

# PYROSPOT DS 4N/DG 4N

## Pyrometer for industrial application

### Overview

#### Digital pyrometer with RS-485 interface



### Features

- For temperature measurements between 250 °C and 2500 °C
- 0/4 to 20 mA temperature linear output, switchable
- RS-485 interface
- Two opto relay outputs, potential-free
- Small sensor head
- Display and programming keyboard

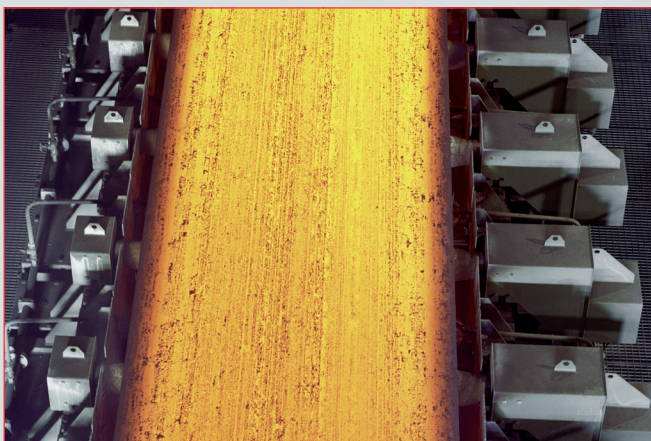
### Description and applications

The digital pyrometers PYROSPOT DS 4N/DG 4N are specifically designed for industrial purpose. The devices are suitable for temperature measurement from 250 °C to 2500 °C on many different nonmetallic or coated metallic surfaces.

The solid body allows usage even under rough environmental conditions. The bright OLED as a display is visible even over long distance. The very small sensor head allows even the acquisition of measuring object which are difficult of access.

The temperature linear standard output signal of 0/4 to 20 mA allows easy implementation in existing measuring and controlling 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. Also by using the comfortable parameterising and evaluation software PYROSOFT Spot the parameters can be easily adjusted to the application.



Typical application areas:

- Steel industry
- Furnace industry
- Soldering applications
- Ceramic industry
- Metal industry

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| Technical data                                 |                                                                                                                                                                                                                          |                          |                          |                          |                          |                          |                          |                          |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Type                                           | DS 4N                                                                                                                                                                                                                    |                          |                          |                          | DG 4N                    |                          |                          |                          |
| Temperature range                              | 600 °C to 1800 °C                                                                                                                                                                                                        |                          | 800 °C to 2500 °C        |                          | 250 °C to 1300 °C        |                          | 350 °C to 1800 °C        |                          |
| Sensor head cable length                       | 2.5 m                                                                                                                                                                                                                    | 5.0 m                    | 2.5 m                    | 5.0 m                    | 2.5 m                    | 5.0 m                    | 2.5 m                    | 5.0 m                    |
| Part numbers:<br>Close lens<br>Standard optics | 4040041211<br>4040043211                                                                                                                                                                                                 | 4040041221<br>4040043221 | 4040041212<br>4040043212 | 4040041222<br>4040043222 | 4041041211<br>4041043211 | 4041041221<br>4041043221 | 4041041212<br>4041043212 | 4041041222<br>4041043222 |
| Spectral range                                 | 0.8 µm to 1.1 µm                                                                                                                                                                                                         |                          |                          |                          | 1.5 µm to 1.8 µm         |                          |                          |                          |
| Internal data processing                       | digital                                                                                                                                                                                                                  |                          |                          |                          |                          |                          |                          |                          |
| Emissivity ε                                   | 0.050 to 1.000, adjustable (factory setting: 1.000)                                                                                                                                                                      |                          |                          |                          |                          |                          |                          |                          |
| Sub temperature range of analog output         | adjustable within temperature range, minimum span 50 °C                                                                                                                                                                  |                          |                          |                          |                          |                          |                          |                          |
| Response time (t <sub>95</sub> )               | 10 ms, adjustable up to 100 s                                                                                                                                                                                            |                          |                          |                          |                          |                          |                          |                          |
| Measurement uncertainty <sup>1</sup>           | 1 % of measured value in °C + 1 K                                                                                                                                                                                        |                          |                          |                          |                          |                          |                          |                          |
| Reproducibility <sup>1</sup>                   | 0.5 % of measured value in °C + 0.5 K                                                                                                                                                                                    |                          |                          |                          |                          |                          |                          |                          |
| NETD <sup>1,2</sup>                            | 0.1 K                                                                                                                                                                                                                    |                          |                          |                          |                          |                          |                          |                          |
| Output                                         | 0/4 to 20 mA, switchable, temperature linear, max. burden 700 Ω                                                                                                                                                          |                          |                          |                          |                          |                          |                          |                          |
| Interface                                      | RS-485 (galvanically isolated), half duplex, max. baudrate 115 kBd, data protocol Modbus RTU                                                                                                                             |                          |                          |                          |                          |                          |                          |                          |
| More inputs/outputs                            | Input for clear maximum and minimum value storage, 2 opto relay switching outputs, potential free, max. 60 V DC/42 V AC <sub>eff</sub> 500 mA                                                                            |                          |                          |                          |                          |                          |                          |                          |
| Data storage                                   | minimum/maximum value storage                                                                                                                                                                                            |                          |                          |                          |                          |                          |                          |                          |
| User controls                                  | temperature display, keyboard, display for parameterizing                                                                                                                                                                |                          |                          |                          |                          |                          |                          |                          |
| Parameters                                     | emissivity, transmission, response time, data storage, analog output, sub temperature range, switching output, address, baudrate, temperature unit °C or °F, adjustable via keyboard and display as well as via software |                          |                          |                          |                          |                          |                          |                          |
| Power supply                                   | 24 V DC ± 25 %, residual ripple 500 mV                                                                                                                                                                                   |                          |                          |                          |                          |                          |                          |                          |
| Power consumption                              | approx. 2 W                                                                                                                                                                                                              |                          |                          |                          |                          |                          |                          |                          |
| Operating temperature                          | sensor head: 0 °C to 125 °C, electronics box: 0 °C to 70 °C                                                                                                                                                              |                          |                          |                          |                          |                          |                          |                          |
| Storage temperature                            | –20 °C to 70 °C                                                                                                                                                                                                          |                          |                          |                          |                          |                          |                          |                          |
| Safety class                                   | IP65 (DIN EN 60529, DIN 40050)                                                                                                                                                                                           |                          |                          |                          |                          |                          |                          |                          |
| Weight                                         | approx. 500 g                                                                                                                                                                                                            |                          |                          |                          |                          |                          |                          |                          |
| Dimensions                                     | approx. 110 mm × 80 mm × 40 mm (electronics box)                                                                                                                                                                         |                          |                          |                          |                          |                          |                          |                          |
| CE symbol                                      | according to EU regulations                                                                                                                                                                                              |                          |                          |                          |                          |                          |                          |                          |
| Test regulations                               | EN 55 011: 1998                                                                                                                                                                                                          |                          |                          |                          |                          |                          |                          |                          |
| Scope of delivery                              | DS 4N/DG 4N with connected sensor head, manual, inspection sheet, software PYROSPOT Spot                                                                                                                                 |                          |                          |                          |                          |                          |                          |                          |

<sup>1</sup> Specifications for black body radiator,  $T_{\text{ambient}} = 23 \text{ °C}$ ,  $t_{95} = 1 \text{ s}$ . <sup>2</sup> Noise equivalent temperature difference.

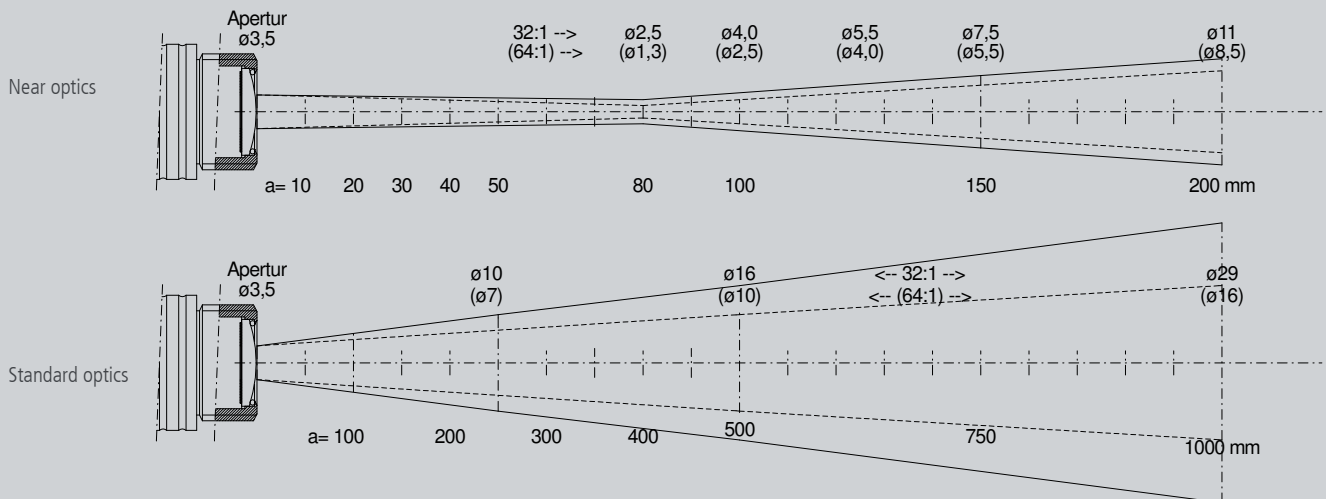
### Display and Keyboard



# PYROSPOT DS 4N/DG 4N

## Pyrometer for industrial application

| Near optics (aperture diameter 3.5 mm) |                                 |         |         | Standard optics (aperture diameter 3.5 mm) |                                 |          |          |
|----------------------------------------|---------------------------------|---------|---------|--------------------------------------------|---------------------------------|----------|----------|
| Meas. distance a [mm]                  | a = 80                          | a = 150 | a = 200 | Meas. distance a [mm]                      | a = 500                         | a = 1000 | a = 1500 |
| Distance ratio                         | Measuring field diameter M [mm] |         |         | Distance ratio                             | Measuring field diameter M [mm] |          |          |
| 32 : 1                                 | 2.5                             | 7.5     | 11.0    | 32 : 1                                     | 16.0                            | 29.0     | 42.0     |
| 64 : 1                                 | 1.3                             | 5.5     | 8.5     | 64 : 1                                     | 10.0                            | 16.0     | 22.0     |



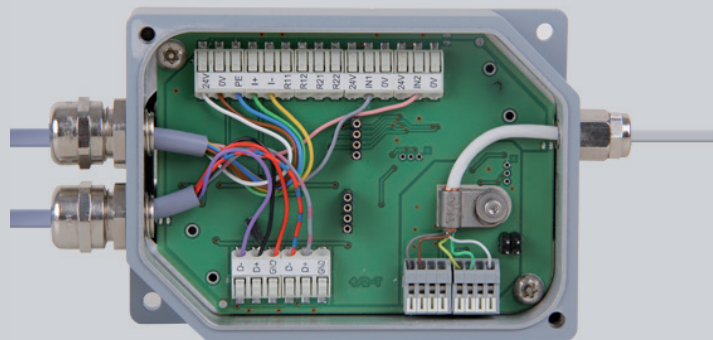
Optics variants:

DS 4N (600 °C to 1800 °C) and DG 4N (250 °C to 1300 °C) = 32 : 1

DS 4N (800 °C to 2500 °C) and DG 4N (350 °C to 1800 °C) = 64 : 1

### Elektronics box

#### Opened electronics box with feeder clip and relay output



|     |                                                                |     |                              |
|-----|----------------------------------------------------------------|-----|------------------------------|
| 24V | Power supply +24 V DC                                          | 0V  | – Feed-in for function input |
| 0V  | Power supply 0 V DC                                            | 24V | + Feed-in for function input |
| PE  | Potential GROUND, screen                                       | IN2 | Function input 2             |
| I + | + Analog output 0/4 to 20 mA                                   | 0V  | – Feed-in for function input |
| I – | – Analog output 0/4 to 20 mA                                   |     |                              |
| R11 | Opto relay 1 pin 1, max. 60 V DC/42 V AC <sub>eff</sub> 500 mA | D–  | D– RS-485                    |
| R12 | Opto relay 1 pin 2, max. 60 V DC/42 V AC <sub>eff</sub> 500 mA | D+  | D+ RS-485                    |
| R21 | Opto relay 2 pin 1, max. 60 V DC/42 V AC <sub>eff</sub> 500 mA | GND | GND RS-485                   |
| R22 | Opto relay 2 pin 2, max. 60 V DC/42 V AC <sub>eff</sub> 500 mA | D–  | D– RS-485                    |
| 24V | + Feed-in for function input                                   | D+  | D+ RS-485                    |
| IN1 | Function input 1, delete data storage                          | GND | GND RS-485                   |

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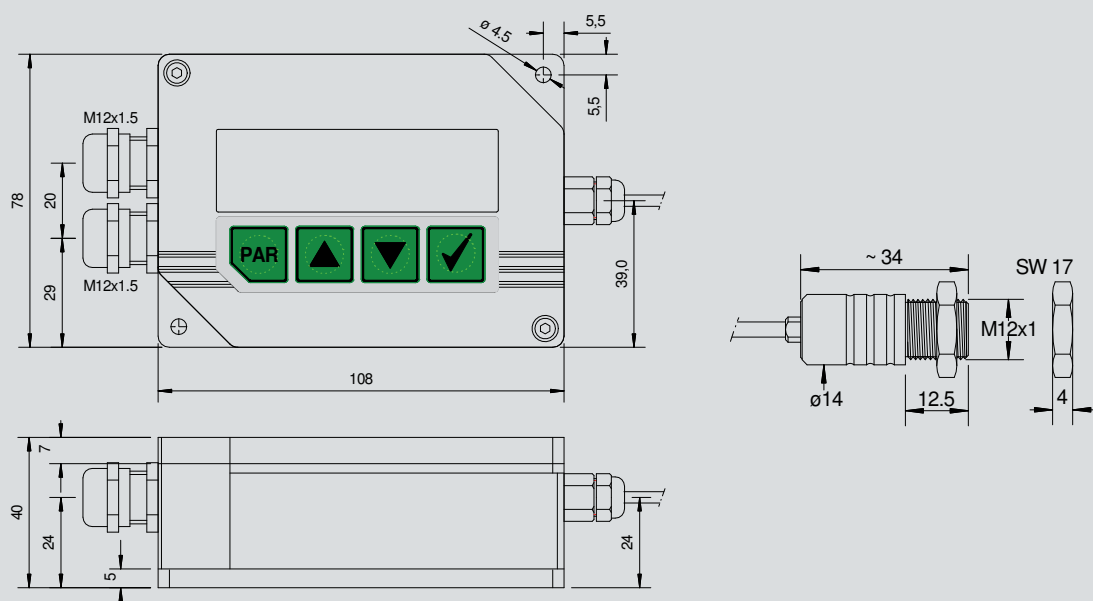
## Pyrometer for industrial application

| Electrical, mechanical and optical accessories <sup>1</sup> |                        | Part number |
|-------------------------------------------------------------|------------------------|-------------|
| Mounting angle                                              | fixed, stainless steel | 3310A21014  |
| Air purge unit                                              |                        | 3310A22041  |
| Air purge unit                                              | angled                 | 3310A22045  |
| Compact housing                                             | with air purge         | 3310A22040  |
| Mirror                                                      | 90°                    | 3310A31030  |
| Interface module                                            | RS-485 to USB          | 3310A14020  |

<sup>1</sup> More accessories available.

| Accessories                                                                                                    |                                                                                                                |                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Mounting angle                                                                                                 | Air purge unit                                                                                                 | Compact housing                                                                                                  |
| Part number: 3310A21014<br>   | Part number: 3310A22041<br>   | Part number: 3310A22040<br>   |
| Air purge unit, angled                                                                                         | Mirror                                                                                                         | Power supply PSU 15                                                                                              |
| Part number: 3310A22045<br> | Part number: 3310A31030<br> | Part number: 3310A12010<br> |

### Dimensional drawing pyrometer and sensor head



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