

ABB ROBOTICS

YuMi® App

User's guide

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Integrator functions

Description of the Integrator YuMi App functions. As an integrator you can basically add all functions in RAPID. Most of this you can run with the App.

(no TPWrite yet, but TPreadFK is working)

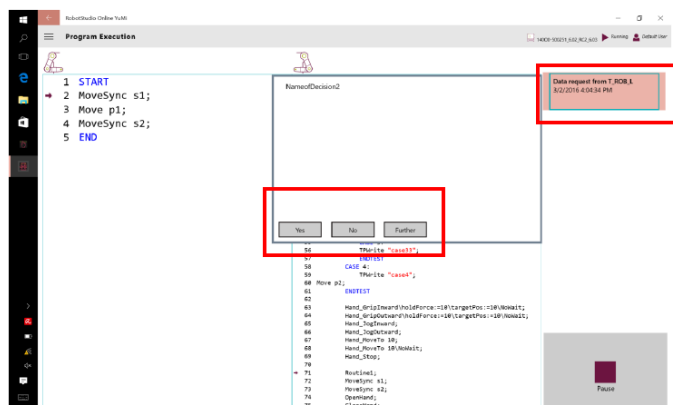
If the routine is not visible => restart the app / create a new program

Add Routines from RobotStudio®

Add routines in a separate system module via RobotStudio => it is possible to call the routines and they will not be deleted when creating a new program

6.5 Create routines

Limit: a TPreadFK function pops up if you run the program in the main window, but not if you run it in the routine window



MODULE AdditionalFunction (SYSMODULE)

```
PROC askQuestion()
```

```
  reg1:=0;
```

```
  WHILE reg1=0 DO
```

```
    TPreadFK reg1,"Wait","Yes","No","","","";
```

```
  ENDWHILE
```

```
  IF reg1=1 THEN
```

```
    Waittime 5;
```

```
  ELSEIF reg1=2 THEN
```

```
    Waittime 1;
```

```
  ENDIF
```

```
ENDPROC
```

```
ENDMODULE
```

– **Tip:** Install RobotStudio on your tablet: Add TPreadFK to ask the operator

- **Tip:** Work with background task for "Waiting for Tap" or for "path recording"

MultiMove Synchronized

Add a MultiMove routine to both arms of your program.

You can use synchronous movement also from the App.

Left arm => will be moved by the other arm

MODULE MainModule

LOCAL CONST string YuMi_App_Program_Version:="1.0.1"; !Do not edit or remove this line!

LOCAL VAR robtarget point1 := [[-4.95,247.75,188.22],[0.988188,0.135211,0.0689391,-0.0212039],[-2,1,-1,11],[122.339,9E+09,9E+09,9E+09,9E+09,9E+09]];

TASK PERS wobjdata wcoordL:=[FALSE,FALSE,"ROB_R",[[0,0,0],[1,0,0,0]],[[0,0,0],[1,0,0,0]]];

VAR syncident sync1;

VAR syncident sync2;

VAR syncident sync3;

PERS tasks all_tasks{2} := [{"T_ROB_L"},{"T_ROB_R"}];

PROC main()

 WaitSyncTask sync1, all_tasks;

SyncMoveOn sync2, all_tasks;

MoveJ point1 \ID:=10, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;

MoveJ point1\ID:=20, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;

MoveJ point1\ID:=30, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;

MoveJ point1\ID:=40, v100, z10, YuMi_App_move_tool_local \WObj:=wcoordL;

SyncMoveOff sync3;

ENDPROC

ENDMODULE

Right arm – will be moved

MODULE MainModule

LOCAL CONST string YuMi_App_Program_Version:="1.0.1"; !Do not edit or remove this line!

LOCAL VAR robtarget point1 := [[372.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,11],[-167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;

```
LOCAL VAR robtarget point2 := [[377.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,11],[-167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;
```

```
LOCAL VAR robtarget point3 := [[385.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,11],[-167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;
```

```
LOCAL VAR robtarget point4 := [[390.64,-193.70,43.74],[0.0318436,-0.018982,0.990476,0.132601],[0,-2,0,11],[-167.051,9E+09,9E+09,9E+09,9E+09,9E+09]] ;
```

```
VAR syncident sync1;
```

```
VAR syncident sync2;
```

```
VAR syncident sync3;
```

```
PERS tasks all_tasks{2} := [{"T_ROB_L"}, {"T_ROB_R"}];
```

```
PROC main()
```

```
    WaitSyncTask sync1, all_tasks;
```

```
    SyncMoveOn sync2, all_tasks;
```

```
    MoveJ point1 \ID:=10, v100, z10, YuMi_App_move_tool_local;
```

```
    MoveJ point2\ID:=20, v100, z10, YuMi_App_move_tool_local ;
```

```
    MoveJ point3\ID:=30, v100, z10, YuMi_App_move_tool_local ;
```

```
    MoveJ point4\ID:=40, v100, z10, YuMi_App_move_tool_local ;
```

```
    SyncMoveOff sync3;
```

```
ENDPROC
```

```
ENDMODULE
```

Questions:

Send an email to Katja.Butterweck@de.abb.com

Hide your routines

In the config file you can add your routines as hidden => in this case they are not visible in the App anymore.

Open Robotstudio for IV

Additional modules/programs

- Move between Calib- and Transportposition
- How to bring YuMi from Calib- to transport-position
- How to bring YuMi from transport- to calib-position

Wait for Tap

WaitForTap function is missing

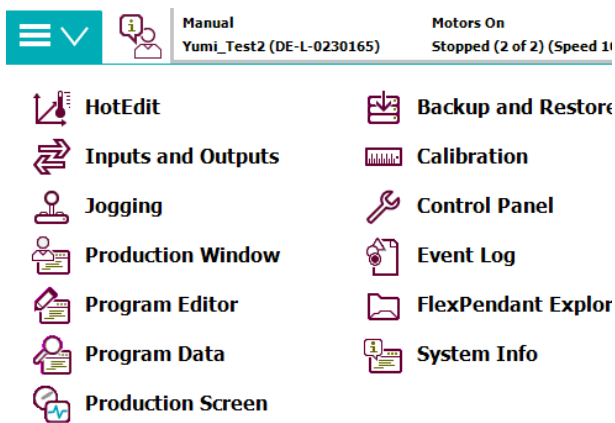
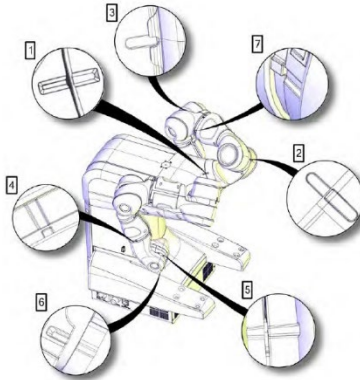
Tips for an integrator

- Change the Proc for hands if you have gripper fingers which grip from inward.
- MoveSync movements are possible also if just one arm is switched on Switch of one task in the settings.
- Build different fingers for YuMi.
- Use Torx screws if you change hands or fingers often.

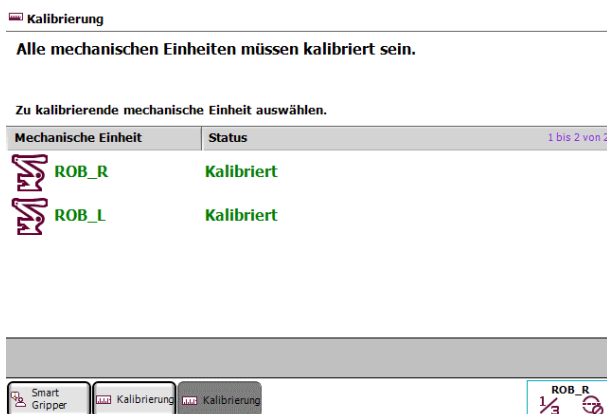
FAQ

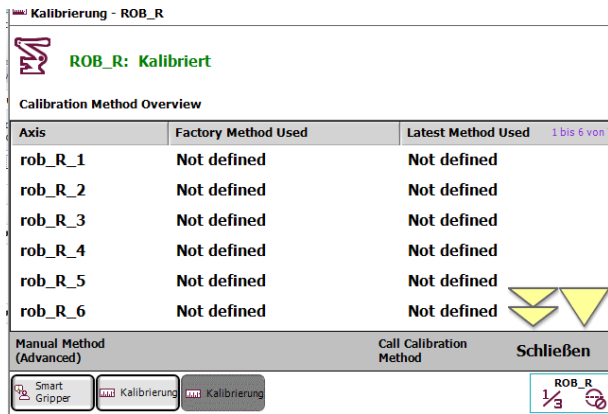
Update revolution counter => Calibration

To be calibrated YuMi needs to be in the calibration position (see picture and markers on the right and the left arm – some with R and L). This is possible by losing the brakes and moving the arms manual.

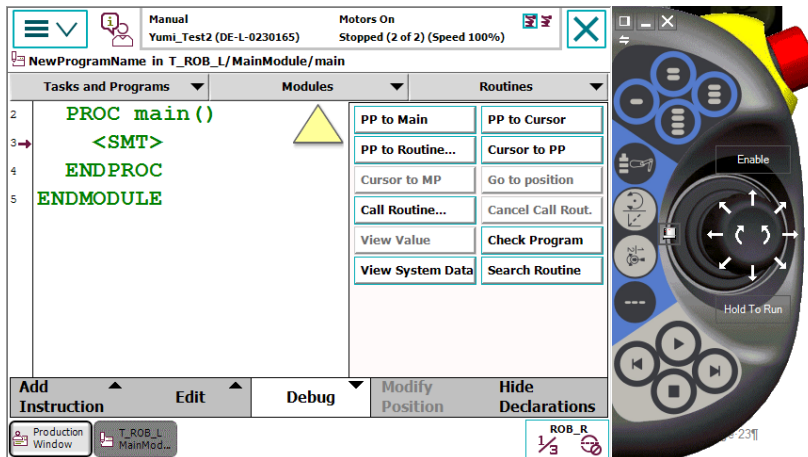


Go to menu and chose Calibration.

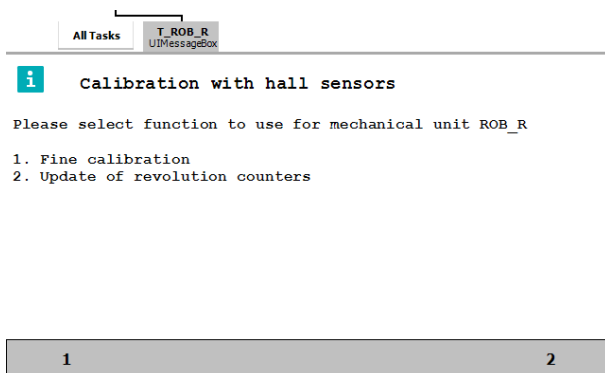




Click on Call Calibration Method.



(When YuMi is in the calibration position) Call Calibration routine
 (Calibration – Select Arm – Call Calibration Method – in Manual mode)
 Start Program on FlexPendant – Play



Chose Update of revolution counters

All Tasks T_ROB_R
UMessageBox

i Selection of joint(s) to update

Choose joint(s) to update revolution counters for ROB_R

1. [X]
2. [X]
3. [X]
4. [X]
5. [X]
6. [X]
7. [X]

1 2 3 4 Next

Chose all

All Tasks T_ROB_R
UMessageBox

i Selection of joint(s) to update

Choose joint(s) to update revolution counters for ROB_R

1. [X]
2. [X]
3. [X]
4. [X]
5. [X]
6. [X]
7. [X]

5 6 7 Next

Wait until a message at the end shows up and indicates that everything is completed.

Repeat for second arm.

If YuMi does not find the hall sensors => manual calibration for this axis and repeat the call hall.

Kalibrierung - ROB_R

ROB_R: Kalibriert

Calibration Method Overview

Axis	Factory Method Used	Latest Method Used
rob_R_1	Not defined	Not defined
rob_R_2	Not defined	Not defined
rob_R_3	Not defined	Not defined
rob_R_4	Not defined	Not defined
rob_R_5	Not defined	Not defined
rob_R_6	Not defined	Not defined

Manual Method (Advanced) Call Calibration Method Schließen

Smart Gripper Kalibrierung Kalibrierung

ROB_R 1/3

How to change the Ip address of a WAN port?

Chose menu on FlexPendant and make an advanced restart => Start Boot Application

Go to setting – IP set up

Start Boot Application

Set the IP address - Always Subnet mask: 255.255.255.0

Since RobotWare 6.03 it is also possible to change the WAN port via RobotStudio

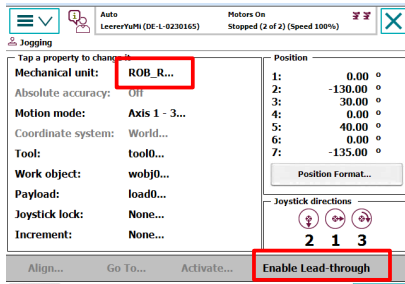
How to bring YuMi from Calib- to transport-position

You can use this YuMi-Program (see attachments)

- mvCalibTransp_2.yumi
- Transportposition_DE_CallHall.docx
- Transportposition_EN.docx

Or Do it manually

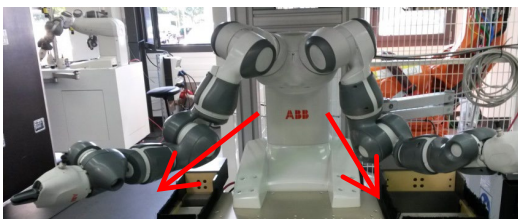
Switch YuMi on -> Switch on lead through mode in jogging window for both arms



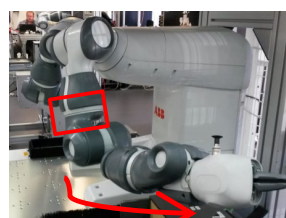
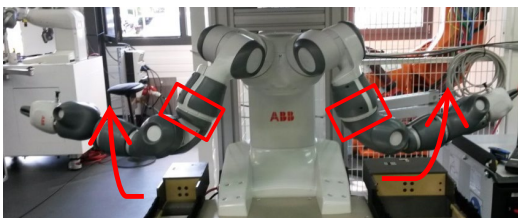
Start in calibration position



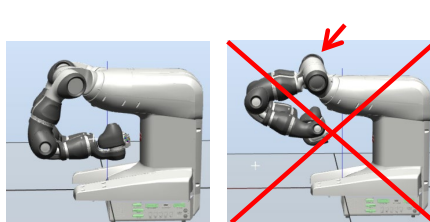
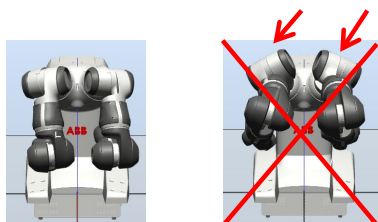
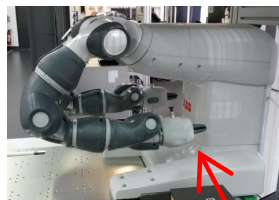
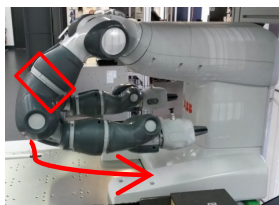
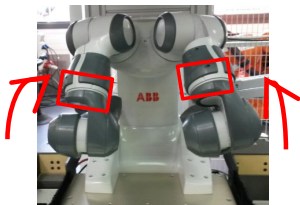
Move arms to the front and outward



Turn axis 7 outward



Turn axes 7



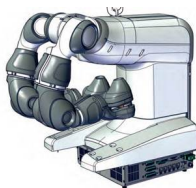
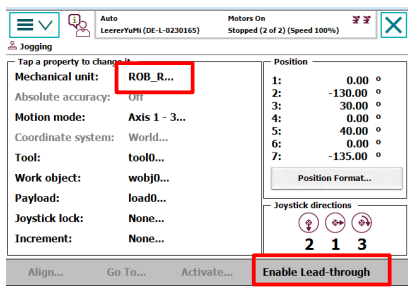
Switch YuMi Off

How to bring YuMi from transport- to calib-position

You can use this YuMi-Program (see attachments)

- mvCalibTransp_2.yumi
- Transportposition_DE_CallHall.docx
- Transportposition_EN.docx

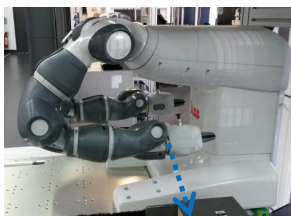
Switch YuMi on -> Switch on lead through mode in jogging window for both arms



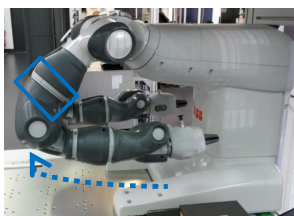
Start in transport position and remove packaging



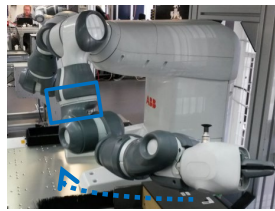
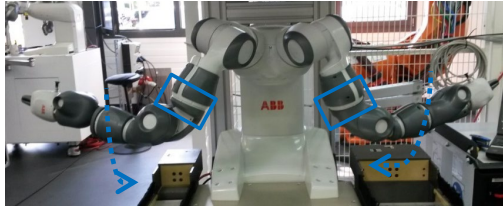
Move arms outward



Turn axis 7 outward



Turn axes 7 until arms are pointing to the front



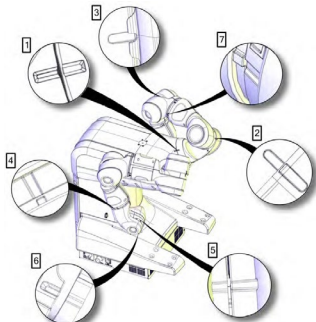
Right arm



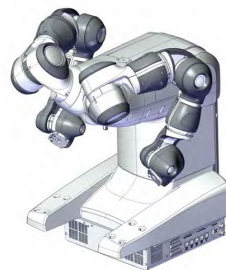
left arm



Check the markers for right and left arm



Switch YuMi Off



Arms are moving to a wrong position

- Calibrate arms => see Update RevolutionCounter
- Check tooldata and first-hand settings

Predicted collision with the App

- Move hands to a better position (if hands are blocked – go back to Teach in Window) see also Switch off Predicted Collision
- You might need to shift your point => use ModPos

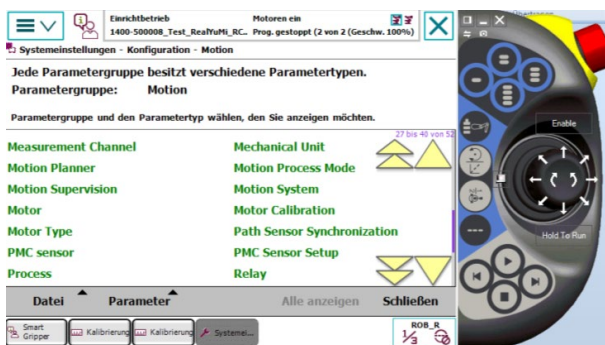
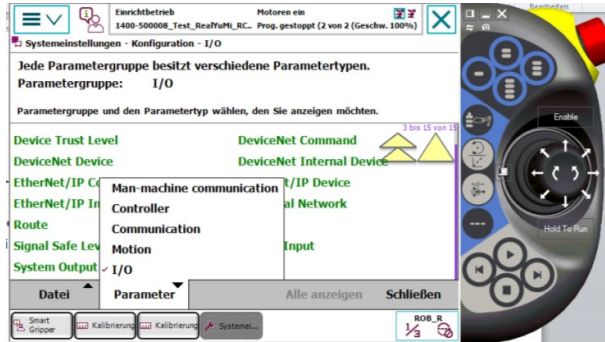
With RobotStudio 6.05 you can visualize the collision position.

Switch off / change predicted collision

To change value of the collision zone, go on FlexPendant to:

Control Panel – Configuration

Chose topic Motion

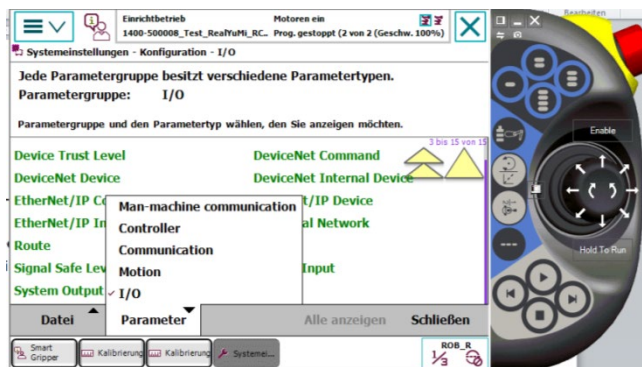


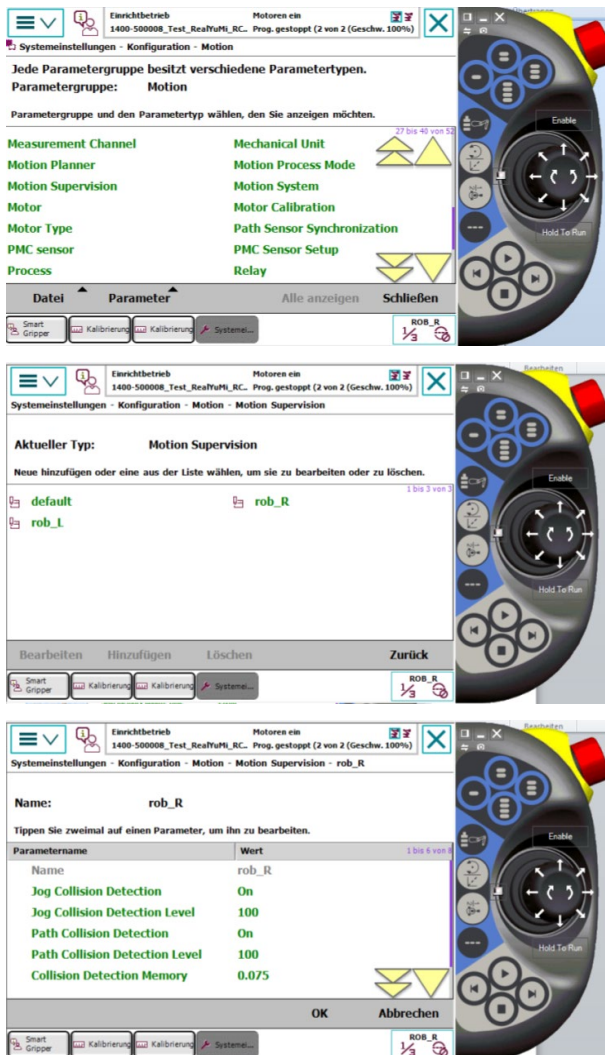
Go to Motion System – System 1

Change Coll-Pred Safety Distance



To switch collision protection off go on FlexPendant to:





Restart the system

In RobotWare 6.03 there is also a Signal to switch collision protection off- set this from the App

Lead through is not working

Check the tool and load data

No connection to App

Can you try RobotWare 6.05

Yes - do it => recommended

Have you run RobotStudio before?

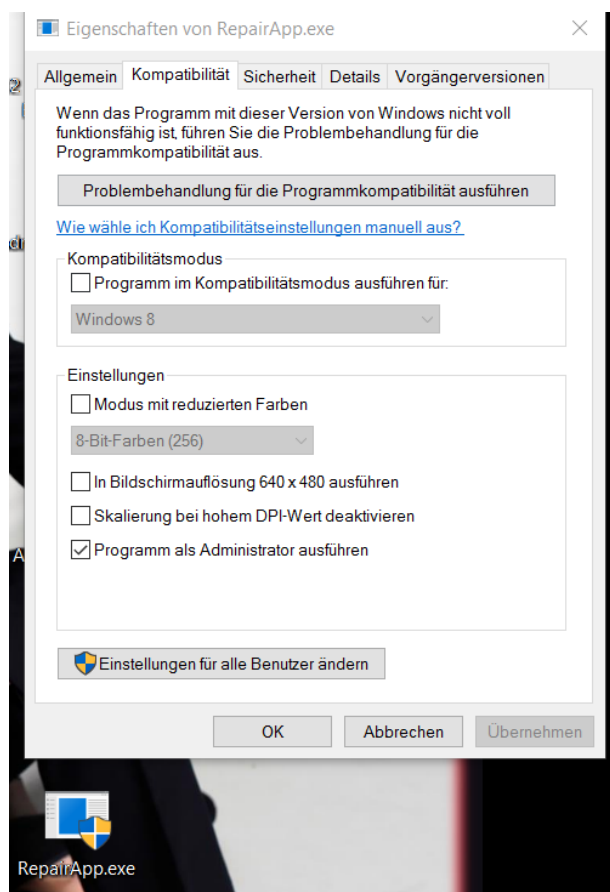
Yes:

If you start and connect RobotStudio first it is not possible to connect with the App afterwards.

This happens because of the background processes from RobotStudio
 => ABB Industrial Robot Communication Server
 + ABB Industrial robot Discovery Server

Please stop this process from the Task manager first. Then it is possible to connect the App again.

Or use this RepairApp.exe to kill the task RepairApp (attached).



Run the file as an administrator.

- You can preselect it

No:

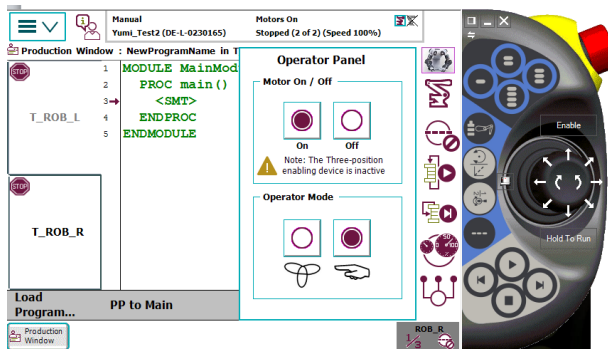
Check if WLAN is connected to Router

Check used WAN Port / Service Port

Check IP address of Tablet

Check if you use last version of the App.

Get Write Access back from App to FlexPendant (or RobotStudio)



Close App -

Chose manual mode – Automatic mode and Manual mode again

If nothing helps:

Make sure that you do not connect the LAN and the WiFi at the same time. If you run LAN disable WiFi.

Wrong version of system modules

Under construction

Delete all YuMi System Modules and start the App again

Error Message on App - nothing works

Solution 1:

- Got to FlexPendant => Cancel call routine
- Nothing is possible on the App and FlexPendant

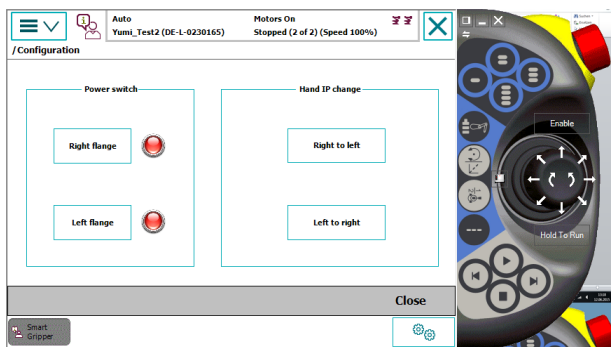
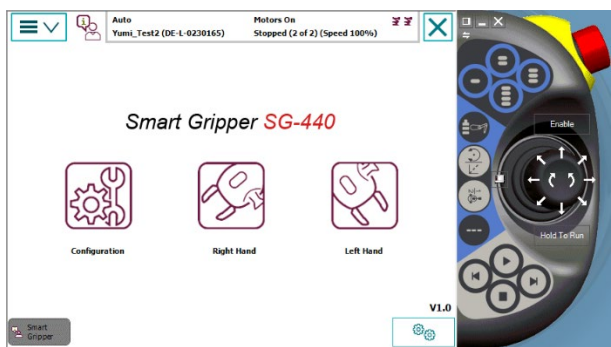
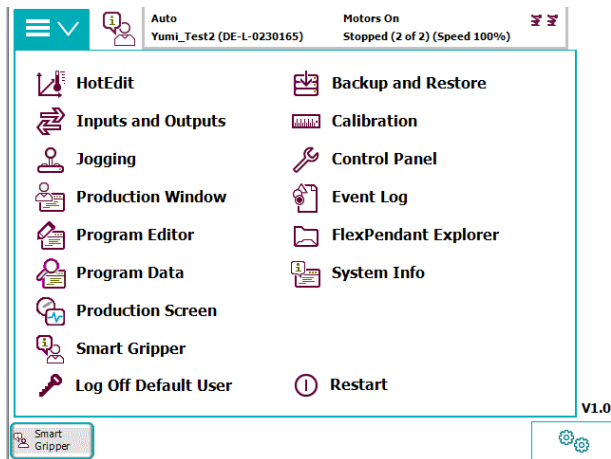
Solution 2:

- Make sure, that there is no error message on the FlexPendant.
- e.g. with RobotWare 6.04.01 we have lots of lost revolution counters => this needs to be solved before you use the tablet

Calibrate hands without the App

Calibrate hands without the App (possible when there is connection problem to the hands).

Open Smart Gripper Add-in



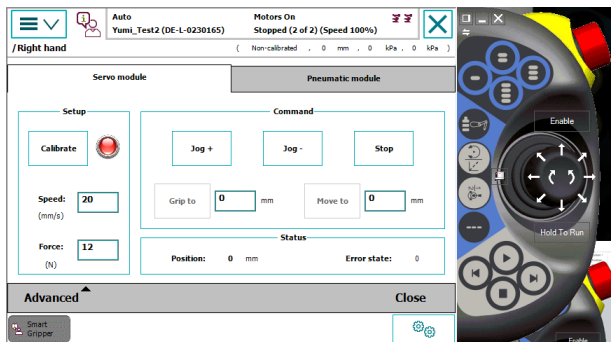
Switch on both hands in next window

Wait about 1 min. until hand symbols get colored

Click on Right hand

Jog – until hands are closed – Press Calibrate

Repeat for second hand

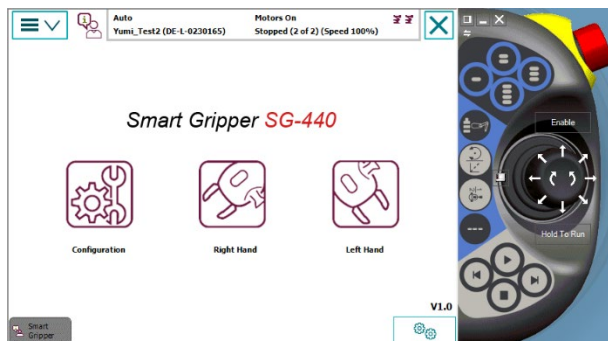


If you do not have the smart gripper here => it is necessary to change your system => add smart gripper

Hand not found

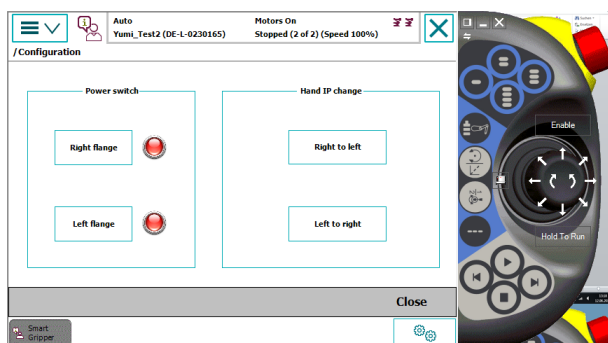
If one hand is not found (hand in smart gripper add in main window does not get colored in violet) and manual switch on shown in 7.4 does not work, there are two main reasons for the problem.

1. Hand is damaged => Call ABB
2. Hands are both preconfigured for the same side (two right or two left hands)



To check the pre-configuration follow these steps:

- Switch both hands off. Wait 30 seconds.
- Switch the right flange on. Go to the main window. Wait 30 seconds. Check if right hand is switched on.
- If the left hand is switched on: Go to the Configuration window and click on “Left to right”.
- Switch hand off. This is an important step.
- Repeat for the left hand.
- Switch the left flange on. Go to the main window. Wait 30 seconds. Check if left hand is switched on.
- If the right hand is switched on: Go to the Configuration window and click on “Right to left”.
- Switch hand off. Wait 30 seconds. Switch both hands on and test the App again.



Finger does not close - does not end at the same position

Calibration error

Solution:

Close Finger

Restart the App

Finger get calibrated with closed fingers now

Check your values for the fingers

Calibration error - my YuMi program does not start from FlexPendant

After restart the hands are not calibrated anymore so you get a calibration error.

- => Go to the top left on FlexPendant
- => Open Smartgripper
- => Select one hand => Jog to minus until Fingers are closed
- => Press Calibrate-button
- => Press Close button
- => Select other hand => Jog to minus until fiingers are closed
- => Press Calibrate-Button
- => Close the window
- => Set PPToMain
- => Start your program

Online monitoring

It is possible to use the online monitoring function in RobotStudio during using the App.

Simulate App program in RobotStudio

- YuMi_App_Common.sys, please see attached

At the moment the YuMi hands are not supported for simulation in RobotStudio

During this time, you can use this module => replace the YuMi_App_Common.sys module in both arm tasks.

Attention! If you start the YuMi App on an empty system, the old System module will be installed from the App.

In the system module the following code is included:

```
IF RobOS() THEN
!use the normal instruction
ELSE
!no action if you use a virtual system.
ENDIF
```

Can I open the saved YuMi program in RobotStudio

No, it is not possible.

A YuMi program is just designed for the App.

=> If you want to see save the program for RobotStudio => Create a normal Backup via FlexPendant or RobotStudio

Variable is decelerated twice

Check if there is just one YuMi system module in each arm task. If there is still an old YuMi Modul => delete the old one (e.g. YuMi_App_L)

Not possible to delete a function

When you stop the program in the middle it is not possible to delete an instruction which was used last. The program / motion pointer is still in this routine.

=> Solution => Go back to play mode => Set start to beginning => now it is possible to delete all instructions

WaitForTap function is missing

You need a special module for this.

TapMove for YuMi

Add both modules manually (via RobotStudio or via FlexPendant) in both tasks.

- YuMi_TapMove_Base.sys, please see attached
- YuMi_TapMove_User.sys, please see attached

Now you can add the procedure from the tablet: 6.5 Create routines

How to tap YuMi

The code recognizes a speed peek on any of the axis of the arm. Pressing onto the arm (increasing force/torque) will not be recognized and might lead to a position error.

More information:

Version: v0.4

22.04.2016

Christian Goy

Description

The user may interact with YuMi by tapping on its arm. YuMi needs to stop in a waiting position before activating the waiting for tap.

Content

YuMi_TapMove_Base.sys – Contains the logging instruction (LogRobSpeed)

YuMi_TapMove_User.sys – Example procedure “WaitForTap” incl. gesture movements

- “WaitMove” (axis 5 movement, requesting the tap)
- “AcknowledgeMove” (elbow movement, acknowledging the tap)

Installation

- Both modules have to be loaded into both robot tasks

Configuration

The sensitivity of the recognized tap can be influenced by changing nTapSeedLimit

!Speed limits (rad/s), motor side

CONST num nTapSpeedLimit:=2.5;

Programming

Program the motion task like this:

```
MoveL pPreGrip,v100,fine,tGripper;
```

```
WaitForTap;
```

WaitForTap is part of YuMi_TapMove_User.sys and calls “WaitMove” and “AcknowledgeMove”

WaitMove -3; !create an axis 5 movement of -3 degree at the current position

AcknowledgeMove 3; !create an elbow movement of 3 degrees at the current position

Can I use RobotStudio together with the App

Yes, you can install RobotStudio on the same tablet e.g. to show integrated vision.

If you want to open both make sure you open the YuMi App first.

Else you cannot connect the app => see 9.2 no connection with the App

How to show the App on a bigger screen

We use a Wireless Display Adapter from Microsoft



Model 1733 5VDC 500ma

Note: You can wirelessly connect Wi-Fi CERTIFIED Miracast enabled devices to a TV or monitor (available HDMI port and USB power required).

Set up

1. Connect your Microsoft Wireless Display Adapter to the HDMI and powered USB ports on your TV or monitor



2. On the TV, set the channel to the HDMI source

Windows 10

- Slide with the Finger from right to the left on the screen (Action center) and click on "Connect" => "Select Wireless Display Adapter"
- => for adapter updates and additional settings,
- Microsoft Wireless Display Adapter app from the Windows store

Android (not for YuMi App)

- Slide from Top to Bottom
- Click on Streaming-Symbol
- Click on Monitro
- To stop presentation: Slide from top to bottom and disconnect

Can I run any program on the App

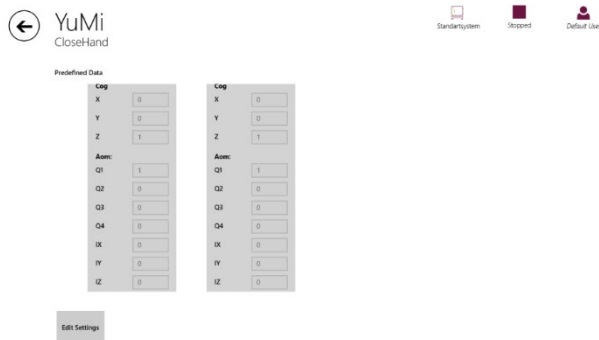
Yes, you can run every program, which starts in Mainmodule in main.

The App shows the main-Routine from MainModule

Behind there are two system Modules in each arm for the YuMi-App Functions.

Not full data for load data close hand is visible

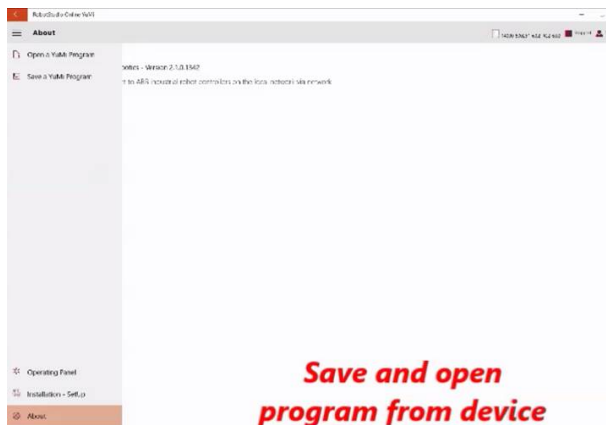
Scroll down



Where is the version number?

The current version number is available here:

If you cannot find it, you have a version older than 2.1.1346.0.



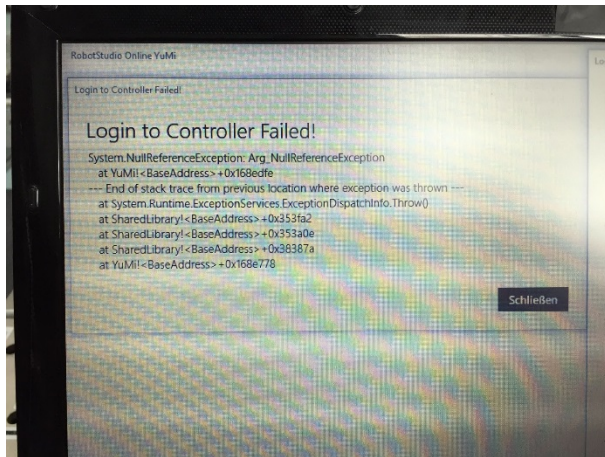
In the YuMi-Modul this line is added:

```
CONST string YuMi_App_Version_Arm := "1.0.1";
```

No connection with 6.04.01

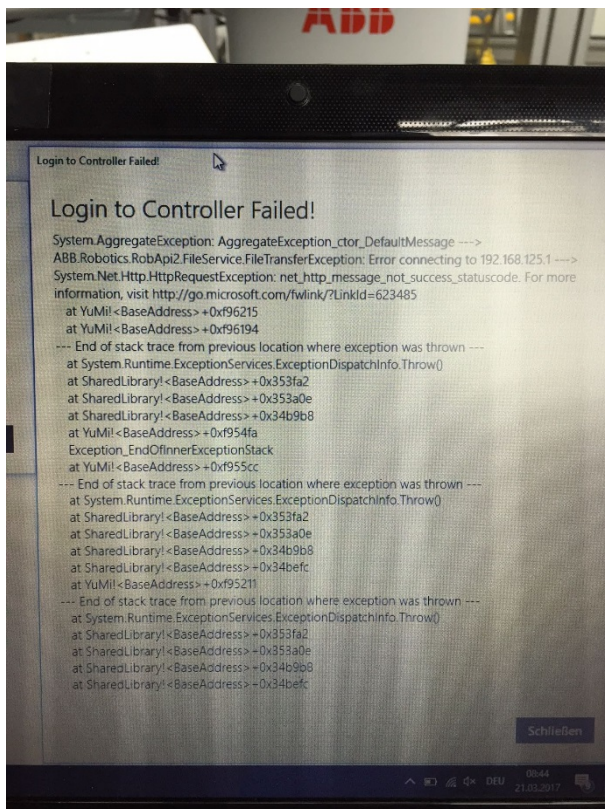
Is it this error?

The error is due to both wired and wireless network interfaces enabled in Tab. If you disable wireless when working with service port, then this error should not appear.



If not do the following:

Might be this one



Was RobotStudio used? See no connection with app

=> Kill this task

ABB Industrial Robot Communication Server

+ ABB Industrial robot Discovery Server

If there is still an error:

Update your RobotWare to the latest version

Check if you have the Windows update anniversary

To verify whether you have the anniversary update yet, you can do the following:

1. right-click on the flag button (start menu) in the bottom-left of your screen
2. select the "run" option
3. in the window that appears type into the box labelled "open" the word "winver" and select "OK" to run the program
4. the "About Windows" box should appear with the Windows 10 logo at the top and the words "Microsoft Windows" followed by the version number on the next line

The anniversary update should show the version number "1607" which is the year and month of the release (July 2016 - this is not August despite the update only being available on or after the 2nd of August presumably because the version was initially released to Windows Insiders in July for testing before the final release).

Use this App version

Install an App version manually

- YuMi_2.1.1354.0_Debug_Test.zip, please see attached file

If it is still not working.

Please send a system diagnostic and screenshots to Katja.Butterweck@de.abb.com

My arm is moving wild (with RobotWare 6.05)

The standard value for friction_comp_lead_through_facto (in Motion - Robot) is 0.6 =>

If you set this value to 0.2 => the lead through is working.

It is a setting in the robot configuration

hands move up

- IMG_6643.MOV, please see attached

Does it look like this?

Check the first settings:

3.4 First settings - Smart instructions