ENGINEERING
TOMORROW

# Danfoss Smart Building Design

## NovoCon Intelligent Actuator for Pressure Independent Control Valves

# Four products-in-one for Building Intelligence

**Actuator**
NovoCon® digital adjustment of AB-QM valve flow rate

**Flow & Energy Monitor**
NovoCon® indicates flow rate and energy consumed per room

**Bus communication device**
NovoCon® enables status and alarms and flow control including peripheral I/O via Fieldbus BACnet or Modbus

**Data portal**
NovoCon® provides building information for fault finding, predictive maintenance and trending and optimisation

Superior hydronic performance of Danfoss AB-QM PICV combined with automation functionality and BMS connectivity

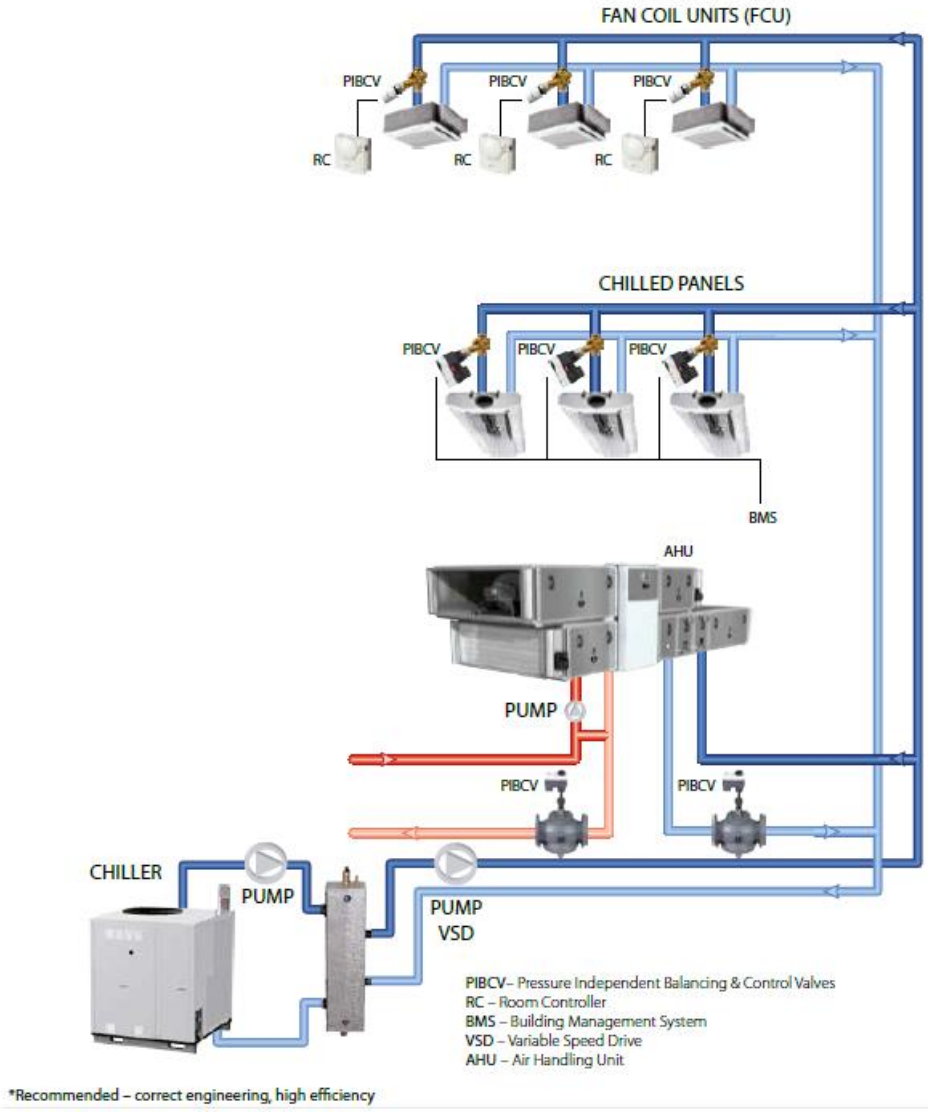
# Danfoss HVAC Smart Building Design
## PICV and NovoCon Versatility

Where would we use a PICV and NovoCon?
Anywhere where a 2-port control valve is used:

- AHU
- FCU
- Heater batteries
- Overdoor heaters
- Large radiant panels
- Heat exchanger
- Calorifier
- Trench Heating
- Chillers
- Chilled Beams

- Balance the whole system to maximise energy efficiency

- DN10-DN32HF NovoCon S
- DN40-DN100 NovoCon M
- DN125-DN250 NovoCon L/XL



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# Traditional Method of Installation and Commissioning V New NovoCon Digital Installation

**Traditional Method**:

- Install PICV
- Pressure test the system
- Fill and flush the system
- Remove any air in the system
- Set the flow rate on the valve
- **Install the actuator**
- Close the ceiling

- Ceiling closing time is crucial to completing the installation

Return Visits:

- Removal of air
- Further system flushing
- Seasonal commissioning

This requires physical access to the building

**V**

**NovoCon Method**:

-Install PICV + NovoCon

-Close the ceiling

**-Via the BMS**

-remote flow setting

-remote flow indication

-remote flush and de-airing

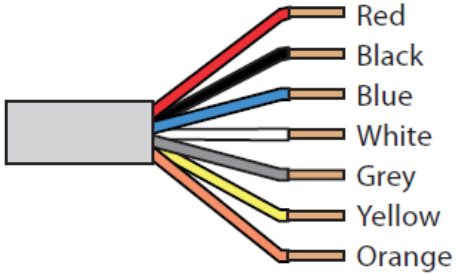
-remote failure detection

# NovoCon S Remote I/O

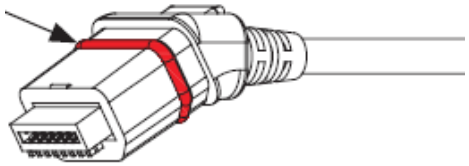
- Lower cost of building automation by reducing nr. of room controllers
- Increase energy efficiency with Novocon high accuracy

- Accessory:
  - Remote I/O cable fitting to middle port (7 wires, 1.5m)
  - Junction box (non-Danfoss)
  - Sensors or other field devices (non-Danfoss)

**NovoCon® I/O cable**



| | |
|---|---|
| Red | Power 24V |
| Black | GND |
| Blue | Analog GND |
| White | Control signal |
| Grey | Feedback signal |
| Yellow | T1 or resistance input |
| Orange | T2 or resistance input |



Available I/O:

- T1 (1-10 kΩ resistance input)
- T2 (1-10 kΩ resistance input)
- 0-10V in
- 0-10V out
- 24V power supply

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## NovoCon S Remote I/O

PT1000 room temperature

0-10V OUT fan

PT1000 exhaust temperature

J-Box

0-10V IN presence

Window sensor

Room temperature
& Setpoint

Dew point sensor

**Danfoss HVAC Smart Building Design**

## Energy Indication

HVAC accounts for 34% of energy used on site and 31% of primary energy use

**34%**

### Save Energy, Save Money

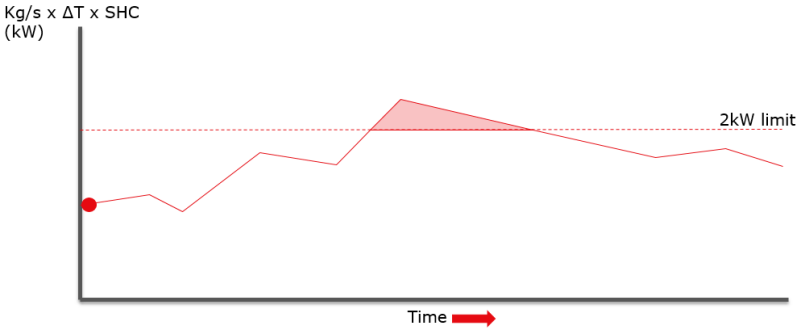
- Energy allocation on terminal units
- Energy monitoring & optimization
- Continuous commissioning

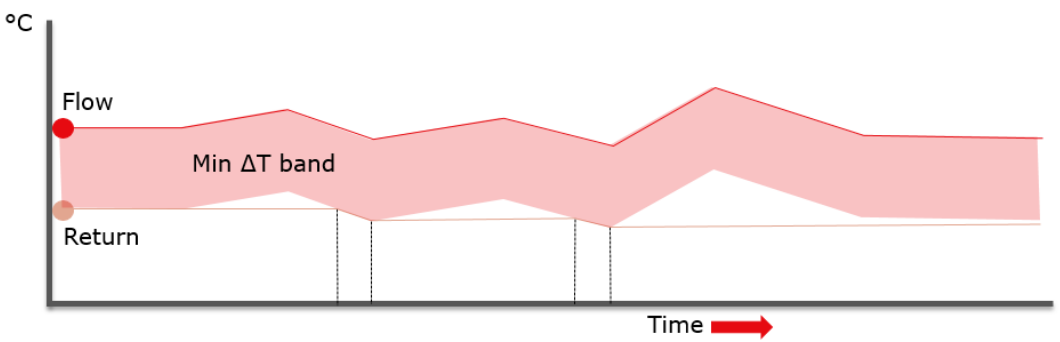
## Danfoss HVAC Smart Building Design
## Energy Savings

- Power Limitation Setup - NovoCon will override the DDC control signal when the calculated power exceeds the user defined limit and the valve will begin to close

- Minimum ΔT Manager - NovoCon overrides the DDC control signal and maintains a minimum temperature difference between the flow and return temperatures by closing the valve when the user defined minimum is not achieved.

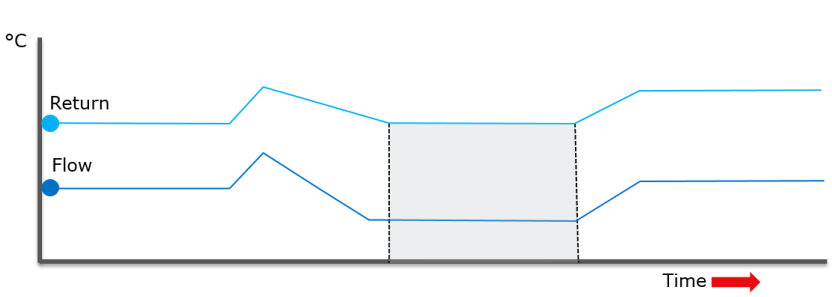
- Set ΔT Control - NovoCon overrides the DDC control signal and maintains a constant temperature difference between the flow and return temperatures by opening and closing the valve when the user defined ΔT is exceeded or not achieved.

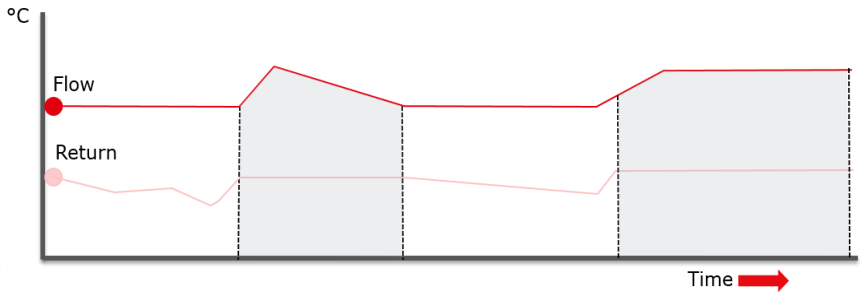


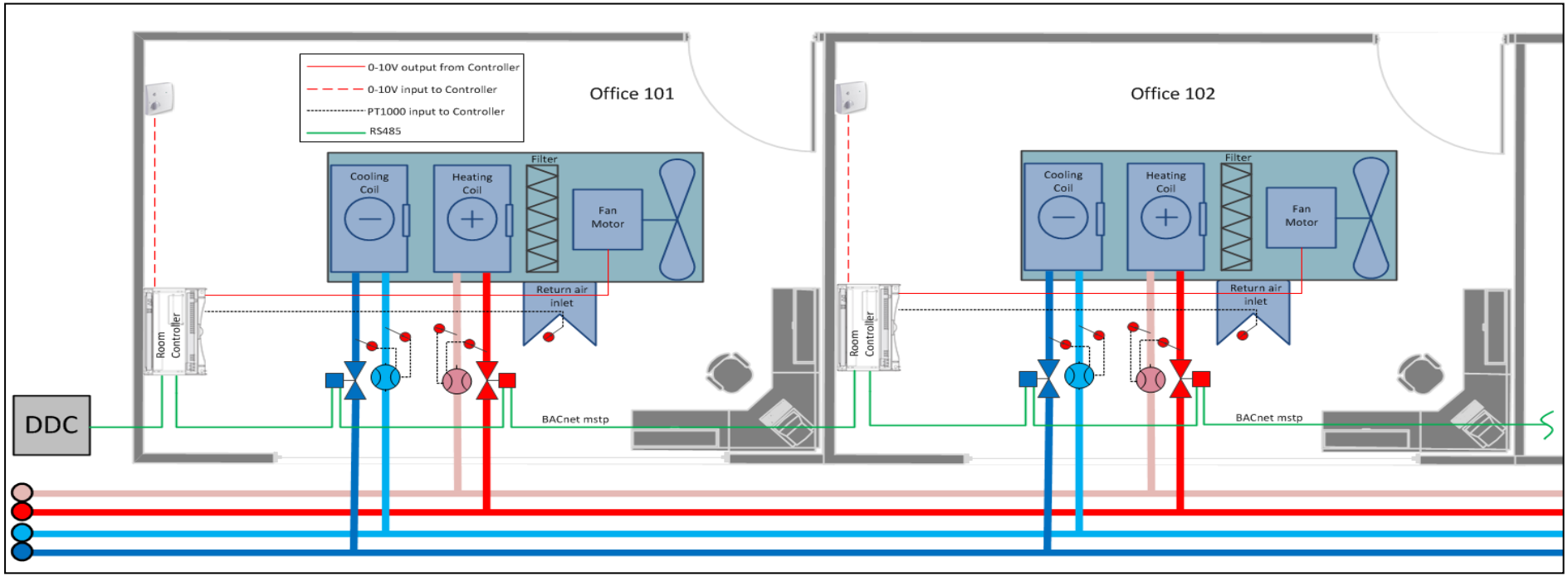
## Danfoss HVAC Smart Building Design
## Energy Savings

- Minimum Return Temperature Management - This function will mainly be used for a Cooling application where the return temperature is higher than the flow temperature.
- Maximum Return Temperature Management - This function will mainly be used for a Heating application where the return temperature is lower than the flow temperature.
- Set Return Temperature Control - NovoCon overrides the DDC control signal and maintains a constant return temperature by opening and closing the valve when the user defined Return T is exceeded or not achieved.
- Control Loop Setup - NovoCon has a simple control loop built in which allows simple stand alone control of e.g. a FCU that is controlling the room temperature.



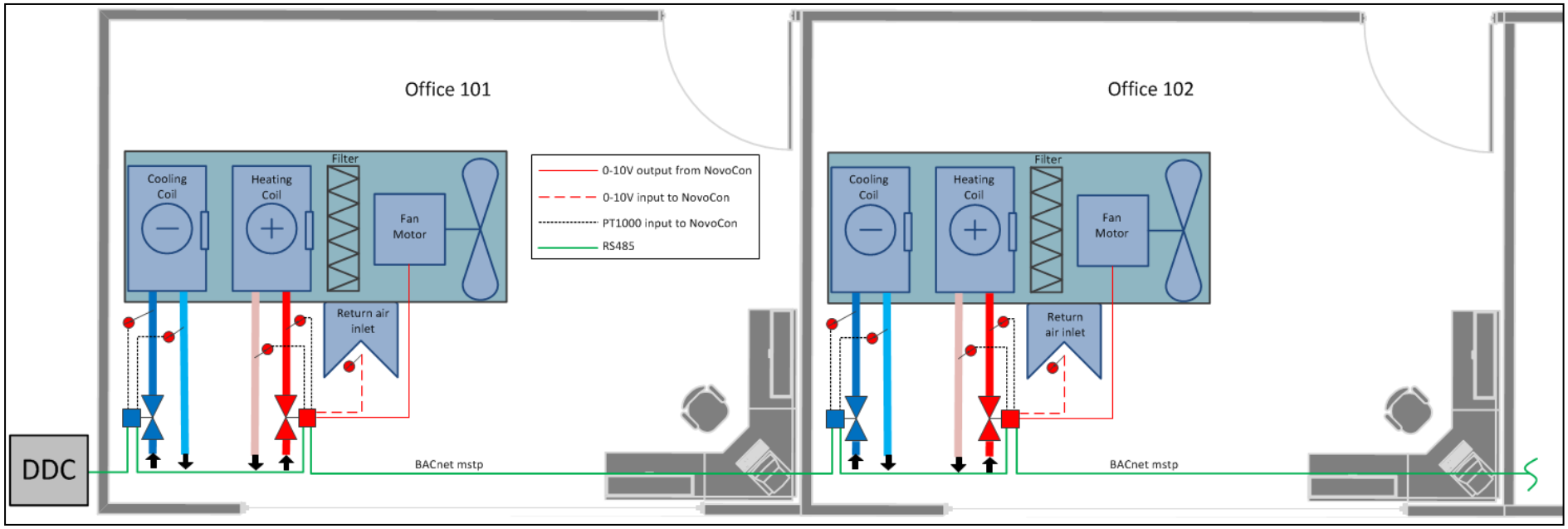
# NovoCon IO Application Topology
## IO & Energy Application Example




**Traditional Solution:**

DDC, Room Controller, 2 bus MID flowmeter actuators, 2 x PIBCV, Return air temperature, Set-point adjuster, 0-10V fan control

# NovoCon IO Application Topology
## IO & Energy Application Example




**NovoCon IO and Energy Solution per room:**

2 x NovoCon, 2 x PIBCV, 0-10V Return air temperature, 0-10V fan control, Cooling pipe temperature sensors, Heating pipe temperature sensors

# Danfoss HVAC Smart Building Design Seamless BMS integration

- Auto MAC addressing & Auto baud rate – time saving
- BACnet & Modbus in single product – ease of use
- Daisy chaining & plug in cables – time and cost saving
- Energy Indication- energy saving, energy proportioning
- Remote I/O – lower BA cost
- Comm tool – easy, quick, cost effective commissioning
- Remote fault finding by unique alarm system