AC EMU
AUXILIARY CIRCUIT

N.D.Turkar/PL/IRIEEN/NK

Auxiliaries

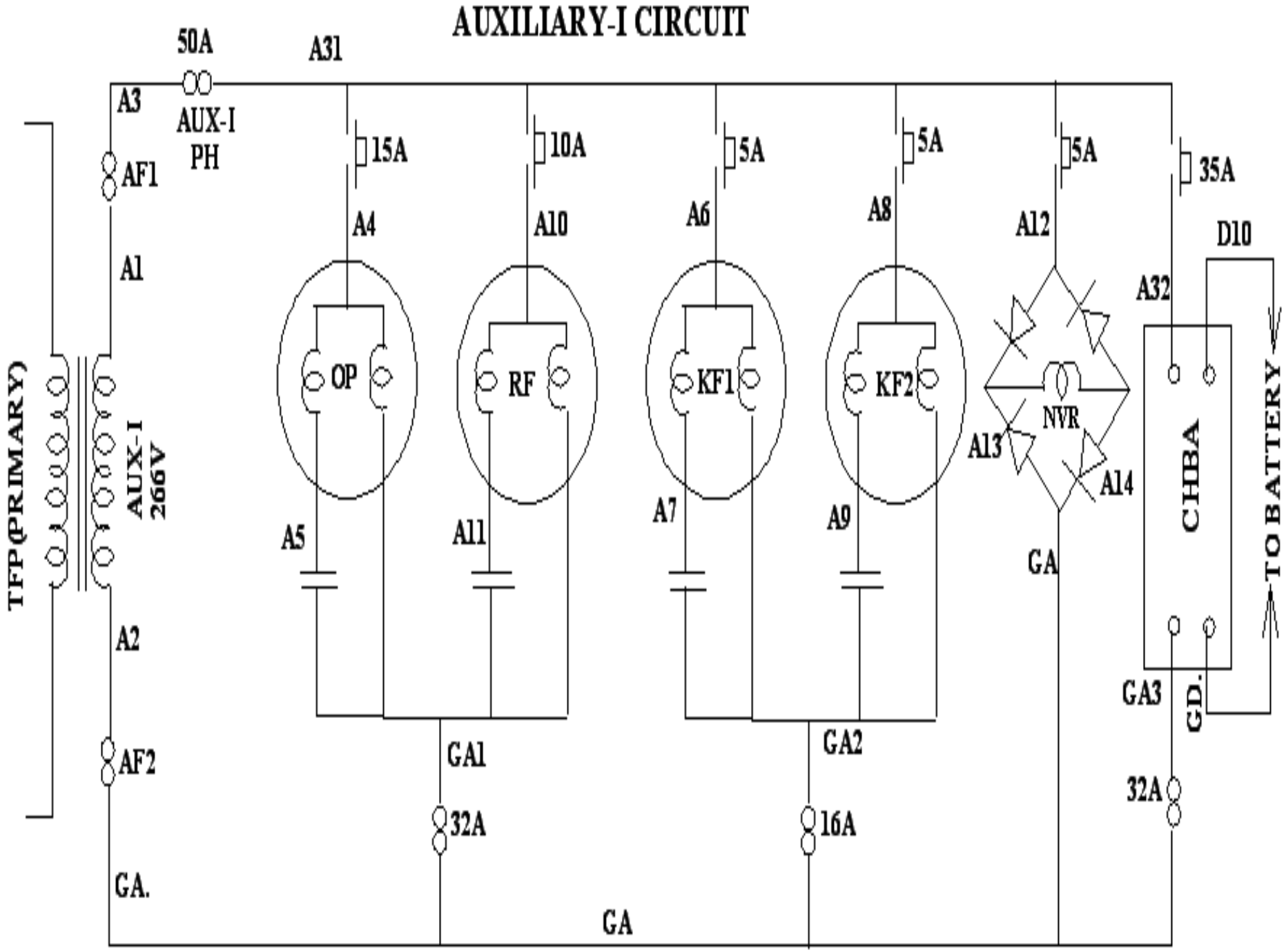
- Oil pump (OP)
- Radiator fans(two) (KFl,KF2)
- Main rectifier fan (RF)
- Battery charger
- Auxiliary compressor
- Main compressor
- Passenger lights
- Passenger fans

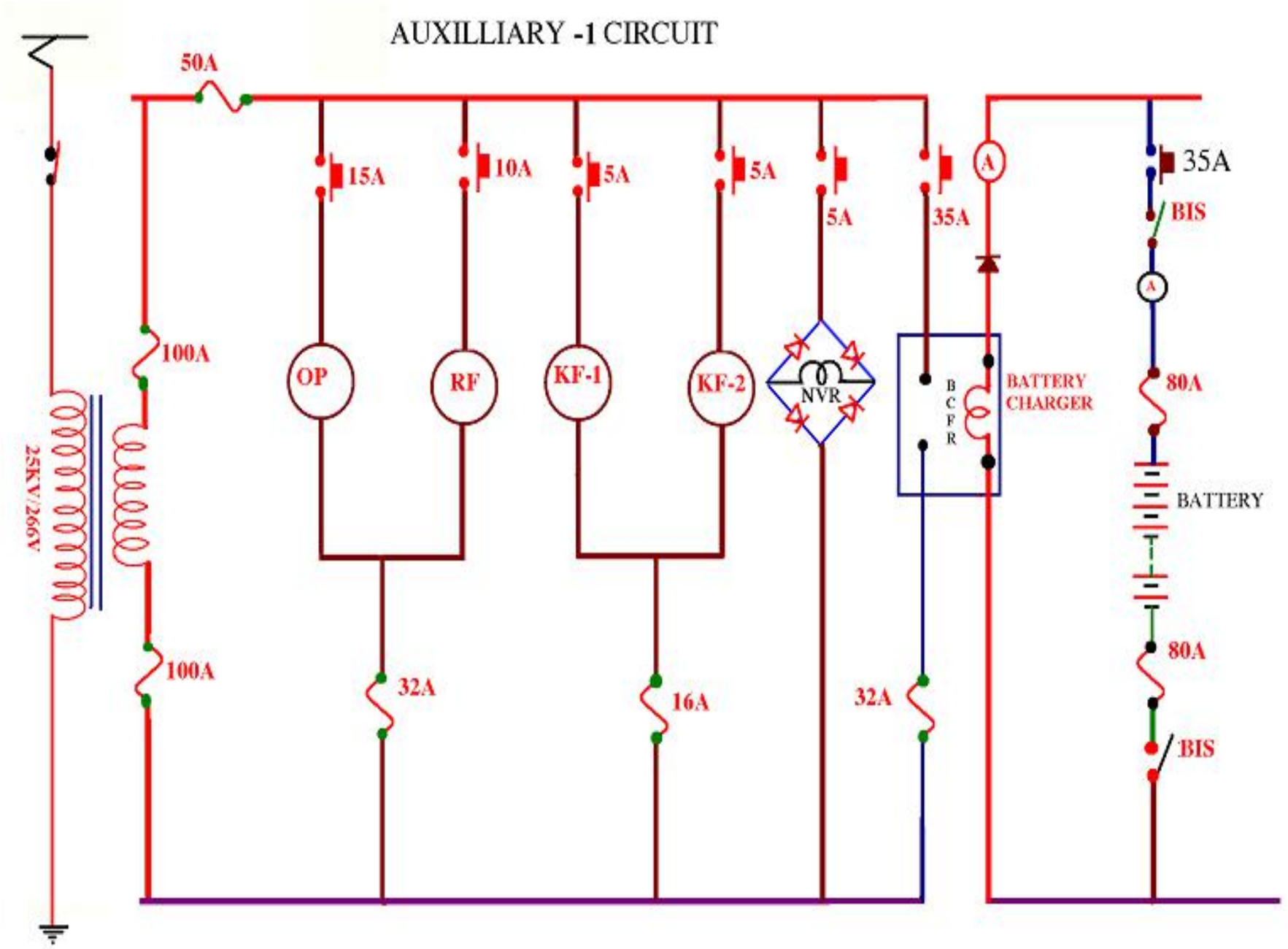
AUXILIARY CIRCUITS

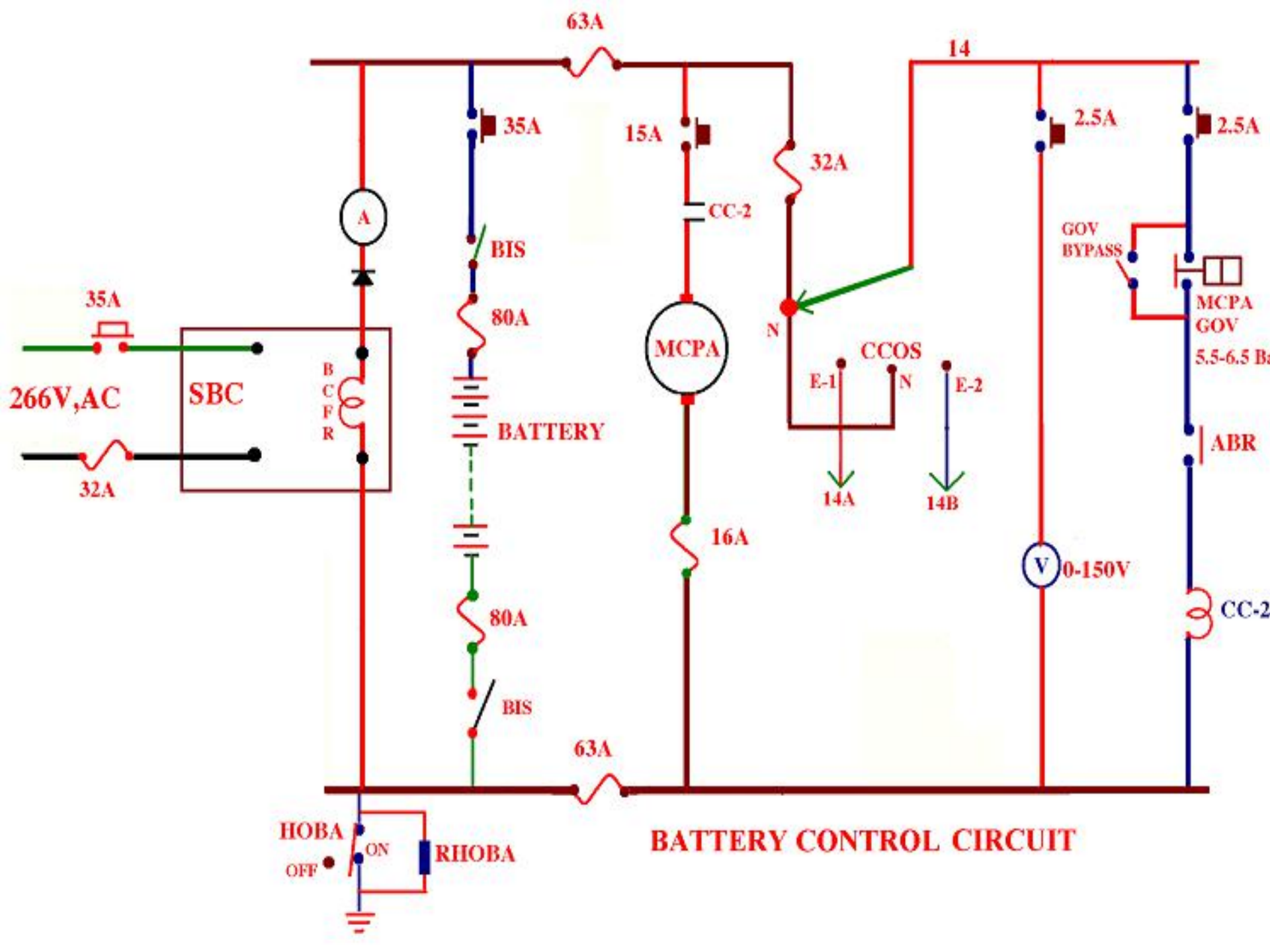
There are two separate auxiliary circuits,

I. **266V AC**
II. **141V AC**

AUXILIARY I CIRCUIT


AUXILIARY-I CIRCUIT
50A
A31
A3
AUX-I
PH
AF1
A1
TFP(PRIMARY)
AUX-I
266V
A2
AF2
GA.
15A
10A
5A
5A
5A
35A
A4
A10
A6
A8
A12
D10
A32
OP
RF
KF1
KF2
NVR
A13
A14
CHBA
TO BATTERY
A5
A11
A7
A9
GA
GA3
GD.
GA1
GA2
32A
16A
32A
GA


AUXILLIARY -1 CIRCUIT
50A
15A
10A
5A
5A
5A
35A
35A
100A
100A
25KVA/266V
OP
RF
KF-1
KF-2
NVR
B
C
F
R
BATTERY
CHARGER
BIS
80A
BATTERY
80A
BIS
32A
16A
32A


63A
14
35A
15A
32A
2.5A
2.5A
A
BIS
CC-2
GOV
BYPASS
35A
80A
MCPA
N
CCOS
MCPA
GOV
266V,AC
SBC
B
C
F
R
E-1
N
E-2
5.5-6.5 Ba
BATTERY
ABR
14A
14B
16A
V
0-150V
80A
CC-2
BIS
63A
HOBA
ON
OFF
RHOBA
BATTERY CONTROL CIRCUIT

266V A.C. AUXILIARY CIRCUIT

- This circuit is fed from Auxiliary winding on the main transformer Aux. I and gives a nominal 266V AC Output.
- It is used to feed the battery charger and the single phase induction motors driven auxiliary machines.
- These machines are capacitor start and run single phase induction motors.

266V A.C. AUXILIARY CIRCUIT

Auxiliaries are:

1. **Oil pump (OP)**
2. **Radiator fans(two) (KF1,KF2)**
3. **Main rectifier fan (RF)**
4. **Battery charger**

266V A.C. AUXILIARY CIRCUIT

- **No-Volt Relay (NVR)**
- **This is a DC relay fed by a bridge rectifier, and is used to detect whether the transformer is ‘live or not.**
- **The NVR circuit is protected by a miniature circuit breaker.**
- **On failure of OHE voltage, NVR drops out and disconnects the traction circuit by means of its Interlocks in the control circuit**

Oil Pump

- It is provided to circulate the transformer oil to keep it cool & the entire unit is mounted in transformer oil pipe line.
- The motor is of 4 pole, squirrel cage(induction motor), capacitor start & run type and operates with its rotor immersed in oil.
- Rating: 1.5 HP, 240V AC, 50 Hz, 6.5 A, Single phase, 1420 RPM.
- Pump capacity: 364 lpm against 7.32m head.

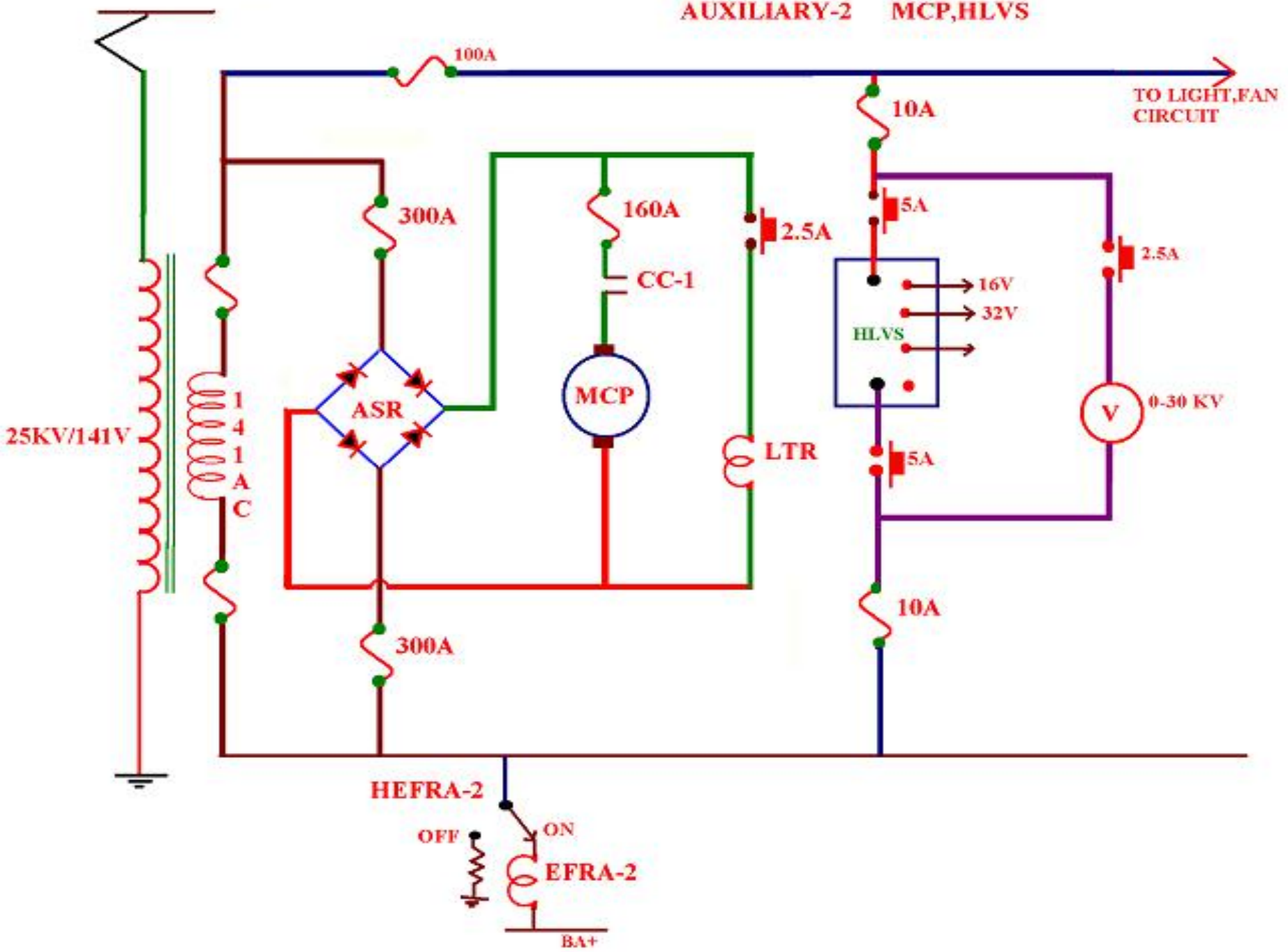
Radiator Fans

- **These are provided for air forced cooling of transformer oil and are fed by auxiliary I circuit of transformer.**
- **Rating: 0.5 HP, 240 V AC, 50Hz, single phase, 2.5A, 1410 rpm.**

Rectifier cooling fan

- **It is provided to cool the heat sinks of rectifier diodes and is fed by auxiliary-I circuit of transformer.**
- **Rating: 1HP, 240V, AC, single phase, 3.6A, 1430 rpm.**

AUXILIARY II CIRCUIT


AUXILIARY-2 MCP,HLVS
100A
TO LIGHT,FAN CIRCUIT
10A
300A
160A
2.5A
5A
CC-1
16V
32V
HLVS
2.5A
25KV/141V
141AC
ASR
MCP
V
0-30 KV
LTR
5A
10A
300A
HEFRA-2
OFF
ON
EFRA-2
BA+

141V A.C. CIRCUIT

- **This circuit is fed from a secondary winding Aux. II (141V AC) and is protected by two fuses AF3 and AF4, located inside the transformer connection chamber.**
- **A rectifier-fed relay LTR is provided to prove that fuses AF3 and AF4 are intact and the auxiliary supply rectifier (ASR)is working normal.**

141V AC CIRCUIT

- **The circuit of LTR is protected by a miniature circuit breaker.**
- **A surge suppression capacitor with a series resistor is provided across the input to ASR.**

141V AC CIRCUIT

Auxiliaries are

- Main compressor
- 110V DC, 8.5KW, 1150rpm, 1075lpm
- Passenger lights and fans
- Fans: 32 fans of 60W each coach
- Lights
- 16 normal lights of 18W each coach
- 12 emergency lights of 18W in each coach

SL.NO.	CIRCUIT	QUANTITY	LOAD		VOLTAGE
			WATTS	AMPS	
1.	F1	16x60W	960W	7.56A	141V ac
2.	F2	16x60W	960W	7.56A	141V ac
3.	L1	8x18W	144W	1.13A	141V ac
4.	L2	8x18W	144W	1.13A	141Vac
5.	EL1 / L1	5x18W	90W	0.83A / 0.71A	110Vdc/141Vac
6.	EL2 / L2	6x18W	108W	1.00A / 0.85A	110Vdc/141Vac

Load distribution in Trailer coach

SL.NO.	CIRCUIT	QUANTITY	LOAD		VOLTAGE
			WATTS	AMPS	
1.	F1	17x60W	1020W	8.03A	141V AC
2.	F2	17x60W	1020W	8.03A	141V AC
3.	L1	10x18W	180W	1.42A	141V AC
4.	L2	10x18W	180W	1.42A	141V AC
5.	EL1/L1	8x18W	144W	1.33A/1.13A	110V DC/141V AC
6.	EL2/L2	8x18W	144W	1.33A/1.13A	110V DC/141V AC

MAIN-COMPRESSOR MOTOR

- **The main compressor motor is protected by fuse AF10 and a permanent series resistor, and its contactor CC1 which is in turn controlled by a compressor set and trip relay (CR) through the compressor governor.**

MAIN-COMPRESSOR MOTOR

- **When the Compressor set button in any driving cab is pressed, train line 12 is energized, sets all the compressor relays in the train and the contact CR/1 completes the respective compressor contactor coil (CC 1) circuit. This closes the compressor contactor.**

MAIN-COMPRESSOR MOTOR

- To switch off the compressor, the compressor trip button in the BL box is pressed, this energizes train line 42, trips the compressor relay (CR) and the compressor contactor(CC1).
- A sealed switch GS3 is provided to short circuit the main-compressor governor if it sticks in the open position.

MAIN-COMPRESSOR MOTOR

- **Compressor synchronizing is achieved through train line wire 13.**

ABB RED LAMP

- **The lamp glows indicate that ABB in one/more unit is in tripped condition.**

Parking brake applied

PARKING BRAKE APPLIED ON - RED

This lamp is fed from Train Line wire no. 39 which is energised from TL wire 15, the lamp is lit whenever parking brake is applied. This is being achieved through parking brake governor contacts.

Aux. rectifier Trip-RED

AUX. RECTIFIER TRIP - RED

This lamp is fed from train-line wire 17 which is energised from train-line wire 15 by the combination of contacts ABB/2, LTR/1. The lamp is lit if the low-tension proving relay LTR opens while the air-blast circuit-breaker is closed, thus indicating an abnormal loss of power, due, for example, to a transformer tertiary fuse blowing.

BATTERY CHARGER OFF - RED

This lamp is fed from train line wire 17A which is energised from train line wire 15 by the combination of contacts ABB/2 and Battery charger failure relay through wire no. 1701.

EP supply on relay

- It gives the indication that brake valve is charged & EP brake supply is ‘ON’.

RECTIFIER FUSE BLOWN

- The lamp is provided to give an indication for failure of any one of the rectifier bridges. Normally it remains in extinguished condition.

CHBA FAILURE INDICATION

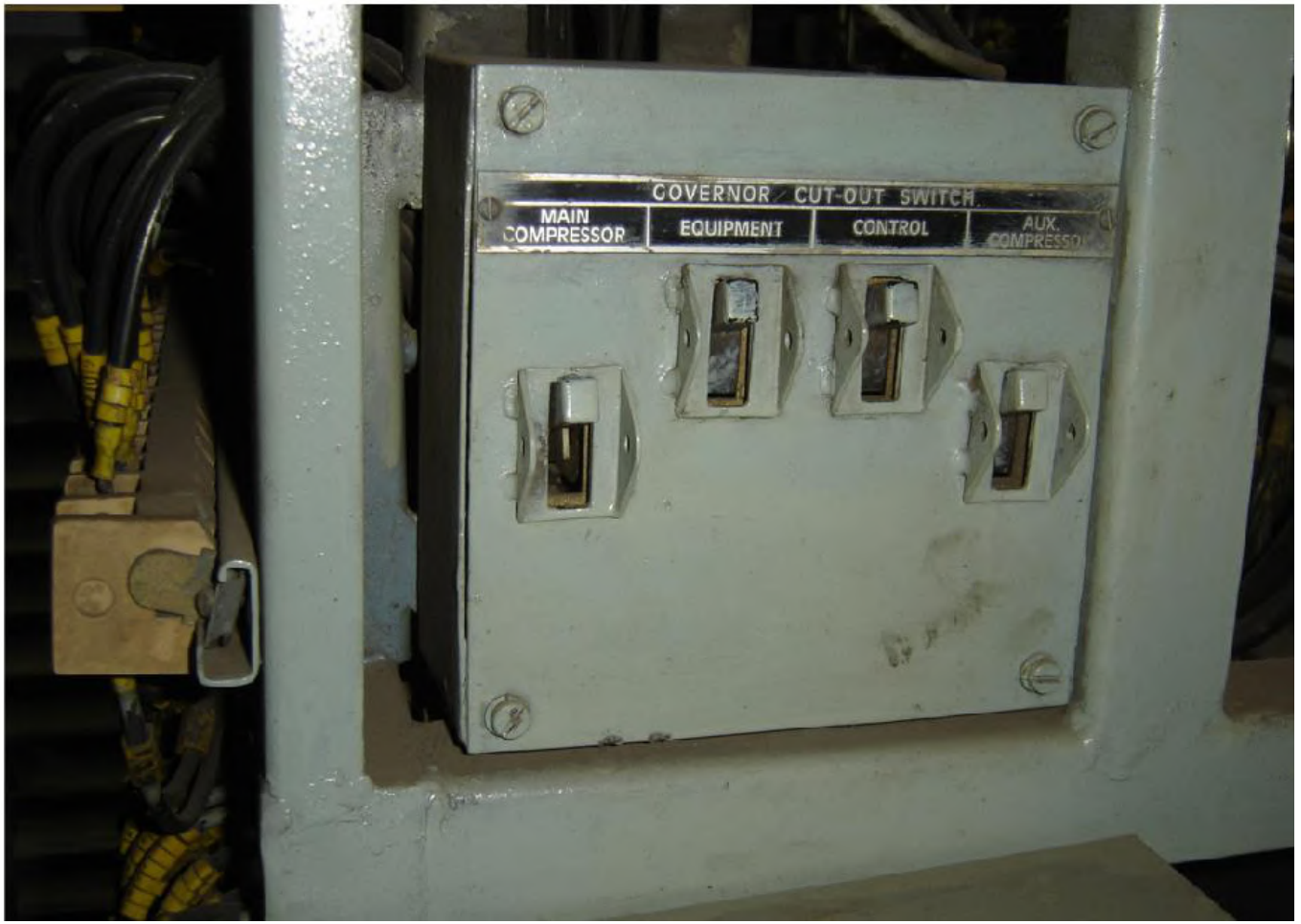
- This lamp is provided to give an indication for failure of Battery charger.
- It remains in extinguished condition if the Battery charger is in healthy condition.

AUXILIARY WHITE LIGHT

- **It is provided to give an indication for no OHE voltage. LTR does not pick up or there is no ASR output, provided ABB is closed. For normal working, it remains in extinguished condition.**

Battery Isolating switch

Governor bypass switches



Reverser


Macromedia Flash Player 8
File View Control Help
TYPE
LOCATION
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Macromedia Flas...
Microsoft PowerP...
ENG
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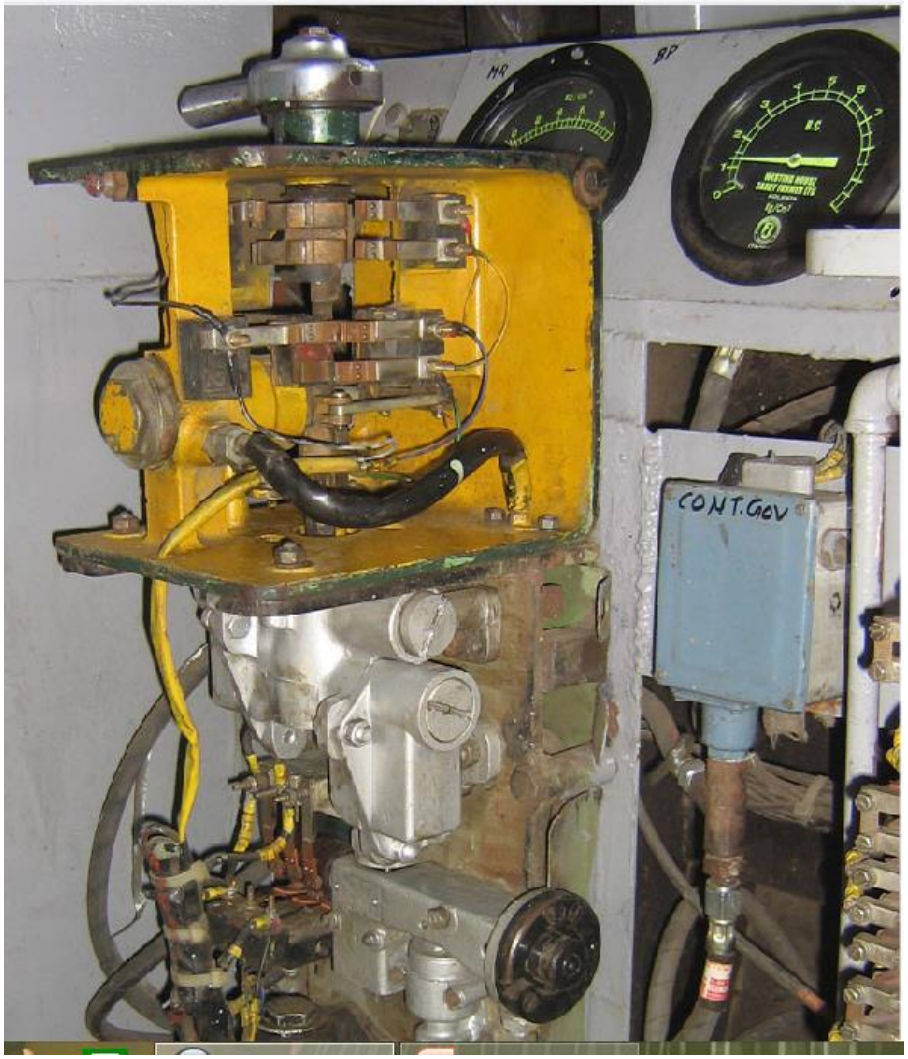
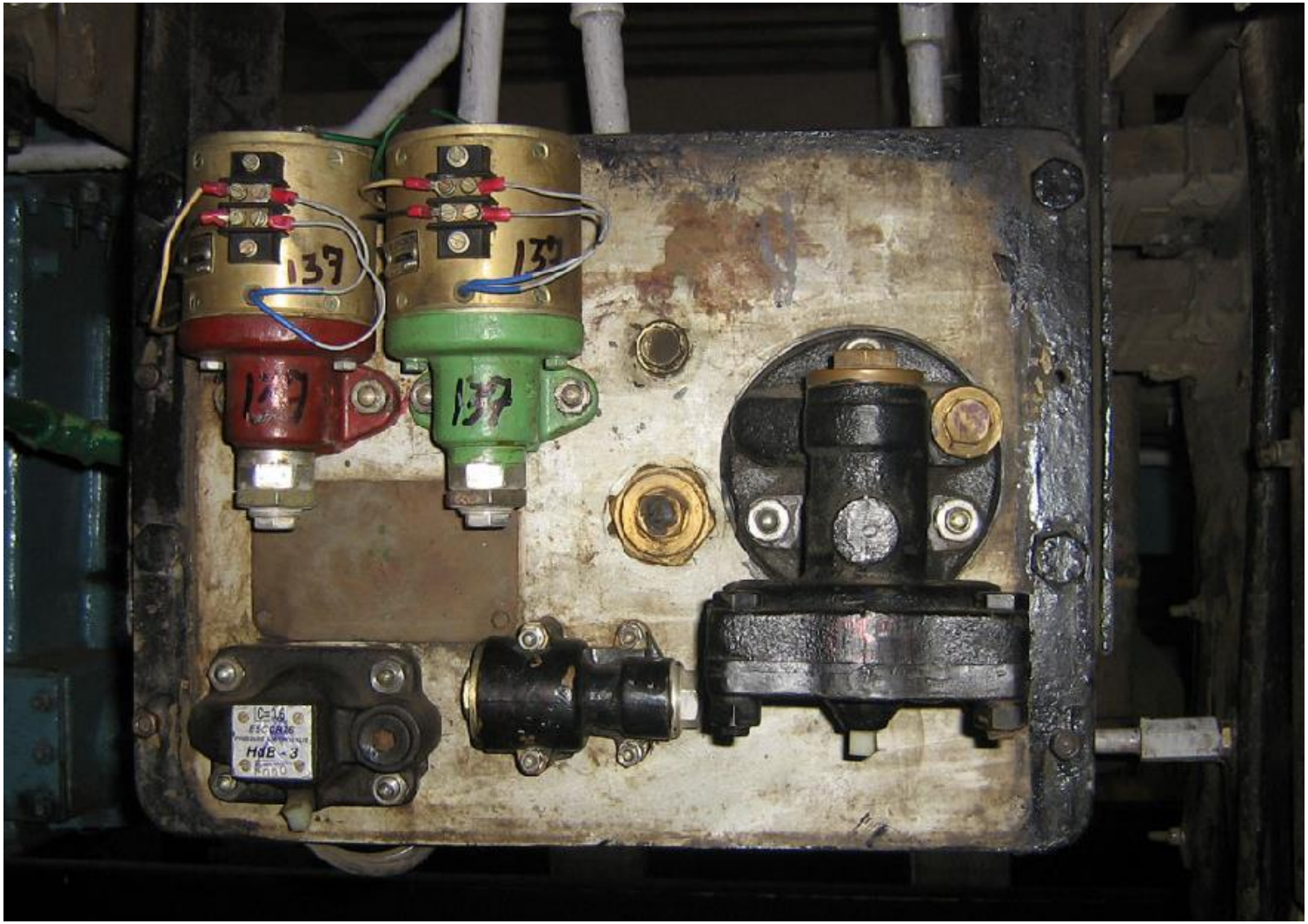
29-10-2015

Brake Controller



EP Unit



JUMPERS

'A' JUMPER

CABLE NO	CIRCUIT WIRE NO	CIRCUIT DESCRIPTION
101	14A	CONTROL POSITIVE
102	14A	CONTROL POSITIVE
103	14A	CONTROL POSITIVE
104	9	ABB CLOSE
105	44	AC FAN'S-I
106	45	AC FAN'S -II
107	10	ABB TRIP
108	12	MAIN COMPRESSOR SET
109	42	MAIN COMPRESSOR TRIP
110	1452	AUDIO VISUAL CIRCUIT
111	7	PANTOGRAPH RAISE
112	40	BRAKE CIRCUIT RETURN
113	8	PANTOGRAPH LOWER
114	36	BRAKE CIRCUIT POSITIVE
115	37	EP HOLDING
116	38	EP APPLICATION
117	3904	AUDIO VISUAL CIRCUIT
118	39	BRAKE END CIRCUIT
119	40	BRAKE CIRCUIT RETURN

B-JUMPER (BLUE JUMPER)

CABLE NO	CIRCUIT WIRE NO	CIRCUIT DESCRIPTION
201	5	FORWARD
202	6	REVERSE
203	1	NOTCH -1
204	2	NOTCH-2
205	3	NOTCH-3
206	SP	SPARE
207	1424A	OVR SYNCHRONISING
208	A261	NLVS INPUT
209	A266	NLVS INPUT
210	A266	NLVS INPUT
211	33	HL, HC, TL EMERGENCY
212	46	AC FAN'S RETURN
213	46	AC FAN'S RETURN
214	11	ALL OVER LOAD RESET
215	A261	NLVS INPUT
216	13	MCP SYNCHRONIZING
217	SP	SPARE
218	SP	SPARE
219	14A	CONTROL CHANGE OVER FEED

C-JUMPER

CABLE NO	CIRCUIT WIRE NO	CIRCUIT DESCRIPTION
301	16	ABB OPEN INDICATOR
302	19	RECTIFIER -FUSE BLOWN INDICATOR
303	18	TRACTION MOTOR OL - INDICATOR
304	17	110V DC SUPPLY INDICATOR
305	15	SUPPLY FOR INDICATION LIGHT
306	17A	BATTERY CHARGER FAILURE INDICATOR
307	A261	NLVS INPUT
308	A261	NLVS INPUT
309	226	NLVS INPUT
310	226	NLVS INPUT
311	14	WARNING
312	SP	SPARE
313	31	EMERGENCY POSITIVE FOR LIGHT
314	31	EMERGENCY POSITIVE FOR LIGHT
315	25	ALARM BELL
316	26	SIGNAL BELL
317	14A	CONTROL CHANGE OVER FEED
318	14A	CONTROL CHANGE OVER FEED
319	20	GUARD'S SUPPLY

D-JUMPER

CABLE NO	CIRCUIT WIRE NO	CIRCUIT DESCRIPTION
401	A226	NLVS INPUT
402	A226	NLVS INPUT
403	44	AC- FANS I
404	45	AC-FANS II
405	21	LIGHT'S ON
406	SP	SPARE
407	22	LIGHT'S OFF
408	23	FAN'S ON
409	24	FAN'S OFF
410	20	GUARD'S KEY SUPPLY
411	41	DC SUPPLY NEGATIVE
412	41	DC SUPPLY NEGATIVE
413	A261	NLVS INPUT
414	A261	NLVS INPUT
415	46	AC FAN'S RETURN
416	41	DC SUPPLY NEGATIVE
417	41	DC SUPPLY NEGATIVE
418	32	HLVS INPUT
419	32A	HLVS INPUT

Thanking You All