



DDC520

Automation station

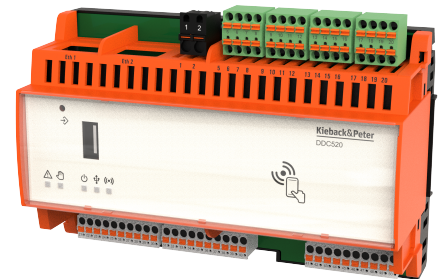
Applications

With the DDC520 automation station, heating, ventilation and air conditioning systems can be controlled (both open and closed-loop control), monitored and optimized.

Input and output modules and room control modules can be connected to the DDC520 fieldbus to expand the system as needed.

The DDC520 offers a web server via an integrated Ethernet interface, enabling visualization, remote control and data backup in a web browser without the need for additional software.

The DDC520 can be operated using separate display and control devices (TPC), a smartphone app (available in the App Store) or devices with a web browser.



Additional key features of the DDC520:

- Native BACnet® in accordance with DIN EN ISO 16484-5 (BACnet® Server, BACnet® Client); BACnet IP and BACnet MS/TP facilitate communication with the BMS via Ethernet.
- BACnet Secure Connect (BACnet/SC) for secure communication between BACnet participants
- Different user roles for displaying and changing system values; customer-specific plain texts for every parameter
- 25 physical data points integrated
- IO modules can increase the number of supported physical data points to a total of 58

This product description describes the function and installation of the DDC520. It also briefly describes how to use the smartphone app to operate the device.



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Important information about product safety

Safety instructions

This document contains information on mounting and commissioning. Any person who carries out work on this product must have read and understood this document.

If you have any questions that are not resolved by this document, you can obtain further information from the supplier or manufacturer. If the product is not used in accordance with this document, the protection provided could be impaired. The applicable local regulations must be observed when mounting and using the product. Within the EU, these include: regulations regarding occupational safety and accident prevention as well as those from the VDE (German Association for Electrical, Electronic & Information Technologies). If the device is used outside of the EU, it is the responsibility of the plant engineer or operator to comply with the 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 based on their technical training, knowledge and experience, as well as their knowledge of the applicable regulations.

Symbol meanings



DANGER

Indicates an imminent hazard that will result in death or serious bodily injury if not avoided.



WARNING

Indicates a potentially imminent hazard that may result in death or serious bodily injury if not avoided.



CAUTION

Indicates a potential hazard that may result in moderate or minor injury if not avoided.

NOTICE

Indicates special information to help you avoid property damage or malfunction and to help you work with the product.



NOTE ON DISPOSAL

In accordance with the applicable laws and directives of the countries of the European Union, the product should not be disposed of with household waste. This ensures environmental protection and sustainable recycling of raw materials. The local and currently applicable laws must be observed.

Private users should contact their local retailer or their local authority for information regarding the environmentally safe disposal of old appliances.

Commercial users should contact their supplier and observe the conditions of the purchase agreement. This device must not be disposed of along with other commercial waste.



Technical data

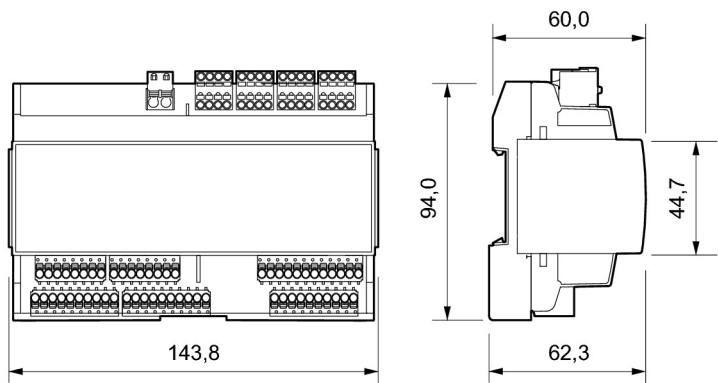
DDC520	Automation station with operator function and integrated web server for remote control
Nominal voltage	■ Device power supply and CAN bus (terminals 17/18): 24 V DC $\pm 10\%$ / 15 W ■ Power supply for the DDC520 inputs and outputs (terminals 5 and 7): 24 V DC $\pm 10\%$ / 55 W Both voltages are necessary for full operation. The device power supply and the supply for the inputs and outputs are only galvanically isolated when two separate power supply units are used (see "Installation", page 7).
Inputs and outputs	■ 6 binary inputs (DI1 to DI6), also for pulse counting up to 80 Hz: Binary input – Each binary input requires 5 mA at +12 V DC – Switching threshold Off ≤ 2.5 V DC; On ≥ 5.0 V DC – Support of NAMUR sensors (proximity sensors) ■ 8 binary inputs and outputs (DU1 to DU8) can be independently configured as: Binary input – Each binary input requires +12 V DC; 2.3 mA – Switching threshold Off ≤ 6.0 V DC; On ≥ 7.0 V DC – Support of NAMUR sensors (proximity sensors) Binary output – For each binary output, 24 V DC transistor output, max. 500 mA (12 W) – Total of all outputs: max. 40 W – 2.5 V (60 μA) can be measured at an unloaded output ■ 8 universal inputs and outputs (M1 to M8) can be independently configured as: Binary input – Each binary input requires +12 V DC; 2.5 mA – Switching threshold Off ≤ 2.5 V DC; On ≥ 6.0 V DC – Support of NAMUR sensors (proximity sensors) Analog input – see "Sensor types", page 6 Analog output – 0(2)..10 V DC; maximum of 2.5 mA ■ 3 analog outputs (AO1 to AO3) can be independently configured as: – 0(2)..10 V DC; maximum of 10 mA – PWM 10 V; 100 Hz..1 kHz (according to VDMA 24244, wet rotor circulation pumps)
Fuse	There is no fuse to be changed by the user.
Auxiliary voltage provided	■ +10 V DC auxiliary voltage (terminals 31/32) for analog input, max. 70 mA – Total of all loads at +10 V DC auxiliary voltage must not exceed 70 mA



	■ +12 V DC auxiliary voltage (terminals 33/34 and 68/70/72/74/76/78) for up to 14 binary inputs plus max. 40 mA for external sensors – Total of all loads at +12 V DC auxiliary voltage must not exceed 100 mA ■ +24 V DC auxiliary voltage (terminals 21/24/ 27), max. 0.5 A – Total of all loads at +24 V DC auxiliary voltage must not exceed 0.5 A
Interfaces	■ 2 Ethernet RJ45 (function: switch) – Data backup; web server communication; BACnet® acc. to EN ISO 16484-5; 10/100/1000 Mbps ■ 1 CAN bus, can be switched between fieldbus and switch cabinet bus – Fieldbus: up to 2000 m; 20 kBd – Switch cabinet bus: up to 200 m; 40 kBd – Voltage supply output for the fieldbus modules: 12 V DC, max. 6 W (terminals 1 and 2) (see "Supported modules and physical data point limit", page 9) ■ RS232 (for modem) ■ RS485 (BACnet® MS/TP) – Up to 1000 m – Up to 32 participants ■ 1 USB A for software update and data backup ■ WLAN 802.11b/g/n – 2457 MHz, max. 20 dBm
Displays and operator elements	■ 5 status LEDs (see "LED status indicator", page 16) ■ Recessed push-button on front to activate the wireless interface and for cold start
Power failure data backup	No data loss in the event of a power failure
Real-time clock	Buffered for 6 months in case of power failure
Overvoltage category	III
Rated impulse voltage	800 V
Level of contamination	2
Method of operation	Type 1
Degree of protection	IP20 (when installed)
Ambient temperature	0..55 °C Limitation: at 1000 Mbps only up to 50 °C
Ambient humidity	During operation: 20..80 % r.h., non-condensing Out of operation: 5..90 % r.h., non-condensing
Mounting	TH 35x7.5 top hat rail in closed housing NOTICE This device is intended for installation in a wall-mounted enclosure or switch cabinet with protection class I or II
Dimensions (W x H x D)	143.8 mm x 94 mm x 62.3 mm
Weight	0.347 kg (without packaging) 0.388 kg (with packaging)



Dimensions



Sensor types

Sensor type	Measuring range
0(2)..10 V	0..100 %
KP10	-50..+150 °C
KP250	-50..+150 °C
ML2	-50..+150 °C
Ni100	-50..+150 °C
Ni1000-DIN	-50..+150 °C
Ni1000-LG	-50..+150 °C
NTC1.8K	-10..+150 °C
NTC5K	-50..+150 °C
NTC10K	-40..+150 °C
NTC10KPRE	-50..+150 °C
NTC20K	-30..+150 °C
PT100	-100..+850 °C
PT1000	-100..+850 °C
Balco500	-40..+150 °C
Satchwell DC1100	-20..+120 °C
Satchwell DC1400	-40..+120 °C
Resistor (potentiometer)	0..500 kilohms

NOTICE

For more information on the sensor types, see the product description “Temperature Sensor Tables”
[1.10-90.100-01-EN](#).



Installation

This chapter explains the mounting and connection procedures for the DDC520 automation station. The device is always mounted on a standard rail that is attached to a vertical surface. The standard rail can be mounted either horizontally (DDC in the normal position) or vertically (DDC in both directions).

NOTICE

Connecting unparameterized products to the power supply can cause unforeseen consequences such as malfunctions or property damage. Do not switch on the power until the commissioning technician has configured the device.

Terminal configuration

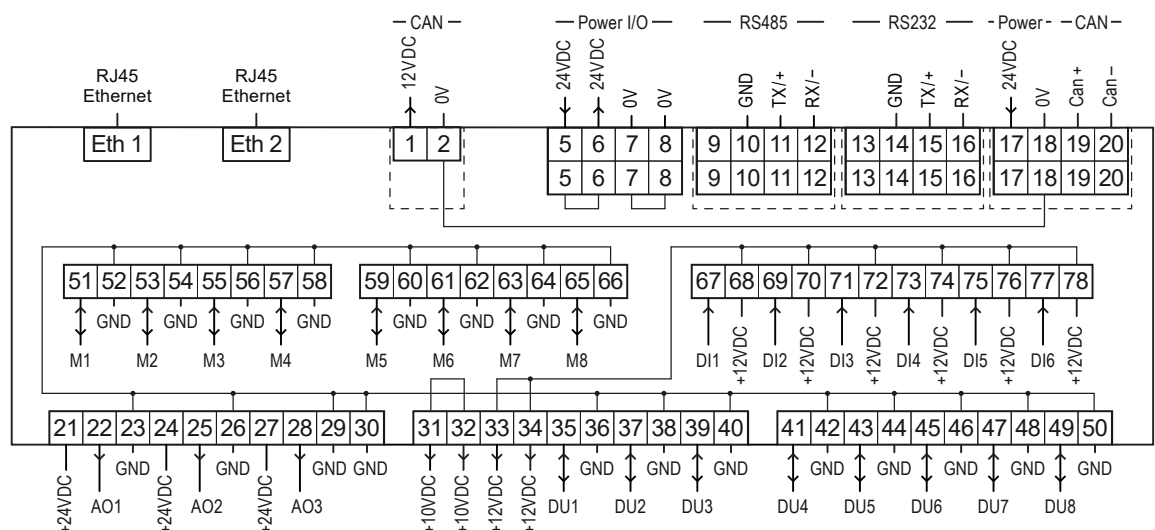
If you only want to start the DDC520, voltage must be applied at terminals 17/18. The DDC520 can be reachable and parameterization can begin. However, the device's own inputs and outputs cannot be used in this state.

To be able to also use the inputs and outputs on the DDC520, voltage must be applied to terminals 5 and 7. Both voltages are necessary for full operation of the DDC520.

In the devices, the CAN bus power supply, RS232, RS485 and the inputs and outputs are galvanically isolated. This functional separation is intended to prevent unwanted ground loops. By means of this functional separation, the inputs and outputs of the DDC520 can offer a separate and independent ground plane, which structurally prevents ground loops and potential shifts between the individual devices.

However, if the system configuration requires it, the ground levels of the devices can also be connected without problems. If the GNDs of the galvanically isolated areas are connected to one another, the connected areas are no longer galvanically isolated.

The 0 V DC at terminals 7/8 has the same potential as all GNDs on the inputs and outputs. However, they must not be connected with each other via external wiring. In this case EMC resistance would not be guaranteed. It may be necessary to install a separate, external distributor terminal for the GNDs of the inputs and outputs.



(---) galvanic isolation



Mounting

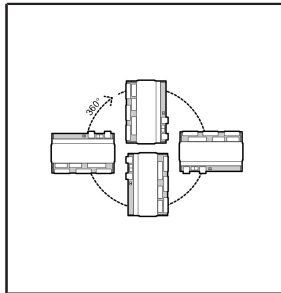
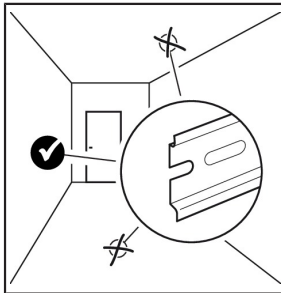


WARNING

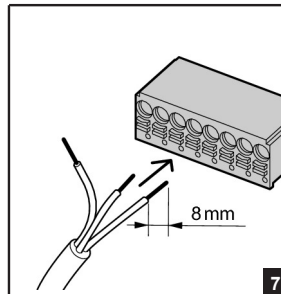
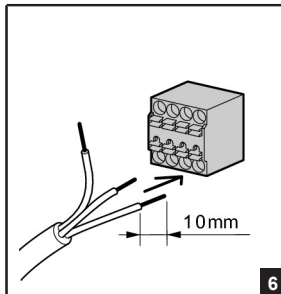
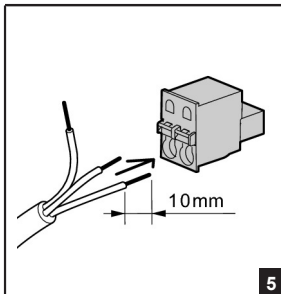
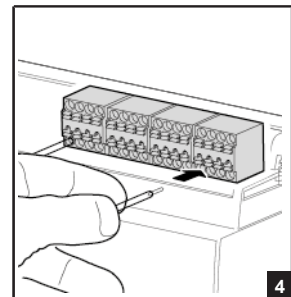
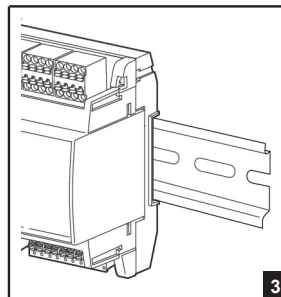
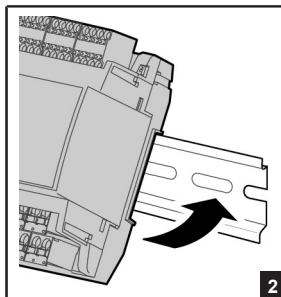
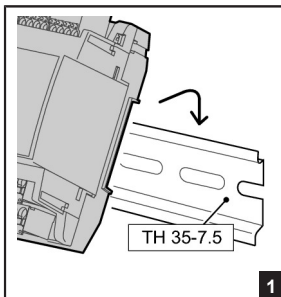
Electrical current

Contact with live parts can cause severe injury by electrocution.

Only carry out the mounting work when the power is switched off.



The device is always mounted on a standard rail that is attached to a vertical surface. The standard rail can be mounted either horizontally (DDC in the normal position) or vertically (DDC in both directions).



NOTICE

Mounting in floor socket boxes or overhead is not allowed.



Connection

Supported modules and physical data point limit

The DDC520 has 25 physical data points built in. IO modules can add 33 data points to the number of physical data points supported. This counts all IO pins in each IO module, even if they are not used in a configuration.

Fieldbus modules – migration (GND switching)

- FBU410
- FBM(0)18
- FBM(0)24

Fieldbus modules – new systems

- BMD1204 (binary input: 12 V detecting)
- BMD1200 (binary input: 12 V detecting)
- BMD0004
- BMA0804
- BMA0004
- BMA0600
- BMAU24
- BMDU32 (binary input: 12 V detecting, or binary output: 24 V switching)
- BMD0401-PO (binary input: 12 V detecting)
- BMA0804-PO
- BMD1204-PO (binary input: 12 V detecting)

Supported local priority operation in conjunction with PO bus modules

- TMC-PO
- TMU-PO

Supported network participants and communicative data point limit

In the standard version, 50 data points from other network participants can be incorporated into the DDC520.

- BACnet MS/TP
- BACnet IP

Supported room control modules (RBW)

Up to six RBWs can be connected.

- RBW201-C to RBW305-C (migration)
- RBW4201 to RBW4305

Supported bus actuators

Up to six bus actuators can be connected.

- MD200BUS



Product description

DDC520

Connecting fieldbus modules

At least one cable of type JY(St)Y 2x2x0.8 Lg shall be used to connect the fieldbus.

- Two pairs of twisted wires with plastic insulation and electrostatic shielding, with a minimum wire diameter of 0.8 mm.

Use a pair of twisted wires for the data lines (+ and -) and another free wire for the ground connection (0).

At both ends of the fieldbus there is a terminating resistor with a resistance of about 180 Ω between the two data lines (+ and -).

- Two terminating resistors included with delivery of the DDC520
- No terminating resistors integrated in the DDC520

When using newer IO modules, a 24 V DC switching power supply can be used to supply power to the DDC520 and the modules if they are located in the same switch cabinet (this removes the galvanic isolation of the CAN bus).

Fieldbus voltage supply

The fieldbus modules can be supplied with power from the DDC520, for example in the event of migration.

Fieldbus power supply (internal):

- 12 V DC / 6 W

RS485 for BACnet MS/TP

Use at least one JY(St)Y 2x2x0.8 Lg cable to connect the MS/TP bus: Two pairs of twisted wires with plastic insulation and electrostatic shielding, each with a minimum wire diameter of 0.8 mm and characteristic impedance between 100 Ω and 130 Ω .

Use a pair of twisted wires for the data lines and another free wire for the ground connection. Note the polarity of the data lines in case of MS/TP.

- Terminal "12" provides the inverted signal, usually labeled -
- Terminal "11" provides the non-inverted signal, usually labeled +
- Terminal "10" provides the ground connection

A terminating resistor of preferably 120 Ω must be installed between the two data lines at the beginning and end of the MS/TP bus.

- Four terminating resistors included with delivery of the DDC520
- No terminating resistors integrated in the DDC520

Third-party devices often offer the possibility to connect a terminating resistor. Please refer to the data sheet or manual of the respective implementer for further information. Fail-safe biasing is used to maintain the bus's noise level at a defined high level and thus prevent noise from being misinterpreted as a data signal.

The DDC520 does not require fail-safe biasing. If external devices require a bias voltage, set the fail-safe biasing externally. A maximum of 2 devices on the bus can have network fail-safe biasing.

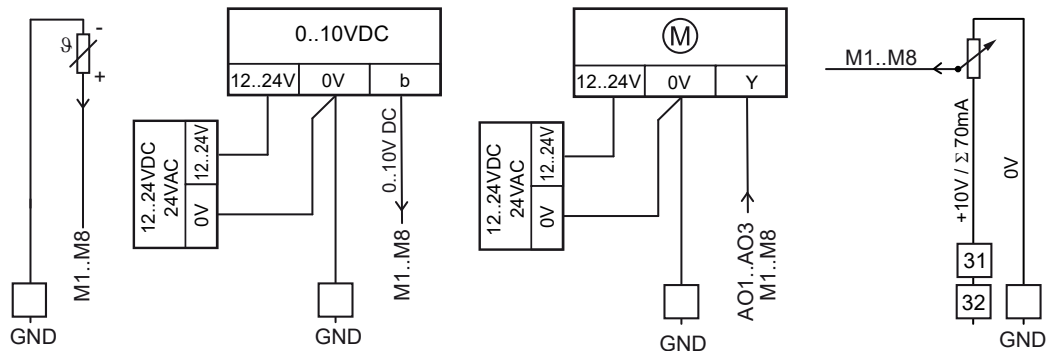
- The maximum possible bus length is 1000 m
- Up to 32 devices on a bus segment
- Line topology must be observed for RS485 bus

Ethernet connection

For the RJ45 connection, use a shielded CAT5e Ethernet cable or better.



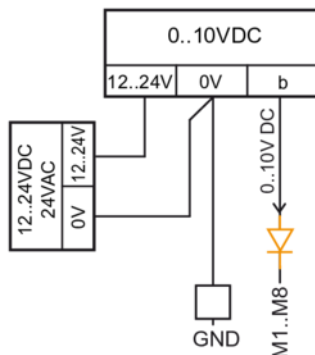
Connecting sensors and actuators



NOTICE

If a GND is to be routed as a common conductor to terminal blocks, a separate GND routing for analog inputs and outputs is to be implemented in order to avoid signal influences between sensors and actuators.

A negative input voltage on a measuring channel (M1..M8) leads to a significant influence on all inputs. All analog inputs (AI) have incorrect measured values. Therefore, all analog inputs (AI) are represented as invalid (???) in the "b" parameter in the pin object. This guarantees the measurement quality.



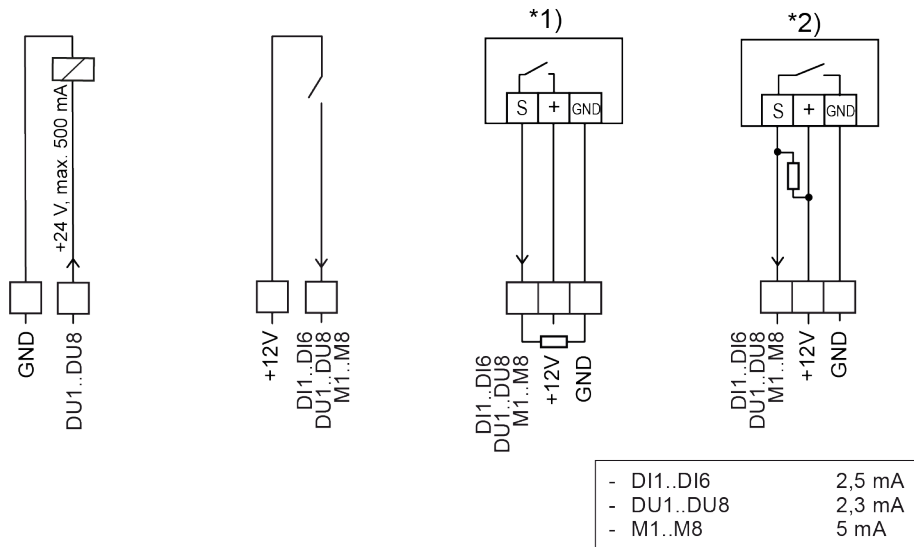
Negative input voltage: If negative input voltages are to be expected due to the sensor used (e.g. in en:air plants with the differential pressure transmitter DE23 from Fischer), appropriate measures must be taken to limit the input voltage outside the module.

Example: Use of a diode in the component plug and matching terminal block

- Diode: BAT86 (Schottky diode)
- Component plug: Phoenix P-CO or equivalent
- Terminal block: Phoenix PT 4-FSI/F GY or equivalent



Connection of binary inputs and outputs



*1) Sensor with PNP output (most frequent application).
The resistance is internal in the input/output module.

*2) Sensor with NPN output/open collector (when the sensor is switched on, the module input resistance is off). The resistance of 2.2 kΩ must be set externally.

If switching transmitters (such as 3-pole Namur sensors) are supplied with the +12 V DC voltage provided by the device, it should be noted that the total maximum current of 100 mA must not be exceeded. A 2-pole Namur sensor is connected to +12 V DC and a binary input.

Terminals

NOTICE

The twisting of two conductors is not permitted. Twin conductor end sleeves can be used.

	Output terminal 1..2	Bus terminal 5..20	IO terminal 21..78
Single-wire / multi-wire conductor Conductor cross-section: Stripping:	0.5..2.5 mm ² 10 mm	0.5..1.0 mm ² 10 mm	0.5..1.5 mm ² 8 mm
Multi-wire conductor with wire end sleeve and/without plastic collar Conductor cross-section: Wire end sleeve length:	0.5..1.5 mm ² 10 mm	0.5..1.0 mm ² 10 mm	0.5..1.0 mm ² 10 mm



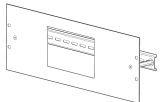
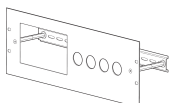
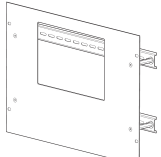
Accessories

Included in the scope of delivery

- BEIPACK-CAN Two terminating resistors for CAN bus with 180 Ω
- BEIPACK-RS485 Four terminating resistors for RS485 with 120 Ω

Not included in the scope of delivery.

- Smartphone app For operating the DDC520 (web pages) and for basic configuration before commissioning
 - ▶ Available in the Google Play Store and the Apple App Store
- USBSTICK-DDC-MINI USB memory stick for updates and data backups
- TPC070, TPC101, TPC156, TPC185 Display and control device with touch function


 - ▶ TPC070: 7" (1024x600)
 - ▶ TPC101: 10.1" (1280x800)
 - ▶ TPC156: 15.6" (1366x768)
 - ▶ TPC185: 18.5" (1920x1080)
- ADRA070 Adapter frame for display and control device
 - ▶ Complete adapter frame, for TPC070
- ADRA070-PO Adapter frame for display and control device
 - ▶ Complete adapter frame, for TPC070 and 4x TMx-PO
- ADRA101 Adapter frame for display and control device
 - ▶ Complete adapter frame, for TPC101



Product description

DDC520

■ Z180

Empty housing for wall mounting



- ▶ Installation space: single row, 324 mm (18 DU, IP65)
- ▶ e.g. 1 DDC520, 2 FBU and 2 DU free

■ HW-103455

Mounting frame



- ▶ Installation space: single row, 216 mm (12 DU, IP44),
- ▶ e.g. 1 DDC520 and 1 FBU

■ Z63

Adapter frame



- ▶ Installation space: single row, 288 mm wide (16 DU)
- ▶ e.g. 1 DDC520 and 2 FBU

■ Z68

Adapter frame for installation in the switch cabinet door



- ▶ Installation space: single row, 144 mm
- ▶ e.g. 1 DDC520



Commissioning

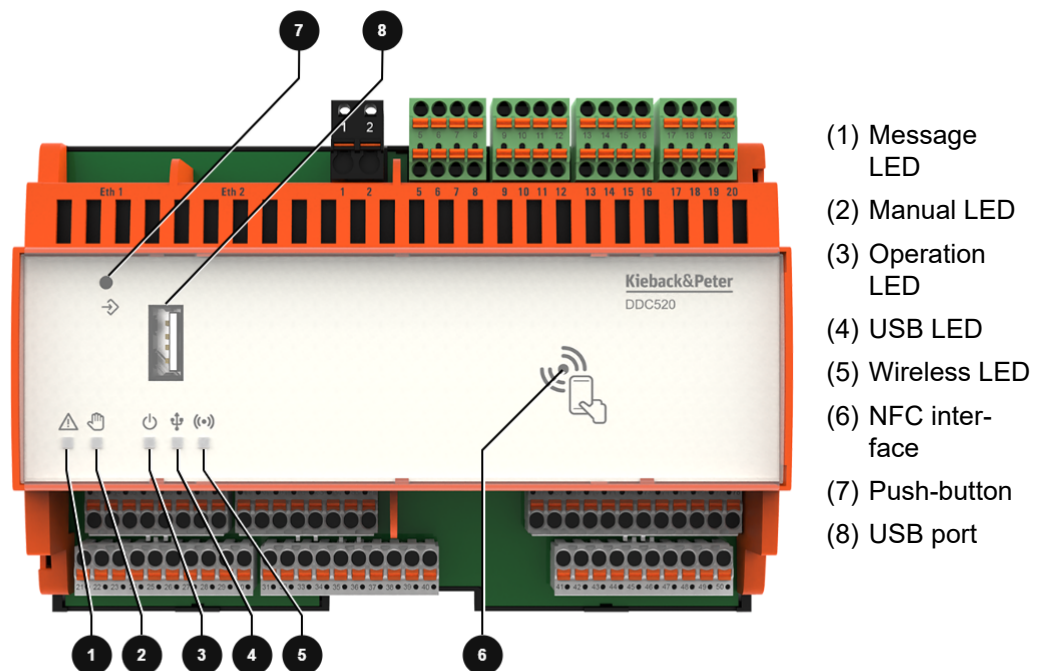
Protect your data traffic from unauthorized access. Use only secure solutions to connect to public networks (VPN).

Use strong passwords to keep your data, devices and systems safe from unauthorized access. A strong password consists of lowercase and uppercase letters, numbers and special characters and must be of sufficient length. The minimum password length is 8 characters.

Change the passwords immediately after handing over the system or after commissioning the device or a software installation. Change passwords periodically. Use different passwords. The security of your data or your system is your own responsibility.

Indicators

The DDC520 has LEDs on the front of the unit. The LEDs act as status indicators for “message,” “manual,” “operating state,” “USB” and “wireless.” These LEDs are permanently assigned to the functions and are each provided with symbols on the device panel.





LED status indicator

LED status	Meaning	Note
(1) Message LED		
Off	There are no alarm/event messages.	
Glows red	There is at least one acknowledged and no unacknowledged alarm/event messages.	The alarm/event message must be set up within the configuration.
Flashes red	There is at least one unacknowledged alarm/event message.	The alarm/event message must be set up within the configuration.
(2) Manual LED		
Off	Manual influence is not applied.	
Glows yellow	Manual influence applied in the configured plant.	– Manual influence must be set up within the configuration – Only if the “old” HMI is used in the function – Or if configured with attachment object F017
(3) Operation LED		
Off	The DDC is not in operation.	
Glows red	The DDC is starting.	
Flashes red	A firmware update is in progress.	
Flashes red rapidly	Firmware update error	
Flashes amber	The DDC program is starting or an I/O card update is in progress.	The DDC boot process is complete.
Glows green	The DDC is in normal mode.	The DDC is controlling (open and closed-loop control) according to the configuration.
Flashes green	The DDC is ready for operation and not configured.	The DDC does not contain a configuration, i.e. the project number with the default value of 000-00-00000 has not yet been changed. This default value must be changed for the DDC to assume the configured state.
(4) USB LED		
Off	The USB stick is not plugged in or not detected.	
Glows blue	The USB stick is detected and ready; no data traffic	Data backup/restoration and software updates can now be performed or USB stick can be removed.
Flashes blue	Data access to the USB stick.	Do not remove the USB stick.



LED status	Meaning	Note
(5) Wireless LED		
Off	Wireless interface disabled	
Glows blue	Wireless interface enabled	Triggered by: – Smartphone app is accessing the DDC via NFC – Push-button on the front of the DDC has been pressed
Flashes blue	Wireless connection is established or connecting	A connection to the end device is established.

Interfaces

Interface	Meaning	Note
(6) NFC surface		
	For reading device data To support dial-in on the web interface	The NFC area of the smartphone must always be held over the NFC interface of the DDC first.
(7) Push-button		
Briefly press and release	Enables the wireless interface	If the wireless interface is not used, it switches off automatically.
	If the DDC is not configured and a USB stick is plugged in, the configuration is loaded into the automation station.	The configuration file must be available on the USB stick.
Pressing and holding the push-button	The LEDs on the DDC switch to red one after the other, starting from the left. A cold start is executed when all 5 LEDs are flashing red. Cold start procedure: 1. Deleting configuration 2. Boot process is starting 3. Operation LED illuminates	If you release the push-button before all LEDs are flashing, a cold start is not performed.
(8) USB port		
	For creating and importing a data backup. For importing software updates.	The USB port is intended exclusively for USB sticks. Please use the model available as an accessory.



Product description

DDC520

Smartphone app for device operation

With the **K&P DDC SmartAccess** app, you can control your building automation systems more efficiently than ever before, directly via smartphone or tablet. The app enables the initial commissioning, configuration and operation of your automation station.

The app replaces classic local user interfaces and was developed especially for the DDC520 automation station and offers you wireless access via smartphone or tablet – ideal for technicians, service teams and facility managers.

Fast initial commissioning

- Prepare the DDC520 in the warehouse or office without powering it on directly: Keep your smartphone close – view device status, transfer data, perform configuration

Automatic connection

- Automatically connect to the desired DDC520 when using an NFC-enabled smartphone: connection established directly – wirelessly and without manual input

Control with the smartphone

- Direct access to the DDC520 via the app after successful commissioning: Operate all functions – without the need for an existing network in the building

User interface directly in the app

- Visualization of all setting options at the customer level on the smartphone or tablet – full transparency, intuitive navigation and easy handling

Backing up and sharing data

- Read configuration data even if devices fail, or back it up and then share it with colleagues – ideal for maintenance, servicing and replacement processes

Installing the app

- Scan the QR code and download the app – fast, secure and free

NOTICE

You can find detailed information about the **K&P DDC SmartAccess** smartphone app in the document “DDC520 V1.24_User Manual_9.38-10-520-01”.





Dismounting



WARNING

Electrical current

Contact with live parts can cause severe injury by electrocution.

Only carry out the dismounting work when the power is switched off.

