azbil

L91B/D

PRESSURETROL CONTROLLERS (PROPORTIONAL)

The L91B/D, Proportional Pressuretrol senses pressure changes, thus actuating an internal potentiometer and changing the electric resistance of the potentiometer in proportion to those changes.

The pressuretrol is suitable as a direct controller for the proportional motors of automatic burners inside high limit controllers or for steam heater equipment.

RESTRICTIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment.
Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

- □ The L91B is equipped with one potentiometer (two potentiometers for L91D).
- □ Variable proportional band.
- □ Phosphor bronze bellows are used at the pressure sensing part.
- □ R1/4 and RC1/4 fittings (PT1/4) are provided at the pressure conduits.

SPECIFICATIONS

Table 1

Model	Ranges (kPa)	Proportional Range* at Midscale		Max. Operating Pressure (kPa)
		Min. (kPa)	Max. (kPa)	
L91B	0 to 100	15	84	160
	0 to 350	100	224	600
	35 to 1000	91	364	1600
	70 to 2000	300	770	2500
L91D	35 to 1000	91	364	1600
	70 to 2000	300	770	2500

* Valve at midscale; Proportional range is above the setpoint

MODELS:

L91B–Adjustable proportional range.

L91D–Adjustable proportional range. Two potentiometers in unison allow control of two motors.

ELECTRICAL RATING: 24 V AC

SCALE RANGES AND MARKINGS: Refer to Table 1.

ADJUSTMENT MEANS:

Scale setting, 70 - 2000 kPa range, knurled knob; other ranges, screw on top of case. Proportional range, L91B, D, screw on top of case.

CONNECTION:

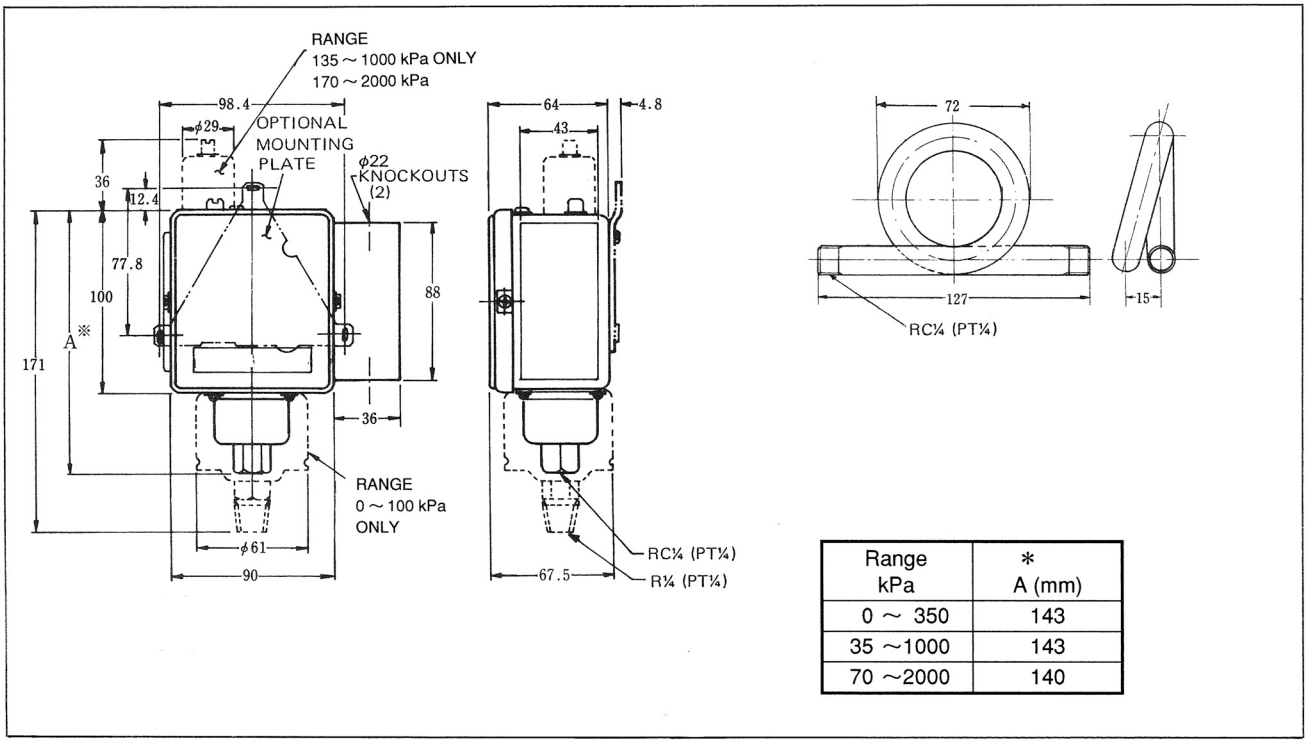
R¼ (PT¼), RC¼ (PT¼) male fitting provided for; 0 - 100 kPa R1/4 (PT1/4) RC1/4 (PT1/4) female fitting provided for higher ranges.

DIMENSIONS: See Fig. 1

FINISH: Gray

OPTIONAL PARTS:

1. Steam Trap (Siphon Loop): J-14026
2. Mounting Plate: 188050A
   (M4 screw–3)
   (M5 screw–3)



Range kPa	* A (mm)
0 ~ 350	143
35 ~1000	143
70 ~2000	140

Figure 1 Approximate Dimensions in Millimeters

INSTALLATION

GENERAL

These controllers may be mounted in various locations – in a fitting provided by the boiler manufacturer, alongside the pressure gauge, or at a location remote from the boiler. The control is provided with a 1/4 inch iron pipe fitting – male for 0 to 1.0 kg (0 to 100 kPa) and lower ranges, and female for higher ranges.

If there is no pressure gauge or fitting in which to mount the controller, consult your local boiler representative for the correct location.

A syphon must always be connected between the controller and the boiler to protect the bellows from corrosive vapors (see Fig. 2).

When making piping connections, use pipe dope or white lead to seal the joints, but use it sparingly. Any excess compound may clog the small hole in the controller fitting.

NOTE: When using the L91 with compressors, a dampening device such as a needle valve, header, or a surge tank must be installed to dampen pulsations which can damage the controller.

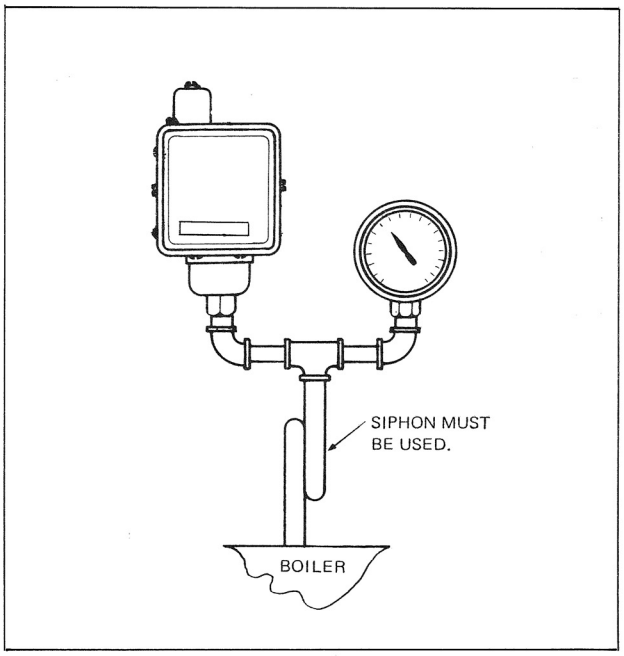


Figure 2 Method of Installing beside Pressure Gauge

MOUNTING

Pressure Gauge Mounting: To mount the controller beside the pressure gauge, remove the gauge and install a tee. Mount the controller and pressure gauge, one on each side. A syphon must be used between the tee and boiler.

Remote Mounting: On all installations where excessive vibration is encountered, the controller may be mounted remotely from the boiler on a solid support with a suitable piping connection to the boiler. Located remotely from the boiler, it should be installed with the piping properly pitched to drain all condensation back to the boiler. On larger boilers where this would place the controller at an inconvenient height, the controller may be mounted at a lower level if the connecting piping is filled with clean water.

IMPORTANT: If this is done the Pressuretrol must be set for a higher pressure than the pressure desired, an amount equivalent to the water head in the vertical section of the pipe. The Pressuretrol should be set 10 kPa higher for each 1 m of vertical pipe.

Boiler Mounting: If it is not convenient to mount the controller adjacent to the pressure gauge, mount it at the location in the boiler recommended by the boiler manufacturer. For this type of mounting, screw a syphon into the boiler and then screw the controller directly to the syphon.

WIRING

1. Refer to wiring diagrams 3 & 4.
2. A shield cable of more than 1.2 mmG should be used for low voltage wiring.
3. When the rotation is made in reverse of that in Fig. 3 & 4, replace the wiring to motor W with B.

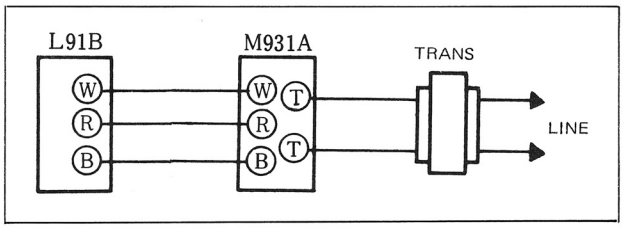


Figure 4 Wiring of Controllers

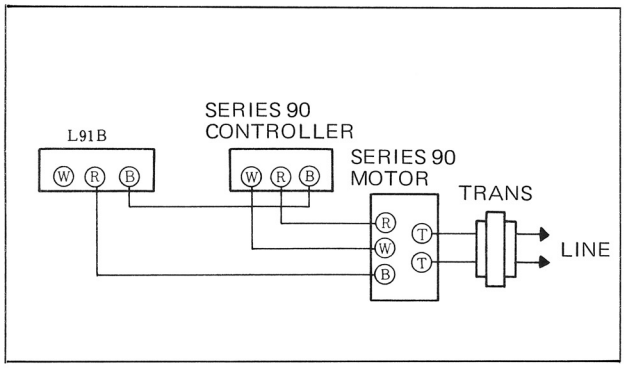


Figure 3 L91B Used as High Limit

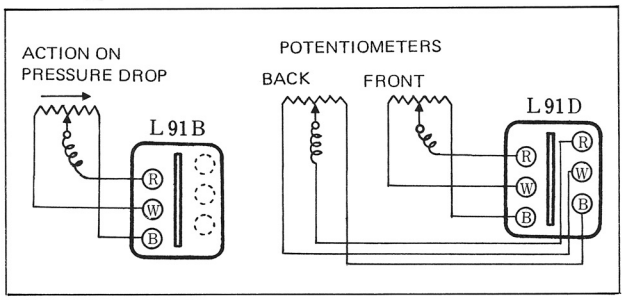


Figure 5 Internal Connections to Terminals

SETTING AND ADJUSTMENTS

PRESSURE SETTING

Rotate the ① screw to get the desired indication of the pressure at the ⑤ scale plate. In this case, the proportional range scale shows the lower limit, so the pressure will be held in the range of the setpoint plus the proportional range.

PROPORTIONAL RANGE SETTING

After the pressure setting, adjust by rotating the ② screw. Adjustment should be made between "min" and "F" on the ⑦ scale plate by positioning them in equally divided values on the Table 1 proportional band.

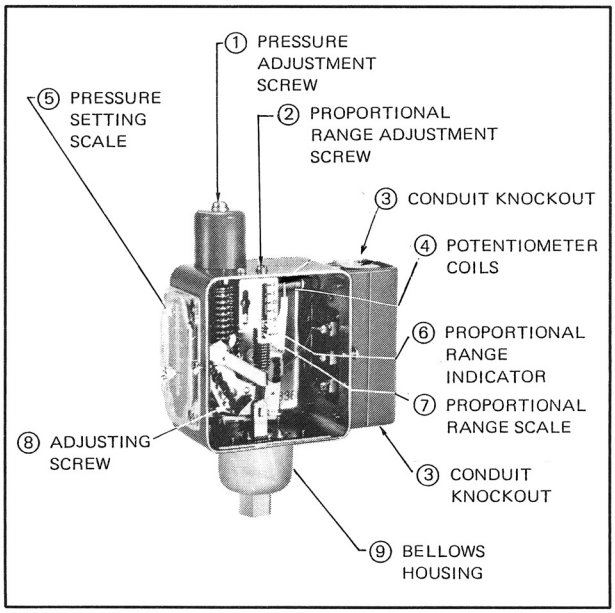


Figure 6 Internal View of L91B (L91D has 2 potentiometers enclosed)

TYPICAL OPERATION

Pressure variations cause the bellows to expand or contract, moving the potentiometer wiper across its windings. This varies the resistance between R and B and R and W, and causes a proportional motor to run in one direction or the other.

The controller potentiometer and the motor potentiometer, together with a balancing relay, form a bridge circuit. As long as the pressure of the controlled medium remains at the controller setpoint, the circuit is balanced (equal current flowing through each half of the balancing relay), and the motor does not run. When the pressure of the medium changes, the potentiometer wiper moves. This unbalances the circuit and a larger current flows through one side of the balancing relay. The relay closes and the motor runs in the direction necessary to correct the change in pressure. As the motor runs, the controller wiper moves until it returns to the balanced position, opening the relay and stopping the motor.

MAINTENANCE AND CHECKOUT

Check the following after completion of mounting, wiring, pressure setting and proportional band setting,

1. The cover should be tightly mounted on the pressuretrol (to prevent any adverse influences or damage from the duct).

   When performing maintenance, clean by blowing the duct inside the pressuretrol.

2. Make certain the pressuretrol is receiving no excess vibration from the motor or other moving parts.
3. Start the system by operating the pressuretrol and ascertain that it is functioning smoothly.

NOTE: The pressuretrol is strictly calibrated at the factory. When making the check in 3 above, an accurate pressure gauge should be used.

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