

## Integration of EStop-Sensing for Safe Brake Actuation

support@cpr-robots.com

Dec. 07th 2022

### 1. Introduction

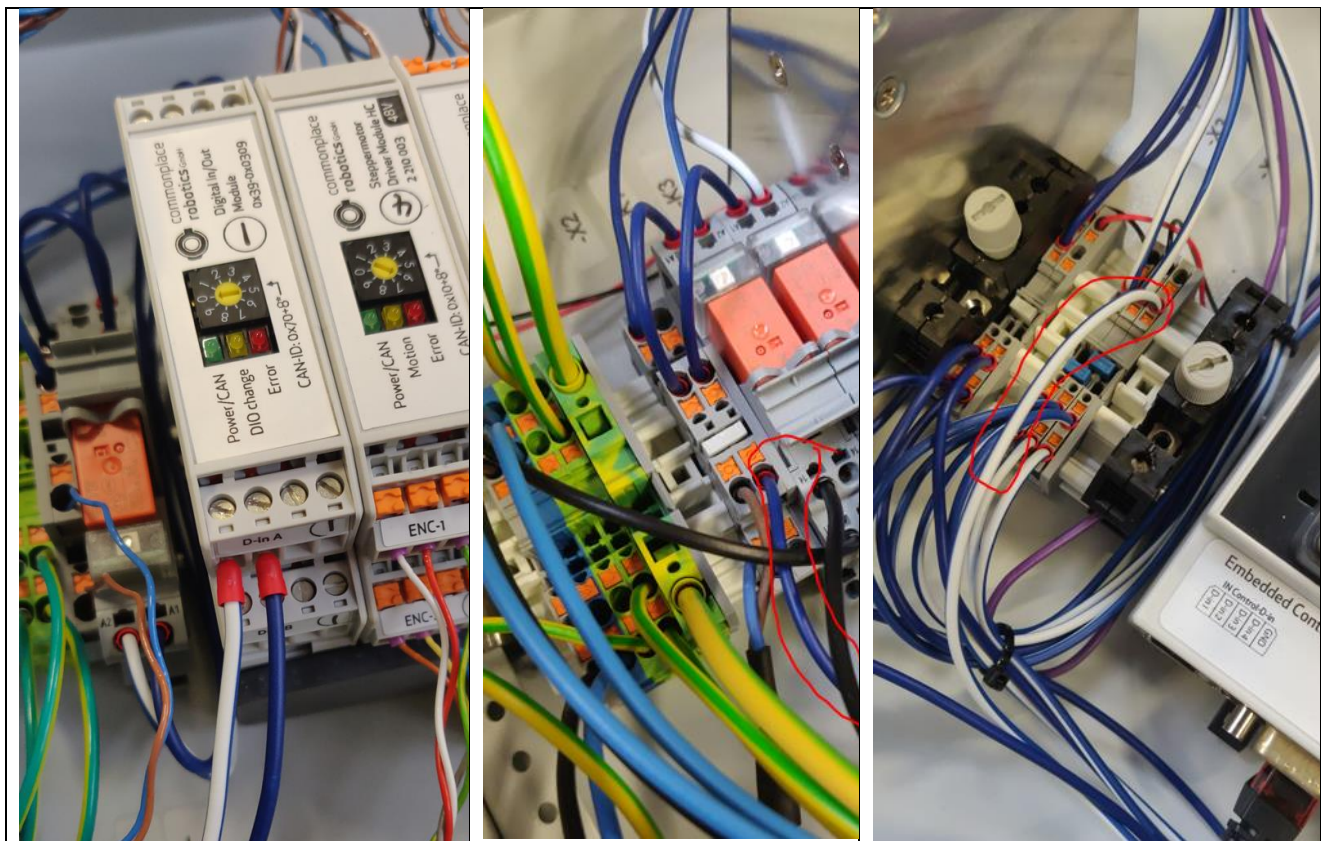
The iRC robot control can handle a motor brake e.g. in vertical joints. In certain situations the electronic modules do not recognize an emergency stop and release the brake too early. This might lead to dangerous situations.

To avoid these situations the EStop sensing functionality has to be activated

### 2. Electrical Connections

The EStop-Signal needs to be made available to the Digital Inputs of the iRC. Two connections are necessary:

- From the EStop to the Digital Input, e.g. DIn21
- From the DIn ground connection to ground (this connection might be already available, it is necessary for all digital inputs)

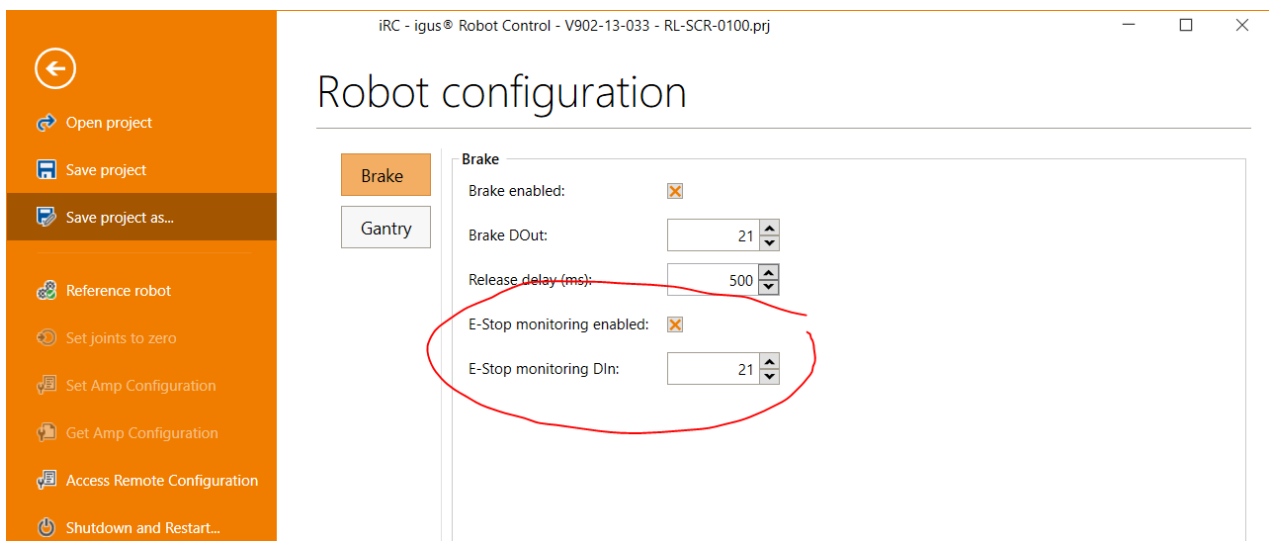


### 3. Activation in Software

This functionality is available in iRC Version 13-033 and higher. You can download the current version on the wiki at <https://wiki.cpr-robots.com/index.php/IgusRobotControl-Release13-EN>

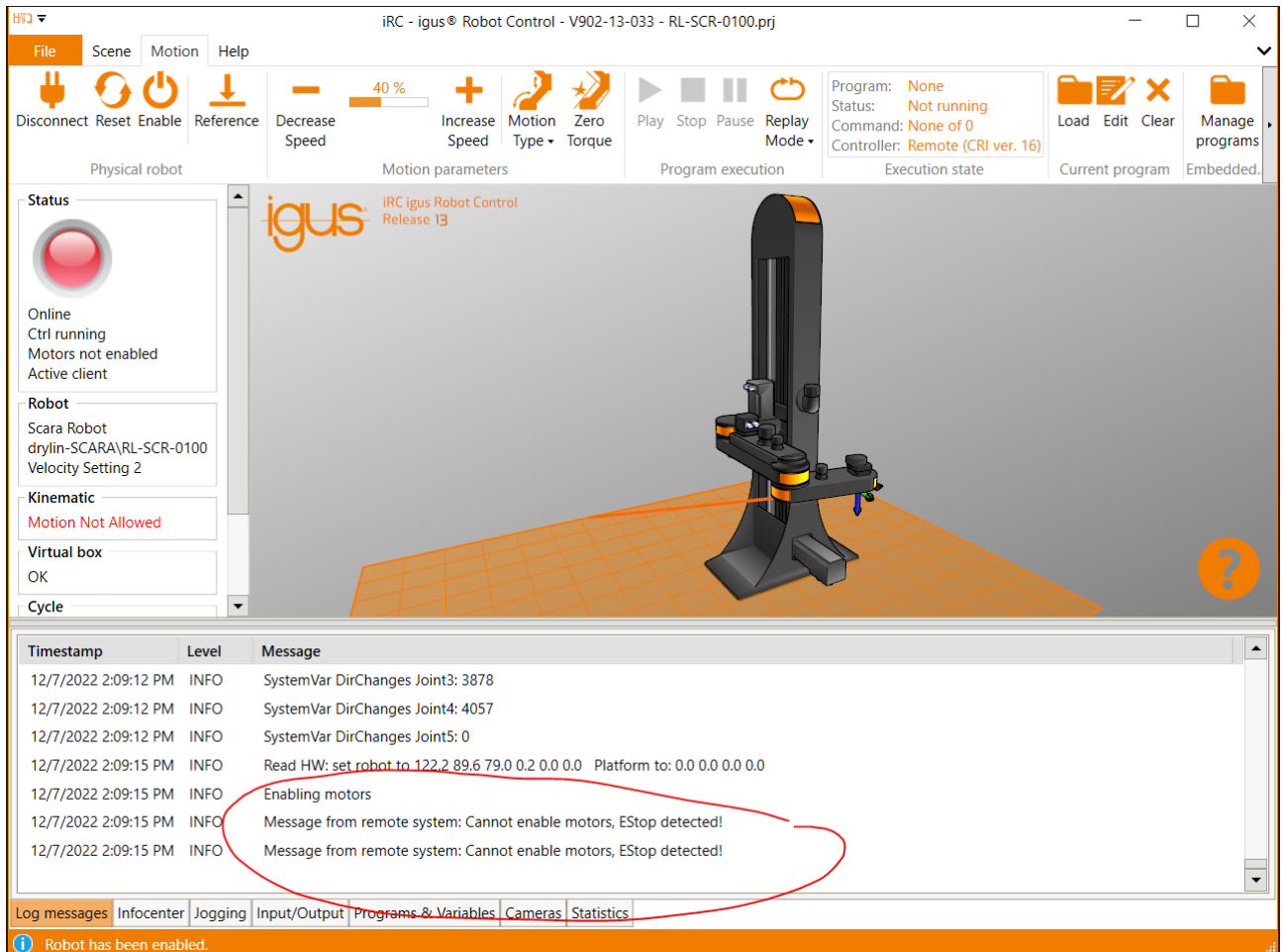
The functionality has to be activated, the according Digital Input has to be defined. The robot has to be connected.

\\File\RobotConfiguration\Brake, here the first digital input with number 21 has been used.



## 4. Functionality

The EStop-Sensing disables a reset or enable when there is no signal on the digital input. An according message is generated in the log tab.



The screenshot shows the 'irc - igus® Robot Control - V902-13-033 - RL-SCR-0100.prj' window. The interface includes a menu bar (File, Scene, Motion, Help), a toolbar with buttons for Disconnect, Reset, Enable, Reference, Decrease Speed, Increase Speed, Motion Type, Zero Torque, Play, Stop, Pause, and Replay Mode. The status bar shows 'Program: None', 'Status: Not running', 'Command: None of 0', and 'Controller: Remote (CRI ver. 16)'. The main area displays a 3D model of a robot arm with the 'igus' logo and 'irc igus Robot Control Release 13' text. The left sidebar shows 'Status' (Online, Ctrl running, Motors not enabled, Active client), 'Robot' (Scara Robot, drylin-SCARA\RL-SCR-0100, Velocity Setting 2), 'Kinematic' (Motion Not Allowed), 'Virtual box' (OK), and 'Cycle'. The bottom log window shows the following messages:

Timestamp	Level	Message
12/7/2022 2:09:12 PM	INFO	SystemVar DirChanges Joint3: 3878
12/7/2022 2:09:12 PM	INFO	SystemVar DirChanges Joint4: 4057
12/7/2022 2:09:12 PM	INFO	SystemVar DirChanges Joint5: 0
12/7/2022 2:09:15 PM	INFO	Read HW: set robot to 122.2 89.6 79.0 0.2 0.0 0.0 Platform to: 0.0 0.0 0.0 0.0
12/7/2022 2:09:15 PM	INFO	Enabling motors
12/7/2022 2:09:15 PM	INFO	Message from remote system: Cannot enable motors, EStop detected!
12/7/2022 2:09:15 PM	INFO	Message from remote system: Cannot enable motors, EStop detected!

The bottom status bar shows 'Robot has been enabled.' and a navigation bar with tabs for Log messages, Infocenter, Jogging, Input/Output, Programs & Variables, Cameras, and Statistics.

## 5. It does not work?

- Does the cabling work? Please press the EStop or release is. Doing so the yellow LED on the digital IO module will blink once. If it does not, the cabling is not correct.
- Is the DIIn-port correct? The first port ist DIIn21 (The second connector on the plug from the left), the second DIN22, ...