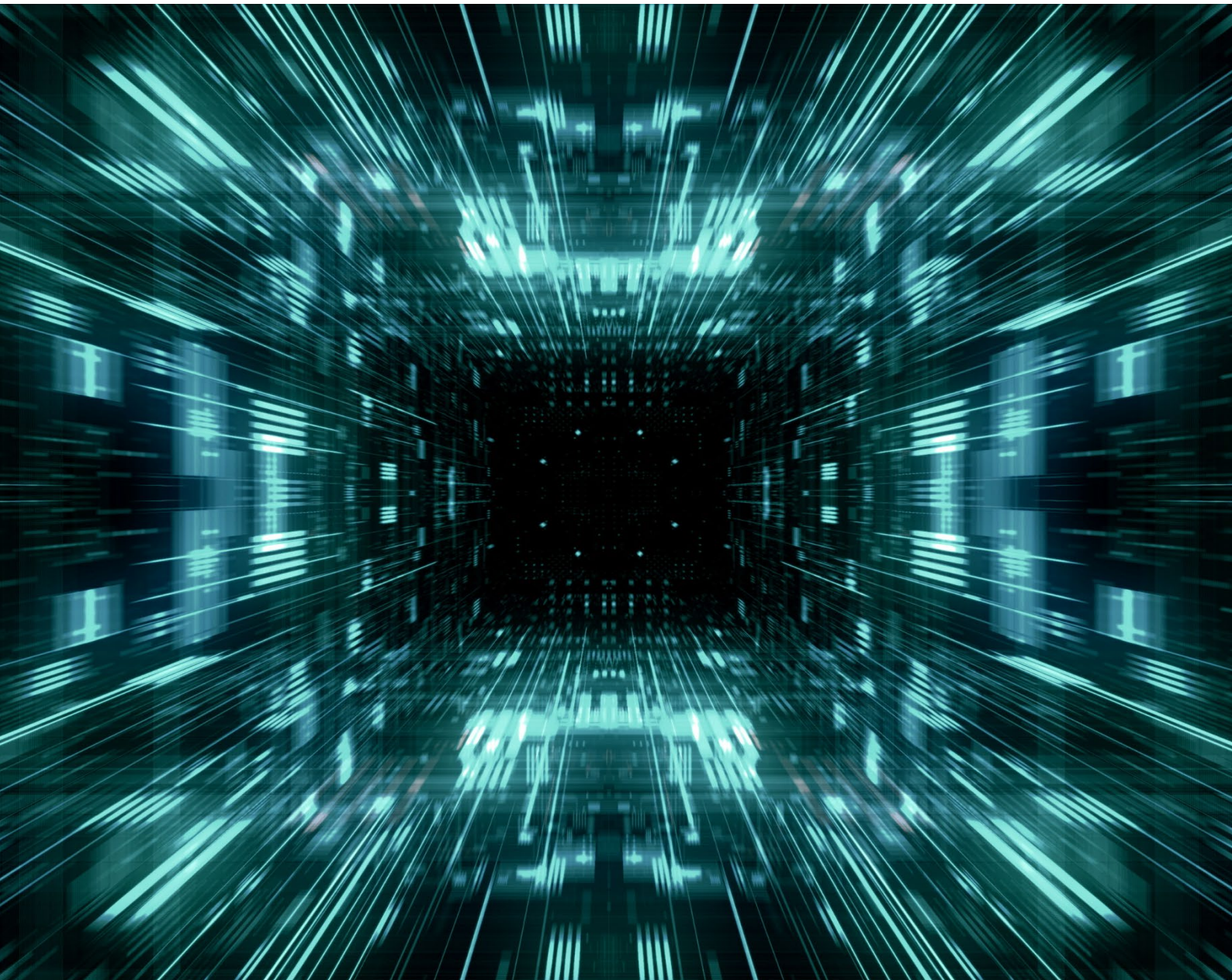


DAIM EDGE DEVICE SYSTEM SPEZIFICATION



30.05.2023

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1 Introduction

This template is intended for those DAIM customers who wish to operate the DAIM Edge Computing Platform themselves. Customers who have the platform operated by DAIM will already receive this template pre-filled by DAIM.

First, let's start with a definition of terms:

- **Customer:** This refers to the DAIM customer and the operator of the Edge Device Management platform.
- **End Customer:** Customer of the DAIM customer and operator of the Edge Devices. The end customer can be either internal (i.e., a branch) or external (i.e., a buyer of equipment or machinery).

This document is intended as a template for *customers* to familiarize their end customers with the edge device and the customer services offered (e.g., customer portal, shopfloor monitor). Customer-specific sections in this template are therefore left open and highlighted in **yellow**. These sections must be filled by the customer with their specific content.

This specification defines the requirements for the necessary IT infrastructure for the edge device and the services operated with it. The required network infrastructure is provided and maintained by both the customer and the end customer. The recommendations listed below are non-binding and do not claim to be complete.

2 Edge Device Hardware

The recommended hardware comes from Kontron, one of the leading providers of edge computing solutions. The Kontron KBox A-150-KBL has been extensively tested by external institutions and has been successfully deployed by our customers for years. The following documentation is based on this device.

Please contact us if you wish to use your own hardware, as there are a few requirements to be met, such as having a TPM2.0 chip.

2.1 Commissioning



Fig.1: Kontron KBox A-150-KBL

The Edge Device is an industrial PC that is provisioned and managed by **the customer**. It is directly associated with an end customer through its serial number, ensuring that it can only be used by that customer. The Edge Device runs a Linux Debian distribution as its operating system, and it requires a TPM2.0 chip for proper operation.

The Edge Device serves as the foundation for the operation of the following services:

- **Kundenservice 1 (z.B. Shopfloor Monitor)**
- **Kundenservice 2 (z.B. Service Portal)**

The initial configuration of the Edge Device at the end customer is performed through a local web application, which is directly accessible via the support interface of the Edge Device using a web browser.

The Edge Device communicates exclusively over LAN (Ethernet) with the connected machines (LAN1) as well as with the **customer backend** via the internet (LAN3).

2.2 Dimensions and Operating Temperature

Dimensions

L x B x H: 180 mm x 134 mm x 50 mm

Gewicht: 1 kg

Operating Temperature

The KBox A-150-KBL is a fanless industrial PC, which is why the enclosure must function as a heat sink. If the edge device is used in non-air-conditioned areas, an additional heat sink is recommended. The maximum operating temperature of the edge device is 50°C.

2.3 Connections

The Edge Device has the following connectors:

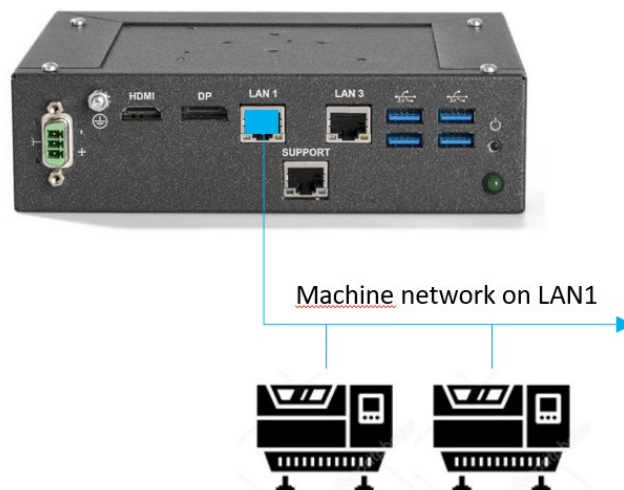
1. 3x Ethernet network ports (1000 Mbps)
2. 1x HDMI port
3. 1x DisplayPort
4. 4x USB ports
5. 1x power supply connector

2.3.1 Network Connections

During the configuration of the Edge Device, the configuration wizard must be used to select whether the Edge Device should be set up with or without network segmentation. The two configuration options are further described in detail in Chapter "3.2.1 Integration into Customer LAN".

2.3.1.1 LAN1

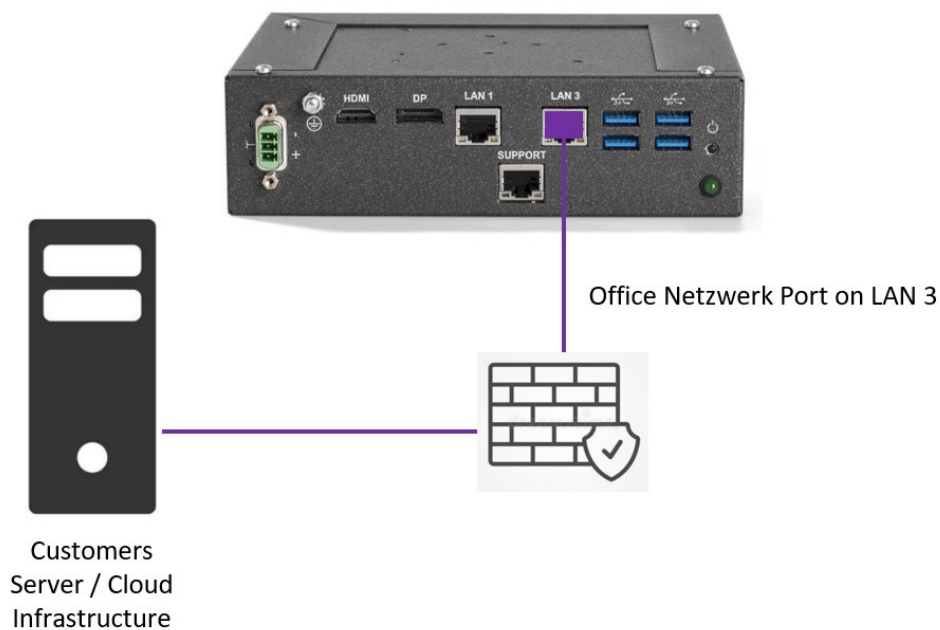
The LAN1 connection is only required when an active network separation mode (recommended setting) is in place and is intended for connecting to the protected machine network. For this connection, only a static or dynamic IP address configuration without a default gateway is possible. When not using network separation, LAN1 is disabled and not used.



2.3.1.2 LAN3

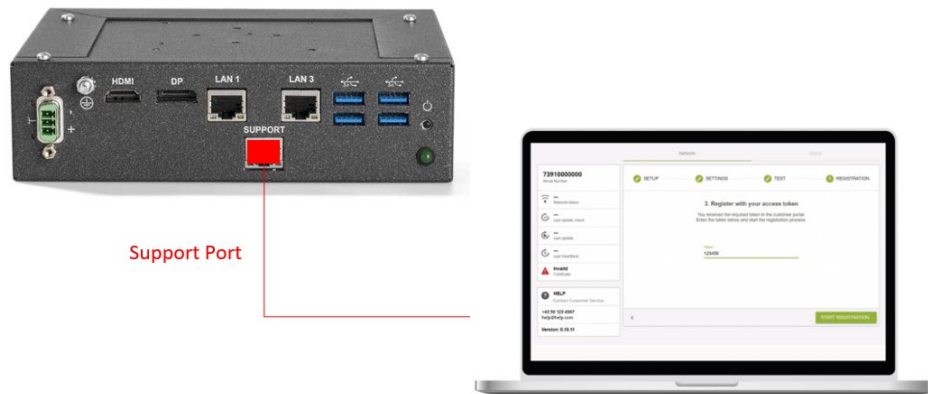
In a network separation scenario, the LAN3 network port on the Edge Device is used for communication with customer endpoints. An internet connection is required for this purpose (e.g., your office network). The IP address for LAN3 can be configured as either dynamic or static. When not using network separation, LAN3 is used for both the connection to customer endpoints and the connection to the machines.

The term "customer endpoint" refers to servers at the customer's site that the Edge Device communicates exclusively with. It is important to ensure that the Edge Device can reach the endpoint `e3.customerportal.com` on port 443 via the internet. This may require your IT team to set up a firewall rule for the Edge Device. Depending on the services running on the Edge Device, additional connections to other endpoints may be necessary. Please refer to the respective service section in the "Service" chapter for more details.



2.3.1.3 Support Port (LAN2)

The network port SUPPORT is intended for the setup and administration of the Edge Device (such as changing the network configuration and resetting to factory settings). CAUTION: Behind the SUPPORT port, there is a DHCP server on the Edge Device which provides the connected PC/Laptop with an IP address for configuration purposes. For more information, please refer to the Network chapter. The SUPPORT port should only be connected to a service employee's notebook for maintenance purposes and should not be permanently connected to a network.



2.3.2 Power Supply

A manufacturer-specific power supply, 230/100V, 50/60Hz, is included in the delivery package. An uninterrupted power supply must be available for the Edge Device.

2.3.3 Displayport, HDMI and USB

These connections are not required either during ongoing operation or for initial start-up. Logging into the operating system via keyboard and display is not possible as no user is available for login for security reasons.

3 Network

3.1 IP Address Ranges for End-User Network

3.1.1 LAN1

Machine Connection

- DHCP address or static IP address (without default gateway)

3.1.2 LAN3

Connect to the Internet and (optional) to the machinery

DHCP address (recommended) or static IP address

3.1.3 SUPPORT (LAN2)

Commissioning and Management of the Edge Device

- SUPPORT Connection: 192.168.157.100 (Active DHCP Server!)
- DHCP Address Range: 192.168.157.111 – 192.168.157.120

The Edge Device internally uses the private "Docker Network" 172.17.0.0/16 for communication among the services. Therefore, IP addresses from this network cannot be utilized for LAN1, LAN3, and the machines. If the use of the 172.17.0.0/16 network, or a subnet contained within it, is required, the range of IP addresses for internal communication can be modified through an Edge Device update. Please contact the relevant service at support@operator.com for this purpose.

3.2 Global Network

3.2.1 Integration into Customer's LAN

A stable internet connection is prerequisite for the seamless operation of the services. Interruptions in the connections can adversely impact the quality of the services. During the commissioning of the Edge Device, you can choose between integration with network separation or integration without network separation.

3.2.1.1 Network Separation Mode (recommended)

During the commissioning of the edge device with network separation, the LAN1 port is used for communication with the machine network. For communication with the client servers, the edge device utilizes the LAN3 port. With this type of integration, it is clearly defined which port of the edge device communicates with which components. The advantage here is that the machine network does not need to be routed and does not require internet access. Consequently, the machine network can also be physically located within its own isolated network.

3.2.1.2 Without Network Separation

During the commissioning of the Edge Device without network segregation, the LAN3 port is used for communication with the machine network and the customer's servers. In this scenario, LAN1 is not required. With this kind of integration, the machine network must either have direct access to the Internet or at least be physically connected to the corporate network. This allows the Edge Device to reach the machines through routing.

3.2.2 Integration in a WiFi or via 3G/4G connection

The Edge Device itself does not support WLAN or UMTS connectivity. A mandatory connection via an Ethernet cable to LAN3 is required. However, a WLAN router with UMTS support can also be connected to LAN3. This enables machines, which for instance, due to their distance from the switches, cannot be connected to the company's internal machine network, to benefit from our digital solutions. It is important, however, that the Edge Device has a stable internet connection without interruptions, as this can otherwise lead to significant limitations in various services.

4 Preparations for Commissioning the Edge Device

This section shows a typical onboarding workflow, but this needs to be adapted to each customer's individual process.

4.1 Before Delivery of the Edge Device

4.1.1 Register on the Customer Portal

Ensure you have registered on the customer portal if you do not already possess an account.

4.1.2 Define Network Setup

You must determine how the Edge Device will be connected to the client's network. You can find the options provided by the Edge Device for this purpose in Chapter 3: Network.

4.1.3 Prepare the Network

Prepare your network according to the defined network setup. Wire the machines and assign the corresponding IP addresses to each machine. Information regarding the correct LAN connection to the machine and instructions for configuring the IP address can be found in the machine's manual.

4.1.4 Unblock Ports

Ensure that the required IP addresses/hostnames and ports to the KMON endpoints for the Edge Device and desired services are unblocked on your firewall and can be reached. Details can be found in Section 2.3.1: Network Connections. The Edge Device itself requires a connection to the endpoint `e3.customernet.com` via Port 443 for configuration. The necessary ports for machine communication and additional endpoints can be found in the chapter of the respective service.

4.1.5 Assign IP Addresses in the Customer Portal

Assign the configured IP addresses to the machines in the customer portal.

4.2 After Receiving the Edge Device

4.2.1 Commissioning

Commission the Edge Device as per the Quickstart document included with the delivery of the Edge Device. This document can also be found in electronic form on the customer portal or can be downloaded from the following link: www.customerportal.com