

Fact sheet

One-pipe solution portfolio

Description



One-pipe solution portfolio is a complete set of Danfoss products that ensures efficient and reliable operation of one-pipe heating applications. There are 3 solutions:

- AB-QM dynamic balancing
- QT dynamic balancing with self-acting thermostat
- AB-QTE dynamic balancing with electronic control.

Applications

In one-pipe systems flow in the riser is always present. TRV on the radiator controls room temperature by controlling flow through radiator. However, by reducing flow through the radiator, water flow is not reduced but diverted to a by-pass and thus total water flow in the riser remains permanent. **Therefore at partial loads water temperature in the pipe is increasing.** As a result the riser itself with the by-pass pipe continues to heat the room. This can cause overheating of the room. After the building is renovated the heating system becomes oversized since the heat losses of the building decrease. As a result overheating issue increases even more.

AB-QM mounted in the riser provides a robust solution that offers reliable balance of one-pipe heating system at all system conditions. As a result, every riser gets design flow – and never more than that. Each riser becomes an independent part of installation.

On top of that, QT and AB-QTE convert a one-pipe heating system into an energy efficient variable flow system.

QT and AB-QTE provide flow control through the temperature of return water in the risers. By this water flow in the riser is dynamically controlled to match the actual load in the riser. This results in improved room temperature control and greatly reduced overheating of the building. Thus one-pipe systems become energy efficient variable flow systems, similar as two-pipe systems are.

In addition, AB-QTE features electronic control of return water temperature according to weather compensated supply water temperature as well as service functions that can greatly help to monitor and service a one-pipe heating system in a building.

Typical applications are:

- one-pipe vertical riser based heating system
- one-pipe horizontal loop based heating system
- two-pipe vertical riser based heating system without TRV's, such as staircase or bathroom risers

AB-QM
Product data:

- Sizes AB-QM 4.0 DN 15-32
- Available setting range: 30-3,600 l/h
- PN 25, max 95 °C

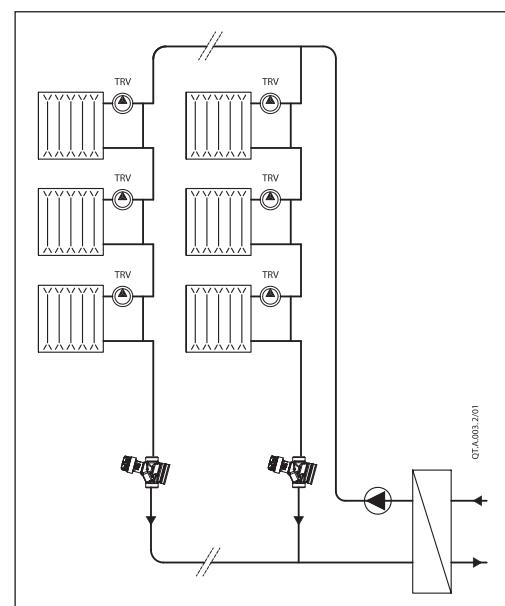
AB-QM is a dynamic balancing valve with the following main features:

- Exact and pressure independent flow limitation allows no overflows at all conditions
- "Set & Forget" setting of required flow: flow setting for the riser is a matter of a simple turn of the setting ring; no additional calculation or measuring is needed
- full flexibility of flow adjustment: AB-QM can be set to a precise design value even when the system is up and running so no need for draining the system or use of flow charts or calculations; easy adjustability allows late change of design flows without high costs
- commissioning costs are minimal because of the automatic flow limitation function

- "Plug and Play" even when installation is not yet completely finished. For example when some floors are already occupied while construction is still going on at other floors, the occupied floors are already fully functional and balanced.


Benefits

- Perfect hydronic balance at all conditions
- Riser/loop independence: each riser/loop becomes independent part of the heating system
- Reliable heating system that results with even heat distribution and no under-heating claims.


Ordering
AB-QM threaded version

Picture	DN	Qmax. (l/h)	Ext. thread (ISO 228/1)	Int. thread (ISO 7/1)	AB-QM	DN	Qmax. (l/h)	Ext. thread (ISO 228/1)	Int. thread (ISO 7/1)
	15 LF	200	003Z8200	003Z8300		15 LF	200	003Z8220	003Z8320
	15	650	003Z8201	003Z8301		15	650	003Z8221	003Z8321
	20	1,100	003Z8203	003Z8303		20	1,100	003Z8223	003Z8323
	25	2,200	003Z8205	003Z8305		25	N/A	N/A	N/A
	32	3,600	003Z8207	003Z8307		32	N/A	N/A	N/A

For details on AB-QM and accessories please refer to AB-QM datasheet.

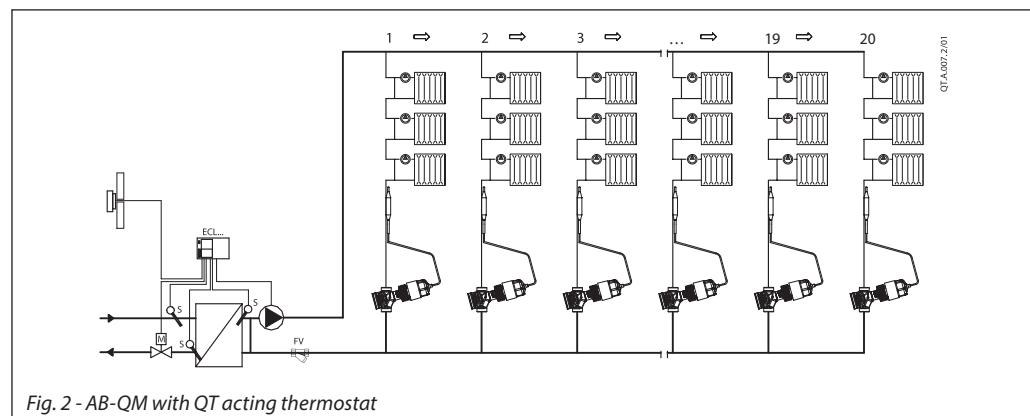
QT

QT is a solution for dynamic balancing and self-acting return temperature control in one-pipe heating systems. QT consists of

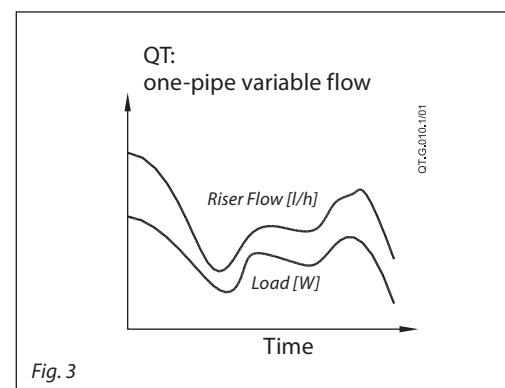
- AB-QM dynamic balancing valve
- QT self-acting thermostat

Feature list includes all AB-QM related features with following QT related additional ones:

- return water temperature control
- QT prevents return temperature to rise at partial loads
- QT transforms one-pipe heating system into a variable flow system
- QT controls flow according to actual load, similar as in two-pipe system.


Benefits

- Perfect hydronic balance at all conditions: it means reliable heating system that results with even heat distribution and no under-heating claims
- each riser/loop becomes independent part of the heating system
- reduced heat losses in the pipes due to low return temperature
- less overheating of the rooms due to vastly improved indoor temperature control
- QT saves energy when matters most since it is most effective at low outdoor temperatures when energy consumption is high.


Ordering
QT thermostatic actuator

Picture	Setting range (°C)	fit to AB-QM	Code No.
	35 ... 50	DN 15-32	003Z0397
	45 ... 60		003Z0398
	65 ... 85		003Z0399

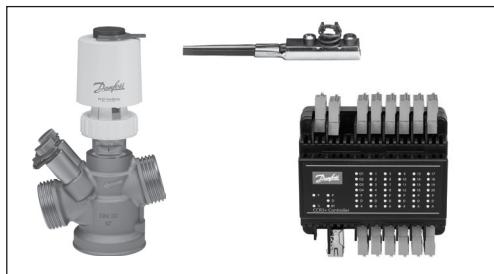
AB-QM valves (refer to page 2)

For details on AB-QM and QT with accessories please refer to AB-QM and QT datasheets respectively.

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AB-QTE



AB-QTE is a top of the line electronic solution for dynamic balancing and electronic return temperature control in one-pipe heating systems. AB-QTE consists of:

- CCR3+ controller
- AB-QM dynamic balancing valve
- TWA-Q actuator
- ESMC surface temperature sensor

One CCR3+ controller connects up to 20 (expansion up to 36 riser with CCR+ Slave Unit) risers in intelligent, electronically controlled

modulating control system for return temperature control in one-pipe systems. For buildings with more risers, the system can easily be expanded with additional CCR3+ modules. Each riser is equipped with AB-QM, TWA-Q actuator and ESMC surface temperature sensor. One additional ESMC sensor is needed to provide input for supply water temperature. Feature list includes all AB-QM related features with following additional ones:

- Dynamic return water temperature control based on supply water temperature: it works during whole heating season even at high outside temperatures
- AB-QTE prevents return temperature to rise at partial loads
- AB-QTE transforms one-pipe heating system into a variable flow system at all conditions
- AB-QTE controls flow according to actual load, similar as in two-pipe system
- Return temperature monitoring and resetting per each individual riser.

Benefits

- Perfect hydronic balance at all conditions: reliable heating system that results with even heat distribution and no under-heating claims
- each riser/loop becomes independent part of the heating system
- reduced heat losses in the pipes due to low return temperature
- less overheating of the rooms due to vastly improved indoor temperature control
- Best energy efficiency: AB-QTE saves energy throughout the heating season
- Electronic & central monitoring, service and resetting of each individual riser
- System expansion via CCR+ Slave Unit (+16 risers)

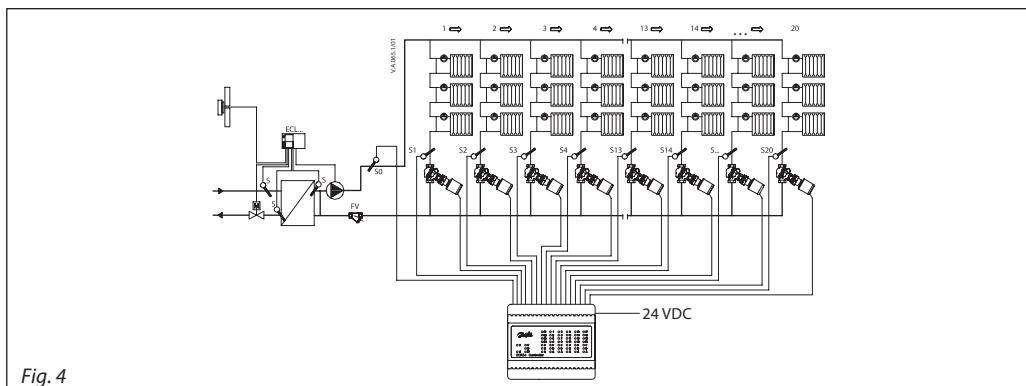


Fig. 4

Ordering

Type	Designation	Voltage	Actuator type	Code No.
CCR3+ Controller	Return Temperature Controller & Temperature Registration	24 VDC	NO/20	003Z0396
CCR3+ Slave Unit	System expansion (add 16 risers)	24 VDC	NO/16	003Z3852

AB-QM threaded version (refer to page 2)

Accessory

Type	Designation	Voltage	Comments	Code No.
TWA-Q (NO) ¹⁾	Thermal actuators	24 V	1.2 m. cable	082F1603
ESMC (PT 1000)	Surface sensor	-	2 meters cable	087N0011
Set: TWA-Q (NO) with ESMC (PT 1000)	Thermal actuators with surface sensor	24 V		003Z0378

For details on AB-QM, TWA-Q, ESMC and CCR3+ controllers with accessories please refer to product datasheets respectively.

¹⁾ 30-70 % recommended AB-QM flow setting.

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