

GENERAL SPECIFICATION CEPS 191
OVERHAUL OF CAV. 460C-24-3 CONTROL BOX

GENERAL

This specification details the procedure to be followed in the overhaul of the CAV 460C-24-3 control box, BR Cat. No. 15/11119.

This control box is used to control the CAV AC 203-060-24/2 alternator, BR Cat. No. 15/11118 fitted to Diesel Multiple Units.

ATTACHED APPENDICES AND FIGURES

APPENDIX A Data for 460C-24-3 control box.

APPENDIX B Fault finding guide.

FIGURE 1. Front view of control box with front cover removed.

FIGURE 2. Rear view of control box with rear cover removed.

FIGURE 3. 440C/4 regulator.

FIGURE 4. Bench test circuit.

TOOLS AND MATERIALS

Cleaning solvent - SPB11.

BR. Cat. No. 7/68268

Test equipment (see figure 4):

5 to 6 HP driving motor with variable speed control up to 6000 RPM with a suitable pulley.

AC 203-060-24/3 alternator (one alternator should be kept as a "master").
24V battery and variable non-reactive load to absorb a current of not less than 60A.

Digital voltmeter to read up to 50V dc or first grade moving coil voltmeter 0-50V fsd.

BS first grade moving coil ammeter 0-100A. Tachometer to read up to 6000 RPM.

NOTE: This equipment is identical to that specified for the alternator test detailed in CEPS 179.

REFERENCE DOCUMENTS

CEPS 179 Overhaul of CAV AC203 alternators fitted to diesel multiple units.

EI G14 Testing and protection of equipment which contains semiconductor devices.

PROCEDURE

1. Examination; overhaul and repair.
2. Testing.

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1. EXAMINATION, OVERHAUL AND REPAIR

NOTE: This regulator contains electronic devices. At no time should meggers, bell sets or buzzers be used. Follow the guidelines laid down in EI G14.

- 1.1. Remove the front cover. Examine the moulded body of the regulator for physical damage. If damaged beyond economic repair then the moulded body must be scrapped.

NOTE: Recover the following items from scrapped bodies for use as spares:

440C/4 regulator (Figure 3)

Shunt (Figure 2, Item 1)

Adjustment screw (Figure 1, Item 2)

- 1.2. Remove the rear cover and remove the 440C/4 regulator by disconnecting the connectors, at the back of the regulator and removing the two cheese head screws.
- 1.3. Remove all loose dust with a fine bristle brush. Remove any oil or stubborn dirt with a cloth moistened in SP11 solvent BR. Cat. No. 7/68268.
- 1.4. Examine the terminal bar (Figure 1, Item 1) for damaged, missing or burnt components. Renew any damaged items including any badly burred cheese headed screws.
- 1.5. Ensure that the voltage adjustment screw (Figure 1, Item 2) is in the HI position and screwed fully home.
- 1.6. Check the condition of the seal (Figure 1, Item 3). Renew the seal with BR Cat. No. 11222, if damaged.
- 1.7. Check the condition of the cables and shunt (Figure 2, Item 1). Look for evidence of high resistance joints, loose connections or damaged terminations. Renew as necessary.
- 1.8. Examine the condition of the seals (Figure 2, Item 2 and Figure 3 Item 1) and renew as required. The rear seal (Figure 2, Item 2) is BR Cat. No. 15/11223 and the regulator seal (Figure 3, Item 1) is BR Cat. No. 15/11224.
- 1.9. Examine the 440C/4 regulator (Figure 3). If physically damaged then the regulator must be discarded and a new CAV part No. 1697C531 (BR Cat. No. 15/11221) used.
- 1.10. Re-assemble the control box leaving the front cover off.

2. TESTING

- 2.1. Connect the control box to the test bench as shown in Figure 4. the warning lamp should illuminate as soon as the warning light switch is closed.

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2. TESTING Cont'd.

NOTE: Care must be taken to make the correct connections to the regulator. Wrong connections or short circuits, no matter how brief, can cause irreparable damage.

The warning indicator lamp shown in Figure 4 is used to determine faulty equipment. Refer to Appendix 'B' for cause of faulty indications.

Do not make any disconnection or connection whilst the alternator is running.

- 2.2. Start the drive motor and increase speed until 3000 RPM has been achieved. Using a fully charged battery and no resistive load obtain an output current of between 5 and 10A. The output voltage should be between 28.3V and 28.7V.

NOTE: If a battery is not used to "smooth" the alternator output the ripple distortion will be so high that a "false" output of 34.5V to 35V will be registered on the output voltmeter with the screw in the HI position.

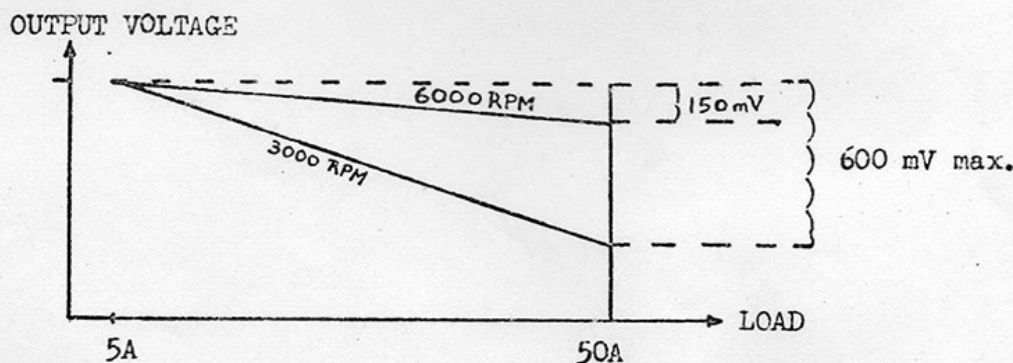
- 2.3. Increase the load current to 50A, the voltage should not fall to less than 26.7 V.
- 2.4. Increase the speed to 6000 RPM and check that the output does not fall any further.
- 2.5. Attempt to increase the current beyond 60A and ensure that the output is retained between 58A and 62A.
- 2.6. If the machine performance does not conform to the tests in 2.2. and 2.5. shut down and investigate cause - see Appendix 'B'.
- 2.7. If a faulty control box is indicated, change the 440C/4 regulator and repeat tests 2.2. to 2.5.

APPENDIX 'A'DATA FOR 460C - 24 - 3 CONTROL BOX1. VOLTAGE OUTPUT

The voltage output is altered by means of the knurled screw marked HI, MED or LO.

At 3000 RPM alternator speed with a 5A load the alternator output should be as follows:-

	Max. voltage	Min. voltage
HI	28.7	28.3
MED	27.7	27.3
LO	26.7	26.3

2. VOLTAGE DROOP ON LOAD3. CURRENT REGULATION

When current regulation comes into effect the current will be controlled between 58A and 62A.

4. SPARES

	<u>CAV Part No.</u>	<u>BR. Cat. No.</u>
440C/4 Regulator	1697C 531	15/11221
Front cover seal	6269/15	15/11222
Rear cover seal	6269/14	15/11223
Regulator seal	6269/16	15/11224
460C-24-3 Control box complete	460C/3	15/11119

FAULT FINDING GUIDE

WARNING LIGHT DOES NOT APPEAR WHEN
WARNING LIGHT SWITCH IS CLOSED

CHECK WARNING LIGHT BULB—CHANGE IF FAULTY

NO FAULT DISCOVERED

CAREFULLY CHECK ALL REGULATOR, ALTERNATOR
AND BATTERY CONNECTIONS. CHECK SUPPLY TO
WARNING LIGHT.

NO FAULT DISCOVERED

TURN W LIGHT SWITCH OFF. DISCONNECT 'F'
LEAD AT REGULATOR AND CLIP LEAD TO REGU-
LATOR NEGATIVE TERMINAL. TURN W LIGHT
SWITCH ON. IF WARNING LIGHT ILLUMINATES, REGU-
LATOR IS FAULTY. IF WARNING LIGHT DOES NOT
LIGHT, ALTERNATOR IS FAULTY.

WARNING LIGHT DOES NOT GO OUT AND AMMETER
SHOWS NO OUTPUT WHEN ALTYR. IS RUNNING.

CAREFULLY CHECK ALL REGULATOR, ALTERNATOR
AND BATTERY CONNECTIONS.

NO FAULT DISCOVERED

TURN W LIGHT SWITCH OFF. DISCONNECT 'F'
LEAD AT REGULATOR AND CLIP LEAD TO REGU-
LATOR NEGATIVE TERMINAL. TURN W LIGHT
OFF AND RUN ENGINE AT FAST IDLE.

IF NO OUTPUT APPEARS

IF OUTPUT APPEARS

ALTERNATOR IS FAULTY

REGULATOR IS FAULTY

WARNING LIGHT DOES NOT GO OUT WHEN ALTYR. IS
RUNNING AND AMMETER SHOWS REDUCED OUTPUT
WITH FULL OUTPUT ONLY AVAILABLE AT MAXIMUM
SPEED.

WARNING LIGHT GOES OUT BUT ALTYR.
DELIVERS REDUCED OUTPUT AND WILL ONLY
PROVIDE FULL OUTPUT AT APPROXIMATELY
MAXIMUM SPEED.

REMOVE ALTYR. FROM INSTALLATION AND
APPLY OPEN CIRCUIT DIODE CHECK

BATTERIES OVERCHARGING AND AMMETER
INDICATES HIGH OR FULL OUTPUT ALL THE TIME.

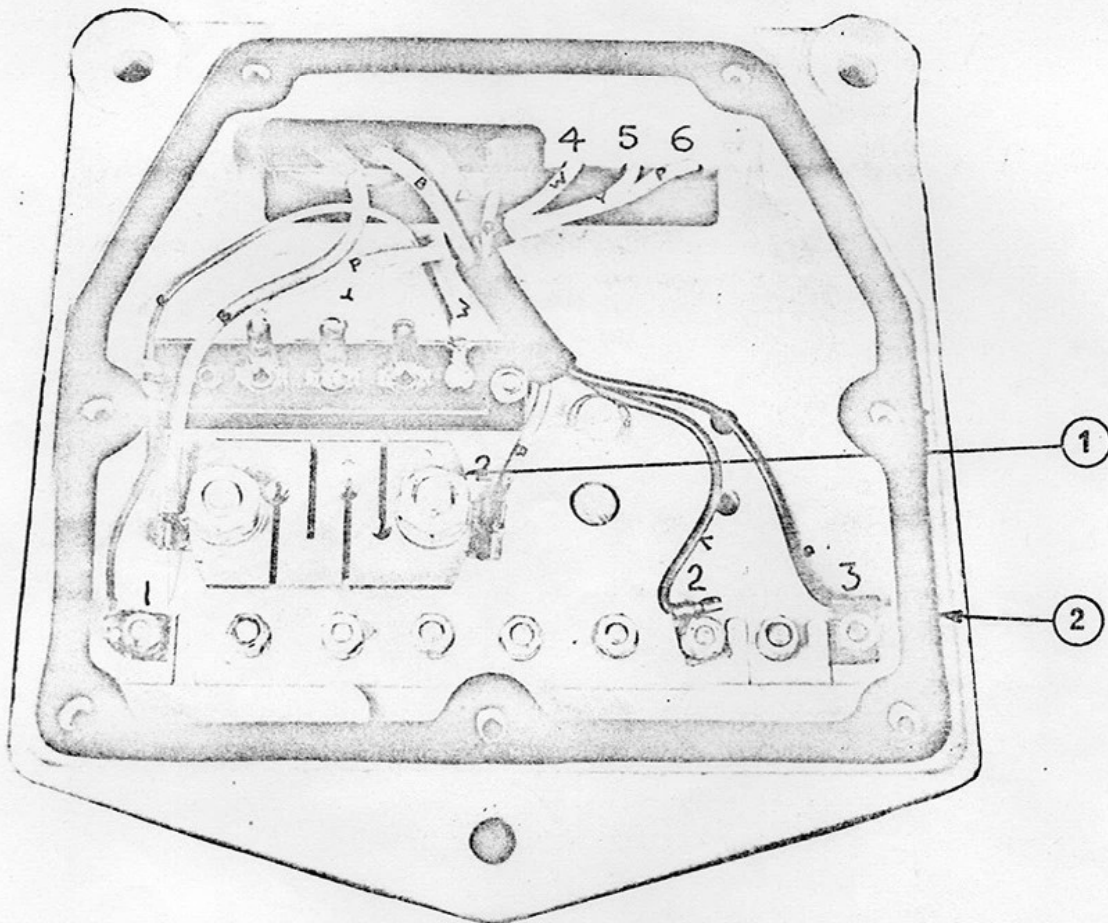
CHECK REGULATOR POSITIVE SENSING LEAD AND
ITS CONNECTION AT REGULATOR

IF NO FAULT DISCOVERED

REGULATOR IS FAULTY

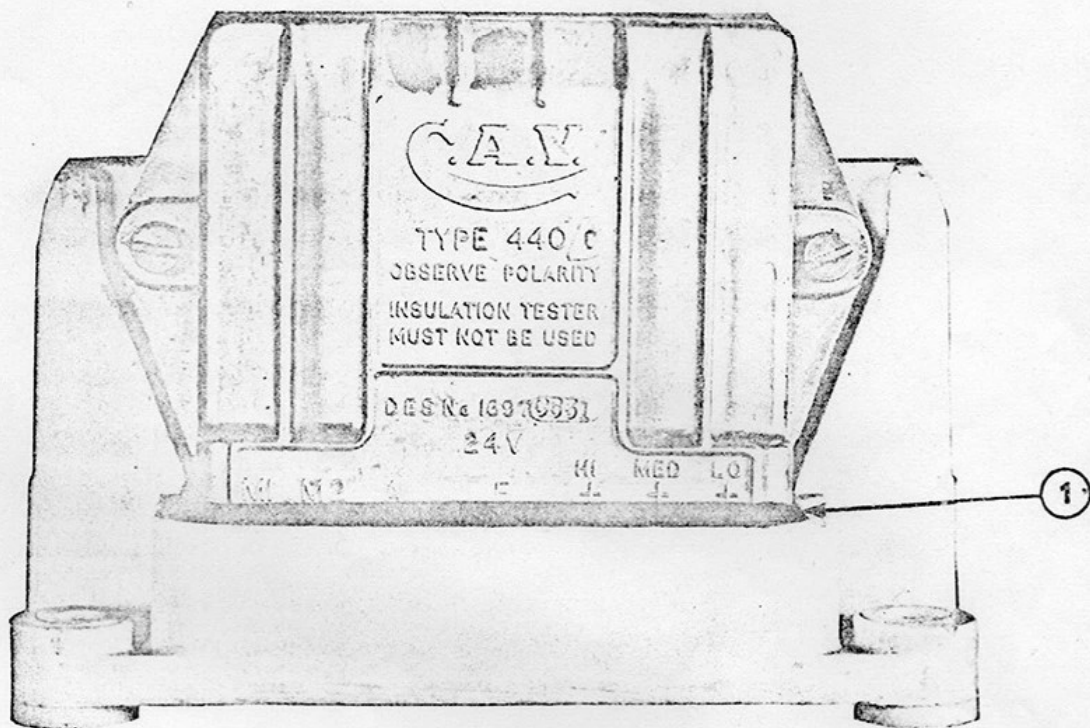
Wiring colour code

B Blue
G Green
P Pink
R Red
V Violet
W White
Y Yellow



1. Shunt
2. Rear seal

FIGURE 2 REAR VIEW OF CONTROL BOX WITH REAR COVER REMOVED



1. Regulator seal

FIGURE 3 440C/4 REGULATOR

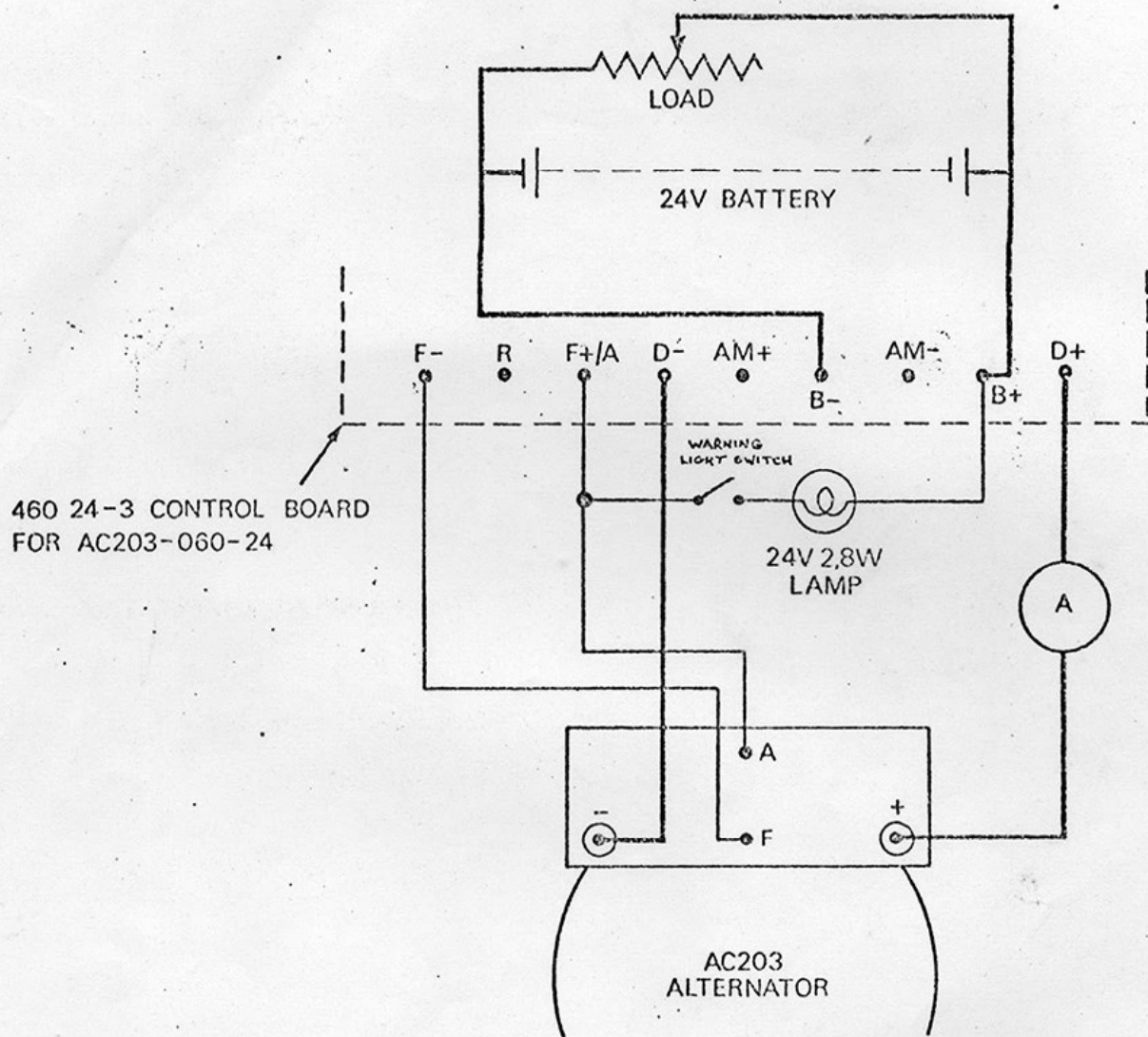


FIGURE 4. Bench test circuit