



resideo

VC valves

Application guide



VC valve series

Application guide

VC valves are used in closed heating and cooling systems in residential and light commercial applications to control the flow of hot and/or cold water within the limits of technical specifications. VC valves are universal as they can be used both for control and on/off, changeover applications. You can use it for various tasks combining the valves and actuators as you wish. It's up to your creativity how and where to use them.

The device consists of three parts. The valve body, the valve cartridge and the actuator. As shown on the picture the valve body and the valve cartridge are delivered as one unit, however valve cartridge is available as spare part as well.

All moving and sealing parts of the valve are constructed in the cartridge assembly. The combination of different types of cartridge designs, valve bodies and actuators make this range of product extremely flexible and suitable for many applications.

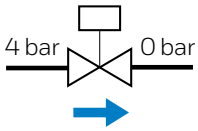
Specifications

Medium	Water or water-glycol mixture (max. 50% glycol content), quality to VDI 2035, pH-value: 8...9.5
Operating temperature	1...95°C, 120°C short duration peak
Ambient temperature	max. 65°C
Operating pressure	max. 20 bar
Differential pressure	max. 4 bar
Actuator Voltage	24 V, 50 Hz (blue label) or 230 V, 50 Hz (red label)
Actuator Power consumption	6 VA (when valve position changes)
Auxiliary switch rating	1.0 A @ 250 V, 50-60 Hz (minimum 0.05 A @ 24 Vdc)
Runtime	6 seconds on/off actuators, 120 seconds floating or modulating actuators
Actuator electrical rating	IP40
Storage temperature	-40...65°C
Humidity rating	5...95% RH (non-condensing)

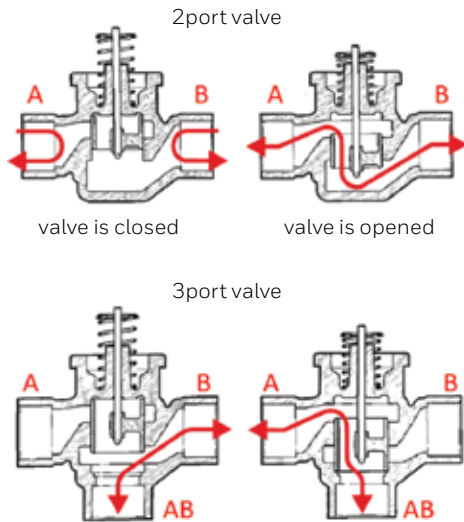


Benefits

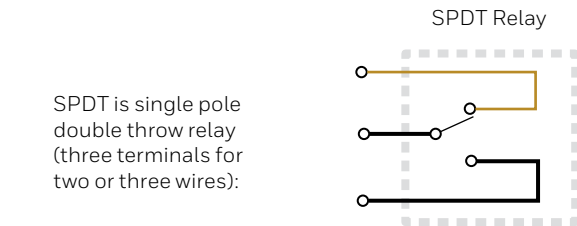
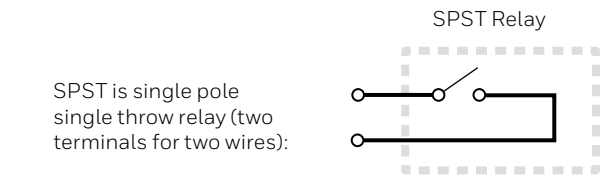
- Almost like a ball valve VC valves can close against high pressure up to 4 bar



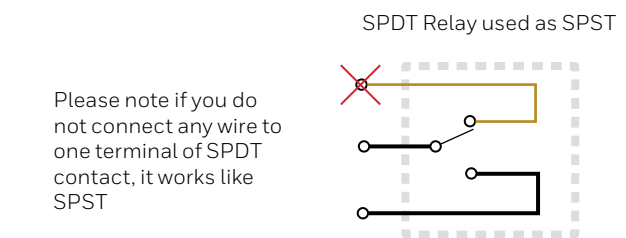
- VC valves are bubble tight. No flow when closed. This is valid for both control and on/off, changeover variants.
- VC valves are available in two versions: 2-way (2-port) valves and 3-way (3-port) mixing/diverting valves:



- VC valves can work in both flow directions as shown above.
- The valve cartridge is replaceable, so it can be replaced either with the same cartridge type, or by changing the cartridge type to transform the valve from on/off to control or vice versa.
- Some variants are considered as universal solutions:
 - control cartridge versions can also be used for on/off applications if using it with on/off actuator
 - VC4613 on/off actuator can be driven by both SPST and SPDT controllers/thermostats



SPST and SPDT contacts are potential free contacts means there is no current on terminals unless an external phase is connected to one of it's ports.



- No water hammers. A VC valve with on/off actuator closes in 6 sec which is fast enough but does not cause water hammer.
- 230V actuators as standard, but 24V actuators are also available.
- Actuators can be mounted onto the valve with one push and turn. No tools required.
- Valve can be moved manually to the middle position by pushing in the actuator's position indicator and move it to the middle position.
- As minimum media temperature is 1°C VC valves are suitable to use in cooling systems as well.

Valve types and operation modes

2-way (2-port) valves:

- If it is used for on/off operation it called as zone valve.
- If it is in control operation, then it can be called as control valve.

3-way (3-port) valves:

- If water flows in through two inlets and flows out through one outlet (from A and B to AB) valve is used in mixing mode. If the valve is in on/off operation it is a changeover valve in mixing mode. If the valve is in control operation, then it is called as control valve in mixing mode.
- If water flows in through one inlet and flows out through two outlets (from AB to A or B) valve is used in diverting mode. If the valve is in on/off operation it is a changeover valve in diverting mode. If the valve is in control operation, then it is called as control valve diverting mode.

On/off or better to say open/close operation as a result of using an on/off actuator:

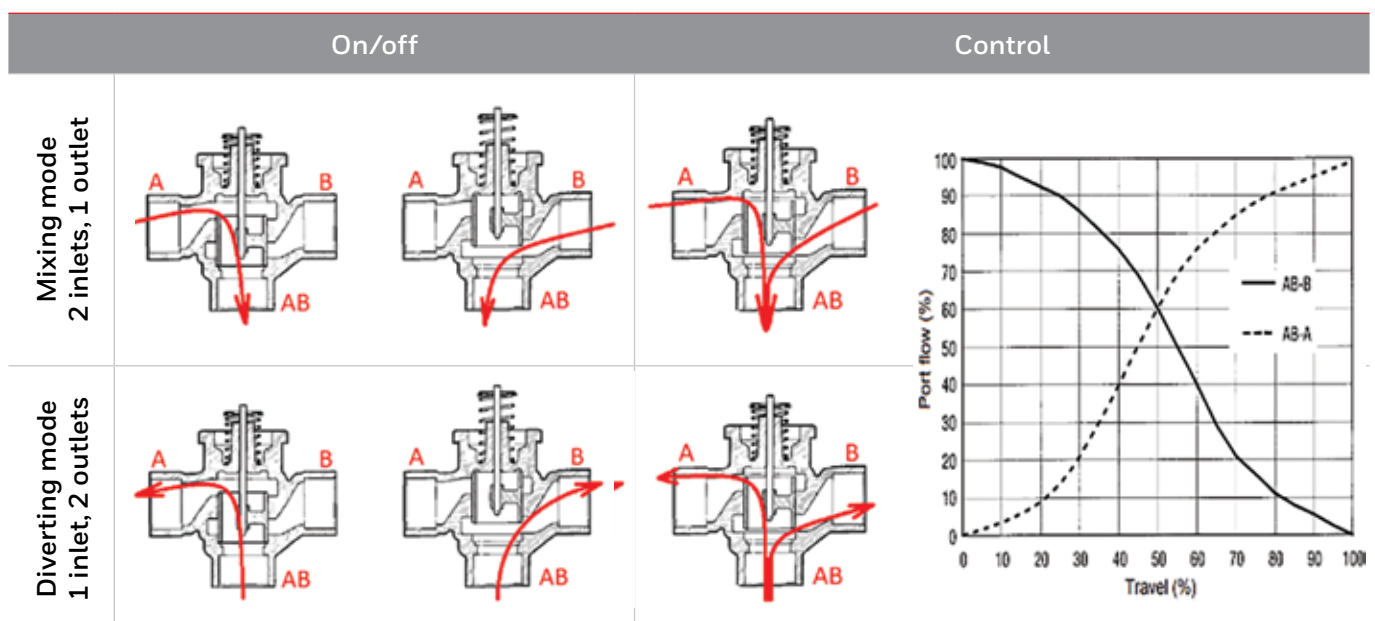
- 2-way valves are moved by the actuator either to the fully open position (valve stem pushed in - A port is open), or to the fully closed position (valve stem extends by the spring force - A port is closed).

- 3-way valves are moved by the actuator either to open A port (valve stem pushed in), or to close A port thus opening B port (valve stem extends by the spring force) while AB port is always open.
- There is no middle position in this operation, A port is either fully opened, or fully closed.
- Both on/off and control cartridges can be used for on/off operations, as if control cartridge equipped by on/off actuator it works like an on/off cartridge.

Control operation with equal percentage characteristics:

- 2-way valve can control the flow between 0-100%. 0% means A port is closed.
- 3-way valves can be used either as mixing or diverting control valve. Where flow on A port is controlled between 0-100%, while on B port between 100-0% respectively.
- Control VC valves with floating or modulating actuator can move to any position between fully closed and fully opened position.
- For control applications only control valve cartridges are suitable.

As an example see below 3-way valve operation modes with on/off and with control cartridges



Actuator types and operation modes

- On/off actuators with 6 sec runtime VC4 series and VC6 series.
- Control actuators with 120 sec runtime:
 - Floating or also called as 3-pt actuator VC6983 (3-point control means that controller makes the actuator either to move to open direction, or to move to close direction, or by not giving any signal let it stay stopped in any position).
 - Modulating actuator VC7931 which receives 0-10V control signal from a controller and sets the valve position between 0-100% accordingly.







Control actuators are typically used for control valve applications to control the flow on 2-way valves between 0-100% thus control the flow rate or as an example using 3-way control valve to mix the boiler's supply flow and heating circuit's return flow to control the heating circuit's supply temperature.

If you wish floating actuator can be used for on/off operation as well controlled by SPDT relay or thermostat, however 120 sec runtimes is quite long for such applications. SPDT relay can not let the actuator stay in a mid position it either gives open signal, or close signal thus after the 120 sec runtime valve either fully opens, or fully closes.

Cartridge types

	2-way (2-port)	3-way (3-port)
on/off (open/close)	2-way on/off (zone valve) Order Number: VCZZ1000/U 	3-way on/off (changeover valve) Order Number: VCZZ6000/U 
Control	2-way control (control valve) Order Number: VCZZ1100/U 	3-way control (mixing/diverting valve) Order Number: VCZZ6100/U 

Selection guide for VC valves and actuators

	beginning of product ID	middle of product ID	end of product ID	DN	thread	kvs (m³/h)	2-way open/close	3-way diverter	2-way regulating	3-way mixing	3-way diverting
											
valves	VCZ	AF	1000/U	½"	internal	3.2	•	—	—	—	—
			1100/U			2.6	•	—	•	—	—
		ME	6000/U	¾"	internal	3.2	—	•	—	—	—
			6100/U			3.2	—	•	•	•	
		AJ	1000/U	¾"	internal	5.0	•	—	—	—	—
			1100/U			4.5	•	—	•	—	—
		MH	6000/U	¾"	internal	6.6	—	•	—	—	—
			6100/U			5.9	—	•	•	•	
		AH	1000/U	¾"	external	5.3	•	—	—	—	—
			1100/U			4.5	•	—	•	—	—
		MG	6000/U	¾"	external	6.6	—	•	—	—	—
			6100/U			5.7	—	•	•	•	
		AP	1000/U	1"	internal	5.5	•	—	—	—	—
			1100/U			5.7	•	—	•	—	—
		MP	6000/U	1"	internal	8.5	—	•	—	—	—
			6100/U			6.4	—	•	•	•	
		AQ	1000/U	1"	external	5.5	•	—	—	—	—
			1100/U			5.3	•	—	•	—	—
		MQ	6000/U	1"	external	8.5	—	•	—	—	—
			6100/U			6.8	—	•	•	•	
		MU	6000/U	1¼"	external	11 (B->AB)	—	•	—	—	—
actuators				230Vac	SPST controller 1 open + 1 fix phase		number of auxiliary switches	—	VC4013ZZ00/U VC4013ZZ11/U	230Vac Floating with auxiliary switch: VC6983ZZ11/U	
					SPDT controller 1 open + 1 close phase			1 SPDT	VC4613ZZ00/U VC4613ZZ11/U		
				24Vac	SPST controller 1 open + 1 fix phase			—	VC6013ZZ00/U		24Vac 0-10Vdc modulating: VC7931ZZ11/U
					SPST controller 1 open + 1 fix phase			1 SPDT	VC6613ZZ00/U		
					SPDT controller 1 open + 1 close phase			—	VC8011ZZ00/U		
					SPDT controller 1 open + 1 close phase			1 SPDT	VC8611ZZ00/U		
SPST controller 1 open + 1 fix phase		—	VC2011ZZ00/U	If you wish to use control valves for on/off applications you can pick one of the on/off actuators listed on the left							
SPDT controller 1 open + 1 close phase		1 SPDT	VC2611ZZ00/U								

Most universal on/off actuator solution is VC4613

as it can be controlled by both SPST and SPDT thermostats as you can see in the How to wire section. It also has auxiliary switch which can stay unused, but it is there in a case of a need to start a heat source or a pump for example.

Most universal valve cartridge solution is the control cartridge

2-way valves with control cartridge can be used either for flow control if equipped with floating or modulating actuator or for on/off application (zone valve) if equipped with on/off actuator

3-way valves with control cartridge can be used either for mixing control, diverting control if equipped with floating or modulating actuator or in changeover applications if equipped with on/off actuator.

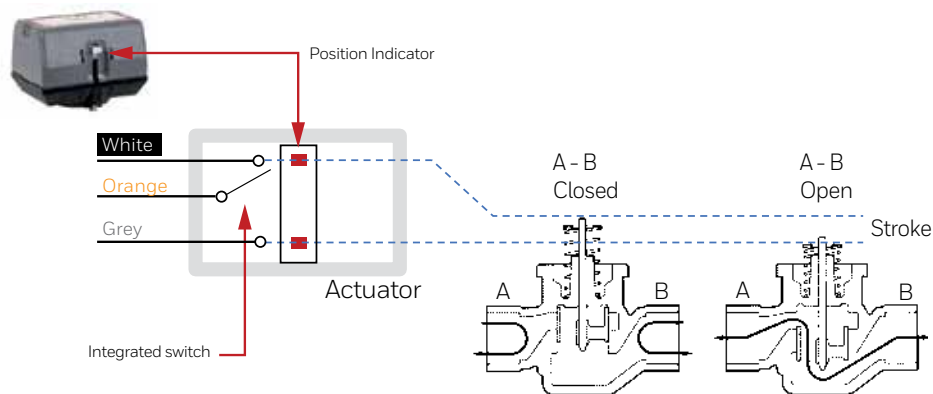
VC valves flow rates and related heat loads

Heat loads in kW

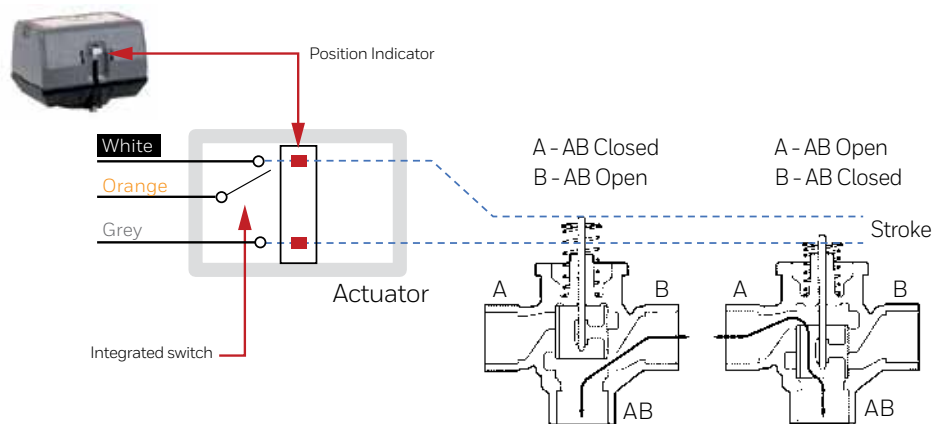
		$\Delta p = 5 \text{ kPa}$								$\Delta p = 10 \text{ kPa}$								$\Delta p = 20 \text{ kPa}$									
Cartridge	Size	kvs [m ³ /h]		$\Delta T [^{\circ}\text{C}]$				$\Delta T [^{\circ}\text{C}]$				$\Delta T [^{\circ}\text{C}]$				$\Delta T [^{\circ}\text{C}]$				$\Delta T [^{\circ}\text{C}]$							
		2-way	3-way	5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20				
On/Off	1/2"	3.2	3.2	4.2	8.3	12.5	16.6	4.2	8.3	12.5	16.6	5.9	11.8	17.7	23.5	5.9	11.8	17.7	23.5	8.3	16.6	25.0	33.3	8.3	16.6	25.0	33.3
	3/4"	5.3	6.6	6.9	13.8	20.7	27.6	8.6	17.2	25.7	34.3	9.7	19.5	29.2	39.0	12.1	24.3	36.4	48.5	13.8	27.6	41.3	55.1	17.2	34.3	51.5	68.7
	1"	5.5	8.5	7.2	14.3	21.5	28.6	11.1	22.1	33.2	44.2	10.1	20.2	30.3	40.5	15.6	31.3	46.9	62.5	14.3	28.6	42.9	57.2	22.1	44.2	66.3	88.4
	1 1/4"	-	11.00	-	-	-	-	14.3	28.6	42.9	57.2	-	-	-	-	20.2	40.5	60.7	80.9	-	-	-	-	28.6	57.2	85.8	114.4
Control	1/2"	2.6	3.2	3.4	6.8	10	14	4.2	8.3	12	17	4.8	9.6	14	19	5.9	12	18	24	6.8	14	20	27	8.3	17	25	33
	3/4"	4.5	6.0	5.9	12	18	23	7.8	16	23	31	8.3	17	25	33	11	22	33	44	12	23	35	47	16	31	47	62
	1"	5.7	6.8	7.4	15	22	30	8.8	18	27	35	10	21	31	42	13	25	38	50	15	30	44	59	18	35	53	71

Valve and actuator positions during operation

2-way valve



3-way valve



Please note when spring fully extends the valve stem A port is closed on both 2-way and 3-way valves. When actuator pushes in the valve stem against the spring load making it to retract fully, B port is closed on all valve variants.

Good to know

- Control valves can be used both in control and in on/off applications as the valve cartridge closes tightly the related port in end position
- Control valves have equal percentage flow characteristic
- Control and on/off cartridges can be ordered as spare part
- On/off cartridge can be replaced by control cartridge in the same valve body and vice versa
- SPDT contact (Relay or thermostat) is universal as it can be used both as SPDT or SPST contact

As an example

VCZMQ6000/U → 3-way on/off changeover valve

VCZZ6000/U → on/off spare cartridge for 3-way valve

VCZMQ6100/U → 3-way control valve

VCZZ6100/U → control spare cartridge for 3-way valve

2-port VC valves are neither NC (Normally Closed), nor NO (Normally Open) valves. VC valves do not have return spring, they are “fail in place” type: for both types of actuators (SPDT and SPST), a power failure will leave the valve at the position it was in when interrupted. When power is restored, the valve will respond to controller demand,

How to wire

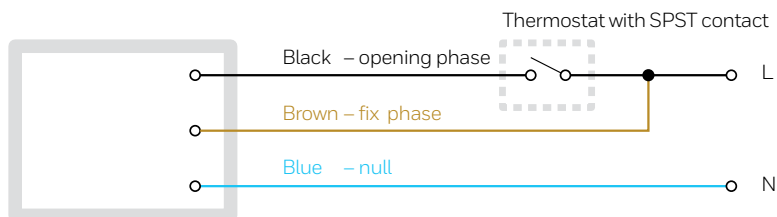


WARNING

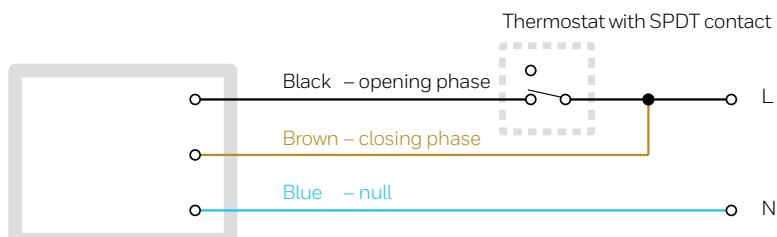
All electrical wiring should be made by trained and authorized technicians only. In case of 3-phase environment make sure you use only one phase on one actuator, both on the power supply and on the auxiliary switch side.

- **on/off SPST controlled actuator:** VC4 series requires phase to be switched on to the Black wire if valve need to be opened (A port to be opened).

This actuator can be controlled with one on/off contact (SPST)

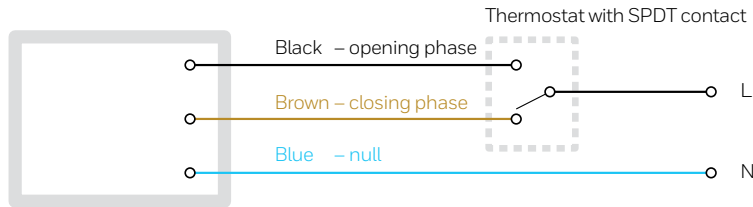


VC4 series SPST controlled actuator can be also controlled by an SPDT contact.



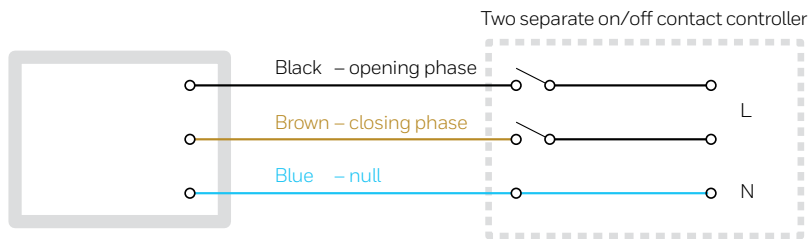
– **on/off SPDT controlled actuator:** VC6 series: requires either phase to be switched on to the Black wire if valve need to be opened (A port to be opened)

or phase to be switched on to the Brown wire if valve need to be closed (A port to be closed). This actuator can be controlled with one switchover contact (SPDT)



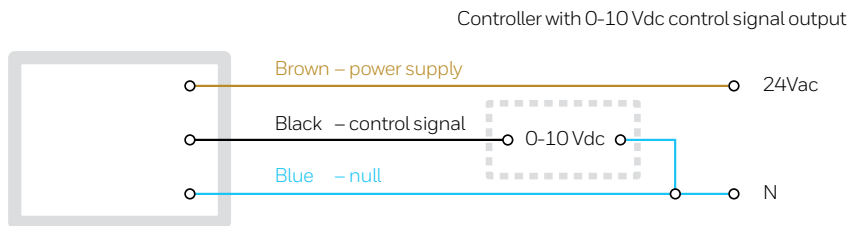
– **Actuator with floating control:** VC6983 requires either phase to be switched on to the Black wire if valve need to be opened further (A port to be opened further) or phase to be switched on to the Brown wire

if valve need to be closed further (A port to be closed further). Typically used for control valve applications with boiler controller such as SMILE controllers from Resideo.



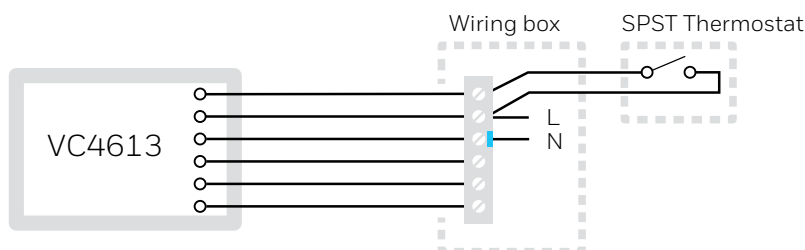
– **Actuator with modulating control:** VC7931 requires 24Vac power supply and 0-10Vdc control signal to

be provided by a controller. Typically used in building management systems for control valve applications.



VC actuators have either 3 or 6 wires. 3 wires versions have no auxiliary switch integrated, 6 wires versions have one potential free SPDT auxiliary switch integrated. The 3 wires operate the actuator are Black, Brown, Blue colored, the integrated SPDT auxiliary switch has Orange, Grey, White colored wires

If you have a 6 wire actuator but does not use the auxiliary switch insulate the unused wires one-by-one or connect in the wiring box to separate unused terminals as the example shows below.



Wiring VC actuators to Honeywell Home thermostats

As an example see below 3-way valve operation modes with on/off and with control cartridges

Thermostat type	VC4013 or VC4613 (wiring of auxiliary switch is not shown on the picture)	VC6013 or VC6613 (wiring of auxiliary switch is not shown on the picture)
DT90 T3 T4 CM700 CM900		

Honeywell Home T6 wired thermostat chronotherm is supplied with relay box having SPDT relay

Thermostat type	VC4013 or VC4613 (wiring of auxiliary switch is not shown on the picture)	VC6013 or VC6613 (wiring of auxiliary switch is not shown on the picture)
T6 control box		

Honeywell Home wireless thermostats chronotherms are supplied with relay box having SPDT relay, the same type of relay box is used in EVOHOME zone system

Thermostat type	VC4013 or VC4613 (wiring of auxiliary switch is not shown on the picture)	VC6013 or VC6613 (wiring of auxiliary switch is not shown on the picture)
T3R T4R T6R and BDR91 relay box supplied with DT92 T87RF CM727 CM927 also used in EVOHOME systems		

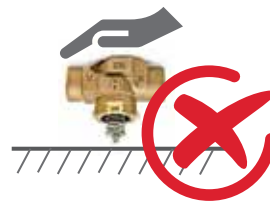
Be aware!

– VC valves can work with the media temperature up to 95°C.

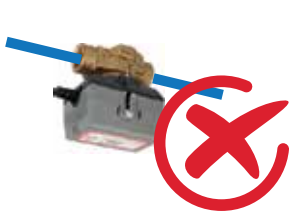
- Do not install (solar panel outlet), but in return only.
- Do not install in steam application.
- It is not mandatory, but we recommend installing VC valves into cooler section of the heating

systems and into warmer section of the cooling systems.

- VC actuators have an electrical protection IP20. Do not use them outdoors or in wet environment.
- It is forbidden to manually adjust the stem.

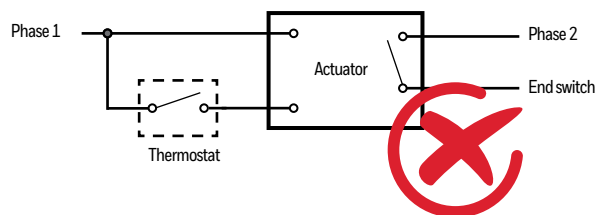
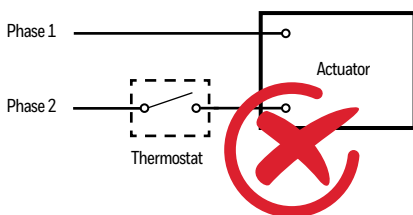


– Do not install actuators downwards or where water can drop into the actuator.



– Do not connect a port that has not been used for a long time. In generally it should not be a problem, but it could happen that dirt cumulates in the closed port and may result a valve blockage.

– In 3-phase systems do not use two different phases for one actuator.



– Do not use on/off actuator for floating (3pt) control application. It can work but due a fast (6 sec) runtime control, output can oscillate.

– If there is need for valve insert replacement use the tool delivered with the spare cartridge. The tool can be also ordered separately as accessory.



– Do not try to install a 3-way cartridge to a 2-way valve and vice versa.

Troubleshooting actuators

Issue	Solution			
	VC4XXX	VC6XXX	VC6983X	VC7931
Continuously opens and closes in sequence	Replace the actuator	Make sure there is no phase both on opening and closing wire at the same time		Replace the actuator
Strong burned plastic smell	Internal short circuit – replace actuator. Check wiring and make sure water cannot flow or drop on or inside the actuator.			
Actuator don't move while control signal is given	Check wiring first make sure Null is connected, but if wiring is OK then replace the actuator			Check wiring first make sure 24Vac power supply is available and connected, but if wiring is OK then replace the actuator
Auxiliary switch does not contact	Check wiring first, if wiring is OK check in fully closed and fully opened position if the auxiliary switch works fine, if not then replace the actuator			There is no auxiliary switch in this product

Troubleshooting valves

Issue	Solution
Leaking at the pipe connection	Tighten the pipe connection or change the sealing
Leaking at the valve stem	Replace the valve cartridge
Valve stem is stuck as the spring can not make it to extend	Replace the valve cartridge
Valve stem is stuck as the actuator can not push the stem in	Replace the valve cartridge

Order numbers

Actuators

Order Number	Control type	Power supply	Control signal	Auxiliary switch
VC4013ZZ00/U	SPST	230 Vac	opening phase	No
VC4613ZZ00/U	SPST	230 Vac	opening phase	1 x SPDT
VC6013ZZ00/U	SPDT	230 Vac	opening and closing phase	No
VC6613ZZ00/U	SPDT	230 Vac	opening and closing phase	1 x SPDT
VC6983ZZ11/U	Floating	230 Vac	opening and closing phase	1 x SPDT
VC7931ZZ11/U	Modulating	24 Vac	0-10 Vdc	No

Valves

Order Number	Type	Operation	Size	Connection	kvs [m ³ /h]
VCZAF1000/U	2-way	on/off	½"	internal threaded	3.2
VCZAJ1000/U	2-way	on/off	¾"	internal threaded	5.0
VCZAH1000/U	2-way	on/off	¾"	external threaded	5.3
VCZAP1000/U	2-way	on/off	1"	internal threaded	5.5
VCZAQ1000/U	2-way	on/off	1"	external threaded	5.5
VCZME6000/U	3-way	on/off	½"	internal threaded	3.2
VCZMH6000/U	3-way	on/off	¾"	internal threaded	6.6
VCZMG6000/U	3-way	on/off	¾"	external threaded	6.6
VCZMP6000/U	3-way	on/off	1"	internal threaded	8.5
VCZMQ6000/U	3-way	on/off	1"	external threaded	8.5
VCZMU6000/U	3-way	on/off	1¼"	external thread	11 (B->AB)
VCZAF1100/U	2-way	control	½"	internal threaded	2.6
VCZAJ1100/U	2-way	control	¾"	internal threaded	4.5
VCZAH1100/U	2-way	control	¾"	external threaded	4.5
VCZAP1100/U	2-way	control	1"	internal threaded	5.7
VCZAQ1100/U	2-way	control	1"	external threaded	5.3
VCZME6100/U	3-way	control	½"	internal threaded	3.2
VCZMH6100/U	3-way	control	¾"	internal threaded	5.9
VCZMG6100/U	3-way	control	¾"	external threaded	5.7
VCZMP6100/U	3-way	control	1"	internal threaded	6.4
VCZMQ6100/U	3-way	control	1"	external threaded	6.8

Spare cartridges

Order Number	Type	Operation	Size
VCZZ1000/U	2-way	on/off	for all sizes
VCZZ6000/U	3-way	on/off	for all sizes
VCZZ1100/U	2-way	control	for all sizes
VCZZ6100/U	3-way	control	for all sizes

Standard models are listed above. If you require a special valve or actuator or you prefer to use valve&actuator kit, please contact your Resideo account manager.

Application examples

**WARNING**

All electrical wiring should be made by trained and authorized technicians only. In case of 3-phase environment make sure you use only one phase on one actuator, both on the power supply and on the auxiliary switch side.

NOTE

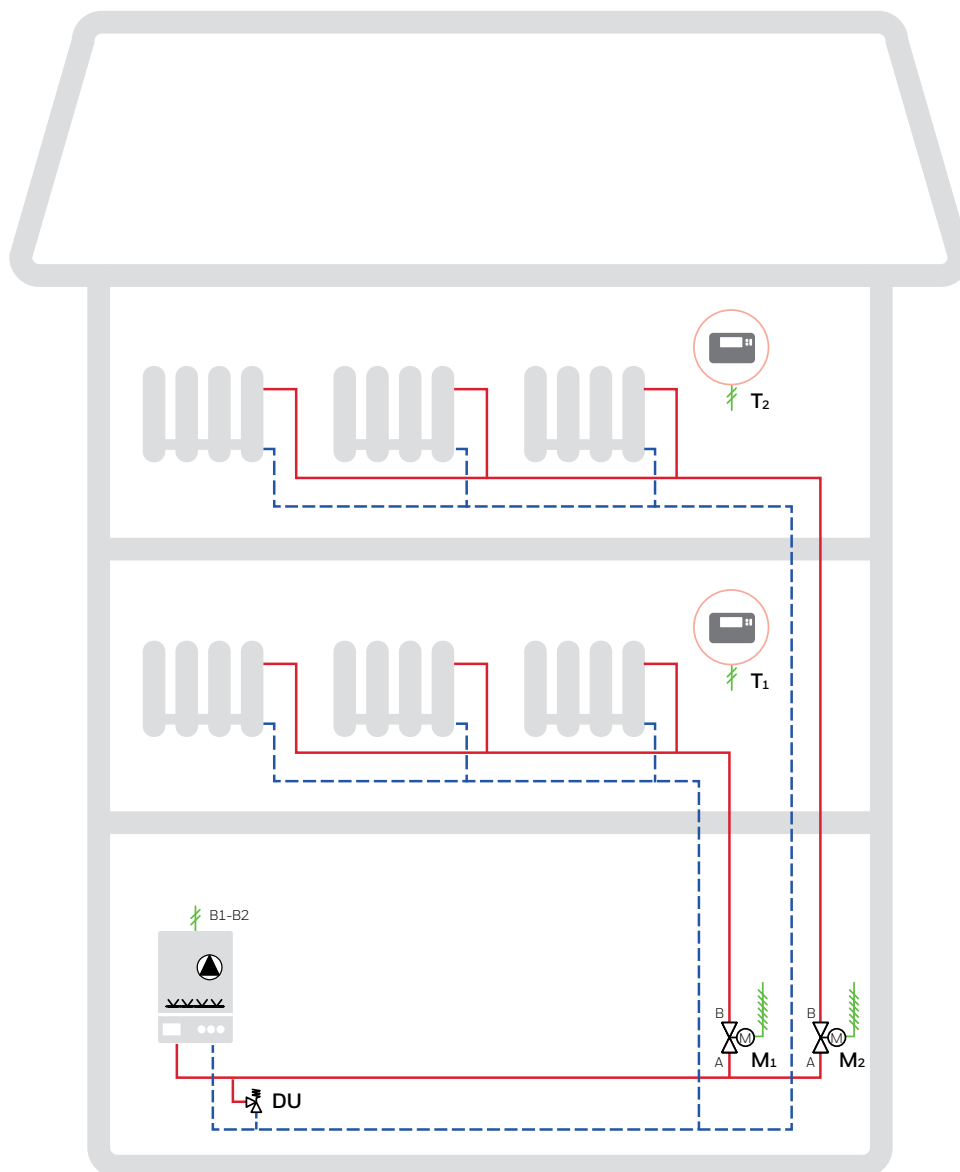
The number of green crosslines on the drawing represents how many wires needed in the electrical cable.

Application examples may show the wiring of the system using wired room thermostats. To wire any Honeywell Home wired or wireless thermostats please consult the “Wiring VC actuators to Honeywell Home thermostats” section of this manual

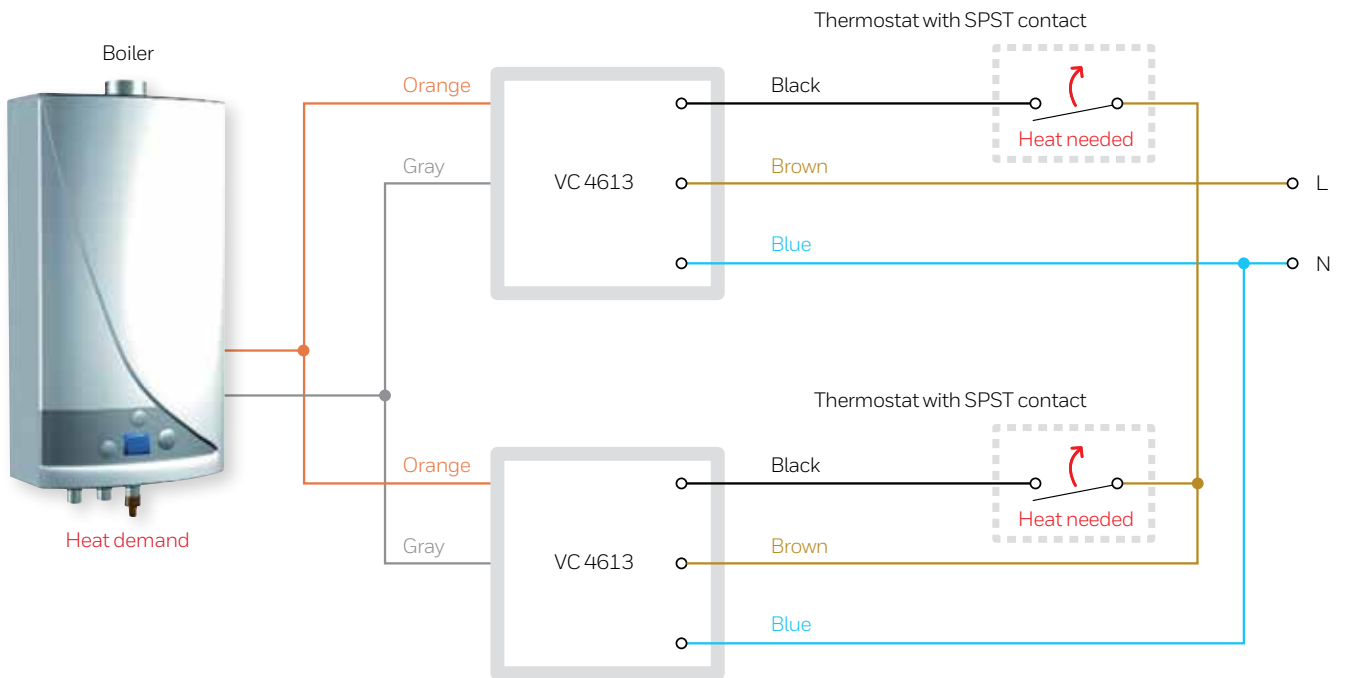
Two Zone heating system

In this application two independent heating zones were created by installing two 2-way VC zone valves in the heating distribution system. The particular room thermostat opens the related heating zone valve in case heating is needed in that heating zone. Each zone valves equipped with on/off actuators with auxiliary switches. The auxiliary switches are used to provide heat demand contact to the boiler.

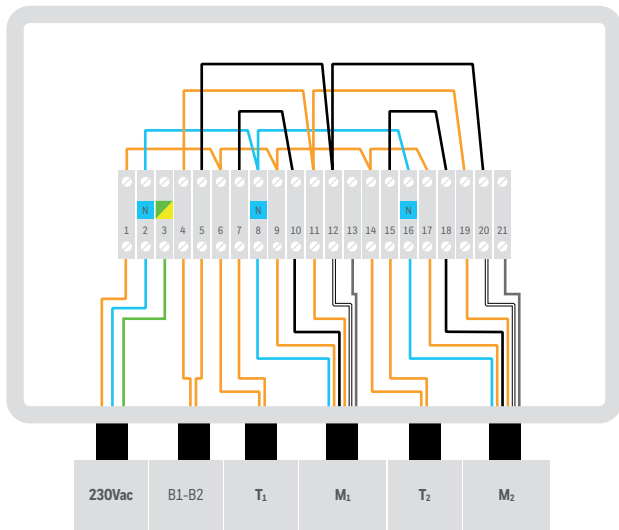
The auxiliary switches are connected in parallel to the room thermostat input terminals of the boiler. With this solution both zones can initiate boiler demand independently. In this application both heating and combi boilers can be used, either with integrated outside air temperature compensated boiler temperature controller or without it.



Schematic drawing of the wiring using VC4613 actuators



Physical wiring in an electrical wiring box in the boiler room using VC4613 actuators



230Vac is the power supply

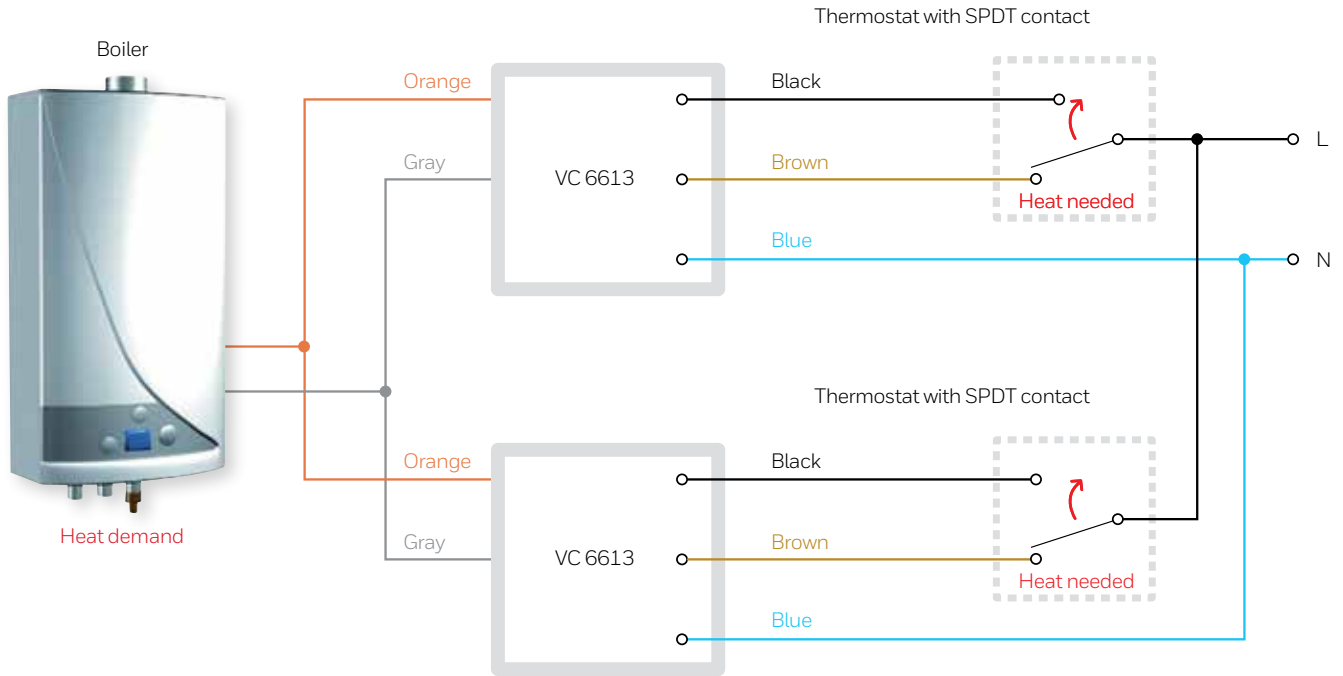
B1-B2 are the two terminals in the boiler for potential free room thermostat contact. To identify the terminals in the boiler please check the boiler's installation manual.

T₁ and **T₂** are the A and B terminals of the room thermostats.

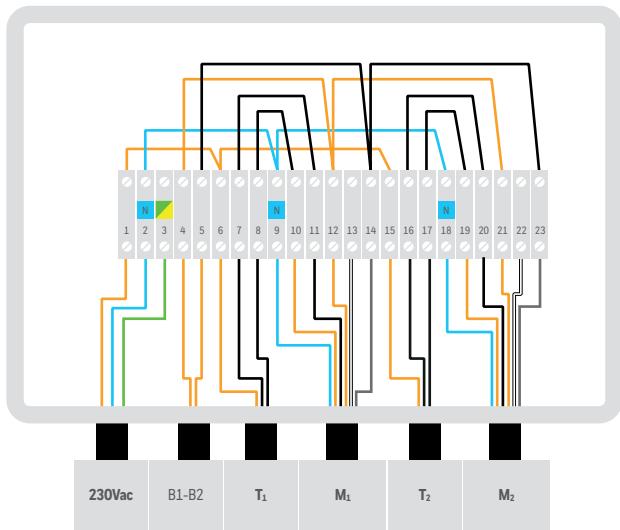
(See Wiring VC actuators to Honeywell Home thermostats section)

M₁ and **M₂** are the VC4613 actuators with their 6 wires of each

Schematic drawing of the wiring using VC6613 actuators



Physical wiring in an electrical wiring box in the boiler room using VC6613 actuators



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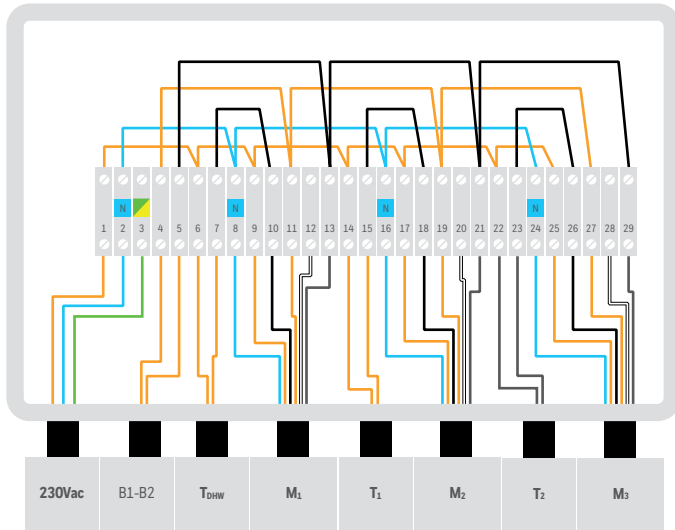
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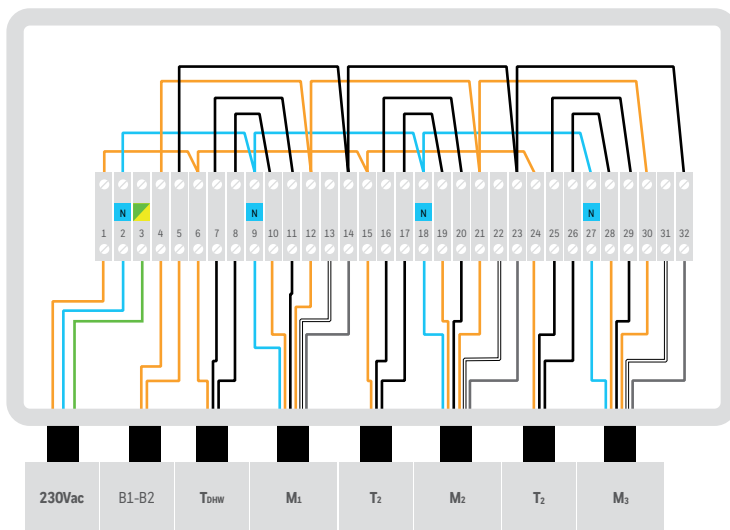
B1-B2 are the two terminals in the boiler for potential free room thermostat contact. To identify the terminals in the boiler please consult boiler's installation manual.

T_{DHW} represents the two respective terminals of the hot water tank thermostat which are closes when temperature drops below the setpoint. To identify the terminals in the tank thermostat please consult it's installation manual

T₁ and **T₂** are the A and B terminals of the room thermostats. (See Wiring VC actuators to Honeywell Home thermostats section)

M₁ , **M₂** and **M₃** are the VC4613 actuators with their 6 wires of each

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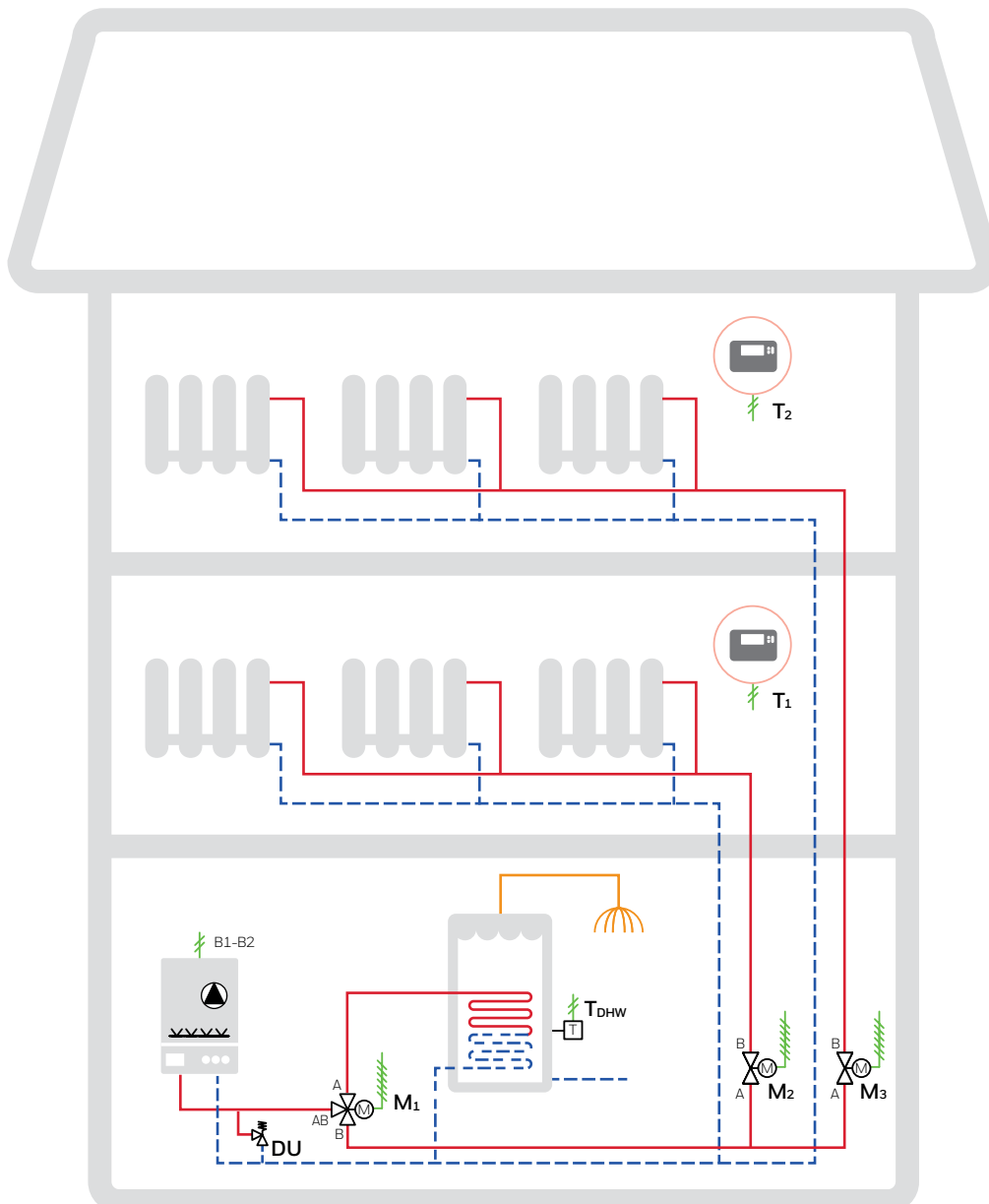
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Two Zone heating system with priority domestic hot water production

In this application two independent heating zones were created by installing two 2-way VC zone valves in the heating distribution system. Domestic hot water tank is loaded through its heat exchanger controlled by a 3-way VC changeover valve. The particular room thermostat opens the related heating zone valve in case heating is needed in that heating zone. Each zone valves equipped with on/off actuators with auxiliary switches. The auxiliary switches are used to provide heat demand contact to the boiler. The auxiliary switches are connected in parallel to the room thermostat input terminals of the boiler. With this solution both zones can initiate boiler demand independently. When the hot water tank thermostats require tank loading, it opens the changeover valve

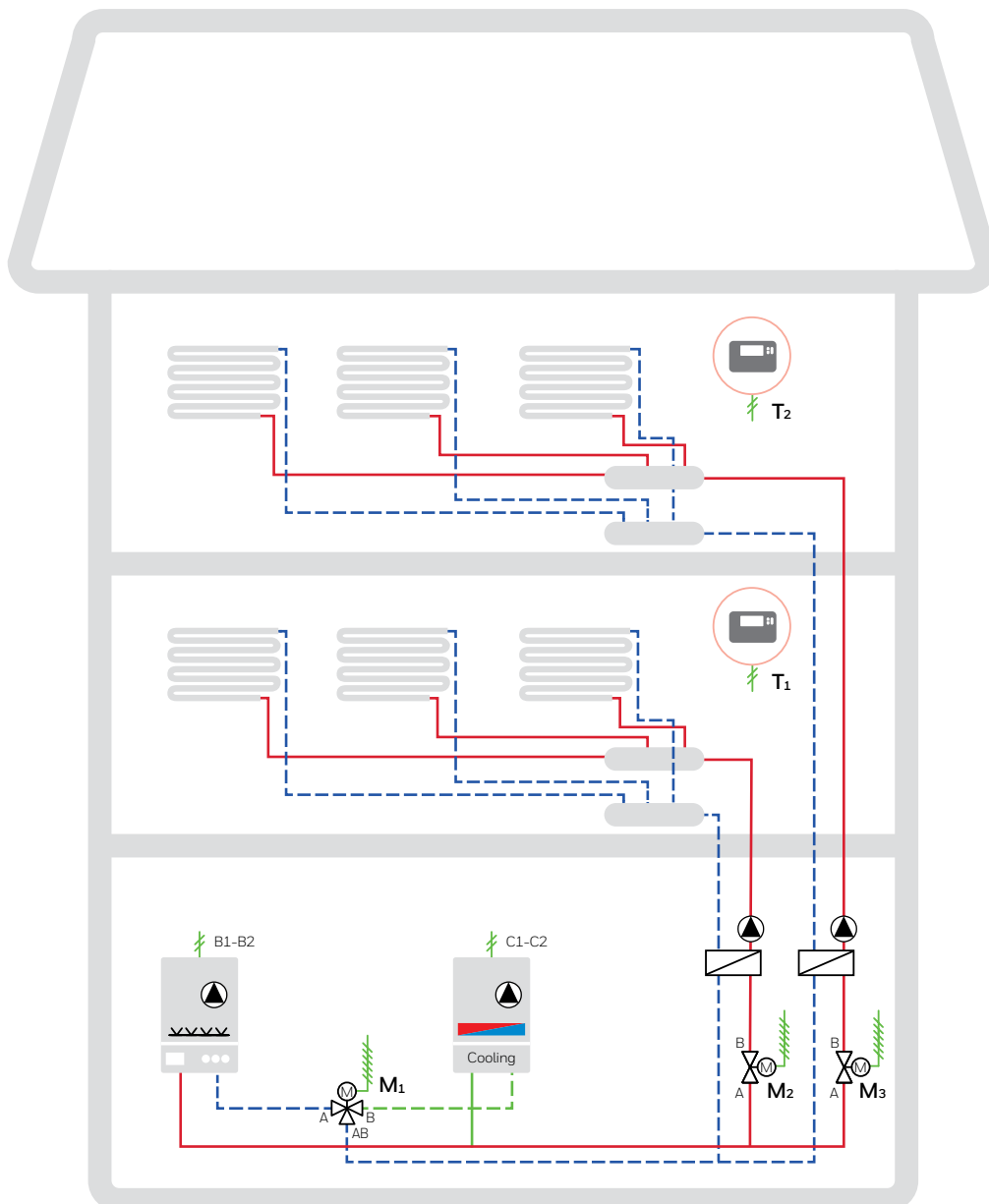
switching the flow from the heating system to the domestic hot water tank loading circuit. Changeover valve is equipped with an on/off actuator with auxiliary switch. The auxiliary switch of the hot water loading changeover valve is also connected in parallel to the room thermostat input terminals of the boiler. In this application only heating boiler can be used, without integrated outside air temperature compensated boiler temperature controller, and the boiler supply temperature has to be set to the level which is high enough to heat up the rooms and load the hot water tank at any time. In this application domestic hot water tank loading has a priority over the heating so even a less powerful boiler can supply the heat consumers.



Two Zone heating/cooling system with heating/cooling changeover valve

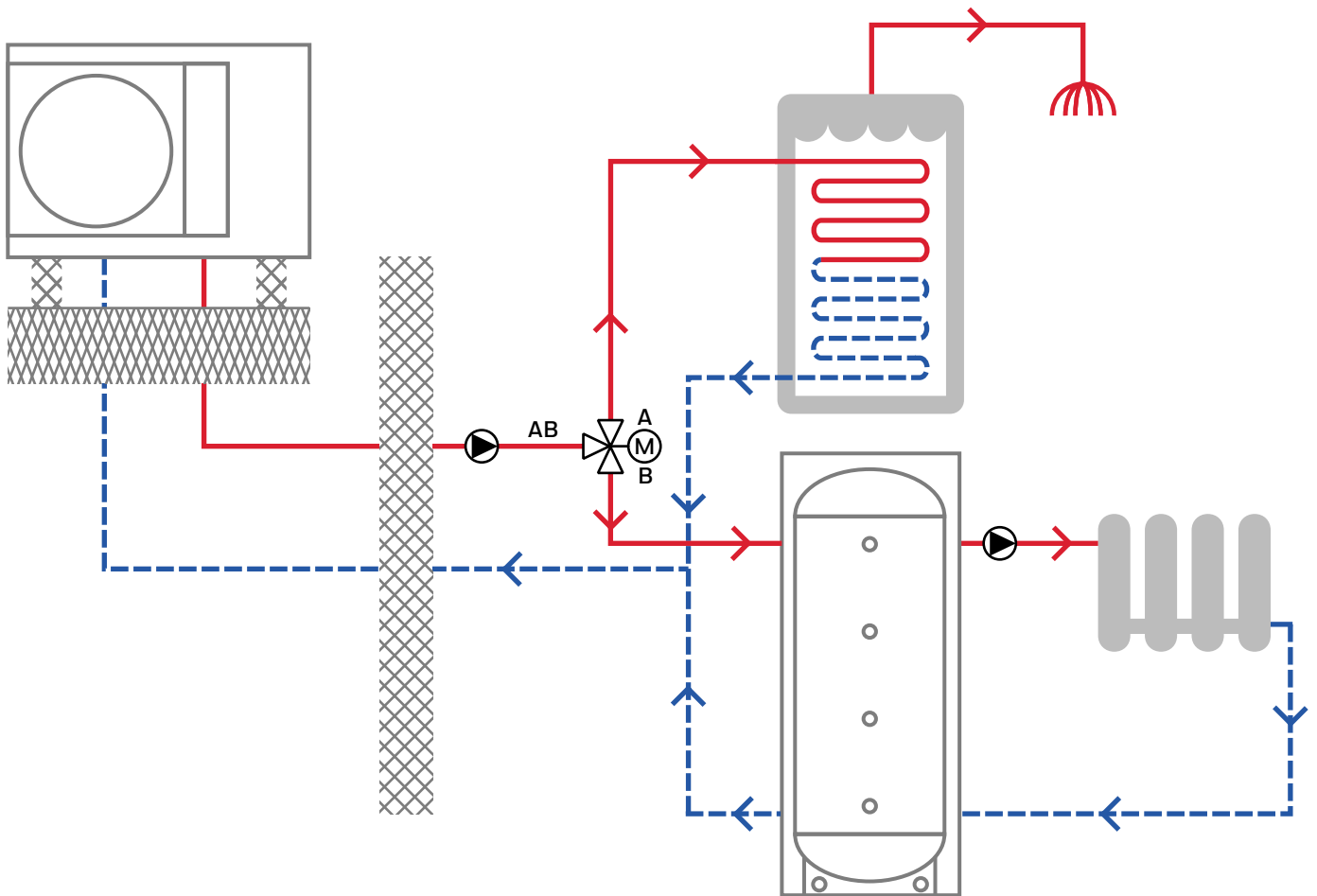
This application is quite similar to the previous ones from the heating zones point of view, however here two heating/cooling zones were created. Zones are controlled with room thermostats which open the related 2-way VC zone valves. A 3-way changeover valve is installed to select the heat source according the needs. In this application either heating or cooling mode is available, it is not possible to heat one zone while cool the other. The best way to control such application is using an applicable boiler room controller, however with a heat/cool manual operation mode selector switch and using some electrical relays the system can be managed without using a central controller. To design the wiring please consider that

room thermostats should open the zone valves equipped with on/off actuators with auxiliary switch. The auxiliary switch starts the pump of the related circuit as well as send a heat demand contact to the heat source through an electrical relay. Heat demands are collected by a relay which sends the demand signal to the boiler when the system is in heating mode set by the manual operation mode selector, and sends the demand signal to the cooler appliance if the system is in cooling mode. User should aware that both room thermostats and the manual operation mode switch have to be all set either to heating or cooling mode.



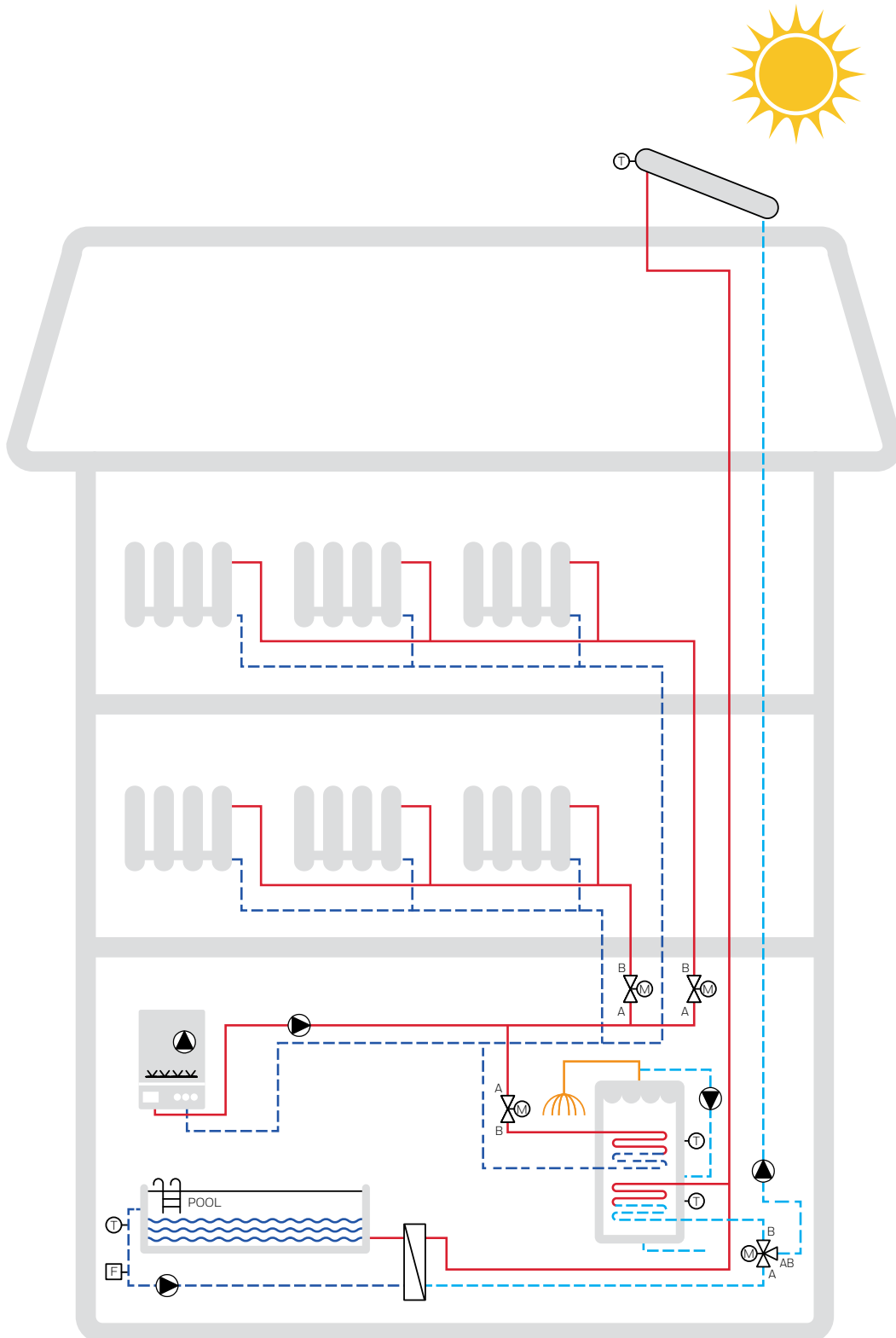
Some more ideas where to use VC valves:

- priority domestic hot water production
- the 3-way changeover valve switches the flow from the heating system to the domestic hot water tank and viceversa.



Some more ideas where to use VC valves:

- 3-way changeover valve in the solar circuit to let the solar panel loads either the domestic hot water tank, or heat up the water in the swimming pool through a heat exchanger
- 2-way zone valves to create independent heating zones
- 2-way zone valve to load the domestic hot water tank by the boiler



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