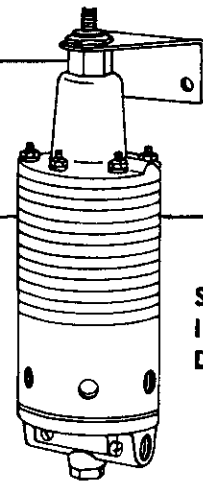




SERVICE INSTRUCTIONS NULLMATIC® AVERAGING RELAY MODEL SERIES 68A



SD68A
Issue: 4
Date: 3/78

GENERAL INFORMATION

The Model Series 68A Averaging Relay is a force balance relay. This relay is capable of averaging from three to six linear input signals, depending on the particular model. The number of input signals which the relay is capable of averaging is indicated by the last digit in the model number. For example, Model 68A5 will average 5 input signals; a Model 68A4 will average 4 input signals, etc.

The output signal from the relay represents the average of all the input signals expressed in the general equation. (Note: A suppression constant of ± 18 psig may be added to the input signals.)

$$P_T = \frac{P_1 + P_2 + P_3 + P_4 + P_5 + P_6 + K}{N}$$

where:

P_T = Pressure Transmitter (output)

P_1 = Input signals (from three to six signals)

K = Suppression (± 18 psig)

N = Number of input signals

The output signal may also be considered the total of the input signals which has been rescaled. The white dots in the rings oriented over the various input ports (marked 1, 2, 3, 4 and 6) indicate the chamber in which the input signal will be sensed. The dots over the #5 port indicate the rebalance chambers of the relay.

INSTALLATION

MOUNTING - Refer to Figure 1 for mounting dimensions, connections, and configurations. The relay may be mounted in any position, in a reasonably vibration free location.

PIPING - All relay connections are 1/4" NPT. Pipe dope should be used sparingly and then only on the male threads. The connections must be leak tight. They should be checked, with air pressure in the lines, using a soapless lather.

SUPPLY AIR - Clean, dry, oil-free air should be used for the supply. If poor quality plant air is used, a filter should be installed in the supply line close to the regulator. This will remove scale and impurities and should virtually eliminate relay maintenance.

Supply pressure should be set at 20 psig for the standard output of 3-15 psig; or 5 psig above the maximum output, but no greater than 50 psig.

OPERATION

Start-up Procedure

1. Make all connections to the relay in accordance with the schematic in Figure 1.
2. Apply known pressures to the input ports of the relay.
3. If the output is not the average of the input signals, turn the adjusting screw on the top of the relay until the output is correct.
4. Add desired suppression ($K - N$).

MAINTENANCE

PREVENTATIVE MAINTENANCE

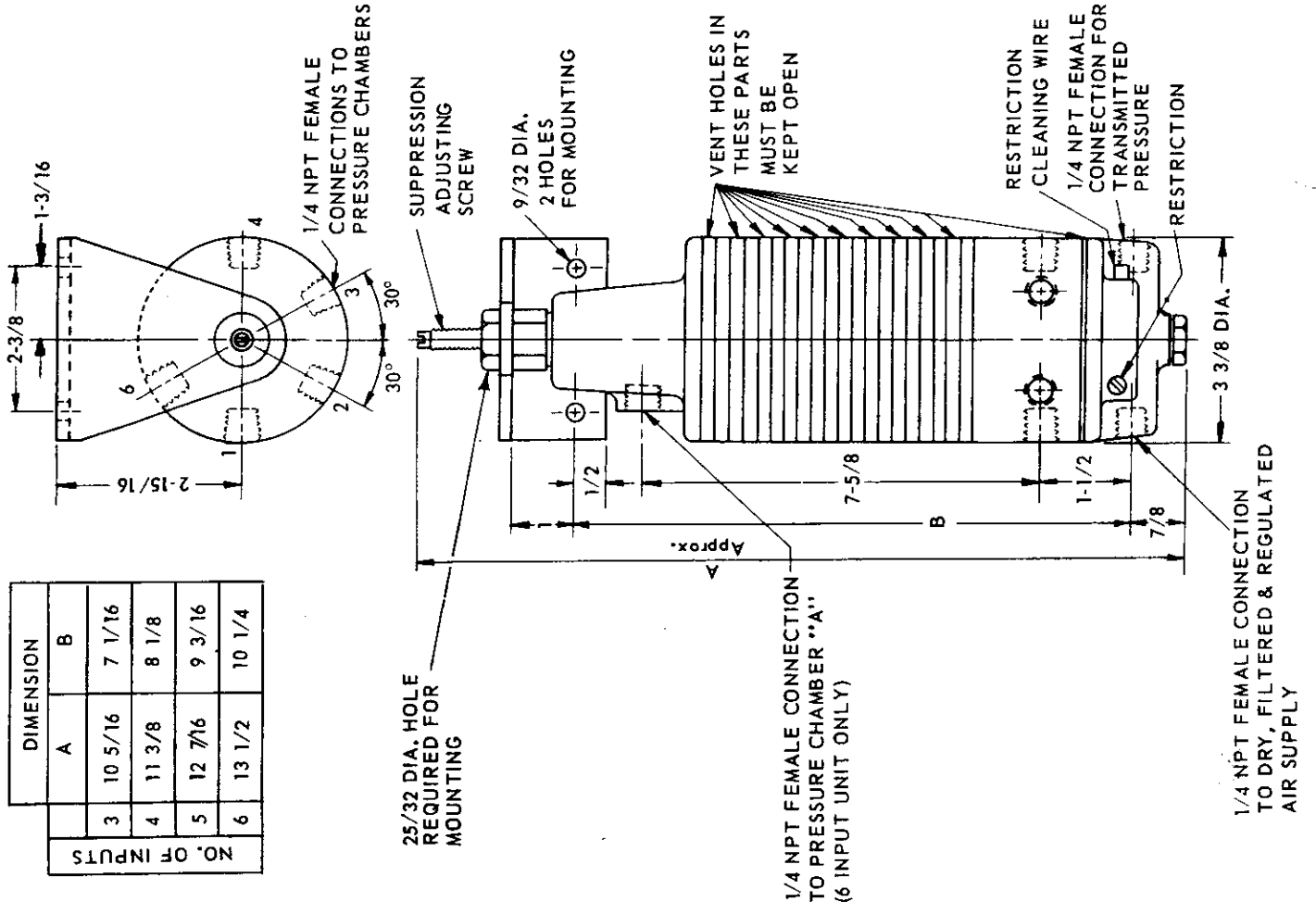
A clean dry and oil-free supply air should be used. Providing an instrument air filter for the supply air system will prevent most difficulties arising from a dirty air supply. A periodic check of the filter element and regular blow-down of the dripwell is recommended.

CLEANING

Restriction Screw - To clean the restriction screw, turn off the supply air and remove the restriction screw from the bottom forging. Remove the knurled cleaning wire located near the output port and run it through the orifice at the tip of the restriction screw. In stubborn cases, the screw can be soaked in solvents to dissolve the blockage. Examine the "O" ring for damage and cleanliness. When re-installing the restriction screw, tighten it securely.

Valve Plunger - To clean the valve plunger and its supply and exhaust seats, it must be removed from the relay. Turn off the supply air and remove the retaining nut on the bottom forging. The valve plunger and plunger spring will drop out when this nut is removed; be careful not to lose them. The valve plunger must be clean on both the ball and tapered-end surfaces. If necessary, use a non-abrasive solvent. The supply and exhaust seats in the regulator must also be clean. The supply seat is readily accessible; the exhaust seat can be reached by using a tobacco pipe cleaner. Here again, use non-abrasive solvents. When re-installing, see the parts list for part orientation and tighten the retaining nut securely.

FIGURE 1 INSTALLATION

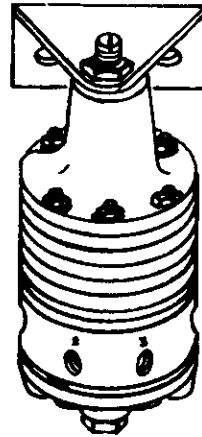
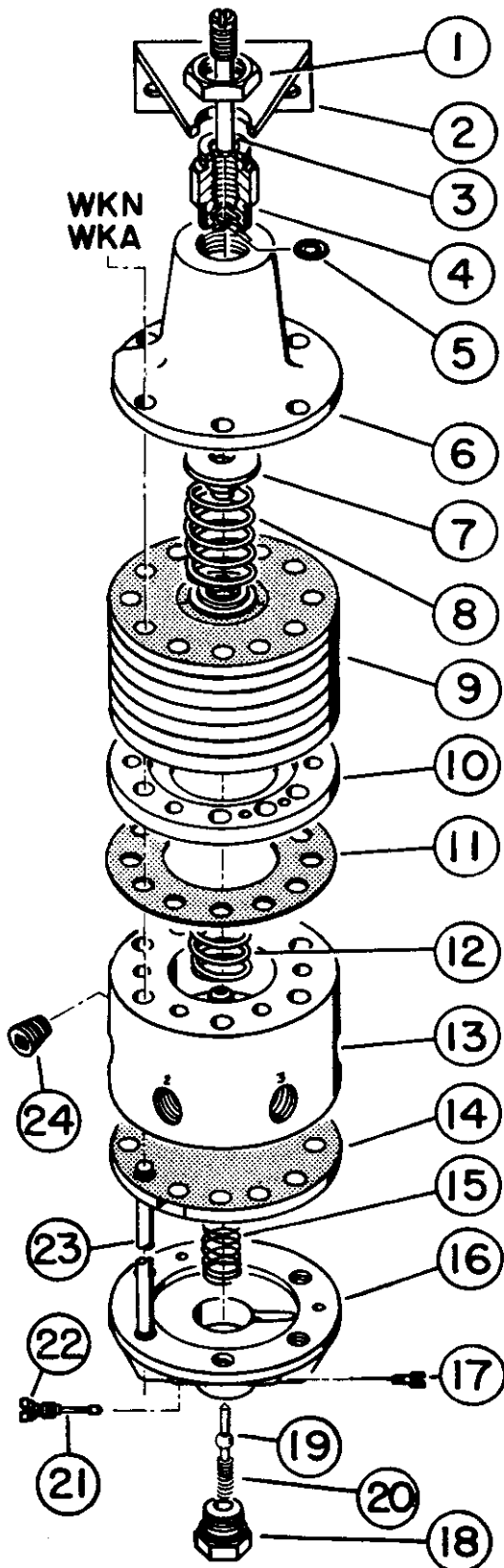


NO. OF INPUTS	DIMENSION	
	A	B
3	10 5/16	7 1/16
4	11 3/8	8 1/8
5	12 7/16	9 3/16
6	13 1/2	10 1/4

SCHEMATIC DIAGRAMS

<p>3 2 1 SUPPLY → PILOT VALVE → TRANS. TRANS. = $\frac{A + B + C + K}{3}$ K = ±18 PSI SUPPRESSION ADJUSTMENT 68A3 (3 INPUTS)</p>	<p>6 4 3 2 1 SUPPLY → PILOT VALVE → TRANS. TRANS. = $\frac{A + B + C + D + E + K}{5}$ K = ±18 PSI SUPPRESSION ADJUSTMENT 68A5 (5 INPUTS)</p>
<p>4 3 2 1 SUPPLY → PILOT VALVE → TRANS. TRANS. = $\frac{A + B + C + D + K}{4}$ K = ±18 PSI SUPPRESSION ADJUSTMENT 68A4 (4 INPUTS)</p>	<p>6 4 3 2 1 SUPPLY → PILOT VALVE → TRANS. TRANS. = $\frac{A + B + C + D + E + F + K}{6}$ K = ±18 PSI SUPPRESSION ADJUSTMENT 68A6 (6 INPUTS)</p>

PARTS LIST
NULLMATIC® AVERAGING RELAY
MODELS 68A3, 68A4, 68A5 & 68A6

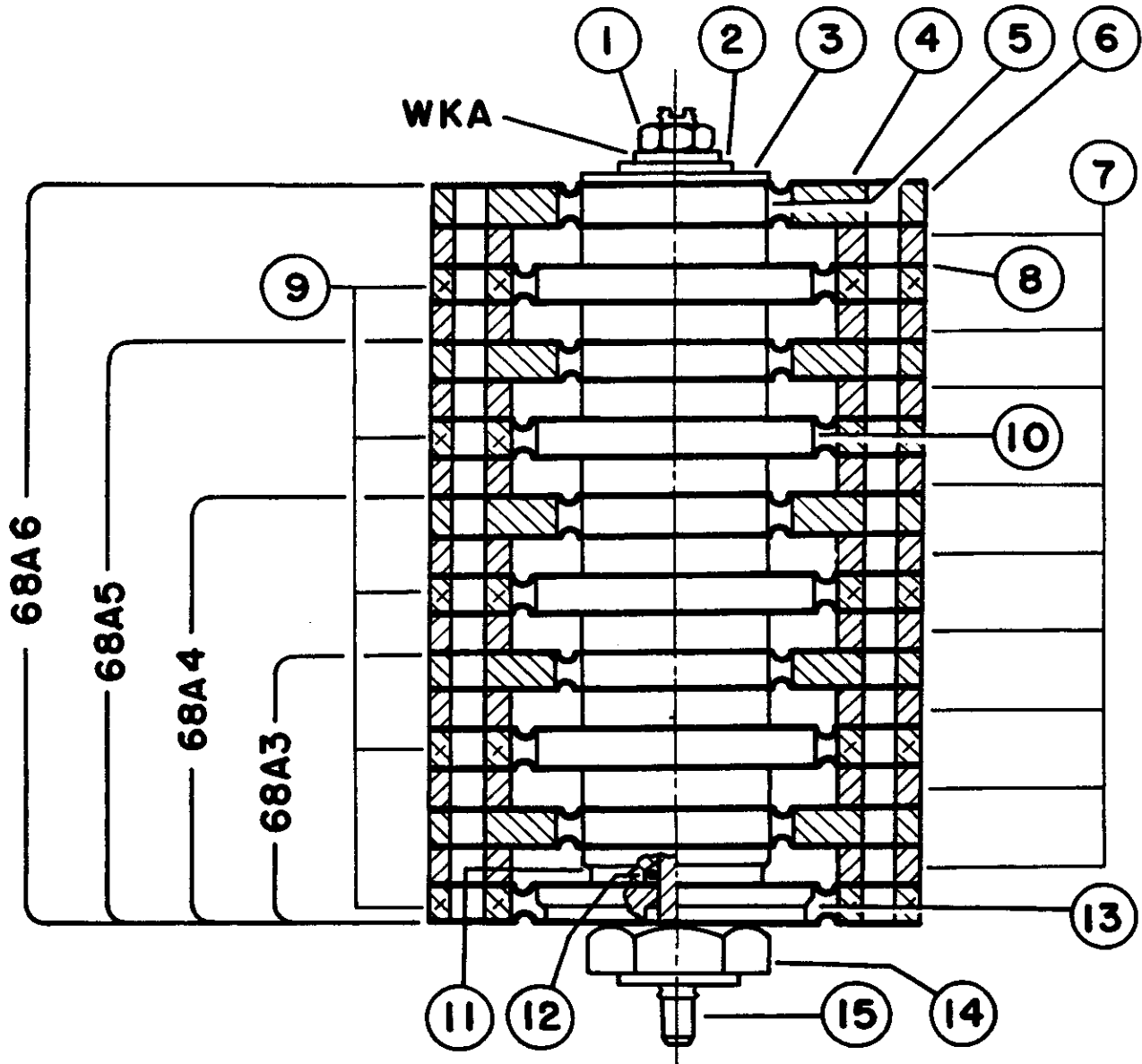


MODEL 68A3 B/M 10803S9
68A4 10818S6
68A5 10805S8
68A6 12022N4

Item No.	Part No.	Description	Req'd			
			68A3	68A4	68A5	68A6
1a	3603-14	Mounting Nut	1	1	1	1
1b	3605-5	Locknut (Optional Not Shown)	-	-	-	-
2	2932-19	Mounting Bracket	1	1	1	1
3	4513-10	Adjusting Screw	1	1	1	1
4	3494-8	Bushing	1	1	1	1
* 5	2938-1	"O" Ring	1	1	1	1
6a	4771-2	Top Casting	1	1	-	-
6b	14412-16	Top Casting	-	-	-	1
7	1447-24	Spring Seat	1	1	1	1
8	7150-2	Spring	1	1	1	1
* 9a	10803-20	Diaphragm Assy.	1	-	-	-
* 9b	10818-13	Diaphragm Assy. See Spare	-	1	-	-
* 9c	10805-136	Diaphragm Assy. Parts Dwg.	-	-	1	-
* 9d	12022-24	Diaphragm Assy. 10803-25	-	-	-	1
10	10805-8	Spacer Ring	1	1	1	1
* 11	10805-7	Gasket	1	1	1	1
12	572-37	Spring	1	1	1	1
13a	10803-18	Pilot Ring	1	-	-	-
13b	10805-137	Pilot Ring	-	1	1	1
* 14	1447-3	Lower Diaphragm Assy.	1	1	1	1
* 15	4771-55	Spring	1	1	1	1
16	2155-112	Bottom Forging	1	1	1	1
* 17	1518-4	Cleaning Wire	1	1	1	1
* 18	2155-6	Retaining Nut	1	1	1	1
* 19	2155-3	Pilot Plunger	1	1	1	1
* 20	2155-7	Spring	1	1	1	1
* 21	10792-12	Restriction Screw (Incl. Item 22)	1	1	1	1
* 22	2938-154	"O" Ring	1	1	1	1
23a	7307-4	Stud	6	-	-	-
23b	7307-19	Stud	-	6	-	-
23c	7307-13	Stud	-	-	6	-
23d	7307-36	Stud	-	-	-	6
24	3092-35	Pipe Plug	-	1	-	-
-Code-		-Hardware-				
WKA	1/4 - Lockwasher		6	6	6	6
WKN	1/4-20 Hex Nut		6	6	6	6

* Recommended On-Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.

PARTS LIST
 NULLMATIC AVERAGING RELAY
 DIAPHRAGM ASSEMBLY — MODELS 68A



Item No.	Part No.	Description	Required				Item No.	Part No.	Description	Required			
			68A3	68A4	68A5	68A6				68A3	68A4	68A5	68A6
1	3821-32	Jam Nut	1	1	1	1	13	14956-928	Spacer	1	1	1	1
2	4771-8	Spring Guide	1	1	1	1	14	10805-5	Nut	1	1	1	1
3	3821-45	Disc	1	1	1	1	15a	10803-22	Nozzle Seat & Stud	1	-	-	-
* 4	4541-2	Diaphragm	4	6	8	10	15b	10818-16	Nozzle Seat & Stud	-	1	-	-
5	4551-6	Diaphragm Ring	4	7	10	13	15c	10805-146	Nozzle Seat & Stud	-	-	1	-
6	4551-3	Diaphragm Ring	2	3	4	5	15d	12022-26	Nozzle Seat & Stud	-	-	-	1
7	4513-6	Diaphragm Ring	3	5	7	9							
* 8	4541-3	Diaphragm	4	6	8	10							
9	4551-1	Diaphragm Ring	2	3	4	5	-Code-	-Hardware-					
10	4551-5	Spacer	1	2	3	4	WKA	1/4 - Lockwasher	1	1	1	1	
11	4771-7	Spacer	1	1	1	1							
* 12	2938-1	"O" Ring	1	1	1	1							

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