



RIEGL LD90-3100-GF general purpose distance meter

LD90-3100HS-GF <i>equipped with optical head MK36(-Z65):</i>	Measuring range depending on the reflection coefficient ρ of the target	
	good, diffusely reflecting targets, $\rho \geq 80\%$	up to 100 m ¹⁾
High-Speed version for robotics applications, automatic anticollision systems, etc.	bad, diffusely reflecting targets, $\rho \geq 10\%$	up to 35 m ¹⁾
	Reflecting foil ²⁾ or plastic cat's-eye reflectors	> 1000 m
Minimum distance, typically		1 m
Accuracy ³⁾		typically ± 15 mm, in the worst case ± 50 mm
Measuring time (ms or s) ⁴⁾		5ms 10ms 20ms 50ms 0.1 0.2 0.5 1
Statistical deviation (mm) ⁵⁾		± 30 ± 20 ± 15 ± 10 ± 7 ± 5 ± 3 ± 2
Resolution (mm) ⁵⁾⁶⁾		20 20 10 10 5 5 2 2
Divergence of the infrared measuring beam ⁷⁾		3.2 mrad
Laser product classification according to IEC60825-1:2007		
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.		

LD90-3100HA-GF <i>equipped with optical head MK36 (-Z65):</i>	Measuring range depending on the reflection coefficient ρ of the target	
	good, diffusely reflecting targets, $\rho \geq 80\%$	up to 100 m ¹⁾
High-Accuracy version for profilometry, etc.	bad, diffusely reflecting targets, $\rho \geq 10\%$	up to 35 m ¹⁾
	Reflecting foil ²⁾ or plastic cat's-eye reflectors	> 1000 m
Minimum distance, typically		2 m
Accuracy ³⁾		typically ± 10 mm
Measuring time (ms or s) ⁴⁾		10ms 20ms 50ms 0.1 0.2 0.5 1 2
Statistical deviation (mm) ⁵⁾		± 20 ± 15 ± 10 ± 7 ± 5 ± 3 ± 2 ± 2
Resolution (mm) ⁵⁾⁶⁾		10 5 5 2 2 1 1 1
Divergence of the infrared measuring beam ⁷⁾		3.2 mrad
Laser product classification according to IEC60825-1:2007		
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.		

- 1) Typical values for average conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky. At dawn or at night the range is even higher.
- 2) reflecting foil 3M 3000X or equivalent, minimum dimensions 0.45 x 0.45 m²
- 3) standard deviation, plus distance depending error ≤ 20 ppm
- 4) adjustable via RS232/RS422 (RS232 data output useful only for measuring times of 10 ms or more)
- 5) depending on measuring time
- 6) chosen automatically by the internal microprocessor
- 7) 1 mrad corresponds to 10 cm beamwidth per 100 m of distance

Selectable data processing modes

The characteristics of the instrument can be adapted to the actual measurement situation by choosing between four different data processing programs:

The program FAST enables the quickest possible measurement at undisturbed conditions simply by averaging the single-pulse distance values which are acquired within the selected measuring time.

The program STANDARD provides a very useful clutter suppression: occasional echo signals caused not by the target itself but by

backscattering of particles between target and instrument (e.g. clouds of material in a dusty silo, or raindrops and snowflakes in free air) are eliminated and not taken into account.

The program MAXIMUM DISTANCE is optimized for undisturbed level measurements in a silo at the cost of a slightly higher acquisition time.

The program MINIMUM DISTANCE is ideal for measurements to small targets which are not easy to aim at, as it eliminates background echoes.

General technical data and dimensions as given in our general data sheet LD90-3-GF series.

Information contained herein is believed to be accurate and reliable. However, no responsibility is assumed by RIEGL for its use. Technical data are subject to change without notice. Data sheet RIEGL LD90-3100-GF, 25/03/2010



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RIEGL LD90-3300-GF long range distance meter

LD90-3300-GF

equipped with optical head MK42(-Z80):

Powerful distance and speed meter for long ranges and/or badly reflecting targets: Height-of-flight measurements on planes or helicopters, tide-gage in hydrography, level measurement in large coal silos, etc.

Measuring range depending on the reflection coefficient ρ of the target	
good, diffusely reflecting targets, $\rho \geq 80\%$	up to 300 m ¹⁾
bad, diffusely reflecting targets, $\rho \geq 10\%$	up to 100 m ¹⁾
Reflecting foil ²⁾ or plastic cat's-eye reflectors	> 1000 m

Minimum distance, typically 5 m

Distance measurement:

Accuracy ³⁾	typically ± 50 mm							
Measuring time (ms or s) ⁴⁾	10ms	20ms	50ms	0.1	0.2	0.5	1	2
Statistical deviation (cm) ⁵⁾	± 10	± 7	± 5	± 3	± 2	± 1.5	± 1	± 0.7
Resolution (cm) ⁵⁾⁶⁾	10	10	5	5	2	2	1	1

Speed measurement:

Measuring range	0 to ± 30 m/s
Accuracy	± 0.5 m/s
Measuring time, typically ⁴⁾	0.5 s

Divergence of the infrared measuring beam ⁷⁾ 4.7 mrad

Laser product classification according to IEC60825-1:2007

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Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.



LD90-3300-GF

equipped with optical head MK56-Z150:

High-Range version of LD90-3300-GF for use in ship-docking systems, etc.

Measuring range depending on the reflection coefficient ρ of the target	
good, diffusely reflecting targets, $\rho \geq 80\%$	up to 400 m ¹⁾
bad, diffusely reflecting targets, $\rho \geq 10\%$	up to 120 m ¹⁾
Reflecting foil ²⁾ or plastic cat's-eye reflectors	> 1000 m

Minimum distance, typically 10 m

Distance measurement:

Accuracy ³⁾	typically ± 50 mm							
Measuring time (ms or s) ⁴⁾	10ms	20ms	50ms	0.1	0.2	0.5	1	2
Statistical deviation (cm) ⁵⁾	± 10	± 7	± 5	± 3	± 2	± 1.5	± 1	± 0.7
Resolution (cm) ⁵⁾⁶⁾	10	10	5	5	2	2	1	1

Speed measurement:

Measuring range	0 to ± 30 m/s
Accuracy	± 0.5 m/s
Measuring time, typically ⁴⁾	0.5 s

Divergence of the infrared measuring beam ⁷⁾ 3.2 mrad

Laser product classification according to IEC60825-1:2007

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- 1) Typical values for average conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky. At dawn or at night the range is even higher.
- 2) reflecting foil 3M 3000X or equivalent, minimum dimensions 0.45 x 0.45 m²
- 3) standard deviation, plus distance depending error ≤ 20 ppm
- 4) adjustable via RS232/RS422
- 5) depending on measuring time
- 6) chosen automatically by the internal microprocessor
- 7) 1 mrad corresponds to 10 cm beamwidth per 100 m of distance

Selectable data processing modes

The characteristics of the instrument can be adapted to the actual measurement situation by choosing between four different data processing programs:

The program FAST enables the quickest possible measurement at undisturbed conditions simply by averaging the single-pulse distance values which are acquired within the selected measuring time.

The program STANDARD provides a very useful clutter suppression: occasional echo signals caused not by the target itself but by

backscattering of particles between target and instrument (e.g. clouds of material in a dusty silo, or raindrops and snowflakes in free air) are eliminated and not taken into account.

The program MAXIMUM DISTANCE is optimized for undisturbed level measurements in a silo at the cost of a slightly higher acquisition time.

The program MINIMUM DISTANCE is ideal for measurements to small targets which are not easy to aim at, as it eliminates background echoes.

General technical data and dimensions as given in our general data sheet LD90-3-GF series.

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RIEGL LD90-3VHS-FLP-GF First & Last Pulse distance meter

Laser Distance Meter for use with or without reflectors which, because of its long-range, and its "First & Last Pulse"¹⁾ facility, is especially well suited for scanner applications.

LD90-3100VHS-FLP-GF

equipped with optical head MK36(-Z65)²⁾:

Very High-Speed, highly accurate distance meter for scanner applications.

Measuring range depending on the reflection coefficient ρ of the target
good, diffusely reflecting targets, $\rho \geq 80\%$ 2m up to 150 m³⁾
bad, diffusely reflecting targets, $\rho \geq 10\%$ 5 m up to 50 m³⁾
Reflecting foil⁴⁾ or plastic 10 m up to 350 m @ 25mm resolution
cat's-eye reflectors 10 m up to 700 m @ 50mm resolution

Minimum distance between two targets, typically 5 m

Measurement accuracy⁵⁾ typically ± 25 mm
Measurement resolution (selectable) 25 mm or 50 mm
Measurement rate 2000 Hz
Laser wavelength typ. 0.9 μm (near infrared)
Beam divergence⁶⁾ 3.2 mrad

Laser product classification according to IEC60825-1:2007



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.

Interface RS422 serial interface, 115.2 kBd, asynchronous

- 1) First, Last, or First&Last Target alternatively selectable
- 2) glass-fiber cable length max. 4 m
- 3) Typical values for average conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky.
- 4) reflecting foil 3M DG4090 or equivalent, minimum dimensions 0.45 x 0.45 m²
- 5) standard deviation, plus distance depending error 20 ppm
- 6) 1 mrad corresponds to 10 cm increase of beamwidth per 100 m of distance

General technical data and dimensions as given in our general data sheet LD90-3GF series.

RIEGL LD90-3VHS-FLP-GF First & Last Pulse distance meter

Laser Distance Meter for use with or without reflectors which, because of its long-range, and its "First & Last Pulse"¹⁾ facility, is especially well suited for scanner applications.

LD90-3300VHS-FLP-GF

equipped with optical head MK42²⁾:

Very High-Speed rangefinder module for long range scanner applications.

Measuring range depending on the reflection coefficient ρ of the target
good, diffusely reflecting targets, $\rho \geq 80\%$ 5 m up to 300 m³⁾
bad, diffusely reflecting targets, $\rho \geq 10\%$ 5 m up to 100 m³⁾
Reflecting foil⁴⁾ or plastic 10 m up to 700 m @ 50mm resolution
cat's-eye reflectors 10 m up to 350 m @ 25mm resolution

Minimum distance between two targets, typically 5 m

Measurement accuracy⁵⁾ typically ± 50 mm
Measurement resolution (selectable) 25 mm or 50 mm
Measurement rate 2000 Hz
Laser wavelength typ. 0.9 μm (near infrared)
Beam divergence⁶⁾ approx. 4.7 mrad

Laser product classification according to IEC60825-1:2007



The following clause applies for instruments delivered into the United States:
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Interface RS422 serial interface, 115.2 kBd, asynchronous

- 1) First, Last, or First&Last target alternatively selectable
- 2) glass-fiber cable length max. 4 m
- 3) typical values for average conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky.
- 4) reflecting foil 3M DG4090 or equivalent, minimum dimensions 0.45 x 0.45 m²
- 5) standard deviation, plus distance depending error 20 ppm
- 6) 1 mrad corresponds to 10 cm increase of beamwidth per 100 m of distance

General technical data and dimensions as given in our general data sheet LD90-3GF series.

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RIEGL LD90-3EHS-FLP-GF extremely high-speed distance meter

Laser Distance Meter for use with or without reflectors which, because of its high-speed and its "First & Last Pulse"¹⁾ facility, is especially well suited for scanner applications.

LD90-3100EHS-FLP-GF Measuring range depending on the reflection coefficient ρ of the target
equipped with optical head MK36(-Z65)²⁾:
for natural targets, $\rho \geq 80\%$ 2 m up to 150 m³⁾
for natural targets, $\rho \geq 10\%$ 5 m up to 50 m³⁾
for retroreflecting targets⁴⁾ 10 m up to 350 m @ 25mm resolution
10 m up to 700 m @ 50mm resolution

Extremely High-Speed,
highly accurate distance meter
for scanner applications

Minimum distance between two targets, typically 5 m

Measurement accuracy⁵⁾ typically ± 25 mm

Measurement resolution (selectable) 25 mm or 50 mm

Measurement rate⁶⁾ up to 12 000 Hz

Laser wavelength typ. 0.9 μm (near infrared)

Beam divergence⁷⁾ 3.2 mrad

Laser product classification according to IEC60825-1:2007



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.

Interface Parallel interface,
ECP standard (extended capabilities port)

LD90-3300EHS-FLP-GF Measuring range depending on the reflection coefficient ρ of the target
equipped with optical head MK42²⁾:
for natural targets, $\rho \geq 80\%$ 5 m up to 300 m³⁾
for natural targets, $\rho \geq 10\%$ 5 m up to 100 m³⁾
for retroreflecting targets⁴⁾ 10 m up to 700 m @ 50mm resolution
10 m up to 350 m @ 25mm resolution

Extremely High-Speed
distance meter for long-range
scanner applications

Minimum distance between two targets, typically 5 m

Measurement accuracy⁵⁾ typically ± 50 mm

Measurement resolution (selectable) 25 mm or 50 mm

Measurement rate⁶⁾ up to 12 000 Hz

Laser wavelength typ. 0.9 μm (near infrared)

Beam divergence⁷⁾ approx. 4.7 mrad

Laser product classification according to IEC60825-1:2007



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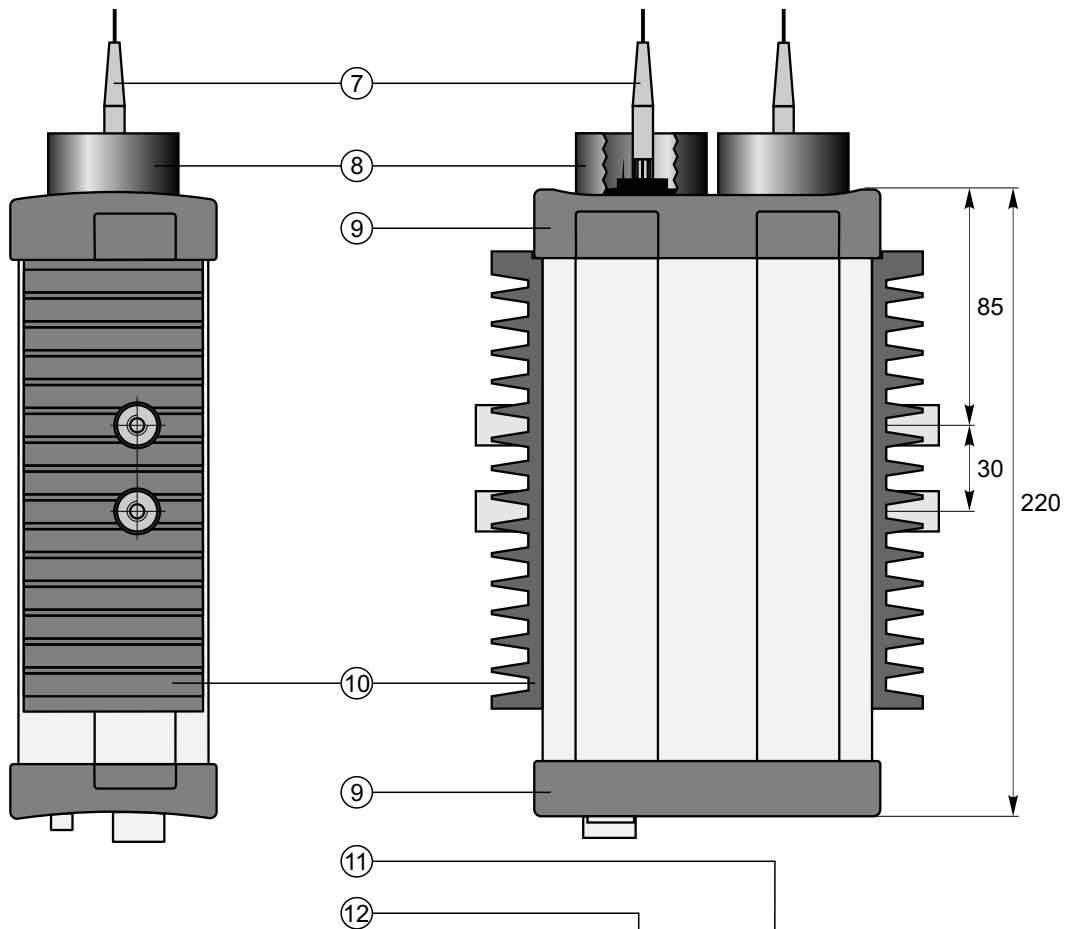
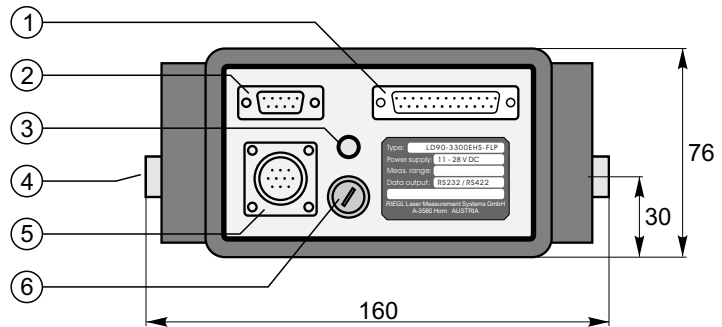
Interface Parallel interface,
ECP standard (extended capabilities port)

- 1) First, Last, or First&Last Target alternatively selectable
- 2) glass-fiber cable length max. 4 m
- 3) Typical values for average conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky. At dawn or at night the range is even higher.
- 4) reflecting foil 3M DG4090 or equivalent, minimum dimensions 0.45 x 0.45 m²
- 5) standard deviation, plus distance depending error ≤ 20 ppm
- 6) adjustable in steps by software command; up to max. 12019 Hz (± 2 Hz)
- 7) 1 mrad corresponds to 10 cm increase of beamwidth per 100 m of distance

General technical data as given in our general data sheet LD90-3-GF series.

RIEGL LD90-3EHS-FLP-GF dimensional drawings

- (1) ECP interface
- (2) 9pole socket for RS232 / RS422 data interface
- (3) LED "POWER ON"
- (4) 4xM6 threads on both sides for mounting the instrument
- (5) 10 pole socket for power supply
- (6) Fuse holder



- (7) SMA glass-fiber connectors
- (8) Protecting for glass-fiber socket
- (9) Rubber-armoured front and rear panel
- (10) Cooling block
- (11) SMA glass-fiber socket for receiver
- (12) SMA glass-fiber socket for transmitter


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RIEGL LD90-3200HiP-GF "High Penetration" level meter

LD90-3200HiP-GF <i>equipped with optical head MK42:</i> Laser Distance Meter for use with or without reflectors which, because of its "High Penetration" facility under conditions of bad visibility, is especially well suited for level measurements in large silos, distance measurement on cranes, etc. ¹⁾	Measuring range depending on the reflection coefficient ρ of the target ²⁾³⁾					
	good, diffusely reflecting targets, $\rho \geq 80\%$				up to 600 m	
	bad, diffusely reflecting targets, $\rho \geq 10\%$				up to 200 m	
	Reflecting foil ⁴⁾ or plastic cat's-eye reflectors				2000 m	
	Minimum distance ⁵⁾				1 m	
	Accuracy ^{6) 7)}				typically ± 25 mm, in the worst case ± 75 mm	
	Resolution				2 mm	
	Measuring time (s) ⁸⁾		0.3	0.5	1	2
	Statistical deviation (mm) ⁹⁾		± 20	± 15	± 10	± 7
	Divergence of the infrared measuring beam ¹⁰⁾					approx. 4.7 mrad
Laser product classification according to IEC60825-1:2007						
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.						
Data interface					RS232 & RS422 (selectable), baud rate between 300 Bd and 38.4 kBd	

- 1) last, first, or strongest target return selectable
- 2) Typical values for average conditions. In bright sunlight, the operational range is considerably shorter than under an overcast sky. At dawn or at night the range is even higher.
- 3) target size \geq beam diameter
- 4) reflecting foil 3M680 or equivalent, dimensions 0.45 x 0.45 m²
- 5) minimum distance 5 m for full accuracy with retroreflecting targets
- 6) standard deviation, plus distance depending error 20 ppm
- 7) ≥ 5 min after power up
- 8) adjustable via RS232/RS422 or self-adapting
- 9) depending on measuring time
- 10) 1 mrad corresponds to 10 cm increase of beamwidth per 100 m of distance

General technical data and dimensions as given in our general data sheet LD90-3-GF series.

Information contained herein is believed to be accurate and reliable. However, no responsibility is assumed by RIEGL for its use. Technical data are subject to change without notice. Data sheet RIEGL LD90-3200HiP-GF, 25/03/2010



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RIEGL LD90-3HT-GF high-temperature distance meter

Design principle: 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. Furthermore, the small optical head can be surrounded by a water-cooled robust outer case to insulate the optical head against heat. If necessary the front side can be equipped with a protection tube, which can be flushed with nitrogen or compressed air to keep the lenses clean.

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

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

LD90-310HT-GF

equipped with optical head MK36(-HT):

Position measurement of glowing slabs in rolling mills etc.

Measuring range

depending on the surface temperature and the reflection coefficient of the target

liquid steel, temperature up to 1450 °C	3 m to 7 m
glowing slabs, temperature up to 1200 °C	2 m to 10 m

Accuracy (typically)¹⁾ ±10 mm plus statistical deviation

Measuring time (s)²⁾ 0.1 0.2 0.5 1 2

Statistical deviation (mm)³⁾ ±7 ±5 ±3 ±2 ±2

Resolution (mm)³⁾⁴⁾ 2 2 1 1 1

Diameter of the infrared measuring beam approx. 30 mm

Laser product classification according to IEC60825-1:2007

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.



LD90-3100HT-GF

equipped with optical head MK56-HT:

Level measurement of liquid steel in converters, transfer ladles, torpedo cars etc.

Measuring range

depending on the surface temperature and the reflection coefficient of the target

liquid steel, temperature up to 1650 °C	3 m to 10 m
glowing slabs, temperature up to 1200 °C	2 m to 35 m
other targets, temperature up to 800 °C	2 m to 100 m

Accuracy (typically)¹⁾ ±15 mm plus statistical deviation

Measuring time (s)²⁾ 0.1 0.2 0.5 1 2

Statistical deviation (mm)³⁾ ±10 ±7 ±5 ±3 ±2

Resolution (mm)³⁾⁴⁾ 2 2 1 1 1

Diameter of the infrared measuring beam approx. 50 mm at 2 m, approx. 150 mm at 50 m

Laser product classification according to IEC60825-1:2007

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.



Viewing the laser output with certain optical instruments designed for use at a distance (for example, telescopes and binoculars) may pose an eye hazard.

1) standard deviation, plus distance depending error 20 ppm

2) adjustable via RS232/RS422

3) depending on measuring time

4) chosen automatically by the internal microprocessor

Information contained herein is believed to be accurate and reliable. However, no responsibility is assumed by RIEGL for its use. Technical data are subject to change without notice. Data sheet LD90-3HT-GF, 25/03/2010



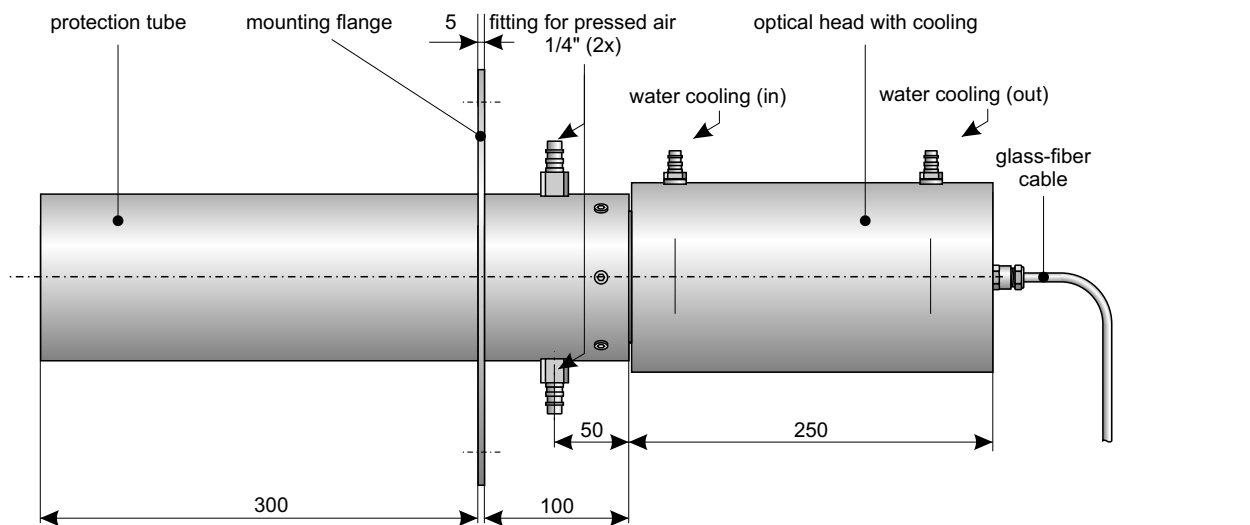
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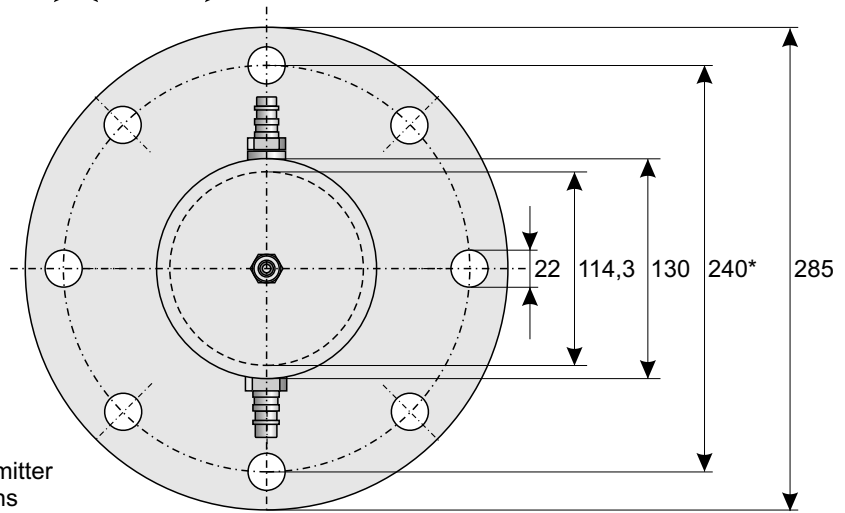
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RIEGL Optical heads for high-temperature applications

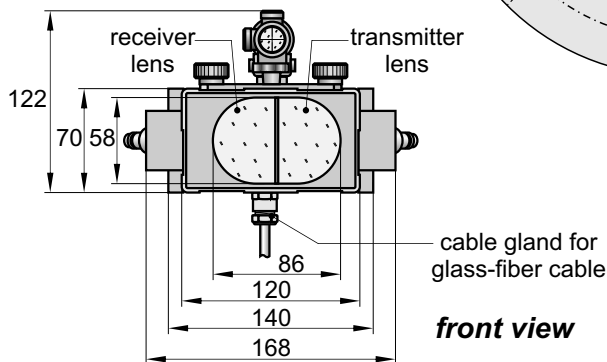


side view

MK36-HT
case: aluminium,
color-less anodized

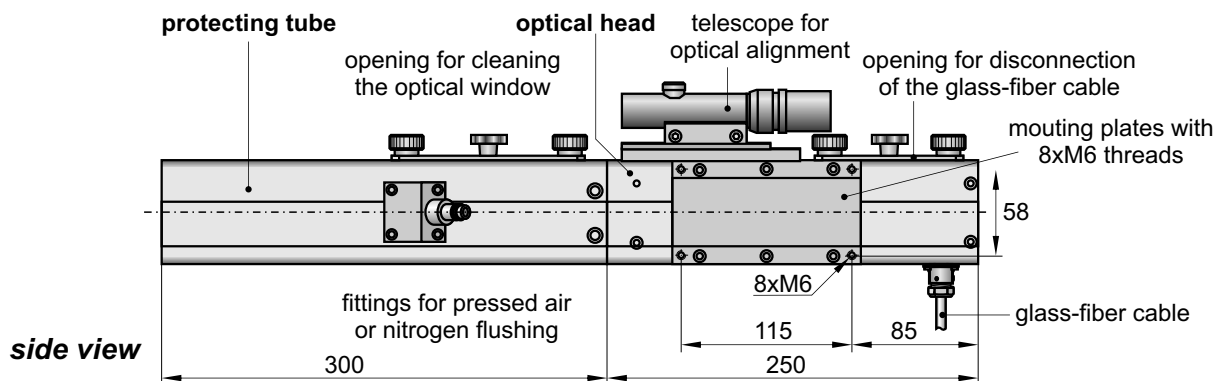


All dimensions in mm.



front view

MK56-HT
case: aluminium,
color-less anodized



side view

Other parameters as given in our general data sheet LD90-3-GF series.