Satco

ISO 9001 : 2008

SATCO ELECTRIC INDUSTRIES LTD.

A House of Electrical Solution

Factory

Sahebpara, West Mizmizi, Sanarpar, Siddirgonj, Narayangonj.

SATCO is one of the fastest growing company with the products of Sub-station and its equipments as Transformer, HT (High Tension) Switchgear, LT (Low Tension) Switchgear, PFI (Power Factor Improvement) Plant, MDB (Main Distribution Board), SDB (Sub-distribution Board), Generator and so on. Emphasising on valued client's interest, the SATCO sharply committed to meet the client's requirements in the most convenience way. SATCO provides a complete solution with technical skills, services, spare support system, integrity system management and system monitoring. SATCO maintain a best relationship with ensuring client's satisfaction. SATCO pledge to use its resources efficiently to solve the problems raised at the client ends. SATCO is also ready to provide services round the clock 24/7.

SATCO is the world class manufacturer of electrical substations, Power transformers & distribution transformers, various switch gears and equipments incorporating with a number of vast experienced, high skilled, qualified and committed engineers and technicians. These experts are closely related with the international professional bodies like IEEE, ASME, etc. and also they are ensuring the products quality as the standards of these international professional bodies. These experts are involved to research and development to upgrading & designing the products regarding client's demands in according to IEC, ANSI, BS, VDE and so on.

SATCO is most reliable manufacturer of distribution transformer rated from 100KVA to 3200KVA and power transformer rated from 2500KVA to 10000KVA of the system voltage 11KV & 33KV.

3000 KVA 33/11KV Sub-Station
Vintage , Denim, Gazipur

SATCO TRANSFORMER

As consistent guarantee of the highest quality Power & Distribution Transformers are manufactured from cold rolled grain oriented (CRGO) silicon steel. Quality control is carried out at all stages of production while final routine and type tests are performed in our well equipped testing laboratory according to IEC-76, BDS 1081, ANSI, AEC and BSTI standards.

Power Transformer

STANDARDS & DESIGN

Standards	:	IEC 76, BDS-1081, ANSI, VDE.
Frequency	:	50Hz, 60Hz (on request)
Ratings	:	100 KVA - 10000 KVA
Primary voltage	:	33 kv and 11 kv.
Tapping	:	± 2.5 %; ± 5 % or ± 2 x 2.5 %; -7.5% or Customised
Secondary voltage	:	11 KV and 0.415 KV or Customised

Distribution Transformer

Transformer Core & Coil Assembly

Disk Coil

CORE COIL & WINDING

The core is built with laminations of high grade grain-oriented silicon steel. The special cutting and stacking methods result in low no load losses and low noise levels. Wound on mandrel, the core is annealed at the highest temperature to relieve mechanical stress and fix into the design shape.

Low cold rolled grain oriented silicon steel strip. The core is built with laminations of voltage coils are normally larger layer wounds using paper insulated copper conductor. Circular type and rectangular type windings are respectively used for relatively large or small type of transformers.

The coil has to allow the liquid insulation for cooling. It causes uniform heat dissipation due to losses. The round conductor windings consist of individually wound coil sections connected in series to produce phase winding. We use high grade Imported copper for winding and export quality super enamel wires for HT windings. HT and LT coils are checked for inner diameter, outer diameter, axial length, number of turns and resistance.

INSULATION

The dielectric circuit of transformer which isolates the magnetic & electric circuit & their parts, insulation papers and press board of high quality are used for our Transformer. Moisture content of the insulation paper is very minimum. Drying system removes almost all moisture from the insulation structure and finally from the transformer.

BUSHING

High voltage and low voltage bushing are of wet process porcelain terminals suitable for copper or aluminum conductors. All the bushings are top mounted.

TRANSFORMER OIL

Transformer oil is procured from reputed manufacturers. It is tested for resistivity dielectric dissipation factor, acidity, flash point, pour point, break down voltage and inter facial tension as per BIS & IEC. No further drying will be required before putting into operation.

Insulating oil are as follows:

Specific gravity at 15°C:	0.87
Viscosity at 75°C	5.5 centistokes (max)
Viscosity at 30°C	19.0 centistokes (max)
Flash point	145°C (min)
Dielectric strength	50 kv (min), 12.5mm
Diameter spare electrode gap length	2.5mm

TAP CHANGER

Top changer is mode of high quality homogeneous insulating board or synthetic resin mould is mounted below oil level for changing the connections of taps in primary windings. In allmosl all our distribution transformers, we use imported Manual/Auto tap changer From reputed Company.

OLTC

RADIATORS

Conservator Tank is detachable by providing a flange at its point of connection to the tank cover. Transformer tank is made with steel sheet and covers are fabricated by welding. Tank is tested under pressure for finding any leakage. Tanks employed for housing the core coil assembly are mechanically strong. Tank finish consists of three coats. Each coat is applied uniformly and cured at even temperature. For properly making of radiator is very important. Each individual element and radiator under assembled condition is tested with air pressure of approximately 3kg/cm^2.

Tank painted by a zinc riched primer coat and two finishing coats as required by the customer. Powder coated radiator is also available on request.

Conservator

ACCESSORIES

- HT/LT Bushing with terminal connectors
- Buchholz relay
- Gate valve
- Tap changers
- Lifting-Lug
- Thermometer (for 3 phase transformer)
- Oil level Indicator
- Oil drain plug
- Earthing terminal
- Silica gel breather for the conservator tank
- Pressed steel radiator
- Name plate with connection diagram

Spare accessories on request

- High voltage plug in connectors.
- Marshalling box with accessories for thermal protection.
- Temperature measurement by means of a PT100 resistor in the middle phase, with digital or analog indicator with or without contacts.
- Digital display of temperature on the 3 phases with contacts and storage of maximum values.
- Fans with control and control box for forced cooling (increases the rating with 10%)
- Vibration dampers.
- WTI, OTI, Buchholz Relay .
- Flexible connector from LV Bushing to BBT end connection unit.

TESTING

ROUTINE TEST

- Insulation resistance test
- Core insulation test
- Winding resistance test
- Voltage ratio & polarity test (vector group test)
- No load loss & exciting current measurement test
- Load loss & impedance voltage measurement test
- Dielectric strength test of oil
- Power frequency (separate source) voltage withstand test
- Short-circuit test
- Function of tap changer test
- Heat-run test at ONAN and ONAF rating (specify)
- Noise level test
- Oil leakage test

Test certificates are issued for all the above tests on request

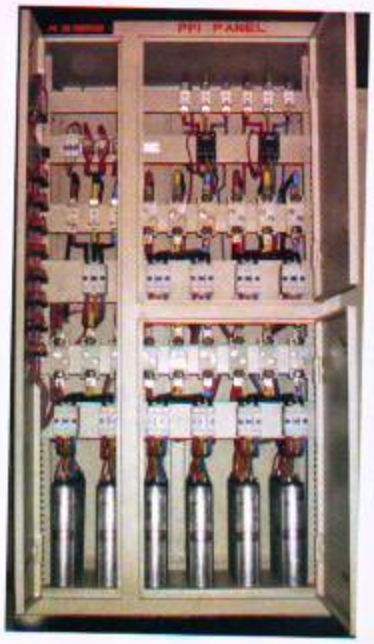
WARRANTY

SATCO committed to its valued client for trouble free operation of our supplied equipment and under make warranty for free replacement of any part or parts failing due to manufacturing defect, which shall not include normal operational wear and tear for a period of 18 Months from the date of delivery of equipment and 12 months from the date of commissioning.

SERVICE

Maintenance of transformer are also taken care of in our factory or at site of installation. Rectifier and AC/DC welding transformer are also be repaired on request. Rettrofitting in feeder unit and out feeders with any kind of circuit breakers, including re-winding & repair of transformer, fittings. For repairing of winding & up to 33 kV assembly and OLTC utility and big substation woners can contact us in full confidence.

POWER TRASFORMER



PFI PLANTS

SATCO POWER FACTOR IMPROVEMENT (PFI) PLANTS ARE OF-

* MODULAR DESIGN
* COMPACT ARRANGEMENT
* LOW LOSSES CAPACITORS
* HIGH RELIABILITY
* SMART OPERATING

Power factor correction is the switching of the capacitors in parallel with inductive loads in the network.
Motors, Transformers and other inductive loads require reactive power. Transmitting/distributing the reactive power from the power station to the loads in un-economical. It improves undue burden on generators and transmission/distribution system, causes additional losses, increases, voltage drop and the overall power requirement of the plant. SATCO Power Factor Improvement (PFI) plant is well suited for this purpose.

DESIGN

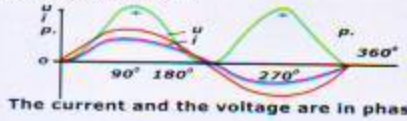
Power Factor Improvement Plants are manufactured in modular design and consist of :
* Relay Module * Capacitor Modules
The regulation module consist of :
Solid state reactive power rlay with digital indication of power factor.
Circuit breaker for controlable protection.
The capacitor module consist of :
* High reliability
* Long life
* Harmonic load tolerance
* High temperature class
* Air break contactors to switch capacitors
* Metallized plastic foil
* High over load capacity
* Environment friendly insulating gas filled
* Touch proof terminals

CAPACITOR, HARMONIC FILTER

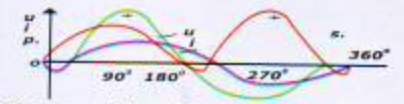
Relays are fitted with a specially developed Harmonic Filter device which will oversees the voltage dynamic. The measured voltage is reviewed with respect to it deviation from a pure sine wave. Capacitor current is heavily influenced by the dynamic of the supply voltage, the total effect is evaluated by measuring the current. If this current exceeds its nominal value by approximate120% over a time interval of 1 minute (current measurement), then the symbol hA will appear in the display.

Standard & Regulations

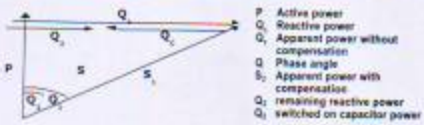
DIN VDE 0660, Part 500 (TTA) and IEC - Pubi, 439-1
DIN VDE 0106, Part 100



The current and the voltage are in phase



The current lags the voltage by the angle φ



Active, Reactive and Apparent Power:
The apparent power S required by electrical machines and electrical equipment is the product of voltage U and current I.
S=U I or v3 U. I
The active power is calculated as follows:
P=U.I. cosø or v3U.I cosø
In AC systems the power factor is cosø=1, if the current and voltage are in phase, I.e. both reach their highest positive and negative values simultaneously and pass trough zero together. This is the case with resistive loads (heater elements, filament lamps). The delivered energy is almost totally converterd, e.g. into heat. Here we talk about pure 'active' power 'P' reactive current flows internally between the inductive loads, e.g. motors and the capacitors.

SWITCHGEAR

SATCO's switchgear division is itself a complete unit with knowledge, experience, skills as well as machineries and also test equipment. SATCO is Manufacturing-

- HT switchgear, 11KV, 33KV.
- LT switchgear
- PFI Plant
- Control panel, Motor Control, Star Delta Starter.
- HT Metering Panel
- LT Metering Panel, so on.

FEATURES OF SWITCHGEAR

-The Panel is equipped by high reliability and world class brand equipment
-Easy and smart operation
- Lookative, safe and dust proof casing.
-Standard clearance
-Perfect air ventilation
-Extra cooling system
- Powder coating painted

HT Switchgear

HIGH TENTION SWITCHGEAR

High Tension Switchgear (HT) comprise the units designed for rated voltage of 12kv, 33kv current range 400A to 3200A. Switchgear insulation designed to withstand rated voltage is also subjected to over voltage due to lightning and breaker operation transients. Depending on the conditions Switchgear installation are designed and manufactured for outdoor and indoor service. Suitable for mass production, transportation handling and convenient operation, the weight of the equipment is kept as low as practicable. Without compromising quality and standard.

The IBS, VCB, SF6 circuit breaker and the switchgear are of optimized design for Bangladesh environmental condition. This design ensures easy of operation, low cost maintenance and higher reliability.

The cubical design of 12KV, 33KV, and 1250A is also compatible with our SF6 and VCB (Vacum Circute Bracker). The panels are fully compartmentalized and extensible on both side, consisting of busbar chamber with adequate air clearances, PT compartment, CT and cable termination compartment, breaker compartment and metering chamber.

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DRAW-OUT TYPE HT SWITCHGEAR

The complete unit may be provided with a shutter of front cover. VCB/SF6 breaker is mounted on a cradle. This SF6 breaker /VCB along with the cradle can be easily installed inside a switchgear compartment without any need of mechanical adjustment.

The interlock of the draw out mechanism type and its special features are-

- The circuit breaker cannot be placed in or withdrawn from its cradle when it is in closed position.
- The circuit breaker cannot be operated as the time of inserting in the cradle.
- The circuit breaker & other components like CT, PT, IDMT relays all are imported from USA, Germany, France, UK and Japan or as per choice of our valued customers.

FIXED TYPE HT SWITCHGEAR

LBS/VCB/ SF6 breaker is suitable for use in cubicle switchgear units. This breaker is fixed to a switchgear or floor by bolt with it's base with it. On requested, fixed mounting SF6 breaker / VCB / LBS's may be provided with wheels which will make its movement easier.

Connections between the breaker and incoming as well as outgoing busbars, are made directly and kept fixed.

The terminal arrangement of a fixed mounting breaker is such that connection to various positions are made in the following manner :

- Main connection made by bolts
- Control connection made by screws
- Earth connection made by screws

TECHNICAL DATA

Rated voltage (V)	: up to 11 kV/ 33kV, 50 hz
Rated current (A)	: up to 600/200 A
Rated currents of components Circuit breakers	: up to 3200 A

TESTS

All the breakers are subjected to routine tests as per IEC the panels along with the breaker are subjected to routine tests as per IEC before dispatch.

DIMENSIONS

Height	: 600/800/1500/1800/2200 mm
Width	: 400/600/800/1000 mm
Depth	: 400/600/800 mm

RATED PEAK WITHSTAND CURRENT

Main busbars	: up to 176 kA
Dropper bars	: up to 120 kA
Degree of protection to DIN / IEC	: IP 40

About VCB

* Proven hermetically sealed vacuum interrupters.
* Low contact erosion.
* Fast recovery of dielectric strength.
* Maintenance free vacuum interrupter.
* Suitable for auto re-closing duty.
* Small stroke length and less moving parts.

Low Tension Switchgear

SATCo manufacturing fixed-mounted LT switchgears. Our LT switchgears are steel claded sheet with modular systems for assembly of cubicles intended to take heavy equipments, dust and vermin proof, free standing of against wall installation, single or double fronted arrangement and all-round steel enclosure, floor mounting indoor type, with TPN&E copper busbar. We prefers to use ABB, SIEMENS, Moller branded circuit breaker in our panels. But if it is prescribed other brand by the customer and it does not over rule the standards, we manufacture as per customer's requirements.

TECHNICAL DATA

Typical	
Rated voltage (V)	up to 650V, 50-Hz
Rated current (A)	up to 7200A
Rated currents of components Circuit breakers	up to 6300A
DOL contactor starters	up to 400 A
A Contactor type reversers	up to 400A
Contactor type star-delta starters	up to 700A

OVERALL DIMENSIONS

Preferred dimensions to DIN 41s 488 Sheet 2	
Height	1220/1500/1800/2200 mm
Width	400/600/750/800/1000 mm
Depth	400/60/800 mm

TESTS

All the breakers are subjected to routine tests as per IEC the panels along with the breaker are subjected to routine tests as per IEC before despatch.

INDOOR OR OUT DOOR CABLE

- Air insulated, Metal clad construction using high quality steel.
- Durable epoxy powder coated finish
- Computerized and compact design
- Easy accessibility for maintenance
- Meters, Relays and Controlers located at convenient height
- Extensible on both sides
- Side cable box for single panels
- Compatible with State of the art numerical

TECHNICAL DATA FOR DISTRIBUTATION & POWER TRANSFORMER

33000/11000Volt , 3-Phase Transformer

Rated capacity KVA	No Load Loss	Load Loss at 75°C	Efficiency at unity power factor %	Approximate Weight		Approximate Dimension			Impedance Voltage %
				Oil weight	Total weight	length mm	width mm	height mm	
1000	1750	12500	98.95	850	4000	1950	1650	2200	6 ~ 7
1250	2050	14900	98.97	1000	4800	2000	1700	2250	6 ~ 7
1500	2380	16900	98.98	1170	5400	2050	1750	2280	6 ~ 7
1600	2470	17800	98.98	1260	5700	2090	1800	2300	6 ~ 7
2000	2950	21000	99.00	1450	6600	2150	1880	2370	6 ~ 7
2200	3150	22500	99.01	1600	7300	2200	1950	2420	6 ~ 7
2500	3500	24700	99.02	1750	8050	2300	2050	2500	6 ~ 7
2800	3800	26800	99.02	1900	8600	2350	2100	2560	6 ~ 7
3000	4000	27900	99.03	2000	9200	2420	2200	2620	6 ~ 7
3500	4500	30700	99.03	2250	10250	2500	2290	2680	6 ~ 7
3800	4750	32200	99.02	2450	10900	2580	2350	2730	6 ~ 7
4000	5000	33500	99.03	2500	11000	2640	2440	2770	6 ~ 7
4400	5300	35000	99.04	2650	11850	2700	2500	2850	6 ~ 7
4800	5650	37000	99.04	2850	12500	2760	2600	2900	6 ~ 7
5000	5850	37500	99.05	2950	12800	2850	2680	2970	6 ~ 7
5500	6250	39700	99.03	3170	13600	2930	2750	3000	6 ~ 8
6000	6700	41800	99.04	3400	14400	3000	2850	3100	6 ~ 8
6500	7100	43700	99.04	3600	15200	3050	2910	3150	6 ~ 8
7000	7500	45600	99.05	3800	15900	3120	3000	3200	6 ~ 8
8000	8300	50000	99.05	4220	17500	3200	3080	3270	6 ~ 8
8500	8700	51200	99.05	4400	18000	3270	3170	3320	6 ~ 8
9000	9200	52800	99.06	4600	18700	3350	3250	3400	6 ~ 8
9500	9400	55000	99.08	4800	19400	3400	3300	3450	6 ~ 8
10000	9800	56000	99.08	4900	19900	3480	3400	3500	6 ~ 8
10000	9800	56000	99.1	4900	19900	3480	3400	3500	6 ~ 8
11000	10600	60000	99.11	5300	21200	3500	3450	3550	7 ~ 10
12000	11300	64000	99.12	5600	22500	3550	3470	3590	7 ~ 10
13000	12200	68000	99.14	6000	23800	3600	3510	3620	7 ~ 10
14000	12800	71700	99.15	6300	25000	3630	3550	3660	7 ~ 10
15000	13600	75400	99.18	6600	26200	3670	3600	3700	7 ~ 10
16000	14300	79300	99.19	7000	27400	3700	3630	3740	7 ~ 10
17000	15000	82900	99.19	7300	28500	3750	3670	3800	7 ~ 10
18000	15700	86500	99.2	7600	29600	3800	3720	3820	7 ~ 10

11000/415Volt , 3-Phase Transformer

Rated capacity KVA	No Load Loss	Load Loss at 75°C	Efficiency at unity power factor %	Approximate Weight		Approximate Dimension			Impedance Voltage %
				Oil weight	Total weight	length cm	width cm	height cm	
50	150	925	98.00	140	580	94	58	118	4
100	245	1700	98.42	180	650	100	63	132	4
150	320	2412	98.60	220	900	105	88	145	4
200	435	2820	98.79	230	975	112	93	150	4
250	520	3265	98.81	270	1100	113	95	158	4
315	580	4500	98.89	350	1250	120	97	160	4
400	722	5490	98.95	390	1450	123	98	162	4
500	865	6275	99.00	425	1725	124	102	165	4
630	920	7740	99.05	500	1970	136	103	170	4.5
750	1150	8850	99.06	625	2250	155	112	185	5
800	1300	9800	99.06	650	2575	170	113	200	5
1000	1650	11600	99.08	800	2850	185	115	215	5
1250	1820	12300	99.10	1000	3725	190	116	225	5
1600	2200	14275	99.12	1200	4300	200	120	230	6
2000	2650	16470	99.15	1450	4750	210	135	250	6
2500	3140	19700	99.17	1800	5600	220	150	285	6.5
3000	3420	22860	99.19	2050	6350	230	170	300	6.5

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