#### **FLSTDmAHUE** customization training

Loris Pedron 20/06/2012



### Topics

- 1. How to add a probe management
- 2. Ebm papst fan management
- 3. Supply setpoint compensation based on Return Temperature
- 4. Connect an pCOe expansion board to a J23 connector of a large controller (pCO3 or pCO5)
- 5. Sharing a probe value through the AHUE's units via pLAN network
- 6. Air flow fans control management





- 7. Fancoil management
- 8. Fans management with the supply temperature
- 9. Night freecooling
- 10. New features available starting from the release 2.0





#### 1 How to add a probe management

The simplest way, and already available in the application, is the using of an auxiliary loop for reading an analogue input (refer to masks Ha19, Ha20..23, Hb19..22, Gfc36..39).

The probe value is available in the I/O loop masks.

This management doesn't need an application modifying, just a proper parameters setting.





#### 1 How to add a probe management

You can add an analogue inputs management modifying the 'Mod\_Check\_Position\_25' 1tool module

- Automatic position management, based on the inputs availability – placing a variable and field code (e.g. 'Pos\_Temp\_Setp' variable)
- Fixed position management placing a constant value (e.g '2' if analogue input B2)







#### 1 How to add a probe management

All the other inputs management (conversion, probe type, probe alarm, supervision availability) can be copied from an already present analogue input management.





### 2 Ebmpapst fan management

It is possible to manage the ebmpapst fans, using the 'Mod\_MB\_Ebmpapst\_Fans' 1tool module available in the 1tool modules standard library ModStd (ver2.4.6.0).

A demo application is available at the KSA site (<u>http://ksa.carel.com</u>)

Library View							
Atoms (1.3.2.0)	Macroblocks (1.1	2.5.0) Modstd (2.4	<b>4.6.0)</b> Fistdmał	nue (flstdmahue)	Lib_mod_loadsavecf	g_1_0606_20101105 (fl	stdmahu
ALL							
EVD400_Com	🥌 Mod_Belimo	Mod_CPY_Cor	m 👬 Mod_Devi	ces Mod_Far	ns 🛃 Mod_MB_	Clima 🛐 Mod_MB_lr	nv 2005
EVD400_Spec	Mod_ChillBoo.	💭 Mod_CPY_Sp	🕑 Mod_DST	Mod_Gra	aph	LI Mod_MB_F	<sup>o</sup> ro 🍞
Mod_Ain	Mod_Circuit	. Mod_Crl_Mod.	Mod_EVD	_E Tod_HV	VSW MOD_MB	Eb Mod_MB_S	Seri 🔊
Mod_Air_Qual.	🚺 Mod_Comp_S.	MOD_DAMP	. 🚺 Mod_EVD	_E 🎽 Mod_M_	Store	MOD_MB_Ebmpapst	Fans
MOD_AIR_R	Mod_Comp_S.	🚺 Mod_Devices.	Mod_EVD	_E In Mod_ME	3_BL a Mod_MB_	Ga Mod_MB_V	/FD
<b>_</b>	9.9	<u> </u>	<u> </u>		4		







### 2 Ebmpapst fan management



For introducing the Ebmpapst fans management the following steps are needed:

1.Place in a strategy page the 'Mod\_MB\_Ebmpapst\_Fans' 1tool module (1 module = 1 ebmpapst fan)

2.Update the 'MB\_List\_Size' pin of the 'MB\_protocol\_Mng' module adding the required sublists number (24 sublists for each module 'Mod\_MB\_Ebmpapst\_Fans' added in the strategy page). The calculation rule is:

```
10 + device sublist*2 \downarrow 24
```



#### 2 Ebmpapst fan management

A modbus master management adaption is required, adding the ebmpapst sublists number in order to control the fans.

Each module (1 module = 1 Ebmpapst fan managed) needs 24 sublists.

e.g. adding 1 Ebmpapst fan, the 'MB\_List\_Size' pin number will become: 300 (actual modbus master management)+24\*2 (Ebmpapst fan) = 348







24 sublists for the modbus control of the fan

CAREL

## 3 Supply setpoint compensation based on return or room Temperature

If supply regulation is selected (Mask **HcO1**), a possible useful function could be the supply setpoint compensation based on the return or room temperature. The management can be done directly in the **Scheduler\_OnOff\_Mng** page.

Here the steps:

1.Insert a Setpoint\_Compensation macroblock (Macroblock library) in the strategy page **Scheduler\_OnOff\_Mng** 

2. Insert the parameters in mask or fixed values.

3.Add the macroblock output value with the variable coming from

the already present setpoint

management

Remember that you can use also the ST function block



## [ 3 Supply setpoint compensation based on return or room Temperature

	4/0
× <mark>280</mark>	
	GP Producet_Temperatu
Return_Temp 2→513→C In0     In0     In0     In0     In0     In0     In0     In     In  In     In	Add
© Room_Temp 0 0 ←C In1 → 518 0 ut → 518 Supply satisfiest companyation based on the	Add
Selection_Compensation_Probe O e Sel	
Insert the parameter in mask if needed Set T.	
460	
Insert the parameter in mask if needs Ext Temp Set Compensated	e e e e e e e e e e e e
Comp_Setpoint Comp_Setpoint Comp_Setpoint Comp_Set	
Comp_Diff Comp_Diff Ext_Temp_Diff	🗗
A set a se	e e e 🖌 e e e e e e e
Comp_Max_Value comp_10.0 + Comp_Max_Value comp_10.0 + Comp_Max_Comp_	e a ser e se a se a se a
Enable Control	e e e <mark>n</mark> ere e e e e e e
Setpoint_Compensation	
Insert the parameter in mask if needed 455	
– En_Supply_Set_Compensation – 📲 📑 🚛 PGD1 (6 kevs) Terminal Editor	_ = ×
	hing law and a
And	Display only
Supply temperature regulation (Mask Hc01)	1
	1
le l	
	····
· · · · · · · · · · · · · · · · · · ·	
· · · · · · · · · · · · · · · · · · ·	





### 4 Connect an pCOe expansion board to a J23 connector of a large controller (pCO3 or pCO5)

The FLSTDmAHUE manages the pCOe expansion board connected in the fieldbus port (pCO100FD10 in the field card slot) as explained in the application manual.



It is possible to keep the pCOe sofware management (masks and strategy) and connect it to the J23 simply changing an input pin value of the **Mod\_pCOe** 1tool module.





4 Connect an pCOe expansion board to a J23 connector of a large controller (pCO3 or pCO5)

Here the steps:

1.Select the strategy page Modbus\_devices2.Modify the pCOe\_Connection\_Type pin value from 3 to 1







## 5 Sharing a probe value through the AHUE units via pLAN network

Using the pLAN network is possible to share a probe value through the AHUE's units; it is necessary to select the probe reading variable, for example **External\_temp**, and share in the Network editor of the project.





# 5 Sharing a probe value through the AHUE units via pLAN network

#### Steps:

1.Enable the pLAN property

of the variable External\_Temp

2.Use the variable

External\_Temp in the pLAN link table

	/ariable wizard - Modification 🛛 🕺 🗙	[Add1.5][FT0]6CLFES
	Networks Variable properties in network communications.	PC01XSE
	Image: PLAN         Image: PLAN	Addr:7][Project:FLST
ariable List	[FLSTDmAHUE]	Ą
Pilte	external U S M B I A S V X T P E F G Cat.	▼ Array
Name	Description	
External_I	Humidity_Prb_Adj External humidity offset	
External_1	emp External temperature	

pLAN links									
Reset Filter		Filter	ter B I A X T						
Link	Group	Source l	Unit	Source Variable		Target Unit	Target Variable		Bidirectional
1	1 🔻	1	-	switch_unit	•	2,3,4,5,6,7,8 💌	switch_unit	•	<b>v</b>
2	1 💌	1	-	Alarm_Status	•	2,3,4,5,6,7,8 👻	Alarm_Status	•	✓
3	1 💌	1	-	External_Temp	-	2,3,4,5,6,7,8 👻	External_Temp	•	



#### 6 Air flow control managemen

This feature is available starting from the release 2.0.

The module **Mod\_Fans** manages the fans control; the airflow control needs some application masks and a simple strategy logic outside the module **Mod\_fans**.

Airflow control enabled based on the m3h









Available in the release 2.0

The airflow setpoints are managed using the module pins and placing in mask the parameters. We suggest to place the mask in the thermoregulation loop.



Available in the release 2.0

The airflow regulation parameters (Diff, int.time, etc) are already available in the **Mod\_Fans** module masks, these mask are imported (linked or imported) placing the module in the strategy page.

The module mask are available in the THERMOREG loop, reachable from the Service\_page sheet of the solution explorer as shown below.







Available in the release 2.0

The airflow management is done inside the **Mod\_Fans** module, where a macroblock acts the conversion between pressure management to airflow









Available in the release 2.0

The current airflow feedback is available in the I/O loop mask





#### 7 Fan-Coil management

The Fan-Coil management is based on the termoregulation request, the output signal is used to manage the fan-coil steps

Graph of fan coil activation with request from control probe



It can be easily implemented, starting from the cooling/heating (0..1000 value) request module available in the Thermoregulation page:





### 7 Fan-Coil management

The Fan-Coil management implementation is an easy steps management, the fancoil speed activation can be done automatically (termoregulation) or manually by keyboard or with an external thermostat using digital inputs





### 7 Fan-Coil management

The Fan-Coil management requires the fancoil steps interblock for having a single speed working at time



CAREL

# 8 Fans management with the supply temperature

The **Mod\_Fans** module, usually managed with the pressure can be controlled using the supply temperature as well.

The logic inside allow to replace the pressure variables (probe, setpoint and differential) with the supply temperature ones.





# 8 Fans management with the supply temperature

The different probe request can be done using a SEL\_I atom that discriminate the fans regulation signal (probe, setpoint, differential)

Supply Press         Return Press         Reg_Fans_Air_Quality         Reg_Air_Cleaning         Din_OverL_Supply_Fan_1         Din_OverL_Return Fan_2         Din_OverL_Return Fan_1         Din_OverL_Return Fan_2         Din_Supply_Inv_Fan_Alarm         Din_Supply_Inv_Fan_Alarm         Din_Return_Inv_Fan_Alarm         Din_Return_Fan_1en         Pos_Supply_Fan_Line         Pos_Supply_Fan_Delta         Pos_Return_Fan_Len         Pos_Return_Fan_Len         Pos_Return_Fan_Len         Pos_Return_Fan_Len         Pos_Return_Fan_Len         Pos_Return_Fan_Len         Pos_Return_Fan_Len         Pos_Return_Fan_Star         I_g_Star_Detta	Supply_Press         Supply_Fan_Inv Retum_Press           Retum_Press         Retum_Fan_Inv Supply_Coerload_1           Supply_Overload_1         Retum_Fan_1           Supply_Overload_1         Retum_Fan_1           Supply_Overload_2         Retum_Fan_1           Retum_Overload_1         Supply_Line_Relay           Retum_Overload_2         Supply_Int_Fan_Alarm           Supply_Inv_Fan_Alarm         Retum_Star_Relay           Din_Supply_Flow         Retum_Star_Relay           Din_Retum_Flow         Retum_Delta_Relay           Ch_Supply_Line         En_Msk_Fan_Air_Quality           Ch_Supply_Line         En_Msk_Fan_Air_Quality           Ch_Retum_Delta         Warning_Inpuls_S2           Ch_Retum_Line         Warning_Inpuls_R1           Ch_Retum_Star         Fan_Alarm           Star_Delta_Logic         Fan_Serious_Alarm           Stop_Time_By_Warning         Supply_Sar	Mod_Supply_Fan o Mod_Return_Fan o On_Off_Supply_Fan_1 On_Off_Supply_Fan_2 On_Off_Return_Fan_2 On_Off_Return_Fan_1 On_Off_Return_Fan_2 Supply_Fan_Line Supply_Fan_Delta Return_Fan_Delta Return_Fan_Delta En_Msk_Fan_Air_Quality Warning_Inpuls_S1 Warning_Inpuls_S2 Warning_Inpuls_S2 Warning_Inpuls_S2 Warning_Inpuls_S2 Fan_Alarm Fans_Serious_Alarm
SysOn Damper_Active Al_Antifreeze Force_Supply Force_Return En_Force_Return En_Force_Return	Switch_Fans Warnings_Reset Unk_OnOff Damper_Active AL_Antifreeze Force_Supply_Fan En_Force_Supply En_Force_Returm_Fan	he
Fans_Type_Sel	Supply_Return spicessure En_Mak_Fans In_Fans Mod_Fans (FANSWITH the S	upply

temperature values



### New features available starting from the release 2.0

- 1. Airflow management
- 2. Direct evaporative cooling (DEC)
- 3. Indirect evaporative cooling (IEC)
- 4. Offcoil humidity probe (dehumidification with absolute and not relative humidity)



