# VA-7450
# Electronic Terminal Unit Valve Actuator

## Introduction

*The VA-7450 Series provides floating or proportional control in HVAC (Heating, Ventilating, and Air Conditioning) applications. The compact design of this actuator makes it suitable for installation in confined spaces, such as fan coil applications.*

*The VA-7450 series actuator is designed for field mounting onto VG5000 and VB5040-S forged brass valves (see pertinent bulletin).*

**VA-7450 microprocessor-based actuator with VG5000 (left) and VB-5040-S (right) valves**

| Features and Benefits | |
|---|---|
| ❑ **Automatic calibration** | Simplifies installation; requires no calibration |
| ❑ **Selectable linear or equal percentage characteristic** | Provides optimal control function |
| ❑ **Compact design** | Allows installation in confined spaces (fan coils, etc.) |
| ❑ **Can be mounted after valve body is installed** | Simplifies installation; allows application flexibility |
| ❑ **Actuator can be rotated after mounting** | Provides easier wiring by locating the wiring entry in any direction |
| ❑ **Periodic full cycle (anti-sticking) option** | Keeps plug and seat clear of impurities |
| ❑ **LED operating status display** | Reduces the commissioning time and display operating status |
| ❑ **Motor Time-out Feature** | Provides higher reliability by deactivating the actuator motor at ends of stroke |


Order No. DS 10.469 E

# Ordering data

**VA-7450-1001**
3-point actuator, 24 VAC power supply

**VA-7452-1001**
0..10 VDC input actuator
Fixed settings: no anti-sticking, linear characteristic, direct action

**VA-7452-9001**
Configurable actuator with voltage input 0..10, 0..5 or 5..10 VDC
See "Adjustments" for more information.
Special models with other cable lengths are available on request.

# Actuator combinations

The VA-7450 series electronic valve actuators are designed to be used with the VG5000 and VB-5040-S valve series. An adapter is required when used in combination with VB-5040-S valve series. The ordering data for these valve bodies and adapters are as follows:

- **VG5000 series**

| | |
|---|---|
| **VG52□0□C** | **2-way Push Down To Close (Normally Open) series** |
| **VG54□0□C** | **2-way Push Down To Open (Normally Closed) series** |
| **VG55□0□C** | **3-way mixing with built-in Normally Open bypass** |
| **VG58□0□C** | **3-way mixing** |

**Option**: VA-7450-8900 manual override accessory (See "Dimensions")
Please refer to the product bulletin "VG5000 Forged Brass Valves" for complete ordering information.

- **VB-5040-S series** (male connections)

| | |
|---|---|
| **VB-5440-S□□□□** | **2-way Push Down To Open (Normally Closed) series** |
| **VB-5540-S□□□□** | **3-way with built-in Normally Open bypass series** |
| **VB-5840-S□□□□** | **3-way mixing** |
| **VB-5000-8045** | **Adapter set to be ordered separately (pack of 10)** |

Please refer to the product bulletin "VB-5040-S Forged Brass Valves ½" and ¾" male thread" for complete ordering information.

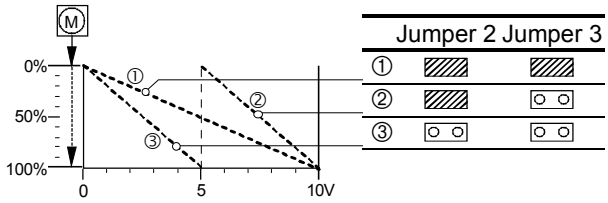
# Operation

**Floating models (VA-7450-xxxx series)**
See also VG5000 or VB-5040-S product bulletins for valve operation.

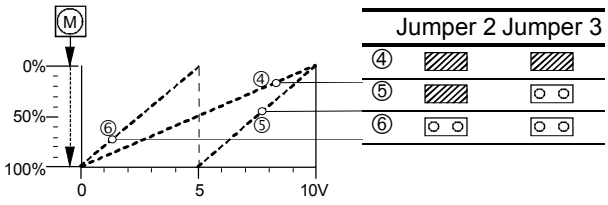
| | | |
|---|---|---|
| Red cable energised | M ↓ | Actuator stem extends |
| White cable energised | M ↑ | Actuator stem retracts |

When the signal is applied to the Blue and Red wires, the actuator motor drives to gear assembly, and pushes down on the valve stem against the force of the valve return spring. When the signal is removed, the actuator remains in position.
The signal remain applied to the Up or Down wire, the actuator will time out and shut off the motor after approximately 80 seconds.
**End of stroke Confirmation:** When the signal is applied continuously in the same direction, the actuator turns on every 2 hours and drives in the signal direction for approximately 80 seconds to confirm the end of stroke position.

**Proportional models (VA-7452-xxxx series)**
See also VG5000 or VB-5040-S product bulletins for valve operation.
The **VA-7452-1001** has fixed settings (see curve ① below)
The **VA-7452-9001** is configurable:
Jumper 5 "Direct Action" ▨




Jumper 5 "Reverse Action" ○○



When the signal increases in Direct Action (DA) configuration or decreases in Reverse Action (RA) configuration, the actuator motor drives the gear assembly, and pushes down on the valve return spring.
When the signal decreases in DA configuration or increases in RA configuration, the actuator retracts and allows the valve return spring to move the valve stem in the direction of its normal position or up.
**End of Stroke Confirmation:** When the input signal is at 0 or 100% continuously, the actuator turns on every 2 hours and drives in the signal direction for approximately 80 seconds to confirm the end-of-stroke position.
**Auto-Zero Calibration:** when the power is applied, the actuator self-calibrates to the full stroke end position by performing a complete cycle. The actuator drives in the stem down direction for approximately 80 seconds, then drives to the input signal command position.
**Anti-Sticking Cycle**: When the anti-sticking cycle is enabled (On), the actuator performs one complete cycle every 24 hours to clear possible accumulation of impurities from the valve plug and seat. The anti-sticking feature is jumper selectable, (see page 4).
**Characteristic**: the actuator can be set to perform linear or equal percentage flow characteristic when used in combination with VG5000 valves series.
**Valve Selection**: the actuator is factory set for use with 2-way Push Down to Close (PDTC) VG5200 valves. For 2-way Push Down To Open (PDTO) VG5400 valve applications, change the valve normal position jumper to PDTO. For 3-way VG5000 valve applications, set the valve body type jumper to 3-way and set the valve normal position jumper to correspond to the service port of the valve (See Adjustments Jumper setting on page 4).
Setting the Valve normal position jumper
**Operating display**

| **LED Indication** | | |
|---|---|---|
| **On** | ☼ | Power line present, motor not running **(*)** |
| **Single Blinking** | ◑ | Motor running |
| **Double Blinking** | ◑ ◑ | End-of-stroke confirmation cycle or anti-sticking cycle |
| **Off** | ● | Power line not present |

(*) Note: Proportional model: when in control.
Floating model: time out, motor not running.

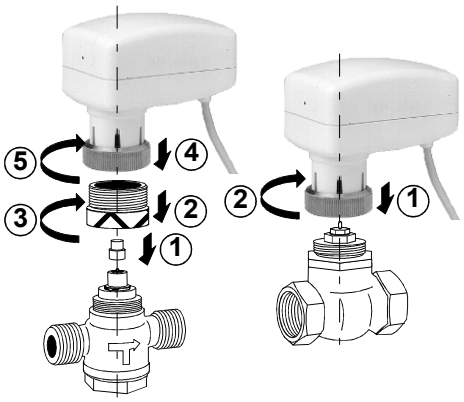
## Valve Action Summary

See “Operation” for information about spindle movement.

| Valve Code | Valve Type | Stem movement / flow ▶ = flow ▷ = no flow |
|---|---|---|
| VG52x0xC | 2-way NO, PDTC *) | Actuator spindle down / Actuator spindle up |
| VG54x0xC VB-5440-Sxxxx | 2-way NC, PDTO *) | Actuator spindle down / Actuator spindle up |
| VG55x0xC VB-5540-Sxxxx | Return, Supply, 3-way + NO ByPass | Actuator spindle down / Actuator spindle up |
| VG58x0xC VB-5840-Sxxxx | 3-way, mixing | Actuator spindle down / Actuator spindle up |

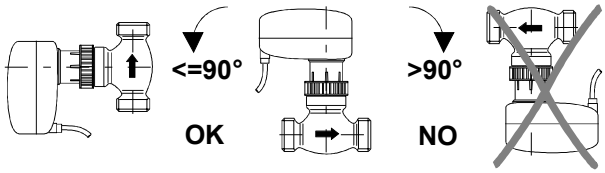
## Mounting instructions

When mounting the actuator on a VG5000 or a VB-5040-S valve, please follow the instructions below:
Mount the VB-5000-8045 adapter set when used with VB-5040-S only (steps ①,②,③)




*VB-5040-S* *VG5000*

- Never use the actuator as a mounting lever.
- Mounting position:



## Wiring instructions

**WARNING**

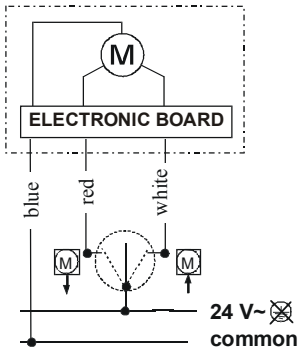
When servicing make sure that:

- the electric supply to the actuator is switched off to avoid possible damage to the equipment, personal injury or shock.
- you do not touch or attempt to connect or disconnect wires when electric power is on.

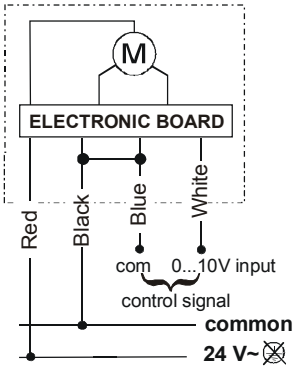
When wiring the actuator, please follow the instructions below:

- Before mounting, wiring or adjusting the actuator, make sure that the power supply has been disconnected to avoid possible harm to material or person.
- Make sure that the line power supply is in accordance with the power supply specified on the actuator.
- All wiring should conform to local codes and must be carried out by authorised personnel only.

## Wiring Diagrams




**Incremental model**



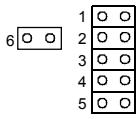

**Proportional model**

## Adjustments (Jumper settings)

(For proportional models only).
**VA-7452-1001** has FIXED settings (the jumpers are NOT accessible)
**VA-7452-9001** is fully configurable

This is how the jumpers are positioned on the board:

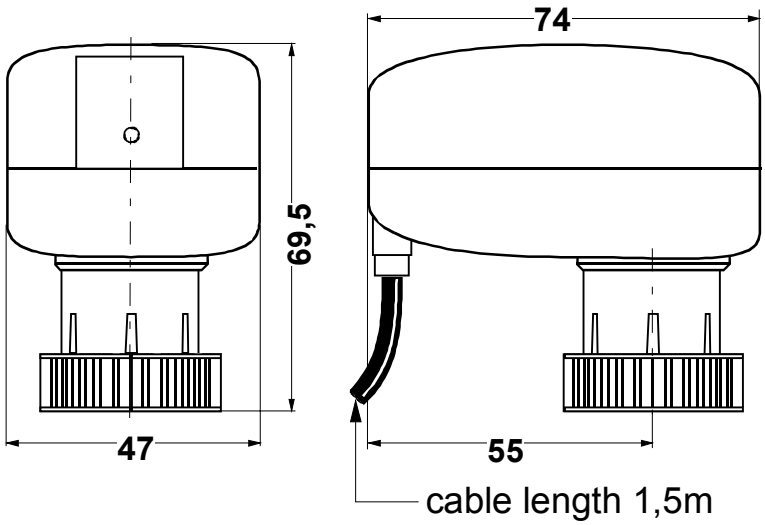
Jumper in place:
Jumper removed:



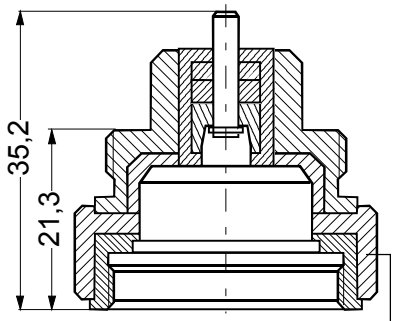

| Function | Jumper No. | VA-7452-9001 (adjustable) | | VA-7452-1001 (fixed settings) |
|---|---|---|---|---|
| | | Factory setting | Alternative setting | |
| **Anti-sticking** | 1 | active | not active | not active |
| **Input control signal** | 2<br>3 | 0..10V | 5..10V / 0...5V | 0...10 V |
| **Flow characteristic *)** | 4 | linear | equal percentage (VG5000 only) | linear |
| **Action** | 5 | Direct (DA) | Reverse (RA) | Direct (DA) |
| **Body type** | 6 | 2-way PDTO (NC) and 3-way Normally Closed port | 2-way PDTC (NO) valve bodies | 2-way PDTO (NC) and 3-way Normally Closed port |

***)** In combination with VB-5040-S valve bodies, Jumper 4 must be set to linear
On VG5000 series with Kvs 0,25 and 0,4 . These is always quick characteristic independent from jumper setting.

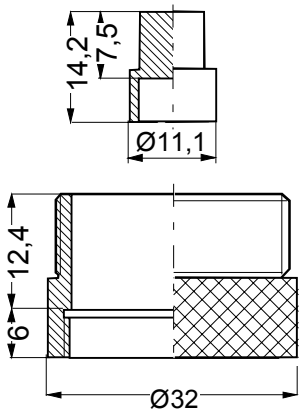
## *D* imensions (in mm)




**VA-7450 actuator**




**VA-7450-8900 manual override ring accessory** (optional) for combination with VG5000 valve bodies.
It is used to manually open PDTO valves or the Normally Closed port of 3-way valves. It is to be mounted between the valve and the actuator.
Note: The manual override ring will not fully close PDTC valves or the Normally Opened port or 3-way valves.




**Adapter set VB-5000-8045** for combination with VB-5040-S valve bodies

# Specifications

| Models: | VA-7450-1001 | VA-7452-1001: fixed settings<br>VA-7452-9001: configurable |
|---|---|---|
| Action/Control: | Incremental<br>(floating or PAT) | Proportional<br>(0...10 V, 0...5 V or 5...10 V) |
| Supply voltage (50/60 Hz): | 24 VAC ± 15% | |
| Input impedance: | - | 80 kΩ |
| Power consumption: | | |
| Apparent | 5 VA at max. power supply | |
| Active | 2,5 W | |
| Nominal force: | 120 N +30% / -20 % | |
| Maximum stroke: | 5 mm | |
| Full stroke time: | 45 seconds for 3 mm stroke | |
| Protection: | IP40 (EN 60529) | |
| Connection to Valves: | M28x1,5 for VG5000 series valves | |
| Ambient Operating condition: | 0 to +50 °C, non condensing | |
| Ambient Storage condition: | -20 to +65 °C, non condensing | |
| Electrical connections: | 1,5 m long flexible cable, ø 4,5 mm | |
| Operating status: | LED display | |
| Shipping Weight: | 0,18 Kg | |
| CE Compliance: | EMC (89/336 EEC) according to the standard EN 50081-1 and EN 50082-1 | |

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office.*
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