KVASER
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Kvaser Edge WL400S

Learn more about this product

Secure, rugged, and ready for edge computing

The Kvaser Edge is a secure, rugged ARM-based Linux computer tailored for demanding real-time data acquisition, edge analytics and seamless cloud integration, all within a compact form factor.

Beyond its robust hardware, the Kvaser Edge offers flexibility through our containerized software architecture, Kvaser OS (KEOS) ensures secure isolation. You can choose your Linux distribution, use apps for data processing, and retain full control of your data and intellectual property. This makes Kvaser Edge ideal for proof-of-concept testing or scalable production.

Warranty
2-year warranty. See our general conditions and policies for details.

Support
Free support for all products by contacting support@kvaser.com

EAN
73-30130-01688-0

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Kvaser Edge WL400S

Major Features

- Designed for effortless execution of data logging and processing missions at the edge.
- Powerful embedded ARM-based Linux computer with "Secure Element", NXP SE051C2 faciliating CRA compliance with target software applications.
- Four fully featured, time-synchronized, individually galvanically isolated CAN-FD channels utilizing Kvaser CAN-IP implemented in FPGA.
- Wi-Fi 6 and Gigabit Ethernet Interfaces enables remote connectivity.
- Ruggedized housing with IP67 ingress protection.
- Wired intefaces for durable flexible connections.
- Integrated positioning and inertial measurement units.
- Galvanically isolated GPIO intefaces enabling trigger-based logging.
- Separate galvanically isolated power supply with support of activation via ignition signal.
- High-capacity battery ensures safe shutdown and supports intermediate operation.
- Multi-GNSS (Global Navigation Satellite System) support (GPS, Galileo, GLONASS) for enhanced positioning accuracy and reliability.

Support

Documentation and Kvaser SDK can be downloaded for free at www.kvaser.com/downloads. Drivers are already included in the Kvaser Edge base system.

Kvaser SDK is a free resource that includes everything you need to develop software for the Kvaser CAN interfaces. Includes full documentation and many program samples, written in C, C++, C#, Delphi, Visual Basic, Python and t script language.

The Kvaser EDGE base system can be pre-configured with customer system image, setup of containers, installation of Kvaser SDK and customer-selected drivers to fit potential needs.

Kvaser CAN hardware is built around the same common software API. Applications developed using one device type will run without modification on other device types.

Technical Data

Battery	Lithium-ion 18650
Bluetooth	Supporting mode BLE 5.3
CAN	4xCAN FD SIC Galvanic Isolated, HD26
CAN FD Bit Rate	Up to 8 Mbit/s
Ethernet	Gigabit Ethernet 1000 BaseT, RJ45 Socket
GPIO	2x Digital Input 1x Digital Output
Housing	Aluminum housing with plastic protective caps, approx. 200x110x58 mm
IMU Acceleration sensitivity Angular rate sensitivity	6-axis (accelerometer + gyroscope) +-2g range 0.061 mg/LSB (Typical) +-125 dps range 4.375 mdps/LSB (Typical)
Ingress Protection: Housing	IP67
Operating Temperature	-40 to 50 °C ambient (If handheld use is not a requirement, the device can operate at ambient temperatures up to +70 °C.)
Operating System	Linux-Kernel
Positioning accuracy (CEP) 1.5 m	Multi-GNSS (GPS, Galileo, GLONASS) with external active antenna via FAKRA connector (Key Code-C)
Power activation	Galvanic Isolated
Power consumption	Up to 15 W in active mode Standby mode, down to 200 mW
Power supply	9-36 VDC, Galvanic Isolated
Processor	ARM, Quad core Cortex®-A53 up to 1.6 GHz
RAM	2 GB
Regulatory Compliance	CE, FCC
Status display	9 LEDs
Storage	256 GB eMMC (embedded MultiMediaCard)
USB	USB 3.1 Host, Type-C (PD 400 mA)
Weight	850 g, cables excluded
Wi-Fi	Wi-Fi 6 IEEE 802.11ax, Dual Band, 2x2 MIMO (5GHz), Antenna Diversity, Integrated antennas

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Ref. No. 98401-1 v. 2.2

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KEOS (Kvaser Edge OS)

Learn more about this product

Secure and flexible Edge Computing OS

KEOS is a purpose-built operating system powering the Kvaser Edge, delivering secure and flexible edge computing in automotive and industrial applications. It lets you run critical workloads directly at the edge while protecting data, communications and system with advanced cybersecurity features.

KEOS supports Linux (LXC) containers, enabling an isolated user environment for your preferred applications in data acquisition, fleet management and edge analytics. This containerized architecture ensures workload separation, maximizes performance, simplifies management and allows for flexible system scaling.

Support
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Version
KEOS (Kvaser Edge OS)

Ref. No. 98439-4 v. 2.0

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KEOS (Kvaser Edge OS)

Major Features

SECURITY

Secure host OS root filesystem

The host operating system is packaged as a sealed, read-only image that can't be altered once it's running. On top of that, a built-in security check watches every piece of that image and compares it to a known "good" fingerprint—if anything doesn't match, it won't let the system use it, so no one can sneak in changes while it's up and running.

The security is implemented using two Linux technologies: **SquashFS** and **dm-verity**.

Secure boot

Only cryptographically signed host systems provided by Kvaser can run on the device.

MANAGEMENT

User Container Updates with Minimal Downtime

A user container update can be downloaded and installed in the background. As soon as the update is installed a reboot is all that is required to continue running with the updated container. If the updated container fails to start or complete the update sequence, a rollback can be initiated from the container, or by power-cycling the device. The rollback will take no longer than an ordinary reboot.

Reproducible Onboarding for Vehicle Fleets

Reproducible Onboarding for Fleets packages every setup step into a single, versioned LXC image—installations, network and security configs, and application code—so each new fleet deployment is identical, drift-free, and fully traceable.

Remote Management

Remote management is made possible by a proprietary command line interface (CLI) with the following functionality:

- Host OS update (Kvaser firmware)
- User container update (User customization)
- System reboot

The CLI is made available in the user container and communicates with the host OS services through a Unix domain socket (UDS).

Factory Reset

The factory reset will return the device into a state that would be identical to when the device leaves the factory, that is no secrets, user data or configuration is left on the device.

The factory reset serves multiple purposes

- A safe fallback in case a non-working configuration has been installed
- A cybersecurity measure that wipes all user data from the device
- A known good startup state. All devices will behave the same when in factory reset mode.

The wiping of all user stored secrets includes the keys used for disk encryption, when the keys are gone the residual data on the disk will be irretrievable.

Host OS Updates with Minimal Downtime

A host OS update can be downloaded and installed in the background. As soon as the update is installed a reboot is all that is required to continue with the update host OS. If the new updated OS fails to start and complete the update sequence, an automatic rollback to the previous version will be executed. The rollback will take no longer than an ordinary reboot.

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KEOS (Kvaser Edge OS)

INTERFACE

LED User Interface

The LED user interface consists of three distinct components:

1. Power LED
   A single-color power LED that indicates device power status. This LED is not user-controllable.
2. Channel LEDs
   One red-green (RG) LED per CAN/CAN FD bus channel. These are user-controllable and, by default, are managed by the CAN/CAN FD bus controllers, with each LED corresponding to a specific channel.
3. User-Defined LEDs
   Four fully user-programmable RGB LEDs, which can be customized to display any color or pattern as defined by the user.

CAN/CAN FD using SocketCAN

The system provides CAN and CAN FD interface support via SocketCAN, Linux kernel-based CAN stack.

Digital Input

A digital input is used to detect on/off conditions of an external signal. The external digital I/O is handled by the Linux GPIO sub-system.

Digital Output

A digital output is used to control an external signal. The external signal can be set in on or off state. The external digital I/O is handled by the Linux GPIO sub-system.

GPS for Precise Positioning

GPS (Global Positioning System) is a satellite-based navigation tool that determines your precise latitude, longitude and altitude by triangulating signals from multiple orbiting satellites. It delivers real-time location data anywhere on Earth, enabling accurate mapping, tracking, and timing for a wide range of applications.

The onboard GPS device is accessible from the user container and has been tested using the Linux service gpsd.

6-axis IMU

A 6-axis IMU (Inertial Measurement Unit) is an electronic device that measures and reports a body's specific force and angular rate. It is commonly used in robotics, drones, automotive systems, mobile devices, and industrial applications.

USB Serial Port Container Console

If the Edge device is connected to a USB host interface, the container console will be accessible through an USB ACM serial device. The ACM serial devices are supported by both Windows and Linux. The serial console can be used to setup and debug a containerized system.

Front-Panel Push Buttons

The push buttons are available as key events to the user containerized system. Can be tested using the evtest application.

The buttons are completely managed by the user on a running system, but during the power on sequence the buttons are used for initiating a factory reset

Ethernet Access

An Ethernet interface is the port and circuitry in a device that connects it to a wired Ethernet network. It handles sending and receiving data over an Ethernet cable using the Ethernet protocol.

It provides a physical connection (RJ45 socket) and works at the data link layer to enable communication within a local area network (LAN), at speeds up to 1 Gbps.

The Ethernet interfaces are fully accessible from the user container.

WiFi Client

The dual-band WiFi client interfaces are accessible from the user container. The functionality has been tested using wpa_supplicant.

WiFi Access Point

The WiFi interface is accessible from the user container and available for use with the access point application. The device has been tested using hostapd. It is possible to run the access point simultaneously with the WiFi client and on both bands, 2.4 GHz and 5 GHz, at the same time.

Wakeup on external input

An external signal that can be used to wake the device from suspend or power off mode (Ignition/Activation).

USB webcam and microphone support

Common webcams are supported using normal Linux tools.

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KEOS (Kvaser Edge OS)

PERFORMANCE

Fast resume from low power mode

The device will resume from low power mode (suspend) in less than 1 second.

STORAGE

USB mass storage device

An external USB mass storage device can be connected to the Edge device to access the files.

CONTAINER

Full Customization from Container Image

Package all device logic—OS tweaks, services, network and storage setup—into a single Linux container (LXC) image.

- **Plug-and-Play:** Load the image, boot the device, and everything configures itself automatically.
- **Atomic Updates:** Swap in a new image over-the-air and rollback instantly if needed.
- **Strong Isolation:** Runs unprivileged in its own user, PID, network, and mount namespaces. Containers can't break out to the host or affect each other, and cgroups enforce resource limits.
- **Repeatability:** Every device launched from the same image follows the exact same configuration steps—no drift or manual tweaks—so deployments are reliably identical.

SYSTEM

Battery Management System

The device is equipped with a hardware-controlled battery management system (BMS) that monitors key battery parameters and provides protection mechanisms to prevent damaging discharge.

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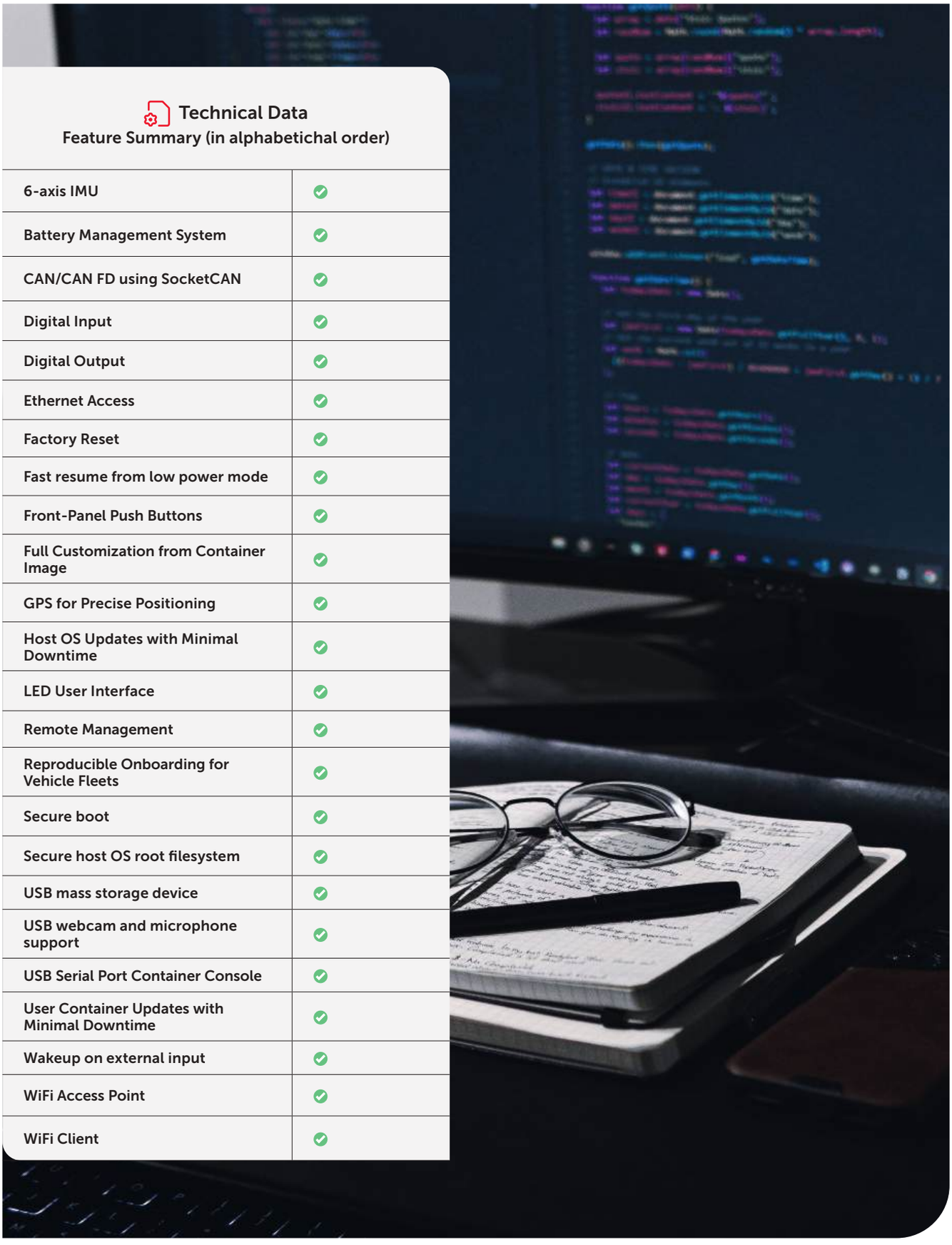

Technical Data
Feature Summary (in alphabetichal order)

6-axis IMU	✓
Battery Management System	✓
CAN/CAN FD using SocketCAN	✓
Digital Input	✓
Digital Output	✓
Ethernet Access	✓
Factory Reset	✓
Fast resume from low power mode	✓
Front-Panel Push Buttons	✓
Full Customization from Container Image	✓
GPS for Precise Positioning	✓
Host OS Updates with Minimal Downtime	✓
LED User Interface	✓
Remote Management	✓
Reproducible Onboarding for Vehicle Fleets	✓
Secure boot	✓
Secure host OS root filesystem	✓
USB mass storage device	✓
USB webcam and microphone support	✓
USB Serial Port Container Console	✓
User Container Updates with Minimal Downtime	✓
Wakeup on external input	✓
WiFi Access Point	✓
WiFi Client	✓

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