

# Actuators

## AND ACCESSORIES

Two position valves switch back and forth between Load and Inject, or Position A and Position B. Selectors operate in continuous revolutions by incremental steps. There are several ways to actuate each type of valve, along with a number of supporting controllers and devices to interface the actuators with computer-controlled systems.

With the exception of low pressure Cheminert selectors, we recommend that selectors be purchased with air or electric actuators. While a manual detent assembly is available, the higher turning torque of our other selector designs makes them more difficult to position accurately by hand.

### Manual Actuation

Simplicity and low cost are the main advantages of manual actuation. Some models can be ordered with position feedback, an option which sends a signal to start a data system when the valve is switched.



**Manual**  
page 204

### Air Actuation

Air actuators are useful in situations where any spark could be disastrous or where there is no electricity available. They are small, relatively inexpensive, very rugged and dependable, and field serviceable. Low gas consumption and lightweight, compact construction make the air actuator suitable for aerospace flight hardware applications as well as laboratory or process applications.

With the addition of a DVI (digital valve interface) to translate the timed event signals into the necessary air pulses, air actuators can be automatically switched by a data system, integrator, or controller.



**Air actuator**  
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### MORE INFORMATION

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## Electric Actuation



**Microelectric actuator**  
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The **microelectric actuator** features automatic valve alignment, high-speed switching, compact size, 24 VDC power input, and reversible direction (in the selector model).

Microelectric actuators can be operated manually with a controller assembly that features position-indicating LEDs and a toggle switch, or can be easily connected to an external data system for fully automated control. Built-in multidrop RS-232 (RS-485 optional) facilitates bidirectional communications.

The new **universal actuator** operates virtually any Valco or Cheminert rotary valve – two position and selector alike – greatly simplifying the electronic aspect of instrument design. A manual controller is included; current interface options include RS232/485, USB, and BCD.

A **modular universal actuator**, also available, is fully backward-compatible with multiposition microelectric actuator models EMH and EMT. Like the universal actuator, it can also be used for two position valves.



**Microelectric actuator**  
For selectors, page 192



**Universal actuator**  
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**Modular universal actuator**  
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## Standoff Assemblies



**Standoff assemblies**  
page 205

All valves, no matter what their actuation mode, can be ordered with a standoff assembly. The standoff is an extension shaft mounted between the handle or actuator and the valve, allowing the valve to be installed within a heated zone while the actuator or handle remains outside at ambient temperature. The standoff extends through the oven wall, and is secured by a clamp ring supplied with the assembly. Standard standoff assembly lengths are 2", 3", 4", and 6". Other lengths can be special-ordered at additional cost.

## Right Angle Drive

Some installations don't allow the valve and actuator to be installed in a typical in-line configuration. The RAD (right angle drive) is a 90° gearbox which permits the actuator or handle to be installed at a right angle to the valve. The RAD fits all VICI electric and air actuators.



**Right angle drive**  
page 204

ACTUATORS AND ACCESSORIES

## Microelectric actuators for two position valves

- CE certified
- Automatic alignment via stall-sensing circuitry – no mechanical microswitches
- Manual remote control with position indication
- High speed switching – <100 ms in EQ model
- RS-232 bidirectional communication (switchable RS-485)
- Universal power supply, 110/230 VAC to 24 VDC



The two position microelectric actuator features exclusive stall-sensing circuitry which eliminates problems associated with valve/actuator misalignment. Power to the actuator motor is switched off when the driver pin goes against the stop of the valve cutout – no sooner, no later – and it’s all done without any mechanical microswitches. Not only does this mean that alignment problems are a thing of the past, it means that you can stock one actuator for valves that turn 30°, 36°, 45°, 60°, 90°, or anything in between. During initialization, the valve rotates at moderate speed while the actuator waits to sense the stall. Once the rotation angle has been measured and confirmed by repetition, the angle is memorized and actuation takes place at maximum speed. Valve position memory is maintained even in the event of a power failure. There is nothing more to do unless you wish to install a valve with a different angle of rotation. In that event, cycling the actuator with no valve mounted sets up reinitialization.

Since different valve models have varying actuation torque requirements, there are five microelectric actuator models – EQ, EH, EP, ED, and ET. Consult the chart on the facing page to determine which model meets your requirements. When a valve and actuator are ordered at the same time, the proper actuator is supplied automatically.

An actuator can be specified with closemount hardware, with a standoff, or with just the standoff mounting hardware, if your valve already has a standoff. The microelectric actuator is designed for room temperature use, so valves which will be mounted in ovens require a standoff assembly to locate the actuator out of the heated zone.

The microelectric actuator consists of a control module, a stepper motor/gearbox assembly, a manual remote control, interconnecting cables, and a 110/230 VAC to 24 VDC power supply. The RS-232 interface cable, if required, must be ordered separately. (See facing page.)

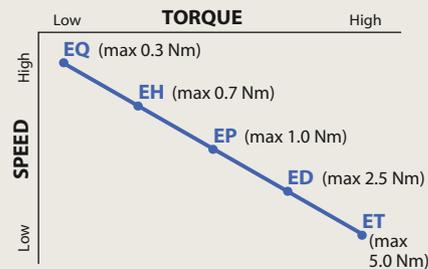
### WHICH MODEL FOR WHICH TWO POSITION VALVE?

Fitting size	Valve type	Actuator model	Valve type	Actuator model
		<b>Valco GC</b>	<b>Valco HPLC</b>	
1/32"	W	EH	W	EP
1/16"	W	EH	W	EP
1/16"	UW	ED	UW	ED
1/8"	UW	ED	UW	ED
1/4"	MW	ET	—	—

### Cheminert HPLC & Low Pressure

Model C72X	
8 and 10 ports	ED
All other valves	EH

### SPEED AND TORQUE: Inversely proportional



### Microelectric actuators

for two position valves

Standard voltage 24 VDC. Includes autosensing 24 VDC power supply. Standoff version includes a 2" standoff. 3", 4", and 6" standoffs are also available. Consult the chart below left to determine which actuator model is best suited for your valve.

Description	With closemount assembly	With 2" standoff assembly	For use with existing standoff
	Prod No	Prod No	Prod No
Highest speed actuator	EQ	EQ2	EQS
High speed actuator	EH	EH2	EHS
Medium torque actuator	EP	EP2	EPS
High torque actuator	ED	ED2	EDS
Highest torque actuator	ET	ET2	ETS

### MORE INFORMATION

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 Microelectric actuators for selectors . . . . 192  
 Right angle drive . 204  
 Standoff assembly 205  
 Standoff mounting hardware . . . . . 205

### ORDER TIP

To purchase a **two position valve with a microelectric actuator installed**, see valve ordering information.  
 Valco injectors and valves . . . 98-117  
 Cheminert injectors and valves . 146-169, 181, 183

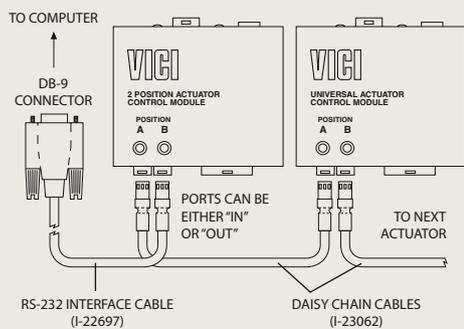
### RS-232 interface cable

Description	Prod No
RS-232 interface cable	I-22697

#### DAISY CHAIN CABLES

Daisy chain cables permit a single serial port (RS-232) to control multiple actuators – newer two position microelectric and universal.

See Technical Note 421 for further information..



**NEW**

#### Daisy chain cables

for newer two position microelectric actuators and universal actuators

- More layout flexibility
- More economical than multi-drop configuration

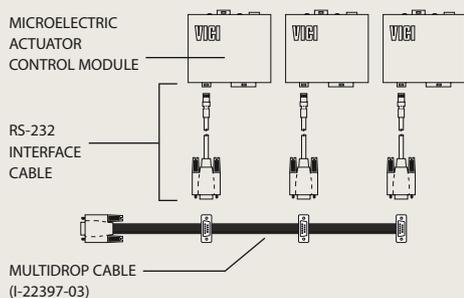
The newly redesigned two position microelectric actuator controller on the facing page (differentiated by a plastic housing instead of a metal one) allows multiple units to be daisy-chained for control from a single serial port. Universal actuators with the RS232/485 option (page 193) can be included in the series, if desired. A chain of actuators requires only one RS-232 interface cable, plus a 3-pin daisy chain cable for each actuator – a more flexible and economical solution than the multi-drop cable application described below.

For lengths other than the 55 cm cable listed, please contact our technical support department. Note that cable lengths should be shorter than one meter for reliable RS-232 communication; longer lengths can affect the signal integrity.

Length	Prod No
55 cm	I-23062

#### MULTI-DROP CABLES

Multi-drop cables permit a single serial port (RS-232) to control multiple actuators – microelectric and universal.



#### Multi-drop cables

for microelectric and universal actuators

- Work with all VICI microelectric and universal actuators (RS232/485 option)

Multi-drop cables permit a single serial port (RS-232) to control any combination of microelectric actuators (two position and multiposition, any vintage) and universal actuators with the RS232/485 option (page 193). These ribbon cables have one female DB9 and 2 to 8 male DB9 connectors, spaced at approximately 6".

Note: An RS-232 interface cable (I-22697), above, is required for **each** actuator.

No. of actuators to be controlled	Prod No
2	I-22897-02
3	I-22897-03
4	I-22897-04
5	I-22897-05
6	I-22897-06
8	I-22897-08

#### TECH TIP

Electric actuators can be directly controlled by signals from microprocessor-based instruments, data systems, or valve programmers, unlike air actuators, which require an interface to convert the signal to an air pulse.

#### MORE INFORMATION

Universal actuators . . . 193

#### Plug-and-play cables

for two position microelectric actuators

Plug-and-play cables will allow a direct connection and control between a specific instrument and the microelectric two position actuator. Contact technical support for other instruments.

Relay assembly	Prod No
Two position microelectric actuator to	
Agilent 6890 GC	V-RA-24VDC-HP6890
Agilent 7890 GC	V-RA-24VDC-HP6890
Varian 3800 GC	V-RA-24VDC-VA3800
Agilent 1100 LC	V-RA-5VDC-HP1100
Waters Alliance LC	V-RA-5VDC-WA2690

**ACTUATORS AND ACCESSORIES**

## Microelectric actuators for selectors

- CE certified
- Direction reversal
- Position indication
  - LED display
  - RS-232 output
  - BCD 5V negative true output
- Manual control
  - Step and home functions
  - Clockwise and counterclockwise functions
- Remote control
  - Step and home functions with contact closure
  - Direct position access with BCD 5V negative true input
  - Direct position access with RS-232 input (RS-485 optional)
- Automatic self-alignment with keyed valves and standoffs
- Universal power supply, 110/230 VAC to 24 VDC



One actuator can be used on any selector, from 2 to 96 positions – you tell the actuator how many stops to make through its 360° of rotation. So you can stock only one type of actuator even if you have 4, 6, 8, 10, 12, and 16 position valves. Valve position memory is maintained even in the event of a power failure. The direction reversal feature means that if a 6 position stream selection valve is on stream 1 and you select stream 6, you have the option of stepping “backwards” to stream 6 instead of passing through 2, 3, 4, and 5. The RS-232 input offers various commands like position

access, direction control, shortest route, etc. (The RS-232 cable must be ordered separately. *See below.*) An actuator can be specified with closemount hardware, with a standoff, or with just the standoff mounting hardware, if your valve already has a standoff. The microelectric actuator is designed for room temperature use. Valves which will be mounted in ovens require a standoff assembly, which locates the actuator out of the heated zone.

### Microelectric actuators

*for selectors*

Standard voltage 24 VDC. Includes autosensing 24 VDC power supply. Standoff version includes a 2" standoff. 3", 4", and 6" standoffs are also available. Consult the chart below to determine which actuator model is best suited for your valve.

	With keyed closemount assembly	With keyed 2" standoff assembly	For use with existing standoff
Description	Prod No	Prod No	Prod No
High speed actuator	EMH	EMH2	EMHS
High torque actuator	EMT	EMT2	EMTS

### RS-232 interface cable

Description	Prod No
RS-232 interface cable	I-22697

**TECH TIP**

Multi-drop cables permit a single serial port to control multiple actuators. In addition, we offer plug-and-play cables for direct connection of the actuator to a specific instrument.  
 Multi-drop cables... 191  
 Plug-and-play cables ..... 195

**ORDER TIP**

To purchase a **selector (multiposition valve) with a microelectric actuator installed**, see valve ordering information.  
 Valco selectors ... pp 124-135  
 Cheminert selectors ..... 172-179

**MORE INFORMATION**

Closemount hardware ..... page 208  
 Microelectric actuators for two position .... 190  
 Right angle drive ..... 204  
 Standoff assembly ..... 205  
 Standoff mounting hardware ..... 205

**WHICH MODEL FOR WHICH INJECTOR / TWO POSITION VALVE?**

**Valco**

Fitting size	Valve type	Actuator model	Actuator model
		<b>GC</b>	<b>HPLC</b>
1/32"	W	EUH	EUH
1/16"	W	EUH	EUH
1/16"	UW	EUD	EUD
1/8"	UW	EUD	EUD
1/4"	MW	EUT	—

**Cheminert**

	Actuator model	Actuator model
	<b>HPLC</b>	<b>UHPLC</b>
4 and 6 ports *	EUH	EUH
8 and 10 ports	EUH	EUD
	<b>Low pressure</b>	
All valves	EUH	

\*20,000 psi versions use EUD.

**WHICH MODEL FOR WHICH SELECTOR?**

**Valco**

	Actuator model
All valves	EUT

**Cheminert**

	Actuator model	Actuator model
	<b>HPLC</b>	<b>UHPLC</b>
4 and 6 position *	EUH	EUH
8 and 10 position	EUD	EUD
	<b>Low pressure</b>	
Model C25 and C25Z	EUH	
Model C25G	EUD	
Model C45	EUT	

\* 20,000 psi versions use EUD.

**ABOUT STANDOFFS**

Keyed standoff assemblies are used with selectors on universal actuators, to key the valve body to the actuator and standoff so that the actuators can self-align and operate valves with any number of positions.

Valco selectors are not keyed unless ordered with a universal actuator. To install a universal actuator on an existing Valco selector, the key (pin) must be removed from the actuator clamp ring assembly. This can be done easily with a pair of pliers.

See page 207, top and bottom illustrations, for drawings of keyed standoff assemblies with modular universal actuators.

**MORE INFORMATION**

Cables . . . . .pages 191, 195

Closemount hardware . . . . .208

Right angle drive . . . . .204

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Standoff mounting hardware . . . . .205

**NOTE**

Modular universal actuators, with the motor separated from the controller, offer the same features and functionality as the universal actuator. The modular configuration is often easier to incorporate into an instrument design.

Modular universal actuators for OEMs . . . . .194-5

**Universal actuators**

- CE certified
- One actuator works with two position valves *and* selectors
- Simplified, universal communication protocol
- Variety of interfaces
- Three versions for various valve torque requirements



Our universal actuators are truly universal – a single actuator can be used to operate a selector and later to operate a two position valve and back again, simply by changing simple settings.

Three universal actuator models – high speed, medium speed/medium torque, and high torque – cover our entire line of Valco and Cheminert valves and selectors, with their wide range of turning torques.

Actuators include a universal 24 VDC power supply and a manual controller. An OEM version that excludes these items is also available. The standard interface allows simple positioning commands – Step and Home for selectors, A and B for two position – via direct input signals from switch closures, relay contacts, or TTL-compatible interfaces. A more extensive command set is available with the optional RS232/485, USB, or BCD interfaces.

Note: while the actuators listed

below are universal, the valve mounting hardware is not. The product numbers shown do not include the hardware required for mounting a valve, since the necessary hardware depends on the valve type. If you are ordering the actuator for use with an *existing* valve, call our sales or technical staff to determine the correct hardware needed. If you want to order the universal actuator with a *new* valve, simply substitute the actuator product number in place of a different actuator and we'll provide the correct hardware.

**Universal actuators**

Standard voltage 24 VDC. Includes autosensing 24 VDC power supply. Does not include mounting hardware. Order separately.

Interface	High speed (EUH) Prod no	Medium torque (EUD) Prod no	High torque (EUT) Prod no
Standard	EUH	EUD	EUT
RS-232/485	EUHA	EUDA	EUTA
USB	EUHB	EUSB	EUTB
BCD	EUHC	EUDC	EUTC



**ACTUATORS AND ACCESSORIES**

## Modular universal actuators

- CE certified
- Bidirectional
- Optional position indication
  - LCD display    BCD
  - RS-232/485    USB
- Compact stepper motor design
- Automatic self-alignment with keyed selector valves
- Variety of control modes with optional interfaces
  - Step and home functions with contact closure (*standard*)
  - Direct position access via BCD interface
  - Position access/confirmation via serial interface



The modular universal actuator allows instrument manufacturers to use a single motor and control software to operate virtually any Valco or Cheminert rotary valve. This actuator is a drop-in replacement for the previous microelectric multiposition actuator (part numbers EMH, EMT, etc.); the motor is identical, and the controller is the same size, with the same cable connections. And while the modular universal actuator perfectly mimics the microelectric's functionality, it packs even more features into the same small package.

This new version of the popular universal actuator makes it easier for the instrument manufacturer to work in the limited space frequently encountered in today's modern instruments. Plus, the modular design makes it possible to mount the more sensitive electronics module away from the liquid end of the valve.

Like the microelectric actuator, the modular universal actuator is bidirectional, and can be easily programmed to take the shortest

path during actuation. Position feedback is available via RS232/485 (switchable) or USB interfaces.

All Valco and Cheminert valves and selectors can be actuated by one of the three available versions: high speed, medium speed/torque, or high torque. The actuator includes a universal input 24 volt DC power supply and a manual controller with LCD display. An OEM version that excludes these and the motor mounting bracket is available at additional savings.

While the actuators listed here are universal, the valve mounting hardware is not. The product numbers shown do *not* include the hardware required to mount a valve, since the parts required depend on the valve type. If you are ordering a universal actuator with a *new* valve, the proper hardware is, of course, included. If you are ordering an actuator for use with an *existing* valve, call our technical support staff for help in acquiring the correct mounting hardware.

**NEW Modular universal actuators**    *for selectors and two position valves*

Standard voltage 24 VDC. Includes autosensing 24 VDC power supply. Consult the charts at left to determine which actuator model is best suited for your valve.

	<b>High speed</b>	<b>Medium torque</b>	<b>High torque</b>
<i>Interface</i>	<i>Prod no</i>	<i>Prod no</i>	<i>Prod no</i>
Standard	UMH	UMD	UMT
RS-232/485	UMHA	UMDA	UMTA
USB	UMHB	UMDB	UMTB
BCD	UMHC	UMDC	UMTC

**WHICH MODEL FOR WHICH INJECTOR / TWO POSITION VALVE?**

**Valco**

<i>Fitting size</i>	<i>Valve type</i>	<i>Actuator model</i>	<i>Actuator model</i>
		<b>GC</b>	<b>HPLC</b>
1/32"	W	UMH	UMH
1/16"	W	UMH	UMH
1/16"	UW	UMD	UMD
1/8"	UW	UMD	UMD
1/4"	MW	UMT	—

**Cheminert**

	<i>Actuator model</i>	<i>Actuator model</i>
	<b>HPLC</b>	<b>UHPLC</b>
4 and 6 ports *	UMH	UMH
8 and 10 ports	UMH	UMD
	<b>Low pressure</b>	
All valves	UMH	

\*20,000 psi versions use UMD.

**WHICH MODEL FOR WHICH SELECTOR?**

**Valco**

	<i>Actuator model</i>
All valves	UMT

**Cheminert**

	<i>Actuator model</i>	<i>Actuator model</i>
	<b>HPLC</b>	<b>UHPLC</b>
4 and 6 position *	UMH	UMH
8 and 10 position	UMD	UMD
	<b>Low pressure</b>	
Model C25 and C25Z	UMH	
Model C25G	UMD	
Model C45	UMT	

\* 20,000 psi versions use UMD.

**MOUNTING HARDWARE**

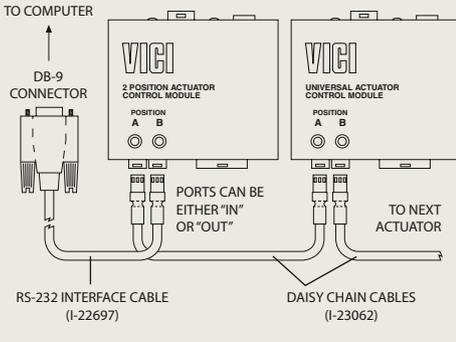
Closemount hardware.....	page 208
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Standoff mounting hardware.....	205

**RS-232 interface cable**

Description	Prod No
RS-232 interface cable	I-22697

**DAISY CHAIN CABLES**

Daisy chain cables permit a single serial port (RS-232) to control multiple actuators – newer two position microelectric and universal.  
See Technical Note 421 for further information..



**NEW**

**Daisy chain cables** *for universal actuators and newer two position microelectric actuators*

- More layout flexibility
- Economical

Universal actuators with the RS232/485 interface option can be daisy-chained for control from a single serial port. The series can also include the redesigned two position microelectric actuator (page 191) if desired. A chain of actuators requires only one RS-232 interface cable, plus a 3-pin daisy chain cable for each actuator – a more flexible and economical solution than the multi-drop cable application described in the shaded box below.

For lengths other than the 55 cm cable listed, please contact our technical support department. Note that cable lengths should be shorter than one meter for reliable RS-232 communication; longer lengths can affect the signal integrity.

Length	Prod No
55 cm	I-23062

**Plug-and-play cables** *for microelectric selector and universal actuators*

Plug-and-play cables will allow a direct connection and control between a specific instrument and a microelectric or universal actuator. Contact technical support for other instruments.

BCD cable	Prod No
Modular universal actuator to	
Agilent 6890 GC	V-EMPMCR-HP6890
Agilent 6890 Network GC	V-EMPMCR-HP6890N
Agilent 7890 GC	V-EMPMCR-HP6890N

**For 4 and 6 column selector** \* (page 175)

Remote cable	Prod No
Modular universal actuator to	
Agilent 1100 LC	V-EMPMCR-HP1100
Waters Alliance LC	V-EMPMCR-WA2690

**For 8 and 10 column selector** \* (page 175)

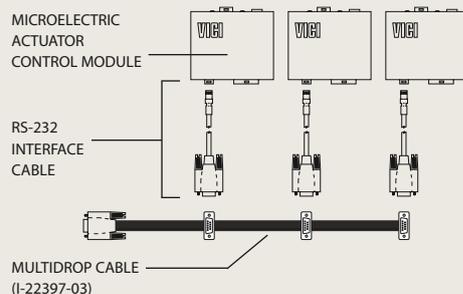
Remote cable	Prod No
Modular universal actuator to	
Agilent 1100 LC	V-EMPMCR-HP1100-10
Waters Alliance LC	V-EMPMCR-WA2690-10

\* Requires a specific software setting in the actuator control module

**MULTI-DROP CABLES**

Multi-drop cables permit a single serial port (RS-232) to control multiple actuators. These ribbon cables work with all VICI microelectric and universal (RS232 option) actuators. Requires one RS-232 interface cable per actuator.

See page 191.



**MORE INFORMATION**

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Universal actuators . . . 193

**ACTUATORS AND ACCESSORIES**

Air actuators offer reliable performance under the most stringent conditions. Low gas consumption and lightweight, compact construction make the air actuator suitable for aerospace flight hardware applications as well as laboratory or process applications.

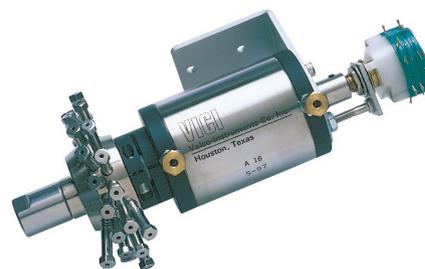
The standard air actuator is rated for up to 80 psig at temperatures up to 70°C. Generally speaking, valves which will be heated require a standoff assembly, which locates the air actuator out of the heated zone and supports both the valve and actuator. A high temperature model permits both valve and actuator to be mounted within an oven (175°C maximum), but it is not recommended for use below 50°C.

**Air actuators for selectors**

The recommended method for implementing a selector (multi-position) air actuator requires only a single 4-way solenoid. Up to 80 psig may be used without damaging the valve or actuator. Bottled instrument air or nitrogen is recommended.

If plant air from compressors must be used, an oil separator and water dryer are required.

Multiposition air actuators include a rotary switch which may be connected to a digital readout of your own design.



**Standard air actuators**

*for selectors*

Temperature range 0-70°C

Standoff version includes a 2" standoff. 3", 4", and 6" standoffs are also available.

Description	With closemount assembly	With 2" standoff assembly	With standoff mounting hardware
	Prod No	Prod No	Prod No
4 position	A4	A42	A4S
6 position	A6	A62	A6S
8 position	A8	A82	A8S
10 position	A10	A102	A10S
12 position	A12	A122	A12S
16 position	A16	A162	A16S

**High temperature air actuators**

*for selectors*

Temperature range 50-175°C

Standoff version includes a 4" standoff. 2", 3", and 6" standoffs are also available.

Description	With closemount assembly	With 4" standoff assembly	With standoff mounting hardware
	Prod No	Prod No	Prod No
4 position	AT4	AT44	AT4S
6 position	AT6	AT64	AT6S
8 position	AT8	AT84	AT8S
10 position	AT10	AT104	AT10S
12 position	AT12	AT124	AT12S
16 position	AT16	AT164	AT16S

**Replacement O-rings**

Includes a complete set of O-rings for a multiposition air actuator.

Description	Prod No
Standard	ORMP
High temp	ORTMP



**TECH TIP**

The actuator's rotation must be properly matched to the valve's. If you are converting a manual valve to air actuation and have any doubts about which actuator and hardware you need, call our sales or technical staff for assistance.

**ORDER TIP**

To purchase a **valve with an air actuator installed**, go directly to valve ordering information.

**MORE INFORMATION**

PFAF ..... page 199  
Position feedback

**Mounting Hardware**

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## Air actuators for two position valves

### TECH TIP

Here's what you'll get when you order:



Air actuator with a closemount assembly



Air actuator with a 4" standoff assembly



Air actuator for use with an existing standoff

### MORE INFORMATION

HSSA ..... page 199  
 High speed switching accessory  
 5-way three position solenoid air valve ... 198  
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 Position feedback

The recommended method for implementing a two position air actuator is a manifold solenoid valve assembly (5-way three position solenoid air valve, *page 198*) that pulses air to the actuator to switch it from position to position. If air is applied continuously, the continuous rotational force applied to the valve can cause sideloading, leaking, and additional wear.

Typical actuation pressure is 40 to 50 psig, but up to 80 psig may be used. Ideally, only enough air

pressure should be used to switch the valve in 1/3 to 1/2 second. Bottled instrument air or nitrogen is recommended. If plant air from compressors must be used, an oil separator and water dryer are required.

A high speed switching accessory (HSSA) can upgrade valve switching times to less than 30 ms with air or 8 ms with helium. A position feedback (PFAF) with contact closures in both positions is also available as an option.

### Standard air actuators

*for two position valves*

Temperature range 0-70°C

Standoff version includes a 4" standoff. 2", 3", and 6" standoffs are also available.

No. of ports in valve	Description	With	With	For use with
		closemount assembly	4" standoff assembly	existing standoff
		Prod No	Prod No	Prod No
3,4	90° rotation	A90	A904	A90S
6	60° rotation	A60	A604	A60S
8	45° rotation	A45	A454	A45S
10	36° rotation	A36	A364	A36S
12	30° rotation	A30	A304	A30S

### High temperature air actuators

*for two position valves*

Temperature range 50-175°C

Standoff version includes a 2" standoff. 3", 4", and 6" standoffs are also available.

No. of ports in valve	Description	With	With	For use with
		closemount assembly	2" standoff assembly	existing standoff
		Prod No	Prod No	Prod No
3,4	90° rotation	AT90	AT902	AT90S
6	60° rotation	AT60	AT602	AT60S
8	45° rotation	AT45	AT452	AT45S
10	36° rotation	AT36	AT362	AT36S
12	30° rotation	AT30	AT302	AT30S

### Replacement O-rings

Includes a complete set of O-rings for a two position air actuator.

Description	Prod No
Standard	OR
High temp	ORT



### Actuator compression fittings

Includes 1/8" compression to 10-32 male thread, plus 1/8" brass ferrule and hex nut.

	Prod No
3 piece fitting assembly	F-TCF



### 4-Way solenoid air valve CE *for selector air actuators*

This 4-way solenoid air valve with 1/8" tube fittings is the simplest method of stepping a selector air actuator. Energizing the solenoid steps the valve to its next position, and de-energizing the solenoid resets the mechanical ratchet in the actuator. This implementation, not recommended for two position actuators, can be useful when only a limited number of external events is available on the data system.

	<i>Prod No</i>
110 VAC	V-SV-S52-110VAC
240 VAC	V-SV-S52-220VAC
24 VAC	V-SV-S52-24VAC
24 VDC	V-SV-S52-24VDC



### 3-Way solenoid air valve CE *for diaphragm valves*

This 3-way solenoid with 1/8" tube connections is perfect for switching spring-return valves such as our on/off or prime/purge valves (pages 212-213) or the DV22 diaphragm valves on pages 142-144. Energizing the solenoid provides air to the actuator, while removing power from the solenoid allows the valve to return to its original state. Use of this solenoid is not recommended for rotary valves.

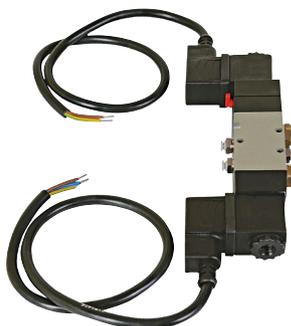
	<i>Prod No</i>
110 VAC	V-SV-S32-110VAC
240 VAC	V-SV-S32-220VAC
24 VAC	V-SV-S32-24VAC
24 VDC	V-SV-S32-24VDC



### 5-Way three position solenoid air valve CE *for two position air actuators*

This 5-way solenoid air valves with 1/8" tube connections is recommended to switch two position air actuators. It applies air to the actuator only during switching and alleviates problems associated with continuous air pressure.

	<i>Prod No</i>
110 VAC	V-SV-S53-110VAC
240 VAC	V-SV-S53-220VAC
24 VAC	V-SV-S53-24VAC
24 VDC	V-SV-S53-24VDC

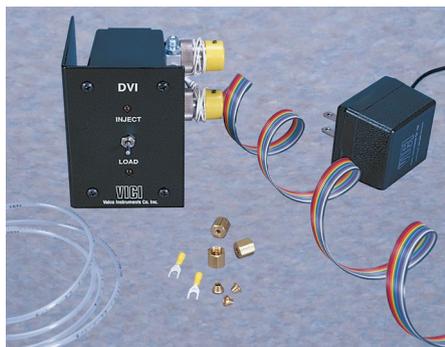


#### MORE INFORMATION Actuators

Air . . . . . pages 196-197  
 Microelectric . . . . . 190-192  
 Universal electric . . . . . 193

#### Mounting Hardware

Closemount  
 hardware . . . . . page 208  
 Right angle drive . . . . . 204  
 Standoff assembly . . . . . 205  
 Standoff mounting  
 hardware . . . . . 205



**DVI** Digital valve interface (Non-CE) *for two position air actuators*

We highly recommend the DVI for use with two position air actuators. It sends a two second pulse of air to switch the valve and then vents the air, simulating switching by hand and eliminating the potential for damaging the valve or actuator with continuously-applied pressure. It also features LED position indication, manual and remote operation, and a contact closure output on arrival to the INJECT position, a feature which can be used to start a run or integration. The DVI is available for 110 or 230 VAC.

*Prod No*

110 VAC	DVI
230 VAC	DVI-220



**HSSA** High speed switching accessory *for two position air actuators*

The HSSA is an add-on for our standard air actuators, providing increased air or helium flow for the fast actuation required in microbore chromatography or partial loop injections. Normal switching time for a C6W with 100 psi air is 180 ms. With the HSSA that drops to 20 ms; substitute 100 psi helium and the valve switches in 8 ms. Usually the HSSA is used in conjunction with the DVI above.

*Prod No*

HSSA



**PFAF** Position feedback *for two position air actuators*

The optional position feedback (PFAF) can be field installed on any two position standard air actuator. Each position provides a contact closure for TTL logic level signals.

*Prod No*

PFAF



**Position feedback** *for manual valves*

An optional position feedback is available for manual Valco W type and Cheminert C2 and C4 series valves (standard on Cheminert C1 valves). The continuous contact closure, provided only while the valve is in the inject position, can be used to start a chromatograph or data system.

*Description* *Prod No*

For Valco W type valves	
4 port	PFW90
6 port	PFW60
8 and 10 port	PFW36
For Cheminert valves	
C2 series except 4 port	PFC2
C2 series, 4 port	PFC4
C4 series	PFC4

## Purge housings

### ACTUATORS AND ACCESSORIES

Purge housings for Valco valves eliminate any possible diffusion from the atmosphere *into* the valve, or safely vent fugitive emissions *from* the valve. They are typically used in trace level analyses to isolate the valve from ambient air, but can also be used as a safety measure to isolate a valve against leaks into the atmosphere, such as when pyrophoric, toxic, or carcinogenic materials are present in the sample stream.

Two screws secure each half of the purge housing to the valve, so that the rear chamber of the housing (the preload assembly/spring side of the valve) can be removed for rotor inspection or replacement without affecting the actuator side of the housing.

Ideally, the purge housing should be ordered when a new valve is ordered, so that it can be factory-installed. Field installation of purge housings is generally not recommended. To order a new valve with a purge housing, add the suffix "PH" to the product number for the valve/actuator assembly. The purge housing requires a standoff assembly, which can be 2", 3", 4", or 6" long.

All Valco two position valves with two threaded mounting holes will accommodate a purge housing without modification. Some two position valves must be modified at the factory to accept the housing. The charge for modifying an existing valve includes the new purge housing. Call our service department to make arrangements for this service.



### Purge housings

*for two position valves and selectors*

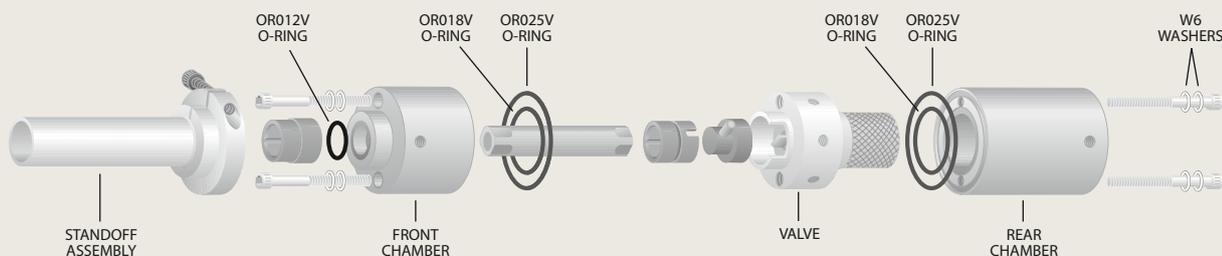
Description	Prod No	Notes
On a new valve	Add suffix PH to valve prod no	Requires standoff assembly. Multiposition valve requires an actuator.
On existing valve, factory installation	Contact factory	
On existing valve, for field installation	Not recommended	

#### SPECS

**Maximum temperature:**  
175°C

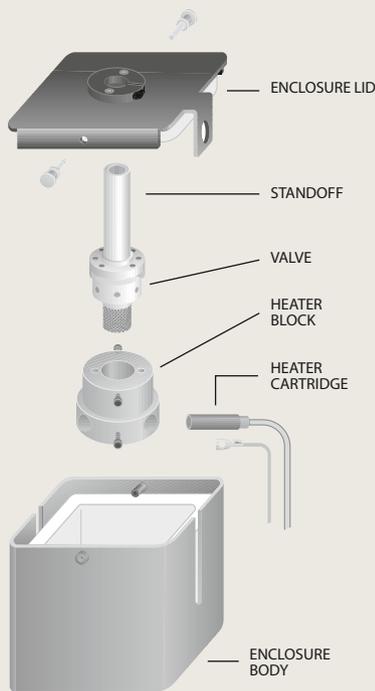
Note: The purge housing limits the maximum temperature of the purged valve to 175°C, regardless of the valve specifications.

### PURGE HOUSING WITH VALVE



**HEATED VALVE ENCLOSURE**

For one valve (HVEA)



These insulated enclosures allow valves to be operated at temperatures independent of other controlled zones of analytical instruments. The compact construction and minimum power dissipation enable mounting within larger, lower temperature zones without significantly raising the larger oven's minimum temperature or impairing its programmability.

An insulated enclosure and a standard heater block are included. The product number chart lists the heater cartridge size typically required to heat the valve(s) to the indicated temperature. Holes are provided in the heater block for Perkin Elmer, Agilent, and other temperature sensors, with an additional thermocouple hole permitting temperature readout.

Since 1/32" W type valves are smaller, they require a special heater block; enclosures for 1/32" valves are denoted by asterisk (\*) in the price chart below.

**Note:** Heated valve enclosures provide a way to heat valves. A GC's auxiliary temperature zone controller or a device such as our ITC (instrumentation temperature controller) is required to maintain the valves at a set temperature.

Standard voltage: 110 VAC. For a 230 VAC model, add -220 to the product number. Insulation is 1/2" thick, so internal dimensions are 1" smaller than the exterior size given below.

**Heated valve enclosures (Non-CE) for two position valves and selectors**

Capacity	Exterior dimensions (Interior approx 1" smaller)	Rating	With heater cartridge Prod No	Without heater cartridge Prod No
1 valve	4" x 4-1/4" x 3-5/8"d	65W/350°C	HVEA	HVEAX
		* 65W/350°C	HVEAN	HVEANX
	4-1/4" x 5-1/8" x 3-5/8"d	65W/350°C	HVEB	HVEBX
		* 65W/350°C	HVEBN	HVEBNX
	8" x 8" x 6"d	100W/350°C	HVEC	HVECX
2 valves	8" x 5-1/4" x 4"d	125W/350°C	HVE2	HVE2X
3 valves	13-1/2" x 5-3/4" x 4"d	150W/350°C	HVE3	HVE3X
6 valves	13-3/4" x 8" x 6"d	300W/350°C	HVE6	HVE6X

\* for use with 1/32" valves



**MORE INFORMATION**

ITC ..... page 203  
Instrumentation temperature controller

Heated column enclosures .....203  
Heater assemblies .....202  
Heater blocks. ....202

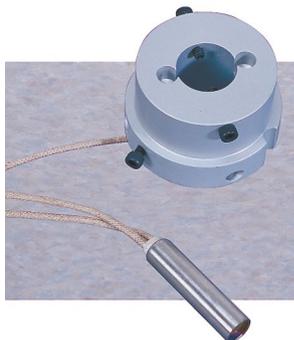
**ACTUATORS AND ACCESSORIES**

**Heater assemblies** (Non-CE)

A heater assembly includes a standard heater block, heater cartridge, and line cord. Heater cartridges are also available individually. Consult the factory for price and availability.

Standard voltage is 110 VAC. For a 230 VAC model, add -220 to the product number.

<i>Description</i>	<i>Rating</i>	<i>Prod No</i>
<b>Heater assembly</b>		
For use with HVEA or HVEB	65W/350°C	HA1
For use with HVEC	100W/350°C	HA1T
For use with HVE2	125W/350°C	HA2
For use with HVE3	150W/350°C	HA3
For use with HVE6	300W/350°C	HA6



**Heater blocks** *for single valves*

There are two single valve heater block designs: standard and low mass. The low mass heater block, which has a .075" diameter hole for sensor or thermocouple, works well for two position valves. The standard heater block is a high mass, multipurpose design which can be used with any Valco valve. It is designed so that sample loops or short columns can be wound directly on it.

Heater blocks do not include a heater cartridge.

<i>Description</i>	<i>Prod No</i>
Low mass heater block, 1 valve	HBS
Standard heater block, 1 valve	HB
Standard heater block, 1 NW Type valve (1/32" fittings)	HB1N

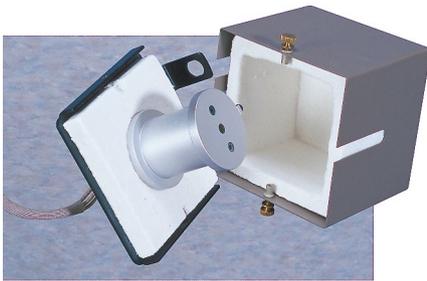


**Heater cartridges** *for single valve heater blocks*

The cartridge size is 1.5" long by 3/8" diameter. Consult the factory to purchase cartridges for larger heater blocks.

<i>Rating</i>	<i>Prod No</i>
65W 110 VAC	I-21208-32
65W 220 VAC	I-21208-33
100W 110 VAC	I-21208-05
100W 220 VAC	I-21208-06

**MORE INFORMATION**  
Heated valve enclosures . . . . . page 201



**Heated column enclosures**

(Non-CE)

Heated column enclosures allow a column to be operated at temperatures independent of other controlled zones in the instrument. They are similar in construction to our heated valve enclosures (page 201), except instead of a valve heater block they contain a column mandrel which will accept 1/8" columns up to 10' long. The HCE2 can have a heated valve installed adjacent to the heated column, with a valve heater block ordered separately.

Includes a column mandrel, an insulated enclosure, and a standard heater block, with or without the heater cartridge and line cord. Standard voltage: 110 VAC. For a 230 VAC model, add -220 to the product number. Insulation is 1/2" thick, so internal dimensions are 1" smaller than the exterior size given below.

Capacity	Exterior dimensions (Interior approx 1" smaller)	Rating	With heater cartridge Prod No	Without heater cartridge Prod No
<b>Heated column enclosure</b>				
1 column	4" x 4-1/4" x 3-5/8"d	65W/350°C	HCE1	HCE1X
	4-1/4" x 5-1/8" x 3-5/8"d	65W/350°C	HCEB	HCEBX
	8" x 8" x 6"d	65W/350°C	HCEC	HCECX
2 columns	8" x 5-1/4" x 4"d	65W/350°C	HCE2	HCE2X
<b>Column mandrel</b> (heater assembly not included with column mandrel)			Prod No	CM



**ITC Instrumentation temperature controller**

(Non-CE)

The ITC is an isothermal proportional controller for use in the thermal systems common to analytical instrumentation, and is often used with heated valve enclosures. The desired temperature is set in 1°C increments on the front panel. A thermocouple sensor provides quick recognition of temperature changes. The power to the heater can be attenuated from 0-90% in 10% increments, an easy-to-use feature which improves temperature stability at the set point to 0.5°C. Maximum output current is 10 amps.

The ITC is available with a range of 0°C to 399°C, in 110 VAC or 230 VAC.

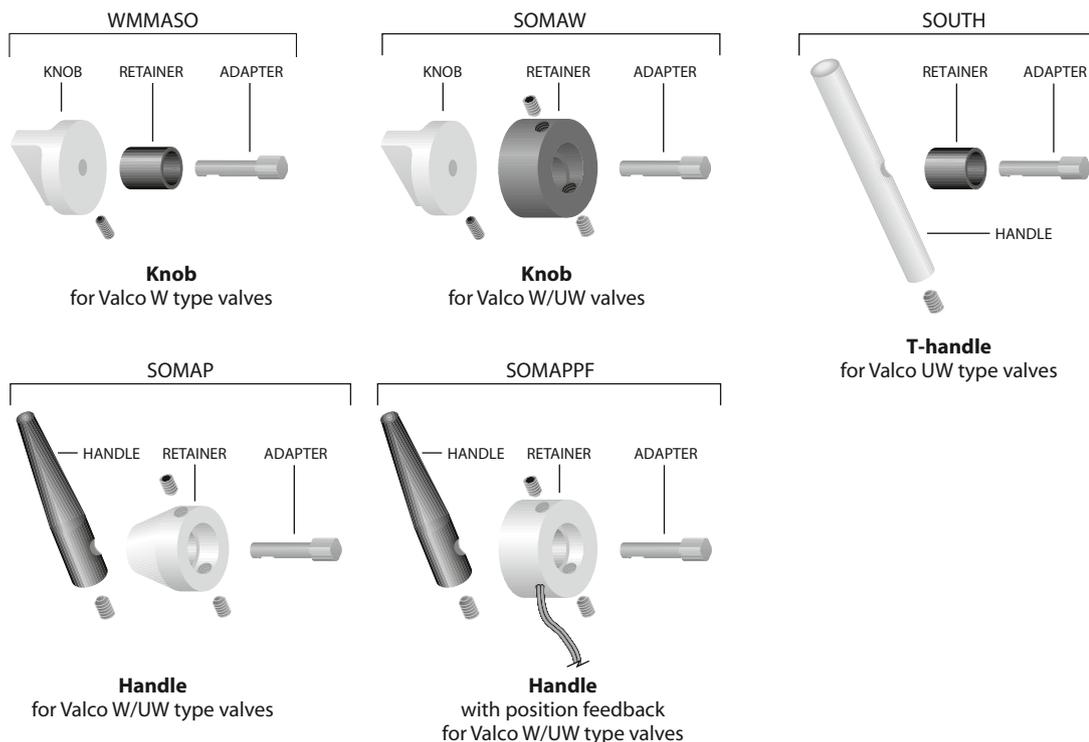
		Prod No
0°C to 399°C	110 VAC	ITC10399
	230 VAC	ITC10399-220
Replacement thermocouple		I-21014-01

**ACTUATORS AND ACCESSORIES**

**Knobs and handles** *for use with a standoff*

Choose from theselection below if you already have a spare standoff assembly (see facing page) but lack the knob or retainer, or have an actuated valve on a standoff which you'd like to convert to manual use. Includes parts shown.

<i>Description</i>	<i>Prod No</i>
Knob for a W type valve	WMMASO
Knob for W/UW type valve	SOMAW
T-handle for a UW type valve	SOUTH
Handle for UW type valve	SOMAP
Handle with position feedback for W/UW type valve	SOMAPPF



**RAD Right angle drive** *for two position actuators*

Some installations don't allow the valve and actuator to be installed in a typical in-line configuration. The RAD is a 90° gearbox which permits the actuator or handle to be installed at a right angle to the valve. The RAD fits all VICI two position electric and air actuators. Not for use with 1/4" valves. RAD with standoff includes a 2" standoff; 3", 4", and 6" standoffs are also available.

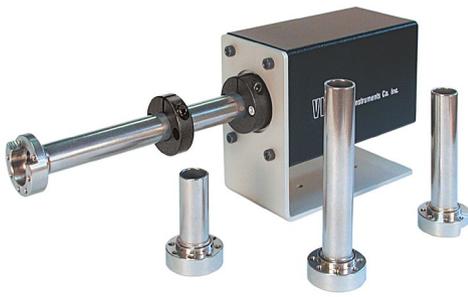
<b>With closemount hardware</b>	<b>With 2" standoff assembly</b>
<i>Prod No</i>	<i>Prod No</i>
RAD	2RAD



**TECH TIP**  
RADs add a slight amount of backlash and load. The backlash is not an issue with two position valves on microelectric or universal actuators, since the actuators locate and remember the stopping point. However, for two position valves on other actuators and for all selectors, we recommend that the valves have ports no smaller than .016".

The additional load may mean that a valve that ordinarily requires an ED actuator might require an ET when used with a right angle drive.

If you have any questions, please consult our technical support.



Valves which will be installed in ovens or heated zones require a standoff assembly, which locates the actuator out of the heated zone and supports both the valve and the handle or actuator. The 5/8" outside diameter standoff tube extends through the oven wall and is secured by means of a clamp ring supplied with the assembly.

If you are converting an actuated valve from a closemount to a standoff application, order the appropriate clamp ring and two screws in addition to the standoff assembly. Consult the factory for availability of non-standard lengths.

The microelectric actuator for selectors uses a special standoff assembly (SOMMP) which is keyed to both valve and actuator. The key guarantees proper alignment and positioning of the valve.

Product numbers show the most common length of standoffs: 4" for air actuators and manual knobs, 2" for microelectric and standard electric actuators. Standoff assemblies are available in lengths of 2", 3", and 6". To order a 6" standoff instead of a 4" one, change the 4 at the beginning of the product number to a 6.

### Standoff assemblies and mounting hardware

*for actuators*

	Standoff assembly <i>Prod No</i>	Clamp ring <i>Prod No</i>	Screws <i>Prod No</i>
<b>Air actuators</b>			
For Valco two position valves with 1 or 2 mounting holes	4SOA	CR3	HWSC-SC8-6
with no mounting holes	4SOAMP	CR3	HWSC-SC8-6
For Valco selectors	4SOAMP	CR3	HWSC-SC8-6
For Cheminert valves	4SOAMP	CR3	HWSC-SC8-6
<b>Microelectric actuators</b>			
For Valco two position valves with 1 or 2 mounting holes	2SOA	CR8	HWSC-SC8-8B
with no mounting holes	2SOAMP	CR8	HWSC-SC8-8B
For Valco multiposition valves (UW and MW Types only)	2SOAMMP	CR10	HWSC-SC8-8TDH
For Cheminert two position valves	2SOAMP	CR8	HWSC-SC8-8B
For Cheminert selectors	2SOAMMP	CR10	HWSC-SC8-8TDH
<b>Standard electric actuators</b>			
For Valco two position valves with 1 or 2 mounting holes	2SOA	CR3	HWSC-SC8-8B
with no mounting holes	2SOAMP	CR3	HWSC-SC8-8B
For Valco selectors	2SOAMP	CR3	HWSC-SC8-8B
For Cheminert valves	2SOAMP	CR3	HWSC-SC8-8B

#### TECH TIP

If you need the **actuator as well as the hardware**, you can order it complete with the appropriate hardware or with the required standoff already installed.

#### Actuators

Air ..... pages 196-7  
Microelectric .... 190-192  
Universal elec ..... 193

#### CONVERTING FROM CLOSEMOUNT TO A STANDOFF

If you are converting an actuated valve from a closemount to a standoff application, the clamp ring and screws which secure the standoff to the actuator are **not included** in the standoff assembly. Order clamp ring and screws in addition to the standoff assembly.

#### MORE INFORMATION

For illustrations of standoffs on valves and actuators, see pages 206 and 207.

### Standoff assemblies

*for manual valves*

Includes knob, standoff assembly, retainer, and adapter. For illustration, see page 206, top.

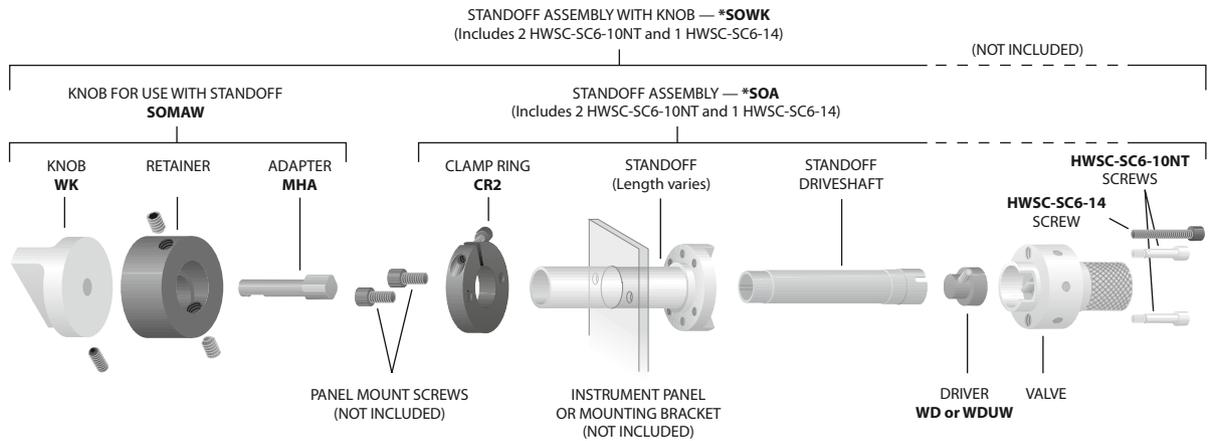
	<i>Prod No</i>
For Valco W and UW Type two position valves rated less than 5,000 psi with 1 or 2 mounting holes	4SOWK
with no mounting holes	4SOWKMP
For Valco UW Type two position valves rated 5,000 psi and higher with 1 or 2 mounting holes	4SOUTH
with no mounting holes	4SOUTHMP
For Cheminert valves	4SOWKMP



**ACTUATORS AND ACCESSORIES**

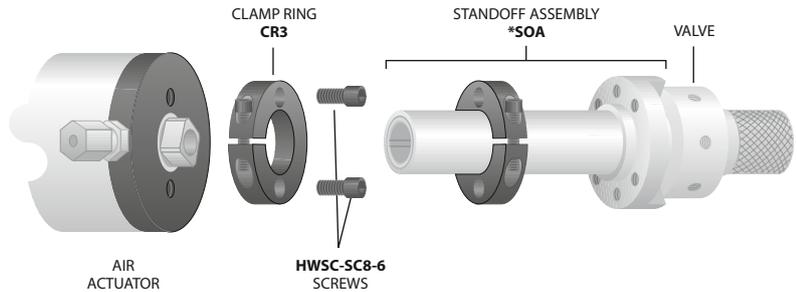
**Standoff with**

**VALCO TWO POSITION VALVE – MANUAL**



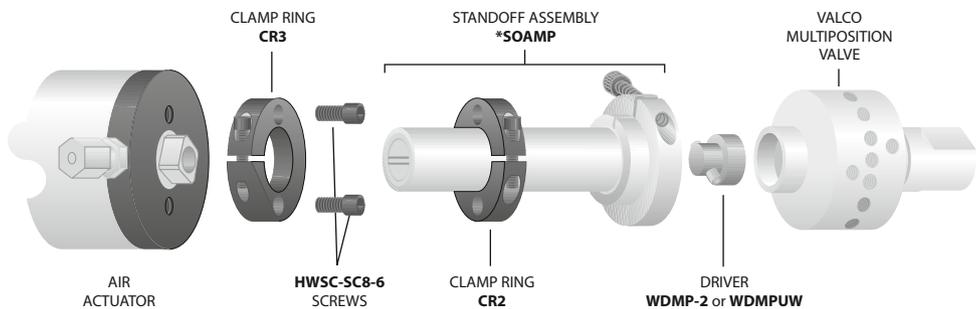
**Standoff with**

**VALCO TWO POSITION VALVE – AIR ACTUATOR**

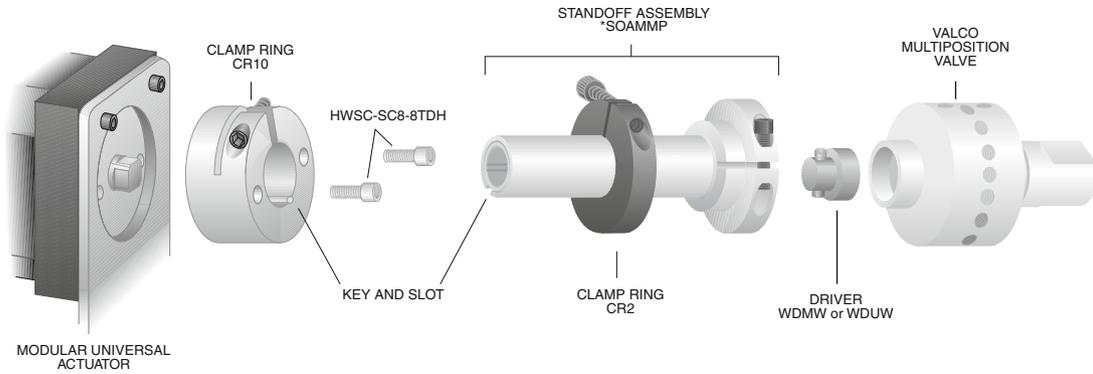


**Standoff with**

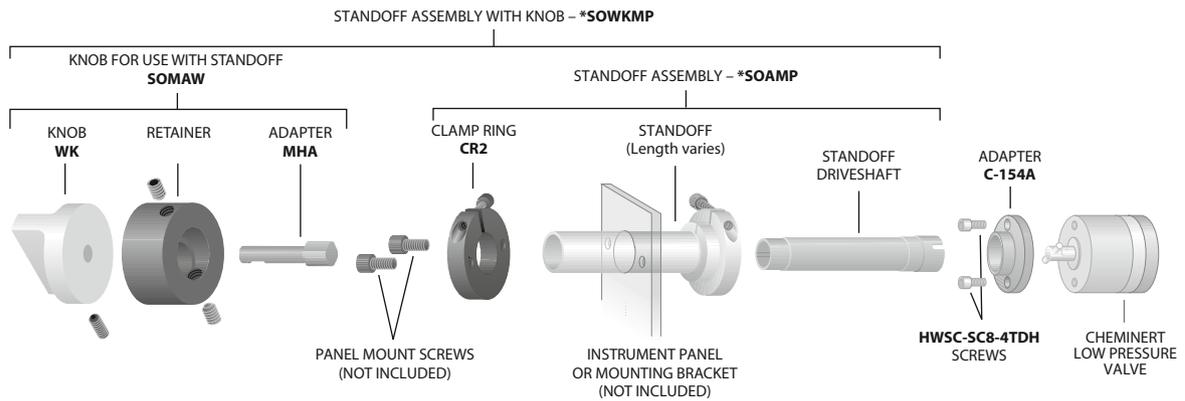
**VALCO SELECTOR – AIR ACTUATOR**



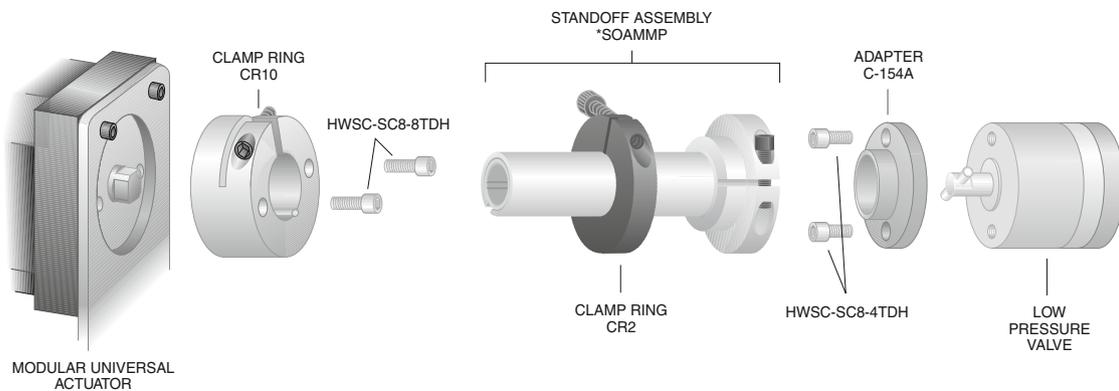
**Keyed standoff with  
VALCO SELECTOR – MICROELECTRIC, UNIVERSAL, OR MODULAR UNIVERSAL ACTUATOR**



**Standoff with  
CHEMINERT TWO POSITION VALVE – MANUAL**



**Keyed standoff with  
CHEMINERT SELECTOR – MICROELECTRIC, UNIVERSAL, OR MODULAR UNIVERSAL ACTUATOR**



## ACTUATORS AND ACCESSORIES

If a valve is not going to be heated beyond the temperature range of the actuator, closemount hardware often makes the cleanest installation.

### Closemount hardware *for manual valves*

If you have a Valco W Type valve with no hardware and want a knob on it, or if you are converting an air or electrically actuated two position valve to manual use, this is what you need. There are two versions: one for valves with threaded mounting holes and one for valves with unthreaded mounting holes. (If your valve has no mounting holes, you will have to use it with a standoff.)



Description	Prod No
For valves with threaded mounting holes	WMMA
For valves with unthreaded mounting holes	WMMA10

### Closemount hardware *for actuators*

Order the appropriate closemount hardware if you want to change your valve and actuator from a standoff to a closemount connection. Two mounting screws are included. If air and standard electric actuators require different mounting screws, two of each screw are included with the closemount hardware.

Description	Prod No
<b>Air or standard electric actuators</b>	
For Valco two position valves with 1 or 2 mounting holes	CMH
For Valco two position valves with no mounting holes	CMHMP
For Valco multiposition valves	CMHMP
For Cheminert valves high pressure design	CMH11H
For Cheminert valves low pressure design	CMH11L
(low pressure design includes required adapter)	



<b>Two position microelectric actuators</b>	
For Valco two position valves with 1 or 2 mounting holes	CMH12H
For Valco two position valves with no mounting holes	CMH12H
For Cheminert two position valves high pressure design	CMH12H
For Cheminert two position valves low pressure design	CMH12L
(low pressure design includes required adapter)	

<b>Universal and modular universal actuators</b>	
For Valco multiposition valves (UW and MW Types only)	CMH13
For Cheminert multiposition valves high pressure design	CMH13H
For Cheminert multiposition valves low pressure design	CMH13L
(low pressure design includes required adapter)	

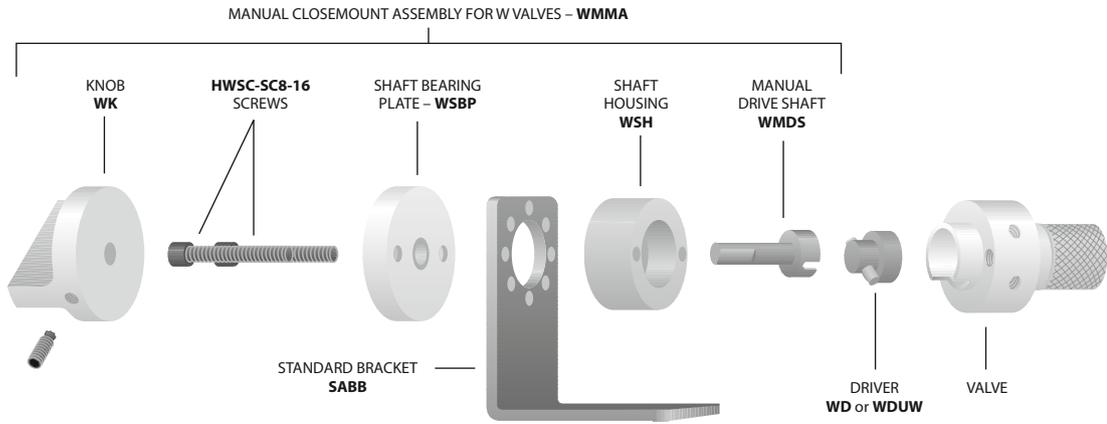
#### TECH TIP

If you need the **actuator as well as the hardware**, you can order it complete with the appropriate hardware or with the required standoff already installed.

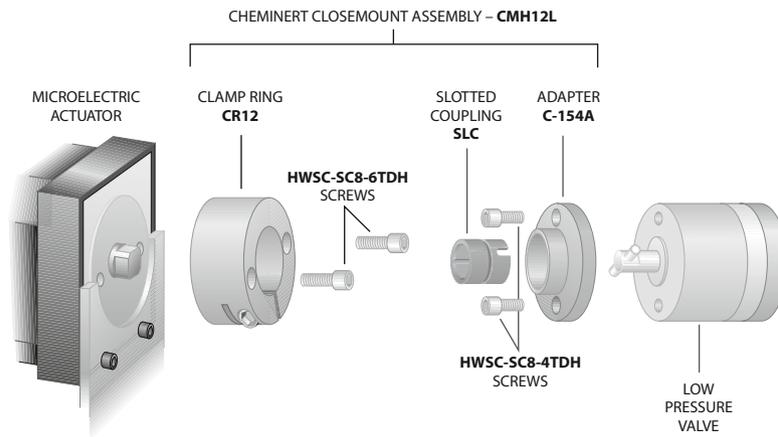
#### Actuators

Air . . . . . pages 196-197  
 Microelectric . . . . . 190-192  
 Modular universal . . . . . 194  
 Universal . . . . . 193

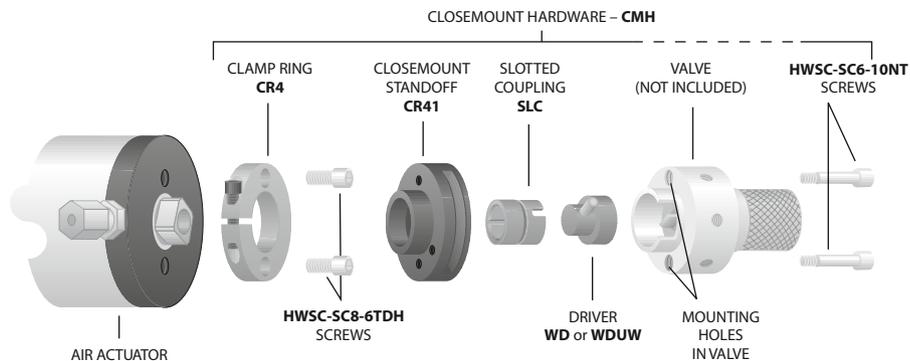
Closemount with  
VALCO VALVE – MANUAL



Closemount with  
CHEMINERT VALVE (Low pressure two position) – MICROELECTRIC



Closemount with  
VALCO VALVE (1 or 2 mounting holes) – AIR ACTUATOR



## ACTUATORS AND ACCESSORIES

As a convenience to our customers, we stock several standard tools that are useful for working with valves, fittings, and other products from VICI. In addition, we offer custom tools which are designed and machined in our factory to facilitate use of specific VICI products.

### Custom socket wrench

These socket wrenches with a slot to slip over the tubing are the perfect tool for installing fittings when proximity of the ports makes it difficult to get a normal open end wrench in position. The SWH3 fits the 3/16" hex head on our 1/32" ZDV fittings; the SWH4 works with the 1/4" hex nuts for 1/16" fittings.

Size	Prod No
3/16"	SWH3
1/4"	SWH4



### Hex key set

The hex key set has a wrench to fit any socket head screw on any VICI valve or actuator. Includes .050", 1/16", 5/64", 3/32", 7/64", 1/8", 9/64", and 5/32" sizes.

Prod No
HKS



### Open end wrenches

Size	For use with	Prod No
3/16" x 1/4"	1/32" and 1/16" nuts	OEW
3/8" x 7/16"	1/8" nuts	OEW-2
1/2" x 9/16"	1/4" nuts	OEW-3



### Pencil magnet

A pencil-type magnet is useful for removing the rotor from Valco valves when the rotor must be replaced or rotated. The process of disassembly and assembly is described in Technical Note 201, which may be found in the support section at [www.vici.com](http://www.vici.com).

Prod No
PM



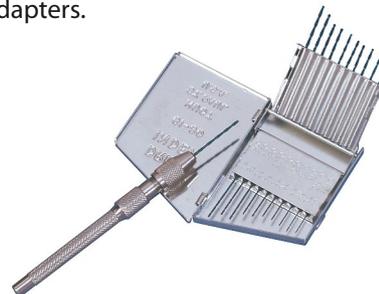
**MORE INFORMATION**  
 Ferrule removal kit... p 54

### Pin vise and drill index

The drill index has drills sized from 0.0135" to 0.039" (0.34 to 1 mm). These are useful tools when a fused silica tube breaks in a union, or for enlarging the inner diameter of fused silica adapters.

Prod No

PV

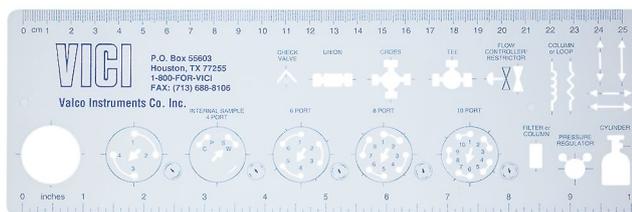


### Template

This tool is just what you need when you're working out plumbing and valve switching schematics. It features templates for two position valves with 4, 6, 8, and 10 ports with indications of both positions, as well as various flow symbols. For added convenience, the sides are edged with metric and inch rulers.

Prod No

TEMPLATE1

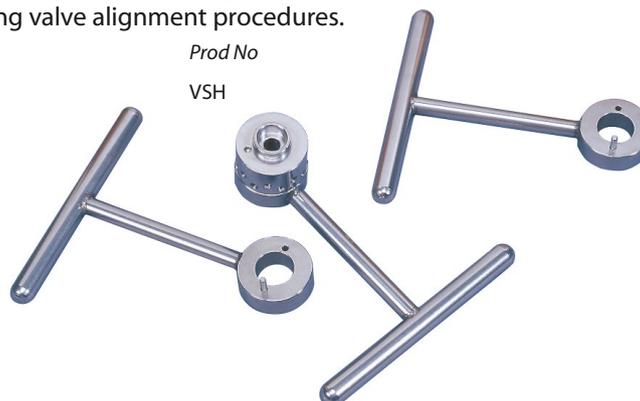


### Valve spanner handle

A special tool for gripping a multiposition valve body. It is especially useful during valve alignment procedures.

Prod No

VSH



### Mirror

Helpful to get access to valve serial numbers and to check discharge on pulsed discharge detectors (PDD).

Prod No

MR

