

# Product manual

## DressPack/SpotPack IRB 6620LX

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**Product manual**  
**DressPack/SpotPack IRB 6620LX**

**IRC5**

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**Revision: -**

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# Overview of this manual

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## About this manual

This manual contains instructions for:

- mechanical and electrical work for DressPack/SpotPack systems
- maintenance of the DressPack/SpotPack systems
- mechanical and electrical repair of the DressPack/SpotPack systems.

The manual also contains reference information for all procedures detailed in this manual.

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## Usage

This manual shall be used during:

- installation on the DressPack/SpotPack system
- maintenance on the DressPack/SpotPack system
- repair work on the DressPack/SpotPack system.

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## Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance personnel
- repair personnel.

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## Prerequisites

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

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.

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## Organization of chapters

The manual is organized in the following chapters:

Chapter	Contents
Safety	Safety information that must be read through before performing any installation or service work on the robot. Contains general safety aspects as well as more specific information on how to avoid personal injuries and damage to the product.
Installation	Descriptions of mechanical installation and electrical connections.
Maintenance	Descriptions of all required preventive maintenance procedures including intervals.
Repair	Descriptions of all recommended repair procedures.
Decommissioning	Environmental information about the components.
Reference information	Useful information when performing installation, maintenance or repair work. Includes lists of necessary tools, additional documents, safety standards, etc.
Spare parts	Complete spare part list including wear parts shown in exploded views.
Circuit diagrams	References to article numbers for circuit diagrams.

*Continues on next page*

### References

Reference	Document ID
<i>Operating manual - General safety information</i> <sup>i</sup>	3HAC031045-001
<i>Product specification - IRB 6620</i>	3HAC025861-001
<i>Product manual - IRB 6620LX</i>	3HAC035737-001
<i>Product manual - IRC5</i>	3HAC021313-001
<i>Circuit diagram - DressPack 6620</i>	3HAC026136-001
<i>Circuit diagram - SpotPack 6620</i>	3HAC026208-001
<i>Operating manual - IRC5 with FlexPendant</i>	3HAC050941-001
<i>Technical reference manual - System parameters</i>	3HAC050948-001

<sup>i</sup> This manual contains all safety instructions from the product manuals for the manipulators and the controllers.



#### Note

The document numbers that are listed for software documents are valid for RobotWare 6. Equivalent documents are available for RobotWare 5.

### Revisions

Revision	Description
-	First edition.



# Product documentation, IRC5

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## Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents listed can be ordered from ABB on a DVD. The documents listed are valid for IRC5 robot systems.

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## Product manuals

Manipulators, controllers, DressPack/SpotPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with exploded views (or references to separate spare parts lists).
- Circuit diagrams (or references to circuit diagrams).

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## Technical reference manuals

The technical reference manuals describe reference information for robotics products.

- *Technical reference manual - Lubrication in gearboxes*: Description of types and volumes of lubrication for the manipulator gearboxes.
- *Technical reference manual - RAPID overview*: An overview of the RAPID programming language.
- *Technical reference manual - RAPID Instructions, Functions and Data types*: Description and syntax for all RAPID instructions, functions, and data types.
- *Technical reference manual - RAPID kernel*: A formal description of the RAPID programming language.
- *Technical reference manual - System parameters*: Description of system parameters and configuration workflows.

*Continues on next page*

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### Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, DVD with PC software).
- How to install included or required hardware.
- How to use the application.
- Examples of how to use the application.

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### Operating manuals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and trouble shooters.

The group of manuals includes (among others):

- *Operating manual - Emergency safety information*
- *Operating manual - General safety information*
- *Operating manual - Getting started, IRC5 and RobotStudio*
- *Operating manual - Introduction to RAPID*
- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - RobotStudio*
- *Operating manual - Trouble shooting IRC5, for the controller and manipulator.*

# Product name principles

## General

The different robots have a wide range of options. In many cases the option name gives a good explanation of its content. In some cases there is a need to add more information in the product name in order to clearly show a certain variant and to avoid misunderstandings. Hence a complementary naming standard is used.

The family name of the options is DressPack (that is customer cables and hoses from the controller to the robot's axis 6, divided in different sections).

## DressPack parts

DressPack parts that are assembled on the robot are called:

- IRBDP (IRB DressPack)

## Main application

The DressPack has been prepared for two main applications:

Product name	Application
MH	Material handling
SW	Spot welding

## Generations

The different generations of a DressPack is indicated with a generation number. The number indicates the different design of each generation. (Some generations might not be available since it has been phased out).

- 1, 2, 3 etc

## Sections

The DressPack on the robot is supplied in different sections:

Product name	Section
L	Lower DressPack section
U	Upper DressPack section
C	Continuous DressPack (DressPack without an intermediate connection point)

## Routing

The DressPack can be routed in different ways:

Product name	Routing
I	Integrated DressPack The main parts are integrated within the robot structure.
E	External DressPack The main parts are routed outside, on the robot structure.

*Continues on next page*

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### Examples

- **IRBDP MH 3 UE** = IRB DressPack / Material handling application / Generation 3 / Upper arm DressPack section / External routing
- **IRBDP SW 4 UI** = IRB DressPack / Spot welding application / Generation 4 / Upper arm DressPack section / Internal routing
- **IRBDP SW 2 LE** = IRB DressPack / Spot welding application / Generation 2 / Lower arm DressPack section / External routing
- **IRBDP SW 2 CE** = IRB DressPack / Spot welding application / Generation 2 / Continuous DressPack section / External routing

# 1 Safety

## 1.1 Introduction to safety information

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### Overview

The safety information in this manual is divided into the following categories:

- General safety aspects, important to attend to before performing any service work on the robot. These are applicable for all service work and are found in [General safety information on page 14](#).
- Safety signals and symbols shown in the manual and on the robot, warning for different types of dangers, are found in [Safety signals and symbols on page 37](#).
- Specific safety information, pointed out in the procedures. How to avoid and eliminate the danger is either described directly in the procedure, or in specific instructions in the section [Safety related instructions on page 45](#).

# 1 Safety

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## 1.2.1 Introduction to general safety information

## 1.2 General safety information

### 1.2.1 Introduction to general safety information

---

#### Definitions

This section details general safety information for personnel performing installation, repair and maintenance work.

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#### Sections

The general safety information is divided into the following sections.

Contents	Examples of content
<b>General information</b>	<ul style="list-style-type: none"><li>• safety, service</li><li>• limitation of liability</li><li>• related information</li></ul>
<b>Safety risks</b> lists dangers relevant when working with the product. The dangers are split into different categories.	<ul style="list-style-type: none"><li>• safety risks during installation or service</li><li>• risks associated with live electrical parts</li></ul>
<b>Safety actions</b> describes actions which may be taken to remedy or avoid dangers.	<ul style="list-style-type: none"><li>• fire extinguishing</li><li>• safe use of the teach pendant or jogging device</li></ul>
<b>Safety stops</b> describes different types of stops.	<ul style="list-style-type: none"><li>• stopping functions</li><li>• description of emergency stop</li><li>• description of safety stop</li></ul>

## 1.2.2 Safety in the robot system

### Validity and responsibility

The information does not cover how to design, install and operate a complete system, nor does it cover all peripheral equipment that can influence the safety of the entire system. To protect personnel, the complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the robot is installed.

The users of ABB industrial robots are responsible for ensuring that the applicable safety laws and regulations in the country concerned are observed and that the safety devices necessary to protect people working with the robot system are designed and installed correctly. Personnel working with robot must be familiar with the operation and handling of the industrial robot as described in the applicable documents, for example:

- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - General safety information*<sup>1</sup>
- *Product manual*

<sup>1</sup> This manual contains all safety instructions from the product manuals for the robots and the controllers.

The robot system shall be designed and constructed in such a way as to allow safe access to all areas where intervention is necessary during operation, adjustment, and maintenance.

Where it is necessary to perform tasks within the safeguarded space there shall be safe and adequate access to the task locations.

Users shall not be exposed to hazards, including slipping, tripping, and falling hazards.

### Connection of external safety devices

Apart from the built-in safety functions, the robot is also supplied with an interface for the connection of external safety devices. An external safety function can interact with other machines and peripheral equipment via this interface. This means that control signals can act on safety signals received from the peripheral equipment as well as from the robot.

### Limitation of liability

Any information given in this manual regarding safety must not be construed as a warranty by ABB that the industrial robot will not cause injury or damage even if all safety instructions are complied with.

### Related information

Type of information	Detailed in document	Section
Installation of safety devices	<i>Product manual for the robot</i>	Installation and commissioning
Changing operating modes	<i>Operating manual - IRC5 with FlexPendant</i>	Operating modes

*Continues on next page*

# 1 Safety

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## 1.2.2 Safety in the robot system

*Continued*

Type of information	Detailed in document	Section
Restricting the working space	<i>Product manual for the robot</i>	Installation and commissioning



## **1.2.3 Safety risks**

### **1.2.3.1 Safety risks during installation and service work on robots**

---

#### **Overview**

This section includes information on general safety risks to be considered when performing installation and service work on the robot.

These safety instructions have to be read and followed by any person who deals with the installation and maintenance of the robot. Only persons who know the robot and are trained in the operation and handling of the robot are allowed to maintain the robot. Persons who are under the influence of alcohol, drugs or any other intoxicating substances are not allowed to maintain, repair, or use the robot.

---

#### **General risks during installation and service**

- The instructions in the product manual in the chapters *Installation and commissioning*, and *Repair* must always be followed.
- Emergency stop buttons must be positioned in easily accessible places so that the robot can be stopped quickly.
- Those in charge of operations must make sure that safety instructions are available for the installation in question.
- Those who install or service/maintain the robot must have the appropriate training for the equipment in question and in any safety matters associated with it.

---

#### **Spare parts and special equipment**

ABB does not supply spare parts and special equipment which have not been tested and approved by ABB. The installation and/or use of such products could negatively affect the structural properties of the robot and as a result of that affect the active or passive safety operation. ABB is not liable for damages caused by the use of non-original spare parts and special equipment. ABB is not liable for damages or injuries caused by unauthorized modifications to the robot system.

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#### **Personal protective equipment**

Always use suitable personal protective equipment, based on the risk assessment for the robot installation.

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#### **Nation/region specific regulations**

To prevent injuries and damages during the installation of the robot, the regulations applicable in the country concerned and the instructions of ABB Robotics must be complied with.

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#### **Non-voltage related risks**

- Make sure that no one else can turn on the power to the controller and robot while you are working with the system. A good method is to always lock the main switch on the controller cabinet with a safety lock.

*Continues on next page*

# 1 Safety

## 1.2.3.1 Safety risks during installation and service work on robots

*Continued*


- Safety zones, which must be crossed before admittance, must be set up in front of the robot's working space. Light beams or sensitive mats are suitable devices.
- Turntables or the like should be used to keep the operator out of the robot's working space.
- If the robot is installed at a height, hanging, or other than standing directly on the floor, there may be additional risks than those for a robot standing directly on the floor.
- The axes are affected by the force of gravity when the brakes are released. In addition to the risk of being hit by moving robot parts, there is a risk of being crushed by the parallel arm (if there is one).
- Energy stored in the robot for the purpose of counterbalancing certain axes may be released if the robot, or parts thereof, are dismantled.
- When dismantling/assembling mechanical units, watch out for falling objects.
- Be aware of stored heat energy in the controller.
- Never use the robot as a ladder, which means, do not climb on the robot motors or other parts during service work. There is a serious risk of slipping because of the high temperature of the motors and oil spills that can occur on the robot.
- Never use the robot as a ladder, which means, do not climb on the manipulator motors or other parts during service work. There is a risk of the robot being damaged.

### To be observed by the supplier of the complete system

When integrating the robot with external devices and machines:

- The supplier of the complete system must ensure that all circuits used in the safety function are interlocked in accordance with the applicable standards for that function.
- The supplier of the complete system must ensure that all circuits used in the emergency stop function are interlocked in a safe manner, in accordance with the applicable standards for the emergency stop function.



### Complete robot

Safety risk	Description
Hot components!	 <b>CAUTION</b> Motors and gearboxes are HOT after running the robot! Touching motors and gearboxes may result in burns! With a higher environment temperature, more surfaces on the manipulator will get HOT and may also result in burns.


*Continues on next page*

## 1.2.3.1 Safety risks during installation and service work on robots

*Continued*

Safety risk	Description
Removed parts may result in collapse of the robot!	 <b>WARNING</b> Take any necessary measures to ensure that the robot does not collapse as parts are removed. For example, secure the lower arm according to the repair instruction if removing the axis-2 motor.
Removed cables to the measurement system	 <b>WARNING</b> If the internal cables for the measurement system have been disconnected during repair or maintenance, then the revolution counters must be updated.

**Cabling**

Safety risk	Description
Cable packs are sensitive to mechanical damage!	 <b>CAUTION</b> The cable packs are sensitive to mechanical damage! They must be handled with care, especially the connectors, in order to avoid damaging them!

## 1 Safety

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### 1.2.3.2 CAUTION - Hot parts may cause burns!

### 1.2.3.2 CAUTION - Hot parts may cause burns!

---

#### Description

During normal operation, many robot parts become hot, especially the drive motors and gearboxes. Sometimes areas around these parts also become hot. Touching these may cause burns of various severity.

Because of a higher environment temperature, more surfaces on the robot get hot and may result in burns.

---

#### Elimination

The instructions below detail how to avoid the dangers specified above:

	Action	Information
1	Always use your hand, at some distance, to feel if heat is radiating from the potentially hot component before actually touching it.	
2	Wait until the potentially hot component has cooled if it is to be removed or handled in any other way.	

### 1.2.3.3 Safety risks related to tools/work pieces

#### Safe handling

It must be possible to safely turn off tools, such as milling cutters, etc. Make sure that guards remain closed until the cutters stop rotating.

It should be possible to release parts by manual operation (valves).

#### Safe design

Grippers/end effectors must be designed so that they retain work pieces in the event of a power failure or a disturbance to the controller.

Unauthorized modifications of the originally delivered robot are prohibited. Without the consent of ABB it is forbidden to attach additional parts through welding, riveting, or drilling of new holes into the castings. The strength could be affected.



#### CAUTION

Ensure that a gripper is prevented from dropping a work piece, if such is used.

# 1 Safety

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## 1.2.3.4 Safety risks related to pneumatic/hydraulic systems

### 1.2.3.4 Safety risks related to pneumatic/hydraulic systems

---

#### General

Special safety regulations apply to pneumatic and hydraulic systems.



#### Note

All components that remain pressurized after separating the machine from the power supply must be provided with clearly visible drain facilities and a warning sign that indicates the need for pressure relief before adjustments or performing any maintenance on the robot system.

#### Residual energy

- Residual energy can be present in these systems. After shutdown, particular care must be taken.
- The pressure must be released in the complete pneumatic or hydraulic systems before starting to repair them.
- Work on hydraulic equipment may only be performed by persons with special knowledge and experience of hydraulics.
- All pipes, hoses, and connections have to be inspected regularly for leaks and damage. Damage must be repaired immediately.
- Splashed oil may cause injury or fire.

#### Safe design

- Gravity may cause any parts or objects held by these systems to drop.
- Dump valves should be used in case of emergency.
- Shot bolts should be used to prevent tools, etc., from falling due to gravity.

---

**1.2.3.5 Safety risks during operational disturbances**

---

**General**

- The industrial robot is a flexible tool that can be used in many different industrial applications.
- All work must be carried out professionally and in accordance with the applicable safety regulations.
- Care must be taken at all times.

---

**Qualified personnel**

Corrective maintenance must only be carried out by qualified personnel who are familiar with the entire installation as well as the special risks associated with its different parts.

---

**Extraordinary risks**

If the working process is interrupted, extra care must be taken due to risks other than those associated with regular operation. Such an interruption may have to be rectified manually.

# 1 Safety

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## 1.2.3.6 Risks associated with live electric parts

### 1.2.3.6 Risks associated with live electric parts

---

#### Voltage related risks, general

Work on the electrical equipment of the robot must be performed by a qualified electrician in accordance with electrical regulations.

- Although troubleshooting may, on occasion, need to be carried out while the power supply is turned on, the robot must be turned off (by setting the main switch to OFF) when repairing faults, disconnecting electric leads and disconnecting or connecting units.
- The main supply to the robot must be connected in such a way that it can be turned off from outside the working space of the robot.
- Make sure that no one else can turn on the power to the controller and robot while you are working with the system. A good method is to always lock the main switch on the controller cabinet with a safety lock.

The necessary protection for the electrical equipment and robot system during construction, commissioning, and maintenance is guaranteed if the valid regulations are followed.

All work must be performed:

- by qualified personnel
- on machine/robot system in deadlock
- in an isolated state, disconnected from power supply, and protected against reconnection

---

#### Voltage related risks, controller

A danger of high voltage is associated with, for example, the following parts:

- Be aware of stored electrical energy (DC link, Ultracapacitor bank unit) in the controller.
- Units such as I/O modules, can be supplied with power from an external source.
- The main supply/main switch
- The transformers
- The power unit
- The control power supply (230 VAC)
- The rectifier unit (262/400-480 VAC and 400/700 VDC. Note: Capacitors!)
- The drive unit (400/700 VDC)
- The drive system power supply (230 VAC)
- The service outlets (115/230 VAC)
- The customer power supply (230 VAC)
- The power supply unit for additional tools, or special power supply units for the machining process.
- The external voltage connected to the controller remains live even when the robot is disconnected from the mains.
- Additional connections.

*Continues on next page*



---

### Voltage related risks, robot

A danger of high voltage is associated with the robot in:

- The power supply for the motors (up to 800 VDC).
- The user connections for tools or other parts of the installation (max. 230 VAC).

See chapter [Installation on page 53](#).

---

### Voltage related risks, tools, material handling devices, etc.

Tools, material handling devices, etc., may be live even if the robot system is in the OFF position. Power supply cables which are in motion during the working process may be damaged.

# 1 Safety

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## 1.2.4.1 Safety fence dimensions

### 1.2.4 Safety actions

#### 1.2.4.1 Safety fence dimensions

---

##### General

Install a safety cell around the robot to ensure safe robot installation and operation.

---

##### Dimensioning

The fence or enclosure must be dimensioned to withstand the force created if the load being handled by the robot is dropped or released at maximum speed.

Determine the maximum speed from the maximum velocities of the robot axes and from the position at which the robot is working in the work cell (see the section *Robot motion* in the *Product specification*).

Also consider the maximum possible impact caused by a breaking or malfunctioning rotating tool or other device fitted to the robot.

### 1.2.4.2 Fire extinguishing



#### Note

Use a CARBON DIOXIDE (CO<sub>2</sub>) extinguisher in the event of a fire in the robot system (robot or controller)!

# 1 Safety

---

## 1.2.4.3 Emergency release of the robot arm

### 1.2.4.3 Emergency release of the robot arm

---

#### Description

In an emergency situation, the brakes on the robot axes can be released manually by pushing the brake release buttons.

How to release the brakes is detailed in the section:

- *Manually releasing the brakes* in the product manual for the robot.

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 arms does not increase the pressure on the trapped person, further increasing any injury!

### **1.2.4.4 Brake testing**

---

#### **When to test**

During operation, the holding brake of each axis normally wears down. A test can be performed to determine whether the brake can still perform its function.

---

#### **How to test**

The function of the holding brake of each axis motor may be verified as described below:

- 1 Run each robot axis to a position where the combined weight of the robot arm and any load is maximized (maximum static load).
- 2 Switch the motor to the MOTORS OFF.
- 3 Inspect and verify that the axis maintains its position.

If the robot does not change position as the motors are switched off, then the brake function is adequate.

## 1 Safety

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### 1.2.4.5 Risk of disabling function "Reduced speed 250 mm/s"

### 1.2.4.5 Risk of disabling function "Reduced speed 250 mm/s"



#### Note

Do not change *Transm gear ratio* or other kinematic system parameters from the FlexPendant or a PC. This will affect the safety function "Reduced speed 250 mm/s".

### 1.2.4.6 Safe use of the jogging device

#### Enabling device

The enabling device is a manually operated, constant pressure push-button which, when continuously activated in one position only, allows potentially hazardous functions but does not initiate them. In any other position, hazardous functions are stopped safely.

The enabling device is of a specific type where you must press the push-button only half-way to activate it. In the fully in and fully out positions, operating the robot is impossible.



#### Note

The enabling device is a push-button located on the jogging device which, when pressed halfway in, switches the system to MOTORS ON. When the enabling device is released or pushed all the way in, the manipulator switches to the MOTORS OFF state.

To ensure safe use of the jogging device, the following must be implemented:

- The enabling device must never be rendered inoperational in any way.
- During programming and testing, the enabling device must be released as soon as there is no need for the robot to move.
- Anyone entering the working space of the robot must always bring the jogging device with him/her. This is to prevent anyone else from taking control of the robot without his/her knowledge.

#### Hold-to-run function

The hold-to-run function allows movement when a button connected to the function is actuated manually and immediately stops any movement when released. The hold-to-run function can only be used in manual mode.

How to operate the hold-to-run function for IRC5 is described in *Operating manual - IRC5 with FlexPendant*.

#### 1.2.4.7 Work inside the working range of the robot



##### WARNING

If work must be carried out within the work area of the robot, then the following points must be observed:

- The operating mode selector on the controller must be in the manual mode position to render the enabling device operational and to block operation from a computer link or remote control panel.
- The maximum speed of the robot is limited to 250 mm/s when the operating mode selector is in the position *Manual mode with reduced speed*. This should be the normal position when entering the working space.  
The position *Manual mode with full speed (100%)* may only be used by trained personnel who are aware of the risks that this entails. *Manual mode with full speed (100%)* is not available in USA or Canada.
- Pay attention to the rotating axes of the robot. Keep away from axes to not get entangled with hair or clothing. Also, be aware of any danger that may be caused by rotating tools or other devices mounted on the robot or inside the cell.
- Test the motor brake on each axis, according to the section [Brake testing on page 29](#).
- To prevent anyone else from taking control of the robot, always put a safety lock on the cell door and bring the enabling device with you when entering the working space.



##### WARNING

**NEVER**, under any circumstances, stay beneath any of the robot's axes! There is always a risk that the robot will move unexpectedly when robot axes are moved using the enabling device or during other work inside the working range of the robot.



## 1.2.5 Safety stops

### 1.2.5.1 What is an emergency stop?

#### Definition of emergency stop

An emergency stop is a state that takes precedence over all other robot controls, causes all controlled hazards to stop, removes drive power from the robot actuators, remains active until it is reset, and can only be reset by manual action.

An emergency stop state means that all power is disconnected from the robot except for the manual brake release circuits. You must perform a recovery procedure, that is, resetting the emergency stop button and pressing the Motors On button, to return to normal operation.

The robot system can be configured so that the emergency stop results in either:

- A category 0 stop, immediately stopping the robot actions by disconnecting power from the motors.
- A category 1 stop, stopping the robot actions with power available to the motors so that the robot path can be maintained. When completed, power is disconnected from the motors.

The default setting is a category 0 stop. However, category 1 stops are preferred since they minimize unnecessary wear on the robot and the actions needed to return the system back to production. Consult your plant or cell documentation to see how your robot system is configured.



#### Note

The emergency stop function may only be used for the purpose and under the conditions for which it is intended.



#### Note

The emergency stop function is intended for immediately stopping equipment in the event of an emergency.



#### Note

Emergency stop should not be used for normal program stops as this causes extra, unnecessary wear on the robot.

For how to perform normal program stops, see section *Stopping programs* in *Operating manual - IRC5 with FlexPendant*.

#### Classification of stops

The safety standards that regulate automation and robot equipment define categories in which each type of stop applies:

If the stop is...	... then it is classified as...
category 0 (zero)	uncontrolled

*Continues on next page*

# 1 Safety

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## 1.2.5.1 What is an emergency stop?

*Continued*

If the stop is...	... then it is classified as...
category 1	controlled

---

### Emergency stop buttons

In a robot system there are several emergency stop buttons that can be operated in order to achieve an emergency stop. There are emergency stop buttons available on the FlexPendant and on the controller cabinet. There can also be other types of emergency stops on your robot. Consult your plant or cell documentation to see how your robot system is configured.

## 1.2.5.2 What is a safety stop or protective stop?

### Definition of safety stops

A safety stop is a state that stops all robot motion and removes power to the robot drive actuators. There is no recovery procedure. You need only to restore motor power to recover from a safety stop. Safety stop is also called protective stop.

The robot system can be configured so that the safety stop results in either:

- A category 0 stop, immediately stopping the manipulator actions by disconnecting power from the motors.
- A category 1 stop, stopping the manipulator actions with power available to the motors so that the manipulator path can be maintained. When completed, power is disconnected from the motors.

The default setting is a category 1 stop.

Category 1 stops are preferred since they minimize unnecessary wear on the manipulator and the actions needed to return the system back to production. Consult your plant or cell documentation to see how your robot system is configured.



#### Note

The safety stop function may only be used for the purpose and under the conditions for which it is intended.



#### Note

Safety stop should not be used for normal program stops as this causes extra, unnecessary wear on the manipulator.

For how to perform normal program stops, see section *Stopping programs* in *Operating manual - IRC5 with FlexPendant*.

### Classification of stops

The safety standards that regulate automation and robot equipment define categories in which each type of stop applies:

If the stop is...	... then it is classified as...
category 0 (zero)	uncontrolled
category 1	controlled

*Continues on next page*

# 1 Safety

---

## 1.2.5.2 What is a safety stop or protective stop?

*Continued*

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### Type of safety stops

Safety stops are activated through special signal inputs to the controller, see *Product manual - IRC5*.

The inputs are intended for safety devices such as cell doors, light curtains, or light beams.

Safety stop:	Description:
Automatic mode stop (AS)	Disconnects drive power in automatic mode. In manual mode this input is inactive.
General stop (GS)	Disconnects drive power in all operating modes.
Superior stop (SS)	Disconnects drive power in all operating modes. Intended for external equipment.



#### Note

Use normal program stop for all other types of stop.

## 1.3 Safety signals and symbols

### 1.3.1 Safety signals in the manual






#### Introduction to safety signals

This section specifies all dangers that can arise when doing the work described in the user manuals. Each danger consists of:

- A caption specifying the danger level (DANGER, WARNING, or CAUTION) and the type of danger.
- A brief description of what will happen if the operator/service personnel do not eliminate the danger.
- Instruction about how to eliminate danger to simplify doing the work.

#### Danger levels

The table below defines the captions specifying the danger levels used throughout this manual.

Symbol	Designation	Significance
 xx0200000022	DANGER	Warns that an accident <i>will</i> occur if the instructions are not followed, resulting in a serious or fatal injury and/or severe damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, and so on.
 xx0100000002	WARNING	Warns that an accident <i>may</i> occur if the instructions are not followed that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, etc.
 xx0200000024	ELECTRICAL SHOCK	Warns for electrical hazards which could result in severe personal injury or death.
 xx0100000003	CAUTION	Warns that an accident may occur if the instructions are not followed that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height, etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment where there is a risk of damaging the product or causing a breakdown.
 xx0200000023	ELECTROSTATIC DISCHARGE (ESD)	Warns for electrostatic hazards which could result in severe damage to the product.



*Continues on next page*

# 1 Safety

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## 1.3.1 Safety signals in the manual

*Continued*

Symbol	Designation	Significance
 xx0100000004	NOTE	Describes important facts and conditions.
 xx0100000098	TIP	Describes where to find additional information or how to do an operation in an easier way.

## 1.3.2 Safety symbols on product labels

### Introduction to labels

This section describes safety symbols used on labels (stickers) on the product. Symbols are used in combinations on the labels, describing each specific warning. The descriptions in this section are generic, the labels can contain additional information such as values.



#### Note

The safety and health symbols on the labels on the product must be observed. Additional safety information given by the system builder or integrator must also be observed.




### Types of labels

Both the robot and the controller are marked with several safety and information labels, containing important information about the product. The information is useful for all personnel handling the robot system, for example during installation, service, or operation.

The safety labels are language independent, they only use graphics. See [Symbols on safety labels on page 39](#).

The information labels can contain information in text (English, German, and French).

### Symbols on safety labels

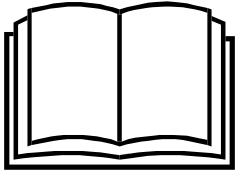
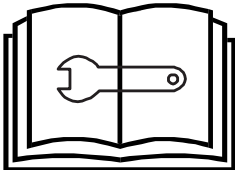
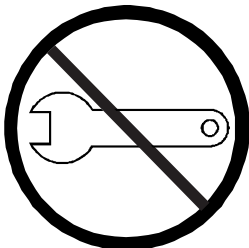
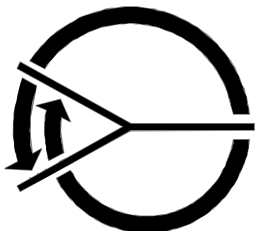

Symbol	Description
 xx0900000812	<b>Warning!</b> Warns that an accident <i>may</i> occur if the instructions are not followed that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height, etc.
 xx0900000811	<b>Caution!</b> Warns that an accident may occur if the instructions are not followed that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height, etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment where there is a risk of damaging the product or causing a breakdown.
 xx0900000839	<b>Prohibition</b> Used in combinations with other symbols.

*Continues on next page*

# 1 Safety

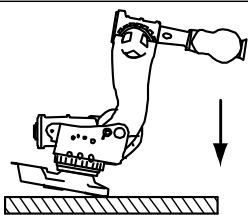

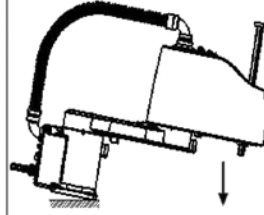

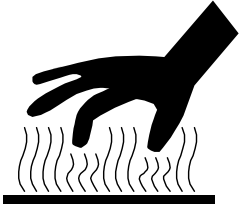
## 1.3.2 Safety symbols on product labels

*Continued*

Symbol	Description
 xx0900000813	<b>See user documentation</b> Read user documentation for details. Which manual to read is defined by the symbol: <ul style="list-style-type: none"><li>• No text: <i>Product manual</i>.</li><li>• EPS: <i>Application manual - Electronic Position Switches</i>.</li></ul>
 xx0900000816	<b>Before dismantling, see product manual</b>
 xx0900000815	<b>Do not dismantle</b> Dismantling this part can cause injury.
 xx0900000814	<b>Extended rotation</b> This axis has extended rotation (working area) compared to standard.
 xx0900000808	<b>Brake release</b> Pressing this button will release the brakes. This means that the robot arm can fall down.

*Continues on next page*

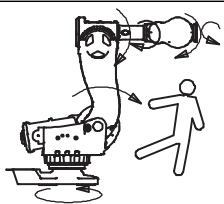
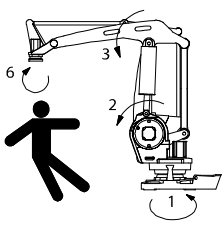
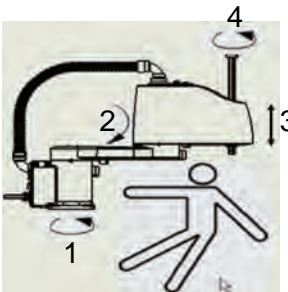





Symbol	Description
 <p>xx0900000810</p>   <p>3HAC 057068-001</p> <p>xx1500002402</p>	<p><b>Tip risk when loosening bolts</b> The robot can tip over if the bolts are not securely fastened.</p>
 <p>xx0900000817</p>	<p><b>Crush</b> Risk of crush injuries.</p>
 <p>xx0900000818</p>	<p><b>Heat</b> Risk of heat that can cause burns.</p>

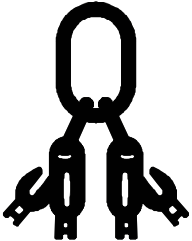





# 1 Safety

## 1.3.2 Safety symbols on product labels

Continued

Symbol	Description
 xx0900000819  xx1000001141  xx1500002616	<b>Moving robot</b> The robot can move unexpectedly.
 xx0900000820  xx1000001140	<b>Brake release buttons</b>
 xx0900000821	<b>Lifting bolt</b>

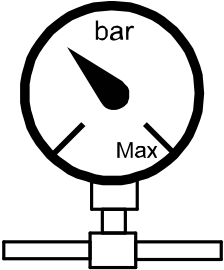
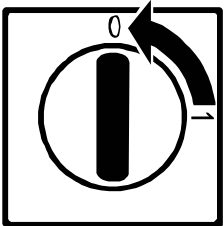

Continues on next page

Symbol	Description
 xx1000001242	Chain sling with shortener
 xx0900000822	Lifting of robot
 xx0900000823	<b>Oil</b> Can be used in combination with prohibition if oil is not allowed.
 xx0900000824	Mechanical stop
 xx1000001144	No mechanical stop
 xx0900000825	<b>Stored energy</b> Warns that this part contains stored energy. Used in combination with <i>Do not dismantle</i> symbol.

# 1 Safety

## 1.3.2 Safety symbols on product labels

Continued

Symbol	Description
 xx0900000826	<b>Pressure</b> Warns that this part is pressurized. Usually contains additional text with the pressure level.
 xx0900000827	<b>Shut off with handle</b> Use the power switch on the controller.
 xx1400002648	<b>Do not step</b> Warns that stepping on these parts can cause damage to the parts.

## 1.4.1 DANGER - Moving robots are potentially lethal!

## 1.4 Safety related instructions

## 1.4.1 DANGER - Moving robots are potentially lethal!

## Description

Any moving robot is a potentially lethal machine.

When running, the robot may perform unexpected and sometimes irrational movements. Moreover, all movements are performed with great force and may seriously injure any personnel and/or damage any piece of equipment located within the working range of the robot.

## Elimination

	Action	Note
1	Before attempting to run the robot, make sure all emergency stop equipment is correctly installed and connected.	Emergency stop equipment such as gates, tread mats, light curtains, etc.
2	Usually the hold-to-run function is active only in manual full speed mode. To increase safety it is also possible to activate hold-to-run for manual reduced speed with a system parameter. The hold-to-run function is used in manual mode, not in automatic mode.	How to use the hold-to-run function is described in section <i>How to use the hold-to-run function</i> in the <i>Operating manual - IRC5 with FlexPendant</i> .
3	Make sure no personnel are present within the working range of the robot before pressing the start button.	

## 1 Safety

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### 1.4.2 DANGER - First test run may cause injury or damage!

### 1.4.2 DANGER - First test run may cause injury or damage!

---

#### Description

Since performing a service activity often requires disassembly of the robot, there are several safety risks to take into consideration before the first test run.

---

#### Elimination

Follow the procedure below when performing the first test run after a service activity, such as repair, installation, or maintenance.

	Action
1	Remove all service tools and foreign objects from the robot and its working area.
2	Verify that the robot is secured to its position, see installation section in the product manual for the robot.
3	Verify that the fixture and work piece are well secured, if applicable.
4	Install all safety equipment properly.
5	Make sure all personnel are standing at a safe distance from the robot, that is out of its reach behind safety fences, and so on.
6	Pay special attention to the function of the part that previously was serviced.

---

#### Collision risks



#### CAUTION

When programming the movements of the robot, always identify potential collision risks before the first test run.

## 1.4.3 WARNING - The brake release buttons may be jammed after service work

## 1.4.3 WARNING - The brake release buttons may be jammed after service work

## Description

The brake release unit has push-buttons for the brake release of each axis motor. When service work is performed inside the SMB recess that includes removal and refitting of the brake release unit, the brake release buttons may be jammed after refitting.

**DANGER**

If the power is turned on while a brake release button is jammed in depressed position, the affected motor brake is released! This may cause serious personal injuries and damage to the robot.

## Elimination

To eliminate the danger after service work has been performed inside the SMB recess, follow the procedure below.

	Action
1	Make sure the power is turned off.
2	Remove the push-button guard, if necessary.
3	Verify that the push-buttons of the brake release unit are working by pressing them down, one by one. Make sure none of the buttons are jammed in the tube.
4	If a button gets jammed in the depressed position, the alignment of the brake release unit must be adjusted so that the buttons can move freely in their tubes!

## 1 Safety

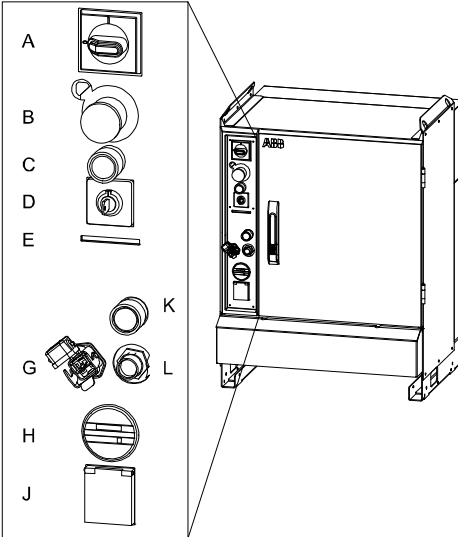
### 1.4.4 DANGER - Make sure that the main power has been switched off!

### 1.4.4 DANGER - Make sure that the main power has been switched off!

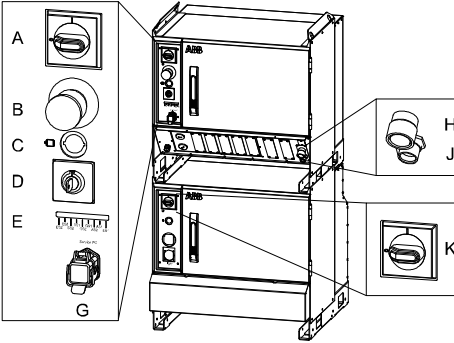
#### Description

Working with high voltage is potentially lethal. Persons subjected to high voltage may suffer cardiac arrest, burn injuries, or other severe injuries. To avoid these dangers, do not proceed working before eliminating the danger as detailed below.

#### Elimination, Single Cabinet Controller

	Action	Note/illustration
1	Switch off the main switch on the controller cabinet.	 <p>xx0600002782</p> <p>A: Main switch</p>

#### Elimination, Dual Cabinet Controller

	Action	Note/illustration
1	Switch off the main switch on the Drive Module.	 <p>xx0600002783</p> <p>K: Main switch, Drive Module</p>
2	Switch off the main switch on the Control Module.	A: Main switch, Control Module



### 1.4.5 WARNING - The unit is sensitive to ESD!

#### Description

ESD (electrostatic discharge) is the transfer of electrical static charge between two bodies at different potentials, either through direct contact or through an induced electrical field. When handling parts or their containers, personnel not grounded may potentially transfer high static charges. This discharge may destroy sensitive electronics.

#### Elimination

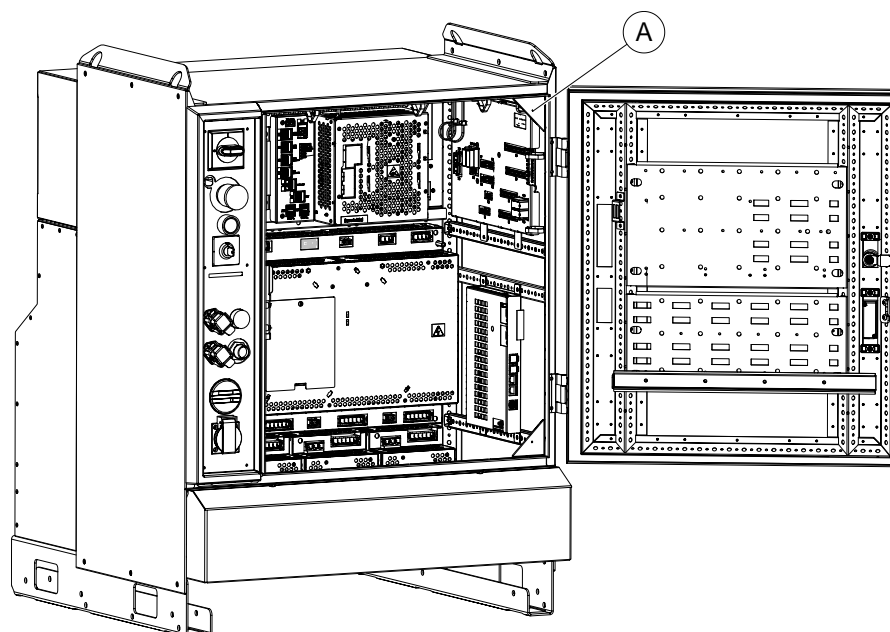
	Action	Note
1	Use a wrist strap	Wrist straps must be tested frequently to ensure that they are not damaged and are operating correctly.
2	Use an ESD protective floor mat.	The mat must be grounded through a current-limiting resistor.
3	Use a dissipative table mat.	The mat should provide a controlled discharge of static voltages and must be grounded.

#### Location of wrist strap button

The location of the wrist strap button is shown in the following illustration.

#### IRC5

The wrist strap button is located in the top right corner.



xx1300000856

A	Wrist strap button
---	--------------------

## 1 Safety

### 1.4.6 WARNING - Safety risks during handling of batteries

### 1.4.6 WARNING - Safety risks during handling of batteries

#### Description

Under normal conditions of use, the electrode materials and liquid electrolyte in the batteries are not exposed to the outside, provided the battery integrity is maintained and seals remain intact.

There is a risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/explosion/fire may follow, depending upon the circumstances.



#### Note

Appropriate disposal regulations must be observed.

#### Elimination

	Action	Note
1	Do not short circuit, recharge, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion.	
2	Use safety glasses when handling the batteries.	
3	In the event of leakage, wear gloves and chemical apron.	
4	In the event of fire, use self-contained breathing apparatus.	

## 1.4.7 WARNING - Safety risks during work with gearbox lubricants (oil or grease)

## 1.4.7 WARNING - Safety risks during work with gearbox lubricants (oil or grease)

## Description

When handling gearbox lubricants, there is a risk of both personal injury and product damage occurring. The following safety information must be regarded before performing any work with lubricants in the gearboxes.

**Note**

When handling oil, grease, or other chemical substances the safety information of the manufacturer must be observed.

**Note**

When aggressive media is handled, an appropriate skin protection must be provided. Gloves and goggles are recommended.




**Note**

Appropriate disposal regulations must be observed.

**Note**

Take special care when handling hot lubricants.

## Warnings and elimination






Warning	Description	Elimination/Action
 xx0100000002 <b>Hot oil or grease</b>	Changing and draining gearbox oil or grease may require handling hot lubricant heated up to 90 °C.	Make sure that protective gear like goggles and gloves are always worn during this activity.
 xx0100000002 <b>Allergic reaction</b>	When working with gearbox lubricant there is a risk of an allergic reaction.	Make sure that protective gear like goggles and gloves are always worn.
 xx0100000002 <b>Possible pressure build-up in gearbox</b>	When opening the oil or grease plug, there may be pressure present in the gearbox, causing lubricant to spray from the opening.	Open the plug carefully and keep away from the opening. Do not overfill the gearbox when filling.

*Continues on next page*

## 1 Safety

### 1.4.7 WARNING - Safety risks during work with gearbox lubricants (oil or grease)

Continued

Warning	Description	Elimination/Action
 xx0100000002 <b>Do not overfill</b>	Overfilling of gearbox lubricant can lead to internal over-pressure inside the gearbox which in turn may: <ul style="list-style-type: none"><li>• damage seals and gaskets</li><li>• completely press out seals and gaskets</li><li>• prevent the robot from moving freely.</li></ul>	Make sure not to overfill the gearbox when filling it with oil or grease! After filling, verify that the level is correct.
 xx0100000002 <b>Do not mix types of oil</b>	Mixing types of oil may cause severe damage to the gearbox.	When filling gearbox oil, do not mix different types of oil unless specified in the instructions. Always use the type of oil specified by the manufacturer!
 xx0100000098 <b>Heat up the oil</b>	Warm oil drains quicker than cold oil.	When changing gearbox oil, first run the robot for a time to heat up the oil.
 xx0100000004 <b>Specified amount depends on drained volume</b>	The specified amount of oil or grease is based on the total volume of the gearbox. When changing the lubricant, the amount refilled may differ from the specified amount, depending on how much has previously been drained from the gearbox.	After filling, verify that the level is correct.
 xx0100000003 <b>Contaminated oil in gear boxes</b>	When draining the oil make sure that as much oil as possible is drained from the gearbox. The reason for this is to drain as much oil sludge and metal chips as possible from the gearbox. The magnetic oil plugs will take care of any remaining metal chips.	

## 2 Installation

### 2.1 Introduction

---

**General**

This chapter presents general information, complementing the more specific information in the following chapters.

---

**Sections**

The installation chapter is divided in the following sections:

- Fitting DressPack cable package attachments
- Fitting DressPack cable packages
- DressPack floor cable
- IRC5 spot welding cabinet.

## 2 Installation

---

### 2.2.1 Overview

## 2.2 DressPack cable package

### 2.2.1 Overview

---

#### General

Installing, programming and operating the ABB DressPack/SpotPack product program may be a complex task as each application instance is very specific. The product is designed to fit a wide variety of applications, and must be adapted to each in order to maximize life and function.

The generic installation procedure is described below.

---

#### Limitation of robot movement due to DressPack

When using DressPack upper arm the movements of the robot will be limited. The position of process cable support axis 6 is important to take in consideration when optimizing the possible movements of the robot.



#### Note

Maximum movement of axis 5 is  $\pm 110^\circ$ .  
For more information, please contact local ABB.

---

#### Effects on armload and performance



#### Note

The extra weight of the DressPack/SpotPack products will affect the armload data and the performance of the robot. The effect differs depending on which type of DressPack/SpotPack product. See [DressPack - arm load parameters and LoadId on page 77](#)

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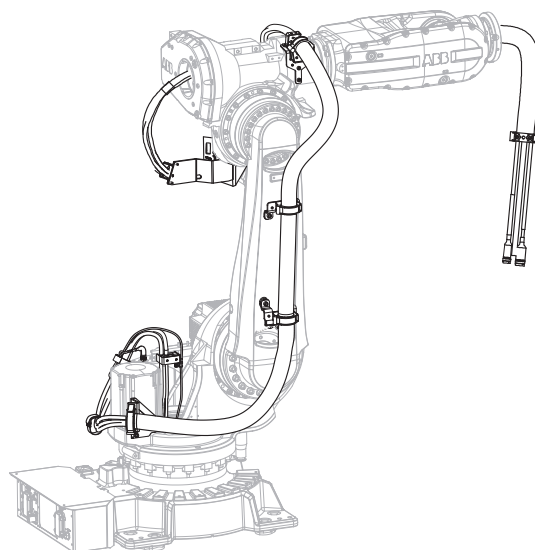
#### Installation activities

##### General

This procedure describes the main activities of fitting the cable package attachments and mounting of the cable packages.

#### Location

The figure shows the cable package IRBDP MH LE and IRBDP MH3 UE.



xx0700000617

#### Procedures, DressPack cable packages with division point

The following procedures are valid for DressPack cable packages *with* division point.

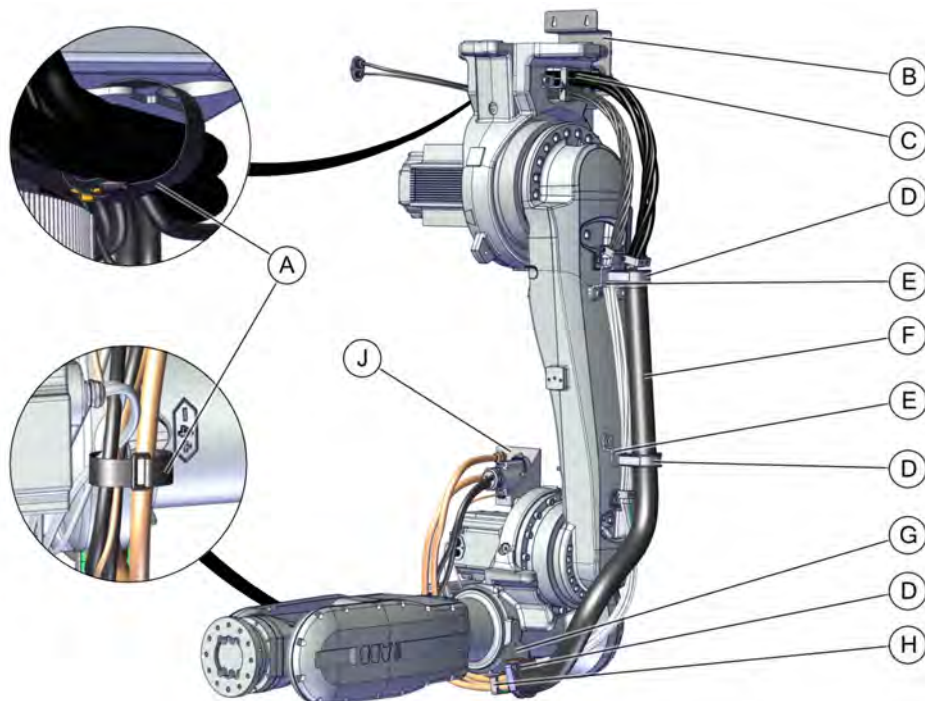
	For information about:	See
1	Fitting the lower arm cable package IRBDP MH3 LE.	See <a href="#">Fitting the lower arm cable package - IRBDP MH 3 LE on page 56</a> .
2	Fitting the upper arm cable package IRBDP MH3 UE.	See <a href="#">Fitting the upper arm cable package - IRBDP MH 3 UE on page 66</a> .
3	Inspect the lower arm equipment after installation.	See <a href="#">Inspection, DressPack lower arm on page 71</a>
4	Inspect the upper arm equipment after installation.	See <a href="#">Inspection, DressPack upper arm on page 72</a>
5	Inspection of the DressPack equipment during programming.	See <a href="#">Inspection during programming and test-running on page 76</a>
6	Adjustment of the upper arm cable package.	See <a href="#">DressPack adjustments on page 74</a>

## 2 Installation

### 2.2.2 Fitting the lower arm cable package - IRBDP MH 3 LE

### 2.2.2 Fitting the lower arm cable package - IRBDP MH 3 LE

#### Location of the lower arm cable package - IRBDP MH 3 LE



xx1500003193

A	Strap velcro (2 pcs)
B	Customer plate
C	Metal clamp with rubber clamp
D	Gripping clamp (3 pcs)
E	Bracket lower arm
F	Protection hose (Cable package)
G	Bracket for clamp (on upper arm)
H	Metal clamp with rubber clamp
J	Connection plate axis 3

#### Required equipment

The following equipment is required for fitting the cable package IRBDP MH 3 LE.

Equipment	Article number	Note
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/Spot-Pack</a> on page 111.

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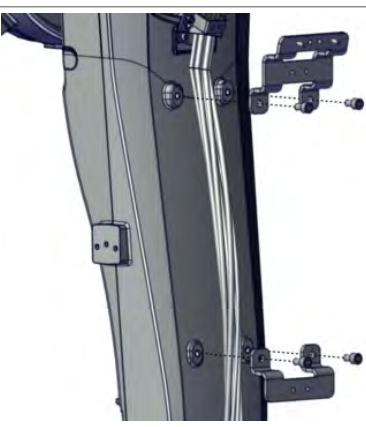
#### Required consumable

Equipment	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking screws.

#### Fitting of the lower arm cable package IRBDP MH3 LE

This procedure describes how to fit the cable package IRBDP MH 3 LE.

All screws are supplied with the kit.

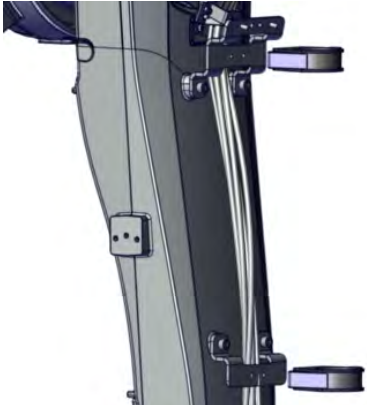
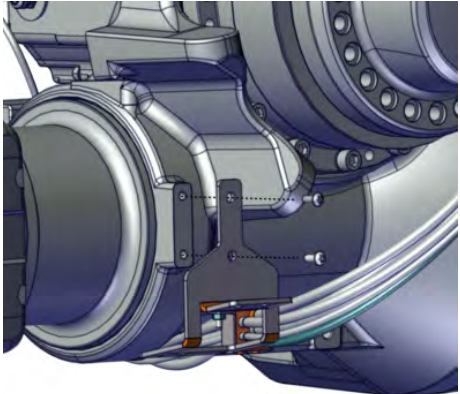
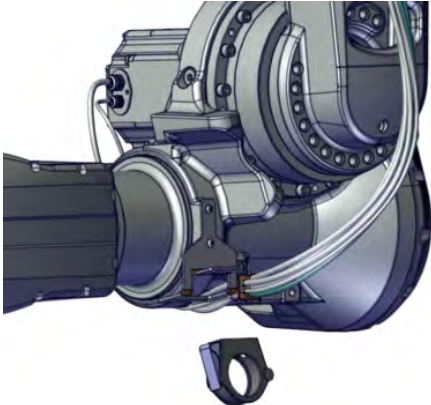
	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic pressure supply</li> <li>• air pressure supply</li> </ul> to the robot, before entering the robot working area.	
2	 <b>CAUTION</b> The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
3	Fit cable brackets on the lower arm. Lock screws with locking liquid (Loctite 243).	 xx1500003194 <b>Screw: M10 (4 pcs)</b>

*Continues on next page*

## 2 Installation

### 2.2.2 Fitting the lower arm cable package - IRBDP MH 3 LE

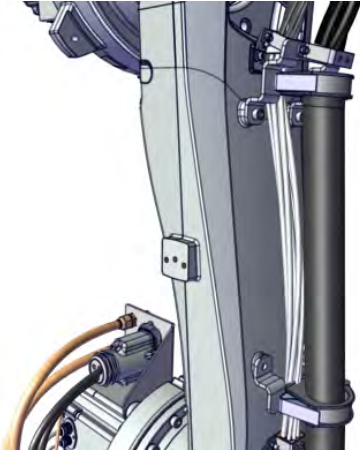
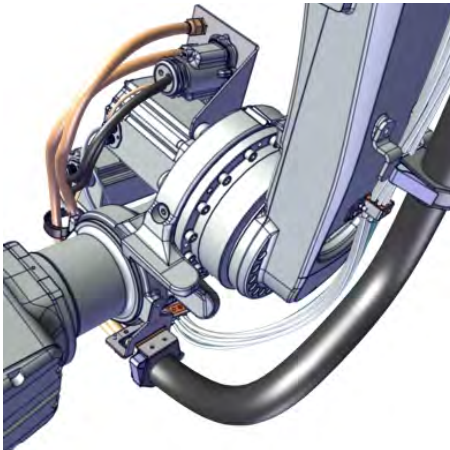
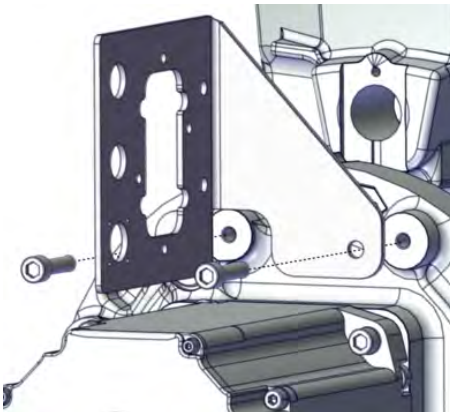
*Continued*

	Action	Note
4	Fit gripping clamps. Lock screws with locking liquid (Loctite 243).	  xx1500003195 <b>Screw: M8 (4 pcs)</b>
5	Fit cable bracket to the upper arm. Lock screws with locking liquid (Loctite 243).	  xx1500003196 <b>Screw: M8 (2 pcs)</b>
6	Fit gripping clamp to the cable bracket. Lock screws with locking liquid (Loctite 243).	  xx1500003197 <b>Screw: M8 (2 pcs)</b>

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### 2.2.2 Fitting the lower arm cable package - IRBDP MH 3 LE

*Continued*

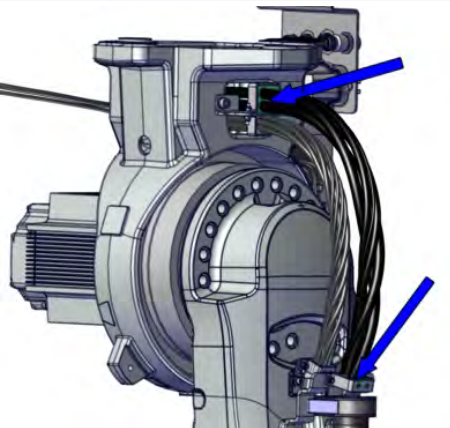
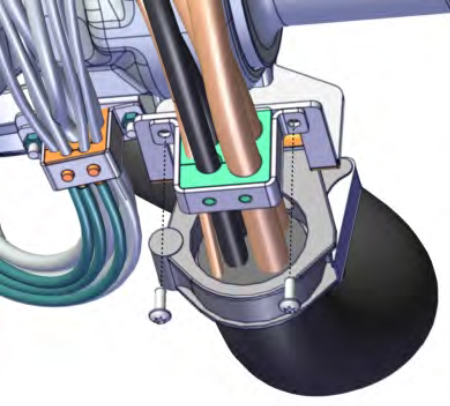
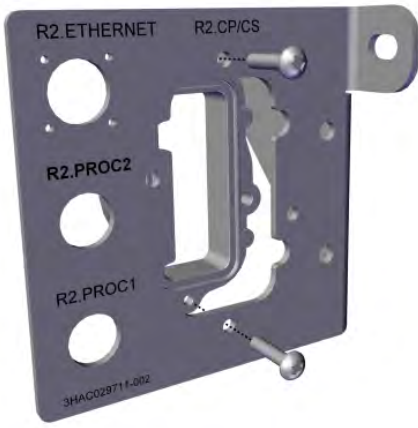
	Action	Note
7	Secure the cable package to the upper and lower gripping clamps on the lower arm.	 <p>xx1500003198</p>
8	Secure the cable package to the gripping clamp on the upper arm.	 <p>xx1500003199</p>
9	Fit the connector plate axis 3 to the arm house. Lock screws with locking liquid (Loctite 243).	 <p>xx1500003200</p> <p>Screw: M8 (2 pcs)</p>

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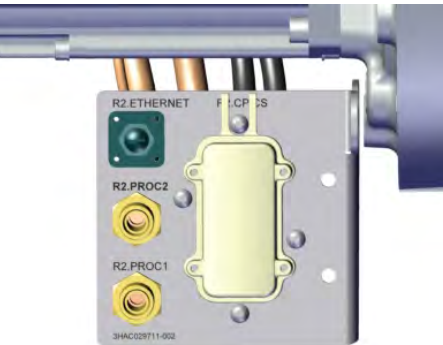
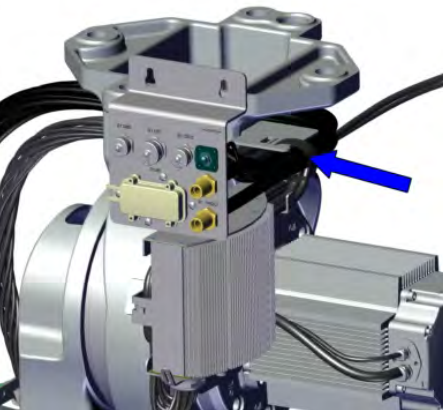


## 2 Installation

### 2.2.2 Fitting the lower arm cable package - IRBDP MH 3 LE

*Continued*

	Action	Note
10	Route the cables through the frame and secure the two metal clamps.	 xx1500003201 Nut: M6-lock nut (2 pcs)
11	Secure the metal clamp to the cable bracket on the upper arm. Lock screws with locking liquid (Loctite 243).	 xx1500003204 Screw: M6 (2 pcs)
12	Fit the adapter complete to the connector plate axis 3.	 xx1500003205 Screw: M6 (2 pcs)

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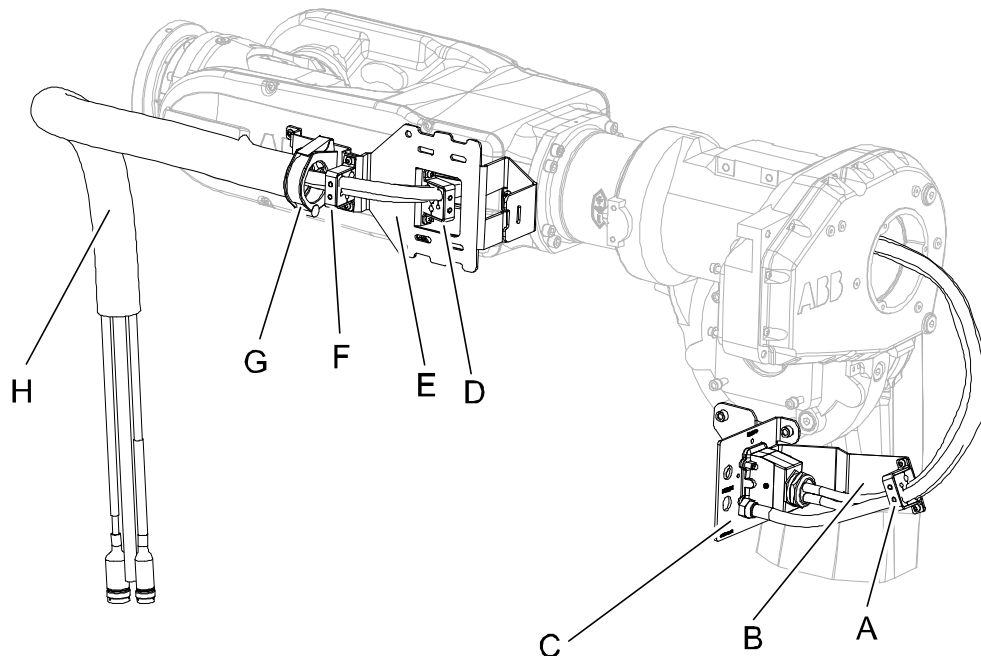
	Action	Note
13	<p>Fit the connectors and process couplings to the connector plate axis 3.</p> <p> <b>CAUTION</b></p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Tightening torque, brass couplings 1/2": 31 Nm</p> <p>Tightening torque, brass couplings 3/8": 17 Nm</p>  <p>xx1500003203</p>
14	<p>Secure the cables and hose to the cable fixing bracket with a velcro strap.</p>	 <p>xx1500003206</p>
15	<p>Connect all connectors and process couplings to the connection plate.</p> <p> <b>CAUTION</b></p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Tightening torque, brass couplings 1/2": 31 Nm</p> <p>Tightening torque, brass couplings 3/8": 17 Nm</p>  <p>xx1500003207</p>

## 2 Installation

### 2.2.3 Fitting the attachments of the upper arm cable package - IRBDP MH 3 UE

### 2.2.3 Fitting the attachments of the upper arm cable package - IRBDP MH 3 UE

#### Location of cable package attachments - IRBDP MH 3 UE



xx0700000580

A	Metal clamp with rubber clamp
B	Bracket for metal clamp
C	Connection plate ax 3 (delivered with cable package IRBDP MH 3 LE)
D	Metal clamp with rubber clamp (right)
E	Bracket at wrist
F	Metal clamp with rubber clamp (left)
G	Gripping clamp with clamp half
H	Protection hose

#### Required equipment

Equipment	Article number	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/SpotPack on page 111</a> .


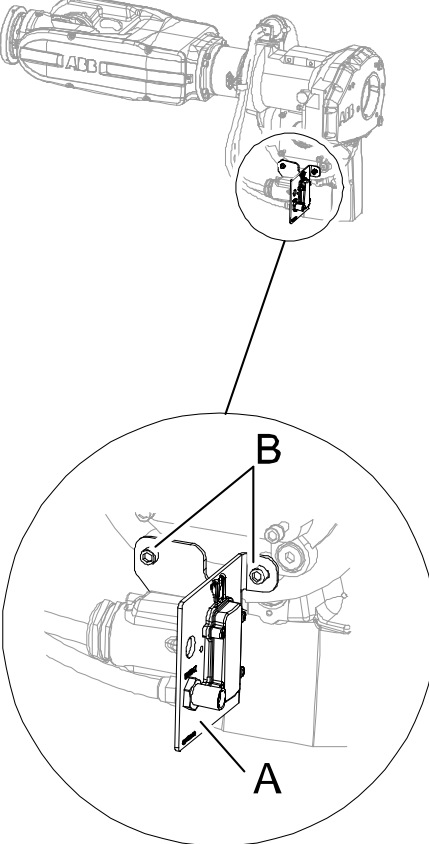
#### Required consumables

Equipment	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking screws.

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## Fitting of the attachments

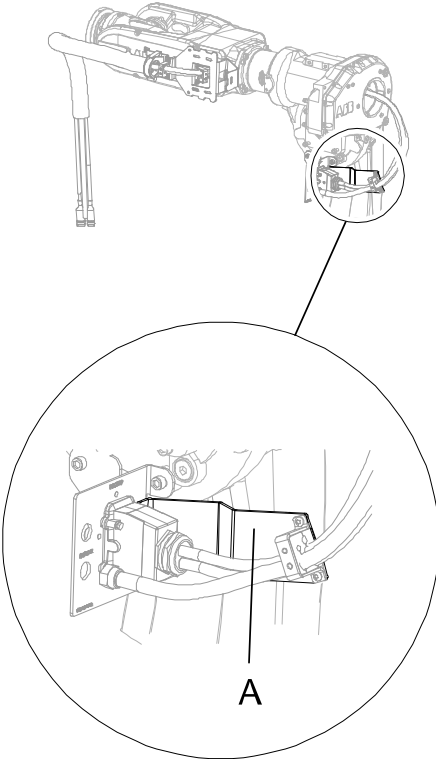
	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic pressure supply</li> <li>• air pressure supply</li> </ul> to the robot, before entering the robot working area.	
2	Fit the connection plate to axis 3 with its attachment screws. Lock screws with locking liquid (Loctite 243).	 <p>xx0700000588</p> <p><b>Parts:</b></p> <ul style="list-style-type: none"> <li>• A: Connection plate</li> <li>• B: Screws, M10x16 8.8-A3F (2 pcs)</li> </ul>

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## 2 Installation

### 2.2.3 Fitting the attachments of the upper arm cable package - IRBDP MH 3 UE

*Continued*

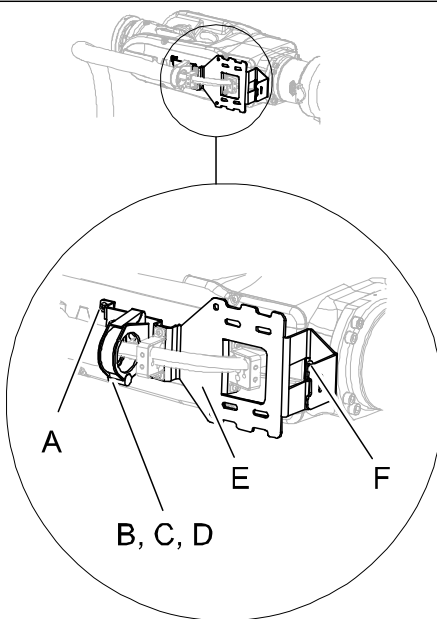
	Action	Note
3	Fit the bracket for metal clamp to the connection plate with its attachment screws.	 <p data-bbox="963 1077 1066 1095">xx0700000592</p> <p data-bbox="963 1115 1027 1137"><b>Parts:</b></p> <ul data-bbox="995 1144 1374 1236" style="list-style-type: none"><li>• A: Bracket for metal clamp</li><li>• Screw, M8x25, 8.8-A2F (2 pcs)</li><li>• Nut, M8 (2 pcs)</li></ul>

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### 2.2.3 Fitting the attachments of the upper arm cable package - IRBDP MH 3 UE

*Continued*

	Action	Note
4	Fit bracket at wrist with its attachment screws. Lock screws with locking liquid (Loctite 243).	 <p>xx0700000594</p> <p><b>Parts:</b></p> <ul style="list-style-type: none"> <li>• A: Screw, M6x16 8.8-A2F (2 pcs)</li> <li>• B: Gripping clamp</li> <li>• C: Screw, M8x16 8.8-A2F (2 pcs)</li> <li>• D: Washer 2 holes</li> <li>• E: Bracket at wrist</li> <li>• F: Screws, M6x12 8.8-A2F (2 pcs)</li> </ul>
5	Fit the gripping clamp on the bracket with its attachment screws and the washer 2 holes. Lock screws with locking liquid (Loctite 243).	

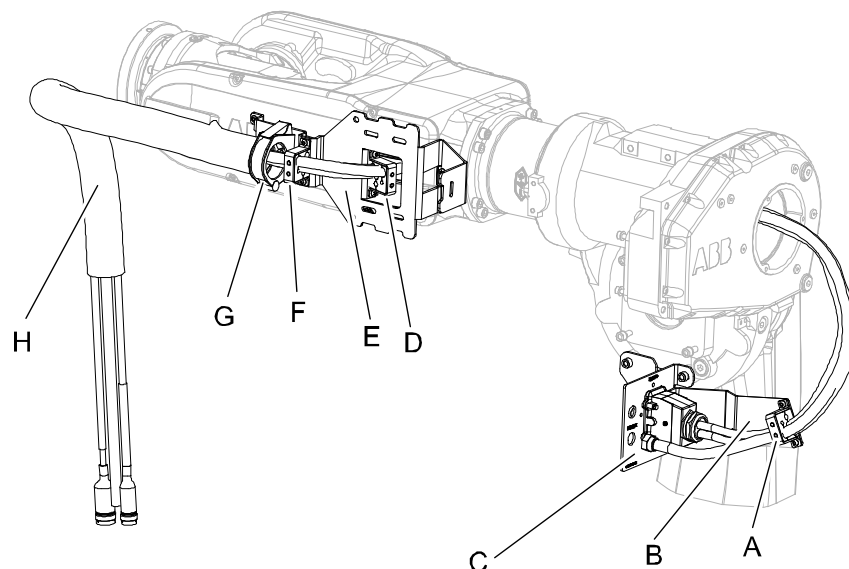
## 2 Installation

### 2.2.4 Fitting the upper arm cable package - IRBDP MH 3 UE

### 2.2.4 Fitting the upper arm cable package - IRBDP MH 3 UE

#### Location of upper arm cable package - IRBDP MH 3 UE

The location of the cable package IRBDP MH 3 UE, is shown in the figure below.



xx0700000580

A	Metal clamp with rubber clamp
B	Bracket for metal clamp
C	Connection plate ax 3 (delivered with cable package IRBDP MH 3 LE)
D	Metal clamp with rubber clamp (right)
E	Bracket at wrist
F	Metal clamp with rubber clamp (left)
G	Gripping clamp & clamp half
H	Protection hose

#### Required equipment

The following equipment is required for fitting the cable package IRBDP MH 3 UE.

Equipment	Article number	Note
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/SpotPack on page 111</a> .




#### Required consumable

Equipment	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking screws.

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## Fitting of the upper arm cable package IRBDP MH3 UE

This procedure describes how to fit the cable package IRBDP MH 3 UE.



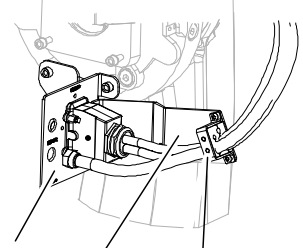
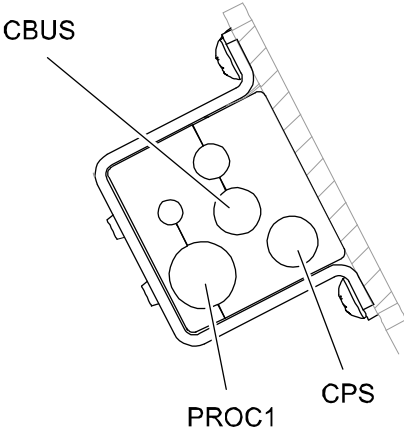
	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic pressure supply</li> <li>• air pressure supply</li> </ul> to the robot, before entering the robot working area.	
2	 <b>CAUTION</b> The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
3	Push the customer signal and power cables as well as air hose into the upper arm tube from the rear and pull it out of the hole on the side of the wrist where the bracket at wrist is placed. Arrange cables and hose so no cables or hoses are twisted.   <b>Note</b> Be careful not to damage the motor cables!	See figure <a href="#">Location of upper arm cable package - IRBDP MH 3 UE on page 66</a> .

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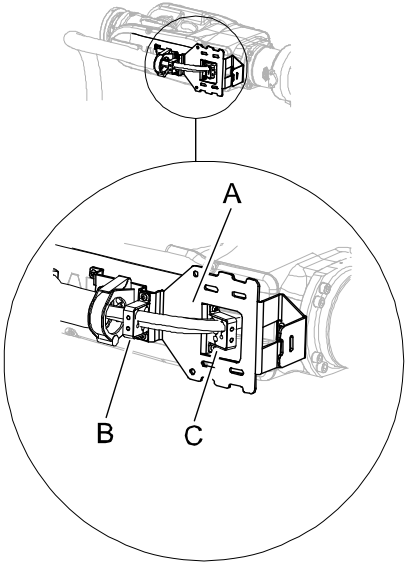
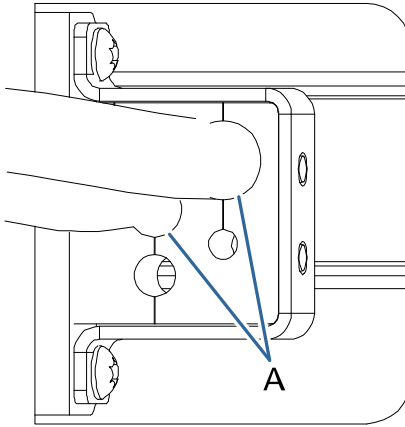
## 2 Installation

### 2.2.4 Fitting the upper arm cable package - IRBDP MH 3 UE

*Continued*

	Action	Note
4	Connect cables and hose of the cable package to the connection plate.	Tightening torque, brass couplings 1/2": 31 Nm
5	<p>Fit the metal clamp with rubber clamp with its attachment screws.</p> <p>Lock screws with locking liquid (Loctite 243).</p> <p> <b>CAUTION</b></p> <p>Do not tighten the brass couplings for water and air with excessive force.</p> <p> <b>Note</b></p> <p>Place cables and hose in the correct position! See figure!</p>	<p>Tightening torque, brass couplings 3/8": 17 Nm</p>  <p>A B C, D</p> <p>xx0700000605</p> <p><b>Parts:</b></p> <ul style="list-style-type: none"> <li>• A: Connection plate</li> <li>• B: Bracket for metal clamp</li> <li>• C: Metal clamp with rubber clamp</li> <li>• D: Screws, M6x16, 8.8-A2F (2 pcs)</li> </ul>  <p>CBUS</p> <p>PROC1 CPS</p> <p>xx0700000369</p>

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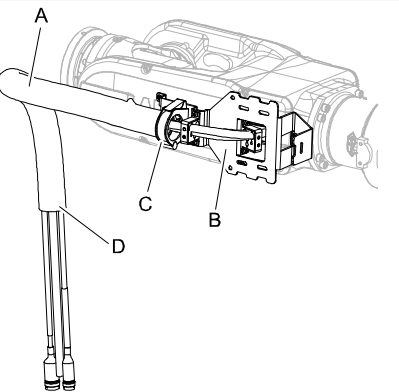

Action	Note
<div>6</div> <div>Fit the cables and hose to the bracket at wrist with the metal clamp with rubber clamp (right). Lock screws with locking liquid (Loctite 243).</div> <div><div></div><div>Note</div><div>The <i>green color markings</i> on the cables shall be visible just outside of the right metal clamp with rubber clamp.</div></div>	<div></div> <div>xx0700000606</div> <div>Parts:</div> <div><ul style="list-style-type: none"><li>A: Bracket at wrist</li><li>B: Metal clamp with rubber clamp (left)</li><li>C: Metal clamp with rubber clamp (right)</li></ul></div> <div></div> <div>xx0700000607</div> <div><ul style="list-style-type: none"><li>A: Green color markings</li></ul></div>

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## 2 Installation

### 2.2.4 Fitting the upper arm cable package - IRBDP MH 3 UE

Continued

	Action	Note
7	<p>Put the protection hose in the gripping clamp, on the bracket at wrist.</p> <p>If needed, cut the protection hose to desired length.</p>	 <p>xx0700000609</p> <p>Parts:</p> <ul style="list-style-type: none"> <li>• A: Protection hose</li> <li>• B: Bracket at wrist</li> <li>• C: Gripping clamp with clamp halves</li> <li>• D: Place for gripping clamp at tool</li> </ul>
8	<p>Push the cables and hose through the protection hose.</p>	
9	<p>Pull the cables and hose back so the desired free length out of the protection hose is achieved.</p>	
10	<p>Fit the cables and hose to the bracket at wrist with the metal clamp with rubber clamp (left). Lock screws with locking liquid (Loctite 243).</p>	<p>See figure above.</p>
11	<p> <b>Note</b></p> <p>When delivered there are no adjustments made to the final location of air hose and cables. Air hose and cables are pulled out completely through the protection hose. The whole package is then wrapped around the arm when delivered.</p> <p>How to adjust the cable package IRBDP MH 3 UE is detailed in section <a href="#">Adjustments of the cable package - IRBDP MH3 UE on page 74</a>.</p>	
12	<p>Fit a gripping clamp at the other end of the protection hose.</p> <p>The protection hose is to be fitted on the tool with this gripping clamp with clamp halves.</p>	<p>See position in figure above.</p>


## 2.2.5 Inspection, DressPack lower arm

### General

In order to ensure adequate life of the equipment, it is vital that the cables and hoses are properly installed and operated correctly, with their movement patterns well within the acceptable limits.

This procedure describes how to inspect the DressPack lower arm installation in this regard.

### Procedure, process cable package

	Action	Note
1	<p><i>Do not bend</i> any cable or hose excessively!</p>  <b>Note</b> Make sure no cables or hoses are twisted.	Minimum bending radius is approximately 10x the cable or hose diameter.
2	Make sure all cables straps are tight enough to prevent the cable package from moving in any undesired way.	
3	Make sure the cable package is properly connected at the connection plate as well as at the robot base.	
4	Make sure no hoses or cables, or parts thereof, touch any part of the robot structure in a way that may cause wear.	
5	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.	
6	Make sure that cables, hoses or packages do not rub against <i>any sharp corner of something</i> (not just the robot itself)!	
7	Make sure all connection points are well tightened and sealed in order to avoid leaks.	

### Procedure, attachments and brackets

	Action	Note
1	Make sure that all cable clamps securing the process cable package and protective hose are tightened correctly.	Tightening torques are specified: <ul style="list-style-type: none"> <li>• For <i>standard tightening torques</i> - See tightening torque table in chapter References.</li> <li>• For <i>non standard tightening torques</i> see chapter <i>Installation</i>.</li> </ul>

## 2 Installation

### 2.2.6 Inspection, DressPack upper arm

### 2.2.6 Inspection, DressPack upper arm

#### General

In order to ensure adequate life of the equipment, it is vital that the cables and hoses are properly installed and operated correctly, with their movement patterns well within the acceptable limits.

This procedure describes how to inspect the DressPack upper arm installation in this regard.

#### Procedure, general

	Action	Note
1	Inspect all attachments, brackets and any other hardware securing or guiding the protective hose.	
2	Inspect the process cable package.	Detailed in section <a href="#">Cables and hoses on page 72</a> .
3	Make sure all cables and hoses are securely fixed and connected.	Detailed in section <a href="#">Securing and connecting on page 73</a> .

#### Cables and hoses

The procedure below details each inspection to be carried out, not necessarily in any particular order if not so stated.


	Action	Note
1	<i>Do not bend</i> any cable or hose excessively.	Minimum bending radius is approximately 10 x the cable or hose diameter.
2	Make sure no cables or hoses are twisted.	
3	Make sure that cables are clamped with straps in a way that there is no movement at connectors.	Use only wide straps or velcro straps in order not to damage the cables and hoses.
4	Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure in a way that may cause wear.	
5	Make sure that no hoses or cables, or parts thereof, touch any part of the <i>surrounding equipment</i> in a way that may cause wear.	
6	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.	
7	Make sure cable loops are not allowed to swing as the robot runs.	

*Continues on next page*



**Securing and connecting**

The procedure below details each inspection to be carried out, not necessarily in any particular order unless stated.

	Action	Note
1	Make sure that all cable clamps securing the process cable package and protective hose are tightened correctly.	Tightening torques are specified: <ul style="list-style-type: none"> <li>• For <b>standard tightening torques</b> - See tightening torque table in chapter References.</li> <li>• For <i>non standard tightening torques</i> - See Installation chapter.</li> </ul>
2	Make sure all cable straps are tight enough to prevent the cable package from moving in any undesired way.   <b>Note</b>  The cable straps/ties should not be too narrow. It may damage the cables/hoses.	
3	When securing cables and hoses with cable ties: <i>never</i> overtighten the ties! This may damage the equipment.	
4	Make sure that the cable package have been properly connected at the base as well as at the tool on the robot turning disk.	
5	Make sure all connection points are well tightened and sealed in order to avoid leaks.	
6	Make sure the weight of the cable package is secured to the tool in order to avoid straining the connectors!	

## 2 Installation

### 2.3.1 Adjustments of the cable package - IRBDP MH3 UE

## 2.3 DressPack adjustments

### 2.3.1 Adjustments of the cable package - IRBDP MH3 UE

#### Overview



The procedure below details how to adjust the routing of the upper arm cable package -IRBDP MH3 UE, in order to avoid reducing its life.

#### Hoses and cables too long around the wrist

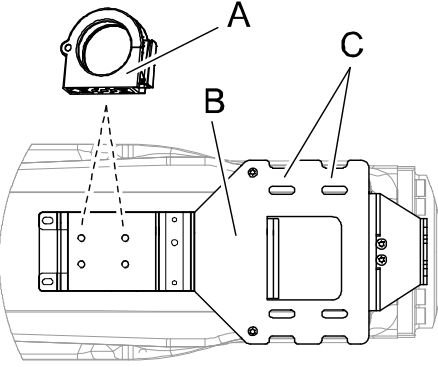
Depending on robot version and gripper design, the length of the protection hose, air hose and/or cables may need to be adjusted. Protection hose and air hose can be cut to the desired length.

It is possible to fit the protection hose in different positions, depending on where the gripping clamp is fitted on the bracket. There are more than one position to fit the gripping clamp.

The procedure below details how to fit gripping clamp and protection hose in the different positions.

	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"><li>• electric power supply</li><li>• hydraulic pressure supply</li><li>• air pressure supply</li></ul> to the robot, before entering the robot working area.	
2	 <b>CAUTION</b> The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	

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	Action	Note
3	Fit the <i>gripping clamp</i> in the best suitable position on the <i>bracket</i> . Choose one of the positions shown in the figure.	 <p>xx0700000611</p> <p><b>Parts:</b></p> <ul style="list-style-type: none"> <li>• A: Gripping clamp</li> <li>• B: Bracket at wrist</li> <li>• C: Position for straps</li> </ul>
4	If the cables are too long it is possible to pull them back out of the protection hose and then put them in a loop. Fit the cables with the enclosed <i>straps</i> on the bracket.	Shown in the figure above.

## 2 Installation

### 2.3.2 Inspection during programming and test-running

### 2.3.2 Inspection during programming and test-running

#### General

In order to ensure adequate life of the equipment, it is vital that the cables and hoses are properly installed and operated correctly, with their movement patterns well within the acceptable limits.

#### Checking the cable package at the upper end

This procedure describes how to inspect the DressPack upper end installation during programming and test-running the complete installation the very first times.

#### IRBDP MH3 LE & IRBDP MH3 UE

	Action	Note
1	Inspect the DressPack upper arm installation before programming and test-running.	See section <a href="#">Inspection, DressPack upper arm on page 72</a> .
2	Make a check of the operating cycle of the robot, to make sure that the movement pattern of the wrist does not cause extensive wear or strain of the cable package.	If required, re-program the robot movement pattern.
3	Make sure that the upper arm protective hose does not get flattened during rotating upper arm movements.	Flattening indicates an overstressed hose and increases the risk of damaging the DressPack upper arm.
4	If any of the actions recommended above, causes a change of the DressPack installation, it must be reinspected.	See section <a href="#">Inspection, DressPack upper arm on page 72</a> .
5	Make sure that no parts of the DressPack are in contact with the surroundings.	
6	<b>(Only applicable if process cable support axis 6 is used!)</b> Make sure no combined rotating movements of axes 5 and 6 causes collisions between the cables/hoses or the process cable support axis 6, and the upper arm. Such movements may also cause excessive cable/hose bending.	Collisions and excessive bending will increase the risk of damaging the equipment. Minimum bending radius: 10x cable/hose diameter.

#### Checking the DressPack at the lower

This instruction describes how to inspect the DressPack lower end installation during programming and test-running the complete installation the very first times.

	Action	Note
1	Inspect the DressPack at the lower arm installation before programming and test-running.	See section <a href="#">Inspection, DressPack lower arm on page 71</a>
2	Check the operating cycle of the robot, to make sure the movement pattern of the robot does not cause extensive wear or straining on the cable package.	If required, re-program the robot movement pattern!
3	If any of the actions recommended above, causes changes of the DressPack installation, it must be reinspected.	See section <a href="#">Inspection, DressPack lower arm on page 71</a>

## 2.4 DressPack Armload parameters

### DressPack - arm load parameters and LoadId

#### General

A DressPack is adding load to the robot. If the arm and tool loads are not stated correctly, this will affect the behavior and the wear of the robot.



#### Note

The extra weight of the DressPack products will affect the arm load data and the performance of the robot! The effect differs depending on which type of DressPack product.

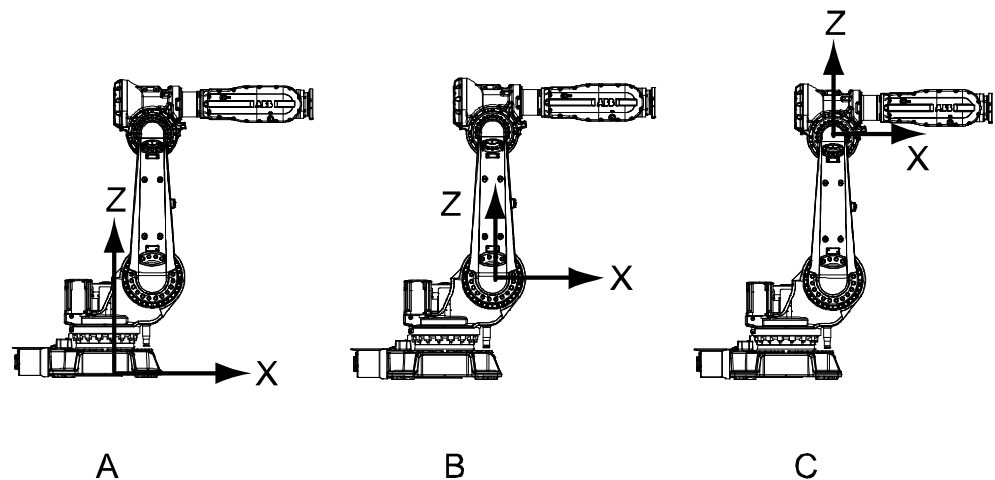


#### Note

The "Add to tool data" shall only be used when stating the effect of the DressPack on tool load manually.

#### Coordinate system definitions

Coordinate system definitions when defining arm loads.



xx0600003186

A	Frame - axis 1
B	Lower arm - axis 2 (Z is in the lower arm direction)
C	Upper arm - axis 3 (X is in the upper arm direction)

#### DressPack for Material handling

The following table details values for DressPack - Material handling.

Frame axis 1	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6620LX	3.6	-0.145	0.000	0.218

*Continues on next page*

## 2 Installation

### 2.4 DressPack Armload parameters

*Continued*

Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6620LX	2.1	-0.023	0.020	0.030

Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6620LX	30.6	0.000	0.000	0.000

If Tool load is entered manually the following mass shall be added to tooldata **tload**.

Add to tool data	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6620LX	4.9	-0.191	0	0

#### Procedures Step 1 - Arm load data

How to define the *Arm load* data is described in *Operating manual - IRC5 with FlexPendant* section *Configuring system parameters*.

All system parameters are described in *Technical reference manual - System parameters*.

Define the arm loads, typically:

- load:\_1
- load:\_2
- load:\_3

The used arm load is defined for each arm, irb\_1, irb\_2, and irb\_3.

#### Procedures Step 2 - Load Identification

It is recommended to use the service routine *Load Identification* (LoadID) to define the load data for an individual robot, as this method not only measures the mass but also the inertia of the tool.

Detailed in *Operating manual - IRC5 with FlexPendant*.

	Action	Note
1	Check if the cable package prevents movements.	If the cable package prevent the motions.
2	If not: Run <i>Load Identification</i> .	The DressPack forces on the wrist will "increase" the load parameters, but this is anyhow a good approximation of the actual load case to be considered by the motion planning functions of the robot.
3	If the cable package prevent the motions: Remove the cable package.	
4	Make the Load Identification.	
5	Refit the cable package.	
6	Add the DressPack load manually.	See <a href="#">Procedures Step 1 - Arm load data on page 78</a> .

## 2.5 DressPack floor

### 2.5.1 Installation of DressPack floor

#### Configuration and connections of DressPack floor

The DressPack floor is made up of several components. Some of these components are specific to DressPack / SpotPack application, while others are used also in other applications.

The configuration of the components differs between different application types.

#### Types of application

Some typical applications are specified below:

Type of application	Description	Example of included components
H		Robot, single cabinet controller
S	Pneumatic gun	Robot, single cabinet controller, water and air unit
HS	Material handling and pneumatic gun	Robot, single cabinet controller, spot welding cabinet, water and air unit, pedestal gun
Se	Servo gun	Robot, single cabinet controller, spot welding cabinet, water and air unit
HSe	Material handling and servo gun	Robot, single cabinet controller, spot welding cabinet, water and air unit, pedestal gun

#### Connection points

The cables and connections points between the components are all detailed and illustrated in the circuit diagram for the current application. See references to the circuit diagrams in [Reference documents on page 79](#).

#### Required equipment

Equipment, etc.	Article number	Note
DressPack floor	For spare part number see chapter: <ul style="list-style-type: none"> <li><a href="#">Spare parts on page 113</a>.</li> </ul>	A number of versions are available.
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/SpotPack on page 111</a> .

#### Reference documents

Document	Document number	Note
<i>Circuit diagram - DressPack 6620</i>	3HAC026136-001	

*Continues on next page*



## 2 Installation

### 2.5.1 Installation of DressPack floor

*Continued*

#### Installation

The procedure below details how to install the DressPack floor. Also refer to the current circuit diagram according to [Reference documents on page 79](#) and the [Spare parts on page 113](#) chapter.

	Action	Note
1	 <b>DANGER</b>  Turn off all: <ul style="list-style-type: none"><li>• electric power supply</li><li>• hydraulic power supply</li><li>• air pressure supply</li></ul> to the robot, before entering the robot working area.	
2	 <b>CAUTION</b>  The cable package is sensitive to mechanical damage. Handle it with care in order to avoid damaging the cabling or the connectors.	
3	Determine which type of installation is to be done. Study the circuit diagram to decide which cables to connect.	The different types are shown in section <a href="#">Configuration and connections of DressPack floor on page 79</a> .
4	Whenever possible, run all cables/hoses in cable ducts or trenches. Make sure these meet the required standards.	Make sure: <ul style="list-style-type: none"><li>• no floor weld cable is routed along signal cabling to minimize the risk of interference.</li><li>• the duct/trench floor is free from sand and other contamination. This is to reduce the risk of damaging the cable insulation.</li><li>• no cables or hoses rub against any sharp corners which might damage them.</li></ul>
5	Do not bend or twist any cable or hose excessively.	Minimum bending radius is approximately 10x the cable or hose diameter.
6	Make sure all cable straps are tight enough to prevent the cable package from moving in any undesired way.	
7	Remember that switching the weld power as well as the water ON and OFF may cause the cables/hoses to move slightly. They may require additional clamping to avoid damage caused by these movements.	
8	Select which CP/CS cabling (customer power/customer signals) to be used.	Some versions include industrial buses. See circuit diagram and the <a href="#">Spare parts on page 113</a> chapter.
9	Connect the CP/CS cable to the manipulator and controller cabinet connectors.	See circuit diagram and the <a href="#">Spare parts on page 113</a> chapter.

*Continues on next page*



	Action	Note
10	If used, connect the split box cable to the water and air unit on the robot and to the spot welding cabinet (if no PROFINET is available) or to the single cabinet controller (if PROFINET is available) <i>connectors</i> .	See circuit diagram and the <a href="#">Spare parts on page 113</a> chapter.
11	If used, connect the stationary/pedestal gun process cable to the stationary/pedestal gun connectors and to the spot welding cabinet (if no PROFINET is available) or to the single cabinet controller (if PROFINET is available).	A stationary/pedestal gun is optional. See circuit diagram and the <a href="#">Spare parts on page 113</a> chapter.
12	If used, connect the weld power cable to the spot welding cabinet and to the robot or the stationary/pedestal gun (depending on if it is variant <i>Se</i> or <i>HSe</i> ).	See circuit diagram and the <a href="#">Spare parts on page 113</a> chapter.
13	If used, connect the resolver cable to the robot base and to the stationary/pedestal gun.	See circuit diagram and the <a href="#">Spare parts on page 113</a> chapter.

## 2 Installation

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### 2.5.2 Inspection, DressPack floor

### 2.5.2 Inspection, DressPack floor

---

#### General

In order to ensure adequate life of the equipment, it is vital that the cables and hoses are properly installed and operated correctly, with their movement patterns well within the acceptable limits.

This instruction details how to inspect the DressPack floor installation in this regard.

---

#### Procedure, process cable package

This section details each inspection to be carried out, not necessarily in any particular order unless stated.

	Action	Note
1	Make sure that the cable package is properly connected at the robot base as well as at the other end.	
2	Make sure that no hoses or cables, or parts thereof, are routed in such a way that they are subjected to wear, for example hoses being run over by fork lifts etc.	
3	Make sure that no cables or hoses rub against any sharp corners which might damage them.	
4	Make sure all connection points are well tightened and sealed in order to avoid leaks.	

## 3 Maintenance

### 3.1 Introduction

---

**Structure of this chapter**

This chapter describes all the maintenance activities recommended for the DressPack.

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 13](#) before performing any service work!

## 3 Maintenance

### 3.2.1 Maintenance schedule

## 3.2 Maintenance schedule and component lives

### 3.2.1 Maintenance schedule

#### General

The DressPack must be maintained regularly to ensure its function. The lifetime of a process cable package can be extended with the correct preventive maintenance activities. A daily visual check of the DressPack is highly recommended, which is normally performed by robot production personnel. It is essential that the person performing the visual check have basic training in ABB DressPack.

#### Wear parts

Wear parts should be replaced before considerable damage occurs to the process cable package. Replace wear parts before the part is completely damaged.

The following parts are considered as wear parts:

- Protection sleeves
- Protective hose
- Hose reinforcement

#### Activities and intervals, standard equipment

The sections referred to in the table can be found in the different chapters for each maintenance activity.

The table below specifies the required maintenance activities and intervals:

Maintenance activity	Equipment	Interval	Detailed in section:
Inspection	All cables	Regularly <sup>i</sup>	<a href="#">Preventive inspection of all cables, DressPack on page 86</a>
Inspection	DressPack cable package	Regularly <sup>i</sup>	<a href="#">Preventive inspection, DressPack upper end on page 88</a>
Cleaning	DressPack cable package	Regularly <sup>i</sup>	

<sup>i</sup> "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 the environment, the closer the maintenance intervals. Also, the more demanding the movement pattern (sharper bending cable harness), the closer the intervals.

#### DressPack upper arm cable package

Based on experience, some parts are more exposed to wear. Therefore the DressPack upper arm cable package should be inspected according to the following schedule.

Interval	Action
Weekly	None
Every two weeks	Inspection wear
Every third month	Inspection

*Continues on next page*

Interval	Action
After changing movement pattern	Inspection

## 3 Maintenance

### 3.3.1 Preventive inspection of all cables, DressPack

## 3.3 Inspection activities

### 3.3.1 Preventive inspection of all cables, DressPack

#### Cables in the DressPack system

There are many different cables used in the DressPack system. The different cables used are listed in Spare parts section.

The inspection activities described below are a general description, and does not refer to any specific cable.

#### Required equipment


Equipment	Art. no.	Note
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/SpotPack on page 111</a> .

#### Inspection

The procedure below details how to inspect all cables included in the SpotPack system.

This instruction applies to:

- DressPack upper arm and cables and hoses contained within
- DressPack lower arm and cables and hoses contained within
- DressPack lower/upper arm and cables and hose contained within
- DressPack floor and cables and hoses contained within.

	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"><li>• electric power supply</li><li>• hydraulic power supply</li><li>• air pressure supply</li></ul> to the robot, before entering the robot working area.	
2	Make sure that the unit is clean and not overly contaminated.	
3	Make sure that all bolts are fastened.	Recommended tightening torques are specified in section <a href="#">Screw joints on page 107</a> .
4	Make sure that all connections are fastened.	Re-tighten if necessary.
5	Make sure that all hose connections are fastened and that there are no leaks.	Re-tighten if necessary.

*Continues on next page*

### 3.3.1 Preventive inspection of all cables, DressPack

*Continued*

	Action	Note
6	Check for mechanical wear, especially in areas where the cable/hose package rub against, or move close to, the robot or any other structure. Especially check any cable/hose package at the robot wrist.	Replace any worn items as detailed in the chapter <a href="#">Repair on page 91</a> . Re-adjust the assembly after installation.
7	If any of the protective sleeves are worn, rotate it or replace it.	
8	Check the attachments of the cable/hose package, to make sure they are properly secured.	Secure any loose items as detailed in the <a href="#">Installation on page 53</a> chapter.
9	Check all cable retainers, to make sure the cables/hoses are securely locked in the cable retainers.	

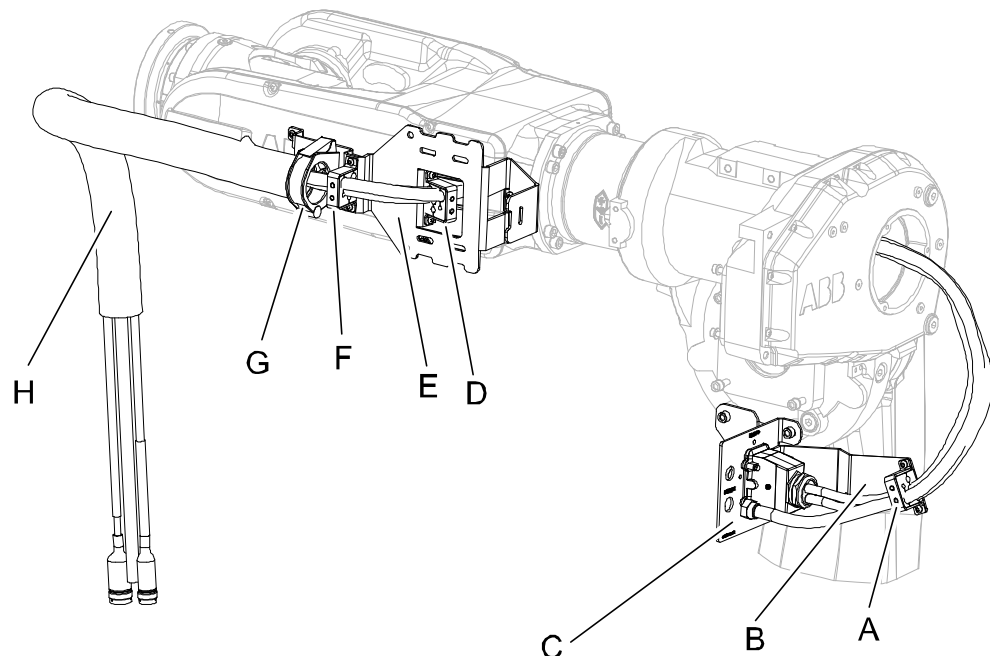
## 3 Maintenance

### 3.3.2 Preventive inspection, DressPack upper end

### 3.3.2 Preventive inspection, DressPack upper end

#### Location of DressPack upper end

The figure shows the cable package IRBDP MH 3 UE.



xx0700000580

A	Metal clamp with rubber clamp
B	Bracket for metal clamp
C	Connection plate, ax 3 (delivered with the cable package IRBDP MH 3 LE)
D	Metal clamp with rubber clamp (right)
E	Bracket at wrist
F	Metal clamp with rubber clamp (left)
G	Gripping clamp & clamp halves
H	Protection hose

#### Required equipment


Equipment	Article number	Note
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/SpotPack on page 111</a> .

*Continues on next page*



##### Inspection - Robot standing still

Use this procedure to inspect the DressPack upper end when the robot is not in motion.

	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic power supply</li> <li>• air pressure supply</li> </ul> to the robot, before entering the robot working area.	
2	Make sure that the DressPack is not contaminated.	
3	Make sure that all bolts are fastened.	Recommended standard tightening torques are specified in section <a href="#">Screw joints on page 107</a> .
4	Make sure all cable straps are tight enough to prevent the cable package from moving in an undesired way.	
5	Make sure that the velcro strap are not too tight. The cables should be able to twist.	
6	Make sure that the cable package is properly connected at: <ul style="list-style-type: none"> <li>• the connection plate</li> <li>• the robot base</li> <li>• the lower arm</li> <li>• the tool on the turning disc of the robot.</li> </ul>	
7	Make sure that all connections are fastened and that there are no leaks.	Re-tighten if necessary.
8	Make sure that the cable package is not cracked or damaged in any other way.	Shown in the figure in section <a href="#">Location of DressPack upper end on page 88</a> .
9	Check all cable clamps securing the process cable package and protective hose for tightness.	Tightening torques are specified either in: <ul style="list-style-type: none"> <li>• Installation chapter (non-standard tightening torques) or</li> <li>• standard tightening torque table (standard tightening torques).</li> </ul>

*Continues on next page*

## 3 Maintenance

### 3.3.2 Preventive inspection, DressPack upper end

*Continued*

#### Inspection - Reduced speed

The following procedure details how to inspect the DressPack at the upper arm when the robot is moving in reduced speed.



#### **WARNING**

A robot in motion is dangerous and may cause severe personal injuries, if safety procedures are not followed. Hence, all work must be performed outside the robots working range and outside the robots safety area.

Secure the following before work starts:

- Check that all emergency stops are fully functional.
- Close and activate all safety equipment (safety gates and/or safety curtains etc.).

	Action
1	Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure in a way that may cause wear.
2	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.

#### Inspection - Full speed

The following procedure details how to inspect the DressPack at the upper arm, when the robot is moving in full speed.



#### **WARNING**

A robot in motion is dangerous and may cause severe personal injuries, if safety procedures are not followed. Hence, all work must be performed outside the robots working range and outside the robots safety area.

Secure the following before work starts:

- Check that all emergency stops are fully functional.
- Close and activate all safety equipment (safety gates and/or safety curtains etc.).

	Action	Note
1	Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure (or something in the vicinity of it) in a way that may cause wear.	
2	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.	

## 4 Repair

### 4.1 Introduction

---

#### Structure of this chapter

This chapter describes all repair activities recommended for the DressPack and any external unit.

It is made up of separate procedures, each describing a specific repair activity. Each procedure contains all the information required to perform the activity, for example spare parts numbers, required special tools, and materials.

The procedures are gathered in sections, divided according to the component location on the DressPack.

---

#### Required equipment

The details of the equipment required to perform a specific repair activity are listed in the respective procedures.

The details of equipment are also available in different lists in the chapter [Reference information on page 103](#).

---

#### Safety information

There are general safety information and specific safety information. The specific safety information describes the danger and safety risks while performing specific steps in a procedure. Make sure to read through the chapter [Safety on page 13](#) before commencing any service work.



#### Note

If the DressPack is connected to power, always make sure that the DressPack is connected to earth before starting any repair work.

For more information see:

- *Product manual - IRC5*

## 4 Repair

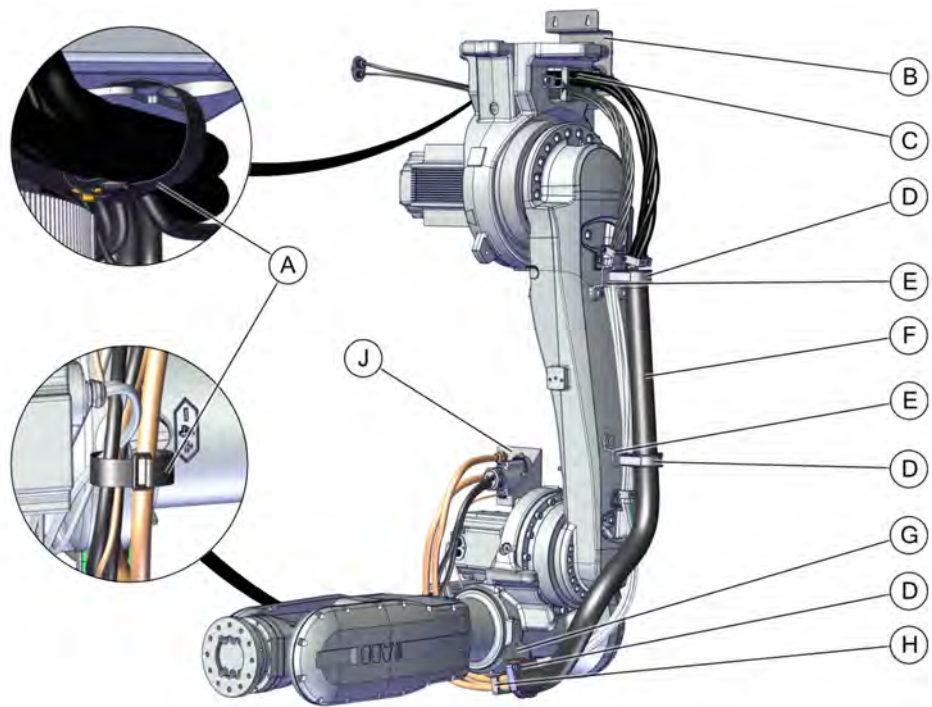
### 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

## 4.2 DressPack cable package

### 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

#### Location

This section details how to replace the cable package IRBDP MH 3 LE. The actual work may differ due to the type of cables and hoses, the type of connectors etc. However, if differences are distinguishable, these are pointed out in the procedure description.



xx1500003193

A	Strap velcro
B	Customer plate
C	Metal clamp with rubber clamp
D	Gripping clamp
E	Bracket lower arm
F	Protection hose (Cable package)
G	Bracket for clamp (on upper arm)
H	Metal clamp with rubber clamp
J	Connection plate axis 3

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## 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

Continued



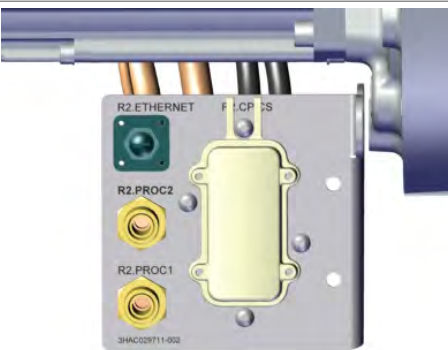
## Required equipment

The following equipment is required for replacement of the cable package IRBDP MH 3 LE.

Equipment	Article number	Note
Cable package IRBDP MH 3 LE		
Locking liquid	3HAB 7116-1	Loctite 243 For locking screws.
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/Spot-Pack on page 111</a> .
Circuit diagram	3HAC026136-001 3HAC026208-001	

## Removal

The procedure below describes how to remove the cable package IRBDP MH 3 LE from the robot, before it is disassembled.

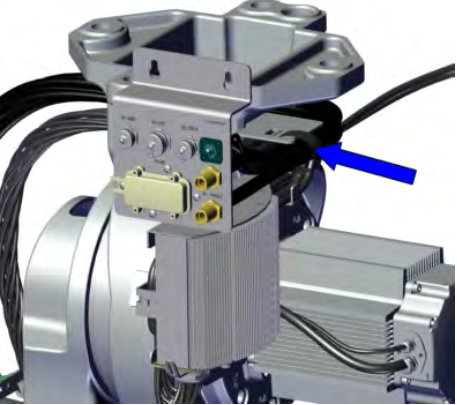
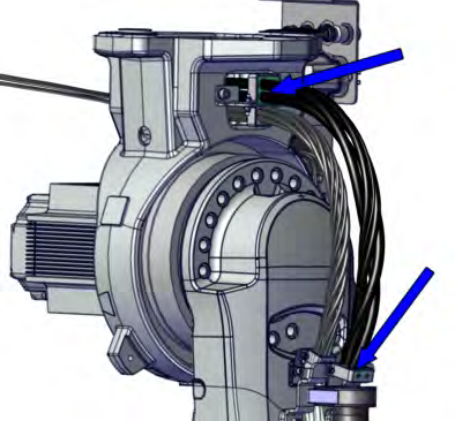
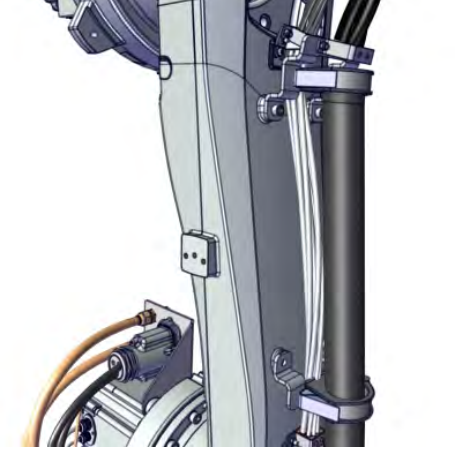
Action	Note
<p>1</p>  <b>DANGER</b> Turn off all: <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic pressure supply</li> <li>• air pressure supply</li> </ul> to the robot, before entering the robot working area.	
<p>2</p>  <b>CAUTION</b> The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
<p>3</p> Disconnect all connectors and process couplings from the connection plate.	 <p>xx1500003203</p>

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## 4 Repair

### 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

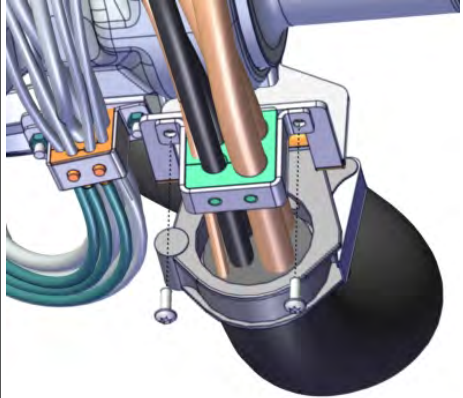
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	Action	Note
4	Loosen the velcro strap and pull out the cables through the base.	 xx1500003206
5	Remove the metal clamp with rubber clamp on the base and lower arm.	 xx1500003201
6	Open the gripping clamp on the lower arm and loosen the cable package.	 xx1500003198
7	Disconnect all connectors and process couplings from connector plate axis 3.	

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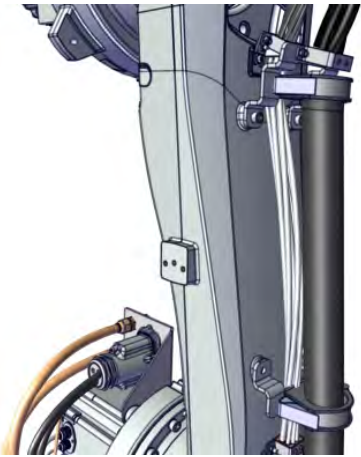
## 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

*Continued*

	Action	Note
8	Remove the metal clamp with rubber clamp on the upper arm.	 xx1500003204
9	Open the gripping clamp on the upper arm and remove the cable package.	

**Refitting**

The procedure below describes how to refit the cable package IRBDP MH 3 LE on the robot.

	Action	Note
1	Secure the new or repaired cable package to the gripping clamp on the lower arm.	 xx1500003198

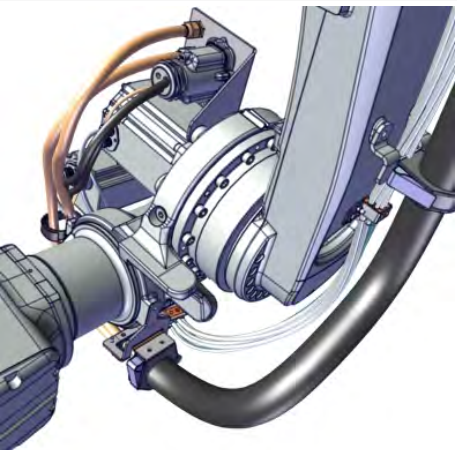
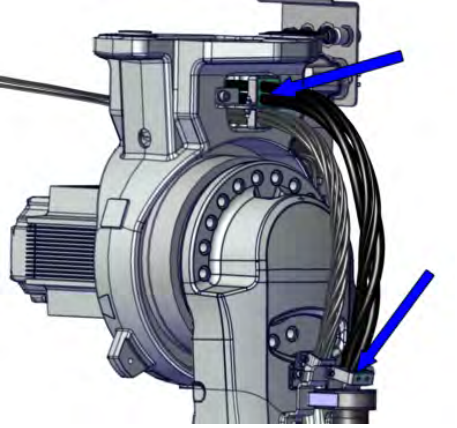
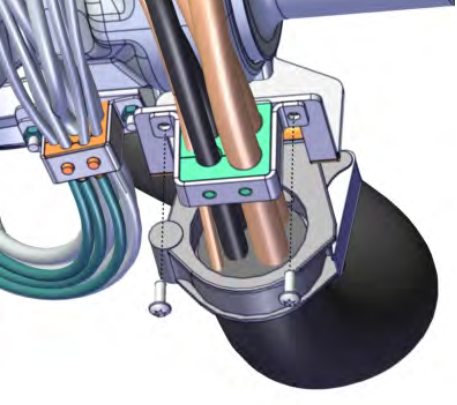
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## 4 Repair

### 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

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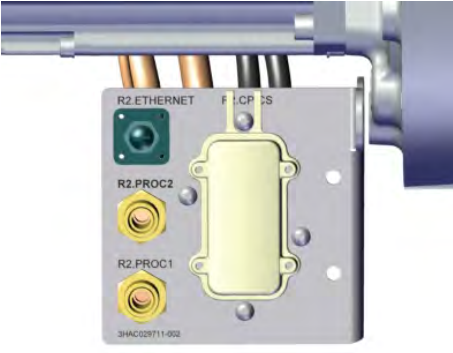
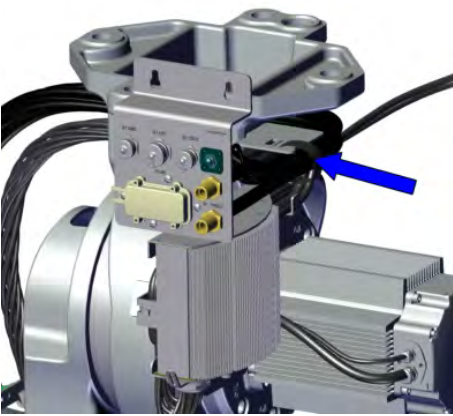


	Action	Note
2	Secure the cable package to the gripping clamp on the upper arm.	 xx1500003199
3	Route the cables through the frame and secure the two metal clamps.	 xx1500003201 Nut: M6-lock nut (2 pcs)
4	secure the metal clamp to the cable bracket on the upper arm. Lock the screws with locking liquid.	 xx1500003204 Screw: M6 (2 pcs)

*Continues on next page*



## 4.2.1 Replacement of the lower arm cable package - IRBDP MH 3 LE

Continued

	Action	Note
5	<p>Fit all connectors and process couplings to the connector plate axis 3.</p> <p> <b>CAUTION</b></p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	 <p>xx1500003203</p> <p>Tightening torque, brass couplings 1/2": 31 Nm</p> <p>Tightening torque, brass couplings 3/8": 17 Nm</p>
6	<p>Secure the cables and hose to the cable fixing bracket with a velcro strap.</p>	 <p>xx1500003206</p>
7	<p>Fit all connectors and process couplings on the connection plate.</p> <p> <b>CAUTION</b></p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	 <p>xx1500003207</p> <p>Tightening torque, brass couplings 1/2": 31 Nm</p> <p>Tightening torque, brass couplings 3/8": 17 Nm</p>

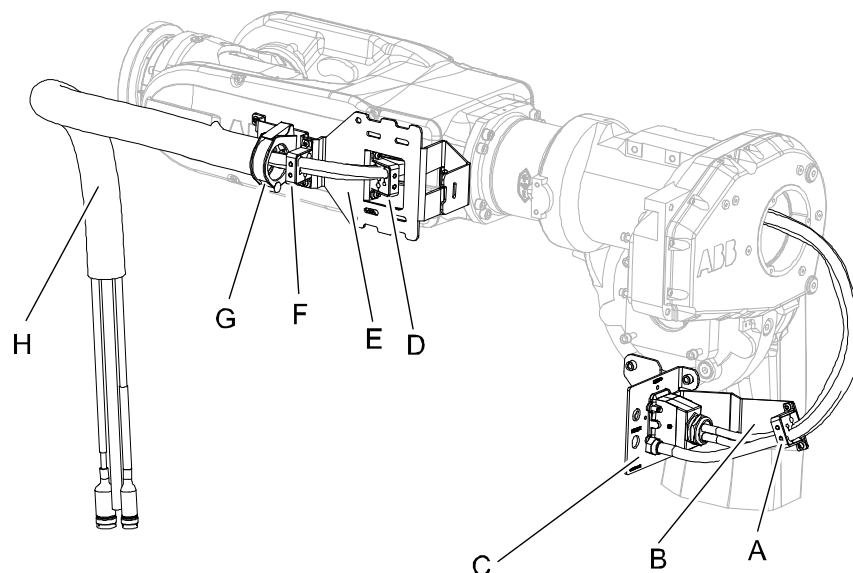
## 4 Repair

### 4.2.2 Replacement of upper arm cable package - IRBDP MH 3 UE

### 4.2.2 Replacement of upper arm cable package - IRBDP MH 3 UE

#### Location

The location of the cable package IRBDP MH 3 UE is shown in the figure below.



xx0700000580

A	Metal clamp with rubber clamp
B	Bracket for metal clamp
C	Connection plate ax 3
D	Metal clamp with rubber clamp (right)
E	Bracket at wrist
F	Metal clamp with rubber clamp (left)
G	Gripping clamp & clamp halves
H	Protection hose

#### Required equipment



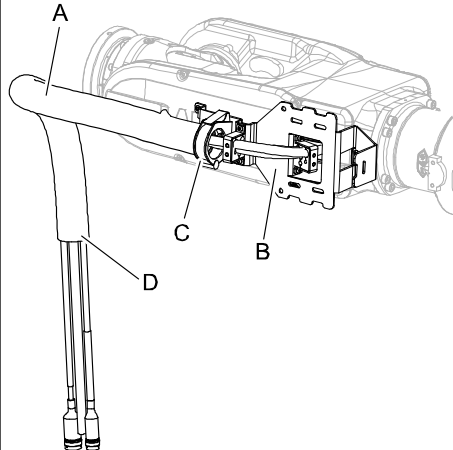
The following equipment is required for replacement of the cable package IRBDP MH 3 UE.

Equipment	Art. no.	Note
Cable package IRBDP MH 3 UE		
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <a href="#">Toolkits, DressPack/SpotPack on page 111</a> .
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		These procedures include references to the tools required.
Circuit diagram	3HAC026209-001	

*Continues on next page*

## Procedure

The procedure below details how to remove the cable package IRBDP MH 3 UE from the robot, before it is disassembled.

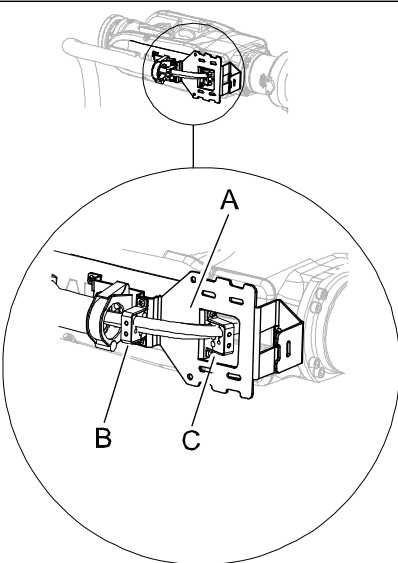
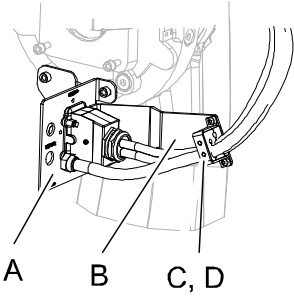
	Action	Note
1	 <b>DANGER</b> Turn off all: <ul style="list-style-type: none"> <li>• electric power supply</li> <li>• hydraulic pressure supply</li> <li>• air pressure supply</li> </ul> to the robot, before entering the robot working area.	
2	 <b>CAUTION</b> The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
3	Open the gripping clamp at the front end of the cable package.	
4	If the cables has been put in a loop and fitted with straps on the bracket at wrist, remove the straps.	
5	Open the gripping clamp on the bracket at wrist.	 <p>xx0700000609</p> <p><b>Parts:</b></p> <ul style="list-style-type: none"> <li>• A: Protection hose</li> <li>• B: Bracket at wrist</li> <li>• C: Gripping clamp</li> <li>• D: Place for gripping clamp (front)</li> </ul>

Continues on next page

## 4 Repair

### 4.2.2 Replacement of upper arm cable package - IRBDP MH 3 UE

Continued

	Action	Note
6	Remove the <i>metal clamp with rubber clamp</i> - left and right - on <i>bracket at wrist</i> .	 <p>xx0700000606</p> <p>Parts:</p> <ul style="list-style-type: none"> <li>• A: Bracket at wrist</li> <li>• B: Metal clamp with rubber clamp (left)</li> <li>• C: Metal clamp with rubber clamp (right)</li> </ul>
7	Remove the <i>metal clamp with rubber clamp</i> on the <i>bracket for metal clamp</i> .	 <p>xx0700000605</p> <p>Parts:</p> <ul style="list-style-type: none"> <li>• A: Connection plate</li> <li>• B: Bracket for metal clamp</li> <li>• C: Metal clamp with rubber clamp</li> <li>• D: Attachment screws</li> </ul>
8	Disconnect all cable and hose connectors from the <i>connection plate</i> .	Shown in the figure above!
9	Pull out the cable package from the upper arm and put it in a safe place.	
10	Refit the new or repaired cable package.	Detailed in section <a href="#">Fitting the upper arm cable package - IRBDP MH 3 UE on page 66</a> .

## 5 Decommissioning

### 5.1 Environmental information

#### Hazardous material

The table specifies some of the materials in the product and their respective use throughout the product.

Dispose components properly to prevent health or environmental hazards.

Material	Example application
Batteries, NiCad or Lithium	Serial measurement board
Copper	Cables, motors
Cast iron/nodular iron	Base, lower arm, upper arm
Steel	Gears, screws, base frame, and so on.
Neodymium	Brakes, motors
Plastic/rubber	Cables, connectors, drive belts, and so on.
Aluminium	Covers, synchronization brackets

#### Oil and grease

Where possible, arrange for oil and grease to be recycled. Dispose of via an authorized person/contractor in accordance with local regulations. Do not dispose of oil and grease near lakes, ponds, ditches, down drains, or onto soil. Incineration must be carried out under controlled conditions in accordance with local regulations.

Also note that:

- Spills can form a film on water surfaces causing damage to organisms. Oxygen transfer could also be impaired.
- Spillage can penetrate the soil causing ground water contamination.

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## **6 Reference information**

### **6.1 Introduction**

---

**General**

This chapter includes general information, complementing the more specific information in the different procedures in the manual.

## 6 Reference information

### 6.2 Applicable safety standards

### 6.2 Applicable safety standards

#### Standards, EN ISO

The robot system is designed in accordance with the requirements of:

Standard	Description
EN ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1	Safety of machinery, safety related parts of control systems - Part 1: General principles for design
EN ISO 13850	Safety of machinery - Emergency stop - Principles for design
EN ISO 10218-1	Robots for industrial environments - Safety requirements -Part 1 Robot
EN ISO 9787	Robots and robotic devices -- Coordinate systems and motion nomenclatures
EN ISO 9283	Manipulating industrial robots, performance criteria, and related test methods
EN ISO 14644-1 <sup>i</sup>	Classification of air cleanliness
EN ISO 13732-1	Ergonomics of the thermal environment - Part 1
EN IEC 61000-6-4 (option 129-1)	EMC, Generic emission
EN IEC 61000-6-2	EMC, Generic immunity
EN IEC 60974-1 <sup>ii</sup>	Arc welding equipment - Part 1: Welding power sources
EN IEC 60974-10 <sup>ii</sup>	Arc welding equipment - Part 10: EMC requirements
EN IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1 General requirements
IEC 60529	Degrees of protection provided by enclosures (IP code)

<sup>i</sup> Only robots with protection Clean Room.

<sup>ii</sup> Only valid for arc welding robots. Replaces EN IEC 61000-6-4 for arc welding robots.

#### European standards

Standard	Description
EN 614-1	Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles
EN 574	Safety of machinery - Two-hand control devices - Functional aspects - Principles for design
EN 953	Safety of machinery - General requirements for the design and construction of fixed and movable guards

#### Other standards

Standard	Description
ANSI/RIA R15.06	Safety requirements for industrial robots and robot systems
ANSI/UL 1740 (option 429-1)	Safety standard for robots and robotic equipment

*Continues on next page*



Standard	Description
CAN/CSA Z 434-03 (option 429-1)	Industrial robots and robot Systems - General safety requirements

## 6 Reference information

---

### 6.3 Unit conversion

### 6.3 Unit conversion

---

#### Converter table

Use the following table to convert units used in this manual.

Quantity	Units		
Length	1 m	3.28 ft.	39.37 in
Weight	1 kg	2.21 lb.	
Weight	1 g	0.035 ounces	
Pressure	1 bar	100 kPa	14.5 psi
Force	1 N	0.225 lbf	
Moment	1 Nm	0.738 lbf-ft	
Volume	1 L	0.264 US gal	

## 6.4 Screw joints

### General

This section describes how to tighten the various types of screw joints on the DressPack.

The instructions and torque values are valid for screw joints comprised of metallic materials and do *not* apply to soft or brittle materials.

### UNBRAKO screws

UNBRAKO is a special type of screw recommended by ABB for certain screw joints. It features special surface treatment (Gleitmo as described below) and is extremely resistant to fatigue.

Whenever used, this is specified in the instructions, and in such cases, *no other type of replacement screw* is allowed. Using other types of screws will void any warranty and may potentially cause serious damage or injury.

### Gleitmo treated screws

Gleitmo is a special surface treatment to reduce the friction when tightening the screw joint. Screws treated with Gleitmo may be reused 3-4 times before the coating disappears. After this the screw must be discarded and replaced with a new one.

When handling screws treated with Gleitmo, protective gloves of **nitrile rubber** type should be used.

### Screws lubricated in other ways

Screws lubricated with Molycote 1000 should *only* be used when specified in the repair, maintenance or installation procedure descriptions.

In such cases, proceed as follows:

- 1 Apply lubricant to the screw thread.
- 2 Apply lubricant between the plain washer and screw head.
- 3 Screw dimensions of M8 or larger must be tightened with a torque wrench. Screw dimensions of M6 or smaller may be tightened without a torque wrench *if* this is done by trained and qualified personnel.

Lubricant	Article number
Molycote 1000 (molybdenum disulphide grease)	11712016-618

### Tightening torque

Before tightening any screw, note the following:

- Determine whether a **standard** tightening torque or **special** torque is to be applied. The **standard torques** are specified in the following tables. Any **special torques** are specified in the repair, maintenance or installation procedure descriptions. **Any special torque specified overrides the standard torque!**
- Use the *correct tightening torque* for each type of screw joint.
- Only use *correctly calibrated* torque keys.

*Continues on next page*

## 6 Reference information

### 6.4 Screw joints

*Continued*

- Always *tighten the joint by hand*, and never use pneumatic tools.
- Use the *correct tightening technique*, that is *do not* jerk. Tighten the screw in a slow, flowing motion.
- Maximum allowed total deviation from the specified value is **10%**!

#### Oil-lubricated screws with slotted or cross-recess head screws

The following table specifies the recommended standard tightening torque for *oil-lubricated screws with slotted or cross-recess head screws*. Any special torque specified in the repair, maintenance or installation procedure overrides the standard torque!

#### Oil-lubricated screws with allen head screws

The following table specifies the recommended standard tightening torque for *oil-lubricated screws with allen head screws*. Any special torque specified in the repair, maintenance or installation procedure overrides the standard torque!

Dimension	Tightening torque (Nm) Class 8.8, oil-lubricated	Tightening torque (Nm) Class 10.9, oil-lubricated	Tightening torque (Nm) Class 12.9, oil-lubricated
M5	6	-	-
M6	10	-	-
M8	24	34	40
M10	47	67	80
M12	82	115	140
M16	200	290	340
M20	400	560	670
M24	680	960	1150

#### Lubricated screws (Molycote, Gleitmo or equivalent) with allen head screws

The following table specifies the recommended standard tightening torque for *screws lubricated with Molycote 1000, Gleitmo 603 or equivalent with allen head screws*. Any special torque specified in the repair, maintenance or installation procedure overrides the standard torque!

Dimension	Tightening torque (Nm) Class 10.9, lubricated <sup>i</sup>	Tightening torque (Nm) Class 12.9, lubricated <sup>i</sup>
M8	28	35
M10	55	70
M12	96	120
M16	235	280
M20	460	550
M24	790	950

<sup>i</sup> Lubricated with Molycote 1000, Gleitmo 603 or equivalent

*Continues on next page*

#### Water and air connectors

The following table specifies the recommended standard tightening torque for *water and air connectors* when *one or both* connectors are made of *brass*. Any special torque specified in the repair, maintenance or installation procedure overrides the standard torque!

Dimension	Tightening torque Nm - Nominal	Tightening torque Nm - Min.	Tightening torque Nm - Max.
1/8	12	8	15
1/4	15	10	20
3/8	20	15	25
1/2	40	30	50
3/4	70	55	90

## 6 Reference information

---

### 6.5 Weight specifications

### 6.5 Weight specifications

---


#### Definition

In installation, repair, and maintenance procedures, weights of the components handled are sometimes specified. All components exceeding 22 kg (50 lbs) are highlighted in this way.

To avoid injury, ABB recommends the use of a lifting accessory when handling components with a weight exceeding 22 kg. A wide range of lifting accessories and devices are available for each manipulator model.

#### Example

Following is an example of a weight specification in a procedure:

	Action	Note
	 <b>CAUTION</b> The robot weighs 610 kg. All lifting accessories used must be sized accordingly!	

## 6.6 Toolkits, DressPack/SpotPack

### General

All service (repair, maintenance and installation) instructions contain lists of tools required to perform the specified activity. All special tools, that is all tools that are not considered standard as defined below, are listed in their instructions respectively.

This way, the tools required are the sum of the Standard Toolkit and any tools listed in the instruction.

### Standard toolkit

This standard toolkit contains a set of standard tools used for DressPack/SpotPack, 3HAC17290-7.

Qty	Article number	Tool	Note
1	-	Socket head cap, 5-17mm	-
1	-	Torx socket no: 20-60	-
1	-	Phillips screwdriver, small	For Harting connectors
1	-	Flat screwdriver, medium	For Harting connectors
2	-	Ring-open-end spanner 8-19 mm	For water connectors on water and air unit
1	-	Open end wrench, 27 mm.	For Tension arm unit and water connectors on DressPack
1	-	Open end wrench, 36 mm	For water connectors on DressPack

### Toolkit, cables

This toolkit contains tools needed for work with cables:

Qty	Article number	Tool	Note
1	0999 000 0171 (D-sub)	Removal and Insertion tool for pins and sockets	Art. no. from Harting
1	0999 000 0012 (HAN DD)	Removal tool for pins and sockets	Art. no. from Harting
1	0999 000 0319 (HAN EE)	Removal tool for pins and sockets	Art. no. from Harting
1	0999 000 0059 (HAN DD and HAN EE)	Insertion tool for pins and sockets	Art. no. from Harting
1	-	Stripping pliers	
1	09 99 000 0021	Crimping tool HARTING with locator	Art. no. from Harting
1	09 99 000 0001	Crimping tool BUCHANAN, HARTING	Art. no. from Harting
1	09 99 000 0175 09 99 000 0169	Crimping tool HARTING	Art. no. from Harting

## 6 Reference information

---

### 6.7 Lifting accessories and lifting instructions

### 6.7 Lifting accessories and lifting instructions

---

#### General

Many repair and maintenance activities require different pieces of lifting accessories, which are specified in each procedure.

The use of each piece of lifting accessories is *not* detailed in the activity procedure, but in the instruction delivered with each piece of lifting accessories.

This implies that the instructions delivered with the lifting accessories should be stored for later reference.



## 7 Spare parts

### 7.1 Introduction

---

**General**

This chapter contains more specific article information. It is to be regarded as a complement to the slightly generic procedure information found in the Installation, Maintenance and Repair chapters.

## 7 Spare parts

### 7.2.1 DressPack cable package lower arm - IRBDP MH 3 LE

## 7.2 DressPack IRB 6620LX

### 7.2.1 DressPack cable package lower arm - IRBDP MH 3 LE

#### Overview

The following section details spare parts for DressPack upper arm cable package IRBDP MH 3 LE.

#### DressPack cable package lower arm - IRBDP MH 3 LE

Article number: 3HAC029595-001

Parts	Article no.	Note
Process cable package 1-3 MH	3HAC029704-001	Paracom
Process cable package 1-3 MH	3HAC029705-001	Parabuscom
Process cable package 1-3 MH	3HAC034140-001	Paracom Ethernet
Material set lower arm MH	3HAC029710-001	

#### Spare parts for cable package

Parts	Article no.	Note
Protection hose	3HAC024692-052	Wear part 2.2 m Only sold in whole meters!
Clamp half	3HAC024692-051	2 pcs needed
Gripping clamp	3HAC024692-013	
Rubber clamp	3HAC11487-6	
Strap, velcro	3HAC12625-1	

## 7.2.2 DressPack cable package upper arm - IRBDP MH 3 UE

## Overview

The following section details spare parts for DressPack upper arm cable package IRBDP MH 3 UE.

## DressPack cable package upper arm - IRBDP MH 3 UE

Article number: 3HAC029596-001

Parts	Article no.	Note
Process cable package upper arm MH 3	3HAC026813-001	Paracom CPS
Process cable package upper arm MH 3	3HAC034204-002	Ethernet
Process cable package upper arm MH 3	3HAC026813-002	Parabuscom CPS/CBUS
Material set upper arm MH 3	3HAC029770-001	

## Spare parts for cable package

Parts	Article no.	Note
Protection hose	3HAC024692-060	Wear part 1.4 m
Hose upper arm MH 3	3HAC024692-047	
Clamp half	3HAC024692-051	2 pcs needed
Gripping clamp	3HAC024692-013	
Rubber clamp	3HAC11487-8	
Strap, velcro	3HAC12625-1	
Protective sleeve, NW 52	3HAC032661-001	Wear part

## 7 Spare parts

### 7.2.3 Connection kits

### 7.2.3 Connection kits

#### General

This chapter contains more specific article information. It is to be regarded as a complement to the slightly generic procedure information found in the Installation, Maintenance and Repair chapters.

The robot itself and controller cabinet, is detailed in separate technical documents.

#### Spare parts

Not valid for IRBDP SW6 LE/UE and IRBDP MH6 LE/UE. See below!

Spare part	Article number	Note
CP/CS, Proc. 1 on base	3HAC16667-1	
Weld, Proc. 1-4 on base	3HAC17201-1	
Weld, Proc. 1-4 ax.6 (35 mm <sup>2</sup> )	3HAC023072-001	
7-axis on base	3HAC023441-001	
CP/CS/CBUS, Proc. 1 ax. 6	3HAC020155-001	Tool side
CP/CS/CBUS, Proc. 1 ax. 6	3HAC029072-001	Tool side MH3

#### Spare parts - IRBDP SW6 LE/UE and IRBDP MH6 LE/UE

Spare part	Article number	Note
CP/CS, Proc 1 on base	3HAC16667-1	
CP/CS/CBUS Ethernet, Proc axis 3	3HAC048464-001	
CP/CS/CBUS Ethernet, Proc axis 6	3HAC043503-001	
Weld, Proc axis 6	3HAC043502-001	
7-axis on base	3HAC023441-001	

## 7.2.4 7:th axis to base

---

### General

This chapter contains more specific article information. It is to be regarded as a complement to the slightly generic procedure information found in the Installation, Maintenance and Repair chapters.

The robot itself and controller cabinet, is detailed in separate technical documents.

---

### Spare parts

Part	Article number	Note
7:th axis, serial cable		

## 7 Spare parts

### 7.2.5 Customer signal/power

### 7.2.5 Customer signal/power

#### General

This chapter contains more specific article information. It is to be regarded as a complement to the slightly generic procedure information found in the Installation, Maintenance and Repair chapters.

The robot itself, consisting of robot and controller cabinet, is detailed in its own technical documents.

#### Spare parts floor harness (3HAC023120-001, 3HAC023121-001)

Part	Article number	Note
Harness-CP/CS/DeviceNet, 7m	3HAC022978-001	Parallel DeviceNet
Harness-CP/CS/DeviceNet, 15m	3HAC022978-002	Parallel DeviceNet
Harness-CP/CS/DeviceNet, 22m	3HAC022978-006	Parallel DeviceNet
Harness-CP/CS/DeviceNet, 30m	3HAC022978-003	Parallel DeviceNet
Harness-CS floor cable, 7m	3HAC029393-001	Parallel
Harness-CS floor cable, 15m	3HAC029393-002	Parallel
Harness-CP floor cable, 7m	3HAC029396-002	24V
Harness-CP floor cable, 15m	3HAC029396-001	24V
Harness-CP/CS/InterBus, 7m	3HAC023024-001	InterBus
Harness-CP/CS/InterBus, 15m	3HAC023024-002	InterBus
Harness-CP/CS/InterBus, 22m	3HAC023024-006	InterBus
Harness-CP/CS/InterBus, 30m	3HAC023024-003	InterBus
Harness-CP/CS/Pbus, 7m	3HAC022988-001	ProfiBus
Harness-CP/CS/Pbus, 15m	3HAC022988-002	ProfiBus
Harness-CP/CS/Pbus, 22m	3HAC022988-006	ProfiBus
Harness-CP/CS/Pbus, 30m	3HAC022988-003	ProfiBus
Harness-CP/CS, 7m	3HAC022957-001	Parallel
Harness-CP/CS, 15m	3HAC022957-002	Parallel
Harness-CP/CS, 22m	3HAC022957-006	Parallel
Harness-CP/CS, 30m	3HAC022957-003	Parallel

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