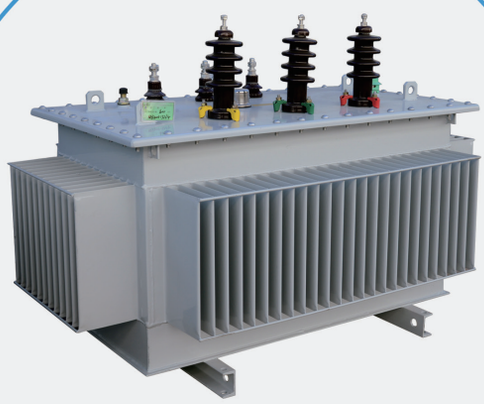
CREAT



Distribution Transformers

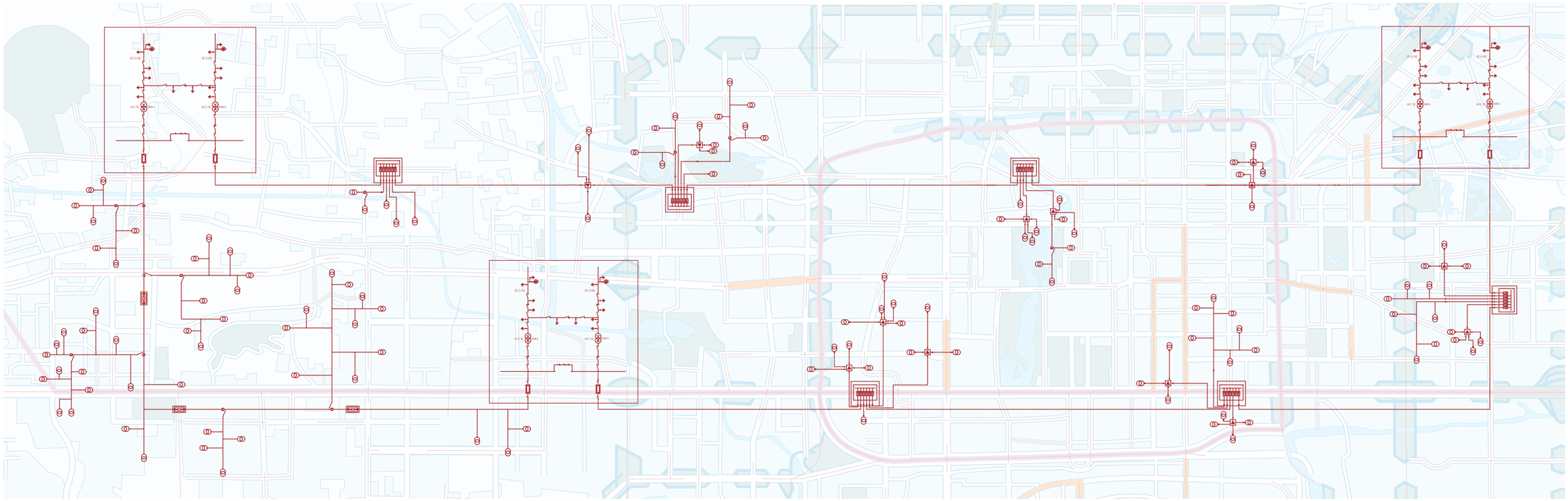
CREAT
北京科锐
SZSE:002350

Client-centered

Self-improvement

Return for shareholders

Contribution to society



Company Profile

Creative Distribution Automation Co., Ltd. (CREAT) is a public company (Stock Code/ SZSE: 002350) specializing in the research and development, manufacture, sale and service of electric power equipment in Distribution Automation.

Founded in 1988, CREAT is a spinoff of China Electric Power Research Institute (CEPRI), and it is one of the national most important high-tech enterprises (Torch Plan of the Ministry of Science and Technology of China).

Moreover, as a leading provider of Smart Grid solutions, CREAT is often ranked in the Top 10 Growth & Innovational Companies in the electric industry of China. Power Utilities are our main clients.

CREAT's headquarter and main manufactory site are located in Beijing, with other factories located in Wuhan, Shenzhen, Shanghai, Zhengzhou, and Xianyang.

Since 1988, CREAT has been constantly advancing the science & technology of distribution network in China. Our main innovational or advantage products/solutions are:

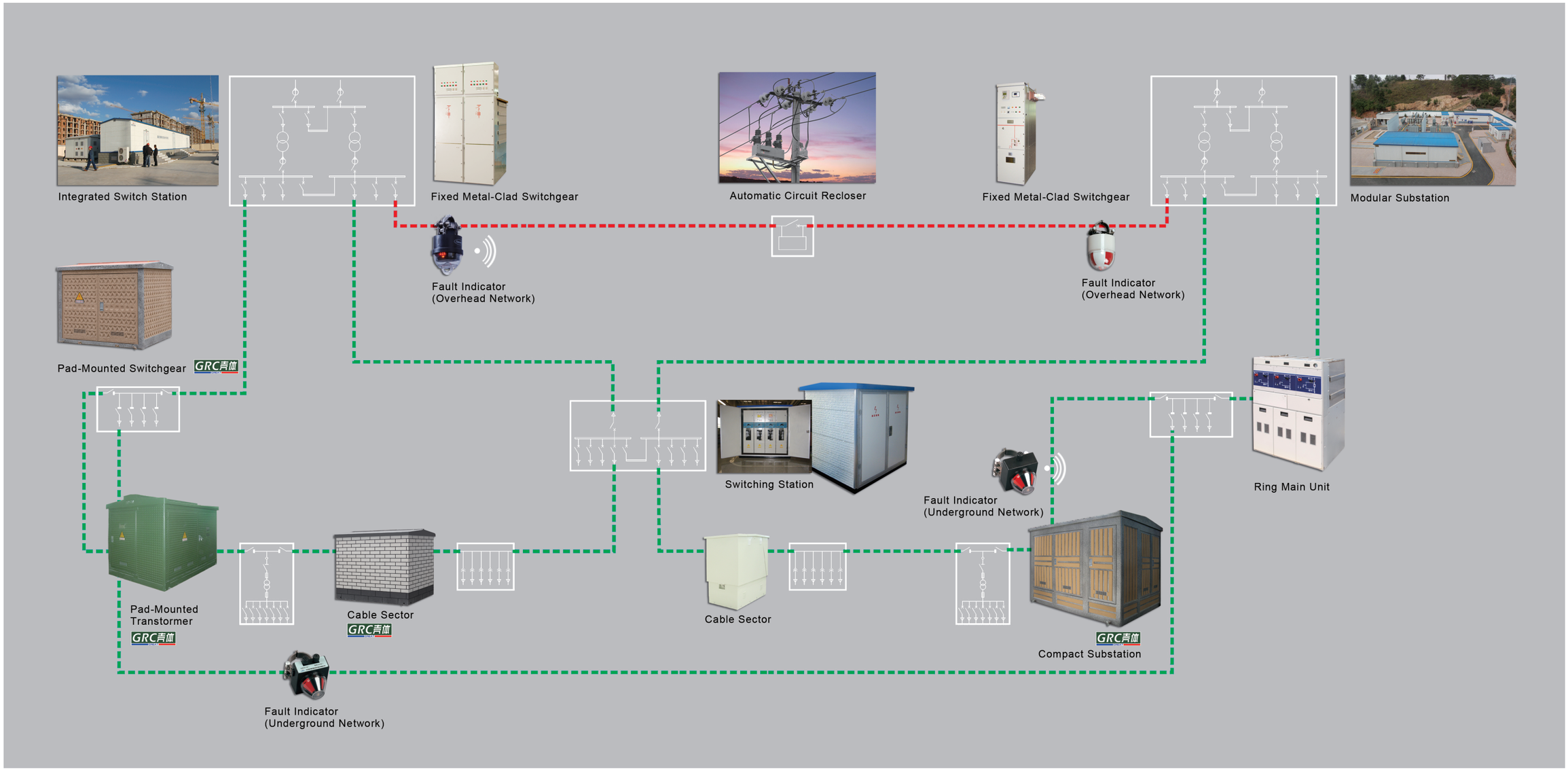
- *Fault Indicator,*
- *Automatic Circuit Recloser with Permanent Magnetic Actuator,*
- *Remote Distribution Control Unit,*
- *Pad-Mounted Switchgear/Ring Main Unit,*
- *Pad-Mounted Transformer/Compact Substation,*
- *Cable Accessories,*
- *GRC Enclosure,*
- *Modular Substation*

CREAT continually focuse on the R & D of smart grid technology and equipment for 110kV and below, such as:

Fault Locating System based on fault indicator;

Modular Substation Solution based on vacuum circuit breaker with permanent magnetic actuator.

Products Range



Specializing in the R & D, manufacture of the products in the Transformer, Switch and Automation fields

Serving as an one–stop solution provider of distribution network

Oil-immersed Distribution Transformer

(Silicone Steel or Amorphous Core)

CREAT offers a complete range of oil-immersed distribution transformers designed to grant the reliability, durability, and efficiency required in utility, industrial, and commercial applications.

CREAT's liquid-filled transformers are manufactured in accordance with the most demanding industry and international standards. Transformers can be used for indoor or outdoor applications and can be provided with off-load and on-load tap changers.

Single-phase 0~315kVA (Silicone Steel or Amorphous Core)

CREAT liquid-filled, single-phase distribution transformers are specifically designed for networks where it is not practical to have a three-phase supply.

They are typically used for servicing residential overhead distribution loads.

They are also suitable for light commercial loads, industrial lighting and diversified power applications.

Three-phase 0~315kVA (Silicone Steel or Amorphous Core)

Small distribution transformers are typically oil-immersed and suitable for pole-, pad- or ground-mounting. They represent an economical option for certain networks, particularly those with low population densities.

Depending upon requirements, transformers may be connected between two phases of a three-phase system (two high voltage bushings) or from one phase to ground (single high voltage bushing).

The units are suitable for residential overhead distribution loads, as well as light commercial or industrial loads and diversified power applications.

Three-phase 315~2500kVA (Silicone Steel or Amorphous Core)

Medium distribution transformers are used to step down three-phase high voltage to low voltage for energy distribution, mainly in the countryside or low-density populated areas.

The transformers are three-phase, oil-immersed hermetically sealed, adaptable for pole-mounting or assembly in substations.

On request, the transformer can be equipped with an oil conservator and the transformer tanks surface can be hot dip zinc coating.

Three-phase 2500~10000kVA (Silicone Steel Core)

Large distribution transformers are used for receiving energy from higher voltage levels and to transform and distribute this energy to lower voltage substations or directly to large industrial consumers.

Transformers in this range are three-phase and can be manufactured with off-circuit tap changer or on-load tap changer. Transformers provided with on-load tap changer usually have a separate tap winding.

The core is constructed of grain-oriented steel laminations. The windings are made of either copper or aluminum conductor and wound in a foil or multi-layer configuration. The tank construction can be a corrugated fin wall type or of a rigid construction type with radiators typically used for larger transformer. Fans can also be mounted on the radiators to provide additional cooling capacity.

Primary voltage: up to 36 kV

Available fluids: mineral oil, plant oil

Performance Parameter Table for 10kV Voltage Level

Rated Power (kVA)	S15 Series (Amorphous Core)		S13 Series (Silicone Steel Core)		S11 Series (Silicone Steel Core)		Load Loss at 75℃ (W)		Impedance Voltage (%)
	No-Load Loss (kW)	No-Load Current (%)	No-Load Loss (kW)	No-Load Current (%)	No-Load Loss (kW)	No-Load Current (%)	Dyn11	Yyn0	
50	43	1.2	100	0.5	130	1	870	910	4
100	75	0.9	150	0.45	200	0.9	1500	1580	4
200	120	0.6	240	0.4	340	0.8	2600	2730	4
315	170	0.5	340	0.35	480	0.7	3650	3830	4
400	200	0.5	410	0.35	570	0.6	4300	4520	4
500	240	0.5	480	0.3	680	0.6	5150	5410	4
630	320	0.3	570	0.25	810	0.5	6200	6200	4.5
800	380	0.3	700	0.18	980	0.4	7500	7500	4.5
1000	450	0.3	830	0.17	1150	0.4	10300	10300	4.5
1250	530	0.2	970	0.17	1360	0.3	12000	12000	4.5
1600	630	0.2	1170	0.16	1640	0.3	14500	14500	4.5
2000	750	0.2	1550	0.16	1940	0.3	18300	18300	5
2500	900	0.2	1830	0.16	2290	0.3	21200	21200	5

Dry Type Casting Epoxy Resin Coil Transformer

(Silicone Steel or Amorphous Core)

Dry type casting epoxy resin coil transformers are the natural choice for the distribution of electrical energy.

There are numerous advantages in the selection of a cast resin transformer over the traditional fluid cooled transformer design.

Low Fire Risk

- *Dry insulation system. No flammable or high flame point fluids*
- *Materials are self extinguishing*
- *Materials are Low Smoke/Zero Halogen*
- *No need for security devices for fire survey*

Environmentally Friendly

- *No danger of liquid spillage*
- *All materials recyclable*
- *Eco-friendly materials and manufacturing processes*

Reduced Installation and Construction Costs

- *Installed indoors, close to the load center*
- *Shorter LV cable runs: reduced cable and installation costs*
- *Reduced construction costs (no leakage containment or blast wall required)*

Overload capability

- *Excellent short time overload capability due to the low current density in the windings and the high time constant of the coils*
- *Overloads to IEC60905 - Loading Guide for Dry Type Transformers*

Increase in performance

- *Increased ratings to match 'unforeseen' higher demand using cooling fans.*
- *Forced air cooling fans easily retro fitted to provide extra capacity*

Designed for Reliability

- *Excellent dielectric strength*
- *Optimized short circuit withstand strength*
- *Good resistance to humidity and atmospheric pollution*
- *Resistance to shock and vibration*

Maintenance

- *Practically maintenance free*
- *Designed for a minimum 25 year life expectancy*

Silicone Steel Core Dry Type Transformer

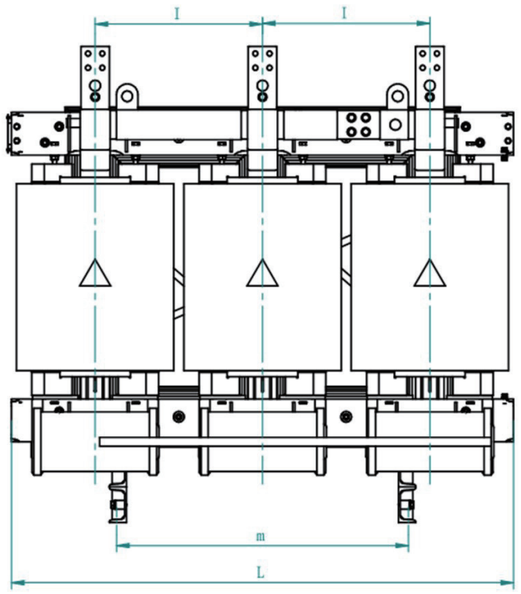
Amorphous Core Dry Type Transformer

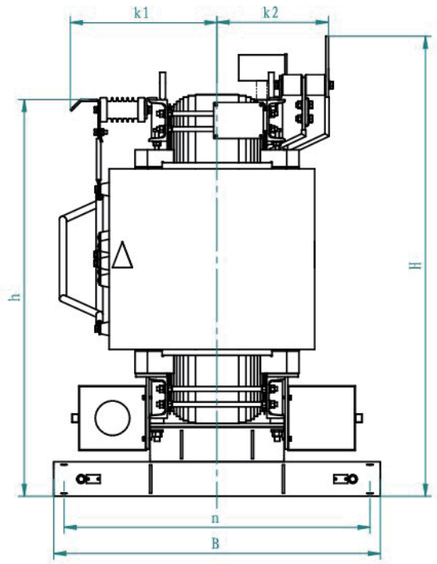
SCB10 Series Performance Parameter Table (Silicone Steel Core)

Rated Power (kVA)	HV (kV)	Voltage Regulating Range	LV (kV)	Connection	No-Load Loss (kW)	Load Loss at 120℃ (kW)	No-Load Current (%)	Impedance Voltage (%)	Installation dimensions m×n (mm)
315	10, 6.3	±2×2.5%	0.4	Dyn11, Yyn0	0.88	3.47	1.2	4.0	660×660
400					0.98	3.99	1.2		660×660
500					1. 16	4.88	1.2		660×660
630					1.34	5.88	1.0		660×660
630					1.3	5.96	1.0	6.0	820×820
800					1.52	6.96	1.0		820×820
1000					1.77	8.13	1.0		820×820
1250					2.09	9.69	1.0		1070×820
1600					2.45	11.73	1.0		1070×820
2000					3.05	14.45	0.9		1070×820
2500					3.6	17.17	0.8		1070×820
1600					2.45	12.96	1.0	8.0	1070×820
2000					3.05	15.96	0.9		1070×820
2500					3.6	18.89	0.8		1070×820

SCBH15 Series Performance Parameter Table (Amorphous Core)

Rated Power (kVA)	HV (kV)	Voltage Regulating Range	LV (kV)	Connection	No-Load Loss (kW)	Load Loss at 120℃ (kW)	No-Load Current (%)	Impedance Voltage (%)	Installation dimensions m×n (mm)
315	10, 6.3	±2×2.5%	0.4	Dyn11, Yyn0	0.28	3.47	0.9	4.0	660×660
400					0.31	3.99	0.8		660×660
500					0.36	4.88	0.8		660×660
630					0.42	5.88	0.7		660×660
630					0.41	5.96	0.7	6.0	820×820
800					0.48	6.96	0.7		820×820
1000					0.55	8.13	0.6		820×1070
1250					0.65	9.69	0.6		820×1070
1600					0.76	11.73	0.6		1070×1070
2000					1.0	14.45	0.5		1070×1070
2500					1.2	17.17	0.5		1070×1070
1600					0.76	12.96	0.6	8.0	1070×1070
2000					1.0	15.96	0.5		1070×1070
2500					1.2	18.89	0.5		1070×1070



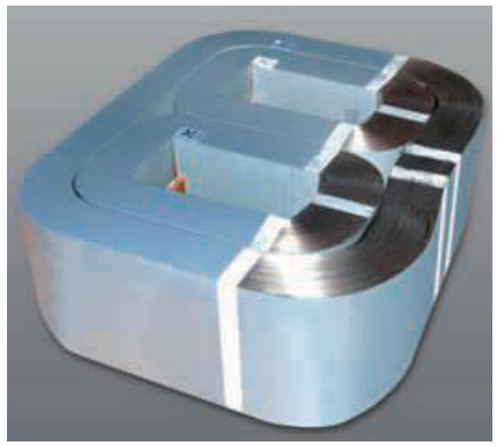


Dimensions and weights for 10KV SCBH15 Series (Amorphous Core)

Rated Power (kVA)	Transformer (mm)									Enclosure (mm)			Weight without enclosure (kg)
	L	B	H	h	l	K1	K2	m	n	Length	Width	Height	
315	1360	860	1240	1185	465	485	375	660	660	1800	1350	1600	1860
400	1440	860	1315	1250	490	485	380	660	660	1800	1350	1600	2170
500	1420	1020	1385	1310	480	455	405	660	820	1900	1450	1800	2540
630	1480	1020	1395	1310	505	535	410	660	820	1900	1450	1800	2660
800	1580	1020	1585	1510	535	545	410	820	820	2000	1500	1900	3225
1000	1660	1270	1655	1590	565	545	435	820	1070	2100	1500	2000	3790
1250	1680	1270	1675	1610	565	600	460	820	1070	2100	1500	2000	4485
1600	1750	1270	1890	1810	595	605	485	1070	1070	2200	1700	2200	5525
2000	1810	1270	1840	1780	615	605	530	1070	1070	2200	1700	2200	6650
2500	1950	1250	1940	1860	655	610	570	1070	1070	2300	1800	2200	7700

Amorphous Metal Transformer

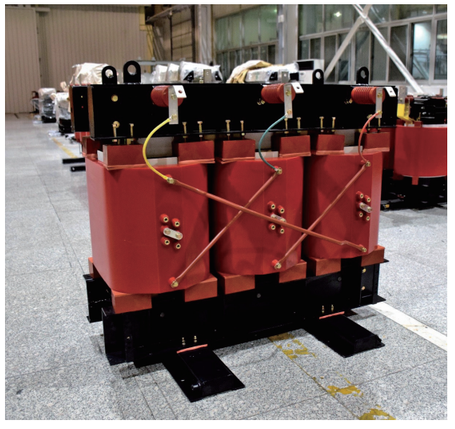
An amorphous metal transformer (AMT) is a type of energy efficient transformer found on electric grids. The magnetic core of this transformer is made with a ferromagnetic amorphous metal. The typical material is an alloy of iron with boron, silicon, and phosphorus in the form of thin (e.g. 25 μm) foils. These materials have high magnetic susceptibility, very low coercivity and high electrical resistance. The high resistance and thin foils lead to low losses by eddy currents when subjected to alternating magnetic fields.



Amorphous Metal Core

Oil-immersed Transformer (Amorphous Metal Core)

Dry Type Casting Epoxy Resin Coil Transformer (Amorphous Metal Core)



Core loss

In a transformer the no load loss is dominated by the core loss. With an amorphous core, this can be 70–80% lower than with traditional crystalline materials.

Applications

The main application of AMTs are the grid distribution transformers rated at about 50-1000 kVA. These transformers typically run 24 hours a day. The no load loss of these transforms makes up a significant part of the loss of the whole distribution net.

Using in China

As one of the major programs to improve grid efficiency, China has started to install amorphous metal transformers in a number of energy intensive provinces since 2005. Over 20,000 MVA of such transformers are installed every year.

About CREAT's Amorphous Metal Transformers

CREAT's first AMT was bulit in 2005, and now CREAT is the biggest AMTs supplier in north China (Top 2 in whole China). Since 2013, more than 10,000 every type AMTs was sold to every provinces in China for the power distribution net construction every year. And now, there are more than 40,000 AMTs running in everywhere of China.

CREAT could design and manufacture both oil-immersed and dry-type AMTs for every customers in both distribution and other industry fields.

Primary voltage: up to 36 kV

Rated Power: 0~2500kVA

Pad-mounted Transformer

A pad-mounted transformer is a ground mounted electric power distribution transformer in a locked steel cabinet mounted on a concrete pad. Since all energized connection points are securely enclosed in a grounded metal housing, a pad-mounted transformer can be installed in places that do not have room for a fenced enclosure. Pad-mounted transformers are used with underground electric power distribution lines at service drops, to step down the primary voltage on the line to the lower secondary voltage supplied to utility customers. A single transformer may serve one large building, or many homes.

Pad-mounted transformers are made in power ratings from around 75 to around 5000 kVA and often include built-in fuses and switches. Primary power cables may be connected with elbow connectors, which can be operated when energized using a hot stick and allows for flexibility in repair and maintenance.

Tanks and compartments

Pad-mount transformers have tanks and compartments assembled on top of a flat, rigid surface, usually a concrete pad. The pad-mounted transformer unit may be rolled, skidded or jacked into place, or raised using hooks. Underground cables are used to connect high voltage, which are connected to the bushings or to factory-installed auxiliary equipment. The high- and low-voltage compartments are separated by a metal barrier.

Terminations

Compartmental type pad-mounted transformers support underground entrance of primary and secondary conductors. Live and dead front primary termination on radial or loop feed service is provisioned for. Wet process electrical grade porcelain bushings with eyebolt terminals are provided for live front construction. For all voltage ratings, dead front construction with provisions for high voltage terminators is available. Secondary terminals are sealed into molded epoxy bushings and externally clamped to the tank wall.

Switch and fuse

In a three-phase pad-mounted transformer, oil immersed switches that switch in three current ratings are available for radial and loop feed. Load break and latch operations are facilitated through spring load mechanism. A three-phase gang-operated switch is mounted near the core and coil assembly for low cable capacitance. Depending on the customers requirement, and transformer size and rating, the most common fuse options include weak link expulsion fuses; Bay-o-Net fuses; dry well canisters; arc strangler fused switch blades; clip-mounted, full-range, current-limiting fuses; and S&C disconnects with E-rated power fuses.

YBM Type

YBM Pad-mounted transformer has both the advantages of IEEE std. and IEC std. of pad-mounted transformers:

Small size, whole insulation, double-fuses protection, full devices of low-voltage;

Two-tank structure, measurement of high-voltage, anti-unbalanced voltage and spare power source automatic switch .

YBP Type

Completely conforming to the IEEE std., the features of YBP Pad-mounted transformer:

Small size, quick installation, and high adaptability to work conditions.

Low Voltage Transformer and Reactor

Chokes and reactors always need to be calculated, designed and built specifically for each application. There are almost no standard products in this field.

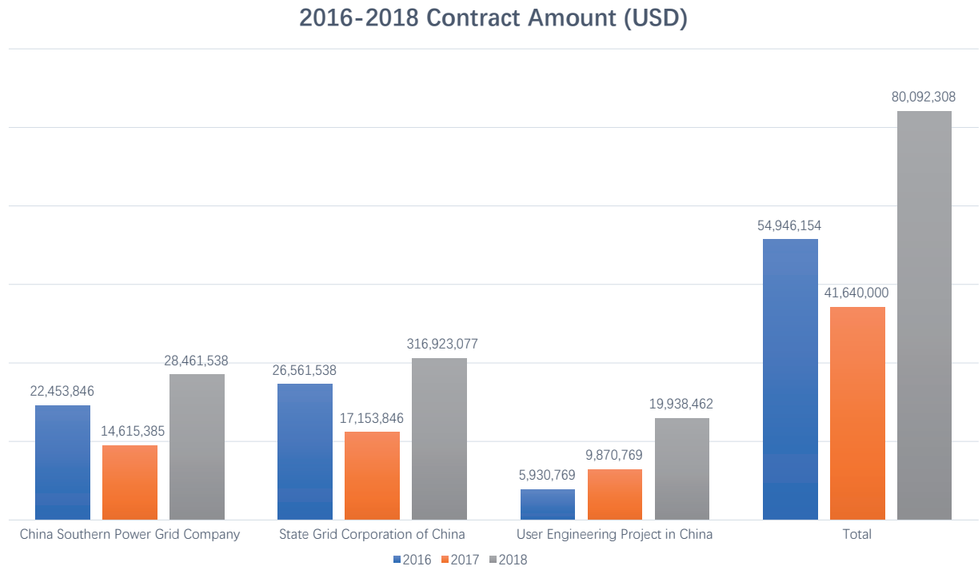
CREAT is able to optimally solve all operational requirements thanks to the experience of its own engineers, an extensive database of applications and specialized proprietary software used for the calculations. The choice of materials used, however, will vary depending on the ultimate purpose of the component and the type of performance and technology to be applied.

Applications

Railway		• *Rolling Stocks* CREAT designs transformers and reactors for both wagons and locomotives. • *Substations* CREAT also designs transformers and reactors for both railways and subway substations.
Renewable Energy		• *Windpower & Solar* In the last 5 years CREAT has developed several products for the renewable energy markets. CREAT low voltage transformers and reactors are installed in many inverter cubicles the conversion of wind or solar energy. CREAT also designs transformers and reactors for both windpower and solar substations.
Marine		CREAT has supplied several products for containers vessels, military vessels and oil&gas platforms.
Industry		CREAT manufactures transformers and reactors for a large variety of industrial applications. • *Heavy Industries* • *Chemical Industries* • *Pumping Stations* • *Power Plants* • *Mines*

Focus on Electrical Power Distribution Network

Sales Achievement



Average Annual Increasing Rate: 32%

Marketing Network

Our main clients are Power Utilities. Besides China, our products are exported to:

North/East Europe, USA, South America, Middle East, Southeast Asia and Africa.

Salesmen: more than 100

Market Engineers: more than 50

Quality

CREAT is conferred the National Important High-tech Enterprises (the torch plan) of the Ministry of Science and Technology of China.

Certificate of IRIS (International Railways Industry Standard)

National Most Important Hi-tech Enterprise (by MOST)

ISO 9001: 2008 Std.

Auto-Recloser pass the "Complete Type Test" .

National Project "Modular Substation" (Torch Plan of MOST)

Top 10 Growth Companies of China in Electric Industry.

Top 10 Innovational Companies of China in Electric Industry.

AAA Grade Credit Rating Enterprise (The Hightest Grade)

National Important Product: Fault Indicator by MOST,MOFCOM, AQSIQ, MEP.

National Important Product: GRC Enclosure by MOST,MOFCOM, AQSIQ, MEP.

National Important Product: RDCU by MOST,MOFCOM, AQSIQ, MEP.

Ministry of Science and Technology of China (MOST)
General Administration of Quality Supervision, Inspection and Quarantine of China (AQSIQ)

Ministry of Commerce of China (MOFCOM)
Ministry of Environmental Protection of China (MEP)

北京科锐配电自动化股份有限公司
Creative Distribution Automation Co.,Ltd
Building 4 ,Xibeiwang East Rd,Haidian,Beijing,P.R.China 100193
Tel:(+86)10 62981321 Fax:(+86)10 62981320 www.creat-da.com.cn