DDC420 Automation Station

Application

DDC420 is a controller for closed-loop and open-loop control, monitoring and optimizing heating, ventilation and air conditioning systems.

The DDC420 also has a fieldbus to allow for flexible enhancement with input and output modules, as well as with room control modules.

With an integrated Ethernet interface, the DDC420 provides a Web server to facilitate visualization, remote control and data backups via a web browser without the need for additional software.

Fast, simple configuration, management and commissioning using the Designer project planning tool: Plant macros are set to configure the DDC420 completely, set the associated DDC software objects, configure the parameters and assign the input and output signals.

Additional main features of the DDC420:

- Native BACnet® in accordance with DIN EN ISO 16484-5 (BACnet® server functionality) BACnet IP and BACnet MS/TP facilitates communication with the BMS by Ethernet or modem.
- Illuminated graphic display
- Control panel with selection knob and function keys
- Weekly schedule and annual schedule
- Trend data can be saved and visualized
- Different, password-protected operating levels for displaying and changing plant values; customer-specific plain texts for every parameter
- User interface available in 12 languages (Czech, Dutch, English, French, German, Hungarian, Italian, Latvian, Polish, Russian, Spanish and Swedish)
- Three closed-loop control circuits for heating or two for ventilation, which can be extended by hardware and software objects
- Malfunction message logging with time and date

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Kieback&Peter GmbH & Co. KG
Tempelhofer Weg 50, 12347 Berlin/Germany
Telefon: +49 30 60095-0, Telefax: +49 30 60095-164
www.kieback-peter.de, info@kieback-peter.com

Important Information Regarding Product Safety

Safety Instructions

This data sheet contains information on installing and commissioning the product "DDC420". Each person who carries out work on this product must have read and understood this data sheet. If you have any questions that are not resolved by this data sheet, you can obtain further information from the supplier or manufacturer.

If the product is not used in accordance with this data sheet, the protection provided will be impaired.

Applicable regulations must be observed when installing and using the device. Within the EU, these include regulations regarding occupational safety and accident prevention as well as those from the VDE (Association for Electrical, Electronic & Information Technologies). If the device is used in other countries, it is the responsibility of the system installer or operator to comply with local regulations.

Mounting, installation and commissioning work on the devices may only be carried out by qualified technicians. Qualified technicians are persons who are familiar with the described product and who can assess given tasks and recognize possible dangers due to technical training, knowledge and experience as well as knowledge of the appropriate regulations.

Legend

WARNING

Indicates a hazard of medium risk which can result in death or severe bodily injury if it is not avoided.

CAUTION

Indicates a hazard of low risk which can result in minor or medium bodily injury if it is not avoided.

CAUTION

Indicates a hazard of medium risk which can result in material damage or malfunctions if it is not avoided.

NOTE

Indicates additional information that can simplify the work with the product for you.

Notes on Disposal

For disposal, the product is considered waste from electrical and electronic equipment (electronic waste) and must not be disposed of as household waste. Special treatment for specific components may be legally binding or ecologically sensible. The local and currently applicable legislation must be observed.

Item

DDC420	Controller with operator function and integrated Web server for remote control

Technical Data

Nominal voltage	AC 110 V to 230 V ± 10%; 50/60 Hz; 21 VA
Fuse	Time-delay power fuse, 1.25 A
Inputs and outputs	Five binary outputs Floating relay contact max. 5 (3) A; AC 250 V 2 binary inputs (P9 and P10), also for pulse counting up to 80 Hz 8 universal inputs/outputs (P1 to P8) that can be independently configured as: - Binary output Transistor outputs DC 24 V, max. 40 mA - Binary input Contact input (floating) - Analog output DC 0 V to 10 V; max. 2.5 mA - Analog input See table “Sensor types”, page 4.
Interfaces	■ Ethernet RJ45 Data backup; web server communication; BACnet® in accordance with DIN EN ISO 16484-5; 10/100 Mbit/s ■ 1 CAN bus; F bus; 2000 m; 20 kBd Power supply (internal, uncontrolled) for fieldbus module DC 12 V; 6 W; see page 10 ■ RS232 (for modem) Modem connection for fax, SMS and BMS with BACnet® in accordance with DIN EN ISO 16484-5 ■ RS485 for BACnet MS/TP: DDC420 is BACnet MS/TP master 8 devices (DDC420 + 7 external devices), 1000 m, up to 115 kBd, routing in accordance with BACnet/IP
Displays	Backlit graphic display, LED “messages” for malfunction messages and “manual” LED for configurable messages
Operation	**[Set]** selection knob; **[Select]** button for accessing the context menu and **[Esc]** button Additional keys: “Info” button, “Messages” button, freely programmable button
Power failuredata backup	10 years, battery-buffered clock module Battery: CR1225 (Renata)
Overvoltage category	III
Rated impulse voltage	4000 V
Level of contamination	2
How It Works	Type 1
Degree of protection	IP20 (when installed)
Ambient temperature	0 °C to 50 °C (see installation note)
Ambient humidity	During operation: 20% to 80% r.h., non-condensing; Out of operation: 5% to 90% r.h., non-condensing

Installation	Standard rail TH 35x7.5 in closed housing This device is intended for installation in a wall-mounted enclosure or switch cabinet with protection class I or II.
Dimensions	WxHxD: 143.5 x 90 x 67 mm
Weight	Approx. 0.345 kg

Sensor types

Sensor type	Measuring range
0(2)..10 V	0% to 100%
KP10	-50 °C to 150 °C
KP250	-50 °C to 150 °C
ML2	-50 °C to 150 °C
Ni100	-50 °C to 150 °C
Ni1000 (DIN)	-50 °C to 150 °C
Ni1000 (L&G)	-50 °C to 150 °C
NTC1,8K	-10 °C to 100 °C
NTC5K	-35 °C to 100 °C
NTC10K	-35 °C to 100 °C
NTC10KPRE	-35 °C to 100 °C
NTC20K	-25 °C to 100 °C
PT100	-50 °C to 850 °C
PT1000	-50 °C to 850 °C
Balco500	-40 °C to 150 °C
Satchwell DC1100	-20 °C to 120 °C
Satchwell DC1400	-40 °C to 120 °C
Resistance (potentiometer)	0 kΩ to 10 kΩ

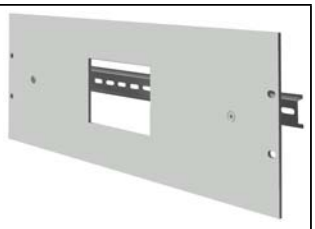
NOTE

You can find more information on the sensor types in the “Temperature Sensor Tables” product description (1.10-90.100-01).

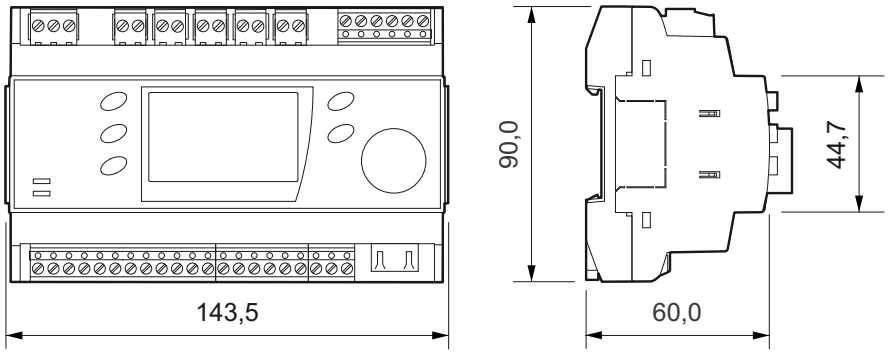
Accessories (not included in delivery)

Designer	Project planning tool for configuring, managing and commissioning the DDC420 automation station with plant images.
TPC35	Remote display and operator panel with 3.5” / 8.9 cm screen ■ You can operate up to 3 automation stations with TPC35. 
TPC56	Remote display and operator panel with 5.6” / 14.2 cm screen ■ You can operate up to 99 automation stations with TPC56. 
HW-103455	Mounting frame DDC420 ■ Installation space: one row, 216 mm (12 HP, IP44); 1 DDC420 and 1 FBU, for example 
Z180	Housing for wall mounting ■ Installation space: one row, 324 mm (18 HP, IP65); 1 DDC420 and 2 FBU and 2 HP free, for example 
Z68	DDC420 Adapter frame for installation in the switch cabinet door ■ Installation space: one row, 144 mm (8 HP); 1 DDC420, for example 
Z63	Adapter frame DDC420/modules ■ Format: 19" ■ Installation space: one row, 288 mm wide (16 HP); 1 DDC420 and 2 FBU, for example 

Z62	Adapter frame for TPC35 ■ Format: 19" ■ Front cutout: fits TPC35 ■ Installation space: one row, 414 mm wide (23 HP); 1 DDC420 and 3 FBU and 3 HP free, for example ■ Z62 with DDC420 and TPC35 can be used as a replacement for MRP with SP in a KA frame.



Dimensions



Connectible modules

You can connect up to three input/output modules (Fieldbus modules) and additionally, up to three Room control modules, to the DDC420.

Fieldbus modules

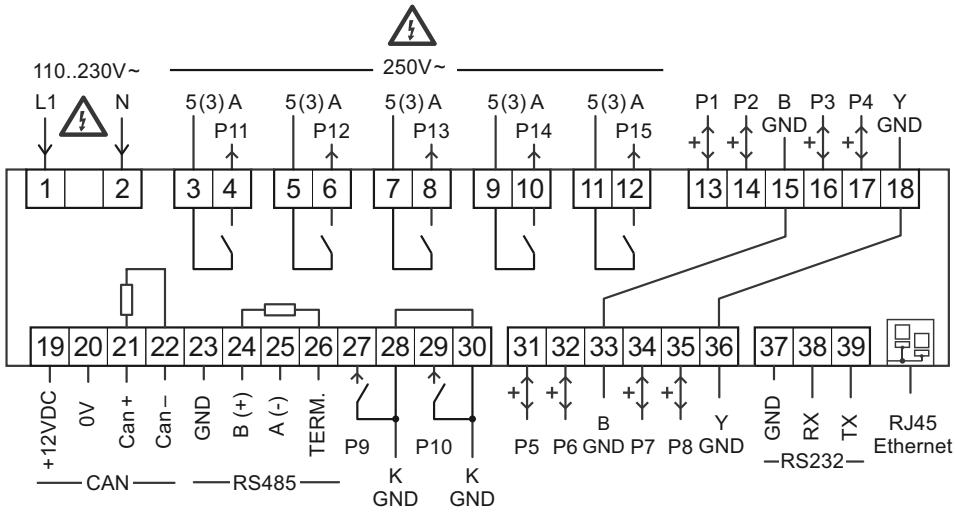
- FBU410
- FBM(0)18
- FBM(0)24
- FBS51/04, can be installed only once on DDC420

Room control modules

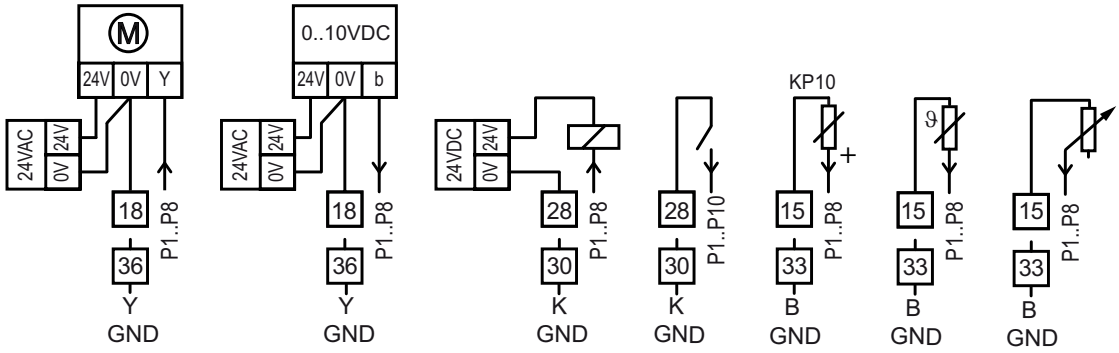
- DDC110-3
- DDC110S
- DDC110-3S1
- DDC110-4
- RBW201-C
- RBW202-C
- RBW204-C
- RBW205-C
- RBW301-C
- RBW302-C
- RBW304-C
- RBW305-C

Connection

Terminal assignment DDC420



Wiring diagram for sensors and actuators



CAUTION

The GND wiring specified in the wiring diagram (Y GND, K GND, B GND) must be observed.

Incorrect GND wiring may lead to errors in measurement.

CAUTION

Ensure that no third persons can access your data during data transfer.

Only use secure solutions when connecting to public networks (VPN).

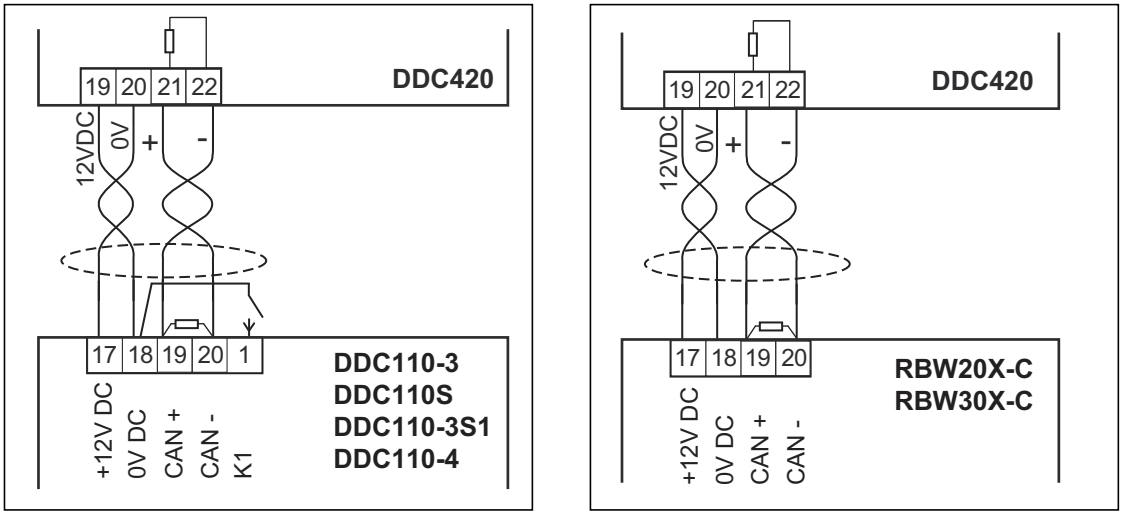
CAUTION

Use secure passwords to protect your data, devices and plants from unauthorized access. A secure password consists of lowercase and uppercase letters, numbers and special characters. It must also be long enough.

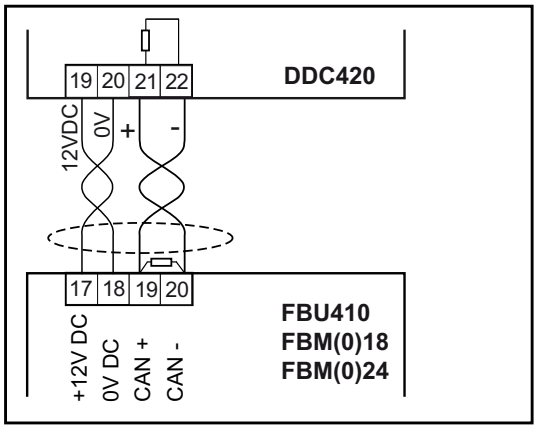
Change the passwords directly after transfer of the plant, commissioning of the device or importing software. Change the passwords at regular intervals. Use different passwords.

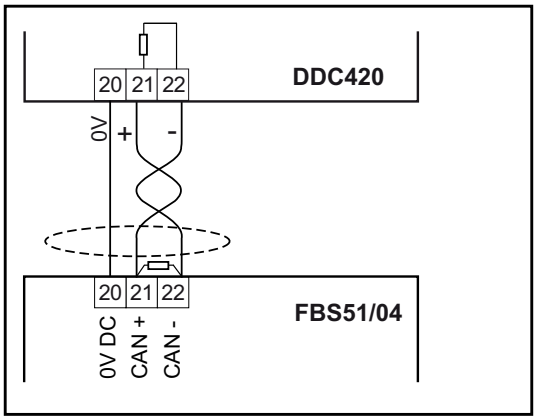
You are responsible for the security of your data and/or plant.

Wiring diagram for room control modules



Fieldbus module wiring diagram





Fieldbus

To connect the fieldbus, use at least one cable of the type JY(St)Y 2x2x0.8 Lg: Two x two leads stranded into a pair, plastic insulation and an electrostatic shield with a lead diameter of at least 0.8 mm. Use a stranded pair of leads for the data lines (+ and -) and another stranded pair of leads for the ground connection 0 V and DC 12 V.

When connecting the fieldbus, use daisy chain topology (series connection) only. Do not use star or ring topologies.

At the start and end of the fieldbus, install a terminating resistor of about 180 Ω between the two data lines (+ and -).

- The DDC420 has an integrated 180 Ω resistor.
- Two terminating resistors are included with the automation station.
- The maximum cable length for the fieldbus is 2000 m.

CAUTION

Deviating terminating resistor wiring can result in faulty data transmission.

RS485 for BACnet MS/TP

To connect the MS/TP bus, use at least one cable of the type JY(St)Y 2x2x0.8 Lg:

Two x two leads stranded into a pair with plastic insulation and electrostatic shielding with a lead diameter of at least 0.8 mm and a characteristic impedance between 100 and 130 ohms.

Use a stranded pair of leads for the data lines and another free lead for the ground connection.

Observe the polarity of the data lines of the MS/TP. Terminal “25” supplies the inverted signal, it is usually labeled with A (-). Terminal “24” supplies the non-inverted signal, it is usually labeled with B (+). Terminal 23 is used for the ground connection.

At the start and end of the RS485 bus, install a terminating resistor of about 120 ohm between the two data lines (+ and -)

The DDC420 has an integrated 120 ohm resistor. It can be activated by means of a bridge between the terminals “25” A(-) and “26” TERM.

Foreign devices often enable a switchable terminating resistor. Refer to the data sheet or the respective manufacturer’s manual for further information.

- The maximum possible cable length of the RS485 bus is 1000 m at 115200 baud and 1200 m at 78600 baud.
- A maximum of 8 devices (DDC420 + 7 external devices) can be operated on a bus segment.
- Observe the line topology for the RS485 bus.

CAUTION

Deviating terminating resistor wiring can result in faulty data transmission.

Fieldbus Power Supply

In the simplest case, the fieldbus modules can be supplied with power from the DDC420.

- Fieldbus power supply (internal): DC 12 V; 6 W; uncontrolled; open circuit voltage up to DC 18 V

When JY(St)Y 2x2x0.8 Lg bus cables are used, the following maximum fieldbus lengths are possible:

FBU and FBM modules	RBW30x-C-, RBM20x-C- and DDC110 modules	Maximum fieldbus length
3	0 to 3	20 m
2	0 to 3	40 m
1	0 to 3	80 m
0	0 to 3	160 m
0 to 3 < 2 m	0 to 3	160 m

Tab. 1: Maximum fieldbus length

NOTE

The fieldbus length can be up to 2000 m if you install additional power supply units for the DC 12 V power supply.

NOTE

FBS modules always need to be supplied with external power as they require an AC 24 V power supply (the power supply for the fieldbus is DC 12 V). Therefore, the fieldbus length is not limited for FBS modules.

Mounting

WARNING

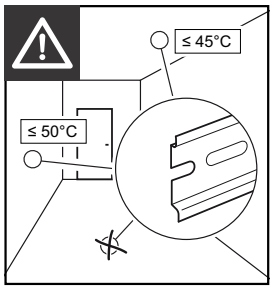
Danger of death by electrocution.

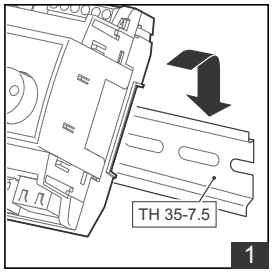
Mount or remove only when power is switched off.

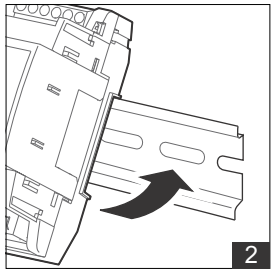
CAUTION

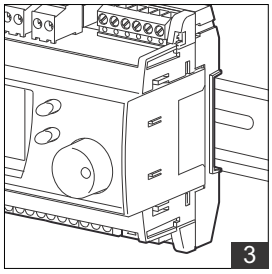
If the DDC420 is installed in false ceilings, the maximum permitted ambient temperature is only 45 °C.

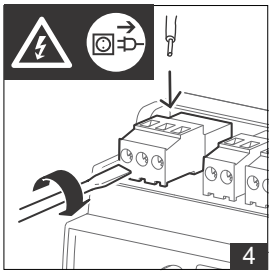
Installation in floor boxes or similar systems is not permitted.











Removal