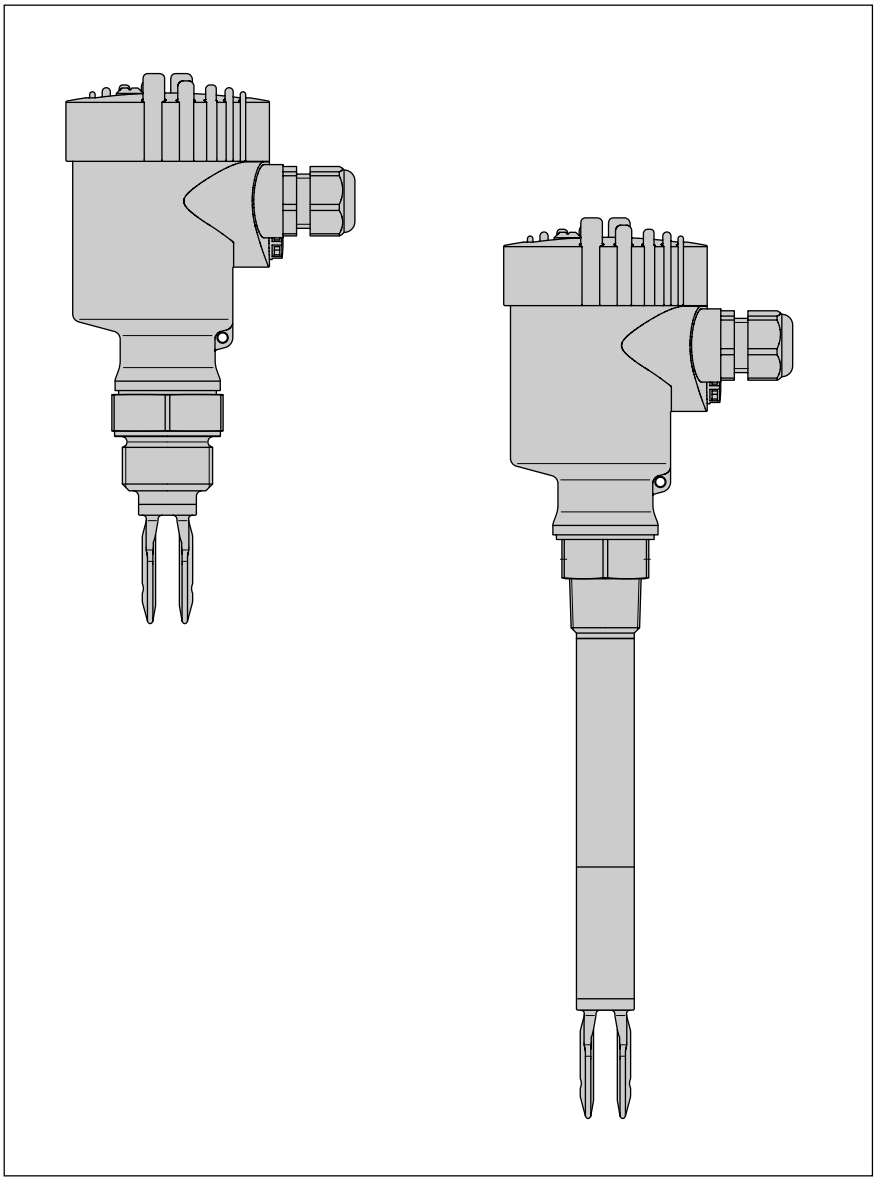
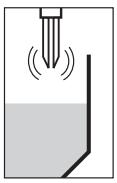
Level and Pressure

Product Information

VEGASWING series 60 and signal conditioning instruments





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2 Function and application

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3 Types and versions

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1 Product description

VEGASWING 61 and 63

VEGASWING 61 and 63 vibrating level switches are used for level detection of liquids.

Typical applications are overfill and dry run protection. With a tuning fork with a length of only 40 mm, VEGASWING 61 opens up new areas of application, e.g. in pipelines from DN 25. The vibrating level switches with different electronics versions are available as compact instruments, i.e. with integrated signal processing, or as versions for connection to remote signal conditioning instruments.

VEGASWING series 60 vibrating level switches detect levels of liquids with a viscosity of 0.2 … 10000 mPa s and a density of 0.5 g/cm³. Modular construction enables their use in vessels, tanks and pipelines.

Due to its simple and rugged measuring system, VEGASWING is virtually unaffected by the chemical and physical properties of the liquid. It does its job even under difficult conditions such as turbulence, bubbles, foam generation, buildup, plant vibration or product variation.

- Tuning fork with only 40 mm length.
- Thread from $^3/_4$" and flanges from DN 25 (ANSI 1").
- Product temperature -40°C ... +250°C without shock limitation.
- Insensitive to external vibrations.
- Operating pressure up to 64 bar.
- ECTFE coated or enamelled.
- Viscosity 0.2 ... 10000 mPa s.
- Density range 0.5 g/cm³…2.5 g/cm³.
- NAMUR output.
- Overfill protection acc. to WHG.
- Ex-Zone 0/Zone 1
  ATEX II 1G or 1/2G EEx ia IIC T6
  ATEX II 1/2G or 2G EEx d IIC T6.
- Integrated fault monitoring.
- Fixed, reproducible switching point.
- Switching mode visible (LED) externally.
- Setup without adjustment.
- Compact.
- Installation in any position.
- Min. or max. mode.

Recurring test acc. to WHG
According to the type approval acc. to WHG (Water Resources Ordinance), the recurring test acc. to WHG can be carried out by pushing the test key on VEGATOR 536 Ex, 537 EX, 636 Ex signal conditioning instrument or by interrupting the connection cable to the sensor. It is neither necessary to remove the sensor nor trigger a response from the sensor by filling the vessel. This is valid for VEGASWING 61 EX and 63 EX with two-wire oscillator SWING E60Z EX.

In mode A (overfill protection) VEGASWING 61 EX and 63 EX meet the fail safe requirements acc. to class 3 (AK 1 … 3) acc. to DIN 19 251.

2 Function and application

2.1 Principle of operation

VEGASWING vibrating level switches detect levels of nearly all liquids.
Viscosity: 0.2 ... 10000 mPa s
Density: 500 ... 2500 g/L

VEGASWING measuring principle

The tuning fork is piezoelectrically energised and vibrates at its mechanical resonance frequency of approx. 1200 Hz. The piezoelectric elements are fastened mechanically and are therefore not subject to temperature shock limitations. When the tuning fork is immersed in the product, the frequency changes. This change is detected by the integrated oscillator and converted into a switching command.

The integrated fault monitoring detects:
- interruption of the connection cable to the piezoelectric elements
- extreme wear on the tuning fork
- break of the tuning fork
- in absence of vibration.

If one of the stated failures is determined or in case of voltage loss, the electronics takes on a defined switching condition depending on the electronic version,
- the contactless electronic switch opens
- the relay de-energises
- the output transistor blocks
- the NAMUR electronics outputs a switching signal.

In the two-wire output version, the failure is signalled through a defined current to the connected VEGATOR signal conditioning instrument.

Furthermore the connection cable from the signal conditioning instrument to the sensor is monitored on the following criteria:
- line break
- short-circuit
- load increase

Compact instruments

All VEGASWINGs are available as compact instruments, i.e. all instruments can also be operated without remote VEGATOR. The integrated electronics evaluates the level signals and provides an output signal according to the oscillator type. With this output signal, a connected device can be operated directly (e.g. a warning system, a PLC, a pump etc.).

With one of the following oscillators you can convert the vibrating level switch into a compact instrument:
- contactless electronic switch (C)
- relay output (R)
- transistor output (T).

Compact instrument with NAMUR output

The electronics version SWING E60N delivers as output signal a current jump according to the NAMUR interface in accordance to IEC 60947-5-6 (EN 50 227).
The switching signal is further processed via complementary NAMUR processing systems, e.g. PLC input card or remote I/O.

In case of failure, a defined current (≤ 1.0 mA) is imprinted in the cable to the NAMUR amplifier.

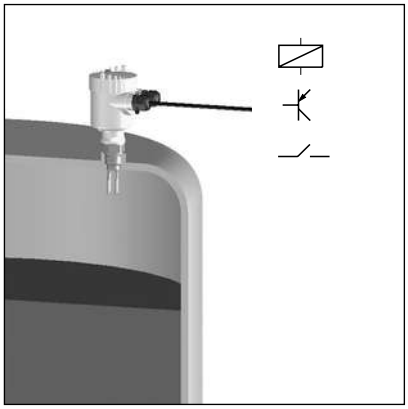
Vibrating level switch with remote signal conditioning instrument

The VEGASWING series 60 with electronics version SWING E60Z can be connected to a signal conditioning instrument. Depending on your requirements, you can choose from the following conditioning instruments:
- VEGATOR 536 Ex
- VEGATOR 537 Ex
- VEGATOR 636 Ex

2.2 Measuring system

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

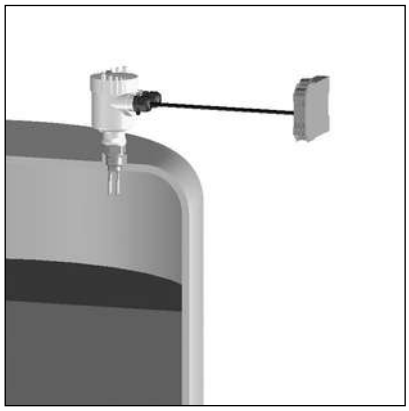
Level detection of liquids with compact instrument



Measuring system with VEGASWING as compact instrument

A measuring system consists of:
- a VEGASWING vibrating level switch with integrated oscillator (SWING E60C, R, T)
- connected instruments which can be operated with VEGASWING.

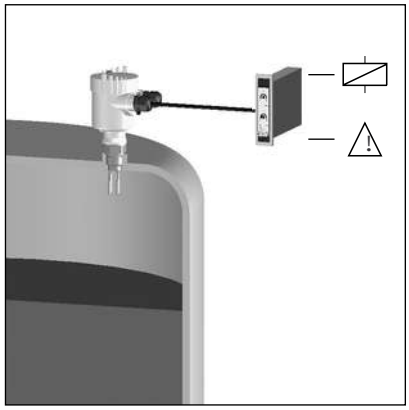
Level detection of liquids with NAMUR compact instrument



Measuring system with VEGASWING as NAMUR compact instrument

A measuring system consists of:
- a VEGASWING vibrating level switch with integrated oscillator SWING E60N
- a NAMUR amplifier acc. to IEC 60947-5-6.

Level detection of liquids with signal conditioning instrument



Measuring system with VEGASWING with separate processing

A measuring system consists of:
- a VEGASWING vibrating level switch with integrated oscillator SWING E60Z
- a VEGATOR level switch or the VEGALOG processing system

3 Types and versions

3.1 VEGASWING 60 - Overview

Version	61 (Ex i)	63 (Ex i)	61 ExD	63 ExD
Standard (fixed length)	•		•	
Tube version (variable length)		•		•
Approvals				
Ex-Zone 0 acc. to ATEX 100a II 1G or 1/2G EEx ia IIC T6	•	•		
Ex-Zone 0 acc. to ATEX 100a II 1/2G or 2G EEx d IIC T6			•	•
Overfill protection acc. to WHG	•	•	•	•
Fault monitoring acc. to AK 3	•	•	•	•
Mechanical connection				
G $^3/_4$ A	•	•	•	•
$^3/_4$" NPT	•	•	•	•
G 1 A	•	•	•	•
1" NPT	•	•	•	•
Flange from DN 25, ANSI 1"	•	•	•	•
Tri-Clamp 1"	•	•	•	•
Tri-Clamp 1$^1/_2$"	•	•	•	•
Bolting DN 40	•	•	•	•
Tuchenhagen Varivent	•	•	•	•
Material, tuning fork				
1.4435 (316 L)	•	•	•	•
2.4610 (Hastelloy C4)	•	•	•	•
Material, mechanical connection				
1.4435 (316 L)	•	•	•	•
2.4610 (Hastelloy C4)	•	•	•	•
Coating				
ECTFE (Halar)	•	•	•	•
Enamel	•	•	•	•
Oscillator				
Contactless electronic switch (SWING E60C)	•	•	•	•
Relay output (SWING E60R) DPDT	•	•	•	•
Transistor output (SWING E60T)	•	•	•	•
Two-wire output (SWING E60Z) 8 mA/16 mA	•	•	•	•
Two-wire output (SWING E60N) NAMUR acc. to IEC 60947-5-6	•	•	•	•
Temperature adapter				
1.4435 (316 L) up to 200°C	•	•	•	•
Locking thread				
G 1 A (unpressurized)	•	•	•	•
G 1 A - WHG approval	•	•	•	•
G 1 A - Ex-, WHG approval	•	•	•	•

3.2 Technical data - VEGASWING 60

VEGASWING 61 and 63

Housing

Housing material	PBT (Polyester), Aluminium (plastic coated)
Protection	IP 66 and IP 67 (meets both protection classes)
Cable entry	2 x M20 x 1.5 or 2 x $^1/_2$" NPT
Terminals	max. 1 x 1.5 mm^2

Mechanical connection

Thread	G $^3/_4$ A, $^3/_4$" NPT, G 1 A or 1" NPT PN 64
- material	1.4435 (316 L) or 2.4610 (Hastelloy C4)
Flanges	DIN from DN 25 and ANSI from 1"
- material	1.4435, 1.4435 with Hastelloy C4 plated, enamelled steel, 1.4435 ECTFE coated
Hygienic fittings	
- material	1.4435
- bolting	DN 40 PN 40
- Tri-Clamp	1", 1$^1/_2$" PN 10
- conus	DN 25 PN 40
- Tuchenhagen Varivent	DN 50 PN 10

Tuning fork

Material	1.4435 (316 L), 2.4610 (Hastelloy C4), Hastelloy C4 enamelled, 1.4435 with ECTFE coating
Surface quality (option)	
- standard	Ra approx. ≤ 3.0 µm
- polished	Ra ≤ 1.5 µm
- hygienic version (3A)	Ra ≤ 0.5 µm

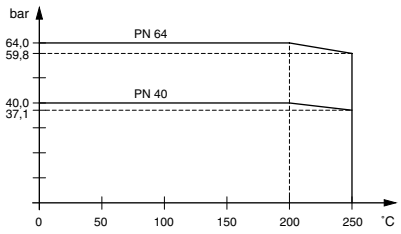
Extension tube (VEGASWING 63)

Material	1.4435 (316 L), 2.4610 (Hastelloy C4), Hastelloy C4 enamelled 1.4435 with ECTFE coating
Length	
- steel 1.4435, 2.4610 (Hastelloy C4)	150 mm … 3000 mm
- Hastelloy C4 enamelled	150 mm … 1200 mm
- 1.4435 ECTFE coated	150 mm … 3000 mm

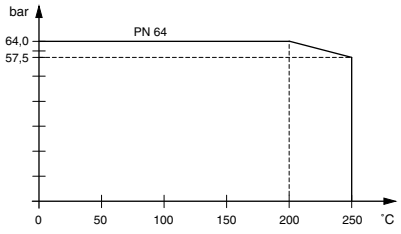
Operating pressure

Operating pressure	max. 64 bar depending on the mechanical connection

Flanges acc. to DIN 2527 - Forms A to E (DIN 2526)



Flanges acc. to DIN 2527 - Forms V13 to R13 (DIN 2513)



Weight

Tube extension (VEGASWING 63A)	approx. 0.11 kg/m

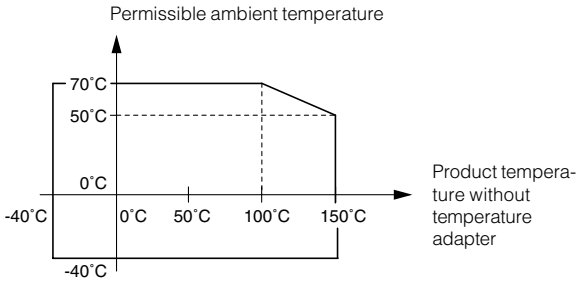
Medium

Viscosity	
- dynamic	0.2 … 10.000 mPa s (requirement: with density 1)
Density	0.7 … 2.5 g/cm^3 (0.5 … 0.7 g/cm^3 by switching over)

Ambient conditions

In Ex environment the atmospheric conditions according to the definition of Ex-Zone 0 are valid.

Ambient temperature on the housing	-40°C ... +70°C
Storage and transport temperature	-40°C ... +80°C
Product temperature without temperature adapter	-40°C ... +150°C
Product temperature with temperature adapter of 1.4435 (option)	-40°C ... +250°C



Temperature adapters

G 1 A, G 1 1/2 A, 1" NPT, 1 1/2" NPT	
ARV unpressurized	1.4435 (stainless steel)
ARV unpressurized/ WHG approval	1.4435 (stainless steel / Hastelloy C4)
ARV 40 bar / Ex-WHG approval	1.4435 (stainless steel / Hastelloy C4)

Function

Modes	A - max. detection or overfill protection B - min. detection or dry run protection A/B mode in the oscillator or definition via the signal conditioning instrument (SWING E60Z, SWING E60N) two-wire and NAMUR output switchable to falling and rising characteristics		
Integration time	approx. 500 ms		
Meas. frequency	approx. 1100 Hz		
Hysteresis	approx. 2 mm with vertical installation		
Signal lamp			
- SWING E60 C, R, T	two-colour LED for display of switching condition green = output conductive red = output blocks red (flashes) = failure		
- SWING E60 Z, E60 Z Ex	two-colours LED		
	green=	approx. 16 mA	= High current
	red=	approx. 8 mA	= Low current
	dark ≤	1.8 mA	= Failure
- SWING E60 N	one-colour LED		
	red ≥	2.1 mA	= High current
	dark ≤	1.0 mA	= Low current
	red flashing ≥	1.0 mA	= Failure

CE conformity CE

VEGASWING 61 and 63 vibrating level switches meet the protective regulations of EMC (89/336/EWG) and NSR (73/23/EWG). Conformity has been judged acc. to the following standards:

EMC	Emission	EN 61 326/A1: 1998 (class B)
	Susceptibility	EN 61 326/A1: 1998
NSR		EN 61 010 - 1: 1993

Approvals VEGASWING 61 and 63

Water Resources Ordinance (WHG)

Approval as overfill protection system acc. to WHG	
Ambient temperature on the housing	-40°C … +70°C
Product temperature	-40°C … +150°C
- test report	VEGASWING 61 EX and 63 EX with oscillator SWING E60R, C, T EX or oscillator SWING E60 N Ex or SWING E60 Z EX
- with temperature adapter	up to 200°C
Operating pressure	max. 64 bar

Recurring test acc. to WHG

According to the type approval acc. to WHG, the recurring test acc. to WHG can be carried out by pushing the test key on VEGATOR 536 Ex, 537 EX, 636 Ex signal conditioning instrument or by interrupting the connection cable to the sensor. It is neither necessary to remove the sensor nor trigger a response from the sensor by filling the vessel. This is valid for VEGASWING 61 EX and 63 EX with two-wire oscillator SWING E60Z EX. If VEGASWING is connected to a VEGALOG processing system or to a PLC, you have to interrupt the connection cable to the sensor.

Explosion protection VEGASWING 61 EX0, 63 EX0 ⟨Ex⟩

Certificate	EC type approval certificate acc. to ATEX 100a
Classification mark	II 1/2G EEx d IIC T6
Permissible application range	Ex Zone 0
Ambient temperature dependent on temperature class and Ex-Zone:	see safety information
Electrical safety-relevant characteristics:	see safety information

3-A Hygienic conformity

In conjunction with the surface quality Ra ≤ 0.5 µm, VEGASWING 61 and 63 meets the requirements of the hygienic approval 3-A. The instrument is marked accordingly.

Oscillators

The oscillators are available with different approvals. The possibilities are shown in the following table:

Electronics version	C	R	T	Z	N
WHG	•	•	•		
EEx ia, WHG				•	•
EEx d, WHG	•	•	•	•	•

C - Contactless electronic switch
R - Relay output
T - Transistor output
Z - Two-wire output
N - Two-wire-NAMUR output

Contactless electronic switch (SWING E60C)

Power supply	20 … 250 V AC, 50/60 Hz or 20 … 250 V DC
Output	contactless electronic switch
Current consumption	approx. 3 mA (via the load circuit)
Load current	min. 10 mA max. 400 mA (at I > 300 mA the ambient temperature can be max. 60°C) max. 4 A to 40 ms (not WHG specified)
Protection class	I
Overvoltage category	III
Modes (changeover)	A = max. detection or overfill protection B = min. detection or dry run protection

Relay output (SWING E60R)

Power supply	20 … 250 V AC, 50/60 Hz or 20 … 72 V DC (at U > 60 V DC the ambient temperature can be max. 50°C)
Power consumption	1 … 8 VA (AC), approx. 1,3 W (DC)
Output	relay output (DPDT) 2 floating changeover contacts
Contact material	AgCdO and Au plated
Turn-on voltage	min. 10 mV max. 250 V AC, 250 V DC
Switching current	min. 10 µA max. 5 A AC, 1 A DC
Breaking capacity	max. 750 VA AC, 54 W DC
Protection class	I
Overvoltage category	III
Modes (changeover)	A = max. detection or overflow/overfill protection B = min. detection or dry run protection

Transistor output (SWING E60T)

Power supply	10 … 55 V DC
Power consumption	max. 0,5 W
Output	floating transistor output overload and permanently short-circuit resistant
Load current	max. 400 mA
Voltage loss	max. 1 V
Turn-on voltage	max. 55 V DC
Blocking current	< 10 µA
Protection class	II
Overvoltage category	III
Modes (changeover)	A = max. detection or overflow/overfill protection B = min. detection or dry run protection

Two-wire NAMUR output (SWING E60N)

Supply (standard characteristics)	for connection to amplifier acc. to NAMUR IEC 60947-5-6, approx. 8.2 V
- no-load voltage	U_O ~ 8.2 V
- short-circuit current	I_U ~ 8.2 mA
Output	two-wire NAMUR output
Necessary processing system	NAMUR processing system acc. to IEC 60947-5-6 (EN 50227)
Current consumption	
- falling characteristics	≥ 2.2 mA uncovered/≤ 1 mA covered
- rising characteristics	≤ 1 mA uncovered/≥ 2.2 mA covered
- fault signal	≤ 1 mA
Protection class	II
Overvoltage category	III
Modes	falling or rising characteristics selectable on the oscillator

Two-wire output (SWING E60Z)

Power supply	12 … 36 V DC (via VEGA signal conditioning instrument)
Output	two-wire output
Necessary signal conditioning instrument	VEGATOR 536 Ex, 537 Ex, 636 Ex, VEGALOG 571
Current consumption	
- falling characteristics (overfill protection)	approx. 16 mA uncovered / approx. 8 mA covered
- rising characteristics (dry run protection)	approx. 8 mA uncovered / approx. 16 mA covered
- fault signal	≤ 3.6 mA
Protection class	II
Overvoltage category	III

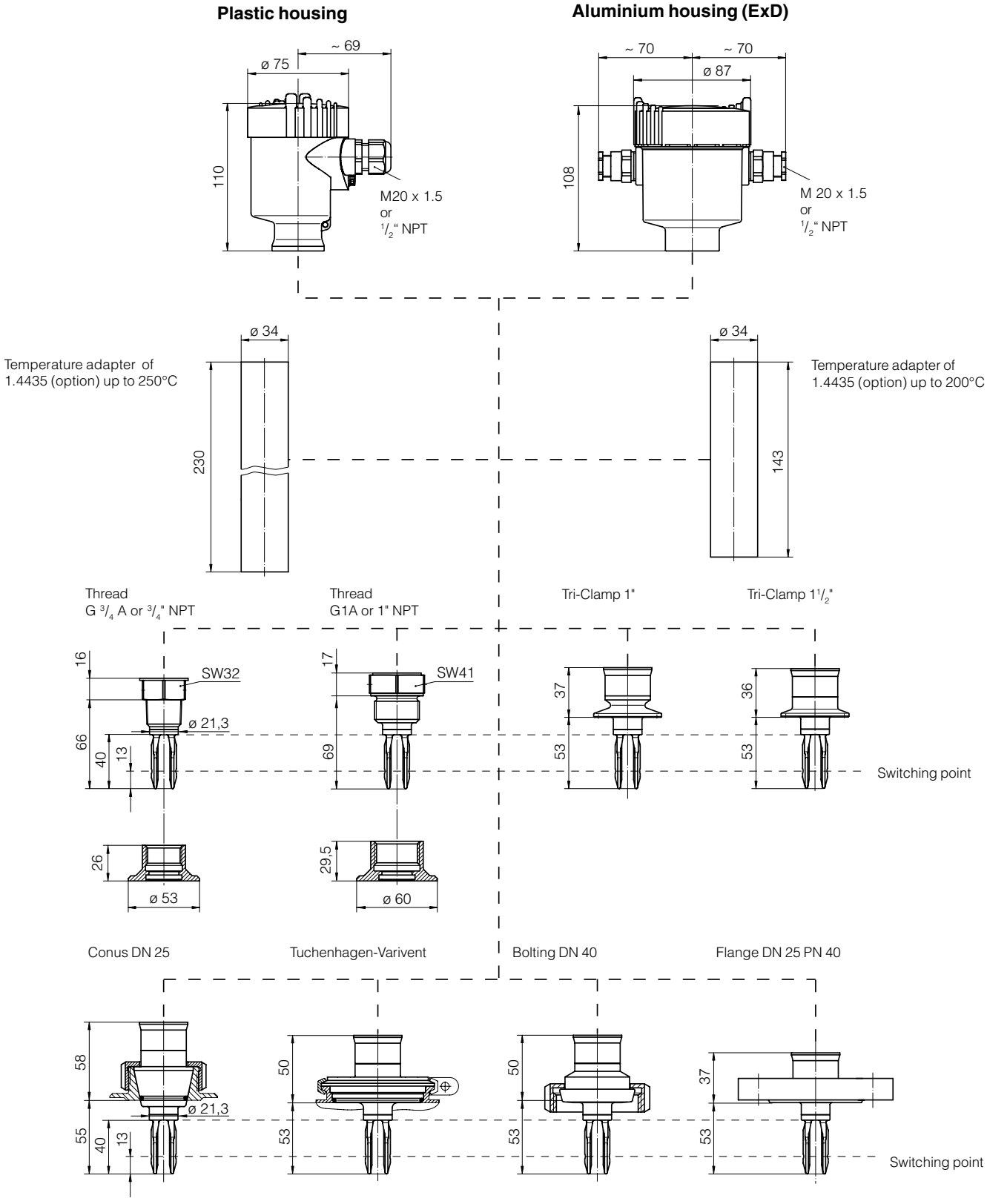
Ex versions with integrated SWING E60 Ex (intrinsically safe)

Voltage	12 … 23 V of VEGA … Ex instruments
Required signal conditioning instrument	VEGATOR 536 Ex, 537 Ex, 636 Ex other signal conditioning instruments with safety barrier type 145
Classification mark	EEx ia IIC T6

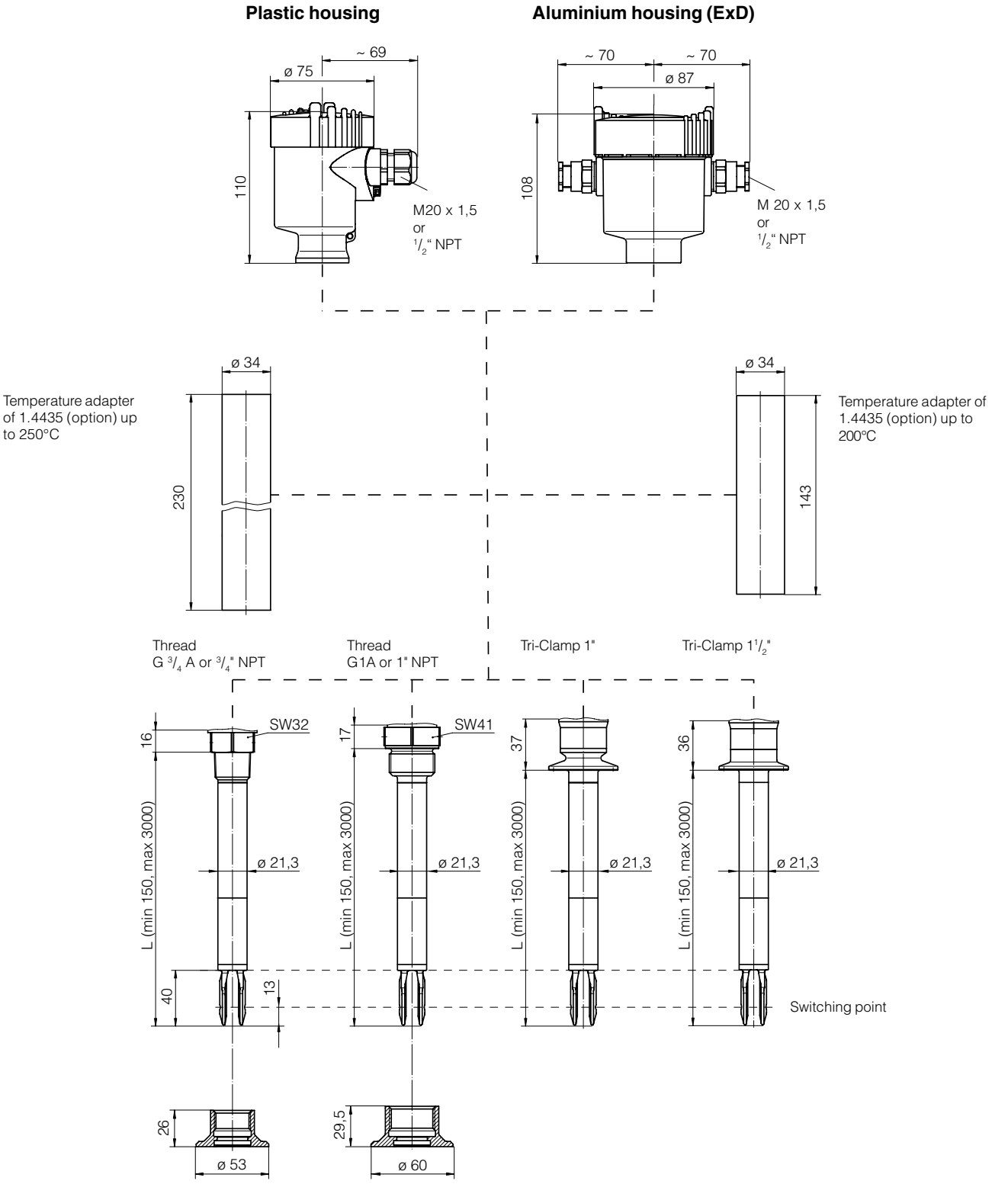
Safety barrier type 145 can be used for connection of SWING E60 Z Ex to non-Ex signal conditioning instruments.

3.3 Dimensions - VEGASWING 60

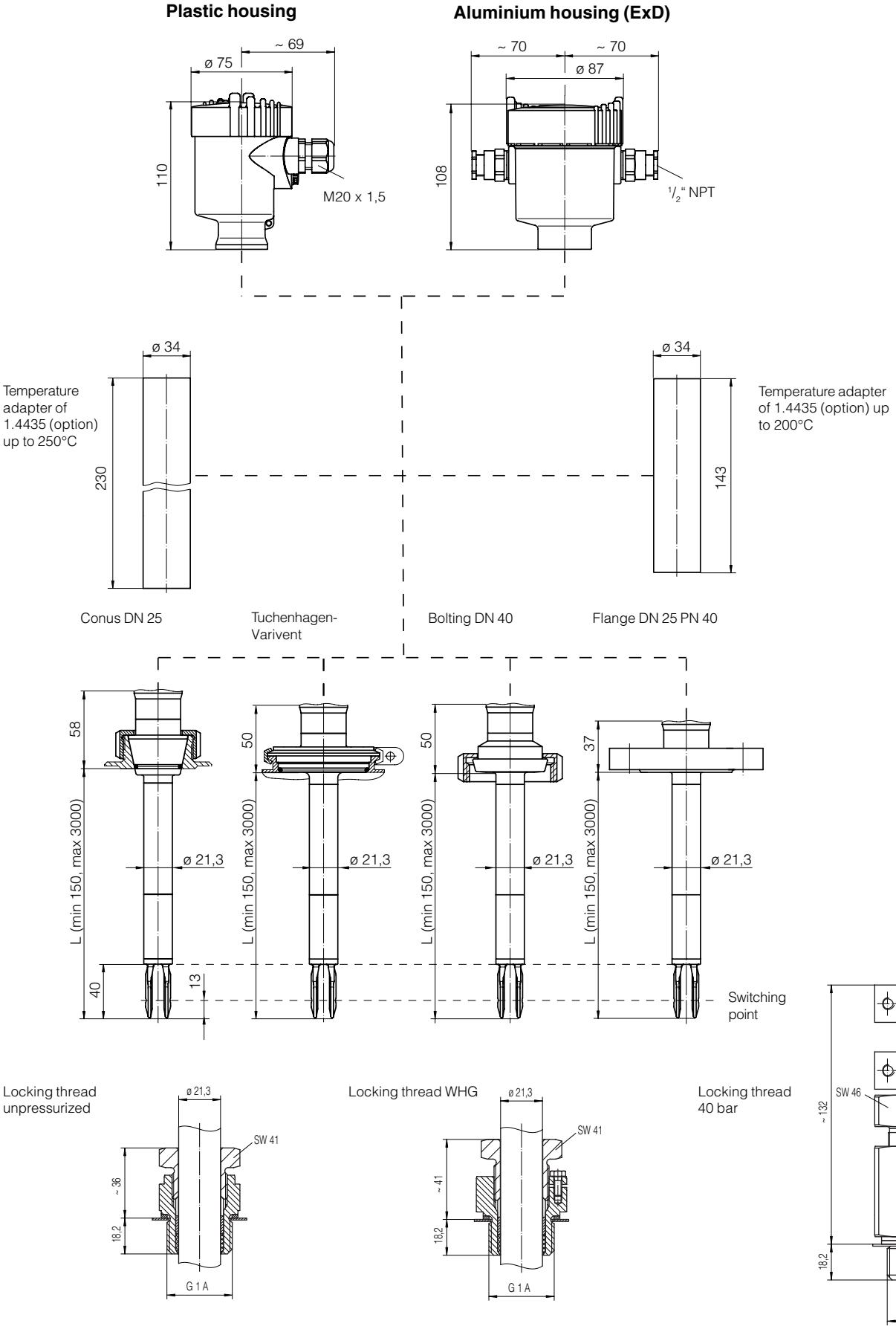
VEGASWING 61



VEGASWING 63

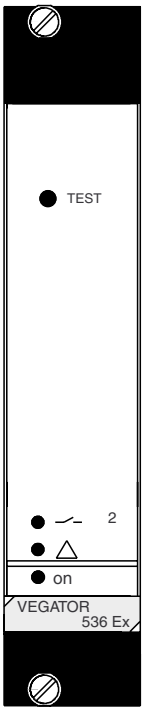


VEGASWING 63



3.4 Technical data - Signal conditioning instruments

VEGATOR 536 Ex, 537 Ex



General

Series	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 short-circuit proof)
Sensor power supply	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 A - max. detection or overfill protection B - min. detection or dry run protection (with rising characteristics of the sensor electronics)
Contact	1 spdt each
Contact material	AgCdO and Au plated
Turn-on voltage	min. 10 mV max. 250 V AC, 250 V DC
Switching current	min. 10 µA max. 3 A AC, 1 A DC
Breaking capacitance	max. 500 VA AC, 54 W DC

Transistor output

Number, function	
- VEGATOR 536 Ex	2, synchronously switching with relays
- VEGATOR 537 Ex	3, synchronously switching with relays
Galvanic separation	floating
Max. values	U_B max. = 36 V DC 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 I_K = 126 mA 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 all non-intrinsically safe circuits up to a peak value of the nominal voltage of 375 V.
The intrinsically safe circuits of the channels 1 and 2 are reliably separated

Electrical connection

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

CE conformity

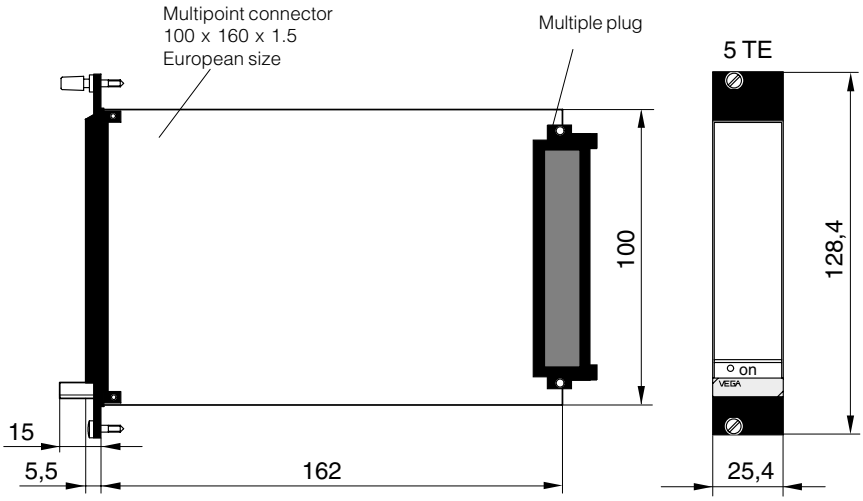
The signal conditioning instrument meets the protective regulations of EMC (89/336 EWG) and NSR (73/23/EWG). Conformity has been judged acc. to the following standards:

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

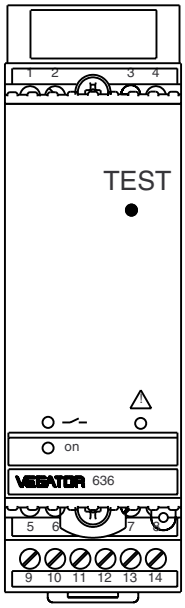
Indicating elements

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

Series 500



VEGATOR 636 Ex



General

Series	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 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 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	analogue
Sensor supply voltage	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 A - Max. detection or overfill protection B - Min. detection or dry run protection (with rising characteristics of the sensor electronics)
Contact	1 spdt each
Contact material	AgCdO and Au plated
Turn-on voltage	min. 10 mV DC max. 250 V AC, 250 V DC
Switching current	min. 10 µA DC max. 3 A AC, 1 A DC
Breaking capacitance	max. 500 VA AC, 54 W DC

Transistor output

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

Indicating 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 I_K - 125 mA 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.
The max. voltage on the non-intrinsically safe circuits must not exceed 250 V_{eff} in case of failure.

Electrical connection

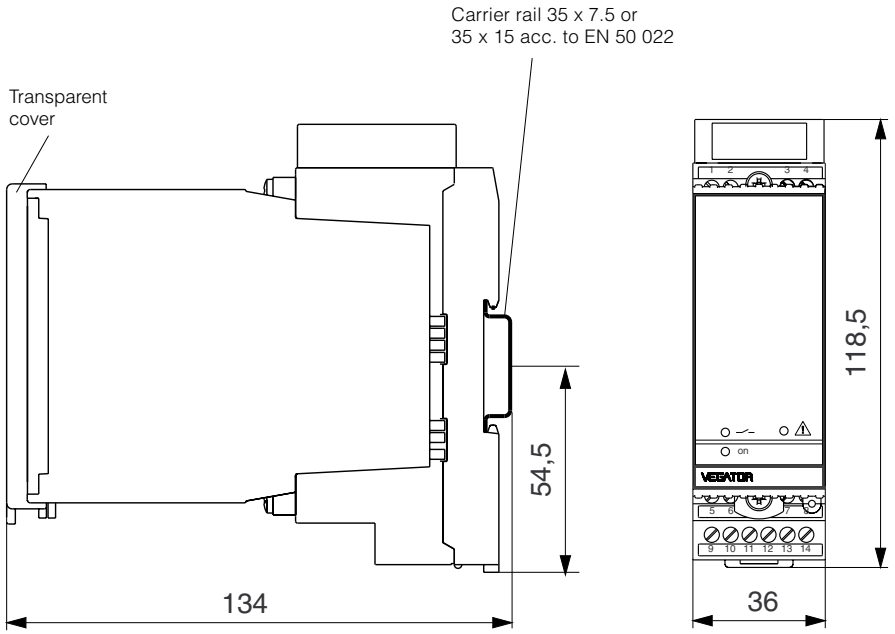
Screw terminal — max. for 1.5 mm²

CE conformity

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

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

Series 600



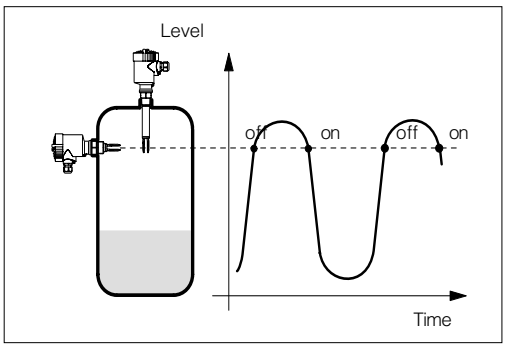
3.5 Application examples

Single point control

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

Vibrating level switch at the appropriate height
- mounted at the appropriate height
- as tube version, adjustably mounted with locking thread
- with tube extension in specified length

- suitable signal conditioning instruments (in conjunction with oscillator Z) VEGATOR 536 Ex, 537 Ex or 636 Ex



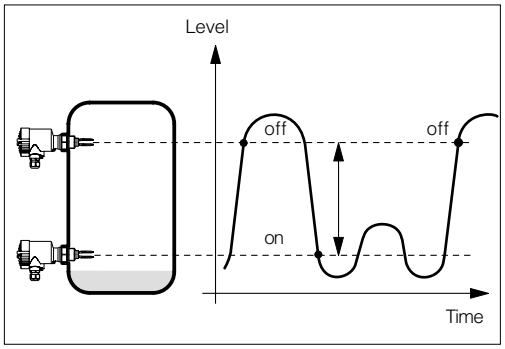
Single point control

Double point control

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

Vibrating level switch at the appropriate height
- mounted at the appropriate height
- as tube version, adjustably mounted with locking thread
- with tube extension in specified length

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



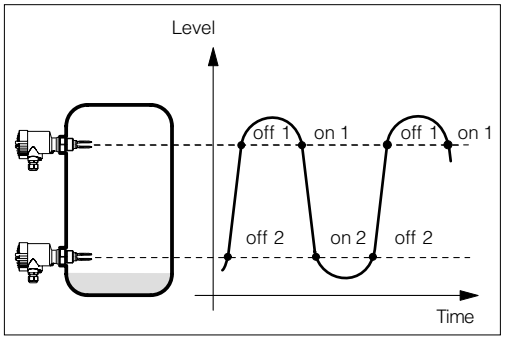
Double point control

Double single point control

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

Vibrating level switch at the appropriate height
- mounted at the appropriate height
- as tube version, adjustably mounted with locking thread
- with tube extension in specified length

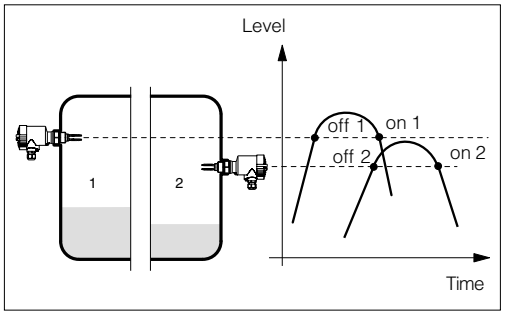
- suitable signal conditioning instruments (in conjunction with oscillator Z) VEGATOR 537 Ex



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

3.6 Mounting instructions

In principle, VEGASWING can be mounted in any position. The instrument must be mounted such that the tuning fork is at the height of the required switching point. Note the following installation instructions:

Switching point

The tuning fork is provided with lateral markings (notches), marking the switching point with vertical installation. The switching point refers to the medium water at the basic setting of the density switch ≥ 0.7 g/cm³. Make sure when mounting VEGASWING that this marking is at the height of the requested level. Note that the switching point of the instrument shifts when the medium has a density differing from water (water = 1.0 g/cm³). For products < 0.7 g/cm³ the density switch has to be set to ≥ 0.5 g/cm³.

Vertical installation

from top, from bottom

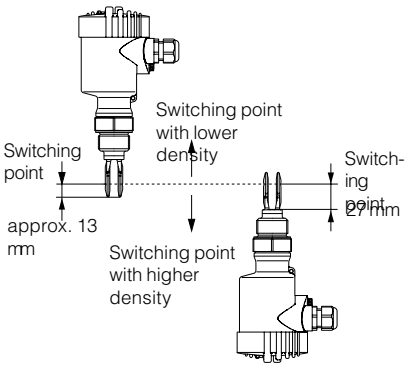
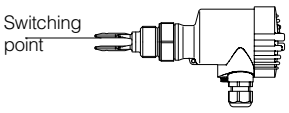


Fig. 3.1

Horizontal installation



recommended installation position for adhesive products:

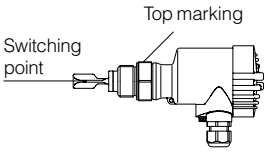


Fig. 3.2

Adhesive products

In case of horizontal mounting in adhesive and viscous products, the surfaces of the tuning fork should be vertical to reduce buildup on the tuning fork (see fig. 3.2). The orientation of the tuning fork is marked by a notch on the hexagon of VEGASWING. With this you can check the orientation of the tuning fork when screwing it in. When the hexagon touches the seal, the thread can be still turned by approx. half a turn. This is sufficient to reach the recommended installation position.

In case of adhesive and viscous products, the tuning fork should protrude into the vessel to avoid buildup. Sockets for flanges and mounting bosses should therefore not exceed a certain length. The tuning fork should protrude into the vessel/pipeline.

Vibrations

Extreme vibration or shock, caused by stirrers and turbulences in the vessel, can cause the extension tube of VEGASWING 63 to vibrate. This will cause increased stress on the upper weld joint.

To counteract this, provide a support directly above the tuning fork to secure the extension tube (see fig. 3.3).

This applies mainly for application in Ex areas category 1G or WHG. Make sure that the tube is not subjected to bending forces through this measure.

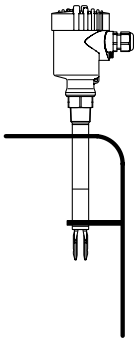


Fig. 3.3

Stirrers

Through the action of stirrers or similar devices, the level switches can be subjected to strong lateral forces. For this reason, do not use an overly long extension tube for VEGASWING 63, but check if it is possible to mount a VEGASWING 61 level switch laterally in horizontal position.

Cable entries

Use a cable with round wire cross-section and tighten the cable entry firmly. The cable entry is suitable for cable diameter from 5 mm to 9 mm.

Lateral load

Make sure that the vibrating element is not subjected to lateral forces. Mount the instrument at a location in the vessel where no interfering effects caused by stirrers, filling openings can occur. This applies mainly to instrument types with extension tube (see fig. 3.4).

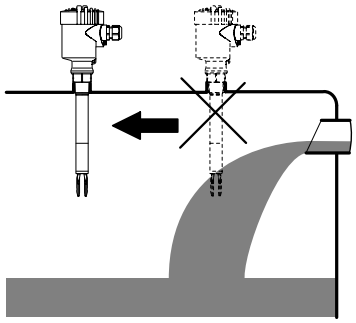


Fig. 3.4

Chemical resistance

When applied in Ex areas zone 0, VEGASWING must be used only in combustible liquids against which the materials of the tuning fork system are sufficiently chemically resistant.

Flow

When mounting in pipelines VEGASWING should be installed such that the surfaces of the tuning fork are aligned in the same direction.

4 Electrical connection

4.1 VEGASWING 61 and 63

Note
Switch off the power supply before starting connection work.

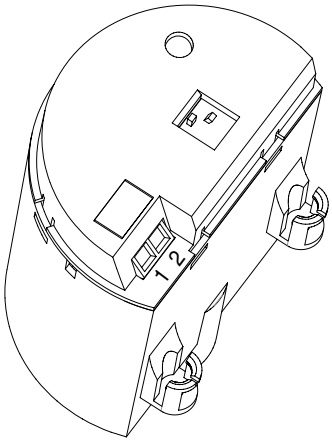
The electrical connection must be carried out according to the installed oscillator. Connect supply voltage according to the following wiring diagrams.

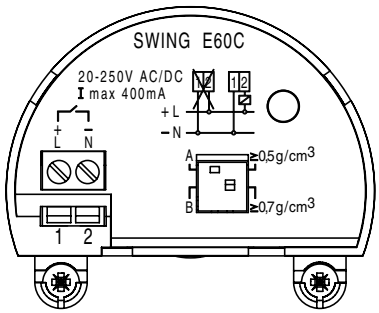
As a rule, connect VEGASWING to vessel ground (PA) or in plastic vessels, to the next ground potential. For this purpose, a grounding terminal is provided between the cable entries on the side of the housing. This connection serves to drain off electrostatic charges.

In Ex applications it is also necessary to note the installation regulations for hazardous areas.

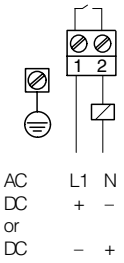
The oscillators SWING E60R and SWING E60C are in protection class 1. To maintain this protection class, it is obligatory that the ground conductor is connected to the internal ground terminal. For this purpose, note the general installation regulations.

Contactless electrical switch (SWING E60C)





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



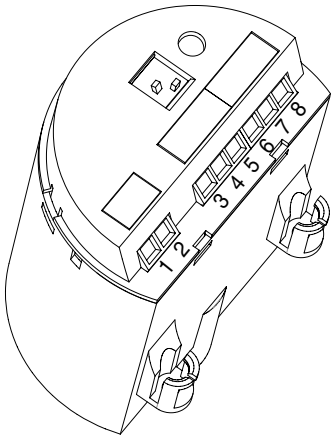
AC L1 N
DC + –
or
DC – +

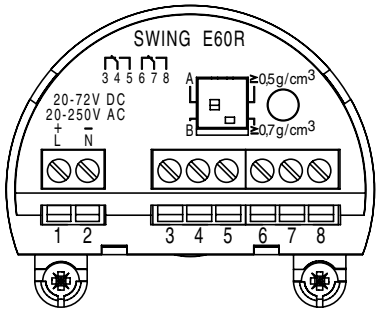
For direct control of relays, contactors, magnet valves, warning lights, horns etc. The instrument must not be operated without connected load (switching in series), as the oscillator can be destroyed when connected directly to mains. Not suitable for connection to low voltage PLC inputs.

The domestic current is temporarily lowered below 1 mA after switching off the load so that the contactors, whose holding current is lower than the permanently flowing domestic current of the electronics, are reliably switched off.

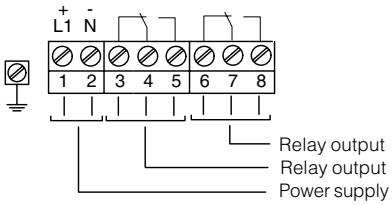
When VEGASWING is used as part of an overfill protection system acc. to WHG, also note the regulations of the general type approval.

Floating relay output (SWING E60R)





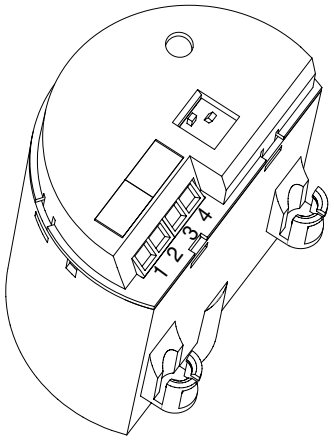
Power supply:
20 … 250 V AC, 50/60 Hz
20 … 72 V DC
(for further information, see technical data)

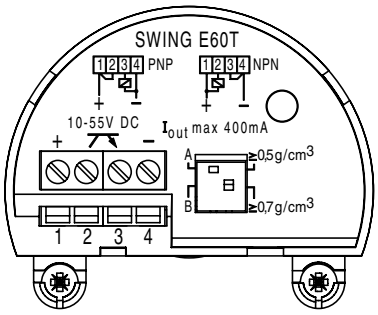


For direct control of relays, contactors, magnet valves, warning lights, horns etc.

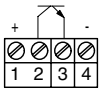
When VEGASWING is used as part of an overfill protection system acc. to WHG, also note the regulations of the general type approval.

Floating transistor output (SWING E60T)



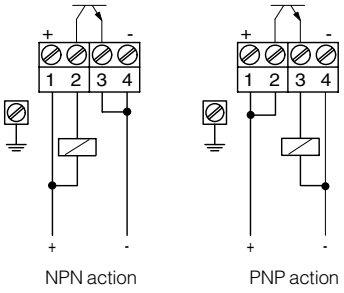


Power supply:
10 … 55 V DC
(for further information, see the following connection examples, as well as technical data)

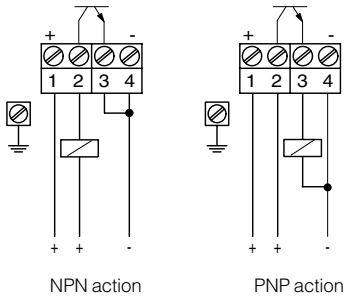


For direct control of relays, contactors, magnet valves, warning lights, horns, as well as PLC inputs.

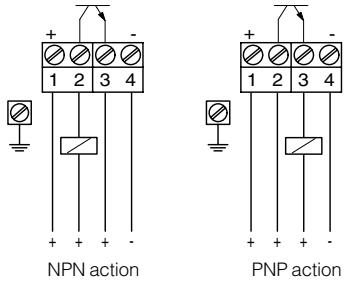
Connection examples



The transistor switches the supply voltage of the oscillator to the binary input of a PLC or to an electrical load. Through different connection of the consumer (load), PNP or NPN action can be preset.

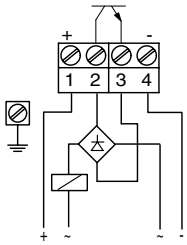


The transistor switches a second voltage source with the same reference potential to the binary input of a PLC or to an electrical load. Through different connection of the consumer (load), PNP or NPN action can be preset.

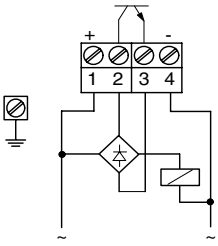


The transistor switches a second, galvanically isolated voltage source to the binary input of a PLC or to an electrical load. Through different connection of the consumer (load), PNP or NPN action can be preset.

Control of alternating current loads



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

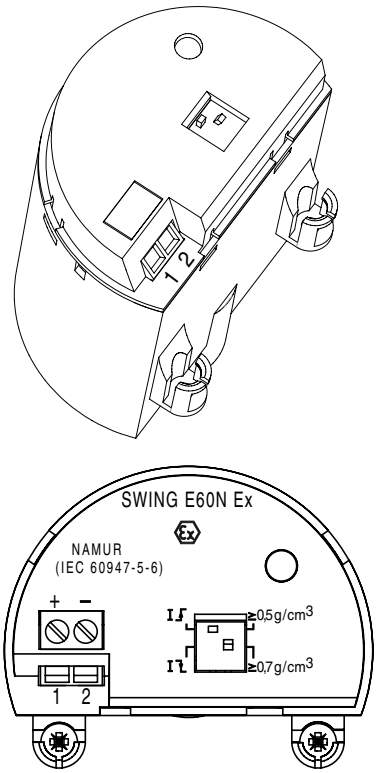


The transistor switches an alternating voltage 10 … 42 V AC, which is also supply voltage, to a load.

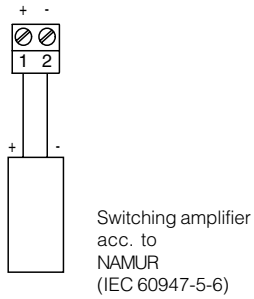
Note

The transistor outputs of several VEGASWING can be switched in series or in parallel to connect their signals logically. The connection must be made such that terminal 2 always has a higher voltage with respect to terminal 3.

Two-wire NAMUR output (SWING E60N)

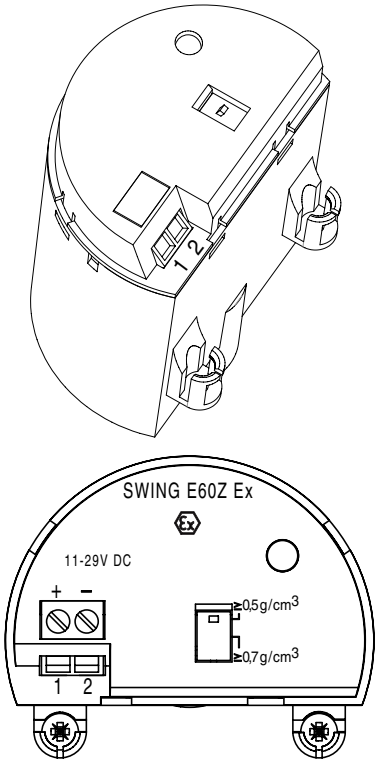


For connection to amplifiers acc. to NAMUR (IEC 60947-5-6, EN 50227) (for further information see technical data)



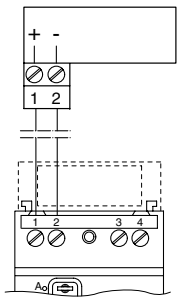
Switching amplifier acc. to NAMUR (IEC 60947-5-6)

Two-wire output (SWING E60Z)



For connection to a VEGATOR signal conditioning instrument do. Ex, WHG.

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



The switching example is valid for all applicable signal conditioning instruments.

As a rule, the signal lamp on VEGASWING lights
red - with covered tuning fork
green - with uncovered tuning fork.

Take note of the operating instructions of the signal conditioning instrument. Suitable signal conditioning instruments are listed under technical data.

If VEGASWING is used in Ex areas or as part of an overfill protection system acc. to WHG, the regulations of the safety instructions and conformity certificates must be observed. If VEGASWING with oscillator SWING E60Z Ex is operated directly on the analogue input of a PLC, an [EEx] ia safety barrier type 145 must be connected in between.

4.2 Signal conditioning instruments series 500 and series 600

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

A transistor output operating in parallel to each relay output is also available for use.

Reset of alarm functions

You can use the fail safe relay of VEGATOR 536 as a second level relay for a signaller (horn etc.). To deactivate the connected signaller (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. In case of failure (e.g. line break), the alarm is not switched off.

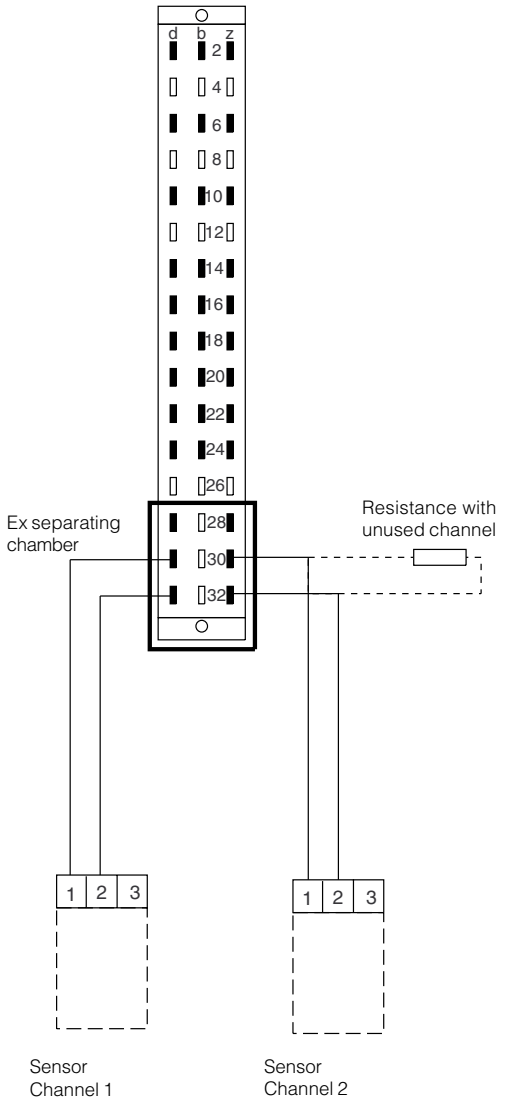
When the key is connected, the fail safe relay has the same function as the level relay, however, the fail safe relay can be reset by pressing the key for reset of alarm functions.

If, e.g. an acoustic warning system is activated when the max. level is reached, it can be switched off by pressing the key for reset of alarm functions. The second output (level relay) still signals the reaching of the max. level to the processing system.

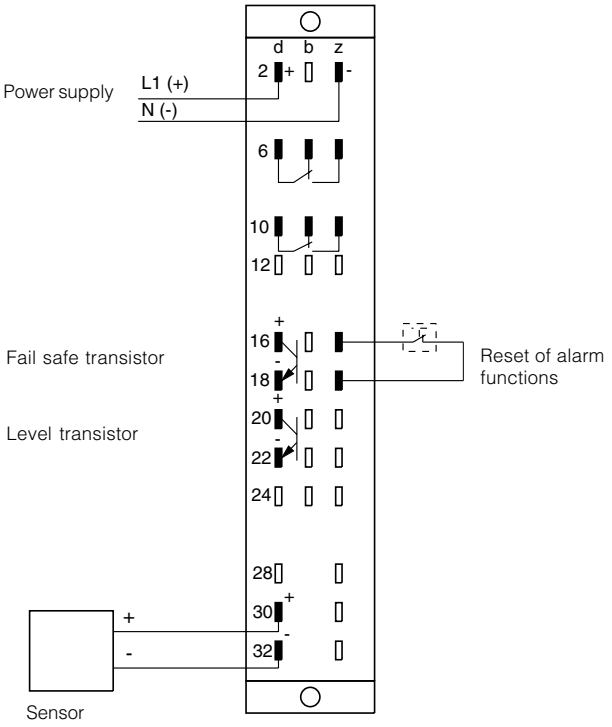
Note

If very strong electromagnetic interference is expected, we recommend the use of screened cable. The screening of the cable must only be earthed on one end. The following connection diagrams show the currentless condition.

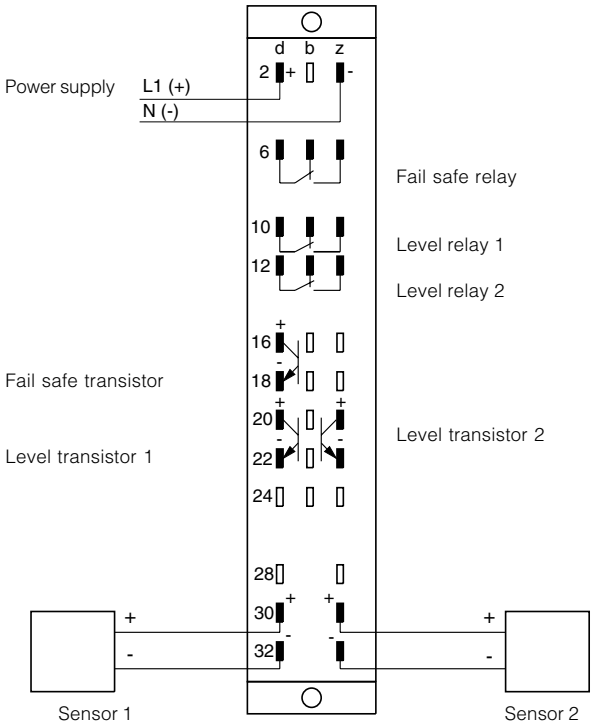
Module with multipoint connector acc. to DIN 41 612 for carrier (rear view)



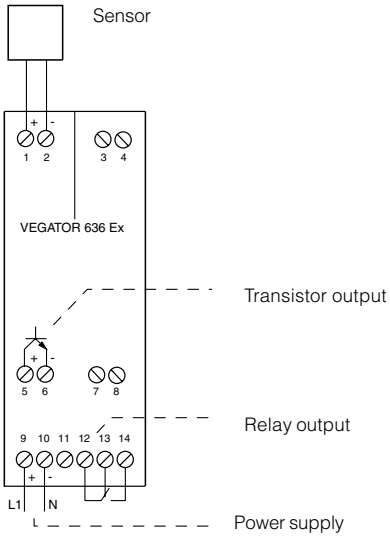
VEGATOR 536 Ex



VEGATOR 537 Ex



VEGATOR 636 Ex



Level and Pressure

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Netherlands
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Ukraine
USA/Canada/Mexico
United Arab. Emirates
Venezuela

Detailed information on our homepage www.vega.com

All statements relating to scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the latest information at the time of printing.

Technical data subject to alterations

2.25 027 / April 2001