



**SOJO 双杰电气**

(Stock Code: 300444)

# SOJO Company and Products



2021

# Company Background Information

- Established 2002, Public listed from 2015, formed into a group company with 9 subsidiary companies, providing complete products and solutions for MV and smart grid applications.
- SOJO is mostly known as the **major manufacturer for MV solutions**, with strength in research and development of new technologies.
- 20 years' dedication into R&D of SF6 and Solid insulation solutions, more than **300,000.00** Delivered globally.
- The main promotor for *SF6 free* solutions. Huge efforts spent on introducing Greener Solutions to State Grid and China Southern Power Grid. Only private company within comity engaged in the standard drafting for **Solid insulated Switchgear** in China, national standard was written around SOJO product.

# SOJO Business Scopes

**SOJO 双杰电气**  
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## Smart Grid

Complete Offerings covers  
all medium voltage  
application:

- **Equipment Manufacturing**
- New Product R&D
- Operation and maintenance
- EPC



## Smart Energy & Energy Management

Micro-grid and Distributed  
Generation Construction &  
Operation:

- Distributed Generation: Solar PV EPC
- EV Charger
- Power Quality Management
- Power Re-selling
- Operation Installation and Commissioning Service



## Battery

Power Battery Components  
Lithium-ion battery  
membrane

# SOJO Business Scopes

**SOJO 双杰电气**  
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## Scope 1 Smart Grid

SOJO Electric Beijing Co., Ltd

Joyo Electric Co., Ltd

Zoyo Electric Co., Ltd

Wuxi Power Transformer Co., Ltd

Yunnan Yitong Meier Co., Ltd

## Scope 2 Smart Energy & Energy Management

SOJO New Technology R&D Center

Yingli Rongchuang Engineering Technology Co., Ltd

Beijie New Energy Co., Ltd

Nanjie New Energy Co., Ltd

## Scope 3 Battery

Tianjin DG Membrane Tech. Co., Ltd.

# Domestic Market Performance

**SOJO 双杰电气**

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**300 000 IN 20 YEARS**



**11** Subsidiary Companies



**2000** Employees



**34** Provinces (National Wide)

**State Grid Coverage**

**South Power Grid Coverage**

## Listed Vendor for Oil and Gas Industry:

China Petroleum company

Sinopec Engineering Incorporation

China National Offshore Oil Company

## Listed Vendor for Railway industry:

China railway Construction Corporation

**Top 1 SF6 & SIS in China**



**Beijing Headquarter  
(Group Headquarter)**

**Hefei Headquarter  
(Second Headquarter)**

# International Market Presence

Exported to more than 13 countries in 9 years

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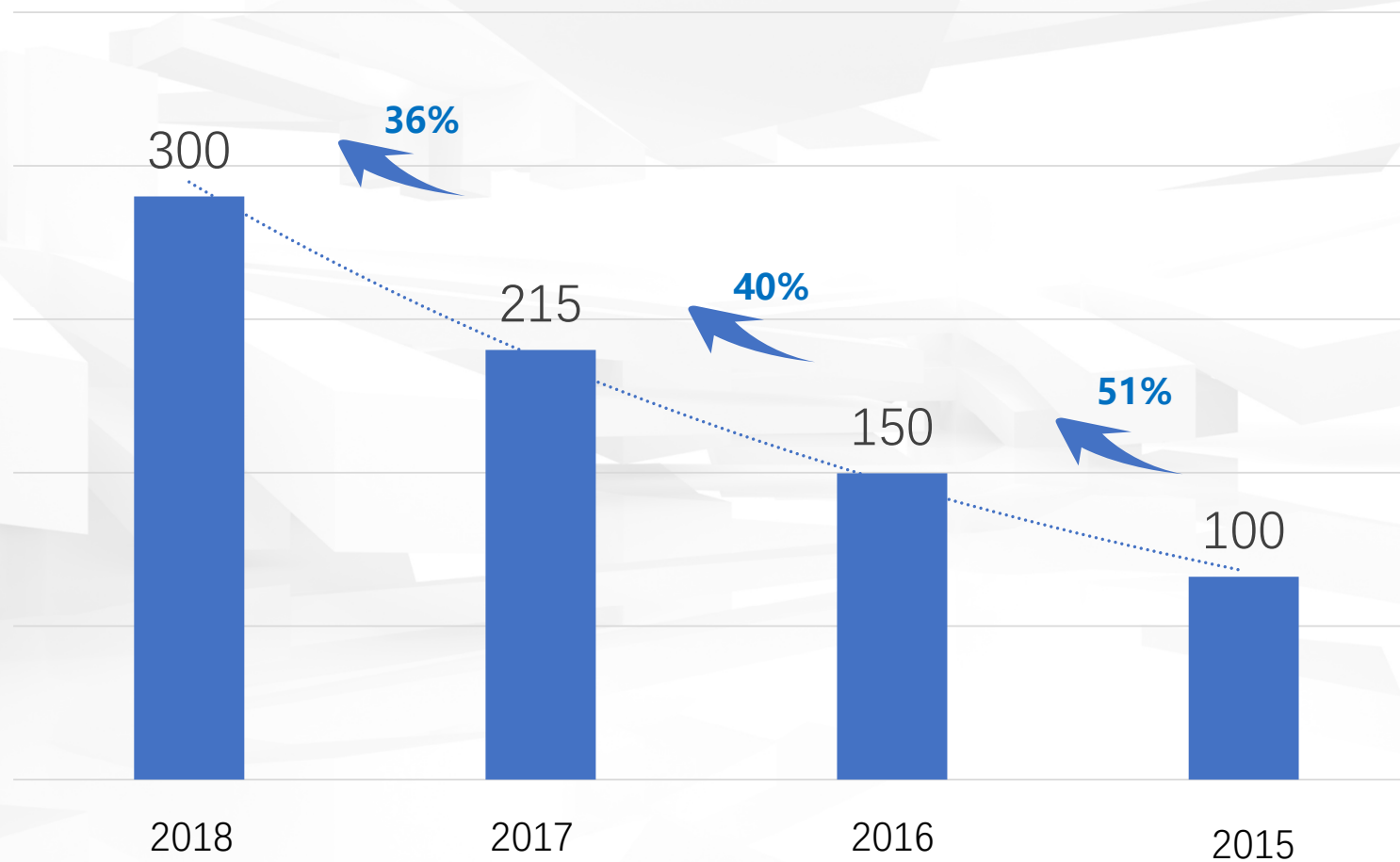




# Sales Performance

**SOJO 双杰电气**  
(股票代码: 300444)

Turnover (Million USD)



# SOJO New Manufacturing Plants and Headquarter

**SOJO 双杰电气**  
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**Growing Business Drives for bigger capacity:**

Started construction on 29 November 2018 in **Hefei**

Total Investment: **385 million USD**

Land Area **354,000.00** Square meters, 10 times bigger.

**Industrial 4.0 Automated Factory**

Advanced production systems

Expected Production Value: **550 million USD**



**Headquarter & Manufacturing Base**



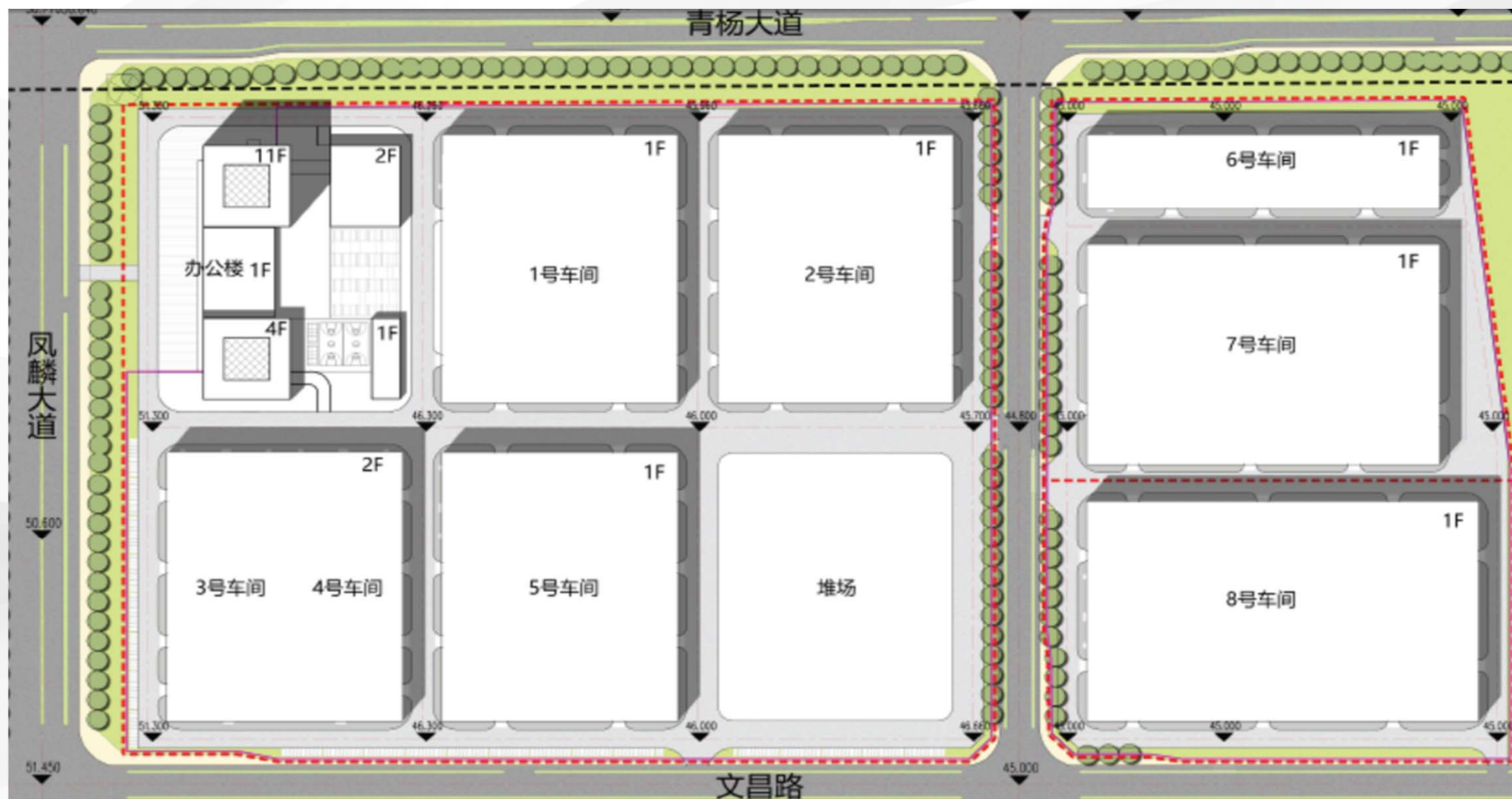


## New Headquarter and Manufacturing Base

### Floor Plan

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# Smart Grid - SOJO Main Products

**SOJO 双杰电气**  
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## MV Switchgears

- SIS
- AIS
- GIS

## Transformer & Compact Substation

- Oil Immersed Type up to 220kV
- Dry Type up to 40.5kV
- Prefabricated Substation up to 40.5kV

## Controller for LBS/CB/Recloser

## Charging Pole for EV



# Smart Grid - SOJO SF6 RMU

## Background Information

**SOJO 双杰电气**

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A mature and cost-effective solution, delivered by SOJO for 20 years with accumulated volumes more than 200 000 functions.

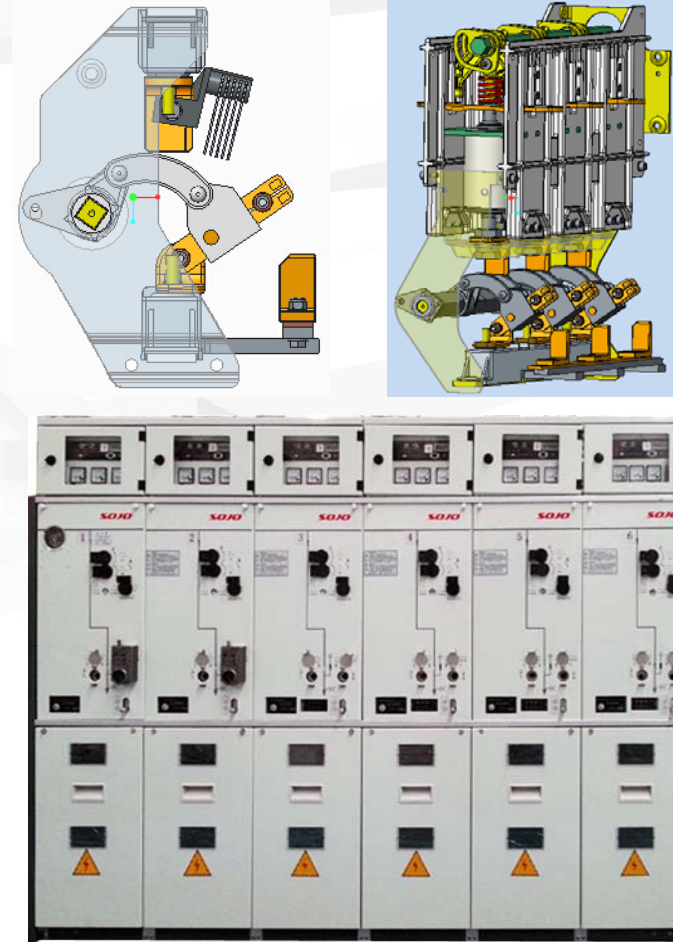
Top 1 in China Utility market.

### Advantages:

- Smaller size
- Despite the globally warming fact,
- SF6 is one of the best insulating and arch quenching medium
- Less GFA
- Safety reliability

### Disadvantage:

- Globally Warming Potential 2,4000 times more than CO2
- Strict Application Conditions
- High Maintenance Cost due to leakage related issues, Inspection, refilling etc.



# Smart Grid - SOJO SF6 RMU

## Technical Details

**SOJO 双杰电气**  
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### Service Conditions

- Maximum ambient temperature 50oC
- Average value measured over a period of 24 hours 45oC
- Minimum ambient temperature 0 oC
- Altitude 1000 Meter
- Maximum relative humidity 95%
- Location: Sea-coast
- Condensation, heavy pollution and corrosion shall be considered while designing.

Comply with KE Specification:

K-R&D-RMU-53 Rev (05)





# Smart Grid - SOJO SF6 RMU

## Technical Details

**SOJO 双杰电气**  
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### Technical Specification for RMU

S. No.	Description	High Voltage Switch	Earthing Switch	Circuit Breaker
a.	Sr. Number			
b.	Manufacturer	SOJO Electric	SOJO Electric	SOJO Electric
c.	Single line diagram			
d.	Type designation	XGN-12/630-C-Hex	XGN-12/630-J-Hex	XGN-12/630-V-Hex
e.	Rated Voltage, KV	11	11	11
f.	Highest voltage for equipment	12	12	12
g.	Rated impulse with stand Voltage, KV	95	95	95
h.	Rated One Min. power frequency Voltage, KV	42	42	42
i.	Rated frequency, Hz	50	50	50
j.	Rated Normal current, Amps	630	630	630
k.	Rated breaking capacity, Amps	630		20
l.	Rated 3 Sec. short time Current, KA	20	20	20
m.	Rated peak withstand current KA	50	50	50
n.	Rated short circuit making Capacity, KA	50	20	50
o.	Mechanical/Electrical Endurance Class	M2 (5000 times)/E3	M1 (3000 times)/E2	M2 (10000 times)/E2
p.	Loss of service continuity Class	LSC2A	LSC2A	LSC2A
q.	Partition Class	PM	PM	PM
Dimensions (Ring Main Unit) 3 functions CVV with encloser				
a.	Width, mm	1250		
b.	Height, mm	1800		
c.	Depth, mm	800		



# Smart Grid - SOJO SF6 RMU

## Production Line

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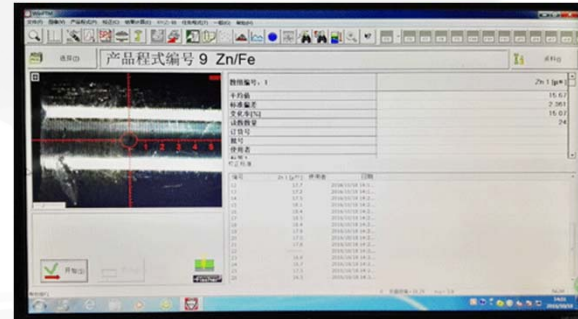
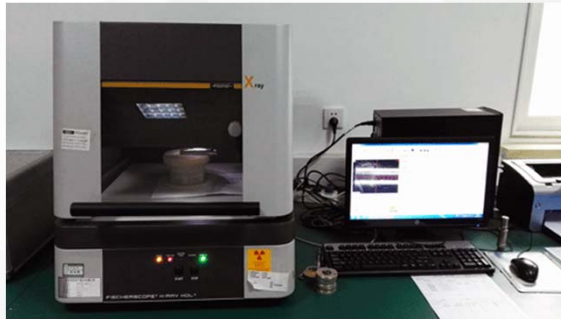


# Smart Grid - SOJO SF6 RMU

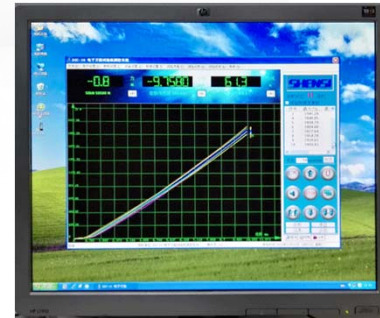
**SOJO 双杰电气**

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## Material Test Facilities



Coating Thickness Test Equipment



Rockwell Hardness Tester

Spring Curve Measure Equipment

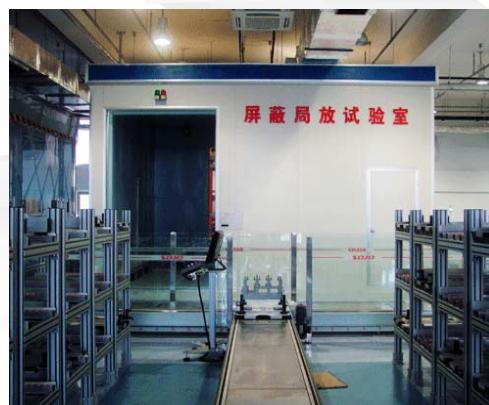
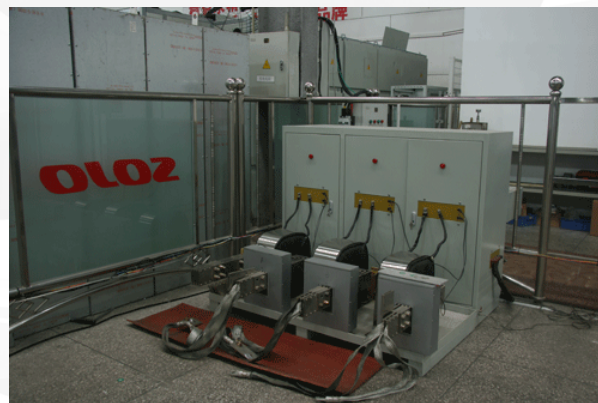


# Smart Grid - SOJO SF6

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## Routine Test & Type Test Facilities





# Smart Grid - SOJO SIS

## Background for SIS R&D

China is country with Variable landscapes posed a big challenge for conventional switchgears to handle where application conditions can be very extreme:

- Very Cold
- High temperature
- High Altitude
- Dusty
- High Humidity
- Flooding

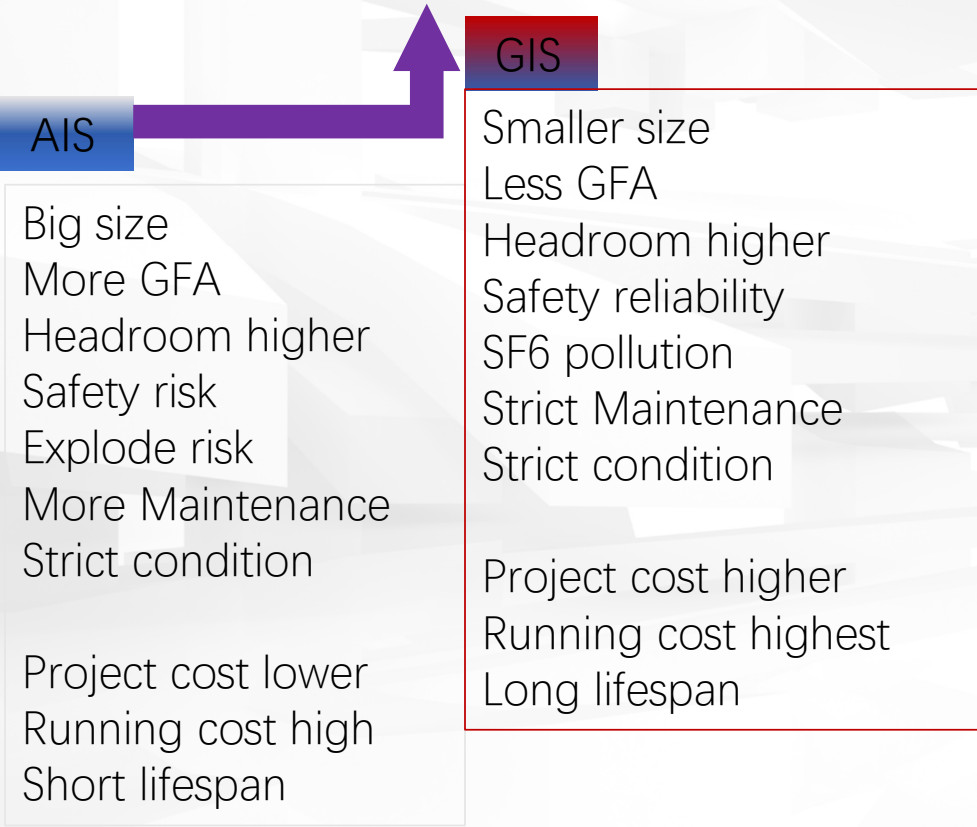


Solid insulation was found out to be an ideal solution to such applications, overall 100,000 panels delivered all over the nation covering every provinces.

Exported to 8 countries.

# Smart Grid - SOJO SIS

The Developing of  
MV switchgear in the world



**SIS**

- Smallest size
  - Less GFA
  - Headroom lower
  - More Safety & reliability
  - SF6 pollution free
  - Maintenance free for live part
  - Flexible condition
  - Application under harsh conditions
  - Lower possibility for internal arc fault
  - Project cost higher
  - Running cost lower
  - Long lifespan
- A desirable substitute for AIS and GIS**

AIS: Air Insulated Switchgear  
GIS: Gas Insulated Switchgear  
SIS: Solid Insulated Switchgear

# Smart Grid - SOJO SIS

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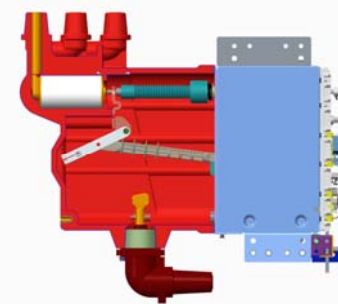
## New Version launched !!!

### SVI3 - 3SIS New Version

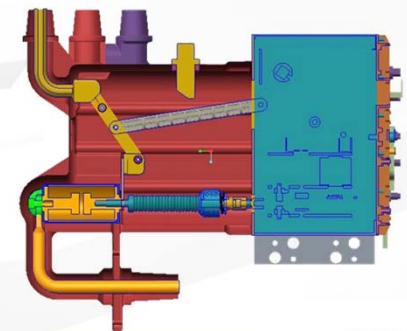
**Segregated Phases, Shielded Solid Insulated System**

- Shielded layer of conductive material makes the surface at earth potential everywhere;
- It is accidentally touchable providing safety features for operator.
- Application good for dirty, humidity and contaminated environment etc.
- Maintenance-free for live parts
- Segregated phases eliminate phase to phase discharge, reduces concern for internal arc fault
- Modular architecture enables free expansion

NEW Version - SVS3



SVS2



# Smart Grid - SOJO SIS

## New Version launched !!!

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### SVI3 – Technical Details

Segregated Phases, Shielded Solid Insulated System

Technical Data

Item	Unit	C	F	V	Disconnecter	Earthing switch
Rated voltage	kV	12	12	12	12	12
Rated current	A	630/1250	125	630/1250	630/1250	630/1250
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60
Rated power frequency withstand voltage 1 min	kV	48	48	48	48	48
Rated lightning impulse withstand voltage	kV	75/95	75/95	75/95	75/95	75/95
Rated breaking current	kA		31.5	20/25/31.5		
Rated short-time withstand current	kA/s	20/4		20/25/4	20/25/4	20/25/3
Rated short-time making current	kA	50		50/63		
Partial discharge	pC	≤5	≤5	≤5		

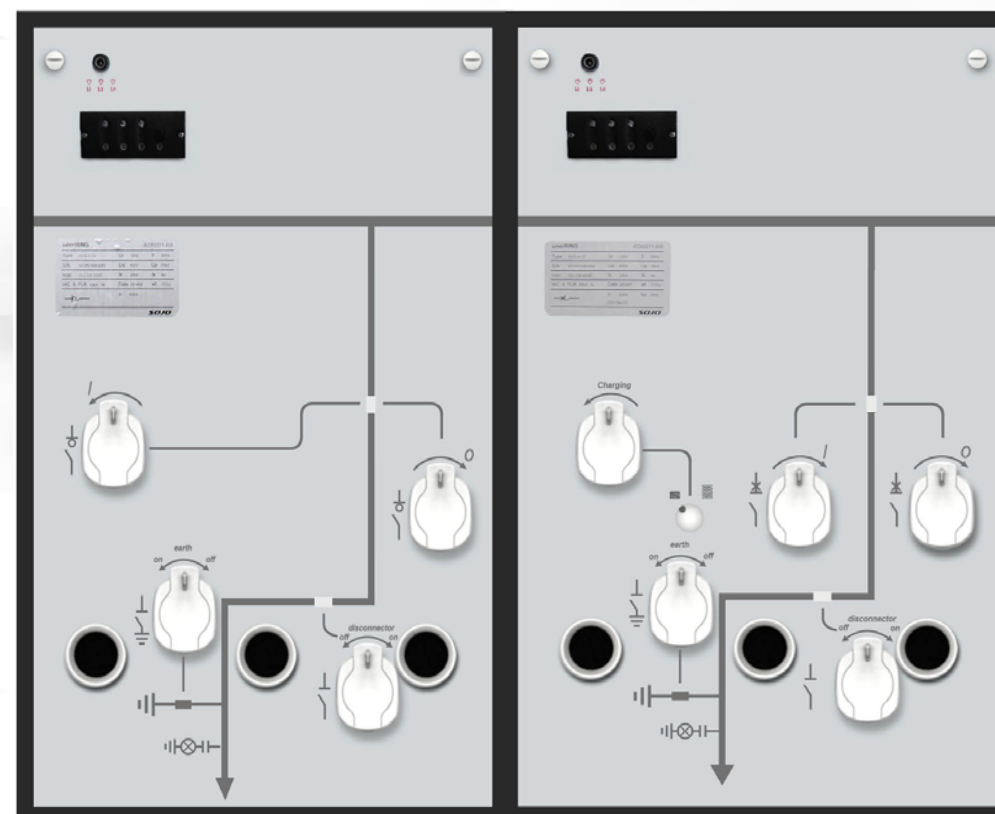
Internal arc classification is AFLR 21 kA 1s defined in the standard IEC 62271-200.

#### SVI complies with:

IEC 62271-200(2011), IEC 62271-1, IEC 62271-100, IEC 62271-102 (2012), IEC 62271-103(2011), IEC 62271-105, IEC 60529;  
GB 1984-2003, GB 3906-2006, GB 1985-2004, GB 3804-2004, GB/T 11022-1999.

NEW Version - SVS3

Intuitive Mimic – Easy to Operate!

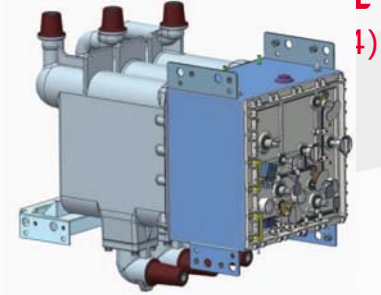




# Smart Grid - SOJO SIS

## New Version launched !!!

**SOJO** 双木由气

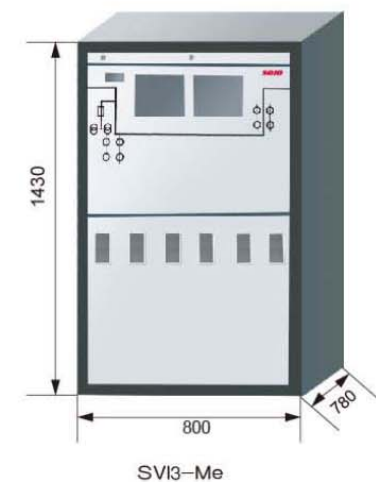
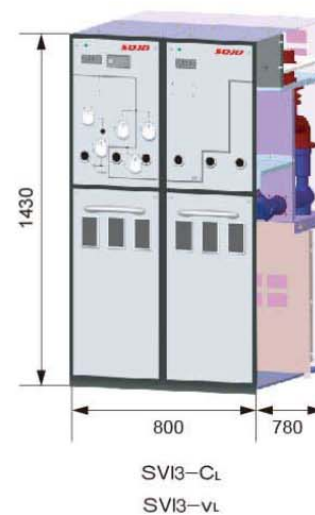
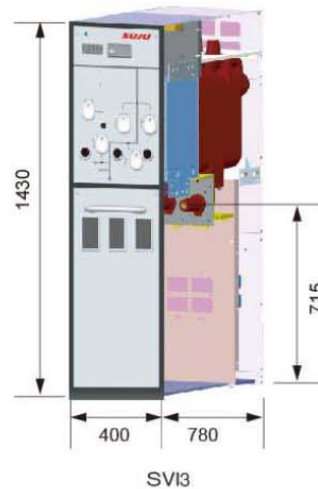


### SVI3 – Architecture

- Core Unit Design
- Downstream Independent Disconnecter Switch /Earthing Switching
- Same Busbar System as SVI2, fully insulated or shielded
- Interchangeable with SVI2, using SVI2 as incomer and SVI3 as outgoing providing easier coordination between stations for start-up electricity supply
- Sealed Mechanism IP67

#### Dimensions

SVI3 Width	400mm	Hight (Manual operation)	1430mm
Width (V1,CL and Me)	800mm	Hight (Motorized operation)	1750(1900)mm
Depth	780mm	The distance of cable connector and earth	715mm



# Smart Grid - SOJO SIS

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## New Version launched !!!

### *SVI3 – Architecture Indoor Installation*

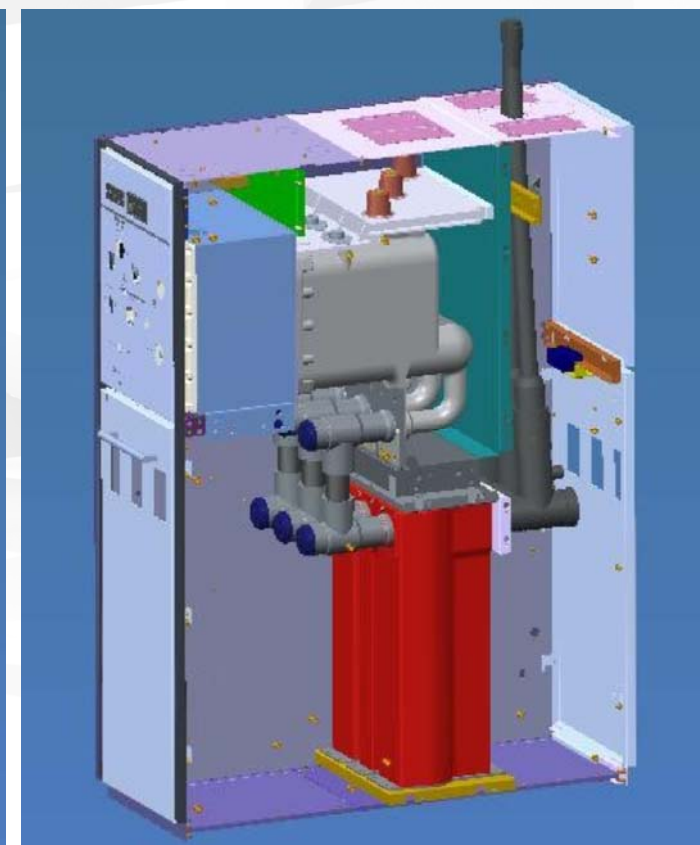
Suitable for Indoor application with no cable trench

Dimensions:

➤ 1500×1100×400mm (HDW)

Special Indoor type CT

- Ratio: 300 - 600/5
- Class 0.2/0.5/10p20/10p20
- Volume: 15/15/20/20VA



# Smart Grid - SOJO SIS

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## New Version launched !!!

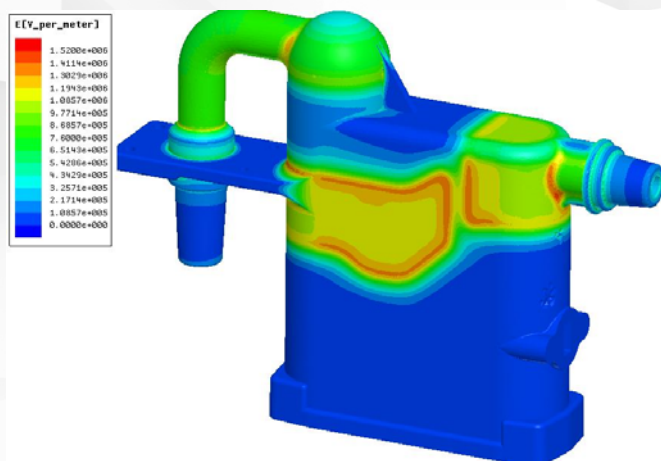
### SVI3 – Commuting Optimized Design

Computing Analysis for solid Insulation Design Process

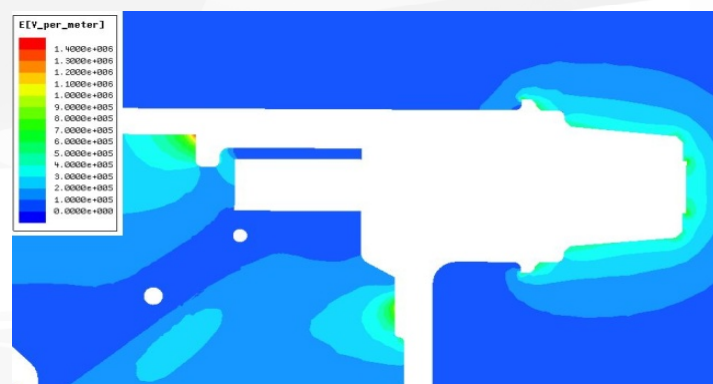
Safe, Stable, Highly Reliable

- ◆ Magnetic field intensity design
- ◆ 3D simulation design, finite element analysis

Comprehensive 3D Simulation



Detail



Various forms



# Smart Grid - SOJO 3SIS

**SOJO 双杰电气**  
(股票代码: 300444)

## SVI3 New Version launched !!!

### SVI3 – Type Tested in KEMA Netherlands

DNV-GL

#### DECLARATION OF TESTS PERFORMED

We herewith declare that we have tested the following object on 3, 4, 6 December 2018:  
A three-pole solid insulated vacuum circuit-breaker in a three-phase metal-enclosed solid insulated switchgear assembly. Type SVI3-V-12/630-21, Serial No. 532018111059.

The object was rated: 12 kV – 630 A – 20 kA (1) – 50 Hz  
(1) On request of the client the tests have been based on a short-circuit current of 21 kA and 52.5 kApeak.

The object was manufactured by Beijing Sojo Electric Co. Ltd., Beijing, China.

The object has passed the following tests:

- Short-time withstand current and peak withstand current test (4 s)
- T10 ( $K_{ad}=1.5$ )
- T30 ( $K_{ad}=1.5$ )
- T60 ( $K_{ad}=1.5$ )
- T100a ( $K_{ad}=1.5$ )
- T100b (single-phase test to cover  $K_{ad}=1.3$ )
- T100a ( $K_{ad}=1.5$ )
- T100a (single-phase test to cover  $K_{ad}=1.3$ )
- Double-earth fault test
- Endurance test according class E2 (table 33, list 3)

The tests have been carried out in accordance with IEC 62271-100:2008, +A1:2012, +A2:2017, taking account of the STL Guide wherever applicable.

For the above mentioned object we will issue a KEMA TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE in accordance with IEC 62271-100:2008, +A1:2012, +A2:2017.

The number of this Certificate is 2427-18.

M. Dekker  
Head of Section, MV Operations  
KEMA Laboratories Arnhem

Arnhem, 11 April 2019

**KEMA** Laboratories

KEMA B.V., Utrechtseweg 310, 6812 AR Arnhem | P.O. Box 9035, 6800 ET Arnhem, the Netherlands  
T +31 26 356 2993 | contact.power@dnvgl.com | [www.dnvgl.com/energy](http://www.dnvgl.com/energy) | Registered Arnhem 73117455

DNV-GL

#### DECLARATION OF TESTS PERFORMED

We herewith declare that we have tested the following object on 3, 4, 6 December 2018:  
A three-pole solid insulated vacuum circuit-breaker in a three-phase metal-enclosed solid insulated switchgear assembly. Type SVI3-V-12/630-21, Serial No. 532018111059.

The object was rated: 12 kV – 630 A – 20 kA (1) – 50 Hz  
(1) On request of the client the tests have been based on a short-circuit current of 21 kA and 52.5 kApeak. See declaration 2427-18.

The object was manufactured by Beijing Sojo Electric Co. Ltd., Beijing, China.

The object has passed the following tests:

- Pre-conditioning
  - CC1 ( $K_{ad}=1.5$ )
  - CC2 ( $K_{ad}=1.5$ )
- The tests have been carried out in accordance with IEC 62271-100:2008, +A1:2012, +A2:2017, taking account of the STL Guide wherever applicable.

For the above mentioned object we will issue a KEMA TYPE TEST CERTIFICATE OF SWITCHING PERFORMANCE in accordance with IEC 62271-100:2008, +A1:2012, +A2:2017.

The number of this Certificate is 2428-18.

M. Dekker  
Head of Section, MV Operations  
KEMA Laboratories Arnhem

Arnhem, 11 April 2019

**KEMA** Laboratories

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T +31 26 356 2993 | contact.power@dnvgl.com | [www.dnvgl.com/energy](http://www.dnvgl.com/energy) | Registered Arnhem 73117455

DNV-GL

#### DECLARATION OF TESTS PERFORMED

We herewith declare that we have tested the following object on 3, 5 December 2018:  
A three-pole solid insulated vacuum load-break switch in a three-phase metal-enclosed solid insulated switchgear assembly. Type SVI3-C-12/630-21, Serial No. 532018111058.

The object was rated: 12 kV – 630 A – 20 kA (1) – 50 Hz  
(1) On request of the client the tests have been based on a short-circuit current of 21 kA and 52.5 kApeak.

The object was manufactured by Beijing Sojo Electric Co. Ltd., Beijing, China.

The object has passed the following tests:

- Short-time withstand current and peak withstand current test (4 s)
- T1load1
- T1load2
- T1load3
- T1load4
- T1load5
- T1load6
- T1load7
- T1load8
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# Smart Grid - SOJO SIS

**SOJO 双杰电气**

(股票代码: 300444)

## New Version launched !!!

**SVI3** – Standardized Parts good for Massive Production and Fast Delivery  
*Core Unit Design easier for panel engineering and unit assembling*



# Smart Grid - SOJO SIS

**SOJO 双杰电气**

(股票代码: 300444)

## SVP Metal-Clad Solid Insulation

*SVP - A revolutionary product initially designed for CNNOC off-shore application*

### Compact

$$\text{GFA S A I S / S I S} = 1.2 / 0.528 = 2.27$$

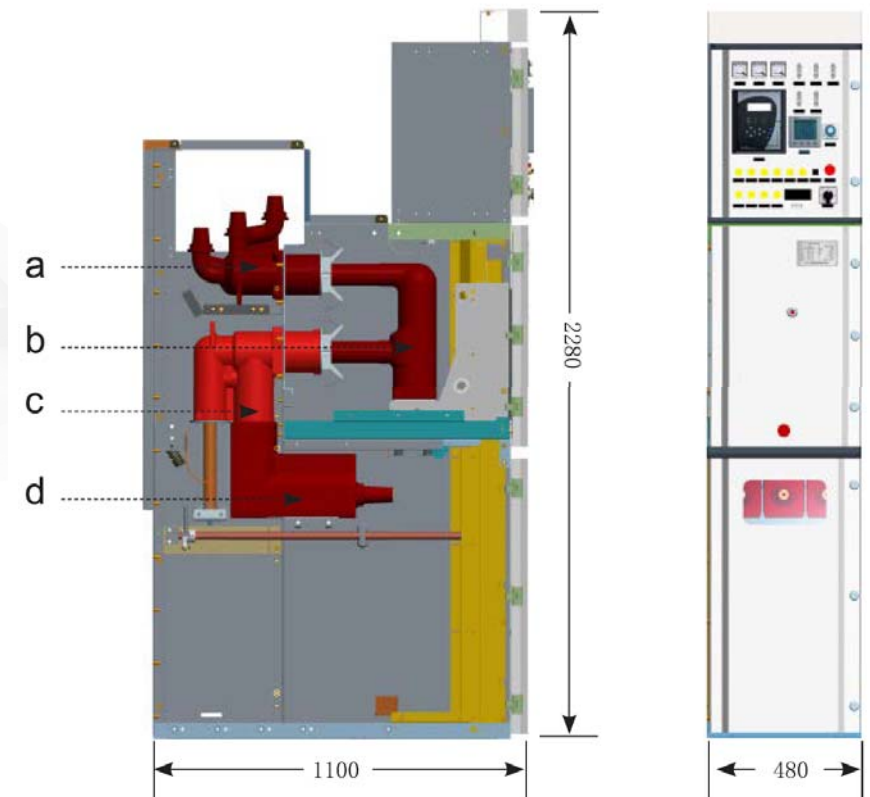
- WXD<sub>XH</sub>: 480X1100X1835mm
- GFA 0.48X1.1=0.528
- AIS: GFA 0.8X1.5=1.2
- Maintenance-free

Fully Insulated System requires **free maintenance** for live parts

Fully Insulated, No exposed live parts reduce potential of phase to phase discharge ensure a **higher Safety Level**

Shielded Option provides suitability for **Extreme Application** against dust, humidity and contamination

Direct Acting Earthing Switch provides **reliable** making capacity



# Smart Grid - SOJO SIS

**SOJO 双杰电气**

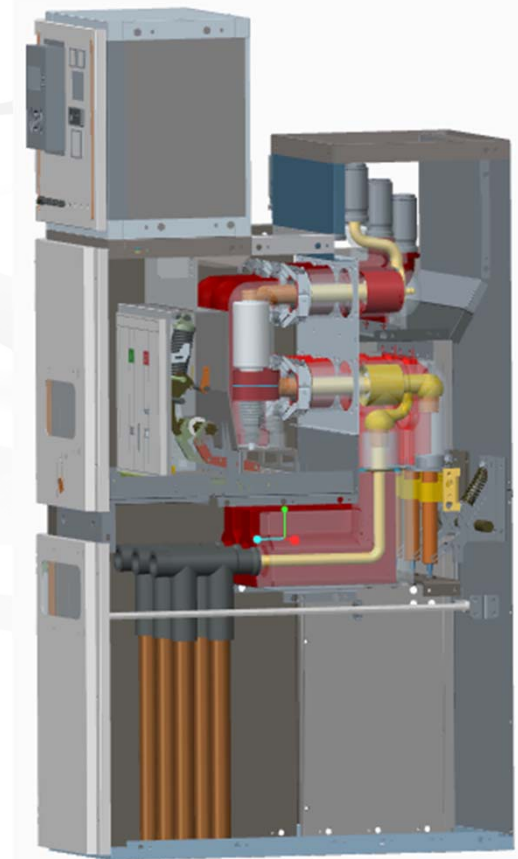
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## SVP Metal-Clad Solid Insulation

*SVP - A revolutionary product initially designed for CNNOC off-shore application*

### SVP Ratings

No	Items	Unit	Parameters
1	Rated Voltage	kV	12
2	1min power frequency withstand voltage		42/48
3	BIL		75/85
4	Rated Frequency	Hz	50
5	Rated Current	A	1250
6	Rated Short-circuit breaking	kA	31.5
7	Short-circuit Breaking Current peak	kA	80
8	Short-circuit making Test	kA	80
9	4s current withstand	kA	31.5
10	Breaking current for earthing faults (Ph to Ph)	kA	27.3
11	Current withstand	S	4
12	Secondary voltage withstand (1min)	kV	2
13	Short-circuit breaking	times	E2
14	Mechanical Endurance		10000
15	IP (Busbar, Cable/ VCB)		IP67/IP4X



# Smart Grid - SOJO SIS

## 40.5kV Primary Solid Insulation

**SOJO 双杰电气**

(股票代码: 300444)

**3SIS - Segregated Phases, Shielded Solid Insulated System**

### Features

#### Shielded Solid Insulation Provides More Safety for Operator

- Shielded layer of conductive material makes the surface at earth potential everywhere;
- it is accidentally touchable providing safety features for operator.
- Less affection of dirty, humidity and pollutions etc.
- Maintenance-free
- Segregated phases eliminate phase to phase discharge ,
- Modular architecture enables free expansion
- Compact size only 1/4 of air insulated switchgear    W800×D1200×H2150, weight: 800Kg





# Smart Grid - SOJO SIS

**SOJO 双杰电气**

(股票代码: 300444)

## 40.5kV Primary Solid Insulation

**3SIS** - Segregated Phases, Shielded Solid Insulated System

### Ratings

Name		Unit	Three Phase	Two phase	Single phase
Rated voltage		kV	40.5	2×27.5	27.5
Lightning impulse withstand voltage	Phase to earth	kV	185	185	185
	Open Contacts	kV	215	220	220
Power frequency withstand voltage	Phase to earth	kV	95	95	95
	Open Contacts	kV	118	118	118
Rated frequency		Hz	50/60	50/60	50/60
Rated current		A	1250	1250	1250
Rated short circuit withstand current		kA/4s	31.5	31.5	31.5
Mechanical life		time	10000	10000	10000



# Smart Grid - SOJO SIS

## New 27/38kV Recloser !!!

### SVR – Solid insulated Auto-Recloser

#### Recloser Features

##### Reliability

- 10,000 times mechanical endurance
- UV resistant solid insulation material
- 100% Factory Acceptance Testing
- Single mold Feature

##### Maintenance-free

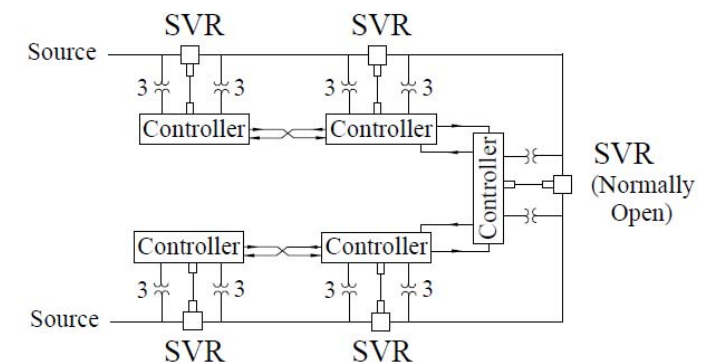
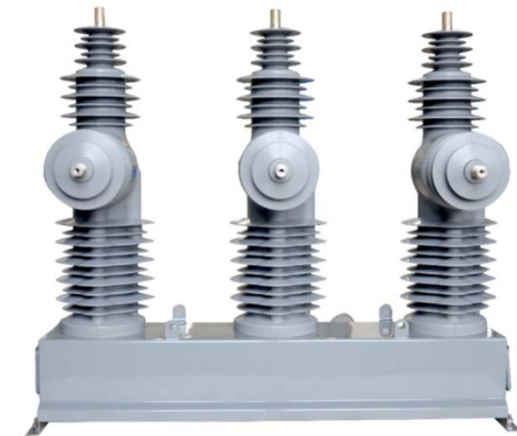
- HCEP
- Magnetic Actuator with few moving parts
- Painted Stainless steel enclosure and operation shaft guarantee maximum corrosion protection

#### Environmentally Friendly

- SF6 free
- Altitude: 3000m
- Operating temperature: -40 to 55°C
- Maximum solar radiation: 1.1 kW/m<sup>2</sup>
- Icing thickness: 20mm
- Pollution level: IV-Very Heavy
- Seismic intensity: ≤8
- Wind pressure: ≤34 m/s
- Humidity: Daily Average ≤95%;  
Monthly Average ≤90%

#### Smart Grid and Automation

- Encapsulated 3 current transformers (±0.2%)
- Encapsulated 6 voltages sensors maximum (±5%)



# Smart Grid - SOJO SIS

## New 27/38kV Recloser !!!

### *SVR – Solid insulated Auto-Recloser*

#### Recloser Control Features

- Protection for Medium Voltage feeders
- Overhead switchgear control
- Local operation and setting by means of a graphic display, and remotely through serial and Ethernet protocols
- User-friendly configuration and supervision software. The device data model is integrated automatically to the software when connected, not needing any previous configuration work
- Wide range current inputs allowing the same device to be connected to 1A and 5A CT secondary
- Sensor voltage inputs or conventional transformers
- User logic signals according to the IEC 61131-3 standard
- Different options for programmable digital inputs and outputs number
- Local signaling through programmable LED indicators
- Circuit breaker and operation monitor
- Fault location
- Faults and events recording
- Automatic reclosing function, for application in overhead lines
- Synchronisation by IRIG-B or through communications



**SOJO 双杰电气**

(股票代码 (Stock code: 300444))



[Thank You! ]

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