WHAT IS CLAIMED IS:

1. A temperature sensor, comprising:

a main body being of a pipe shape and having a first end at which a temperature measuring part is installed and a second end at which a connection part is installed;

a first positioner attached to a side of the first end in an axial direction of the main body;

a second positioner attached to a side of the second end in the axial direction of the main body; and

a mount configured to be capable of being connected to a portion of the main body that is located between a portion of the main body to which the first positioner is attached and a portion of the main body to which the second positioner is attached,

wherein the main body is movable with the portion of the main body connected to the mount as a fulcrum, within a range determined by the mount, the first positioner, and the second positioner.

2. The temperature sensor of Claim 1, wherein the mount includes an opening and the main body is configured to be inserted into the opening.

3. The temperature sensor of Claim 2, wherein a length between an end portion of the first positioner at a side of the mount and an end portion of the second positioner at a side of the mount is larger than a length of the opening in an axial direction of the main body.

4. The temperature sensor of Claim 2, wherein a diameter of each portion, at which the first positioner is attached to the main body and the second positioner is attached to the main body, is larger than a diameter of the opening provided in the mount.

5. The temperature sensor of Claim 1, further comprising a first heat insulator installed to

cover the first positioner,

wherein the first positioner and the first heat insulator are in close contact with the mount.

6. The temperature sensor of Claim 5, further comprising a second heat insulator installed to be in close contact with the first heat insulator and to cover the main body.

7. The temperature sensor of Claim 1, wherein the main body, the first positioner, and the second positioner are configured not to be fixed to the mount.

8. The temperature sensor of Claim 5, wherein the main body, the first positioner, and the mount are configured not to be fixed to the first heat insulator.

9. The temperature sensor of Claim 5, wherein the main body and the first positioner are configured not to be fixed to the first heat insulator.

10. The temperature sensor of Claim 1, wherein the connection part includes a cover containing at least a tail end portion of the main body therein and a connector, and

wherein a wire protruding from the tail end portion is configured to be covered with an insulator.

11. The temperature sensor of Claim 10, wherein a wiring of the wire from the tail end portion to the connector is configured to include a bend.

12. The temperature sensor of Claim 10, wherein the wire from the tail end portion to the connector is configured to be wired in a spiral shape.

13. The temperature sensor of Claim 1, wherein a wire constituting the temperature measuring part is configured to communicate with an interior of the main body.

14. A heater unit comprising:

a temperature sensor that includes:

a main body being of a pipe shape and having a first end at which a temperature measuring part is installed and a second end at which a connection part is installed;

a first positioner attached to a side of the first end in an axial direction of the main body with;

a second positioner attached to a side of the second end in the axial direction of the main body; and

a mount configured to be capable of being connected to a portion of the main body that is located between a portion of the main body to which the first positioner is attached and a portion of the main body to which the second positioner is attached, and

wherein the main body is movable with the portion of the main body connected to the mount as a fulcrum, within a range determined by the mount, the first positioner, and the second positioner.

15. A substrate processing apparatus comprising:

a heater unit including a temperature sensor,

wherein the temperature sensor includes:

a main body being of a pipe shape and having a first end at which a temperature measuring part is installed and a second end at which a connection part is installed;

a first positioner attached to a side of the first end in an axial direction of the main body;

a second positioner attached to a side of the second end in the axial direction of the main body; and

a mount configured to be capable of being connected to a portion of the main body that is located between a portion of the main body to which the first positioner is attached and a portion of the main body to which the second positioner is attached, and

wherein the main body is movable with the portion of the main body connected to the mount as a fulcrum, within a range determined by the mount, the first positioner, and the second positioner.

16. A method of manufacturing a semiconductor device, comprising:

heating a substrate by a heater unit including a temperature sensor,

wherein the temperature sensor includes:

a main body being of a pipe shape and having a first end at which a temperature measuring part is installed and a second end at which a connection part is installed;

a first positioner attached to a side of the first end in an axial direction of the main body;

a second positioner attached to a side of the second end in the axial direction of the main body; and

a mount configured to be capable of being connected to a portion of the main body that is located between a portion of the main body to which the first positioner is attached and a portion of the main body to which the second positioner is attached, and

wherein the main body is movable with the portion of the main body connected to the mount as a fulcrum, within a range determined by the mount, the first positioner, and the second positioner.

17. A program stored in a computer-readable recording medium that causes, by a computer, a temperature sensor to perform a process comprising:

heating a substrate by a heater unit including the temperature sensor,

wherein the temperature sensor includes:

a main body being of a pipe shape and having a first end at which a temperature measuring part is installed and a second end at which a connection part is installed;

a first positioner attached to a side of the first end in an axial direction of the main body;

a second positioner attached to a side of the second end in the axial direction of the main body; and

a mount configured to be capable of being connected to a portion of the main body that is located between a portion of the main body to which the first positioner is attached and a portion of the main body to which the second positioner is attached, and

wherein the main body is movable with the portion of the main body connected to the mount as a fulcrum, within a range determined by the mount, the first positioner, and the second positioner.