

# NIVOCONT R

VIBRATING ROD LEVEL SWITCHES  
FOR SOLIDS



5 YEARS WARRANTY

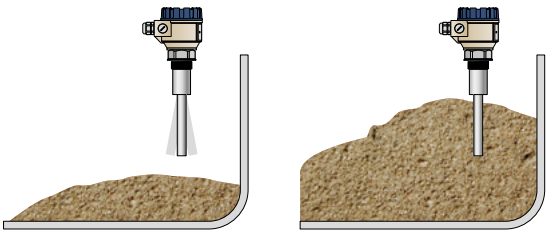
NIVELCO

LEVEL SWITCHES

GENERAL DESCRIPTION

The NIVOCONT R series of vibrating rod level switches are robust instruments designed for low and high level indication of granules and powders with a minimum of 0.05 kg/dm<sup>3</sup> density. Mounted on tanks, silos or hopper bins it can control filling / emptying, or give fail-safe alarm signals. The highly polished version is recommended to use for abrasive mediums.

The operation principle is based on that the electronic circuit excites a vibration in the rod probe. When the medium reaches and covers the rod, its vibration stops, when the medium leaves the rod it returns to vibrate freely. The electronics senses the change of vibration and gives output signal after a selected delay.



MAIN FEATURES

- Extension up to 20 m ( 65.5 feet)
- Adjustable sensitivity
- Max. medium temperature: +160 °C (320 °F)
- Universal supply voltage
- Dust explosion protection
- Fine polished probe
- IP67 protection

APPLICATIONS

- Powders, pellets, granulates
- Grains
- Ground products
- Stone-powder, chippings
- Cement, sand, gravel
- Coal, slag
- Bulk solid materials

CERTIFICATIONS

- ATEX (Dust Ex)
- IEC (Dust Ex)



RKL-500-5Ex



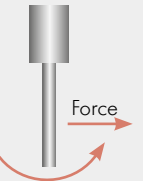
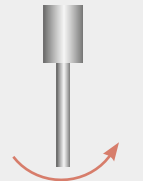
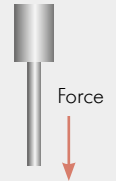
RKR-500 / 600



RKK-500 / 600

TYPE SELECTION

Position of the switching point (high, low) and the mounting (side, top) determines the selection of the appropriate type.

| Version           |        | Standard                                                                            | Rod extended                                                                         | Cable extended                                                                        |
|-------------------|--------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| High limit switch |        | Side mounted                                                                        | Top mounted                                                                          | Top mounted                                                                           |
| Low limit switch  |        |                                                                                     |                                                                                      |                                                                                       |
| Loadability       |        |  |  |  |
| Max. load         | Force  | 500 N                                                                               | –                                                                                    | 45 kN                                                                                 |
|                   | Torque | 100 Nm                                                                              | 100 Nm                                                                               | –                                                                                     |

TECHNICAL DATA

| Version                       |                 | Standard                                                                                                                                                                                              | Rod extended                             | Cable extended                                  |
|-------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------------|
| Insertion length              |                 | 207 mm (8.15 inch)                                                                                                                                                                                    | 0.3 – 3 m (1 – 10 feet)                  | 1 – 20 m (3.3 – 65.5 feet)                      |
| Material of wetted parts      |                 | 1.4571 (316Ti) stainless steel                                                                                                                                                                        |                                          | Vibrating part: 1.4571 (316Ti); cable: PE cover |
| Process connection            |                 | 1½" BSP; 1½" NPT as per order code                                                                                                                                                                    |                                          |                                                 |
| Output                        |                 | See: output data                                                                                                                                                                                      |                                          |                                                 |
| Medium temperature range      |                 | Standard: -30 °C ... +110 °C (-22 °F ... +230 °F);<br>High temp. version: -30 °C ... +160 °C (-22 °F ... +320 °F)                                                                                     |                                          | -30 °C ... +80 °C (-22 °F ... +176 °F)          |
|                               |                 | Ex version: see temperature data                                                                                                                                                                      |                                          |                                                 |
| Medium pressure               |                 | Max. 2.5 MPa (25 bar [363 psi])                                                                                                                                                                       |                                          | Max. 0.6 MPa (6 bar [Max. 87 psi])              |
| Max. load                     | Force           | 500 N                                                                                                                                                                                                 | –                                        | 45 kN                                           |
|                               | Torque          | 100 Nm                                                                                                                                                                                                | 100 Nm                                   | –                                               |
| Medium density <sup>(1)</sup> |                 | Minimum 0.05 kg/dm³ (0.05 S.G.) (granular size 10 mm [0.4 inch])                                                                                                                                      |                                          |                                                 |
| Response time (selectable)    |                 | < 2 sec or 5 sec ±1.5 sec                                                                                                                                                                             |                                          |                                                 |
| Power supply                  |                 | 20 – 255 V AC/DC, Ex: 20 – 250 V AC, 20 – 50 V DC                                                                                                                                                     |                                          |                                                 |
| Power consumption             |                 | ≤ 2.5 VA / 2 W                                                                                                                                                                                        |                                          |                                                 |
| Housing material              |                 | Paint coated aluminium or plastic (PBT)                                                                                                                                                               |                                          |                                                 |
| Electrical connection         |                 | 2x M20x1.5 plastic cable glands, for Ø6 – 12 mm (Ø0.25 – 0.5 inch) cable + 2x NPT ½" internal thread for cable protective pipe<br>2 pcs. terminal blocks for 0.5 – 1.5 mm² (AWG16) wire cross section |                                          |                                                 |
| Electrical protection         |                 | Class I                                                                                                                                                                                               |                                          |                                                 |
| Ingress protection            |                 | IP67                                                                                                                                                                                                  |                                          |                                                 |
| Mass                          | Metal housing   | 1.88 kg (4.15 lbs)                                                                                                                                                                                    | 1.88 kg + 1.4 kg/m (4.15 lbs + 1 lbs/ft) | 1.88 kg + 0.6 kg/m (4.15 lbs + 0.4 lbs/ft)      |
|                               | Plastic housing | 1.5 kg (3.3 lbs)                                                                                                                                                                                      | 1.5 kg + 1.4 kg/m (3.3 lbs + 1 lbs/ft)   | 1.5 kg + 0.6 kg/m (3.3 lbs + 0.4 lbs/ft)        |

<sup>(1)</sup> Depends on the internal friction and the granular size of the medium

OUTPUT DATA

| Type                            | Relay                   | Electronic                            |
|---------------------------------|-------------------------|---------------------------------------|
| Output type and rating          | SPDT 250 V AC, 8 A, AC1 | SPST 50 V, 350 mA                     |
| Output protection               | –                       | Overvoltage, overcurrent and overload |
| Voltage drop (switched on)      | –                       | < 2.7 V 350 mA                        |
| Residual current (switched off) | –                       | < 10 µA                               |

SPECIAL DATA FOR Ex CERTIFIED MODELS

| Type                      |                       | R□□-5□□-5Ex                                                                                                                             |                               |
|---------------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Protection type           |                       | Dust Ex                                                                                                                                 |                               |
| Ex marking <sup>(2)</sup> | ATEX                  | ⚡ II 1/2 D Ex ta/tb IIIC T90 °C...T170 °C Da/Db                                                                                         |                               |
|                           | IEC Ex <sup>(3)</sup> | Ex t IIIC T* Da/Db IP67                                                                                                                 | *(see Temperature data table) |
| Electrical connection     |                       | 2 pcs. M20x1.5 cable glands with Ex ta IIIC protection type,<br>2 pcs. plug-in type terminal blocks for max. 1.5 mm² wire cross section |                               |

<sup>(2)</sup> Only with metal housing

<sup>(3)</sup> Need of IEC is to be specified with order

TEMPERATURE DATA

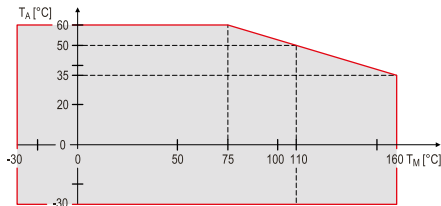
Temperature limit values for Ex versions

| Temperature data                                                       | Cable extended      |                     |                                    | Standard and rod extended |                     |                     |                      | High temp.           |
|------------------------------------------------------------------------|---------------------|---------------------|------------------------------------|---------------------------|---------------------|---------------------|----------------------|----------------------|
| Medium temp. (T <sub>M</sub> ) <sup>(4)</sup><br>Min.: -30 °C (-22 °F) | +60 °C<br>(+140 °F) | +70 °C<br>(+158 °F) | +80 °C<br>(+176 °F) <sup>(5)</sup> | +60 °C<br>(+140 °F)       | +70 °C<br>(+158 °F) | +95 °C<br>(+203 °F) | +110 °C<br>(+230 °F) | +160 °C<br>(+320 °F) |
| Ambient temp. (T <sub>A</sub> ) <sup>(4)</sup><br>Min.: -30 °C         | +60 °C<br>(+140 °F) | +50 °C<br>(+122 °F) | +60 °C<br>(+140 °F)                | +60 °C<br>(+140 °F)       | +50 °C<br>(+122 °F) | +60 °C<br>(+140 °F) | +50 °C<br>(+122 °F)  | +35 °C<br>(+203 °F)  |
| Max. surface temp. of process connection                               | +85 °C<br>(+185 °F) |                     | +95 °C<br>(+203 °F)                | +85 °C<br>(+185 °F)       |                     | +95 °C<br>(+203 °F) |                      | +135 °C<br>(+275 °F) |
| Max. surface temp.                                                     |                     |                     |                                    |                           |                     | +95 °C<br>(+203 °F) | +110 °C<br>(+230 °F) | +160 °C<br>(+320 °F) |
| Temp. classes                                                          | T90°C               |                     | T100°C                             | T90°C                     |                     | T100°C              | T115°C               | T170°C               |

<sup>(4)</sup> To operate the level switch with the maximum values of the related temperature data the applied cable should permanently withstand up to +90 °C (+194 °F) temperature.

<sup>(5)</sup> Medium temperature for max. 1 hour: +95 °C (+203 °F)

Temperature diagram

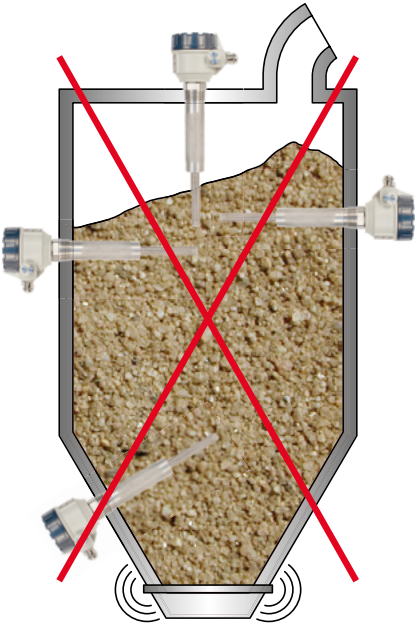


Ambient temperature (T<sub>A</sub>) versus  
Medium temperature (T<sub>M</sub>)

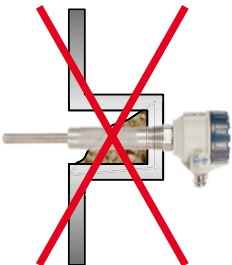
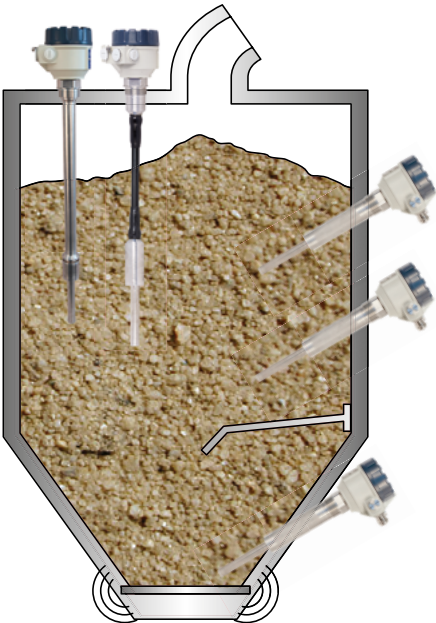
**INSTALLATION**

The probe should be protected against strong material inflow by appropriate selection of the mounting position or by using an overhead protective shield. When the instrument is mounted on the side of the tank, coning or arching of the material should be taken into consideration. In dusty mediums the inclination of the side mounted probe should be greater than the angle of repose to ensure self cleaning and avoid deposition of material on the vibration rod switches. Avoid mounting the unit close to the filling entry or near to medium accumulation.

Incorrect

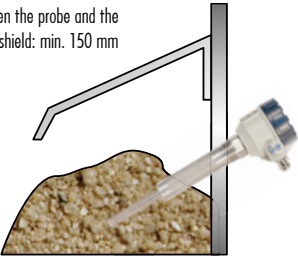


Correct



Incorrect

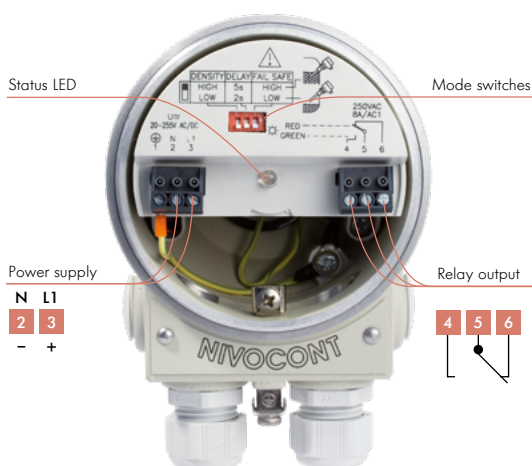
Distance between the probe and the protective shield: min. 150 mm



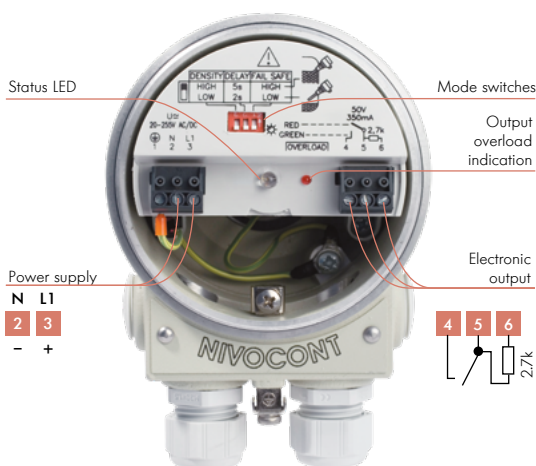
Correct

## WIRING

### Relay output



### Electronic output



## MODE SWITCHES

| Density                                                        |                                                              | Delay                                                                                         |                                                                                   |
|----------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| To be selected depending on the density of the measured medium |                                                              | Response time delay to be selected                                                            |                                                                                   |
| High                                                           | medium density is $>0.1\text{kg/dm}^3$ or abrasive materials | 5 sec                                                                                         | Output does not change if the rod is blocked for a moment (e.g. falling material) |
| Low                                                            | medium density is $<0.1\text{ kg/dm}^3$                      | 2 sec                                                                                         | Fast switching                                                                    |
| Fail-Safe                                                      |                                                              |                                                                                               |                                                                                   |
| High                                                           | High Fail-safe                                               | Fail-safe alarm is indicated with de-energised relay or open state of the solid state output. |                                                                                   |
| Low                                                            | Low Fail-safe                                                |                                                                                               |                                                                                   |

## OPERATION

| Power supply | Switching  | Fail-Safe kapcsoló | Status LED | Output           |            |
|--------------|------------|--------------------|------------|------------------|------------|
|              |            |                    |            | Relay            | Electronic |
| ON           | High level | High<br>           |            | <br>Energised    | <br>ON     |
|              |            | High<br>           |            | <br>De-energised | <br>OFF    |
|              | Low level  | Low<br>            |            | <br>Energised    | <br>ON     |
|              |            | Low<br>            |            | <br>De-energised | <br>OFF    |
| OFF          | —          | High or Low<br>    |            | <br>De-energised | <br>OFF    |

## ORDER CODES (NOT ALL CODE VERSIONS ARE AVAILABLE)

### NIVOCONT R vibrating rod level switches

NIVOCONT R ■ ■ ■ ■ ■ ■ ■ ■ (1)

| Version                   | Code             | Housing | Code             | Insertion length        | Code | Power supply / Output / Ex    | Code |
|---------------------------|------------------|---------|------------------|-------------------------|------|-------------------------------|------|
| Standard                  | K                | Metal   | 5                | Standard 207 mm (8.14") | 02   | 20 – 255 V AC/DC / Relay      | 1    |
| Standard polished         | S                | Plastic | 6 <sup>(3)</sup> | 300 mm (1 ft)           | 03   | 20 – 255 V AC/DC / electronic | 3    |
| High temperature          | H <sup>(2)</sup> |         |                  | 400 mm (1.31 ft)        | 04   | 20 – 250 V AC                 | 5    |
| High temperature polished | T <sup>(2)</sup> |         |                  | •                       | •    | 20 – 50 V DC / Relay / Ex     |      |
|                           |                  |         |                  | •                       | •    |                               |      |
|                           |                  |         |                  | •                       | •    |                               |      |
|                           |                  |         |                  | 1000 mm (3.28 ft)       | 10   |                               |      |
|                           |                  |         |                  | 1100 mm (3.6 ft)        | 11   |                               |      |
|                           |                  |         |                  | •                       | •    |                               |      |
|                           |                  |         |                  | •                       | •    |                               |      |
|                           |                  |         |                  | 3000 mm (9.8 ft)        | 30   |                               |      |
|                           |                  |         |                  |                         |      |                               |      |
|                           |                  |         |                  | 1 m (3.28 ft)           | 01   |                               |      |
|                           |                  |         |                  | 2 m (6.56 ft)           | 02   |                               |      |
|                           |                  |         |                  | •                       | •    |                               |      |
|                           |                  |         |                  | •                       | •    |                               |      |
|                           |                  |         |                  | 20 m (65.61 ft)         | 20   |                               |      |

| Process connection / Extension |                  | Code |
|--------------------------------|------------------|------|
| 1½" BSP                        | Standard version | H    |
|                                | Pipe extended    | R    |
|                                | Cable extended   | K    |
| 1½" NPT                        | Standard version | N    |
|                                | Pipe extended    | L    |
|                                | Cable extended   | C    |

(1) The order code of an Ex version should end in „Ex“  
(2) Only for Standard and Pipe extended versions  
(3) Not available in Ex version

