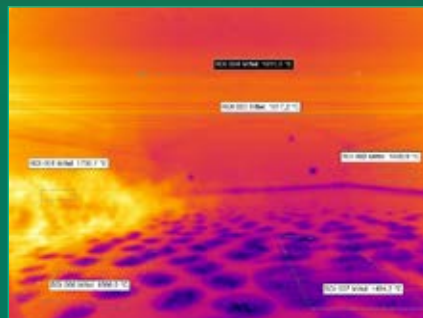
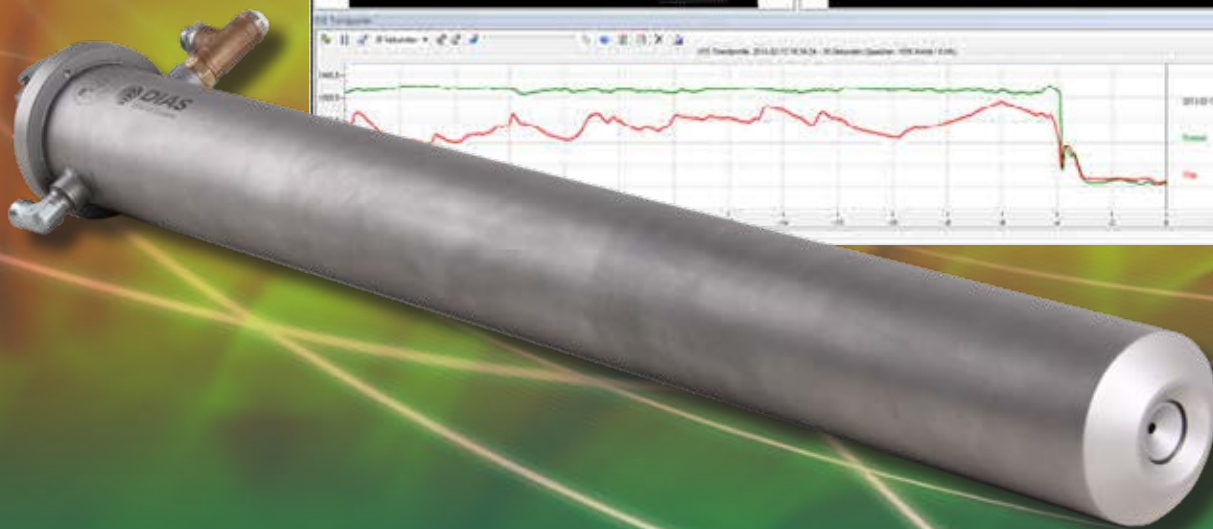
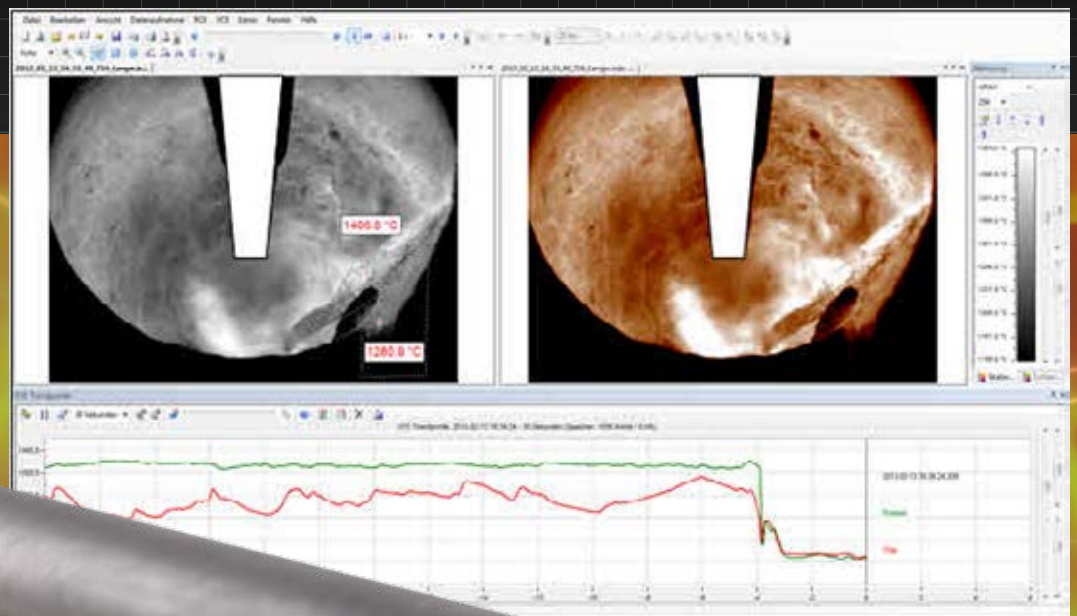


Infrared Cameras for Combustion Chambers

PYROINC

with High-Resolution for Temperature Measurements from

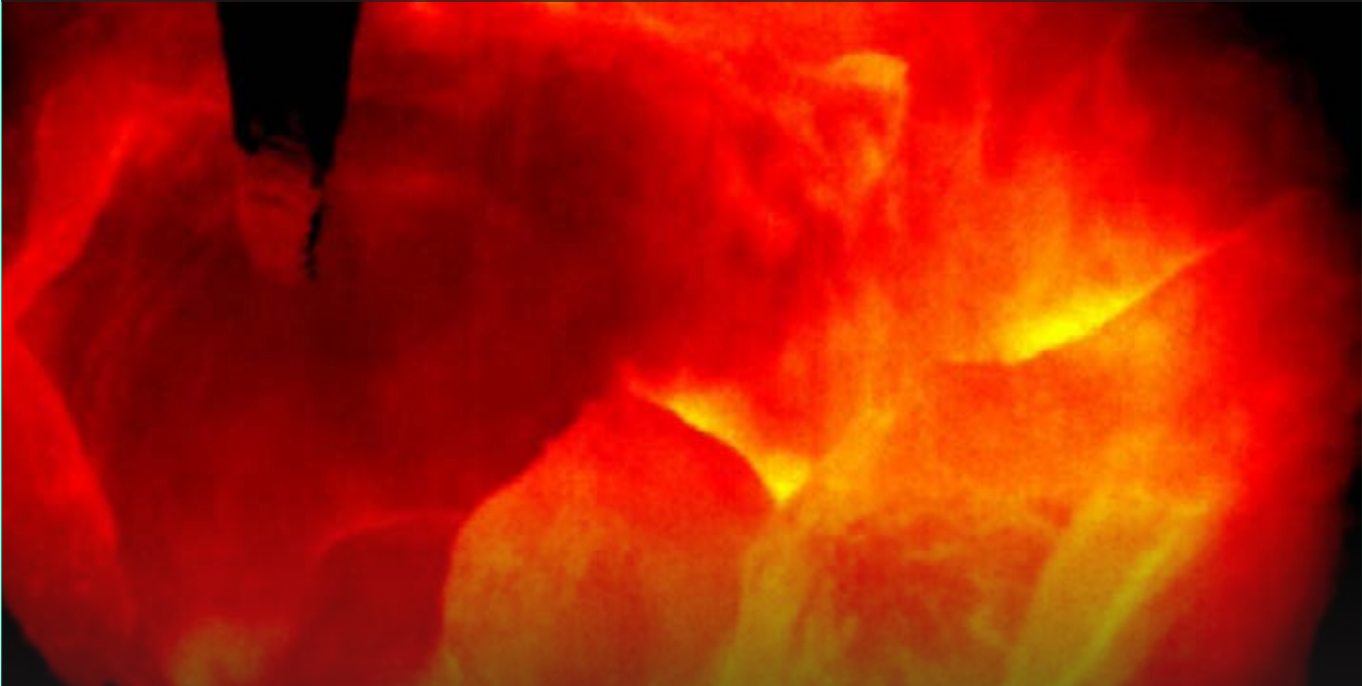
400 °C to 1800 °C



PYROINC

High-Resolution IR Combustion Chamber Cameras for High Temperature Measurement

Thermal image of PYROINC 380LF: Clearly visible clumping during zinc recycling



- ✓ One large temperature range
- ✓ Industrial continuous operation
- ✓ Special NIR filter
- ✓ Cooled probe lens
- ✓ Patented air purging system
- ✓ Automatic retraction system

Description and application

The PYROINC cameras for combustion chambers are special and very robust infrared cameras that are used for the measurement of high temperatures between 400 °C and 1800 °C.

They have a motorfocus borescope lens with protection window. The camera and the borescope lens are installed in a watercooled stainless steel probe cooling jacket.

The inlet for the IR radiation has a very small diameter and it is airpurged. In this way, the probe cooling jacket can be pulled directly through the opening in the combustion chamber walls.

Together with the automatic retraction system it is guaranteed that the system withstands the high temperatures and special requirements of the location. The front part of the probe cooling jacket is able to resist temperatures about 1800 °C with a service life between 2 and 10 years (depending on the operating conditions).

Depending on the concrete case of application, the cameras measure in different spectral ranges. The used 2D infrared image sensors enable large continuous temperature ranges. For the visualization and processing of the measured data the thermal images are transferred in real-time via Ethernet.

System solutions with the camera types PYROINC 320F, 640LF and 640F are realized in cooperation with the companies CMV Systems and SOBOTTA Sondermaschinenbau.



Examples of application:

- ✓ In glass melting furnaces the PYROINC 768N camera for combustion chambers is used for the temperature measurement of the glass melt and for the monitoring of the brickwork.
- ✓ In cement rotary kilns the IR cameras PYROINC 320F/640F and 768N are used for the online temperature monitoring in the sintering area to derive control variables for the burner control.
- ✓ In aluminum and zinc recycling ovens, PYROINC 640LF is able to monitor the condition and the temperature of the raw material online.

PYROINC

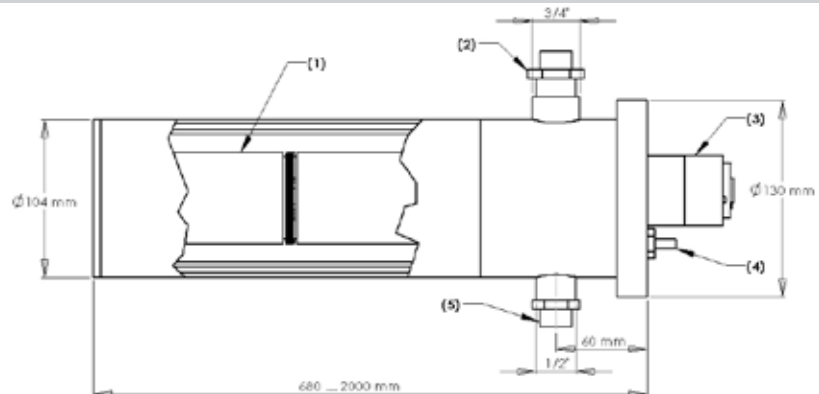
High-Resolution IR Combustion Chamber Cameras for High Temperature Measurement

Technical data		PYROINC 768N	PYROINC 320F/PYROINC 640F				PYROINC 640LF	
Spectral range		0.8 μm to 1.1 μm	about 3.9 μm				10.6 μm	
Meas. temperature range ¹		600 °C to 1500 °C 800 °C to 1800 °C	600 °C to 1250 °C				400 °C to 1250 °C	
Sensor		uncooled 2D-Si-CMOS-array (768 × 576 pixels)	microbolometer 2D-array PYROINC 320F: 320 × 240 pixels, PYROINC 640F: 640 × 480 pixels				microbolometer 2D-array (640 × 480 pixels)	
Optics ¹	Angle of aperture	74° × 59°	28° × 21°	43° × 33°	67° × 52°	60° skew, 75° × 54°	44° × 34°	74° × 52°
	Measurement distance	from 1 m	from 1 m	from 1 m	from 1 m	from 1 m	from 1 m	from 1 m
	Motor focus	yes	yes	yes	yes	yes	yes	yes
Measurement uncertainty ²		2 % of measured value in °C		2 % of measured value °C			2 % of measured value °C	
NETD ³		< 1 K (600 °C, 50 Hz) ⁴	1.2 K (800 °C, 50 Hz)	< 1 K (1000 °C, 50 Hz)			< 1.5 K (1000 °C, 25 Hz)	
Measurement frequency		internal 50 Hz, selectable: 50 Hz, 25 Hz, 12,5 Hz, ...						
Response time		internal 40 ms, selectable: 2/measurement frequency						
Interface		Ethernet (real-time, 50 Hz), each two galvanically isolated digital inputs and digital outputs						
Connections		HAN Modular (operating voltage, digital inputs and outputs, Ethernet)						
Weight		approx. 15 kg	approx. 10 kg				approx. 15 kg	
Auxiliary energy		12 V to 36 V DC, typical 7 ... 10 VA						
Housing		stainless steel housing, length = 1040 mm, \varnothing 104 mm (water cooling)						
Operating temperature of the camera module		-10 °C to 55 °C (internal instrument temperature)					0 °C to 50 °C (internal instrument temperature)	
Storage conditions		-20 °C to 70 °C, max. 95 % relative humidity						
Software		PC control and display program PYROSOFT for Windows®, customized version on request						

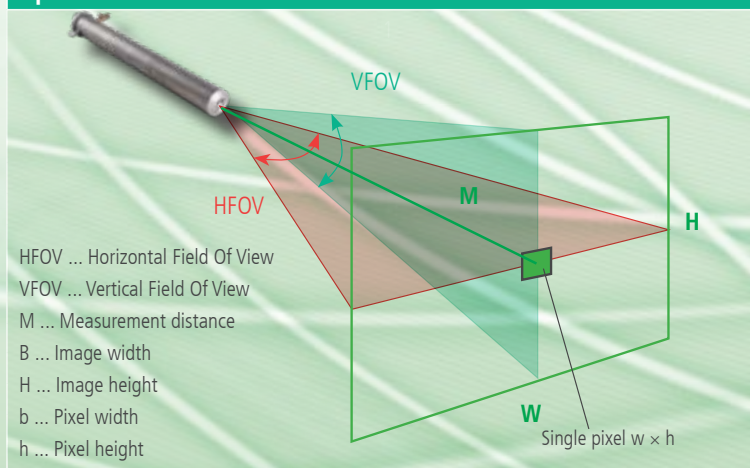
¹ Others on request. ² Specifications for black body radiators and ambience temperature 25 °C. ³ Noise equivalent temperature difference. ⁴ ... or 0.15 % of measured value in °C, 50 Hz.

Dimensional drawing (example: PYROINC 768N)

- (1) Borescope
- (2) Water drain
- (3) Harting Modular plug
- (4) Purge air connector SW 19
- (5) Water inlet



Optics

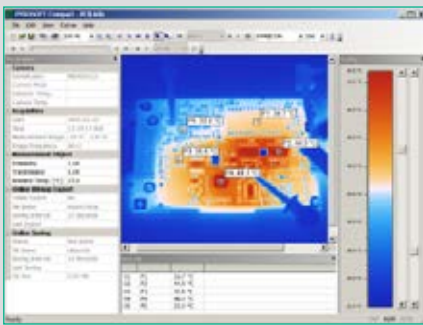


HFOV × VFOV	M [m]	W [m]	H [m]	w [mm]	h [mm]
74° × 59°	1	1.5	1.1	2	2
	10	15	11	20	20
28° × 21°	1	0.5	0.4	2	2
	10	5.0	3.7	16	16
43° × 33°	1	0.8	0.6	2	2
	10	7.9	5.9	25	25
67° × 52°	1	1.3	1.0	4	4
	10	13	10	40	40
75° × 54°	1	1.5	1.1	5	5
	10	15	11	50	50
44° × 34°	1	0.8	0.6	1	1
	10	8.1	6.1	11	11
74° × 52°	1	1.5	1.1	2	2
	10	15	11	20	20

PYROSOFT

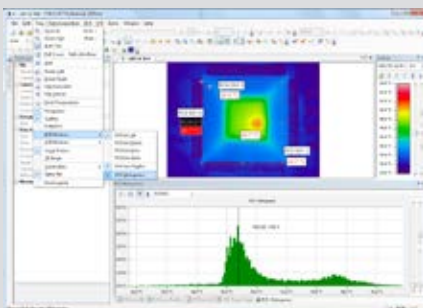
Powerful online and offline software for DIAS infrared cameras

PYROSOFT Compact



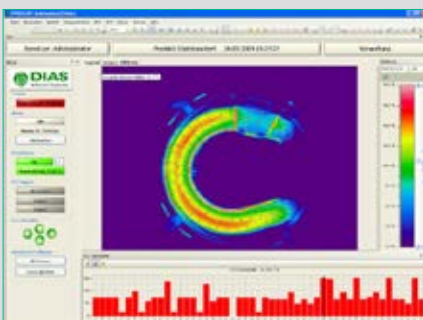
- Online data acquisition of one DIAS infrared camera
- Open and edit archived measured data and sequences
- Bitmap and video export
- Online data storage and online bitmap export
- Definition of regions of interests (ROI): points, lines and rectangle
- Generating of reports in Microsoft® Word format by integrated report function
- Context-sensitive help system (F1 key)
- Included in the scope of delivery of every PYROVIEW infrared camera

PYROSOFT Professional



- Online data acquisition – Analyze, store and export data in real-time
- Open and edit archived measured data and sequences
- Multi document structure for several documents
- Bitmap, video and text export
- Definition of regions of interests (ROI) and values of interests (VOI) with alarm calculation, histogram and trend chart
- Numerous interface possibilities for processes (PROFIBUS, PROFINET, WAGO, TCP-Socket, Text IO)
- Reporting function, context-sensitive help system (F1 key)
- PYROSOFT Professional IO offers optionally a bidirectional data interface via PROFIBUS, PROFINET, WAGO, MODBUS, OPC, TCP Socket to process control systems, controllers and other applications

PYROSOFT Automation



DIAS has developed the software PYROSOFT Automation for the integration of infrared cameras in automation processes.

- Comfortable product management with free definable document templates
- Product choice and release control can be made manually or automatically
- Different user levels for operator, tool setter and administrator
- Functionality of PYROSOFT Professional for administrators
- Automatic logging of system messages, measured data and alarms
- Easy to use and configurable user interface for application in fabrication
- Learning functions for automatic adjustment of alarm threshold
- Offline viewer for belated data analysis
- Bidirectional data interface via PROFIBUS, PROFINET, WAGO, MODBUS, OPC, TCP Socket to process control systems, controllers and other applications

PYROSOFT DAQ



For users who want to make an integration into their software environment by themselves, we offer an own online and offline DLL interface for DIAS infrared cameras.

- API (DLL) for direct data access under Windows®
- Support for DIAS IRDX file format
- Setting of data acquisition parameters and object properties
- Query of temperature values and camera information
- Functions for displaying of images and palettes as bitmap
- Online and offline function

More software packages are available, for example:

PYROSOFT MultiCam (process software for monitoring up to 8 cameras), PYROSOFT CamZone (software for programming a stand-alone camera), application specific software like PYROSOFT FDS for DIAS fire detection systems.