

Actuators electromechanical VA2500.1 L

Description

The actuators are designed for regulators with continuous or contact output. They are suitable to actuate two-way and three-way valves series RV 113 and RV 2xx. The actuator consists of cover made of self-extinguishing plastic housing a stepping motor, control unit, signalisation LEDs and no-maintenance gear made of sintered steel. The connection to its valve is provided by stainless steel columns and yoke made of light metal alloy. Electric connection (max. 2,5 mm²) is provided with the aid of screw clamps. There are three self-breaking openings for cable glands M20x1,5 (2x) and M16x1,5. One cable gland M20x1,5 is a part of standard delivery.

Application

Based on a connection variant (see wiring diagram), the actuator can be used as floating (0...10V or 4...20 mA), or 2-position (open-closed) or 3-position (open-stop-closed). Manual operating is available with outer handle. The motor is disconnected when the hand crank is folded back. When the handle is positioned back, the actuator resumes into required position (without initialization). If the hand crank remains folded out, the actuator keeps its set position.

Installation position

Upright, vertical, max. horizontal.

Technology

The actuator can be controlled by regulators with continuous (0...10V and/or 4...20 mA) or contact (2-position or 3-position) output. The actuator feeding is optional. The running speed and output characteristic is also optional.

Features

- electronic switch off based on the running force registered by stops inside appliance or valve.
- automatic adapting to the valve stroke
- code switch for characteristic and running time selection
- hand crank for manual operating with swithing the motor off as a start for new initiation
- possibility of direction change of control signal (feeding voltage at terminal 2a or 2b)

Technical data

Type	VA2500.1L
Suitable for valves	RV 113 R, M
Specification code	VA2500.1L
Execution	Electric actuator
Voltage	24 V AC ± 20%, 50 - 60 Hz; 24 V DC ± 15%; 230 V AC ± 15%
Frequency	50 Hz
Power consumption	18 VA
Control	0 - 10 V, 4 - 20 mA, 3-pos., 2-pos. 3-position
Open-close running time	Adjustable 2, 4, 6 s.mm ⁻¹
Nominal force	2500 N
Travel	20 a 40 mm
Enclosure	IP 66
Process medium max. temperature	200°C, with a mid piece up to 240°C
Ambient temperature range	-10 to 55°C
Ambient humidity range	< 95 % relative humidity
Weight	4,5 kg

Accessories

ZVA.SRU	Split range unit to set sequences
ZVA.2	Module, plug-in type, for 230 V ± 15% voltage supply and 3-point activation, additional power 2 VA
ZVA.S	2 auxiliary changeover switches, continuously adjustable, additional load 5(2) A, 12 - 250 V, 3(1) A, 12 - 250 V AC ¹⁾
ZVA.P2	Potentiometer 2000 Ω, 1 W, 24 V ¹⁾
ZVA.EP	Mid piece (required for medium above 200 up to 240°C)

¹⁾ one option of accessory can be used only

Operation

Initialisation and feedback signal

When used as a continuous drive, the device initialises itself automatically. As soon as voltage is applied to the drive for the first time, it moves to the lower limit stop on the valve, thus enabling automatic connection with the valve spindle. Then it moves to the upper limit stop and the value is recorded and saved with the help of a path measurement system. The control signal and the feedback signal are adjusted to this effective stroke. There is no re-initialisation if the voltage is interrupted or if the voltage supply is removed. The values remain saved.

To re-initialise, the drive must be connected to the voltage. To trigger an initialisation, fold the hand crank out and back in again twice within 4 seconds. Both the LEDs will then flash red. During initialisation, the feedback signal is inactive, or it corresponds to a value of "0". Initialisation uses the shortest run time. The re-initialisation is only valid once the entire procedure has been completed. Folding the hand crank out again will interrupt the procedure.

If the valve drive detects a blockage, it will report this by setting the feedback signal to 0V after approx. 90 s. However, the drive will try to overcome the blockage during this time. If it is possible to overcome the blockage, the normal control function is activated again and the feedback signal is resumed.

No initialisation is performed with a 2-position or 3-position control. The feedback signal is inactive.

Connection as a 2-point valve drive (24 V)

This activation (OPEN/CLOSED) can take place via two cables. The voltage is applied to terminals 1 and 2a. Applying the voltage (24 V) to terminal 2b opens the valve's control passage. After this voltage has been switched off, the drive moves to the opposite end position and closes the valve. The electronic motor switch-off responds in the end positions (valve limit stop, or when maximum stroke is reached) or in case of overload (no limit switches).

The coding switch can be used to set the run times. The characteristic curve cannot be selected in this case (resulting in the characteristic curve for the valve). Terminals 3i, 3u and 44 must not be connected.

Connection as a 3-point valve drive (24 V)

Applying voltage to terminal 2a (or 2b) makes it possible to move the valve to any desired position. If voltage is applied to terminals 1 and 2b, the valve shaft moves out and opens the valve. It moves in and closes the valve when the electrical circuit is closed over terminals 1 and 2a.

In the end positions (at the valve stop, or when the maximum stroke is reached) or in case of an overload, the electronic motor switch-off responds (no limit switches). The direction of the stroke can be changed by transposing the connections.

The coding switch is used to set the run times. In this case, the characteristic curve cannot be selected (resulting in the characteristic curve for the valve). Terminals 3i, 3u and 44 must not be connected.

Connection as a 2-point/3-point or continuous activation of valve drive with 230 V (accessory ZVA.2)

The accessory module is plugged on in the connection area and is then connected for 3-position mode. If this accessory is used, only control in 3-position mode is available. The coding switch on the baseboard can be used to select the run times. The characteristic curve cannot be selected; the characteristic curve for the valve is applicable.

The module has a built-in switch which is automatically moved into the correct position when the module is installed. On this drive (which has no spring return action) the switching lever is in the lower position.

The accessory module is not suitable for 2-position activation.

Connection as continuous control (0...10V and/or 4...20 mA) - (24V)

The built-in positioner controls the drive depending on the controller output signal y.

The control signal used is a voltage signal (0...10 V □) at terminal 3u, or a current signal at terminal 3i. If a control signal is present at both terminals (3u (0...10 V) and 3i (4...20 mA)) simultaneously, the input with the higher value takes priority.

Mode of action 1 (mains voltage to internal connection 2a):

as the output signal increases, the valve shaft moves out and opens the valve (control passage).

Mode of action 2 (mains voltage to internal connection 2b):

as the output signal increases, the valve shaft moves in and closes the valve (control passage).

The starting point and the control span are fixed. To set partial ranges (and only for voltage input 3u), a split range unit is available as an accessory (see the split range unit function); this unit is intended for installation in the drive.

After the voltage supply is applied and after initialisation, the drive moves to each valve stroke between 0% and 100%, depending on the control signal. The electronics and the path measurement system ensure that no stroke is lost, and the drive does not require re-initialisation at intervals. When the end positions are reached, the position is checked, corrected as necessary and stored again. This ensures parallel running of several drives of the same type. Feedback signal y 0 = 0...10V corresponds to the effective valve stroke of 0 to 100%. If the 0...10V control signal is interrupted in direction of action

is present at both terminals (3u (0...10 V) and 3i (4...20 mA)) simultaneously, the input with the higher value takes priority.

Mode of action 1 (mains voltage to internal connection 2a): as the output signal increases, the valve shaft moves out and opens the valve (control passage).

Mode of action 2 (mains voltage to internal connection 2b): as the output signal increases, the valve shaft moves in and closes the valve (control passage).

The starting point and the control span are fixed. To set partial ranges (and only for voltage input 3u), a split range unit is available as an accessory (see the split range unit function); this unit is intended for installation in the drive.

After the voltage supply is applied and after initialisation, the drive moves to each valve stroke between 0% and 100%, depending on the control signal. The electronics and the path

measurement system ensure that no stroke is lost, and the drive does not require re-initialisation at intervals. When the end positions are reached, the position is checked, corrected as necessary and stored again. This ensures parallel running of several drives of the same type. Feedback signal $y_0 = 0...10$ V corresponds to the effective valve stroke of 0 to 100%.

If the control signal 0...10V is interrupted in mode of action 1, the spindle moves in completely and the valve is closed. So that the valve can be opened (direction of action 1), a voltage of 10 V must be connected between terminals 1 and 3u, or it is necessary to switch over to direction of action 2.

The coding switch can be used to set the characteristic curve for the valve: linear, equal percentage or quadratic. This characteristic curve can only be generated if the drive is used as a continuous drive. Additional switches can be used to select the run times (applicable for 2-position, 3-position or continuous function).

LED display

Both LEDs flashing red: initialisation procedure

Upper LED lit red: upper limit stop or "CLOSED" position reached

Lower LED lit red: lower limit stop or "OPEN" position reached

Upper LED flashing green: drive running, moving towards "CLOSED" position

Upper LED lit green: drive stationary, last direction of running "CLOSED"

Lower LED flashing green: drive running, moving towards "OPEN" position

Lower LED flashing green: drive stationary, last direction of running "OPEN"

Both LEDs are lit green: waiting time after switching on, or after emergency function

No LED lit: no voltage supply (terminal 2a or 2b)

Both LEDs are flashing red and green: drive is in manual mode

Accessories application

Split range unit

This accessory can be built into the drive or can be accommodated externally in an electrical distribution box. The starting point U_0 and the control span ΔU can be set with the help of a potentiometer. This makes it possible to operate several regulating units in sequence or in a cascade with the control signal from the controller. The input signal (partial range) is converted into an output signal of 0...10 V.

Auxiliary changeover switch

Auxiliary changeover switch double 0372333 001

- Switching capacity max. 250 V~, min. current 250 mA at 12 V (or 20 mA at 20 V)
- Switching capacity max. 12...30 V=, max. current 100 mA

Auxiliary changeover switch double gold 0372333 002

- Switching capacity max. 250 V~, min. current 1 mA at 5 V
- Switching capacity max. 0.1...30 V=, current 1...100 mA

Even if used only once above 10 mA or up to 50 V, the gold coating will be destroyed. The switch can then be used only for higher switching outputs.

Engineering and installation notes

Penetration of condensate or dripping water, etc. along the valve spindle into the drive should be avoided.

The valve is plugged directly onto the drive and is fixed with screws (no further settings are needed). The drive is automatically connected to the valve spindle. When the device is delivered, the drive spindle is in the middle position.

The housing contains three breakthrough-type cable leadthroughs which are broken open automatically when the cable leadthrough is screwed in. The stepping motor/electronics concept guarantees parallel running of several valve drives of the same type. The cross-section of the connecting cable should be selected according to the line length and the number of drives. With five drives connected in parallel and a line length of 50 m, we recommend using a cable cross-section of 1.5 mm² (power consumption of the drive \times 5). The drive can be assembled with a maximum of one 230 V module, one additional accessory component (auxiliary switch or potentiometer) and the split range unit.

Warnings

If the temperature of the medium in the valve is high, the drive columns and the shaft may also reach high temperatures. It is necessary to ensure that the maximum ambient temperature be max. 55°C during operation. If the temperature exceeds this limit, it is recommended to insulate the valve (e.g. IKA insulation, see catalogue sheet 01-09.6).

If a failure of the final control element could cause damage, additional protective precautions must be taken.

CE -Conformity

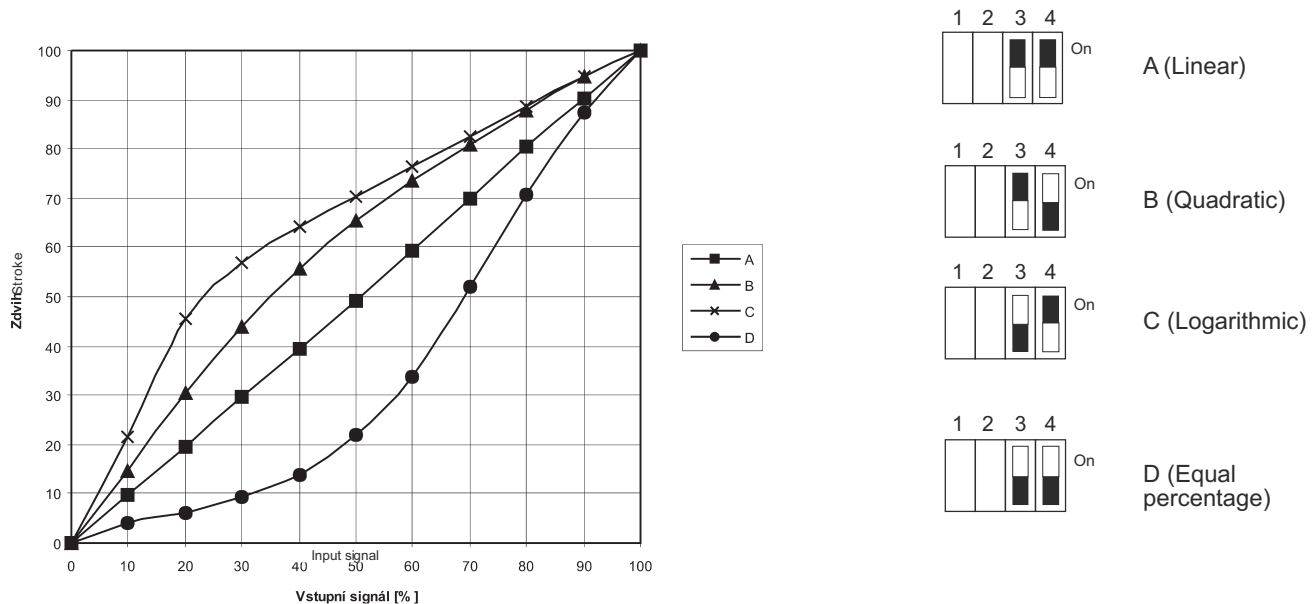
EMV Directive 2004/108/ES	Low Voltage Directive 2006/95/ES
EN 61000-6-2 *)	EN 60730 1
EN 61000-6-4	EN 60730-2-14
	Over-voltage category III
	Degree of pollution III

*) HF immunity, limitation of feedback signal between 80 MHz a 1000 Mhz criterion B, otherwise criterion A

Switch coding

Actuator characteristic (switches 3 and 4)
- optional for actuators with floating control only

Characteristics of the actuator

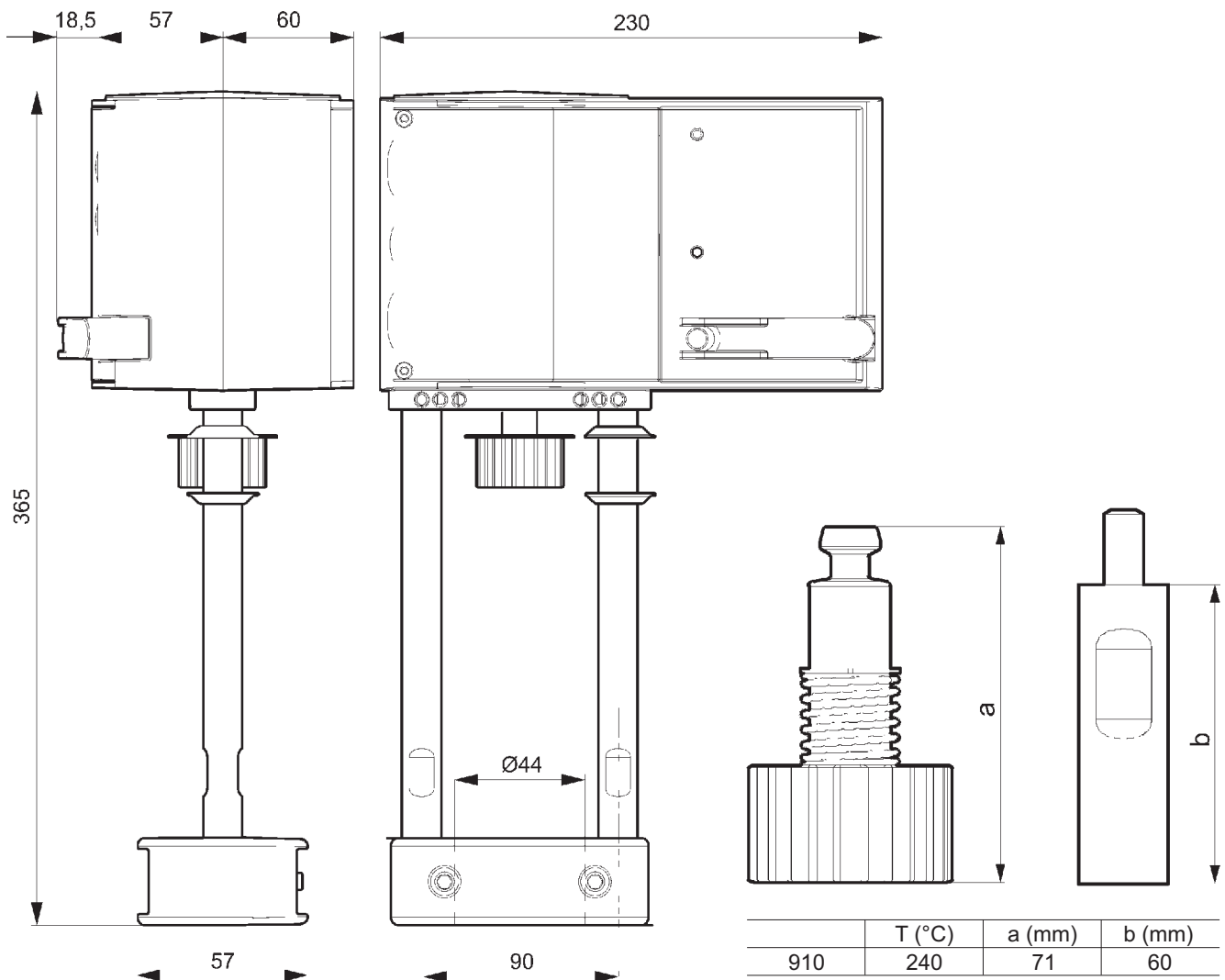


Run time (switches 1 and 2)
- optional for all types of control of the actuator

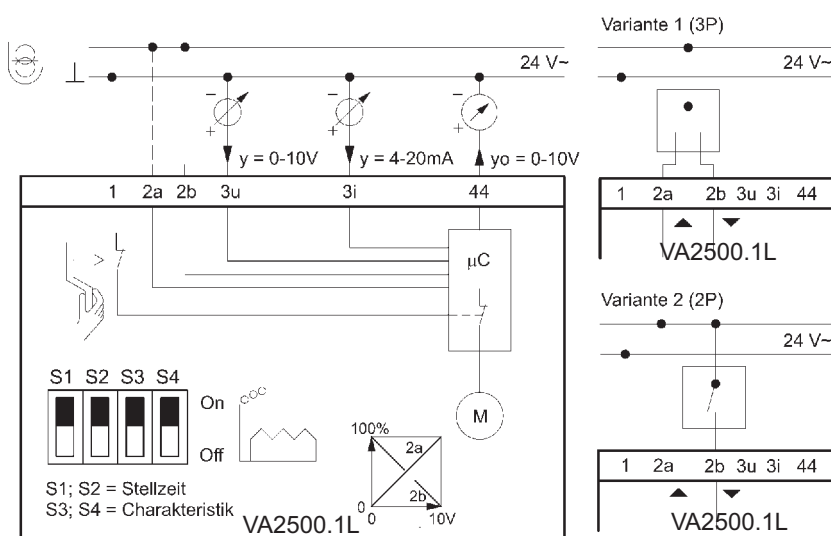
Run time per mm	Switch coding	Run time for 20 mm stroke	Run time for 40 mm stroke
2 s / mm		40 s ± 1	80 s ± 2
4 s / mm		80 s ± 2	160 s ± 4
6 s / mm		120s ±4	240s ±8

Note: Data in bold mean factory settings.

Dimensional drawings of the drive and the intermediate piece for higher temperatures

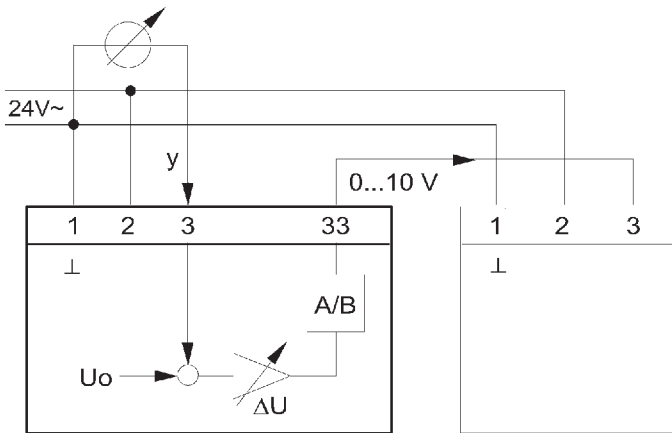


Wiring diagram of the actuator

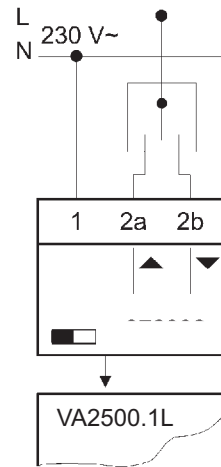


Connection diagram of the accessories

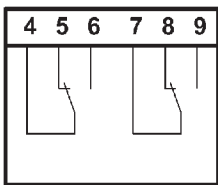
ZVA.SRU



ZVA.2



ZVA.S



ZVA.P2

