

DKP

DIRECTOR OF MECHANICAL & ELECTRICAL ENGINEERING

DERBY

Engineering Instruction

No. MD / 369
ISSUE 4

TITLE CONVERSION OF THE CAV 460 C-24-3 CONTROL BOX TO SUIT NIFE AND LEAD ACID BATTERIES

LOCOMOTIVES, VEHICLES OR EQUIPMENT

Description	Serial Nos.	Lot Nos.
DMU CLASSES 101, 107, 108, 115, 116, 117 118, 119, 120, 122, 128 141, 140, 142. (FITTED WITH AC203 ALTERNATORS)		

LOCOMOTIVE, VEHICLE OR EQUIPMENT CODES
DMU 101, DMU 107, DMU 108, DMU 115, DMU 116, DMU 117, DMU 118, DMU 119, DMU 120
DMU 122, DMU 128, DMU 141 and 140 prototype, 142.

COMPONENT CODES 0512	LVR'S CODE
--------------------------------	-------------------

INSTRUCTION	WORKS	DEPOTS
--------------------	--------------	---------------

This Instruction supersedes Engineering Instruction MD369 issue 3 dated 20 December 1984, which should be destroyed. This issue includes Classes 142.

The CAV 460C-24-3 control box currently being fitted in conjunction with the AC203 alternator, Engineering Instructions MD/199 and MD/305 is a standard bus regulator and needs to be converted to suit the British Rail application.

This instruction lays down the Stores procedure and the Main Works conversion procedure to produce a unit that will cater for the various voltages required on B.R. service for D.M.U's. This instruction does not apply to the production or prototype Class 150, or 151.

STORES PROCEDURE

CAV will continue to supply the standard control box, therefore /Continued...

Type of Instruction	Recurring	-	Non-Recurring	<input checked="" type="checkbox"/>
---------------------	-----------	---	---------------	-------------------------------------

Signed H. F. Tribley Date 3.2.86 Corres. Ref. TEE177/244/302(G.A.)

Approved [Signature] Business Engineer / Functional Head

Countersigned M. V. Casey D of M & E E. Telephone No. 056-3523

For B.R.E.L. HQ. USE ONLY

B.R.E.L. Eng. Inst. No.	Type of Instruction		Estimates of unit cost change are / are not required	
	Recurring	Non-Recurring	Recurring	Non-Recurring

Restriction Panel

To :-

- Divisional / Works Manager -----
- Works / Depot -----

Please acknowledge receipt of this Engineering Instruction

Signed _____ Corres. Ref. _____ Date _____
for D.M & E.E. / MD, B.R.E.L

* Delete whichever is not applicable

No.	MD/369
	ISSUE 4
SHEET No.2 of 5	

Engineering Instruction

(Continuation)

the ordering details, Type No 460C-24-3, BR Cat No 15/11119 are unchanged. The units are to be credited into stock in the normal manner but are no longer to be issued in their existing form to outstations. The Workshops concerned with the conversion procedure will draw from stock under BR Cat No 15/11119, convert the control boxes in accordance with the following procedure, and return to stores under the re-allocated, BR Cat No 15/11417 for issue.

CONVERSION PROCEDURE (MAIN WORKS ONLY)

1. Remove the front and rear covers from the control box. The 440 C regulator in the aluminium case need not be removed.
2. The conversion consists of inserting a resistor in series with the flying lead connecting D+ (terminal 1) to the HI, MED and LO positions (terminals 4, 5 & 6) on the underside of the regulator.
3. The resistors will be supplied as an assembly complete with a small printed circuit board and will be identified by BR Cat No 15/11418 etched on the PC board.
4. Mount the resistor assembly in the recess above the shunt in the back of the control box with the resistor protruding downwards into the recess.

NOTE:- Earlier control boxes have a HI, MED and LO selector with a voltage adjustment screw situated above the shunt, this must be discarded before proceeding.

5. To assemble the resistor unit in position, utilise the existing holes above the shunt, insert the two 3 mm bolts with a flat washer behind the head and make each captive with a flat washer, spring washer and nut.

Place a flat washer over each nut and locate the printed circuit board about the fixing centres on to the captive bolts.

6. Cut the existing flying lead to give a short length approximately 70 mm from D+ to the input of the resistor and approx 110 mm from the output of the resistor to supply the HI, MED and LO positions as selected.

Crimp the cable ends using 3 mm crimps and crimping tool BR Cat No 39/8126. Connect to the input and output of the resistor board and secure using a flat washer, spring washer and nut at each location.

7. Identify the three regular positions as shown in Fig 1 i.e. the HI position, terminal 4, labelled 31.5V; MED position, terminal 5, labelled 30.5V; and the LO position, terminal 6, labelled 29.5V.
8. Before replacing the covers connect the flying lead in the 29.5V position as this is the mode for the majority of vehicles.
9. Replace the front and rear covers and paint a yellow band beneath the CAV label on the front cover to indicate converted control boxes.

/Continued

Engineering Instruction

(Continuation)

No.	MD/369
	ISSUE 4
SHEET No.3 of 5	

10. Examination, overhaul and testing is as laid down in CEPS 191 except for references to the Voltage adjustment screw and item 2.2 under testing. The effect of this Instruction will increase the output voltage to give 31.5 V in the HIGH position, 30.5 V in the MEDIUM position and 29.5 V in the LOW POSITION as indicated.

<u>ADDITIONAL MATERIAL ITEM</u>	<u>QUANTITY</u>	<u>BR CAT NO</u>
Printed circuit board assembly SK116 (complete with resistor)	1	15/11418
Resistor 180 Ω 1 W (for spares)	-	26/152751
Screw, Cheesehead M3 x 20 Steel grade 4.8, BS 4183	2	35/104240
Nut M3, hexagon, plain BS 3692 Steel grade 4	4	3/174015
Washer, spring, single coil, steel BS 4464 Table 1 type A	4	3/195000
Washer, flat, BS 4320 Table 1 (Form A)	8	3/190814
Insulated terminal 3 mm	2	54/119375

MAIN WORKS AND DEPOTS

On receipt of converted control boxes BR Cat No 15/11417 remove the steel backing cover and select the setting required by moving the flying lead to suit the vehicle battery.

NOTE:- The printed circuit board complete with 180 Ω 1 W Resistor Part No SK 116, BR Cat No 15/11418 BR Drg No. TPE-A3-9007011 is obtainable from:

SK ELECTRONICS CO
REGENT STREET
OLDHAM OL1 3TZ

VOLTAGE SELECTION

Selection of the required setting shall be as follows:-

1. Low setting identified as 29.5 V - Class 141,142 and remaining listed classes fitted with lead acid batteries.
2. High setting identified as 31.5 V - All D.M.U's with alkaline batteries listed above.
3. Med setting identified as 30.5 V - Class 140 prototype only

MD 368
No. ISSUE
SHEET No. 4 of 5

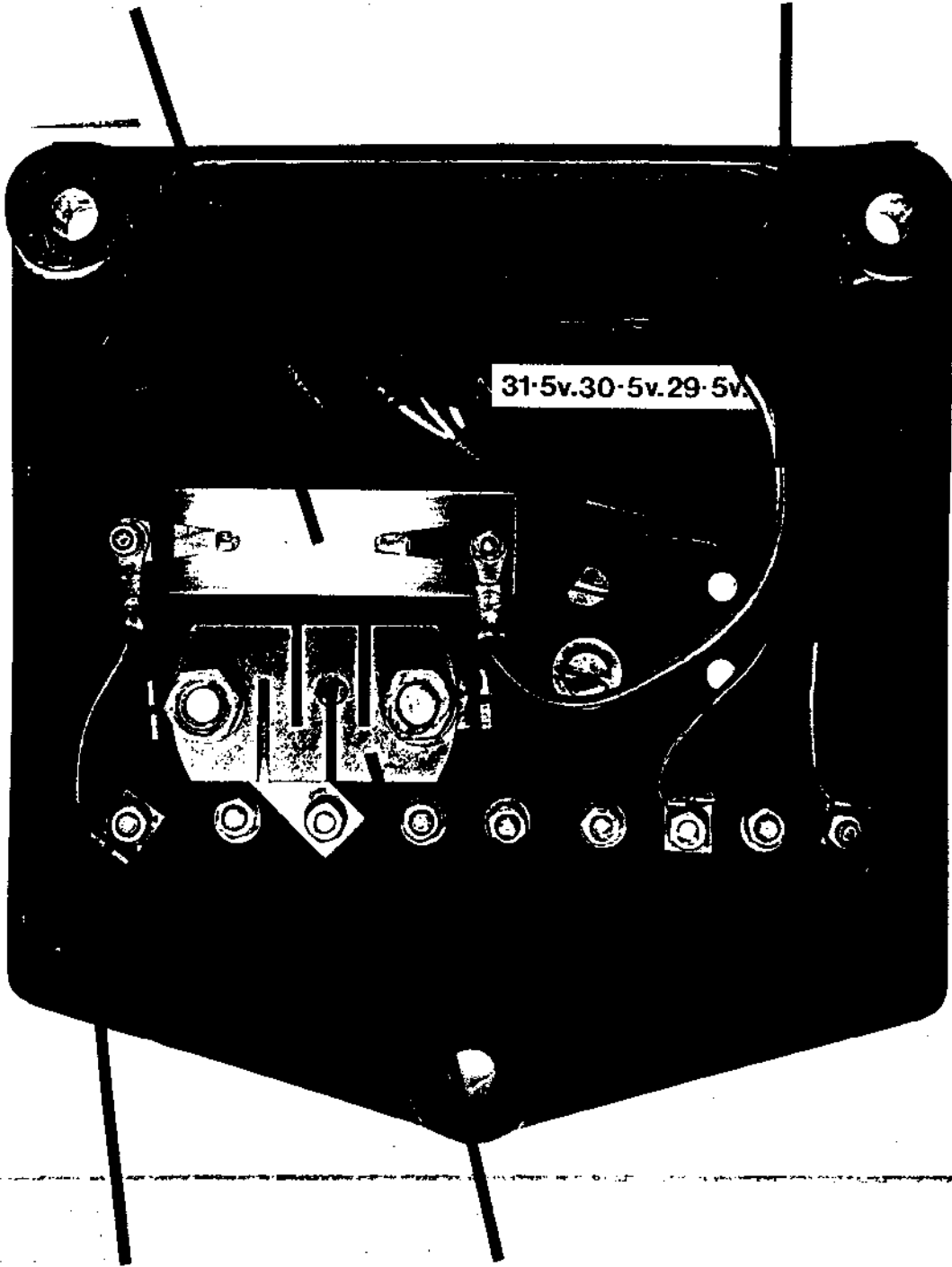
Engineering Instruction

(Continuation)

CONTROL BOX (REAR VIEW)

RESISTOR ASSEMBLY

FLYING LEAD



SHORT LEAD
D+ TO RESISTOR

SHUNT

FIG 1

Engineering Instruction

(Continuation)

No.	MD/303
	ISSUE 4
SHEET No 5 of 5	

CONTROL BOX (FRONT VIEW)



FIG 2