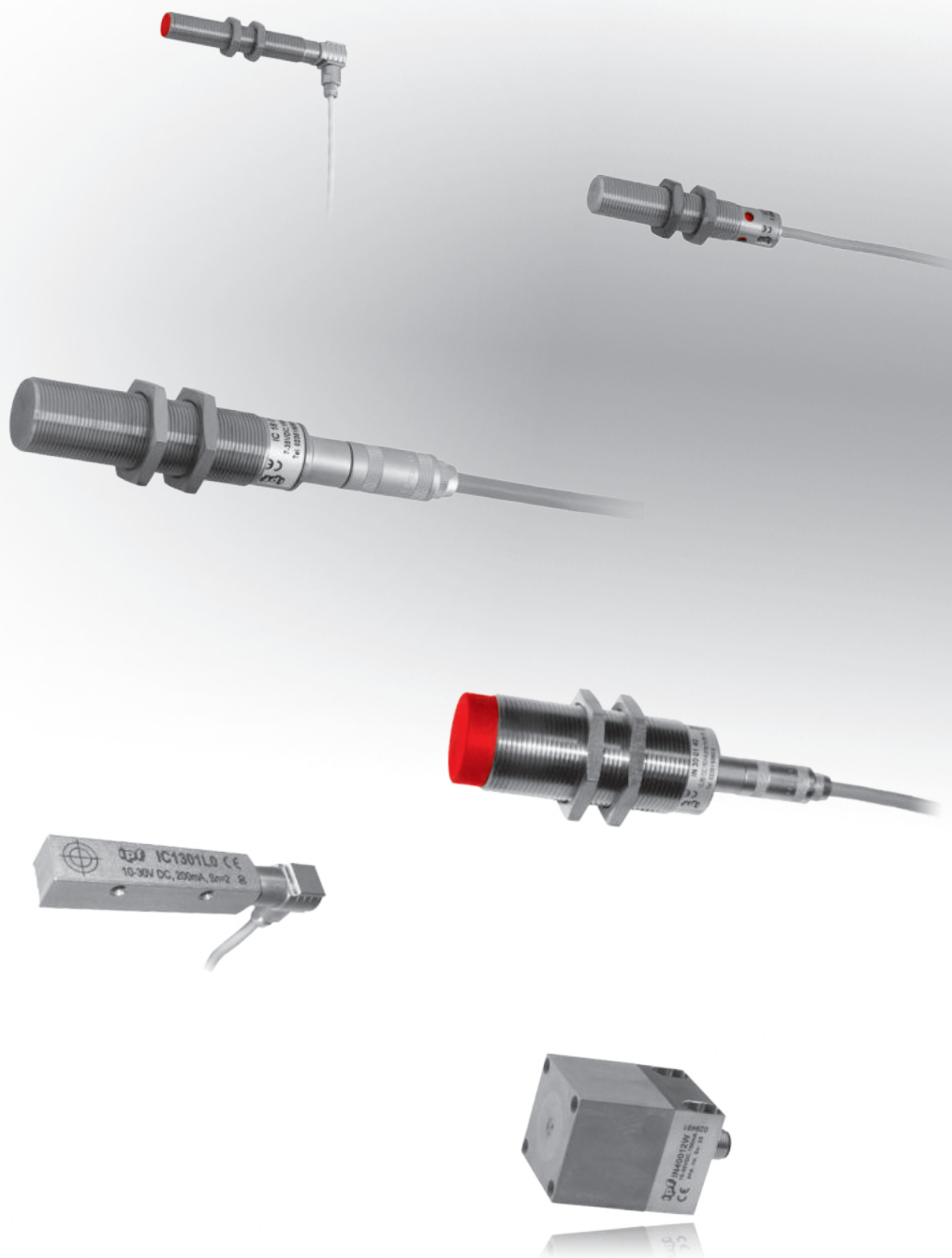




► inductive high temperature sensors  
up to +180°C

**flush, non-flush, all-metal**

## NOTES

**dimensions**

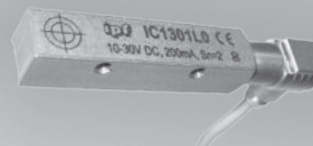
M8 x 1  
 M12 x 1mm  
 M18 x 1mm  
 M30 x 1.5mm  
 M50 x 1.5mm  
 M80 x 1.5mm  
 8 x 40 x 8mm  
 12 x 55 x 12mm  
 12 x 66 x 12mm  
 40 x 40mm

**flush**

switching distance

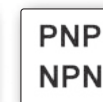
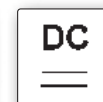
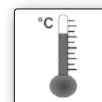
**2 to 10mm**
**non-flush**

switching distance

**4 to 50mm**


- ✓ an innovation of ipf electronic
- ✓ all-metal sensors all around (sleeve, front- and backside) made of stainless steel
- ✓ with integrated amplifier
- ✓ connection via cable, M12 or Lemo-connector

**active surface made of stainless steel or Vectra® devices usable up to +180°C**


**description**

Inductive high temperature sensors are available with integrated amplifiers in the M8, M12, M18, M30, M50, M80 and cuboid designs. The maximum ambient temperature, depending on the version, can lie between +130°C and +180°C. The devices are available with silicone or teflon cables and also with M12 or Lemo-connectors.

On the active surfaces, devices with full metal housings are absolutely impermeable to fluids and gases, against which the entire housing material is resistant.

They are much more resistant to mechanical loads than conventional proximity switches. Easy cleaning with a stream jet is also satisfied.

To obtain the maximum switching distance, pay attention to the size of the object (standard target) and its surface finish (even surface).

**application examples**

- ▶ integration in machine parts subject to rough industrial environments
- ▶ robotics applications in welding plants
- ▶ detection of hot workpieces in the steel industry, in foundries and glass manufacture
- ▶ positioning hot parts in handling and conveying systems
- ▶ foodstuffs industry, chemical industry

### Notes on inductive proximity switches

I inductive sensor

IB flush

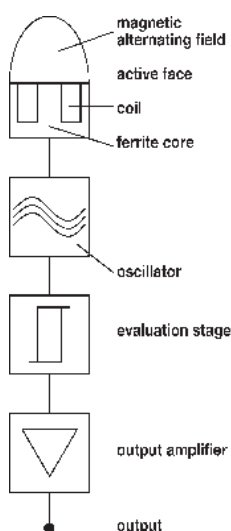
IC flush, all-metal

IN non-flush

### functional principle

The oscillation coil behind the active surface of the proximity switch produces an alternating electromagnetic field. Any electrically conductive material entering the field will induce rotational currents extracting energy from the oscillating circuit. The damping of the oscillator is then converted into a switching signal in the output amplifier.

It follows the functional principle that all metals are detected, moving or not. Important: The high frequency field produces no measurable increase in temperature and no magnetic influence inside the object to be detected. That means the sensors operate without interacting with the system.



functional principle of an inductive proximity switch

### switching distance / norm measuring plate

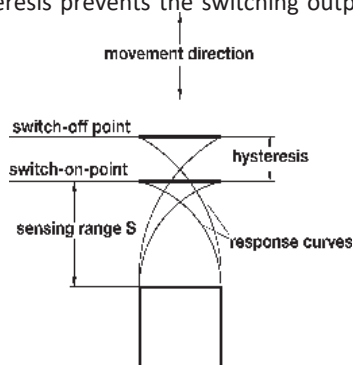
The distance to the sensor surface, where a metal causes a change in the switching state, is called switching distance. This distance is not the same for all metals. That is why a so-called correction factor has been specified for the respective metal, e.g. copper or aluminum. The nominal switching distance is determined by a norm measuring plate. This is a quadratic metal plate made from steel (St37) with a thickness of 1mm and a smoothed surface for determining the switching distance  $S_n$ , otherwise the edge length is the same as the diameter of the active surface.

One differentiates between the normal switching distance  $S_n$ , which is determined without consideration for manufacturing tolerances or external influences, and the operational switching distance  $S_a$ .

The safe operational switching distance is between 0 and 81% of  $S_n$  ( $0 < S_a < 0.81 \times S_n$ ).

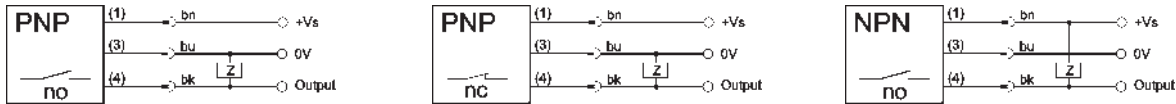
### switching hysteresis

During the approach and subsequent removal of the measuring plate from the initiator there will be a difference between switch-on point and switch-off point. This integrated hysteresis prevents the switching output from oscillating during mechanical vibrations. Usually the hysteresis is between 3 to 15% of  $S_n$ .



### output circuit

For the switching outputs of DC devices, a differentiation is made between PNP and NPN. For PNP outputs the load is connected in such a way that it is energized (positive switching) when the sensor is driven to full output (damping). NPN devices maintain their load permanently energized, switching the earth connection only (negative switching). A corresponding wiring diagram is supplied with every sensor.



### series connection

When a number of sensors are connected in series, the voltage drop of each device should be taken into account in order to ensure that even the final device also receives the required operating voltage. The internal electronics permits a maximum of 3 devices to be connected in series.

To be operationally safe the connection in series of 3-wire PNP sensors requires a logical AND-gate, e.g. VL250100.

### parallel connection

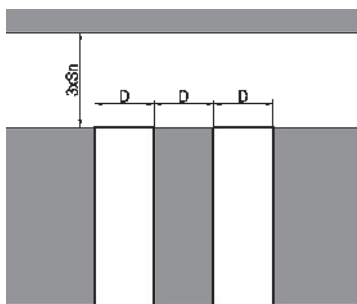
When connecting 3-wire PNP-sensors in parallel, the internal resistance of the sensor that is driven to full output influences the other proximity switches. This requires decoupling diodes to be inserted into the outputs. A logical OR-gate, e.g. the VL250120, can be used to facilitate the connection in parallel.

### mounting

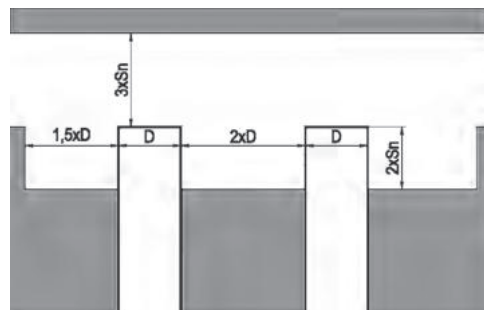
Please follow the mounting instructions for flush or non-flush sensors when installing inductive proximity switches into a metal backing material to avoid undefined switching of the device. For a flush device the active face may be on one level with the backing material.

Non-flush sensors must protrude. As a rule of thumb use 2x the nominal switching distance of the sensor.

#### mounting instructions for flush sensors



#### mounting instructions for non-flush sensors



### switching frequency

The switching frequency states the maximum number of available switching operations per second. Every switching operation of the inductive proximity switch causes the oscillating circuit to move.

The time needed for the oscillation puts a limit on the switching frequency.

For half the nominal switching distance the pulse to pause ratio should be at least 1 : 2,

i.e. when choosing the right proximity switch, a compromise needs to be made between the size of the sensor and the switching frequency. General rule: The larger the sensor, the lower the switching frequency.

**tightening torques**

To avoid damage when mounting proximity switches, never exceed the tightening torque given.

**metal threads**

|     |   |       |
|-----|---|-------|
| M8  | = | 3Nm   |
| M12 | = | 20Nm  |
| M18 | = | 50Nm  |
| M30 | = | 150Nm |
| M50 | = | 200Nm |
| M80 | = | 200Nm |

**active switching zone / active surface:**

The active switching zone is the area in front of the active surface, within which the proximity switch reacts to the approach of metal parts, i.e. changes the state of the output.

**nominal switching distance ( $S_n$ ):**

The distance at which a metal part that is approaching the active surface of the proximity switch causes a status change in the state of the switching output.

**repeatability:**

Repeat accuracy of two measurements under standardized conditions. The difference in the measured values should be less than 10%.

**output function:**

normally open: Object within the area of the active switching zone – output switched

normally closed: Object within the area of the active switching zone – output inhibited

**readiness delay:**

Time required by the proximity switch to be functional after the supply voltage is applied (lies in the millisecond range).

**correction factors:**

Specify the reduction in the switching distance, if materials other than steel St37 are used. The change in the switching distance depends on the type, characteristics (internal structure), size and the geometry of the material that is to be detected.

typical correction factors: St: 1      V2A: approx. 0.7      Ms: approx. 0.4      Al: approx. 0.3      Cu: approx. 0.2

In order to assess the approximate switching distance on the materials which differ from St37, the switching distance for St37 has to be multiplied by the appropriate correction factor.

**repeat accuracy:**

The repeat accuracy (according to IEC 60947-5-2 / EN 60947-5-2) is the repeat accuracy of the real switching distance  $S_r$  over a period of 8 hours at an ambient temperature of  $(23 \pm 5)^\circ\text{C}$  and a defined operating voltage. The specified repeat accuracy corresponds to this definition. Generally the repeat accuracy is considerably better in case of sequent measurements.

**reverse polarity protection:**

An internal protection prevents destruction of the proximity switch if the connection lines are accidentally swapped.

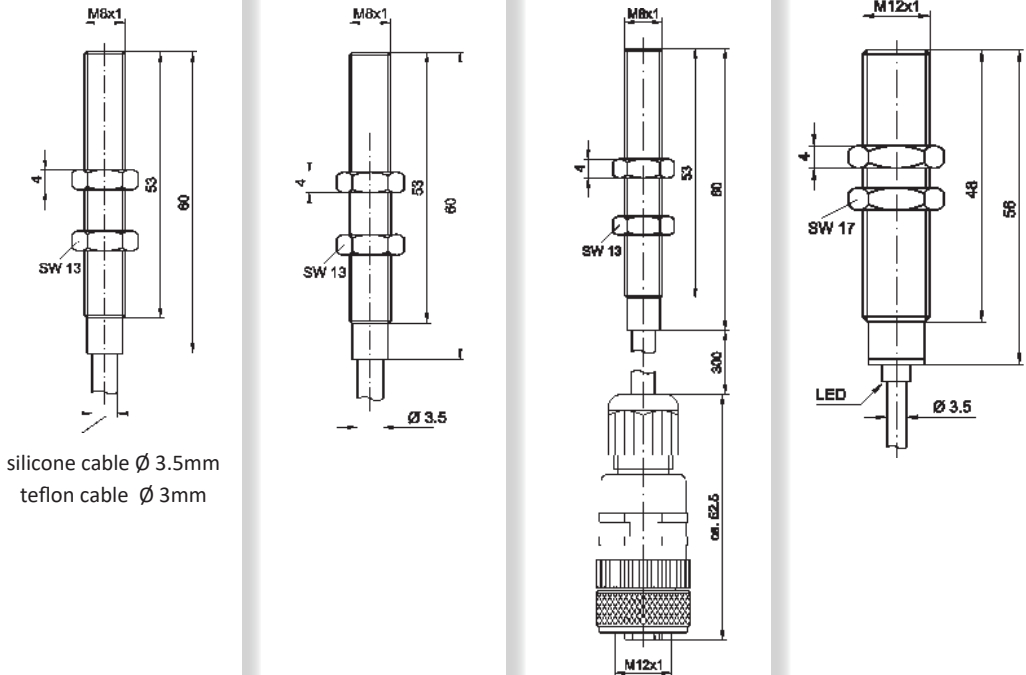
**short-circuit protection:**

An internal protection prevents destruction of the proximity switch in case of an overcurrent.

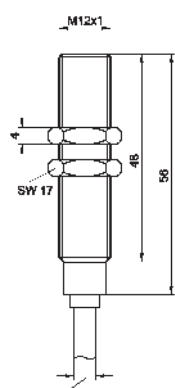
**switching point drift:**

The switching point shifts due to the change e.g. in ambient temperature.

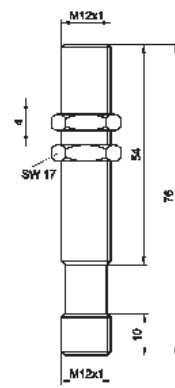
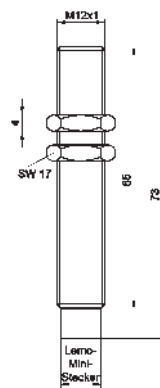
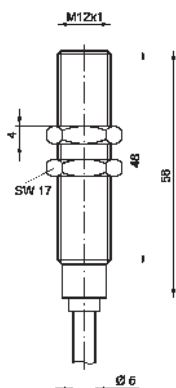
**Warning:** Never use these devices in applications where the safety of a person depends on their functionality.

| switching distance                                                                                                                       | 2mm           | 2mm           | 2mm                 | 3mm           |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------------|---------------|
| operating temperature                                                                                                                    | 0 ... +140°C  | 0 ... +140°C  | 0 ... +140°C        | 0 ... +130°C  |
| output signal                                                                                                                            | pnp, no       | pnnp, nc      | pnnp, no            | pnnp, no      |
| mounting                                                                                                                                 | flush         | flush         | flush               | flush         |
| 2m silicone cable                                                                                                                        | IB080150      | IB080250      | -                   | IB120155      |
| 5m silicone cable                                                                                                                        | IB080151      | IB080251      | -                   | IB120156      |
| 10m silicone cable                                                                                                                       | IB080152      | IB080252      | -                   | IB120157      |
| 2m teflon cable                                                                                                                          | IB0801T0      | -             | -                   | -             |
| 5m teflon cable                                                                                                                          | IB0801T1      | -             | -                   | -             |
| 10m teflon cable                                                                                                                         | IB0801T2      | -             | -                   | -             |
| M12 cable connector                                                                                                                      | -             | -             | IB08012W            | -             |
|  <p>silicone cable Ø 3.5mm<br/>teflon cable Ø 3mm</p> |               |               |                     |               |
| TECHNICAL DATA                                                                                                                           |               |               |                     |               |
| switching distance                                                                                                                       | 2mm           | 2mm           | 2mm                 | 3mm           |
| output signal                                                                                                                            | pnnp, no      | pnnp, nc      | pnnp, no            | pnnp, no      |
| operating voltage                                                                                                                        | 10 ... 30V DC | 10 ... 30V DC | 10 ... 35V DC       | 10 ... 35V DC |
| current consumption (w/o load)                                                                                                           | ≤ 15mA        | ≤ 15mA        | ≤ 15mA              | ≤ 15mA        |
| output current (max. load)                                                                                                               | 50mA          | 50mA          | 80mA                | 120mA         |
| voltage drop (max. load)                                                                                                                 | 2.0V DC       | 2.0V DC       | 2.0V DC             | 2.0V DC       |
| hysteresis                                                                                                                               | 3 ... 15%     | 3 ... 15%     | 3 ... 15%           | 3 ... 15%     |
| switching frequency                                                                                                                      | 600Hz         | 600Hz         | 600Hz               | 500Hz         |
| display (signal)                                                                                                                         | -             | -             | -                   | yellow LED    |
| short-circuit protection                                                                                                                 | +             | +             | +                   | +             |
| reverse polarity protection                                                                                                              | +             | +             | +                   | +             |
| dimensions                                                                                                                               | M8x1          | M8x1          | M8x1                | M12x1         |
| housing material                                                                                                                         | stainl. steel | stainl. steel | stainl. steel       | stainl. steel |
| material (front cap)                                                                                                                     | Vectra®       | Vectra®       | Vectra®             | Vectra®       |
| length (thread/complete)                                                                                                                 | 53mm / 60mm   | 53mm / 60mm   | 53mm / 60mm         | 48mm / 56mm   |
| operating temperature                                                                                                                    | 0 ... +140°C  | 0 ... +140°C  | 0 ... +140°C        | 0 ... +130°C  |
| degree of protection (EN 60529)                                                                                                          | IP65          | IP65          | IP65                | IP65          |
| connection                                                                                                                               | see above     | see above     | M12 cable connector | see above     |
| connection accessories                                                                                                                   | -             | -             | e.g. VK50H026       | -             |
| mounting accessories (clip)                                                                                                              | AY000098      | AY000098      | AY000099            | AY000099      |

|                       |              |              |              |              |
|-----------------------|--------------|--------------|--------------|--------------|
| switching distance    | 3mm          | 3mm          | 3mm          | 3mm          |
| operating temperature | 0 ... +150°C | 0 ... +150°C | 0 ... +150°C | 0 ... +150°C |
| output signal         | pnnp, no     | pnnp, nc     | pnnp, no     | pnnp, no     |
| mounting              | flush        | flush        | flush        | flush        |
| 2m silicone cable     | IB120150     | IB120250     | -            | -            |
| 5m silicone cable     | IB120151     | -            | -            | -            |
| 10m silicone cable    | IB120152     | -            | -            | -            |
| 2m teflon cable       | IB1201T0     | -            | -            | -            |
| 5m teflon cable       | IB1201T1     | -            | -            | -            |
| 10m teflon cable      | IB1201T2     | -            | -            | -            |
| M12-connector         | -            | -            | -            | IB12012W     |
| Lemo mini-connector   | -            | -            | IB1201L0     | -            |

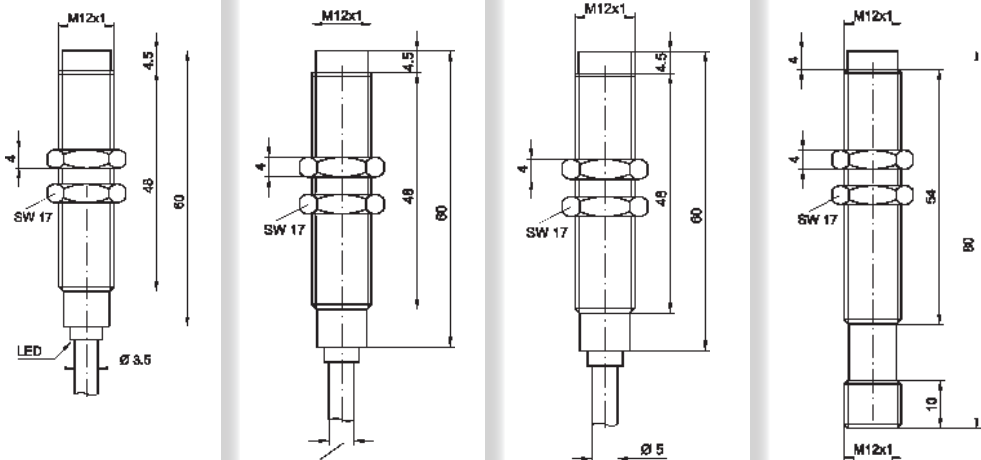


silicone cable Ø 5mm  
teflon cable Ø 3mm

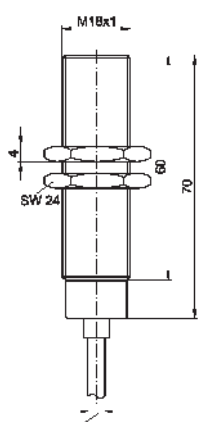
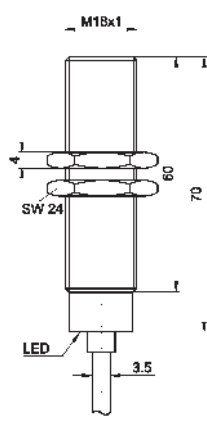


### TECHNICAL DATA

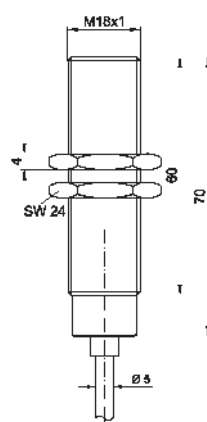
|                                 |               |                   |                     |               |
|---------------------------------|---------------|-------------------|---------------------|---------------|
| switching distance              | 3mm           | 3mm               | 3mm                 | 3mm           |
| output signal                   | pnnp, no      | pnnp, nc          | pnnp, no            | pnnp, no      |
| operating voltage               | 10 ... 35V DC | 10 ... 35V DC     | 10 ... 35V DC       | 10 ... 35V DC |
| current consumption (w/o load)  | ≤ 15mA        | ≤ 15mA            | ≤ 15mA              | ≤ 15mA        |
| output current (max. load)      | 120mA         | 120mA             | 120mA               | 120mA         |
| voltage drop (max. load)        | 2.0V DC       | 2.0V DC           | 2.0V DC             | 2.0V DC       |
| hysteresis                      | 3 ... 15%     | 3 ... 15%         | 3 ... 15%           | 3 ... 15%     |
| switching frequency             | 500Hz         | 500Hz             | 500Hz               | 500Hz         |
| display (signal)                | -             | -                 | -                   | -             |
| short-circuit protection        | +             | +                 | +                   | +             |
| reverse polarity protection     | +             | +                 | +                   | +             |
| dimensions                      | M12x1         | M12x1             | M12x1               | M12x1         |
| housing material                | stainl. steel | stainl. steel     | stainl. steel       | stainl. steel |
| material (front cap)            | Vectra®       | Vectra®           | Vectra®             | Vectra®       |
| length (thread/complete)        | 48mm / 56mm   | 48mm / 56mm       | 65mm / 73mm         | 54mm / 76mm   |
| operating temperature           | 0 ... +150°C  | 0 ... +150°C      | 0 ... +150°C        | 0 ... +150°C  |
| degree of protection (EN 60529) | IP65          | IP65              | IP50                | IP65          |
| connection                      | see above     | 2m silicone cable | Lemo mini-connector | M12-connector |
| connection accessories          | -             | -                 | e.g. VK2000L4       | e.g. VK50H026 |
| mounting accessories            | AY000099      | AY000099          | AY000099            | AY000099      |

|                                                                                                                                        |               |               |                   |               |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|-------------------|---------------|
| switching distance                                                                                                                     | 4mm           | 4mm           | 4mm               | 4mm           |
| operating temperature                                                                                                                  | 0 ... +130°C  | 0 ... +150°C  | 0 ... +150°C      | 0 ... +150°C  |
| output signal                                                                                                                          | pnnp, no      | pnnp, no      | pnnp, nc          | pnnp, no      |
| mounting                                                                                                                               | non-flush     | non-flush     | non-flush         | non-flush     |
| 2m silicone cable                                                                                                                      | IN120155      | IN120150      | IN120250          | -             |
| 5m silicone cable                                                                                                                      | IN120156      | IN120151      | -                 | -             |
| 10m silicone cable                                                                                                                     | IN120157      | IN150152      | -                 | -             |
| 2m teflon cable                                                                                                                        | -             | IN1201T0      | -                 | -             |
| 5m teflon cable                                                                                                                        | -             | IN1201T1      | -                 | -             |
| 10m teflon cable                                                                                                                       | -             | IN1201T2      | -                 | -             |
| M12-connector                                                                                                                          | -             | -             | -                 | IN12012W      |
|  <p>silicone cable Ø 5mm<br/>teflon cable Ø 3mm</p> |               |               |                   |               |
| <b>TECHNICAL DATA</b>                                                                                                                  |               |               |                   |               |
| switching distance                                                                                                                     | 4mm           | 4mm           | 4mm               | 4mm           |
| output signal                                                                                                                          | pnnp, no      | pnnp, no      | pnnp, nc          | pnnp, no      |
| operating voltage                                                                                                                      | 10 ... 35V DC | 10 ... 35V DC | 10 ... 35V DC     | 10 ... 35V DC |
| current consumption (w/o load)                                                                                                         | ≤ 15mA        | ≤ 15mA        | ≤ 15mA            | ≤ 15mA        |
| output current (max. load)                                                                                                             | 120mA         | 120mA         | 120mA             | 120mA         |
| voltage drop (max. load)                                                                                                               | 2.0V DC       | 2.0V DC       | 2.0V DC           | 2.0V DC       |
| hysteresis                                                                                                                             | 3 ... 15%     | 3 ... 15%     | 3 ... 15%         | 3 ... 15%     |
| switching frequency                                                                                                                    | 500Hz         | 500Hz         | 500Hz             | 500Hz         |
| display (signal)                                                                                                                       | yellow LED    | -             | -                 | -             |
| short-circuit protection                                                                                                               | +             | +             | +                 | +             |
| reverse polarity protection                                                                                                            | +             | +             | +                 | +             |
| dimensions                                                                                                                             | M12x1         | M12x1         | M12x1             | M12x1         |
| housing material                                                                                                                       | stainl. steel | stainl. steel | stainl. steel     | stainl. steel |
| material (front cap)                                                                                                                   | Vectra®       | Vectra®       | Vectra®           | Vectra®       |
| length (thread/complete)                                                                                                               | 48mm / 60mm   | 48mm / 60mm   | 48mm / 60mm       | 54mm / 80mm   |
| operating temperature                                                                                                                  | 0 ... +130°C  | 0 ... +150°C  | 0 ... +150°C      | 0 ... +150°C  |
| degree of protection (EN 60529)                                                                                                        | IP65          | IP65          | IP65              | IP65          |
| connection                                                                                                                             | see above     | see above     | 2m silicone cable | M12-connector |
| connection accessories                                                                                                                 | -             | -             | -                 | e.g. VK50H026 |
| mounting accessories                                                                                                                   | AY000099      | AY000099      | AY000099          | AY000099      |

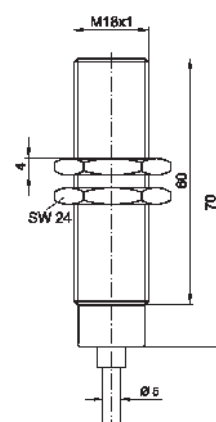
|                       |              |              |              |              |
|-----------------------|--------------|--------------|--------------|--------------|
| switching distance    | 5mm          | 5mm          | 5mm          | 5mm          |
| operating temperature | 0 ... +130°C | 0 ... +180°C | 0 ... +180°C | 0 ... +180°C |
| output signal         | pnp, no      | pnp, no      | pnp, nc      | nnp, no      |
| mounting              | flush        | flush        | flush        | flush        |
| 2m silicone cable     | IB180155     | IB180150     | IB180250     | IB181150     |
| 5m silicone cable     | IB180156     | IB180151     | IB180251     |              |
| 10m silicone cable    | IB180157     | IB180152     | IB180252     | IB181152     |
| 2m teflon cable       | -            | IB1801T0     | -            | -            |
| 5m teflon cable       | -            | IB1801T1     | IB1802T1     | -            |
| 10m teflon cable      | -            | IB1801T2     | -            | -            |



silicone cable Ø 5mm  
teflon cable Ø 3mm



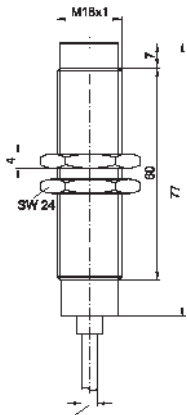
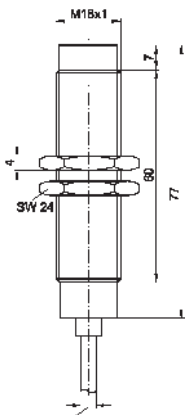
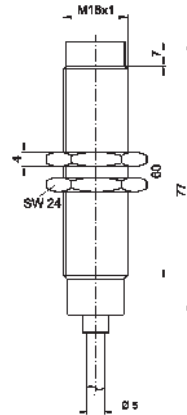
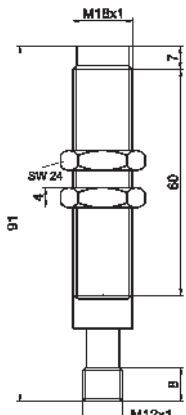
silicone cable Ø 5mm  
teflon cable Ø 3mm

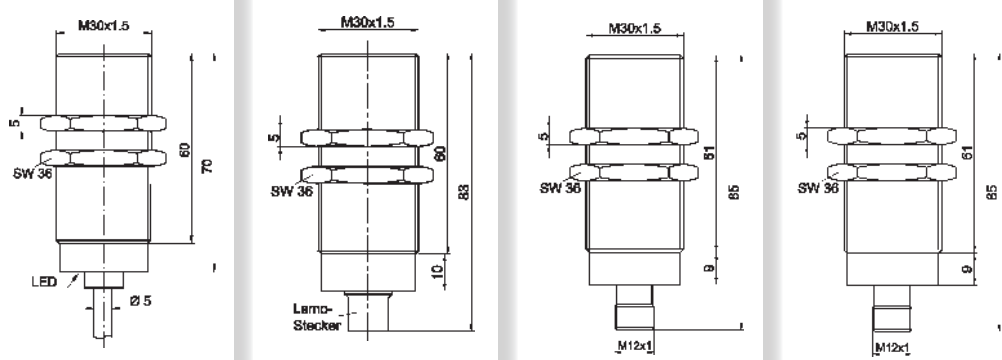


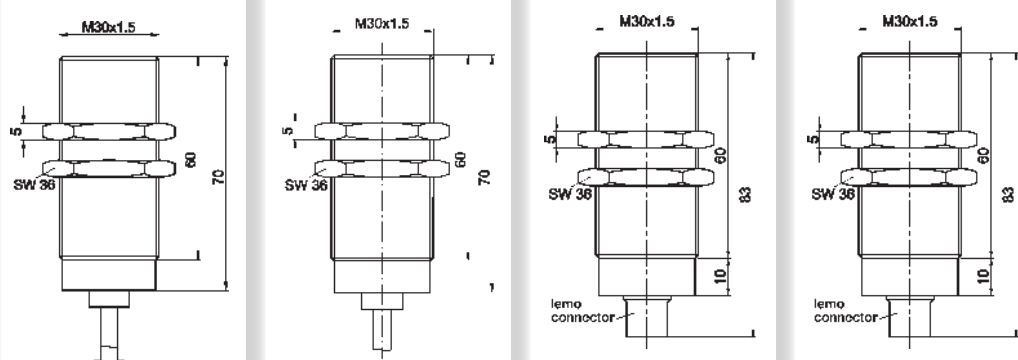
### TECHNICAL DATA

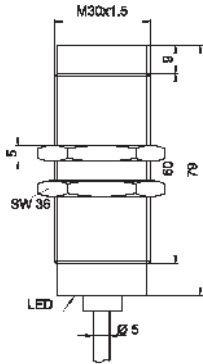
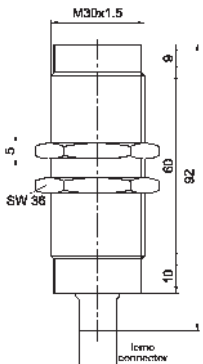
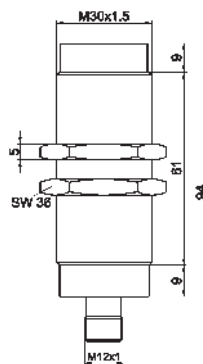
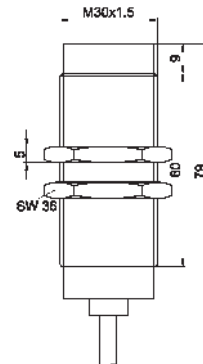
|                                 |               |               |               |               |
|---------------------------------|---------------|---------------|---------------|---------------|
| switching distance              | 5mm           | 5mm           | 5mm           | 5mm           |
| output signal                   | pnp, no       | pnp, no       | pnp, nc       | nnp, no       |
| operating voltage               | 10 ... 35V DC | 10 ... 35V DC | 10 ... 35V DC | 10 ... 35V DC |
| current consumption (w/o load)  | ≤ 15mA        | ≤ 15mA        | ≤ 15mA        | ≤ 15mA        |
| output current (max. load)      | 120mA         | 150mA         | 150mA         | 150mA         |
| voltage drop (max. load)        | 2.0V DC       | 2.0V DC       | 2.0V DC       | 2.0V DC       |
| hysteresis                      | 3 ... 15%     | 3 ... 15%     | 3 ... 15%     | 3 ... 15%     |
| switching frequency             | 400Hz         | 400Hz         | 400Hz         | 400Hz         |
| display (signal)                | yellow LED    | -             | -             | -             |
| short-circuit protection        | +             | +             | +             | +             |
| reverse polarity protection     | +             | +             | +             | +             |
| dimensions                      | M12x1         | M18x1         | M18x1         | M18x1         |
| housing material                | stainl. steel | stainl. steel | stainl. steel | stainl. steel |
| material (front cap)            | Vectra®       | Vectra®       | Vectra®       | Vectra®       |
| length (thread/complete)        | 60mm / 70mm   | 60mm / 70mm   | 60mm / 70mm   | 60mm / 70mm   |
| operating temperature           | 0 ... +130°C  | 0 ... +180°C  | 0 ... +180°C  | 0 ... +180°C  |
| degree of protection (EN 60529) | IP65          | IP65          | IP65          | IP65          |
| connection                      | see above     | see above     | see above     | see above     |
| connection accessories          | -             | -             | -             | -             |
| mounting accessories            | AY000100      | AY000100      | AY000100      | AY000100      |

|                                 |                |                |               |               |
|---------------------------------|----------------|----------------|---------------|---------------|
| switching distance              | 5mm            | 5mm            | 5mm           | 8mm           |
| operating temperature           | 0 ... +180°C   | 0 ... +180°C   | 0 ... +150°C  | 0 ... +130°C  |
| output signal                   | pnp, no        | pnp, nc        | pnp, no       | pnp, no       |
| mounting                        | flush          | flush          | flush         | non-flush     |
| 2m silicone cable               | -              | -              | -             | IN180155      |
| 5m silicone cable               | -              | -              | -             | IN180156      |
| 10m silicone cable              | -              | -              | -             | IN180157      |
| M12-connector                   | -              | -              | IB18012W      | -             |
| Lemo connector                  | IB180140       | IB180240       | -             | -             |
|                                 |                |                |               |               |
| <b>TECHNICAL DATA</b>           |                |                |               |               |
| switching distance              | 5mm            | 5mm            | 5mm           | 8mm           |
| output signal                   | pnp, no        | pnp, nc        | pnp, no       | pnp, no       |
| operating voltage               | 10 ... 35V DC  | 10 ... 35V DC  | 10 ... 35V DC | 10 ... 35V DC |
| current consumption (w/o load)  | ≤ 15mA         | ≤ 15mA         | ≤ 15mA        | ≤ 15mA        |
| output current (max. load)      | 150mA          | 150mA          | 150mA         | 150mA         |
| voltage drop (max. load)        | 2.0V DC        | 2.0V DC        | 2.0V DC       | 2.0V DC       |
| hysteresis                      | 3 ... 15%      | 3 ... 15%      | 3 ... 15%     | 3 ... 15%     |
| switching frequency             | 400Hz          | 400Hz          | 400Hz         | 400Hz         |
| display (signal)                | -              | -              | -             | yellow LED    |
| short-circuit protection        | +              | +              | +             | +             |
| reverse polarity protection     | +              | +              | +             | +             |
| dimensions                      | M18x1          | M18x1          | M18x1         | M18x1         |
| housing material                | stainl. steel  | stainl. steel  | stainl. steel | stainl. steel |
| material (front cap)            | Vectra®        | Vectra®        | Vectra®       | Vectra®       |
| length (thread/complete)        | 60mm / 83mm    | 60mm / 83mm    | 60mm / 84.5mm | 60mm / 77mm   |
| operating temperature           | 0 ... +180°C   | 0 ... +180°C   | 0 ... +150°C  | 0 ... +130°C  |
| degree of protection (EN 60529) | IP50           | IP50           | IP65          | IP65          |
| connection                      | Lemo-connector | Lemo-connector | M12-connector | see above     |
| connection accessories          | e.g. VK200940  | e.g. VK200940  | e.g. VK50H026 | -             |
| mounting accessories            | AY000100       | AY000100       | AY000100      | AY000100      |

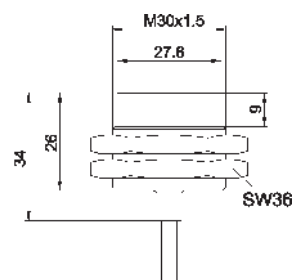
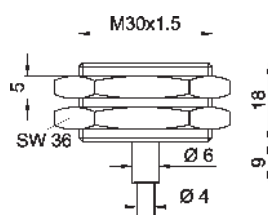
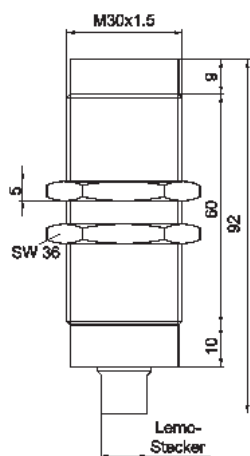
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |               |               |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|
| switching distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8mm           | 8mm           | 8mm           | 8mm           |
| operating temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0 ... +180°C  | 0 ... +180°C  | 0 ... +180°C  | 0 ... +150°C  |
| output signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | pnp, no       | pnp, nc       | nnp, no       | pnp, no       |
| mounting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | non-flush     | non-flush     | non-flush     | non-flush     |
| 2m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | IN180150      | IN180250      | IN181150      | -             |
| 5m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | IN180151      | -             | IN181151      | -             |
| 10m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | IN180152      | -             | IN181152      | -             |
| 2m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | IN1801T0      | IN1802T0      | -             | -             |
| 5m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | IN1801T1      | -             | -             | -             |
| 10m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | IN1801T2      | -             | -             | -             |
| M12-connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -             | -             | -             | IN18012W      |
| <div>  <p>silicone cable Ø 5mm<br/>teflon cable Ø 3mm</p> </div> <div>  <p>silicone cable Ø 5mm<br/>teflon cable Ø 3mm</p> </div> <div>  </div> <div>  </div> |               |               |               |               |
| <b>TECHNICAL DATA</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |               |               |               |               |
| switching distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 8mm           | 8mm           | 8mm           | 8mm           |
| output signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | pnp, no       | pnp, nc       | nnp, no       | pnp, no       |
| operating voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 10 ... 35V DC | 10 ... 35V DC | 10 ... 35V DC | 10 ... 35V DC |
| current consumption (w/o load)                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ≤ 15mA        | ≤ 15mA        | ≤ 15mA        | ≤ 15mA        |
| output current (max. load)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 150mA         | 150mA         | 150mA         | 150mA         |
| voltage drop (max. load)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2.0V DC       | 2.0V DC       | 2.0V DC       | 2.0V DC       |
| hysteresis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3 ... 15%     | 3 ... 15%     | 3 ... 15%     | 3 ... 15%     |
| switching frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 400Hz         | 400Hz         | 400Hz         | 400Hz         |
| display (signal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -             | -             | -             | -             |
| short-circuit protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | +             | +             | +             | +             |
| reverse polarity protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | +             | +             | +             | +             |
| dimensions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | M18x1         | M18x1         | M18x1         | M18x1         |
| housing material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | stainl. steel | stainl. steel | stainl. steel | stainl. steel |
| material (front cap)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Vectra®       | Vectra®       | Vectra®       | Vectra®       |
| length (thread/complete)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 60mm / 77mm   | 60mm / 77mm   | 60mm / 77mm   | 60mm / 91mm   |
| operating temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0 ... +180°C  | 0 ... +180°C  | 0 ... +180°C  | 0 ... +150°C  |
| degree of protection (EN 60529)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | IP65          | IP65          | IP65          | IP65          |
| connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | see above     | see above     | see above     | M12-connector |
| connection accessories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -             | -             | -             | e.g. VK50H026 |
| mounting accessories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | AY000100      | AY000100      | AY000100      | AY000100      |

|                                                                                     |                   |                   |                   |                   |
|-------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| switching distance                                                                  | 10mm              | 10mm              | 10mm              | 10mm              |
| operating temperature                                                               | 0 ... +130°C      | 0 ... +130°C      | 0 ... +150°C      | 0 ... +150°C      |
| output signal                                                                       | pnnp, no          | pnnp, no          | pnnp, no          | pnnp, nc          |
| mounting                                                                            | flush             | flush             | flush             | flush             |
| 2m silicone cable                                                                   | IB300155          | -                 | -                 | -                 |
| 5m silicone cable                                                                   | IB300156          | -                 | -                 | -                 |
| 10m silicone cable                                                                  | IB300157          | -                 | -                 | -                 |
| M12-connector                                                                       | -                 | -                 | IB30012W          | IB30022W          |
| Lemo connector                                                                      | -                 | IB300145          | -                 | -                 |
|  |                   |                   |                   |                   |
| <b>TECHNICAL DATA</b>                                                               |                   |                   |                   |                   |
| switching distance                                                                  | 10mm              | 10mm              | 10mm              | 10mm              |
| output signal                                                                       | pnnp, no          | pnnp, no          | pnnp, no          | pnnp, nc          |
| operating voltage                                                                   | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     |
| current consumption (w/o load)                                                      | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            |
| output current (max. load)                                                          | 150mA             | 150mA             | 150mA             | 150mA             |
| voltage drop (max. load)                                                            | 2.0V DC           | 2.0V DC           | 2.0V DC           | 2.0V DC           |
| hysteresis                                                                          | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         |
| switching frequency                                                                 | 200Hz             | 200Hz             | 200Hz             | 200Hz             |
| display (signal)                                                                    | yellow LED        | -                 | -                 | -                 |
| short-circuit protection                                                            | +                 | +                 | +                 | +                 |
| reverse polarity protection                                                         | +                 | +                 | +                 | +                 |
| dimensions                                                                          | M30x1.5           | M30x1.5           | M30x1.5           | M30x1.5           |
| housing material                                                                    | stainl. steel     | stainl. steel     | stainl. steel     | stainl. steel     |
| material (front cap)                                                                | Vectra®           | Vectra®           | Vectra®           | Vectra®           |
| length (thread/complete)                                                            | 60mm / 70mm       | 60mm / 83mm       | 61mm / 85mm       | 61mm / 85mm       |
| operating temperature                                                               | 0 ... +130°C      | 0 ... +130°C      | 0 ... +150°C      | 0 ... +150°C      |
| degree of protection (EN 60529)                                                     | IP65              | IP50              | IP65              | IP65              |
| connection                                                                          | see above         | Lemo-connector    | M12-connector     | M12-connector     |
| connection accessories                                                              | -                 | e.g. VK200940     | e.g. VK50H026     | e.g. VK50H026     |
| mounting accessories                                                                | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 |

|                                                                                                                                        |                   |                   |                   |                   |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| switching distance                                                                                                                     | 10mm              | 10mm              | 10mm              | 10mm              |
| operating temperature                                                                                                                  | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      |
| output signal                                                                                                                          | pnp, no           | pnnp, nc          | pnnp, no          | pnnp, nc          |
| mounting                                                                                                                               | flush             | flush             | flush             | flush             |
| 2m silicone cable                                                                                                                      | IB300150          | IB300250          | -                 | -                 |
| 5m silicone cable                                                                                                                      | IB300151          | -                 | -                 | -                 |
| 10m silicone cable                                                                                                                     | IB300152          | -                 | -                 | -                 |
| 2m teflon cable                                                                                                                        | IB3001T0          | -                 | -                 | -                 |
| 5m teflon cable                                                                                                                        | IB3001T1          | -                 | -                 | -                 |
| 10m teflon cable                                                                                                                       | IB3001T2          | -                 | -                 | -                 |
| Lemo-connector                                                                                                                         | -                 | -                 | IB300140          | IB300240          |
|  <p>silicone cable Ø 5mm<br/>teflon cable Ø 3mm</p> |                   |                   |                   |                   |
| <b>TECHNICAL DATA</b>                                                                                                                  |                   |                   |                   |                   |
| switching distance                                                                                                                     | 10mm              | 10mm              | 10mm              | 10mm              |
| output signal                                                                                                                          | pnnp, no          | pnnp, nc          | pnnp, no          | pnnp, nc          |
| operating voltage                                                                                                                      | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     |
| current consumption (w/o load)                                                                                                         | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            |
| output current (max. load)                                                                                                             | 150mA             | 150mA             | 150mA             | 150mA             |
| voltage drop (max. load)                                                                                                               | 2.0V DC           | 2.0V DC           | 2.0V DC           | 2.0V DC           |
| hysteresis                                                                                                                             | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         |
| switching frequency                                                                                                                    | 200Hz             | 200Hz             | 200Hz             | 200Hz             |
| display (signal)                                                                                                                       | -                 | -                 | -                 | -                 |
| short-circuit protection                                                                                                               | +                 | +                 | +                 | +                 |
| reverse polarity protection                                                                                                            | +                 | +                 | +                 | +                 |
| dimensions                                                                                                                             | M30x1.5           | M30x1.5           | M30x1.5           | M30x1.5           |
| housing material                                                                                                                       | stainl. steel     | stainl. steel     | stainl. steel     | stainl. steel     |
| material (front cap)                                                                                                                   | Vectra®           | Vectra®           | Vectra®           | Vectra®           |
| length (thread/complete)                                                                                                               | 60mm / 70mm       | 60mm / 70mm       | 60mm / 83mm       | 60mm / 83mm       |
| operating temperature                                                                                                                  | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      |
| degree of protection (EN 60529)                                                                                                        | IP65              | IP65              | IP50              | IP50              |
| connection                                                                                                                             | see above         | see above         | see above         | see above         |
| connection accessories                                                                                                                 | -                 | -                 | e.g. VK200940     | e.g. VK200940     |
| mounting accessories                                                                                                                   | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 |

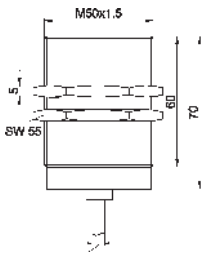
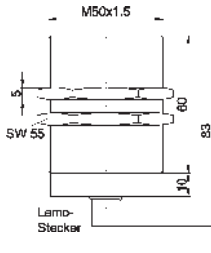
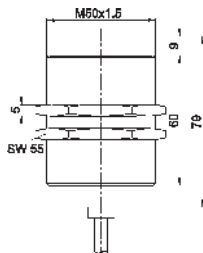
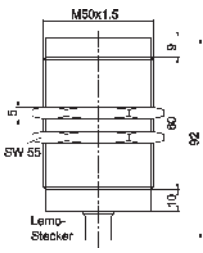
|                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   |                   |                   |                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| switching distance                                                                                                                                                                                                                                                                                                                                                                                                                          | 15mm              | 15mm              | 15mm              | 15mm              |
| operating temperature                                                                                                                                                                                                                                                                                                                                                                                                                       | 0 ... +130°C      | 0 ... +130°C      | 0 ... +150°C      | 0 ... +180°C      |
| output signal                                                                                                                                                                                                                                                                                                                                                                                                                               | pnp, no           | pnp, no           | pnp, no           | pnp, no           |
| mounting                                                                                                                                                                                                                                                                                                                                                                                                                                    | non-flush         | non-flush         | non-flush         | non-flush         |
| 2m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                           | IN300155          | -                 | -                 | IN300150          |
| 5m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                           | IN300156          | -                 | -                 | IN300151          |
| 10m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                          | IN300157          | -                 | -                 | IN300152          |
| 2m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                             | -                 | -                 | -                 | IN3001T0          |
| 5m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                             | -                 | -                 | -                 | IN3001T1          |
| 10m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                            | -                 | -                 | -                 | IN3001T2          |
| M12-connector                                                                                                                                                                                                                                                                                                                                                                                                                               | -                 | -                 | IN30012W          | -                 |
| Lemo-connector                                                                                                                                                                                                                                                                                                                                                                                                                              | -                 | IN300145          | -                 | -                 |
| <div>     </div> <div>             silicone cable Ø 5mm<br/>teflon cable Ø 3mm           </div> |                   |                   |                   |                   |
| <b>TECHNICAL DATA</b>                                                                                                                                                                                                                                                                                                                                                                                                                       |                   |                   |                   |                   |
| switching distance                                                                                                                                                                                                                                                                                                                                                                                                                          | 15mm              | 15mm              | 15mm              | 15mm              |
| output signal                                                                                                                                                                                                                                                                                                                                                                                                                               | pnp, no           | pnp, no           | pnp, no           | pnp, no           |
| operating voltage                                                                                                                                                                                                                                                                                                                                                                                                                           | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     |
| current consumption (w/o load)                                                                                                                                                                                                                                                                                                                                                                                                              | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            |
| output current (max. load)                                                                                                                                                                                                                                                                                                                                                                                                                  | 150mA             | 150mA             | 150mA             | 150mA             |
| voltage drop (max. load)                                                                                                                                                                                                                                                                                                                                                                                                                    | 2.0V DC           | 2.0V DC           | 2.0V DC           | 2.0V DC           |
| hysteresis                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         |
| switching frequency                                                                                                                                                                                                                                                                                                                                                                                                                         | 200Hz             | 200Hz             | 200Hz             | 200Hz             |
| display (signal)                                                                                                                                                                                                                                                                                                                                                                                                                            | yellow LED        | -                 | -                 | -                 |
| short-circuit protection                                                                                                                                                                                                                                                                                                                                                                                                                    | +                 | +                 | +                 | +                 |
| reverse polarity protection                                                                                                                                                                                                                                                                                                                                                                                                                 | +                 | +                 | +                 | +                 |
| dimensions                                                                                                                                                                                                                                                                                                                                                                                                                                  | M30x1.5           | M30x1.5           | M30x1.5           | M30x1.5           |
| housing material                                                                                                                                                                                                                                                                                                                                                                                                                            | stainl. steel     | stainl. steel     | stainl. steel     | stainl. steel     |
| material (front cap)                                                                                                                                                                                                                                                                                                                                                                                                                        | Vectra®           | Vectra®           | Vectra®           | Vectra®           |
| length (thread/complete)                                                                                                                                                                                                                                                                                                                                                                                                                    | 60mm / 79mm       | 60mm / 92mm       | 61mm / 94mm       | 60mm / 79mm       |
| operating temperature                                                                                                                                                                                                                                                                                                                                                                                                                       | 0 ... +130°C      | 0 ... +130°C      | 0 ... +150°C      | 0 ... +180°C      |
| degree of protection (EN 60529)                                                                                                                                                                                                                                                                                                                                                                                                             | IP65              | IP50              | IP65              | IP65              |
| connection                                                                                                                                                                                                                                                                                                                                                                                                                                  | see above         | Lemo-connector    | M12-connector     | see above         |
| connection accessories                                                                                                                                                                                                                                                                                                                                                                                                                      | -                 | e.g. VK200940     | e.g. VK50H026     | -                 |
| mounting accessories                                                                                                                                                                                                                                                                                                                                                                                                                        | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 |

|                                |              |              |              |
|--------------------------------|--------------|--------------|--------------|
| switching distance             | 15mm         | 8mm          | 15mm         |
| operating temperature          | 0 ... +180°C | 0 ... +140°C | 0 ... +140°C |
| output signal                  | pnnp, no     | pnnp, no     | pnnp, no     |
| mounting                       | non-flush    | flush        | non-flush    |
| 5m stainl. steel teflon cable  | -            | IB3001S1     | -            |
| 10m stainl. steel teflon cable | -            | IB3001S2     | -            |
| 15m stainl. steel teflon cable | -            | IB3001S3     | IN3001S3     |
| Lemo connector                 | IN300140     | -            | -            |

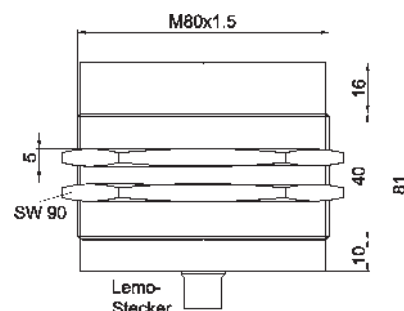
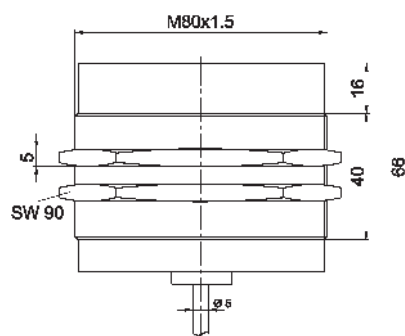


### TECHNICAL DATA

|                                 |                   |                   |                   |
|---------------------------------|-------------------|-------------------|-------------------|
| switching distance              | 15mm              | 8mm               | 15mm              |
| output signal                   | pnnp, no          | pnnp, no          | pnnp, no          |
| operating voltage               | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     |
| current consumption (w/o load)  | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            |
| output current (max. load)      | 150mA             | 150mA             | 150mA             |
| voltage drop (max. load)        | 2.0V DC           | 2.0V DC           | 2.0V DC           |
| hysteresis                      | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         |
| switching frequency             | 200Hz             | 200Hz             | 200Hz             |
| display (signal)                | -                 | -                 | -                 |
| short-circuit protection        | +                 | +                 | +                 |
| reverse polarity protection     | +                 | +                 | +                 |
| dimensions                      | M30x1.5           | M30x1.5           | M30x1.5           |
| housing material                | stainl. steel     | stainl. steel     | stainl. steel     |
| material (front cap)            | Vectra®           | Vectra®           | Vectra®           |
| length (thread/complete)        | 60mm / 92mm       | 18mm / 18mm       | 18mm / 27mm       |
| operating temperature           | 0 ... +180°C      | 0 ... +140°C      | 0 ... +140°C      |
| degree of protection (EN 60529) | IP50              | IP65              | IP65              |
| connection                      | Lemo-connector    | see above         | see above         |
| connection accessories          | e.g. VK200940     | -                 | -                 |
| mounting accessories            | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 |

| switching distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20mm              | 20mm              | 25mm              | 25mm              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
| operating temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      |
| output signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | pnp, no           | pnp, no           | pnp, no           | pnp, no           |
| mounting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | flush             | flush             | non-flush         | non-flush         |
| 2m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | IB500150          | -                 | IN500150          | -                 |
| 5m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | IB500151          | -                 | IN500151          | -                 |
| 10m silicone cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | IB500152          | -                 | IN500152          | -                 |
| 2m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | IB5001T0          | -                 | IN5001T0          | -                 |
| 5m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | IB5001T1          | -                 | IN5001T1          | -                 |
| 10m teflon cable                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | IB5001T2          | -                 | IN5001T2          | -                 |
| Lemo connector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -                 | IB500140          | -                 | IN500140          |
| <div>  <p>silicone cable Ø 5mm<br/>teflon cable Ø 3mm</p> </div> <div>  </div> <div>  <p>silicone cable Ø 5mm<br/>teflon cable Ø 3mm</p> </div> <div>  </div> |                   |                   |                   |                   |
| TECHNICAL DATA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                   |                   |                   |
| switching distance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20mm              | 20mm              | 25mm              | 25mm              |
| output signal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | pnp, no           | pnp, no           | pnp, no           | pnp, no           |
| operating voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     | 10 ... 35V DC     |
| current consumption (w/o load)                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            | ≤ 15mA            |
| output current (max. load)                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 150mA             | 150mA             | 150mA             | 150mA             |
| voltage drop (max. load)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2.0V DC           | 2.0V DC           | 2.0V DC           | 2.0V DC           |
| hysteresis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         | 3 ... 15%         |
| switching frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 100Hz             | 100Hz             | 100Hz             | 100Hz             |
| display (signal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                 | -                 | -                 | -                 |
| short-circuit protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | +                 | +                 | +                 | +                 |
| reverse polarity protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | +                 | +                 | +                 | +                 |
| dimensions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | M30x1.5           | M30x1.5           | M30x1.5           | M30x1.5           |
| housing material                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | stainl. steel     | stainl. steel     | stainl. steel     | stainl. steel     |
| material (front cap)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Vectra®           | Vectra®           | Vectra®           | Vectra®           |
| length (thread/complete)                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 60mm / 70mm       | 60mm / 83mm       | 60mm / 79mm       | 60mm / 92mm       |
| operating temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      | 0 ... +180°C      |
| degree of protection (EN 60529)                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | IP65              | IP50              | IP65              | IP50              |
| connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | see above         | Lemo-connector    | see above         | Lemo-connector    |
| connection accessories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -                 | e.g. VK200940     | -                 | e.g. VK200940     |
| mounting accessories                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 | AY000101/AY000104 |

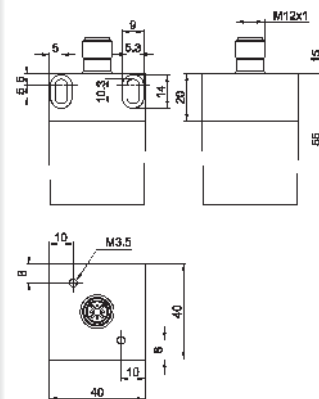
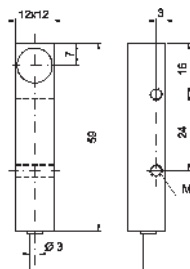
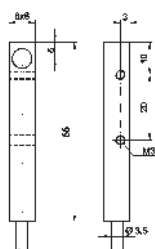
|                       |              |              |
|-----------------------|--------------|--------------|
| switching distance    | 50mm         | 50mm         |
| operating temperature | 0 ... +160°C | 0 ... +160°C |
| output signal         | pnp, no      | pnp, no      |
| mounting              | non-flush    | non-flush    |
| 2m silicone cable     | IN800150     | -            |
| 5m silicone cable     | IN800151     | -            |
| 10m silicone cable    | IN800152     | -            |
| Lemo connector        | -            | IN800140     |



### TECHNICAL DATA

|                                 |                   |                   |
|---------------------------------|-------------------|-------------------|
| switching distance              | 50mm              | 50mm              |
| output signal                   | pnp, no           | pnp, no           |
| operating voltage               | 10 ... 35V DC     | 10 ... 35V DC     |
| current consumption (w/o load)  | ≤ 15mA            | ≤ 15mA            |
| output current (max. load)      | 150mA             | 150mA             |
| voltage drop (max. load)        | 2.0V DC           | 2.0V DC           |
| hysteresis                      | 3 ... 15%         | 3 ... 15%         |
| switching frequency             | 100Hz             | 100Hz             |
| display (signal)                | -                 | -                 |
| short-circuit protection        | +                 | +                 |
| reverse polarity protection     | +                 | +                 |
| dimensions                      | M80x1.5           | M80x1.5           |
| housing material                | stainl. steel     | stainl. steel     |
| material (front cap)            | Vectra®           | Vectra®           |
| length (thread/complete)        | 40mm / 66mm       | 40mm / 81mm       |
| operating temperature           | 0 ... +160°C      | 0 ... +160°C      |
| degree of protection (EN 60529) | IP65              | IP50              |
| connection                      | see above         | Lemo connector    |
| connection accessories          | e.g. VK50H026     | e.g. VK200940     |
| mounting accessories            | AY000101/AY000104 | AY000101/AY000104 |

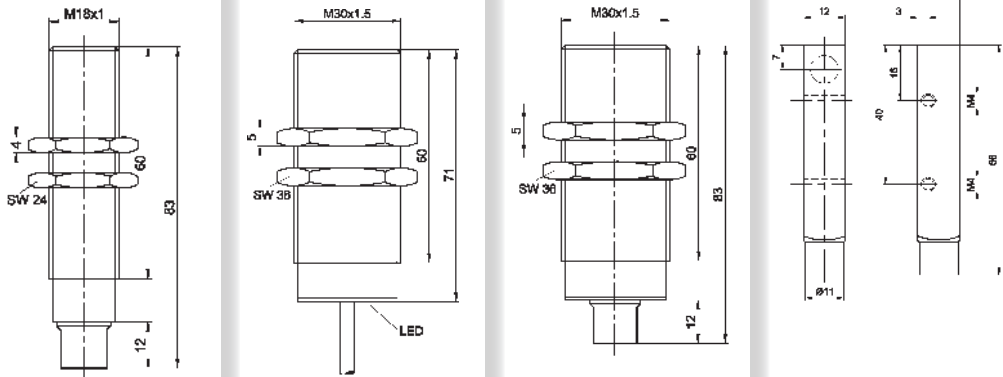
|                       |              |              |              |
|-----------------------|--------------|--------------|--------------|
| switching distance    | 2mm          | 4mm          | 25mm         |
| operating temperature | 0 ... +140°C | 0 ... +130°C | 0 ... +150°C |
| output signal         | pnp, no      | pnp, no      | pnp, no      |
| mounting              | flush        | flush        | non-flush    |
| 2m silicone cable     | IB090150     | IB130155     | -            |
| 5m silicone cable     | IB090151     | IB130156     | -            |
| M12-connector         | -            | -            | IN40012W     |



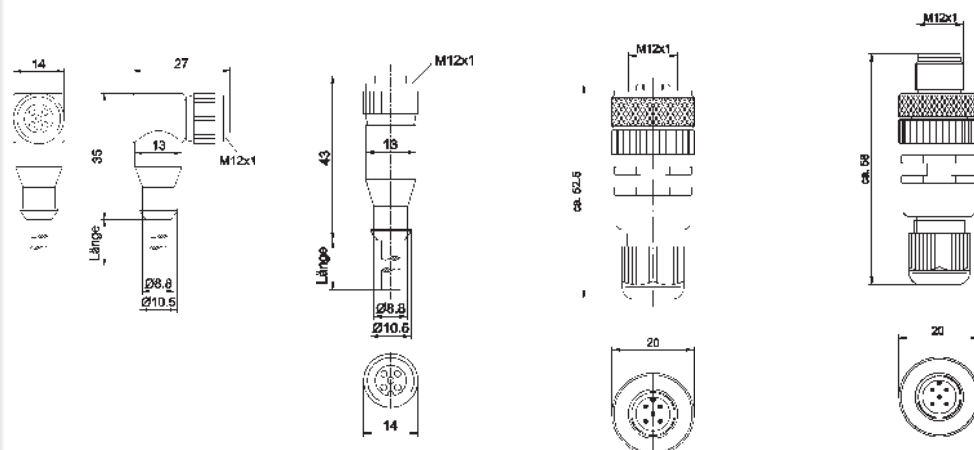
## TECHNICAL DATA

|                                 |               |               |                      |
|---------------------------------|---------------|---------------|----------------------|
| switching distance              | 2mm           | 4mm           | 25mm                 |
| output signal                   | pnp, no       | pnp, no       | pnp, no              |
| operating voltage               | 10 ... 30V DC | 10 ... 30V DC | 10 ... 35V DC        |
| current consumption (w/o load)  | ≤ 15mA        | ≤ 15mA        | ≤ 15mA               |
| output current (max. load)      | 50mA          | 200mA         | 200mA                |
| voltage drop (max. load)        | 2.0V DC       | 2.0V DC       | 2.0V DC              |
| hysteresis                      | 3 ... 20%     | 3 ... 15%     | 3 ... 15%            |
| switching frequency             | 600Hz         | 500Hz         | 200Hz                |
| display (signal)                | -             | -             | -                    |
| short-circuit protection        | +             | +             | +                    |
| reverse polarity protection     | +             | +             | +                    |
| dimensions                      | 8x40x8mm      | 12x55x12mm    | 40x40mm              |
| housing material                | stainl. steel | stainl. steel | stainl. steel        |
| material (front cap)            | Vectra®       | Vectra®       | Vectra®              |
| length (thread/complete)        | - / 40mm      | - / 55mm      | - / 55mm             |
| operating temperature           | 0 ... +140°C  | 0 ... +130°C  | 0 ... +150°C         |
| degree of protection (EN 60529) | IP65          | IP65          | IP65                 |
| connection                      | see above     | see above     | M12-connector        |
| connection accessories          | -             | -             | e.g. <b>VK50H026</b> |
| mounting accessories            | -             | -             | e.g. <b>AY000135</b> |

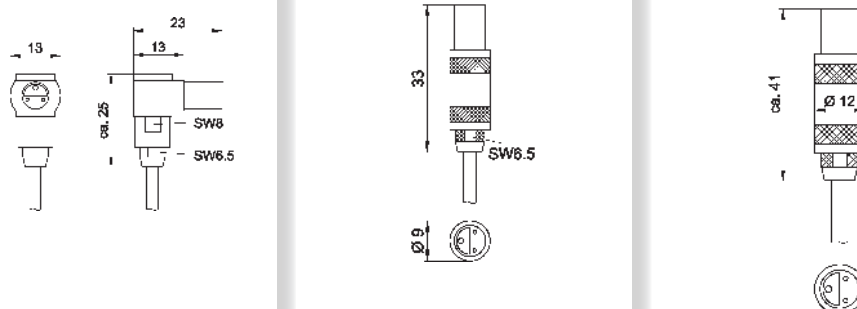
|                                 |                   |                     |                |                   |
|---------------------------------|-------------------|---------------------|----------------|-------------------|
| switching distance              | 2mm               | 2mm                 | 2mm            | 5mm               |
| operating temperature           | -25 ... +130°C    | -25 ... +130°C      | -25 ... +130°C | -25 ... +130°C    |
| output signal                   | pnnp, no          | pnnp, no            | pnnp, no       | pnnp, no          |
| mounting                        | flush             | flush               | flush          | flush             |
| 2m silicone cable               | IC120155          | -                   | -              | IC180155          |
| M12-connector                   | -                 | -                   | IC12012W       | -                 |
| Lemo mini-connector             | -                 | IC120110            | -              | -                 |
|                                 |                   |                     |                |                   |
| <b>TECHNICAL DATA</b>           |                   |                     |                |                   |
| switching distance              | 2mm               | 2mm                 | 2mm            | 5mm               |
| output signal                   | pnnp, no          | pnnp, no            | pnnp, no       | pnnp, no          |
| operating voltage               | 7 ... 35V DC      | 7 ... 35V DC        | 7 ... 35V DC   | 7 ... 35V DC      |
| current consumption (w/o load)  | ≤ 15mA            | ≤ 15mA              | ≤ 15mA         | ≤ 15mA            |
| output current (max. load)      | 150mA             | 150mA               | 150mA          | 150mA             |
| voltage drop (max. load)        | 2.0V DC           | 2.0V DC             | 2.0V DC        | 2.0V DC           |
| hysteresis                      | 3 ... 20%         | 3 ... 20%           | 3 ... 20%      | 3 ... 15%         |
| switching frequency             | 40Hz              | 40Hz                | 40Hz           | 30Hz              |
| display (signal)                | yellow LED        | yellow LED          | yellow LED     | yellow LED        |
| short-circuit protection        | +                 | +                   | +              | +                 |
| reverse polarity protection     | +                 | +                   | +              | +                 |
| dimensions                      | M12x1             | M12x1               | M12x1          | M18x1             |
| housing material                | stainl. steel     | stainl. steel       | stainl. steel  | stainl. steel     |
| material (front cap)            | stainl. steel     | stainl. steel       | stainl. steel  | stainl. steel     |
| length (thread/complete)        | 45mm / 59mm       | 45mm / 70mm         | 45mm / 71mm    | 60mm / 71mm       |
| operating temperature           | -25 ... +130°C    | -25 ... +130°C      | -25 ... +130°C | -25 ... +130°C    |
| degree of protection (EN 60529) | IP65              | IP50                | IP65           | IP65              |
| connection                      | 2m silicone cable | Lemo mini-connector | M12-connector  | 2m silicone cable |
| connection accessories          | -                 | e.g. VK2000L4       | e.g. VK50H026  | -                 |
| mounting accessories            | AY000099          | AY000099            | AY000099       | AY000100          |

|                                                                                     |                |                   |                   |                     |
|-------------------------------------------------------------------------------------|----------------|-------------------|-------------------|---------------------|
| switching distance                                                                  | 5mm            | 10mm              | 10mm              | 2mm                 |
| operating temperature                                                               | -25 ... +130°C | -25 ... +130°C    | -25 ... +130°C    | -25 ... +130°C      |
| output signal                                                                       | pnnp, no       | pnnp, no          | pnnp, no          | pnnp, no            |
| mounting                                                                            | flush          | flush             | flush             | flush               |
| 2m silicone cable                                                                   | -              | IC300155          | -                 | -                   |
| Lemo connector                                                                      | IC180145       | -                 | IC300145          | -                   |
| Lemo mini-connector                                                                 | -              | -                 | -                 | IC1301L0            |
|  |                |                   |                   |                     |
| <b>TECHNICAL DATA</b>                                                               |                |                   |                   |                     |
| switching distance                                                                  | 5mm            | 10mm              | 10mm              | 2mm                 |
| output signal                                                                       | pnnp, no       | pnnp, no          | pnnp, no          | pnnp, no            |
| operating voltage                                                                   | 7 ... 35V DC   | 7 ... 35V DC      | 7 ... 35V DC      | 10 ... 30V DC       |
| current consumption (w/o load)                                                      | ≤ 15mA         | ≤ 15mA            | ≤ 15mA            | ≤ 15mA              |
| output current (max. load)                                                          | 150mA          | 150mA             | 150mA             | 200mA               |
| voltage drop (max. load)                                                            | 2.0V DC        | 2.0V DC           | 2.0V DC           | 2.0V DC             |
| hysteresis                                                                          | 3 ... 15%      | 3 ... 15%         | 3 ... 15%         | 3 ... 15%           |
| switching frequency                                                                 | 30Hz           | 30Hz              | 30Hz              | 40Hz                |
| display (signal)                                                                    | -              | yellow LED        | -                 | -                   |
| short-circuit protection                                                            | +              | +                 | +                 | +                   |
| reverse polarity protection                                                         | +              | +                 | +                 | +                   |
| dimensions                                                                          | M18x1          | M30x1.5           | M30x1.5           | 12x66x12mm          |
| housing material                                                                    | stainl. steel  | stainl. steel     | stainl. steel     | stainl. steel       |
| material (front cap)                                                                | stainl. steel  | stainl. steel     | stainl. steel     | stainl. steel       |
| length (thread/complete)                                                            | 60mm / 83mm    | 60mm / 71mm       | 60mm / 83mm       | - / 66mm            |
| operating temperature                                                               | -25 ... +130°C | -25 ... +130°C    | -25 ... +130°C    | -25 ... +130°C      |
| degree of protection (EN 60529)                                                     | IP50           | IP65              | IP50              | IP50                |
| connection                                                                          | Lemo connector | 2m silicone cable | Lemo connector    | Lemo mini-connector |
| connection accessories                                                              | e.g. VK200940  | -                 | e.g. VK200940     | e.g. VK2000L4       |
| mounting accessories                                                                | AY000100       | AY000101/AY000104 | AY000101/AY000104 | -                   |

| cable socket              | M12 cable socket<br>+150°C angular | M12 cable socket<br>+150°C straight | M12 cable socket<br>+150°C straight | M12 cable connector<br>+150°C straight |
|---------------------------|------------------------------------|-------------------------------------|-------------------------------------|----------------------------------------|
| number of pins (assigned) | 3-wire                             | 3-wire                              | 4-pin                               | 4-pin                                  |
| article-no.               | VK50H022 polyolefin                | VK50H026 polyolefin                 | VK003524                            | VK003528                               |
| length                    | 5m                                 | 5m                                  | field attachable                    | field attachable                       |
| article-no.               | VKA0H022 polyolefin                | VKA0H026 polyolefin                 | -                                   | -                                      |
| length                    | 10m                                | 10m                                 | -                                   | -                                      |

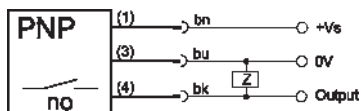


| cable socket              | Lemosa mini<br>-40 bis +180°C angular | Lemosa mini<br>-40 bis +180°C straight | Lemosa<br>-40 bis +180°C straight |
|---------------------------|---------------------------------------|----------------------------------------|-----------------------------------|
| number of pins (assigned) | 3-wire                                | 3-wire                                 | 3-wire                            |
| article-no.               | VK2000L0, silicone                    | VK2000L4, silicone                     | VK200940, silicone                |
| length                    | 2m                                    | 2m                                     | 2m                                |
| article-no.               | VK5000L0, silicone                    | VK5000L4, silicone                     | VK500940, silicone                |
| length                    | 5m                                    | 5m                                     | 5m                                |
| article-no.               | VKA000L0, silicone                    | VKA000L4, silicone                     | VKA00940, silicone                |
| length                    | 10m                                   | 10m                                    | 10m                               |
| article-no.               | VK2000L1, teflon                      | VK2000L5, teflon                       | VK200941, teflon                  |
| length                    | 2m                                    | 2m                                     | 2m                                |
| article-no.               | VK5000L1, teflon                      | VK5000L5, teflon                       | VK500941, teflon                  |
| length                    | 5m                                    | 5m                                     | 5m                                |
| article-no.               | VKA000L1, teflon                      | VKA000L5, teflon                       | VKA00941, teflon                  |
| length                    | 10m                                   | 10m                                    | 10m                               |
| article-no.               | -                                     | -                                      | VKB00941, teflon                  |
| length                    | -                                     | -                                      | 20m                               |



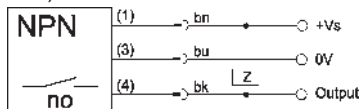
## connection

PNP, no



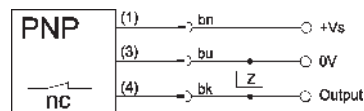
wire colors: bn = brown (1), bu = blue (3), bk = black (4)

NPN, no



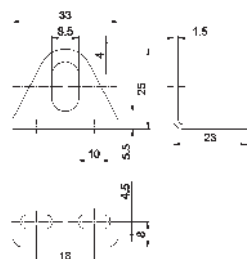
wire colors: bn = brown (1), bu = blue (3), bk = black (4)

PNP, nc

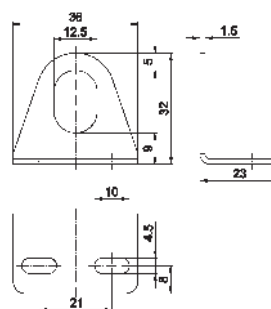


## mounting material

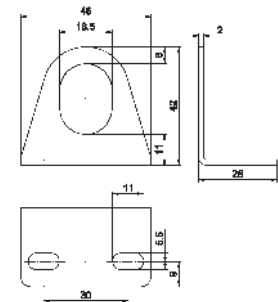
**AY000098** for design M8x1, stainl. steel



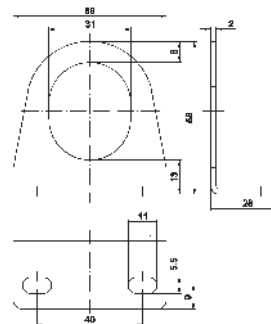
**AY000099** for design M12x1, stainl. steel



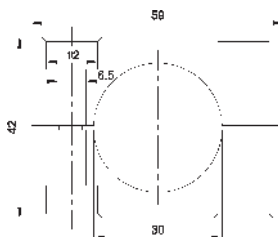
**AY000100** for design M18x1, stainl. steel



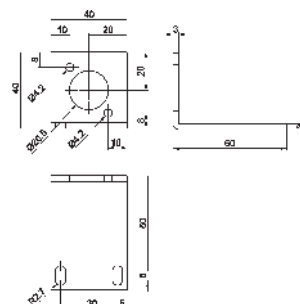
**AY000101** for design M30x1.5, stainl. steel



**AY000104** for design M30x1.5, aluminum



**AY000135** for design 40



This data sheet contains only the available standard versions. Please contact us for other output and connection versions.

We will be pleased to supply the matching cable socket for your connector devices. Please refer to the list in catalog chapter "accessories" under "cable sockets **ipf-SENSORFLEX®**" or search our website for "VK".

**Warning:** Never use these devices in applications where the safety of a person depends on their functionality.

## NOTES