

# SIEMENS



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## Sitras REC-W

### Withdrawable diode rectifier for DC traction power supply

These withdrawable diode rectifiers are designed to supply traction power to DC operated rail systems.

The Sitras® REC-W is based on the service-proven series of fixed installed diode rectifiers using air-cooled disc-type diodes with a high blocking voltage.

#### Features

- Optimized design for combined installation with DC switchgear Sitras DSG
- Enables compact dimensions due to elimination of the incoming/return line panel for the DC switchgear
- Easy maintenance thanks to withdrawable truck
- High capacity, high overload capability
- Type-tested to IEC 60146-1-1 and EN 50328
- Reliable, low maintenance requirements as a result of robust mechanical and electrical design

#### Technical data

Nominal voltage $U_n$	[V]	600 / 750	1,500
Peak inverse voltage of diodes $U_{RRM}^*$ (Option)	[V]	2,200	4,000 (4,600)
Maximum rated current $I_{dN}^*$ (depending on load class and number of parallel diodes)	[A]	3,420	2,640
Width	[mm]	800	800
Height	[mm]	2,200	2,200
Depth*	[mm]	1,400	1,400
Maximum ambient temperature**	[°C]	+40	+40
Maximum installation height above sea level**	[m]	1,000	1,000
Degree of protection acc. to IEC 60529		IP20	IP20

\* other values on request

\*\* without current decrease

# Design

The diode rectifier is designed as a sheet-steel cubicle for indoor installation and consists of a fixed part and a withdrawable truck. The fixed part and withdrawable truck are connected to each other by a system of contacts.

## Fixed part

The low voltage compartment is located behind the top front door. This is where the control and protection equipment is integrated.

Behind the bottom front door is the withdrawable truck, which can occupy the operating or the disconnecting position inside the cubicle. When the truck is withdrawn, the closed door ensures that the system is encapsulated.

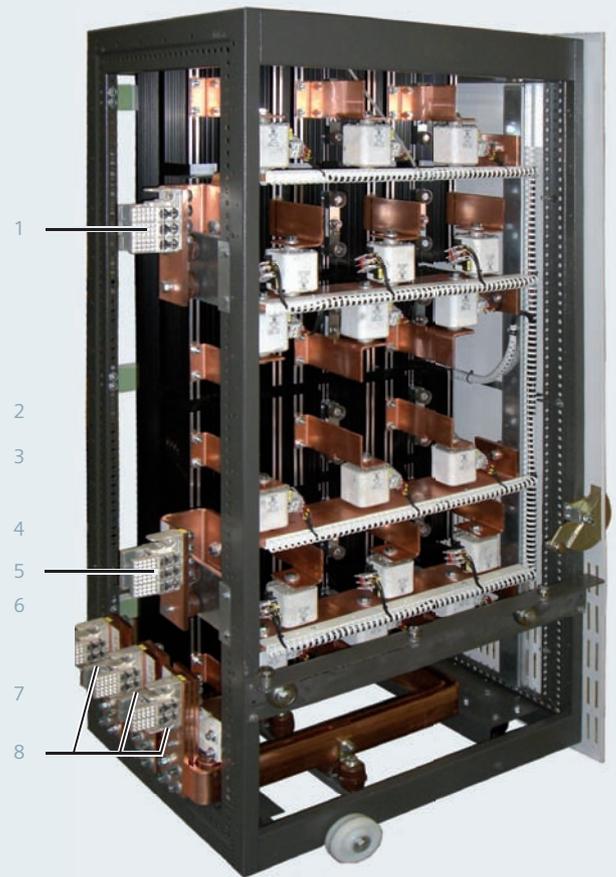
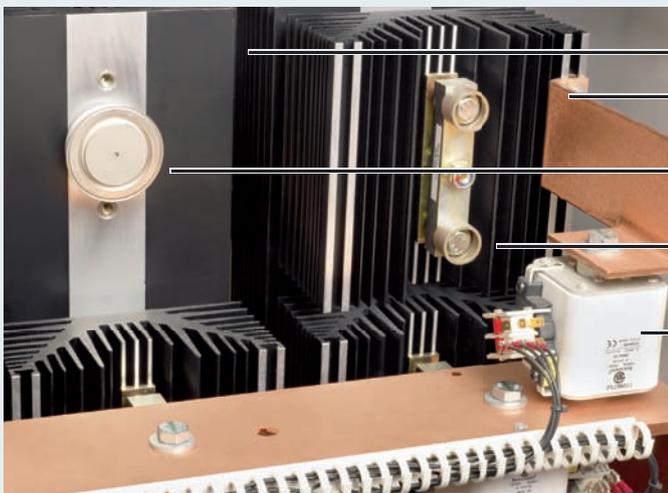
The combined RC and base-load elements are bolted in the fixed part. As an option, a shutter can also be provided for protection against electric shock.

In the case of the DC power terminals, L+ is arranged as a busbar connection at the side and L- as a cable connection in the downward direction. The AC power terminals are also arranged downwards.

All the main components are easily accessible from the front (the cubicle is suitable for mounting against a wall) and can be easily replaced.

## Truck

The diode sets are arranged on the truck and consist of disc-type diodes cooled from both sides. The disc is cooled by a heat sink on one side and by cooling bars on the other. The massive cooling bars extend over a number of diode locations and give the structure a high stability. The heat sinks and cooling bars are made of the same thermally optimized extruded aluminium profiles.



- |                           |                           |                                       |
|---------------------------|---------------------------|---------------------------------------|
| 1 DC isolating contact L+ | 4 Disc-type diode         | 7 Semiconductor fuse with microswitch |
| 2 Cooling bar             | 5 DC isolating contact L- | 8 AC isolating contacts               |
| 3 Heat sinks              | 6 Clamping strip          |                                       |

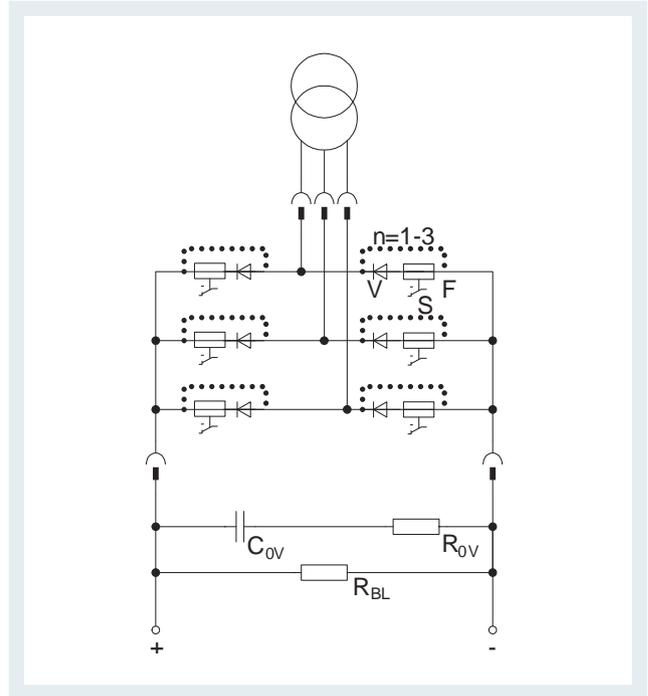
Layout of diode mounting position (left) and truck (right)

# Circuit Variants

The diode rectifiers are based on diode sets connected as a three-phase 6-pulse uncontrolled bridge circuit (B6U). 6-pulse bridge circuits with  $n = 1$  to 3 parallel diodes per bridge arm, i.e. a maximum of 18 diode locations, can be fitted in one cubicle.

12-pulse versions are also possible by connecting cubicles in series or parallel.

- $C_{OV}$  Capacitor RC circuit
- F Semiconductor fuses
- $n$  Number of parallel diodes per arm
- $R_{OV}$  Resistor, RC circuit
- $R_{BL}$  Base-load resistor
- S Microswitch
- V Disk-type diode

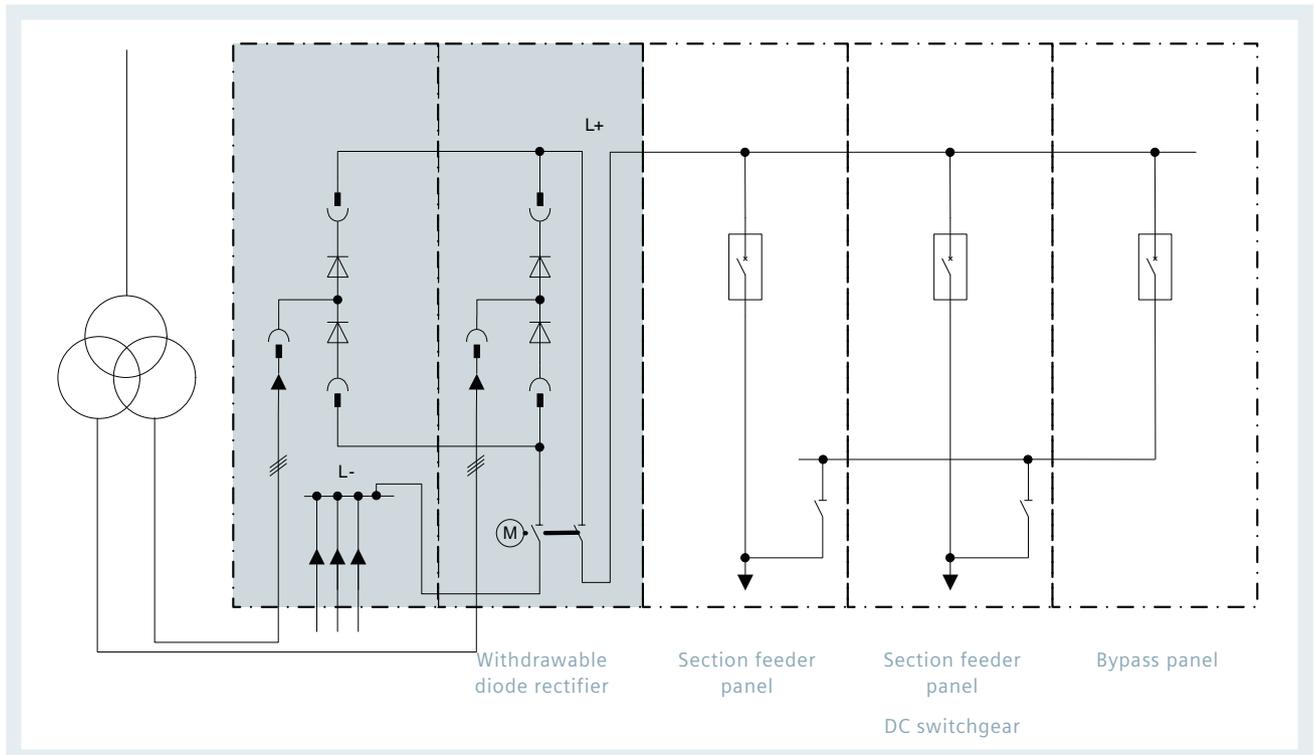


6-pulse version, 600 / 750 V DC and 1500 V DC

Types: B6U 750P1, B6U 750P2, B6U 750P3, B6U 1500P1  
B6U 1500P2, B6U 1500P3

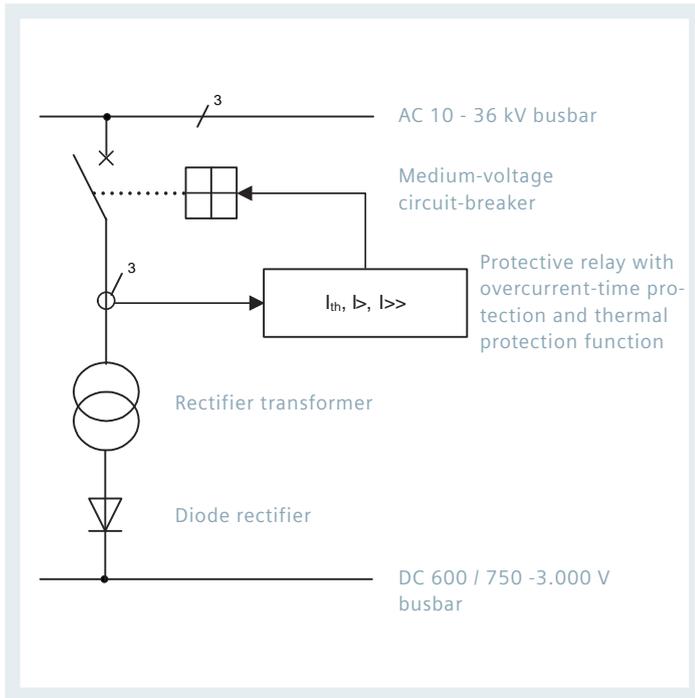
A safe isolating section is formed by the contact system of the withdrawable diode rectifier. This makes it possible to ensure compact dimensions of the installation when

combined with the DC switchgear. A return conductor busbar and frame fault protection are also installed in the diode rectifiers cubicle.

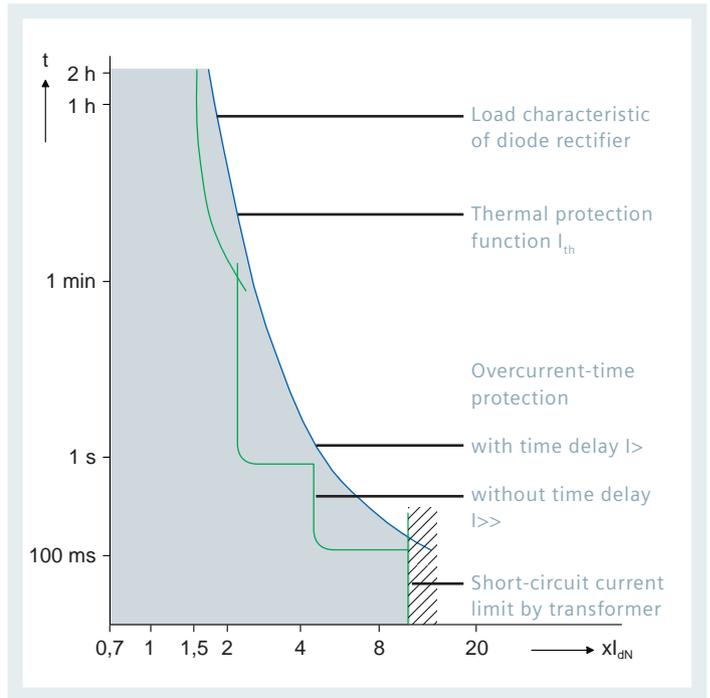


Configuration with two section feeder panels of the DC switchgear (block diagram)

# Protection



Schematic diagram: Protection against overload



Schematic diagram: Protection against external short-circuit

## Protection against internal short-circuit

The diode rectifier is protected by fuses in series with each diode. The failed diode is thus selectively disconnected by its fuse. The operation of the fuse is signaled by its potential-free contact.

## Protection against internal and external switching overvoltages

The RC circuit of the diode rectifier damps transient overvoltages, which come through the input or output or which occur as a result of commutation between the diodes. The RC circuit thus protects the diodes.

## Protection against overload and external short-circuit

This protection is provided by external protective relays. The diode rectifier is designed to conduct the DC short-circuit current until operation of the protective element. This is usually the relevant medium-voltage circuit-breaker with its protective relay. Typically, the protective relay with overcurrent-time protection and thermal protection function monitors the diode rectifier and the rectifier transformer.

## Protection against atmospheric overvoltages

The diode rectifier is protected against external overvoltages by external surge arresters on the contact wire or in the outgoing feeder panels of the DC switch-gear. Surge arresters can optionally be installed also directly in the rectifier cubicle.

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The information in this document contains general descriptions of the technical options available, which do not always have to be present in individual cases. If not stated otherwise, we reserve the right to include modifications, especially regarding the stated values and dimensions.