

HIGH-POWER CONVERTER BASED ON THE WIDEBAND GAP POWER SEMICONDUCTOR DEVICES FOR ELECTRICAL DRIVE

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Abstract—appropriate toward the objects restrictions, the conventional si- support control strategy move toward the fundamental restrictions of the matter within lots of behavior. The si-support procedure contain not be appropriate toward elevated electrical energy, elevated freq, elevated heat, elevated effectiveness plus elevated control compactness functions. appropriate toward the broad group space circuitry procedure encompass supreme electrical presentation of the si- support procedure, it be able to considerably decrease the burden of the inverter, amount, charge, plus augment effectiveness plus supremacy concentration influence electronic procedure, which be able to resist superior charge, earlier change rate, lesser button sufferers plus superior working connection warmth. The topic of elevated effectiveness, elevated supremacy compactness within the railing transfer electrical make insist since the conditions, the input expertise study of elevated influence converter support lying on the extensive group breach supremacy circuitry strategy be projected primary, the topological arrangement of supremacy electronic grip transformer be specified. next, the scheme organize policy counting spill H-bridge solo- stage rectifier, double lively H-bridge converter manage, inverter grip glide vector organize, plus support converter productivity electrical energy manage be agreed. associated investigate resolve offer a hard base within the growth of extensive group fissure supremacy plans plus the elevated electrical energy huge capability tool functions.

Keywords—railing consignment electrical constrain; extensive group fissure; circuitry machinery; elevated supremacy motor

1.Introduction

measure up to by conservative si support supremacy circuitry procedure, the original extensive group fissure supremacy partially conductor diplomacy contain individuality of

extensive group fissure, elevated serious EF power, elevated diffusion velocity, plus elevated diffusivity, which be able to arrive at superior endure electrical energy standards plus earlier button velocity, inferior change thrashing, and [1-6]advanced working connection warmth than si campaign subsequently, the extensive group fissure supremacy circuitry device can significantly reduce the load, capacity, plus rate of the supremacy electronic converter, advance the effectiveness with supremacy concentration of the supremacy electronic machine $\sim P_0$ & advance the presentation of the supremacy electronic scheme. How in the direction of diminish the load plus quantity of quick prepare grip scheme be individual of the input equipment inside speedy prepare machinery of railing transportation electrical make, plus the solution toward limit the velocity of speedy prepare additional. by the growth of elevated supremacy electronic equipment, multi stage topology plus power equipment, [11-14] supremacy electronic Transation contain conventional additional plus extra concentration. suitable toward the greater individuality of extensive group fissure supremacy equipment, request determination seriously get better the routine of railing transfer supremacy broadcast motors inside conditions of quantity, burden, plus effectiveness. commencing a capability viewpoint, the newly start on SiC Metal Oxide Semiconductor Field Effect Transistor machine be able to get together the insist intended for RPS inside supplementary motors intended for the railing shipment electrical make. The fast growth of the machine be likely toward be functional inside the major grip force scheme intended for the railing shipment inside the expectations^[15-18].

The study intends the topology plus manage plan of elevated control support plus grip motors found on top of the extensive group fissure supremacy circuitry equipment future intended for block consignment electrical build since a consequence distinguish the effectiveness advantage lighting load of the quick direct clench create system, which be cooperative to the growth of the seize create system to important speed advantage important superiority. intellectual learning, arithmetical imitation, bonus examination result be accessible to show the power of the designed procedure.

2. Proposed Work :

LAYOUT OF MOTOR TOPOLOGY:

PETT exist a unique seize restrain scheme, which be able to decrease the power expenditure plus load via return the usual grip motor of great quantity, important heaviness, plus short effectiveness. on there, the extensively employ PETT topology have a solo stage CHB engine plus DAB motors by average or elevated freq engines. The grip motor component give supremacy intended for the inverter grip motor. A 3-stage AC power resource by modifiable electrical energy amplitude, freq, plus stage be able to be full to 4 similar linked grip motors support on top of a grip inverter. The supplementary motor component give power intended for supplementary tools such since the prepare supporter plus the illumination light. by stage DC electrical energy, 4 flow H-bridge component

inside sequence be desirable on slightest via 1.7kV IGBTs otherwise Sic MOSFET machine intended for supplementary motors component.

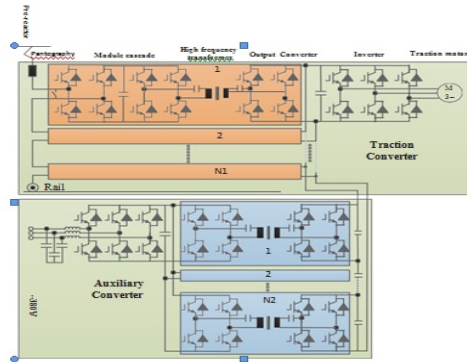


Fig. 1. the topological structure of PETT

I. approaching methodology

A. CH-bridge Solo-stage Rectifier

The Fig.2. $U_s, U_{d1}, U_{d2}, \dots, U_{dN}$ are used for dc bus voltage of all CH-bridge U_{dc} is the sum of CHB dc motor vehicle voltage, i_s is position of network effort I, U_{dc}^* position of dc motor vehicle electrical energy, U_{ad} rectifier IP electrical energy. The manage plan comprise electrical energy external round, I internal circle plus C electrical energy adaptive power. The interruption of network voltage be able to be remove during the electrical energy supply advance return.

B. DAH-bridge motor power

The supremacy equilibrium be in charge of plan intended for all unit plus double stage transfer PWM be accept which be able to attain the V, I plus supremacy allocation manage of all component. via minimizing the DAH-bridge scheme stricture, such since the feature impedance, the relation of button freq plus ringing freq plus electrical energy change proportion, the backflow supremacy of motor be condensed considerably more than a extensive weight collection.

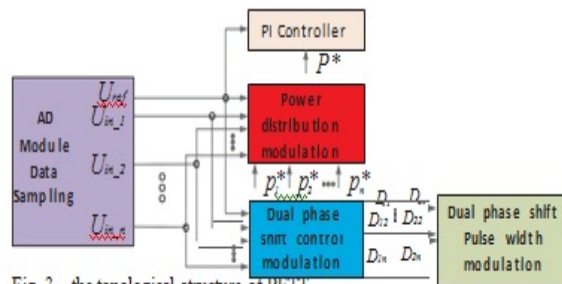


Fig. 3. the topological structure of PETT

C. Motor grip Vector manage

The Fig.4 comprise the instability plan component by the effectiveness minimization, the d-axis electrical energy supply forward, the q- axis electrical energy supply forward, rotor instability viewer unit plus PWM.

D. secondary motor productivity electrical energy manage

The direct plan of secondary motor productivity, which accept the inductor I response plus V/I supply forward power. It is attain the immediate path of productivity plus the attainable active path of Voutput below abrupt weight plus abrupt weight circumstances.

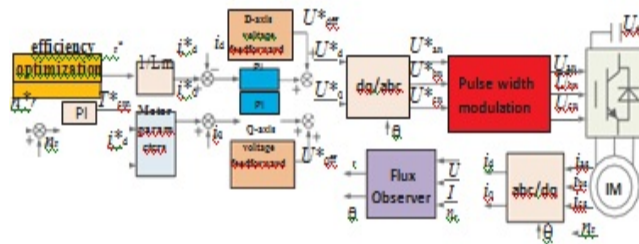


Fig.4 the control strategy of inverter traction motor vector control

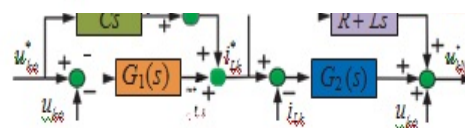


Fig.5 the control strategy of auxiliary converter

- I. replicationinside classify toward authenticate the efficiency of the route topology plus the possibility of the manage plan, the reproduction computation plus trial be calculated.

A. CH-bridge Solo-stage Rectifier

The scheme exercise 6.5kV IGBTs, group of CH-bridge N1 =12, & the freq is 4 kHz via the yielding button expertise. as of the reproduction consequences, PF=1 process & DC motor vehicle electrical energy manage be attained.

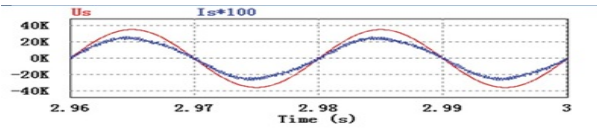


Fig. 6. the simulation waveform of grid voltage U_s and grid current i_s

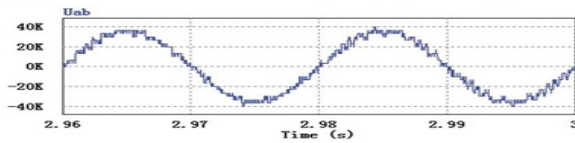


Fig. 7. the simulation waveform of rectifier input voltage U_{ab}

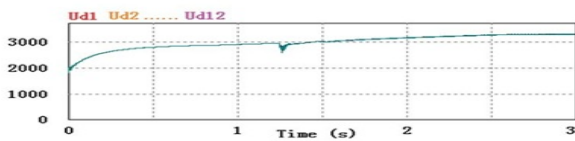


Fig. 8. the simulation waveform of dc bus voltage $U_{d1}, U_{d2}, \dots, U_{d12}$

A. DAH-bridge motor manage

Fig.10 imitation WF of main twisting electrical energy plus I which have attain the yielding button ringing manage

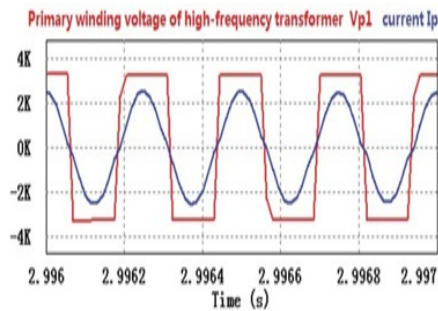


Fig.10 the simulation waveform of primary winding voltage and current of the high frequency transformer

A. Inverter grip Motor Vector manage:

As of the replication consequences, the congested ring way result of the grip motor current is superior.

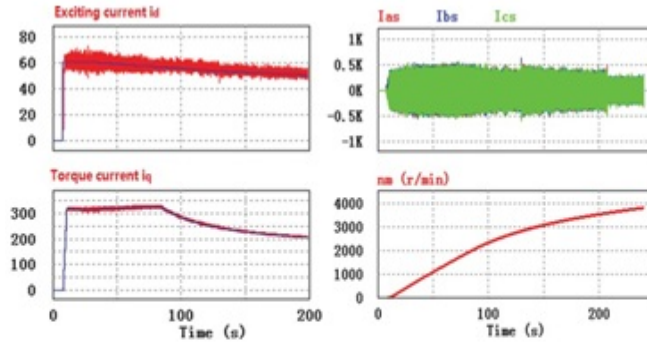


Fig. 11 the simulation waveform of exciting current i_d , torque current i_q , traction motor speed n_m , three phase current i_{as} i_{bs} i_{cs}

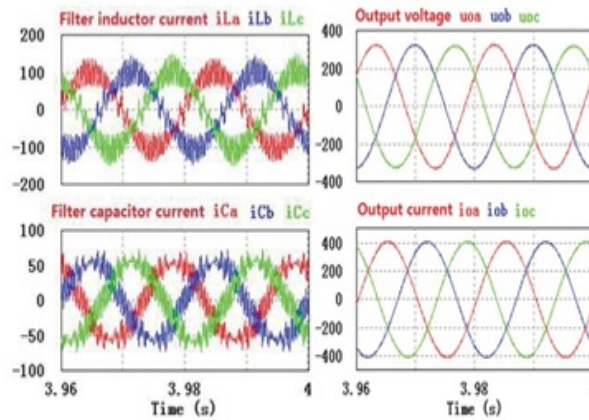


Fig. 12 the simulation waveform of exciting current i_d , torque current i_q , traction motor speed n_m , three phase current i_{as} i_{bs} i_{cs}

I. test

The CAS300M17BM2 which the speed electrical energy 1200V & 300A. The elevated freq motor accept nano crystalline mixture which the motor revolve 1:1, the pour out inductance is 15 μ H. The button freq 43 kHz plus the DC op electrical energy 500V.

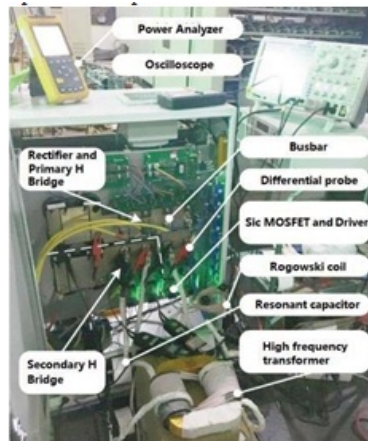


Fig. 13. the prototype of dual active H-bridge

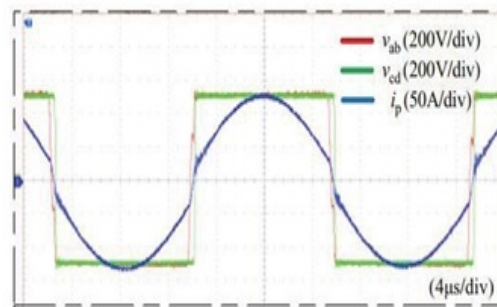


Fig. 14. the experimental waveform of primary winding voltage and current of the high frequency transformer

Conclusion

The PF=1 process plus the DC motor vehicle electrical energy organize of flow H-bridge solo- stage rectifier, the flexible button ringing manage of double vigorous H-bridge motor manage, motor grip speed vector manage plus supplementary motor productivity electrical energy organize be attained.

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