Kuka SA Robot Driver Deployment

When Customer Has a Rail  
  
**Required Setup**As of this version (SA Robot Driver Version 2013.09.19 Kuka Rail Support), we support external axis E1. **THE RAIL MUST BE DECOUPLED KINEMATICALLY FROM THE ARM**. This is done by editing the $Machine.dat file so this line reads as follows…

$EX\_KIN={ET1 #NONE,ET2 #NONE,ET3 #NONE,ET4 #NONE,ET5 #NONE,ET6 #NONE} ;

Anything other than #NONE means the external axis is coupled to the robot arm, and you cannot safely run SARobotDriver until this is changed.

In order to operate the brakes on your robot safely, the customer should verify the settings in the line

$BRK\_MODE=

with their Kuka representative. The representative should be consulted to ensure the kinematics decoupling of the rail and robot arm as well.

**To Test**To see whether the system has the Required Setup, simply move the rail in external control software to a position a little away from the zero or home position. Make certain the path to the home position is clear, and run the SA Robot Driver. Perform a Cartesian move from SA RobotDriver, being sure to vary the axis along the rail. If the robot is properly decoupled, this will not change the robot’s position on the rail. If this condition is met, then carefully run SA RobotDriver and try moving the robot again in Cartesian space, especially along the rail axis, and then try driving external Axis E1 to a valid position. (Note the ui should show the minimum and maximum limits for the rail’s travel in inches, as well as the current rail position. You should monitor the values in $POS\_ACT and $AXIS\_ACT on the KR C2 controller.) Likewise, when changing the robot’s position on the rail, this should not change the pose of the robot arm.

If there are any doubts regarding any of the above requirements, DO NOT RUN SA RobotDriver until they are resolved.

Procedure

**Requirements for PC Running SA RobotDriver (Remote Access Computer)**

Windows XP

.NET v.2 with Service Pack 1

Localization Settings – Must use ‘.’ as decimal point, not ‘,’  
  
**Recommended Setup**

**You will need to connect a monitor, keyboard, mouse, and (optionally) a USB extension to the controller. The USB extension is for easy transfer of the required files listed above to the controller.**

**Network connection under VxWorks**

**Description** Direct data exchange with VxWorks allows greater performance during data

transfer.

􀂄 KR C2 ed05: requires a KUKA network card (option).

􀂄 KR C2 sr: requires a KUKA network card (option).  
  
  
  
**Network connection under VxWorks**

**Advantages**􀂄 The direct connection to VxWorks reduces the load on the robot controller,

since data exchange no longer uses the shared memory network.

􀂄 Bypassing the shared memory network shortens the transmission distance,

thus enabling faster data transmission.

􀂄 With a point-to-point connection there is no risk of data collisions on the

bus, thus enabling faster data transmission.

**Modifying the IP address for KSS 5.x**

**Precondition**􀂄 User group “Expert”  
 From Kuka Teach Pendand HMI, select Configure >> User Group  
 Press “Log On”

Select “Expert”

Press “Log On”

Password is “kuka” (all lower case)

NOTE: The controller has a time out, after which it will return the User Group to Operator.

􀂄 Windows interface (CTRL+ESC) – To get into Windows XP running on Controller  
**Procedure**1. Open the file C:\Windows\vxWin.ini.

2. Modify the controller’s IP address under e={......}.

3. Save and close.

4. Reboot the robot controller.  
  
  
  
Files Needed  
  
**You will need to back up ALL files that are already on the controller before editing, such as $config.dat. This file contains global variable declarations, and will render the robot inoperable if corrupted. The KRL files, like SAKRL, MoveToFrame, MovetojointSet, etc. will be new to the controller unless upgrading the SA Robot Driver.**

**XML Channel configuration and Data format files (C:\KRC\Roboter\INIT)**

RAC.xml

RAC+.xml

XmlApiConfig.xml (set tcp/ip address and port of remote access computer – secondary fixed ip on remote computer)

**KRL Client Communication (C:\KRC\Roboter\KRC\R1\Program)**

SAKRL.dat

SAKRL.src

**KRL Client motion programs (called by SAKRL.SRC C:\KRC\Roboter\KRC\R1\Program)**

MoveToFrame.SRC and .DAT

MoveToJointSet.SRC and .DAT

MoveToExternalAxisSet.SRC and .DAT

HitEStop.SRC

**VxWorks Communication Configuration (C:\Windows)**

vxWin.ini (robot controller VxWorks tcp/ip address modified under e={……})

**Server application and data format files on remote computer (all in SA install)**

SARobotDriver.exe (uses PC’s secondary fixe ip address for KRL/XML connection)

KukaCoreInterface.dll

SA Robot Driver.exe.manifest

RACData.xml

**Global Data (c:\KRC\Roboter\KRC\R1\System)**

$config.dat

Running SA Robot Driver on the Kuka KR C2  
  
**1) On the Teach Pendant, make sure the program SAKRL (.krl) is selected.**

**2) On the Teach Pendant, in the lower left of the window, ensure that the “S” (submit interpreter status) indicator is green, the “I” (I/O status for Drives/Motors) is green, and the “R” (program run status) is either yellow or black.**

**Press the “I” motor enable button on the teach pendant near the E-Stop button if the “I” indicator is not green.  
Go to the Program menu, and select “Reset Program” if the R indicator is yellow or black.  
  
  
3) Add your robot model to SA, and run SA Robot Driver.exe. Press “Connect”, and select the Kuka robot from the drop down. You’ll see a progress dialog, informing you that the interface is waiting for a connection to SAKRL.  
  
4) On the Teach Pendant, press and hold the green “Start” button (bottom of teach pendant). Hold until the robot has completed the move to the Kuka home position.  
  
5) The Program Run State Indicator “R” in the lower left teach pendant window should be red. Now press the green “Start” button again. The Program Run Indicator “R” should now be green, and the “waiting for connection” on the pc should go away. You are now running the robot driver.  
  
6) You should ALWAYS perform a joint space move OUT of the Kuka home position first, because it is a singularity.**