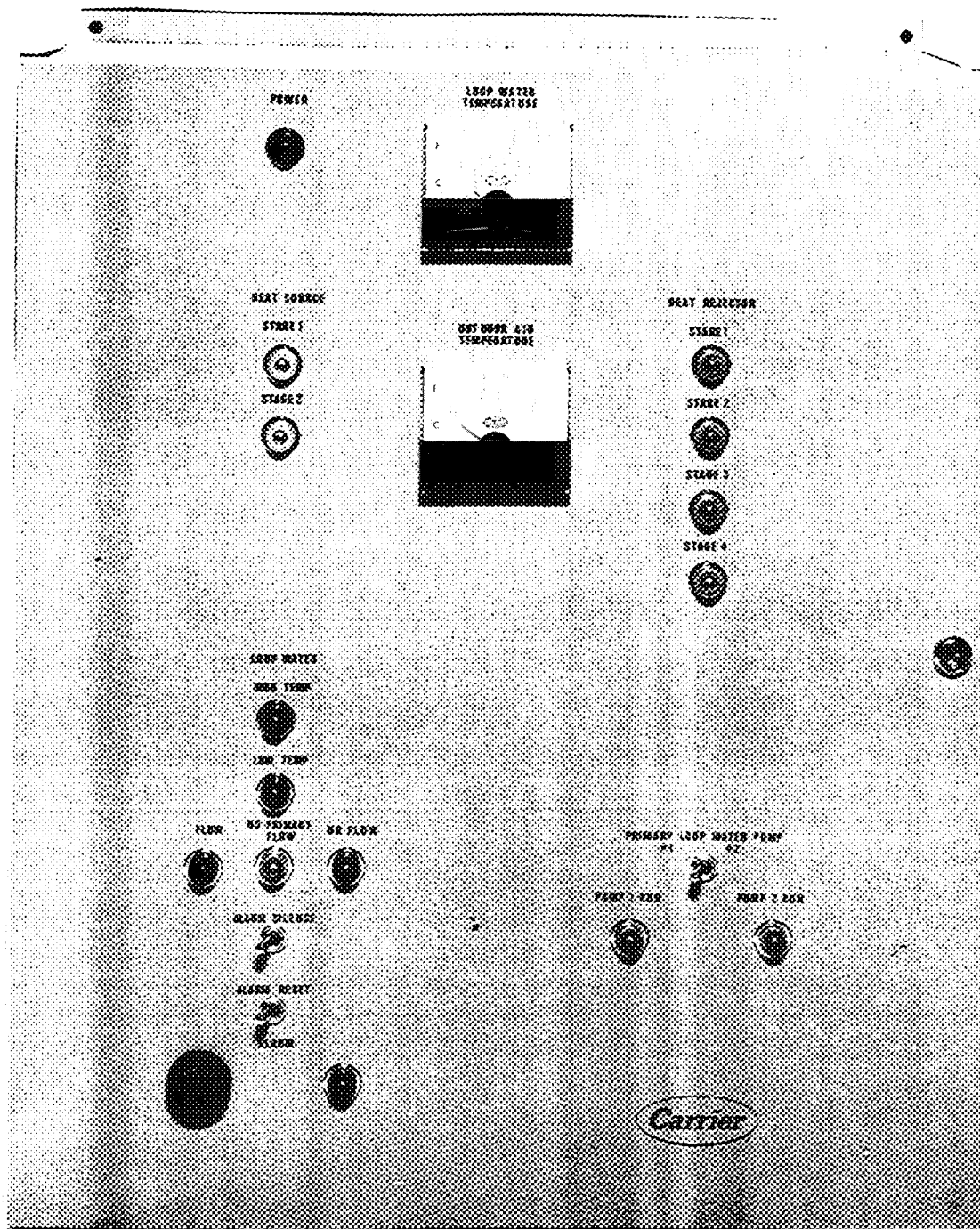


LOOP CONTROL PANEL



Book	1	4
Tab	5a	5a

Product Description

Carrier's loop control panels have been designed, factory assembled and tested to provide accurate, staged control of heat rejection and supplementary heat equipment. Its basic function is to monitor and control conditions within a building's - water source heat pump's - water loop while automatically initiating the following functions:

- Energizes up to 4 stages of cooling tower control when water temperature exceeds the adjustable setpoint say 90°F. Panels are available with up to 6 stages of heat rejection capability.
- Energizes up to 2 stages of supplementary heat when the loop water temperature exceeds the adjustable setpoint say 60°F. Panels are available with up to 4 stages of supplementary heat control capability.
- Automatic pump sequencer circuit starts the stand-by pump in the event of loss of water flow.
- Pilot lights for normal system status. Pre-alarm and alarm functions are supplemented with an audible alarm and silencer switch.
- A master lock out relay circuit activated in the event of extreme abnormal system conditions. The central shutdown circuit will provide a signal for de-energized all water source heat pumps through a central control system. Central shutdown eliminates any possibility of having to manually reset individual WSHP units throughout a building.
- After the cause of any abnormal condition has been rectified, the controllers manual reset provides a central start-up signal to a central WSHP control system.
- Temperature indication in Fahrenheit and Centigrade scales on the panel enclosure.

Accessories/Options

Additional Stages of Heat Rejection and Supplementary Heat -

Up to 6 stages of rejection (4-std.)

Up to 4 stages of supplemental heat (2-std.)

Outdoor Temperature Reset - For extreme outdoor temperature conditions, this factory-installed option automatically resets supplementary heat source setpoint so that a building's comfort level is maintained.

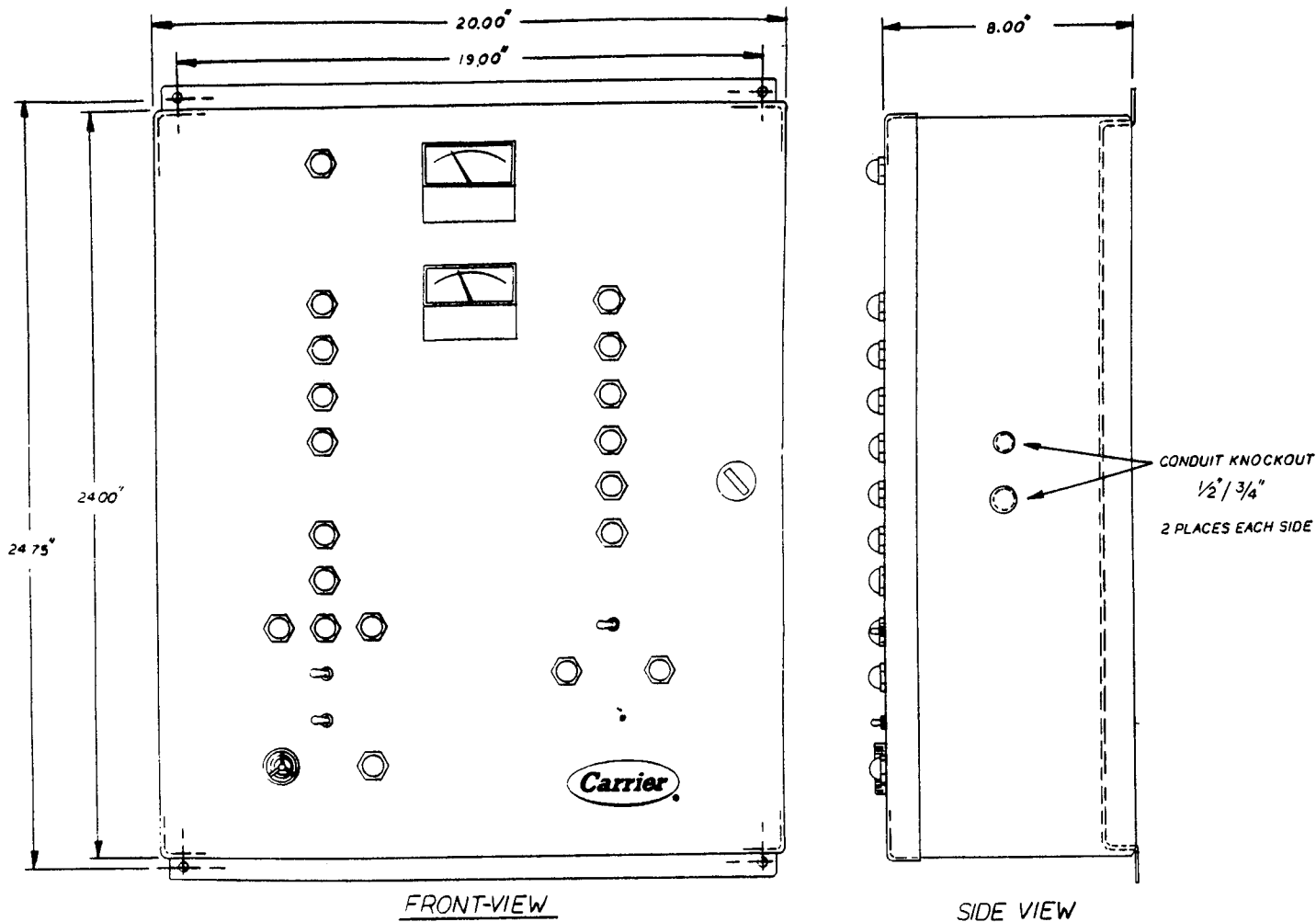
Test Simulator - Can be factory or field installed to simulate water loop flow conditions and outdoor and loop temperature conditions. The simulator is a convenient tool for fine-tuning the control and verifying its proper operation.

Repeater Panels - Available in two designs, repeater panels provide remote indication of water loop conditions including status of heat rejection, pumps and supplementary heat equipment, pre-alarms, alarms and temperature(s).

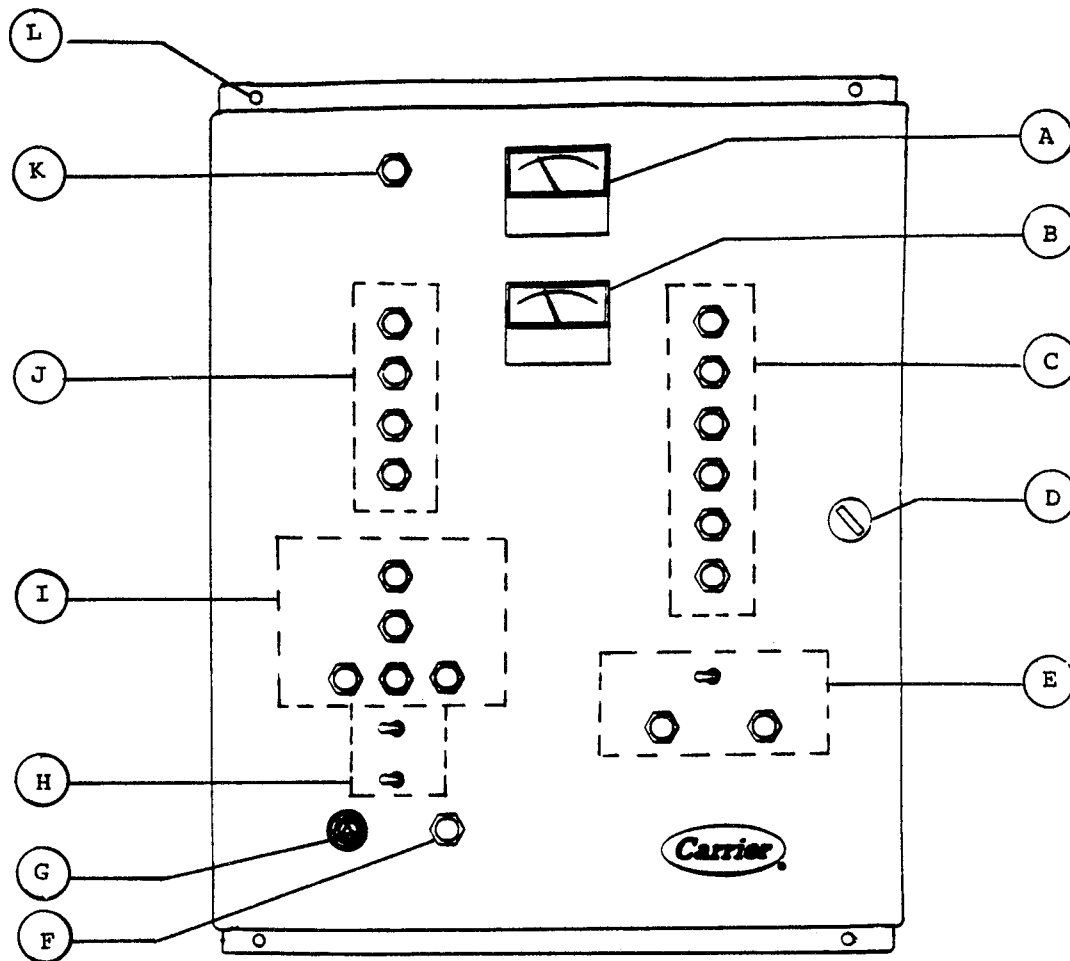
Flow Switches and Temperature Sensors for water loop and outdoor air sensing.

Push to Test Lamp Switch - A convenient service tool to test for defective pilot lights.

PHYSICAL DIMENSIONS



TYPICAL PANEL



A. Dual-Scale Water Temperature Indicator

B. Dual Scale Outdoor-Air Temperature Indicator

C. Heat Rejector Indicators

D. Door Key-Lock

E. Circulating Pump Selector Switch and Indicators

F. Alarm Indicator

G. Audible Alarm

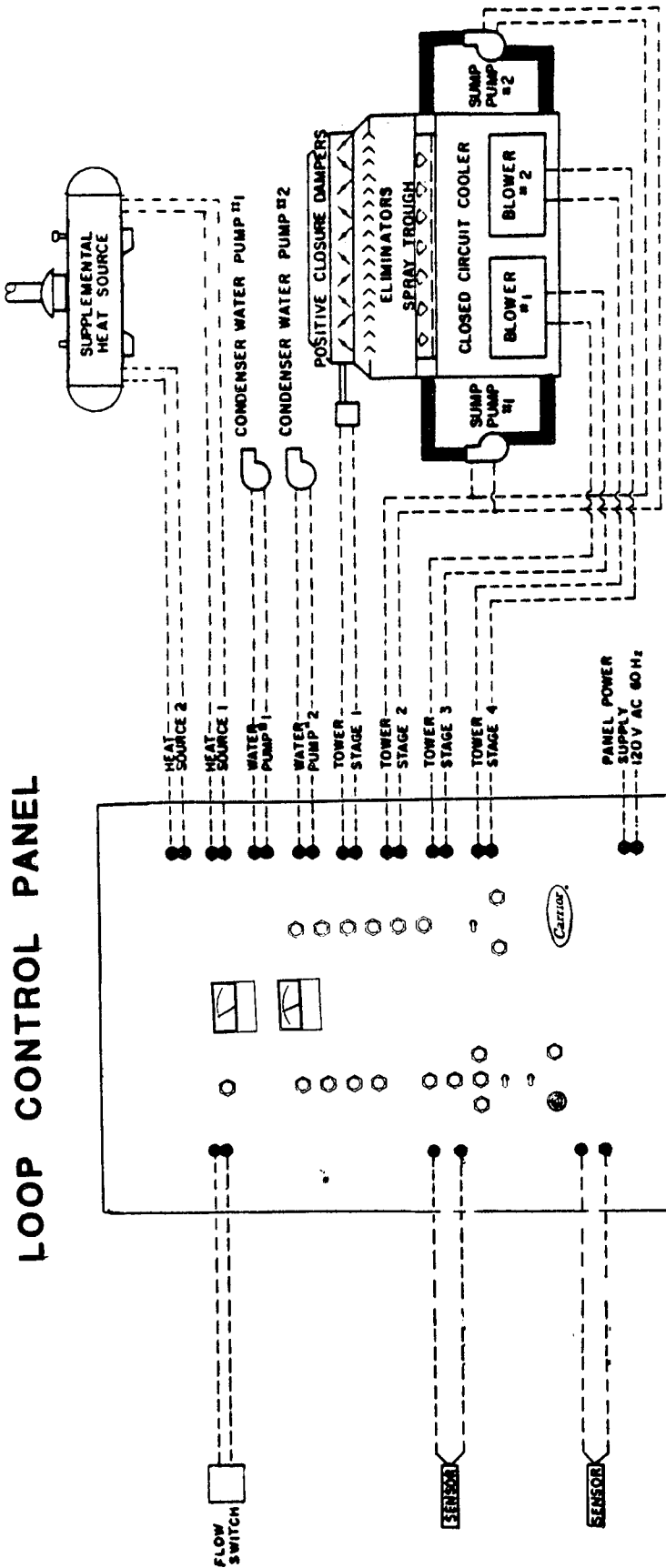
H. Alarm Reset and Silence Switch

I. Temperature and Flow Alarm Indicators

J. Heating Supply Indicators

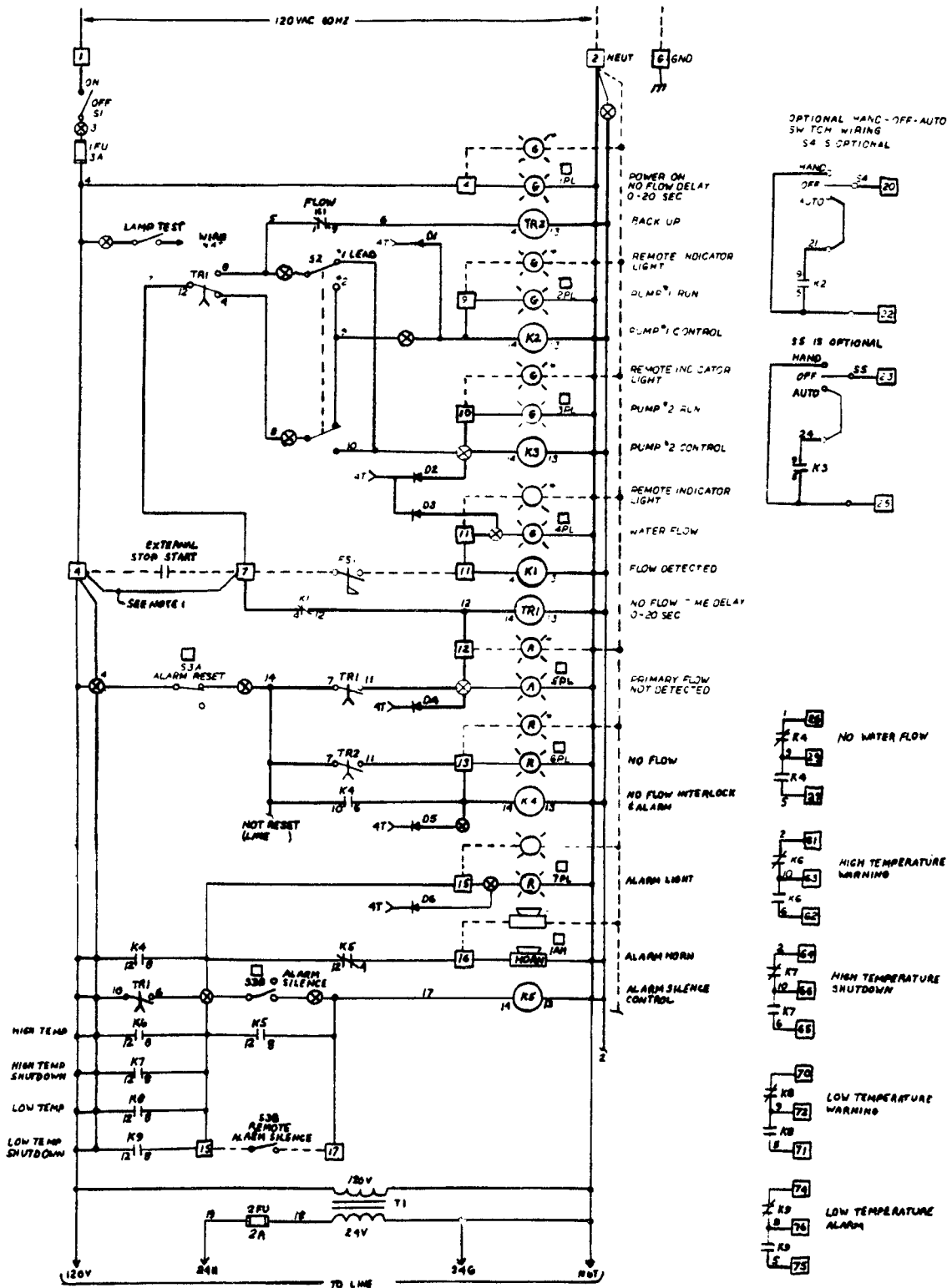
K. Power Supply Indicator

L. Monitoring Holes



TYPICAL INSTALLATION

WIRING DIAGRAM



Note 1 Remove Jumper For External Control

CARRIERS 50HQ,VQ,BQ

LOOP CONTROL PANEL

GUIDE SPECIFICATIONS

PART I - GENERAL

1.01 SYSTEM DESCRIPTION

- A. Solid state electronic control panel for the use in conjunction with Carrier's water source heat pumps and central water supply system.

1.02 WARRANTY

- A. Manufacturer (Carrier) shall warrant product to be free from defects in material and workmanship under normal use and service, and manufacturer (Carrier) will, within one year from date of original installation, repair or replace without cost to the original customer any part, assembly or portion thereof which shall be returned to our factory, transportation charges prepaid, and which our inspection shall show to be thus defective. This one year warranty plan does not apply to any parts not supplied or designated by manufacturer (Carrier). This warranty applies only to manufacturer's (Carrier) products installed within the boundaries of continental United States, Canada and Hawaii.

Under the terms of this warranty, manufacturer (Carrier) assumes no responsibility for the labor cost involved in removal of defective part or installation of new part, or any service charges. Nor shall manufacturer (Carrier) be liable for any injury, loss or damage (direct, indirect or consequential) arising out of the use or inability to use the product. This warranty is in lieu of all other warranties, expressed or implied.

PART II - PRODUCTS

2.01 EQUIPMENT

A. General:

Factory tested and assembled, single piece solid state electronic control panel.

Panel controls the addition of supplementary heat, and heat rejection in stages. Indicates status, alarms, sequence of circulating pumps and provides temperature indication.

B. Features:

- (1) Control panel shall indicate the operating mode(s) of the supplemental heat source and cooling rejector stages through visible indicator lights located on exterior panel. Supplemental heat indicator (white) cooling rejector indicator (amber).
- (2) Control panel shall indicate high, low limit temperature, high, low temperature shut down, no primary flow and no flow conditions through visible and audible indication located on exterior panel. Visible indication through (red) indicator light, and audible indication through 70 db exterior alarm.
- (3) Control panel shall indicate the acceptance of 120 volt 60 Hz power supply through indication of (green) indicator located on exterior panel as well providing a internal master power switch to interrupt main power for ease of service and installation.

- (4) The Control Panel cabinet shall be a NEMA 1 approved enclosure, having appropriate knockouts on all sides for all necessary field wiring. Panel shall also contain lockable access door to prevent unauthorized entrance.

- (5) Control panel shall have an accessible internally mounted terminal board labeled for all necessary field wiring of switches, power supply, repeater panel and all other available options.

- (6) Control panel shall have a factory mounted temperature indicator in F&C degree, temperature range (50-100) degrees F (10-37.8) degree C for loop temperatures as well as an (optional) outdoor temperature indicator ranging from (-40 to 120) degrees F (-40 to 49) degrees C

- (7) Control panel shall contain factory installed primary and secondary in line fuse protection to protect all internal electrical components.

- (8) Control panel shall consist of individual replaceable electrical assemblies and plug-in-relays for ease of maintenance and field replacement eliminating the need for soldering.

- (9) Control panel shall contain provisions to activate a remote signal if shutdown conditions occur. Signal may be relayed to the water source heat pumps system controller, which will eliminate individual unit lock-out conditions and a need to reset manually.

- (10) Control panel shall contain exterior manual water loop circulating pump switch to alternate from lead to standby pump operation to provide equal pump wear for longer pump life.

- (11) Control panel shall contain an exterior mounted alarm silencer switch to provide temporary silence during an alarm condition as well as supplying an alarm reset switch to provide system reset only after alarmed condition is corrected.

- (12) Control panel shall have provisions to prevent electrical demand surges upon restoration of power after failure by sequentially starting all required stages of heat rejector or supplementary heat.

- (13) Panel shall have interface provisions for remote repeater indication.

- (14) Panel shall have interface provisions to facilitate electronic water loop sensor, outdoor sensor, and loop flow switch. (Accessories)

C. Controls:

I. Heat Rejection:

- (1) The heat rejector circuit shall provide as standard four independent stages of heat rejection. First stage shall activate at a factory set point of 83 degree F (28.3C), adjustable plus or minus 10 degree F. Indication of energized first stage through indicator light (amber).
- (2) The second stage shall be activated at an increase of 2 degrees from the first stage setting and activating second stage indicator light (amber).
- (3) The third stage shall be activated at an increase of 2 degrees from the second stage setting and activating the third stage indicator light (amber)

- (4) The fourth stage shall be activated at an increase of 2 degrees from the third stage setting and activating fourth stage indicator light (amber).
- (5) On a decrease in water loop temperature, the sequence shall take place in reverse order at no more than 2.5 degrees differential between stages.

II. Heat Supply

- (A) The supplemental heat circuit shall be provided as standard two independent stages of supplemental heat. The first stage shall activate at a factory set point of 65 degrees F (18.3) degrees C, adjustable plus or minus 5 degrees F. Indicator first stage light (white) activated.
- (B) The second stage shall be activated at a decrease of 2 degrees from the first stage setting and indicator second stage light (white) activated.

III. Automatic Pump Sequencing

- (A) Control panel shall automatically energize the standby circulation pump whenever main pump failure has occurred for a factory set at 15 seconds.
- (B) Indication of energized lead or standby circulation pump shall be indicated on exterior control panel through (amber) indicator light.

IV. Safety Functions

- (A) If loss of flow is indicated, no flow indicator light (red) and audible alarm will be energized.
- (B) If no flow condition exists after 15 seconds stand-by pump will automatically energize leaving alarm and (RED) light energized on lock out.
- (C) If no flow condition exists after an additional 15 seconds (total 30) system will shutdown, on lock-out still sounding an audible and visible alarm (red).
- (D) On water loop temperature rise to a factory set point of 100 degrees F, indicator light (red) and audible pre-alarm will be activated.
- (E) On a continuing loop temperature rise to a factory set point of 105 degrees F indicator light and audible alarm will continue to be activated along with energizing a SPDT relay creating a master shutdown and lock out condition.
- (F) On water loop temperature decrease to 55 degrees, indicator light (red) and audible pre-alarm will be activated.
- (G) On continuing loop temperature decrease to 50 degrees indicator light and audible alarm will continue to be energized along with energizing a SPDT relay creating master shutdown and lock out condition.
- (H) After the cause of the flow interruption has been eliminated or when extreme temperature conditions have ceased, system may be reset by manually deactivating the lock-out circuit through exterior mounted switch.

D. Accessories/Options:

- A. Expanded Controller:
Shall be a 10 stage controller to provide 4 independent stages of heat supply and 6 independent stages of heat rejection and supply all visible and audible indications.
- B. Test Simulator Package:
Shall be a field installed package to simulate loop and outdoor temperatures as well as flow and no flow conditions to assure proper controller operation.
- C. Outdoor Temperature Reset:
Shall automatically reset the supplementary heat source set-point when a predetermined outdoor temperature is reached.
- D. Flowswitch:
Shall be a "flow" or "no flow" type switch with 1" N.P.T. mounting connections and 1/2" N.P.T. electrical conduit connection.

Switch may be used in piping systems from 1" and up.
- E. Loop Sensor:
Shall be a 1000 OHM temperature sensitive resistant type capable of -40 to 250 degree F operation
- F. Outdoor Sensor:
Shall be a 1000 OHM temperature sensitive 5" cartage type capable of -40 to 240 degree F operation.
- G. Repeater Panel A:
Shall provide all audible and visible functions and features as main controller.
- H. Repeater Panel B:
Shall provide visible indication of power, high, low temperature, no flow and standby pump operation as well as audible alarm and silencer switch. Shall be in a lockable enclosure to prevent unauthorized entrance.
- I. Remote Maintenance Panel:
Shall provide warning indicator light (red), sound audible alarm with silence switch.
- J. Push to Test Lamp Switch:
Shall provide a test of all visible lamp indicators through the activation of an interior mounted switch.