Assembly Instructions and User Reference

EdgeSenses ES...

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Neglecting safety instructions can result in injury to the operating personnel or damage to the equipment. Therefore, please follow safety instructions before each use.

Should you have any questions regarding this product, please contact the manufacturer:

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V 1.1

The national and regional requirements for the environment protection and the recycling of devices no longer used have to be considered. Please dispose of separately from regular household waste. For further information on waste disposal, please contact your local authorities or the dealer, from whom you have bought the product.

The information contained in this document represents the current state of knowledge. ConSenses reserves the right for technical alterations. The liability for consequential damages resulting from the application of ConSenses products is excluded.

Content

1. Scope of delivery and accessories

1.1.Scope of delivery

The scope of delivery contains the EdgeSenses system with connectors ready for connection and this product documentation.

Picture 1: Photograph of product with installed extension channels

Furthermore, connecting wires with different length are contained depending on the ordered accessories.

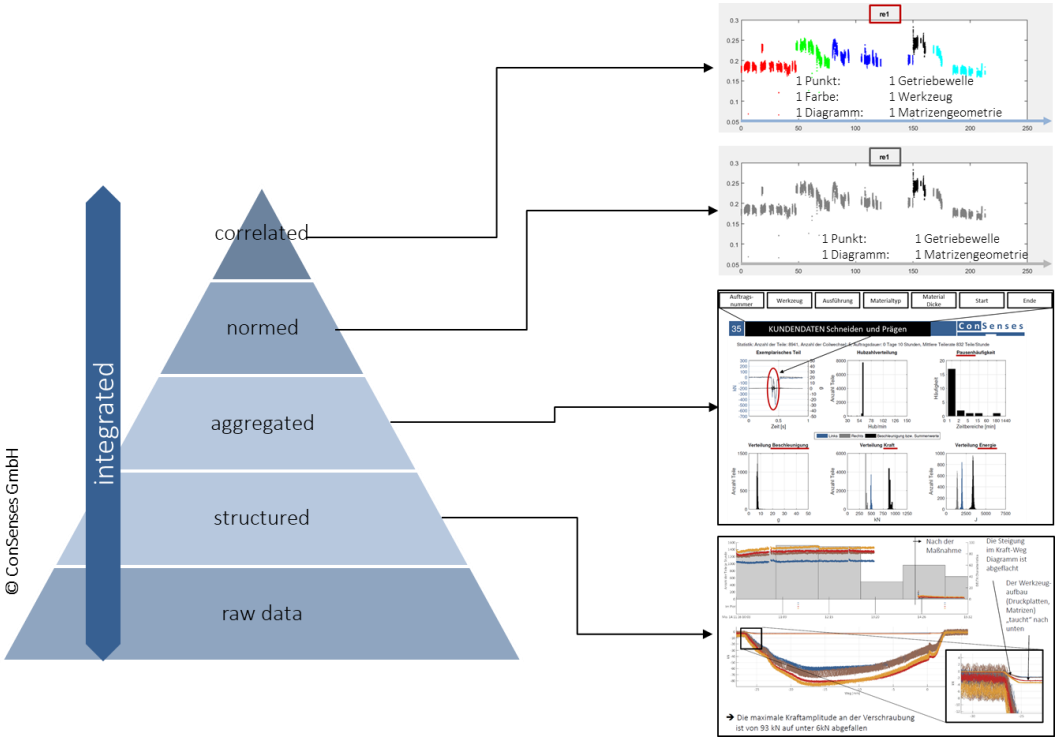
1.1.Software and data concept

The EdgeSenses device contains all needed software components for data acquisition and analysis:

ProcessScope is the control center of the ConSenses solution. The intuitive user interface allows for an easy, rapid and safe configuration – regardless whether you are operating a mobile development system or an installed process monitoring. The procedure is always the same. The intelligent data handling as well as the sophisticated storage concepts are controlled from ProcessScope. The coordinated systems provide a consistently high quality in data processing. This forms the basis for a sustainable and comprehensive usage of data.

ProcessScope provides connectivity to further systems as well: from central storage concepts to connectors for different enterprise software systems. This central control unit is where all threads run together. The benefits of consolidated data quality are accessible to every connected sensor.

SmartEvaluator is a high-performance tool for professional data processing. Quickly and clearly a huge amount of data can be presented and anomalies identified reliably. For a detailed analysis, the representative force curves can be dynamically loaded, grouped and highlighted for comparison. Another unique feature of SmartEvaluator is the intelligent construction of characteristic data to identify process changes even in extensive amount of data. The characteristic values reliably reflect physical facts which can be attributed to practical changes in the process over time. The browser-based interface allows for immediate report generation. The tab feature enables you to execute comparative analyses on a single monitor and even in complex context, lets you keep an overview on the analysis. Data sets can naturally be exported in standard formats for further analysis.



Picture 2: ConSenses Data management concept

Picture 2 shows the ConSenses data management concept. ProcessScope acquires data synchronously and stores them highly structured. Analog data may be aggregated precisely with digital sources. For statistical methods or advanced analytics, methods of artificial intelligence respectively, normalized characteristic values (Tech-KPIs) are calculated, which allow efficient and secure analysis.

1.2.Configuration options and accessory

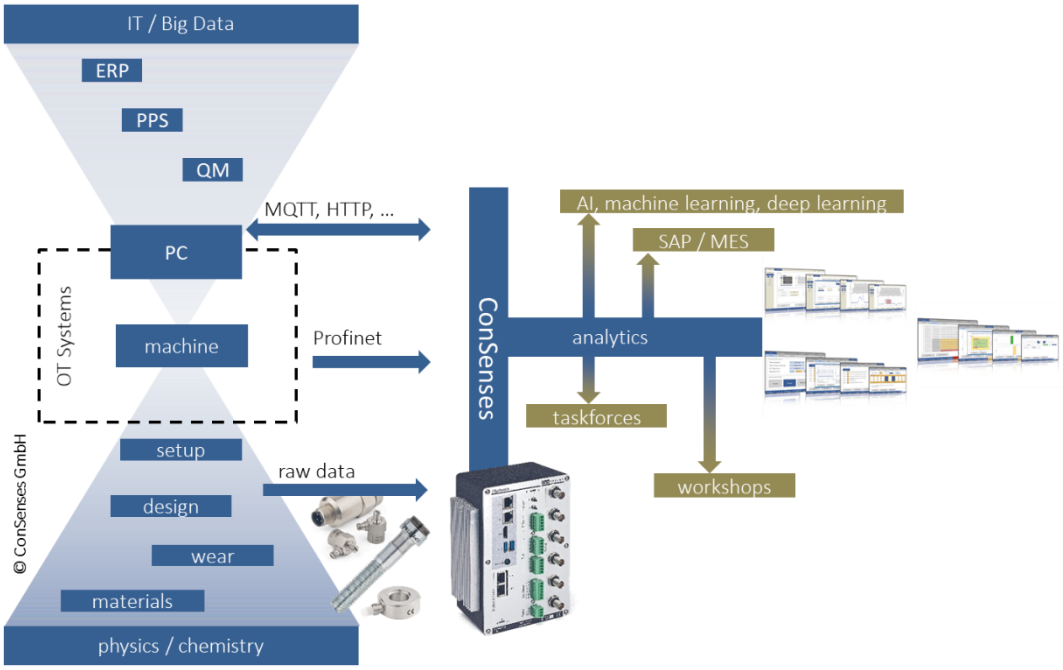
The six analog base channels can be equipped for the needed signal inputs. An overview of the available inputs is shown in chapter 6.3.2. Other accessory allows to add additional inputs. Please contact your vendor if you have special requirements or want to get closer information.

2. Function principle and application instructions

2.1. Working principle

EdgeSenses is the solution for integration of competences from mechanical production surrounding into digitalization concepts. The Edgedevice integrates raw data by means of native sensor inputs (Piezo, BA, IEPE, DMS, -10V … 10V), connection interfaces of machines via digital I/O as well as field bus communication and the full amount of connectivity of IT systems. Basically, one of the available network interfaces is connected to the machine network, the other into the company IIoT-infrastructure.

The device is designed for fully automated service without user interaction. For visualization at machines a graphical user interface in a strongly hardened Kiosk mode is running. Extensive configuration options are available via secured network access.



Picture 3: IIoT hour glas

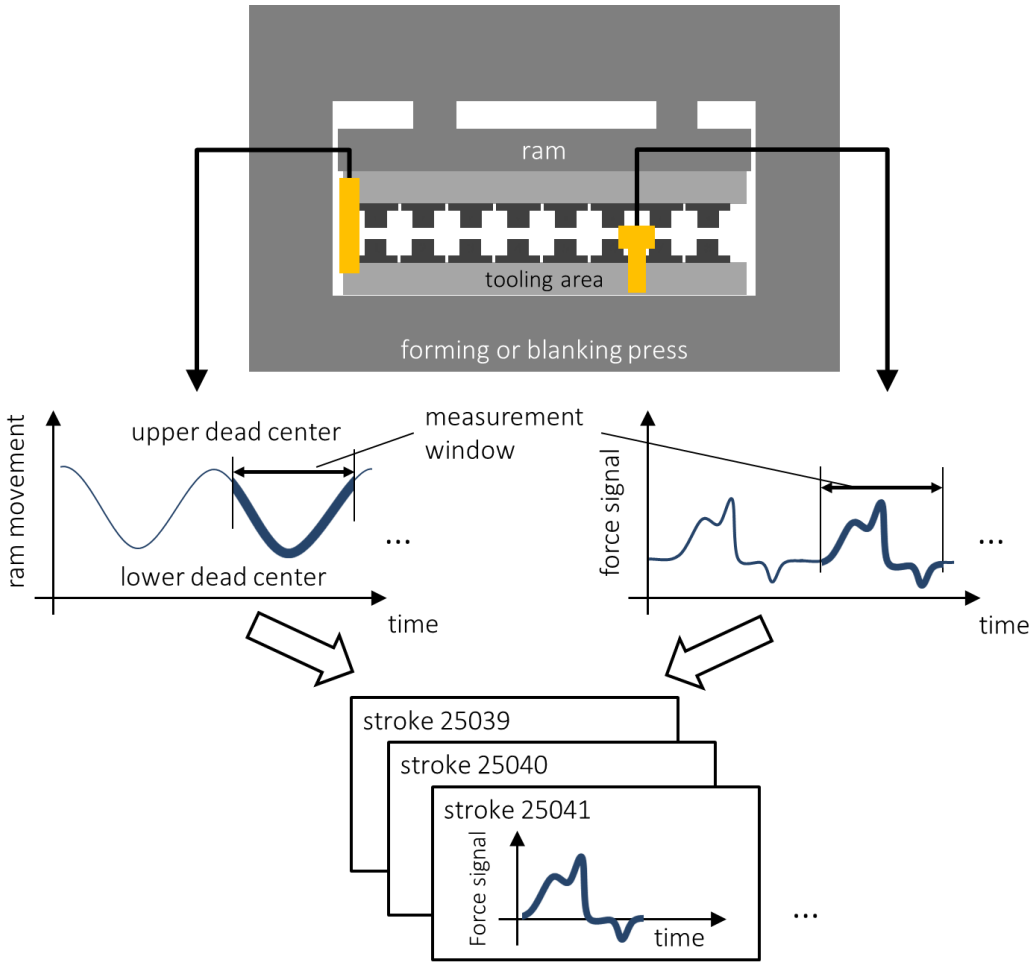
Picture 3 shows the IIoT hour-glass. Under the operative perspective, every working production machine is a bottleneck. From the organizational point of view (north side) multiple IT- and OT-systems are used to optimize usage of capacity. On the technological side (south side), process specific knowledge dominates, that leverages the availability and the efficiency of the specific facilities. EdgeSenses technology offers crucial functionalities to connect these two knowledge and processual domains (north & south), effectively. The following subchapters provide practical examples of successful applications in industrial surroundings.

2.2.Function in Technology layer: Process-analysis

Industrial production is typically characterized by repeating procedures. EdgeSenses contains several input options for process signals and -information which can reveal unwanted or unexpected fluctuations, uncertainties and/or process behavior.

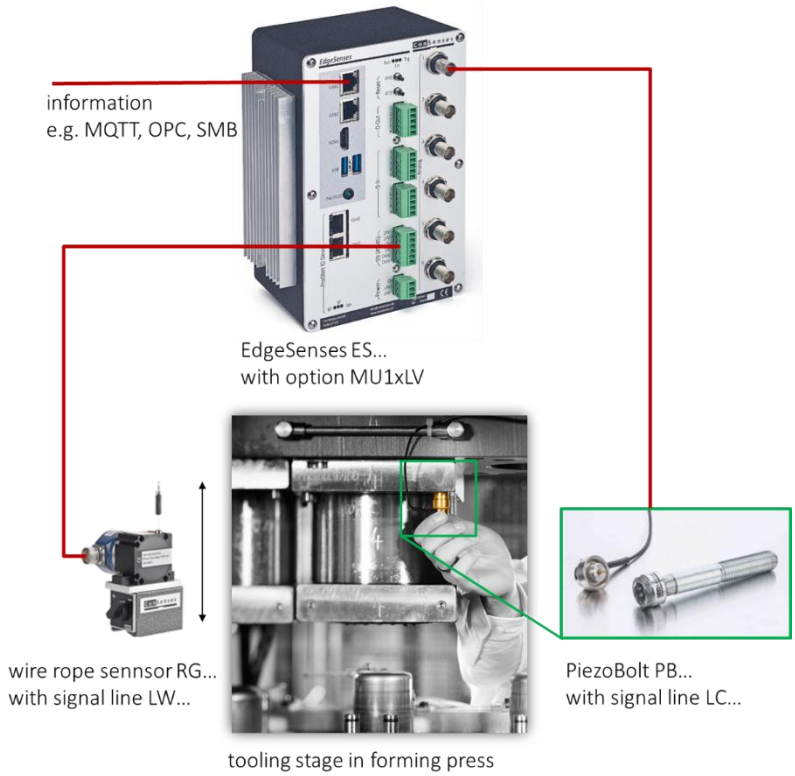
Primary the character of repetition in processes has to be identified. Typically, there is a time-period, a clock signal or repeating movement that characterizes the dominating work cycle. This context is used for definition of measurement windows.

This approach is shown exemplarily in Picture 4 for the force-/tool-travel measurement in a forming- or blanking machine.



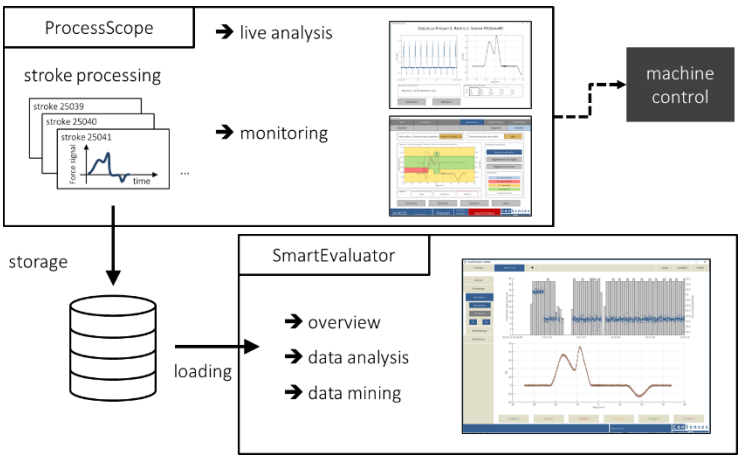
Picture 4: Exemplarily process analysis at a forming-/ blanking machine

Tool-travel and forming force per process stage may be measured e.g. by means of sensors and measurement setup as shown in Picture 5. The Picture shows additionally the integration of a digital information source for organizational data (north side) e.g. for fully automized process identification.



Picture 5: Example for acquisition of process characteristics force, tool-travel and process identification

A local buffering of acquired data within EdgeSenses is possible. ProcessScope and SmartEvaluator offer various options for automated and manual data analysis and processing. Picture 6 shows a typical workflow which is processed parallel.



Picture 6: Options of the contained software solutions

User instructions for the effective usage of these tools are available separately.

Specific visualization options for ad-hoc-process analysis in live visualizations are available for various production processes. Picture 7 shows exemplarily graphical user interfaces for condition monitoring of mechanical presses.

Picture 7: Options for visualization of ad-hoc process analysis

Because of the various input and connectivity options for additional information sources, the device constitutes a platform for digitalization on the shop floor layer in industrial production surroundings. The following chapter describes designs that allow provision of data within company IT-systems.

2.3.Function within IT-Layer: Gateway

The functions shown in chapter 2.2 are applicable without any further IT- /IoT-Integration. The exploitation of transfer through layers shown in chapter 2.1 is fully feasible, if the system is integrated into IT/IoT-infrastructure. Typically, EdgeSenses acts as source of high value data in these infrastructures, this means:

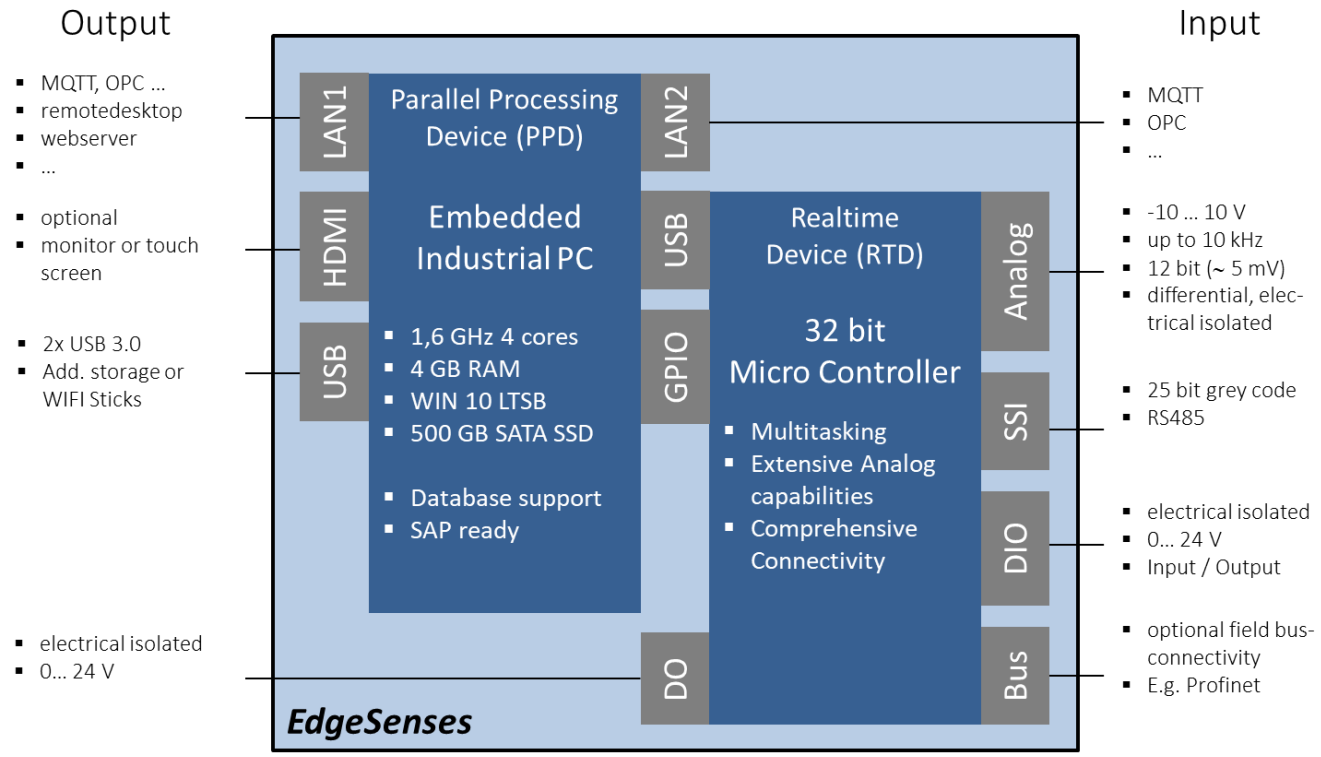
- Data is prepared for several data-aggregation layers directly at the machine. Thus, analytics-experts can work with speaking data immediately.
- Basically, we recommend to consider processing of raw-data within the data-management concept. The integrated storage capacity allows buffering of several month of raw data, which can be used as reference of for readjustment processes. Of course, garbage management must be activated.
- We offer several options for forwarding data into IT-/IoT-surroundings. EdgeSenses is prepared for all needed connectivity options for IoT-solutions, starting from individual socket connectors via proprietary file consume, IoT-standards like MQTT, OPC-UA and industrial standards like SAP-service calls. This enables direct connection of the mechanical process-world (south-side) with the transactional IT-environment (north-side)

In every case, the specific merit of a proper installed EdgeSenses device is, that in every of the before described cases data quality of acquired data is tested and warrantied. This means:

- Signals, acquired or mapped by EdgeSenses are processed synchronously. Synchronized devices deliver data with reliable temporal assignment, even if systems are strongly distributed or heterogenous. This is a crucial point for technological motivates analyses.
- On demand, ConSenses secures further investments in IoT technology by supporting the assessment of measurement locations of data sources, sampling rates, resolution and signal to noise ratio.

2.4.Technical realization

The measurement device EdgeSenses integrates an industrial PC and a microcontroller-based measurement device within a compact Aluminum housing. Following their key tasks, the both functional modules wear the description “parallel processing device“ (PPD) and “Realtime device” (RTD). Picture 8 schematically shows the interfaces of both devices and their interconnection. This visualization furthermore shows which input signals and -information from different sources are transformed, aggregated into output signals, stored locally and ore are prepared for visualization.



Picture 8: input and output linkage

The exploitation of various measurement or informational applications is possible based on the prepared signal and information-processing. Functionality of the systems configuration and settings is exemplarily shown in the above described application examples.

3. Safety instructions

3.1.Intended use

The EdgeSenses Device is designed for the usage as measurement system. The frame of usage is set by the individually input channel specifications. The application as signal converter within measurement chains for the monitoring of machine functions need application of safety coefficients.

Any other usage is not intended.

In order to mandate a safe operation, the product may only be used in accordance with the assembly instructions and in compliance with the following safety regulations along with the provided technical data. When in use for a particular application, the legal and safety regulations must also be observed. This applies similarly when the using accessories. The use of charge amplifier as a safety component is not intended.

Proper transport, appropriate storage and professional installation along with careful operation and maintenance are absolutely essential for correct and safe operation of charge amplifier.

3.2.Operating staff

This product is to be mounted and operated exclusively by the qualified personnel in accordance with the technical data in context with the undermentioned safety rules and regulations.

Qualified personnel are considered those who have been trained as operators of the facility and instructed with the safety concept and are familiar with the operation of product as described in the documentation. The operator must have carefully read and understood the installation instructions and safety precautions.

When using measurement system for the specific application, safety regulations for that particular application must also be observed. The same applies as well when using accessories.

Pay attention to safety conscious work and compliance of relevant accident prevention regulations.

3.3.Safety regulations and load capacity

For a safe operation of the measurement system, instructions regarding installation and load capacity are to be absolutely observed. Maximum load specified in the technical datasheets must not be exceeded. This concerns:

- Procedure for the adjustment of amplification factors.
- Temperature limits

Signal cables of the sensors must be installed so that the electromagnetic emissions do not cause interference to the sensor functionality.

Before each application, project planning and risk analysis should be carried out that takes into consideration all safety aspects of the surrounding technology. This applies particularly to the protection of personnel and equipment. In order to avoid defects or errors in systems that have a personnel, equipment damage or loss of data, additional safety precautions must be taken into consideration.

3.4.Supplementary notes on safety instructions

The EdgeSenses as a measurement system cannot assume any safety related feature by itself. For this reason additional components and equipment required for the safety of the installer and operator should be equally taken care of. Electronics handle the measurement signal such that in case of a failure of measurement signal, no subsequent damages can occur.

In the event of a failure through breakage or malfunctioning of charge amplifier that can cause harm to persons or equipment, the user must arrange to reach a securer operating state. Such measures can, for example, be achieved by joining or disjoining the safety devices or something similar and must at least satisfy the applicable accident prevention regulations.

3.5.General dangers of neglecting safety instructions

The EdgeSenses conforms to the state-of-the-art technology and are reliable to operate. However, an element of risk exists when operated improperly. For this reason, any person entrusted with installing, operating and dismantling of the device should read and understand the operating manual, especially the safety instructions.

Due to the improper use of EdgeSenses or by the non-observance of safety instructions, damage, malfunction, failure or breakage of EdgeSenses can occur. Especially by the failure of force sensors, equipment or persons in the vicinity can be harmed. A malfunction or failure of the EdgeSenses can have the consequence that the items or personnel in the vicinity of the EdgeSenses can be brought into danger.

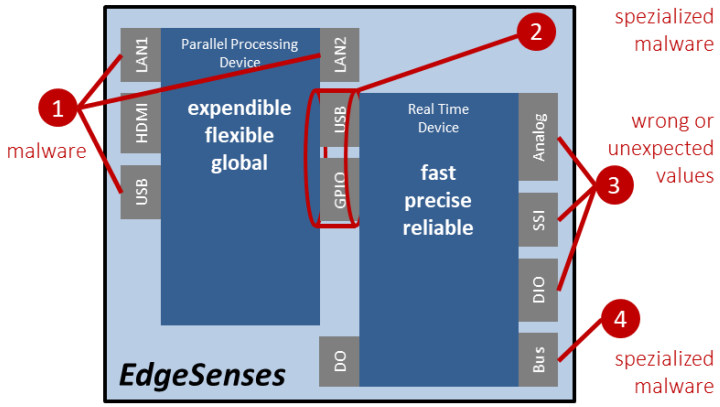
The services and items delivered as the product covers a signal converter and is only a part of the measuring chain. Additional safety related checks of the measurement chain are to be planned, realized and implemented by the equipment designer/installer/operator to minimize residual hazards. Existing regulations are to be observed.

3.6.Alterations and modifications

The product is not allowed to be modified without the explicit consent of the manufacturer. Any modification shall exclude any liability of the manufacturer for resulting damage.

4. IT/OT Security Concept

For security reasons, EdgeSenses is probed by consideration of potential attack vectors. The analysis is summarized in the following. Picture 9 structures basic points for attacks onto the device.



Picture 9: Possible points of attack at interfaces

The risk assessment of the attack location is summarized as follows:

1) All interfaces at the IT (PPD) side are exposed points of attack ➔ critical, see below for detailed action list
2) Due to the protected 1:1 binding protected against intrusion. Attack through taking over of code highly complex ➔ rather uncritical
3) Typical measurement technology ➔ uncritical
4) Only relevant if the option field bus connectivity is installed and activated. Attack nowadays very rare ➔ potential risk, measure: keep on track, follow recommendations of important consortia and expert groups. Is object of patching strategy.

Most points of attack are located at the LAN and USB interfaces of PPD. The action plan has to be designed case by case, but contains at least:

<u>Endpoint protection</u>

- Is possible on PPD. Should be specified between vendor and customer

<u>Interface security LAN1/LAN2</u>

- User concept on OS layer and within PPD-Software
- Restriction of ports and services
- End-to-end encoding

<u>Interface security USB</u>

- USB access only via defined processes e.g. connection of devices only by special user
- Polling of updates
- Pushing of data

The following hardening process is applied in order to avoid successful attacks.

4.1.Real Time Device (RTD)

The digital- and analog inputs of the device are mostly unproblematic. Wrong or unexpected measurement values lead to wrong or misleading data. Negative effects can be countervailed by 1) validation on the output side and 2) calibration on the input side.

In principle, highly specialized malware can attack at fieldbus interface. This is only possible if the fieldbus interface is active. In case of fieldbus connectivity, an individual risk assessment must be applied.

The RTD is patchable. For this reason, it is directly connected to PPT. The patch process is secured on multiple layers and protected by passphrase. An attack at this interface seems impossible without 1) opening of the device or 2) taking over the PPD.

4.2.Parallel Processing Device (PPD)

The operating system on the x86 architecture component is a Windows IoT Enterprise system. This means all LAN and USB interfaces are high risk points of attack for a large group of threads.

The following measures are applied in order to design and deliver a most robust system from the date of shipment:

- User concept
  - guiOperator
    - restricted usage of programs
    - NO password, running in kiosk mode
  - osAdmin
    - extensive rights for system configuration, access on file system
    - extensive rights
    - secure password
- Access concept
  - Local login
    - Automated login of guiOperator in hardened Kiosk-Mode
    - NO possibility to change user
  - RDP-login
    - Standard access for administration with osAdmin
    - Additional option to logon guiOperator for remote access on measurement

  The network access should be regulated further by customer IT.
- Removal media
  - Shall only be attached / activated by osAdmin
  - Access for guiOperator not allowed
- Endpoint protection / virus scanner
  - Standard: Windows defender in standard configuration
  - Usage of customer solutions possible and welcome
- Backup, Archiving
  - Image production by customer side
- Updates / containment
  - Concepts shall be designed between customer and vendor or standards applied
  - Windows Systems should be updated. Please be aware of down time for update initialization.
  - Updated may stress limited resources of PPD. Please consider fitting update concept.
- Garbage-management
  - EdgeSenses can archive or delete old data automatically.
  - Rules shall be designed for the specific use case.

Please remind: System, IT security and -safety must be considered in context of your IT-environment. ConSenses can take no liability for IT security and safety, since possible attack vectors through customer IT are not known.

5. Operation

5.1. Global guideline for integration

Treat EdgeSenses mildly. Thus, you prevent damages, that can compromise measurement results. Take care, that measurement systems are protected against harsh environments like saltwater, oil, coolant, snow rain ore ice.

Protect connectors against dirt and do not touch contacting surfaces. Wrong signals can occur if the isolation value of measurement chain (Sensor, connectors, cable and signal converter is reduced).

You should avoid the operation of EdgeSenses at high humidity (> 80 % relative humidity) Make sure that EdgeSenses is not overloaded (see chapter 3.3). Defects may result from the case of an overload. This may lead to thread for persons or machines. Take provisions against the case of an overload and measures for the case of a defect.

5.2. Mounting

The measurement system EdgeSenses is e.g. suited for the integration into control cabinets. The scope of supply contains adaptor for DIN rails. A minimum distance to other devices of at least 20 mm should be given to enable convective cooling. It is recommended to care for cooling of the control cabinet. Please mind the operating temperature.

Locknuts are mounted on the backside of the device. The adaptor for DIN-rails is preinstalled. If mounting on DIN-rail is not wanted, this connection might be used directly. The distance between holes in 46 mm maximum mounting depth for M5 bolts in these locknuts is 12 mm.

Cables are mounted from the front side, the underside respectively. Please care for enough room for bending radii of cables.

Please keep in mind to allow access to systems information.

5.3. System state-LEDs

Several state-LEDs are placed on the front plane of the device. The following table describes their functionality.

For an explanation of the status LEDs for the fieldbus connection, please refer to Chapter 7.

LED: PWR/HDD	state	meaning
	off	The PPD is off / shut down. Procedure for reboot refer to chapter 6.1.
	Pulsating or continuous	The PPD is running. Flashing of the LED indicates HDD/SSD activity.

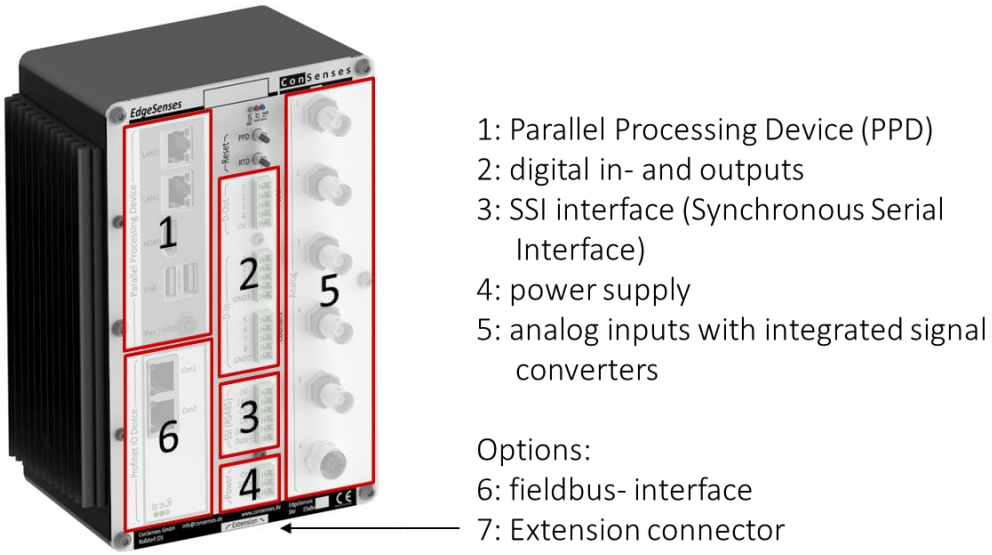
LED: Run	state	meaning
	off	The RTD is off / is in reset mode
	Pulsating green in second period	The RTD is working and sends data to the PPD

LED: Err	state	Meaning
	off	The RTD is internally disconnected or nbo failure
	glows weak red	The RTD is internally connected, but the polling process from the PPD is currently not running
	lights strong red	The watchdog-signal is missing, system reset takes place within 30 sec
	pulsating red in second period	Fatal failure mode of RTD. Please refer to the vendor

LED: Trg	state	meaning
	off	Reference sensor is not installed or not configured
	glows weak blue	Reference sensor is installed and configured. The measurement window is closed, no data are acquired
	lights strong blue	Reference sensor is installed and configured. The measurement window is open, data are acquired

6. Electrical Connection

EdgeSenses comes with several connectors for input- and output signals. The signal types can be subdivided in following groups:



Picture 10: Connector's overview

For electrical connection of signal or power lines, please proceed as follows:

1. Dismount the connector housing from the device
2. Remove isolation from the connector cable and mount it into to the screw terminal according to the printed polarity
3. Security check of polarization and voltage at the connector housing with voltage meter
4. If voltage and polarization are ok, connect the connector housing into the device

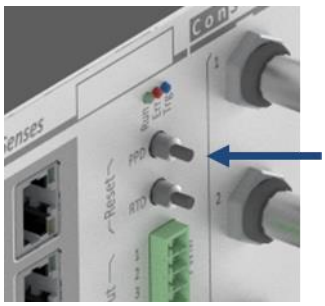
6.1.Power supply

For the connection of the 24V power supply, please proceed in the order as described in Chapter 6.

Picture 11: Connection of power supply

The integrated industrial PC (PPD) boots and the RTD is working as soon as the power supply is connected to the device.

A shutdown of the PPD is possible either by proper configured digital input, by OS-shutdown from osAdmin or by short pressing on the push button “PPD”. System boot process without un-powering of the system of a shutdown device can be initiated by short pressing on push button “PPD”.

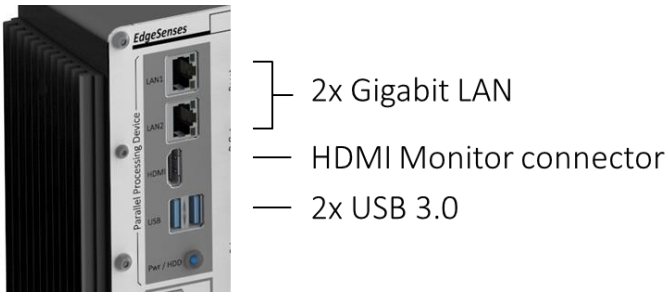


Picture 12: Initiation of shutdown- and boot procedure of PPD

The second push button “RTD“ resets the RTD.

6.2. Parallel Processing Device (PPD)

The front-plane of EdgeSenses offers the following connectors of the integrated industrial PC:



Picture 13: Connectors of PPD

E.g. for direct user interaction with ProcessScope and SmartEvaluator a touch monitor can be mounted to HDMI and USB-connector. (refer to chapter 2.2).

6.3.Inputs

6.3.1.Digital inputs

For the connection of digital inputs, please proceed in the order as described in chapter 6.

The inputs DIn 5-8 offer counter-functionality additional. This means they can be connected to incrementally working linear or rotation encoders directly and acquire these data in system sampling rate directly. For proper integration of encoders with A- and B-puls and a RS422 compatible TTL level, conversion boxed are available as accessory.

Please note: For Systems of the generation ESxA, only two counter inputs are available at DIn 6 and DIn 8.

6.3.2. Analog inputs

Multiple connectors for up to six analog sensor types are available depending on the configuration of the system. The connector type for analog sensors is either BNC or multipolar M12. The following table shows possible sensor types as well as electrical specifications:

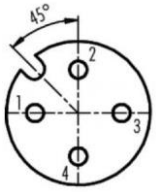
Sensor type / transducer type	Allowed Signal region	Sensor power supply	Device connector	Pin assignment
Piezo / Q350	+/- 350.000 pC	Not necessary	BNC socket	Center: Signal Shield: Ground
IEPE / IE	+/- 10 V	24 VDC, 4 mA		
Voltage / U0	+/- 10 V	Not necessary		
Voltage / U12 U24	+/- 10 V	12 VDC, max. 80 mA 24 VDC, max. 40 mA	M12 socket, 4 Pol 	1: Ground 2: Signal 3: Feed + 4: 0V
Voltage & DIn / BA	+/- 10 V, 0…5 V	12 VDC, max. 50 mA		1: Signal 2: Ground/0V 3: DIn 4: Feed +

Table 1: Sensortypes at analog inputs

6.3.3.SSI interface

For the connection of SSI input, please proceed in the order as described in Chapter 6.

Signal encoders with an SSI-output can be connected to this interface and data acquired in systems sampling rate. The interface provides connection to the system's power supply, a clock signal and data input for differential TTL-signals. The interface is preconfigured for 25-bit Gray-code.

6.4.Digital outputs

For the connection of digital outputs, please proceed in the order as described in Chapter 6.

7. Fieldbus-connector (optional)

EdgeSenses includes a communication module type “Hilscher comX51” configured for PROFINET IO Device

Picture 14: Connectors for the field bus connection

A generic GSD-file is available as download. Other configurations are available on request.

For the meaning of the status-LEDs refer to the following table:

LED	Color / state	Meaning
SYS „System“ (Duo LED yellow/green)	Green on	OS running
	Flashing yellow/green	Bootloader is waiting for Firmware.
	Yellow on	Bootloader is waiting for Software
	Off	Power supply for the device in missing or hardware is defect.
SF „System failure“ (LED red)	Red on	Watchdog Time-out; Channel-, generic of specific diagnosis is available; System failure
	Periodically flashing red with 2 Hz on: 3 sec.	DCP-Signal-Service is triggered via bus
	Off	No failure
BF „Bus failure“ (LED red)	Red on	No configuration or slow physical connection no physical connection
	Periodically flashing red with 2 Hz	No data exchange
	Off	No failure

8. Access modes, IT-integration of the device

The system is designed for the operation in complex IT-/IIoT infrastructure environments. It can be operated fully automized without monitor (headless). The system boots automatically after power supply is attached.

After the system start, the user guiOperator is logged on within the hardened kiosk mode.

For standard access onto the system, the remote desktop protocol (RDP) is activated on both network interfaces. As soon as a wifi USB – adapter is connected, the EdgeSenses mounts a wifi-Hotspot with the next boot.

DHCP is activated on all network interfaces by default. The computer name and wifi-SSID are set to the Systems serial number of the device. The preset wlan passphrase is “consenses”.

Mouse and keyboard and monitor can be attached for local access and visualization at the machine. The administration access via local devices is not possible within standard setup.

8.1. Quick start and/or access without IT-/IIoT-integration

The device is operable without integration into IT-/IIoT-infrastructure integration. The administration is done via network (RDP). Preinstalled measurement- and analysis tools are accessible via local login or RDP.

In standard setup no garbage-management is installed. Thus, user shall care for available storage and delete old measurement data from the device manually.

For longer operation periods the device-integration in IT-/IIoT-infrastructure is strongly recommended. Parallel analyses and measurement on the device should be avoided, because response time of analytics tools is reduced for the benefit of secure data acquisition. Analytics processes should take place on appropriate devices. The analytics software if free for multiple copying for customers.

The systems usage is prepared with the following presets in the basic configuration. Please be aware, that administration is only possible via RDP on the network ports (Pos. 1, 2 & 5). The device automatically logs on with guiOperator without password in kiosk-mode (Pos. 3 & 4) and starts the tools ProcessScope and SmartEvaluator.

Pos	Accesss	Primary function	Local user
1	LAN1	DHCP, RDP	osAdmin, guiOperator
2	LAN2	DHCP RDP	osAdmin, guiOperator
3	HDMI	Lokal Login	guiOperator
4	USB Option Mouse, Keyboard	Lokal Login	guiOperator
5	USB Option wifi	DHCP, RDP	osAdmin, guiOperator
6	USB Option removable devices	Locked for guiOperator	
7	optional: Profinet-connector	Not configured	

Table 2: Access points, primary functions and local for operation with and without IT-, IoT infrastructure

It falls to the customer to care for systems security by regular updates or proper encapsulation of the system (refer to chapter 4).

8.2. Integration as Infrastructural component

EdgeSenses can be operated as component of infrastructure. In this case the PPD must be configured in order to fit into the specific company infrastructure.

Typical configurations are:

- The local administrator osAdmin account is accessed via the company network (RDP).
- The guiOperator account is accessed via the company network (RDP) or local.
- Additional devices from the machine layer are connected to LAN2 in order to provide further data.
- Automated garbage-Management engaged, combined with archives on file servers.
- Preprocesses data is shipped via MQTT or REST-API into higher-order IT-/IoT-Systems.
- User specific visualizations are automatically shown via the local HDMI-Port.
- Case specific reports are prepared and distributed automatically.
- Update- and security-policies are applied on the device.

Pos	Access	Primary function	Lokal user
1	LAN1	DHCP, RDP, IoT-Protocols	osAdmin, guiOperator
2	LAN2	Machine network	appropriate user
3	HDMI	Local Login	guiOperator
4	USB Option Mouse, Keyboard	Local Login	guiOperator
5	USB Option wifi	DHCP, RDP	osAdmin, guiOperator
6	USB Option removable devices	locked for guiOperator	
7	optional: Profinet-connector	configurable	

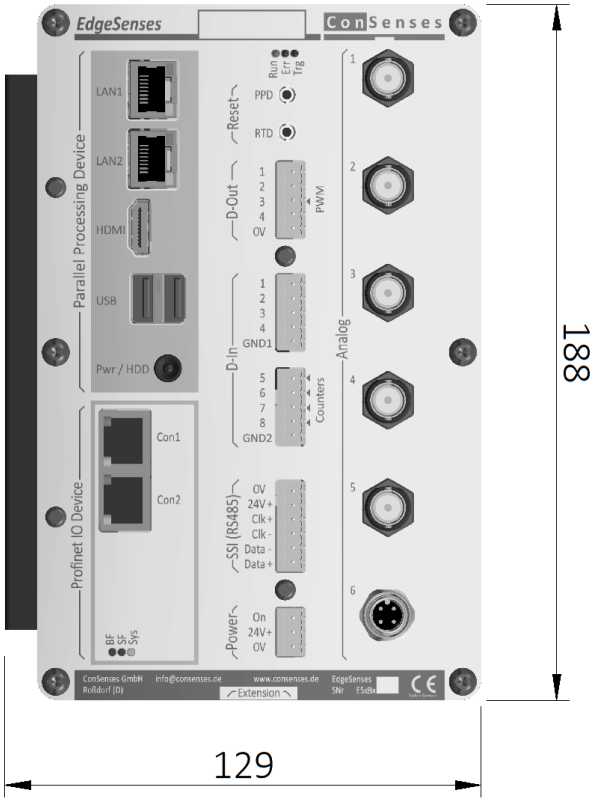
Table 3: Access points, primary functions and local for operation with and with IT-, IoT infrastructure

Confirmation by means of integration into IIoT systems is done by osAdmin.

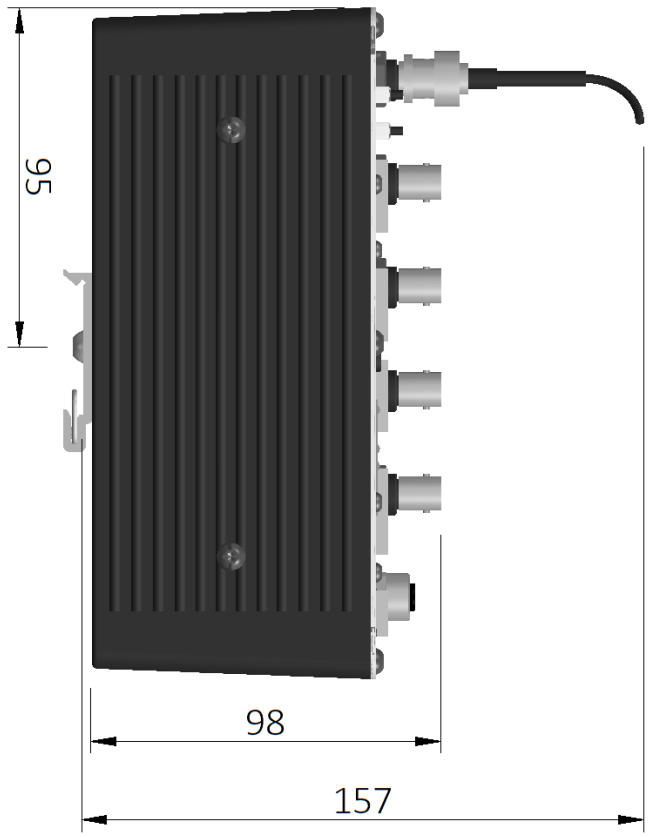
9. Datasheet

9.1.Dimensions

Front view



View from the side with connected cable and DIN rail mount



9.2.Technical Data

9.2.1.Ambient conditions

Operating temperature range	°C	0 … 45
Degrees of protection DIN EN 60529		IP30

9.2.2.Electrical Connection

Supply		
Voltage	VDC	24 (22 … 26)
Maximum power input	A	1,5 (at 24 VDC)
Connector		1 piece contained in scope of supply Order number: PHOENIX CONTACT MC 1,5/ 3-ST-3,81

Digital inputs		
Quantity of inputs		8 (2x 4 electrically isolated)
Level state „0“	V	0 … 5
Level state „1“	V	10 … 30
Maximum input current	mA	5 (at 24 VDC)
Connector		2 pieces contained in scope of supply Order number: PHOENIX CONTACT MC 1,5/ 5-ST-3,81
Counter inputs		ESxA: DIn 6 & DIn 8 2 pieces ESxB: DIn 5 … 8 4 pieces
Maximum counting frequency	MHz	4
Digital outputs		
Quantity of outputs		4
Level state „0“	V	< 0,1 (at output current 5 mA)
Level state „1“	V	Voltage supply – 0,1 (at output current 5 mA)
Maximum output current	mA	40 (at 24 VDC)
Connector		1 piece contained in scope of supply Order number: PHOENIX CONTACT MC 1,5/ 5-ST-3,81
SSI Interface (Synchronous Serial Interface)		
Signal output / -input		RS-422 / 485
Clock frequency	MHz	0,25 - 1 (standard: 0,5)
Connector		1 piece contained in scope of supply Order number: PHOENIX CONTACT MC 1,5/ 6-ST-3,81
Analog inputs		electrically isolated, differential voltage inputs
Voltage range	V	-10 … 10
Resolution	bit	12
Class of accuracy	%	0,5
Maximum sampling frequency	kHz	5

9.2.3.Parallel Processing Device (PPD)

Processor (CPU)		Intel® Atom Processor E3940 (9.5W TPD, 4 Cores)
Working memory (RAM)	GB	4
Hard drive	TB	0,25 – 2; 2,5“ SSD SATA (Standard: 0,5)
Operating system		Windows IoT Enterprise LTSB/C

10. Declaration of Conformity

CE

We,

ConSenses GmbH, Arheilger Weg 11, D-64380 Roßdorf, Germany

declare under our sole responsibility that the product

EdgeSenses

in the design

ESx…

Meets the following regulations of the European Union:

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

Consequently, the underlying relevant standards or normative documents are listed herein:

EN 61326-1: 2013 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements

EN 61326-2-3:2013 Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-3 Particular requirements – Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

Signed for and on behalf of:

ConSenses GmbH

Roßdorf, 01.08.2018

Dr. Matthias Brenneis, Director