7.1.7 Collision Avoidance

Introduction

The function *Collision Avoidance* monitors a detailed geometric model of the robot. By defining additional geometrical models of bodies in the robot workarea, the controller will warn about a predicted collision and stops the robot if two bodies come too close to each other. The system parameter *Coll-Pred Safety Distance* determines at what distance the two objects are considered to be in collision.

The function *Collision Avoidance* is useful for example when setting up and testing programs, or for programs where positions are not static but created from sensors, such as cameras (non-deterministic programs).

Besides the robot itself the function will monitor up 10 objects that is created via the configurator in RobotStudio. Typical objects to be monitored are tool mounted on the robot flange, additional equipment mounted on the robot arm (typically axis 3) or static volume around the robot.

The geometric models are set up in RobotStudio.

The functionality is activated by the system input *Collision Avoidance*. A high signal will activate the functionality and a low signal will deactivate the functionality. The functionality is by default active if no signal has been assigned to the system input *Collision Avoidance*.

Collision Avoidance is active both during jogging and when running programs. Also, the RAPID function `IsCollFree` provides a way to check possible collisions before moving into a position.

CAUTION

Always be careful to avoid collisions with external equipment, since a collision could damage the mechanical structure of the arm.

Collision Avoidance is no guarantee for avoiding collisions.

Limitations

Collision Avoidance is a function included in the option *Collision Detection*.

Paint robots, IRB 6620LX, and IRB 360 are not supported.

Collision Avoidance cannot be used together with responsive jogging. The system parameter *Jog Mode* must be changed to *Standard*.

The *Collision Avoidance* functionality between 2 robots (or more) can only be achieved when using a MultiMove system.

CAUTION

Collision Avoidance shall not be used for safety of personnel.

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False collision warning

There are different ways to lower the sensitivity of the function *Collision Avoidance* to avoid false warnings.

- Temporarily disable *Collision Avoidance*, see *Disabling Collision Avoidance on page 275*.
- For IRB 14000, decrease the safety distance for the arm or geometric model that triggers the false collision warning, see *Decrease sensitivity between links for IRB 14000 on page 275*.
- Decrease the general safety distance with the system parameter *Coll-Pred Safety Distance*.

Disabling *Collision Avoidance*

It is possible to temporarily disable the function *Collision Avoidance* if the robot has already collided or is within the default safety distance, or when the robot arms need to be very close and the risk of collision is acceptable.

Set the system input signal `Collision Avoidance` to 0 to disable *Collision Avoidance*. It is recommended to enable it (set `Collision Avoidance` to 1) as soon as the work is done that required *Collision Avoidance* to be disabled.

Decrease sensitivity between links for IRB 14000

For dual arm robots, the sensitivity can be decreased between individual robot arm links. This is useful if two links come close to each other, but the general safety distance should be maintained.

Open the file *irb_14000_common_config.xml* located in the folder *<SystemName>\PRODUCT\ROBOTWARE_6.XX.XXXX\robots\CA\irb_14000*.

For example, to decrease the safety distance between the left arm's link 3 and the right arm's link 4 to 1 mm, add the following row:

```
<Pair object1="ROB_L_Link3" object2="ROB_R_Link4"
     safetyDistance="0.001"/>
```

To decrease the safety distance between the left arm's link 5 and the robot base to 2 mm, add the following row:

```
<Pair object1="ROB_L_Link5" object2="Base" safetyDistance="0.002"/>
```

To disable collision avoidance between the left arm's link 2 and the right arm's link 3, add the following row:

```
<Pair object1="ROB_L_Link2" object2="ROB_R_Link3" exclude="true"/>
```

Note

The safety distance between two links can be decreased by adding a row to this XML file, but it cannot be increased to a higher value than defined by the system parameter *Coll-Pred Safety Distance*.