

Common Maker

Troubleshooting

Overview

This document contains testing procedures for the Common Maker to determine installation errors and equipment faults.

Common Terms

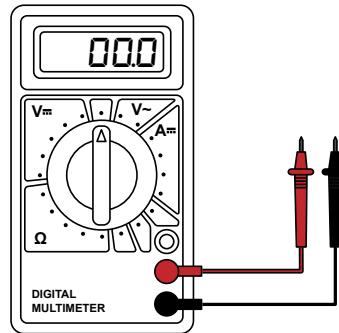
Equipment: Any furnace, boiler, zone controller, zone valves, etc, the thermostat is controlling.

Thermostat Cable: The cable in the wall that connects the thermostat to the equipment. Contains two or more wires.

Thermostat Subbase: The component attached to the wall that the thermostat fits onto. Contains the connections to the thermostat cable wires.

Open Circuit: A break in a wire that prevents electricity from flowing through it.

Short Circuit: An unintended connection between two or more wires in the thermostat cable, or between a wire and electrical ground.



Multimeter

Needed Tools

The testing procedures require a multimeter, also known as a multitester or Volt-Ohm Meter (VOM). Refer to the multimeter's instructions for operation.

Installation Testing

Follow the testing method that best describes your installation problem.

- A** **No Power at Thermostat** Page 2

The thermostat is not powering on
- B** **Equipment Will Not Start** Page 3

The thermostat has power but the equipment will not start

Equipment Testing

If the previous tests did not solve the issue, check that the equipment is working.

- C** **Common Maker Test** Page 4-5

Determine if the Common Maker is faulty
- D** **Thermostat Cable Test** Page 6

Determine if the thermostat cable is damaged

A No Power at Thermostat

Troubleshooting

Problem: The Common Maker and thermostat are installed but the thermostat is not receiving power.

1. Remove the thermostat from its subbase. Set the multimeter to 'Volts AC' (V~) and measure between the subbase 'R' (or 'Rc') and 'C' terminals. It should read between 23-28 volts.

If the multimeter reads 0 volts

- The power to the equipment should have been turned off during installation. Ensure it was turned back on.
- Check each wire nut for broken wires. Ensure the wire nut is tightened enough stay on when lightly pulled.
- Some equipment may have a control panel cabinet with a 'door safety switch' that disconnects power while the cabinet door is open. Ensure the door is closed while testing.
- Check the fuse at the equipment to see if it was blown during installation. If it did, check the Common Maker wiring for errors and replace the fuse.

If the thermostat has both 'Rh' and 'Rc' terminals

If the system has a single transformer

- Thermostats typically require power on 'Rc' to function. The 'Rc' and 'Rh' terminals should be jumpered together to provide power to both the thermostat and heating equipment.
- Smart thermostats may have an internal jumper that connects 'Rh' and 'Rc'. This is configured in the thermostat settings.

If the system has two transformers (one for heating, one for cooling)

- The Common Maker must be installed on the cooling equipment. See diagram 'G' in 'Additional Wiring Diagrams'.
 - If the thermostat has a jumper between 'Rh' and 'Rc', remove it.
 - Smart thermostats may have an internal jumper that connects 'Rh' and 'Rc'. This is configured in the thermostat settings.
- If the problem still persists, proceed to the 'Thermostat Cable Test' (page 4).

If the multimeter reads below 23 volts

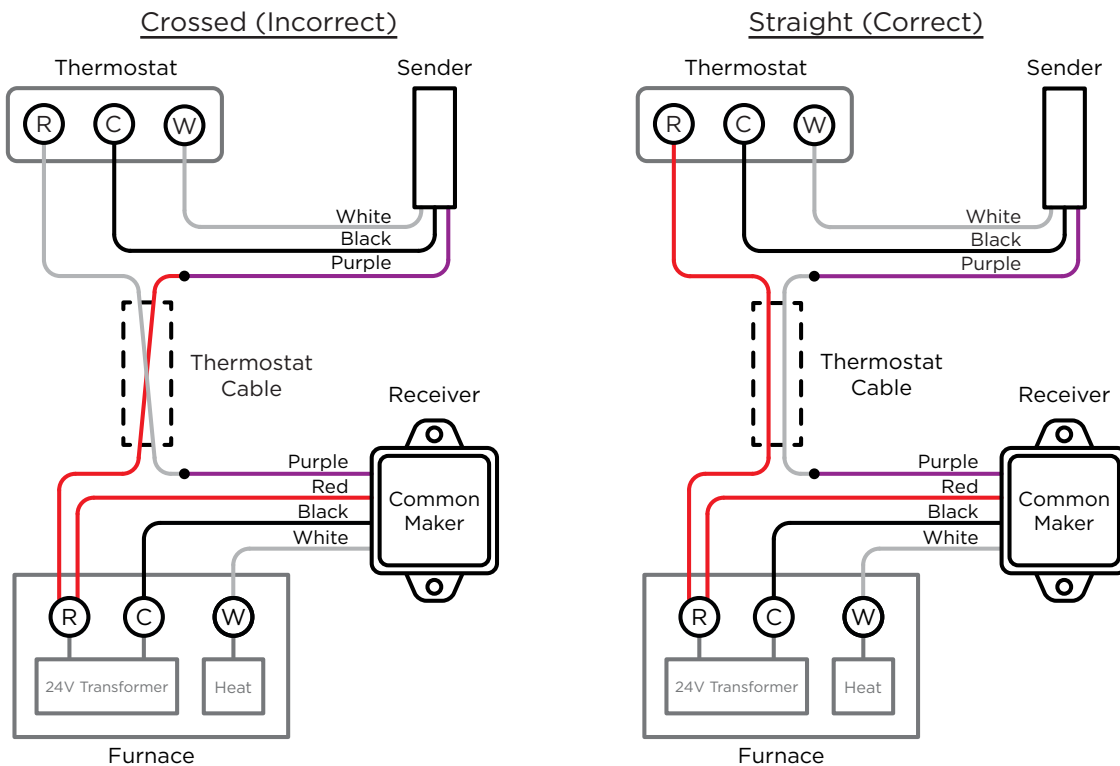
- Some equipment may not have a transformer large enough to power a Wi-Fi thermostat. If the voltage drops below 23 volts when the thermostat is connected and the equipment is on, a second transformer will have to be installed. See diagram 'C' on the instructions.

B Equipment Will Not Start

Troubleshooting

Problem: The Common Maker and thermostat are installed, the thermostat has power, but the equipment will not start.

1. Check that the thermostat cable wires were not crossed during installation. This may occur when both thermostat cable wires are the same color or when a spliced thermostat cables has different colored wires at the thermostat and equipment. Having crossed wires will not damage the Common Maker or equipment, but will prevent the equipment from running.



2. Some equipment requires an external transformer to be wired into the switching side of the Common Maker, as shown in diagram 'E' in the instructions. Check if this is the correct wiring by referencing the previous system wiring or the manufacturer's wiring diagram for the equipment. If this is not the correct wiring, it may cause damage to the equipment.
3. Connect the Sender's white wire directly to the thermostat 'R' (or 'Rc') terminal. This should activate the equipment. If the equipment activates from this test, the thermostat is not functioning properly.
4. Using a wire, jumper between the two terminals the Receiver's red and white wires are connected to. This should start the equipment. If the equipment does not start from this test, there may be a problem with the equipment or equipment wiring. If the equipment does start, proceed to 'Common Maker Test' (page 5).

D Common Maker Test (Equipment Transformer)

Troubleshooting

Problem: The Common Maker and thermostat are installed, the thermostat is receiving power, and the 'Equipment Will Not Start' section did not resolve the issue.

This test will determine if there is a fault in the Common Maker. It can be tested either at the equipment transformer (page 5) or a bench power supply (page 6).

Testing at Equipment Transformer

1. Disconnect the Sender, Receiver, and thermostat cable from the equipment.
2. Bring the Sender to the location of the equipment.
3. Set the multimeter to 'Resistance' (Ω) and connect it to the Receiver's red and white wires. It should read an 'open loop', typically displayed as 'OL' or '-1'.
4. Connect the Receiver's black wire to equipment 'C'. If there is not an equipment 'C' (or equivalent), connect it to one side of the external transformer powering the thermostat.
5. Connect the Sender's purple wire and the Receiver's purple wire together.
6. Connect the Sender's white wire to equipment 'R'. If there is not an equipment 'R' (or equivalent), connect it to the side of the external transformer that doesn't have the Receiver's black wire connected to it.
7. The relay in the Receiver should close, causing the multimeter to read between 0-1 Ω .

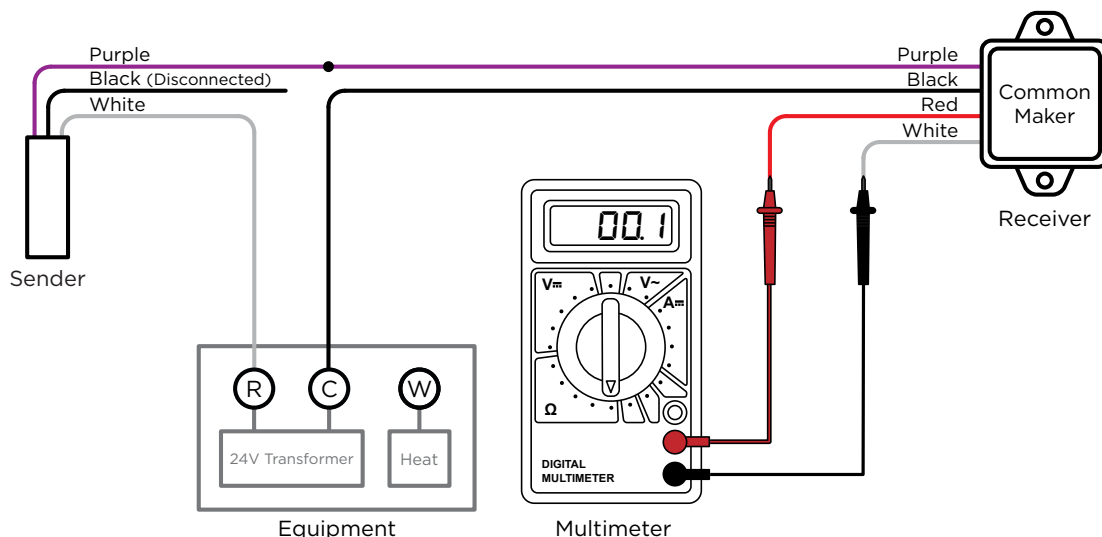
If the resistance is not less than 1 Ω

- The Common Maker is not working properly. It is covered by a lifetime warranty that can be redeemed from the store it was purchased from, or the manufacturer.

If the resistance is less than 1 Ω but it doesn't work when installed

- Check if the equipment requires an external power source (see diagram 'E' on the instructions). Some equipment may require a 24V transformer to be connected to it in order to operate.

Equipment Transformer



D Common Maker Test (Bench Power Supply)

Troubleshooting

Problem: The Common Maker and thermostat are installed, the thermostat is receiving power, and the 'Equipment Will Not Start' section did not resolve the issue.

This test will determine if there is a fault in the Common Maker. It can be tested either at the equipment (page 5) or a bench power supply (page 6).

Testing at Bench Power Supply

1. Set the multimeter to 'Resistance' (Ω) and connect it to the Receiver's red and white wires. It should read an 'open loop', typically displayed as 'OL' or '-1'.
2. Connect the Receiver's black wire to one side of the 24V AC power supply.
3. Connect the Receiver's purple wire to the Sender's purple wire.
4. Connect the Sender's white wire to the other side of the 24V AC power supply.
5. The relay in the Receiver should close, causing the multimeter to read between 0-1 Ω .

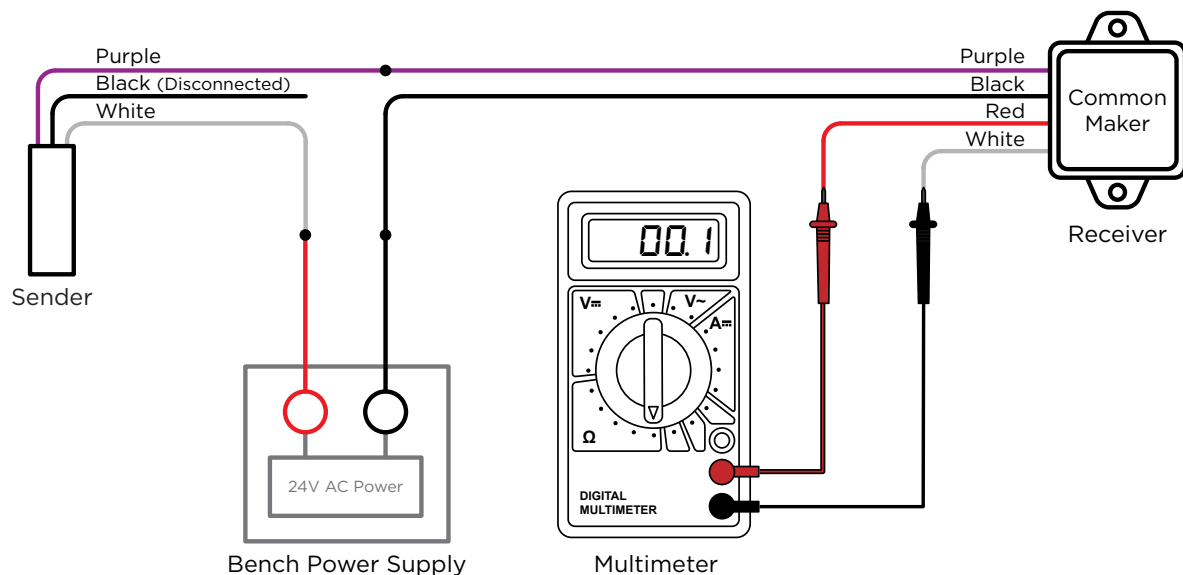
If the resistance is not less than 1 Ω

- The Common Maker is not working properly. It is covered by a lifetime warranty that can be redeemed from the store it was purchased from, or the manufacturer.

If the resistance is less than 1 Ω but it doesn't work when installed

- Check if the equipment requires an external power source (see diagram 'E' on the instructions). Some equipment may require a 24V transformer to be connected to it in order to operate.

Bench Power Supply



Troubleshooting

Problem: The Common Maker and thermostat are installed, the thermostat is not receiving power, and the 'No Power at Thermostat' section did not resolve the issue.

This test will determine if there is a fault in the thermostat cable.

Voltage Test

1. Disconnect the thermostat cable wires from the thermostat and equipment. Separate the wires so they are not making contact with anything. Set the multimeter to 'AC Volts' (V~) and check for voltage between the two wires in the thermostat cable. If the thermostat cable has more than two wires, check for voltage between each combination of two wires.

If a voltage is measured

- There is a device (relay, transformer, etc) connected between the thermostat and equipment. Locate the device and contact our technical support line to determine how the Common Maker should be installed.

Short Circuit Test

2. Disconnect the thermostat cable wires from the thermostat and equipment. Separate the wires so they are not making contact with anything. Set the multimeter to 'Resistance' (Ω). At the location of the equipment, measure between the two wires in the thermostat cable. If the thermostat cable has more than two wires, measure the resistance between each combination of two wires. Then measure between each wire and electrical ground. The resistance should read 'open circuit', normally displayed as 'OL' or '-1' for each test.

If the resistance is not 'OL' or '-1'

- There is a short between at least two wires in the thermostat cable, or between at least one wire and ground that will prevent it from working. If there are not at least two functional wires, a new cable will have to be installed.

Open Circuit Test

3. Disconnect the thermostat cable wires from the thermostat and equipment. At the thermostat, tie the thermostat cable wires together. Set the multimeter to 'Resistance' (Ω). At the location of the equipment, measure between the two wires in the thermostat cable. If the thermostat cable has more than two wires, measure the resistance between each combination of two wires. The resistance should typically read between 0.5 to 5 Ω for each test.

If the resistance is not between 0.5 to 5 Ω

- There is a break in at least one of the wires that will prevent it from working. If there are not at least two functional wires, a new cable will have to be installed.