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Commercial Division
Carrier Corporation

BULLETIN: CA-5B-19-C-57-3
DATE: 6/5/57
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SERVICE BULLETIN

SUBJECT:

SHUNT RESISTOR; MOTOR OVERLOAD CONTROL

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PURPOSE

To provide information for the shunt resistor wiring in the motor overload control.

MACHINES AFFECTED

19C machines.

INFORMATION

Most electronic motor overload modules returned to the vendor for repairs indicate excessive current has been applied to them. These modules have radio type circuits, and the normal current is in microamps or milliamps. Full current from the current transformer is usually 3 to 5 amp which, if applied to the module, would burn it out instantly.

It is very likely that incorrect or faulty wiring of the shunt resistor in the main starter, from which the half-volt signal is supplied to the motor overload module through Lines 23 and 24, has caused the trouble.

Most of the returned modules have been from jobs on which the starter was supplied with the adjustable type resistor. Fixed resistors are specified and all starter manufacturers have, again, been advised that fixed resistors must be supplied.

The figures attached show several ways in which the resistor may be wired. Some of these figures are correct and some are not.

DANGER! DO NOT ATTEMPT TO ADJUST THE RESISTOR OR CHANGE ANYTHING IN THIS CIRCUIT WHILE THE MACHINE IS IN OPERATION. OPENING THE SECONDARY OF A CURRENT TRANSFORMER WHILE THE CURRENT IS ON THE PRIMARY WILL PRODUCE DANGEROUSLY HIGH VOLTAGES IN THE SECONDARY. UNDER CERTAIN CIRCUMSTANCES, THIS COULD BE IN THE ORDER OF SEVERAL THOUSAND VOLTS.

Figure 1 shows the correct wiring for the fixed type resistor specified for all starters. Note the position of the overload (which is correct in this diagram) as opposed to its location in Fig. 5, which is incorrect. (The overload has not been the cause of module damage, but its correct position is shown here for reference when checking or making job site wiring changes.) Even when correctly wired, as shown in Fig. 1, a motor overload module can be damaged if a loose connection exists at either end of the resistor.

Figure 2 shows the correct wiring with an adjustable resistor, which is not specified, but which is occasionally and erroneously furnished. Here, again, a loose connection on the left side of the resistor will put Line 23 straight through to



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the module, the resistor will then be in series in line 24, and full amperage will pass through the module.

Figure 3 is incorrect in that the resistor is open at one end. This is an adjustable type resistor. Any attempt to adjust it during operation may result in removing the resistor from the circuit for a fraction of a second which is enough to send full amperage through the module and burn it out.

Figure 4 is incorrect, as it places the resistor in series and permits full amperage to be applied to the module.

Figure 5 is a very unlikely wiring arrangement. As far as the resistor is concerned, it would be approximately the same as in Fig. 2, with the wire in the lower right hand corner having little, if any, effect on the output. However, in this figure the overload is shown in the incorrect position. It should be in the line, as shown in Fig. 1.

Before operating the machine, check out the wiring of this resistor and correct if necessary. Also, check the tightness of all terminals.

If an adjustable type resistor is furnished, it should be set for minimum voltage which, in Fig. 2, would mean moving the adjustable line 24 fairly close to the left side of the resistor. The machine can then be operated and the voltage on Lines 23 and 24 checked. If adjustment is necessary as indicated by insufficient voltage at full load amperage on the motor, shut down the machine while making the adjustment at the resistor. This adjustment, necessarily, will have to be trial and error until the proper position is obtained.



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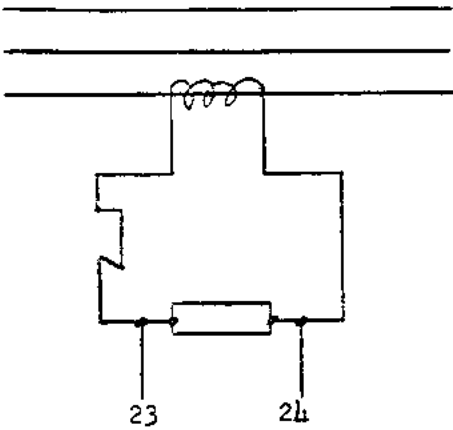


Fig. 1

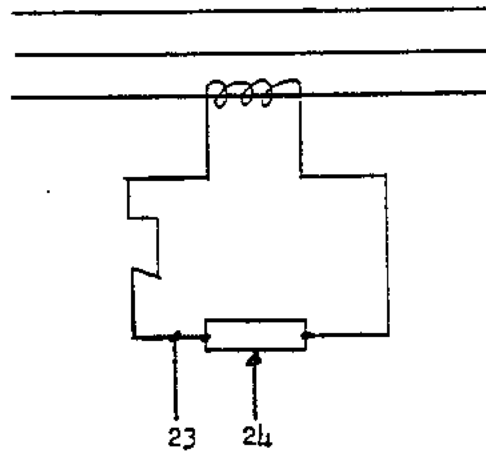


Fig. 2

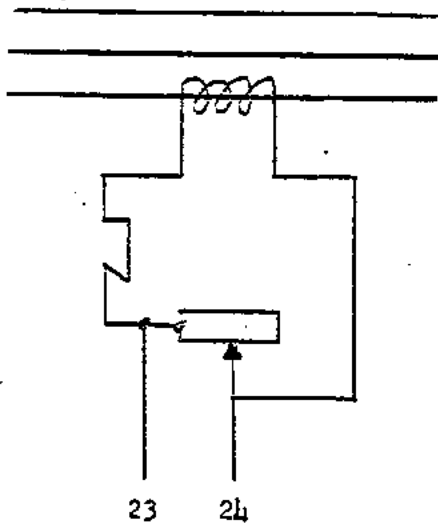


Fig. 3

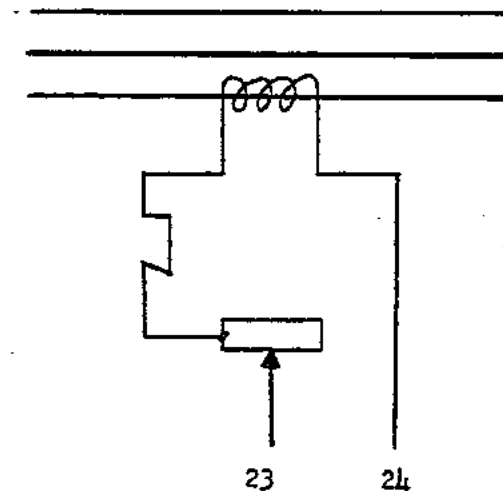


Fig. 4

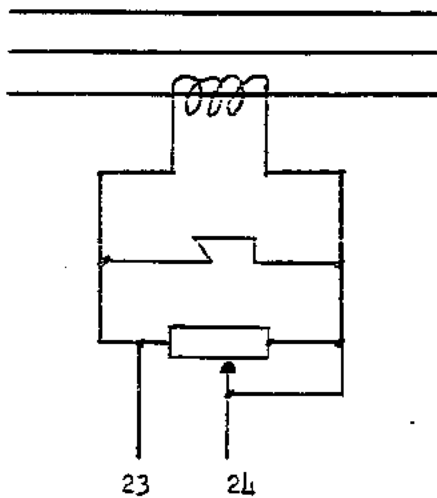


Fig. 5

LEGEND

- Main Power Leads in Starter
- Magnetic Overload
- Fixed Shunt Resistor
- Adjustable Shunt Resistor
- Current Transformer

- 23 Line to Terminal 23 of Junction Panel in Control Console
- 24 Line to Terminal 24 of Junction Panel in Control Console