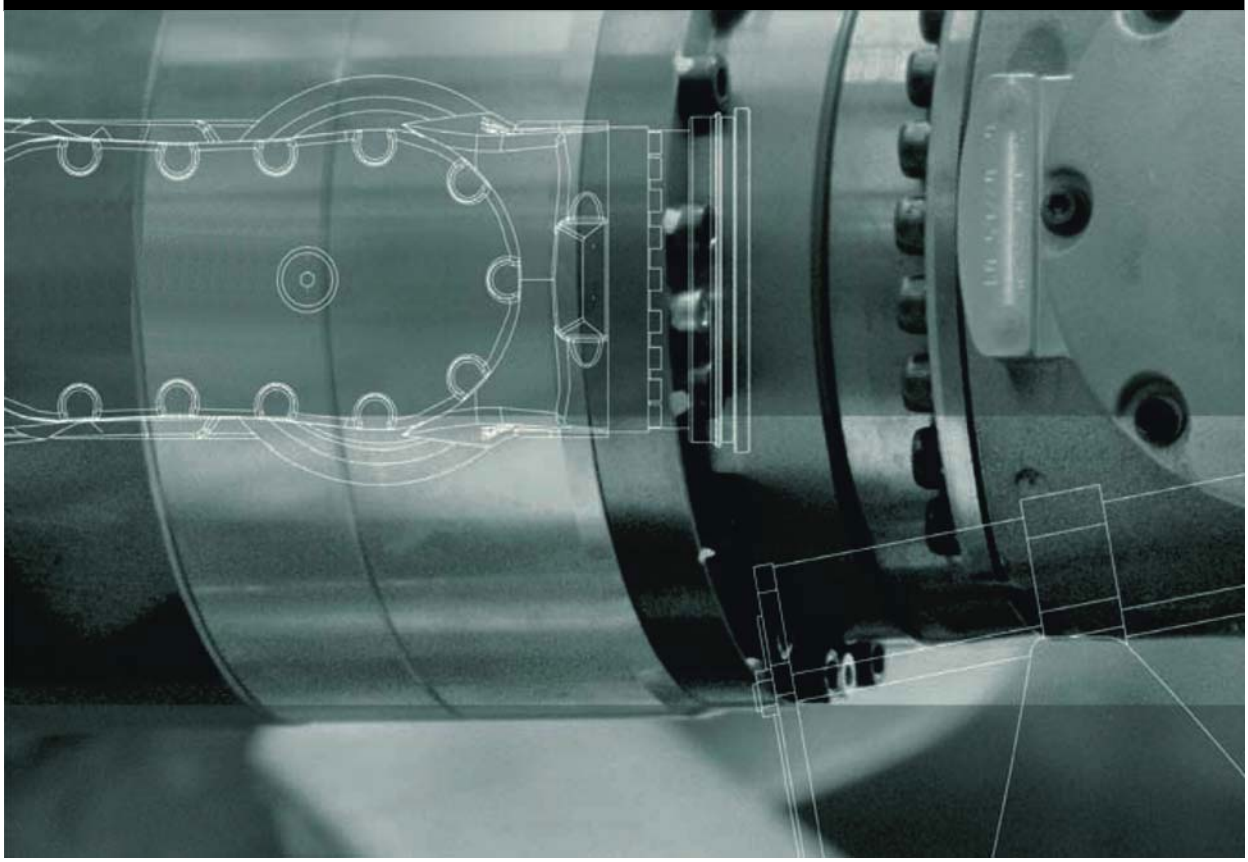
KUKA

KUKA System Technology

KUKA Roboter GmbH

KUKA.RecoveryUSB 2.2

For KR C2 ed05, KR C2 sr and KR C4



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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.

Translation of the original documentation

KIM-PS5-DOC

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Contents

1 Introduction

1.1 Industrial robot documentation

The industrial robot documentation consists of the following parts:

- Documentation for the manipulator
- Documentation for the robot controller
- Operating and programming instructions for the System Software
- Instructions for options and accessories
- Parts catalog on storage medium

Each of these sets of instructions is a separate document.

1.2 Representation of warnings and notes

Safety

These warnings are relevant to safety 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 INSTRUCTIONS	Procedures marked with this warning **must** be followed exactly.

Notes

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

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

1.3 Terms used

Term	Description
CSP	Controller System Panel Display element and connection point for USB and network (KR C4)
DHCP	Dynamic Host Configuration Protocol DHCP enables the assignment of the network configuration to clients by a server. DHCP can be used to integrate a computer into an existing network without having to configure the network manually.
GUI	Graphical User Interface
GUI mode	Installation mode for a robot controller with graphical user interface.
IPv4	Internet Protocol Version 4
KCB	KUKA Controller Bus KCB is the designation for the drive bus. (KR C4)
KLI	KUKA Line Interface KLI is a line bus for integrating the system into the customer network. (KR C4)
KPC	KUKA PC in the control cabinet (KR C4)
KSB	KUKA System Bus KSB is a bus to the KCP and to customer EtherCAT I/Os. (KR C4)
Multicast	Simultaneous transmission of a data packet in a network to multiple receivers.
Non-finalized (master) image	Image released for an installation.
Finalized image	Image that can only be installed on the robot controller from which it originates.
SID	Security identifier A unique security identifier that is issued automatically in order to be able to identify every system, every user and every group permanently.
Silent mode	Installation mode for a robot controller without graphical user interface (no operator action required)
UFD	USB Flash Drive (USB memory stick)
UNC	Uniform Naming Convention (also Universal Naming Convention) Standard format for designation of network addresses
VGA	Video Graphics Array (computer graphics standard)
Visual Basic 6	Object-oriented programming language from Microsoft: Visual Basic 6 is required for the program KSR Configurator in order to be able to execute certain applications.
VxWorks	Real-time operating system
WES7	Windows Embedded Standard 7

Term	Description
WIM	Windows imaging format Non-hardware-specific Windows format for an image
WinPE	Windows Preinstallation Environment WinPE enables installation of a Windows operating system if no operating system has previously been installed on the hard drive.

1.4 Trademarks

VxWorks is a trademark of Wind River Systems Inc.

Windows is a trademark of Microsoft Corporation.

WinPE is a trademark of Microsoft Corporation.

2 Purpose

2.1 Target group

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

- Advanced knowledge of the robot controller system
- Advanced knowledge of the Windows operating system
- Basic knowledge of network connections

For optimal use of our products, we recommend that our customers take part in a course of training at KUKA College. Information about the training program can be found at www.kuka.com or can be obtained directly from our subsidiaries.

2.2 Intended use

Use of KUKA.RecoveryUSB is only permissible for the following applications:

- Loading non-finalized master images or finalized images (resetting a controller)
- Creating and restoring a hard drive image of a controller (to back up an existing configuration, data backup)

The creation of non-finalized master images can only be performed by KUKA Service.

Duplication of a controller that has already been finalized (factory settings) is not permissible and can lead, for example, to network problems, blue screens, etc.

Misuse

Any use or application deviating from the intended use is deemed to be misuse and is not allowed.

3 Product description

3.1 Overview of KUKA.RecoveryUSB

Description

KUKA.RecoveryUSB is a WinPE-based archiving software package for creating and restoring an image (backup) of the hard drive of a robot controller.

Functions

- Creation of a hard drive image on a KUKA.RecoveryUSB stick, an external USB hard drive, a local drive or network drive.
- Restoration of a hard drive image from a KUKA.RecoveryUSB stick, an external USB hard drive, a local drive or network drive.
- Restoration of the most recently loaded/restored hard drive image saved to the hidden partition of the hard drive.
- Configuration of the functions of the KUKA.RecoveryUSB stick for the different modes (“KSR Configurator” software).
- BIOS update for D2608-K motherboard (depending on existing hardware/version).

3.2 Network interfaces

3.2.1 Ethernet interface KR C2 ed05/KR C2 sr

Description

In order to establish a link between the robot controller and the network drive, the network cable must be connected to the on-board Ethernet interface.

Further information about the on-board Ethernet interface is contained in the assembly or operating instructions for the robot controller.

3.2.2 Ethernet interfaces of the KR C4

Description

In order to establish a link between the robot controller and the network drive, the network cable must be connected to the KLI.

Further information about the KLI interface is contained in the assembly or operating instructions for the robot controller.

4 Safety

This documentation contains safety instructions which refer specifically to the software 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.

The “Safety” chapter in the operating and programming instructions of the KUKA System Software (KSS) must be observed. Death to persons, severe injuries or considerable damage to property may otherwise result.

5 Configuration

5.1 System requirements

Hardware

- KUKA.RecoveryUSB stick
- KR C2 ed05, KR C2 sr, KR C4, KR C4 compact, KR C4 extended
  - At least 512 MB RAM
  - At least 20 GB hard disk

Software

For KR C2 ed05, KR C2 sr

- BIOS V4.06 R1.05-08.1688.01 (booting with the F10 key)
- Operating system Windows XP embedded 2.0

For KR C4

- Operating system Windows XP embedded 3.0

  or
- Operating system WES7 4.0

Licenses

Valid licenses for the following software must be present on the robot controller:

- Windows system license
  - Windows XP embedded

    or
  - Windows WES7
- VxWorks

5.2 KUKA System Recovery Configurator

Description

The KSR Configurator program (KSR_Configurator.exe) is used for configuring the KUKA.RecoveryUSB stick and is started from the main directory of the USB stick.

The configuration window of the KUKA.RecoveryUSB stick is subdivided into 4 tabs. For execution of the Recovery software, either GUI mode or Silent mode can be configured:

- GUI mode

  Once the controller has been booted from the KUKA.RecoveryUSB stick, the creation and restoration of the partitions must be started by the user.

  Preconditions:
  - Graphics interface
  - Monitor (only KR C4), mouse and keyboard
- Silent mode

  Silent mode enables the automatic creation or restoration of a hard drive image following booting of the controller, without the need for additional operator actions.

  The RecoveryUSB stick is first configured accordingly using the KSR Configurator on an external PC.

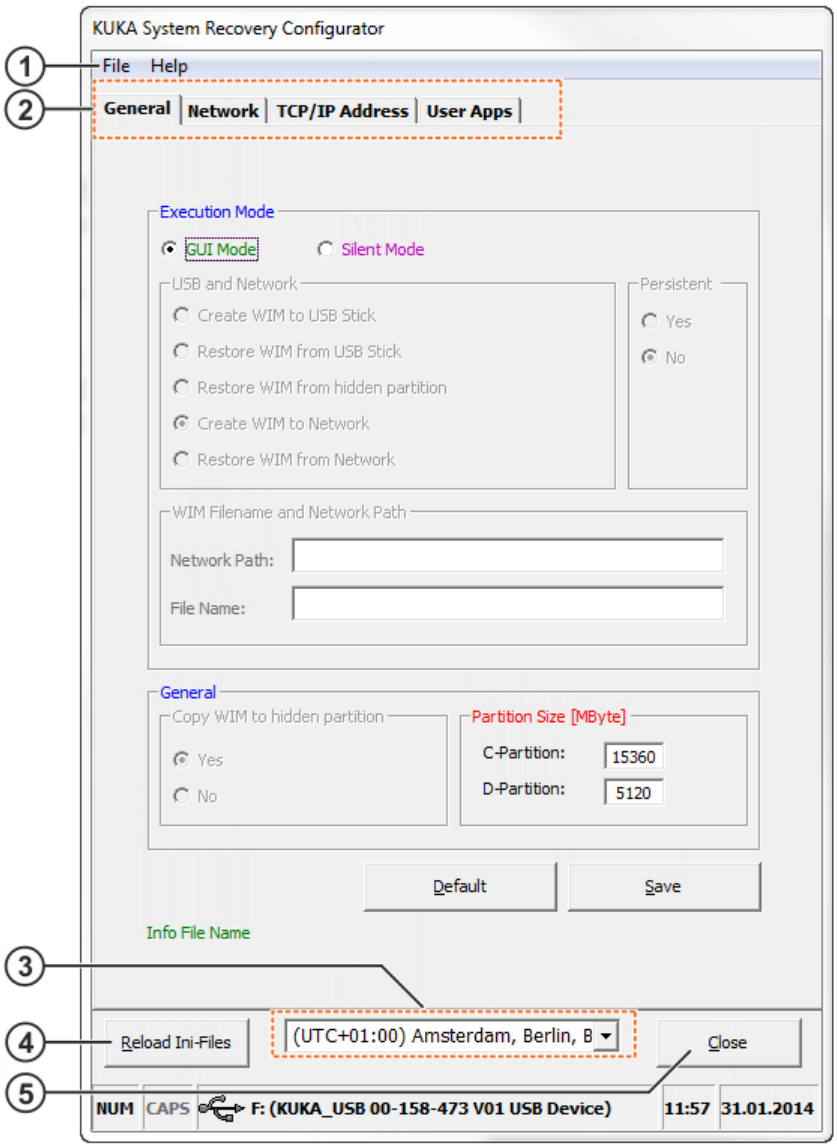

Fig. 5-1: KUKA System Recovery Configurator window

Item	Description
1	Menu bar
2	Tabs: ■ **General** ■ **Network** ■ **TCP/IP Address** ■ **User Apps**
3	Time zone selection Setting of the time zone to be used during image creation as the time reference for the time stamp of the image. Default: UTC +1h Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna
4	**Reload Ini-Files** button: Settings displayed on the tab are restored from the INI files on the RecoveryUSB stick.
5	**Close** button: Closes the window (no automatic saving of settings).

5.2.1 Menu bar

Description

The following INI files can be opened directly in the default editor using the menu bar:

- Controller.ini
- Netconfig.ini
- SetIPadress.ini
- UserApps.ini

This function is only used for checking entries made via the tabs and should only be used by specially trained persons.

Procedure

1. Select the menu sequence **File** > **Open**.
2. Select the required INI file.
3. Edit the INI file(s) and save them in the editor.
4. If required, check the settings by pressing the **Reload Ini-Files** button (>>> 5.2 "KUKA System Recovery Configurator" Page 15).

The edited entries of all tabs can be saved simultaneously using the menu item **Save all**.

The menu item **Close** closes the window (no automatic saving of settings).

5.2.2 General tab

Description

In the **Execution Mode** group of the **General** tab, it is possible to choose between GUI mode and Silent mode. Depending on the selection, certain groups are activated for editing on the tabs.

5.2.2.1 General tab – GUI mode

Description

If GUI mode is selected for the Recovery software, actions must be carried out manually. GUI mode can only be used on systems with a connected monitor (KR C4). This mode is always possible with a KR C2 ed05. If GUI mode is selected, only the **Partition Size [MByte]** group can be edited on the **General** tab.

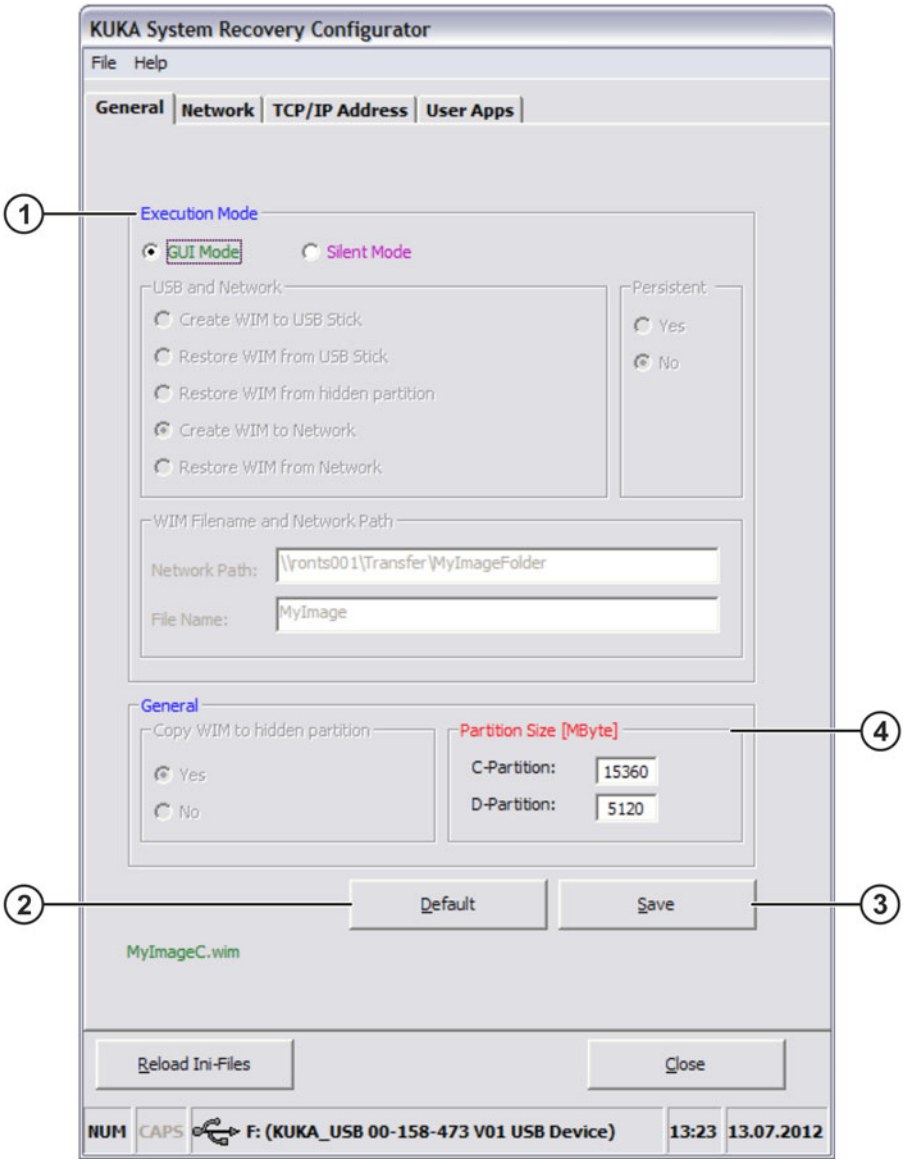

Fig. 5-2: General tab – GUI mode

Item	Description
1	**Execution Mode** group: Selection of GUI mode or Silent mode
2	**Default** button: Loads the default values of the KUKA.RecoveryUSB software.
3	**Save** button: Saves the settings on the “General” tab.
4	**Partition Size [MByte]** group

- **Partition Size [MByte]** group:

  The memory size of partitions C:\ and D:\ can be defined in the input boxes for use of an XPe-based operating system. If a WES7-based operating system is used, the partition sizes are calculated automatically.

  There are 3 partitions on the hard drive of the robot controller:

  - The partition KUKA_DISK contains the operating systems and the system software installation. This corresponds to drive C:\.
  - The partition KUKA_DISK contains, among other things, the setup programs for system installation and the technology option. This corresponds to drive D:\.

- The partition KUKA_RECOVERY contains the most recently loaded images of partitions 1 and 2 (= factory settings of the KUKA System Software or most recently loaded images). It is normally hidden and not visible.

- For XPe:

  The first and second partitions must both be at least 3000 MB in size and may jointly occupy up to the entire capacity of the hard drive.

  Default setting (for the partition setting for XPe):

  - Partition 1: drive C:\KUKA_DISK with 15360 MB
  - Partition 2: drive D:\KUKA_DATA with 5120 MB
  - Partition 3: hidden partition KUKA_RECOVERY with the remaining memory

NOTICE KR C2 ed05 controllers with XPe are generally equipped with 20 GB hard drives. For these systems, the default values must be adapted in the configurator.

Recommendation:

- For partition 1: 10240 MB
- For partition 2: 5120 MB

Incorrect configuration of the partition sizes results in an inoperable system and is not automatically corrected.
KUKA Service must be consulted before modifying the partition sizes.

- For WES7:

  The sizes of the partitions are determined by the overall capacity of the hard drive. The settings in the boxes are ignored.

  The available memory capacity is divided up as follows for hard drives > 20 GB:

  - Partition 1: drive C:\ contains 10/16 of the available capacity.
  - Partition 2: drive D:\ contains 3/16 of the available capacity.
  - Partition 3: hidden partition KUKA_RECOVERY contains 3/16 of the available capacity.

In the case of 20 GB hard drives, the 1st partition is automatically allocated 15360 MB and the 2nd partition 5120 MB.

5.2.2.2 General tab – Silent mode

Description Silent mode enables the automatic creation or restoration of a robot controller hard drive image after booting. The action to be carried out must first be configured.

Silent mode

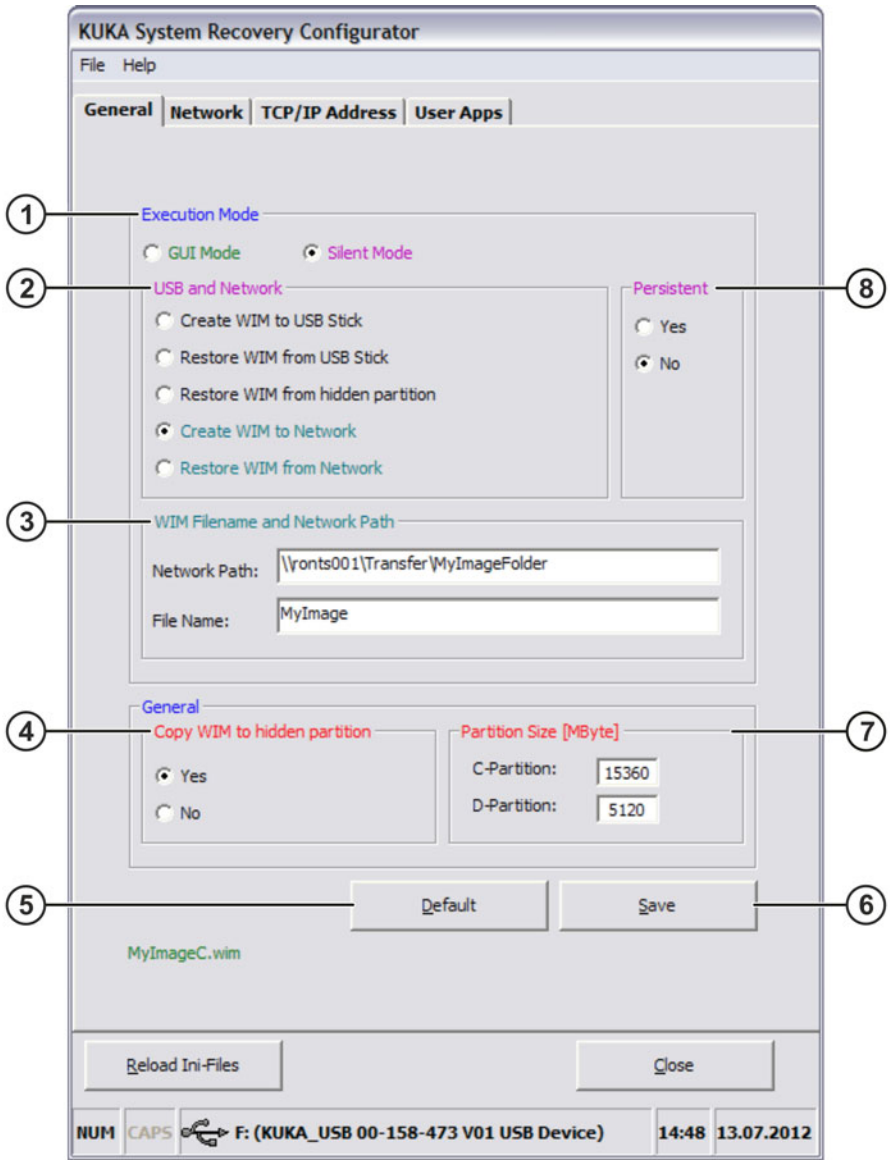

Fig. 5-3: General tab – Silent mode

Item	Description
1	**Execution Mode** group: Selection of GUI mode or Silent mode
2	**USB and Network** group
3	**WIM Filename and Network Path** group
4	**Copy WIM to hidden partition** group
5	**Default** button: Loads the default values of the KUKA.Recovery-USB software.
6	**Save** button: Saves the settings on the “General” tab.
7	**Partition Size [MByte]** group
8	**Persistent** group (default setting: No)

USB and Network group:

- **Create WIM to USB Stick** option

  There must be enough free memory space on the KUKA.RecoveryUSB stick for creation of the image:

  - XPembedded images – approx. 1.5 GB

- WES7 images – approx. 2.5 to 3 GB

A separate WIM image is created for each partition and stored in the “Image” folder on the KUKA.RecoveryUSB stick with the file name “Image[Partition].wim”. Examples:

- Image**C**.wim = image of partition **C**
- Image**D**.wim = image of partition **D**

- **Restore WIM from USB Stick** option

  The WIM images are restored from the “Image” folder of the KUKA.RecoveryUSB stick onto the controller as partitions C:\ and D:\ and copied to the hidden partition (default setting). They are assigned in accordance with the last two letters before the file extension. The preceding part of the name can be chosen freely. Examples:

  - MyKRC4Image**C**.wim = creates partition **C**.
  - MyKRC4Image**D**.wim = creates partition **D**.

- **Restore WIM from hidden partition** option

  Existing WIM images are restored from the hidden partition as partitions C:\ and D:\. They are assigned in accordance with the last two letters before the file extension. Examples:

  - MyKRC4Image**C**.wim = creates partition **C**.
  - MyKRC4Image**D**.wim = creates partition **D**.

- **Create WIM to Network** option

  A separate WIM image is created for each partition and stored under the configured network path. Before the image is created, the network path and the image name must be entered in the **WIM Filename and Network Path** group and the domain, the user and a password must be entered in the **User and Password** group. The user must have write access to the drive used (>>> 5.2.3 ""Network” tab" Page 22).

  They are assigned in accordance with the last two letters before the file extension. Examples:

  - MyNetworkImage_**C**.wim = image of partition **C**
  - MyNetworkImage_**D**.wim = image of partition **D**

  A preview of the image name is displayed in the KSR Configurator.

- **Create WIM from Network** option

  Each partition is restored from its WIM image from the configured network path. Before the image is restored, the network path and the image name must be entered in the **WIM Filename and Network Path** group and the domain, the user and a password must be entered in the **User and Password** group. The user must have read access to the drive used (>>> 5.2.3 ""Network” tab" Page 22). They are assigned in accordance with the last two letters before the file extension. Examples:

  - MyNetworkImage_**C**.wim = image of partition **C**
  - MyNetworkImage_**D**.wim = image of partition **D**

  A preview of the image name is displayed in the KSR Configurator.

Persistent group:

After restoration of an image, the default setting resets the **USB and Network** group to the **Create WIM to USB Stick** option. This prevents the unintentional restoration of an image to the controller.

- **Yes** option

  No automatic resetting to the **Create WIM to USB Stick** option.

- **No** option (default)

  Automatic resetting to the **Create WIM to USB Stick** option.

If the “Yes” option is selected, the partitions of the controller may inadvertently be overwritten on booting.

WIM Filename and Network Path group:

For the creation or restoration of an image, the configuration of a UNC-compliant network path is required. The target and source paths and the name of the image can be entered in the input boxes. The configured path must be completely present in the network. KUKA.RecoveryUSB does not create new folders. During restoration, the configured image name (displayed in the preview) must match the image file of partition C:\ in the source path.

- Input box **Network Path**: Entry of the network path
- Input box **File Name**: Entry of the image name

Partition Size [MByte] group:

The partition size is described in the description of the General tab with the Execution Mode GUI mode (>>> 5.2.2.1 "General tab – GUI mode" Page 17).

The hidden partition contains the master image ImageC.WIM and ImageD.WIM of partitions C:\ and D:\ (= factory settings of the KUKA System Software).

The first and second partitions must both be at least 3,000 MB in size and may jointly occupy up to the entire capacity of the hard drive.

Copy WIM to hidden partition group:

- **Yes** option

  During restoration, the WIM images are copied from the source directory to the hidden partition of the controller.
- **No** option

  During restoration, the hidden partition is recreated and is empty. Restoration of an image from this partition is thus no longer possible in such a system.

5.2.3 “Network” tab

Description

The **Network** tab enables configurations for the creation/saving of partitions via the network in GUI mode and Silent mode.

The user must have access rights to the network path.

5.2.3.1 Network tab – GUI mode

Description

UNC-compliant network paths can be entered as source and target directories in the **NetUNC** group on the tab (for this, it is necessary to log onto the network manually via the GUI). The entered network path is activated by means of the check box of the line.

The user must have read and write access rights to the network path.

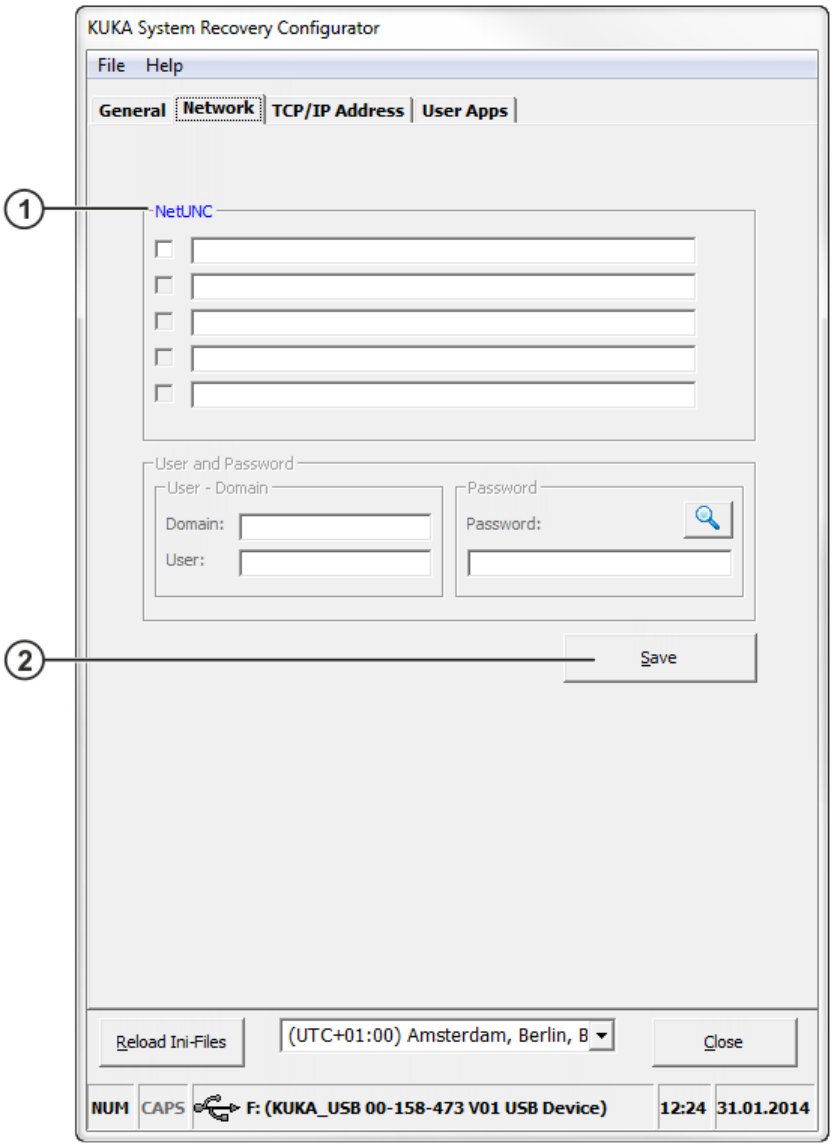

Fig. 5-4: Network tab – GUI mode

Item	Description
1	**NetUNC** group
2	**Save** button: Saves the settings on the “Network” tab.

5.2.3.2 Network tab – Silent mode

Description

The domain and user name can be entered in the **User Domain** group. The password can be entered in the **Password** group.

This is a precondition for the creation of partition images (**Create WIM to Network** option) or the restoration of partitions (**Create WIM from Network** option) via the network path defined in the **WIM Filename and Network Path** group (>>> 5.2.2 "General tab" Page 17).

The boxes in the **User - Domain** group can only be edited if one of the two options **Create WIM to Network** or **Create WIM from Network** has been selected beforehand.

The user must have read and write access rights to the network path.

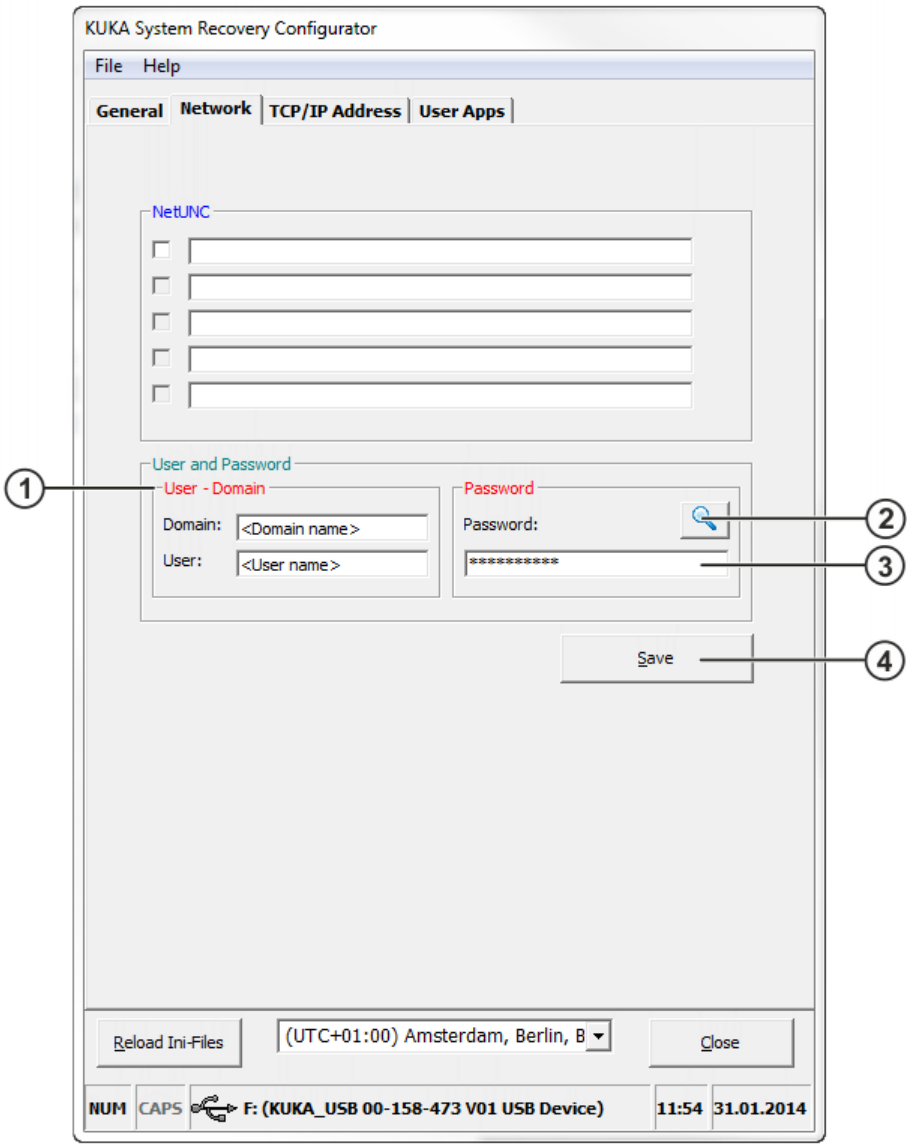

Fig. 5-5: Network tab – Silent mode

Item	Description
1	**User - Domain** group
2	The encrypted password can be displayed by clicking on this button. The password is encrypted again by clicking on the button again.
3	**Password** The password is entered in this box.
4	**Save** This button is used to save the settings on the Network tab.

5.2.4 TCP/IP Address tab

Description The **TCP/IP Address** tab must be configured before the creation/saving of partitions via the network.

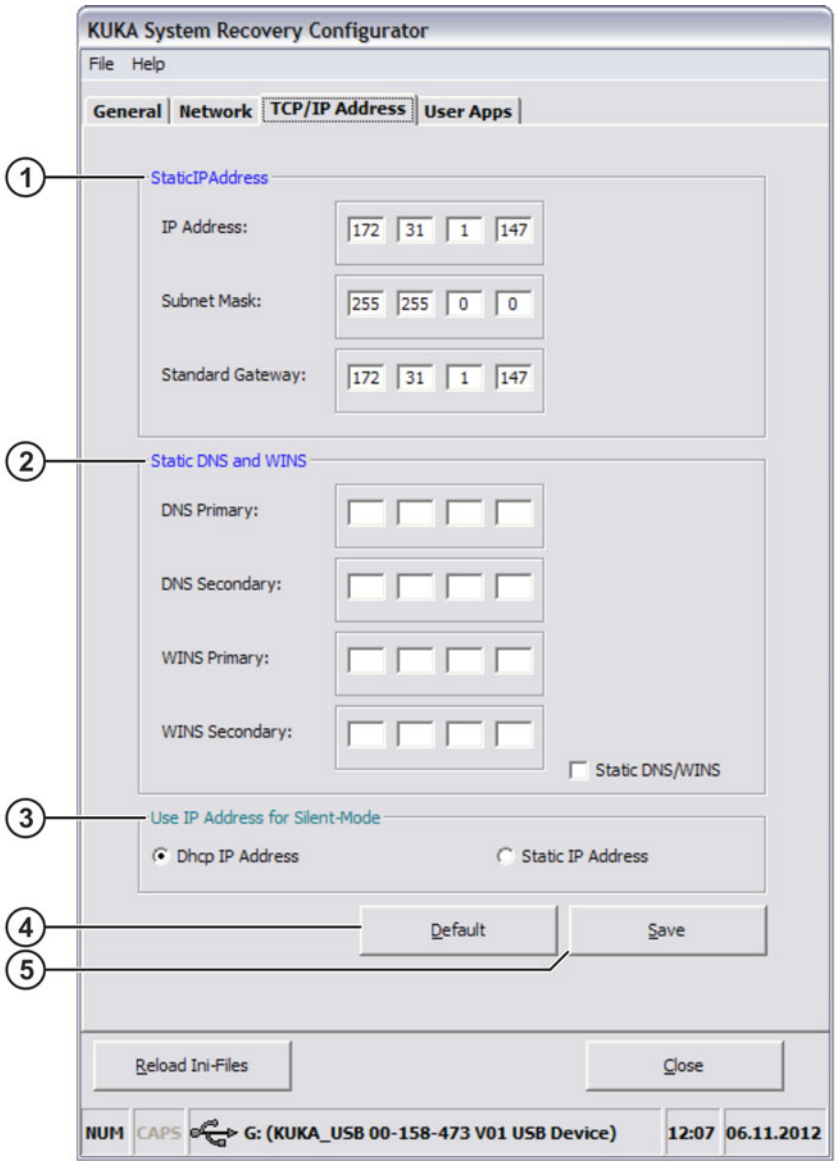

Fig. 5-6: TCP/IP Address tab

Item	Description
1	**StaticIPAddress** group ■ Input box: **IP Address** ■ Input box: **Subnet Mask** ■ Input box: **Standard Gateway**
2	**Static DNS and WINS** group ■ Input box: **DNS Primary** ■ Input box: **DNS Secondary** ■ Input box: **WINS Primary** ■ Input box: **WINS Secondary** ■ Check box **Static DNS/WINS**
3	**Use IP Address for Silent Mode** group ■ “Dhcp IP Address” option ■ “Static IP Address” option
4	**Default** button: Loads the default values of the KUKA.Recovery-USB software.
5	**Save** button: Saves the settings on the “TCP/IP Address” tab.

- **StaticIPAddress** group: The values for static IP address assignment can be entered in the input boxes **IP Address**, **Subnet Mask** and **Standard Gateway**. Activation is carried out in the **Use IP Address for Silent Mode** group.

The settings configured in the **SetStaticIPAddress** group for the static IP are also applied in GUI mode if static addressing is selected via the menu (>>> 6.4.2 "Activating the IP address" Page 34).

If a static IP address is used, it must be ensured that the IP address is not present in the network more than once and does not conflict with address assignment by a DHCP server.

The default prefix lengths for the router and subnet masks for IPv4 addresses must be observed. No plausibility check is carried out.

Class	Start	End	Prefix length	Subnet mask
A	0.0.0.0	127.255.255.255	8 bits	255.0.0.0
B	128.0.0.0	191.255.255.255	16 bits	255.255.0.0
C	192.0.0.0	223.255.255.255	24 bits	255.255.255.0
D	224.0.0.0	239.255.255.255	Multicast	Multicast
E	240.0.0.0	255.255.255.254	Reserved	Reserved

- **Static DNS and WINS** group:

  In the case of static and dynamic IP address assignment, primary and secondary WINS and DNS servers can be configured. Activation is carried out by means of the **Static DNS/WINS** check box (irrespective of the setting in the **Use IP Address for Silent Mode** group).

  If this check box is not activated, the values from the DHCP server are applied for dynamic IP address assignment.
- **Use IP Address for Silent Mode** group:
  - **Dhcp IP Address** option: Dynamic IP address assignment for network connection
  - **Static IP Address** option: Static IP address assignment for network connection

In GUI mode, dynamic IP address assignment is activated by default.

5.2.5 User Apps tab

Description

The **User Apps** tab enables the configuration of WinPE-compatible UserApps for GUI mode and selection of the hardware boot criteria. The settings can be made irrespective of the selected mode.

- **UserAppsMnu** group: The menu names can be entered in this group.
- **UserAppsLnk** group: The corresponding local paths (root directory or higher) can be entered in this group.

The settings can be activated by means of the check box of the line.

- **Controller Type** group:
  - **Support All controllers** option: The RecoveryUSB stick boots in any hardware environment, e.g. external PC/notebook.

With this setting, the stick boots in any hardware environment and performs its configured task. This may result in the hard drive being overwritten and data lost.
KUKA Roboter GmbH must be consulted before this setting is used.

- **Support only KUKA Controller** option: The RecoveryUSB stick only boots a KR C2/KR C4 (default setting).

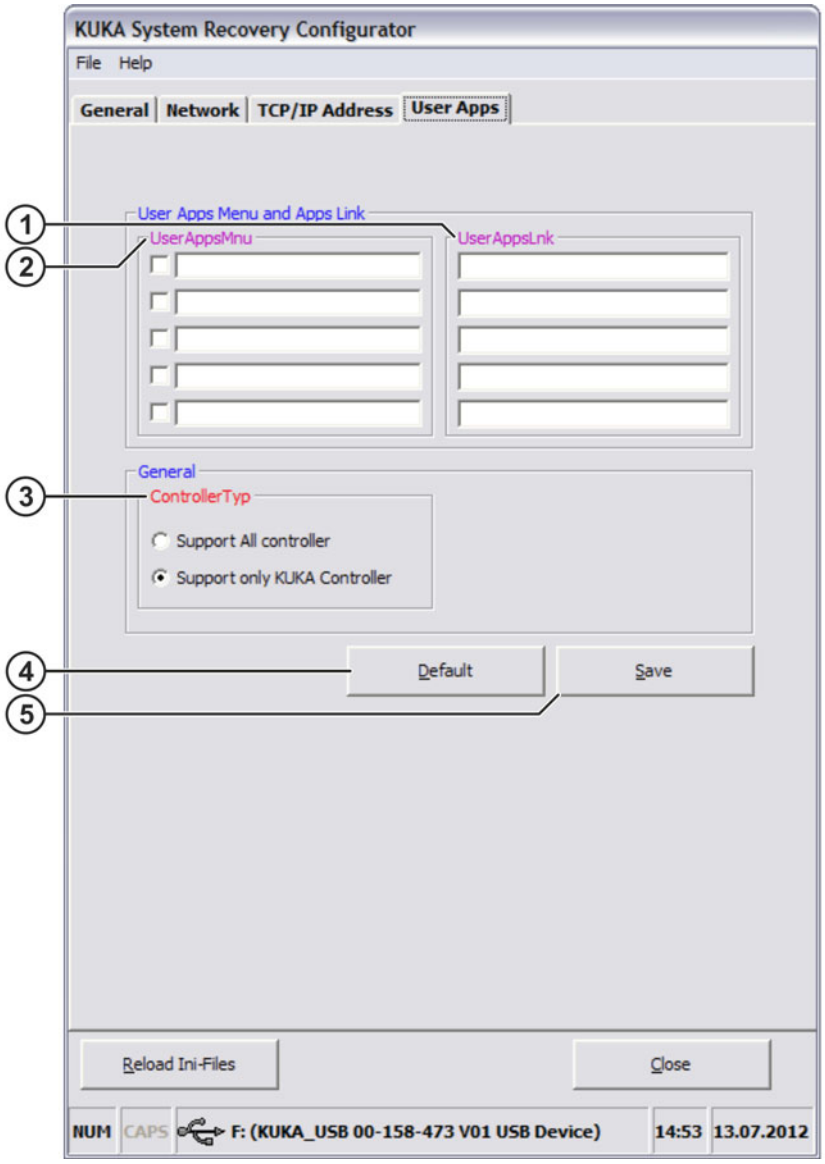

Fig. 5-7: User Apps tab

Item	Description
1	**UserAppsMnu** group
2	**UserAppsLnk** group
3	**Controller Type** group
4	**Default** button: Loads the default settings.
5	**Save** button: Saves the settings on the “User Apps” tab.

6 Operation

6.1 Starting KUKA.Recovery in GUI mode (KR C2 ed05, KR C2 sr)

KUKA.Recovery can also be started in silent mode.

Precondition

- External keyboard and mouse

Procedure

1. Connect external keyboard and mouse to the robot controller.
2. Connect the RecoveryUSB stick.
3. Boot the robot controller.
4. Press F10 during the boot procedure.
   The user interface is opened.

If KUKA.Recovery is not started after the F10 key has been pressed, the BIOS settings must be checked and altered if necessary:

1.Press F2 during the boot procedure.

2. Select **Advanced** > **Advanced System Configuration** in the BIOS menu and set **USB Legacy Support** to **Enabled**.

It may be necessary for this setting to be altered before every start of KUKA.Recovery.

6.2 Starting KUKA.Recovery in GUI mode (KR C4)

KUKA.Recovery can also be started in silent mode.

Precondition

- Robot controller with VGA interface
- External monitor
- External keyboard and mouse

Procedure

1. Connect the RecoveryUSBStick.
2. Boot the robot controller.
   The user interface is opened.

6.3 Overview of graphical user interface

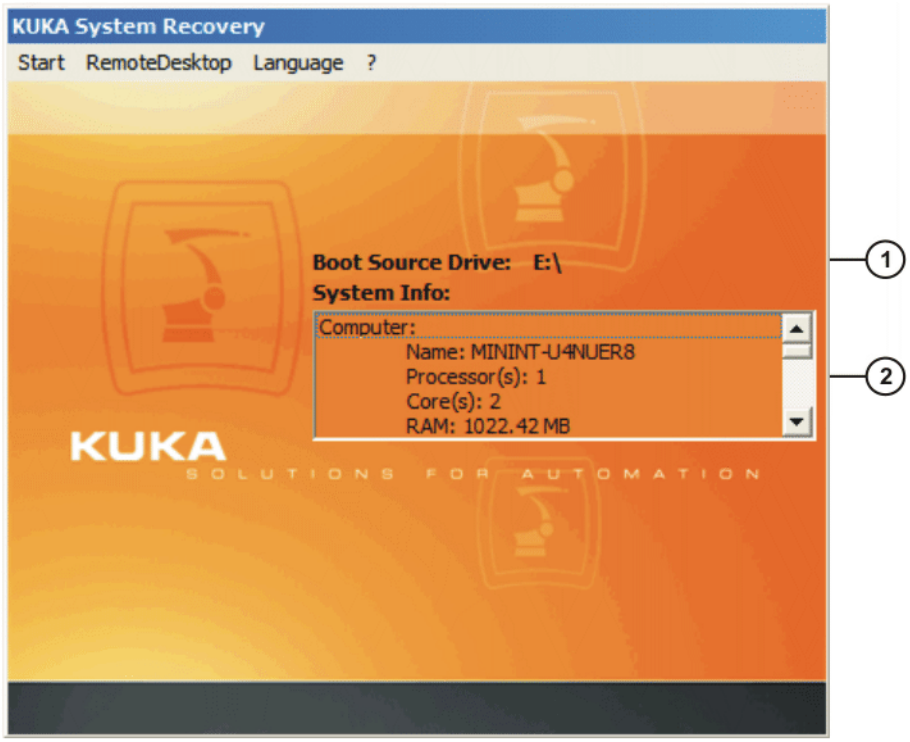

Fig. 6-1: KUKA.Recovery user interface

Item	Description
1	Indication of the logical drive from which KUKA.Recovery was started

2	System information display
	■ **Computer**
	  ■ **Name**: Name of the computer
	  ■ **Processor(s)**: Number of processors
	  ■ **Core(s)**: Number of processor cores
	  ■ **RAM**: Size of the main memory
	■ **CPU**: Name of the main processor
	■ **BIOS**: BIOS version numbers
	■ **Logical drive**: Partitions and size of the partitions on the hard drive
	■ **Hard drive disk**: Name of the hard drive, number of partitions on the hard drive and the overall capacity of the hard drive
	■ **System**: Version of the WinPE software
	■ **USB Device**: Connected USB devices with indication of the drive letter and the available capacity

6.3.1 Changing the user interface language

Description

The user interface is available in the following languages:

- German
- English

Procedure

- Select the desired language under **Language** in the menu.

6.3.2 Refreshing the system information

Procedure

- Select the menu sequence **Start** > **Refresh System Info**.
  The displayed system information is refreshed.

6.3.3 Changing the screen resolution

Procedure

1. Select the menu sequence **Start** > **Display resolution**.
   The **Display resolution** window is opened.
2. Deactivate the **KR C2 Ed05/sr resolution** check box.
3. Select the desired screen resolution from the list.
4. Press the **Display** button. The displayed screen resolution is applied.
5. If the set screen resolution is in order, answer the request for confirmation in the **Monitor Settings** window with **Yes** within 15 seconds.
   The screen resolution is reset to the default setting if the request for confirmation is answered with **No** or if no answer is given within this time.
6. Close the **Display resolution** window with **Exit**.

Description

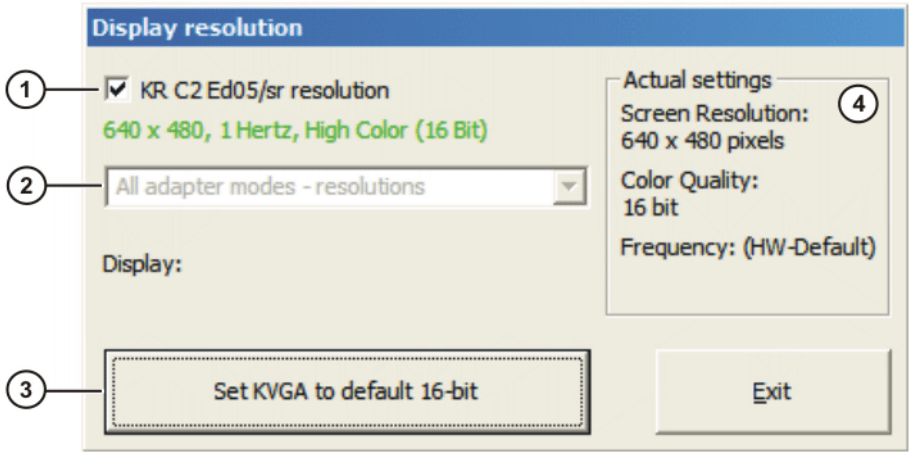

Fig. 6-2: Display resolution window

Item	Description
1	**KR C2 Ed05/sr resolution** check box ■ Check box active: By default, the screen resolution for KR C2 edition2005/sr is active. ■ Check box not active: Additional screen resolutions can be selected.
2	List of available screen resolutions The list is only available if the **KR C2 Ed05/sr resolution** check box is deactivated.
3	**Display** button The screen resolution selected in the list is displayed on the button.
4	Display of the screen resolution currently set

6.3.4 Establishing a remote desktop connection

Description

It is possible to establish a remote desktop connection to another computer. The connection corresponds to the client variant, i.e. the connection can only be established from WinPE. The server variant is not supported by WinPE.

Procedure

1. Select the menu sequence **RemoteDesktop** > **Client**.
   The **Remote Desktop Connection** window is opened.
2. Select remote computer then press **Connect**.

6.3.5 Calling utilities

Procedure

- Select the menu sequence **Start** > **Utilities** and the desired menu item.

Description

The following utilities are available:

- **Notepad**: Text editor
- **Command prompt**: Windows shell (input prompt)
- **Registry**: Registry editor
- **Task manager**: Task manager
- **Paint**: MS Paint for graphics processing
- **Check Disk**: MS ChkDsk for checking the hard drive and USB devices for file system errors

6.3.5.1 Checking the hard drive or USB devices (Check Disk)

Procedure

1. Select the menu sequence **Start** > **Utilities** > **Check Disk**.
   All hard drives and connected USB devices are displayed in the list of drives.
2. Select the desired drive and click on the **Check** button.
   The program **chkdsk.exe** is executed.

Description

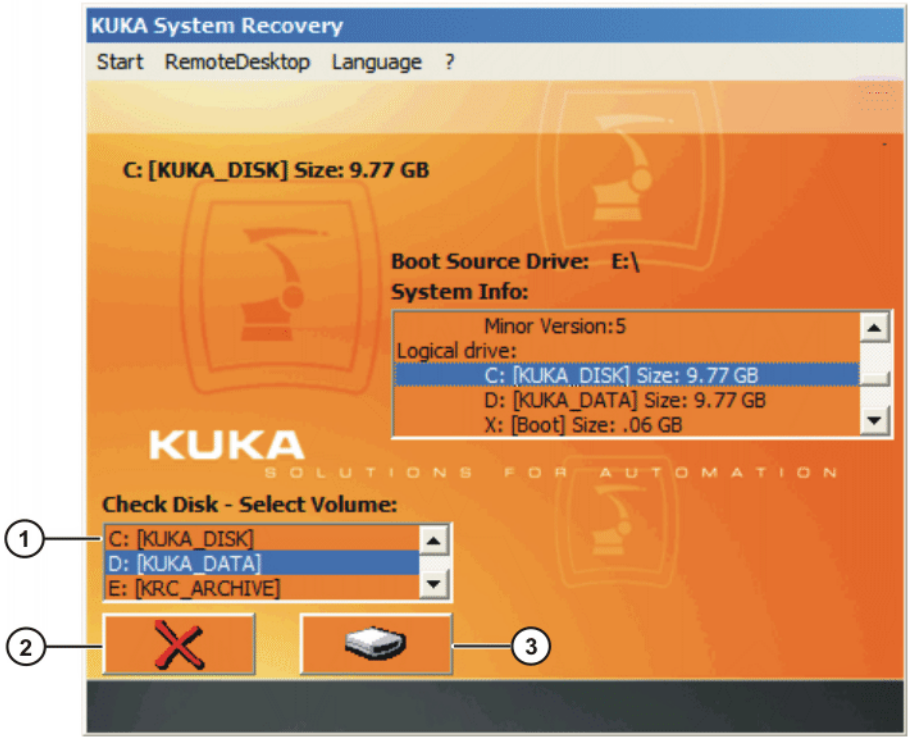

Fig. 6-3: Check Disk

1	List of drives	3	**Check** button
2	**Close** button		

6.3.6 Calling online help

Procedure

1. Select the menu sequence **?** > **Tips and Tricks**.
   The first help text is displayed.
2. Click on **Next Tip** to display the next help text.

6.3.7 Displaying information about KUKA.Recovery

Procedure

- Select the menu sequence **?** > **About…**.

Description

The information is required, for example, when requesting help from KUKA Customer Support.

The following information is displayed:

- Version of the Recovery software
- Version of the basic WinPE software
- Main functionality of the Recovery software

6.3.8 Exiting KUKA.Recovery

Procedure

For KR C2

- Select the menu sequence **Start** > **System** > **Reboot**.
  The RecoveryUSB stick is deactivated and the robot controller is rebooted.

For KR C4

1. Select the menu sequence **Start** > **System** > **Shutdown**.
   The RecoveryUSB stick is deactivated and the robot controller is shut down. CSP LED 2 flashes.
2. Turn the main switch to **OFF**.
3. Remove the KUKA.RecoveryUSB stick.
4. Turn the main switch to **ON**.
   The controller is rebooted.

6.4 Activating a network connection

6.4.1 Configuring network settings online

Description

Network settings that are defined on the user interface are only valid for the current WinPE session. The configuration is not permanently saved.

DHCP is active by default. WinPE issues a new computer name every time the Recovery software is started. The IP address is automatically allocated by the DHCP server.

If necessary, a static IP address can be configured. The UNC network path must always be configured.

Procedure

1. Select the menu sequence **Start** > **Network** > **Edit ini file** > **NetCon.ini**.
2. Enter the network path in the file NetCon.INI and save it.
3. Select the menu sequence **Start** > **Network** > **Edit ini file** > **SetIPAddress.ini**.
4. Enter the IP address, subnet mask and gateway (optional) in the file SetIPAddress.INI and save them.

6.4.2 Activating the IP address

Description

The static IP address, i.e. the IP address on the RecoveryUSBStick or configured for the current WinPE session can be activated.

Procedure

- Select the menu sequence **Start** > **Network** > **Set IP address** and the desired menu item.
  - **Static IP**: Activates the static IP address
  - **DHCP**: Activates DHCP

6.4.3 Disabling and enabling the firewall

The firewall is enabled by default and can be disabled.

Procedure

- Select the menu sequence **Start** > **Network** > **Firewall** and the desired menu item.
  - **Enable**: Enables the firewall
  - **Disable**: Disables the firewall

6.5 Creating and archiving a hard drive image

Overview

Various destinations are available for archiving the hard drive images of the robot controller.

- RecoveryUSBStick
- Local drive
- Hidden partition of the hard drive
- Network drive
- External USB hard drive

The hidden partition of the hard drive is not immediately available in all cases; it might not become available until after the hard drive image has been restored once with KUKA.Recovery.

Separate images are created in WIM format for partition C:\ and partition D:\ and saved with the same name.

- Default name: **Custom**
- The images for partitions C:\ and D:\ are differentiated by the suffixes C and D in the name:
  - **CustomC.WIM**
  - **CustomD.WIM**

6.5.1 Archiving a hard drive image on the RecoveryUSBStick

Procedure

Recommended procedure:

1. Select the menu sequence **Start** > **Image hard drive disk** > **Create**.
2. Select the **Browse…** button.

   The **HDD Creation** window is opened. By default, the **Image** folder on the RecoveryUSBStick is selected as the target directory.
3. Click on **Next** and enter a name for the hard drive image. Click **OK** to confirm.

   Separate images are created for partition C:\ and partition D:\ and saved in the **Image** folder.
4. A message indicates completion of the archiving process or the occurrence of an error.

- Click on **Yes** to open the LOG file for archiving.
- Click on **No** to terminate archiving.

Alternative procedure:

1. Select the menu sequence **Start** > **Image hard drive disk** > **Create**.
2. Select the **BootStick** button.
3. Enter a name for the hard drive image and confirm with **OK**.
   Separate images are created for partition C:\ and partition D:\ and saved in the **Image** folder on the RecoveryUSBStick.
4. A message indicates completion of the archiving process or the occurrence of an error.
   - Click on **Yes** to open the LOG file for archiving.
   - Click on **No** to terminate archiving.

Description

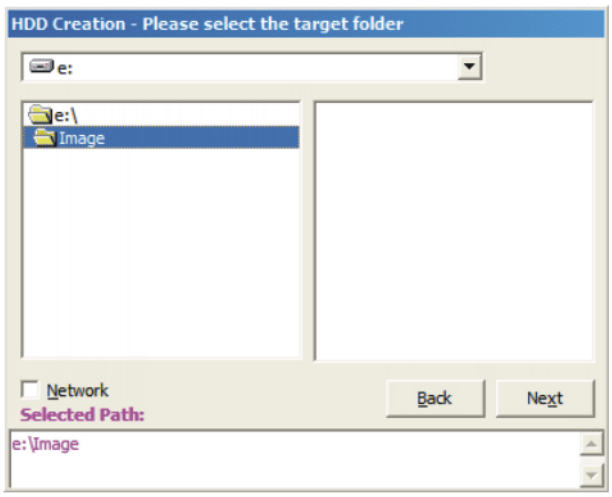

Fig. 6-4: Archiving on RecoveryUSBStick

6.5.2 Archiving a hard drive image on a network drive

Precondition

- Network connection is activated.

Procedure

1. Select the menu sequence **Start** > **Image hard drive disk** > **Create**.
2. Select the **Browse…** button.
   The **HDD Creation** window is opened.
3. Click on the **Network** check box.
4. Enter the access data in the **Network Login** window to connect to the network drive:
   - Domain (if present)
   - User name
   - Password

   Click **OK** to confirm.
5. Select the network drive and if necessary navigate to the folder in which the hard drive image is to be saved.
6. Click on **Next** and enter a name for the hard drive image. Click **OK** to confirm.
   Separate images are created and saved for partition C:\ and partition D:\.
7. A message indicates completion of the archiving process or the occurrence of an error.
   - Click on **Yes** to open the LOG file for archiving.

- Click on **No** to terminate archiving.

Description

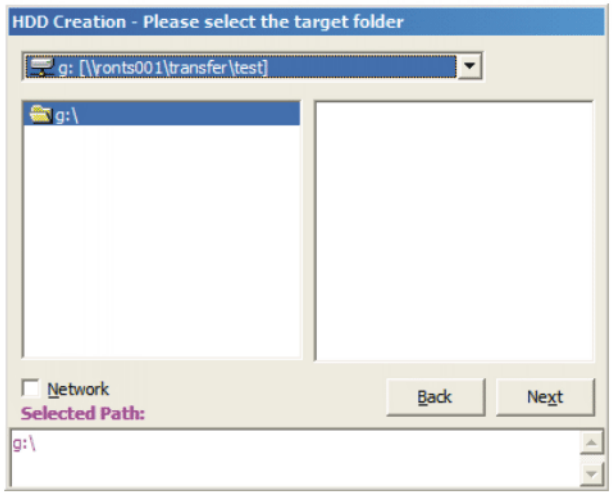

Fig. 6-5: Archiving to network drive

6.5.3 Archiving a hard drive image on a hidden partition

Procedure

1. Select the menu sequence **Start** > **Image hard drive disk** > **Create**.
2. Select the **Browse…** button.
   The **HDD Creation** window is opened.
3. Select the **KUKA_RECOVERY** drive.
4. Click on **Next** and enter a name for the hard drive image. Click **OK** to confirm.
   Separate images are created and saved for partition C:\ and partition D:\.
5. A message indicates completion of the archiving process or the occurrence of an error.
   - Click on **Yes** to open the LOG file for archiving.
   - Click on **No** to terminate archiving.

Description

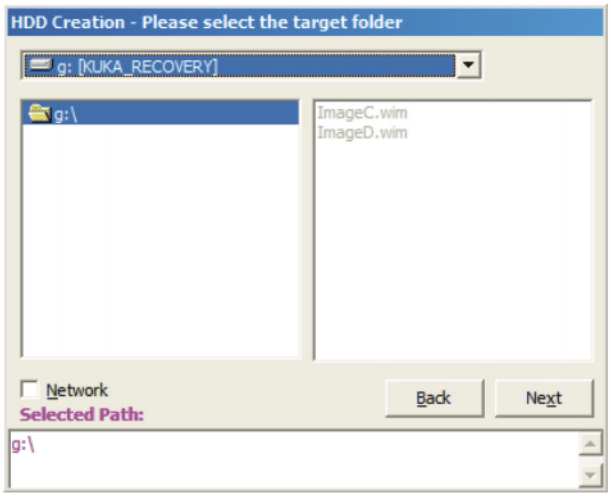

Fig. 6-6: Archiving on hidden partition

6.6 Restoring a hard drive image

6.6.1 Modifying partition sizes online

Description

The partition sizes can be modified online using the text editor. Partition sizes that are changed online are only valid for the current WinPE session. The configuration is not permanently saved.

Procedure

1. Select the menu sequence **Start** > **Utilities** > **Notepad**.
2. Select **File** > **Open** in the menu of the text editor and navigate to the file Controller.INI.
   The file is located in the directory Boot (X:)\Windows\System32\mode.
3. Open the file Controller.INI, change and save the partition sizes.

6.6.2 Restoring a hard drive image from the RecoveryUSBStick

Procedure

1. Select the menu sequence **Start** > **Image hard drive disk** > **Restore**.
   The **HDD Restoration** window is opened. By default, the **Image** folder on the RecoveryUSBStick is selected as the directory.
2. Select the image C.WIM for partition C:\ or the image D.WIM for partition D:\. Click on **Next**.

> Only one WIM file can be selected, e.g. Custom15C.WIM for partition C:\. Both partitions are automatically restored if a complementary WIM file with the same name has been saved, e.g. Custom15D.WIM for partition D:\.

3. A message indicates completion of the restoration process or the occurrence of an error.
   - Click on **Yes** to open the LOG file for restoration.
   - Click on **No** to terminate restoration.

Description

As can be seen in the screenshot, only an image of partition C:\ has been saved on the RecoveryUSBStick. The complementary image of partition D:\ has not been created. Only partition C:\ will therefore be restored.

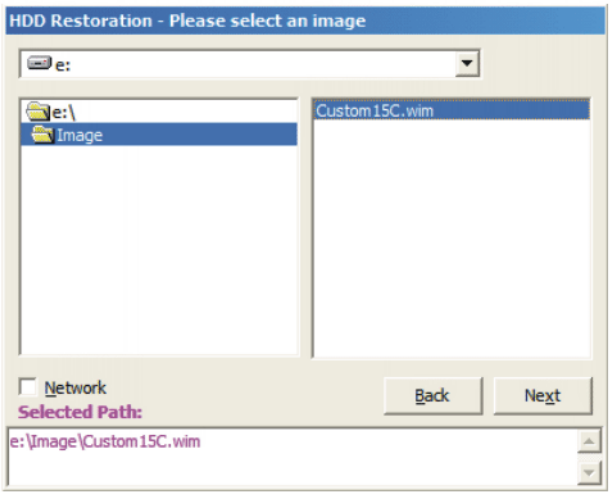

Fig. 6-7: Restoration from RecoveryUSBStick

6.6.3 Restoring a hard drive image from a network drive

Precondition

- Network connection is activated.

Procedure

1. Select the menu sequence **Start** > **Image hard drive disk** > **Restore**.
   The **HDD Restoration** window is opened.
2. Click on the **Network** check box.
3. Enter the access data in the **Network Login** window to connect to the network drive:
   - Domain (if present)
   - User name
   - Password

   Click **OK** to confirm.
4. Select the network drive and if necessary navigate to the folder with the hard drive image.
5. Select the image C.WIM for partition C:\ or the image D.WIM for partition D:\. Click on **Next**.

> Only one WIM file can be selected, e.g. Custom15C.WIM for partition C:\. Both partitions are automatically restored if a complementary WIM file with the same name has been saved, e.g. Custom15D.WIM for partition D:\.

6. A message indicates completion of the restoration process or the occurrence of an error.
   - Click on **Yes** to open the LOG file for restoration.
   - Click on **No** to terminate restoration.

Description

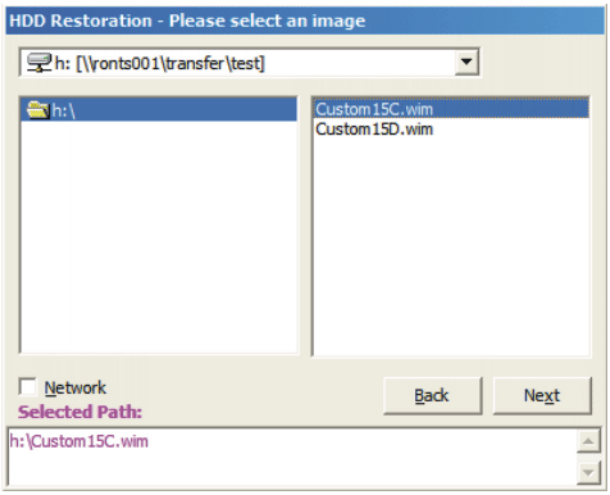

Fig. 6-8: Restoration from network drive

6.6.4 Restoring a hard drive image from a hidden partition

Procedure

1. Select the menu sequence **Start** > **Image hard drive disk** > **Restore**.
   The **HDD Restoration** window is opened.
2. Select the **KUKA_RECOVERY** drive.
3. Select the image C.WIM for partition C:\ or the image D.WIM for partition D:\. Click on **Next**.

Only one WIM file can be selected, e.g. Custom15C.WIM for partition C:\. Both partitions are automatically restored if a complementary WIM file with the same name has been saved, e.g. Custom15D.WIM for partition D:\.

4. A message indicates completion of the restoration process or the occurrence of an error.
   - Click on **Yes** to open the LOG file for restoration.
   - Click on **No** to terminate restoration.

Description

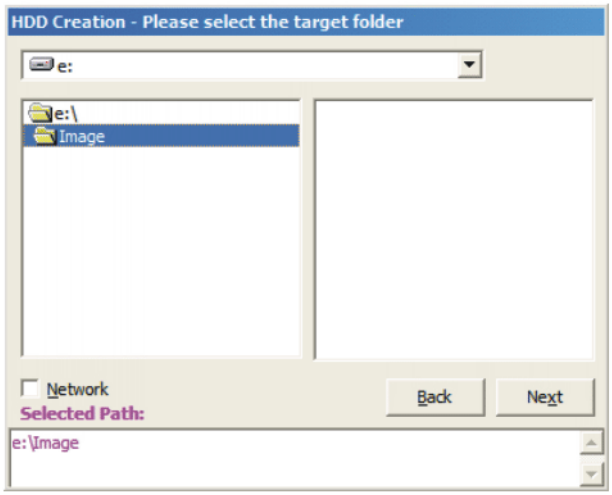

Fig. 6-9: Restoration from hidden partition

6.7 Safely removing USB devices

Procedure

1. Select the menu sequence **Start** > **USB flash drive** > **Eject**.
   All connected USB devices are displayed in the **UFD list**.
2. In the list, select the USB device that is to be removed. Activate the check box with the corresponding drive letter.
3. Click on the **Remove** button.
   The connections to all selected USB devices are terminated and deenergized. If several USB sticks are plugged into a hub and the connection to all sticks is terminated, the hub is also deenergized.
4. Once the selected USB devices are no longer displayed in the list, the process has been completed. Remove the selected USB devices.

Description

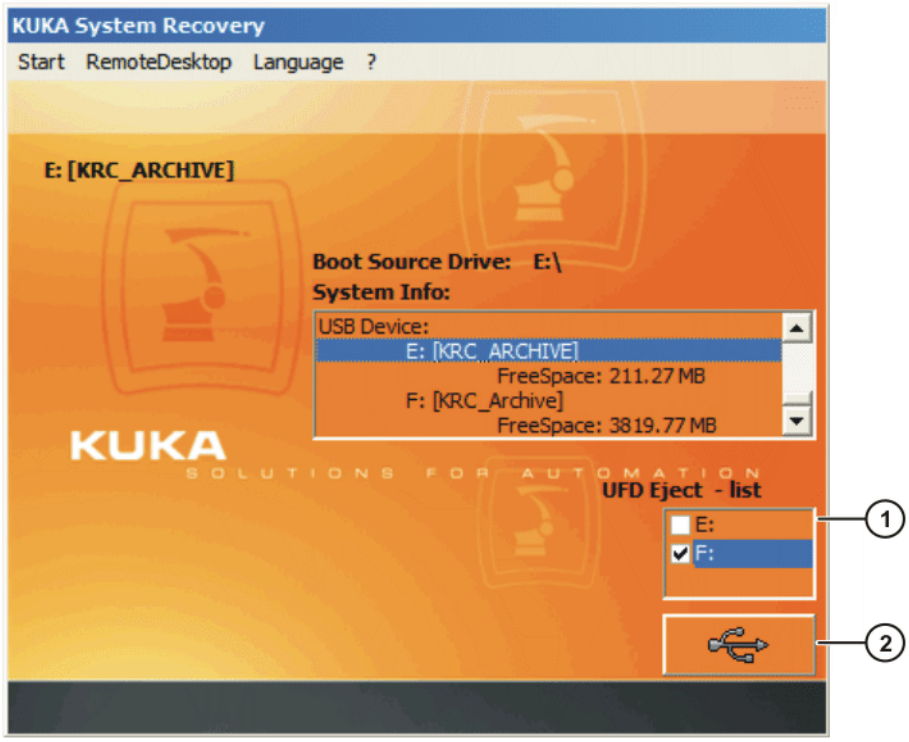

Fig. 6-10: Safely removing USB devices

1 UFD list
2 **Remove** button

6.8 Executing Silent mode

Description

Depending on the configuration, an image is created or restored in Silent mode (>>> 6.8 "Executing Silent mode" Page 40).

Examples for target and source directory:

- Target directory:
  - RecoveryUSBStick\Image
  - Network drive
- Source directory:
  - RecoveryUSBStick\Image
  - Network drive
  - Hidden partition
- Image name for partition C:\ and D:\: ***C.WIM** and ***D.WIM**

If the KUKA.RecoveryUSB stick is used more than once to create hard drive images on the KUKA.RecoveryUSB stick in Silent mode (**Create WIM to USB Stick** option), the most recently saved image is overwritten (>>> 5.2.2.2 "General tab – Silent mode" Page 19).

Precondition

- Configuration for Silent mode is saved.

Procedure

For KR C2

1. Connect the RecoveryUSB stick.
2. Boot the robot controller.
   The image is automatically created in the configured target directory or restored from the source directory.

3. Once the image has been completely created or restored, the KUKA.RecoveryUSB stick is automatically deactivated and the robot controller is automatically rebooted.
4. Before it can be used again, the KUKA.RecoveryUSB stick must be removed and plugged back in.

For KR C4

1. Connect the RecoveryUSB stick.
2. Boot the robot controller.
   The image is automatically created in the configured target directory or restored from the source directory.
3. Once the image has been completely created or restored, the controller is shut down.
4. Switch off the controller via the main switch.
5. Remove the KUKA.RecoveryUSB stick.
6. Switch on the controller via the main switch.

6.8.1 KR C4 CSP operating state indicator

Description

The LEDs of the Controller System Panel (CSP) indicate the operating state of the controller.

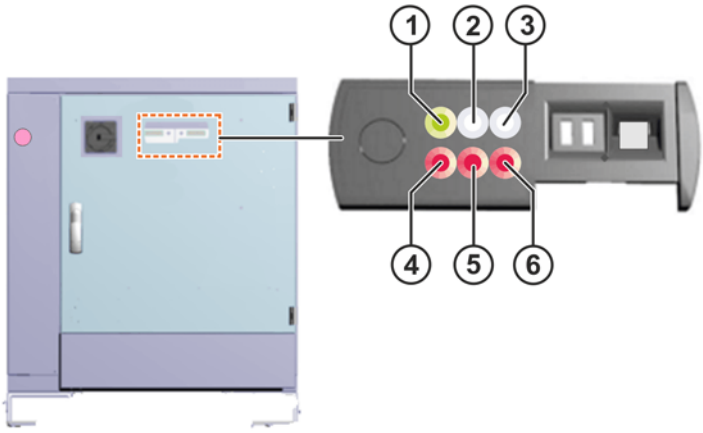

Fig. 6-11: KR C4 operating state indicator

Item	Description
1	LED 1 (green): Operation
2	LED 2 (white): Sleep
3	LED 3 (white): Automatic
4	LED 4 (red): Error LED 1
5	LED 5 (red): Error LED 2
6	LED 6 (red): Error LED 3

The LEDs 4 - 6 are not controlled by RecoveryUSB during creation/ restoration of the image.

6.8.2 Creating a KR C4 image in Silent mode

Precondition

- The robot controller is switched off.
- There is sufficient memory space available in the target directory.

Procedure

1. Connect the KUKA.RecoveryUSB stick to the PC of the robot controller.
2. Boot the robot controller.
3. CSP LED 1 flashes: KUKA.RecoveryUSB is booting the controller.
4. CSP LED 1 lights up: The boot procedure has been completed.
5. CSP LED 2 flashes: Image of the C:\ partition is being created.
6. CSP LED 2 lights up: Image creation of the C:\ partition has been completed.
7. CSP LED 3 flashes: Image of the D:\ partition is being created.
8. CSP LED 3 lights up: Image creation of the D:\ partition has been completed.
9. CSP LED 1-6 lights up for 1 second: The complete image has been created.
10. CSP LED 2 flashes: The controller has been shut down.
11. Switch off the controller via the main switch.
12. Remove the KUKA.RecoveryUSB stick.
13. Switch on the controller via the main switch.

6.8.3 Restoring a KR C4 image in Silent mode

Precondition

- The robot controller is switched off.

Procedure

1. Connect the KUKA.RecoveryUSB stick to the PC of the robot controller.
2. Boot the robot controller.
3. CSP LED 1 flashes: KUKA.RecoveryUSB is booting the controller.
4. CSP LED 1 lights up: The boot procedure has been completed.
5. CSP LED 2 flashes: Images of the C:\ and D:\ partitions are being restored.
6. CSP LED 2 lights up: Restoration of the C:\ and D:\ partitions has been completed.
7. CSP LED 3 flashes: Images of the C:\ and D:\ partitions are being copied to the hidden partition.
8. CSP LED 3 lights up: Copying of the images has been completed.
9. CSP LED 1-6 lights up for 1 second: The complete image has been restored.
10. CSP LED 2 flashes: The controller has been shut down.
11. Switch off the controller via the main switch.
12. Remove the KUKA.RecoveryUSB stick.
13. Switch on the controller via the main switch.

7 KUKA Service

7.1 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:

- Model and serial number of the manipulator
- Model and serial number of the controller
- Model and serial number of the linear unit (if present)
- Model and serial number of the energy supply system (if present)
- Version of the system software
- Optional software 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
- Description of the problem, duration and frequency of the fault

7.2 KUKA Customer Support

Availability

KUKA Customer Support is available in many countries. Please do not hesitate to contact us if you have any questions.

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