Operating Instructions

VEGATOR 632

Signal conditioning instrument

Document ID:
35243

Signal
conditioning instruments
and communication

Contents

35243-EN-120228

Supplementary documentation

Information:
Supplementary documents appropriate to the ordered version come with the delivery. You can find them listed in chapter "*Product description*".

Editing status: 2012-02-20

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1 About this document

1.1 Function

This operating instructions manual provides all the information you need for mounting, connection and setup as well as important instructions for maintenance and fault rectification. Please read this information before putting the instrument into operation and keep this manual accessible in the immediate vicinity of the device.

1.2 Target group

This operating instructions manual is directed to trained qualified personnel. The contents of this manual should be made available to these personnel and put into practice by them.

1.3 Symbolism used

Information, tip, note
This symbol indicates helpful additional information.

Caution: If this warning is ignored, faults or malfunctions can result.
Warning: If this warning is ignored, injury to persons and/or serious damage to the instrument can result.
Danger: If this warning is ignored, serious injury to persons and/or destruction of the instrument can result.

Ex applications
This symbol indicates special instructions for Ex applications.

- **List**
  The dot set in front indicates a list with no implied sequence.

→ **Action**
This arrow indicates a single action.

1 **Sequence**
Numbers set in front indicate successive steps in a procedure.

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2 For your safety

2.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

2.2 Appropriate use

VEGATOR 632 is a universal signal conditioning instrument for connection of a level switch.

You can find detailed information on the application range in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

2.3 Warning about misuse

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

2.4 General safety instructions

This is a high-tech instrument requiring the strict observance of standard regulations and guidelines. The user must take note of the safety instructions in this operating instructions manual, the country-specific installation standards as well as all prevailing safety regulations and accident prevention rules.

The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

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2.5 CE conformity

This device fulfills the legal requirements of the applicable EC guidelines. By attaching the CE mark, VEGA provides a confirmation of successful testing. You can find the CE conformity declaration in the download area of www.vega.com.

2.6 Safety instructions for Ex areas

Please note the Ex-specific safety information for installation and operation in Ex areas. These safety instructions are part of the operating instructions manual and come with the Ex-approved instruments.

2.7 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfil this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"
- Chapter "*Disposal*"

3 Product description

3.1 Structure

Scope of delivery

The scope of delivery encompasses:

- VEGATOR 632 signal conditioning instrument
- Documentation
  - this operating instructions manual
  - Ex-specific "*Safety instructions*" (with Ex-versions)
  - if necessary, further certificates

Constituent parts

VEGATOR 632 consists of:

- VEGATOR 632 signal conditioning instrument

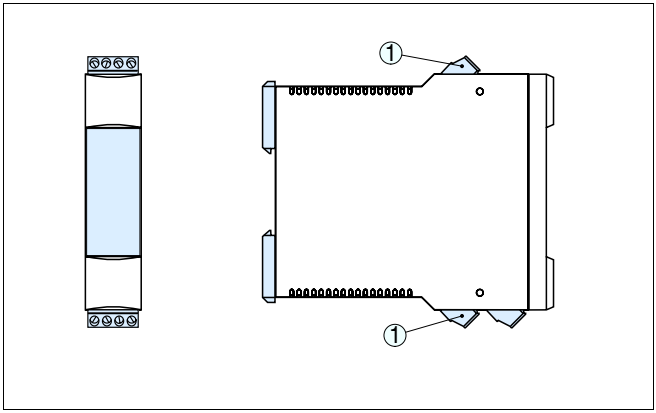

Fig. 1: VEGATOR 632

1 Pluggable terminal blocks

Type label

The type label contains the most important data for identification and use of the instrument:

- Article number
- Serial number
- Technical data
- Article numbers, documentation
- Information about connection and adjustment of the instrument

The serial number allows you to access the delivery data of the instrument via www.vega.com, "*VEGA Tools*" and "*serial number search*".

3.2 Principle of operation

Application area

VEGATOR 632 is a single signal conditioning instrument with two channels (relay) for processing the signals of conductive probes.

The following switching functions are possible:

- Single channel control (simple level detection)
- Two-point control (pump control)
- Two-channel control (two separate switching points)
- Four-channel control or combination of two-point and two-channel control (with two VEGATOR 632)

Functional principle

The VEGATOR 632 signal conditioning instrument powers connected sensors and simultaneously processes their measuring signals.

It delivers a small alternating current to the measuring cell via the signal cable. Electrolytic decomposition of the electrode rods and the medium is avoided by using alternating current.

The cable is connected to the measurement loop or the metallic vessel and the probe.

When the medium reaches the switching point of the sensor, the voltage on the sensor drops. The output relays then switch according to the set mode.

Voltage supply

Detailed information about the power supply can be found in chapter "*Technical data*".

3.3 Operation

The damping and the mode can be adjusted on the signal conditioning instrument via the slide switch. The instrument function can be preadjusted with a DIL switch block.

The switching point can be adjusted with a potentiometer.

3.4 Packaging, transport and storage

Packaging

Your instrument was protected by packaging during transport. Its capacity to handle normal loads during transport is assured by a test according to DIN EN 24180.

The packaging of standard instruments consists of environment-friendly, recyclable cardboard. For special versions, PE foam or PE foil is also used. Dispose of the packaging material via specialised recycling companies.

Transport

Transport must be carried out under consideration of the notes on the transport packaging. Nonobservance of these instructions can cause damage to the device.

Transport inspection

The delivery must be checked for completeness and possible transit damage immediately at receipt. Ascertained transit damage or concealed defects must be appropriately dealt with.

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Storage

Up to the time of installation, the packages must be left closed and stored according to the orientation and storage markings on the outside.

Unless otherwise indicated, the packages must be stored only under the following conditions:

- Not in the open
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration

Storage and transport temperature

- Storage and transport temperature see chapter "*Supplement - Technical data - Ambient conditions*"
- Relative humidity 20 … 85 %

4 Mounting

4.1 General instructions

Installation location

VEGATOR 632 signal conditioning instrument for mounting on carrier rail according to EN 60715 TH 35 x 7.5 or EN 60715 TH 35 x 15.

Front plate

The adjustment elements of VEGATOR 632 are protected under a hinged front plate against unauthorised or inadvertent adjustment.

Protected mounting location

VEGATOR 632 must be mounted outside the hazardous area in a switching cabinet (at least protection rating IP 55).

For moisture-protected mounting outside the switching cabinet, we offer an insulated protective housing with transparent cover (IP 65) for surface mounting.

4.2 Instructions for installation

Installation

A VEGATOR 632 in Ex version is an auxiliary, intrinsically safe instrument and may not be installed in explosion-endangered areas.

Min. distances

Please keep the following min. distances when mounting.

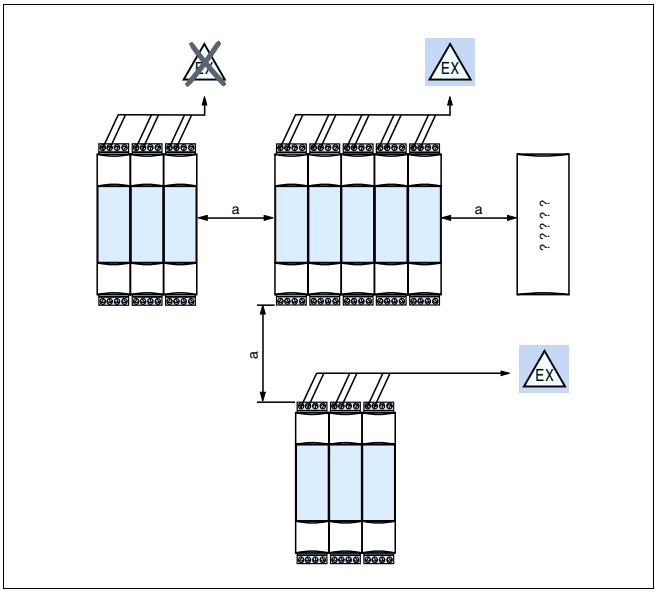


Fig. 2: Min. distances to other instruments

a Distance ≥ 50 mm (1.97 in)

Carrier rail mounting

Snap in the instrument vertically on a suitable carrier rail (EN 60715 TH 35 x 7.5 or EN 60715 TH 35 x 15).

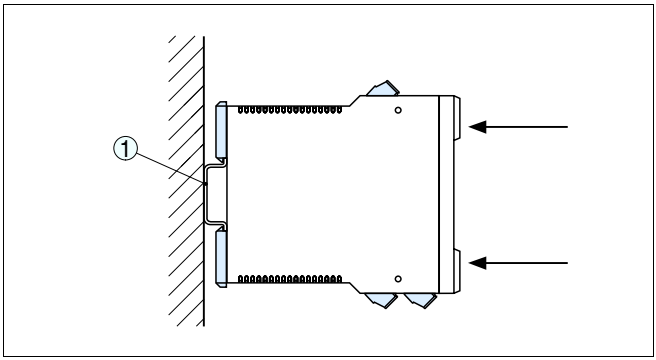


Fig. 3: Mounting of the signal conditioning instrument

1 Carrier rail EN 60715 TH 35

Dismounting

Dismount the instrument in the following sequence.

1 Switch off power supply

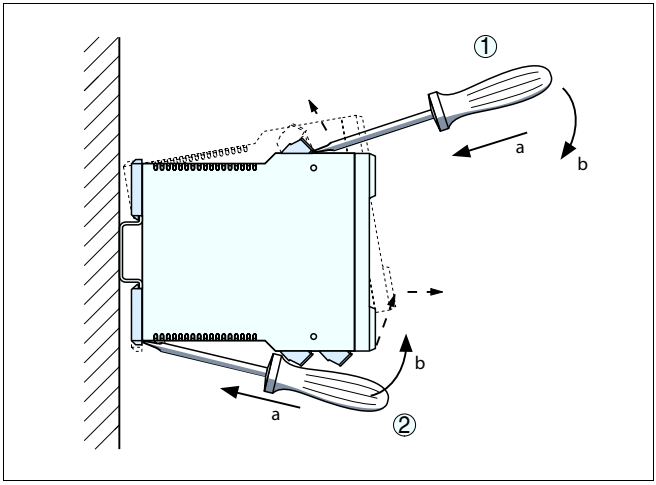


Fig. 4: Dismounting of the signal conditioning instrument

2 Remove the terminal blocks with a screwdriver ①

3 Open the slide with a screwdriver ②

4 Flip up the signal conditioning instrument and remove it from the carrier rail

5 Connecting to power supply

5.1 Preparing the connection

Note safety instructions

Always keep in mind the following safety instructions:

- Connect only in the complete absence of line voltage
- If overvoltage surges are expected, overvoltage arresters should be installed

Tip:
We recommend VEGA overvoltage arresters B61-300 (power supply VEGATOR 632) and B62-36G (sensor supply).

Take note of safety instructions for Ex applications

In hazardous areas you must take note of the respective regulations, conformity and type approval certificates of the sensors and power supply units.

Select power supply

The power supply can be 85 … 253 V AC, 50/60 Hz or 20 … 60 V DC.

Selecting connection cable

The operating voltage of VEGATOR 632 is connected with standard cable according to the national installation standards. The line resistance must be max. 25 Ω per wire. If electromagnetic interference is expected which is above the test values of EN 61326 for industrial areas, screened cable should be used.

Cable screening and grounding

If screened cable is necessary, connect the cable screen on both ends to ground potential. In the sensor, the screen must be connected directly to the internal ground terminal. The ground terminal on the outside of the housing must be connected to the potential equalisation (low impedance).

If potential equalisation currents are expected, the connection on the processing side must be made via a ceramic capacitor (e. g. 1 nF, 1500 V). The low frequency potential equalisation currents are thus suppressed, but the protective effect against high frequency interference signals remains.

Select connection cable for Ex applications

Take note of the corresponding installation regulations for Ex applications.

5.2 Connection procedure

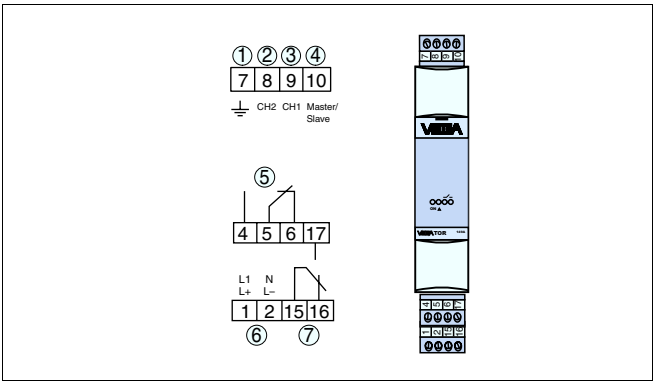


Fig. 5: Terminal assignment

1 Ground
2 Sensor input - Channel 1 (CH 1)
3 Sensor input - Channel 2 (CH 2)
4 Master/Slave
5 Level relay 1
6 Voltage supply
7 Level relay 2 or operating relay

Move on to electrical connection and proceed as follows:

1 Snap VEGATOR 632 onto the carrier rail
2 Connect the sensor cable to terminals 7 to 10 (see the following wiring plans)
3 Connect relay outputs (4 to 6 and 15 to 17)
4 Connect power supply (switched off) to terminal 1 and 2

The electrical connection is finished.

5.3 Wiring plan

Note:
In conductive vessels, the ground cable has contact to the grounded vessel via the process fitting.

In non-conductive vessels, the probe requires a ground rod which is connected to the ground terminal of VEGATOR 632.

Line monitoring

The line break monitoring or alarm function defines the function of the signal conditioning instrument in case of failure.

The line monitoring is required for probes with approval according to WHG (WRA) or Ex.

To realize a line monitoring, an additional electronics must be integrated in the connection housing of the probe.

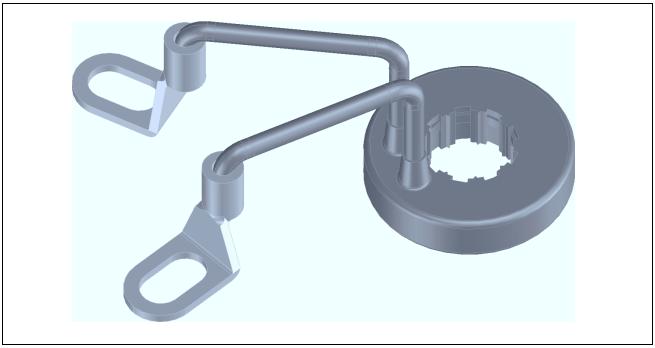


Fig. 6: Additional electronics for line break monitoring in conjunction with a conductive probe

1 Connect the eyelet according to the following illustration.

   Make sure that the eyelets have no contact to other metal parts.

2 Open one of the other terminals and attach the additional electronics.

3 Tighten the terminal.

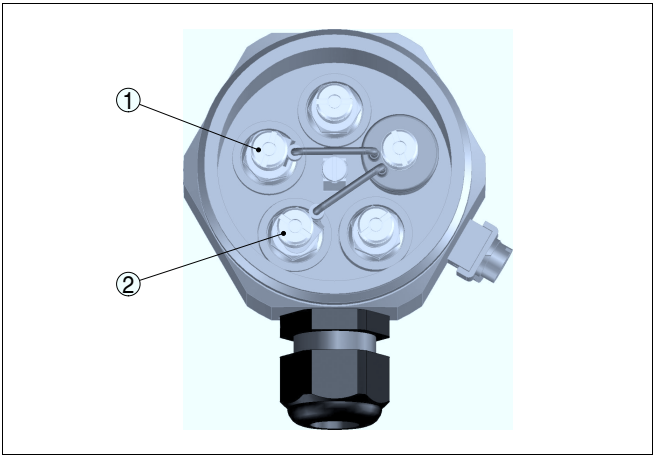


Fig. 7: Mounting of the additional electronics for line break monitoring

1 Connection to terminal 1 (ground rod = longest rod)
2 Connection to terminal 2 (max. rod = shortest rod)
3 Additional electronics for line break monitoring

If you are using a probe without additional electronics for line break monitoring, a fault signal will be triggered.

Keep in mind that in case of a fault signal also the switching output will be activated.

Only failures of channel 1 are monitored.

Take note of the operating instructions of the conductive probe.

Level detection in conductive vessels

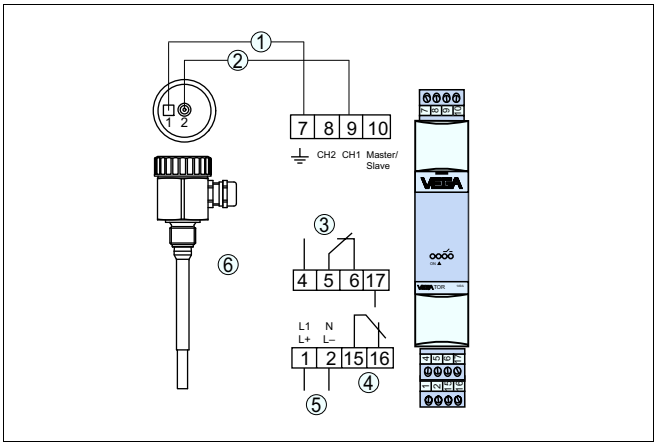


Fig. 8: Level detection in metallic (conductive) vessels

1 Ground
2 max. - channel 1 (CH 1)
3 Level relay 1
4 Level relay 2 or fail safe relay
5 Voltage supply
6 Probe, e.g. EL1

You can find detailed information under "*Set up - Single point control*" as well as under "*Switching examples*".

Level detection in non-conductive vessels

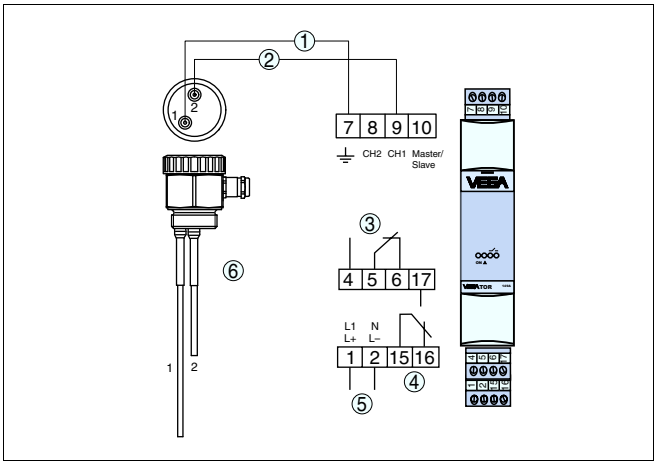


Fig. 9: Level detection in non-conductive vessels

1 Ground
2 max. - channel 1 (CH 1)
3 Level relay 1
4 Level relay 2 or fail safe relay
5 Voltage supply
6 Probe, e.g. EL3

You can find detailed information under "*Set up - Single point control*" as well as under "*Switching examples*".

Two-point control (min./ max. control)

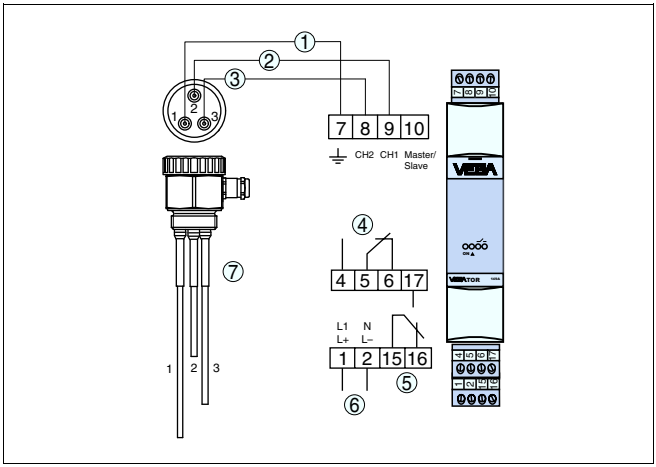


Fig. 10: Two-point control

1 Ground
2 max. - channel 1 (CH 1)
3 min. - channel 2 (CH 2)
4 Level relay 1
5 Level relay 2 or fail safe relay
6 Voltage supply
7 Probe, e.g. EL3

You can find detailed information under "*Set up - Two-point control*" as well as under "*Switching examples*".

Four-channel control with two signal conditioning instruments

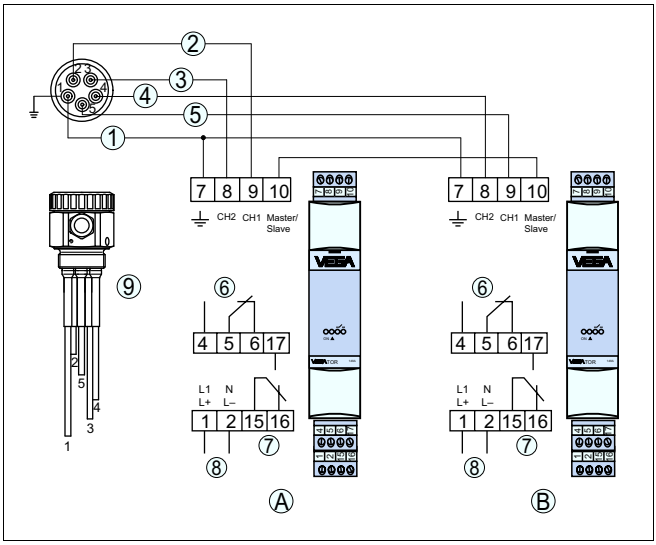


Fig. 11: Four-channel control with two signal conditioning instruments VEGATOR 632

1 Ground
2 max. - channel 1 (CH 1)
3 min. - channel 2 (CH 2)
4 min. - channel 2 (CH 2)
5 max. - channel 1 (CH 1)
6 Level relay 1
7 Level relay 2 or fail safe relay
8 Voltage supply
9 Probe, e.g. EL3
A Min./max. control (signal conditioning instrument 1 - Master)
B Min./max. control (signal conditioning instrument 2 - Slave)

You can find detailed information under "*Set up - Four-channel control*" as well as under "*Switching examples*".

6 Adjustment elements

6.1 Adjustment elements - Overview

The following adjustment elements are located below the cover.

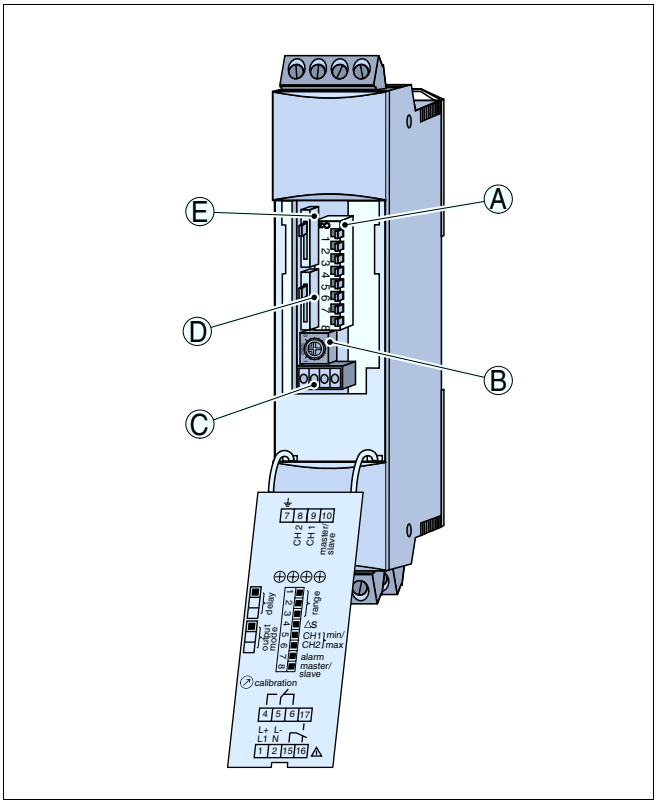


Fig. 12: VEGATOR 632 - Adjustment elements

A DIL switch block
B Potentiometer for switching point adjustment
C Control lamps
D Slid switch for mode adjustment
E Slide switch for setting the switching delay

DIL switch block (A) SIL switch block with 8 switches. The individual switches are assigned as follows:

(numbering from top to bottom)

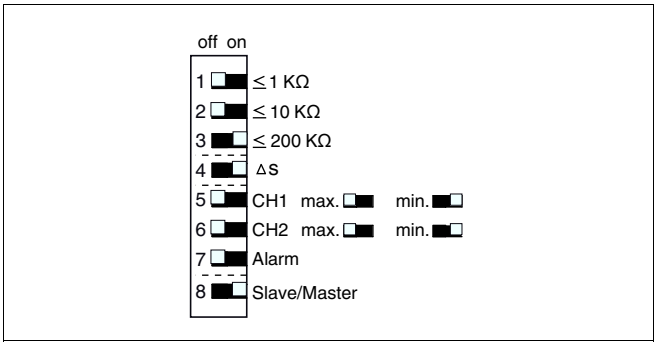


Fig. 13: DIL switch block (A)

1 Sensitivity adjustment - range up to 1 kΩ
2 Sensitivity adjustment - range up to 10 kΩ
3 Sensitivity adjustment - range up to 200 kΩ
4 Two-point control
5 Mode - channel 1 (CH 1)
6 Mode - channel 2 (CH 2)
7 Line monitoring (alarm)
8 Master/Slave adjustment

- A1 - Sensitivity adjustment - range up to 1 kΩ
- A2 - Sensitivity adjustment - range up to 10 kΩ
- A3 - Sensitivity adjustment - range up to 200 kΩ
- A4 - Two-point control
- A5 - Mode - Channel 1 (CH 1)
  - off: Max. detection or overflow protection
  - on: Min. detection or dry run detection
- A6 - Mode - Channel 2 (CH 2)
  - off: Max. detection or overflow protection
  - on: Min. detection or dry run detection
- A7 - Line monitoring (alarm)
- A8 - Master/Slave adjustment (on = Master)

Potentiometer for switching point adjustment (B)

A potentiometer for switching point adaptation is located below the cover of the signal conditioning instrument. With this potentiometer you can adapt the measuring system to the conductivity of the product.

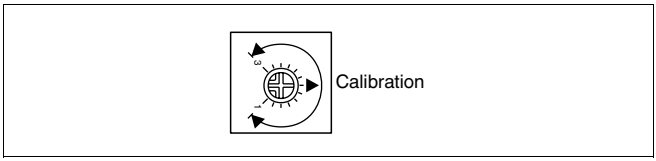


Fig. 14: Potentiometer for switching point adjustment (B)

Note:
When carrying out switching point adjustments keep in mind that there is a switching delay of 0.5 sec between the moment when the switching point is reached and the moment when the switching function is triggered. The potentiometer must therefore be turned slowly.

A possible additional switching delay should only be switched on after the adjustment.

Signal lamps (C)

Control lamps (LED) in the front plate indicate operation, switching status and fault signal.

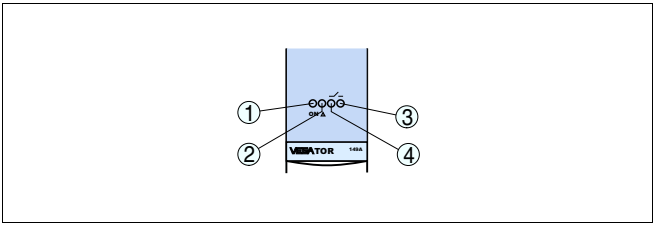


Fig. 15: Control lamps in the instrument front (C)

1 Control lamp - Operating voltage - green (gn)
2 Control lamp - Fault signal - red (rd)
3 Control lamp - Switching status channel 2 - yellow (ye)
4 Control lamp - Switching status channel 1 - yellow (ye)

- Green (gn)
  - Operating control lamp
  - Mains voltage on, instrument is operating
- Red (rd)
  - Failure lamp
  - Fault on the sensor circuit due to sensor failure or line break
  - If the fail safe relay is deenergized, the red failure lamp will light
- Yellow (ye)
  - Relay control lamps
  - The yellow relay control lamps react depending on the set mode (min./max.)
  - The relay control lamp generally indicates the activated (energized) condition of the relay
  - A dark relay control lamp means that the relay is deenergised

Slide switch for adjustment of the relay outputs (D)

3-step switch for mode adjustment of the second output relay. The individual switch positions are assigned as follows:

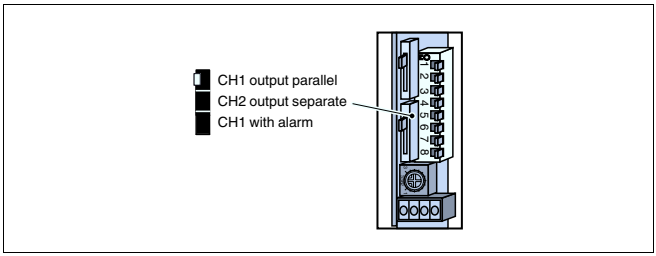


Fig. 16: Slide switch for adjustment of the relay outputs (D)

- CH 1 output parallel - Both relay outputs switch in parallel. The second relay (15 - 17) switches analogue to relay 1 (4 - 6)
- CH 2 output separate - Two-point control or two independent relay outputs. The second relay (15 - 17) switches independently of relay 1 (4 - 6)
- CH 1 with alarm - Fault signal with relay output 2. The second relay (4 - 6) triggers a fault signal.

Slide switch for setting the switching delay (E)

3-step switch for adjustment of the switching delay. The adjusted switching delay applies to the switch on and switch off delay.

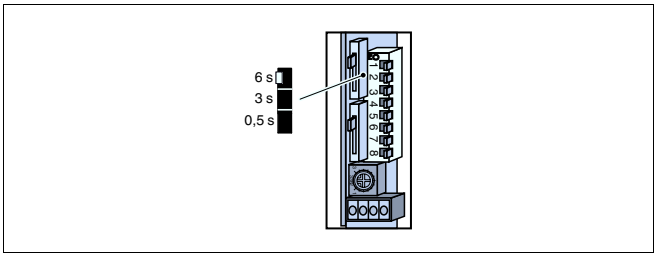


Fig. 17: Slide switch for setting the switching delay (E)

- 6 s
- 3 s
- 0.5 s

7 Set up - Single channel control (level detection)

7.1 Adjust relay function

Adjustment of the relay outputs (slide switch D)

3-step switch. The individual switch positions are assigned as follows:

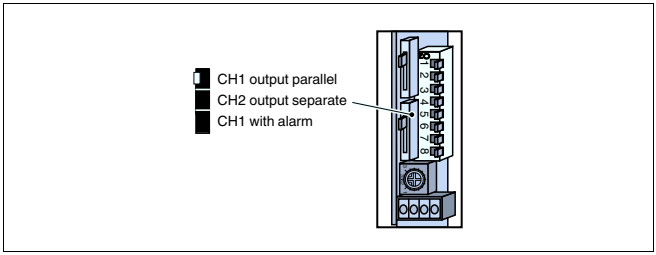


Fig. 18: Slide switch for adjustment of the relay outputs (D)

- CH 1 output parallel - Both relay outputs switch in parallel
- CH 2 output separate - Relay outputs switch separately
- CH 1 with alarm - Fault signal with relay output 2

The following charts provide an overview of the relay switching conditions and the control lamps depending on the adjusted mode and level.

CH 1 output parallel

Level detection with one switching point

- Min. (dry run protection) or mac. (overfill protection)
- Channel 1 (relay 1) and channel 2 (relay 2) switch in parallel (CH 1 output parallel)

Mode	Level	Channel 1	Channel 2	Control lamps
max.				
max.				
min.				

Mode	Level	Channel 1	Channel 2	Control lamps
min.				

CH 2 output separate

In this switch position, channel 2 (relay 2) has no switching function and remains deengerised.

Switching reaction of channel 1 see "*CH 1 output parallel*".

CH 1 with alarm

Level detection with one switching point - Fault signal with relay output 2

- Min. (dry run protection) or mac. (overfill protection)
- Channel 1 (switching relay) and channel 2 (fail safe relay) - (CH 1 with alarm)

Mode	Level	Channel 1	Channel 2	Control lamps
max.				
max.				
min.				
min.				
Malfunction	any			
Voltage interruption	any			

7.2 Sensitivity adjustment

Medium: Non-conductive liquids

Standard adjustment for conductive liquids.

Specifications:

The probe is covered with medium by at least 1 cm.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

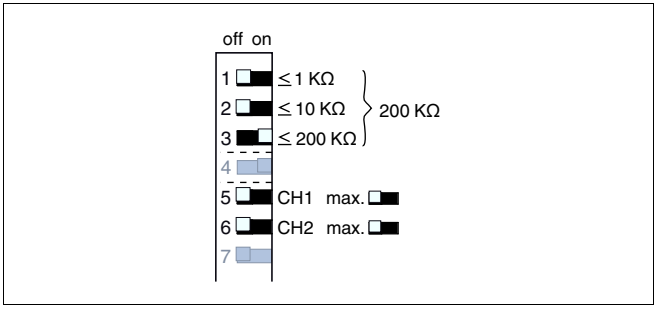


Fig. 53: Medium: Conductive liquids up to 200 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

5 If the relay output does not change, you have to switch to the next range (10 kΩ).

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Medium: Liquids in the resistance range up to 10 kΩ

Adjustment in liquids with resistance range up to 10 kΩ

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

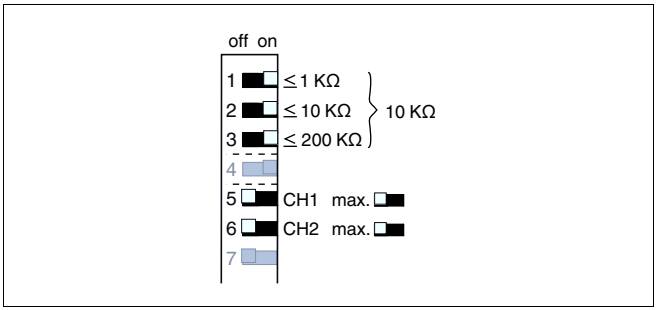


Fig. 54: Medium: Liquids in the resistance range up to 10 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

5 If the relay output does not change, you have to switch to the next range (1 kΩ).

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Medium: Liquids in the resistance range up to 1 kΩ

Adjustment in liquids with resistance range up to 1 kΩ

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

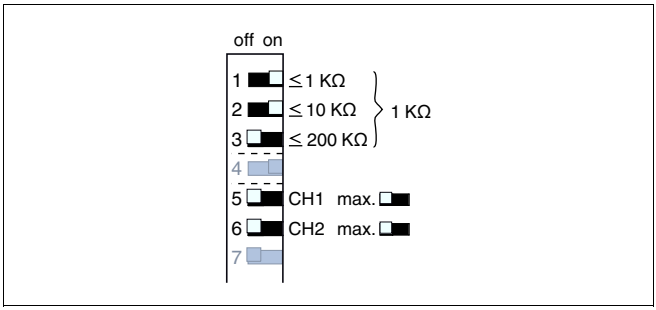


Fig. 55: Medium: Liquids in the resistance range up to 1 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Note:
A failure exists, if the relay output does not switch over even in the last range. You will find instructions for fault rectification in chapter "*Maintenance and fault rectification*".

7.3 Adjust switching delay

Adjustment of the switching delay (slide switch E)

Adjust the switching delay for the instrument with the slide switch (E).

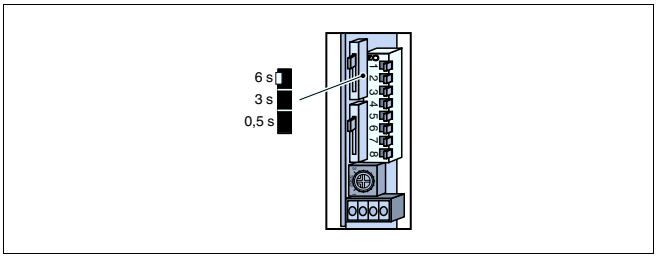


Fig. 56: Slide switch (E) for setting the switching delay

The adjusted switching delay refers to the switching function of the relay and applies only to the switch on delay.

Note:
When carrying out switching point adjustments keep in mind that there is a switching delay of 0.5 sec between the moment when the switching point is reached and the moment when the switching function is triggered. The potentiometer must therefore be turned slowly.

A possible additional switching delay should only be switched on after the adjustment.

The following switching delays can be selected with the 3-step switch.

- 6 s
- 3 s
- 0.5 s

7.4 Activate line break monitoring

The line break monitoring or alarm function defines the function of the instrument in case of failure.

If you are using a probe without line break monitoring, a fault signal will be triggered. In this case, set the switch (7) to off.

Only failures of channel 1 are monitored.

A failure is signalled via the red control lamp on the front plate.

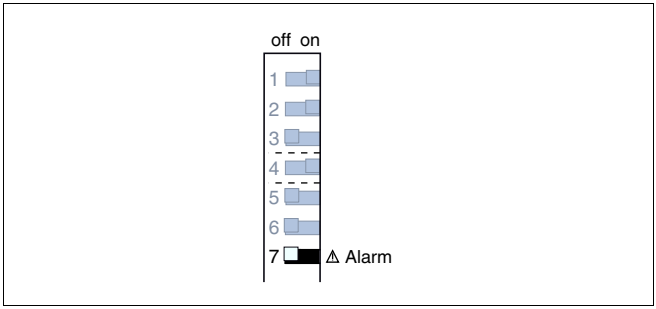


Fig. 57: Switch block (A) with switch (7) for activation of the line break monitoring (alarm)

You find detailed information on how to trigger a fault signal via the second relay output in the previous chapter "*Adjust relay function*".

7.5 Master/Slave function

Definition of the instrument as Master or Slave (DIL switch block A)

Adjust the instrument as Master with switch 8 of the DIL switch block (A).

8 Set up - Two-point control Δs (pump control)

8.1 Adjust relay function

Adjustment of the relay outputs (slide switch D)

3-step switch. The individual switch positions are assigned as follows:

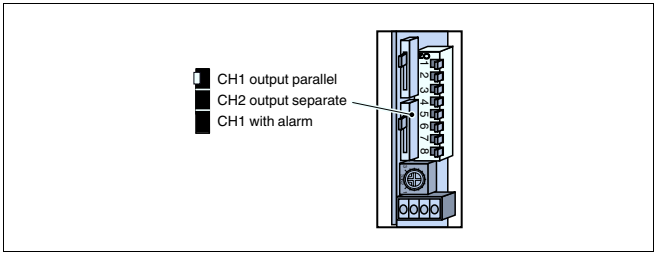


Fig. 58: Slide switch for adjustment of the relay outputs (D)

- CH 1 output parallel - Both relay outputs switch in parallel
- CH 2 output separate - Relay outputs switch separately
- CH 1 with alarm - Fault signal with relay output 2

The following charts provide an overview of the relay switching conditions and the control lamps depending on the adjusted mode and level.

CH 1 output parallel

Output relay 2 operates like output relay 1. The function of the two output relays is the same.

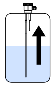
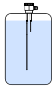
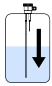
Switching condition of the two channels see "*CH 2 output separate*".

CH 2 output separate

Two-point control (pump control) Δs - Overfill protection (max.)
Specifications:

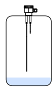
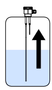
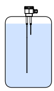
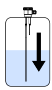
- Overfill protection (max.) - DIL switch block (A) switch 5 and 6 to off
- Channel 1 (relay 1) and channel 2 (relay 2) switch separately (the respective mode is selectable for each relay)
- Two-point control (pump control) - DIL switch block (A) switch 4 to on (Δs)

Mode	Level	Channel 1	Channel 2	Control lamps
Two-point control - max.				

Mode	Level	Channel 1	Channel 2	Control lamps
Two-point control - max.		4 5 6	17 15 16	gn rd ye ye ☼ ● ☼ ☼
Two-point control - max.		4 5 6	17 15 16	gn rd ye ye ☼ ● ● ●
Two-point control - max.		4 5 6	17 15 16	gn rd ye ye ☼ ● ● ●
Two-point control - max.		4 5 6	17 15 16	gn rd ye ye ☼ ● ☼ ☼

Two-point control (pump control) Δs - Dry run protection (min.)
Specifications:

- Dry run protection (min.) - DIL switch block (A) switch 5 and 6 to on
- Channel 1 (relay 1) and channel 2 (relay 2) switch separately (CH 2 output separate)
- Two-point control (pump control) - DIL switch block (A) switch 4 to on (Δs)

Mode	Level	Channel 1	Channel 2	Control lamps
Two-point control - min.		4 5 6	17 15 16	gn rd ye ye ☼ ● ● ●
Two-point control - min.		4 5 6	17 15 16	gn rd ye ye ☼ ● ● ●
Two-point control - min.		4 5 6	17 15 16	gn rd ye ye ☼ ● ☼ ☼
Two-point control - min.		4 5 6	17 15 16	gn rd ye ye ☼ ● ☼ ☼

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Mode	Level	Channel 1	Channel 2	Control lamps
Two-point control - min.				

CH 1 with alarm

Level detection with one switching point - Fault signal with relay output 2
Switching reaction of channel 1 see "*CH 2 output separate*".

- Dry run protection (min.) or overfill protection (max.)
- Channel 1 (switching relay) and channel 2 (fail safe relay) - (CH 1 with alarm)

8.2 Adjustment

Adjustment with conductive liquids

Standard adjustment for conductive liquids.

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

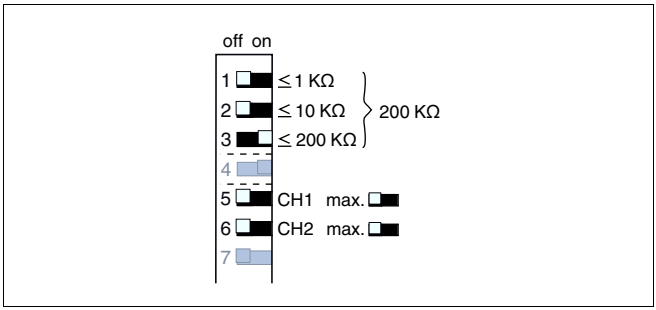


Fig. 95: Conductive liquids up to 200 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

5 If the relay output does not change, you have to switch to the next range.

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Resistance range up to 10 kΩ

Adjustment in liquids with resistance range up to 10 kΩ.

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

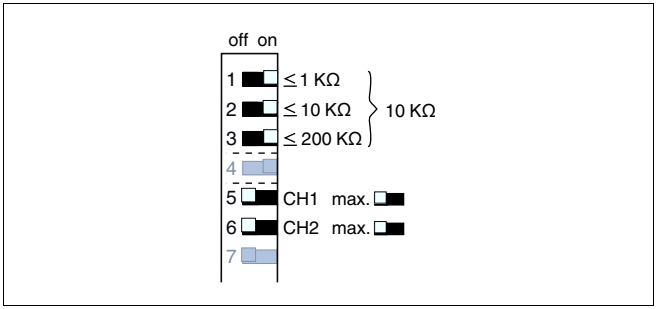


Fig. 96: Resistance range up to 10 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

5 If the relay output does not change, you have to switch to the next range.

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Resistance range up to 1 kΩ

Adjustment in liquids with resistance range up to 1 kΩ.

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

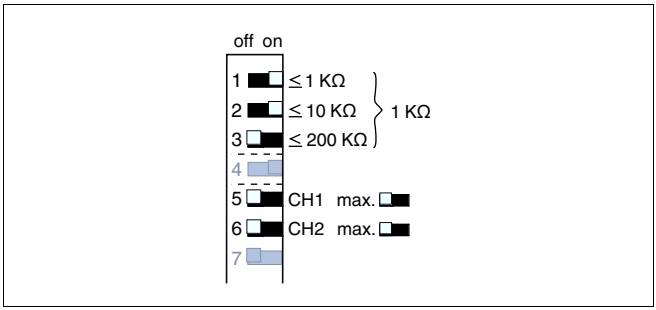


Fig. 97: Resistance range up to 1 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Note:
A failure exists, if the relay output does not switch over even in the last range. You will find instructions for fault rectification in chapter "*Maintenance and fault rectification*".

8.3 Adjust switching delay

Adjustment of the switching delay (slide switch E)

Adjust the switching delay for the instrument with the slide switch (E).

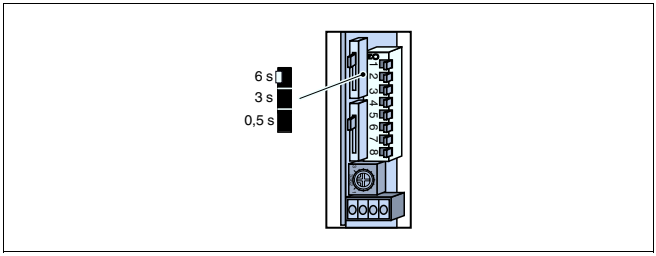


Fig. 98: Slide switch (E) for setting the switching delay

The adjusted switching delay refers to the switching function of the relay and applies only to the switch on delay.

Note:
When carrying out switching point adjustments keep in mind that there is a switching delay of 0.5 sec between the moment when the switching point is reached and the moment when the switching function is triggered. The potentiometer must therefore be turned slowly.

A possible additional switching delay should only be switched on after the adjustment.

The following switching delays can be selected with the 3-step switch.

- 6 s
- 3 s
- 0.5 s

8.4 Activate line break monitoring

The line break monitoring or alarm function defines the function of the instrument in case of failure.

If you are using a probe without line break monitoring, a fault signal will be triggered. In this case, set the switch (7) to off.

Only failures of channel 1 are monitored.

A failure is signalled via the red control lamp on the front plate.

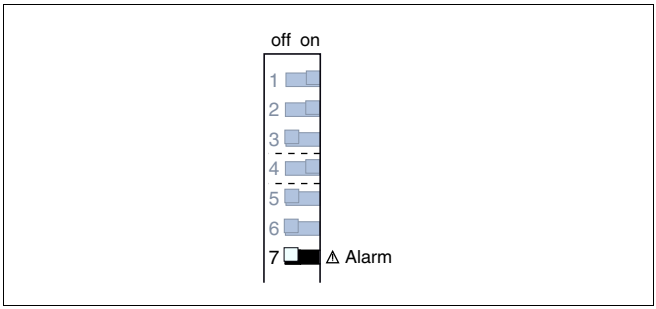


Fig. 99: Switch block (A) with switch (7) for activation of the line break monitoring (alarm)

You find detailed information on how to trigger a fault signal via the second relay output in the previous chapter "*Adjust relay function*".

8.5 Master/Slave function

Definition of the instrument as Master or Slave (DIL switch block A)

Adjust the instrument as Master with switch 8 of the DIL switch block (A).

9 Set up - Two-channel control

9.1 Adjust relay function

Adjustment of the relay outputs (slide switch D)

3-step switch. The individual switch positions are assigned as follows:

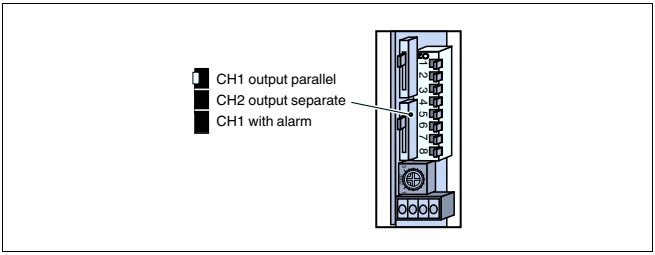


Fig. 100: Slide switch for adjustment of the relay outputs (D)

- CH 1 output parallel - Both relay outputs switch in parallel
- CH 2 output separate - Relay outputs switch separately
- CH 1 with alarm - Fault signal with relay output 2

The following charts provide an overview of the relay switching conditions and the control lamps depending on the adjusted mode and level.

CH 1 output parallel

Output relay 2 operates like output relay 1. The function of the two output relays is the same.

Switching reaction of the two channels see "*CH 2 output separate*".

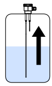
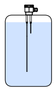
Not useful for two-channel control.

CH 2 output separate

Two-channel control - max./min.

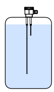
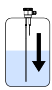
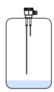
Specifications:

- Channel 1: Overfill protection (max.) DIL switch block (A) switch 5 to off
- Channel 2: Dry run protection (min.) DIL switch block (A) switch 6 to on
- Channel 1 (relay 1) and channel 2 (relay 2) switch separately (CH 2 output separate)
- Two-channel control (two separate switching points) - DIL switch block (A) switch 4 to off

Mode	Level	Channel 1	Channel 2	Control lamps
max. - min.		4 5 6	17 15 16	gn rd ye ye
max. - min.		4 5 6	17 15 16	gn rd ye ye
max. - min.		4 5 6	17 15 16	gn rd ye ye

Two-channel control - min./max.
Specifications:

- Channel 1: Dry run protection (min.) - DIL switch block (A) switch 5 to on
- Channel 2: Overfill protection (max.) - DIL switch block (A) switch 6 to off
- Channel 1 (relay 1) and channel 2 (relay 2) switch separately (CH 2 output separate)
- Two-channel control (two separate switching points) - DIL switch block (A) switch 4 to off

Mode	Level	Channel 1	Channel 2	Control lamps
min. - max.		4 5 6	17 15 16	gn rd ye ye
min. - max.		4 5 6	17 15 16	gn rd ye ye
min. - max.		4 5 6	17 15 16	gn rd ye ye

CH 1 with alarm

Level detection with one switching point - Fault signal with relay output 2
Switching reaction of channel 1 see "*CH 2 output separate*".

Not useful for two-channel control.

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9.2 Adjustment

Standard adjustment for conductive liquids.

Adjustment with conductive liquids

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

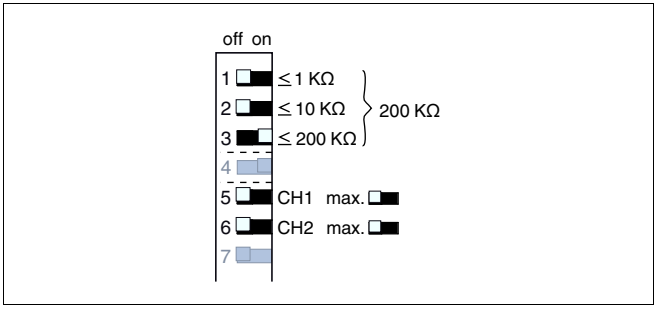

Fig. 125: Conductive liquids up to 200 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

5 If the relay output does not change, you have to switch to the next range.

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Resistance range up to 10 kΩ

Adjustment in liquids with resistance range up to 10 kΩ.

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

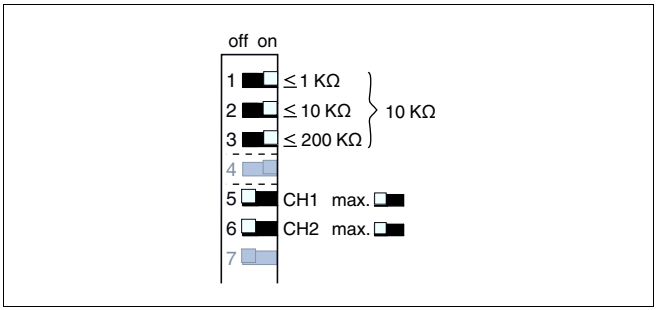

Fig. 126: Resistance range up to 10 kΩ

2 Turn potentiometer (B) to complete left position

3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

5 If the relay output does not change, you have to switch to the next range.

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Resistance range up to 1 kΩ

Adjustment in liquids with resistance range up to 1 kΩ.

Specifications:

The probe is covered with medium.

1 Set DIL switch 1 to 3 on the DIL switch block (A) according to the following illustration

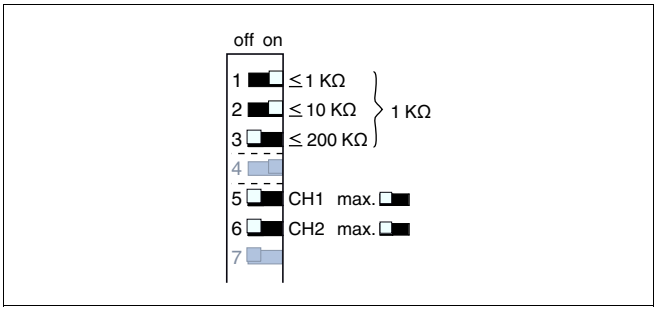

Fig. 127: Resistance range up to 1 kΩ

2 Turn potentiometer (B) to complete left position

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3 Turn potentiometer (B) slowly clockwise until the relay output switches and the yellow control lamp changes condition

4 Turn the potentiometer approximately 15° in the same direction

If the relay output has switched, empty the vessel until the electrode is uncovered.

The relay output must now switch again.

Note:
A failure exists, if the relay output does not switch over even in the last range. You will find instructions for fault rectification in chapter "*Maintenance and fault rectification*".

9.3 Adjust switching delay

Adjustment of the switching delay (slide switch E)

Adjust the switching delay for the instrument with the slide switch (E).

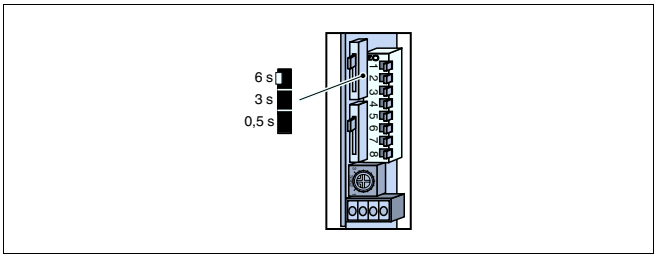

Fig. 128: Slide switch (E) for setting the switching delay

The adjusted switching delay refers to the switching function of the relay and applies only to the switch on delay.

Note:
When carrying out switching point adjustments keep in mind that there is a switching delay of 0.5 sec between the moment when the switching point is reached and the moment when the switching function is triggered. The potentiometer must therefore be turned slowly.

A possible additional switching delay should only be switched on after the adjustment.

The following switching delays can be selected with the 3-step switch.

- 6 s
- 3 s
- 0.5 s

9.4 Activate line break monitoring

The line break monitoring or alarm function defines the function of the instrument in case of failure.

If you are using a probe without line break monitoring, a fault signal will be triggered. In this case, set the switch (7) to off.

Only failures of channel 1 are monitored.

A failure is signalled via the red control lamp on the front plate.

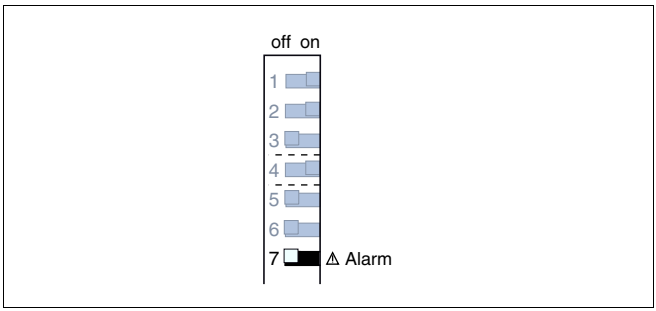

Fig. 129: Switch block (A) with switch (7) for activation of the line break monitoring (alarm)

You find detailed information on how to trigger a fault signal via the second relay output in the previous chapter "*Adjust relay function*".

9.5 Master/Slave function

Definition of the instrument as Master or Slave (DIL switch block A)

Adjust the instrument as Master with switch 8 of the DIL switch block (A).

10 Set up - Four-channel control

10.1 General information

You require two VEGATOR 632 signal conditioning instruments for a four-channel control.

10.2 Adjust relay function

Depending on the switching function of the signal conditioning instrument.

See single channel, two-point or two-channel control.

10.3 Adjustment

Depending on the switching function of the signal conditioning instrument.

See single channel, two-point or two-channel control.

10.4 Adjust switching delay

See single channel, two-point or two-channel control.

10.5 Activate line break monitoring

The line break monitoring or alarm function defines the function of the instrument in case of failure.

If you are using a probe without line break monitoring, a fault signal will be triggered. In this case, set the switch (7) to off.

Only failures of channel 1 are monitored.

A failure is signalled via the red control lamp on the front plate.

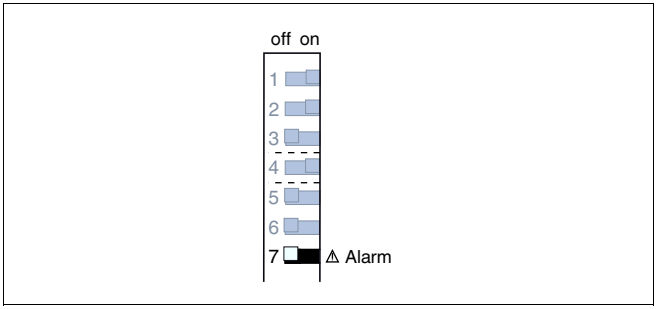

Fig. 130: Switch block (A) with switch (7) for activation of the line break monitoring (alarm)

You find detailed information on how to trigger a fault signal via the second relay output in the previous chapter "*Adjust relay function*".

10.6 Master/Slave function

Definition of the instrument as Master or Slave (DIL switch block A)

When connecting two VEGATOR 632 signal conditioning instruments, one instrument must be configured as reference power supply unit (Master) and one as Slave.

Adjust the respective instrument as Master or Slave with switch 8 of the DIL switch block (A).

To ensure that the two VEGATOR 632 can synchronize their phases, a connection cable is required between the two signal conditioning instruments.

Connect this connection cable according to the following illustration between terminals 10 of the signal conditioning instruments.

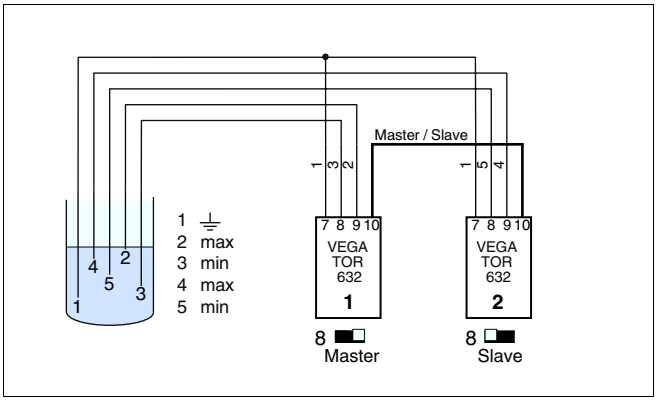

Fig. 131: Connection cable between terminals 10

11 Switching examples

11.1 Single channel operation

Single channel operation without alarm monitoring

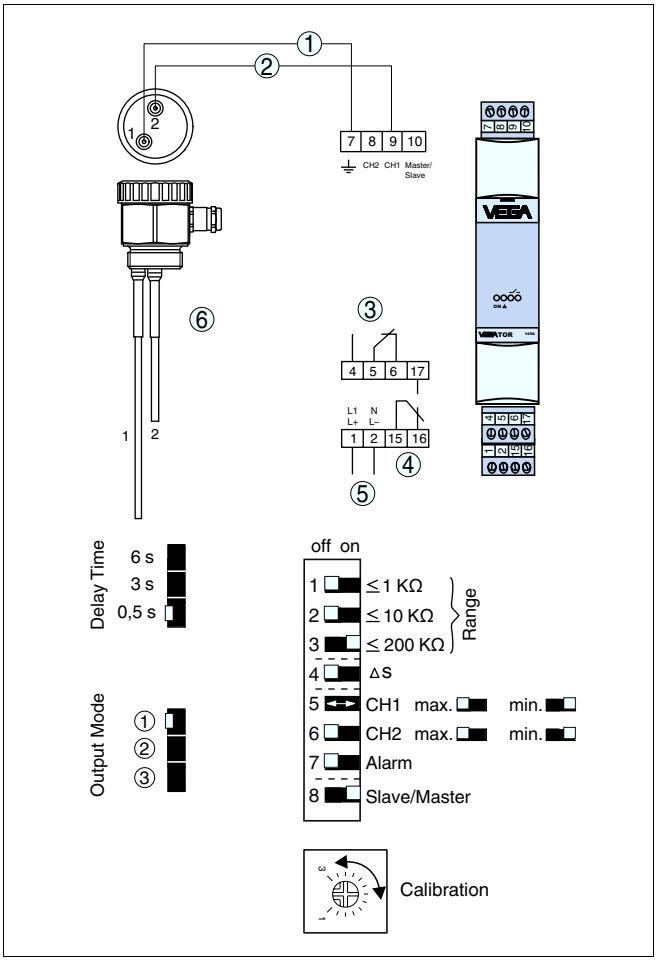

Fig. 132: Level detection - Single channel operation without alarm monitoring with ground electrode

1 *Ground*
2 *max. - channel 1 (CH 1)*
3 *Level relay*
4 *Level relay or fail safe relay*
5 *Voltage supply*
6 *Probe, e.g. EL1*

Single channel operation with alarm monitoring

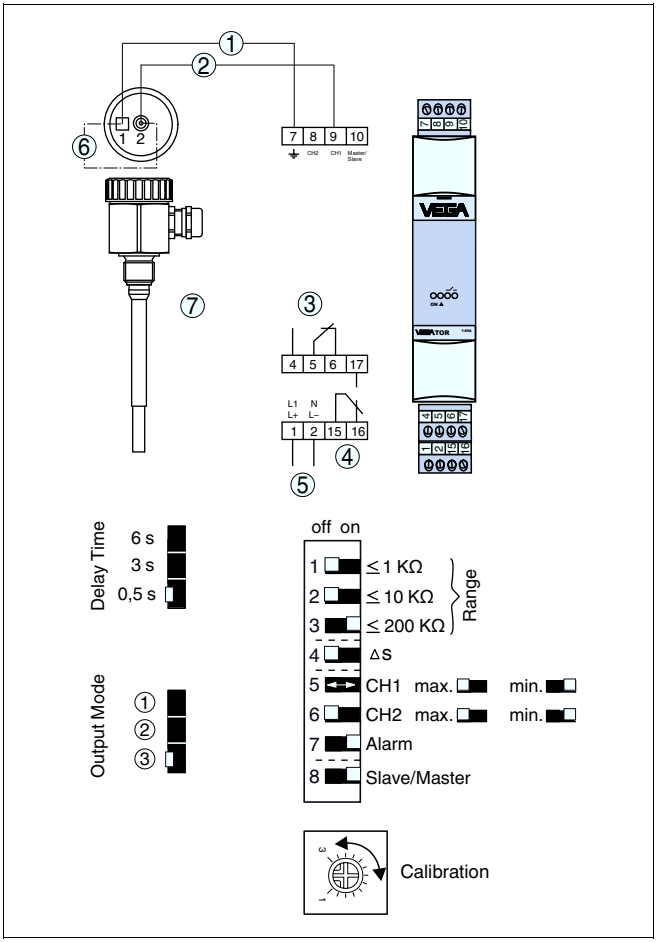

Fig. 133: Level detection - Single channel operation with alarm monitoring

1 *Ground*
2 *max. - channel 1 (CH 1)*
3 *Level relay*
4 *Level relay or fail safe relay*
5 *Voltage supply*
6 *Line break monitoring*
7 *Probe, e.g. EL3*

11.2 Two-channel operation

Level detection - Two-channel operation (outputs separate)

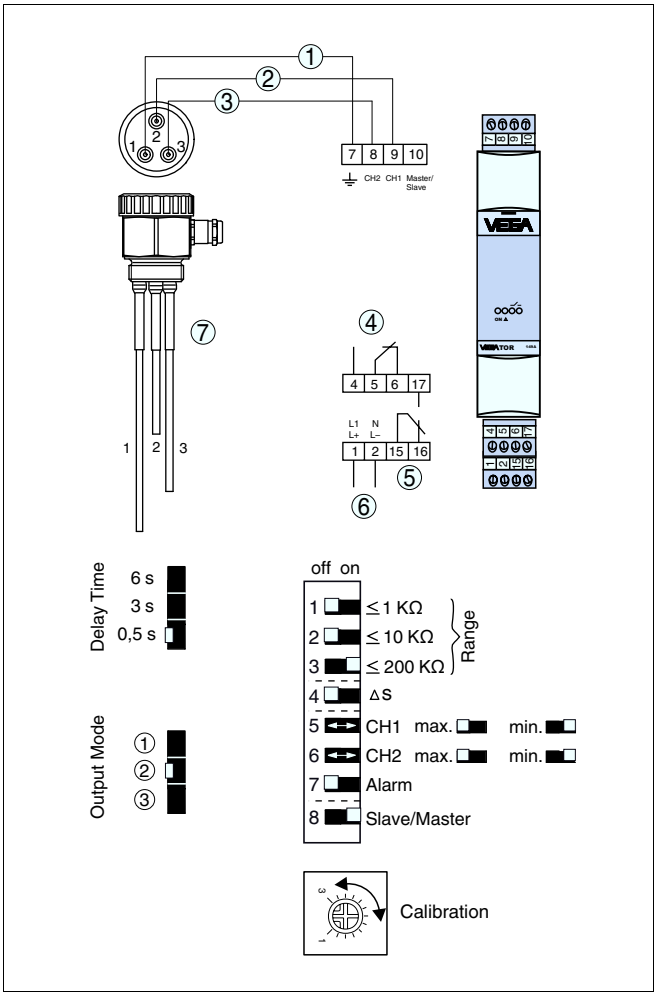

Fig. 134: Level detection - Two-channel operation, outputs separate

1 *Ground*
2 *max. - channel 2 (CH 2)*
3 *min. - channel 1 (CH 1)*
4 *Level relay 1*
5 *Level relay 2 or fail safe relay*
6 *Voltage supply*
7 *Probe, e.g. EL3*

11.3 Two-point control

Two-point control (Δs) with alarm monitoring

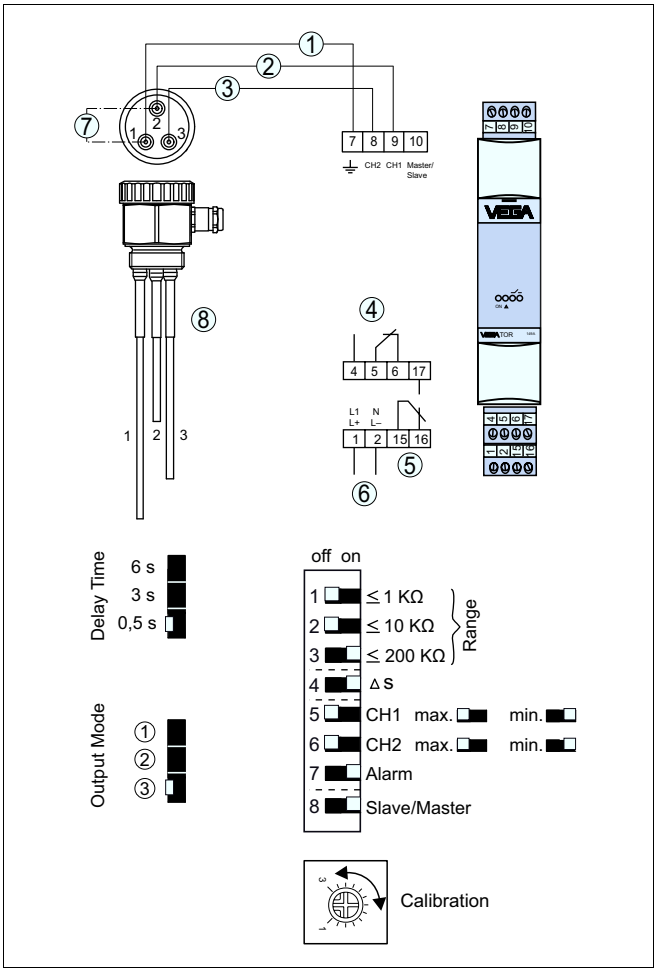

Fig. 135: Two-point control (Δs) with alarm monitoring

1 *Ground*
2 *max. - channel 2 (CH 2)*
3 *min. - channel 1 (CH 1)*
4 *Level relay 1*
5 *Level relay 2 or fail safe relay*
6 *Voltage supply*
7 *Line break monitoring*
8 *Probe, e.g. EL3*

Two-point control (Δs) without alarm monitoring

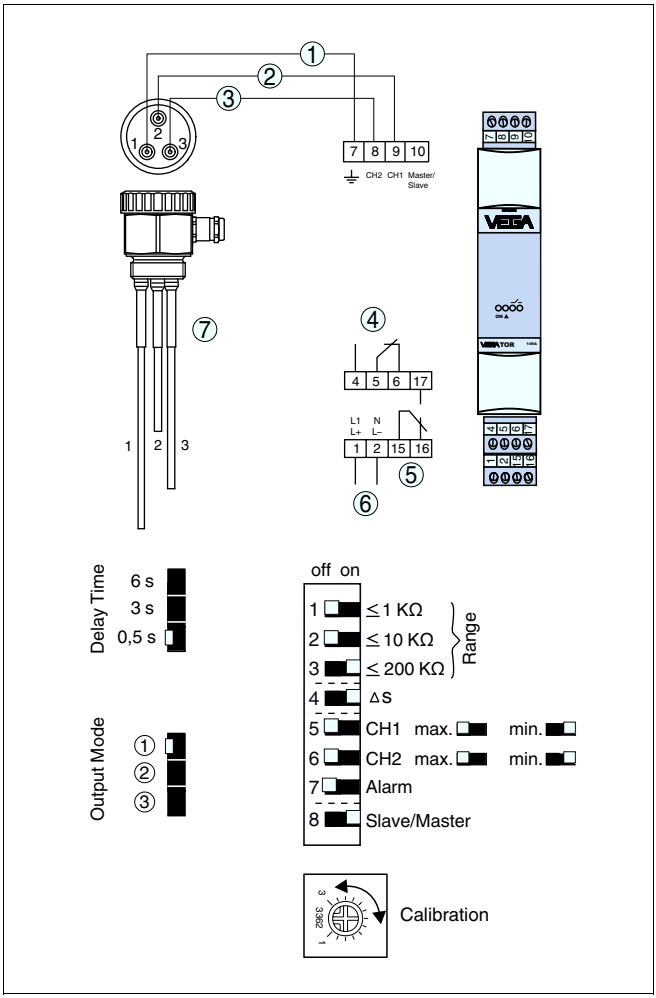

Fig. 136: Two-point control (Δs) without alarm monitoring, outputs parallel

1 *Ground*
2 *max. - channel 2 (CH 2)*
3 *min. - channel 1 (CH 1)*
4 *Level relay 1*
5 *Level relay 2 or fail safe relay*
6 *Voltage supply*
7 *Probe, e.g. EL3*

11.4 Four-channel operation

Four-channel operation - min./max.

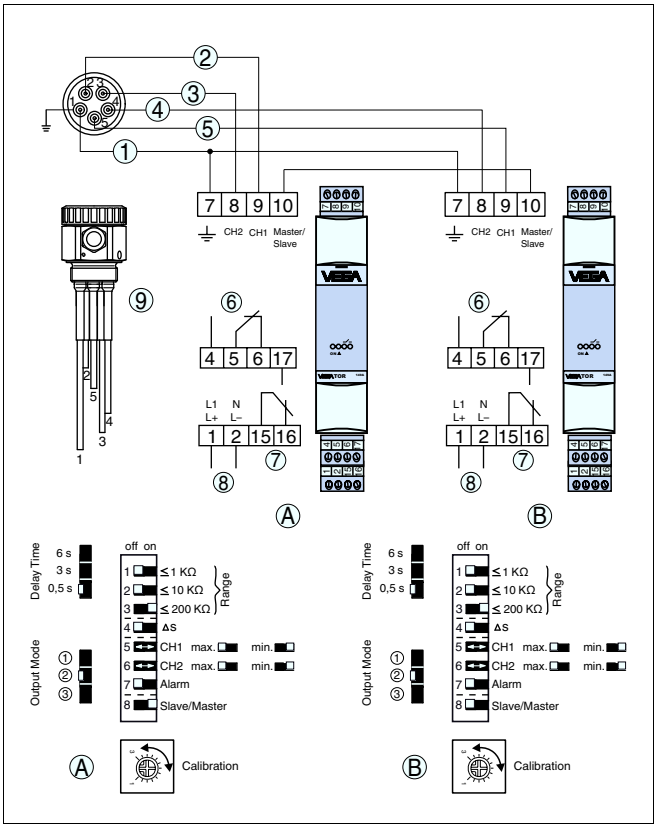

Fig. 137: Four-channel operation - min./max. individual combination

1 *Ground*
2 *max. - channel 1 (CH 1)*
3 *min. - channel 1 (CH 1)*
4 *min. - channel 2 (CH 2)*
5 *max. - channel 2 (CH 2)*
6 *Level relay 1*
7 *Level relay 2 or fail safe relay*
8 *Voltage supply*
9 *Probe, e.g. EL3*

11.5 Two-point control and two-channel operation

Two-point control without alarm monitoring and two-channel operation, outputs separate

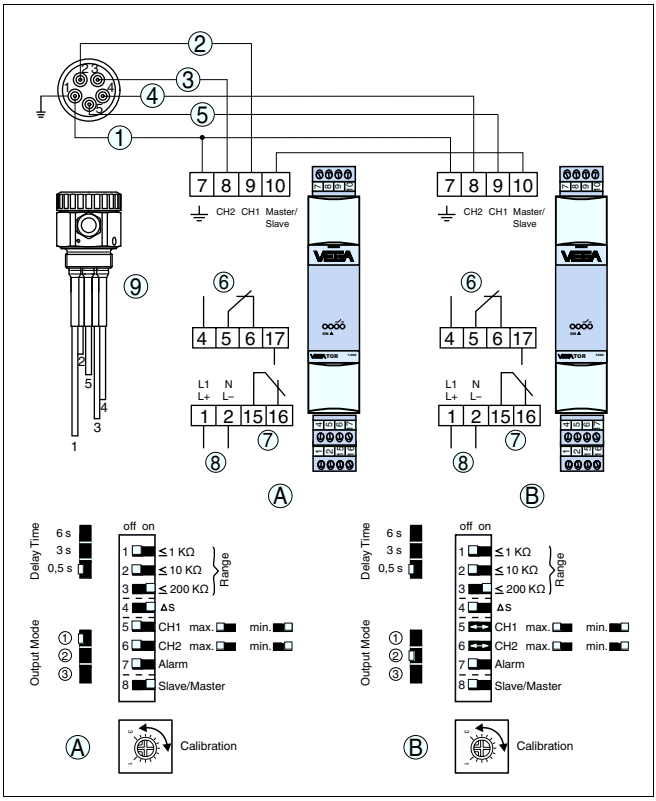

Fig. 138: Two-point control without alarm monitoring and two-channel operation, outputs separate

1 *Ground*
2 *max. - channel 1 (CH 1)*
3 *min. - channel 1 (CH 1)*
4 *min. - channel 2 (CH 2)*
5 *max. - channel 2 (CH 2)*
6 *Level relay 1*
7 *Level relay 2 or fail safe relay*
8 *Voltage supply*
9 *Probe, e.g. EL3*

12 Maintenance and fault rectification

12.1 Maintaining

If the instrument is used properly, no special maintenance is required in normal operation.

12.2 Remove interferences

Failure reasons

A maximum of reliability is ensured. Nevertheless, faults can occur during operation. These may be caused by the following, e.g.:

- Measured value from sensor not correct
- Voltage supply
- Interference on the cables

Fault rectification

The first measure to be taken is to check the input and output signals. The procedure is described as follows. In many cases the causes can be determined this way and faults can be easily rectified.

24 hour service hotline

Should these measures not be successful, please call in urgent cases the VEGA service hotline under the phone no. **+49 1805 858550**.

The hotline is available to you 7 days a week round-the-clock. Since we offer this service world-wide, the support is only available in the English language. The service is free of charge, only the standard telephone costs will be charged.

Malfunction

? The red failure control lamp (LED) of the signal conditioning instrument lights

- Sensor not connected correctly

→ Check the electrical connection by means of the wiring plans

- Line break

→ Check the electrical connection cables from the probe to the signal conditioning instrument

- Probe without line break monitoring

→ Check if in the sensor housing between terminals 1 and 2 the electronics for line break monitoring is mounted. If the probe has no line break monitoring, set the switch for line break monitoring (alarm) on the signal conditioning instrument to off.

In Ex systems, make sure that the Ex protection is not compromised by the possible use of measuring instruments.

? The signal conditioning instrument does not switch when the respective probe is covered or uncovered

- Operating voltage missing (green control lamp is off)

→ Check the electrical connection cables

- Signal conditioning instrument defective

→ Exchange VEGATOR 632

- Probe mechanically damaged

→ Exchange probe

- Conductivity of the product too low

→ Check if the conductivity value of your product is at least 7.5 µS/cm

- Welded contacts - for example after a shortcircuit

→ Exchange VEGATOR 632. If necessary, integrate a fuse into the contact circuit

? Wrong switching function of the signal conditioning instrument.

- Wrong setting of the change over switch for the level signal

→ Set the change over switch for the level signal correctly. See chapter "*Adjustment*".

12.3 Function test

Simulation of a fault signal

For simulation of a fault signal you can remove the upper plug connection from VEGATOR 632.

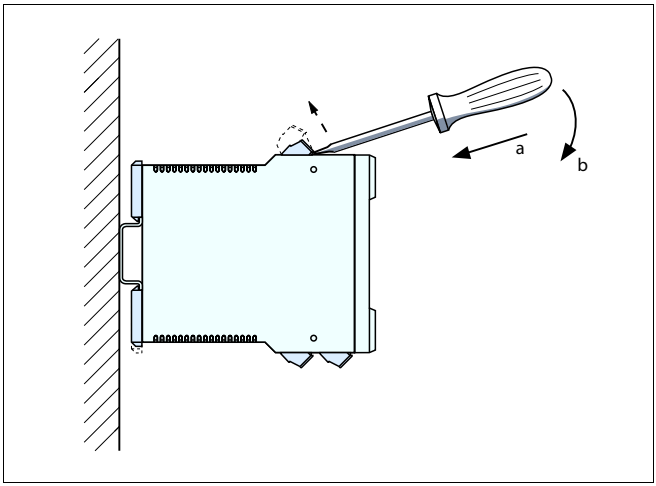

Fig. 139: Function test

The instruments signals a failure and the switching relays take on deenergized (safe) condition.

Caution:
Take note that when switching over the relay output also the connected instruments can be energized.

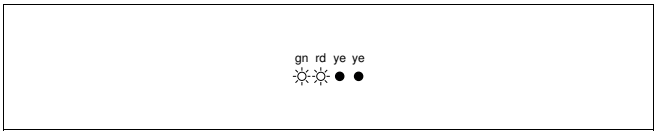

Fig. 140: Status of the control lamps in case of fault signal

After the function test is finished, plug the plug connection again into the signal conditioning instrument.

Simulation of a level signal

For simulation of a level signal, the covering of the probe must be changed. The relay outputs and the corresponding control lamps than change their status.

Caution:
Take note that when switching over the relay output also the connected instruments can be energized.

After the function test is finished, plug the plug connection again into the signal conditioning instrument.

12.4 Instrument repair

If a repair is necessary, please proceed as follows:

You can download a return form (23 KB) from our homepage at www.vega.com under: "*Downloads - Forms and certificates - Repair form*".

By doing this you help us carry out the repair quickly and without having to call back for needed information.

- Print and fill out one form per instrument
- Clean the instrument and pack it damage-proof
- Attach the completed form and, if need be, also a safety data sheet outside on the packaging
- Please ask the agency serving you for the address of your return shipment. You can find the respective agency on our website www.vega.com under: "*Company - VEGA worldwide*"

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13 Dismounting

13.1 Dismounting steps

Take note of chapters "*Mounting*" and "*Connecting to power supply*" and carry out the listed steps in reverse order.

13.2 Disposal

The instrument consists of materials which can be recycled by specialised recycling companies. We use recyclable materials and have designed the electronics to be easily separable.

WEEE directive 2002/96/EG

This instrument is not subject to the WEEE directive 2002/96/EG and the respective national laws. Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

Correct disposal avoids negative effects on humans and the environment and ensures recycling of useful raw materials.

Materials: see chapter "*Technical data*"

If you have no way to dispose of the old instrument properly, please contact us concerning return and disposal.

14 Supplement

14.1 Technical data

General data	
Series	Module unit with plug-in socket for mounting on carrier rail 35 x 7.5 or 35 x 5 according to EN 60715
Weight	170 g (6 oz)
Housing material	Housing: Polycarbonate, front cover: Polypropylene PPN
Fixing slide for rail fastening	Polyamide PA6

Power supply - Alternating voltage version AC	
Operating voltage	85 … 253 V AC, 50/60 Hz
Max. power consumption	4.5 W

Power supply - Direct voltage version DC	
Operating voltage	20 … 30 V AC, 50/60 Hz, 20 … 60 V DC
Max. power consumption	1.2 W (at 20 V)

Sensor input	
Quantity	2 x level detection or 1 x pump control (min./max.)
Response resistor	1 … 200 kΩ adjustable
Measuring circuit	max. 5 V eff., max. 1 mA
Permissible line capacitance	1 x 100 nF or 2 x 70 nF with min./max. control
Switching hysteresis	15 % Relating to the conductivity of the medium

Adjustment elements	
DIL switch block	For preadjustment of the damping and the mode
Potentiometer	for switching point adjustment
Control lamps in the front plate	
– Status indication operating voltage	Signal lamp green (LED)
– Status indication fault signal	Signal lamp red (LED)
– Status indication switching point control	2 signal lamps yellow (LED)

Relay output	
Number - Relay outputs	
– Level relay (spdt)	1
– Fail safe relay (spdt)	1 (adjustable as second level relay)
Mode (adjustable)	Max. detection or overfill protection or min. detection or dry run protection

Switching delay	0.5 s, 3 s or 6 s - Selection via DIL switch
Contact	1 spdt for each output
Contact material	AgNi, hard gold-plated
Turn-on voltage	≥ 10 mV DC, ≤ 253 V AC/DC
Switching current	≥ 10 µA DC, ≤ 3 A AC, 1 A DC
Breaking capacity	≤ 750 VA, ≤ 54 W DC

Ambient conditions

Ambient temperature	
– With single mounting	-20 … +60 °C (-4 … +140 °F)
– With mounting in series (without lateral distance)	-20 … +50 °C (-4 … +122 °F)
– When mounting in protective housing	-20 … +40 °C (-4 … +104 °F)
Storage and transport temperature	-40 … +70 °C (-40 … +158 °F)

Electromechanical data

Screw terminals	for wire cross-section up to 1.5 mm^2 (AWG 16)

Electrical protective measures

Protection rating	IP 20
Overvoltage category	II
Protection class	II
Electrical separating measures	Reliable separation (VDE 0106, part 1) between power supply, sensor input and level relay

Approvals

Instruments with approvals can have different technical data depending on the version.

That's why the associated approval documents have to be noted with these instruments. They are part of the delivery or can be downloaded under www.vega.com via "*VEGA Tools*" and "*serial number search*" as well as via "*Downloads*" and "*Approvals*".

14.2 Dimensions

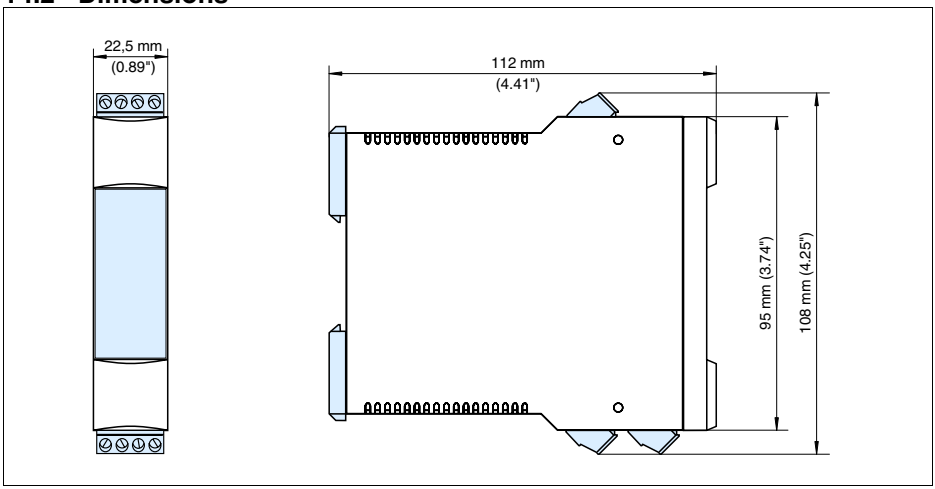

Fig. 141: Dimensions VEGATOR 632

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Printing date:

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