

COPELAND ZX REFRIGERATION UNITS STARTING AT LOW AMBIENT CONDITIONS

1 Issue description

During winter or at low ambient temperatures, ZX refrigeration units (especially with low pressure refrigerants like R134a) may fail to start. The reason is the insufficient pressure difference between the liquid receiver pressure after standstill and the evaporator pressure. The situation is even worse if the receiver pressure gets lower than the evaporator pressure. As a result, after the solenoid valve opens, the pressure in the evaporator cannot increase and the unit controller cannot detect enough pressure to start the unit. **Figure 1** shows pressure differences in summer and winter with standard controller settings.

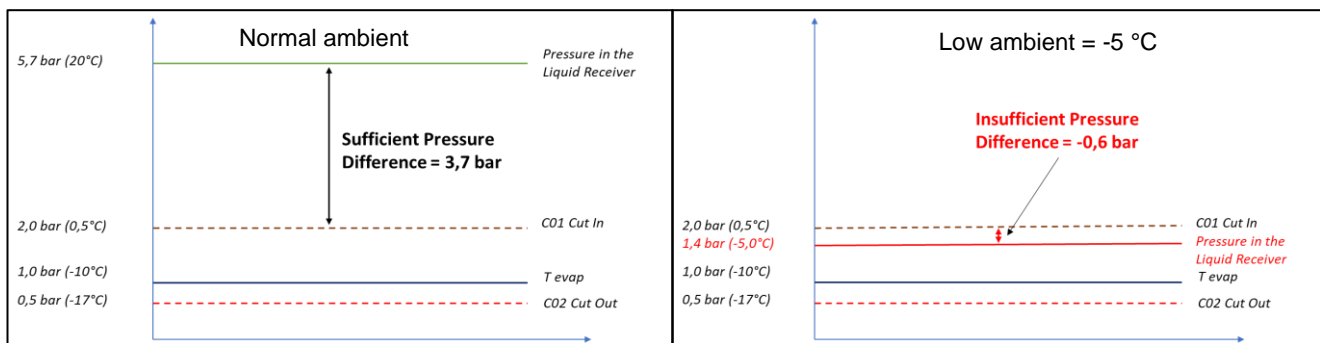


Figure 1: Pressure difference comparison normal ambient vs low ambient

As shown in **Figure 1** above, in case of low ambient temperature, the evaporator pressure cannot increase due to lack of pressure in the liquid receiver. Insufficient pressure difference can be corrected in two ways:

2 Solution 1

The refrigeration unit must be controlled by the room thermostat or temperature sensor, providing the starting signal directly to the unit controller. For the respective settings see the "**Additional features for customization**" section in the unit application guidelines. Note that this option is NOT available on ZXDE digital units!

3 Solution 2

The cut-in and cut-out values must be adjusted in such a way that the evaporator pressure is always lower than the receiver pressure. It means that the switch-off setpoint of the unit must always be lower than the ambient temperature by at least 5 K.

Table 1 shows recommended settings for ZXME, ZXLE and ZXDE units for start at low ambient temperatures down to -15 °C.

ZXME/ZXLE			ZXDE		
Parameter	Value	Description	Parameter	Value	Description
C01	0.5 bar	Cut-in	C16	1.4 bar	Setpoint
C02	0.1 bar	Cut-out	C17	2.0 bar	P-Band
			C24	10 %	Minimum unit capacity
D12	10 sec	LP alarm delay	D12	10 sec	LP alarm delay
D29	0.0 bar	LP alarm trigger point	D29	0.0 bar	LP alarm trigger point

Table 1: Recommended settings for low ambient temperatures down to -15 °C

NOTE: The settings might have to be adapted depending on the individual application.