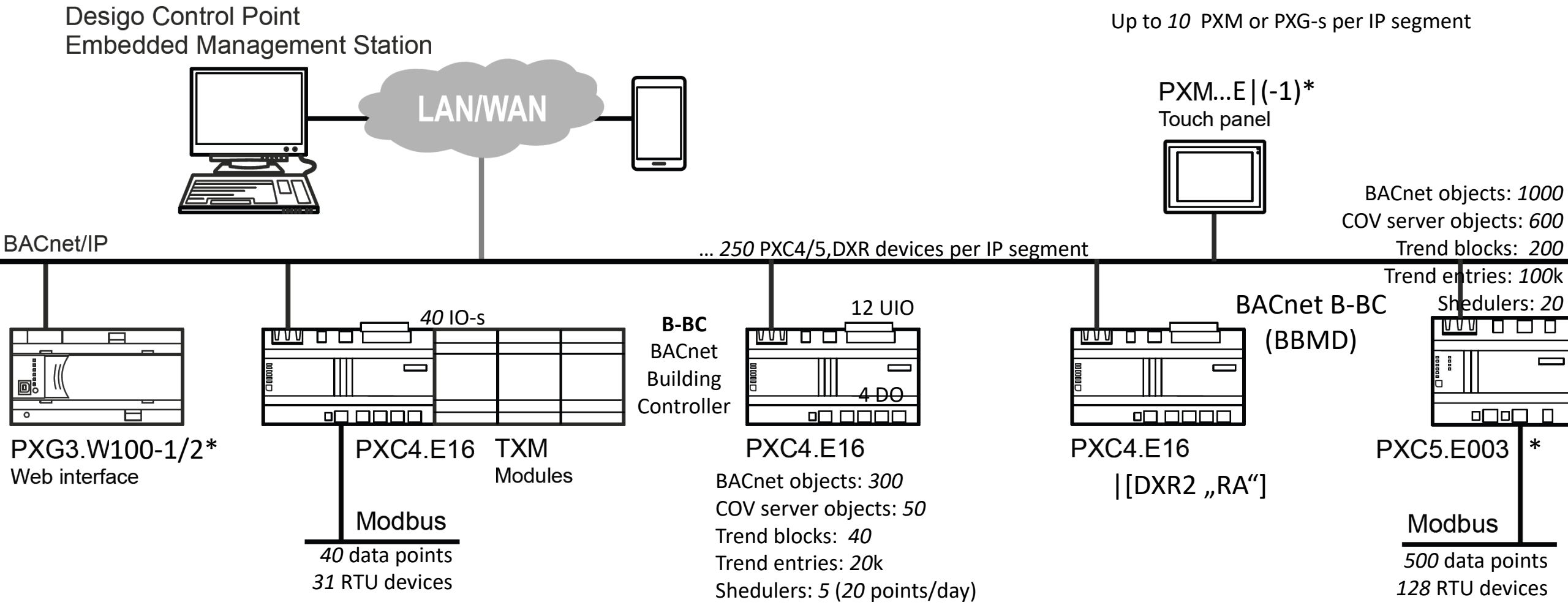
# Typical & *max*.




**50* BACnet assigned devices for web interface operation

State: Program halted | Check

Plants

Add data point | Assign all

Filter

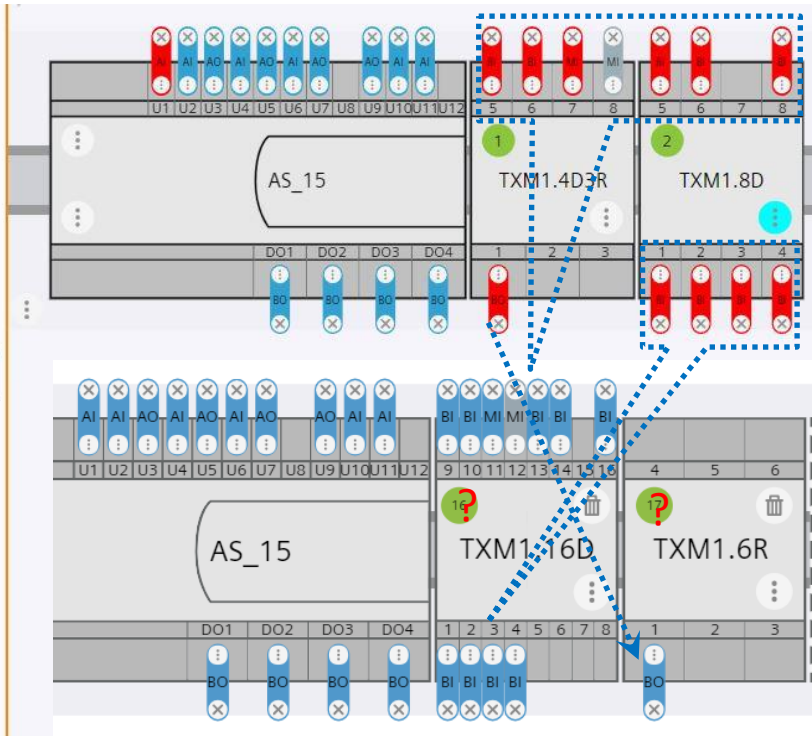
- Air handling unit (15)
  - Energy recovery
  - Exhaust air damper
  - Exhaust air fan
  - Extract air filter
  - Fire dampers
    - [BI] Feedback opened
    - Programming
  - Heating coil
  - Night cooling
  - Outside air damper
  - Outside air filter
  - Supply air fan
    - [AI] Supply air pressure
    - [BI] Fault
    - [BI] Maintenance switch
    - [AO] Speed
    - [BO] Command
    - Programming
  - Temperature control
  - [AI] Outside air temperature
  - [AI] Room temperature
  - [AI] Supply air temperature
  - [BI] Filter detector
  - [BI] Fire detection contact
  - [BI] Smoke detector
  - [MI] Operating mode switch

Tabular view | Graphical view

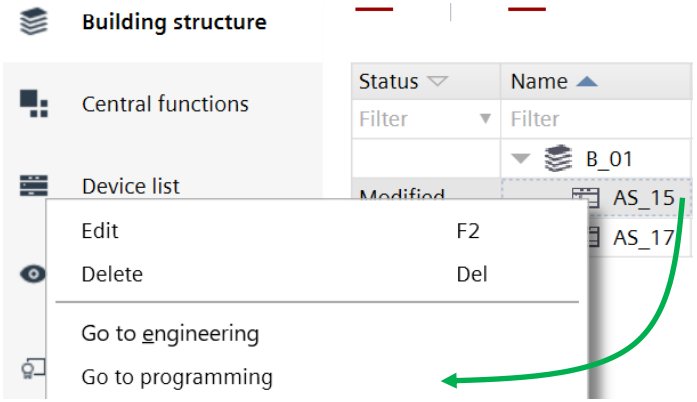
95mA 300mA

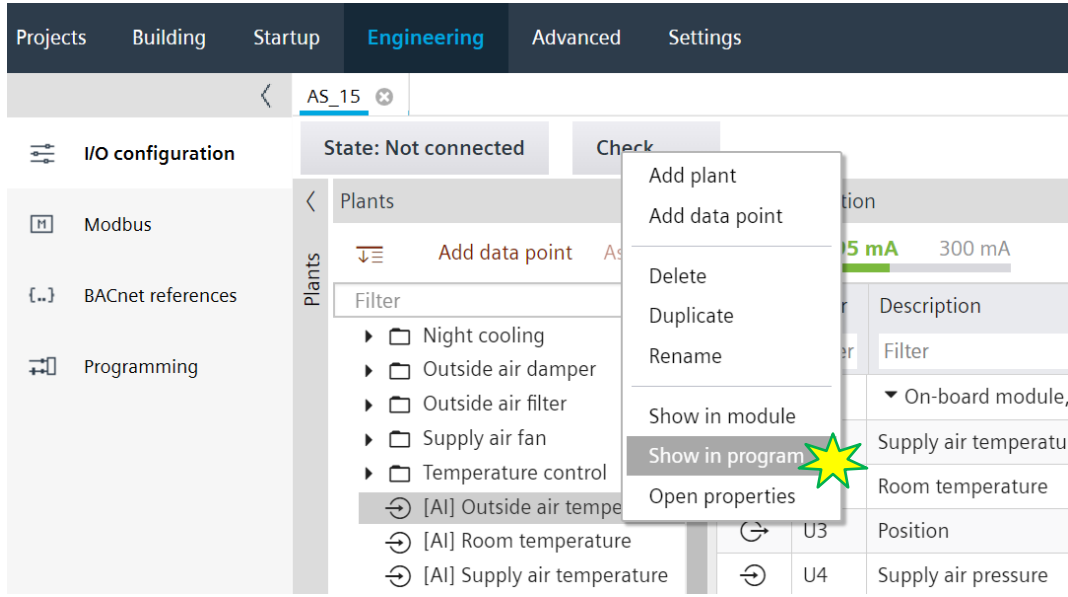
| | Address | Description | Value/Unit | Present priority | | Type | Signal | Commissioning | Name |
|---|---|---|---|---|---|---|---|---|---|
| | Fi... | Filter | Filter | Filter | Filter | Filter | Filter | Filter | Filter |
| | | On-board module, universal inputs/outputs - [10/12] | | | | | | | |
| | U1 | Supply air temperature | Line break | | | AI | Temperatur... | Not checked | Ahu(15)'TSu |
| | U2 | Room temperature | 24,5 [°C] | | | AI | Temperatur... | Not checked | Ahu(15)'TR |
| | U3 | Position | 0 [%] | Prio 2 Em... | | A.. | 0...10 V DC ... | Not checked | Ahu(15)'Hcl'Vlv'Pos |
| | U4 | Supply air pressure | 6 [Pa] | | | AI | 0...10 V DC | Not checked | Ahu(15)'FanSu'PSu |
| | U5 | Speed | 0 [%] | Prio 2 Em... | | A.. | 0...10 V DC ... | Not checked | Ahu(15)'FanSu'Spd |
| | U6 | Extract air pressure | 6 [Pa] | | | AI | 0...10 V DC | Not checked | Ahu(15)'FanEh'PEx |
| | U7 | Speed | 0 [%] | Prio 2 Em... | | A.. | 0...10 V DC ... | Not checked | Ahu(15)'FanEh'Spd |
| | U9 | Modulating | 0 [%] | Prio 2 Em... | | A.. | 0...10 V DC ... | Not checked | Ahu(15)'Erc'Mdlt |
| | U10 | Exhaust air temp.after energy recovery | 19,9 [°C] | | | AI | Temperatur... | Not checked | Ahu(15)'Erc'TEhAfErc |
| | U11 | Outside air temperature | 8,2 [°C] | | | AI | Temperatur... | Not checked | Ahu(15)'TOa |
| | | On-board module, binary/multistate outputs - [4/4] | | | | | | | |
| | 1 | [TXM1.4D3R] Binary inputs, relay outputs - [4/7] | | | | | | | |
| | 1.1 | Command | | | | | | | |
| | 1.5 | Frost protection monitor | | | | | | | |
| | 1.6 | Fire detection contact | | | | | | | |
| | 1.7 | Operating mode switch | | | | | | | |
| | 1.8 | Operating mode switch | | | | | | | |
| | 2 | [TXM1.8D] Binary inputs - [7/8] | | | | | | | |
| | 2.1 | Feedback opened | | | | | | | |
| | 2.2 | Smoke detector | | | | | | | |
| | 2.3 | Maintenance switch | | | | | | | |
| | 2.4 | Fault | | | | | | | |
| | 2.5 | Maintenance switch | | | | | | | |
| | 2.6 | Fault | | | | | | | |
| | 2.8 | Filter detector | | | | | | | |

- Exhaust air damper
  - [BO] Command
- Exhaust air fan
  - [AI] Extract air pressure
  - [BI] Fault
  - [BI] Maintenance switch
  - [AO] Speed
  - [BO] Command
  - Programming
- Extract air filter
- Fire dampers
  - [BI] Feedback opened
  - Programming
- Heating coil
  - Pump
    - [BO] Command
  - Valve
    - [AO] Position
    - Programming
  - [BI] Frost protection monitor
  - Programming
- Night cooling
- Outside air damper
- Outside air filter

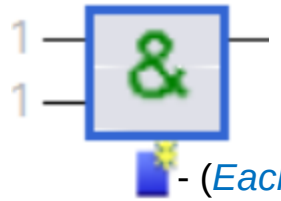


# Open Programming Editor



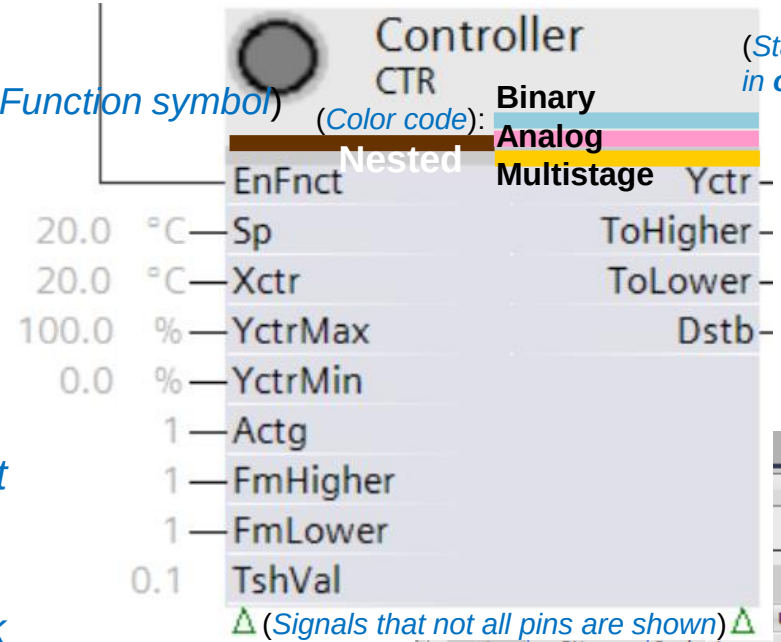



# ABT Site FB charts




- (*Each click of a symbol adds another input*)

(*Function symbol*)

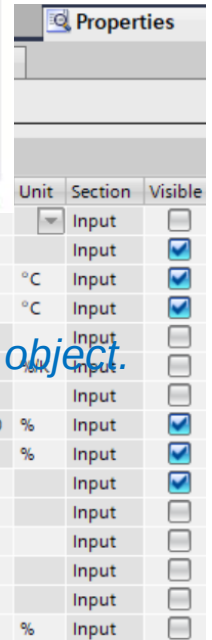



(*Color code*):

(*State symbol in **online** mode*) -

(*Signals that not all pins are shown*)

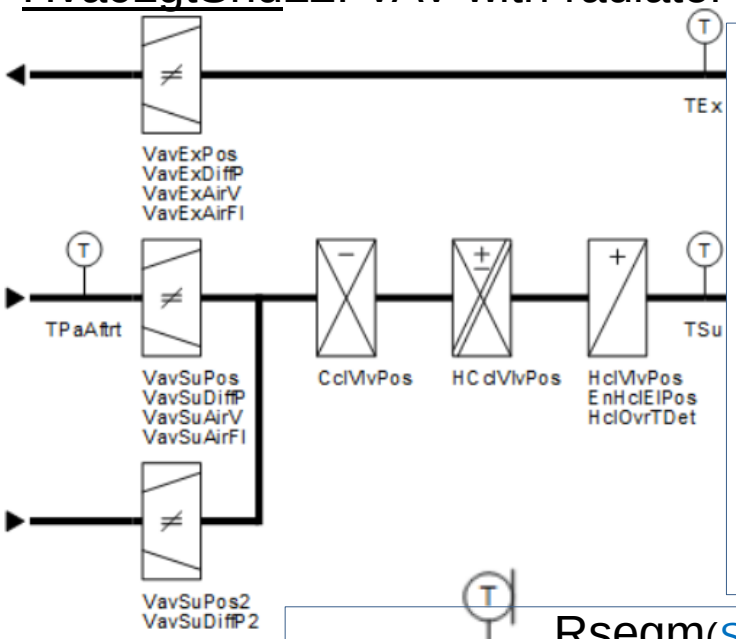
- *Nested chart*
- *Input block*
- *Output block*
- *Input or output block*
- *Input block or output block without assigned BACnet object.*
- *Special BACnet object*
- *Block with link to a group master object*
- *Block with scheduler*




- *Out of service*
- *Error*
- *Local override*
- *Active alarm*
- *Confirm active alarm*
- *Inactive alarm*
- *Confirm inactive alarm*
- *Commanded at priority 1*
- *Commanded at priority 8*

# Application functions(AFs) for Rooms

HvacLgtShd**12**: VAV with radiator and heating/chilled ceiling +(4 light and 2 shading zones)

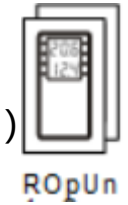



RHvacCoo(*HVAC*)
- Hvac**Plt**Mod(*Plant*)
- HvacPscMod,Dtr
- RpdVntOp
- SpTR,Dtr
- VavTRCtlC,TCasCtlC
- VavTRCtlH,TCasCtlH
- HCStaDtr
- VavVntCtl 1,2
- AirFITck 1,2
- HvacGmLf

RLgtCoo(*Lighting*)
- LgtPscMod,Dtr
- LgtOpStry,Dtr
- LgtOmt,Dtr

RShdCoo(*Shd*)
- ShdPscMod,Dtr
- ShdOpStry,Dtr

R(*Room*)OpUnitf (*Oper.Unit*)
- ROpModDtr
- RThLdDtr
- RGmLf



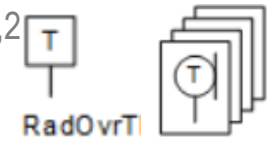


Rsegm(*Segment*)

Hvac12
- VavSu,VavEx 1…5, VavSuDuald
- CclChw 1…4 RcgVlvPos 1,2
- HCd2Pipe 1…3,HCd4Pipe 1…6, HCcl
- HclHw 1..3, HcIE 1…5, Hcl
- CcgChw, HCog2/4Pipe 1,2, Rcg
- RadHw, RadE 1,2, Rad

AuxFnct(*Aux*)
- UCtlFnct 1,2

RadVlvPos, EnRadElPos 1,2

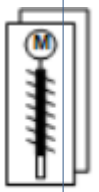




Lgt(1,2,3,4)
- LgtLocManOp
- LgtPscOp
- LgtConstCtl
- LgtBrgtSw,BrgtCtl

Lgtlmncinfl
- LgtCtMst,BrgtCtMst
- LgtCtlSlv,BrgtCtlSlv
- LgtGmLf
- LgtLifeCyc
- LgtBsc



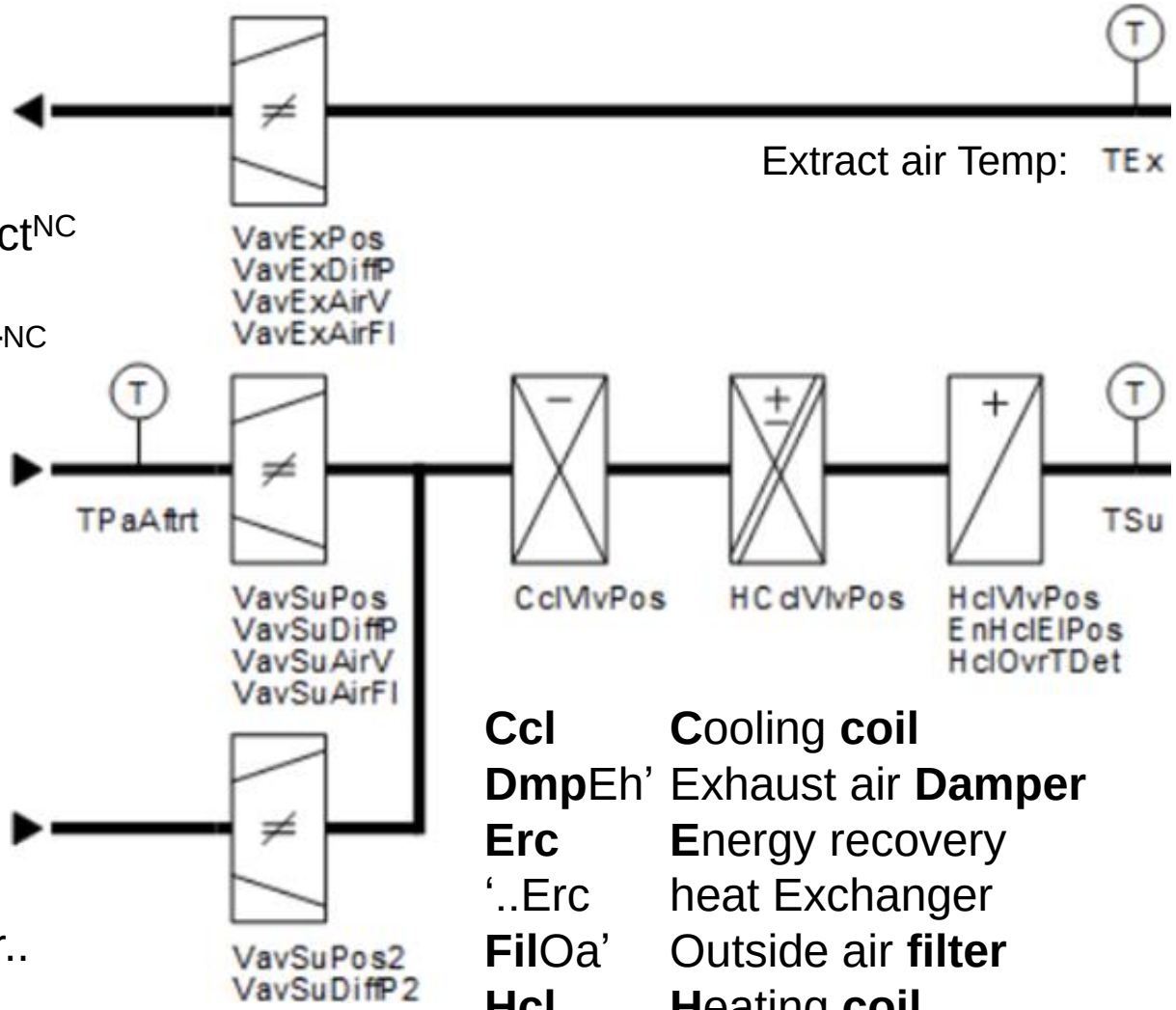
Shd(1,2)
- ShdLocManOp
- ShdPscOp
- ShdGlrPrt
- ShdEngyEffcy
- ShdCenFcd
- ShdDlgCorr
- ShdGmLf
- ShdClsDet
- ShdBsc


HvacLgtShd11/13: Fan-Coil w outside air damper/Fan-powered Box, radiator, heated/chilled ceiling+

# Devices and (I/O) parameters

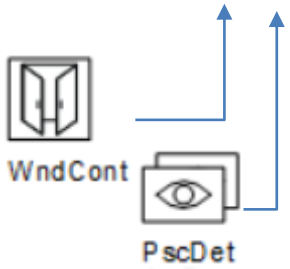
Actg = Control **Action**
=1/0 heating/cooling
'FilDet Filter Detector (NO)
FireDetCont Fire Detection Contact[NC]
'**Flt** **Fault** (NO)
FrPrtMon FrostProtection Monitor[NC]
Hi, Lo High, Low
IcPrt Anti-icing Protection
MntnSwi Maintenance Switch[NO]
Max|Min Max|Minimum value of
ModSwi Mode Switch[Auto|Off|On]
**P**Ctr **P**ressure Controller
**Pr**Sp **Present** Setpoint
PrVal Present Value
P**Ex** **Extract air** Pressure
**Sp**P Pressure **Setp**oint
T**Eh**Af **Exhaust air** Temp After..
T**Ctr** Temp **Controller**
Tn Integral action Time
T**Oa** **Outside air** Temp
**T**R Room **Temp**erature
TSu Supply air Temp




**Ccl** **C**ooling **coil**
**Dmp**Eh' Exhaust air **Damper**
**Erc** **E**nergy recovery
'..Erc heat Exchanger
**Fil**Oa' Outside air **filter**
**Hcl** **H**eating **coil**
**Fan**Su' Supply air **Fan**
**Pu**'Cmd **Pump** Command 1|0
'Spd Speed 0...100 [%]
**Vlv**'Pos **Valve** Position 0..100

# Operating Modes

Central OpMode→ Room OpMode* → Plant OpMode → Device OpMode




| | | PltOpMod== |
|---|---|---|
| WndCont=Open & ROpMod= - | THEN | Protection |
| WndCont=Closed **&** | | |
| ROpMod=Protection | THEN | **Pr**ot**e**ction |
| ROpMod=**Economy** & ~~NgtC~~ & ~~CoolDwn~~ & ~~WarmUp~~ | THEN | **Eco**nomy |
| ROpMod=Economy & **NgtC** & CoolDwn & ~~WarmUp~~ | THEN | Night cooling |
| ROpMod=Economy & **WarmUp** | THEN | Warm-up |
| ROpMod=Economy & **CoolDwn** & ~~WarmUp~~ | THEN | Cool down |
| ROpMod=Pre-Comfort & **CoolDwn** | THEN | Cool down |
| ROpMod=Pre-Comfort & ~~CoolDwn~~ | THEN | **P**re-**C**om**f**ort |
| ROpMod=Pre-Comfort & ~~PscDet~~ & ~~CoolDwn~~ | THEN | Pre-Comfort |
| ROpMod=Pre-Comfort & **PscDe**t | THEN | **Com**fort |
| ROpMod=Comfort & ~~**PscDe**t~~ & ~~CoolDwn~~ | THEN | Pre-Comfort |
| ROpMod=Comfort (& PscDet) | THEN | Comfort |

DevOpMod==
Control

*can be overridden in the room (local PscDet -presence detector/button) or
by a central request for warm up (WarmUp), cool down (CoolDwn), or night cooling (NgtC).

# Device Operating Modes

Room OpMode → **Device** OpMode

DevOpMod==*Control*,

| except: | Air handling | | Heat/cooling radiation | |
|---|---|---|---|---|
| **ROpMod** | **VavSu, VavEh** | **Ccl, Hcl** | **Ceiling** | **Radiator** |
| 1. Off \| 9.13.Not used | Off | Closed | Closed | Closed |
| 8. R low temp protect. | Max flow, Cntrl | Off, Fully open | (heat.)Fully Open | |
| 11. Night cooling | *Control* | Closed | Closed | Closed |
| 12. Ventilation | Max flow, *Cntrl* | *Cntrl* | *Cntrl* | *Cntrl* |
| 14. Air flow off | Off | Closed | *Cntrl* | *Cntrl* |
| 15. Smoke extract. +P | Spec.flow, Off | *Cntrl* | *Cntrl* | *Cntrl* |
| 16. Smoke extract. -P | Off, Spec.flow | Closed | *Cntrl* | *Cntrl* |
| 17. Purge | Max flow, Cntrl | *Cntrl* | *Cntrl* | *Cntrl* |

# Central functions {CenFnct11}

Cen(*Central*) Op(*Operation*) Mod(*Mode*)
Ossc(*Ossc*)
OpModExtd(*Oper.Mode*)
OpModDlyOn(*Delay On*)
R(*Room*)OpDstr(*Oper.Dstr*)

CenWthStn (*Central weather station*)

Cen(*Central*)Fcd(*Facade*)Shd(*Shd*)
FcdDlyOn(*Shd*)
CenBrgWths(*Brg*)
BrgDtr(*Brg*)
CenGlrPrt(*Glr*)
CenAnnShd
CenSolWths(*Solar*)
SolRdn(*Solar*)

CenOpShd(*Shd*)
CenManOpShd(*Man Oper*)
OpDlyOn(*Delay On*)
CenManOpLgt(*Lighting*)

CenSrvShd(*Service*)
SrvDlyOn(*Delay On*)

**SplyAir** (*Supply Air*)
SplyRItFnct (*Fnct*) SplyTDwpEvi (*TDwp*)
SplySpTSu (*TSu*) SplyHuREvl
SplyChovrCnsAirDtr (*Dtr*) SplyVavOvrr (*Ovrr*)
SplyDmpPosSu, SplyDmpPosEx (*DmpPos*)
DmpPosSuEvi, DmpPosExEvi (*Pos Evi*)
SplyAfDvnSu, SplyAfDvnEx (*Dvn*)
AirFIDvnSuEvi, AirFIDvnExEvi (*Dvn*)
SplySpAfSu, SplySpAfEx (*SpAirFl*)
SpAirFifSuEvi, SpAirFifExEvi (*SpAirFl*)
SplyVavSuSrt, SplyVavExSrt (*Vav Srt*)
VavSuStrtnEvi, VavExStrtnEvi (*Strtn)*

SplyHw (*Supply Hot water*)
SplyChw (*Supply Chilled water*)
SplyCdnPrev (*Cnd Prev*)
SplyChovr2Pipe (*2pipe*)
SplyFreeC (*Free cool*)
SplyHpuSrc (*Hpu Src*)

CenSsnCmp(*Seasonal Compens.*)
WthDstr(*Dstr*)

CenEmgHvac(*Emergency*)
CenSmexEh(*Smex*) )
CenSmexSu(*Smex*)
CenEmgLgt(*Lighting*)

CenPrtShd(*Protection*)
CenWdPrt (*WdPrt*) )
CenPcpPrt (*WdPrt*) )
CenFrPrt (*Fr*) )
CenPrtShdDly

# Priority system

Priority range:
“**Exclusive**”: startup, runtime (*kaks ühesugust ei saa olla samas plokis*)
1...5,
9...12,
14...16
“**Last wins**”: (*sama tasemega ainult esimene võidab*)
7,8,13
Cmd priority 8 is for manual operation; remote System operator (via group master)

Each BACnet object reserves command priority 6 for min. on/off time functionality.

| | |
|---|---|
| 1, **2**, 3 | Emerg.mode 1, **2**, 3 (2=Safety of persons; the object cannot be switched) |
| 4, **5** | Prot.mode 1, **2** = Interlocks |
| 6: | Min.On/Off |
| 7, 8, **13** | Man.mode 1, 2, **3** = local user, presence, schedl (via group master) |

9,10,11*,12, 14,**15**,16 Auto.mode 1, 2, 3, 4, 5, **6**, 7 (**=**Automatic program mode)

Value 17 means that the input is not used.

*Window Contact