

opacity and  
dust compliance  
monitoring



# LAND

Combustion & Environmental Monitoring

An **AMETEK**® Company

# 4500 MkII+

## 4500MkII+ - Compliance monitoring for opacity and dust

“ outstanding reliability, proven on thousands of instruments installed worldwide”



Land is a world leader in opacity monitor design and manufacture, with a commitment to continuous product improvement.

The Model 4500 MkII+ meets the latest and most demanding standards for Continuous Opacity Monitoring Systems.

### Designed for compliance monitoring

- Meets or exceeds US EPA requirements for 40CFR60 Sections 13, 17 and App. B PS-1 and PS-11
- Meets or exceeds US EPA requirements for proposed 40CFR60 App. F Procedure 3
- Meets or exceeds ASTM Standard D6216
- TÜV approved to the requirements of 13th BImSchV and TA Luft
- MCerts certified Continuous Emissions Monitoring System

## Features and Benefits

- Designed for compliance applications - *Approved to the latest standards*
- High reliability, low maintenance - *No continuously moving parts*
- Automatic in-situ zero and span checking - *Built-in calibration audit jig*
- Patented measurement technology - *Unique “no drift” zero check*
- Easily integrated into plant control system - *RS232 or RS485 serial MODBUS interface*



## Applications include:

- Power utilities
- Incineration
- Pulp and paper
- Rock products
- Steel
- Cement
- Glass
- Refineries
- Petrochemical
- Process Industries

## Patented Technology

The Model 4500 MkII+ uses a patented highly homogeneous “advanced LED light source”<sup>1</sup> together with a patented “Flood LED”<sup>2</sup>, to achieve the highest levels of stability and accuracy. The “no moving parts” optical system gives the dust emissions monitor exceptional reliability.

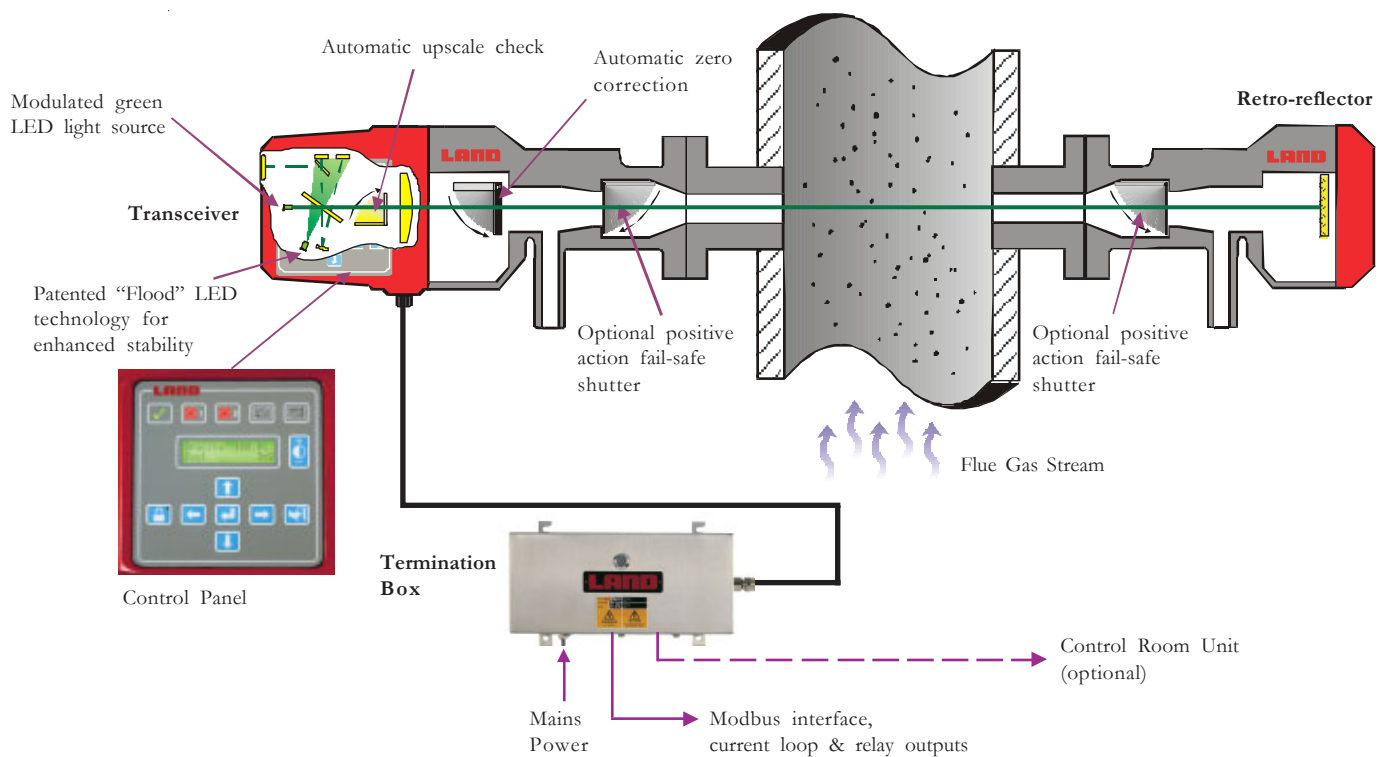
- 1 US Patent No. 6781695
- 2 UK Patent No. 2287785  
US Patent No. 5617212

## Easy Installation

The stainless steel Termination Box has a single, pre-terminated cable for connection to the instrument itself. All customer connections are made using simple terminal rails inside the box.

## Simple Setup

The integral control panel provides all user setup, control and diagnostic information.



## Automatic Calibration

The Model 4500 MkII+ is fitted with a fully automatic zero checking and drift compensation system. An automatic span check mechanism confirms the instrument calibration at user defined intervals.

## Easy Auditing

Periodic performance verification could not be simpler. The built-in audit jig accepts standard optical filters, and the zero alignment can be confirmed without removing the instrument from the stack.



## Dust Density

Dust density monitors must be calibrated by comparison with an isokinetic sample test, as proposed in PS-11. The Model 4500 MkII+ fully supports this operation with automatic averaging and calculation.

## Further Information

### UK

Land Instruments International Ltd  
Dronfield,  
Derbyshire, S18 1DJ  
Tel: +44 (0) 1246 417691  
Fax: +44 (0) 1246 290274  
E-Mail: [combustion.info@landinst.com](mailto:combustion.info@landinst.com)  
Web: [www.landinst.com](http://www.landinst.com)

### USA

Ametek LAND, Inc.  
10 Friends Lane  
Newtown, PA 18940-1804  
Tel: +1 215 504 8000  
Fax: +1 215 504 0879  
E-Mail: [combsales@landinstruments.net](mailto:combsales@landinstruments.net)  
Web: [www.landinstruments.net](http://www.landinstruments.net)

### Poland

Land Instruments Sp z o.o.  
ul. Michalowskiego 5/2  
31 - 126 Krakow  
Tel: +48 (0) 12 632 82 62  
Fax: +48 (0) 12 632 24 74  
E-Mail: [land@land.com.pl](mailto:land@land.com.pl)  
Web: [www.land.com.pl](http://www.land.com.pl)

### Italy

Land Instruments SRL  
Via dell'Industria, 2  
20037 Paderno Dugnano MI  
Tel: +39 02 9904 0423, 9108 0020  
Fax: +39 02 99 04 0418  
E-Mail: [comb.info@landinst.it](mailto:comb.info@landinst.it)  
Web: [www.landinst.it](http://www.landinst.it)

### France

Land Instruments Sarl  
7 Parc des Fontenelles  
78870 Bailly  
Tel: +33 (0) 1 30 80 89 20  
Fax: +33 (0) 1 30 80 89 21  
E-Mail: [info-combustion@landinst.fr](mailto:info-combustion@landinst.fr)

### Mexico

Land Instruments International  
Av. Horacia 1132 Planta Baja "B"  
Col. Polanco  
11550 MEXICO D.F.  
Tel + 52 55 5281 1165  
Fax + 52 55 5281 5364  
E-Mail: [ventas@landinstruments.net](mailto:ventas@landinstruments.net)

## Specifications

### Measuring

Technique: Cross stack, double pass / path transmissometry  
Operating Wavelength: 520 ± 20 nm  
Light Source: High Intensity LED  
Range: Opacity 0 - 20 % to 0 - 100 %; Optical Density 0 - 0.2 to 0 - 3.0  
Dust Density 0 - 100 to 0 - 4000 mg/m<sup>3</sup> User Selectable  
Accuracy: ± 2% Opacity  
Linearity: < 2% of range  
Resolution: 0.1% Opacity; 0.001 Optical Density; 0.1 mg/m<sup>3</sup> Dust  
Suitable for stack diameter: 0.6 to 25 m / 2 ft to 82 ft  
Installation pathlength: 0.97 to 25 m / 3 ft to 82 ft  
Calibration: Automatic zero and upscale calibration  
(Selectable interval 1 to 24 hours in 1 hour steps)  
Response Time: < 10s (< 2s with no damping)  
Calibration Error: < 2% Opacity  
(per ASTM D6216)  
24 Hour Drift: < 0.3% Opacity  
Long Term Drift: < 0.3% Opacity per month  
Voltage Variation: < 0.5% Opacity (over 85 - 265 V a.c.)  
(per ASTM D6216)  
Thermal Stability: < 2% Opacity (over -20 to +55°C / -4 to +131°F range)  
Ambient Light Sensitivity: < 2% Opacity  
(per ASTM D6216)  
Insensitivity to Misalignment: < 1% Opacity for ±0.25° Misalignment

### Control Panel

Display: 2 x 16 character reflective backlit LCD with adjustable contrast control  
Keypad: 7 Keys for data input  
Indicators: System OK, Alarm 1, Alarm 2, Zero calibration, Span calibration

### Environmental

Operating Temperature: -20 to 55 °C / -4 to 131 °F (-40 °C / -40 °F with optional heater)  
Max. Flue Gas Temp.: 600 °C / 1112 °F  
Max. Flange Temp.: 200 °C / 392 °F  
Environmental Rating: IP66 / NEMA4X

### Compliance

Measurement Standards: Meets or exceeds US EPA requirements for 40CFR60 Sections 13, 17 and App. B PS-1 & PS-11  
Meets or exceeds US EPA requirements for proposed 40CFR60 App. F Procedure 3  
Meets or exceeds ASTM Standard D6216  
Approvals: MCerts certified Continuous Emissions Monitoring System  
TUV Approved to the 13<sup>th</sup> BImSchV and TA Luft  
Safety: Conforms to EN-61010-2  
EMC: Conforms to EN-50 081 & EN-50 082

### Outputs

Modbus Interface: RS232 or RS485. Opacity, Dust, Optical Density, Status, Averaging and Range information available  
Analog Outputs (2): Two isolated 4-20mA current outputs, independently configurable as Opacity, Dust Optical Density, Calibration Drift or OPLR  
Relay Outputs (2): Independently configurable as System OK, Span calibration, Zero calibration, Alarm 1, Alarm 2 or Maintenance  
Relay Rating: 1 A @ 24 V d.c., 1 A @ 240 V a.c.

### Electrical

Power Supply: 90 - 260 V a.c. 50 - 60 Hz  
Power Rating: 10 W

### Mechanical Data

Dimensions (HxWxD)  
Transceiver 220 x 220 x 520 mm / 9 x 9 x 20.5 in  
Retro-reflector 220 x 220 x 320 mm / 9 x 9 x 12.6 in  
Termination box 180 x 400 x 120 mm / 7 x 16 x 5 in  
Weight  
Transceiver 15.2 kg / 33.5 lb  
Retroreflector 7.6 kg / 16.8 lb  
Termination Box 7.5 kg / 16.5 lb

### Options

Air Blower Units Automatic Fail-safe Shutters  
Weather Covers Control Room Unit  
Lightning Protection System Alignment Tool  
Calibration Filters

*Continuous product development may make it necessary to change these details without notice*

# LAND

[www.landinst.com](http://www.landinst.com)

An **AMETEK** Company

LAND has a comprehensive range of Combustion and Environmental Monitoring Instrumentation.



TÜV approved



Sira MC 040028/00



PDS 196/08/06

*Approval applies to products designed and manufactured in the UK*

*Approval applies in the USA*