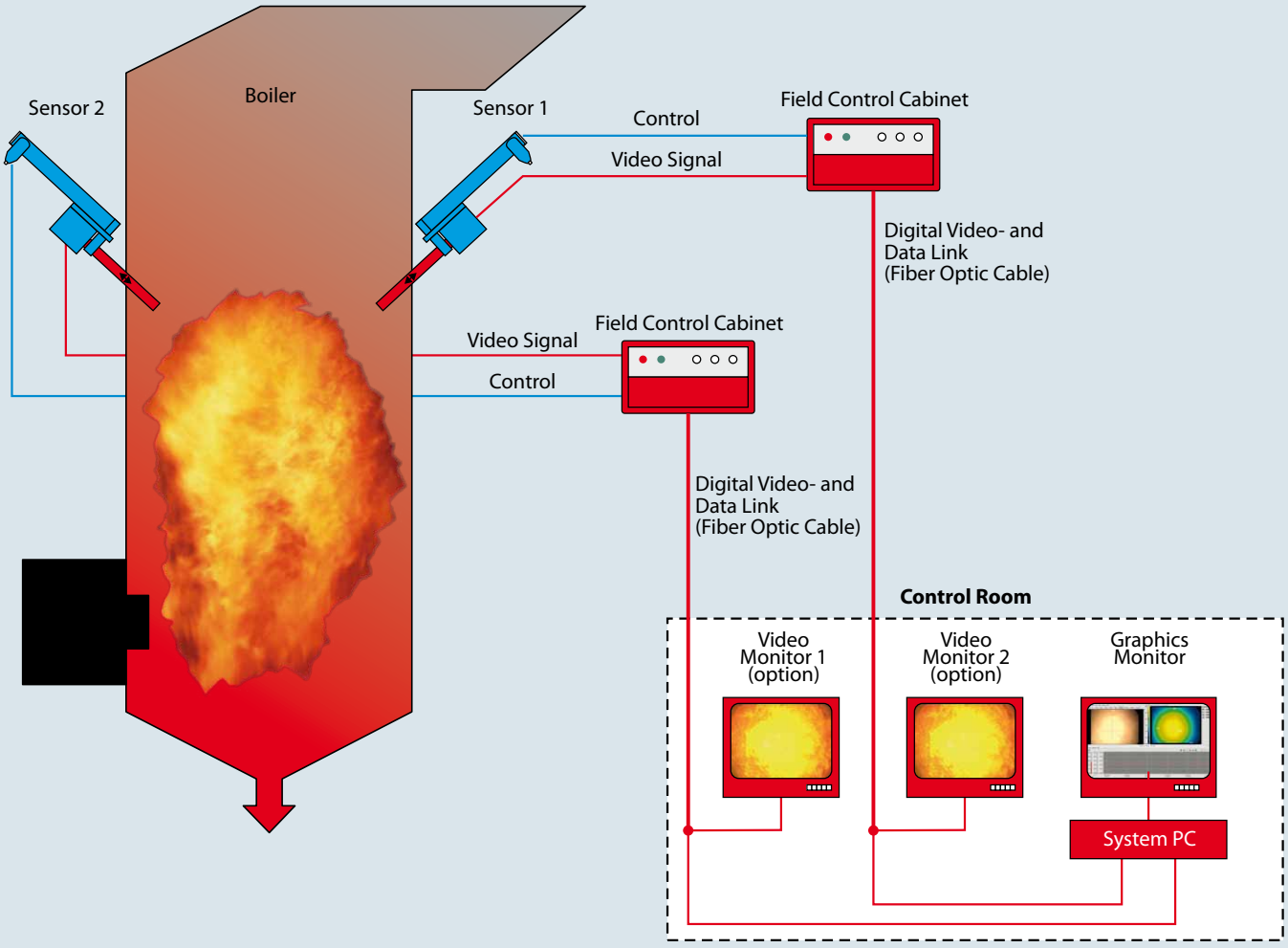
DURAG process & systems technology

D-VTA 200

Video-based Thermography for Combustion Processes



DURAG GROUP smart solutions for combustion and environment

D-VTA 200

Video Monitoring

The Video-based D-VTA 200 Thermography System

is a modular system for monitoring industrial high temperature processes. Intelligent sensors allow contactless, optical and thermal online analysis of processes in the combustion chamber. Applications include:

- Detection of the Temperature Distribution in side combustion chambers; analysis of unbalanced combustion processes
- Burning analysis and slag monitoring in power plants
- Visualization of flame post combustion chambers and flame front monitoring in waste incineration plants
- Visualization and temperature distribution analysis of grate based firing systems, f.e. biomass and co-firing
- Monitoring ore calcination and hazardous waste disposal in the chemical industry
- Annealing and pusher furnace monitoring in the steel industry
- Scale formation and melting charge control in the glass industry.

The Sensors

have been specially developed for the harsh working conditions in industrial combustions.
The sensor housing contains the special boroscope as optical system, or the videoscope and the industrial CCD camera. In this design all electronic components are operated outside the kiln area, in the cooled camera housing.
The slim, air or water-cooled sensor shaft (Ø 43mm) minimises the mechanical stress (abrasive dust) and the thermal influence on the sensor parts in the combustion chamber.
The optical system is protected against mechanical and thermal damage by a sapphire lens at the sensor tip, in addition to air flushing. As no moving parts (no mirrors, prisms or motors) are located in the process-oriented area, the sensors achieve a high availability with minimum service requirement.

The Field Components

- Pneumatically operated retraction system with monitoring units for the cooling and flushing media, including integrated air accumulator
- Field control cabinet for control of the sensors, signal processing for the data and video transmission via fibre-optic cable to the control room.

The Control Room Equipment

- Linux based system computer for temperature calculation, thermography presentation
- Video monitor for online colour display

The Video System

The basic system comprises the above-mentioned system components, without system computer. It enables visual monitoring through real-time colour video display.

Thermography

The Thermography Analysis System

The thermography system comprises the components of the video system plus the system computer with software modules.
It operates as a spatial optical pyrometer on the basis of image data processing and offers, in addition to the video system:

- Temperature determination of each visible image point of the video sensor
- Thermal analysis of the local temperature distribution
- Temperature definition within freely definable measuring window and lines (ROI = Region of Interest / LOI = Line Of Interest).
- Analysis of thermal samples to identify anomalies in the combustion process

All data of the thermography system can be transmitted to the process control system via a standardized data interface.

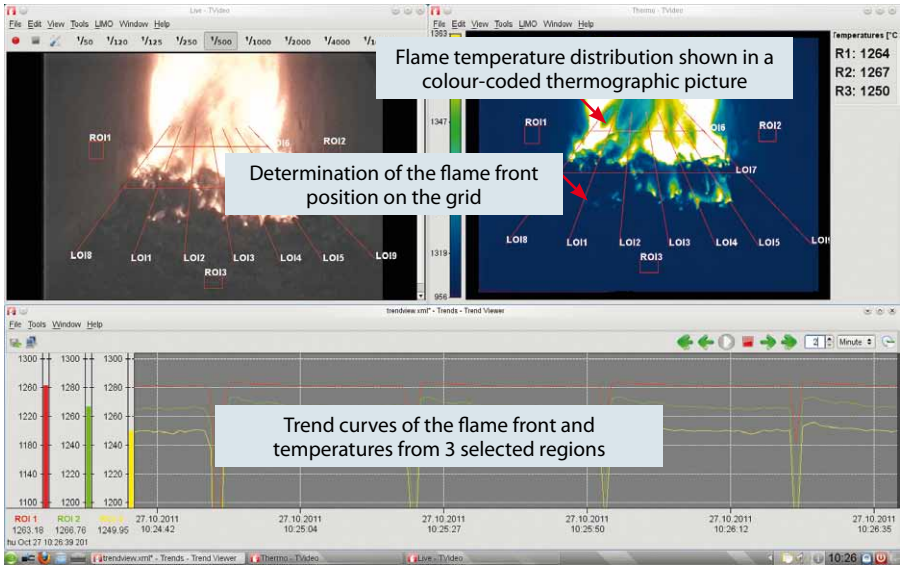
Furnace Camera with Retraction Unit (water-cooled)

Waste Incineration Plant

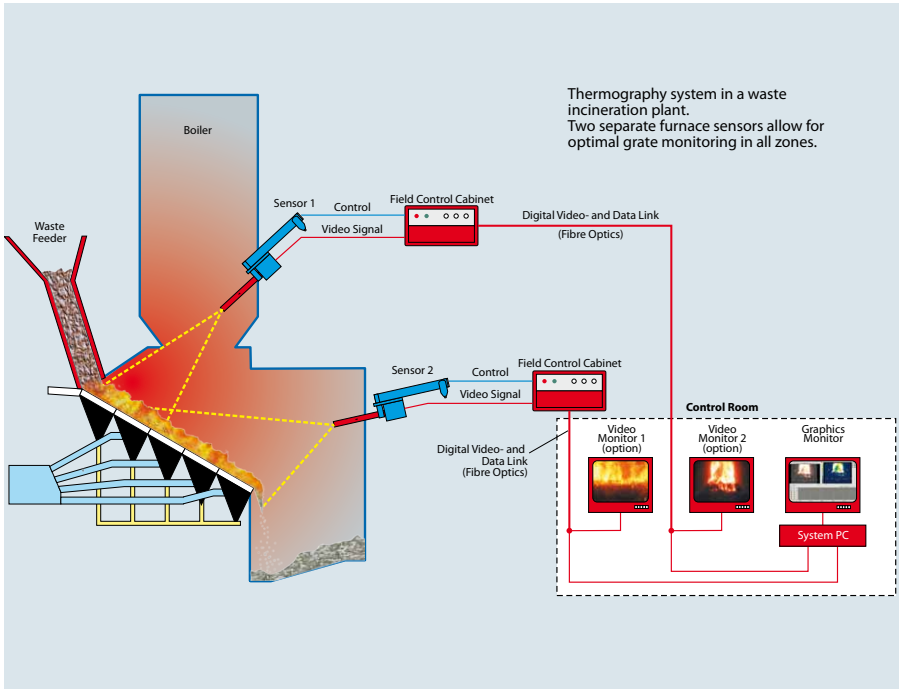
Power Plant

Chemical & Petrochemical Industry

Analysis System



Thermography screen (waste incineration plant)



D-VTA 200 System in a Waste Incineration Plant

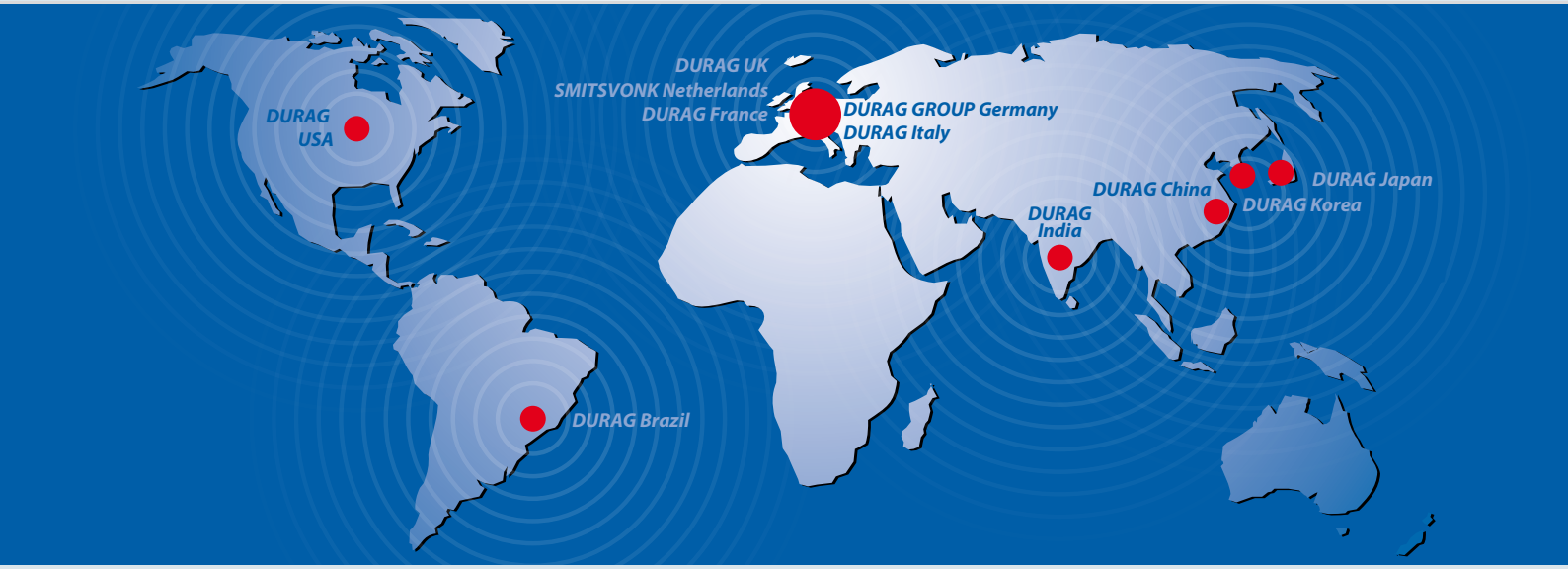
Technical Data

Video system	PAL, picture elements: 752(H) x 582(V), fixed focus
Thermography from total radiation	Temperature range 1000°C – 2000°C
Optical alignment	Sensor 0°: axially-parallel to sensor axis; Sensor45°: angled 45° to sensor axis
Optical field of view	Sensor 0°: horizontal 72°, vertical 54°, diagonal 90°; Sensor 45°: horizontal 48°, vertical 36°, diagonal 60°
Data interfaces on the system PC	RS232, RS422, RS485: ASCII, MODBUS; Ethernet: TCP/IP: FTP, MODBUS
Auxiliary energy	230 V / 60 Hz & 115 V / 50 Hz, 500 VA
Gas temperature in combustion chamber	Water-cooled sensor <2000°C
Ambient temperature	Sensor / Retraction: 0°C…60°C, Field control cabinet: 0°C…55°C
Material	Sensor: stainless steel 1.4571 / 1.4301, Field control cabinet: steel sheet, painted in RAL 7035
Dimensions / Weights	Diameter of sensor tip: water-cooled 43 mm
Immersion depth in combustion chamber	max. 450 mm from welding plate, other lengths optional
Space requirement for sensor / retraction device	1450 x 500 x 800 mm (LxWxH)
Field cabinet	600 x 380 x 210 mm (HxWxD)
Cable length	Sensor/Retraction – Field control cabinet 14 m
Connection Site / Control Room	Optical Fiber, max. 1000 m
System PC	19" industrial housing, 4 HE, depth 450 mm
Weights	Sensor with retraction and carrier 70 kg, Field control cabinet 15 kg
Cooling water volume	350 l/h, 1.5…8 barg
Cooling water temperature	Inlet: <45°C, Outlet: Temperature increase <10° C
Cooling water quality	Clean, chemically neutral, non-corrosive, Hardness: <5°dH / <28 mMol/l
Compressed air volume	max. 25 Nm^3/h
Compressed air pressure	5 – 8 barg
Compressed air temperature	5…40°C
Compressed air quality	dry, free from dust, aerosols, oil

Steel Industry

Biomass Plants

Glas Industry



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