EMU/MEMU

N.D.TURKAR/PL/PSTC/IRIEEN

SELECTION OF SERVICES

The different transport needs of a community are:

(a)Transport of goods and passengers within a city,

(b)Transport of goods and passengers from suburbs to the business centers in the city.

(c)Transport of goods and passengers between different cities,

(d)Transport of goods and passengers between different countries/nations.

To cope up with the above needs of the community, the following types of electric traction systems were evolved over the year.

(a)Tramcars moving on rails, trolley buses with rubber tyres moving on roads for transport within a city and battery operated cars for personal use.

(b)Electrical Multiple Units (EMU's)moving on standard rail tracks for suburban services and in underground metro tunnels for suburban movement as well as within the city.

(c)Electric locomotives –hauled trains moving between cities & adjacent countries.

EMU/MEMU – A Brief History

Important Historical Events for EMU/MEMU

- 03.02.1925
  - •First Sub-urban Train of 4 car rakes ran between VT and Kurla
  - •1500V DC stock
  - • Electrical Equipments by EECo.
  - •Mech equipments by Metropolitan Vickers England
  - • 10 Feet wide stock with Cement flooring

- 1951
  - •12 Feet wide EMU stock with Electro Pneumatic brake system in Mumbai Area
  - •Imported from EECo. England

Important Historical Events for EMU/MEMU contd

- 14.12.1957
  - 3000V DC EMU introduced in Howrah division of ER between Howrah and Seoraphuli.

  - Imported from Switzerland (SIG)

- 1958
  - 12 Feet wide 1500 V DC EMU stock imported from Japan (NSSK/Toshiba/Hitachi)

Important Historical Events for EMU/MEMU
contd

- 1963-64
  - •BG 25kV AC EMUs were introduced in Sealdah Division in Kolkotta Area.
  - •Coaches Manufactured by ICF.
  - • Electrical Equipments from Hitachi Japan and AEI England.

- 1965-66
  - •ICF Manufactured MG AC EMUs.
  - •Electrical Equipments from Japan.

- 1968-69
  - •ICF Manufactured DC and AC EMUs alongwith M/s Jessop, Kolkotta.

Important Historical Events for EMU/MEMU
contd

- 1989-90
  - •ICF Manufactured Thyristor controlled 25kV MG EMU for Chennai Area.
  - •Electrical Equipments by GEC England.

- 1993
  - •Chopper control was introduced on 20 nos. BG EMU in association with BARC.

- 1995
  - •IR adopted 3 phase Traction Drives Equipments suitable for dual voltage 1500V DC or 25kV AC system with Regenerative Braking features for use in Mumbai Area.

Important Historical Events for EMU/MEMU
contd

- Since 2007
  - 116 Energy Efficient AC/DC rakes have been introduced with 3 phase IGBT propulsion system and Regenerative Breaking feature. (In Mumbai)
- Since Jan 2015
  - 72 Energy Efficient AC rakes have been introduced in Phase II with 3 phase IGBT propulsion system and Regenerative Breaking feature. (In Mumbai)

Since 16-17 , 6 Energy Efficient AC rakes have been introduced ,Medha make. (In Mumbai).

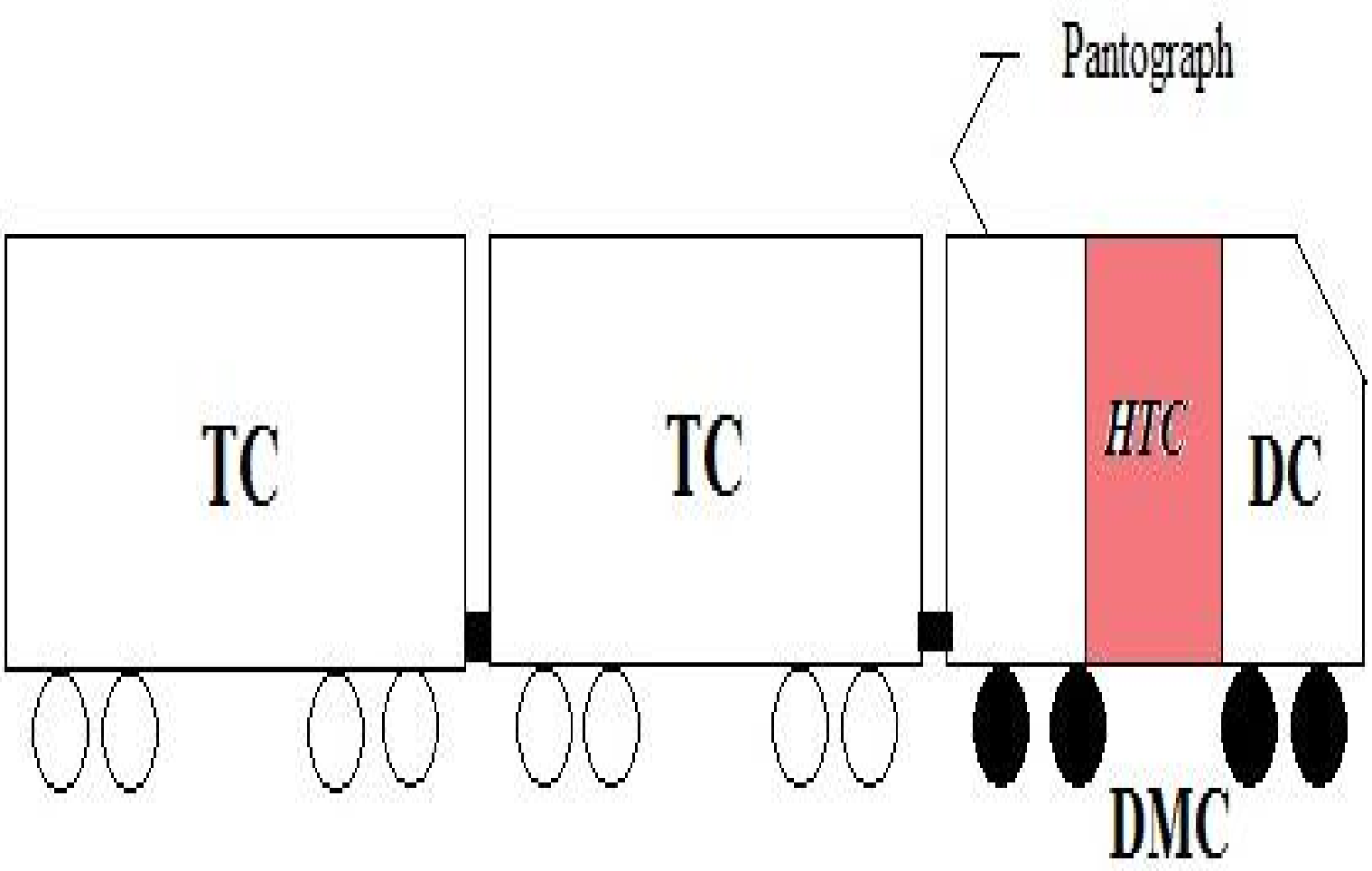
MEMU As on 01.06.2017												
Rlys	Name of the shed	Designed capacity of the shed	Coach holding						Staff		Utilisation kms /day/on line	Number of services
			MC	TC	Total	8 car	12 car	16 car	Sanc.	On roll		
ER*	Asansol	15 rakes of 12 car	66	198	**264**	2	17	0	304	253	449.7	12 car-82, 8 car-14
	Ranaghat	12 rakes of 12 car	6	18	**24**	4	0	0	0	0	611	8 car-6
	Total	**27 rakes of 12 car**	**72**	**216**	**288**	**6**	**17**	**0**	**304**	**253**		**102**
NR*	GZB	10 RAKES OF 12 CAR	91	270	**361**	3	18	5	1227	878	423	8/12/16 car-7+77+25 **Total-109**
	SRE	10 RAKES OF 12 CAR	35	105	**140**	5	7	0	111	98	431	8 car-19, 12 car-20= Total-**39**
	Total		**126**	**375**	**501**							**148**
SR*	Avadi	-	23	68	**91**	9	0	0	-	-	488	45
	Palakkad	10 rakes of 4 car	8	24	**32**	4	0	0	32	23	PGT-310& SA529	12
	Kollam	10 rakes of 8 car	8	24	**32**	4	0	0	35	35	TVC 295	14
	Total		**39**	**116**	**155**	**17**	0	0	**67**	**58**		**71**
SCR*	Maulali		5	15	**20**	2	0	0			285	8
	Rajamundary	10 rakes of 16-car	29	84	**113**	0	8	0	148	141	522	35
	Total		**34**	**99**	**133**							**43**
SER*	Kharagpur	10 MEMU rakes of 12 car	37	108	**145**	17	0	0	751	703	496	**81**
WR*	**BRC**	20 rakes of 12 car	58	170	**228**	1	14	0	242	211	306	**71**
ECR*	Jhajha	15 rakes of 16 car	103	312	**415**	0	0	22	232	212	378	**78**
SECR	Bhilai	15 Rakes of 8 car	33	97	**130**	13	0	0	58	95	435	**48**
SWR	-	10 rakes of 8 car	8	24	**32**	2	0	0	NA	NA	800	**23**
		MEMUs	**510**	**1517**	**2027**				**3140**	**2649**		**665**

EMU position As on 01.06.2017

Rlys	Name of the shed	Designed capacity of the shed	Coach holding			Rakes composition			Staff		Utilisation kms /day/on line	Number of services
			MC	TC	Total	9 car	12 car	15 car	Sanc.	On roll		
ER*	Howrah	32 rakes of 12 car	140	290	430	0	29	0	849	762	519.95	9 car -462, 10 car - 12, 12 car -821, **Total - 1295**
	Bandel	24 rakes of 12 car	101	215	316	0	21	0	437	439		
	NKG	23 rakes of 9 car & 7 rakes of 12 car	106	224	330	30	0	0	662	456	466	
	Barasat	15 rakes of 9 car & 15 rakes of 12 car	111	238	349	24	6	0	474	376		
	Sonarpur	30 rakes of 12 car	134	278	412	0	27	0	529	408		
	Ranaghat	12 rakes of 12 car	60	127	187	0	11	0	304	263		
	Total	**38 rakes of 9 car + 120 rakes of 12 car**	**652**	**1372**	**2024**	**54**	**94**	0	**3255**	**2704**		**1295**
NR*	GZB	25 rakes of 12 car	97	192	**289**	4	11	3	1227	878	EMU=316 MEMU=423	6 car -8(4L+4G),9 car-26,12 car-61, 15 car-16 **Total-111(L=LADY, G=GENL.)**
												111
SR*	Avadi	35 rakes of 9 car	122	245	**367**	36	0	0	841	759	9 car - 425	9 car-333
	Tambaram	30 rakes of 12 car	120	239	**359**	0	26	0	643	574	12 car -397	12 car -240
	Velachery	9 rakes of 9 car	28	57	**85**	7	0	0	104	100	331	9 car-66
	Total	**74 rakes of 9 car**	**270**	**541**	**811**	**43**	**26**	**0**	**1588**	**1433**		**639**
SCR	Maula Ali	20 rakes of 9- car	32	64	**96**	9	0	0	158	156	430	**121**
SER*	Tikiapara/Panskara	22.5 rakes of 8 car(TKPR) +9.5 rakes of 8 car (Panskura)	125	243	**368**	19	14	0	751	695	506	**9 car-103, 12 car-89**
	Total											**192**

CR	**Kurla**	49 rakes of 12 car							**1824**	**1886**	**Mainline**-Monday to Saturday-605.44; Sunday-643.15 **Harbour**; Monday to Saturday-556.97 Sunday-573.84 **Tarans Harbour**-Monday to Saturday-542.54 Sunday-544.63	**12 car-1688, 15 car-16**
	AC-DC Retro		0	0	0	0	0	0				
	AC-DC siemens		256	511	767	0	56	1				
	Total		**256**	**511**	**767**	**0**	**56**	**1**				
	Kalva	45 rakes of 12 car										
	AC Retro		58	124	182	0	5	0	**745**	**526**		
	AC-DC siemens		88	176	264	0	20	0				
	AC-DC Bhel		50	99	149	0	5	0				
	AC Pune		0	0	0	0	5	0				
	Total		**196**	**399**	**595**	**0**	**35**	0				
	Sanpada	42 rakes of 9 car										
	AC-DC Retro		90	182	272	0	15	0	**469**	**443**		
	AC-DC siemens		92	184	276	0	21	0				
	Total		**182**	**366**	**548**	**0**	**36**	**0**				
	G. Total	**167 rakes of 9 car**	**634**	**1276**	**1910**	**0**	**127**	**1**	**3038**	**2855**		**1704**
WR	**BCT , KILE & VR**	BCT- 50 rakes of 12 car & KILE -20 rakes of 12 car & VR 30 rakes of 12 car							1548	1155	543.61	12 car -1281 & 15 car -42 **Total=1323**
	AC(Retrofitted)		41	85	126	0	83	3				
	AC EMU		1	0	1							
	Alstom		26	54	80							
	Siemens/MUTP Phase-i		58	114	172							
	MUTP Phase-II		288	576	864							
	Medha		8	16	24							
	Total		**422**	**845**	**1267**							**1323**
		EMUs	***2232***	***4533***	***6765***				**11565**	**9876**	Nos. of services daily	**5385**

AC EMU UNIT FORMATION



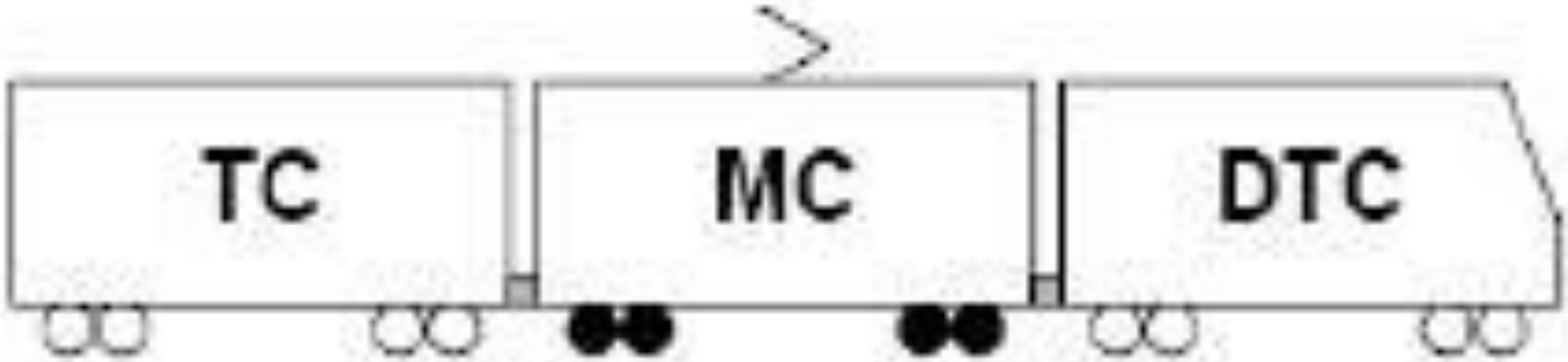
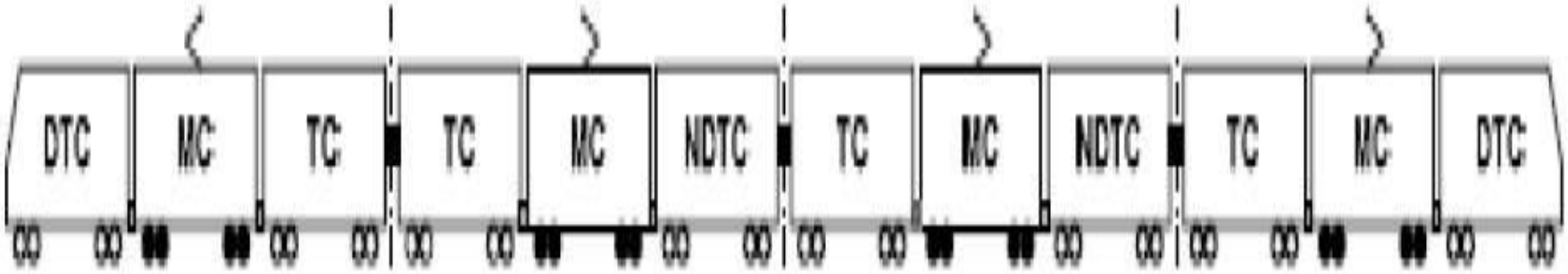


Figure 1: End Basic Unit

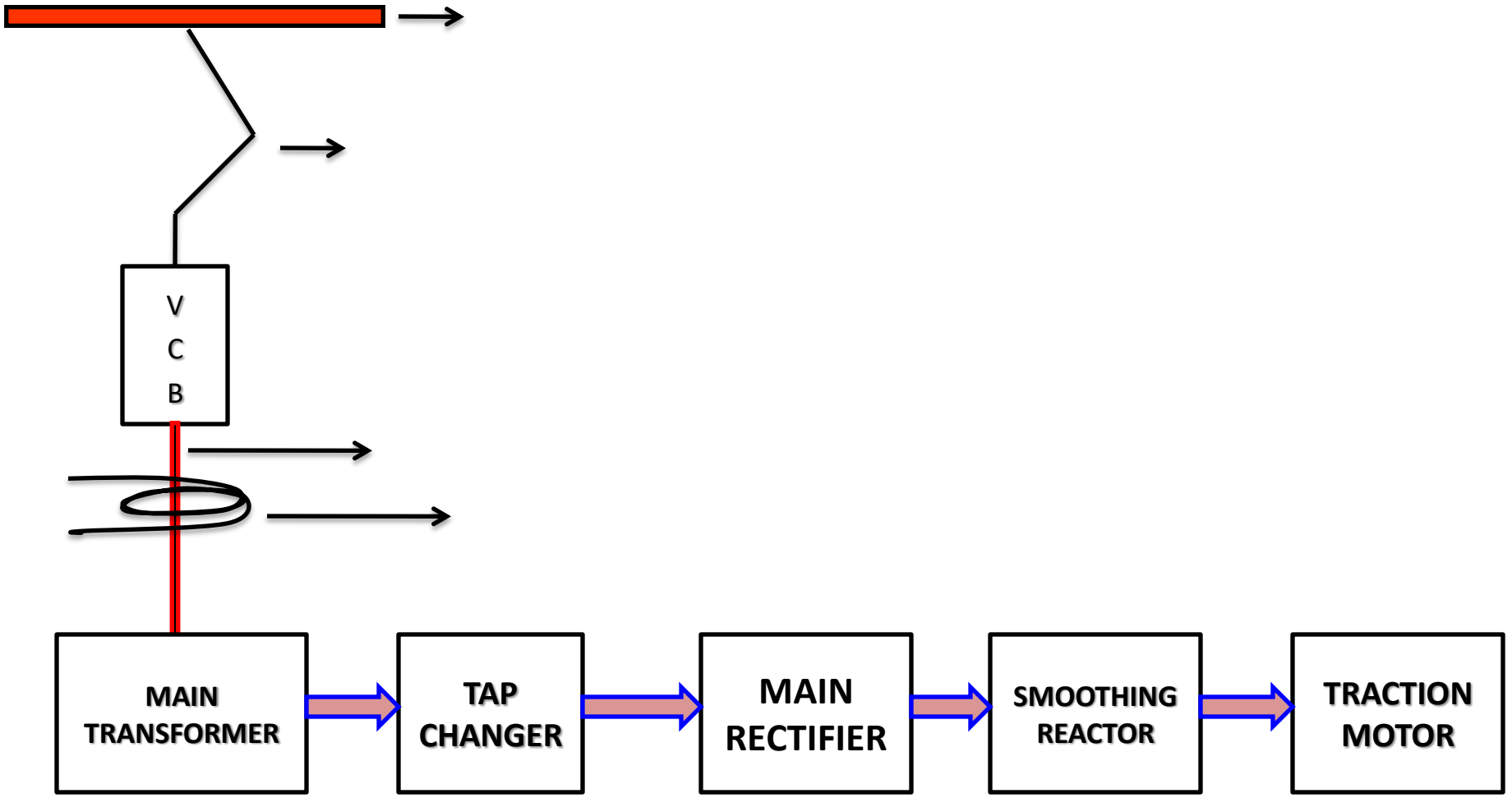


CCG
KYN

Figure 4: Twelve Car Rake

VR (WR)
CSTM (CR)

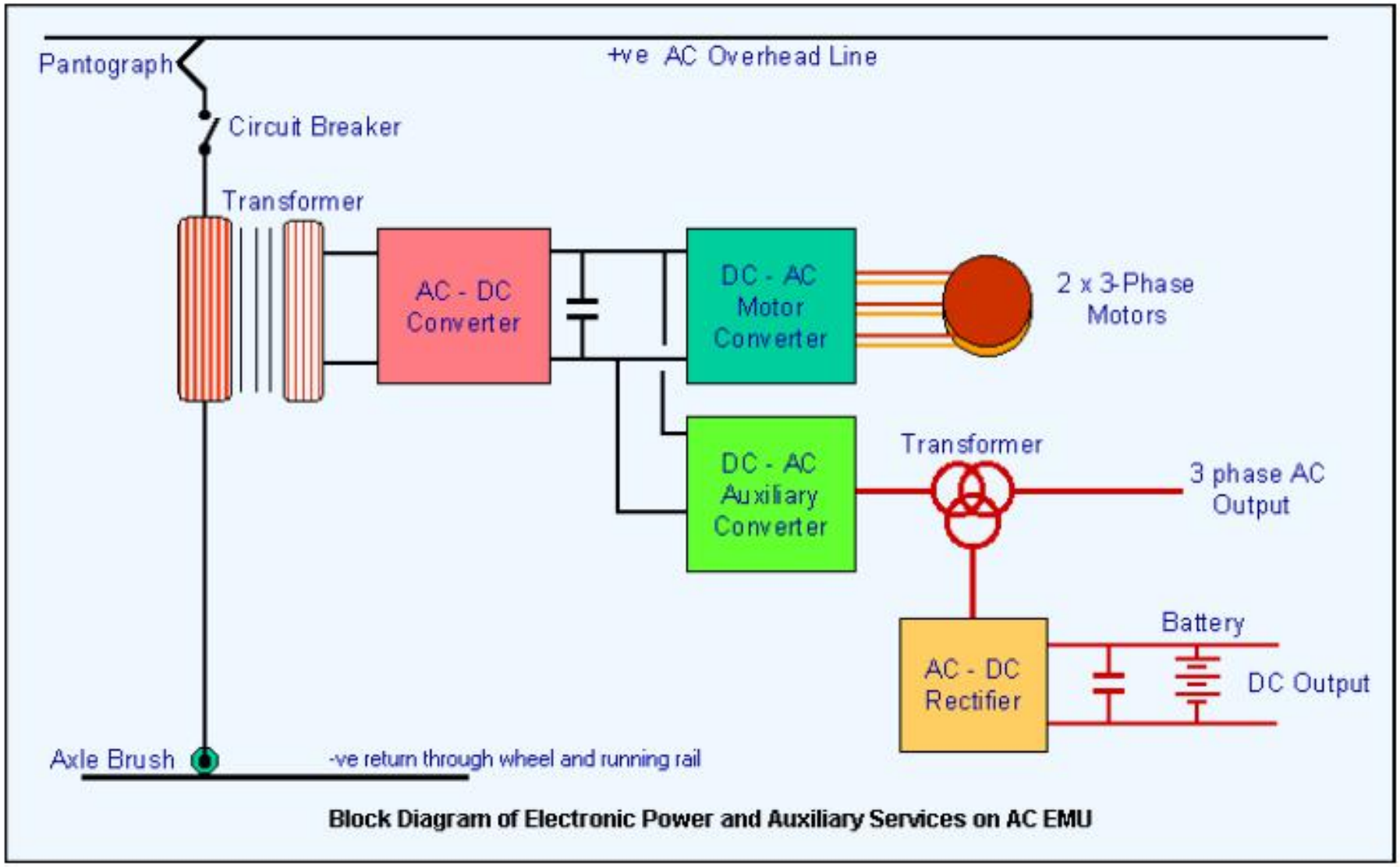
AC EMU/MEMU POWER CKT


V
C
B
MAIN TRANSFORMER
TAP CHANGER
MAIN RECTIFIER
SMOOTHING REACTOR
TRACTION MOTOR

BASIC TYPE OF COACHES and UNITS

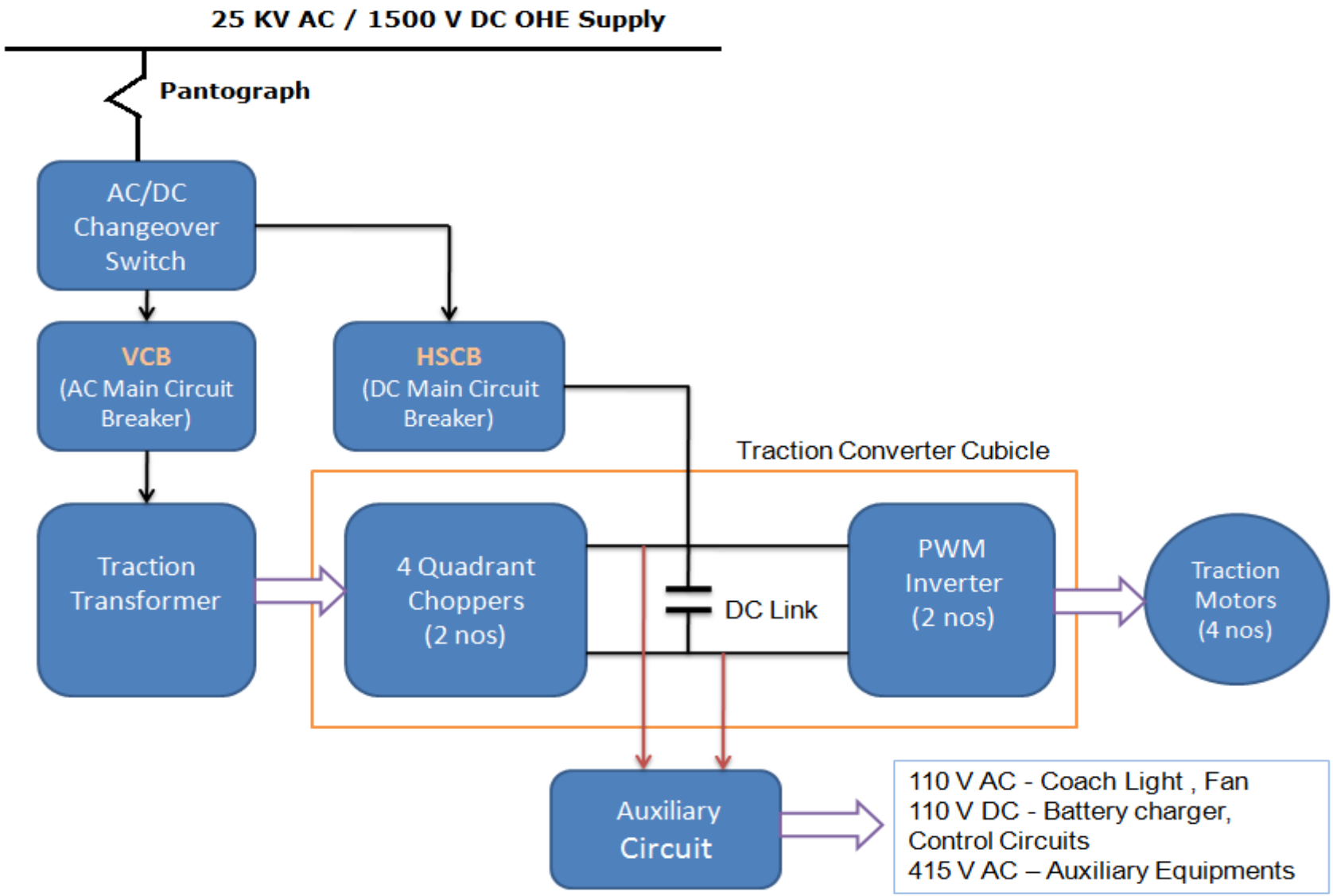
- DTC
- TC
- MC
- DMC

POWER CIRCUIT (3 phase)



Block Diagram of Electronic Power and Auxiliary Services on AC EMU

Block diagram of Traction Power Circuit



THANKS