Table 5

SELECTION OF NASH PRIMARY CONTROL VALVE

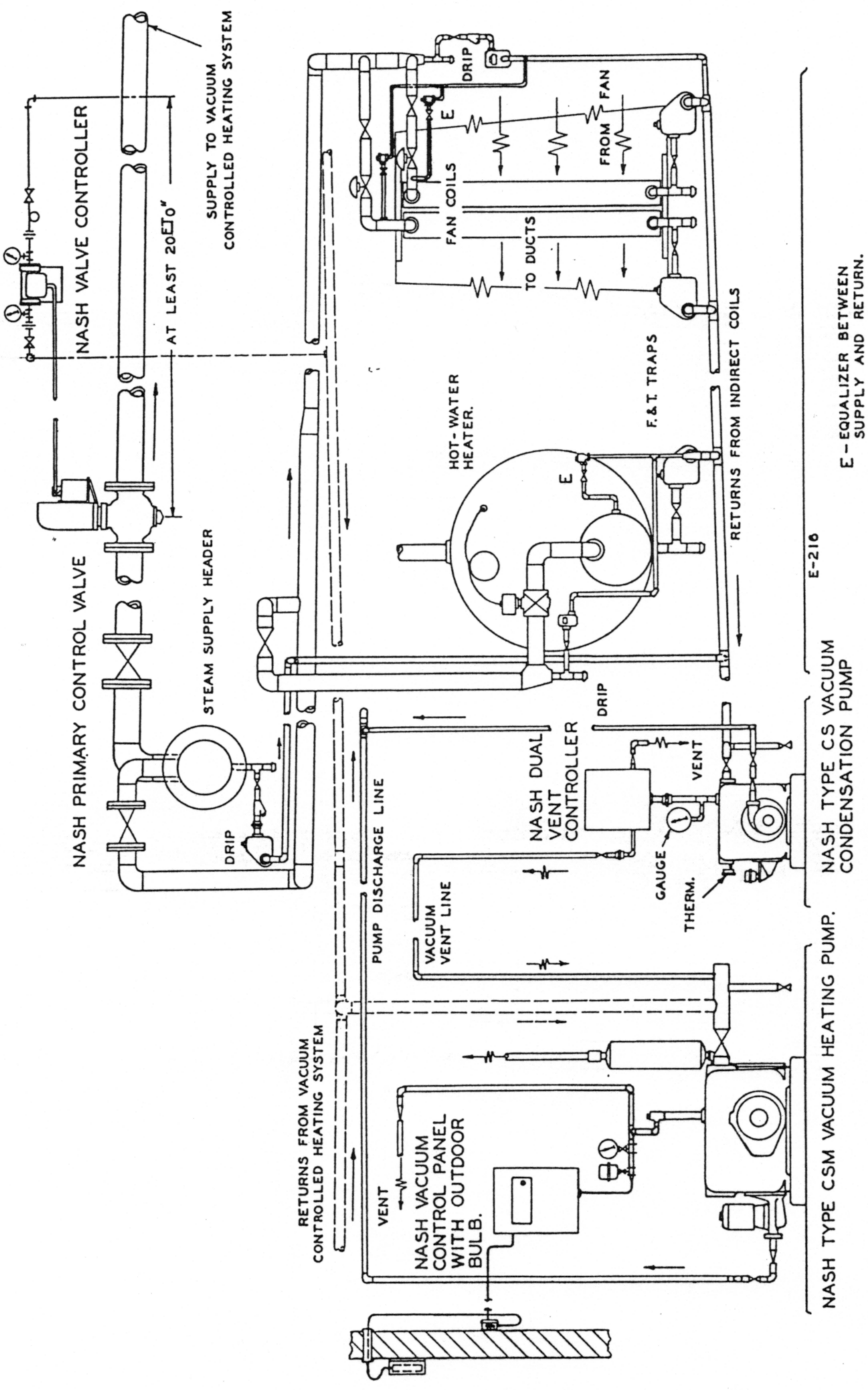
CAPACITY IN POUNDS OF STEAM PER HOUR	VALVE SIZE		CAPACITY IN POUNDS OF STEAM PER HOUR	VALVE SIZE	
	MOTOR OPERATED	PNEUMATIC		MOTOR OPERATED	PNEUMATIC
250	1"	1½"	3,500	4"	5"
500	1½"	2"	4,000	5"	5"
750	2"	2½"	5,000	5"	6"
1,000	2"	3"	6,000	6"	6"
1,250	2½"	3"	7,000	6"	**
1,500	2½"	4"	8,000	*	**
1,750	3"	4"	9,000	*	**
2,000	3"	4"	10,000	*	**
2,500	4"	4"	12,000	*	**
3,000	4"	5"			

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

NASH SYNCHRONIZED HEATING CONTROL WITH DIVIDED HEATING SYSTEM

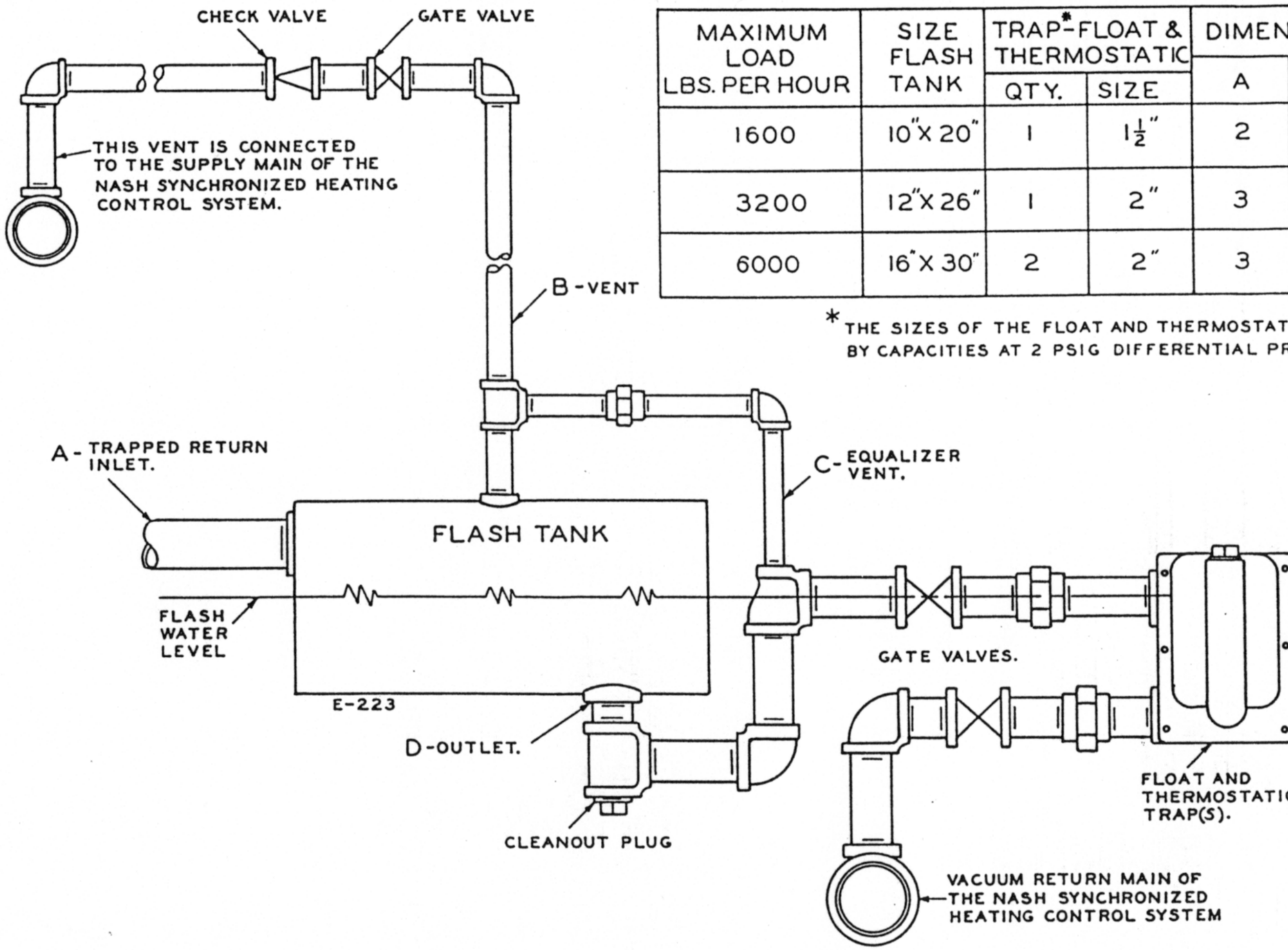
When ventilating fan units and water heaters constitute a large part of the total heating load, it is possible with the Nash Control to divide or split the heating system as shown in Figure 2, thus eliminating the possibility of requiring a separate boiler for this load. Coils of ventilating fans and water heaters are supplied with low pressure steam taken from the steam main ahead of the Nash Primary Control Valve and are regulated by their own thermostatically controlled valves. The condensate from these indirect coils is drained by gravity into the separate Nash vacuum condensation pump which returns the condensate separately to the boilers or boiler feed system. Thus the relatively hot returns from the ventilating fans and water heaters do not interfere with the vacuum operation of the Nash Synchronized Heating Control.

When the total condensate load from the ventilating fan coils and water heaters does not exceed 20 percent of the total heating load, these units may be drained directly into the return side of the direct heating system as shown in Figure 3. This arrangement flashes sufficient condensate



SCHEMATIC DRAWING SHOWING DIVIDED SYSTEM LAYOUT

FIGURE 2



MAXIMUM LOAD LBS. PER HOUR	SIZE FLASH TANK	TRAP*-FLOAT & THERMOSTATIC		DIMENSIONS IN INCHES			
		QTY.	SIZE	A	B	C	D
1600	10"X 20"	1	$1\frac{1}{2}$"	2	1	$\frac{3}{4}$	$1\frac{1}{2}$
3200	12"X 26"	1	2"	3	$1\frac{1}{4}$	1	2
6000	16"X 30"	2	2"	3	$1\frac{1}{2}$	$1\frac{1}{4}$	$2\frac{1}{2}$

*THE SIZES OF THE FLOAT AND THERMOSTATIC TRAPS ARE DETERMINED BY CAPACITIES AT 2 PSIG DIFFERENTIAL PRESSURE.

FLASH TANKS FOR THE NASH SYNCHRONIZED HEATING CONTROL SYSTEM

FIGURE 3

into the supply side of the direct system to reduce the remaining condensate of the indirect system to a temperature corresponding to that existing in the return side of the direct heating system.

With the divided system arrangement, it is possible to provide vacuum drainage to the coils of the ventilating fan units and water heaters. This is accomplished by using the vacuum available in the return side of the Nash Synchronized Heating Control regulated by the Nash Dual-Vent Controller as shown in Figure 2.

The Dual-Vent Controller maintains the maximum vacuum possible without flashing in the vacuum condensate unit and the indirect return lines draining to it. This vacuum is regulated by the temperature of the returns and varies inversely with it. The vacuum condensate unit is vented to atmosphere by the Dual-Vent Controller whenever the temperature is too high to carry any vacuum without flashing.

With the Dual-Vent Controller the efficiency of ventilating fan units and hot water heaters is increased by assured drainage of condensate. Condensate is not held in the coils by the induced vacuum created by condensing steam. Also the conventional drop-leg of 12″ to 18″ from the coils to the traps is not required.

Longer coils may be used with assurance that steam will be evenly distributed throughout the coils by expansion due to the vacuum. Multi-zone fan units, in particular, will produce more uniform temperatures at all outlets.

Vacuum condensate drainage provided by operation of the Dual-Vent Controller greatly reduces the possibility of water hammer and coil freezing.

SPECIFICATION FOR DIVIDED SYSTEM

The basic specification on Pages 6 and 8 covering a Nash Synchronized Heating Control should be used. The air capacity of the vacuum pump of the Nash CSM vacuum heating unit should be increased 1/3 cfm per 1000 square feet EDR for the load of the ventilating fan coils and water heaters.

The following specifications should be added:

The coils of the ventilating fans, water heaters, and hot drips from sources other than the Nash Synchronized Heating Control shall drain by gravity into a Nash duplex vacuum condensation pump equipped with a Dual-Vent Controller. This Controller shall maintain the maximum vacuum possible without flashing in the vacuum condensate unit and the indirect return lines draining to it. This vacuum shall be regulated by the temperature of the returns and shall vary inversely with it. The vacuum condensate unit shall be vented to atmosphere by the Dual-Vent Controller whenever the temperature is too high to carry any vacuum without flashing. Connect a ¾″ vacuum vent line to the top of the nearest Nash Synchronized Heating Control return main and a ¾″ atmospheric vent line to a floor drain. The Controller is connected to the vacuum condensation pump tank by a 1¼″ connection.

The vacuum condensation pump shall be a Nash size ______ duplex unit designed for high vacuum operation. Each pump shall have a capacity of _____ gpm from 20″ Hg. vacuum to ____ lbs. discharge pressure at the pump when the condensing load is lowest, and at least 50 percent more capacity at full load when no vacuum exists in the unit. Each pump shall be direct connected to a ____hp, ______ phase, ____cycle, _____volt drip-proof motor. The pumps shall be mounted on a cast iron receiver, which shall be complete with two float switches, compound gauge, gauge glass and cocks. The unit shall also include two magnetic starters for wall mounting and one Nash Dual-Vent Controller for mounting on the receiver and connected to a single phase, 60 cycle, 230 volt circuit.

All automatic steam coil-valves and traps shall function satisfactorily with 20″ Hg. vacuum in the fan coils; all returns shall flow by gravity to inlet of pump receiver without lifts or pockets, and the vacuum vent line shall be properly graded to eliminate pockets.

The above specifications may be modified for a single unit instead of a duplex unit or for units with totally enclosed motors or combination starters. Wiring for the Nash vacuum condensation unit should be included in the electrical specifications as well as wiring from a 230 volt, 60 cycle, single phase circuit to the Dual-Vent Controller.

Table 6

SELECTION TABLE FOR NASH TYPE CS VACUUM CONDENSATION PUMPS

SERIES	CAPACITIES		DISCHARGE PRESSURE IN POUNDS PER SQUARE INCH (WITH 20" HG. VACUUM IN RECEIVER)							
	SQ. FT. EDR	*GPM FROM 20" HG. VAC.	10		20		30		40	
			PUMP	HP	PUMP	HP	PUMP	HP	PUMP	HP
10	2,000	2	D220V	1/3	D230V	1/2	D240V	1	D250V	1 1/2
	4,000	4	D420V	1/3	D430V	1/2	D440V	1	D450V	1 1/2
	6,000	6	D620V	1/3	D630V	1/2	D640V	1	D650V	1 1/2
20	8,000	8	D820V	1/2	D830V	1/2	D840V	1	D850V	1 1/2
	10,000	10	D1020V	1/2	D1030V	3/4	D1040V	1	D1050V	1 1/2
40	15,000	15	D1520V	1/2	D1530V	3/4	D1540V	1 1/2	D1550V	1 1/2
	20,000	20	D2020V	1/2	D2030V	1	D2040V	1 1/2	D2050V	2
	25,000	25	D2520V	3/4	D2530V	1	D2540V	1 1/2	D2550V	2
50	30,000	30	D3020V	1	D3030V	1	D3040V	2	D3050V	3
	40,000	40	D4020V	1	D4030V	1 1/2	D4040V	2	D4050V	3

*Pump Capacities listed in table are for lowest condensing loads.

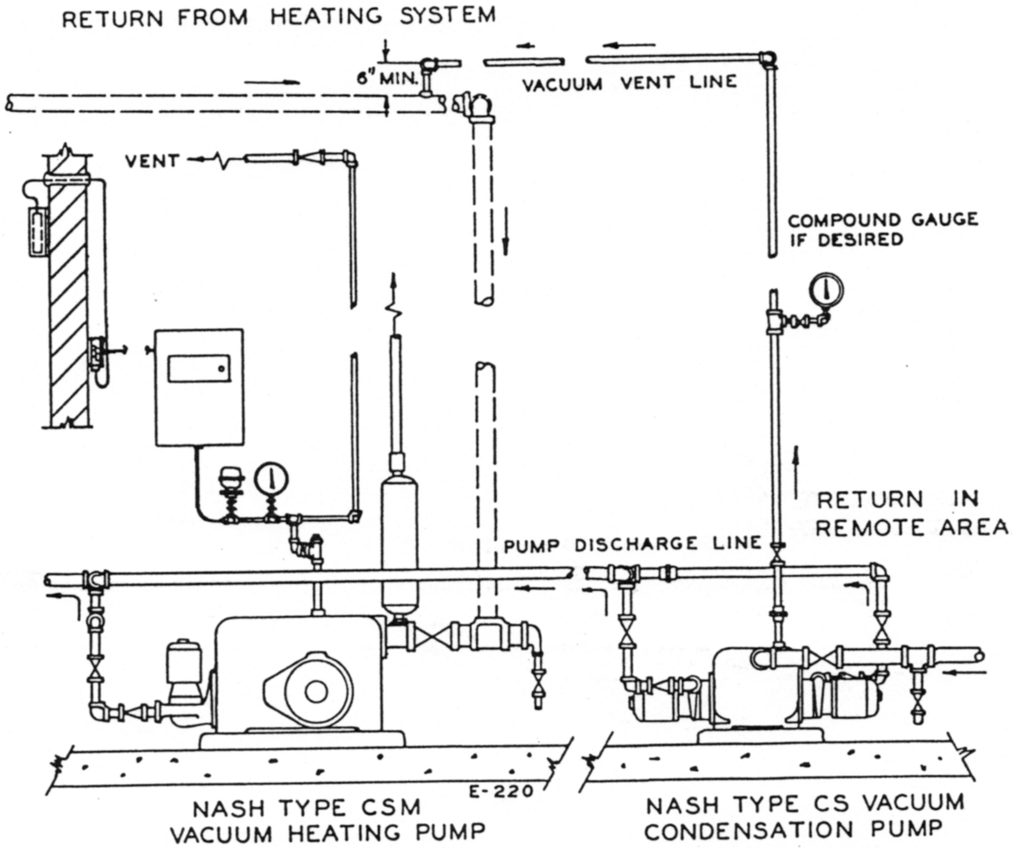
Each pump has approximately 50 percent more capacity when there is no vacuum in the receiver. This occurs when the load is maximum. Units for larger capacities and higher pressures can be furnished. Single unit size designation starts with the letter S instead of D.

NASH SYNCHRONIZED HEATING CONTROL WITH REMOTE AREA DRAINAGE

With the Nash Synchronized Heating Control, it is easy to provide for returns from remote sections of buildings or separate buildings where gravity returns are not possible. A Nash vacuum condensation pump is located in the remote section or building into which the returns are drained. This arrangement is shown in Figure 4.

One or more vacuum condensation pumps may be used. Each unit discharges its condensate to the pumped condensate return line and thence to the boilers or boiler feed system. Each vacuum condensation pump and the return lines draining to it are maintained under the same vacuum conditions as the rest of the Nash Synchronized Heating Control by connecting the vacuum condensation pump tank to the top of the nearest Nash Synchronized Heating Control return main.

Selection of the Nash vacuum condensation pump can be made from the pump table in the preceding section. The water capacity of the unit is



DRAINING REMOTE SECTION

FIGURE 4

determined on the basis of 1 gpm per 1000 square feet EDR. The air capacity required by the remote radiation should be included in the air capacity calculated for the Nash CSM vacuum heating unit, since the CSM unit is handling the air requirements for the entire system.

The vacuum vent line between the vacuum condensation pump and the return main is sized as indicated in Table 7. For runs over 100 feet, the line should be increased one pipe size over that shown.

Table 7

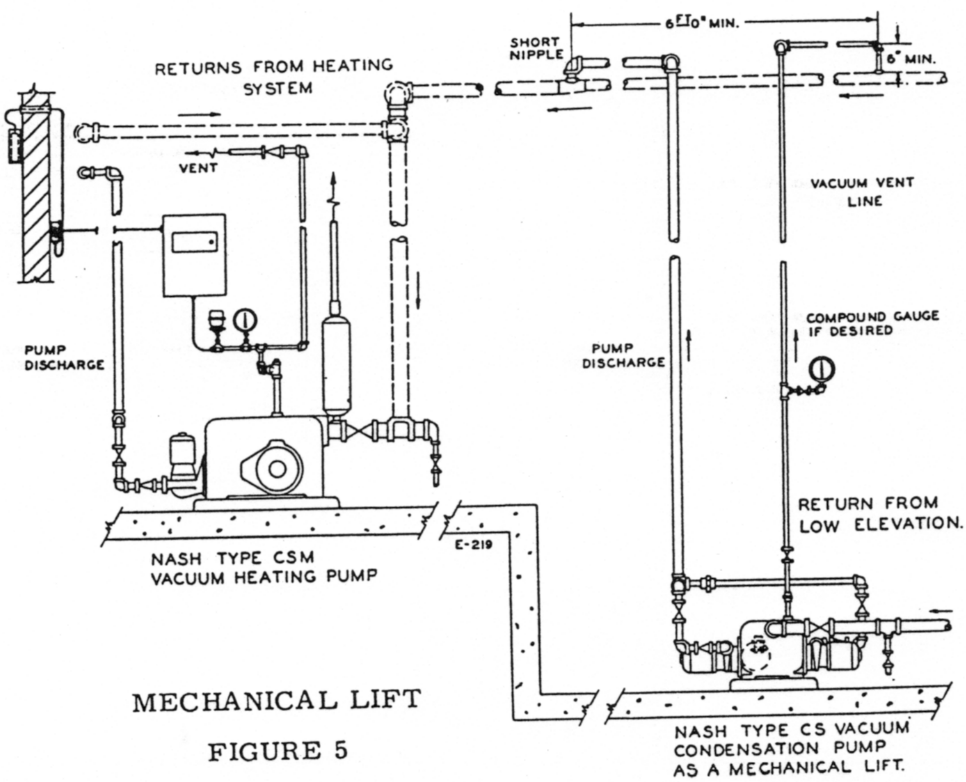
SQ. FT. EDR	SIZE OF VACUUM VENT LINE	SQ. FT. EDR	SIZE OF VACUUM VENT LINE
2,000	¾"	15,000	1"
4,000	¾"	20,000	1¼"
6,000	¾"	25,000	1¼"
8,000	1"	30,000	1½"
10,000	1"	40,000	1½"

NASH SYNCHRONIZED HEATING CONTROL WITH MECHANICAL LIFT

When it is necessary to raise small amounts of condensate from low returns that are below the gravity return level, a Nash vacuum condensation pump is used as a mechanical lift as shown in Figure 5. This eliminates the necessity of lowering the entire return main and the Nash vacuum heating pump as well, to meet required gravity drainage. The Nash vacuum condensation pump is vacuum vented to the nearest Nash Synchronized Heating Control return main, and discharges its condensate into the top of the same return main. The return main is sized to accommodate this added load.

The discharge head of the Nash vacuum condensation pump, used as a mechanical lift, is only the static head plus the friction in the discharge line, because the same vacuum exists in both the mechanical lift and in the vacuum return line into which it discharges.

It is not recommended that the mechanical lift be for over 5000 square feet EDR. For larger amounts of radiation, it is advisable to discharge the condensate from the Nash vacuum condensation pump directly into the Nash CSM vacuum heating pump or into the pumped condensate discharge line of the CSM pump.



MECHANICAL LIFT

FIGURE 5