Toroidal fixed transformers
Useful facts about toroidal fixed transformers

Wide range of toroidal fixed transformers for any application

REO has been developing and manufacturing toroidal fixed transformers for more than 25 years. It constantly implements optimisations in development and production processes and thus, ensures continuous further development and an increase in efficiency of the components.

Toroidal fixed transformers are mainly used when compact power supplies are required. The components are used in the entire field of electronics and electrical engineering and in addition to the small dimensions, they have many other considerable advantages compared to conventional transformers.

In general all manufactured transformers are tested in accordance with the EN ISO 9001 standard at the in-house laboratory and only approved once the single test has been passed. Other standards used for the toroidal fixed transformers:

- DIN EN 61558-2-1; DIN EN 61558-2-2; DIN EN 61558-2-4; DIN EN 61558-2-6; DIN EN 61558-2-13
- DIN EN 60601-1
- UL/cRU-certified according to OBJY2/OBJY8.E251513: Approved class B insulation system
Guarantee

Winning quality - extra peace of mind, thanks to the expanded REO manufacturer’s guarantee.

We believe in the quality of our own products and are confident of the durability of all components used, which is why we have extended the legal guarantee from one to two years.

Safety

We offer you devices with the highest possible operational safety. Should any unwanted events occur with any of our products, your professional emergency responder will be available to help you over the telephone free of charge. If the situation or query cannot be resolved over the telephone, you have the opportunity to have the defective device sent back after consultation.

Repairs

After telephone consultation, and after the defective product has been received, we can even offer you express repairs if possible. This minimises downtime in the event of a fault and guarantees a swift exchange.

Hotline

Our REO sales specialists look forward to giving you a helping hand. Contact your REO contact partner or call our hotline to receive further information about our services and the REO portfolio.
## Toroidal fixed transformers

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**Low energy consumption**

**REO toroidal fixed transformers for efficient energy and cost reduction**

Thanks to increased burdens on the environment and the resulting environmental awareness, the topic of energy efficiency is back in the spotlight. REO toroidal fixed transformers help achieve this goal. The following illustration compares the leakage values between a commercially available transformer and a toroidal fixed transformer with different performance values. The direct comparison makes the extreme leakage differences easy to recognise.

**REO Advantages**

- Attractive price structure even for small quantities
- Individual solutions adapted to your application
- Rapid production of your standard or specific solution due to a range of cores available in stock
- In-house core production
- REO speaks your language: Due to our distribution centres worldwide we are always close to the customer. Regardless of what language you speak, which time zone you live in or which currency you use - an REO office is in your vicinity and it guarantees a quick, efficient and cost-effective processing of your order.

**Advantages of toroidal fixed transformers**

- High energy savings
- Weight reduction of up to 50%
- Very low internal losses
- Low magnetic stray field
- Low development of humming sounds and noise
- Full sealing protects the toroidal fixed transformer when used in an aggressive environment
- UL-listed materials
- High safety level of downstream control systems or consumers
- Safe electrical separation
- Set-up of SELV circuits
- Protection class II prepared
- Small dimensions as well as a high level of efficiency
- Flexible adjustment of the dimensions to your requirements
- Diverse DIN-compliant mounting connections with a large number of housing designs
- Optional with temperature switch or thermal fuse

**Efficient energy reduction**

Comparison of leakages between a standard transformer and a REO toroidal fixed transformer. The actual energy savings soon become clear.

*Leakages at operating temperature*
Toroidal fixed transformer, open

Toroidal fixed transformer in open design as a mains, auto, safety or isolation transformer

Toroidal fixed transformers have significant advantages over conventional transformers: their construction results in up to 50% less volume and low weight. Since the ring cores have almost no air gap, only a very low magnetic stray field is produced and the transformers are almost hum-free. The change in secondary voltage between idling and full load is much smaller than with transformers with a nested core.

Advantages

- Adaptation of mains voltage to different output voltages
- No humming
- Low magnetic stray field
- Low voltage drop
- Minimum overall weight
- Small dimensions
- Connection with free wire or stranded wires
- Mounting set available as accessory
- Standards: EN 61558; EN 60601

Technical data

<table>
<thead>
<tr>
<th>Toroidal fixed transformer, open</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power</td>
<td>10 - 6000 VA</td>
</tr>
<tr>
<td>Input voltage</td>
<td>230 V</td>
</tr>
<tr>
<td>Output voltage</td>
<td>24 - 690 V</td>
</tr>
<tr>
<td>Rated current</td>
<td>max. 50 A</td>
</tr>
<tr>
<td>Frequency range</td>
<td>50 - 400 Hz</td>
</tr>
<tr>
<td>Temperature class</td>
<td>T40/E and T40/B</td>
</tr>
</tbody>
</table>

*Special voltages and higher powers on request
Toroidal fixed transformer with sealed centre hole

Toroidal fixed transformer with sealed centre hole as a mains, auto, safety or isolation transformer

The toroidal fixed transformers with sealed centre hole or sealed socket have the same advantages as the open transformers, however, offer a good mounting solution for the transformers. The costs for an additional mounting option are cut in this series of transformers and replaced by a central screw, which only requires a short set-up time. A safe distance to the mounting surface is ensured.

Advantages

- Integrated mounting plate with partial sealing
- No humming
- Low magnetic stray field
- Low voltage drop
- High degree of efficiency
- Direct mounting option with just one screw
- Safe distance to the mounting surface
- Connection with wires or stranded wires
- Standards: EN 61558; EN 60601

Technical data

<table>
<thead>
<tr>
<th>Toroidal fixed transformer with sealed centre hole*</th>
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</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

*Special voltages and higher powers on request
Fully sealed toroidal fixed transformer

Fully sealed toroidal fixed transformer as a mains, auto, safety or isolation transformer

All the advantages of the toroidal fixed transformer are combined in fully sealed toroidal fixed transformers in a special plastic housing. The shape of the housing is perfectly adapted to the application. The plastic housing offers optimal mechanical protection against humidity and dust and also offers better thermal conductivity which results in an increased power density. The mounting is carried out by means of a central screw and thus, allows for a short set-up time.

Advantages

- Fully sealed in the plastic housing
- High degree of efficiency
- Very low no-load losses
- No humming
- Low voltage drop
- Protection class IP 54 (for the fully sealed housing)
- Low magnetic stray field
- Optimal mechanical protection
- Protection against humidity and dust
- Even heat distribution
- Connects with wires, strands or clamps according to VBG 4
- Standards: EN 61558; EN 60601

Technical data

<table>
<thead>
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<th>Fully sealed toroidal fixed transformer*</th>
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<tbody>
<tr>
<td>Rated power</td>
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<tr>
<td>Input voltage</td>
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<tr>
<td>Output voltage</td>
</tr>
<tr>
<td>Rated current</td>
</tr>
<tr>
<td>Frequency range</td>
</tr>
<tr>
<td>Temperature class</td>
</tr>
</tbody>
</table>

*Special voltages and higher powers on request
High current transformer

High-current transformers according to the current transformer principle

High-current transformers enable the simple transformation of very small primary currents into very high secondary currents. The compact and robust structure is already provided with reinforced insulation. As a result, uncoated copper bars that are already safely insulated on the primary side, without any additional measures, can be used as a secondary winding.

The high-current transformers are completely pre-assembled on stable aluminium profiles and provided with terminals according to VBG 4. In addition, a connection is provided for the grounding of the mounting rails. Due to parallel connection being possible, even higher output currents can be achieved.

Typical areas of application are: Test devices for switchgears as well as lifting gates to examine the current and heating tests of the switching contacts.

Advantages

- Partial sealing with large push-through opening for cable rails or busbars
- Compact design
- Very low magnetic stray field
- Simply and quick assembly
- High electro-magnetic compatibility without additional components
- Pre-assembled on aluminium rails with clamps according to VBG 4
- Standard: EN 61558

Technical data

<table>
<thead>
<tr>
<th>High current transformer</th>
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<tbody>
<tr>
<td>Rated power</td>
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<tr>
<td>Input voltage</td>
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<tr>
<td>Output voltage</td>
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<tr>
<td>Rated current</td>
</tr>
<tr>
<td>Frequency range</td>
</tr>
<tr>
<td>Temperature class</td>
</tr>
</tbody>
</table>
Housing and interference suppression transformer

Transformer with special segregated windings

A damping of up to 90 dB is achieved with specially wound isolating transformers in segregated windings due to the low-capacitance design and an additional high-quality filter. An isolating transformer ensures additional safety - even for experimental constructions.

Advantages

- Fault clearance of sources of interference, operation on contaminated networks
- Integrated mains input socket, power switch, device fuse and output socket
- Free-of-ground output voltage to establish an IT network
- Galvanic mains separation
- High insulation resistance
- Low-capacitance isolating transformer
- Broadband interference suppression
- Integrated mains filter with high damping
- Transportable with handle

Standard EN 61558
## Technical data

### Interference suppression transformer

<table>
<thead>
<tr>
<th>Typ</th>
<th>Rated power (VA)</th>
<th>Voltage (V)</th>
<th>Electrical current (A)</th>
<th>Dimension</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFT/SST-300</td>
<td>300</td>
<td>230</td>
<td>Primary current 1,3</td>
<td>A (mm) 175</td>
<td>B (mm) 165</td>
</tr>
<tr>
<td>RFT/SST-600</td>
<td>600</td>
<td>230</td>
<td>Primary current 2,6</td>
<td>A (mm) 175</td>
<td>B (mm) 165</td>
</tr>
<tr>
<td>RFT/SST-900</td>
<td>900</td>
<td>230</td>
<td>Primary current 3,9</td>
<td>A (mm) 175</td>
<td>B (mm) 165</td>
</tr>
</tbody>
</table>

Maximum production range: up to 0.9 kVA, primary/secondary voltages: 230 V, rated currents: up to 3.9 A
Damping measurement

Rated power 300 VA

![Graph showing damping measurement for 300 VA transformer.]

Rated power 600 VA

![Graph showing damping measurement for 600 VA transformer.]

Rated power 900 VA

![Graph showing damping measurement for 900 VA transformer.]

Symmetrical measurement

Asymmetrical measurement

Housing and interference suppression transformer
Three-phase toroidal fixed transformer

Three-phase isolating transformer

The three-phase toroidal fixed transformer is used for protective separation between both alternating voltage networks (through double or reinforced insulation, optimal: shielding winding).

Advantages

- Use in contamination levels of up to PD3
- Protection class IP 00 to IP 54 (with terminal boxes)
- Shock and vibration-resistant design (upon request)
- Use of high-quality cores for the minimisation of power loss
- Flexible adjustment to customer specifications (modified voltage ratio, voltage taps, performance values, high level of protection, temperature monitoring, additional windings and alternative switch groups possible)
- Optional: All materials upon request in accordance with REO UL-System E251513
- Standards: EN 61558

Three-phase toroidal fixed transformer

Technical data

<table>
<thead>
<tr>
<th>Three-phase toroidal fixed transformer*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power</td>
<td>600 - 15.000 VA</td>
</tr>
<tr>
<td>Input voltage</td>
<td>3 x 400; 3 x 230 V</td>
</tr>
<tr>
<td>Output voltage</td>
<td>3 x 230; 3 x 400 V</td>
</tr>
<tr>
<td>Rated current</td>
<td>up to 3 x 22 A</td>
</tr>
<tr>
<td>Frequency range</td>
<td>50 - 400 Hz</td>
</tr>
<tr>
<td>Temperature class</td>
<td>T40/E and T40/B %</td>
</tr>
</tbody>
</table>

*Special voltages and higher powers on request
Switch-on current limiter with magnetic bias

The switch-on current limiter ED 1/16 enables the direct switching on of single-phase transformers, without triggering upstream safety devices as a result of the inrush current.

The switch-on current limiter can be used for conventional transformers as well as for toroidal and strip-wound transformers.

Advantages

- Protection class IP 00, IP 20
- No excessive inrush current of the transformer
- High transformer switch on frequency possible
- Use of transformers with low-loss sheet metals

Technical data

<table>
<thead>
<tr>
<th>Switch-on current limiter with magnetic bias</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>115 - 230 VA</td>
</tr>
<tr>
<td>Mains frequency</td>
<td>45 - 65 Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>max. 16 A</td>
</tr>
<tr>
<td>Switch-on delay</td>
<td>approx. 500 ms</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>0..45 °C</td>
</tr>
</tbody>
</table>
Switch-on current limiter with damping resistance

REO switch-on current limiters enable the safeguarding of the rated current and the use of automatic circuit breakers.

The areas of application include the inductive and capacitive consumers such as rectifiers, motors (circular saws etc.) and transformers.

Advantages

- Compact design
- Long service life
- Standard rail mounting
- Robust relay technique
- Touch-proof according to VBG 4

Technical data

<table>
<thead>
<tr>
<th>Switch-on current limiter with damping resistance</th>
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<tbody>
<tr>
<td>Input voltage</td>
</tr>
<tr>
<td>Output voltage</td>
</tr>
<tr>
<td>Rated current</td>
</tr>
<tr>
<td>Switch-on delay</td>
</tr>
</tbody>
</table>
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