

INSTRUCTIONS

SECTION AC 620
FOR ADJUSTMENT AND OPERATION OF
BAILEY RATIO CONTROLLERS
TYPES B41B AND B41D



BAILEY METER COMPANY
CLEVELAND, OHIO

RATIO CONTROLLERS TYPES B41B AND B41D

GENERAL DESCRIPTION AND PRINCIPLE OF OPERATION

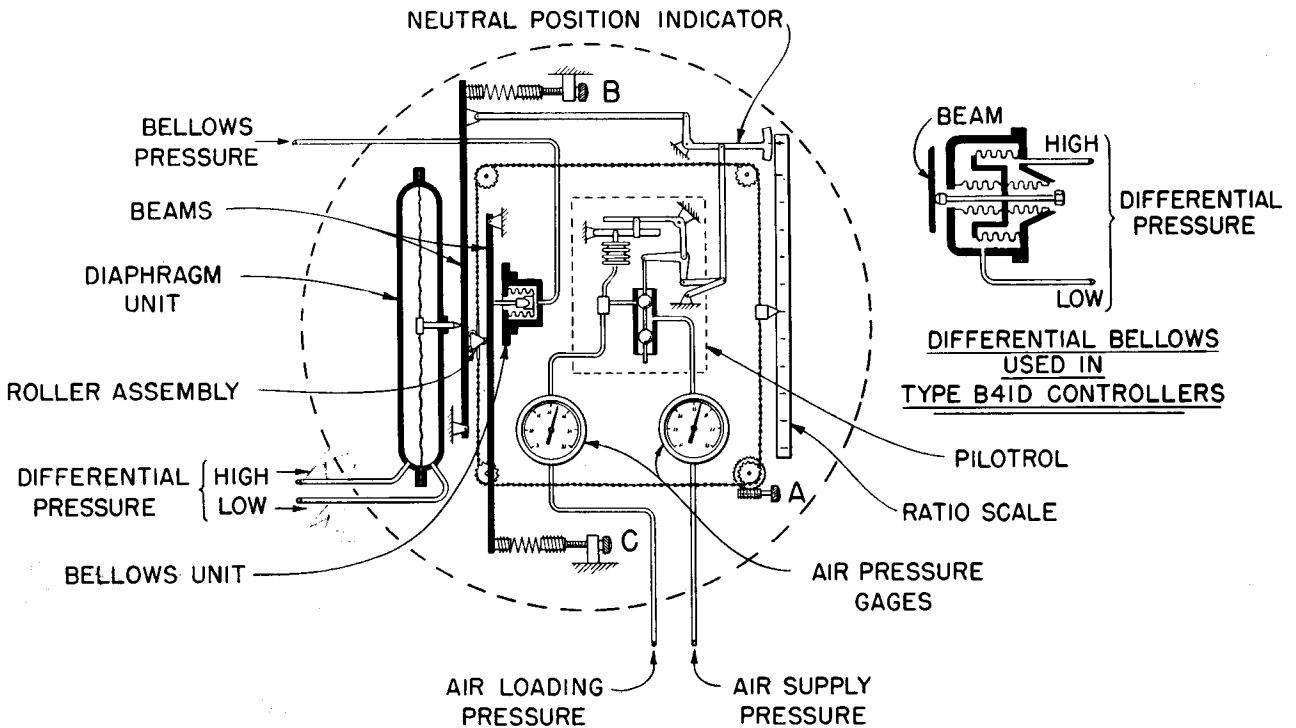


FIGURE 1

Diagrammatic Arrangement of Type B41B Controller

This Ratio Controller consists of two spring loaded beams pivoted at opposite ends and held apart by a roller assembly, the position of which can be varied by means of a chain and sprocket operated by adjusting knob "A." Bearing against each beam is a pressure sensitive element which transmits a force to the beam proportional to the pressure or differential applied to the element. The motion of the rear beam is transmitted by a linkage drive to a pilotrol unit which establishes an air loading pressure proportional to the displacement of the beams from a neutral position. This neutral position, at which the beams are parallel, is indicated by a pointer.

The ratio of pressures required to hold the beams in the neutral position is determined by the position

of the roller assembly between the beams. (This relation is shown by Figures 3 and 4.) Thus if the roller assembly is moved up, the lever arm of the rear beam is increased and the lever arm of the front beam decreased which gives a greater mechanical advantage to the front pressure element. Then, to keep the beams in the neutral position the pressure or differential of the rear pressure element must be increased, or the pressure or differential of the front element decreased, in proportion to the change in mechanical advantage.

The spring loading on the beams acts to stabilize the controller by preventing too great a movement from a small change in pressure of differential and also serves to obtain a certain amount of suppression of the zero or pick-up points of the pressure elements.

INSTALLATION

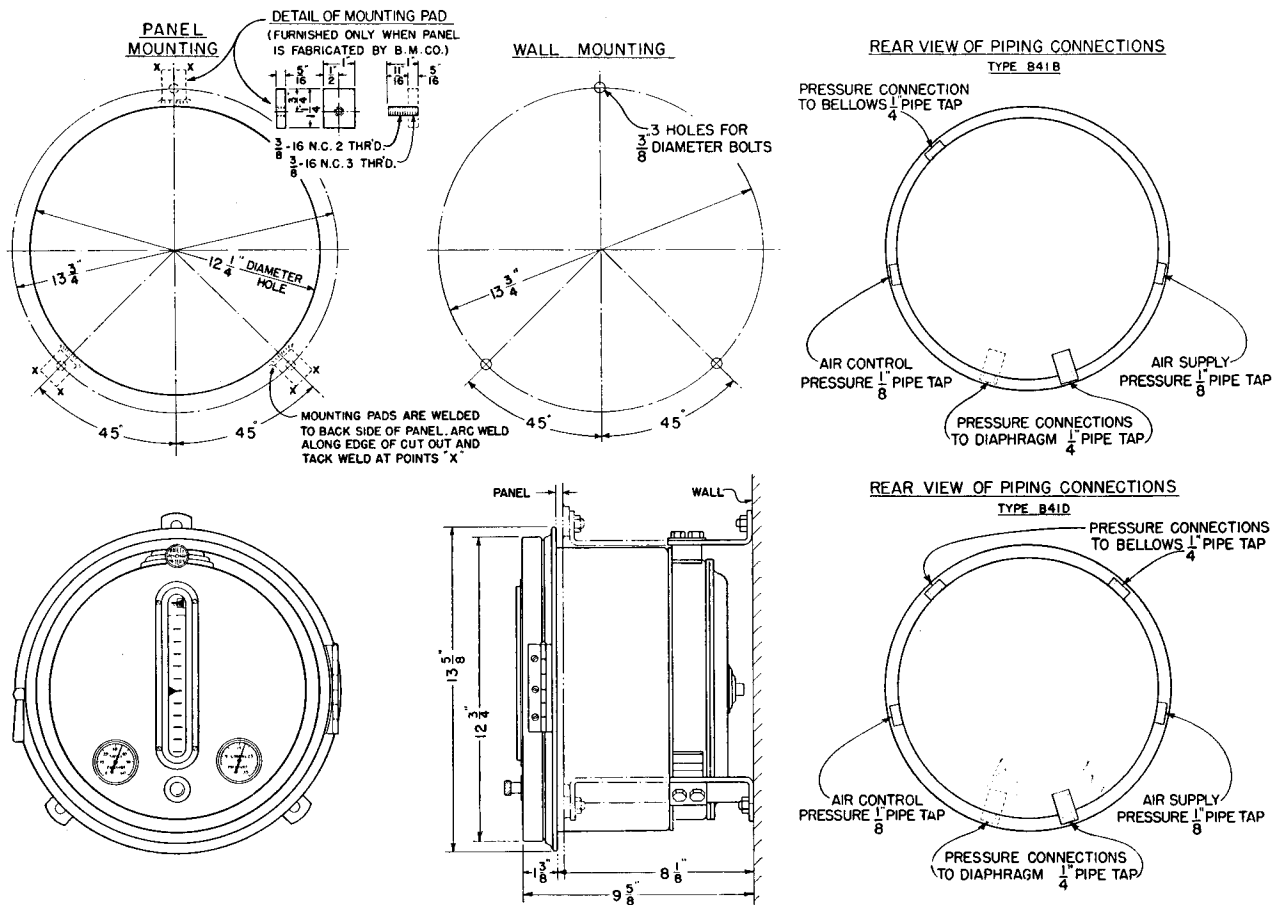


FIGURE 2

Overall Dimension and Mounting Details

The air connections to the pilotrol unit should be made with $\frac{1}{4}$ " O.D. copper tubing and suitable fittings.

The connecting piping for the diaphragm should be at least $\frac{1}{4}$ " iron pipe size for any length up to 25 feet; $\frac{1}{2}$ " iron pipe size for 25 to 100 feet; or $\frac{3}{4}$ " iron pipe size for any length over 100 feet.

Unions should be provided at or near the diaphragm to permit the opening of the lines for blowing with compressed air. A more convenient arrangement is obtained by providing four-way cocks near the diaphragm with a permanent compressed air connection. If four-way cocks are used, they should be connected so as to open the diaphragm to atmosphere when the compressed air is applied to the line.

A tee should be provided at the connection into the furnace, duct or other pressure source so any solid obstruction can be removed by pushing a rod through the pipe.

The piping in general should be installed so as to avoid the trapping of water or, if traps are unavoidable, plugged tees should be placed at the low points in the line to allow periodic draining.

The piping to the bellows should be at least $\frac{3}{8}$ " O.D. tubing or $\frac{1}{4}$ " iron pipe size and should be installed so as to avoid the trapping of air. A tee with a valve on the atmospheric connection should be provided at the connection to the controller to allow the venting of any air in the line and also to provide a connection through which the line and separating chamber can be filled with sealing fluid if required.

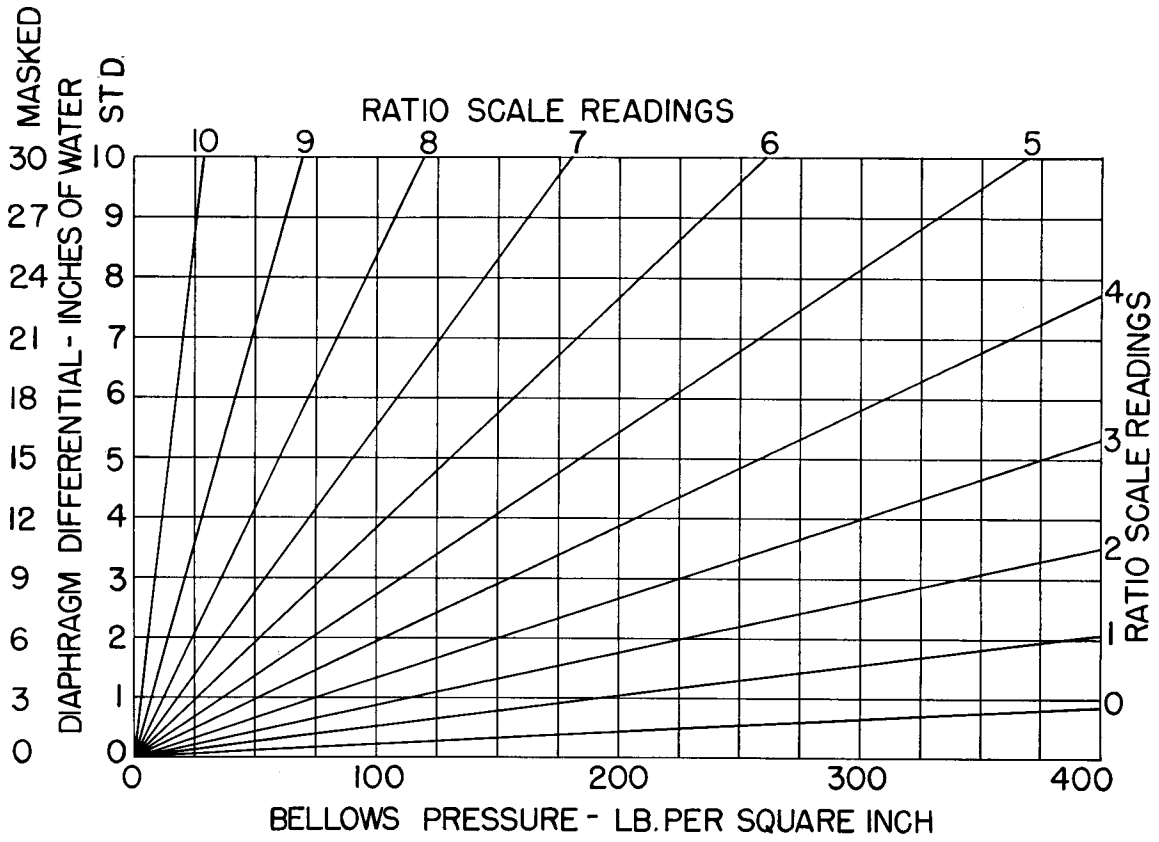


FIGURE 3
Adjustment Data — Type B41B

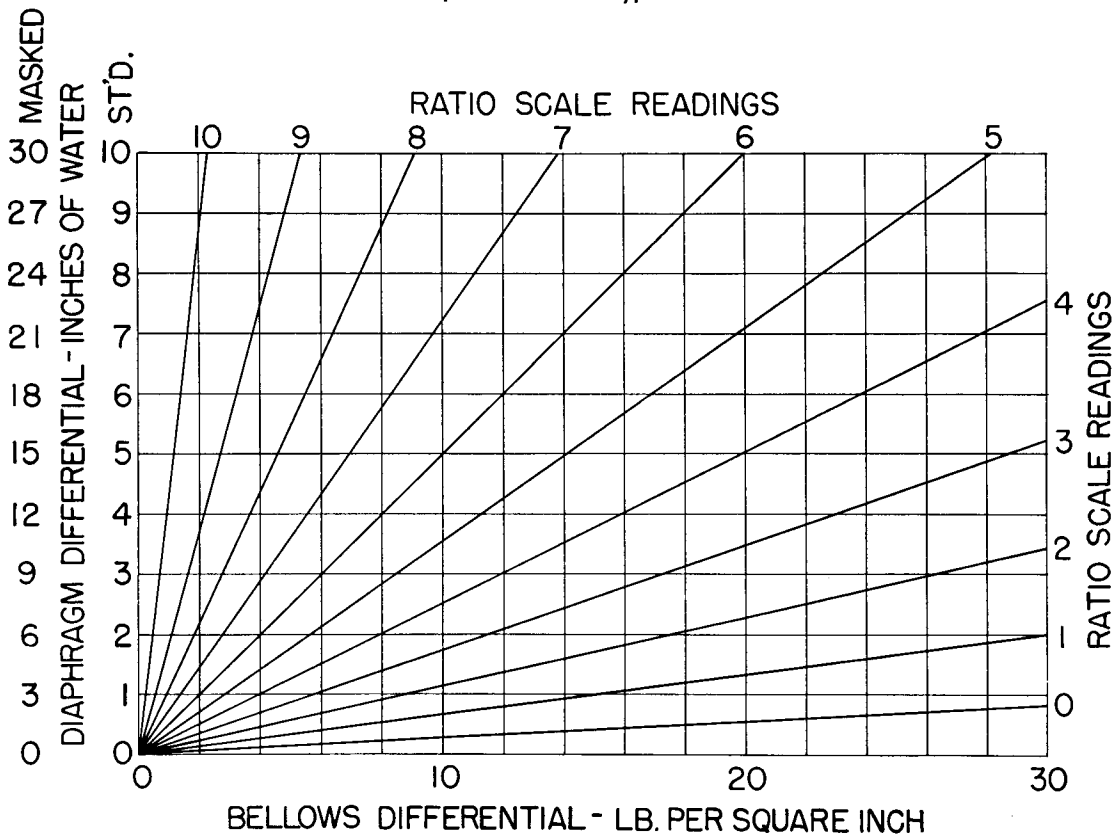


FIGURE 4
Adjustment Data — Type B41D

ADJUSTMENTS

Turn knob "A" (Figure 1) to change ratio scale reading. (See Figures 3 and 4.) Clockwise rotation increases reading.

Turn knob "B" (Figure 1) counterclockwise to suppress diaphragm.

Turn knob "C" (Figure 1) clockwise to suppress bellows.

To Adjust the Ratio Controller to Predetermined Conditions

Plot at least one high rating and one low rating point on the appropriate curve, Figure 3 or Figure 4. More points can be plotted for greater accuracy. A straight line drawn through the greatest number of points will show the desired characteristic. The point at which this line intersects the base coordinate indicates the element to be suppressed and the amount of suppression required. A line drawn parallel to the characteristic line and passing through zero will indicate the required ratio scale reading.

If no predetermined values are available, use knob "A" to make high rating adjustments and knob "B" or "C" to make low rating adjustments, depending on which element must have a positive value when the other element is at zero.

To Adjust Pilotrol Regulating Range

For control using no Standatrol, start with regulating range adjustment over hole No. 8, and gradually move adjustment to the left until the control becomes unstable. Then move adjustment to the right until control is again stable.

If a Standatrol is used, the bleed valve should be nearly closed while the regulating range is being adjusted as described above. The valve should then be gradually opened to the point of instability; then gradually closed until the control becomes stable.

CALIBRATION

Check calibration of Pilotrol unit according to Instructions — Section AC100.

1. Set ratio scale pointer at mid-scale.
2. Set Pilotrol regulating range adjustment over hole No. 2.
3. Turn knob "C" (Figure 1) clockwise as far as possible.
4. Turn knob "B" (Figure 1) to bring operation indicator to mid-position with no pressure on bellows or diaphragm.
5. Adjust Pilotrol "standard" to establish a loading pressure of 14.5 pounds per square inch. (15.5 pounds per square inch if Pilotrol is reversed.)
6. Turn knob "C" (Figure 1) counterclockwise until a loading pressure of 15 pounds per square inch is obtained.
7. Adjust regulating range, ratio scale pointer and suppression springs to operating position according to procedure under "Adjustments."

MAINTENANCE

Refer to Instructions — Section AC100 — for maintenance of the Pilotrol unit.

The operating mechanism of the controller requires no lubrication or care other than preventing excessive accumulation of dust or dirt within the case.

Blow compressed air through diaphragm connecting lines periodically by means of a four-way cock or

by breaking unions at diaphragm. *Do not apply compressed air pressure to diaphragm* as fabric is easily ruptured.

Keep bellows, connecting line and separating chamber filled with sealing fluid if specified on piping diagram.

Vent air from bellows connecting line after adding sealing fluid and at regular intervals thereafter.

RECOMMENDED SPARE PARTS

Quan.	Name	Part No.
1	Supply Pressure Gage	195151-1
1	Loading Pressure Gage	195151-3
1	Air Filter	53164-1
1	Diaphragm	53071-3
2	Small Diaphragms	531491-1
For B41B Only		
1	Bellows	536893-1
For B41D Only		
1	Bellows	537501-1
1	Bellows	537504-1

Parts list for Pilotrol unit can be obtained from Instructions — Section AC100.

ASSEMBLY AND PARTS

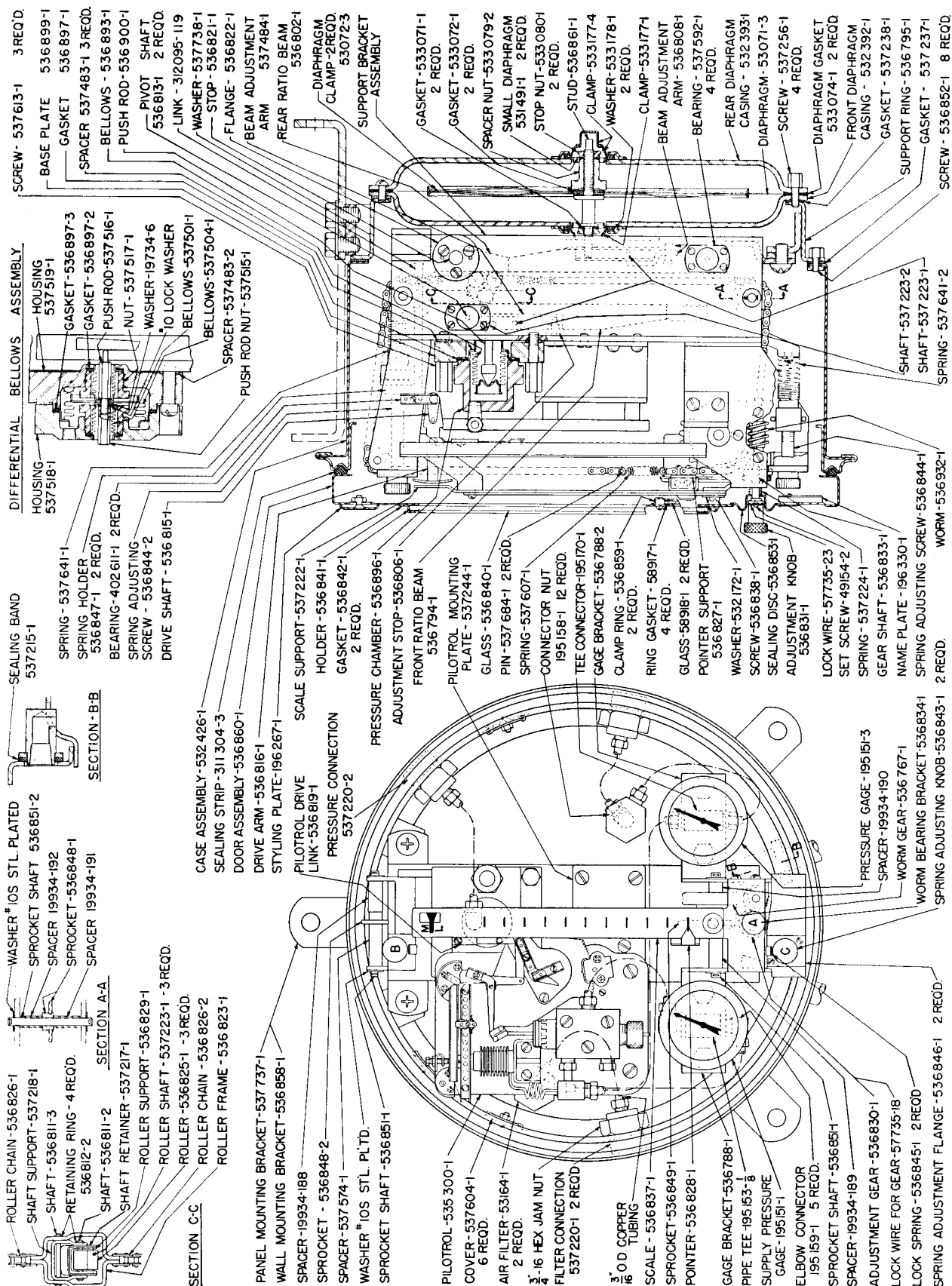


FIGURE 5
Bailey Ratio Controller — Type B41B or B41D — Class 1 AP7
 Specify Controller Type and Serial Number in Ordering Parts

