

# Robertshaw

## INDUSTRIAL PRODUCTS DIVISION

### GENERAL DESCRIPTION

The 83939-B Series is a two-position, five ported, 3-way relay with an internal orifice. It is diaphragm actuated and has a connection which may be used to cancel the actuating pressure. This relay will perform various operations such as:

- (a) Supply and exhaust a control line.
- (b) Divert one supply to either one or two control lines.
- (c) Select either one of two lines to supply one control line.

It has no transient position which allows Ports C, NO, and NC to all be connected; ie., before Ports C and NO are connected, Port NC will be closed, and likewise, before Ports C and NC are connected, Port NO will be closed.

These features make this relay suitable in "Sequence" functions and it may be used for many applications depending on installation.

### SPECIFICATIONS

**Construction:** Aluminum body; stainless steel cover and bracket; stainless and plated steel springs; elastomer coated, fabric diaphragms and gaskets; stainless steel and aluminum valve with resilient seat.

**Supply Pressure:** ..... See Figure 3

**Maximum Pressure:** ..... See Figure 3

**CAUTION: DO NOT EXCEED MAXIMUM PRESSURES.**

**Mounting:** ..... Surface

**Dimensions:** ..... See Figure 1

**Models Available:** 83939-B X X X

Specify	Orifice Size
2	.028" Diameter
3	.014" Diameter

Specify	Orifice Position
1	Orifice not used
2	Orifice 1 to C
3	Orifice 1 to NC
4	Orifice 1 to NO

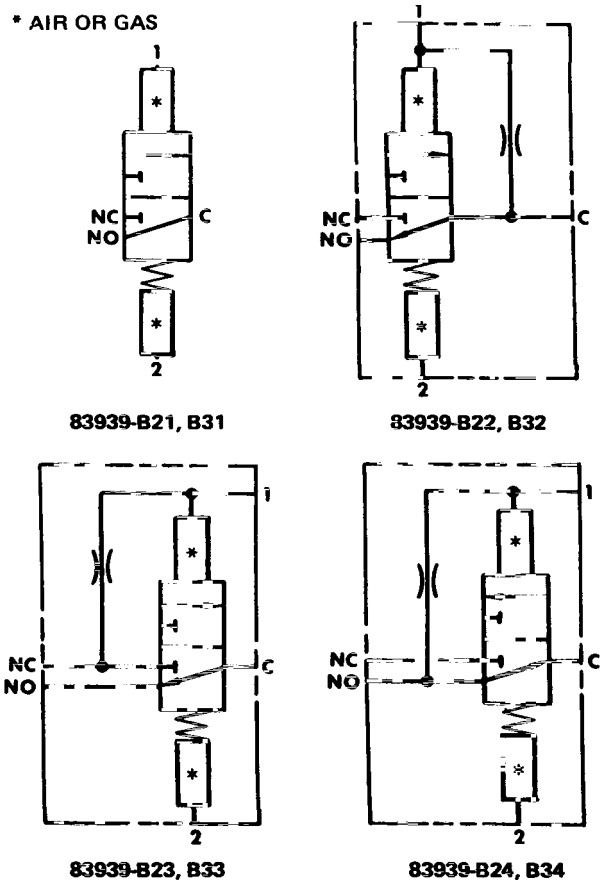
Specify	Body Material
—	Aluminum
9	Stainless Steel

**Connections:** ..... 1/8" -27 NPT  
**Approximate Shipping Weight:** ..... 1 lb. (.454 kg)

### ORDERING INFORMATION:

Specify Model Number

# Relay with Internal Orifice 83939-B Series



J. I. C. Symbol

# INSTALLATION

## A. General

Tubing and fittings used to connect the relay must be free of chips, dirt, and moisture or other foreign material.

It is recommended that an "anti-seize" type thread compound be applied to the second or third male thread in moderate amount. Do not allow compound to be deposited inside the relay. Thread sealing tape is not recommended.

For continuous, trouble-free operation, the supply to the relay must be clean and dry.

## B. Mounting

When installing the No. 83939-B Series relay, care should be taken to prevent any foreign matter from entering the ports. Provision should be made to prevent foreign matter from entering the ports which are left open to the atmosphere.

The relay may be installed in any position, but vertical (upright) is recommended. The relay should be securely mounted, using the two slots (clearance for No. 10 screws), provided in the mounting bracket (see Figure 1).

## DIMENSIONS

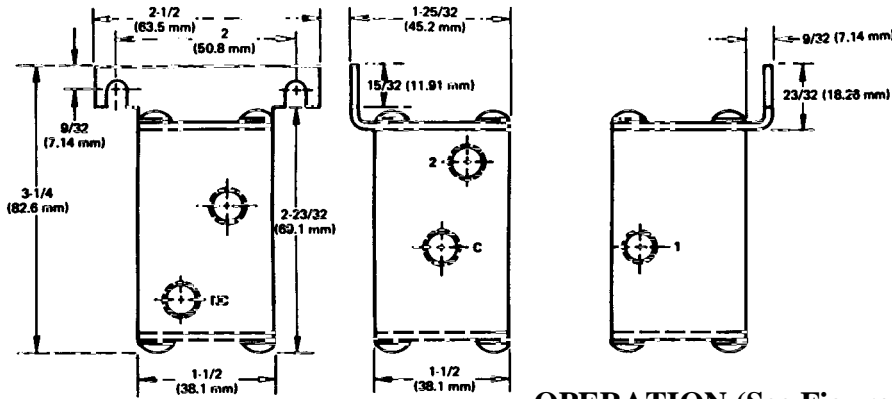


Figure 1

## OPERATION (See Figure 2)

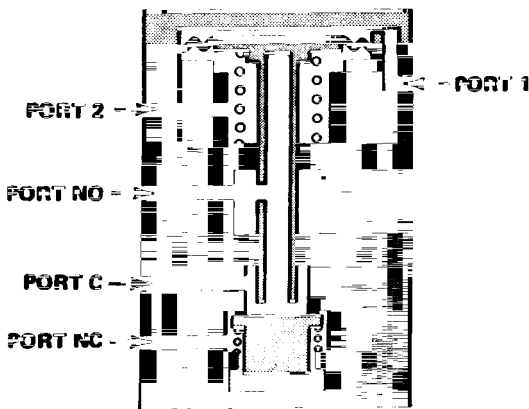


Figure 2

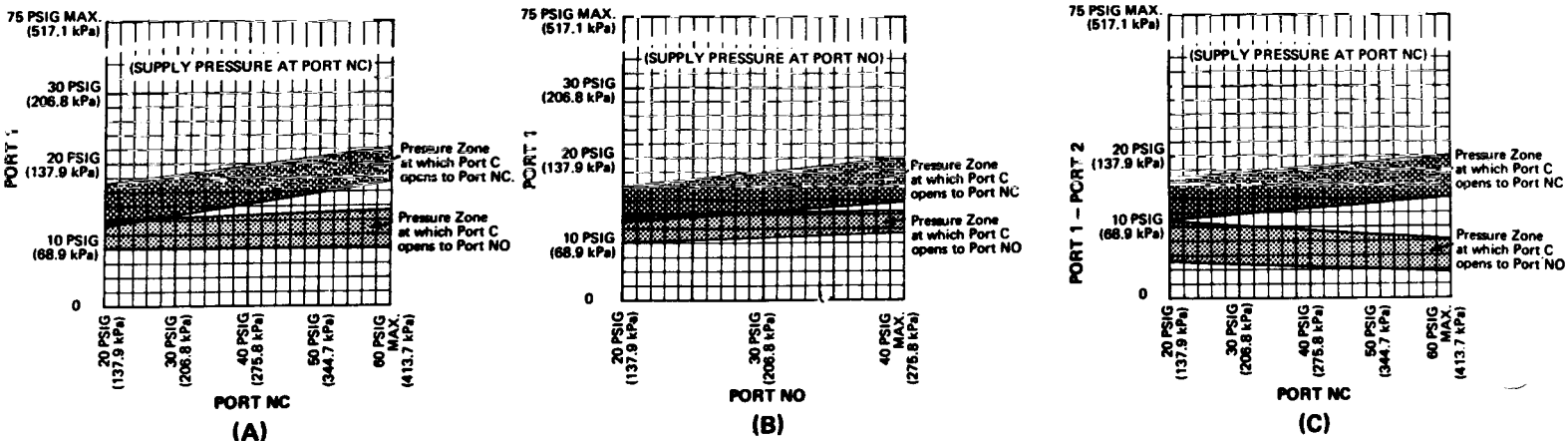
With no pressure applied to the diaphragm through Port 1, Port C is connected, through a hollow stem, to Port NO while closed to Port NC.

When sufficient pressure is applied to the diaphragm through Port 1, the hollow stem moves down, closing Port NO to Port C. As the hollow stem moves farther, it forces the lower poppet down, opening Port NC to Port C.

If an equalizing pressure is applied to Port 2, it will nullify the effects of the pressure at Port 1 and allow the hollow stem to return to its original position. This allows the lower poppet to return and Port C is now connected to Port NO while closed to Port NC. Also, removal of the pressure at Port 1 will create the same action.

(Continued on Page 3)

NOTE: A & B indicate actuating pressure (Port 1) required to operate valve at various supply pressures.



CAUTION: DO NOT EXCEED MAXIMUM PRESSURES.

Figure 3

## OPERATION (Continued)

If an equalizing pressure is applied through Port 2 prior to applying pressure through Port 1, the relay will not respond to pressure through Port 1 until the equalizing pressure through Port 2 is lost.

The 83939-B22 and 83939-B32 have an internal orifice assembly which connects Port 1 to Port C.

The 83939-B23 and 83939-B33 have an internal orifice assembly which connects Port 1 to Port NC.

The 83939-B24 and the 83939-B34 have an internal orifice assembly which connects Port 1 to Port NO.

NOTE: See Figure 5 for correct arrangement of the bottom diaphragm and gasket.

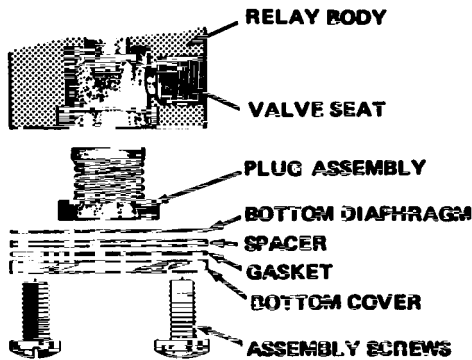


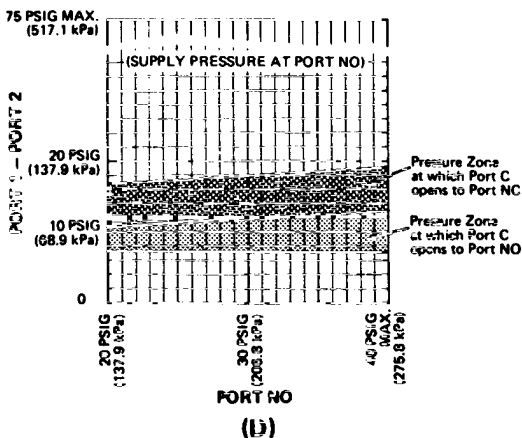
Figure 4

## MAINTENANCE

**WARNING:** Disassemble carefully - spring load forces present.

- If excessive leakage occurs at valve seat, remove bottom cover. Clean poppet and seat with soft, dry cloth (See Figure 4).
- If relay does not function properly due to contamination by foreign matter, disassemble and clean all metal parts with non-flammable solvent and dry thoroughly.
- The Orifice is removable by applying pressurized air to Port 1. **WARNING:** The pressure should be initially applied at 3 psi (20.7 kPa) and slowly increased to a minimum of 30 psi (206.8 kPa). Care must be exercised to prevent the orifice from being

**NOTE:** C & D indicate equalizing pressures (Port 2) required to cancel the actuating pressures (Port 1) at various supply pressures.



(b)

ejected in a manner which would be injurious to personnel. Clean with a small diameter wire and pressurized air. In removal or replacement of orifice, care must be exercised not to nick or scratch sealing surfaces. "O"-ring must be inserted into relay body before orifice.

(Continued on Page 4)

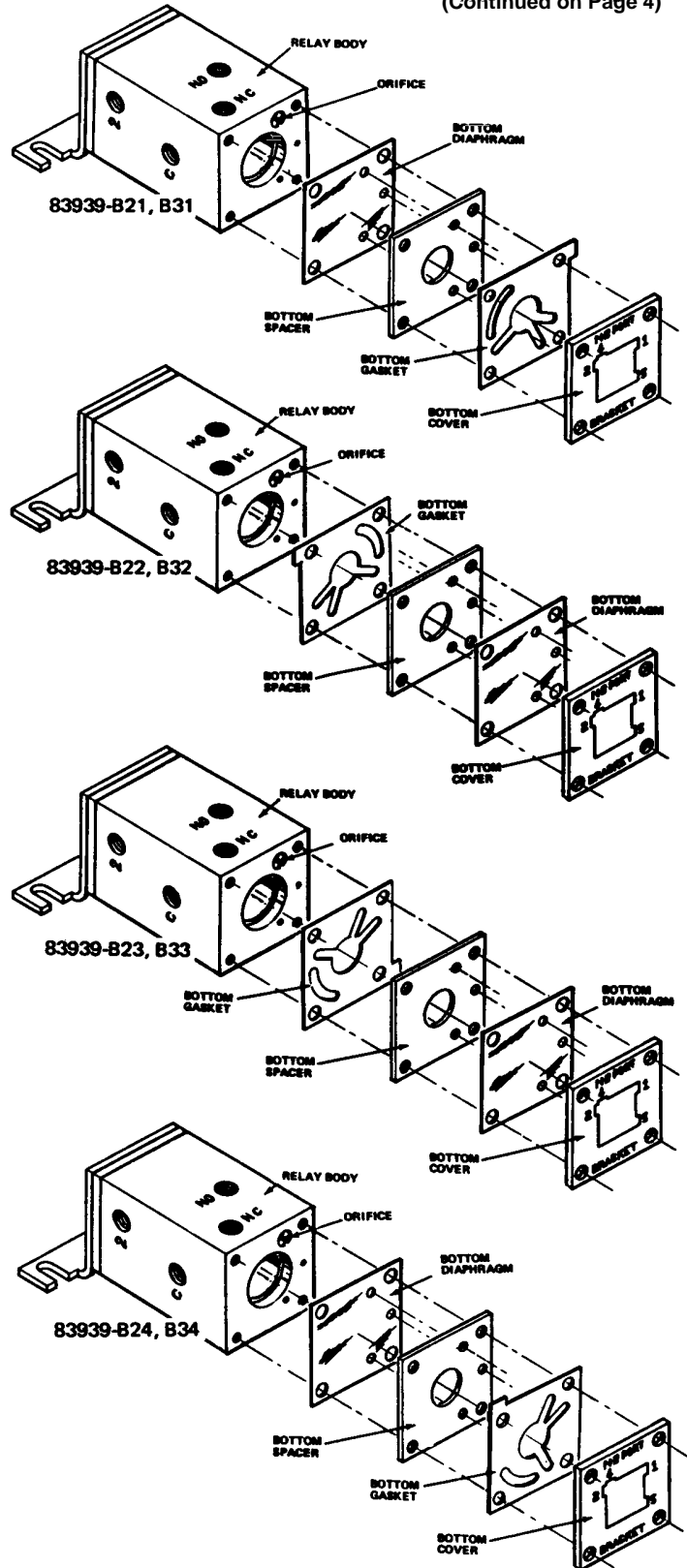


Figure 5

## MAINTENANCE (Continued)

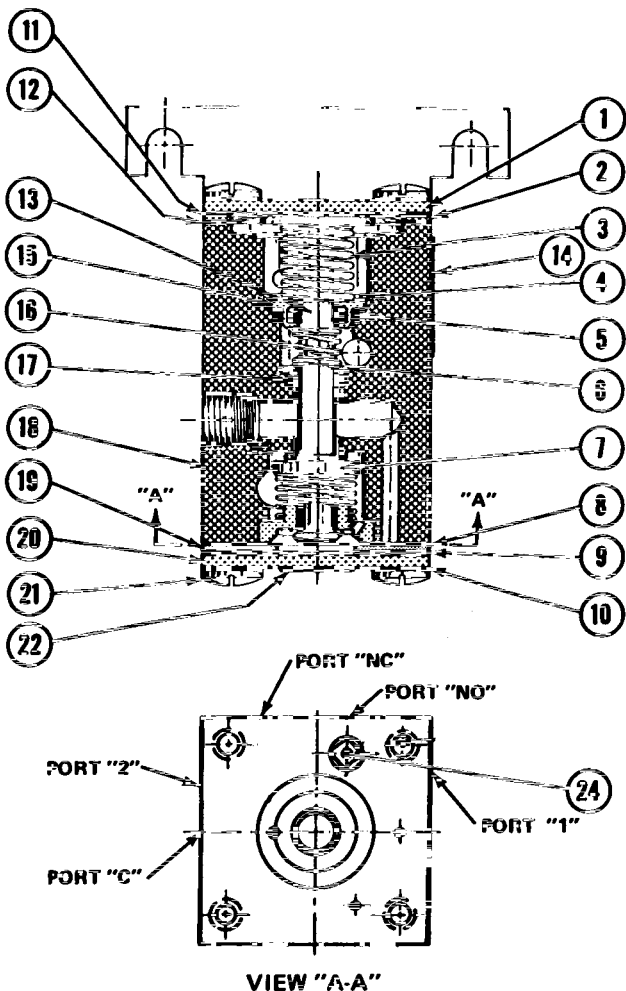
D. After reassembly, check for external leakage. Retighten assembly screws as necessary. Gasket cement should not be used to seal leaks due to the possibility of plugging small passages or damaging the operating characteristics of the diaphragms.

### CAUTION:

If cleaning is required, do not subject "O" Rings, valve poppets, diaphragms or gaskets to cleaning fluid, acetone, or any halogenated hydrocarbons such as vapor degrease liquids, etc. Clean only with a soft, dry cloth.

Upon reassembly, all "O" Rings are to be lubricated with a silicone-type lubricant. Do not permit lubricant to get on poppet or valve seats.

## PARTS LIST



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Det. No.	No. Req'd	Description	Drawing Number	
			Aluminum	Stainless Steel
1	1	Mounting Bracket	24637-C2	24637-C2
2	1	Spacer	33430-A2	33430-A2
3	1	Spring	27953-A1	27953-A1
4	1	Retaining Ring	36605-A2	36605-A2
5	1	"O"-Ring	3624N0013	3624N0013
6	1	Washer	33671-A2	33671-A2
7	1	Plug Assembly	84895-A1	84895-A2
8	1	See Tabulation	See Tabulation	See Tabulation
9	1	See Tabulation	See Tabulation	See Tabulation
10	8	Lockwasher	36600L0609	36600L0609
11	1	Gasket	33665-B 1	33665-B1
12	1	Diaphragm	24498-A1	24498-A1
13	1	Head & Stem Assy	85013-A1	85013-A2
14	1	Decal	30036-G1	30036-G1
15	1	"O"-Ring Carrier	33667-B1	33667-B2
16	1	Spring	33668-B1	33668-B1
17	2	"O"-Ring	36240C0010	36240C0010
18	1	Relay Body	31857-G1	31857-G2
19	1	Spacer	33430-B2	33430-B2
20	1	Cover	33666-A2	33666-A2
21	8	Screws	33713G1109	33713G1109
22	1	Decal	35173-A1	35173-A1
24	1	Orifice	See Tabulation	See Tabulation

## TABULATION

ASSEMBLY NO.	DET.8	DET.9	DET.24
83939-B21, -B219	24498-B2 Diaphragm	33885-A1 Gasket	31311 F3
83939-B22, -B229	33665-A1 Gasket	24498-B2 Diaphragm	31311 F3
83939-B23, -B239	33885-A1 Gasket	24498-B2 Diaphragm	31311 F3
83939-B24, -B249	24498-B2 Diaphragm	33885-A1 Gasket	31311 F3
83939-B31, -B319	24498-B2 Diaphragm	33885-A1 Gasket	31311 F4
83939-B32, -B329	33865-A1 Gasket	24498-B2 Diaphragm	31311 F4
83939-B33, -B339	33885-A1 Gasket	24498-B2 Diaphragm	31311 F4
83939-B34, -B349	24498-B2 Diaphragm	33885-A1 Gasket	31311 F4

\*Details 8, 9, 18, 19 and 20 should be assembled as shown in Figures 4 and 5.

NOTE: For complete kit containing all 'O' Rings, gaskets, diaphragms and poppet to service one unit, order Repair Kit No. 82665-B1.

# Robertshaw

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