

Control Sensor Installation Guide

Introduction

A control system is only as good as the sensor used to measure the controlled variable (temperature, humidity, pressure etc.) and transmit it as a measured value to the controller. It is crucial that the sensor should provide an accurate measurement of the controlled variable at the reference point in the control loop. However, it is often found in practice that too little attention has been paid both to the way in which the sensor is mounted and to its location. This generally results in a failure to meet the desired conditions satisfactorily, and this, in turn, can lead to customer complaints. This guide is written for the benefit of engineers and installers on site, it also provides the project engineer with useful information at the design stage.

Choosing the Right Sensor

Temperature Measurement in Pipes

Immersion sensors: In most cases the immersion sensor has the most advantages. The entire active length of the sensor must be fully immersed in the pipe.

Strap-on sensors: Used when installation conditions make the immersion sensor unsuitable.

For retrofit installation (renovations).

For heating systems in residential buildings.

Temperature Measurement in Ducts

Probe sensors: These produce spot measurements and should be used only in ducts where there is no stratification.

Averaging sensors: Recommended for all applications. The length of the rod or capillary tube must be suitable for the duct cross-section (approx. 4m per m²). Where necessary, use more than one sensor. Never install sensing elements in plastic housings downstream of heating coils. Alternatively, fit a radiant heat shield.

Room Temperature Measurement

Room sensors: In large spaces, it is advisable to use more than one sensor (for average value). With high internal loads and where extractors are used above lamps, sensors must not be sited in the exhaust airflow.

External Temperature Measurement

External sensors: Suitable for heating systems. For ventilation purposes the temperature must be measured directly after the weather shield in the outside air intake.

Installation Notes

General Points

Always comply with local installation and safety regulations.

Do not install sensors so that they protrude in any direction.

Ensure that they are protected against damage and vandalism and will not cause injury.

Be aware of the effects of orientation on the functioning of the sensor.

Always determine the following before installation:

- Min./max. ambient temperature
- Ambient humidity
- Vulnerability to spray water and/or vibration
- Explosion protection
- External influences

Take account of the active and inactive sections of a sensor probe.

A tight-sealing test hole must be provided adjacent to every sensor.

The cable should be installed with a 'drip loop' to prevent water entering the sensor housing.

Always allow a sufficient length of spare cable so that the sensor can be removed at any time without disconnecting the wiring.

When installing a sensor, avoid compressing the lagging.

Where sensors will be concealed (e.g. in false ceilings, shafts etc.) mark their locations visibly and record them in the site documentation.

Fix a labeling plate in the direct vicinity of the sensor. This must include a plain text description and the reference number that appears in the plant schematic. Do not attach the label to the device itself.

Immersion Sensors for Water

Ensure that the full active length of the sensor is immersed in the medium. Install sensors against the direction of flow.

Duct Sensors

Ensure that the full length of the sensor probe is exposed to the airflow.

A test hole must be provided adjacent to every sensor.

Do not use probe-type sensors in areas where stratification can occur, such as downstream of mixing dampers, heating coils, cooling coils or heat recovery equipment.

Room Sensors

Install sensors at a height of 1.5m in occupied spaces, and at least 50cm from the adjacent wall.

The sensor must not be exposed to direct solar radiation.

Always use a thermally insulated backing when fitting to solid walls (steel, concrete etc.).

Avoid External Walls

Avoid recesses and alcoves.

Do not install near lamps or above radiators.

Avoid chimney walls.

Do not install directly adjacent to doors or behind curtains.

Do not fit to walls concealing hot-water pipes.

Seal plastic and metal conduits, and cavity walls, to prevent draughts.

External Sensors

The facade (N,S,E,W) on which the sensor should be located is determined by the system design.

Do not expose to direct solar radiation.

Do not install on facades affected by significant rising heat (e.g. metal), or facades which will be heated by solar radiation.

Avoid chimney walls.

Do not install under eaves.

Do not install above windows.

Do not install above ventilation shafts.

Seal plastic sleeves and metal conduits to prevent draughts.

Do not paint the sensor.

Ensure accessibility (for inspection/verification).

Surfaces Mounted/Strap-on Sensors

The surface must be clean and smooth (remove paint). The sensor must be fixed firmly to the surface. Use heat compound.

Caution: Avoid exposure to external heat gains.

Pay attention to the cable length when fitting to windows which can be opened! The sensor must be fixed directly to the window surface.

The sensor must be fixed directly to the surface. Use heat conductive compound.