GESTRA® Control Technique

Instructions for Installation and Maintenance

Level Switch/Level Controller

VR 16

Issue: 5/86

Application

The amplifier type VR 16 is used in conjunction with a multiple level-control electrode for on-off feedwater control (fill or discharge control), signalling of low level in vessels and boilers and as oil detector for cooling water.

Available Designs

VR 16-a: plastic case, mounted in a case for field installation.
Protection IP 65. Max. ambient temperature 55 °C.
Dimensions see fig. 1, wiring diagrams for different applications see figs. 3-7.

VR 16-b: plastic case for snapping onto supporting rail TS 35 to DIN 46277.
Protection IP 10. Max. ambient temperature 70 °C.
Dimensions see fig. 2, wiring diagrams for different applications see figs. 3-7.

Mode of Operation

Every liquid possesses a certain conductivity which is used to signal its level. On immersion of the electrode a bridge circuit provided in the amplifier, fed with alternating current, is unbalanced. The resulting bridge voltage energizes a relay via a threshold amplifier. On emergence of the electrode, the bridge voltage returns to zero, the relay is de-energized.

For on-off control the relay is provided with an auxiliary contact, ensuring that the relay is not released until the lower electrode tip is exposed.

The conductivity range covers 1 to 100mS/cm with the wire link between terminals 5 and 6 (see fig. 2) and 0.01 to 1 mS/cm after removing the wire link.

Installation

The amplifier type VR 16-a is protected in accordance with IP 65 and can be installed without any additional measures being necessary.

As far as the amplifier type VR 16-b is concerned the protection required must be obtained by installing in a suitable switch cabinet.

The ambient temperature as indicated under "Available Designs" should not be exceeded.

For installation of level-control electrode see separate instructions.

Wiring

To connect the level-control electrode to the amplifier always use screened cable I – Y (St) Y 2 x 2 x 0.6, FMGCG or similar. The maximum length must not exceed 100 m. Connect screen only to the terminal provided for the purpose in the amplifier. Do **not** connect screen to earth terminal of electrode or to reference electrode of the multiple level-control electrode.

Power supply 220 V, 50 or 60 Hz.

Max. contact rating of relay contacs 250 V, 3 A, 750 W.

The life of the contacts is 4 x 10^5 switching cycles for 220 V~, 3 A and 2 x 10^6 switching cycles for 220 V~, 0,5 A (ohmic or inductive load with appropriate spark suppression).

Commissioning

After wiring and installation the equipment is ready for operation.

If the amplifier does not respond correctly (e.g. cold, sticky liquids), the sensitivity of the amplifier can be reduced by re-establishing the wire link between terminals 5 and 6.

Performance Test

1. Short-circuit terminals 1 and 2 or 1 and 4 of electrode supply cable. The amplifier should respond and the relay should be energized, terminals 7 and 8 are connected.
2. Disconnect conductor of electrode supply cable connected to terminal 1. The relay should be de-energized, terminals 8 and 9 are connected.

Dimensions

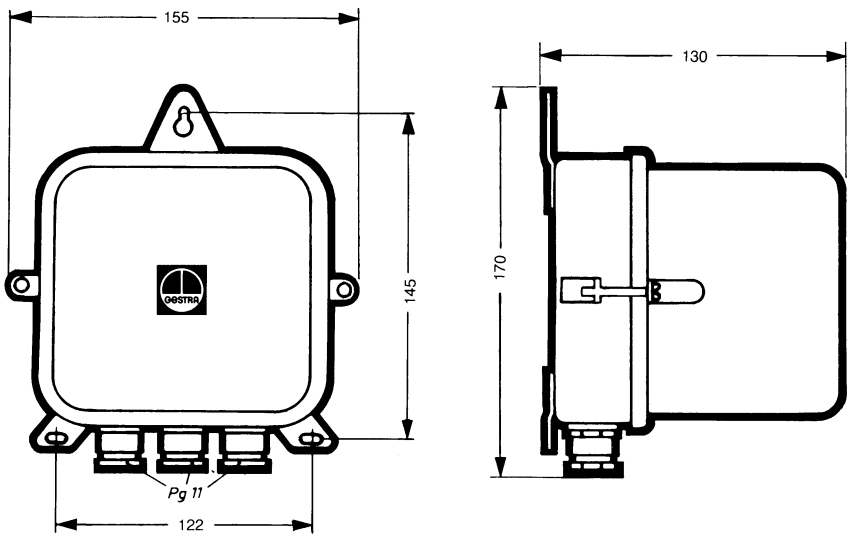

Fig. 1: Dimensions for amplifier type VR 16-a (field case)

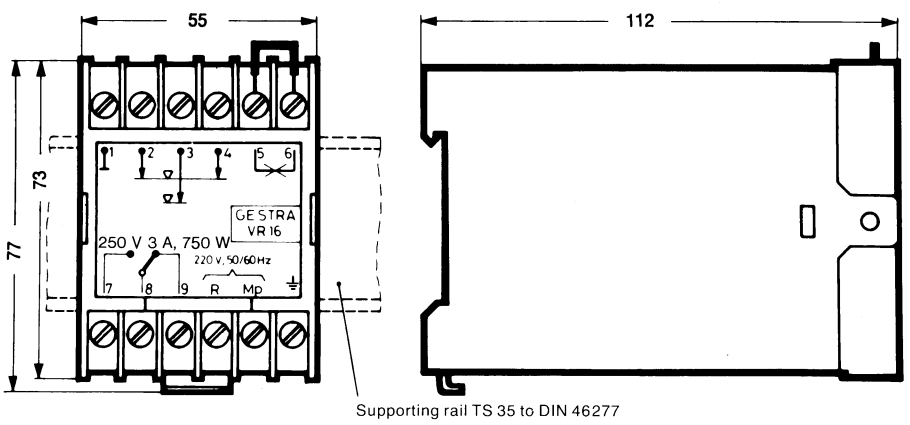

Fig. 2: Dimensions for amplifier type VR 16-b (plastic case for snapping onto supporting rail TS 35)

Fault Finding

In the event of malfunction check power supply, change sensitivity range by means of wire link (see under "Commissioning"), check supply cables for damage (short-circuit or breaking), check correct connections of terminals, try amplifier (see under "Performance Test"), inspect electrodes to see whether insulators need cleaning or are defective (tightness of electrode).

Relay Arc Suppression for Inductive Loads

When switching off inductive loads voltage peaks are produced that may reach several times the mains voltage. The result is:

1. The operation of control and measuring systems may be impaired by interference caused by the voltage peaks.
2. The life of the relay contacts is reduced by the electric arcs formed.

We therefore recommend that inductive loads are provided with commercial arc suppressor RC combinations (e.g. 0.1 µF/100 Ω).

Spare Parts

Individual spare parts are not available. The amplifier is supplied as a complete unit (design VR 16-b) for installation into a field case or for snapping onto a supporting frame (order Nr. 055027).

Wiring Diagrams

Drawn position of contacts in each case: electrode exposed or power supply off

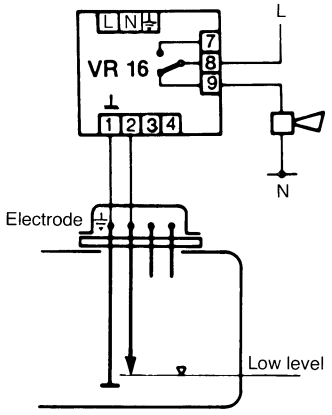

Fig. 3: Signalling of low level with amplifier type VR 16 and multiple level-control electrode

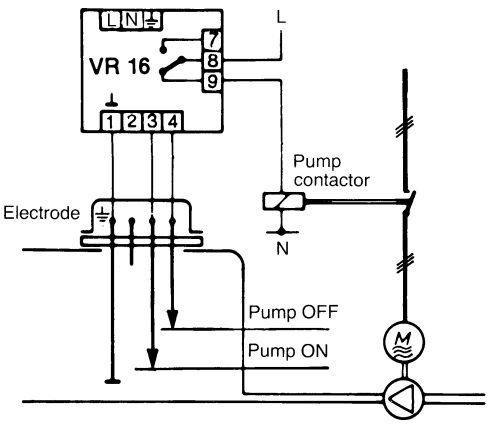

Fig. 4: Fill control with amplifier type VR 16 and multiple level-control electrode

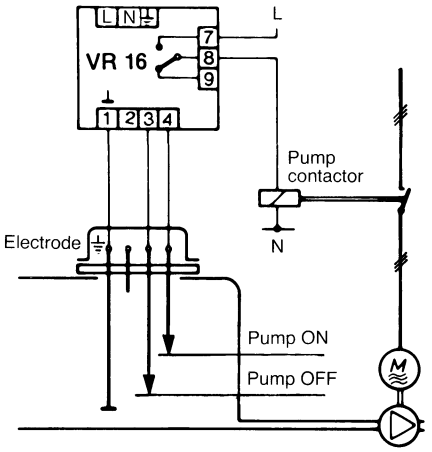

Fig. 5: Discharge control with amplifier type VR 16 and multiple level-control electrode

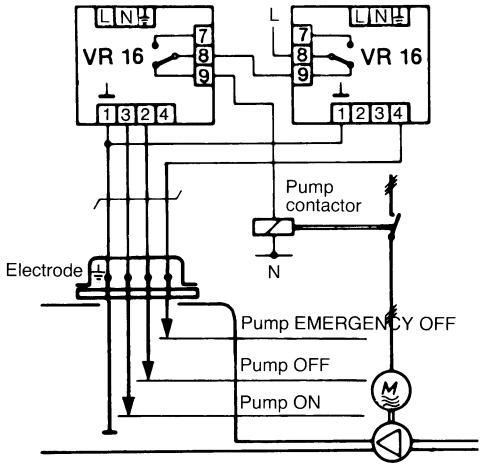

Fig. 6: Fill control and signalling of high level with 2 amplifiers type VR 16 and multiple level-control electrode

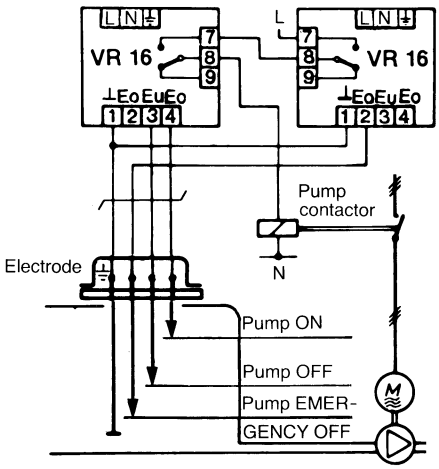

Fig. 7: Discharge control and signalling of low level with 2 amplifiers type VR 16 and multiple level-control electrode

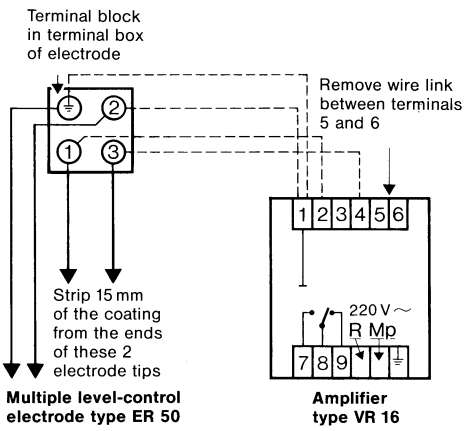

Fig. 8: Wiring diagram for oil detector for monitoring cooling water. Connect screen only to terminal 1 in the amplifier