



ENERGY SAVING POWER QUALITY SOLUTION

Anhui Zhongdian Electric Co., Ltd.

Tel: 86-552-4081055, 4077338

Fax: 86-552-4081155

Add.: No.25, Jinhe Rd, Economic&Development Zone,
Huaiyuan, Bengbu, Anhui, China

Mail: hanson@chinazddq.com

Web: <http://www.zddqelectric.com/>



Energy Saving Power Quality Solution

Anhui Zhongdian Electric Co., Ltd.



Anhui Zhongdian(ZDDQ) Electric Co., Ltd. established in 2001. ZDDQ Technology Park locates in Bengbu City of Anhui Province. We're a professional and leading manufacture, focus on advanced power quality improvement and power factor correction. APF,SVG,APFC are our main products. ZDDQ has a leading independent R&D team and quality supervision system, and maintain long-term cooperative relations with China University of Science and Technology, Zhejiang University and a number of well-known institutions.

We insists on customers' demand as the guide, with the technology innovation as the drive, through 20 years technology accumulation, has already owned a series of power quality products including APF, Medium voltage and low voltage SVG, Medium voltage and Low voltage Automatic Power Factor Correction, which are widely used in many countries and industries such as power grid, hospital, sewage plant, railway, subway, airport, seaport, oil and chemical industry, metallurgy, coal mine, tele-communication and high buildings and so on.

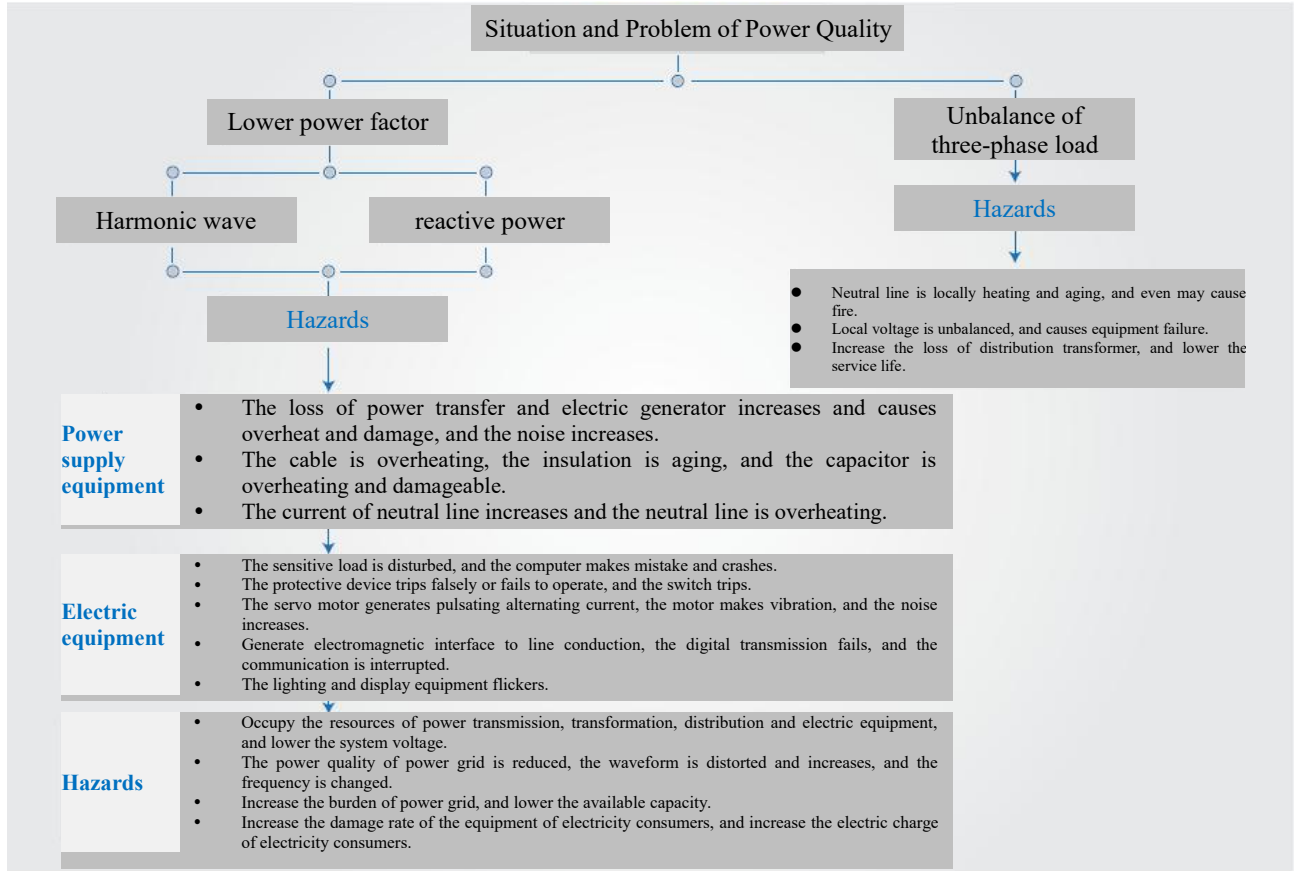
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Focus on Power quality improvement and power factor correction.

Analysis of Power Quality

Problems, Hazards and Analysis of Causes



Common Harmonic Sources are as Follows

- Rectifier, charging device
- Frequency converter, DC speed regulator
- DC power supply, charger
- Electric arc furnace, induction heating equipment
- Welding equipment
- Electrified railway and ship electric drive
- Air conditioner and other household appliances
- Lighting equipment
- Uninterrupted power supply UPS, EPS
- Computer and other office equipment



National Standards for Harmonic Limits

For user equipment and public power distribution network, the power quality index directly affects the efficacy, service life and efficiency of equipment, and even may directly damage the electric equipment.

In accordance with *Quality of Electric Energy Supply – Harmonics in Public Supply Network* (GB/T 14549-1993), the public supply network standard is as follows:

Nominal voltage of power grid (kV)	Total harmonic distortion of voltage (%)	Voltage content rate of each order of harmonic wave	
		Odd order	Even order
0.38	5.0	4.0	2.0

Standard voltage KV	Reference short-circuit capacity MVA	Harmonic order and allowable value of harmonic current, A																							
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
0.38	10	78	62	39	62	26	44	19	21	16	28	13	24	11	12	9.7	18	8.6	16	7.8	8.9	7.1	14	6.5	1

Benefit of Power Quality Control

- Improve the power factor, and save electric energy by 10%~25%;
- Reduce the inputs in capacity expansion of transformer, and extend the service life of equipment;
- Increase the operational reliability of equipment, and reduce the inputs in equipment maintenance and replacement;
- Maintain continuity and stability of production and power supply, and improve production efficiency;
- Meet national standard, and avoid the power supply management department to urge rectification and give punishment.

Application Industry of Power Quality Control

Power Grid, Semi-conductor, rail traffic, telecommunication, hospital, municipal administration, petrochemical, electronics, mining,, automobile manufacturing, machinery & heavy industry, marine petroleum, sewage treatment, cement, tobacco, plastics.

Introduction

Power Quality

Power quality has been a central issue in many installations and systems for years. Poor power quality has many effects on electrical installations, and can drive up energy costs, lower overall energy efficiency, cause nuisance tripping of circuit breakers, and damage and destroy sensitive electrical and electronic equipment. Therefore, it is very important for users to have a good power quality in order to ensure their systems function as required with a good efficiency.

Power quality is often defined in terms of the voltage, frequency and waveform of the electrical supply. Good power quality centres around ensuring the supply is within tolerable limits of the required voltage and frequency limits, with a smooth delivery in the form of a sinewave .

ZDDQ focus on power quality improvement and Power factor correction

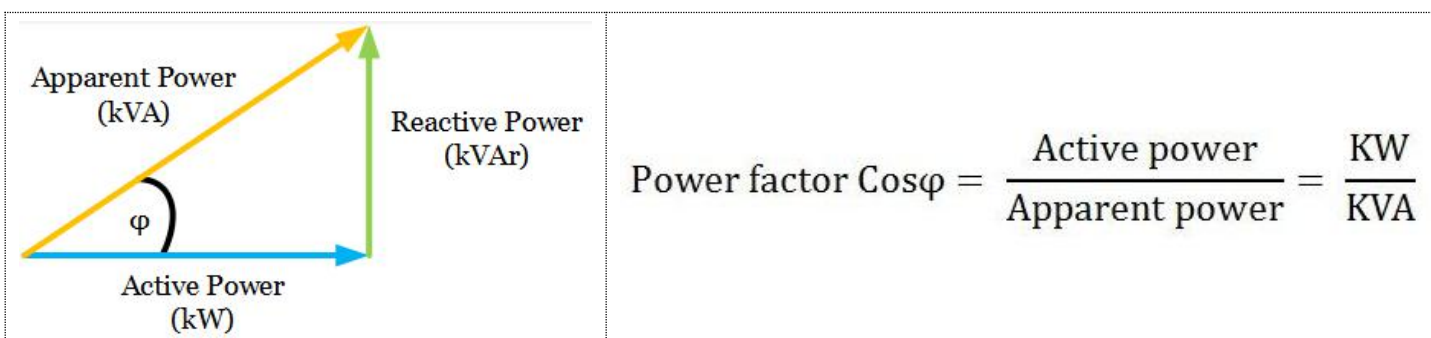
Power Factor

Power factor is defined as the ratio of real power to apparent power. In AC systems, there are three components which make up AC power:

Active power P, measured in Watts (W/KW). This is understood as the useful energy transferred to loads in order for them to operate as required.

Reactive power Q, measured in volt-amperes reactive (VAr/KVAr). This component of AC power is energy which is transferred back and forth between a load and the source, with no net energy transfer to the load and does no ‘work’. However, reactive power is still required in electrical systems, as it is the component used in inductive loads to set up the magnetic fields in equipment such as motors and transformers.

Apparent power S, measured in volt amperes (VA/KVA). This component of AC power is composed of both the active and reactive power, and is the ‘true’ power of a load. This is the component of power used in electrical design, as a system must be sized to carry the current to transmit the total power of both the active and reactive power.



Why Power Factor Correction?

There are several reasons why it is important to correct the power factor:

A lower power factor results in a higher apparent power, which leads to a higher current draw. These higher values place greater stress on transformers and cables, requiring larger cables and transformers to be installed to handle the higher stresses. Improving the power factor allows for smaller cables and transformers to be used, as well as freeing up power on existing transformers.

Power suppliers commonly charge now on kVA demand tariffs, rather than on kW tariffs. Therefore, the end user is now paying for all power consumed – both active and reactive power. Improving the power factor will result in a lower reactive power, decreasing energy bills through the lower power draw.

A higher power factor results in a higher energy efficiency through less ‘wasted’ power from the reactive power. This leads to, again, lower power bills, greater energy utilisation, and less impact on the environment through lower carbon emissions.

ZDDQ Power Factor Correction

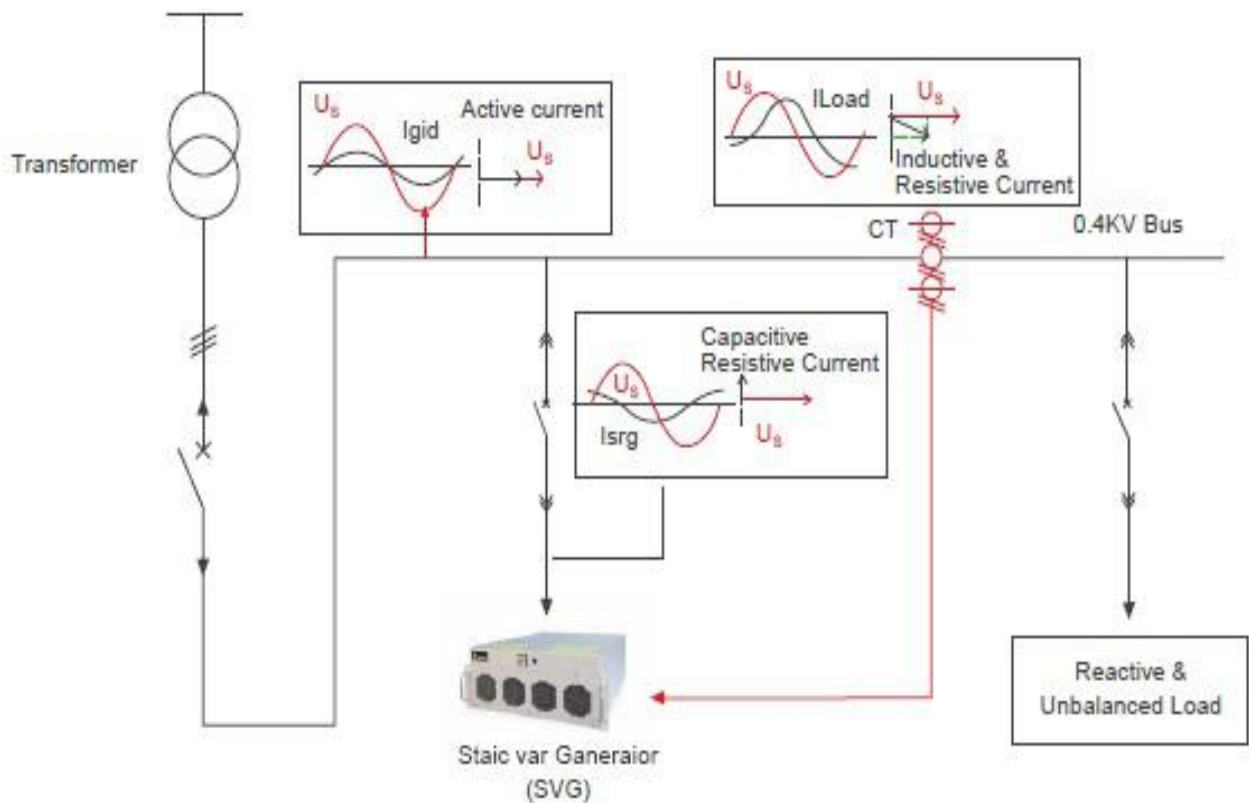
Products Scope	ZDDQ model	Rated Voltage	Switch Type	Feature
SVG/STATCOM	ZD-ASVG	0.4kV	Static Var Generator	SVG
	ZD-FGSVG	3kV~35kV	Static Synchronous Compensator /STATCOM	STATCOM
Automatic Capacitor banks and Filters	ZD-DWJ	0.4kV	AC Contactor	SVC
	ZD-DWT	0.4kV	Thyristor	TSC
	ZD-GWJ	3kV~20kV	AC Contactor	SVC
	ZD-GWJ-R	20kV~35kV	AC Contactor	SVC Open Rack
Hybrid Compensation	ZD-CSVG	0.4kV	SVG+ Capacitors	Hybrid reactive power compensation
Comprehensive Power Quality Control	ZD-APF	0.4kV	SVG+ AHF	Comprehensive Power Quality Control

0.4Kv Static Var Generator ZD-ASVG

The advanced static var generator (ASVG for short), based on voltage type inverter principle, uses the isolated gate binary transistor (IGBT4) to control the value and phase of AC voltage of inverter, so as to serve the purpose of reactive and harmonic compensation. As the switching frequency of IGBT is very high (dozens of kHz), ASVG can realize fast compensation for reactive load, and achieve very high compensation precision. ASVG is currently the best solution in reactive power control filed. Compared with the traditional SVT represented by TSC, the regulation speed of ASVG is faster (the response speed is within 5ms), its compensation precision is high (the power factor after compensation is over 0.99), the compensation method is flexible (ASVG can compensate both inductive reactive power and capacitive reactive power), and ASVG also has the function of active filtration of harmonic current.



Principle



Technical Data

Electrical properties	Rated voltage	400/440VAC
	Operating frequency	50Hz
	Electrical connection	Three-phase three-wire, three-phase four-wire
	Filter range	2nd~50th non-zero-sequence odd-order harmonics (selectable)
	Filtering control effect	Single-control rate > 97% at sufficient capacity .
	Compensation mode	Reactive Power Compensation, Harmonic compensation(60% capacity)
	Reactive compensation effect	The system power factor is greater than 0.98 after compensation within the rated capacity.
	Initial response time	<200us
	Response time	<5ms
	Active loss of system	<3%
	Output current limit	Automatically limited within 100% of rated capacity to output
	Number of units connected in parallel	≤10 units
Control characteristics	MTBT	>100,000 hours
	Controller	DSP+FPGA+IGBT
	Control algorithm	Self-adaptive control algorithm
	Capacitor control interface	14 ways
	Communication mode	Adopt Modbus remote communication protocol; communication interface adopts RS485 and CAN bus
Structural characteristics	Control connection	Fiber or electrical connection
	Weight	Refer to the model selection table.
	Level of protection	IP20
	Cooling method	Air cooling
	Noise	<65db
Environmental requirements	Installation method	Module embedded installation
	Ambient temperature	-20~55℃
	Relative humidity	Maximum 95%, without condensation
	Mounting height above sea level	≤1,500 at rated capacity; appropriately reduce the capacity if it is greater than 1,500

Model Table

Applied Type	Model	Connection Type	Voltage Class	Capacity	Dimension	Weight
ASVG Module	ZD-ASVGM-1000/50-4-4L-R	3P 4W	400V	50kvar	540×472×122mm	25kg
	ZD-ASVGM-1000/75-4-4L-R	3P 4W	400V	75kvar	540×550×190mm	45kg
	ZD-ASVGM-1000/100-4-4L-R	3P 4W	400V	100kvar	540×558×220mm	55kg
	ZD-ASVGM-1000/50-4-4L-W	3P 4W	400V	50kvar	503×122×558mm	25kg
	ZD-ASVGM-1000/75-4-4L-W	3P 4W	400V	75kvar	503×201×598mm	45kg
	ZD-ASVGM-1000/100-4-4L-W	3P 4W	400V	100kvar	503×220×608m	55kg

Remarks: The modular ASVG products support the combination of different models, for example, 75kvar modular unit and 100kvar modular unit can be installed into 175Kvar modular cabinet system.

6kv~35kv STATCOM ZD-FGSVG



Like SVC but faster, STATCOM continuously provides variable reactive power in response to voltage variations, supporting the stability of the grid. STATCOM operates according to voltage source converter (VSC) principles, combining unique PWM (pulse width modulation) with millisecond switching. STATCOM functions with a very limited need for harmonic filters, contributing to a small physical footprint. If required, switched or fixed air core reactors and capacitors can be used with the VSC as additional reactive power elements to achieve any desired range.

ZD-FGSVG STATCOM has outdoor type and indoor type, with air cooling system or water cooling system.

Advantages

STATCOM, Best Power quality solutions for Medium Voltage Grids.

- The fastest dynamic voltage stabilizer
- Better control for power grids, better load compensation
- Optimal stability and quality
- In harmony with harmonics – and best flicker reduction
- Fastest response – efficient solution

Naming Rules

Remarks	Model Description
Capacity (Mvar) means the rated maximum adjustment capacity range from inductive reactive power to capacitive reactive power. For example C2.0/10 means the device is connect to the 10kV power grid directly and its capacity is ±2Mvar. It can change from +2000kvar (inductive) to -2000kvar (capacitive) continuously and smoothly.	<div><div>FGSVG - C □ / □ - □ □ □ □ □</div><div><div>W:water cooling;Empty-air cooling</div><div>2-Single phase; Empty-3 phase</div><div>T-triangle;Emptye-star</div><div>H-harmonic Compensation</div><div>Empty: without harmonic compensation</div><div>O: Outdoor; Empty: Indoor</div><div>Voltage Level</div><div>6-6kV;10-10kV;35-35kV</div><div>35T-35kV with Transformer</div><div>Capacity: Mvar,Such as 2.0-2Mvar</div><div>C: Cascade</div><div>Winsun STATCOM</div></div></div>

Technical Data

Electrical properties	Rated voltage	6kv~35kv
	Operating frequency	50/60Hz
	Electrical connection	Three-phase four-wire/ three-phase three-wire
	Rated Capacity	1Mvar~100Mvar
	Reactive Power Compensation	Compensate inductive and capacitive power continuously and smoothly.
	Control Power	380VAC, 220VAC, or 220VDC
	Over-load Capacity	>120%
	Response time	≤10ms（if capacity is lower than 15Mvar, response time≤5ms）
	Active power loss	≤0.8%
	THDi (Current)	≤3%
	Start regulated reactive power	10kvar
	Resolution of compensate current	1%
Control characteristics	Main Circuit	H-Bridge IGBT
	Redundant Design	Yes
	Power Cells Design	Yes
	Protection	The protection strategy includes three levels, such as component protection, device protection, system protection.
	Running Mode	Constant reactive power, constant assessment point of reactive power, constant assessment point of power factor, constant assessment point of voltage, load compensation and 96 points time sharing control.
	Communication Interface	Ethernet, RS485, CAN, high-speed optical communication interface
	Communication Protocol	Communication protocol: MODBUS_RTU, ProfiBUS, CDT91, IEC61850-103/104, CANOPEN, User-defined.
Structural characteristics	Weight and Dimensions	Refer to the model table.
	Level of protection	Indoor IP40,Outdoor IP44
	Cooling system	Air cooling system or water cooling system
	Installation method	Indoor or outdoor
Environmental requirements	Ambient temperature	-10~40℃
	Relative humidity	Maximum 90%(25℃), without condensation.
	Mounting height above sea level	≤2,000m at rated capacity; If above, should inform in advance.
	Seismic intensity	8 degree

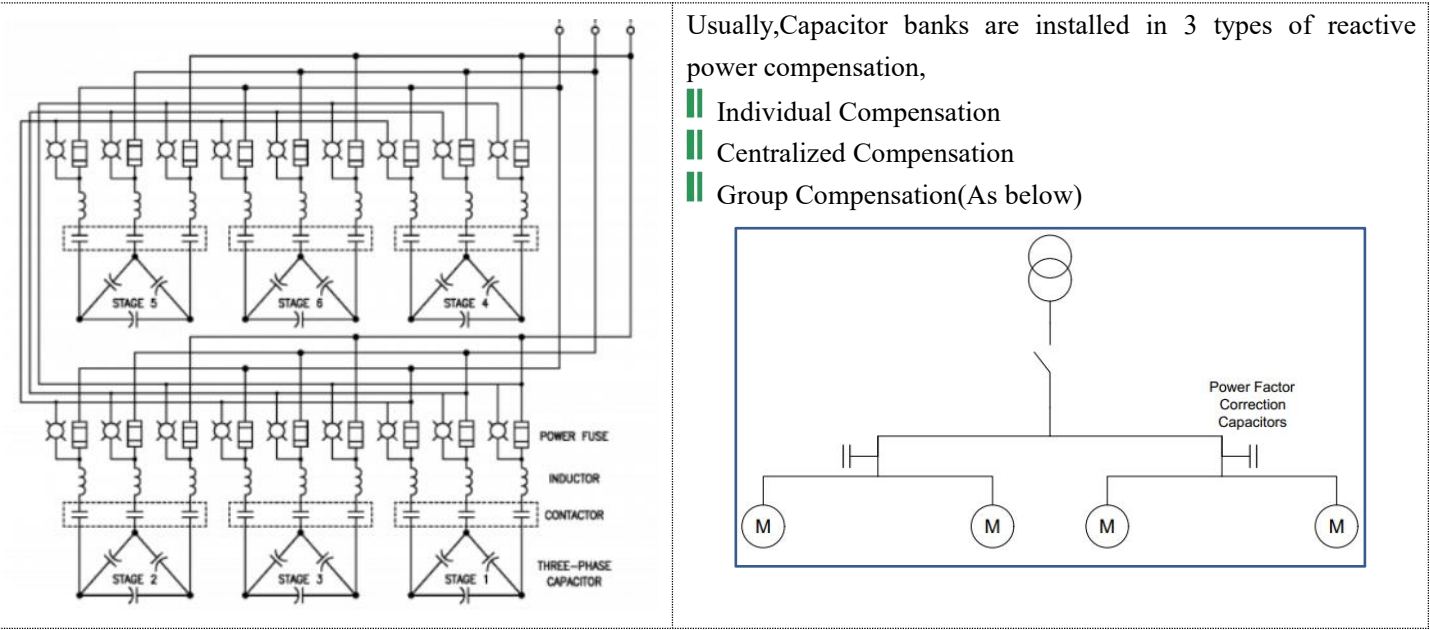
0.4kv Capacitor banks ZD-DWJ/DWM

ZDDQ Low Voltage Capacitor Banks provide a cost-effective, user friendly, reliable solution for power factor correction. They are a more efficient alternative to individual motor capacitors, especially in large industrial facilities.

ZDDQ units are designed to provide power factor correction with a single installation on the main plant bus and are ideal for applications where plant loading is constantly changing, resulting in the need for varying amounts of reactive power. The solid state reactive power controller reacts to a current signal from a single remote current transformer, measures plant power factor and adjusts system load requirements in selected kVAr steps in order to maintain the desired target Power Factor.



Principle



Technical Data

Technical performance	
Rated Voltage	0.4kV
Rated Frequency	50/60Hz
Electric Connection	Three-phase four-wire/ three-phase three-wire
Rated Capacity	50~1600kvar
Control Switch	ZD-DWJ: AC Contactor
	ZD-DWM: Compound Switch
	ZD-DWT: Thyristor
Response time	ZD-DWJ: ≤100ms
	ZD-DWM: ≤60ms
	ZD-DWT: ≤20ms
Compensation mode	Automatically control(switching)
Compensation effect	> 0.95 at sufficient capacity.
Capacitors	Single or Three phase capacitors
Reactors	Three phase, Iron core(Optional)
Power factor controller	ZD-MC
Protection	Short circuit,Over Circuit,Over voltage,Under voltage
Protection Level	Up to IP55 Indoor or Outdoor
Installation	Base Fixing
Color	RAL7035
Weight	400kg
Dimension(W*H*D,mm)	1000*1000*2200 or customized
Ambient temperature	-20~55℃
Relative humidity	Maximum 95%, without condensation
Mounting height above sea level	≤1,000m at rated capacity; above should inform.

Characteristics

- High rupturing capacity (HRC) fuses connected to a busbar system.
- Contactors /Thyristors specially adapted to the work with capacitors.
- Inrush current limiting inductances.
- Fast discharge resistors.
- Low losses power capacitors.
- Reactive power controllers.
- Terminals for neutral and ground conductors.
- Metal cabinet containing all the switchgear.

Advantages

- Equipment wired and tested at works, full finished and supplied with all control and safety devices.
- Easy transportation and installation due to their light weigh.
- Easy selection of the most appropriate $\cos \phi$ to avoid penalty charges on tariffs.
- Long life and high reliability, thank to the use of self-healing and low losses capacitors.
- Wide range of power (from 10 to 1600 kvar) with standard equipment for immediate delivery.
- Option of including various accessories.

0.4kv Thyristor Switched Capacitor banks ZD-DWT

A thyristor switched capacitor bank is functionally the same as an automatic capacitor bank. However, rather than contactor based switching, thyristors are used to switch in the various capacitors and capacitor banks to provide the required kVAr to the system.

- Thyristor switched capacitor provides better switching times than a contactor based system.
- Thyristor switches also require less maintenance than contactors, and so provide a longer overall lifespan to the Power Factor Correction unit.
- Thyristor switching also has lower switching transients than contactors, which helps to again improve the overall lifecycle of the Power Factor Correction system by placing less strain on the system.

Remark: ZD-DWT Technical Data refer to DWJ/WDM of last page.



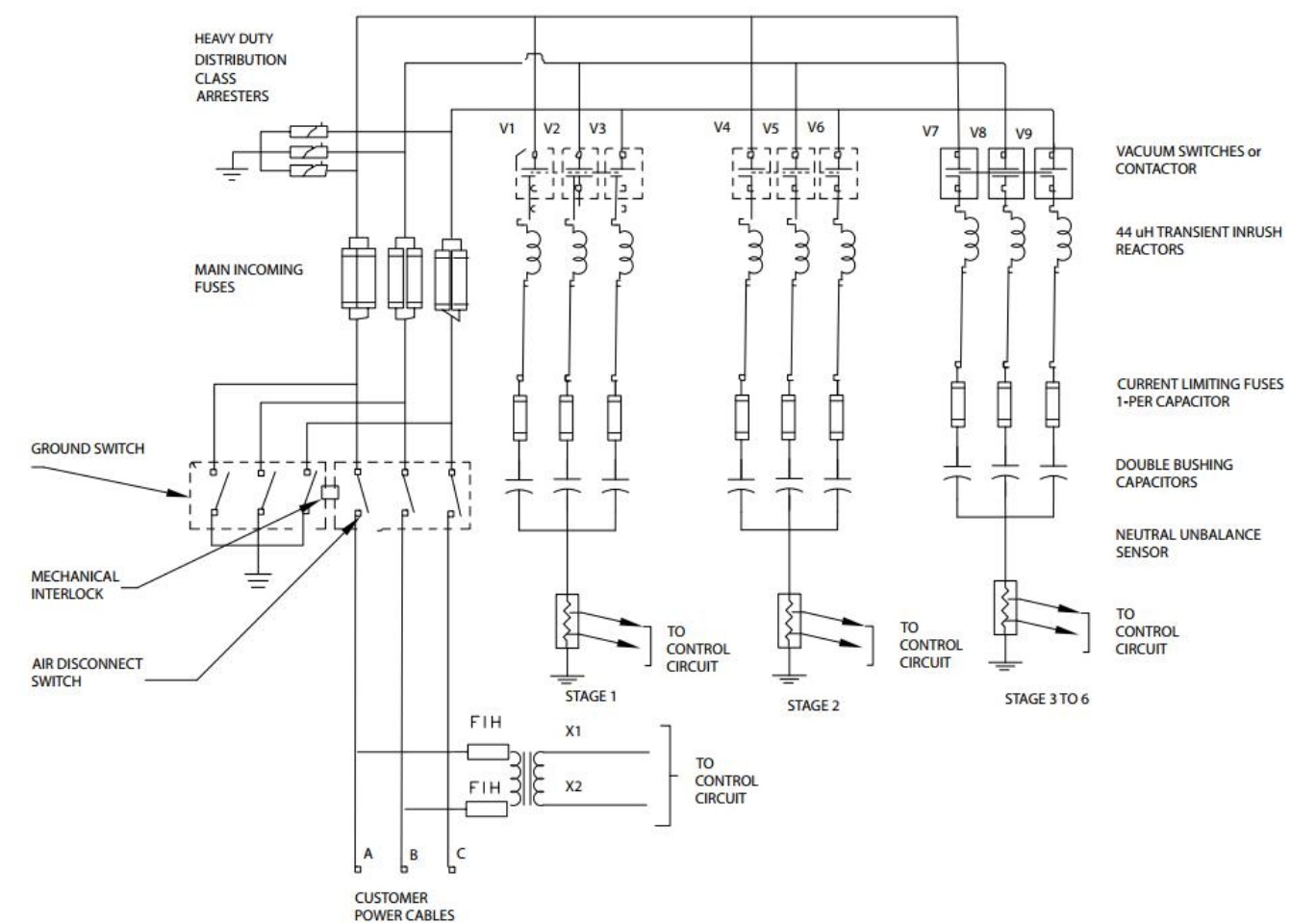
Medium Voltage Capacitor banks ZD-GWJ

ZDDQ Medium Voltage(3kV~35kV) Metal-enclosed Power Capacitor Banks are custom designed for application on industrial, commercial, and utility power systems that require medium voltage power factor correction. The capacitor banks are configurable as fixed or automatic controlled with 1 or more stages.

The power capacitor banks are designed for placement in outdoor or indoor substations and come fully assembled, tested, and ready for interconnection.



Principle





Technical Data

Technical performance	
Capacitor banks Configuration	Multiple step
Rated Voltage	3kv~20kv
Rated Frequency	150Kvar~30Mvar
Switching switch	Vacuum Contactor
Short Circuit	16kA~61kA
Impulse Withstand Voltage	60kV~200kV
Short time Withstand Voltage	19kV~100kV
Capacitor	Single Phase Capacitors
Reactors	3 phase Iron Core Reactors
Capacitor Fusing	Internal Fuse or HRC Fuse
Compensation mode	Multi step compensate automatically
Compensation effect	> 0.90 at sufficient capacity.
Response time	100ms(contactors)
Protection	Short circuit,Over Circuit,Over voltage,Under voltage,Over temperature
Installation	Metal closed cabinet, free standing
Protection Level	IP3X
Weight per cabinet	800kg
Dimension(W*H*D,mm)	1100*1600*2400 or customized
Ambient temperature	-20~55℃
Relative humidity	Maximum 95%, without condensation
Mounting height above sea level	≤1,000m at rated capacity; above should inform.

Rated voltage	20kv~35kv	
Open Rack Capacitor banks		



Hybrid Dynamic Reactive Compensation ZD-CSVG-2000



ZD-CSVG-2000 hybrid dynamic reactive compensation device adopts the configuration scheme of combining ZD-ASVGM-1000 static var generator and switching capacitor/reactor, and implements different reactive compensation schemes according to the actual needs of users on site, so as to achieve the best combination of price and effect. ZD-CSVG-2000 hybrid dynamic reactive compensation device consists of two parts – static reactive generator unit and switching capacitor / reactor reactive compensation unit. In ZD-CSVG-2000 hybrid dynamic reactive compensation device, each unit is designed and produced in the method of low power, small volume and low cost, and both of them are optional, and can be combined in the best and flexible way according to the actual reactive state of the site, so as to achieve the optimum ratio of operation effect and cost.



Naming Rules

Single Machine	Model Description					
ZD-CSVG-2000L Single-module capacity: 50kvar~500kvar For example: <u>ZD-CSVG-2000/50-4-3L/W-10</u> means 50kVar type of ZD-CSVG-2000 series products, with voltage class of 400V, adopting 3-phase 3-wire connection mode; W means outdoor mounting, and ASVG capacity occupies 10% of the total capacity.	<u>ZD - CSVG - 2000 / XXX - 4 - 3L / W-10</u>					
						Proportion of ASVG among total capacity
						W: Outdoor type N: Indoor typ
						3L: 3-phase 3-wire system 4L: 3-phase 4-wire system
						4: 400V voltage class 6: 690V voltage class
						Capacity: 50kvar~500kvar
						ZDDQ 2000 series Hybrid compensation device

Performance Indicators

Electrical properties	Rated voltage	400/690VAC
	Operating frequency	50/60Hz
	Electrical connection	Three-phase four-wire/ three-phase three-wire
	Capacity of whole cabinet	50~500kvar
	Switching switch of capacitors	Thyristor, compound switch, contactors
	Compensation mode	Either three-phase compensation or single-phase compensation
	Compensation effect	The system power factor is greater than 0.98 after compensation within the rated capacity.
	SVG module response time	<5ms
	Capacitor response time	<1s
	Active loss of system	<3%
	Output current limit	Automatically limited within 100% of rated capacity to output
	Number of units connected in parallel	≤10 units
	MTBT	>100,000 hours
Control characteristics	Controller	DSP+FPGA
	Switching frequency	12.8K
	Capacitor control interface	14 ways
	Communication mode	Adopt Modbus remote communication protocol; communication interface adopts RS485 and CAN bus, supporting USB data download.
	Control connection	Fiber or electrical connection
Structural characteristics	Weight	Refer to the model selection table.
	Level of protection	IP20
	Cooling method	Air cooling
	Noise	<50db
	Installation method	Cabinet mounting.
Environmental requirements	Ambient temperature	-20~55°C
	Relative humidity	Maximum 95%, without condensation
	Mounting height above sea level	≤1,000m at rated capacity; appropriately reduce the capacity if it is greater than 1,000m

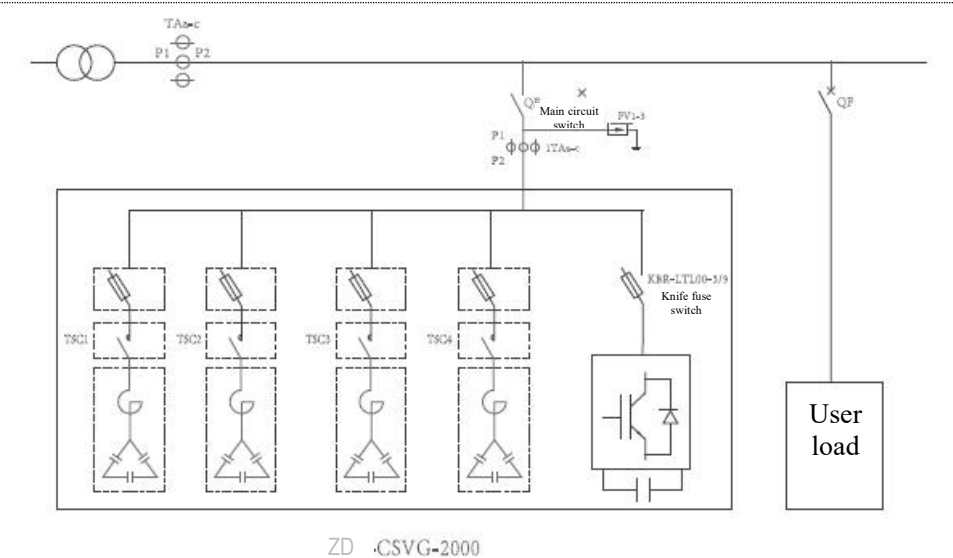
Model Table

Applied Type	Model	Voltage Class	ASVGM Module	Capacitance	Dimension
			Capacity		
ASVG Module	ZD-CSVG-2000/50	400V	50kvar	0kvar	800×600×1,200mm
	ZD-CSVG-2000/100	400V	50kvar	50kvar	800×600×1,200mm
	ZD-CSVG-2000/240	400V	50kvar	190kvar	800×600×1,200mm
	ZD-CSVG-2000/360	400V	50kvar	310kvar	800×600×1,200mm
	Higher capacity	400V	Customized	Customized	Standard cabinet/ Customized

Remarks: ZD-CSVG-2000 consists of ZD-ASVGM-1000 advanced static var generator, ZD-TSC-01 thyristor switched device and ZD-HMI-1000 multi-machine connection parallel master controller. ASVGM module and capacitor capacity can be configured flexibly according to the working condition of site.

Typical Design Scheme

The reactive compensation is usually configured on the basis of 30% of the transformer capacity, for example, 400KVA transformer is usually configured with 120kvar-capacity reactive compensation device, and in special cases, first test the power quality, and then confirm the configuration capacity according to the test result. ASVG module and capacitor capacity in the compensation capacity can be configured flexibly, to achieve the optimum compensation effect.



Typical Case

ZD-CSVG-2000 hybrid reactive compensation device is widely applied in the low-voltage distribution system of a provincial-level electric power company.



Intelligent Capacitor ZD-DWM



ZD-DWM series intelligent capacitor is a new-generation reactive power compensation device to carry out efficient energy saving, reduction of line loss and improvement of power grid power factor and power quality of 0.4KV low-voltage distribution network. This series of products apply to the working condition that the harmonic pollution doesn't exceed the specified limit.

Device Features

- Realize perfect combination of measurement and control technology and synchronous switch, control the movement speed of switching switch, eliminate the bounce, improve the service life, track the correction of closing phase angle, and ensure millions of switching service life of switching switch. The product also has the advantages of high reliability, low failure rate, low power consumption and long service life.
- There is no inrush current at closing, thus realizing the capacitor voltage zero-crossing switch-on and current zero-crossing switch-off. The synchronous switching completely avoids operation over-voltage, with no voltage breakdown, no arc discharge and no reigniting.
- Compensation is made in the most reasonable way, all control functions are perfect, and the product also has the function of high-grade power quality analyzer, with complete functions and good performance, and is also configured with various peripherals, so as to meet different customer requirements.
- Several products can be connected in parallel, to automatically generate the master and slave machines, and constitute a non-automatic control system, and the individual failure slave machines, if any, will exit automatically, not affecting the work of other machines. The failure master machine, if any, will exit automatically, and new master machine will be generated, and constitute a new system to continue to work, with high intelligent degree.
- The single capacitor displays the working condition of product and the condition of electrical circuit, and the human-machine interaction is simple and visual.

Technical Parameters

Rated voltage: AC220V/380V

Voltage deviation: $\pm 20\%$

Power consumption: $< 3W$

Measurement voltage error: $\leq 0.5\%$

Measurement power factor error: $\leq \pm 1.5\%$

Measurement temperature error: $\leq \pm 1^\circ C$

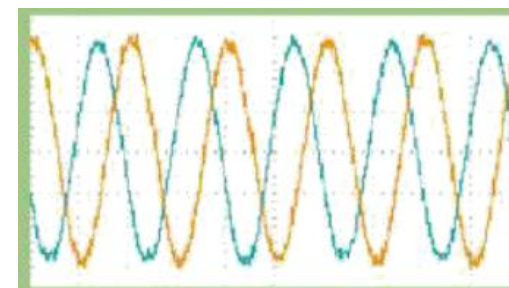
Operating ambient temperature: $-10^\circ C \sim 45^\circ C$

Height above sea level: $\leq 2,000m$

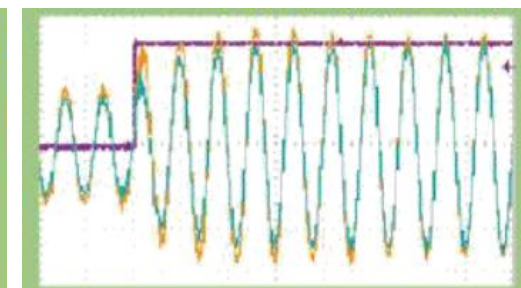
Projects Applications: 35Kv Statcom in Solar Plant

Projects Instruction

- Install place: DelingHa City, Tsinghai Province
- Capacity: $-8Mvar \sim +8Mvar$
- Rated Voltage: 35Kv
- Load: 30Mvar Solar Farm, Inductive and Capacitive Load.
- Effect: $PF > 0.98$, voltage fluctuation $< 1.5\%$, $TDHi < 5\%$



Parallel running waveform



Response time test

Projects Applications: 35Kv Statcom in Wind Farm

Projects Instruction

- Install place: Changji City, Xinjiang Province
- Capacity: $-16Mvar \sim +16Mvar$
- Rated Voltage: 35Kv
- Load: Great voltage fluctuation, and the instantaneous power factor is as low as 0.81.
- Compensation effect After Statcom: Power Factor > 0.98 ,
Meet harmonics Standard (GB/T 14549 / 1993);
Meet the needs of low voltage traversing.



Projects Applications: 10Kv APFC for Rolling Mill

Projects Instruction

- Install place: Heze City, Shandong Province
- Capacity: 8000kvar
- Rated Voltage: 10Kv
- Load: large voltage fluctuation, power factor 0.35, harmonics pollution at order 3rd,5th,7th
- Compensation effect APFC :
Power Factor 0.91, voltage fluctuation<1.5%,



Projects Applications: 0.4kv APF&SVG for Chemical Factory

Projects Instruction

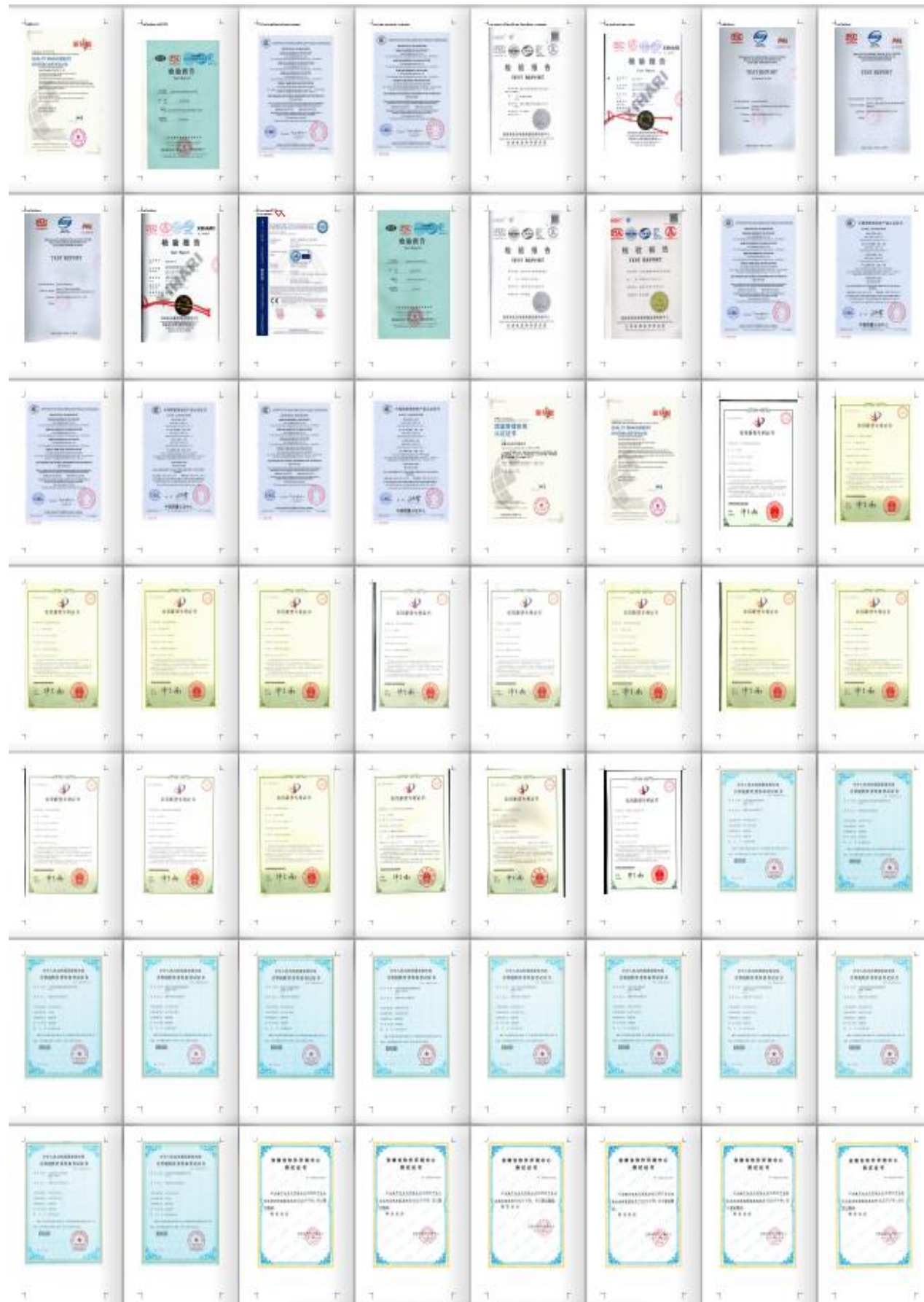
- Install place: Binzhou City, Shandong Province
- Capacity: 1100A APF and 900Kvar SVG
- Rated Voltage: 400V
- Load: serious harmonics pollution and low power factor
- Compensation effect APF and SVG:
Power Factor>0.98, THDi<5%,THDv<2%



Projects List

SN	Product	Capacity	User	Field	Country
1	10kv APFC	2000Kvar	Runfeng Power	Mining	CN
2	10kv APFC	3000Kvar	CN Electric Construction	Power Distribution	CN
3	6kv APFC	3600kvar	Weifang Chemical Factory	VFDs	CN
4	400V SVG	1100kvar	Hebei Yanzhong Power	Mining	CN
5	10KV SVG	2000Kvar	Ningbo Power Design Institute	Solar	CN
6	35kv SVG	4Mvar	GD Changsheng	Solar	CN
7	6kv APFC	2Mvar	Tongxin Power design Institute	Rolling furnace	CN
8	35kv SVG	10Mvar	CN Huadian Corporation	Wind	CN
9	10kv APFC	6Mvar	JinRen Design Institute	Electrolytic AL Manu.	CN
10	400V APF	1200A	National Grid(jiangsu)	Hospital	CN
11	400V APF	600A	Hebei TX power Design Institute	Hospital	CN
12	400V SVG	900kvar	Jinan Metro	Railway/metro	CN
13	10KV SVG	1400kvar	Xian hh power design institute	Power Distribution	CN
14	11kv APFC	1200kvar	Motors	Sugar factory	PK
15	SVG	1MVAR	Solar	Solar station	KR
16	APFC	11MVAR	Solar	Solar station	MY
17	400V APF	600A	Harmonics from device	Medical	ID
18	400V APF	600A	Motors	Metallurgical industry	CL
19	400V SVG	800Kvar	Harmonics from device	Medical	IN
20	380V SVG	600Kvar	Lights	high building	BR
21	6.6kv SVG	1000Kvar	Solar	Solar Sation	MY
22	400V APF	600A	Cranes	Seaport	MY
23	7.2KV APFC	1500kvar	Poor Power Factor	Steel	RO
24	380V APF	800A	VFDs and Motors	Chemical	EG
25	380V APF	400A	Melting funace	Steel factory	BR
26	380V APF	300A	Harmonics from device	Hospital	BR
27	440V APF	300A	Harmonics from device	Hospital	CO
28	220V SVG	6*75Kvar	Motors	Factory	CO
29	440V APFC	350Kvar	Motors	foundry factory	CO
30	400V APF	300A	Motors	Steel factory	IN
31	400V SVG	400kvar	Motors and ovens	Bakery factory	ZA
32	400V APF	300A	VFDs	Oil factory	LB
33	400V SVG	200Kvar	Motors	Steel factory	IN
34	400V APF	300A			
35	3.3kv APFC	675kvar	Waste water treatment	Motors	ZW
36	33kvs tatcom	30Mvar	Power Plant	Oil and Gas	GO
37	33kv Statcom	2.5Mvar	Symbior 8MW solar plant	Solar plant	BD
38	6.6kv Statcom	2Mvar	Auto Manufactory	Automotive machine	TH
39	10kv Statcom	3Mvar	Wind Plant	Wind Plant	KR

Company Certificate and Honor



Anhui Zhongdian Electric Co., Ltd.

Tel: +86-0552-4081055

Fax: +86-0552-4081155

Add.: No.25-1,Jinhe Rd,Economic Development Zone, Huaiyuan, Bengbu, Anhui Province

E-mail: info@zddqelectric.com

Website: zddqelectric.com