BCXb

CHILLED BEAM CONTROLLER
Room climate control

QUICK FACTS

- A smart control unit for room climate using a chilled beam.
- Connection for multiple sensors.
- Adjusts air flow and activates heating or cooling according to setpoints and operating functions.
- Can activate lighting via sensors.
- CAN network connection.
- Bluetooth® for access via mobile application LINDINSIDE.

Demand control creates an optimal indoor climate and reduces energy use to a minimum. Based on sensor input and activated functions, BCXb controls the chilled beam air flow and water flow to optimize the room climate. The controller is accessible via several communication paths and user interfaces. Chilled beam climate control is suitable for premises where low ceiling height limits the possibility of cooling only via sub-tempered supply air.

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Why BCXb?

Simplicity and performance

As with active supply air devices, a chilled beam also needs smart control. Lindinvent develops technology for simplicity in all aspects of planning, installation and commissioning of indoor climate solutions for workplaces. BCXb contributes together with other control units to a collaborative climate control that enables reduced energy use without tolling comfort requirements.

Increased staff efficiency

A room with a chilled beam solution usually results in lower air volumes than systems where the cooling effect is only obtained from sub-tempered supply air. With BCXb, available air volumes can be optimized. Correct airflow volumes increase staff efficiency by up to 8% according to the Harvard study "Economic, Environmental and Health Implications of Enhanced Ventilation in Office Buildings" from 2015.

Maximum digitization

The starting point is an architecture for stable communication between controllers equipped with Bluetooth® where measurement data is accessed via API, Modbus, HTTP, and app. The platform makes real estate data meaningful and creates opportunities for maximum digitization.

Chilled beam controller BCXb.
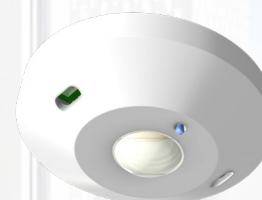
Sensor unit GTO-B.

Content

Accessories to note:
- Room temperature sensor and occupancy detector unit GTO-B
- Carbon dioxide sensor GQH-B
- Temperature sensor GT-P (Chilled beam surface)
- Temperature sensor GT-S (Radiator surface)
- Duct temperature sensor GTN-D

See the respective product description for properties and technical data.

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System expectations

Degree of presence and level of activity
Work from home, sick leave, holidays or external assignments are all reasons that contribute to variations in the degree of presence. To manage and limit energy use, a function needs to ensure that the total amount of air never exceeds the actual need. This minimizes the energy required to drive fans and it reduces the amount of air that needs to be heated or cooled.

The right duct pressures and temperatures
Duct pressure, airflows, and temperatures must be continuously optimized to achieve the lowest possible energy use.

Simplicity and collaboration
Smart climate control should be easy to design, install, commission, and maintain. Systems for lighting control and solar shading must be able to operate in collaboration with other installations for climate control.

Versatility and performance
Room climate control should be part of a system solution that efficiently and sustainably delivers a good indoor climate when and where it is demanded.

- Large flow range (supply air and extract air)
- Low noise level even with high airflow and high duct pressure
- Draft-free environment even with severely under-tempered supply air and a low airflow
- An adjustable air distribution pattern
- Compact design that simplifies installation work
- Easy integration and deployment of accessories
- Smart local control and optimization functions
- Parent functions for optimization and debugging
- Robust and reliable communication between devices
- Multiple and intuitive user interfaces
- Commissioning via app and Bluetooth®
- Good environmental choice in all aspects

Lindinvent's system solutions meet these expectations. Consultants, installers, integrators, operating technicians, tenants, and property owners shall feel safe with their choice of system now and for the future.

From CAV to VAV with DCV-B and BCXb
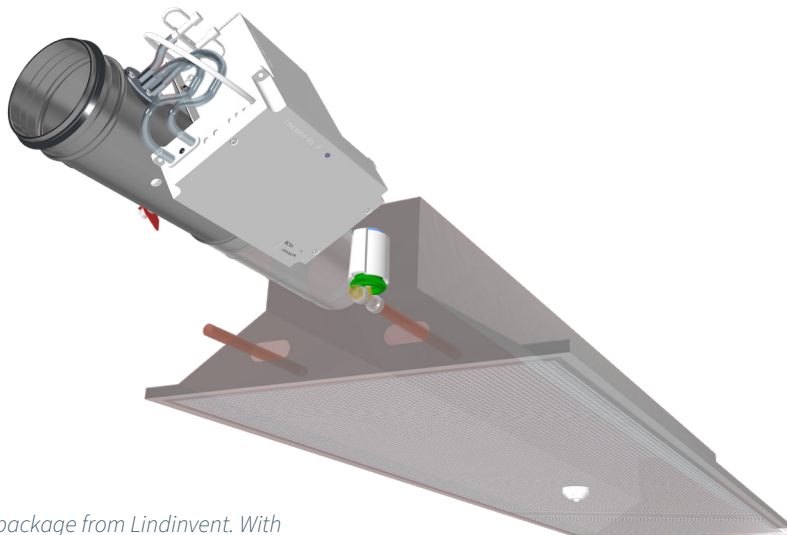
BCXb is part of the DCV-B package from Lindinvent. With DCV-B it's possible to modernize your CAV chilled beams to make them energy efficient, digital and truely flexible with the added possibility to get sensor data. All this without replacing units. See the product description för DCV-B.

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Functions

Area of use

BCXb is part of Lindinvent's series of regulators and intended for on-demand room climate control via cooling baffles. The regulator has the functionality to, in addition to the airflow, also control heating, cooling, and lighting with the help of sensors. A baffle with BCXb can be set in economy or comfort mode. The economic situation contributes to a more economical and responsible use of energy.

Airflow control

The supply air is registered by BCXb, which then controls the damper motor in the supply air chilled beam for the appropriate degree of opening. The amount of air is continuously adjusted according to the level of activity or measured heat loads in the room. The diffusion pattern is determined by the model of the chilled beam.

Room climate control

BCXb functions as a complete room climate controller. With the help of measured values, the BCXb continuously controls the room for optimal function. This applies to air volumes but also supplementary heating or cooling. In absence, the control system works towards an economy mode that allows greater temperature fluctuations and utilization of stored energy in the building frame.

Presence detection and sensors

With BCXb, the chilled beam is equipped with sensor GTO-B for presence detection and room temperature measurement. GQH-B is a sensor for carbon dioxide measurement and used for air quality regulation. Temperature sensors GT-P and GT-S, see accessories, are available for analysis and troubleshooting.

Bluetooth®

BCXb is easily commissioned via Bluetooth® and Lindinvent's mobile application LINDINSIDE. Authorized personnel can quickly identify devices to make settings or read values. Stored data is available for instant access.

Network communication

BCXb is connected to a local network (a CAN-loop). All controllers are addressed with a unique node ID in connection with commissioning. Gateway NCE is used to link local networks to Lindinvent's central unit or to an external parent system.

Connections diagram
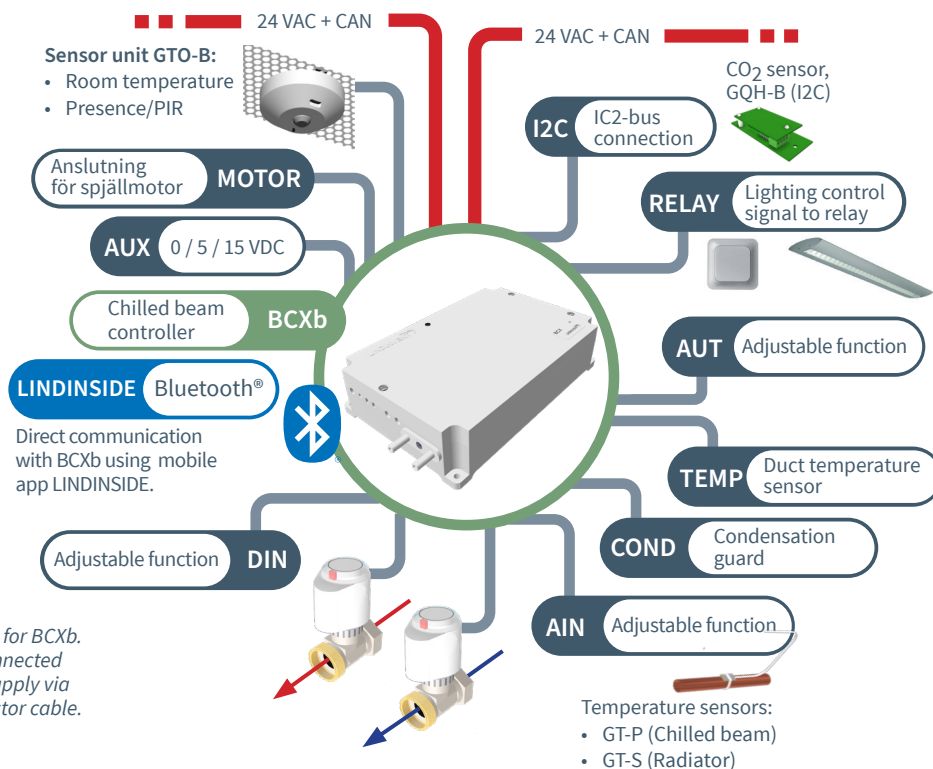
Connections diagram for BCXb. Controller BCXb is connected to CAN and voltage supply via Lindinvent's 4-conductor cable.

Operating card

Cell office with a VAV chilled beam and radiator

- The supply airflow is measured by BCXb via the internal aitflow sensor connected to measuring flange MF.
- GTO-B with an occupancy detector and a room temperature sensor is connected to the controller.
- In case of presence, the supply air is increased from the absence flow to the projected presence flow.
- When the room temperature rises, the cooling valve and air flow are sequentially regulated. Liquid-based cooling is prioritized as standard.
- When the room temperature drops, the airflow is reduced to the set absence flow.

- The room temperature sensor has higher priority than the presence detector.
- When the room temperature drops, the radiator valve is regulated according to set P-band.
- An associated extract air control unit continuously balances the supply air considering the set offset.
- BCXb can be set in an economy mode where the room is neither heated nor cooled within specified limits.
- Reading of actual values as well as changing settings is carried out via the parent system or via mobile app LINDINSIDE.
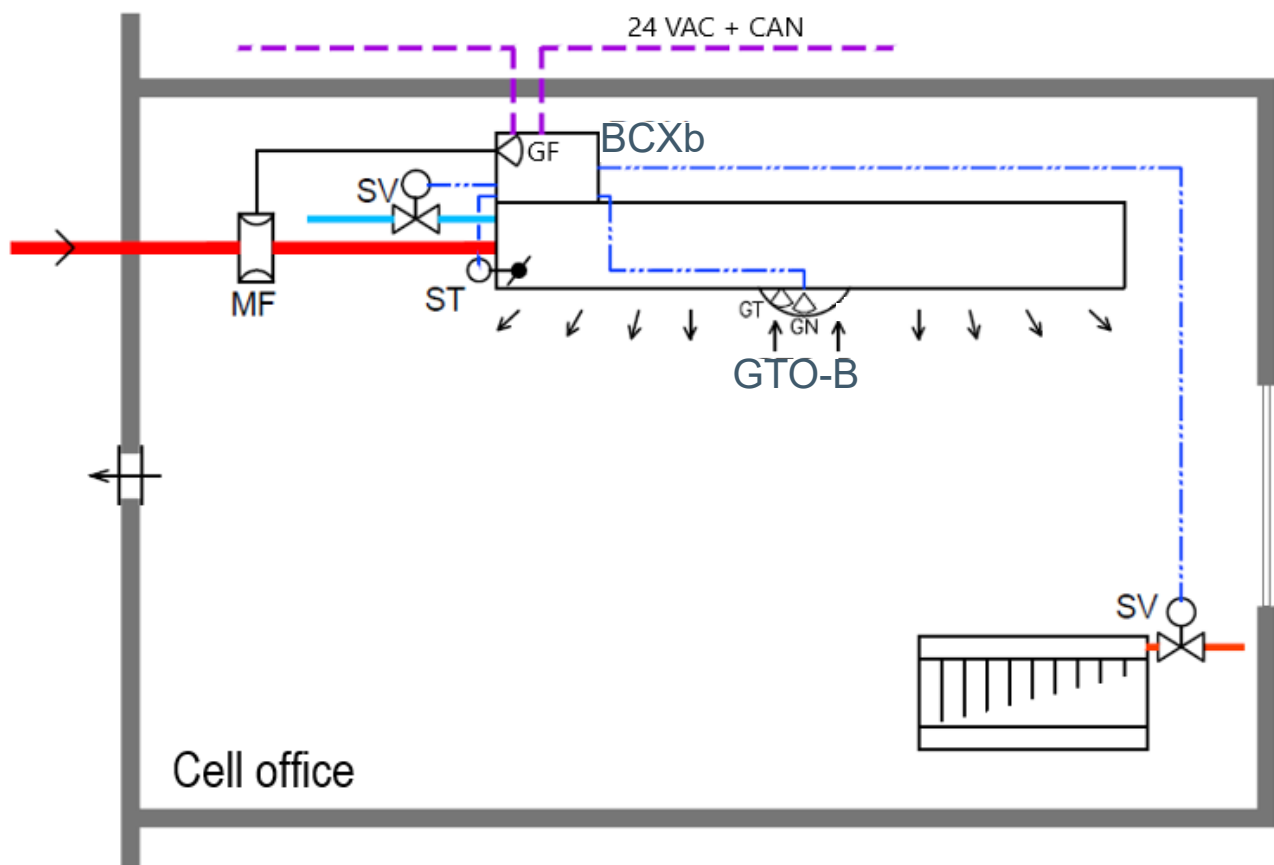
Material specification (chilled beam without a built-in flow meter)

BCXb: Chilled beam controller

MF: Measuring flange SMED

GTO-B: Occupancy detector and room temperature sensor

SV :   Radiator valve (A40405) 24VAC ON/OFF NC

ST: Built in damper actuator

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A selection of accessories

Flow balancing
See airflow control unit DCV-BLb for extract air balancing.

Room temperature sensor & presence detector GTO-B
A unique BCXb accessorie. See the product description.

Carbon dioxide & humidity sensor GQH-B
A unique BCXb accessorie. GQH-B is a carbon dioxide sensor for measurement and air quality regulation. The sensor is prepared for a humidity measurement function.

Temperature sensor module GT-P and GT-S
- GT-P consists of a sensor module and an AIN converter module. The sensor module mounted on a chilled beam inlet pipe allows for troubleshooting and tracking transmission losses
- GT-S consists of a connection box with an input for the temperature sensor and a connection for a valve actuator. The unit enables monitoring of a radiator for effective function control

Troubleshooting and visualization require a system solution with LINDINSPECT®.

Lighting control
Lighting can be controlled via the presence detector included in GTO-B and/or via push buttons using lighting box CBR. See SBDb for DALI lighting control.

Radiator control
Valve actuators for radiators can be connected for sequential regulation of heating and cooling.

Electric radiator control
Heating batteries and electric radiators can be controlled via control box CBT.

Fan coil cooling
Control additional cooling via control boxes CBF-E or CBF-S.

Setpoint adjuster
A wall-mounted panel can be installed to allow users to adjust the room temperature setpoint or temporarily activate a ventilation function. See user panel DRP. See also INOFFIX ® below.

INOFFIX®

Scan QR codes placed in the facility or on equipment with the smart phone app InOffix®. Lindinvent offer a number of smart solutions for a smart and more efficient property. Learn more at inoffix.com

Functions:
- Adjust temperature
- Adjust sunscreen
- Book rooms or order offered property services
- Put in a cleaning request
- Deviation rapport
- Surveys
- Check in/out
- Room info
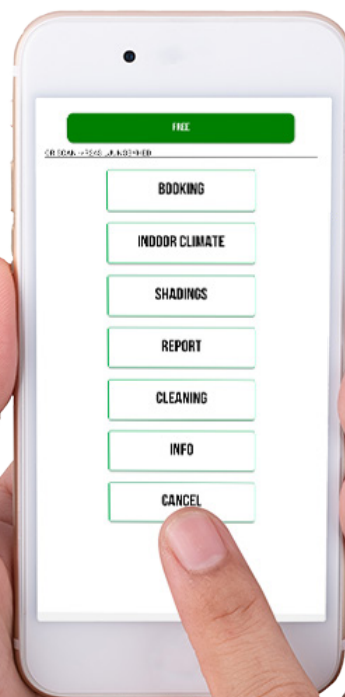
Systems with or without LINDINSPECT®

Visualization tool LINDINSPECT®
LINDINSPECT® is a web-based tool that enables a coordinated administration and visualization of the building with control units. Equipment such as active diffusers, sun protection, and lighting can be graphically shown, with its location, using plan views. The variables displayed next to a certain equipment are selectable. Deviating values are marked and specific operating conditions are also indicated graphically.

LINDINSPECT® requires a system structure where controllers are linked to Lindinvent's central unit through Gateway NCE.

Modbus TCP or Modbus RTU
Control units can also be accessed in a system build-up without LINDINSPECT®. An external parent system is then connected via Gateway NCE using either Modbus TCP or Modbus RTU.

API
Lindinvent's REST-based API can be accessed for data to be used by third-party applications. Lindinvent's app InOffix® uses this API.
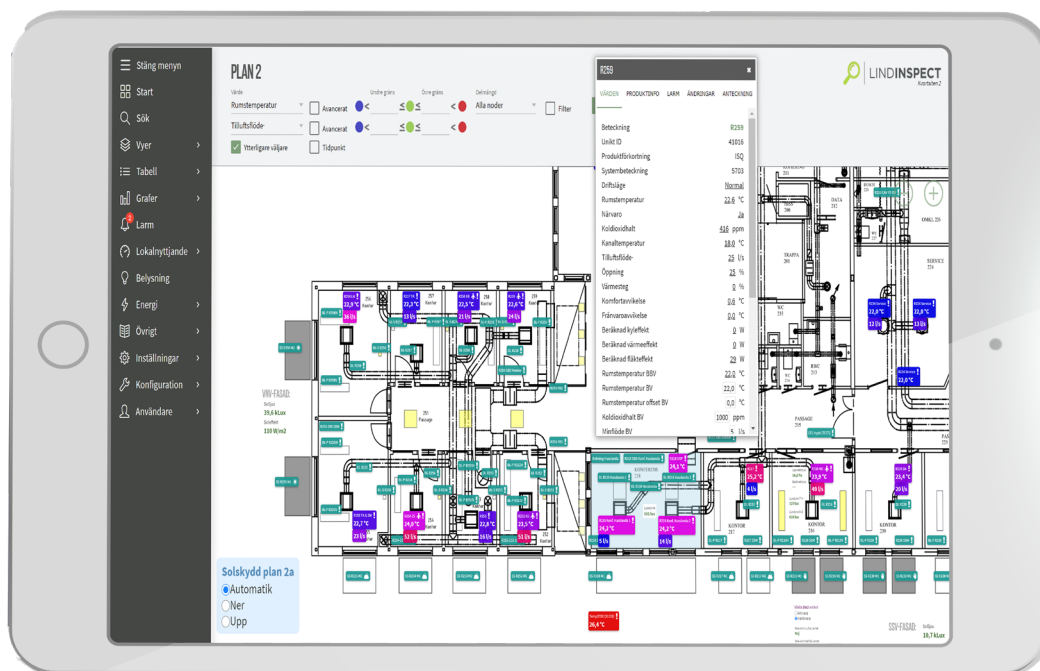
Plan view in LINDINSPECT®.

User interface LINDINSIDE
Easily connect directly to individuals controllers via Bluetooth® and Lindinvent's mobile application LINDINSIDE. With the app, authorized personnel can identify the device to make settings or read values. Data is stored in the cloud for easy access.

Bluetooth®
Creates additional communication possibilities.

LINDINSIDE screenshots.

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Technical specifications

General
Dimension (mm): 200 x 130 x 45 (LxWxH)
Material: Enclosure in polystyrene
Net weight: 0,4 kg
Colour: RAL 9003
IP-class: IP53

Temperature limits
Operation: 0°C to 40°C; <85% RF
Storage: -20°C to 50°C; <90% RF

Electrical system
Supply voltage: 24 VAC
Effect: 2,2 VA
CE-marking: Complies with EMC and the low voltage directive. A certificate of compliance is available at lindinvent.com

Cabling for CAN and supply voltage
Control units are connected to CAN and power supply via a shielded 4-conductor signal cable (FLAQQBR) with adapted and separated conductors for communication and power supply.

Airflow measurement and control
BCXb is equipped with an internal airflow sensor.
Recommended measurement range: 0.5 to 6.0 m/s
Maximum range: 0.2 to 7.0 m/s
Measurement accuracy*: ± 5% or at least ± x l/s
(x = duct area in dm²)

Room temperature measurement
Sensor with termistor of NTC type (GTO-B)
Accuracy: ± 0,5 K

Carbon dioxide measurement with GQH-B
GQH-B is ordered separately as an accessory. The sensor is background calibrated against 400 ppm.
Measuring range: 400 to 10 000 ppm
Accuracy: ± (30 ppm + 3%)

Connectors
- 24 VAC + CAN (communication loop In/Out)
- 8-pole for sensor GTO-B
- 0 to 10 VDC AOUT (damper actuator, Y)
- 0 to10 VDC AIN (Damper actuator, U)
- External presence detector (24VAC/15VDC/5VDC)
- Condensation guard (G0, signal)
- Lighting relay box CBR
- Duct temperature sensor GTN-X (NTC-type)
- AIN2 and AIN3: General 0 to 10 VDC
- AUT2 and AUT3: General 0 to 10 VDC
- DIN, [PULL-UP, +5V] or [0-5 VDC]
- "DUT1", 24 VAC, TRIAC1 (heating)
- "DUT2", 24 VAC, TRIAC2 (cooling)
  (Triac1 and Triac2 are intended för radiator valves. Maximum load: 10 valves at 1W each per TRIAC)
- Generic supply voltage (G0, +5 V, +15 V)
- I2C-bus (GQH-B)
- Bluetooth®

Radio communication
Bluetooth® 2.4 GHz
Listen mode only for calls from app or similar.
Beacon functionality etc requires broadcasting.

Humidity measurement
Note: This feature is not implemented. Sensor GQH-B is prepared for relative humidity measurement.

Additional documentation

Download available in the product page for BCXb at lindinvent.com

Document	Comments
Installation instruction	See the external connection diagram and project specific documentation.
Start-up instruction	Available in Swedish.
Maintenance instruction	Regarded as maintanence free.
External connection diagram	Available
Building material declaration	Assessed by Byggvarubedomningen.
Modbus list	Available in Swedish.
AMA text	Available in Swedish.

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