

Adjustment of the supply air temperature setpoint

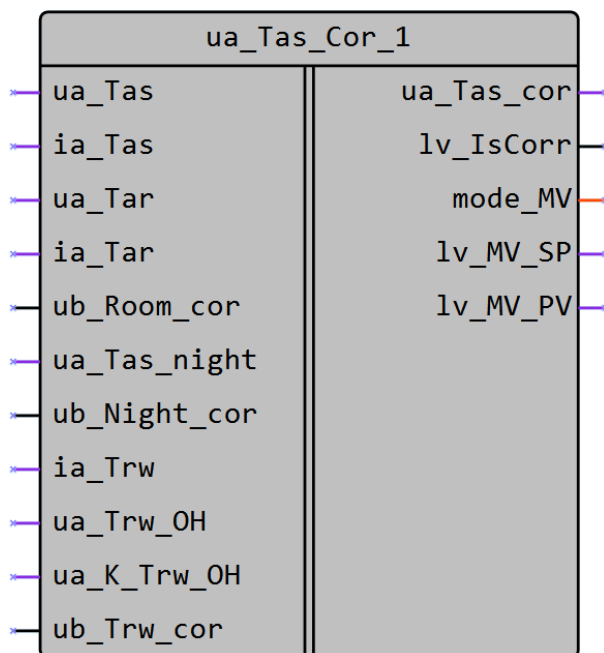


Figure 1 – Symbol

Inputs	Data type	Description	Range
ua_Tas	Float	Supply air temperature setpoint	
ia_Tas	Float	Current supply air temperature	
ua_Tar	Float	Indoor temperature setpoint	
ia_Tar	Float	Current indoor temperature	
ub_Room_cor	Bool	Enable indoor temperature correction	0 – Off 1 – On
ua_Tas_night	Float	Supply air temperature setpoint during the night period	
ub_Night_cor	Bool	Enable time-of-day adjustment	0 – Off 1 – On
ia_Trw	Float	Current return water temperature	
ua_Trw_OH	Float	Upper operating temperature limit of the return water	
ua_K_Trw_OH	Float	Return water temperature influence coefficient	
ub_Trw_cor	Bool	Enable return water correction	0 – Off 1 – On
Outputs	Data type	Description	Range
ua_Tas_cor	Float	Supply air temperature setpoint with correction	
lv_IsCorr	Bool	Availability of correction	0 – No correction 1 – Correction
mode_MV	Int	Main controlled parameter	0 – ia_Tas 1 – ia_Tar
lv_MV_SP	Float	Setpoint of the main controlled parameter	
lv_MV_PV	Float	Current value of the main controlled parameter	

Explanation of how macro works

The macro is designed to adjust the supply air setpoint based on three factors (in decreasing order of priority):

1. **ub_Trw_cor =1** Return water temperature. Allows avoiding overheating of return water.
2. **ub_Night_cor = 1** Time of day. Allows reducing energy consumption at night by lowering the setpoint.
3. **ub_Room_cor = 1** Indoor temperature. Allows maintaining a comfortable temperature more accurately.

Impact of indoor air temperature

If indoor temperature correction is enabled, half of the difference between the setpoint and the current indoor temperature $(ua_Tar - ia_Tar)/2$ is added to the setpoint ua_Tas . The impact is limited: $[-3...+5]$.

Thus:

$$ua_Tas_cor = ua_Tas + LIMIT((ua_Tar - ia_Tar)/2; -3; 5)$$

Influence of time of day

If time-of-day correction is enabled, the influence of indoor temperature is not considered (equivalent to $ub_Room_cor = 0$) and the setpoint for the night period (ua_Tas_night) is applied.

Thus:

$$ua_Tas_cor = ua_Tas_night$$

Influence of the return water temperature.

If the return water temperature correction is enabled and return water temperature is higher than the upper operating limit (ua_Trw_OH), then the difference between the upper limit and the current return water temperature value, multiplied by the influence factor, is added to the setpoint previously corrected by other factors, with no limitations.

Thus:

$$ua_Tas_cor = ua_Tas_cor' + (ua_Trw_OH - ia_Trw) \times ua_K_Trw_OH$$

Display of the main controlled parameter.

If the correction is based on indoor temperature, the main controlled parameter is indoor temperature ($mode_MV=1$), the setpoint of the main controlled parameter is the indoor temperature setpoint ($lv_MV_SP=ua_Tar$), the current value of the main controlled parameter is the current value of indoor temperature ($lv_MV_PV=ia_Tar$).

If the correction is based on the time of day, the main controlled parameter is supply air temperature ($mode_MV=0$), the setpoint of the main controlled parameter is the supply air temperature setpoint ($lv_MV_SP=ua_Tas_night$), the current value of the main controlled parameter is the current value of supply air temperature ($lv_MV_PV=ia_Tas$).

If the correction is based on return water temperature, the main controlled parameter is supply air temperature ($mode_MV=0$), the setpoint of the main controlled parameter is the supply air temperature setpoint ($lv_MV_SP=ua_Tas_cor$), the current value of the main controlled parameter is the current value of supply air temperature ($lv_MV_PV=ia_Tas$).

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