

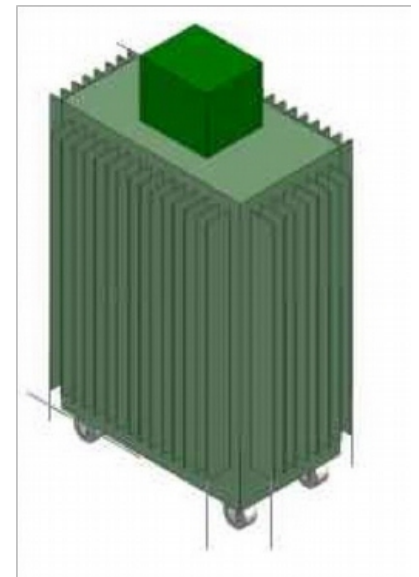
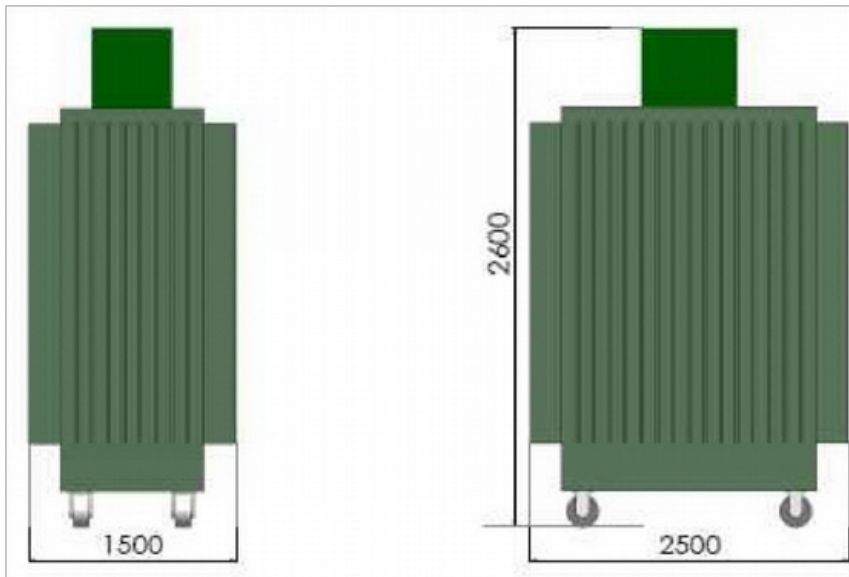


## REC-MAK Series Oil Cooled Rectifier Solutions



480VAC 60Hz / 5500A 60VDC  
Oil Cooled Rectifier

[www.mak-powersis.de](http://www.mak-powersis.de)



Similar to all electrical systems, rectifiers too heat up and need cooling. Due to cooling method applied in the system's influence on both the efficiency and service life length, selection should be done convenient to working conditions and device features. Cooling systems are realized by use of cooling fluids such as air, water, oil etc. and are named after fluid type.

MA series air cooled systems are based on removing heat energy on heated surfaces by air. This has some advantages such as easiness of cleaning and maintenance and being more economic via lack of need to use of external components. As the device becomes ready to service by only establishing electrical connections, setup time and costs diminish. This system is more convenient for work environments without corrosive factors such as acid, humidity in the air.

MO series oil cooled systems uses oil as cooling fluid. All heated components of system are placed in an oil tank and heat is conducted to air by the tank surface contacted to air. The most important advantage of these systems is the safe performance in low aerated and rather dirty work environments. System's essential requirement is cooling oil. This oil could be used for years in condition that it is filtered periodically.

MW series water cooled systems are used for efficient cooling of medium and large power devices, independent of ambient temperature, humidity etc. This offers advantages as existence of smaller devices, use of existing cooling system in most of the facilities and low response to environmental conditions. The most significant advantage is that it provides more effective cooling than other systems, so that operation losses and energy consumption decrease.

Mixed cooling (hybrid) systems are obtained by forced cooling the cooling fluid. Different combinations could give different cooling efficiencies. This is more commonly applied to oil cooled systems. Water or cooling gas driving panels are placed in the oil tank for a better cooling of the oil. Via panels oil is kept at a constant temperature in order to obtain a more efficient cooling. Another application is based on driving tank oil in a cooling unit outside of the tank for keeping constant temperature. In some applications, convenient fans are placed on winglets of the tank's outer surface, so that these fans accelerate heat transfer on tank surface.

A good rectifier depending on its power should be able to continuously provide output power by using any of the systems stated above. Device's heat and performance intensity are the most crucial factors in selection of cooling systems. However, this selection should be done considering any possibility of need or any increase in intensity of the work in the future.



Air Cooled System  
MRA SERIES



Oil Cooled System  
MRO SERIES



Water Cooled System  
MRW SERIES

# REC-MAK Series Rectifier Solutions Oil Cooled 60V DC – 5500A Rectifier

[www.mak-powersis.de/60vdc-rectifier.html](http://www.mak-powersis.de/60vdc-rectifier.html)

|              |           |                                   |
|--------------|-----------|-----------------------------------|
| <b>Input</b> | Power kVA | 380kVA                            |
|              | Voltage   | 480V AC / 50Hz – 60Hz 3 Phase + N |
|              | Current   | 457A (Phase)                      |
|              | Harmonics | >%7                               |



|                          |                         |  |
|--------------------------|-------------------------|--|
| <b>Output</b>            | Power kVA               | 330kW                                      |
|                          | Voltage                 | 60VDC (0.1V Adjust)                        |
|                          | Current                 | 5500A                                      |
|                          | Efficiency              | %87 - %91                                  |
|                          | Ripple                  | <%4  |
| <b>GENERAL</b>           | Technologie             | Thyristor Technologie                      |
|                          | CPU                     | Micro Controller Texas Instruments         |
|                          | Pulse                   | 6 Pulse                                    |
|                          | Color                   | RAL7032                                    |
|                          | Transformer             | Copper                                     |
|                          | Timer                   | Exists Adjustable Working Time             |
|                          | External Stop           | Standard                                   |
|                          | Input Protection        | Thermic Magnetic Circuit Breaker           |
|                          | Over Current Protection | MCCB & Software                            |
|                          | Parallel Operation      | Optional                                   |
|                          | Dry Contacts            | Optional                                   |
|                          | Cooling Type            | Oil Cooled                                 |
|                          | Remote Controller       | 50 Meter (Optional)                        |
|                          | Communication           | SNMP, RS232, RS485, USB, MODBUS (Optional) |
|                          | Working Temperature     | 0C / +50C Celcius                          |
|                          | Protection Additional   | Standard Information                       |
|                          | Over Current Protection | Via Software                               |
|                          | Voice (1m)              | <65Db                                      |
|                          | LCD                     | LCD Screen with buttons                    |
|                          | Cooling Power           | Max 43000                                  |
| Standard Protection      | EN 62040-1              |  |
| Standard EMC             | EN 62040-2              |  |
| Working Altitude         | 2200 Meter              |  |
| <b>Rectifier Cabinet</b> | Width mm                | 2500                                       |
|                          | Depth mm                | 1500                                       |
|                          | Height mm               | 2600                                       |
|                          | Weight kg (Without Oil) | 37700kg + 21 Barrels Oil                   |
|                          | Protection Class        | IP44                                       |

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