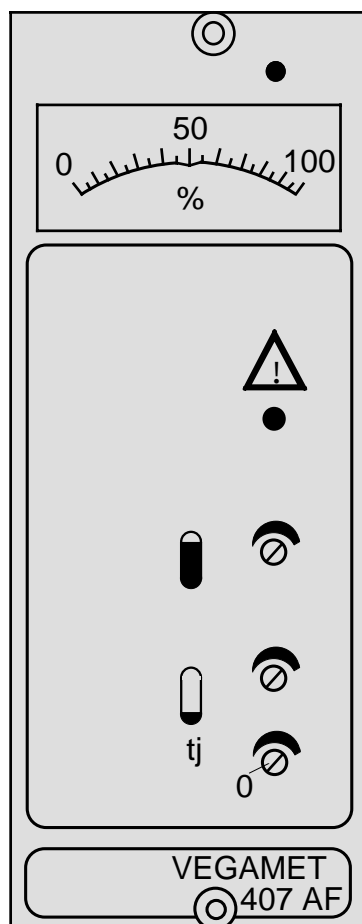


VEGAMET 407 AF VEGAMET 407 AFT

TIB • Technical Information • Operating Instructions



VEGA

Signal conditioning
instrument



For continuous level
measurement

- for connection of a
capacitive electrode
- or a pressure sensor

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Application

The VEGAMET 407 AF or 407 AFT is a signal conditioning instrument and is used for level propor-

tional indication (continuous level measurement).

Configuration

The VEGAMET 407 AF or 407 AFT consists of:

- plastic housing with plug-in socket (series400)
- electronics
- relay output with floating spdt (fail safe)
- front plate with:
 - mains control lamp
 - indicating instrument
 - signal lamp
 - potentiometer for full adjustment
 - potentiometer for empty adjustment
 - potentiometer for integration time

A measuring system consists of:

- signal conditioning instrument VEGAMET 407 AF or 407 AFT
- capacitive electrode with oscillator or pressure sensor with oscillator

Additional indicating instruments and auxiliary level switches can be connected to the current and voltage output.

Function

Level measurement with capacitive electrodes

a) non-conductive products

Electrode and container wall form a capacitor. The level changes the dielectric of the capacitor and therefore its capacitance.

b) conductive products

The fully insulated electrode and product form a capacitor. The level changes the size of the capacitor and therefore its capacitance.

In both cases a level proportional measuring current is generated in the oscillator from the capacitance change.

Fault monitoring

The integral fault monitoring detects

- short-circuit or line break of the connection line to the transducer
- current value of the connection line $< 2,5 \text{ mA}$ or $> 23,5 \text{ mA}$ (e.g. as well as failures of the electronics in the transducer)

If one of the above mentioned failures is detected, the failure LED lights and the output relay de-energizes, i.e. terminal 16 and 17 are connected through relays (see electrical connection).

In addition more the output current increases to approx. 23 mA and the voltage outputs take a value $< 5 \text{ V}$ or $< 10 \text{ V}$.

Current output

VEGAMET 407 AF

The current output of VEGAMET 407 AF is non-floating with reference to the sensor input and voltage output, however is floating with reference to the mains connection.

VEGAMET 407 AFT

The current output of VEGAMET 407 AFT is floating.

Level measurement with pressure sensors

The diaphragm of the pressure sensor converts the hydrostatic pressure of the product linear into a movement. This movement changes the size of a capacitor.

The respective oscillator generates a level proportional current out of this capacitance change.

The VEGAMET 407 AF or 407 AFT evaluates the measuring current several times (see page 5).

Integration time

In case of fluctuating product surface it is useful to smooth the outputs (indication, output 1 - 3), by adjusting an integration time $0 \dots 20 \text{ sec}$.

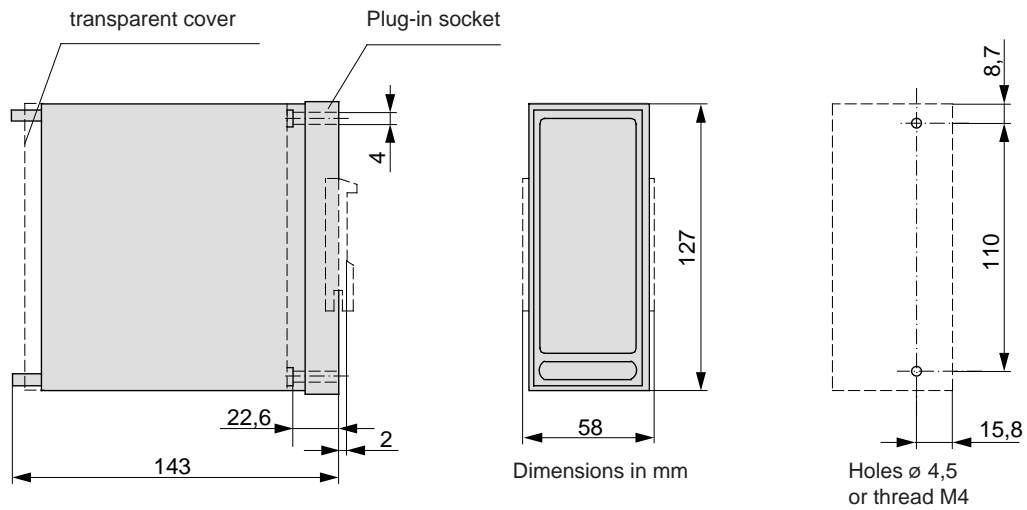
Important note

The period of the integration time orientates on the filling and emptying time of the vessel, i.e. integration time \leq filling / emptying time.

Technical data

Power supply		Value	Tolerance	Frequency
	standard	AC 220 V	+15 % -10 %	50 / 60 Hz
	options	AC 230 V	+10 % -15 %	50 / 60 Hz
		AC 110 V		
		130 V	+15 %	
		240 V	-10 %	50 / 60 Hz
		260 V		
		AC 24 V	+15 %	
		42 V	-10 %	
		48 V		
		DC 9 ... 16 V		
16 ... 60 V				
Power consumption at U _N :		approx. 7 VA		
Voltage for the transducer on terminals 1 and 2 (terminal 3 and 4 bridged)		approx. 22 V		
Resistance per conductor to the transducer		max. 50 Ohm		
Voltage for the transducer on terminals 1 and 2 (terminal 3 and 4 open) (only for electrodes with oscillator type 117)		approx. 15 V		
Resistance per conductor to the transducer		max. 50 Ohm		
Indication		analog indication 0 ... 100 %		
Output 1	type	current output		
Output 2	range	0 ... 20 mA or 4 ... 20 mA		
	load	max. 750 Ohm		
Output 3	floating	VEGAMET 407 AFT		
	type	current output		
Output 4	range	0 ... 5 V, max. 2 mA		
		for connection of		
		max. 10 auxiliary limit switches VEGASEL		
	type	voltage output		
	range	0 ... 10 V, max. 2 mA		
	type	relay output		
	function	fail safe		
	contact	1 spdt		
	relay data:			
	contact material	AgCdO and Au plated		
min. turn-on voltage	10 mV			
switching current	10 µA			
max. turn-on voltage	AC 250 V, DC 60 V			
switching current	AC 2 A, DC 1 A			
breaking capacity	125 VA, 60 W			
Integration time		0 ... 20 sec.		
Permissible ambient temperature on the housing		-20°C ... +50°C / -4 ... 122°F		
Storage and transport temperature		-20°C ... +70°C / -4 ... 158°F		
Housing	type	plastic ABS light grey		
	protection	IP 40		
	dimensions	B = 53 mm, T = 143 mm, H = 127 mm		
Terminal board: for cross section area of conductors		max. 1 x 1,5 mm ²		
Weight: with plug-in socket		approx. 710 g		

Dimensional drawing



Mounting instructions

The mounting assembly is provided as standard feature with

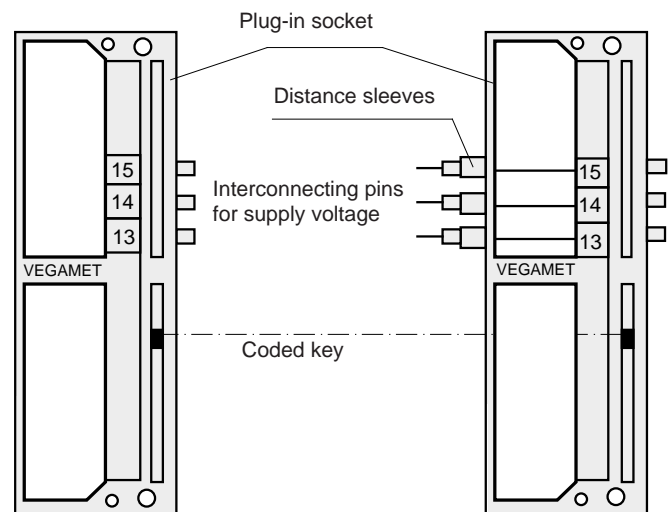
- respective terminals
- interconnection pins
- distance sleeves for mounting several instruments in a row
- coded key

Spacers slide onto the interconnecting pins and ensure that adjacent instruments have a minimum gap of 5 mm between each other.

For mounting on standard rail (TS 35 mm) an adapter is enclosed. The two screws located on the front of the instrument are used to fasten the instrument to the mounting assembly.

In case of single mounting remove the interconnection pins and connect the supply voltage directly. The coded key avoids that instruments of series 400 are exchanged.

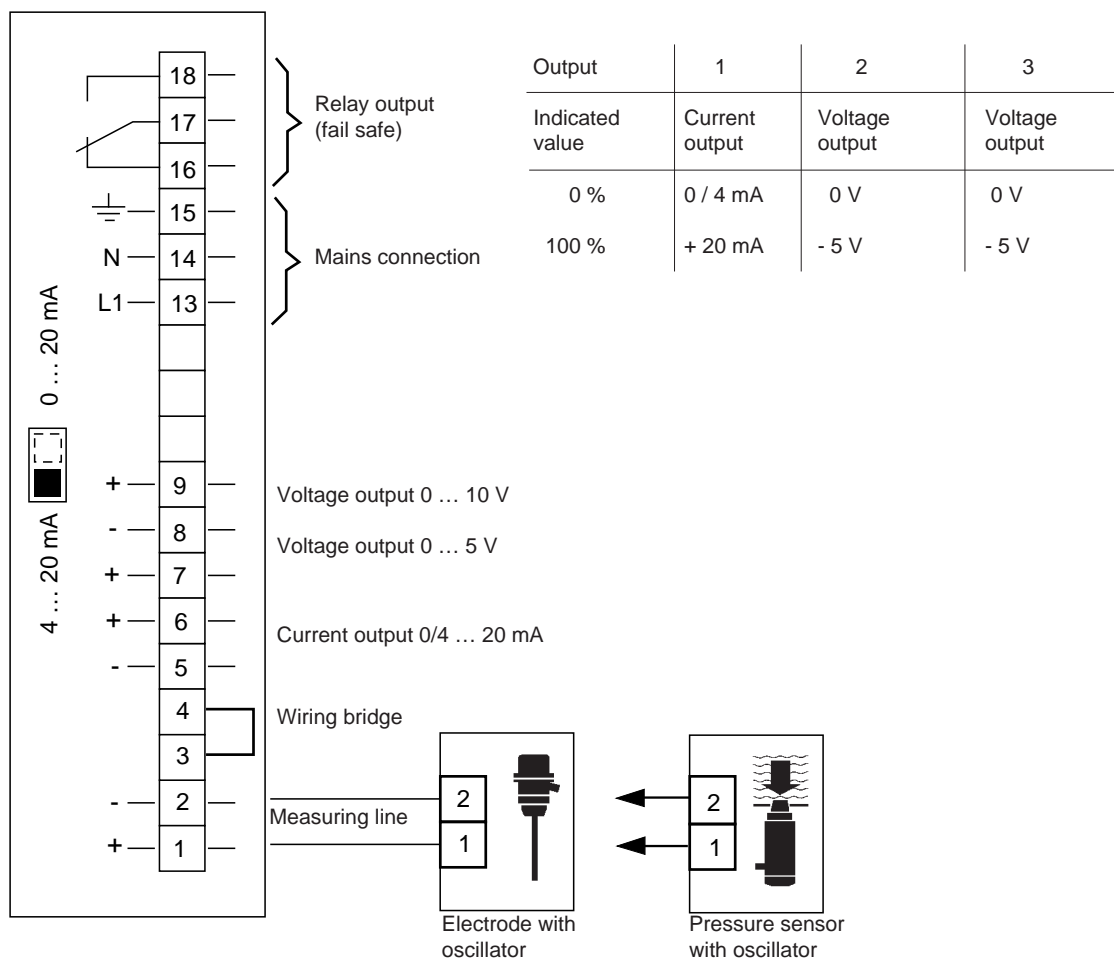
Remove all interconnection pins on the first plug-in socket.



Attention:

The pins on terminals 13, 14 and 15 carry the supply voltage.

Electrical connection



The electrical connections should be made on the mounting assembly in accordance with the diagram located on the back of the instrument.

Standard two-wire cable can be used as measuring line, electrode and signal conditioning instrument.

If electromagnetic interferences have to be expected, screened cable must be used.

As factory preset, the terminals 3 and 4 are bridged (supply voltage for oscillator: 22 V DC)

Attention:

In conjunction with oscillator type 117 the bridge must be removed!
(Therefore supply voltage for oscillator: 12 V DC)

Protective measures:

If there is a danger of voltage spikes overvoltage arresters are recommended.
Note TIB "Overvoltage arresters" for connection.

Start-up

- Feed supply voltage. **The voltage must comply with the figure stated on the wiring diagram.**
- Adjust changeover switch on the back of the instrument or on the front plate to the desired current output range 0 ... 20 mA or 4 ... 20 mA
- turn potentiometer for integration time completely anti-clockwise
- potentiometer for full adjustment must be turned clockwise by 22 turns
- Carry out adjustment as follows

Adjustment

The full or empty adjustment is carried out by a spindle potentiometer. Overwinding is avoided by the slide clutch. In practice three different methods are possible for empty / full adjustment:

- a) Level in the vessel can be filled to the required min. level (= 0 %) and max. level (= 100 %)**

Empty adjustment

- Reduce product to required min. level.
- Adjust with potentiometer for empty adjustment the indication of the instrument to 0 %.

Full adjustment

- Increase product to required max. level.
- Adjust with potentiometer for full adjustment the indication of the instrument to 100 %.

Integration time

- Adjust potentiometer for integration time to required value (see page 2).

- b) Level in the vessel can be filled to the required min. level (= 0 %), but only to a max. level < 100 %**

Empty adjustment

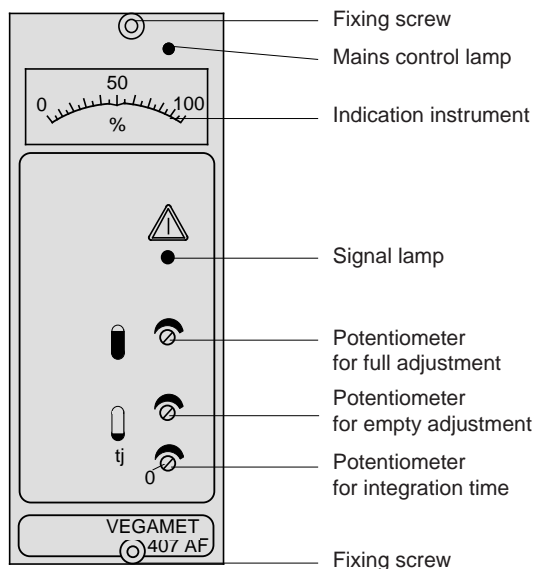
- Reduce product to required min. level.
- Adjust with potentiometer for empty adjustment the indication of the instrument to 0 %.

Full adjustment

- Increase product to max. possible level and dipcheck (e.g. 80 %)
- Adjust with the potentiometer for full adjustment the indication of the instrument to the checked value.

Integration time

- Adjust potentiometer for integration time to required value (see page 2).



- c) Level in the vessel can only be reduced to a min. level > 0 % and to a max. level ≤ 100 %**

Empty adjustment

- Reduce product to min. possible level and dipcheck (e.g. 20 %)
- Adjust with the potentiometer for empty adjustment the indication of the instrument to the checked value.

Full adjustment

- Increase level to max. possible level and dipcheck (e.g. 60 %)
- Calculate indication value to be adjusted: max. level minus min. level = indicating value to be adjusted.
in the example: 60 % - 20 % = 40 %
- Set with the potentiometer for full adjustment the indication of the instrument to the calculated value (in the example 40 %).
- Set with the potentiometer for empty adjustment the indication of the instrument to the actual level (max. level in the example 60 %).

Integration time

- Adjust with potentiometer for integration time to required value.

Example

Automatic emptying of a vessel

At a level of 90 % the pump is switched on and at 10 % level switched off.

