FIRE DETECTION SYSTEM

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Overview

The Fire Detection System warns the flight crew of fire or overheat conditions in the engine core department.

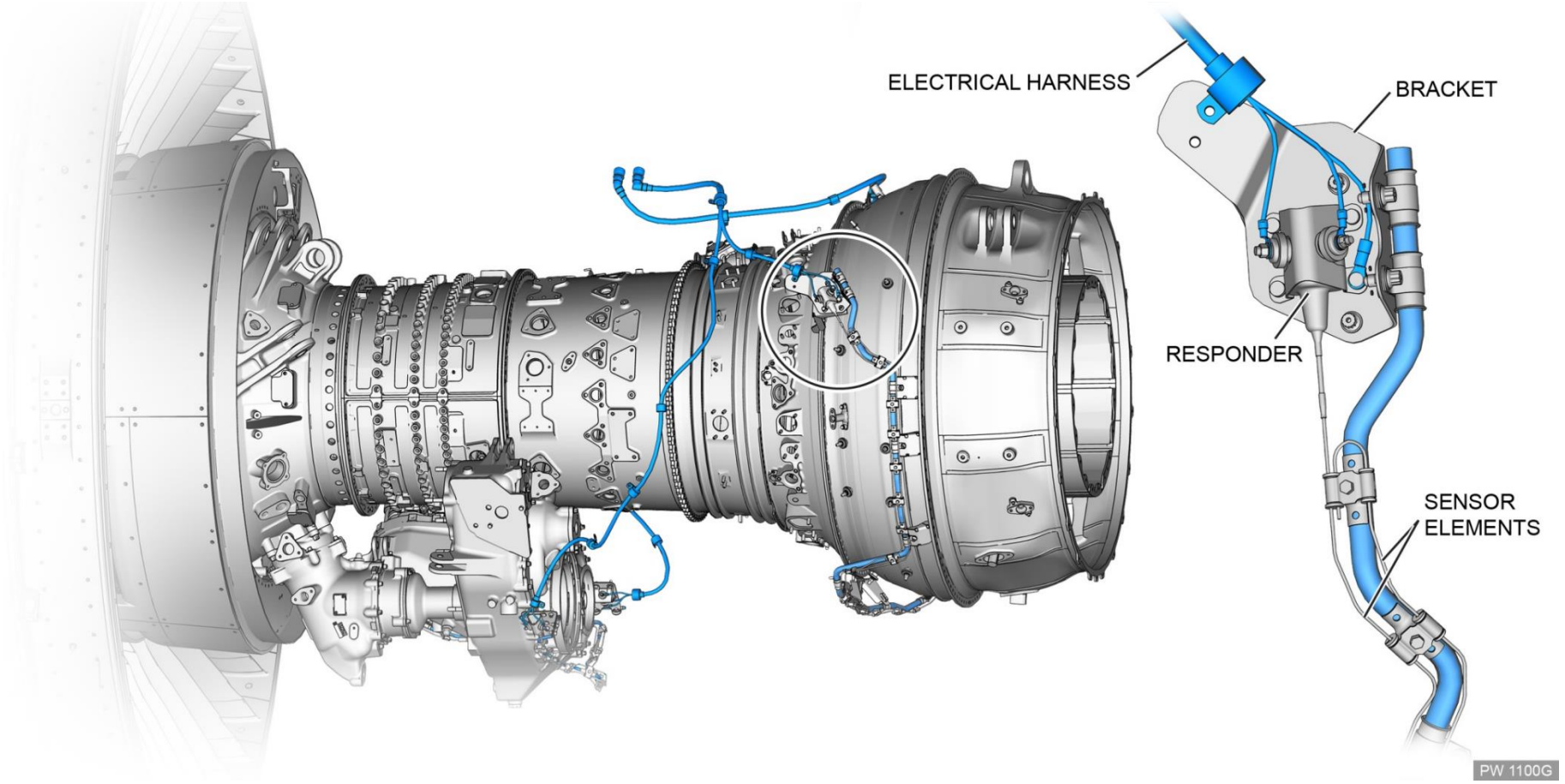
System components are located on the left and right side of the engine core along the Main Gearbox and Low Pressure Turbine.

The fire/overheat detector assembly is attached directly to the engine. Each of the assemblies consists of a stainless-steel support tube, a bracket, and four fire/overheat detectors.

The detector responder cases are secured with attaching hardware to the support tube and the bracket.

Detector sensor elements are secured to the support tube by clamps and Teflon® liners. The clamps are welded to the support tube and provide for rigid positioning of the sensor elements.

The support tube establishes the position of the sensor element and provides the attachment point to the engine.


ELECTRICAL HARNESS
BRACKET
RESPONDER
SENSOR ELEMENTS
PW 1100G

System Switches

The detector assembly has an alarm switch that reacts to temperature and pressure, and an integrity switch that responds to pressure.

Alarm Switch

The detector operates on the principle that pressure increases with a rise in temperature.

If ambient temperature around the sensor element increases, or a short section of the sensor element is exposed to intense heat, internal pressure in the sensor element and the responder housing will increase in proportion.

The detector issues an alarm signal to the flight deck if either of these temperature/pressure conditions is present:

overheat: a general, ambient area temperature increase above set limits in the sensor element environment, measured by expanded internal helium gas

fire: a high intensity flame occurring at a short section of the sensor element.

A fire condition causes the fast release of a large amount of gas from the special core material.

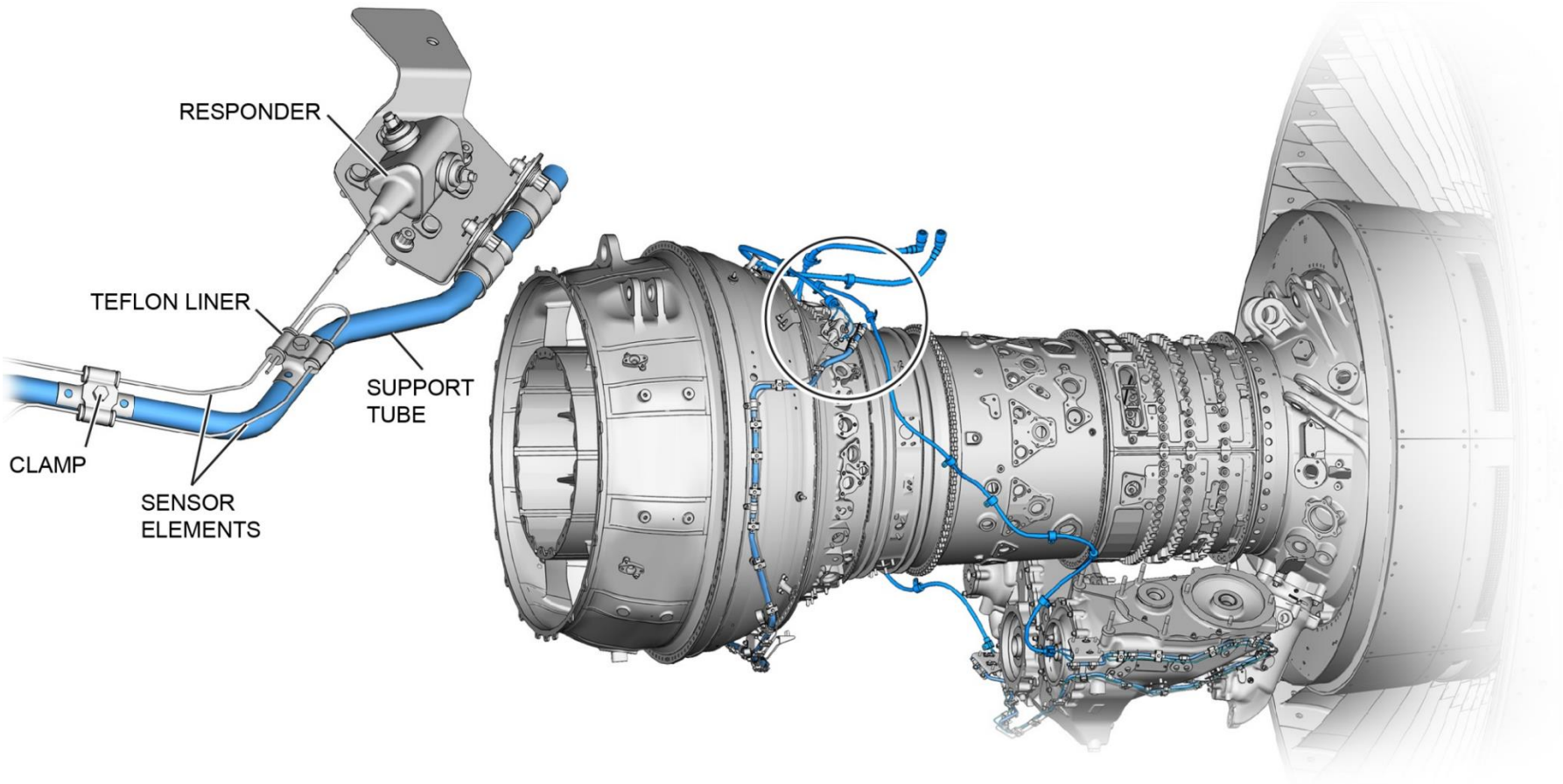
This gas release very quickly increases the internal pressure.

When the pressure increases to a set value, the pressure-sensitive alarm switch inside the responder closes.

This completes an electrical circuit path through the interface connector to the external aircraft alarm system.

After an alarm signal, the detector goes back to normal operation.

If the temperature decreases, the internal gas pressure will also decrease and the alarm switch will open.

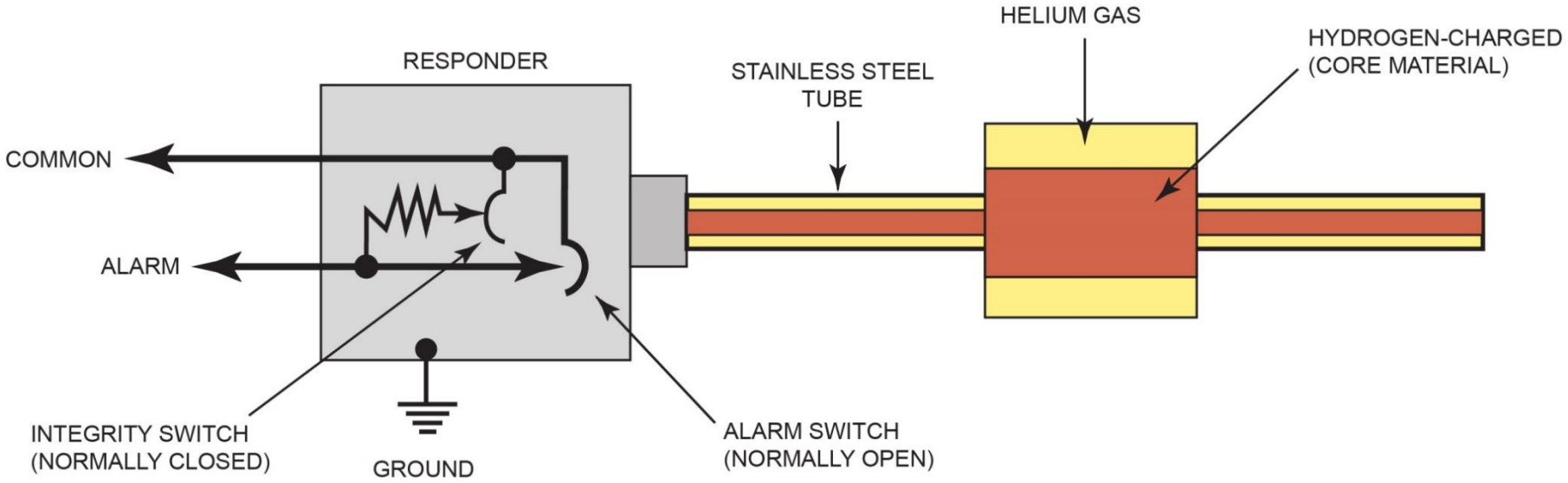

RESPONDER
TEFLON LINER
SUPPORT TUBE
CLAMP
SENSOR ELEMENTS

System Switches (Cont.)

Integrity Switch

A second, pressure-sensitive integrity switch in the responder housing is kept closed by normal gas pressure in the sensor element.

Leakage of the gas, and the subsequent pressure decrease, will cause the integrity switch to open, signalling a fault malfunction to the flight deck.


HELIUM GAS
HYDROGEN-CHARGED
(CORE MATERIAL)
RESPONDER
STAINLESS STEEL
TUBE
COMMON
ALARM
INTEGRITY SWITCH
(NORMALLY CLOSED)
GROUND
ALARM SWITCH
(NORMALLY OPEN)

INTENTIONALLY BLANK