

# DIGITAL LASER DISTANCE METER **LD05-HTGF**

with glass-fiber coupled remote optical head

The *RIEGL* LD05-HTGF is a **laser distance meter** based on precise time-of-flight laser range measurement especially suited for demanding applications under critical environmental conditions, i.e. high ambient temperature or hazardous environment. It is additionally optimized for **very high target temperatures**.

It uses state-of-the-art **digital signal processing** to enable precise distance measurement for complex multi-target situations even under bad visibility conditions. Digitizing the echo signal and subsequent analysis enables multi-target distance measurements.

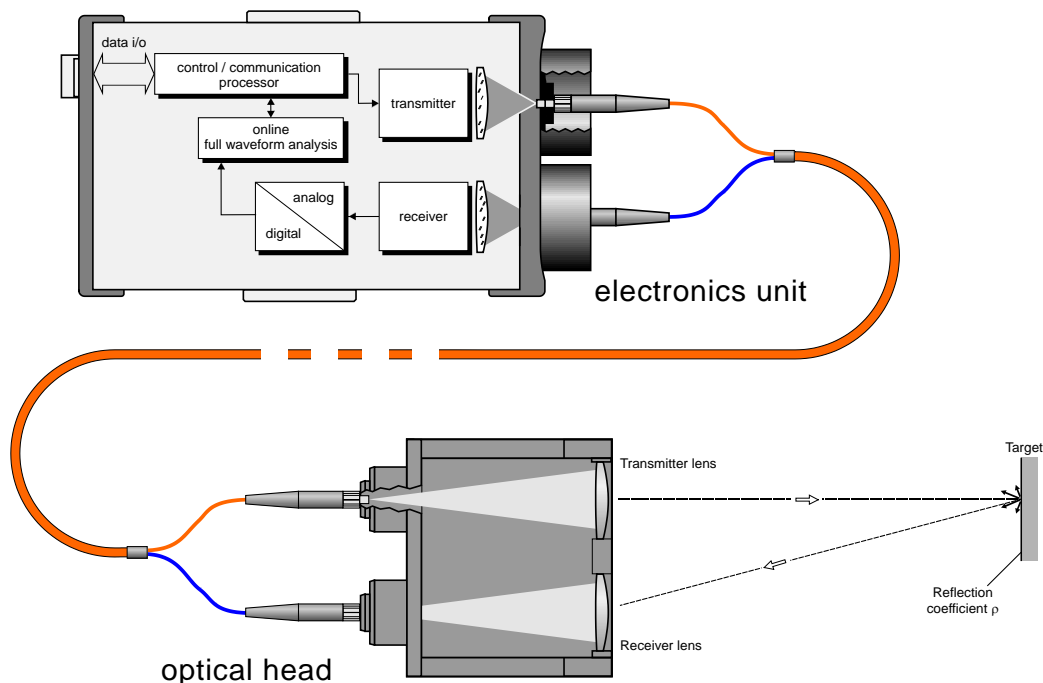


**The measuring system consists of an optical head** meeting the requirements of the relevant application **and a separate electronics box, connected by a duplex glass-fiber cable** of variable length with connectors on both sides.

- **Electronics unit and measuring head** can be **mounted separately** according to requirements resulting from critical environmental conditions
- **Further improved measurement capability** in demanding situations **causing poor visibility** (rain, dust, fog).
- Short infrared laser pulses providing **excellent interference immunity**
- Narrow measurement beam with low divergence for **excellent spatial resolution**
- **Measurement to almost any surface** regardless of the angle of incidence of the beam and the surface characteristics
- Significant enhancement of the maximum range based on **pre-detection-averaging**

# General Description LD05-HTGF

## Principle of Operation



An electrical pulse generator periodically drives a semi-conductor laser transmitter, emitting infrared light pulses, which are fed into a glass fiber cable. The pulses are guided to the optical head and collimated by the transmitter lens. Part of the echo signal reflected by the target is coupled into the glass fiber cable via the receiver lens and guided back to the electronics unit.

A receiver converts the optical echo signal into an electrical signal, which is digitized internally and subsequently forwarded to a subsystem for on-line full waveform analysis. Sophisticated algorithms for waveform analysis improve the instrument's capabilities to measure the desired target even in the presence of smoke, fumes or dust.

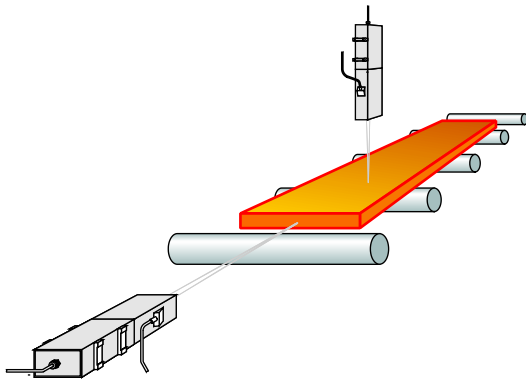
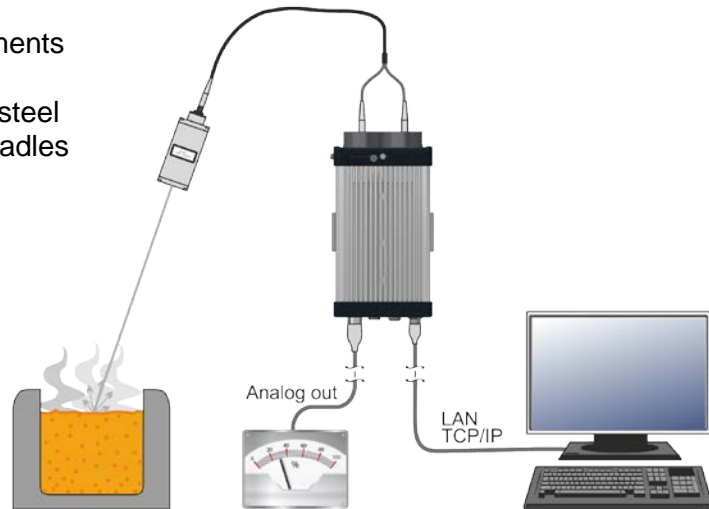
## Features and Advantages:

- The LD05-HTGF electronics unit can be combined with **various optical heads** to suit nearly any requirement.
- The **optical head contains no electronics** and is therefore extremely small, light-weight, inexpensive, high-temperature resistant, and insensitive to electromagnetic or ionizing radiation.
- The **duplex glass-fiber cable** connecting the electronics unit and the optical head provides galvanic insulation between optical head and electronics box. Its length can be specified with options ranging from **4m to more than 100m**.

# General Description LD05-HTGF

## Main Applications

- Distance and level measurements in high-temperature areas
- Level measurement of liquid steel in melting pots or in transfer ladles
- Robotic applications in nuclear power plants.



- Measurement of the position, width, and thickness of glowing slabs in rolling mills

The LD05-HTGF is optimized for measuring very hot and glowing targets in steel plants, rolling mills, foundries etc.:

Transmitter and receiver optics are equipped with narrow-band optical filters to avoid disturbances of the measurement caused by the radiation of light and heat from the hot target surface. If necessary the front side can be equipped with an additional protection tube, which can be flushed with nitrogen or compressed air to keep the lenses clean.

## General Description LD05-HTGF

Digitizing the echo signal and analyzing it allows **excellent clutter suppression under demanding environmental conditions, i.e., in the presence of dust, smoke or fumes.**

To meet different application challenges, user parameters as measurement rate, maximum target count (first target only, last target only, all targets) or sensitivity are adjustable.

### Standard Interfaces:

- WEB Interface for configuration via WEB browser
- LAN TCP/IP ports
- RS232 / RS422 port

### Optional Industrial Interfaces:

- Analog output 4 – 20 mA
- Digital switching output (2x)

### Optional Infrared Radiation Channel:

With this option the LD05-HTGF also measures the infrared radiation received in a well-defined wavelength band emitted by the targets within the solid angle of the measurement beam with every range measurement. The output is proportional to the logarithm of the received infrared power and can be calibrated to give the target's surface temperature within the range of 300°C to 1600°C.

### Further key features of the LD05-HTGF are:

- Short infrared laser pulses providing excellent interference immunity
- Narrow measurement beam with low divergence for excellent spatial resolution
- Lightweight, with a stable metal housing, suitable for use in rough industrial environments.

# Technical Data LD05-HTGF

The technical data can be influenced by the environmental conditions to a considerable extent, especially by the following parameters and conditions:

- Surface temperature and reflection characteristics of the target
- Distance to the target
- Angle of incidence of the measurement beam
- Optical attenuation of the gases between target and instrument

## Specifications

	<b>LD05-HTGF in combination with Optical Head MK36-XX</b>
<b>Measurement range in High Penetration Mode</b> <sup>1)</sup>	
Optimized for liquid steel, temperature up to 1600°C	3 m to 10 m
Optimized for glowing slabs, temperature up to 1450°C	2 m to 35 m
Optimized for other targets, temperature up to 1000°C	2 m to 100 m

Examples for integrated predefined measurement programs:

<b>High Penetration Mode</b>	<b>LD05-HTGF in combination with Optical Head MK36-XX</b>
<b>Measurement accuracy</b> <sup>2)</sup>	typ. ± 10 mm
<b>Measurement rate</b> <sup>3)</sup>	typ. 100 Hz

<b>Fast Mode</b>	<b>LD05-HTGF in combination with Optical Head MK36-XX</b>
<b>Measurement accuracy</b> <sup>2)</sup>	typ. ± 15 mm
<b>Measurement rate</b>	typ. 1000 Hz


1) Depending on the surface temperature and the reflection coefficient of the target

2) One sigma @ 5 m range under *RIEGL* test conditions (except measurements at reflective foil / retro-reflective targets).

3) With self-adapting measurement time selected, the effective data update rate depends on the reflectivity of the target.

# Technical Data LD05-HTGF

## Laser Specifications

	<b>LD05-HTGF in combination with Optical Head MK36-XX</b>
<b>Wavelength</b>	near infrared
<b>Beam divergence</b> diameter of the infrared measuring beam @ 3 m – 10 m @ 50 m @ 100 m	approx. 30 mm approx. 120 mm approx. 240 mm
<b>Laser Product Classification</b> according to IEC 60825-1:2007  The following clause applies for instruments delivered into the United States: Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.	Class 1  

# Technical Data LD05-HTGF

## Electrical Data

	<b>LD05-HTGF in combination with Optical Head MK36-XX</b>
<b>Data interfaces</b>	
Data port	TCP/IP, 10/100/1000 MBit port or RS232/RS422
Configuration port	TCP/IP, 10/100/1000 MBit port or RS232/RS422
WEB Interface	TCP/IP, 10/100/1000 MBit port
<b>Power supply</b>	11 – 28 V DC, 24 VDC nominal
<b>Power consumption</b>	18 W
<b>Optional</b>	
Analog Output	4 – 20 mA <sup>1)</sup> , not galvanically isolated, resolution 16 Bit, linearity 1 ‰ of full scale
Switching Output	2 x PNP transistor driver <sup>2)</sup> , built-in thermal and short-circuit protection, switching current 200 mA max., switching voltage = supply voltage

1) Operating range selectable via TCP/IP port or serial interface.

2) Switching points adjustable via TCP/IP port or serial interface.

# Technical Data LD05-HTGF

## Physical Data

<b>Electronics Unit</b>	<b>LD05-HTGF</b>
<b>Main dimensions</b> (L x W x H)	245.5 x 130 x 98 mm
<b>Weight</b>	approx. 2.8 kg
<b>Protection class</b> glass-fiber cables attached	IP64
<b>Temperature range</b> Operation Storage	+15°C up to +50°C <sup>1)</sup> -20°C up to +60°C <sup>1)</sup>
<b>Mounting</b>	Flanges on both sides

1) The life expectancy (MTBF) of the instrument is reduced in case of operation and/or storage at high temperatures.

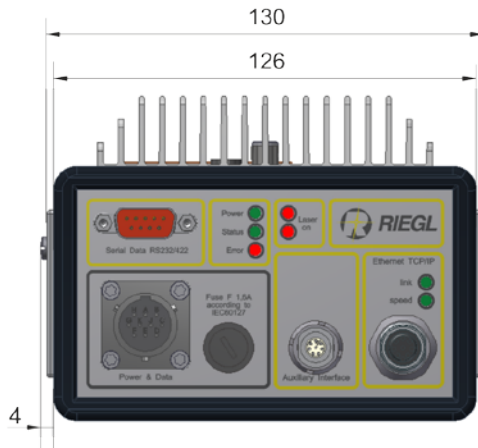
<b>Optical Head</b>	<b>MK36</b>	<b>MK36-Z65</b>	<b>MK36-PT</b>	<b>MK36-HT</b>
<b>Main dimensions</b> (L x W x H)	120x80x50 mm	133x Ø65 mm	500x120x70 mm	655x Ø285 mm
<b>Weight</b>	0.67 kg	0.4 kg	approx. 4.4 kg	10.0 kg
<b>Protection class</b> glass-fiber cables attached	IP62	IP 62	IP62	IP64
<b>Temperature range</b> Operation Storage	-20°C up to +80°C -20°C up to +80°C			



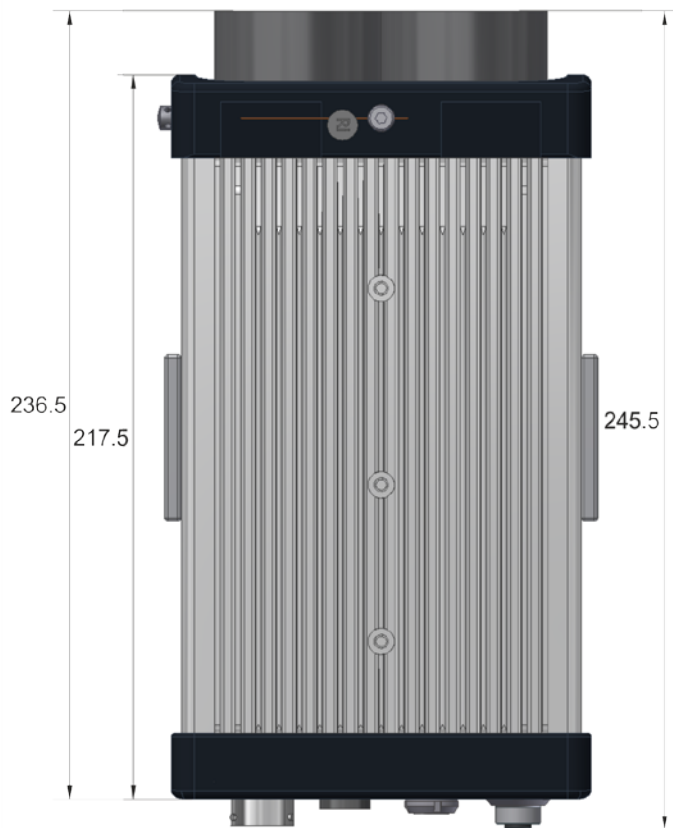
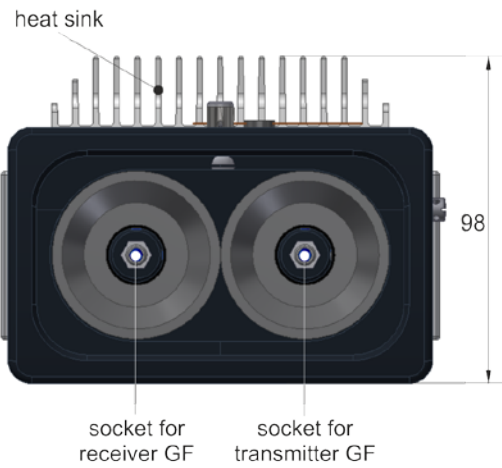
# Technical Data LD05-HTGF

## Dimensional Drawings

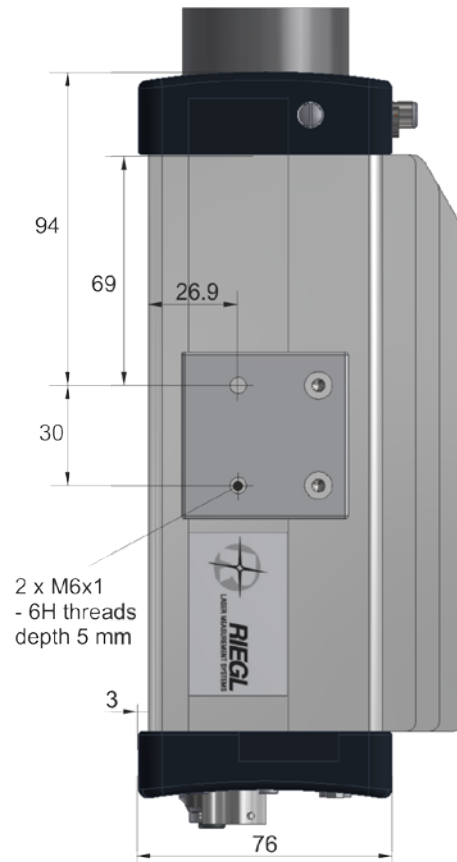
rear view



front view



top view



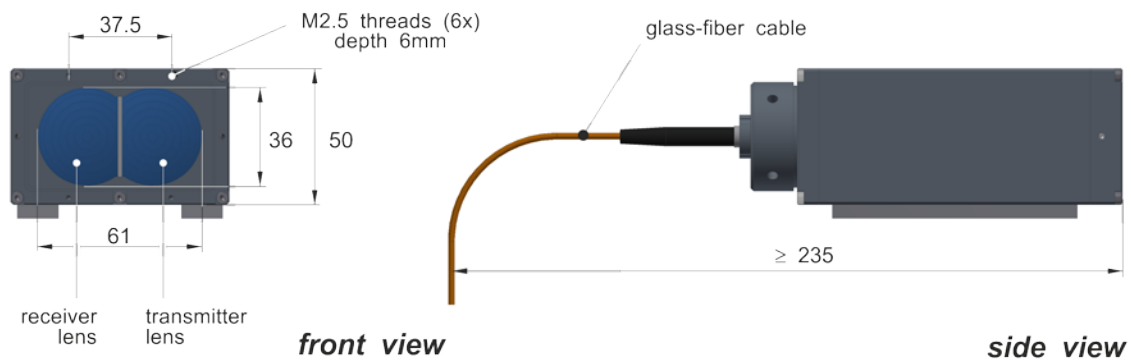
side view

All dimensions in mm.

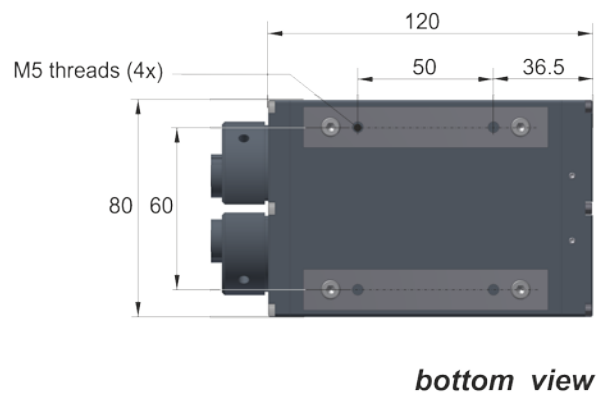
# Technical Data LD05-HTGF

## Remote Optical Head MK36:

case: aluminium, black anodized  
main dimensions: 120 x 80 x 50 mm  
weight: 0.67 kg  
protection class: IP62 (glass fiber cables attached)  
temperature range: -20° to +80° C (operation and storage)



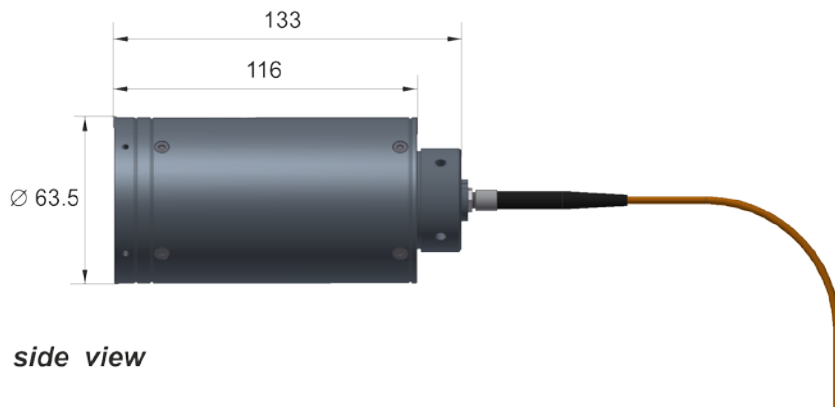
All dimensions in mm.



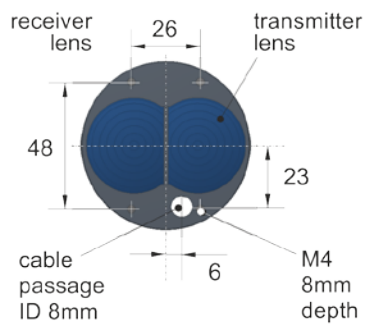
# Technical Data LD05-HTGF

## Remote Optical Head MK36-Z65:

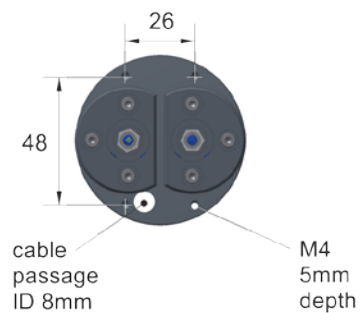
case:	aluminium, black anodized (stainless steel version on request)
main dimensions:	133 x Ø 65 mm
weight:	0.4 kg
protection class:	IP62 (glass fiber cables attached)
temperature range:	-20° to +80° C (operation and storage)



side view



front view

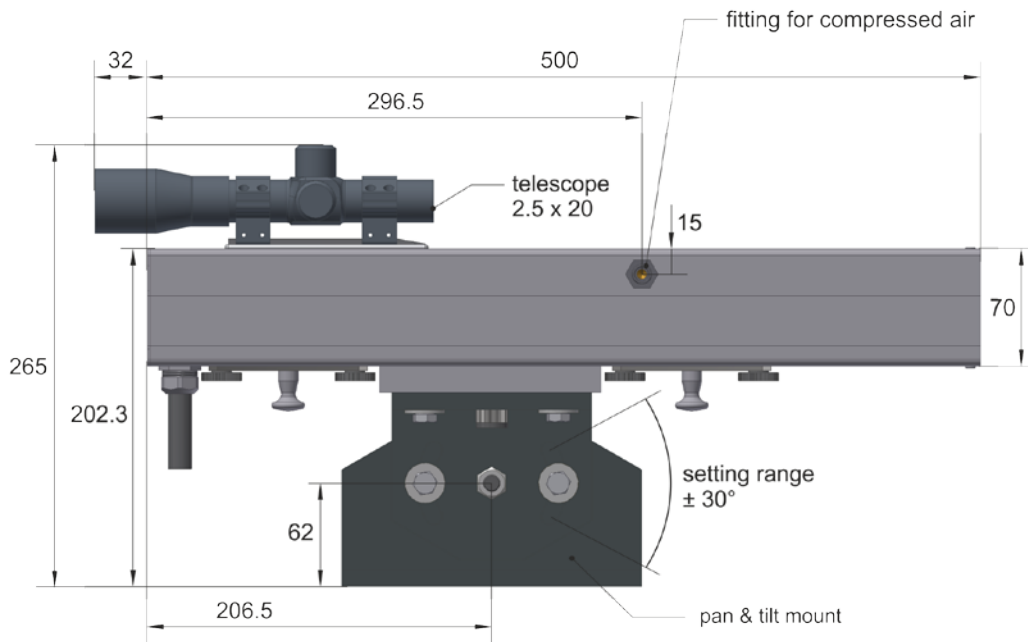


rear view

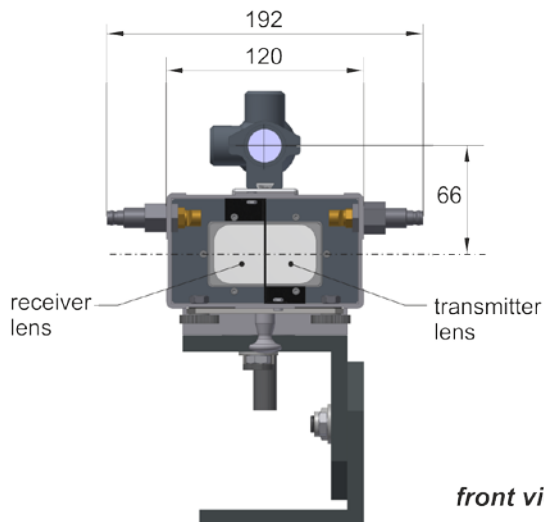
# Technical Data LD05-HTGF

## Remote Optical Head MK36-PT:

case:	aluminium, black anodized
main dimensions:	500 x 120 x 70 mm
weight:	approx. 4.4 kg
protection class:	IP62 (glass fiber cables attached)
temperature range:	-20° to +80° C (operation and storage)
recommended air pressure:	2 – 4 bar



*side view*



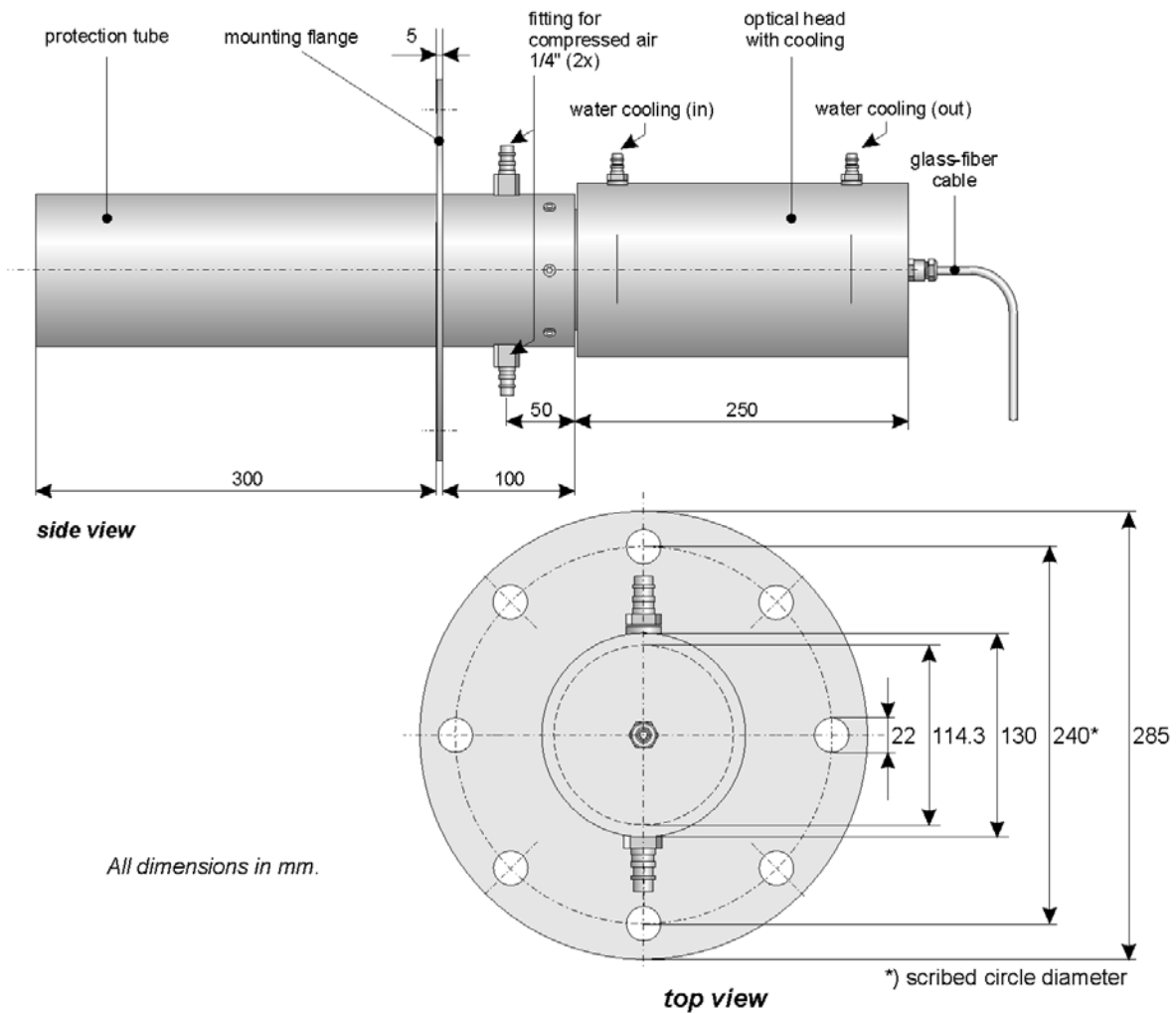
*front view*

*All dimensions in mm.*

# Technical Data LD05-HTGF

## Remote Optical Head MK36-HT:

case:	aluminium, colorless anodized
main dimensions:	655 x Ø 285 mm
weight:	10 kg
protection class:	IP64 (glass fiber cables attached)
temperature range:	-20° to +80° C (operation and storage)
recommended air pressure:	2 – 4 bar



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