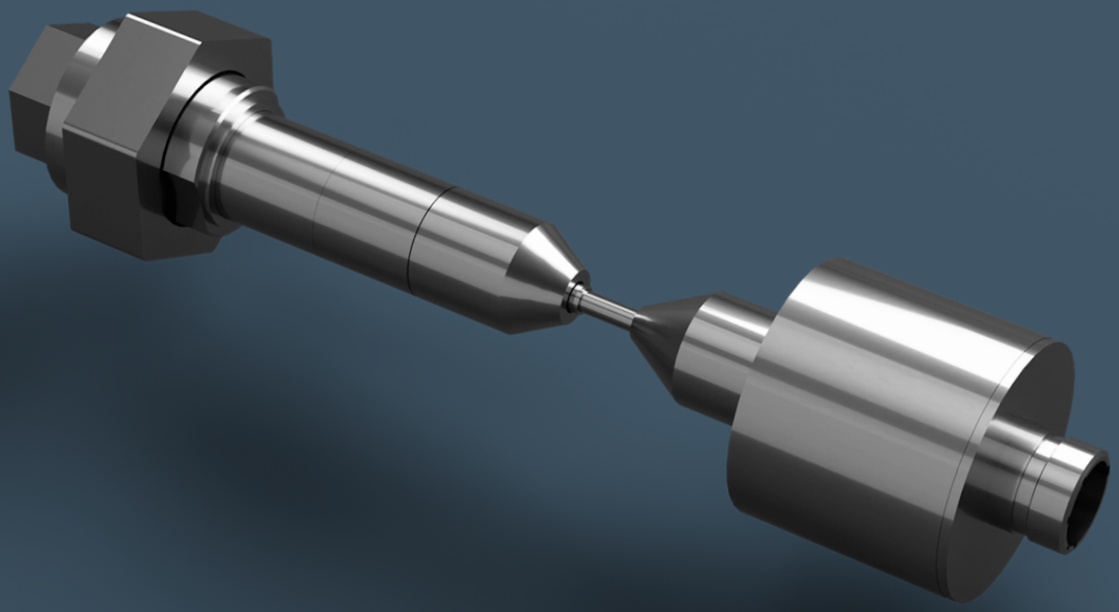
Reuter-Stokes

Upgrading from Geiger-Muller sensors to the Reuter-Stokes Flame Tracker Dry 325 (FTD 325)



Introduction

This document describes the steps to upgrade from Geiger-Muller type flame sensors to Reuter-Stokes (RS) Flame Tracker Dry 325 (FTD 325) sensors.

The operator should completely read the FTD 325 Operation and Maintenance (O&M) manual before performing an upgrade. **This document should be treated as supplementary to the O&M manual, not as a replacement.**

Scan the QR code that corresponds to your FTD 325 part number to view its O&M manual:

FS-9009 SERIES

FS-9010 SERIES

The sensors, interconnect cables, and installation hardware mentioned in this document are all available from Reuter-Stokes. There are kits that aggregate the parts in appropriate quantities and are tailored to different gas turbines. Contact your sales representative for details.

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CAUTION:

Before performing any work on the flame sensors, ensure that the sensor temperatures and other equipment are cool enough to safely perform work.

Ensure that the turbine compartment is safe to work in and all energy sources are eliminated using proper lockout/tagout (LOTO) procedures.

1 Remove Geiger-Muller sensors from the sight tubes.

2 Inspect the sight tubes for restriction orifices.

Some sight tubes have small plates with holes inside the barrel of the sight tube that restrict the amount of light that reaches the flame sensors. If restriction orifices are present, they must be drilled out or the sight tubes must be replaced.

3 Remove all conduit from the space over the gas turbine.

Often, the conduit will be connected to a junction box inside the turbine compartment. In that case, the junction box should be left in place as well as any conduit from the junction box to the control system.

4 If water cooling lines are present...

Remove them from the space over the gas turbine, then cap the lines at the main water supply pipes or other convenient point.

IMPORTANT: When handling the FTD 325 mineral insulated (MI) cables, do not bend the cable past the six inch minimum bend radius.

Avoid kinks because they will damage the sensor.

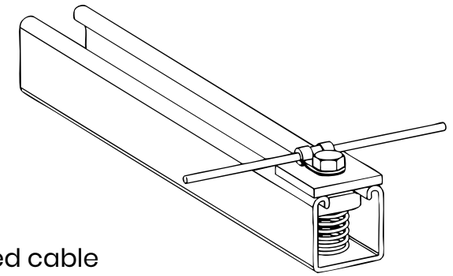
Avoid sharp bends where the mineral insulated cables are connected to the hot ends and the cool ends.

5 Temporarily attach the hot end to the sight tube.

The hot end connects to the sight tube with a pipe union fitting. Connect the pipe union to the sight tube with hand tight torque only. Proper assembly will be done after functional testing.

6 Mount the MI cable to strut channel.

Use Reuter-Stokes installation hardware, including 1/8" cushioned loop clamps. The loop clamps include a silicone cushion that has a high temperature rating. See the O&M manual for details.



IMPORTANT: The cable must be secured **at least every three feet.**

At the cool end, the extra mineral insulated cable should be looped and mounted to a nearby strut channel using any convenient means.

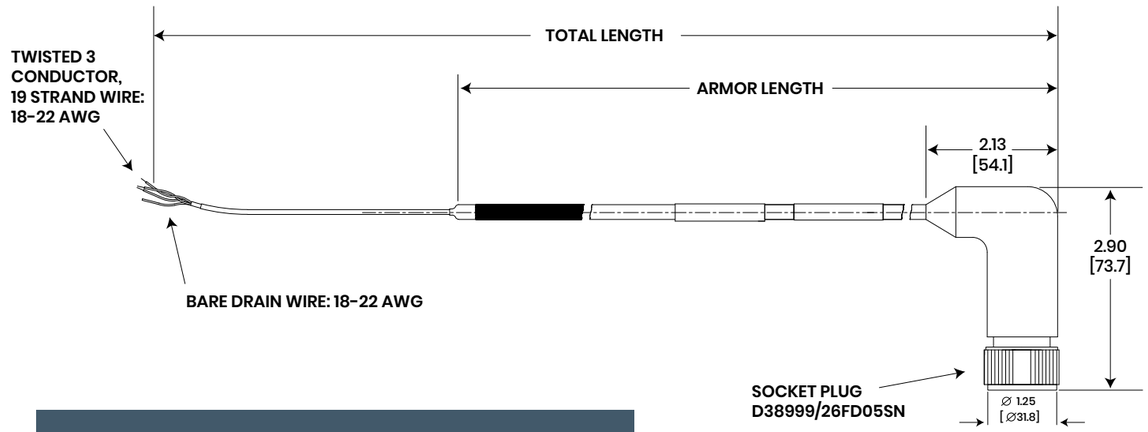
7 Mount the cool end where the ambient temperature does not exceed 140°C.

In most cases, this is below the turbine on F-Class gas turbines or under the foot grating on E-Class gas turbines.

Mount the cool end on a 1-5/8" strut channel using a 2-1/2" pipe clamp.

8 Attach interconnect cable to the MIL SPEC connector on the cool end.

Interconnect cables, RS part number RS-E2-0285PXXX, carry the 4-20 mA signal from the cool end to the control system. A right angle version of the cable is shown below. Dimensions are for reference only.



Turn the coupling nut on the connector until the blue line on the cable connector completely covers the red line on the housing connector - this indicates that the connector is fully engaged.

9 Route the conduit and the interconnect cable to the junction box.

The interconnect cable has a short, armored section on the connector end that provides electric shielding. The rest of the interconnect cable is not armored and must be routed through grounded conduit for electrical shielding. Ensure that only the armored cable section protrudes from the conduit. Route the conduit and the interconnect cable to the junction box. See the O&M manual for wiring details.

10 The strut channel used for mounting the cool ends must also be grounded.

11 Ensure that any existing cable meets or exceeds cable specifications.

In most cases, there will be a junction box in the turbine compartment and cable connecting the junction box to the control system. The cable should be 18 gauge, twisted, shielded pair. Ensure that any existing cable meets or exceeds this cable specification. Reuter-Stokes offers a spool of unterminated cable for this purpose, part number CB-37. The non-connector end of the interconnect cable will be attached to terminals in the junction box. See the O&M manual for wiring details.

12 Ensure that the power supply voltage is set correctly.

FTD 325 sensors are powered by 12-30 VDC, nominal 24 VDC. Geiger-Muller type sensors are powered by 300-350 VDC.

Ensure that the power supply voltage is set correctly before applying power to the FTD 325 sensors. Applying voltages >30 VDC can damage the FTD 325 sensors. See the FTD 325 O&M manual for details on power supply specifications.

13 If the control system is a GE Vernova Mark V...

It will only accept frequency signals for flame supervision. The output of the FTD 325 sensors is 4-20 mA. Reuter-Stokes offers a Flame Sensor Module (FSM), part number RS-FSM-1002-002, that converts 4-20 mA signals to frequency. The FSM is compatible with the Mark V. See the FSM manual for details. The FSM is a four-channel device and it must be installed in a safe area (non-hazardous) that is climate controlled, such as a PEECC. The FSMs are often installed adjacent to or inside the Mark V cabinets.

14 When using any GE Vernova control system...

Review all relevant GE Vernova bulletins and ensure that the threshold values in the control system are compliant.

15 Perform functional tests on all FTD 325 sensors.

Disconnect hot ends from sight tubes. At this point, they should be hand tight. Use an ultraviolet (UV) light source, such as the Reuter-Stokes UV penlight (part number FS-9000-LP), to perform a functional test on all the FTD 325 sensors. Read the outputs from the control system.

A purpose-built UV penlight is superior to open flames or flashlights for functional testing. Open flames have inherent safety risks. Flashlights can have different technologies, LED or incandescent, and have an unknown amount of UV light at unknown wavelengths.

16 Assemble hot ends onto sight tubes.

Once the functionality of all sensors has been verified, assemble the hot ends onto the sight tubes. The flame sensor is installed to the sight tube using a pipe union.

See the O&M manual for details on hot end assembly. It is key to ensure that the correct amount of torque is applied to properly attach the hot end.

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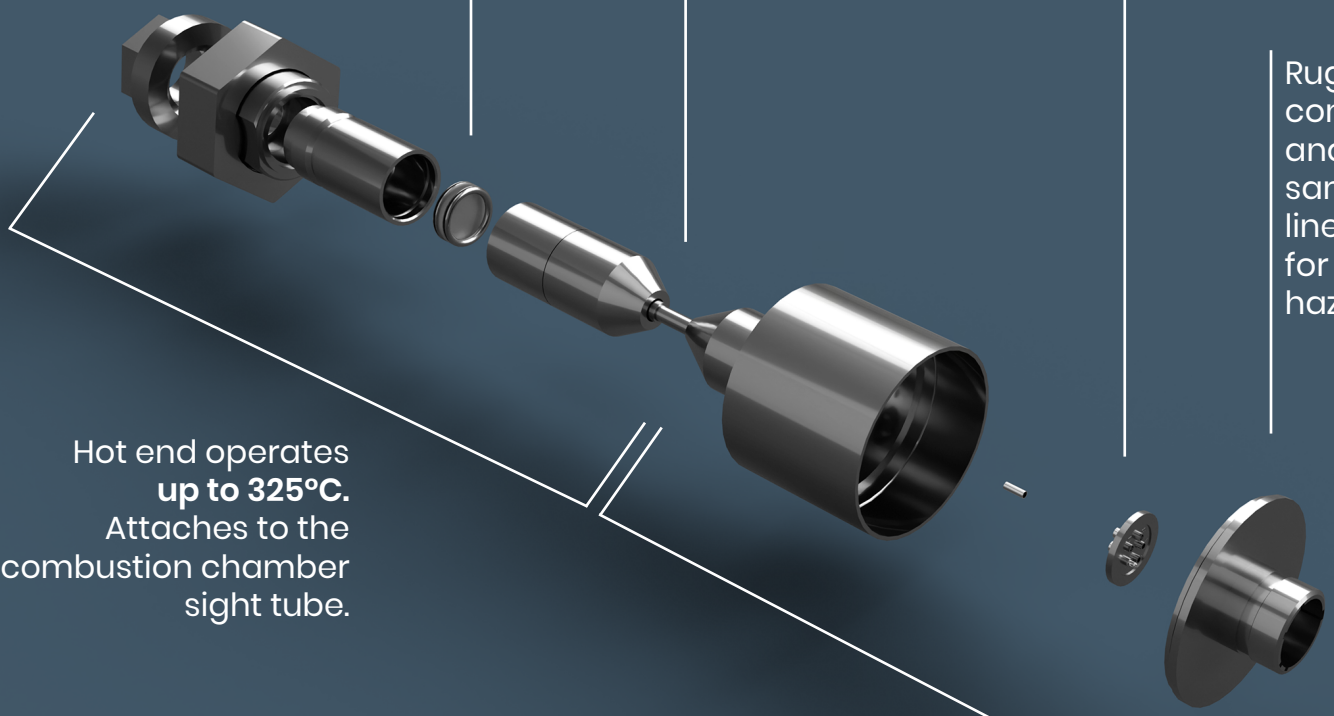
Window is transparent to **UV light** and seals up to **400 psi.**

Mineral insulated cable is **30 feet** long. Stainless steel outer sheath for harsh environment operation.

Electronics **amplify signal** from hot end and output proportional signal.

Rugged **MIL SPEC** connector. Signal and power on the same **4-20 mA** lines. Lower power for use in hazardous areas.



Hot end operates **up to 325°C.** Attaches to the combustion chamber sight tube.

Cool end operates **up to 140°C.** Located away from combustion chamber.

High reliability. Ruggedized construction. Rigorous validation.

Designed to replace existing sensors such as Geiger-Muller type sensors, the Flame Tracker Dry 325 is applicable to a variety of gas turbine models. **In addition, it is ETL, ATEX, and IECEx certified.**

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