EMS-ITS/OTS (INDOOR or OUTDOOR SENSORS)

EMS-ITS/-OTS (INDOOR OR OUTDOOR SENSOR) INSTALLATION

Introduction

The EMS-ITS and EMS-OTS are indoor and outdoor sensors for optional use with the EMS-100 thermostat. The ITS senses air temperature at a remote location from the thermostat (since the thermostat's own sensor can not be moved). Up to six ITS units can be connected together to provide temperature averaging for one thermostat. The sensor can also be modified for use with a duct sensor, or to connect an existing RSK4 network to a new thermostat.

The OTS senses outdoor air temperature via an exterior wired probe. This temperature can be displayed on the thermostat.

Specifications

Power supply	12-30 VAC or DC (24 V Nominal)
Sensor box operating temp.	0-50 C
Sensor box max. Rel. Humid.	90% (non-condensing)
Max. cable length between any 2 units	90 m (300')
Max. number of ITS units	6
Max. number of OTS units	1
ITS measurement range	0-48 C; or 28-124 F
ITS Accuracy (30 mins. operation)	1 C from 15-30 C; or 2 F at 68 F
OTS guaranteed measurement range	–30-47 C; or –22-119 F
OTS probe operating range	–40-50 C; or –40-134 F
OTS max. display range	–48-47 C; or –55-119 F
OTS Accuracy (30 mins. operation)	2 C from –20-30 C; or 4 F from –4-86 F

General Installation

1. Install the EMS-100 Thermostat according to the instructions supplied with it. Check its operation (display shows correct temperature).
   CAUTION: *Power down the thermostat before wiring the sensors. To do this, remove the thermostat from its backplate. This avoids possible damage from live wires.*
2. Select a location where the probe will give accurate readings. Avoid sunlight, heat sources, etc..
   ITS: The ITS should be wired to the thermostat with non-shielded 3-conductor wire. The maximum distance is 90 m (300'). The ITS probe is within the sensor case, and is not mounted separately.
   OTS: The north side of the building, or under the eaves are often good locations. The OTS probe is mounted separately from the OTS sensor case. Mount the sensor case indoors in a controlled airspace in a location near where the probe is to be mounted outdoors. The probe is attached with a cable which may be routed directly through the wall or bent along a surface to enter at a more convenient place. The cable with the OTS probe is approx. 1.8 m (6') long. Splice on additional 2-conductor cable if necessary to increase the length. Mount the OTS probe using the screw and wall anchor provided, with its tip oriented outwards away from the wall.
3. Open the sensor case by pressing the button on its bottom edge. Remove the cover by pulling it out and up at the bottom.
4. Remove the board from the backplate by pulling back the latch that holds it at the centre bottom.
5. Use the backplate as a template to mark the mounting hole locations on the wall. Drill size for the wall anchors is ¼". Mount the backplate over the wires coming out of the wall using the two screws and anchors provided. The angled corner on the backplate should be at the bottom right.
6. Snap the board back into the backplate. Ensure the latch holds the board properly.
7. **OTS**: Strip ¼" of insulation from the two wires coming from the probe at the OTS sensor box. Connect the wires to terminals labelled 1 and 2. Polarity is not important on the probe.
   Install non-shielded 3-conductor wire from the thermostat to the OTS sensor box.
8. Strip ¼" of insulation from the three wires coming from the thermostat at the sensor. Connect these wires to the terminals labelled RS2, RS+V, and RS1. Push any extra wire back into the wall cavity. Seal the hole in the wall around the cable (drafts might affect the probe in the case of the ITS).
9. Note the wire colour going to each terminal. The order of the wires on the thermostat is not the same as on the sensor.
10. Connect the wires on the thermostat backplate to the terminals labelled RS2, RS1, and RS+V. Each must be wired to the terminal of the same name on the sensor.
11. Mount the thermostat on its backplate and verify that it is displaying the temperature (it may take a few minutes to stabilize).
12. **OTS**: Press the Outdoor button on the thermostat. The Outdoor temperature should be displayed with the tree and thermometer icon.
13. Re-install the cover on the sensor by hooking it on at the top and snapping the bottom into place.
14. If a remote ITS is to be connected to the thermostat in conjunction with an OTS, they are connected in series, the same way as multiple ITS units are connected for temperature averaging. It does not matter which order the OTS unit is connected with respect to the ITS unit(s). Refer to Connecting Multiple Sensors below for instructions.

Connecting Multiple Sensors (ITS and OTS) and Temperature Averaging (ITS only)

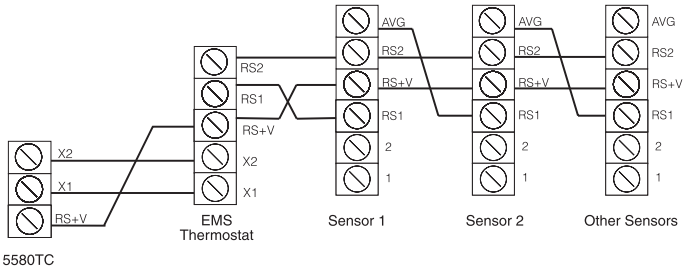
Only one OTS unit may be installed per thermostat. But multiple ITS units, up to six, may be installed for temperature averaging in a large area or in multiple rooms controlled by the same thermostat. Maximum distance between any two sensors is 90 m (300 ft.).

1. Wire the first sensor according to the instructions above.
   CAUTION: *Power down the thermostat before wiring the sensors. To do this, remove the thermostat from its backplate. This avoids possible damage from live wires.*

• W A R N I N G •

Please refer to the system Installation manual for information on limitations regarding product use and function and information on the limitations as to liability of the manufacturer.

2. Connect wires to each additional sensor as shown in the following diagram:



NOTE: *If an OTS is to be installed, it may be connected in any location in the chain.*

3. Replace the thermostat on its backplate. Check for proper operation of each sensor by connecting a jumper between terminals 1 and 2. This shorts out the thermistor. The displayed temperature will go up several degrees if the sensor is installed properly. Repeat for each sensor.

Using a Duct Sensor (ITS only)

The ITS and thermostat are designed to sense air temperature in a room. The fast moving air in a duct has small but rapid changes in temperature. This will affect the control algorithm of the thermostat. For better control in measuring air duct temperature, it is recommended that a specialized duct sensor be installed as follows:

1. Install the ITS to the thermostat according to the instructions in the General Installation section.
2. Clip the thermistor (bottom right corner of board) of this ITS using wire cutters.
3. Install the duct sensor in the return air duct according to the instructions supplied with it. Connect the two wires from the duct sensor to terminals 1 and 2 of the ITS. If shielded cable was required because of a long distance from the duct to the ITS, connect the shield wire to terminal 2 also.

Troubleshooting

Thermostat has no display: Check 24 VAC supply. Check for incorrect wiring between thermostat and sensor. Incorrect wiring can damage the thermostat, transformer or blow a fuse in the equipment.

Thermostat reads "AC": AC power is disconnected.

Not sure if display is showing local or remote temperature (ITS): Breathe on the wall near the bottom right corner of the thermostat. Temperature will go up for a few seconds if sensing locally.

Display shows two dashes when outdoor button is pressed (OTS): Duct sensor or probe not connected properly. Check wiring between thermostat and sensor. Check that sensor is not an ITS (an ITS has a thermistor sticking out from the bottom right corner of the board).

Thermostat displays very high temperature: Wires on probe are touching (shorted together). Separate them.

Thermostat displays very low temperature: Probe is not connected to sensor properly. Check probe wiring.

LIMITED WARRANTY

Digital Security Controls Ltd. warrants that for a period of twelve months from the date of purchase, the product shall be free of defects in material and workmanship under normal use and that in fulfilment of any breach of such warranty, Digital Security Controls Ltd. shall, at its option, repair or replace the defective equipment upon return of the equipment to its repair depot. This warranty applies only to defects in parts and workmanship and not to damage incurred in shipping or handling, or damage due to causes beyond control of Digital Security Controls Ltd. such as lightning, excessive voltage, mechanical shock, water damage, or damage arising out of abuse, alteration or improper application of the equipment.
The foregoing warranty shall apply only to the original buyer, and is and shall be in lieu of any and all other warranties, whether express or implied and of all other obligations or liabilities on the part of Digital Security Controls Ltd. This warranty contains the entire warranty. Digital Security Controls Ltd. neither assumes, nor authorizes any other person purporting to act on its behalf to modify or to change this warranty, nor to assume for it any other warranty or liability concerning this product.
In no event shall Digital Security Controls Ltd. be liable for any direct , indirect or consequential damages, loss of anticipated profits, loss of time or any other losses incurred by the buyer in connection with the purchase, installation or operation or failure of this product.
WARNING: DSC Ltd. recommends that the entire system be completely tested on a regular basis. However, despite frequent testing, and due to but not limited to, criminal tampering or electrical disruption, it is possible for this product to fail to perform as expected.

FCC COMPLIANCE STATEMENT

CAUTION: Changes or modifications not expressly approved by Digital Security Controls Ltd. could void your authority to use this equipment.

This equipment generates and uses radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for Class B device in accordance with the specifications in Subpart "B" of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in any residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to television or radio reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna
- Relocate the alarm control with respect to the receiver
- Move the alarm control away from the receiver
- Connect the alarm control into a different outlet so that alarm control and receiver are on different circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the FCC helpful: "How to Identify and Resolve Radio/Television Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock # 004-000-00345-4.