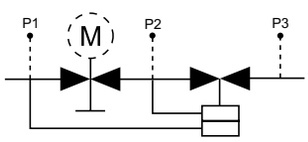
VDL 050...100: 2-way regulating valve for dynamic hydronic balancing, PN 16, Valveco flange

VDL065F501



How energy efficiency is improved

Automatic dynamic hydronic balancing with the SAUTER Valveco flange regulating valve provides a correct supply to the downstream consumers and a reduction of temperature variations in HVAC installations, so that energy is used more accurately and more efficiently

Features

- Regulating valve with three functions: Control, preset maximum volume flow, automatic flow regulation
- Control of low and mean temperature domestic hot water, cooled water, water with anti-freeze in closed circuits[1)]
- Volume flow range: 3.7…90.9 m^3/h
- Easy to preset the max. required volume flow
- All types with three pressure measurement nipples
- The valve is closed when the spindle is moved in
- Closing procedure against the pressure
- Simple connection to SAUTER actuators AVM 215 for DN 50...80 and AVM 234 for DN 100
- Regulating valve with flange connection (DN 50...DN 100) according to EN ISO 7005-2
- Flat-sealing regulating valve
- Differential pressure across the control unit is kept constant; valve authority 1
- Valve body DN 50…80 made of grey cast iron (GJL-250); DN 100 made of ductile cast iron (GJS-400)
- Stainless-steel spindle

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ValveDim app

Technical data

Parameters		
	Nominal pressure	16 bar
	Volume flow setting range	3.7...90.9 m^3/h
	Maximum operating pressure	PN 16 (EN 1333)
	Connection	Flange as per ISO 7005-2
	Valve characteristic	Linear (VDI/VDE 2173)
	Control ratio	1:100
	Leakage rate	Max. 0.01% of the volume flow with the valve fully open (Class IV, EN 1349)
Ambient conditions		
	Operating temperature for valve	1…120 °C
Construction		
	Pressure measurement nipple	3 pcs, G¼ inch, suitable for 2 × 40 mm probes
Standards, directives		
	Pressure and temperature data	EN 764, EN 1333
	Flow parameters	EN 60534, page 3
	PED 2014/68/EU[2)]	Fluid group 2 as per Art. 13 Pressure equipment as per Art. 1.1
	EAC Directive	All types EAC-compliant (Eurasian conformity)

1) *Water quality must comply with VDI 2035, water with anti-freeze permissible*

2) *No special valve test required at operating temperature ≤ 110 °C. This also applies to valves with PS x DN < 1000. In both cases the valves do not have a CE label*

Overview of types					
Type	Nominal diameter (DN)	Volume flow range m^3/h	Control range min Δp...max Δp (kPa)	Valve stroke (mm)	Weight (kg)
VDL050F501	50	3.7…14.3	13…600	20	15
VDL050F501H	50	5.7…24.6	30…600	20	15
VDL065F501	65	4.5…24.4	28…600	20	19
VDL065F501H	65	6.4…37.7	30…600	20	19
VDL080F501	80	6.8…35.7	18…600	20	28
VDL080F501H	80	8.5…49.0	22…600	20	28
VDL100F501	100	12.2…69.6	18…600	40	46
VDL100F501H	100	14.8…90.9	20…600	40	46

Type	Fluid group 2	Average flow accuracy	
VDL050F501	No CE marking as per PED, Article 4.3	± 10% of Δp_{min} up to 70 kPa	± 5% at 70...600 kPa
VDL050F501H			
VDL065F501	With CE marking as per PED, Article 14.2 (conformity assessment procedure: Category I, Module A)		
VDL065F501H			
VDL080F501			
VDL080F501H			
VDL100F501	With CE marking as per PED, Article 14.2	± 10% of Δp_{min} up to 105 kPa	± 5% at 150...600 kPa
VDL100F501H			

Combination of VDL with electrical actuators

i ***Warranty:*** *The technical data and pressure differences indicated here are applicable only in combination with SAUTER valve actuators. The warranty does not apply if used with valve actuators from other manufacturers.*

i ***Definition of Δp_s:*** *Maximum admissible pressure drop in the event of a malfunction (pipe break after the valve) at which the actuator reliably closes the valve.*

i ***Definition of Δp_{max}:*** *Maximum admissible pressure drop in control mode at which the actuator reliably opens and closes the valve.*

i ***Definition of Δp_{min}:*** *Minimum differential pressure across the control passage of the valve for the differential pressure regulator to operate reliably.*

Pressure differences

Actuator	**AVM215SF132-7**	**AVM234SF132-7**
Voltage	24 V~/=	24 V~/=
Control signal	0…10 V	0…10 V
Running time	7.5 s/mm 15 s/mm	2/4/6 s/mm
Actuating power	500 N	1700 N
Media temperature	Max. 120 °C	Max. 120 °C

Δp [bar]

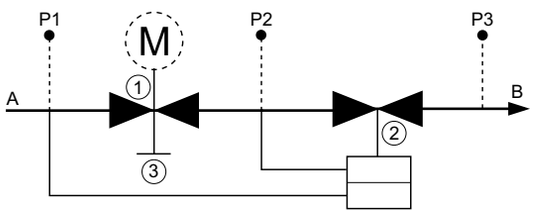
Closes against the pressure	**Δp_{max}**	**Δp_s**	**Δp_{max}**	**Δp_s**
VDL050F501 VDL050F501H VDL065F501 VDL065F501H VDL080F501 VDL080F501H	6.0	7.0	–	–
VDL100F501 VDL100F501H	–	–	6.0	6.0
Cannot be used to close with the pressure				

Description of operation

The Valveco range of valves combines a dynamic controller with presettable maximum volume flow, a differential pressure controller and a regulating valve, independent of the set volume flow.
The dynamic controller keeps the differential pressure across the regulating valve (PICV) constant, regardless of pressure fluctuations in the system. When the spindle is pressed in, the regulating valve is closed.
The combination of dynamic hydronic balancing and dynamic regulation in the SAUTER Valveco simplifies the work of planning engineers and installers. No time-consuming calibration or adjustment of the systems is required. In the event of pressure fluctuations, the energy supply of the existing system remains unaffected.
The mechanical differential pressure regulator connected in series keeps the pressure across the regulating valve constant, thus also maintaining the preset volume flow. The volume flow and therefore the required temperature in buildings, rooms and zones are precisely controlled. PICVs can thus help increase energy efficiency in buildings and control the hydraulic system more accurately.

Flow rate

The medium entering through the inlet (A) first flows through the regulating valve (1) with linear valve characteristic. The actuator opens and positions the regulating valve precisely. At the same time, the medium flows through the opening of the variable preset with graduated ring (3). The preset limits the volume flow to the set maximum value.
The built-in differential pressure regulator (2) ensures that the required volume flow is constantly maintained over the entire operating range, regardless of the input pressure P1.
The constant volume flow leaves the PICV valve through outlet B.



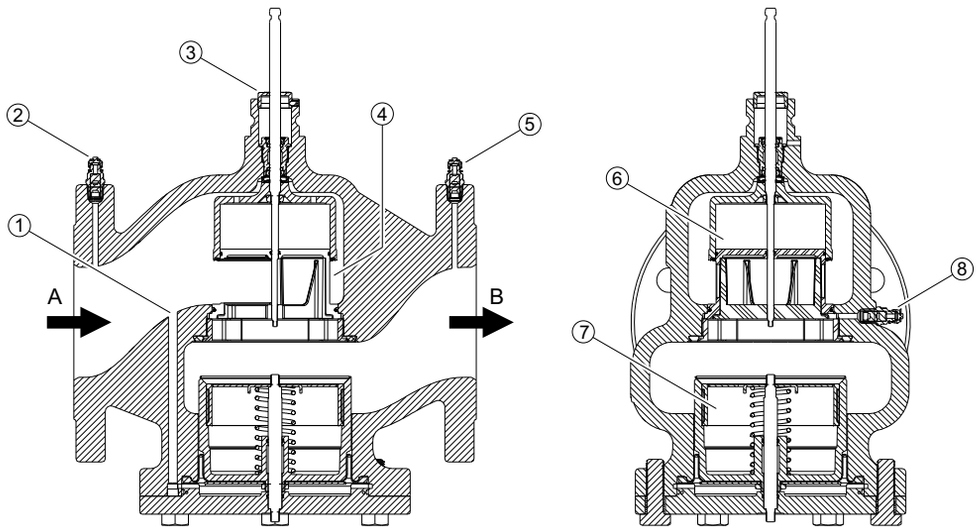
P1	Pressure measuring point (P/T) inlet A
P2	Pressure measuring point (P/T) regulating valve
P3	Pressure measuring point (P/T) outlet B
A	Inlet
B	Outlet
(1)	Regulating valve with actuator (M)
(2)	Differential pressure regulator (DPR)
(3)	Preset with graduated ring

Manual adjustment

Manual adjustment of the valve is only possible using the manual adjustment on the mounted actuator.

Mechanical layout

Shown in open valve position.



A Inlet
B Outlet
(1) Opening for differential pressure regulator is connected to inlet (A)
(2) Pressure measuring point (P/T) at inlet, red marking, P1
(3) Preset with graduated ring
(4) Valve seat with variable preset opening
(5) Pressure measuring point (P/T) at outlet, blue marking, P3
(6) Regulating valve
(7) Differential pressure regulator (DPR)
(8) Pressure measuring point (P/T) on regulating valve, blue marking, P2

Intended use

This product is only suitable for the purpose intended by the manufacturer, as described in the “Description of operation” section.
All related product regulations must also be adhered to. Changes or modifications are not permitted.
Only use the VDL 050...100 as a regulating valve. In cases where a failure or malfunction of the valve could result in personal injury or damage to the controlled system or other property, additional protective and warning devices must be incorporated into the system. Integrate monitoring or alarm systems, safety or limit controllers for this purpose.

Engineering and fitting notes

The VDL 050...100 should preferably be used in the return line. Due to the lower temperatures, there is less strain on the diaphragms and seals.

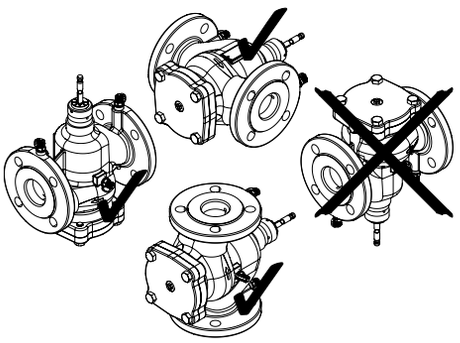
CAUTION!
Failure to observe safety regulations can result in physical injury and property damage.
▶Observe the current local regulations and safety regulations.

The valve, actuator and accessories must be ordered separately and are shipped individually packaged. The valves are supplied without a counterflange, without bolts and nuts and without a flange gasket.
All SAUTER Valveco valves may only be used in closed circuits, closing against the pressure. An excessively high oxygen mixture may irreparably damage the regulating valves in open water circuits.
Observe the flow direction according to the fitting instructions and the arrow on the valve body.
Only insulate the valve up to the valve neck. The actuator must not be insulated. To avoid disturbing flow noises, a differential pressure of 150 kPa should not be exceeded.

Using with water

It is recommended to install strainers, e.g. on each floor or line. This prevents the valve and the differential pressure regulator from being damaged by impurities in the water such as weld beads or rust particles.
The water quality must comply with standard VDI 2035. When using an additive in the water such as an oxygen binding agent, the compatibility of the valve materials must be checked with the manufacturer of the medium. The materials table shown below may be used.

Fitting position
Fitting in a suspended position is not permitted.



Valve design
The appropriate Valveco valve can be selected in five steps using the following formula:

$$\dot{V} = \frac{Q[kW] \times 1000}{1.163 \times \Delta T[K]} \left[\frac{l}{h}\right]$$

1. Determine the heating/cooling requirement (Q [kW])
2. Determine the temperature spread ΔT [K]
3. Calculate the volume flow
4. Choose the suitable Valveco valve
5. Determine the scale setting using the tables in the “Volume flow, scale preset” section

Example:
1. Heat requirement: Q = 130 kW
2. Temperature spread: ΔT = 5 K
3. Volume flow: $\dot{v}$ = (130 kW × 1000) / (1.163 × 5 K) = 22,356 l/h = 22.4 m³/h
4. Select the Valveco valve. Select the PICV so that it can be operated at 80% of the maximum flow. This way, more heating or cooling capacity can be supplied if required. The following are available:
   - VDL065F501 with Δp_{min}= 28 kPa
   - VDL065F501H with Δp_{min}= 30 kPa
5. Scale setting:
   - VDL065F501 with volume flow 22.4 m³/h = scale value 3.7 (interpolated)
   - VDL065F501H with volume flow 22.4 m³/h = scale value 2.6

VDL065F501H is selected because the setting for VDL065F501 is already above 80% of the maximum flow.

Slide rule and supplementary technical documents

SAUTER slide rule for valve sizing	P100013496
Technical manual on control units	7000477001
CE conformity	A5W00159722A
Declaration on materials and the environment	MD 56.112
Fitting instructions:	
VDL 050…100	P100019274
AVM215SF132-7 for VDL 50...80	51.383
AVM234SF132-7 for VDL 100	51.377

Valve design

SAUTER provides various tools for valve design and engineering:

- ValveDim smartphone app
- ValveDim PC program
- ValveDim slide rule

You can find the tools under the link www.sauter-controls.com/en/performance/valve-calculation/ or scan the QR code

Design and materials

Valve body protected by matt paint RAL 9005 jet black.

Material numbers as per DIN

	Designation
Valve body VDL 050...80	Grey cast iron (GJL-250)
Valve body VDL 100	Ductile cast iron (GJS-400)
Valve spindle, spring	Stainless steel
Seals	EPDM
Controller	Stainless steel
Pressure measuring point, edge	Brass (DZR)

Commissioning

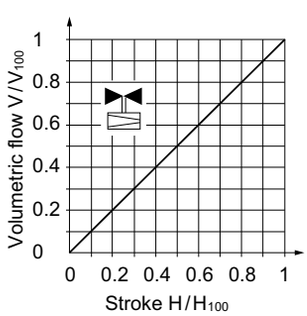
Flush dirt and residues out of valves and pipes before commissioning.

The valve may only be commissioned with the actuator mounted as specified.

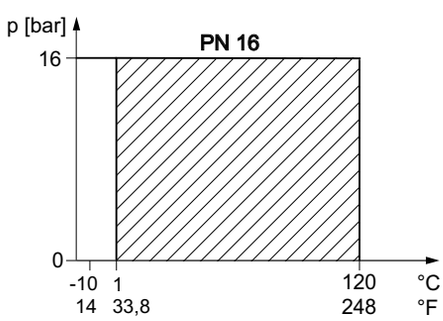
The valve must be open when flushing and pressure-testing the system. Pressure surges can damage the PICV if it is closed. The valve is open when the spindle is extended (the valve is closed on delivery).

The differential pressure Δp_{max} across the control section of the valve must not exceed 600 kPa.

Valve characteristic



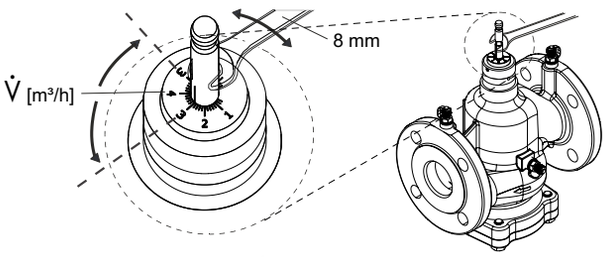
Pressure/temperature range



All VDL 50...100 have the same valve characteristic and pressure/temperature range. The valve characteristic is linear according to VDI/VDE 2173.

Volume flow, scale preset

The set maximum volume flow (V̇) can be read off from the symmetrical preset scale. The volume flow can be preset by turning the valve spindle with an open-end wrench (8 mm).



The scale values can be assigned to the respective volume flows using the following table. Intermediate values are interpolated and fine-adjusted with an electronic pressure gauge.
A preset up to 3.4 on the scale is ideal, because a performance reserve of approximately 20% is still available in this range.

Note
Values outside the scale shown are not specified and must not be set.

VDL050F501																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
V̇ [m³/h]	14.3	14.1	13.8	13.5	13.2	12.6	11.9	11.0	10.0	9.2	8.4	7.7	7.0	6.3	5.6	4.9	4.2	3.7
Δp_{min} [kPa]	25	25	24	23	23	22	21	21	20	19	18	18	17	16	16	15	14	13

VDL050F501H																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
V̇ [m³/h]	24.6	24.0	23.5	22.9	22.2	21.0	19.7	18.1	16.5	15.0	13.5	12.3	11.1	9.9	8.8	7.8	6.9	5.7
Δp_{min} [kPa]	55	54	53	51	50	48	47	45	44	42	41	39	38	36	35	33	32	30

VDL065F501																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
V̇ [m³/h]	24.4	23	21.6	20.4	19.1	17.9	16.7	15.3	13.8	12.5	11.1	9.9	8.7	7.9	7.1	6.2	5.3	4.5
Δp_{min} [kPa]	32	32	32	32	32	31	31	31	31	30	30	30	30	29	29	29	29	28

VDL065F501H																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
V̇ [m³/h]	37.7	35.2	32.7	30.6	28.5	26.5	24.6	22.4	20.2	18.1	16.1	14.2	12.3	11.2	10.1	8.8	7.8	6.4
Δp_{min} [kPa]	50	49	48	47	46	45	43	42	41	40	39	38	36	35	34	33	32	30

VDL080F501																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
V̇ [m³/h]	35.7	34.5	33.2	31.2	29.3	27.2	25.1	23.3	21.4	19.4	17.3	15.5	13.7	12.2	10.7	9.6	8.4	6.8
Δp_{min} [kPa]	22	22	22	22	22	21	21	21	21	20	20	20	20	19	19	19	19	18

VDL080F501H																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
V̇ [m³/h]	49.0	47.2	45.4	42.5	39.6	36.5	33.4	30.2	27.0	24.7	22.4	20.2	18.0	16.0	13.9	12.2	10.5	8.5
Δp_{min} [kPa]	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	22

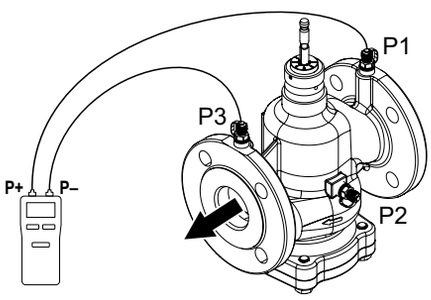
VDL100F501																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
$\dot{v}$ [m³/h]	69.6	68.4	67.2	64.3	61.5	56.3	51.1	46.2	41.2	37.1	33.0	29.1	25.2	22.5	19.8	17.3	14.8	12.2
Δp_{min} [kPa]	33	33	32	31	30	29	28	27	26	26	25	24	23	22	21	20	19	18

VDL100F501H																		
Scale	4.0	3.8	3.6	3.4	3.2	3.0	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
$\dot{v}$ [m³/h]	90.9	89.0	87.1	82.3	77.5	70.5	64.0	55.7	47.4	43.7	39.9	35.4	30.8	27.6	24.4	21.3	18.2	14.8
Δp_{min} [kPa]	45	44	43	41	40	38	37	35	34	32	31	29	28	26	25	23	22	20

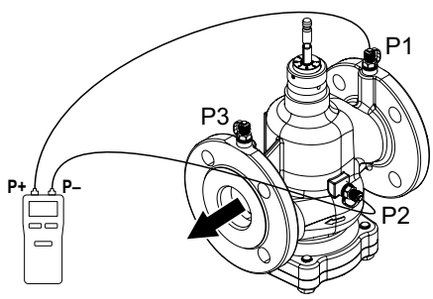
Testing using the pressure measuring points

The specified volume flow can be tested at the pressure measuring points and precisely readjusted if required. For this purpose, all versions of the VDL 050...100 have three pressure measurement nipples (P1, P2, P3). The differential pressure and flow can be measured and monitored at the measurement nipples using a commercially available electronic pressure gauge with 2 mm × 40 mm probes.

Δp measurement between inlet (P1) and outlet (P3)



Flow measurement between inlet (P1) and regulating valve (P2)



Maintenance

The VDL 050...100 is maintenance-free.

The differential pressure regulator (DPR) is replaceable. The sealing sleeve is an integral part of the VDL 050...100 and cannot be replaced.

To prevent the valve from seizing up, the actuator should be run through a full valve stroke once a week.

WARNING!

Danger of burns due to hot surfaces. Danger of scalding from hot liquids. Before servicing or dismantling the valve or actuator:

- ▶De-energise the circulation pump and actuator.
- ▶Close the shut-off valves in the pipe network.
- ▶Depressurise the affected pipes and let them cool down.
- ▶Only disconnect electrical connections on the actuator if necessary.

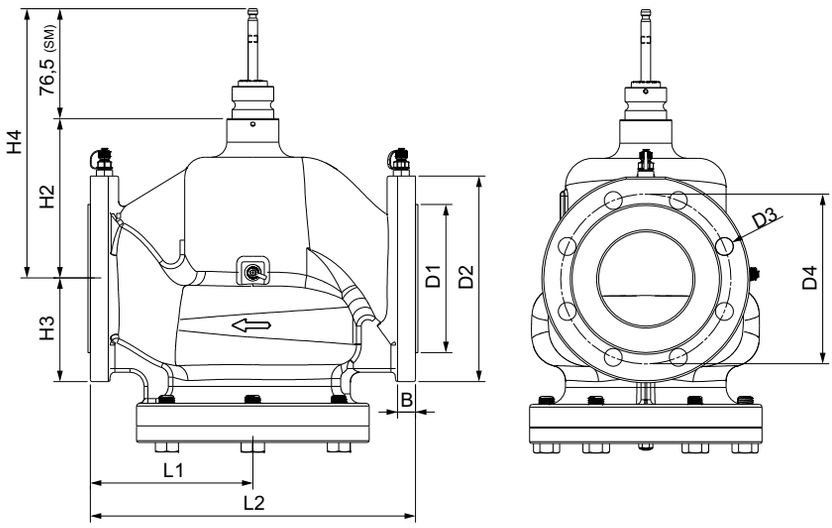
Disposal

When disposing of the product, observe the currently applicable local laws.

More information on materials can be found in the Declaration on materials and the environment for this product.

Dimension drawings

All dimensions in mm.

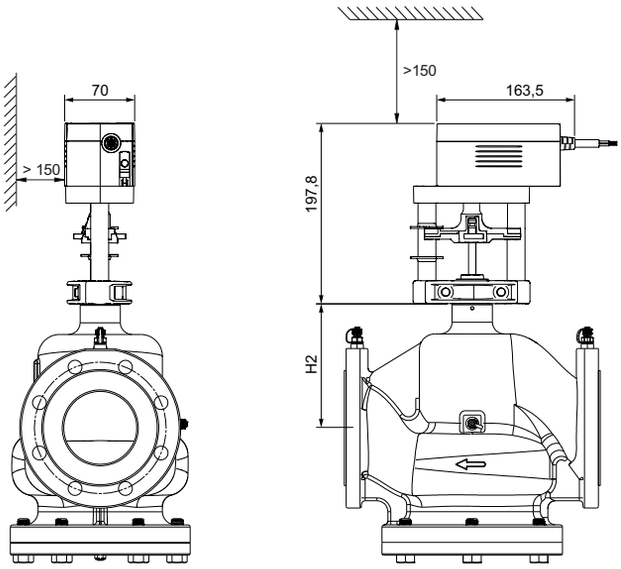


Type	D1 (Ø)	D2 (Ø)	D3 (Ø)	D4 (Ø)	B	H2	H3	H4	L1	L2
VDL050F501	99	165	19 (4×)	125	17	102.5	115	199	115	230
VDL050F501H										
VDL065F501	118	185	19 (4×)	145	17	104	122	200.5	145	290
VDL065F501H										
VDL080F501	132	200	19 (8×)	160	19	104.5	139	201	155	310
VDL080F501H										
VDL100F501	156	220	19 (8×)	180	21	169	174.5	285.5	175	350
VDL100F501H										

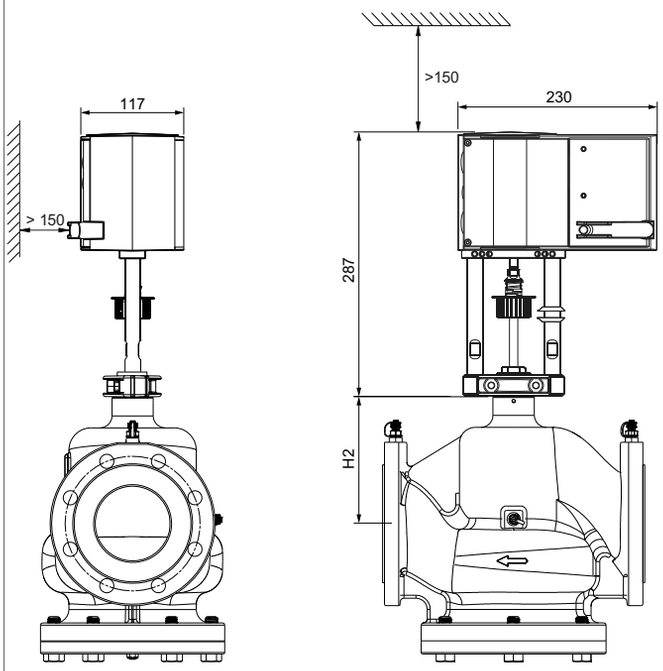
Spindle closing dimension (SM): 77 mm

Combinations

VDL 050...080 with AVM215SF132-7



VDL 100 with AVM234SF132-7



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