SOJO 双杰电气

(Stock Code：300444)

SOJO Company and Products

2021

Company Background Information

SOJO 双杰电气
(股票代码：300444)

- 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
(股票代码：300444)

Smart Grid

Complete Offerings covers all medium voltage application：

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

Smart Energy & Energy Management

Micro-grip and Distributed Generation Construction & Operation:

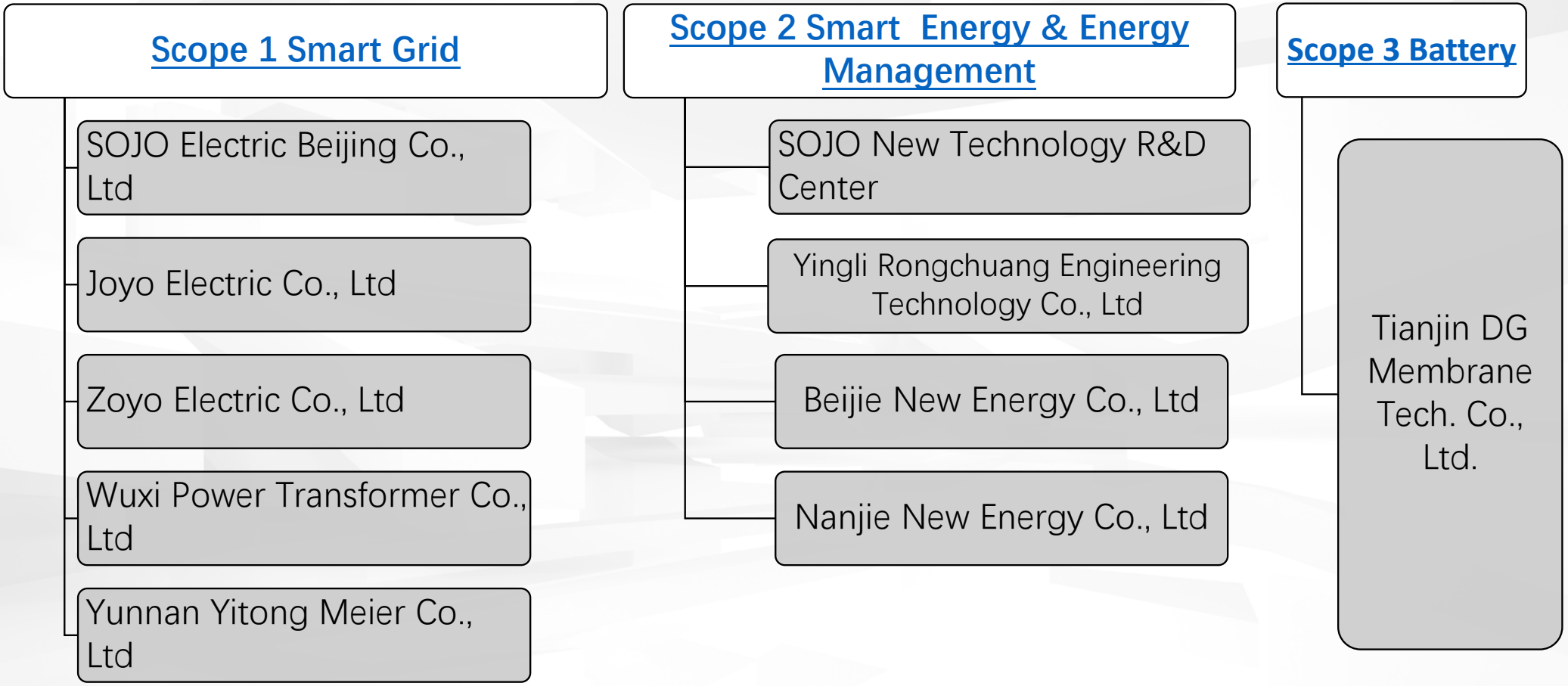
- Distributed Generation: Solar PV EPC
- EV Charger
- Power Quality Management
- Power Re-selling
- Operation Installation and Commissioning Service

Battery

Power Battery Components Lithium-ion battery membrane

SOJO Business Scopes

SOJO 双杰电气
(股票代码：300444)



Domestic Market Performance

SOJO 双杰电气
(股票代码：300444)

11 Subsidiary Companies

2000 Employees

34 Provinces (National Wide)

300 000 IN 20 YEARS

State Grid Coverage

South Power Grid Coverage

Top 1 SF6 & SIS in China

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

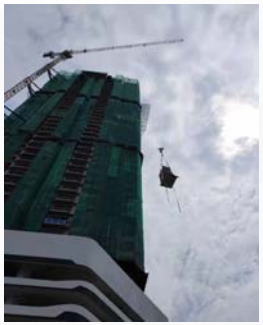
International Market Presence

SOJO 双杰电气
(股票代码：300444)

Exported to more than 13 countries in 9 years

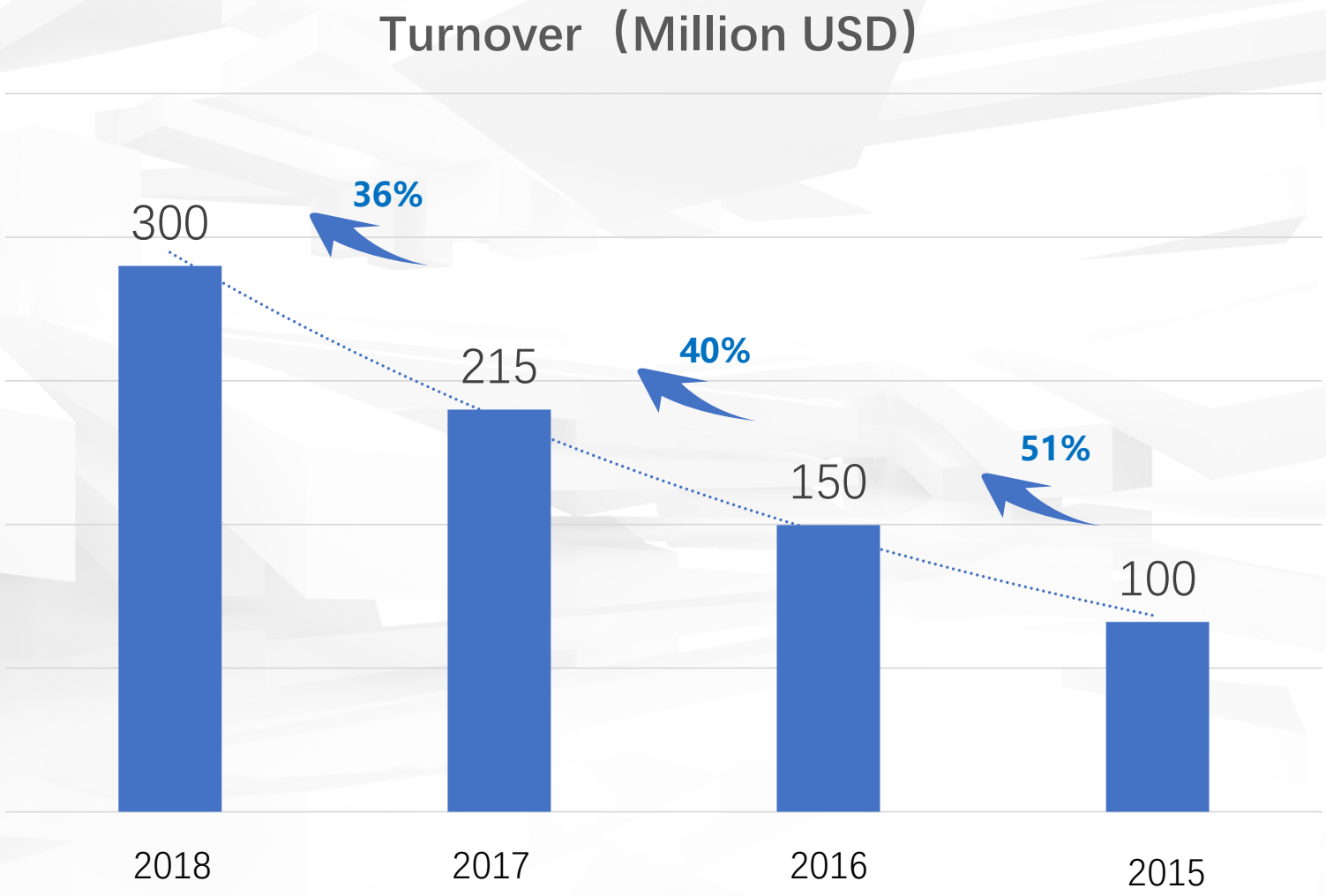




Sales Performance

SOJO 双杰电气
(股票代码：300444)



SOJO New Manufacturing Plants and Headquarter

SOJO 双杰电气
(股票代码：300444)

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

SOJO 双杰电气

(股票代码：300444)

Smart Grid - SOJO Main Products

SOJO 双杰电气
(股票代码：300444)

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

RMU KEMA


12/24kV Solid Insulated Switchgear


40.5kV Solid Insulated Switchgear


SF6 Gas Insulated Switchgear


Dry Air Switchgear


MV ATS

Pole Mounted Switch


Recloser


LBS


VCB

VS1 VCB


Withdrawable VCB


Withdrawable VCB

Transformer


110kV Oil-immersed Transformer


10kV Amorphous Metal Transformer


10kV Dry-type Transformer

Substation


Prefabricated Secondary Substation


Pad-mounted Secondary Substation - American Type


SF6 Load Switch


Core Unit of Solid Insulated Switchgear


Automatic Control Device


Recloser Controller


Charging Pole

Smart Grid - SOJO SF6 RMU

SOJO 双杰电气
(股票代码：300444)

Background Information

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

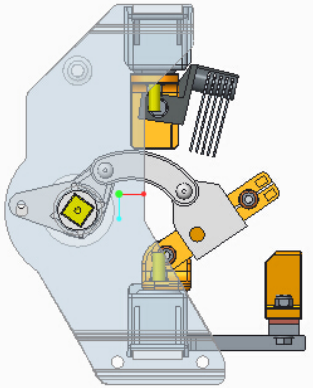
Top 1 in China Utility market.

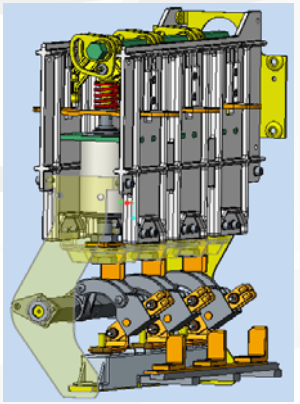
Advantages:

- 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
(股票代码：300444)

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
(股票代码：300444)

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

SOJO 双杰电气
(股票代码：300444)

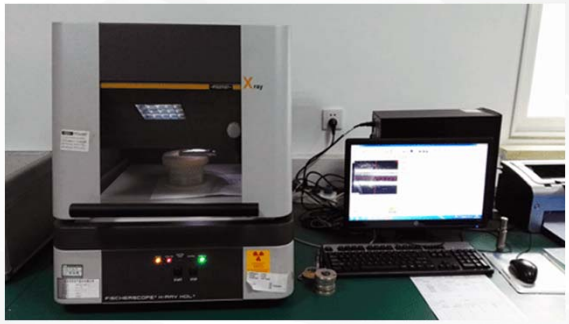





Smart Grid - SOJO SF6 RMU

SOJO 双杰电气
(股票代码：300444)

Material Test Facilities



Coating Thickness Test Equipment

Rockwell Hardness Tester

Spring Curve Measure Equipment

Smart Grid - SOJO SF6

SOJO 双杰电气
(股票代码：300444)

Routine Test & Type Test Facilities

Smart Grid - SOJO SIS

SOJO 双杰电气
(股票代码：300444)

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

SOJO 双杰电气
(股票代码：300444)

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

The Developing of
MV switchgear in the world

AIS

Big size
More GFA
Headroom higher
Safety risk
Explode risk
More Maintenance
Strict condition

Project cost lower
Running cost high
Short lifespan

GIS

Smaller size
Less GFA
Headroom higher
Safety reliability
SF6 pollution
Strict Maintenance
Strict condition

Project cost higher
Running cost highest
Long lifespan

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

Smart Grid - SOJO SIS

SOJO 双杰电气
(股票代码：300444)

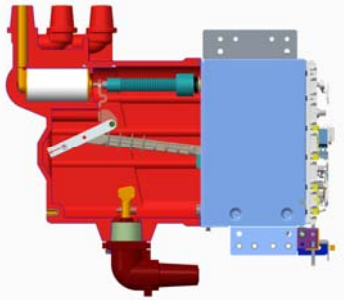
New Version launched !!!

SVI3 - 3SIS New Version

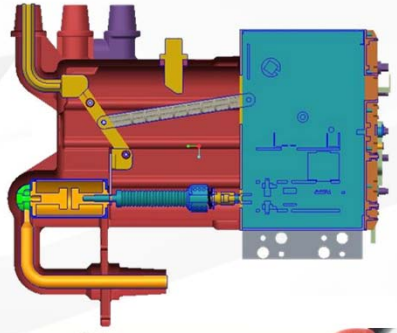
Segregated Phases, Shielded Solid Insulated System

- Shielded layer of conductive material makes the surface at earth potential everywhere;
- It is accidently 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

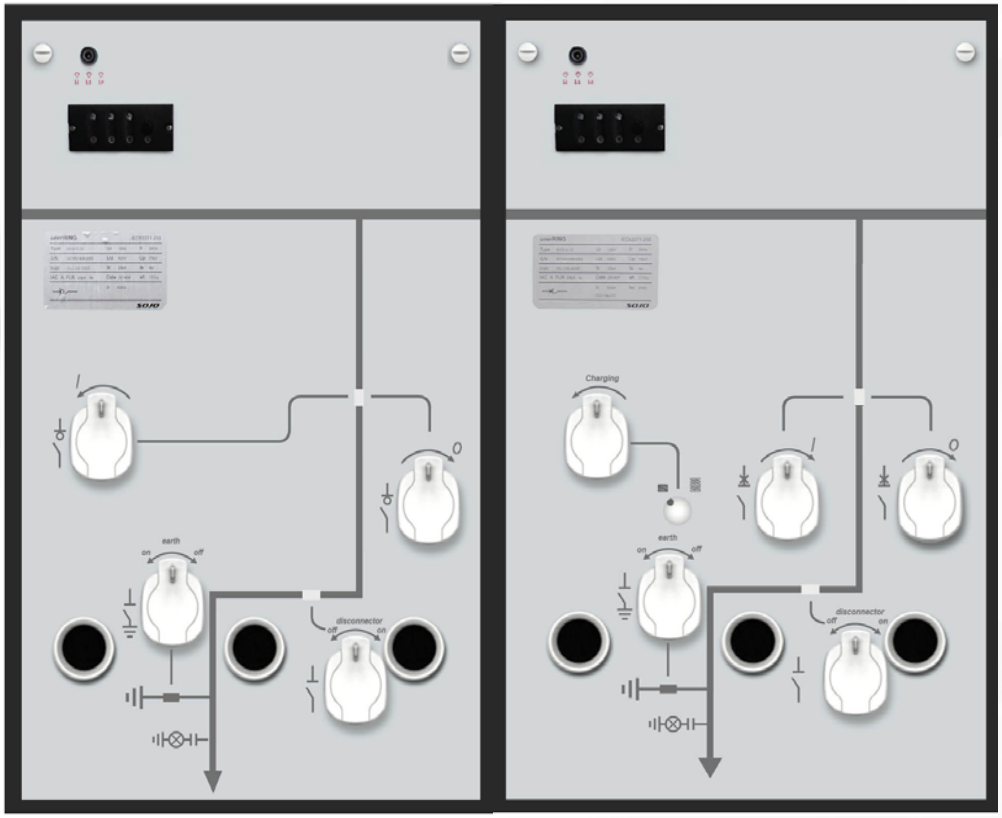
SOJO 双杰电气
(股票代码：300444)

New Version launched !!!

SVI3 – Technical Details

NEW Version - SVS3

Intuitive Mimic – Easy to Operate!



Segregated Phases, Shielded Solid Insulated System

Technical Data

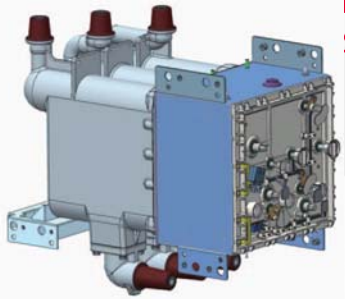
Item	Unit	C	F	V	Disconnector	Earthing switch
Rated voltage	kV	12	12	12	12	12
Rated current	A	630/1250	125	630/1250	630/1250	630/1250
Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60
Rated power frequency withstand voltage 1 min	kV	48	48	48	48	48
Rated lightning impulse withstand voltage	kV	75/95	75/95	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.

Smart Grid - SOJO SIS

New Version launched !!!

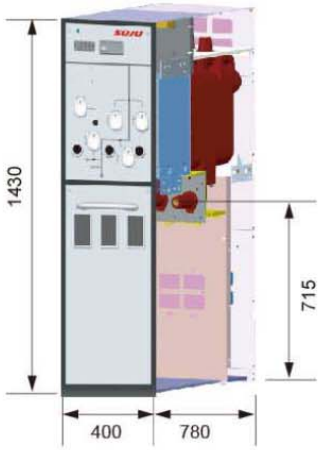


SVI3 – Architecture

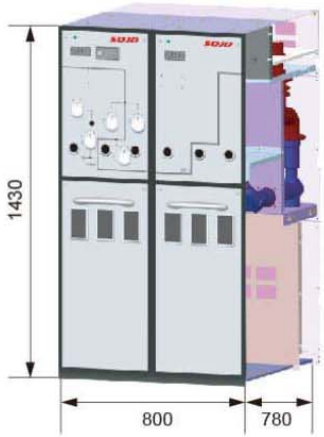
- Core Unit Design
- Downstream Independent Disconnector Switch /Earthing Switching
- Same Busbar System as SVI2, fully insulated or shielded
- Interchangeable with SVI2, using SVI2 as incomer and SVI3 as outgoing providing easier coordination between stations for start-up electricity supply
- Sealed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

Dimensions

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

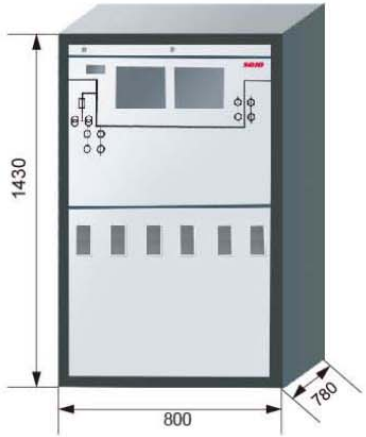


SVI3



SVI3–CL

SVI3–VL



SVI3–Me

Smart Grid - SOJO SIS

SOJO 双杰电气
(股票代码：300444)

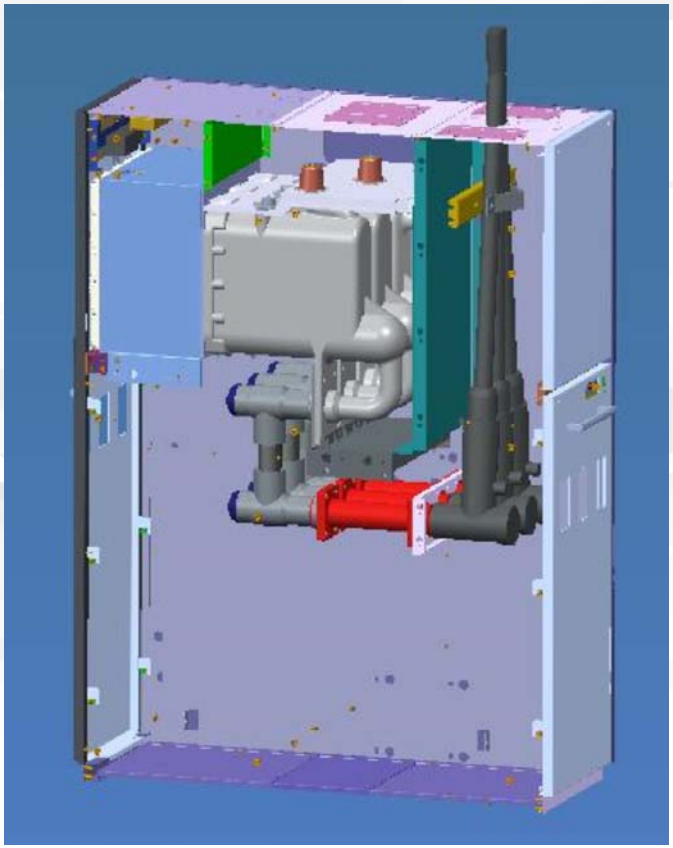
New Version launched !!!

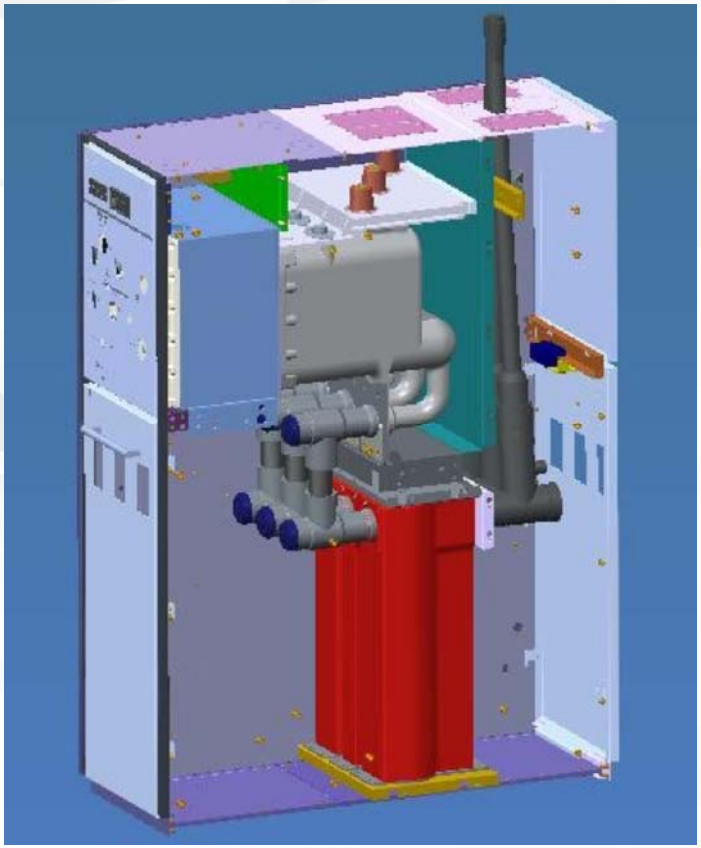
SVI3 – Architecture
Indoor Installation

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

SOJO 双杰电气
(股票代码：300444)

New Version launched !!!

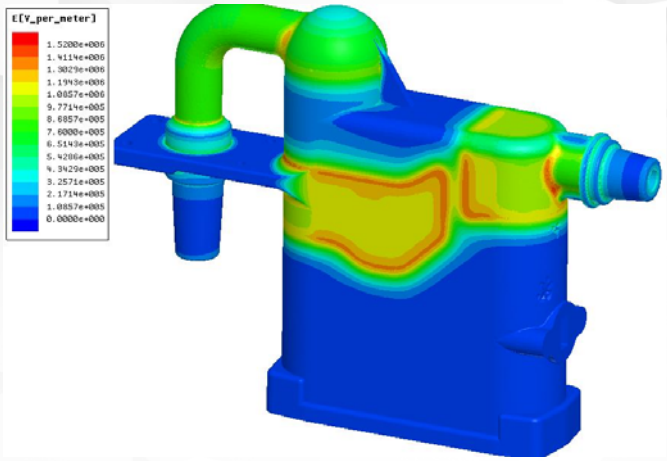
SVI3 – Commuting Optimized Design

Computing Analysis for solid Insulation Design Process

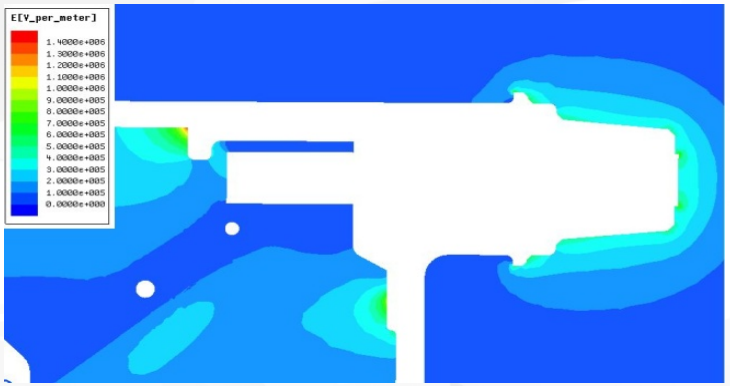
Safe, Stable, Highly Reliable

- 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. SJ2018111059.

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_{pp}=1,5)
- T30 (k_{pp}=1,5)
- T60 (k_{pp}=1,5)
- T100s (k_{pp}=1,5)
- T100s (single-phase test to cover k_{pp}=1,3)
- T100a (k_{pp}=1,5)
- T100a (single-phase test to cover k_{pp}=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.

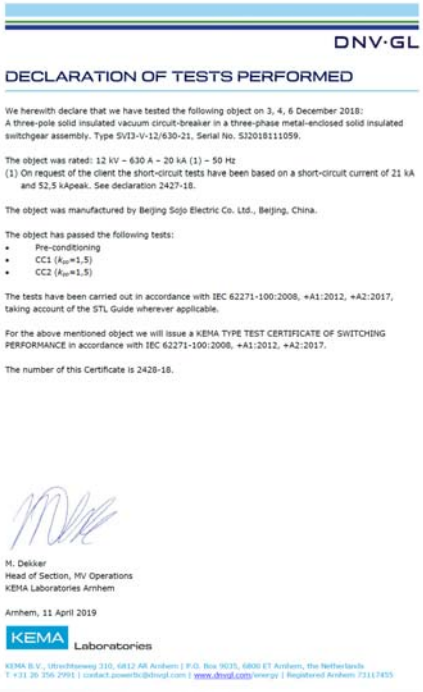
For the above mentioned object we will issue a KEMA TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE in accordance with IEC 62271-100:2008, +A1:2012, +A2:2017.

The number of this Certificate is 2427-18.

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

Arnhem, 11 April 2019

KEMA Laboratories



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. SJ2018111059.

The object was rated: 12 kV – 630 A – 20 kA (1) – 50 Hz
(1) On request of the client the short-circuit 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_{pp}=1,5)
- CC2 (k_{pp}=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

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 soli switchgear assembly. Type SVI3-C-12/630-21, Serial No. SJ2018111058.

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)
- TDload2
- TDload1
- TDloop
- TDcc2
- TDcc1
- TDlc
- TDma (class E3)

The tests have been carried out in accordance with IEC 62271-103:2011, taking account o Guide wherever applicable.

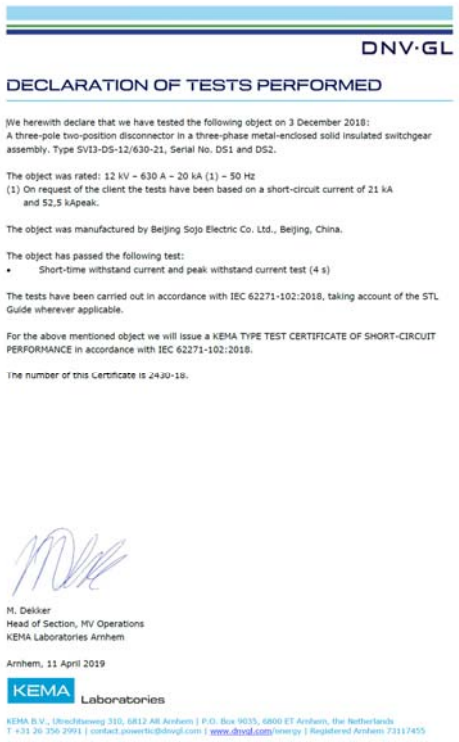
For the above mentioned object we will issue a KEMA TYPE TEST CERTIFICATE OF SWITCH SHORT-CIRCUIT PERFORMANCE in accordance with IEC 62271-103:2011.

The number of this Certificate is 2429-18.

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

Arnhem, 11 April 2019

KEMA Laboratories



DNV·GL

DECLARATION OF TESTS PERFORMED

We herewith declare that we have tested the following object on 3 December 2018:
A three-pole two-position disconnector in a three-phase metal-enclosed solid insulated switchgear assembly. Type SVI3-DS-12/630-21, Serial No. DS1 and DS2.

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 test:
- Short-time withstand current and peak withstand current test (4 s)

The tests have been carried out in accordance with IEC 62271-102:2018, taking account of the STL Guide wherever applicable.

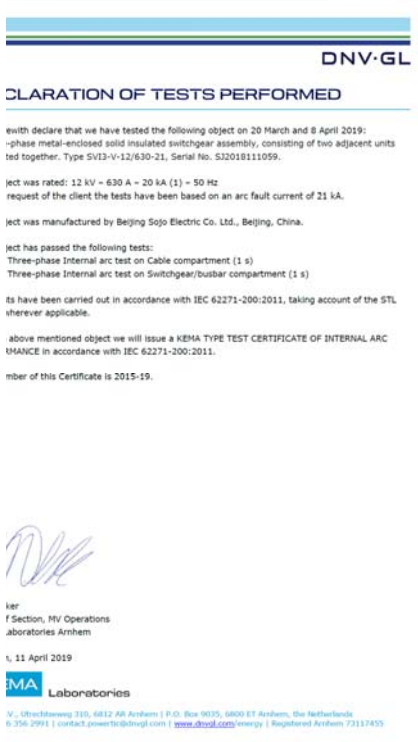
For the above mentioned object we will issue a KEMA TYPE TEST CERTIFICATE OF SHORT-CIRCUIT PERFORMANCE in accordance with IEC 62271-102:2018.

The number of this Certificate is 2430-18.

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

Arnhem, 11 April 2019

KEMA Laboratories



DNV·GL

CLARATION OF TESTS PERFORMED

ewith declare that we have tested the following object on 20 March and 8 April 2019:
-phase metal-enclosed solid insulated switchgear assembly, consisting of two adjacent units ted together. Type SVI3-V-12/630-21, Serial No. SJ2018111059.

ject was rated: 12 kV – 630 A – 20 kA (1) – 50 Hz
request of the client the tests have been based on an arc fault current of 21 kA.

ject was manufactured by Beijing Sojo Electric Co. Ltd., Beijing, China.

ject has passed the following tests:
Three-phase Internal arc test on Cable compartment (1 s)
Three-phase Internal arc test on Switchgear/busbar compartment (1 s)

ts have been carried out in accordance with IEC 62271-200:2011, taking account of the STL wherever applicable.

above mentioned object we will issue a KEMA TYPE TEST CERTIFICATE OF INTERNAL ARC MANCE in accordance with IEC 62271-200:2011.

mber of this Certificate is 2015-19.

ker
f Section, MV Operations
aboratories Arnhem

, 11 April 2019

MA Laboratories

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 **GFA S A I S/S S I S =1.2/0.528=2.27**

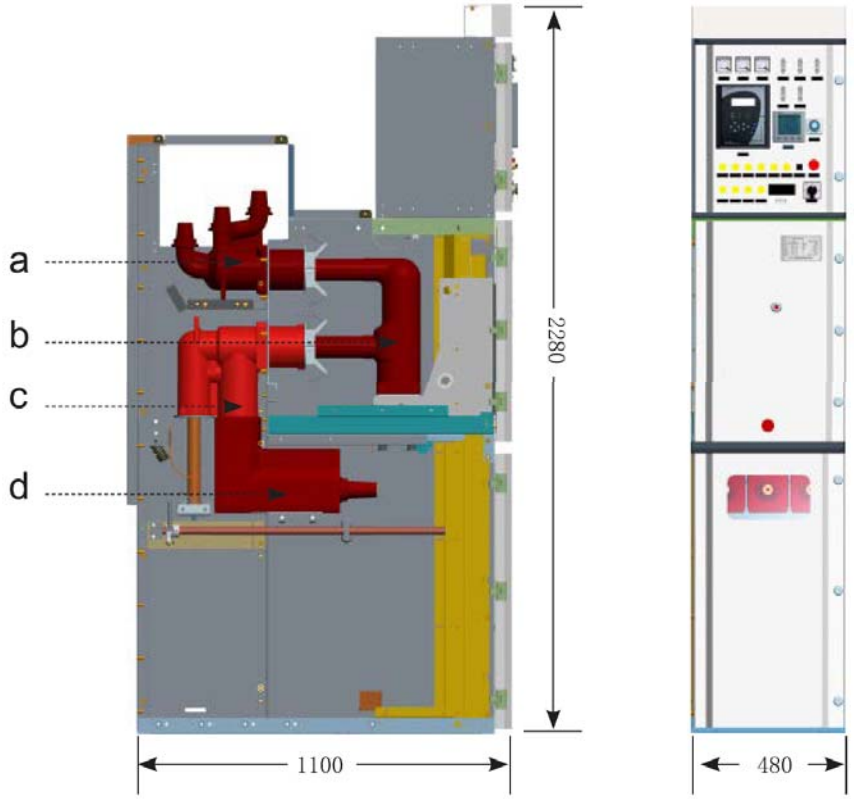
- WXDXH: 480X1100X1835mm
- GFA 0.48X1.1=0.528
- AIS: GFA 0.8X1.5=1.2
- Maintenance-free

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

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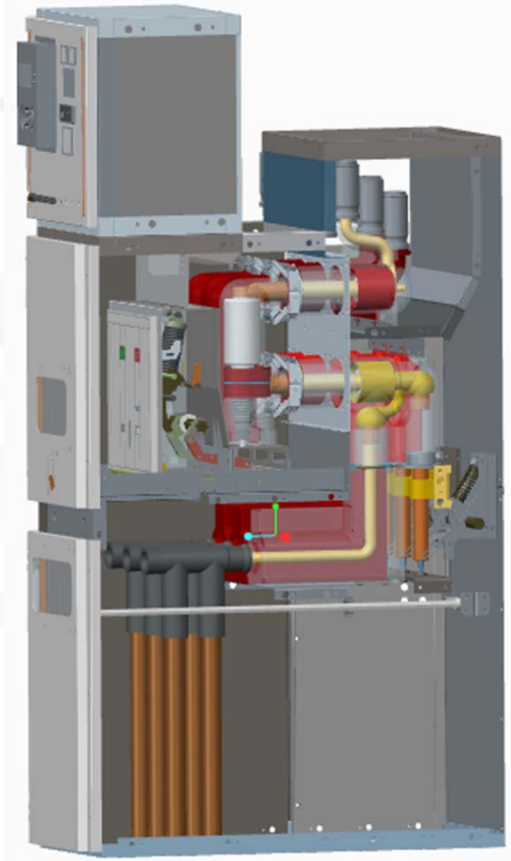
SVP Metal-Clad Solid Insulation

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



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Smart Grid - SOJO SIS

40.5kV Primary Solid Insulation

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 accidently 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

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Smart Grid - SOJO SIS

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

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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

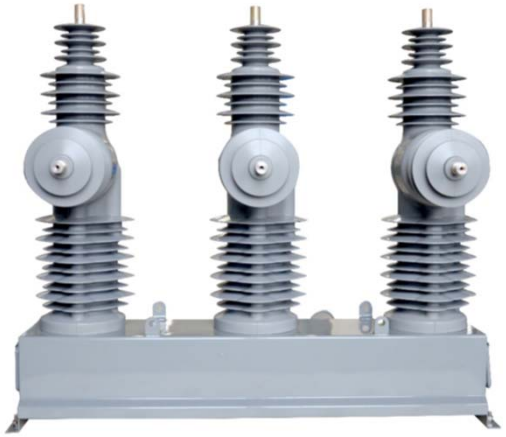
- HCEP
- Magnetic Actuator with few moving parts
- Painted Stainless steel enclosure and operation shaft guarantee maximum corrosion protection

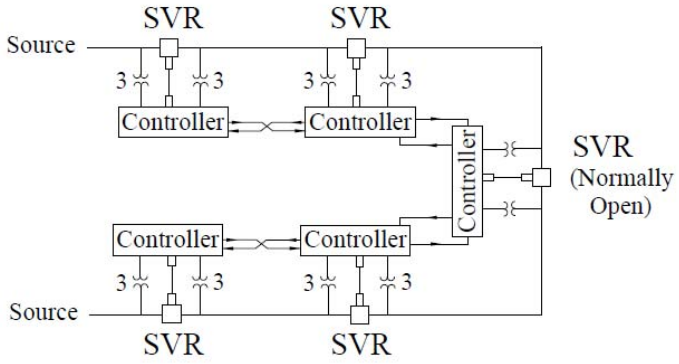
Environmentally Friendly

- SF6 free
- Altitude:3000m
- Operating temperature:-40 to 55°C
- Maximum solar radiation:1.1 kW/m2
- Icing thickness: 20mm
- Pollution level: IV-Very Heavy
- Seismic intensity:≤8
- Wind pressure:≤34 m/s
- Humidity: Daily Average ≤95%; MonthlyAverage≤90%

Smart Grid and Automation

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





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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

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[Thank You！]

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