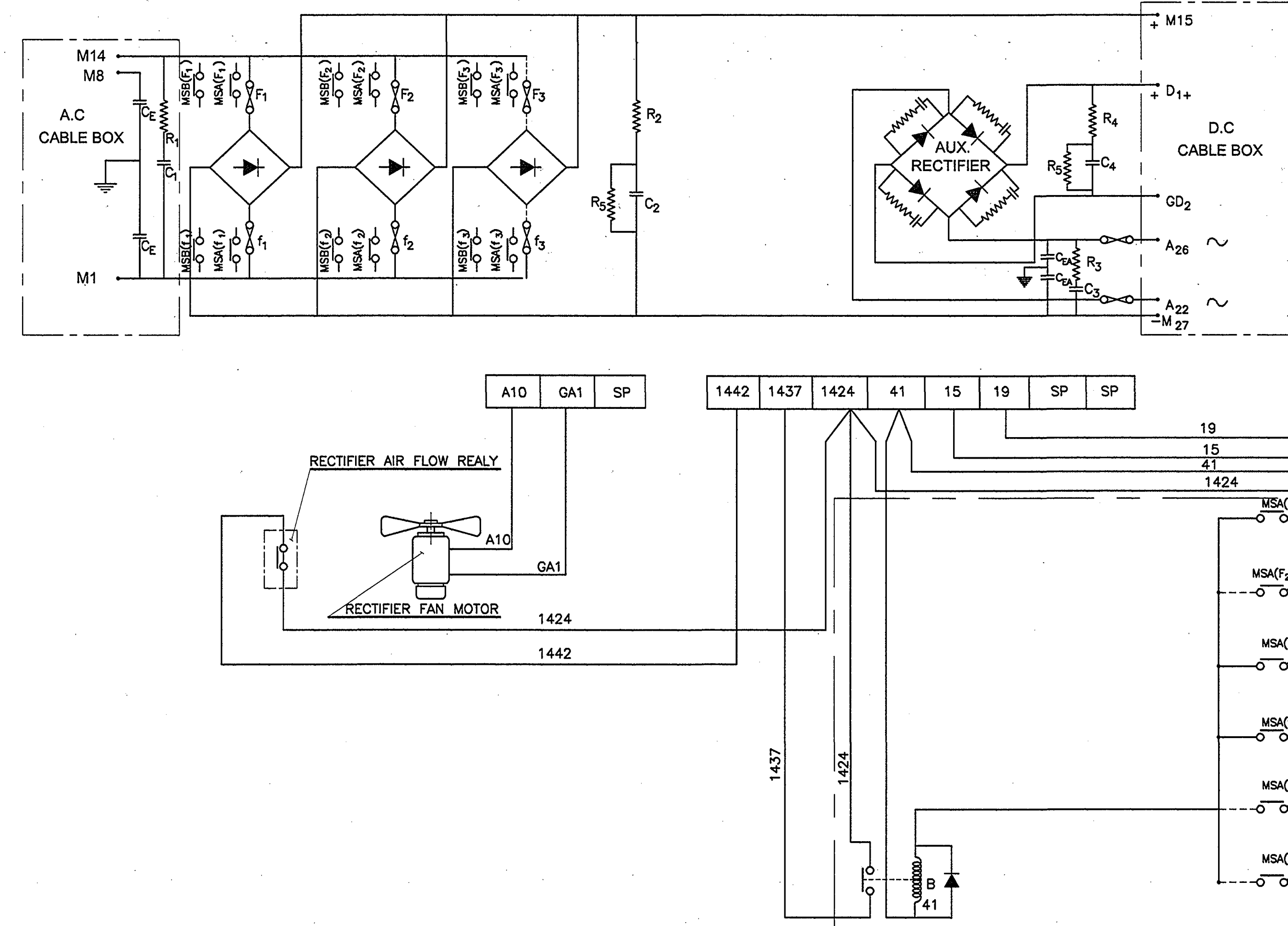


SCHEMATIC DIAGRAM OF POWER CIRCUIT AND CONTROL CIRCUIT



NOTE:-

- THIS DRAWING SHALL ACCOMPANY SPEN. ICF/ELEC/021 REV 'A'.
- OVER ALL WEIGHT NOT TO EXCEED 700 KGS.
- FRAMED DIMENSIONS TO BE STRICTLY ADHERED TO.
- FRONT COVERS TO BE REMOVABLE, REAR COVERS TO BE SECURED TO THE BODY.
- PROPER BEADING TO BE PROVIDED FOR CUT AWAYS TO AVOID SHARP EDGES.
- ALL INTERNAL WIRING SHALL BE DONE WITH MULTISTRAND FLEXIBLE ELASTOMERIC CONFORMING TO RS02 SPECN. IIS E14/01 PART III AS APPLICABLE.
- ALL CABLE TERMINATIONS SHALL BE PROVIDED WITH SOLDERLESS CRIMPING SOCKETS.
- ALL WIRING SHALL BE PROPERLY CLAMPED AND SECURED ON INSULATED STIFFENERS.
- P.T.F.E (POLY TETRA FLUORO ETHYLENE) INSULATED CABLES ONLY SHALL BE USED FOR ALL INTER CONNECTION TO THE SNUBBER CIRCUITS, DAMPING CIRCUITS AND SIGNALLING FUSES WITH PROPER CRIMPING SOCKETS.
- KEY SHALL BE MADE OF HIGH TENSILE STEEL TO SPECN. IS:2073-1970, GRADE C-40 & CHROMIUM PLATED.
- CABLE ENTRY CUTOFFS, AIR DUCT OPENING AND MOUNTING HOLES SHALL BE PROVIDED, WITH SUITABLE INLAYS TO AVOID WATER ENTRY. THE HEIGHT OF INLAYS SHALL BE NOT LESS THAN 10mm.

FUSE BLOWOUT SUPERVISORY CIRCUIT  
MSA: MICRO SWITCH CONTACTS.  
RELAY A: FIRST BRIDGE FAILURE RELAY.  
RELAY B: SECOND BRIDGE FAILURE RELAY.

CIRCUITS & DETAILS OF CABLE TERMINATION

LOCATION	CIRCUIT	CABLE NO	QTY	SINGLE CORE SIZE	GRADE & INSULATION	FINISHED CABLE DIA	CRIMPING SOCKET DRG.NO	TYPE/ITEM
AC BOX	860V A.C INPUT	M1	8	756/0.5 150mm <sup>2</sup>	1500V	27.2±1	ICF/SK-7-2-166	D16/50, B5 S.NO.22
		M14	4	756/0.5 150mm <sup>2</sup>	1500V	27.2±1	ICF/SK-7-2-166	D16/50, B5 S.NO.22
		M8	1	126/0.4 16mm <sup>2</sup>	1500V	12.8±0.7	ICF/SK-7-2-166	C7/50, B5 S.NO.29
DC BOX	535/690V. D.C OUTPUT	M15	4	756/0.5 150mm <sup>2</sup>	1500V	27.2±1	ICF/SK-7-2-166	D16/50, B5 S.NO.22
		M27	4	756/0.5 150mm <sup>2</sup>	1500V	27.2±1	ICF/SK-7-2-166	D16/50, B5 S.NO.22
		M27	1	84/0.3 6mm <sup>2</sup>	1500V	10.0±0.7	ICF/SK-7-2-166	C6/50, B5 S.NO.27
	136V D.C OUTPUT	D1	1	396/0.4 30mm <sup>2</sup>	750V	15.7±1	ICF/SK-7-2-166	D11/50, B5 S.NO.17
		GD.2	1	396/0.4 30mm <sup>2</sup>	750V	15.7±1	ICF/SK-7-2-166	D11/50, B5 S.NO.17
		GD.2	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	155V A.C INPUT	A22	2	475/0.5 95mm <sup>2</sup>	750V	20.3±1	ICF/SK-7-2-166	D14/50, B5 S.NO.20
		A26	2	475/0.5 95mm <sup>2</sup>	750V	20.3±1	ICF/SK-7-2-166	D14/50, B5 S.NO.20
		15,19	2	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	CBAR	1437	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	ABB & FAULT M.C.B	1424	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	RFAR	1442	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	110V DC NEG FOR A&B	41	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	RECTIFIER FAN SUPPLY	A10	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
		GA.1	1	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9
	SPARE	S.P.	2	80/0.2 2.5mm <sup>2</sup>	750V	5.3±0.5	ICF/SK-7-2-528	ITEM-9

REQUIREMENTS OF MAIN & AUX RECTIFIER COMPONENTS (DEVICE DAMPING & PROTECTION CIRCUITS)

SL.NO	CIRCUIT DESCRIPTION/PARAMETERS OF DEVICE	MAIN TRACTION RECTIFIER	AUXILIARY RECTIFIER
1	SYSTEM OF CONNECTION	BRIDGE	BRIDGE
2	NO OF DEVICES PER CONVERTER	12	4
3	NO LOAD INPUT VOLTAGE CORRESPONDING TO 27.5KV LINE VOLTAGE	860V	165V
4	PEAK INPUT VOLTAGE AT 30KV LINE	1326.8V	239.13V
5	200% SWITCHING SURGE VOLTAGE	2653.6V	478V
6	10% OVER VOLTAGE SHOOT DUE TO NON-AVALANCHE R-C DAMPING LIMITS	2919V	526V
7	PIV RATING OF RECTIFIER NOT LESS THAN -URRM	3000V	2000V
8	PIV RATING OF RECTIFIER NOT LESS THAN	3000V	2000V
9	RATED D.C VOLTAGE FOR STEADY STATE	535V	136V
10	DESIGNED D.C RATING FOR SEMICONDUCTOR DEVICE WITH ALL PARALLEL PATH IN HEALTHY CONDITION.	2640A	500A
11	SEMICONDUCTOR FUSES (BRIDGE)	MATCHING TO DIODE RATING IF VALUE SHALL BE LESS THAN 1% VALUE OF DIODE.	10mm <sup>2</sup> F.V. VALUE SHALL BE LESS THAN 1% VALUE OF DIODE NOT LESS THAN 300A.
12	DIODE FVD GROUP	THREE CONSEQUENT FVD GROUPS FOR ENTIRE LOT. NOT MORE THAN ONE GROUP IN A CUBICLE.	NOT APPLICABLE
13	FVD GROUP BAND WIDTH	BASED ON F.V. PIV RATING OF DIODE	-
14	COOLING AIR TEMPERATURE	50°C (SINCE PLACED IN COOLING DUCT)	70°C (SINCE PLACED AFTER MAIN RECTIFIER)
15	COOLING AIR VELOCITY	NOT LESS THAN 6m/sec	NOT LESS THAN 6m/sec
16	VENTILATION PROTECTION	AIR FLOW RELAY COMMON	FOR EACH RECTIFIER
17	BUSBAR TEMPERATURE	100°C	100°C
18	FUSE BLOW OUT SUPERVISORY CIRCUIT DIODE PIV RATING	1200V	-
19	DIODE AND CONVERTER ASSEMBLY TESTING	IS:7788	IS:7788
20	BRIDGE FAILURE RELAY	a) NOMINAL VOLTAGE b) VOLTAGE RANGE c) MIN. PICK UP VOLTAGE d) MIN. CONTACTS REQUIRED e) RATING OF CONTACTS	110V D.C 90 TO 120V D.C 75V D.C 2 N/O 2A (INDUCTIVE) AT 110V D.C WITH TIME CONSTANT OF 60ms

SL.NO	CIRCUIT DESCRIPTION PARAMETERS OF DEVICE	MAIN TRACTION RECTIFIER	AUXILIARY RECTIFIER
21	<u>DAMPING PARAMETERS</u> *		
	a) A.C. DAMPING	$R_1=8\text{ ohms, }500W$ IN SERIES WITH $C_1=15MFD$ , NOT LESS THAN 1000V RMS	$R_3=10\text{ ohms, }100\text{ WATTS}$ IN SERIES WITH $C_3=8MFD$ , NOT LESS THAN 500V RMS
	b) D.C. DAMPING	$R_2=2\text{ ohms, }200W$ IN SERIES WITH $C_2=10MFD$ , 1000V RMS WITH CAPACITOR DISCHARGE RESISTOR OF 50K.ohms, 50W	$R_4=20\text{ ohms, }100\text{ WATTS}$ IN SERIES WITH $C_4=5MFD$ , 500V RMS WITH CAPACITOR DISCHARGE RESISTOR OF 50K.ohms, 20 WATTS.
	c) EARTHING CIRCUIT	0.1MFD, 2000V RMS ( $C_2$ ) BETWEEN EARTH POINT M1 TERMINAL AND 0.1MFD, 2000V RMS BETWEEN M8 AND EARTH POINT.	0.1MFD, 1000V RMS ( $C_{2A}$ ) BETWEEN $A_{26}$ AND EARTH & 0.1MFD, 1000V RMS BETWEEN $A_{26}$ AND EARTH.
* ALL THE CAPACITORS USED MUST BE APPROVED TYPE, NON-BURSTING AND SUITABLE FOR +85°C CASE TEMPERATURE.			

NO. OFF	DESCRIPTION & DIMENSIONS	ITEM	REF.DRGS.	MAT. SPEC.	WEIGHT/UNIT	REMARKS
IV/III/II/I	GROUP:- 7-1					
OUT LINE OF SILICON RECTIFIERS CAPSULE TYPE FOR A.C EMUS						
SUPERSEDED BY: ICF/SK-7-1-068 AL 1/-						
SCALE: SSEE/D						
CND						
CAD						
DRN						
R.SHANMUGARAJ						
INTEGRAL COACH FACTORY CHENNAI-38						
SHEET 1 OF 1						