

电力电容器与无功补偿

POWER CAPACITOR & REACTIVE POWER COMPENSATION

DIANLI DIANRONGQI YU WUGONGBUCHANG

Vol.40 No.1 Feb.2019
第40卷第1期 2019年2月

西安电力电容器研究所主办

2019 1

XD 中国西电
CHINA XD

西安西电电力电容器有限责任公司
XI'AN XD POWER CAPACITOR CO., LTD.

实现客户满意

追求客户感动

创造客户价值

±800kV糯扎渡特高压直流工程
悬吊式高压直流滤波电容器组

ISSN 1674-1757



地址: 陕西省西安市桃园路10号 传真: 029-84221447

电话: 029-84241194 / 84226319 邮编: 710082

84226325 / 84221496 网址: www.xd-xr.com

万方数据

《电力电容器与无功补偿》 第4届编委会名单

主任委员:元复兴
副主任委员:周会高
委员:(以姓氏笔画为序)

王 耀	王崇裕	刘水平	同向前
汲胜昌	张万荣	张丹丹	张建平
张建军	张春朋	李 化	李 电
李志远	杨一民	陈才明	张勇军
肖 遥	张悻宁	卓 放	段晓波
祝令瑜	倪学锋	徐 政	党智敏
袁铁江	梁 臻	贾 华	黄 莹
葛磊蛟	葛锦萍	储松潮	翁利民
薛 晔			

中文核心期刊

中国期刊全文数据库全文收录期刊
万方数据库数字化期刊群入网期刊
中国期刊订阅指南信息库收录期刊
第四届陕西省科技期刊优秀期刊奖
主管、主办:西安电力电容器研究所
编辑、出版:《电力电容器与无功补偿》

编辑部

总 编:周会高
主 编:杨佩侠
责任编辑:杨文荣 谭艺玲
编 辑:于淑霞

地 址:西安市西二环北段18号
邮政编码:710077

电 话:(029)84221423
传 真:(029)84221423

在线投稿:www.dldrq.com
电子邮箱:dldrqxb@163.com

dldrq@126.com

出版日期:2019年2月25日

印 刷:西安新华印务有限公司

国内发行:陕西省邮政报刊发行局

订 购 处:全国各地邮局

中国标准连续 ISSN 1674-1757

出版物号 CN 61-1468/TM

邮发代号:52-13

每期定价:¥15.00元/本

广告经营许可证号:6101004001036

目 次

● 无功补偿与滤波装置 ●

± 800 kV 直流滤波器不拆线试验方法研究与应用

..... 刘春涛,戚科孙,王耀,罗新,黄学民(1)

低压配电网分散无功补偿与扩大线径协调优化计算

..... 严以臻,张海鹏,刘杨华,林舜江,刘明波(6)

10 kV 无功补偿电容器分相合闸策略研究

..... 许巧云,吴昌盛,董超俊,温浩,韩冰,张秀杰(13)

基于谐波阻抗的单调谐滤波器在线监测及失谐辨识

..... 黄银龙,赵胜男,罗光辉,罗晓晨,董超群(18)

基于重复控制和滑模控制的 APF 电流控制方法

..... 谢锡锋(23)

基于改进 SOGI 的二倍频锁相在 APF 中的应用

..... 李珊,张喜玲,封佳池(29)

有源电力滤波器比例复数积分电流控制策略设计

..... 陈曦,唐斌,蔡文辉,毛虎贵,余飞(35)

模块化三电平静止无功补偿器的新型有源阻尼控制研究

..... 孙斌,林成,康鹏,付俊波(41)

高压电容器极间绝缘耐潮湿性能的试验研究

..... 姜胜宝,倪学锋,林浩,罗天鸣,谢光良,张政成(46)

± 1 100 kV 特高压直流滤波电容器组电场设计研究

..... 蒋利军,秦华忠,梁琮,朱明轩,黄雪勇,杨结春(49)

● 电力电子电容器 ●

金属化膜电容器可靠性研究进展

..... 刘泳斌,曹均正,黄金魁,张一恺,姚睿丰,王妍,高景晖(53)

柔性直流输电用电力电子电容器的测试与工程应用

储松潮,黄云锴,潘焱尧,汪威,张 ,李仁山,邢照亮,潘毓娴(59)

● 电容式电压互感器 ●

传导干扰下 CVT 宽频等效电路模型的建模方法

..... 戴丽莉,张广勇,闫根弟,张焯(65)

● 特种电容器 ●

500 kV 断路器断口电容及介损测量影响因素研究

..... 李威,张进,黄 怡,张国旗,王晓,罗磊(71)

● 配套设备 ●

干式空心电抗器噪声等效电流测试方法研究

..... 陆居志,李健,汲胜昌,祝令瑜,李金宇,肖鲲,吴方 (77)

铁心电抗器匝间短路的空间磁场分布

..... 齐伟强,陈柏超,董健鹏,李伟,姚玉海,李邦彦,马磊(86)

基于振荡波的干式空心电抗器局部放电检测方法

..... 陈凌,王京保,刘睿,刘策,向天堂(92)

● 系统应用研究 ●

燃煤机组深度调峰时进相能力分析的提升措施

..... 解兵,徐珂,罗凯明,周前,赵静波(97)

江苏苏州南部电网受电能力分析

..... 蔡晖,张文嘉,吕翔,彭竹弈,祁万春,谢珍建,吴熙(103)

ECT与EVT在智能配电设备一二次融合中相融性分析

..... 熊江咏,杨桂平,郭毅,熊刘(108)

基于样本熵和蜻蜓算法优化SVM的电能质量扰动识别和诊断研究

..... 屈高强,王承民,齐彩娟,赵亮,刘涌,陈万喜(115)

滞留电荷对智能配电设备一二次融合的影响与对策

..... 钱远驰,周斌,熊江咏,杨桂平,郭毅(123)

基于串联电压补偿控制法的农网低电压治理综合调控方法研究

..... 胡翔,谢刘丹,张弛,金玲珠,彭团丰(129)

电网不平衡情况下级联星接STATCOM的控制策略

..... 黄炎光,许崇福,马智远,许中,王弋飞(135)

基于蜻蜓算法优化ELM的电能质量扰动诊断与识别研究

..... 王宏刚,田洪迅,谈军,周辉(142)

● 清洁能源领域应用技术 ●

基于光伏并网逆变器功率调整的本地电压选择性控制策略

..... 邓俊,钟明航,刘坤雄,张小庆,刘博立,同向前(148)

基于全桥变流器的微电网功率平衡控制技术研究

..... 曹斌,魏业文,胡紫华,孙宇轩,方 (154)

计及源荷不确定性的新能源电站无功电压控制

..... 苏志朋,夏友斌,潘文虎,宋铭敏,俞鹏,沈新村(160)

基于不同种类储能电池的微电网综合储能系统性能对比

..... 王若谷,戴立森,梁芷睿,王贤(166)

交直流混合微电网组网和控制策略的研究与应用

..... 王杰峰,任军辉,宋志顺,李嘉丰(172)

● 广告单位 ● (64)

● 2019年《电力电容器与无功补偿》投稿指南 ● (I)

CONTENTS

●Reactive Power Compensation and Filter Device●

- Study and Application of No HV Lead Removal Test Method for ± 800 kV DC Filter
..... LIU Chuntao, QI Kesun, WANG Yao, LUO Xin, HUANG Xuemin(1)
- Coordinated Optimization Calculation of Distributed Reactive Power Compensation and Line Diameter Expansion in Low Voltage Distribution Network
..... YAN Yizhen, ZHANG Haipeng, LIU Yanghua, LIN Shunjiang, LIU Mingbo(6)
- Study on Phase Closing Strategy of 10 kV Reactive Compensation Capacitor
..... XU Qiaoyun, WU Changsheng, DONG Chaojun, WEN Hao, HAN Bing, ZHANG Xiujie(13)
- Online Monitoring and Detuning Identification for Single-tuned Filter Based on Harmonic Impedance
..... HUANG Yinlong, ZHAO Shengnan, LUO Guanghui, LUO Xiaochen, DONG Chaoqun(18)
- APF Current Control Method Based on Repetitive Control and Slide Mode Control
..... XIE Xifeng(23)
- Application of Double Frequency Phase-locking in APF Based on Improved SOGI
..... LI Shan, ZHANG Xiling, FENG Jiachi(29)
- Design of Proportional Complex Integral Current Control Strategy for Active Power Filter
..... CHEN Xi, TANG Bin, CAI Wenhui, MAO Hufen, YU Fei(35)
- Study on New Active Damping Control for Modular Three Level Static Var Compensator
..... SUN Bin, LIN Cheng, KANG Peng, FU Junbo(41)
- Test Study on Moisture Resistance Performance Between Poles of High Voltage Capacitor
..... JIANG Shengbao, NI Xuefeng, LIN Hao, LUO Tianming, XIE Guangliang, ZHANG Zhengcheng(46)
- Study on Electric Field Design of ± 1 100 kV UHVDC Filter Capacitor Bank
..... JIANG Lijun, QIN Huazhong, LIANG Cong, ZHU Mingxuan, HUANG Xueyong, YANG Jiechun(49)

●Power Electronic Capacitor●

- Study Development on the Reliability of Metallized Film Capacitor
..... LIU Yongbin, CAO Junzheng, HUANG Jinkui, ZHANG Yikai, YAO Ruifeng, WANG Yan, GAO Jinghui(53)
- Testing and Engineering Application of Power Electronic Capacitor for Flexible HVDC
..... CHU Songchao, HUANG Yunkai, PAN Yanyao, WANG Wei, ZHANG Chong, LI Renshan, XING Zhaoliang, PAN Yuxian(59)

●Capacitor Voltage Transformer●

- Modeling Method of Wideband Equivalent Circuit Model of CVT Under Conduction Interference
..... DAI Lili, ZHANG Guangyong, YAN Gendi, ZHANG Ye(65)

●Special Capacitor●

- Study on Influencing Factors of Measuring Break Capacitance and Dielectric Loss of 500 kV Circuit Breaker
..... LI Wei, ZHANG Jin, HUANG Jieyi, ZHANG Guoqi, WANG Xiao, LUO Lei(71)

●Auxiliary Equipment●

- Study on Equivalent Current Test Method of Noise of Dry-type Air-core Reactor
..... LU Juzhi, LI Jian, JI Shengchang, ZHU Lingyu, LI Jinyu, XIAO Kun, WU Fangjie(77)

Spatial Magnetic Field Distribution on Inter-turn Short Circuit Fault of Iron Core Reactor

..... QI Weiqiang, CHEN Baichao, DONG Jianpeng, LI Wei, YAO Yuhai, LI Bangyan, MA Lei(86)

Partial Discharge Detection Method of Dry-type Air-core Reactor Based on Oscillation Wave

..... CHEN Ling, WANG Jingbao, LIU Rui, LIU Ce, XIANG Tiantang(92)

● Research on System Application ●

Leading Phase Capacity Analysis and Improvement Measures of Coal-fired Units in the Deep Peak-regulation

..... XIE Bing, XU Ke, LUO Kaiming, ZHOU Qian, ZHAO Jingbo(97)

Analysis of Power Receiving Capacity of Suzhou Southern Power Grid in Jiangsu Province

..... CAI Hui, ZHANG Wenjia, LYU Xiang, PENG Zhuyi, QI Wanchun, XIE Zhenjian, WU Xi(103)

Compatibility Analysis of ECT and EVT in Primary & Secondary Fusion of Intelligent Power Distribution Equipment

..... XIONG Jiangyong, YANG Guiping, GUO Yi, XIONG Liu(108)

Study on Power Quality Disturbance Identification and Diagnosis of SVM Based on Sample Entropy and Dragonfly Algorithm

..... QU Gaoqiang, WANG Chengmin, QI Caijuan, ZHAO Liang, LIU Yong, CHEN Wanxi(115)

Influence and Countermeasures on Detention Charge on Primary & Secondary Fusion of Intelligent Distribution Equipment

..... QIAN Yuanchi, ZHOU Bin, XIONG Jiangyong, YANG Guiping, GUO Yi(123)

Study on Comprehensive Control Method of Rural Grid Low Voltage Control Based on Series Voltage Compensation Control Method

..... HU Xiang, XIE Liudan, ZHANG Chi, JIN Lingzhu, PENG Tuanfeng(129)

Control Strategy of Cascade Y-STATCOM Under Imbalanced Grid Conditions

..... HUANG Yanguang, XU Chongfu, MA Zhiyuan, XU Zhong, WANG Yifei(135)

Study on the Optimization of Power Quality Disturbance Diagnosis and Identification of ELM Based on Dragonfly Algorithm

..... WANG Honggang, TIAN Hongxun, TAN Jun, ZHOU Hui(142)

● Application Technology in the Field of Clean Energy ●

Local Voltage Selective Control Strategy Based on Power Regulation of Photo-voltaic Grid-connected Inverter

..... DENG Jun, ZHONG Minghang, LIU Kunxiong, ZHANG Xiaoqing, LIU Boli, TONG Xiangqian(148)

Study on Power Balance Control Technology of Microgrid Based on Full-bridge Converter

..... CAO Bin, WEI Yewen, HU Zihua, SUN Yuxuan, FANG Xuan(154)

Voltage/Var Optimization for Renewable Power Plants Considering Uncertainties of Source and Load

..... SU Zhipeng, XIA Youbin, PAN Wenhua, SONG Mingmin, YU Peng, SHEN Xincun(160)

Performance Comparison of Microgrid Integrated Energy Storage System Based on Different Kinds of Batteries

..... WANG Ruogu, DAI Lisen, LIANG Zhirui, WANG Xian(166)

Study and Application of Networking and Control Strategy of AC/DC Hybrid Microgrid

..... WANG Jiefeng, REN Junhui, SONG Zhishun, LI Jiafeng(172)

Sponsored by:Xi'an Power Capacitor Research Institute

Edited by:Editorial Office of POWER CAPACITOR & REACTIVE POWER COMPENSATION

Head of Editorial Committee:FANG Jinlan

Chief Editor:YANG Peixia

Add:No.18 the North of the No.2 West Ring Road, Xi'an, Shaanxi 710077, P.R.China

Tel:+86-29-84221423

Fax:+86-29-84221423

Website:www.dldrq.com

Email:dldrqxb@163.com dldrq@126.com

Distributed by:Shaanxi Office of Postal Service

版权声明

1.本刊对发表的文章拥有出版电子版、网络版版权,并拥有与其他网站交换信息的权利。本刊支付的稿酬已包含以上费用。

2.本刊文章版权所有,未经书面许可,不得以任何形式转载。



热烈祝贺青海海西 750kV 变电站扩建串补工程用串联电容器组一次性投运成功



合容电气
HERONG ELECTRIC

为电网的建设提供坚固化的
产品，让用户享受技术进步的
简便和安宁

www.hycapacitor.cn

增强信心 办好企业 成为民营电力装备制造企业的典范



酒泉—湖南 ±800kV 特高压直流
输电工程换流站设备



准东—华东 1100kV 特高压直流
皖南换流站配套输电工程



灵州—绍兴 ±800kV 特高压直流
输电工程换流站设备



永仁—富宁 ±500kV 直流输电工
程换流站设备



合容电气股份有限公司

地 址：西安市经济技术开发区泾渭工业园西金路9号 邮 编：710200 电 话：029-86968790
传 真：029-86968753 网 址：www.hycapacitor.cn