# SAFETY QA

## Explain the steps in “Pre-Use Assessment”?

The steps of assessments can be explained and summarised as below,

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| Aims | Content | Explanation |
| To examine the safety inputs | 1. Test that emergency stop buttons and input stop the robot and engage brakes.  2. Test that safeguard input stop the robot motion. If safeguard reset is configured, check that it needs to be activated before motion can be resumed.  3. Examine the initialization screen to test that reduced mode can switch the safety mode to reduced mode.  4. Test that the operational mode switches the operational mode, see icon in top right corner of user interface.  5. Test that the 3-position enabling device must be pressed to enable motion in manual mode and that the robot is under reduced speed control. | The first two assessments are designed to ensure that the operating universal robot can receive and respond the safety inputs of emergency stop button, safeguard stop, or safeguard reset.  The third to fifth assessments are to validify if the robot system can run in a specific mode or the modes can be converted. |
| To examine the safety outputs | 6. Test that System Emergency Stop outputs are actually capable of bringing the whole system to a safe state.  7. Test that the system connected to Robot Moving output, Robot Not Stopping output, Reduced Mode output, or Not Reduced Mode output can actually detect the output changes. | These two assessments are to validify if the safe outputs are identified by the robot system, then the robot needs to make corresponding security actions. |

## Shortlist integrator role in this document?

The integrator of the universal robot should be aware of the necessary safety information mentioned in technique files before the robot starts to operate. The integrator should ensure that the robot needs to follow the local regulations and secure the user safety. The responsibilities of integrator are including,

* Conducting a risk assessment for the whole robot system and additional devices.
* Prepare the methods or functions for facing hazards in the software.
* Noticing safety specifications or documentations for users.
* Encapsulating any safety measures or settings which cannot be adjusted.
* Ensuring the installation of the robot system stably and correctly.

Normal mode: is the safety mode depending on the default.

Reduced mode: is a mode that can be triggered when the robot tools or elbows moves beyond the workspace defined by the control plane or the safety inputs are applied. It will limit the position of the robot moving.

Recovery mode: is a mode that can restart the safety system when the safety limits are not satisfied by the operating robot arm. It will make the robot return to the safety limits or boundaries of recovery mode which are shown below.

![A screenshot of a cell phone

Description automatically generated]()