



# STOCKTROL

CV210/CV310/CV410/CV510

Single rod vibrating level switch for reliable level control of all kinds of powdered, grained and granular bulk solids.

Also available: **STOCKTROL-SEDIMENT**, a special model of the **STOCKTROL** designed for detecting material, e.g. sand, that has settled in water.

## Description

The STOCKTROL is a piezoelectric driven vibration type level switch that detects high, mid and low level in bins, silos and hoppers, filled with grained or powdered materials, (bulk solids). The instrument can be used for overflow protection, for high or low level alarm and in a special configuration for the detection of interfaces, e.g. sand that has settled in water (special model **SEDIMENT**).

## Advantages

### low subsequent costs due to state-of-the-art vibration technique

- no calibration required: the function is not effected by material characteristics, e.g. dielectricity; therefore the instruments are ideal to use at applications where material changes are common
- no readjustment required: the function is not affected by environmental changes like temperature, pressure, humidity ect.
- no wear-out, no sealing problems: the vibration technique includes no moving parts
- no maintenance required
- durable

### high performance and reliability

- The single rod design with its sharp edged vibrating blade prevents bridging of material typically associated with the dual rod „tuning fork“ design
- the sword shaped blade lets material easily flow and thus prevents material build-up
- material sticking on the container wall has no influence on the function of the STOCKTROL as only the tip of the vibrating blade is sensitive and not the base
- no false alarms due to rat-holing: the probes get driven with very low energy only which is why it is impossible for them to dig a hole inside the material in which they could vibrate
- the high quality and a sophisticated fine-tuning of the vibrating system enable the instruments to reliably detect extremely light materials with densities down to 20 grams per litre; special models allow even lighter materials with densities down to 10 grams per litre



## highest quality

- strong stainless steel construction
- enclosure aluminium diecast IP66 / 67
- wide range power supply with relay output and fail safe function, alternatively DC-versions with 3-wire transistor output and 2-wire 8/16mA-output available
- designed and manufactured at PTL in Germany according to DIN EN ISO9001:2000 with the background of over 20 years of experience in the field of vibrating level switches

## Function and Application

The vibrating system of the STOCKTROL gets forced to vibrate on its resonance frequency by a piezo crystal drive. If filling material, (bulk solids), covers the vibrating blade of the probe, its vibration gets damped. This is sensed by the electronic circuit and the output switches. When the blade gets uncovered due to declining level, the instrument restarts to vibrate and the output switches back.

The STOCKTROL is designed for the detection of all kinds of dry bulk solids, powdered, grained or in granular state. Its robust design and its high sensitivity makes it perfect for a wide range of applications: heavy materials in rough environments as well as lightest materials and powders. The special model **SEDIMENT** is used in special applications where settled material, e.g. sand, has to be detected in water.



Typical applications are mentioned below:

tea (leaves)	powdered milk	wood shavings
salt	frozen chips	chalk
flour	beans	styrofoam
spices	sugar	cellulose
soda	sweets	glass ground
pellets	coffee beans	granular plastics
animal food	coffee ground	powdered clay
carbon black	peanuts	polystyrene
chemicals	tobacco	gravel
foundry sand	grain	sawdust

## Models

### ➤ Standard model: **STOCKTROL CV210**

The standard model CV210 has an insertion length of approx. 190 mm and can be mounted to the container from top or from side for both high or low level detection.



Connection to the container is made via thread 1 ½" DIN (equals BSPT) or NPT. Material sticking onto the container wall has no influence on the function of the CV210 as only the vibrating blade is sensitive and not the 90mm long base which is located between blade and mounting thread.

### ➤ Pipe extension welded: **STOCKTROL CV310**

If the application requires longer insertion lengths the CV310 is the right choice. This model offers the possibility to adapt the insertion length exactly to the application by



means of a pipe which is welded between the vibrating probe and the 1½" mounting socket. Maximum insertion length for CV310 is 2,0 meters. The CV310 is suitable for top mounting. Side mounting is possible for insertion lengths shorter than 1 meter and if the extension pipe is adequately supported. Connection to the container is made via thread 1 ½" DIN (equals BSPT) or NPT.

Alternatively the CV310 is available with process connection "**Tri-Clamp**" according to DIN32626

### ➤ Threaded pipe extension: **STOCKTROL CV410**

The CV410 provides the possibility of insertion lengths up to 4,0 meters. The extension is performed by a 1" pipe with threads on both ends. This pipe simply gets



screwed between the vibrating probe and the 1 ½" mounting socket. As no special equipment is necessary for making the extension it is possible that the customer obtains and mounts the extension tube at the site which helps to save costs for equipment and transport. The CV410 is suitable for top mounting. Side mounting is possible for insertion lengths shorter than 1 meter and if the extension pipe is adequately supported. Connection to the container is made via thread 1 ½" DIN (equals BSPT) or NPT. The type of the 1" inside thread for the extension tube, (DIN or NPT), equals the type of the 1½" outside thread for process connection.

### ➤ Flexible cable extension: **STOCKTROL CV510**

The CV510 is a cable extended model.

The polyurethane sheathed, steel rope reinforced cable allows insertion lengths up to 20 meters.

A 1 ½" mounting socket connects it to the container. The CV510 helps to reduce shipment costs. Long insertion lengths fit into compact boxes for shipment.



➤ **Remote electronics installation**  
(not in combination with ex approval)

For some applications it is necessary to keep the electronics separated from the container. This is the case at very high temperatures or heavy vibrations or shocks. The remote electronics installation is possible for all STOCKTROL models. The standard length of the cable extension is 2 meters. Longer cables are possible.



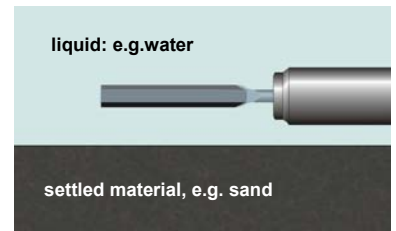
➤ **High temperature model**

The standard STOCKTROL is designed for process temperatures of max. 80°C. For temperatures up to 150°C, the high temperature model must be used which is available for CV210, CV310 and CV410. To protect the electronics from too high temperatures, a temperature insulating tube gets mounted in between the mounting socket and the enclosure. Instead it is also possible to install the electronics at a place with lower ambient temperature by using the remote electronics installation.



➤ **special model SEDIMENT**

The special model SEDIMENT is designed to detect material that has settled in liquids. A typical application is the detection of sand and dirt in front of pumping systems. The probe vibrates in the liquid: if the sediment reaches the vibrating blade, it damps the vibration and causes the relay to switch.



### Options

The following options are available:

- second cable gland M20 x 1,5 (not available in combination with remote electronics installation)
- enclosure powder coated grey, blue, orange or beige
- double pole relay DPDT
- test facility: function test to be performed when probe is vibrating: the vibration can be stopped by closing a contact. The output of the electronics switches accordingly enabling the test of all further signals and actions.
- process connection "Tri-Clamp" according to DIN32626, (available for CV310 only)
- externally visible LED for indicating relay status (not in combination with ex approval)
- ex approvals according ATEX directive 94/9/EC for CV210, CV310, CV510

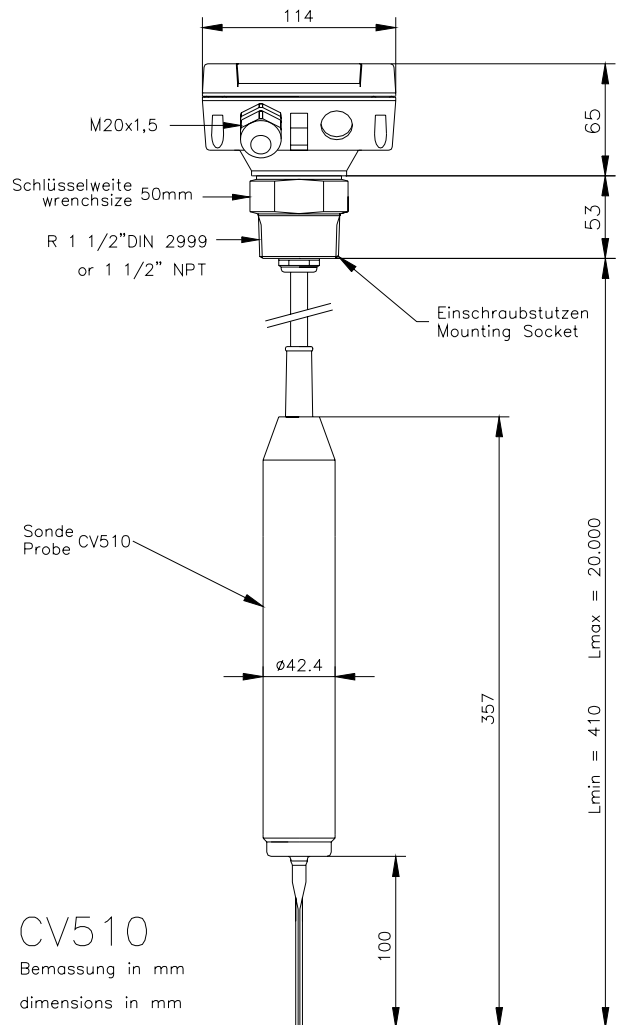
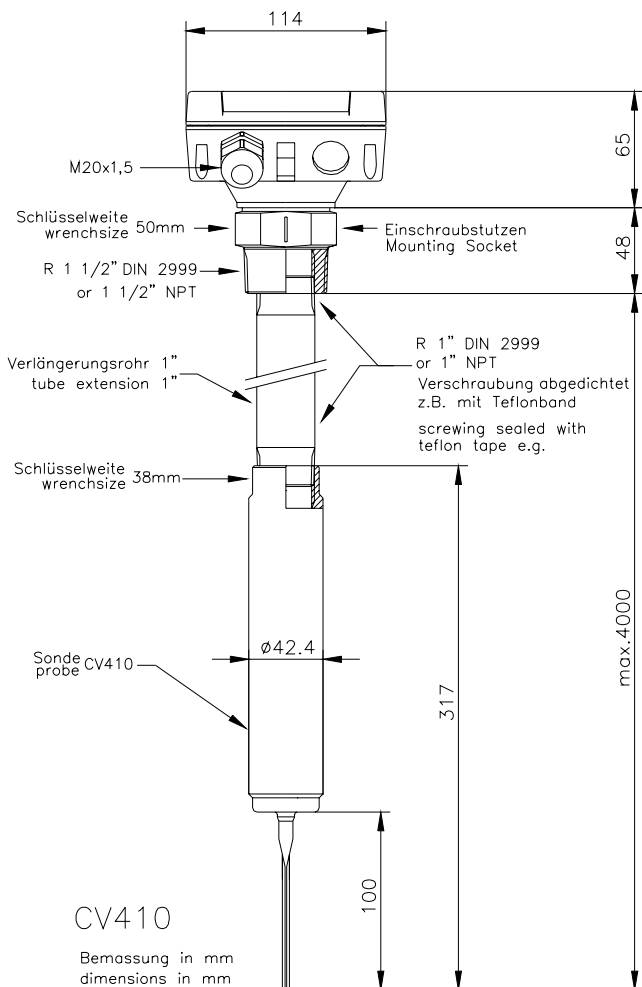
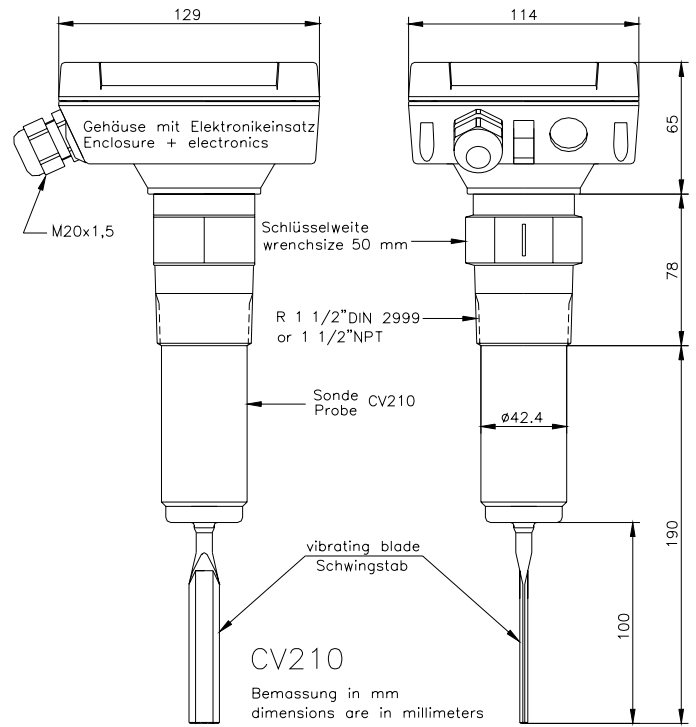
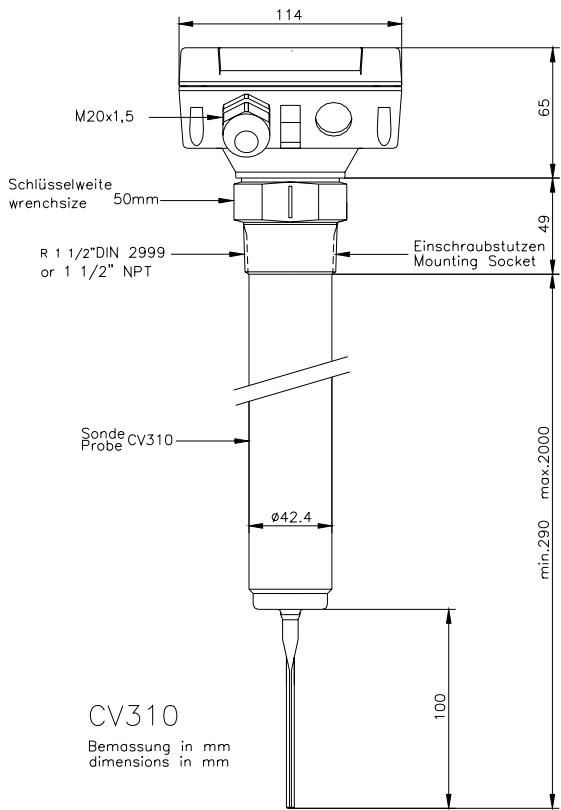
### Approvals

- CE-approval for all instruments according to the following directives:
  - EMC-directive 2004/108/EG
  - Low Voltage-directive 2006/95/EG
- Ex-approval according to ATEX 94/9/EC available for CV210, CV310 and CV510:
  - Dust-Ex: ATEX II 1/2D Ex tD A20/21 IP66 T95°C for zones 20/21/22
  - Gas-Ex: ATEX II 1G Ex ia IIB T4 or 1/2G Ex ia IIB T4 for zones 0, 1 or 2

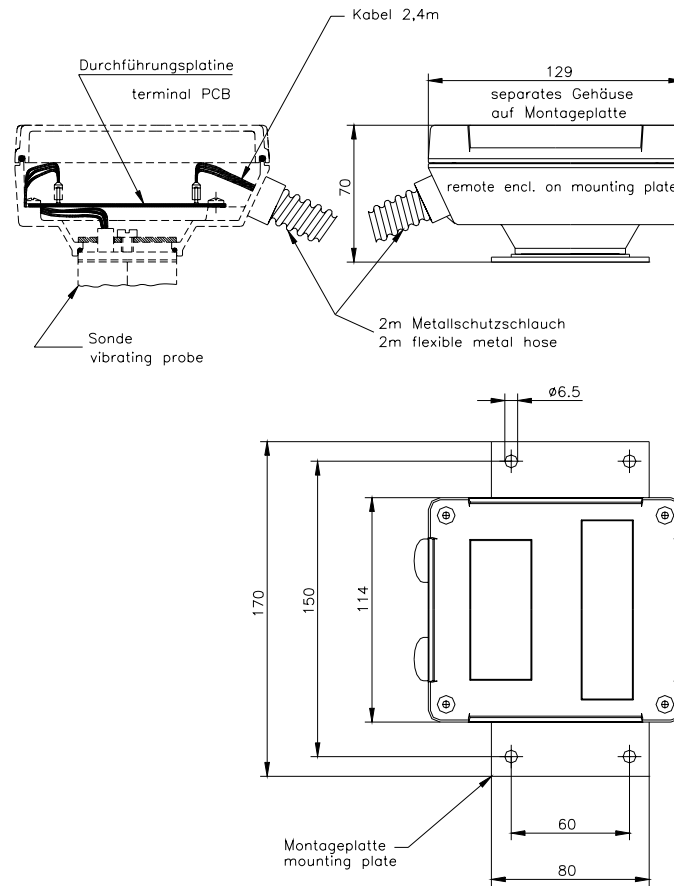
## Specifications

- Enclosure:** die cast aluminum, (option powder coated)  
 protection IP 66 and IP 67 (IP65 for remote electronics installation)  
 1 cable gland M20 x 1,5 (option: second cable gland)
- Electronics:** **Wide range power supply 20 ... 250V AC/DC with relay output:**  
 one potential-free change-over contact (SPDT), (option: DPDT)  
 max. switching datas AC: 250V-AC, 8A, 2000VA,  $\cos\phi = 1$   
 max. switching datas DC: 8,0A at 24V-DC / 1,5A at 48V-AC  
 min. switching datas DC: 24V / 100mA  
 Power consumption: < 3 VA
- or: **24V-DC power supply with transistor output:**  
 potential free, NPN or PNP type  
 350mA @ 24V-DC, shorttime max. 1A, max. power 20W  
 power loss max. 3V, max. leakage current 100 $\mu$ A; short circuit proof  
 power consumption at blocked transistor: < 1 W
- or: **power supply 20...30V-DC with 8/16mA-output (2-wire):**  
 power consumption: < 0,5 W  
 The probe can be supplied by the supply and analyzing unit CV2000AE e.g.  
 Gas-Ex approval with protection concept *intrinsic safety* is available for his version.
- Time Delay: 1 second from stop of vibration  
 2 to 5 seconds for start of vibration
- Indication: red LED on PCB (option: externally visible)
- Probe:** Material: stainless steel 1.4301 / AISI 304  
 connection: thread 1 1/2" DIN 2999 (equals BSPT) or 1 1/2" NPT  
 resonance frequency: approx. 290 Hz  
 max. vertical and horizontal load upon the end of the blade: 100 N  
 max. tensile load of cable CV510: 200 kg
- Material to be detected:** non sticky bulk solids  
 min. density 20 grams per litre  
 grain size from powder to max. 20mm
- max. pressure inside bin: 10 bar
- ambient temperature electronics: -40°C ... + 70°C (max. +60°C for ATEX approved models)
- process temperature: probe: -40°C ... + 80°C (CV510: max. 70°C)  
 probe HT: -40°C ... + 150°C

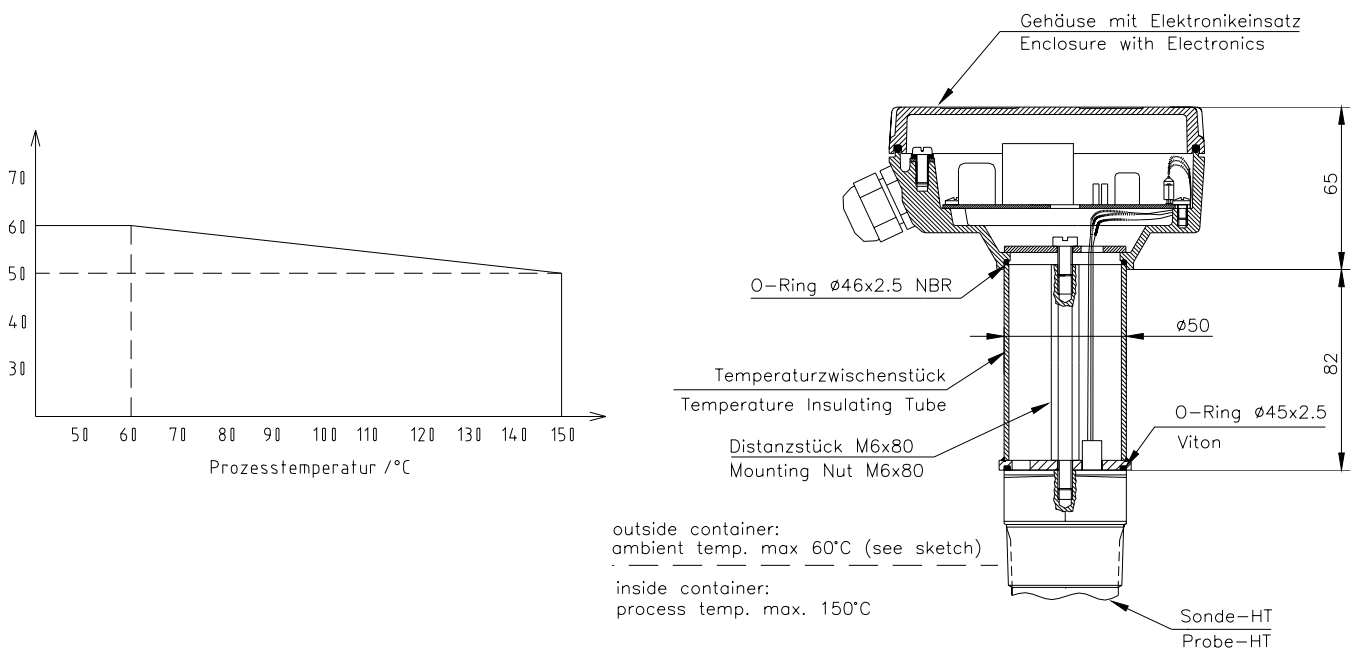
**Dimensions**



➤ Remote Electronics Installation



➤ Special Model HT with Temperature Insulating Tube



- Split architecture at probes with 2-wire electronics with 8/16mA-output and Exi-approval:

