English | Srpski

YOUR PARTNER / VAŠ PARTNER

FOR CAST RESIN TRANSFORMER / ZA SUVE TRANSFORMATORE

Power FULL STOP

... nothing else

CREDICOM.CO

Your Partner for Cast Resin Transformers

POWER Sp. z o.o. is a young and dynamic Polish company providing transformers, components and accessories, particularly for cast resin and dry type transformers.

In the last years POWER Sp. z o.o. started the production of cast resin transformers according our own design or the client's projects. All POWER transformers are completely assembled and tested in our workshops.

All transformers are produced in accordance with IEC 60076-11 standards, and in particular they meet requirements for climatic (C), environmental (E) and fire (F) classes:

Climatic class C2:

Transformer suitable for working, transport and storage at temperatures down to -25°C.

Environmental class E2:

Transformer suitable for working in environments subject to frequent condensation or heavy pollution or a combination of the two.

Fire class F1:

Transformers subject to a fire hazard. They present a restricted inflammability, low emission of toxic substances and opaque fumes.

The standard offer of POWER Sp. z o.o. covers distribution cast resin transformers from 50 kVA up to 3150 kVA, insulation class up to 36 kV with standard or reduced losses (IEC 60076-11):

TPZ3K

(Distribution transformers comply with standards:

IEC 60076-11, EN 50588,EU 548/2014)

Our design and construction capacity can satisfy all various needs and applications such as autotransformers, reactors and earthing transformers, transformers for 6-12-18-24-36 pulse rectifier, HV-HV transformers and LV-LV transformers, three-single phase transformers, triple windings transformers, application for traction and for testing rooms, etc...

Vaš partner za suve transformatore

POWER SP.z.o.o. je mladi i dinamični poljski proizvođač suvih transformatora i transformatorskih komponenti.

Poslednjih godina POWER Sp. Z.o.o. je započeo proizvodnju suvih transformatora prema sopstvenom dizajnu ili projektu klijenata. Svi naši transformatori su proizvedeni kod nas i testirani u našoj laboratoriji u skladu sa IEC 60076-11 standardom, uključujući klimatske (C), ekološke (E) i požarne (F) klase prema specifikaciji:

Klimatska klasa C2:

Transformatori pogodni za rad, transport i skladištenje na temperaturama do -25 ° C.

Klasa zaštite životne sredine E2:

Transformatori pogodni za rad u okruženju gde mogu biti predmet česte kondenzacije, teškog zagađenja ili kombinacija ova dva faktora.

Klasa požara F1:

Transformatori izloženi opasnosti od požara. Karakterišu se ograničenom zapaljivošću, niskom emisijom toksičnih supstanci i neprovidnim isparenjem.

Standardni asortiman proizvoda POWER Sp. Z.o.o. pokriva distribucione transformatore od 50kVA do 3150kVA, izolacijske klase do 36 kV sa standardnim Ili smanjenim gubicima (IEC 60076-11).

TPZ3K

(Distribucioni transformatori su u skladu sa standardima: IEC 60076-11, EN 50588, EU 548/2014).

Naše mogućnosti dizajna i proizvodnje mogu zadovoljiti sve potrebe različitih tipova i aplikacija transformatora kao što su autotransformatori, transformatori za reaktore, transformatori za galvansko odvajanje 6-12-18-24-36-pulsni ispravljači, HV-HV i LV-LV transformatori, trofazni transformatori, tronamotajni transformatori, vučni i ispitni transformatori itd.

Why cast resin transformers?

Very reduced fire risk

Cast resin assembling materials are hardly inflammable and can be defined self-extinguishing. There are no special fire prevention coatings, with associated fire conditions, the calorific potential of the cast resin transformer is minimal and there are no dangerous fire gases capable of long-term damage. This advantage is especially appreciated for the installations where safety is crucial, for instance in hospitals, public premises, airports, subway lines, mines, oil rigs, nuclear power plants, ships, etc...

No special cooling liquids required:

Cast resin transformers only need air for cooling. Liquid coolants - of whichever chemical type cannot be released into the environment. Cast resin transformers are therefore virtually maintenance free, whereas a liquid cooled transformer needs much more attention.

No need of maintenance:

cast resin transformers are designed in such a way so as to withstand the worst climatic and environmental conditions. Preventive maintenance consists in a simple visual check.

Low operation costs:

The low losses in the magnetic core and in the windings reduce the costs of operation.

Unrestricted installation possibilities:

The transformer is a key component in the electrical supply network, and speed of installation can be valuable. A cast resin transformer is easily accommodated, for example, no blast walls are necessary. Consequently, the planning of the installation is simplified and installation costs are saved.

Advantageous capabilities of the enclosure:

Instead of transformer bays or cable housings, a simple enclosure can be used for access prevention. Enclosures can be complemented with the provision of high voltage flanges and low voltage cabinets to provide local stations.

Simple increased performance:

Through optimized forced ventilation there is an increase in performance of about 40%.

High short time overload capability:

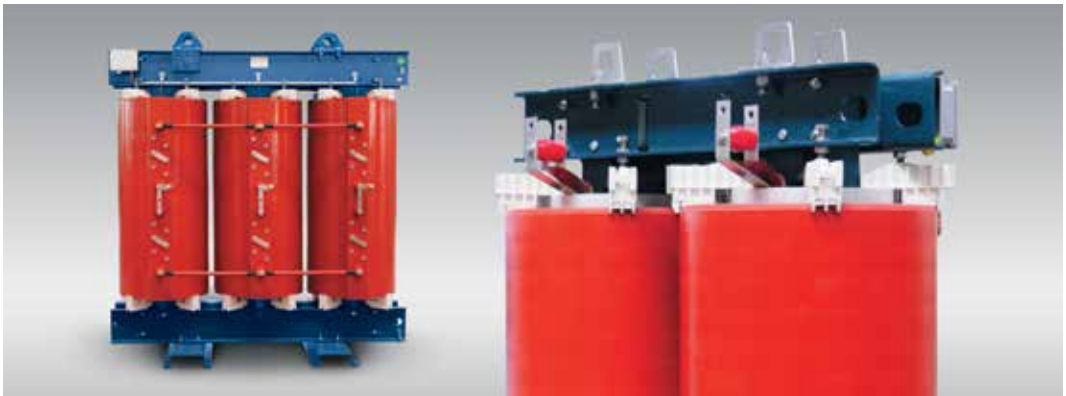
The current density in the winding with cast resin transformers is considerably lower than with oil transformers. Short time load peaks, such as with wind power installations, can be easily overcome without there being a need to plan the relevant over sizing.

High reliability:

The high technology employed in the manufacturing process of windings gives the product a high level of reliability.

Versatility and Performances:

Cast Resin Transformers can support overloads and perturbations which can be found in every installation



Zašto suvi transformator?

Minimalni rizik od požara

Materijali koji se koriste za proizvodnju transformatora su teško zapaljivi i mogu se definisati kao samogasivi, zbog čega nema potrebe da koristite bilo koji posebni premaz protivpožarne zaštite za ovu vrsta transformatora. Pored toga, u slučaju požara, emisija toksičnih gasova i neprozirnih isparenja je vrlo niska.Ove prednosti čine savršen izbor za instalacije na mestima gde je bezbednost od ključnog značaja, kao što su bolnice, javni prostori, aerodromi, linije podzemne železnice, rudnici, naftne stanice, nuklearne elektrane, brodovi itd.

Nisu potrebne tečnosti za hlađenje

Suvom ransformatoru treba samo vazduh za hlađenje. Oni su praktično bez održavanja, dok za transformator sa tečnim hlađenjem treba više pažnje. Ovo takođe čini suve transformatore ekološki prihvatljivijim jer nema tečnog rashladnog sredstva bilo kog hemijskog tipa koje se može ispustiti u životnu sredinu.

Lakše održavanje

Preventivno održavanje suvih transformatora sastoji se od jednostavne vizuelne provere.

Niski operativni troškovi

Mali gubici u magnetnom jezgru i u namotajima smanjuju troškove tokom rada.

Jednostavnost instalacije

Transformator je ključna komponenta električnog snabdevanja, stoga laka i brza instalacija može biti važan faktor pri izboru. Suvi transformator se lako instalira, na primer, nijedan protivpožarni zid nije potreban. Shodno tome, planiranje instalacije je pojednostavljeno i instalacioni troškovi se smanjuju.

Prednosti IP kućišta

Umesto tradicionalnih prostorija za smeštaj transformatora, jednostavno IP kućište može se koristiti za prevenciju i zaštitu pristupa suvom transformatoru. IP kućišta se proizvode u različitim vrstama i bojama u zavisnosti od zahteva klijenta.

Mogućnost značajnog povećanja performansi

Kroz optimizovanu dodatnu ventilaciju postoji mogućnost povećanja u performansama oko 40%.

Mogućnost visokih kratkotrajnih preopterećenja

Intenzitet struje u namotajima suvih transformatora je znatno niži nego u namotajima kod uljnih transformatora. Shodno tome kratkotrajni pikovi, kao što su kod vetrogeneratora, mogu biti jednostavno prevaziđeni bez dodatne potrebe za povećanjem kapaciteta.

Visoka pouzdanost

Visoka tehnologija koja se koristi u proizvodnji namotaja daje proizvodu visok nivo pouzdanosti.

Svestranost i performanse

Suvi transformatori mogu da izdrže preopterećenja koja se mogu naći u svakoj instalaciji.

Magnetic Core

The magnetic core is produced in our plant thanks 2 cutting lines and 5 assembling tables. For cast resin transformers, where the No-Load losses and the noise level have primary importance, the magnetic core is always made by grain oriented steel (CRGO) which is cut with "Step Lap" method. In order to avoid the risk of rust, the magnetic core is painted with an epoxy resin with F temperature class. The clamps of the core are usually painted, but under request they could be also hot or cold galvanized.

LV Windings

The Low voltage cast resin windings are made with an electrolytic aluminum or copper foil conductor together with an insulating film in class "F", and then subjected to the oven drying process. The terminals are made by aluminum or copper bars welded in inert atmosphere and firmly locked to the frame with spacer insulators.

MV Windings

Medium voltage windings are wound by automatic machines and consist in a set of electrolytic aluminum or copper tape coils. The insulation between turns is obtained through a polyester film.

One of the characteristics of cast resin transformers is that the conductors of the medium voltage winding are completely encapsulated in a cast resin body with a smooth surface. This can only be carried out in molds under vacuum.

The tapping links (generally ±2x2,5%) are obtained directly at the center of the coil.

Magnetic Core / Magnetno jezgro

Magnetno jezgro

Magnetna jezgra u potpunosti su proizvedena u našoj fabrici zahvaljujući linijama za rezanje (2) i montažnim stolovima (5). Za suve transformatore, gdje su nivo gubitaka i buka od primarne važnosti, magnetno jezgro je uvek napravljeno od zrna čelika (CRGO) i rezanja metodom Step-Lap.
Da bi se izbegao rizik od rđe, magnetno jezgro je premazano sa epoksidnom smolom temperaturne klase F. Kleme su obično obojene, ali na zahtev one mogu biti toplo ili hladno pocinkovane.

Niskonaponski namotaji

Niskonaponski namotaji izrađeni su od elektrolita aluminijuma ili bakarne provodne folije zajedno sa izolacionim filmom u klasi „F“, a potom su podvrgnuti procesima pečenja i sušenja. Terminali su izrađeni od aluminijumskih ili bakarnih šipki zavarenih u inertnoj atmosferi i čvrsto prikačeni na ram sa izolatorima.

Srednjenaponski namotaji

Srednjenaponski namotaji su složeni pomoću automatskih mašina i sastoje se od elektrolitičkih aluminijumskih ili bakarnih trakastih kalemova.

Izolacija između je izrađena od poliesterskog filma. Jedna od karakteristika suvog transformatora je da su provodnici srednjenaponskih namotaja potpuno inkapsulirani u telu od smole sa glatkom površinom. Ovo se može izvršiti samo u kalupima pod vakumom.

Pločice za „tapovanje" (uglavnom ± 2x2,5%) se nalaze direktno u središtu jezgra.

Standard accessories

Standard accessories supplied with all transformers are:

- N.3 PT100 probes for windings temperature
- N.4 lifting eyebolts
- N.4 bidirectional wheels
- N.2 earthing link
- N.1 identification plate comply with EU regulation 548/2014
- Tapping terminal board on MV side
- CE marking

Accessories upon request

Together with the transformers, can be supplied additional accessories according the clients requirements:

• Forced cooling System (POWER Sp. z o.o. production):

This kind of ventilation guarantees a correct forced circulation of the air inside every single column for three phase transformers. Together with the Forced cooling system is suggested the use of PWR12. It's a device specially developed for the control of electric motors fitted to the ventilation systems, able to diagnose motor faults by valuating changes in current drawn by the same.

• Anti-vibration Pads for transformers wheels (POWER Sp. z o.o. production):

It's an intelligent, compact and cheap device with the function of reducing vibrations and noise of the transformers. There are 2 kind of Anti-vibration pads according the standard wheels dimensions of distribution transformers:

- PWP125: wheels with diameter up to 125mm
- PWP200: wheels with diameter up to 200mm

• Temperature Relay for PT100 and PTC sensors

- PWR07 provides temperature control of 3 phase transformer equipped with PT100 probes, and a fourth option for the core or the ambient temperature.
- PWR08 is a control unit developed to control the temperature of MV cast resin and dry type transformers equipped with PTC probes.

- Additional PT100 or PTC probes
- Earthing bolts with spherical end Ø 20 mm, Ø 25 mm and Ø 30 mm
- Marshalling boxes with one or more relays wired according to clients specifications.
- 2 or more contacts Thermometers.
- Encapsulated delta connections with elastimold up to class 36 kV 400 A.
- Elastimold from 250 A/400 A up to class 36 kV
- Bi-metal (Al/Cu) plates.
- Surge Arrestor in MV side from 3 kV up to 36 kV

• Protection Housing

We offer transformers assembled inside enclosure with different kind of protections for indoor and outdoor installation. Typical are the protection IP21 and IP23, but there is also the possibility to supply protection housing also with higher protection, such as IP31 up to IP55 with different kind of RAL.

POWER Sp. z o.o. has is his offer 5 kind of standard enclosures internally projected according the power of the transformer:

POWER (kVA)	L (mm)	P (mm)	H (mm)	T (mm)	WEIGHT (kg)
From 50 up to 250	1500	950	1300	520	160
From 315 up to 630	1700	1150	1650	670	230
From 800 up to 1000	1900	1350	1850	820	280
From 1250 up to 1600	2300	1500	2300	820	410
From 2000 up 3150	2500	1500	2300	1070	450

All the enclosures made by POWER Sp. z o.o. are designed in order to guarantee the adequate natural ventilation of the transformers. With special requirement the protection housing are produced in galvanized steel, stainless steel or aluminum in order to avoid the problem of the rust, especially for outdoor application.

Tangential fans / Ventilatori za prinudno hlađenje

Standardni pribor

Standardni pribor koji se isporučuje sa svim transformatorima su:

- 3 PT100 sonde za merenje temperature namotaja
- 4 okca za podizanje
- 4 dvosmerna točka
- 2 veze za uzemljenje
- Identifikaciona ploča u skladu sa propisima EU 548/2014
- "Taping" terminalne ploče na MV strani
- CE oznaka

Dodatna oprema na zahtev

Pored transformatora, dodatni pribor može biti isporučen prema zahtevima klijenta:

- **Prinudni sistem hlađenja (POWER Sp. Z o.o. proizvodnja):**

Ova vrsta ventilacije osigurava pravilnu cirkulaciju vazduha kroz svako jezgro trofaznog transformatora. Zajedno sa prinudnim sistemom hlađenja preporučuje se da koristite PVR12 - uređaj specijalno razvijen za kontrolu elektromotora ugrađenih u sisteme za ventilaciju, sposobnih da vrše dijagnostifikovanje grešaka motora otkrivanjem promjena struje.

- **Antivibracioni podmetači za točkove transformatora (POWER Sp. Z o.o. proizvodnja):**

To je pametno, kompaktno i jeftino rešenje za smanjenje vibracije i nivoa buke vašeg transformatora. Antivibraciona postolja su dostupna u 2 veličine prema standardnim dimenzijama točkova distributivnih transformatora:

- PVP125: točkovi prečnika do 125 mm
- PVP200: točkovi prečnika do 200 mm

- **Temperaturni releji za PT100 i PTC senzore**
  - PVR07 obezbeđuje kontrolu temperature unutar svakog jezgra trofaznog transformatora opremljenih s PT100 sondama; Takođe dozvoljava instalaciju opciono četvrte sonde za merenje temperature jezgra ili ambijenta.
  - PVR08 je kontrolna jedinica razvijena za kontrolu temperatura namotaja i suvih transformatora opremljenih sa PTC sondama.
- Dodatne PT100 ili PTC sonde
- Vijci za uzemljenje sa sfernim krajem Ø 20 mm, Ø 25 mm i Ø 30 mm
- Priključne kutije sa jednim ili više releja ožičenih prema prema specifikacijama klijenata
- 2 ili više kontaktnih termometara
- Elastimold(izolacioni material) od 250 A / 400 A do klase 36 kV
- Bimetalne (Al / Cu) podloške i priključne ploče
- Odvodnik prenapona na MV strani od 3 kV do 36 kV
- **Zaštitno kućište**

Nudimo transformatore sastavljene unutar kućišta sa različitim stepenom zaštite za unutrašnje i spoljašnje instalacije. Najčešći tipovi su IP21 i IP23, ali možemo i da isporučujemo kućišta sa višim stepenom zaštite - od IP 31 do IP55 – i različite boje (RAL).

Opseg proizvoda POWER obuhvata 5 vrsta standardnih tipova kućišta dizajniranih prema snazi transformatora:

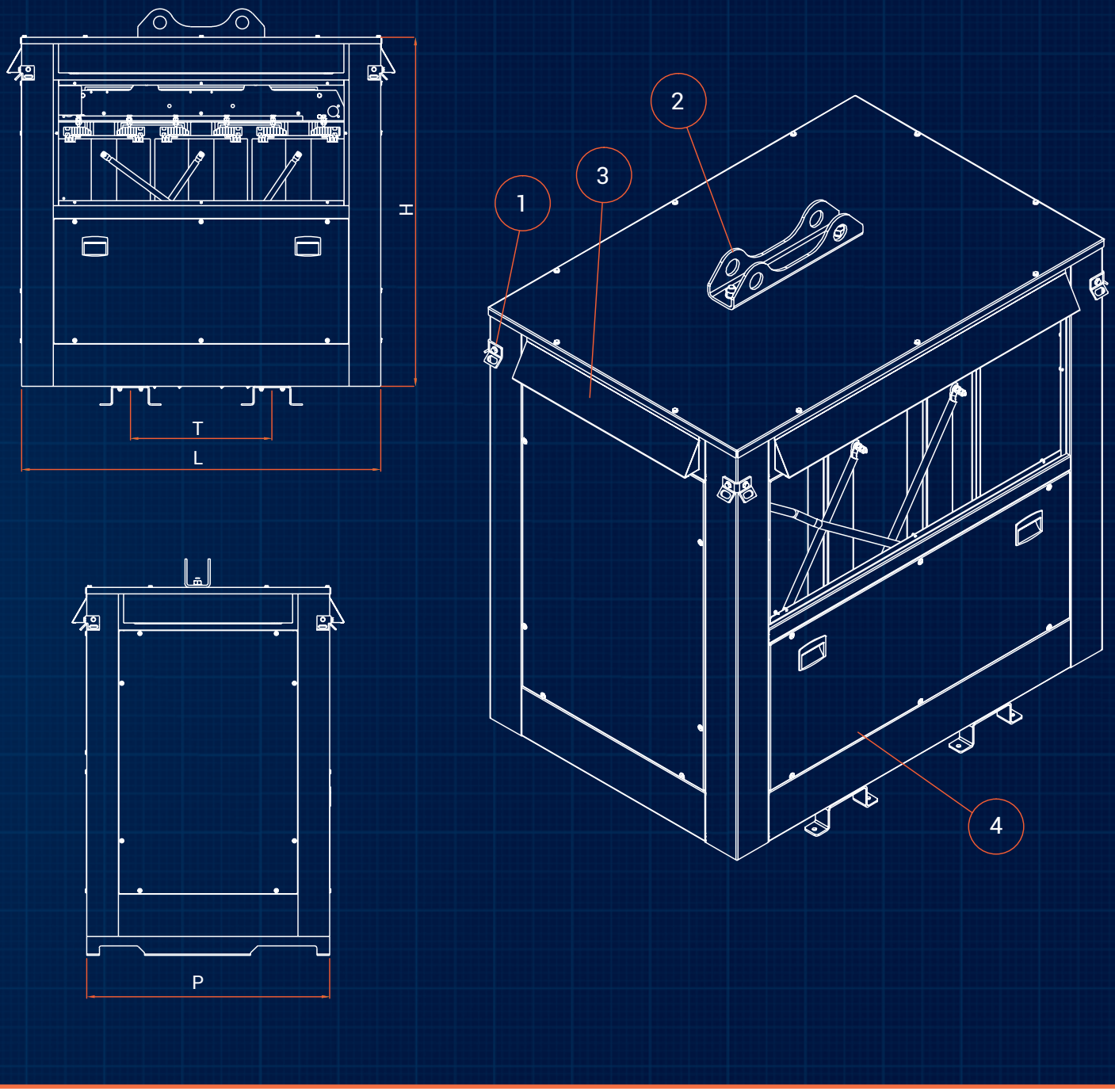
SNAGA (kVA)	L (mm)	P (mm)	H (mm)	T (mm)	TEŽINA (kg)
od 50 do 250	1500	950	1300	520	160
od 315 do 630	1700	1150	1650	670	230
od 800 do1000	1900	1350	1850	820	280
od 1250 do1600	2300	1500	2300	820	410
od 2000 do 3150	2500	1500	2300	1070	450

Sva kućišta proizvođača POWER Sp. Z.o.o. su projektovana tako da garantuju adekvatnu prirodnu ventilaciju transformatora. Na poseban zahtev, zaštitno kućište može se proizvoditi u galvaniziranom čeliku, od nerđajućeg čelika ili aluminijuma kako bi se izbegao problem rđe, posebno za spoljašnju primenu.

Temperature relays / Temperaturni releji

Anti-vibration pads / Antivibraciona postolja

Protecting Housing
Zaštitno kućište

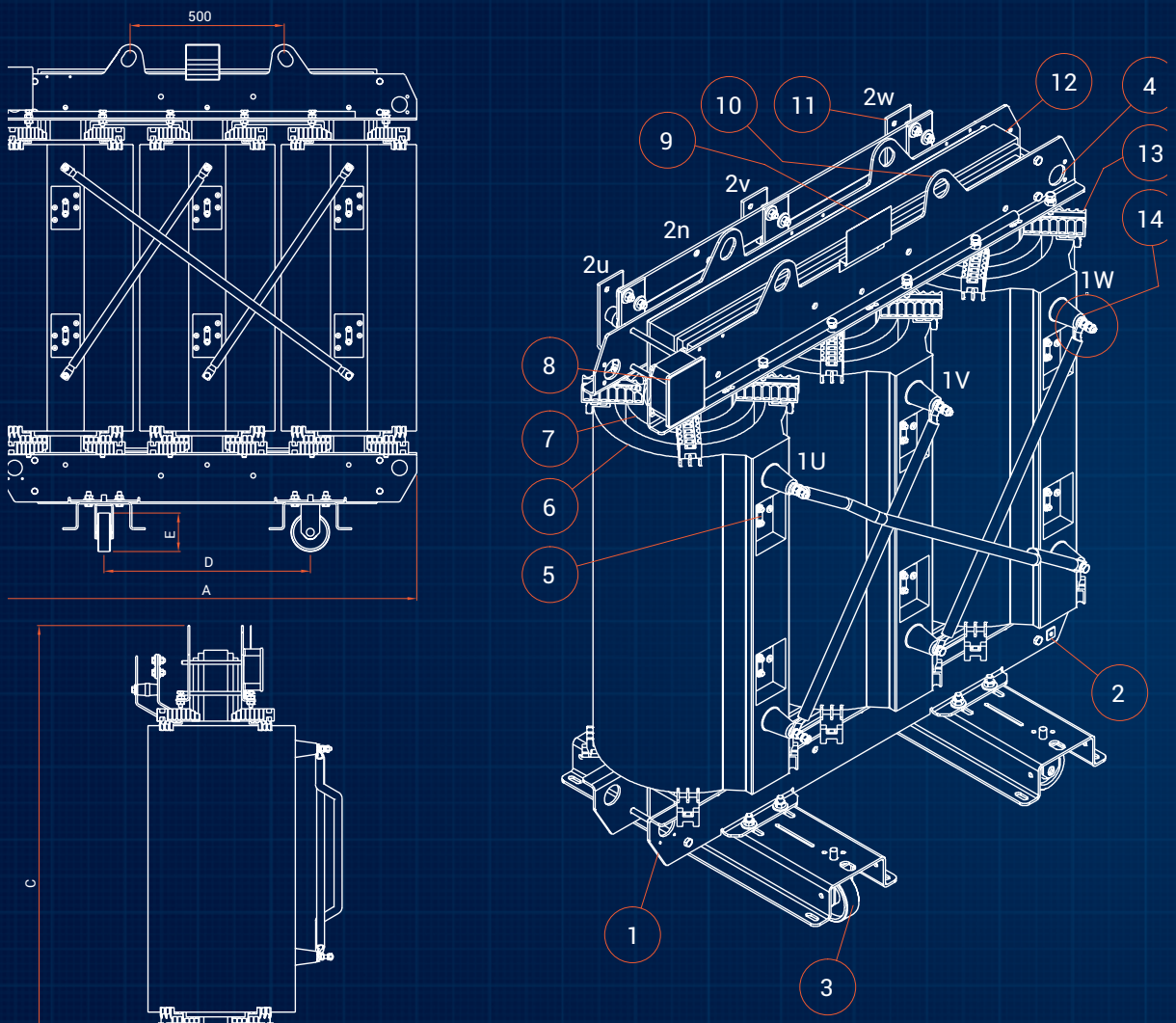


Specification
Specifikacija

1	Transport Eyebolts
2	Lifting Eyebolts
3	Ventilation Grid
4	Removable Panel

1	Transportna okca
2	Okca za podizanje
3	Ventilaciona rešetka
4	Demontažni panel

Cast Resin Transformers
Suvi Transformatori



Specification
Specifikacija

1	Lamination holder
2	Earth tapping M12
3	Orthogonal positioned wheels
4	Trasfer eyebolts
5	Regulation tappings for M.V
6	M.V windings
7	L.V. Winding
8	Centralization aux box
9	Label with electrical features
10	Lifting eyebolts
11	Ouput L.V. Bars
12	Magnetic core
13	Winding pressure plugs
14	Input M.V. Terminals

1	Čelični ram
2	Priključci za uzemljenje
3	Vertikalno postavljeni točkovi
4	Okca za transport
5	Regulacioni "Tapovi"za MV
6	MV namotaji
7	LV namotaji
8	Centralizovana izlazna kutija
9	Oznaka sa elektro simbolima
10	Okca za podizanje
11	Izlazne LV šine
12	Magnetno jezgro
13	Pritisne kleme za namotaje
14	Ulazni MV priključci

Distribution Cast Resin Transformers
Distributivni Suvi Transformatori

IEC 60076
STANDARD

Table 1.1

TRANSFORMERS UP TO CLASS 12 KV – STANDARD LOSSES (CoBk) TRANSFORMATORI DO KLASA 12 KV – STANDARDNI GUBICI (CoBk)																
Power / Snaga (kVA)	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk%	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6
Po (W)	300	440	610	715	820	960	1150	1300	1500	1800	2100	2500	2800	3600	4300	5300
Pcc75° (W)	1250	1760	2380	2690	3090	3620	4330	5390	6460	7960	8840	10610	12830	15920	18580	23000
Pcc120°(W)	1420	2000	2700	3050	3500	4100	4900	6100	7300	9000	10000	12000	14500	18000	21000	26000
Lpa (dB)	48	59	62	64	65	67	68	69	70	71	73	75	76	78	81	83
A (mm)	1040	1100	1200	1300	1300	1300	1400	1400	1500	1500	1600	1700	1700	1800	1800	2100
B (mm)	670	670	670	670	670	820	820	820	820	1000	1000	1000	1000	1300	1300	1300
C (mm)	1100	1200	1200	1300	1300	1400	1400	1500	1600	1700	1800	1900	2200	2200	2300	2500
D (mm)	520	520	520	520	520	670	670	670	670	820	820	820	820	1070	1070	1070
E (mm)	125	125	125	125	125	125	125	125	125	125	125	125	200	200	200	200
Weight / Težina (kg)	400	510	770	890	1020	1140	1300	1510	1800	2110	2450	2820	3350	3980	4830	5710

Table 2.1

TRANSFORMERS UP TO CLASS 24 KV – STANDARD LOSSES (CoBk) TRANSFORMATORI DO KLASA 24 KV – STANDARDNI GUBICI (CoBk)																
Power / Snaga (kVA)	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk%	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6
Po (W)	480	600	870	990	1100	1280	1200	1450	1650	2000	2300	2800	3100	4000	5000	6000
Pcc75° (W)	1410	1540	2210	2630	3050	3690	4860	5790	6720	8310	9730	11500	14150	15920	20350	24770
Pcc120°(W)	1570	1750	2500	2980	3450	4170	5500	6550	7600	9400	11000	13000	16000	18000	23000	28000
Lpa (dB)	49	59	62	64	65	67	68	69	70	72	73	75	76	78	81	83
A (mm)	1040	1100	1100	1300	1300	1300	1400	1400	1500	1600	1600	1800	1800	1900	2100	2100
B (mm)	670	670	670	670	670	820	820	820	820	1000	1000	1000	1000	1300	1300	1300
C (mm)	1100	1200	1200	1300	1300	1400	1400	1500	1600	1700	1800	2000	2200	2300	2300	2500
D (mm)	520	520	520	520	520	670	670	670	670	820	820	820	820	1070	1070	1070
E (mm)	125	125	125	125	125	125	125	125	125	125	125	125	200	200	200	200
Weight / Težina (kg)	430	580	820	960	1090	1220	1400	1590	1790	2190	2600	3100	3600	4260	4920	5890

Table 3.1

TRANSFORMERS UP TO CLASS 36 KV – STANDARD LOSSES (CoBk) TRANSFORMATORI DO KLASA 36 KV – STANDARDNI GUBICI (CoBk)												
Power / Snaga (kVA)	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk%	6	6	6	6	6	6	6	6	6	6	6	6
Po (W)	1280	1500	1650	1950	2200	2700	3100	3600	4200	5000	5800	670
Pcc75° (W)	3360	4150	4770	5840	6630	7960	9730	11500	14150	16370	19910	24330
Pcc120°(W)	3800	4700	5400	6600	7500	9000	11000	13000	16000	18500	22500	27500
Lpa (dB)	67	68	69	70	71	72	73	75	76	78	81	83
A (mm)	1500	1500	1500	1600	1800	1800	1800	1900	2100	2100	2300	2400
B (mm)	670	670	820	820	820	1000	1000	1000	1050	1300	1300	1300
C (mm)	1600	1700	1800	1800	2000	2200	2300	2400	2700	2700	2800	2900
D (mm)	520	520	670	670	670	820	820	820	820	1070	1070	1070
E (mm)	125	125	125	125	125	125	125	200	200	200	200	200
Weight / Težina (kg)	1530	1650	1820	2040	2480	2760	3130	3640	4320	5090	6300	7470

All dimensions & weights are indicative.
Dimenzije i težine su samo u informativne svrhe.

Distribution Cast Resin Transformers
Distributivni Suvi Transformatori

IEC 60076
STANDARD

Table 1.2

TRANSFORMERS UP TO CLASS 12 KV – REDUCED LOSSES (BoBk) TRANSFORMATOI DO KLASA 12 KV – SMANJENI GUBICI (BoBk)																
Power / Snaga (kVA)	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk%	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6
Po (W)	230	330	450	540	610	750	880	1000	1150	1300	1500	1800	2200	2600	3200	3800
Pcc75° (W)	1250	1760	2380	2690	3090	3620	4330	5390	6460	7960	8840	10610	12830	15920	18580	23000
Pcc120°(W)	1420	2000	2700	3050	3500	4100	4900	6100	7300	9000	10000	12000	14500	18000	21000	26000
Lpa (dB)	41	51	54	56	57	59	60	61	62	65	67	69	71	73	75	77
A (mm)	1040	1100	1200	1300	1300	1300	1400	1400	1500	1500	1600	1700	1700	1800	1800	2100
B (mm)	670	670	670	670	670	820	820	820	820	1000	1000	1000	1000	1300	1300	1300
C (mm)	1100	1200	1200	1300	1300	1400	1400	1500	1600	1700	1800	1900	2200	2200	2300	2500
D (mm)	520	520	520	520	520	670	670	670	670	820	820	820	820	1070	1070	1070
E (mm)	125	125	125	125	125	125	125	125	125	125	125	125	200	200	200	200
Weight / Težina (kg)	410	540	760	900	1040	1150	1320	1490	1750	2120	2520	2880	3400	4120	4890	5660

Table 2.2

TRANSFORMERS UP TO CLASS 24 KV – REDUCED LOSSES (BoBk) TRANSFORMATOI DO KLASA 24 KV – SMANJENI GUBICI (BoBk)																
Power / Snaga (kVA)	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk%	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6
Po (W)	300	400	580	570	800	950	940	1100	1250	1500	1800	2100	2400	3000	3600	4300
Pcc75° (W)	1410	1540	2210	2960	3050	3690	4860	5790	6720	8310	9730	11500	14150	15920	20350	24770
Pcc120°(W)	1570	1750	2500	3350	3450	4170	5500	6550	7600	9400	11000	13000	16000	18000	23000	28000
Lpa (dB)	49	51	54	56	57	59	60	61	62	64	65	67	68	70	71	74
A (mm)	1040	1100	1300	1300	1300	1400	1400	1400	1500	1600	1600	1800	1800	1900	2100	2100
B (mm)	670	670	670	670	670	820	820	820	820	1000	1000	1000	1000	1300	1300	1300
C (mm)	1100	1200	1200	1200	1300	1400	1400	1500	1600	1700	1800	2000	2200	2300	2300	2500
D (mm)	520	520	520	520	520	670	670	670	670	820	820	820	820	1070	1070	1070
E (mm)	125	125	125	125	125	125	125	125	125	125	125	125	200	200	200	200
Weight / Težina (kg)	460	600	860	920	1170	1320	1340	1660	1840	2330	2860	3230	3860	4340	5170	6240

Table 3.2

TRANSFORMERS UP TO CLASS 36 KV – REDUCED LOSSES (BoBk) TRANSFORMATOI DO KLASA 36 KV – SMANJENI GUBICI (BoBk)												
Power / Snaga (kVA)	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk%	6	6	6	6	6	6	6	6	6	6	6	6
Po (W)	1100	1250	1300	1500	1600	1900	2250	2600	3000	3500	4200	5000
Pcc75° (W)	3360	4150	4770	5840	6630	7960	9730	11500	14150	16370	19910	24330
Pcc120°(W)	3800	4700	5400	6600	7500	9000	11000	13000	16000	18500	22500	27500
Lpa (dB)	64	65	65	67	68	69	70	72	73	74	78	81
A (mm)	1500	1500	1500	1600	1800	1800	1800	1900	2100	2100	2300	2400
B (mm)	670	670	820	820	820	1000	1000	1000	1050	1300	1300	1300
C (mm)	1600	1700	1800	1800	2000	2200	2300	2400	2700	2700	2800	2900
D (mm)	520	520	670	670	670	820	820	820	820	1070	1070	1070
E (mm)	125	125	125	125	125	125	125	200	200	200	200	200
Weight / Težina (kg)	1580	1750	1910	2090	2590	2950	3230	3850	4700	5260	6470	7720

All dimensions & weights are indicative.
Dimenzije i težine su samo u informativne svrhe.

The European Union Regulation No. 548/2014

The European Union Regulation No. 548/2014 issued on 21 May 2014 imposes limits on the permitted levels of losses for transformers placed on the market or put into service within the EU countries from 1 July 2015. The aim of the regulation is to prevent non-efficient products from being placed on the market and thus reduce electrical losses. This Regulation becomes mandatory by European Law on 1 July 2015 (Tier 1) with an additional reduction of losses from 1 July 2021 (Tier 2). Another important change from the past is that the maximum permitted values of Load losses (Pk) and No-Load losses (Po) cannot be exceeded, which means that no loss tolerance is allowed.

The Regulation has the following objectives:

- Reduction of operating costs
- Reduction of greenhouse gases emission
- Reduction of needs for additional power capacity

The Regulation applies to the following transformers:

- All transformers above 1 kVA with voltage higher than 1,1 kV
- Dry-type distribution transformers with high voltage winding above 1.1kV up to 36 kV
- Dry-type medium power transformers above 3150 kV up to 10 MVA

The Regulation shall not apply to transformers specifically designed e.g.:

- instrument transformers
- earthing or grounding transformers
- starting transformers
- testing transformers
- welding transformers

Power Sp. z o.o. has prepared to meet Ecodesign requirements, therefore all the transformers described herein fully comply with EU Regulation 548/2014 and European Standard EN 50588-1.

The results of routine and type tests performed by an external laboratory according to the new EU Regulations are available upon request.

Regulativa br. 548/2014

Regulativa Evropske unije br. 548/2014 objavljena 21. Maj 2014. nameće ograničenja na dozvoljene nivoe gubitaka za transformatore isporučene ili puštene u upotrebu u okviru zemalja EU od 1. jula 2015 godine. Cilj ove regulative je da spreči neefikasne proizvode na tržištu i time smanji električne gubitke. Ova Uredba postaje obavezna po Evropskom zakonu od 1. jula 2015. godine (Tier 1) sa dodatnim smanjenjem gubitaka od 1. jula 2021. godine (Tier 2). Još jedna važna promena od predhodnih je ta da maksimalno dozvoljene vrednosti gubitaka (Pk) i gubici bez opterećenja (Po) ne mogu biti prekoračeni, što znači da nije dozvoljena tolerancija gubitka.

Regulativa ima sledeće ciljeve:

- Smanjenje operativnih troškova
- Smanjenje emisije gasova
- Smanjenje potreba za dodatnim kapacitetom napajanja.

Regulativa se primjenjuje na sledeće transformatore:

- Svi transformatori iznad 1 kVA sa naponom višim od 1,1 kV
- Transformatori suvog tipa sa visokonaponskim namotajima iznad 1.1kV do 36 kV
- Srednjenaponski energetski transformatori suvog tipa iznad 3150 kV do 10 MVA

Regulativa se ne primjenjuje na posebno dizajnirane transformatore:

- merni transformatori
- izolacioni transformatori
- startni transformatori
- transformatori za testiranje
- transformatori za zavarivanje

Pover Sp. Z.o.o. je spreman da ispuni zahteve Ecodesign-a, stoga svi transformatori koji su ovde opisani u potpunosti su u skladu sa Uredbom EU 548/2014 i evropskim standardom EN 50588-1.

Rezultati rutinskih i tipskih testova sprovedenih od strane eksterne laboratorije prema novim propisima EU dostupni su na zahtev.

Isolation / Izolacija HV: 12/28/75 kV
Isolation / Izolacija LV: 1,1/3- kV
Frequency / Frekvencija: 50Hz
Tapping / Tapping: +/-2x2,5%
No tolerance on the losses / Bez tolerancije na gubitke

TRANSFORMERS UP TO CLASS 12 kV IMPEDANCE 4% TRANSFORMATORI DO KLASA 12 kV IMPEDANCE 4%									
Power [kVA] Snaga [kVA]	50	100	160	200	250	315	400	500	630
Uk [%]	4	4	4	4	4	4	4	4	4
Po [W]	200 (A0)	280 (A0)	400 (A0)	450 (A0)	520 (A0)	610 (A0)	750 (A0)	900 (A0)	1100 (A0)
Pk at 120 °C [W]	1700 (Bk)	2050 (Bk)	2900 (Bk)	3300 (Bk)	3800 (Bk)	4530 (Bk)	5500 (Bk)	6410 (Bk)	7600 (Bk)
LpA [dB]	38	39	42	43	44	46	47	48	49
Length A [mm] Dužina A [mm]	1040	1100	1100	1200	1200	1300	1300	1400	1400
Width B [mm] Širina B [mm]	670	670	670	670	670	670	820	820	820
Height C [mm] Visina C [mm]	1040	1225	1315	1350	1435	1560	1535	1595	1750
Wheel Base D [mm] Dimenzije točka D [mm]	520	520	520	520	520	520	670	670	670
Weight [kg] Težina [kg]	550	740	860	1030	1140	1280	1500	1650	2000

The dimensions and weights are for information purposes only / Dimenzije i težine su samo u informativne svrhe.

Isolation / Izolacija HV: 12/28/75 kV
Isolation / Izolacija LV: 1,1/3- kV
Frequency / Frekvencija: 50Hz
Tapping / Tapping: +/-2x2,5%
No tolerance on the losses / Bez tolerancije na gubitke

TRANSFORMERS UP TO CLASS 12 kV IMPEDANCE 6% TRANSFORMATORI DO KLASA 12 kV IMPEDANCE 6%																
Power [kVA] Snaga [kVA]	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk [%]	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Po [W]	200 (A0)	280 (A0)	400 (A0)	450 (A0)	520 (A0)	610 (A0)	750 (A0)	900 (A0)	1100 (A0)	1300 (A0)	1550 (A0)	1800 (A0)	2200 (A0)	2600 (A0)	3100 (A0)	3800 (A0)
Pk at 120 °C [W]	1700 (Bk)	2050 (Bk)	2900 (Bk)	3300 (Bk)	3800 (Bk)	4530 (Bk)	5500 (Bk)	6410 (Bk)	7600 (Bk)	8000 (Ak)	9000 (Ak)	11000 (Ak)	13000 (Ak)	16000 (Ak)	19000 (Ak)	22000 (Ak)
LpA [dB]	38	39	42	43	44	46	47	48	49	50	51	53	53	55	56	59
Length A [mm] Dužina A [mm]	1040	1100	1100	1200	1200	1200	1300	1400	1400	1500	1500	1700	1700	1800	1900	2000
Width B [mm] Širina B [mm]	670	670	670	670	670	670	820	820	820	1000	1000	1000	1000	1300	1300	1300
Height C [mm] Visina C [mm]	1015	1130	1235	1350	1375	1375	1440	1560	1730	1715	1870	2085	2310	2330	2500	2570
Wheel Base D [mm] Dimenzije točka D [mm]	520	520	520	520	520	520	670	670	670	820	820	820	820	1070	1070	1070
Weight [kg] Težina [kg]	510	695	800	1045	1065	1210	1500	1820	2050	2300	2800	3400	4200	4850	6400	6790

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Distribution Cast Resin Transformers
Distributivni Suvi Transformatori

ECOLINE
EU 548/2014
EN 50588-1

Isolation / Izolacija HV: 24/50/125 kV
Isolation / Izolacija LV: 1,1/3- kV
Frequency / Frekvencija: 50Hz
Tapping / Tapping: +/-2x2,5%
No tolerance on the losses / Bez tolerancije na gubitke

TRANSFORMERS UP TO CLASS 24 kV IMPEDANCE 6% TRANSFORMATORI DO KLASA 24 kV IMPEDANCE 6%																
Power [kVA] Snaga [kVA]	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk [%]	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Po [W]	200 (A0)	280 (A0)	400 (A0)	450 (A0)	520 (A0)	610 (A0)	750 (A0)	900 (A0)	1100 (A0)	1300 (A0)	1550 (A0)	1800 (A0)	2200 (A0)	2600 (A0)	3100 (A0)	3800 (A0)
Pk at 120 °C [W]	1700 (Ak)	2050 (Bk)	2900 (Bk)	3300 (Bk)	3800 (Bk)	4530 (Bk)	5500 (Bk)	6410 (Bk)	7600 (Bk)	8000 (Ak)	9000 (Ak)	11000 (Ak)	13000 (Ak)	16000 (Ak)	19000 (Ak)	22000 (Ak)
LpA [dB]	38	39	42	43	44	46	47	48	48	50	51	53	53	55	56	59
Length A [mm] Dužina A [mm]	1040	1200	1200	1200	1200	1300	1300	1400	1450	1500	1700	1700	1800	1900	1900	2000
Width B [mm] Širina B [mm]	670	670	670	670	670	670	820	820	820	1000	1000	1000	1000	1300	1300	1300
Height C [mm] Visina C [mm]	1105	1210	1185	1385	1360	1370	1440	1545	1715	1715	2000	2045	2195	2350	2500	2570
Wheel Base D [mm] Dimenzije točka D [mm]	520	520	520	520	520	520	670	670	670	820	820	820	820	1070	1070	1070
Weight [kg] Težina [kg]	640	750	1000	1100	1260	1400	1630	1750	2060	2700	3010	3330	4170	5420	6500	7180

The dimensions and weights are for information purposes only / Dimenzije i težine su samo u informativne svrhe.

Isolation / Izolacija HV: 36/70/170 kV
Isolation / Izolacija LV: 1,1/3- kV
Frequency / Frekvencija: 50Hz
Tapping / Tapping: +/-2x2,5%
No tolerance on the losses / Bez tolerancije na gubitke

TRANSFORMERS UP TO CLASS 36 kV IMPEDANCE 6% TRANSFORMATORI DO KLASA 36 kV IMPEDANCE 6%																
Power [kVA] Snaga [kVA]	50	100	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150
Uk [%]	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Po [W]	230 (A0)	320 (A0)	460 (A0)	520 (A0)	590 (A0)	710 (A0)	860 (A0)	1030 (A0)	1260 (A0)	1490 (A0)	1780 (A0)	2070 (A0)	2530 (A0)	2990 (A0)	3560 (A0)	4370 (A0)
Pk at 120 °C [W]	1870 (Bk)	2250 (Bk)	3190 (Bk)	3630 (Bk)	4180 (Bk)	4980 (Bk)	6050 (Bk)	7050 (Bk)	8360 (Bk)	8800 (Ak)	9900 (Ak)	12100 (Ak)	14300 (Ak)	17600 (Ak)	20900 (Ak)	24200 (Ak)
LpA [dB]	41	43	44	44	45	46	47	48	49	49	50	52	53	56	57	60
Length A [mm] Dužina A [mm]	1300	1350	1400	1550	1550	1550	1600	1650	1700	1750	1800	1900	1950	2000	2300	2400
Width B [mm] Širina B [mm]	670	670	670	670	670	820	820	820	820	1000	1000	1000	1000	1300	1300	1300
Height C [mm] Visina C [mm]	1555	1605	1620	1775	1675	1785	1940	1955	2100	2195	2395	2445	2730	2725	2675	2915
Wheel Base D [mm] Dimenzije točka D [mm]	520	520	520	520	520	670	670	670	670	820	820	820	820	1070	1070	1070
Weight [kg] Težina [kg]	860	1040	1340	1610	1600	1800	2000	2220	2500	3010	3650	3920	4900	5990	7200	8650

The dimensions and weights are for information purposes only / Dimenzije i težine su samo u informativne svrhe.

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