3 Maintenance

3.1 Introduction

Structure of this chapter

This chapter describes all the maintenance activities recommended for the IRB 1200.

It is based on the maintenance schedule found at the beginning of the chapter. The schedule contains information about required maintenance activities including intervals, and refers to procedures for the activities.

Each procedure contains all the information required to perform the activity, including required tools and materials.

The procedures are gathered in different sections and divided according to the maintenance activity.

Safety information

Observe all safety information before conducting any service work!

There are general safety aspects that must be read through, as well as more specific safety information that describes the danger and safety risks when performing the procedures. Read the chapter *Safety on page 17* before performing any service work!

Note

If the IRB 1200 is connected to power, always make sure that the IRB 1200 is connected to protective earth before starting any maintenance work!

For more information see:

- *Product manual - IRC5*
- *Product manual - IRC5 Compact*

3.2 Maintenance schedule

3.2.1 Specification of maintenance intervals

Introduction

The intervals are specified in different ways depending on the type of maintenance activity to be carried out and the working conditions of the IRB 1200:

- Calendar time: specified in months regardless of whether the system is running or not.
- Operating time: specified in operating hours. More frequent running means more frequent maintenance activities.

3.2.2 Maintenance schedule

Scheduled and non-predictable maintenance

The robot must be maintained regularly to ensure proper function. The maintenance activities and intervals are specified in the table below.

Non-predictable situations also give rise to inspections of the robot. Any damages must be attended to immediately!

Life of each component

The inspection intervals *do not* specify the life of each component.

Activities and intervals, standard equipment

The table below specifies the required maintenance activities and intervals:

Maintenance activities	Regularly [i]	Every 12 months	Every 36 months	Reference
Cleaning activities				
Cleaning the robot	x			*Cleaning the IRB 1200 on page 133*
Inspection activities				
Inspecting the robot	x			Check for abnormal wear or contamination. For robots with protection type Clean Room: Inspect daily
Inspecting the robot cabling [ii]	x [iii]			*Inspecting the robot cabling on page 109*
Inspecting the information labels		x		*Inspecting the information labels on page 110*
Inspecting the axis-1 mechanical stop pin	x [iv]			*Inspecting mechanical stops on page 115*
Inspecting the axis-2 mechanical stop	x [iv]			*Inspecting mechanical stops on page 115*
Inspecting the axis-3 mechanical stop	x [iv]			*Inspecting mechanical stops on page 115*
Inspecting the axis-4 mechanical stop	- [v]			
Inspecting the timing belts			x	*Inspecting timing belts on page 118*
Replacement/changing activities				

Continues on next page

3.2.2 Maintenance schedule

Continued

Maintenance activities	Regularly [i]	Every 12 months	Every 36 months	Reference
Replacing the battery pack [vi]				*Replacing the battery pack on page 123*

i "Regularly" implies that the activity is to be performed regularly, but the actual interval may not be specified by the robot manufacturer. The interval depends on the operation cycle of the robot, its working environment and movement pattern. Generally, the more contaminated environment, the shorter intervals. The more demanding movement pattern (sharper bending cable harness), the shorter intervals.

ii The robot cabling comprises the cabling between the robot and controller cabinet.

iii Replace when damage or cracks is detected or life limit is approaching.

iv Inspect immidiately if the mechanical stop is hit.

v Inspect immidiately if the mechanical stop is hit.

The robot needs to be disassembled according to section *Replacing the axis-4 mechanical stop on page 411* in order to get access to and inspect the mechanical stop.

vi The battery low alert (38213 **Battery charge low**) is displayed when remaining backup capacity (robot powered off) is less than 2 months. Typical life of a new battery is 36 months if the robot is powered off 2 days/week, or 18 months if the robot is powered off 16 hours/day. The life can be extended (approximately 3 times) for longer production breaks by a battery shutdown service routine. See *Operating manual - IRC5 with FlexPendant*.

See the replacement instruction for more details.

Activities and intervals, optional equipment

The table below specifies the required maintenance activities and intervals:

Maintenance activities	Every 12 months	Reference
Inspection activities		
Inspecting the signal lamp	x	*Inspecting the signal lamp (option) on page 121*

3.3 Inspection activities

3.3.1 Inspecting the robot cabling

Introduction

CAUTION

Always read the specific instructions if the robot has protection type Clean Room, before doing any repair work, see *Replacing parts on the robot on page 138*

Location of robot cabling

The robot cabling comprises the cabling between the robot and controller cabinet.

Required tools and equipment

Visual inspection, no tools are required.

Other tools and procedures may be required if the spare part needs to be replaced. These are specified in the replacement procedure.

Inspection, robot cabling

Use this procedure to inspect the robot cabling.

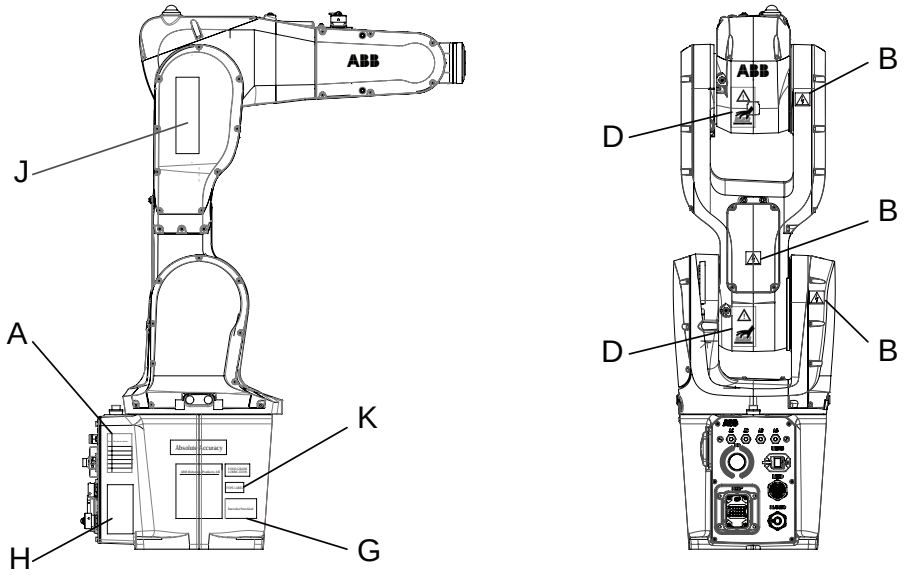
	Action	Note
1	**DANGER** Turn off all: • electric power supply to the robot • hydraulic pressure supply to the robot • air pressure supply to the robot Before entering the robot working area.	
2	Visually inspect: • the control cabling between the robot and control cabinet Look for abrasions, cuts or crush damages.	
3	Replace the cabling if wear or damage is detected.	

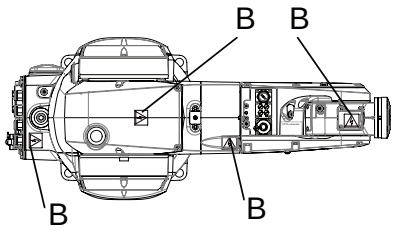
3.3.2 Inspecting the information labels

Location of labels

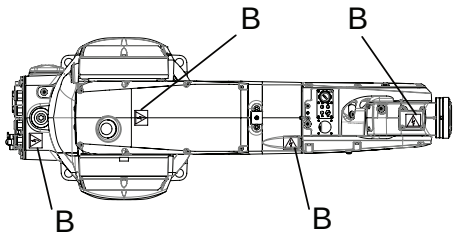
These figures show the location of the information labels to be inspected. The symbols are described in section *Safety symbols on product labels on page 41*.

Illustration 1 of 2





IRB 1200-7/0.7



IRB 1200-5/0.9

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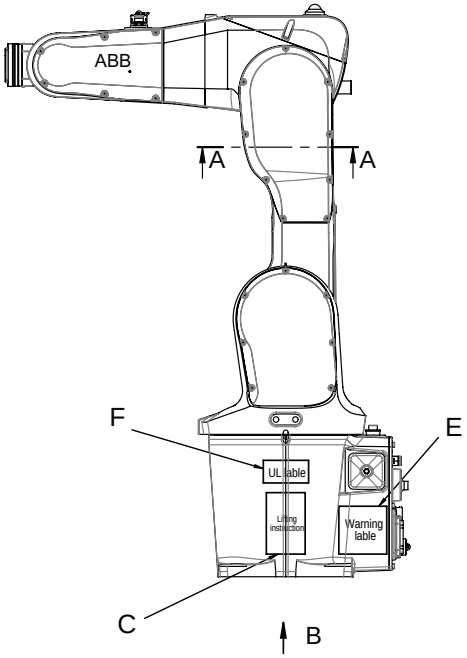
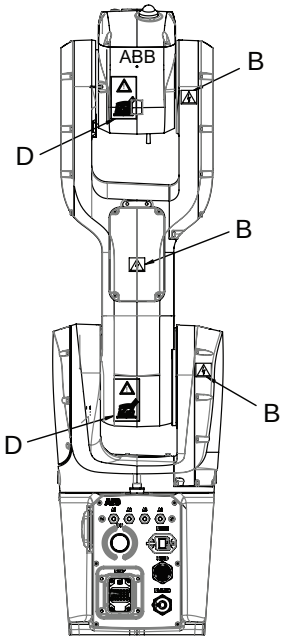
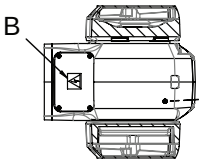
Illustration 2 of 2

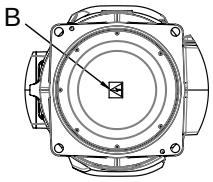




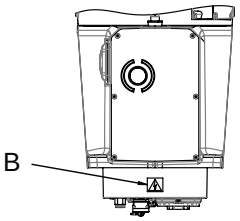
IRB 1200-0.5/9



SECTION A-A



VIEW B



IRB 1200 Option

	Description	Illustration
A	Calibration label	
B	Warning label **Flash**	 xx1300001091

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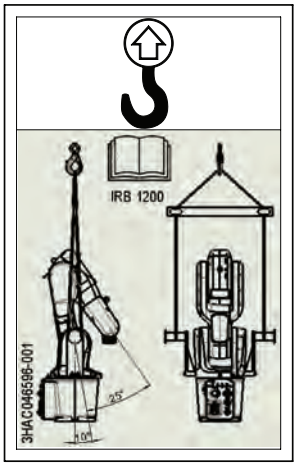
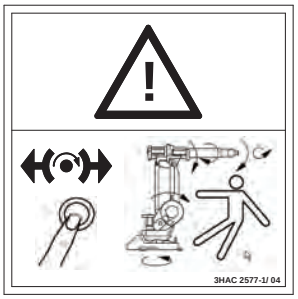
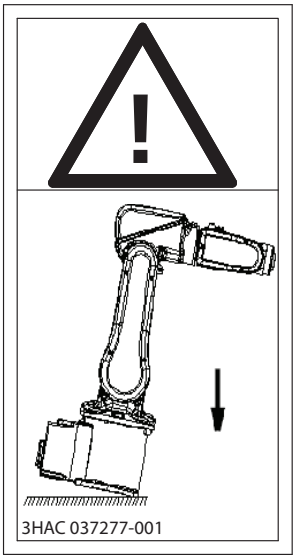
3.3.2 Inspecting the information labels

Continued

C	Instruction label **Lifting of robot**	 xx1400000518
D	Warning label **Heat**	 xx1300001087
E	Instruction label **Brake release** **Moving robot** **Brake release buttons**	 xx1400000519
F	UL label	
G	Rating label	

Continues on next page

H	Warning label **Tip risk when loosening bolts**	 xx1400000527
J	Clean Room label	 xx1600001074
	Foundry Plus label	 xx1600001075

Continues on next page

3.3.2 Inspecting the information labels
Continued

K	Type A label	 xx1600002136
	Type B label	 xx1600002137

Required spare parts

Note

The spare part numbers that are listed in the table can be out of date. See the latest revision of *Product manual, spare parts - IRB 1200* on ABB Library.

Spare part	Article number	Note
Labels and plate set	3HAC051417-001	Includes all safety and information labels required for the robot. Missing, damaged or illegable labels must be replaced.

Required tools and equipment

Visual inspection, no tools are required.

Inspecting, labels

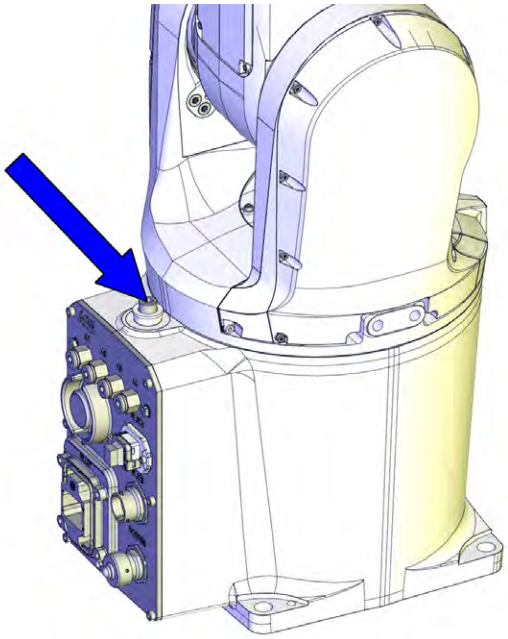
	Action	Note
1	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	Inspect the labels, located as shown in the figures.	
3	Replace any missing or damaged labels.	Article numbers for the labels and plate set is specified in *Spare parts on page 813*.

3.3.3 Inspecting mechanical stops

Location of mechanical stops

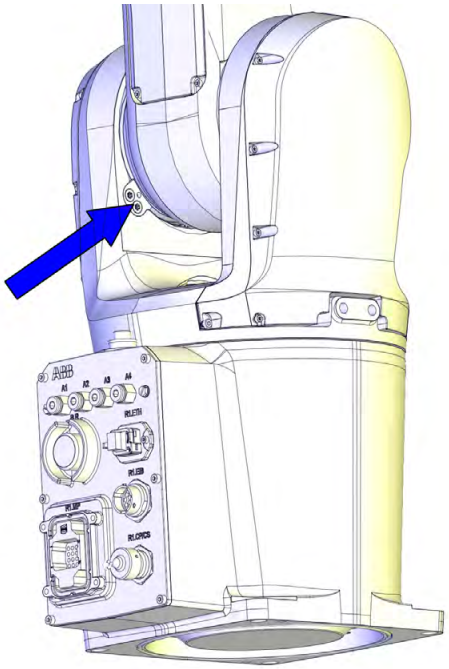
The mechanical stops on axes 1, 2 and 3 are located as shown in the figures.

Axis 1



xx1400000391

Axis 2



xx1400000389

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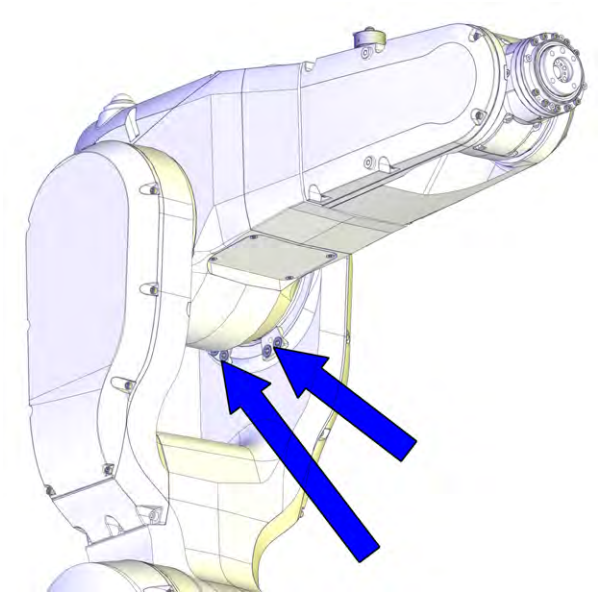
3.3.3 Inspecting mechanical stops
Continued

Axis 3



xx1400000386

Required spare parts

Note

The spare part numbers that are listed in the table can be out of date. See the latest revision of *Product manual, spare parts - IRB 1200* on ABB Library.

Spare part	Article number	Note
Mechanical stop set, axis 1	3HAC049630-001	Includes mechanical stop pin (1 pc), washer and screw.
Mechanical stop set, axis 2	3HAC049637-001	Includes mechanical stop pin (1 pc) and screws.
Mechanical stop set, axis 3	3HAC049644-001	Includes mechanical stop pin (1 pc) and screws.

Required tools and equipment

Visual inspection, no tools are required.

Other tools and procedures may be required if the spare part needs to be replaced. These are specified in the replacement procedure.

Continues on next page

Inspecting mechanical stops

Use this procedure to inspect mechanical stops on axes 1, 2 and 3.

	Action	Information
1	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	Inspect the *mechanical stops*.	See the figures in: • *Location of mechanical stops on page 115*
3	Replace if the mechanical stop is: • bent • loose • damaged. **Note** The expected life of gearboxes can be reduced as a result of collisions with the mechanical stop.	

3.3.4 Inspecting timing belts

Introduction

CAUTION

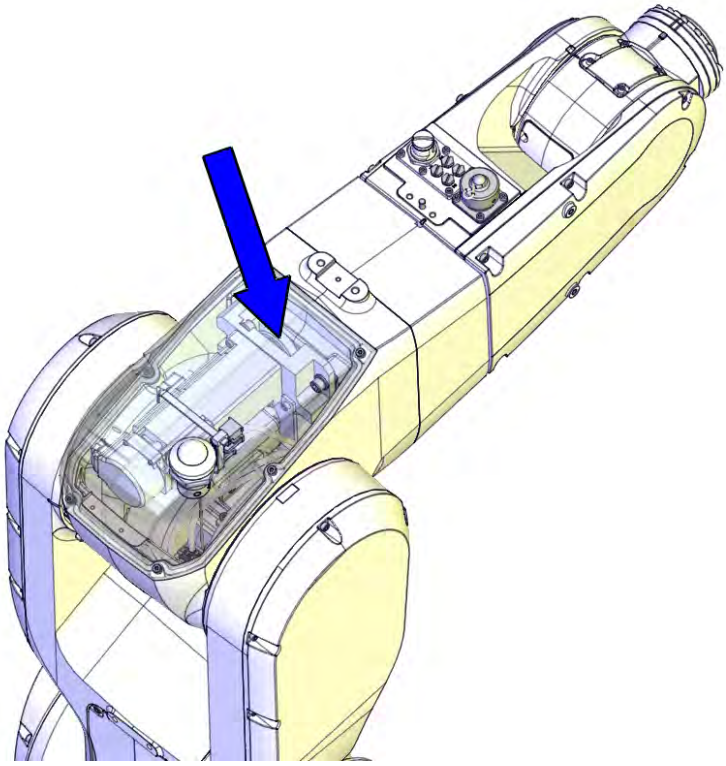
Always read the section "General procedures" befor doing any repair work.

Replacing parts on the robot on page 138

Location of timing belts

The timing belts are located as shown in the figures.

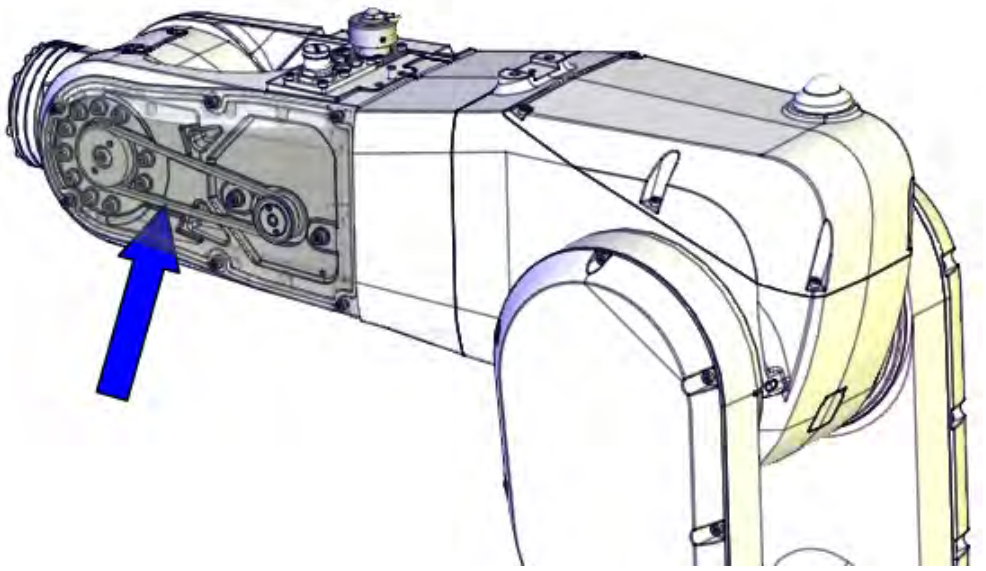
Axis 4



xx1400000036

Continues on next page

Axis 5



xx1400000032

Required tools and equipment

Equipment	Note
Standard toolkit	The content is defined in the section *Standard toolkit on page 808*.
Other tools and procedures may be required if the spare part needs to be replaced. These are specified in the replacement procedure.	

Timing belt tension

The table describes the timing belt tension.

Axis	Timing belt tension
Axis 4	F = 30 N
Axis 5	F = 26 N

Inspecting timing belts

Use this procedure to inspect timing belts.

	Action	Information
1	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

Continues on next page

3.3.4 Inspecting timing belts

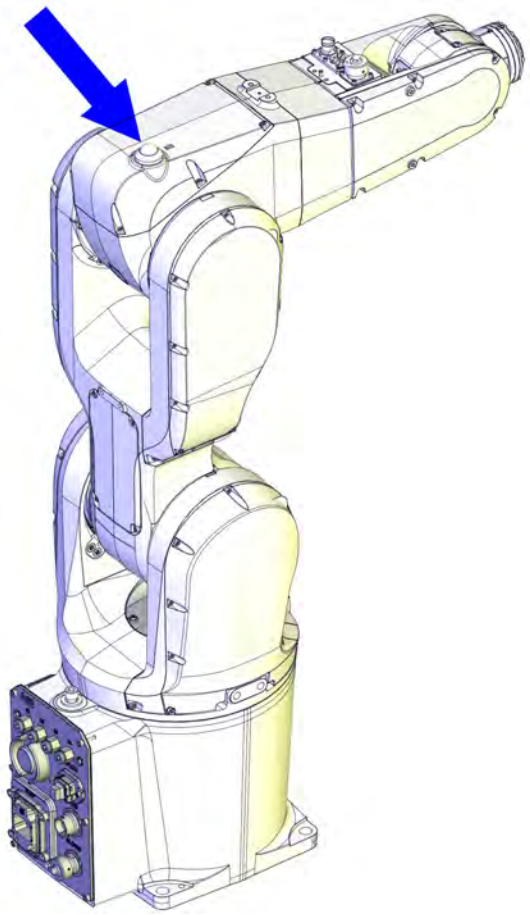
Continued

	Action	Information
2	Gain access to each *timing belt* by removing the cover.	
3	Check the timing belts for damage or wear.	
4	Check the *timing belt pulleys* for damage.	
5	If any damage or wear is detected, the part must be replaced!	
6	Check each belt for tension. If the belt tension is not correct, adjust it!	Axis 4: F = 30 N. Axis 5: F = 26 N.

3.3.5 Inspecting the signal lamp (option)

Location of signal lamp

The signal lamp is located as shown in this figure.



xx1300000455

Required tools and equipment

Equipment	Article number	Note
Signal lamp kit	See *Spare parts on page 813*.	To be replaced if damage is detected.
Standard toolkit	-	Content is defined in section *Standard toolkit on page 808*.

Inspecting, signal lamp

Use this procedure to inspect the function of the signal lamp.

	Action	Note
1	Inspect that signal lamp is lit when motors are put in operation ("MOTORS ON").	

Continues on next page

3.3.5 Inspecting the signal lamp (option)

Continued

	Action	Note
2	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
3	If the lamp is not lit, trace the fault by: • inspecting whether the signal lamp is broken. If so, replace it. • inspecting cable connections. • inspecting the cabling. Replace the cabling if a fault is detected.	Article number is specified in *Required tools and equipment on page 121*.

3.4 Replacement/changing activities

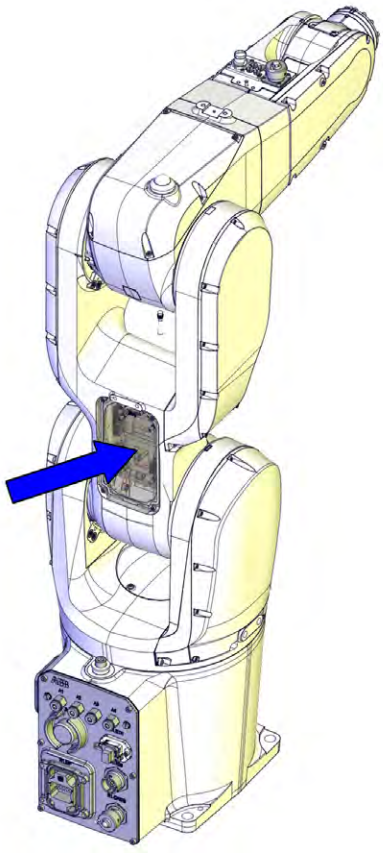
3.4.1 Replacing the battery pack

Note

The battery low alert (38213 **Battery charge low**) is displayed when remaining backup capacity (robot powered off) is less than 2 months. Typical life of a new battery is 36 months if the robot is powered off 2 days/week, or 18 months if the robot is powered off 16 hours/day. The life can be extended (approximately 3 times) for longer production breaks by a battery shutdown service routine. See *Operating manual - IRC5 with FlexPendant*.

Location of battery pack

The battery pack is located as shown in the figure.



xx1300002574

Required spare parts

Note

The spare part numbers that are listed in the table can be out of date. See the latest revision of *Product manual, spare parts - IRB 1200* on ABB Library.

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3.4.1 Replacing the battery pack

Continued

Spare part	Article number	Note
Battery pack	3HAC051036-001	Battery includes protection circuits. Only replace with a specified spare part or an ABB-approved equivalent.
Battery pack, SafeMove 2-supported	3HAC044075-001	Used for IRB 1200 Type B. See *Type B of IRB 1200 on page 792*. Battery includes protection circuits. Only replace with a specified spare part or an ABB-approved equivalent.
Gasket on EIB/SMB cover	3HAC056728-001	Not used with protection class IP40. Replace if damaged.

Required tools and equipment

Equipment, etc.	Article number	Note
24 VDC power supply	-	Used to release the motor brakes.
Standard toolkit	-	Content is defined in section *Standard toolkit on page 808*.

Required consumables

Consumable	Article number	Note
Cable straps	-	

Removing the battery pack

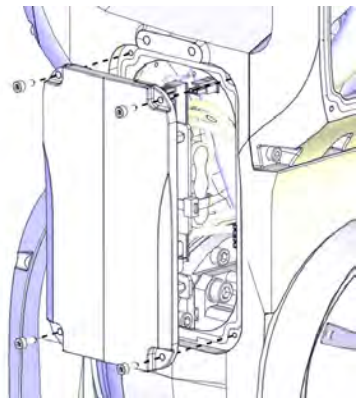
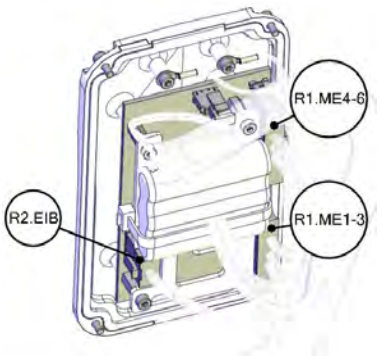
Use this procedure to remove the battery pack.

Preparations before removing the battery pack

	Action	Note
1	Move the robot to its zero position.	This is done in order to facilitate updating of the revolution counter.
2	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

Continues on next page

Removing the battery pack

	Action	Note
1	**DANGER** Make sure that all supplies for electrical power, hydraulic pressure, and air pressure are turned off.	
2	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit please read the safety information in the section *WARNING - The unit is sensitive to ESD! on page 50*	
3	**CAUTION** For robots with protection type Clean Room: Always cut the paint with a knife and grind the paint edge when disassembling parts of the robot! See *Replacing parts on the robot on page 138*	
4	Remove the connector cover attachment screws on the lower arm and carefully open the cover. **CAUTION** Be aware of the cabling that is attached to the cover!	 xx1300002427
5	**Valid for IRB 1200 (no type specified) and IRB 1200 Type A** Disconnect the connectors on the EIB unit. • R1.ME1-3 • R1.ME4-6 • R2.EIB	 xx1400000812

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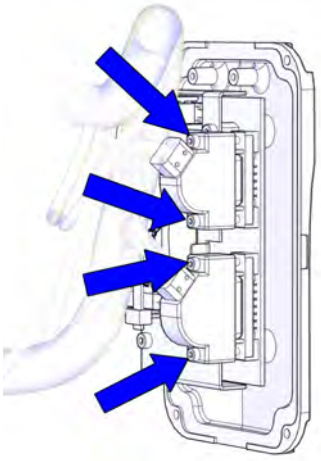
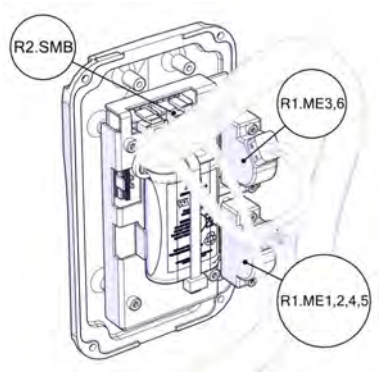
3.4.1 Replacing the battery pack

Continued

	Action	Note
6	**Valid for IRB 1200 Type B** Loose the connector screws.	 xx1700000004
7	**Valid for IRB 1200 Type B** Disconnect the connectors on the SMB unit. • R1.ME1,2,4,5 • R1.ME3,6 • R2.SMB	 xx1700000005

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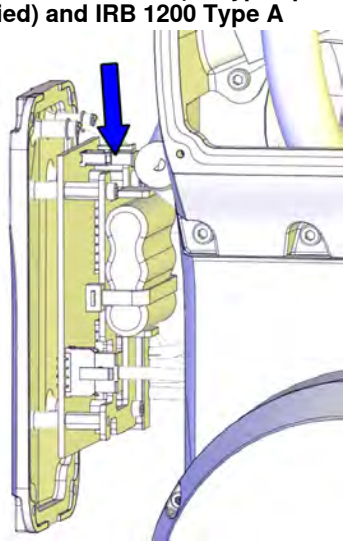
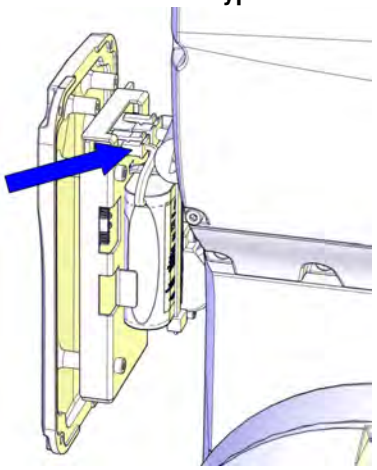
	Action	Note
8	Disconnect the battery cable.	**Valid for IRB 1200 (no type specified) and IRB 1200 Type A**  xx1300002571 **Valid for IRB 1200 Type B**  xx1700000006

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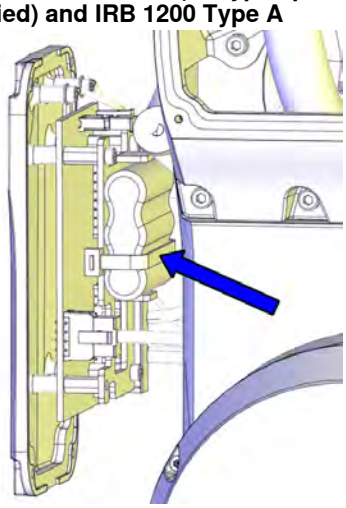
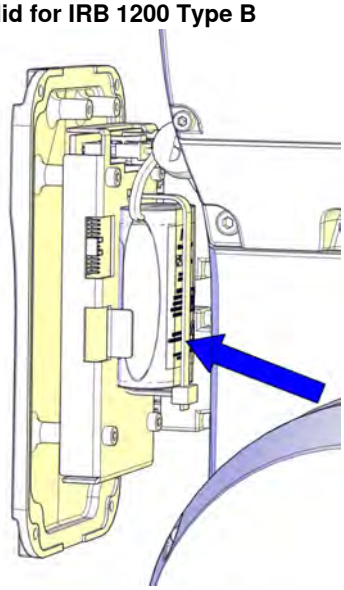
3.4.1 Replacing the battery pack

Continued

	Action	Note
9	Cut the cable strap that secures the battery and remove the battery. **Note** Battery includes protection circuits. Only replace with a specified spare part or with an ABB- approved equivalent.	**Valid for IRB 1200 (no type specified) and IRB 1200 Type A**  xx1300002579 **Valid for IRB 1200 Type B**  xx1700000007

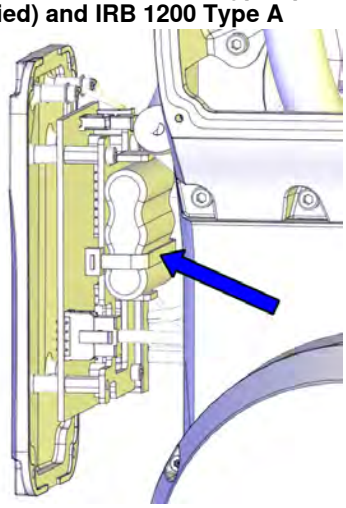
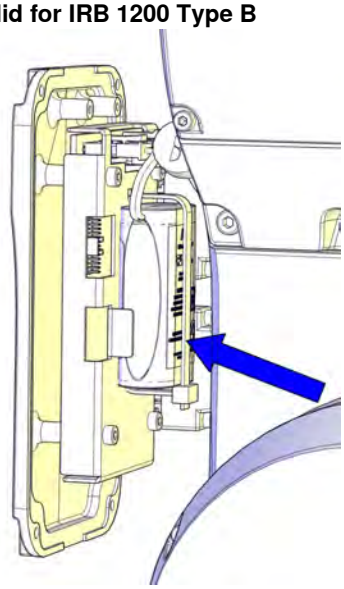
Refitting the battery pack

Use these procedures to refit the battery pack.

Refitting the battery pack

	Action	Note
1	**ELECTROSTATIC DISCHARGE (ESD)** The unit is sensitive to ESD. Before handling the unit please read the safety information in the section *WARNING - The unit is sensitive to ESD! on page 50*	

Continues on next page

	Action	Note
2	Clean Room robots: clean the joints that have been opened. See *Replacing parts on the robot on page 138*	
3	Fit the battery and and secure it with a cable strap. **Note** Battery includes protection circuits. Only replace with a specified spare part or with an ABB- approved equivalent.	**Valid for IRB 1200 (no type specified) and IRB 1200 Type A**  xx1300002579 **Valid for IRB 1200 Type B**  xx1700000007

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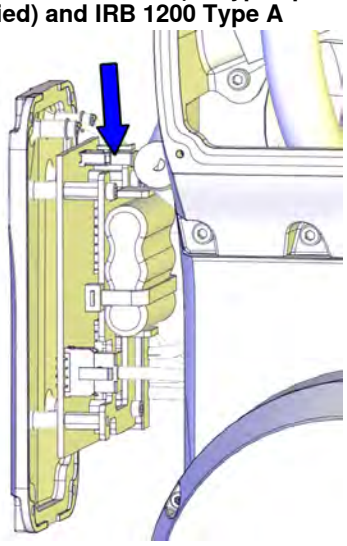
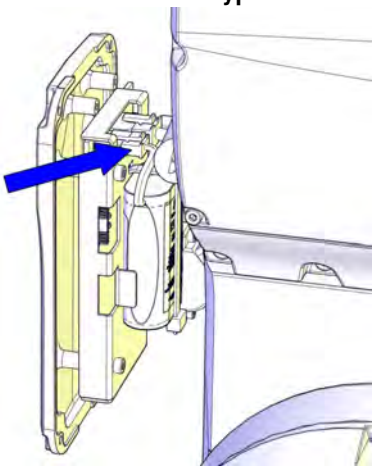
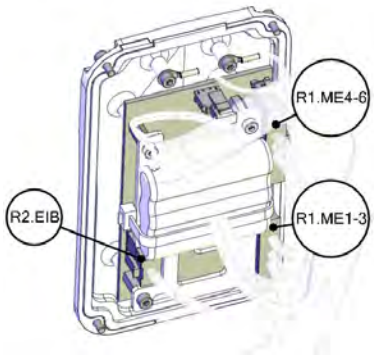
3.4.1 Replacing the battery pack

Continued

	Action	Note
4	Connect the battery cable.	**Valid for IRB 1200 (no type specified) and IRB 1200 Type A**  xx1300002571 **Valid for IRB 1200 Type B**  xx1700000006
5	**Valid for IRB 1200 (not type specified) and IRB 1200 Type A** Connect the connectors to the EIB unit. • R1.ME1-3 • R1.ME4-6 • R2.EIB **WARNING** Make sure not to mix the R2.EIB and R2.ME2. Axis 2 may be severely damaged. See the labels on the connectors for correct connection.	 xx1400000812

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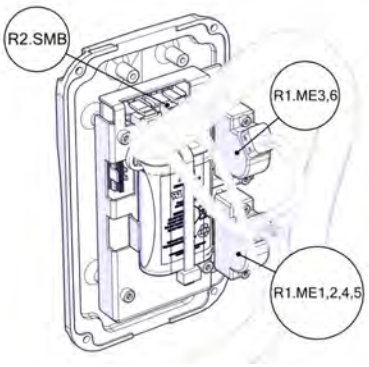
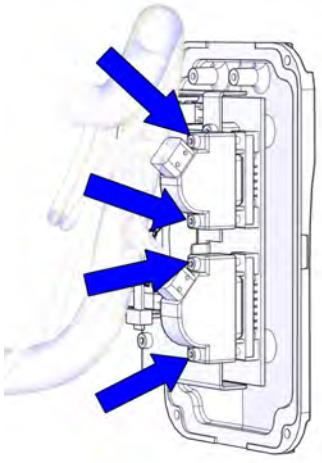
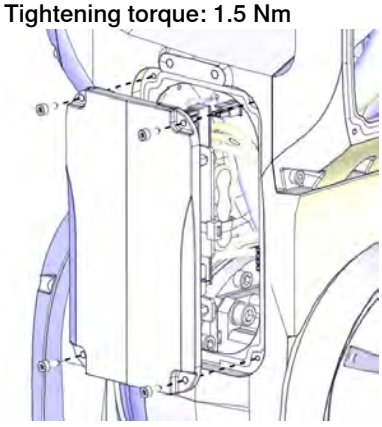
	Action	Note
6	**Valid for IRB 1200 Type B** Connect the connectors to the SMB unit. • R1.ME1,2,4,5 • R1.ME3,6 • R2.SMB **WARNING** Make sure not to mix the R2.SMB and R2.ME2. Axis 2 may be severely damaged. See the labels on the connectors for correct connection.	 xx1700000005
7	**Valid for IRB 1200 Type B** Tighten the connector screws.	Tightening torque: 0.3 Nm  xx1700000004
8	Refit the EIB/SMB cover to the lower arm with the attachment screws.	Screws: 3HAB3409-207 (M3x8). Tightening torque: 1.5 Nm  xx1300002427 **Note** Only use specified screws, never replace them with other screws.

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3.4.1 Replacing the battery pack

Continued

	Action	Note
9	Clean Room robots: seal and paint the joints that have been opened. See *Replacing parts on the robot on page 138* **Note** After all repair work, wipe the robot free from particles with spirit on a lint free cloth.	

Concluding procedure

	Action	Note
1	Update the revolution counters.	See *Updating revolution counters on page 739*.
2	For robots with protection type Clean Room: Clean and paint the joints that have been opened. See *Replacing parts on the robot on page 138* **Note** After all repair work, wipe the Clean Room robot free from particles with spirit on a lint free cloth.	
3	**DANGER** Make sure all safety requirements are met when performing the first test run. These are further detailed in the section *DANGER - First test run may cause injury or damage! on page 48*.	

3.5 Cleaning activities

3.5.1 Cleaning the IRB 1200

WARNING

Turn off all electrical power supplies to the manipulator before entering its work space.

General

To secure high uptime it is important that the IRB 1200 is cleaned regularly. The frequency of cleaning depends on the environment in which the manipulator works.

Different cleaning methods are allowed depending on the type of protection of the IRB 1200.

Note

Always verify the protection type of the robot before cleaning.

Dos and don'ts!

This section specifies some special considerations when cleaning the robot.

Always!

- Always use cleaning equipment as specified! Any other cleaning equipment may shorten the life of the robot.
- Always check that all protective covers are fitted to the robot before cleaning!

Never!

- Never point the water jet at connectors, joints, sealings, or gaskets!
- Never use compressed air to clean the robot!
- Never use solvents that are not approved by ABB to clean the robot!
- Never spray from a distance closer than 0.4 meters!
- Never remove any covers or other protective devices before cleaning the robot!

Cleaning methods

These following table defines what cleaning methods are allowed for ABB manipulators depending on the protection type.

Protection type	Cleaning method			
	Vacuum cleaner	Wipe with cloth	Rinse with water	High pressure water or steam
Standard IP40	Yes	Yes. With light cleaning detergent.	No	No

Continues on next page

3.5.1 Cleaning the IRB 1200
Continued

Protection type	Cleaning method			
	Vacuum cleaner	Wipe with cloth	Rinse with water	High pressure water or steam
IP67 (option)	Yes	Yes. With light cleaning detergent.	Yes. It is highly recommended that the water contains a rust-prevention solution and that the manipulator is dried afterwards.	No
Foundry Plus	Yes	Yes. With light cleaning detergent or spirit.	Yes. It is highly recommended that the water contains a rust-prevention solution.	Yes[i]. It is highly recommended that the water and steam contains rust preventive, without cleaning detergents.
Clean room	Yes	Yes. With light cleaning detergent, spirit or isopropyl alcohol.	No	No

i Perform according to section *Cleaning with water and steam on page 134*.

Wiping with cloth

Additional cleaning instructions for robots with food grade lubrication

Make sure that no liquid flows into the robot or stagnates in any gap or surface after cleaning.

Cleaning with water and steam

Instructions for rinsing with water

IRB 1200 with protection class IP67 (option) and with protection type *Foundry Plus* can be cleaned by rinsing with water (water cleaner).[1]

The following list defines the prerequisites:

- Maximum water pressure at the nozzle: 700 kN/m^2 (7 bar) [I]
- Fan jet nozzle should be used, min. 45° spread
- Minimum distance from nozzle to encapsulation: 0.4 meters
- Maximum flow: 20 liters/min[I]

I Typical tap water pressure and flow

Instructions for steam or high pressure water cleaning

ABB robots with protection types *Foundry Plus*, *Wash*, or *Foundry Prime* can be cleaned using a steam cleaner or high pressure water cleaner.[2]

The following list defines the prerequisites:

- Maximum water pressure at the nozzle: 2500 kN/m^2 (25 bar)
- Fan jet nozzle should be used, min. 45° spread

1 See *Cleaning methods on page 133* for exceptions.

2 See *Cleaning methods on page 133* for exceptions.

Continues on next page

- Minimum distance from nozzle to encapsulation: 0.4 meters
- Maximum water temperature: 80° C

Cables

Movable cables need to be able to move freely:

- Remove waste material, such as sand, dust and chips, if it prevents cable movement.
- Clean the cables if they have a crusty surface, for example from dry release agents.