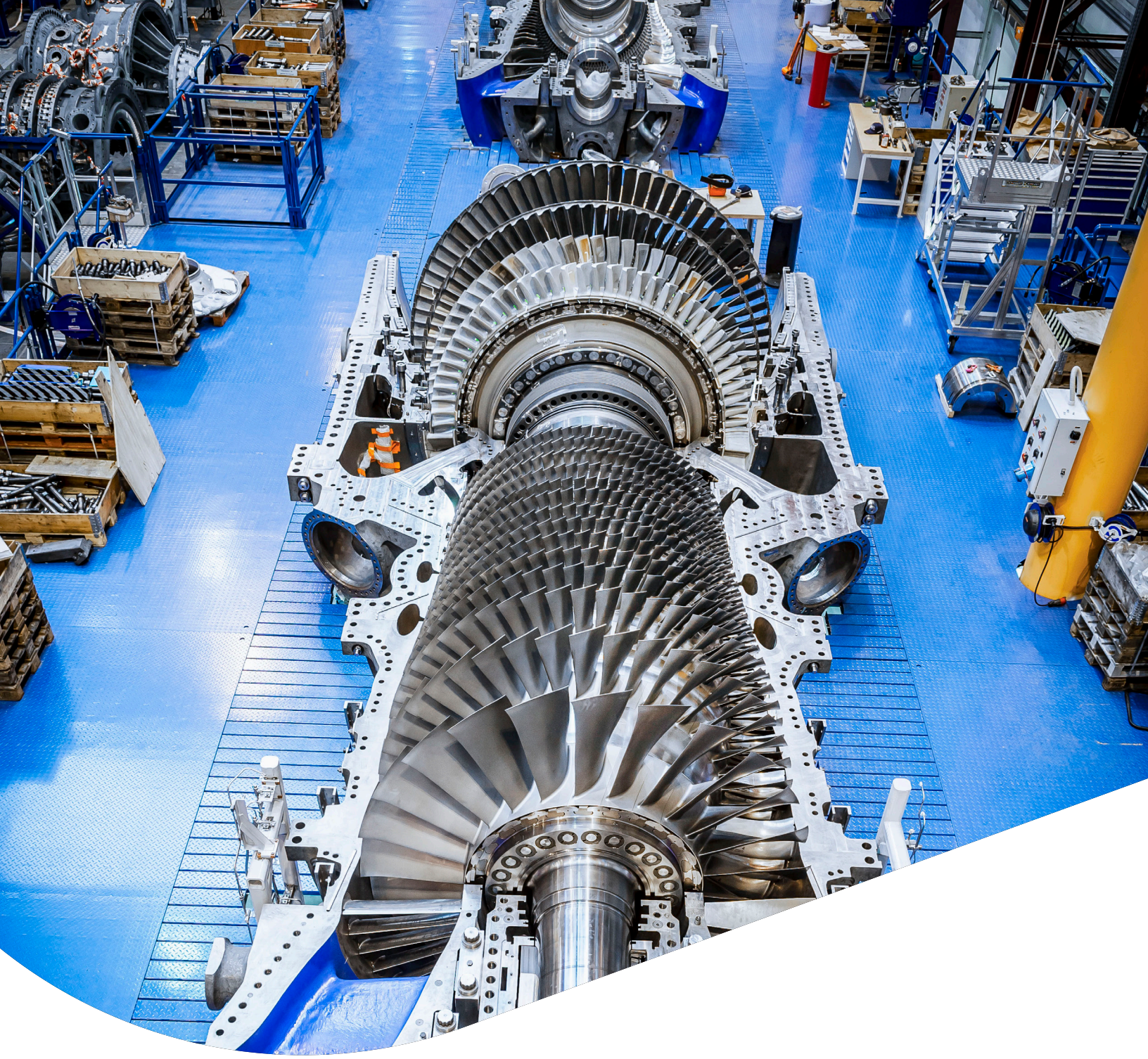


Flame Tracker* Dry 325

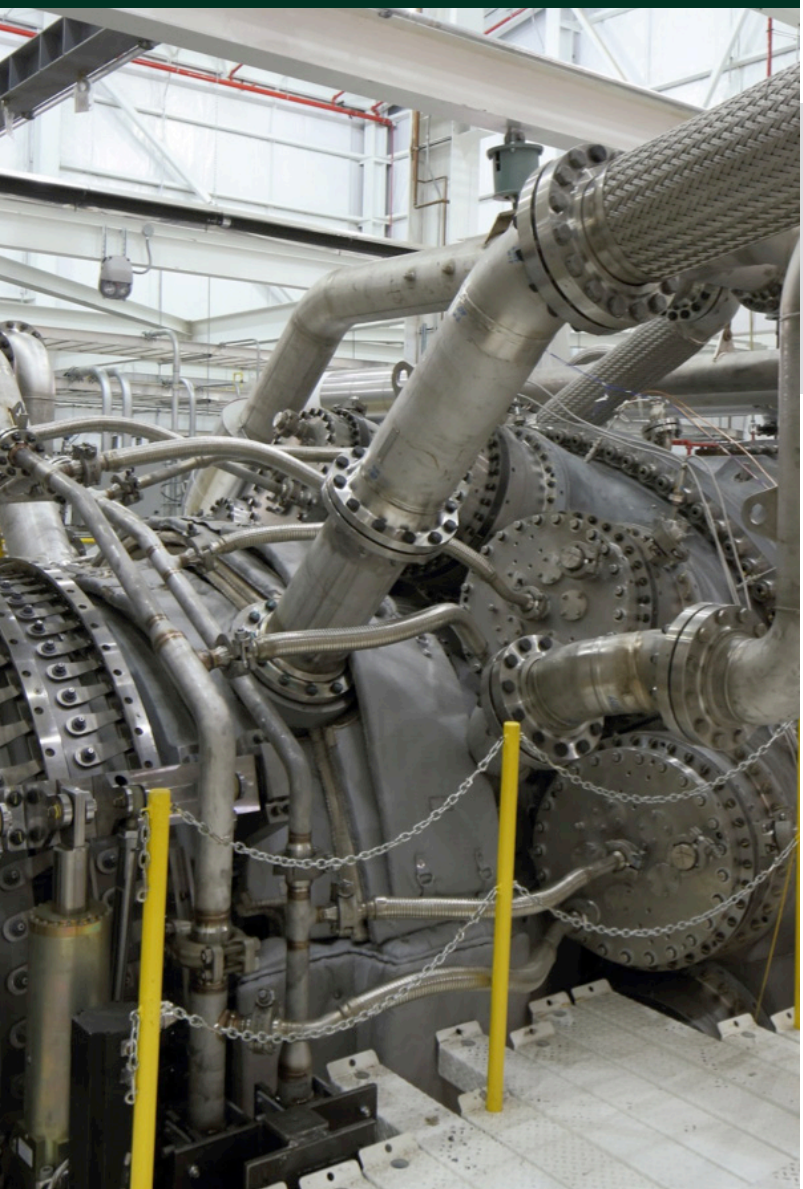
Reducing risks and costs for gas turbine operators

Reuter-Stokes
a Baker Hughes business

From power generation to LNG processing, gas turbines serve as a primary energy source across several industries.

Heavy duty turbines require periodic maintenance for optimal performance and safety, which means selecting the appropriate parts to service the turbine is just as crucial for plant engineers and facility managers as purchasing the turbine. Selecting the right parts and implementing a regular maintenance schedule protect both the investment in the turbine and contribute to reducing unplanned outages, saving facilities time and money. Chief among innovative solutions to achieve this objective is the development of the Flame Tracker Dry 325, which eliminates the risks associated with water cooling systems.

Flame Tracker Dry 325 eliminates the need for water cooling



The challenge:
Cooling flame sensors

One of the most important functions of a control system is the ability to quickly stop the fuel supply if flameout is detected in the turbine. Flame sensors are used to detect flameouts and must have fast response times to reduce the potential impact caused by a flameout.

The traditional flame sensor water cooling system comes with the risk and history of causing water leaks, which can lead to major damage within the turbine. Leaks can result in extensive down time for repair and turbine inspection. Furthermore, ongoing maintenance to prevent clogged water lines can be burdensome and time consuming.

Eliminating water leaks and improving turbine availability is a top priority for our customers. Since 2002, we have recorded 25 high impact events due to water leakages. When water leaks, it lands on the turbine housing over the compressor. Cool water hitting the hot surface will shrink the housing, sometimes causing the compressor rotor blades to hit the housing and break off. Additionally, anti-freeze leaks can lead to fires when the liquid leaks onto the hot casing surfaces. These accidents can be extremely costly, not only to repair damages, but also as a result of downtime and lost production.

Impact of a water leak:

- Shrunken housing due to cool water hitting the hot surface
- Broken rotor blades
- Fires
- Downtime/lost production

Even instances with no damage or fire result in downtime for leak repair and turbine inspection. Plants are paid when they are generating power and when they are available to generate power, which means extended downtime and potential lead time for replacement parts and repair (stator casings and rotor components) can result in significant loss of revenue. And, even when there are no issues with the water lines, there are costs associated with the removal and reinstallation of the line during regular maintenance.

The solution:
Flame Tracker Dry 325

Power plant maintenance managers and instrumentation and control engineers needed increased system reliability, improved outage times, and reduced maintenance costs. The Flame Tracker Dry 325 eliminates the risk of water leaks, reduces water maintenance, and shortens outages, while maintaining safety with rapid response times.

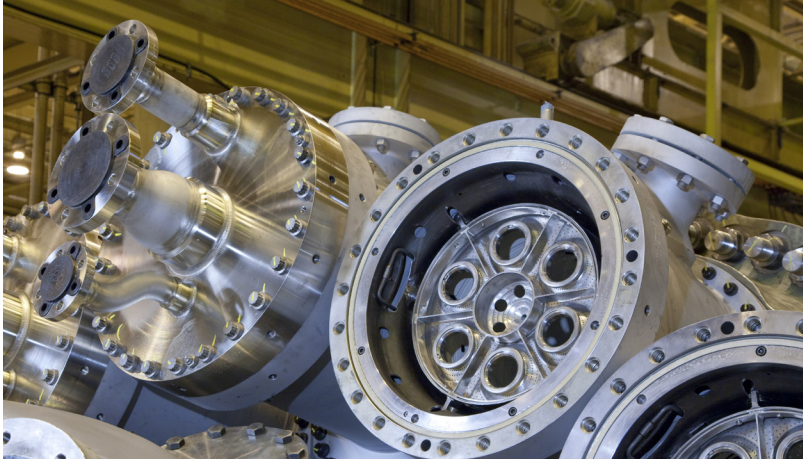
The Flame Tracker Dry 325 senses the ultraviolet (UV) light produced by a flame and signals whether a flame condition exists. This rugged design reduces maintenance by moving sensitive electronics away from the heat, thereby eliminating the need for water cooling. The Silicon Carbide (SiC) photodiode is designed for use with multiple fuels, low NOx combustors, and steam injection. The Flame Tracker Dry 325 is applicable to a variety of heavy duty gas turbine models.

Flame Tracker Dry 325 **sensors eliminate the need for cooling water lines or electrical conduits** on new turbines and upgrades. This simplifies outages, resulting in reduced labor costs and shorter overall outage time. The elimination of cooling water lines and electrical conduits over the turbine **shortens the outage by up to 12 hours and saves approximately 50 man-hours in labor** to complete an outage (estimates based on 7FA turbine). Reduced water maintenance requirements mean no more cooked sensors from water lines clogged with silt, scale, corrosion products, ice, or biologicals.

The Flame Tracker Dry is gaining wide acceptance in the field with over 1,600 sensors sold. There is minimal upfront cost to install and bring online, which leads to overall reduced operational expenses, thanks in part to the role it plays in reducing unplanned downtime.



Flame Tracker Dry 325: No water cooling required



The hot end assembly for the Flame Tracker Dry 325 is installed on the sight tubes of the combustion chambers and **operates up to 325°C**, which makes it applicable to a variety of heavy duty gas turbine models. The cool end operates up to 150°C[1] and is located in a lower temperature area inside the turbine compartment. Competitor solutions cannot tolerate this level of heat, resulting in additional penetration of the turbine compartment. Additionally, the Flame Tracker Dry 325 is **backward compatible with the standard flame sensor and is built on proven SiC technology.**

FTD 325 sensors are a key safety feature for heavy duty gas turbines, enabling a response time specification of less than 175 milliseconds, while competitors record a response time as high as 1.5 seconds.
The difference in response time is essential for safety and ensuring that fuel is stopped in the event of a Flame Off condition, avoiding a potential accident.

[1] Thermal shutdown of sensor circuitry occurs at 150±10°C

Flame Tracker Dry 325 benefits:

- Eliminate the need for water lines or electrical conduit
- Shortens outage by up to 12 hours
- Backward compatible with the standard flame sensor
- Response time of less than 175 milliseconds
- Operates up to 325°C
- Built on proven SiC technology

Conclusion

The risks associated with improper maintenance of the cooling water lines can be extremely detrimental to power generation facilities. The Flame Tracker Dry 325 not only removes the need for water cooling, but also eliminates water leakage risk and significantly reduces outage time. At the same time it maintains the safety of the gas turbines through fast response times.

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