MultiPlexBox Central Controller

Part No: 90001246

Manual on the correct usage, maintenance, and installation of the MultiPlexBox central controller

0. Table of Content

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1. General Information

1.0 Important Information

To ensure complete and effective operation and for your own safety, all the following instructions should be read carefully and observed. The relevant national standards, safety regulations and instructions must be observed and applied. Please keep the operating instructions close to the unit for reference.

> **1.1 Warning: Safety instructions will be presented in a box such as this. All instructions <u>must</u> be followed and adhered to. To not do so will or could result in a dangerous situation.**

1.2 Safety Information

Special regulations apply for use, connection, and operation. Consultation is required in case of doubt. Further information can be found in the relevant standards and legal texts. Regarding all work, the generally applicable safety at work and accident prevention regulations must be observed!

• All electrical work as well as commissioning, installation, servicing, and maintenance work must only be carried out by authorised, qualified electricians!

1.3 Warranty claims – Exclusion of liability

If the following instructions are not observed, our warranty shall not be valid. The same applies to liability claims against the manufacturer. The use of accessory parts, which are not recommended or offered by Airflow Developments, is not permitted. Any possible damages are not covered by the warranty.

1.4 Regulations – Guidelines

If the unit is installed correctly and used for its intended purpose, it conforms to all applicable regulations and EU/UK guidelines at its date of manufacture.

1.5 Receipt

The shipment must be checked for damage and correctness immediately upon delivery. If there is any damage, promptly report the damage with the assistance of the transport company. If complaints are not made within the agreed period, any claims could be lost.

1.6 Scope of delivery - Contents

The delivery contains the central controller as well as 2 terminating resistors (120 Ohm) and one SD card (in SD card slot).

1.7 Storage

When storing for a prolonged time the following steps must be taken to prevent damaging effects: Protection by dry, air-dustproof packing (plastic bags with drying agent and moisture indicators). The storage place must be waterproof, vibration-free, and free of temperature variations. Damages due to improper transportation, storage or commissioning must be verified and are not liable for warranty.

1.8 Area of application – Intended use

The central controller is designed for indoor installation on a top-hat rail e.g, in a switch cabinet. **Any use other than the intended use is prohibited!**

1.9 Functions

The Central controller enables the establishment of a network with up to 255 MultiPlexBoxes. All connected MultiPlexBoxes can be controlled via the central controller. Communication between the central controller and the PC is possible using software by means of a USB cable. The controller can also be integrated in a building control system via Modbus TCP or RS 485. All connected MultiPlexBoxes can be configured, current values and error statuses can be requested, a central adjustment can be initiated, and an external ventilation unit can be controlled to manipulate the supply air and extract air fan using the fan optimiser function via 0-10 V outputs, all via the central controller. Communication between the central controller and PC is possible using software by means of a USB cable.

1.10 Technical Data

Supply Voltage	12-24 V DC
Power Consumption	3 W
Protection Category	IP20
USB Type	B
Network Connection	10/100 Mbit RJ45
Max units to be connected	255
Installation room requirements	0-55 ˚C <95% RH; non-condensing
Max. operating temperature	55˚C
Weight	170g

2. Installation

2.0 Installation

Place the central controller on the standard top-hat rail from above at a slight tilt and push backwards until the unit locks into place. Ensure the future accessibility of the connections (e.g. USB connection) during installation.

3.0 Central controller software

3.1 Central controller update via "MultiPlexBox update software"

Please ensure you update your firmware upon first opening the controller by following the steps below:

1. Connect the controller to your PC via a USB data cable.
2. Start the application "Multiplex Update"
3. Click on the "Establish connection via USB" button while USB is connected.
4. Once the Central Controller has been found, the system information will be displayed (version, date, last update).
5. Click on the "Select file" button. This will open the explorer window and all available firmware files will be displayed.
6. Select central controller firmware by clicking on it and confirm by clicking "Open".
7. Start the update process by clicking on the "Start" button. The update process may take a few minutes and the status will be displayed by green bars. Completion of the update will be displayed in the software. Now close the application "Multizone Update".

3.2 MultiPlex configuration software

3.2.1 Software Overview

<div align="center"><u>Commissoning</u></div>

1st Menu ⟶	Options
Automatic search	Activate Search Specify start address Save changes
Connected boxes	Overview of connected boxes
Delete list of connected boxes	No Yes
Adjustment	No Yes
Adjustment specification ventilation level	Access to individual box for adjustment

Current Values

1st Menu ⟶	2nd Menu ⟶	Options
Central Control	Ventilation	Control Voltage Fan Supply air Control Voltage Fan Extract air Volume Flow Supply air Volume Flow Extract air Setpoint Volume flow Supply air Setpoint Volume flow Extract air Max Shutter position Supply air Max Shutter position Extract air Min Shutter position Supply air Min Shutter position Extract air Setpoint Shutter position Supply air Setpoint Shutter position Extract air Status Fan Supply air Status Fan Extract air
	Firmware	Main version Minor Version
MultiPlexBoxes	Access to individual box for adjustment	
Errors	Current errors Error History Error list MultiPlexBox	

Configuration

1st Menu ⟶	2nd Menu ⟶	Options		
Central Control	Ventilation	Setpoint Shutter Opening	Setpoint Shutter Opening Supply Air	Value Entry
			Setpoint Shutter Opening Extract Air	Value Entry
		Reset time Vol. flow controller Supply air	Value Entry	
		Reset time Vol. flow controller Extract air	Value Entry	
		Reset time Shutter controller Supply air	Value Entry	
		Reset time Shutter controller Extract air	Value Entry	
	Network	Selection dynamic / static (value entry required)		
MultiPlexBox	Overview of connected boxes			
Service Level	Only for factory customer service	Only for factory customer service		

Saved Configuration

1ˢᵗ Menu ———————▶	Options
Load from File	File Explorer
Save to file	File Explorer

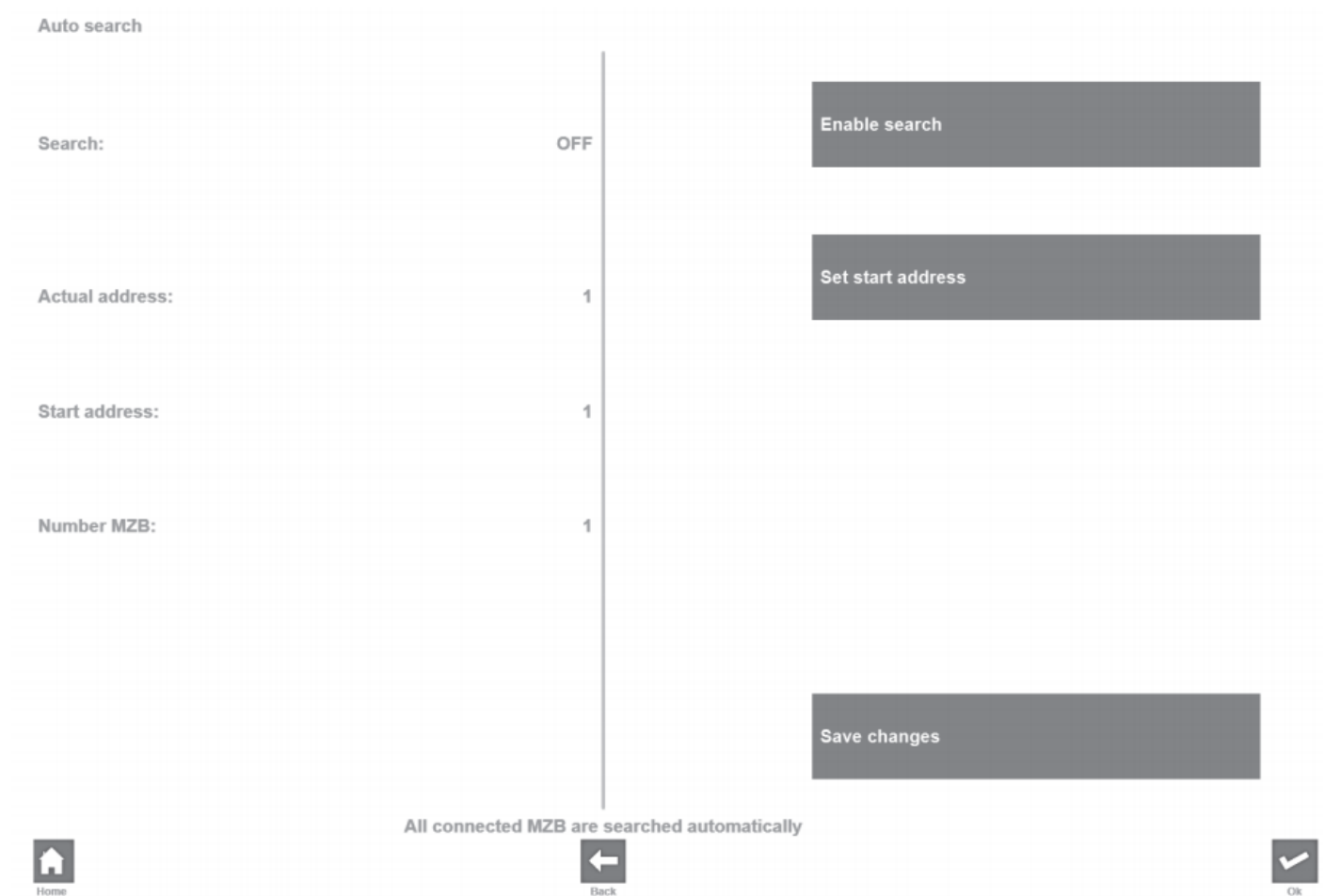### 3.2.2 Access to Central Controller

1. Connect the central controller to your PC using a USB data cable.

2. Start the application MultiPlexBox commissioning.

3. Click Establish connection via USB (This will open the main menu of the software)

Commissioning
Click on Commissioning button which will open the commissioning menu. Upon first opening, "connected boxes," "delete list of connected" and "adjustment ventilation levels" will be greyed out.

Auto Search
Here you can search for new or connected boxes in the network. For this purpose, click on the "Auto search" button and the following submenu will then open (see Fig. 3)

"Activate search" You can start the search for connected MultiPlexBoxes here.

You can follow the progress of the search in the left half of the screen by the increasing number of "Current addresses". You can see how many boxes have already been found in the network under "Number of MZB".

You can enter at which number the search should begin under "Specify start address".

Save the information regarding which boxes are available via "Save changes". Please make sure to save or confirm with "OK" after searching.

Connected Boxes
"Connected boxes" See how many MultiPlexBoxes are currently registered in your network here. Clicking on the button will open a list of the addresses of connected boxes. You will gain remote access by clicking on the button for the box.

Delete list of connected MultiPlexBoxes
Here you can delete the registered boxes.

Adjustment
The "Adjustment" button is intended for the adjustment of the overall system, you can activate the adjustment here. After activation, you can select at which ventilation level each individual registered MultiPlexBox is operating under "Adjustment specification ventilation level". Manual inputs on any control elements are disabled. Following adjustment, the "Adjustment" function must be deactivated again. When adjustment is activated, "Adjustment active" will appear in the main menu behind the Commissioning heading.

Current Values
Click on the "current values" button. This will open the submenu.

Current values

| Central control |
| MultiZoneBoxes |
| Error |

Central Control
"Central control" -> "Ventilation": You can display the cumulative values of volume flows; maximum shutter positions and the current control voltages present at the 0-10 V output supply air/extract air fan (fan optimiser function) here.

Ventilation

Control voltage supply air fan

Control voltage extract air fan

Supply air flow volume

Extract air flow volume

Setpoint supply air flow volume

Setpoint extract air flow volume

Maximum damper position supply air

Maximum damper position extract air

Minimum damper position supply air

Minimum damper position extract air

Setpoint damper position supply air

Setpoint damper position extract air

Condition supply air fan

Condition extract air fan

Currently measured parameters of ventilation

Home

Back

MultiPlexBox

MultiZoneBoxes" You can access the registered MultiPlexBoxes and display the current values here.

Errors

"Errors" You can display the current error status of the MultiPlexBox, you can also display the error history of the last 5 errors and the errors of the individual connected units in the system here.

Configuration

Clicking the configuration button will open the below menu (Fig 6):

Configuration

Central control

MultiZoneBoxes

Service level

Central Control

"Central control" You can configure the central controller regarding ventilation and network parameters here. "Ventilation" You can adjust the settings to control a central ventilation unit using the fan optimiser function via the central controller here.

Ventilation

Setpoint damper opening
Reset time volume flow controller supply air
Reset time volume flow controller extract air
Reset time damper controller supply air
Reset time damper controller extract air

"Setpoint Shutter opening" Enter the intended maximum shutter opening as a reference variable for the fan optimiser function (index circuit evaluation).

"Reset time Volume flow controller…" You can set the "damping" for the MultiPlexBox here (I element).
"Reset time Shutter controller…" You can set the "damping" for the leading MultiPlexBox to the ventilation unit (I element).

MultiPlexBox

"MultiPlexBoxes" You can gain remote access to the connected boxes here (displayed in a list). To configure this, please proceed as described in the MultiPlexBox manual.

"Network" You can set how the IP address is assigned for the central controller here. The default setting is the dynamic IP address, which can be switched to the static IP address. (Requires further entries: IP address, subnet mask, gateway address, DNS address).

Service Level

The "Service level" is only intended for the factory customer service.

Saved Configuration

You can use this function, for example, as a backup function following successful commissioning. The MultiPlexBox settings including the list of registered MultiPlexBox will be saved. This allows you to subsequently reset the system to the state following commissioning or import existing configurations when exchanging the Central Controller. Click on the "Saved configuration" button. This will open the submenu.

"Load from file" You can load saved central controller configurations here.
"Save to file" You can save central controller configurations here.

Saved configuration

Load from file
Save to file

4. Commissioning

This chapter contains instructions on how to commission the MultiPlexBox.

4.1 Conditions for commissioning

Please ensure that the following conditions are met before attempting to commission the unit:

- The installation of all individual ventilation system components is complete.

- All valves are completely open.

- Approximate duct network calculations are carried out and total volume flow calculated to estimate the approximate operating point for commissioning using the ventilation unit curve. (only necessary without fan optimiser function)

- The controller is connected to the power supply according to the wiring diagram.

- All MultiPlexBoxes are connected to the central controller by means of a RJ 45 network cable according to the wiring diagram and the terminating resistor is plugged into the last MultiPlexBox in the network.

- All ventilation components are freely accessible.

- All BUS addresses of the individual MultiPlexBox have been listed, check for duplicate numbers, and rename them accordingly.

- Commissioning software has been downloaded. (**Download before visit as internet access is required**)

- All other controllers: touchscreen controllers, and eco controllers have been updated to the latest firmware version.

- Possession of a Windows laptop or tablet with free USB A port/adapter and USB A to B cable (recommendation min. 2 m length, depending on the installation situation).

4.2 Procedure for Commissioning

1. Check in advance that all the conditions for commissioning are met.

2. Start the automatic search via the commissioning function in the configuration software.

3. Configure the boxes according to the procedure in the MultiPlexBox manual.
   a. Unit settings (Name, location, controls)
   b. Ventilation settings (air volume per level etc)
   c. Sensor setting and sensitivity if applicable.

4. Activate of adjustment and specification of respective ventilation level. (**This function overrides all possible user input via control panels. The function must be deactivated again following commissioning.**)

5. Only necessary without fan optimiser function:
   a. Set approximately determined operating point (target pressure) on ventilation unit.
   b. Wait until the system has stabilised (approx. 15 minutes).
   c. Check whether the max. shutter position shows approx. 85% under "Current values --> Central control --> Ventilation". If the value >85%: Increase target pressure on ventilation unit, wait and check again. If the value <85%: Reduce target pressure on ventilation unit, wait and check again.

6. Finally, the individual box must be adjusted. For this purpose, proceed as described in the installation and operating instructions of the MultiPlexBox unit.

4.3 Errors

The controller error status is indicated visually via the integrated LED. There are no errors while the Ethernet port LED is green and there is an error if the LED flashes red. The individual flash codes and corresponding errors can be found in the following table. If errors occur, you can also display these as clear texts via the software under "Current values". You also have the option to display the error status of the individual boxes including the address here.

Error Group	Flash Code	Comment
0	-	
1	2x flashes + pause	System memory error. Parameter data could not be loaded.
2	6x flashes + pause	Internal sensor communication error. Communication could not be established with the configured sensor.
3	8x flashes + pause	Communication error. Communication could not be established between the box and the controller.

Description	Solution
Central Controller cannot be connected to laptop/tablet	Check admin rights and permissions on your laptop. Check the USB cable is connected properly.
MultiPlexBox is not found during search	Check the power supply of the corresponding MultiPlexBox Check whether the BUS address is duplicated and modify it if necessary.

Notes

4.2 Wiring Diagrams

Please refer to Wiring Diagram 1 below for the central controller and the MultiPlexBox, And diagram 2 for the connection of a network.

> **1.1 Warning: <u>RISK OF ELECTRIC SHOCK!</u> Switch off the unit and please ensure there is no electricity present when carrying out the works. Ensure the work is carried out by a qualified person.**
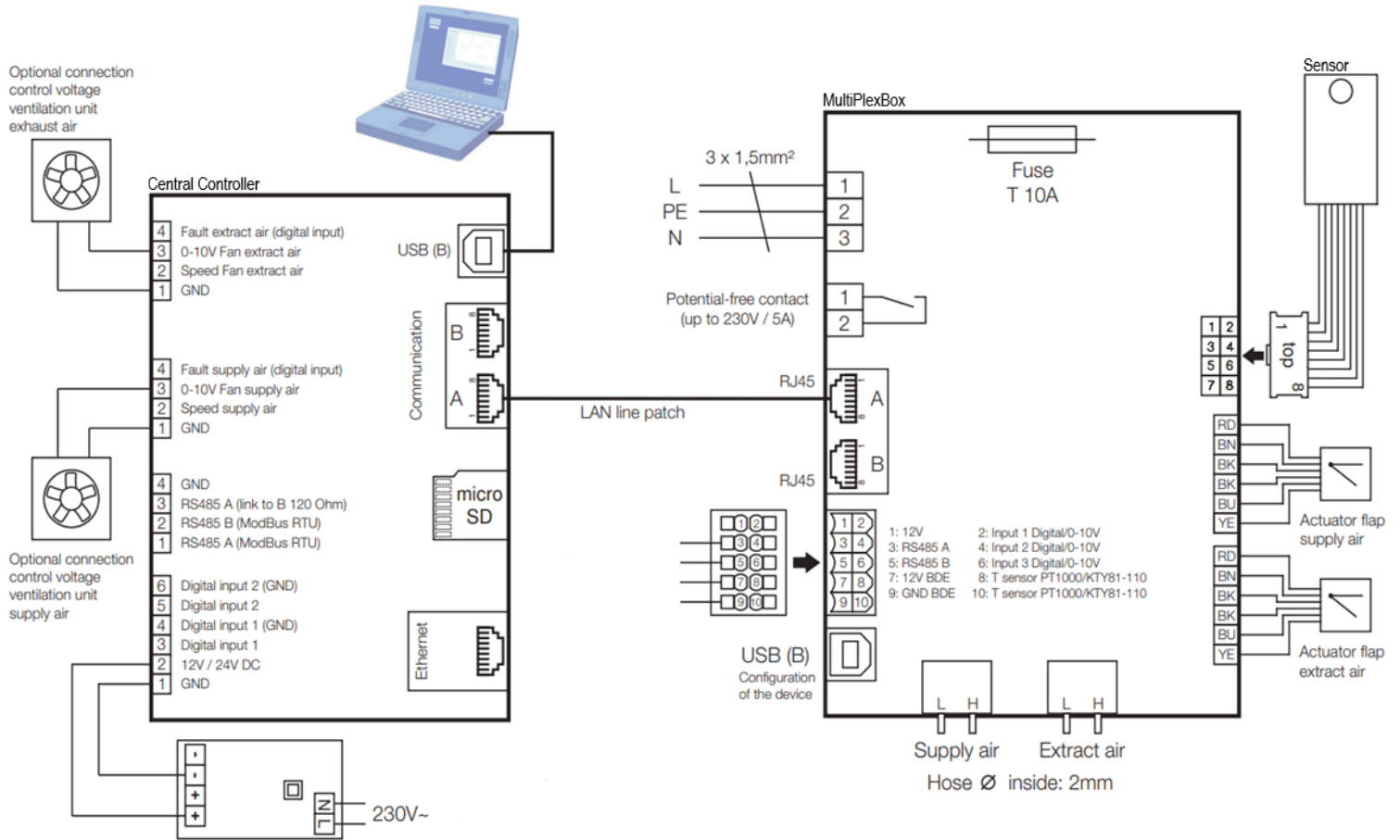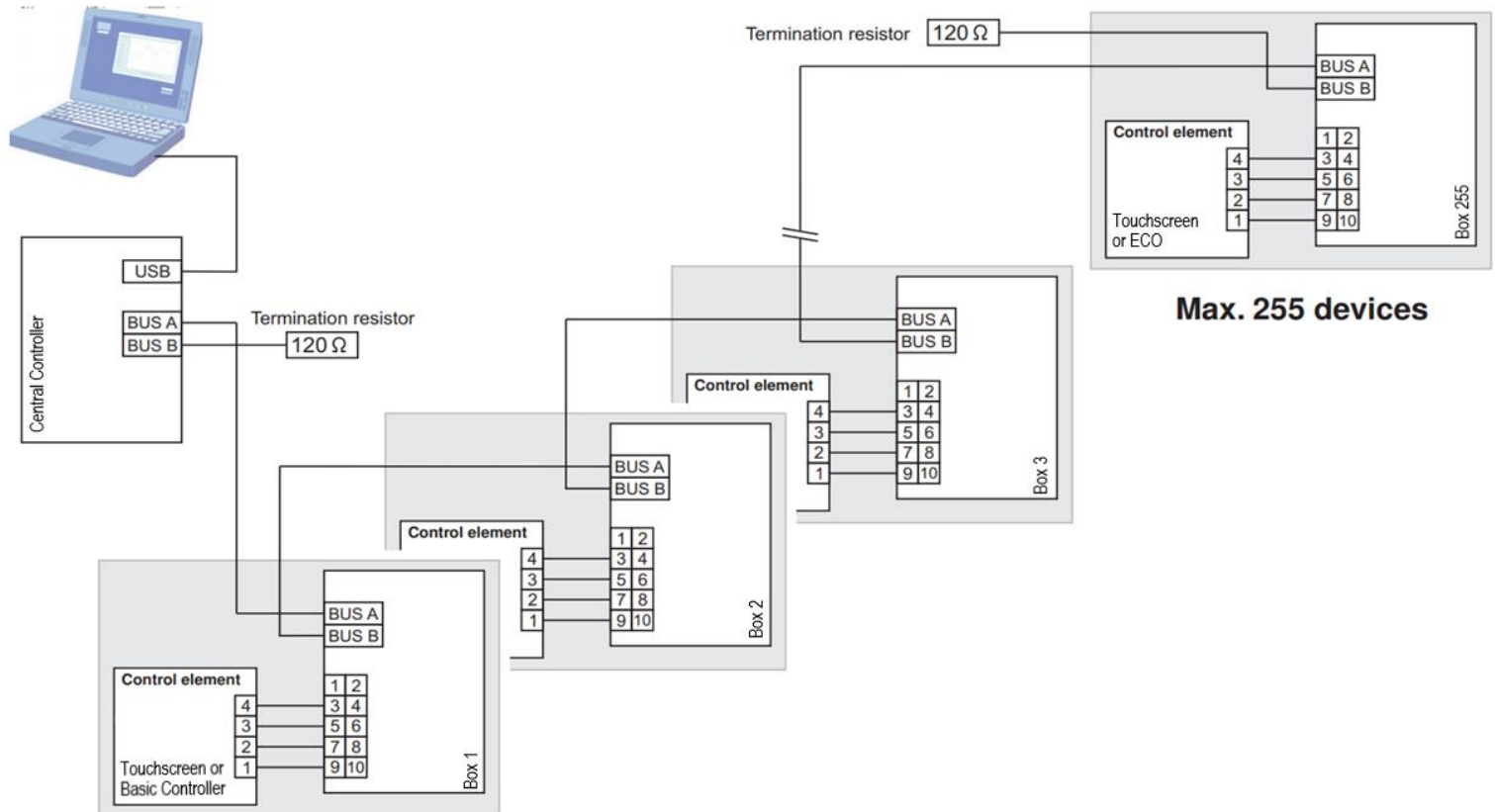

Diagram 1: Central Controller

Diagram 2: Connection Principle

Commissioning Help Sheet

Date _____

Property _____

Address _____

Unit Label or Identification	BUS Address	Unit Location
	Bus Address changed in:	
	Bus Address changed in:	
	Bus Address changed in:	
	Bus Address changed in:	

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