

Sarmacell calculator instructions



For calculating the air cooler efficiency factor

Optimum performance can only be achieved with the correct expansion valve setting!

The optimum performance of an Air Cooler can only be achieved if the expansion valve is turned to the Corresponding Air Cooler and the actual air inlet temperature difference on the system. The expansion valve setting of every Air Cooler should therefore be checked and adjusted if necessary.

Because we want you to be able to do this without any extensive installation work we fit all Air Coolers with a Schrader valve soldered into the suction line.

Every thermostatic expansion valve requires a specific minimum overheat when used in conjunction with an Air Cooler. Below this level, i.e. if the valve is opened too far, the flow control is very uneven (hunting), this in turn leads to a loss of performance of the Air Cooler. This hunting should not exceed 0.5 K.

As described in our technical documentation we calculate the refrigerant capacity of our Air Coolers in accordance with EN DIN 328.

The difference specified in this standard should be 0.65 times the air inlet temperature difference Δt , (DT1). Actually the target value should be between 0.5 and 0.7. Values above 0.7 mean a loss of Air Cooler performance.

The following principle applies: The lower the overheat the higher the Air Cooler performance.

Example: At an air inlet temperature $t_{L1} = 3^{\circ}\text{C}$ and an evaporation temperature $t_0 = -5^{\circ}\text{C}$ (measured via the pressure on the Schrader valve at the Air Cooler outlet) the overheat temperature t_{oh} should show a figure of approximately $+0.2^{\circ}\text{C}$.

Using the t_0 reading, in other words Δt_{oh} (Dt_{oh}) of 5.2K, Δt_{oh} (Dt_{oh}) divided by Δt_1 (DT1) gives the ideal overheat factor of 0.65.

To check or readjust the expansion valve please proceed as follows:

1. Unscrew the cap on the Schrader valve and connect P_0 vacuum pressure manometer. You should use a manometer with the maximum possible reading precision. Read off the corresponding refrigerant temperature or calculate the associated evaporation temperature using a refrigerant slide (rear side of the Calculator).

2. Attach the t_{oh} sensor of temperature gauge 5 to 10 cm from the Schrader valve. Place the second temperature sensor of the gauge in the Air Cooler air inlet. The distance between Air Cooler and t_{L1} sensor here should be 15 to 20 cm. The air inlet temperature sensor should not come into contact with the wall or any other parts.

3. To calculate the overheat factor only use measurement values taken when the refrigeration store is operating at a constant level without any icing on the Air Cooler. It is essential in this respect to wait for the min. 15 minute response time of each expansion valve. The cooling process should not be interrupted during this period. If necessary you must ensure adequate heating e. g. by opening doors, during the period in which the readings are taken.

Once these requirements have been met you can start analyzing the measurement results in order to calculate the overheat factor.

4. The air inlet temperature difference Δt_1 (DT1) in Kelvin [K] is calculated from the evaporation temperature t_0 ascertained and the actual air inlet temperature t_{L1} shown on the temperature gauge.

5. Using the evaporation temperature t_0 ascertained and the actual **overheat temperature** t_{oh} recorded on the temperature gauge over an adequate period of time, you can calculate the Δt_{oh} (Dt_{oh}) in [k]. Using the calculator slide, now look up the calculated Δt_1 (DT1) on the calculated Δt_{oh} (Dt_{oh}), if the black arrow on the calculator is located inside the green range (marked **ok**) the expansion valve is correct. Please ensure that you follow the instructions of the expansion valve manufacturer for adjusting settings.

6. After removing the P_0 vacuum pressure manometer the cap on the Schrader valve must be screwed back on tightly.

7. If soldering work is being carried out in the area near the Schrader valve this must be protected from the effects of heat or the gasket set must be unscrewed.

