# Linear actuators for globe valves of $8 . . .20 \mathrm{~mm}$ lift 

Modulating actuator (AC/DC 24V)
Control signal DC $0 . . .10$ V

## Applications

The NV..-MFT-(E)T actuator is intended for motorizing globe valves by exerting an operating force on the valve stem in either a retracting or an extending direction.

## Mode of operation

Modulating control is effected by means of a standard signal of DC $0 . .10 \mathrm{~V}$.
The control signal is produced by the microprocessor and acts on the brushless motor. When the actuator is powered up for the first time the stroke is acquired automatically and stored in the microprocessor. The control signal and the running time are then adapted to suit that value of stroke. If no correct adaption is performed at that time (e.g. because there is no valve mounted) another adaption will be performed the next time the actuator is powered up. When the actuator is lifting and it reaches the seat for either VALVE OPEN or VALVE CLOSED the supply of current to the actuator is reduced. The actuator has an anti-blocking feature which, should dirt on the valve seat prevent it from closing properly, causes the actuator to move several times in the open and close directions over 1 to $5 \%$ stroke. When de-energized, the spindle of the NVF24-MFT-T retracts and that the NVF24-MFT-E-T extends.

## Functional reability

The actuator is short-circuit-proof and protected against polarity reversal. The stroke is adapted automatically.

## Manual operation

Inserting a 5 mm hexagonal key and turning it clockwise causes the spindle of the actuator to emerge from the housing (an extending action). The spindle will remain in that position until the power supply is applied (the controller has first priority).

## Position indication

The stroke is indicated mechanically on the UNV-... mounting bracket and the maximum stroke adjusts itself automatically. There is a two-colour LED status indicator under the cover of the housing.

## Safety note

The linear actuator contains no components which the user can replace or repair.

## Dimensions

The dimensions depend on the type of UNV-... mounting bracket used; see from Page 22.

## Arrangement of the operating controls



Under the cover of the actuator are the terminals for connecting the lead, the control devices S1, S2 and S3 and the LED indicator H1.

By setting the slide switch S3 appropriately or by pressing push-buttons S1 and S2 it is possible to configure the actuator very simply on-site to suit actual requirements when changes from the factory settings are needed.

LED indicator H1
see details on Page 20

## Functional description $S$

| Function | Description | Switch |  | Bold type in the table means standard factory setting. |
| :---: | :---: | :---: | :---: | :---: |
| Test | The valve covers the full stroke in maximum running time and verifies the adapted stroke to ensure that both end-points are reached ( $\mathrm{H}=0 \%$ and $\mathrm{H}=100 \%$ ). | $\begin{gathered} \text { S1 } \\ \text { press } \end{gathered}$ |  |  |
| Adaptation | The effected stroke (between the two mechanical end-stops of the valve) is acquired as $100 \%$ stroke and stored in the microprocessor. The control signal and running time are then matched to this $100 \%$ stroke. | $\begin{gathered} \mathrm{S} 2 \\ \text { press } \end{gathered}$ |  |  |
| Direction of stroke | The direction of travel in response to the control signal | S3.1 | Symbol | Effect |
| direct | $0 \%$ control signal corresponds to $0 \%$ position checkback. (The actuating spindle is then retracted or extended depending on the choice of closing point). | OFF |  |  |
| inverted | $0 \%$ control signal corresponds to $100 \%$ position checkback. (The actuating spindle is then retracted or extended depending on the choice of closing point). | ON |  |  |
| Closing point valve | The closing point is when the actuating spindle is either retracted or extended. There is no flow through the valve control path. | S3.2 | Symbol | Effect |
| up | The actuating spindle is retracted into the actuator and the valve stem is extended from the valve body. The position checkback shows 0\% for direct travel. | OFF | $\triangle$ |  |
| down | The actuating spindle is extended from the actuator and the valve stem is retracted into the valve body. The position checkback shows $0 \%$ for direct travel. <br> (This setting is not necessary with Belimo Type H4.., H5.., H6.. and H7.. globe valves.) | ON | $\nabla$ | 1) |

Only properly authorized and trained persons may change the settings of slide switch S3 and push-button S2.

1) Depending on the type of emergency function chosen, NVF24-MFT-T or NVF24-MFT-E-T, the electrical closing point is either identical to or opposite to the de-energized position of the actuator spindle. The type of actuator chosen depends on the design of valve involved and the required NO function (valve open when de-energized) or NC function (valve closed when de-energized).

## MFT

| Parameter | Standard | Variable |
| :--- | :--- | :--- |
| Control signal | DC 0...10 V | 3-point, Open/Closed |
| Operating range | DC $\mathbf{2 . . 1 0} \mathbf{V}$ | Start point DC 0.5...30 V <br> End point DC 2.5...32 V |
| Position checkback <br> U $_{5}$ | DC 2...10 V | Start point 0.5...8 V <br> End point $1.5 . .10 ~ V$ <br> Parameterizable for fault alarm |
| Running time | $\mathbf{1 5 0 ~ s}$ | $(35) 75 \ldots . .300 \mathrm{~s}^{1)}$ |

${ }^{1)} 35 \mathrm{~s}$ for 10 mm stroke

Multi-Function Technology allows optimum matching of parameters to the different needs of an installation. The parameters are either entered as standard values at the factory or altered subsequently using an MFT-H adjuster.

Bold type in the table means standard factory setting..

Wiring diagram NV24-3-T, NV230-3-T

| 3-point |  | Symbols |  |  |  |  |  |  | Actuator spindle moves |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\perp \sim \text { AC } 24 \mathrm{~V} \text { DC } 24 \mathrm{~V} / \begin{aligned} & \text { Connect via } \\ & \text { safety isolating } \\ & \text { transformer } \end{aligned}$ | $\stackrel{1}{=}$ L1 AC 230 V |  |  |  |  |  |  |  | $\begin{aligned} & \text { \|ccw } \\ & \frac{1 \mathrm{NV}}{\square} \end{aligned}$ |  |
| a b | $a \mid b$ |  |  | S1.1 |  | S1.2 | 0 | 0 | stationary | stationary |
|  |  | $\xrightarrow[\longrightarrow]{7.5 \mathrm{~s} / \mathrm{mm}}$ | $\Delta$ | OFF |  | OFF | 1 | 0 |  | OUT |
|  |  |  |  |  |  | 0 | 1 | IN |  |
|  |  |  | $\nabla$ | OFF |  |  | ON | 1 | 0 | IN |  |
|  |  |  |  |  |  | 0 |  | 1 |  | OUT |
|  |  | $\xrightarrow[\rightarrow]{4.5 \mathrm{~s} / \mathrm{mm}}$ | $\Delta$ | ON |  | OFF | 1 | 0 | IN |  |
| -12] |  |  |  |  |  | 0 | 1 |  | OUT |
| $\underset{+}{ \pm} \mathrm{Y}$ + Y2 | N Y1 Y2 NV230-3-T |  | $\nabla$ | ON |  |  | ON | 1 | 0 |  | OUT |
|  |  |  |  |  |  | 0 |  | 1 | IN |  |

In the case of the classic 3-point actuator (NV..-3-T) the actuating time can be reduced from $7.5 \mathrm{~s} / \mathrm{mm}$ to $4.5 \mathrm{~s} / \mathrm{mm}$ by moving the slide switch 1.1 to the «ON» position. With less than $20 \%$ of the valves used the closing point is in the down position so the slide switch S 1.2 can be set to the "ON» position.

## Wiring diagram NV24-MFT(2)-T, NVF24-MFT(2)(-E)-T, NVG24-MFT2



Setting the slide switch S 3.1 to the «ON» position inverts the control signal so that the valve closes as the control signal is increased. This is a simple way of matching the sequences in the actuator. With less than $20 \%$ of the valves used the closing point is in the down position so the slide switch S 3.2 must be set to the «ON» position. The position checkback signal $\mathrm{U}_{5}$ is also matched to the closing point.

## Wiring diagram NV24-MFT(2)-T, NVF24-MFT(2)(-E)-T, NVG24-MFT2



The MFT linear actuator NV..-MFT.. can also be used as a 3-point control device. However, in this case the actuator must be assigned parameters for 3-point control and be provided with a 4-wire connection. Note: It will only function with an AC $\mathbf{2 4 V}$ power supply!

