

Climate control of outdoor enclosures

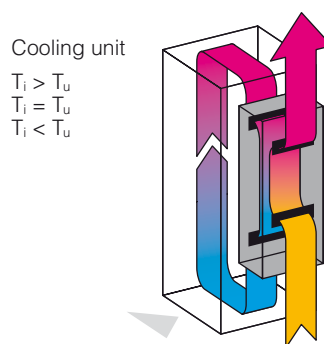
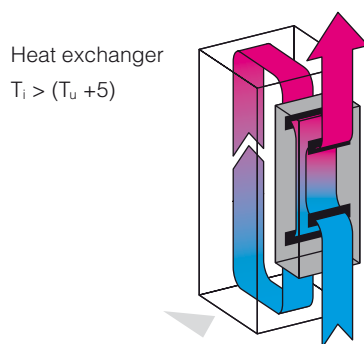
For applications inside buildings, the temperature fluctuations inside the room are generally minimal. Even in extreme locations e.g. in the vicinity of furnaces, the temperature range is limited. For outdoor installations, the range is greater, and at many locations worldwide a range of more than 50 Kelvins (e.g. minimum temperature -15°C and maximum temperature $+40^{\circ}\text{C}$) has been measured.

The application range of the installed components is crucial when selecting the right climate control unit. If appliances which have been designed for conventional indoor applications, i.e. an ambient temperature of up to approximately $+35^{\circ}\text{C}$ are used

outdoors, a compressor cooling unit must be used. Only cooling units allow temperatures which are lower than the ambient temperature to be achieved in the enclosure interior. When using equipment suitable for outdoor use which operates correctly at interior temperatures of up to $+55^{\circ}\text{C}$, an air/air heat exchanger may be used for climate control purposes. Like the cooling unit, the air/air heat exchanger has hermetically separate air circuits and uses the ambient air to cool the raised interior temperature at the heat exchanger module. With a correctly designed heat exchanger, this climate control concept is capable of achieving temperatures inside the enclosure which are 10 Kelvins higher than the ambient temperature.

All Rittal Outdoor climate control components have a protection category of IP 55 for the basic enclosure and may be used at ambient temperature ranges of -33°C to $+55^{\circ}\text{C}$ (cooling unit) or -33°C to $+65^{\circ}\text{C}$ (heat exchanger).

Many units are already equipped with an internal heater; to upgrade or increase the thermal output, Rittal recommends the powerful 800 W heater CS 9769.080.



Sunlight

With outdoor siting, the enclosure is additionally heated by direct and diffuse sunlight. The fact is that over the course of the day, the angle of sunlight changes, and even at its zenith, approximately 50 % of the enclosure is in shade. The individual side panels also heat up to varying degrees over the course of the day, depending on whether the sun is shining directly onto the side of the enclosure or part of the enclosure is in shade. The basic design of the enclosures also plays a major role with regard to additional heating from sunlight:

While single-walled enclosures can heat up to an extreme degree, the chimney effect

resulting from a twin-walled design reduces the influence of sunlight. Rittal has conducted in-depth studies and accumulated wide-ranging expertise in the calculation and design of climate control units for outdoor siting. Rittal offers a free calculation service for determining the required output of climate control units in outdoor applications. We need the following information in order to be able to provide a meaningful calculation:

- Enclosure platform
- Enclosure dimensions: Width, height, depth
- Minimum ambient temperature
- Maximum ambient temperature
- Minimum internal temperature
- Maximum internal temperature
- Installed heat loss
- Installation site (geographical location)
- Special features at the installation site (e.g. fully roofed or positioned in front of a black wall)

For climate calculations, please contact your Rittal representative in the sales team or field service.

