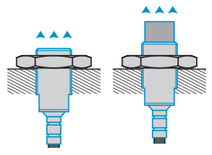
Mounting

The measurement behavior of eddy current displacement sensors can be affected by a metal holder.

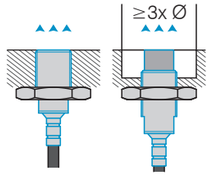
i The standard mounting method for the sensor should be used, since you will achieve the best measurement results with this method!

Standard Mounting Method



- Sensors protrude over metal holder
- Corresponds to factory calibration
- To achieve the technical data, the sensor should be mounted in the same way
- Also pay attention to the distance A from the front sensor face to the metal nut.

Flush Mounting Method

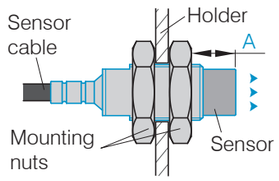


Mounting method does not correspond to factory calibration. Recommended: perform 3-point field linearization

i Linearize the measuring system, if possible in exactly the same measurement setup as will be used later for the measurement itself!

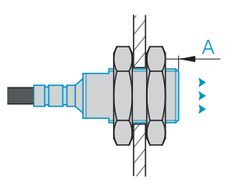
Sensors with Threads

- Insert the sensor through the hole in the sensor holder.
- Fasten the sensor.
- To do so, screw the mounting nuts supplied with the sensor onto the threads protruding from the holder on both sides.
- Tighten the mounting nuts carefully in order to avoid damage, especially to small sensors.



Sensor	Dimension A
ES-U1	8 mm
ES-U2	8 mm
ES-U3	10 mm
ES-U6	20.4 mm
ES-U8	24.6 mm

Unshielded sensor with threads, standard mounting

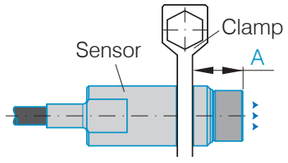


Sensor	Dimension A
ES-S1	4 mm
ES-S2	4 mm
ES-S4	4 mm

Shielded sensor with threads, standard mounting

Sensors Without Threads

Preferably mount with a circumferential clamp; alternatively, with a set screw made of plastic.



Sensor	Dimension A
ES-U1-T	7 mm
ES-U3-T	10 mm

Distance between front sensor face and holder, sensors without threads, standard mounting

Using Multiple Sensors

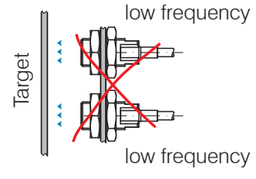
Eddy current sensors generate magnetic fields, which can overlap when the sensors are placed too close together (known as cross-talk).

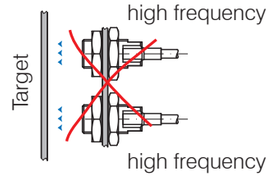
There are two solutions to avoid this. Either install them with a sufficient minimum distance or use sensors with different frequencies, LF (low frequency) and HF (high frequency).

Necessary Distances:

- 4x sensor diameter as distance between two unshielded sensors with the same carrier frequency (e.g. low frequency)
- 2x sensor diameter as distance between two shielded sensors with the same carrier frequency (e.g. low frequency)
- If more than two sensors are placed close to each other, pay attention to the correct sequence (e.g. LF-HF-LF-...).

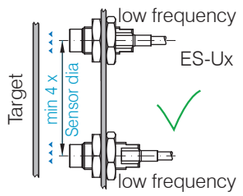
Not possible:



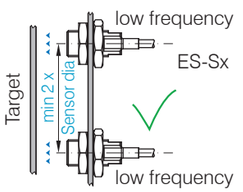


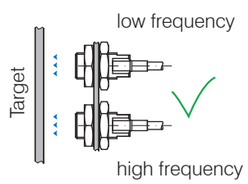
No synchronization required:

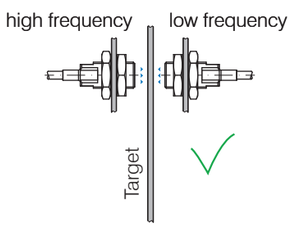
ES-Ux unshielded sensor



ES-Sx, shielded sensor



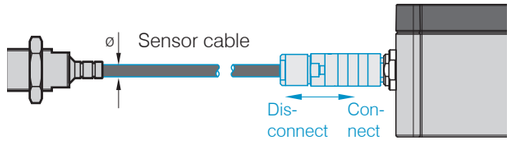




Sensor Cable

- Do not kink the sensor cable. Observe minimum bending radii.
- Do not subject the sensor cable to any mechanical stresses. For drag chain or robotics applications, the controller must also be attached to the robot.
- Lay the sensor cable in such a way that no sharp or heavy objects affect the cable sheath.
- Connect the sensor cable to the controller.
- Check the plug connections for a tight fit.

i The sensor cable must not be shortened. This causes loss of the specified technical data.



Take the connector on the ribbed grips (outer sleeves) and pull it apart. Do not pull on the cable or clamping nut.

d Ø2 mm	d Ø3.6 mm	
10 mm	27 mm	Fixed/static
20 mm	54 mm	Dynamic

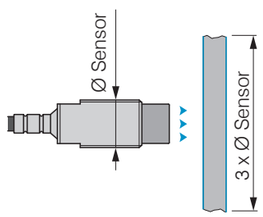
Minimum sensor cable bending radii

Target Size

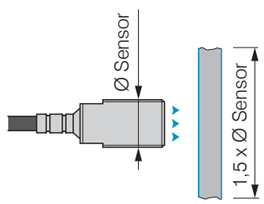
The relative size of the target relative to the sensor influences the linearity and slope deviation. If the required minimum size of the target is not met:

- The size of the target must not change
- The target must not be moved laterally in relation to the front sensor face

A successful field linearization is also required.



Minimum target size, unshielded sensors



Minimum target size, shielded sensors

Further information on the controller can be found in the interface instructions:

https://www.micro-epsilon.com/download-file/man--eddyNCDT-3020--en.pdf

Warnings

Connect the power supply and the display/output device according to the safety regulations for electrical equipment.

> Risk of injury from electric shock
> Damage to or destruction of the sensor

The supply voltage must not exceed the specified limits.

> Damage to or destruction of the sensor

Avoid shocks and impacts to the sensor.
> Damage to or destruction of the sensor

Protect the sensor cable against damage.
> Failure of the measuring device

Proper Environment

Sensor system		DT3020
Protection class		IP 67 (when plugged in)
Temperature range	Operation	-20 ... +105 °C
	Storage	-20 ... +105 °C
Temperature compensation range		+10 ... +105 °C
Ambient pressure		Atmospheric pressure
Humidity		5 ... 95% (non-condensing)

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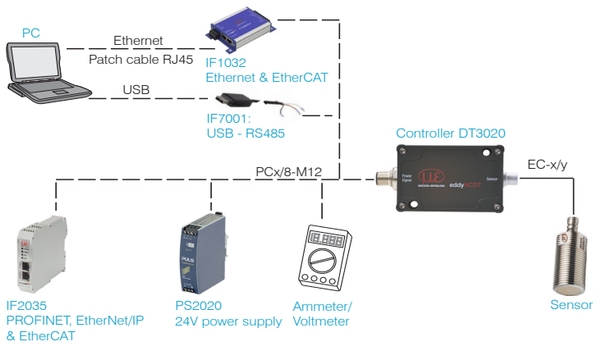
Setup Guide
eddyNCDT
DT3020/I

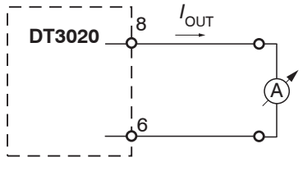
Electrical Connections



Analog Output for Displacement

The controller supplies a current output of 4 ... 20 mA.

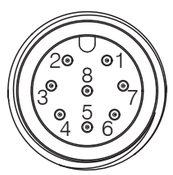
➡ Connect the outputs `8 (red)` and `6 (pink)` on the controller to the measuring device.



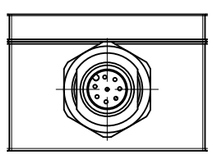
Circuit diagram for current output

Pin Assignment

DT3020			
Pin	**Description**	**Wire color PCx/8-M12**	
1	NC	White	
2	12 ... 30 VDC	Brown	
3	Switching output	Green	
4	RS485 A / +	Yellow	
5	RS485 B / -	Gray	
6	GND (displacement)	Pink	
7	GND (supply)	Blue	
8	Distance signal, current output I_{Out}	Red	



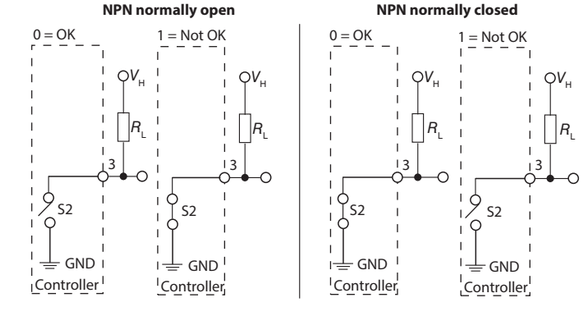
Pin side, 8-pin housing plug

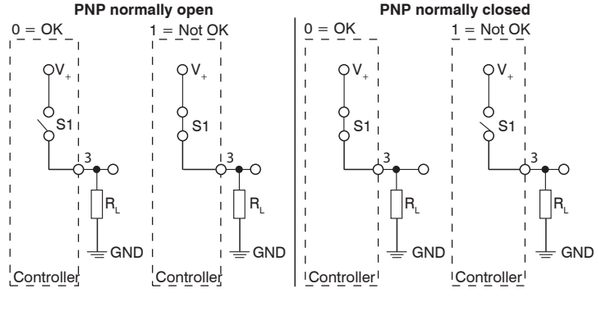


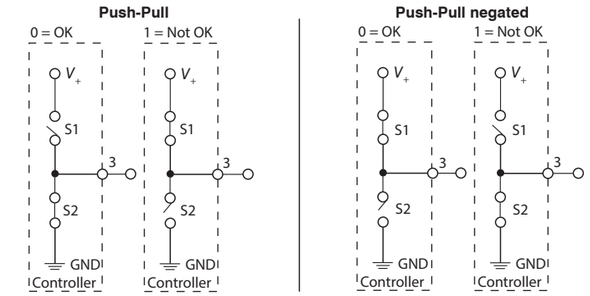
Supply and analog output, controller, 8-pin plug

Switching Output

The selection of the output type determines the switching behavior of the output, depending on the result of the limit value test. Closed means that the “GND switch” connects the switching output to GND, or, in the case of “Switch Vcc,” the switching output is connected to the supply voltage of the DT3020. The maximum current at the switching output is 100 mA.







ℹ If the switching output is deactivated, the output is always at high impedance regardless of the other settings and the result of the limit value test.

Wiring with USB/RS485 Converter IF7001

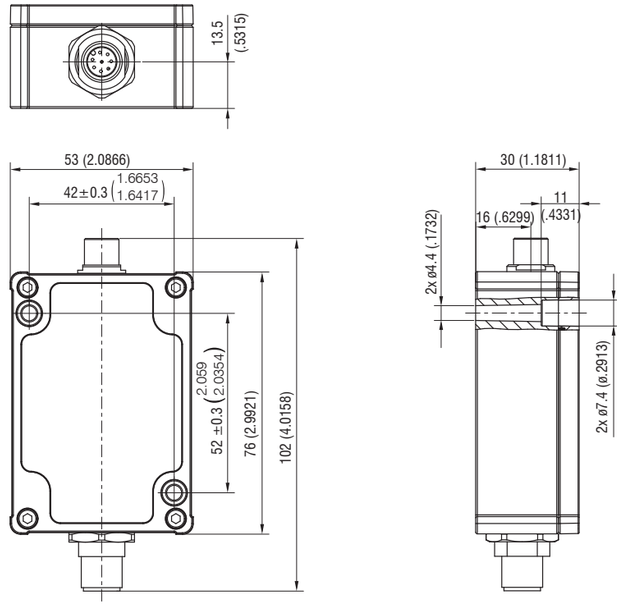
Connecting the open ends of the USB/RS485 converter:

- Connection A of the USB/RS485 converter to connection A of the sensor electronics.
- Connection B of the USB/RS485 converter to connection B of the sensor electronics

ℹ The connections A and B must not be reversed.

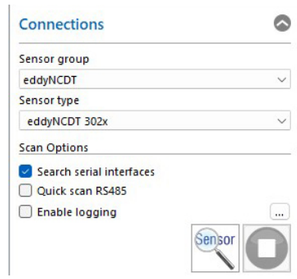
IF7001 Converter Wire color	Description	DT3020	
		Pin	**Sensor cable PCx/8-M12 Wire color**
Brown	RS485 A/+	4	Yellow
White	RS485 B / -	5	Gray
Black	GND	7	Blue

Dimensional Drawing



Controller dimensional drawing, dimensions in mm (inches, rounded off)

sensorTOOL



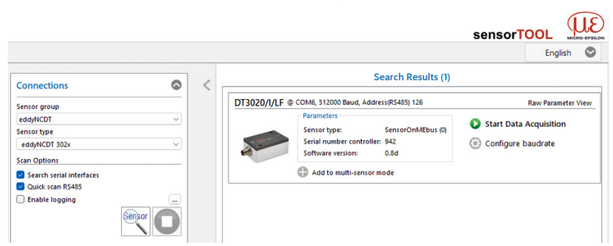
➡ Connect the controller to the PC using a USB-RS485 interface, e.g. IF7001, or using the IF1032 RS485 Ethernet interface.

➡ Start the `sensorTOOL` program.

➡ Click on the `Sensor` button.

If only 1 DT3020 is connected, the `Quick scan RS485` button can be activated.

➡ Now click the `Start Data Acquisition` button.

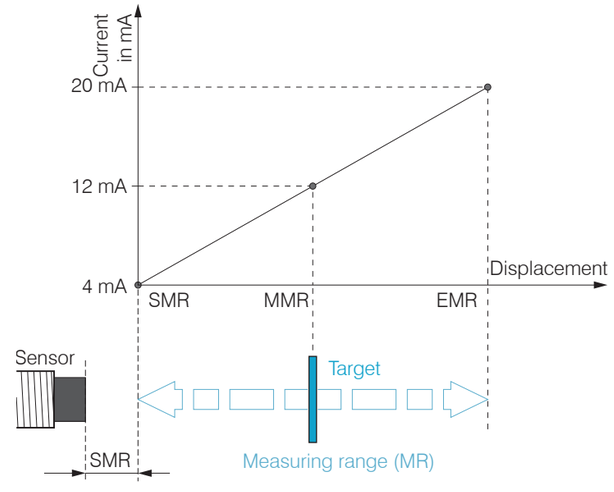


Digital Interfaces

The DT3020 can be connected to fieldbuses via various interface modules. Operation using the sensorTOOL software is also possible.

Download sensorTOOL:
https://www.micro-epsilon.com/service/software-sensorintegration/sensortool/

Analog Output for Displacement



Standard scaling on delivery

SMR	Start of measuring range Minimum distance between the front sensor face and the target, sensor-specific
MMR	Mid of measuring range
EMR	End of measuring range (start of measuring range + measuring range) Maximum distance between front sensor face and target
MR	Measuring range

ℹ The analog output can be freely set between 0 ... 20 mA to the desired measuring range between SMR and EMR.

Connection to EtherNet or EtherCAT via IF1032/ETH

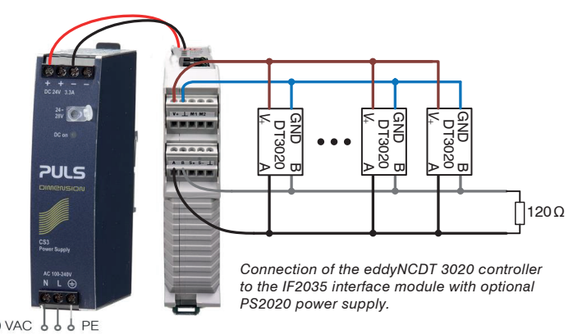
If only 1 sensor is connected to an interface module, the IF1032/ETH interface module is optionally available (Ethernet, EtherCAT). You can find more information online in the interface module operating instructions:

https://www.micro-epsilon.com/fileadmin/download/manuals/man--IF1032-ETH--en.pdf

Connection to PROFINET, EtherCAT, Ethernet/IP via IF2035

Up to 32 sensors can be connected to common fieldbuses (PROFINET, EtherCAT, Ethernet/IP) via the optional IF2035 interface module.

➡ Using software such as sensorTOOL, assign unique bus addresses before operating multiple DT3020 controllers on one IF2035. It is not possible to assign addresses directly using the fieldbus.



Connection of the eddyNCDT 3020 controller to the IF2035 interface module with optional PS2020 power supply.

You can find more information online in the interface module operating instructions:

https://www.micro-epsilon.com/industry-sensors/interfaces/if2035-for-industrial-ethernet/?sLang=en