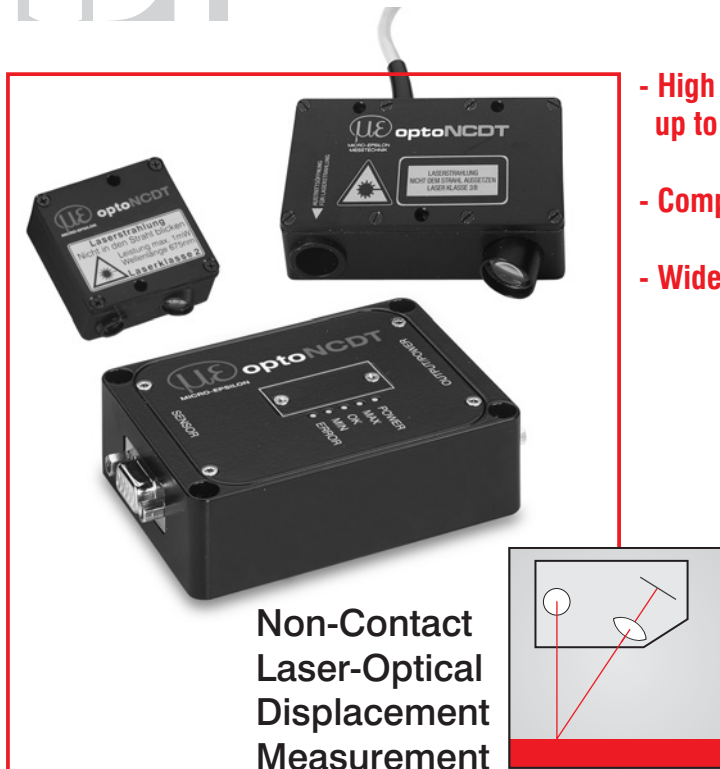


FRANZ ROBOTER OPTO NCDT

NEW with improved electronics
optoNCDT 1607



- High speed measurements up to 37 KHz
- Compact sensor design
- Wide range of applications

Non-Contact
Laser-Optical
Displacement
Measurement

Compact PSD sensor
optoNCDT 1607

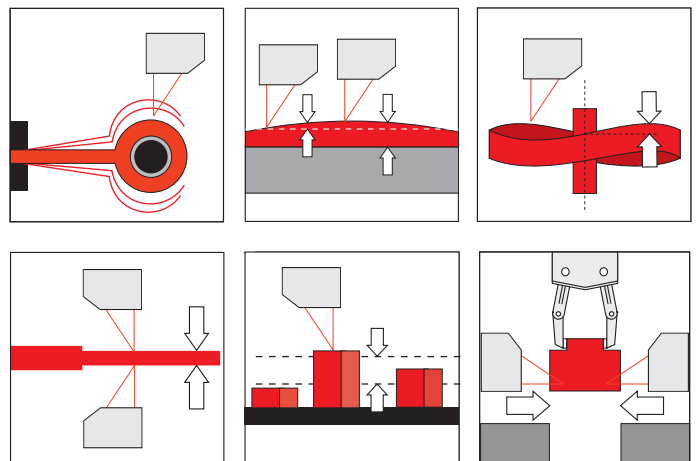
Measuring principle

optoNCDT 1607 is an optoelectronic displacement measurement system with analog signal processing. It measures with high precision and without contact against a wide range of material surfaces by using the triangulation principle. A laser diode projects a visible laser light spot at the target surface. The reflected light is projected on a position sensitive element (PSD line). If the light point moves, this changing is mapped on the PSD and evaluated by the controller unit. This non-contact and wear-free measuring principle is used against almost any target materials. optoNCDT has proofed its technology since years in almost any application in measuring and testing, automation and machine control. The various sensor models differ in range, reference distance and laser spot size.



ADVANTAGES

- Measuring ranges 0.5 to 200 mm
- For high speed applications (option up to 37 kHz)
- Linearity 0.2 % FSO
- Compact sensor design
- Tiny measuring spot for small targets (100 µm)
- Operation with 24 VDC supply (10 ... 30 V)
- Output: ±10 V and 4 ... 20 mA and RS232



TYPICAL APPLICATIONS

optoNCDT 1607 is designed for industrial use in production plant and for measuring and testing during in-process quality assurance. Illustrated are examples showing only a small selection of the numerous possibilities.

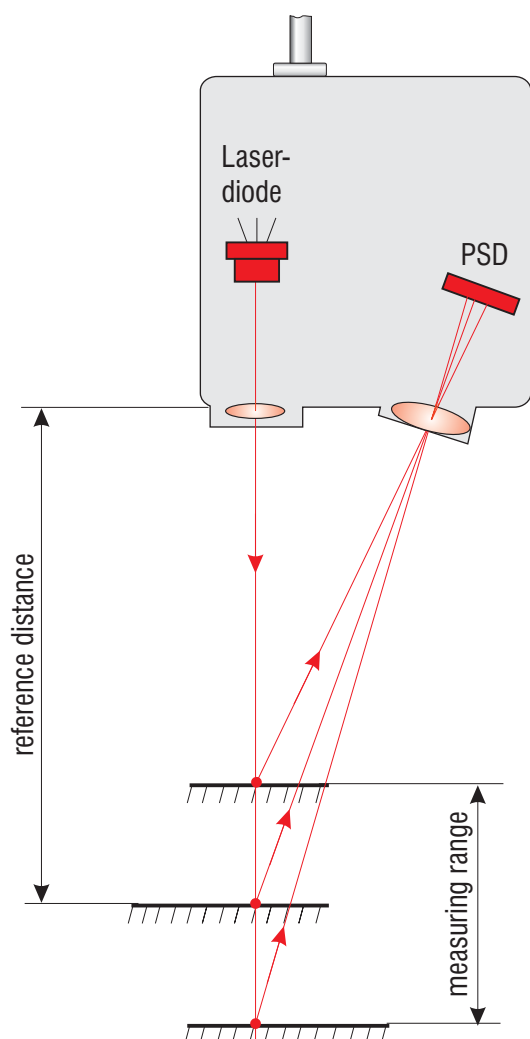
- vibration, amplitude, clearance, run-out
- displacement, distance, position, elongation
- deflection, deformation, waviness, tilt
- dimensions, measuring tolerances, sorting, part recognition
- stroke, deformation, axial shaft oscillation
- in-process quality-control, dimensions test

System structure

The complete system consists of a laser optical sensor LD 1607 and an intelligent controller (signal conditioning unit). Sensor and controller are mounted in aluminium housings. They are consequently designed for robustness and for use in harsh environment.



The measurement system consists of:
 - LD 1607 sensor
 - Controller



Triangulation measuring principle

A point of light is projected onto the target and reflected diffusely. This point is focussed on a position sensitive device (PSD) by a lens. The PSD element supplies a position dependent, analog output voltage proportional to the measuring distance between sensor and target. The diffuse reflection is necessary for the triangulation principle.

Controller switch positions for reaction time and frequency response (-3dB)

| SW4 | SW5 | SW6 | f/kHz | t/ms |
|-----|-----|-----|-------|------|
| On | On | On | 10 | 0,1 |
| Off | On | On | 7 | 0,14 |
| On | Off | On | 4 | 0.25 |
| Off | Off | On | 1 | 1 |
| On | On | Off | 0.25 | 4 |
| Off | On | Off | 0,1 | 10 |
| On | Off | Off | 0.025 | 40 |
| Off | Off | Off | 0.015 | 67 |

Factory setting 4 kHz

Sensor mounting

Mounting via 3 holes with M4 thread (10 mm deep) on the sensor rear side. This type of mounting should be used on machines and devices because of its higher immunity to the effect of vibrations.

LED-Indicators

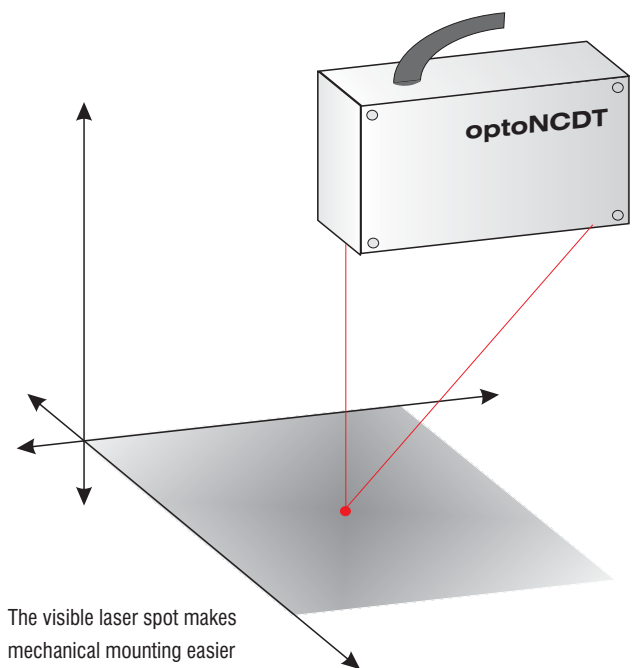
The incident light intensity is automatically matched to the reflectivity of the target. If the intensity of the reflected light is too low even with maximum incident light intensity, an ERROR message is output. An additional analog output voltage provides information on the intensity of the reflected light.






Limit switches

The optoNCDT 1607 series has two switching levels in the controller that can be adjusted for minimum and maximum threshold values over the entire measuring range.

Light intensity

The intensity of the diffuse reflected light creates a signal in the electronics proportional to the spot intensity. This signal can be used for quality control of measuring results.



| Outputs (connector) | | LED - indicators | |
|-------------------------------------|-----------------|------------------|---|
| 24 V logic | | | |
| MIN | +24 V / 10 mA | POWER |  GREEN - power on |
| OK | +24 V / 10 mA | MAX |  RED - MAX value is exceeded |
| MAX | +24 V / 10 mA | OK |  GREEN - LED level indicator OK shows the position of the target within the set limits |
| Hysteresis | appr. 0.4 % FSO | MIN |  YELLOW - value drops below the set MIN |
| Output of errors (connector) | | ERROR |  RED - too little light is reflected |
| Too little light | +24 V / 10 mA | | |
| Too much light | +24 V / 10 mA | | |

Technical data

| Specifications | | Sensor | | LD 1607-0,5 | LD 1607-2 | LD 1607-4 | LD 1607-10 | LD 1607-20 | LD 1607-50 | LD 1607-100 | LD 1607-200 |
|---------------------------------|--------------|----------------------|---------------|---|-----------|-----------|------------|------------|------------|-------------|-------------|
| | | | | | | | | | | | |
| Measuring range | mm | | | 0.5 | 2 | 4 | 10 | 20 | 50 | 100 | 200 |
| Reference distance ¹ | MR | mm | | 24 (2) | 24 | 24 | 45 | 65 | 120 | 220 | 340 |
| Linearity | | $\leq \pm 0.2\%$ FSO | μm | 1 | 4 | 8 | 20 | 40 | 100 | 200 | 400 |
| Resolution (noise) ² | static | | μm | 0.1 | 0.5 | 1 | 3 | 6 | 20 | 30 | 60 |
| Frequency response | | | | 10 kHz, 7 kHz, 4 kHz, 1 kHz, 250 Hz, 100 Hz, 25 Hz or 15 Hz (-3 dB), selectable with DIP switches | | | | | | | |
| Temperature stability | | | | $\pm 0.03\%$ FSO / °C | | | | | | | |
| Light source | | | | laser 1 mW, wavelength: 675 nm (red) | | | | | | | |
| Life cycle | typ. | | | 100,000 h (laserdiode) | | | | | | | |
| Laser safety class | | | | class 2 acc.DIN EN 60825-1:2001-11 | | | | | | | |
| Spot diameter | MR | mm | | 0.1 | 0.3 | 0.3 | 0.6 | 0.9 | 1.5 | 1.5 | 4 |
| Permissible ambient light | | | | 20,000 lx | | | | | | | |
| Output | displacement | | | $\pm 10\text{ V} / 4 - 20\text{ mA} / \text{RS232}$ | | | | | | | |
| | intensity | | | 0 V ... 10 V | | | | | | | |
| Vibration | | | | 2 g (IEC 68-2-6) | | | | | | | |
| Shock | | | | 15 g (IEC 68-2-6) | | | | | | | |
| Operation temperature | | | | 0 ... 50 °C | | | | | | | |
| Storage temperature / humidity | | | | -20 ... +70 °C / up to 90 % RH | | | | | | | |
| Protection class | sensor | | | IP 64 | | | | | | | |
| | controller | | | IP 40 | | | | | | | |
| Supply | | | | + 24 VDC / 200 mA (10 ... 30 VDC) | | | | | | | |
| Connector | | | | 25-pin Sub-D connector | | | | | | | |
| Sensor-cable length | | | | 2 m | | | | | | | |

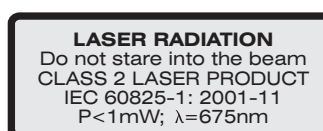
FSO = Full Scale Output MR = Midrange

All specifications apply for a diffusely reflecting matt white ceramic target

¹ Referring to the level sensor housing border and midrange (MR = 0 V / 12 mA)

² Frequency response 15 Hz

optoNCDT 1607 uses a semiconductor laser with a wavelength of 675 nm (visible/red). The maximum optical output power is 1 mW. The sensor is classified as laser class II. A warning sign is attached to the sensor housing.



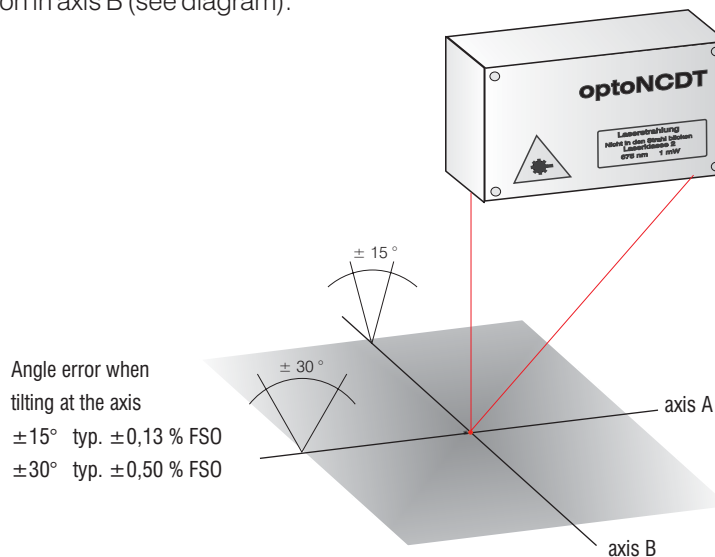
IEC - Standard

Self test

By permanent monitoring the reflected light continuously tests whether there is a target in the measuring range or the amount of the reflected light is sufficient.

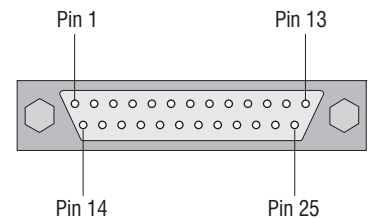
Angle dependence

Measurement accuracy can be affected by the angular relationship of the sensor to the target surface. In the case of a matt finished surface, which is highly diffuse-reflective, the angle induced error is especially low. In the case of a shiny surface (specular reflective) the angle induced error is greater. The angle induced error is less per degree with rotation in axis A than with rotation in axis B (see diagram).

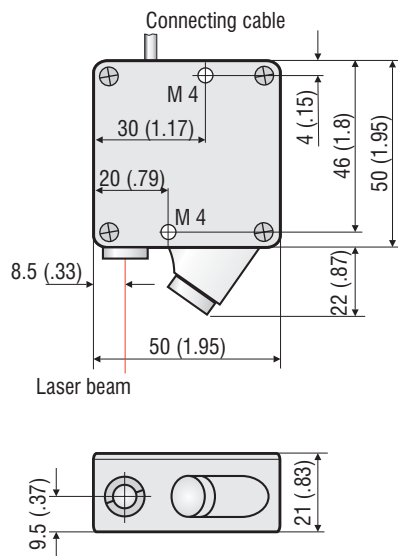


Pin assignment controller

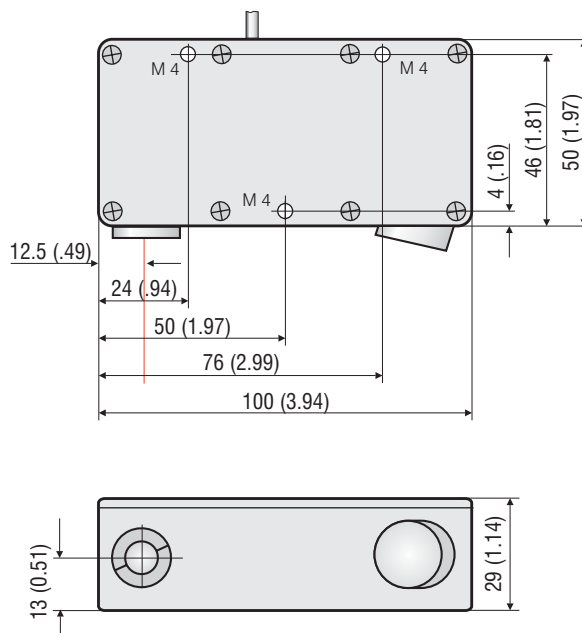
| | | | |
|----|-----------------------------|----|--------------------------|
| 1 | Displacement output, ±10 V | 14 | Analog ground |
| 2 | Too little light, + 24 V | 15 | Too much light +24 V |
| 3 | Laser OFF Input + 15 - 30 V | 16 | MAX, +24 V |
| 4 | TXD (RS 232) | 17 | n.c. |
| 5 | OK in range, +24 V | 18 | RTS (RS 232) |
| 6 | 4 ... 20 mA current output | 19 | MIN, +24 V |
| 7 | RXD (RS 232) | 20 | Light intensity 0 - 10 V |
| 8 | 0 V supply | 21 | +24 V supply |
| 9 | n.c. | 22 | n.c. |
| 10 | n.c. | 23 | n.c. |
| 11 | n.c. | 24 | n.c. |
| 12 | n.c. | 25 | n.c. |
| 13 | n.c. | | |



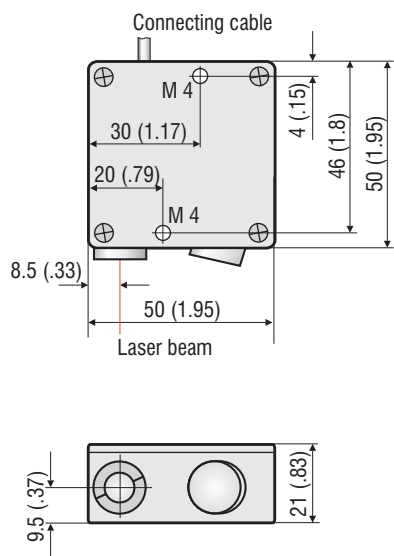
Sensor LD 1607 - 0.5



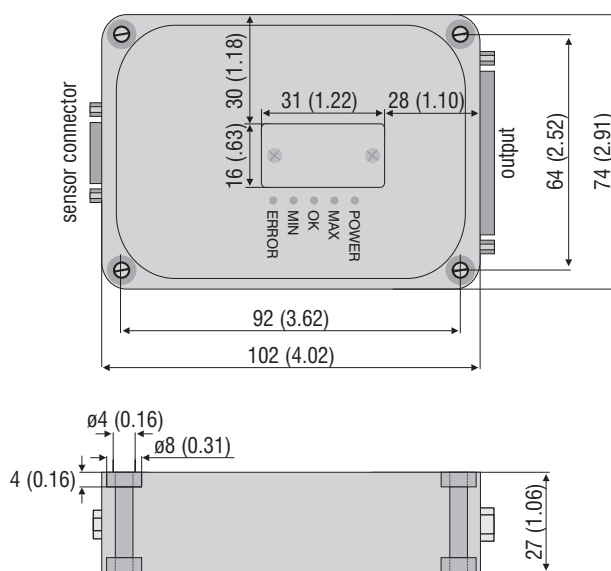
Sensors LD 1607 - 50/100/200



Sensors LD 1607 - 2/4/10/20



Controller



Options

LD 1627: option with 37 kHz frequency response

Option V: vibration resistant option (up to 20 g)

Option with cable out on the right sensor side

Sensor-cable in lengths up to 5 m

Accessories

PC1605 - 3

Supply- and output-cable, 3 m long

PC1607-3/RS232

Supply- and output-cable,
3 m long with 9-pin. Sub-D connector for RS232

CSP 301

Digital signal processing unit with display,
programmable for 2 analog signals

PS 2010

Power supply for mounting on DIN-rail
Input 230 VAC / 115 VAC, selectable
Output 24 VDC / 2.5 A
Dimensions:
120 x 120 x 40 mm (4.7 x 4.7 x 1.6 inches)

SGF 1605

Aluminium protection housing
with glass window and air connection with blowing
the air along the glass window

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