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CARRIER**

Commercial Division  
Carrier Corporation

BULLETIN: CA-SB-19-C-67-34  
DATE: 4/6/67  
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## SERVICE BULLETIN

SUBJECT:  
19C CONTROL MODULE REPLACEMENT

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**PURPOSE:** To transmit information on installing and calibrating Barber-Colman Control Module, Carrier Part No. 19P47-236 supplied as a Service Part replacement for Barber-Colman Control Module, Carrier Part No. 19P47-1543.

**MACHINES  
AFFECTED:** 19C machines shipped prior to February, 1961, with approximate machine serial number 5200 and lower, having original Barber-Colman controls (Figure 1).

**PROCEDURE:** A new control (Figure 2), Carrier Part No. 19P47-236 has been designed to replace control module, Carrier Part No. 19P47-1543, which is no longer available.

The new control chassis consists of chilled water and motor overload modules plus a third module containing the vane position (capacity) indication circuit, the refrigerant reset push button, and slave relays for operating the solenoid valves. The modules are mounted on a common base and are harness wired to female plugs so the new control can be mounted and plugged in similar to the original style control. A wiring change must be made to the terminal board on the back of the purge console. The change is explained in detail in this bulletin.

### Exchanging Control Chassis

1. De-energize power source to machine.
2. Disconnect B plug to control panel and C plug to terminal panel, Figure 1.
3. Unbolt and remove old chassis from console.
4. Bolt in new chassis and connect B and C plugs (Figure 2).
5. Set capacity control switch (Item 6, Figure 2) to auto position. The capacity control switch on the new style module may be left in the auto position at all times. Manual control of vanes will be obtained the same as before conversion through the use of "higher" (Item 6, Figure 4) "lower" (Item 12, Figure 4) and capacity control (Item 11, Figure 4).



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NOTE: Manual control may also be obtained by leaving the capacity control (Item 11, Figure 4) on the "thermostatic" position and operating the vanes with the capacity control switch (Item 6, Figure 2) on the chilled water amplifier module.

6. Remove cover on back side of console exposing terminal strip shown in Figure 3.
7. Remove orange wire with green tracer from terminal ground mounting screw, Figure 3, and connect to terminal 26.

NOTE: Color codes may not all be as shown. Locate proper wire by checking continuity to pin 4 of C male Jones plug shown in Figure 3.

8. Remove jumper connecting terminals 26, 28 and ground mounting screw, Figure 3.
9. Install jumper from terminal 28 to ground mounting screw as per Figure 3.
10. Calibrate vane indicator, motor load control and chilled water amplifier as follows:

### CALIBRATING VANE INDICATOR (ZERO AND SPAN ADJUSTMENT)

The adjusting screws are shown in Figure 2. They synchronize the capacity indicator with the prewhirl vane position. Adjustments should be made before the initial start-up, as follows:

1. With power to control console de-energized, connect a jumper between terminals 3 and 18 on back of console.
2. Remove covers over terminal connections on control modules.
3. Energize power to console and turn electronic control switch (Item 8, Figure 4) to "on" position.
4. Set voltmeter on 3 volt-AC scale and connect to terminals TR (Item 13, Figure 2) and TC (Item 14, Figure 2) on chilled water amplifier.
5. Turn full scale adjustment (Item 5, Figure 2) full clockwise.
6. Start the oil pump, using manual switch in the lower console.



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7. With capacity control switch (Item 6, Figure 2) in "auto" position and capacity control switch (Item 11, Figure 4) in "manual" position, close vanes completely by pressing "lower" button (Item 12, Figure 4) and holding until vanes are completely closed. Vanes are closed when voltmeter pointer discontinues moving to the left. It will read approximately 1 1/2 volts.
8. Adjust zero scale (Item 4, Figure 2) until pointer on capacity indicator meter (Item 5, Figure 4) pointer indicates zero percent or "lower".
9. Turn full scale adjustment (Item 5, Figure 2) full counterclockwise.
10. Change voltmeter to 12 volts AC scale.
11. Press "higher" button (Item 6, Figure 4) and hold until voltmeter pointer discontinues moving to the right (approximately 3 1/2 volts). The button should be held in about four minutes.
12. Adjust full scale (Item 5, Figure 2) until capacity indicator (Item 4, Figure 4) pointer indicates 100% or "higher" position.
13. Alternately close and open vanes manually, re-adjusting zero and full scale screws for accuracy. Two or three cycles will be sufficient.
14. De-energize power, set oil pump switch on automatic, remove voltmeter from terminals TR and TC and remove jumper between terminals 3 and 18.

### CALIBRATING MOTOR OVERLOAD CONTROL

1. Set electrical demand control knob (Item 21, Figure 2) to 100%.
2. Connect voltmeter to terminals B (Item 15, Figure 2) and C (Item 16, Figure 2) of the motor load control.
3. Place a clamp-on ammeter on one of the three starter leads to observe motor amperage.
4. Turn CR1 (Item 7, Figure 2) and CR2 (Item 8, Figure 2) screws full clockwise.
5. Energize power and press start button to start compressor.



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6. With capacity control switch (Item 11, Figure 4) on manual, open vanes using "higher" button (Item 6, Figure 4). At 100% load, voltmeter should read between 0.45 volts and 0.55 volts. If reading is below 0.45 volts, there may be insufficient adjustment in the calibration potentiometers, so voltage signal should be increased. To increase reading, the load register on current transformer in starter cabinet must be resized.
7. Increase loading of machine. When current reaches 105% of full load amperage, turn CRL calibration screw CCW until vanes begin to close. This can be observed by CRC relay (Item 18, Figure 2) becoming energized.
8. Again load machine using "higher" push button. As vanes are opening, adjust CR2 so the vanes will stop opening at 100% load as read on the clamp-on ammeter. This can be observed by the CRO relay (Item 17, Figure 2) dropping out.
9. Recheck settings by loading machine and reading the clamp-on ammeter. Machine should continue to load up until current reached 100% at which time vanes should stop opening.
10. In order to obtain 105% load (after CR2 has been adjusted), it will be necessary to add a jumper to terminals D (Item 20, Figure 2) and E (Item 19, Figure 2) of the motor load control module. At 105% current, CRC relay should energize to drive the vanes closed until the current drops to approximately 103%. Be sure to remove the jumper placed on D and E.

### CALIBRATING CHILLED WATER AMPLIFIER (COMPRESSOR OPERATING)

1. Rotate throttling range screw (Item 2, Figure 2) clockwise, 1/3 of its total travel from the counterclockwise stop.
2. Operate vanes manually until chilled water temperature drops to design temperature. Capacity control switch, (Item 11, Figure 4) should be in "manual" position and Capacity Control Switch (Item 6, Figure 2) on Chilled Water module, should be in "auto" position.
3. Set chilled water thermostat on console panel (Item 7, Figure 4) to center of dial.



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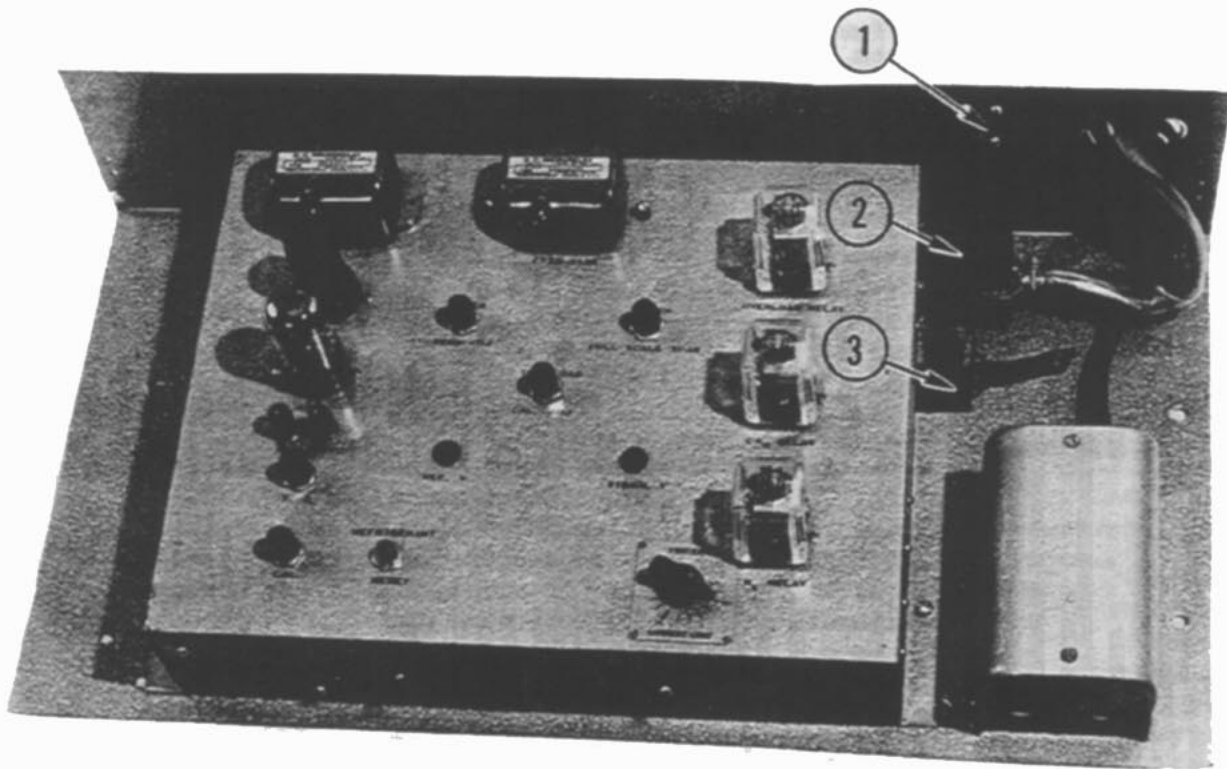
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4. Connect voltmeter (12 volt scale) between terminals "T" (Item 9, Figure 2) and "X" (Item 10, Figure 2) on chilled water amplifier. (Connect "common" plug to terminal "X".)
5. Adjust temperature bridge calibration screw (Item 3, Figure 2) until a "null" voltage (minimum voltage) is reached.
6. Adjust capacity balance screw (Item 1, Figure 2) until a further "null" is reached. Repeat steps 5 and 6. "Null" voltage should be from 0 to 1 volt when adjusted.
7. Remove voltmeter from terminals "T" and "X".
8. Place capacity control switch (Item 11, Figure 4) to "thermostatic" position and observe control and machine operation. If chilled water temperature "hunts", add throttling range by rotating throttling range screw, (Item 2, Figure 2) clockwise one or two degrees. (See note). If throttling range is added, it will be necessary to recalibrate as in steps 2 through 6.

NOTE: The total throttling range adjustment (full counterclockwise to full clockwise) is 10F. If machine normally operates at less than full vane opening at full load, more than 3 degrees (1/3 total travel of adjustment screw) throttling range may be necessary.

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**Original Control Module.**

- 1. A Female Plug
- 2. C Male Plug
- 3. B Male Plug

**FIGURE 1**



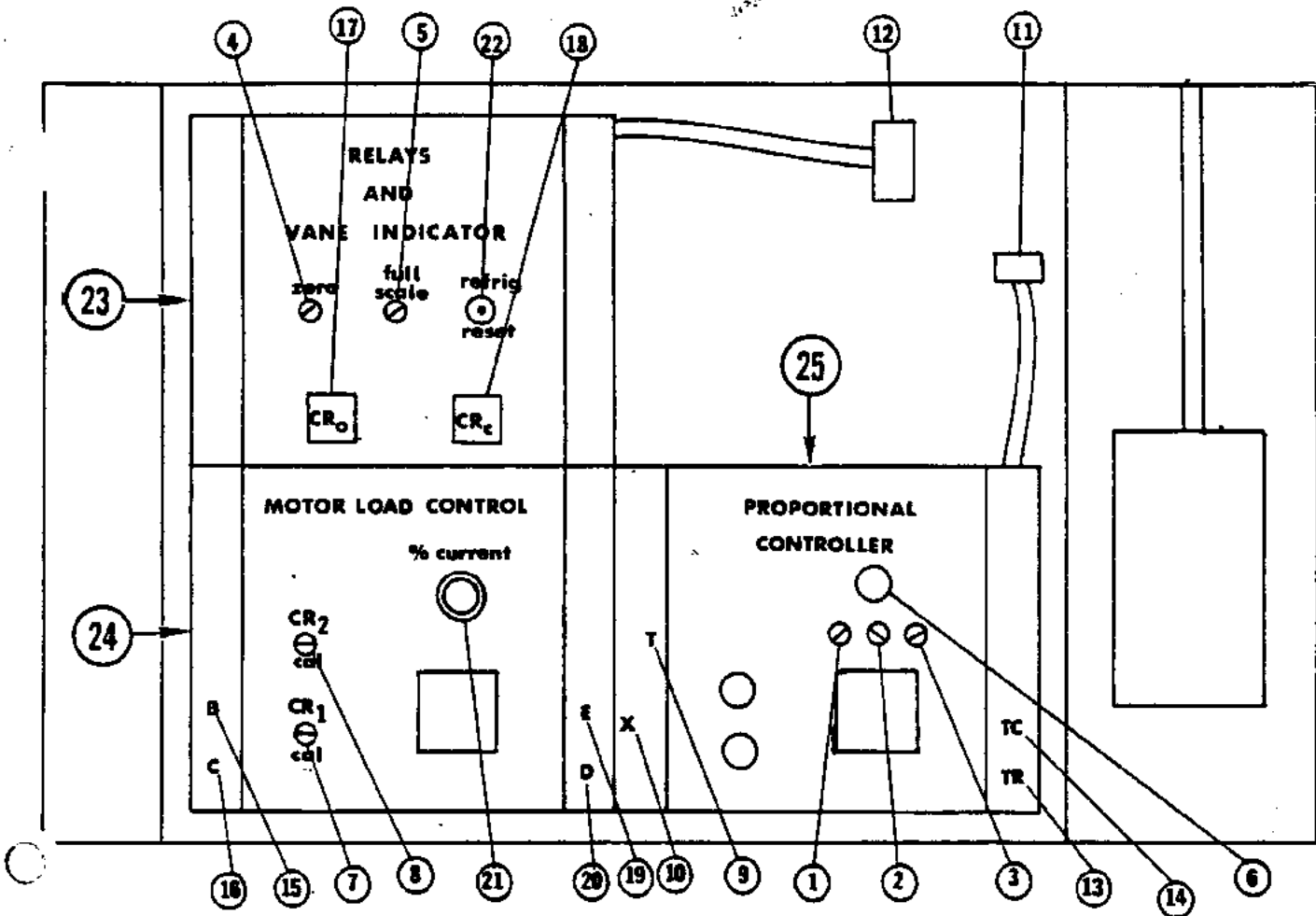
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**FIGURE 2**



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### Replacement Control 19P47-236

1. Capacity balance screw
  2. Throttling range screw
  3. Temperature bridge calibration screw
  4. Zero adjustment
  5. Span adjustment
  6. Capacity Control "Auto-Manual" switch
  7. CR1 Calibration screw
  8. CR2 Calibration screw
  9. T terminal (beneath cover)
  10. X terminal (beneath cover)
  11. B Plug connection
  12. U Plug connection
  13. TR Terminal (beneath cover)
  14. TC Terminal (beneath cover)
  15. B Terminal (beneath cover)
  16. C Terminal (beneath cover)
  17. CRo Relay \*
  18. CRc Relay \*
  19. E Terminal (beneath cover)
  20. D Terminal (beneath cover)
  21. Electrical Demand Control Knob
  22. Refrigerant Reset
  23. Vane Indicator Module (Part Number will be issued later - order by description)
  24. Motor Load Module - Part Number HN65PZ-010
  25. Proportional Controller Module - Part Number HN65PZ-014
- \* Potter and Brunfield Relay Mfr. Part #KRP5AG - Purchase locally in field.

FIGURE 2



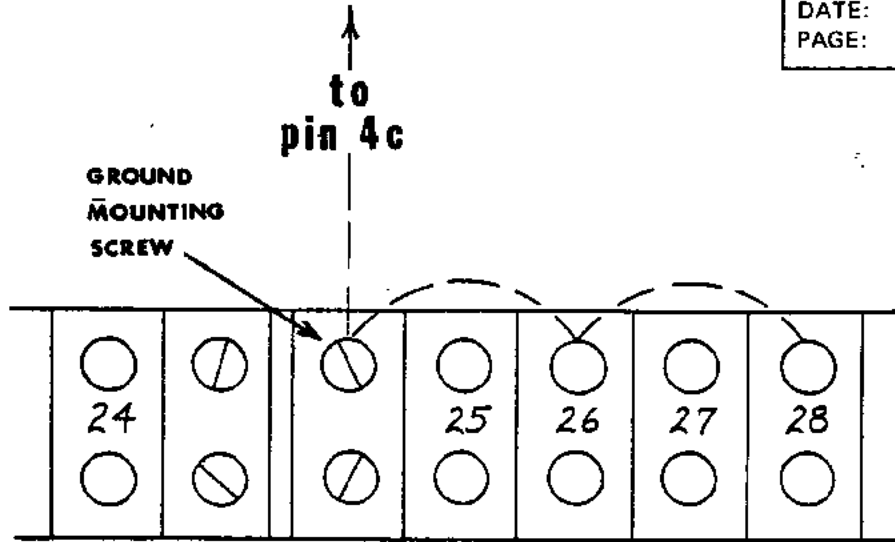
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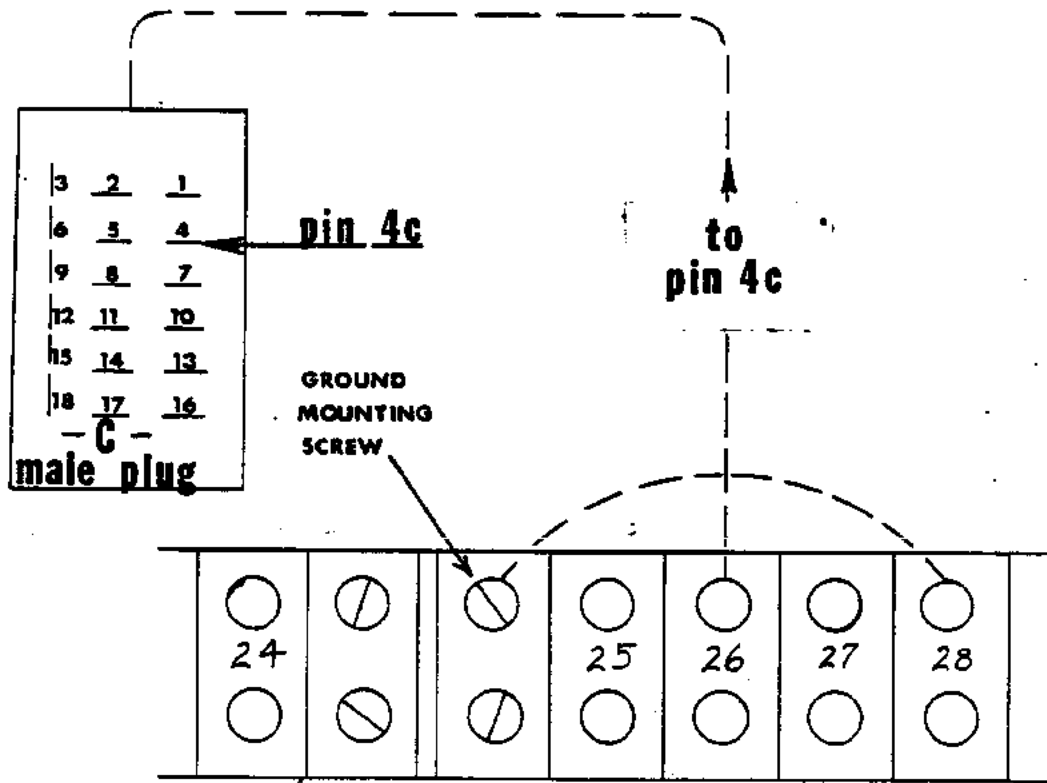
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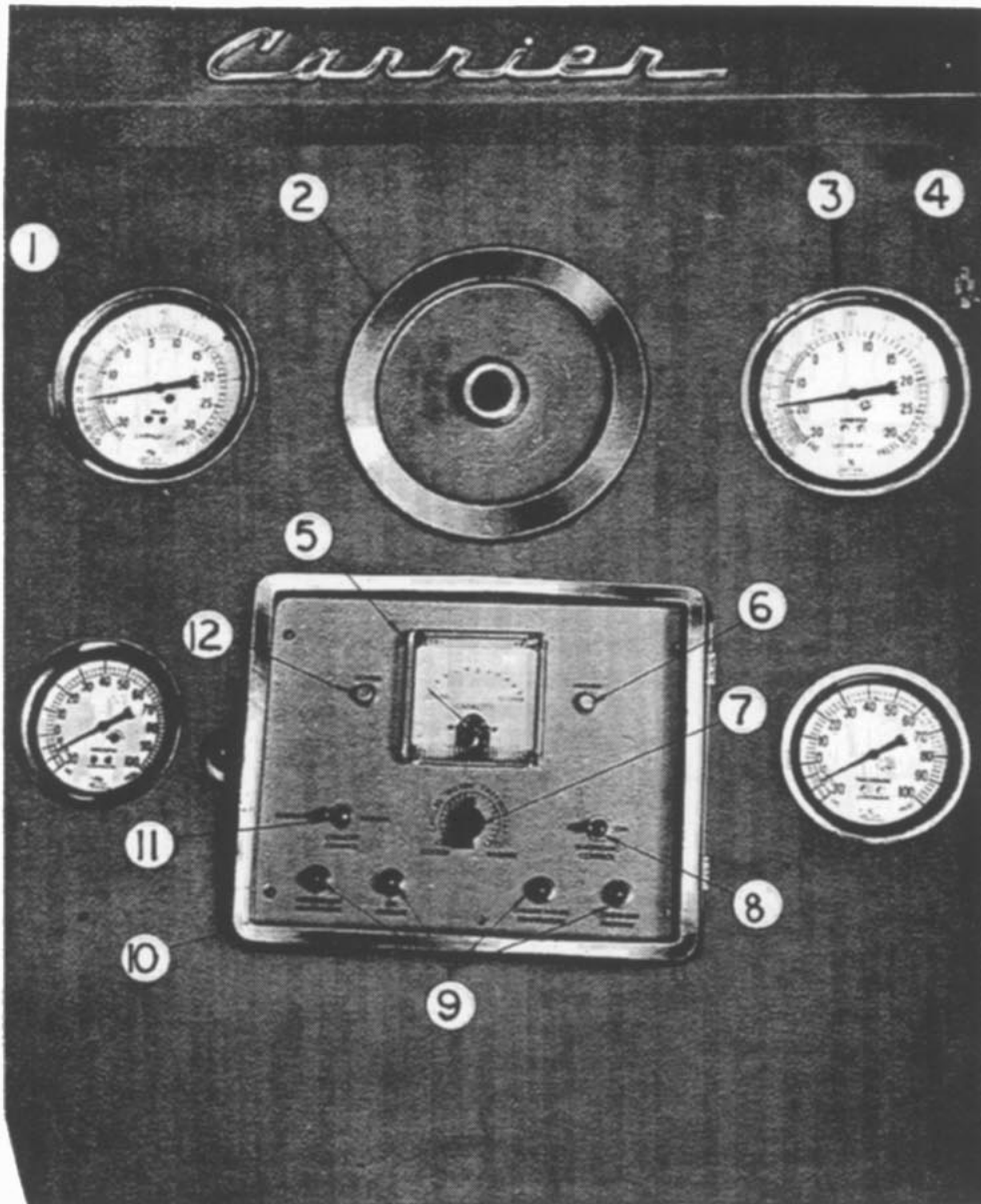
**Original Wiring Arrangement**



**Conversion Wiring Arrangement**

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**Console Panel**

**FIGURE 4**



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1. Pressure gage cooler
2. Stop
3. Pressure gage condenser
4. Toggle switch (lamp)
5. Capacity indicator
6. Push button "Higher Capacity"
7. Chilled water potentiometer
8. Electronic control switch
9. Safety lights for console panel
10. Console Panel Assembly
11. Capacity Control Switch
12. Push button "Lower Capacity"

### FIGURE 4