Proper Environment
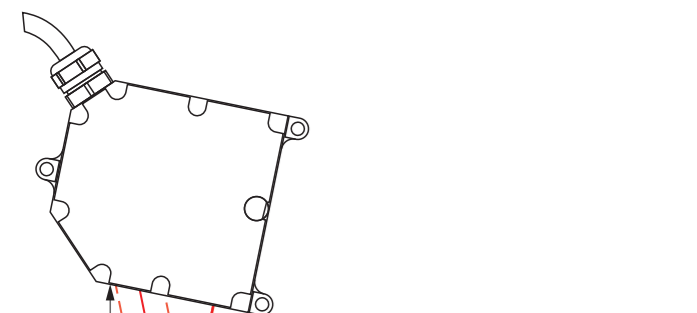
- Protection class: IP65 (applies only when the sensor cable is plugged in)

Optical inputs are excluded from protection class. Contamination leads to impairment or failure of the function.

- Temperature range
  - Operation: 0 °C ... +50 °C (+32 ... +104 °F)
  - Storage: -20 °C ... +70 °C (-4 ... +158 °F)
- Humidity: 5 - 95 % (non-condensing)
- Ambient pressure: Atmospheric pressure

Sensor Mounting, Dimensions

The optoNCDT 1750 sensor is an optical system for measurements with micrometer accuracy. Pay attention to careful handling during mounting and operation.

➡ Mount the sensor only to the existing holes on a flat surface. Clamps of any kind are not permitted.

➡ Use three M4 screws to mount the sensors. The bearing surfaces surrounding the fastening holes (through-holes) are slightly raised.
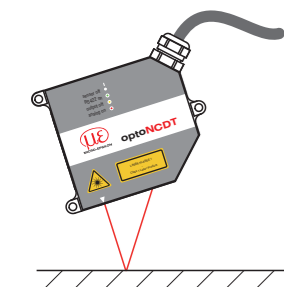
Measuring range, Start of Measuring range

Current	Voltage	Digital value [1]
3 mA	5,2 V / 10,2 V	262077
4 mA (SMR)	0 V	98232
12 mA (MMR)	2,5 V / 5 V	131000
20 mA (EMR)	5 V / 10 V	163768
3 mA	5,2 V / 10,2 V	262078

MR = Measuring range
SMR = Start of measuring range
MMR = Mid of measuring range
EMR = End of measuring range

1) For displacement values without zero setting or mastering.

Mounting

ℹ Mount the sensor only to the existing holes on a flat surface. Clamps of any kind are not permitted. Do not exceed torques. The laser beam must be directed perpendicularly onto the surface of the target. In case of misalignment it is possible that the measurement results will not always be accurate.
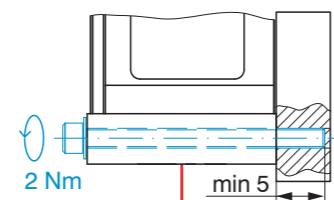
Sensor mounting with direct reflection

Drawings
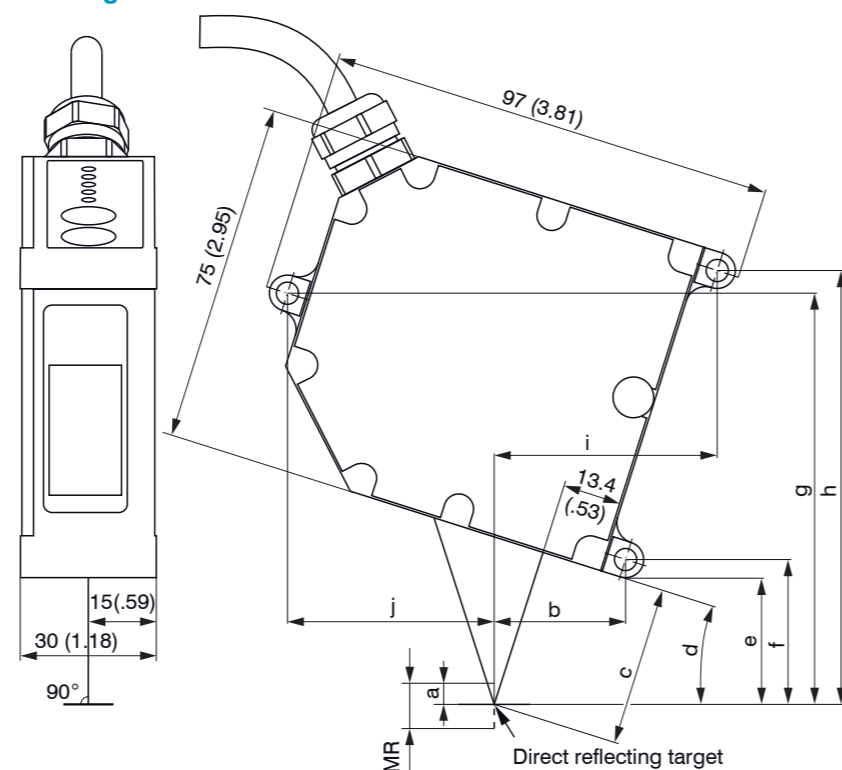
MR	2 (.08)	10 (.39)	20 (.79)
a	1 (.04)	5 (.20)	10 (.39)
b	26.5 (1.04)	29 (1.14)	30.9 (1.22)
c	25 (.98)	35.5 (1.40)	63.5 (2.5)
d	20°	17.6°	11.5°
e	16.7 (.66)	28.3 (1.11)	58.6 (2.31)
f	20.7 (.81)	32.3 (1.27)	62.6 (2.46)
g	82.6 (3.25)	91.1 (3.59)	113.2 (4.46)
h	83.7 (3.30)	96.2 (3.79)	128.2 (5.04)
i	49.5 (1.95)	49.2 (1.94)	44.3 (1.74)
j	45.6 (1.80)	45.7 (1.80)	49.6 (1.95)

Dimensions in mm (inches)
MR = Measuring range

Mounting

Washer A4.3; ISO 7089 - A2
M4 x 35; ISO 4762-A2
Bolt connection

Pin Assignment

Signal	Pin	Description	Cable PC1700-x
$+U_B$	5	Supply voltage (11 ... 30 VDC)	red
GND	6	System ground supply, switch signals (Laser on/off, Zero, Limits)	black
Analog output	13	Current 4 ... 20 mA ($R_B < (U_B - 6\ V)$ / 20 mA)	Coaxial inner conductor, white
		Voltage 0 ... 5 VDC	
		Voltage 0 ... 10 VDC ($R_i = 50$ Ohm, $I_{max} = 5$ mA)	
AGND	14	Reference potential for analog output	Screening, black
Laser on/off	9	Switching input, Laser operates when pin 9 is connected to GND	red and blue
Multi-function input	10	Switching input, TrigIn, Zero/Master, TeachIn, SlaveIn	white and green
Switching output 1	8	Error/Limit 1	gray and pink
Switching output 2	7	Limit 2, programmable switching characteristic: (NPN, PNP, Push-Pull)	violet
Sync +	3	Symmetrical synchronous output (Master) or input (Slave) RS422 level, terminating resistor 120 Ohm switchable, input or output depends on selected synchronization mode	blue
Sync -	4		pink
Tx +	1	RS422 - Output (symmetric) terminate with 120 Ohm receive-site	green
Tx -	2		brown
Rx +	12	RS422 - Input (symmetric) internally terminated with 120 Ohm	gray
Rx -	11		yellow

View: Solder-pin side male cable connector, insulator
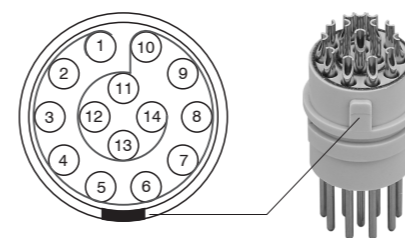
The PC1700 sensor cable is qualified for drag chain use. One end of the cable has a molded cable connector, the other end has braids with ferrules. Connector: ODU MINI-SNAP, 14 poles, B series, size 2, coding 0, IP 68

Supply Voltage, Nominal value: 24 V DC (11 ... 30 V, P < 3 W)
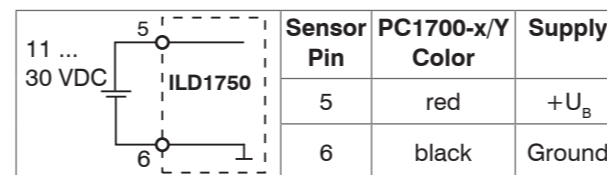
Sensor Pin	PC1700-x/Y Color	Supply
5	red	$+U_B$
6	black	Ground

Use supply voltage for measurement instruments only. MICRO-EPSILON recommends using an optional available power supply unit PS2020 for the sensor.

Proper Use

The optoNCDT 1750-xDR system is designed for use in industrial and laboratory areas.
It is used for measuring displacement, distance and position as well as in in-process quality control and dimensional testing.
The sensor may only be operated within the limits specified in the technical data, see operating instructions, Chap. 3.3. The sensor must be used in such a way that no persons are endangered or machines are damaged in case of malfunctions or total failure of the sensor.
Take additional precautions for safety and damage prevention for safety-related applications.

Warnings

Avoid unnecessary laser radiation to be exposed to the human body. Switch off the sensor for cleaning and maintenance, for system maintenance and repair if the sensor is integrated into a system.
Caution - use of controls or adjustments or performance of procedures other than those specified may cause harm.
Connect the power supply and the display-/output device in accordance with the safety regulations for electrical equipment. The power supply may not exceed the specified limits.
> Risk of injury. Damage to or destruction of the sensor.

Avoid continuous exposure to splashing water on the sensor and the controller.
Avoid exposure to aggressive materials (washing agent, cooling emulsions) on the sensor.
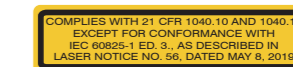> Damage to or destruction of the sensor.

Avoid shock and vibration to the sensor. Protect the sensor cable against damage.
> Damage to or destruction of the sensor , failure of the measuring device.

Laser Safety

The ILD1750-xDR sensors operate with a semiconductor laser with a wavelength of 670 nm (visible/red) with a maximum optical power of ≤0.39 mW. The sensors fall within laser class 1 (I).

ℹ Laser radiation. Irritation of the eyes possible.

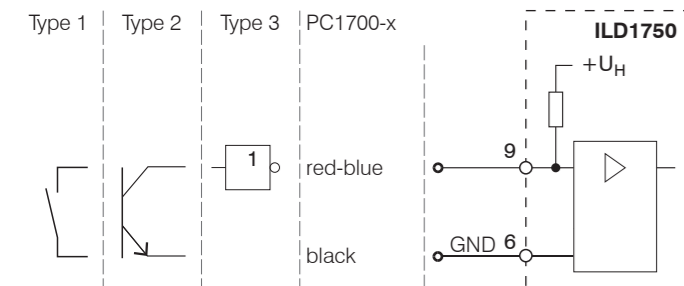The following warning labels must be attached to the cover (front and/or rear side) of the sensor housing:

LASER KLASSE 1
-
Class 1 Laser Product

COMPLIES WITH 21 CFR 1040.10 AND 1040.11
EXCEPT FOR CONFORMANCE WITH
IEC 60825-1 ED. 3., AS DESCRIBED IN
LASER NOTICE NO. 56, DATED MAY 8, 2019

Laser warning sign and laser label, ILD1750-xDR *Only for USA*

Laser On

Type 1	Type 2	Type 3	PC1700-x

ILD1750
+U_H

9
red-blue

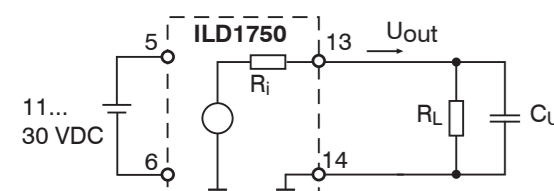GND 6
black

1

Analog Output

Current output 4 ... 20 mA or
Voltage output 0 ... 5 V or 0 ... 10 V

ℹ The current output may not be continuously operated in short-circuit operation without load resistor. This would lead to thermal overload and thus to the automatic overload cut-off of the output.

ILD1750
5   13 I_{out}
11... 30 VDC
6   14
R_B C_I

ILD1750
5   13 U_{out}
11... 30 VDC
R_i
6   14
R_L C_U
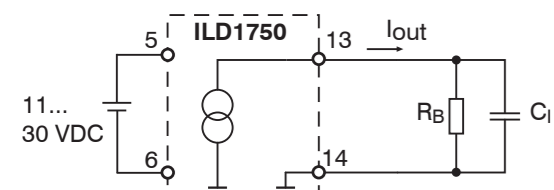
Current output

$R_B < (U_B - 6 V) / 20$ mA;

R_B max. = 250 Ohm at U_B = 11 V
$C_I \leq 33$ nF

Voltage output

R_i = 50 Ohm, I_{max} = 5 mA,
Short circuit protection 7 mA
R_L > 20 MOhm
$C_U \leq 100$ nF

Multi-Function Input

The multi-function input enables triggering, zero setting/mastering and teaching. The function depends on the programming of the input and on the timing of the input signal.

The inputs are not electrically isolated. The maximum switching frequency is 10 kHz.

Type 1	Type 2	Type 3	PC1700-x

ILD1750
+U_H

1

10
white-green

GND 6
black
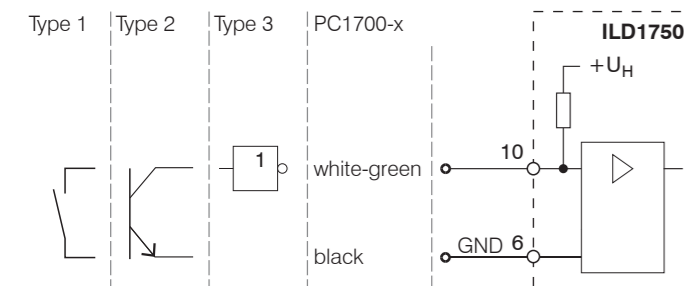
24 V logic (HTL):
Low level ≤ 3 V; High level ≥ 8 V
(max 30 V)

5 V logic (TTL):
Low level ≤ 0.8 V; High level ≥ 2 V

internal pull-up resistor, an open input is detected as High.

▶ Connect the input to GND to trigger the function.

RS422 Connection with USB Converter IF2001/USB

Cross the lines for connections between sensor and PC.

ℹ Disconnect or connect the D-sub connection between RS422 and USB converter when the sensor is disconnected from power supply only.

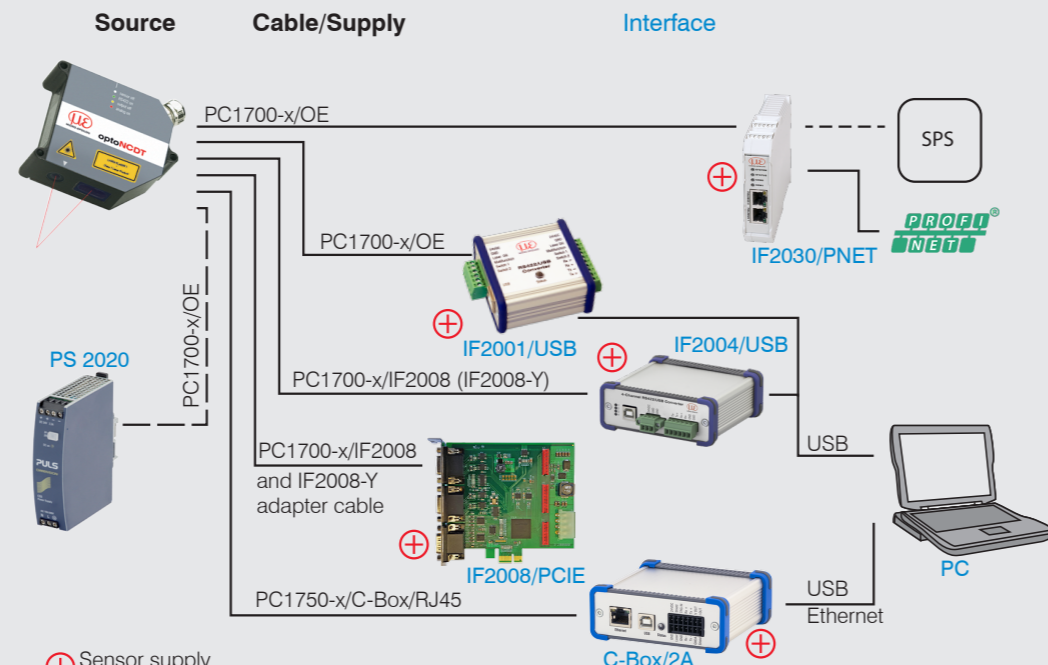| Sensor		End device (converter) Type IF2001/USB from MICRO-EPSILON
14-pin cable connector	**Sensor cable**	
Tx + (Pin 1)	green	Rx + (Pin 3)
Tx -(Pin 2)	brown	Rx -(Pin 4)
Rx + (Pin 12)	gray	Tx + (Pin 1)
Rx -(Pin 11)	yellow	Tx -(Pin 2)
GND (Pin 6)	black	GND (Pin 9)
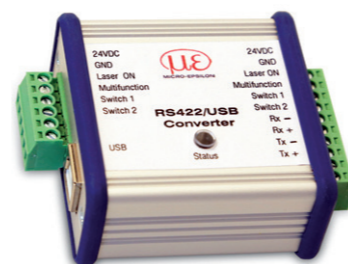
Symmetric differential signals acc. to EIA-422, not electrically isolated from supply voltage. Use a shielded cable with twisted cores e.g. PC1700-x.

Quick Guide

Components

▶ Mount the sensor and connect the components.

Source **Cable/Supply** **Interface**

PC1700-x/OE

SPS

PC1700-x/OE

IF2030/PNET

PS 2020

PC1700-x/OE

IF2001/USB

PC1700-x/IF2008 (IF2008-Y)

IF2004/USB

PC1700-x/IF2008 and IF2008-Y adapter cable

USB

IF2008/PCIE

PC1750-x/C-Box/RJ45
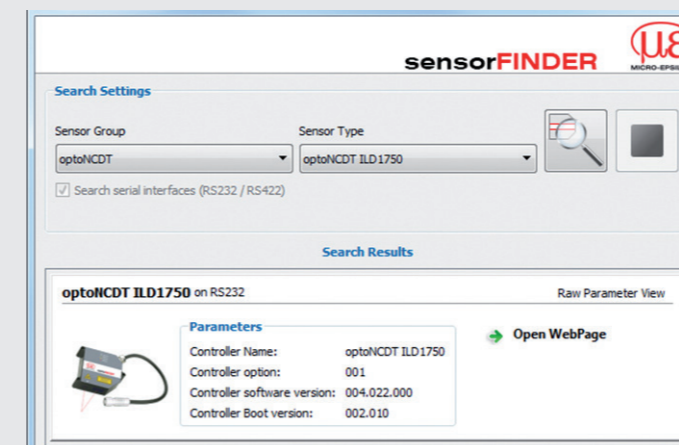
USB Ethernet

PC

C-Box/2A

⊕ Sensor supply is done by peripheral.

Commissioning

▶ Connect the sensor to a PC/notebook via a RS422 connector. Connect the supply voltage.

▶ Start the program sensorFINDER Vx.x.x.

The sensorFINDER program is available online on https://www.micro-epsilon.com/service/download/software/.

You need a web browser (e. g. Mozilla Firefox or Internet Explorer) on a PC/notebook.

▶ Select the desired sensor. Click on the button Open WebPage.

Access via Web Interface

Interactive web pages for programming the sensor now appear in the web browser. The sensor is active and supplies measurement values. The ongoing measurement can be operated by means of function buttons in the area Chart type.

In the top navigation bar other functions (settings, measurement chart etc.) are available.
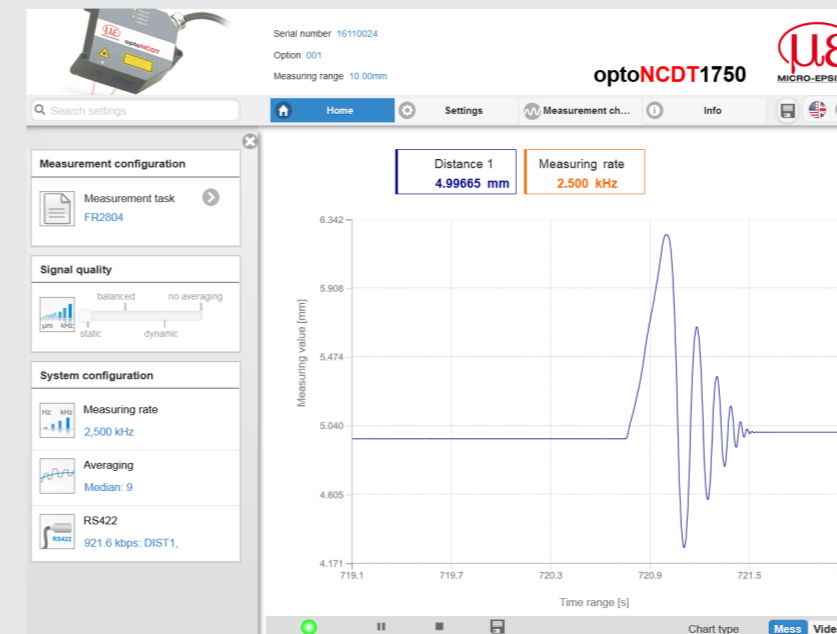
The appearance of the websites can change dependent of the functions. Each page contains descriptions of parameters and so tips for filling the website.

Select a Measuring Rate

▶ Go to the menu Settings > Data recording > Measuring rate.

Start with a medium measuring rate. Select a measuring rate from the list. Confirm with Apply.

Select an Interface

▶ Go to the menu Settings > Output > Output interface.

Defines which interface is used for output of measured values. A parallel output o measured values via multiple channels is not possible. RS422 and analog output cannot be operated simultaneously. While using the web interface, the output is switched off via RS422.

Place target

▶ Position the target (measurement object) as much as possible in the midrange.
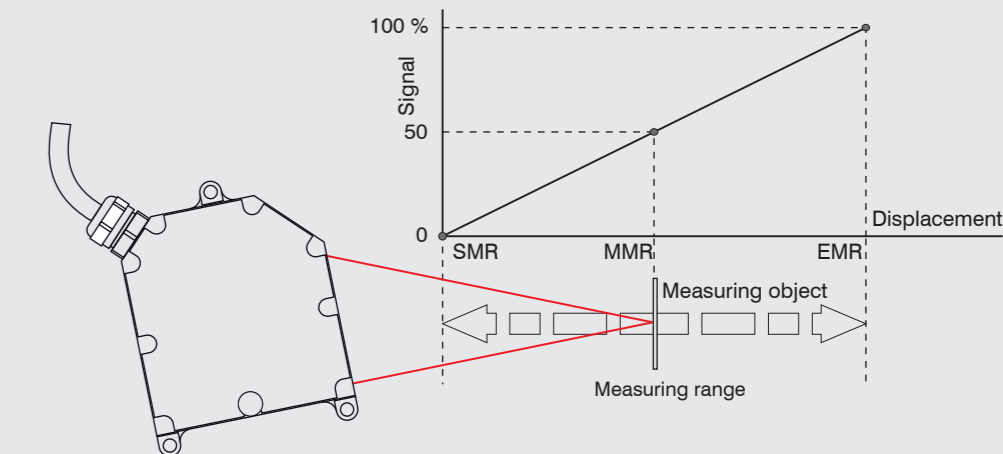
The State LED on the sensor indicates the position of the target to the sensor.

LED	Color		Labeling	Meaning
State	○	off	Laser off	Laser beam is switched off
	●	green	In range	Target within measuring range
	●	yellow	Midrange	Target within the midrange
	●	red	Error	Target outside the measuring range, too low reflection

Store the Settings

▶ Go to the menu Settings > System settings > Load & Stores or click the Save settings button.

Read the detailed operating instructions before using the sensor. The manual is available online on www.micro-epsilon.com/download/manuals/man--optoNCDT-1750--en.pdf.