# DCV-B

## PACKAGE FOR CHILLED BEAM CONTROL

From CAV to “VAV”

**$CO_2$-SAVINGS: >300 KG***

*Case Greenhouse Solna Strand

### BASIC INFO

- Go from CAV to ”VAV” by supplementing your chilled beam with DCV-B, the package for enhenced room climate control.
- The unit adjusts flows and activates additional heating or cooling after set setpoints, operating mode and measured climate data.
- Connection for several sensors.
- Lighting control.
- CAN loop connection for collaboration and communication.
- Bluetooth® connectivity.
- Pre-mounted unit for quick and easy installation.

Modernise your CAV chilled beams with DCV-B! Make them energy efficient, digital, flexible and get sensor data without replacing units.

DCV-B is the truly smart baffle control unit with up to nine sensors integrated for maximum energy efficiency and analysis. Get smart control and monitoring of air flow, cooling and heating effects, valve functions and lighting.

Large CO2 savings are made by keeping existing chilled beams and the suspended ceiling.

LINDINVENT®

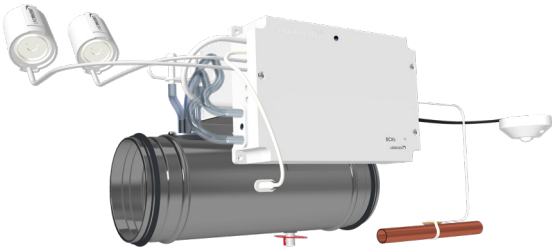
## Why DCV-B?

### Make your chilled beam smarter
When using DCV-B's demand control, flows are reduced in the event of absence. In turn this reduces energy requirements for fan operation and heating. DCV-B contributes to a collaborative climate control that enables reduced energy use and increased comfort.

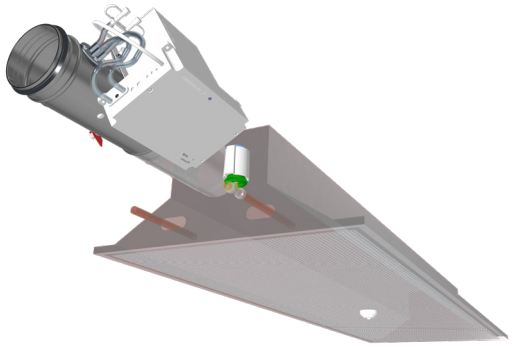
### A more dynamic use of premises
As both the presence level and the energy cost tends to vary, it is increasingly important to be able to go from comfort to economy mode in a smart way. With digital and connected setpoint regulation, energy is saved compared to analog setpoint switches.

### Several products in one
With DCV-B, the room is equipped with a presence detector and a temperature sensor. Additional sensors are easily connected without additional, often costly, cabling and integration.

### Maximum digitization
The starting point is an architecture for stable communication between Bluetooth®-equipped devices where measured data is accessed via API, Modbus, HTTP, and app. The platform makes property data meaningful and creates opportunities for digitization.



*Chilled beam controller DCV-B with room temperature and presence sensor GTO-B, duct temperature sensor GTN-X, temperature sensor GT-P and valve actuators.*



*DCV-B on the supply air duct in front of the cooling beam with room temperature and presence sensor GTO-B mounted on the grid of the cooling beam.*

## Content



Included products
- Chilled beam controller BCXb
- Damper with measuring flange SPMF
- Damper motor DBA
- Room temperature and presence sensor GTO-B

Optional
- Carbon dioxide sensor GQH-B
- Temperature sensor GT-P (Chilled beam inlet pipe)
- Temperature sensor GT-S (Radiator)
- Duct temperature sensor GTN-D

See section *Some accessories* or product descriptions for properties and technical data.

## System expectations

### Presence and level of activity
Home office, sick leave, holidays, or external assignments are all reasons that contribute to variations in the degree of presence. To limit energy use, a function must ensure that the total air flow is always adapted to the actual need. This minimizes the energy required to drive the air and reduces the amount of air that needs to be heated or cooled to maintain the correct room temperature.

### Right pressure and right temperature
Duct pressure, airflows, and temperatures must be continuously optimized to achieve the lowest possible energy use.

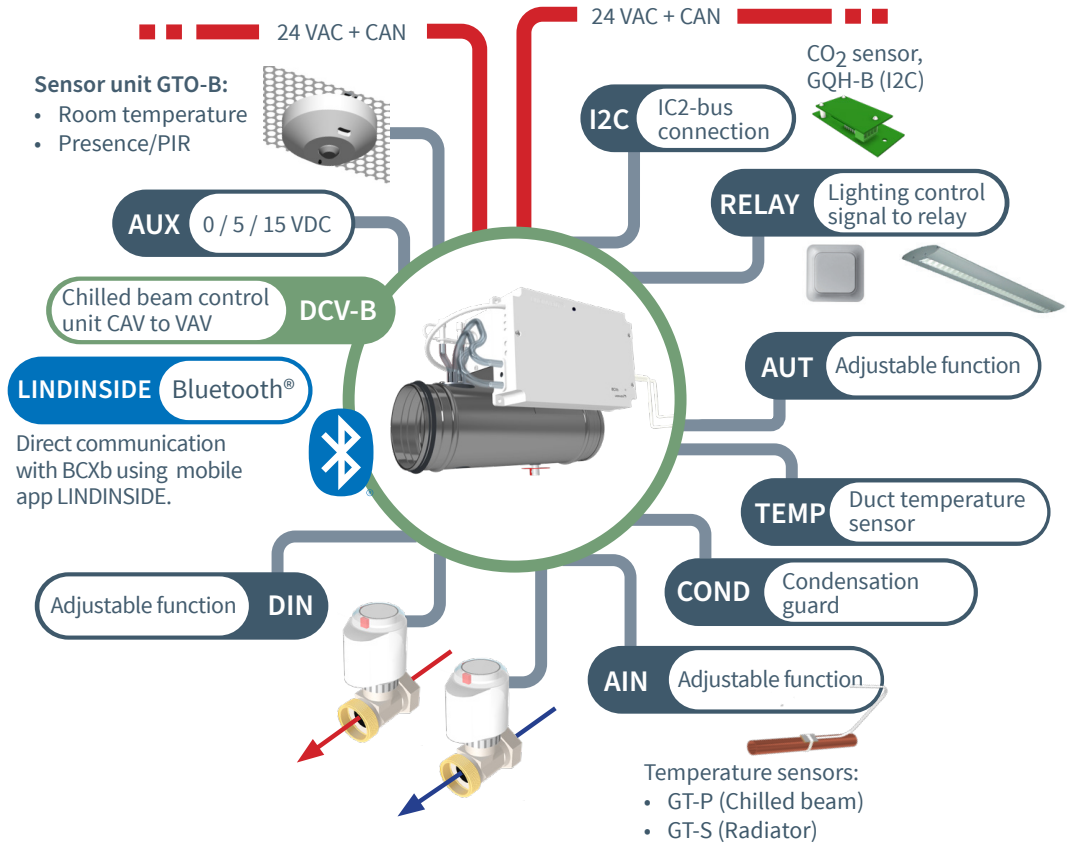
### Simplicity and collaboration
Smart climate control should be easy to design, install, commission, and maintain. Systems for lighting control and solar shading must be able to operate in collaboration with other installations for climate control.

### 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 also at high airflow and high duct pressure
- Draft-free environment even with severely under-tempered supply air and a low airflow
- Diffusers with 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.

## Connections diagram




*Connection diagram DCV-B. The controller is connected to a CAN loop of cooperating control units via Lindinvent's shielded 4-conductor cable.*

# Functions

## Area of use
DCV-B is part of Lindinvent's series of smart dampers and intended for on-demand room climate control in conjunction with a CAV chilled beam.

## Airflow control
The rate of supply air is measured or registered by DCV-B and it controls the damper motor for a suitable opening degree. The amount of air is continuously adjusted according to the activity level or measured heat loads in the room. The distribution pattern, in terms of air direction, is determined by the model of the chilled beam.

## Room climate control
Chilled beam controller BCXb, which is included in DCV-B, is a complete room climate controller. With the help of measured values, DCV-B continuously controls the room for optimal operation. This applies to air volumes and additional heating or cooling. In cases of absence, the control system works towards an economy mode that allows for greater temperature fluctuations. Energy stored in the building's framework is used for heating.

## Presence detection and sensors
With DCV-B, the baffle is equipped with the sensor GTO-B for presence detection and room temperature measurement. GQH-B is a carbon dioxide sensor and accessory for measurement and air quality control. Temperature sensors GT-P and GT-S, see Constituent parts and options, can be connected for extended analysis and troubleshooting.

## Bluetooth®
DCV-B 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.

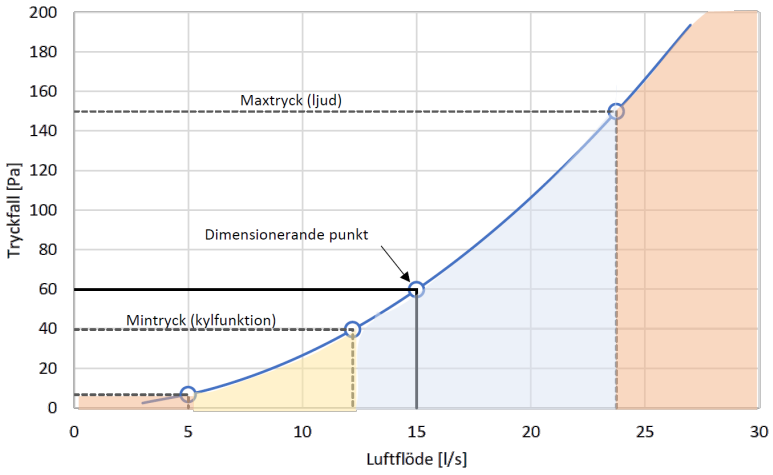
## Network communication
DCV-B is connected to a local network (a CAN-loop). All controllers are addressed with a unique node ID in connection with commissioning. Gateway NCE is used to link local networks to Lindinvent's central unit or an external parent system.

# To think about before converting from CAV to "VAV"

## Working area for pressure
A CAV needs minimum pressure in the chilled beam for the air in the room to be co-injected through the cooling coil. Since the pressure drop, across a CAV chilled beam, is proportional to the airflow squared, it's necessary to find the working range with regard to sound levels.

## An example
The chart shows a case where the:

- Dimensioning CAV-flow is at 15 l/s, 60 Pa.
- Maximum flow with regards to sound and pressure in the system is at 24 l/s, 150 Pa.
- Minimum flow for cooling function is 12 l/s, 40 Pa. At air flows below 12 l/s, the cooling valve is locked.
- Absence flow is 5 l/s, 7 Pa.

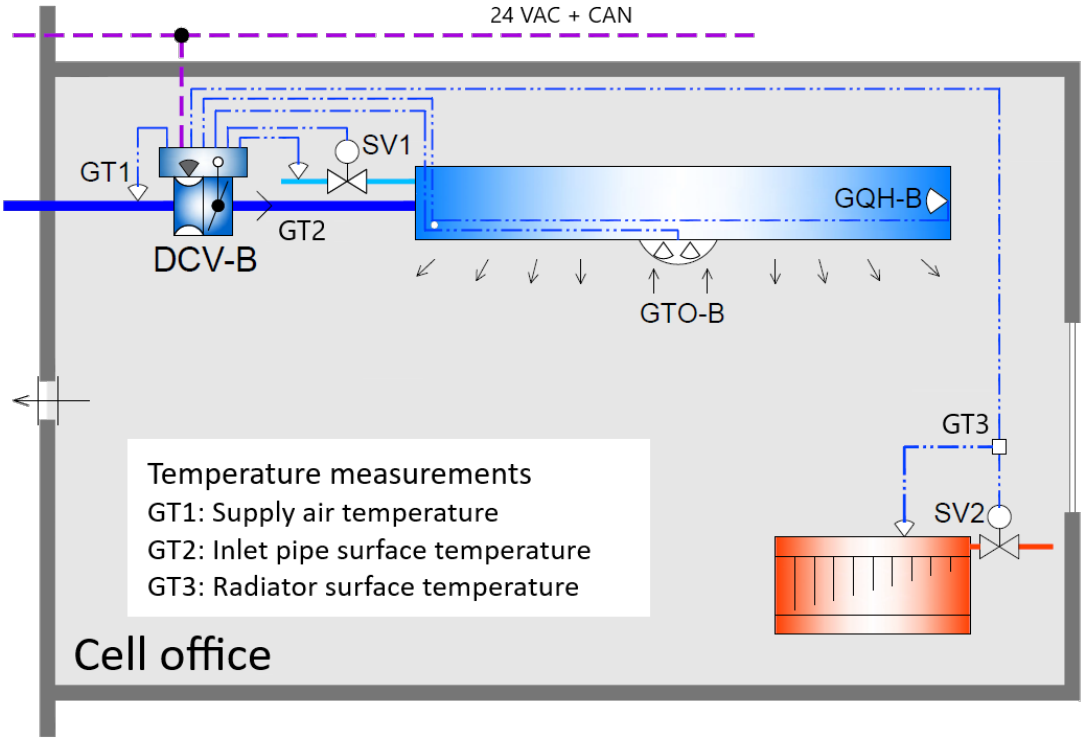



*An example of a working area for a CAV chilled beam with DCV-B for "VAV".*

# Operating card

## Cell office with a duct-mounted chilled beam control unit

- DCV-B is mounted on the supply air duct.
- The supply airflow is measured by BCXb via the built in flow sensor connected to the measuring flange in DCV-B.
- The sensor unit GTO-B, which is mounted on the outside of the cooling beam grid, is connected to DCV-B.
- When presence is detected, the supply air is increased from the minimum flow to the projected presence flow.
- When room temperature rises, cooling valves and airflow are regulated sequentially.
- When the room temperature drops, the airflow is reduced to the set presence or absence flow (absence flow is the minimum projected airflow).
- When room temperature drops, the radiator valve is regulated according to set P-band.
- An associated extract air control unit continuously balances the supply air with set offset.
- DCV-B can be set to economy mode so the room is neither heated nor cooled if it's within specified limits.
- The supply air temperature is measured by GT1.
- The temperature sensors GT-P (GT2) and GT-S (GT3) provide measurement data for troubleshooting and energy calculations.
- Reading of actual values as well as changing settings is carried out via the parent system or via the mobile app LINDINSIDE.




## Material specifications:

| | |
|---|---|
| DCV-B | Chilled beam control unit (chilled beam controller BCXb on damper SPMF with a measuring flange and damper actuator DBA) |
| GTO-B | Occupancy detector and room temperature sensor unit |
| GQH-B | Sensor for carbon dioxide measurement (optional) |
| GT1 | Duct temperature sensor GTN-X (optional) |
| SV1 | Valve actuator (A40405) 24VAC ON/OFF NC for cooling (optional) |
| GT2 | Temperature sensor chilled beam inlet pipe, GT-P (optional) |
| GT3 | Temperature sensor radiator with connection box for valve actuator, GT-S (optional) |
| SV2 | Valve actuator 24VAC NO/OFF (optional) |

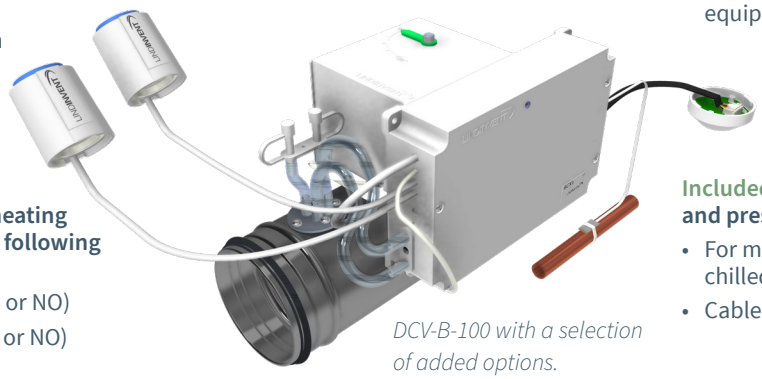
## Constituent parts and options

The following products are included as parts or are available as options to DCV-B. See the Product description for technical specifications. DCV-B is in the database for MagiCAD.

**Included: Circular damper with flange SPMF**
- DIM 100, 125, 160, 200, 250
- Measuring devices with double measuring sockets
- Swivel damper with full damper blade

**Included; Damper actuator DBA**
Delivered mounted on damper SPMF and connected to BCXb which is mounted, removable, on the engine cover.

**Included: Chilled beam controller BCXb**
- Internal flow sensor
- CAN connection
- Input and output for equipment/function



*DCV-B-100 with a selection of added options.*

**Option: 24 VAC valve actuators (Steps for heating or cooling are always following in serial sequence)**
- One for heating (NC or NO)
- One for cooling (NC or NO)

**Included: Room temperature- and presence sensor GTO-B**
- For mounting on the chilled beam grid
- Cable for connection to BCXb

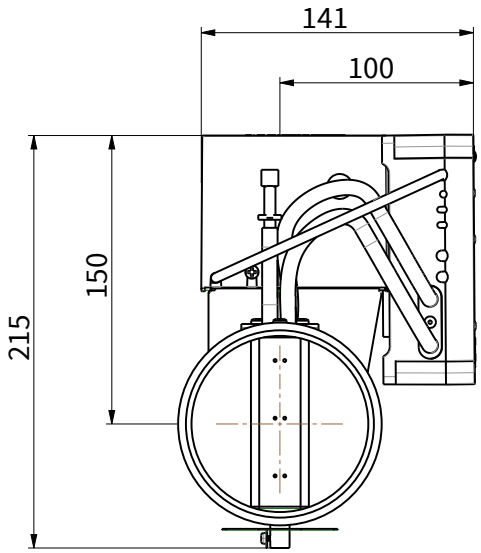
**Option: Duct temperature sensor GTN-X (GTN-D)**
Mounted into the damper housing or the duct.

**Option: Carbon dioxide sensor GQH-B**
- For mounting inside the CAV chilled beam
- Cable for I2C connection to BCXb
- Prepared for humidity measurement

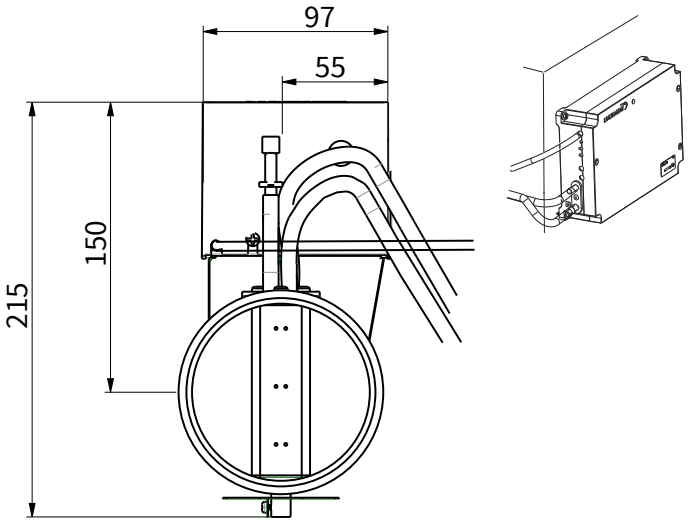
**Option: Temperature sensor module GT-P and GT-S**
- GT-P, with its sensor mounted on the chilled beam inlet pipe, allows for troubleshooting and for tracking transmission losses
- GT-S, which monitors the temperature of a radiator, provides for additional troubleshooting and analysis of energy usage

Troubleshooting and visualization require a system solution with LINDINSPECT®.

## Dimensions (mm)




*DCV-B-100 with non-split mounting: The regulator is mounted on the damper motor cover.*




*DCV-B-100 in case of split assembly: The regulator is not mounted on the cover of the damper motor but in another place.*

## Some accessories

### Flow balancing
See Airflow control unit dcv-BLb for balancing extract air.

### Lighting control
Lighting can be controlled via occupancy detector or manually via push button by connecting control box CBR. See controller SBDb for lighting control via DALI.

### Electric radiator control box
Heating batteries or electric radiators can be controlled. See the I/O-product CBT.

### Air fan cooling control box
Control additional cooling via control boxes CBF-E and CBF-S.

### External occupancy detector
For an alternative detector see GO-C or PD-2400.

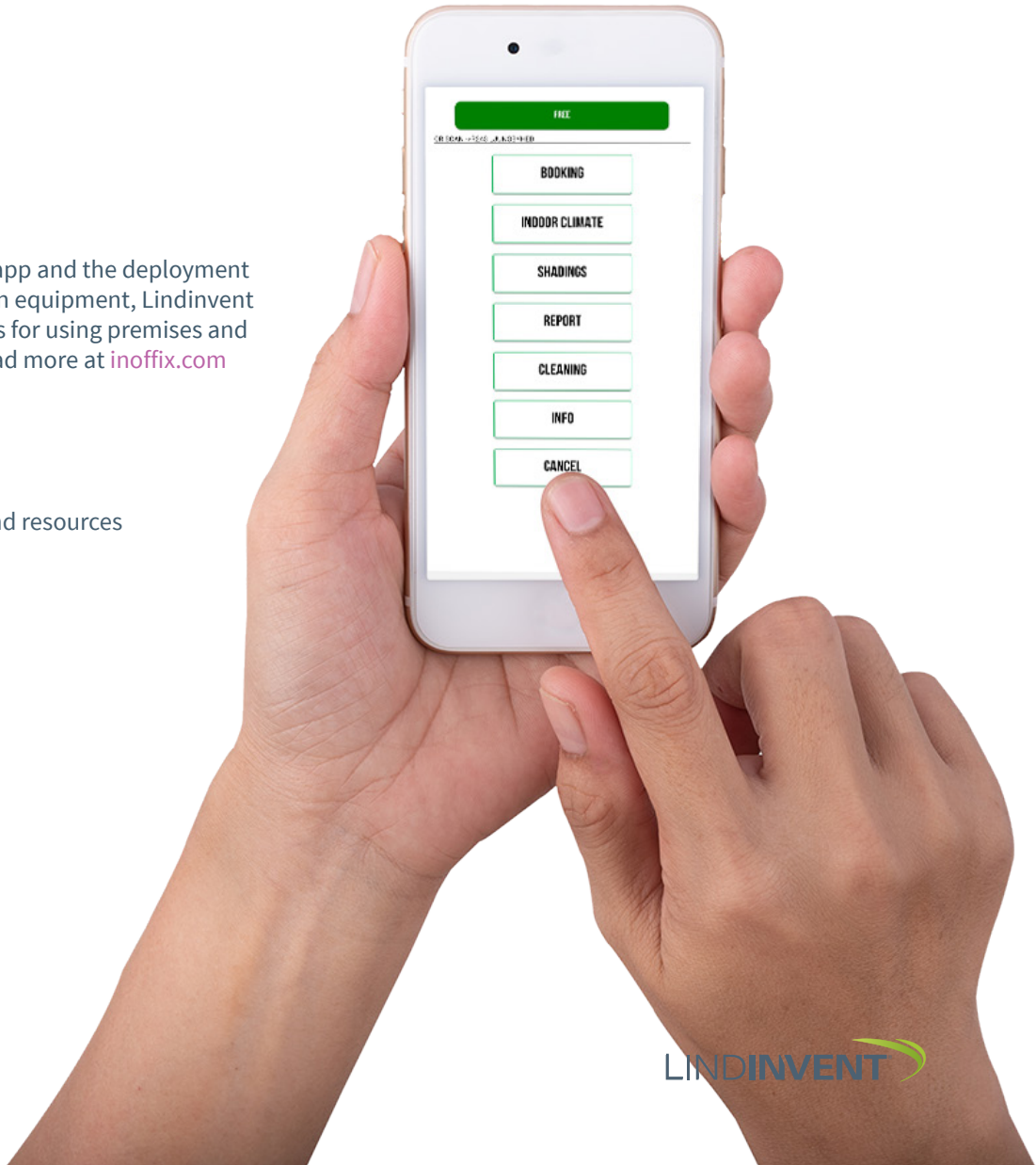
### Temperature sensor module GT-P and GT-S
- GT-P consists of a sensor module and an AIN converter module. The sensor module mounted on a chilled beam inlet pipe allows for troubleshooting and tracking transmission losses
- GT-S consists of a connection box with an input for the temperature sensor and 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®.

### Setpoint switch panel
A wall-mounted panel can be installed in order for users to adjust the setpoints for room temperature or temporarily activate an airing function. Take a look at the DRP user panel for more information and read about InOffix below.

## INOFFIX®
With support from the InOffix® app and the deployment of QR codes in the building or on equipment, Lindinvent offers a range of smart solutions for using premises and equipment more efficiently. Read more at inoffix.com

### Functions:
- Temperature adjustments
- Adjustment of sun protection
- Booking conference rooms and resources
- Request cleaning
- Deviation reporting
- Forms
- Check in/out
- Room information



# 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.

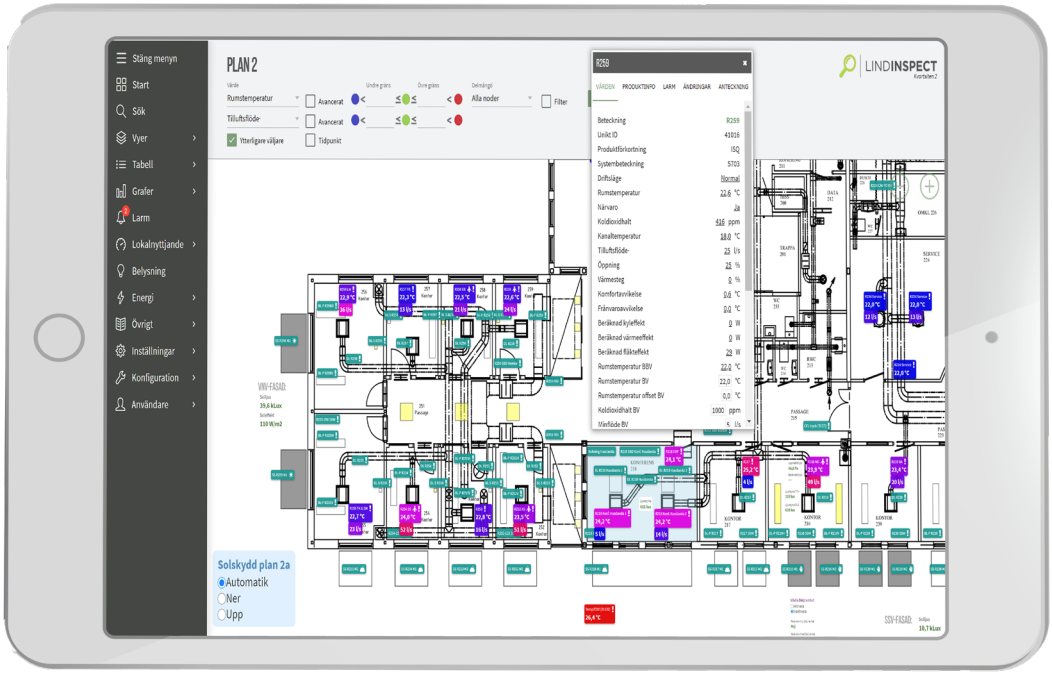
LINDINSPECT® requires a system structure where controllers are linked to Lindinvent's central unit through Gateway NCE.

## 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.



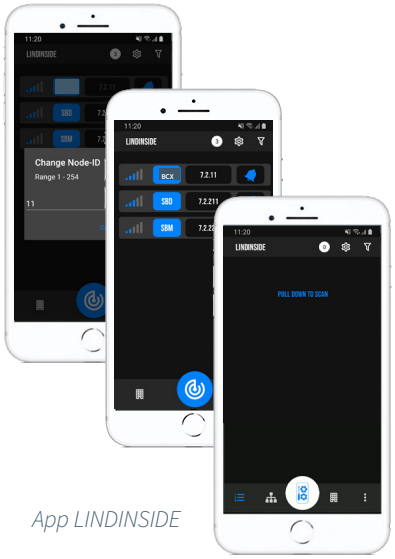

*Plan view in LINDINSPECT®.*

## LINDINSIDE User interface

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.




*App LINDINSIDE*

# Order information

## DCV-B Circular Ø100-250 mm

Chilled beam control unit, Lindinvent AB,
DCV-B-[Damper size][Material]-[Colour]

Damper size: 100, 125, 160, 200, 250
Material: galvanised sheet steel(C3), epoxy-coated sheet steel(E), powder-coated sheet steel(P)
Omitted material specification: galvanised(C3)
Colour: RAL9003 (with gloss 30, corrosivity class C4 as standard). Other colours and gloss levels can be ordered
The colour entry is omitted for C3 and C5.

Example:

- DCV-B-250G:
  (Circular DCV-B galvanised)
- DCV-B-250P-RAL9003:
  (Powder-coated RAL9003)

# Complementary documentation

Document can be viewed on the product page at www.lindinvent.com

| Document | Comments |
|---|---|
| **Installation instructions** | See the external connection diagram and project specific dokumentation. |
| **Operation instructions** | Short presentation of LINDINSIDE. |
| **Maintenance instructions** | Considered maintenance free. For cleaning and control measurement of the flange, see the maintenance instructions for SPMF. |
| **External connection diagram** | Shows how conductors from equipment are connected to BCXb/ DCV-B. |
| **Environmental product declaration** | For assessment at Byggvarubedömningen. |
| **Modbus list** | Last entry in the modbus list for BCXb. |
| **AMA-text** | Available for download in pdf and word formats via the product's website. |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