

Operating manual
Emergency safety information

IRC5

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Revision: L

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Overview of this manual

About this manual

This manual contains information for emergency situations in the manipulator system.

For any work in the manipulator system you must use the appropriate product, operating, application, or reference manual.



Note

This manual must always be stored together with the manipulator system!

This manual must always be easy to access for an operator, service engineer, or anyone using or working with the manipulator system.

Prerequisites

A maintenance/repair/installation craftsman working with an ABB Robot must:

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.
- read the user documentation before performing any installation or service work on the robot.

References

The documents listed below describe the manipulator system in detail, including service and safety instructions. All documents are available on the documentation DVD, 3HAC032875-001.

Reference	Document ID
<i>Operating manual - General safety information</i> ⁱ	3HAC031045-001
<i>Operating manual - Getting started, IRC5 and RobotStudio</i>	3HAC027097-001
<i>Operating manual - IRC5 with FlexPendant</i>	3HAC050941-001
<i>Operating manual - Trouble shooting IRC5</i>	3HAC020738-001
<i>Product manual - IRC5</i> IRC5 of design M2004	3HAC021313-001
<i>Product manual - IRC5</i> IRC5 of design 14	3HAC047136-001
<i>Product manual - IRC5 Panel Mounted Controller</i> IRC5 of design M2004	3HAC027707-001
<i>Product manual - IRC5 Panel Mounted Controller</i> IRC5 of design 14	3HAC047137-001
<i>Product manual - IRC5 Compact</i> IRC5 of design M2004	3HAC035738-001
<i>Product manual - IRC5 Compact</i> IRC5 of design 14	3HAC047138-001

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Reference	Document ID
Product manual for the manipulator	

- i This manual contains all safety instructions from the product manuals for the manipulators and the controllers.

Revisions

Revision	Description
-	First revision.
A	Polish translation added.
B	IRB 360, IRB 6640, and IRB 6660 added. Russian translation added.
C	IRB 4600 added.
D	IRB 120, IRB 2600, IRB 6620LX, and IRC5 Compact added. Hungarian translation added.
E	Updated safety signal graphics for the levels <i>Danger</i> and <i>Warning</i> .
F	IRB 460 and IRB 760 added. Warning added to section Mains power switch, controller with additional cabinets on page 14 .
G	IRB 1620ID added. Warning added to section Mains power switch, controller with additional cabinets on page 14 . Deleted section "External power supply for brake release unit". How to connect an external power supply for the brake release buttons is described in each manipulator manual.
H	IRB 1620ID removed. IRB 1520ID added.
J	IRB 6700 added.
K	IRB 1200 added.
L	IRB 14000 added. IRB 8700 added.

1 Emergency safety information

1.1 Stop the system

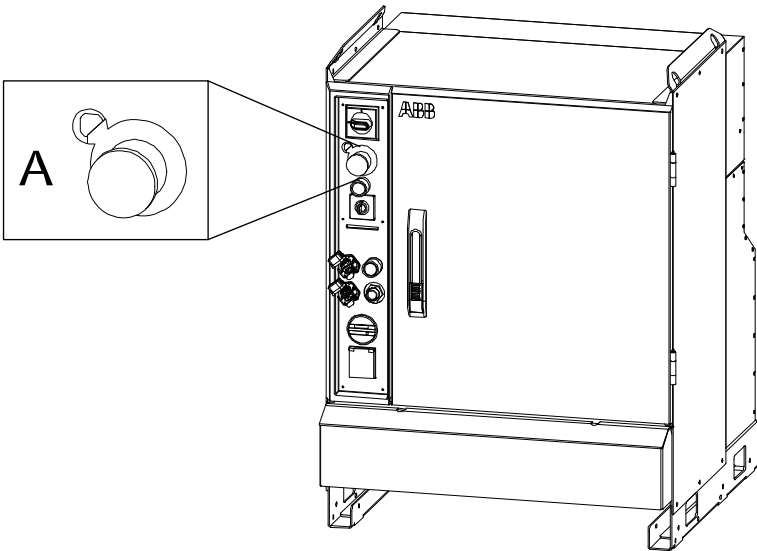
Overview

Press any of the emergency stop buttons immediately if:

- There are any personnel in the robot manipulator area, while the manipulator is working.
- The manipulator causes harm to personnel or mechanical equipment.

The controller emergency stop button

The emergency stop button on the controller is located on the front of the cabinet. However, this can differ depending on your plant design.



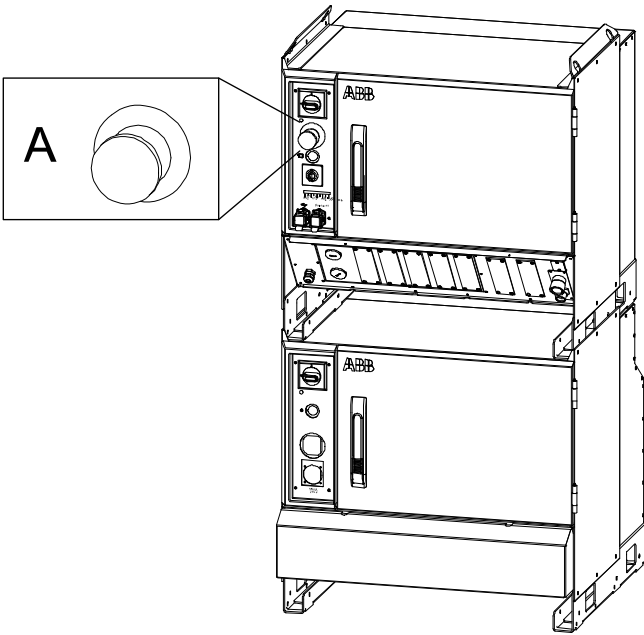
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A	Emergency stop button, Single Cabinet Controller
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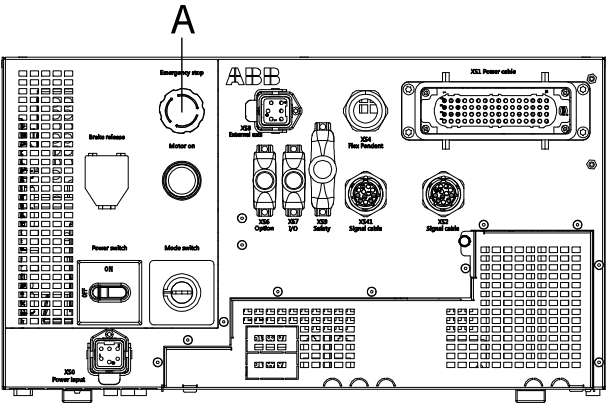
1 Emergency safety information

1.1 Stop the system
Continued



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A	Emergency stop button, Dual Cabinet Controller
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A	Emergency stop button, IRC5 Compact
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The FlexPendant emergency stop button



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A	Emergency stop button
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Other emergency stop devices

The plant designer may have placed additional emergency stop devices in convenient places. Please consult your plant or cell documentation to find out where these are placed.

1 Emergency safety information

1.2 Fire extinguishing

1.2 Fire extinguishing



Note

Use a CARBON DIOXIDE (CO₂) extinguisher in the event of a fire in the robot system (robot or controller)!

1.3 Shut down all power to the controller

Overview

The controller has one mains power switch on each module. To make sure that NO power is connected to the controller, all modules' mains switches must be turned off.



Note

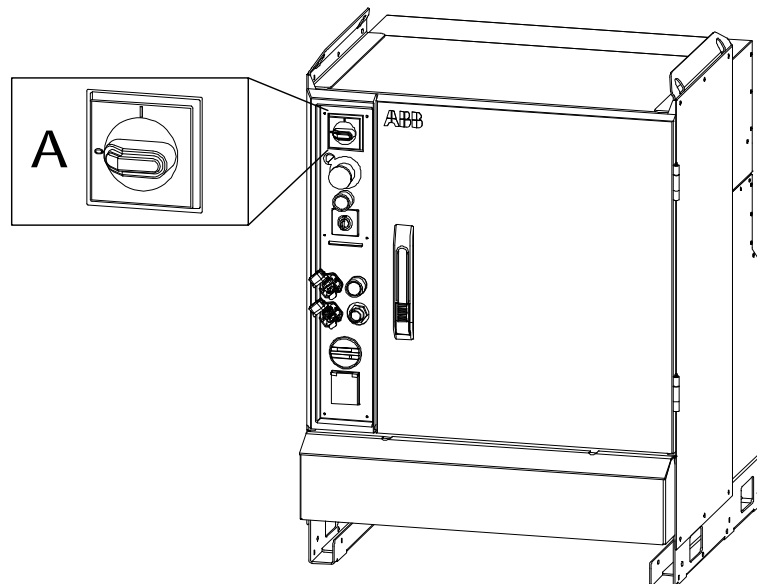
Your plant or cell may have additional equipment that may also need to be disconnected from the power. Please consult your plant or cell documentation to find out where these power switches are placed.

Shut down power to the controller

	Action	Information
1	Turn off the mains power switch on the Control Module.	If your system uses a Single Cabinet Controller, a Modular Controller, or a IRC5 Compact controller, then only step 1 is necessary.
2	Turn off the mains power switch on any connected Drive Module and other modules, such as spotwelding cabinets etc..	See illustration Mains power switch, controller with additional cabinets on page 14 .

Mains power switch, Single Cabinet Controller

The mains power switch is located on the front of the controller cabinet for Single Cabinet Controller and IRC5 Compact controller. The design of a Modular Controller depends on the installation.



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A	Mains power switch, Single Cabinet Controller
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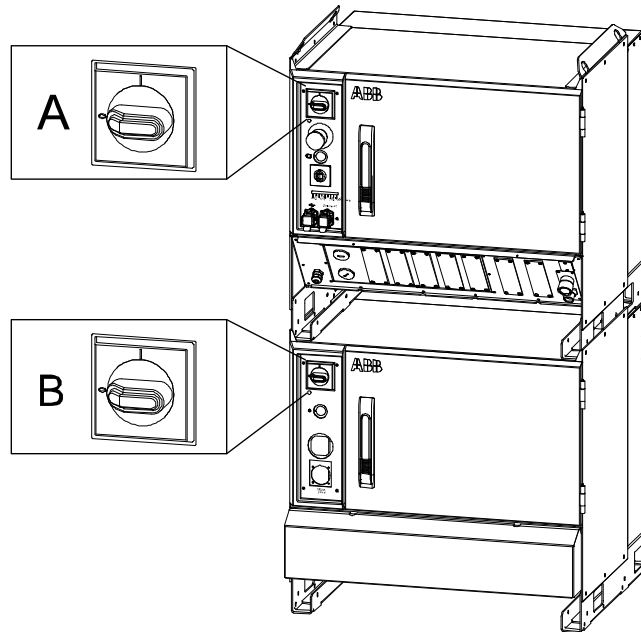
1 Emergency safety information

1.3 Shut down all power to the controller

Continued

Mains power switch, controller with additional cabinets

Note that each connected Drive Module, or other connected modules such as a spotwelding cabinet, has its own mains power switch. On other types of cabinets, the power switch is often placed top left on the front of the cabinet.



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A	Mains power switch, Control Module (Dual Cabinet Controller)
B	Mains power switch, Drive Module (Dual Cabinet Controller)



WARNING

If the power supply to the Control Module comes from the Drive Module, it is only the main switch on the Drive Module that will switch off the power to the entire system (Control Module and Drive Module).

1.4 Releasing a person trapped by the robot arm

Overview

If a person has been trapped by the robot arm, you must make sure that any attempt to release the person does not further increase the risk of injury.

Releasing the robot holding brakes will make it possible to move the robot manually, but only small robots are light enough to be moved by human force. Moving larger robots may require using an overhead crane or similar. Make sure you have the right equipment at hand before releasing the brakes!



WARNING

Before releasing the brakes, make sure that the weight of the arms does not increase the pressure on the trapped person, further increasing any injury!

How to release a trapped person

This procedure details how to release a person trapped by the robot arm.

	Action	Info/illustration
1	Press any of the emergency stop buttons.	
2	Make sure that the trapped person will not be more injured by the intended release action.	
3	Move the robot so that the trapped person is released.	To release the robot holding brakes, see instructions on the next page, Emergency release of the robot arm on page 16 .
4	Help the trapped person and make sure he/she gets medical attention.	
5	Make sure the robot cell is cleared so that no one else runs the risks of being injured.	

1 Emergency safety information

1.5 Emergency release of the robot arm

1.5 Emergency release of the robot arm

Overview

In an emergency situation, any of the robot axes may be released manually by pushing the brake release buttons.

The robot arm may be moved manually on smaller robot models, but larger models may require using an overhead crane or similar equipment.


Increased injury

Before releasing the brakes, make sure that the weight of the arm does not increase the pressure on the trapped person, further increasing any injury!

Releasing the robot arm

Use this procedure to release the robot arm.

The brake release unit is illustrated on the following pages. Depending on the robot model, the unit may be placed differently, see section [Brake release unit on page 16](#).

	Action	Information
1	The internal brake release unit is equipped with buttons for controlling the brake on each axis. Depending on robot model, the number of buttons varies. The buttons are numbered according to the numbers of the axes.	Some of the small robots have one or two brake release buttons for all axes, see section Brake release unit on page 16 .
2	 DANGER When releasing the holding brakes, the robot axes may move very quickly and sometimes in unexpected ways! Before releasing the brakes, make sure that the weight of the arm does not increase the pressure on the trapped person, further increasing any injury!	Make sure the robot arm is secured with a crane or similar before releasing the brakes!
3	Release the holding brake on a particular robot axis by pressing the corresponding button on the internal brake release panel and keeping it depressed. The brake will function again as soon as the button is released.	

Brake release unit

This illustration is a schematic overview of the brake release unit, placed in the robot frame or base, or on the robot controller. Depending on the robot model, the placing can vary slightly. The brake release unit is protected with a plate or clamp.

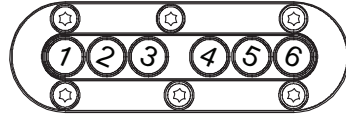
There is one button per axis except for:

- IRB 120, IRB 140, IRB 1410, and IRB 360 have one button
- IRB 14000 has two buttons

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Brake release unit, large robots

The graphic below shows a brake release unit for a robot with six axes. On four axis robots, buttons 4 and 5 are not used.

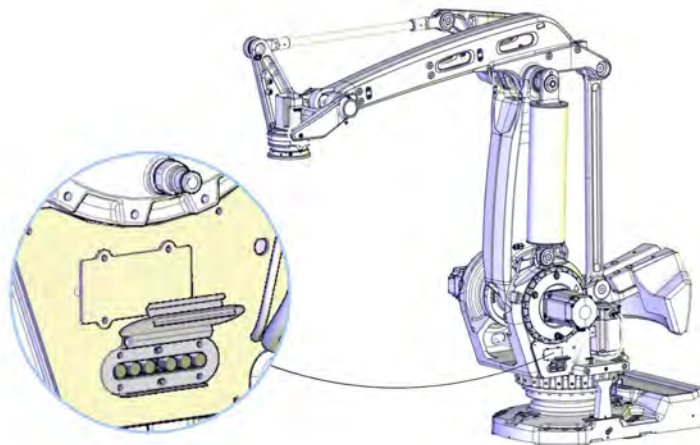


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On the following large robot models the brake release unit is located on the robot frame.

- IRB 460
- IRB 660
- IRB 760
- IRB 6400RF
- IRB 6600/6650
- IRB 6620
- IRB 6620LX
- IRB 6640
- IRB 6650S
- IRB 6660
- IRB 6700
- IRB 7600
- IRB 8700

On **IRB 460**, **IRB 660**, and **IRB 760** robots, the brake release unit is located on the frame, close to the axis-2 motor.



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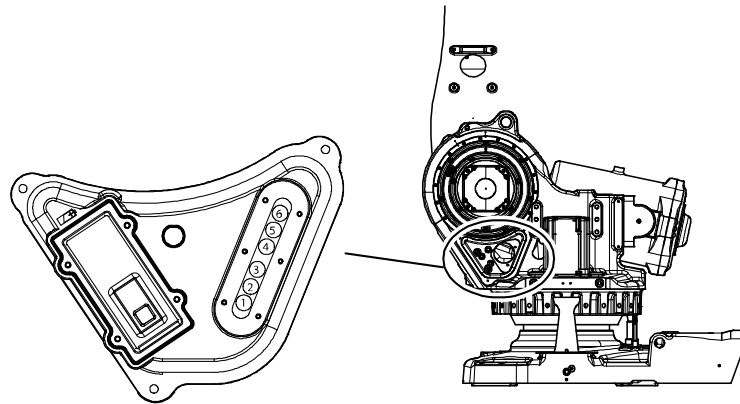
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1 Emergency safety information

1.5 Emergency release of the robot arm

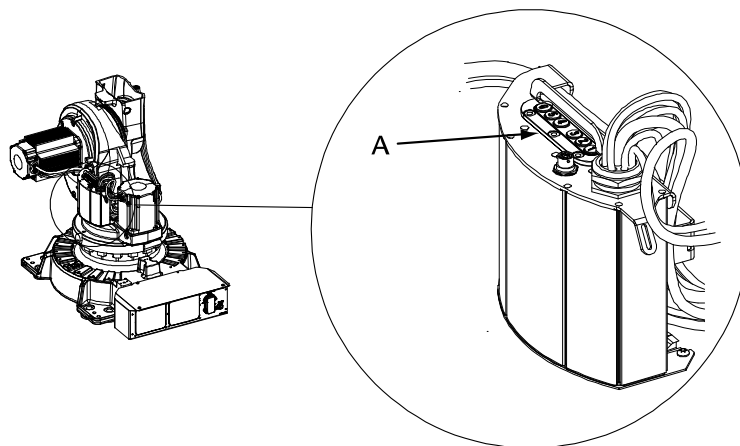
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On **IRB 6600/6650** robots, the brake release unit is located on the frame, close to the axis-2 motor. For **IRB 6650S** the placing is the same.



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On **IRB 6620** robots, the brake release unit is located on the frame, to the right of the axis-2 motor.



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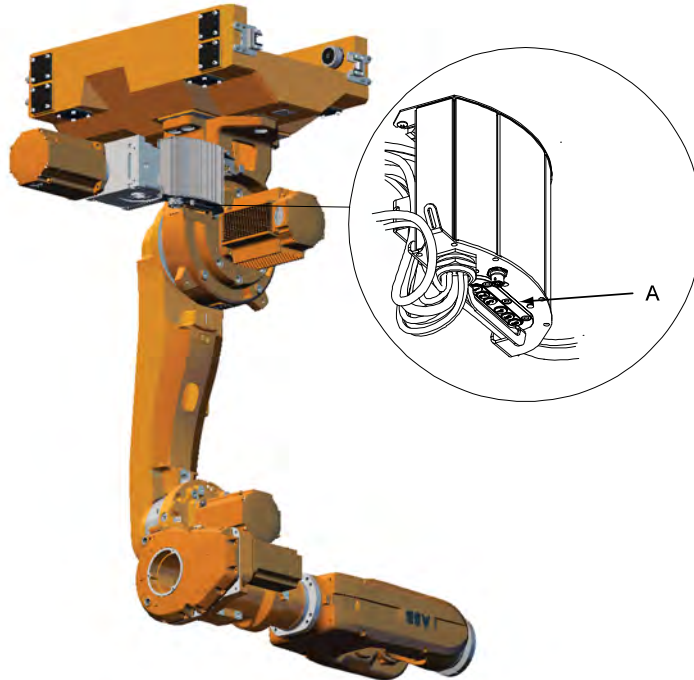
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1 Emergency safety information

1.5 Emergency release of the robot arm

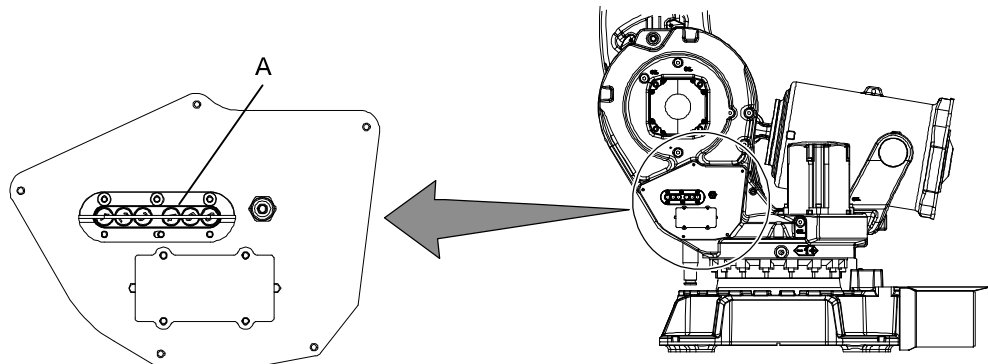
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On IRB 6620LX robots, the brake release unit is located on the frame.



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On IRB 6640 robots, the brake release unit is located on the frame, close to the axis-2 motor.



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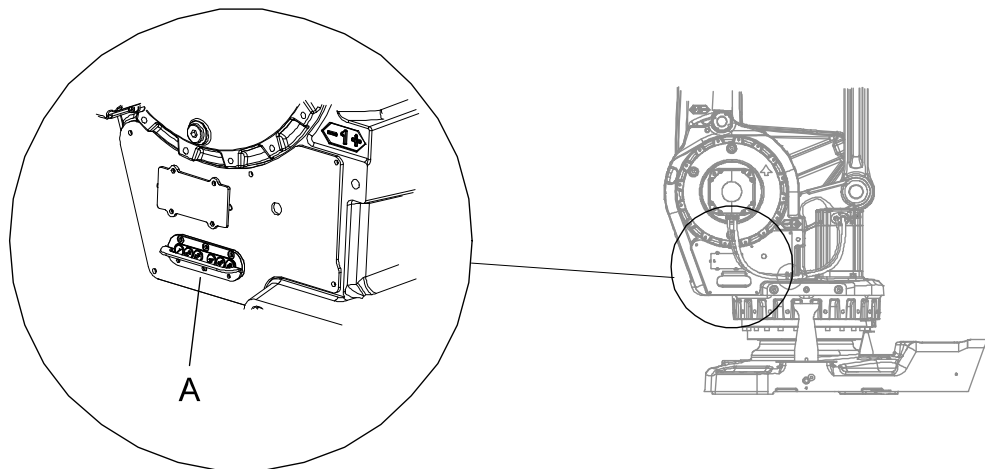
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1 Emergency safety information

1.5 Emergency release of the robot arm

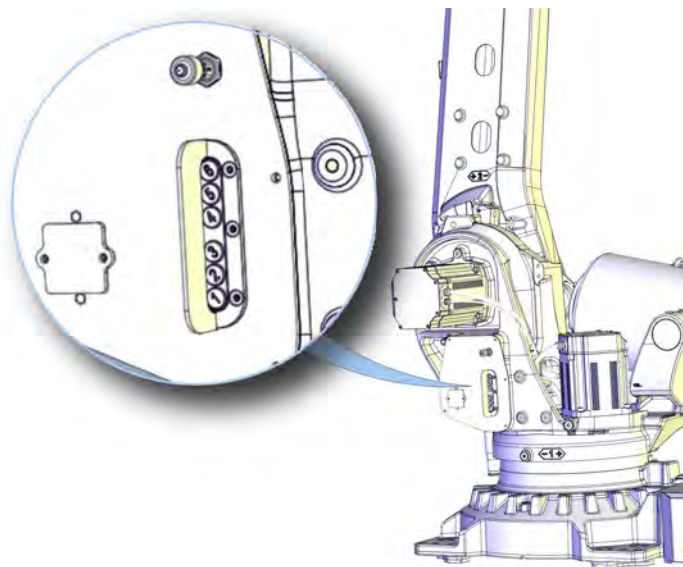
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On IRB 6660 robots, the brake release unit is located on the frame, close to the axis-2 motor.



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On IRB 6700 robots, the brake release unit is located on the frame, close to the axis-2 motor.



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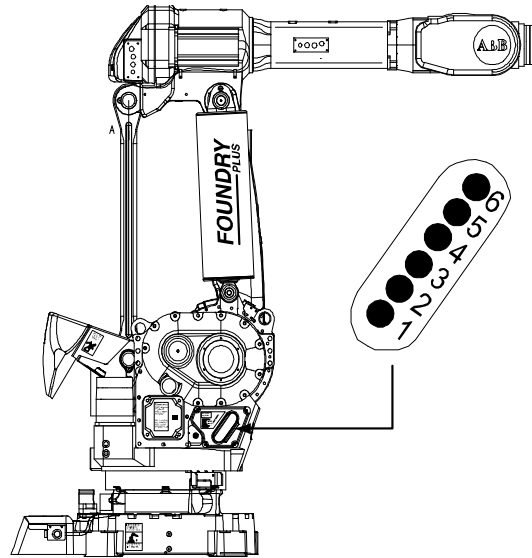
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1 Emergency safety information

1.5 Emergency release of the robot arm

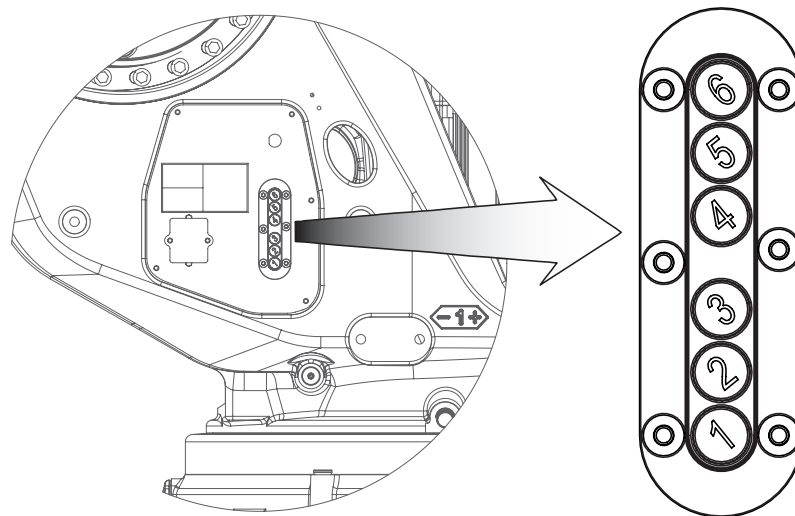
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On IRB 6400RF robots, the brake release unit is located close to the axis-3 motor.



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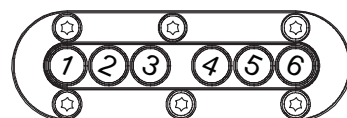
On IRB 8700 robots, the brake release unit is located on the frame, close to the axis-2 motor.



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Brake release unit, medium size robots

The graphic below shows a brake release unit for a robot with six axes. On four axis robots, buttons 4 and 5 are not used.



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On medium sized robot models the brake release unit is located on the robot base.

- IRB 260
- IRB 1600

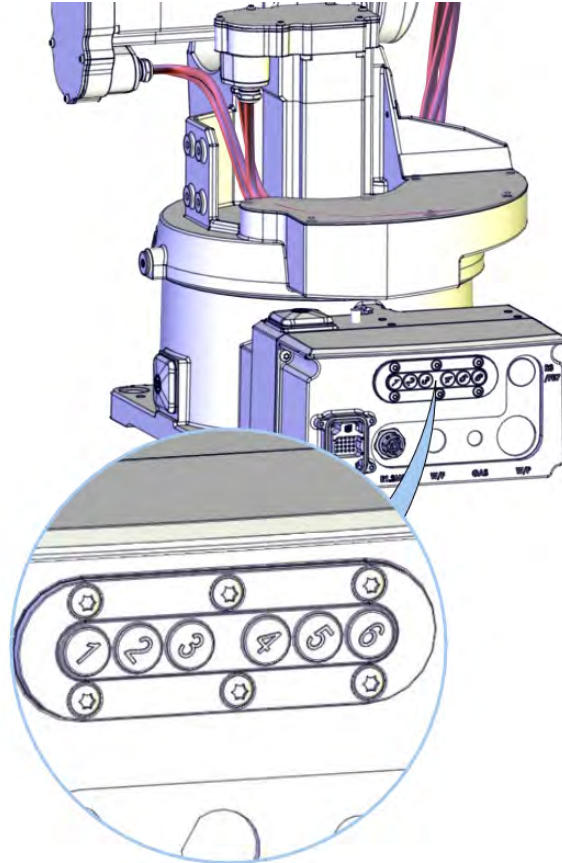
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1 Emergency safety information

1.5 Emergency release of the robot arm

Continued

- IRB 1520ID
- IRB 2400
- IRB 2600
- IRB 4400/4450S
- IRB 4600



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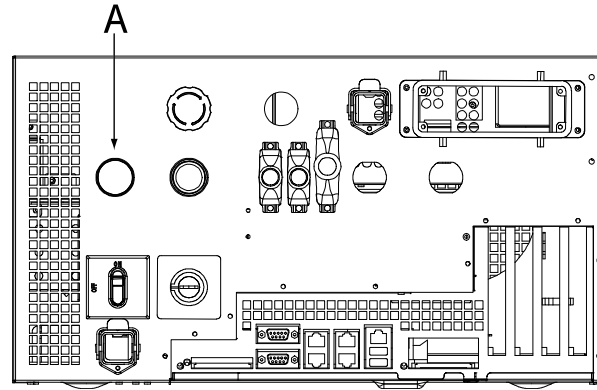
Brake release unit, IRB 1600ID

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Brake release unit, small robots with one brake release button

On small robot models there is one button releasing all six axes.

The IRB 120 robot has no brake release button, instead use the brake release button on the IRC5 Compact controller. For other controller variants, the placing depends on the design of the cell.

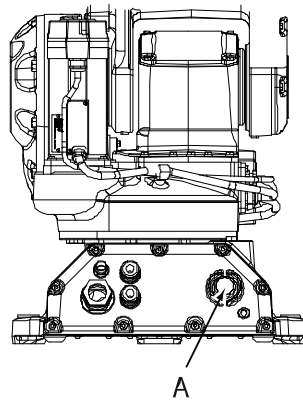


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A	Brake release button, IRC5 Compact controller
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On the following robot models, the brake release unit is located on the back of the robot base.

- IRB 140
- IRB 1200
- IRB 1410



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A	Brake release button, IRB 140
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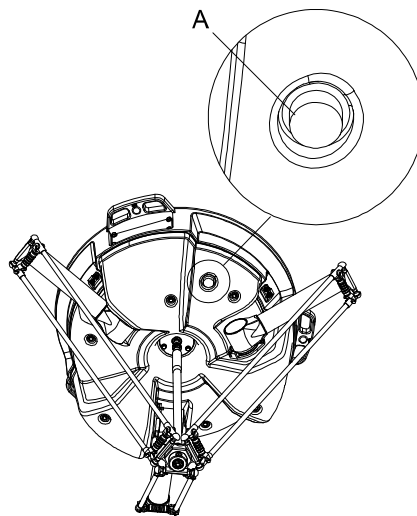
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1 Emergency safety information

1.5 Emergency release of the robot arm

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On IRB 360 robot, the brake release button is located on the base of the robot, close to the center.



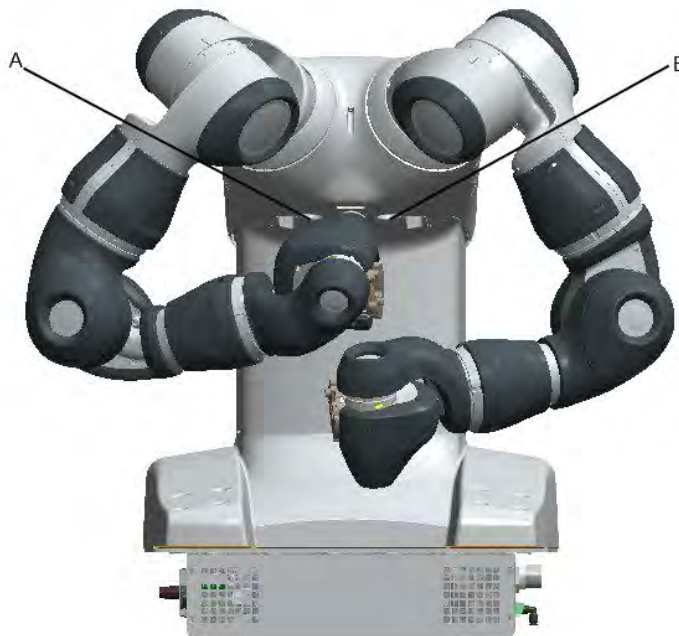
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A	Brake release button, IRB 360
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Brake release unit, IRB 14000

This section describes how to release the holding brakes for the motors of axis-1, axis-2, axis-3, and axis-7.

There are two brake release buttons, located as shown in the figure.



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A	Brake release button for right arm
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1 Emergency safety information

1.5 Emergency release of the robot arm

Continued

B	Brake release button for left arm
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Note

There is no holding brake for axis-4, axis-5, or axis-6.

1 Emergency safety information

1.6 Recover from emergency stops

1.6 Recover from emergency stops

Overview

Recovering from an emergency stop is a simple but important procedure. This procedure ensures that the manipulator system is not returned to production while maintaining a hazardous condition.

Reset the latch of emergency stop buttons

All push-button style emergency stop devices have a latching feature that must be released in order to remove the emergency stop condition of the device.

In many cases this is done by twisting the push-button as marked, but there are also devices where you pull the button to release the latch.

Reset automatic emergency stop devices

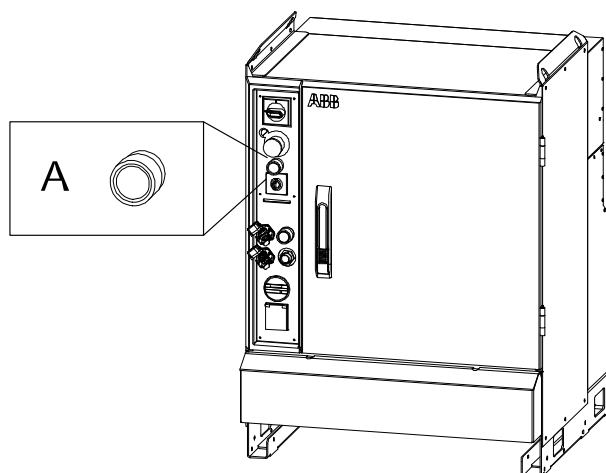
All automatic emergency stop devices also have some kind of latching feature that must be released. Please consult your plant or cell documentation to see how your manipulator system is configured.

Recover from emergency stops

	Action
1	Make sure the hazardous situation that resulted in the emergency stop condition no longer exists.
2	Locate and reset the device or devices that gave the emergency stop condition.
3	Press the Motors On button to recover from the emergency stop condition.

The Motors On button

The Motors On button is located on the controller. On a Dual Controller the Motors On button is located on the Control Module. If your manipulator system uses another type of control cabinet, then the Motors On button may look different than the illustration below.



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A	Motors On button
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