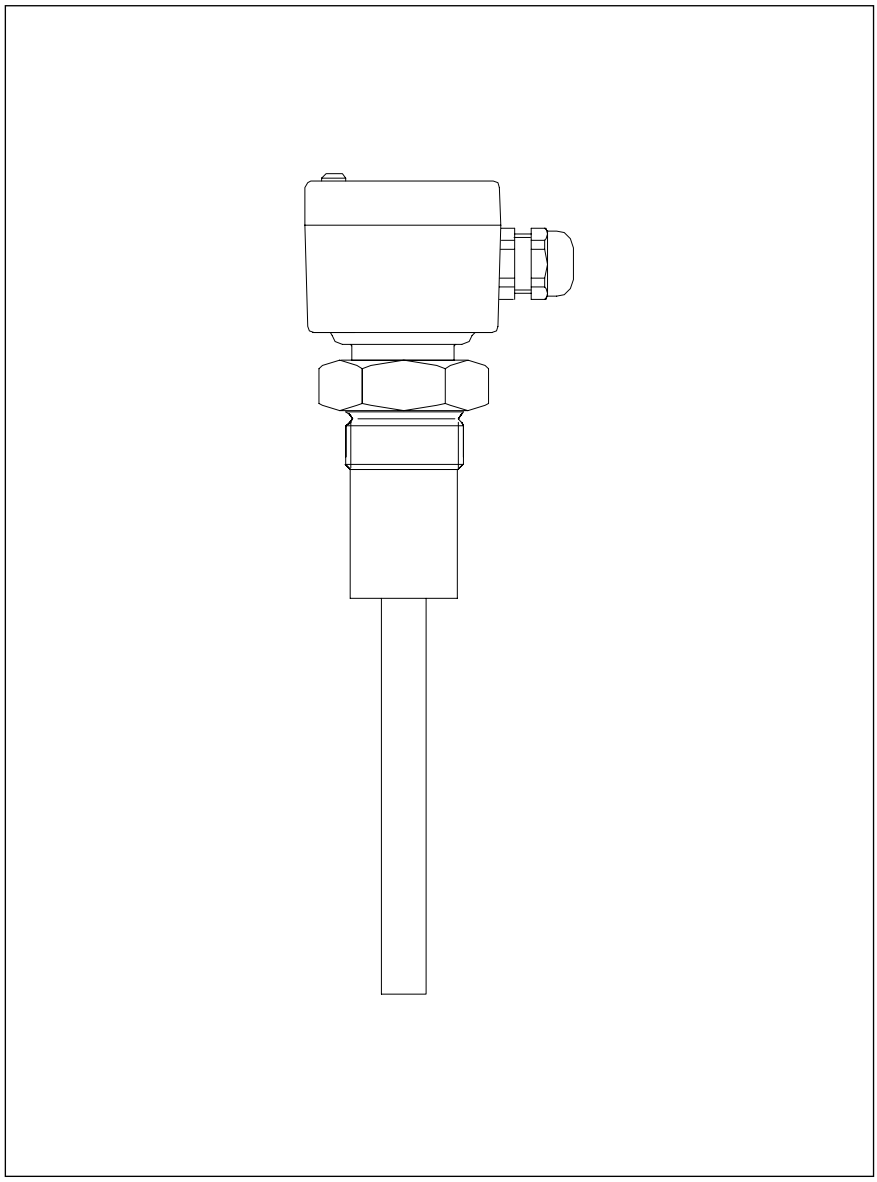
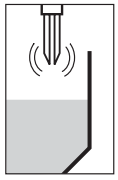
Level and Pressure

# Product Information

## VEGAVIB for solids





## Contents

# 1 Product description

## 1.1 General information

The VEGAVIB vibrating level switches are used for level detection of solids.

The vibrating rod of the VEGAVIB series is used for detection of solids. Typical applications are overfill or dry run protection systems. As compact instruments, the vibrating level switches are available with integrated data processing, or as a version designed for connection to a signal conditioning instrument.

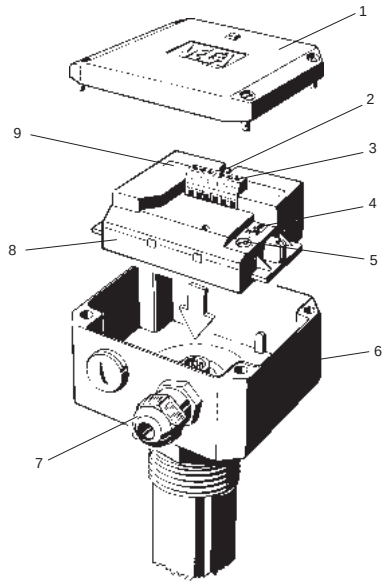
## 1.2 VEGAVIB

### Vibrating level switches for detection of solids

VEGAVIB vibrating level switches detect levels of solids (powders or granules) with a density of ≥ 0.02 g/cm³.

- Rod version of VEGAVIB series 40 and 50 best suited for solids
- Setup without adjustment
- Any mounting position possible
- Pluggable oscillators
- Solid detection in liquids
- Selectable min. or max. mode
- Operating temperature from -40°C to +150°C
- Operating pressure up to 10 bar, VEGAVIB 31 up to 25 bar
- Switching condition visible on closed instrument (LED)
- Protection IP 66
- Approvals acc. to StEx Zone 10, CENELEC EEx ia IIC
- Suitable for foodstuffs

Typical products are, e.g. gypsum, cement, cereals, flour, styropor, chalk, paper scrap, washing powder, plastic granules etc.




1 Housing cover
2 Control lamp (LED)
3 Terminals
4 A/B switch
5 Potentiometer
6 Instrument housing
7 Cable entry (Pg 13.5)
8 Oscillator
9 Type label oscillator

*VEGAVIB*

# 2 Function and application

## 2.1 Principle of operation

VEGAVIB vibrating level switches detect the level of virtually any solids, regardless of condition, whether powder or granule.

### VEGAVIB measuring principle

The vibrating rod (tuning fork) is piezoelectrically actuated and vibrates at an inherent mechanical frequency of:
approx. 210 Hz VEGAVIB 31,
approx. 530 Hz VEGAVIB 41 and 43 or approx. 350 Hz VEGAVIB 51, 52 and 53.
If the measured product touches the vibrating rod, the vibrating amplitude will be damped. The integrated electronics detects this damping and triggers a switching command. A pulsed actuating signal restarts the oscillation (VEGAVIB series 40 and 50) of the vibrating rod after covering and removes buildup.

### Compact instruments

All vibrating level switches are available as compact instruments, i.e. all instruments can be operated without external processing. The integrated electronics processes the level signal and provides (depending on the integrated oscillator) an output signal. With this output signal, it is possible to directly control a connected device (e.g. a warning system, a PLC, a pump etc.).

If one of the following electronics modules is installed in the vibrating level switch, it becomes a compact instrument:
- non-contact switch (C)
- relay output (R)
- transistor output (T).

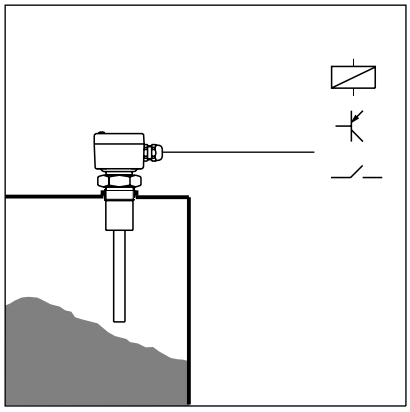
### Vibrating level switch with signal conditioning instrument

The oscillator Z (two-wire output) can be mounted in VEGAVIB series 50. You can then connect the vibrating level switch to a signal conditioning instrument. Depending on your requirements, you can choose from the following signal conditioning instruments:
- VEGATOR 425 Ex F
- VEGATOR 525 F
- VEGATOR 534 Ex
- VEGATOR 536 Ex
- VEGATOR 537 Ex
- VEGATOR 636 Ex
- VEGATOR 825 Ex.

## 2.2 Measuring system

A measuring system with a vibrating level switch can be realised in two different ways.

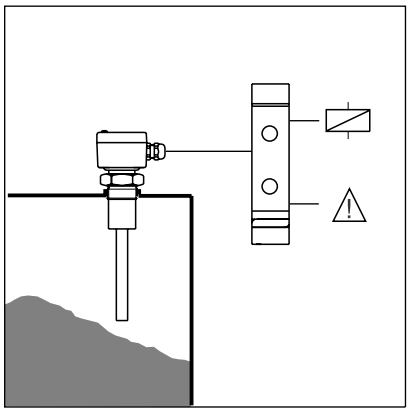
**Level detection of solids with compact instrument**



*Measuring system with VEGAVIB as compact instrument*

A measuring system consists of:
- a VEGAVIB vibrating level switch with integrated oscillator
- connected devices that can be controlled by VEGAVIB.

**Level detection of solids with signal conditioning instrument**



*Measuring system with VEGAVIB and separate processing*

A measuring system consists of:
- a VEGAVIB vibrating level switch with integrated oscillator
- a VEGATOR level switch or the VEGALOG processing system.

# 3 Types and versions

## 3.1 VEGAVIB vibrating level switches – Overview

| Type | VEGAVIB | | | | | |
|---|---|---|---|---|---|---|
| **Version** | **31** | **41** | **43** | **51** | **52** | **53** |
| Standard (fixed installation length) | • | • | | • | | |
| Suspension cable version | | | | | | • |
| Tube version | | | • | | | • |
| **Approvals** | | | | | | |
| CENELEC EEx ia IIC T6 | | | | • | • | • |
| StEx Zone 10 | | | | • | • | • |
| **Mechanical connection** | | | | | | |
| G 1 A | • | • | • | | | |
| 1" NPT | • | • | • | | | |
| G 1 1/2 A | | | | • | • | • |
| 1 1/2 "NPT | | | | • | • | • |
| **Material, mechanical connection** | | | | | | |
| Plastic | | | | • | • | |
| Stainless steel (1.4571) | | • | • | | | |
| Stainless steel (1.4301) | • | | | • | • | • |
| **Coating** | | | | | | |
| PTFE | | | | • | | • |
| **Electronics module** | | | | | | |
| Non-contact switch (C) | | • | • | • | • | • |
| Relay output (R) | • | • | • | • | • | • |
| Transistor output (T) | | • | • | • | • | • |
| Two-wire output (Z) | | | | • | • | • |
| **Temperature adapter** | | | | | | |
| 1.4571 (stainless steel) | | • | • | • | | • |
| **Others** | | | | | | |
| Lock fitting G 1 1/2 A (unpressurized) | | | • | | | |
| Lock fitting G 2 A (unpressurized) | | | | | | • |
| Lock fitting G 1 1/2 A up to 4 bar | | | • | | | |

## 3.2 Technical data and dimensions – VEGAVIB

### VEGAVIB 31

**Housing**

| | |
|---|---|
| Housing material | plastic PBT (Polyester) |
| Protection | IP 66 |
| Cable entry | 2 x Pg 13.5 |
| Terminals | for max. 1.5 mm² cross-section area of conductor |

**Mechanical connection**

| | |
|---|---|
| Thread | G 1 A of 1.4301 (stainless steel) |

**Tuning fork**

| | |
|---|---|
| Material | 1.4571 (stainless steel) |
| Lateral load | max. 300 N perpendicular to the narrow fork side |

**Weight**

| | |
|---|---|
| VEGAVIB 31 | approx. 0.8 kg |

**Ambient conditions**

| | |
|---|---|
| Ambient temperature on the housing | -40°C … +70°C |
| Product temperature | -40°C … +100°C (130°C for max. 30 minutes) |
| Storage and transport temperature | -40°C … +70°C |

**Operating pressure**

| | |
|---|---|
| VEGAVIB 31 | max. 25 bar |

**Medium**

| | |
|---|---|
| Density | min. 0.1 g/cm³ |
| Granule size | max. 6 mm |

**Electronics module - R (relay output)**

| | |
|---|---|
| Protection class | I |
| Overvoltage category | III |
| EMC | > 10 V/m |

**Function**

| | |
|---|---|
| Integration time | approx. 2 s |
| Meas. frequency | approx. 210 Hz |
| Control lamp | LED for indication of the switching condition |
| Mode | A/B switch<br>A - max. detection<br>B - min. detection |

**CE conformity** CE

VEGAVIB 31 vibrating level switch meets the protective regulations of EMVG (89/336/EWG) and NSR (73/23/EWG). Conformity has been judged acc. to the following standards:

| | | |
|---|---|---|
| EMVG | Emission | EN 50 081 - 1: 1992 |
| | Susceptibility | EN 50 082 - 2: 1995 |
| NSR | | EN 61 010 - 1: 1993 |

## VEGAVIB 41 and 43

### Housing

| | |
|---|---|
| Housing material | plastic PBT (Polyester) |
| Protection | IP 66 |
| Cable entry | 1 x Pg 13.5 (with electronics module R = 2 x Pg 13.5) |
| Terminals | for max. 1.5 mm² cross-section area of conductor |

### Mechanical connection

| | |
|---|---|
| Thread | G 1 A or 1" NPT of 1.4571 (stainless steel) |
| Lock fitting (VEGAVIB 43) | G 1 1/2 A of 1.4571 (stainless steel) |

### Vibrating rod

| | |
|---|---|
| Material | 1.4571 (stainless steel) |
| Lateral load | 60 Nm or max. 400 N at the rod end (VEGAVIB 41) |

### Extension tube (only VEGAVIB 43)

| | |
|---|---|
| Material | 1.4571 (stainless steel) |
| Length | 350 mm ... 4000 mm |

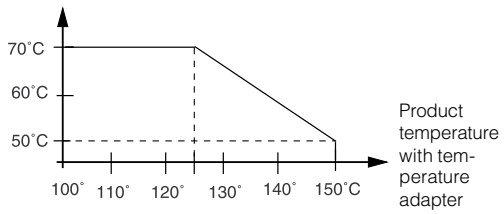
### Weight

| | |
|---|---|
| VEGAVIB 41 | approx. 0.8 kg |
| VEGAVIB 43 | approx. 0.8 kg + extension tube (approx. 1 kg/m) |

### Ambient conditions

| | |
|---|---|
| Ambient temperature on the housing | -40°C ... +70°C |
| Product temperature | -40°C ... +100°C |
| Storage and transport temperature | -40°C ... +70°C |
| Product temperature with temperature adapter of 1.4571 (option) | -40°C ... +150°C |

Permissible ambient temperature




### Operating pressure

| | |
|---|---|
| VEGAVIB 41, 43 | max. 10 bar |
| VEGAVIB 43 with lock fitting | max. 4 bar |

### Medium

| | |
|---|---|
| Density | ≥ 0.02 g/cm³ |

### Oscillators

| | |
|---|---|
| Protection class | |
| - elec. modules R and C | I |
| - elec. modules T and Z | II |
| Overvoltage category | III |
| EMC | > 10 V/m |

### Function

| | |
|---|---|
| Integration time | approx. 2 s |
| Meas. frequency | approx. 530 Hz |
| Control lamp | |
| - elec. modules C, R, T | LED for indication of the switching condition |
| Modes | |
| - elec. modules C, R, T | A/B switch<br>A - overfill protection or max. detection<br>B - dry run protection or min. detection |

### Lock fitting

| | |
|---|---|
| Tube diameter of the sensor | Ø 20 mm (DIN 2463/2462 D4-T3) |
| Material | 1.4571 or 1.4435 |
| Product temperature | -50°C … +150°C |
| Operating pressure | |
| - ARV | unpressurised |
| - ARV2…B | 25 bar |

### CE conformity CE

VEGAVIB 41 and 43 vibrating level switches meet the protective regulations of EMVG (89/336/EWG) and NSR (73/23/EWG). Conformity has been judged acc. to the following standards:

| | | |
|---|---|---|
| EMVG | Emission | EN 50 081 - 1: 1993 |
| | Susceptibility | EN 50 082 - 1: 1995 |
| NSR | | EN 61 010 - 1: 1993 |

## VEGAVIB 51, 52 and 53

### Housing

| | |
|---|---|
| Housing material | plastic PBT (Polyester) |
| Protection | IP 66 |
| Cable entry | 1 x Pg 13.5 (with oscillator R = 2 x Pg 13.5) |
| Terminals | for max. 1.5 mm² cross-section area of conductor |

### Mechanical connection

| | |
|---|---|
| Thread | G $1^1/_2$ A or $1^1/_2$" $N_P$T |
| Material | |
| - VEGAVIB 51, 52 | plastic PBT, 1.4301 (stainless steel) |
| - VEGAVIB 53 | 1.4301 (stainless steel) |
| Lock fitting (VEGAVIB 53) | G 2 A of 1.4301 (stainless steel) |

### Vibrating rod

| | |
|---|---|
| Material | 1.4301 (stainless steel) |
| Lateral load | 60 Nm or max. 400 N at the rod end (VEGAVIB 51) |

### Suspension cable (only VEGAVIB 52)

| | |
|---|---|
| Material | PE |
| Max. tensile load | 6000 N |
| Length | |
| - PBT mounting boss | 600 mm … 10 m |
| - steel mounting boss | 600 mm … 20 m |

### Extension tube (only VEGAVIB 53)

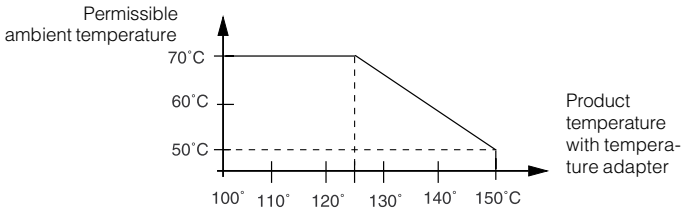
| | |
|---|---|
| Material | 1.4301 (stainless steel) |
| Length | 350 mm … 4000 mm |

### Weight

| | |
|---|---|
| VEGAVIB 51 | approx. 1.7 kg |
| VEGAVIB 52 | approx. 1.3 kg (at 2 m) + suspension cable (approx. 0.15 kg/m) |
| VEGAVIB 53 | approx. 2.0 kg + extension tube (approx. 2.2 kg/m) |

### Ambient conditions

| | |
|---|---|
| Ambient temperature on the housing | -40°C … +70°C |
| Product temperature | |
| - VEGAVIB 51, 53 | -40°C … +100°C |
| - VEGAVIB 52 | -40°C … +80°C |
| Storage and transport temperature | -40°C … +70°C |
| Product temperature with temperature adapter of 1.4571 (option) (VEGAVIB 51, 53 with1.4301 mounting boss) | -40°C … +150°C |




| | |
|---|---|
| Operating pressure | |
| - VEGAVIB 51, 53 | max. 10 bar |
| - VEGAVIB 52 | max. 6 bar |
| - VEGAVIB 53 with lock fitting | unpressurised or vacuum |
| - VEGAVIB 51 with PBT mounting boss | max. 6 bar |

### Medium

| | |
|---|---|
| Density | ≥ 0.02 g/cm³ |

### Electronics modules

| | |
|---|---|
| Protection class | |
| - elec. modules R and C | I |
| - elec. modules T and Z | II |
| Overvoltage category | III |
| EMC | > 10 V/m |

### Function

| | |
|---|---|
| Integration time | approx. 2 s |
| Meas. frequency | approx. 350 Hz |
| Control lamp | |
| - elec. modules C, R, T | LED for indication of the switching condition |
| - elec. module Z | LED lights when vibrating rod is covered |
| Modes | |
| - elec. modules C, R, T | A/B switch<br>A - overfill protection or max. detection<br>B - dry run protection or min. level detection |
| - elec. module Z | definition via the signal conditioning instrument |

### VEGAVIB 51 Ex S / 53 Ex S (deviating technical data)

| | |
|---|---|
| Protection (acc. to BVS) | IP 65 |
| Ambient temperature on the housing | -20°C … +70°C |
| Mounting boss | 1.4301 (stainless steel) |
| Operating pressure | 0.8 … 1.1 bar<br>(if no dust-explosive atmosphere is present: vacuum … +16 bar) |

### CE conformity

VEGAVIB 51, 52 and 53 vibrating level switches meet the protective regulations of EMVG (89/336/EWG) and NSR (73/23/EWG). Conformity has been judged by means of a typical configuration according to the following standards:

| | | |
|---|---|---|
| EMVG | Emission | EN 50 081 - 1: 1993 |
| | Susceptibility | EN 50 082 - 1: 1995 |
| NSR | | EN 61 010 - 1: 1993 |

## Electronics modules

**C - non-contact (E40C, E50C),** VEGAVIB 41, 43, 51, 52, 53

| | |
|---|---|
| Supply voltage | 20 … 250 V AC, 50/60 Hz<br>20 … 250 V DC |
| Output | non-contact switch |
| Current consumption | < 5 mA (via the load circuit) |
| Load current | min. 10 mA, max. 400 mA (max. 4 A up to 40 ms) |

The max. permissible ambient temperature is 60°C at a load current of more than 300 mA.

**R - relay output (E30R, E40R, E50R),** VEGAVIB 41, 43, 51, 52, 53

| | |
|---|---|
| Supply voltage | 20 … 250 V AC, 50/60 Hz<br>20 … 72 V DC<br>(between 60 V DC and 72 V DC the max. permissible ambient temperature decreases linearly from 70°C to 50°C) |
| Power consumption | approx. 1 … 8 VA, max. 1.5 W |
| Output | relay output |
| Relay data: | |
| - contact | floating spdt |
| - contact material | AgCdO and Au plated |
| - turn-on voltage | min. 10 mV<br>max. 250 V AC, 250 V AC |
| - switching current | min. 10 µA<br>max. 3 A AC, 1 A DC |
| - breaking capacity | max. 750 VA, 54 W |

**T - transistor output (E40T, E50T),** VEGAVIB 41, 43, 51, 52, 53

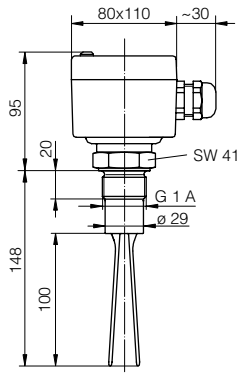
| | |
|---|---|
| Supply voltage | 10 … 55 V DC |
| Power consumption | max. 0.5 W |
| Output | floating transistor output<br>NPN/PNP wiring |
| Load current | maximum 400 mA<br>(output - overload resistant and permanently short-circuit proof) |
| Voltage loss | max. 1 V |
| Turn-on voltage | max. 55 V DC |
| Blocking current | < 10 µA |

**Z - two-wire output (E50Z, E50Z Ex),** VEGAVIB 51, 52, 53

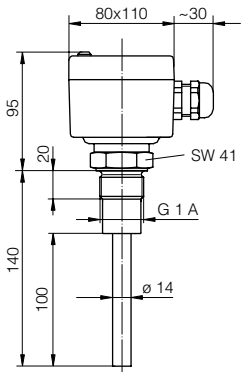
| | |
|---|---|
| Supply voltage | 12 … 36 V DC<br>(supply via VEGATOR signal conditioning instrument) |
| Output | two-wire output |
| Current consumption | |
| - vibrating rod free | 8 mA |
| - vibrating rod covered | 16 mA |
| Suitable signal conditioning instruments | VEGATOR 534 Ex, 536 Ex, 537 Ex, 636 Ex<br>VEGALOG 571 |

For connection of E50Z Ex to non-Ex signal conditioning instruments, safety barrier type 145 can be used.

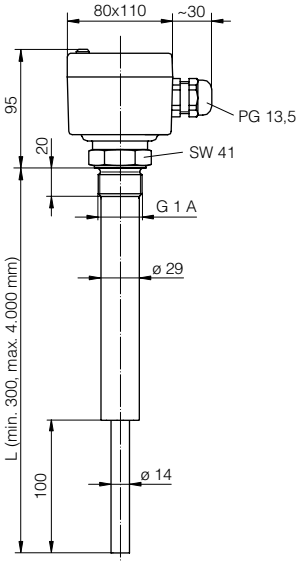
**VEGAVIB 31**

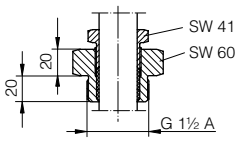



**VEGAVIB 41**

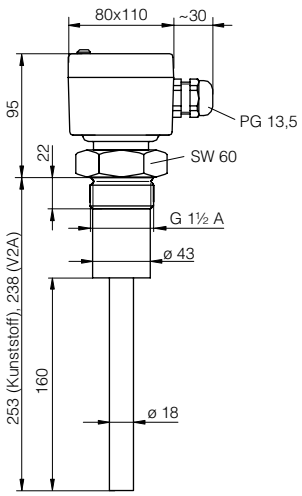



**VEGAVIB 43**



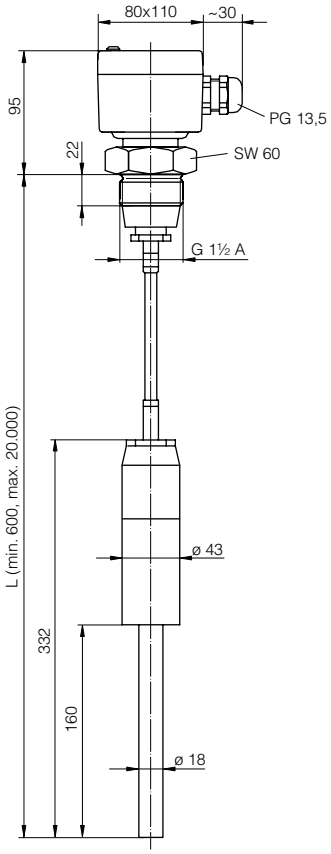



**VEGAVIB 51**

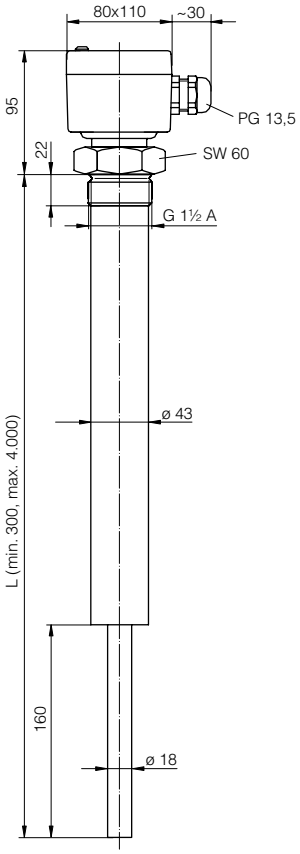



Kunststoff = plastic

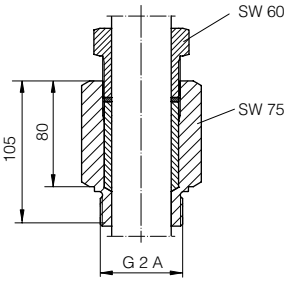
**VEGAVIB 52**




**VEGAVIB 53**

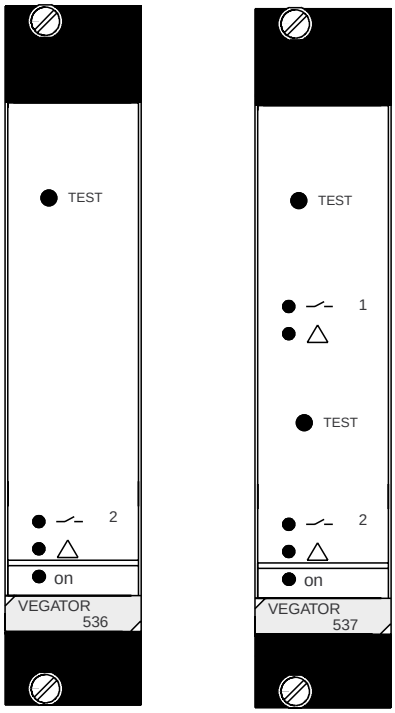



Lock fitting



## 3.3 Technical data and dimensions – signal conditioning instruments

### VEGATOR 536 Ex, 537 Ex




#### General

| | |
|---|---|
| Version | module unit for carrier type 596 Ex |
| Dimensions | W = 25.4 mm (5 TE), H = 128.4 mm, D = 162 mm |
| Weight | approx. 180 g |

#### Ambient conditions

| | |
|---|---|
| Ambient temperature | -20°C … +60°C |
| Storage and transport temperature | -40°C … +70°C |

#### Power supply

| | |
|---|---|
| Operating voltage | 20 … 53 V AC, 20 … 72 V DC |
| Power consumption | max. 3 W |
| Electrical connection | multiple plug DIN 41 612, series F (d, b, z) 33-pole |

#### Electrical protective measures

| | |
|---|---|
| Protection class | II |
| Overvoltage category | II |
| Protection | |
| - mounted into housing type 505 Ex | IP 30 |
| Protection (mounted into carrier type 596 Ex with Ex module) | |
| - front side (completely equipped) | IP 30 |
| - upper and lower side | IP 20 |
| - wiring side | IP 00 |

#### Inputs

| | |
|---|---|
| Number of inputs | |
| - VEGATOR 536 Ex | 1 sensor input |
| - VEGATOR 537 Ex | 2 sensor inputs |
| Data transmission | analogue |
| Switching threshold | 12 mA |
| Current limitation | 24 mA (permanently shortcircuit proof) |
| Sensor supply voltage | approx. 15 … 18 V DC |
| Connection cable | 2-wire |
| Resistance per wire | max. 35 Ω |
| Integration time | 0.1 … 20 s, directional switching (adjustment via DIL switch) |

#### Relay output

| | |
|---|---|
| Number, function | |
| - VEGATOR 536 Ex | 1 switching relay (spdt), 1 fail safe relay |
| - VEGATOR 537 Ex | 2 switching relays (spdt), 1 fail safe relay |
| Modes | A/B switch<br>A - max. detection or overfill protection<br>B - min. detection or dry run protection |
| Contact | 1 spdt each |
| Contact material | AgCdO and Au plated |
| Turn-on voltage | min. 10 mV<br>max. 250 V AC, 250 V DC |
| Switching current | min. 10 µA<br>max. 3 A AC, 1 A DC |
| Breaking capacitance | max. 500 VA AC, 54 W DC |

#### Transistor output

| | |
|---|---|
| Number, function | |
| - VEGATOR 536 Ex | 2, synchronous switching with relays |
| - VEGATOR 537 Ex | 3, synchronous switching with relays |
| Galvanic separation | floating |
| Max. values | $U_B$ max. = 36 V DC<br>$I_B$ max. = 60 mA |
| Transistor voltage loss | $U_{CE}$ min. - 1.5 V at $I_B$ = 60 mA |
| Blocking current | < 10 µA |

## Approvals

| | |
|---|---|
| Classification | intrinsic safety EEx ia IIC or EEx ia IIB |
| Max. values | $U_0$ = 20 V<br>$I_K$ = 126 mA<br>P = 627 mW |
| Characteristics | linear |

| | EEx ia IIC | | | EEx ia IIB | |
|---|---|---|---|---|---|
| Max. permissible outer inductance (mH) | 0.5 | 1.0 | 1.5 | < 0.5 | 0.5 … 20 |
| Max. permissible outer capacitance (nF) | 97 | 78 | 68 | 97 | 486 |

The intrinsically safe circuits are reliably galvanically separated from the non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.
The intrinsically safe circuits of channels 1 and 2 are reliably separated.

## Electrical connection

| | |
|---|---|
| Mounted into | |
| - carrier BGT 596 Ex | 33-pole multipoint connector, series F d, b, z with coding holes |
| - in housing type 505 Ex | screw terminals, max. for 1.5 mm² |

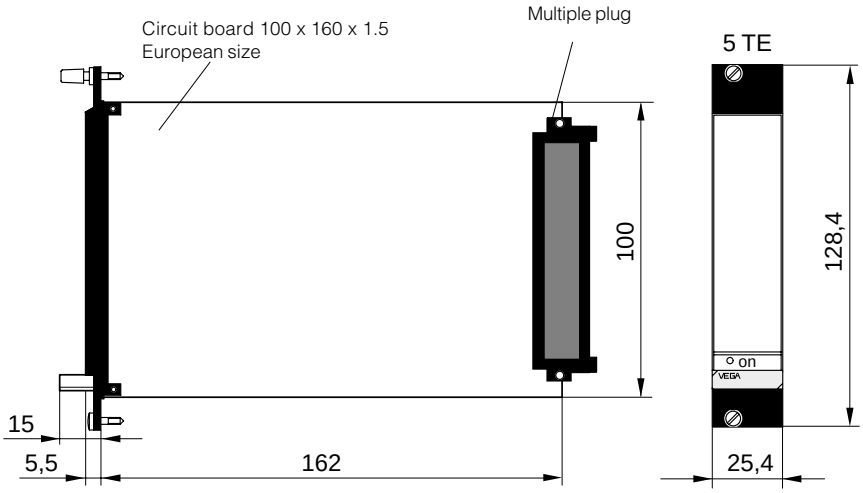
## CE conformity

The signal conditioning instrument meets the protective regulations of EMVG (89/336 EWG) and NSR (73/23/EWG).
Conformity has been judged acc. to the following standards:

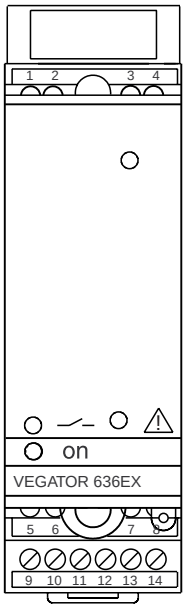
| | | |
|---|---|---|
| EMVG | Emission | EN 50 081 - 1: 1993 |
| | Susceptibility | EN 50 082 - 2: 1995 |
| NSR | | EN 61 010 - 1: 1993 |

## Display elements

| | |
|---|---|
| LED in the front plate | |
| - green on | operating voltage on |
| - yellow | switching point control |
| - red | fault signal |



## VEGATOR 636 Ex




### General

| | |
|---|---|
| Version | module unit with plug-in socket for carrier rail mounting acc. to DIN 46 277, Bl. 3 |
| Dimensions | W = 36 mm (5 TE), H = 118.5 mm, D = 134 mm |
| Weight | approx. 170 g |

### Ambient conditions

| | |
|---|---|
| Ambient temperature | -20°C … +60°C<br>at an operating voltage of 60 … 72 V DC, the permissible ambient temperature decreases linearly from 60°C to 40°C |
| Storage and transport temperature | -40°C … +70°C |

### Power supply

| | |
|---|---|
| Operating voltage | 20 … 250 V AC, 50/60 Hz<br>20 … 72 V DC |
| Power consumption | max. 3 W (3 … 18 VA) |

### Electrical protective measures

| | |
|---|---|
| Protection class | II |
| Overvoltage category | II |
| Protection | |
| - instrument | IP 30 |
| - plug-in socket | IP 20 |
| Electrical separating measures | reliable separation (VDE 0106, part 1) between power supply, measuring data input, level relay and transistor output |

### Inputs

| | |
|---|---|
| Number of inputs | 1 current input |
| Data transmission | analog |
| Sensor voltage supply | approx. 15 … 18 V DC |
| Hysteresis | 100 µA fixed |
| Switching threshold | 12 mA |
| Current limitation | 24 mA, permanently short-circuit proof |
| Connection cable | 2-wire |
| Resistance per cable | max. 35 Ω |
| Integration time | 0.1 … 20 s, directional switching |

### Relay output

| | |
|---|---|
| Number, function | 1 switching relay (spdt) |
| Modes | A/B switch<br>A - max. detection or overfill protection<br>B - min. detection or dry run protection |
| Contact | 1 spdt each |
| Contact material | AgCdO and Au plated |
| Turn-on voltage | min. 10 mV DC<br>max. 250 V AC, 250 V DC |
| Switching current | min. 10 µA DC<br>max. 3 A AC, 1 A DC |
| Breaking capacitance | max. 500 VA AC, 54 W DC |

### Transistor outputs

| | |
|---|---|
| Number, function | 1, synchronous switching with relays |
| Galvanic separation | floating |
| Max. values | $U_B$ max. = 36 V DC<br>$I_B$ max. = 60 mA ( short-circuit proof) |
| Transistor voltage loss | $U_{CE}$ min. - 1.5 V at $I_B$ = 60 mA |
| Blocking current | < 10 µA |

### Display elements

LED in the front plate

| | |
|---|---|
| - green on | operating voltage on |
| - yellow | switching point control |
| - red | fault signal |

### Approvals

| | |
|---|---|
| Classification | intrinsic safety EEx ia IIC or EEx ia IIB |
| Max. values | $U_0$ - 20 V<br>$I_K$ - 125 mA<br>P - 624 mW |
| Characteristics | linear |

| | EEx ia IIC | | | EEx ia IIB | |
|---|---|---|---|---|---|
| Max. permissible outer inductance (mH) | 0.5 | 1.0 | 1.5 | < 0.5 | 0.5 … 20 |
| Max. permissible outer capacitance (nF) | 97 | 78 | 68 | 97 | 486 |

The intrinsically safe circuits are reliably galvanically separated from the non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.
In case of failure, the max. voltage on the non-intrinsically safe circuits must not exceed 250 $V_{eff}$.

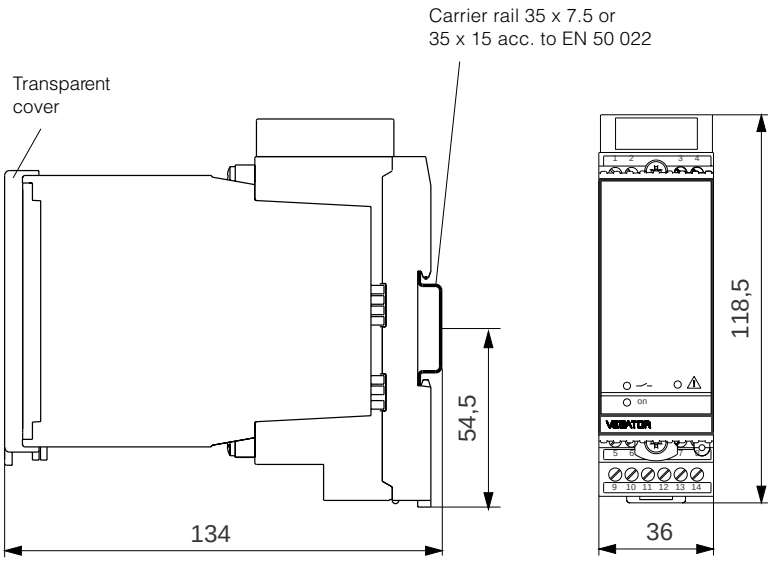
### Electrical connection

Screw terminal — max. for 1.5 mm²

### CE conformity

The signal conditioning instrument meets the protective regulations of EMVG (89/336 EWG) and NSR (73/23/EWG). The conformity has been judged acc. to the following standards:

| | | |
|---|---|---|
| EMVG | Emission | EN 50 081 - 1: 1993 |
| | Susceptibility | EN 50 082 - 2: 1995 |
| NSR | | EN 61 010 - 1: 1993 |



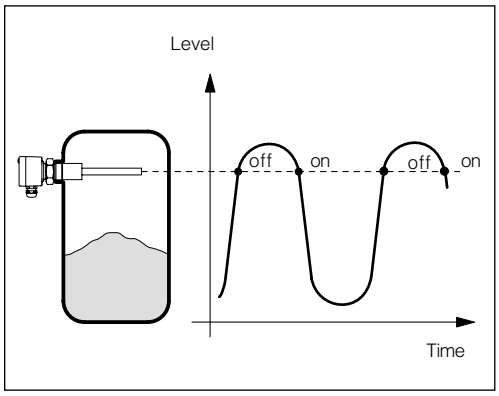
## 3.4 Application examples

### Single point control

Measuring system for detection of the max. level, e.g. for overfill protection or for switching on emptying pump.

Vibrating level switch at the respective switching point
- mounted at the appropriate height
- as tube version, can be mounted with lock fitting (shiftable)
- with tube or cable extension of appropriate length

- suitable signal conditioning instruments (in conjunction with electronics module Z) VEGATOR 425 Ex F, 534 Ex, 536 Ex, 537 Ex, 636 Ex or 825 Ex



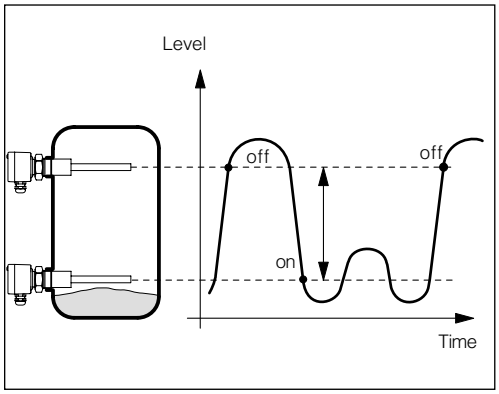

*Single point control*

### Double point control

Measuring system for detection of two levels (alternating function), e.g. for pump control

Vibrating level switch at the respective switching points
- mounted at the appropriate height
- as tube version, can be mounted with lock fitting (shiftable)
- with tube or cable extension of appropriate length

- suitable signal conditioning instruments (in conjunction with electronics module Z) VEGATOR 537 Ex



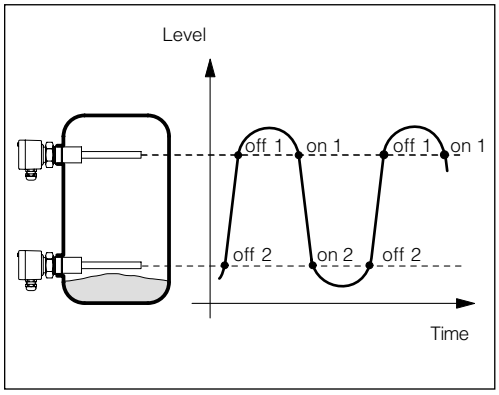

*Double point control*

### Double single point control

Measuring system for detection of the min. and max. level

Vibrating level switch at the respective switching points
- mounted at the appropriate height
- as tube version, can be mounted with lock fitting (shiftable)
- with tube or cable extension of appropriate length

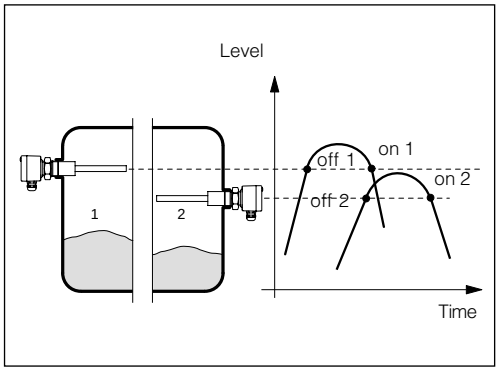
- suitable signal conditioning instruments (in conjunction with electronics module Z) VEGATOR 534 Ex or 537 Ex




*Double single point control*

**or**

Measuring system for detection of one level in each of two different vessels.




*Double single point control with two vessels*

Any other vibrating level switch of the VEGAVIB series can be used instead of the shown VEGAVIB 41.

## 3.5 Approvals

If measuring systems are mounted according to the following approvals, the respective official documents and their regulations have to be observed. The documents are supplied with the respective measuring system.

**Level measuring instrument for the use in dust-Ex areas (zone 10)**

Level detection with fault monitoring

| Instrument | Elec. module | Required signal conditioning instr. VEGATOR | Test certificate no. BVS no. |
|---|---|---|---|
| Vibration<br>VEGAVIB<br>51 Ex S.- | E50 C<br>E50 R<br>E50 T | Compact instr. | 94.Y.8009 |
| | E50 Z Ex | 544 Ex | 94.Y.8009 |
| 53 Ex.5.- | | 536 Ex, 537 Ex<br>636 Ex | applied for |

**Level measuring instruments acc. to CENELEC for use in hazardous areas**

Level detection with fault monitoring

| Instrument | Conformity certificate PTB no. | Elec. module | Conformity certificate PTB no. | Required signal conditioning instr. VEGATOR | Conformity certificate PTB no. |
|---|---|---|---|---|---|
| Vibration | Ex-95.D.2023 | E50 Z Ex | Ex-95.D.2023 | 534 Ex | Ex-93.C.4066 X |
| VEGAVIB | | | | 536 Ex | Ex-95.D.2065 X |
| 51 Ex | | | | 537 Ex | Ex-95.D.2073 X |
| 52 Ex | | | | 636 Ex | applied for |
| 53 Ex | | | | | |

# 4 Electrical connection

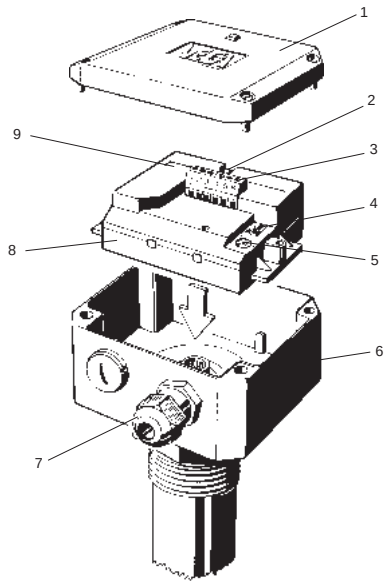
## 4.1 VEGAVIB

**Danger**
Switch off the power supply before starting connection work.

The electrical connection must be carried out according to the type of integrated electronics module. Connect mains according to the following sketches.

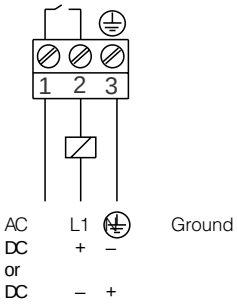
As a rule, connect VEGAVIB to vessel ground (PA), or in case of plastic vessels, to the next ground potential. A thread (screw M4 x 5) is located laterally on the hexagon of the mounting boss. This connection is used to drain off electrostatic charges.

For dust-Ex applications, the PA terminal (on the hexagon of the mounting boss) must be connected to a potential equalisation cable.




1 Housing cover
2 Control lamp (LED)
3 Terminals
4 A/B switch
5 Potentiometer
6 Instrument housing
7 Cable entry (Pg 13.5)
8 Oscillator
9 Type label oscillator

**Non-contact switch (E40C, E50C)**

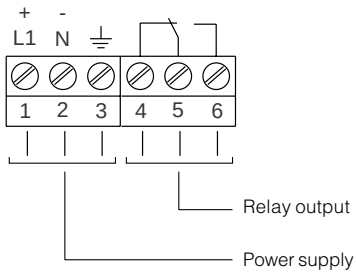



Power supply:
20 … 250 V AC, 50/60 Hz
20 … 250 V DC
(for further information see technical data)

For direct control of relays, contactors, magnet valves, signal lamps, horns etc. Must not be operated without connected load (switching in series), because the electronics module will be damaged if connected directly to mains. Not suitable for connection to low voltage PLC inputs.

The domestic current is lowered briefly below 1 mA when switching of the load so that contactors, the holding current of which is lower than the permanently flowing domestic current of the electronics, are nevertheless reliably switched off.

**Floating relay output (E30R, E40R, E50R)**




Power supply:
20 … 250 V AC, 50/60 Hz
20 … 72 V DC
(for further information see technical data)

Is used for switching of external voltage sources to relays, contactors, magnet valves, signal lamps, horns etc.

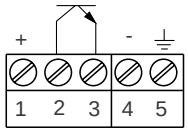
**Two-wire output (E50Z)**
for connection to a VEGATOR signal conditioning instrument (only with VEGAVIB 51, 52 and 53)

Power supply via the connected VEGATOR signal conditioning instrument (12 … 36 V DC)
(for further information see technical data)

The control lamp in the housing generall lights when the vibrating rod is covered, independent of the mode set in the signal conditioning instrument.

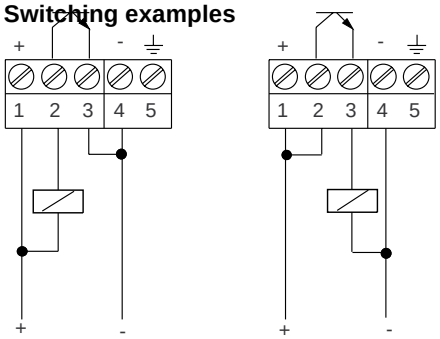
Observe the operating instructions of the signal conditioning instrument. Suitable signal conditioning instruments are listed under Technical data.

**Floating transistor output (E40T, E50T)**

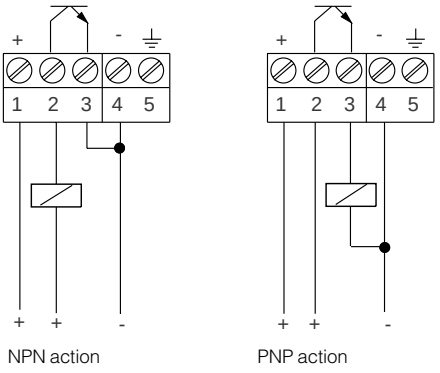



Power supply:
10 … 55 V DC
(for further information see the following switching examples as well as the technical data)

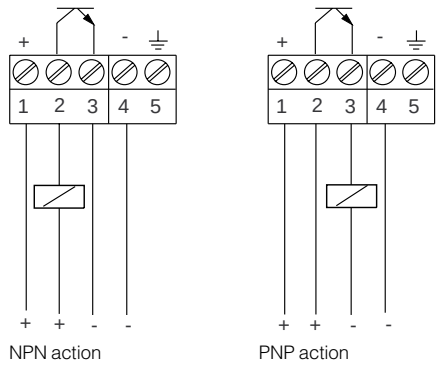
**Switching examples**




The transistor switches the supply voltage of the electronics module to the binary input of A PLC or to an electrical load. By different connection of the consumer (load), PNP or NPN action can be reached.

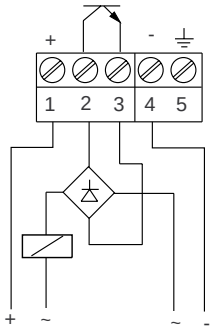



The transistor switches a second voltage source with the same reference potential to the binary input of a PLC or to an electrical load. By a different connection of the consumer (load), PNP or NPN action can be achieved.

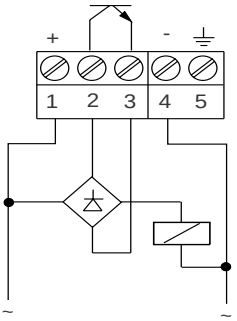



The transistor switches a second, galvanically separated voltage source to the binary input of a PLC or to an electrical load. By a different connection of the consumer (load), PNP or NPN action can be achieved.

**Control of alternating current loads**




The transistor switches a galvanically separated alternating voltage 10 … 42 V AC to a load.




The transistor switches an alternating voltage 10 … 42 V AC, which is also supply voltage, to a load.

**Note**

The transistor outputs of several VEGAVIB can be switched in series or in parallel, to connect their signals logically. The wiring must be such that terminal 2 always has a higher voltage than terminal 3.

## 4.4 Signal conditioning instruments series 500 and series 600

If only one channel should be used on VEGATOR signal conditioning instrument, connect a resistor of 1 kΩ (0.5 W) to the free connecting pins of the second channel. The resistor prevents a fault signal being triggered by a missing sensor.

For each relay output, there is a concurrently operating transistor output ready for use.

### Reset of alarm functions

The fail safe relay of VEGATOR 536 can be used as second level relay for a horn etc. For deactivating the connected horn, lamp etc. in case of a level alarm (e.g. reaching of the max. permissible level), an additional key (opener) can be connected to VEGATOR 536. This key can deactivate a level alarm. The alarm will not be terminated in case of failure (e.g. line break).

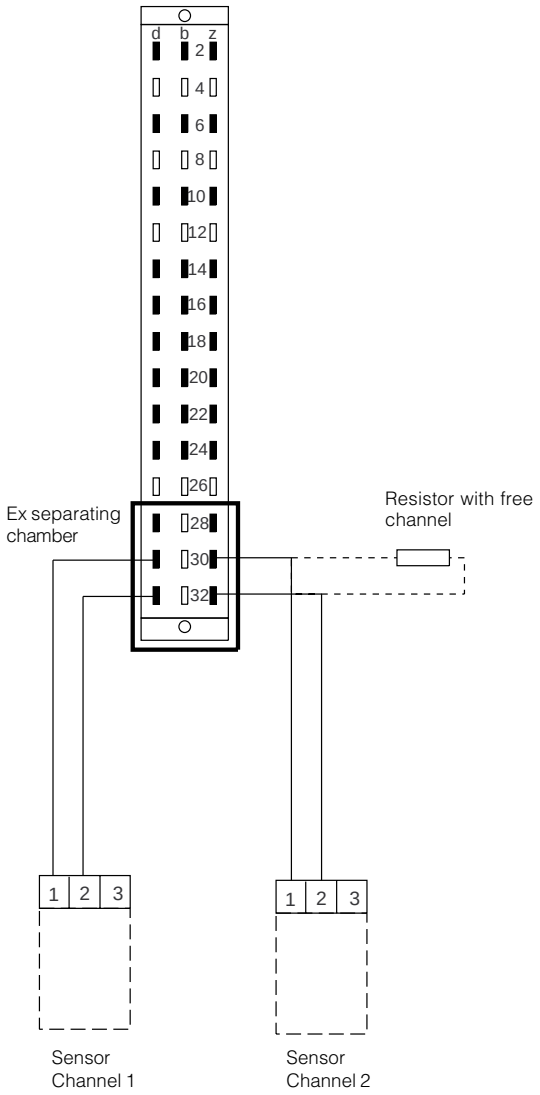
If this key is connected, the fail safe relay then has the same function as the level relay, however, the fail safe relay can be reset with the key for reset of alarm functions.

For example, if an acoustic warning system is activated when the max. level is reached, it can be deactivated with the key for reset of alarm functions. The second output (level relay) still signals to the process control that the max. level has been reached.

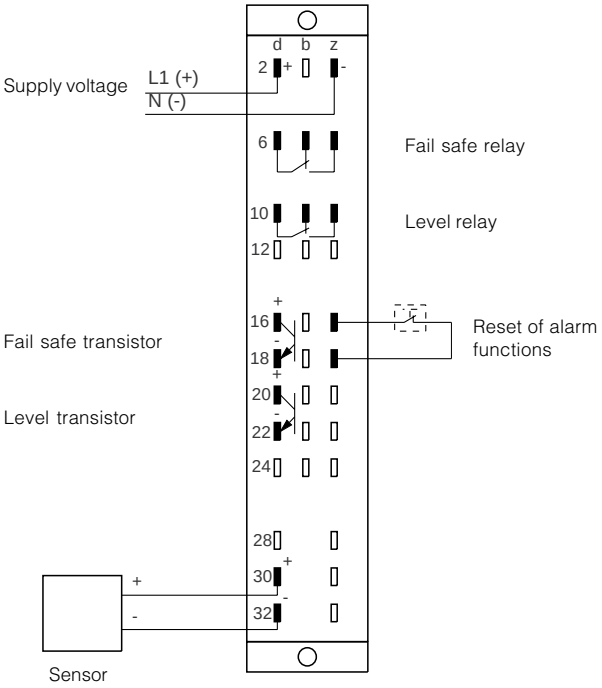
### Note

If very strong electromagnetic interferences are expected, we recommend the use of screened cable. The shielding of the cable must only be grounded at one end. The grounding should be done on the sensor side. The following illustrations show the condition in the absence of current.

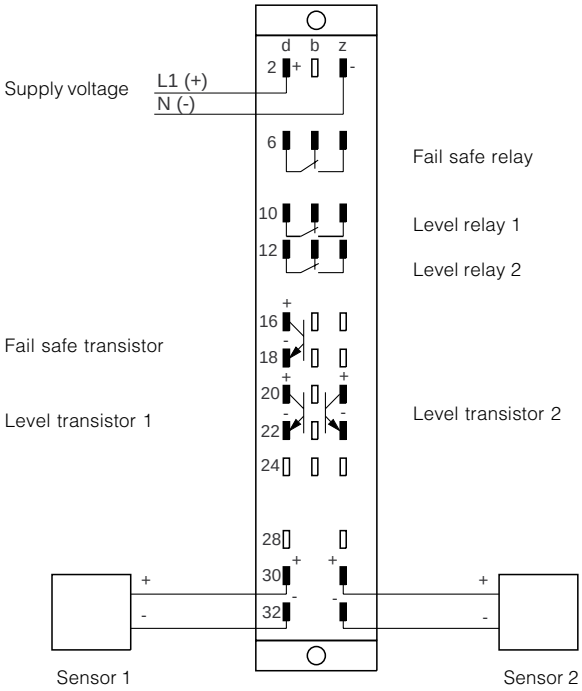
**Module with multipoint connector acc. to DIN 41 612 for carrier (rear view)**



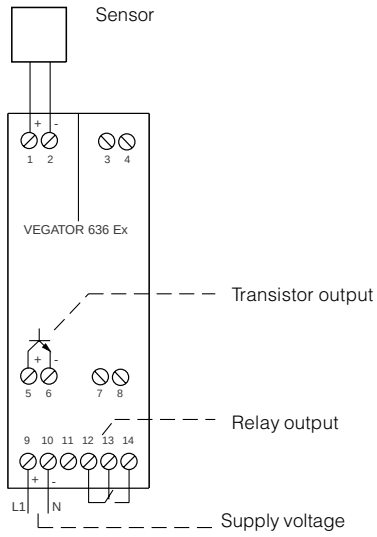
## VEGATOR 536 Ex




## VEGATOR 537 Ex




## VEGATOR 636 Ex



**Level and Pressure**

VEGA Grieshaber KG
Am Hohenstein 113
D-77761 Schiltach
Phone +49 7836 50-0
Fax +49 7836 50201
**e-mail info@vega-g.de**
**internet www.vega-g.de**

# VEGA - Your worldwide sales and service partner

Argentina
Australia
Austria
Belgium/Luxembourg
Brazil
Bulgaria
Chile
China
Columbia
Croatia
Czech Republic
Denmark
Egypt
Finland
France
Germany
Greece
Great Britain
Hong Kong
Hungary
India
Indonesia
Iran
Israel
Italy
Japan
Korea
Lithuania
Malaysia
Netherlands
New Zealand
Norway
Peru
Philippines
Poland
Portugal
Romania
Singapore
Slovakia
Slovenia
Southern Africa
Spain
Sweden
Switzerland
Taiwan
Thailand
Turkey
USA/Canada/Mexico
United Arab. Emirates
Venezuela

**Detailed information on our homepage www.vega-g.de**



*24870-EN-000401*