Halton Workplace WRA – Room automation controller

Overview

Halton Workplace WRA is a controller especially designed for controlling the automation system of office spaces and meeting rooms. It is used for controlling the ventilation airflow, room temperature, and indoor air quality.

The Halton Workplace WRA room automation package consists of a controller unit and optional components depending on customer needs: a wall panel and sensors for temperature, CO2, occupancy, pressure, and condensation.

There are options available for the controller unit and wall panel, depending on the number of controls and sensors required. The Halton Workplace WRA room automation controller is always combined with other Halton products for adaptable and high-level indoor climate.

Application area

- Controlling the ventilation airflow, room temperature, and indoor air quality in office spaces and meeting rooms
- The Halton Workplace WRA room automation controller is an important part of the Halton Workplace system, controlling room units and airflow control dampers

Key features

- Factory-tested controller and wiring, easy to install
- Pre-installed project-specific parameters, quick to commission
- Several operating modes based on occupancy, thermal comfort, and indoor air quality
- Enables fully flexible layout solutions for changing needs in office environments
- Highly energy-efficient and reliable system operation

Operating principle

The Halton Workplace WRA room automation controller operates with Variable Air Volume (VAV) dampers and active chilled beams of the Halton Workplace system. These are used for adjusting the ventilation airflow, room temperature, and indoor air quality in office spaces.

Fig. 2: *Halton Workplace system: Halton Workplace WRA room automation controller combined with Halton room units*

Each room unit in an office space can have its own dedicated Halton Workplace WRA room automation controller, or a single controller can control multiple room units. The Halton Workplace WRA room automation controller can automatically adjust the system according to the indoor environment level preferred by users. Each room unit having its own dedicated controller brings

maximum flexibility.

Operating modes

The Halton Workplace WRA room automation controller has four operating modes for controlling the ventilation airflow in a room or area:

- Unoccupied (minimum) for outside office hours
- Standby (medium) during office hours when no occupancy is detected in the room or area
- Occupied (normal) during office hours when occupancy is detected
- Boost (maximum) for situations where the CO_2 level rises above the desired level or more cooling is needed

Note: The corresponding terms used in the controller unit are Economy, Pre-comfort, Comfort, and Comfort max.

You can define the temperature setpoints for each operating mode separately.

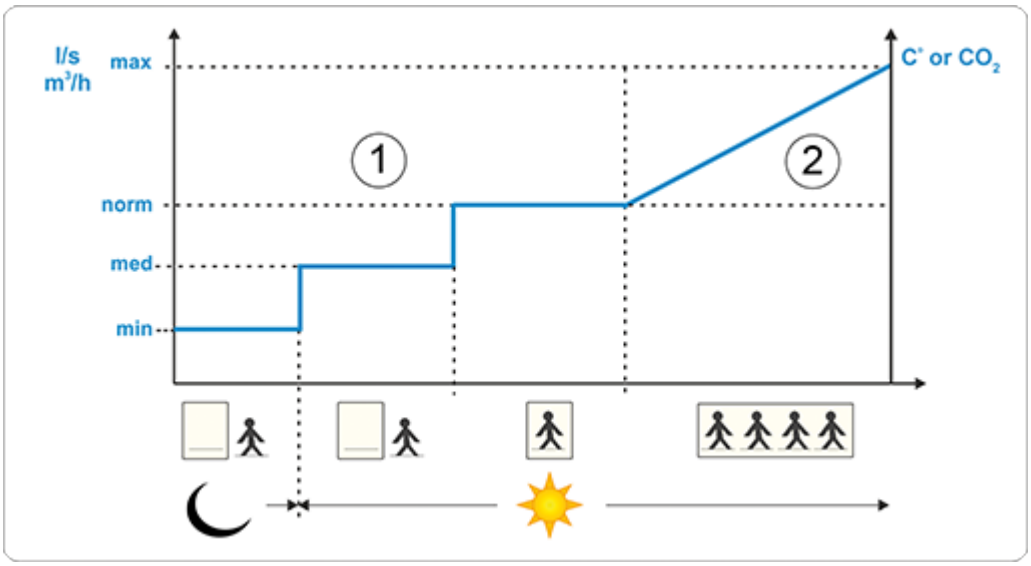


Fig. 3: *Operating modes of Halton Workplace WRA room automation controller, based on occupancy and the time of the day*

No.	Description
1	Based on occupancy (unoccupied, standby, and occupied)
2	Based on indoor conditions (boost)

Airflow control

The supply and exhaust ventilation airflow control is based on occupancy detection as well as

temperature and CO_2 levels.

The Halton Workplace WRA room automation controller manages the room's supply airflow rate by controlling the following:

- Active chilled beams where the supply airflow rate is adjusted with the Operation Mode Damper (OMD) control. Products: Halton Rex Integrated VAV (R6O) and Halton Rex Exposed VAV (REO) chilled beams.
- Active chilled beams where the supply airflow rate is adjusted with the Halton Air Quality (HAQ) control which can be accompanied with an on-off or position control damper (Halton PTS) for controlling the minimum airflow rate in the standby and unoccupied operating modes. Products: Halton Rex 600 (RE6), Halton Rex Exposed (REE), and Halton Rex Expander (RXP) chilled beams.

Both room and central zone exhausts are possible. In the case of room exhaust, the Halton Workplace WRA room automation controller manages the room's exhaust ventilation airflow rate by controlling a VAV damper, such as Halton Max Ultra Circular (MUC) or Halton Max One Circular (MOC). The central zone exhaust is managed by a zone VAV control damper (Halton Max MDC).

Temperature control

The room temperature sensor can be integrated into a room unit (for example, a chilled beam) or the wall panel (optional).

In air-water systems, temperature is controlled by using water valves for controlling the water flow rate. If more cooling capacity is needed, the ventilation airflow rate can be increased.

Different operating modes have different temperature setpoints. Users can select the desired temperature level from the wall panel (optional).

Condensation sensor

A condensation sensor is used to prevent condensation in chilled beams. It can be specified when selecting Halton Workplace WRA room automation for chilled beams. If the sensor detects condensation, the Halton Workplace WRA room automation controller closes the cooling valves.

If there is no condensation sensor in a chilled beam, the condensation control must be done on the Building Management System (BMS) level.

Occupancy sensor

An occupancy sensor detects motion in a room or space and is used to control the ventilation airflow in the space based on occupancy. It can also be used for measuring brightness in the space. The occupancy sensor can be integrated into a room unit or it can be installed as a separate sensor.

If occupancy is detected in the space, the Halton Workplace WRA room automation controller increases the supply airflow rate. When occupancy is not detected, the airflow rate is decreased

typically based on building material emissions.

CO_2 sensor

A carbon dioxide (CO_2) sensor is used to control the ventilation airflow rate based on the CO_2 level of the indoor air. The CO_2 sensor can be integrated into a room unit or it can be installed as a separate sensor. The Halton Workplace WRA room automation controller manages the ventilation airflow rate based on the CO_2 level setpoint. If the CO_2 levels in a space increase above the setpoint levels, the supply airflow rate is increased. The CO_2 level is typically used as an indoor air quality indicator.

Window switch

The window switch is a magnetic switch that is installed to a window and connected to the Halton Workplace WRA room automation controller with a cable. It detects whether a window is open or closed. If the window is open, the Halton Workplace WRA room automation controller closes the cooling valves to prevent condensation.

Pressure sensor

A pressure sensor is used for the pressure measurement of supply air room units which is then used for calculating the supply ventilation airflow rate in the Halton Workplace WRA room automation controller. Controller type DXR2.E12P-102A has an integrated pressure sensor. With controller type DXR2.E18-102A, a separate pressure sensor is needed.

System settings

The parameters are pre-set at the factory and customer-specific settings are possible.

The system setpoints and functions are controlled using the Building Management System (BMS) via BACnet/IP or with a web browser. Users can adjust the room temperature from the wall panel (optional). After office hours, the temperature setpoint is reset to the default.

Key technical data

Controller options

Controller option	Description
DXR2.E12P-102A	• Integrated pressure sensor • Inputs: 1 DI • Inputs: 2 UI • Outputs: 6 Triacs • Outputs: 2 AO • Power consumption up to 60 VA including connected components
DXR2.E18-102A	• Inputs: 2 DI • Inputs: 4 UI • Outputs: 8 Triacs • Outputs: 4 AO • Power consumption up to 84 VA including connected components

Wall panel options

Wall panel option	Display	Temperature measurement	Humidity measurement	CO_2 measurement	Setpoint shift	Configurable
QMX3.P30	–	X	–	–	–	–
QMX3.P34	X	X	–	–	X	–
QMX3.P37	X	X	–	–	X	X
QMX3.P40	–	X	X	–	–	–
QMX3.P70	–	X	X	X	–	–
QMX3.P74	X	X	X	X	–	–
No wall panel	–	–	–	–	–	–

Optional features

- Window switch control
- Humidity measurement
- Control output for radiator valves
- External room unit pressure sensor

Specification

A factory-tested and assembled room automation system. Includes control, measuring, and adjustment components.

- Different wall panel options for controlling and measurement
- Supply and exhaust ventilation airflow control
- Temperature control using either valves or airflow, or both
- Airflow rate control based on either occupancy or CO_2 level, or both
- BACnet/IP communication

Electrical data

- Power supply 230 V AC
- Controller type DXR2.E12P-102A: Power consumption up to 60 VA including connected components
- Controller type DXR2.E18-102A: Power consumption up to 84 VA including connected components
- Power supplies L and N have their own fuses, type glass tube 5×20 4 A F
- Internal transformer 24 V AC
- 24 V AC terminal fuse, type glass tube 5×20 4 A F

Parameter settings

- Project-specific parameters pre-set at the factory
- Controller settings can be modified on site with BACnet/IP or with a web browser

Optional features

- Window switch control
- Humidity measurement
- Control output for radiator valves
- External room unit pressure sensor

Design information

When designing an office space or meeting room, consider the following:

Should individual room units in a room have their own dedicated Halton Workplace WRA room automation controllers or should the whole room be controlled as one area?

    - If every terminal unit has its own dedicated controller, it allows for a more adaptable solution, enabling room layout changes and better individual control of the indoor environment.

- One controller can control up to four terminal units (one primary + three secondaries)

Should the measurement sensors be integrated into a wall panel or should separate sensors be used?

- If there is nowhere to install a wall panel (due to glass walls, for example), sensors can be integrated into room units or separate sensors can be used.
- All sensors cannot be integrated into all room units. In this case, sensors can be integrated into the wall panel or separate sensors can be used.

Is the exhaust airflow damper controlled by the Halton Workplace WRA room automation controller or some other system?

- If room-specific exhaust with a VAV damper is used, the room exhaust airflow is controlled by the Halton Workplace WRA room automation controller.
- If zone exhaust is used, the exhaust airflow is controlled by a zone VAV control damper (Halton Max MDC).

Installation information

For the active chilled beams of the Halton Workplace system, the Halton Workplace WRA room automation controller unit is installed to the main product at the factory. It is also possible to remove the Halton Workplace WRA room automation controller unit from the main product and install it separately.

If there is nowhere to install a wall panel (due to glass walls, for example), sensors can be integrated into room units or separate sensors can be used.

Component	Halton Rex 600 (RE6) chilled beam	Halton Rex Exposed VAV (REO) chilled beam	Halton Rex 600 (RE6) chilled beam	Halton Rex Expander (RXP) chilled beam	Halton Rex Exposed (REE) chilled beam
Halton Workplace WRA room automation controller	F	F	F	F	F
Supply air control damper	F	F	F	F	F
• Halton PTS damper	–	–	S	S	S
Room exhaust air control damper	S	S	S	S	S
Transformer	F	F	F	F	F
Temperature sensor	F	F	F	F	F
CO_2 sensor	F	F	F	F	F
Occupancy sensor	S	F	S	S	F
Condensation sensor	F	F	F	F	F
Window switch	S	S	S	S	S

Component	Halton Rex 600 (RE6) chilled beam	Halton Rex Exposed VAV (REO) chilled beam	Halton Rex 600 (RE6) chilled beam	Halton Rex Expander (RXP) chilled beam	Halton Rex Exposed (REE) chilled beam
Wall panel	S	S	S	S	S
Pressure sensor	F	F	F	F	F
Cooling water valves and actuators:					
• Danfoss	F*	F*	F*	F*	F*
• Siemens	S	F*	S	S	F*
Heating water valves and actuators:					
• Danfoss	F*	F*	F*	F*	F*
• Siemens	S	F*	S	S	F*
• Radiator	S	S	S	S	S

Table 1: *Installation of components*

- F = Factory-installed
- S = Installed on site
- F*= Factory-installed, with the exception of primary and secondary units being installed on

site

Space requirements

The Halton Workplace WRA room automation controller unit is usually installed to the main product. Enough space must be reserved around the controller unit for service. If there is a solid ceiling, there must be a service hatch close to the controller unit.

Wiring

The wiring must only be carried out by qualified personnel following the local regulations.

For more information on wiring, see the project-specific wiring diagrams. In addition, you can find some example wiring diagrams in *Technical reference data*.

Cabling requirements

Field devices:

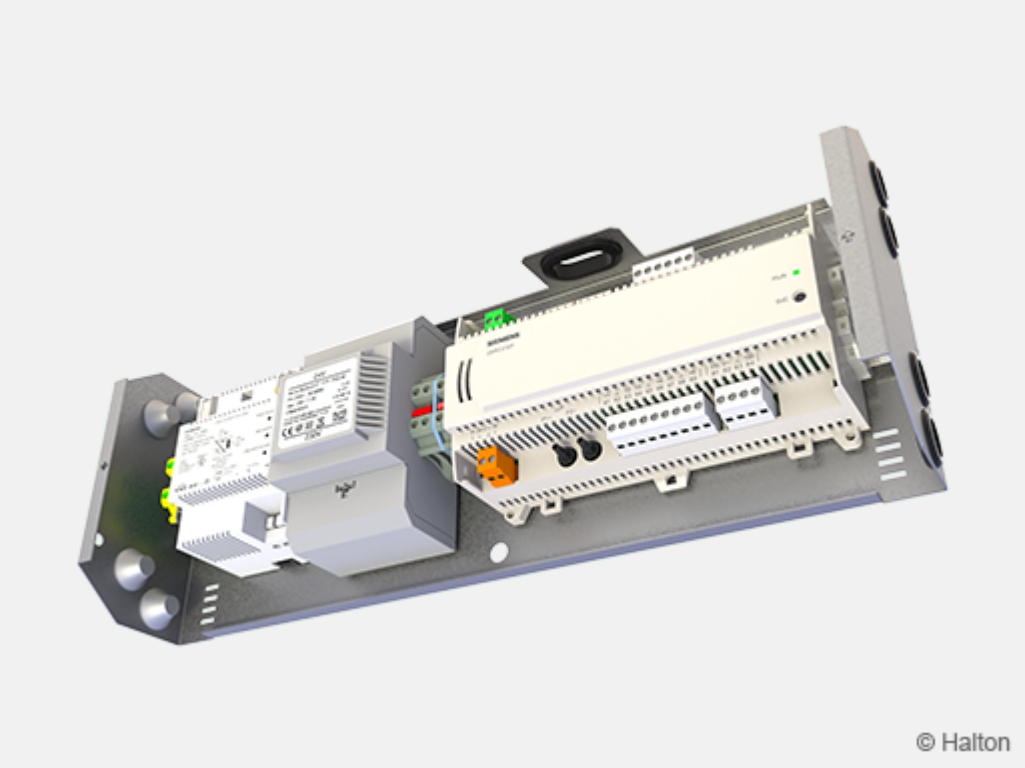
- The wires connected to the terminals have a cross-sectional area of at least 0.5 mm^2.
- Twisted-pair cables, shielding recommended.
- The length must not exceed 80 m.

Bus cable:

- Standard Ethernet cable min. category 5
- Shielded or unshielded
- Length between room automation stations max. 100 m
- Length between switch and room automation station 100 m
- Star or line (daisy chain) topology
- Number of devices under a line topology max. 20.

Connection diagrams

Connection diagram: Halton Workplace WRA room automation controller DXR2.E12P-102A



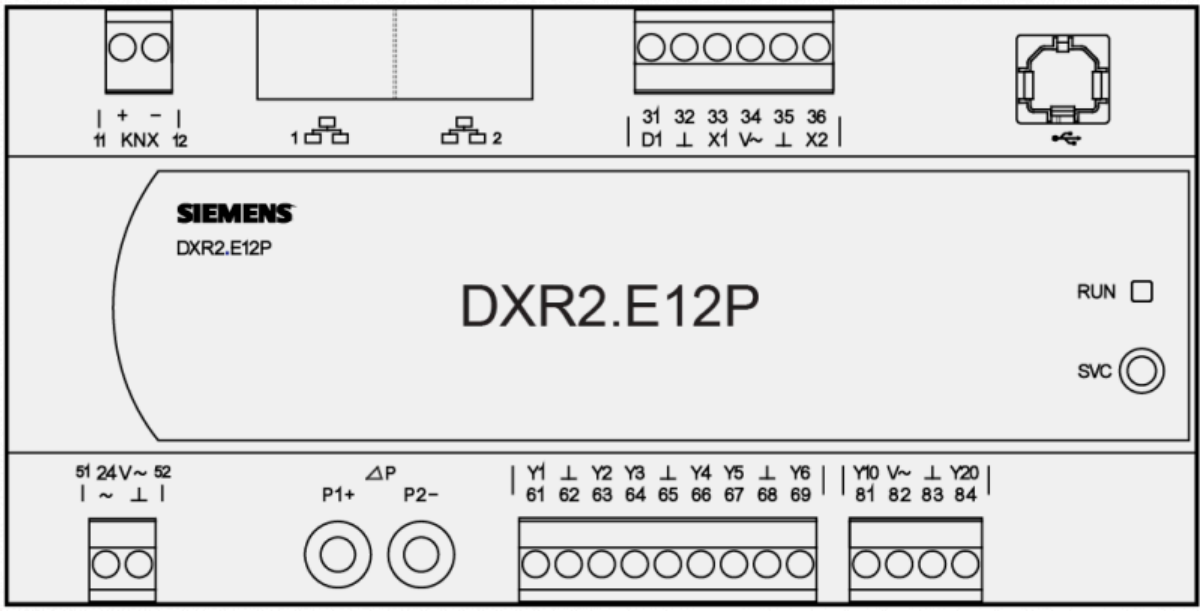
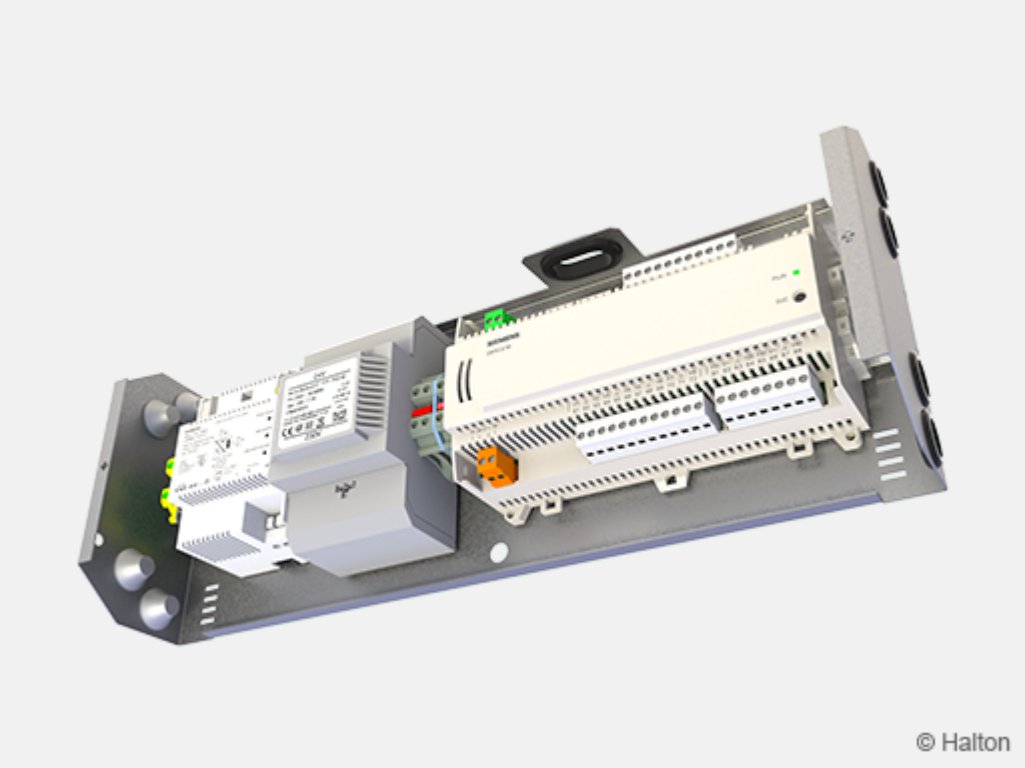


Fig.4. *Connection diagram: Halton Workplace WRA room automation controller DXR2.E12P-102P*

Connection diagram: Halton Workplace Room Automation controller DXR2.E18-102A



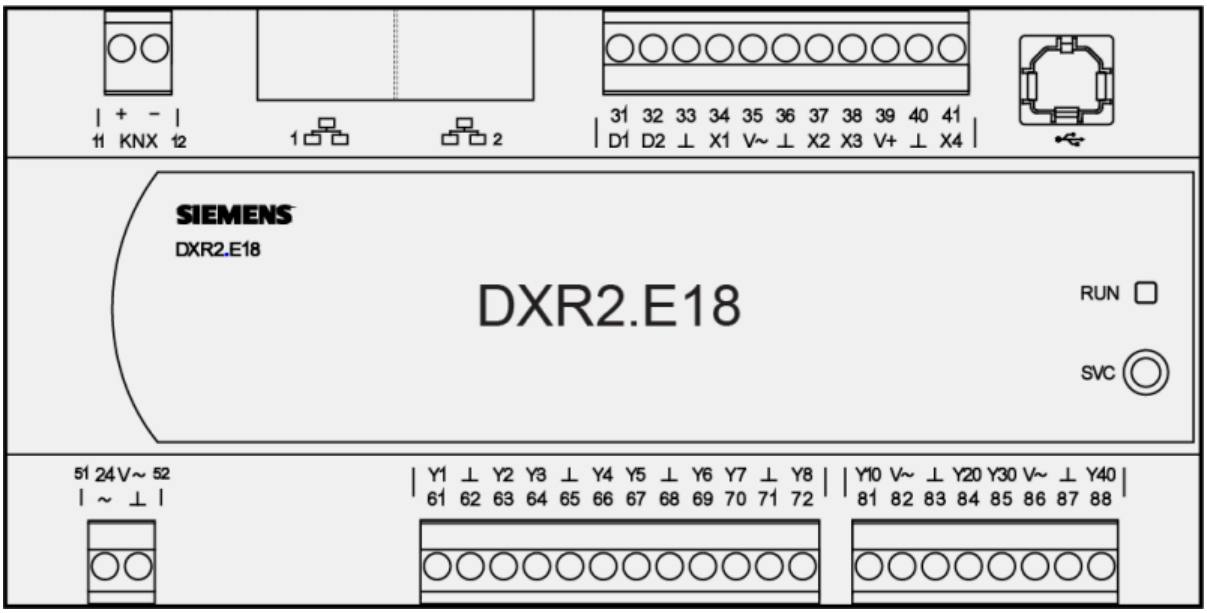


Fig.5. *Connection diagram: Halton Workplace Room Automation controller DXR2.E18-102A*

Wiring diagrams

Wiring diagram: Halton Rex Integrated VAV (R6O) active chilled beams controlled with Halton Workplace WRA room automation controllers

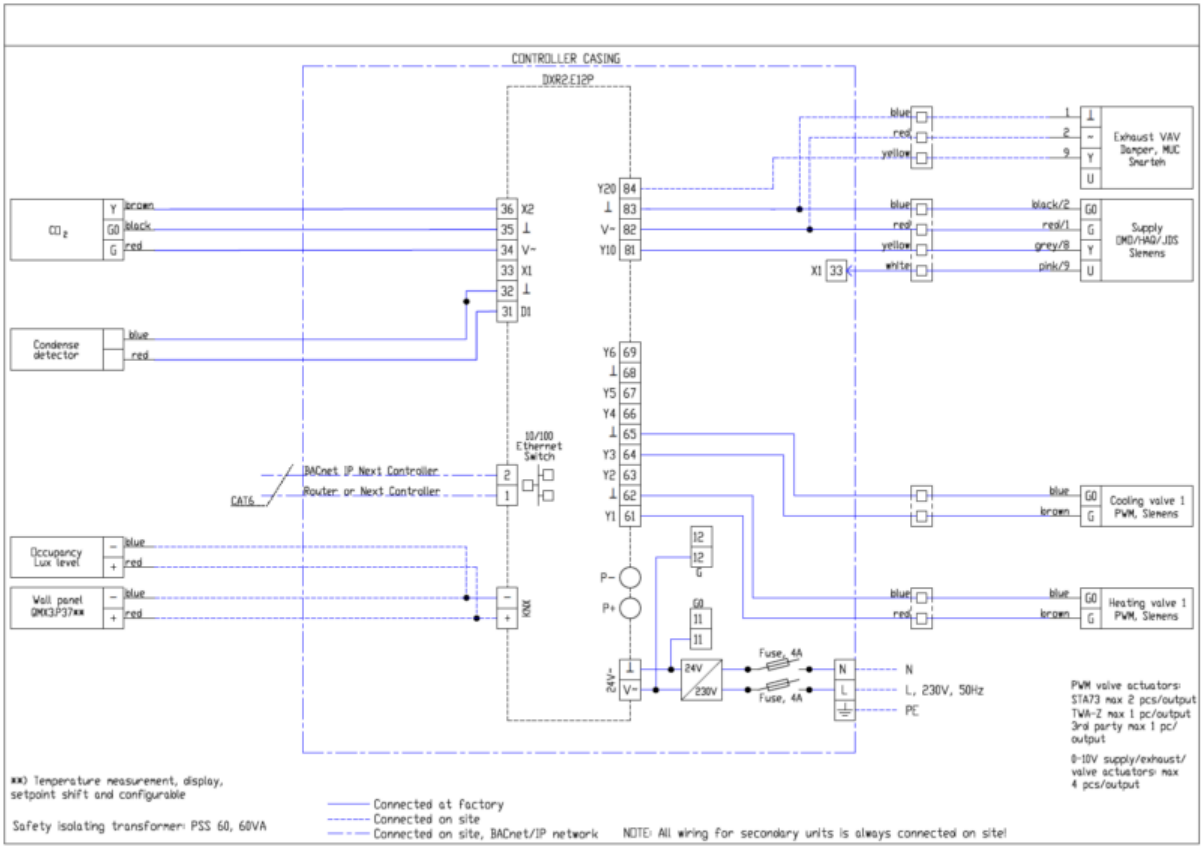


Fig. 6: *Wiring diagram: Halton Rex Integrated VAV (R6O) active chilled beams (4-pipe) controlled with Halton Workplace WRA room automation controllers*

Wiring diagram: Halton Rex Exposed (REE) active chilled beams with HAQ control and Halton PTS damper, controlled with Halton Workplace WRA room automation controllers

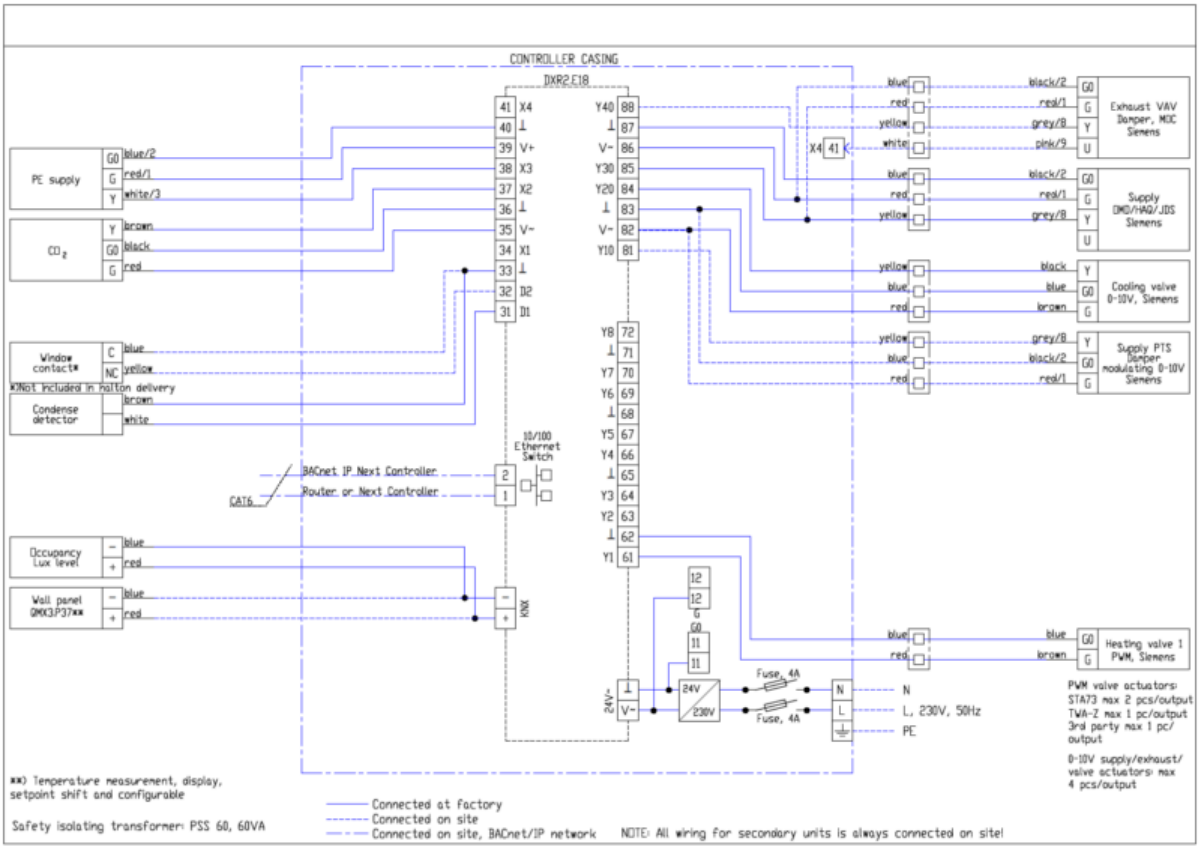


Fig. 7: *Wiring diagram: Halton Rex Exposed (REE) active chilled beams (4-pipe) with HAQ control and Halton PTS damper, controlled with Halton Workplace WRA room automation controllers*

Wiring diagram: Halton Workplace WRA room automation controller DXR2.E12P-102A with Siemens components (all components included)

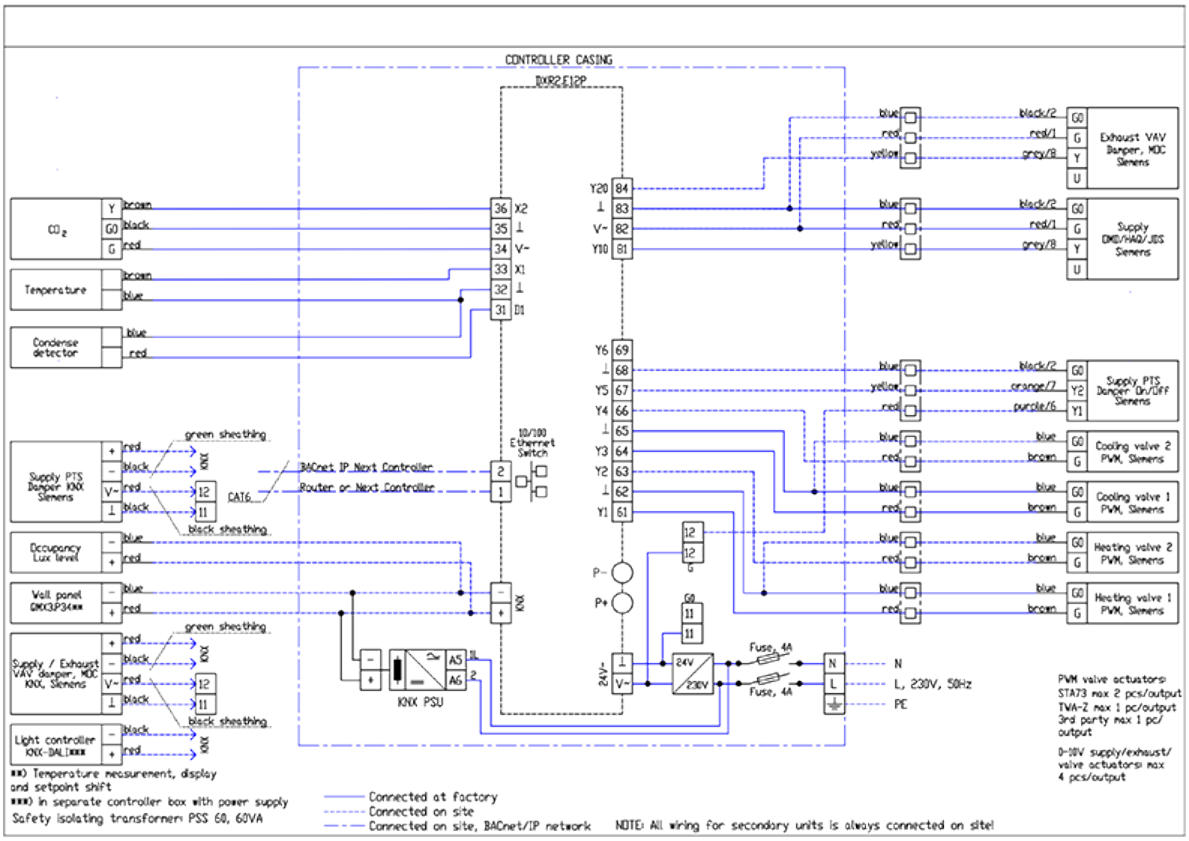


Fig.8. *Wiring diagram: Halton Workplace Room Automation controller DXR2.E12P-102A with Siemens components (all components included)*

Wiring diagram: Halton Workplace WRA room automation controller DXR2.E12P-102A with Belimo and Danfoss components (all components included)

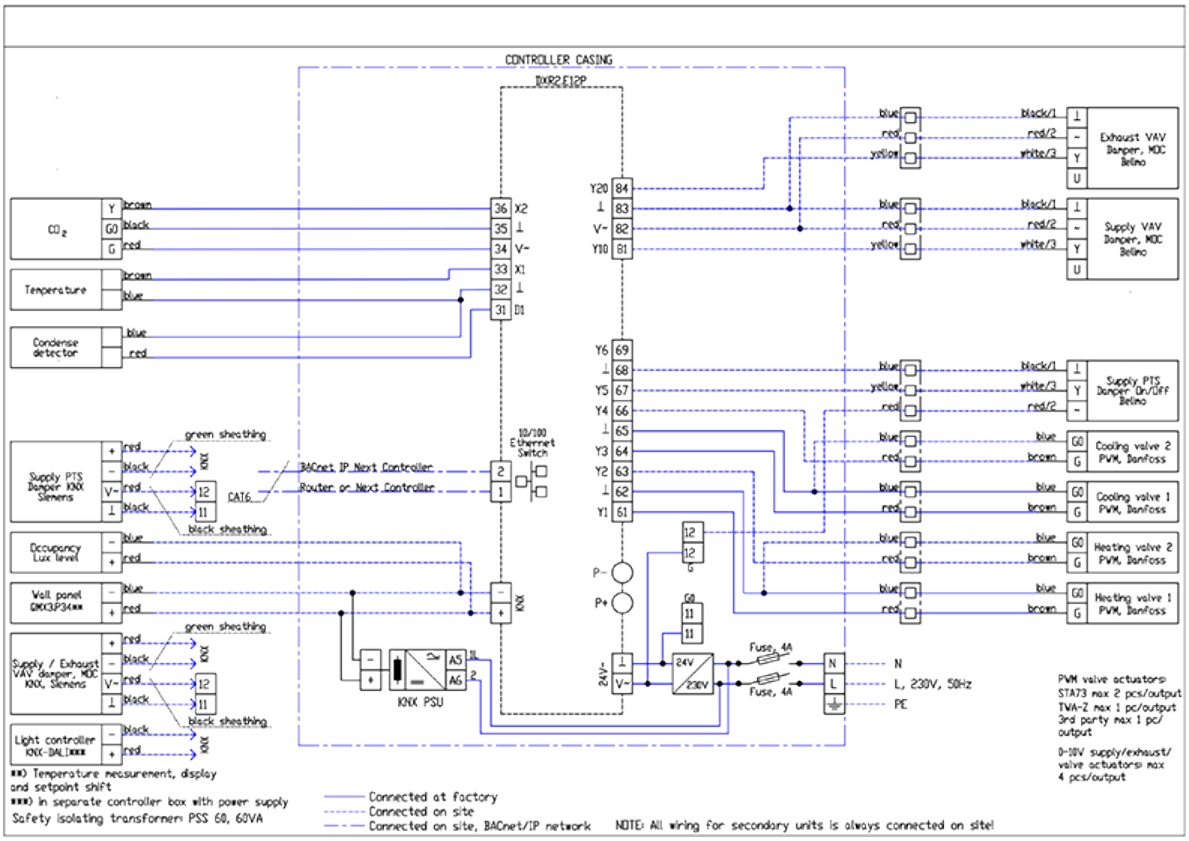


Fig.9. *Wiring diagram: Halton Workplace Room Automation controller DXR2.E12P-102A with Belimo and Danfoss components (all components included)*

Wiring diagram: Halton Workplace WRA room automation controller DXR2.E18-102A with Siemens components (all components included)

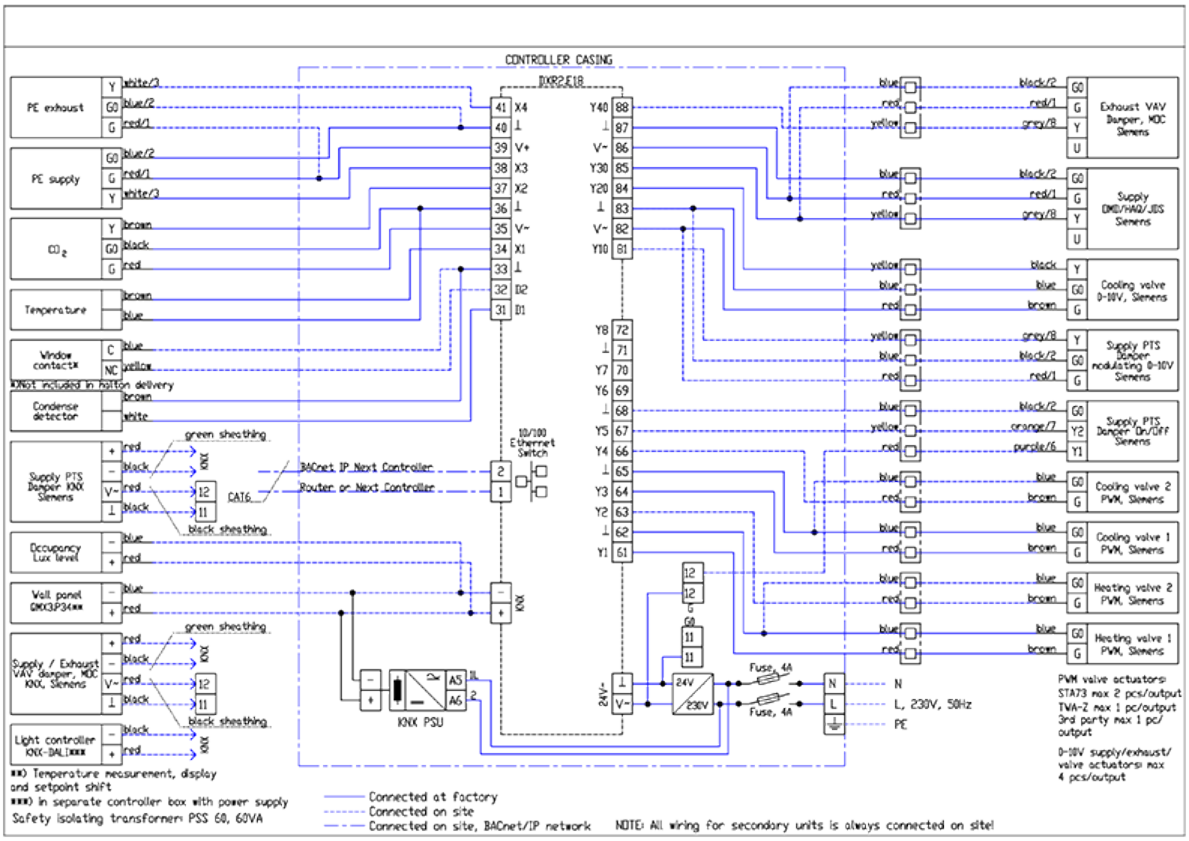


Fig.10. *Wiring diagram: Halton Workplace Room Automation controller DXR2.E18-102A with Siemens components (all components included)*

Wiring diagram: Halton Workplace WRA room automation controller DXR2.E18-102A with Belimo and Danfoss components (all components included)

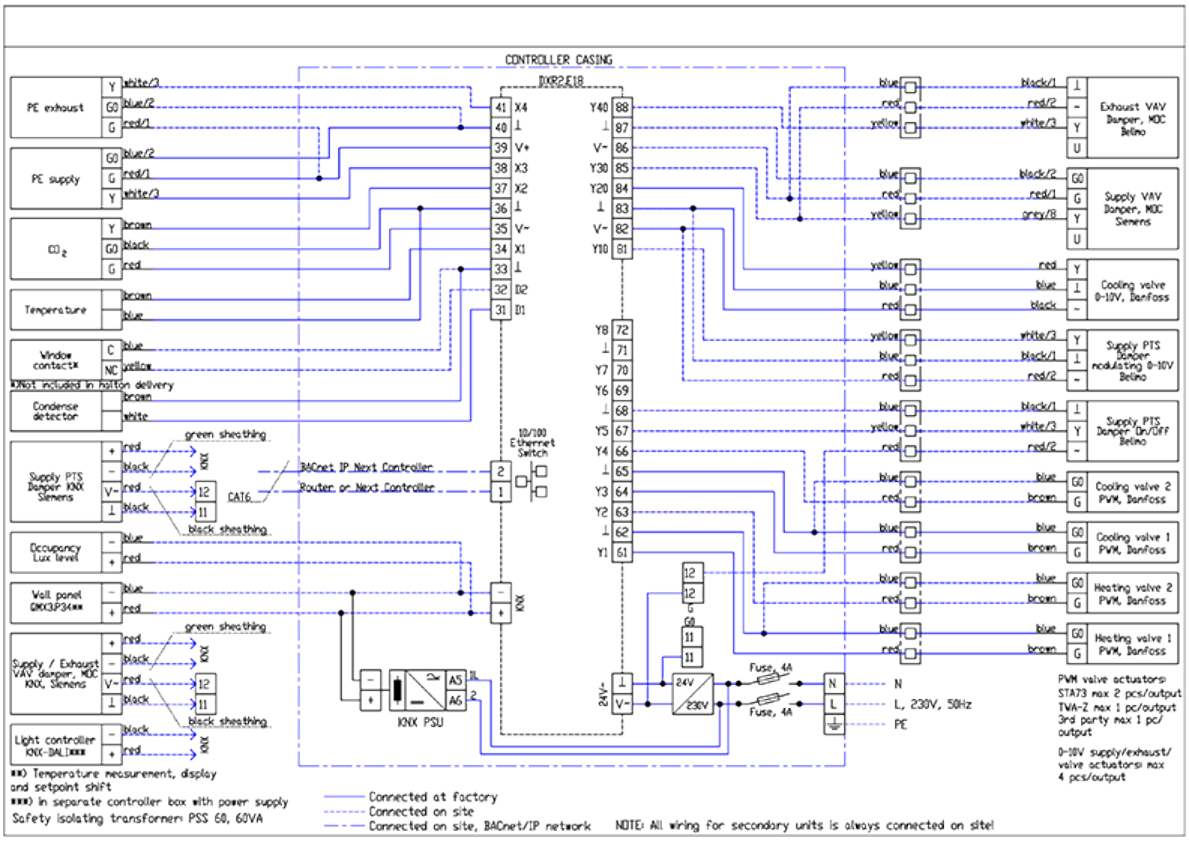


Fig.11. *Wiring diagram: Halton Workplace Room Automation controller DXR2.E18-102A with Belimo and Danfoss components (all components included)*

Commissioning

For the active chilled beams of the Halton Workplace system, the Halton Workplace WRA room automation controller unit is installed to the main product and configured at the factory. External wiring needs to be checked before the system start-up.

The Halton Workplace WRA room automation controller addressing is pre-set at the factory. All system parameters can be modified on site with BACnet/IP or with a web browser.

Product selection examples

Room automation: Halton Rex Integrated VAV (R6O) active chilled beams controlled with Halton Workplace WRA room

automation controllers

***Fig.10**. Halton Rex Integrated VAV (R6O) chilled beams controlled with Halton Workplace WRA room automation controllers in a double office room*

Room automation description

In this configuration, two Halton Workplace WRA room automation controllers (type DXR2.E12P-102A) control two Halton Rex Integrated VAV (R6O) active chilled beams. Each chilled beam has heating and cooling valves, a motorised Operation Mode Damper (OMD) control, and integrated CO_2 and condensation sensors. A pressure sensor is integrated into the Halton Workplace WRA room automation controller. The system also includes an exhaust VAV damper and a wall panel (type QMX3.P37) with temperature sensor and display. One Halton Workplace WRA room automation controller can individually control up to four room units, and there can be several Halton Workplace WRA room automation controllers in the room.

Design criteria for room automation

- Chilled beam has heating and cooling valves
- Chilled beam has motorised OMD control
- Condensation sensor and CO_2 sensor integrated into chilled beam
- Exhaust airflow control

- Wall panel with temperature sensor and display
- Window switch control
- Pressure sensor integrated into Halton Workplace WRA room automation controller

Schematic drawing

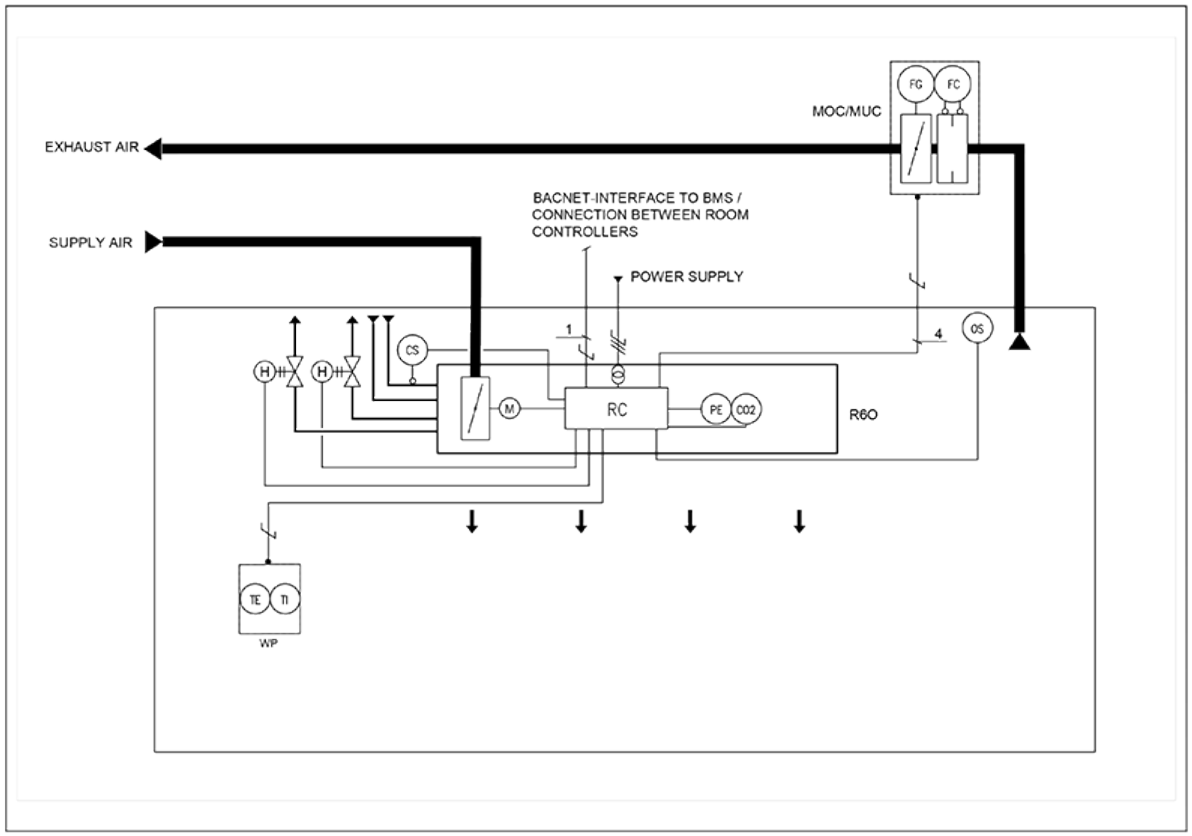


Fig.11. *Schematic drawing: Halton Rex Integrated VAV (R6O) chilled beam (4-pipe) controlled with Halton Workplace WRA room automation controller*

Equipment list

Code	Equipment
RC	Controller unit
FG	Airflow damper actuator
FC	Airflow measurement
H	Water valve actuator
CS	Condensation sensor
OS	Occupancy sensor
PE	Pressure sensor
CO_2	CO_2 sensor
WP	Wall panel
TE	Temperature sensor
TI	Temperature display

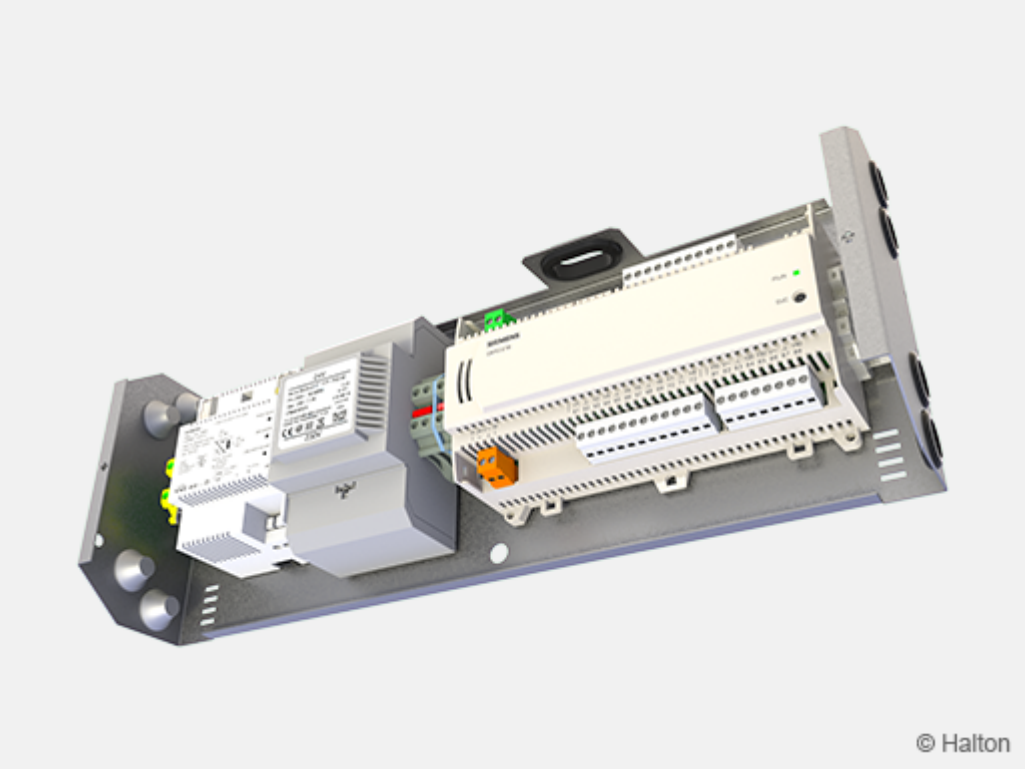


Fig.12. *Factory-installed Halton Workplace WRA room automation controller, type DXR2.E12P-102A*

Wiring diagram

For the wiring diagram of this configuration, see *Wiring diagram: Halton Rex Integrated VAV (R6O) active chilled beams controlled with Halton Workplace WRA room automation controllers*.

Components and order code examples for the system

- 2 x Active chilled beam: Halton Rex Integrated VAV (R6O)
  R6O/A-2400-C-2100, SP=Y, LD=R3, TC=H, CO=SW, ZT=N
- 1 x Exhaust unit: Halton AGC Exhaust grille + Halton PRL Plenum for grilles
  AGC/N-400-100 FS=CL, ME=A, FI=PN, CO=W, ZT=N+PRL/F-400-100-160
- 1 x VAV damper: Halton Max Ultra Circular (MUC) or Halton Max One Circular (MOC)
  MUC/G-160, MA=CS
- Automation package: 2 x Halton Workplace WRA room automation controller unit with related components
  WRA/R6O-E21-OM-EX4, WP=37, LC=NA, CD=CS, SW=NA, ST=IC, SL=OE, PM=P2, TC=H, CV=SP5, RV=NA, ZT=N

Room automation: Halton Rex Exposed (REE) active chilled beams with HAQ control and Halton PTS damper, controlled with Halton Workplace WRA room automation controllers

Fig.13. *Halton Rex Exposed (REE) active chilled beams with HAQ control and Halton PTS damper, controlled with Halton Workplace WRA room automation controllers in a meeting room*

Room automation description

In this configuration, two Halton Workplace WRA room automation controllers (type

DXR2.E18-102A) control two Halton Rex Exposed (REE) active chilled beams. Each chilled beam has heating and cooling valves, motorised Halton Air Quality (HAQ) control, as well as integrated CO_2, occupancy, pressure, and condensation sensors. A Halton PTS single-blade damper is used for controlling the minimum airflow rate in the standby and unoccupied operating modes. The system also includes an exhaust VAV damper, window switch control, and a wall panel (type QMX3.P37) with a temperature sensor and display. One Halton Workplace WRA room automation controller can individually control up to four room units, and there can be several Halton Workplace WRA room automation controllers in the room.

Design criteria for room automation

- Chilled beam has heating and cooling valves
- Chilled beam has motorised HAQ control
- Chilled beam has integrated CO_2, occupancy, pressure, and condensation sensors
- Wall panel with temperature sensor and display
- Window switch control
- PTS damper for controlling minimum airflow
- Exhaust airflow control

Schematic drawing

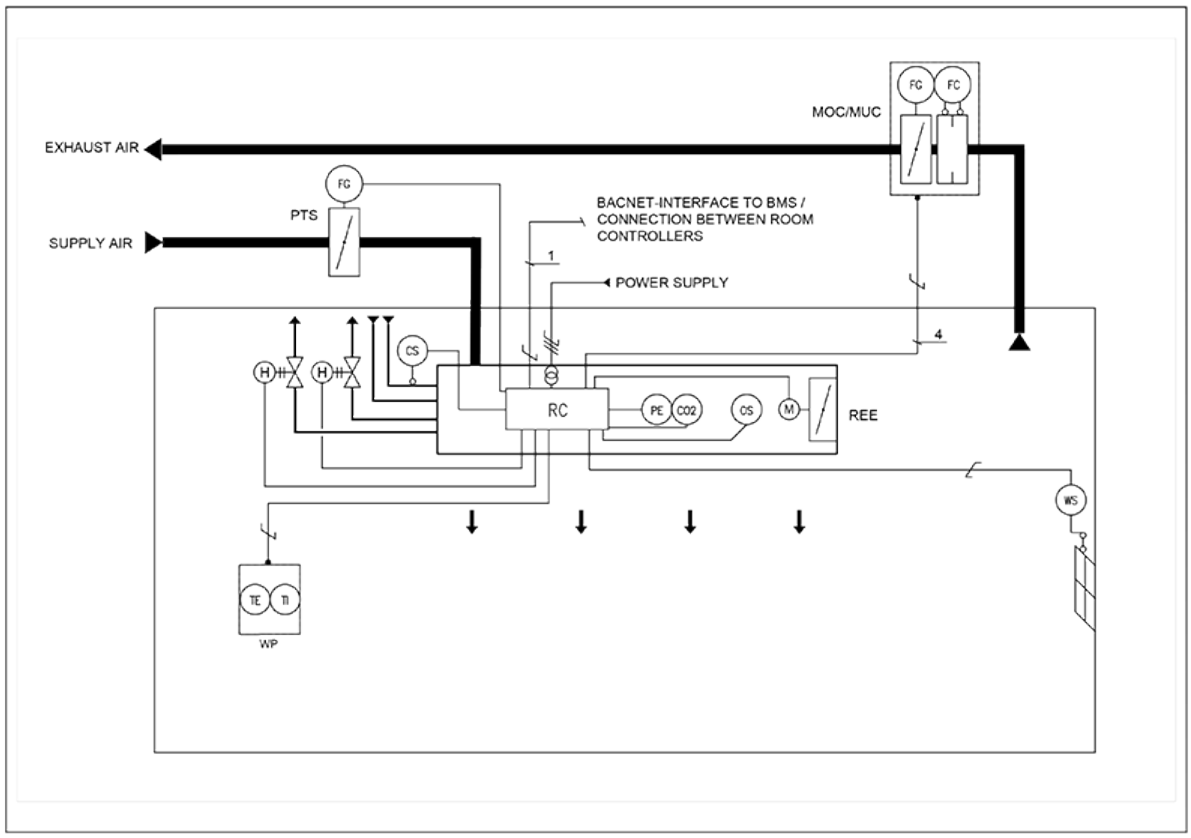


Fig.14. *Schematic drawing: Halton Rex Exposed (REE) chilled beam (4-pipe) controlled with Halton Workplace WRA room automation controller*

Equipment list

Code	Equipment
RC	Controller unit
FG	Airflow damper actuator
FC	Airflow measurement
H	Water valve actuator
CS	Condensation sensor
OS	Occupancy sensor
PE	Pressure sensor
CO_2	CO_2 sensor
WP	Wall panel
TE	Temperature sensor
TI	Temperature display
WS	Window switch control

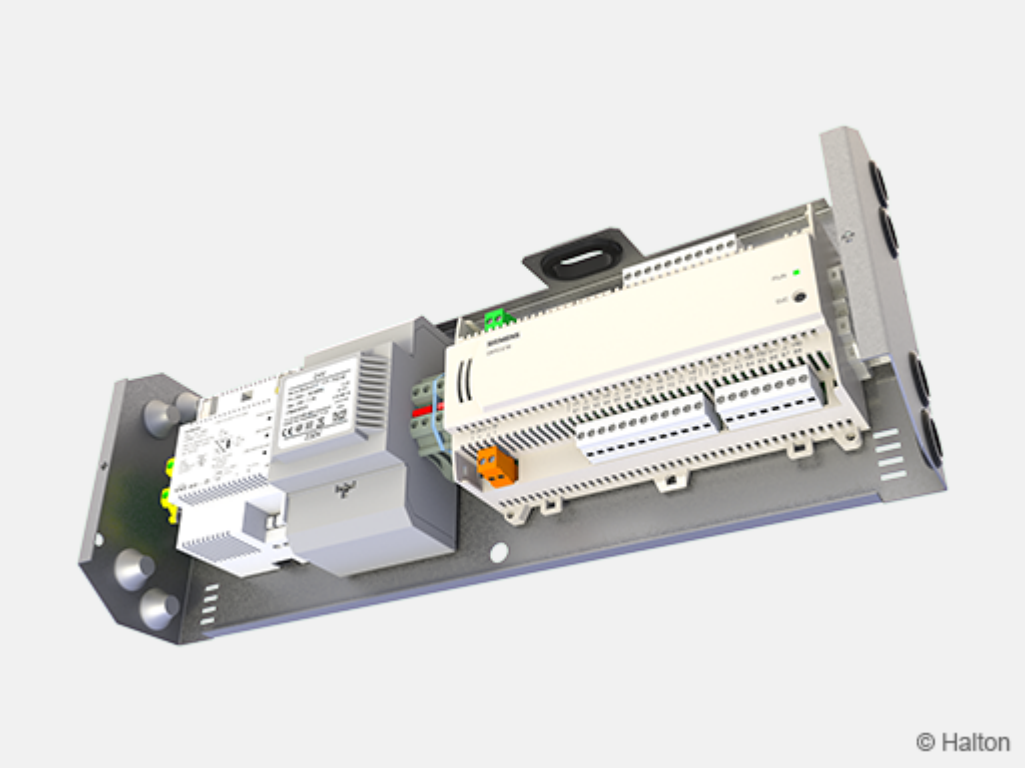


Fig.15. Factory-installed Halton Workplace WRA room automation controller, type DXR2.E18-102A

Wiring diagram

For the wiring diagram of this configuration, see *Wiring diagram: Halton Rex Exposed (REE) active chilled beams with HAQ control and Halton PTS damper, controlled with Halton Workplace WRA room automation controllers*.

Components and order code examples for the system

- 2 x Active chilled beam: Halton Rex Exposed (REE)
  REE/A-2800-2500, TC=H, CT=S, AQ=MO, VA=RO, CO=SW, CV=NA, ZT=N
- 1 x Exhaust unit: Halton AGC Exhaust grille + Halton PRL Plenum for grilles
  AGC/N-400-100 FS=CL, ME=A, FI=PN, CO=W, ZT=N+PRL/F-400-100-160
- 1 x VAV damper: Halton Max Ultra Circular (MUC) or Halton Max One Circular (MOC)
  MUC/G-160, MA=CS
- 2 x standby, shut-off damper: Halton PTS
  PTS/A-125, MA=CS, MO=B4, ZT=N
- Automation package: 2 x 2 x Halton Workplace WRA room automation controller unit with related components
  WRA/REE-E81-H3-EX4, WP=37, LC=NA, CD=CS, SW=NC, ST=IC, SL=OI, PM=P1, TC=H, CV=SP6, RV=NA, ZT=N

Structure and components

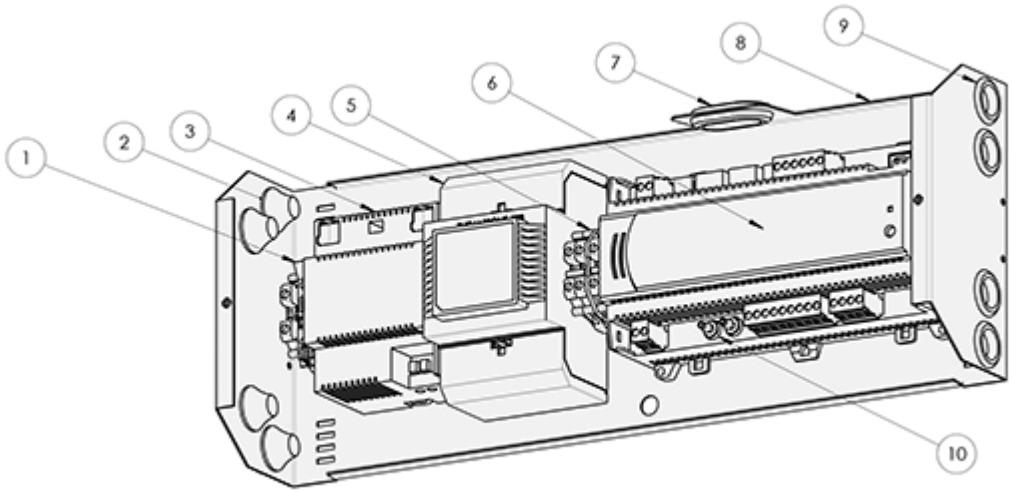


Fig.24. *Components of Halton Workplace WRA room automation controller, type DXR2.E12P-102A*

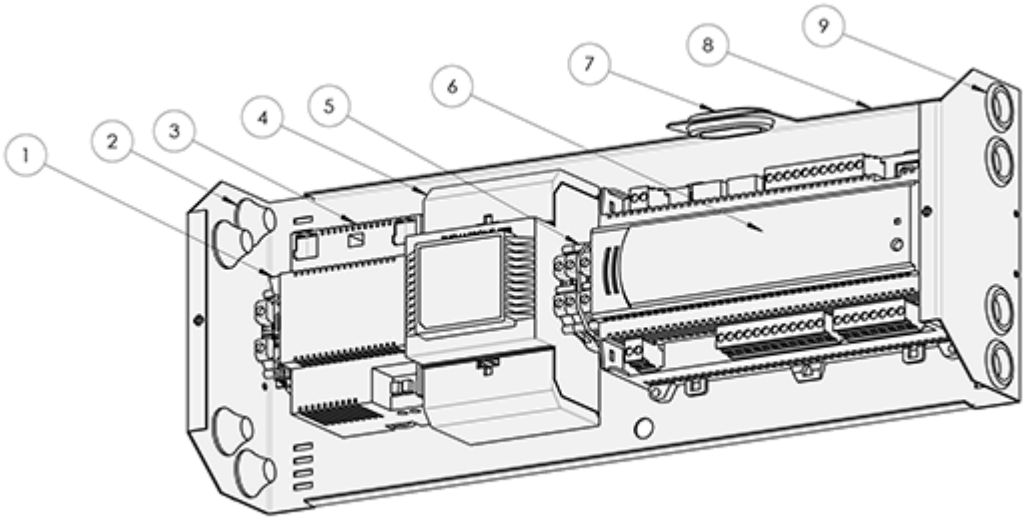


Fig.25. Components of Halton Workplace WRA room automation controller, type DXR2.E18-102A

No.	Part	Material
1	230 V AC fuses	4 A fast
2	Bushing TET	Bushing for power supply, TET 7-10
3	KNX Power supply unit 160 mA	5WG1 125-1AB02
4	Transformer	60 VA
5	24 V AC terminals	Actuator or sensor power connection
6	Controller	Type DXR2.E12P-102A or DXR2.E18-102A
7	Bushing ethernet	Bushing for ethernet cable
8	Controller unit case	Casing and top cover galvanised steel
9	Bushing TET	Bushing for sensors, actuators and KNX devices. TET 7-10
10	Pressure sensor	For controller type DXR2.E12P-102A only

Dimensions and weight

The dimensions are given in millimeters.

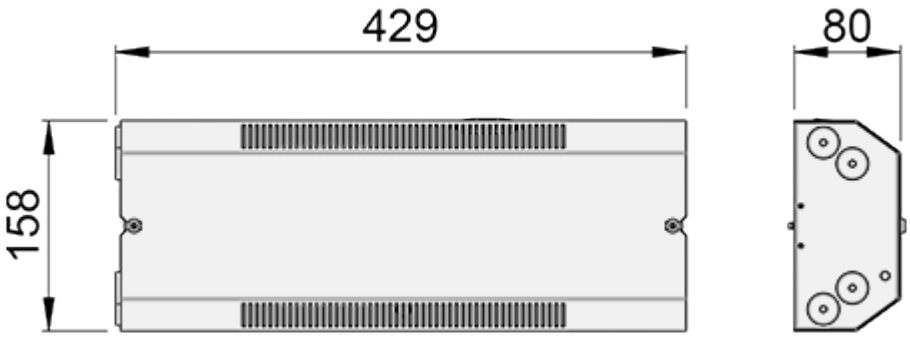


*Fig.**26.** Dimensions of Halton Workplace WRA controller unit*

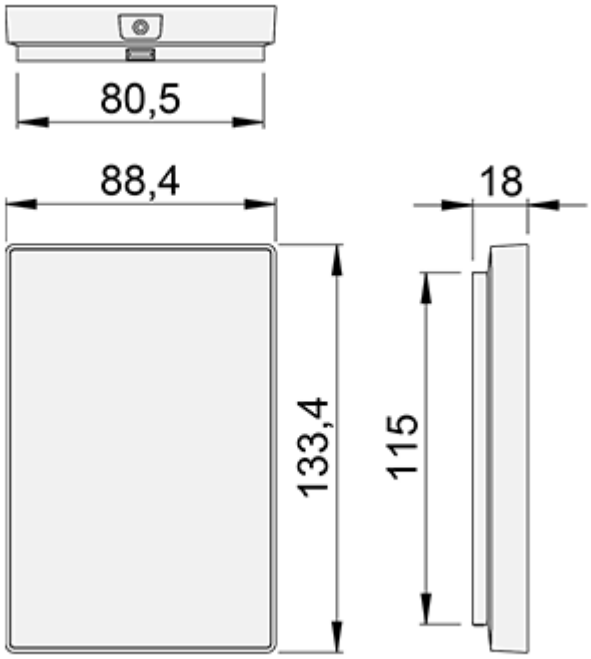


Fig.27. Dimensions of Halton Workplace WRA wall panel

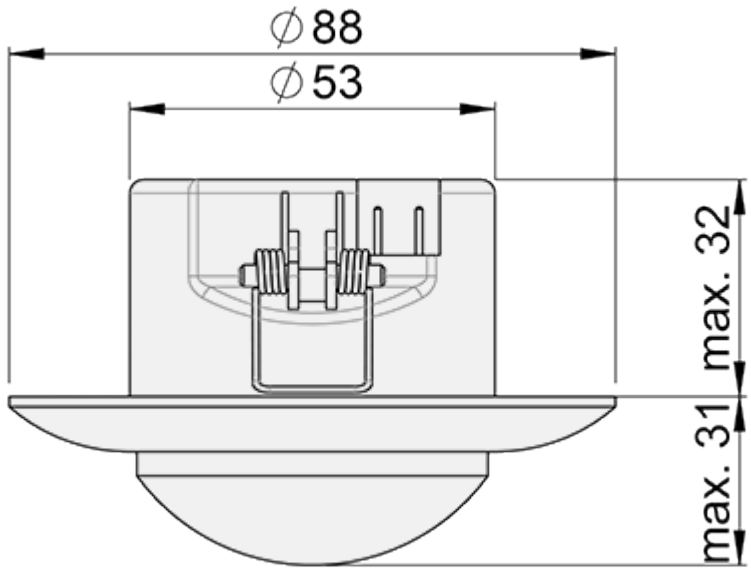


Fig.28. *Dimensions of Halton Workplace WRA occupancy sensor*

Weight:

- Halton Workplace WRA controller unit: 2.5 kg
- Halton Workplace WRA wall panel: 0.2 kg

Order code

WRA/P-C-S-E, WP-LC-CD-SW-ST-SL-PM-TC-CV-RV-ZT

P = Parent product
R6O Ceiling integrated beam (OMD)
REO Exposed beam (OMD)
RE6 Ceiling integrated beam (HAQ)
REE Exposed beam (HAQ)
RXP Ceiling integrated beam 4-way (HAQ)

C = Controller type
E21 Primary for single unit (E12)
E22 Primary +1 secondary unit (E12)
E23 Primary +2 secondary units (E12)
E24 Primary +3 secondary units (E12)

E81 Primary for single unit (E18)
E82 Primary +1 secondary unit (E18)
E83 Primary +2 secondary units (E18)
E84 Primary +3 secondary units (E18)
S Secondary

S = Supply air control mode
OM OMD
JD Active diffuser
H1 HAQ
H2 PTS/position (Siemens KNX)+HAQ
H3 PTS/position (Siemens 0-10V)+HAQ
H4 PTS/position (Belimo 0-10V)+HAQ
H5 PTS/on-off (Siemens)+HAQ
H6 PTS/on-off (Belimo)+HAQ
MS MOC/VAV (Siemens 0-10V)
MB MOC/VAV (Belimo 0-10V)
MK MOC/VAV (Siemens KNX)
MU MUC/VAV (0-10V)

E = Exhaust air control mode
NA Not assigned
EX1 MOC/VAV (Siemens KNX)
EX2 MOC/VAV (Siemens 0-10V)
EX3 MOC/VAV (Belimo 0-10V)
EX4 MUC/VAV (Siemens 0-10 V)

Other options and accessories

WP= = Wall panel (measurements)
NA Not assigned
34 Display, setpoint shift (TE)
37 Display, setpoint shift,config (TE)
74 Display, setpoint shift (RH,CO2,TE)
30 No display (TE)
40 No display (RH,TE)
70 No display (RH,CO2,TE)

LC = Light controller mode
NA Not assigned
L1 Relay (on/off)
L2 DALI

CD = Condensation detection
NA Not assigned
CS Unit integrated sensor
DP Dew point calculation

SW = Window switch input
NA Not assigned

NC Switch NC
NO Switch NO

ST = Unit integrated measurement sensors
NA Not assigned
IT Temperature sensor
IC CO2 sensor
IA Temperature and CO2 sensor

SL = Occupancy and light sensor
NA Not assigned
OI Unit integrated sensor
OE External sensor

PM = Pressure measurement for supply air
NA Not assigned
P1 External sensor
P2 Controller integrated

TC = Water cooling/heating function
NA Not assigned
C Cooling
RH Heating
H Cooling and heating

CV = Water valves and actuators
NA Not assigned
SP4 VPP, STA (0-10V) 24V
SP5 VPP, STA (PWM) 24V
SP6 VPP, cool.(0-10V), heat.(PWM) 24V
DA4 AB-QM, ABNM (0-10V) 24V
DA5 AB-QM, TWA-Z (PWM) 24V
DA6 AB-QM, cool.(0-10V), heat.(PWM) 24V
DR5 RA-C, TWA-A (PWM) 24V

RV = Water valve controls for radiators
NA Not assigned
RL Linear (0-10V/heating)
RA 1 pc. (PWM/heating)
RB 2 pcs. (PWM/heating)

ZT = Tailored product
N No
Y Yes (ETO)

Code example

WRA/R6O-E21-OM-EX4, WP=37, LC=NA, CD=CS, SW=NA, ST=IC, SL=OE, PM=P2, TC=H, CV=SP5, RV=NA, ZT=N