AST AL514

Pyrometer for application in glass industry

Overview

Digital pyrometer with RS-485 interface

Features

- For temperature measurements between 50 °C and 2500 °C
- Temperature linear output 0/4 to 20 mA
- RS-485 interface

- Short response time from 5 ms
- Several fixed optics available
- Robust stainless steel housing

Description and applications

The digital pyrometers AST AL514 are specifically designed for application in glass industry. The devices are suitable for temperature measurement from 50 °C to 2500 °C on glass surfaces, float glass and liquid glass especially in glass industry.

The solid body in stainless steel housing allows usage even under rough environmental conditions. With a fast response time of only 5 ms (t_{95}) these pyrometers are also suitable for fast measuring rocesses. Several fixed optic types realise measuring field diameters from 1.6 mm.

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

The devices are equipped with a galvanically isolated RS-485 interface, which allows parameterizing and software evaluation even in bus systems. The connection to local area networks can be supported by an Ethernet interface box.

The optional integrated LED aiming light allows exact alignment to the measuring object. The LED size is identical to measuring spot size and visible even at high temperatures.

Via an optional interface module (RS-485 to USB) parameters like emissivity, sub range, response time and storage can be easily adjusted by using the convenient parameterizing and evaluation software AST NET. The parameters can also be adjusted via RS-485 interface with the optional available handheld programming device DHP 1040 or the Ethernet Interface-Box DCU$_{IoP}$.

Typical application areas:

- Glass industry
- Float glass
- Glass bottle production
- Liquid glass
- Glass forms

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Technical data

Type	AL514	AL514	AL514
Measuring temperature range	50 °C to 1300 °C	100 °C to 1800 °C	500 °C to 2500 °C
Sub temperature range	adjustable via RS-485 interface within temperature range, minimum span 50 °C		
Spectral range	around 5.0 µm		
Optics	several fixed optics (type 100, 300 and 800), aperture diameter D = 15 mm		
Distance ratio	approx. 50 : 1		
Measurement uncertainty [1]	0.6 % of meas. value in °C or 1 K [2]		
Reproducibility [1]	0.3 % of meas. value in °C or 0.5 K [2]		
NETD [1]	0.1 K [4]		
Response time (t95)	5 ms (min.), adjustable via RS-485 interface		
Emissivity ε	0.050 to 1.000, adjustable via RS-485 interface		
Storage	minimum and maximum value storage, adjustable via RS-485 interface		
Output	0/4 to 20 mA, temperature linear, max. burden: 700 Ω		
Interface	RS-485 (galvanically isolated), half duplex, max. baudrate 115 kBd, data protocol Modbus RTU		
Aiming	none, optional: integrated LED aiming light or laser aiming light adaptor		
Software	PYROSOFT Spot for Windows®, optional: PYROSOFT Spot Pro		
Parameters	emissivity, response time, storage, sub range, adjustable via RS-485 interface and software		
Power supply	24 V DC ± 25 %, residual ripple 500 mV		
Power consumption	max. 1.5 W (without aiming light)		
Operating temperature	0 °C to 70 °C		
Storage temperature	−20 °C to 70 °C		
Weight	approx. 450 g		
Dimensions	thread M40 × 1.5, length 126 mm		
Housing	stainless steel with plug connector		
Protection class	IP 65 (according to DIN EN 60529 and DIN 40050)		
CE symbol	according to EU regulations		
Scope of delivery	AST AL514, manual, inspection sheet, mounting screw nuts, AST NET for Windows® (without connecting cable, please order separately)		

[1] For black body radiation, T = 23 °C, T = 300 °C, whichever is higher value. [2] Noise equivalent temperature difference. [4] object 700 °C once, object (500 °C to 2500 °C)

Dimensional drawing
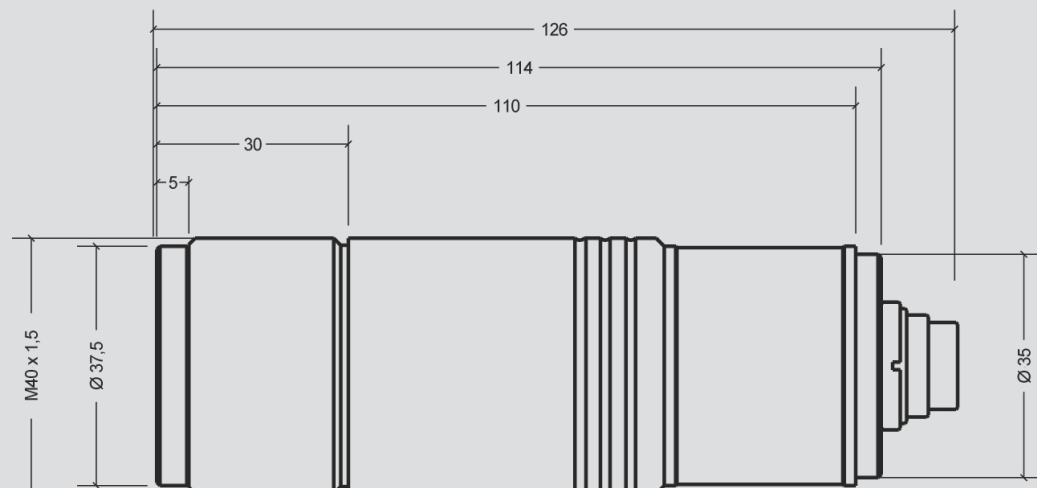
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Optics 100, 300 and 800

Optics 100 (sharp point at a = 95 mm measuring distance, marked bold)

Measuring distance a [mm]	0	50	**95**	150	200	250	300
Temperature range	Measuring field diameter M [mm]						
AL514 (50 °C to 2500 °C) without LED aiming light	15.0	7.9	**1.6**	11.0	20.0	28.0	37.0
AL514 (50 °C to 2500 °C) with LED aiming light [1]	13.0	7.1	**1.7**	11.0	18.0	26.0	34.0
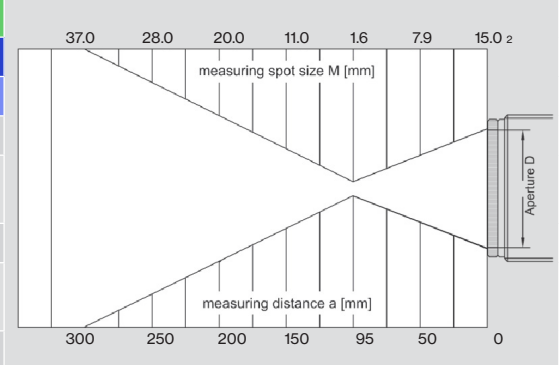
Optics 300 (sharp point at a = 250/260 mm measuring distance, marked bold)

Measuring distance a [mm]	**250**	**260**0	100		400	500	600
Temperature range	Measuring field diameter M [mm]						
AL514 (50 °C to 2500 °C) without LED aiming light	15.0	10.8	4.6	**4.2**	15.0	22.0	29.0
AL514 (50 °C to 2500 °C) with LED aiming light	15.0	11.0	**4.5**	5.3	17.0	25.0	32.0
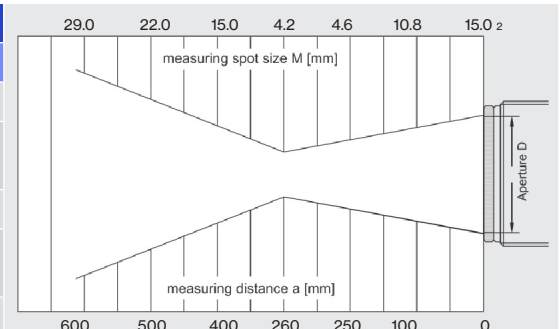
Optics 800 (sharp point at a = 800 mm measuring distance, marked bold)

Measuring distance a [mm]	0	300	500	600	**800**	1000	1200
Temperature range	Measuring field diameter M [mm]						
AL514 (50 °C to 2500 °C) without LED aiming light	15.0	14.6	14.4	14.3	**14.0**	18.0	24.0
AL514 (50 °C to 2500 °C) with LED aiming light	15.0	14.6	14.4	14.3	**14.0**	18.0	24.0
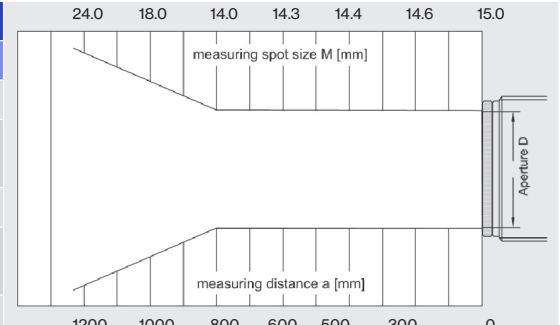
[1] With attachment lens tubus. Aperture D = 13 mm, length 24 mm, Ø 19 mm.   [2] Target size without LED aiming light.

Calculation of measuring field diameter

$$M_1 = \frac{a_1}{a} \times (M + D) - D$$

$$M_2 = \frac{a_2}{a} \times (M - D) + D$$
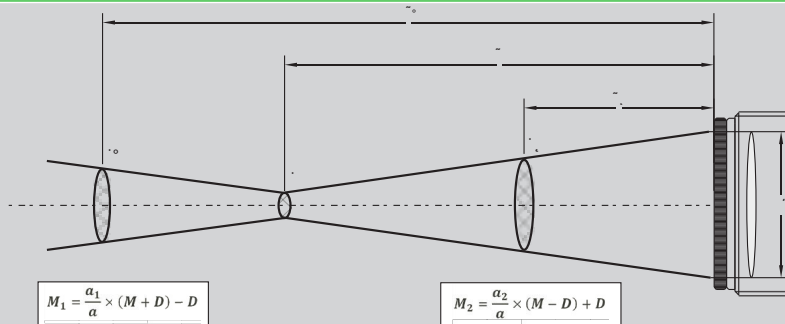
Order numbers

Device \ Optics	100	300	800
AL514 (50 °C to 1300 °C)	4449541201, 4449551201 (LED)	4449542201, 4449552201 (LED)	4449543201, 4449553201 (LED)
AL514 (100 °C to 1800 °C)	4449541202, 4449551202 (LED)	4449542202, 4449552202 (LED)	4449543202, 4449553202 (LED)
AL514 (500 °C to 2500 °C)	4449541203, 4449551203 (LED)	4449542203, 4449552203 (LED)	4449543203, 4449553203 (LED)
(LED = with LED aiming light)			

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Electrical, mechanical and optical accessories[1]			Order number	
Connecting cable, straight plug, 12-pin	Connecting cable, with pilot light button, angulated plug, 12-pin	length 2 m length 5 m length 10 m length 15 m length 20 m length 25 m length 30 m	3310A11111 3310A11112 3310A11113 3310A11114 3310A11115 3310A11116 3310A11117	3310A11151 3310A11152 3310A11153 3310A11154 3310A11155 3310A11156 3310A11157
Interface module	RS-485 to USB		3310A14020	
Power supply PSU 15	24 V DC, 0.6 A		3310A12010	
Mounting angle	fixed, adjustable		3310A21010 3310A21011	
Ball and socket mounting			3310A21012	
Air purge unit	stainless steel, purge air 0.1 to 0.5 bar, oil-free		3310A22010	
Cooling jacket	stainless steel, with integrated air purge unit		3310A23010	
Vacuum flange	KF 16 (without window) with zinc selenide window		3310A24010 3310A24010 + 3310A34041	
Laser aiming light adaptor	adapter (only for devices without integrated LED aiming light)		3310A33010	
DHP 1040	portable handheld device for pyrometer programming		3310A17010	
Ethernet Interface-Box DCU_{IoP}	For the connection in local networks and parameterizing		3310A13500	
[1] More accessories available.				

Selected accessories – images		
Mounting angle, adjustable	**Window slide (without window)**	**Air purge unit for series 40/42/44**
Order number: 3310A21011	Order number: 3310A21210	Order number: 3310A22010
Cooling jacket	**Ethernet Interface-Box DCU_{IoP}**	**Digital display DD 200/210**
Order number: 3310A23010	Order number: 3310A13500	Order number: 3310A13020/3310A13025