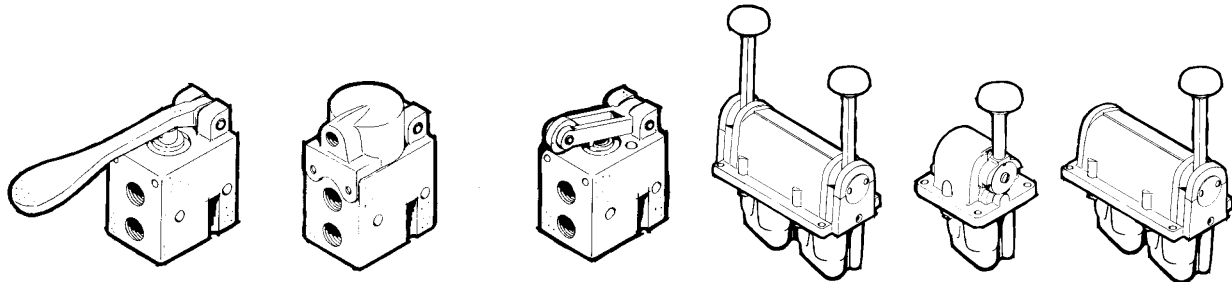


## “A” PILOTAIR® VALVE BLOCK TYPE AND PANEL MOUNTED

### SERVICE INFORMATION



## **BLOCK TYPE “A” PILOTAIR® VALVE**

**BLOCK TYPE:** Pages 1-6  
**PANEL MOUNTED:** Pages 7-22

The Block Type “A” PILOTAIR Valve is a poppet type, on-off, three-way directional valve. The body design lends itself to individual or multiple mounting operations. The basic valve 2-MA-1A, with a choice of six operators, can be easily and quickly assembled without special tools. The valve is interchangeable with the former design. Refer to “Identity Schedule,” page 3.



### **WARNING: INSTALLATION AND MOUNTING**

The user of these devices must conform to all applicable electrical, mechanical, piping and other codes in the installation, operation or repair of these devices.

**INSTALLATION!** Do not attempt to install, operate or repair these devices without proper training in the technique of working on pneumatic or hydraulic systems and devices, unless under trained supervision.

Compressed air and hydraulic systems contain high levels of stored energy. Do not attempt to connect, disconnect or repair these products when a system is under pressure. Always exhaust or drain the pressure from a system before performing any service work. Failure to do so can result in serious personal injury.

**MOUNTING!** Devices should be mounted and positioned in such a manner that they cannot be accidentally operated.

### **Installation (BLOCK TYPE)**

The Block Type “A” PILOTAIR Valve can be installed in any convenient position without interfering with the valve operation. The straight, flat sides are identical to provide either right or left hand horizontal mounting. Mounting holes are also provided for mounting the valve vertically from the top or bottom.

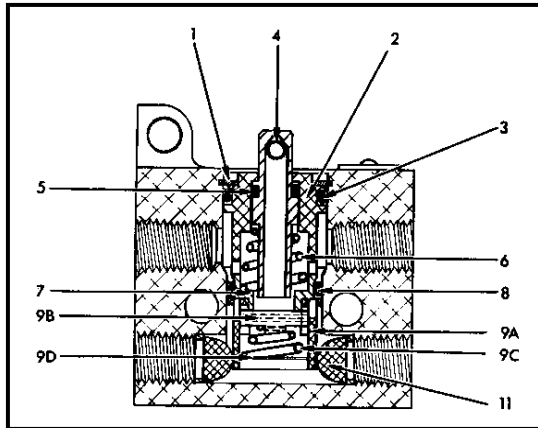
Dual IN and OUT ports are provided on all valves except the 2-CA-1B for ease of piping. Pipe plugs are supplied for plugging the unused ports.

Note: Install the valve to ensure operation within the travel limits shown on the outline drawings (refer to sales catalog SC-700-800). Travel beyond these limits can cause damage to the valve plunger O-ring and subsequent valve leakage.

### **Operation**

The Block Type “A” PILOTAIR Valve is designed to operate at pressures up to 250 psi within a temperature range of -40° F to 200° F (-40° C to 93° C).

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION



**FIGURE 1: Block Type PILOTAIR Valve Assembly View.**

Refer to Figures 1 and 2. With no mechanical force on the plunger as shown, the valve disc seats on the inlet valve seat and seals the passage from the inlet to the outlet port. The outlet port is vented to atmosphere through the center of the plunger. As the plunger is forced downward by an external force it seats on the valve disc. This seals the passage between the outlet port and atmosphere.

Further downward travel of the plunger unseats the valve disc from the inlet valve seat and allows inlet air pressure to flow to the outlet port.

Release of the external force, releases the plunger and valve, and plunger return to the original position.

Install the valve to ensure operation within the travel limits shown on the outline drawings. Travel beyond these limits can cause damage to the valve.

All combinations of the Block Type "A" PILOTAIR Valve are "normally closed" except that designated 2-CA-1B which is "normally open."

## Maintenance Disassembly

Refer to Figure 2. Completely disassemble the valve in sequence shown.

**NOTE:** Strainers are easily damaged. Do not remove from IN ports of valve body.

## Cleaning

1. Clean the body, with strainers intact, and all other metal parts with a nonflammable solvent.
2. Wash all rubber parts with soap and water.
3. Rinse parts thoroughly and blow dry with a low-pressure air jet.
4. Inspect all parts and replace those which are worn or damaged.

THE NEW VALVE DESIGN IS INTERCHANGEABLE WITH THE FORMER DESIGN.

## Reassembly

Refer to Figures 1 and 2, and cartridge valve (4).

1. The valve assembly (4) is a cartridge design to simplify repairs and eliminate problems to improper assembly.
2. Lubricate all metal-to-metal contact surfaces with Number 107 Lubriplate.
3. Lubricate all rubber parts with Dow Corning No. 55 Pneumatic Grease.
4. After reassembly is complete, install the operator and test for correct operation and any evidence of leakage.

## Adjustment

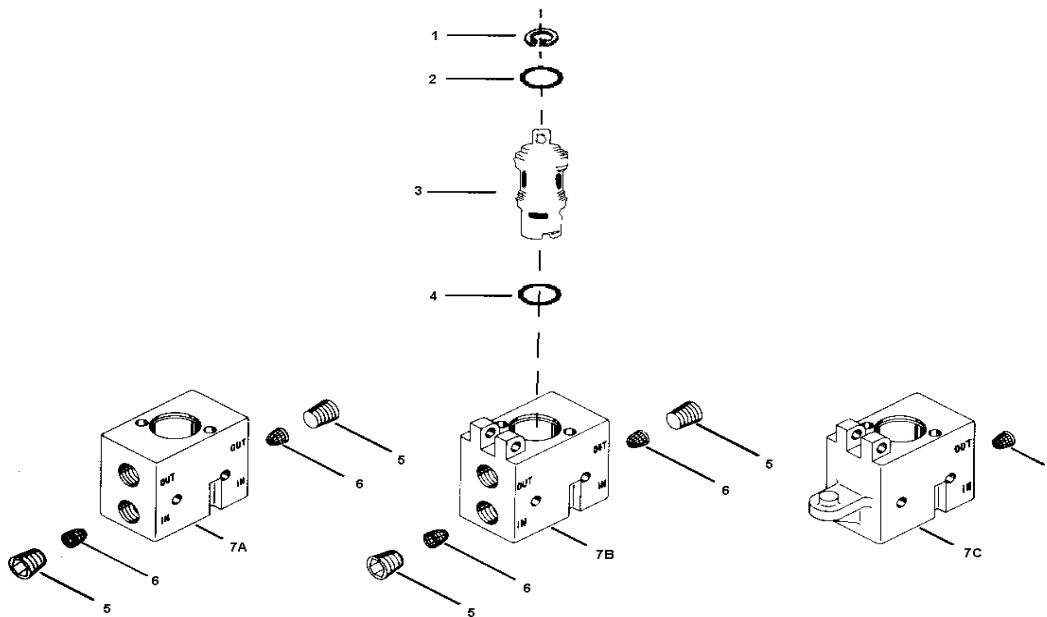
The Block Type "A" PILOTAIR Valve requires no adjustment after reassembly.

# AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

## IDENTITY SCHEDULE

DESIGNATION	OLD PART. NO.	NEW PART NO.	DESIGNATION	OLD PART. NO.	NEW PART NO.
2-MA-1A (less lugs)	P -058718-00000	R431004659	2-CA-1B (light spring)	P -058722-00003	R431004672
2-MA-1A w / lugs	P -058719-00000	R431004661	2-CA-1B (heavy spring)	P -058722-00005	R431004673
2-CA-1A	P -058720-00000	R431004665	2-CA-1B	P -058722-00006	
2-CA-1A	P -058721-00000	R431004666	2-CA-1C	P -061347-00000	R431005758
2-CA-1B	P -058722-00000	R431004669	2-PA-1A	P -058723-00000	R431004674
2-CA-1B (heavy spring)	P -058722-00002	R431004671	2-LA-1A	P -058724-00000	R431004675

\*Less Roller



**FIGURE 2: Block Type PILOTAIR Valve Exploded View**

### PARTS LIST

REF	QTY	DESCRIPTION	NEW PART NO.	OLD PART NO.
1*	1	RING, Retaining	(see kit)	
2*	1	O-RING	(see kit)	
3*	1	CARTRIDGE	(see kit)	
4*	1	O-RING	(see kit)	
5	2	PLUG, Pipe	R432027754	P -049909-00013
6	2	STRAINER	R431003238	P -053477-00000
7A	1	BODY (without lugs)	R431004615	P -058630-00000
7B	1	BODY (with lugs)	R431004944	P -059215-00000
7C	1	BODY (2-CA-1B only)	R431004613	P -058629-00000

### REPAIR KIT

**NEW P/N R431003743**

**(P-055474-K0002) INCLUDES:**

REF.	DESCRIPTION
2	O-RING
3	ASSEMBLY, Cartridge
4	O - RING
----	Dow Corning 55M Grease

### REPAIR KIT/ RETAINING RING

**NEW P/N R431003742**

**(P -055474-00004) INCLUDES:**

REF.	DESCRIPTION
1	RING, Retaining
2	O-RING
3	ASSEMBLY, Cartridge
4	O-RING
----	Dow Corning 55MM Grease

\*Recommended spare parts to be retained in stock.

Available in repair kits at right.

Lubriplate No. 107 grease, 1 gram tube

Part No. R431001581 (P -048294-00000)

# AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

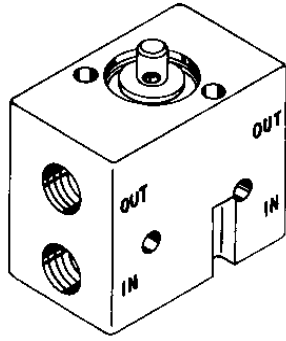


Figure 3: 2 MA-1A PILOTAIR Valve (Less Lugs)

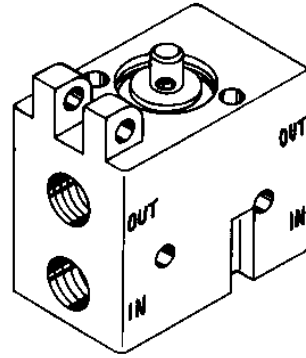


Figure 4: 2-MA-1A PILOTAIR Valve

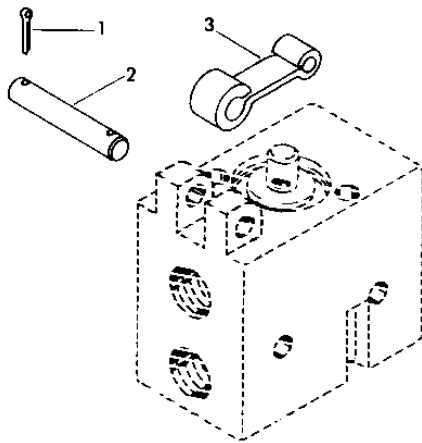


Figure 5: 2-CA-1A PILOTAIR Valve with Cam Dog Operator

## PARTS LIST

2-CA-1A PILOTAIR Valve Complete	New P/N R431004665 (P -058720-00000)
Basic Valve 2-MA-1A (Less Operator)	New P/N R431004663 (P -058719-00002)
<b>Cam Dog Operator Kit</b>	<b>New P/N R431003068</b> <b>(P -052973-K0000)</b>

REF	QTY	DESCRIPTION
1	2	PIN, 1/16" X 1/2" Cotter
2	1	PIN, Lever
3	1	DOG, Cam

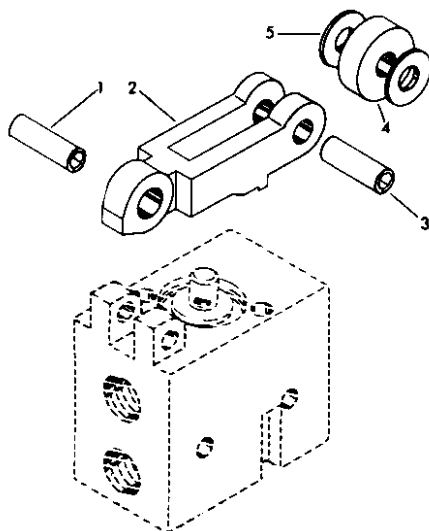


Figure 6: 2-CA-1A PILOTAIR Valve with Cam Roller Operator

## PARTS LIST

2-CA-1A PILOTAIR Valve Complete	New P/N R431004666 (P -058721-00000)
Basic Valve (Less Operator)	New P/N R431004663 (P -058719-00002)
<b>Cam Lever Kit with Roll</b>	<b>New P/N R431003071</b> <b>(P -052974-K0000)</b>

REF.	QTY.	DESCRIPTION
1	1	PIN, 1/4" x 1" Roll
2	1	LEVER
3	1	PIN, 1/4" x 3/4" Roll
4	1	ROLLER
5	2	WASHER

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## PARTS LIST

- \* 2-CA-1B PILOTAIR Valve Complete New P/N R431004669  
(standard return spring) (P -058722-00000)
- \* 2-CA-1B PILOTAIR Valve Complete New P/N R431004671  
(heavy return spring) (P -058722-00002)
- \* 2-CA-1B PILOTAIR Valve Complete New P/N R431004672  
(light return spring) (P -058722-00003)
- \* See Figure 2, for body and valve assembly part numbers.

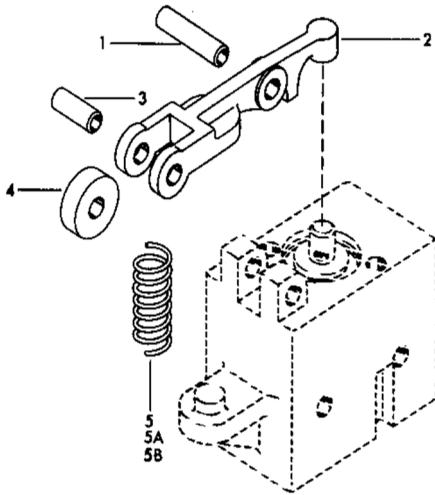


Figure 7: 2-CA-1B PILOTAIR Valve

### LEVER Operator Kit (Less Spring) New P/N: R431009260 (P -052853-K0000)

REF. NO.	QTY	DESCRIPTION
1	1	PIN, 1/4" x 1" Roll
2	1	LEVER
3	1	PIN, 1/4" x 5/8" Roll
4	1	ROLLER

SOLD SEPARATELY		Part Number
5	1	SPRING, Standard Return New P/N R431005489 (P -060360-00000)
5A	1	SPRING, Heavy Return New P/N R431005782 (P -061474-00000)
5B	1	SPRING, Light Return New P/N R431006126

## PARTS LIST

- 2-CA-1C PILOTAIR  
Valve Complete New P/N R431005758  
(P -061347-00000)
- Basic Valve 2-MA-1A  
(Less Operator) New P/N R431004663  
(P -058719-00002)

### Cam Roller Operator Kit New P/N : R431009301 (P -061348-K0000)

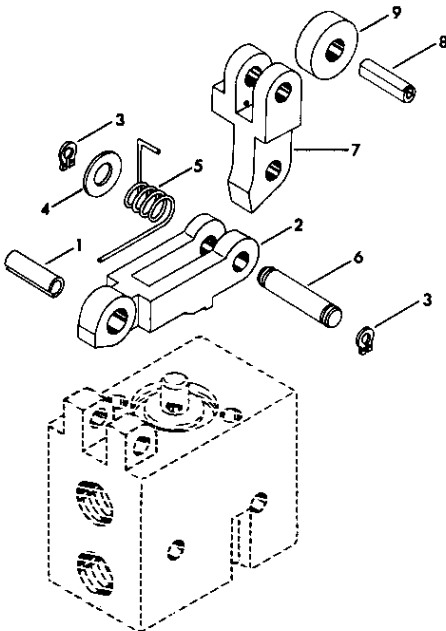


Figure 8: 2-CA-1C PILOTAIR Valve

REF.	QTY	DESCRIPTION
1	1	PIN, 1/4" x 1" Roll
2	1	LEVER
3	2	RING, Retaining
4	1	WASHER
5	1	SPRING, Torsion
6	1	PIN, Pivot
7	1	LEVER, One Way
8	1	PIN, Roll
9	1	ROLLER

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

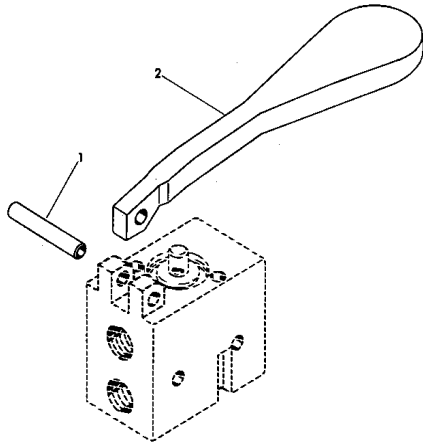


Figure 9: 2-LA-1A PILOTAIR Valve

## PARTS LIST

2-LA-1A PILOTAIR  
Valve Complete    New P/N R431004675 (P -058724-00000)

Basic Valve 2-MA-1A  
(Less Operator)    New P/N R431004663 (P -058719-00002)

### Lever Operator Kit New P/N R431004677 (P -058725-K0000)

REF. NO	QTY.	DESCRIPTION
1	1	PIN, 1/4" x 1" Roll
2	1	LEVER

## PARTS LIST

2-PA-1A PILOTAIR  
Valve Complete    New P/N R431004674 (P -058723-00000)

Basic Valve 2-MA-1A  
(Less Operator)    New P/N R431004663 (P -058719-00002)

### Pilot Cylinder Operator Kit New P/N R431003054 (P -052956-K0001)

REF. NO.	QTY.	DESCRIPTION
1	1	PIN, 1/4" x 1" Roll
2	2	PIN, 5/32" x 3/8" Driv-lok
3	1	CYLINDER, Pilot
4	1	PISTON
5	1	O-RING

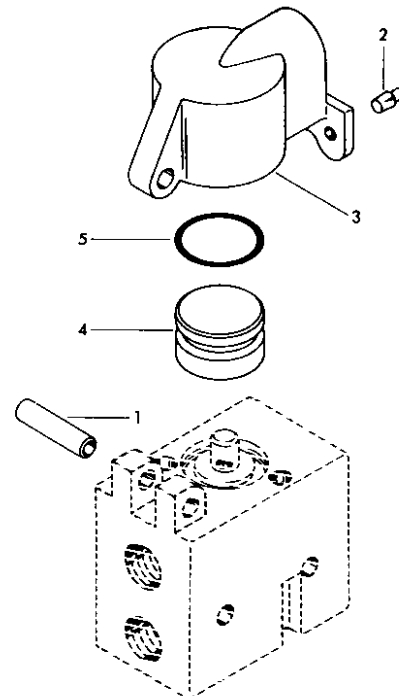


Figure 10: 2-PA-1A PILOTAIR Valve

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# AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

## PANEL MOUNTED “A” PILOTAIR® VALVE

The Panel Mounted “A” PILOTAIR Valve is a poppet type pneumatic directional control valve consisting of a cam housing assembly and a valve portion assembled in a variety of configurations.

**SEE “WARNING: INSTALLATION AND MOUNTING” ON FRONT COVER.**

### Latest Design Features

Several features have been designed into the Panel Mounted “A” PILOTAIR Valve for added strength, easier maintenance and longer service life.

- One-piece solid steel shaft for increased strength
- Bronze bearings in cam housing for longer wear
- Separate steel handle and hub for increased strength
- Tooth-type Nylatron plastic detents for longer wear and more positive detenting
- Internal centering spring assembly for longer wear and more positive handle centering
- One-piece supply valve sub-assembly for easier, more economical maintenance
- Die-cast anodized aluminum body and cam housing for lighter weight, added strength and corrosion resistance.
- Improved latch
- Simplified “cartridge” repair

### Installation

The Panel Mounted “A” PILOTAIR Valve can be mounted in either a horizontal or vertical panel. For mounting hole dimensions and operator travel, refer to sales catalog SC-700-800.

### Operation

The Panel Mounted “A” PILOTAIR Valve is designed to operate at pressures up to 250 psi (17.2 bar) within a temperature range of -40° F to 200° F (-40° C to 93° C).

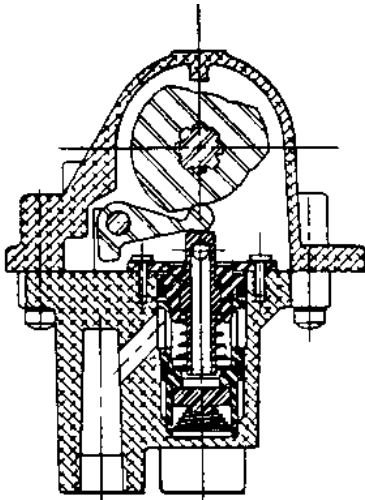


Figure 11. Valve Portion  
Assembly View

Refer to Figure 11. With no mechanical force on the valve disc seat, the inlet valve seats and seals the passage from the inlet to the outlet port. The outlet port is vented to atmosphere through the center of the plunger.

As the plunger is forced downward by the cam force, it seats on the valve disc. This seals the passage between the outlet port and atmosphere. Further downward travel of the plunger unseats the valve disc from the inlet valve seat and allows inlet air pressure to flow to the outlet port.

Several variations of valve operation and handle holding functions are available in the Panel Mounted “A” PILOTAIR Valve .

- ◆ 2-BA-1 PILOTAIR Valve is a two position button operated valve.
- ◆ 2-HA-1 PILOTAIR Valve is available with either a two-position detent or a two-position latching handle.
- ◆ 2-HA-2 PILOTAIR Valve is available with a two-, three-, or five-position detent, a latching handle for various positions, or a spring-centered handle.
- ◆ 2-HA-3 and 2-HA-4 PILOTAIR Valves are usually pin-gated in each handle position, but detents in each position are also available. A three- or five-position detent can be supplied on single handle valves if required.

# AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

## Valve Portion Maintenance

### DISASSEMBLY

Refer to Figure 16, and completely disassemble the valve portion in sequence shown.

### CLEANING

1. Clean all metal parts with a nonflammable solvent.
2. Wash all rubber parts with soap and water.
3. Rinse parts thoroughly and blow dry with a low-pressure air jet.
4. Inspect all parts and replace those which are worn or damaged.

### REASSEMBLY

Refer to Figures 11 and 16, and reassemble the valve portion.

1. The cartridge valve assembly (6) is designed to simplify repairs and eliminate possible problems in assembly.
2. Lubricate all metal-to-metal contact surfaces with Number 107 Lubriplate.
3. Lubricate all rubber parts with Dow Corning No. 55 Pneumatic Grease.
4. After reassembly is complete, install the operator and test for correct operation and evidence of leakage.

### ADJUSTMENT

The “A” PILOTAIR Valve requires no adjustment after reassembly.

## CAM HOUSING MAINTENANCE

**NOTE:** Before performing maintenance on the cam housing, the following information must be noted.

All cams in the “A” PILOTAIR Valve are marked for position on the shaft and for the valve cavity that they are to operate.

1. The position index mark indicates the position of the cam on the shaft when the handle is in the upright position. This mark appears on the edge of the cam.

2. The engraved cavity number indicates the valve cavity that the cam is to operate. This marking appears as an Arabic numeral on the same side of the cam as the position index mark.

With the front (vertical side) of the cam housing facing the operator and with the handle facing toward the right (single handle models), the position index marks and engraved cavity numbers appear on the right side of the cams.

The valve cavities are numbered 1, 2, 3 and 4 from the left with the cam housing in the same position as above.

## 2-BA-1 PILOTAIR VALVE

### HOUSING DISASSEMBLY

Refer to Figure 17 (page 17). Disassemble the housing in sequence shown.

### CLEANING

1. Clean all parts with a nonflammable solvent.
2. Rinse parts thoroughly and blow dry with a low-pressure air jet.
3. Lubricate Driv-lok pin, shaft of push-button and both sides of cam dog with Number 107 Lubriplate.

### REASSEMBLY

Refer to Figure 17, and reassemble the housing.

## 2-HA-1 PILOTAIR VALVE

### HOUSING DISASSEMBLY

Refer to Figure 18, and disassemble the cam housing in sequence shown.

### CLEANING

1. Clean all parts with a nonflammable solvent.
2. Rinse parts thoroughly and blow dry with a low-pressure air jet.
3. Lubricate bronze bearings located in cam housing with Number 107 Lubriplate.
4. Lubricate cam surfaces and cam follower surfaces with Number 107 Lubriplate after they have been reassembled in cam housing.

### REASSEMBLY

Refer to Figure 18

1. Position handle hub (7) onto shaft (13). Hub end must be flush with end of shaft.
2. Insert rubber plug (6) into hole of handle hub. Screw handle (5) into hub and tighten to secure hub against shaft.
3. Position washer (8) onto shaft.
4. Insert handle and hub assembly into right side of cam housing just enough to allow cam (9) to be positioned on shaft.
5. Position cam (9) on shaft so that the position index mark is facing toward the handle and, at the same time, appears at bottom center when the handle is in the upright position.
6. Place spacer (10) on shaft.
7. Slide shaft through hole in left side of cam housing.
8. Add washer (8) and secure with retaining ring (14).



# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## 2-HA-2 PILOTAIR VALVES

### HOUSING DISASSEMBLY

The "A" PILOTAIR Valve cam housing is manufactured of long-wearing component parts and is designed for years of trouble-free service. Under normal conditions, the cam housing **should not require disassembly** when performing maintenance. Complete cam housing assemblies are available and are economically priced if their replacement becomes necessary.

However, if it becomes necessary to disassemble the unit, it is important that the position of the cams on the shaft in relation to the position of the handle be noted. Each cam is marked with a position index mark and engraved cavity number. (See "NOTE" in this section).

### CLEANING

1. It is recommended that the cam housing be cleaned as an assembled unit. Clean in mineral spirits or in any solvent that is not harmful to Nylatron GS plastic.
2. Rinse parts thoroughly and blow dry with a low-pressure air jet.
3. Lubricate bronze bearings located in cam housing, cam and cam follower with Number 107 Lubriplate.

### REASSEMBLY

If the cam housing has been disassembled, the following procedure must be used.

NOTE: Replacement cams are not marked for index position and cavity number. If any cam is to be replaced, the replacement cam must be marked identically to the cam it replaces.

1. Position cams so that the engraved cavity numbers and position index marks are facing toward the handle. It is imperative that the position index marks appear in a line at the bottom center when the handle is in the upright position.
2. Place cam marked #2 on shaft next to handle and follow with applicable detail parts as shown in Figure 14. Place cam marked #1 on shaft.
3. Slide shaft through left side of cam housing. Add washer and secure with retaining ring.

## 2-HA-3 and 2-HA-4 PILOTAIR VALVES

### HOUSING DISASSEMBLY

The "A" PILOTAIR Valve cam housing is manufactured of long-wearing component parts and is designed for years of trouble-free service. Under normal conditions, the cam housing **should not require disassembly** when performing maintenance. It is not recommended that the cam housing of either the 2-HA-3 or the 2-HA-4 PILOTAIR Valve be disassembled due to the difficulty of reassembly without special factory equipment. Complete cam housing assemblies are available and are economically priced if their replacement becomes necessary.

### CLEANING

Refer to paragraph heading under 2-HA-2 PILOTAIR Valve and follow recommendations listed.

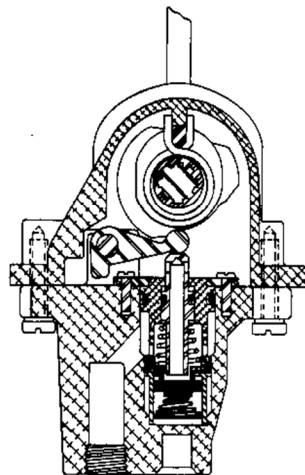


Figure 12 - Typical Spring-Return Valve Assembly

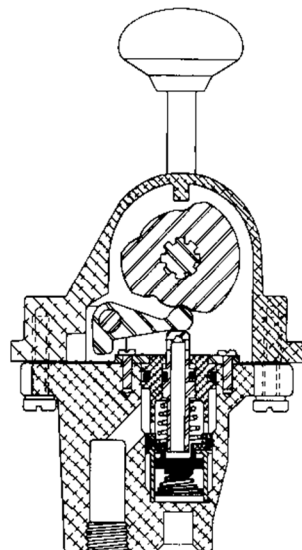


Figure 13 - Typical Valve Assembly

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## IDENTITY SCHEDULES

### 2-BA-1 PILOTAIR VALVE

MODEL	NEW PART NUMBER	OLD PART NUMBER	NEW PART NUMBER	OLD BUTTON OPER. PORTION	NEW VALVE PORTION	OLD VALVE PORTION
2-BA-1	R431003427	P -054692-00002	R43100341	P -054693-00000	R431005023	P -059344-00000

### 2-HA-1 PILOTAIR VALVE

MODEL	NEW PART NUMBER	OLD PART NUMBER	**NEW CAM HOUSING	**OLD CAM, HOUSING	NEW VALVE PORTION	OLD VALVE PORTION
2-HA-1	R431004994	P -059331-00000	R431005035	P -059350-K0000	R431005023	P -059344-00000
2-HA-1L	R431004997	P -059332-00001	R431005036	P -059351-00001	R431005023	P -059344-00000
2-HA-1R	R431005000	P -059333-00000	R431005040	P -059352-00000	R431005023	P -059344-00000
2-HA-1LR	R431005001	P -059334-00001	R431005042	P -059353-00001	R431005023	P -059344-00000
2-HA-1W	R431005660	P -061083-00000	R431005659	P -061082-00000	R431005023	P -059344-00000
2-HA-1RW	R431005661	P -061090-00000	R431005662	P -061091-00000	R431005023	P -059344-00000

### 2-HA-2 PILOTAIR VALVE

MODEL	NEW PART NUMBER	OLD PART NUMBER	**NEW CAM HOUSING	**OLD CAM HOUSING	NEW VALVE PORT	OLD VALVE PORT
2-HA-2	R431005003	P -059335-00000	R431005044	P -059354-00000	R431005026	P -059346-00000
2-HA-2 (less knob)	R431005402	P -060150-00000	R431005045	P -059354-00001	R431005026	P -059346-00000
2-HA-2 (key operated)	R431005815	P -061644-00000	R431005816	P -061645-00000	R431005026	P -059346-00000
2-HA-2 (long handle)	R431005820	P -061652-00000	R431005819	P -061651-00000	R431005026	P -059346-00000
2-HA-2F	R541003360	P -054427-00001	R431005074	P -059364-00000	R431005026	P -059346-00000
2-HA-2F (blk vinyl paint on cam housing)	R431006025	P -062204-00000	R431006026	P -062205-00000	R431005026	P -059346-00000
2-HA-2L	R431005006	P -059336-00003	R431005004	P -059355-00002	R431005026	P -059346-00000
2-HA-2L	R431006008	P -062082-00000	R431005005	P -059355-00003	R431005026	P -059346-00000
2-HA-2L (blk vinyl paint on cam housing)	R431005927	P -061966-00000	R431005988	P -062021-00000	R431005026	P -059346-00000
2-HA-2R	R431005008	P -059337-00000	R431005054	P -059356-00000	R431005026	P -059346-00000
2-HA-2R (long handle)	R431005754	P -061326-00000	R431005055	P -0959356-0001	R431005026	P -059346-00000
2-HA-2LR	R431005011	P -059338-00002	R431005057	P -059357-00001	R431005026	P -059346-00000
2-HA-2X	R431005020	P -059342-00000	R431005069	P -059361-00000	R431005026	P -059346-00000
2-HA-2LX	R434100521	P -059343-00001	R431005070	P -059362-00001	R431005026	P -059346-00000
2-HA-2Y	R431005016	P -059340-00000	R431005064	P -059359-00000	R431005026	P -059346-00000
2-HA-2Y	R431005017	P -061745-00000	R431005863	P -061752-00000	R431005026	P -059346-00000
2-HA-2LY	R431005019	P -059341-00001	R431005067	P -059360-00001	R431005026	P -059346-00000
2-HA-2Z	R431005013	P -059339-00000	R431005059	P -059358-00000	R431005026	P -059346-00000
2-HA-2LZ	R431005864	P -061755-00000	R431005060	P -059358-00001	R431005026	P -059346-00000

### DETENTED SINGLE HANDLE 2-HA-3 and 2-HA-4 PILOTAIR VALVES

MODEL	PART NUMBER	** CAM HOUSING	VALVE PORTION				CAM (REF. NO 11)			
			R SIDE	L SIDE	CAV. #1	CAV.#2	CAV.#3	CAV.#4		
2-HA-3 (long handle)	R431005733 (P -061266-00001)	R431005736 (P -061267-00001)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	
2-HA-4 (short handle)	R431005632 (P -060957-00000)	R431005633 (P -060958-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)	R431004899 (P -059080-00003)	R431004899 (P -059080-00003)	R431004899 (P -059080-00003)	

NOTE: Old Part Number in ( ).

### GATED SINGLE HANDLE 2-HA-3 and 2-HA-4 PILOTAIR VALVES

MODEL	CAM HOUSING PORTION	VALVE PORTION		** CAM HOUSING 1	PIN HOUSING 2	CAV. #1	CAM (Ref. No.12)			
		R SIDE	L SIDE				CAV.#2	CAV.#3	CAV.#4	
2-HA-3	R431004510 (P -058374-00001)	R431004573 (P -058502-00001)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005094 (P -059387-00013)	R431005168 (P -059513-00004)	Plugged	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431005805 (P -061621-00000)
2-HA-3	R431004511 (*P -058378-00002)	R431004582 (P -058515-00002)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005101 (P -059387-00020)	R431005171 (P -059513-00007)	Plugged	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)
2-HA-3	R431004512 (P -058379-00001)	R431004574 (P -058502-00001)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	Plugged	R431004898 (P -059071-00000)	R431004897 (P -059070-00000)	R431004898 (P -059071-00000)
2-HA-3	R431004907 (P -059067-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	Plugged	R431004899 (P -059072-00000)	R431004898 (P -059071-00000)	R431004899 (P -059072-00000)
2-HA-3	(P -059068-00001)	R431005026 (P -059086-00001)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005095 (P -059387-00002)	R431005168 (P -059513-00004)	Plugged	R431004898 (P -059071-00000)	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)
2-HA-3	R431009019 (P -060877-00000)	R431009014 (P -058503-00002)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	Plugged	R431004897 (P -059070-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)
2-HA-3	(P -061959-00000)	(P -061964-00000)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005095 (P -059387-00002)	R431005168 (P -059513-00004)	Plugged	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)	R431004899 (P -059071-00000)
2-HA-3	R431006034 (P -062269-00000)	R431006035 (P -062270-00000)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431006036 (P -062271-00000)	R431005203 (P -05960-00000)	Plugged	R431004897 (P -059070-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)
2-HA-3	(P -062550-00000)	(P -062551-00000)	R431005026 (P -059346-00000)	R431004538 (P -058453-00001)	R431005095 (P -059387-00002)	R431005168 (P -059513-00004)	Plugged	R431005804 (P -061620-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)
2-HA-4	(P -058376-00001)	(P -058506-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004897 (P -059070-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431004897 (P -059070-00000)
2-HA-4	R431009113 (P -058381-00001)	R431004576 (P -058507-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004897 (P -059070-00000)	R431004898 (P -059071-00000)	R431004898 (P -059072-00000)	R431004897 (P -059070-00000)
2-HA-4	R431004540 (P -058454-00001)	R431004583 (P -058516-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00002)	R431005168 (P -059513-00004)	R431004899 (P -059072-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431004899 (P -059072-00000)

\* Spring returned from position no. 4 to position no. 3. \*\* Refer to appropriate CAM HOUSING Exploded View and Parts List for those part numbers not included in these portions.  
NOTE: Old Part Number in ( ).

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## GATED SINGLE HANDLE 2-HA-3 and 2-HA-4 PILOTAIR VALVES (Con't)

MODEL	CAM HOUSING	PORTION	VALVE PORTION		** CAM HOUSING 1	PIN HOUSING 2	CAM (Ref. No.12)			
			R SIDE	L SIDE			CAV. #1	CAV.#2	CAV.#3	CAV.#4
2-HA-4	R431004541 (P -058455-00002)	R431004577 (P -058508-00002)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431005685 (P -061156-00000)	R431004899 (P -059072-00000)
2-HA-4	R432004542 (P -058456-00001)	R431004578 (P -058509-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)	R431006402 (P -059073-00000)	R431006402 (P -064249-00000)
2-HA-4	R431004543 (P -058457-00001)	R431004579 (P -058510-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004898 (P -059080-00000)	R431004898 (P -059080-00000)	R431004899 (P -059080-00000)	R431004897 (P -059072-00000)
2-HA-4	R431004801 (P -058892-00001)	R431004908 (P -059088-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004898 (P -059071-00000)	R431004897 (P -059070-00000)	R431004899 (P -059072-00000)	R431004897 (P -059070-00000)
2-HA-4	R431005522 (P -059552-00001)	R431005026 (P -059553-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004898 (P -059071-00000)	R431004897 (P -059071-00000)	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)
2-HA-4	R431005386 (P -060056-00000)	R431005387 (P -060057-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004897 (P -059072-00000)	R431004898 (P -059071-00000)	R431004899 (P -059072-00000)	R431004898 (P -059071-00000)
2-HA-4	R431005403 (P -060153-00000)	R431005405 (P -060154-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004898 (P -059071-00000)	R431004897 (P -059070-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)
2-HA-4	R431005485 (P -060324-00000)	R431005486 (P -060325-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00002)	R431005169 (P -059513-00004)	R431004898 (P -059071-00000)	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)	R431004898 (P -059071-00000)
2-HA-4	R431005740 (P -061274-00000)	R431005744 (P -061282-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004897 (P -059070-00000)	R431004899 (P -059072-00000)	R431004899 (P -059072-00000)	R431004897 (P -059070-00000)
2-HA-4	R431005803 (P -061619-00000)	R431005802 (P -061618-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004897 (P -059070-00000)	R431005804 (P -061620-00000)	R431005804 (P -061620-00000)	R431005805 (P -061621-00000)
2-HA-4	R431006000 (P -6 02068-00000)	R431006003 (P -062074-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00002)	R431005168 (P -059513-00004)	R431004898 (P -059071-00000)	R431005805 (P -061621-00000)	R431004898 (P -059071-00000)	R431004899 (P -059072-00000)
2-HA-4	R431006038 (P -062275-00000)	R431006060 (P -062481-00000)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005095 (P -059387-00014)	R431005169 (P -059513-00005)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)	R431004898 (P -059071-00000)

NOTE: Old Part Number in ( ).

## GATED DOUBLE HANDLE 2-HA-3 and 2-HA-4 PILOTAIR VALVES

MODEL	CAM HOUSING PORTION	VALVE PORTION		**CAM HOUSING (Ref. No. 1)	PIN HOUSING (Ref. No. 2)		CAM (Ref. No. 12)			
		R Side	L SIDE		Ref. No. 2R	Ref. No. 2L	CAV. #1	CAV. #2	CAV. #3	CAV. #4
2-HA-3	(P -058375-00001) (P -058504-00001)	R431004538 (P 058453-00001)	R431005026 (P -059346-00000)	R431005088 (P -059386-00100)	R431005203 (P -059600-00000)	R431005167 (P -059513-00003)	(P -059080-00000)	(P -059080-00000)	Plugged	(P -059080-00000)
2-HA-3	R431004513 (P -058380-00001)	R431004575 (P -058505-00001)	R431005026 (P -058453-00001)	R431005088 (P -059386-00010)	R431005203 (P -059600-00000)	R431005167 (P -059513-00003)	Plugged	(P -060429-00000)	(P -060429-00000)	(P -060429-00000)
2-HA-4	(P -058377-00001) (P -058512-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005088 (P -059386-00008)	R431005203 (P -059600-00000)	R431005167 (P -059513-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)
2-HA-4	R431004537 (P -058451-00001)	R431004581 (P -058514-00001)	R431005026 (P -059346-00000)	R431005089 (P -059386-00011)	R431005167 (P -059513-00003)	R431005167 (P -059513-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)
2-HA-4	(P -058452-00001) (P -058511-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005088 (P -059386-00001)	R431005203 (P -059600-00000)	R431005168 (P -059513-00004)	R431004904 (P -059080-00003)	R431004904 (P -059071-00000)	R431004898 (P -059071-00000)	R431004904 (P -059071-00000)
2-HA-4	R431004544 (P -058458-00001)	R431004580 (P -058513-00001)	R431005026 (P -059346-00000)	R431005089 (P -059386-00011)	R431005167 (P -059513-00003)	R431005167 (P -059513-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)
2-HA-4	(P -059069-00001) (P -059087-00001)	R431005026 (P -059346-00000)	R431005026 (P -059346-00000)	R431005088 (P -059386-00010)	R431005203 (P -059600-00000)	R431005167 (P -059513-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)	R431004904 (P -059080-00003)

\* Refer to appropriate CAM HOUSING Exploded Views and Parts Lists for those piece numbers not included in these portions.  
NOTE: Old Part Number in ( ).

## Handle Position - Port Diagrams

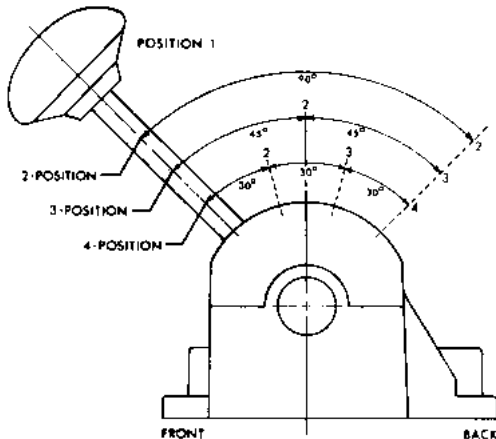


Figure 14: Two-, Three-, and Four-Position Handle

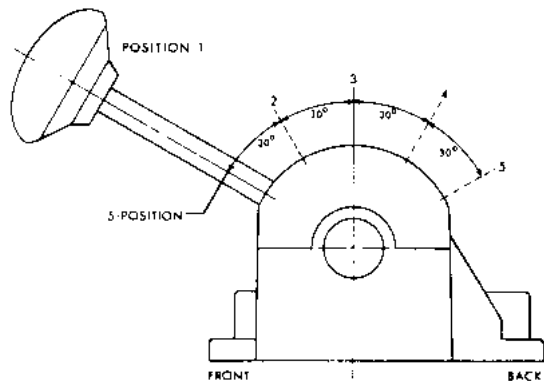


Figure 15: Five-Position Handle

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## SINGLE THREE-WAY VALVES (2-HA-1)

2-HA-1 R431004944 (P-059331-00000)    2-HA-1R R431005000 (P-059333-00000)    2-HA-1W R431005660 (P-061083-00000)    2-HA-1RW R431005661 (P-061090-00000)  
 2-HA-1L R431004997 (P-059332-00001)    2-HA-1LR R431005001 (P-059334-00001)

HANDLE POSITION	PORT WHICH PRESSURE IS SUPPLIED
FIG. 14	OUT
1	
2	X

HANDLE POSITION	PORT WHICH PRESSURE IS SUPPLIED
FIG. 14	OUT
1	X
2	

HANDLE POSITION	PORT WHICH PRESSURE IS SUPPLIED
FIG. 14	OUT
1	
2	
3	X

HANDLE POSITION	PORT WHICH PRESSURE IS SUPPLIED
FIG. 14	OUT
1	X
2	
3	

## DOUBLE THREE-WAY VALVES (2-HA-2)

2-HA-2F R431003360 (P-054427-00001)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED	
	OUT 1	OUT 2
FIG. 15		
1	X	X
2	X	
3		
4		X
5	X	X

2-HA-2 R431005003 (P-059335-00000)    2-HA-2R R431005008 (P-059337-00000)  
 2-HA-2L R431005006 (P-059336-00003)    2-HA-2LR R431005111 (P-059338-00002)  
 2-HA-2Z R431005013 (P-059339-00000)    2-HA-2R R431005754 (P-061326-00000)  
 2-HA-2 R431005402 (P-060150-00000)    2-HA-2Y R431005016 (P-059340-00000)  
 2-HA-2 R431005815 (P-061644-00000)    2-HA-2LY R431005019 (P-059341-00001)  
 2-HA-2 R431005820 (P-061652-00000)    2-HA-2Y R431007017 (P-067145-00000)  
 2-HA-2LZ R431005864 (P-061755-00000)    2-HA-2X R431005020 (P-059342-00000)  
 2-HA-2L R431005927 (P-061966-00000)    2-HA-2LX R431005021 (P-059343-00001)  
 2-HA-2L R431006008 (P-062082-00000)    2-HA-2F R431006025 (P-062204-00000)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED	
	OUT 1	OUT 2
FIG. 14		
1		X
2		
3	X	

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED	
	OUT 1	OUT 2
FIG. 14		
1		X
2	X	X
3	X	

2-HA-2Y R431005016 (P-059340-00000)  
 2-HA-2LY R431005019 (P-059341-00001)  
 2-HA-2Y R431007017 (P-067145-00000)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED	
	OUT 1	OUT 2
FIG. 14		
1		X
2	X	

2-HA-2X R431005020 (P-059342-00000)  
 2-HA-2LX R431005021 (P-059343-00001)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED	
	OUT 1	OUT 2
FIG. 14		
1		
2		X
3	X	X

2-HA-2F R431006025 (P-062204-00000)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED	
	OUT 1	OUT 2
FIG. 15		
1		
2		X
3	X	X
4	X	
5		

## TRIPLE THREE-WAY VALVES (2-HA-3)

2-HA-3 R431004510 (P-058374-00001)

HANDLE-POSITION	PORTS WHICH PRESSURE IS SUPPLIED			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
FIG. 14	SINGLE RIGHT HANDLE			
1	Plugged		X	
2	Plugged		X	X
3	Plugged	X		X
4	Plugged	X		

2-HA-3 (P-058375-00001)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
FIG. 14				
1		X	Plugged	X
2			Plugged	
3	X			

2-HA-3 R431004511 (P-058378-00002)  
 2-HA-3 (P-061959-00000)

HANDLE POSITION	PORTS WHICH PRESSURE IS SUPPLIED			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
FIG. 14	SINGLE RIGHT HANDLE			
1	Plugged	X		
2	Plugged			X
3	Plugged			
4	Plugged		X	

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## TRIPLE THREE-WAY VALVES (2-HA-3) (Con't)

2-HA-3 R431004512 (P-58379-00001)    2-HA-3 R431006034 (P-062269-00000)    2-HA-3 R431004513 (P-58380-00001)    2-HA-3 (P-59067-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	Plugged			X
2	Plugged			
3	Plugged		X	
4	Plugged			
5	Plugged	X		

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	LEFT HAND		RIGHT HAND	
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X	Plugged	X
2	X	X	Plugged	
3	X		Plugged	

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	Plugged			
2	Plugged		X	X
3	Plugged			X
4	Plugged	X		
5	Plugged	X		

2-HA-3 (P-59068-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	LEFT HAND		RIGHT HAND	
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	Plugged			X
2	Plugged			
3	Plugged	X		
4	Plugged	X	X	

2-HA-3 (P-060877-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	Plugged		X	
2	Plugged			
3	Plugged	X		
4	Plugged			
5	Plugged			X

2-HA-3 R431005733 (P-061266-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	Plugged		X	
2	Plugged	X		
3	Plugged			X

2-HA-3 (P-062550-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	SINGLE RIGHT HANDLE			
1	Plugged	X	X	
2	Plugged		X	
3	Plugged	X		X
4	Plugged			X

## QUADRUPLE THREE-WAY VALVES (2-HA-4)

2-HA-4 R431009113 (P-058381-0001)

2-HA-4 (P-058376-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		X
2				
3	X			X
4	X			
5	X		X	

2-HA-4 (P-058377-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	LEFT HAND		RIGHT HAND	
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		X
2	X		X	X
3			X	

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
R		X		X
N				X
F-1	X			X
F-2	X		X	X
F-3	X		X	

# AVETNICS "A" PILOTAIR® VALVE SERVICE INFORMATION

## QUADRUPLE THREE-WAY VALVES (2-HA-4) (Con't)

2-HA-4 R431004537  
(P -058451-00001)

HANDLE POS. FIG. 14	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	LEFT HAND		RIGHT HAND	
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		X
2			X	X
3	X		X	

2-HA-4 (P -058452-00001)

HANDLE POS. FIG. 14	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	LEFT HANDLE	RIGHT HANDLE		
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X	X		
2		X		X
3			X	X
4			X	

2-HA-4 R431004540  
(P -058454-00001)

HANDLE POS. FIG. 14	PORTS TO WHICH PRESURE IS SUPPLIED			
	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		X
2		X		
3			X	
4	X			

2-HA-4 R431004542  
(P -058456-00001)

R431005632  
(P -060957-00000)

2-HA-4 R431004541  
(P -058455-00002)

HANDLE POS. FIG. 15	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
R		X		
N		X		X
F-1			X	X
F-2	X		X	
F-3			X	

HANDLE POS. FIG. 15	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X	X	
2		X		X
3				
4	X		X	
5	X			X

2-HA-4 R431004543  
(P -058457-00001)

HANDLE POS. FIG. 14	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X		X	
2		X		X

2-HA-4 R431004544  
(P -058458-00001)

HANDLE POS. FIG. 14	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	LEFT HAND		RIGHT HAND	
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		X
2				
3	X		X	

2-HA-4 R431004801  
(P -058892-00001)

HANDLE POS. FIG. 15	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1				X
2	X			X
3	X	X		X
4	X	X	X	
5		X	X	

2-HA-4 (P -059069-00001)

HANDLE POS. FIG. 14	PORTS TO WHICH PRES-SURE IS SUPPLIED			
	LEFT HAND		RIGHT HAND	
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		X
2			X	
3	X			

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

2-HA-4 (P -059552-00001)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X	X		
2		X		
3		X	X	
4			X	X
5				X

2-HA-4 R431005386  
(P -060056-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X	X		
2	X			
3				
4			X	
5			X	X

2-HA-4 R431005403  
(P -060153-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1				
2	X			
3		X		
4			X	
5				X

2-HA-4 R431005485  
(P -060324-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1		X		
2				X
3	X			
4			X	

2-HA-4 R431005740  
(P -061274-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X		X	
2	X		X	X
3	X			X
4	X	X		X
5		X		X

2-HA-4 R431005803  
(P -061619-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X	X	X	X
2	X	X		X
3	X	X	X	
4	X		X	X
5		X	X	X

2-HA-4 R431006000  
(P -062068-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 14	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X			
2	X	X		
3		X	X	
4			X	X

2-HA-4 R431006038  
(P -062275-00000)

HANDLE POS.	PORTS TO WHICH PRESSURE IS SUPPLIED			
FIG. 15	SINGLE RIGHT HANDLE			
	OUT 1L	OUT 2L	OUT 1R	OUT 2R
1	X			
2		X		
3				
4			X	
5				X

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION

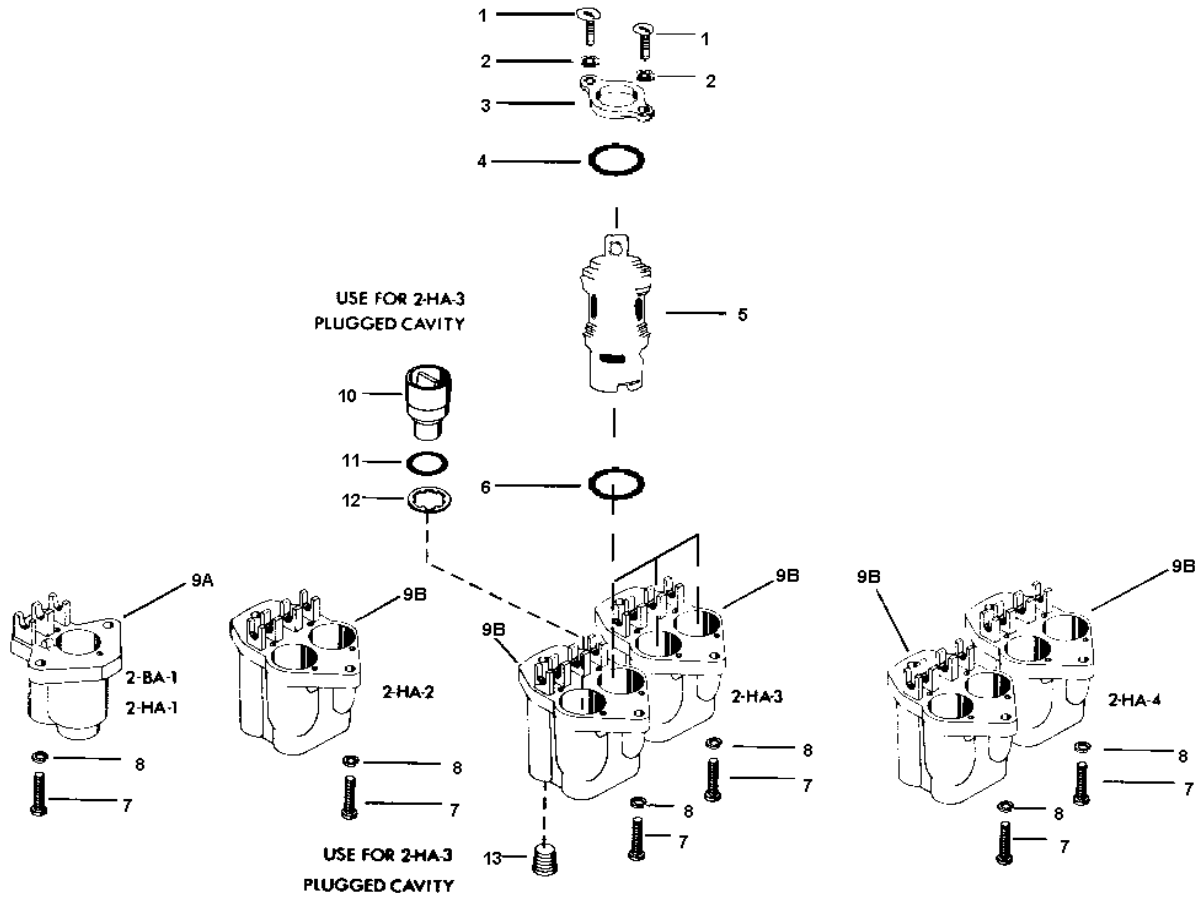


FIGURE 16: Valve Portion Exploded View.

## PARTS LIST

\*(Quantities Ref. No. 1 thru 6 are per each operating valve cavity)

REF.	QTY.	DESCRIPTION	NEW P/N	OLD P/N
1**	2	SCREW	See Repair Kits	See Repair Kits
2**	2	WASHER	See Repair Kits	See Repair Kits
3**	1	FLANGE, Valve Retaining	See Repair Kits	See Repair Kits
4* & **	1	O-RING	See Repair Kits	See Repair Kits
5* & **	1	CARTRIDGE	See Repair Kits	See Repair Kits
6* & **	1	O-RING	See Repair Kits	See Repair Kits
7†	2	SCREW	R431001840	P -049526-00010
8‡	2	WASHER, Lock	R431002344	P -049866-00007
9A	1	BODY (2-BA-1 and 2-HA-1)	R431004951	P -059298-00000
9B†	1	BODY (2-HA-2)	R431009020	P -062648-00009
10†	1	PLUG, Valve Cavity	R431005364	P -060028-00000
11†	1	RING, Retaining	R431001749	P -049438-00000
12†	1	O-Ring	R431002016	P -049708-00115
13	1	PLUG, Pipe	R431001963	P -049685-00002

## REPAIR KITS

\* MINOR REPAIR KIT:  
New P/N R431003743  
(P -055474-K0002)

REF. NO.	DESCRIPTION
4	O-RING, 15/16" O.D.
5	CARTRIDGE
6	O-RING, 7/8" O.D.
----	Dow Corning 55m Grease

\*\* MINOR REPAIR KIT:  
New part no. R431001581  
(P -055474-00004) SAME AS  
ABOVE PLUS REF. NO 1, 2 AND 3.

† For plugged cavity use one each of  
Ref. No. 10, 11 and 12 and two  
each of Ref. No. 1 and 2.

‡ Double listed quantities required for  
2-HA-3 and 2-HA-4.

Lubriplate No.107 Grease, 1 gram  
tube, New part no. R431001581  
(P -048294-00000)



## AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

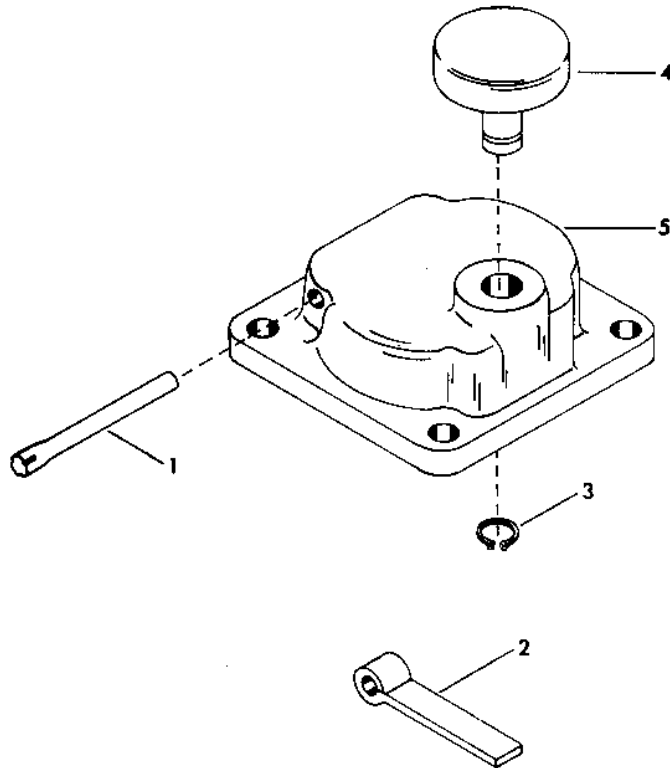


Figure 17: 2-BA-1 PILOTAIR Valve Cover Exploded View

REF. NO.	QTY.	DESCRIPTION	NEW PART NUMBER	OLD PART NUMBER
1	1	PIN. Driv-lok	R431002116	P -049775-00006
2	1	DOG. Cam	R431003426	P -054691-00000
3	1	RING. Retaining	R431002335	P -049857-00012
4	1	PUSH-BUTTON	R431002956	P -051997-00004
5	1	COVER, Top	R431003992	P -057103-00010

## AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

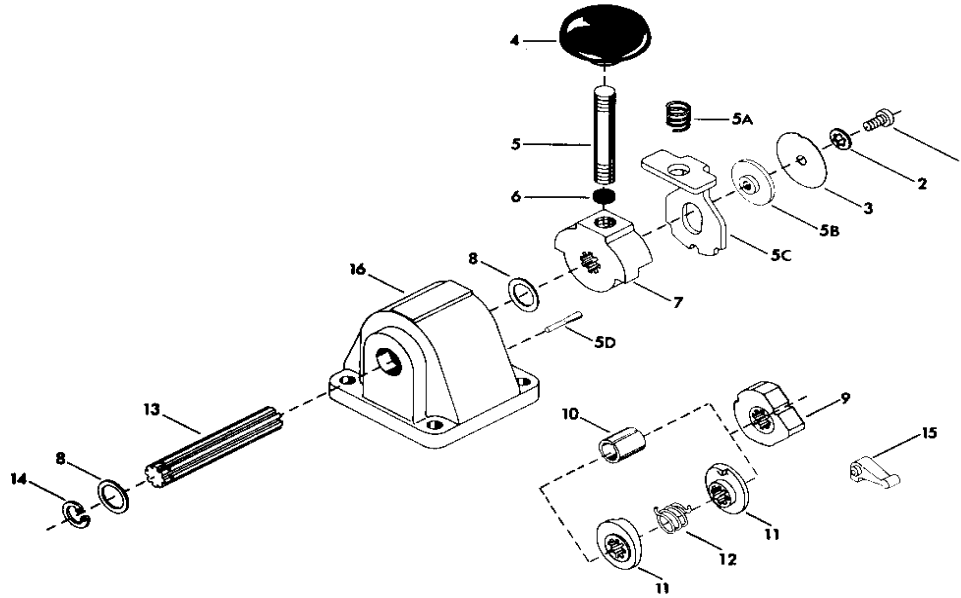
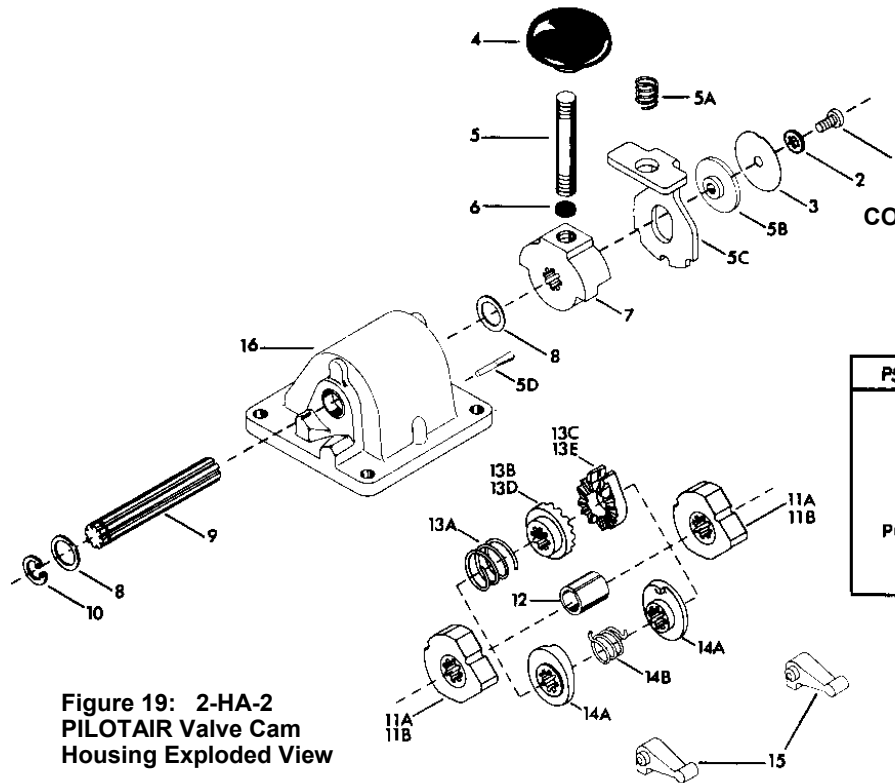


Figure 18: 2-HA-1 PILOTAIR Valve Cam Housing Exploded View

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1*	1	SCREW	R431001837	P -049526-00003
1A*	1	SCREW (Latching Models Only)	R431001842	P -049526-00005
2*	1	WASHER	R431002408	P -049898-00000
2A*	1	WASHER (Latching Models Only)	R431002408	P -049898-00000
3*	1	NAMEPLATE	R431001739	P -049408-00000
4	1	KNOB, Handle	R431004273	P -057662-00000
5	1	HANDLE	R431004984	P -059312-00000
5A	1	SPRING, Handle Latch (Latching Models Only)	R431005355	P -059987-00000
5B	1	COLLAR (Latching Models Only)	R431005865	P -061762-00000
5C	1	LATCH, Handle (Latching Models Only)	R431005852	P -061744-00000
5D	1	PIN, Driv-Lok (Latching Models Only)	R431001979	P -049705-00008
6	1	PLUG	R431002563	P -049958-00008
7	1	HUB, Handle	R431004981	P -059311-00000
8	2	WASHER	R431002165	P -049804-00039
9	1	CAM	R431004904	P -059080-00003
10	1	SPACER	R431001740	P -049410-00001
11	2	ARBOR, Spring (Spring Returned Models Only)	R431004979	P -059307-00000
12	1	SPRING (Spring Returned Models Only)	R431004978	P -059306-00001
13	1	SHAFT, Handle	R431004987	P -059313-00000
14	1	RING, Retaining	R431002333	P -049857-00007
15*	1	FOLLOWER, Cam	R431005076	P -059370-00001
16	1	HOUSING, Cam	R431004955	P -059299-00006
16A	1	HOUSING, Cam (Latching Models Only)	R431004959	P -059299-00010

\* All items, except these, are needed in a Cam Housing Position, see pages 10 and 11.

# AVENTICS "A" PILOTAIR® VALVE SERVICE INFORMATION



**COMPLETE VALVE PIECE NUMBERS**  
(Includes the Valve Portion and Cam Housing Portion with the corresponding Handle Latch.)

P59336-0003	P61966	P62082
POS. 1 & 3 PC. NO. P61744	POS. 2 PC. NO. P61744-0002	POS. 1,2,3 PC. NO. P61744-0003

**Figure 19: 2-HA-2 PILOTAIR Valve Cam Housing Exploded View**

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1*	1	SCREW	R431001837	P -049526-00003
1A*	1	SCREW (Latching Models Only)	R431001842	P -049526-00005
2*	1	WASHER	R431002408	P -049898-00000
2A*	1	WASHER (Latching Models Only)	R431002408	P -049898-00000
3*	1	NAMEPLATE	R431001739	P -049408-00000
4	1	KNOB, Handle	R431004273	P -057662-00000
5	1	HANDLE	R431004984	P -059312-00000
5A	1	SPRING, Handle Latch (Latching Models Only)	R431005355	P -059987-00000
5B	1	COLLAR (Latching Models Only)	R431005865	P -061762-00000
5C	1	LATCH, Handle (Latching Models Only)		(See Figure 19)
5D	1	PIN, Driv-Lok (Latching Models Only)	R431001984	P -049705-00017
6	1	PLUG	R431002563	P -049958-00008
7	1	HUB, Handle	R431004981	P -059311-00000
8	2	WASHER	R431001576	P -048286-00000
9	1	SHAFT, Handle	R431004988	P -059313-00001
10	1	RING, Retaining	R431002333	P -049857-00007
11A	2	CAM	R431004904	P -059080-00003
11B	2	CAM (2-HA-2F, 2-HA-2Z & 2-HA-2LZ)	R431004899	P -059072-00000
12	1	SPACER	R431002727	P -050688-00021
13A	1	SPRING, Detent (Detent Models Only)	R431004980	P -059308-00000
13B†	1	DETENT (3-Position Detent Models Only)	R431004976	P -059304-00000
13C†	1	DETENT (3-Position Detent Models Only)	R431004975	P -059303-00000
13D†	1	DETENT (5-Position Detent Models Only)	R431004977	P -059305-00000
13E†	1	DETENT (5-Position Detent Models Only)	R431004974	P -059302-00000
14A	2	ARBOR, Spring (Spring Returned Models Only)	R431004979	P -059307-00000
14B	1	SPRING (Spring Returned Models Only)	R431004978	P -059306-00001
15*	2	FOLLOWER, Cam	R431005076	P -059370-00001
16A	1	HOUSING, Cam	R431006110	P -062647-00021
16B	1	HOUSING, Cam (Latching Models Only)	R431006092	P -062647-00003

\* All items, except these, are needed in a Cam Housing Position, see pages 10 and 11.

† Detents are used in pairs. New Part Numbers R431004975; (P -059303-00000) and R431004976; (P -059304-00000) are used for 3-position detent models and Part Number (P 059302-00000) and (P -059305-00000) are used for 5-position detent models.

## AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

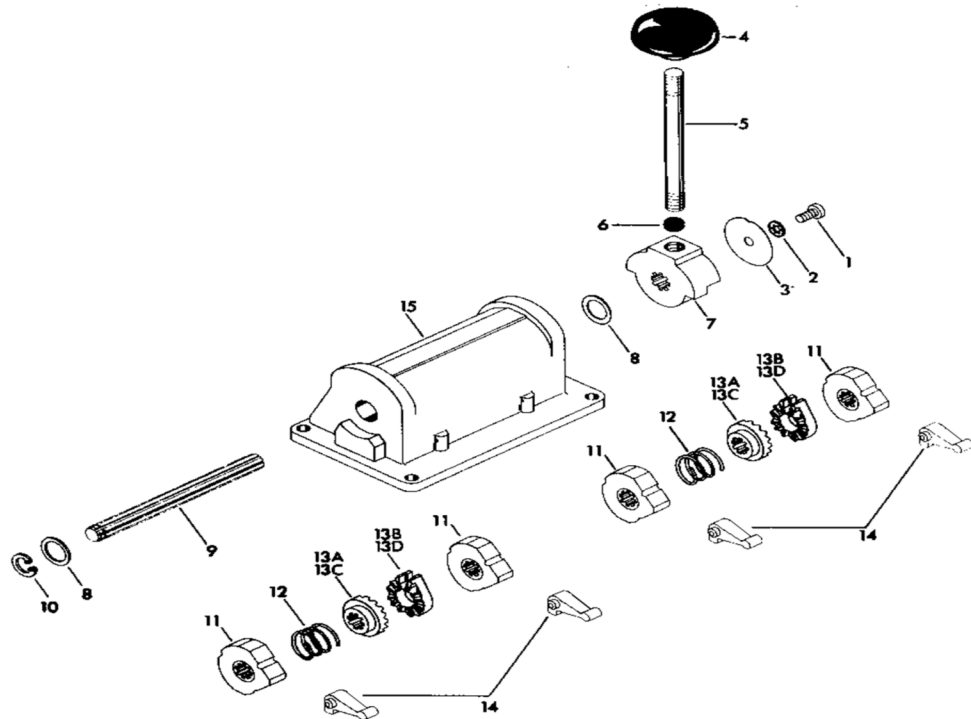


Figure 20: Gated Single Handle 2-HA-3 and 2-HA-4 PILOTAIR Valve Cam Housing Exploded View

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1*	1	SCREW	R431001837	P -049526-00003
2*	1	WASHER	R431002408	P -049898-00000
3*	1	NAMEPLATE	R431001739	P -049408-00000
4	1	KNOB, Handle	R431004273	P -057662-00000
5A	1	HANDLE (Long)	R431005405	P -060155-00000
5B	1	HANDLE (Short)	R431004984	P -059312-00000
6	1	PLUG	R431002563	P -049958-00008
7	1	HUB	R431004981	P -059311-00000
8	2	WASHER	R431001576	P -048286-00000
9	1	SHAFT, Handle	R431004989	P -059313-00003
10	1	RING, Retaining	R431002333	P -049857-00007
11	-†	CAM		(See "Identity Schedule")
12	2	SPRING, Detent	R431004980	P -059308-00000
13A	2	DETENT (3-Position Detent Models)	R431004976	P -059304-00000
13B	2	DETENT (3-Position Detent Models)	R431004975	P -059303-00000
13C	2	DETENT (5-Position Detent Models)	R431004977	P -059305-00000
13D	2	DETENT (5-Position Detent Models)	R431004974	P -059302-00000
14†	-	FOLLOWER, Cam	R431005076	P -059370-00001
15	1	HOUSING, Cam	R431005408	P -060158-00003

† 3 are required on 2-HA-3 and 4 are required on 2-HA-4.

\* All items, except these, are needed in a Cam Housing Position, see pages 10 and 11.

# AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

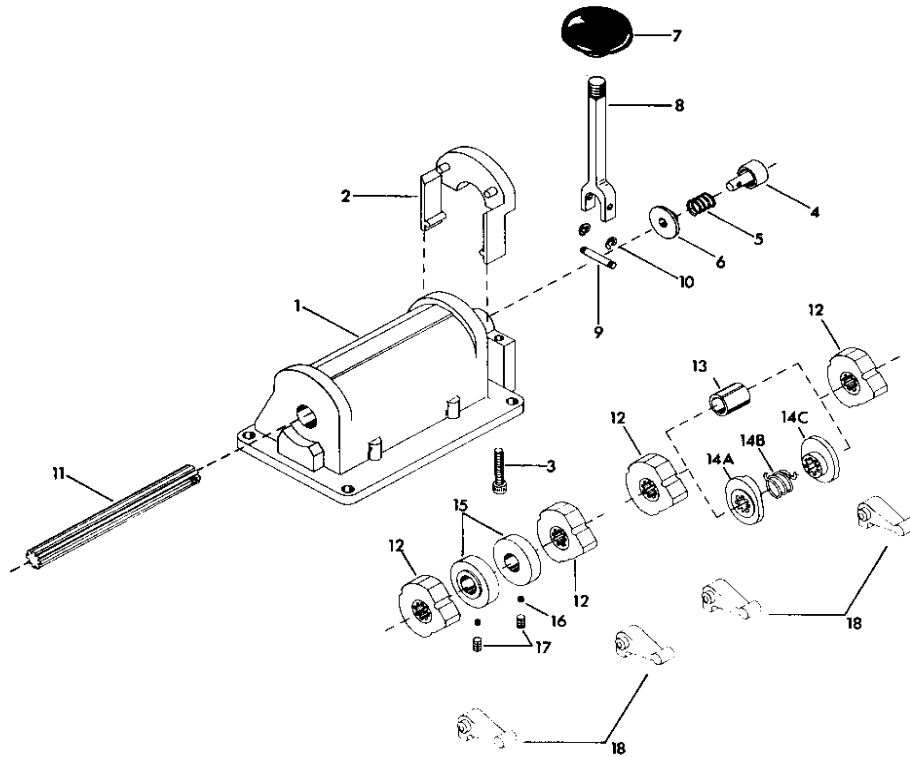


Figure 21: Gated Single Handle 2-HA-3 and 2-HA-4 PILOTAIR Valve Cam Housing Exploded View

REF	QTY	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	1	HOUSING, Cam		(See "Identity Schedule")
2	1	HOUSING, Pin		(See "Identity Schedule")
3	2	SCREW	R431001886	P -049604-00096
4	1	SEAT, Spring	R431004902	P -059076-00000
5	1	SPRING, Handle	R431004901	P -059075-00000
6	1	ADAPTER, Spring	R431004903	P -059077-00000
7	1	KNOB, Handle	R431004273	P -057662-00000
8	1	HANDLE	R431004179	P -057574-00000
9	1	PIN, Handle	R431004900	P -059074-00000
10	2	RING, Handle Pin Retaining	R431001843	P -049528-00000
11	1	SHAFT, Handle	R431004181	P -057576-00002
12	-*	CAM	----	(See "Identity Schedule")
13	1	SPACER	----	P -049410-0001
14A	1	ARBOR, Spring (Spring-Return Models Only)	----	P -059307
14B	1	SPRING, Handle Return (Spring-Return Models Only)	----	P -059306-00001
14C	1	SPACER (Spring-Return Models Only)	----	P -060047
15	2	SPACER	R431002711	P -050658-00029
16	2	PLUG	R431002564	P -049958-00009
17	2	SCREW, Set	R431002491	P -049905-00034
18†	-	FOLLOWER, Cam	R431005076	P -059370-00001

† 3 are required on 2-HA-3 and 4 are required on

\* All items, except these, are needed in a Cam Housing Position, see pages 10 and 11.

# AVENTICS “A” PILOTAIR® VALVE SERVICE INFORMATION

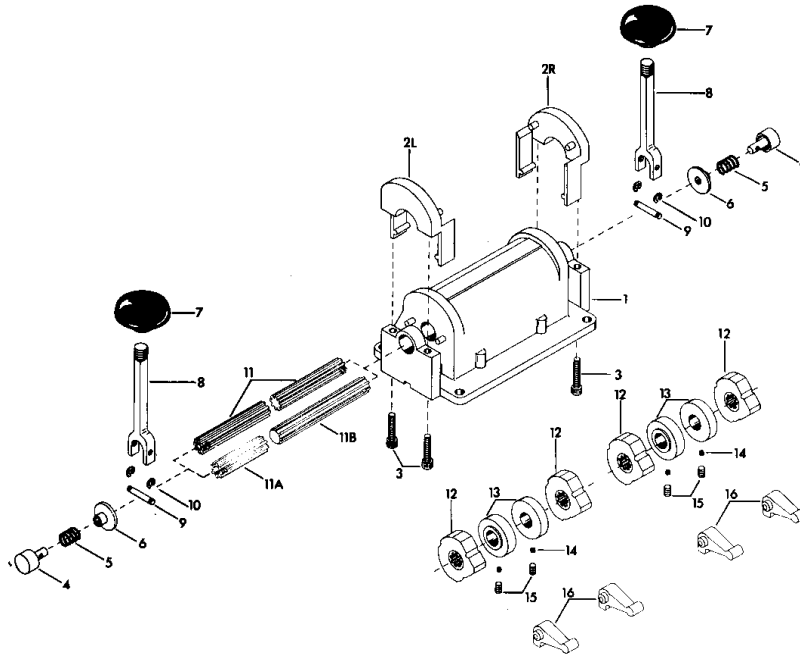


Figure 22: Gated Double Handle 2-HA-3 and 2-HA-4 PILOTAIR Valve Cam Housing Exploded View

REF.	QTY.	DESCRIPTION	NEW PART NO.	OLD PART NO.
1	1	HOUSING. Cam		(See "Identity Schedule")
2L	1	HOUSING. Pin (Left Side)		(See "Identity Schedule")
2R	1	HOUSING. Pin (Right Side)		(See "Identity Schedule")
3	4	SCREW	R431001886	P -049604-00096
4	2	SEAT, Spring	R431004902	P -059076-00000
5	2	SPRING, Handle	R431004901	P -059075-00000
6	2	ADAPTER, Spring	R431004903	P -059077-00000
7	2	KNOB, Handle	R431004273	P -057662-00000
8	2	HANDLE	R431004179	P -057574-00000
9	2	PIN, Handle	R431004900	P -059074-00000
10	4	RING, Handle Pin Retaining	R431001843	P -049528-00000
11	2	SHAFT, Handle	R431004181	P -057576-00002
11A	1	SHAFT, Handle (Pc.No. P58452-0001 Only)	OBSOLETE	P -057576-00001
11B	1	SHAFT, Handle (Pc.No. P58452-0001 Only)	OBSOLETE	P -057576-00003
12	-*	CAM		(See "Identity Schedule")
13	4	SPACER	R431002711	P -050658-00029
14	4	PLUG	R431002564	P -049958-00009
15	4	SCREW, Set	R431002491	P -049905-00034
†16	-	FOLLOWER, Cam	R431005076	P -059370-00001

† 3 are required on 2-HA-3 and 4 are required on 2-HA-4.

\* All items, except these, are needed in a Cam Housing Position, see pages 10 and 11.

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# NOTICE TO PRODUCT USERS

## 1. WARNING: FLUID MEDIA

AVENTICS pneumatic devices are designed and tested for use with filtered, clean, dry, chemical free air at pressures and temperatures within the specified limits of the device. For use with media other than air or for human life support systems, AVENTICS must be consulted. Hydraulic cylinders are designed for operation with filtered, clean, petroleum based hydraulic fluid; operation using fire-resistant or other special types of fluids may require special packing and seals. Consult the factory.

## 2. WARNING: MATERIAL COMPATIBILITY

Damage to product seals or other parts caused by the use of noncompatible lubricants, oil additives or synthetic lubricants in the air system compressor or line lubrication devices voids AVENTICS warranty and can result in product failure or other malfunction. See lubrication recommendations below.

**AIR LINE LUBRICANTS!** In service higher than 18 cycles per minute or with continuous flow of air through the device, an air line lubricator is recommended.\* (Do not use line lubrication with vacuum products.) However, the lubricator must be maintained since the oil will wash out the grease, and lack of lubrication will greatly shorten the life expectancy. The oils used in the lubricator must be compatible with the elastomers in the device. The elastomers are normally BUNA-N, NEOPRENE, VITON, SILICONE and HYTREL. AVENTICS recommends the use of only petroleum based oils without synthetic additives, and with an aniline point between 180° F and 210° F.

**COMPRESSOR LUBRICANTS!** All compressors (with the exception of special "oil free" units) pass oil mist or vapor from the internal crankcase lubricating system through to the compressed air. Since even small amounts of non-compatible lubricants can cause severe seal deterioration (which could result in component and system failure) special care should be taken in selecting compatible compressor lubricants.

## 3. WARNING: INSTALLATION AND MOUNTING

The user of these devices must conform to all applicable electrical, mechanical, piping and other codes in the installation, operation or repair of these devices.

**INSTALLATION !** Do not attempt to install, operate or repair these devices without proper training in the technique of working on pneumatic or hydraulic systems and devices, unless under trained supervision. Compressed air and hydraulic systems contain high levels of stored energy. Do not attempt to connect, disconnect or repair these products when a system is under pressure. Always exhaust or drain the pressure from a system before performing any service work. Failure to do so can result in serious personal injury.

**MOUNTING!** Devices should be mounted and positioned in such a manner that they cannot be accidentally operated.

## 4. WARNING: APPLICATION AND USE OF PRODUCTS

The possibility does exist for any device or accessory to fail to operate properly through misuse, wear or malfunction. The user must consider these possibilities and should provide appropriate safe guards in the application or system design to prevent personal injury or property damage in the event of a malfunction.

## 5. WARNING: CONVERSION, MAINTENANCE AND REPAIR

When a device is disassembled for conversion to a different configuration, maintenance or repair, the device must be tested for leakage and proper operation after being reassembled and prior to installation.

**MAINTENANCE AND REPAIR!** Maintenance periods should be scheduled in accordance with frequency of use and working conditions. All AVENTICS products should provide a minimum of 1,000,000 cycles of maintenance free service when used and lubricated as recommended. However, these products should be visually inspected for defects and given an "in system" operating performance and leakage test once a year. Where devices require a major repair as a result of the one million cycles, one year, or routine inspection, the device must be disassembled, cleaned, inspected, parts replaced as required, rebuilt and tested for leakage and proper operation prior to installation. See individual catalogs for specific cycle life estimates.

## 6. PRODUCT CHANGES

Product changes including specifications, features, designs and availability are subject to change at any time without notice. For critical dimensions or specifications, contact factory.

\*Many AVENTICS pneumatic valves and cylinders can operate with or without air line lubrication; see individual sales catalogs for details.

## LIMITATIONS OF WARRANTIES & REMEDIES

AVENTICS warrants its products sold by it to be free from defects in material and workmanship to the following:

For twelve months after shipment AVENTICS will repair or replace (F.O.B. our works), at its option, any equipment which under normal conditions of use and service proves to be defective in material or workmanship at no charge to the purchaser. No charge will be made for labor with respect to defects covered by this Warranty, provided that the work is done by AVENTICS or any of its authorized service facilities. However, this Warranty does not cover expenses incurred in the removal and reinstallation of any product, nor any downtime incurred, whether or not proved defective.

All repairs and replacement parts provided under this Warranty policy will assume the identity, for warranty purposes, of the part replaced, and the warranty on such replacement parts will expire when the warranty on the original part would have expired. Claims must be submitted within thirty days of the failure or be subject to rejection.

This Warranty is not transferable beyond the first using purchaser. Specifically, excluded from this Warranty are failures caused by misuse, neglect, abuse, improper operation or filtration, extreme temperatures, or unauthorized service or parts. This Warranty also excludes the use of lubricants, fluids or air line additives that are not compatible with seals or diaphragms used in the products. This Warranty sets out the purchaser's exclusive remedies with respect to products covered by it, whether for negligence or otherwise. Neither, AVENTICS nor any of its affiliates will be liable for consequential or incidental damages or other losses or expenses incurred by reason of the use or sale of such products. Our liability (except as to title) arising out of the sale, use or operation of any product or parts, whether on warranty, contract or negligence (including claims for consequential or incidental damage) shall not in any event exceed the cost of replacing the defective products and, upon expiration of the warranted period as herein provided, all such liability is terminated. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHETHER FOR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE. No attempt to alter, amend or extend this Warranty shall be effective unless authorized in writing by an officer of AVENTICS Corporation.

AVENTICS reserves the right to discontinue manufacture of any product, or change product materials, design or specifications without notice.



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