American Pad-mounted Substation/European Prefabricated Substation

Schneider's authorization, and modularized manufacturing

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Prefabricated substation

Since cooperation with **Schneider**, CEEG has developed a series of international standard products, including cutting-edge YB series of European prefabricated substations, ZGS American pad-mounted substations, YBZ-40.5 of intelligent half buried type prefabricated substations, power cables, BIOSCO series of prefabricated substations(compact type, half buried type, and buried type).

By cooperating with **ABB** and taking advantage of its impeccable global service net, CEEG developed a series marine switch panels, which has become the priority choice of ocean ships, oil production platforms, port terminals and even some offshore projects.

Z G S-□/12/□-□

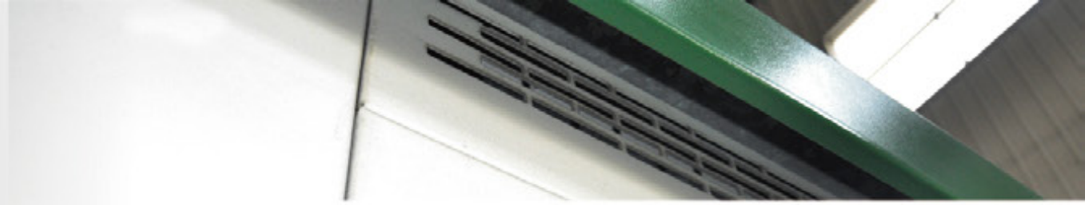
- Rated capacity（kVA）
- Rated working voltage on low voltage side（kV）
- Rated working voltage on high voltage side（kV）
- H: ring type Z: terminal type
- Three phases
- Pad mounted
- Combined type

American pad-mounted substation

YB-□/12/0.4-□

- Rated capacity（KVA）
- Rated working voltage on high voltage side(kV)
- M. structure in the shape of chinese character "目"
- P. structure in the shape of chinese character "品"
- Prefabricated substation

European prefabricated compact substation



Schneider's authorization, and modularized manufacturing

ZGS-12 American pad-mounted substation assembles the transformer, oil-immersed on-load switch, protective fuse into a full sealed oil tank. With reliable performance, reasonable structure, easy operation, small size and low cost, this kind of substation could be widely used in power transformation and distribution sites; including indoors areas, such as industrial parks, residential areas, commercial centers, and high-rise buildings.

Combined by three parts of high voltage switch, power transformer, and low voltage switch, YB-12 and YB-24 series prefabricated substations are comprehensive indoors and outdoors transformation and distribution equipments.

Standard: GB17467-2010.DL/T537-2002.

Characteristics

Schneider’s authorization
Modularized manufacturing.

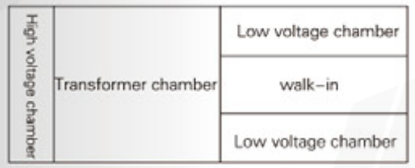
User-friendly design
Easy access to infromation for users.

Safe and reliable
Full sealed, resonable struture, and high reliablity.

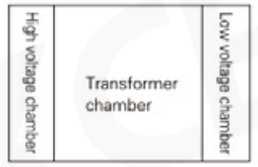
Impeccable ventilation system
Equipped with complete ventilation system, and temperature control data could be set according to user’s requirements.

Small size
American pad-mounted substation has a small size and compact structure, and its size is only 1/3 that of European substation with same capacity.

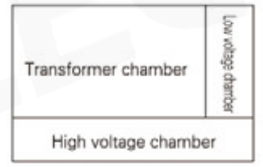
Structure layout



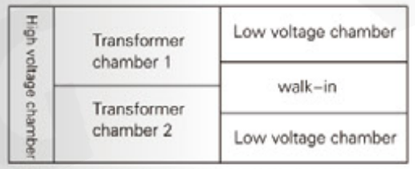
Structure 1 in the shape of chinese character “目”1



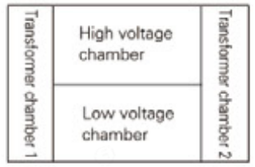
Structure 2 in the shape of chinese character “目”



Structure in the shape of chinese character “品”

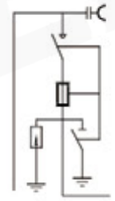
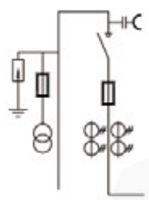
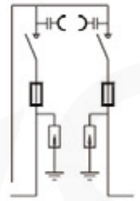
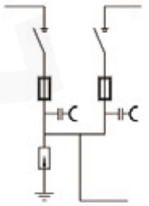
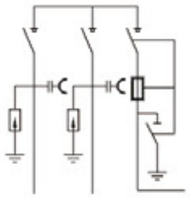
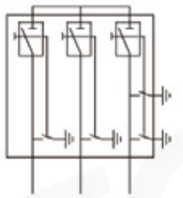


Structure 3 in the shape of chinese character “目”

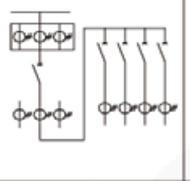
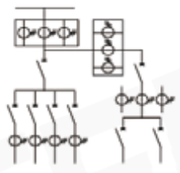
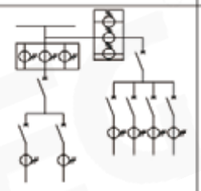
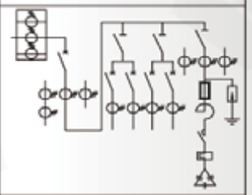


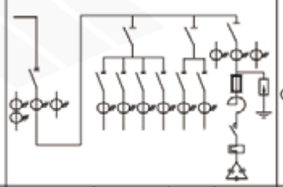
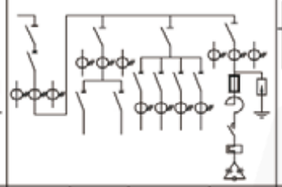
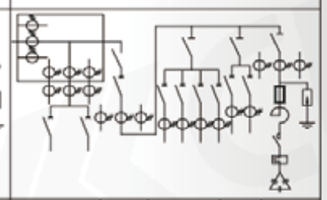
Structure 4 in the shape of chinese character “目”

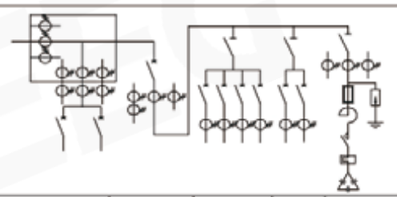
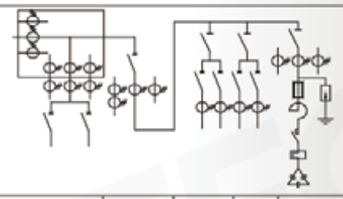
High voltage primary circuit scheme

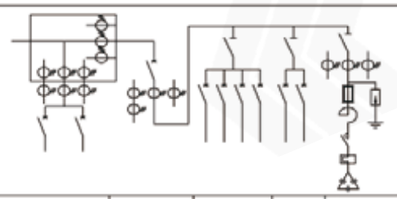
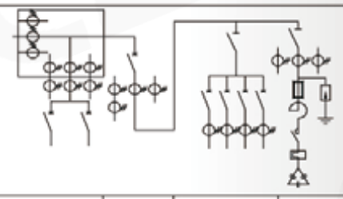
Main circuit scheme number		01	02	03
Main circuit scheme	Single line diagram			
Usage		Cable inlets	cable inlets metering	Double transformer of cable inlets
Main circuit scheme number		04	05	06
Main circuit scheme	Single line diagram			
Usage		Double power of cable inlets	Looped network (double power)	Looped network (double power)

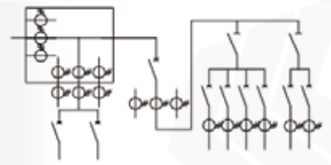
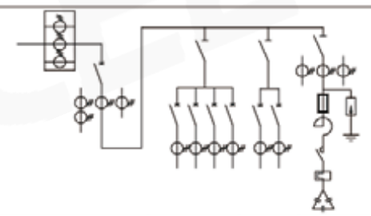
Low voltage primary circuit scheme

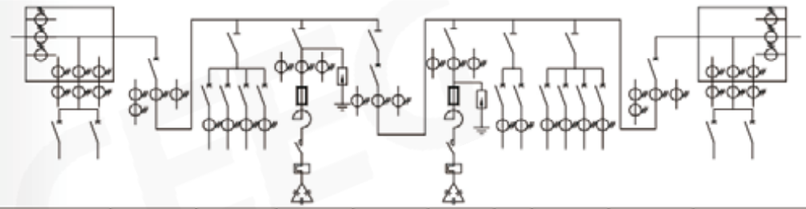
Main circuit combined scheme number		01	02	03	04
Main circuit scheme	Single line diagram				
Combined primary circuit number		02 17	29 25	30 29	24 14 31
Substation structure		High voltage supply and low voltage metering on low voltage panel			No operation walk-in of high voltage supply and low voltage metering on low voltage cabinet

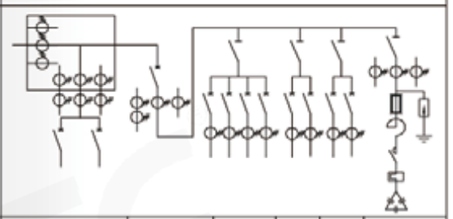
Main circuit combined scheme number		05	06	07
Main circuit scheme	Single line diagram			
Combined primary circuit number		02 09 07 31	01 08 09 31	27 01 09 07 31
STypeubstation structure		Operation walk-in of high voltage supply and low voltage metering on low voltage cabinet in the shape of chinese character "日"	High voltage supply and low voltage metering with operation walk-in on low voltage cabinet	High voltage supply and low voltage metering in the shape of chinese character "品" on low voltage cabinet

Main circuit combined scheme number		08	09
Main circuit scheme	Single line diagram		
Combined primary circuit number		27 02 09 07 31	27 02 07 07 31
Substation structure		High voltage supply and low voltage metering in the shape of chinese character "品" on low voltage cabinet	High voltage supply and low voltage metering in the shape of chinese character "品" on low voltage cabinet

Main circuit combined scheme number		10	11
Main circuit scheme	Single line diagram		
Combined primary circuit number		27 02 09 07 31	27 02 09 31
Substation structure		High voltage supply and low voltage metering in the shape of chinese character "品" on low voltage cabinet	High voltage supply and low voltage metering in the shape of chinese character "品" on low voltage cabinet

Main circuit combined scheme number		12	13
Main circuit scheme	Single line diagram		
Combined primary circuit number		27 02 09 07	24 09 07 31
Substation structure		High voltage supply and low voltage metering in the shape of chinese character "日" and with an operation walk-in on low voltage cabinet	High voltage supply and low voltage metering in the shape of chinese character "日" and with an operation walk-in on low voltage cabinet

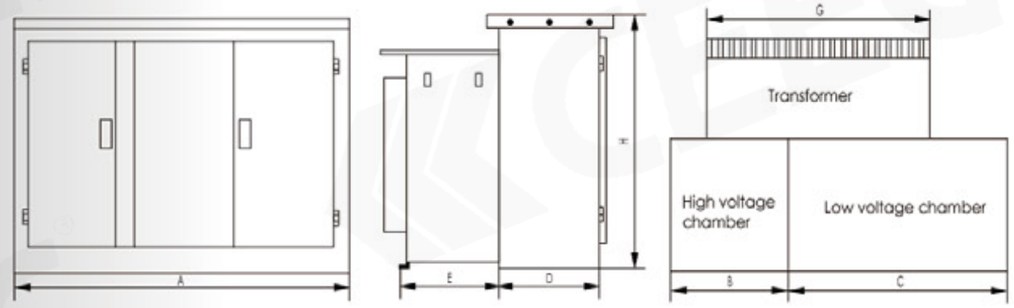
Main circuit combined scheme number		14
Main circuit scheme	Single line diagram	
Combined primary circuit number		27 02 09 31 01 31 07 09 04 27
Substation structure		High voltage supply and low voltage metering in the shape of chinese character "日" on low voltage cabinet

Main circuit combined scheme number		15
Main circuit scheme	Single line diagram	
Combined primary circuit number		27 02 09 07 07 31
Substation structure		High voltage supply and low voltage metering in the shape of chinese character "日" and with an operation walk-in on low voltage cabinet

Technical parameters of American pad-mounted substation

Type	Voltage combination			Coupling group number	No-load loss	On-load loss	Short circuit impedance	No-load current
	High voltage (kV)	Tapping range	Low voltage (kV)					
ZGS9-H(Z)-100	6	±5% Or ±2×2.5%	0.4	Yyn0 Or Dyn11	290	1500	4	1.6
ZGS9-H(Z)-125					340	1800	4	1.5
ZGS9-H(Z)-160					400	2200	4	1.4
ZGS9-H(Z)-200	6.3				480	2600	4	1.3
ZGS9-H(Z)-250					560	3050	4	1.2
ZGS9-H(Z)-315	10				670	3650	4	1.1
ZGS9-H(Z)-400					800	4300	4	1
ZGS9-H(Z)-500	10.5				960	5150	4	1
ZGS9-H(Z)-630					1200	6200	4.5	0.9
ZGS9-H(Z)-800					1400	1400	4.5	0.8
ZGS10-H(Z)-100	6	±5% Or ±2×2.5%	0.4	Yyn0 Or Dyn11	260	1500	4	1.5
ZGS10-H(Z)-125					305	1800	4	1.4
ZGS10-H(Z)-160					360	2200	4	1.3
ZGS10-H(Z)-200					430	2600	4	1.2
ZGS10-H(Z)-250	6.3				500	3050	4	1.1
ZGS10-H(Z)-315					600	3650	4	1
ZGS10-H(Z)-400	10				720	4300	4	0.9
ZGS10-H(Z)-500					860	5150	4	0.9
ZGS10-H(Z)-630	10.5				1080	6200	4.5	0.8
ZGS10-H(Z)-800					1260	7500	4.5	0.7
ZGS11-H(Z)-100	6	±5% Or ±2×2.5%	0.4	Yyn0 Or Dyn11	205	1500	4	1
ZGS11-H(Z)-125					240	1800	4	0.9
ZGS11-H(Z)-160					275	2200	4	0.8
ZGS11-H(Z)-200	6.3				330	2600	4	0.7
ZGS11-H(Z)-250					400	3050	4	0.7
ZGS11-H(Z)-315	10				480	3650	4	0.6
ZGS11-H(Z)-400					565	4300	4	0.6
ZGS11-H(Z)-500	10.5				680	5150	4	0.5
ZGS11-H(Z)-630					805	6200	4.5	0.5
ZGS11-H(Z)-800					980	7500	4.5	0.4

Overall dimension



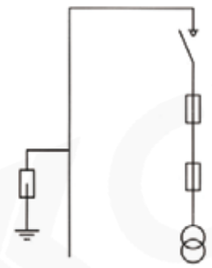
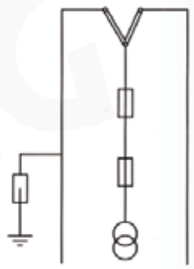
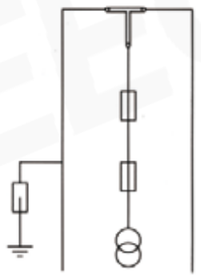
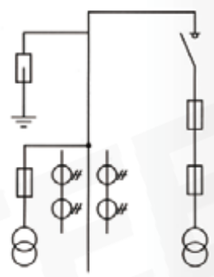
Number	A	B	C	D	E	H	G	Capacity(kVA)
1	1805	700(900)	1100(900)	550	500	1550	950	50~100kVA
2	2405	700(900)	1700(1500)	650	500	1550	950	50~100kVA
1	1805	750(900)	1050(900)	550	575	1550	975	160~250kVA
2	2405	750(900)	1650(1500)	650	575	1550	975	160~250kVA
1	1805	750(900)	1050(900)	550	600	1600	1000	315kVA
2	2405	750(900)	1650(1500)	650	600	1600	1000	315kVA
1	1805	750(900)	1050(900)	550	625	1700	1060(1100)	400~500kVA
2	2405	750(900)	1650(1500)	650	625	1700	1060(1100)	400~500kVA
2	2705	750(900)	1950(1800)	700	625	1700	1060(1100)	400~500kVA
1	1805	750(900)	1050(900)	550	670	1750	1240	630kVA
2	2405	750(900)	1650(1500)	650	670	1750	1240	630kVA
2	2705	750(900)	1950(1800)	700	670	1750	1240	630kVA

Full-sealed, safe and reliable, reasonable structure.

Working conditions

Working sites: outdoors and indoors
Altitude: ≤1000m
Ambient temperature:-30℃-+45℃
Highest daily average temperature:+30℃
Lowest daily average temperature:+20℃
Outdoor wind speed:≤35m/s
Relative humidity: daily average≤95% monthly average≤90%
Seismic fortification intensity: Grade 8
Please specify in the contract if the actual working conditions exceeds above requirement.

High voltage connection scheme

Scheme number	H1	H2
Main circuit single-line diagram	 10kV power supply	 10kV power supply I 10kV power supply II
Type	Terminal American substation, two position load switch	Looped network American substation, four position "V" type load switch
Applicable scope	single power supply, applicable to terminal users	Looped network or double power supply could be realized. If transformer was switched off, high voltage power I and II would be also switched off simultaneously. Applicable to looped network current of 200A, and 600A.
Scheme number	H3	H4
Main circuit single line diagram	 10k ply II	
Type	Looped network pad-mounted substation, Four position "T" type on-load switch	Terminal pad-mounted substation, with high voltage meansurement functionBest Regards，Stoney Shi
Applicable scope	Looped network or double power supply could be realized. But transformer, high voltage power supply I and II could not be connected. Applicable to looped network current of 200A, and 600A.	Appliable to high voltage measurement users.

Structure of European prefabricated substation

Product structure

The structure of its frame was welded by structural steel or assembled by steel panel. Covered by special paintcoat, it has strong mechanism, weather resistant and anti-corrosion performances.

Three relatively independent chambers, namely high voltage chamber, transformer chamber and low temperature chamber, form a comprehensive structure. Lighting could be automatically turned on or turned off with the opening or closing of each chamber's door.

Substation was equipped with a heat insulation layer on top, which could prevent condensation in high temperature areas or paramos as temperature inside of the cabinet changes dramatically. Temperature auto-control device was equipped in the transformer chamber and low voltage chamber to stablize the temperature in the substation.

Cabinet structure

High voltage chamber

High voltage chamber is equipped with high voltage looped net cabinet. Pressure-operated type, vaccum type, sulfur hexafluoride load switch, vaccum breaker are available options for high voltage switch. High voltage cabinet could protect transformer from short circuit or overload.

Transformer chamber

Transformer chamber is equipped with dry type or oil-immersed transformer. It is equipped with impecable ventilation system and temperature control data could be set according to users' needs. Mistakenly entry of charged spacers device is also installed to prevent mistakenly entry during observation.

Low voltage chamber

Low voltage chamber can be divided as walk-in type and non walk-in type. It can be loaded with measurement cabinet, master inlet cabinet, outlet cabinet, capacitor cabinet and connection cabinet (when there are two transformers). Measurement cabinet and master inlet cabinet can be put together with the meter, measurement cabinet in the upper part and the air breaker, lighting rod, and mutual conductor in the lower part. Compensation could be made either manually or automatically by the capacitor. Generally reactive power compensation capacity is 15%-30% that of the total capacity of the transformer and partial compensation or total compensation could be realized.

Working conditions

Ambient temperature: +40℃~25℃

Altitude: no more than 1000 meters

Relative humidity: no more than 90% (+25℃), and substation could operate at 100% relative humidity for a short time.

Installed in areas without fire, explosion, chemical corrosion or strong vibration.

Users may coordinate with CEEG if special working conditions occur.

Technical data

Number	Project name	Unit	High voltage	Transformer	Low voltage
1	Rated voltage	kV	12	12/0.4	0.4
2	Rated current	A	20–200		100–4000
3	Transformer capacity	kVA	/	50–2500	
4	Rated short circuit breaking current	kA	31.5、50	/	30–50
5	Rated short–circuit current`	kA	50	/	
6	Rated thermal current	kA/S	20/2	/	30/1
7	Rated dynamic current	kA	/	/	
8	1 min frequency withstand voltage (phase to phase, ground, isolation circuit)	kV	42/48	35	2.5
9	Lightning impulse withstand voltage (phase to phase, ground, isolation circuit)	kV	Circuit75/break circuit85	/	/
10	Cabinet protection grade			IP33D	
11	Noise level			∠55DB	

YB–12 series prefabricated substation (Reference choice for transformer capacity, first current, second current, rated current of high voltage fuse and low voltage fuse)

Transformer capacity(KVA)	First current (A)	Second current (A)	Rated current of high voltage fuse (A)	Rated current of low voltage breaker (A)
50	2.9	72	6.3	100
80	4.6	115	10	1223
100	5.8	144	16	160
125	7.2	180	16	250
160	9.2	231	16	250
200	11.5	290	20	400
250	14.4	360	25	400
315	18.2	455	31.5	630
400	23.0	576	40	630
500	28.9	720	50	800
630	36.4	910	63	1250
800	46	1160	80	1250
1000	58.0	1440	100	1600

Technical data of main components

Technical data of high voltage switch

Number	Project name	Unit	FN12–12 (D/R)	FZN23–12 (D/R)	VS1–12	SF6
			Load switch	Vacuum load switch	Vacuum breaker	Load switch
1	Rated voltage	kV	12	12	12	12
2	Rated current	A	630	630	630–2500	630
3	Transformer capacity	kA/S	20/3	20/2	25/4 20/2	
4	Rated short circuit breaking current	kA	50	50	80 50	
5	Rated short–circuit current	kA	31.5、40、50	31.5	31.5、40	31.5
6	Rated thermal current	kA	50	50	50、63 50	
7	Rated dynamic current	A	1300	2000	/ 1500	
8	1 min frequency withstand voltage (phase to phase, ground, isolation circuit)	kV	42/48	42/48	42/48 42/48	
9	Lightning impulse withstand voltage (phase to phase, ground, isolation circuit)	kV	75/85	75/85	75/85 75/85	
10	Service life	次	2000	2000	2000 2000	

Technical data of high voltage limiting fuse

Type	Rated voltage (kV)	Rated current (A)	Rated breaking current (kA)	Rated current of melt(A)
XRNP1–12	12	0. 5	50	0. 5、1、2、3.15
SDLAJ–12	12	40	50	6. 3、10、16、20、25、31.5、40
SFLAJ–12	12	100	50	50、63、71、80、100
SKLAJ–12	12	125	50	125
XRNT3–12	12	40	40	6. 3、10、16、20、25、31.5、40
NRNT3–12	12	125	40	50、63、80、100、125

Main technical data of low voltage breaker

CW1 series intelligent universal breaker

Type			CW1–2000	CW1–3200	CW1–4000	CW1–5000
Rated current of frame grade (A)			2000	3200	4000	5000
Rated current (A)			630–2000	2000–3200	3200–400	4000–5000
Rated working voltage (V)			AC400、690 50HZ			
Rated insulation voltage (V)			AC1000 50HZ			
Rated impulse withstand voltage (V)			12000			
Frequency withstand voltage (V)			AC3500V1min 50HZ			
Number of poles			3.4	3.4	3.4	3
Rated ultimate short–circuit analysis (kA)		AC400V	80	100	100	120
		AC690V	50	65	75	75
Rated operation short–circuit analysis (kA)		AC400V	50	80	80	100
		AC690V	50	65	65	65
Rated short–circuit connection capacity (kA)		AC400V	176	220	220	264
		AC690V	105	143	165	165
Rated short–time withstand capacity (kA)		AC400V	50	80	80	100
		AC690V	40	50	65	65
Intelligent controller	Electronical type (L)		V	V	V	V
	Standard type (M)		V	V	V	V
	Communicational type (H)		V	V	V	V
Performance	Electrical life	AC400V	1500	500	500	
		AC690V	500	500	500	
	Service life	Maintainance free	5000	2500	2000	
		Maintainance	10000	10000	800	

Prefabricated substation

CW1 series intelligent shell-type breaker

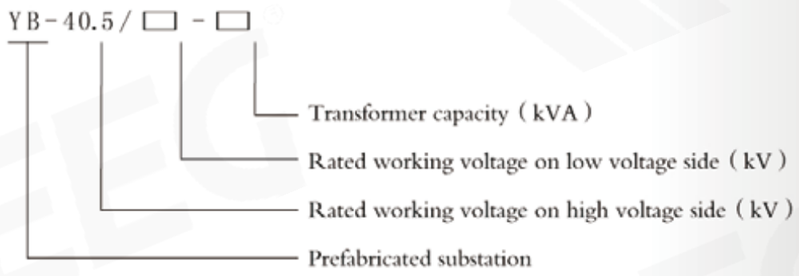
Type		CW1-63	CW1-100	CW1-160	CW1-225	CW1-400	CW1-630	CW1-800
Rated current of frame grade (A)		63	100	160	225	400	630	800
Rated current (A)		10-63	16-100	100-160		225-400	400-630	
Rated working voltage (V)		AC400、690 50HZ						
Rated insulation voltage (V)		AC800 50HZ						
Rated impulse withstand voltage (V)		8000						
Number of poles		3.4	3.4	3.4	3.4	3.4	3.4	3.4
Arcing distance (MM)		≥50	≥50	≥50	≥50	≥100	≥100	≥100
Rated ultimate short-circuit analysis (kA)	AC400V	50	85	85	85	100	100	100
	AC690V		10	10	10	15	15	20
Rated operation short-circuit breaking capacity (kA)	AC400V	35	35	50	50	65	65	65
	AC690V		15	35	65	65	50	65
Performance	Power on	6000	6000	3000	3000	2000	1500	1000
	Power off	8500	8500	7000	7000	4000	4000	2500

E series air breaker

Type	E1		E2			E3				E4		E6		
Performance level	B	N	B	N	L	N	S	H	L	S	H	H	V	
Performance level (40) Iu(A)	800	800	1600	1250	1250	2500	1250	1250	2000	4000	3200	5000	3200	
	1250	1250	2000	1600	1600	3200	1600	1600	2500		4000	6300	4000	
				2000			2000	2000					5000	
							2500	2500					6300	
							3200	3200						
Rated continuous current Icu(kA)														
220/230/380/400/415V~	42	50	42	65	130	65	75	100	130	75	100	100	150	
440V~	42	50	42	65	110	65	75	100	110	75	100	100	150	
500/660/690V	36	36	42	55	85	65	75	85(2)	85	75	85	100	100	
Rated ultimate short-circuit breaking capacity Icu(kA)														
220/230/380/400/415V~	42	50	42	65	130	65	75	85	130	75	100	100	125	
440V~	42	50	42	65	110	65	75	85	110	75	100	100	125	
550/660/690~	36	36	42	55	65	65	75	85	65	75	85	100	100	
Rated short-circuit withstand current Icu(kA)	1s	36	50	42	55	10	65	75	75	15	75	100	100	100
	3s	36	36	42	42	--	65	65	65	--	75	75	85	85

T series plastic shell-type breaker

Type	S1	S2	S3	S4	S5	S6	S7
Rated current of frame level (A)	125	160	160-250	160-250	400-630	630-800	1250-1600
Rated operation voltage (V)	500	690	690	690	690	690	690
Rated insulation voltage (V)	500	690	800	800	800	800	800
Rated impulse withstand voltage (kA)	6	6	8	8	8	8	8
Poles	3-4						
Rated ultimate short-circuit breaking capacity (kA)	N	N、S	N、H、L	N、H、L	N、H、L	N、S、H	S、H、L
Rated short-circuit closing capacity (kA)	52、5	105	187	220	220	143	220
Service life	25000	25000	25000	20000	20000	20000	10000
Electrical life	8000	8000	8000	10000	7000	7000	7000



YB-40.5KV prefabricated substation

Structure layout

A1、Transformer

a、Oil-immersed
b、Protection level: Transformer chamber IP20
c、Tapping voltage
d、Coupling group number
e、Insulation level
f、Rated frequency

A2、Technical data of 40.5kV high voltage cabinet

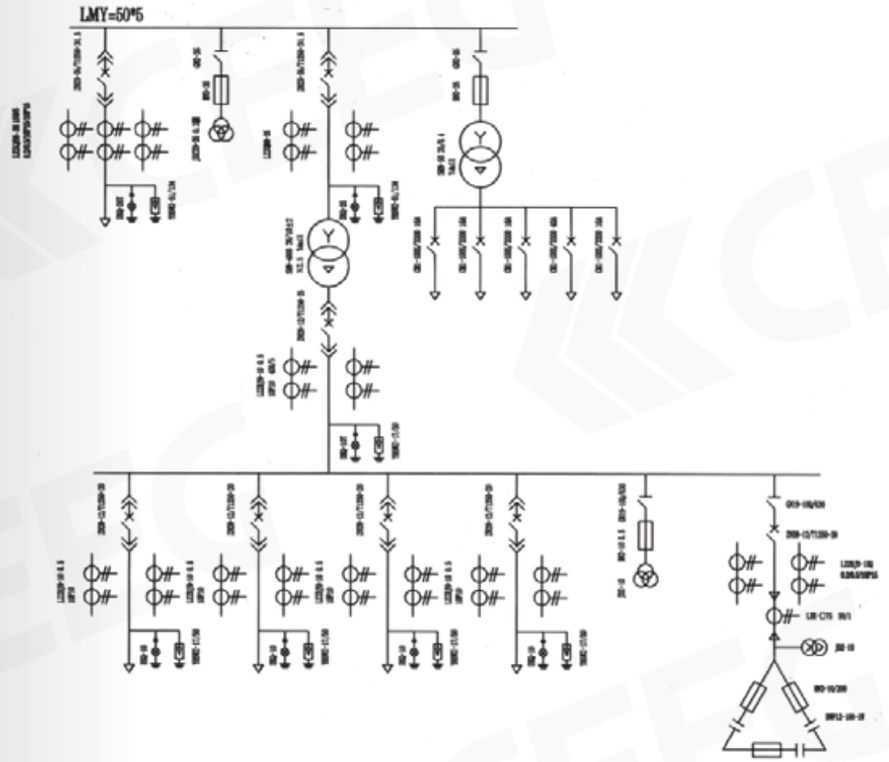
a、Type: (All are available for users)
b、Protection level
c、Rated voltage
d、Rated current of vacuum breaker
e、Rated short-circuit breaking current
f、Rated thermal current
g、Rated dynamic current

A3、10kV high voltage cabinet

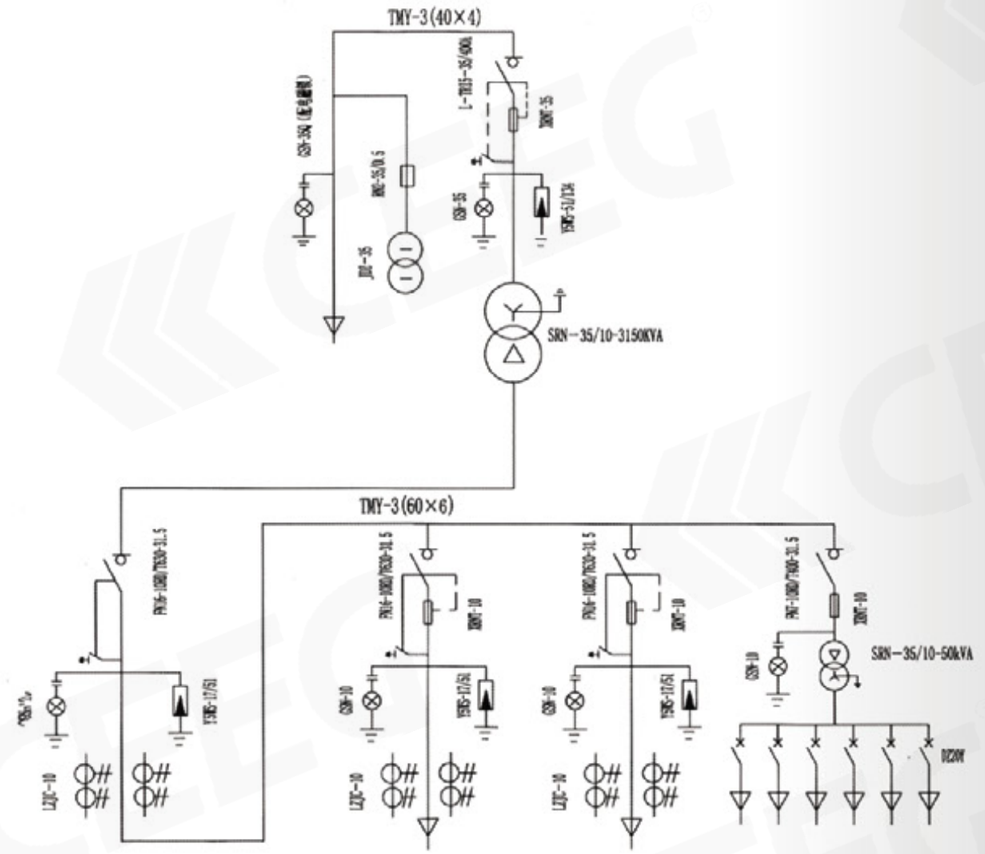
a、Type: (All are available for users)
b、Shell protection level
c、Rated voltage
d、Rated current
e、Rated breaking current
f、Rated thermal current
g、Operation device: CT19 spring operation device
h、Vacuum breaker

Primary circuit scheme I and II

Primary circuit scheme I



Primary circuit scheme II



Working conditions

Altitude: ≤1000m (when altitude is >1000, design may change to plateau type)
Ambient temperature:−25℃~+40℃
Wind speed: ≤34/s (Wind pressure is less than 700 pa)
Contamination level: Ⅰ、Ⅲ
Protection level：IP33D
Installed in areas without fire, explosion, chemical corrosion or strong vibration, ground tilt less than 5°
Relative humidity: ≤85%

European prefabricated substations

Non-metal shell prefabricated substation