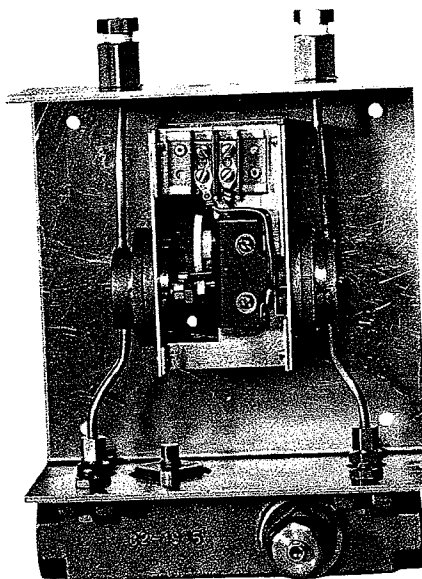


DUNHAM-BUSH

VARI-VAC DIFFERENTIAL CONTROLLER MODEL 389 K

INSTALLATION AND OPERATING INSTRUCTIONS



INTRODUCTION

The Dunham-Bush Differential Controller is used to govern the operation of the Differential Vacuum Pump in order to maintain a differential in pressure between the steam supply and return piping of a zone in a heating system. This difference in pressure ensures positive circulation of steam throughout the zone. When the differential vacuum pump services more than one zone of heating, it is necessary to use more than one differential controller.

REFERENCES

Please consult the latest edition of the following forms for additional information. Forms are available from your local Dunham-Bush heating representative or from Dunham-Bush, West Hartford, CT, 06110.

Catalog	Form 2140
Vari-Vac Heating Systems	3174
Vari-Vac Control Center I & O	2159
DV, DVD Model 'E' Vacuum Pumps	
VR, VRA, VRD, VRDA, DV, DVA, DVD & DVDA Model 'E' Vacuum Pump	3456
Installation Operation and Maintenance Manual	

DUNHAM-BUSH RESERVES THE RIGHT TO MAKE CHANGES IN SPECIFICATION AND DESIGN WITHOUT NOTICE.

GENERAL

This equipment is factory designed, built and tested to maintain a pressure differential between the main steam and return piping lines of a zone of heating. To assure satisfactory operation and to avoid costly damage to the unit, the following procedures should be observed.

INSTALLATION

A. Receiving Inspection

When the unit is delivered, an immediate visual inspection of the unit and its accessories should be made in the presence of the carrier's representative. If there is any evidence of rough handling or damage, a notation should be made on the delivery receipt. Shipping damages are the responsibility of the carrier and it is the obligation of the customer to file a claim. If requested, Dunham-Bush will assist in the filing of the claim.

B. Unpacking

When unpacking the Differential Controller be sure that all temporary plugs remain in their tappings until you are ready to connect it to the system.

C. Location

The Differential Controller should be piped at the end, or as

near as possible to the end of the supply line of the heated zone. It should be installed above the return main and located where the cover of the cabinet may be removed. The preferred location of the controller is above the steam main. It can, however, be mounted below it provided a drip line is employed on the inlet side.

When the Differential Controller is properly installed it will be in a vertical or upright position with the manifold on the bottom. This allows the closure disc in the internally built check valve to float freely.

Four one-quarter ($\frac{1}{4}$) inch diameter holes are located on the back of the cabinet for mounting the unit to the wall.

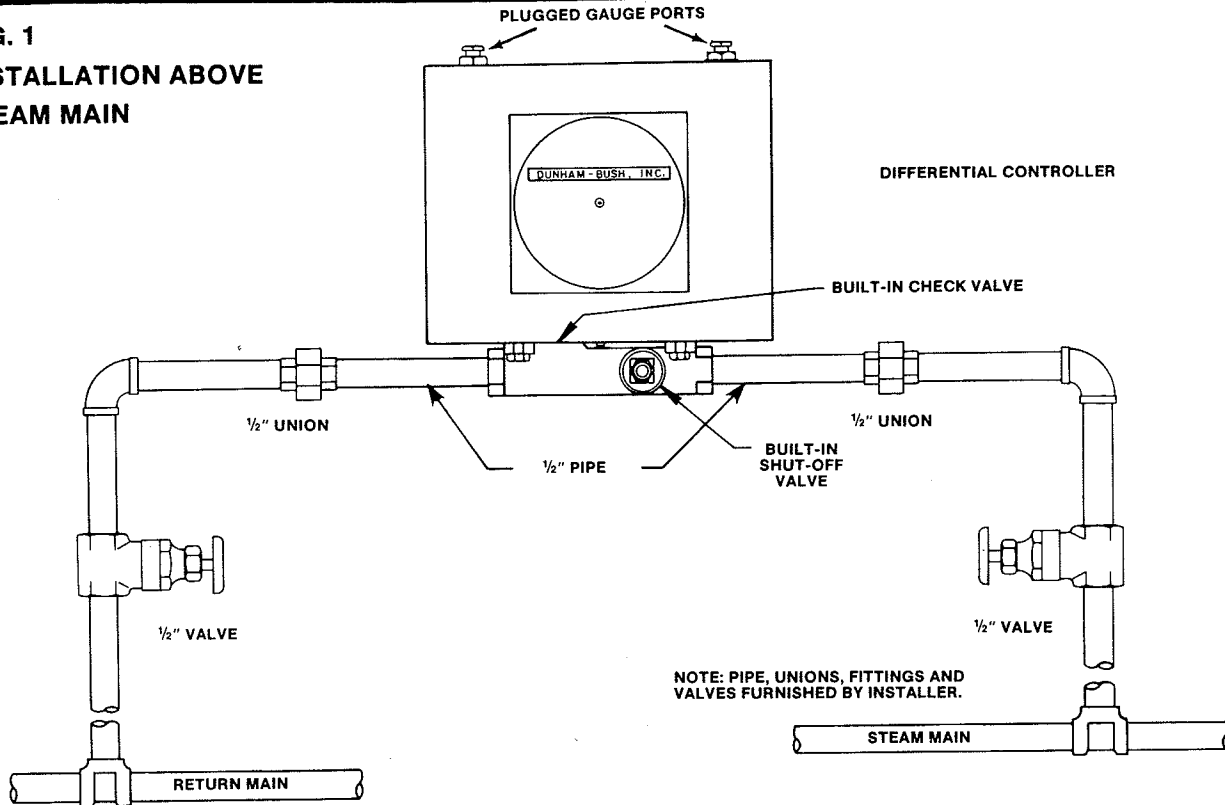
D. Piping

When piping the Differential Controller, the piping connections should be as short as possible and arranged so that condensate will drain away from the controller. When the controller is mounted above the steam main it should be mounted as shown in Figure 1. When it is mounted under the steam main it should be mounted as shown in Figure 2, with a

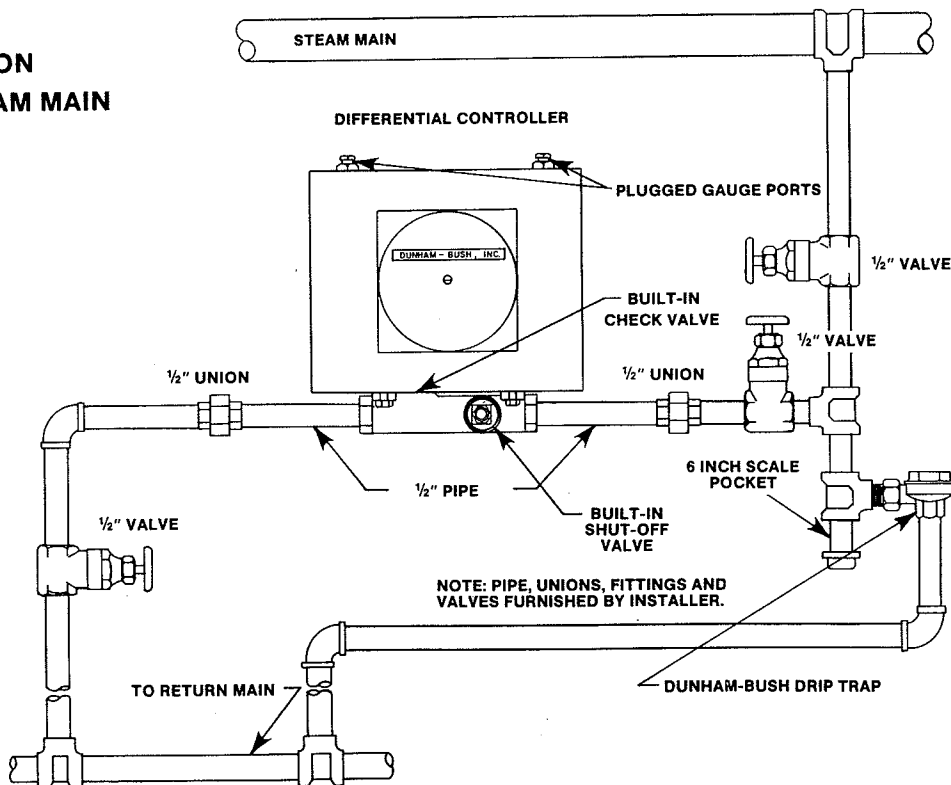
drip line and thermostatic radiator trap incorporated in the system to allow condensate to flow to the main return line.

Connections to the steam and return mains and to the steam and return openings of the controller are one-half (1/2) inch pipe. Piping fittings and valves are to be furnished by the contractor.

**FIG. 1
INSTALLATION ABOVE
STEAM MAIN**



**FIG. 2
INSTALLATION
BELOW STEAM MAIN**



E. Wiring

Wiring of the Differential Controller shall be in accordance with Federal, State and local codes, and all conduit and wire will be furnished by the contractor.

When wiring, one-half (1/2) inch conduit should be used between the Differential Pump and each Differential Controller.

Then two (2) #14 AWG gauge solid copper conductors, with approved insulation and color coded black and white, should be pulled through the conduit and connected as shown in the wiring diagrams, figures 3 through 8.

WIRING DIAGRAMS

FIG. 3

ONE DIFFERENTIAL CONTROLLER - 389K
WITH ONE MODEL 'B' OR 'C' SINGLE OR DUPLEX VACUUM PUMP

* REMOVE JUMPER AND REPLACE WITH WIRING FROM THE RTMS VALVE, WHEN USED.

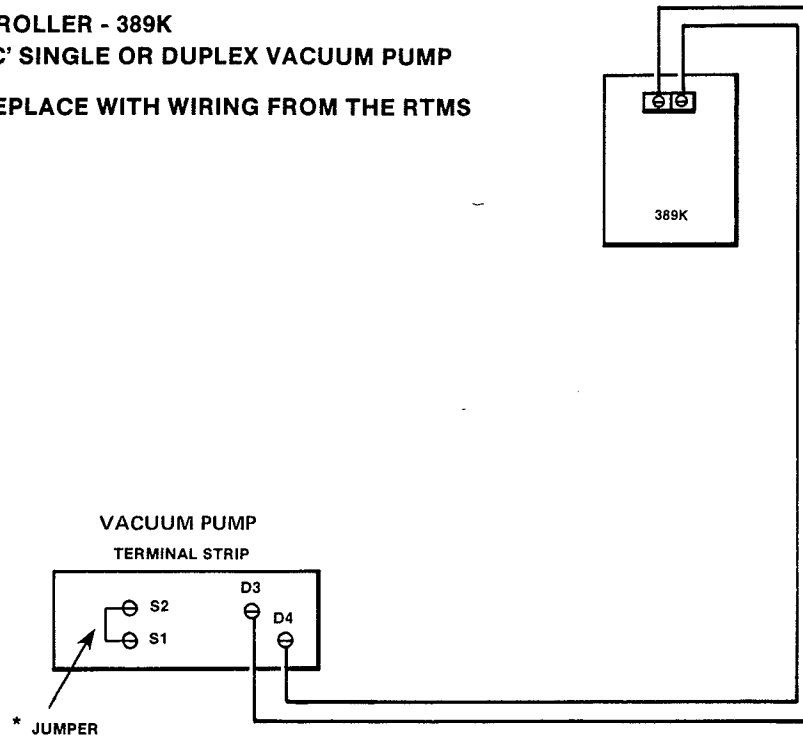
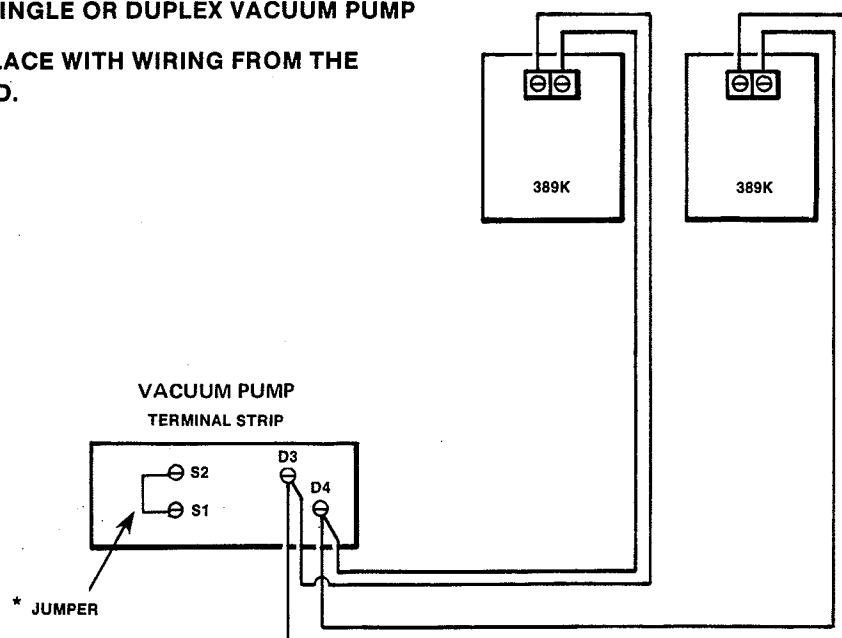


FIG. 4

TWO DIFFERENTIAL CONTROLLERS - 389K
WITH ONE MODEL 'B' OR 'C' SINGLE OR DUPLEX VACUUM PUMP

* REMOVE JUMPER AND REPLACE WITH WIRING FROM THE RTMS VALVE(S), WHEN USED.



WIRING DIAGRAMS

FIG. 5
THREE DIFFERENTIAL CONTROLLERS
WITH ONE MODEL 'B' OR 'C' SINGLE OR DUPLEX
VACUUM PUMP

* REMOVE JUMPER AND REPLACE IT WITH WIRING FROM THE RTMS VALVE(S), WHEN USED.

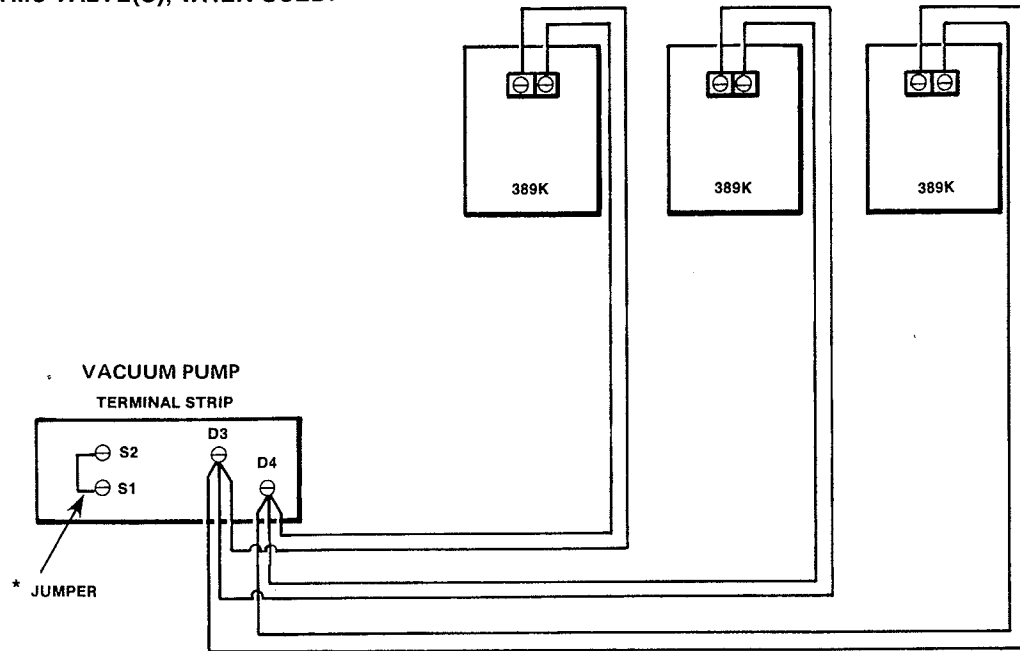
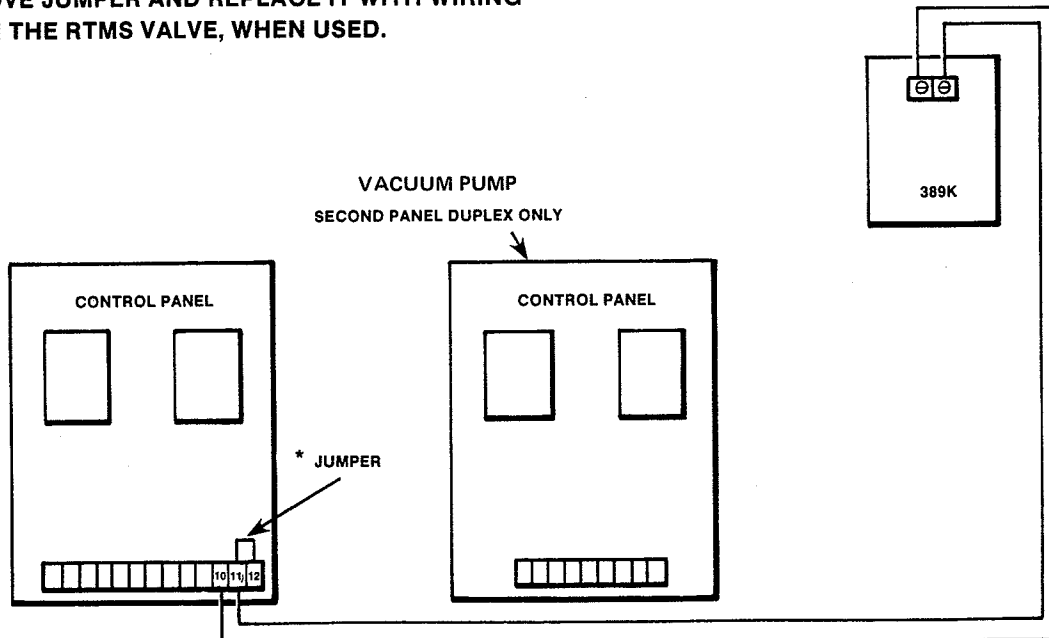


FIG. 6
ONE DIFFERENTIAL CONTROLLER
WITH ONE MODEL 'E' SINGLE OR DUPLEX
VACUUM PUMP

* REMOVE JUMPER AND REPLACE IT WITH WIRING FROM THE RTMS VALVE, WHEN USED.



WIRING DIAGRAMS

FIG. 7
TWO DIFFERENTIAL CONTROLLERS
WITH ONE MODEL 'E' SINGLE OR DUPLEX
VACUUM PUMP

* REMOVE JUMPER AND REPLACE IT WITH WIRING
FROM THE RTMS VALVE(S), WHEN USED.

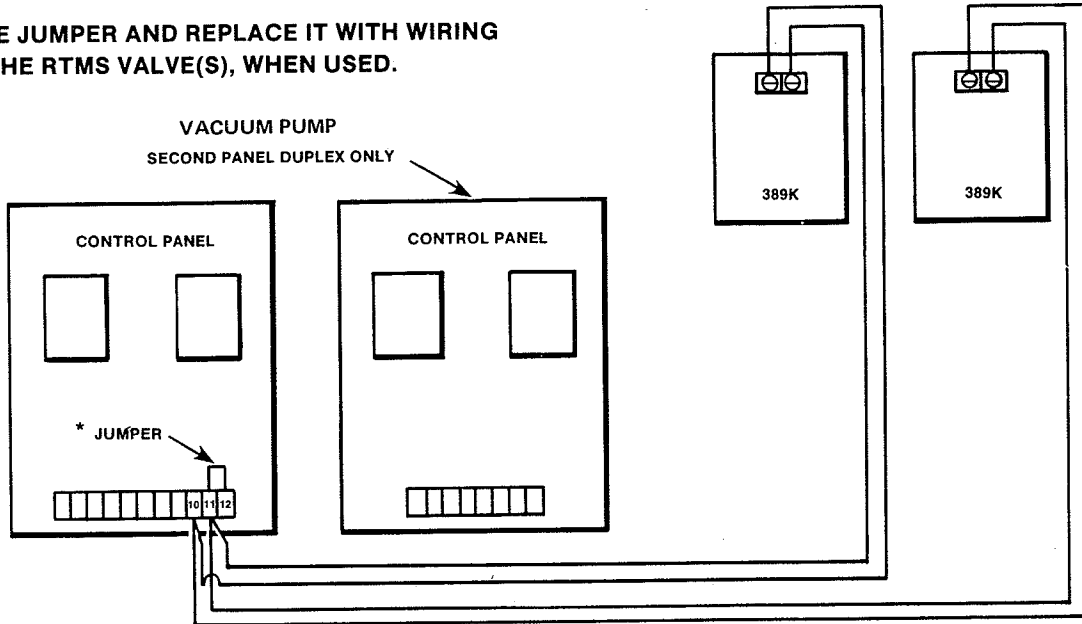
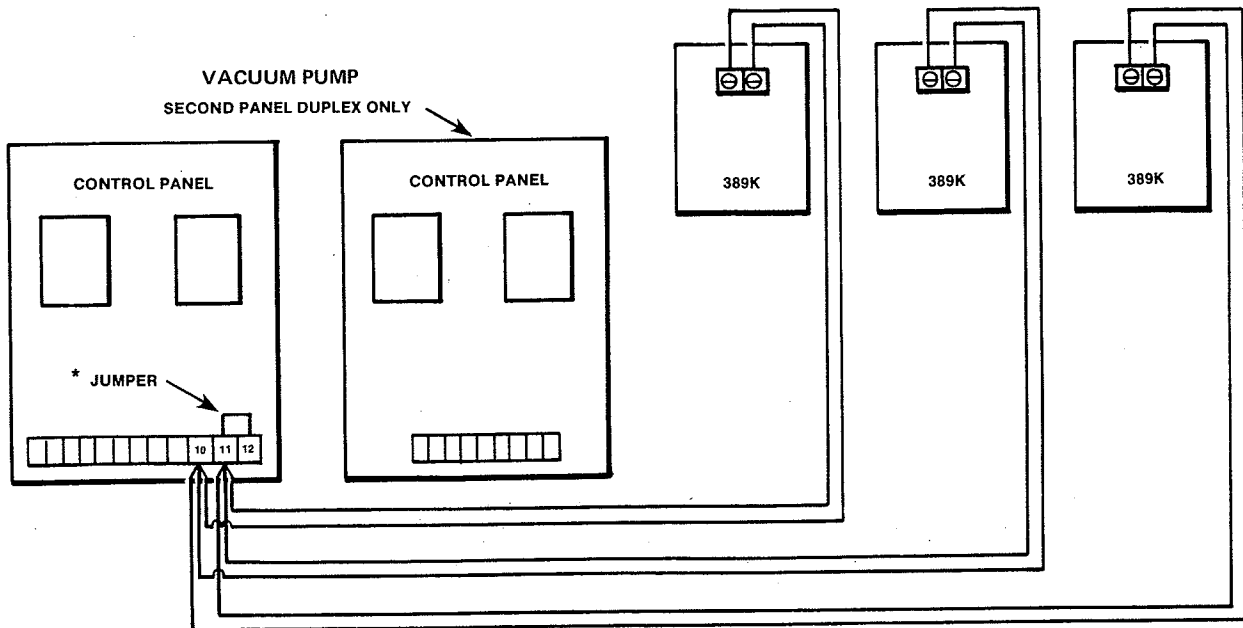


FIG. 8
THREE DIFFERENTIAL CONTROLLERS
WITH ONE MODEL 'E' SINGLE OR DUPLEX
VACUUM PUMP

* REMOVE JUMPER AND REPLACE IT WITH WIRING
FROM THE RTMS VALVE(S), WHEN USED.



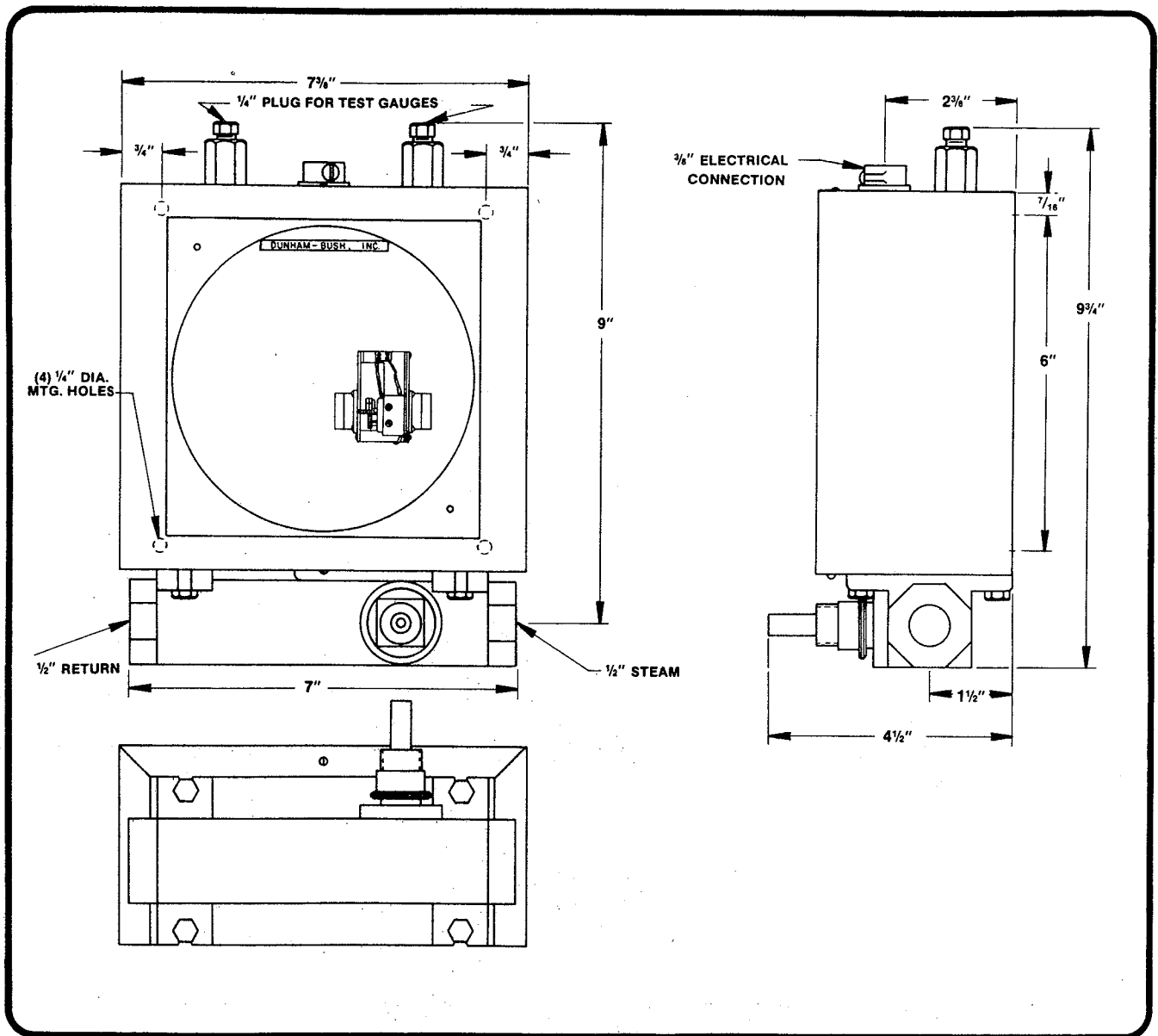
OPERATING INSTRUCTIONS

The Differential Controller was set and checked at the factory. Consult with your Dunham-Bush Service Engineer or Sales Representative prior to making changes in the setting of the switch.

A. Differential Adjustment

To increase the differential between the cutout point and cut-in point, turn the adjustment counterclockwise. To decrease the differential, turn it clockwise. One full turn equals a change of one and two-tenths (1.2) inches of mercury.

DIMENSIONS



DUNHAM-BUSH

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