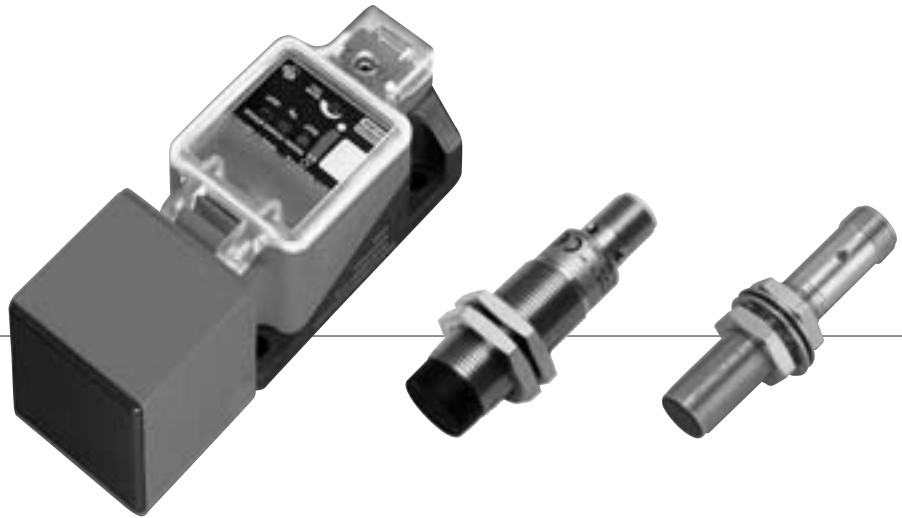


## Programmable inductive sensors



### Principle

These sensors work on the conventional inductive principle, nevertheless they can, thanks to their adaptable properties, be universally adapted for many applications.

With this learning capability (the so-called teach-in function), the sensors can be split into two groups:

- Sensors with teach-in-function for distance sensing
- Sensors with teach-in-function for speed monitoring

The following demonstrates two application examples:

A practical application is the sensing range of targets, which due to changing conditions, e.g. operating conditions or wear and tear, would require a constant re-adjustment.

Through a simple voltage pulse or PLC the necessary programmable pulse can be directed to the sensor and the learning process initiated. The programmable pulse can vary within the voltage range of  $U_B$ .

A further application for teach-in sensors is the speed monitoring of rotating shafts (detection by gear wheels) with changing, rotational frequencies. Here a simple voltage pulse or PLC can be used to set the necessary programmable pulse to "learn" the maximum operating frequency. Additional control devices with power supply and complicated evaluating electronics are not necessary.

### Mode of operation

The teach-in-function is achieved by an A/D-converter which permanently stores and compare the values in EEPROM (Electrical Erasable Read Only Memory).

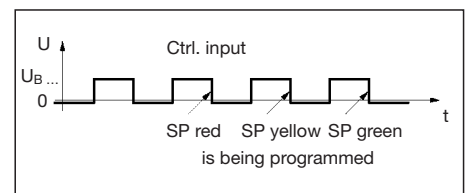
The EEPROM data can be safely stored for at least 40 years with the number of read/write-operations said to be 1.000.000.

By using a micro-controller for signal processing, Bernstein sensors can also be re-programmed to meet specific customer requirements for especially difficult tasks.

### Variations

BERNSTEIN delivers the programmable inductive sensor in different enclosure designs and with a varying range of technical features.

The multi-norm version has three programmable switching outputs. With this type of sensor, four positive impulse signals are expected one after the other on the control line. At the first impulse signal, the sensor switches to the programming mode. After each following impulse signal, the actual distance to the targeted object is assigned to an output (Teach-in sensing distance).



Programming for multi-norm version

The teach-in speed monitor sensors are available in M12 and M18 enclosures in plug and cable versions and PNP-version (special types on request).

### General data

Enclosure material	PA6.6 <sup>1)</sup> / CuZn39Pb3 <sup>2)</sup>
Protection class according to IEC	IP 65 <sup>1)</sup> / IP 67 <sup>2)</sup>
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	programmable, 20..40 mm <sup>1)</sup> / 8..16 mm <sup>2)</sup>

### Teach-in distance sensing sensors

Enclosure material	PA6.6 <sup>1)</sup> / CuZn39Pb3 <sup>2)</sup>
Protection class according to IEC	IP 65 <sup>1)</sup> / IP 67 <sup>2)</sup>
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	programmable, 20..40 mm <sup>1)</sup> / 8..16 mm <sup>2)</sup>

### Teach-in speed monitoring sensors

Enclosure material	CuZn39Pb3
Protection class according to IEC	IP 67
Operating temperature	-25 °C bis +70 °C
Storage temperature	-40 °C bis +80 °C
Sensing distance	2 mm <sup>3)</sup> / 5 mm <sup>4)</sup>

### Electrical data

Switching frequency	3 Hz
Hysteresis	≤ 10% (from programmed sensing distance)
Open-circuit current	< 10 mA <sup>1)</sup> / < 11 mA <sup>2)</sup>
Voltage drop	≤ 1.5 V
Polarisation protection	yes
Overload-/short-circuit withstand capability	yes
Repeat accuracy	≤ 5%

Switching frequency	programmable, 1..5000 Hz
Hysteresis	≤ 15% (from progr. switching frequency)
Open-circuit current	< 11 mA
Voltage drop	≤ 2.5 V
Polarisation protection	yes
Overload-/short-circuit withstand capability	yes
Repeat accuracy	≤ 5%

<sup>1)</sup> European standard enclosure (N44 series Multinorm)

<sup>2)</sup> Metric design (M12 / M18)

<sup>3)</sup> Metric design M12

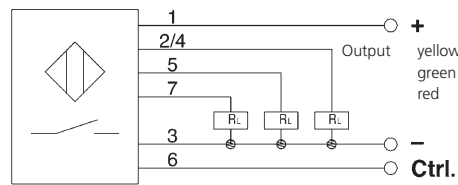
<sup>4)</sup> Metric design M18

### Advantages

- Sensor adjustment is easy
- Calibration in the application
- Sensors can be re-programmed without additional mounting effort
- One sensor can scan a number of switching points
- Programming from control panel possible
- High process safety due to tolerance minimisation
- High repeat accuracy

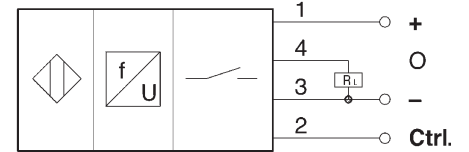
### Teach-in distance sensing sensors

Connection diagram, N44

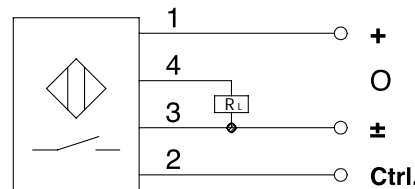


### Teach-in speed monitoring sensors

Connection diagram, M12/M18



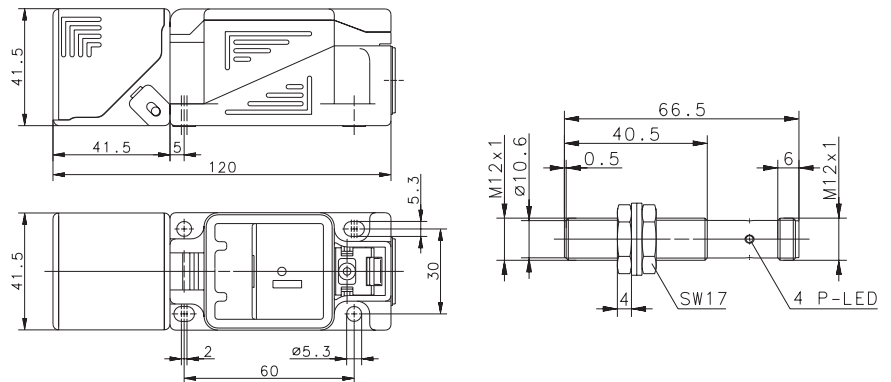
Connection diagram, M18



### Version

Designation	KIN-N44PS/040-KLSE	KIB-M12PS/002-KLS12I	KIB-M12PS/002-KL2I
Part number	<b>650.2954.015<sup>1)</sup></b>	<b>650.2943.014<sup>1)</sup></b>	<b>650.2903.024<sup>2)</sup></b>
Operating voltage	10 – 30 V DC	10 – 36 V DC	10 – 36 V DC
Switching current	≤ 200 mA	≤ 200 mA	≤ 200 mA
Switching distances / prog. switching frequencies	20...40 mm / –	– / 1...5000 Hz	– / 1...5000 Hz

### Dimensions



### Version

Designation	KIB-M18PS/005-KLS12I	KIB-M18PS/005-KL2I
Part number	<b>650.2940.004<sup>1)</sup></b>	<b>650.2905.021<sup>2)</sup></b>
Operating voltage	10 – 30 V DC	10 – 30 V DC
Switching current	≤ 200 mA	≤ 200 mA
Switching distance/frequency programmable	– / 1...5000 Hz	– / 1...5000 Hz

### Dimensions

- <sup>1)</sup> S12 plug version  
for connection coupling 413.9100.299
- <sup>2)</sup> Cable type 2 m

