

# Bleeder or Inlet Pressure Regulator Type BD-1-B

This mechanism automatically controls the bleeder valve operating mechanism so as to maintain the desired pressure at the bleeder (or L.P. inlet) zone, within reasonably close limits. It accomplishes this purpose by controlling the oil pressure above the oil operated relay of the bleeder valve operating mechanism.

Referring to Figure 1, the principal parts are: the diaphragm "40", the counter-balance weights "6", "7", and "8", and the frictionless relief valve "34". The chamber below the relief valve is connected to the chamber above the relay of the bleeder valve operating mechanism; and the pressure maintained by this relief valve determines the differential pressure acting on the relay which controls the opening of the bleeder valve.

The bleeder or inlet line is connected to the lower side of the diaphragm "40" and the pressure, which is to be controlled, acts upward on this diaphragm. The upward force against the diaphragm is counterbalanced by the weights "6", "7", and "8". Therefore, the bleeder pressure maintained is determined by the number of weights used. The lever "17" which connects the diaphragm and weights is supported on knife edges so as to be practically frictionless. The weights act on the lever through the spring "10" and their movement is dampened by the dashpot piston "3". With this arrangement there is no movement of the weights unless there is a definite change in bleeder pressure. However, with a definite change, the weights and dashpot piston will follow up to restore the same tension in spring "10".

When the bleeder line pressure becomes greater than that for which the regulator is set, the diaphragm "40" moves upward and in turn raises the diaphragm rod "42". This causes the lever "17" to move about the knife edge "20" as a fulcrum and increases the compression of the spring "29" on the relief valve "34" which is connected to the bleeder valve operating mechanism relay. Therefore, the oil pressure above the relay of the bleeder valve operating mechanism is increased, thus opening the bleeder valve, to maintain the correct bleeder pressure.

When the bleeder line pressure becomes lower than that for which the regulator is set, the opposite movements occur. This causes the bleeder valve to respond in the same manner as described above, but in the opposite direction, thus closing the bleeder valve to maintain the correct bleeder pressure.

## OPERATION

When starting the turbine, it is recommended that the regulator be cut out of operation until the turbine is on the line. Likewise, when shutting down, the regulator should be cut out of operation before the unit is taken off the line.

In order to cut the regulator out of service:

- 1 - Remove the weights "7" and "8", one at a time until the lever "17" rises to its upper limit of travel. The bleeder valve will then be wide open.

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- 2 - As the weights are removed, adjust the speed changer to maintain the electrical load constant.
- 3 - Close the valve in the oil line between the relief valve and the bleeder valve operating mechanism relay, thus definitely holding the bleeder valve in its full open position.
- 4 - Screw the knurled lock nut "15" up against the lever "17" to hold it in its upper position.

In order to cut the regulator into service:

- 1 - Gradually open the valve in the oil line between the relief valve and the bleeder valve operating mechanism relay. The bleeder valve should still remain open.
- 2 - Add weights "7" and "8" to give the approximate bleeder pressure desired, (as determined by previous experience).
- 3 - Slowly screw down the knurled nut "15" thus allowing the lever "17" to drop gradually.
- 4 - At the same time, adjust the speed changer to maintain the electrical load constant.
- 5 - Change the weights "8" if necessary to maintain the desired bleeder pressure.
- 6 - Screw the knurled nut "15" down against the nuts "14" so that it cannot become loose and interfere with the operation of the regulator.

A loop is provided in the steam line leading to the diaphragm "40" to serve as a condenser so that the diaphragm will be subjected to water instead of steam. This is necessary to protect the diaphragm, and it is important to fill the section of pipe adjacent to the diaphragm with water before starting up, following a shut-down during which this pipe may have been removed and the trapped water lost.

The drain line between the relief valve "34" and the reservoir must be kept free of obstruction at all times in order to avoid any pressure being imposed on the relief valve diaphragm "31".

Erratic operation of the regulator may be caused by small particles of dirt lodged under the relief valve "34", thus preventing proper seating of this valve. Such trouble frequently can be cleared by raising the spring "29" free of the valve, thus allowing the oil to flow freely through the valve and wash away the dirt.

The following list has been compiled to facilitate ordering spare or renewal parts by name and number together with the serial number of the turbine.

<u>Item No.</u>	<u>Name</u>
1	Regulator Dashpot
2	Regulator Dashpot Spring
3	Regulator Dashpot Piston
4	Regulator Weight Rod
5	Regulator Dashpot Cover
6	Regulator Weight
7	Regulator Weight
8	Regulator Weight



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<u>Item No.</u>	<u>Name</u>
9	Regulator Weight Spring Nut
10	Regulator Weight Spring
11	Regulator Weight Spring Lock Nut
12	Regulator Weight Spring Adjusting Screw
13	Adjusting Screw Washer
14	Regulator Lever Stop Stud Lock Nut
15	Regulator Lever Stop Nut
16	Regulator Lever Stop Stud
17	Regulator Lever
18	Blind Flange
19	Regulator Diaphragm Spring
20	Regulator Lever Knife Edge (Lower)
21	Regulator Lever Knife Edge Tap Bolt
22	Regulator Lever Knife Edge (Upper)
23	Regulator Relief Valve Adjusting Screw Spacer
24	Regulator Relief Valve Adjusting Screw
25	Regulator Relief Valve Adjusting Screw Lock Nut
26	Regulator Lagging
27	Regulator Lever Knife Edge Spacer
28	Regulator Relief Valve Spring Seat (Upper)
29	Regulator Relief Valve Spring
30	Regulator Relief Valve Spring Seat (Lower)
31	Regulator Relief Valve Diaphragm
32	Regulator Relief Valve Diaphragm Ring (Inner)
33	Regulator Relief Valve Diaphragm Ring (Outer)
34	Regulator Relief Valve
35	Regulator Relief Valve Bolt
36	Regulator Relief Valve Seat
37	Regulator Body
38	Regulator Diaphragm Ring
39	Regulator Diaphragm Support
40	Regulator Diaphragm
41	Regulator Diaphragm Washer
42	Regulator Diaphragm Rod
43	Regulator Diaphragm Cover