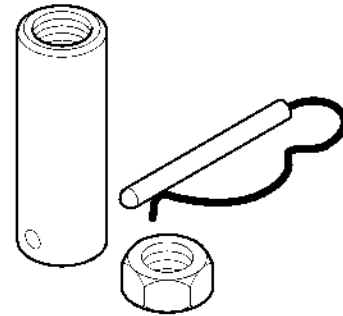


***Pneumatic Actuator Valve Linkage Kit  
General Instructions***

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## **Application**

The AV-401 valve linkage kit is used to field assemble MK-4600 series pneumatic actuators to a variety of 1/2" through 2" valve bodies.



## **Features**

- Kit fits both current and obsolete Siebe Environmental Controls (Barber-Colman) valve bodies

## **Applicable Literature**

- Invensys Building Systems Cross-Reference Guide, F-23638
- Invensys Building Systems Reference Manual, F-21683
- Invensys Building Systems Application Manual, F-21335
- Invensys Building Systems Catalog, F-25683
- MK-4600 Series, Pneumatic Valve Actuator General Instructions, F-13894
- Invensys Building Systems Valve Selection Guide, F-26094
- EN-205 Water System Guidelines, F-26080

# SPECIFICATIONS

Refer to Table-1 to select compatible valves and actuators for use with the AV-401 linkage kit. Refer to Table-2 and Table-3 for a listing of the combinations of obsolete valve bodies and actuators used with the AV-401 linkage kit.

**Table-1 VB-7XXX Series Valve and Actuator Selections for Use With AV-401 Linkage.**

| Valve Assembly Number †                   | Actuator Number               | Spring Range         | Valve Body Number Standard, No Linkage |                |                             | Set Stem Height (Dim. "X") in. (mm) |
|---|-------------------------------|----------------------|--|----------------|-----------------------------|-------------------------------------|
|   |                               |                      | Angle                                  | Straightway    | 3-Way                       |                                     |
| VK-7211-301<br>VK-7211-303                | MK-4601<br>MK-4621            | 3-6<br>10-13         | VB-7211-0-3-XX                         | —              | 1-1/32<br>(26)<br>Stem Down |                                     |
| VK-7211-301<br>VK-7211-302<br>VK-7211-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | —                                      | VB-7211-0-4-XX |                             |                                     |
| VK-7212-301<br>VK-7212-302<br>VK-7212-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7212-0-4-XX |                             |                                     |
| No factory assembly available ‡           | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7213-0-4-XX |                             |                                     |
| VK-7214-301<br>VK-7214-302<br>VK-7214-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7214-0-4-XX |                             |                                     |
| VK-7221-301<br>VK-7221-302<br>VK-7221-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7221-0-4-XX |                             | —                                   |
| VK-7222-301<br>VK-7222-302<br>VK-7222-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7222-0-4-XX |                             |                                     |
| VK-7223-301<br>VK-7223-302<br>VK-7223-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | VB-7223-0-4-XX                         |                |                             |                                     |
| No factory assembly available ‡           | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | VB-7224-0-4-XX                         |                |                             |                                     |
|   | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | VB-7253-0-4-XX                         |                |                             |                                     |
|   | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | VB-7263-0-4-XX                         |                |                             |                                     |
|   | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | VB-7273-0-4-XX                         |                |                             |                                     |
|   | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | VB-7283-0-4-XX                         |                |                             |                                     |
| VK-7312-301<br>VK-7312-302<br>VK-7312-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 | —                                      | VB-7312-0-4-XX | 1-15/32<br>(36)<br>Stem Up  |                                     |
| VK-7313-301<br>VK-7313-302<br>VK-7313-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7313-0-4-XX |                             |                                     |
| No factory assembly available ‡           | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7323-0-4-XX |                             |                                     |
|   | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-7314-0-4-XX |                             |                                     |
| VK-7332-303<br>VK-7332-313                | MK-4621<br>MK-4621-422        | 10-13<br>10-11 1/4   |  | VB-7332-0-4-XX |                             | 1-1/4<br>(32)<br>Stem Down          |

†VK4-7XXX-0-4-XX; indicates valve assembly with positive positioner.

‡Purchase actuator, linkage, and valve body separately.

**Table-2 Obsolete VB-9XXX Valve Bodies Using AV-401 Linkage Kit.**

| Valve Assembly Number †                   | Actuator Number               | Spring Range         | Valve Body Number Standard, No Linkage |                |                | Stem Height in. (mm)        |
|---|-------------------------------|----------------------|--|----------------|----------------|-----------------------------|
|   |                               |                      | Angle                                  | Straightway    | 3-Way          |                             |
| VK-1115-401<br>VK-1115-421                | MK-4601<br>MK-4621            | 3-6<br>10-13         | VB-111-0-3-XX                          | —              |                |                             |
| VK-9211-301<br>VK-9211-302<br>VK-9211-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9211-0-4-XX |                |                             |
| VK-9212-301<br>VK-9212-302<br>VK-9212-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9212-0-4-XX |                | 1-1/32<br>(26)<br>Stem Down |
| VK-9213-301<br>VK-9213-302<br>VK-9213-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9213-0-4-XX |                |                             |
| VK-9214-301<br>VK-9214-302<br>VK-9214-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9214-0-4-XX |                |                             |
| VK-9221-301<br>VK-9221-302<br>VK-9221-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9221-0-4-XX |                |                             |
| VK-9222-301<br>VK-9222-302<br>VK-9222-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9222-0-4-XX | —              | 1-3/8<br>(35)<br>Stem Up    |
| VK-9223-301<br>VK-9223-302<br>VK-9223-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9223-0-4-XX |                |                             |
| VK-9224-301<br>VK-9224-302<br>VK-9224-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9224-0-4-XX |                |                             |
| VK-9253-301<br>VK-9253-302<br>VK-9253-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9253-0-4-XX |                | 1-1/32<br>(26)<br>Stem Down |
| VK-9263-301<br>VK-9263-302<br>VK-9263-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9263-0-4-XX |                | 1-3/8<br>(35)<br>Stem Up    |
| VK-9273-301<br>VK-9273-302<br>VK-9273-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9273-0-4-XX |                | 1-1/32<br>(26)<br>Stem Down |
| VK-9283-301<br>VK-9283-302<br>VK-9283-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  | VB-9283-0-4-XX |                |                             |
| VK-9312-301<br>VK-9312-302<br>VK-9312-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  |                | VB-9312-0-4-XX | 1-3/8<br>(35)<br>Stem Up    |
| VK-9313-301<br>VK-9313-302<br>VK-9313-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  |                | VB-9313-0-4-XX |                             |
| VK-9314-301<br>VK-9314-302<br>VK-9314-303 | MK-4601<br>MK-4611<br>MK-4621 | 3-6<br>5-10<br>10-13 |  |                | VB-9314-0-4-XX |                             |
| VK-9332-303<br>VK-9332-313                | MK-4621<br>MK-4621-422        | 10-13<br>10-11 1/4   |  |                | VB-9332-0-4-XX | 1-1/4<br>(32)<br>Stem Down  |

† VK4-7XXX-0-4-XX; indicates valve assembly with positive positioner.

**Table-3 Obsolete Valve Bodies Using AV-401 Linkage Kit.**

| Valve Type              | Valve Assembly Number † | Actuator Number | Spring Range | Valve Body Number Standard, No Linkage |                             | Stem Height Setting for AV-401 (Dim. "X") in. (mm) |                      |
|-------------------------|-------------------------|-----------------|--------------|--|-----------------------------|--|----------------------|
|                         |                         |                 |              | Angle                                  | Straightway                 |  |                      |
| Radiator (Union End)    | VK-1115-401-4           | MK-4601         | 3-6          | --                                     | VB-111-0-4-X                | 1-1/16 (27) Stem Down                              |                      |
|                         | VK-1115-421-4           | MK-4621         | 10-13        |  |                             |  |                      |
| Globe Screwed N.C.      | VK-1515-401             | MK-4601         | 3-6          |  | Replace with VK-9223 Series | VB-151-0-1-X                                       | 1-13/32 (36) Stem Up |
|                         | VK-1515-421             | MK-4621         | 10-13        |  |                             |  |                      |
|                         | VK-2455 Obsolete        | MK-4600         |              |  |                             |  |                      |
| Globe Screwed 3-Way     | VK-3145-401             | MK-4601         | 3-7          | VB-314-0-1-X                           |                             | 1-1/16 (27) Stem Down                              |                      |
|                         | VK-3145-411             | MK-4611         | 5-10         |  |                             |  |                      |
|                         | VK-3145-421             | MK-4621         | 8-13         |  |                             |  |                      |
| Sequencing Flared 3-Way | VK-3345-411             | MK-4611         | 5-10         | VB-334-0-5-4                           |                             | 1-1/4 (32) Stem Down                               |                      |

† No longer available - see the Maintenance Parts Catalog, F-26033 for available maintenance and repair parts.

## Required Components

Selecting the valve assembly number from Table-1 specifies a complete assembly of an actuator, valve body, and the AV-401 linkage kit. If no valve assembly number is available the actuator, valve body, and AV-401 listed in Table-1 must be purchased separately.

## INSTALLATION

### Inspection

Inspect the package for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for obvious damage. Return any damaged products.

### Requirements

- Tools (not provided):  
Appropriate hand tools for field service.
- Training:  
Installer must be a qualified, experienced technician

### ▼ CAUTION

- Avoid locations where excessive moisture, corrosive fumes, or vibration are present. Do not insulate above actuator mounting nut trapping moisture.
- Install all two-way valves so that they close against the flow. An arrow on the valve body or a tag indicates the proper flow direction.
- Install all three-way mixing valves with two inlets and one outlet.
- Install all three-way diverting valves with one inlet and two outlets.
- Do not install the actuator below the center line of the valve. For steam applications only, mount the actuator above the valve body at 45° from vertical.

### Mounting

1. Actuators can be mounted in any upright position above the centerline of a valve body.
2. When selecting a location, allow sufficient room for accessories and for service of the product.
3. Maintain proper flow direction when installing all globe and radiator-type valves. Flow direction is indicated by an arrow on the valve body or by information on the attached tag.

## ASSEMBLY PROCEDURE

### NOTE

For current valves refer to Table-1 to maintain the proper stem height during assembly.  
For obsolete valves see Table-2 or Table-3.

1. Thread the locknut and the stem extension several turns onto the valve stem (Figure-1).

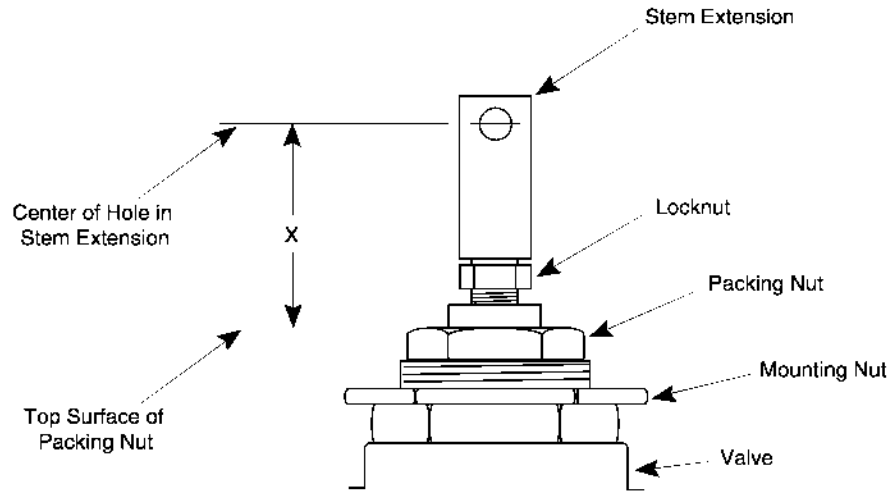


Figure-1 Assembly of AV-401 Linkage Kit onto Valve.

2. Push or pull the valve stem to the position (stem up or stem down) noted in Table-1, Table-2, or Table-3.
3. Adjust the height of the stem extension as indicated in Table-1. This height (dimension "X") is measured from the top surface of the packing nut to the center of the hole in the stem extension (Figure-1).
4. Holding the stem extension stationary, tighten the locknut against it to secure it in position on the stem.
5. Install the actuator onto the valve by screwing the actuator base onto the mounting nut (Figure-2). The actuator may be rotated as desired to facilitate making the pneumatic connection.

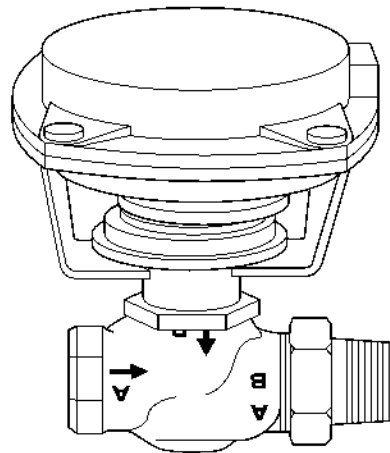


Figure-2 MK4600 Actuator Mounted on Valve.

6. Apply air pressure to the actuator so that the holes in the stem extension and the actuator stem are aligned. Insert the connecting pin into the aligned holes.

## MAINTENANCE

The actuator linkage requires no maintenance.

Regular maintenance of the total system is recommended to assure sustained, optimum performance. Hard water leaves abrasive deposits and reduces component life. To maximize valve life consult **EN-205, Water System Guidelines, F-26080**.

## FIELD REPAIR

Individual parts of the actuator linkage are not repairable. Replace an inoperative actuator linkage with a functional unit, or replace individual parts as necessary (Figure-3).

**Table-4 AV-401 Replacement Parts.**

| Item<br>(See Figure-3) | Part No.  | Description          |
|------------------------|-----------|----------------------|
| 1                      | YBA-539-1 | Stem Extension       |
| 2                      | BDHE-136  | Valve Connecting Pin |
| 3                      | YBA-519   | Locknut              |

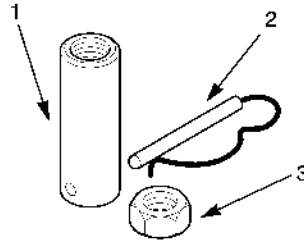


Figure-3 AV-401 Pneumatic Actuator Valve Linkage Kit.



