Jungheinrich WMT 210/215
Service manual

Contents

1. Comments

1.1 General Comments

This manual is about administration and usage of the Jungheinrich truck terminals WMT 210 and 215, referred to in the following as device You can find further information for mounting, cabling and safety-relevant aspects in the separate available operation instructions.
The original version of this manual is in German. Every non-german version is a translation.

1.2 Manufacturer

Manufacturer of this product is the Jungheinrich AG, referred to in the following as Jungheinrich.

1.3 Data, Images, Changes

All data, images and changes have been created to the best of one's knowledge and belief. There is no assurance for any specification. There is no guarantee for integrity and topicality. Subject to change without prior notice.

1.4 Trademark

All mentioned (soft-/hardware, brands) descriptions are protected by the general trademark right. Other used foreign brand names are acknowledged. Jungheinrich reserves the right to assert all rights in the event of a breach of the trademark rights.

1.5 Copyright

Jungheinrich Aktiengesellschaft
Friedrich-Ebert-Damm 129 - 22047 Hamburg - Deutschland
Telefon: +49 (0) 40/6948-0 - www.jungheinrich.com

2. General Description

2.1 Intended Use

The device was specifically developed for use on forklift trucks in logistics and industrial environments. A further application area is in the production environment where the device is used for stationary visualisation, control and operating/machine data collection.

The device must be operated and stored under the following conditions:
Temperature during operation -30°C to +50°C
Temperature during storage -40°C to +80°C
Air humidity in operation and storage 10% to 95% without condensate.
The device is protected against dust and jets of water in accordance with protection rating IP65.
Use in areas where there is a risk of explosion is prohibited.

The operator alone shall be responsible for ensuring that all operator obligations are observed and for complying with any technical or statutory amendments that may arise.
Installation, commissioning and operation may only be performed by qualified and trained personnel.
Intervention by the user is required only for performing the actions described in this document.
Should any further modifications be required, it is necessary to consult either with the manufacturer directly or with service personnel authorised by the manufacturer.
The device must be de-energised during service work. Appropriate measures must be taken to prevent electrostatic discharges on components.
The device is only to be assembled, installed and operated within the permissible specifications.
Use in non-specified environments is prohibited.

2.2 Improper use

Operation other than or beyond that described for the device shall be deemed improper use. The device is not allowed to be used to control vehicles or for applications for which further approvals beyond the manufacturer's declaration are necessary, e.g. applications with explosion hazard, medical technology and shipping industry. The device must not be put into operation in the case of transport damage or nonconformity with the specifications and must be taken out of operation in the case of changing conditions. In the case of improper use, ADS-TEC shall not accept responsibility or liability for injury or damage that is directly or indirectly attributable to the handling of the device. If the device is opened by an unauthorised person, the user may be subject to hazards and the warranty is invalidated. Should the device have evident signs of damages caused, e.g., by improper operation or storage conditions or due to improper use or handling, it must be shut down immediately. Ensure that it is secured against being started up accidentally. The device can be damaged as a result of unauthorised mechanical modifications. Make sure that the device is not drilled, chiselled or perforated and its exterior shape and design is not modified in any way!

2.3 Environmental Conditions

The device can be operated under the environmental conditions specified in the technical data. Failure to observe any one of these conditions will invalidate the warranty of the device. Jungheinric cannot be held liable for any damages arising from improper use and handling.

HINWEIS - condensation

If the temperature of the device is different to that of the environment in which it is located, condensation can form.
Switch on the device only after it has acclimated to the ambient temperature.

HINWEIS - Heat

If the device is exposed to sunlight or any other light or heat source, it can overheat and suffer damage.
If the device is installed in a panel, casing or similar, heat accumulation can occur.
Make sure that heat can be dissipated from the device and do not expose the device to direct radiation by sunlight or any other light or heat source.

2.4 Conformity

Regarding conformity, please observe the information in the operating instructions enclosed with the device.
The complete text of the EU declaration of conformity is available at the following Internet address:
www.jungheinrich.com/declaration-of-conformity

2.5 Warranty / repairs

During the device warranty period, any repairs must only be performed by the manufacturer or by service personnel that has been authorised by the manufacturer.

2.6 Treatment and disposal of lithium batteries

The device contains a lithium battery to power the system clock and an optionally available uninterruptible power supply - UPS. The batteries have a service life of approx. 5 years under normal load.
The used lithium battery should be disposed of in accordance with local legal regulations.

2.7 Technical Data - Power supply

Power Supply	
Nominal voltage	12 - 48 V DC
Range of tolerance	9 – 72 V DC
Power consumption	
Typical	25 W
Maximum	58 W, 64 W with UPS battery
Closed current	max. 10mA at 9 V

2.8 Technical data – UPS

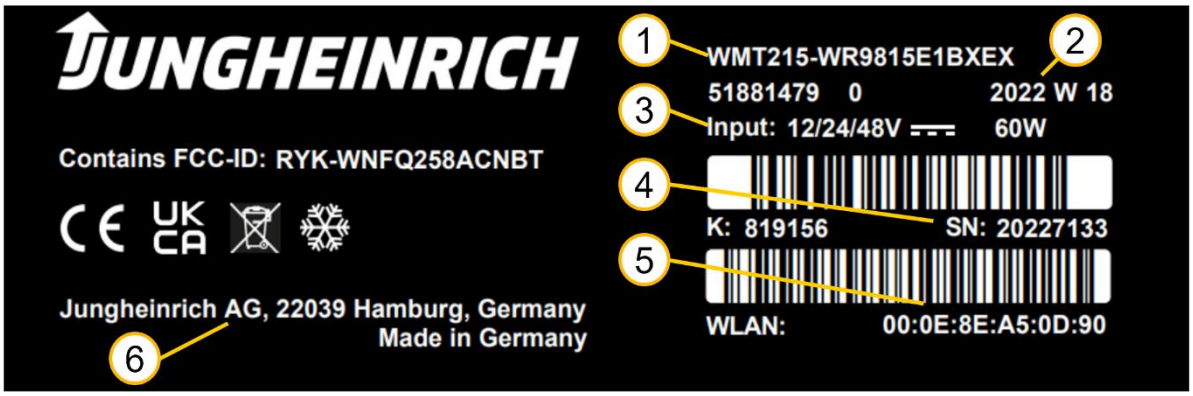
Uninterruptible power supply	
Operating temperature	Charging: 0…50 °C) The batteries cannot be charged at cell temperatures below 0 °C. Discharging: 0…60 °C)
Storage temperature	-20 – 45 °C
Backup power time (typical)	Depending on the load, at least 15 minutes
Max. power	40 W
Weightt	0,42 kg

2.9 Type plate

2.9.1 WMT 210

No.	Description
1	Feature number
2	Production year and calendar week
3	Serial number (also as barcode above)
4	WLAN MAC address (also as barcode above)
5	Input voltage and maximum power consumption
6	Manufacturer

2.9.2 WMT 215



No.	Description
1	Feature number
2	Production year and calendar week
3	Input voltage and maximum power consumption
4	Serial number (also as barcode above)
5	WLAN MAC address (also as barcode above)
6	Manufacturer

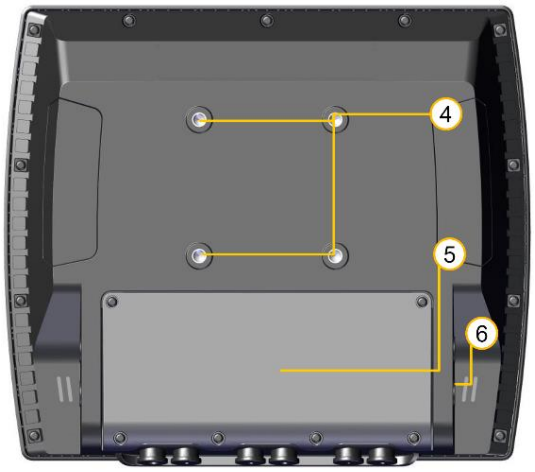
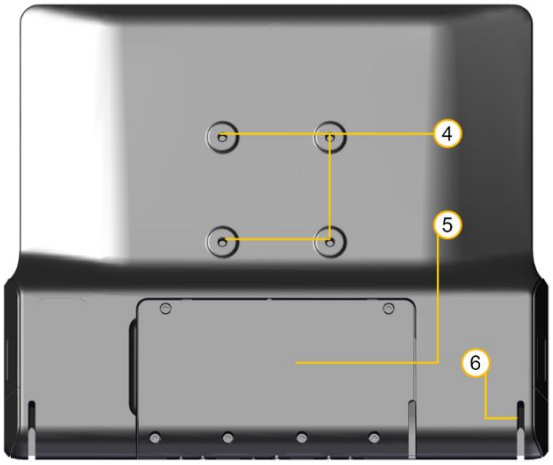
3. Scope of delivery

Check that the contents of the packaging are intact: If you find any damage, the device must not be put into operation. Please contact the manufacturer immediately.

Check the contents of the packaging for completeness regarding your order:

- 1 x device
- 1 x 4-pin plug for power supply in the service duct
- Operating instructions
- Accessories according to order/delivery note

4. Mounting and Handling

WMT 210	WMT 215
	

4.1 VESA75 Interface

VESA75 hole pattern according to illustration, position 4.

- Horizontal and vertical distance between the screw holes: 75 mm
- Thread: M6, torque: 8 Nm (recommended)
- Screw-in depth in the threaded bushings: max. 6 mm

4.2 U-Mount Interface

Mount the retaining bracket (see illustration, position 6) on the device using the screws supplied in the following order from the inside to the outside:
Nord-Lock washer -> bracket -> Nord-Lock washer -> Allen screw (SW 6 mm) -> cover cap.

4.3 Opening the service slot

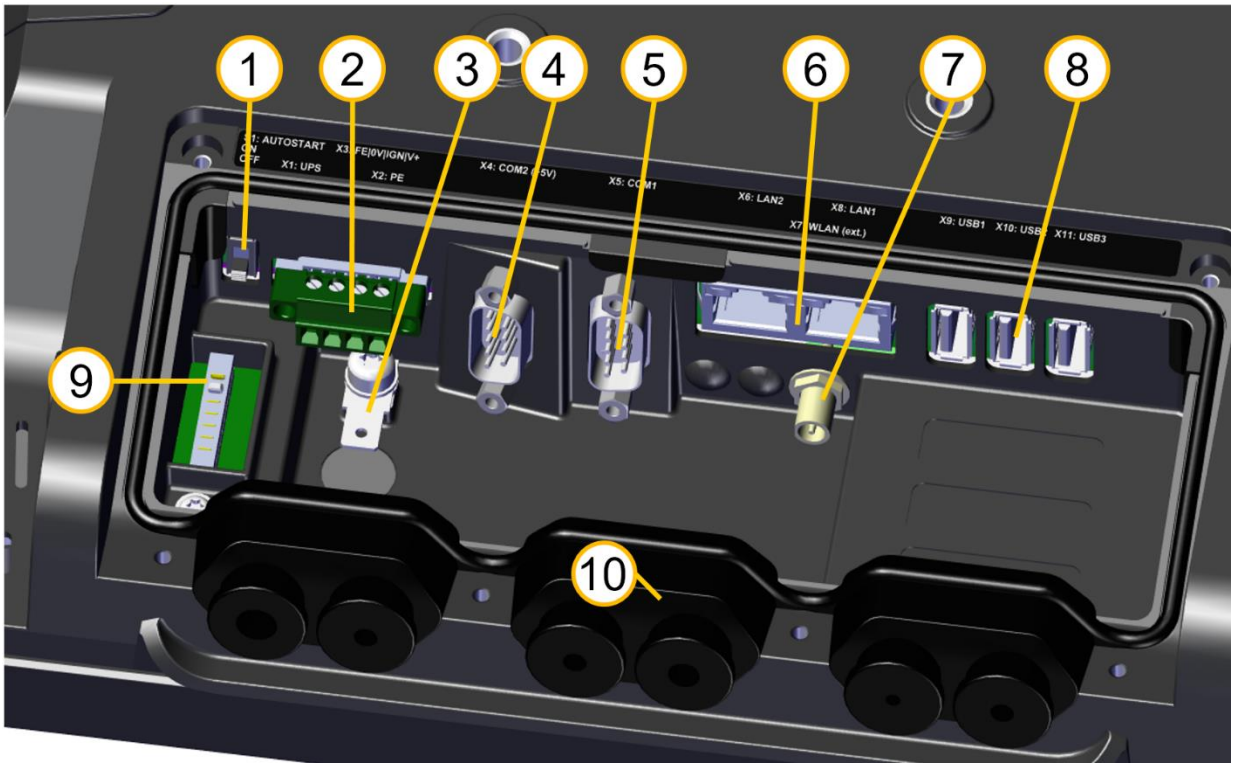
NOTE

The relevant safety measures must be observed at all times when handling electrostatically hazardous components. (DIN EN61340-5-1 / DIN EN 61340-5-2).

Remove the 6 screws of the service slot cover (see illustration, position 5) with a Torx Tx10 screwdriver.
Remove the service slot cover from the device.

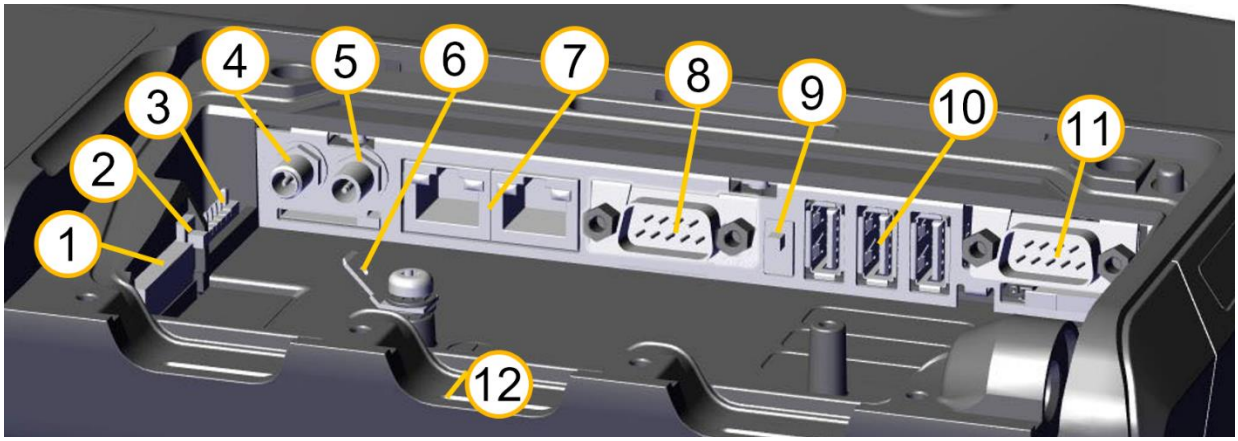
4.4 Interface Overview

4.4.1 WMT 210



No.	Description
1	Switch for autostart (OFF:ON) – standard: off
2	Power supply (PE – 0 VDC – Ignition - +12 to +48 VDC)
3	Grounding (PE) – 1,5mm² flat plug contact
4	COM2 (RS232)
5	COM1 (RS232) with optional 5V power supply on pin 9
6	2 x Ethernet 10/100/1000 Mbit RJ45
7	Connection socket (RP-SMA male) for external WLAN antenna (activated via configuration center)
8	3 x Type A USB 3.0
9	Connection for UPS (uninterruptible power supply)
10	Use grommets to ensure IP65 protection. The grommets have a slot on the side for inserting the cables. For strain relief, an additional cable tie can be attached over the corresponding opening on the outside. 

4.4.2 WMT 215

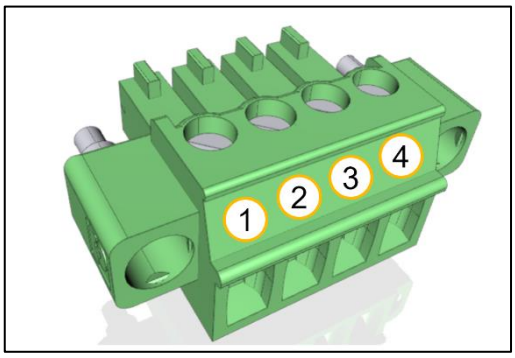


Nr.	Beschreibung
1	Power supply (PE – 0 VDC – Ignition - +12 to +48 VDC)
2	Switch for autostart (OFF:ON) – standard: off
3	Connection for UPS (uninterruptible power supply)
4	Optional: Connection socket (SMA female) for external GPS antenna
5	Connection socket (RP-SMA male) for external WLAN antenna (activated via configuration center)
6	Grounding (PE) – 1,5mm² flat plug contact
7	2 x Ethernet 10/100/1000 Mbit RJ45
8	COM1 (RS232) with optional 5V power supply on pin 9
9	Switch for power supply 5V on COM1
10	3 x Type A USB 3.0
11	COM2 (RS232)
12	Use grommets to ensure IP65 protection. The grommets have a slot on the side for inserting the cables. For strain relief, an additional cable tie can be attached over the corresponding opening on the outside. 

4.4.3 Power supply connector

The device is supplied with 12 V to 48 V DC via a 4-pole plug (Phoenix Contact MC 1.5/ 4-STF-3.81), depending on the version.

1. PE
2. 0 V DC
3. Ignition (+12 bis 48 V DC)
4. +12 bis 48 V DC



NOTE – PE Protective earth and fuse

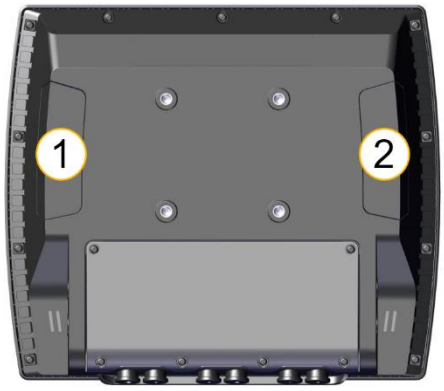
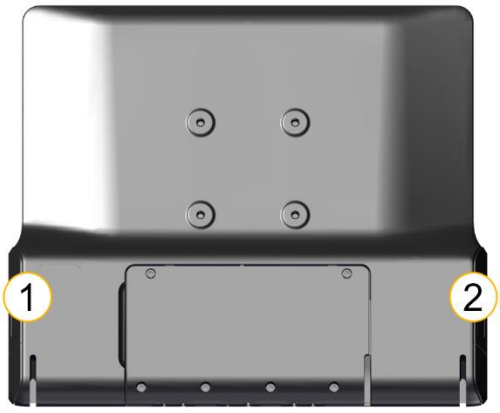
The protective earth conductor must always be attached.
Without a protective earth conductor, there is a risk of overvoltage on the device.
The power supply must be provided with a fuse:
7 A at 12 V DC; 4 A at 24 V DC; 2 A at 48 V DC.

4.4.4 Ignition (IGN)

The device starts automatically when the voltage is applied to the Ignition input.
The supply voltage must be constant. The permissible voltage at the IGN input corresponds to the supply voltage of the device.
Further reactions to state changes at the Ignition input can be defined in the corresponding module of the **Configuration Center**, see section 6.2.

4.5 Antennas WLAN and Bluetooth

The two antennas for 2.4 and 5 GHz WLAN and Bluetooth are protected behind the two plastic covers on the back of the device.
Avoid covering the antennas with metal parts during installation.

WMT 210	WMT 215
	

The option "external antenna" deactivates the internal antenna at the rear right (2) and offers it externally in the service slot via an R-SMA connector.

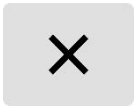
5. Start-up

After the device has been connected to the voltage source and the service slot has been closed again, the device can be put into operation.
When the device is switched on for the first time, it automatically starts the start-up wizard of the operating system.

To do this, press the power-on button on the front for approx. 1 second.

5.1 Front Keys

The front keys can be individually configured in the Configuration Center. They have the following functions ex-factory:

	Power button. To avoid unintentional actuation, press the button for at least 1 second.
FN	Shift key (Function) for the second keyboard level. The key is pressed, then the corresponding function key can be pressed.
	Standard: Cancellation of the respective action (ESC) FN: Decrease screen brightness
	Standard: Navigation up (arrow up) FN: Increase screen brightness
	Standard: Navigation down (arrow down) FN: Decrease volume
	Standard: Confirmation of the respective action (Enter) FN: Increase volume

Except for the FN key and the power button, all keys can be individually configured via the Configuration Center.

NOTE

The assignment of the front keys in the BIOS differs from that in the operating system. See chapter 8.

5.2 Users

There are 2 Users preset in the Windows operating system:

Login name: User
User group: Users
Password: user

Login Name: Admin
User Group: Administrators
Password: jhwmt

An autologon is activated for the user "User":

NOTE

Change Autologon:

To change the autologon user, e.g. after an Active Directory domain integration, the Autologon settings can be changed in the registry as follows:

Registry-Path	*[HKLM\Software\Microsoft\Windows NT\CurrentVersion\winlogon]*			
Name	**Type**	**Value**	**Default**	**Description**
AutoAdminLogon	REG_SZ	0 (off) / 1 (on)	1	Enable/disable automatic login
DefaultUserName	REG_SZ	<string>	user	User name for autologon
DefaultPassword	REG_SZ	<string>	user	password for autologon
DefaultDomainName	REG_SZ	<string>	<<leer>>	Domain name (if domain member)

5.3 Windows Setup Wizard

The Windows Setup Wizard is used for initial setup and is automatically executed when the device is started for the first time.

The following settings must be made:

- Language
- Region
- Keyboard layout
- Alternate keyboard layout
- Accept the Windows 10 licence agreement

After completing the wizard, 2 reboots are performed and the final configuration scripts are run.

5.4 Wizard Reset

With the script "reset_image_for_customer" in the path C:\Program Files\Jungheinrich\ResetImage, the Windows Setup Wizard can be reset and restarted.

5.5 Partitioning

The devices are always equipped with a 64GB eMMC mass storage and optionally with an additional 128GB SSD.

In the basic version, the 64 GB eMMC is partitioned as follows:

1. 37 GB - WINDOWS (C:)
2. 10 GB – DATA (D:)
3. 12 GB – Recovery partition
4. 0,25 GB – EFI system partition

In the version with an additional 128GB SSD, the following partitioning is carried out:

1. [eMMC] 0,25 GB – EFI system partition
2. [eMMC] 59 GB – WINDOWS (C:)
3. [SSD] 96 GB – DATA (D:)
4. [SSD] 32 GB - Recovery partition

5.6 Touch calibration

The touchscreens are controlled and configured with the driver integrated in Windows ("Tablet PC settings"). The calibration of the touch screen can also be achieved via the control panel ("Calibrate screen for pen and finger inputs").

5.7 UPS - Uninterruptible Power Supply (optional)

On request, the devices can be supplied with a buffer battery integrated in the service shaft cover. This buffer battery ensures the operability of the system in the event of short-term power failures. In the event of longer power failures, the system can be shut down automatically after saving the data.

Due to its limited capacity, the UPS battery is only suitable for bridging short-term power failures. Therefore, care should always be taken to keep the energy requirement low during battery operation.

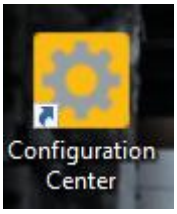
NOTE

Power failures during system updates can damage the operating system.
We strongly advise against installing programme updates or even system updates on battery power. Even if the system shuts down when battery capacity is critical, it cannot be guaranteed that updates have already been completely installed at this time.

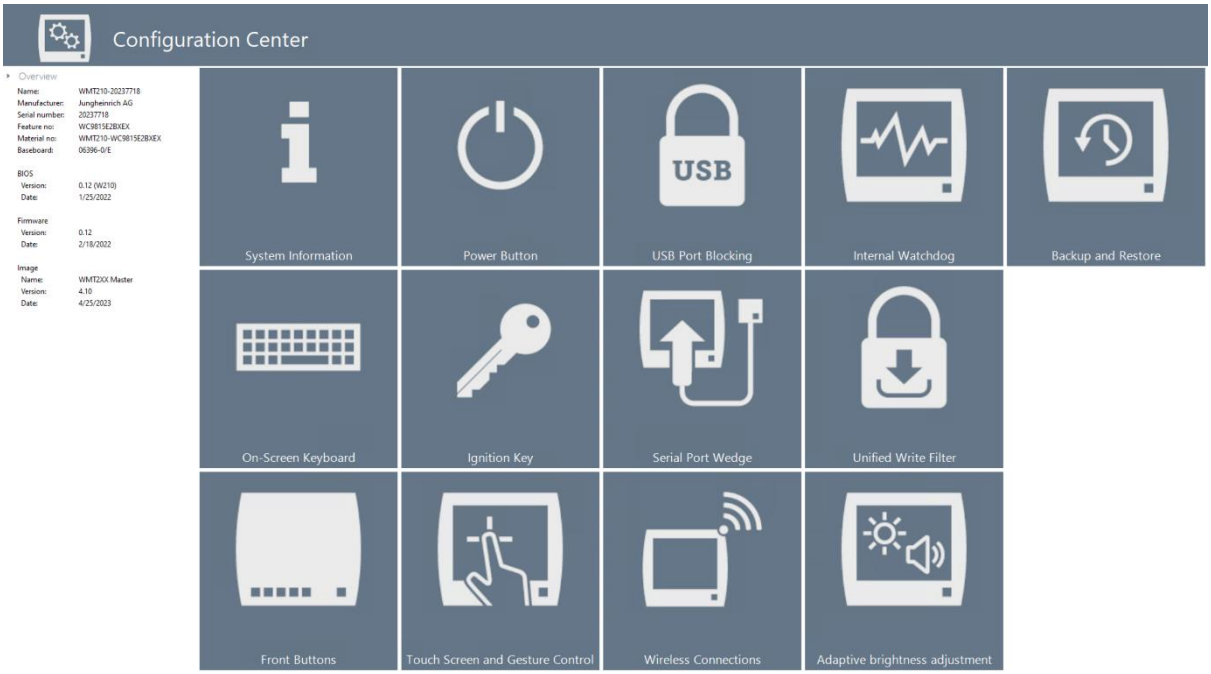
Configuration of the battery operation is done via the power settings of Windows 10.

6. Configuration Center

The **Configuration Center** is used to configure the device-specific settings. It can be started via the **Configuration Center** desktop icon.



Administrative rights are required to edit the settings.



The following chapters describe the individual menu items of the **Configuration Center**.
All settings must always be saved via the diskette symbol at the top right before they become active.

6.1 System Information

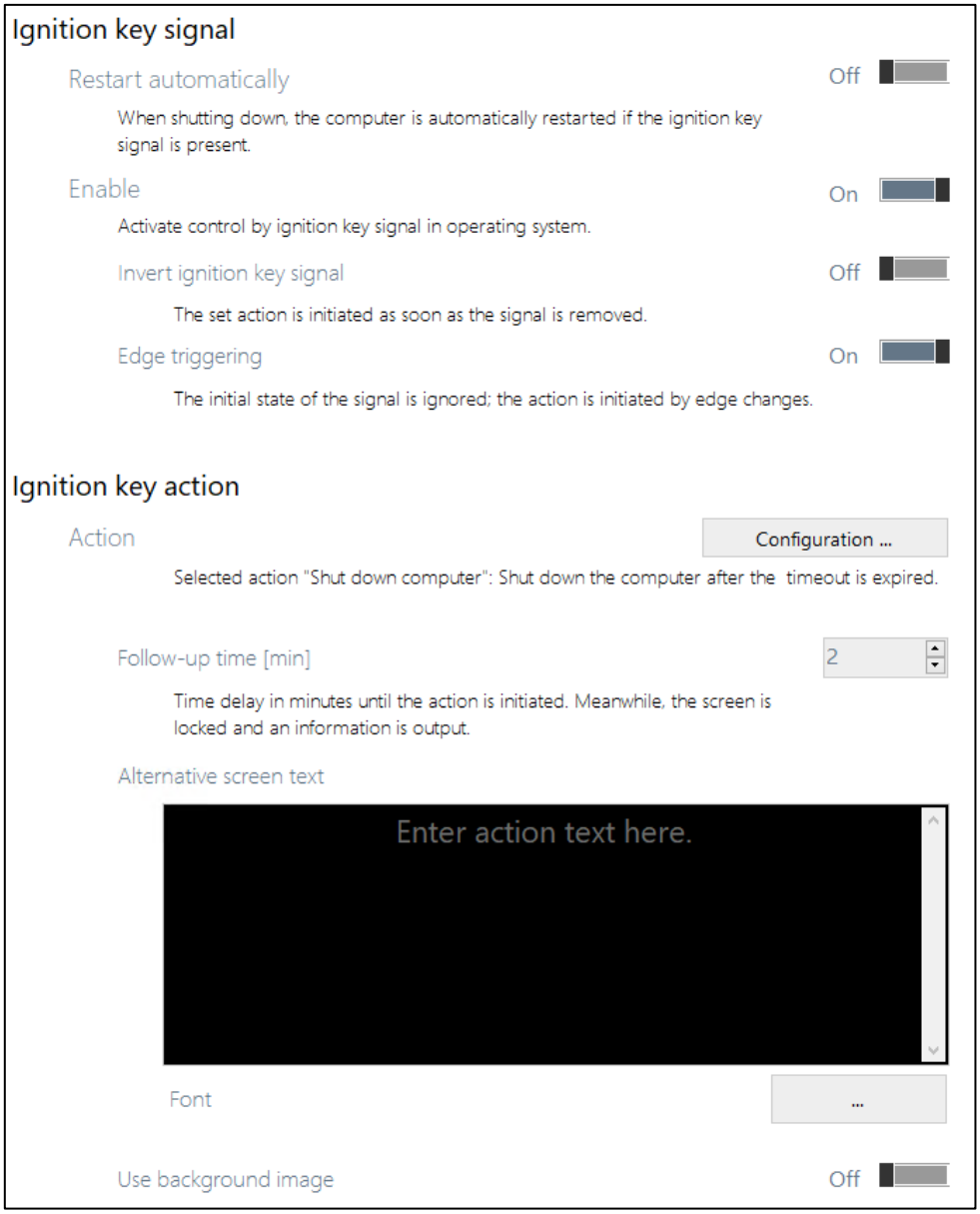
Displays detailed system-specific information, among other things:

- System overview
- BIOS version
- Serial number
- Model number
- Image version
- Network information
- Hardware information

6.2 Ignition Key

The device has the option of being started or locked by means of an additional signal input. The function serves to secure the system against unauthorised access and at the same time saves energy when used in battery-operated vehicles or mobile locations.

Applying a voltage to the enable contact when the vehicle is switched off causes the device to switch on automatically.

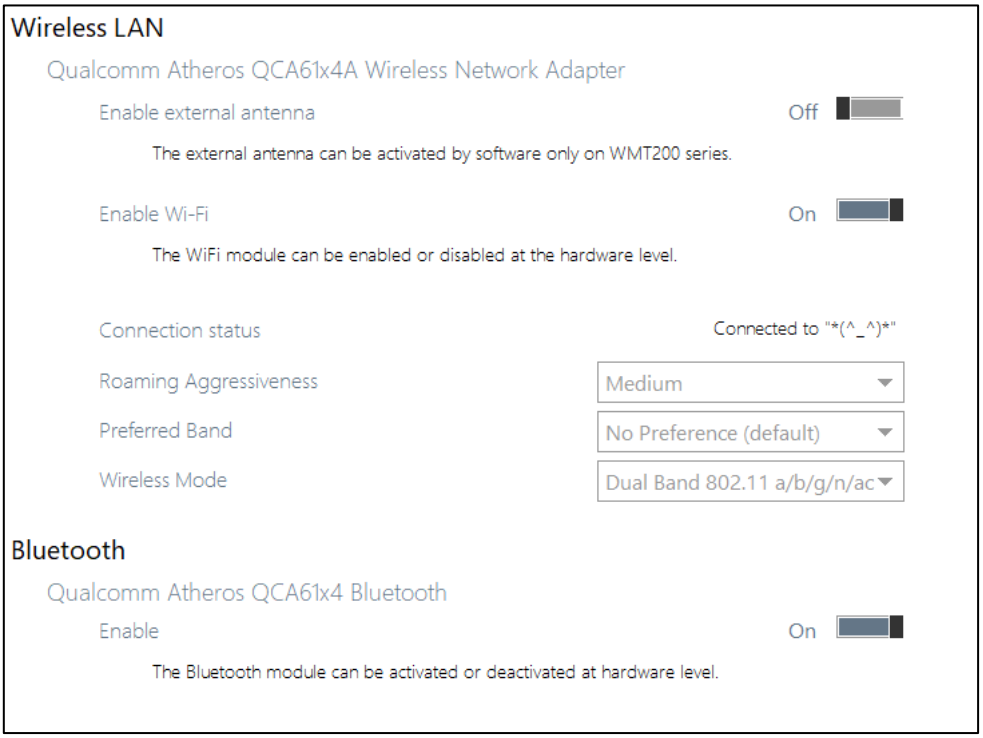


NOTE

If no ignition voltage is applied to the device, activating the ignition function may render the device unusable until appropriate wiring has been established.

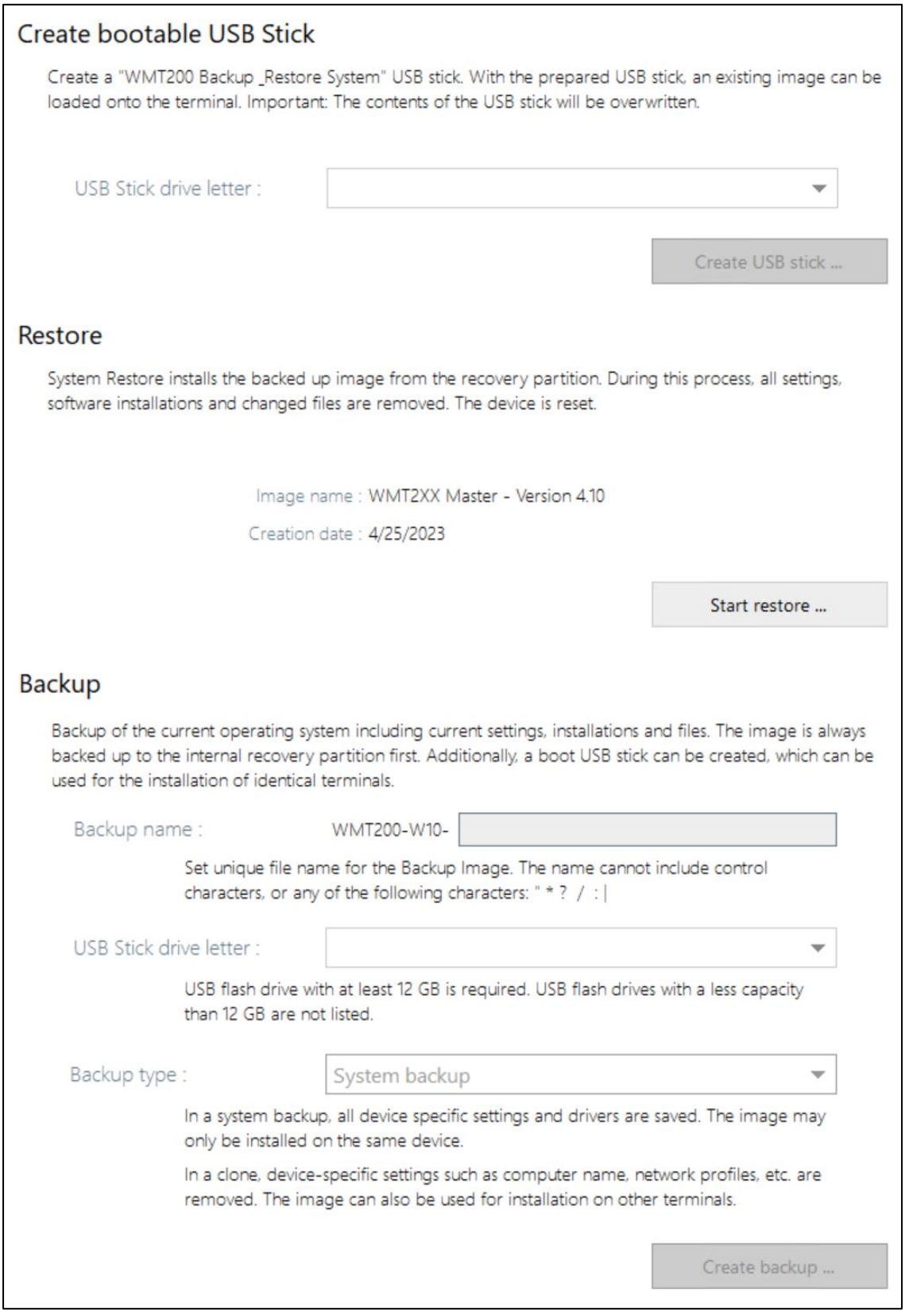
6.3 Wireless Connections

Configuration of the WLAN and Bluetooth radio modules.



6.4 Backup and Restore

Tools for backing up and restoring the operating system.



Further information and details in chapter 9. Installation, Backup and Restore.

6.5 On-Screen Keyboard

Tool for configuring the soft keyboard.

In addition to the on-screen keyboard integrated in Windows (osk.exe), another configurable on-screen keyboard is available.

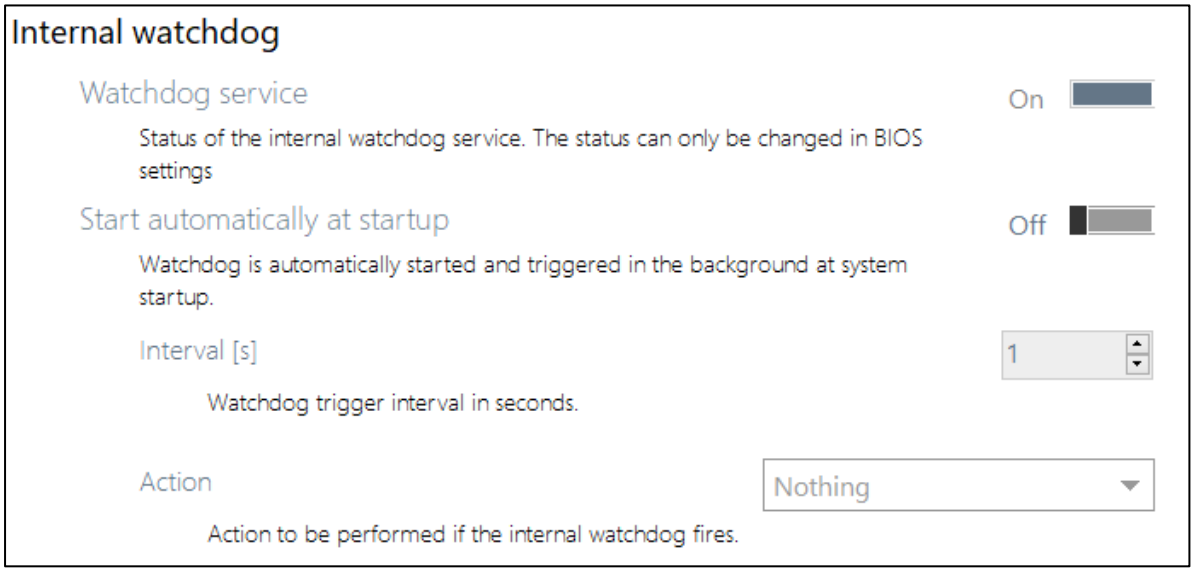
Standard layout of the on-screen keyboard:

The following settings, among others, can be made for the on-screen keyboard via the **Configuration Center**:

- Input language / keyboard layout (alphanumeric / numeric)
- Display (colours / transparency)
- Auto-hide after inactivity timeout (in seconds)

6.6 Internal Watchdog

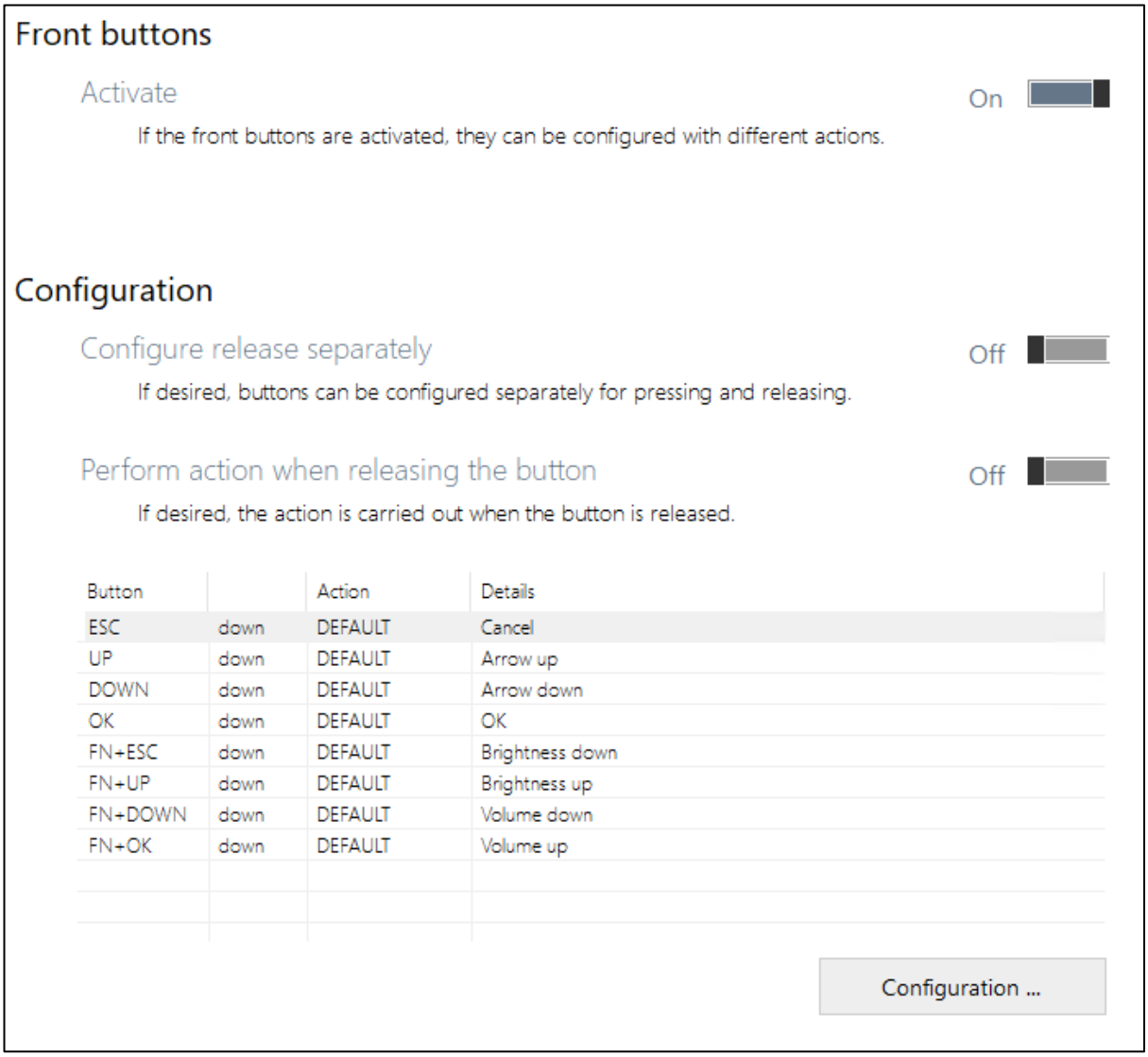
Configuration of the internal watchdog.



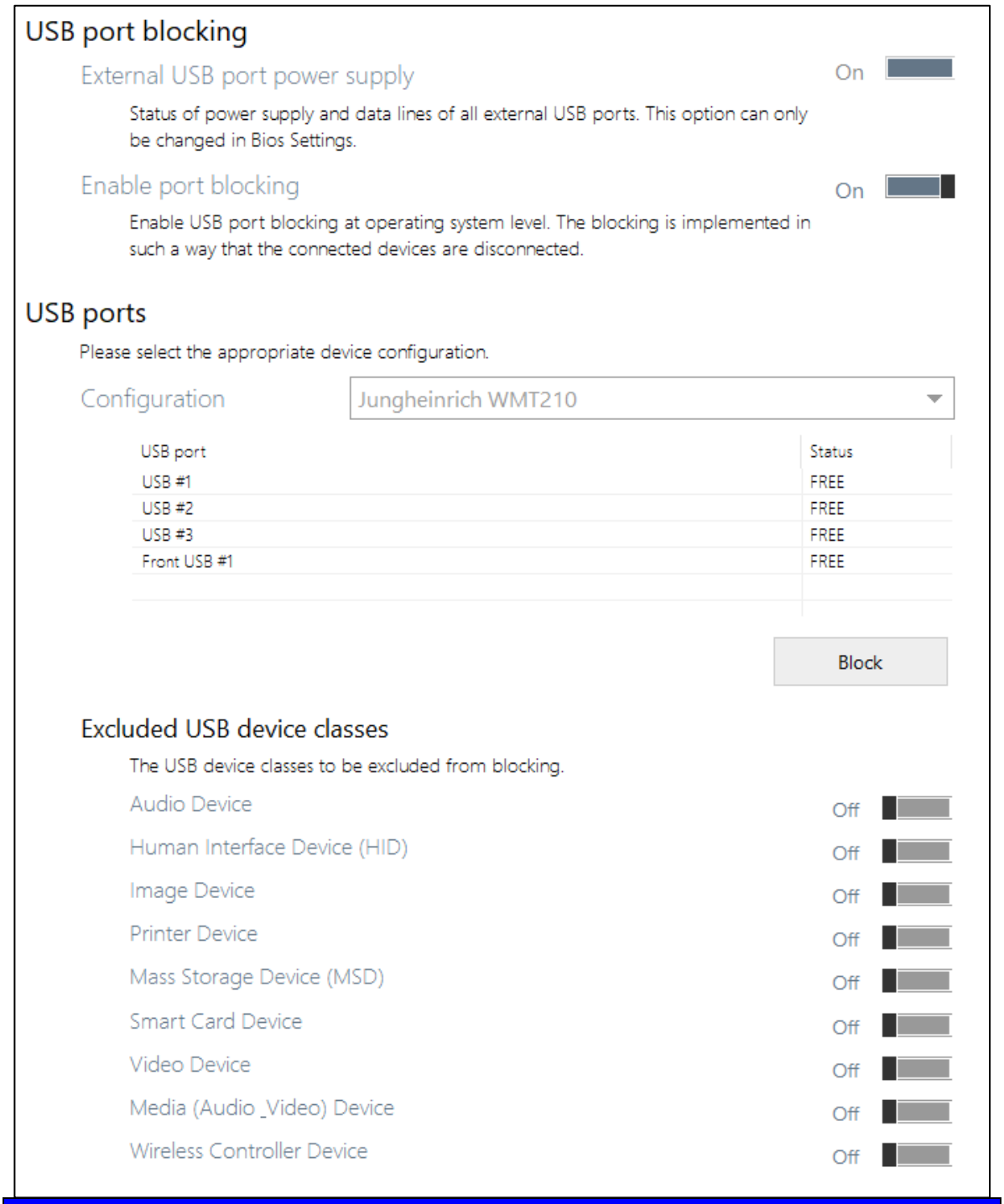
With the help of the watchdog, a "freeze" of the operating system can be detected and the system can react automatically with a restart or shutdown.

6.7 Front buttons

Configuration of the front buttons.



6.8 USB port blocking



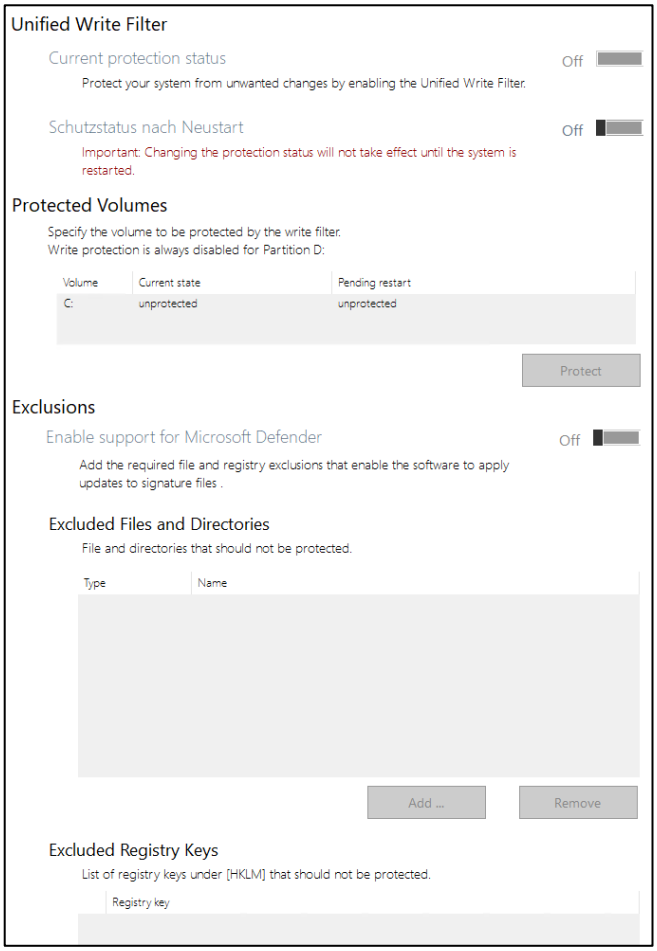
NOTE

Only the data connection is blocked. Charging of USB devices is still possible. Complete deactivation of the front USB port is possible via the BIOS.

To deactivate a USB port, mark the corresponding USB port and press the "Lock" button.

6.9 Unified Write Filter

UWF (Windows 10 IoT) is a Microsoft driver which, when activated (enabled), redirects all I/O operations on the hard disk and stores them in an intermediate cache in the working memory. If the device is restarted, all changes made in this cache are discarded. To permanently save changes to the device, the UWF must be disabled.



The write protection is only intended for the C:\ partition, the D:\ partition is always excluded from the write protection.
It is recommended to operate the device with the UWF enabled after final configuration to avoid unwanted configuration changes.

If automatic Windows updates are activated, the write protection must be deactivated accordingly to enable the installation of the updates.

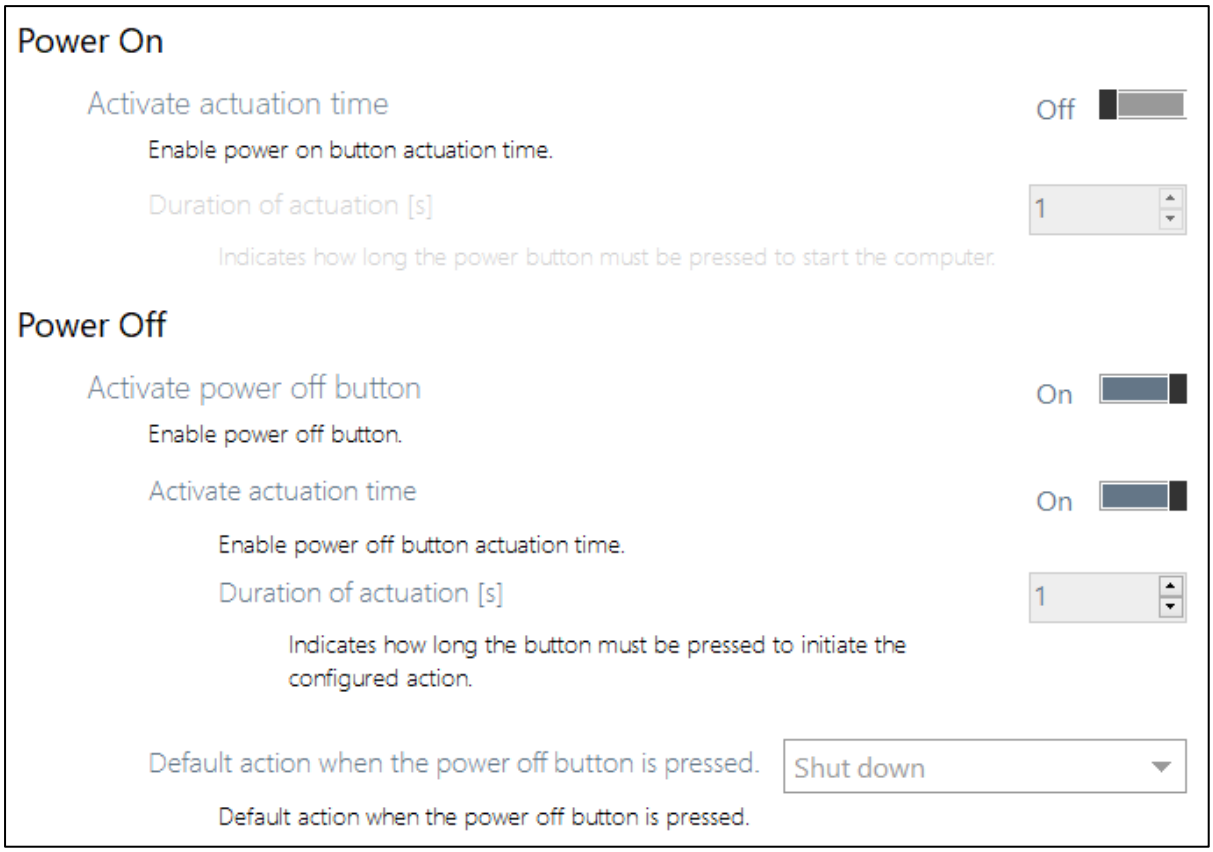
NOTE

The change of the Unified Write Filter status is only applied after a restart.

The current write protection status can be determined via the configuration menu or via the display on the desktop.

6.10 Power On / Power Off

Controls the behaviour when the power button is pressed.



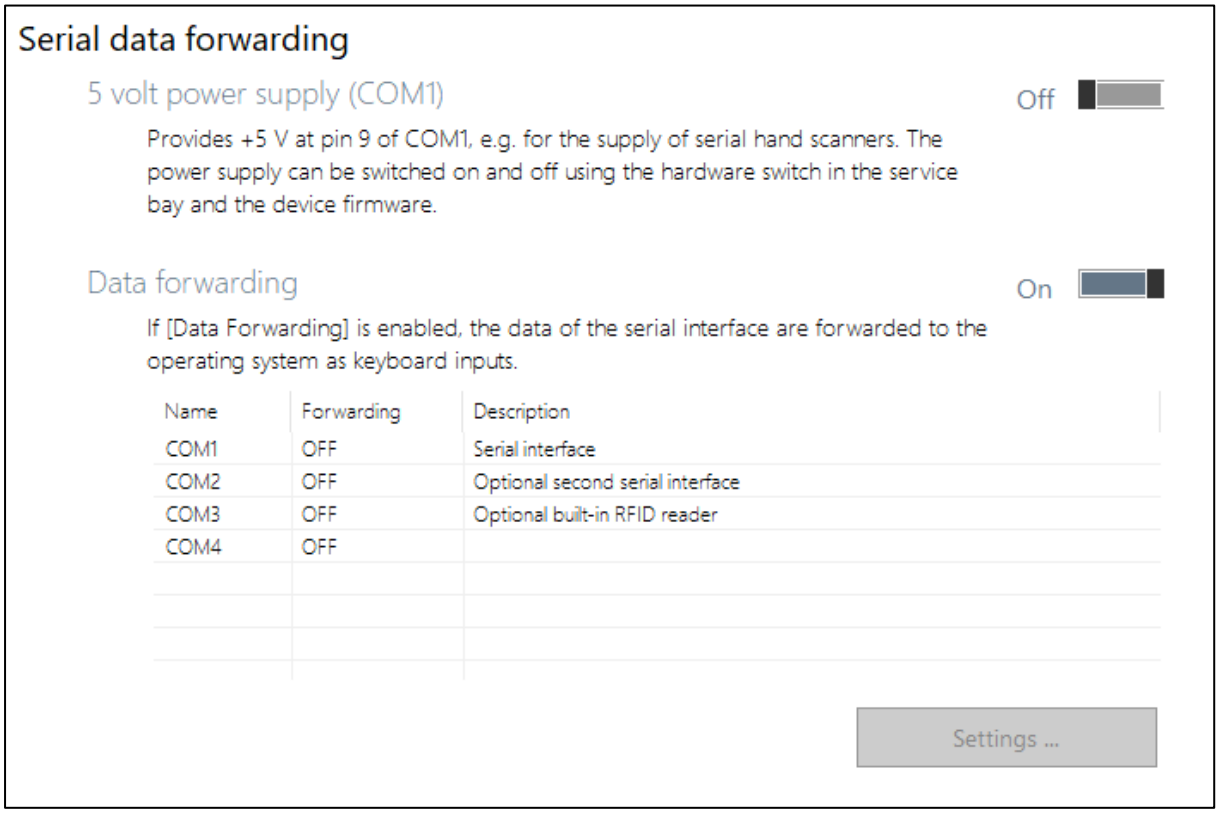
NOTE

If the power button is pressed for longer than 5 seconds, the device is switched off hard, regardless of the configuration.

These settings are permanently stored in the system controller of the device. Changing the power settings in the operating system for the power button has no effect on the behaviour.

6.11 Serial Port Wedge

The Serial Port Wedge Tool interprets all incoming data as keyboard entries via the selected COM port. Optionally, a pre- or postcode can be configured, which should be transmitted before or after the input. Application example: Barcode scanner with serial port.



NOTE

Note that only one process can access a COM port at a time.

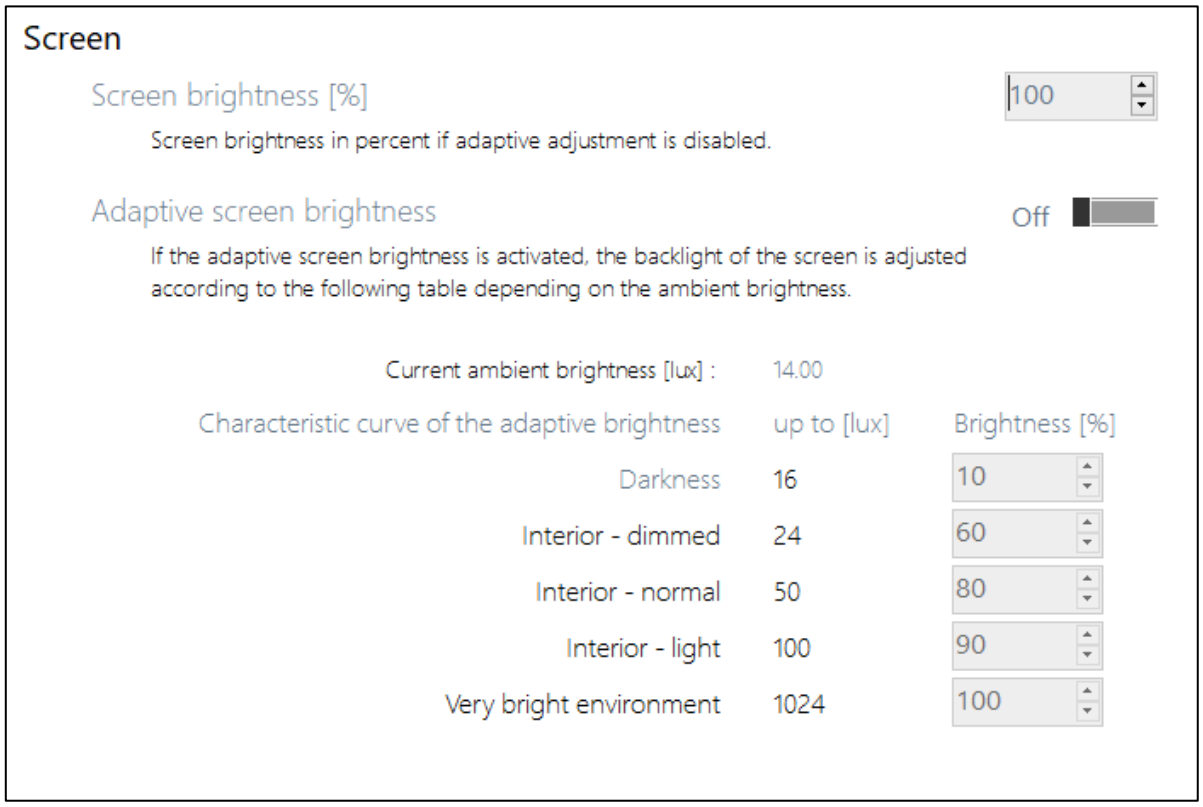
You can find a selection of possible pre- or postcodes in the following table:

Key	Code Syntax
BACKSPACE	{BACKSPACE}, {BS}, or {BKSP}
BREAK	{BREAK}
CAPS LOCK	{CAPSLOCK}
DEL or DELETE	{DELETE} or {DEL}
DOWN ARROW	{DOWN}
END	{END}
ENTER	{ENTER} or ~
ESC	{ESC}
HELP	{HELP}
HOME	{HOME}

INS or INSERT	{INS}
LEFT ARROW	{LEFT}
NUM LOCK	{NUMLOCK}
PAGE DOWN	{PGDN}
PAGE UP	{PGUP}
PRINT SCREEN	{PRTSC} (reserved for future use)
RIGHT ARROW	{RIGHT}
SCROLL LOCK	{SCROLL}
TAB	{TAB}
UP ARROW	{UP}
F1	{F1}
F2	{F2}
{VKEY X}	Sends the VKEY of value X. For example, {VKEY 13} is equivalent to VK_RETURN.
{BEEP X Y}	Beeps with a frequency of X and a duration of Y milliseconds.
{DELAY X}	Delays sending the next key of X milliseconds. After the delaying the following key, the subsequent keys will not be further delayed unless there is a default delay value (see DELAY=X). Example: {DELAY 1000} <-- delays subsequent key stroke for 1 second.
{DELAY=X}	Sets the default delay value to X milliseconds. This will cause every key to be delayed X ms. If a value is already set and you specify {DELAY Y} you will have your following key delay Y ms but the subsequent keys will be delayed X ms.
{APPACTIVATE WindowTitle}	Activates an application using is WindowTitle. Very useful if you want to send different keys to different applications.

6.12 Adaptive brightness and adjustment

Default values according to illustration.



7. Jungheinrich Image: Windows Standard 10 IoT Enterprise 2019/2021 LTSC

The following settings differ from the standard Windows configuration:

- Windows Remote Desktop (RDP) connections are activated for "Admin" and "User" users.
- Automatic Windows updates are deactivated, please deactivate the write protection (UWF) in any case before activating the updates.
- Windows Action Center messages have been deactivated.
- Windows Firewall enabled, but exceptions for ICMP and Remote Desktop enabled.
- AutoPlay options have been deactivated.
- Enabled the display of file extensions.
- Power options were adjusted for continuous operation and UPS operation.
- Internet Explorer start page: https://support-rdt.jungheinrich.com
- All symbols and icons are displayed in the info area.

7.1 Windows Updates

Automatic Windows updates are deactivated by default. It is recommended (even when used in isolated networks with write protection activated) to install the monthly updates.
To do this, the write protection must be deactivated and then a manual search for updates must be carried out via "Windows Update". The write protection can then be reactivated.

7.2 Pre-installed third-party software

The following software is preinstalled on the machine:

Name	Developer	Function
Sumatra PDF (only W10 2019)	Krzysztof Kowalczyk	Display of PDF files
Intel Wireless Driver	Intel	WLANdriver and configuration
Microsoft .Net Framework 4.8	Microsoft	.Net Framework runtime environment
WMT200 Device Tools	Jungheinrich	Configuration Center

8. BIOS

NOTE

The BIOS setup menu, as well as the BIOS one-time boot menu, is secured with the standard BIOS administrator password "jhwmt".

To start the BIOS setup menu, please press the DEL key (external keyboard) directly after switching on the device.

The One-Time-Boot menu can be opened via the ESC key (external keyboard) or via the "X" front key when the Jungheinrich boot logo is displayed:

"Enter Setup" starts the BIOS setup menu.

8.1 Navigation in BIOS

NOTE

The assignment of the front keys in the BIOS differs from that in the operating system.

FN	Shift key (Function) for the second keyboard level. The key is pressed, then the corresponding function key can be pressed.
✕	Standard: Cancellation of the respective action (ESC) FN: No function
⇧	Standard: Navigation up (arrow up) FN: Switching the tab to the left
⇩	Standard: Navigation down (arrow down) FN: Switching the tab to the right
✓	Standard: Confirmation of the respective action (Enter) FN: Increase volume

8.1.1 Activating/deactivating interfaces

The setup menu allows you to configure performance, hardware and interface properties. The settings are adjusted to the device ex works and should only be changed by experienced users.
The following menu paths can be used to activate / deactivate selected interfaces:

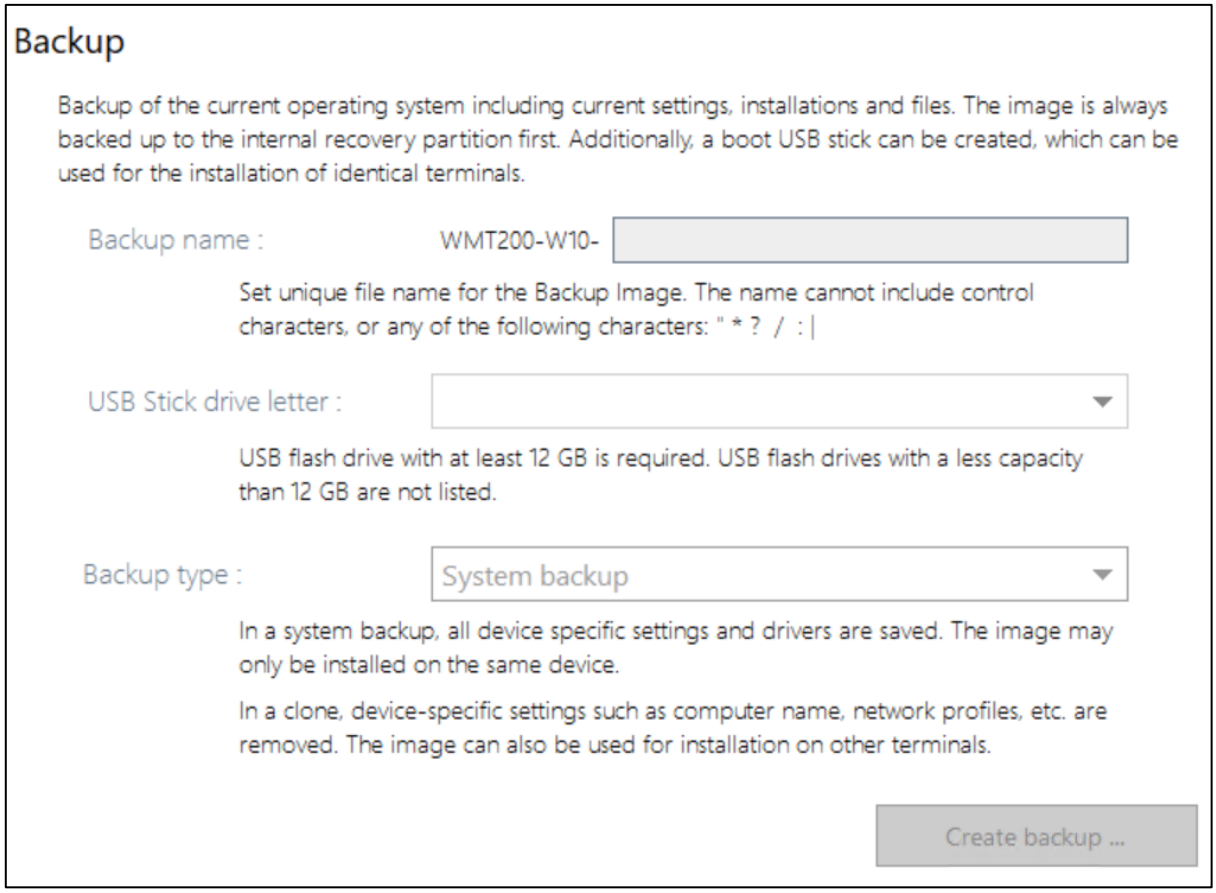
Interface	Menu	Default
PXE-Boot	System Settings → Network Stack Configuration Boot → Network Stack Driver Support	Disabled Disabled
Front USB	System Settings → Front USB	Enabled
3 USB 3.0	System Settings → M.2 Slot 3 USB3	Enabled

9. Installation, Backup and Restore

The WMT 2XX vehicle terminals offer various options for backing up, restoring and reinstalling the Windows operating system.

9.1 Backup

In the "Backup and Restore" area of the Configuration Centre, a system backup or clone image can be created via the "Create Backup..." button.
In both cases, a copy of the backup image is first saved on the local restore partition.



The image is stored as install*.swm in the folder image/"name of the backup" on the target drive.

9.2 Restore

There are 2 options available to reset the operating system to the factory settings or to a saved backup state (see previous chapter):

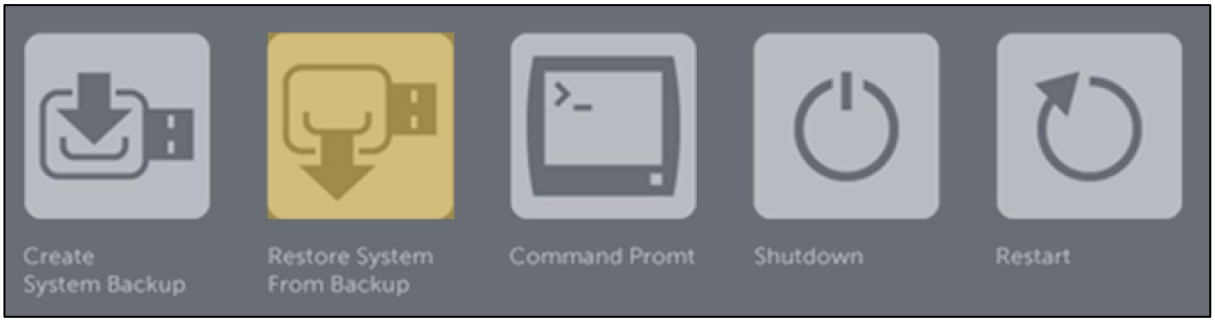
9.2.1 Restore from Windows

In the "Backup and Restore" area in the configuration center, the image stored on the recovery partition can be installed via the "Start Restore..." button:

9.2.2 Restore from boot menu (at least Image V4.1)

Connect a keyboard before switching on the device.
Power on the device, start the One-Time-Boot menu using the "ESC" key (alternatively front key "X") and enter the admin password jhwmt.
In the menu "Please select boot device" that appears, select the option "Backup and Restore System" with the arrow keys and confirm with Enter.

Then select the option "Restore System from Backup" by touching it.



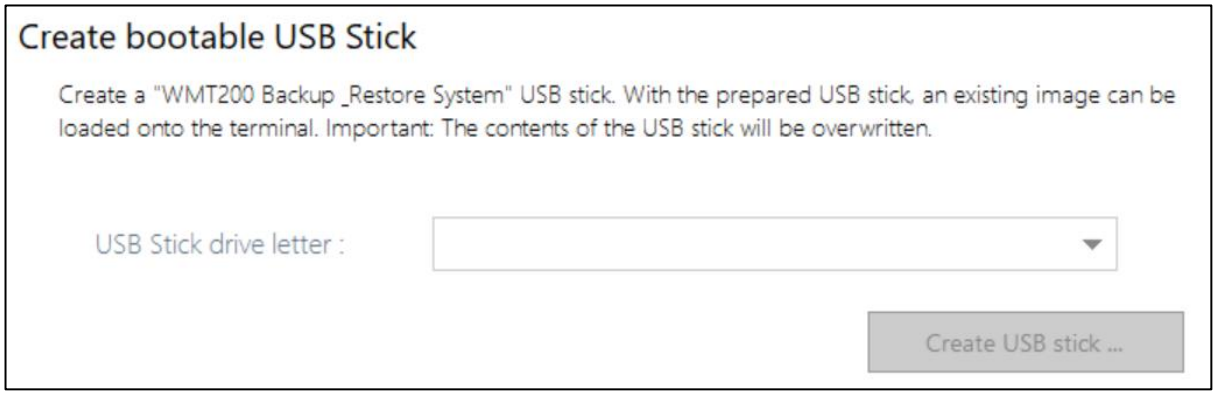
9.3 Installation with USB-Stick

9.3.1 Rquirments

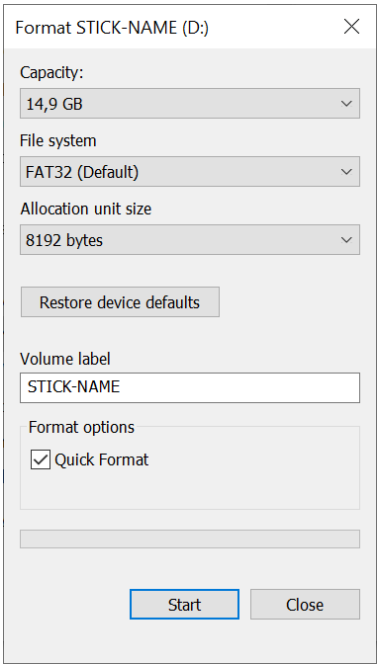
- USB stick with 16 or 32 GB storage space.
- Either
  - WMT 2XX with Jungheinrich Configuration Center at least v1.12.127
- Oder
  - PC with Microsoft Windows 10 (oder höher)
- WinPE boot environment for WMT 2XX (please contact LS-Support-Interfaces@jungheinrich.de)

9.3.2 Create the bootable USB-Stick from configuration center

In the "Backup and Restore" area in the Configuration Centre, a bootable USB stick can be created via the "Create USB stick..." button.



9.3.3 Create the bootable USB-Stick with a PC



- - Format the USB stick with Windows standard tool with FAT32 (see illustration on the right).
- - Copy the WinPE boot environment to the stick.
- - Copy the image to be installed (install*.swm) into the Image directory on the USB stick.

9.3.4 Save the image on the bootable USB-Stick

The image to be installed must be stored on the boot stick in the directory "image" with the name "install*.swm".
The image is divided into several files because of the FAT32 file system:

- install.swm
- install2.swm
- installx.swm

9.3.5 Installation from USB-Stick

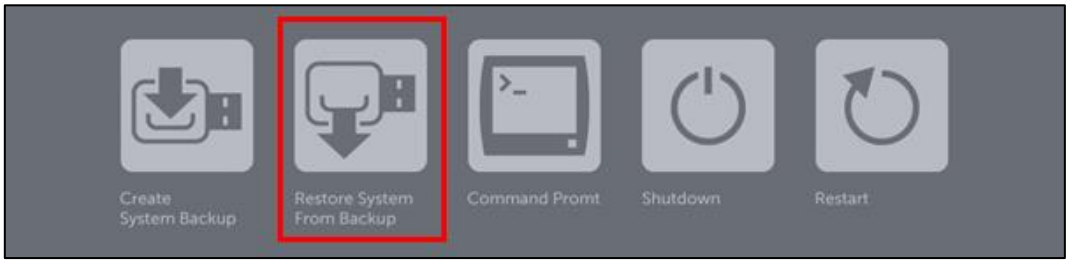
Before switching on the device, connect the boot USB stick and a keyboard. Please note that the rear USB 3.0 ports offer faster data transfer compared to the front USB 2.0 port.
Switch on the unit, start the One-Time-Boot menu by pressing the "ESC" key (alternatively front key "X") and enter the admin password jhwmt.

In the menu "Please select boot device" that appears, select the USB stick using its type identification with the arrow keys and confirm with Enter.

NOTE

At the time of the new installation, only the boot USB stick should be connected to the unit. Do not use a USB hub, but connect the boot USB stick directly to one of the available USB interfaces.

The device loads the setup files of the USB stick and starts the "Backup and Restore System" tool. Continue with the desired installation.



After pressing the button, a command line window opens automatically, which carries out the reinstallation of the unit. The progress is displayed during the installation.

10. Change history

Date	Description	Version
30.05.2022	First Version	1.0
24.05.2023	Update for Image Version 4.1	1.1