



**NIVOCONT**  
R-300/R-400 SERIES  
VIBRATING ROD LEVEL SWITCHES



## *HiTECH* Technologies, Inc.

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## 1. APPLICATIONS

The vibrating rod is a mechanical resonant system excited and kept in resonance by an electronic unit. The medium to be measured, when reaching the vibration rod end, will damp the vibration. The change in vibration intensity is sensed by an electronic unit, which, upon the elapse of the delay time, actuates the output circuit.

## 2. TECHNICAL DATA

### 2.1. GENERAL SPECIFICATION

		Standard	Pipe extended	Cable extended
Probe length		235 mm	0.3 ... 3 m	1 ... 20 m
Parts protruding into the tank		1.4571		Probe: 1.4571 Cable: PE coated
Housing material		Aluminum: Powder paint coated (R-300) Plastic: PBT fiber-glass reinforced, flame-retardant (DuPont®) (R-400)		
Process connection		RKH, RHH, RKL, RHR, RKK: 1 1/2" BSP RKN, RHN, RKL, RHL, RKC: 1 1/2" NPT		
Temperature ranges see Derating diagram	Process	RK: -30°C ... +110°C	RH: -30°C ... +160°C	-25°C ... +90°C
	Ambient temp.	-30°C ... +60°C		
Max. pressure (absolute)		25 bar (2.5 MPa)		6 bar (0.6 MPa)
Minimum medium density*		0.05 kg/dm <sup>3</sup> (max. granular size: 10 mm)		
Response time (selectable)	Not vibrating (covered)	< 1.8 sec or 5 ±1.5 sec		
	Vibrating (free)	< 2 sec or 5 ±1.5 sec		
Supply voltage (universal)		Voltage version I: 16 ... 40V AC (50/60Hz) / 19 ... 55V DC Voltage version II: 85 ... 265V AC (50/60Hz) / 120 ... 375V DC		
Power consumption		Voltage version I: ≤ 2.5 VA, 1.2W    Voltage version II: ≤ 2.5 VA, 1.3 W		
Electrical connections		2 pcs. Pg16 for Ø8 to 15 mm cables; 2 pcs. plug-in type terminal block for max. 1.5 mm <sup>2</sup> wire cross section		
Ingress protection		IP 67 (NEMA6)		
Electrical protection		Class I.		
Explosion proof protection mark		Ex II 1D T6 IP67 (Zone 20) ** (except version with plastic housing)		
Weight (with extension)	plastic housing	1.56 kg	1,56 kg (+1.4 kg/m)	1.56 kg (+ 0.6 kg/m)
	aluminum housing	1.94 kg	1,94 kg (+1.4 kg/m)	1.94 kg (+ 0.6 kg/m)

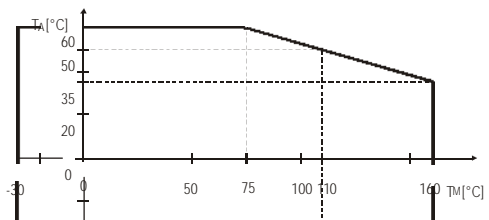
\* may depend on friction and granular size of the medium

\*\* Pending

### 2.2. OUTPUT VERSIONS

Version	RELAY	SOLID STATE
		R00-000-1 R00-000-2 R00-000-5 R00-000-6
Output	SPDT (potential free)	SPST (electronic)
Output rating	250 V AC, 8A, AC 1	350 mA/50V pick
Output protection	-	Overvoltage, overcurrent and overload
Voltage drop (switched of state)	-	< 1.7 V @ 350 mA
Residual current (switched on state)	-	< 10 µA

**Figure 2**  
**Derating diagram**  
Ambient temperature ( $T_A$ )  
Versus  
Medium temperature ( $T_M$ )



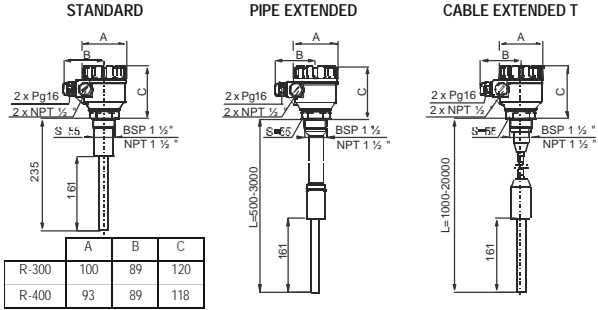
## 2.4 ORDER CODE

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VERSION	CODE	PROCESS CONN.	STANDARD	CODE	PIPE	CABLE	HOUSING	CODE	PROTRUSION LENGTH	STANDARD	PIPE	CABLE	SUPPLY / OUTPUT/Ex	CODE
Standard	K	1" BSP	H	A	K		Alu cast	3	25 mm	00	05	10	85-265 V AC / 120-375 V DC / relay	1
High Temp.	HT	1.5" NPT	N	L	C		Stainless	4	0.3 - 3 m	—	—	—	85-265 V AC / 120-375 V DC / solid state	2
									1 - 20 m	—	01	20	16-40 V AC / 19-55 V DC / solid state	3
													16-40 V AC / 19-55 V DC / relay / Ex	4
													85-265 V AC / 120-375 V DC / relay / Ex	5
													16-40 V AC / 19-55 V DC / relay / Ex	6
													85-265 V AC / 120-375 V DC / solid state / Ex	7
													16-40 V AC / 19-55 V DC / solid state / Ex	8

\* only for standard and pipe extended version

## 2.5 DIMENSION

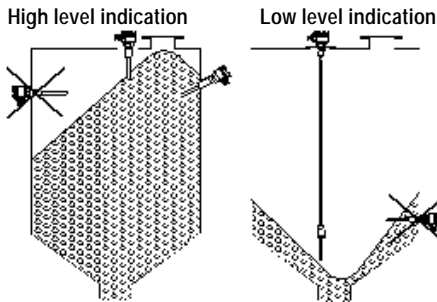


## 3. INSTALLATION

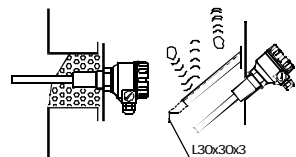
Prior to installation, it is advised to check the switching function for proper adjustment on a sample quantity of material (see Calibration). The unit may not work with mediums within the specified density range but having very large size of granules or extremely little friction.

**WARNING!** Handle the device with great care, especially the sensing probe. Any impact on the sensing probe may ruin its resonance system.  
A protective shield should be installed (see Figure 6) if the probe is exposed to falling material or a excessive mechanical load.

Screw in the device by its hexagon neck. After screwing tight the process connection, the housing can be rotated (max. 300°), to adjust the cable gland to the required position. It might be necessary to install the device at an offset level position relative to the switching level actually required taking into account caving or arching of the material in the silo (see Figure 4)



With powder level detection device should be installed at an inclination exceeding the angle of repose (or, in case of high level detection vertically), to prevent powder deposition on vibrating rod that might substantially reduce the self-cleaning effect. Also avoid mounting the rod in a recess (see Figure 5)



In case of tanks that are likely to be exposed to intense vibrations, necessary provisions shall be made for damping the vibrations acting on the device (e.g. vibration damping inserts made of rubber have to be applied).

## 4. ADJUSTMENT

Remove the top cover of the housing to access the connection terminals and adjusting switches.

Do not remove the wire form terminal pin 1 (Figure 7) because it is an internal connection. For grounding the unit use the PE grounding screw terminal PE.

After proper installation and the electrical connection, established the device is ready for operation. The switched-on state is indicated by the lighting of the LED.

The DENSITY (switch **A**) switch is to be set in accordance with the density of the material:

- LOW position, recommended for loose and light materials with **density** below  $0.1 \text{ kg/dm}^3$  represent **small energy** and **amplitude** of vibration and **great sensitivity** of detection.
- HIGH position, recommended for (thick and heavy) materials with **density** over  $0.1 \text{ kg/dm}^3$  represents vibration with **great energy** and **amplitude** and **small sensitivity** of detection.

To obtain FAIL SAFE alarm (switch **C**), use the de-energised or open state of the output as an alarm, thus a power breakdown will also be considered as alarm (Table below).

The delay (switch **B**) is to be selected to comply with requirements of the process control technology the units is used for.

**Note:** The instrument may be damaged via switches by electrostatic discharge (ESD), thus the precautions commonly used to avoid ESD is to be applied.

## 5. ELECTRICAL CONNECTION

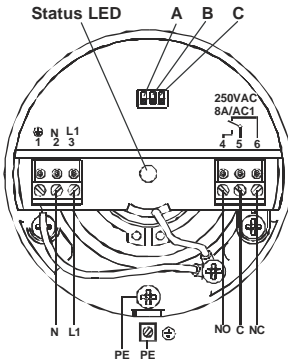


Figure 7

Electrical connection of relay output version

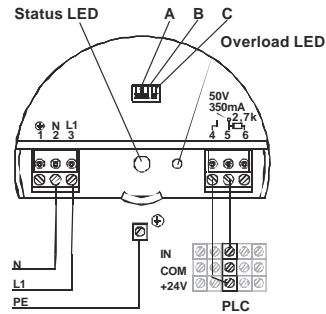


Figure 8

Electrical connection of opto-coupled sink input to solid state output version supplied from AC line

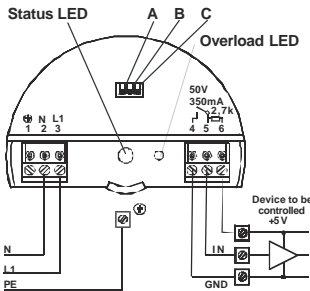


Figure 9

Electrical connection of logical voltage input to solid state output version supplied from a AC line

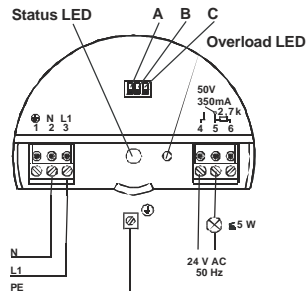


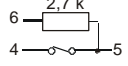


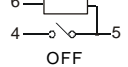


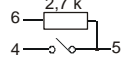


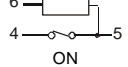

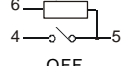


Figure 10

Electrical connection of a load to a solid state output version supplied from a AC line

5.1. OPERATING DIAGRAM

POWER	PROBE	FAIL-SAFE MODE	LED	RELAY	SOLID STATE OUTPUT
ON	NOT VIBRATING (COVERED)	 LOW	GREEN	 ENERGIZED	 ON
		 HIGH	RED	 DE-ENERGIZED	 OFF
	VIBRATING (FREE)	 LOW	RED	 DE-ENERGIZED	 OFF
		 HIGH	GREEN	 ENERGIZED	 ON
FAILS		LOW or HIGH	NOT LITE	 DE-ENERGIZED	 OFF

6. MAINTENANCE, REPAIR

The device does not require maintenance on a regular basis. Repairs under or out of guarantee are performed at the Manufacturer.

7. STORAGE CONDITIONS

Environment temperature: -25 to +140 °F (-35 to +60 °C)  
 Relative humidity: max. 98 %

8. PERFORMANCE GUARANTEE

Since 1986, every instrument sold by **HITECH** has been guaranteed to perform in the application it originally was engineered and recommended for. Our company policy remains the same, every product sold comes with a written performance guarantee.

Should the equipment be unable to perform satisfactorily in your application and we are not able to correct the problem, we will accept the instrument in return and issue full credit.

This performance guarantee is valid for 60 days. Thereafter, our standard limited two years factory warranty goes into effect.

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