WAGO TECHDOCS

Manual

WAGO Edge Computer

752-9412

Version 1.0.0

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Every conceivable measure has been taken to ensure the accuracy and completeness of this documentation. However, as errors can never be fully excluded, we always appreciate any information or suggestions for improving the documentation.

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Table of Contents

1 Regulations

The WAGO product shall only be installed and operated according to the instructions in this documentation.

Note

Always retain this documentation!
This documentation is part of the product. Therefore, retain the documentation during the entire service life of the product. Pass on the documentation to any subsequent user. In addition, ensure that any supplement to this documentation is included, if necessary.

1.1 Validity of this Documentation

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1.4 Symbols

⚠ DANGER

Personal Injury!
Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ DANGER

Personal Injury Caused by Electric Current!
Indicates a high-risk, imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Personal Injury!
Indicates a moderate-risk, potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Personal Injury!
Indicates a low-risk, potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTICE

Damage to Property!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

NOTICE

Damage to Property Caused by Electrostatic Discharge (ESD)!
Indicates a potentially hazardous situation which, if not avoided, may result in damage to property.

Note

Important Note!
Indicates a potential malfunction which, if not avoided, however, will not result in damage to property.

Information

Additional Information:
Refers to additional information which is not an integral part of this documentation (e.g., the Internet).

1.5 Number Notation

Table 1: Number Notation

Number Code	Example	Note
Decimal	100	Normal notation
Hexadecimal	0x64	C notation
Binary	'100' '0110.0100'	In quotation marks, nibble separated with dots (.)

1.6 Font Conventions

Table 2: Font Conventions

Font Type	Indicates
italic	Names of paths and data files are marked in italic-type. e.g.: *C:\Program Files\WAGO Software*
Menu	Menu items are marked in bold letters. e.g.: **Save**
>	A greater-than sign between two names means the selection of a menu item from a menu. e.g.: **File** > **New**
Input	Designation of input or optional fields are marked in bold letters, e.g.: **Start of measurement range**
“Value”	Input or selective values are marked in inverted commas. e.g.: Enter the value “4 mA” under **Start of measurement range**.
[Button]	Pushbuttons in dialog boxes are marked with bold letters in square brackets. e.g.: **[Input]**
[Key]	Keys are marked with bold letters in square brackets. e.g.: **[F5]**

1.7 Legal Bases

1.7.1 Subject to Changes

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1.7.2 Personnel Qualification

All sequences implemented on Series 752 devices may only be carried out by electrical specialists with sufficient knowledge in automation technology. These specialists must be familiar with the current standards and guidelines for the devices and the automated environments.

1.7.3 Intended Use

The Edge Computer is suitable for use in the area of control and automation. Its use extends industrial areas. Technical data must be observed for all types of applications.

The product is an open system and is designed for installation in an additional enclosure.
This product fulfills the requirements of protection type IP40 and is designed for use in dry indoor spaces.

1.7.3.1 Improper Use

Improper use of the product is not permitted. Specifically, improper use occurs in the following cases:

- Non-observance of the intended use.
- Use without protective measures in an environment in which moisture, salt water, salt spray mist, dust, corrosive fumes, gases, direct sunlight or ionizing radiation can occur.
- Use of the product in areas with special risk that require flawless continuous operation and in which failure or operation of the product can result in an imminent risk to life, limb or health or cause serious damage to property or the environment (such as the operation of nuclear power plants, weapon systems , aircraft and motor vehicles).

1.7.3.2 Warranty and Liability

The terms set forth in the General Business & Contractual Conditions apply to deliveries and services of WAGO GmbH & Co. KG, and the WAGO Software

License Contract applies to software products and products with integrated software. Both are available at www.wago.com. In particular, the warranty is void if:

- The product is improperly used.
- The deficiency (hardware and software configurations) is due to special instructions.
- Modifications to the hardware or software have been made by the user or third parties that are not described in this documentation and that has contributed to the fault.

Individual agreements always have priority.

1.7.3.3 Obligations of Installers/Operators

The installers and operators bear responsibility for the safety of an installation or a system assembled with the products. The installer/operator is responsible for proper installation and safety of the system. All laws, standards, guidelines, local regulations and accepted technology standards and practices applicable at the time of installation, and the instructions in the the products' Instructions for Use, must be complied with. In addition, the Installation regulations specified by Approvals must be observed. In the event of non-compliance, the products may not be operated within the scope of the approval.

2 Safety Information

2.1 Safety Advice (Precautions)

This section includes an overall summary of the most important safety requirements and notes that are mentioned in each individual section. To protect your health and prevent damage to devices as well, it is imperative to read and carefully follow the safety guidelines.

For installing and operating purposes of the relevant device to your system the following safety precautions shall be observed:

DANGER

Do not work when devices are energized!
High voltage can cause electric shock or burns.
Always disconnect the power supply from those parts of the system on which you wish to mount or remove the device!

DANGER

Ensure a standard connection!
To minimize any hazardous situations resulting in personal injury or to avoid failures in your system, the data and power supply lines shall be installed according to standards, with careful attention given to ensuring the correct terminal assignment. Always adhere to the EMC directives applicable to your application.

NOTICE

Consider the IP protection type!
The device is an open unit is IP40 protected. If the operating environment does not fulfill these requirements you have to install the device into cabinet resp. housing.

NOTICE

Replace defective or damaged devices!
Replace defective or damaged device/module (e.g., in the event of deformed contacts).

NOTICE

Protect the components against materials having seeping and insulating properties!
The components are not resistant to materials having seeping and insulating properties such as: aerosols, silicones and triglycerides (found in some hand creams). If you cannot exclude that such materials will appear in the component environment, then install the components in an enclosure being resistant to the above-mentioned materials. Clean tools and materials are imperative for handling devices/modules.

NOTICE

Clean only with permitted materials!
Clean housing and soiled contacts with propanol.

NOTICE

Do not use any contact spray!
Do not use any contact spray. The spray may impair contact area functionality in connection with contamination.

NOTICE

Do not use in telecommunication circuits!
Only use devices equipped with ETHERNET or RJ-45 connectors in LANs. Never connect these devices with telecommunication networks.

NOTICE

Remove USB mass storage devices when not in use!
Removing a USB mass storage device during operation can lead to data loss. Only remove USB mass storage devices from the product when it is not in use.

NOTICE

Avoid electrostatic discharge!
The devices are equipped with electronic components that may be destroyed by electrostatic discharge when touched. Please observe the safety precautions against electrostatic discharge per DIN EN 61340-5-1/-3. When handling the devices, please ensure that environmental factors (personnel, work space and packaging) are properly grounded.

2.2 Special Use Conditions

If not otherwise specified, ETHERNET devices are intended for use on local networks. Please note the following when using ETHERNET devices in your system:

- Do not connect control components and control networks to an open network such as the Internet or an office network. WAGO recommends putting control components and control networks behind a firewall.
- In the control components (e.g., for CODESYS) close all ports and services not required by your application to minimize the risk of cyber attacks and to enhance cyber security.
  Only open ports and services during commissioning and/or configuration.
- Limit physical and electronic access to all automation components to authorized personnel only.
- Change the default passwords before first use! This will reduce the risk of unauthorized access to your system.
- Regularly change the passwords used! This will reduce the risk of unauthorized access to your system.
- Regularly perform threat analyses. You can check whether the measures taken meet your security requirements.
- Use “defense-in-depth” mechanisms in your system's security configuration to restrict the access to and control of individual products and networks.

Note

Please note the risks of using cloud services!
If you use third-party cloud services, sensitive data is transferred to the cloud service provider at one's own responsibility. External access may result in manipulated data and/or unwanted control commands affecting the performance of your control system.

Use encryption methods to protect your data and observe the information provided by the Federal Office for Information Security – “Cloud: Risks and Security Tips”.
Observe comparable publications of the competent, public institutions of your country.

3 Overview

The Edge Computer is a wireless and fanless automation computer that can handle control, monitoring and communication tasks. The product is suitable for DIN-rail mounting and is characterized by its various interfaces. The product can be used for applications in mechanical and systems engineering, in the processing industry and in building technology.

4 Properties

4.1 View

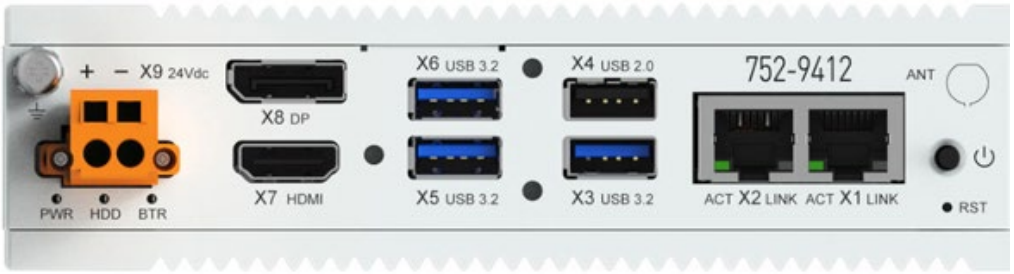

Figure 1: Front view

The connectors are located on the **front**. For details, see section “Properties” > “Connectors.”

4.2 Labeling

The type plate is attached on the bottom side.

Table 3: Type Plate

Field	Example
Article number	752-9400
Supply voltage	10 … 36 VDC, 4 A
MAC address	X1: 00:30:DE:46:F6:A7 X2: 00:30:DE:46:F6:A8
Serial number	TPAC211489
Release indexes (2 digits each, “00” = not available): 1. Calendar week, 2. Year, 3. Firmware version, 4. Hardware version, 5. BIOS/UEFI version	2520010100

Figure 1: Type plate (Example)

4.3 Connectors

4.3.1 Connectors on the front

Table 4: Connectors on the front

Connector	Function
X1, X2	ETHERNET Interface with LED
X3, X5, X6	USB 3.2 Interface
X4	USB 2.0 Interface
X7	HDMI 1.4 Interface
X8	DisplayPort 1.4 Interface
X9	POWER. Power supply

4.3.2 “X1” and “X2” ETHERNET Interfaces

The ETHERNET interfaces are RJ-45 ports. The orange LED illuminates when there is a LINK and the green one blinks during data transfer.

The connectors and cables meet category 5e requirements and guidelines for ETHERNET interfaces.

The integrated 10/100/1000 Mbit ETHERNET switch supports Auto-MDI(X). A crossover or patch cable can be used.

4.3.3 “X3”, “X5” and “X6” USB 3.2 Interfaces

The USB 3.2 host interfaces are designed with 4-pin type A sockets. Each interface can supply max. 900 mA.

The connectors comply with the USB 3.2 Gen 2 specification.

Keyboards or mice can be connected as alternative input devices or USB memory devices. The interfaces are designed for plug-and-play and the USB devices can be connected / disconnected during operation.

Table 5: Pin Assignment“ USB 3.2 Interface

Pin	Description	Assignment
1	VBUS	Power
2	D–	USB 2.0 differential pair
3	D+	USB 2.0 differential pair
4	GND	Ground for power return
5	StdA_SSRX–	Super Speed receiver differential pair
6	StdA_SSRX+	Super Speed receiver differential pair
7	GND_DRIAN	Ground for signal return
8	StdA_SSTX–	SuperSpeed transmitter differential pair
9	StdA_SSTX+	SuperSpeed transmitter differential pair

4.3.4 “X4” – USB 2.0 Interface

The USB 2.0 host interface is designed as a TYPE A socket. The interface can supply max. 500 mA.

The port complies with the USB 2.0 specification.

Keyboards or mice can be connected as alternative input devices or USB mass storage devices.

4.3.5 “X7” – HDMI 1.4 Interface Type A

HDMI stands for “High Definition Multimedia Interface” and is a standard for the simultaneous transmission of picture and sound using just one cable. The Edge Computer can be connected to a monitor via HDMI. The maximum resolution is 3840 x 2160 Pixel at 30 Hz.

Table 6: Pin Assignment HDMI 1.4 Interface

Pin	Description
1	TMDS data2+
2	TMDS data2 shield
3	TMDS data2–
4	TMDS data1+
5	TMDS data1 shield
6	TMDS data1–
7	TMDS data0+
8	TMDS data0 shield
9	TMDS data0–
10	TMDS clock+
11	TMDS clock shield
12	TMDS clock–
13	CEC
14	Reserved, HEC data+ (HDMI 1.4)
15	SCL
16	SDA
17	DDC/CEC/HEC ground
18	+5 V Power
19	Hot plug detect, HEC data- (HDMI 1.4)

4.3.6 “X8” DP 1.4 Interface

The DisplayPort interface of the Edge Computer is used to connect a monitor. The maximum resolution is 4096 x 2160 Pixel at 60 Hz.

Table 1: Pin Assignment DP 1.4 Interface

Pin	Description
1	ML_Lane 0 (p)
2	GND
3	ML_Lane 0 (n)
4	ML_Lane 1 (p)
5	GND
6	ML_Lane 1 (n)
7	ML_Lane 2 (p)
8	GND
9	ML_Lane 2 (2)
10	ML_Lane 3 (p)
11	GND
12	ML_Lane 3 (n)
13	CONFIG1
14	CONFIG2
15	AUX CH (p)
16	GND
17	AUX CH (n)
18	Hot plug
19	Return
20	DP-PWR

4.3.7 “X9” Supply Voltage

The supply voltage of 10… 36 V is connected here. To do so, use the included connector with Item No. 231-302/107-000.

Table 7: Pin Assignment Supply Voltage

Pin	Description	Assignment
1	In V+	10 … 36 V_{DC}
2	In V– (GND)	

4.4 RTC Battery

The RTC battery (RTC = **R**eal **T**ime **C**lock) type BR2032, 3 VDC, is installed internally and not accessible. The RTC battery ensures that the system clock and BIOS settings are retained even after power interruptions.

4.5 Display Elements

There are three LEDs at the bottom right on the front of the product.

4.5.1 PWR LED

The PWR LED indicates whether the supply voltage is present and whether the product has booted.

Table 8: PWR LED

LED Display	Meaning
Orange	Supply voltage available
Green	System restarted

4.5.2 HDD LED

The HDD LED indicates read / write access to the flash memory or to an additional SSD.

Table 9: HDD LED

LED Display	Meaning
Green	Write / read access available

4.5.3 BTR LED

The BTR LED shows the status of the BR2032 RTC battery.

Table 10: BTR LED

LED Display	Meaning
Red	Replace battery.

4.6 Operating Elements

4.6.1 ON/OFF Button

The ON/OFF button can be used to switch the product on and off. The button can be configured in the BIOS or using a DIP switch PSON2 on the motherboard so that the product is automatically switched on when power is available (AT mode).

Option 1: Configuration in the BIOS

Chipset → PCH-IO Configuration → Restore AC Power Loss

Restore AC power loss
- Power on = AT mode
- Power off = ATX mode
- Last State (default)

Option 2: Configuration with a DIP switch PSON2

- 1-2 = AT mode
- 2-3 = ATX mode (default)

4.6.2 Reset Button

The Reset button is installed behind drilling to prevent operating errors. It is a shortstroke button with a low actuating force of 1.1 … 2.1 N (110 … 210 gf). The button can be actuated using a suitable object (e.g., pen).

You can perform a hardware reset with the reset button.

4.7 Schematic Diagram

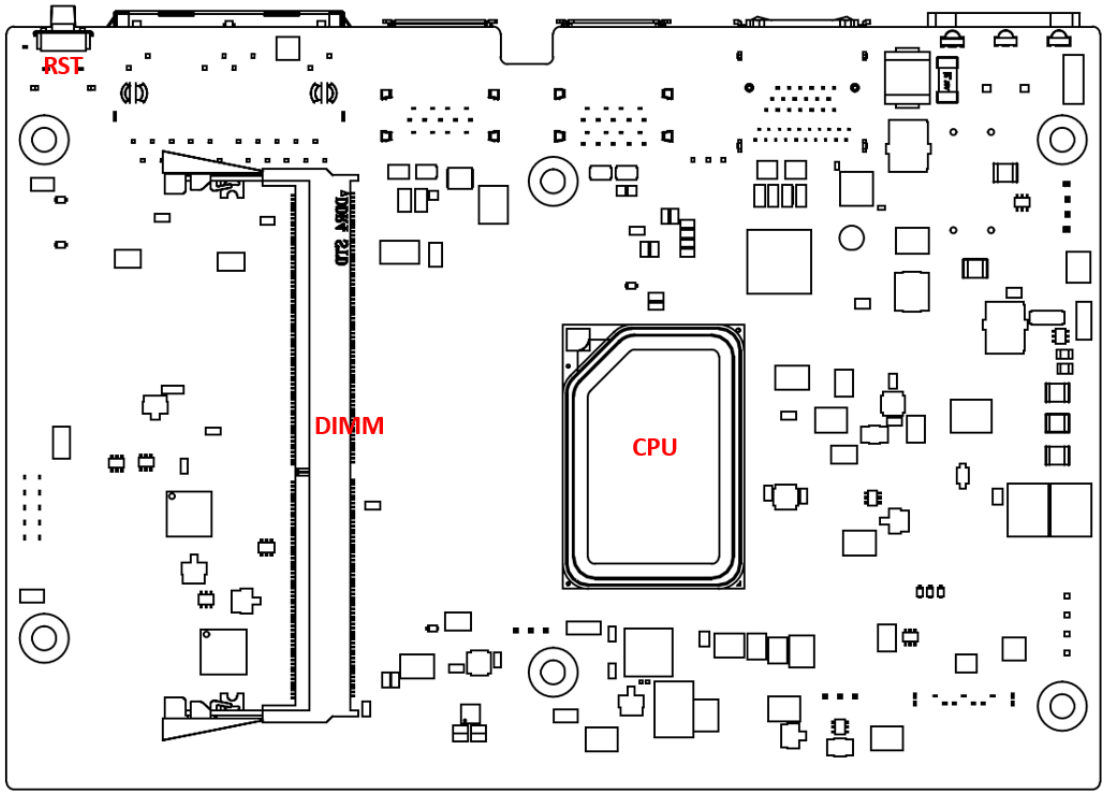

Figure 2: Schematic Diagram (top)

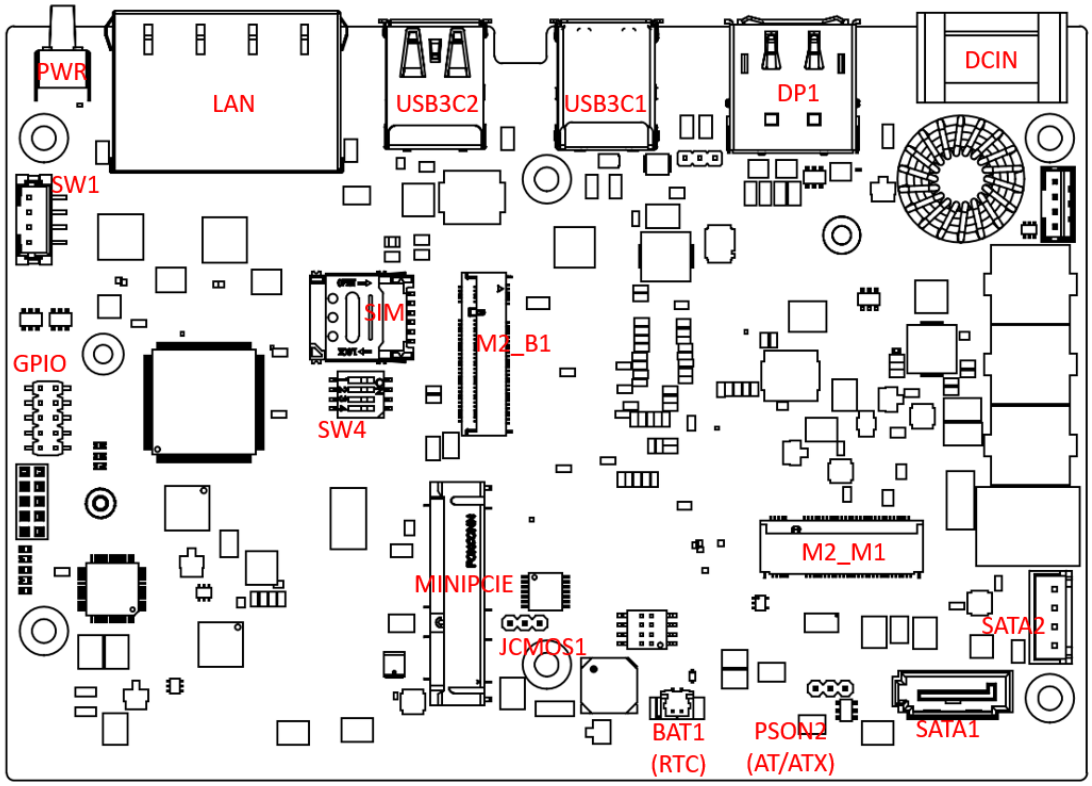

Figure 3: Schematic Diagram (bottom)

Table 11: Schematic Diagram Legend (top/bottom)

Position	Meaning
top	
RST	Reset button
DIMM	DDR4 Non-ECC SO-DIMM sockets
CPU	Processor
bottom	
PWR	ON/OFF button
LAN	LAN connection
USB3C2	USB 3.2 and USB 2.0 connections
USB3C1	2 x USB 3.2 connections
DP1	HDMI/ DisplayPort connection
DCIN	Power supply DC_{IN}
SW1	Remote Power button / Remote Reset button
GPIO	GPIO interface
SIM	Internal nano SIM card slot for M2_B1
SW4	M.2 B-key GPIO pull-up-level
M2_B1	M.2 B slot (USB3.0 signal) e.g. for LTE (3042) / 5G (3052)
M2_M1	M.2 M slot (PCIe x2- / B+M SATA signal) e.g. for NVME/SSD (2242)
MINIPCIE	mPCIe memory card slot (PCIe/USB2.0 signal)
JCMOS1	CMOS delete function
BAT (RTC)	RTC battery
PSON2 (AT/ATX)	AT/ATX mode switch
SATA1	SATA connection
SATA2	SATA power connection

5 Functions

5.1 Network Security

5.1.1 Users and Passwords

There are several user groups that can be used for different services.

A default password is set for all users. We strongly recommend changing these passwords on startup!

Note

Change passwords
Default passwords are documented in these instructions and therefore do not offer adequate protection! Change the passwords to meet your particular needs.

5.1.2 Services and Users

All password-protected services and their associated users are listed in the following table.

Table 12: Services and Users

Service	User	
	Linux®	
	root	edge
Web-Based Management Tool Cockpit	X	X
Linux® console	X	X
SSH	X	X

5.1.3 Linux® User Group

The Linux® user group includes the actual users of the operating system who are also used by most services. The passwords for these users are to be configured via SSH terminal connection.

Table 13: Linux® User

User	Special Feature	Home Directory	Default Password
root	Superuser	/root	wago
edge	Normal user	/home/user	wago

Note

Change passwords
Default passwords are documented in these instructions and therefore do not offer adequate protection! Change the passwords to meet your particular needs.

Example

The PuTTY SSH client is used via ETHERNET to change the default password for the Linux® user “root”.
After launching putty.exe, “login as:” appears. Enter “root” and press [**Enter**]. You are prompted to enter the password. Enter “wago” as the default password. You are prompted to assign a “New password:”. Enter a unique password that meets the required level of security and press [**Enter**]. You are prompted to “Retype password:”. Enter your password again and press [**Enter**] to change the password.
Repeat the process when logging in as a Linux® “edge” user.

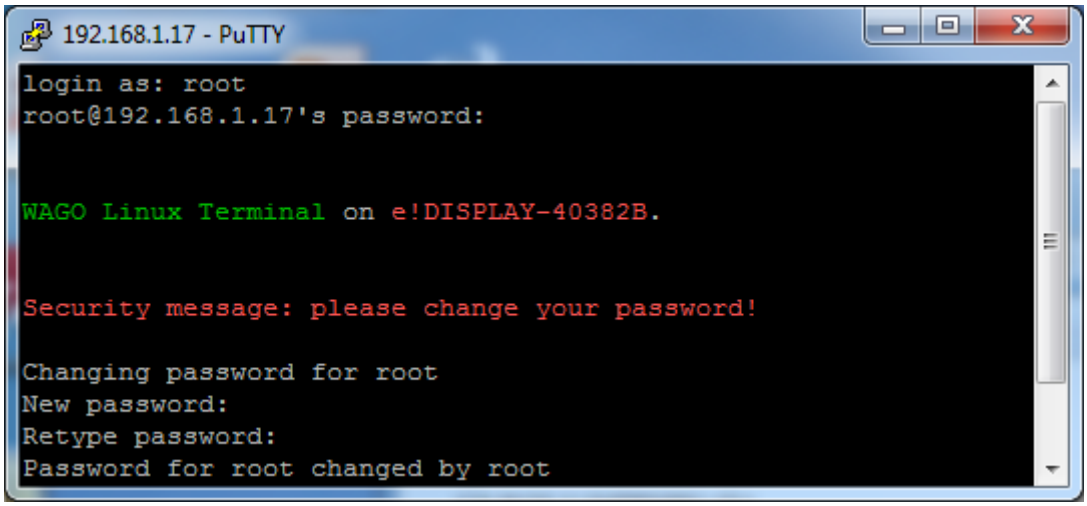

Figure 4: Example for Linux® Password

5.1.4 Web Protocols for WBM Access

The Cockpit Visualization Tool can be opened via HTTPS: https://IP-Adresse:9090.
The SSL/TLS protocol ensures secure communication through encryption and authentication.

5.1.5 Opened IP ports

Table 14: Opened P ports

Service	TCP	UDP
Webserver	443	–
SSH	22	22

6 Mounting

NOTICE

Avoid electrostatic discharge!
The devices are equipped with electronic components that may be destroyed by electrostatic discharge when touched. Please observe the safety precautions against electrostatic discharge per IEC 61340-5-1/-3. When handling the devices, please ensure that environmental factors (personnel, work space and packaging) are properly grounded.

Note

Avoid exposure to direct light!
Position the product to avoid direct exposure to a strong light source, e.g., sunlight!

6.1 Assembly Guidelines/Standards

- DIN 60204 Electrical equipment of machines
- DIN EN 50178 Electronic equipment for use in power installations (replacement for VDE 0160)
- EN 60439 Low-voltage switchgear and controlgear assemblies

6.2 Mounting position

Nominal mounting position: Front, marking legible.

Device must not be operated without air gap. If adjacent device is equivalent under full load the air gap has to be at least 12 mm. If adjacent device does not generate heat the air gap has to be at least 6 mm.

6.3 Mount to the Rail

Mount the product by snapping it into the rail according to EN 60715:

1. Place the product with its rail guide on the top edge of the rail.
2. Press the product onto the rail while simultaneously pulling on the latch until it locks into place.
3. To ensure secure fastening on the rail, fit end clips on either side of the device (e.g., Article No. 249-197).

This product is intended for installation in control cabinets or housings complying with UL type 1, type 12 or type 4X. To ensure adequate cooling and a suitable cable route, a free space of 100 mm (3.94 in.) must be available on all sides. Mounting is to a DIN-35 rail (TS 35).

7 Connecting

7.1 Grounding

Grounding is through the grounding screw on the front side.

7.2 Connecting the Supply Voltage

Connect the power supply to connector X9, pin 1(+) and 2(-). Use the included connector (female connector 231-302/107-000).

8 Commissioning

8.1 Switching ON

Press the ON/OFF button on the front. The product boots with the pre-installed operating system. The interface X1 is set with the default IP 192.168.2.17. Interface X2 is preset to DHCP.

Note

Static IP hidden!
The static IP (manual configuration) only becomes visible when the interface is enabled.

8.2 Login

The system is pre-set with two users:

Table 15: Default User

Users	Password
edge	wago
root	wago

The first time a user logs on, they are prompted to change the respective password. The password must be least 6 characters long, have upper and lower case letters and at least one number.

Note

Change passwords!
Default passwords are documented in these instructions and therefore do not offer adequate protection! Change the passwords to meet your particular needs.

8.3 Configuration

You can perform configurations as follows:

- With the configuration tool „Terminal“
- With the Web-based visualization tool „Cockpit“
- Locally via the graphical user interface (GUI)

8.3.1 Configure Locally with “Terminal”

After booting the system (Debian Linux), the configuration tool “Terminal” of the operating system opens automatically (Default).

Log in to configure the Edge Computer locally.

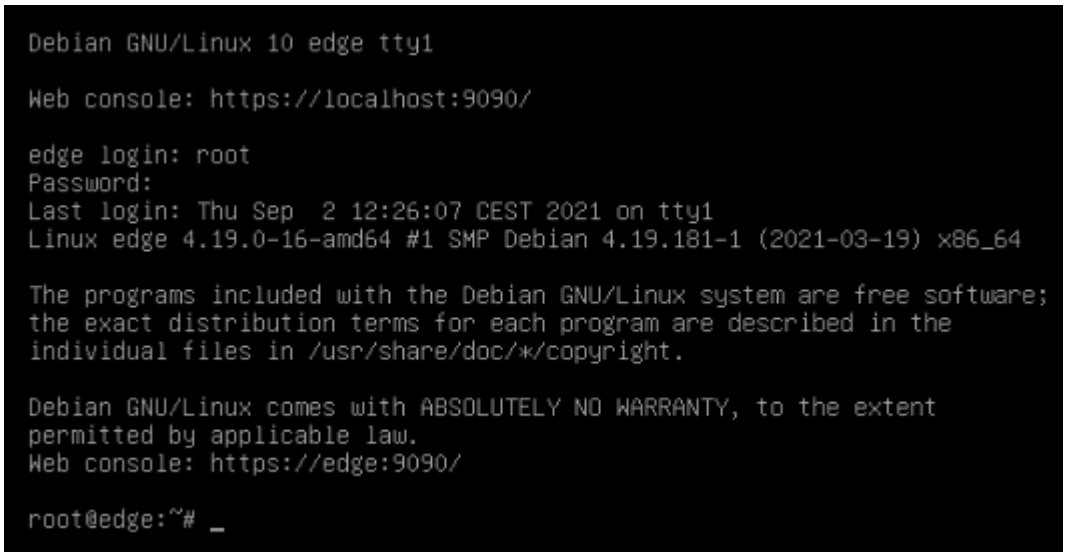

Figure 5: “Terminal” Login Screen

8.3.2 Web-Based Configuration with “Cockpit”

The HTML pages (hereinafter referred to as “pages”) of the visualization tool “Cockpit” (Web-Based Management) are used to configure the computer.

To access “Cockpit” via a Web browser, proceed as follows:

1. Connect the Edge Computer to your PC via the ETHERNET interface and the ETHERNET network.
2. Start a Web browser on your PC.
3. Enter “https://" in the address line of your Web browser, followed by the IP address of the Edge Computer and port number “9090”, e.g., “https://192.168.2.17:9090”.
   Note that the PC and the Edge Computer must be on the same subnet.

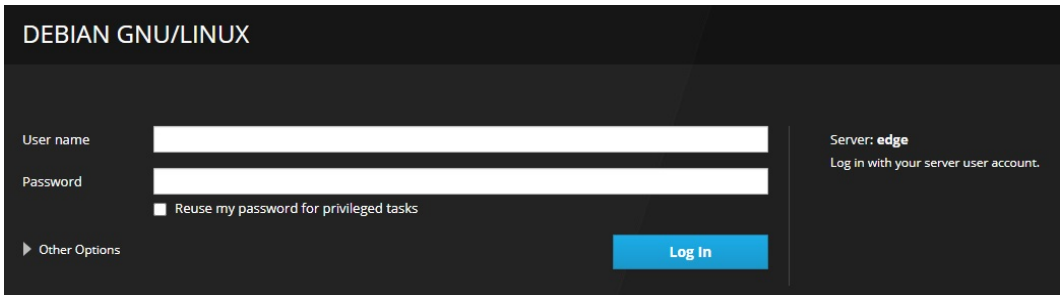

Figure 6: “Cockpit” Login Screen

You can call up the pages for viewing or editing, depending on your access rights.

Access to the pages is as follows:

Table 16: Access Rights for the “Cockpit” Pages

Tab/Navigation		Access Right to View	Access Right to Edit
System			
	Overview	edge/root	root
	Logs	root	root
	Storage	edge/root	root
	Networking	edge/root	root
	Accounts	edge/root	root
	Services	edge/root	root
Tools			
	Applications	edge/root	root
	License	edge/root	–
	Portainer	edge/root	root
	Software Updates	edge/root	root
	Terminal	edge/root	edge/root

8.3.3 Configure Locally via GUI

In addition, you have the option of installing a graphical user interface (GUI) locally in “Terminal” or Web-based in “Cockpit”.

Requirement: Login with administrator rights (default: user root)

1. Start the configuration tool “Terminal”.

2. Enter the command “apt-get update” and confirm the entry by pressing Enter.
   The Update Tool updates.

3. Enter “apt install gnome” in “Terminal” and confirm your entry by pressing “y”.
   The graphical user interface for Debian Linux is installed.

4. Reboot the Edge Computer with the command “reboot”.
   The product boots with the graphical user interface.

Note

Perform a local configuration ex works via the GUI with the “edge” user!
The system does not allow logging in with the “root” user for local configuration via the GUI.
Log in with the “edge” user.

8.4 Start “Portainer”

The tool “Portainer” (Community Edition) is installed for creating and managing container-based applications.

Enter “https://” in the address line of your Web browser, followed by the IP address of the Edge Computer and port number ”9443”, e.g., “https://192.168.2.17:9443.”

Note that the PC and the Edge Computer must be on the same subnet.

Alternatively, you can also start the tool from Cockpit via the link in the “Portainer” tab.

Note

Create a user!
When logging in for the first time, a user must be created.
Enter a username and 12-digit password.

8.5 Upgrade System

Regularly update the operating system. Debian (Linux) is installed on the Edge Computer. You can update the computer, for example, via the configuration tool “Terminal” or via the visualization tool “Cockpit”.

You can find more information in the “Configure” section.

Note

Status change with new distribution!
A recently released distribution is marked with the status “stable” in Debian. After a new distribution is released, the status of the older version changes to “oldstable.”
Update the package manager to continue getting updates for older Debian versions.

To update the package manager, do the following:

Launch “Terminal” locally or Web-based in “Cockpit” with administrative rights.

Enter the command “apt update” and confirm the installations.

Updates are now available, e.g., in “Cockpit”, in the “Updates” tab.

For more information, see the Debian Guide and Debian Release Notes at http://www.debian.org/.

8.6 Set System Behavior When Idle

You can set the system behavior in “Terminal”, in “Cockpit” or via the GUI.

Note

Custom settings can be overwritten!
In some cases, when Debian (Linux) is upgraded to a newer version, the custom settings may be overwritten by default settings.
After updating the Debian Linux version, check your custom settings.

8.6.1 Enable Suspend, Hibernation and Hybrid Sleep Mode (Default) via “Terminal”

Enter the following command:
systemctl unmask sleep.target suspend.target hibernate.target hybrid-sleep.target

8.6.2 Disable Suspend, Hibernation and Hybrid Sleep Mode via “Terminal”

Enter the following command:
systemctl mask sleep.target suspend.target hibernate.target hybrid-sleep.target

9 Decommissioning

9.1 Shut Down

You can shut down the system as follows:

- Via the power button
- In the configuration tool “Terminal”
- In the visualization tool “Cockpit”

10 Removal

10.1 Removal from the Rail

2. To remove, pull down the latch. Use a screwdriver or an operating tool for this.

2. Slide the product out at the lower edge of the rail.

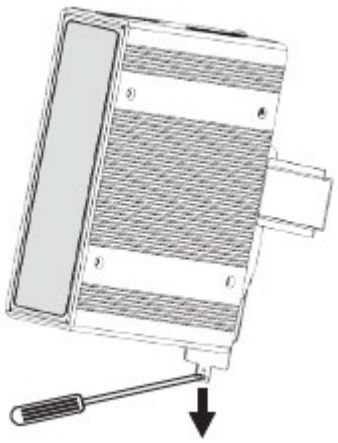

Figure 7: Removal from the Din-35 rail

11 System Expansion

11.1 mPCIe/m.2 Card

To install a suitable mPCIe or m.2 expansion card, e.g., LTE modem, open the housing by loosening the four screws on the left side of the housing. Remove the side panel and insert the expansion card into the open mPCIe/m.2 slot. Use the included screw for this.

11.2 2.5” SSD

A 2.5” SSD can be used to expand storage space.

Open the housing by loosening the two screws on the left side of the housing. Remove the side panel and install the hard drive on the inside of the side panel. For this purpose, the side panel has four holes that are used to attach the hard drive. Remove the four dust covers from the holes and secure the hard drive with the included screws.

For the electrical connection, use the included SATA cable and connect the hard drive to the SATA1 and SATA2 connectors on the product circuit board.

12 License Agreement

The pre-installed Debian operating system and the Cockpit web-based visualization interface are subject to the “GNU General Public License”.
For information on the GNU license, see:
http://www.gnu.de/documents/gpl-2.0.de.html
https://www.gnu.org/licenses/old-licenses/gpl-2.0.html

Note the license terms of the individual components, which you can find at: /usr/share/doc/*/copyright.

12.1 WAGO SOFTWARE LICENSE AGREEMENT

WAGO SOFTWARE LICENSE AGREEMENT

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4.1 During activation, the software will send information about the software and User`s computer to WAGO. This information includes the version, license version, language, and product key of the software, the Internet protocol address of the computer, and information derived from the hardware configuration of the computer. For more information about activation, see http://global.wago.com/en/wago/impressum/data-protection/index.jsp. If the licensed computer is connected to the Internet, the software will automatically connect to WAGO for activation.

4.2 WAGO uses the information it collects through the software features to upgrade or fix the software and otherwise improve our products and services. In certain

circumstances, WAGO also shares it with others. For example, WAGO shares error reports with relevant hardware and software vendors, so that they can use the information to improve how their products run with WAGO products. User agrees that WAGO may use and disclose the information as described in our Privacy Statement at http://global.wago.com/en/wago/impressum/data-protection/index.jsp.

4.3 If User connects from his computer to the Internet, some features of the software may connect to WAGO or service provider computer systems to send or receive information. The User may not always receive a separate notice when they connect. If User chooses to use any of these features, he agrees to send or receive this information when using that feature; all of these features can be switched off or User can choose not to use them.

4.4 If WAGO installs the software covered by this agreement as an upgrade or conversion to your existing software, then the upgrade or conversion replaces the original software that User is upgrading or converting from. User does not retain any rights to the original software after he has upgraded and he may not continue to use it or transfer it in any way.

4.5 Automatic Update (only valid if User has activated this feature). Software may periodically check with WAGO for updates and supplements to the software. If found, these updates and supplements might be automatically downloaded and installed on User`s licensed computer.

4.6 Upon request the User will allow WAGO to verify the proper use of the Software, in particular to determine whether the User uses the Software in the context of his acquired licenses. For this purpose the User shall provide necessary information to WAGO and provide access to relevant documents and records, as well as allow a review of the hardware and software environment used. WAGO or a third party, appointed by WAGO and bound by its duty of professional secrecy, may carry out the audit during regular business hours.

5. TERMINATION
5.1. Either party may terminate this Agreement immediately upon written notice for the material breach of the other party, which material breach is curable and has remained uncured for a period of thirty (30) days from the date of delivery of written notice thereof to the breaching party.

5.2. Upon termination, User shall: (i) not use the Software for any purpose whatsoever and (ii) immediately destroy or return to WAGO all material belonging to WAGO including the Software. Upon WAGO`s request, User shall provide WAGO a written confirmation stating that he has destroyed the Software.

5.3. In the event that any provision of this Agreement shall be unenforceable or invalid under any applicable law or be so held by applicable court decision, such unenforceability or invalidity shall not render this Agreement unenforceable or invalid as a whole, and, in such event, such provision shall be changed and interpreted so as to best accomplish the objectives or such unenforceable or invalid provisions within the limits of applicable law or applicable court decisions.

5.4. This Agreement shall be governed in all respects by the laws of Germany without regard to conflicts of law principles. The parties agree that the United Nations Convention on Contracts for the International Sale of Goods is specifically excluded from application to this Agreement. All disputes arising under this Agreement shall be brought exclusively in the courts responsible for Minden/Westfalen (Germany), as permitted by the law.

13 Disposal

13.1 Electrical and electronic equipment

Electrical and electronic equipment may not be disposed of with household waste. This also applies to products without this symbol.

Electrical and electronic equipment contain materials and substances that can be harmful to the environment and health. Electrical and electronic equipment must be disposed of properly after use.
WEEE 2012/19/EU applies throughout Europe. Directives and laws may vary nationally.

Environmentally friendly disposal benefits health and protects the environment from harmful substances in electrical and electronic equipment.

- Observe national and local regulations for the disposal of electrical and electronic equipment.
- Clear any data stored on the electrical and electronic equipment.
- Remove any added battery or memory card in the electrical and electronic equipment.
- Have the electrical and electronic equipment sent to your local collection point.

Improper disposal of electrical and electronic equipment can be harmful to the environment and human health.

13.2 Packaging

Packaging contains materials that can be reused.
PPWD 94/62/EU and 2004/12/EU packaging guidelines apply throughout Europe. Directives and laws may vary nationally.

Environmentally friendly disposal of the packaging protects the environment and allows sustainable and efficient use of resources.

- Observe national and local regulations for the disposal of packaging.
- Dispose of packaging of all types that allows a high level of recovery, reuse and recycling.

Improper disposal of packaging can be harmful to the environment and wastes valuable resources.

14 Appendix

14.1 mPCIe Slot

Table 17: mPCIe Slot – Connection

Pin	Description	Explanation
1	WAKE#	Open drain active low signal. This signal is used to request that the system return from a sleep/suspended state to service a function-initiated wake event.
2	+3.3 V aux / +3.3 V	PCI 1.1 was +3.3 V, PCI 1.2 was +3.3 V aux
3	NC	NC
4	GND	
5	NC	NC
6	1,5 V	
7	CLKREQ#	Reference clock request signal
8	NC	NC
9	GND	
10	NC	NC
11	REFCLK–	
12	NC	NC
13	REFCLK+	
14	NC	NC
15	GND	
16	NC	NC
17	Reserved	
18	GND	
19	Reserved	
20	W_DISABLE#	Active low signal. This signal is used by the system to disable radio operation on add-in cards that implement radio frequency applications. When implemented, this signal requires a pull-up resistor on the card.
21	GND	
22	PERST#	Functional reset to the card
23	PERn0	
24	+3.3 V aux	

25	PERp0	PCI Express differential receive pair
26	GND	
27	GND	
28	+1.5 V	
29	GND	
30	SMB_CLK	
31	PETn0	
32	SMB_DATA	SMBus data signal compliant to SMBus 2.0 specification
33	PETp0	
34	GND	
35	GND	
36	USB_D–	
37	GND	
38	USB_D+	USB serial data interface compliant to the USB 2.0 specification
39	+3.3 V aux	
40	GND	
41	+3.3 V aux	
42	NC	NC
43	PIN43_MPCIE_PWRSEL	Pin for selecting Pin 2; 52 power output for +3.3 V aux or +3.3 V (PCI 1.1 was reserved and PIC1.2 was GND)
44	NC	NC
45	Reserved	
46	NC	
47	Reserved	
48	+1.5 V	
49	Reserved	
50	GND	
51	Reserved	
52	+3.3 V aux / +3.3 V	PCI 1.1 was +3.3 V, PCI 1.2 was +3.3 V aux

14.2 M.2 B Slot

Table 18: M.2 B Slot – Connection

Pin	Signal name	Pin	Signal name
1	M2_SATA1_DET	2	+V3.3_M2
3	GND	4	+V3.3_M2
5	GND	6	M2_LTE_PWR_OFF#
7	M2_LTE_USB_DP	8	M2_LTE_W1_DISABLE_N
9	M2_LTE_USB_DN	10	+V3.3_M2
11	GND	12	Mechanical notch B
13	Mechanical notch B	14	Mechanical notch B
15	Mechanical notch B	16	Mechanical notch B
17	Mechanical notch B	18	Mechanical notch B
19	Mechanical notch B	20	NC
21	NC	22	NC
23	WAKE_ON_WAN#	24	NC
25	NC	26	M2_LTE_W2_DISABLE_N
27	GND	28	NC
29	USB_Z_SSRX1-	30	M2_SIM1_RESET
31	USB_Z_SSRX1+	32	M2_SIM1_CLK
33	GND	34	M2_SIM1_DATA
35	USB_C_SSTX1-	36	M2_SIM1_PWR
37	USB_C_SSTX1+	38	NC
39	GND	40	M2_SIM1_DET
41	SATA1_RX+	42	NC
43	SATA1_RX-	44	NC
45	GND	46	NC
47	SATA1_C_TX-	48	NC
49	SATA1_C_TX+	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	M2_SIM1_DET
67	LTE_RST#_P67	68	NC
69	NC	70	+V3.3_M2
71	GND	72	+V3.3_M2
73	GND	74	+V3.3_M2
75	NC		

14.3 M.2 M Slot

Table 19: M.2 M Slot – Connection

Pin	Signal name	Pin	Signal name
1	GND	2	+V3.3_MKEY
3	GND	4	+V3.3_MKEY
5	NC	6	M2E_LED_1#
7	NC	8	NC
9	GND	10	NC
11	NC	12	+V3.3_MKEY
13	NC	14	+V3.3_MKEY
15	GND	16	+V3.3_MKEY
17	NC	18	+V3.3_MKEY
19	NC	20	+V3.3_MKEY
21	GND	22	NC
23	NC	24	
25	NC	26	
27	GND	28	
29	PCIE_PCH_M2_M1_RX_N2	30	
31	PCIE_PCH_M2_M1_RX_P2	32	NC
33	GND	34	NC
35	PCIE_PCH_M2_M1_TX_N2	36	NC
37	PCIE_PCH_M2_M1_TX_P2	38	NC
39	GND	40	NC
41	SAT_SWITCH_M2_M1_RX_N	42	NC
43	SAT_SWITCH_M2_M1_RX_P	44	NC
45	GND	46	NC
47	SAT_SWITCH_M2_M1_TX_N	48	NC
49	SAT_SWITCH_M2_M1_TX_P	50	PLTRST_MKEY#
51	GND	52	M2_E_CLKREQ0#
53	CLK100M_PCH_M2_E1_K_N	54	PCIE_WAKE#
55	CLK100M_PCH_M2_E1_K_P	56	NC
57	GND	58	NC
59	NC	60	Mechanical notch E
61	NC	62	Mechanical notch E
63	NC	64	Mechanical notch E
65	NC	66	Mechanical notch E
67	LTE_RST#_P67	68	PMC_SUSCLK
69	NC	70	+V3.3_MKEY
71	GND	72	+V3.3_ MKEY
73	GND	74	+V3.3_ MKEY
75	NC		

15 Technical Data, Guidelines and Standards

Note

Subject to change!
Please also note the other product documentation! You can always generate the current data sheet at:
www.wago.com/<article number>.

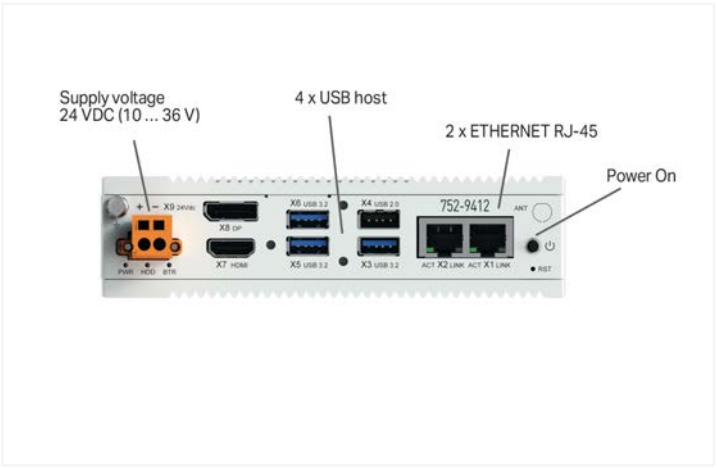
See also

→ Data sheet 752-9412 (on the following pages)

Data Sheet | Item Number: 752-9412

Edge Computer; 2 x ETHERNET, 4 x USB, HDMI, DP; 16GB RAM; 128GB FLASH

https://www.wago.com/752-9412



- 2 x ETHERNET interface for connecting to field devices and IT networks
- 4 x USB interface for optional connection of a USB stick, mouse or keyboard
- HDMI and display port interfaces for connecting a display

Technical data

ETHERNET protocols	DHCP DNS HTTP HTTPS SSH SCP SFTP
Visualization	Web server
Operating system	Debian Linux; optional ctrlX OS pending
Processor	Intel® Atom X6413E Processor 4 x 1.5 GHz (max. 3.00 GHz)
Safety	TPM2.0-Chip, UEFI Secure Boot
Main memory (RAM)	16 GB; DDR4 SODIMM
Internal memory (flash)	128 GB; m.2 SSD
Indicators	3 x LED
Supply voltage	24 VDC (10 … 36 V); with reverse voltage protection
Input current (typ.) at nominal load (24 V)	800 mA
Input current (max.) (24 V)	2250 mA
Operating power	19 W (typ.); 54 W (max.)

Connection data

Connection technology: communication/fieldbus	2 x RJ-45 socket, 1 Gbit/s; 3 x USB 3.2 (type A); 1 x USB 2.0 (type A)
Interfaces	ETHERNET: 2 x RJ-45 socket, 1 Gbit/s (Realtek RTL8119I-CG); Twisted Pair SF-UTP connecting cables, 100 Ohm, category 5e, patch or crossover, max. 100 m long; Display: 1 x DisplayPort 1.4, 4096 x 2160 @60 Hz; 1 x HDMI 1.4, 3840 x 2160 @30 Hz
Interfaces (USB)	3 × USB 3.2 Gen 2 Host (type A) socket, 10 Gbit/s, connection cables max. 3 m long, current consumption max. 2 × 900 mA; 1 × USB 2.0 (type A) socket
Memory expansion	1 x mPCIe slot, 1 x M.2 B and SATA 2.5“ SSD
RTC (Real-Time Clock)	Battery type BR2032; 3 VDC
SIM card type	Nano-SIM
Connection technology: supply	1 x Female connector (231-302/107-000); CAGE CLAMP®; 2-pole
Cable length (max.)	3 m (Connecting cable (max.) up to power supply)
Connection type 1	Power supply
Solid conductor	0.08 … 2.5 mm² / 28 … 12 AWG

Connection data

Fine-stranded conductor	0.08 … 2.5 mm² / 28 … 12 AWG
Strip length	8 … 9 mm / 0.31 … 0.35 inches

Physical data

Width	40 mm / 1.575 inches
Height	150 mm / 5.906 inches
Depth	105 mm / 4.134 inches

Mechanical data

Weight	1309 g
Housing material	Aluminum, powder-coated

Environmental requirements

Ambient temperature (operation)	-20 … +60 °C (at 5 … 85 % RH (with 0.7m/s airflow))
Ambient temperature (storage)	-40 … +85 °C
Protection type	IP40
Note on protection type	Protection type with extension housing: IP20
Pollution degree	2
Protection class	III
Operating altitude	0 … 2000 m / 0 … 6562 ft
Relative humidity	10 … 95 % (RH at 40 °C)
Mounting type	DIN-35 rail
EMC immunity to interference	per EN 61000-6-2
EMC emission of interference	per EN 61000-6-4

Commercial data

PU (SPU)	1 pcs
Packaging type	Box
Country of origin	TW
GTIN	4066966580068
Customs tariff number	84715000000

Zulassungen

Approvals	CE UKCA UL FCC

List of Figures

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