Frost Units

QAF81...

for air temperature monitoring

- **Robust aluminium die-cast housing**
- **Responds to temperature change sensed over any 30 cm length of capillary**
- **Small switching differential**
- **Good repeatability**
- **Setpoint adjustment (–5...+15 °C)**
- **Protection standard IP 54 (65)**

Use

The frost unit QAF81... for air-side monitoring of the temperature of LTHW heating coils in ventilation and air conditioning systems is used to prevent frost damage. It has a small switching differential and good repeatability. The reset occurs automatically (manual reset required with QAF81.6M).

Typical applications

The frost unit can be used to initiate the following frost protection functions:

– Stop fan
– Close outside air dampers
– Open heating coil valve 100 %
– Start heating coil pump
– Switch off chiller (condenser) and humidifier
– Trip visual and/or audible frost alarm

Type summary

Typ reference	*Reset*	*Capillary length*
QAF81.3	automatic reset	3 m
QAF81.6	automatic reset	6 m
QAF81.6M	with lock-out and manual reset	6 m

Accessories

Name	*Typ reference*
Capillary tube clamp (6 pieces)	**AQM63.3**

Ordering and delivery

When ordering, please give name and type reference, e.g. frost unit **QAF81.6M**.

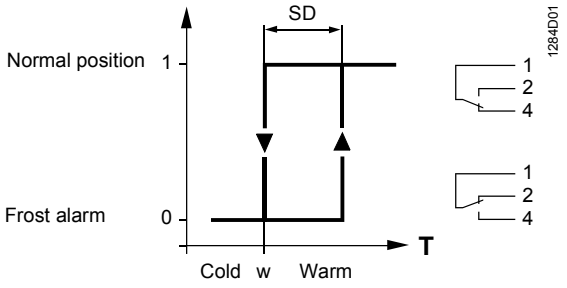
The QAF81... frost unit is supplied complete with **AQM63.3** (capillary tube clamps).

Technical design

The frost unit QAF81... trips when the temperature drops below the selected setpoint over a capillary length of 30 cm.

An automatic reset occurs when the temperature rises above the setpoint again (manual reset required with QAF81.6M).

The (R134a) gas-filled capillary and the diaphragm assembly together form the measuring element, which is mechanically linked to the micro-switch. The temperature is measured over the full length of the capillary.



Legend.

SD	Switching differential
T	Air temperature
w	Preselected setpoint

Mechanical design

The frost unit QAF81... has the following parts:

- Die-cast aluminium housing with removable cover
- Mechanical setpoint adjuster with scale in °Celsius and °Fahrenheit (setpoint adjustment screw can be locked mechanically)
- Micro-switch for change-over contact
- Sensor unit with diaphragm assembly and copper capillary
- Capillary filled with R134a gas
- The QAF81.6M has a manual reset button

Disposal

The device is a waste electronic equipment in terms of the European Directive 2002/96/EC (WEEE) and should not be disposed as part of unsorted municipal waste. The relevant national legal rules are to be paid attention. Use for disposal the systems set up to collect electronic waste. Observe all local and applicable laws.

Engineering notes

Withdrawable tray:
It is recommended that the frost unit QAF81... should be installed on a purpose-built withdrawable tray directly downstream of the heating coil. The connecting cable must be long enough to enable the tray to be inserted and removed without difficulty.

For heating coils with very large cross-sections, a number of frost units can be fitted and connected in series. In this case, the setpoint must be set individually on each frost unit.

Fitting notes

Frost thermostat

The ambient temperature affecting the frost unit housing (with the test loop) must be at least 2 °C above the pre-selected setpoint. If this cannot be guaranteed (e.g. outdoors or in exposed spaces), the housing and test loop must be installed inside the supply air unit.

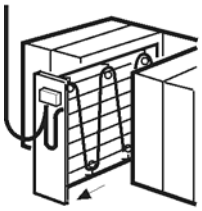
Capillary

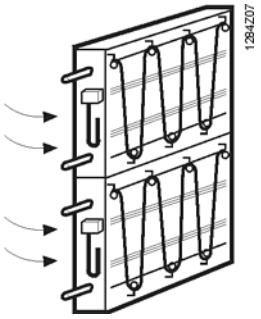
The capillary must be mounted on the downstream side of the heating coil (and on the upstream side in the case of coiling coils). It should be looped diagonally across the heat exchanger pipes at a distance of approximately 5 cm, and should cover the entire area evenly. For test purposes, it is advisable to leave a loop of approximately 20 cm directly beneath the housing outside the entry to the duct.

To prevent damage to the capillary it should be protected by grommets or similar where it passes through metal walls.

To prevent damage to the capillary, a minimum bending radius of 20 mm must be ensured.

Mounting is easier if the capillary tube clamps (AQM63.3) are used.





Commissioning notes

After removal of the locking screw (under the housing cover) the setpoint can be adjusted from above with a screwdriver.

Frost simulation

To simulate frost conditions, the test loop can be immersed in a vessel of iced water.

To simulate frost with the frost unit QAF81.6M, push in the reset button (on the housing base).

Maintenance notes

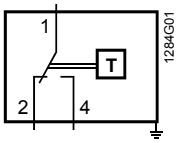
The frost unit is maintenance-free.

Correct operation of the device can be checked by immersing the test loop in a vessel of iced water.

Technical data

Setpoint adjustment range W_h	−5...+15 °C (23...59 °F)
Factory setting w	5 °C (41 °F)
Switching differential SD	2 ±1 °C (3.6 ±1.8 °F)
Repeatability	±0.5 °C (±0.9 °F)
Responsive length of sensor	Approx. 0.3 m
Capillary length	refer to "Type summary"
Type of switch	Single pole change-over
Contact rating	AC 250 V, 10(2) A
Reset mechanism	QAF81.3, QAF81.6 Automatic QAF81.6M Manual
Admissible medium	Air
Orientation	Any
Electrical connection	
Screw terminals for	1.5 mm²
Cable entry	Threaded M 20 x 1.5
Protection class	I to EN 60 730-1
Protection standard	IP 54 to EN 60 529
with cable gland (M20x1.5 IP65)	IP 65 to EN 60 529 (not included as standard)
Ambient temperature	
Max. operating temperature	70 °C (158 °F)
Min. operating temperature	w + min. 2 °C (min. 3.6 °F)
Storage	−30...+70 °C (−22...+158 °F)
Destruction limit t_{smax}	140 °C (284 °F)
Materials	
Housing	Die-cast aluminium
Bellows housing	Copper
Capillary	Copper
Capillary contents	Freon R134a
Contacts	Ag (Silver)
Weight (including packaging)	0.9 kg
Maintenance	None required
Conformity	Meets the requirements for CE marking

Connection terminals

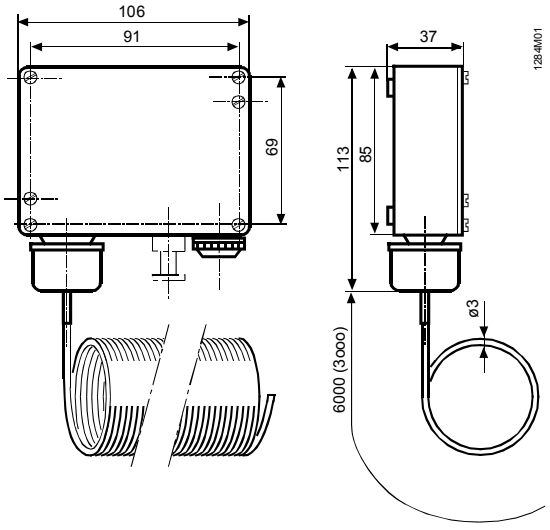


Legend

1 – 2	Frost alarm / sensor short circuit
1 – 4	Normal operation

Dimensions (dimensions in mm)

QAF81...



AQM63.3