

# QUARTER TURN AUTOMATION

## Quarter Turn Automation – Pneumatic / Electric

Automation is an ideal solution for precise control of many valves in a system, when valves are remotely located, or when the process requires constant monitoring and adjustment. Pneumatic and electric actuators can be easily fitted on our ball, multi-port, and butterfly valves. Some features and functions include normally closed, normally open, or double-acting operation; corrosion resistant aluminum bodies, pre-loaded springs, and adjustable cams. Many accessories such as visual position indicators, limit switches, 3 and 4-way solenoids, and positioners are also available. For further information, please refer to the IPEX *Industrial Technical Manual Volume IX* entitled, "Quarter Turn Automation".

### PNEUMATIC ACTUATORS OVERVIEW

Pneumatic actuators are the most common choice for quarter turn plastic valves in process applications. Compressed air systems are readily available in any plant, and the cost of the actuator itself is generally lower than that of an electric unit with a comparable torque output. Typical quarter turn automation seldom requires positioning (something achieved more easily with an electric actuator), therefore the cycle life of a pneumatic unit will be substantially greater, and will be intrinsically safer than an electric actuator in volatile environments. While there are many different kinds of pneumatic actuators, a rack and pinion style is the preferred choice within the plastic piping industry. This type of actuator is quite tough and rugged, and has a high cycle life. They generally have a compact, simple construction, and certain models can be quite light in weight. The design also allows the same basic actuator to be used as a double acting or (with minor additions) a spring return unit.



## **i** DID YOU KNOW?

The three basic control functions available through quarter turn automation are:

- 1. Double Acting** – This requires external power for each stroke. For example, power to open the valve, then power to close the valve.
- 2. Normally Closed** – Also referred to as “fail safe closed”, the default position is closed and the actuator requires power to open the valve.
- 3. Normally Open** – Also referred to as “fail safe open”, the default position is open and the actuator requires power to close the valve.

## **ELECTRICAL ACTUATORS OVERVIEW**

Although slightly more expensive than pneumatics, electric actuators have certain desirable benefits. They are the preferred choice when cycle time is an issue, as a quick closing pneumatically actuated valve could cause a damaging pressure surge condition (water hammer). The use of an electric actuator may also be preferred when the distance from the power source is considerable. The friction losses in long runs of compressed air line may result in reduced efficiency and/or additional compressor stations. In addition, electric actuators are the preferred (if not the only) choice when a quarterturn valve like a multi-port is used. In this case, it is possible that the travel required is not just 0° to 90° but 0° to 90° to 180°. A rack and pinion actuator would need four separate pistons and a multiplicity of related air chambers, whereas this is easily accomplished with an electric unit. Most electric actuators have a cam/limit switch arrangement which allows the unit to be set up for a variety of rotations. The two standard limit switches can be used to provide a remote location with an open or closed signal. A multitude of voltages both for AC and DC current are also typically available.



Size (in)	Body Material	Diaphragm Material	Product Code	Universal Number
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**VKD w PTFE Seats**

**Pneumatic – SPRING RETURN,  
NORMALLY CLOSED – SOCKET/THREADED**

1/2	PVC	EPDM	253332	VKDBV103-NC
		FPM	253341	
	CPVC	EPDM	253350	VKDBC103-NC
		FPM	253359	VKDBC203-NC
3/4	PVC	EPDM	253333	VKDBV104-NC
		FPM	253342	
	CPVC	EPDM	253351	VKDBC104-NC
		FPM	253360	VKDBC204-NC
1	PVC	EPDM	253334	VKDBV105-NC
		FPM	253343	
	CPVC	EPDM	253352	VKDBC105-NC
		FPM	253361	VKDBC205-NC
1-1/4	PVC	EPDM	253335	VKDBV106-NC
		FPM	253344	
	CPVC	EPDM	253353	VKDBC106-NC
		FPM	253362	VKDBC206-NC
1-1/2	PVC	EPDM	253336	VKDBV107-NC
		FPM	253345	
	CPVC	EPDM	253354	VKDBC107-NC
		FPM	253363	VKDBC207-NC
2	PVC	EPDM	253337	VKDBV108-NC
		FPM	253346	
	CPVC	EPDM	253355	VKDBC108-NC
		FPM	253364	VKDBC208-NC

**Pneumatic – SPRING RETURN,  
NORMALLY CLOSED – SOCKET**

2-1/2	PVC	EPDM	253338	VKDAV109-NC
		FPM	253347	
	CPVC	EPDM	253356	VKDAC109-NC
		FPM	253365	VKDAC209-NC
3	PVC	EPDM	253339	VKDAV110-NC
		FPM	253348	
	CPVC	EPDM	253357	VKDAC110-NC
		FPM	253366	VKDAC210-NC
4	PVC	EPDM	253340	VKDAV111-NC
		FPM	253349	
	CPVC	EPDM	253358	VKDAC111-NC
		FPM	253367	VKDAC211-NC

Size (in)	Body Material	Diaphragm Material	Product Code	Universal Number
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**VKD w PTFE Seats**

**Pneumatic – SPRING RETURN,  
NORMALLY OPEN – SOCKET/THREADED**

1/2	PVC	EPDM	253368	VKDBV103-NO
		FPM	253377	
	CPVC	EPDM	253386	VKDBC103-NO
		FPM	253395	VKDBC203-NO
3/4	PVC	EPDM	253369	VKDBV104-NO
		FPM	253378	
	CPVC	EPDM	253387	VKDBC104-NO
		FPM	253396	VKDBC204-NO
1	PVC	EPDM	253370	VKDBV105-NO
		FPM	253379	
	CPVC	EPDM	253388	VKDBC105-NO
		FPM	253397	VKDBC205-NO
1-1/4	PVC	EPDM	253371	VKDBV106-NO
		FPM	253380	
	CPVC	EPDM	253389	VKDBC106-NO
		FPM	253398	VKDBC206-NO
1-1/2	PVC	EPDM	253372	VKDBV107-NO
		FPM	253381	
	CPVC	EPDM	253390	VKDBC107-NO
		FPM	253399	VKDBC207-NO
2	PVC	EPDM	253373	VKDBV108-NO
		FPM	253382	
	CPVC	EPDM	253391	VKDBC108-NO
		FPM	253400	VKDBC208-NO

**Pneumatic – SPRING RETURN,  
NORMALLY OPEN – SOCKET**

2-1/2	PVC	EPDM	253374	VKDAV109-NO
		FPM	253383	
	CPVC	EPDM	253392	VKDAC109-NO
		FPM	253401	VKDAC209-NO
3	PVC	EPDM	253375	VKDAV110-NO
		FPM	253384	
	CPVC	EPDM	253393	VKDAC110-NO
		FPM	253402	VKDAC210-NO
4	PVC	EPDM	253376	VKDAV111-NO
		FPM	253385	
	CPVC	EPDM	253394	VKDAC111-NO
		FPM	253403	VKDAC211-NO