

AST A250C FOPL

Ratio pyrometers with fiber cable for industrial application

Overview

Digital ratio pyrometers with RS-485 interface



Features

- For temperature measurements between 300 °C and 2300 °C
- Short response times from 5 ms
- Vario optics with measurement field diameters from 0.7 mm
- RS-485 interface
- Display and keyboard
- Applicable up to 250 °C ambient temperature

Description and applications

The digital ratio pyrometers AST A250C FOPL are specifically designed for industrial temperature measurement from 300 °C. They utilize the 2-colour system which has the advantage of measurement widely independent from the emissivity.

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 5 ms (t_{95}) these pyrometers are also suitable for fast measurement processes. The vario optics for fibre optical head realizes spot sizes from 0.7 mm diameter.

The integrated laser aiming light enables to focus the measuring object exactly. The temperature linear standard output signal of 0/4 to 20 mA allows easy implementation in existing measurement and control systems.

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

All parameters are adjustable via push-buttons and display directly on the device. Also by using the convenient parameterizing and evaluation software AST NET1 the parameters can be easily adjusted to the application.

Typical application areas:

- Monitoring of the cooling down temperatures in the heat treatment of metals
- Stress relief annealing
- Recrystallization annealing
- Tempering

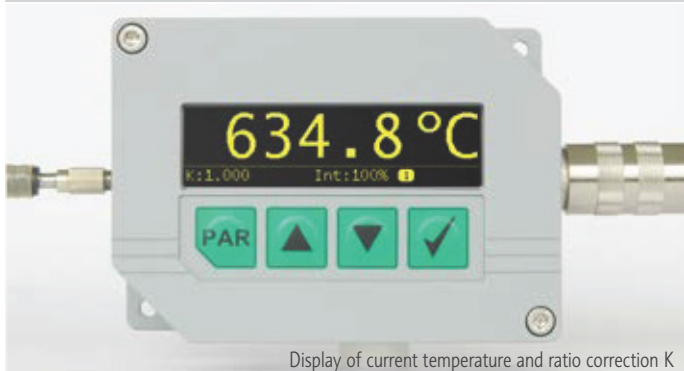


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| Technical data | | | | |
|--|--|-------------------------|-------------------------|-------------------------|
| Type (Order number) | A250C FOPL(5113010202) | A250C FOPL (5113010203) | A250C FOPL (5113010204) | A250C FOPL (5113010205) |
| Temperature range | 300 °C to 1100 °C | 350 °C to 1300 °C | 400 °C to 1600 °C | 500 °C to 2300 °C |
| Sub temperature range of analog output | adjustable within temperature range, minimum span 50 °C | | | |
| Spectral range | 1.5 µm to 1.9 µm | | | |
| Optics | vario optics ROH I-100, ROH II-65, ROH II-250 | | | |
| Distance ratio | see table | | | |
| Measurement uncertainty ¹ | 0.5 % of measured value in °C + 1 K | | | |
| Reproducibility ¹ | 0.2 % of measured value + 0.5 K | | | |
| Transmittance | 50 % to 100 % | | | |
| NETD ^{1,2} | 0.1 K | | | |
| Response time (t ₉₅) | 5 ms ³ , adjustable up to 100 s | | | |
| Ratio correction K | 0.800 to 1.200 | | | |
| Emissivity | 0.050 to 1.000 (1-channel mode) | | | |
| Storage | minimum and maximum value storage | | | |
| Output | 0/4 to 20 mA, switchable, temperaturlinear, max. burden: 500 Ω (galvanically isolated) | | | |
| Interface | RS-485 (galvanically isolated), half duplex, max. baudrate 115 kBd, Modbus RTU | | | |
| Aiming | laser aiming light, 630 nm to 680 nm, class II, < 1 mW | | | |
| Switching output/thresholds | 1 opto relay, R _{load} min. 48 Ω/adjustable within temperature range | | | |
| Software | AST NET1 | | | |
| Parameters ⁴ | ratio correction, emissivity, transmissivity, 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 setting | | | |
| 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 | appr. 600 g (without fibre cable and optical head) | | | |
| Dimensions | appr. 110 mm × 80 mm × 40 mm | | | |
| Housing | alu housing with plug connector, display and keyboard | | | |
| Safety class | IP 65 (DIN 40 050) | | | |
| CE symbol | according to EU regulations (EN 55 011) | | | |
| Scope of delivery | AST A250C FOPL, manual, inspection sheet, AST NET1for Windows® (without connection cable, fibre cable and optical head, please order separately) | | | |

¹ T_{ambient} = 23 °C, ε = 1, t₉₅ = 1 s. ² Noise equivalent temperature difference. ³ With dynamic adaption at low signal level. ⁴ Adjustable via interface and software or directly at the device.



Display of current temperature and ratio correction K



Optical head ROH II (left side) and optical head ROH I (right side)

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Optics

ROH I-100 (Part number 3310A50011), Aperture D = 6,0 mm

| Measurement distance a [mm] | 0 | 100 | 165 | 225 | 300 | 500 | 700 | 1000 |
|-----------------------------|--------------------|-----|-----|-----|-----|-----|-----|------|
| Measuring temperature range | Target size M [mm] | | | | | | | |
| 300 °C to 1100 °C | 6.0 | 1.8 | 2.9 | 4.0 | 5.5 | 9.0 | 13 | 18 |
| 350 °C to 1300 °C | 6.0 | 1.8 | 2.9 | 4.0 | 5.5 | 9.0 | 13 | 18 |
| 400 °C to 1600 °C | 6.0 | 0.9 | 1.4 | 2.0 | 2.7 | 4.5 | 6.5 | 9.0 |
| 500 °C to 2300 °C | 6.0 | 0.9 | 1.4 | 2.0 | 2.7 | 4.5 | 6.5 | 9.0 |

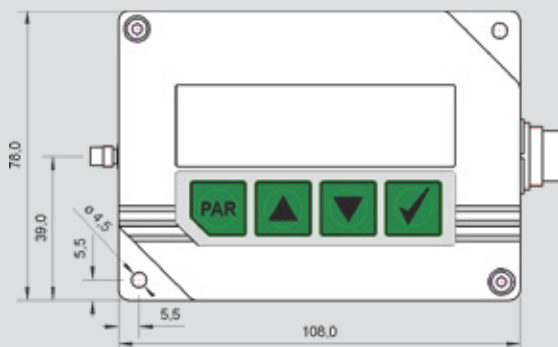
ROH II-65 (Part number 3310A50021), Aperture D = 9,0 mm

| Measurement distance a [mm] | 0 | 65 | 85 | 110 | 150 | 200 | 240 | 300 |
|-----------------------------|--------------------|-----|-----|-----|-----|-----|-----|-----|
| Measuring temperature range | Target size M [mm] | | | | | | | |
| 300 °C to 1100 °C | 9.0 | 1.3 | 1.7 | 2.1 | 2.8 | 3.6 | 4.2 | 5.0 |
| 350 °C to 1300 °C | 9.0 | 1.3 | 1.7 | 2.1 | 2.8 | 3.6 | 4.2 | 5.0 |
| 400 °C to 1600 °C | 9.0 | 0.7 | 0.9 | 1.1 | 1.4 | 1.8 | 2.1 | 2.5 |
| 500 °C to 2300 °C | 9.0 | 0.7 | 0.9 | 1.1 | 1.4 | 1.8 | 2.1 | 2.5 |

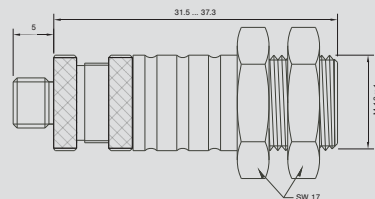
ROH II-250 (Part number 3310A50026), Aperture D = 9,0 mm

| Measurement distance a [mm] | 0 | 250 | 400 | 600 | 800 | 1000 | 2000 | 2500 |
|-----------------------------|--------------------|-----|-----|-----|-----|------|------|------|
| Measuring temperature range | Target size M [mm] | | | | | | | |
| 300 °C to 1100 °C | 9.0 | 3.0 | 5.0 | 7.2 | 9.2 | 12 | 24 | 31 |
| 350 °C to 1300 °C | 9.0 | 3.0 | 5.0 | 7.2 | 9.2 | 12 | 24 | 31 |
| 400 °C to 1600 °C | 9.0 | 1.7 | 2.7 | 4.4 | 5.5 | 6.8 | 13 | 17 |
| 500 °C to 2300 °C | 9.0 | 1.7 | 2.7 | 4.4 | 5.5 | 6.8 | 13 | 17 |

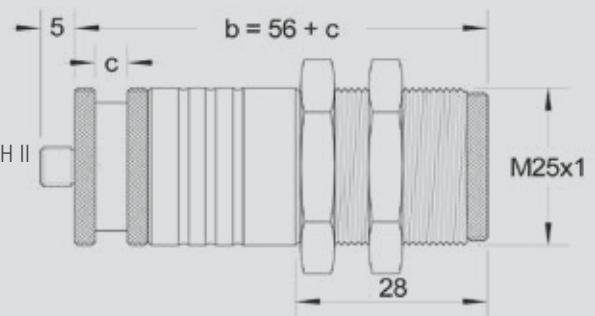
Pyrometer dimensions



ROH I

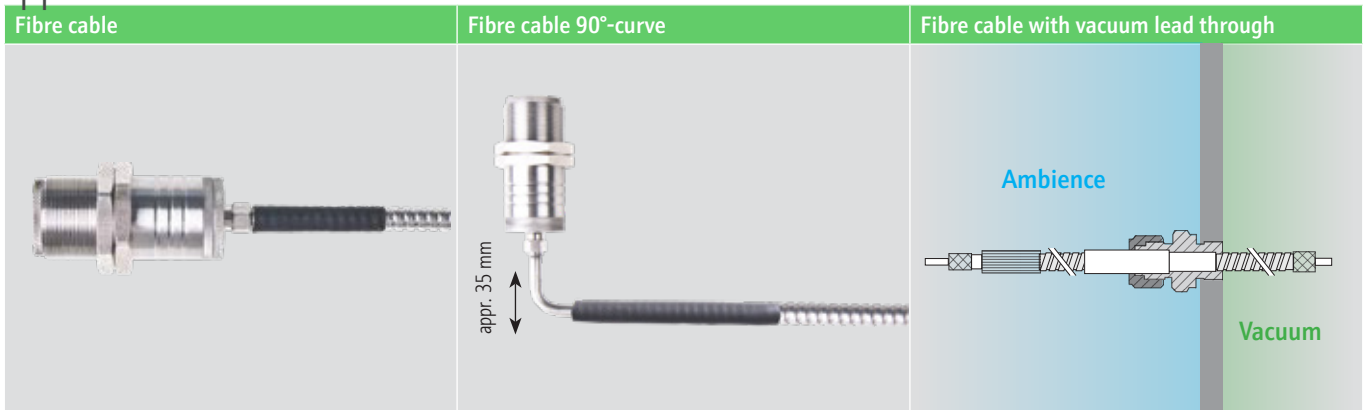


ROH II



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| Fibre cables, stainless steel \varnothing 200 μ m - Order numbers | | | | Fibre cables, stainless steel \varnothing 400 μ m - Order numbers | | | |
|---|--------|------------|------------|---|--------|------------|------------|
| Temperature range | length | straight | 90° curve | Temperature range | length | straight | 90° curve |
| A250C FO PL 400 °C to 1600 °C 500 °C to 2300 °C | 1.5 m | 3310A42001 | 3310A42011 | AST 250C FO PL 300 °C to 1100 °C 350 °C to 1300 °C | 1.5 m | 3310A44001 | 3310A44011 |
| | 2.0 m | 3310A42002 | 3310A42012 | | 2.0 m | 3310A44002 | 3310A44012 |
| | 2.5 m | 3310A42003 | 3310A42013 | | 2.5 m | 3310A44003 | 3310A44013 |
| | 5.0 m | 3310A42004 | 3310A42014 | | 5.0 m | 3310A44004 | 3310A44014 |
| | 7.5 m | 3310A42005 | 3310A42015 | | 7.5 m | 3310A44005 | 3310A44015 |
| | 10.0 m | 3310A42006 | 3310A42016 | | 10.0 m | 3310A44006 | 3310A44016 |
| | 15.0 m | 3310A42007 | 3310A42017 | | 15.5 m | 3310A44007 | 3310A44017 |

Other lengths on request! Variants with vacuum lead through or special quartz and sapphire glass available.

| 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 ROH I | 3310A21014 |
| Length 5 m | 3310A11112 | 3310A11132 | Mounting angle fixed for optical head ROH II | 3310A21522 |
| Length 10 m | 3310A11113 | 3310A11133 | Mounting angle adjustable for optical head ROH II | 3310A21523 |
| Length 15 m | 3310A11114 | 3310A11134 | Air purge unit for ROH 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 ROH II, stainless steel, 90° | 3310A31020 |

¹ Selected accessories.

| Selected accessories - pictures | | |
|---|---|---|
| Mounting angle, adjustable, for ROH II Order number:: 3310A21523 | Mounting angle, adjustable, for ROH II Order number:: 3310A21520 | Air purge unit for ROH II Order number:: 3310A22520 |
|  |  |  |
| Mirror 90° for ROH II Order number:: 3310A31020 | Power supply Order number:: 3310A12010 | Sighting tube (100 mm) Order number: 3310A22530 |
|  |  |  |

Technical details are subject to change. 05.06.20



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