



## Instruction manual vnp-Ultrasonic Sensors with one analogue output

- vnp-25/IU/TC
- vnp-35/IU/TC
- vnp-130/IU/TC
- vnp-340/IU/TC
- vnp-600/IU/TC

### Product description

- The vnp-sensor with one analogue output measures the distance to an object within the detection zone contactless. A signal proportional to distance is created according to the adjusted window margins of the analogue characteristic curve.
- The actual window margins arise from a virtual origin set with the Teach-in procedure and offsets that are set numerically using two push-buttons and a three-digit LED-display (TouchControl). As an additional feature the virtual origin can be shifted continuously by connecting the control input line »Sync/Com« at pin 5 of the sensor connector to +U<sub>B</sub>.
- Light emitting diodes (three-colour LEDs) indicate all operation conditions.
- Choosing between rising and falling output characteristic is possible.
- Useful additional functions are set in the Add-on-menu.
- The measured distance value can be displayed relatively in relation to the virtual origin (see Add-on-menu).
- Using the LinkControl adapter (optional accessory) all TouchControl and additional sensor parameter settings may be made by a Windows-Software.

### Important instructions for assembly and application

All employee and plant safety-relevant measures must be taken prior to assembly, start-up, or maintenance work (see operation manual for the entire plant and the operator instruction of the plant).

**The sensors are not considered as safety equipment and may not be used to ensure human or machine safety!**

The vnp-sensors indicate a **blind zone**, in which the distance cannot be measured. The **operating range** indicates the distance of the sensor that can be applied with normal reflectors with sufficient function reserve. When using good reflectors, such as a calm water surface, the sensor can also be used up to its **maximum range**. Objects that strongly absorb (e.g. plastic foam) or diffusely reflect sound (e.g. pebble stones) can also reduce the defined operating range.

### Synchronisation

If the assembly distances shown in Fig.1 for two or more sensors are exceeded the integrated synchronisation should be used. Connect Sync/Com-channels (pin 5 at the units acceptable) of all sensors (10 maximum).

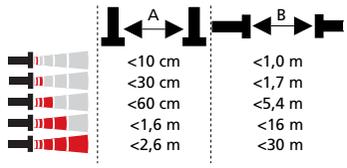


Fig. 1: Assembly distances, indicating synchronisation/multiplex

### Multiplex mode

The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the »Sync/Com« line (Pin5). The sensors perform the ultrasonic measurement sequentially from low to high address. Therefore any influence between the sensors is rejected. The address »00« is reserved to synchronisation mode and deactivates the multiplex mode. (To use synchronised mode all sensors must be set to address »00«.)

### Assembly instructions

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M 12 connector.

Pin	Function	Colour
1	+U <sub>B</sub>	brown
3	-U <sub>B</sub>	blue
4	-	black
2	I/U	white
5	Sync/Com.	grey

Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

### Start-up

- vnp-sensors are delivered factory made with the following settings:
- Rising analogue characteristic
- Offsets at 10 cm
- Measurement range set to maximum range

Set the parameters of the sensor manually to adjust the relative window margins (offsets).

- The offsets can be programmed in the range of ± 99 cm around the teachable origin.
- For offsets less than 10 cm the programmable resolution is 1 mm.

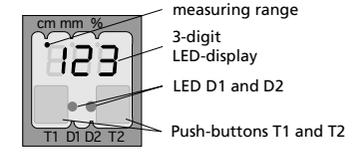


Fig. 3: TouchControl

### Operation

By connecting the control input line »Sync/Com« at pin 5 for 3 seconds to + U<sub>B</sub> the virtual origin is set to the actually measured distance. This has to be done in normal operation mode. vnp-sensors work maintenance free. Small amounts of dirt on the surface do not influence function. Thick layers of dirt and caked-on dirt affect sensor function and therefore must be removed.

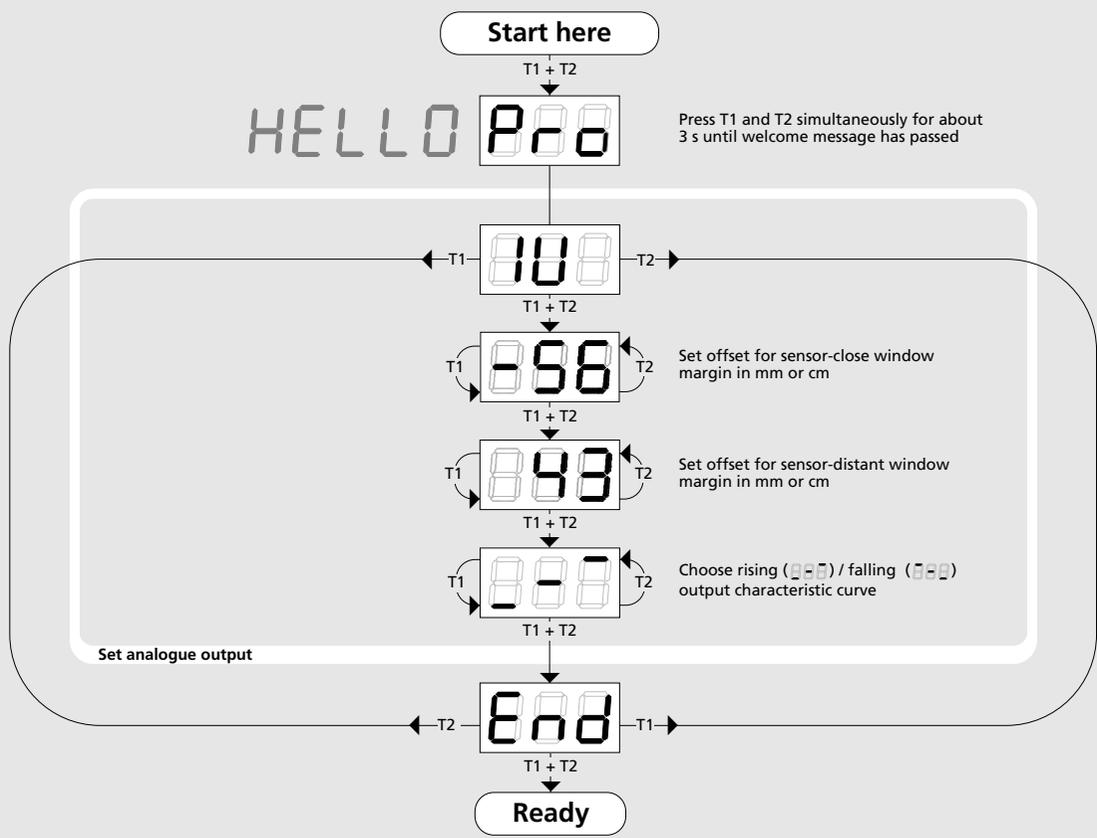
### Note

- vnp-sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
- If an object is within the set window margins of the analogue output, then LED D1 lights up green, if the object is outside the window margins, then LED D1 lights up red.
- The load put to the analogue output is detected automatically when turning supply voltage on.
- During normal mode operation, the measured distance value is displayed on the LED-indicator in mm (up to 999 mm) or cm (from 100 cm). Scale switches automatically and is indicated by a point on top of the digits. Alternatively a percentage scale may be set in the add-on menu. In this connection 0% and 100% correspond to the set window margins of the analogue output.
- If no objects are placed within the detection zone the LED-indicator shows »- -«.
- If no push-buttons are pressed for 20 seconds during parameter setting mode the made changes are stored and the sensor returns to normal mode operation.
- You can lock the key pad to provide inputs, see »Key lock and factory setting«.
- You can reset the factory settings at any time, see »Key lock and factory setting«.

### Show parameters

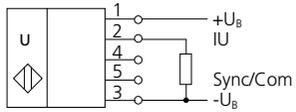
Tapping push-button T1 shortly during normal mode operation shows »PAR« on the LED-display. Each time you tap push-button T1 the actual settings of the analogue output are shown.

## Set the offsets to origin numerically using LED-display....

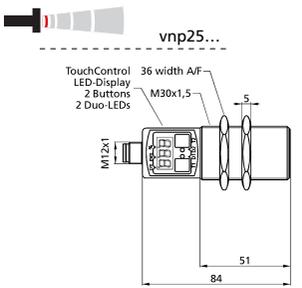




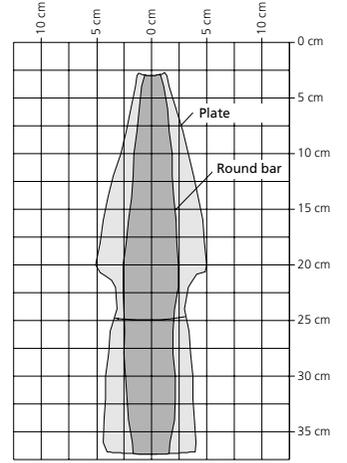
# Technical data



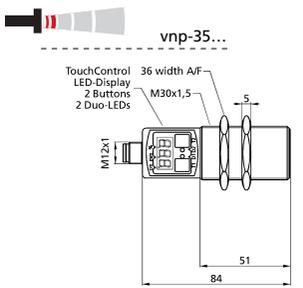
Analogue output



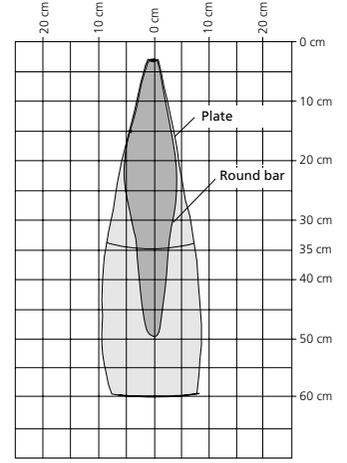
<b>Blind zone</b>	0 to 30 mm
<b>Operating range</b>	250 mm
<b>Maximum range</b>	350 mm
<b>Angle of beam spread</b>	Please see detection zone
<b>Transducer frequency</b>	ca. 320 kHz
<b>Resolution, sampling rate</b>	0,18 mm
<b>Reproducibility</b>	± 0,15 %
<b>Accuracy</b>	Temperature drift internal compensated, ≤ 2 % may be deactivated <sup>1)</sup> (0,17%/K without compensation)



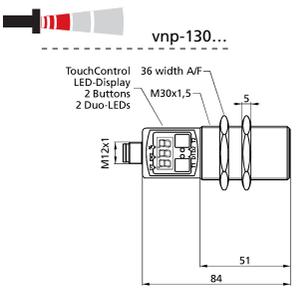
<b>Operating voltage U<sub>B</sub></b>	9 V to 30 V DC, reverse polarity protection
<b>Voltage ripple</b>	±10 %
<b>No-load supply current</b>	≤ 80 mA
<b>Housing</b>	Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
<b>Class of protection to EN 60529</b>	IP 67
<b>Norm conformity</b>	EN 60947-5-2
<b>Type of connection</b>	5-pin initiator plug, PBT
<b>Controls</b>	2 push-buttons (TouchControl)
<b>Indicators</b>	3-digit LED-display, 2 three-colour LEDs
<b>Programmable</b>	Yes, with TouchControl and LinkControl
<b>Operating temperature</b>	-25°C to +70°C
<b>Storage temperature</b>	-40°C to +85°C
<b>Weight</b>	150 g
<b>Response time<sup>1)</sup></b>	50 ms
<b>Time delay before availability</b>	< 300 ms
<b>Order No.</b>	vnp-25/IU/TC
<b>Current output 4 – 20 mA</b>	R <sub>i</sub> ≤ 100 Ω at 9 V ≤ U <sub>B</sub> ≤ 20 V; R <sub>i</sub> ≤ 500 Ω at U <sub>B</sub> ≥ 20 V Rising/falling output characteristic
<b>Voltage output 0 – 10 V</b>	R <sub>i</sub> ≥ 100 kΩ at U <sub>B</sub> ≥ 15 V, short-circuit-proof Rising/falling output characteristic



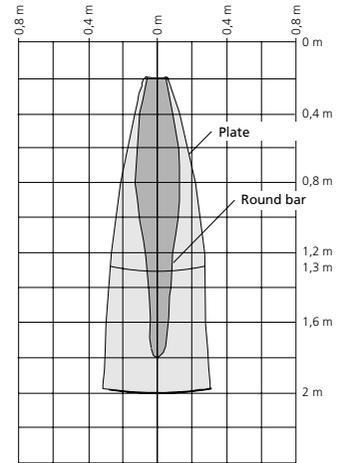
<b>Blind zone</b>	0 to 65 mm
<b>Operating range</b>	350 mm
<b>Maximum range</b>	600 mm
<b>Angle of beam spread</b>	Please see detection zone
<b>Transducer frequency</b>	ca. 400 kHz
<b>Resolution, sampling rate</b>	0,18 mm
<b>Reproducibility</b>	± 0,15 %
<b>Accuracy</b>	Temperature drift internal compensated, ≤ 2 % may be deactivated <sup>1)</sup> (0,17%/K without compensation)



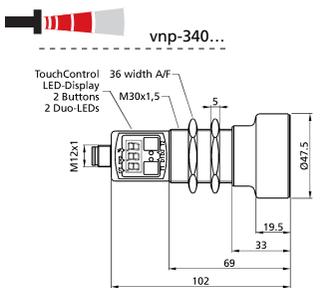
<b>Operating voltage U<sub>B</sub></b>	9 V to 30 V DC, reverse polarity protection
<b>Voltage ripple</b>	±10 %
<b>No-load supply current</b>	≤ 80 mA
<b>Housing</b>	Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
<b>Class of protection to EN 60529</b>	IP 67
<b>Norm conformity</b>	EN 60947-5-2
<b>Type of connection</b>	5-pin initiator plug, PBT
<b>Controls</b>	2 push-buttons (TouchControl)
<b>Indicators</b>	3-digit LED-display, 2 three-colour LEDs
<b>Programmable</b>	Yes, with TouchControl and LinkControl
<b>Operating temperature</b>	-25°C bis +70°C
<b>Storage temperature</b>	-40°C bis +85°C
<b>Weight</b>	150 g
<b>Response time<sup>1)</sup></b>	70 ms
<b>Time delay before availability</b>	< 300 ms
<b>Order No.</b>	vnp-35/IU/TC
<b>Current output 4 – 20 mA</b>	R <sub>i</sub> ≤ 100 Ω at 9 V ≤ U <sub>B</sub> ≤ 20 V; R <sub>i</sub> ≤ 500 Ω at U <sub>B</sub> ≥ 20 V Rising/falling output characteristic
<b>Voltage output 0 – 10 V</b>	R <sub>i</sub> ≥ 100 kΩ at U <sub>B</sub> ≥ 15 V, short-circuit-proof Rising/falling output characteristic



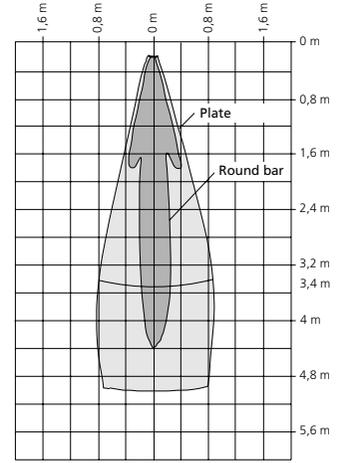
<b>Blind zone</b>	0 to 200 mm
<b>Operating range</b>	1.300 mm
<b>Maximum range</b>	2.000 mm
<b>Angle of beam spread</b>	Please see detection zone
<b>Transducer frequency</b>	ca. 200 kHz
<b>Resolution, sampling rate</b>	0,18 mm
<b>Reproducibility</b>	± 0,15 %
<b>Accuracy</b>	Temperature drift internal compensated, ≤ 2 % may be deactivated <sup>1)</sup> (0,17%/K without compensation)



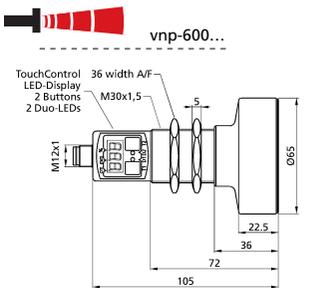
<b>Operating voltage U<sub>B</sub></b>	9 V to 30 V DC, reverse polarity protection
<b>Voltage ripple</b>	±10 %
<b>No-load supply current</b>	≤ 80 mA
<b>Housing</b>	Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
<b>Class of protection to EN 60529</b>	IP 67
<b>Norm conformity</b>	EN 60947-5-2
<b>Type of connection</b>	5-pin initiator plug, PBT
<b>Controls</b>	2 push-buttons (TouchControl)
<b>Indicators</b>	3-digit LED-display, 2 three-colour LEDs
<b>Programmable</b>	Yes, with TouchControl and LinkControl
<b>Operating temperature</b>	-25°C bis +70°C
<b>Storage temperature</b>	-40°C bis +85°C
<b>Weight</b>	150 g
<b>Response time<sup>1)</sup></b>	110 ms
<b>Time delay before availability</b>	< 300 ms
<b>Order No.</b>	vnp-130/IU/TC
<b>Current output 4 – 20 mA</b>	R <sub>i</sub> ≤ 100 Ω at 9 V ≤ U <sub>B</sub> ≤ 20 V; R <sub>i</sub> ≤ 500 Ω at U <sub>B</sub> ≥ 20 V Rising/falling output characteristic
<b>Voltage output 0 – 10 V</b>	R <sub>i</sub> ≥ 100 kΩ at U <sub>B</sub> ≥ 15 V, short-circuit-proof Rising/falling output characteristic



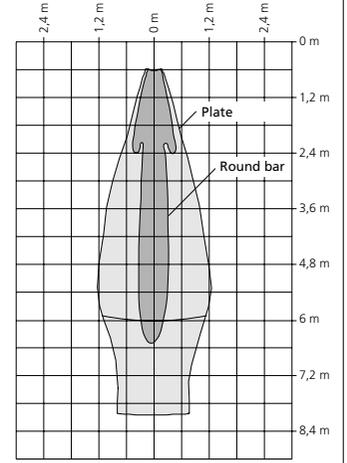
<b>Blind zone</b>	0 to 350 mm
<b>Operating range</b>	3.400 mm
<b>Maximum range</b>	5.000 mm
<b>Angle of beam spread</b>	Please see detection zone
<b>Transducer frequency</b>	ca. 120 kHz
<b>Resolution, sampling rate</b>	0,18 mm
<b>Reproducibility</b>	± 0,15 %
<b>Accuracy</b>	Temperature drift internal compensated, ≤ 2 % may be deactivated <sup>1)</sup> (0,17%/K without compensation)



<b>Operating voltage U<sub>B</sub></b>	9 V to 30 V DC, reverse polarity protection
<b>Voltage ripple</b>	±10 %
<b>No-load supply current</b>	≤ 80 mA
<b>Housing</b>	Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
<b>Class of protection to EN 60529</b>	IP 67
<b>Norm conformity</b>	EN 60947-5-2
<b>Type of connection</b>	5-pin initiator plug, PBT
<b>Controls</b>	2 push-buttons (TouchControl)
<b>Indicators</b>	3-digit LED-display, 2 three-colour LEDs
<b>Programmable</b>	Yes, with TouchControl and LinkControl
<b>Operating temperature</b>	-25°C bis +70°C
<b>Storage temperature</b>	-40°C bis +85°C
<b>Weight</b>	210 g
<b>Response time<sup>1)</sup></b>	180 ms
<b>Time delay before availability</b>	< 300 ms
<b>Order No.</b>	vnp-340/IU/TC
<b>Current output 4 – 20 mA</b>	R <sub>i</sub> ≤ 100 Ω at 9 V ≤ U <sub>B</sub> ≤ 20 V; R <sub>i</sub> ≤ 500 Ω at U <sub>B</sub> ≥ 20 V Rising/falling output characteristic
<b>Voltage output 0 – 10 V</b>	R <sub>i</sub> ≥ 100 kΩ at U <sub>B</sub> ≥ 15 V, short-circuit-proof Rising/falling output characteristic



<b>Blind zone</b>	0 to 600 mm
<b>Operating range</b>	6.000 mm
<b>Maximum range</b>	8.000 mm
<b>Angle of beam spread</b>	Please see detection zone
<b>Transducer frequency</b>	ca. 80 kHz
<b>Resolution, sampling rate</b>	0,18 mm
<b>Reproducibility</b>	± 0,15 %
<b>Accuracy</b>	Temperature drift internal compensated, ≤ 2 % may be deactivated <sup>1)</sup> (0,17%/K without compensation)



<b>Operating voltage U<sub>B</sub></b>	9 V to 30 V DC, reverse polarity protection
<b>Voltage ripple</b>	±10 %
<b>No-load supply current</b>	≤ 80 mA
<b>Housing</b>	Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content
<b>Class of protection to EN 60529</b>	IP 67
<b>Norm conformity</b>	EN 60947-5-2
<b>Type of connection</b>	5-pin initiator plug, PBT
<b>Controls</b>	2 push-buttons (TouchControl)
<b>Indicators</b>	3-digit LED-display, 2 three-colour LEDs
<b>Programmable</b>	Yes, with TouchControl and LinkControl
<b>Operating temperature</b>	-25°C bis +70°C
<b>Storage temperature</b>	-40°C bis +85°C
<b>Weight</b>	270 g
<b>Response time<sup>1)</sup></b>	240 ms
<b>Time delay before availability</b>	< 300 ms
<b>Order No.</b>	vnp-600/IU/TC
<b>Current output 4 – 20 mA</b>	R <sub>i</sub> ≤ 100 Ω at 9 V ≤ U <sub>B</sub> ≤ 20 V; R <sub>i</sub> ≤ 500 Ω at U <sub>B</sub> ≥ 20 V Rising/falling output characteristic
<b>Voltage output 0 – 10 V</b>	R <sub>i</sub> ≥ 100 kΩ at U <sub>B</sub> ≥ 15 V, short-circuit-proof Rising/falling output characteristic

1) Can be programmed with TouchControl and LinkControl