# POSITIVE POWER BANGLADESH

THINK POSITIVE
BE POSITIVE



A Product Catalog of PPBL



# POSITIVE POWER BANGLADESH

| | |
|---|---|
| **Transformer** | :: **Power Transformer** (up to 20MVA, 33KV) |
| | :: **Distribution Transformer (oil type up to 6 MVA)** |
| | :: **Distribution Transformer (Dry type up to 2.5 MVA)** |
| | :: **Special Transformer (on request)** |
| **Switchgear** | :: **HT Switchgear (up to 33KV fixed/Drawout type)** |
| | :: **LT Switchgear (Regular/compartmental type up to 6300A)** |
| | :: **PFI Panel (Regular/ Thyristor type)** |
| **Distribution Box** | :: **MDB, DB, SDB**<br>:: **Cable Trunking System** |
| **Pannel** | :: **MCC Panel** |
| **Trading Items** | :: **Diesel Generator from UK, (up to 2000 KVA)** |
| | :: **Solar Systems (Off Grid & Ongrid)**<br>:: **.....** |
| | :: **BBT (From Europe)**<br>:: **OLTC (CTR, India / MR, Germany)** |
| **Servicing** | :: **All type of Substation**<br>:: **All type of Diesel Generator** |
| **Training** | :: **Ask for Details** |

**POSITIVE POWER BANGLADESH LTD. (PPBL)** is one of the leading Transformer, Switchgear & Low Voltage Few Products manufacturer in Bangladesh. By using the latest manufacturing technology according to IEC (International Electro Technical Commission) and ANSI (American National Standard Institute). We, the PPBL produce different power products for power generation operation and distribution.

**PPBL** is manufacturing and servicing of Distribution and Power Transformer from 50KVA to 5000KVA on 11/0.415KV and 100KVA to 10,000KVA on 33/11KV. Our products are designed, manufactured and tested to the highest international standards to ensure the high quality, reliability and efficiency. Starting from the very beginning we are trying to provide the top class service and engineering support, through which we can give the most appropriate technical solutions to every problem.

## ABOUT US:

**PPBL** is moving by a group of skilled engineers, who wanted to provide optimum energy solutions in Bangladesh. It has been manufacturing top-notch energy products like Sub-station and equipment i.e. Transformer, HT (High Tension) Switchgear, LT (Low Tension) Switchgear, PFI (Power Factor Improvement) Plant, MDB (Main Distribution Box), SDB (sub-distribution Box), and sales & servicing the best Quality Solar systems / panel, Generator and so on.

Emphasizing valued client's Interests, the **PPBL** is sharply committed to meeting the Client's requirements in the most beneficial way. **PPBL** pledges to use its resources effectively to solve the problem with the right and complete solution for the project with Service, Spare support, integration or system management, and monitoring. It always looking to go the extra step to ensure Client's satisfaction with long term good relations. **PPBL** is also ready to give service round the clock whole the week- whole the month- whole the year.

**PPBL** started making of world-class Substation/ Distribution and Power Transformer, Switchgear and its equipment incorporate several highly skilled, qualified, and committed engineers and technicians. Its engineers are closely related to international professional bodies like IEEE, ASME and accordingly updating technologies with the latest developments and also designed on requirements of valued customers according to IEC (International Electro-technical Commission), ANSI (American National Standard Institute), BS, VDE so on.

## OUR BUSINESS POLICY

* Efficient and proper service
* Perfect & Quality Products
* On commitment delivery
* Best product in minimum price

## OUR MISSION

Our thinking is driven by commitment to make best of the transformers to satisfy our customers with respect to proven design, quality input material & finally through Inspection.

## OUR QUALITY SYSTEMS

The quality of our transformer is assured by well defined Quality Policy and procedures in conformance to the ISO 9001 2015 standard. Quality Assurace Plan is guided by the urge to provide uncompromising quality to our valued customers to ensure lasting satisfaction. Each transformer undergoes a prescribed range of the tests as per IEC. Inaddition, supplementary tests are caried out as part of an internal sampling procedure to ensure continuous quality monitoring.



# DISTRIBUTION & POWER TRANSFORMER

## Fundamentals of Distribution & Power Transformer

• Power Transformers are used in transmission network of higher voltages for step-up and step down application (400 KV, 230 KV, 132 KV, 33KV) and are generally rated above 200MVA. They are used for the transmission purpose at heavy load, high voltage greater than 33 KV & 100% efficiency. They are also used in Transmission network so they do not directly connect to the consumers, so load fluctuations are very less.

• Distribution transformers are used for lower voltage distribution networks as a means to end user connectivity. (11KV, 6.35 KV, 3.3 KV, 440V, 230V) and are generally rated less than 200 MVA. Distribution transformer is used for the distribution of electrical energy at low voltage as less than 33KV in industrial purpose and 440V-230V in domestic purpose. It work at low efficiency at 50-70%, small size, easy in installation, having low magnetic losses & it is not always fully loaded.

## Design & Development

Our Professional Designers and Engineers are over the years of award winning experienced in the designing of Distribution & Power Transformer, Switchgear & Control Panels. We deliver top-quality Transformers, Substation and Equipment at prices the equivalent to commercial firms can't match. Our experts at managing complex power projects, bringing 99.99% of them to "Launch date" on time and on budget. Our design department is dedicated to develop the diversity of products as per needs and requirements of the marker.

## Standard & Rating

| | | |
|---|---|---|
| Standards | : | IEC-76, BS-171, ANSI C57.12, VDE 0537 |
| Frequency | : | 50 Hz, on request 60 Hz |
| Ratings | : | For ratings higher than 10/14 MVA (On request) |
| Primary Voltage | : | For values above 24 KV and up to 36 KV (On request)<br>Double high voltages (example 15-20 KV) can be offered. |
| Secondary Voltage | : | 400 to 433 V other values may be offered.<br>Double low voltages with 7 LV bushings can be offered with full rating or both voltages or with reduced rating 75% or lowest voltage. |
| Standard Tappings | : | +2.5%, ±5% or +2x2.5%, 7.5% and others on request |

*Remarks:: Special designs may be studied on request.*

## Physical Dimensions of Transformers:

| Rating (kVA) | 100 | 150 | 200 | 250 | 315 | 400 | 500 | 630 | 750 | 800 | 1000 | 1250 | 1500 | 2000 | 3000 | 5000 | 10000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weight (kg) | 650 | 760 | 1000 | 1150 | 1369 | 1400 | 1795 | 2540 | 2800 | 2875 | 3000 | 3900 | 4800 | 5650 | 9400 | 13500 | 28500 |
| Height (mm) | 1350 | 1450 | 1600 | 1550 | 1600 | 1600 | 1650 | 1750 | 1990 | 1990 | 2050 | 2150 | 2250 | 2500 | 2650 | - | - |
| Width (mm) | 900 | 1050 | 1000 | 1000 | 1230 | 1230 | 1530 | 1630 | 1600 | 1650 | 1850 | 1950 | 2050 | 2200 | 2450 | - | - |
| Length (mm) | 1200 | 1230 | 1320 | 1420 | 1300 | 1300 | 1570 | 1670 | 1650 | 1650 | 1870 | 1970 | 2070 | 2220 | 2540 | - | - |

L = Length, H = Height, W = Width (All dimensions are shown including radiator and conservator tank.)
Above dimensions and weight can be changed upto ±5% subject to change of design-data,
though improvement is the part of our everyday activities.





## WARRANTY

**PPBL** committed to it's valued client for trouble free operation of supplied equipment and under make warranty for free replacement of any part or parts failing due to manufacturing defect or wrong workmanship, which shall not include normal operational wear and tear for a period of 24 months from the date of delivery of equipment and 12 month from the date of commissioning.

## DELIVERY

**PPBL** offer free delivery at our factory premises and for customer satisfaction, we may deliver to customer premises subject to negotiation at extra payment. Since **PPBL** believes in all-round quality, Our delivery people are also technically sound and skilled in Transformer handling with our equipped lifting system.

## INSTALLATION WITH SERVICE

We have an excellent team with service vehicle. Required handling equipment, tools and test equipment to provide possible best services to our client at door steps. Our team is committed to reach in complaint site within couple of hours.

## REPAIR & SERVICE

Repairing of power transformer are also taken care of by **PPBL** in our factory or at site of installation. Furnace transformer, rectifier and AC/DC welding transformer are also be repaired on request. Retrofitting in feeder unit and out feeders, with any kind of circuit breakers, including rewinding; repair of transformer, fittings. **PPBL** is capable for smooth and better complicated of such complex jobs. For repairing of winding up to 132 kV assembly and OLTC utility owners and big substation owners can contact us with full confidence.

## TROLLEY MOUNTED SUBSTATION/COMPACT SUBSTATION

**PPBL** is also making trolley mounted transformer as well as compact trolley mounted substations. In such units 1110/ Isolator/LBS, Transformer, LT Switchgear cum PFI Plants are made to keep in a compact trolley with proper wheel and brake.

## POWER TRANSFORMER

**PPBL** can manufacture power transformer up to 20 MVA 33/11 kV system. The detail technical specification and data are available up on request.

POSITIVE POWER BANGLADESH

## TESTING

During the entire manufacturing process the transformer is approved by BSTI, Electrical Licensing authority of energy ministry, IEC76/BDS1081.TESTING

## ROUTINE TEST

1) Insulation resistance test.
2) Winding resistance test.
3) Voltage ratio & polarity test (vector group test)
4) Load loss & impedance voltage measurement
5) No load loss & exciting current measurement
6) Dielectric strength test of oil
7) Power frequency (separate source) voltage withstand test
8) Core insulation test
9) Function of tap changer test
10) Heat-run test at ONAN and ONAF rating (specify)
11) Short-circuit test

## TYPE TEST

1) Impulse voltage withstand test
2) Temperature rise test
3) Over load test
4) Noise level test
5) Oil leakage test

Note: Short circuit test and impulse test can be conducted from BUET upon negotiation.



POSITIVE POWER BANGLADESH

# CAST RESIN TRANSFORMERS

## Standard execution and equipment

* Primary Tension: up to Kv 24
* Secondary Tension:  up to Kv 0.5
* Insulation Class: up to Kv 24
* Connection: delta star with neutral (others on request)
* Group: Dyn 11  or Dyn5  (others on request)
* Frequency: Hz 50
* Core with oriented grain, insulated with carlite
* Cast Resin H V windings
* Impregnated LV windings
* Plaque for primary voltage toppings variation
* Plate for LV connection
* Lifting lugs
* Earthing terminal
* Electronic temperature monitoring unit
* Name plate

## Quality control (Checks and tests):

According a Quality Assurance Sistem in compliance ISO 9001 : 2000 Standard.
The Quality Manual's constant application, with the relatives operative procedures, guarantee a severe checking with all materials and components, with the store, with production's processing up to the final test and to the costumers deliver.
In our test room we carry out:

* Routine test (price included);
* Type test (extra payment, by customer on request)





# PPBL Transformer's Electrical Specifications

## Type PPBL-I

**11/0.415 kv, 3 Phase, 50Hz**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated Power | | (KVA) | 50 | 100 | 150 | 200 | 250 | 315 | 400 | 500 | 630 | 750 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3000 |
| Model No. | | - | XI-50 | XI-100 | XI-150 | XI-200 | XI-250 | XI-315 | XI-400 | XI-500 | XI-630 | XI-750 | XI-800 | XI-1000 | XI-1250 | XI-1600 | XI-2000 | XI-2500 | XI-3000 |
| No Load Loss | | (W) | 153 | 250 | 300 | 395 | 460 | 571 | 652 | 740 | 912 | 970 | 1047 | 1233 | 1550 | 1760 | 2488 | 2598 | 3170 |
| Load Loss at 75$^0$C | | (W) | 1560 | 1965 | 2600 | 3200 | 3700 | 4500 | 5800 | 6300 | 7600 | 8500 | 9600 | 11800 | 12600 | 14000 | 17700 | 21600 | 25300 |
| Imped. Vol at 15$^0$C | | (%) | 4 | 4 | 4 | 4 | 4 | 4.5 | 4.5 | 4.5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Regulation at PF=1.00 | | (%) | 1.75 | 1.41 | 1.30 | 1.10 | 1.08 | 1.04 | 0.987 | 0.941 | 0.987 | 0.90 | 1.03 | 1.00 | 0.98 | 0.95 | 0.93 | 0.90 | 0.83 |
| Regulation at PF=0.8 | | (%) | 3.54 | 3.36 | 3.29 | 3.17 | 3.16 | 3.41 | 3.37 | 3.34 | 4.23 | 4.27 | 4.33 | 4.31 | 4.30 | 4.28 | 4.26 | 4.24 | 4.23 |
| Efficiency at PF=1 | At Load 100% | (%) | 98.00 | 98.42 | 98.60 | 98.79 | 98.81 | 98.89 | 98.95 | 99.00 | 99.05 | 99.04 | 99.03 | 99.06 | 99.09 | 99.12 | 99.15 | 99.19 | 99.09 |
| | At Load 75% | (%) | 98.31 | 98.68 | 98.82 | 98.98 | 99.00 | 99.06 | 99.12 | 99.16 | 99.20 | 99.21 | 99.20 | 99.23 | 99.25 | 99.28 | 99.31 | 99.34 | 990.26 |
| | At Load 50% | (%) | 98.52 | 98.85 | 98.98 | 99.11 | 99.13 | 99.29 | 99.23 | 99.27 | 99.31 | 99.34 | 99.33 | 99.35 | 99.38 | 99.40 | 99.43 | 99.46 | 99.40 |
| | At Load 25% | (%) | 98.30 | 98.71 | 98.83 | 98.98 | 99.02 | 99.08 | 99.13 | 99.17 | 99.22 | 99.31 | 99.29 | 99.32 | 99.36 | 99.39 | 99.42 | 9946 | 99.41 |
| Efficiency at PF=0.8 | At Load 100% | (%) | 97.50 | 98.03 | 98.26 | 98.48 | 98.51 | 98.61 | 96.68 | 98.75 | 99.81 | 98.80 | 98.78 | 98.83 | 98.86 | 98.90 | 98.94 | 98.99 | 98.87 |
| | At Load 75% | (%) | 98.89 | 98.34 | 98.53 | 98.72 | 98.75 | 98.83 | 98.98 | 99.95 | 99.00 | 99.01 | 99.00 | 99.03 | 99.07 | 99.10 | 99.13 | 99.17 | 99.08 |
| | At Load 50% | (%) | 98.15 | 98.56 | 98.72 | 98.88 | 98.91 | 98.98 | 99.04 | 98.09 | 99.13 | 99.18 | 99.16 | 98.19 | 99.23 | 99.25 | 99.29 | 99.32 | 99.25 |
| | At Load 25% | (%) | 97.88 | 98.38 | 98.55 | 98.73 | 98.77 | 98.85 | 98.91 | 98.97 | 99.02 | 99.14 | 99.12 | 99.15 | 99.21 | 99.24 | 99.28 | 99.32 | 99.26 |

## Type PPBL-II

**11/0.415 kv, 3 Phase, 60Hz**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rated Power | | (KVA) | 50 | 100 | 150 | 200 | 250 | 315 | 400 | 500 | 630 | 750 | 800 | 1000 | 1250 | 1600 | 2000 | 2500 | 3000 |
| Model No. | | - | XII-50 | XII-00 | XII-150 | XII-200 | XII-250 | XII-315 | XII-400 | XII-500 | XII-630 | XII-750 | XII-800 | XII-1000 | XII-1250 | XII-1600 | XII-2000 | XII-2500 | XII-3000 |
| No Load Loss | | (W) | 180 | 130 | 510 | 540 | 630 | 720 | 900 | 1100 | 1260 | 1350 | 1400 | 1610 | 2070 | 2430 | 2700 | 2910 | 5100 |
| Load Loss at 75$^0$C | | (W) | 900 | 1500 | 2000 | 2400 | 2790 | 3300 | 4550 | 4545 | 5640 | 6400 | 7200 | 9000 | 11700 | 14000 | 18000 | 24000 | 27000 |
| Imped. Vol at 15$^0$C | | (%) | 4.35 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 4.75 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 | 6.00 |
| Regulation at PF=1.00 | | (%) | 1.94 | 1.68 | 1.50 | 1.39 | 1.29 | 1.23 | 1.16 | 1.10 | 1.06 | 0.94 | 1.14 | 1.15 | 1.16 | 1.16 | 1.16 | 1.16 | 0.93 |
| Regulation at PF=0.8 | | (%) | 4.15 | 3.90 | 3.88 | 3.79 | 3.75 | 3.71 | 3.67 | 3.63 | 3.60 | 4.30 | 4.41 | 4.44 | 4.42 | 4.43 | 4.43 | 4.43 | 4.43 |
| Efficiency at PF=1 | At Load 100% | (%) | 97.74 | 98.09 | 98.30 | 98.47 | 98.55 | 98.63 | 98.71 | 98.78 | 98.84 | 98.93 | 98.86 | 98.85 | 98.85 | 99.85 | 98.88 | 98.89 | 98.92 |
| | At Load 75% | (%) | 98.20 | 98.27 | 98.52 | 98.69 | 98.75 | 98.82 | 98.89 | 99.96 | 99.01 | 99.09 | 99.04 | 99.04 | 99.03 | 99.04 | 99.08 | 99.10 | 99.90 |
| | At Load 50% | (%) | 98.46 | 98.45 | 98.62 | 98.75 | 98.87 | 98.94 | 99.00 | 99.06 | 99.10 | 99.19 | 99.16 | 99.17 | 99.17 | 99.18 | 99.23 | 99.27 | 99.20 |
| | At Load 25% | (%) | 98.13 | 98.27 | 98.52 | 98.57 | 98.63 | 98.72 | 98.79 | 98.86 | 99.92 | 99.04 | 99.04 | 99.06 | 99.07 | 99.09 | 99.21 | 99.28 | 99.08 |
| Efficiency at PF=0.8 | At Load 100% | (%) | 97.19 | 97.61 | 97.89 | 98.09 | 98.19 | 98.28 | 98.38 | 98.48 | 98.54 | 98.67 | 98.57 | 99.56 | 98.56 | 98.56 | 98.60 | 98.62 | 98.66 |
| | At Load 75% | (%) | 97.76 | 97.97 | 98.15 | 98.36 | 98.44 | 98.53 | 98.61 | 99.69 | 98.76 | 98.97 | 98.80 | 98.80 | 98.79 | 98.80 | 98.85 | 98.88 | 98.87 |
| | At Load 50% | (%) | 98.10 | 98.18 | 98.12 | 98.52 | 98.59 | 98.67 | 99.75 | 98.82 | 98.88 | 98.99 | 98.95 | 98.96 | 98.96 | 98.97 | 99.04 | 99.09 | 99.00 |
| | At Load 25% | (%) | 97.72 | 97.83 | 97.82 | 98.21 | 98.29 | 98.40 | 98.48 | 98.52 | 98.65 | 99.80 | 99.80 | 99.86 | 98.84 | 98.86 | 99.01 | 99.10 | 98.86 |

POSITIVE POWER BANGLADESH

# 33KV IN REB

## LEGENDS

METERS
1.A-AMMETER
2.V-VOLTMETER
3.AS-AMMETER SELECTOR SWITCH
4.LA-LIUGHTINGING ARRESTOR
5.MFM-MULTI FUNCTION METER

SYMBOLS

CURRENT TRANSFORMER
CURRENT TRANSFORMER
DRAWOUT TYPE CKT. BKR(VCB)
LIGHTNING ARRESTOR
POWER TRANSFORMER
AMMETER
VOLTMETER
MCCB
ACB

AAAC O/H CONDUCTOR
CHECK METERING
CT CORE-2 100/5-5A 15VA CL5P15
CT CORE-1 100/5-5A 15VA CL 0.5

**33KV REB METERING UNIT**

33KV OUT DOOR AUTOMATIC CIRCUIT RECLOSER (ACR), INTRA
33KV, AIR BREAK SWITCH (ABS),
33 KV LIGHTNING ARRESTOR,
33KV GANG ISOLATOR INTERLOCKED WITH EARTH SWITCH,

**33KV REB PROTECTION UNIT**

33 KV OUTDOOR VCB 1250A, 25KV,
33000V/√3:110V/√3:110V/3 100VA,CL 0.5, CT:
4MVA, OIL IMMERSED TRANSFORMER (33/11 KV), Dyn11 ONAN, WITH OLTC-16 STEPS, 17 POSITION

**33KV OUTDOOR SUBSTATION EQUIPMENT**

CORE-1 250/5-5A CL 0.5 CT
CORE-2 250/5-5A CL 5P15 CT
11 KV INDOOR VCB, 1250A, 20 KA,

**11KV INCOMING FEEDER**

DG 1 DG 2 DG 3 DG 4
ACB ACB ACB ACB
415KV BUS
GENERATOR SYNCHRONIZATION COMMON BUS (415VOLTS)
ACB 4000A
ACB 2500A

11KV BUS

11 KV INDOOR VCB 630A, 20 KA,
CORE-1 150/5A CT CL 0.5
CORE-2 150/5A CT CL 10
2500KVA OIL IMMERSED TRANSFORMER (11/0.415 KV) Dyn11, ONAN

11 KV INDOOR VCB 630A, 20 KA,
CORE-1 100/5A CT CL 0.5
CORE-2 100/5A CT CL 10
1500KVA OIL IMMERSED TRANSFORMER (11/0.415 KV) Dyn11, ONAN

Electrical Interlock
4000A TPN ACB,80kA
4000A TPN ACB, 80 kA
Bus Coupler
3200A TPN ACB,80kA
2500A TPN, ACB, 65 kA
4650A Copper Bus TPN: (2x125x12)mm2+E (125x12)mm2, 415V
3100A Copper Bus TPN: (2x100x10)mm2+E (100x10)mm2, 415V

2500A TP ACB, 65 kA
2000A TPN ACB, 65 kA
1600A TP ACB,50kA
630A TP MCCB
63A TP MCCB
400A TP MCCB
100A TP MCCB
BBT
DB-CHILLER
DB - COMPRESSOR
DB - OUT DOOR
BOILER
SPARE
1500 KVAR PFI
LT SWITCHGEAR-1

1600A TP ACB 50 kA
1600A TPN ACB, 50kA
63A TP MCCB
400A TP MCCB
250A TP MCCB
400A TP MCCB
250A TP MCCB
160A TP MCCB
100A TP MCCB
BBT
DB - UTILITY
DB-FIRE PUMP
DB-WATER PUMP
DB-ETP
SPARE
SPARE
SPARE
900 KVAR PFI
LT SWITCHGEAR-2

# SWITCHGEAR

**PPBL** improving and updating the engineering know-how in switchgear technology. The switchgear division of the company is itself a complete unit with knowledge, experience, skills as well as machineries, machining facilities and test equipment.

## General Standards Applicable to PPBL Products

| | | |
|---|---|---|
| * Degree of Protection | : | DIN 40050/1EC-Pub1.529 /1P40 |
| * Dimension | : | DIN 41 s488 Sheet 2 |
| * Routine Test of Breakers | : | IEC 60056 |
| * Routine Test of Panel along with the Breakers | : | IEC 60298 |
| * Indoor / Outdoor Compartment | : | IEC 60298 |
| * Clearance of Air and skate module Distance | : | DIN VDE 0660, part 500 (TTA)/IEC- Pubi.439-1, DIN VDE 0160, part 100. |
| * Dry Power of Capacitor (Insulating Gas filled) | : | IEC 70 |

## Product Specialty

* Panel is equipped by world class brand equipment
* High reliability and performance
* Suitable and Compact Design
* Easy and smart Operation
* Easy Cable wiring system
* Good out looking, Safe and Dust Proof Casing.
* Standard Clearance (Which is very important for non TTA Panel)
* Air Ventilation
* Extra Cooling system (Exit Fan)
* Standard Internal Structure
* Panel is painted by powder coating Painting

All the panels of HT switch gear, LT switch gear, PFI plant and Distribution board are powder coated by high quality imported paints from BERGER.

## RETROFIT!

To ensure safety of your existing factory (Steel Mills, Cement Factory etc.) We can modernize your old switchgear panels by making all necessary modifications and inserting the brand new units of VCB, ACB or any other components.





# HT (High Tension) SWITCHGEAR

Today's industry requires economical, efficient and reliable power distribution with the guarantee of maximum personnel safety. Our complete range of medium voltage switchgears have designed and constructed to cover exactly these requirements. Vacuum type factory assembled metal clad and metal enclosed switchgear has totally sheet steel encapsulated design with protection degree of IP4X according to IEC/BS standards. Our PID104, PID106 and PID106 type metal enclosed switchgears in which components arranged in separate components with METAL partitions intended to be earthed according to IEC 298 standard.

High tension switchgear comprise the units designed for rated voltage of 12kv, 33kv current range 400A to 1250 A. 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.

The VCB, LBS, SF6 circuit breaker and the switchboards are of optimized design for Bangladeshi supply condition and ambient. This design ensures ease of operation, low cost maintenance and higher longevity.

The cubical design of 12kv, 25kv, and 1250A is also compatible with our SF6 and Minimum Oil Circuit Breakers (MOCB). 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.

ADVANTAGE OF 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.

## Standard and regulation

DIN VDE 0660. Part 500 (TTA) and IEC-Pubi, 439-1 DIN VDE 0160, Part 100 CLEARANCES IN AIR AND CREEPAGE DISTANCES (DIN VDE 0110 Jan 89 Clearances in air) Rated impulse voltage 4kv Over voltage category III Case A (Non uniform field) Rated voltage 1000V Contamination class 3

| SPECIFICATION OF H.T. SWITCHGEAR | VCB | LBS | VCB | SF6 | SF6 |
|---|---|---|---|---|---|
| | 10 | FPE 20 | FPE21 | FPE30 | FPE31 |
| Rated voltage | 12kV | 12kV | 33kV | 12kV | 33kV |
| Rated voltage | 630A-1250A | 630A | 630A-1250A | 630A | 1250A |
| Short Time Current rating for 3 sec. | 20 kA | 20 kA | 20 kA | 20 kA | 20 kA |
| Basic impulse level | 75 kA | 75 kA | 75 kA | 75 kA | 75 kA |
| Making Current | 50 kA | 50 kA | 50 kA | 50 kA | 50 kA |

## FIXED TYPE

VCB/ LBS/ SF6 breaker is suitable for use in cubicle switchgear units. Such breaker is fixed to a switchgear or floor by bolting its base with it. If 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 - by bolts
Control connection - by screws
Earth connection - by screws

## DRAW-OUT TYPE

VCB/SF6 breaker is mounted on a cradle. The complete unit may be provided with a shutter of front cover. 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.
* 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.
* Our HT Switchgear can be equipped with Vacuum Circuit Breaker (VCB), SF6 circuit breaker and Load Break Switch (LBS) to meet individual requirements which comply IEV, BS, VDE, ANSI standards.

## Load Break Switch Compartment

This compartment normally contains Load, break switch, cast resin wound type voltage & current transformers, cable connection terminals, cable glands on the cable access cover from the bottom, The load break Switch can be operated from the front of the switchgear by an operating handle. Also the earthing switch, which is interlocked with Load break Switch, can be operated from the front of the switchgear by on operating handle.



# LT (Low Tension) SWITCHGEAR

LV SWITCHGEAR (Distribution & Power Factor Correction Unit)
The low voltage switchgear of **PPBL** offer high safety standards and are easily operated and maintained in accordance with BS5486 standard. **PPBL** products can offer you fully compartentalised LV Switchgears designed to meet today's stringent market needs.

## Construction

LT Switchgears are sheet steel (12-16 SWG) cladded with modular system for assembly of cubicles intended to take heavy equipment, dust and vermin proof, free standing, floor mounting indoor type, with TPN &E copper busbar.

## Distinctive Features

**PPBL** made LT switchgears are with busbar arrangement into part of cubcles, strict separation of Switch board, cable termination and busbar compartment, free standing of against a wall installation, single or double fronted arrangements and all-round steel enclosure. AXON prefers to use Marlin Gerin, ABB branded Circuit break in panels, but if it is prescribed other brands by customer and it does not over rule the standards we manufacture as per customer's requirement.

## TECHNICAL DATA

| | |
|---|---|
| Rated voltage (V) | up to 660v, 50 hz |
| Rated current (A) | up to 7200 A |
| | |
| Rated currents of components | |
| Circuit breakers | up to 6300 A |
| DOL contactor starters | up to 400A |
| Contactor type reversers | up to 400 A |
| Contactor type star-delta starters | up to 700 A |

## DIMENSIONS

(Dimensions to DIN 41S488 SHEET 2)

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



# POWER FACTOR IMPROVEMENT (PFI) PLANTS

The control module of PFI Plant contains a microprocessor based solid state relay, which continuously measures the reactive power in the incoming feeder. In the event of the actual value differing from the preset value, the relay activates contactors to switch capacitors in and out in steps as required. the capacitor rating is chosen so that, on average, the required power factor is attained.

* MODULAR DESING * COMPACT ARRANGEMENT * LOW LOSSES CAPACITORS * HIGH RELIABILITY
* FACTORY WIRED * EXTENDIBLES

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 uneconomical. It improves undue burden on generators and transmission/distribution system, causes additional losses, increases, voltage drop and the overall power requirement of the plant.

Economic and technical reasons thus make it expedient to relieve the generators, transmission/ distribution system and cables of reactive power. The automatically controlled capacitors i.e. our power factor improvement (PFI) plant is well suited for this purpose.

**STANDARD & REGULATION**

Power factor correction principles : Our 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 control valve protection. The capacitor module consist of :

* Harmonic load tolerance
* Air break contactors to switch capacitors
* High over load capacity (15x rated current)
* High temperature class
* High reliability
* Metallized plastic foil
* Long life (approx 100,000 hrs.)
* Touch proof terminals

**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 v 3 U.I

The active power is calculated as follows; P=U.I. cosø or U.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 converted, 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.

## Wiring Diagram & single line Diagram

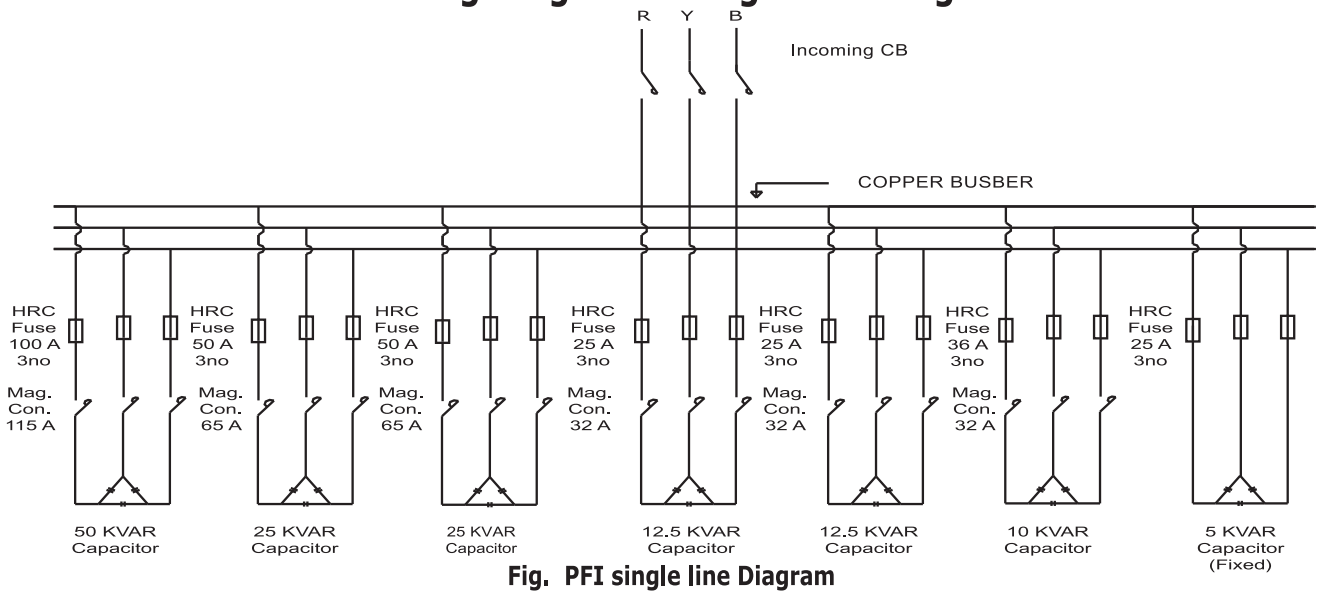



**Fig. PFI single line Diagram**

# Flange Mounted ONLOAD Tapchanger

* Acquired technical expertise over years and developed in-house few models from 11 kV to 66 kV class and 132 kV neutral end application.
* For changing the transforming ratio of oil Immersed power transformers without load interruption.
* For regulating output voltage of power, furnace, rectifier and distribution Transformers.
* Type tested as per IEC : 60214
* Suitable for bidirectional power flow
* Compatible with SCADA and all modern data communication equipment and systems
* Approved by transformer manufacturers, power utilities, industrial customers and railways





| Parameter | CM08 | CM16 | CL08 | CK16 |
|---|---|---|---|---|
| Type | Oil Type | Oil Type | Oil Type | DryType |
| Tappings | Linear | Linear | Linear | Coarse fine/Reversing |
| Maximum Number of steps | 08 | 16 | 08 | 16 |
| Maximum Voltage per Step | 300 V | 300 V | 600 V | 220 V |
| Maximum rated through current | 200 A | 200 A | 300 A | 100 A |
| Short Circuit withstand current | 3.5 kA for 3 sec | 3.5 kA for 3 sec | 4 kA for 3 sec | 2 kA for 2 sec |
| Time per tapchanger | 4-6 sec | 4-6 sec | 4-6 sec | 4-6 sec |

## Test Voltage: Power Frequency 1 Minute / Lightning Impulse 1.2/50 sec

| | | | | |
|---|---|---|---|---|
| Between hases | 28 kV/75 kVp | 28 kV/75 kVp | 28 kV/75 kVp | 28 kV/75 kVp |
| T Earth | 28 kV/75 kVp | 28 kV/75 kVp | 28 kV/75 kVp | 28 kV/75 kVp |
| Between adjacent contacts | 10 kV/40 kVp | 10 kV/40 kVp | 16.5 kV/40 kVp | 10 kV/25 kVp |
| Between first & last contact | 15 kV/60 kVp | 15 kV/60 kVp | 20 kV/60 kVp | 10 kV/30 kVp |
| Over changeover selector contact | .... | .... | .... | 10 kV/30 kVp |
| Tapchanger net weight | 370 kg | 370 kg | 392 kg | 470 kg |
| Mechanical operations | 5,00,000 | 5,00,000 | 5,00,000 | 5,00,000 |
| Flange Dimensions | 700x700 mm | 700x700 mm | 838x827 mm | 1050 x 1285 mm |

POSITIVE POWER BANGLADESH

# BBT (Busbar Trunking Systems)

Busbar Trunking System is very low compare to conventional cabling system for distribution up to load due to shorter and easier installation, reduced costs, time, space and maintenance management. We dopted most advance European technology for Busbar trunking systems. All the deign and drawing from European consultant. The busbar is designed for sandwich construction which is efficient in perfomance, cost effective, compact, safe and enviromnent friendly.

**Compactness:** Sandwich construction render to the BET system more compact than air insulated bus bar system, thus making them a preferred choice in plant room and building applications.

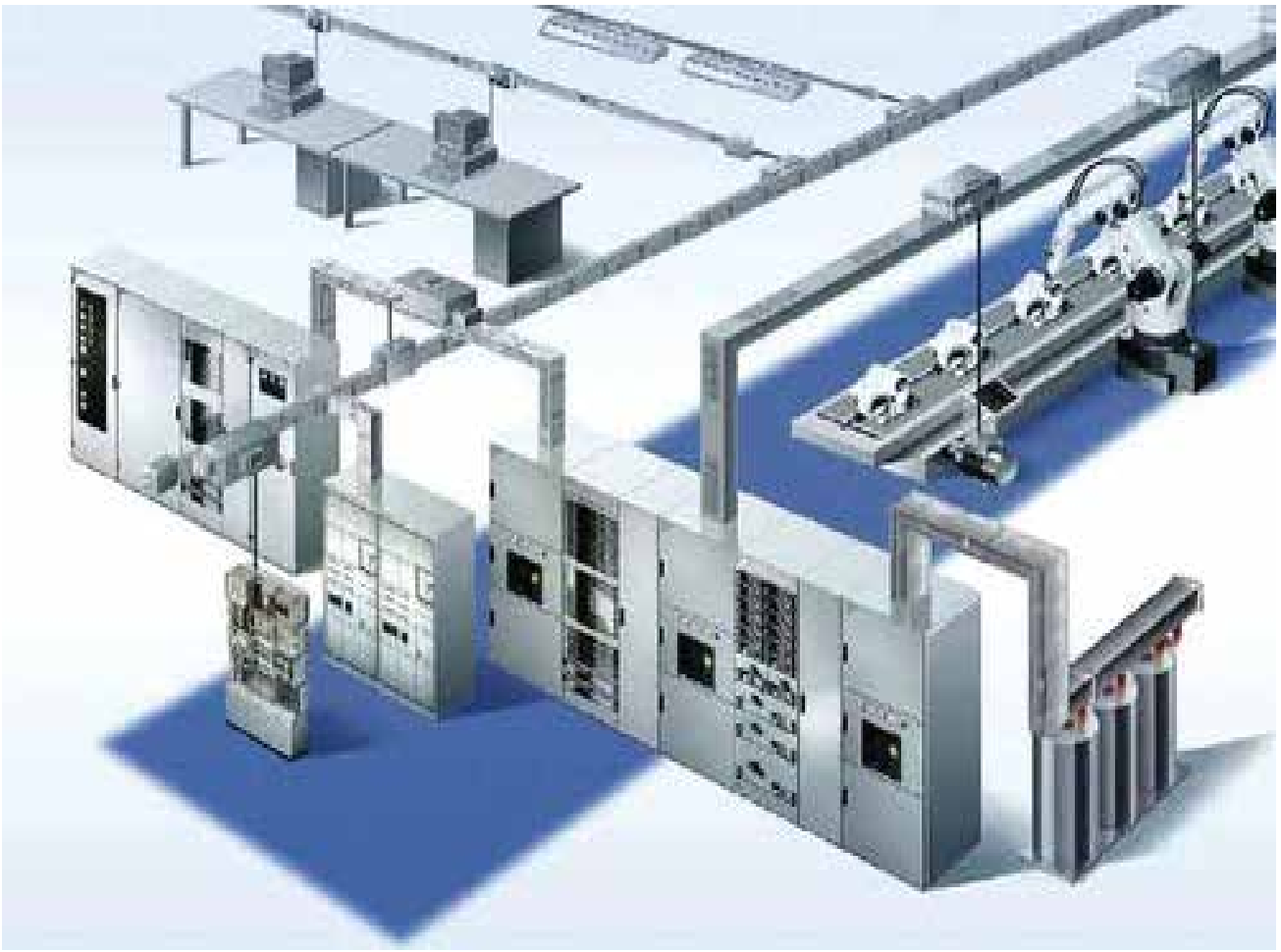
**Energy Efficiency:** Compactness of sandwich construction results in higher efficiency due to lower voltage drop and impedance. This ensures all connected equipment run cooler.

**Flexible:** Additions of floor to a building or any expansion to an existing system is extremely simple with sandwich BBT. They are scalable & elegant.

**Safe & Sure:** Higher mechanical strength over long runs, better electrical conductivity and lower MV drop which ensures high reliability. Ability to withstand high short circuit currents make them doubly safe.

**Fire Retardant:** Sandwich construction do not have air gap due to which natural progression of fire is inhibited. Epoxy insulation, being name retardant provides better resistance to spread of fire

**Economical:** Inherently flexible design ensures easy Installation and maintenance thus resulting in lower installation and maintenance costs.



POSITIVE POWER BANGLADESH

# The benefit of Busbar over Cabling System

When comparing the total estimated cost of the power supply system with cabling and trunking using the same user, the cost of installation and materials system not only exceeds the cost of cabling, but in some cases much lower, and taking the time factor into account, busbars are simply irreplaceable. Below are some of the benefits.

Mounting willingness busbar systems is significantly higher than that of cable. This provides a much lower cost of installation and use less time while working on the tire mounting.

* Busbar trunkings are functional and flexible, busbar systems quickly accomodate changes in machinary lines or any kind of extansion.

* No additional ducting or piping is necessary.

* If additional extension is required in the existing Busbar Trunking system, then it can be done reusing the existing one. But for the case of Conventional cable, existing cable cannot be reused,

* Unlike conventional cabling system, jointing can be done in Busbar Trunking system.

* Individual floor metering system can be easily encorporated.

* Busbar installations can be changed or can be mounted to another establishment.

* Minimises maintenance.

* Voltage drop can be measured exactly as inductive reactance and electrical values are designed and calculated values.

* Operating costs are minimum.

* Establishments can be operational in 50 % shorter time to other systems, for its easy mounting and installation.

* Busbar projects are easy to prepare. Even with estimated layouts, it can be projected and approximate material list can be prepared.

* It gives a modern and esthetic appearance where its used.

* System does not cover a large area and helps space management. Considering its ampere range dimensions are small.

* Manages man power and mounting costs.

* Reduces amounts and dimensions of panel boards.

* Specially for compact types heat transfer is perfect

* Short circuit withstands are high.

* Energy can be collected from plug»in points without turning off the power. As a result, incase of extension or changes other systems connected to busbar will not be affected.

* Busbars can be apllied to any kind of building by its modular structure.

* It covers much less space than cable systems according to its high ampere rate.

* Busbar trunkings doesn‘t carry flames incase of fire as a result of compact structure.

* Cables enables fire to split out. It has no chimney effect because of its compact structure for that fire barrier in not needed.

* Busbar trunkings have the advantage of expand, change, replacement and reusing, According to needs it can be changed or moved to another establishment.

* Comparing to cable systems mounting and man power costs are very low. Short mounting time helps time management.

POSITIVE POWER BANGLADESH

# DIESEL GENERATOR

## LOWEST LIFE CYCLE COST

Perkins has positioned their Diesel Engine in a standard for comparison of operating, economy, reliability and long life. When all cost factors like initial purchase, fuel lube oil, maintenance and overhaul are considered, the bottom line will show that this Perkins series will deliver the lowest life cycle cost.

## HEAVY DUTY, DURABLE AND EMISSION COMPLIANT

Perkins Diesel engine comes with heavy duty features, optimum sized camshaft, optimized turbo-matching premium injectors and is yet compact in size with optimum power to weight ratio making it the obvious choice for your long-term power needs. The Genset powered by the reliable Perkins Diesel engine meets stringent exhaust emission tests as per CPCB norms without sacrificing fuel efficiency at normal operating loads.

## SILENT POWER

Power 600kVA upto 2250kVA enclosures are so designed as to have optimum performance and service ability over the complete operating range. The enclosures are compact are designed for ease in maintenance. The power coated enclosures are manufactured on latest CNC machines to ensure superior finish and durability.



Perkins | mecc alte | Cummins | LEROY SOMER | JOHN DEERE | STAMFORD | RICARDO



LOWEST OPERATING COST
All elements of the Gensets designed from the start to work together to maximize efficiency, even at part loads, thus offering you the advantage of lowest operating costs.

SINGLE SOURCE POWER ASSURANCE
The reliable Perkins Gensets are manufactured under the design and dedicated team supervision of Perkins for that optimum performance integrity and is backed by country wide product support network with single source responsibility for the entire package.

LOWEST LIFE CYCLE COST
Perkins has positioned their Diesel Engine in a standard for comparison of operating, economy, reliability and long life. When all cost factors like initial purchase, fuel lube oil, maintenance and overhaul are considered, the bottom line will show that this Perkins series will deliver the lowest life cycle cost.

HEAVY DUTY, DURABLE AND EMISSION COMPLIANT
Perkins Diesel engine comes with heavy duty features, optimum sized camshaft, optimized turbo-matching premium injectors and is yet compact in size with optimum power to weight ratio making it the obvious choice for your long-term power needs. The Genset powered by the reliable Perkins Diesel engine meets stringent exhaust emission tests as per CPCB norms without sacrificing fuel efficiency at normal operating loads.

SILENT POWER
Power 600kVA upto 2250kVA enclosures are so designed as to have optimum performance and service ability over the complete operating range. The enclosures are compact are designed for ease in maintenance. The power coated enclosures are manufactured on latest CNC machines to ensure superior finish and durability.

LOWEST OPERATING COST
All elements of the Gensets designed from the start to work together to maximize efficiency, even at part loads, thus offering you the advantage of lowest operating costs.

SINGLE SOURCE POWER ASSURANCE
The reliable Perkins Gensets are manufactured under the design and dedicated team supervision of Perkins for that optimum performance integrity and is backed by country wide product support network with single source responsibility for the entire package.

STANDARD SCOPE ENGINE:
• Perkins, direct injection, water cooled engine, multi cylinder in line N type, 4 stroke, rated at 1500 RPM, conforming to ISO 3046 1 BS 5514 has the following specification.
• PT Fuel Pump • Turbocharger • Dual spin-on filter
• Lube oil filter • Silencer • Radiator I Heat exchanger
• Coolant inhibitor • Lube oil cooler • Cartridge paper filters, fuel and lube oil
• Flywheel and flywheel housing • Electric starter motor • Battery charging alternator
• Fist fill lube oil • Dry type replaceable paper element air cleaner with restriction indicator

GENSETS CONTROLLER
• Microprocessor based Genset controller for metering, monitoring, protecting and electronic governing of the engine.

ALTERNATOR
• Leroy Sower I Stamford brush less alternator • Self -excited, Self regulated
• Class H insulation • Silent pole revolving field
• Single bearing • Automatic voltage regulator

POSITIVE POWER BANGLADESH

# Diesel Generators (50 Hz 1500 rpm)

## KVA Rating: 30 KVA - 1250 KVA

| Model | Prime Power | | Stamford Alternator | Engine Model | Fuel Ltrs/hr | Fuel Tank Capacity (Ltrs) | Net Weight | Sound Proofed Dimension L x W x H (cm) | Net Weight |
|---|---|---|---|---|---|---|---|---|---|
| | kVA | kW | Frame Size | | | | | | |
| PS30 | 30 | 24 | P1144G | Perkins 1103A-33G | 7.1 | 172 | 800kgs | 181cm x 76cm x 135cm | 1100kgs |
| PS40 | 40 | 32 | P1144J | Perkins 1103A-33TG1 | 10.1 | 172 | 960kgs | 231cm x 78cm x 141cm | 1350kgs |
| PS42.5 | 42.5 | 34 | P1144K | Perkins 1103A-33TG1 | 10.1 | 172 | 960kgs | 231cm x 78cm x 141cm | 1350kgs |
| PS45 | 45 | 36.0 | UCD224D | Perkins 1103A-33TG1 | 10.7 | 172 | 950kgs | 231cm x 78cm x 141cm | 1350kgs |
| PS60 | 60 | 48 | UCD224E | Perkins 1103A-33TG2 | 14.0 | 172 | 960kgs | 231cm x 78cm x 141cm | 1350kgs |
| PS65 | 65 | 52 | UCD224F | Perkins 1104A-44TG1 | 14.8 | 260 | 960kgs | 277cm x 86cm x 156cm | 1500kgs |
| PS80 | 80 | 64 | UCD224G | Perkins 1104C-44TAG1 | 19.5 | 260 | 1080kgs | 277cm x 86cm x 155cm | 1545kgs |
| PS85 | 85 | 68 | UCD224G | Perkins 1006C-TG1A | 21.8 | 260 | 1250kgs | 290cm x 95cm x 190cm | 1300 kgs |
| PS93 | 93 | 74.4 | UC1274C | Perkins 1006TG1A | 21.8 | 260 | 1250kgs | 290cm x 95cm x 190cm | 1800 kgs |
| PS100 | 100 | 80 | UC1274C | Perkins 1104C-44TAG2 | 24 | 260 | 1130kgs | 277cm x 86cm x 156cm | 1595 kgs |
| PS103 | 103 | 82.4 | UC1274D | Perkins 1006TG2A | 24.3 | 260 | 1250kgs | 290cm x 95cm x 190cm | 1740kgs |
| PS138 | 138 | 110 | UCI274E | Perkins 1006TAG | 31.5 | 397 | 1310kgs | 290cm x 95cm x 190cm | 1830kgs |
| PS150 | 150 | 120 | UC124F | Perkins 1006TAG2 | 41 | 397 | 1350kgs | 290cm x 95cm x 190cm | 1870kgs |
| PS180 | 180 | 144 | UCI274G | Perkins 11O6C-E66TAG4 | 41.5 | 397 | 1590 KGS | 345cm x 115cm x 187cm | 2150kgs |
| PS200 | 200 | 160 | UCI274H | Perkins 13O6C-E87TAG3 | 43.5 | 397 | 1830 KGS | 345cm x 115cm x 187cm | 2390kgs |
| PS225 | 225 | 100 | UCI274J | Perkins 13O6C-E87TAG4 | 47.5 | 397 | 1920 KGS | 345cm x 115cm x 187cm | 2480kgs |
| PS250 | 250 | 200 | UCD274K | Perkins 13O6C-E87TAG6 | 45.0 | 533 | 1920 KGS | 345cm x 115cm x 187cm | 2480kgs |
| PS300 | 300 | 240 | HC444D | Perkins 2206A-E13TAG2 | 61 | 1048 | 3580 KGS | 268cm x 165cm x 240cm | 4900kgs |
| PS350 | 350 | 280 | HC444E | Perkins 2206A-E13TAG2 | 71 | 1048 | 3580 KGS | 528cm x 165cm x 240cm | 4900kgs |
| PS400st | 400 | 320 | HC444F | Perkins 2206A-E13TAG2 | 80 | 1048 | 3580 KGS | 528cm x 165cm x 240cm | 4900kgs |
| PS400 | 400 | 320 | HC444F | Perkins 2206A-E13TAG3 | 81 | 1048 | 3700 KGS | 528cm x 165cm x 240cm | 4900kgs |
| PS450 | 450 | 360 | HC544C | Perkins 2256C-E15TAG1 | 99 | 1133 | 3900 KGS | 438cm x 125cm x 227cm | 4900kgs |
| PS500 | 500 | 400 | HC544C/D | Perkins 2506C-E15TAG2 | 106 | 1133 | 3580 KGS | 528cm x 165cm x 240cm | 4900kgs |
| PS600 | 600 | 480 | HC544E | Perkins 2806A-E18TAG1A | 123 | 1570 | 4700 KGS | 438cm x 165cm x 229cm | 5800kgs |
| PS650 | 650 | 520 | HC544F | Perkins 2806A-E18TAG2 | 125 | 1570 | 4700 KGS | 438cm x 165cm x 229cm | 5800kgs |
| PS745 | 745 | 596 | HC1634G | Perkins 4006C-23TAG2A | 149 | 1770 | 6350 KGS | 810cm x 210cm x 300cm | 8200kgs |
| PS800 | 800 | 640 | HC1634G | Perkins 4006C-23TAG3A | 164 | 1770 | 6350 KGS | 810cm x 210cm x 300cm | 8200kgs |
| PS900st | 900 | 720 | HC1634H | Perkins 4006C-23TAG2A | 149 | 1770 | 6350 KGS | 810cm x 210cm x 300cm | 8200kgs |
| PS910 | 910 | 728 | HC1634H | Perkins 4008TAG1A | 205 | OPTIONAL | 7500 KGS | '' | '' |
| PS1000 | 1000 | 800 | HC1634J | Perkins 4008TAG2A | 232 | OPTIONAL | 7500 KGS | '' | '' |
| PS1025 | 1025 | 820 | HC1634K | Perkins 4008TAG2A | 232 | OPTIONAL | 7500 KGS | '' | '' |
| PS1250 | 1250 | 1000 | P1734A/D | Perkins 4012-46TWG2A | 267 | OPTIONAL | 8900 KGS | '' | '' |

# 30 KVA to 206 KVA Generator Sets

## Diesel Generator by RICARDO Engine & Alternator with Mebay/Smartgen controller, 50 Hz

**3 Phase 380/220V - 415/240V**

| | Standby Rating | Standby Rating | Prime Rating | Prime Rating | Engine Specifications | | | Set Version (Open) | Weight |
|---|---|---|---|---|---|---|---|---|---|
| Genset Model | KVA | KW | KVA | KW | Engine Model | Fuel Cons 100% Load (L/H) | Alternator Stamford Model | Dimension L x w x H (mm) | KG |
| EP-WR33 | 33 | 26 | 30 | 24 | ZH4100D | 6 | EP-1844G | 2150X850X1130 | 703 |
| EP-WR44 | 44 | 35.2 | 40 | 32 | ZH4100ZD | 7.3 | EP-184J | 2250X850X1200 | 738 |
| EP-WR55 | 55 | 44 | 50 | 40 | ZH4105ZD | 9.5 | EP-224D | 2350X950X1300 | 765 |
| EP-WR69 | 69 | 55.2 | 62.5 | 50 | ZH4105ZLD | 13 | EP-224E | 2250X930X1200 | 1030 |
| EP-WR88 | 88 | 70.4 | 80 | 64 | 6105ZD | 17 | EP-224G | 2800X1100X1550 | 1400 |
| EP-WR110 | 110 | 88 | 100 | 80 | 6105AZD | 19 | EP-274C | 2800X1100X1550 | 1495 |
| EP-WR137-5 | 137.5 | 110 | 125 | 100 | 6105AZLD | 25 | EP-274D | 2250X1000X1450 (OP) | 1095 |
| EP-WR165 | 165 | 132 | 150 | 120 | 61051ZLD | 30 | EP-274FS | 2400X1000X1450 (OP) | 1210 |
| EP-WR206 | 206 | 164.8 | 187.5 | 150 | YXR6108ZLD | 33 | EP-274H | 2450X950X1450 (OP) | 1320 |









# PPBL SOLAR :: SMART ENERGY SOLUTIONS

**PPBL SOLAR ENERGY** stands as one of the pioneer for providing innovative renewable energy focused energy efficient products related to Solar PV based home systems that are best suited to the end users of remote areas and intelligent energy solution for any kinds of renewable energy projects.

**PPBL SOLAR** offers, are equipped with world class features and backed by countrywide excellent after sales service. Most of the products received quality certifications like ISO, CE, UL, TUV & recognitions by both international and local bodies.

**GO GREEN** (depending on Renewable Energy Sources) plus the advantage of being one of the best countries all over the world in Sun light intensity all over the year, Bangladesh Government started to really encourage and direct investments in this sector which an effective solution to the shortage in power sources in Bnagladesh.

**WE BELIEVE** relationship that is the key to any successful. It is important to PPBL Solar that our clients and team members have a strong foundation of trust in each other. We also believe this is the cornerstone of good business. We are committed to honesty and high morals in all dealings, both internally and externally.

**PPBL SOLAR PROVIDE** unique Solutions and Techniques to ensure the successful delivery of renewable and sustainable energy projects promptly. Deliver a value for our clients with creative, experienced and highly skilled Engineering team in the design, installation, operation and maintenance of high quality sustainable Energy Solution. Produce Solar Photovoltaic power plant in various application such as residential, industrial, Commercial and agriculture.

**HOW SOLAR ENERGY SYSTEM WORKS?**

- Solar panels turn sunlight into DC energy.
- Inverter converts the DC energy to AC electricity.
- Service Panel distributes power where needed.
- Utility meters track energy produced and energy used.
- Grid connection ensures access to continous power at light.

**ON GRID SYSTEM**

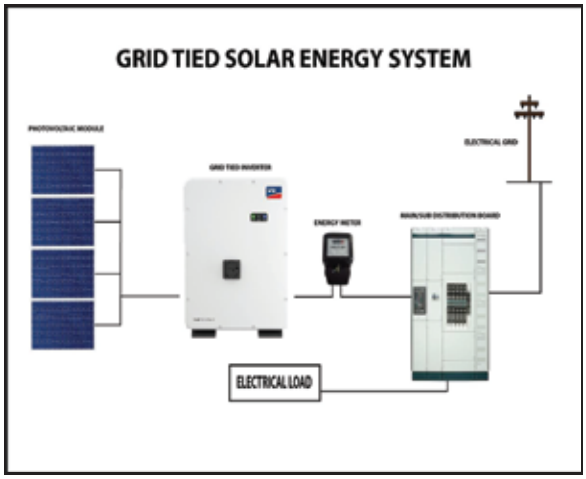
You don't have to worry about storing any energy; the grid will usuall be there to make sure all the loads can run when the user wants them.

ON-GRID APPLICATIONS:
- Solar Home system
- Feed in Tariff (FIT)

Solar panels convert sunlight into DC power (12v to 24v)

The inventer converts DC power into 240 volt AC power for household use.

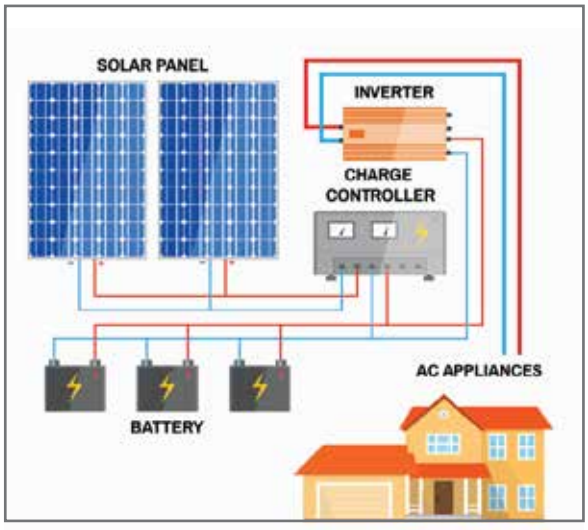
Any surplus electricity simply flows back into the mains grid for use elsewhere.




**OFF GRID SYSTEM**

Off-grid can be stand-alone power system or mini-grids typically to provide a smaller community with electricity. Off-grid solar power also stores DC electricity in batteries.

**OFF-GRID APPLICATIONS:**
- Solar Home system.
- Solar pumping system.
- Solar battery charging system.
- Solar power traffic lighting system
- Solar Street Light Solution
- Solar PV Module
- Solar Mobile Charger
- DC LED Color TV Solar Home System
- DC Fan
- DC LED Light





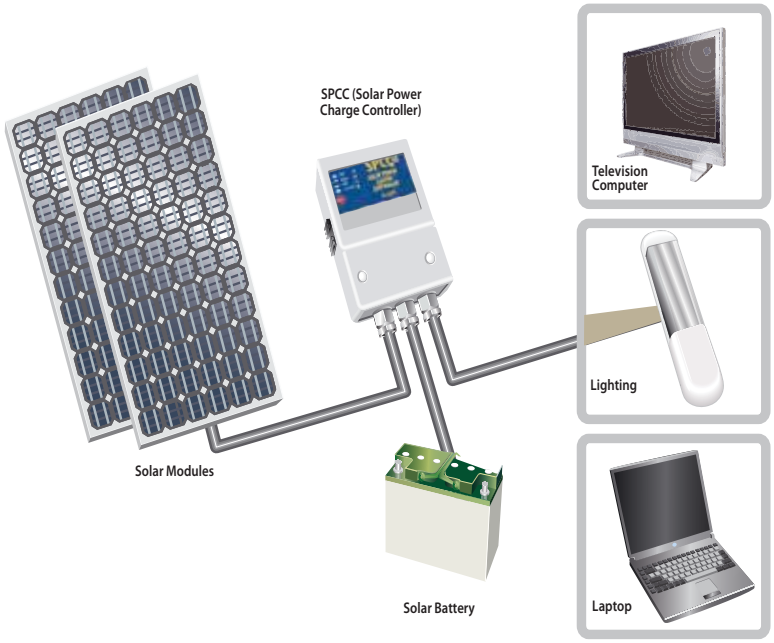
# SOLAR SYSTEMS IN SHORT

THE SOLAR MODULE is a number of solar cells connected together and encapsulated to give an electrical output.
For larger systems, the modules can be connected in series and parallel to form a solar array.

THE CHARGE CONTROLLER is at the heart of every solar power system, and is required to monitor and control the power going into and coming out of the battery. It must also manage the power generated by the solar panel to ensure it does not overcharge the battery. The charge controller must also ensure that the connected loads don't over-discharge the battery, thereby damaging it.

THE SOLAR BATTERY stores the electricity from the solar module via the charge controller. This electricity can then be used at night or in periods of bad weather. Gel, AGM and wet types are available.

THE LOAD covers any equipment which requires power to operate. Examples include lights, televisions, water pumps and radio transmitters.




## GENERAL INFORMATION ON SOLAR CELL TECHNOLOGY

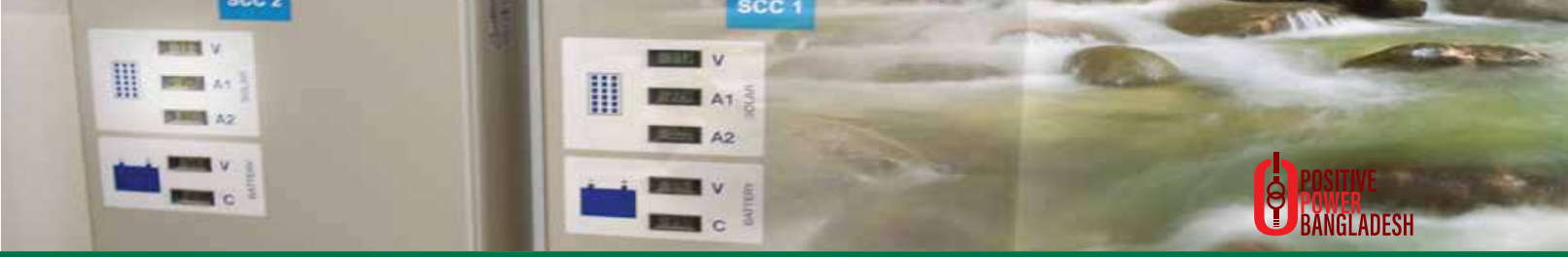
Solar cells directly convert sunlight into electricity by means of the photovoltaic effect. This occurs when photons are absorbed by a solar cell which generates a voltage across its terminals. Cells are connected in series within a solar module to provide sufficient voltage to operate a system. Modules can be connected in series and parallel to increase the system power. This solid state process provides a clean, silent, non polluting and reliable source of electrical energy.


Monocrystalline Multicrystalline

**PPBL** supplies two photovoltaic (PV) technologies:
- Multicrystalline (also called polycrystalline) Made from cells cut from several silicon crystals
- Monocrystalline Made from cells cut from single silicon crystals

A crystal is a regular geometric state taken up by a material's constituent elements in certain conditions. Mono and multicrystalline cells are silicon wafers sliced from cylindrical silicon crystals. These wafers are then chemically treated in furnaces to enhance their electrical properties, after which an anti-reflection coating is applied to the cell surface to help it absorb radiation more effectively. Thin metal wires are soldered to the front of the cell. These "ribbons" of metal on the cell act as the positive contact, while a solid layer of metal on the back of the cell acts as the negative contact.Monocrystalline and multicrystalline materials are chemically stable, making them durable and extremely long-lasting, if properly protected. They provide the ideal technology for making small, and medium to large solar modules. Monocrystalline cells have a single colour tone, whereas multicrystalline cell surfaces have multi patterns. Multicrystalline cells have an efficiency of 9-13%, compared to 11-16% for monocrystalline cells. (i.e. if solar radiation is striking the cells at a perpendicular angle with an intensity of 1000W/M², then 90 to 130 Watts of power per m² of solar cell is converted to electricity).

**PPBL** multicrystalline and monocrystalline solar modules high efficiency solar modules are constructed from 36 or 72 crystalline cells connected in series to raise the system voltage to 12V or 24V. The cells are individually tested and matched for optimum performance before being built into a protective module structure. A Tedlar base is used with ethylene vinyl acetate as an encapsulant. High transmission tempered glass protects the cells from the front with a high strength polymer sheet at the rear. A reinforced aluminium frame completes the laminate structure which is fully sealed against moisture and protected from environmental and mechanical damage.




## SOLAR INVERTERS

The title for best grid-tie solar inverter has never been closer as many of the top manufacturers release advanced new models with clever online monitoring and smart home energy management features. The hype around home battery systems or hybrid systems is also growing, but it is early days for batteries, and the majority of solar installations still require a dedicated solar inverter.

### Solar Inverter Function & Problems

The solar inverter is the most sophisticated part of any grid-tie solar system, and unfortunately, it's also the part most likely to have issues. This is not surprising considering inverters are usually located outside in harsh weather conditions, including rain, humidity and extreme heat, all while generating thousands of watts of power for up to 10 hours a day. This is why it's important to use a quality inverter and mount it in a sheltered location if possible. Learn more about solar system fault finding.




## SOLAR SMART LOGGER

Around the world, the energy situation is a serious concern. The demand for energy sources, namely electricity, is rapidly rising. With such a sharp increase in electricity consumption, traditional electricity generation methods such as burning fossil fuels are no longer viable options. A number of experts have concentrated their efforts on sustainable energy and seek a cost-effective remedy to the energy dilemma. Due to its availability, ingenuity, cheap maintenance, and stability, solar is one of the prospective sources preferred above other renewable sources. Bangladeshi government took a splendid initiative to eradicate darkness from rural areas. A lot of research has gone into making the renewable DC to usable AC conversion system more efficient. The industry is saturated with a variety of solar sensor modules, all of which are extremely expensive, and only a few are extremely sophisticated and inefficient. Most of the PV designer is facing a problem for collecting necessary data from the site location. A smart solar Datalogger has been fabricated for the PV array designer, who can use this device for the splendid design and estimate any circumstances. Our proposed device combines many sensors, controllers, and web-based applications to sense data and store it in the memory unit and provide that information in a cloud network.

PPBL's Solar Smart Logger is dedicated to monitoring and managing a PV power generating system. It can connect up to 80 devices and centrally monitors information regarding connected solar modules and inverters.

### Features:

Remote control of active and reactive power USB and Internet support for data reading and software upgrade Communication Interface:
- Supports 4G networking (No MBUS Communication Interface)
- Through the internet (WAN)
- Local network (LAN)
- RS485 (Reliable communication distance of 1,000 m)
- Smart zero export control design



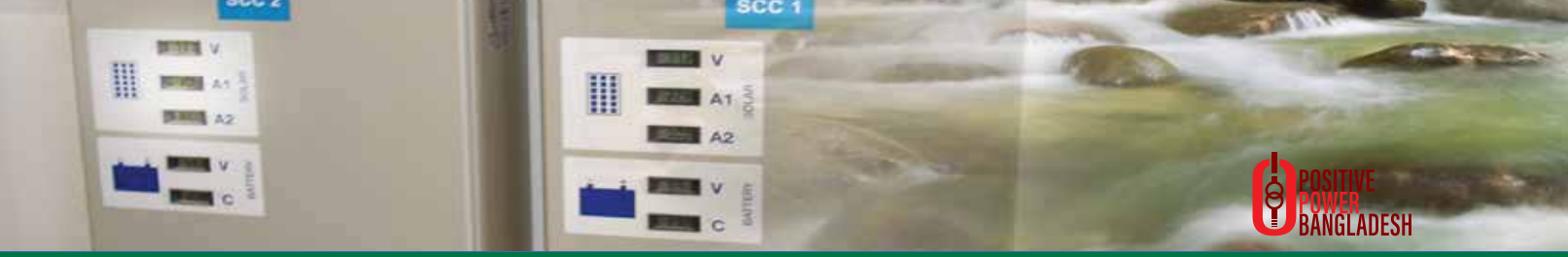

### Easy to install on site:

Wall mounting, DIN rail mounting, Tabletop mounting

**Safety** by lightning protection module
**Dimension** (W x H x D): 225 x 160 x 44 mm
**Weight:** 2 kg

### Key Benefits:

- Includes rated enclosure for outdoor protection.
- Several wireless connectivity types, including optional cards.
- Supports a variety of environmental sensors such as temperature, irradiance and wind.
- Compatible with all Solar Edge inverters.




# SOLAR SYSTEMS IN SHORT VIEW



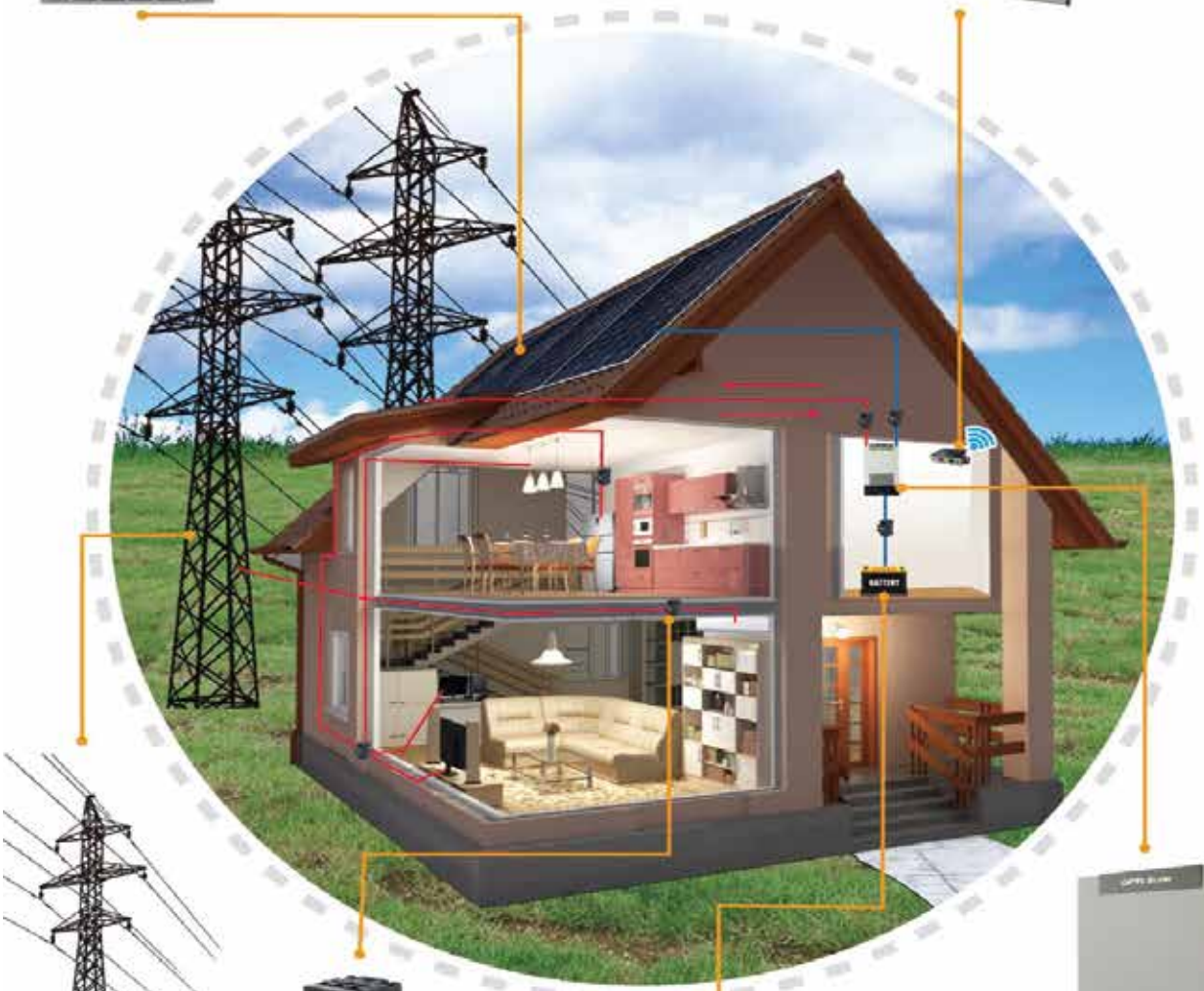
**Solar Panel**

- Standard anodized black and silver aluminum frame
- Modules with 60 solar cells connection in series
- Strict Power measurement minimizes the power tolerance to +0- 4.99W





**SNMP Box**





**Public Grid**



**Circuit Breaker**

- For PV
- For AC input / AC output
- For inductive loads (E.g. Air-conditioning, Refrigerator)
- For Battery




**Battery**

- Energy storage



**SP5000 Regal Ultra** (page 20)

- Design with Zero (0ms) transfer time perfect for Server & ATM
- Optional parallel Operation of up to 9pcs



## Few SOLAR PROJECTS of PPBL

### Styrax Fashions Ltd
110.16kw on grid system



### LZ Fashion Wear Ltd
110.16 kw
DEPZ, Savar

### LZ Textile Ltd
113.94kw
Konabari, Gazipur

### LZ Group
334.8kw
Azompur, Uttara, Dhaka



### PPBL's preferable

Pannel Brand :: JA Solar, Jinko, Lungi, Canadian Solar

Inverter Brand :: Sungrow, Huawei, SMA

Smart Logger :: Sungrow, Huawei, SMA



# Transmission Line Construction, Repair and Maintenance

PPBL is a dependable provider of specialized contracting services, delivering infrastructure solutions to the electric power industries. The company provides a comprehensive range of services, including the design, installation, maintenance and repair of virtually every type of infrastructure. PPBL has the manpower, resources and expertise to complete projects that are local, national. Repair and maintenance of lines is very important for uninterrupted supply of electricity. Line patrolling, maintaining ground clearance, replacement of insulators, restringing of lines, replacement of burnt jumpers, replacement of damaged conductor, replacement of damaged pole, etc. are some of the cheeks performed during maintenance. Proper maintenance of line improves its life drastically.

In this section, we will discuss some materials and accessories used in power distribution. The poles or supports are classified according to the material used for it- Steel / Cement or others.

An Earthing arrangement is provided with a projected length of 50 mm at both ends of the pole, using G.I. wire embedded in concrete. In actual practice, it is convenient to use poles for all purposes (instead of having different sizes) with minor adjustments in spans, if required. This avoids future replacement costs, omission or errors by workmen in transportation and selecting different poles for different locations.

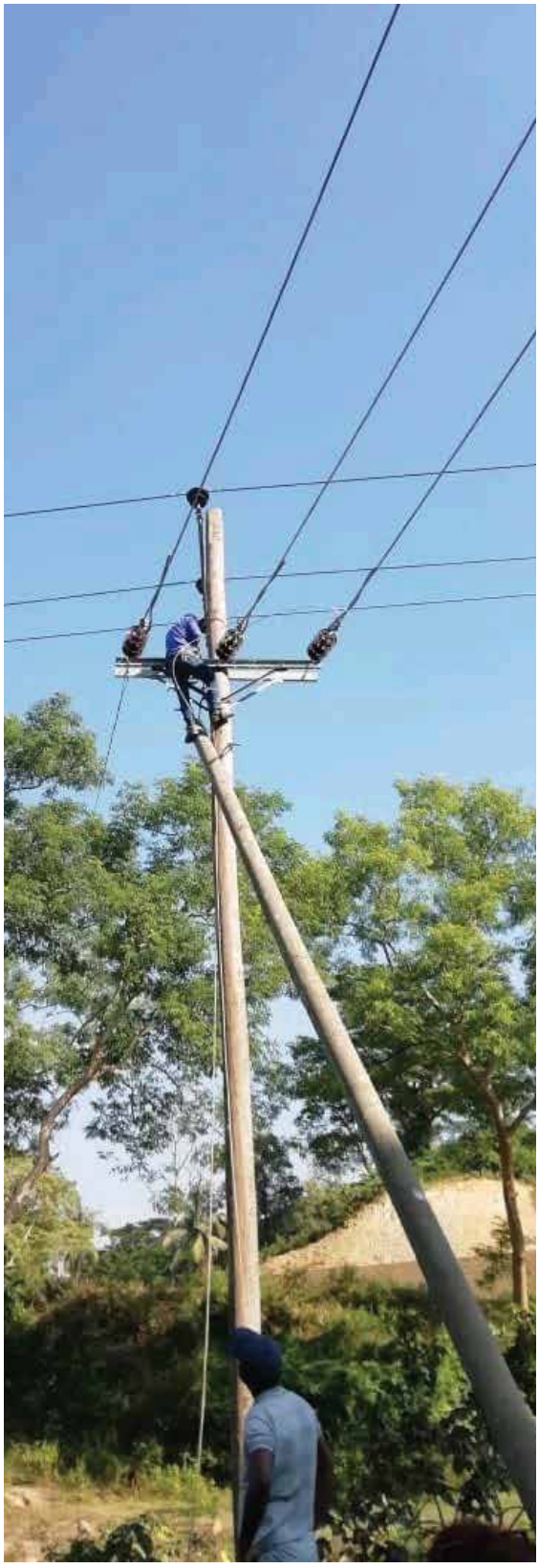
The selection of poles for erection of lines depends on a number of factors such as: y Pole strength, y Type and size of conductor , y Maximum wind pressure, y Maximum line tension, y Guarding, y Different crossings like river, road, railway, telephone lines, etc.

**CONDUCTORS**

Aluminium conductors of different types and sizes are used for drawing overhead lines, whether they are LT or HT lines. These include:

**All Aluminium Conductors (AAC):** This type of conductor is made up of one or more strands of hard drawn 1350 aluminium alloy. The AAC conductors are used in low and high voltage overhead lines. AAC is used extensively in urban areas where spans are usually short but high conductivity is required.

**Aluminium Conductor Steel Reinforced (ACSR):** It is a type of high-capacity, high-strength stranded conductor typically used in overhead power lines. The outer strands are high-purity aluminium, chosen for its excellent conductivity, low weight and low cost. The centre strand is of steel for additional strength to help support the weight of the conductor..





# Transmission Line Construction, Repair and Maintenance

INSULATORS

Pin Type Insulators: These are commonly used on 11 kV Lines. The pins for pin insulators shall have a stalk length of 135 mm, shank-length of 125 mm and minimum failing load of 2kN. They should be forged. The pin type insulator is secured to the cross-arm on the distribution pole. There is a groove on the upper end of the insulator for resting the conductor. The conductor passes through this groove and is bound by the annealed wire made of the same material as the conductor. Pin type insulators can be of one part, two parts or three parts type, depending upon the application voltage. For example, in 11kV system, one part type insulators are used where the whole pin insulator is one single piece of properly shaped porcelain or glass.



Shackle Type Insulators: The shackle insulators are used in low voltage distribution lines (LT lines). They are also called spool insulators. These insulators are used to isolate the live conductor from pole and are mounted in every pole of electrical line. These insulators can be mounted either in vertical or horizontal positions .



Disc Type Insulators: In higher voltage, such as beyond 33kV, it becomes uneconomical to use pin insulator as the size and weight of the insulator becomes more. Handling and replacing bigger sized single unit insulator is a difficult task. Suspension insulator was developed to overcome these difficulties. In suspension insulator, the number of insulators are connected in a series to form a string and the line conductor is carried by the bottom most insulator. Each insulator of a suspension string is called disc insulator because of its disc-like shape. Disc insulators are normally used in 11kV lines for dead-end locations .



Guy Strain Insulators: These are only used for guy/stay wires. These are designed to work in mechanical tension or strain, as they are capable to withstand the pull of a suspended electrical wire or cable. The guy strain insulators are used in overhead electrical line. The strain insulator is inserted between stay wire to isolate the lower portion from electricity. It may also be used where a wire attaches to a pole or tower, to transmit the pull of the wire to the support while insulating it electrically.



POSITIVE
POWER
BANGLADESH

## POSITIVE POWER BANGLADESH LTD. (PPBL)

**Corporate Office**
Wahid Masafi Center, 6th Floor, 73, Puranapaltan Lane, Dhaka-1000

**Contact**
+88 01970 788208, positivepowerbl@gmail.com

**Factory**
BSCIC Industrial Area, Dhamrai, Dhaka, Bangladesh