

KUKA

Device Connector

KUKA.DeviceConnector

Product presentation





_What it is

KUKA.DeviceConnector (KDC) is the software package which provides robot data for KUKA digital products/services or any customer application (cloud or on-premise). It provides access to the data via OPC UA or MQTT.



Cost effective

Running cloud services without additional hardware



High security level

Built-in security, based on same standards as online banking (TLS 1.2)
Point-to-Point encryption (P2PE)



One software for OPC UA and MQTT

The KDC enables access to robot data via the two major protocols OPC UA and MQTT (also in parallel)



Data access for customer applications (cloud or on-premise)

Creation of context-based database for further use cases



Reduced data traffic

Data traffic can be reduced by a minimum due to customized configuration for your specific use cases

_What it is – OPC UA and MQTT

The KUKA.DeviceConnector software package enables access to data via two protocols:

OPC UA: Data transmission can be performed **bidirectionally** within a network by **OPC UA**.

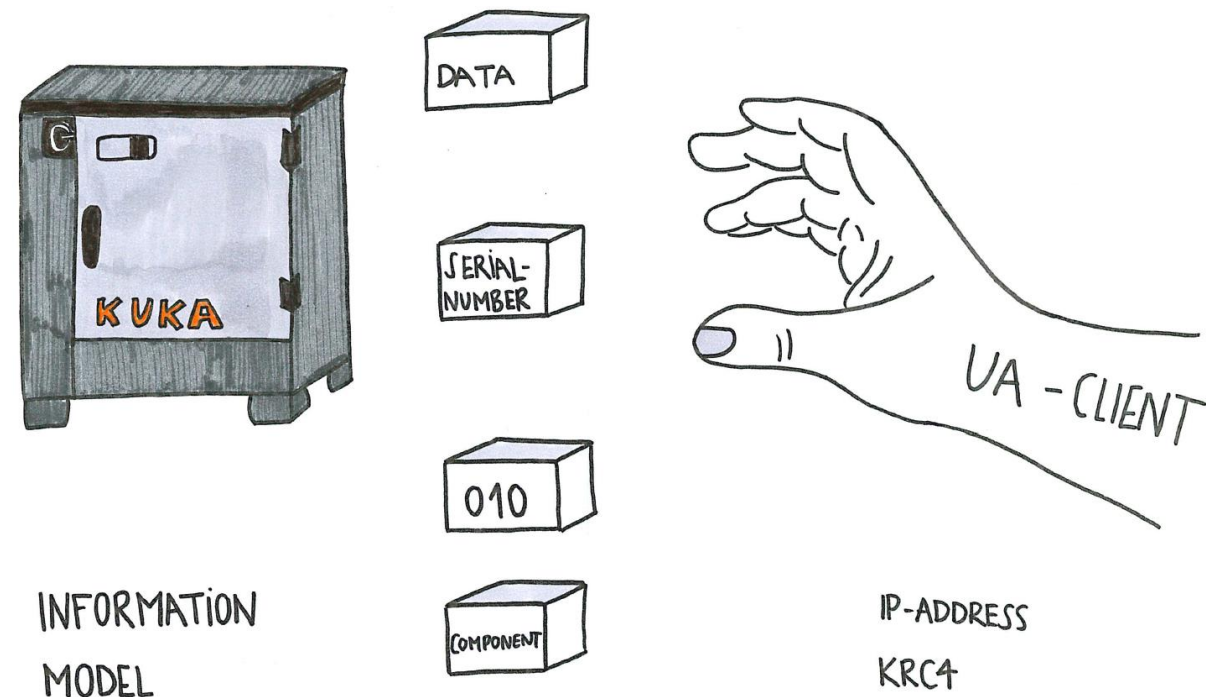
- Using the robot controller as an OPC UA server
- Connection of several OPC UA clients
- Reading robot data
- Read and write process variables (configurable)
- System messages via OPC UA events
- File transfer

Supported OPC UA Information Models

- Part 100: Device Information Model
- OPC UA for Robotics
- OPC UA for PLCopen
- OPC UA for PROFINET
- OPC UA for Machinery



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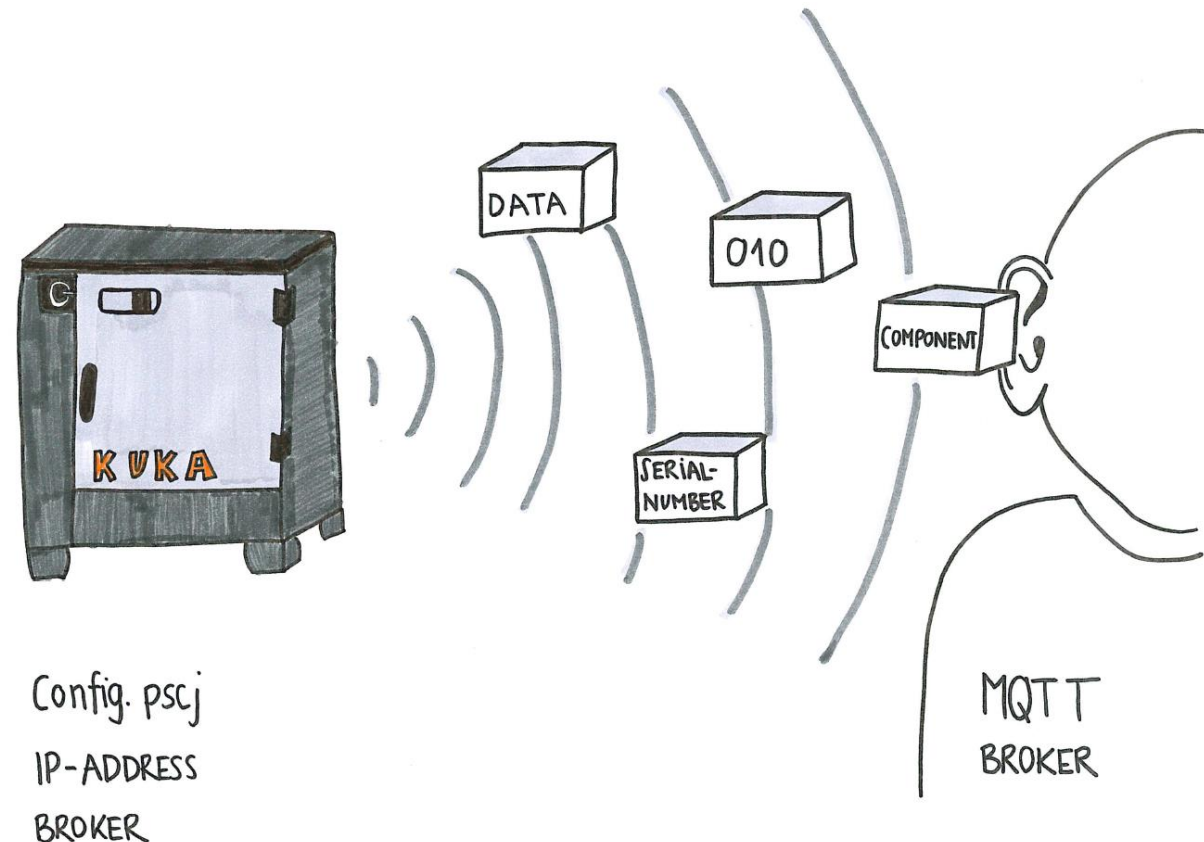


_What it is – OPC UA and MQTT

The KUKA.DeviceConnector software package enables access to data via two protocols:

MQTT: The **MQTT** protocol enables **unidirectional** data transmission **across network boundaries**.

- Robot controller as MQTT client
- Connection of several MQTT brokers
- Publishing robot data
- Publish process variables.





_Scope of “VDMA 40010“ OPC UA Companion Specification Robotics

Robot data

- Serial number
- Model and manufacturer
- Type of kinematic system
- Parameter set
 - Program execution speed
- Axis information
 - Motion type
 - Axis position
- Drive information
 - Motor temperature
- Safety controller / robot
 - Safety states
 - Operational Mode
 - EMERGENCY STOP, Protective Stop



Robot Data

According to the VDMA 40010
 OPC UA Companion Specification Robotics
<https://opcfoundation.org/about/opc-technologies/opc-ua/>

Controller data

- Serial number
- Model and manufacturer
- Current user level
- (Installed) Software
- Data of integrated components
- Task controller
 - Name of the loaded task program
 - Task execution mode
 - Task progress information



_Access to thousands of robot data, files and messages

Asset Management

- Robot information
- Installed TechPackages
- HW / Firmware version (integrated components)
- and many more

Communication

- I / O signals
- AUT_EXT signals

File Transfer

- Power management logs
- Diagnosis via KRC Diag
- Brake test logs
- Setup / System logs
- User Data
- POSLOGS, Ethercat logs



Robot Data and File Transfer

The KUKA.DeviceConnector allows access to more than thousands of robot data

Messaging / Alarming

- Error messages
- Event logs

Condition Monitoring

- Robot / Controller run time
- Load data
- Dynamic data like axis position and speed
- and many more KRL variables

Safety information

- Brake test information
- Mastering reference
- Safety stop
- Safe technology
- Safety checksum



_Order data


Product	Order no.	Usable with	Price	Remark
KUKA.DeviceConnector pre-installed 1.1	00-337-680	(V)KSS 8.2	inclusive	Download via KUKA Marketplace
KUKA.DeviceConnector 1.1	00-337-681	(V)KSS 8.2	€600,-	Will receive no further updates
KUKA.DeviceConnector pre-installed 2.1	00-337-682	(V)KSS 8.3, 8.5, 8.6, 8.7	inclusive	Download via KUKA Marketplace
KUKA.DeviceConnector 2.1 (Basic)	00-337-683	(V)KSS 8.3, 8.5, 8.6, 8.7	€600,-	Access VDMA data
KUKA.DeviceConnector CustomerData 2.1	00-395-002	(V)KSS 8.3, 8.5, 8.6, 8.7	€350,-	Access customer data / variables
KUKA.DeviceConnector SystemVars 2.1	00-396-245	(V)KSS 8.3, 8.5, 8.6, 8.7	€800,-	Access system variables
KUKA.DeviceConnector Messages 2.1	00-395-001	(V)KSS 8.3, 8.5, 8.6, 8.7	€350,-	Access messages
KUKA.DeviceConnector FileTransfer 2.1	00-396-244	(V)KSS 8.3, 8.5, 8.6, 8.7	€350,-	Access files
KUKA.DeviceConnector SoftPLC 2.1	00-394-998	(V)KSS 8.3, 8.5, 8.6, 8.7	€150,-	Access SoftPLC data
KUKA.DeviceConnector Advanced 2.1*	00-395-004	(V)KSS 8.3, 8.5, 8.6, 8.7	€2000,-	Includes all functions

* Free trial on request (DigitalServices.Robotics.De@kuka.com)



_Order information

You should also know that ...

- **KUKA.DeviceConnector pre-installed 2.1** → KUKA Marketplace  Download or KUKA Media Kit
 - Software pre-installed on all KUKA robots free of charge
 - Customer OPC UA clients see all data points, but no values
 - Privileged access for KUKA products (e. g. KUKA iiQoT)
 - Product legitimation by KUKA signed certificates
- **KUKA.DeviceConnector 2.1 xx** → KUKA Media Kit
 - Is a license option to buy - once-only payments
 - Accessable data depending on licenses
 - Each license is independent of eachover except
 - Advanced include all functions & data – no need for further licenses
 - SystemVars included access to customer data (CustomerData)



_Business model KUKA.DeviceConnector 2.1 (OPC UA & MQTT)

Pre-installed version (prerequisite)
Pre-installed compatible with KUKA products (e. g. iiQoT)

Basic (VDMA)
600 €

System Vars
800 €

Customer data
350 €

Messaging
350 €

File Transfer
350 €

SoftPLC data
150 €

Advanced (Full functionality)
2000 €

Trial license 90d*
(like Advanced)

* Free trial on request (DigitalServices.Robotics.De@kuka.com)

Articles	Price
Basic: KUKA.DeviceConnector 2.1 VDMA mandatory data	600 €
SoftPLC data: KUKA.DeviceConnector SoftPLC 2.1 Soft PLC data (e. g. M2M communication)	150 €
Customer data: KUKA.DeviceConnector CustomerData 2.1 Customer data / user variables (e. g. transfer process data)	350 €
Messages: KUKA.DeviceConnector Messages 2.1 Messages (to transfer Messages)	350 €
File Transfer: KUKA.DeviceConnector FileTransfer 2.1 File transfer incl. logs (e. g. file exchange)	350 €
System Vars: KUKA.DeviceConnector SystemVars 2.1 System variables incl. Customer Data (e. g. variable exchange)	800 €
Advanced: KUKA.DeviceConnector Advanced 2.1 Full functionality (e. g. cloud connection)	2.000 €
Trial: KUKA.DeviceConnector Trial 2.1 (90 days)	0 €
Pre-installed: KUKA.DeviceConnector pre-installed 2.1	0 €



_Business model KUKA.DeviceConnector 2.1 (OPC UA & MQTT): Use cases

Customer access to data
(e. g. custom HMI, dashboards)

Basic:

Asset management, live condition data (e. g. mechanics)

SoftPLC data:

M2M communication, access data from external components / machines, CNC

Customer data:

Transfer data from processes (e. g. process quality), access customer variables (e. g. for cycle time analysis)

Messages:

Access messages from robot, error messages (e. g. fault diagnosis), trigger conditions (e. g. for cycle time analysis)

File Transfer:

Transfer files, backup & restore, logs (e. g. fault diagnosis), diagnosis files (e. g. field bus diagnosis)

System Vars:

Advanced condition monitoring and data analysis (e. g. mechanics, position data, control data, load data, process data, tracking error)

Advanced:

Full functionality (e. g. cloud connection) including future features & diagnosis monitor

Trial:

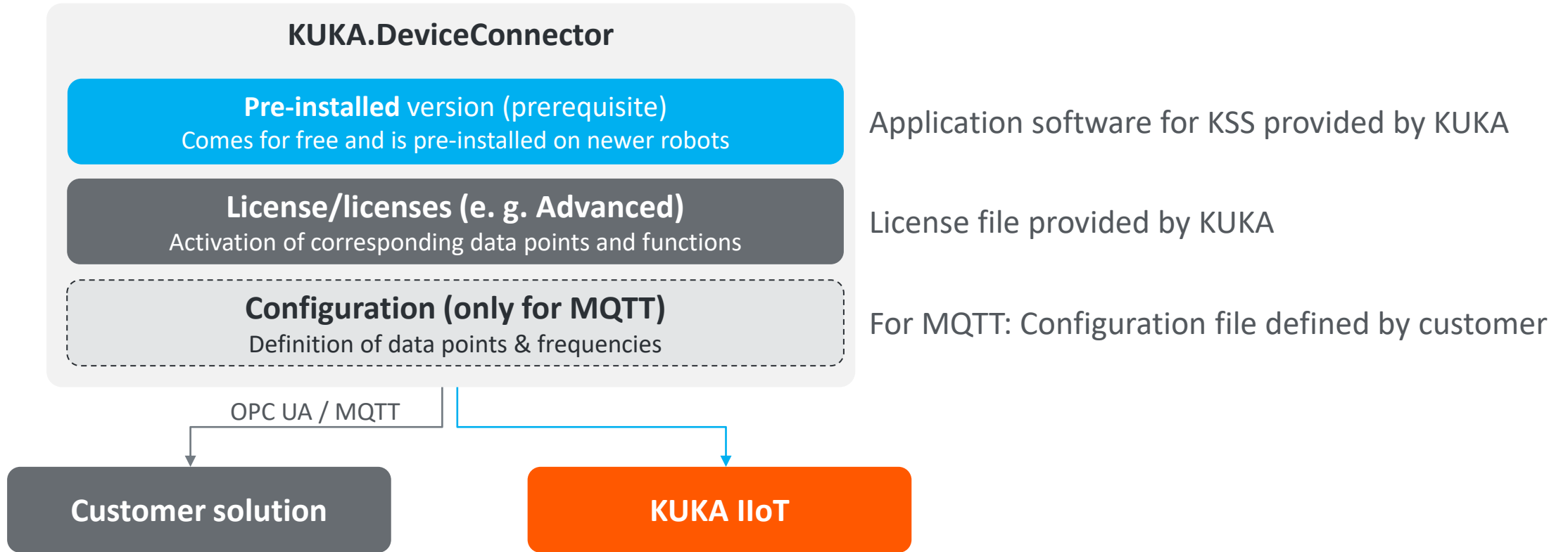
Free test of all functionalities to be convinced of the product and identify needed packages

**KUKA
IIoT**

Pre-installed: Prerequisite for all packages, comes for free and is pre-installed on newer robots
Out of the box connectivity for KUKA IIoT products (e. g. iiQoT)



_KUKA.DeviceConnector: Licensing & configuration



For OPC UA: Configuration via client



_Business model KUKA.DeviceConnector 2.1: Included data & functions

Advanced: Included data & functions

- VDMA OPC UA Robotics data (part of Basic)
- System variables (max. frequency 20 Hz*) (part of SystemVars)
 - Incl. Customer folder (part of CustomerData)
- Files (part of FileTransfer)
 - File transfer: all folders, read & write access
 - Log (all logs)
- Messages (part of Messages)
- Diagnosis monitor
- Soft PLC data (part of PLC)
- Future feature: WoV projects, Ikarus, Profinet CS (included, because Advanced has no limitations)

* Due to the asynchronous nature of the protocols, the frequencies cannot be guaranteed. The achieved frequencies are also dependent on the number of data points and the load of the controller.



_Data as a Service offer

KUKA.Device Connector allows access for KUKAs digital services or any customer application (on-premises / cloud)

KUKA.DeviceConnector for selling raw data to customer with non KUKA cloud/on premise applications

Customer Cloud



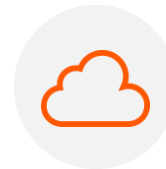
Customer App



Activated by license certificate
- Licence costs for KDC activation (see detailed slides)

KUKA.DeviceConnector enables KUKAs digital products and services

KUKA iiQoT



KUKA VCS



License + Certificate

License + Certificate

Activated by certificate (provided by KUKAs digital products)
- no licence costs for KDC activation



KUKA Device Connector on KRC 4 controllers

KUKA.DeviceConnector pre-installed 1.1 for KSS 8.2 (337680)

KUKA.DeviceConnector pre-installed 2.1 for KSS 8.3 and higher (337682) – installed on every new controller since 12/19

_Value Proposition Summary

Cross-platform access to robot data in a secure & simple way.

Value Propositions:

Speedy setup

- Zero configuration (OPC UA) for I/Os
- Zero configuration (OPC UA) to add new variables
- KUKA.DeviceConnector pre-installed on all KUKA Robots

Simple and intuitive

- Out of the box connectivity to KUKA products (e. g. iiQoT)
- Select from pre-defined data and extend it with your own data

Cost effective

- Running cloud services without additional hardware

Secure

- built-in security, based on same standards as online banking
- Point-to-Point Encryption (P2PE)



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Business Motivation / About:

- Connect KUKA controllers to KUKA or customer products
- Ready4 IIoT / Industry 4.0 business

You should also know that ...

- KUKA.DeviceConnector offers OPC UA + MQTT
- KUKA.DeviceConnector pre-installed for free
- KUKA.DeviceConnector with AIDA / VDMA Robotics Standard
- Free data source for KUKA products (e. g. iiQoT)



_System Requirements / Limitations (KUKA.DeviceConnector 2.1)

Robot control:

- KUKA System Software 8.3, 8.5, 8.6 or 8.7
- VW System Software 8.3, 8.6 or 8.7
- Prerequisite for KUKA.DeviceConnector 2.1 is KUKA.DeviceConnector pre-installed 2.1
- The installation of KUKA.DeviceConnector is possible via KUKA HMI or WorkVisual

Limitations:

- Not compatible with KUKA.OPC Server 4.0 or 4.1
- Maximum sampling rate: 20 Hz (except Basic with maximum 1 Hz)

Laptop/PC:

- For KUKA and VW System Software 8.3: WorkVisual 4.0.x
- For KUKA System Software 8.5: WorkVisual 5.0.x or higher
- For KUKA and VW System Software 8.6 and 8.7: WorkVisual 6.0

-
- Port 4840 is necessary
 - Connect the client to the server, the server endpoint URL:
 - `opc.tcp://IP address:4840/`
 - `opc.tcp://controller name:4840/`



_References

Documentations

- <https://xpert.kuka.com/>

Sales-Webinar OPC-UA / CS-Webinar OPC-UA

- <https://xpert.kuka.com/>

OPC Foundation Information

- <https://opcfoundation.org/about/opc-technologies/opc-ua/>

MQTT Community

- <http://mqtt.org/>



_Tools

In order to process the data published with KUKA.DeviceConnector 2.1, an OPC UA client or MQTT broker is required. It is recommended to use the following demo tools for test purposes:

- For OPC UA:

- **UaExpert v1.4.x** or higher.

- UaExpert is a full-featured OPC UA Client which is capable of several OPC UA Profiles and features.
<https://www.unified-automation.com/downloads/opc-ua-clients.html>

- For MQTT:

- **mosquitto v1.6.2** or higher.

- Eclipse Mosquitto is an open source message broker that implements the MQTT protocol: <https://mosquitto.org/download/>

- **MQTTLens**

- A Google Chrome application, which connects to a MQTT broker and is able to subscribe and publish to MQTT topics.
<https://chrome.google.com/webstore/detail/mqttlens/hemojaeigabkbcookmlgmdigohjobjm?hl=de>