	44.0	35.7

**Note!** The Kvs value refers to the pressure loss across the whole valve.

The Kvm value refers to the pressure loss across the measuring points and must be used only for the flow verification during system commissioning.

### 4.3 Flow measuring

Flow measuring is possible across a NexusValve Relax valve when the pressure loss across the measuring points is equal to or greater than 3.0 kPa.



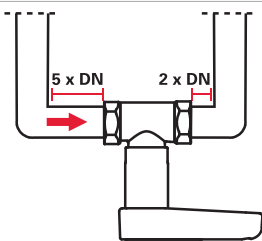
When the NexusValve Relax is fully open and the pressure loss across the measuring points is equal to or greater than 3.0 kPa, the Kvm can be entered into a balancing computer for flow verification.

In order to achieve at least 3.0 kPa pressure loss across the measuring points of a NexusValve Relax valve, the flows must be according to the below stated minimum flows values:

Kvm m <sup>3</sup> /h	Dimension	Minimum required flow l/h	Pressure loss across the measuring points kPa
1.70	DN 15	290	3.0
4.20	DN 20	730	3.0
6.65	DN 25	1150	3.0
13.4	DN 32	2300	3.0
21.1	DN 40	3600	3.0
35.7	DN 50	6100	3.0

The NexusValve Relax measurement function is particularly useful in central heating systems with pre-settable thermostatic radiator valves and differential pressure control valves installed in each riser. Flow balancing valves are not required in this type of application, but using NexusValve Relax as a partner valve to the NexusValve Passim makes it possible to verify the correct flow distribution in each riser.

**Note!** When verifying the flow, the NexusValve Relax must be always in open position.



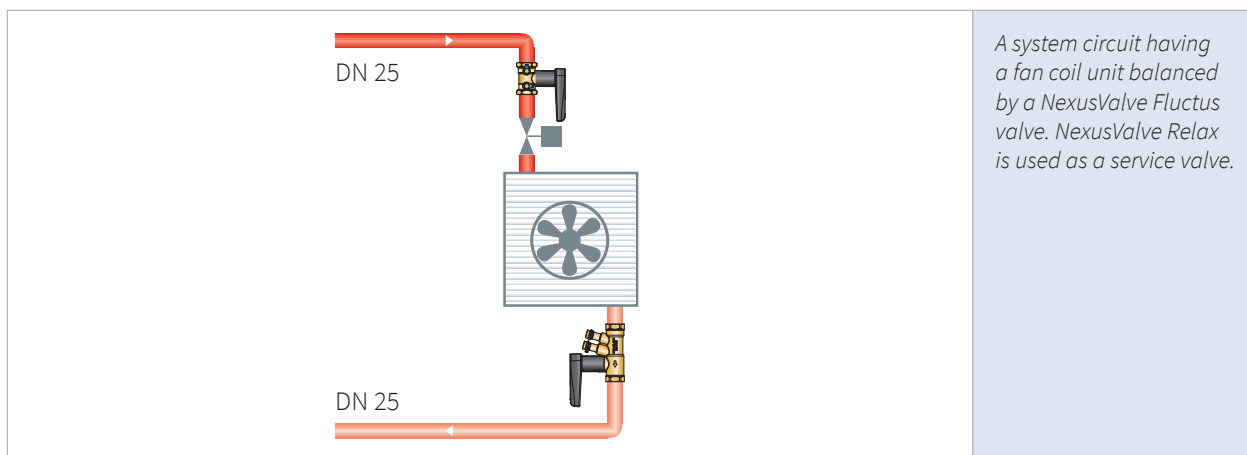
5 × DN straight piping in front of the NexusValve Relax valve and 2 × DN straight piping after the valve must be provided for flow verification.

## 5. Sizing examples

Sizing the NexusValve Relax is initially made according to the system pipe size used. The following examples show, how-ever, how to size NexusValve valves according to the required system flow using smaller valve sizing than the system pipe.

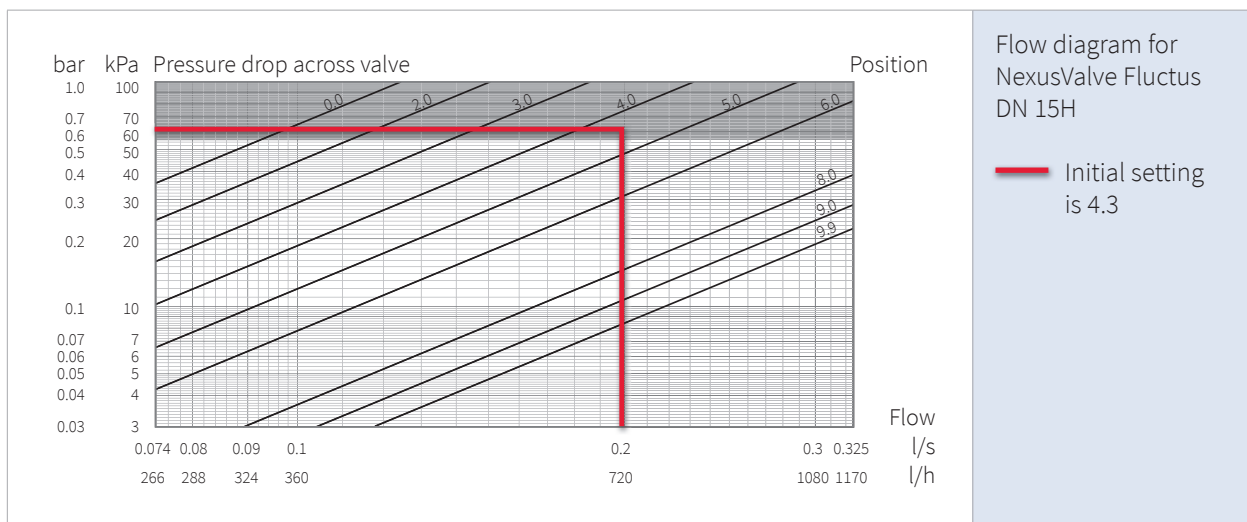
### 5.1 Sizing NexusValve Relax and NexusValve Fluctus

In the below system the NexusValve Fluctus ensures the required flow in the terminal unit whereas the motorized valve connected to a BMS system or a room thermostat controls the indoor temperature and the NexusValve Relax operates as a service valve.

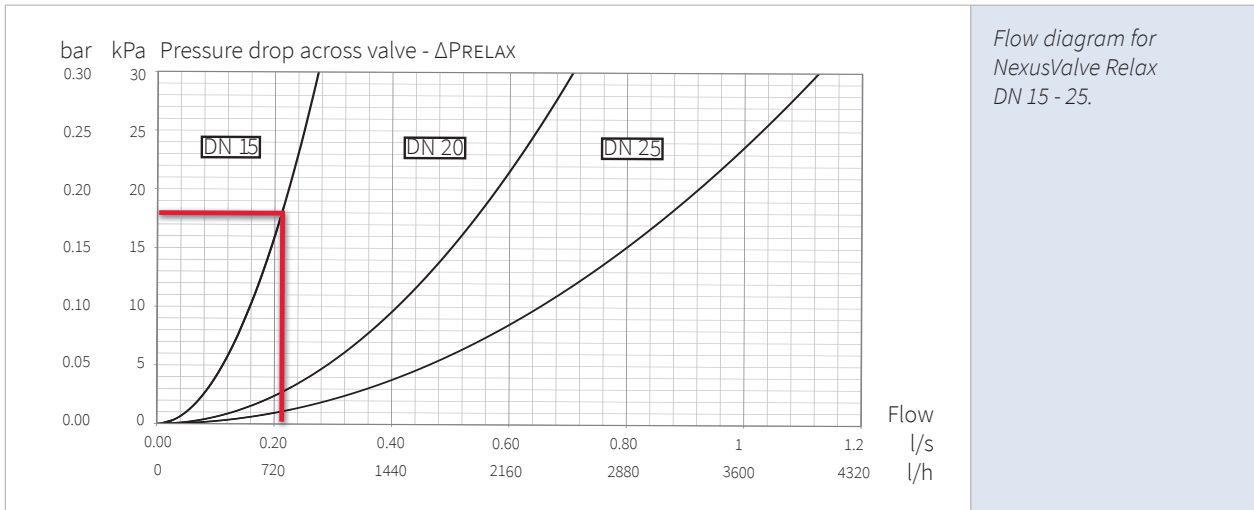


The required flow through the NexusValve Fluctus valve to the fan coil unit is: 0.20 l/s (720 l/h) Due to the installed pump the required pressure loss across the NexusValve Fluctus valve is: 65 kPa.

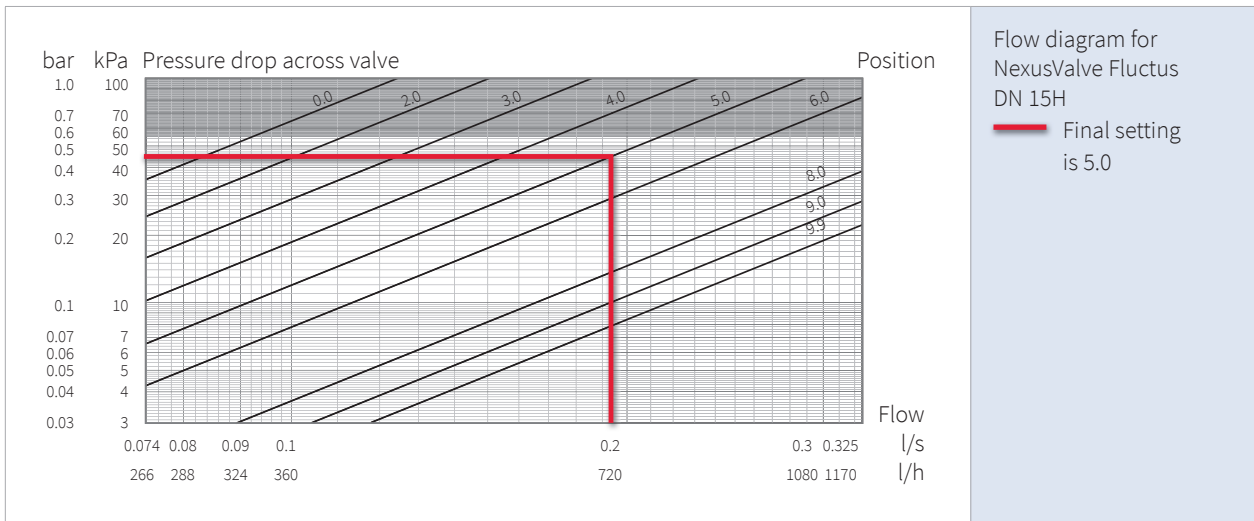
The required flow and pressure loss is reached with a NexusValve Fluctus DN 15H valve.



Under the same conditions the NexusValve Relax DN 15 is dimensioned.



NexusValve Relax DN 15 ensures 18.0 kPa pressure loss at the required flow of 720 l/h. As a result the required pressure loss across the NexusValve Fluctus DN 15H is:  $DP_{bv} = 65 \text{ kPa} - 18.0 \text{ kPa} = 47.0 \text{ kPa}$ .



This helps to avoid potential noise problems and lengthens the lifespan of the balancing valve.

**Note!** NexusValve Relax must be either fully open or fully closed! Any intermediate position of the ball valve is not allowed.

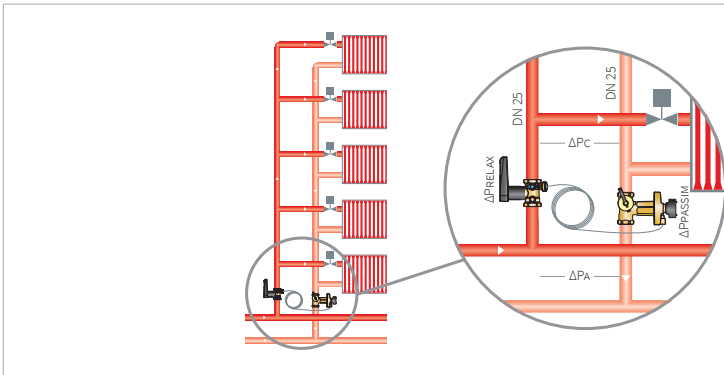
Ordering: NexusValve Fluctus DN 15H, Article No.: MN80597.403

NexusValve Relax DN 15 with drain, Article No.: MN80597.726

## 5. Sizing examples

### 5.2 Sizing NexusValve Relax and NexusValve Passim

The following central heating system, consisting of several risers with radiators and pre-settable thermostatic radiator valves, has NexusValve Passim and NexusValve Relax valves installed. NexusValve Passim is used to provide the required differential pressure in risers whereas NexusValve Relax is used as a service and partner valve. The thermostatic radiator valves are pre-settable and therefore flow balancing valves are not needed in this installation.



*A system riser having radiators and pre-settable thermostatic radiator valves. A NexusValve Passim valve is installed in combination with a NexusValve Relax valve to provide constant differential pressure and enable service of the system riser.*

The NexusValve Passim and the NexusValve Relax must be sized for the following riser.

The flow in the riser is: 0.25 l/s (900 l/h) and the required differential pressure is:  $\Delta P_c = 15.0$  kPa

Available riser differential pressure is:  $\Delta P_A = 37.0$  kPa

Based on above information, the following valves can be selected:

NexusValve Passim DN 20 at a flow of 0.25 l/s (requires 13.0 kPa Pressure loss). NexusValve Relax DN 25 (equal to the pipe size) at a flow of 0.25 l/s generates 1.5 kPa pressure loss (1.8 kPa across the P/T ports) or NexusValve Relax DN 20 which at a flow of 0.25 l/s generates 4.0 kPa pressure loss.

Pressure loss across the measuring points of NexusValve Relax DN 20 is calculated as follows:

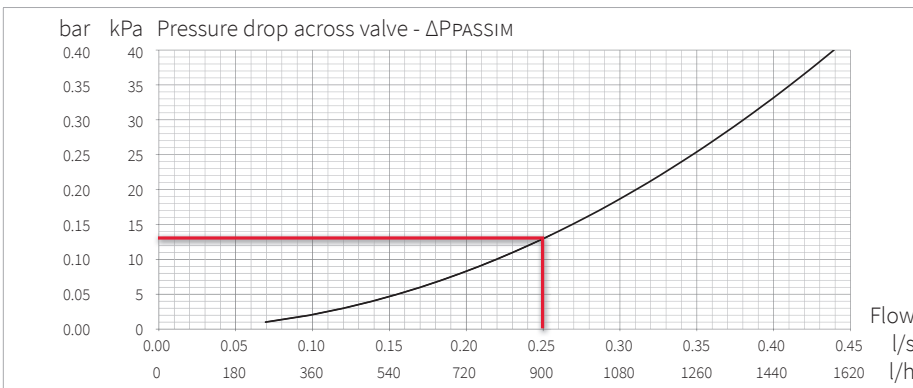
$$\Delta P_{Bm} = \frac{Q \text{ [m}^3\text{/h]}}{Kvm \text{ [m}^3\text{/h]}} = \frac{\frac{900}{1000} \text{ m}^3\text{/h}}{4.2 \text{ m}^3\text{/h}} = 0.046 \text{ bar} = 4.6 \text{ kPa.}$$

The required riser pressure using NexusValve Passim DN 20 and NexusValve Relax DN 20 is:

$$\Delta P_{RELAX} + \Delta P_{PASSIM} + \Delta P_c = 4.0 + 13.0 + 15.0 \text{ kPa} = 32.0 \text{ kPa} < \Delta P_A$$

Based on this calculation NexusValve Relax DN 20 can be used for this application. Since the available pressure is

$\Delta P_A = 37.0$  kPa, the excess pressure ( $37.0 - 32.0 = 5.0$  kPa) is reduced by the NexusValve Passim valve.

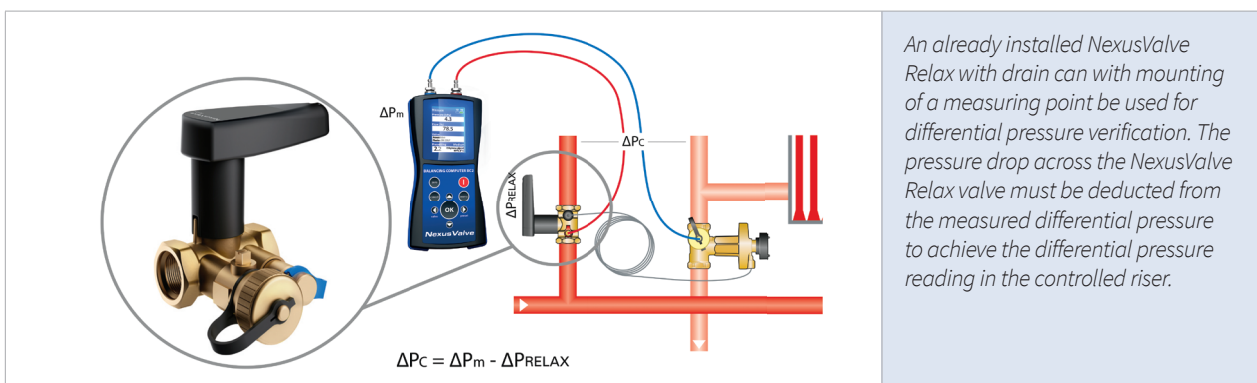
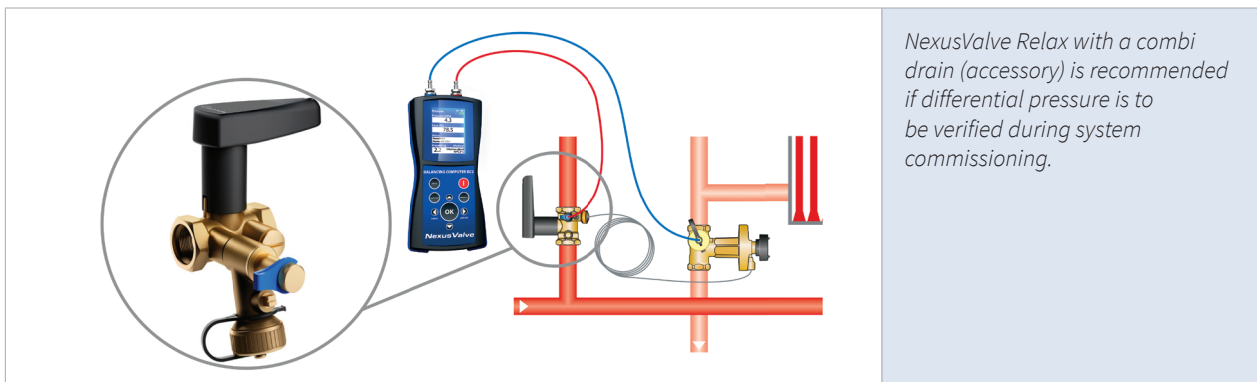
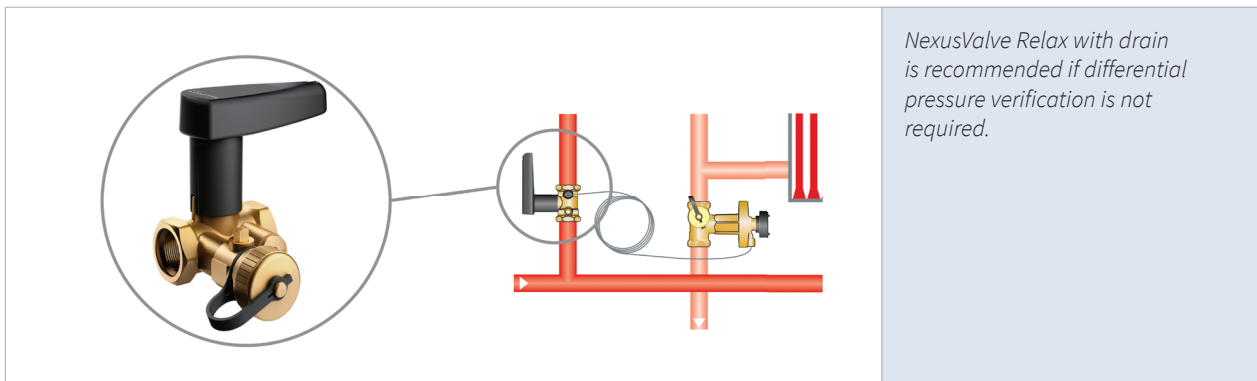


*Pressure loss across the NexusValve Passim DN 20 differential pressure control valve.*



The generated pressure loss across P/T ports of the NexusValve Relax DN 20 is 4.6 kPa. As a result the flow across the NexusValve Relax DN 20 valve can be verified after providing measuring points (available as an accessory). If the flow is to be verified, straight piping of 5 × DN before and 2 × DN after the NexusValve Relax valve is required.

NexusValve Relax can be provided in three different configurations for this application, depending on the necessity for differential pressure verification in the controlled part of the riser.



Ordering:

NexusValve Passim DN 20, Article No.: MN80597.523

NexusValve Relax DN 20, Article No.: MN80597.721

## 5. Sizing examples

### 5.3 General specifications

#### 1. Shut-off valve DN 15 - 50

1.1. The Contractor must install shut-off valves where indicated in drawings.

#### 2. Valve Body

- 2.1. The valve body must be made of hot stamped DR brass CW602N CuZn36Pb2As.
- 2.2. The pressure rating must be no less than PN25 (PN16 with press adaptors).
- 2.3. The valve must be able to perform isolation and optionally draining and pressure measurement in one single unit.
- 2.4. The valve must be bi-directional to flow, and no flow arrow must be indicated in the valve body.
- 2.5. The isolation handle and the measuring points must be positioned in plane incline at an angle of 90° to each other.
- 2.6. Testing through measuring points must be possible in all valve positions.
- 2.7. One P/T port must be in front of the isolation ball and the other behind the isolation ball.
- 2.8. The valve must incorporate a restricted flow ball for the isolation and optional flow measurement.
- 2.9. The size of the valve must be clearly marked on the housing.

#### 3. Functions

- 3.1. The valve must have a visible quarter-turn open/close function.
- 3.2. The flow measurement must be possible at pressure loss of at least 3.0 kPa.
- 3.3. Flow through the valve must be possible in both directions at the same Kv value.

**Notes**

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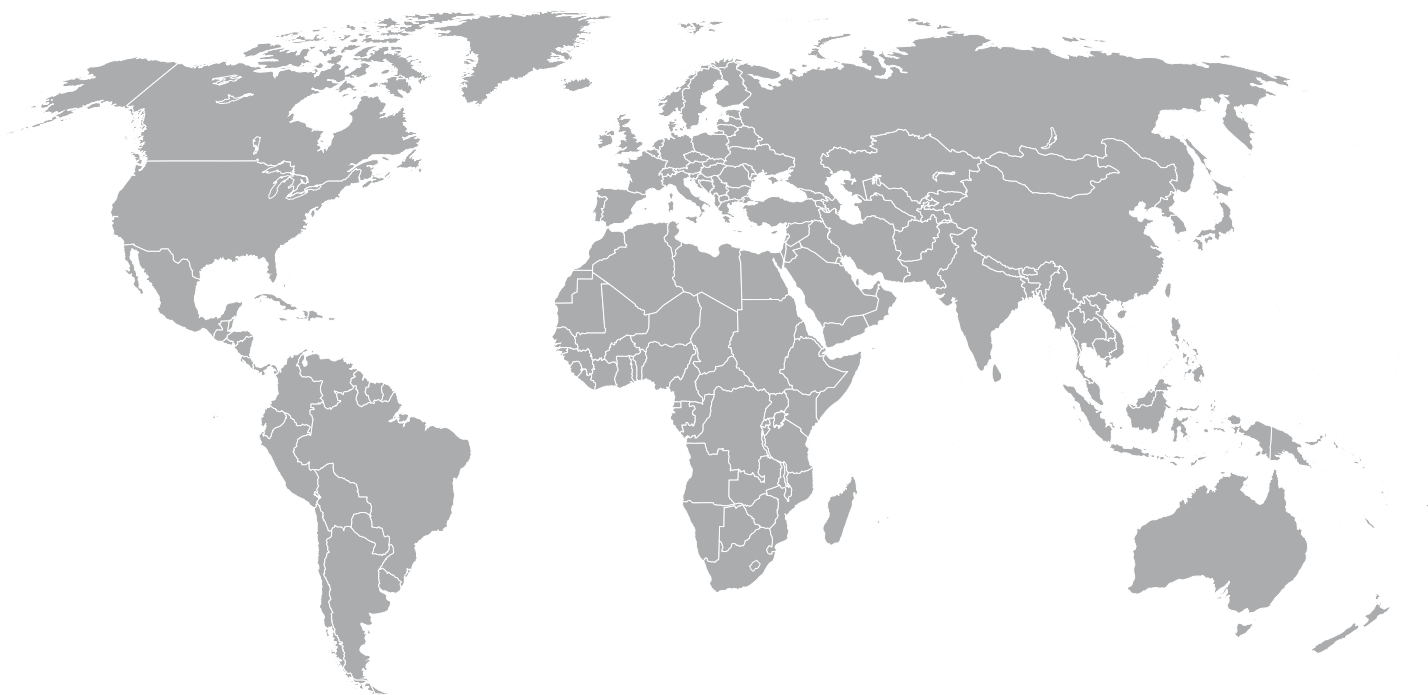
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## Contact

### Contact data

[www.flamcogroup.com](http://www.flamcogroup.com)



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**the Netherlands**

Flamco B.V.  
PO Box 502  
3750 GM Bunschoten  
Amersfoortseweg 9  
3751 LJ Bunschoten

**T** +31 (0)33 299 75 00  
**E** [info@flamco.nl](mailto:info@flamco.nl)  
**I** [www.flamcogroup.com](http://www.flamcogroup.com)

**United Kingdom**

Flamco UK Ltd  
Washway Lane  
St Helens, Merseyside  
WA10 6PB

**T** +44 1744 744 744  
**F** +44 1744 744 700  
**E** [info@flamco.co.uk](mailto:info@flamco.co.uk)  
**I** [www.flamcogroup.com](http://www.flamcogroup.com)

**United Arab Emirates**

Flamco Middle East  
PO Box 262636  
Jebel Ali  
Dubai

**T** +971 4 881 95 40  
**F** +971 4 881 95 60  
**E** [info@flamco-gulf.com](mailto:info@flamco-gulf.com)  
**I** [www.flamcogroup.com](http://www.flamcogroup.com)

Subject to modifications

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