Installation Instructions for the TBVL Valve Set GOLD/COMPACT

1. General

The TBVL valve set is a set of control components for air heaters/air coolers and consists of a 2(3)-way valve, actuator, connection cable with quick-fit connector and temperature sensor water (insertion type), and T-piece (for air heaters without outlet for an insertion sensor).

For air coolers the temperature sensor water and T-piece are options and can be used to read incoming and outgoing cooling medium temperatures.

The control valve, actuator and temperature sensor water if included, are supplied loose together with the air heater/ air cooler.

2. Installation

Install the frost guard sensor on the air heater in the connection intended for an insertion sensor, if there is one. See Fig. 1.

For air heaters that lack a connection for a frost guard sensor, a T-piece (supplied) can be installed on the outlet of the return pipe. See Figures 2 and 3. Make sure that the frost guard sensor is protected to prevent inadvertent damage by installing a pipe extension on the outgoing header of the air heater.

On the Thermo Guard protected coils, always connect a control valve on the inlet water pipe for 2-way operation. See Fig. 2 – Pipe connection example with Thermo Guard.

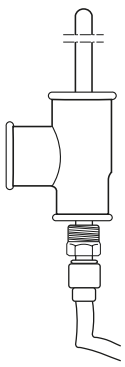
Three types of valve actuator are used, SSF161 for air heaters of a smaller size and SAX 619 or SAS 61 for the larger ones.

The valve actuator is complete with connection cable that should be connected to the control unit of the air handling unit. The valve must not be mounted with the actuator under the valve.

If the coil is to be installed outdoors or in a cold space, take into consideration the enclosure class of the actuator and the permissible ambient temperature. See the section entitled Technical Data. If necessary, see to it that required protection is arranged.

The valve actuator must always be mounted on the valve before you begin wiring the electrical connections to the air handling unit.

Fig. 3



Measuring element, sensor

T-piece

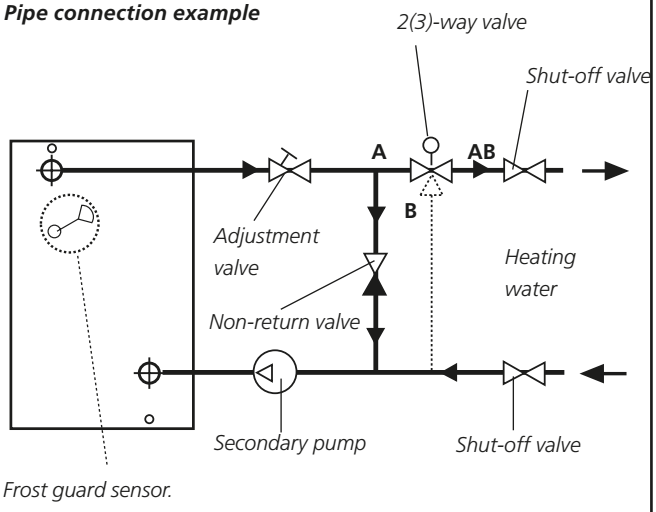
Cable gland

Spacer nut for adjusting the insertion depth.

Installion of frost guard sensor in the connection for an insertion sensor (if any)

Fig. 1

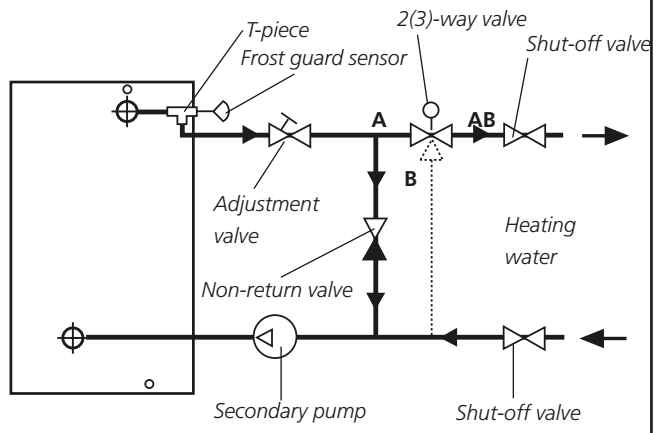
Pipe connection example



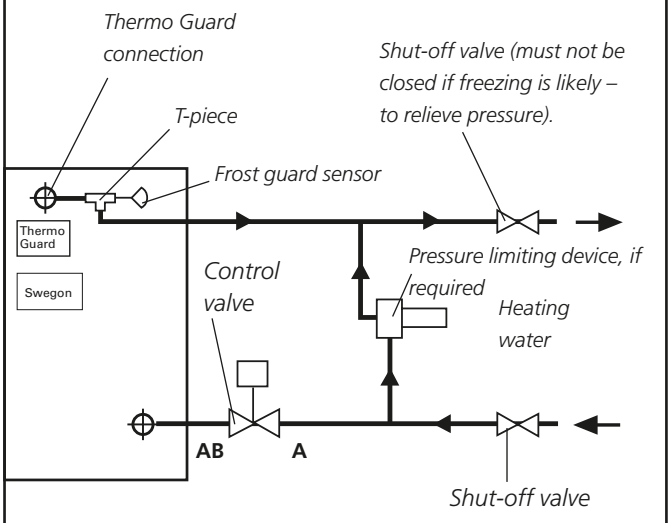
Installation of frost guard sensor if the air heater lacks a connection for an insertion sensor

Fig. 2

Pipe connection example, <u>without</u> Thermo Guard



Installation example, with Thermo Guard



If actuators of the type SAS 61 and SAX 619 are used, after mounting the actuator onto the valve, manually check how it controls the valve to its end positions, the first time you switch on the power. See below.

Actuator SSF161
No end position check. Self-adjusting end positions.

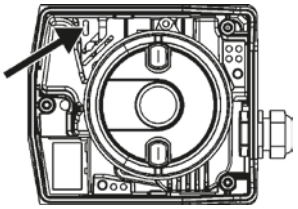
Actuator SAS 61/SAX 619
Two pin connectors, placed under the actuator's cover plate, are strapped with the help of e.g. a screwdriver. Check that the LED flashes green, which indicates that the end position check is in progress.

Once the end position check has been completed the LED is lit green or red. A green light indicates that the actuator is in normal mode. A red light indicates that the end position check must be performed again.

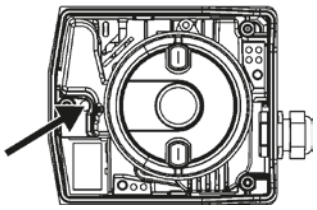
Also see the diagrams below.

SAS 61

The pin connectors are strapped with, e.g. a screwdriver

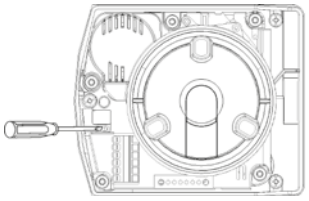


LED. A flashing green light indicates that the end position check is in progress

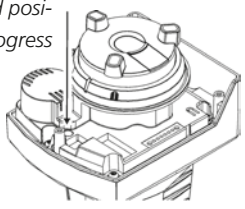


SAX 619

The pin connectors are strapped with, e.g. a screwdriver



LED.
A flashing green light indicates that the end position check is in progress



3. Technical Data

Valve actuator, SAS 61

Power supply voltage	24 VAC ± 20 % 50/60 Hz
Power consumption	4.5 VA
Signal input (Y)	0 - 10 VDC max 0.1 mA
Signal output (U)	0 - 10 VDC max 1.0 mA
Actuating time	30 sec. for 50 Hz
Permissible ambient temp. and humidity while in operation	-5° to +55°C, 5 - 95 %rH
Cable grommets	1 pc. M16, 1 pc. M20
Enclosure class	IP 54

Valve actuator, SAX 619

Supply voltage	24 V AC, 50/60 Hz
Power consumption	8 VA
Signal input (Y)	0 – 10 V DC, max. 0.1 mA
Period in operation	30 sec.
Permissible ambient temperature	+5 to +55°C, 5 – 95 % RH
Enclosure class	IP 54

Valve actuator, SSF161

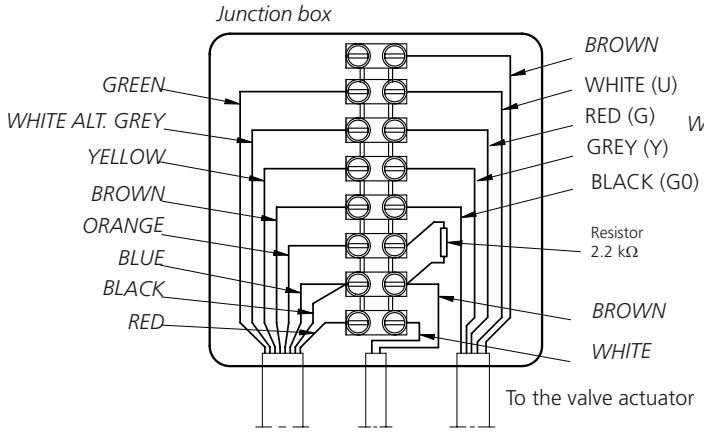
Supply voltage	24 VAC (±15%) or 24 VDC (±20%)
Power consumption	3 VA
Signal input (Y)	0 - 10 VDC
Period in operation	33 s
Permissible ambient temperature	+1 to +50°C, 5 – 95% RH
Protection class	IP 54

4. Electrical Connections

Valve actuator

GOLD RX/PX/CX/SD, version E/F

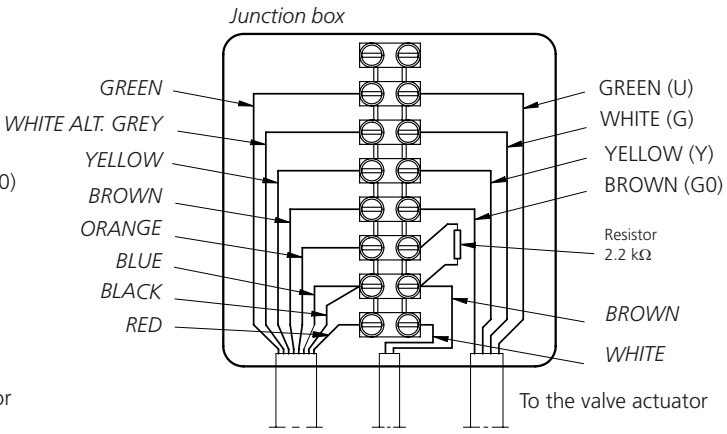
SSF161



Connect the 5 metre long control cable to the modular connection marked HEAT or COOL on the control unit or I/O-module of the air handling unit.

Frost guard sensor, 3.0 m long sensor cable

SAX 619/SAS 61

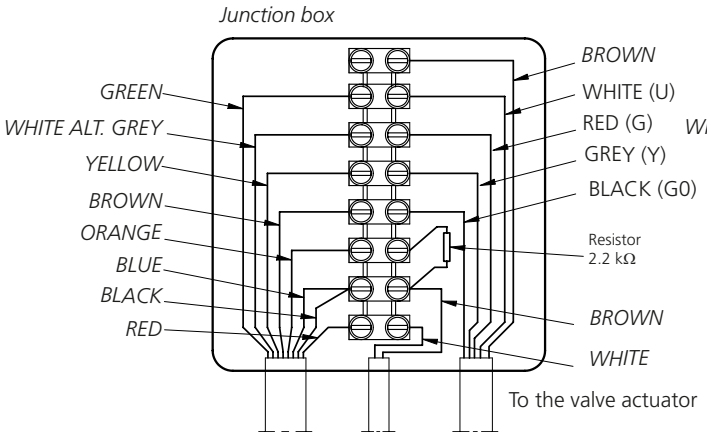


Connect the 5 metre long control cable to the modular connection marked HEAT or COOL on the control unit or I/O-module of the air handling unit.

Frost guard sensor, 3.0 m long sensor cable

COMPACT

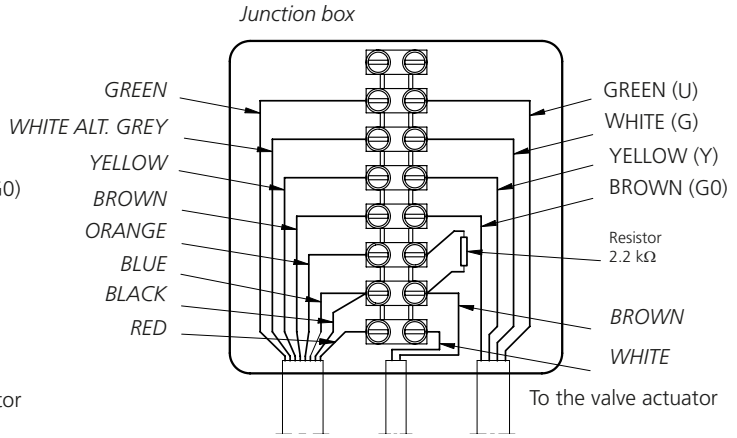
SSF161



Connect the 5 metre long control cable to the modular connection marked REHEAT on the control unit of the air handling unit.

Frost guard sensor, 3.0 m long sensor cable

SAS 61



Connect the 5 metre long control cable to the modular connection marked REHEAT on the control unit of the air handling unit.

Frost guard sensor, 3.0 m long sensor cable

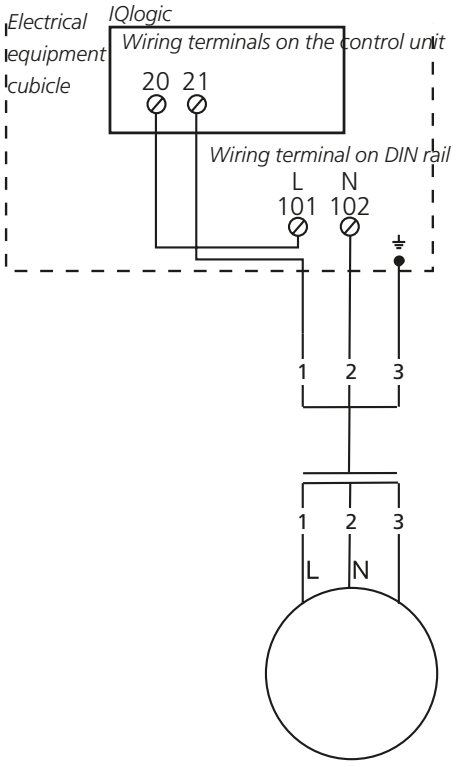
Circulation pump

The electrical connections should be wired by a qualified electrician in accordance with local electrical safety regulations.

GOLD RX/PX/CX/SD, version E/F

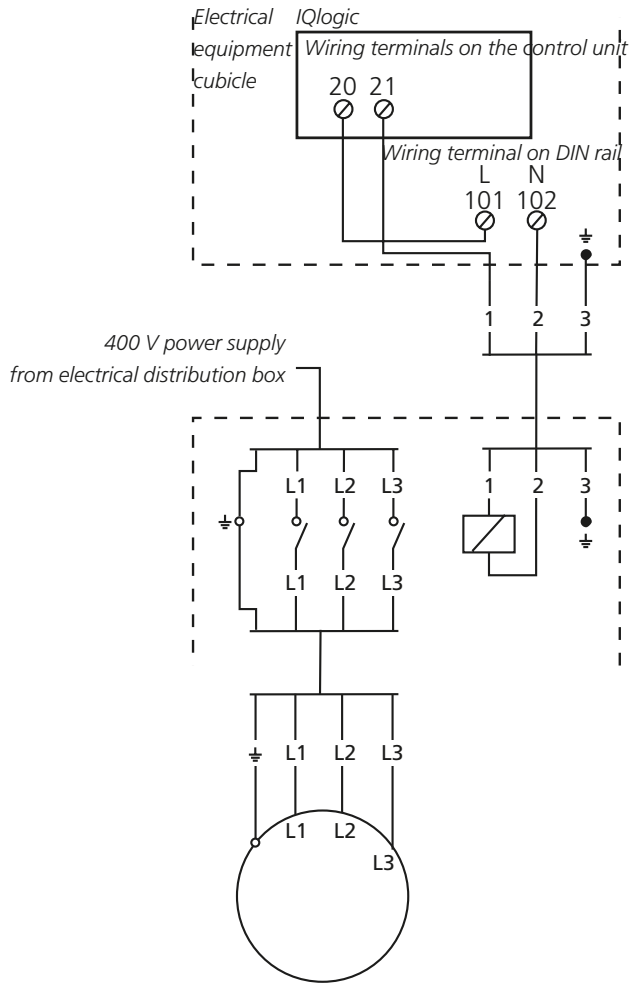
Heating

Alt. 1, 1-phase, max. 1.5 A,



Circulation pump, heating circuit, 1-phase, max. 1.5 A

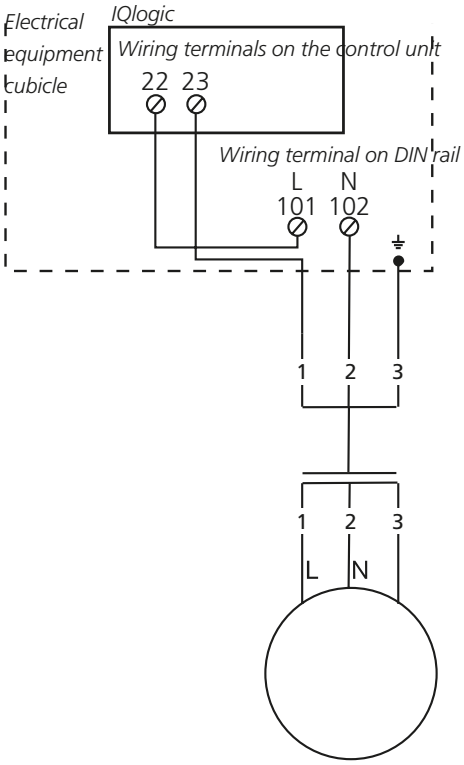
Alt. 2, 3-phase



Circulation pump, heating circuit, 3-phase

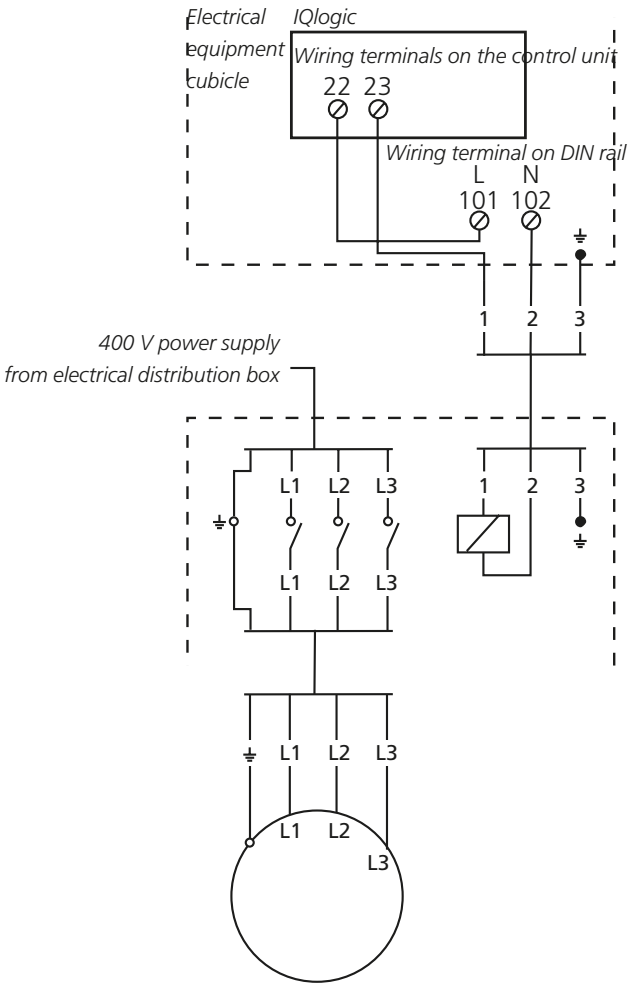
Cooling energy

Alt. 1, 1-phase, max. 1.5 A,



Circulation pump, heating circuit, 1-phase, max. 1.5 A

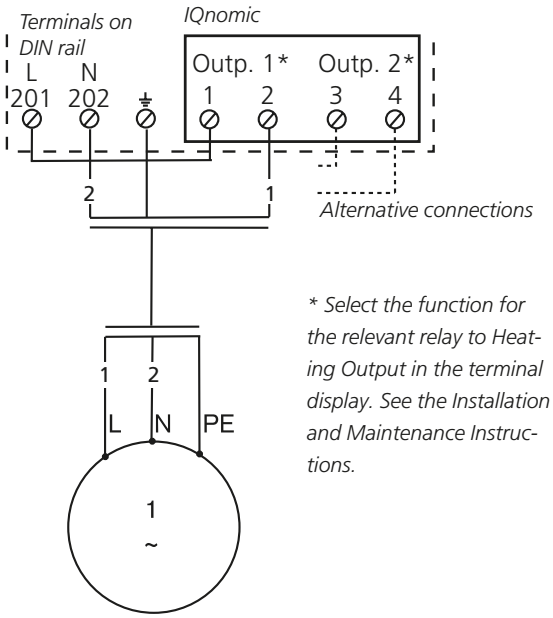
Alt. 2, 3-phase



Circulation pump, heating circuit, 3-phase

COMPACT

1-phase, max. 1.5 A

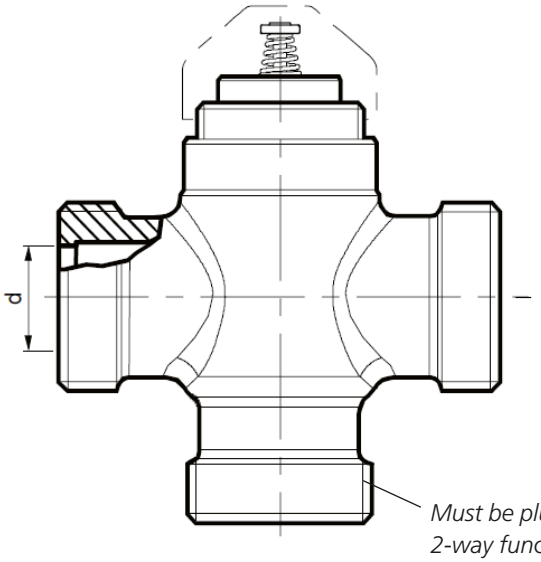


** Select the function for the relevant relay to Heating Output in the terminal display. See the Installation and Maintenance Instructions.*

Circulation pump, heating circuit

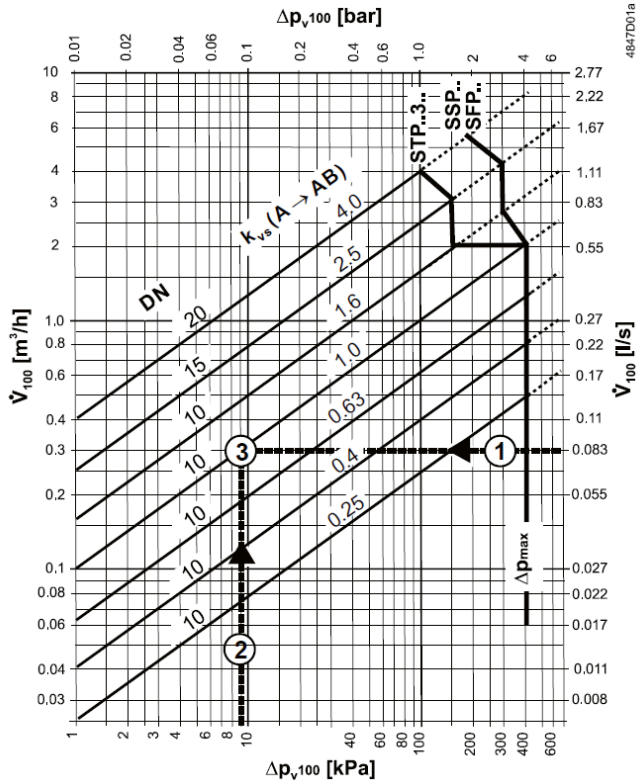
5. Connections, valve

VXP47



Must be plugged if 2-way function is used. (The plug is not included in the supply).

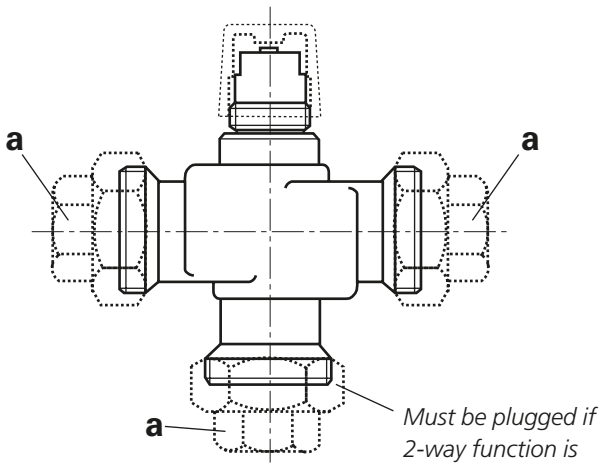
Valve set	Valve	d int. thread	Kvs-value	Actuator
TBVL-4-002	VXP47.10-0.25	DN 10 (3/8")	0.25	SSF161
TBVL-4-004	VXP47.10-0.4	DN 10 (3/8")	0.4	SSF161
TBVL-4-006	VXP47.10-0.63	DN 10 (3/8")	0.63	SSF161
TBVL-4-010	VXP47.10-1	DN 10 (3/8")	1.0	SSF161
TBVL-4-016	VXP47.10-1.6	DN 10 (3/8")	1.6	SSF161
TBVL-4-025	VXP47.15-2.5	DN 15 (1/2")	2.5	SSF161



Example:
1 V_{100} = 0.083 l/s
2 Δ_{pv100} = 9 kPa
3 Required kvs-value = 1.0 m3/h

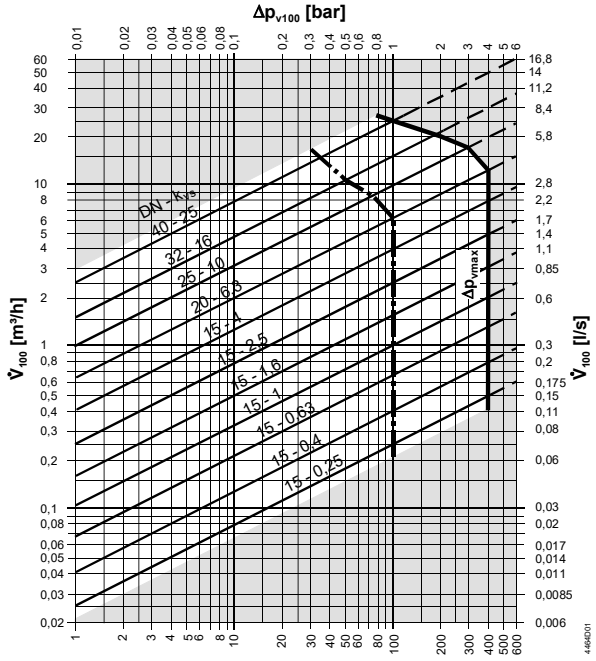
Δ_{pv100}	= Differential pressure over fully open valve and flow direction A to AB at volume flow V_{100}
V_{100}	= Volume flow through fully open valve (H_{100})
Δ_{pvmax}	= Max. permitted pressure difference over the valve's flow path for the valve actuator's entire setting range
100 kPa	= 1 bar approximately equal to 10 mWS
1 m3/h	= 0.278 l/s water at 20°C

VXG44



Valve set	Valve	a, int. threads	Kvs-value	Actuator
TBVL-3-040	VXG44.15-4	DN 15 (1/2")	4,0	SAS61
TBVL-3-063	VXG44.20-6,3	DN 20 (3/4")	6,3	SAS61
TBVL-3-100	VXG44.25-10	DN 25 (1")	10.0	SAS61
TBVL-3-160	VXG44.32-16	DN 32 (1¼")	16.0	SAS61
TBVL-3-250	VXG44.40-25	DN 40 (1½")	25.0	SAS61

Sizing



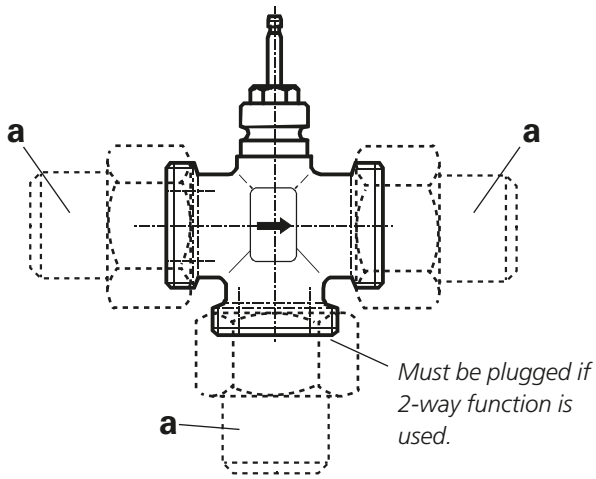
50% of the available pressure drop should be across the valve to give it satisfactory controllability (valve authority). This provides valve authority of 0.5. The ideal authority is 0.5 with an appropriate range of 0.4 – 0.7.

Sizing example

VXG44.15-4 has a kvs-value of 4.0. If the pressure drop is 15 kPa, the max. flow will be 0.45 l/s.

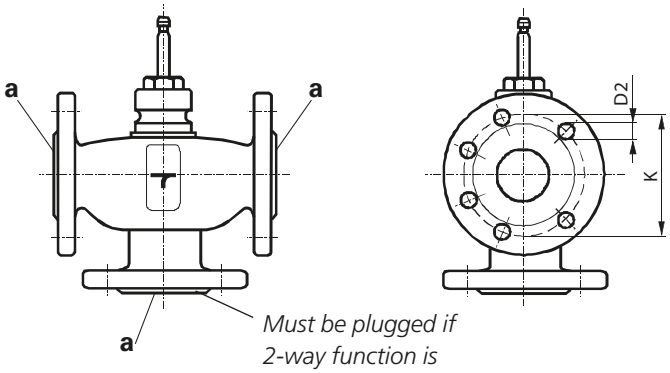
VXG44.15-6.3 has a kvs-value of 6.3. If the pressure drop is 15 kPa, the max. flow will be 0.7 l/s.

VXG41



Valve set	Valve	a, female threads	Kvs-value	Actua-tor
TBVL-3-400	VXG41.50	DN 50 (2³/4")	40,0	SAX619

VXF42



Valve set	Valve	a, fem. conn.	K	D2	Kvs-value	Actua-tor
TBVL-4-490	VXF42.65-50	DN 65	145	19 (4x)	50,0	SAX619
TBVL-4-630	VXF42.65-63	DN 65	145	19 (4x)	63,0	SAX619
TBVL-4-780	VXF42.80-80	DN 80	160	19 (8x)	80,0	SAX619

Sizing