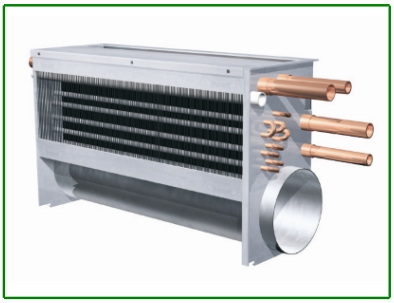
Perimeter wall system QVFB

Functions

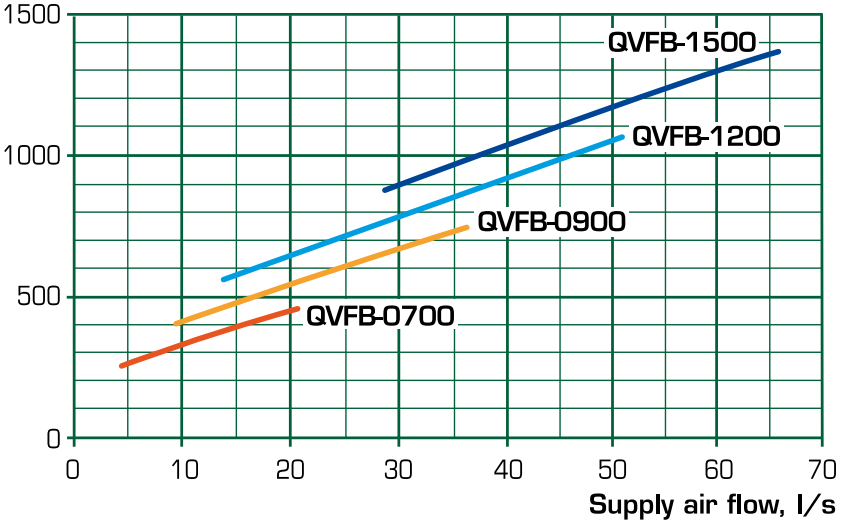
- Ventilation
- Heating
- Cooling
- Control



Perimeter wall system QVFB with heating, cooling and ventilation functions. Perimeter wall systems use the supply air force to create an air fl ow through induction that passes through the battery, which means that heated or cooled air is blown out of the unit. The perimeter wall system is positioned along the perimeter behind purpose built window benches. QVFB provides high comfort in the occupied zone with individual control. Examples of applications for perimeter wall systems are; offi ces, shops, schools, banks, hospitals etc.

Quick Selection

Cooling effect in W, supply air including



The diagram shows the approximate cooling effect, p_{tot} in W with a water flow of = 0.05 l/s, temperature difference between supply air and room temperature, Δt = 8 °C and an operating pressure of 200 Pa.

Product Facts

- Heating, cooling and ventilation functions
- Positioned along the perimeter behind purpose built window benches.
- High capacity and small space requirement.
- Designed for both new build and renovation and for replacing old perimeter units.
- Automation and Control Equipment as accessory.

Product code example

QVFB-1200-45-200
Perimeter wall system QVFB with a nominal length 1200 mm, supply air flow from the unit of 45 l/s and pressure setting 200 Pa.

Technical data for cooling effect

Airflow, pressure and temperature

Several perimeter wall units connected together make an installation branch.

The installation branch connection point is connected to a supply air duct with a normal pressure of 200 Pa. At lower pressure, for example 150 Pa, a lower cooling effect is achieved. The airflow at the connection point is equal to the total supply air flow along the installation branch.

The supply air can be supplied to the room at a subnormal temperature of 8 °C cooler than the room temperature due to the special design of the supply air grille.

Heating and cooling effects

The tables on pages 2 and 3 display the cooling and heating effects for QVFB at 200 Pa.

Cooling and heating effects are shown for the following nominal lengths; 700, 900, 1200 and 1500 mm.

At operating pressure of 250 Pa the effects are increased by approx. 10 % compared to those values given.

At operating pressure of 150 Pa the effects are reduced by approx. 10 %.

The given effects apply to systems without casing. With casing the effects increases with approx. 10%.

Total cooling effect

The total cooling effect is achieved by the cooling effect from the supply air being added to the cooling effect from the battery.

The cooling effect of the supply air is calculated as follows:

(t_{room} – t_{supply} air) x q x 1.2; where

t_{room} = room air temperature in °C

t_{supply} air = Supply air temperature in °C

q = Airflow in l/s

The heating capacity of the system is usually more than sufficient and therefore seldom affects the size of the system.

Cooling effect operating pressure of 200Pa on air side

Nominal length = 700 mm (Coil length = 500 mm)

Water flow, q_w = 0.05 l/s

Pressure drop water, Δp_w = 7.1 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
5	205	260	315	160	210	265	26
10	270	325	380	170	230	285	27
15	330	390	450	185	245	305	28
20	390	455	525	200	265	330	28

Nominal length = 900 mm (Coil length = 700 mm)

Water flow, q_w = 0.05 l/s

Pressure drop water, Δp_w = 8.9 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
10	325	405	480	230	305	385	26
15	390	470	550	240	325	405	27
20	450	535	620	255	340	425	28
25	510	600	690	270	360	445	29
30	575	665	760	280	375	470	30
35	635	735	835	295	395	495	30

Nominal length = 1200 mm (Coil length = 1000 mm)

Water flow, q_w = 0.05 l/s

Pressure drop water, Δp_w = 11.4 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
15	475	585	695	330	440	550	26
20	535	650	765	340	455	570	27
25	600	715	835	355	475	590	29
30	660	780	905	370	490	615	29
35	720	850	975	380	510	635	30
40	785	915	1045	395	525	660	31
45	845	980	1120	410	545	680	31
50	910	1050	1190	425	565	705	32

Nominal length = 1500 mm (Coil length = 1300 mm)

Water flow, q_w = 0.05 l/s

Pressure drop water, Δp_w = 2.6 kPa

(Two circuit coil gives lower pressure drop)

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	6	8	10	6	8	10	
30	745	900	1050	455	605	760	26
35	810	965	1120	470	625	780	27
40	870	1030	1190	480	640	800	29
45	930	1095	1260	495	660	825	29
50	995	1165	1330	510	675	845	30
55	1055	1230	1405	520	695	870	31
60	1120	1295	1475	535	715	895	31
65	1180	1365	1545	550	730	915	33

Technical data for heating effect

Heating effect at operating pressure of 200 Pa on air side

Nominal length = 700 mm (Coil length = 500 mm)

Water flow, q_w = 0.03 l/s

Pressure drop water, Δp_w = 0.9 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	20	30	40	20	30	40	
0*)	80	110	145	80	110	145	
5	320	460	595	275	410	545	26
10	400	555	705	305	455	610	27
15	475	640	810	330	495	660	28
20	545	720	895	350	525	700	28

*) 0 l/s = natural convection

Nominal length = 900 mm (Coil length = 700 mm)

Water flow, q_w = 0.03 l/s

Pressure drop water, Δp_w = 1.2 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	20	30	40	20	30	40	
0*)	100	155	200	100	155	200	
10	500	700	900	400	605	805	26
15	580	795	1010	430	650	865	27
20	650	880	1110	460	690	915	28
25	725	965	1205	480	720	960	29
30	790	1040	1290	500	750	995	30
35	855	1110	1365	515	770	1025	30

*) 0 l/s = natural convection

Nominal length = 1200 mm (Coil length = 1000 mm)

Water flow, q_w = 0.03 l/s

Pressure drop water, Δp_w = 1.5 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	20	30	40	20	30	40	
0*)	145	220	285	145	220	285	
15	725	1015	1305	580	870	1160	26
20	805	1110	1410	610	915	1220	27
25	880	1200	1515	635	955	1275	29
30	950	1285	1615	660	995	1325	29
35	1025	1365	1705	685	1025	1365	30
40	1090	1440	1795	700	1055	1405	31
45	1155	1515	1875	720	1080	1440	31
50	1220	1585	1950	735	1100	1465	32

*) 0 l/s = natural convection

Nominal length = 1500 mm (Coil length = 1300 mm)

Water flow, q_w = 0.03 l/s

Pressure drop water, Δp_w = 1.8 kPa

q_l, l/s	p_{tot}, W Δt, °C			p_{coil}, W Δt, °C			L_{A10}, dB (A)
	20	30	40	20	30	40	
0*)	185	285	370	185	285	370	
30	1105	1515	1920	815	1220	1630	26
35	1180	1600	2020	840	1260	1680	27
40	1255	1685	2120	865	1295	1730	29
45	1325	1765	2210	885	1330	1775	29
50	1390	1845	2300	905	1360	1810	30
55	1455	1920	2380	925	1385	1845	31
60	1520	1990	2460	940	1410	1875	31
65	1585	2060	2535	950	1425	1905	33

*) 0 l/s = natural convection

The above effects apply at the following Δt:

8 °C for cooling and 30 °C for heating.

Correction of effects at other Δt

Example:

Δt at cooling effect 10 °C = effect in the table x (10/8) i.e. q x 1.2

Δt at cooling effect 6 °C = effect in the table x (6/8) i.e. q x 0.75

etc

Pressure drop factors

Pressure drop factors cooling at 0,05 l/s (28 mm)

	C-C 1,2 m Number of units				
Size	1	3	6	9	12
700	53,3	53,6	53,9	54,2	54,4
900	59,7	60,0	60,2	60,5	60,8
1200	67,5	67,8	68,1	68,4	68,7
1500	32,2	32,2	32,8	33,1	33,4

$dp_{water} = (q_{water} \times k_{cooling})^2$

	C-C 2,4 m Number of units				
Size	1	3	6	9	12
700	53,3	53,8	54,3	54,9	55,5
900	59,7	60,1	60,7	61,3	61,9
1200	67,5	68,0	68,6	69,2	69,7
1500	32,2	32,7	33,3	33,9	34,5

$dp_{water} = (q_{water} \times k_{cooling})^2$

	C-C 3,6 m Number of units				
Size	1	3	6	9	12
700	53,3	54,2	55,1	55,9	56,8
900	59,7	60,6	61,4	62,3	63,2
1200	67,5	68,4	69,3	70,2	71,0
1500	32,2	33,2	34,0	34,9	35,8

$dp_{water} = (q_{water} \times k_{cooling})^2$

Pressure drop factors heating at 0,03 l/s (22 mm)

	C-C 1,2 m Number of units				
Size	1	3	6	9	12
700	31,6	31,9	32,2	32,5	32,8
900	36,5	36,8	37,1	37,4	37,7
1200	40,8	41,1	41,4	41,7	42,0
1500	44,7	45,0	45,3	45,6	45,9

$dp_{water} = (q_{water} \times k_{heating})^2$

	C-C 2,4 m Number of units				
Size	1	3	6	9	12
700	31,6	32,2	32,8	33,3	33,9
900	36,5	37,1	37,7	38,2	38,8
1200	40,8	41,4	42,0	42,5	43,1
1500	44,7	45,3	45,9	46,4	47,0

$dp_{water} = (q_{water} \times k_{heating})^2$

	C-C 3,6 m Number of units				
Size	1	3	6	9	12
700	31,6	32,5	33,4	34,3	35,1
900	36,5	37,1	37,7	38,2	38,8
1200	40,8	41,4	42,0	42,5	43,1
1500	44,7	45,3	45,9	46,4	47,0

$dp_{water} = (q_{water} \times k_{heating})^2$

Dimensioning example

Dimensioning example

- Calculate the heating-/cooling requirement and air volumes.
- Perimeter wall systems are normally installed in series along the perimeter and together create an installation branch. The airspeed in the this branch must not exceed 7 m/s, which corresponds to 140 l/s at a duct size of Ø160 mm.

Example ”air side”

If each room should have 15 l/s, an installation branch can distribute air to 8 rooms because the duct size is Ø160 mm. A QVFB with Ø200 mm air duct can also be used, in which case contact your nearest Fläkt Woods sales office.

Example ”water side”

When dimensioning the water side, available pressure is dimensioned. One should not try to exceed 25 kPa in loop pressure drop. The valve authority must also be achieved on the unit valves, on both the heating and cooling side.

Casing

Purpose built casing must have open gap of at least 60 mm along the floor.

Water temperature

The following temperatures are recommended: Incoming hot water temp: max 60 °C, Dt= 8-10 °C. Incoming cold water temp: min 14 °C, Dt= 3-4 °C.

The input hot water temperature should be as low as possible, preferably 40 °C. At this temperature heat from heat pumps can be used. The chilled water should have a constant flow temperature, for example 14 °C. There should also be some form of condensation sensor to ensure function and to prevent water spillage on the floor.

The coil in the system normally permits differences between the room air temperature and the chilled water average temperature of up to 10 °C without risk of condensation build up.

The supply air is cooled down to 14 °C on hot days and/or when there is high moisture content in the air. The air is dehumidified to reduce the risk of condensation over the battery and to increase available capacity.

Operating Pressure

Perimeter wall system QVFB is pressure tested to 1000 kPa kPa before delivery. The highest recommended working pressure in an installation branch is 600 kPa. The units can be delivered pressure tested up to 1600 kPa, intended for working pressure up to 1000 kPa.

Special editions

Certain types of special edition of QVFB can be ordered, for example:

- Air duct 200 mm.
- Water pipes are positioned at the front edge of the unit to allow pillars to be bypassed.

These deviations must be described in plain text when ordering.

Dimensions, product code and accessories

Product code

Perimeter wall system
QVFB-aaaa-bb-ccc

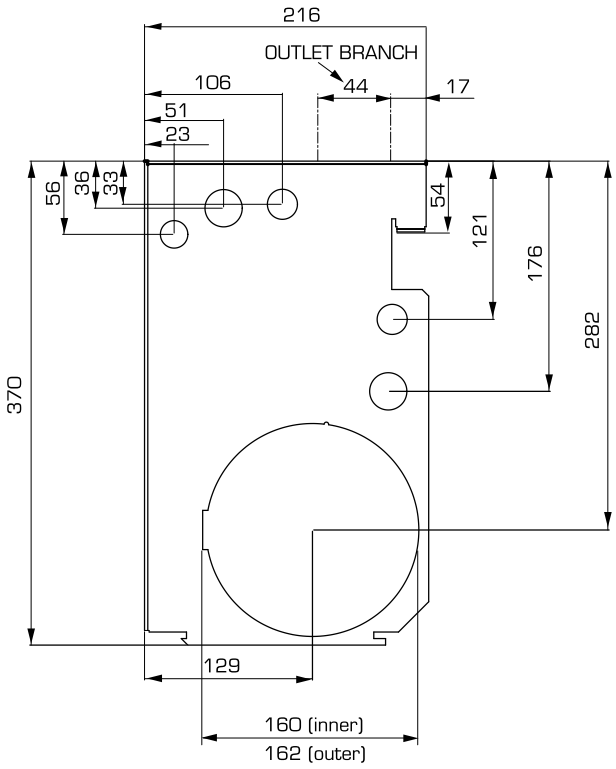
Nominal length, mm (aaaa)
0700, 0900, 1200, 1500

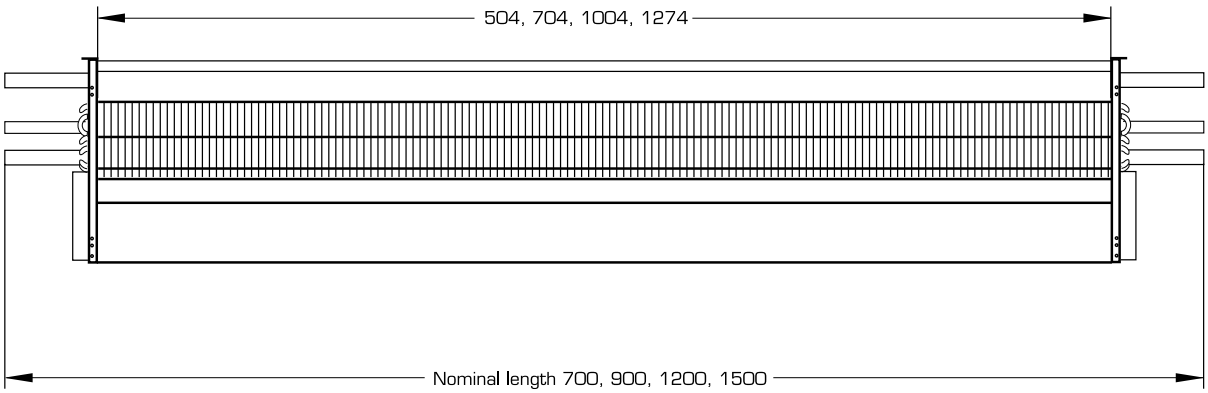
Supply air flow from unit, l/s (bb)

Pressure setting/Operating pressure in unit, Pa (ccc)

Note!
QVFB is delivered without nipples and control.
Control valves are included in all QVFB perimeter wall systems.

Dimensions





Accessories

Wall bracket, length 2475 mm
QVFZ-01

Outlet sleeve, height 50-200 mm
QVFZ-02

Wall block can be offered by request.

Water couplings

Fixed coupling/Sliding socket pipe
QVFZ-03-bb

Size, mm (bb)
22, 28

Flexible coupling 22
QVFZ-04-bb

Size, mm (bb)
22, 28

Pipe terminations with air nipple
QVFZ-05-bb

Size, mm (bb)
22, 28

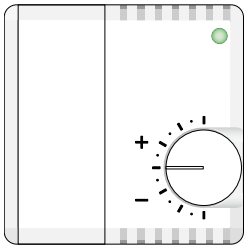
Weight

Size	Weight, kg
700	9
900	11.5
1200	15
1500	19

Control equipment

Digital controller QFZC-02-7

Control with electro thermal actuators



Description, controller QFZC-02-7

- Simple controller with setpoint knob and LED for indication of actual output
- Built in temperature sensor
- Controls effectively and energy saving
- PI control
- Heating and cooling in sequence
- Automatic valve excersice, one time a day
- Mechanical scale range adjustments possible
- CE approved

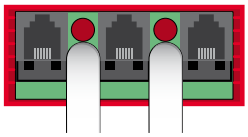
Standard functions / values

Control function	PI regulation
Actual temperature range	0-31.9 °C
Set point range	19-25 °C
P-range, heating	1,5K
P-range, cooling	1K
Dead zone	1K
I time	20 min
Valve exercise	3 minutes fully open (Once daily)
Cooling output	24V
Heating output	24V
Output function	Heating NC*, cooling NC*
Outputs, 24V	Time proportional on/off 24V AC (max 20VA)
Supply voltage	24V AC ±10%
Power consumption	1 VA
Protection class	IP30
Ambient temperature	Storage: 0 to +70 °C. Operating: +5 to +40 °C
Electrical connections	4 wire, modular cable (QFZC-07-1)
Recommended cable type	0.5 mm^2, multicore cable
Sizes	77 x 77 x 27 mm
Light indication	Green = Cooling, red = heating, out = dead zone
Zone Controls product code	R101M

*NC = normally closed, NO = normally open.

Supply box QFZC-12-1

Control with electro thermal actuators



Description, supply box QFZC-12-1

- Used as a connection unit to the QFZC-02-7 controller
- Consists of a connection unit with three modular sockets and 2 actuators for heating and cooling.
- CE approved.
- Max number of QFZC-12-1 in series: 4 pcs. heating / cooling

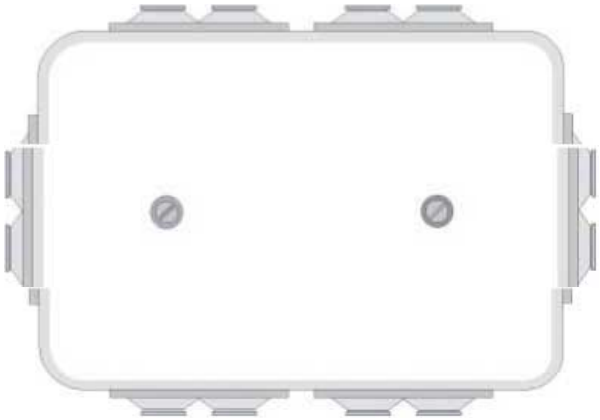
Technical data

Heating actuator	Electro thermal actuator 24V AC- NC**
Cooling actuator	Electro thermal actuator 24V AC - NC**
Supply voltage	24V AC ±10%
Power consumption (at start)	6 VA
Power consumption (permanent)	3 VA
Actuator closing and opening time	approx. 3 min
Protection class	IP44
Ambient temperature	Max 60°C
Connections	3 pcs modular connections (4/4)
Recommended cable type	
- for the controller	4 wire, modular cable (QFZC-07-1)
- between supply boxes	4 wire, modular cable (QFZC-07-3 or QFZC-07-6)
Size	22 x 52 x 21 mm
Zone Controls product code	D1-2

*NC = normally closed, NO = normally open.

Control equipment

Amplifying unit QFZC-13-1



Description, amplifying unit QFZC-13-1

- Amplifying unit QFZC-13-1 is used where more than four units are controlled by the same room controller.
- CE approved.

Technical data

Input signal, from connection box	24V AC signals to heating or cooling actuator
Output signal, to connection box	24V AC signals to heating or cooling actuator
Supply voltage	24V AC ±10%
Power consumption	2 VA
Connections	3 pcs modular contacts (4/4)
Recommended cable type	4x0,14mm^2, modular cable (QFZC-07-3 or QFZC-07-6)
Protection class	IP44
Size	80 x 122 x 40 mm
Zone Controls product code	D63

Transformer QFZC-11-1

Description, transformer QFZC-11-1

- The transformer is supplied with 230V AC
- Can serve up to four perimeter wall units
- CE approved.

Technical data

Supply voltage	230V AC
Output	24V AC
Effect	20 VA
Protective fuse, secondary	PTC 40°C
Protective fuse, primary	–
Connection, primary	Wall socket
Connection, secondary	Modular switch 4/4
Protection class	IP44
Zone Controls product code	T20-21M

Modular cable QFZC-07

Description, modular cable QFZC-07

- Modular cable type QFZC-07-1 connects the room controller with the connection box. Standard length = 3 m
- Modular cable type QFZC-07-3 or QFZC-07-6 connects the junction boxes between two perimeter wall units.

Technical data

Cable	4-wire
Connections, modular contact (QFZC-07-3/QFZC-07-6)	4/4+4/4
Connections, modular contact (QFZC-07-1/QFZC-07-4	4/4 + 6/4
Zone Controls product code (modular connection both ends)	K4
Zone Controls product code (Modular cable for connection between connection box D1-2 and room controller R101M)	K41

Product Code

Modular cable
QFZC-07-b

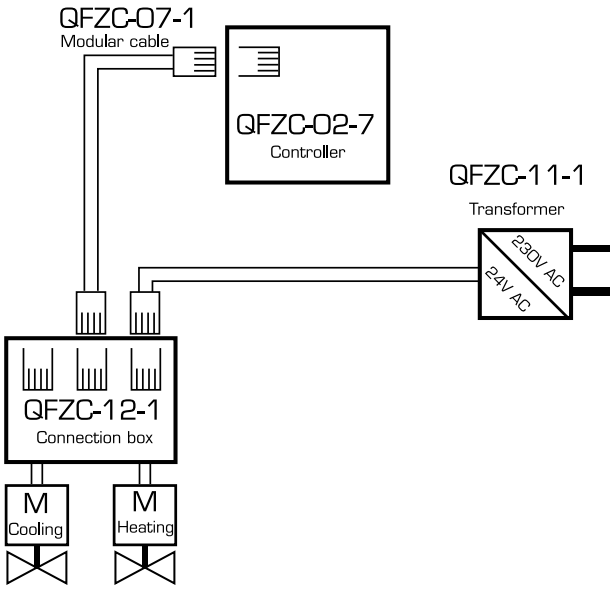
Connection and cable length (b)
1 = Modular connection at both ends between connection box QFZC-12-1 and controller QFZC-02-7 cable length 3 m.
3 = Modular connection at both ends cable length 3 m.
4 = Modular connection at both ends between connection box QFZC-12-1 and controller QFZC-02-7 cable length 6 m.
6 = Modular connection at both ends cable length 6 m.

Note!

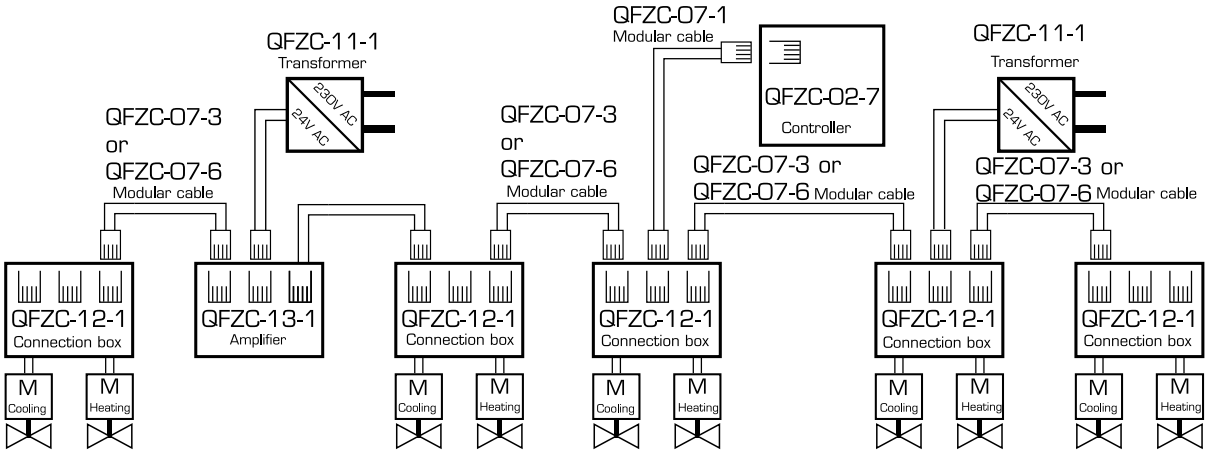
- Control valves are included in all QVFB perimeter wall systems. There is one valve for heating and one valve for cooling – both with adjustable kvs value.
- QVFB is delivered without nipples and control.

Application example

Heating and cooling, one perimeter wall system



Heating and cooling, five or more perimeter wall system



An amplifier QFZC-13-1 and a transformer QFZC-11-1 are needed for every third unit.