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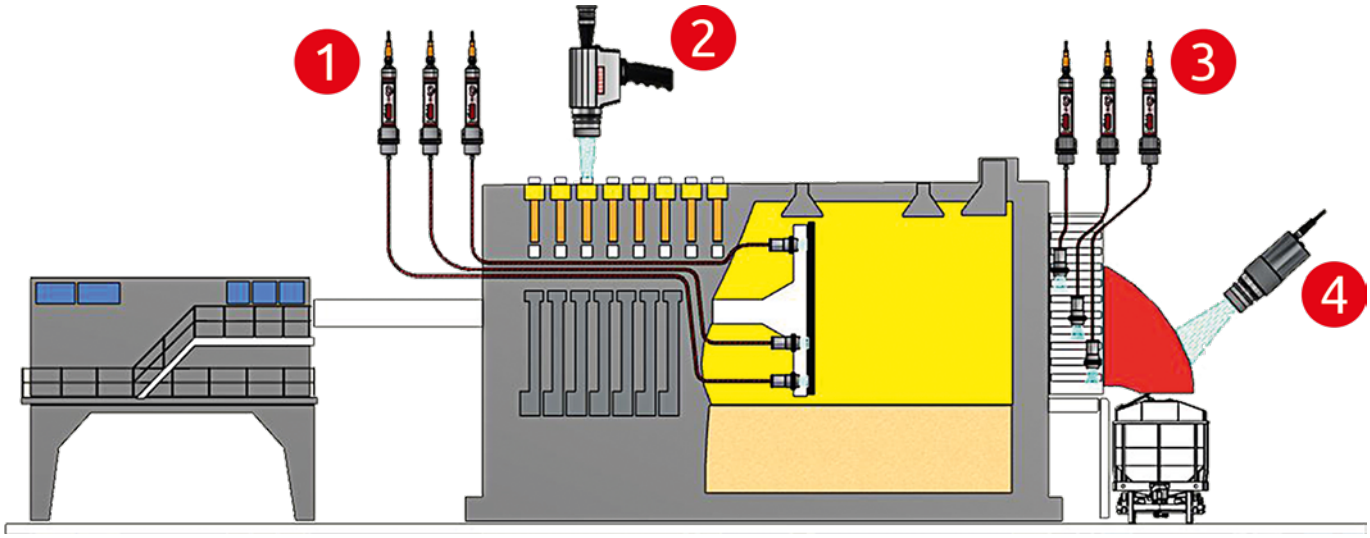
infrared temperature solutions ITS

Application
Coking plant

Optical temperature measurement on the coke battery



Temperature measuring points on the coke battery

Optical temperature measurement on the coke battery

The coke quality and yield as well as the service life of the coke oven depend on the temperature and temperature equilibrium of the coke oven chambers in the coke oven battery. In order to be able to meet the high requirements, modern measuring methods and measuring systems adapted to the respective measuring points are absolutely necessary. A temperature-controlled production is the prerequisite for achieving the desired material properties while maximizing efficiency.

The pyrometer is affected by heavy dust and smoke formation in its field of view at the relevant measuring points. If the temperature is to be reliably recorded here, two-colour pyrometers are absolutely essential. A two-colour pyrometer measures the intensity of the infrared radiation emitted by the measuring object at two neighbouring wavelengths. The object temperature is determined from the quotient of the two radiation intensities. If there is smoke, dust or water vapour in the field of view between the pyrometer and the measuring object, the infrared radiation is weakened. A two-colour pyrometer compensates for this interference and still displays the correct temperature even if it is weakened.

Coke pusher measuring point 1

A precise knowledge of the temperature distribution is required in order to achieve a homogeneous temperature along the wall of the oven chamber. This is the only way to adjust the process management and set the desired temperature. Furthermore, the adapted temperature control reduces energy consumption and thus CO_2 emissions.

For this measuring task, two-colour pyrometers from the CellaTemp PKF series are used, in which the optical measuring head is separated from the electronics. The measuring signal is transmitted from the measuring head to the electronics via a fibre optic cable. Both the measuring head and the fibre optic cable can be used at elevated ambient temperatures. These are also installed in air-cooled hoses or tubes. The electronics are mounted outside the hot zone in a connection box.

Six measuring heads are used to measure the two chamber walls at three different levels during the pushing of the coke cake. The measuring heads are mounted behind the pressure plate on both sides. The heating walls are thermally scanned in order to obtain a precise overview of the temperature distribution in these walls, which is as uniform as possible, and to recognize changes.

Coke battery measuring point 2

The flue gas temperatures are measured via the top of the oven. The temperature of the heating pipes is determined using a hand-held device. The manual measurement is carried out if there is no coke cake pushing for operational reasons. Detailed measurements can also be carried out if there are irregularities in the heating wall temperature.

Due to the narrow width of the extraction system, a portable CellaPort PT 130 pyrometer with focusable lens and a narrow measuring field is required. The pyrometer has a through-the-lens sighting for checking alignment and focusing.

Coke transfer measuring point 3 4

There is a correlation between the temperature of the coke cake and the temperature of the chamber wall of the coke oven. During the coke cake pushing, its temperature is measured continuously to determine the temperature curve along the coke mass. Three optical measuring heads are mounted at different heights on each side of the oven transfer car. These measure through an opening onto the coke mass.

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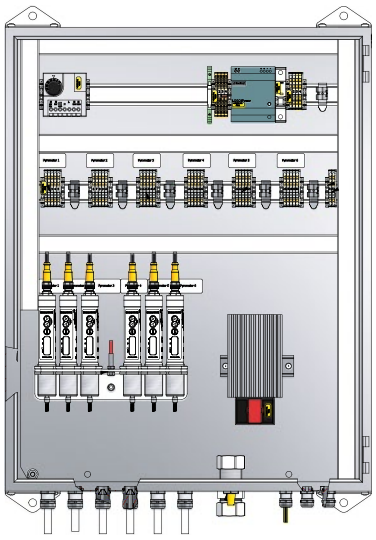
As a contamination protection, the measuring systems have air purge systems that create an air cushion in front of the lenses of the measuring heads. This guarantees permanently reliable measurement with low maintenance.

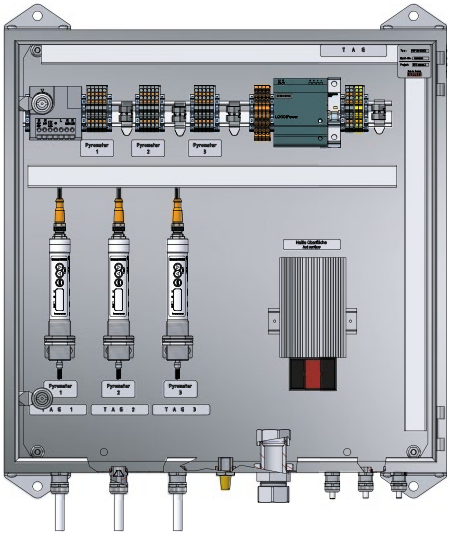
As an alternative to the coke transfer, the PA 40-K020 measuring system is used to record the temperature of the coke during loading from a safe distance of a few metres. The measuring system is based on a two-colour pyrometer with high-resolution lens and through-the-lens sighting as well as an all-enclosing mounting and protective fitting.

Connection box SK 821 and SK 832

In addition to the pyrometer electronics, a power supply unit with a 24 V power supply for the pyrometers and a heater with temperature controller are installed in the stainless steel switch boxes.

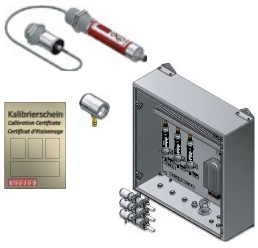


SK 821



SK 832

Measuring systems

Measuring point	Coke pusher	Coke battery	Coke transfer	Coke loading
Measuring system	CellaCast PKF 66-K004	CellaTemp PT 130 AF 1	CellaTemp PKF 66-K006	CellaTemp PA 40-K020
				
Pyrometer	PKF 66 AF 3	PT 130 AF 1	PKF 66 AF 2	PA 40 AF 1
Design	stationary	portable	stationary	
Measuring range	700 – 1800 °C	500 – 2500 °C	700 – 1800 °C	650 – 1700 °C
Sighting aid	–	Through-the-lens sighting	–	Through-the-lens sighting
Spectral range	0.95 / 1.05 µm	0.78 - 1.06 µm	0.95 / 1.05 µm	
Mounting combination	SK 821	–	SK 832	PA 83-011
Scope of delivery	Pyrometer Connection box SK 821	Pyrometer Protective and transport case USB cable	Pyrometer Connection box SK 832 Air purge PS 01/A AF 1	Pyrometer Connection cable VK 02/A AF 1 (5 m) Mounting combination PA 83-011

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Creating Solutions

infrared temperature solutions **ITS**

No 1 in terms of ACCURACY RELIABILITY INNOVATION

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