(c) Totally enclosed motors or combination starters.

The electrical specifications should include the wiring for:

(a) Nash Valve Controller and Primary Supply Valve in accordance with wiring diagram appearing on Page 13. (NOTE: Pneumatic Primary Supply Valve must be provided with a source of control air.)

(b) Nash Vacuum Pump Controller and temperature switch in accordance with wiring diagram appearing on Page 14.

(c) The vacuum heating pump unit in accordance with the wiring diagram supplied with the unit.

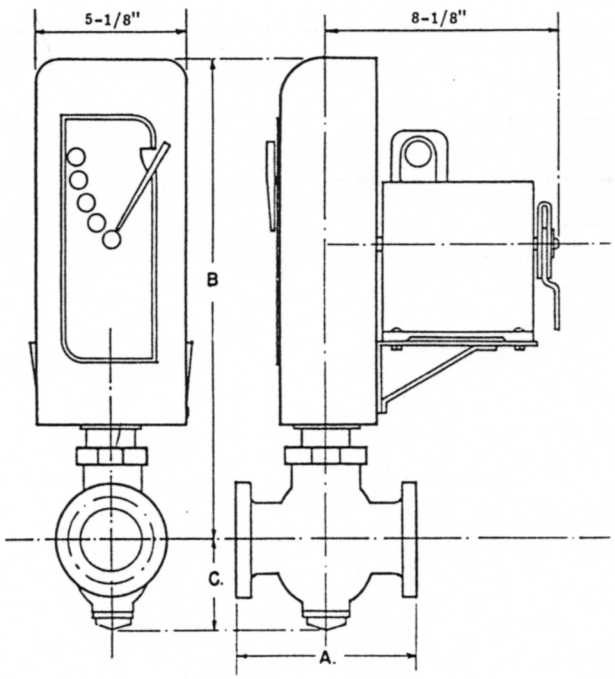
A pressure relief valve should be specified for installation in the heating main beyond the Nash Primary Control Valve if the steam pressure ahead of the primary valve exceeds 15 psi.

The standard practice of rising at each drip in the steam main and branches should be followed where headroom permits.

NASH MOTOR OPERATED TYPE PRIMARY CONTROL VALVES

1″ to 3″, inclusive — Bronze body, bronze trim, with screwed connections.

4″ to 6″, inclusive — High tensile iron body, bronze trim, with flanged connections.



DIMENSIONS

VALVE SIZE (inches)	TYPE AND BODY	DIMENSIONS (inches) A	B	C
1	Single Seated Bronze Screwed	4-3/8	15-1/8	1-5/8
1-1/4	Single Seated Bronze Screwed	5	15-3/8	1-1/2
1-1/2	Single Seated Bronze Screwed	5-3/4	15-1/2	1-3/8
2	Single Seated Bronze Screwed	5-3/4	15-3/4	2
2-1/2	Single Seated Bronze Screwed	7-1/2	16	2-3/8
3	Single Seated Bronze Screwed	8-7/8	16-3/8	2-3/8
4	Double Seated Iron Flanged	10-7/8	19	6
5	Double Seated Iron Flanged	12-1/8	19-7/8	5-1/2
6	Double Seated Iron Flanged	13-3/4	20-7/8	6-1/2

Approximately 4" clearance is required for removal of linkage. The linkage may be installed horizontally provided the motor remains in a horizontal position.

VARIABLE DIFFERENTIAL TYPE NASH VALVE CONTROLLER

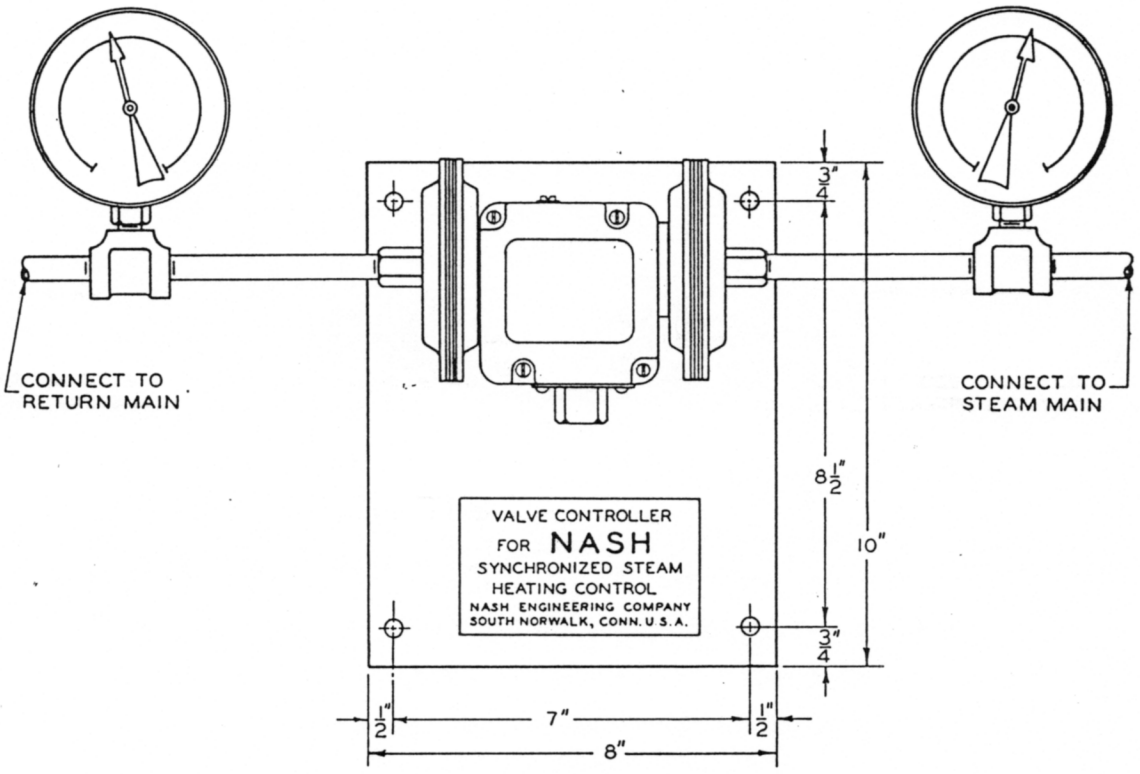
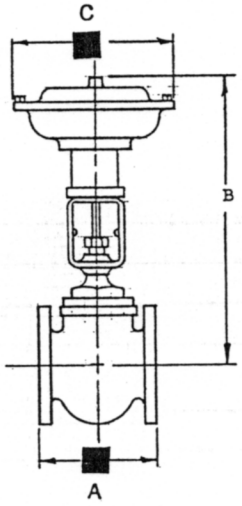


Table 1M
SELECTION OF NASH MOTOR OPERATED TYPE PRIMARY CONTROL VALVE
For 2 psi Pressure in the Heating Main

CAPACITY IN POUNDS OF STEAM PER HOUR	INLET STEAM PRESSURE TO VALVE IN POUNDS PER SQUARE INCH					
	3	4	5	7½	10	15
250	1¼"	1"	1"	1"	1"	1"
500	2"	1½"	1¼"	1¼"	1"	1"
750	2½"	2"	1½"	1¼"	1¼"	1"
1,000	2½"	2"	2"	1½"	1½"	1¼"
1,250	3"	2½"	2"	2"	1½"	1½"
1,500	4"	2½"	2½"	2"	2"	1½"
1,750	4"	3"	2½"	2"	2"	2"
2,000	4"	3"	3"	2½"	2"	2"
2,500	5"	4"	3"	2½"	2½"	2"
3,000	5"	4"	4"	3"	2½"	2½"
3,500	6"	4"	4"	3"	3"	2½"
4,000	6"	5"	4"	4"	3"	3"
5,000	*	5"	5"	4"	4"	3"
6,000	*	6"	5"	5"	4"	4"
7,000	*	6"	6"	5"	4"	4"
8,000	*	*	6"	5"	5"	4"
9,000	—	*	*	6"	5"	4"
10,000	—	*	*	6"	6"	5"
12,000	—	*	*	6"	6"	5"

(*Use two valves of suitable size in parallel. Only one valve controller is required for both valves.)

NASH PNEUMATIC TYPE PRIMARY CONTROL VALVES
1½" to 2" Bronze Body with Screwed Connections
2½" to 6" Iron Body with Flanged Connections



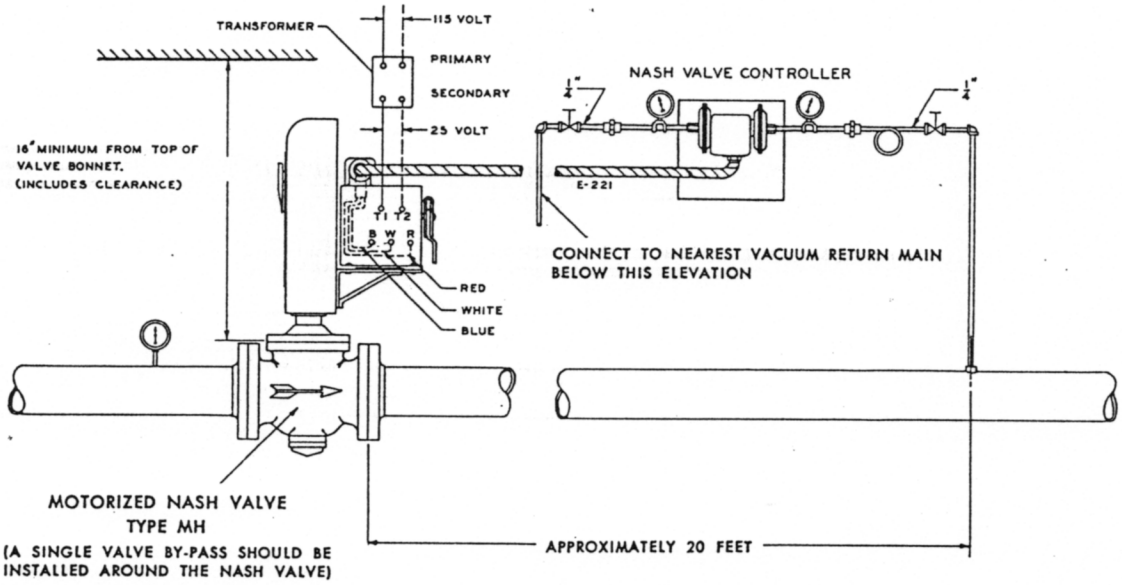
VALVE SIZE (INCHES)	BODY	TOP SIZE	DIMENSIONS (INCHES)		
			A	B	C
1½	BRONZE SCREWED	3-R	4⅞	10¼	6
2	BRONZE SCREWED	3-R	5⅛	10¾	6
2½	IRON FLANGED	4-R	7¼	14	8⅛
3	IRON FLANGED	5-R	8⅝	20 3/16	11⅞
4	IRON FLANGED	5-R	10½	21 13/16	11⅞
5	IRON FLANGED	5-R 8-R	12½ 12½	22 9/16 26 7/16	11⅞ 16½
6	IRON FLANGED	8-R	14½	28	16½

Table 1P
SELECTION OF NASH PNEUMATIC TYPE PRIMARY CONTROL VALVE
For 2 psi Pressure in the Heating Main

CAPACITY IN POUNDS OF STEAM PER HOUR	INLET STEAM PRESSURE TO VALVE IN POUNDS PER SQUARE INCH					
	3	4	5	7½	10	15
250	1½"	1½"	1¼"	1¼"	1"	1"
500	2½"	2"	2"	1½"	1½"	1¼"
750	3"	2½"	2"	2"	1½"	1½"
1,000	3"	3"	2½"	2"	2"	1½"
1,250	4"	3"	3"	2½"	2"	1½"
1,500	4"	4"	3"	2½"	2½"	2"
1,750	4"	4"	3"	3"	2½"	2"
2,000	5"	4"	4"	3"	3"	2½"
2,500	5"	4"	4"	3"	3"	2½"
3,000	5"	5"	4"	4"	3"	3"
3,500	6"	5"	5"	4"	4"	3"
4,000	6"	5"	5"	4"	4"	3"
5,000	*	6"	5"	5"	4"	4"
6,000	*	6"	6"	5"	5"	4"
7,000	*	*	6"	5"	5"	4"
8,000	*	*	*	6"	5"	5"
9,000	—	*	*	6"	5"	5"
10,000	—	*	*	6"	6"	5"
12,000	—	*	*	*	6"	5"

(*Use two valves of suitable size in parallel. A valve controller is required for each valve.)

PIPING AND WIRING DIAGRAM FOR NASH MOTOR OPERATED TYPE PRIMARY CONTROL VALVE AND VALVE CONTROLLER

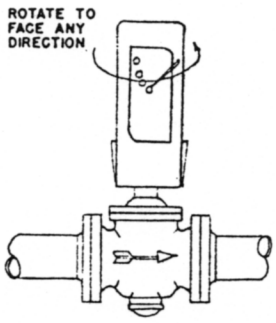


NOTE: The valve body should not be installed directly above a boiler or in any location where the ambient temperature may exceed 110 deg. F. It may be located any distance from the boiler or steam supply header ahead of the initial radiation.

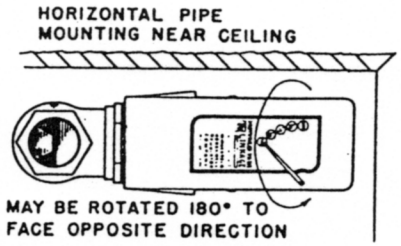
It is improper to install the valve with the motor below the valve body, because an objectionable drippage of condensate may occur under certain conditions of operation. Proper arrangements are shown below.

Valves are furnished with one minute motors. The valve is not in continuous motion.

Installation of valve controller should be arranged so that there can be no accumulation of water in control piping leading to it. All devices indicated are furnished by Nash Engineering Company. Piping, gate valves and wiring are not included.

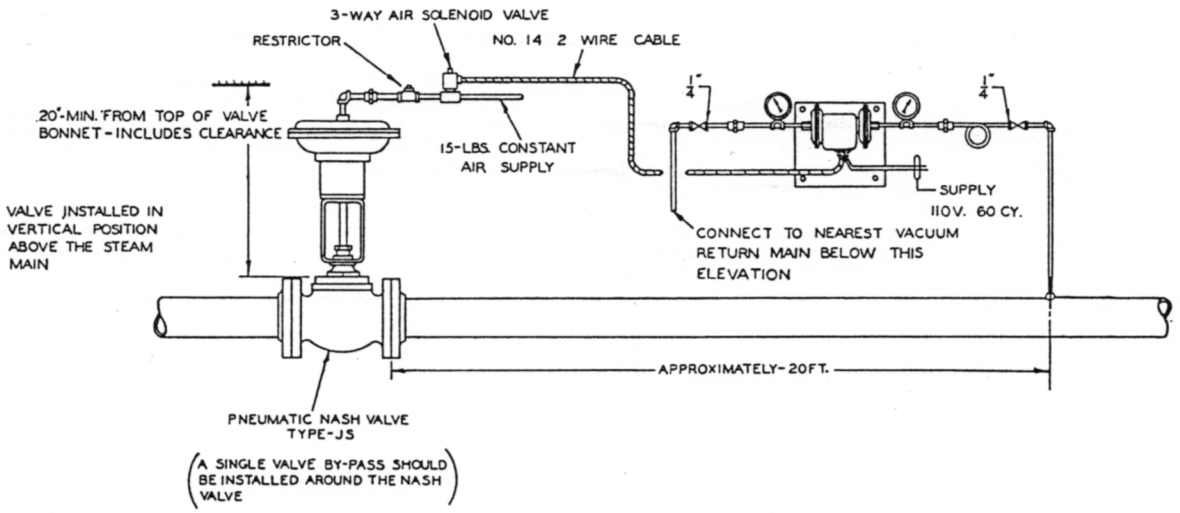


Preferred Arrangement



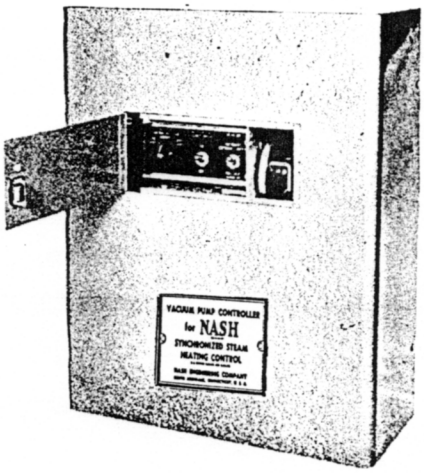
Optional Arrangement
(for limited headroom)

PIPING AND WIRING DIAGRAM FOR NASH PNEUMATIC TYPE PRIMARY CONTROL VALVE WITH ELECTRIC VALVE CONTROLLER

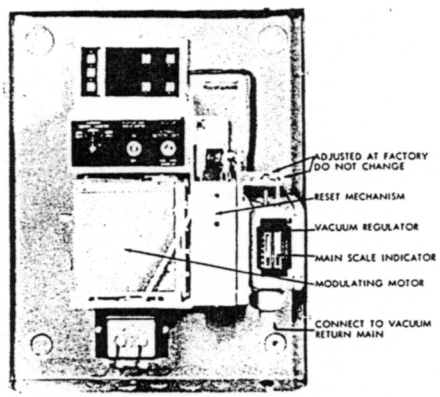


NOTE: Unlike the motor operated valve, the pneumatic valve may be adjusted for any opening or closing speed by adjustment of the restrictor. Adjustment of the restrictor should be such that shaft motion is barely perceptible. The valve remains in continuous motion except when fully open or fully closed.

Installation of valve controller should be arranged so that there can be no accumulation of water in control pipe leading to it. All devices indicated are furnished by Nash Engineering Company. Piping, gate valves and wiring are not included.

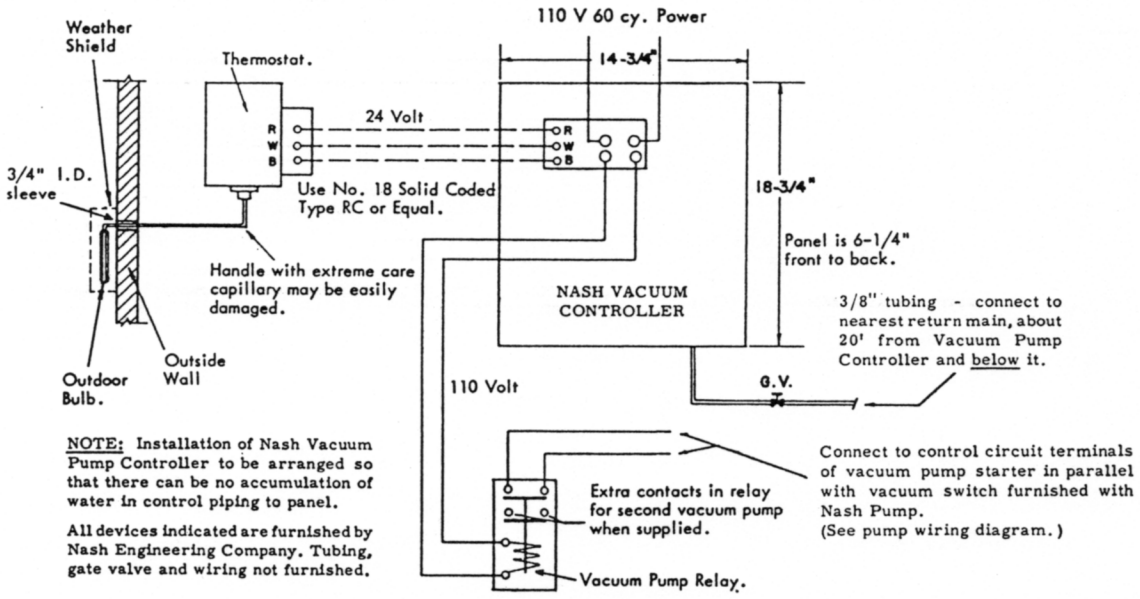


NASH VACUUM PUMP CONTROLLER



NASH VACUUM PUMP CONTROLLER
WITH COVER REMOVED

CONNECTION AND WIRING DIAGRAM.
FOR NASH VACUUM PUMP CONTROLLER AND ACCESSORIES.



NOTE: Installation of Nash Vacuum Pump Controller to be arranged so that there can be no accumulation of water in control piping to panel.

All devices indicated are furnished by Nash Engineering Company. Tubing, gate valve and wiring not furnished.

NASH TYPE CSM VACUUM HEATING PUMPS

Tables 2 and 3 may be used for selecting the correct size CSM unit to meet the water and air capacity requirements of the system. Water pump capacities are in U.S. gallons per minute at 70°F. temperature from 20″ Hg. vacuum against discharge pressure specified. Air pump capacities are in cubic feet per minute of dry air at 70°F. measured at 20″ Hg. vacuum.

Table 2

SERIES	WATER PUMP DISCHARGE PRESSURE FROM 20″ HG. VACUUM													
	10 LBS.		15 LBS.		20 LBS.		25 LBS.		30 LBS.		40 LBS.		50 LBS.	
	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP	GPM	HP
10	7	⅓	—	—	10	½	4	¾	—	—	—	—	—	—
	12	½	12	½	12	¾	12	1	12	1	12	1½	12	2
20	—	—	16	½	20	¾	—	—	—	—	15	1½	14	2
	23	½	23	¾	23	1	23	1	23	1½	23	2	23	3
40	23	½	16	½	20	¾	23	1	12	1	15	1½	14	2
	38	¾	30	¾	36	1	36	1½	30	1½	30	2	—	—
	—	—	—	—	42	1½	—	—	—	—	—	—	—	—
	45	1	45	1	45	2	45	2	45	2	45	3	45	3
60	50	1	50	1½	50	2	50	2	50	3	50	5		
	60	1½	60	2	60	2	60	3	60	3	60	5		
	80	2	80	3	80	3	80	5	80	5	80	5		
	100	2	100	3	100	5	100	5	100	5	100	7½		
100	120	3	120	5	120	5	120	5	120	7½	120	7½		
	150	5	150	5	150	5	150	7½	150	7½	150	10		

Table 3

AIR PUMP PERFORMANCE AT 20″ HG. VACUUM

CFM	SERIES 10	SERIES 20	SERIES 40	SERIES 60	SERIES 100
	MOTOR HP	MOTOR HP	MOTOR HP	MOTOR HP	MOTOR HP
4	½				
10	1				
15	1½	1½			
20	2	2			
28			2		
38			3		
55			5	5	
70				5	5
105				10	10
150				15	15

REVISED PIPING STANDARDS CUT INSTALLATION COSTS

Use of smaller established pipe size standards results in significant savings in piping steam heating systems. These cost reducing methods can be used to great advantage when designing a heating system.

With smaller established pipe size standards and the Nash Synchronized Heating Control, the heating system may be designed for a total pressure drop of 7.5 pounds at 100 percent of heating plant capacity. This total pressure drop consists of the individual pressure drops as shown in Table 4, below. The 7.5 psi design pressure drop is overcome by an average boiler pressure of 4¾ pounds and an average return line vacuum at outside design temperature of 5½" Hg. or minus 2¾ pounds. The recommended boiler pressure range is 4 to 8 psi.

For complete information on pipe sizing and piping connections for steam heating systems refer to the Nash booklet entitled "Advanced Practice in Design of Economical Steam Heating Systems." For additional copies of this booklet write your Nash Representative or write directly to Nash Engineering Co., So. Norwalk, Conn.

Table 5, Page 18 should be used for selection of the Nash Motor Operated Type Primary Control Valve when the smaller established pipe size standards are employed. This Table allows for 2 psi pressure drop through the valve.

Table 4

PRESSURE DROP P.S.I. AT DESIGN CONDITIONS	SYSTEM
2.0	Nash Primary Control Valve
2.5	Steam Mains
1.0	Steam Branches
1.0	Individual Room Control Valves
1.0	Radiation Units
7.5	TOTAL