SIEMENS

Technical Instructions
Document No. 155-707
April 21, 2010

QFM81 Series

Duct Hygrostats

QFM81.21

QFM81.2

Description

On/off hygrostat with microswitch, and temperature-compensated humidity sensor for temperature-independent humidity measurements.

Features

- Stabilized sensing strip (good linearity, very stable even at high humidity, insensitive to dust and contaminated air).
- Can be mounted in ventilating ducts or rooms.

Application

For controlling humidification equipment and dehumidification equipment.

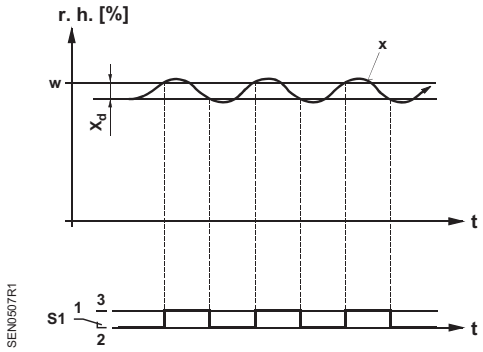
Product Numbers

Product Number	Setpoint Range (W_h)	Switching Differential (X_d)	Degree of Protection	Setpoint Adjustment
QFM81.2	15 to 95% r.h.	Approx. 4% rh	IP 30	Externally
QFM81.21			IP 55	Internally

NOTE: Includes a mounting flange (for duct or wall mounting) and a sealing ring (for duct mounting).

Mode of Operation

The hygrostat acquires the relative humidity of the air with its humidity sensor, which is a stabilized, plastic strip. The strip actuates a microswitch with a fixed switching differential X_d and a potential-free contact output (SPDT), depending on the relative humidity of the air. If the actual humidity deviates from the adjusted setpoint, the hygrostat switches the associated humidification or dehumidification equipment on or off as shown in the following function diagram (Figure 1).



rh Relative humidity in %
S1 Microswitch
1–2 Humidification
1–3 Dehumidification
w Setpoint
x Actual value
X_d Switching differential
t Time

Figure 1. Function Diagram.

If the relative humidity exceeds the adjusted setpoint, the potential-free contact of the microswitch will change over from 1–2 to 1–3. If the relative humidity falls by the amount of the fixed switching differential X_d, the contact will return to the position 1–2.

Mechanical Design

The hygrostat consists of a base with immersion sensor stem and cover. The cover is secured to the base with a screw.

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The stem accommodates the temperature-compensated humidity sensing element (stabilized plastic strip). The strip is mechanically linked to the microswitch via a transfer lever. Transfer lever, microswitch, setpoint setting element and connection terminals for connecting the humidification or dehumidification equipment are mounted on a printed circuit board inside the base. The connection terminals are protected by a hinged cover to avoid direct access when the cover is removed.

The cover has a hole for the setpoint knob. The hygrostat is designed for mounting in air ducts, but can also be mounted on a wall. For both mounting methods, a mounting flange is required, which is supplied with the unit.

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Same design as the QFM81.2, but with an additional transparent cover on the hole for the setpoint knob, cable gland Pg 11, and seal under the unit cover.

Setting Elements
Setpoint knob

On both units, the setpoint is adjusted with the setpoint knob. The setting scale is on the unit cover.

With the QFM81.21, the setpoint can be adjusted only when the cover is removed.

Mounting Notes

Air Duct Mounting

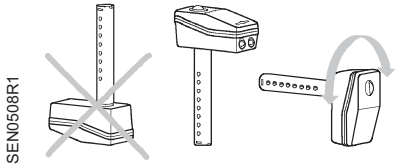
If the duct hygrostat is used for control, it must be mounted in the exhaust air duct after the room to be controlled.

If the duct hygrostat is used for monitoring the maximum or minimum humidity level, it imust be mounted in the supply air duct.

Mounting Positions

The immersion sensor stem must be mounted either horizontally or vertically with the stem pointing downward. Do not mount with the stem pointing upward.

To ensure accurate humidity measurements, it must be made certain that the air to be measured is sufficiently mixed at the point of measurement.



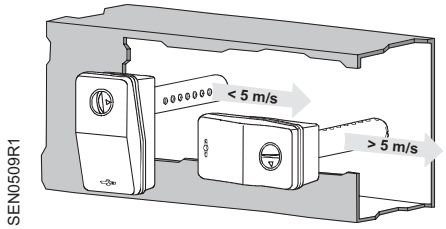


Figure 2. Acceptable Mounting Positions.

The mounting orientation is dependent on the air velocity in the ductwork: at <5 m/s, the holes in the stem must face the airflow; at >5 m/s, they must be perpendicular to the direction of airflow (see Figure 2).

Minimum immersion length

When mounting the hygrostat in air ducts, the minimum immersion length of the stem 5.12 inches (130 mm) must be observed. The mounting flange supplied with the unit allows the immersion length to be adjusted between 5.12 inches (130 mm) and 6.14 inches (156 mm).

Wall Mounting

The hygrostat should be mounted on an inner wall approximately 4.9 feet (1.5 m) above the floor and at least 1.6 feet (0.5 m) from the closest wall.

Mount the unit where there is a natural circulation of room air (do not mount near drafts, in corners, behind curtains, too close to doors and windows, or on an outer wall). Sources of heat and refrigeration (radiators, computers, televisions, concealed heating pipes, hot or cold water pipes) must be at an adequate distance.

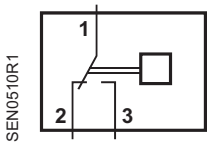
The hygrostat should not be exposed to direct sunlight.

For wall mounting, the mounting flange supplied with the hygrostat must be used.

Specifications

Setpoint range	15 to 95% rh
Control mode	On/off
Switching differential	Approximately 4% rh (fixed)
Type of switch	Potential-free microswitch (SPDT)
Contact rating	
Maximum	5 (3) A, 24 Vac/Vdc
Minimum	100 mA, 24 Vac/Vdc
Temperature influence	Compensated
Long-term stability	Approximately −1.5% rh/a
Balancing	At 55% rh, 73°F (23°C)
Time constant (v = 0.2 m/s)	Approximately 3 minutes
Permissible air velocity	10 m/s
Permissible ambient temperature	
Operation	32°F to 158°F (0°C to 70°C)
Storage/transport	–22°F to 158°F (−30 to 70°C)
Degree of protection	
QFM81.2	IP 30 to EN 60 529
QFM81.21	IP 55 to EN 60 529
Safety class	II to EN 60 730
CE conformity to low-voltage directive	73/23/EEC
UL	UL873
cUL	Canadian Standard C22.2 No. 24-93
Connection terminals for	20 AWG. minimum 2 × 16 AWG maximum
Materials	
Sensing element	Polymer
Casing with stem	PPS, Fortron 1140L6, fiberglass reinforced
Cover	PC Lexan 940
Transparent cover (only with QFM81.21)	PC Makrolon 2014R, transparent
Weight	Approximately 12 ounces (0.34 kg)
Maintenance	Maintenance-free, can be recalibrated

Wiring Diagram



1 – 2 Humidification

1 – 3 Dehumidification

Figure 3. Wiring Connections.

Dimensions

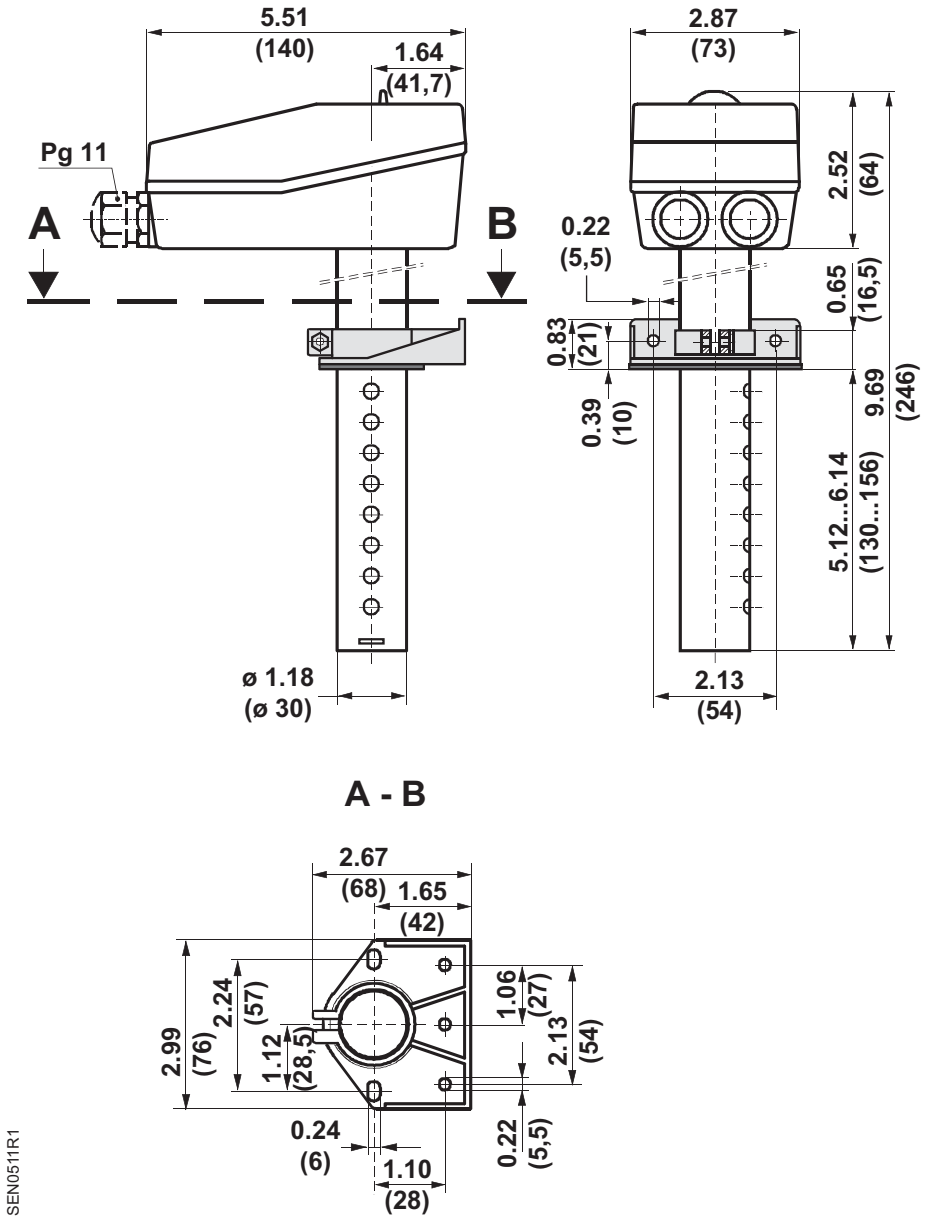


Figure 4. Dimensions in Inches (Millimeters).