

# Rittal—The System.

Faster—better—worldwide.



rEMCi transformer substation solution for electromagnetic shielding and energy-efficient cooler

- **Transformer substations**
- **Main distribution boards**
- **Automation and telecommunications facilities**
- **Base stations**
- **Equipment cases**

## electromagnetic compatibility

**rentratek**

ENCLOSURES

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# What is the purpose of EMC shielding?

## Exposure to electromagnetic fields

Exposure to electromagnetic fields is a risk for both people and equipment. Working or standing near transformer substations and other electricity distribution facilities may lead to such exposure.

## Legislation on electromagnetic fields

Directive 2004/40/EC of the European Parliament and of the Council and its amendment 2007/30/EC pertain to the exposure of workers to electromagnetic fields.

The Directive lays down minimum requirements for the protection of workers from risks to their health and safety arising or likely to arise from exposure to electromagnetic fields while working. The Directive must be incorporated into national legislation. In Finland, the Directive will be implemented by a decree of the Ministry of Social Affairs and Health.\*

# What are the solutions for EMC shielding?

## Traditional, non-flexible solution

The traditional solution consists of covering all walls of the facilities with sheet metal.

- Costs and working time are significant expenses
- The solution cannot be expanded in the future.

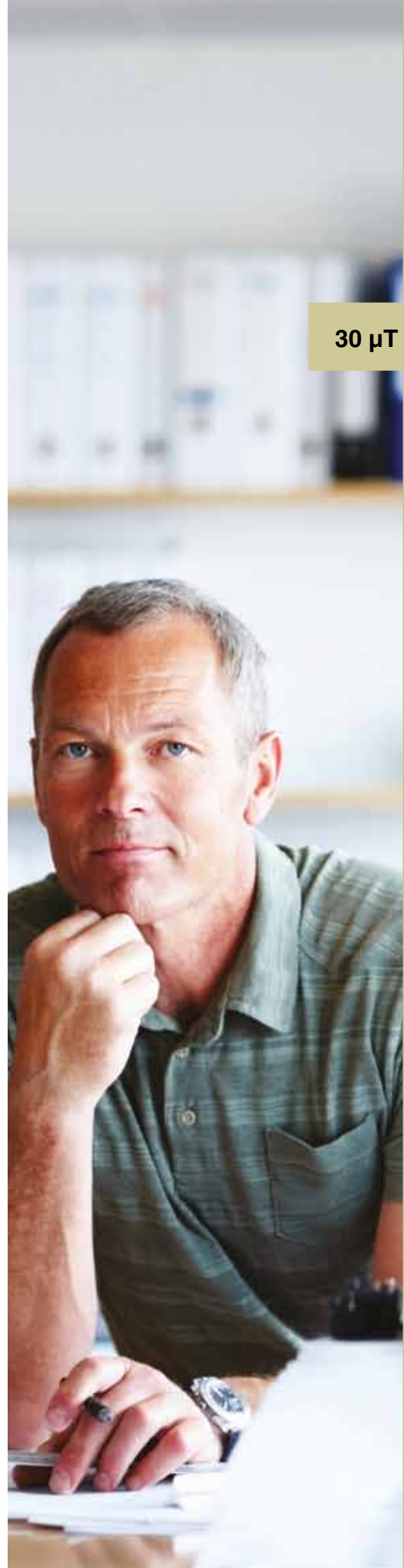
## The rEMCi solution – a new modular, cost-effective solution

Shielding only the radiation source

- A hermetically sealed Faraday cage is built around the transformer.
- The outputs can be handled with encased, shielded bus bars.
- The doors, corners and lead-throughs have rabbets.
- The walls are made of aluminium and are 5 mm thick, and the corners are made of aluminium profile.
- The cable lead-through is; for example, Roxtec's EMC-shielded lead-through flange.
- The modular structure provides flexibility and expandability without compromising the shielding.

\*Source and additional information: <http://www.teknologiateollisuus.fi/fi/a/sahkomagneettiset-kentat.html> (in Finnish)

30  $\mu$ T



100  $\mu$ T

## The rEMCi transformer substation – the result of cooperation between Rittal Oy and Rentrateg Oy

**Optimised energy savings with Rentrateg's rEMCi transformer substation and Rittal's energy-efficient cooler.**

Compared to a traditional transformer substation, the solution developed by Rittal and Rentrateg reduces overall investment costs by at least 30%. With the energy-efficient cooler solution, the operating costs of the transformer substation are significantly lower. The cooling solution and transformer substation only need one third of the space required by a traditional transformer substation solution.

### **Reuse of the heat load produced by the transformer substation**

The loss heat generated in the transformer is most often ventilated away from the transformer facilities into outdoor air. With Rittal's cooling solution, the heat load of the transformer is reused and the transformer operates at optimal temperature regardless of the season. Thanks to its efficient cooling, the transformer can be loaded to its limits. The heat energy produced by the transformer substation is processed into a form suitable for the property – for heating and hot water. The maximum heating and water temperature is 70°C.

The smart measurement system of the transformer substation enables optimised energy savings. The control system minimises electricity distribution risks.

The rEMCi transformer has its own remote control system. Access control and the monitoring of other quantities (e.g., the temperature and possible smoke particles of the operating environment of the transformer) are available as optional features. Smoke particles must be monitored in order to find any loose joints. This measure replaces electric arc protection.

When the temperature of the operating environment of the transformer is controlled, the load capacity of the transformer also grows.



# What is a rEMCi transformer substation?

- Patented, award-winning Finnish solution
- Compliant with legal requirements
- Energy-efficient
  - Cooling with integrated heat recovery
  - Reuse of excess heat from the transformer substation
  - Possibility for remote control of electricity consumption
- Ready-to-use package that speeds up commissioning and reduce construction costs
- Factory-made, tight solution suitable for both construction and renovation projects

## Award-winning and patented

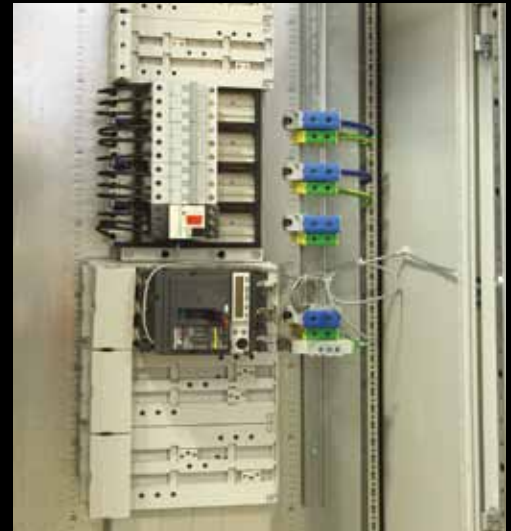
The rEMCi EMC shielding system won the Innosuomi 2011 award and received an honourable mention in the Innovative Product competition at the International Exhibition of Electricity, Telecommunications, Light and Audio Visual 2012 in Jyväskylä. The product is patent-protected.

## The rEMCi shield – benefits

- Cost-effective – sheet metal cover only for the equipment causing the magnetic field or the object to be shielded
- Fast delivery time thanks to factory delivery
- Easy to install in challenging and confined spaces thanks to its modularity and transformability
- Also suitable for renovation projects in addition to construction sites
- Versatile equipment layout as there is no need to take employee exposure to magnetic fields into account
- The heat energy produced by the transformer can be recovered and reused.

## Energy-efficient cooler included

Rittal's energy-efficient cooler consists of carefully optimised, modular equipment with smart heat recovery. The cooler guarantees optimal temperatures for the rEMCi transformer substation regardless of the season.



# Applications

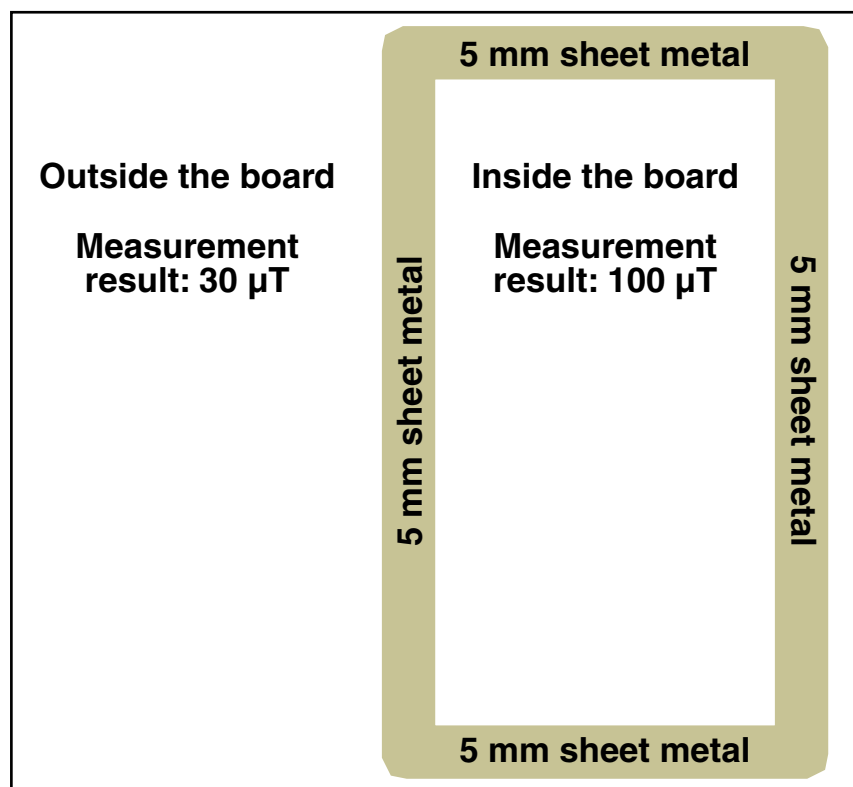
- Transformer substations
- Main distribution boards
- Telecommunications facilities and base stations
- Equipment cases
- Construction sites
- Renovation projects

The rEMCi solution provides shielding for both environmental disturbances caused by equipment and equipment protection from disturbances.

In addition to construction sites, the solution is also suitable for renovation projects. Its modular structure provides flexibility without compromising the level of shielding.

## Measurement result

The 5 mm thick wall of the rEMCi board forms an effective shield that prevents the detrimental effects of the electromagnetic field outside the shield. A NARDA ELT measuring device has been used for the measurement.



# Energy-efficient cooler

Energy-efficient coolers are typically used in machine halls with high heat loads and significant cooling needs. Indoor transformers and other equipment and processes that need cooling are also good targets for use. To be able to use the excess heat, it is essential that the property also need water for heating or hot water.

Energy-efficient coolers can be installed as part of existing cooling systems or for new sites to also take care of cooling and heating.

## New cost-effectiveness

Rittal's energy-efficient cooler consists of carefully optimised, modular equipment with smart heat recovery. For example, the 50 kW cooler has two 25 kW compressors to take advantage of power steps. In addition, small compressors are more efficient.

The new approach is that cooling and heating are both implemented through one cold circuit. This solution is a patented Finnish innovation.

The energy-efficient cooler is at its best when the heat consumption of the property is high and part of the property needs cooling. The modular, ready-to-use package is easy to expand and move as needed. The equipment is built from quality parts and has a long life cycle, which makes the investment even more profitable.

- Smart cooling and heating
- Cooling prioritised in the machine hall
- Excess energy from the heat exchanger to the heating circuit or to hot water
- Logic-controlled process – water to the heating circuit at the right temperature as needed
- Heat regulation; for example, according to the outdoor temperature, fine-tuning with a thermostat
- Hot water of adequate temperature with compressor technology to guarantee the absence of bacteria

## Significant economic gains

- For example, investments in the machine hall environment pay for themselves in as little as about two years. According to calculations carried out for a site, the 50 kW module paid for itself in 1.9 years from energy used for heating. Taking cooling into account, the time decreased to one and a half years. The return on investment period for various applications can be calculated rather reliably when the initial information is available.

Delivery includes a smart energy monitoring system that enables to monitor energy amounts. The system in question serves, for example, as the basis for invoicing.

- Electric energy consumption
- Heating and cooling efficiency
- Heat energy produced
- Cooling power produced
- Remote reading and control

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# Compact 800 A bus bar board with ten fuse-disconnector outlets

The compact 800 A bus bar board is a suitable main or distribution board for sites whose electricity consumption ranges from 200 A to 800 A.

Examples of applications include machine halls, distribution centres, real estate, etc.

## Product information:

- Fuse-disconnectors (10 pcs)  
125–400 A (standard feature)
- Only 0.3 m<sup>2</sup> of floor surface needed
- Installer-friendly assembly
- Selectable handedness
- Upper or lower cabling
- Pre-cabled to connector outlets
- Expandable with five fuse-disconnector outputs
- Filter fan (accessory)
- Also available with EMC shielding
- Delivery time 2 weeks

1,600 A main board with 40 fuse-disconnector outlets also available.





# Rittal–The System.

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- EMC-shielding

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