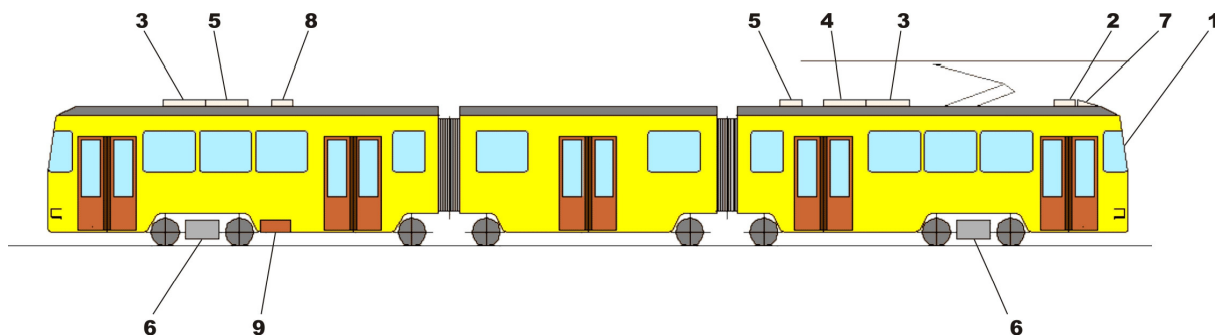
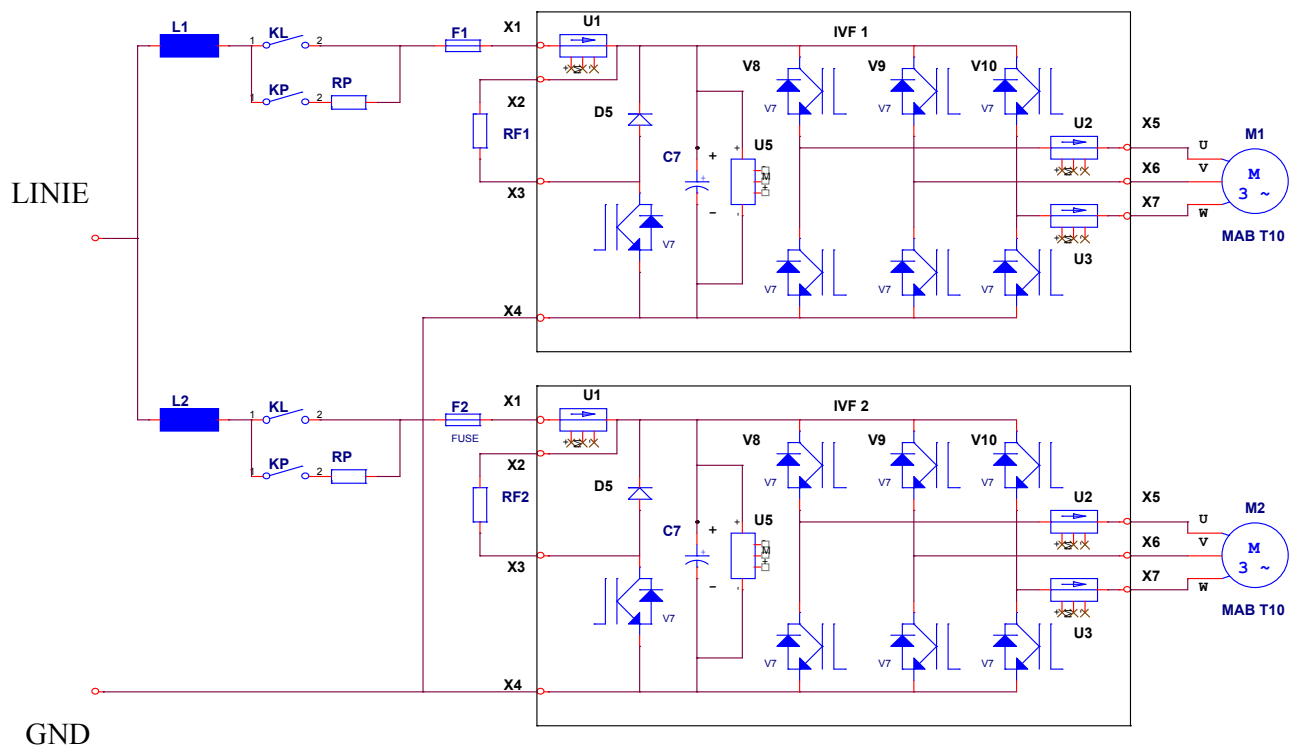


TRAMVAI TIP V3A-H MODERNIZAT CU TRACTIUNE CU MOTOARE ASINCRONE

Dupa realizarea cu succes a actionarii cu motor asincron pentru troleibuze(2 troleibuze Citelis Astrabus- Iveco in circulatie in Bucuresti de 2 ani) ICPE SAERP SA a realizat impreuna cu URAC RATB primul tramvai actionat cu motoare asincrone din Romania. Solutia aleasa implica 2 invertoare de frecventa si 2 boghiuri motoare, tehnica de reglare fiind controlul cu orientare dupa campul rotoric al masinilor asincrone (F.O.C.). Performantele dinamice realizate pe vehicul sunt extrem de bune, franarea electrica facandu-se pana la oprirea completa iar controlul patinarii(antipatinarea) fiind foarte precis realizat. Echipamentele de tractiune sunt proiectate intr-o structura compacta in tehnica IGBT iar controlul se face exclusiv prin DSP-uri de ultima generatie care pot comunica atat pe interfata seriala RS485 cat si pe CAN. De asemenea capacitatile de diagnoza ale sistemului sunt foarte dezvoltate fiind prezente atat la nivelul vatmanului printr-un display multifunctional cat si la nivelul personalului de service cu medie sau inalta pregatire prin semnalizarile vizuale si/sau alphanumerice cu, coduri de stare sau prin interogarea sistemului cu PC-ul (laptop) avand instalat soft-ul de diagnoza DC-Soft dezvoltat de specialistii ICPE SAERP SA.





- | | |
|--|------------------------------------|
| 1. Cabina vatman | Driver's cab |
| 2. Disjunctur | Main circuit breaker |
| 3. Cutie inverter frecventa IVF-01 | Inverter main box IVF-01 |
| 4. Filtru de intrare | Input filter |
| 5. Rezistor franare reostatica 1 si 2 | Breaking resistor 1 and 2 |
| 6. Motor tractiune 1 si 2 | Traction motor, 1 and 2 |
| 7. Unitate aer conditionat pentru post conducere | Driver's cab air-conditioning unit |
| 8. Sursa statica | Auxiliary static converter |
| 9. Baterie 24V | 24V Battery |

Date Tehnice

Model	Vehicul dublu articulat cu 8 osii
Tip	V3A
Aranjament axe	B'2'2'B
Ecartament	1435 mm
Viteza maxima	60 km/h
Acceleratie (incarcata)	1,25 m/s ²
Deceleratie in frana (incarcata)	1,5 m/s ²
Frana de urgenta(incarcata)	2,5 m/s ²
Tensiune de alimentare	750 Vcc (+20-30%)
Lungime	27180 mm
Latime	2390 mm
Distanta intre osiile aceluasi boghiu	1800 mm
Inaltime cu pantograful coborat	4200 mm
Masa vagonului gol	35 t
Masa vagonului incarcata	55 t
Locuri pe scaune	34
Nr total calatori	249
Echipamente pe acoperis	3 containere
Dimensiuni (L x l x h)	1200x800x310 mm
Invertor tractiune	2 invertoare independente in tehnica IGBT
Tip	IVF 260FR/750
Tensiune de intrare	750Vcc(+20% -30%)
Putere iesire	2x240 Kw (continuu) 2x400 Kw(max)
Design	Invertor comandat PWM alimentat direct de la retea
Racire	Fortata cu turbina de ventilatie

Caracteristici

- design optimizat datorita tehnologiei IGBT
- Simplificarea cablajului prin controlul invertoarelor in conexiune RS485
- Generarea pulsurilor de comanda local in tehnica „cu orientare dupa camp” de catre unitatea de control MBB31 a invertorului
- Functie de eliminare a patinarii la tractiune si frana electrica
- Frana electrica regenerativa si reostatica

Technical data:

Model	Eight axle articulated three Section vehicle
Type	V3A
Axle arrangement	B'2'2'B
Gauge	1435 mm
Maximum speed	60 km/h
Acceleration(loaded)	1,25 m/s ²
Breaking deceleration	1,5 m/s ²
Emergency braking (loaded)	2,5 m/s ²
Line Voltage	750 Vdc (+20-30%)
Carbody length	27180 mm
Carbody width	2390 mm
Bogie axle distance	1800 mm
Carbody hight	4200 mm
Vehicle weight	35 t
Vehicle weight(loaded)	55t
Seating	34
Total seating+ standing	249
Roof equipment	3 containers
Containers	
Dimensions (L x l x h)	1200x800x310 mm
Traction Inverter	2 independent inverters, IGBT direct pulse controled
Type	IVF 260FR/750
Input voltage	750Vdc(+20% -30%)
Output power	2 x 240 Kw (continuous) 2 x 400 Kw(max)
Design	PWM pulse inverter operated directly on the network
Cooling	Forced ventilation by fan

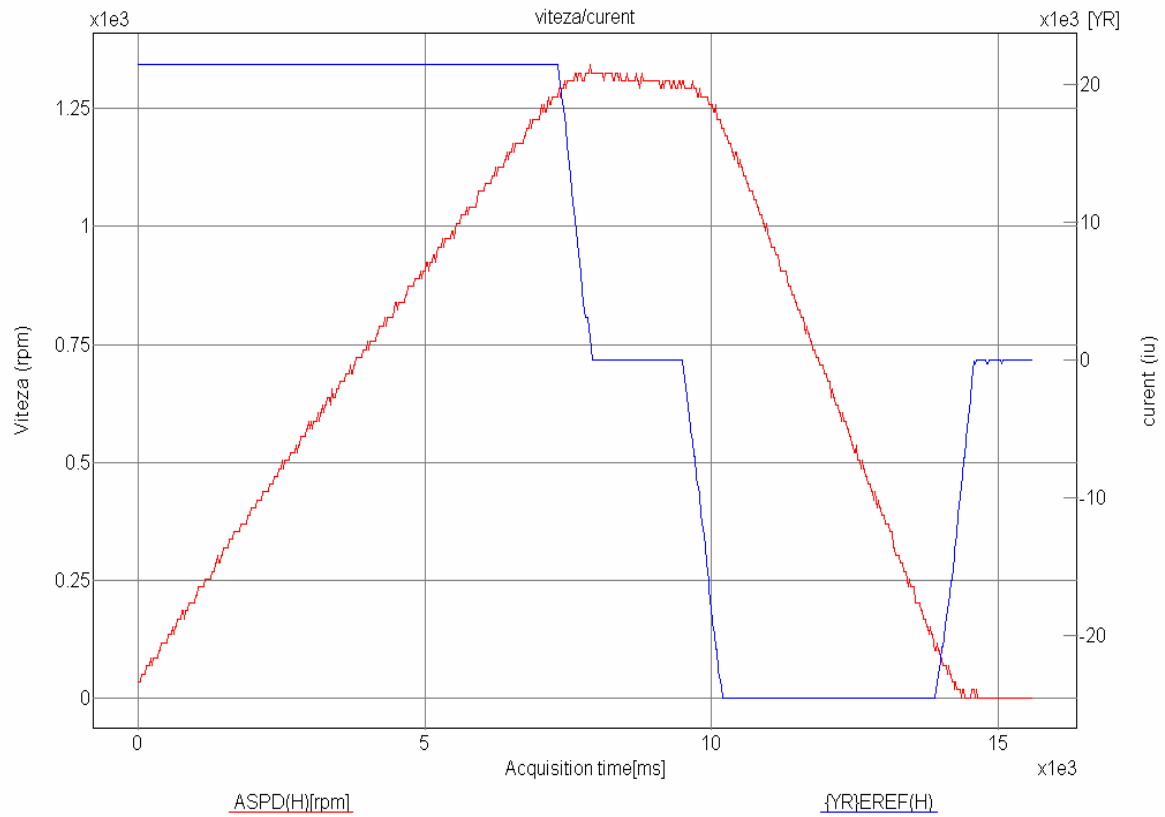
Characteristics

- Optimized design due IGBT technology
- Simply Wiring by series RS 485 inverters controlling or CAN bus
- PWM Pulse pattern Field oriented control (F.O.C.) given by the inverter control unit MBB-31 situated inside the inverter unit
- Jerkfree starting and breaking
- Combined regenerative and rheostatic brake

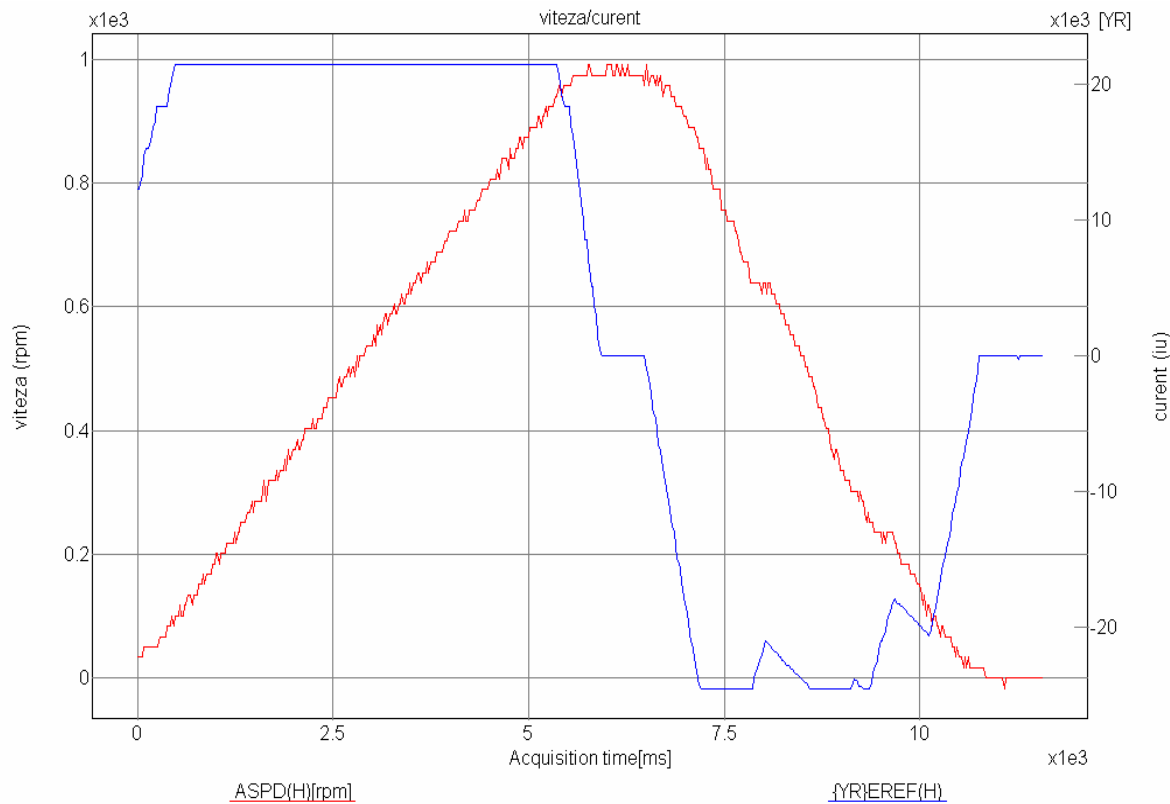
	<ul style="list-style-type: none"> • Comutarea tractiune-frana Inainte-Inapoi fara aparate de comutatie • Frana electrica pana la viteza de 0 km/h • Comanda schimbare macaz prin comanda chopperului de frana reostatica 		<ul style="list-style-type: none"> • Contactless power/brake changeover and contactless changeover of direction of travel • Efective electrical braking till 0 km/h • Special command for changing travel line through rheostatic braking chopper
Control	O unitate Master pentru controlul vehiculului si 2 unitati de control pe motoare	Control	One Master Unit for vehicle control and 2 control units directly in the inverters for driving the motors
Tip	SATREC si MBB 31	Type	SATREC and MBB31
Constructie	Bloc electronic special protejat la EMI inclusiv placi de intrari/iesiri	Construction	Electronic assembly and input/output assembly in compact EMI rack
Racire	Ventilatie naturala	Cooling	Natural ventilation
Alimentare	24Vcc (+20%, -30%)	Supply	24Vdc (+20%, -30%)
Design	Control secvential cu microprocesor	Design	Sequential vehicle control via Microprocessor
	<ul style="list-style-type: none"> • Antipatinare la tractiune/frana • Frana de statie/panta • Limitarea curentului din linie • Regenerarea energiei in retea cu monitorizarea continua a capacitatii acesteia • Memorie de evenimente/defecte • Achizitia de date din functionare/pentru diagnoza/ pentru analiza defectelor prin intermediul PC • contorizarea energiei consumate/recuperate • semnalizarea starilor vehiculului vizual prin led-uri si afisaj alpha numeric cu 2 digiti 		<ul style="list-style-type: none"> • Wheel slip/slide protection • Hill holder • Line current limiting • Recovery to the network with continuous monitoring of the network capacity • Event/Fault recorder • Acquisition of operating data/diagnosis/fault analysis via PC • Recovery/Consumed Energy recorder • Visual signalization of the vehicle status by leds on input/output board units, and by means of an alphanumeric 2 digit display
Motoare de tractiune	2 motoare trifazate asincrone autoventilate	Traction Motors	2 three-phase asynchronous machines with self-ventilation
Tip	MAB T10	Type	MAB T10
Putere nominala	240 kW	Rated output	240 kW
Curent nominal	349 A	Rated current	349 A
Tensiune nominala	500 V	Rated voltage	500 V
Frecventa nominala	50 Hz	Rated frequency	50 Hz
Turatie nominala	1486 rpm	Rated speed	1486 rpm
Sursa auxiliara	O sursa statica in tehnologie Power MOS-Fet	Auxiliary static supply	One power supply in Power Mosfet technology
Tip	SIF 28.180/750	Type	SIF 28.180/750
Tensiune de intrare	750 Vcc (+20% - 30 %)	Input voltage	750 Vdc (+20% - 30 %)
Tensiune de iesire	24 Vcc 180 A total, + o iesire in curent limitat pentru incarcare	Output voltage	24 Vdc 180 A + one output with limiting charging current for battery
Incarcare baterie	incarcare dupa o curba tensiune/curent constante	Battery charge	Constant voltage/constant current curve

Caracteristici Dinamice / Dynamic Characteristics

Viteza (Speed) 43 rpm = 1km/h / Curent (Current) 0,016 A / (IU)



Controlul patinarii (Antipatinare) / Slip – Slide protection



Frana electrica de la 50 Km/h la 0 km /h , 43 rpm= 1 km/h

Viteza (Speed)/ Curent (Current)

