



Double Acting Precision Rotary Pneumatic Vane Actuator Installation, Operation and Maintenance

1. INSTALLATION

Mounting hole sizes – Standard actuator

Model	Number Of holes	ANSI thread	Depth of thread	Bolt hole circle
K1	4	5/16-18	0.63	2.000
K2	4	3/8-16	0.79	2.560
K3	4	1/2-13	0.94	3.060
K4	4	5/8-11	1.13	3.890
K5	4	7/8-9	1.50	6.010
K6	4	1-1/8-7	2.00	8.910
K7	4	1-1/8-7	2.00	8.910

Note: Essential that full number of bolts is used and all tightened evenly.

CAUTION:

NEVER HAMMER OR USE OTHER UNDUE FORCE ON ACTUATOR CASES. DAMAGE TO INTERNAL SEALING FACES WILL RESULT.

2. MOUNTING

- 2.1 The actuator shaft end machined for NAMUR adaptation has a scribe mark machined on a flat side indicating the position of the vane. Actuators are shipped with the vane in the mid-position of the stroke. Move the vane to position end-stop that corresponds with the rotation desired to rotate the driven device.
- 2.2 The bracket utilized to interface the actuator and valve (damper, or other quarter-turn device) must be designed with close tolerance that permits near perfect concentric alignment between the centerlines of the actuator shaft and driven shaft of the device being automated.
NOTE: Improper adaptation of the bracket and coupling to the actuator can cause unnecessary friction and premature failure. Misalignment can certainly lead to poor performance and inaccurate control.
- 2.3 The vane floats on its spring-loaded seals inside actuator housings. Avoid all end loading to the actuator shaft. End loading will force the vane to interfere with casings

and will damage the actuator. This event commonly occurs when proper clearance is not provided for the coupling to float between the actuator shaft and the driven device. When bolting the assembly together, if it is necessary to force the two components together with the coupling fitted between the shafts, chances are you have an end-loading problem.

- 2.4 The actuator can be mounted in any orientation.

3. BROACHED COUPLING

- 3.1 A mild steel broached coupling is furnished with the actuator. The coupling is designed specifically to interface with the K-TORK actuator output shaft. An adapter to match the device to be automated can be welded to the coupling furnished.
- 3.2 When actuator and driven device is tightened to the bracket, ensure that the coupling will slightly float up and down on the actuator and driven shafts. This check will guarantee concentricity between the actuator shaft and driven device.

4. AIR SUPPLY

- 4.1 Air supplied to double acting and spring return actuators should be relatively clean and dry. Water and debris in the air will reduce the life expectancy of the actuator.
- 4.2 Air supplied for actuators supplied with positioners and I/P converters must be clean, dry and of instrument quality per ANSI/ISA-57.3 air quality standards.

5. OPERATION

- 5.1 Operating pressure should not exceed 150 PSIG.
- 5.2 Operating temperatures:
 - 5.2.1 Polyurethane seals: (-40°F to 180°F (-40°F to 82°C))
 - 5.2.2 K-SEAL: -40°F to 350°F (-40°F to 177°C)
- 5.3 Stops external to the actuators should be utilized when operating a device with a moment arm generating a cantilevered load.



5.4 A large plastic indicator is available to provide visual actuator position at a distance.

5.5 Namur VDI/VDE 3845 mounting for adding positioners or limit switches is located on the top of the actuator. A Namur solenoid pad is located on the backside of the actuator. K-1 through K-4 actuator sizes.

6. MAINTENANCE

6.1 Maintenance is limited to replacement of seals when wear affects actuator performance. Seal life will vary according to application, conditions of cycle frequency, temperature, condition of air supply, etc. Detailed seal replacement instructions in next section.

7. RECOMMENDED SPARE PARTS

7.1 Standard seal kits available for each actuator model consist of the following:
2 ea. Vane seals
2 ea. Expanders
2 ea. Shaft seals
plus all necessary O-rings, studs/screws, nuts and grease

7.2 In addition, a tube of Dow Corning Silicone # 732 sealant will be required to seal the case halves

8. STROKE ADJUSTMENT

8.1 The K-TORK actuator has end stops at each end of stroke providing precise adjustment. Simply loosen the locknut and screw the stop bolts in to reduce stroke or screw out to increase stroke. Standard adjustment bolts provide a 10-degree range of adjustment at each end of stroke; Greater range is possible with non-standard stop screws. Consult the factory with your specific requirements.

9. SPEED ADJUSTMENT

9.1 Slower operation of the actuator is possible by restricting the air exhausting from the actuator. The most common device used for adjusting cycle speeds is a "flow control valve" that free flows air into the actuator in one direction and meters the air in the opposite direction. Flow control mufflers will accomplish the same results when utilized with a 5-ported direct acting solenoid valve that has independent exhaust ports.

SEAL REPLACEMENT INSTRUCTIONS

- 1. DISMANTLING ACTUATOR** (see exploded drawing/parts list) CAUTION: Before dismantling, check there are no burrs on square drive shafts. If there are, remove to avoid damage to bearings and shaft seals during removal of case halves.
- 1.1 Remove all casing bolts and nuts.
 - 1.2 Separate the two case halves with a K-TORK tool model CP 1-4 or CP 5-6.
 - 1.3 Clean both case halves removing silicone rubber sealant with mineral spirits.
 - 1.4 Replace and lubricate shaft seals in case housings.
 - 1.5 Remove nuts and seal sideplates, expanders and seals from vane. Clean vane.

- 2. REASSEMBLE VANE**
- 2.1 Check studs are tight through vane and equal length on each side. If not, apply Loctite to thread and relocate correctly in vane.
 - 2.2 Apply Dow Corning sealant around bottom of studs (to prevent air leakage through seal on vane stud holes).
 - 2.3 Fit new seal over studs after checking profile matches vane profile.
 - 2.4 Fit seal expander teeth pointing away from vane.
 - 2.5 Fit side plate over studs.
 - 2.6 Center expanders and side plate so there will be an equal amount of seal around the expanders. The expanders must not touch the actuator case half's.



- 2.7 Fit new nylon insert lock nuts to studs. Tighten nuts to following torques:

Model No.	Torque
K1	8 in. lbs.
K2	20 in. lbs.
K3	30 in. lbs.
K4	30 in. lbs.
K5	100 in. lbs.
K6	100 in. lbs.

3. REASSEMBLE ACTUATOR

- 3.1 Coat bearings and internal vane seal areas of the case halves with grease supplied with the seal kits.
- 3.2 Clean case flanges with isopropyl alcohol. Insure that all grease is removed from the flanges.
- 3.3 Lightly and evenly coat joint face of one case half with Dow Corning 732 silicone sealant. CAUTION: EXCESS SEALANT, if extruded inside case, WILL DAMAGE SEALS. Remove all excess sealant especially from inside edge.
- 3.4 Insert vane into one case half, turning it to ease square on vane shaft

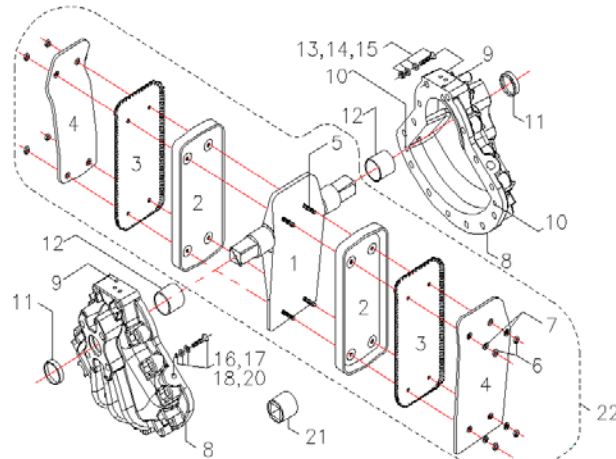
- through shaft seal. Watch that the vane slides smoothly through the shaft seals. Lightly rotating the vane assembly may be necessary.
- 3.5 Fit remaining case half on top of the other turning it to ease vane shaft square through shaft seal. CAUTION: Check that vane lip seals are not trapped at case joint flange face when seals are fitted.
- 3.6 Tighten case screws to the following torques:

Model No.	Torque
K1	180 lb. In.
K2	210 lb. In
K3	210 lb. In
K4	240 lb. In
K5	1080 lb. In
K6	1200 lb. In

- 3.7 Following assembly, rotate vane manually to check movement and wipe away sealant extruded internally.
- 3.8 Allow setting time for sealant before applying test air pressure. See instructions on sealant for cure times recommended.



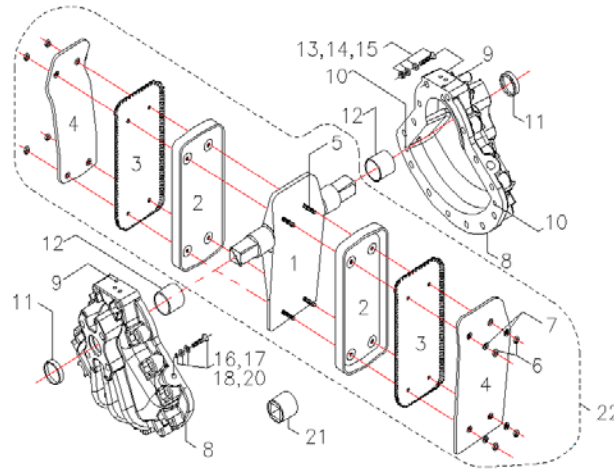
KA-I VANE ASSEMBLY



ITEM #	DESCRIPTION	K1	Qty	K2	Qty	K3	Qty	K4	Qty	K5	Qty	K6	Qty
1	VANE (ENP)	1120020	1	1220020	1	1320020	1	1420020	1	1520020	1	1620020	1
2	VANE SEAL	1130000	2	1230000	2	1330000	2	1430000	2	1530000	2	1630000	2
	VANE SEAL (HT)	-		1230001	2	1330001	2	1430001	2	1530001	2	1630001	2
3	EXPANDER (A)	1140040	2	1240040	2	1340040	2	1440040	2	1540040	2	1640040	2
	EXPANDER (B)									1540140	2	1640140	2
4	SIDE PLATE	1150030	2	1250030	2	1350030	2	1450030	2	1550030	2	1650030	2
5	VANE STUDS	3900100	4	3900100	4	3900100	2	3900100	2	3900500	4	3900800	2
	VANE STUDS	-		-		3900200	4	3900200	4	3900600	2	3900900	4
	VANE STUDS	-		-		-		3900300	2	3900700	2	3901000	2
	VANE STUDS	-		-		-		-		-		-	
6	VANE STUD NUT	3906000	8	3906000	8	3906000	12	3906000	16	3906100	16	3906200	16
7	VANE STUD LOCK WASHER	3901100	8	3901100	8	3901100	12	3901100	16	3901200	16	3901300	16
8	CASE HALF	1110030	2	1210030	2	1310030	2	1410030	2	1510030	2	1610030	2
9	DIRECT MOUNT PLUG	3902000	2	3902000	2	3902000	2	3902000	2	-		-	
10	LOCATOR PIN	3903000	2	3903000	2	3903000	2	3903000	2	3903100	2	3903100	2
11	SHAFT SEAL	1160000	2	1260000	2	1360000	2	1460000	2	1560000	2	1660000	2
	SHAFT SEAL (HT)			1260001	2	1360001	2	1460001	2	1560001	2	1660001	2
12	BEARING	1160100	2	1260100	2	1360100	2	1460100	2	1560100	2	1660100	2
13	CASE SCREW SHORT	3904000	14	3904100	12	3904100	16	3904300	18	3904500	14	3904600	14
	CASE SCREW LONG	-		3904200	2	3904200	2	3904400	2	-		-	
14	CASE WASHER	-		-		-		-		3905000	28	3905100	28
15	CASE NUT	3906100	14	3906200	14	3906200	18	3904300	20	3906400	14	3906500	14
16	STOP BOLT	3907000	2	3907100	2	3907200	2	3907200	2	3907400	2	3907500	2
17	STOP BOLT NUT	3906200	2	3906200	2	3906600	2	3906600	2	3906500	2	3906700	2
18	STOP BOLT WASHER	3905600	2	3905600	2	3905700	2	3905700	2	3905400	2	3905400	2
20	STOP BOLT O-RING (LT)	3909100	2	3909100	2	3909200	2	3909200	2	3909300	2	3909400	2
	STOP BOLT O-RING (HT)	N/A		3909101	2	3909201		3909201	2	3909301		3909401	2
21	COUPLER	2125000	1	2225000	1	2325000	1	2425000	1	2525000	1	2625000	1
22	VANE ASSY (LT)	2122000	1	2222000	1	2322000	1	2422000	1	2522000	1	2622000	1
	VANE ASSY (HT)	N/A		2222001	1	2322001	1	2422001	1	2522001	1	2622001	1
23	SEAL KIT (LT)	2162000	1	2262000	1	2362000	1	2462000	1	2562000	1	2662000	1
23	SEAL KIT (HT)	N/A		2262001	1	2362001		2462001	1	2562001	1	2662001	1



KA-I VANE ASSEMBLY



ITEM #	DESCRIPTION	K7	Qty
1	VANE (ENP)	1720000	1
2	VANE SEAL	1730000	2
	VANE SEAL (HT)	-	
3	EXPANDER (A/LF)	1740040	4
	EXPANDER (B/RT)	1740140	4
	EXPANDER (B/LF)	1740240	4
	EXPANDER (A/RT)	1740340	4
4	SIDE PLATE	1750030	2
5	VANE STUDS	3900850	4
	VANE STUDS	3908000	12
	VANE STUDS	3900900	2
6	VANE STUD NUT	3906200	32
7	VANE STUD LOCK WASHER	3901300	32
8	CASE HALF	1710030	2
9	DIRECT MOUNT PLUG	-	
10	LOCATOR PIN	3903100	2
11	SHAFT SEAL	1760000	2
	SHAFT SEAL (HT)		
12	BEARING	1730100	2
13	CASE BOLT SHORT	3904600	14
14	CASE WASHER	3905100	28
15	CASE NUT	3906500	14
16	STOP BOLT	3907600	2
17	STOP BOLT NUT	3906800	2
18	STOP BOLT WASHER	3905900	2
20	STOP BOLT	3909500	2
	O-RING (LT)		
	STOP BOLT	N/A	
	O-RING (HT)		
21	COUPLER	N/A	1
22	VANE ASSY (LT)	2722000	1
	(ITEMS 1 THRU 6)		
	VANE ASSY (HT)	N/A	
	(ITEMS 1 THRU 6)		
23	SEAL KIT (LT)	2762000	1
23	SEAL KIT (HT)	N/A	