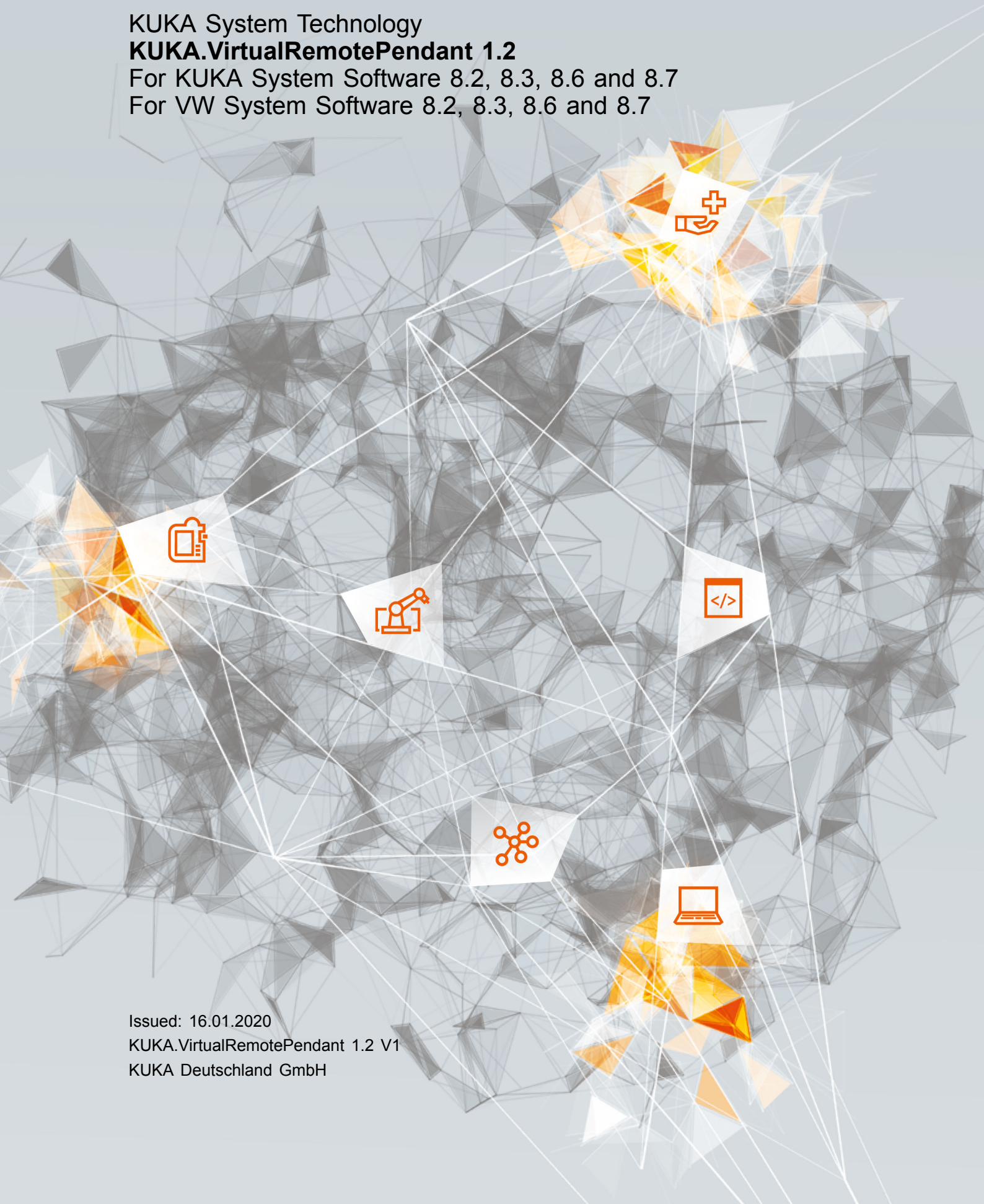
KUKA System Technology

KUKA.VirtualRemotePendant 1.2

For KUKA System Software 8.2, 8.3, 8.6 and 8.7

For VW System Software 8.2, 8.3, 8.6 and 8.7



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KUKA.VirtualRemotePendant 1.2 V1

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Other functions not described in this documentation may be operable in the controller. The user has no claims to these functions, however, in the case of a replacement or service work.

We have checked the content of this documentation for conformity with the hardware and software described. Nevertheless, discrepancies cannot be precluded, for which reason we are not able to guarantee total conformity. The information in this documentation is checked on a regular basis, however, and necessary corrections will be incorporated in the subsequent edition.

Subject to technical alterations without an effect on the function.

KIM-PS5-DOC

Translation of the original documentation

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Contents

1 Introduction

1.1 Target group

This documentation is aimed at users with the following knowledge and skills:

- Knowledge of the robot controller system
- Basic knowledge of the Windows operating system
- Basic knowledge of network technology

For optimal use of KUKA products, we recommend the training courses offered by KUKA College. Information about the training program can be found at www.kuka.com or can be obtained directly from our subsidiaries.

1.2 Industrial robot documentation

The industrial robot documentation consists of the following parts:

- Documentation for the robot arm
- Documentation for the robot controller
- Documentation for the smartPAD-2 (if used)
- Operating and programming instructions for the System Software
- Instructions for options and accessories
- Spare parts overview in KUKA Xpert

Each of these sets of instructions is a separate document.

1.3 Representation of warnings and notes

Safety

These warnings are provided for safety purposes and **must** be observed.

DANGER

These warnings mean that it is certain or highly probable that death or severe injuries **will** occur, if no precautions are taken.

WARNING

These warnings mean that death or severe injuries **may** occur, if no precautions are taken.

CAUTION

These warnings mean that minor injuries **may** occur, if no precautions are taken.

NOTICE

These warnings mean that damage to property **may** occur, if no precautions are taken.

These warnings contain references to safety-relevant information or general safety measures.
These warnings do not refer to individual hazards or individual precautionary measures.

This warning draws attention to procedures which serve to prevent or remedy emergencies or malfunctions:

SAFETY INSTRUCTION

The following procedure must be followed exactly!

Procedures marked with this warning **must** be followed exactly.

Notices

These notices serve to make your work easier or contain references to further information.

Tip to make your work easier or reference to further information.

1.4 Terms used

Term	Description
KLI	KUKA Line Interface Ethernet interface of the robot controller for external communication
KRL	KUKA Robot Language KUKA robot programming language
KSS	KUKA System Software
KUKA smartPAD	see “smartPAD”
KUKA smartPAD-2	see “smartPAD”
RoboTeam	Continuous path motions of RoboTeam participants which are synchronized and/or geometrically coordinated.
RoboTeam participant	Participant in a RoboTeam. A participant can be a robot, a turn-tilt table or a rotational axis.
smartHMI	smart Human-Machine Interface User interface on the smartPAD
smartPAD	Programming device for the robot controller The smartPAD has all the operator control and display functions required for operating and programming the industrial robot. 2 models exist: • smartPAD • smartPAD-2 In turn, for each model there are variants, e.g. with different lengths of connecting cables. The designation “KUKA smartPAD” or “smartPAD” refers to both models unless an explicit distinction is made.
VRP	Virtual Remote Pendant

VSS	VW System Software

1.5 Trademarks

Windows is a trademark of Microsoft Corporation.

2 Product description

2.1 Product description

Description

The KUKA.VirtualRemotePendant 1.2 option package is a virtual KUKA smartPAD which can be used to access any robot controller that has a network connection via the KLI. Unlike with the real KUKA smartPAD, jogging the robot does not require enabling with the enabling switch.

Functions

- The same functions as a real KUKA smartPAD with the following limitations:
  - The robot can be moved under manual or program control only under the following conditions:
    - The robot controller is operated in AUT EXT mode before the connection is established.
    - The safety gate is closed and acknowledged.
  - It is not possible to switch to CRR (Controlled Robot Retraction) mode.
  - The test operating modes T1 and T2 that can be selected with KUKA.VirtualRemotePendant do not correspond to the operating modes in the standard EN ISO 10218-1, but are equivalent in terms of the safety level.
  - It is not possible to archive data from robot controllers to the PC/ laptop on which KUKA.VirtualRemotePendant is installed.
  - Manual manipulation of digital or analog outputs is only possible with the safety gate closed and acknowledged.
  - It is not possible to operate a RoboTeam with KUKA.VirtualRemotePendant.

2.2 Intended use and misuse

Use

KUKA.VirtualRemotePendant 1.2 is intended for operating a robot system via the KLI interface instead of using the KUKA smartPAD for this purpose.

KUKA.VirtualRemotePendant 1.2 may only be installed on a PC that meets the specified system requirements. This PC must not be a robot controller. Within reach of the PC there must be a functioning EMERGENCY STOP device that acts on the robot system to be operated.

Misuse

Any use or application deviating from the intended use is deemed to be misuse and is not allowed. KUKA Deutschland GmbH accepts no liability for damage or injury caused thereby. The risk lies entirely with the user.

Examples of such misuse include:

- Using KUKA.VirtualRemotePendant to operate a robot system that is outside the user's field of vision
- Operating a robot system with KUKA.VirtualRemotePendant without an active EMERGENCY STOP device within the user's reach

3 Safety

This documentation contains safety instructions which refer specifically to the option package described here.

The fundamental safety information for the industrial robot can be found in the “Safety” chapter of the Operating and Programming Instructions for System Integrators or the Operating and Programming Instructions for End Users.

Comply with safety-relevant information
The safe use of this product requires knowledge of and compliance with fundamental safety measures. Death, severe injuries or damage to property may otherwise result.

- The “Safety” chapter in the operating and programming instructions of the system software must be observed.

WARNING

The safety measures for the KUKA smartPAD, described in the “Safety” chapter of the Operating and Programming Instructions of the System Software, also apply for KUKA.VirtualRemotePendant and must be observed accordingly. Death to persons, severe injuries or considerable damage to property may otherwise result.

4 Planning

4.1 EMERGENCY STOP device

The system integrator is responsible for ensuring that an EMERGENCY STOP device is installed at each remote operating station. This EMERGENCY STOP device must act on the EMERGENCY STOP circuits whose robots and robot systems can be operated from the respective remote operating stations. A remote operating station is a laptop or PC on which KUKA.VirtualRemotePendant is installed and which is connected to robot controllers via KLI.

5 Installation

5.1 System requirements

Hardware

- KR C4 or KR C5 robot controller

Software

Laptop/PC:

- Windows 7 or Windows 10 (32-bit or 64-bit)
- Graphics card with a resolution of at least 1024 x 768 pixels

Robot controller:

- KUKA System Software 8.2.x, 8.3.x, 8.6.x or 8.7.x
- Or VW System Software 8.2.x, 8.3.x, 8.6.x or 8.7.x

The numbers of the required releases must be taken from the file ReleaseNotes.txt. The file is located on the data storage medium containing KUKA.VirtualRemotePendant 1.2.

5.2 Installing KUKA.VirtualRemotePendant

KUKA.VirtualRemotePendant must not be installed on a robot controller, Office PC or OfficeLite virtual machine.

Precondition

- Local administrator rights

Procedure

1. Start the program **Setup.exe** from the CD-ROM.
2. Select the desired language and click on **Next >**.
3. The installation wizard opens. Click on **Next >**.
4. Accept the license agreement and click on **Next >**.
5. Read and accept the safety instruction and click on **Next >**.
6. Select the directory and click on **Next >**.
7. Click on **Install**. KUKA.VirtualRemotePendant is installed.
8. Once installation is completed, click on **Finish** to close the installation wizard.

6 Graphical user interface

6.1 KUKA.VirtualRemotePendant user interface

The KUKA.VirtualRemotePendant user interface largely corresponds to the smartHMI. Here, only those parts of the user interface are described that are specific to KUKA.VirtualRemotePendant.

If a touch screen is used, the user interface can also be operated with a finger or stylus.

Information on the smartHMI can be found in the operating and programming instructions for the System Software.

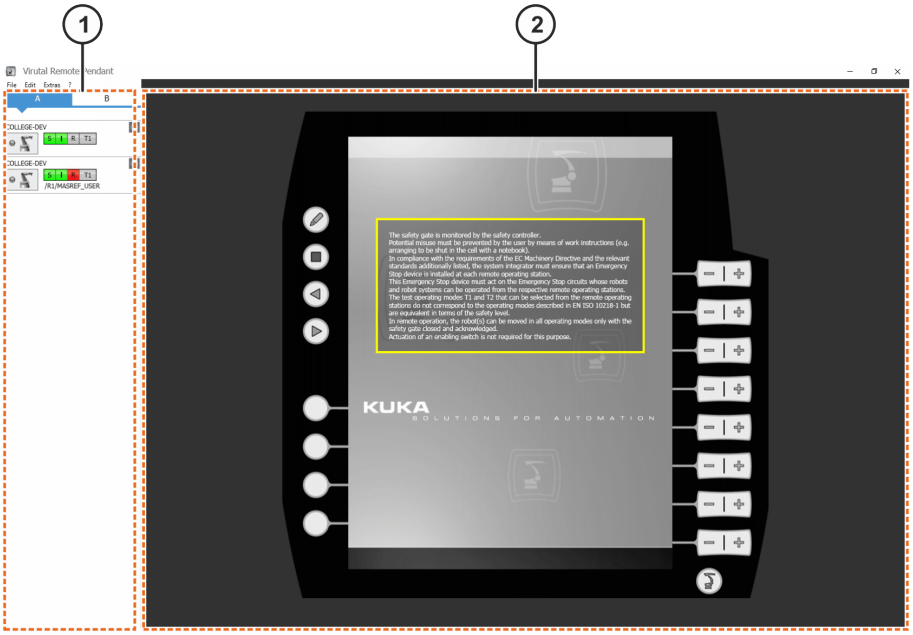

Fig. 6-1: KUKA.VirtualRemotePendant user interface

1 Session Manager 2 Virtual KUKA smartPAD

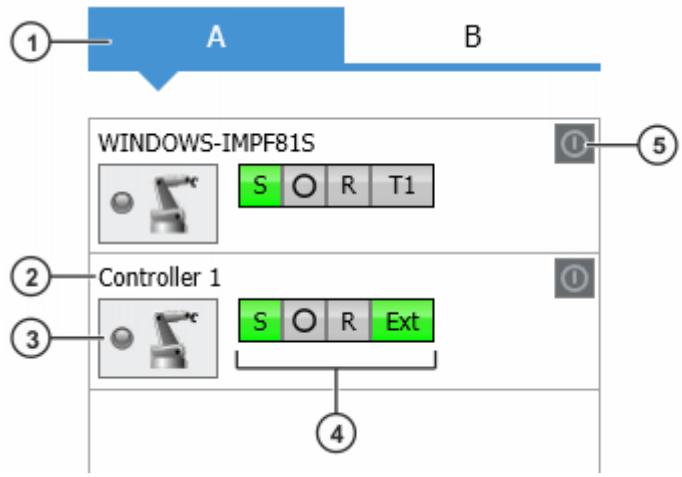

Fig. 6-2: Session Manager

Item	Description
1	Group
2	Robot name or IP address
3	**Connect** button
4	Status indicator (corresponds to the display on the smartHMI)
5	**On** button

Button	Description
	The VRP is connected to the controller.
	The VRP is establishing a connection to the controller.
	An error occurred while establishing a connection.
	A smartPAD is connected to the controller.
	The controller is switched off or cannot be accessed.
	No smartPAD is connected to the controller. The VRP can be connected to the controller.
	The controller is switched off or cannot be accessed.
	The controller has been shut down, but not switched off at the main switch. The button can be used to switch the controller on.
	The controller is switched on or cannot be accessed.

7 Operation

7.1 Starting KUKA.VirtualRemotePendant

Precondition

- KUKA.VirtualRemotePendant is installed.

Procedure

- Double-click on the KUKA Virtual Remote Pendant icon on the desktop.

  Or: Select **All Programs** > **KUKA** > **KUKA Virtual Remote Pendant** in the Windows Start menu.

The first time the program is started, the **Select controllers** window is opened.

7.2 Selecting a robot controller

Description

A robot controller can only be accessed if it has been selected and added to the Session Manager. A robot controller can be selected either manually or using the network search.

Precondition

- Robot controllers are connected to the company network via KLI.
- Laptop or PC is connected to the desired robot controller via the network.
- KUKA.VirtualRemotePendant has been started.

Procedure for network search

1. Select the menu sequence **Edit** > **Select controllers**. A window for selecting the robot controllers is opened.

   All robot controllers present in the network are automatically displayed on the **Network search** tab.
2. To display suitable robot controllers only, activate the **Show only suitable controllers** check box.
3. Select the desired robot controller and click on the **Right arrow** button.
4. The selected robot controller is displayed in the right-hand window. Click on **OK**. The robot controller is displayed in the Session Manager.

Procedure for manual entry

1. Select the menu sequence **Edit** > **Select controllers**. A window for selecting the robot controllers is opened.
2. On the **Manual input** tab, enter the IP address or name of the controller in the input box.
3. Click on the **Right arrow** button.
4. The selected robot controller is displayed in the right-hand window. Click on **OK**. The robot controller is displayed in the Session Manager.

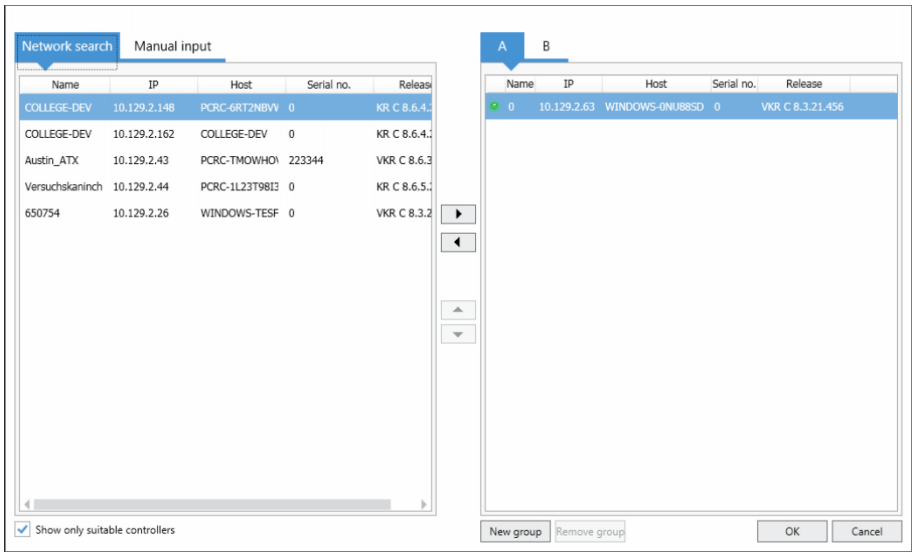

Fig. 7-1: Window for selecting the robot controllers

7.3 Creating and deleting groups

Description

It is possible to create groups in KUKA.VirtualRemotePendant. Groups can be used to gain a clear overview of the robot controllers, e.g. by grouping together the robot controllers of a cell. A maximum of 5 groups can be created.

Precondition

- KUKA.VirtualRemotePendant has been started.

Procedure

1. Select the menu sequence **Edit** > **Select controllers**. A window for selecting the robot controllers is opened. Group **A** is already created by default on the right-hand side of the window.
2. Click on **New group**. A new tab is created on the right-hand side of the window.
3. Optional: use drag&drop or the **Up arrow** and **Down arrow** buttons to change the order of the robot controllers in the group.
4. To delete a group, select the group and click on **Remove group**.

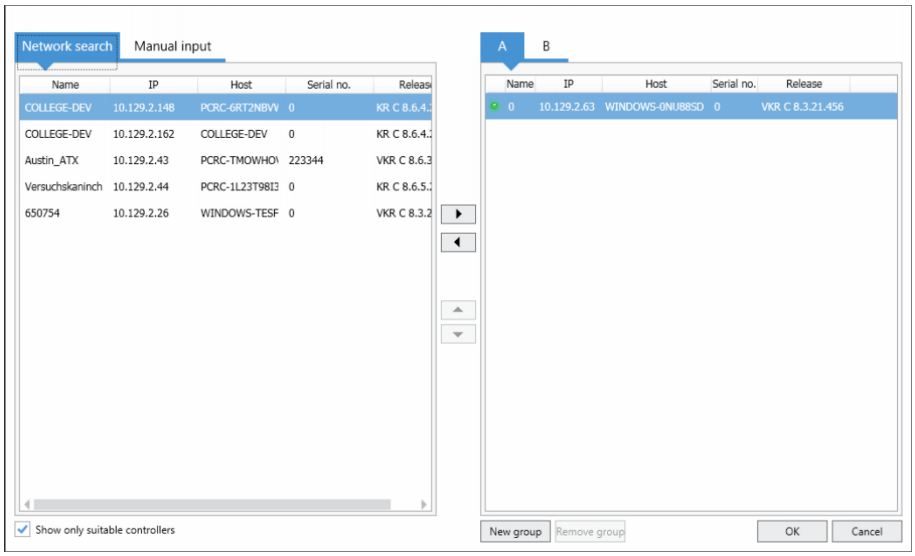

Fig. 7-2: Window for selecting the robot controllers

7.4 Connecting KUKA.VirtualRemotePendant to a robot controller

Description

To access a robot controller, a connection to this controller must be established via the Session Manager.

	In T1, T2 and AUT modes, a connection is only possible if no smartPAD is logged onto the robot controller. The robot cannot be moved in these operating modes. Operator actions that do not require motion enabling can be executed, however. AUT mode is not relevant for the VSS.

Precondition

- The robot controller is switched on and accessible via the network.
- AUT EXT mode
- Safety gate is closed.
- KUKA.VirtualRemotePendant has been started.
- The robot controller is selected and is displayed in the Session Manager.

Procedure

1. Click on the button for the desired robot controller in the Session Manager. The connection is established.
2. To terminate the connection, click on the button again or exit KUKA.VirtualRemotePendant.

Session Manager

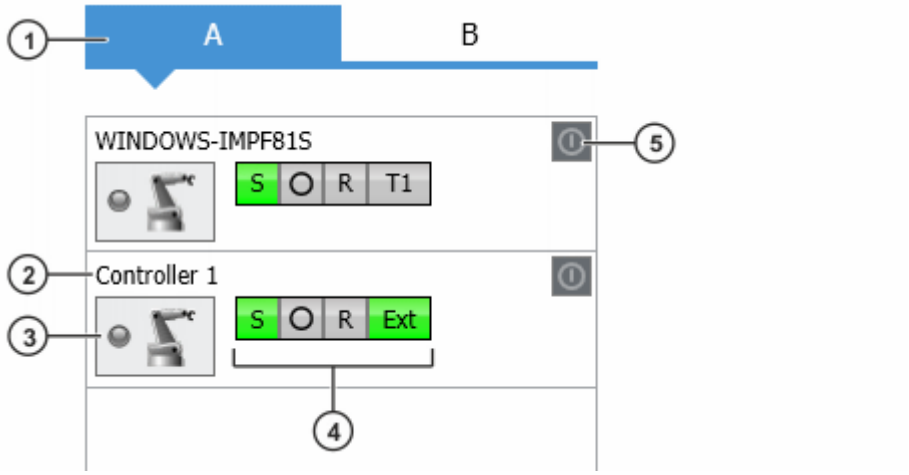

Fig. 7-3: Session Manager

Item	Description
1	Group
2	Robot name or IP address
3	**Connect** button
4	Status indicator (corresponds to the display on the smartHMI)
5	**On** button

Button	Description
	The VRP is connected to the controller.
	The VRP is establishing a connection to the controller.
	An error occurred while establishing a connection.
	A smartPAD is connected to the controller.
	The controller is switched off or cannot be accessed.
	No smartPAD is connected to the controller. The VRP can be connected to the controller.
	The controller is switched off or cannot be accessed.
	The controller has been shut down, but not switched off at the main switch. The button can be used to switch the controller on.
	The controller is switched on or cannot be accessed.

7.5 Exiting KUKA.VirtualRemotePendant

If the robot controller is in T1, T2 or AUT mode and VirtualRemotePendant is exited, the PLC can no longer control the robot. It is advisable to switch to AUT EXT mode before exiting KUKA.VirtualRemotePendant. AUT mode is not relevant for the VSS.

Precondition

- KUKA.VirtualRemotePendant has been started.

Procedure

- Select the menu sequence **File** > **Exit**.
  KUKA.VirtualRemotePendant is exited. If a connection to a robot controller exists, it will be terminated.

8 Troubleshooting

Error	Cause	Remedy
The robot cannot be moved although the safety gate is closed and acknowledged.	Before the connection to the VRP was established, the robot controller was in T1, T2 or AUT mode. AUT mode is not relevant for the VSS.	1. Terminate the VRP connection. 2. Set the operating mode to AUT EXT on the robot controller. 3. Re-establish the VRP connection.
After the VRP has been exited, the robot can no longer be controlled by the PLC. The following message is displayed: "Virtual KCP was not disconnected in EXT mode."	Before the VRP was exited, the operating mode was set to T1, T2 or AUT. AUT mode is not relevant for the VSS.	1. Connect the VRP or smartPAD to the robot controller. 2. Acknowledge the message. 3. Set the operating mode to AUT EXT.
VRP connection was terminated automatically.	A smartPAD was connected to the robot controller.	• The controller is in AUT EXT mode: re-establish the connection. • The controller is in a different operating mode: reconnection is not possible as long as the smartPAD is connected.
	A different VRP has been connected to the robot controller.	Re-establish the connection.
	The maximum number of connections has been exceeded; the connection was the oldest connection.	Re-establish the connection. **Note:** If the maximum number of connections is exceeded again by the re-established connection, the oldest connection is terminated.
	The robot controller has been switched off.	Switch the robot controller back on.

8.1 Saving the LOG file

Description

Information about the status of the application and any errors that have occurred is saved in the LOG file of KUKA.VirtualRemotePendant. In the case of an error, the user can send the LOG file to KUKA Service.

Precondition

- KUKA.VirtualRemotePendant has been started.

Procedure

1. Select the menu sequence **?** > **Error treatment**. A window opens.
2. Select the directory in which the LOG file is to be saved.
3. Click on **Save**.

If the application no longer responds, the file VirtualRemotePendant.log can be copied from the directory %APPDATA%\KUKA\VRP.

9 KUKA Service

9.1 Requesting support

Introduction

This documentation provides information on operation and operator control, and provides assistance with troubleshooting. For further assistance, please contact your local KUKA subsidiary.

Information

The following information is required for processing a support request:

- Description of the problem, including information about the duration and frequency of the fault
- As comprehensive information as possible about the hardware and software components of the overall system

  The following list gives an indication of the information which is relevant in many cases:

  – Model and serial number of the kinematic system, e.g. the manipulator
  – Model and serial number of the controller
  – Model and serial number of the energy supply system
  – Designation and version of the system software
  – Designations and versions of other software components or modifications
  – Diagnostic package KRCDiag

    Additionally for KUKA Sunrise: existing projects including applications

    For versions of KUKA System Software older than V8: archive of the software (KRCDiag is not yet available here.)
  – Application used
  – External axes used

9.2 KUKA Customer Support

The contact details of the local subsidiaries can be found at:
www.kuka.com/customer-service-contacts

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