PYROSPOT DGAF 11N

Special pyrometer with fibre cable for industrial application

Overview

Digital pyrometers for the temperature measurement of silicon and for LASER application

Features

- For temperature measurements between 350 °C and 2500 °C
- Short response times from 2 ms
- Vario and fixed optics with measuring field diameter from 0.7 mm
- RS-485 interface
- Display and keyboards
- Applicable up to 250 °C ambient temperature

Description and application

The digital pyrometers PYROSPOT DGAF 11N are developed for temperature measurements from 350 °C on silicon and for LASER application in industry and research. Due to a special narrow-band spectral range the silicon, that is otherwise permaeble for infrared radiation, can be measured exactly in a wide temperature range with almost constant emissivity.

Also for application on metal surfaces that are machined with LASER the PYROSPOT DGAF 11N is the best choice. The wavelength of many LASER is outside of the spectral range of the pyrometer so that the temperature measurement is not influenced by the LASER. The additional use of mostly expensive LASER blocking filter lapses in this way.

The solid body with fibre optics cable allows usage even under rough environmental conditions. The bright temperature display is visible even over long distance. With a fast response time of only 2 ms (t_{95}) these pyrometers are also suitable for fast measuring processes.

The vario or fixed optics for fibre optical head realizes spot sizes from 0.7 mm diameter. Special vacuum lead-throughs or variants with quartz or sapphire rod are available, too.

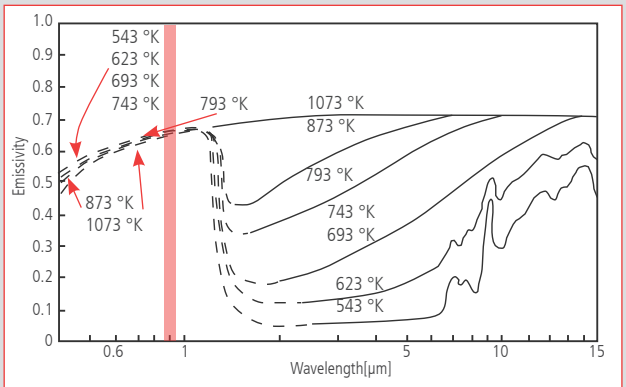
The temperature linear standard output signal of 0/4 to 20 mA allows easy implementation in existing measurement and controll systems.

The device is equipped with a galvanically isolated RS-485 interface which allows parameterising and software evaluation even in bus systems.

All parameters are adjustable via push-buttons and display directly on the device or can be easily adjusted to the application by using the convenient parameterizing and evaluation software PYROSOFT Spot.

Typical application areas are:

- Silicon and solar industry
- Steel and metal industry
- LASER application



Emission of silicon as function of temperature and wavelength
Quelle: Sato, T., Jap., Appl. Phys. 6, March, 1967, p. 339-347

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Technical data			
Type (Order number)	**DGAF 11N** (5117010201)	**DGAF 11N** (5117010202)	**DGAF 11N** (5117010203)
Temperature range	350 °C to 1200 °C	450 °C to 1800 °C	600 °C to 2500 °C
Sub temperature range of analog output	adjustable within temperature range, minimum span 50 °C		
Spectral range	around 0.88 µm		
Optics (see table)	several optical heads (vario optics FOH I-100, FOH II-65, FOH II-250, FOH A-150, FOH A-225, fixed optics FOH F)		
Distance ratio	see table		
Measurement uncertainty [1]	0.5 % of measured value in °C + 1 K		
Reproducibility [1]	0.1 % of measured value in °C + 0.5 K		
Transmittance	50 % to 100 %		
Ambient radiation	adjustable within temperature range		
NETD [1,2]	0.1 K		
Response time (t_{95})	2 ms [3], adjustable up to 100 s		
Emissivity	0.050 to 1.000		
Storage	minimum and maximum value storage		
Output	0/4 to 20 mA, switchable, temperature linear, max. burden: 500 Ω (galvanically isolated)		
Interface	RS-485 (galvanically isolated), half duplex, max. baudrate 115 kBd, Modbus RTU		
Aiming	none	laser aiming light, 630 nm to 680 nm, class II, < 1 mW	
Switching output/threshold	1 opto relay, R_{load} min. 48 Ω/adjustable within temperature range		
Software	PYROSOFT Spot for Windows®, optional: PYROSOFT Spot Pro		
Parameters [4]	emissivity, transmittance, ambient radiation, response time, temperature unit °C or °F, storage settings, sub temperature range of output, switching thresholds of switching output		
User controls	display and keyboard for parameter settings		
Power supply	24 V DC ± 25 %, residual ripple 500 mV		
Power consumption	max. 1.5 W (without load on switching output)		
Operating temperature	0 °C to 70 °C (electronics), 0 °C to 250 °C (optical head), 0 °C to 250 °C (fibre cable), 0 °C to 150 °C (fibre cable with 90° curve)		
Storage temperature	–20 °C to 70 °C		
Weight	approx. 600 g (without fibre cable and optical head)		
Dimensions	approx. 110 mm × 80 mm × 40 mm (without connectors)		
Housing	alu housing with plug connector, display and keyboard		
Safety class	IP 65 (DIN 40 050)		
CE symbol	according to EU regulations (EN 50 011)		
Scope of delivery	PYROSPOT DGAF 11N, manual, inspection sheet, PYROSOFT Spot for Windows® (without connection cable, fibre cable and optics. Please order seperately according to your application.)		

[1] $T_{ambient}$ = 23 °C, ε = 1, t_{95} = 1 s. [2] Noise equivalent temperature difference. [3] With dynamic adapation at low signal level. [4] Adjustable via interface and software or directly on the device.

Measuring temperature range	Fibre optics ∅	Length	Straight	90° curve
350 °C to 1200 °C	1600 µm	1.5 m 3.2 m	3310A46001 3310A46003	– –
450 °C to 1800 °C	400 µm	1.5 m 2.5 m 5.0 m	3310A44001 3310A44003 3310A44004	3310A44011 3310A44013 3310A44014
600 °C to 2500 °C	200 µm	1.5 m 2.5 m 5.0 m	3310A42001 3310A42003 3310A42004	3310A42011 3310A42013 3310A42014

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Optical heads FOH I, FOH II, FOH A und FOH F					
Vario optics type	**FOH II-65**	**FOH II-250**	**FOH I-100**	**FOH A-150**	**FOH A-225**
Measurement distance a [mm]	65 ... 300	250 ... 2500	100 ... 1000	150 ... 230	225 ... 2500
Measurement range	Target size M [mm]				
DGAF 11N (350 °C to 1200 °C)	4.0 ... 15	10 ... 110	6.0 ... 60	7.0 ... 10	10 ... 110
DGAF 11N (450 °C to 1800 °C)	1.3 ... 5.0	3.0 ... 31	1.8 ... 18	2.0 ... 3.0	3.0 ... 31
DGAF 11N (600 °C to 2500 °C)	0.7 ... 2.5	1.7 ... 17	0.9 ... 9.0	1.1 ... 1.7	1.7 ... 17
Aperture D [mm]	9.0	9.0	6.0	9.0	9.0
Part number	3310A50020	3310A50025	3310A50010	3310A52020	3310A52025

Fixed optics type FOH	**F-65**	**F-100**	**F-200**	**F-300**	**F-400**	**F-600**	**F-800**	**F-1000**	**F-1500**
Measurement distance a [mm]	65	100	200	300	400	600	800	1000	1500
Measurement range	Target size M [mm]								
DGAF 11N (350 °C to 1200 °C)	4.0	6.5	12	13	16	24	30	40	60
DGAF 11N (450 °C to 1800 °C)	1.3	2.0	3.6	3.7	5.0	7.2	9.2	12	18
DGAF 11N (600 °C to 2500 °C)	0.7	1.0	1.8	2.1	2.7	4.4	5.5	6.8	10.0
Aperture D [mm]	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0
Part number	3310A51006	3310A51010	3310A51020	3310A51030	3310A51040	3310A51060	3310A51080	3310A51100	3310A51150

Fibre cable

Optical heads FOH F, FOH II, FOH I

Fibre cable with 90° curve

Optical heads FOH A, 90° angled

Software PYROSOFT Spot

For evaluation and processing of measured data obtained DIAS provides two software variants for its pyrometer **PYROSPOT**. These are the free Windows software **PYROSOFT Spot** and the pay version **PYROSOFT Spot Pro**. The Pro version allows the measurement, visualization and measurement recording of several simultaneously connected pyrometers, whereas this is possible with the free version only for one connected pyrometer.

Further functions are for example:

- Measurement data logging with real-time display, parameterization of DIAS pyrometers
- Trigger functions*) and auto save*)
- Extensive statistical analysis of measurement data
- Measurement cursor, print functions, automatic emissivity determination
- Export of measured data as text file and automatic creation of Microsoft Excel® spreadsheets
- Integrated report function with customized templates for Microsoft Word®
- Integrated calculator for easy calculation of optics parameters

*) only for PYROSOFT Spot Pro

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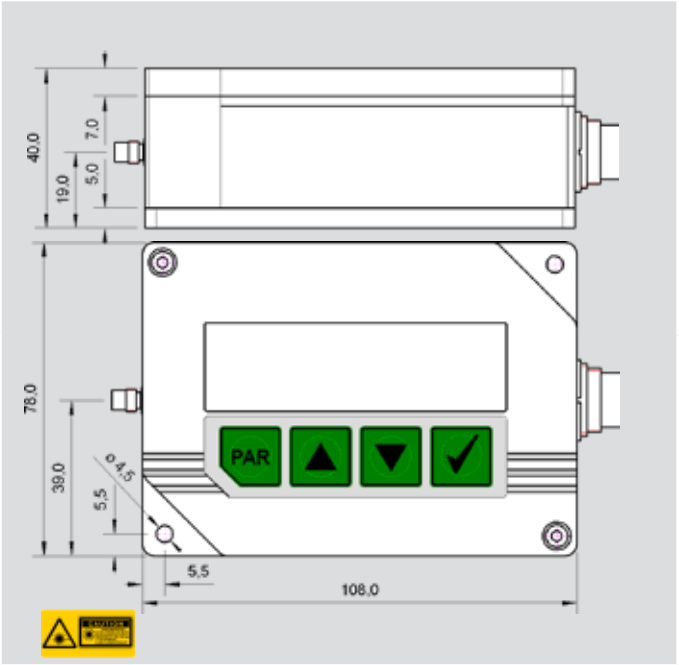
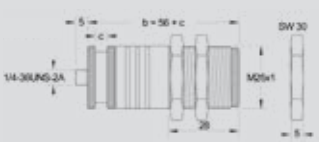
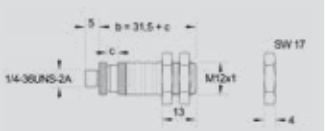
Dimensional drawing pyrometer and optical heads FOH I, FOH II, FOH A and FOH F



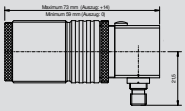
FOH II



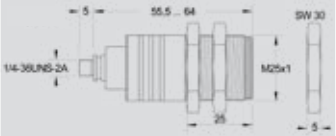
FOH I



FOH A



FOH F



Electrical accessories[1] – Order numbers			Mechanical and optical accessories[1]	
Connecting cable 12 pin	straight plug	angulated plug		
Length 2 m	3310A11111	3310A11131	Mounting angle fixed for optical head FOH I	3310A21014
Length 5 m	3310A11112	3310A11132	Mounting angle fixed for optical head FOH II	3310A21522
Length 10 m	3310A11113	3310A11133	Mounting angle adjustable for optical head FOH II	3310A21523
Length 15 m	3310A11114	3310A11134	Air purge unit for FOH II	3310A22520
Interface module RS-485 to USB	3310A14020		Sighting tube 100 mm	3310A22530
Interface module RS-485 to ProfiBus DP	3310A14021		Sighting tube 300 mm	3310A22535
Power supply PSU 15 (24 V DC, 1 A)	3310A12010		Mirror for FOH II, stainless steel, 90°	3310A31020

[1] Selected accessories, other is available

Selected accessories - pictures

Mounting angle, adjustable, for FOH II

Order number:: 3310A21523

Mounting angle, adjustable, for FOH II

Order number:: 3310A21520

Air purge unit for FOH II

Order number:: 3310A22520

Mirror 90° for FOH II

Order number:: 3310A31020

Power supply

Order number:: 3310A12010

Sighting tube (100 mm)

Order number: 3310A22530

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