



Product Range
Transformers

It is our aim to provide a solution to your problem and more importantly to your satisfaction.

Since our beginnings in 1947, Bowers Electricals has become one of the UK's biggest suppliers of electrical products including energy saving Distribution and Power Transformers. Bowers supply new or refurbished power and distribution transformers, HV and LV switchgear and all manner of associated products and services.

Our transformers provide solutions for all applications and working environments. They are design to fit seamlessly between energy generation and the end user with up to 60MVA at 66kV.

Bowers Electricals offers a full turnkey operation that includes the supply, overhaul, rewind and repair of customer property, as well as ongoing service, maintenance and expert project management of all development, regardless of size.

Bowers Electricals boasts a prestigious list of clients from across the public and private sectors, throughout the UK including:

- Construction
- Food Industry
- Hospitals, Schools & Universities
- Oil, Gas & Water
- Manufacturing
- Ministry of Defence
- Power Stations
- Renewable Energy - Wind & Solar



British Heritage • Global Reputation • World-Renowned Expertise



Table of Contents

- 05** Power Transformers
- 06** Distribution Transformers
- 07** Tier 2 Standard & DNO Approved
- 08** The B.E.S.T
- 10** Cast Resin Transformers
- 12** Intellivolt "Smart" Transformers
- 14** Bespoke
- 16** Refurbished Stock
- 17** Maintenance & Retrofilling
- 18** Data Sheet & Drawing

Power Transformers

Our in-house technical and design experts, supported by our operational facility, offer fully tailored solutions to suit your transformer requirements. All our transformers are manufactured in accordance with UK, EU and International regulations.

Bowers Electricals Ltd offers power transformers up to 60MVA at 66kV available in ONAN, ONAF or OFAF specifications, complete with standard and special fittings that include:

- Conservator and Buchholz
- Forced fan cooling
- HV and LV cable boxes or outdoor bushings
- Oil circulation pump systems
- On load tap changers
- Separate and integral cooling bank systems
- Tap changer control panels
- Temperature monitoring systems

Our team of experienced technicians can quickly react to your individual requirements, with short lead times and competitive prices to your exact specifications.

At our Heanor works, there is opportunity to witness the stringent testing the Power Transformers are subject to during the end of the manufacturing process. Special tests such as temperature rise, impulse, noise levels, etc can also be offered as required.



Standard Distribution

Our standard distribution transformer range is available from 315kVA to 3150kVA, with a typical 11000V input to 415V no-load output, but any size and voltage range can be catered for, up to 60MVA at 66kV. To keep lead times to a minimum, we source standard distribution transformers for stock as well as to clients' specific requirements.

Units are typically designed with HV and LV flanges to BS2562 facings suitable for accommodation of bolt-on HV and LV cable boxes or LV transformer mounted feeder pillars / ACB / MCCB cabinets and HV transformer mounted switch gear to ENATS standards.

Bowers Electricals standard units are also fitted with bolt-on panel design radiators and have been carefully designed so that HV switch gear can be fitted without interfering with the radiators removing the need for extension throats.

Our distribution transformers are manufactured in accordance with national and internationally recognised standards, fully compliant with the EU commission regulation 548/2014 on Ecodesign and also to BSEN60076 standards. All our standard distribution transformers come with a warranty of two years.

Tier 2

The 2021 EU Ecodesign regulation came into place on July 1st 2021 which made amendments to the Regulation 548/2014. The new regulations tighten the requirements for load-losses on energy-related products. It is in place to improve energy efficiency, environmental compatibility and reduce CO2 emissions.

The European Commission estimates that 2.9% of all energy generated across the 27 EU countries (EU27) and the UK is wasted through transformer losses. In a survey led by the EU, they found that the EU27 transformer industry produces losses up to 93.4TWh annually. The strict new design regulation aims to reduce energy losses of distribution transformers to save on average 16TWh annually which equate to 3.7Mt CO2 from being emitted into the atmosphere.

Our standard range of Tier 2 Distribution Transformers are manufactured using cold rolled grain oriented (CRGO) steel and range from 50kVA to 3150kVA. They are fully compliant with all current UK and EU directives including the 2021 Tier 2 EU directive 548/2014, and offer marked reductions both in carbon emissions and energy waste over the course of a units typical 25 year lifespan. Savings can total up to £9,000 per annum, when comparing the running costs of our Tier 2 transformer to a historical 1950's standard CRGO transformer.



D.N.O

Bowers Electricals supplies Distribution Network Operator (or DNO) approved transformers. Our general package includes supply and installation of all required works from the D.N.O metered feeder. We offer full liaison with the D.N.O to connect to the network and install the new D.N.O HV metered feeders. This allows the customer to order from one source and for Bowers to carry out the required project management and liaison.

The B.E.S.T

The **Bowers Energy Saving Transformer** or **B.E.S.T** for short is an alternative to conventional distribution transformers. It increases energy efficiency efforts by saving on energy losses and reducing CO2 waste. Whilst also decreasing total ownership costs over the 25-30 years in service.

With the introduction of the UK Government's Net Zero goals and the increasing global demand for energy consumption the need for more energy efficient and reliable grids is ever-growing. The reduction of CO2 emissions is a large focus of energy-saving programmes driven by both local and global initiatives. Distribution transformers, which are a crucial part of the electrical infrastructure and supply, have a large total loss of energy. The energy losses amount to 3-5% of all electric energy production.

The 2021 Tier 2 EU Ecodesign Regulation 548/2014 tightens the requirements for load-losses on energy-related products. It is in place to improve energy efficiency, environmental compatibility and reduce CO2 emissions. The **Bowers Energy Saving Transformer** losses far exceed the losses that the Tier 2 regulations require.

Compared to a pre-2015 Eco regulation of the same rating, the **B.E.S.T** allows you to save up to 55% on energy losses and total ownership cost, and reduces CO2 waste.

Bowers Electricals can achieve these reduced losses by using an Amorphous Core. This replaces the Cold Rolled Grain Oriented Steel (CRGO) cores which our standard distribution transformers use. The Amorphous material has different properties to CRGO such as atomic structure, electrical resistance, and sheet thickness. These factors impact the transformer losses which are reduced massively when using an Amorphous Core.

Transformer Loss Chart

TYPE OF TRANSFORMER	CORE LOSSES APPROX	LOAD LOSSES APPROX	kWh SAVINGS v AMORPHOUS	£'S SAVINGS WHEN INVESTING IN AMORPHOUS
PRE 2015 STANDARD CRGO	1700 w	21000 w	12290 w	£25,838
OLD BOWERS 2015 STANDARD CRGO - TIER 1	1129 w	13143 w	3862 w	£8,119
BOWERS 2021 STANDARD CRGO - TIER 2	1015 w	11286 w	1891 w	£3,976
BOWERS 2022 B.E.S.T AMORPHOUS	450 w	9960 w	—	—

Based on electricity costs of £0.24 / kWh (average unit rate for electricity in the UK as of 2022) and 1500 kVA rating at full load.

The Amorphous Core transformers significantly reduce both carbon emissions and energy waste, over the course of a units typical 25 year life-span.

Savings can total up to £25,838 per annum, when comparing the running costs of the new Bowers Energy Saving Transformer to a pre 2015 standard CRGO Transformer.

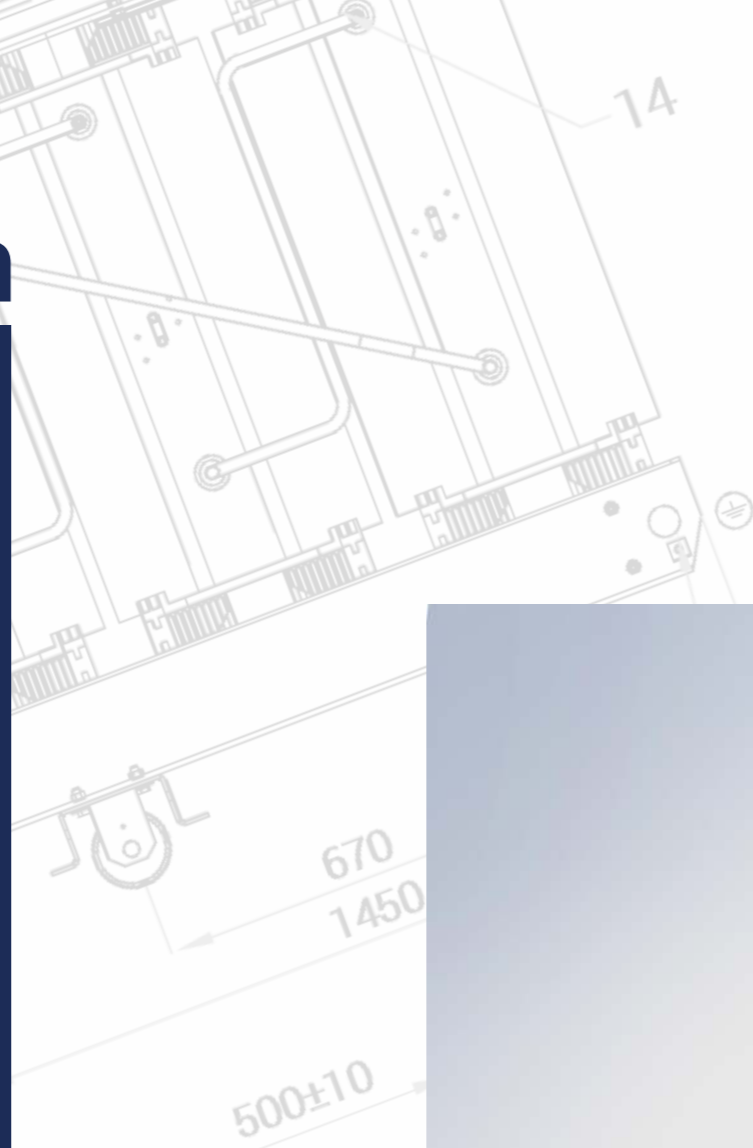


Cast Resin

Our Cast Resin transformers are designed to suit our customers' requirements either in IP00 specification, often required by LV switchboard manufacturers, or with sheet steel ventilated enclosures and cable boxes, which can be designed and built to suit bespoke specifications.

These cast resin transformers are designed and constructed with their windings encapsulated in resin and are an excellent alternative to traditional oil-immersed transformer. Other qualities include: reduced overall sizes, self-extinguishing and high mechanical resistance to electro-dynamic stresses.

All our cast resin transformers are manufactured to IEC 60076-11 and Eco Regulation 548/2014 as applicable. Our standard range of cast resin transformers is 50kVA up to 3150kVA.



Intellivolt 'Smart'

The smart transformer; combining two technologies in one revolutionary package – to save you more.

Two technologies, one revolutionary solution. A low loss distribution transformer with advanced voltage optimisation technology.

Bowers Intellivolt is unlike any other transformer on the market, the intelligent transformer constantly monitors the 3 outgoing voltages independently and optimises them to the required output level, resulting in reduced losses and increased service life of electrical equipment.

When used with equipment such as refrigeration or air-cooling devices, 3 phase motors, high intensity discharge or fluorescent lighting, Intellivolt voltage optimisation not only helps to maximise equipment efficiency, but it reduces energy consumption to create measurable financial savings.

Bowers Intellivolt Real-Time energy monitoring is a sophisticated piece of technology which enables users to pinpoint energy savings remotely, accurately and in real time.



Bespoke

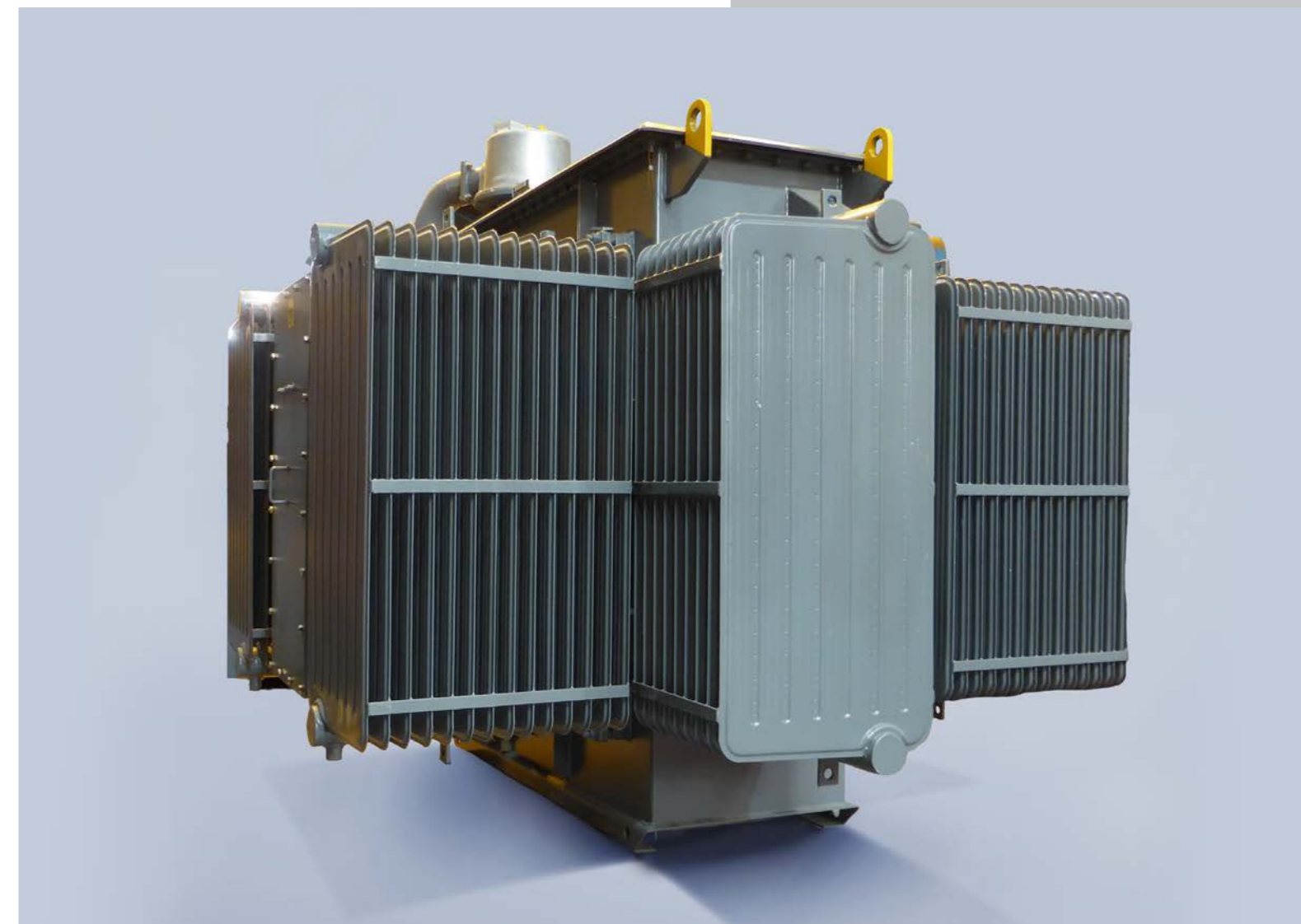
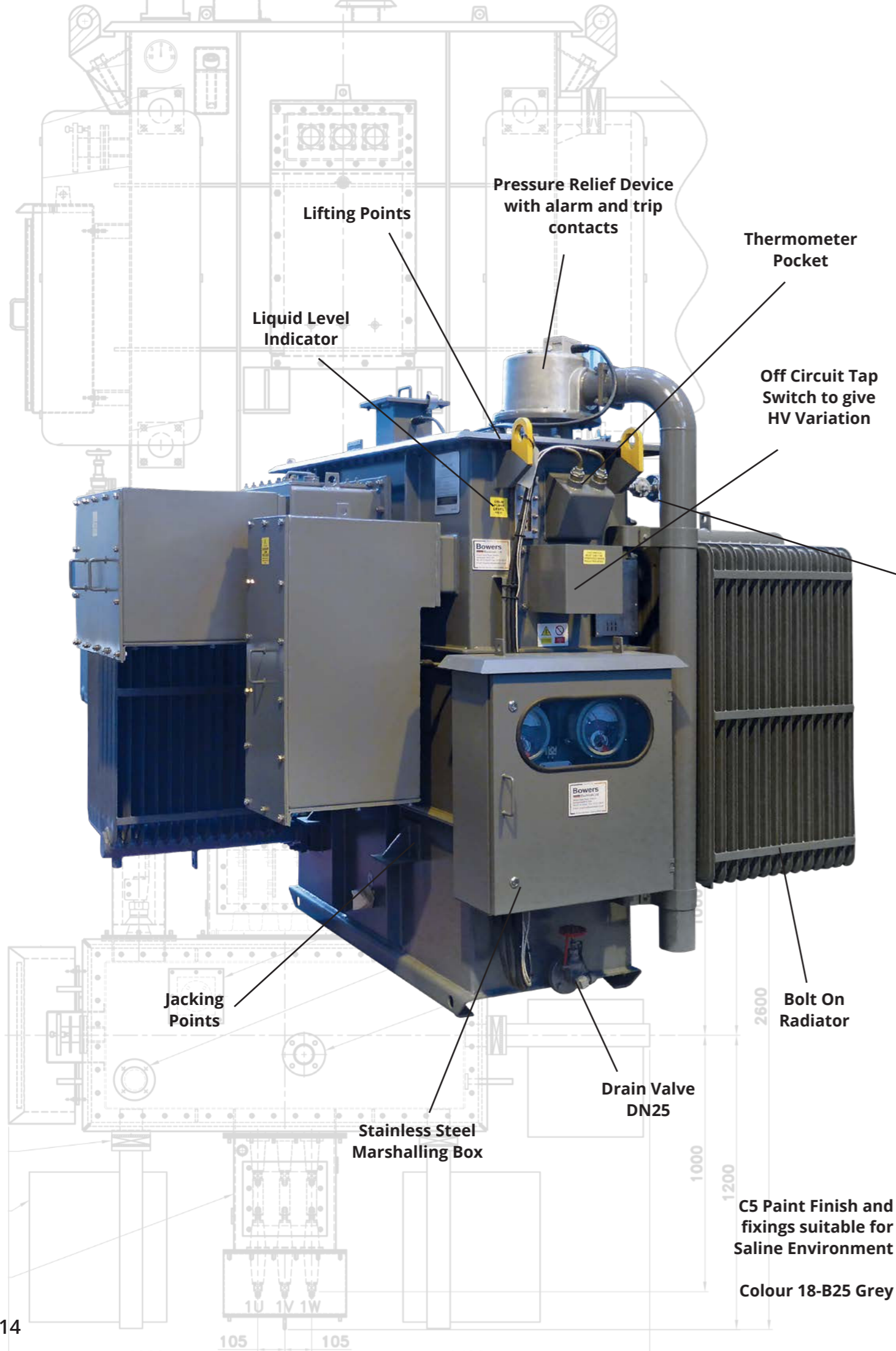
We know every job is different that's why we pride ourselves on understanding the customers requirements. Our team of technical design engineers and dedicated project team take time to understand each project, so we are in a unique position to offer bespoke energy saving solutions for our clients, with a fast turnaround.

Along with the standard transformers, we can provide:

- Custom paint finishes and colours.
- All types of cooling arrangements (conventional mineral oil to natural and synthetic esters).
- Load tap changes.
- Separate or integral cooling systems.
- And many other custom specifications that you might need.



Pressure Vacuum Bleeder (pictured above)



Refurbishment & Maintenance

Bowers Electricals hold large stocks of quality used power equipment including power and distribution transformers, HV & LV switchgear, induction and DC motors, control gear, power factor correction equipment and other associated power equipment.

All our equipment is fully refurbished by our engineers. The refurbished transformers come with a comprehensive warranty of two years. Whilst all other equipment comes with a one year warranty.

Our range of refurbished transformers includes standard distribution up to 5MVA.

We also provide refurbished Cast Resin and air cooled transformers, special ratio transformers (both in step up or step down) designs are also available.



At Bowers Electrical we not only supply the equipment but can also provide lifetime on site technical support and maintenance for a wide range of applications. Our dedicated team of High Voltage engineers can provide full on-site maintenance of all your electrical plant and power equipment 24/7, 365 days a year across the UK and overseas.

We offer bespoke service and maintenance contracts to suit all your requirements. These contracts are typically up to 5 years and include full maintenance, annual inspections and testing of the transformer oil. Our maintenance schedules are carefully designed to optimise the performance, durability, and life span of your equipment.

As well as on-site support, our maintenance customers receive the full support of our technical team, including the provision of HV network diagrams, oil trend analysis information and recommendations on any operational restrictions, DIN's and SOP's.

Bowers will always make recommendations on any suggested upgrade or modifications we consider necessary to improve the reliability and effectiveness of your network.



[MIDEL®] MIDEL SERVICE PARTNER
SAFETY INSIDE

Bowers Electricals have been using Midel ester fluids for over 35 years since we introduced transformers to our product offering. As an official Midel Service Partner, we offer MIDEL refilling either on site, if it is an existing unit, or it can be specified into a new transformer.

The Midel Service Partners (MSP) initiative was developed by Midel. It is a network of experienced oil service and maintenance companies who complete the refilling of electrical transformers. Refilling is the process of replacing oil in an existing transformer and, in this case, replacing it with MIDEL ester fluid. This process extends the life of the transformer and delays the need to purchase an expensive new unit.

MIDEL is a range of natural and synthetic ester fluids which offers biodegradable alternatives to conventional transformer oils. The MIDEL fluid offering comprises of MIDEL eN 1215, MIDEL eN 1204 and MIDEL 7131. They are acknowledged for their excellent fire safety and environmental protection properties. As well as, their ability to extend the life of transformer cellulose insulation.



Tier2 transformer DATA SHEET

Spec 1000STDALT2CRGOOF rev 0

1000 kVA

1000kVA Tier 2 - Aluminium Wound Mineral Oil Filled Distribution Transformer

Specification	BS EN 60076
Part Number	1000STDALT2CRGOOF
Rated Power, Sr	1000 kVA
Rated Frequency, fr	50 Hz
Rated High Voltage, Ur	11000 v
Rated Current, Ir	52.48 A
HV Tapping Range	+7½, -5 %
Tap Switch, CFVV	Off circuit
Tap Steps	5 x 2½ %
Rated Low Voltage, Ur	415 v
Rated Current, Ir	1391 A
Cooling Method	ONAN
Thermal Class	A (105°C)
Location	Indoor/Outdoor
Coolant	Mineral Oil
Insulation Level	Li75.Ac28 / Ac3
Vector Group	Dyn11
Core Material	CRGO
Winding Material	Aluminium
Temperature Rise, Oil/Wdg	60 / 65°C
Load Loss @ 75°C	7600 W
No Load Loss	693 W
Tier 2 EU 548/2014	Ak Ao -10 %
Impedance	4.75%

HV Cable Box
3 pole single gland air filled, shroud insulated, suitable for a single multi core cable from below complete with a mild steel gland plate. Compliant with BS EN 50336 and BS 2562. (Excludes necessary glands, lugs and termination kit).

LV Cable Box
4 pole 8 gland air insulated, suitable for single core cables from below, complete with mono block bushing, non-magnetic gland plate. Compliant with BS EN 50336 and BS 2562. (Excludes necessary cables, glands and lugs).

Paint Finish
Painted in accordance with our standard system with a dark grey finish to BS381c – 632 incorporating corrosion category C4 of ISO 12944.

Neutral Point
A fully rated neutral point provided as standard.

Standard Fittings
ENA TS 35-1 terminal height
Oil filler top plate
Oil level indicator
Main lifters
Breather Pipe
Thermometer pocket
Rating and diagram plate with CE and UKCA marks
Oil drain / sampling valve
Stainless steel earth lugs
Jacking points
Skid under base

Standard Accessories supplied loose
1 x Desiccant breather
2 x Tins touch up paint (1x Grey, 1x Yellow)
1 x Paint Brush
1 x Transformer routine test certificate
1 x Certificate of Conformity
1 x O&M manual

For standard definitions and references please refer to the latest edition of BS EN 60076-1.

Bowers Electricals Ltd, Heanor Gate Road, Heanor, Derbyshire DE75 7GX
Telephone: 01773 531531 (24 hours) Fax: 01773 716171
E-mail: enquiries@bowerselec.co.uk www.bowerselec.co.uk
Registered at the above address in England Company No: 1955004 VAT Ref: 4163613

SL.No.	DESCRIPTION	ESTIMATED WEIGHTS
17	HV SWITCHGEAR FIXING DETAIL (50x50x5 THK. MS ANGLE)	KG
16	PRISMATIC OIL LEVEL INDICATOR	2380
15	EARTHING TERMINAL SUITABLE FOR M12 BOLT (ONE ON EACH SIDE) (SS-316)	680
14	JACKING PADS	3950
13	RATING AND TERMINAL MARKING PLATE (MODEL: 12KV 100A, 6 POSITION) WITH ENCLOSED COVER	
12	THERMOMETER POCKET SUITABLE FOR 3/4" BSP MALE CONNECTION	
11	BREATHING FIXING PIPE WITH 3/4" BSP MALE CONNECTION (BREATHING WILL BE SUPPLY LOOSE)	
10	LIFTING LUGS FOR COMPLETE TRANSFORMER	
9	BOLTED TYPE TOP COVER	
8	LIQUID FILLING PIPE WITH COVER	
7	PSR RADIATOR BOLTED TYPE (1100X520X7FINS)	
6	LV CABLE BOX 4 POLE, 2 CONNECTION PHASE WITH 1:1KV EPOXY MONOBLOCK BUSHING AS PER BS2562	
5	SKID TYPE UNDER BASE ARRANGEMENT (Ø35)	
4	DRAIN VALVE WITH PLUG & SAMPLER (MODEL : 25 mm, PN16)	
3	HV CABLE BOX ASSEMBLY (3 POLE) WITH BS 2862 12KV, 250A PORCELAIN BUSHINGS (TERMINATION KIT REQUIRED)	
2	LIFTING LUGS (ONLY FOR TOP COVER)	
1		

BOWERS JOB No.	1000 kVA
OUTPUT	11000 / 415
VOLTAGE RATIO	52.48 / 1391.21
AMPERES	3
PHASES	50Hz
FREQUENCY	Dyn11
VECTOR SYMBOL	
ESTIMATED WEIGHTS	KG
CORE AND WINDINGS	2380
COOLING LIQUID	800 LTRS
TOTAL WEIGHT	3950

NOTES:

- DIMENSIONS & WEIGHTS ARE SUBJECT TO ±5% TOLERANCE, HOWEVER THE DIMENSIONS WILL NOT CROSS THE DIMENSIONS SPECIFIED IN THE DRAWING.
- PAINTING DARK ADIPALTY GREY CO2 OF BS 381C: BS-12944-2 CATEGORY C4
- THIS IS FOR DRAWING ONLY. EXACT LOCATION OF ACCESSORIES & FITTINGS MAY VARY DURING MANUFACTURING.
- VISIBILITY OF THE ARRANGEMENT OF TOP COVER ALL PART DETAILS PREPARED FOR NOT TO SCALE FOR BETTER VISIBILITY.
- HV LV CABLE BOX GLAND PLATES WILL BE PROVIDED WITH Ø6MM PILOT HOLES

FOR INFO ONLY

Revision Note

RevNo	Date	Signed	Checked

DRG No. FOR INFO ONLY

GENERAL ARRANGEMENT OF 1000KVA 11000/415V TIER 2 TRANSFORMER

Job No. STOCK

Approved by SAMPLE

Checked by SAMPLE

Drawn by SAMPLE

Date 16/04/21

Size A2

Scale 1:15

Revision 1/1

Sheet 1/4

Bowers Electricals Ltd
Derbyshire, DE75 7GX
Heanor Gate Road, Heanor, Derbyshire DE75 7GX
Tel: 01773 531531
Fax: 01773 716171
Email: enquiries@bowerselec.co.uk
www.bowerselec.co.uk

Bowers

The logo graphic consists of two horizontal bars. The top bar is white and the bottom bar is red. They are positioned to the left of the text 'Electricals Ltd'.

Electricals Ltd

(+44)1773 531531 | enquiries@bowerselec.co.uk | www.bowerselec.co.uk
Bowers Electricals Ltd, Heanor Gate Road, Heanor, Derbyshire, UK. DE75 7GX