

Product manual

DressPack/SpotPack IRB 6640

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**Product manual
DressPack/SpotPack IRB 6640
IRC5**

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Overview of this manual

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 the manual.

Usage

This manual should be used during:

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

Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance personnel
- repair personnel.

Prerequisites

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.

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.

Continues on next page

Overview of this manual

Continued

Chapter	Contents
Spare parts	Complete spare part list and list of robot components, shown in exploded views.
Circuit diagram	References to the circuit diagrams.

References

Reference	Document ID
<i>Operating manual - General safety information</i> ⁱ	3HAC031045-001
<i>Product specification - IRB 6640</i>	3HAC028284-001
<i>Product manual - IRB 6640</i>	3HAC026876-001
<i>Circuit diagram - DressPack IRB 6640, IRB 6650S, IRB 7600</i>	3HAC026209-001
<i>Circuit diagram - SpotPack SWC IRC5 M2004</i>	3HAC026208-001
<i>Product manual - IRC5</i>	3HAC021313-001
<i>Operating manual - IRC5 with FlexPendant</i>	3HAC050941-001
<i>Technical reference manual - System parameters</i>	3HAC050948-001

ⁱ 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
A	The following has been added or changed: <ul style="list-style-type: none">• The process cable package IRBDP SW 5 CE (SpotPack Basic) has been implemented throughout the manual.• Chapter <i>Spotwelding Cabinet</i> has been updated.• Prerequisites in section <i>Overview</i> changed.
B	The following has been added or changed: <ul style="list-style-type: none">• The spare parts list for upper arm MH is updated, DressPack upper arm MH - IRBDP MH3 UE on page 365.• Updates for lower arm bracket, see Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE on page 67.

Continues on next page

Revision	Description
C	<p>The following has been added or changed:</p> <ul style="list-style-type: none"> • List of spare parts updated with new spare part number for Ethernet cables. • Decommissioning chapter added. • Circuit diagrams are not included in this document but delivered as separate files. See Circuit diagrams on page 381. • List of standards updated, see Applicable safety standards on page 344. <p>The chapter <i>Safety</i> is updated with:</p> <ul style="list-style-type: none"> • Updated safety signal graphics for the levels <i>Danger</i> and <i>Warning</i>, see Safety signals in the manual on page 44. • New safety labels on the manipulators, see Safety symbols on product labels on page 46. • Revised terminology: <i>robot</i> replaced with <i>manipulator</i>.
D	<p>The following has been added or changed:</p> <ul style="list-style-type: none"> • Some general tightening torques have been changed/added, see updated values in Screw joints on page 347. • The title for the cable package of IRB66X0ID has been changed to "IRBDP SW4 UI". • <i>LeanID process cable package</i> added throughout the manual.
E	<p>The following has been added or changed:</p> <ul style="list-style-type: none"> • A "Caution" has been added due to a possible collision risk between cable package and wrist, see Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID on page 149. • A "Caution" has been added, stating that the position of the two clamp inserts on the protection hose, being fitted in the ball joint housings on the lower arm, must not be changed. See Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID on page 149. • Text and illustration has been updated to better explain the importance of the position of the protective sleeves on the upper arm of the cable packages IRBDP SW6 UI & IRBDP MH6 UI. See Preventive inspection, DressPack upper arm on page 216. • The quality of some illustrations has been updated for better understanding. • New number added in connection kits for Spare parts - IRBDP SW6 LE/UE and IRBDP MH6 LE/UE. See Connection kits on page 374 • New article numbers added to the spare part lists for water and air units, and type S removed. See DressPack - Water and air unit on page 380. • Information about option 782-13 Bosch MFDC PROFINET added to Installation of DressPack floor on page 187. The section is also clarified, information about connections etc. is referred to the circuit diagram
F	<p>The following has been added or changed:</p> <ul style="list-style-type: none"> • Information in section Installation of DressPack floor on page 187 clarified regarding connections whether PROFINET is available or not. • The length of wear parts Protection hose, upper arm has changed (IRBDP SW6 LE/UI and IRBDP MH6 LE/UI Lean ID). New spare part numbers. • Torques added for brass couplings for water and air • Spare part numbers for Process cable packages in 'Lower arm internal cable package' changed.

Continues on next page

Overview of this manual

Continued

Revision	Description
G	The following has been added or changed: <ul style="list-style-type: none">• Grease name changed (Optitemp RB1 → Optitemp RB2)• Added cable spare parts number for Process cable package IRB66X0ID
H	Published in release R16.2. The following updates are done in this revision: <ul style="list-style-type: none">• Information about Spot welding cabinet removed. <i>Product manual - Spot welding cabinet (3HAC058524-001)</i> describes the Spot welding cabinet.

Product documentation, IRC5

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.

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).

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

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.

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 - IRC5 Integrator's guide*
- *Operating manual - IRC5 with FlexPendant*
- *Operating manual - RobotStudio*
- *Operating manual - Trouble shooting IRC5*

How to read the product manual

Reading the procedures

The procedures contain references to figures, tools, material, and so on. The references are read as described below.

References to figures

The procedures often include references to components or attachment points located on the manipulator/controller. The components or attachment points are marked with *italic text* in the procedures and completed with a reference to the figure where the current component or attachment point is shown.

The denomination in the procedure for the component or attachment point corresponds to the denomination in the referenced figure.

The table below shows an example of a reference to a figure from a step in a procedure.

	Action	Note/Illustration
8.	Remove the <i>rear attachment screws, gearbox</i> .	Shown in the figure Location of gearbox on page xx .

References to required equipment

The procedures often include references to equipment (spare parts, tools, etc.) required for the different actions in the procedure. The equipment is marked with *italic text* in the procedures and completed with a reference to the section where the equipment is listed with further information, that is article number and dimensions.

The designation in the procedure for the component or attachment point corresponds to the designation in the referenced list.

The table below shows an example of a reference to a list of required equipment from a step in a procedure.

	Action	Note/Illustration
3.	Fit a new <i>sealing, axis 2</i> to the gearbox.	Art. no. is specified in Required equipment on page xx .

Safety information

The manual includes a separate safety chapter that must be read through before proceeding with any service or installation procedures. All procedures also include specific safety information when dangerous steps are to be performed.

Read more in the chapter [Safety on page 19](#).

Illustrations

The robot is illustrated with general figures that does not take painting or protection type in consideration.

Likewise, certain work methods or general information that is valid for several robot models, can be illustrated with illustrations that show a different robot model than the one that is described in the current manual.

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

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 / Continuos DressPack section / External routing

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1 Safety

1.1 Introduction to safety information

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 20](#).
- 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 44](#).
- 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 52](#).

1 Safety

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.

Sections

The general safety information is divided into the following sections.

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

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*¹
- *Product manual*

¹ 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> <i>Operator's Manual - IRC5P</i>	Operating modes

Continues on next page

1 Safety

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

1.2.3.1 Safety risks during installation and service work on robots

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.

Personal protective equipment

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

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.

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!	 CAUTION 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!	 WARNING 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	 WARNING 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 packages are sensitive to mechanical damage!	 CAUTION The cable packages are sensitive to mechanical damage. Handle the cable packages and the connectors with care in order to avoid damage.

Gearboxes and motors

Safety risk	Description
Gears may be damaged if excessive force is used!	 CAUTION Whenever parting/mating motor and gearbox, the gears may be damaged if excessive force is used!

Balancing device

Safety risk	Description
Dangerous balancing device!	 WARNING <i>Do not</i> , under any circumstances, deal with the balancing device in any other way than that described in the product documentation! For example, attempting to open the balancing device is potentially lethal!

1 Safety

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 following instructions describe 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

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

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, IRC5 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).

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

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 (CO₂) 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

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

Three-position enabling device

The three-position 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 three-position 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 three-position 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 Safety

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 three-position 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 35](#).
- To prevent anyone else from taking control of the robot, always put a safety lock on the cell door and bring the three-position 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 three-position enabling device or during other work inside the working range of the robot.

1.2.4.8 Signal lamp (optional)

Description

A signal lamp with a yellow fixed light can be mounted on the robot, as a safety device.

Function

The lamp is active in MOTORS ON mode.

Further information

Further information about the MOTORS ON/MOTORS OFF mode may be found in the product manual for the controller.

1 Safety

1.2.5.1 What is an emergency stop?

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

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 Safety

1.2.5.2 What is a safety stop or protective stop?

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

1.2.5.2 What is a safety stop or protective stop?

Continued

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 Safety

1.3.1 Safety signals in the manual

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

1.3.1 Safety signals in the manual

Continued

Symbol	Designation	Significance
 xx010000004	NOTE	Describes important facts and conditions.
 xx010000098	TIP	Describes where to find additional information or how to do an operation in an easier way.

1 Safety

1.3.2 Safety symbols on product labels

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 46](#).

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

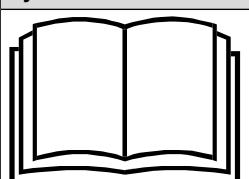
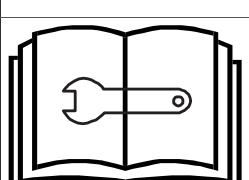
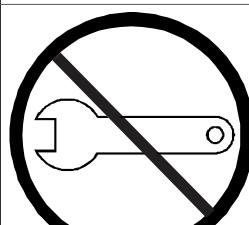
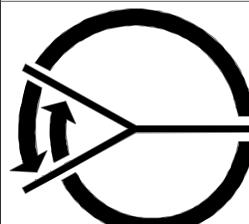
Symbols on safety labels

Symbol	Description
xx0900000812	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.
xx0900000811	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.
xx0900000839	Prohibition Used in combinations with other symbols.

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1.3.2 Safety symbols on product labels

Continued

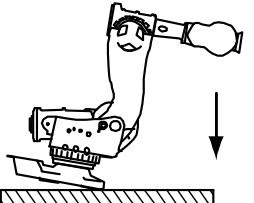
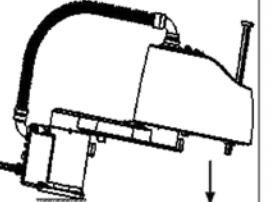
Symbol	Description
 xx0900000813	See user documentation Read user documentation for details. Which manual to read is defined by the symbol: <ul style="list-style-type: none"> • No text: <i>Product manual</i>. • EPS: <i>Application manual - Electronic Position Switches</i>.
 xx0900000816	Before disassemble,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

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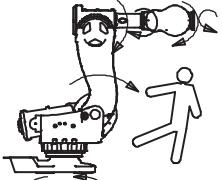
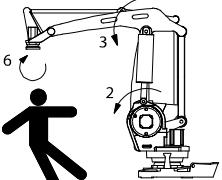
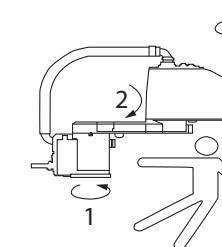
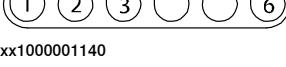
1 Safety

1.3.2 Safety symbols on product labels

Continued

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

Continues on next page

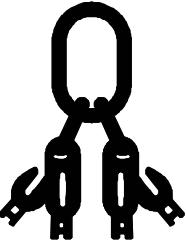
Symbol	Description
 xx0900000819	Moving robot The robot can move unexpectedly.
 xx1000001141	
 xx1500002616	
 xx0900000820	Brake release buttons
 xx1000001140	
 xx0900000821	Lifting bolt

Continues on next page

1 Safety

1.3.2 Safety symbols on product labels

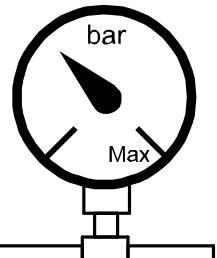
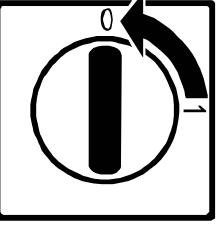
Continued

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

Continues on next page

1.3.2 Safety symbols on product labels

Continued

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

1 Safety

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.	

1.4.2 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 Safety

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!

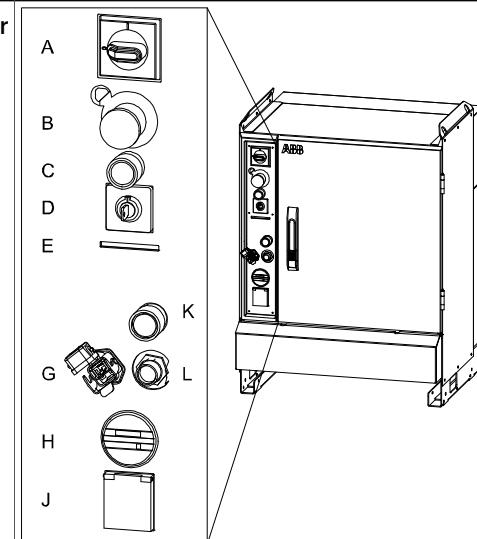
1.4.4 DANGER - Make sure that the main power has been switched off!

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

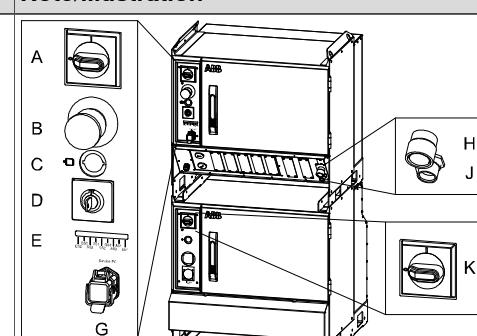
Description

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> <p>A: Main switch, Control Module</p>
2	Switch off the main switch on the Control Module.	

1 Safety

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.

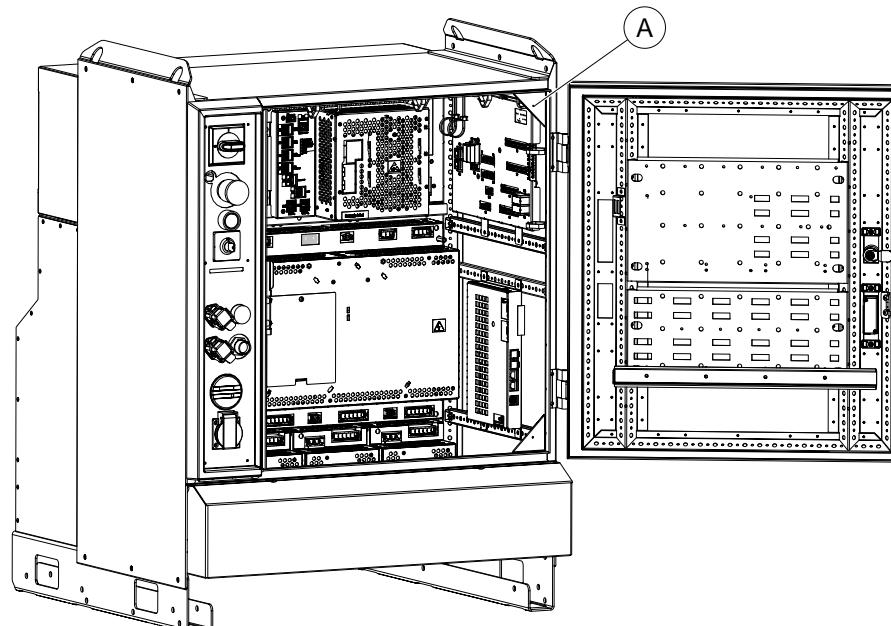
Elimination

	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



A Wrist strap button

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 Safety

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 Hot oil or grease	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 Allergic reaction	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 Possible pressure build-up in gearbox	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

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

Continued

Warning	Description	Elimination/Action
 xx0100000002 Do not overfill	<p>Overfilling of gearbox lubricant can lead to internal over-pressure inside the gearbox which in turn may:</p> <ul style="list-style-type: none"> • damage seals and gaskets • completely press out seals and gaskets • prevent the robot from moving freely. 	<p>Make sure not to overfill the gearbox when filling it with oil or grease!</p> <p>After filling, verify that the level is correct.</p>
 xx0100000002 Do not mix types of oil	<p>Mixing types of oil may cause severe damage to the gearbox.</p>	<p>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!</p>
 xx0100000098 Heat up the oil	<p>Warm oil drains quicker than cold oil.</p>	<p>When changing gearbox oil, first run the robot for a time to heat up the oil.</p>
 xx0100000004 Specified amount depends on drained volume	<p>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.</p>	<p>After filling, verify that the level is correct.</p>
 xx0100000003 Contaminated oil in gear boxes	<p>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.</p>	

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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
- Water and air unit

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.

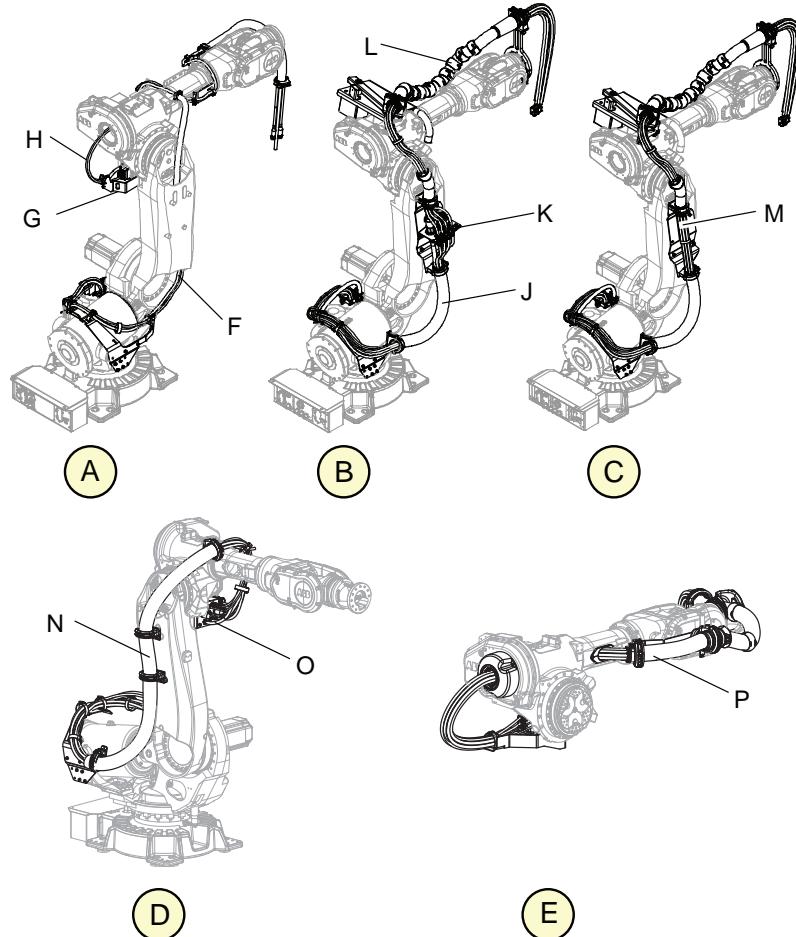
2.2.2 Installation activities

General

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

Location

The figure shows the main parts of the process cable package.



xx0700000313

A	IRBDP MH1 LI and IRBDP MH3 UE (divided)
B	IRBDP SW2 LE/UE & IRBDP MH2 LE/UE (divided)
C	IRBDP SW2 CE (continuous)
D	IRBDP SW6 & MH6 LE
E	IRBDP SW6 & MH6 UI
F	Cable package IRBDP MH1 LI (lower internal)
G	Connection plate
H	Cable package IRBDP MH3 UE (upper external)
J	Cable package IRBDP SW2 LE & IRBDP MH2 LE

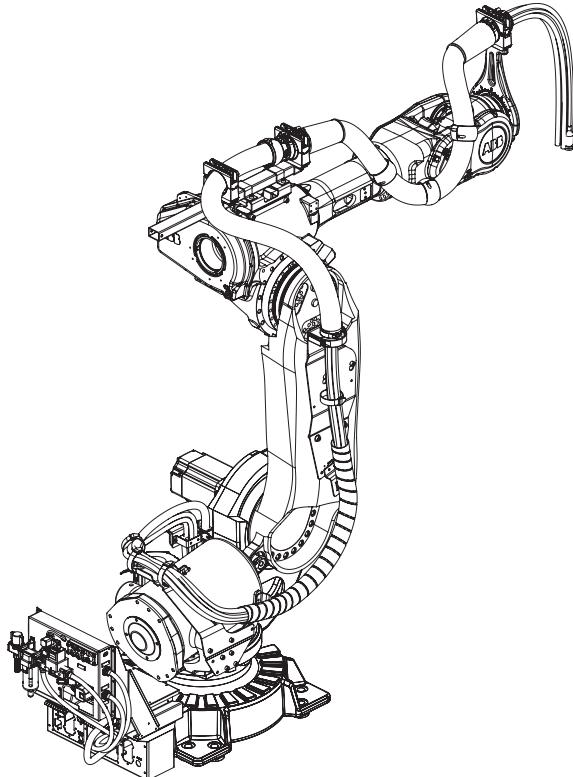
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2 Installation

2.2.2 Installation activities

Continued

K	Connection plate
L	Cable package IRBDP SW2 UE & IRBDP MH2 UE
M	Cable package IRBDP SW2 CE
N	Cable package IRBDP SW6 & MH 6 LE
O	Connection plate
P	Cable package IRBDP SW6 & MH 6 UI



xx0800000127

SpotPack Basic cable package IRBDP SW5 CE (The figure shows the cable package fitted on IRB 6640)

Procedures, DressPack continuous cable package

The following procedures are valid for DressPack cable packages *without* division point (continuous).

	For information about:	See Installation activities on page 63 .
1	Fitting the <i>attachments</i> of the IRBDP SW2 CE, lower end.	See Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE on page 67 .
2	Fitting the <i>attachments</i> of the IRBDP SW2 CE, upper end.	See Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE on page 74 .
3	Fitting the cable package IRBDP SW2 CE.	See Fitting the cable package IRBDP SW2 CE on page 123 .
4	Inspecting the lower arm equipment after installation.	This is detailed in section Inspection, DressPack lower arm on page 161 .
5	Inspecting the upper arm equipment after installation.	This is detailed in section Inspection, DressPack upper arm on page 162 .

Continues on next page

	For information about:	See Installation activities on page 63 .
6	Inspecting the DressPack equipment during programming.	Detailed in section, Inspection during programming and test-running on page 177
7	Adjustment of the upper arm cable package.	Detailed in section, Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE on page 167

Procedures, DressPack cable packages with division point

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

	For information about:	See Installation activities on page 63 .
1	Fitting the <i>attachments</i> of IRBDP MH2 LE and IRBDP SW2 LE.	This is detailed in section Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE on page 67 .
2	Fitting the <i>attachments</i> of IRBDP MH2 UE and IRBDP SW2 UE.	This is detailed in section Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE on page 74 .
3	Fitting the <i>attachments</i> of cable packages IRBDP MH1 LI and IRBDP MH3 UE.	See section Fitting the attachments of IRBDP MH1 LI and MH3 UE on page 79 .
4	Fitting the <i>attachments</i> of IRBDP SW6 UI/LE and IRBDP MH6 UI/LE.	For more information, see Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID on page 94) .
5	Fitting the cable package IRBDP MH1 LI.	This is detailed in section Fitting the cable package IRBDP MH1 LI on page 134 .
6	Fitting the cable packages IRBDP MH2 LE and SW2 LE.	This is detailed in section Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE on page 109 .
7	Fitting the cable packages IRBDP MH2 UE and SW2 UE.	This is detailed in section Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 118 .
8	Fitting the cable package IRBDP MH3 UE.	This is detailed in section Fitting the cable package IRBDP MH3 UE on page 139 .
9	Fitting the cable packages IRBDP SW6 UI/LE and IRBDP MH6 UI/LE.	This is detailed in section Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID on page 149 .
10	Inspect the lower arm equipment after installation.	For more information, see Inspection, DressPack lower arm on page 161 .
11	Inspect the upper arm equipment after installation.	For more information, see Inspection, DressPack upper arm on page 162 .
12	Inspection of the DressPack equipment during programming.	For more information, see Inspection during programming and test-running on page 177 .
13	Adjustment of the upper arm cable package.	For more information, see Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE on page 167 .

Continues on next page

2 Installation

2.2.2 Installation activities

Continued

Procedures, SpotPack Basic cable package - IRBDP SW5 CE

The following procedures are valid for SpotPack Basic cable package IRBDP SW5 CE.

	For information about:	See Installation activities on page 63 .
1	Fitting attachments of IRBDP SW5 CE (SpotPack Basic)	Described in section Fitting the attachments of IRBDP SW5 CE (SpotPack Basic) on page 85 .
2	Fitting the cable package IRBDP SW5 CE (SpotPack Basic)	Described in section Fitting the cable package IRBDP SW5 CE (SpotPack Basic) on page 144 .
3	Inspection during programming and test-running	Detailed in section Inspection during programming and test-running on page 177 .
4	Adjustments of the process cable package IRBDP SW5 CE (SpotPack Basic)	Detailed in section Adjustment of the cable package - IRBDP SW5 CE (SpotPack Basic) on page 172 .

2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

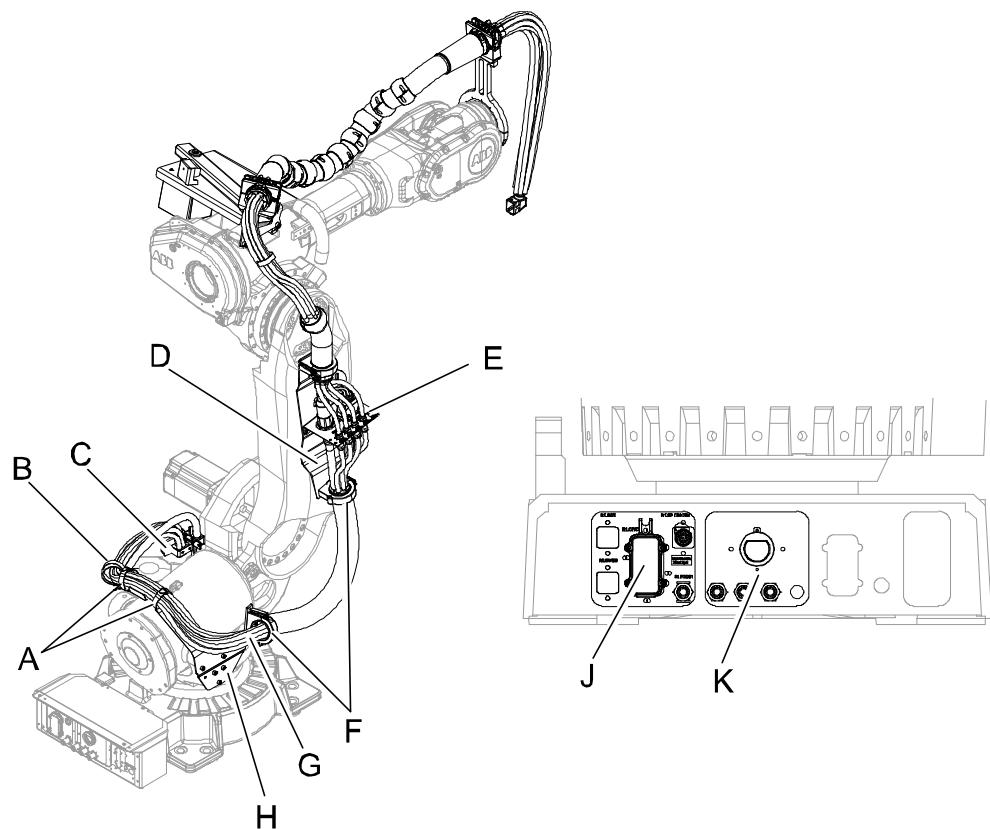


Note

This section is also valid for how to fit the attachments on the lower end of the cable package IRBDP SW2 CE. Only difference is that the connection plate between upper and lower cable package does not exist since the harness is continuous.

Location of the attachments of IRBDP MH2 LE and IRBDP SW2 LE

The location of the attachments of the cable packages IRBDP MH2 LE and SW2 LE are shown in the figure.



xx0700000323

A	Strap
B	Velcro strap
C	Bracket, axis 1
D	Lower arm plate
E	Connection plate (part of process cable package)
F	Gripping clamps
G	Process cable package
H	Side bracket, balancing device (incl. lower bracket)

Continues on next page

2 Installation

2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

Continued

J	Customer plate
K	Process plate

Required spare parts

Spare part	Article number	Note
Material set cable package IRBDP MH2 LE/IRBDP SW2 LE		

Required tools

The following equipment is required for fitting the lower arm cable package attachments.

Equipment	Art. no.	Note
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .

Consumables

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

Procedure

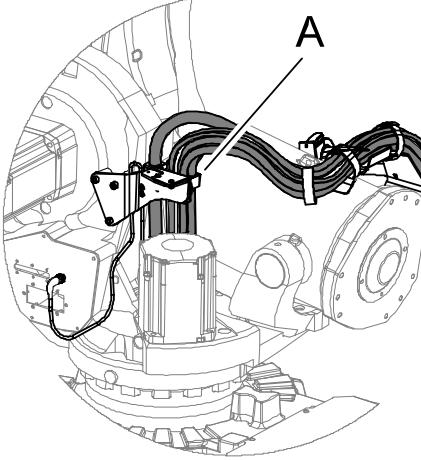
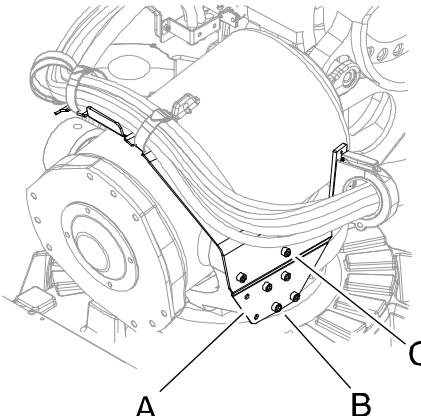
This procedure describes how to install the attachments for the cable packages IRBDP MH2 LE and SW2 LE. The screws are supplied with the kit.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	

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2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

Continued

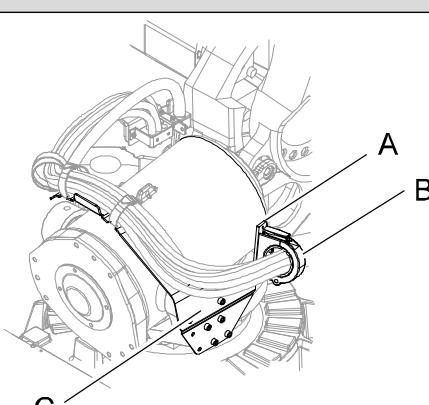
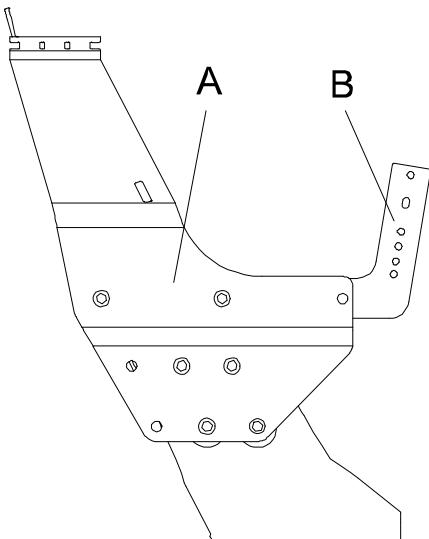
Action	Note						
2 Fit the bracket axis 1 on the frame with its attachment screws. Lock screws with locking liquid.	 xx0700000338 <table border="1"> <tr> <td>A</td> <td>Bracket, axis 1</td> </tr> <tr> <td></td> <td>Screw, M10x16, quality 8.8-A3F (3 pcs)</td> </tr> </table>	A	Bracket, axis 1		Screw, M10x16, quality 8.8-A3F (3 pcs)		
A	Bracket, axis 1						
	Screw, M10x16, quality 8.8-A3F (3 pcs)						
3 Fit the side bracket, balancing device with its attachment screws. Lock the screws with locking liquid.	 xx0700000402 <table border="1"> <tr> <td>A</td> <td>Side bracket, balancing device (incl. lower bracket)</td> </tr> <tr> <td>B</td> <td>Screw, side bracket, M10x16, quality 8.8-A3F (4 pcs)</td> </tr> <tr> <td>C</td> <td>Screw, lower bracket M10x16 quality 8.8-A3F (2 pcs)</td> </tr> </table>	A	Side bracket, balancing device (incl. lower bracket)	B	Screw, side bracket, M10x16, quality 8.8-A3F (4 pcs)	C	Screw, lower bracket M10x16 quality 8.8-A3F (2 pcs)
A	Side bracket, balancing device (incl. lower bracket)						
B	Screw, side bracket, M10x16, quality 8.8-A3F (4 pcs)						
C	Screw, lower bracket M10x16 quality 8.8-A3F (2 pcs)						

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2 Installation

2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

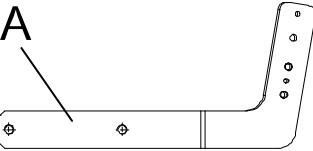
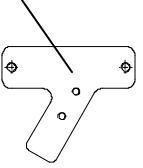
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Action	Note														
<p>4 Fit the gripping clamp to the lower bracket with its attachment screws. Attach the lower bracket to the side bracket, balancing device with its attachment screws. Lock the screws with locking liquid.</p>	 <p>xx0700000342</p> <table border="1"> <tr> <td>A</td> <td>Lower bracket</td> </tr> <tr> <td>B</td> <td>Gripping clamp</td> </tr> <tr> <td>C</td> <td>Side bracket, balancing device</td> </tr> <tr> <td></td> <td>Screw gripping clamp, M8x16, quality 8.8-A2F (2 pcs)</td> </tr> <tr> <td></td> <td>Screw lower bracket, M10x16 quality 8.8-A3F (2 pcs)</td> </tr> </table>  <p>xx0700000334</p> <table border="1"> <tr> <td>A</td> <td>Side bracket, balancing device</td> </tr> <tr> <td>B</td> <td>Lower bracket</td> </tr> </table>	A	Lower bracket	B	Gripping clamp	C	Side bracket, balancing device		Screw gripping clamp, M8x16, quality 8.8-A2F (2 pcs)		Screw lower bracket, M10x16 quality 8.8-A3F (2 pcs)	A	Side bracket, balancing device	B	Lower bracket
A	Lower bracket														
B	Gripping clamp														
C	Side bracket, balancing device														
	Screw gripping clamp, M8x16, quality 8.8-A2F (2 pcs)														
	Screw lower bracket, M10x16 quality 8.8-A3F (2 pcs)														
A	Side bracket, balancing device														
B	Lower bracket														

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2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

Continued

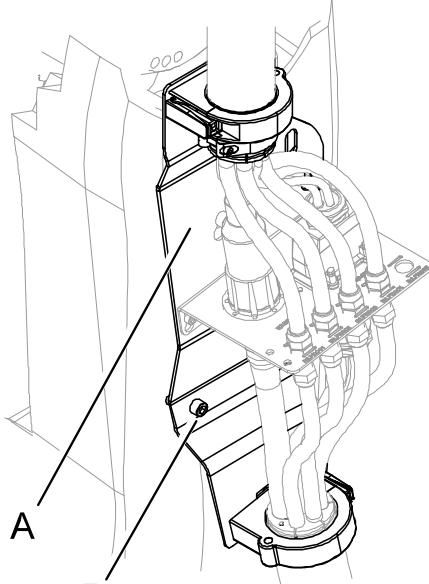
Action	Note						
5  Note The <i>lower bracket</i> is slightly different depending on what cable package is used. See figure to the right.	   <p>xx0700000375</p> <table border="1"> <tr> <td>A</td> <td>Lower bracket (SW and MH internal)</td> </tr> <tr> <td>B</td> <td>Lower bracket (MH external)</td> </tr> <tr> <td>C</td> <td>Lower arm bracket</td> </tr> </table>	A	Lower bracket (SW and MH internal)	B	Lower bracket (MH external)	C	Lower arm bracket
A	Lower bracket (SW and MH internal)						
B	Lower bracket (MH external)						
C	Lower arm bracket						

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2 Installation

2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

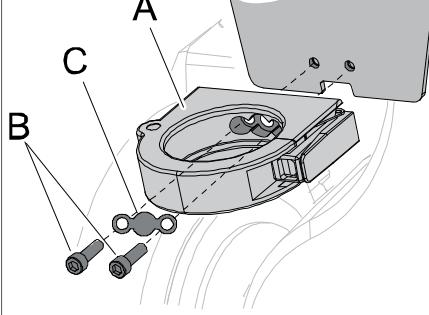
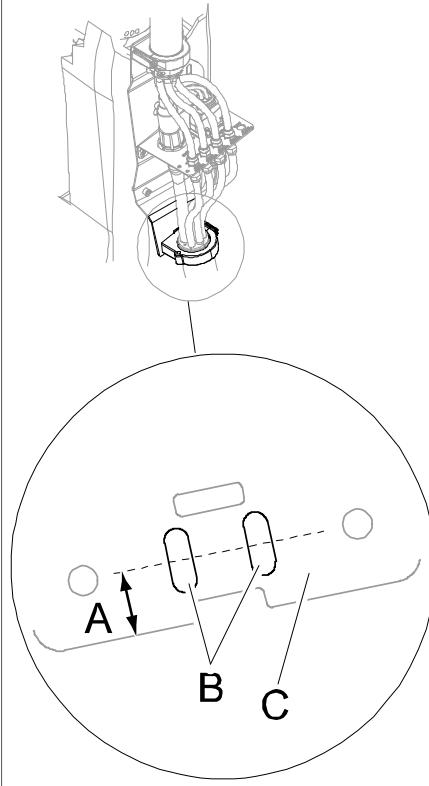
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Action	Note						
6 Fit the lower arm plate to the lower arm with its attachment screws. Lock the screws with locking liquid.	 <p>xx0700000327</p> <table border="1"><tr><td>A</td><td>Lower arm plate</td></tr><tr><td>B</td><td>Screw, M12x25, quality 8.8-A3F (4 pcs) (short upper arm)</td></tr><tr><td>C</td><td>Screws, M12x25 (2 pcs) and M12x35 (2 pcs) with 2 washers, quality 8.8-A3F (long upper arm)</td></tr></table>	A	Lower arm plate	B	Screw, M12x25, quality 8.8-A3F (4 pcs) (short upper arm)	C	Screws, M12x25 (2 pcs) and M12x35 (2 pcs) with 2 washers, quality 8.8-A3F (long upper arm)
A	Lower arm plate						
B	Screw, M12x25, quality 8.8-A3F (4 pcs) (short upper arm)						
C	Screws, M12x25 (2 pcs) and M12x35 (2 pcs) with 2 washers, quality 8.8-A3F (long upper arm)						

Continues on next page

2.2.3 Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE

Continued

Action	Note																
7 Fit the gripping clamp to the lower arm plate.	<p>Note</p> <p>When fitting the gripping clamp, place the attachment screws in the middle of the oval holes, as shown in the figure to the right.</p>  <p>xx0500001418</p> <table border="1"> <tr> <td>A</td> <td>Gripping clamp</td> </tr> <tr> <td>B</td> <td>Screw, M8x25, quality 8.8-A2F (2 pcs)</td> </tr> <tr> <td>C</td> <td>Washer, 2 holes</td> </tr> <tr> <td></td> <td>Washer, (2 pcs)</td> </tr> <tr> <td></td> <td>Locking nuts (2 pcs)</td> </tr> </table>  <p>xx0700000320</p> <table border="1"> <tr> <td>A</td> <td>Measurement 24 mm</td> </tr> <tr> <td>B</td> <td>Oval holes for attachment screws, gripping clamp</td> </tr> <tr> <td>C</td> <td>Lower arm plate</td> </tr> </table>	A	Gripping clamp	B	Screw, M8x25, quality 8.8-A2F (2 pcs)	C	Washer, 2 holes		Washer, (2 pcs)		Locking nuts (2 pcs)	A	Measurement 24 mm	B	Oval holes for attachment screws, gripping clamp	C	Lower arm plate
A	Gripping clamp																
B	Screw, M8x25, quality 8.8-A2F (2 pcs)																
C	Washer, 2 holes																
	Washer, (2 pcs)																
	Locking nuts (2 pcs)																
A	Measurement 24 mm																
B	Oval holes for attachment screws, gripping clamp																
C	Lower arm plate																

2 Installation

2.2.4 Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE

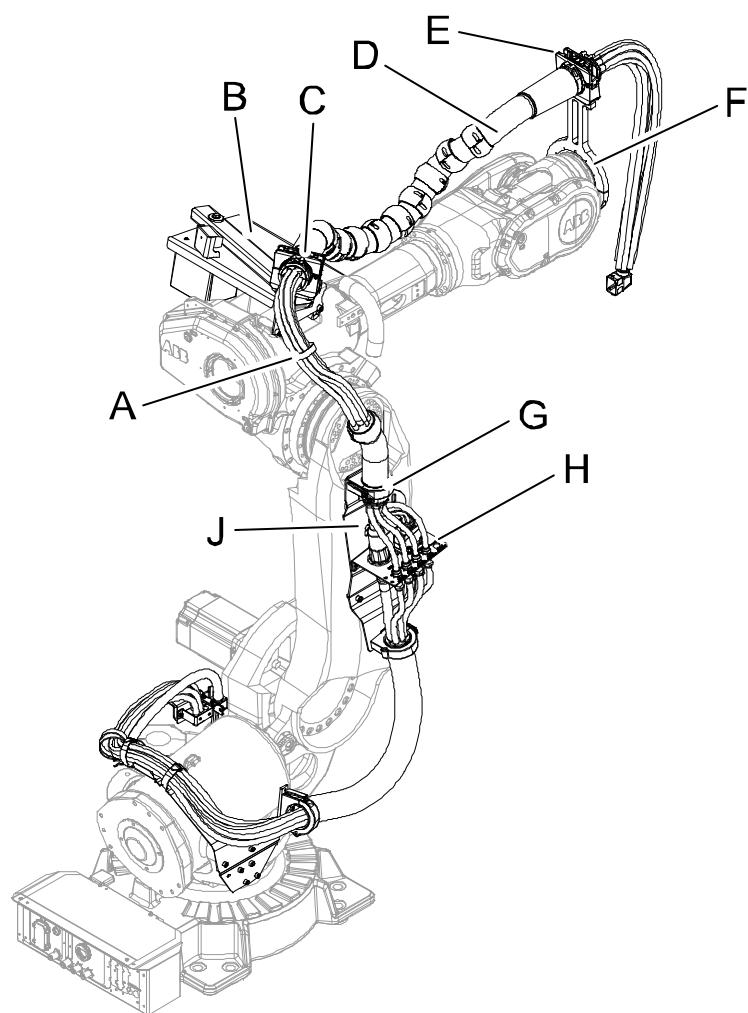


Note

This section is also valid for how to fit the attachments on the upper end of the cable package IRBDP SW2 CE. Only difference is that the connection plate between upper and lower cable package does not exist since the harness is continuous.

Location of the attachments of IRBDP MH2 UE and IRBDP SW2 UE

The location of the attachments of the cable packages IRBDP MH2 UE and SW2 UE is shown in the figure.



xx0700000324

A	Strap and strap holder
B	Tension arm unit
C	Ball joint housing (tension arm)
D	Process cable package

Continues on next page

2.2.4 Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE

Continued

E	Ball joint housing (process cable support axis 6)
F	Process cable support axis 6, complete
G	Gripping clamp (lower arm plate)
H	Connection plate
J	Lower arm plate

Required equipment

The following equipment is required for fitting the cable package attachments.

Equipment	Art. no.	Note
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351</i> .
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.

Required consumables

Consumable	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking the gripping clamps.

Procedure

This procedure describes how to install the attachments for the cable packages IRBDP MH2 UE and SW2 UE. The screws are supplied with the kit.

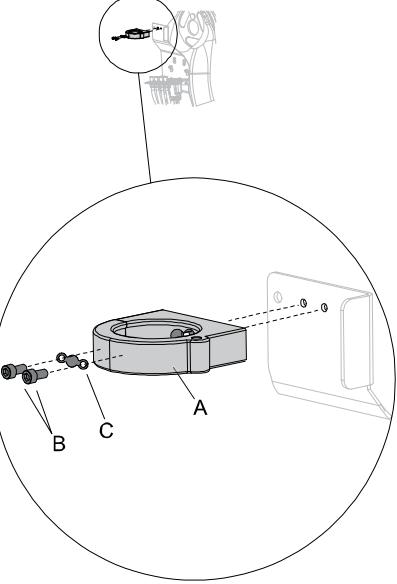
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

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2 Installation

2.2.4 Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE

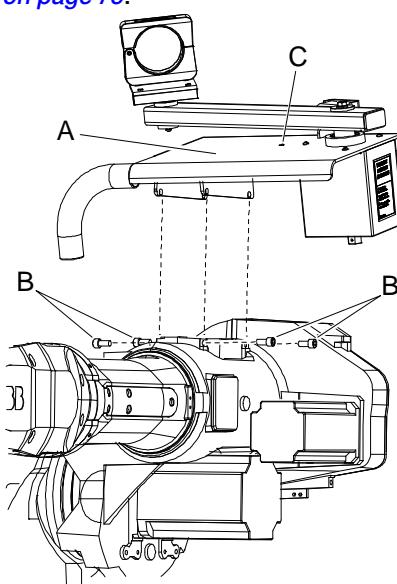
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Action	Note
2 Fit the <i>gripping clamp</i> to the lower arm plate with the two <i>attachment screws</i> . Lock the screws with <i>locking liquid</i> .	Shown in the figure in section, <i>Location of the attachments of IRBDP MH2 UE and IRBDP SW2 UE on page 74</i> Art. no. is specified in section <i>Required equipment on page 75</i> .  xx0500001430 Parts: <ul style="list-style-type: none">• A: Gripping clamp• B: Attachment screws M8x16 quality 8.8-A2F (2 pcs)• C: Washer 2 holes

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2.2.4 Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE

Continued

	Action	Note
3	<p>Fit the tension arm on the arm-house of the robot with the four attachment screws.</p> <p>It is possible to use the Ø10 mm hole with a suitable lifting accessory, to lift the tension arm unit.</p> <p>Lock the screws with <i>locking liquid</i>.</p>	<p>Shown in the figure in section, Location of the attachments of IRBDP MH2 UE and IRBDP SW2 UE on page 74</p> <p>Art. no. is specified in section Required equipment on page 75.</p>  <p>xx0500001433</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Tension arm unit • B: Attachment screws M12x25 quality 8.8-A3F (4 pcs) • C: Ø10 mm hole

Continues on next page

2 Installation

2.2.4 Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE

Continued

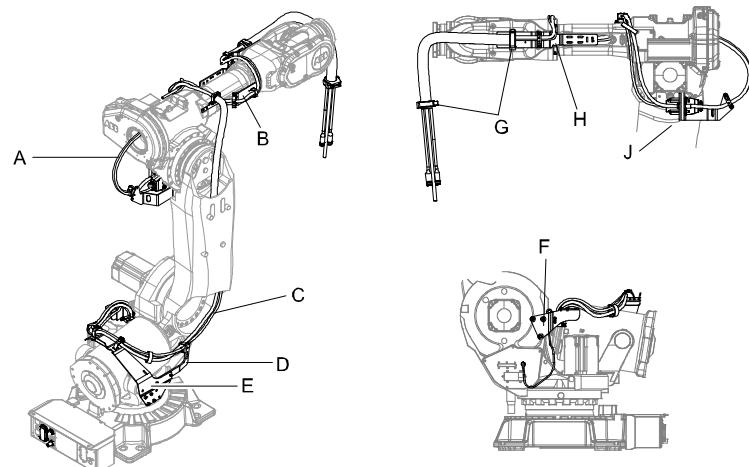
Action	Note
<p>4 Fit the <i>process cable support, axis 6 complete</i> by performing the following steps:</p> <ul style="list-style-type: none">• Remove the lower half of the process cable support axis 6 (<i>clamp</i>), by removing its attachment screws.• Fit the parts from "behind" the robot turning disk.• Make sure the process cable support is turned the right way!• Pull the assembly forwards until it is seated against the rear of the turning disk. <p> Note</p> <p>Lock the <i>M10x40 screws</i> with <i>locking liquid</i>. Do not use locking liquid on the <i>M12x80 screws</i> ! Tightening torque <i>M12x80 screws</i>: 70 Nm</p> <p> Note</p> <p>Make sure there are equal gaps between clamp and support of the process cable support axis 6.</p>	

2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

Location

The location of the attachments of the cable packages IRBDP MH1 LI and IRBDP MH3 UE are shown in the figure.



xx0700000390

A	Upper cable package MH dressing IRBDP MH3 UE
B	Bracket, right
C	Lower cable package MH dressing IRBDP MH1 LI
D	Lower bracket
E	Side bracket, balancing device
F	Bracket, axis 1
G	Gripping clamps
H	Bracket, left
J	Connection plate

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/Spot-Pack on page 351 .

Required spare parts

Spare part	Article number	Note
Material set cable package IRBDP MH1 LI		

Continues on next page

2 Installation

2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

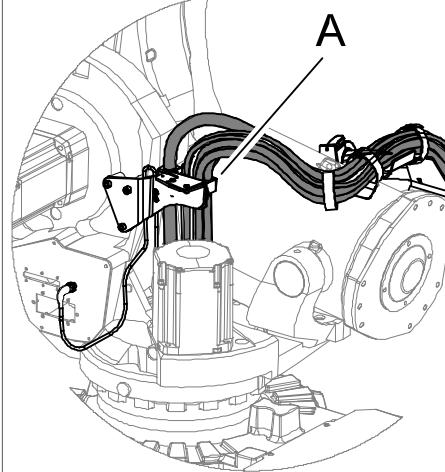
Continued

Required consumables

Consumable	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243. For locking screws securing brackets and connection plate.

Fitting the lower arm cable attachments, IRBDP MH1 LI

This procedure describes how to install the attachments for the cable package IRBDP MH1 LI. All screws are supplied with the kit.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2	Fit the <i>bracket axis 1</i> on the frame with its three attachment screws M10x16 quality 8.8-A3F.	<p>Lock screws with <i>Loctite 243</i>.</p>  <p>xx0700000338</p> <p>Parts:</p> <ul style="list-style-type: none">• A: Bracket, axis 1

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2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

Continued

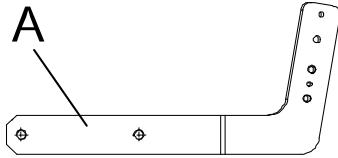
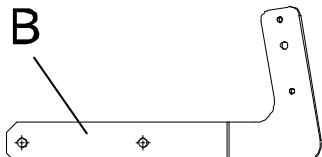
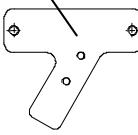
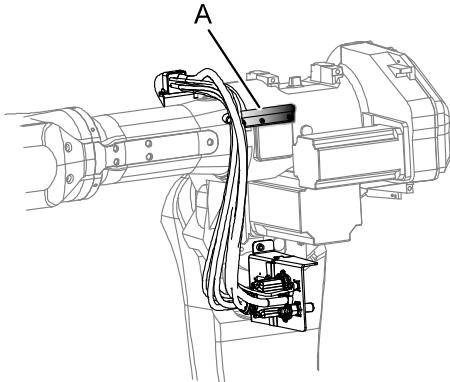
Action	Note
3 Fit the <i>side bracket balancing device</i> with its attachment screws. Lock screws with <i>locking liquid</i> .	<p>Art. no. is specified in <i>Required tools on page 79</i>.</p> <p>xx0700000388</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Straps • B: Velcro straps • C: Rubber clamp with bracket • D: Side bracket balancing device, Screw M10x16, quality 8.8-A3F (4 pcs) • E: Lower bracket

Continues on next page

2 Installation

2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

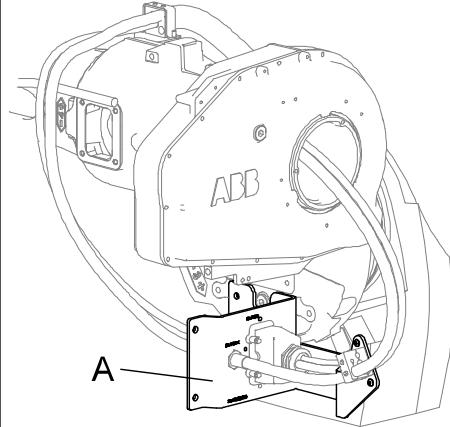
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Action	Note
<p>4 Fit the <i>lower bracket</i> on the side bracket balancing device with its attachment screws. Lock screws with <i>locking liquid</i>.</p> <p> Note</p> <p>The lower bracket is slightly different depending on what cable package is used. Choose the correct one. See figure to the right!</p>	   <p>xx0700000375</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Lower bracket (SW & MH internal) • B: Lower bracket MH (external) • C: Lower arm bracket • Screw, M10x16, quality 8.8-A3F (2 pcs) <p>Art. no. is specified in Required tools on page 79.</p>
<p>5 Fit the <i>cable guide</i> on the upper arm.</p>	 <p>xx1000000119</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Cable guide

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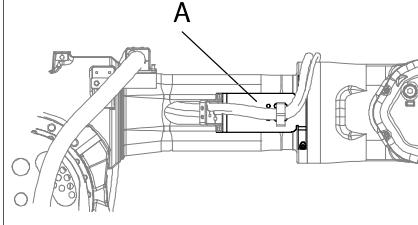
2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

Continued

Action	Note
6 Fit the <i>connection plate</i> to axis 3 with its attachment screws. Lock screws with <i>locking liquid</i> .	 xx0700000365 Parts: <ul style="list-style-type: none"> • A: Connection plate • Screw, M10x16, quality 8.8-A3F (2 pcs) Art. no. is specified in Required tools on page 79 .

Fitting the upper arm cable attachments, IRBDP MH3 UE

This procedure describes how to install the attachments of the cable package IRBDP MH3 UE.

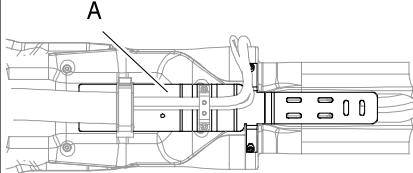
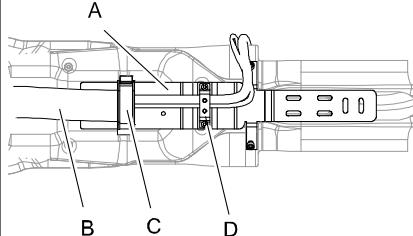
Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2 Fit <i>bracket right</i> with its attachment screws M8x16 quality 8.8-A2F (2 pcs). Lock screws with <i>locking liquid</i> . Screws are supplied with the kit.	 xx0700000366 Parts: <ul style="list-style-type: none"> • A: Bracket, right Art. no. is specified in Required tools on page 79 .

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2 Installation

2.2.5 Fitting the attachments of IRBDP MH1 LI and MH3 UE

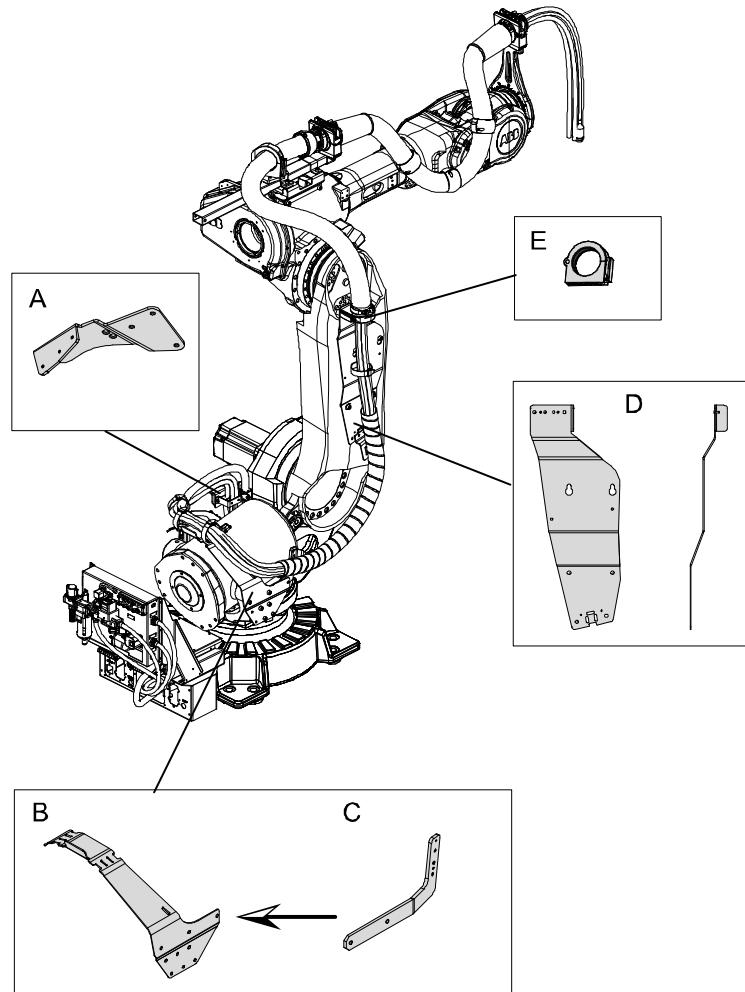
Continued

Action	Note
<p>3 Fit <i>bracket left</i> with its attachment screws M8x16 quality 8.8-A2F (2 pcs). <i>Lock screws with locking liquid.</i> Screws are supplied with the kit.</p>	 xx0700000367 <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, left <p>Art. no. is specified in <i>Required tools on page 79</i>.</p>
<p>4 Fit a <i>gripping clamp</i> on the <i>bracket, left</i>, with its attachment screws M8x16 quality 8.8-A2F (2 pcs). <i>Lock screw with locking liquid.</i> Screws are supplied with the kit.</p>	 xx0700000372 <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, left • B: Protection hose • C: Gripping clamp • D: Rubber clamp with bracket <p>Art. no. is specified in <i>Required tools on page 79</i>.</p>

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)**Location of the attachments**

The location of the attachments of IRBDP SW5 CE (SpotPack Basic) is shown in the figure.



xx0800000067

A	Bracket axis 1
B	Side bracket balancing cylinder
C	Lower bracket + Spiral hose clamp
D	Lower arm plate + Spiral hose clamp fitted at lower holes
E	Gripping clamp

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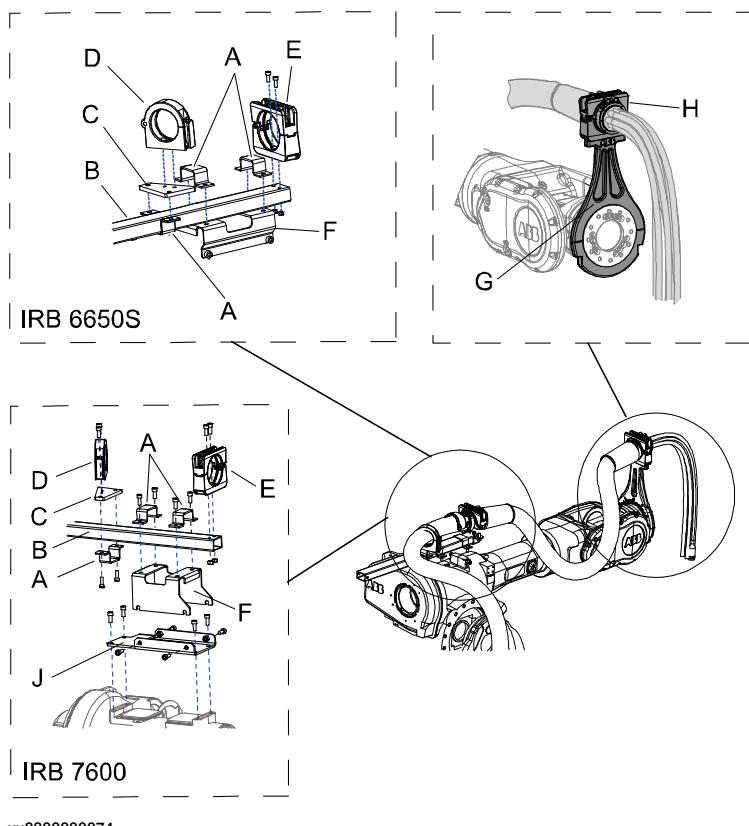
2 Installation

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

Continued

Location of upper attachments

The location of the upper attachments of the cable package IRBDP SW5 CE (SpotPack Basic) are shown in the figure below.



xx0800000074

A	Bracket (3 pcs)
B	Adjustable bracket
C	Angled clamp bracket
D	Gripping clamp
E	Ball joint housing (adjustable bracket)
F	Axis 3 bracket
G	Process cable support axis 6
H	Ball joint housing (harness support axis 6)
J	Adapter plate (only applicable to IRB 7600)

Required equipment

Equipment	Part. no.	Note
Standard toolkit DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
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.

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2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

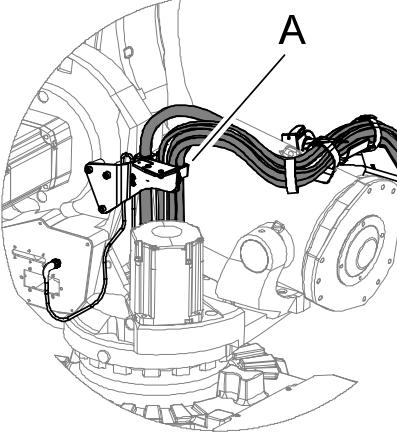
Continued

Required consumables

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

Fitting cable attachments - lower end

This procedure describes how to install the attachments at the lower end of the cable package (SpotPack basic).

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	Fit the <i>bracket axis 1</i> on the frame with its attachment screws M10x16 quality 8.8-A3F (3 pcs). <i>Lock screws with locking liquid.</i>	 xx0700000338 Parts: <ul style="list-style-type: none"> • A: Bracket axis 1

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2 Installation

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

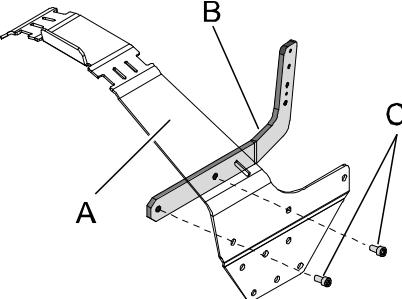
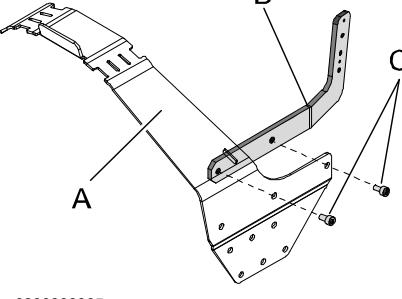
Continued

Action	Note
3 Fit the <i>side bracket balancing cylinder</i> with its attachment screws. <i>Lock screws with locking liquid.</i> The screws are supplied with the kit.	 x0800000010 Parts: <ul style="list-style-type: none">A: Side bracket balancing cylinderB: Attachment screws M10x16 quality 8.8-A3F (4 pcs)

Continues on next page

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

Continued

Action	Note
4 Fit the <i>lower bracket</i> on the <i>side bracket balancing cylinder</i> with its attachment screws. Also fit the <i>spiral hose clamp</i> on the lower bracket. Lock screws with <i>locking liquid</i> . The screws are supplied with the kit.	 <p>xx0800000064</p> <p>Variants IRB 6640 - SW 2.55</p> <ul style="list-style-type: none"> • A: Side bracket balancing cylinder • B: Lower bracket + Spiral hose clamp • C: Attachment screw M10x16 quality 8.8-A3F (2 pcs)  <p>xx0800000065</p> <p>Variants IRB 6640 - SW 2.75</p> <ul style="list-style-type: none"> • A: Side bracket balancing cylinder • B: Lower bracket + Spiral hose clamp • C: Attachment screw M10x16 quality 8.8-A3F (2 pcs) <p>Note</p> <p>The lower bracket is fitted differently depending on robot variant. See figures above!</p>
5 Fit the <i>spiral hose clamp</i> on the bottom lower bracket.	Shown in the figure Location of the attachments on page 85 .

Continues on next page

2 Installation

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

Continued

Action	Note
6 Fit the <i>lower arm plate</i> to the lower arm with its attachment screws. Lock screws with <i>locking liquid</i> .	 xx0800000072 <p>Parts:</p> <ul style="list-style-type: none"> A: Lower arm plate B: Attachment screws M12x25 quality 8.8-A3F, 4 pcs (short upper arm) B: Attachment screws, 2 pcs M12x25 and 2 pcs M12x35 with 2 washers, quality 8.8-A3F (long upper arm) C: Lower arm
7 Fit the <i>gripping clamp</i> on the <i>lower arm plate</i> with: <ul style="list-style-type: none"> attachment screws M8x25 quality 8.8-A2F (2 pcs) washer 2 holes Lock screws with locking liquid.	 xx0800000073 <p>Parts:</p> <ul style="list-style-type: none"> A: Gripping clamp B: Washer 2 holes C: Attachment screws M8x25 quality 8.8-A2F (2 pcs) D: Lower arm plate

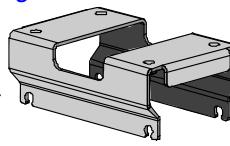
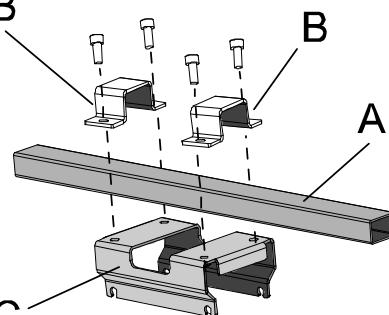
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2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

Continued

Fitting cable attachments - upper end

This procedure describes how to install the attachments at the upper end of the cable package (SpotPack basic).

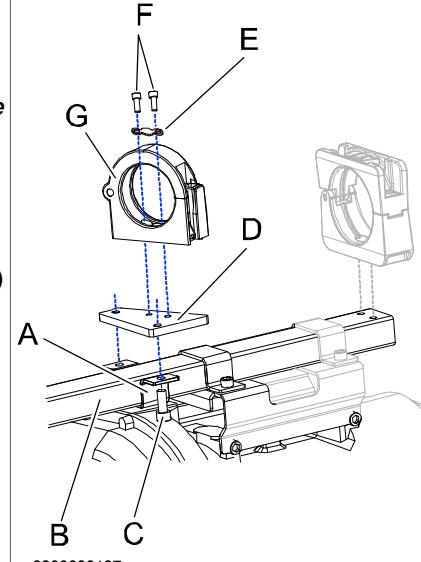
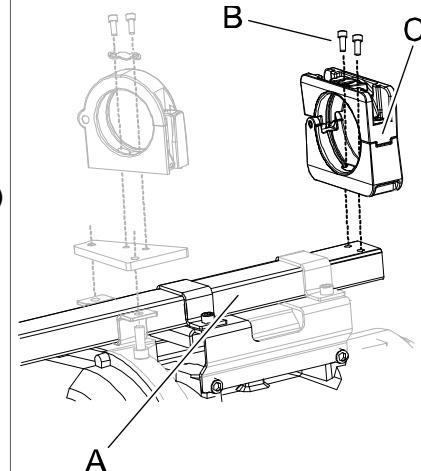
Action	Note
<p>1</p>  DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
<p>2</p> Fit the <i>axis 3 bracket</i> to the armhouse with its attachment screws. Lock screws with <i>locking liquid</i> .	Locking liquid is specified in Required equipment on page 86 .  A xx0800000075 Parts: <ul style="list-style-type: none"> • A: Axis 3 bracket
<p>3</p> Fit the <i>adjustable bracket</i> to the <i>axis 3 bracket</i> with its brackets and attachment screws. Lock screws with <i>locking liquid</i> .	Locking liquid is specified in Required equipment on page 86 .  B B C xx0800000076 Parts: <ul style="list-style-type: none"> • A: Adjustable bracket • B: Bracket • C: Axis 3 bracket

Continues on next page

2 Installation

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

Continued

Action	Note
<p>4 Fit the <i>gripping clamp</i> to the <i>angled clamp bracket</i> with its <i>attachment screws</i> and <i>washer 2 holes</i>. Note Lock screws with <i>locking liquid</i>. Then fit the angled clamp bracket with the gripping clamp already fitted on the <i>adjustable bracket</i> with the <i>bracket</i> and its <i>attachment screws</i>.</p> <p>Note Do not secure the attachment screws (M10x25) at this point! It must still be possible to move the gripping clamp back and forth on the adjustable bracket. Adjustment of the gripping clamp is detailed in section <i>Adjustment of the cable package - IRBDP SW5 CE (SpotPack Basic) on page 172</i>.</p>	<p>Locking liquid is specified in Required equipment on page 86.</p>  <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket • B: Adjustable bracket • C: Attachment screw M10x25 quality 8.8-A3F (2 pcs) • D: Angled clamp bracket • E: Washer 2 holes • F: Attachment screw M8x16 quality 8.8_A2F (2 pcs) • G: Gripping clamp
<p>5 Fit the <i>ball joint housing</i> to the <i>adjustable bracket</i> with the <i>bracket</i> and its <i>attachment screws</i> and <i>washer 2 holes</i>. Note Do not secure the attachment screws (M10x25) at this point! It must still be possible to move the gripping clamp back and forth on the adjustable bracket. Adjustment of the gripping clamp is detailed in section <i>Adjustment of the cable package - IRBDP SW5 CE (SpotPack Basic) on page 172</i>.</p>	 <p>Parts:</p> <ul style="list-style-type: none"> • A: Adjustable bracket • B: Attachment screw M10x25 quality 8.8-A3F (2 pcs) • C: Ball joint housing

Continues on next page

2.2.6 Fitting the attachments of IRBDP SW5 CE (SpotPack Basic)

Continued

	Action	Note
6	Fit the <i>harness support axis 6</i> to the turning disk with its attachment screws. Lock screws with <i>locking liquid</i> .	Shown in the figure Location of upper attachments on page 86 . Locking liquid is specified in Required equipment on page 86 .
7	Fit the <i>ball joint housing</i> the harness support axis 6 with its attachment screws. Lock screws with <i>locking liquid</i> .	Shown in the figure Location of upper attachments on page 86 . Locking liquid is specified in Required equipment on page 86 .

2 Installation

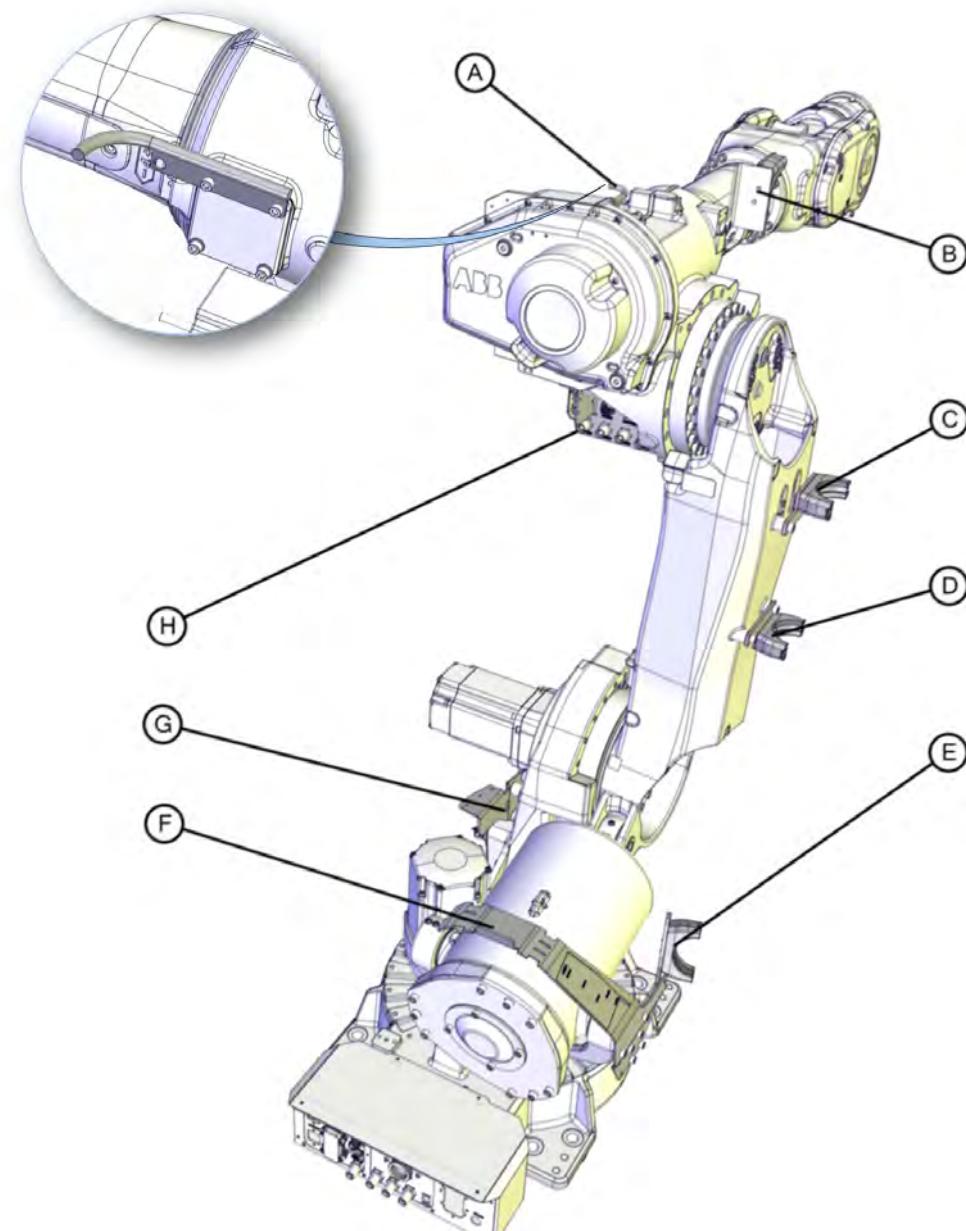
2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Location of the attachments of the cable package

The attachments of the cable package are located as shown in the figures. There are two variants of fastening the cable package to the process turning disc, both of the variants are shown in the figures.

The figure shows the attachments of the cable packages IRBDP SW6 LE and IRBDP MH6 LE.



xx1200000031

A	Cable guide (see enlarged image)
B	Housing lower part fitted on bracket
C	Ball joint housing fitted on lower arm bracket

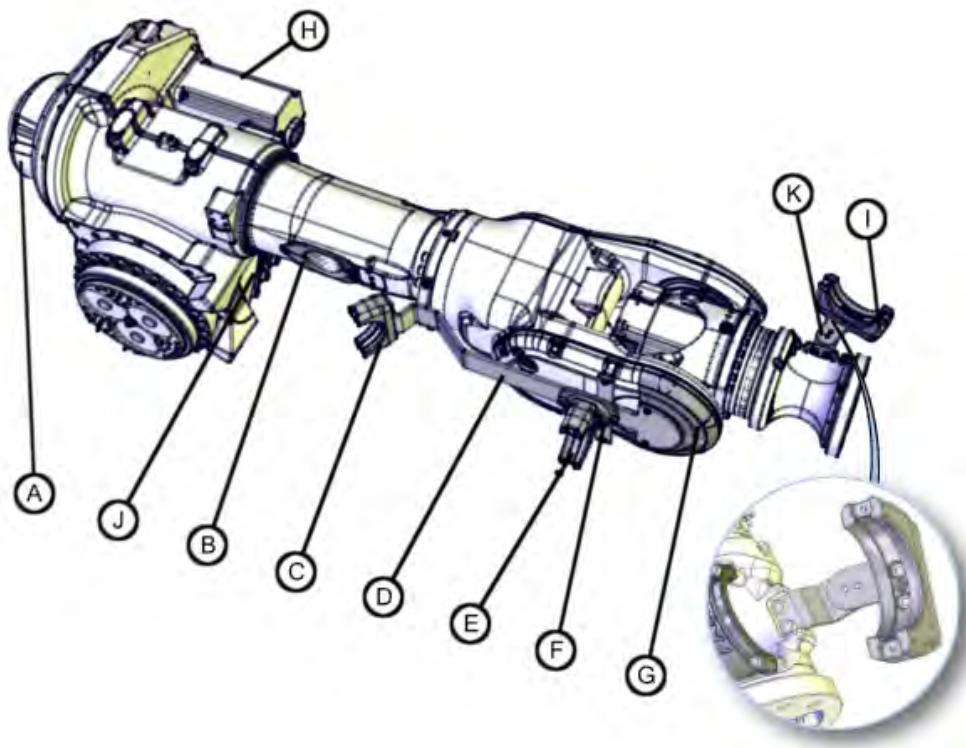
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2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

D	Ball joint housing fitted on lower arm bracket
E	Ball joint housing fitted on lower bracket
F	Side bracket balancing cylinder
G	Bracket axis 1
H	Connection plate

The figure shows the attachments of the cable packages IRBDP SW6 UI and IRBDP MH6 UI.



xx1200000032

A	Cover
B	Insert (and tube, inside upper arm)
C	Housing, lower part
D	Upper arm bracket
E	Housing, lower part
F	Bearing housing
G	Wrist protection cover
H	Mounting plate axis 3 (Not visible in this view)
I	Housing, lower part
J	Connection plate
K	Adjustable axis 6 brackets

Continues on next page

2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Required equipment

Equipment, etc.	Art. no.	Note
Material set cable package IRBDP SW6 UI and IRBDP MH6 UI. Material set cable package IRBDP SW6 LE and IRBDP MH6 LE.	Spare part number is specified in: • <i>Spare parts on page 355.</i>	
Locking liquid	3HAB7116-1	Loctite 243 For locking attachment screws.
Standard toolkit	-	Content is defined in section <i>Standard toolkit on page 351.</i>
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.

Fitting the cable attachments - IRBDP SW6 LE and IRBDP MH6 LE

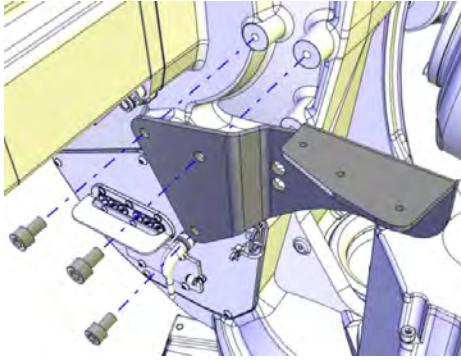
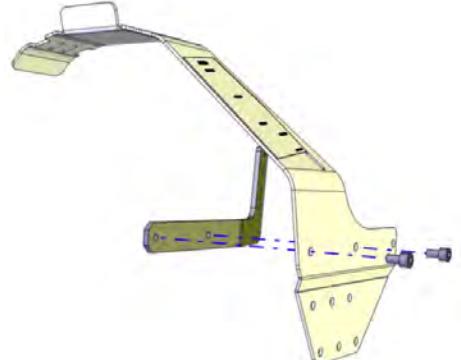
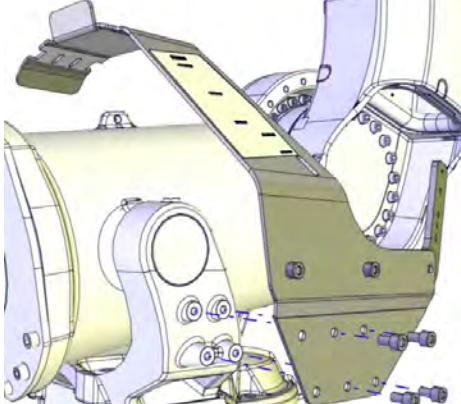
Use this procedure to fit the cable attachments of the cable packages **IRBDP SW6 LE** and **IRBDP MH6 LE**.

Action	Note
1 Move the robot to a comfortable position for fitting the cable attachments on the lower arm.	
2  DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.  DANGER Turn off all electric power, hydraulic and pneumatic pressure supplies to the robot and for the track motion.	

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2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

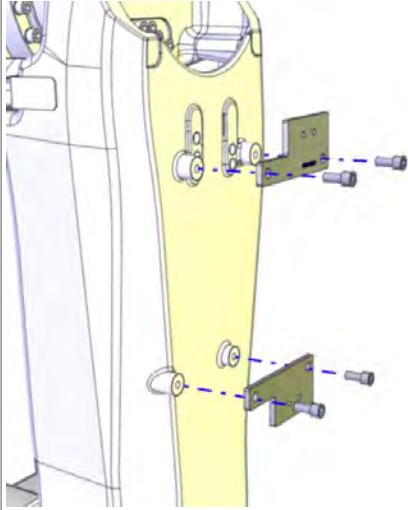
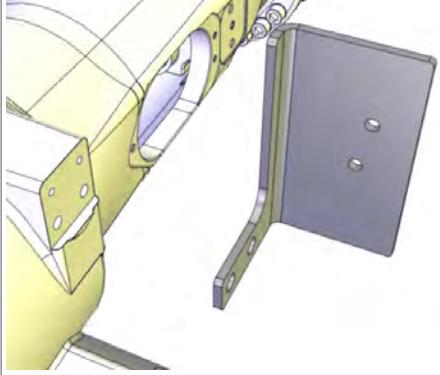
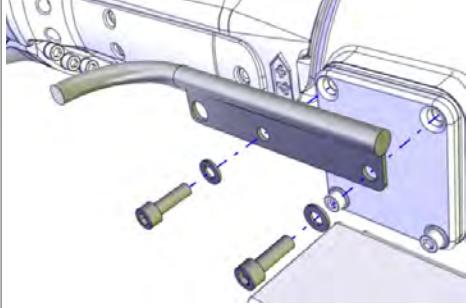
Action	Note
3 Fit the <i>bracket axis 1</i> on the frame. Lock screws with locking liquid (Loctite 243).	 xx1200000025 Attachment screws: M10x16 quality 8.8.A3F (3 pcs)
4 Fit the <i>lower bracket</i> on the side bracket balancing cylinder. Lock screws with locking liquid (Loctite 243).	 xx1200000027 Attachment screws: M12x25 quality 8.8.A3F (2+2 pcs)
5 Fit the <i>side bracket balancing cylinder</i> with the lower bracket already fitted. Lock screws with locking liquid (Loctite 243).	 xx1200000026 Attachment screws: M10x16 quality 8.8.A3F (4 pcs)

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2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Action	Note
6 Fit the two <i>brackets for cable clamp</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000028 Attachment screws: M12x25 quality 8.8.A3F (2+2 pcs)
7 Fit the <i>bracket for cable clamp</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000029 Attachment screws: M12x25 quality 8.8.A2F (2 pcs)
8 Fit the <i>cable guide</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000030 Attachment screws: M8x25 quality 8.8-A2F (2 pcs) + washers

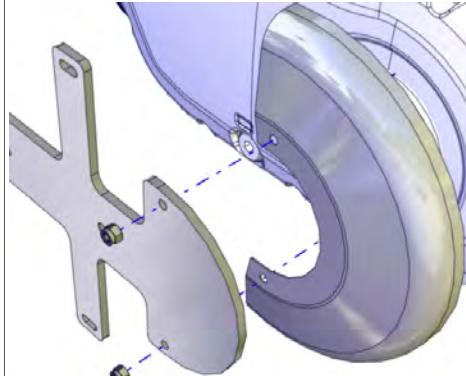
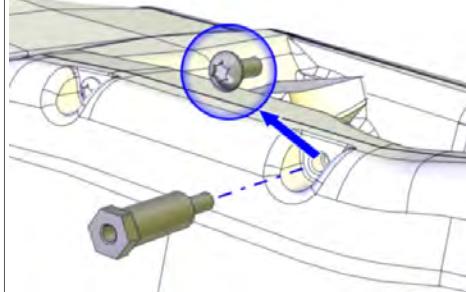
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2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Fitting the cable attachments - IRBDP SW6 UE and IRBDP MH6 UE

Use this procedure to fit the cable attachments of the cable package **IRBDP SW6 UI** and **IRBDP MH6 UI**.

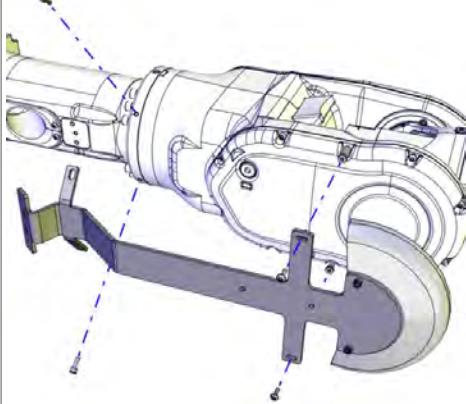
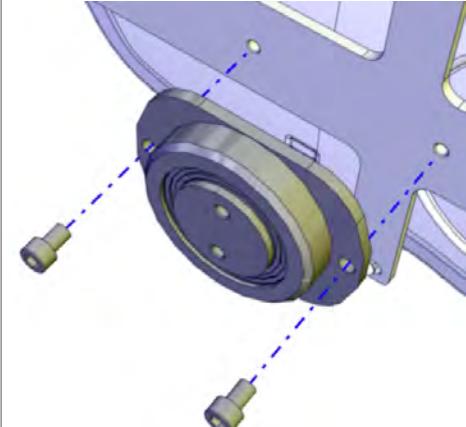
	Action	Note
1	Move the robot to a comfortable position for fitting the cable attachments on the upper arm.	
2	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
3	Fit the <i>wrist protection cover</i> to the upper arm bracket. Attachment screws fitted from inside. Secure the wrist protection cover to the upper arm bracket with the nuts from the outside.	 xx1200000040 Attachment screws and nuts: M6x10 quality 8.8-A2F (2 pcs) + nuts M6 quality steel 8-A2F (2 pcs)
4	Remove two M6 screws securing the wrist cover and replace them with <i>distance screws with flange</i> . The second screw is placed diagonally below the screw shown. Lock distance screws with locking liquid (Loctite 243).	 xx1200000041

Continues on next page

2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Action	Note
5 Fit the <i>upper arm bracket</i> with the wrist protection cover already fitted. Lock screws with locking liquid (Loctite 243).	 xx1200000062 Attachment screws: M8x20 quality 8.8-A2F (2 pcs) M6x13 quality 8.8-A2F (2 pcs) + washers (2 pcs)
6 Fit the <i>bearing housing</i> on the upper arm bracket. Lock screws with locking liquid (Loctite 243).	 xx1200000039 Attachment screws: M8x12 quality 8.8-A2F (2 pcs)

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2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

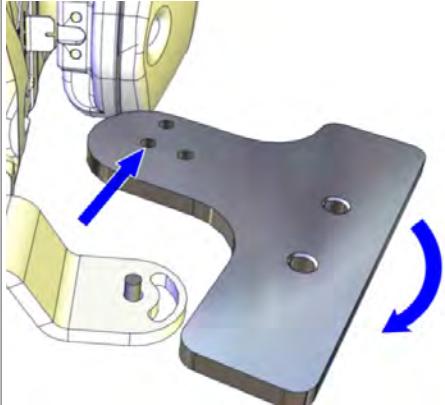
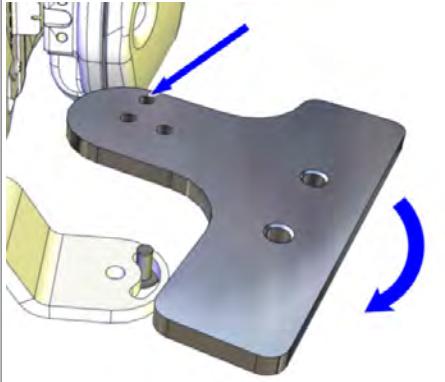
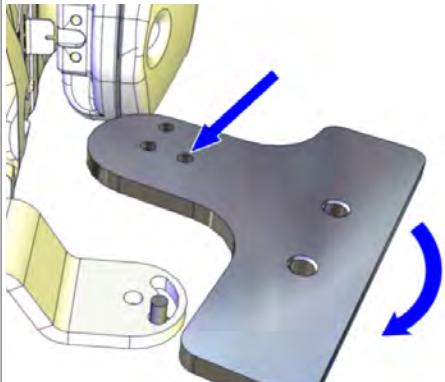
	Action	Note
7	Fit the <i>adjustable A6 bracket 1(2)</i> . Lock screws with locking liquid (Loctite 243).	<p>xx1200000037</p> <p>Attachment screws: M8x16 quality 8.8-A2F (2 pcs)</p>
8	Fit the <i>adjustable A6 bracket 2(2)</i> . Normally this adjustable bracket shall be locked in its most forward position. How to do that is described in the steps followed.	<p>xx1200000157</p>
9	 Note If it is not possible to lock the adjustable bracket 2(2) in its most forward position by following the instructions below, then move the athe bracket 2(2) as far forward as possible. If this is the case the screw shown in the figure is not needed and shall not be used!	

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2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

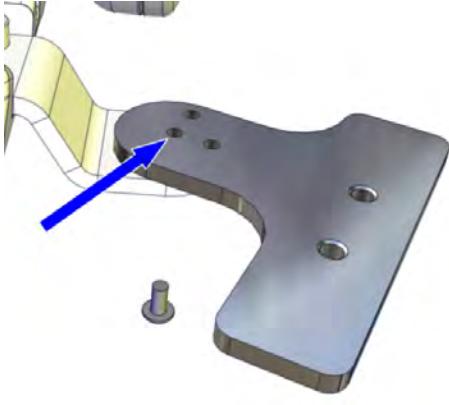
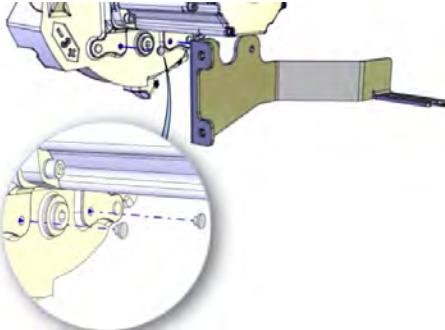
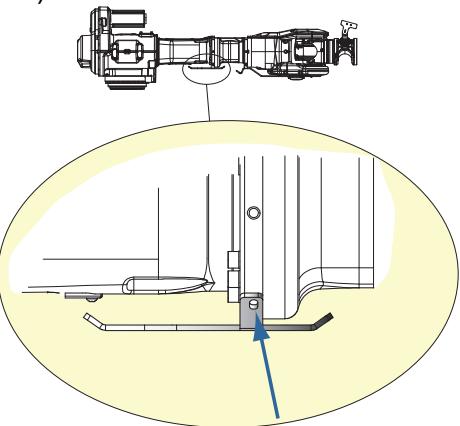
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Action	Note
10 Fit a screw in the hole, as shown in the figure, but do not tighten it fully yet.	 xx1200000154 Attachment screw: M8x16 quality 8.8-A2F
11 Fit a screw in the hole shown in the figure. Lock the screw with locking liquid (Loctite 243). The adjustable bracket w2(2) is now locked in its most forward position.	 xx1200000038 Attachment screw: M8x16 quality 8.8-A2F
12 Secure the adjustable braket 2(2) with the screw shown in the figure. Lock the screw with locking liquid (Loctite 243).	 xx1200000155 Attachment screw: M8x16 quality 8.8-A2F

Continues on next page

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

	Action	Note
13	Remove the screw shown in the figure and apply locking liquid.	 xx1200000156 Attachment screw: M8x16 quality 8.8-A2F
14	Refit the screw.	
15	Remove the plastic plugs (if any) and fit the <i>mounting plate axis 3</i> .	 xx1200000115 Attachment screws: M10x16 quality 8.8-A2F (2 pcs)
16	Only valid with upper arm extension! Fit the <i>extension plate</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000118 A Holes for attachment screws B Position where to fit velcro strap Attachment screws: M8x16 quality 8.8-A2F (2 pcs)

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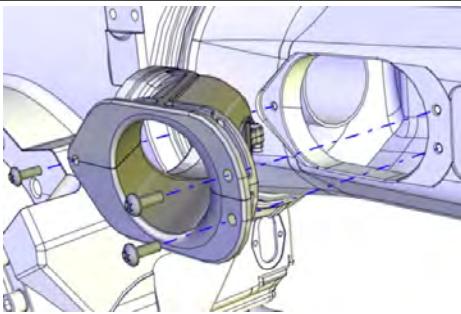
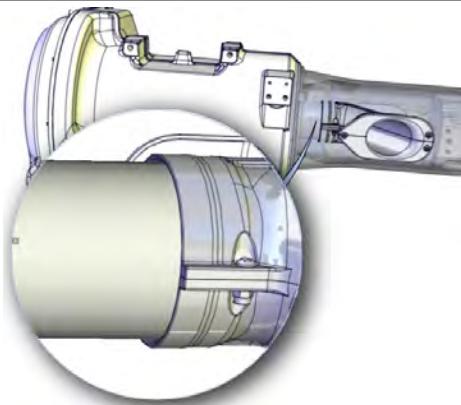
2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Fitting insert, tube and cover

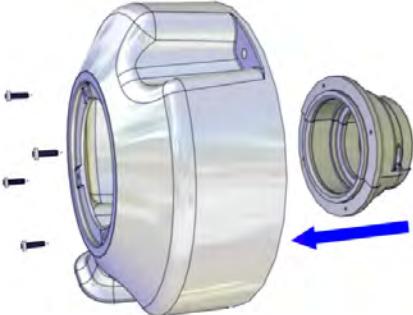
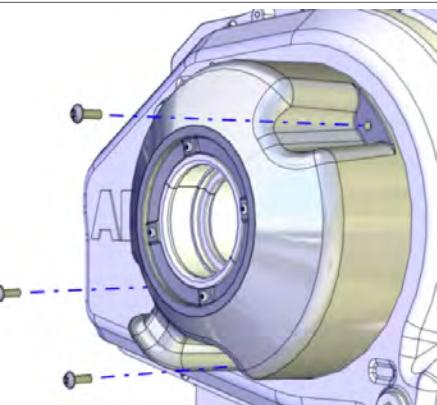
Use this procedure to fit the insert, tube and cover.

Action	Note
1 Fit the <i>insert</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000042 Attachment screws: M6x16 quality 8.8-A2F (3 pcs)
2 Insert the <i>tube</i> into the arm tube and fit it into the insert.	 xx1200000043
3 Mount the two parts of the tube guiding ring.	 xx1200000162 Pan head screw ST3.9x16 (2 pcs).

Continues on next page

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Action	Note
4 Fit the <i>tube guiding ring</i> in the cover.	 xx1200000044 <p>Attachment screws: Pan head screw ST3.9x16 (4 pcs).</p>
5 Fit the <i>cover</i> with the <i>tube guiding ring</i> fitted, on the <i>tube</i> and secure it to the <i>arm-house cover</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000045 <p>Note Check that the tube is being fitted correctly in both ends, when fitting the cover.</p> <p>Attachment screws: M6x16 quality 8.8-A2F (3 pcs)</p>

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2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

Fitting the housing, lower part

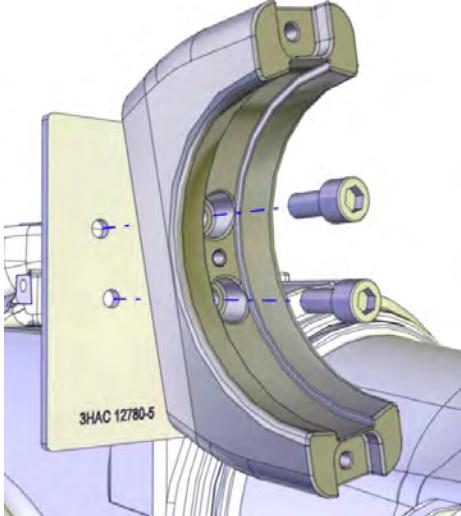
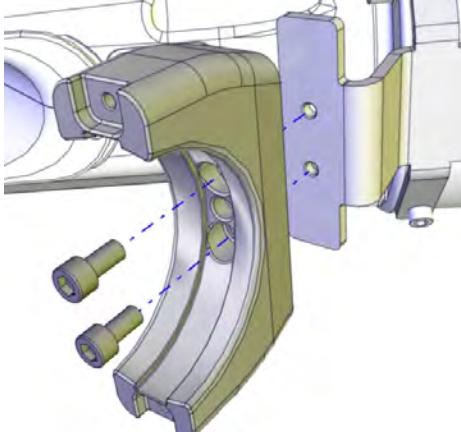
Use this procedure to fit the housing, lower part.

Action	Note
1 Fit the housing, lower part, to the <i>lower bracket</i> . Lock screws with locking liquid (Loctite 243).	 Attachment screws: M8x16 quality 8.8-A2F (2 pcs)
2 Fit the housing, lower part, one on each of the <i>brackets for cable clamp</i> . Lock screws with locking liquid (Loctite 243).	 Attachment screws: M8x16 quality 8.8-A2F (2+2 pcs)

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2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

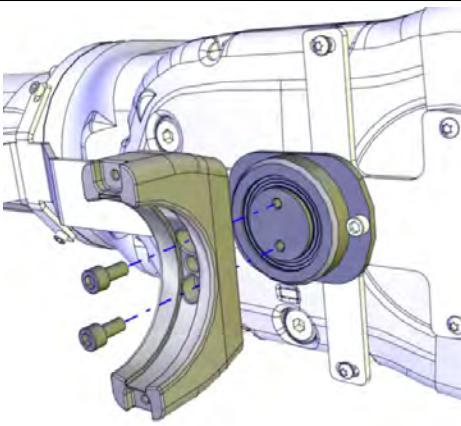
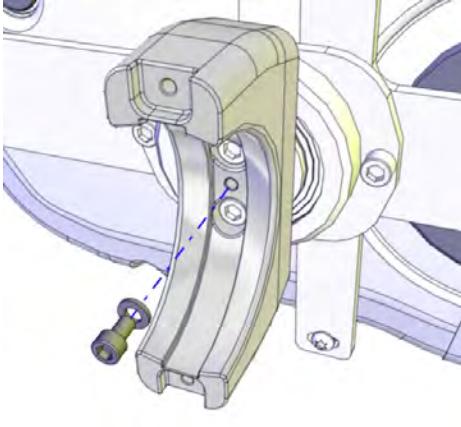
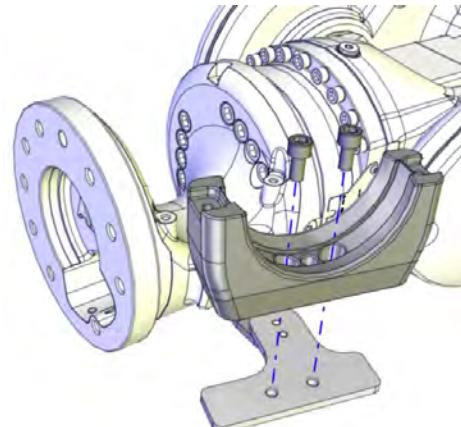
Action	Note
3 Fit the housing, lower part, on the <i>bracket for cable clamp</i> . Lock screws with locking liquid (Loctite 243).	 <p>Attachment screws: M8x16 quality 8.8-A2F (2 pcs)</p>
4 Only valid with upper arm extension! Fit the housing, lower part, on the <i>extension plate</i> . Lock screws with locking liquid (Loctite 243).	<p>Attachment screws: M8x16 quality 8.8-A2F (2 pcs)</p>
5 Fit the housing, lower part, on the <i>upper arm bracket</i> closest to the armhouse. Lock screws with locking liquid (Loctite 243).	 <p>Attachment screws: M8x16 quality 8.8-A2F (2 pcs)</p>

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2 Installation

2.2.7 Fitting the attachments of IRBDP SW6 & MH6 UI/LE (Lean ID)

Continued

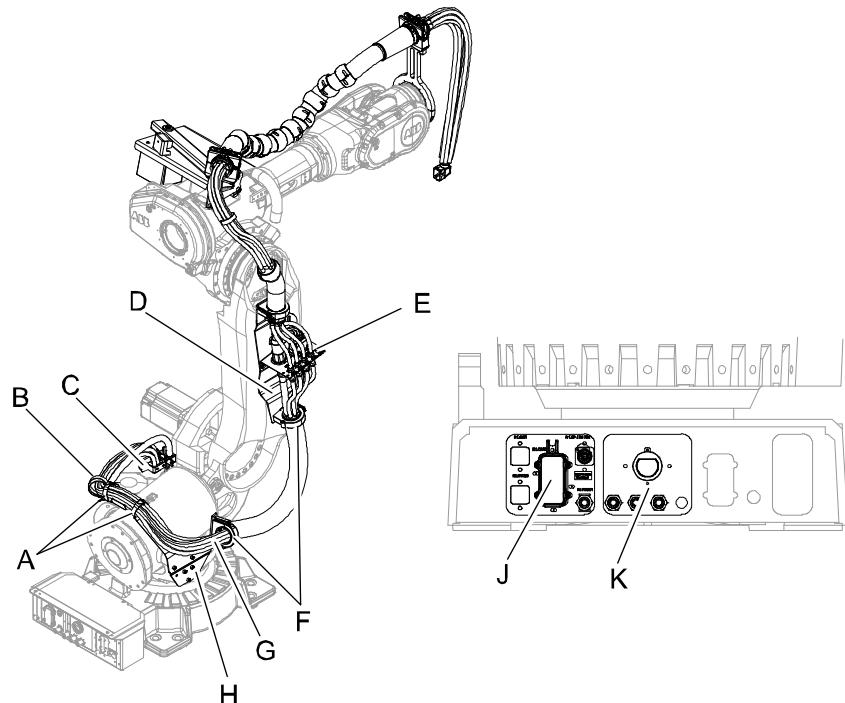
Action	Note
6 Fit the housing, lower part, on the <i>bearing housing</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000034 Attachment screws: M8x16 quality 8.8-A2F (2 pcs)
7 Fit the <i>attachment screw and washer</i> in the middle hole of the housing lower part.	 xx1200000152
8 Fit the housing, lower part, on the <i>adjustable A6 bracket</i> . Lock screws with locking liquid (Loctite 243).	 xx1200000035 Attachment screws: M8x16 quality 8.8-A2F (2 pcs)

2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE**Location of lower arm cable package**

The lower arm cable package consists of the parts shown in the illustration.

How to fit the attachments for the cable packages IRBDP MH2 LE and IRBDP SW2 LE is described in section *Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE on page 67*.



xx0700000323

A	Straps
B	Velcro strap
C	Cable and hose clamp
D	Lower arm plate
E	Connection plate
F	Gripping clamp
G	Process cable package
H	Side bracket, balancing device
J	Customer plate
K	Process plate

Continues on next page

2 Installation

2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

Continued

Required equipment

The following equipment is required for installation of the cable package.

Equipment	Art. no.	Note
Cable package IRBDP MH2 LE	For spare part number see chapter: <ul style="list-style-type: none">• Spare parts on page 355.	A number of versions are available.
Cable package IRBDP SW2 LE	For spare part number see chapter: <ul style="list-style-type: none">• Spare parts on page 355.	A number of versions are available.
Circuit diagram	3HAC026209-001	

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/Spot-Pack on page 351.
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.

Required consumables

Consumable	Article number	Note
Locking liquid	3HAB7116-1	Used for locking screws. (Loctite 243)

Procedures

Use this procedure to fit the cable packages IRBDP MH2 LE and SW2 LE. Screws are supplied with the kit.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION 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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2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

Continued

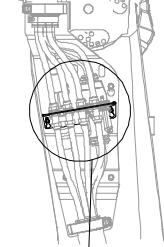
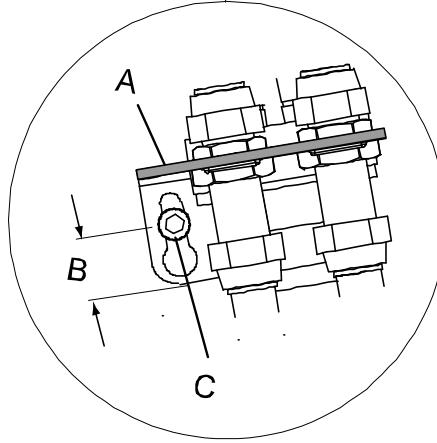
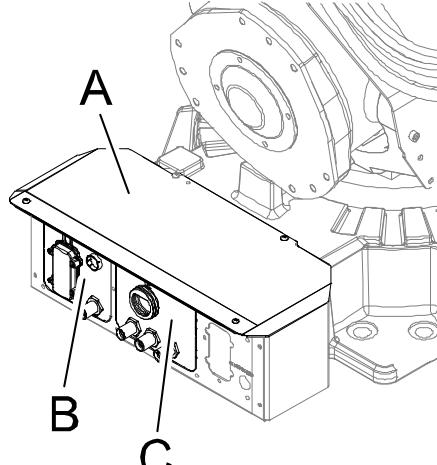
	Action	Note
3	<p>Mount the two <i>attachment screws</i> on the <i>lower arm plate</i>. Use locking liquid on screws.</p> <p>Fit the <i>connection plate</i> on the two screws. The connection plate is pre-mounted on the lower arm cable package.</p>	<p>xx0500001420</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Lower arm plate • B: Attachment screws M8x16 quality 8.8-A3F (2 pcs) • C: Connection plate

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2 Installation

2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

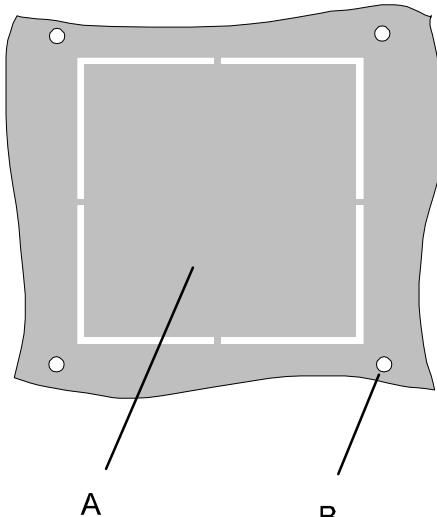
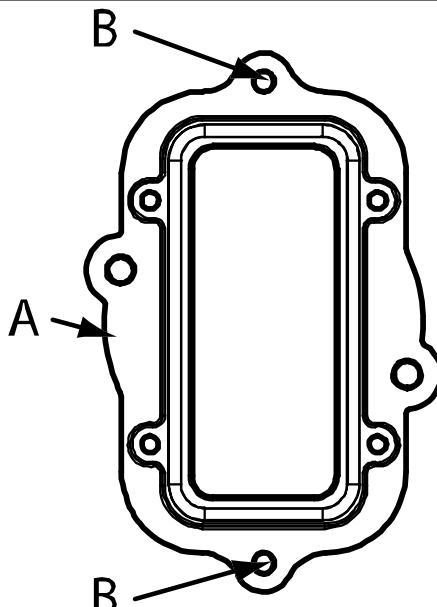
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Action	Note
<p>4 Adjust the <i>connection plate</i> in a way that the center of each <i>attachment screw</i> is placed 27 mm from the lower end of the connection plate. Tighten the screws.</p>	  <p>xx0700000328</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Connection plate • B: Measurement 27 mm • C: Attachment screw M8x16 quality 8.8-A3F (2 pcs)
<p>5 Remove the <i>top cover plate</i> in the back of the robot base.</p>	 <p>xx0700000329</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Top cover plate • B: Customer plate • C: Process plate

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2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

Continued

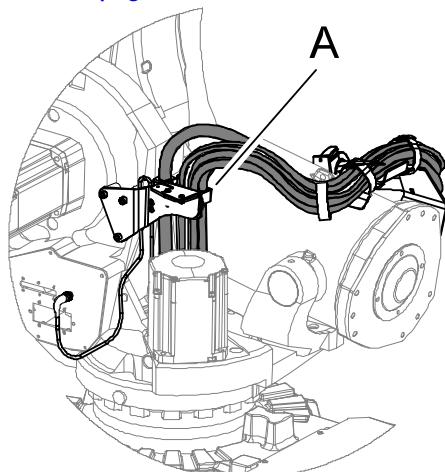
Action	Note
<p>6 Remove the part of the backplate where <i>process and customer plates</i> are supposed to be fitted. Hit the removable part with a plastic mallet or similar without damaging other parts of the backplate. Fit process and customer plates.</p>	<p>Shown in the figure Location of lower arm cable package on page 109.</p>  <p>xx0700000404</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Removable part of backplate B: Holes for attachment screws <p>Note</p> <p>Only needed when the DressPack cable package is fitted for the first time.</p>
<p>7 Fit the <i>adapter complete</i> to the customer plate with the two <i>attachment screws</i>.</p>	 <p>xx0300000195</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Adapter complete B: Attachment screws M6x16 quality 8.8-A2F (2 pcs)

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2 Installation

2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

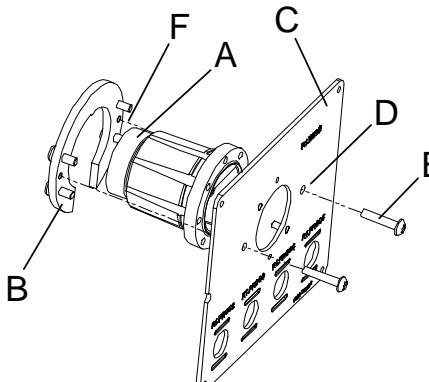
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Action	Note
8 Run the cables down through the center hole of the gearbox axis 1, in the following order: <ul style="list-style-type: none"> • Signal cables • Hoses, slightly to the right of the signal cables • Check that the signal cables and hoses do not end up between the motor cables • Check that cables and hoses do not cross each other. 	
9 Attach the <i>cable and hose clamp</i> with the attachment screws M6x16 quality 8.8-A2F (2 pcs). Lock screws with locking liquid.	Art. no. is specified in Required equipment on page 110 .  Parts: • A: Cable and hose clamp xx0700000338
10 Spot welding applications only: Run the weld power cable slightly to the right of the signal cables and hoses in order to make it easier to connect the cables in the robot base. Fit the weld power cable to the bracket with its two attachment screws.	Check that the weld power cable does not end up between other cables and hoses!

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2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

Continued

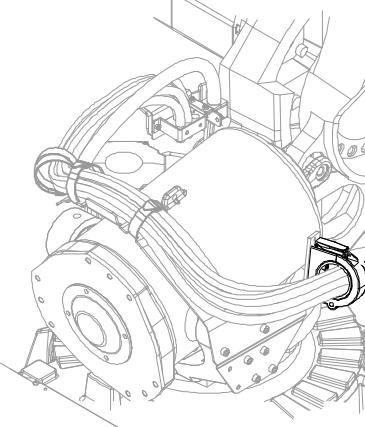
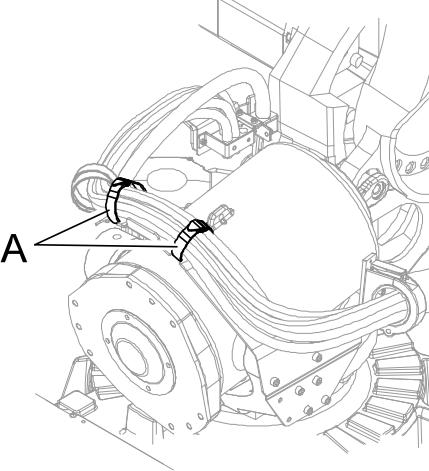
Action	Note
<p>11 Spot welding applications only: Fit the <i>weld power cable</i> to the rear of the process plate with two attachment screws, using the <i>weld connector bracket</i>. Do not tighten the attachment screws at this point! Screws are supplied with the kit.</p>	 <p>xx0300000196</p> <p>Parts (as seen from above):</p> <ul style="list-style-type: none"> A: Weld power cable (behind process plate) B: Weld connector bracket C: Process plate D: Screw holes in process plate E: Attachment screws M6x30 quality 8.8-A2F (2 pcs) F: Guide pins on weld connector bracket
<p>12 Fit the connectors to the <i>customer</i> and <i>process plates</i>, previously fitted to the connection plate base.</p> <p> CAUTION Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Shown in the figure in section Location of lower arm cable package on page 109.</p> <p>Tightening torque, brass couplings 1/2": 31Nm</p> <p>Tightening torque, brass couplings 3/8": 17Nm</p> <p>Recheck all cables and hoses for straining or twisting. Reroute if required!</p> <p>Screw dimension: M6x20 quality 8.8.A2F (4 pcs to each plate).</p>
<p> Tip</p> <p>In order to get the weld power cable mounted in the right position on the process plate, first connect the floor weld cable to the weld power cable and use it as a guide. Before tightening the weld power attachment screws, make sure that the cable connector is evenly placed in the hole of the process plate. Tighten the weld power cable attachment screws.</p>	The attachment screws of the weld power cable are shown in the figure above.

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2 Installation

2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

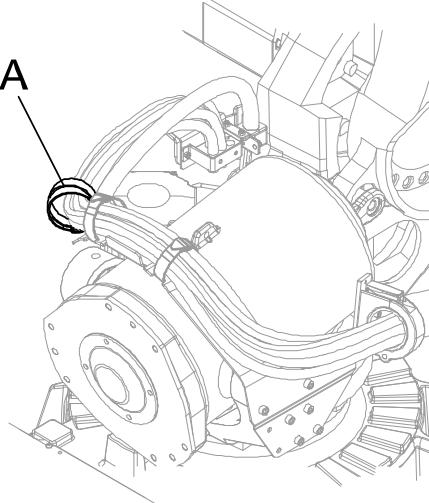
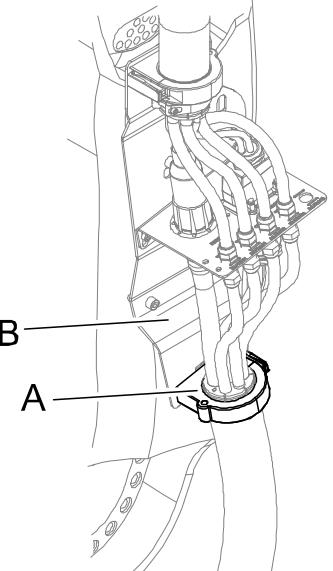
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	Action	Note
14	Secure the cable package to the <i>gripping clamp</i> on the balancing device.	 xx0700000330 Parts: <ul style="list-style-type: none">• A: Gripping clamp
15	Secure the hoses and cables to the side bracket, balancing device with the two straps.	 xx0700000331 Parts: <ul style="list-style-type: none">• A: Straps

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2.2.8 Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE

Continued

	Action	Note
16	<p>Place a <i>velcro strap</i> around the cables and hoses.</p> <p> Note</p> <p>Do not strap around the weld power cable!</p>	 xx0700000332 <p>Parts:</p> <ul style="list-style-type: none"> • A: Velcro strap
17	Secure the cable package to the <i>gripping clamp</i> on the <i>lower arm plate</i> .	 xx0700000333 <p>Parts:</p> <ul style="list-style-type: none"> • A: Gripping clamp • B: Lower arm plate

2 Installation

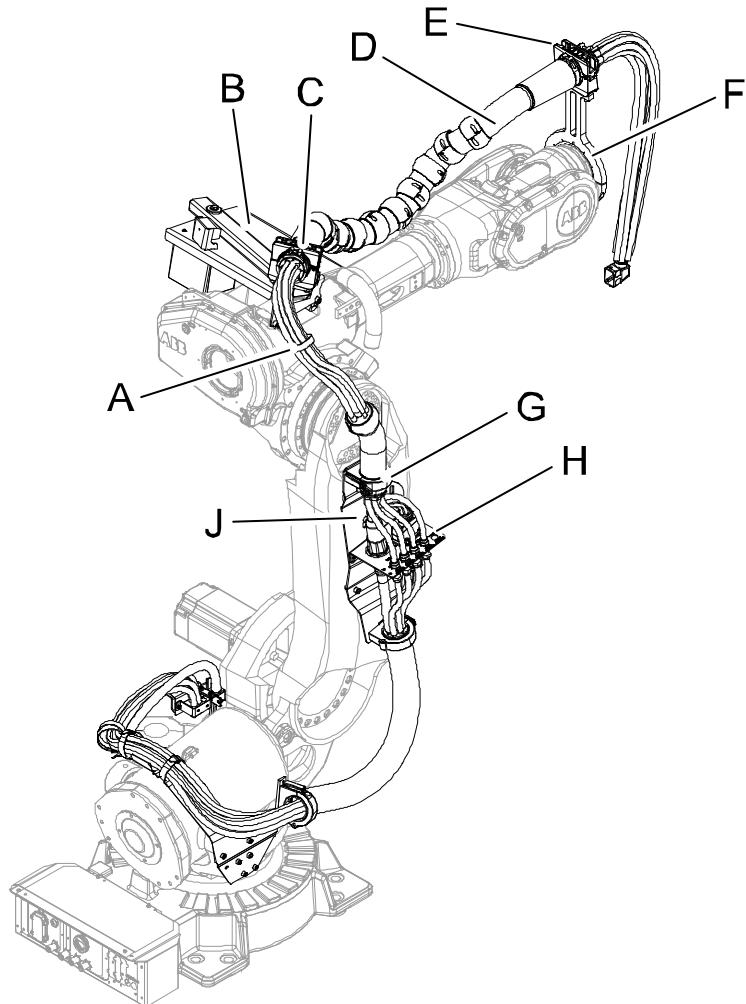
2.2.9 Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE

2.2.9 Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE

Location of the cable packages IRBDP MH2 UE and SW2 UE

The cable package consists of the parts shown in the illustration below.

How to fit the attachments for cable packages IRBDP MH2 UE and IRBDP SW2 UE is described in section [Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE on page 74](#).



xx0700000324

A	Strap and strap holder
B	Tension arm unit
C	Ball joint housing (tension arm)
D	Process cable package
E	Ball joint housing (process cable support axis 6)
F	Process cable support axis 6, complete
G	Gripping clamp (lower arm plate)
H	Connection plate

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2.2.9 Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE

Continued

J	Lower arm plate
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Required equipment

The following equipment is required for the installation of the cable package.

Equipment	Art. no.	Note
Cable package IRBDP MH2 UE	For spare part number see chapter: • Spare parts on page 355 .	A number of versions are available.
Cable package IRBDP SW2 UE	For spare part number see chapter: • Spare parts on page 355 .	A number of versions are available.
Circuit diagram	3HAC026209-001	

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/Spot-Pack on page 351 .
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.

Required consumables

Consumable	Article number	Note
Locking liquid	3HAB7116-1	For locking screws (Loctite 243)

Procedure

Use this procedure to fit the cable packages IRBDP MH2 UE and SW2 UE.

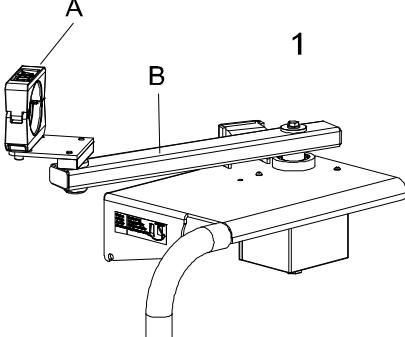
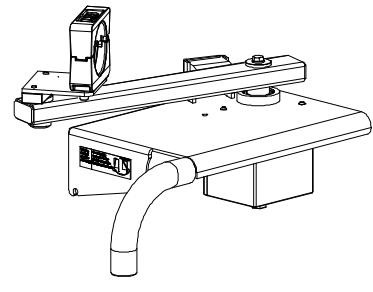
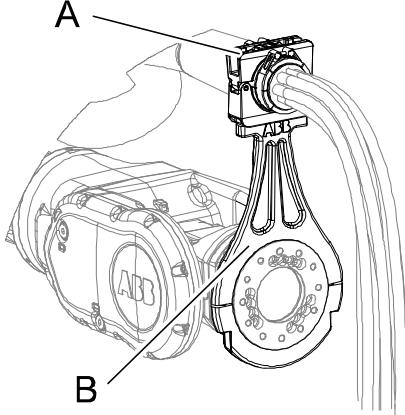
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially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

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2 Installation

2.2.9 Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE

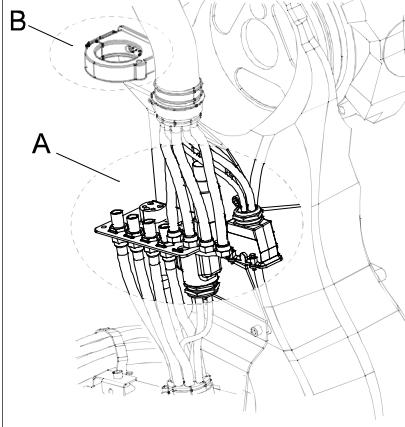
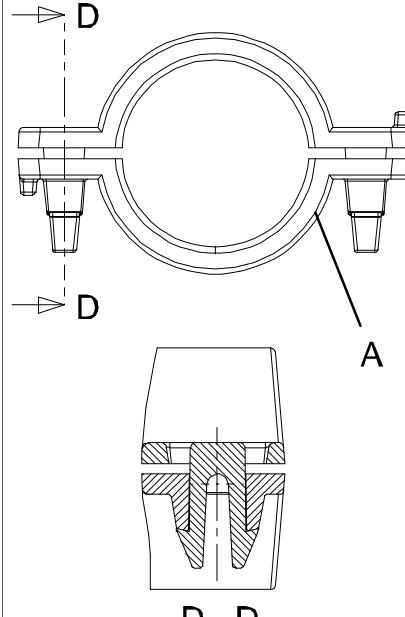
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Action	Note
<p>3 Straighten the cable package out and place it in the <i>ball joint housing</i> on the <i>tension arm</i>. Secure it.</p> <p>The position of the ball joint housing and the tension arm shall be as shown in the figure, in order to get the correct position of the cable package.</p> <p>Position 1:</p> <ul style="list-style-type: none"> • IRB 6640 - 2.55 • IRB 6640 - 2.75 <p>Position 2:</p> <ul style="list-style-type: none"> • IRB 6640 - 2.8 • IRB 6640 - 3.2 	 <p>1</p>  <p>2</p> <p>xx0700000335</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Ball joint housing • B: Tension arm
<p>4 Place the front end of the cable package in the <i>ball joint housing</i> on the <i>process cable support axis 6, complete</i>. Secure it.</p>	 <p>A</p> <p>B</p> <p>xx0700000336</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Ball joint housing • B: Process cable support, axis 6 complete

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2.2.9 Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE

Continued

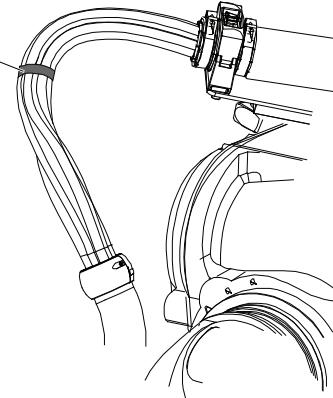
Action	Note
<p>5 Connect all cable and hoses to the <i>lower arm plate</i> in the following order:</p> <ul style="list-style-type: none"> • Fit the weld connector • Fit the cable package in the gripping clamp • Tighten the weld connector • Fit and tighten the cable connectors • Fit and tighten the hose connectors <p> CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p> <p> Note</p> <p>Do not secure the cable package in the <i>gripping clamp</i> on the <i>lower arm plate</i>, until cables and hoses are connected.</p>	<p>Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm</p>  <p>xx0500001439</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Cable and hose connections on the lower arm plate • B: Gripping clamp
6 Fit the <i>strap holder</i> on a 1/2" hose.	 <p>xx0700000337</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Strap holder
7 The locking device on the strap holder shall be placed outwards in relation to the rest of the cables and hoses.	

Continues on next page

2 Installation

2.2.9 Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE

Continued

Action	Note
8 Place the <i>strap</i> around the cables and hoses. Push them through the oval holes in the <i>strap holder</i> .  Note Make sure that the cables and hoses not are squeezed together by the strap.	 xx0500001589 Parts: <ul style="list-style-type: none">• A: Strap and strap holder

2.2.10 Fitting the cable package IRBDP SW2 CE

2.2.10 Fitting the cable package IRBDP SW2 CE

Location of cable package - IRBDP SW2 CE

The cable package, IRBDP SW2 CE consists of the parts shown in the illustration below.

How to fit the attachments for the process cable package IRBDP SW2 CE is detailed in sections:

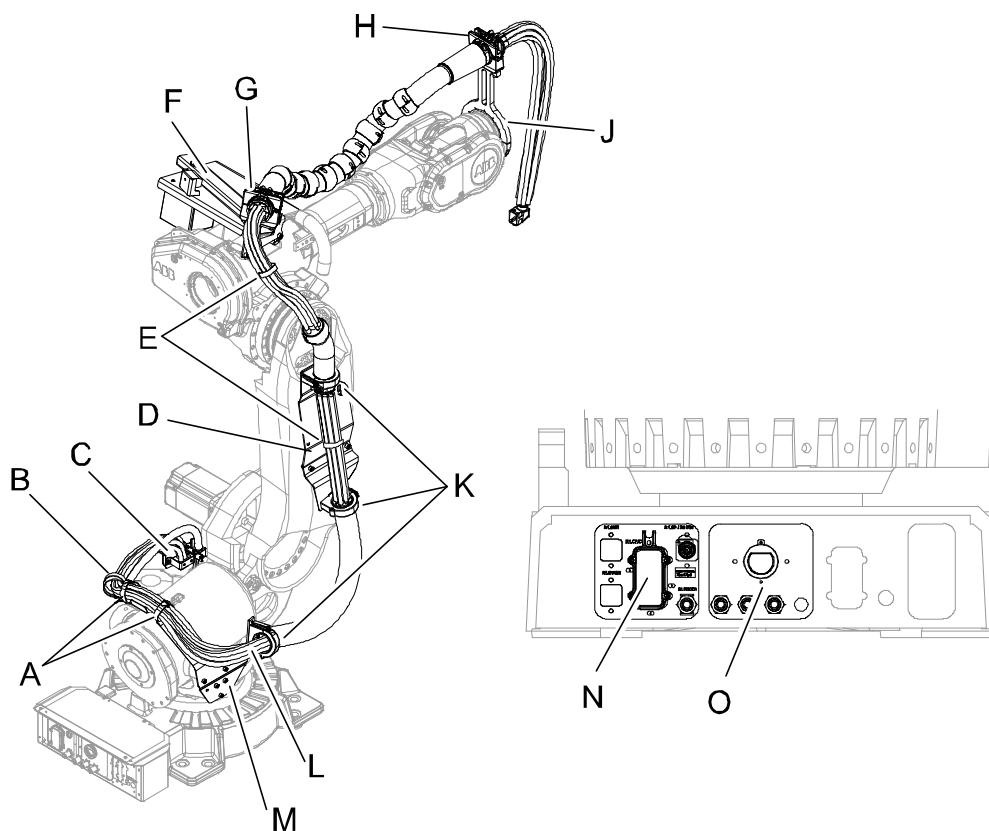
- *Fitting the attachments of IRBDP MH2 LE and IRBDP SW2 LE on page 67*
- *Fitting the attachments of IRBDP MH2 UE and IRBDP SW2 UE on page 74*

Continues on next page

2 Installation

2.2.10 Fitting the cable package IRBDP SW2 CE

Continued



xx0700000339

A	Strap
B	Velcro strap
C	Cable and hose clamp
D	Lower arm plate
E	Strap
F	Tension arm unit
G	Ball joint housing (tension arm)
H	Ball joint housing (process cable support axis 6)
J	Process cable support axis 6, complete
K	Gripping clamps
L	Process cable package
M	Side bracket, balancing device
N	Customer plate
O	Process plate

Continues on next page

Required equipment

The following equipment are required for installation of the cable package IRBDP SW2 CE.

Equipment	Art. no.	Note
Cable package IRBDP SW2 CE	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of versions are available.
Circuit diagram	3HAC026209-001	DressPack

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/Spot-Pack on page 351.</i>
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.

Required consumables

Consumable	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking the gripping clamps.

Procedure

Use this procedure to fit the cable package IRBDP SW2 CE.

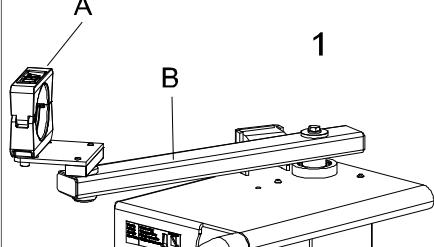
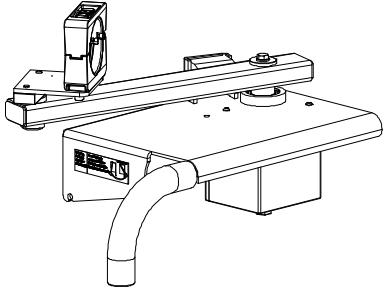
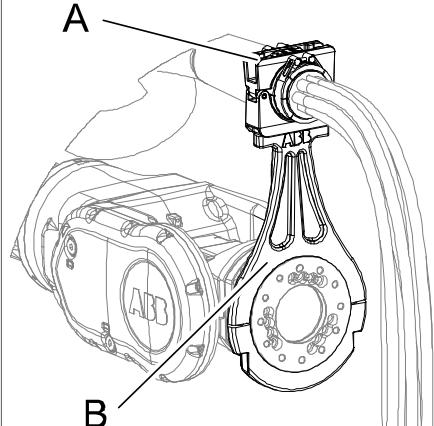
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially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

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2 Installation

2.2.10 Fitting the cable package IRBDP SW2 CE

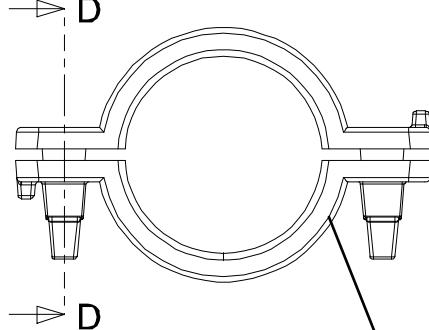
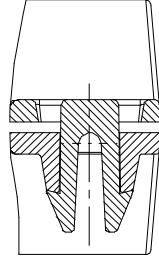
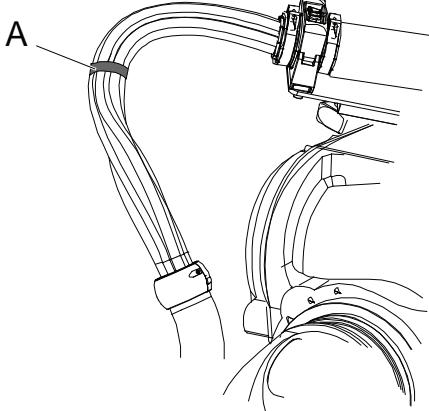
Continued

Action	Note
<p>3 Straighten the package out and place it in the <i>ball joint housing</i> on the <i>tension arm</i>. Secure it.</p> <p>The position of the ball joint housing and the tension arm shall be as shown in the figure, in order to get the correct position of the cable package.</p> <p>Position 1:</p> <ul style="list-style-type: none"> • IRB 6640 - 2.55 • IRB 6640 - 2.75 <p>Position 2:</p> <ul style="list-style-type: none"> • IRB 6640 - 2.8 • IRB 6640 - 3.2 	  xx0700000335 <p>Parts:</p> <ul style="list-style-type: none"> • A: Ball joint housing • B: Tension arm
<p>4 Place the front end of the cable package in the <i>ball joint housing</i> on the <i>process cable support axis 6 complete</i>, and secure it.</p>	 xx0700000336 <p>Parts:</p> <ul style="list-style-type: none"> • A: Ball joint housing • B: Process cable support, axis 6 complete

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2.2.10 Fitting the cable package IRBDP SW2 CE

Continued

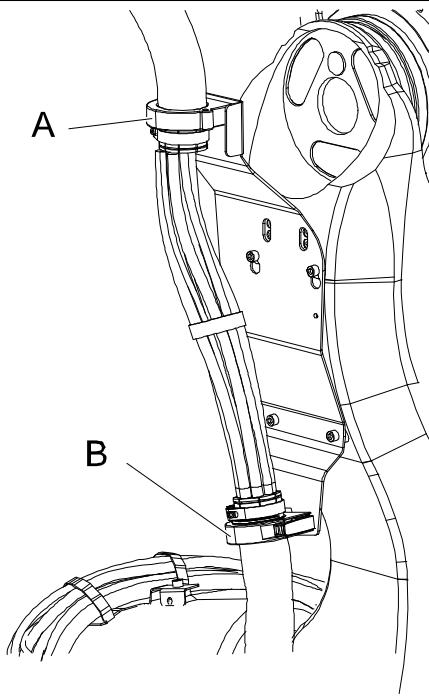
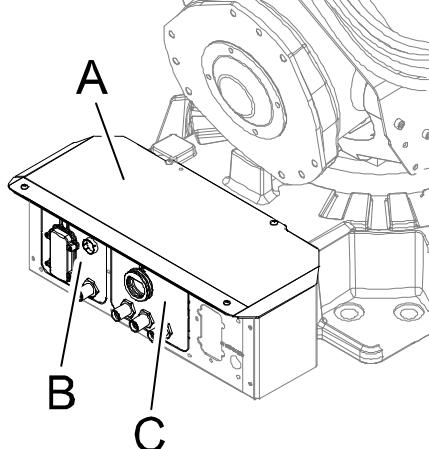
	Action	Note
5	Fit the <i>strap holder</i> on a $\frac{1}{2}$ " hose.	  <p>D - D</p> <p>xx0700000337</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Strap holder D-D: Locking device
6	The locking device on the strap holder shall be placed outwards in relation to the rest of the cables and hoses.	
7	<p>Place a <i>strap</i> around the cables and hoses. Push the straps through the oval in the <i>strap holder</i> holes.</p> <p> Note</p> <p>Make sure that the cables and hoses not are squeezed together by the strap!</p>	 <p>xx0500001589</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Strap and strap holder

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2 Installation

2.2.10 Fitting the cable package IRBDP SW2 CE

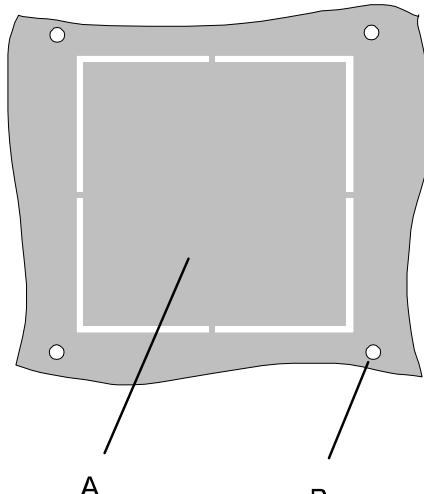
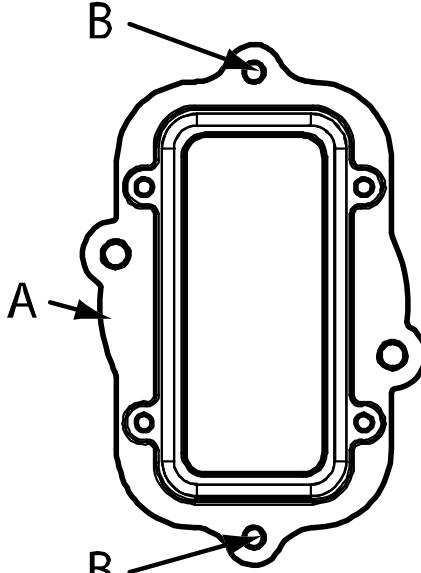
Continued

Action	Note
8 Secure the cable package to the <i>upper</i> and <i>lower gripping clamps</i> on the lower arm plate.	 xx0500001483 <p>Parts:</p> <ul style="list-style-type: none"> • A: Upper gripping clamp • B: Lower gripping clamp
9 Remove the <i>top cover plate</i> in the back of the robot base.	 xx0700000329 <p>Parts:</p> <ul style="list-style-type: none"> • A: Top cover plate • B: Customer plate • C: Process plate

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2.2.10 Fitting the cable package IRBDP SW2 CE

Continued

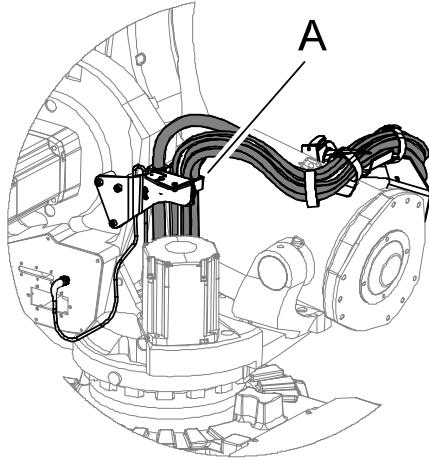
Action	Note
<p>10 Remove the part of the backplate where <i>process</i> and <i>customer plates</i> are supposed to be fitted. Hit the removable part with a plastic mallet or similar without damaging other parts of the backplate. Fit process and customer plates.</p>	<p>Shown in the figure Location of cable package - IRBDP SW2 CE on page 123.</p>  <p>xx0700000404</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Removable part of backplate B: Holes for attachment screws <p> Note</p> <p>Only needed when the DressPack cable package is fitted for the first time.</p>
<p>11 Fit the <i>adapter complete</i> to the customer plate with its two <i>attachment screws</i>. Screws are supplied with the kit.</p>	 <p>xx0300000195</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Adapter complete B: Attachment screws M6x16 quality 8.8-A2F (2 pcs)

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2 Installation

2.2.10 Fitting the cable package IRBDP SW2 CE

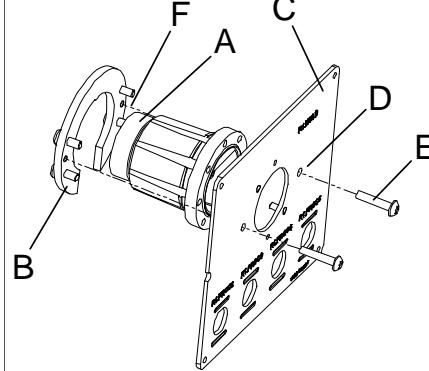
Continued

	Action	Note
12	<p>Run the cables down through the center hole of gearbox axis 1 in the following order:</p> <ul style="list-style-type: none"> • Signal cable • Hoses, slightly to the right of the signal cable <p>Check:</p> <ul style="list-style-type: none"> • Check that signal cable and hoses do not end up between the motor cables • Check that cables and hoses do no cross each other. 	
13	<p>Attach the <i>cable and hose clamp</i> with the <i>attachment screws M6x16 quality 8.8-A2F (2 pcs)</i>. Lock the screws with <i>locking liquid</i>. Screws are supplied with the kit.</p>	 <p>xx0700000338</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Cable and hose clamp <p>Art. no. is specified in section Required equipment on page 125.</p>
14	<p>Spot welding applications only: Run the <i>weld power cable</i>, slightly to the right of the signal cable and hoses in order to facilitate the connecting of cables in the robot base. Fit the weld power cable to the bracket with its two attachment screws.</p>	<p>Check that the weld power cable do not end up between other cables and hoses.</p>

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2.2.10 Fitting the cable package IRBDP SW2 CE

Continued

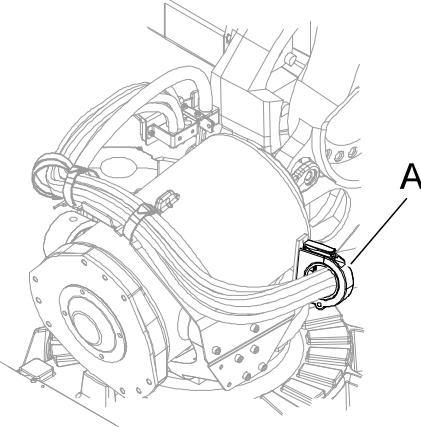
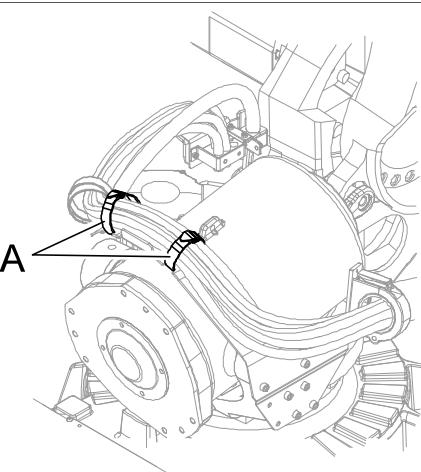
Action	Note
<p>15 Spot welding applications only: Fit the weld power cable to the rear of the <i>process plate</i>, with two <i>attachment screws</i> using the <i>weld connector bracket</i>. Do not tighten the attachment screws at this point. Screws are supplied with the kit.</p>	 xx0300000196 Parts (as seen from above): <ul style="list-style-type: none"> • A: Weld power cable (behind process plate) • B: Weld connector bracket • C: Process plate • D: Screw holes in process plate • E: Attachment screws M6x30 quality 8.8-A2F (2 pcs) • F: Guide pins on weld connector bracket
<p>16 Fit the connectors to the <i>customer plate</i> and <i>process plate</i> previously fitted to the <i>connection plate, base</i>. Screws are supplied with the kit.</p> <p>CAUTION Do not tighten the brass couplings for water and air with excessive force.</p>	Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm Shown in the figure in section Location of cable package - IRBDP SW2 CE on page 123 . Recheck all cables and hoses for straining or twisting. Reroute if required! Screw dimension: M6x20
<p>17</p> <p>Tip</p> <p>In order to get the weld power cable fitted in the right position on the plate customer, first connect the floor weld cable to the weld power cable and use it as a guide. Before tightening the weld power attachment screws, make sure that the cable connector is evenly positioned in the hole of the process plate. Tighten the weld power cable attachment screws.</p>	The weld power attachments screws are shown in figure above!

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2 Installation

2.2.10 Fitting the cable package IRBDP SW2 CE

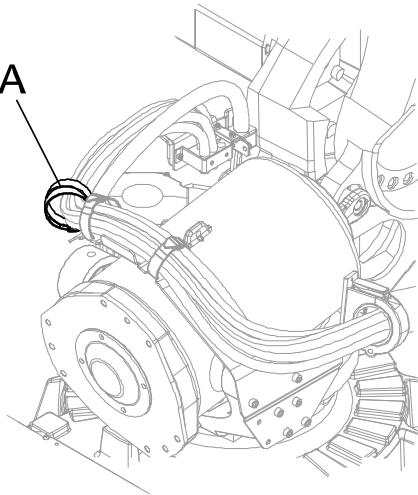
Continued

	Action	Note
18	Secure the process cable package to the <i>gripping clamp</i> on the balancing device.	 xx0700000330 Parts: <ul style="list-style-type: none">A: Gripping clamp
19	Secure the hoses and cables to the side bracket, balancing device with the two straps.	 xx0700000331 Parts: <ul style="list-style-type: none">A: Straps

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2.2.10 Fitting the cable package IRBDP SW2 CE

Continued

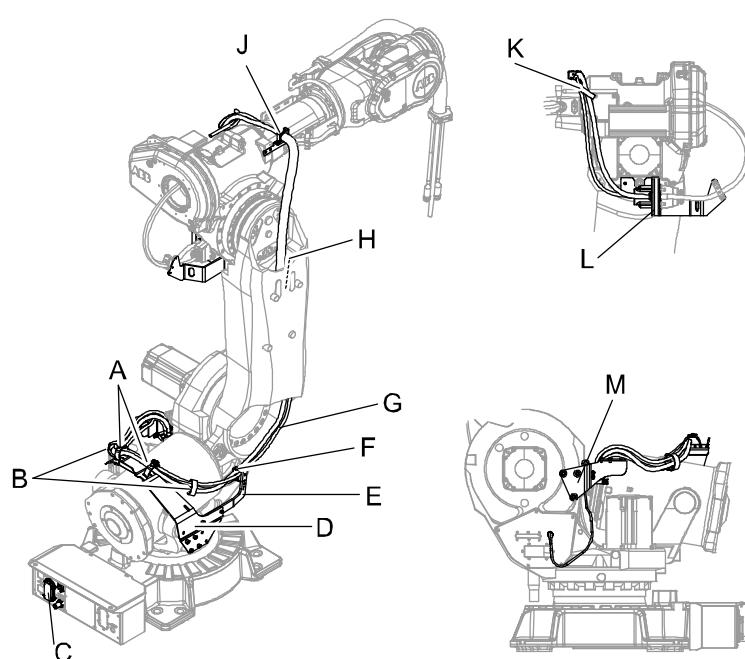
	Action	Note
20	<p>Place a <i>velcro strap</i> around the cables and hoses.</p> <p> Note</p> <p>Do not strap around the weld power cable!</p>	 <p>xx0700000332</p> <p>Parts:</p> <ul style="list-style-type: none">• A: Velcro strap

2 Installation

2.2.11 Fitting the cable package IRBDP MH1 LI

Location

The location of the lower arm internal MH dressing cable package IRBDP MH1 LI is shown in the figure.



xx0700000385

A	Straps
B	Velcro straps
C	Connection point, base
D	Side bracket, balancing device
E	Lower bracket
F	Rubber clamp with bracket
G	Lower cable package, internal - IRBDP MH3 LI
H	Rubber clamp with bracket (inside lower arm)
J	Rubber clamp with bracket
K	Strap
L	Connection plate
M	Bracket, axis 1

Spare parts

Equipment, etc.	Art. no.	Note
Cable package IRBDP SW1 LI.	Spare part number is specified in: • Spare parts on page 355 .	

Continues on next page

Required tools and equipment

Equipment, etc.	Art. no.	Note
Standard toolkit	-	Content is defined in section Standard toolkit on page 351 .
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.

Consumables

Equipment, etc.	Art. no.	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking attachment screws.

Fitting the cable package IRBDP MH1 LI.

Use this procedure to fit the cable package IRBDP MH1 LI.

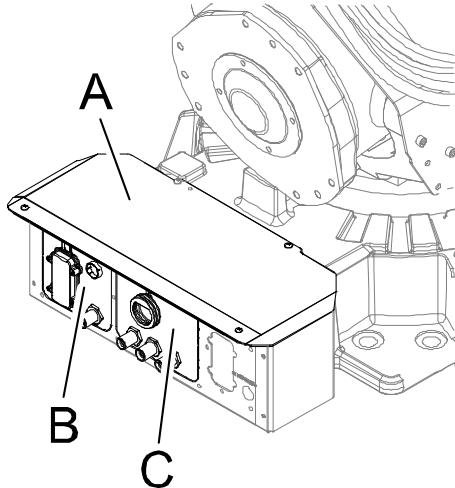
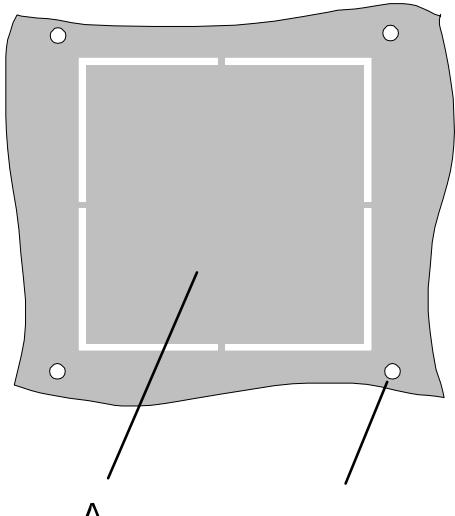
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially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

Continues on next page

2 Installation

2.2.11 Fitting the cable package IRBDP MH1 LI

Continued

Action	Note
3 Remove the top cover plate in the back of the robot base.	 xx0700000329 <p>Parts:</p> <ul style="list-style-type: none"> • A: Top cover plate • B: Customer plate • C: Process plate (not included with MH)
4 Remove the part of the backplate where process and customer plates are supposed to be fitted. Hit the removable part with a plastic mallet or similar without damaging other parts of the backplate.	<p>Shown in the figure Location on page 134.</p>  <p>Parts:</p> <ul style="list-style-type: none"> • A: Removable part of backplate • B: Holes for attachment screws xx0700000404
5 Fit the customer plate.	

Continues on next page

2.2.11 Fitting the cable package IRBDP MH1 LI

Continued

Action	Note
6 Fit the adapter complete to the customer plate with its two attachment screws.	<p>xx030000195</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Adapter complete B: Attachment screws M6x16 quality 8.8-A2F (2 pcs)
7 Run the cables down through the center hole of gearbox axis 1, in the following order: <ul style="list-style-type: none"> Signal cables Hoses, slightly to the right of the signal cables Check that the signal cables and hoses do not end up between the motor cables Check that cables and hoses do not cross each other. 	
8 Fit the cable package to the axis-1 bracket.	<p>xx070000338</p> <ul style="list-style-type: none"> Attachment screws M6x16 quality 8.8-A2F (2 pcs)

Continues on next page

2 Installation

2.2.11 Fitting the cable package IRBDP MH1 LI

Continued

Action	Note
9 Connect all cable and hose connectors to the customer plate, previously fitted to the connection plate, base.	<p>Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm Recheck all cables and hoses for straining or twisting. Reroute if necessary! Screw dimension: M6x20</p> <p>! CAUTION Do not tighten the brass couplings for water and air with excessive force.</p>
10 Secure the cable package with the velcro straps and straps on the balancing device. Also fit the rubber clamp with bracket on the cable package to the lower bracket.	<p>xx0700000388</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Straps • B: Velcro straps • C: Rubber clamp with bracket • D: Side bracket, balancing device • E: Lower bracket
11 Push the cable package through the inside of the lower arm.	
12 Fit the rubber clamp with bracket on the inside of the lower arm.	
13 Attach the rubber clamp with bracket on top of the upper arm.	
14 Fit the connection plate to the mounting plate axis-3.	

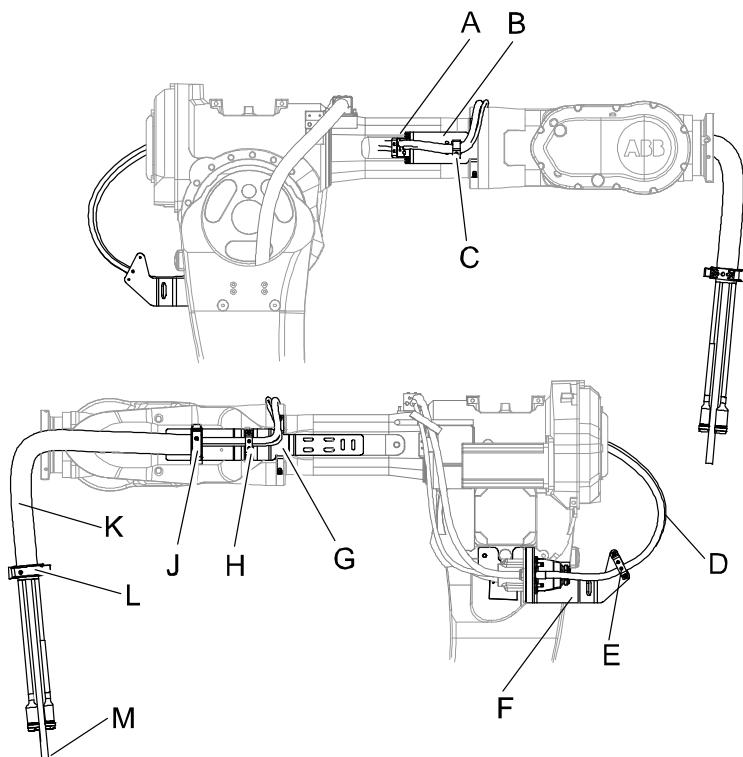
2.2.12 Fitting the cable package IRBDP MH3 UE

2.2.12 Fitting the cable package IRBDP MH3 UE

Location

The location of the cable package IRBDP MH3 UE is shown in the figure below.

How to fit the attachments for the cable package is described in *Fitting the attachments of IRBDP MH3 UE*.



xx070000379

A	Rubber clamp with bracket
B	Bracket, right
C	Velcro strap
D	Upper cable package
E	Rubber clamp with bracket
F	Connection plate
G	Bracket, left
H	Rubber clamp with bracket
J	Gripping clamp (bracket left)
K	Protection hose
L	Gripping clamp (protection hose)
M	Air hose

Continues on next page

2 Installation

2.2.12 Fitting the cable package IRBDP MH3 UE

Continued

Spare parts

Equipment, etc.	Art. no.	Note
Cable package IRBDP MH3 UE.	Spare part number is specified in: • <i>Spare parts on page 355.</i>	

Required tools and equipment

Equipment, etc.	Art. no.	Note
Standard toolkit	-	Content is defined in section <i>Standard toolkit on page 351.</i>
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.

Consumables

Equipment, etc.	Art. no.	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking attachment screws.

Fitting the cable package IRBDP MH3 UE

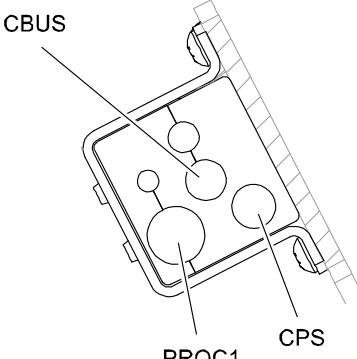
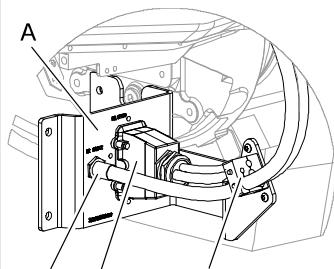
Use this procedure to fit the cable package IRBDP MH3 UE.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION 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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2.2.12 Fitting the cable package IRBDP MH3 UE

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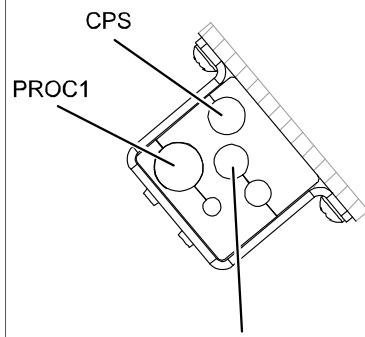
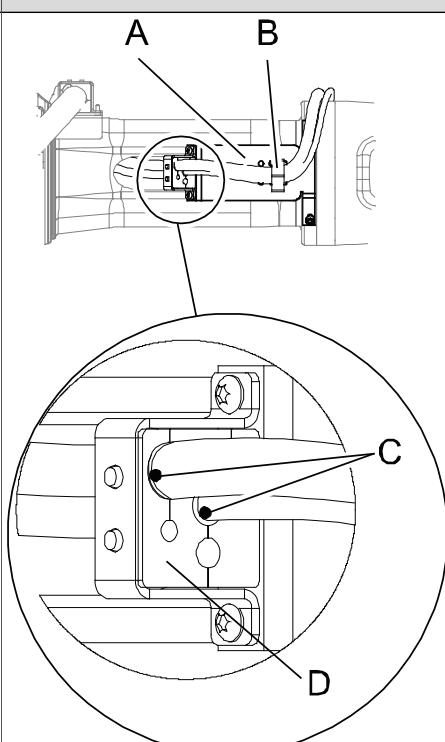
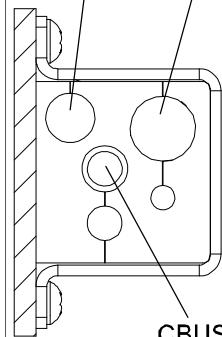
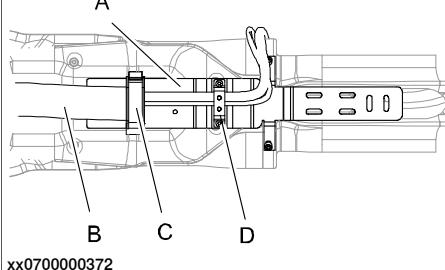
Action	Note
<p>3 Push the customer signal and power cables as well as air hose into the upper arm tube from the rear, and out of the hole on the side where the <i>right bracket</i> is placed on the upper arm.</p> <p>Arrange the cables and hoses so no cables or hoses are twisted.</p> <p> Note</p> <p>Be careful not to damage the existing motor cables!</p>	Shown in the figure Location on page 139 .
<p>4 Connect cables and hoses of the upper cable package, to the <i>connection plate</i>. Fit <i>rubber clamp with bracket</i> on the <i>connection plate</i> with its attachment screws. Lock screws with <i>locking liquid</i>.</p> <p> CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p> <p> Note</p> <p>Place cables and hose in the correct position! See figure!</p>  <p>xx0700000369</p>	<p>Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm</p>  <p>A: Connection plate B: Hose C: Signal and power cable D: Rubber clamp with bracket</p> <p>xx0700000368</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Connection plate • B: Hose • C: Signal and power cable • D: Rubber clamp with bracket <p>Screws M6x16 quality 8.8-A2F (2 pcs)</p>

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2 Installation

2.2.12 Fitting the cable package IRBDP MH3 UE

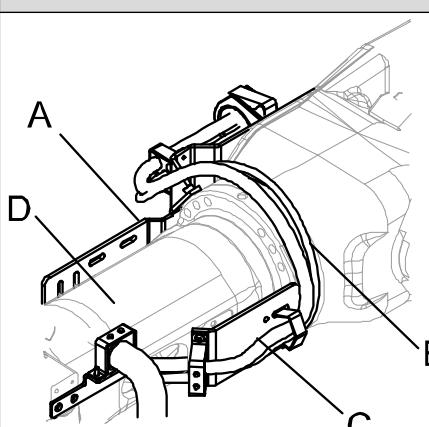
Continued

Action	Note
<p>5 Fit the cables and hose to the <i>bracket right</i> with the <i>rubber clamp with bracket</i> with its attachment screws.</p> <p><i>Lock screw with locking liquid.</i></p> <p>Attach the cable package to the bracket with a <i>velcro strap</i>.</p> <p>Note</p> <p>Do not pull the hose when attaching the strap. It may cause restriction of air flow.</p> <p>Note</p> <p>The <i>white markings on cables</i> shall be visible just outside the <i>rubber clamp</i>.</p>  <p>xx0700000371</p>	 <p>xx0700000370</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, right • B: Velcro strap • C: White markings on cables • D: Rubber clamp with bracket <p>Screw M6x16 quality 8.8-A2F (2 pcs)</p>
<p>6 Fit the cables and hose to <i>bracket left</i> with the <i>rubber clamp with bracket</i> with its attachment screws.</p> <p><i>Lock screws with locking liquid.</i></p>  <p>xx0700000373</p>	 <p>xx0700000372</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, left • B: Protection hose • C: Gripping clamp • D: Rubber clamp with bracket <p>Screws M6x16 quality 8.8-A2F (2 pcs)</p>

Continues on next page

2.2.12 Fitting the cable package IRBDP MH3 UE

Continued

	Action	Note
7	<i>Arrange cable and hose in a way that they form a smooth bend over and close to the upper arm, between the brackets on either side.</i>	 xx0700000386 <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, left • B: Arranged cables and hose • C: Bracket, right • D: Upper arm
8	<i>Push the cables and hose through the protection hose and fit them in the gripping clamp on the bracket left.</i>	Shown in the figure above!
9	<i>Fit a gripping clamp at the other end of the protection hose.</i>	Shown in the figure Location on page 139 .

2 Installation

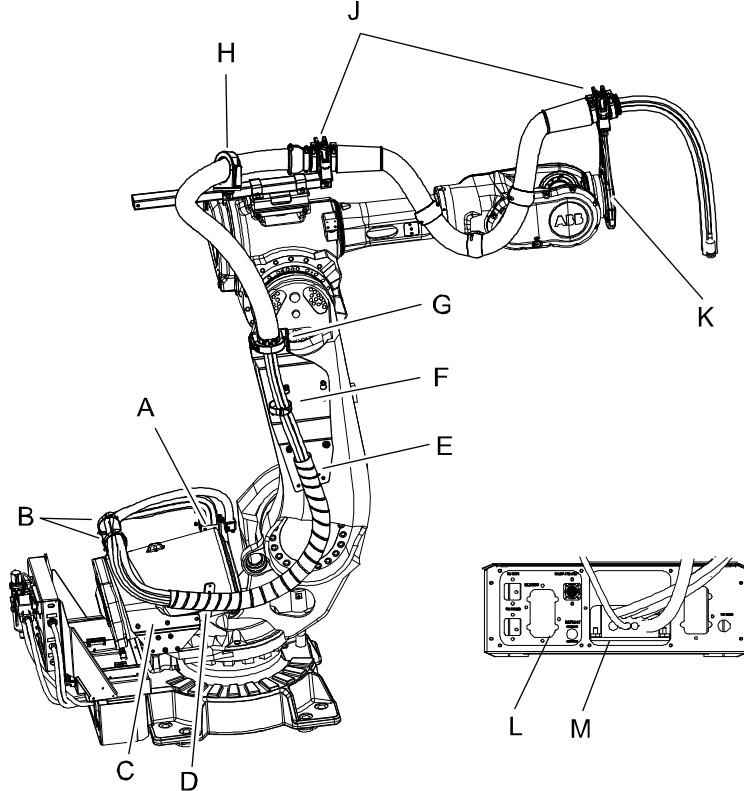
2.2.13 Fitting the cable package IRBDP SW5 CE (SpotPack Basic)

2.2.13 Fitting the cable package IRBDP SW5 CE (SpotPack Basic)

Location of the cable package

The location of the cable package IRBDP SW5 CE (SpotPack Basic) is shown in the figure below.

How to fit the attachments for the process cable package IRBDP SW5 CE is detailed in section [Fitting the attachments of IRBDP SW5 CE \(SpotPack Basic\) on page 85](#).



xx0800000078

A	Cable and hose clamp
B	Velcro straps
C	Side bracket balancing cylinder
D	Spiral hose clamp (lower bracket)
E	Spiral hose clamp (lower arm plate)
F	Velcro strap
G	Gripping clamp (lower arm plate)
H	Gripping clamp (adjustable bracket)
J	Ball joint housing
K	Process cable support axis 6
L	Customer plate
M	Clamp holder with plastic clamp

Continues on next page

2.2.13 Fitting the cable package IRBDP SW5 CE (SpotPack Basic)

Continued

Required equipment

Equipment	Art. no.	Note
Cable package IRBDP SW5 CE (SpotPack Basic)	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of variants are available.

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/Spot-Pack on page 351.</i>
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.

Procedure

Use this procedure to fit the cable package IRBDP SW5 CE (SpotPack Basic).

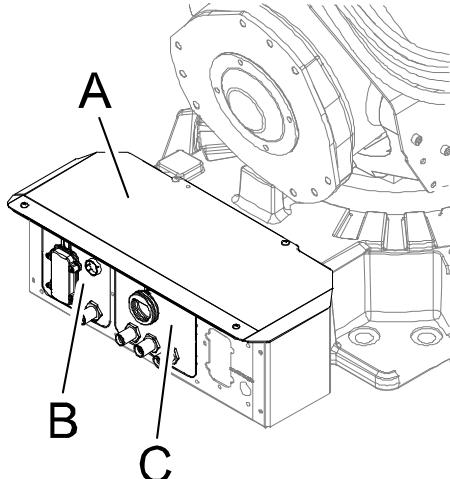
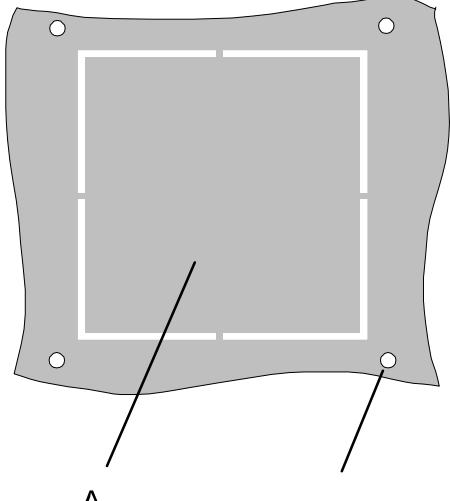
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially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

Continues on next page

2 Installation

2.2.13 Fitting the cable package IRBDP SW5 CE (SpotPack Basic)

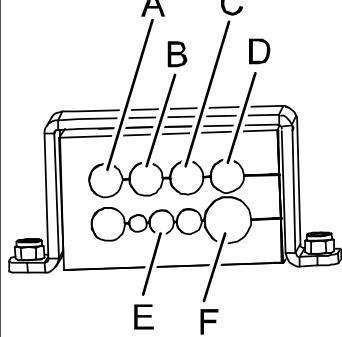
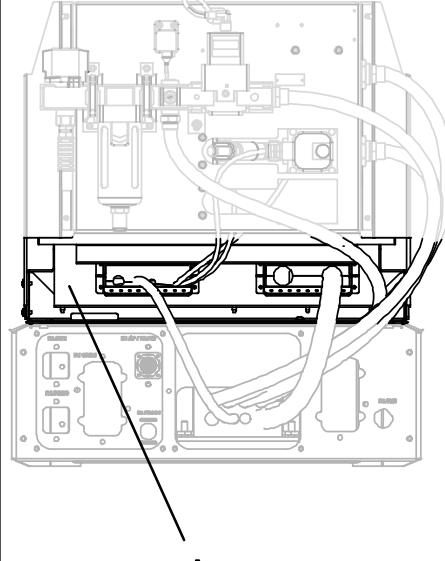
Continued

Action	Note
3 Remove the <i>rear top cover plate</i> in the back of the robot base.	 <p>xx0700000329</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Rear top cover plate
4 Remove the <i>part of the backplate</i> where process and customer plates are supposed to be fitted. Hit the removable part with a plastic mallet or similar without damaging other parts of the backplate.	<p> Note</p> <p>Only needed when the cable package is fitted for the first time!</p>  <p>xx0700000404</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Removable part of backplate • B: Holes for attachment screws
5 Run the cables and hoses down through the center hole of gearbox axis 1 in the following order: <ul style="list-style-type: none"> • Signal cable • Hoses, slightly to the right of the signal cable • Check that signal cable and hoses do not end up between the motor cables • Check that cables and hoses do not cross each other. 	
6 Fit the process cable package to the bracket axis 1 with the <i>cable and hose clamp</i> .	Shown in the figure Location of the cable package on page 144 .

Continues on next page

2.2.13 Fitting the cable package IRBDP SW5 CE (SpotPack Basic)

Continued

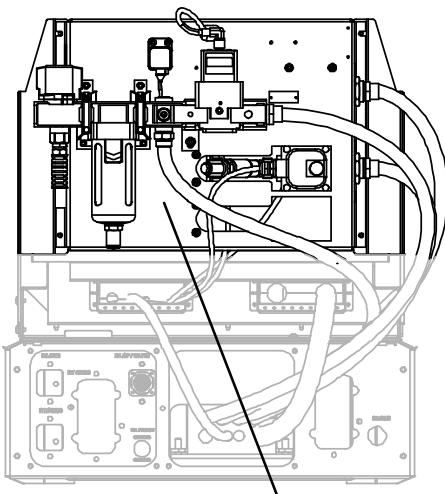
	Action	Note
7	<p>Fit the process cable package to the <i>clamp holder with plastic clamp</i>. Position of cables and hoses is shown in the figure.</p> <p>! CAUTION Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm Shown in the figure Location of the cable package on page 144.</p>  <p>xx0800000079</p> <p>Positions:</p> <ul style="list-style-type: none"> A: PROC 1 (blue) B: PROC 2 (green) C: PROC 3 (red) D: PROC 4 (black) E: Signal cable F: Weld cable
8	Fit the process cable package to the <i>connection box</i> .	 <p>xx0800000082</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Connection box

Continues on next page

2 Installation

2.2.13 Fitting the cable package IRBDP SW5 CE (SpotPack Basic)

Continued

Action	Note
9 Fit the process cable package to the <i>water and air unit</i> .	<p>Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm</p> <p>CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>  <p>xx0800000083</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Water and air unit
10 Fit the process cable package to the <i>lower bracket</i> with the <i>spiral hose clamp</i> .	Shown in the figure Location of the cable package on page 144 .
11 Secure the process cable package to the <i>side bracket balancing cylinder</i> with the <i>velcro straps</i> .	Shown in the figure Location of the cable package on page 144 .
12 Fit the process cable package to the <i>gripping clamp</i> on the <i>lower arm plate</i> .	Shown in the figure Location of the cable package on page 144 .
13 Secure the process cable package with the <i>velcro strap</i> to the <i>lower arm plate</i> .	Shown in the figure Location of the cable package on page 144 .
14 Fit the process cable package to the <i>gripping clamp</i> on the <i>adjustable bracket</i> .	Shown in the figure Location of the cable package on page 144 .
15 Fit the process cable package in the <i>ball joint housing</i> on the <i>adjustable bracket</i> .	Shown in the figure Location of the cable package on page 144 .
16 Fit the process cable package on the <i>ball joint housing</i> on the <i>process cable support axis 6</i> .	Shown in the figure Location of the cable package on page 144 .

2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

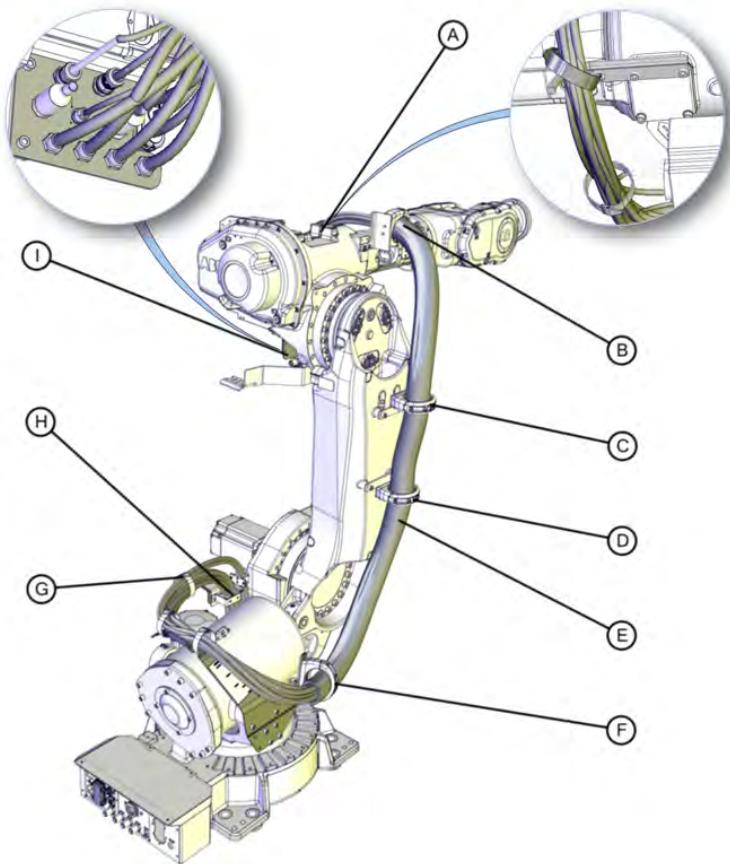
2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Location of the cable package IRBDP SW6 UI/LE and IRBDP MH6 UI/LE

How to fit the attachments, see .

The lower end of the cable package is located as shown in the figure.

The figure shows the cable packages IRBDP SW6 LE and IRBDP MH6 LE.



xx1200000021

A	Velcro straps, 2 pcs (see enlarged view)
B	Ball joint housing
C	Ball joint housing
D	Ball joint housing
E	Cable package
F	Ball joint housing
G	Strap (3 pcs)
H	Bracket axis 1
I	Connection plate, (see enlarged view)

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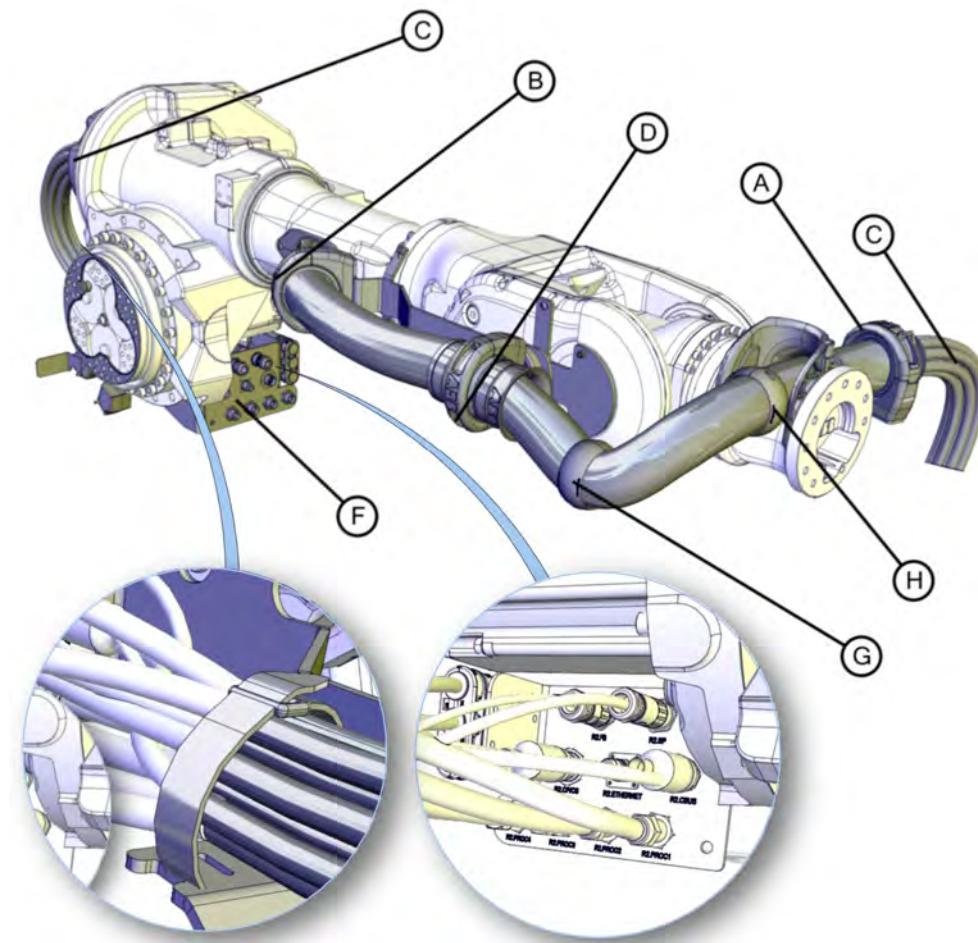
2 Installation

2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

The upper end of the cable package is located as shown in the figure.

The figure shows the cable packages IRBDP SW6 UI and IRBDP MH6 UI.



xx1200000056

A	Ball joint housing
B	Ball joint housing
C	Cable package
D	Ball joint housing
E	Strap (see enlarged image)
F	Connection plate
G	Protective sleeve
H	Protective sleeve

Required equipment

Equipment, etc.	Art. no.	Note
Cable package IRBDP SW6 UI.	For spare part number see: • Spare parts on page 355 .	A number of versions are available.

Continues on next page

2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

Equipment, etc.	Art. no.	Note
Cable package IRBDP MH6 UI.	For spare part number see: • Spare parts on page 355 .	A number of versions are available.
Cable package IRBDP SW6 LE.	For spare part number see: • Spare parts on page 355 .	A number of versions are available.
Cable package IRBDP MH6 LE.	For spare part number see: • Spare parts on page 355 .	A number of versions are available.
Standard toolkit	-	Content is defined in section Standard toolkit on page 351 .
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.

Fitting the cable packages - IRBDP SW6 LE and IRBDP MH6 LE

Use this procedure to fit the cable packages IRBDP SW6 LE and IRBDP MH6 LE.

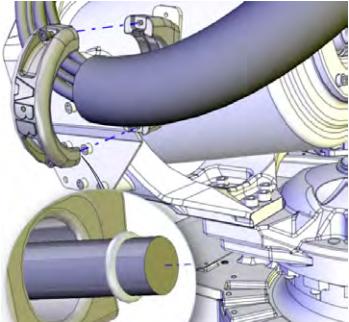
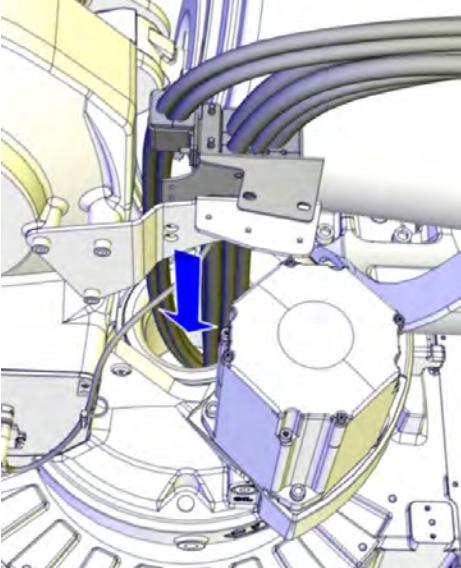
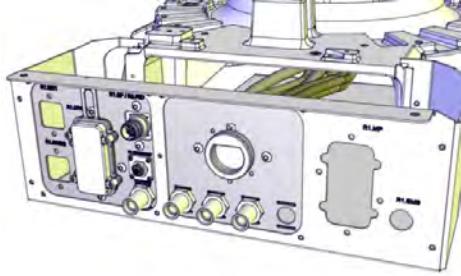
	Action	Note
1	Move the robot to a comfortable working position.	
2	<p> DANGER</p> <p>Turn off all:</p> <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply <p>to the robot, before entering the robot working area.</p> <p> DANGER</p> <p>Turn off all electric power, hydraulic and pneumatic pressure supplies to the robot and for the track motion.</p>	
3	Let the upper part of the <i>cable package - lower end</i> safely rest over the upper arm, while the lower end is being fitted.	

Continues on next page

2 Installation

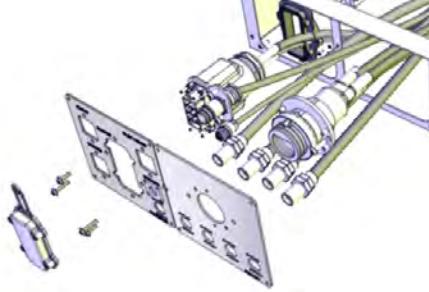
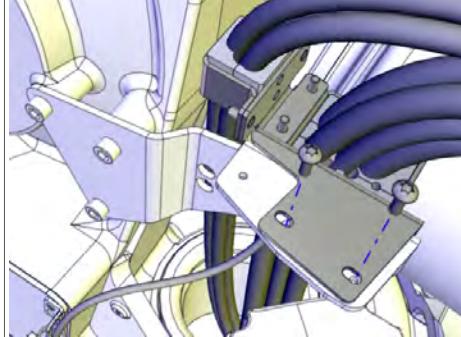
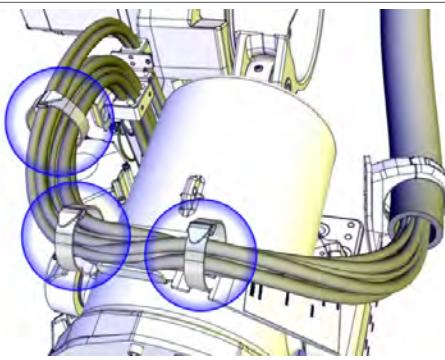
2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

Action	Note
4 Fit the cable package in the <i>housing, upper part</i> of the ball joint housing on the lower bracket.	 Note Be careful not to lose the small o-ring! The purpose of the o-ring is to keep the screws in place in the housing, upper part.  xx1200000053 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)
5 Push carefully the <i>cable package</i> down through the hole in the frame and to the connection plates in the base.	 xx1200000087
6 Fit the <i>customer plate</i> and <i>proc plate</i> .	 xx1200000052

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2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID
Continued

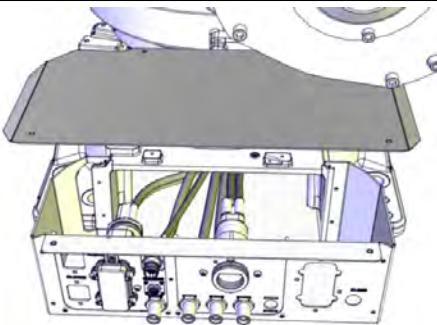
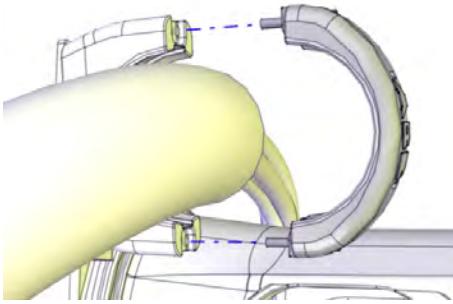
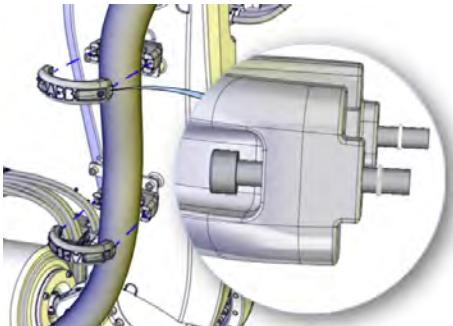
	Action	Note
7	<p>Reconnect the <i>connectors</i> on plate customer and plate process.</p> <p>CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Tightening torque, brass couplings 1/2": 31Nm</p> <p>Tightening torque, brass couplings 3/8": 17Nm</p>  <p>xx1200000088</p>
8	<p>Fit the <i>cable clamp</i> of the cable harness to the bracket axis 1.</p> <p>Lock screws with locking liquid (Loctite 243).</p>	 <p>xx1200000049</p> <p>Attachment screws: M6x16 quality 8.8-A2F (2 pcs)</p>
9	<p>Refit the <i>straps</i> and <i>velcro straps</i>.</p>	 <p>xx1200000047</p>

Continues on next page

2 Installation

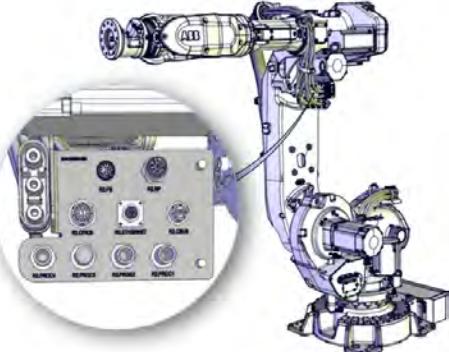
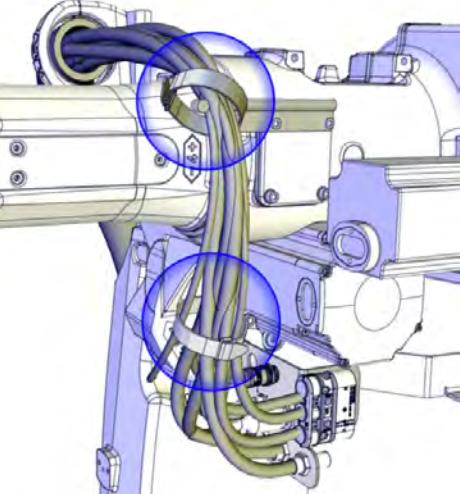
2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

Action	Note
10 Refit the <i>rear cover</i> .	 xx1200000051
11 Fit the cable package in the <i>housing, upper part</i> of the ball joint housing on top of the upper arm. Note Be careful not to lose the small o-ring! The purpose of the o-ring is to keep the screws in place in the housing, upper part.	 xx1200000055 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)
12 CAUTION Do not change the position of the two clamp inserts on the protection hose, being fitted in the ball joint housings on the lower arm! If the position is changed it will alter the bending movement of the protection hose, when both the upper and lower arms are moved. A change of position of the two clamp inserts may result in serious damage to the cable package!	
13 Fit the cable package in the <i>housing, upper part</i> of the ball joint housing on the lower arm. Note Be careful not to lose the small o-ring! The purpose of the o-ring is to keep the screws in place in the housing, upper part.	 xx1200000054 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)

Continues on next page

2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID
Continued

	Action	Note
14	<p>Fit the <i>connection plate</i>. Lock screws with locking liquid (Loctite 243).</p> <p> CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Tightening torque, brass couplings 1/2": 31Nm</p> <p>Tightening torque, brass couplings 3/8": 17Nm</p>  <p>xx1200000050</p> <p>Attachment screws: M10x25 quality 8.8-A3F (2 pcs)</p>
15	Fit the <i>velcro straps</i> at the cable guide and around the cable harness.	 <p>xx1200000048</p>
16	Continue the refitting the cable package on the upper arm (IRBDP SW6 UE & IRBDP MH6 UE)	

Fitting the cable packages - IRBDP SW6 UI and IRBDP MH6 UI

Use this procedure to fit the cable packages. The figure shows the attachments of the cable packages **IRBDP SW6 UI** and **IRBDP MH6 UI**.

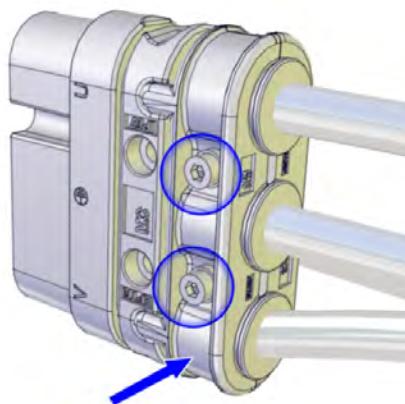
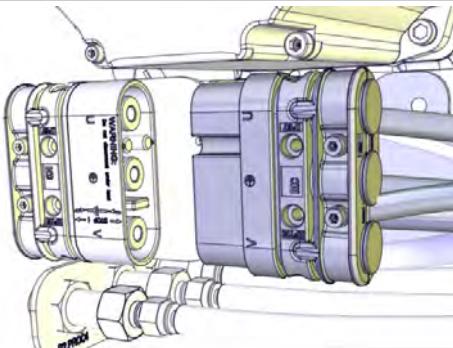
	Action	Note
1	Move the robot to a comfortable working position.	

Continues on next page

2 Installation

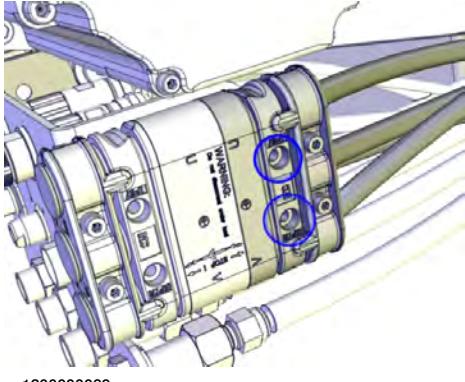
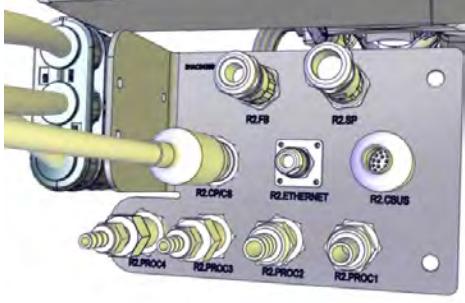
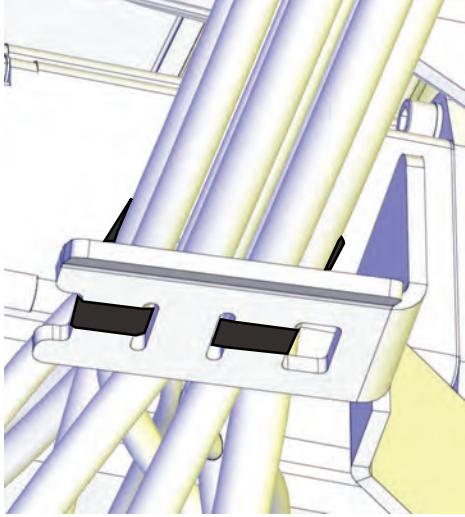
2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

Action	Note
<p>2  DANGER</p> <p>Turn off all:</p> <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply <p>to the robot, before entering the robot working area.</p>	
<p>3 Push the <i>cable package</i> carefully into the upper arm and in through the tube. This is best done following this order: 1: Cables (excluding weld cables) 2: Hoses 3: Weld cables</p>	 Tip <p>This procedure is best done by two persons working together - one pushing cables and hoses into the tube and one pulling them out in the back of the robot.</p>
<p>4 Fit the <i>weld cables</i> in the open weld connector.</p>	
<p>5 Fit the <i>cable strain relief</i>.</p>	 xx1200000058 Attachment screws: M5x25 quality 8.8-A2F (2 pcs)
<p>6 Connect the <i>weld cable</i>.</p>	 xx1200000075

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2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID
Continued

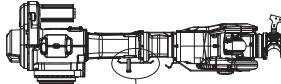
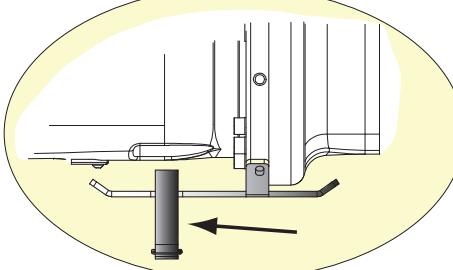
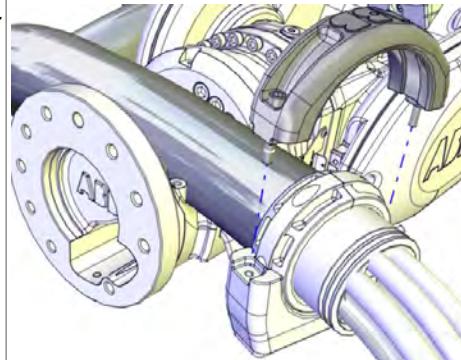
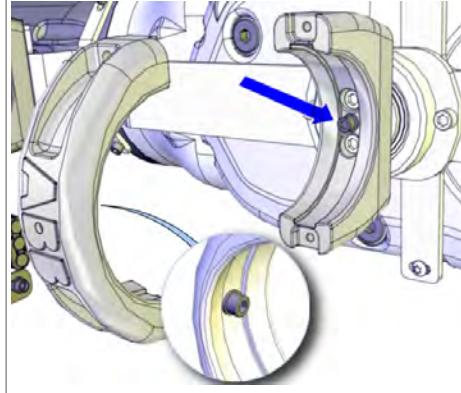
	Action	Note
7	Fit the <i>weld connector</i> of the cable package.	 xx1200000089 <p>Attachment screws: M5x40 quality 8.8-A2F (2 pcs)</p>
8	Connect <i>hose and cable connectors</i> on the connection plate.	<p> CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>  xx1200000059
9	Fit the cable package with the <i>strap</i> to the mounting plate axis 3.	<p> Note</p> <p>See the figure how the strap shall be fitted to holes in the mounting plate!</p>  xx1200000116

Continues on next page

2 Installation

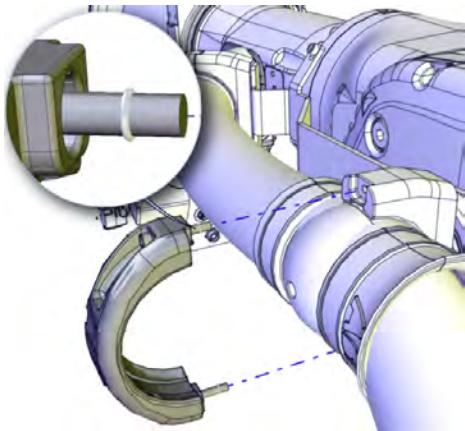
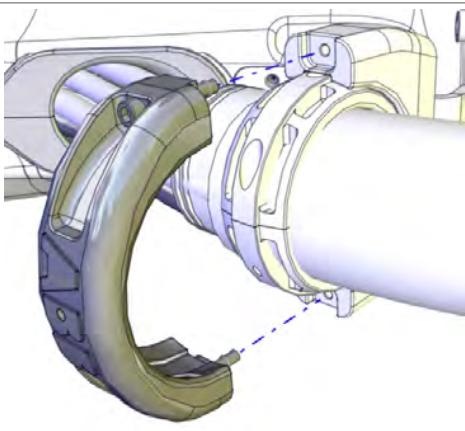
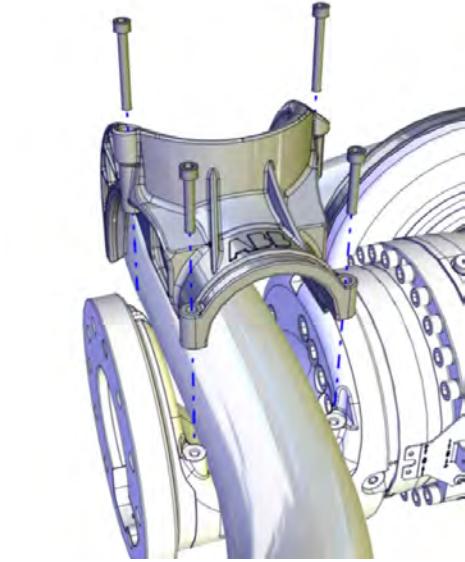
2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

Action	Note
10 Only valid with upper arm extension! Fit the cable package to the <i>extension plate</i> with the velcro strap.	  xx1200000119
11 Fit the cable package in the <i>housing, upper part</i> of the ball joint housing on the adjustable plate axis 6.	 xx1200000060
12 Check that the hose reinforcement funnel is fitted correctly, in the direction shown in the figure and the screws of the hose clamps placed on the inside.	See section Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm on page 296 .
13 The hose reinforcement funnel must not be able to rotate when fitted to the ball joint housing. Therefore check that the attachment screws M6x12 fits into the guiding holes of the hose reinforcement funnel when it is fitted in the ball joint housing.	 xx1200000153

Continues on next page

2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID
Continued

	Action	Note
14	Fit the cable package in the <i>housing, upper part</i> of the ball joint housing on the bearing housing.	 xx1200000074
15	Fit the cable package in the <i>housing, upper part</i> of the ball joint housing on the upper arm bracket.	 xx1200000061
16	Fit the <i>axis 6 cable support</i> .	 xx1200000036
17	If needed, adjust the position of the cable harness at the adjustable bracket axis 6.	See section <i>Adjusting the bracket axis 6 - IRBDP SW6 UI and IRBDP MH6 UI on page 174</i> .

Continues on next page

2 Installation

2.2.14 Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID

Continued

	Action	Note
18	 CAUTION When the cable package has been fitted on the upper arm, always check potential collision risks between the cable package and the wrist as well as between cable package and any equipment fitted on the wrist, before restarting the normal production. Turn on the power and run the present programming in a very slow speed, while checking all movements for collision risk between cable package and wrist.	
19	 DANGER Make sure all safety requirements are met when performing the first test run. These are further detailed in the section DANGER - First test run may cause injury or damage! on page 53.	

2.2.15 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 any cable or hose excessively!</i></p>  Note 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"> For <i>standard tightening torques</i> - See tightening torque table in chapter References. For <i>non standard tightening torques</i> see chapter <i>Installation</i>.

2 Installation

2.2.16 Inspection, DressPack upper arm

2.2.16 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.	Described in section Attachments and brackets on page 162 .
2	Inspect the process cable package.	Detailed in section Cables and hoses on page 163 .
3	Make sure all cables and hoses are securely fixed and connected.	Detailed in section Securing and connecting on page 164 .

Attachments and brackets

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



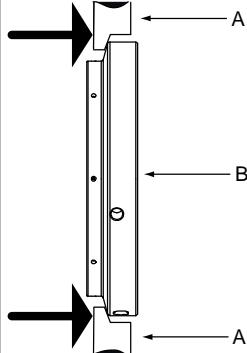
Note

This procedure is not applicable to cable package IRBDP MH3 UE , IRBDP SW6 UI and IRBDP MH6 UI.

	Action	Note
1	<p>Make sure the sliding surfaces of the slide sleeve has not been damaged. Check this with normal hand force:</p> <ul style="list-style-type: none">• grab hold of the package• pull and turn to make sure that the package is free to slide. <p> Note</p> <p>A damaged surface may potentially prevent the cable package from rotating causing excessive wear.</p>	 xx0300000199 <ul style="list-style-type: none">• A: Slide sleeve slide surface• B: Hose reinforcement• C: Process cable support, axis 6

Continues on next page

2.2.16 Inspection, DressPack upper arm
Continued

Action	Note
2 Check that the <i>process cable support, axis 6</i> is pushed forward completely against the <i>turning disk, axis 6</i> . See illustration!	 xx0400001040 Parts: <ul style="list-style-type: none"> • A: Process cable support, axis 6 • B: Turning disk, axis 6
3 Check the tightening torque.	Correct tightening torque: 70 Nm.
4 Check the angle of the <i>process cable support, axis 6</i> in relation to the movement pattern of the cable package. If required, change the position of the process cable support, axis 6 to ensure that the cable package does not get stretched or bent excessively.	

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 any cable or hose excessively.</i>	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 all hoses and cables to gun or gripper are long enough to avoid stretching during any part of the cycle. i Note <i>(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI)</i> When cutting the cables/hoses, make sure the length is sufficient between slide sleeve to fixation point (strap) on the tool, to enable cable and hoses to rotate in the process cable support, axis 6, as detailed above!	<i>(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI)</i> Do not strap closer than 400 mm from slide sleeve.
4 Only applicable to IRBDP SW6 UI and IRBDP MH6 UI! Check that the protection hose is rotating correctly in the hose reinforcement funnel.	

Continues on next page

2 Installation

2.2.16 Inspection, DressPack upper arm

Continued

Action	Note
5 Only applicable to IRBDP SW6 UI and IRBDP MH6 UI! Check that the hose reinforcement funnel is tilting correctly in the ball joint housing.	
6 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.
7 Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure in a way that may cause wear.	
8 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.	
9 Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.	
10 Make sure cable loops are not allowed to swing as the robot runs.	

Securing and connecting

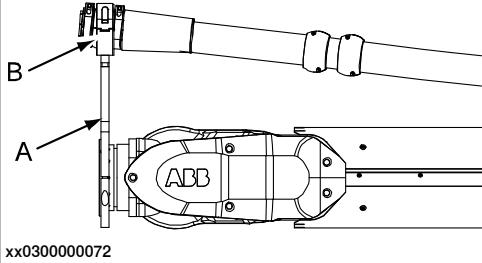
The procedure below details each inspection to be carried out, not necessarily in any particular order unless stated.

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">For standard tightening torques - See tightening torque table in chapter References.For non standard tightening torques - See Installation chapter.
2 Make sure all cable straps are tight enough to prevent the cable package from moving in any undesired way.  Note The cable straps/ties should not be too narrow. It may damage the cables/hoses.	

Continues on next page

2.2.16 Inspection, DressPack upper arm

Continued

Action	Note
<p>3 (Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UE and IRBDP MH6 UI)</p> <p><i>Do not strap, or in any other way secure, the cables/hoses to the process cable support, axis 6 in a way that may prevent the assembly to swivel properly.</i></p> <p>Whenever strapping the cables/hoses to the process cable support, axis 6, make sure the assembly is free to swivel properly.</p> <p> Note</p> <p>Do not strap closer than 400 mm from the slide sleeve!</p>	 <ul style="list-style-type: none"> A: Process cable support, axis 6 B: Slide sleeve
4 When securing cables and hoses with cable ties: <i>never overtighten the ties!</i> This may damage the equipment.	
5 Make sure that the cable package have been properly connected at the connection plate, axis 3 on the rear of the upper arm as well as at the tool on the robot turning disk.	
6 Make sure all connection points are well tightened and sealed in order to avoid leaks.	
7 Make sure the weight of the cable package is secured to the tool in order to avoid straining the connectors!	

2 Installation

2.2.17 Expected lifetime of the integrated DressPack cable package

General

The expected lifetime of the integrated DressPack cable package is dependent of the actual robot cycle. For the robot upper arm (axes 4, 5, and 6) the combination of the robot axes gives influence on lifetime. Below are recommendations for programming given as well as expected lifetime based on long term tests as well as normal spot welding application cycles.

Expected life time

If the robot cycle is done according to the recommendations above a lifetime could be expected for a normal spot welding cycle in two shift production, as shown in the table.

4-6 years	All DressPack cable packages listed in this manual <i>except</i> IRBDP SW6 and IRBDP MH6.
3-6 years	IRBDP SW6 and IRBDP MH6.

2.3 DressPack adjustments

2.3.1 Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE



Note

This section is not applicable to cable package IRBDP MH3 UE! How to adjust cable package IRBDP MH3 UE is detailed in [Adjustments of the cable package - IRBDP MH3 UE on page 171](#).

General

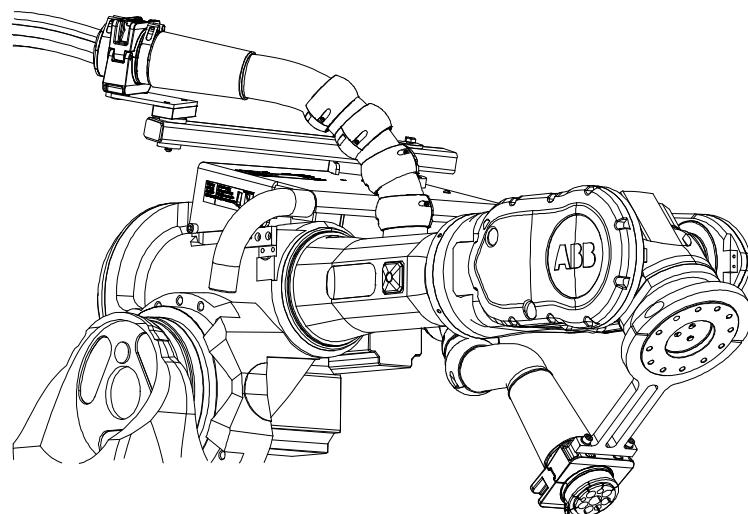
The instructions below details how to adjust the routing of the DressPack upper arm to avoid reducing its life.

How to adjust the tension arm unit, see section [Adjusting tension arm unit on page 315](#).

Hose reinforcement

Should the hose reinforcement get strained under the upper arm during the work cycle, the following tips may assist in alleviating the problem.

The figure shows a DressPack upper arm fitted to an IRB 6600, but the problem is identical to all robot types.



xx0500001560

	Action	Note
1	Either, try changing the robot position or orientation at the particular position to reduce the angle of axis 5 in combination of axis 6,	
2	or rotate the attachment angle of the process cable support, axis 6 slightly.	

Continues on next page

2 Installation

2.3.1 Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE

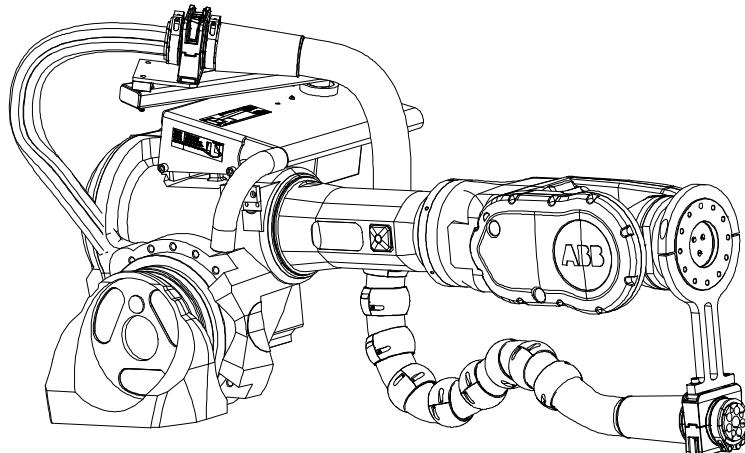
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Hoses and cables too long around the wrist

If the DressPack upper arm is too long, the hose loop may get obstructed or caught by the brackets or any other equipment.

How to adjust the upper arm MH dressing cable package IRBDP MH3 is detailed in section [Adjustments of the cable package - IRBDP MH3 UE on page 171](#).

The figure shows a DressPack upper arm fitted to an IRB 6600, but the problem is identical to all robot types.



xx0500001561

Action	Note
<p>1 Make sure that the position of the <i>ball joint housing</i> is correct.</p> <p>Position 1:</p> <ul style="list-style-type: none">• IRB 6640 - 2.55• IRB 6640 - 2.75 <p>Position 2:</p> <ul style="list-style-type: none">• IRB 6640 - 2.8• IRB 6640 - 3.2	<p>1</p> <p>2</p> <p>xx0700000335</p> <p>Parts:</p> <ul style="list-style-type: none">• A: Ball joint housing• B: Tension arm

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2.3.1 Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE

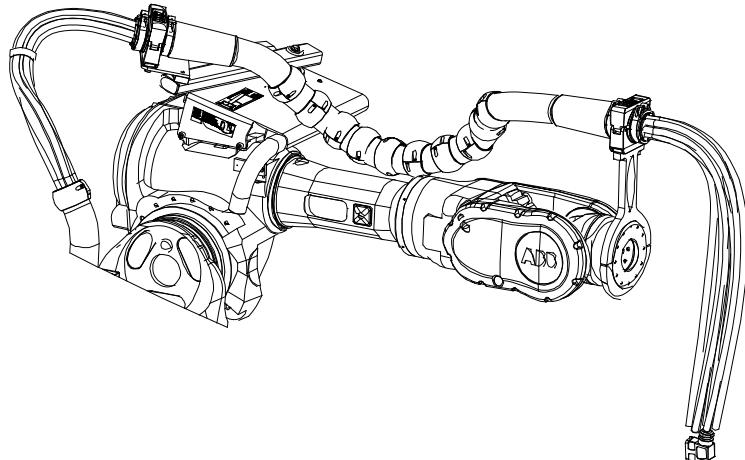
Continued

	Action	Note
2	Adjust the tension arm unit to reduce the slack in the hose package Adjusting tension arm unit on page 315 .	
3	If this does not solve the problem, the robot movements must be limited. If this is not done, there is a substantial risk of damaging the hose/cable package.	
4	After changing the DressPack upper arm installation, it needs to be inspected to ensure the function.	Detailed in section Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE on page 167 .

Hoses and cables too long

The hoses and cables at the end of the hose package are too long. The length should allow any required robot movement without stretching and also allow rotation inside the process cable support, axis 6.

The figure shows a DressPack upper arm fitted to an IRB 6600, but the problem is identical to all robot types.



xx0500001575

	Action	Note
1	<p>Cut the weld cable and hoses to a length that will suit the application before making any connections to the tool.</p> <p>Note</p> <p>Do not pull back the cables and hoses through the protective hose!</p> <p>Note the length of cables and hoses to make it easier for a later change to a spare cable package.</p>	<p>Do not cut the hoses and weld cable too short. During programming it can be necessary to adjust the position of the process cable support, axis 6.</p>

Continues on next page

2 Installation

2.3.1 Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE

Continued

	Action	Note
2	Loop the excess hoses and cables in a way that enables securing them with <i>cable clamps</i> or similar allowing quick replacement of the package.	When securing cables and hoses with cable ties: <i>never overtighten the ties!</i> This may damage the equipment.  Note Use wide cable ties!
3	After changing the DressPack installation, it needs to be inspected to ensure the function.	

Process cable package too short

If the DressPack is too short, unacceptable strain may be put on the cables, hoses and connectors.

	Action	Note
1	Make sure the correct cable package is used.	Check the Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE on page 167 section for article numbers!
2	Check that the position of the ball joint housing is correct.	
3	Make sure all attachments and supports are <i>fitted correctly</i> .	Detailed in section Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 118 . If required adjust their fitting positions! When securing cables and hoses with cable ties: <i>never overtighten the ties!</i> This may damage the equipment.
4	 Note If the DressPack cable package appears to be fitted too strained, the reason can be that the tension arm is adjusted too tightly.	How to adjust the tension arm is detailed in section Adjusting tension arm unit on page 315 .
5	After changing the DressPack upper arm installation, it needs to be inspected to ensure the function.	Detailed in section Preventive inspection, DressPack upper arm on page 216 .

2.3.2 Adjustments of the cable package - IRBDP MH3 UE

Overview

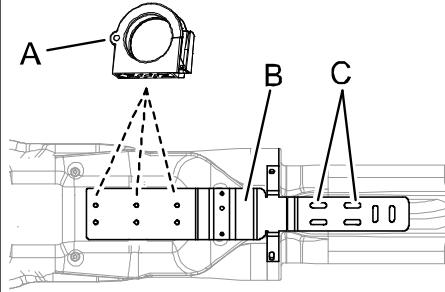
The procedure below details how to adjust the routing of the upper arm cable package -IRBDP MH3 UE, in order to avoid reducing its life.

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	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION 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 the <i>gripping clamp</i> in the best suitable position on the <i>bracket</i> . Choose one of the positions shown in the figure.	 xx070000389 Parts: <ul style="list-style-type: none"> • A: Gripping clamp • B: Bracket left • C: Position for straps
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 straps on the bracket.	Shown in the figure above.

2 Installation

2.3.3 Adjustment of the cable package - IRBDP SW5 CE (SpotPack Basic)

Overview

The position of the ball joint housing and gripping clamp on the adjustable bracket is different depending on robot version.

Adjustment procedure

The procedure below details how to adjust the position of the process cable package SpotPack Basic before commissioning.

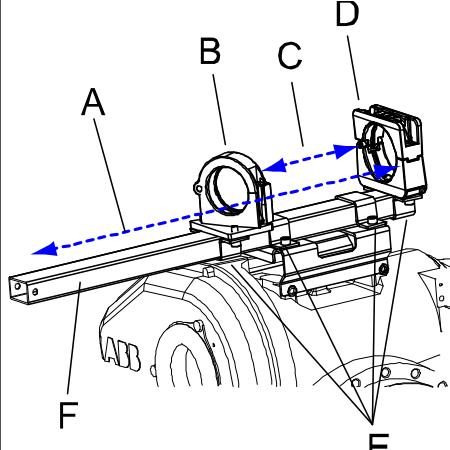
It is possible to place the ball joint housing and gripping clamp in different positions on the adjustable bracket in order to get the smoothest movements possible of the process cable package and preventing premature wear.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION 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 the <i>ball joint housing and gripping clamp</i> on the adjustable bracket with the brackets and attachment screws.	<p>Detailed in section Fitting the attachments of IRBDP SW5 CE (SpotPack Basic) on page 85.</p> <p> Note Place the axis 6 bracket in a way that axis 5 doesn't press the DressPack against the robot arm in any position or movement in the working programs of the robot.</p> <p> Note Do not secure the attachment screws completely at this point! It must still be possible to move the ball joint housing and gripping clamp back and forth on the adjustable bracket.</p>
4	Fit the process cable package in the ball joint housing and gripping clamp.	Detailed in section Fitting the cable package IRBDP SW5 CE (SpotPack Basic) on page 144 .

Continues on next page

2.3.3 Adjustment of the cable package - IRBDP SW5 CE (SpotPack Basic)

Continued

Action	Note
5 Adjust the process cable package in a way that it will move smoothly in accordance to the movements of the robot's axes 4, 5 and 6, by putting the <i>ball joint housing</i> and <i>gripping clamp</i> in the best position possible. The adjustable bracket is also possible to put in different positions depending on robot model and variant. Adjust the position of the <i>adjustable bracket</i> in order to adapt the position of the process cable package to the different arm lengths and movements of the wrist and upper arm. The adjustable bracket shall be fitted as far back as possible in order to allow the DressPack to follow the movements of the robot arm. The process cable package must not be wound hard against the robot arm at any given position while the robot is moving.	 xx0800000109 Parts: <ul style="list-style-type: none"> A: Position can be adjusted depending on which cable package is used. B: Gripping clamp C: Distance and position can be adjusted depending on robot model and version, and cable package. D: Ball joint housing E: Bracket F: Adjustable bracket
6 When fitting the <i>gripping clamp</i> on the adjustable bracket, fit it 450 mm behind the <i>ball joint housing</i> .	Pos C in the figure above.
7 Secure the attachment screws of the brackets holding the ball joint housing and gripping clamp. Lock screws with locking liquid.	
8 If there is any exceptional strain on the process cable package, adjust the position of the ball joint housing and gripping clamp further.	
9 Depending on the actual fitting of the DressPack and the robot program, the protective sleeves may have to be moved in order to prevent the protection hose from being worn directly while rubbing against robot and/or wrist.	

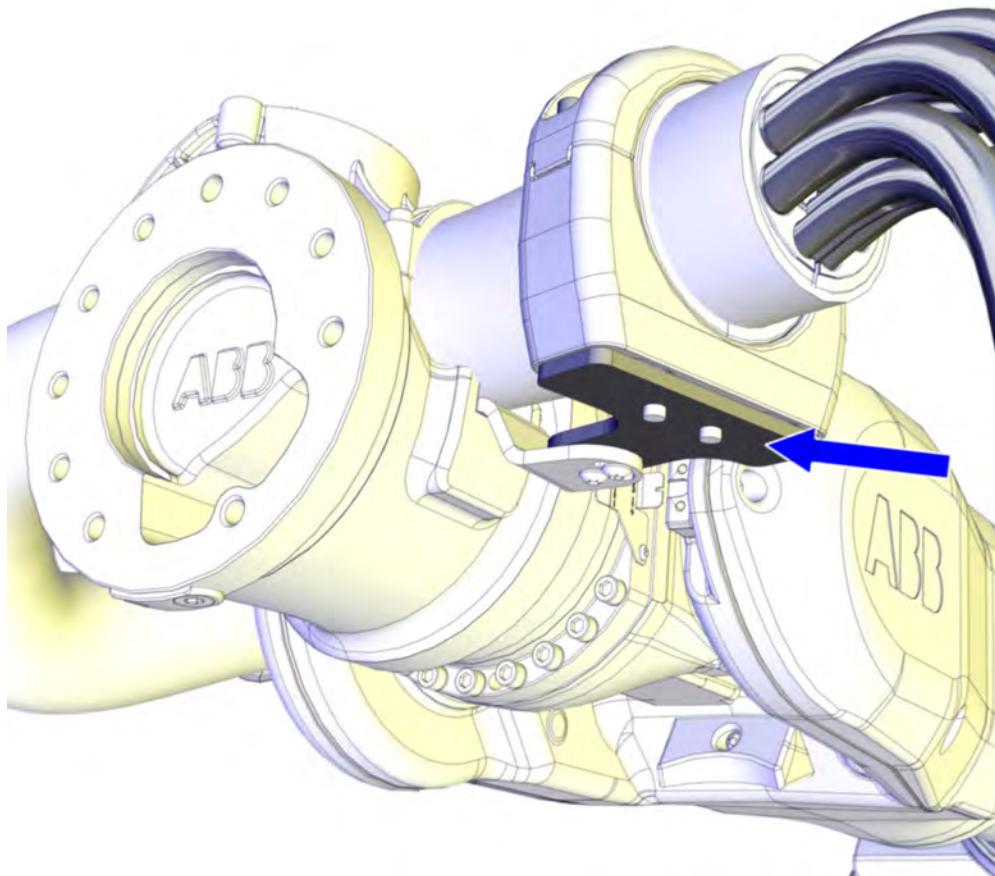
2 Installation

2.3.4 Adjusting the bracket axis 6 - IRBDP SW6 UI and IRBDP MH6 UI

2.3.4 Adjusting the bracket axis 6 - IRBDP SW6 UI and IRBDP MH6 UI

Location of the adjustable bracket axis 6

The adjustable bracket axis 6 is located as shown in the figure.



xx1200000121

Required equipment

Equipment, etc.	Art. no.	Note
Standard toolkit	-	Content is defined in section Standard toolkit on page 351 .
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.

Adjusting the adjustable bracket axis 6.



Note

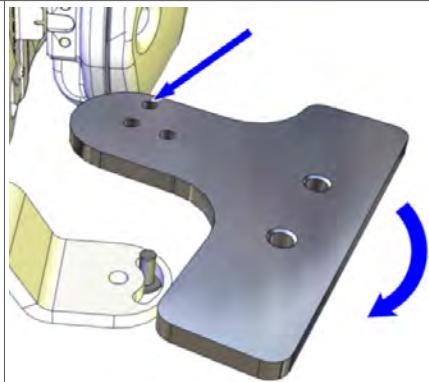
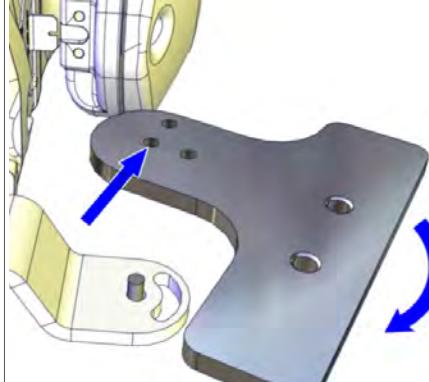
Before starting the adjustment of the adjustable bracket, check the program that no potential collision risk will occur after the adjustment is done!

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2.3.4 Adjusting the bracket axis 6 - IRBDP SW6 UI and IRBDP MH6 UI

Continued

Use this procedure to adjust the adjustable bracket axis 6.

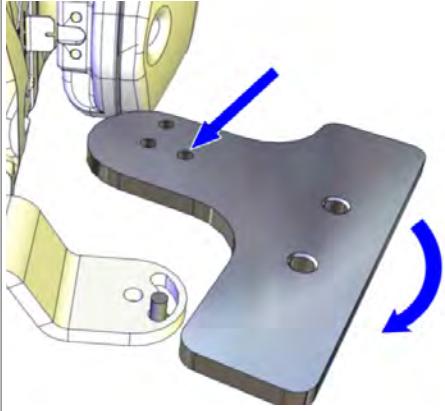
	Action	Note
1	<p> DANGER</p> <p>Turn off all:</p> <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply <p>to the robot, before entering the robot working area.</p> <p> DANGER</p> <p>Turn off all electric power, hydraulic and pneumatic pressure supplies to the robot and for the track motion.</p>	
2	<p>Remove the attachment screw locking the adjustable bracket 2(2) in its most forward position.</p> <p> Note</p> <p>The attachment screw is only used to lock the adjustable bracket axis 6 in its most forward position. If there is a need to adjust the bracket in any other position, this screw is not needed.</p>	 xx1200000038
3	<p>Unscrew the attachment screw shown in the figure, a little, in order to be able to adjust the adjustable bracket. Do not remove it at this stage!</p>	 xx1200000154

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2 Installation

2.3.4 Adjusting the bracket axis 6 - IRBDP SW6 UI and IRBDP MH6 UI

Continued

Action	Note
4 Unscrew the attachment screw shown in the figure, a little, in order to be able to adjust the adjustable bracket. Do not remove it at this stage!	 xx1200000155
5 Move the adjustable bracket as far forward as possible.	
6 Tighten the two attachment screws in order to keep the adjustable bracket in place.	
7 Remove one of the screws, while the other still is tightened and apply locking liquid (Loctite 243).	
8 Tighten the screw.	
9 Repeat the procedure with the remaining attachment screw.	
10 Perform a manual test-run in very low speed and check that there is no collision risk or other risks of damaging the cable package.	
11  DANGER Make sure all safety requirements are met when performing the first test run. These are further detailed in the section DANGER - First test run may cause injury or damage! on page 53.	

2.3.5 Inspection during programming and test-running

2.3.5 Inspection during programming and test-running

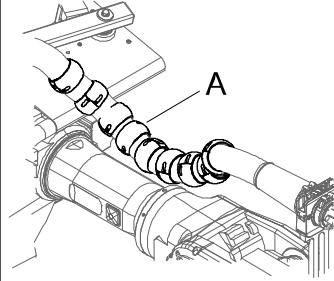
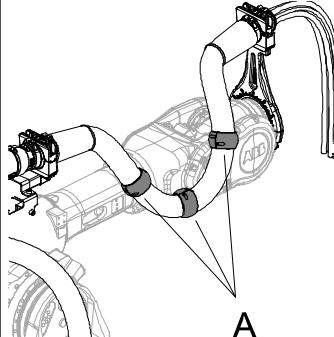
General

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 arm

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

IRBDP MH2 UE, IRBDP SW2 UE, IRBDP SW2 CE and IRBDP SW5 CE

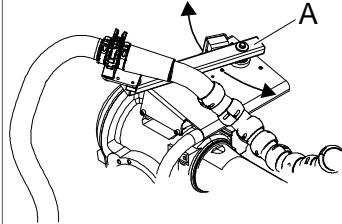
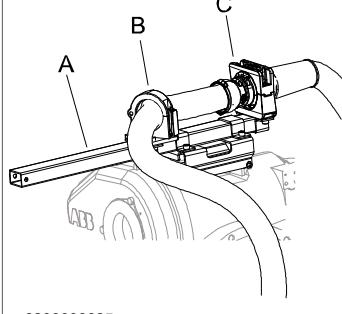
	Action	Note
1	Inspect the DressPack upper arm installation.	See section <i>Inspection, DressPack upper arm on page 162</i> .
2	Check the position of the process cable support axis 6, in relation to the final movement pattern of the robot wrist.	Make a note of where the process cable support axis 6 was finally positioned to make it easier to replace it in the future.
3	<p>Check the positions of the <i>protective sleeves</i> after programming is completed. Place these where they prevent the protective hose from rubbing against the robot's upper arm as much as possible. If required, additional protective sleeves may be fitted.</p>	<p>IRBDP MH2 UE, IRBDP SW2 UE & IRBDP SW2 CE</p>  <p>xx0500001441</p> <p>IRBDP SW5 CE</p>  <p>xx0800000084</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Protective sleeves <p>Make a note of where the protective sleeves were finally positioned to make it easier to replace them in the future.</p>

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2 Installation

2.3.5 Inspection during programming and test-running

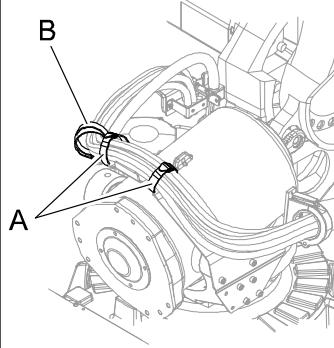
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Action	Note
4 Check the operating cycle of the robot, to make sure the movement pattern of the wrist does not cause extensive wear or strain of the cable package.	If required, re-program the robot movement pattern!
5 Large rotating movements of the upper arm (axes 4 and 6 combined) may cause twisting of the DressPack.	When programming such movements, we recommend that the rotating movement of axis 6 is ordered before that of axis 4. This reduces the risk of damaging the DressPack upper arm.
6 Make sure the upper arm protective hose <i>does not get flattened</i> during rotating upper arm movements.	Flattening indicates an overstressed hose and <i>increases</i> the risk of damaging the DressPack upper arm.
7 Make sure no combined rotating movements of axes 5 and 6 causes collisions between the <i>cables/hoses</i> or the <i>process cable support axis 6</i> and the upper arm. Such movements may also cause excessive bending of cables or hoses.	Collisions and excessive bending will <i>increase</i> the risk of damaging the equipment. Minimum bending radius: 10 x cable/hose diameter.
8 Valid for IRBDP MH2 UE, IRBDP SW2 UE & IRBDP SW2 CE. Make sure that the movements of the <i>tension arm</i> are smooth and do not jerk the cable package.	 xx0500001442 Parts: <ul style="list-style-type: none"> A: Tension arm (seen from above) If required, increase or reduce the amount of spring tension of the tension arm unit.
9 Valid for IRBDP SW5 CE Make sure all movements at the <i>adjustable bracket with ball joint housings and gripping clamp</i> are smooth and do not jerk the process cable package.	 xx0800000085 Parts: <ul style="list-style-type: none"> A: Adjustable bracket B: Gripping clamp C: Ball joint housing
10 If any of the actions recommended above, cause you to change the DressPack installation, it must be reinspected.	See section Inspection, DressPack upper arm on page 162 .

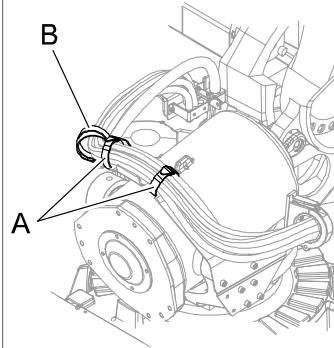
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2.3.5 Inspection during programming and test-running

Continued

Action	Note
<p>11 Make sure that the <i>velcro straps</i> is not too tight. The cables should be able to twist individually. The <i>straps</i> shall be tight!</p>	 <p>xx0700000322</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Straps • B: Velcro straps
12 Make sure that no parts of the DressPack are in contact with the surroundings.	

IRBDP MH3 LE & IRBDP MH3 UE and IRBDP SW6 LE/UI & IRBDP MH6 LE/UI

Action	Note
1 Inspect the DressPack upper arm installation before programming and test-running.	See section Inspection, DressPack upper arm on page 162 .
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 Inspection, DressPack upper arm on page 162 .
5 Make sure that the <i>velcro straps</i> is not too tight. The cables should be able to twist individually. The <i>straps</i> shall be tight.	 <p>xx0700000322</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Straps • B: Velcro straps
6 Make sure that no parts of the DressPack are in contact with the surroundings.	

Continues on next page

2 Installation

2.3.5 Inspection during programming and test-running

Continued

	Action	Note
7	<p>(Only applicable if process cable support axis 6 is used!)</p> <p>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.</p> <p>Such movements may also cause excessive cable/hose bending.</p>	<p>Collisions and excessive bending will increase the risk of damaging the equipment.</p> <p>Minimum bending radius: 10x cable/hose diameter.</p>

Checking the DressPack at the lower arm

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

	Action	Note
1	Inspect the DressPack lower arm installation before programming and test-running.	See section Inspection, DressPack lower arm on page 161
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 lower arm installation, it must be reinspected.	See section Inspection, DressPack lower arm on page 161

2.4.1 DressPack - arm load parameters and LoadId

2.4 DressPack arm load parameters

2.4.1 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 being used.

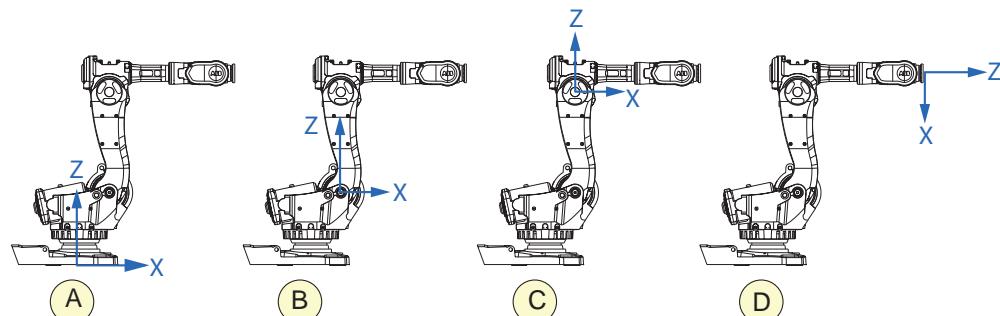


Note

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.



xx0500001893

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)
D	Tool

Arm load parameters for Spot welding

Arm load parameters for IRBDP SW2 and IRBDP SW5

The following table specifies values for DressPack - Spot welding.

Frame axis 1	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	9.0	0.080	-0.550	0.465
IRB 6640 - 235/2.55	9.0	0.080	-0.550	0.465
IRB 6640 - 185/2.8	9.0	0.080	-0.550	0.465

Continues on next page

2 Installation

2.4.1 DressPack - arm load parameters and LoadId

Continued

Frame axis 1	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 205/2.75	9.0	0.080	-0.550	0.465
IRB 6640 - 130/3.2	9.0	0.080	-0.550	0.465
Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	12.4	0	-0.550	0.550
IRB 6640 - 235/2.55	12.4	0	-0.550	0.550
IRB 6640 - 185/2.8	12.4	0	-0.550	0.550
IRB 6640 - 205/2.75	13.1	0	-0.550	0.550
IRB 6640 - 130/3.2	13.1	0	-0.550	0.550
Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	53.5	0.085	0.114	0.286
IRB 6640 - 235/2.55	53.5	0.085	0.114	0.286
IRB 6640 - 185/2.8	54.4	0.110	0.112	0.286
IRB 6640 - 205/2.75	53.5	0.085	0.114	0.286
IRB 6640 - 130/3.2	55.1	0.133	0.111	0.287

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 6640 - 180/2.55	6.4	-0.216	0.000	0.000
IRB 6640 - 235/2.55	6.4	-0.216	0.000	0.000
IRB 6640 - 185/2.8	6.4	-0.216	0.000	0.000
IRB 6640 - 205/2.75	6.4	-0.216	0.000	0.000
IRB 6640 - 130/3.2	6.4	-0.216	0.000	0.000

Arm load parameters for IRBDP SW6

These tables show the values for the cable package IRBDP SW6 - Spot welding.

Frame - axis 1	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	9	0.080	-0.550	0.465
IRB 6640 - 235/2.55	9	0.080	-0.550	0.465
IRB 6640 - 185/2.8	9	0.080	-0.550	0.465
IRB 6640 - 205/2.75	9	0.080	-0.550	0.465
Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	12.4	0	-0.550	0.550
IRB 6640 - 235/2.55	12.4	0	-0.550	0.550
IRB 6640 - 185/2.8	12.4	0	-0.550	0.550

Continues on next page

2.4.1 DressPack - arm load parameters and LoadId Continued

Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 205/2.75	13.1	0	-0.550	0.550
Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	8	-0.25	-0.025	0.08
IRB 6640 - 235/2.55	8	-0.25	-0.025	0.08
IRB 6640 - 185/2.8	8	-0.25	-0.025	0.08
IRB 6640 - 205/2.75	8	-0.25	-0.025	0.08
Upper arm - axis 4	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	10	0.693	-0.20	0.2
IRB 6640 - 235/2.55	10	0.693	-0.20	0.2
IRB 6640 - 185/2.8	10	0.943	-0.21	0.2
IRB 6640 - 205/2.75	10	0.693	-0.20	0.2

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 6640 - 180/2.55	4	0	0	-0.09
IRB 6640 - 235/2.55	4	0	0	-0.09
IRB 6640 - 185/2.8	4	0	0	-0.09
IRB 6640 - 205/2.75	4	0	0	-0.09



Note

These values reflect the standard mounting of the Process bracket, pointing straight upwards in the robot calibration position. If the mounting is changed, the X, Y and Z values must be changed correspondingly.

Arm load parameters for Material handling

Arm load parameters for IRBDP MH

The following table details values for DressPack - Material handling.

For the armload parameters of the cable package IRBDP MH6 see [Arm load parameters IRBDP MH6 on page 184](#).

Frame axis 1	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	5.9	0.080	-0.550	0.465
IRB 6640 - 235/2.55	5.9	0.080	-0.550	0.465
IRB 6640 - 185/2.8	5.9	0.080	-0.550	0.465
IRB 6640 - 205/2.75	5.9	0.080	-0.550	0.465
IRB 6640 - 130/3.2	5.9	0.080	-0.550	0.465

Continues on next page

2 Installation

2.4.1 DressPack - arm load parameters and LoadId

Continued

Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	10.1	0	-0.550	0.550
IRB 6640 - 235/2.55	10.1	0	-0.550	0.550
IRB 6640 - 185/2.8	10.1	0	-0.550	0.550
IRB 6640 - 205/2.75	10.4	0	-0.550	0.653
IRB 6640 - 130/3.2	10.4	0	-0.550	0.653

Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	42.4	0.072	0.116	0.286
IRB 6640 - 235/2.55	42.4	0.072	0.116	0.286
IRB 6640 - 185/2.8	42.7	0.089	0.115	0.286
IRB 6640 - 205/2.75	42.4	0.072	0.115	0.286
IRB 6640 - 130/3.2	43.0	0.104	0.115	0.286

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 6640 - 180/2.55	4.9	-0.191	0	0
IRB 6640 - 235/2.55	4.9	-0.191	0	0
IRB 6640 - 185/2.8	4.9	-0.191	0	0
IRB 6640 - 205/2.75	4.9	-0.191	0	0
IRB 6640 - 130/3.2	4.9	-0.191	0	0

Arm load parameters IRBDP MH6

These tables show the values for the cable package IRBDP MH6 - Material handling.

Frame - axis 1	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	5.9	0.080	-0.550	0.465
IRB 6640 - 235/2.55	5.9	0.080	-0.550	0.485
IRB 6640 - 185/2.8	5.9	0.080	-0.550	0.485
IRB 6640 - 205/2.75	5.9	0.080	-0.550	0.485

Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	10.1	0	-0.550	0.550
IRB 6640 - 235/2.55	10.1	0	-0.550	0.550
IRB 6640 - 185/2.8	10.1	0	-0.550	0.550
IRB 6640 - 205/2.75	10.4	0	-0.550	0.653

Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	6	-0.25	-0.025	0.08

Continues on next page

2.4.1 DressPack - arm load parameters and LoadId

Continued

Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 235/2.55	6	-0.25	-0.025	0.08
IRB 6640 - 185/2.8	6	-0.25	-0.025	0.10
IRB 6640 - 205/2.75	6	-0.25	-0.025	0.08

Upper arm - axis 4	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6640 - 180/2.55	8	0.693	-0.20	0.2
IRB 6640 - 235/2.55	8	0.693	-0.20	0.2
IRB 6640 - 185/2.8	8	0.943	-0.21	0.2
IRB 6640 - 205/2.75	8	0.693	-0.20	0.2

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 6640 - 180/2.55	3.5	0	0	-0.09
IRB 6640 - 235/2.55	3.5	0	0	-0.09
IRB 6640 - 185/2.8	3.5	0	0	-0.09
IRB 6640 - 205/2.75	3.5	0	0	-0.09



Note

These values reflect the standard mounting of the Process bracket, pointing straight upwards in the robot calibration position. If the mounting is changed, the X, Y and Z values must be changed correspondingly.

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.

Continues on next page

2 Installation

2.4.1 DressPack - arm load parameters and LoadId

Continued

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 <i>Procedures Step 1 - Arm load data on page 185</i> .

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.

The connection of the water and air unit also differs whether option 782-13 Bosch MFDC Profinet is chosen or not.

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 connection 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 187](#).

Required equipment

Equipment, etc.	Article number	Note
DressPack floor	For spare part number see chapter: • Spare parts on page 355 .	A number of versions are available.
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .

Reference documents

Document	Document number	Note
<i>Circuit diagram - DressPack IRB 6640, IRB 6650S, IRB 7600</i>	3HAC026209-001	

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 187](#) and the [Spare parts on page 355](#) chapter.

Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2  CAUTION 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 Configuration and connections of DressPack floor on page 187 .
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">• no floor weld cable is routed along signal cabling to minimize the risk of interference.• the duct/trench floor is free from sand and other contamination. This is to reduce the risk of damaging the cable insulation.• no cables or hoses rub against any sharp corners which might damage them.
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.	

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2.5.1 Installation of DressPack floor
Continued

Action	Note
8 Connect the shop power supply to the spot welding cabinet.	The supply needs to be configured in such a way that the requirements of the spot welding cabinet are met: <ul style="list-style-type: none"> • Voltage: 400-600 VAC, 50-60 Hz • Fuse: 110 A • Earth fault protection, see <i>Product manual - Spot welding cabinet (3HAC058524-001)</i>. • Contactor, see <i>Product manual - Spot welding cabinet (3HAC058524-001)</i>.
9	See circuit diagram and the Spare parts on page 355 chapter.
10 Select which CP/CS cabling (customer power/customer signals) to be used.	Some versions include industrial buses. See circuit diagram and the Spare parts on page 355 chapter.
11 Connect the CP/CS cable to the manipulator and controller cabinet connectors.	See circuit diagram and the Spare parts on page 355 chapter.
12 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) connectors.	See circuit diagram and the Spare parts on page 355 chapter.
13 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 Spare parts on page 355 chapter.
14 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 Se or HSe).	See circuit diagram and the Spare parts on page 355 chapter.
15 If used, connect the resolver cable to the robot base and to the stationary/pedestal gun.	See circuit diagram and the Spare parts on page 355 chapter.

2 Installation

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.

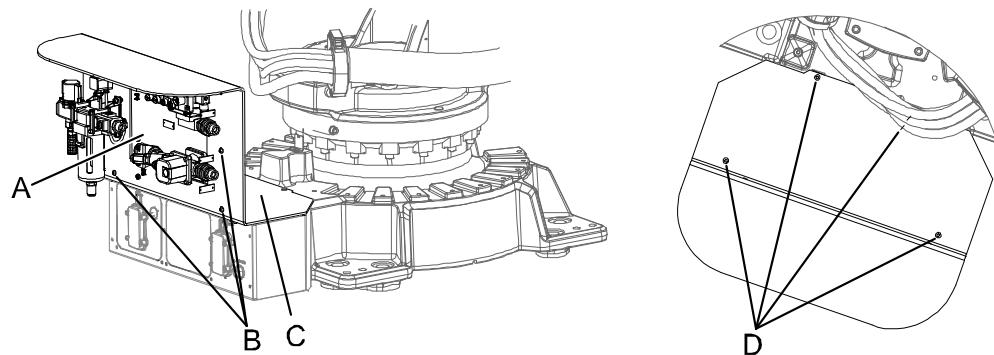
	Action	Note
1	Make sure that the cable package is properly connected at the robot base as well as at the other end.	
2	Make sure that no hoses or cables, or parts thereof, are routed in such a way that they are subjected to wear, for example hoses being run over by fork lifts etc.	
3	Make sure that no 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.	

2.6 Water & Air unit

2.6.1 Installation of Water and air unit

Location of Water and air unit, type S

The Water and air unit type S is located as shown in the figure below. The figure shows the Water and air unit fitted on IRB 6620, but the principle is the same the other models.



xx0600003205

A	Water and air unit, type S
B	Attachment screws M6x8 quality 8.8-A2F, Water in and water return unit (6 pcs)
C	Attachment plate
D	Attachment screws M6x8 quality 8.8-A2F, Water and air unit (4 pcs)



CAUTION

Do not tighten the brass couplings for water and air with excessive force.

Tightening torque, brass couplings 1/2": 31 Nm

Tightening torque, brass couplings 3/8": 17 Nm

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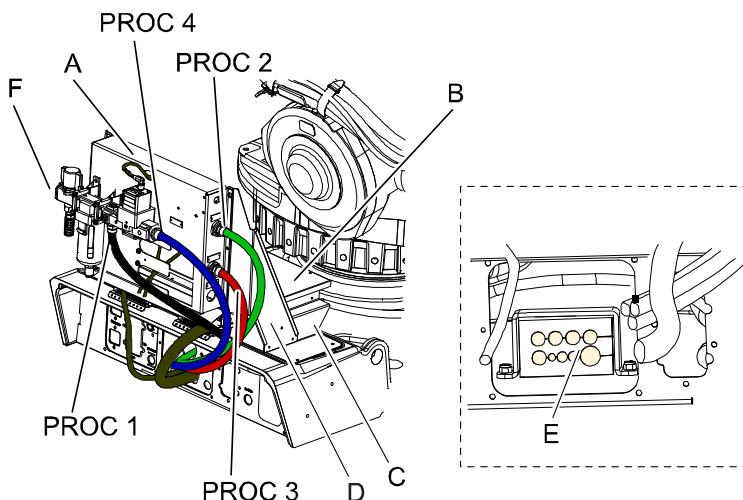
2 Installation

2.6.1 Installation of Water and air unit

Continued

Location of Water and air unit, type Sb (SpotPack Basic)

The Water and air unit type Sb is located as shown in the figure below. The figure shows the water and air unit fitted on IRB 6600, but the principle is the same for the other models.



xx0800000115

A	Water and air unit, type Sb
B	Connection box
C	Bracket, connection box
D	Bracket right (Bracket left on other side. Not shown here)
E	Clamp holder with plastic clamp
PROC 1	PROC 1 on robot base
PROC 2	PROC 2 on robot base
PROC 3	PROC 3 on robot base
PROC 4	PROC 4 on robot base (option)



CAUTION

Do not tighten the brass couplings for water and air with excessive force.

Tightening torque, brass couplings 1/2": 31 Nm

Tightening torque, brass couplings 3/8": 17 Nm

General technical data

The table below shows technical data of the water and air pressure:

Parameter	Value
Water operating pressure	Max. 0.6 MPa / 87 PSI
Air operating pressure	Max. 1.0 MPa / 145 PSI

The table below shows technical data for water and air quality:

Parameter	Value
Water quality	Normal filtered industrial water quality, 80 to 100 mesh.

Continues on next page

Parameter	Value
Air quality	Use clean air. When there is excessive condensate, install a device that will eliminate water, such as a dryer or water separator (Drain Catch) on the inlet side of the air filter.

Required equipment

Equipment, etc	Art. no.	Note
Water and Air unit, type S	For spare part number see chapter: • Spare parts on page 355 .	A number of versions are available.
Water and air unit, type Sb	For spare part number see chapter: • Spare parts on page 355 .	A number of versions are available.
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .

Reference documents

Document	Document number	Note
<i>Circuit diagram - SpotPack SWC IRC5 M2004</i>	3HAC026208-001	Valid for all robots without PROFINET.
<i>Circuit diagram - SpotPack SWC IRC5 Design 2014 PROFINET</i>	3HAC044736-001	Valid for all robots with option 782-13 Bosch MFDC PROFINET.

Installation of Water and air unit, type S

The procedure below details how to install the Water and Air unit, type S on the robot base.

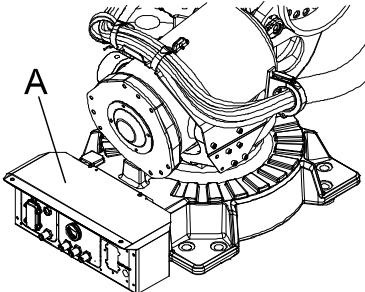
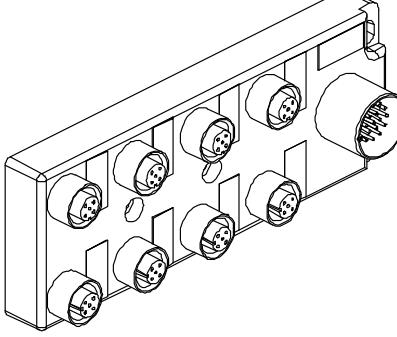
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

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2 Installation

2.6.1 Installation of Water and air unit

Continued

Action	Note
2 Remove the attachment screws securing the <i>top cover</i> at the base of the robot. Keep the screws! They will be reused when fitting the water and air unit.	 xx0700000319 Parts: <ul style="list-style-type: none"> A: Top cover
3 Fit the Water and Air unit and secure it with its attachment screws, M6x8 quality 8.8-A2F (4 pcs).	Reuse the screws of the top cover. Shown in the figure in section Location of Water and air unit, type S on page 191 .
4 Connect the water and air supplies.  CAUTION Do not tighten the brass couplings for water and air with excessive force.	Tightening torque, brass couplings 1/2": 31 Nm Tightening torque, brass couplings 3/8": 17 Nm Specified in section Connections to Water and Air unit, type S on page 197 below.
5 Connect the split box cable for Water and Air unit with the split box at the Water and Air unit.	 xx0600003347 Parts: <ul style="list-style-type: none"> Split box

Installation of Water and air unit, type Sb

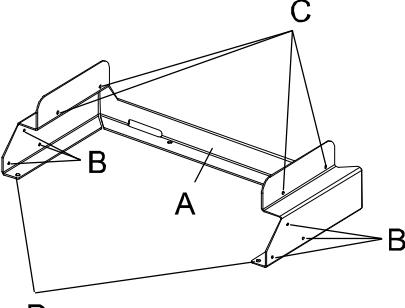
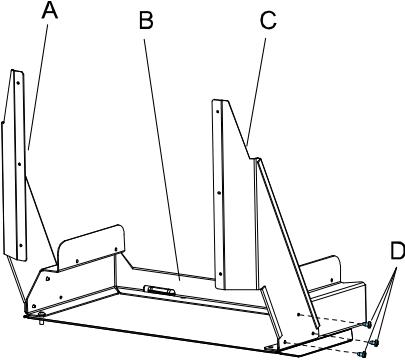
The procedure below details how to install the Water and Air unit, type Sb on the robot base.

Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

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2.6.1 Installation of Water and air unit

Continued

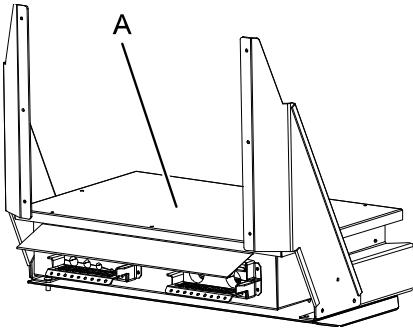
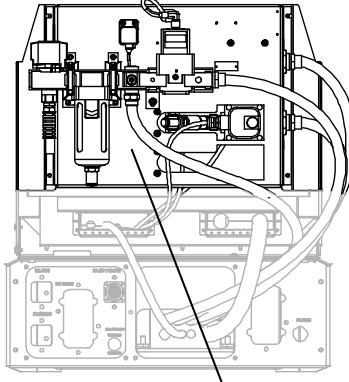
Action	Note
2 Remove the attachment screws securing the top cover at the base of the robot. Keep the screws! They will be reused when fitting the water and air unit.	
3 Fit the <i>bracket connection box</i> using the attachment screws removed earlier.	 <p>xx0800000119</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket connection box • B: Attachment holes for bracket left and right • C: Attachment holes for connection box • D: Attachment holes for securing to top cover
4 Fit the <i>bracket right</i> and <i>left</i> to the bracket connection box with its attachment screws.	 <p>xx0800000116</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket left • B: Bracket connection box • C: Bracket right • D: Attachment screws

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2 Installation

2.6.1 Installation of Water and air unit

Continued

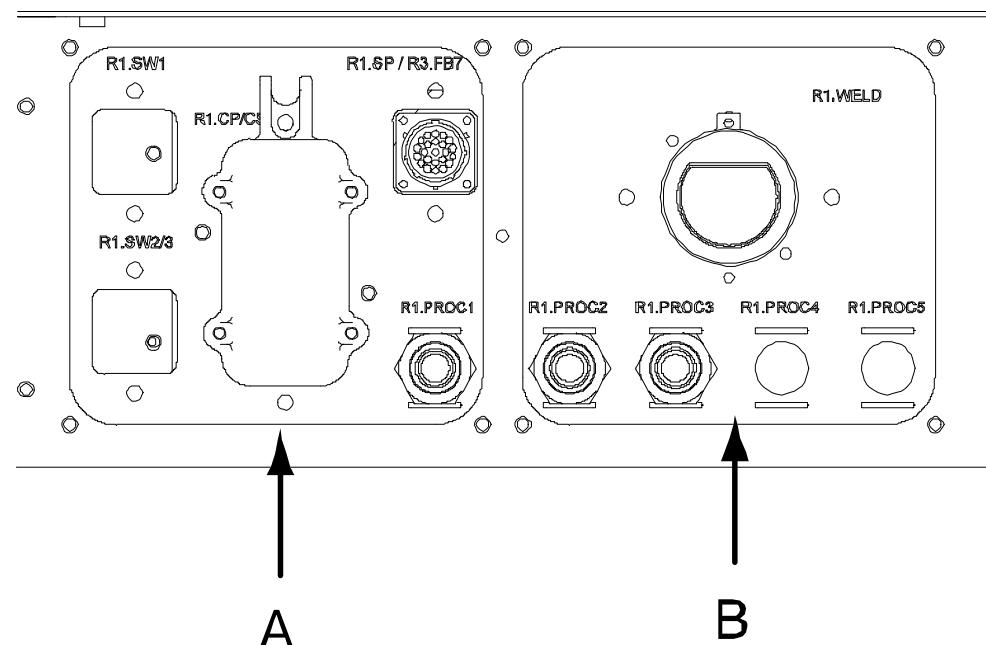
	Action	Note
5	Fit the <i>connection box</i> to the brackets with its attachment screws.	<p>The figure shows the connection box fitted on IRB 6640. The principle is the same on the other models.</p>  <p>xx0800000120</p> <p>Parts:</p> <ul style="list-style-type: none">• A: Connection box
6	Fit the <i>water and air unit</i> to the brackets with its attachment screws (Fastite).	 <p>xx0800000121</p>

Continues on next page

2.6.1 Installation of Water and air unit

*Continued***Connections to Water and Air unit, type S**

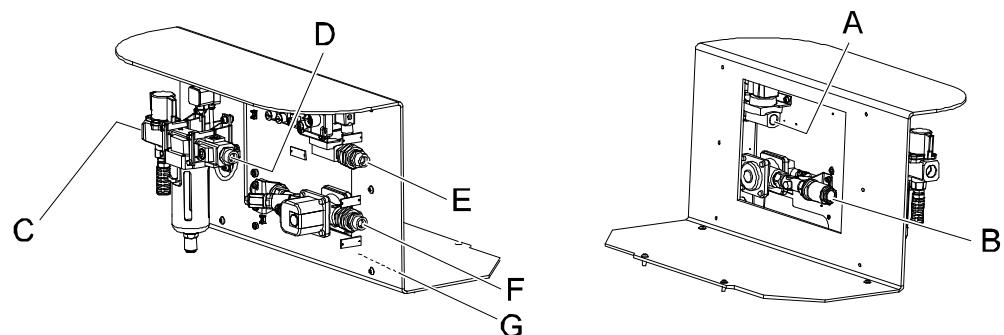
The figure shows the connections at the robot base.



xx0600003178

A	Customer plate
B	Process plate

The figure shows the connections on the Water and Air unit.



xx0600003270

Item in figure	Connect to:	Function:
A	Shop water supply	
B	Shop water drain Note! In case of a second water return, the water drain connection is moved to the outside of the mounting plate!	
C	Shop compressed air supply	
D	PROC1 on robot base	Compressed air supply to robot
E	PROC2 on robot base	Water in circuit

Continues on next page

2 Installation

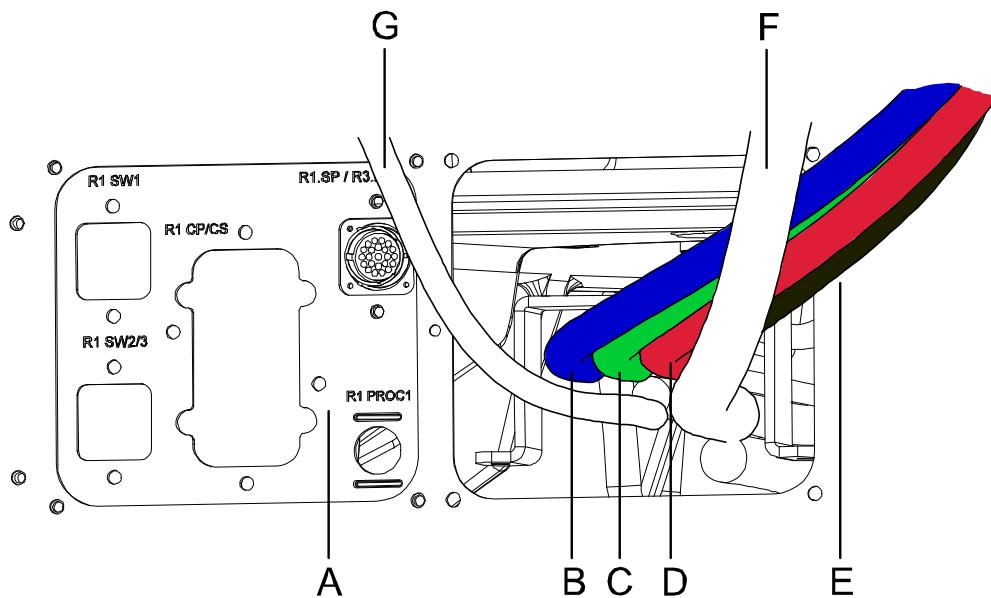
2.6.1 Installation of Water and air unit

Continued

Item in figure	Connect to:	Function:
F	PROC3 on robot base	Water return circuit
G	PROC4 on robot base Note! Only the position of this connection is shown in the figure!	Depending on option selected: • Second water return • Regulated air
	CAUTION Do not tighten the brass couplings for water and air with excessive force.	Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm

Connections to Water and Air unit, type Sb

The figure shows the connections at the robot base.



xx0800000123

A	Customer plate
B	R1.PROC 1
C	R1.PROC 2
D	R1.PROC 3
E	R1.PROC 4
F	WELD
G	R1.CP/CS

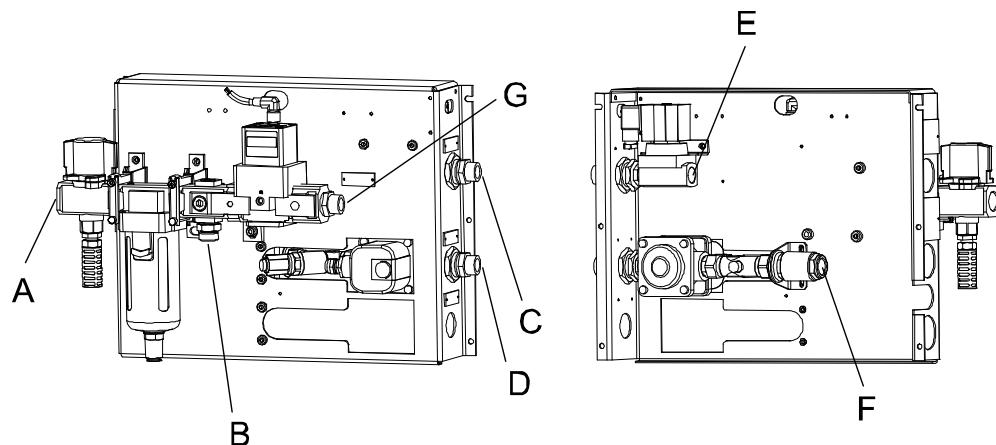
The figure shows the connections on the Water and air unit.

CAUTION Do not tighten the brass couplings for water and air with excessive force.	Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm
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2.6.1 Installation of Water and air unit

Continued



xx0800000122

Item in figure	Connect to:	Function:
A	Shop compressed air supply	
B	PROC 1 on robot base	Compressed air supply to robot
C	PROC 2 on robot base	Water in circuit
D	PROC 3 on robot base	Water return circuit
E	Shop water supply	
F	Shop water drain	
G	PROC4 on robot base (option)	Depending on option selected: • Regulated air

Shop water supply

Use this procedure to connect the Water and Air unit to the shop water supply.

	Action	Note
1	Route the water supply hose through the upper hole in the mounting plate.	
2	Type S: Connect the hose to the fitting with a G $\frac{1}{2}$ " thread on the solenoid valve (A).  CAUTION Do not tighten the brass couplings for water and air with excessive force.	Shown in the figure in section Connections to Water and Air unit, type S on page 197 . Tightening torque, brass couplings 1/2": 31 Nm Tightening torque, brass couplings 3/8": 17 Nm
3	Type Sb: Connect the hose to the fitting with a G $\frac{1}{2}$ " thread on the solenoid valve (C).  CAUTION Do not tighten the brass couplings for water and air with excessive force.	Shown in the figure in section Connections to Water and Air unit, type Sb on page 198 . Tightening torque, brass couplings 1/2": 31 Nm Tightening torque, brass couplings 3/8": 17 Nm

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2 Installation

2.6.1 Installation of Water and air unit

Continued

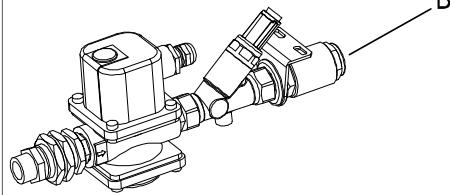
Shop compressed air supply

Use this procedure to connect the Water and Air unit to the shop compressed air supply.

	Action	Note
1	Type S: Connect the air hose to the fitting with a G $\frac{1}{2}$ " thread on the air shut off valve (C).  CAUTION Do not tighten the brass couplings for water and air with excessive force.	Shown in the figure in section Connections to Water and Air unit, type S on page 197 . Tightening torque, brass couplings 1/2": 31 Nm Tightening torque, brass couplings 3/8": 17 Nm
2	Type Sb: Connect the air hose to the fitting with a G $\frac{1}{2}$ " thread on the air shut off valve (A).  CAUTION Do not tighten the brass couplings for water and air with excessive force.	Shown in the figure in section Connections to Water and Air unit, type Sb on page 198 . Tightening torque, brass couplings 1/2": 31 Nm Tightening torque, brass couplings 3/8": 17 Nm

Water drain connection, One water return

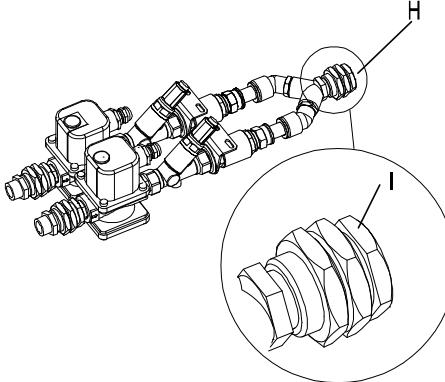
Use this procedure to connect the water drain connection with one water return, to the Water and Air unit.

	Action	Note
1	Route the water drain hose through the lower hole in the mounting plate.	
2	Connect the hose to the fitting with a G $\frac{1}{2}$ " thread on the check-valve.  CAUTION Do not tighten the brass couplings for water and air with excessive force.	 xx0600003348 • B: Water drain connection, one water return

Continues on next page

Water drain connection, Two water return (Only applicable to type S)

Use this procedure to connect the water drain connection with two water return, to the Water and Air unit.

Action	Note
<p>1 Connect the hose to the <i>bulkhead fitting</i> with a G$\frac{1}{2}$" thread.</p> <p>! CAUTION Do not tighten the brass couplings for water and air with excessive force.</p> <p>i Note Any rotation of the bulkhead fitting must be avoided when mounting. Hold the <i>outer part of the bulkhead fitting</i> with a suitable tool, in order to prevent rotation.</p>	 <p>xx0600003349</p> <p>Parts:</p> <ul style="list-style-type: none"> H: Bulkhead fitting I: Outer part of bulkhead fitting

Hoses connecting Robot and Water and Air unit

Use this procedure to connect hoses between manipulator and Water and Air unit.

Action	Note
<p>1 ! CAUTION Do not tighten the brass couplings for water and air with excessive force.</p>	Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm
2 Connect Proc 1 on the Water and Air unit with Proc 1 on the robot.	Shown in the figure in section Connections to Water and Air unit, type S on page 197 . Shown in the figure in section Connections to Water and Air unit, type Sb on page 198 .
3 Connect Proc 2 on the Water and Air unit with Proc 2 on the robot.	Shown in the figure in section Connections to Water and Air unit, type S on page 197 . Shown in the figure in section Connections to Water and Air unit, type Sb on page 198 .
4 Connect Proc 3 on the Water and Air unit with Proc 3 on the robot.	Shown in the figure in section Connections to Water and Air unit, type S on page 197 . Shown in the figure in section Connections to Water and Air unit, type Sb on page 198 .

Continues on next page

2 Installation

2.6.1 Installation of Water and air unit

Continued

Action	Note
5 Connect Proc 4 on the Water and Air unit with Proc 4 on the robot.	If second water return or regulated air is used. Shown in the figure in section Connections to Water and Air unit, type S on page 197 . Shown in the figure in section Connections to Water and Air unit, type Sb on page 198 .
6 Secure all connectors.	See <i>Tightening torques</i> in section Screw joints on page 347 .

2.6.2 Return water flow control

Overview

The mechanical flow control valve is pre-set at delivery at 8 liter/min (maximum flow).

Settings

The procedure below details how to set the mechanical flow control valve.

	Action	Note
1	Open the solenoid valve on the water inlet.	
2	Water flow is indicated on the scale of the Flow control valve.	
3	Adjust water flow by using the red adjusting knob on the scale of the Flow control valve to the required set flow.	The red adjusting knob is placed on the back of the Water and Air unit.

2 Installation

2.6.3 Return water flow switch setting

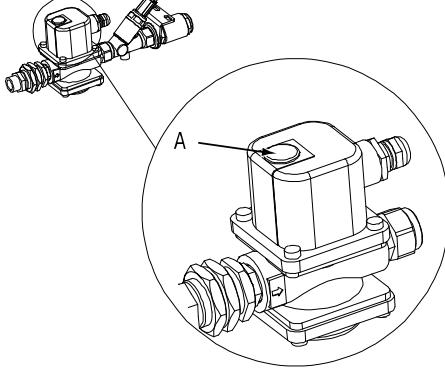
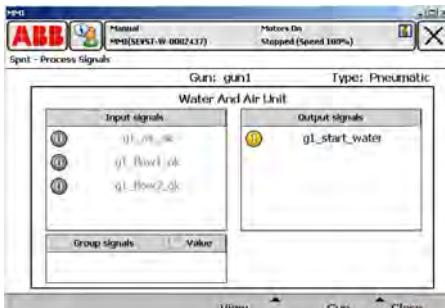
Introduction

The mechanical flow switch is pre-set at delivery to 8 liters/min at 0.2 MPa water pressure.

If the water pressure exceeds 0.2 MPa, the setting cannot be done with the graduation on the window name plate, as the pressure affects the measured flow. Please perform the setting as described in the following procedure.

Settings

The procedure below details how to set the mechanical flow switch.

	Action	Note
1	Open the solenoid valve on the water inlet.	
2	Water flow is indicated on the scale of the flow control valve.	
3	Adjust the water flow to the level where the Flow switch shall give alarm. Use the red adjusting knob on the scale of the flow control valve.	See section Return water flow control on page 203 .
4	To adjust the set flow on the mechanical Flow switch, remove the grommet on the upper cover and rotate the flow adjusting gear by using a flat screwdriver. Turning clockwise will increase the set flow and turning counterclockwise will decrease the set flow.	 xx0600003346 Parts: <ul style="list-style-type: none">A: Flow switch
5	Depending on initial value, increase or decrease the set value until the <i>g_flow_ok</i> changes, by observing the <i>Process Signals</i> window on the FlexPendant.	 xx0600003355 <ul style="list-style-type: none">• Process Signals window
6	Refit the grommet on the flow switch.	

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2.6.3 Return water flow switch setting

Continued

Action	Note
7 Increase water flow to desired level by adjusting the flow control valve. Put back the red adjusting knob on the back of the Water and Air unit.	 Note This level shall be higher than the alarm level.

2 Installation

2.6.4 Setting of air pressure switch (only applicable to type S)

General

The digital pressure switch monitors the shop floor air pressure.

Settings

The procedure below details how to set the digital pressure switch. The example shows how to set according to the pre-set values. The sensor will set **g1_air_ok** in the robot controller when pressure reaches 0.5 MPa and reset **g1_air_ok** if pressure goes lower than 0.45 MPa.

	Mode	Action	Note
1	Preparation	Make sure that the pressure switch is connected to 12-24 VDC power.	
2	Initialize	In measurement mode, press SET button for two seconds or more.	0
3	Selection of Unit	Press UP or DOWN button until the display matches the figure on the right, then press the SET button.	PA PA indicates MPa.
4	OUT1 Output type Setting	Press UP or DOWN button until display matches the figure on the right, then press the SET button.	1no ("1no" = Output 1 normally open)
5	OUT2 Output type Setting	Ignore and press the SET button.	2n*
6	Response Time Setting	Press UP or DOWN button until display matches the value on the right, then press the SET button.	24
7	Auto/Manual Setting	Press UP or DOWN button until display matches the value on the right, then press the SET button.	ñAn (ñAn indicates manual setting)
8	Value Setting	In measurement mode, press the SET button.	
9	Set Point Value for OUT1(1) Pressure OK goes high	When the display blinks, press UP or DOWN button without pressing the SET button. Press UP or DOWN button until the display matches the value on the right, then press the SET button.	P_1 0.500
10	Set Point Value for OUT1(2) Pressure OK goes low	When the display blinks, press UP or DOWN button without pressing the SET button. Press UP or DOWN button until the display matches the value on the right, then press the SET button.	P_2 0.450
11	Set Point Value for OUT2(1)	Ignore and press the SET button.	P/n3
12	Set Point Value for OUT2(2)	Ignore and press the SET button.	P/n4
13		The pressure switch changes to measurement mode. All settings are completed.	0
14	Zero Clear Function	Press UP and DOWN buttons simultaneously for about 2 seconds, under atmospheric pressure.	0

Continues on next page

2.6.4 Setting of air pressure switch (only applicable to type S)

Continued

Pre-set values

Parameter	Pre-set value
Unit specification	MPa
Hysteresis mode	Normally open
Response time	24 ms
High pressure P_1	0.5 MPa
Low pressure P_2	0.05 MPa

2 Installation

2.6.5 Setting of electrical proportional valve (option)

2.6.5 Setting of electrical proportional valve (option)

Introduction

The electrical proportional valve is available as an option.

The output pressure from the proportional valve is set by a voltage input signal, 0 - 10 VDC.

The output pressure range is 0.005 - 0.9 MPa.

I/O configuration

The following has to be done in order to configure the system to automatically feed the electrical proportional valve with 24 V only, when there is a sufficient air pressure indicated by the air pressure switch. If there is not enough pressure, the electrical proportional valve works continuously and the lifetime may be shortened.

The related input and output is **gx_air_ok** and **gx_epvalve_on**, where x represents the actual gun. The example below shows the setting for gun 1.

	Action	Note
1	Create a digital output signal named g1_epvalve_on on unit SWBOARD1 and unit mapping 14.	
2	Create a cross connection between g1_air_ok and g1_epvalve_on .	

Setting

Normally the pre-set values are used. But if other settings are desired, do as described below.

The procedure below details how to set the proportional valve.

Mode	Action	Note
Preparation	1 Make sure that the 12-24 VDC power is connected.	
Release key lock-ing	2 The indication <i>Loc</i> flashes on LED by pushing the DOWN key for two seconds or more. The key locking function is released by pushing the SET key here.	The keys are locked after the power is turned on and cannot be operated. <i>Loc</i> is indicated on LED when the keys are pushed.
Min. pressure setting	3 Press the SET key.	<i>F_1</i> is indicated on LED.
	4 Set the required min. pressure by using the UP and DOWN keys.	The min. pressure is equal to 0 VDC input signal.
	5 When finished, press the SET key.	<i>F_2</i> is indicated on LED.
Max. pressure setting	6 Set the required max. pressure by using the UP and DOWN keys.	The max. pressure is equal to 10 VDC input signal.
	7 When finished press the SET key.	<i>P_1</i> is indicated on LED.

Continues on next page

2.6.5 Setting of electrical proportional valve (option)

Continued

Mode		Action	Note
Setting switch output, P1	8	Set the value 0 (zero) by using the UP and DOWN keys.	<p>There are three kinds of modes of the switch function:</p> <ul style="list-style-type: none"> • Window Comparator Mode • Hysteresis Mode • Out of range Mode <p>The choice of the different modes is determined by setting the two values P1 and P2 and the relation between value P1 and value P2.</p> <p>P1=P2=0 Out of range mode</p>
	9	When finished, press the SET key.	P_2 is indicated on LED.
Setting switch output, P2	10	Set the value 0 (zero) by using the UP and DOWN keys.	
	11	When finished, press the SET key.	LED returns to the present pressure indication. Setting is completed.
Active key locking	12	The indication <i>unL</i> flashes on LED when the DOWN key is pressed for two seconds or more. Key locking function is released by pressing SET key here.	

Pre-set values

Parameter	Pre-set value
Min. pressure F1	0.0 MPa
Max. pressure F2	0.9 MPa
Switch output	Out of range mode (P1=P2=0)

Insufficient air pressure (Only applicable to type S)

If the Air pressure switch indicates too low pressure, the 24 V supply of the Electrical proportional valve is disconnected and the valve stops from operating.

If the Air pressure switch is to be set without having sufficient air pressure, the corresponding digital output *gx_epvalve_on* supplying the valve with 24 V, has to be set manually. This is most easily done by simulating input *gx_air_ok*.

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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 19**](#) before performing any service work!

3 Maintenance

3.2.1 Maintenance schedule

3.2 Maintenance schedule and component life

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 (**Not applicable to IRBDP SW6 and IRBDP MH6**)
- Slide sleeves (**Not applicable to IRBDP SW6 and IRBDP MH6**)
- Damper (**Not applicable to IRBDP SW6 and IRBDP MH6**)

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	Water & Air unit	1 month	Preventive inspection of Water and air unit on page 224
Inspection	All cables	Regularly ⁱ	Preventive inspection of all cables, DressPack on page 214
Inspection	DressPack upper arm	Regularly i	Preventive inspection, DressPack upper arm on page 216
Cleaning	DressPack upper arm	Regularly i	Cleaning, DressPack upper arm on page 227
Cleaning	Water & Air unit	Regularly i	Cleaning, Water and air unit on page 230

ⁱ "Regularly" implies that the activity is to be performed regularly, but the actual interval may not be specified by the robot manufacturer. The interval depends on the operation cycle of the robot, its working environment and movement pattern.

Generally, the more contaminated the environment, the closer the maintenance intervals. Also, the more demanding the movement pattern (sharper bending cable harness), the closer the intervals.

Continues on next page

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
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 Toolkits, DressPack/SpotPack on page 351 .

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  DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2 Make sure that the unit is clean and not overly contaminated.	Clean if required as detailed in section Cleaning, DressPack upper arm on page 227 .
3 Make sure that all bolts are fastened.	Recommended tightening torques are specified in section Screw joints on page 347 .
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 Repair on page 237 . Re-adjust the assembly after installation.
7	If any of the protective sleeves are worn, rotate it or replace it.	Detailed in section Replacement of protective sleeves on page 306 .
8	Check the attachments of the cable/hose package, to make sure they are properly secured.	Secure any loose items as detailed in the Installation on page 61 chapter.
9	Check all cable retainers, to make sure the cables/hoses are securely locked in the cable retainers.	Tighten any loose cable retainers as detailed in Repair of process cable package on page 309 .

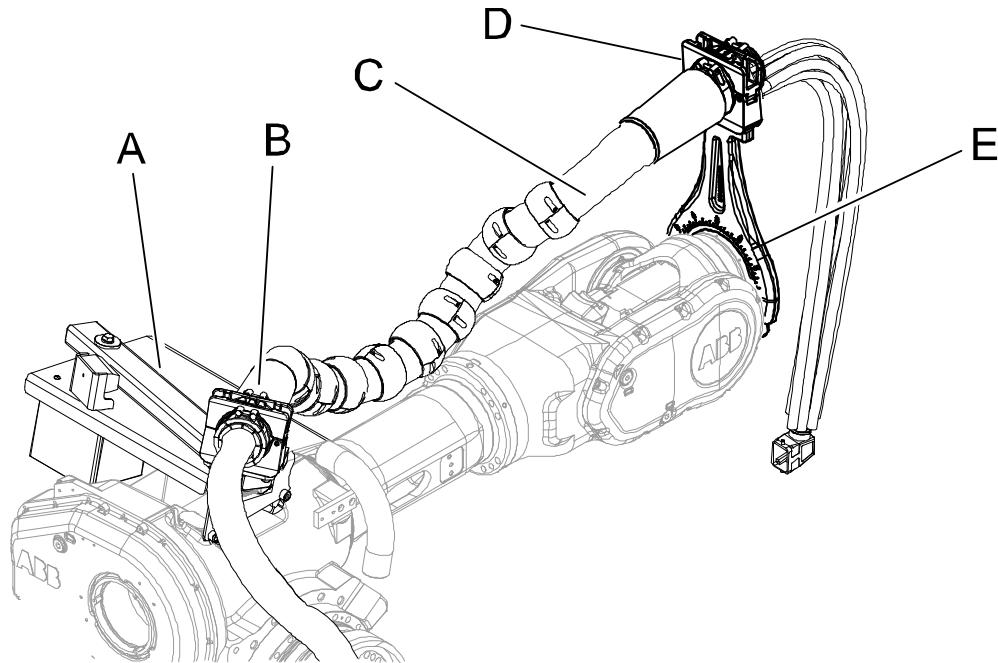
3 Maintenance

3.3.2 Preventive inspection, DressPack upper arm

3.3.2 Preventive inspection, DressPack upper arm

Location of DressPack upper arm

The figure shows the cable package IRBDP SW2 UE.



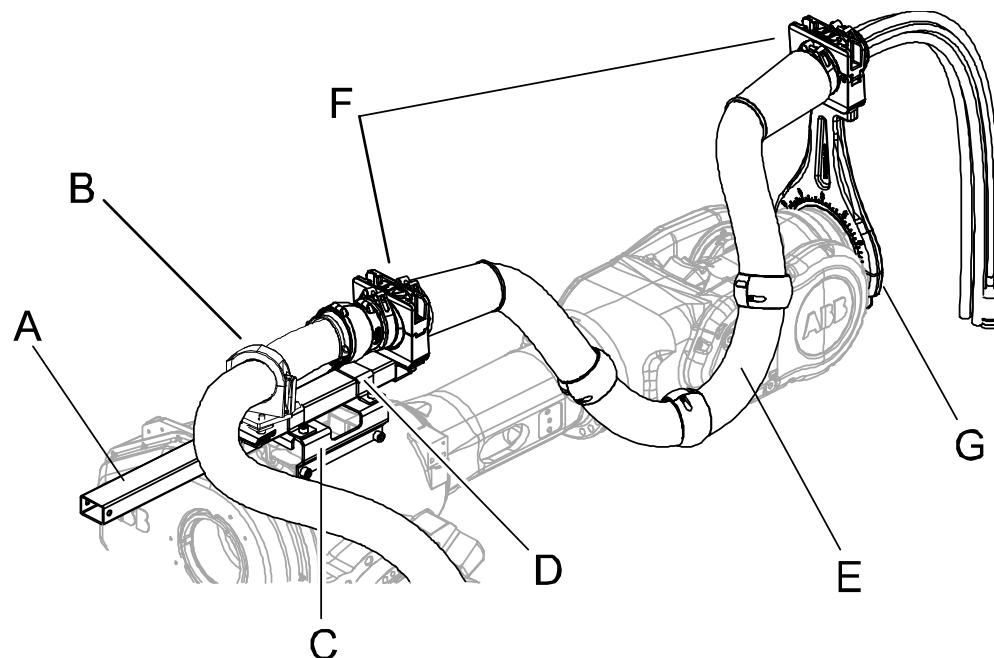
xx0800000086

A	Tension arm unit
B	Ball joint housing (tension arm unit)
C	Process cable package, upper arm
D	Ball joint housing (process cable support axis 6)
E	Process cable support axis 6

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3.3.2 Preventive inspection, DressPack upper arm *Continued*

The figure shows the cable package IRBDP SW5 CE.



xx0800000087

A	Adjustable bracket
B	Gripping clamp
C	Axis 3 bracket
D	Bracket
E	Process cable package IRBDP SW5 CE, upper end
F	Ball joint housing
G	Process cable support axis 6

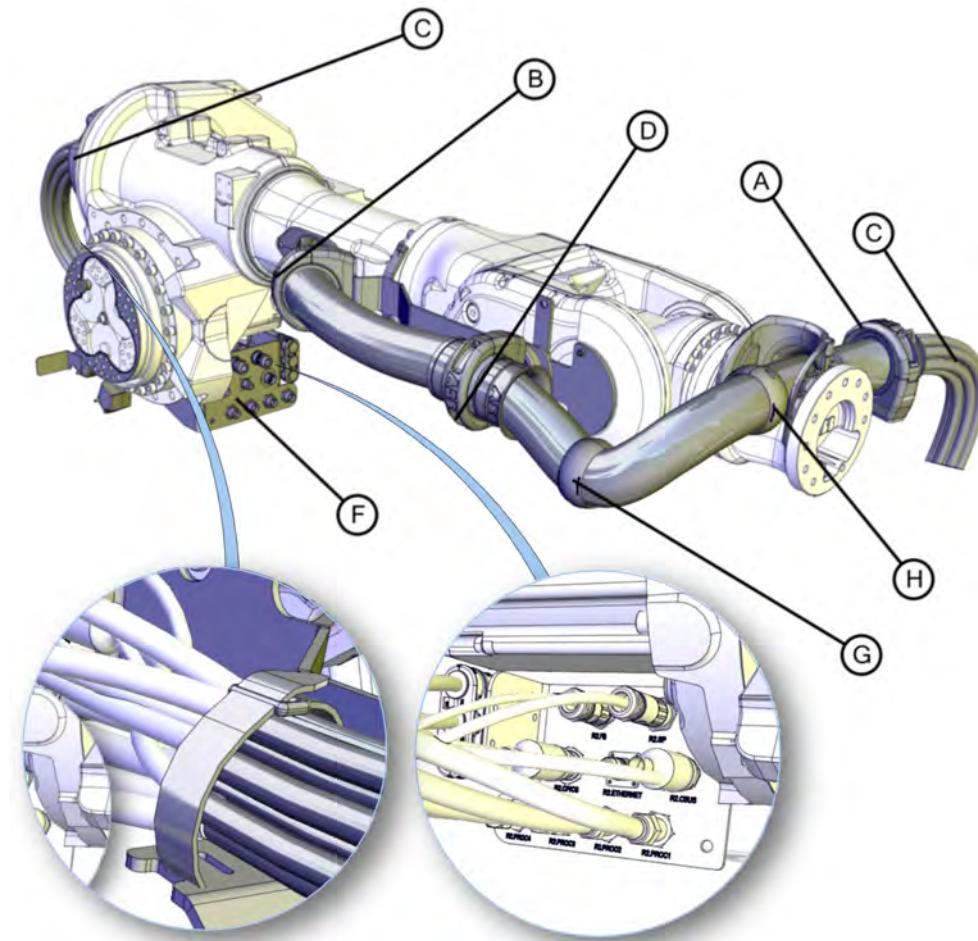
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3 Maintenance

3.3.2 Preventive inspection, DressPack upper arm

Continued

The figure shows the cable package IRBDP SW6 UI and IRBDP MH6 UI.



xx1200000056

A	Ball joint housing
B	Ball joint housing
C	Cable package
D	Ball joint housing
E	Strap (see enlarged image)
F	Connnection plate (see enlarged image)
G	Protective sleeve
H	Protective sleeve

Required equipment

Equipment	Article number	Note
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351.</i>

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Inspection - Robot standing still

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

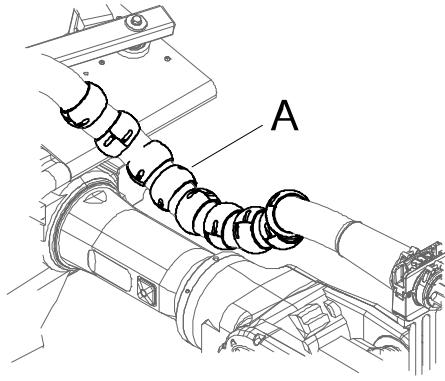
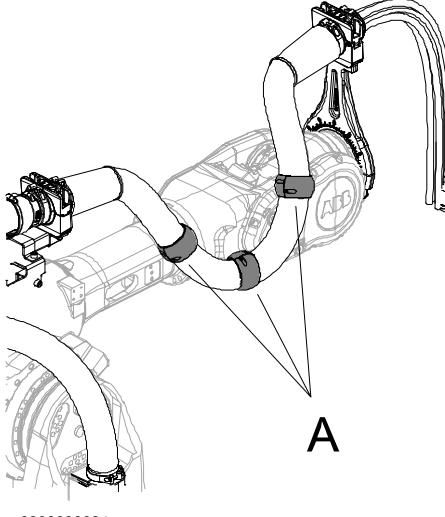
	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	Make sure that the DressPack is not contaminated.	If required, clean as detailed in section Cleaning, DressPack upper arm on page 227 .
3	Make sure that all bolts are fastened.	Recommended standard tightening torques are specified in section Screw joints on page 347 .

Continues on next page

3 Maintenance

3.3.2 Preventive inspection, DressPack upper arm

Continued

	Action	Note
4	<p>(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI)</p> <p>Check the position and state of the <i>protective sleeves</i>. Place these where they prevent the protection hose from rubbing against the upper arm of the robot, as much as possible. If required, additional protective sleeves may be fitted.</p>	<p>IRBDP SW2 UE</p>  <p>xx0500001441</p> <p>IRBDP SW5 CE</p>  <p>xx0800000084</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Protective sleeves <p>Make a note of where the protective sleeves were positioned to facilitate replacing them in the future.</p> <p>If required, replace the protective sleeves.</p>
5	Make sure all cable straps are tight enough to prevent the cable package from moving in an undesired way.	
6	Make sure that the velcro strap are not too tight. The cables should be able to twist.	Shown in the figure in section Location of DressPack upper arm on page 216 .
7	Make sure that the cable package is properly connected at: <ul style="list-style-type: none"> • the connection plate • the robot base • the lower arm • the tool on the turning disc of the robot. 	
8	Make sure that all connections are fastened and that there are no leaks.	Re-tighten if necessary.

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3.3.2 Preventive inspection, DressPack upper arm Continued

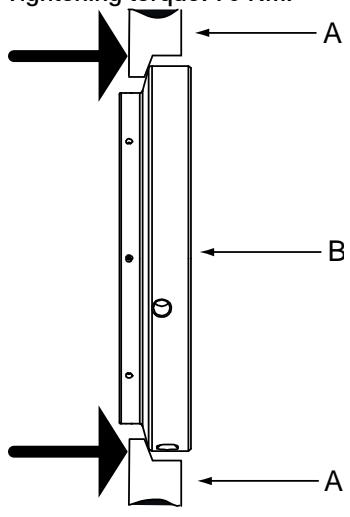
	Action	Note
9	Make sure that the cable package is not cracked or damaged in any other way.	Shown in the figure in section Location of DressPack upper arm on page 216 .
10	(Not applicable to the cable packages IRBDP SW5 CE, IRBDP MH6 UI and IRBDP SW6 UI) Inspect the <i>rubber damper</i> . Make sure it is not chipped or damaged in any other way.	<p>A technical line drawing of a robotic arm assembly. A horizontal beam labeled 'A' extends from a central unit. A vertical component labeled 'B' is attached to the beam. The central unit has a label with text and a barcode.</p> <p>xx0700000318</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Tension arm • B: Rubber damper <p>If required, replace the damper.</p>
11	(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI) Make sure the <i>sliding surfaces</i> at both ends of the slide sleeves (at the process cable support axis 6 as well as at the tension arm unit) has not been damaged or show excessive wear. Check this with normal hand force: 1 grab hold of the package 2 pull and turn to make sure that the package is free to slide. If the slide sleeves are too worn: 1 disassemble and clean 2 replace. Always make sure that the slide sleeves are clean! If they are dirty, clean them!	<p>A diagram showing two views of a slide sleeve assembly. The top view shows a cylindrical sleeve with a curved arrow indicating rotation around a central axis. Labels 'A' and 'B' point to specific parts of the sleeve. The bottom view is a cross-section of the assembly, showing internal components and the ABB logo. Label 'C' points to the central support axis.</p> <p>xx0300000199</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Slide sleeve slide surface • B: Hose reinforcement • C: Process cable support axis 6 <p>A damaged surface may potentially prevent the cable package from rotating, thus causing excessive wear. Cleaning agent is specified in section Required equipment on page 218. If required, replace the slide sleeves as detailed in section Replacement of slide sleeves on page 323.</p>

Continues on next page

3 Maintenance

3.3.2 Preventive inspection, DressPack upper arm

Continued

	Action	Note
12	(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI) Check that the process cable support axis 6 is fully pushed forward against the turning disc axis 6.	If needed, adjust tightening torque. Tightening torque: 70 Nm.  xx0400001040 Parts: <ul style="list-style-type: none">• A: Process cable support axis 6• B: Turning disc axis 6
13	(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI) Visually inspect the <i>hose reinforcement</i> to make sure there are no cracks or other damage.	Shown in the figure above. If required, replace the hose reinforcement as detailed in the section Replacement of hose reinforcement on page 320 .
14	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">• Installation chapter (non-standard tightening torques) or• standard tightening torque table (standard tightening torques).

Inspection - Reduced speed

The following procedure details how to inspect the DressPack 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.).

Continues on next page

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 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.	
3	(Not applicable to cable packages IRBDP MH3 UE, IRBDP SW6 UI and IRBDP MH6 UI) Make sure that when the robot program is running, the movement of the tension arm unit shall be smooth, but still strong enough to retract the hose package without excessive force.	

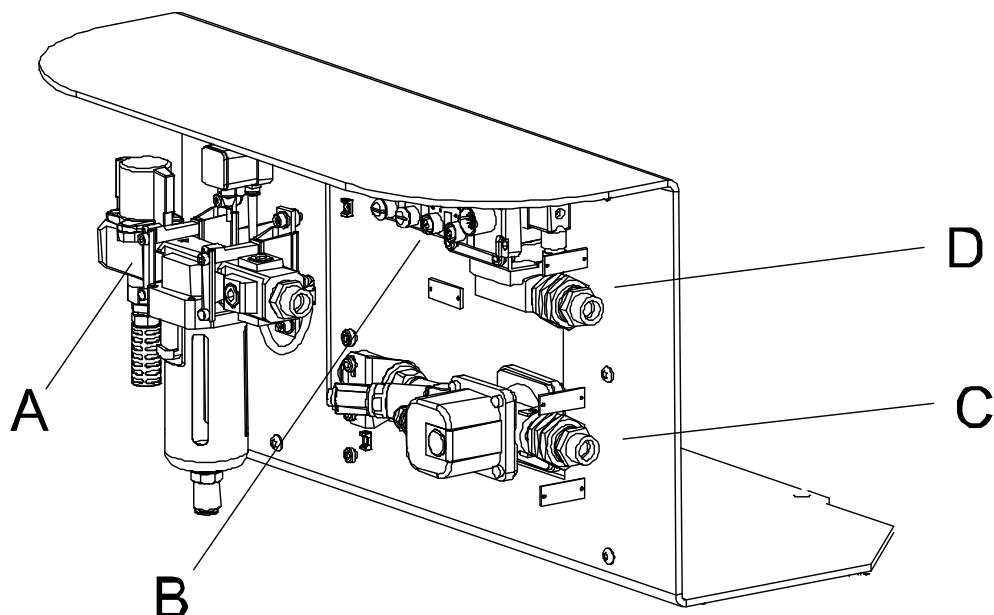
3 Maintenance

3.3.3 Preventive inspection of Water and air unit

3.3.3 Preventive inspection of Water and air unit

Location of Water and air unit, type S

The Water and air unit is located as shown in the figure.

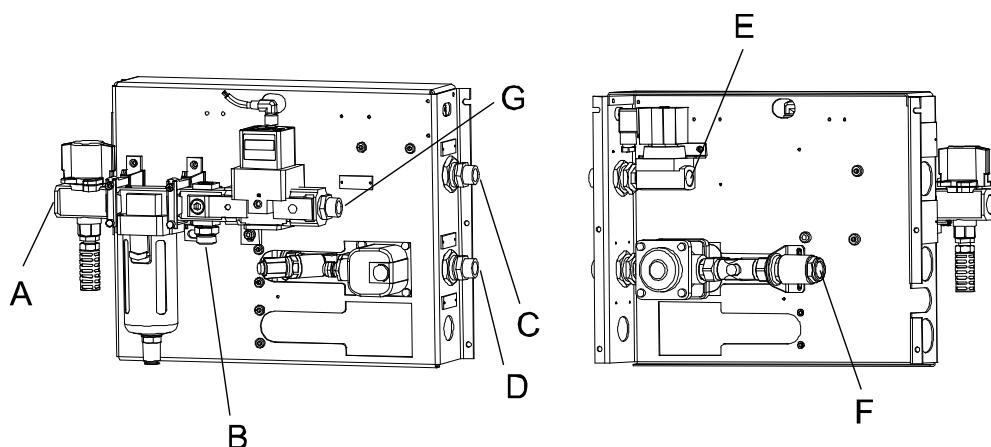


xx0600003293

A	Air supply circuit
B	Split box
C	Water return circuit
D	Water in circuit

Location of Water and air unit, type Sb

The Water and air unit is located as shown in the figure.



xx0800000122

A	Shop compressed air supply
B	PROC 1 on robot base

Continues on next page

C	PROC 2 on robot base
D	PROC 3 on robot base
E	Shop water supply
F	Shop water drain
G	PROC 4 on robot base (option)

Required equipment

Equipment	Article number	Note
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .

General inspection

The procedure below describes how to perform a general inspection of the Water and air unit.

	Action	Note
1	Check that the Water and air unit is not contaminated.	Clean if required as detailed in section Cleaning, Water and air unit on page 230 .
2	Check that the bolts are fastened.	Recommended tightening torques are specified in section Tightening torque on page 347 .
3	Check that all connections are correctly made and that there are no leaks.  CAUTION Do not tighten the brass couplings for water and air with excessive force.	Retighten if necessary. Tightening torque, brass couplings 1/2": 31 Nm Tightening torque, brass couplings 3/8": 17 Nm

Inspection, air supply circuit

The procedure below describes how to inspect the air supply circuit.

	Action	Note
1	Check if there is water in the filter receptacle. Normally the filter receptacle is drained automatically in case of a fall of air pressure. If there is no fall of pressure in the air system, there is an automatic draining of the system, when the water level reaches a certain level.	If there is a lot of water in the filter receptacle, this is a sign that the supplied air consist of too much water. If this is the case, steps must be taken to correct this problem!
2	Drain the air filter receptacle manually by pressing a small pin at the bottom of the air filter unit.	
3	Make a check that there is no leakage.	Retighten if necessary!
4	Make a check of the condition of the air filter.	If needed replace the air filter. Normally the filter should be replaced after one year of use.

Continues on next page

3 Maintenance

3.3.3 Preventive inspection of Water and air unit

Continued

Inspection, water in and water return circuits

The procedure below describes how to inspect the water in and water return circuits.

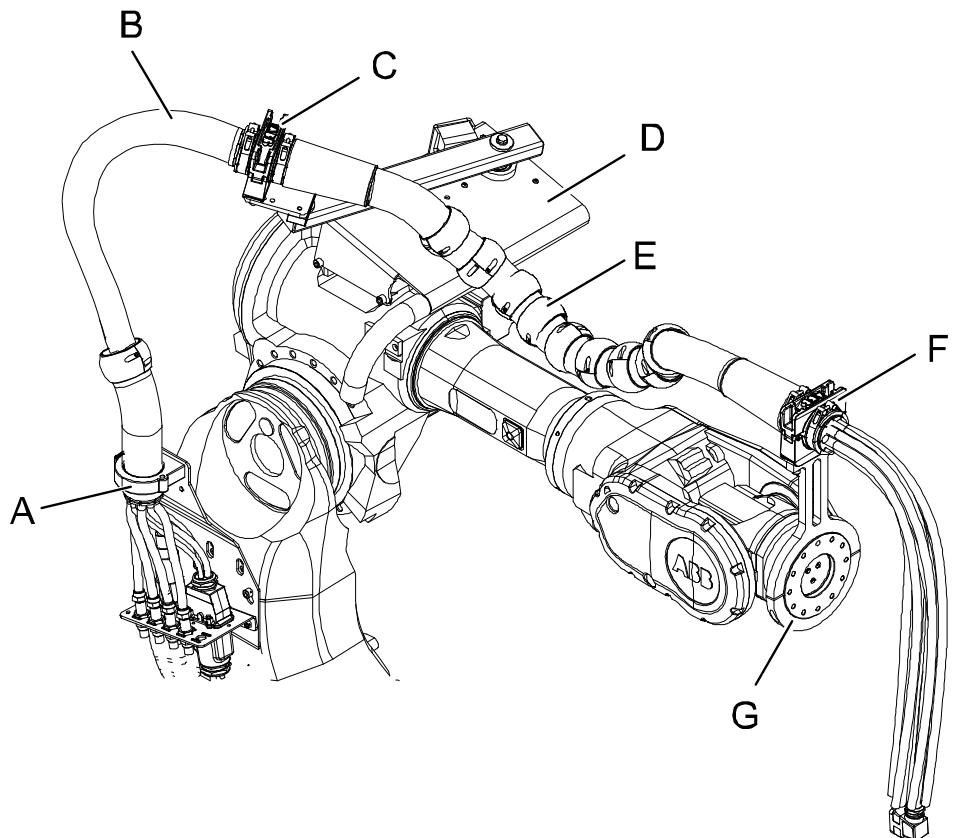
	Action	Note
1	Open the hand operated ball valve for water inlet.	
2	Open the water return valve on the water in circuit.	
3	Close the hand operated ball valve for water outlet.	
4	While the system is under pressure, check if there are any leaks.	Retighten if necessary!
5	Reset the system.	

3.4 Cleaning activities

3.4.1 Cleaning, DressPack upper arm

Location DressPack upper arm

The figure shows cable package IRBDP SW2 UE.



xx0500001530

A	Gripping clamp (lower arm)
B	Cable package, upper arm
C	Ball joint housing (tension arm unit)
D	Tension arm unit
E	Protective sleeves
F	Ball joint housing (process cable support axis 6)
G	Process cable support axis 6, complete

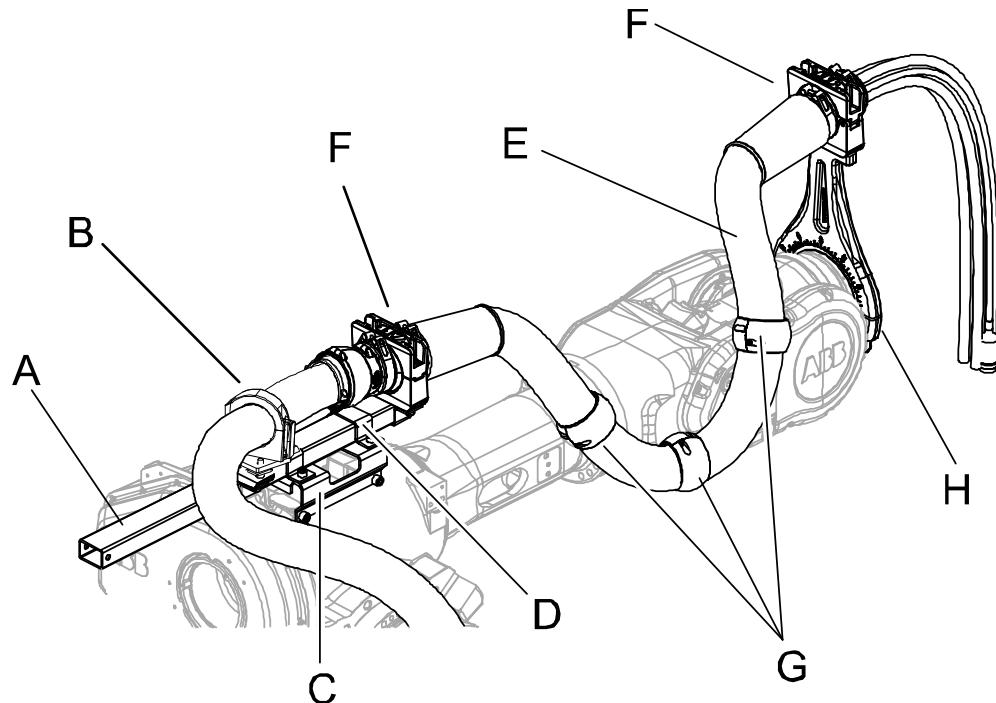
Continues on next page

3 Maintenance

3.4.1 Cleaning, DressPack upper arm

Continued

The figure shows cable package IRBDP SW5 CE.



xx0800000088

A	Adjustable bracket
B	Gripping clamp
C	Axis 3 bracket
D	Bracket
E	Process cable package IRBDP SW5 CE, upper end
F	Ball joint housing
G	Slide sleeves
H	Process cable support axis 6

Required equipment

Equipment	Art. no.	Note
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
Dry rag and medium soft brush		For cleaning the protective hose ribs.

Continues on next page

Cleaning

The procedure below details how to clean the DressPack upper arm.

	Action	Note
1	Clean the DressPack upper arm exterior, in order to avoid filling up the spaces between the ribs with debris. Make sure to clean any areas where any hoses bend or rub against the robot. If the harness is not cleaned sufficiently, breakage of the protective hose may result.	Only use equipment and cleaning agents as specified in section <i>Required equipment on page 214</i> .
2	Clean the slide sleeves of any sort of contamination.	

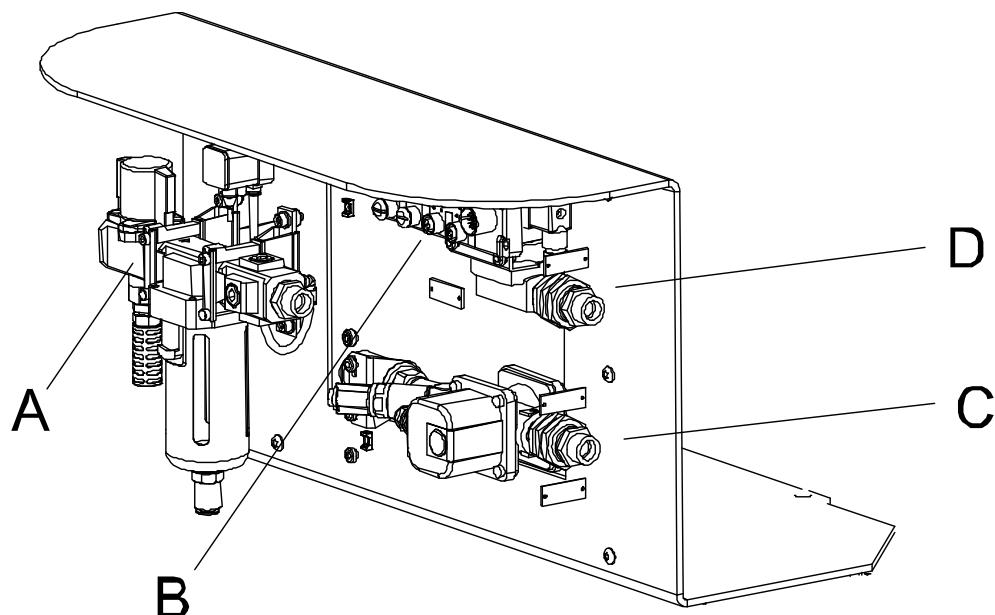
3 Maintenance

3.4.2 Cleaning, Water and air unit

3.4.2 Cleaning, Water and air unit

Location of Water and air unit, type S

The Water and air unit is located as shown in the figure.

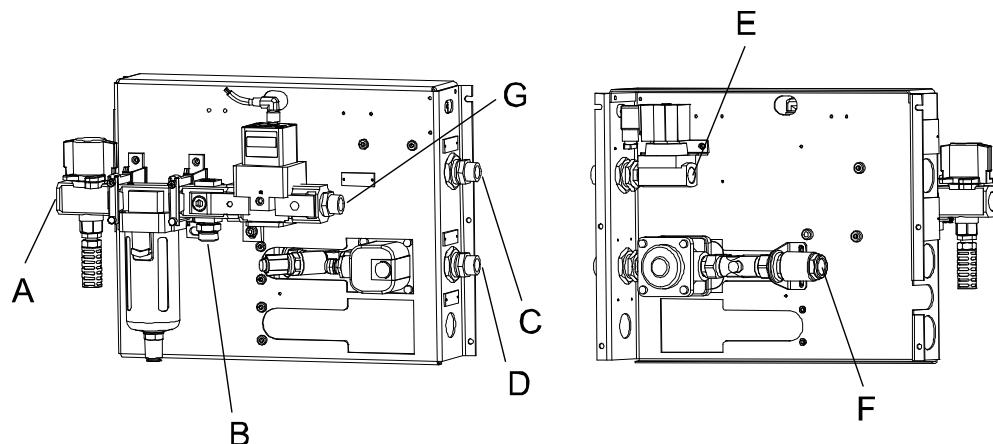


xx0600003293

A	Air supply circuit
B	Split box
C	Water return circuit
D	Water in circuit

Location Water and air unit, type Sb

The Water and air unit is located as shown in the figure.



xx0800000122

A	Shop compressed air supply
B	PROC 1 on robot base

Continues on next page

C	PROC 2 on robot base
D	PROC 3 on robot base
E	Shop water supply
F	Shop water drain
G	PROC 4 on robot base (option)

Required equipment

Equipment	Note
Dry rag	When cleaning the Water and air unit, only use household neutral detergent.

Maintenance of Air filter

	Action	Note
1	Periodically inspect the resin bowl for cracks or other deterioration.	If found, replace the bowl with a new one.
2	Periodically inspect the cleanliness of the resin bowl.	If the resin bowl is dirty, replace it with a new one or clean it. Use a household (neutral) detergent when cleaning, other detergent may break the bowl.
3	Replace the filter element within two years since first use.	Replacement of the air filter is detailed in section Replacement of Air filter element on page 338 .
4	Replace the filter after pressure drop from initial outlet reaches 0.1 MPa.	Replacement of the air filter is detailed in section Replacement of Air filter element on page 338 .
5	Replace if the filter element is broken.	Replacement of the air filter is detailed in section Replacement of Air filter element on page 338 .

3 Maintenance

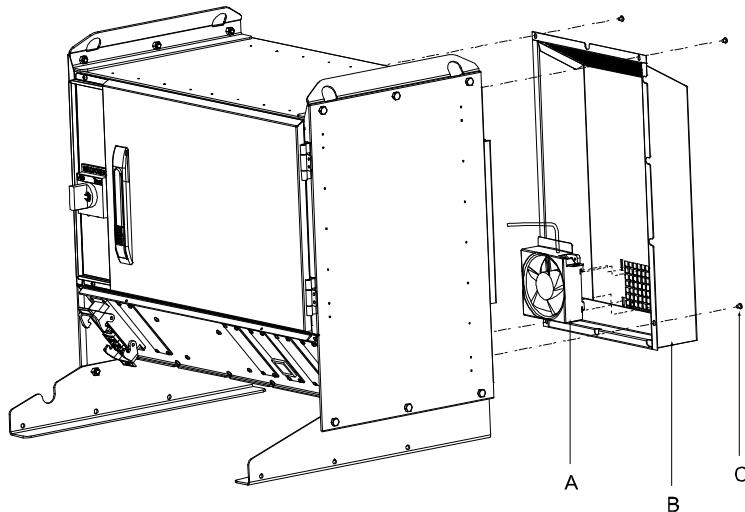
3.4.3 Cleaning the Fan unit

3.4.3 Cleaning the Fan unit

Overview

Use this section to clean the fan unit.

Location



en0500001924

A	Fan holder with fan
B	Fan casing
C	Attachment screws M5x9, Fastite screw (4 pcs)

Required equipment

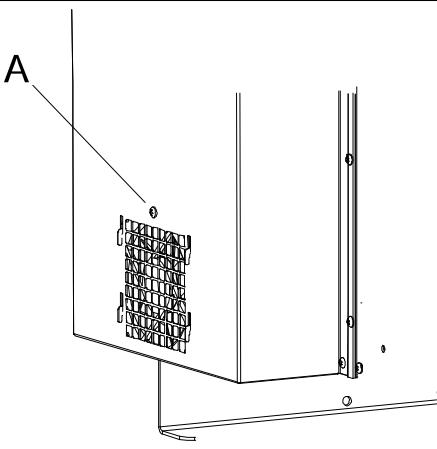
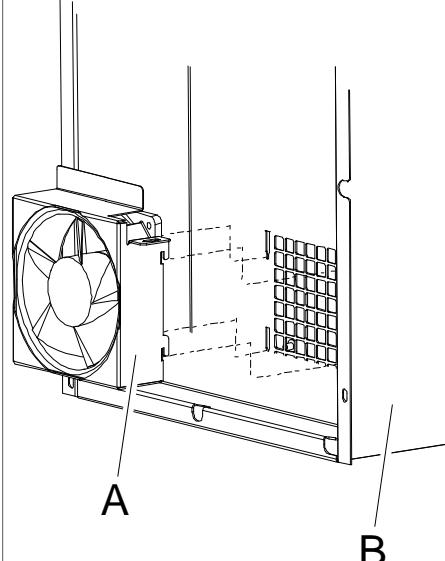
Equipment	Article number	Note
Standard toolkit DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
Vacuum cleaner	-	

Maintenance procedure

	Action	Note
1	 DANGER Before any work inside the cabinet, please observe the safety information in the section DANGER - Make sure that the main power has been switched off in the product manual for the IRC5 controller.	
2	Remove the attachment screws holding the fan casing.	Shown in the section Location on page 232 Screw M5x9 Fastite (4 pcs)
3	Disconnect the fan connector.	

Continues on next page

3.4.3 Cleaning the Fan unit *Continued*

	Action	Note
4	Remove the stop screw.	 <p>xx0500002232</p> <ul style="list-style-type: none"> • A: Stop screw
5	Lift out the fan holder with fan.	 <p>xx0500002234</p> <ul style="list-style-type: none"> • A: Fan holder with fan • B: Fan casing
6	Clean the fan.	
7	Refit according to the steps above, in reverse order.	

3 Maintenance

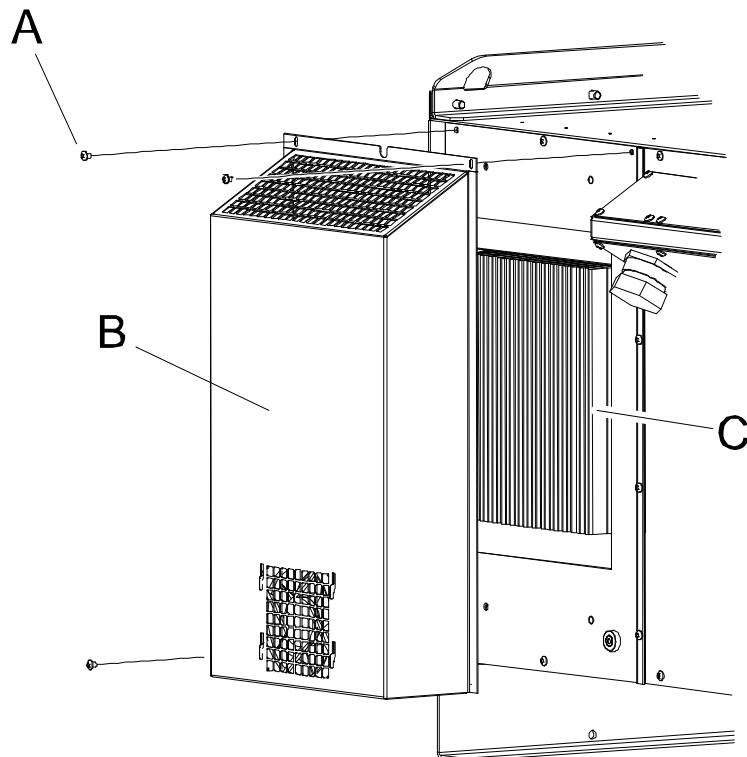
3.4.4 Cleaning the Weld timer cooling fins

3.4.4 Cleaning the Weld timer cooling fins

Overview

Use this procedure to clean the weld timer cooling fins.

Location



A	Attachment screws M5x9 Fastite screw (3 pcs)
B	Fan casing
C	Cooling fins

Required equipment

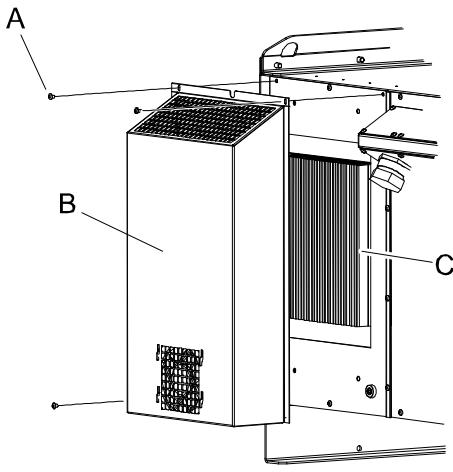
Equipment	Art.no.	Note
Standard toolkit DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351.</i>
Vacuum cleaner		

Continues on next page

3.4.4 Cleaning the Weld timer cooling fins

Continued

Maintenance procedure

	Action	Note
1	 DANGER <p>Before any work inside the cabinet, please observe the safety information in the section DANGER - Make sure that the main power has been switched off in the product manual for the IRC5 controller.</p>	
2	Remove the attachment screws.	 xx0500002240 <ul style="list-style-type: none"> • A: Attachment screw M5x9 Fastite (3 pcs) • B: Fan casing • C: Cooling fins
3	Disconnect the fan connector.	
4	Remove the fan casing.	
5	Clean the cooling fins with a vacuum cleaner.	
6	Refit the fan connector and fan casing.	

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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 343](#).

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 19](#) 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 Repair activities

4.2 DressPack cable package

4.2.1 Repair activities

General

This section describes the main activities of replacing the cable packages or parts thereof.

Procedures

For information about:	See Repair activities on page 238 .
Replacing the cable packages IRBDP MH2 LE and IRBDP SW2 LE.	Described in section Replacing the cable packages IRBDP MH2 LE and SW2 LE on page 239
Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE.	Described in section Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245
Replacement of the cable package IRBDP SW2 CE.	Described in section Replacement of lower/upper arm cable package on page 248 .
Replacement of <i>lower arm internal MH dressing cable package IRBDP MH1 LI</i> .	Described in section Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI on page 251 .
Replacement of <i>upper arm internal MH dressing cable package IRBDP MH 3</i> .	Described in section Replacing the cable package IRBDP MH3 UE on page 255 .
Replacement of <i>process cable package upper arm IRB 66X0ID</i> .	Described in section Replacement process cable package IRBDP SW4 UI (IRB66X0ID) on page 263 .
Replacing the cable package IRBDP SW5 CE (Spot-Pack Basic).	Described in section Replacing the cable package IRBDP SW5 CE (SpotPack Basic) on page 259 .
Replacing the cable package <i>IRBDP SW6 UI/LE & MH6 UI/LE</i> .	Described in section Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID) on page 281 .
Replacement of <i>tension arm unit</i>	Described in section Replacement of tension arm unit on page 291
Replacement of <i>hose reinforcement</i>	Described in section Replacement of hose reinforcement on page 320 .
Replacement of <i>slide sleeves</i>	Described in section Replacement of slide sleeves on page 323 .
Repair of <i>process cable package</i>	Described in section Repair of process cable package on page 309
Adjusting <i>tension arm unit</i>	Described in section Adjusting tension arm unit on page 315

4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

Location of the cable package

The procedure below details how to replace the cable packages IRBDP MH2 LE and IRBDP SW2 LE. The actual work may differ due to the number of cables and hoses, type of connectors etc. However if differences are noticeable, these are pointed out in the procedure description.

The cable packages IRBDP MH2 LE and IRBDP SW2 LE consists of the parts shown in the illustration.

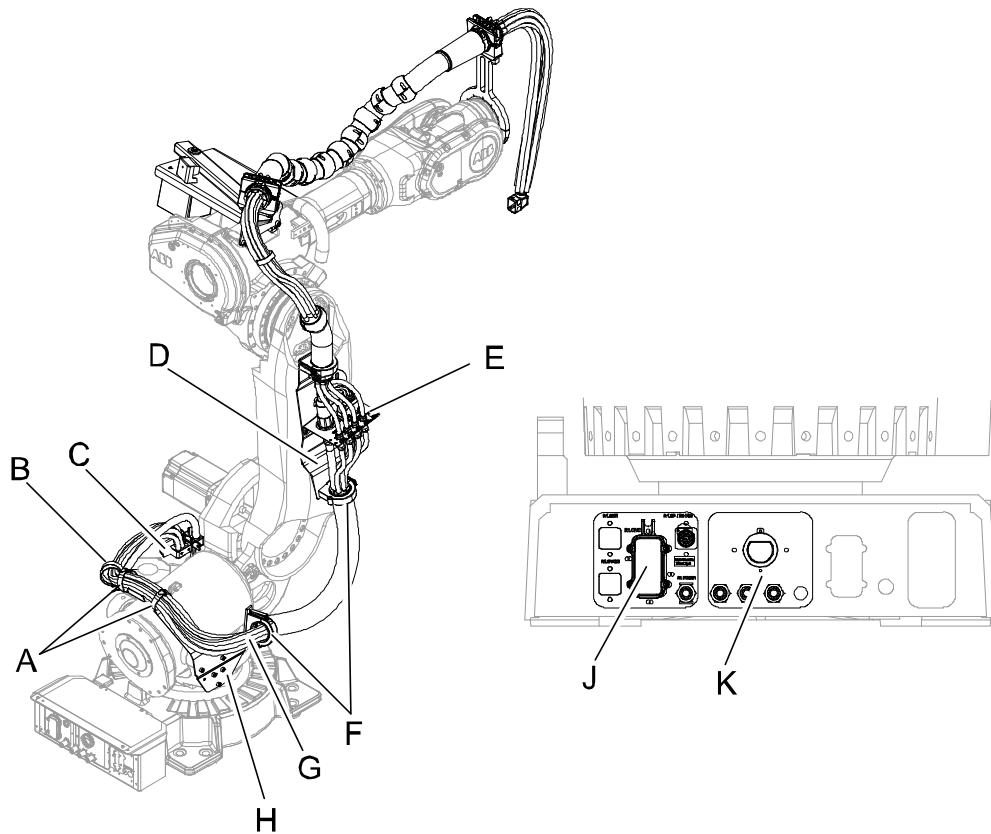
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4 Repair

4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

Continued

Replacement of the upper arm cable package is detailed in section [Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245](#).



xx0700000323

A	Straps
B	Velcro strap
C	Cable and hose clamp
D	Lower arm plate
E	Connection plate
F	Gripping clamps
G	Process cable package
H	Side bracket, balancing device
J	Customer plate
K	Process plate

Required equipment

The following equipment is required for replacement of the cable packages.

Equipment	Art. no.	Note
Cable package IRBDP MH2 LE	For spare part number see chapter: • Spare parts on page 355 .	A number of version are available.

Continues on next page

4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

Continued

Equipment	Art. no.	Note
Cable package IRBDP SW2 LE	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of version are available.
Locking liquid	3HAB7116-1	For locking the cable clamps
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351.</i>
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	

Procedures

Use this procedure to remove the cable packages IRBDP MH2 LE and IRBDP SW2 LE from the robot, before it is disassembled.

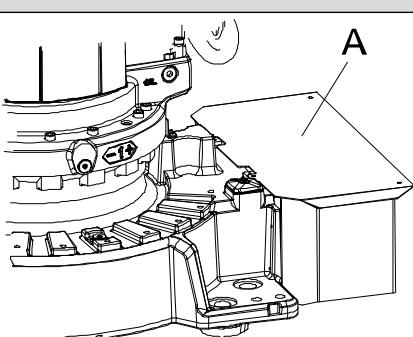
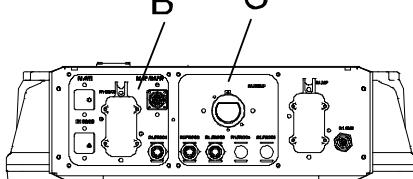
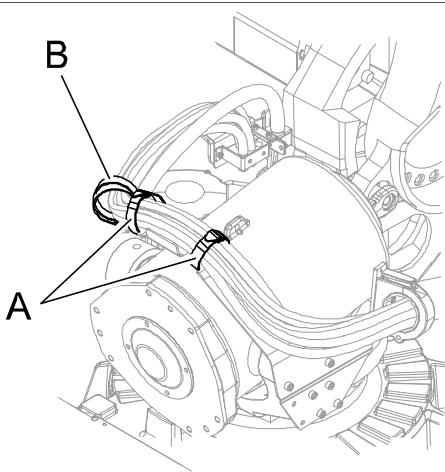
	Action	Note
1	 DANGER Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	

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4 Repair

4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

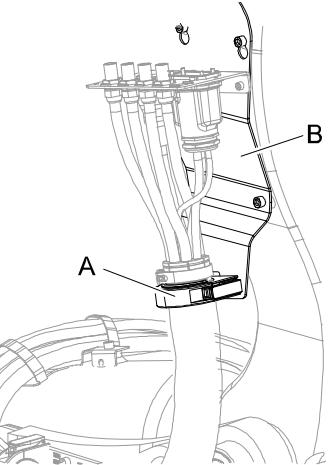
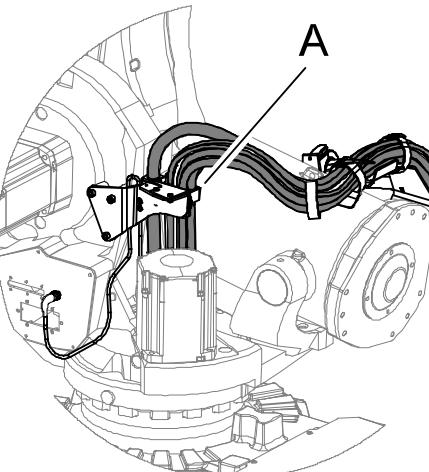
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Action	Note
3 Remove the <i>cover plate</i> at the back of the robot base.	  xx0600003174 <p>Parts:</p> <ul style="list-style-type: none"> • A: Cover plate • B: Customer plate • C: Process plate
4 Open the <i>straps</i> and <i>velcro strap</i> .	 xx0700000322 <p>Parts:</p> <ul style="list-style-type: none"> • A: Straps • B: Velcro strap

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4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

Continued

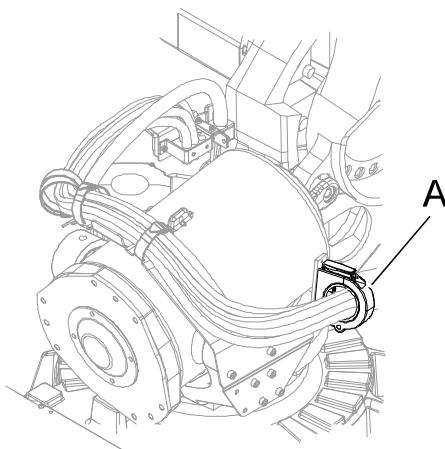
	Action	Note
5	Disassemble the cable package from the <i>lower arm plate</i> .	 xx0500001426 <p>Parts:</p> <ul style="list-style-type: none"> • A: Gripping clamp • B: Lower arm plate
6	Disconnect all hoses from the <i>customer and process plates</i> .	<p> Note</p> <p>It is very important to disconnect the hoses to drain them from water before the disconnection of the cable connectors. This will minimize the risk of getting water into the electrical connectors.</p>
7	Disconnect the cable connectors from the customer and process plates.	
8	Loosen the weld cable clamp and pull the weld cable through the center hole of gearbox axis 1.	
9	Loosen the cable and hose clamp.	 xx0700000338 <p>Parts:</p> <ul style="list-style-type: none"> • A: Cable and hose clamp

Continues on next page

4 Repair

4.2.2 Replacing the cable packages IRBDP MH2 LE and SW2 LE

Continued

Action	Note
10 Pull the lower end of cable package out through the hole in gear box axis 1. Order of disassembly: 1 Hoses 2 Signal cables	
11 Open the <i>gripping clamp</i> on the balancing device, and remove the cable package.	 <p>xx0700000330</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Gripping clamp
12 Refit the new or repaired lower arm cable package.	Detailed in section, Fitting the cable packages IRBDP MH2 LE and IRBDP SW2 LE on page 109

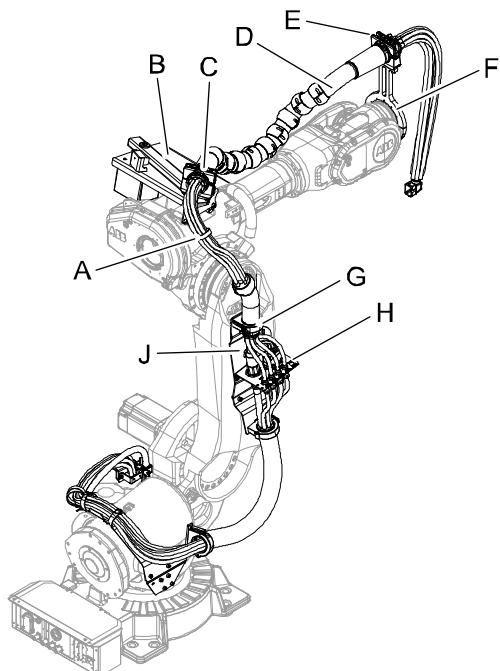
4.2.3 Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE

4.2.3 Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE**Location of the cable packages IRBDP MH2 UE and IRBDP SW2 UE**

This procedure describes how to replace the cable packages. The actual work may differ due to the number of cables and hoses, type of connectors etc. However, if differences are noticeable, these are pointed out in the procedure description.

The cable packages IRBDP MH2 UE and IRBDP SW2 UE consists of the parts shown in the figure.

Replacement of the lower arm cable package is described in section [Replacing the cable packages IRBDP MH2 LE and SW2 LE on page 239](#).



xx0700000324

A	Strap and strap holder
B	Tension arm unit
C	Ball joint housing (tension arm unit)
D	Process cable package
E	Ball joint housing (process cable support axis 6)
F	Process cable support axis 6, complete
G	Gripping clamp
H	Connection plate
J	Lower arm plate

Continues on next page

4 Repair

4.2.3 Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE

Continued

Required equipment

Equipment, etc.	Art. no.	Note
Cable package IRBDP MH2 UE	For spare part number see chapter: <ul style="list-style-type: none">• Spare parts on page 355.	A number of variants are available.
Cable package IRBDP SW2 UE	For spare part number see chapter: <ul style="list-style-type: none">• Spare parts on page 355.	A number of variants are available.
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
Protective plastic		To protect the connector pins during disassembly.
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	DressPack

Procedure

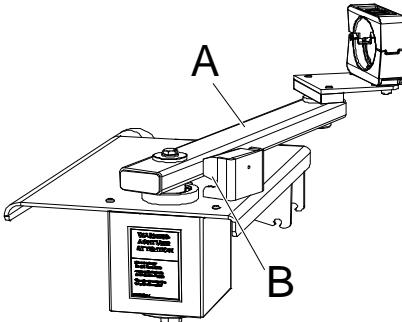
Use this procedure to remove the cable packages IRBDP MH2 UE and IRBDP SW2 UE from the robot, before it is disassembled.

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

Continues on next page

4.2.3 Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE

Continued

Action	Note
3  WARNING The tension arm unit pulls the hose package backwards! Hence, in order to avoid accidents, the robot must be positioned in a way that the arm of the tension unit is placed in its rear position. The <i>tension arm</i> must rest on the <i>damper</i> before disassembly of the upper arm harness starts!	 xx0500001794 Parts: <ul style="list-style-type: none">• A: Tension arm• B: Damper
4 Disconnect the hoses from the tool.	
5 Disconnect the cables from the tool.	
6 Open the <i>ball joint housing</i> and remove the cable package from the <i>process cable support, axis 6</i> .	Shown in the figure, Location of the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245
7 Disconnect the hoses at the <i>connection plate, lower arm</i> .	Shown in the figure Location of the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245 .
8 Disconnect all connectors at the <i>connection plate, lower arm</i> .	Shown in the figure, Location of the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245
9 Open the <i>gripping clamp</i> and remove the cable package from the <i>lower arm plate</i> .	Shown in the figure, Location of the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245
10 Open the <i>ball joint housing</i> and remove the cable package from the <i>tension arm unit</i> .	Shown in the figure, Location of the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245
11 Refit the new or repaired upper cable package.	See section Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 118 .

4 Repair

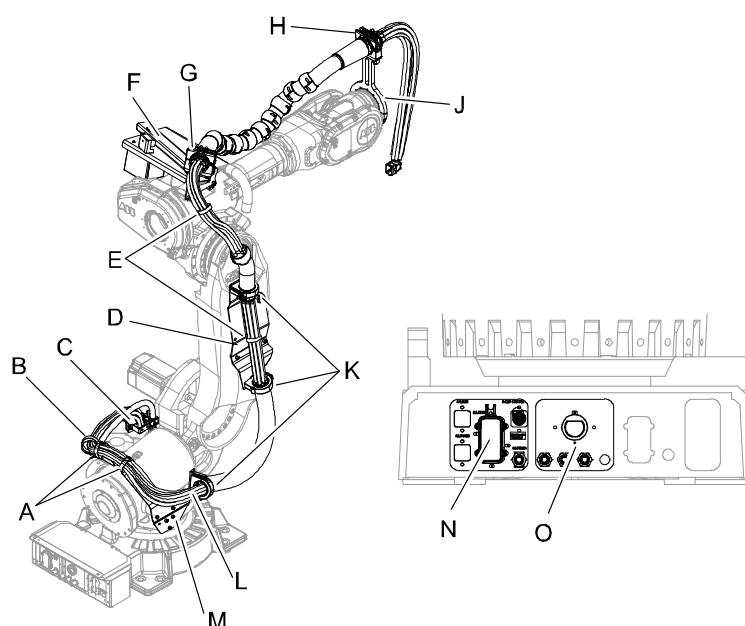
4.2.4 Replacement of lower/upper arm cable package

Location

This procedure describes how to replace the lower/upper arm cable package IRBDP SW2 CE. The actual work may differ due to the type of cables and hoses, type of connectors etc. However, if differences are distinguishable, these are pointed out in the procedure description.

The lower/upper arm cable package IRBDP SW2 CE consists of the parts shown in the figure.

The cable package IRBDP SW2 CE is undivided.



xx0700000339

A	Straps
B	Velcro strap
C	Cable and hose clamp
D	Lower arm plate
E	Straps (and strap holder)
F	Tension arm unit
G	Ball joint housing (tension arm)
H	Ball joint housing (process cable support axis 6)
J	Process cable support axis 6, complete
K	Gripping clamps
L	Process cable package
M	Attachment plate (balancing device)
N	Customer plate
O	Process plate

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4.2.4 Replacement of lower/upper arm cable package

Continued

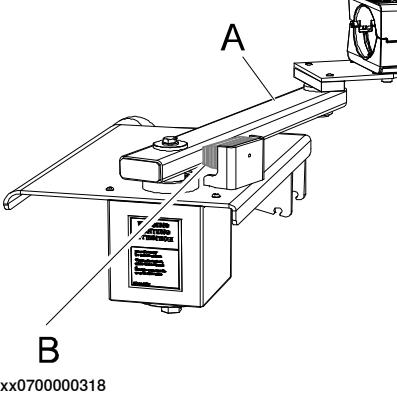
Required equipment

The following equipment is required for replacement of the lower/upper arm cable package.

Equipment	Art. no.	Note
Cable package IRBDP SW2 CE	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of versions are available.
Locking liquid	3HAC7116-1	Loctite 243 For locking the clamps of the gripping clamps.
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351.</i>
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	

Procedure

Use this procedure to remove the lower/upper arm cable package from the robot, before it is disassembled.

	Action	Note
1	 WARNING In order to avoid accidents place the robot in a service position (upper arm slightly upwards) with the <i>tension arm</i> resting against the <i>damper</i> .	 xx0700000318 Parts: <ul style="list-style-type: none"> • A: Tension arm • B: Damper
2	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

Continues on next page

4 Repair

4.2.4 Replacement of lower/upper arm cable package

Continued

	Action	Note
3	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
4	Disconnect all hoses at tool side.	This will drain any water still inside the hoses.
5	Remove the <i>lower end</i> of the lower/upper arm cable package.	See section Replacing the cable packages IRBDP MH2 LE and SW2 LE on page 239 .
6	Place the removed lower end of the cable package in a way that it will not get damaged in the continued removal of the upper arm part.	
7	Disconnect all cables at tool side.	
8	Remove the <i>upper end</i> of the lower/upper arm cable package.	See section Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245 .
9	Fit the new or repaired lower/upper arm cable package.	See section Fitting the cable package IRBDP SW2 CE on page 123 .

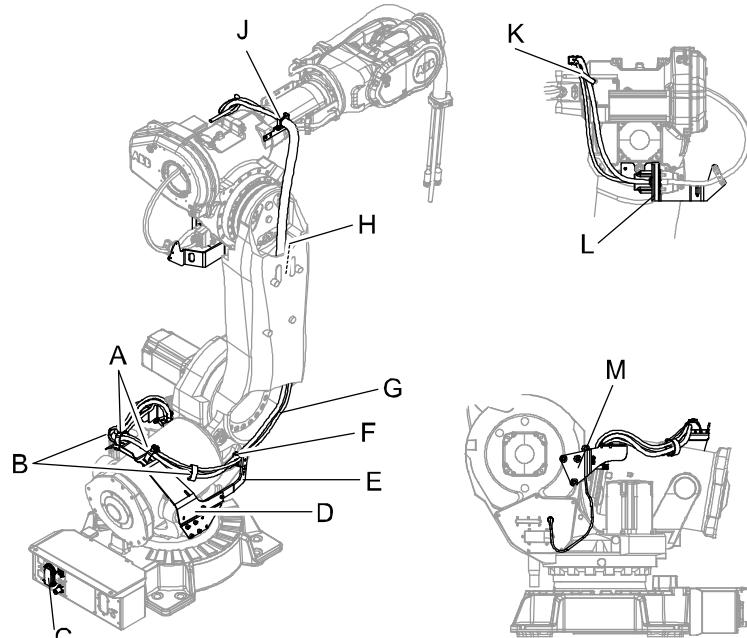
4.2.5 Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI

4.2.5 Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI**Location**

This procedure describes how to replace the lower arm internal MH dressing cable package IRBDP MH1 LI.

How to replace the upper end (IRBP MH3 UE) is described in section [Replacing the cable package IRBDP MH3 UE on page 255](#).

The lower arm MH dressing cable package IRBDP MH1 LI, is located as shown in the figure.



xx0700000385

A	Straps
B	Velcro straps
C	Connection point, base
D	Side bracket, balancing device
E	Lower bracket
F	Rubber clamp with bracket
G	Cable package, IRBDP MH1 LI
H	Rubber clamp with bracket (inside lower arm)
J	Rubber clamp with bracket
K	Strap
L	Connection plate
M	Cable and hose clamp

Continues on next page

4 Repair

4.2.5 Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI

Continued

Spare parts

The following equipment is required for the replacement of the lower arm internal MH dressing cable package IRBDP MH1 LI.

Equipment	Art. no	Note
Lower arm dressing cable package IRBDP MH1 LI	For spare part number see chapter: • <i>Spare parts on page 355</i> .	

Required tools and equipment

The following equipment is required for the replacement of the lower arm internal MH dressing cable package IRBDP MH1 LI.

Equipment	Art. no	Note
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/Spot-Pack on page 351</i> .
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.

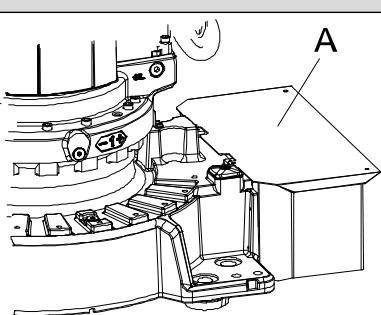
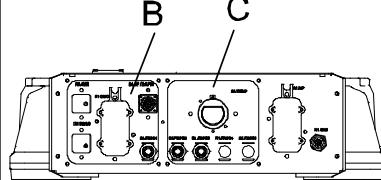
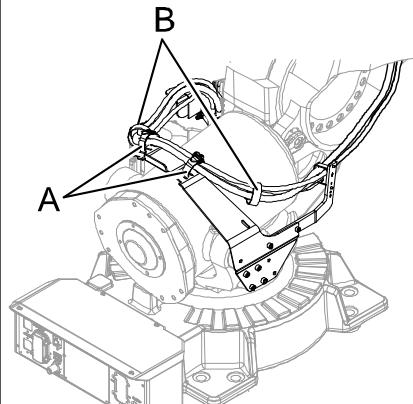
Procedure

Use this procedure to replace the lower arm internal MH dressing cable package IRBDP MH1 LI.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION 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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4.2.5 Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI
Continued

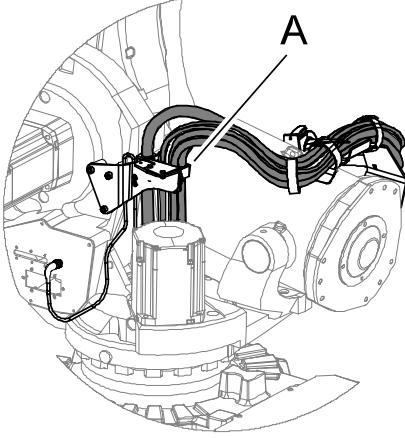
Action	Note
3 Remove the <i>cover plate</i> at the back of the robot base.	  xx0600003174 <p>Parts:</p> <ul style="list-style-type: none"> • A: Cover plate • B: Customer plate • C: Process plate
4 Open the <i>straps</i> and <i>velcro straps</i> .	 xx0700000399 <p>Parts:</p> <ul style="list-style-type: none"> • A: Velcro straps • B: Straps
5 Disconnect the cable connectors from the customer and process plates.	

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4 Repair

4.2.5 Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI

Continued

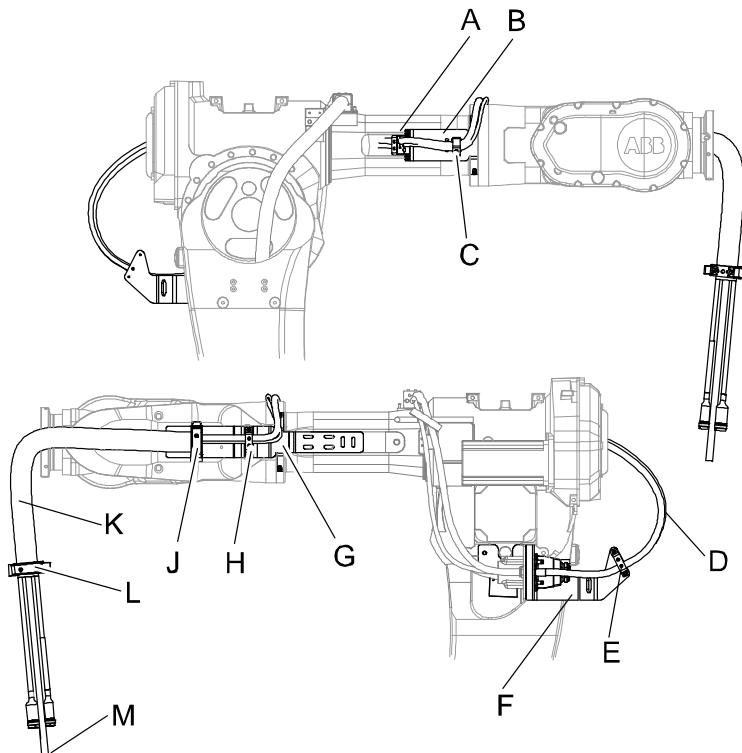
Action	Note
6 Loosen the <i>cable and hose clamp</i> .	 xx0700000338 Parts: <ul style="list-style-type: none"> • A: Cable and hose clamp
7 Pull the lower end of the cable package out through the center hole in gearbox axis 1. Order of disassembly: 1 Hoses 2 Signal cables	
8 Remove the <i>rubber clamp with bracket</i> from the <i>lower bracket</i> .	Shown in the figure Location on page 251 .
9 Open the <i>strap</i> inside the lower arm.	Shown in the figure Location on page 251 .
10 Remove the <i>rubber clamps with bracket</i> on top of the arm house and on the <i>connection plate</i> .	Shown in the figure Location on page 251 .
11 Disconnect all connectors from the <i>connection plate</i> .	Shown in the figure Location on page 251 .
12 Pull the cable package gently out of the lower arm.	
13 Refit the new or repaired lower internal cable package.	See section Fitting the cable package IRBDP MH1 LI on page 134 .

4.2.6 Replacing the cable package IRBDP MH3 UE

4.2.6 Replacing the cable package IRBDP MH3 UE

Location

The cable package IRBDP MH3 UE, is located as shown in the figure.



xx0700000379

A	Rubber clamp with bracket
B	Bracket, right
C	Velcro strap
D	Upper arm cable package MH dressing
E	Rubber clamp with bracket
F	Connection plate
G	Bracket, left
H	Rubber clamp with bracket
J	Gripping clamp (bracket left)
K	Protection hose
L	Gripping clamp (protection hose)
M	Air hose

Continues on next page

4 Repair

4.2.6 Replacing the cable package IRBDP MH3 UE

Continued

Required equipment

The following equipment is required for the replacement of the cable package IRBDP MH3 UE.

Equipment	Part no.	Note
Cable package IRBDP MH3 UE	For spare part number see chapter: <ul style="list-style-type: none">• Spare parts on page 355.	
Standard toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
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	See chapter Circuit diagram on page 381 .

Procedure

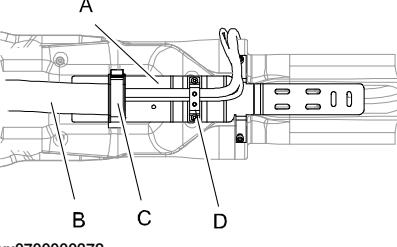
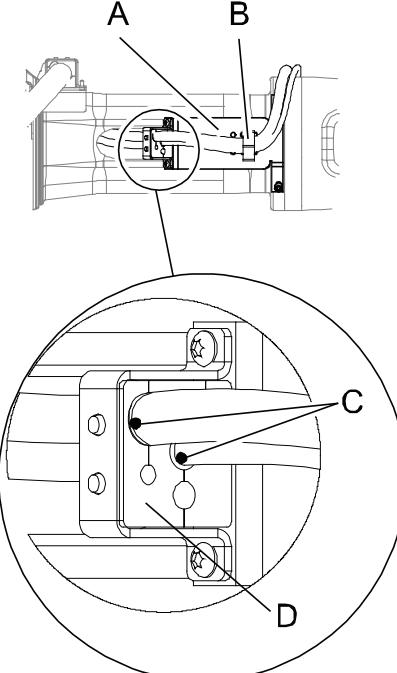
Use this procedure to replace the cable package IRBDP MH3 UE.

Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2  CAUTION 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 <i>gripping clamp</i> at the front end of the cable package.	Shown in the figure Location on page 255 .
4 If the cables has been put in a loop and fitted with straps on the bracket left, remove the straps.	

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4.2.6 Replacing the cable package IRBDP MH3 UE

Continued

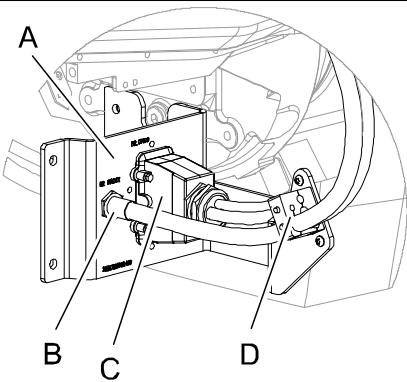
Action	Note
5 Open the <i>gripping clamp</i> on the <i>bracket left</i> .	 <p>xx0700000372</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, left • B: Protection hose • C: Gripping clamp • D: Rubber clamp with bracket
6 Remove the <i>rubber clamp with bracket</i> on the <i>bracket left</i> .	Shown in the figure above.
7 Remove the <i>rubber clamp with bracket</i> on the <i>bracket right</i> . Open the <i>velcro strap</i> .	 <p>xx0700000370</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Bracket, right • B: Velcro strap • C: White markings on cables • D: Rubber clamp with bracket

Continues on next page

4 Repair

4.2.6 Replacing the cable package IRBDP MH3 UE

Continued

Action	Note
8 Remove the <i>rubber clamp with bracket</i> on the <i>connection plate</i> and disconnect <i>cables</i> and <i>hose</i> .	 xx0700000368 Parts: <ul style="list-style-type: none">• A: Connection plate• B: Hose• C: Signal and power cable• D: Rubber clamp with bracket
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 Fitting the cable package IRBDP MH3 UE on page 139 .

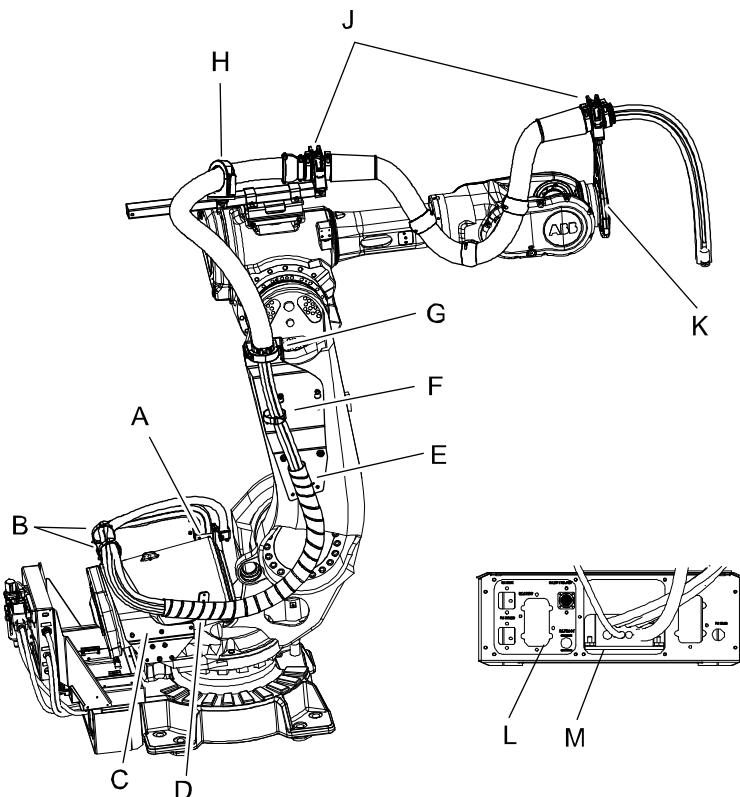
4.2.7 Replacing the cable package IRBDP SW5 CE (SpotPack Basic)

4.2.7 Replacing the cable package IRBDP SW5 CE (SpotPack Basic)**Overview**

This procedure describes how to replace the cable package IRBDP SW5 CE (SpotPack Basic).

Location of the cable package IRBDP SW5 CE

The cable package IRBDP SW5 CE (SpotPack Basic) consists of the parts shown in the figure.



xx0800000078

A	Cable and hose clamp
B	Velcro strap
C	Side bracket balancing cylinder
D	Spiral hose clamp (lower bracket)
E	Spiral hose clamp (lower arm plate)
F	Velcro strap
G	Gripping clamp (lower arm plate)
H	Gripping clamp (adjustable bracket)
J	Ball joint housing
K	Process cable support axis 6
L	Customer plate
M	Clamp holder with plastic clamp

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4 Repair

4.2.7 Replacing the cable package IRBDP SW5 CE (SpotPack Basic)

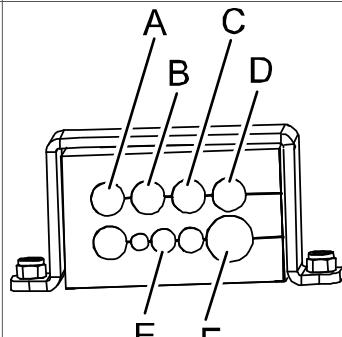
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Required equipment

Equipment	Art. no.	Note
Cable package IRBDP SW5 CE	For spare part number see chapter: <ul style="list-style-type: none">• Spare parts on page 355.	
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351.
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.

Removal

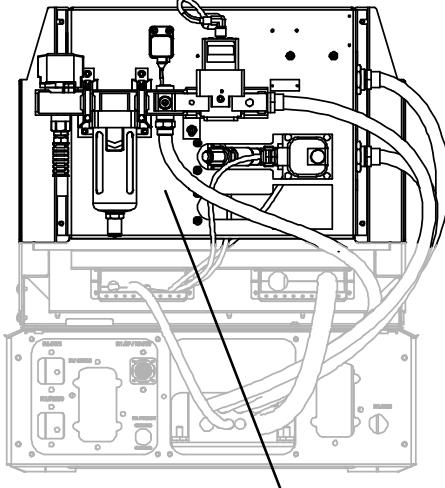
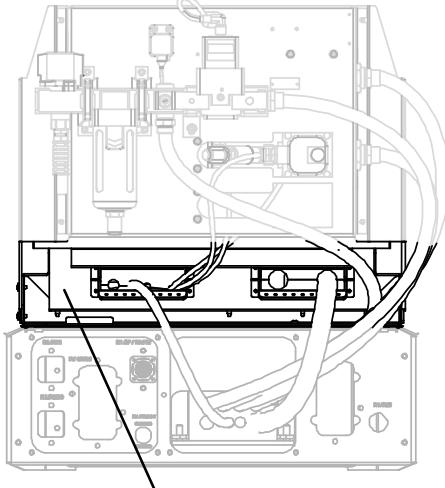
Use this procedure to remove the cable package IRBDP SW5 CE from the robot before it is disassembled.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
3	Remove the <i>clamp holder with plastic clamp</i> in the back of the robot base, securing the cable package.	 <p>xx0800000079</p> <p>Parts:</p> <ul style="list-style-type: none">• Clamp holder with plastic clamp

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4.2.7 Replacing the cable package IRBDP SW5 CE (SpotPack Basic)

Continued

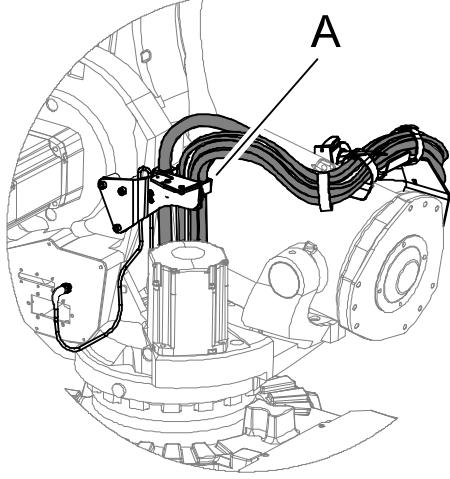
Action	Note
4 Disconnect all cables and hoses at the <i>water and air unit</i> .	 <p>xx0800000083</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Water and air unit
5 Disconnect all cables and hoses at the <i>connection box</i> .	 <p>xx0800000082</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Connection box

Continues on next page

4 Repair

4.2.7 Replacing the cable package IRBDP SW5 CE (SpotPack Basic)

Continued

Action	Note
6 Loosen the <i>cable and hose clamp</i> at the bracket axis 1.	 xx0700000338 Parts: <ul style="list-style-type: none"> • A: Cable and hose clamp
7 Pull the lower end of the cable package carefully up through the center hole in gearbox axis 1. Order of disassembly: 1 Hoses 2 Signal cables	
8 Loosen the <i>spiral hose clamp</i> on the lower bracket.	Shown in the figure Location of the cable package IRBDP SW5 CE on page 259 .
9 Remove the <i>velcro straps</i> at the side bracket balancing cylinder and lower arm plate.	Shown in the figure Location of the cable package IRBDP SW5 CE on page 259 .
10 Loosen the <i>spiral hose clamp</i> on the lower arm plate.	Shown in the figure Location of the cable package IRBDP SW5 CE on page 259 .
11 Open the <i>gripping clamp</i> on the lower arm plate.	Shown in the figure Location of the cable package IRBDP SW5 CE on page 259 .
12 Open the <i>gripping clamp</i> on the adjustable bracket.	Shown in the figure Location of the cable package IRBDP SW5 CE on page 259 .
13 Open the <i>ball joint housings</i> at the process cable support axis 6 and adjustable bracket.	Shown in the figure Location of the cable package IRBDP SW5 CE on page 259 .
14 Remove the complete process cable package.	

Refitting

Use this procedure to remove the cable package IRBDP SW5 CE.

Action	Note
1 Refitting of the process cable package IRBDP SW 5 CE is described in section Fitting the cable package IRBDP SW5 CE (SpotPack Basic) on page 144 .	

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)**Overview**

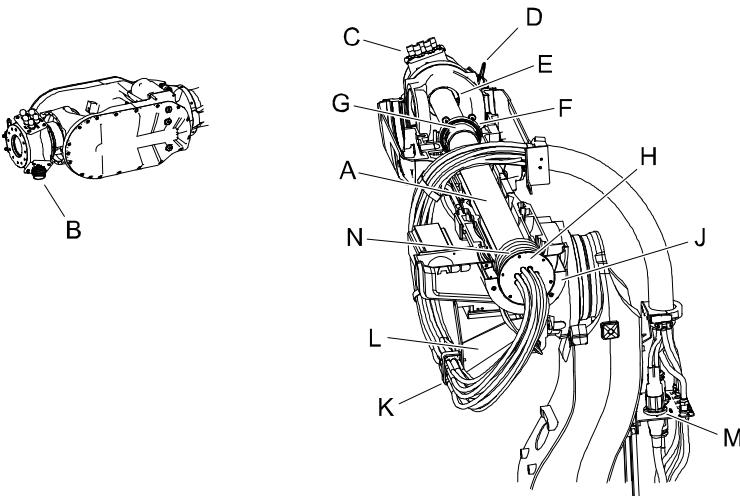
The procedures below details how to remove and refit the process cable package, upper arm.

**Tip**

Replacement of the process cable package is best performed if two persons work together at either end of the upper arm.

Location of process cable package, upper arm

The process cable package for the upper arm is located throughout the upper arm of the robot as shown in figure.



xx0500001942

A	Process cable package, upper arm
B	R3.WELD
C	R3.PROC1-5
D	R3.CP/CS/CBUS
E	Holder front
F	Deep groove ball bearing
G	Holder back
H	Cable holder
J	Motor cable cover
K	Cable holder
L	Angle bracket
M	Connector plate
N	Spiral of motor cable

Continues on next page

4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

Required equipment

Equipment	Art.no.	Note
Process cable package:	For spare part number see chapter <ul style="list-style-type: none">• Spare parts on page 355.	
Guide pin M6 x 90	-	
Standard toolkit	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
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.

Robot position

We recommend placing the robot according to the table below in order to make it easier to replace the cable package.

 Note
Free space is required behind the robot in order to get the cable package out (approx. 2.5 m).

Axis	Position
Axis 4	-270°
Axis 5	0°
Axis 6	270°

Removal preparations

The following procedures details how to make the necessary preparations before removing the process cable package.

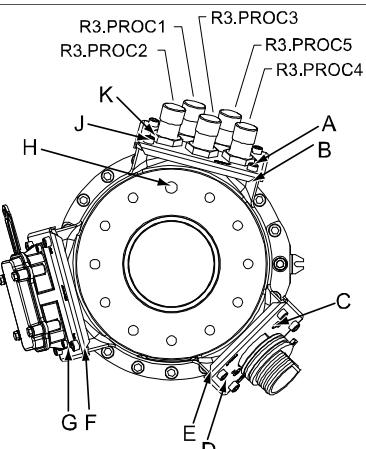
The procedure details what shall be done at both ends of the process cable package. At some stages of the procedure, work is done at both ends simultaneously.

	Action	Note
1	 DANGER Before any work inside the cabinet, please observe the safety information in section DANGER - Make sure that the main power has been switched off in the product manual for the IRC5 controller.	

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4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

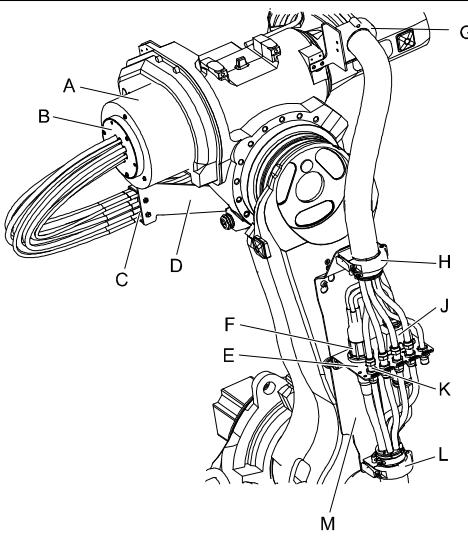
Action	Note
2  CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
3 <i>Front:</i> Remove the screws from the cover of the R3.PROC1-5 hoses, R3.CP/CS/CBUS cables and R3.WELD cable from the turning disk unit M6x16 screws, (4 pcs on each cover).	 <p>xx0500001945</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Cover R3.PROC1-5 • B: Gasket • C: Counterscrew hex head cap screw M5x16 (2 pcs) • D: Cover R3.WELD • E: Gasket • F: Gasket • G: Cover R3.CP/CS/CBUS • H: Guiding hole for tool • J: Hex socket head cap screw M6x12 (4 pcs x 3) • K: Fittings

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4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

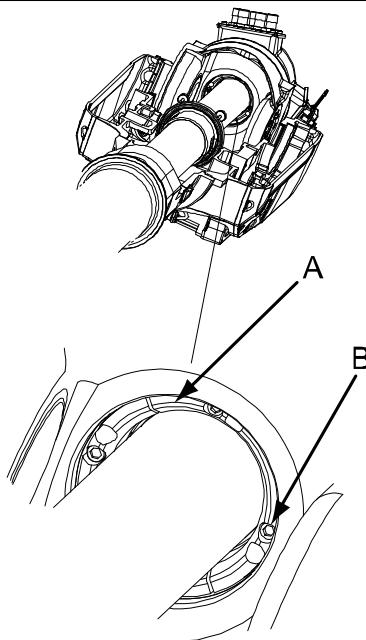
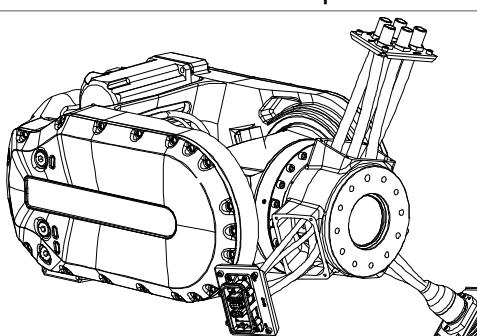
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Action	Note
4 Back: Disconnect the cables and hoses from the connection plate.	 <p>xx0500001946</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Motor cable cover • B: Cable and hose guide • C: Cable holder R3.WELD • D: Angle bracket • E: Connection plate • F: R3.WELD • G: Gripping clamp, upper arm • H: Upper gripping clamp (lower arm plate) • J: R3.CP/CS/CBUS • K: R3.PROC1-5 • L: Lower gripping clamp (lower arm plate) • M: Lower arm plate
5 Back: Unsnap the gripping clamp on the upper arm and the upper gripping clamp on lower arm plate.	
6 Back: Remove the cable holder from the angle bracket, M8 hexagon nuts (2 pcs).	
7 Back: Remove the rear cable and hose guide, M6x16 screws (3 pcs).	

Continues on next page

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

	Action	Note
8	<p>Front: Loosen the screws, M6x60 (4 pcs) that are locking the process cable package in position at the <i>holder front</i>. This is done in order to release the tension in the process cable package.</p> <p>Note Do not remove the screws completely at this point!</p>	 <p>xx0500001944</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Holder front • B: Hex socket head cap screw M6x60
9	<p>Back and front together:</p> <p>Front: Pull out the cables and hoses a little from their holes, one by one.</p> <p>Back: Push the cables and hoses forward, one by one.</p>	 <p>xx0500002502</p> <p>This procedure is done in order to make it possible to remove the covers from the hoses and cables in the turning disk unit. Due to long operation the cable package may be jammed. Depending on the cable package shall be reused or not, follow the appropriate advice below:</p> <ul style="list-style-type: none"> • If the cable package shall be reused do not be afraid to pull harder to get the cables out. Still be careful not to damage it! • If the cable package is <i>scrap</i> pull the cable package out far enough to make it possible to cut off cables and hoses.

Continues on next page

4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

Continued removal - if the process cable package is scrap

The procedure below details how to continue the removal procedure if the process cable package is scrap.



Note

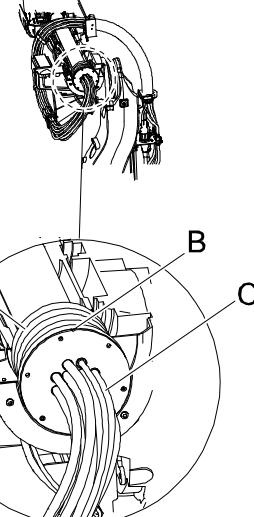
Even if the process cable package is being handled as scrap, it is still important not to damage the motor cable in the process!

	Action	Note
1	Front: Cut off the R3.WELD connector, the Harting connector (R3.CP/CS/CBUS) and the R3.PROC1-5 connector.	
2	Front: Remove the bearing at the holder back, M6x30 screws (4 pcs) and washers.	<p>xx0500002010</p> <p>Parts:</p> <ul style="list-style-type: none">• A: Holder back• B: Washer (4 pcs)• C: Hex socket head cap screw M6x30 (4 pcs)• D: Deep groove ball bearing• E: Bearing holder (2 pcs)
3	Front: Remove the bearing holders M6x30 screws (2 pcs).	

Continues on next page

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

Action	Note
4 Back: Hold the spiral of the motor cable up, while pulling out the process cable package, in order not to damage it.	 xx0500001948 Parts: <ul style="list-style-type: none"> A: Spiral of motor cable B: Groove in the cable and hose guide C: Process cable package
5 Back: Remove the process cable package by pulling it out backwards.	 Note Do not damage the motor cable in the process!

Continued removal - if the process cable package is going to be reused

The procedure below details how to continue the removal procedure if the process cable package is going to be reused.

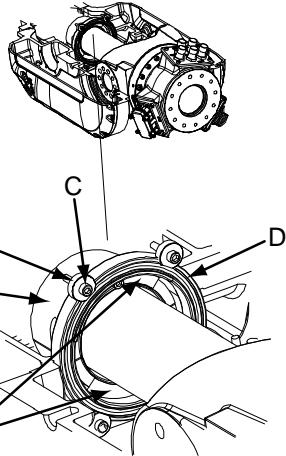
Action	Note
1 Front: Remove the fittings from the R3.PROC1-5 hoses.	Tools needed for this operation <ul style="list-style-type: none"> Ring spanner, 27 mm Ring spanner, 30 mm
2 Front: Remove (temporarily) the two M4 screws on the left side of the Harting connector (R3.CP/CS/CBUS).	
3 Front: Remove the insert of the Harting connector.	This procedure can be a little tricky. Perform it in the following order: <ul style="list-style-type: none"> 1: Push the insert out a little. 2: Put insert in an angle. 3: Pull insert out backwards. The side of the insert marked "A-B" on the right side of the insert, should be the part that is pushed out first.
4 Front: Remove the R3.WELD connector from its cover, M5x16 screws (2 pcs).	

Continues on next page

4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

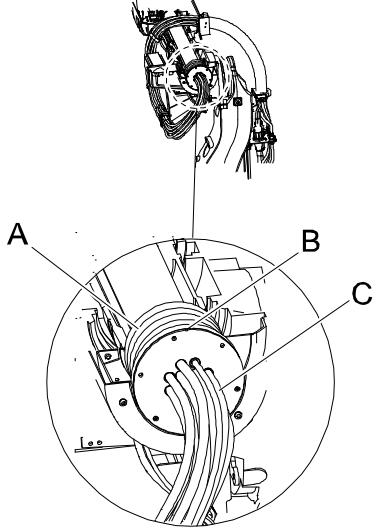
Continued

	Action	Note
5	<p>Front: Remove the bearing at the holder back, M6x30 screws (4 pcs) and washers.</p>	 xx0500001947 <p>Parts:</p> <ul style="list-style-type: none"> • A: Holder back • B: Washer (4 pcs) • C: Torx head cap screw M6x30 (4 pcs) • D: Deep groove ball bearing • E: Bearing holder (2 pcs)
6	<p>Front: Remove the bearing holders, M6x30 screws (2 pcs).</p>	
7	<p>Back and front together: Remove the cables and hoses - one after the other - preferably in the following order:</p> <ul style="list-style-type: none"> • R3.WELD • R3.CP/CS/CBUS • R3.PROC1-5 	

Continues on next page

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

	Action	Note
8	Back: Hold the spiral of the motor cable up while pulling out the process cable package.	 <p>xx0500001948</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Spiral of motor cable B: Groove in the cable and hose guide C: Process cable package
9	Back: Remove the process cable package by pulling it out backwards.	 Note <p>Do not damage the motor cable in the process!</p>

Refitting - part one

The procedure below details how to refit the process cable package. The refitting procedure is described in two parts. This is the first part.

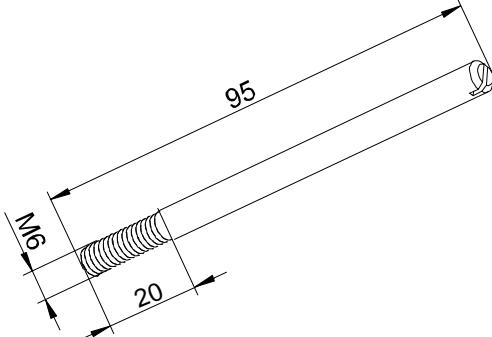
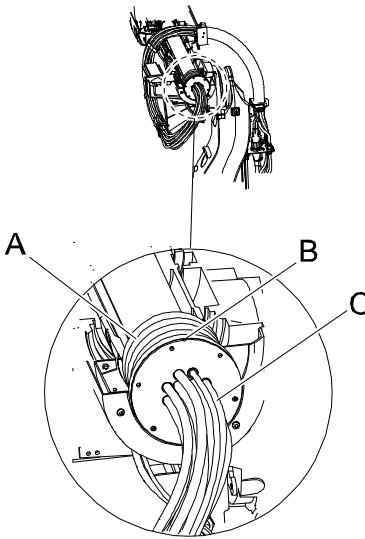
	Action	Note
1	 DANGER <p>Before any work inside the cabinet, please observe the safety information in section <i>DANGER - Make sure that the main power has been switched off</i> in the product manual for the IRC5 controller.</p>	
2	 CAUTION <p>The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.</p>	

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4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

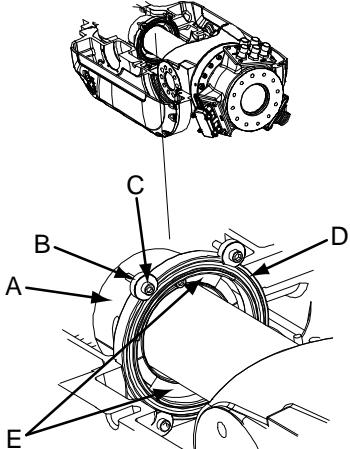
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Action	Note
<p>3 Front: Put a guide pin (M6x90) in the lower hole of the holder front.</p>	 xx0500002503 <p>This will make it easier to find the holes for the screws. It will also make it easier to refit the process cable package in the front part of the wrist.</p>
<p>4 Back and front together: Place the cables and hoses - one after the other - preferably in the following order:</p> <ul style="list-style-type: none"> • R3.WELD • R3.CP/CS/CBUS • R3.PROC1-5 	If the connectors have covers fitted, remove them. Fix the cables and hoses with some tape or straps. This will make it easier to guide the process cable package through the upper arm.
<p>5 Back: Hold the spiral of the motor cable up while the process cable package is inserted into the upper arm.</p>	 xx0500001948 <p>Parts:</p> <ul style="list-style-type: none"> • A: Spiral of motor cable • B: Groove in the cable and hose guide • C: Process cable package

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4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

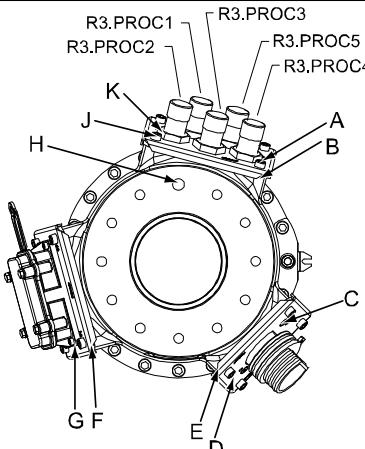
	Action	Note
6	<p>Back and front together: Insert the process cable package into the upper arm and push it carefully forward.</p> <p> Note</p> <p>Perform this procedure carefully in order not to damage the motor cable or process cable package itself!</p>	 Tip <p>This procedure is best performed in two steps and by two persons working together. Step 1: Both persons at the back of the robot - one holding the front end of the process cable package and the other holding the back end of it. Step 2: One person in the back pushing the process cable package and one person in the front, receiving it.</p>
7	<p>Front:</p> <p> Note</p> <p>Place the bearing on the <i>holder back</i>, before the process cable package is fully pushed forward through the wrist.</p> <p> Note</p> <p>Do not refit the bearing at this point!</p>	 xx0500001947 <p>Parts:</p> <ul style="list-style-type: none"> • A: Holder back • B: Washer (4 pcs) • C: Hex socket head cap screw M6x30 (4 pcs) • D: Deep groove ball bearing • E: Bearing holder (2 pcs)

Continues on next page

4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

Action	Note
<p>8 Back and front together: Push and pull the process cable package through the wrist and guide the cables and hoses through their respective holes in the turning disk unit.</p> <p> Note</p> <p>Do not twist the cables and hoses!</p>	 <p>xx0500001945</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Cover R3.PROC1-5 • B: Gasket • C: Counterscrew hex head cap screw M5x16 (2 pcs) • D: Cover R3.WELD • E: Gasket • F: Gasket • G: Cover R3.CP/CS/CBUS • H: Guiding hole for tool • J: Hex socket head cap screw M6x12 (4 pcs x 3) • K: Fittings
<p>9 Front: Pull out the cables and hoses through their respective holes in order to make it possible to refit the covers.</p>	Before performing this procedure, remove tape or straps!

Refitting - part two

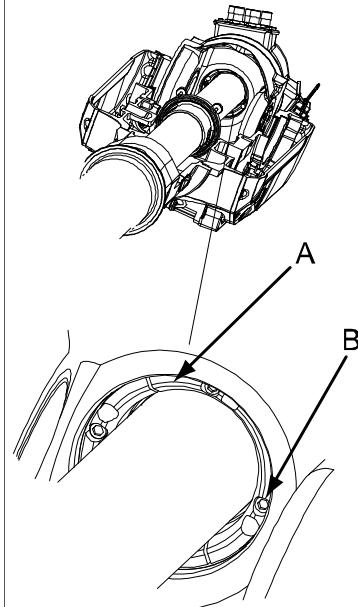
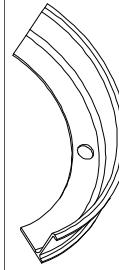
The procedure below details how to refit the process cable package. The refitting procedure is described in two parts. This is the second part.

Action	Note
<p>1 Front: Refit the cover of the Harting connector (R3.CP/CS/CBUS).</p>	
<p>2 Front: Refit the insert of the Harting connector, M4 screws, (4 pcs).</p>	<p>This procedure can be a little tricky. Perform refitting of the insert of the Harting connector in the following order:</p> <ul style="list-style-type: none"> • Remove (temporarily) the two M4 screws on the left side • Put the insert in an angle • Push it into its cover. <p>The side marked "A-B" on the right side of the insert, should go through last.</p>

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4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

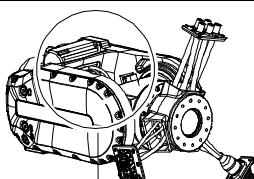
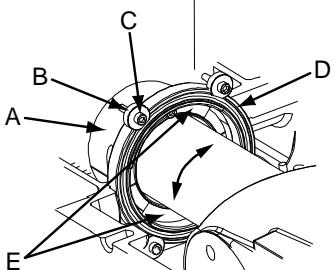
	Action	Note
3	Front: Refit the cover on the R3.WELD connector, M5x16 screws, (2 pcs).	
4	Front: Refit the R3.PROC1-5 hoses on its cover. (fittings, 5 pcs).	See markings on cover and hoses for correct refitting.  Note Do not twist hoses!
5	Front: Refit the process cable package in the holder front, M6x60 screws, (4 pcs).  Note The screws shall not be tightened fully at this point!	 xx0500001944 Parts: <ul style="list-style-type: none">A: Holder frontB: Hex socket head cap screw M6x60 (4 pcs)
6	Front: Refit the bearing holders, M6x30 screws, (2 pcs).  Note Fit the bearing holders correctly! The bearing holder shall be fitted with the flange towards the bearing, as shown in illustration.	 xx0500001943 Parts: <ul style="list-style-type: none">A: Bearing holder correct way

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4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

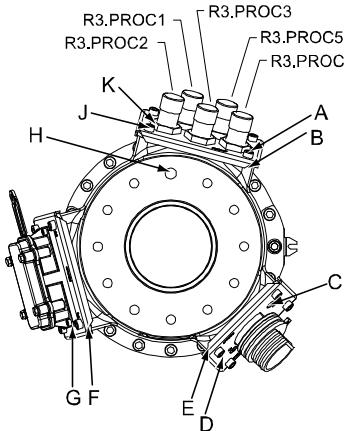
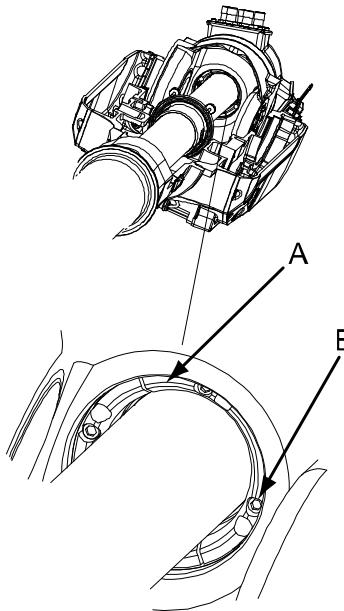
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Action	Note
<p>7 Front: Refit the bearing on the holder back, M6x30 screws, (4 pcs) and washers.</p> <p> Note</p> <p>Make sure that the plastic hose could be turned by hand.</p>	  <p>xx0500002504</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Holder back • B: Washer (4 pcs) • C: Hex socket head cap screw M6x30 (4 pcs) • D: Deep groove ball bearing • E: Bearing holder (2 pcs)
<p>8 Back and front together: Pull and push the cables and hoses of the process cable package, back in the upper arm - one at a time. This is done in order to make it possible to refit the covers of the cables and hoses in the turning disk unit.</p>	<p>This procedure is best performed in sequence, for example in the following order - one at a time:</p> <ul style="list-style-type: none"> • R3.WELD • R3.CP/CS/CBUS • R3.PROC1-5

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4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

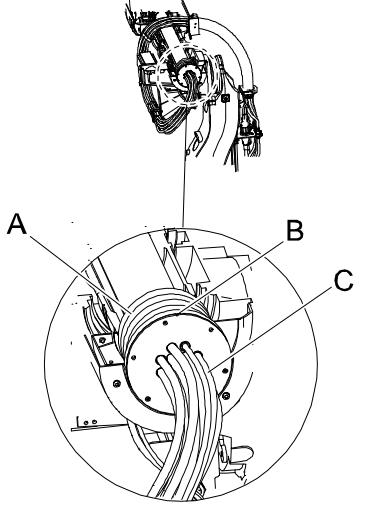
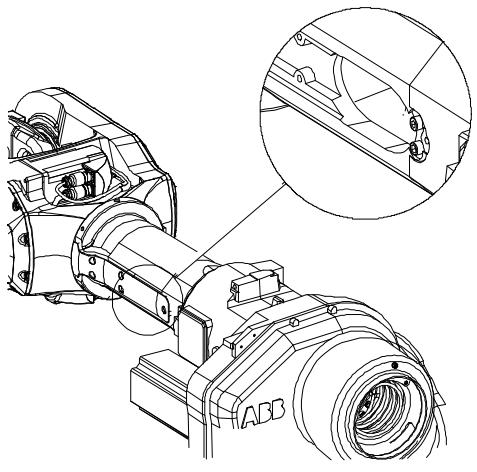
	Action	Note
9	<p>Front: Refit the covers of R3.WELD connector, R3.CP/CS/CBUS connector and R3.PROC1-5 on the turning disk unit, M6x12 screws, (4 pcs x3).</p>	 <p>xx0500001945</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Cover R3.PROC1-5 • B: Gasket • C: Counters. hex head cap screw M5x16 (2 pcs) • D: Cover R3.WELD • E: Gasket • F: Gasket • G: Cover R3.CP/CS/CBUS • H: Guiding hole for tool • J: Hex socket head cap screw M6x12 (4 pcs x 3) • K: Fittings
10	<p>Front: Tighten the process cable package by refitting the M6x60 screws (4 pcs), previously fitted but not tightened. This procedure expands the rubber holder front. This will lock the process cable package in its position.</p>	 <p>xx0500001944</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Holder front • B: Hex socket head cap screw M6x60 (4 pcs)

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4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

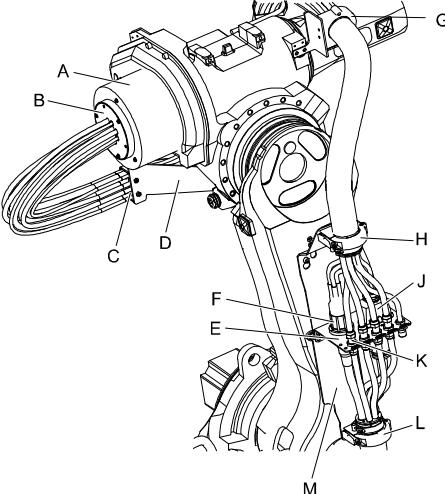
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	Action	Note
11	<p>Back: Refit the rear cable and hose guide, M6x35 screws, (4 pcs). The small groove shall be on top of the guide. See illustration!</p> <p>Note</p> <p>If the process cable package not is fitting correctly, check that the position of plastic tube is correct at the wrist.</p>	 <p>xx0500001948</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Spiral of motor cable B: Groove in the cable and hose guide C: Process cable package
12	<p>Note</p> <p>The cables must be routed parallel inside the upper arm. Remove the cover on the upper arm and check that the cable not are twisted. See illustration!</p>	 <p>xx0500002009</p>
13	<p>Back and front together: Arrange the cables and hoses in a way that they form a gentle parallel bend at the back of the upper arm.</p>	<p>Note</p> <p>It is important that all cables and hoses have the same length and follow each other through the bend!</p>

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4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

Continued

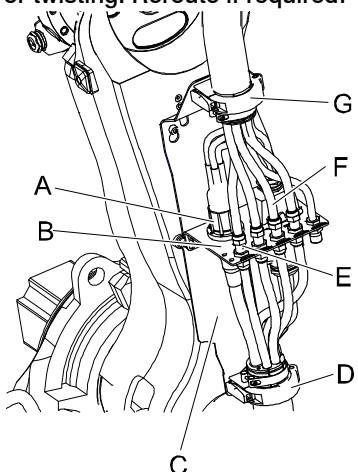
	Action	Note
14	<p>Back: Refit the process cable package on the angle bracket M6 hexagon nuts, (2 pcs).</p>	 <p>xx0500001946</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Motor cable cover • B: Cable and hose guide • C: Cable holder R3.WELD • D: Angle bracket • E: Connection plate • F: R3.WELD • G: Gripping clamp, upper arm • H: Upper gripping clamp (lower arm plate) • J: R3.CP/CS/CBUS • K: R3.PROC1-5 • L: Lower gripping clamp (lower arm plate) • M: Lower arm plate

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4 Repair

4.2.8 Replacement process cable package IRBDP SW4 UI (IRB66X0ID)

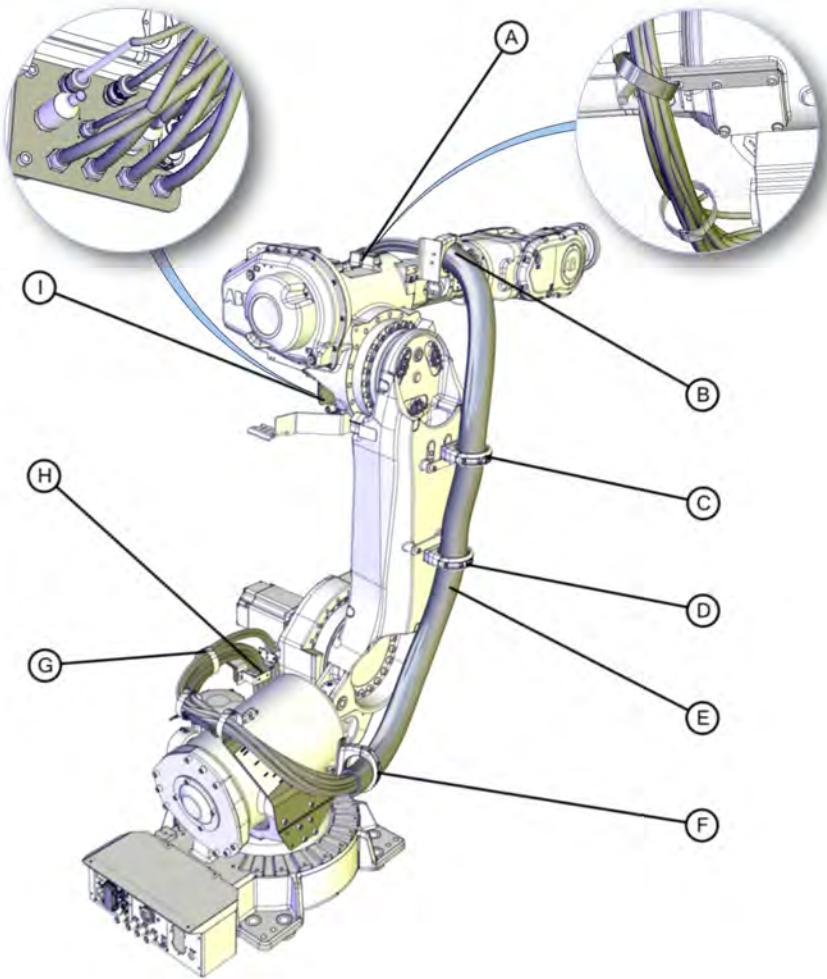
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	Action	Note
15	<p>Back: Refit the cables and hoses on the connection plate.</p> <p> CAUTION</p> <p>Do not tighten the brass couplings for water and air with excessive force.</p>	<p>Tightening torque, brass couplings 1/2": 31Nm Tightening torque, brass couplings 3/8": 17Nm Recheck all cables and hoses for straining or twisting. Reroute if required!</p>  <p>xx0700000429</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: R3.WELD • B: Connection plate • C: Lower arm plate • D: Lower gripping clamp (lower arm plate) • E: R3.PROC 1-5 • F: R3.CP/CS/CBUS
16	<p>Back: Snap the cable package back into the upper gripping clamp on the lower arm plate and gripping clamp on the upper arm.</p>	
17	<p>Back: Reconnect the R3.WELD connector, R3.CP/CS/CBUS connector and R3.PROC1-5 on the connection plate.</p>	

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)**Location of the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)**

The lower end of the cable package is located as shown in the figure.



xx1200000021

A	Velcro straps (2 pcs)
B	Ball joint housing
C	Ball joint housing
D	Ball joint housing
E	Cable package
F	Ball joint housing
G	Strap (4 pcs)
H	Bracket axis 1
I	Connection plate

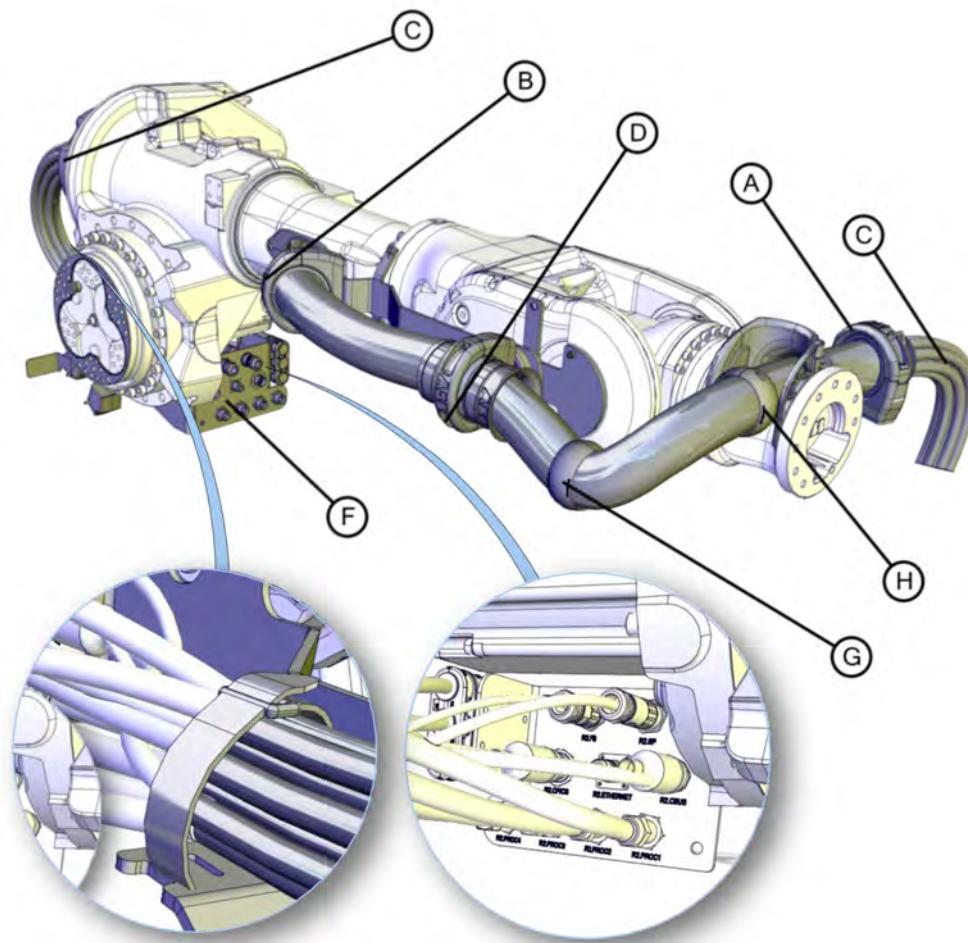
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4 Repair

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)

Continued

The upper end of the cable package is located as shown in the figure.



xx1200000056

A	Ball joint housing
B	Ball joint housing
C	Cable package
D	Ball joint housing
E	Strap (see enlarged image)
F	Connection plate (see enlarged image)
G	Protective sleeve
H	Protective sleeve

Required equipment

Equipment, etc.	Art. no.	Note
Cable package IRBDP SW6 LE	For spare part number see chapter: • Spare parts on page 355 .	A number of versions are available.

Continues on next page

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)
Continued

Equipment, etc.	Art. no.	Note
Cable package IRBDP SW6 UI	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of versions are available.
Cable package IRBDP MH6 LE	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of versions are available.
Cable package IRBDP MH6 UI	For spare part number see chapter: • <i>Spare parts on page 355.</i>	A number of versions are available.
Standard toolkit	-	Content is defined in section <i>Standard toolkit on page 351.</i>
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.

Removing the cable package - IRBDP SW6 LE and IRBDP MH6 LE

Use this procedure to remove the cable packages IRBDP SW6 LE and IRBDP MH6 LE.



Note

When the housing upper part is removed, check that the small o-ring still is left on the attachment screw. The purpose of the o-ring is to keep the screw from falling off the housing when the upper part is removed.

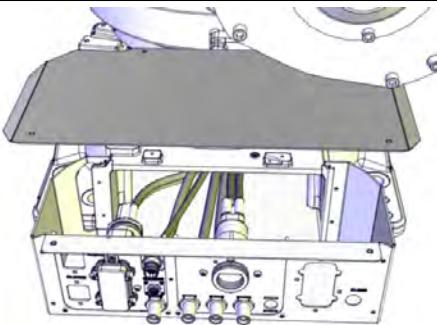
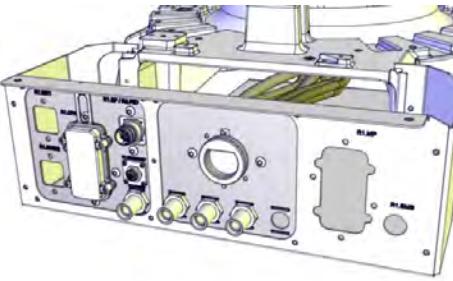
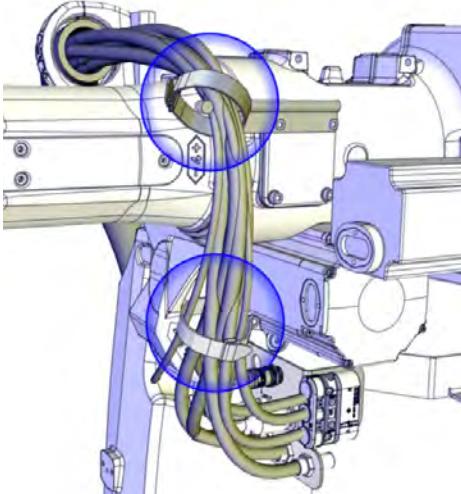
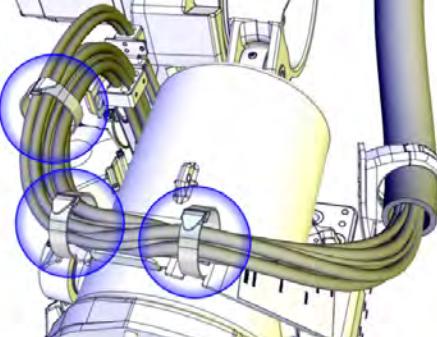
	Action	Note
1	Move the robot to a comfortable working position.	
2	<p> DANGER</p> <p>Turn off all:</p> <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply <p>to the robot, before entering the robot working area.</p> <p> DANGER</p> <p>Turn off all electric power, hydraulic and pneumatic pressure supplies to the robot and for the track motion.</p>	

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4 Repair

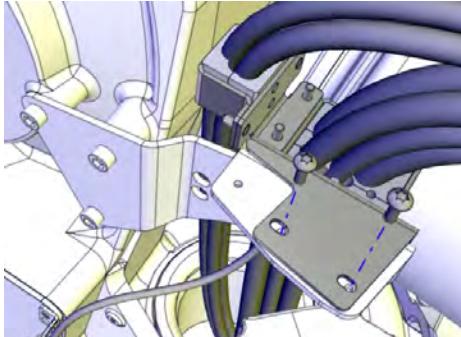
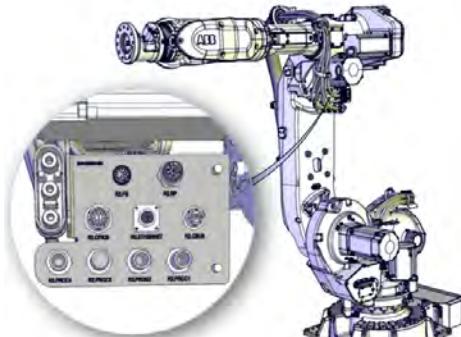
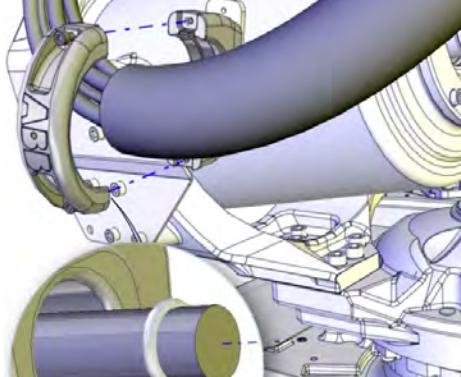
4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)

Continued

Action	Note
3 Remove the <i>rear cover</i> .	 xx1200000051
4 Disconnect <i>connectors at the base</i> .	 xx1200000052
5 Open the <i>straps</i> .	 xx1200000048
6 Open the <i>velcro straps</i> .	 xx1200000047

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4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)
Continued

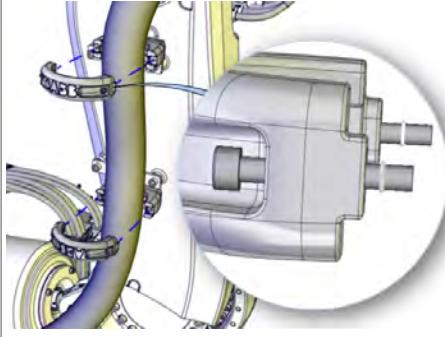
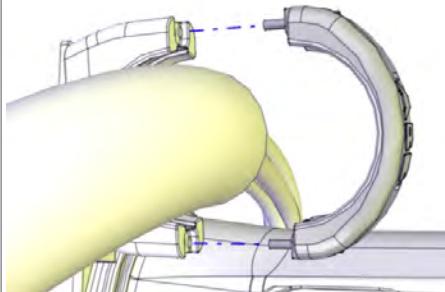
	Action	Note
7	Unscrew the attachment screws of the <i>cable bracket</i> .	 xx1200000049 <p>Attachment screws: M6x40 quality 8.8-A2F (2 pcs)</p>
8	Carefully pull out the <i>cable package</i> through the hole in the frame.	
	This is best done following this order:	
	1: Weld cables	
	2: Hoses	
	3: Remaining cables	
9	Disconnect connectors on the <i>connection plate</i> .	 xx1200000050
10	Remove the <i>housing upper part</i> of the ball joint housing at the balancing cylinder.	 xx1200000053 <p>Attachment screws: M6x40 quality 8.8-A2F (2 pcs)</p>

Continues on next page

4 Repair

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)

Continued

Action	Note
11 Remove the two <i>housings upper part</i> of the ball joint housing on the lower arm.	 xx1200000054 M6x40 quality 8.8-A2F (2 pcs) Attachment screws:
12 Remove the <i>housing upper part</i> of the ball joint housing on top of the upper arm.	 xx1200000055 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)
13 Put the cable package in a safe way on the floor and continue removal on the upper arm.	

Removing the cable package - IRBDP SW6 UI and IRBDP MH6 UI

Use this procedure to remove the cable packages IRBDP SW6 UI and IRBDP MH6 UI.



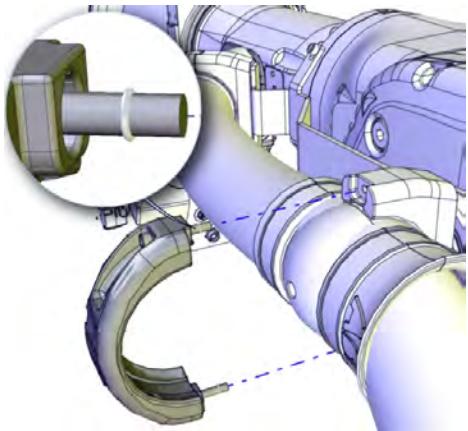
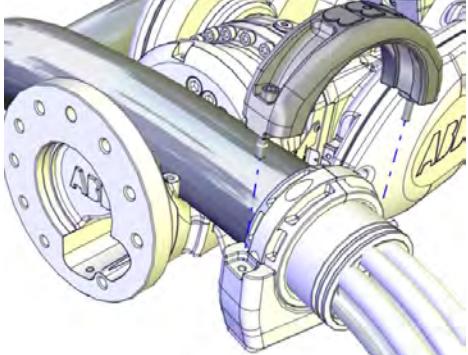
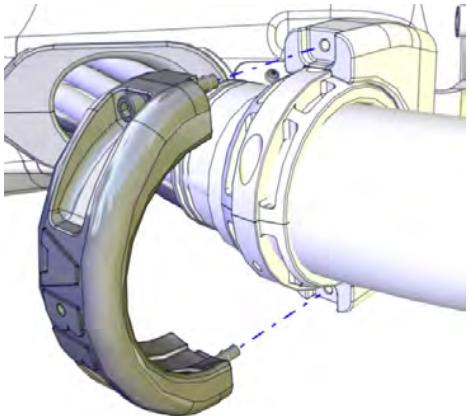
Note

When the housing upper part is removed, check that the small o-ring still is left on the attachment screw. The purpose of the o-ring is to keep the screw from falling off the housing when the upper part is removed.

Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	

Continues on next page

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)
Continued

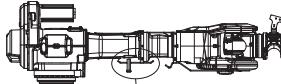
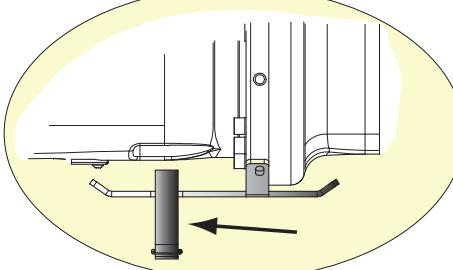
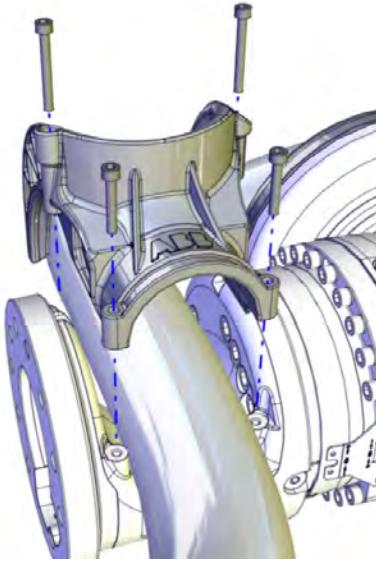
	Action	Note
2	Remove the <i>housing upper part</i> on the bearing housing.	 xx1200000074 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)
3	Remove the <i>housing upper part</i> on the adjustable bracket axis 6.	 xx1200000060 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)
4	Remove the <i>housing upper part</i> on the upper arm bracket.	 xx1200000061 Attachment screws: M6x40 quality 8.8-A2F (2 pcs)

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4 Repair

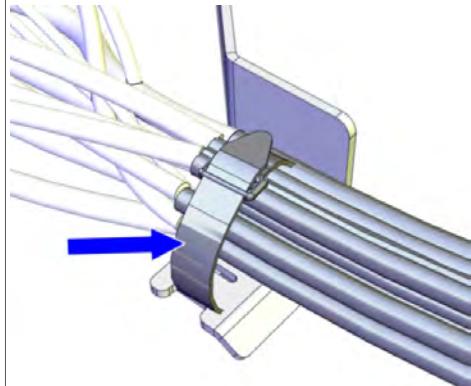
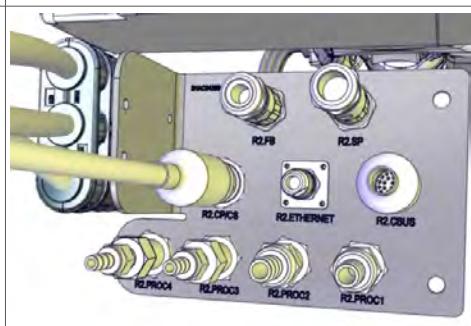
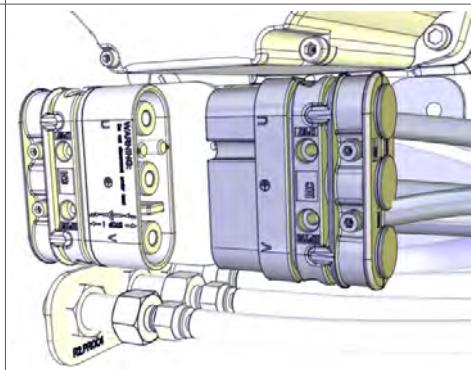
4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)

Continued

Action	Note
5 Only valid with upper arm extension! Open the <i>velcro strap</i> securing the cable package to the extension plate.	  xx1200000119 <i>Figure 4.1:</i>
6 Remove the cable harness from the open ball joint housings and put it on the floor.	
7 Remove the <i>axis 6 cable support</i> .	 xx1200000036 Attachment screws: M6x35 quality 8.8-A2F (2 pcs) M6x50 quality 8.8-A2F (2 pcs)

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4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)
Continued

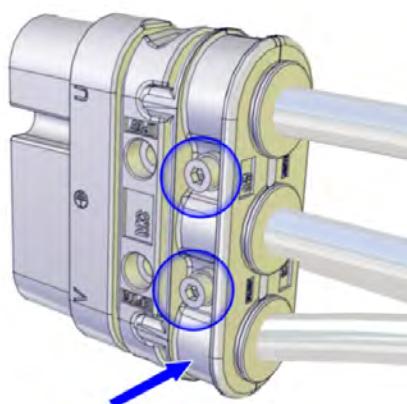
	Action	Note
8	Open the <i>strap</i> at the mounting plate axis 3.	 xx1200000057
9	Disconnect <i>hose and cable connectors</i> on the connection plate axis 3 proc.	 xx1200000059
10	Remove the two M5 screws securing the <i>weld connector</i> to the connection plate and unplug the <i>weld connector</i> .	 xx1200000075

Continues on next page

4 Repair

4.2.9 Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID)

Continued

Action	Note
11 Remove the <i>cable strain relief</i> from the weld connector.	 xx1200000058 Attachment screws: M5x25 quality 8.8-A2F (2 pcs)
12 Unplug the connectors in the <i>weld connector</i> .	
13 Pull out the <i>cable package</i> through the hole in the upper arm tube. This is best done following this order: 1. Welding cables 2. Hoses 3. Remaining cables	 Tip This procedure is best done by two persons working together - one pushing the cable package into the tube and one pulling it out at the back of the robot.

Refitting the cable package - IRBDP SW6 LE and IRBDP MH6 LE

Use this procedure to refit the cable package IRBDP SW6 LE and IRBDP MH6 LE.

Action	Note
1 How to fit the cable package IRBDP SW6 LE and IRBDP MH6 LE, see section Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID on page 149 .	

Refitting the cable package - IRBDP SW6 UI and IRBDP MH6 UI

Use this procedure to refit the cable packages IRBDP SW6 UI and IRBDP MH6 UI.

Action	Note
1 How to fit the cable package IRBDP SW6 UI and IRBDP MH6 UI, is described in section Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID on page 149 .	

4.2.10 Replacement of tension arm unit

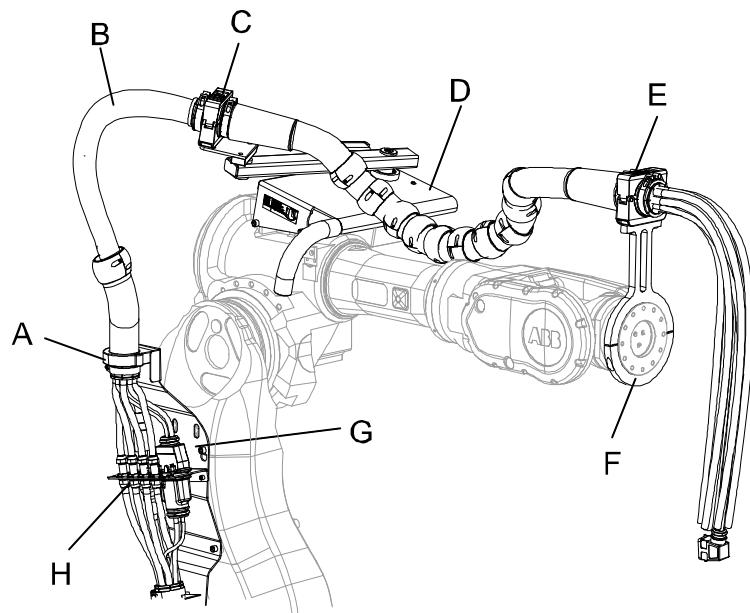


Note

This section is not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI.

Location of tension arm unit

The tension arm is located as shown in the figure.



xx0500001490

A	Gripping clamp (lower arm)
B	Process cable package, upper arm
C	Ball joint housing (tension arm unit)
D	Tension arm unit
E	Ball joint housing (process cable support axis 6)
F	Process cable support axis 6, complete
G	Lower arm plate
H	Connection plate

Required equipment

Equipment	Spare part no.	Art. no.	Note
Standard Toolkit, DressPack/SpotPack		3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
Tension arm unit	3HAC022307-001		
Locking liquid		3HAB7116-1	Loctite 243

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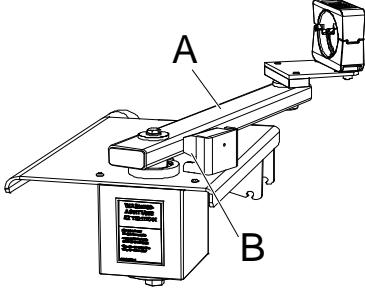
4 Repair

4.2.10 Replacement of tension arm unit

Continued

Procedure

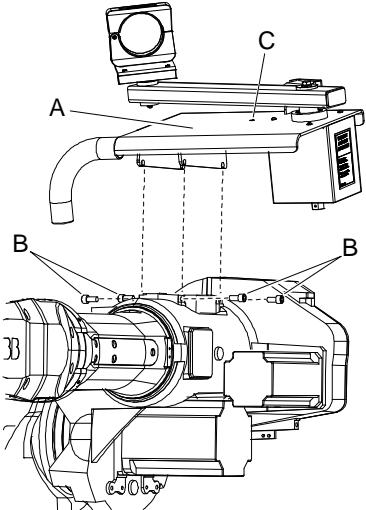
The procedure below details how to replace the tension arm unit.

Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none">• electric power supply• hydraulic pressure supply• air pressure supply to the robot, before entering the robot working area.	
2  CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
3  WARNING The spring inside the tension unit is under tension! Never disassemble the unit! Always exercise care when working with the tension arm unit!	
4  WARNING In order to avoid accidents place the robot arm in a service position (upper arm slightly upwards) with the <i>tension arm</i> resting against the <i>damper</i> .	 xx0500001794 Parts: <ul style="list-style-type: none">• A: Tension arm• B: Damper
5 Remove the cable package from the ball joint housing on the tension arm unit.	Detailed in section, Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245

Continues on next page

4.2.10 Replacement of tension arm unit

Continued

	Action	Note
6	<p>Loosen the <i>attachment screws</i> M12x25 quality 8.8-A3F (4 pcs) holding the <i>tension arm unit</i>. Use the Ø 10.2 mm hole to attach a lifting accessory, for example a 10 mm lifting eye with a nut.</p>	 <p>xx0500001433</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Tension arm unit • B: Attachment screws (4 pcs) • C: Ø10.2 mm hole
7	Replace the <i>tension arm unit</i> , and tighten the four <i>attachment screws</i> . Lock screws with locking liquid.	Art. no. is specified in Required equipment on page 291 .
8	Refit the cable package.	Detailed in section, Fitting the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 118

4 Repair

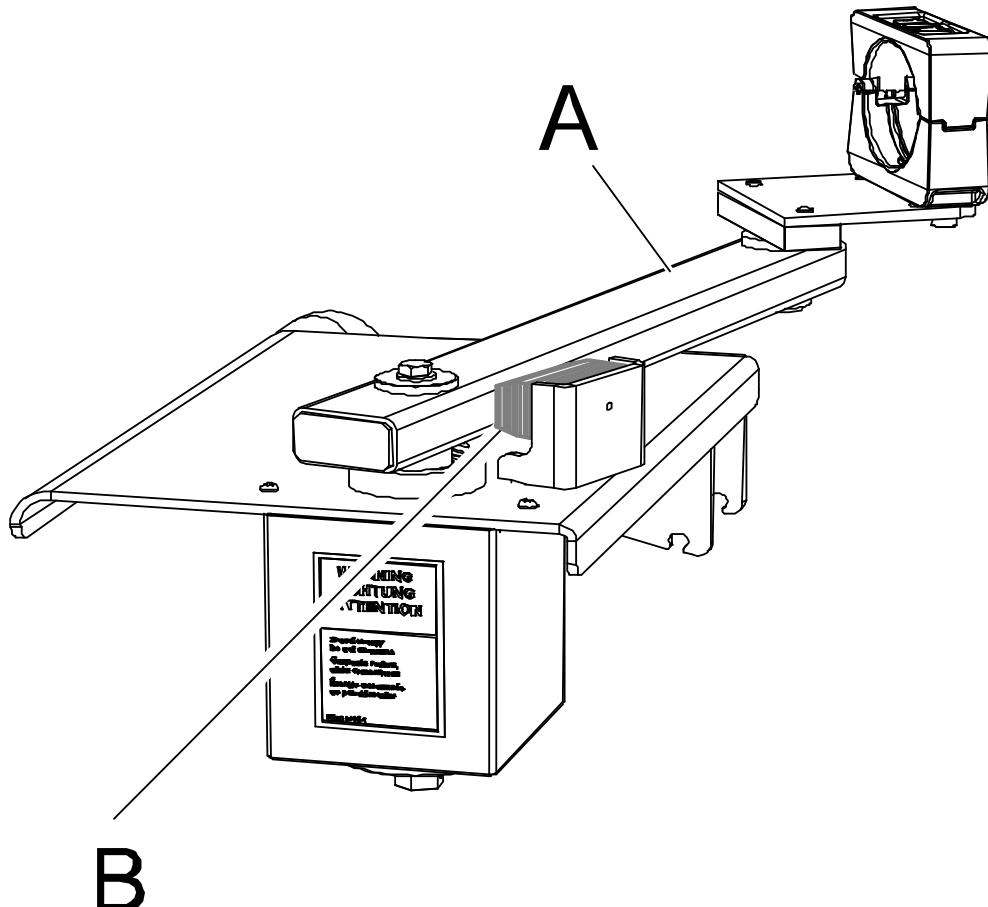
4.2.11 Replacement of damper

Note

This section is not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI.

Location

The damper is located as shown in the figure below.



xx0700000318

A	Arm of tension arm unit
B	Damper

Required equipment

Equipment, etc.	Art. no.	Note
Damper	3HAC022307-048	
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .

Continues on next page

Equipment, etc.	Art. no.	Note
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.

Removal

The procedure below details how to remove the damper.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	Pull the arm of the tension arm unit forward by hand to access the damper.	Shown in the figure in section Location on page 294 .
3	Remove the damper by unscrewing the locking nut beneath the damper.	

Refitting

The procedure below details how to refit the damper.

	Action	Note
1	Pull the arm of the tension arm unit forwards by hand, to access the damper.	Shown in the figure in section Location on page 294 .
2	Fit the damper and secure it with its securing nut beneath the damper.	

4 Repair

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm

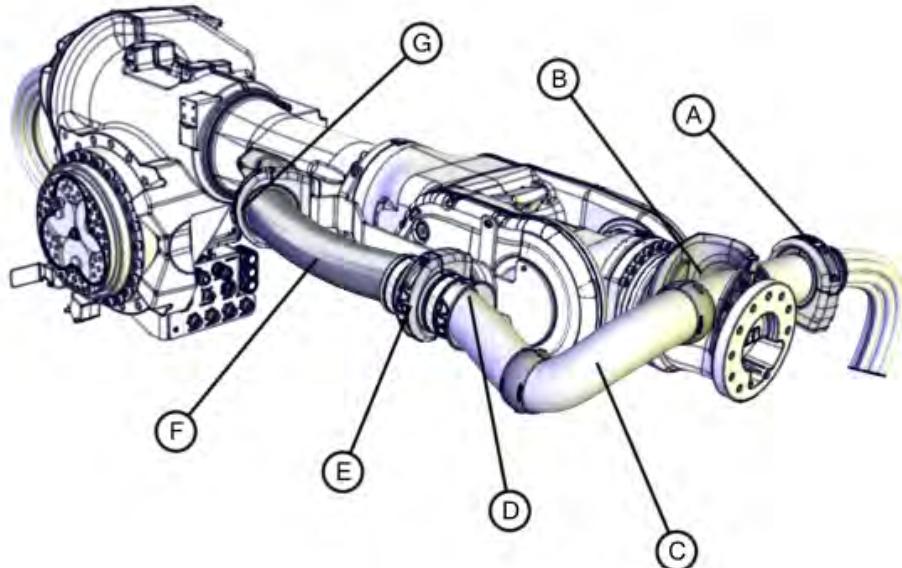
Location of protection hose, upper arm

The protection hose, upper arm is located as shown in the figure.



Note

The protection hose on the upper arm is fitted on the robot in two parts. The division point is placed at the position of the reinforcement funnel.



xx1200000101

A	Ball joint housing (hose clamp, clamp jaw & cable and hose retainer placed inside)
B	Axis 6 cable support
C	Front part of the protection hose
D	Hose reinforcement funnel fitted with hose clamps (middle jaws placed inside)
E	Ball joint housing
F	Inner part of the protection hose
G	Ball joint housing (hose clamp, clamp jaw & cable and hose retainer placed inside)

Required equipment

Equipment, etc.	Art. no.	Note
Protection hose, upper arm front part (1500 mm) Protection hose, upper arm back part (500 mm)	For spare part number see chapter: • Spare parts on page 355 .	Note The spare part is delivered per meters only!

Continues on next page

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm
Continued

Equipment, etc.	Art. no.	Note
Cable grease	3HAC14807-1	Optitemp RB 1
Standard toolkit	-	Content is defined in section Standard toolkit on page 351 .
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.

Removing step 1 - Cable package from the upper arm

Use this procedure to remove the cable package from the upper arm.

 Note
Do not open the ball joint housing on the upper arm tube at this point! It will be easier to remove the front end of the protection hose if the cable package still is fitted to that ball joint housing.

	Action	Note
1	Move the robot to a comfortable working position.	
2	 DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.  DANGER Turn off all electric power, hydraulic and pneumatic pressure supplies to the robot and for the track motion.	
3	Remove the cable package from the upper arm.	See Replacing the cable package IRBDP SW6 UI/LE & IRBDP MH6 UI/LE (Lean ID) on page 281
4	Put some clean plastic, paper or similar on the floor, big enough to keep the cable package from any contamination in the continued removal process of the protection hose.	
5	Put the cable package on the floor.	

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4 Repair

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm

Continued

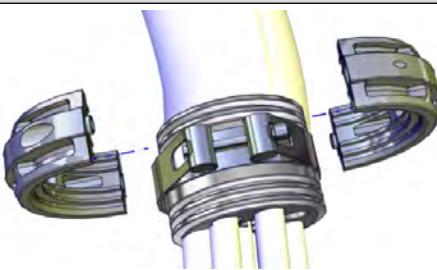
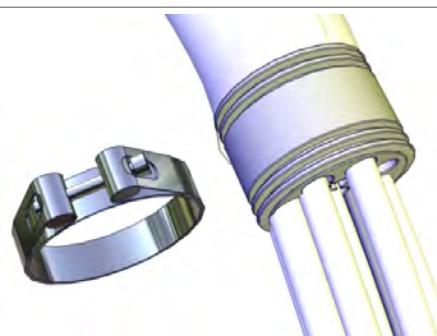
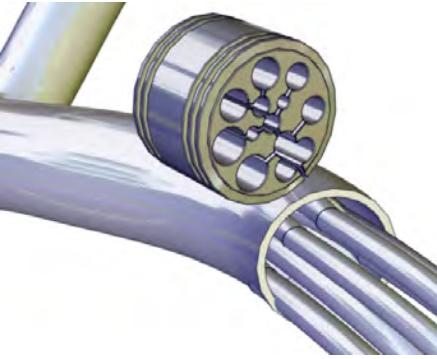
Removing step 2 - Cable and hose retainer (wrist) & hose reinforcement funnel

Use this procedure to remove the cable and hose retainer (wrist) and the hose reinforcement funnel.



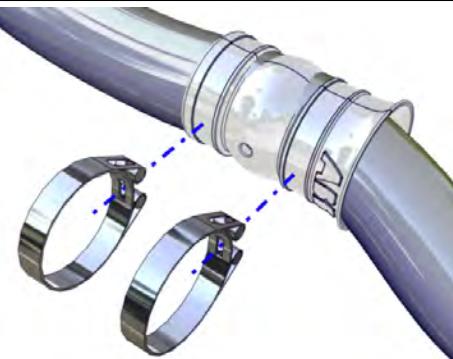
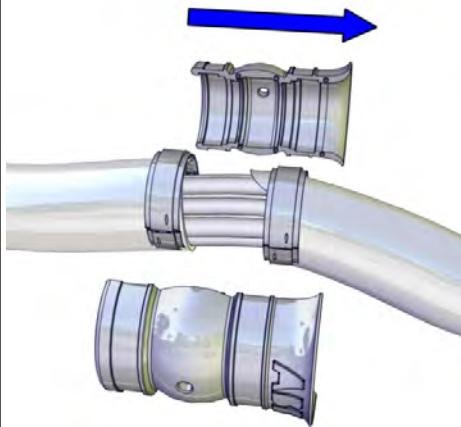
Note

Let the cable package stay fitted in the ball joint housing on the upper arm tube during this procedure.

Action	Note
1 Remove the <i>clamp jaw</i> closest to the wrist.	 xx1200000102
2 Remove the <i>hose clamp</i> securing the cable and hose retainer.	 xx1200000159
3 Remove the <i>cable and hose retainer</i> .	 xx1200000103

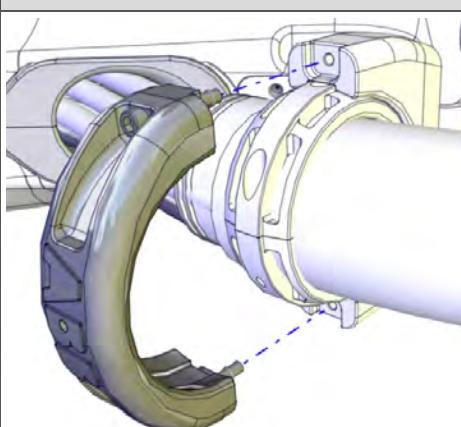
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4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm Continued

	Action	Note
4	Remove the <i>hose clamps</i> (2 pcs) securing the <i>hose reinforcement funnel</i> .	 xx1200000104
5	Remove the <i>hose reinforcement funnel</i> (two parts).  Note The protection hose does not cover the area shown by the arrow in the figure. The protection hose is delivered in two parts - a front end and a back end.	 xx1200000105
6	Pull carefully out cables and hoses and remove the front part of the <i>protection hose</i> .	Best performed in this order: 1 Cables with the smallest connectors 2 Hoses 3 Cables with the biggest connectors.

Removing step 3 - Cable and hose retainer (upper arm tube)

Use this procedure to remove the cable and hose retainer at the upper arm tube.

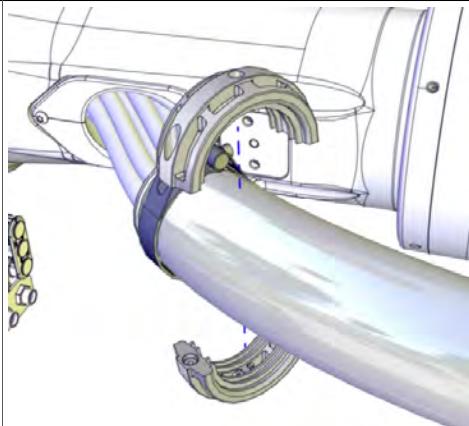
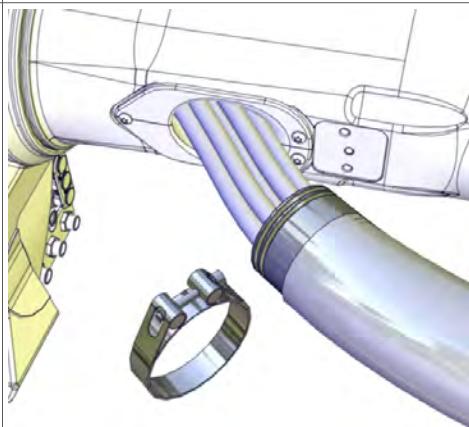
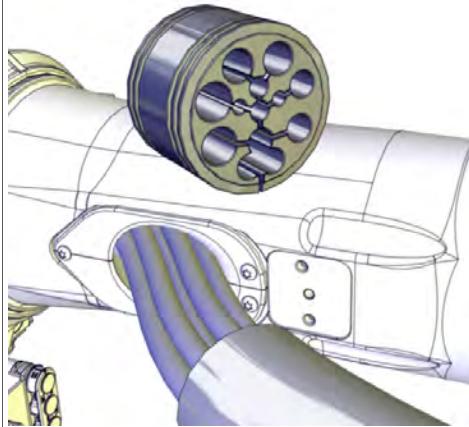
	Action	Note
1	Open the <i>ball joint housing</i> at the upper arm tube.	 xx120000061

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4 Repair

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm

Continued

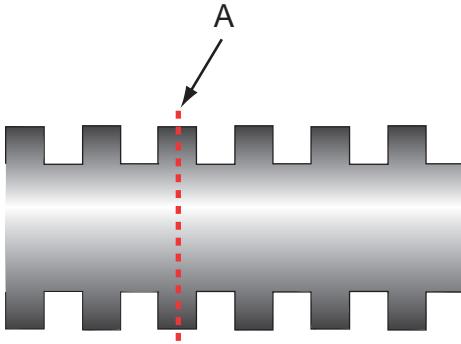
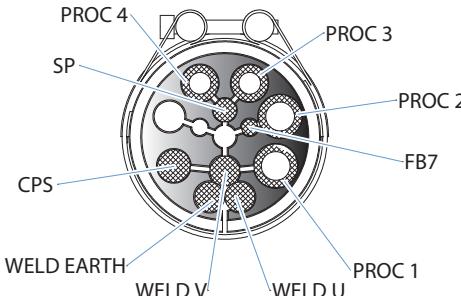
Action	Note
2 Remove the <i>clamp jaw</i> .	 xx1200000110
3 Open the <i>hose clamps</i> securing the cable and hose retainer.	 xx1200000160
4 Remove the <i>cable and hose retainer</i> .	 xx1200000161
5 Pull carefully out cables and hoses and remove the back part of the <i>protection hose</i> .	Best performed in this order: 1 Cables with the smallest connectors 2 Hoses 3 Cables with the biggest connectors.

Continues on next page

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm Continued

Refitting step 1 - Cable and hose retainer (upper arm tube)

Use this procedure to refit the clamp jaw and ball joint housing at the upper arm tube.

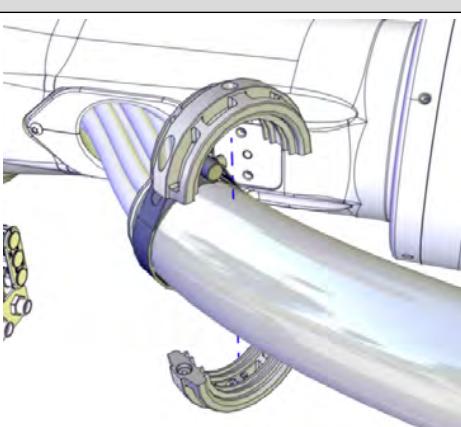
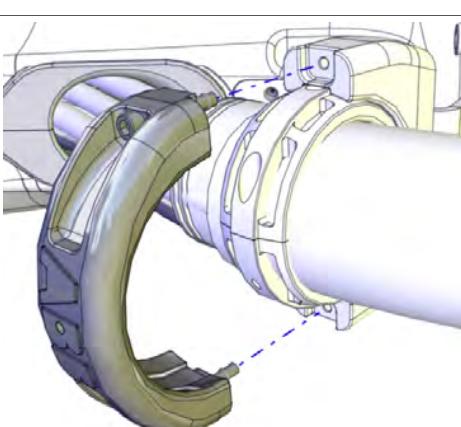
Action	Note
1  DANGER Turn off all: <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2 Cut the new protection hose (for the back end) to the length required.  Note Place the cut on top of a ridge. See A in the figure!	 xx0300000061 Back end: 500 mm
3 Put some <i>cable grease</i> on cables and hoses on the area where they run through the protection hose and hose reinforcement funnel.	
4 Push carefully in <i>cables and hoses</i> into the protection hose.	Best performed in this order: 1 Cables with the biggest connectors 2 Hoses 3 Cables with the smallest connectors.
5 Fit the <i>cable and hose retainer</i> .	
6 Arrange the cables and hoses and put them in their position in the cable and hose retainer.	 xx1200000106 This is an example showing the Paracom cable harness. If in doubt check the positions on a cable and hose retainer that still is fitted.
7 Secure the cable and hose retainer with the <i>hose clamp</i> .	

Continues on next page

4 Repair

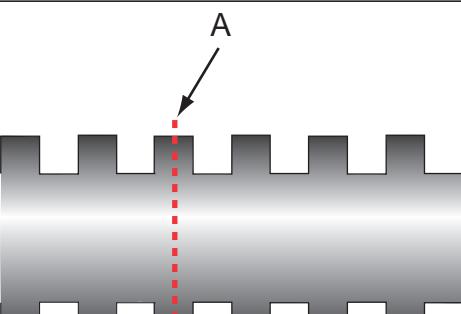
4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm

Continued

Action	Note
8 Fit the <i>clamp jaw</i> .	 xx1200000110
9 Lift the cable package up and put the <i>clamp jaw</i> in the ball joint housing.	
10 Fit the upper part of the <i>ball joint housing</i> .	 xx1200000061

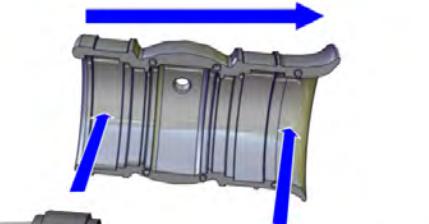
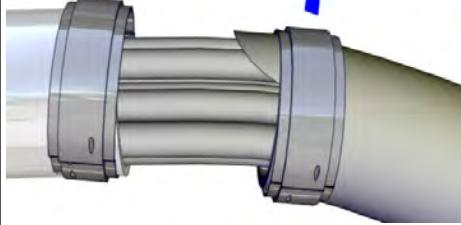
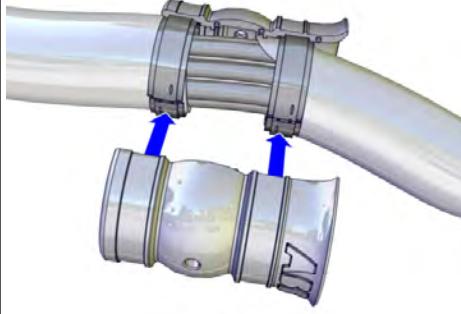
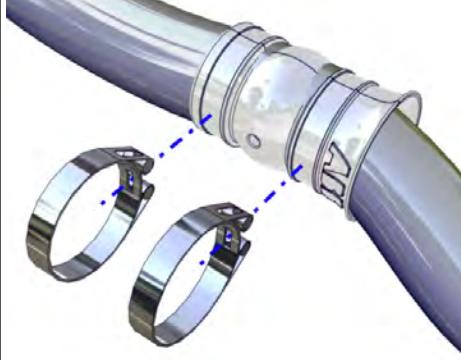
Refitting step 2 - Hose reinforcement funnel

Use this procedure to fit the hose reinforcement funnel.

Action	Note
1 Cut the new protection hose (for the front end) to the length required. Note Place the cut on top of a ridge. See A in the figure!	 xx0300000061

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4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm
Continued

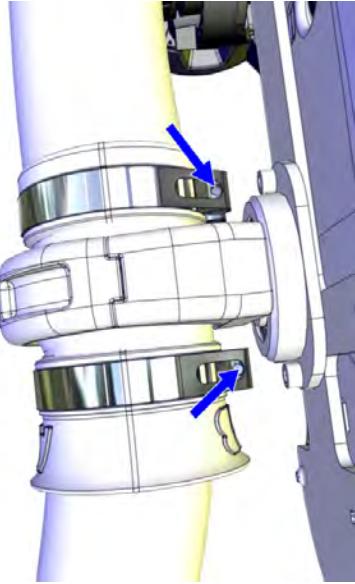
Action	Note
2 Push carefully in <i>cables and hoses</i> into the part of the protection hose.	Best performed in this order: 1 Cables with the biggest connectors 2 Hoses 3 Cables with the smalles connectors.
3 Fit the <i>middle jaws</i> in one of the hose reinforcement funnel halves.  Note The side of the hose reinforcement funnel which has the bigger diameter shall be turned towards the wrist.	  xx1200000111
4 Fit the other half and secure the <i>hose reinforcement funnel</i> with the <i>hose clamps</i> .	 xx1200000113
5 Secure the hose reinforcement funnel with the <i>hose clamps</i> .	 xx1200000104

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4 Repair

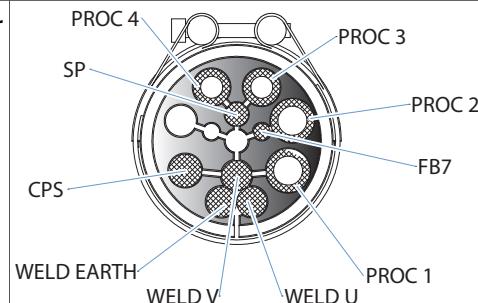
4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm

Continued

Action	Note
<p>6 Check that the screws on the hose clamps are fitted in the correct position.</p> <p>Note</p> <p>Do not place the screws on the outside of the hose reinforcement funnel!</p> <p>On top, below or (as shown in the figure) on the inside are all correct placement of the screws.</p>	 xx1200000112

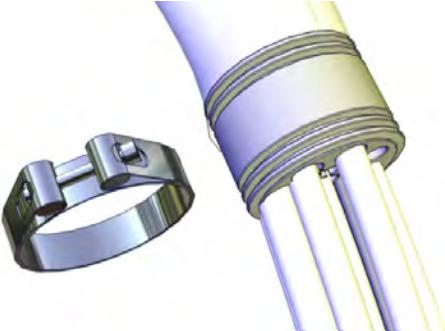
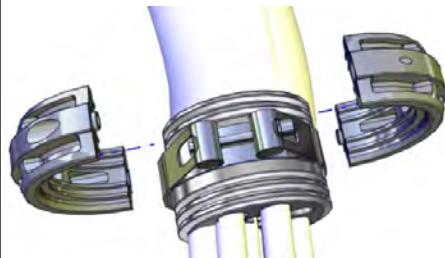
Refitting step 3 - Cable and hose retainer (wrist)

Use this procedure to fit the clamp jaw (wrist).

Action	Note
<p>1 Arrange cable and hoses according to their position in the cable and hose retainer.</p>	 xx1200000106

Continues on next page

4.2.12 Replacing the protection hose - IRBDP SW6 UI and MH6 UI - Upper arm
Continued

Action	Note
2 Secure the cable and hose retainer with the <i>hose clamp</i> .	 xx1200000159
3 Fit the <i>clamp jaw</i> .	 xx1200000102

Refitting step 4 - Cable package

Use this procedure to refit the cable package.

Action	Note
1 Refit the cable package on the upper arm.	<i>Fitting the cable package IRBDP SW6 & MH6 UI/LE, Lean ID on page 149</i>
2  DANGER Make sure all safety requirements are met when performing the first test run. These are further detailed in the section <i>DANGER - First test run may cause injury or damage! on page 53</i> .	

4 Repair

4.2.13 Replacement of protective sleeves

Note

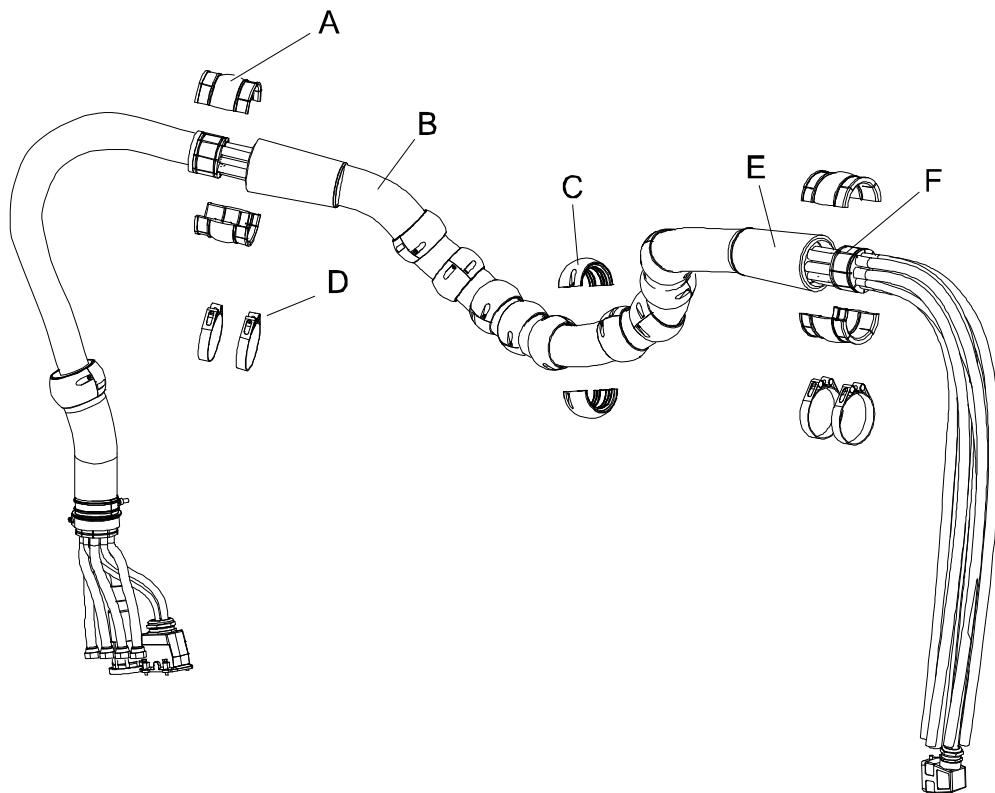
Not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI!

Note

Protective sleeves are not fitted at delivery!

Location of protective sleeve

The protective sleeves are located as shown in the figure below.



xx0500001549

A	Sliding sleeve
B	Protective hose
C	Protective sleeve
D	Hose clamp
E	Hose reinforcement
F	Rubber retainer
G	Cable star
H	Clamp jaw

Continues on next page

Required equipment

The following equipment are required for replacement of protective sleeves.

Equipment	Art. no.	Note
Protective sleeve		For spare part number see: • Spare parts on page 355 . For spare part number see chapter Spare parts for cable package on page 364
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
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.

Procedures

The procedure below details how to change or move the protective sleeves.

	Action	Note
1	 DANGER Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	

Continues on next page

4 Repair

4.2.13 Replacement of protective sleeves

Continued

Action	Note
3 Remove the two attachment screws.	 xx0500001551 <p>Parts:</p> <ul style="list-style-type: none"> • A: Protective sleeve • B: Protective hose • C: Attachment screw (2 pcs)
4 Split the protective sleeve.	 xx0500001550 <p>Parts:</p> <ul style="list-style-type: none"> • A: Protective sleeve • B: Protective hose
5 Replace or move the protective sleeve.	
6  Note	<p>When moving or adding protective sleeves, always leave a space between them (approximately the width of one slide sleeve).</p>
7 Attach the two attachment screws.	

4.2.14 Repair of process cable package



Note

Not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI!

General

This section details how to disassemble the DressPack cable package. 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.

All work detailed in the procedure below is to be performed on a workbench. How to remove the DressPack from the robot is described in one or more of the sections listed below depending on which cable package is used:

- [*Replacing the cable packages IRBDP MH2 LE and SW2 LE on page 239*](#)
- [*Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245*](#)
- [*Replacement of lower/upper arm cable package on page 248*](#)
- [*Replacement of lower arm internal MH dressing cable package IRBDP MH1 LI on page 251*](#)
- [*Replacing the cable package IRBDP MH3 UE on page 255*](#)
- [*Replacement process cable package IRBDP SW4 UI \(IRB66X0ID\) on page 263*](#)

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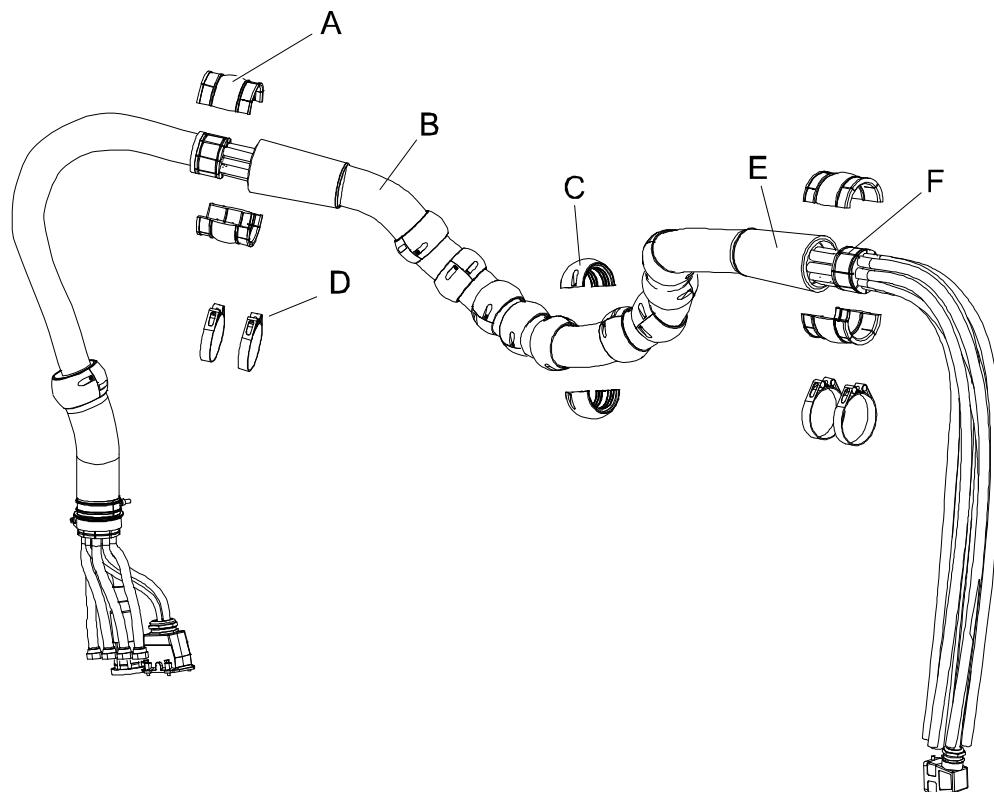
4 Repair

4.2.14 Repair of process cable package

Continued

Upper arm cable package parts

The upper arm cable package consists of the parts described in the figure below.



xx0500001549

A	Sliding sleeve
B	Protective hose
C	Protective sleeve
D	Hose clamp
E	Hose reinforcement
F	Rubber retainer
G	Cable star
H	Clamp jaw

Required equipment

Equipment, etc.	Art. no.	Note
Standard Toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351</i> .
Toolkit cables		The contents are defined in section <i>Toolkit cables</i> .
Other tools and procedures may be required. See refer- ences to these procedures in the step-by-step instructions below.		These procedures include references to the tools required.

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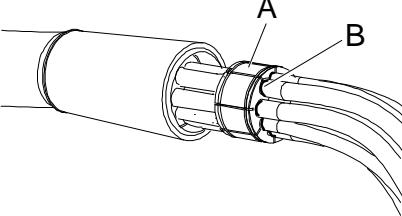
4.2.14 Repair of process cable package

Continued

Equipment, etc.	Art. no.	Note
Cable grease	3HAC14807-1	Optitemp RB2
Protective plastic	-	To protect the connector pins during disassembly.
Circuit diagram	3HAC026209-001	

Disassembly

The procedure below details how to disassemble the DressPack cable package.

	Action	Note
1	 CAUTION The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
2	Remove the connectors in the tool end.	Use recommended removal tool. Detailed in section <i>Toolkit cables</i> .
3	Put plastic film over the pins and tighten with reinforced tape.	
4	Mark the position for <i>rubber retainer</i> on cables and hoses with <i>reinforced tape</i> .	 xx0500001558 Parts: <ul style="list-style-type: none"> A: Rubber retainer B: Reinforced tape
5	Fittings might need to be cut to get the package out from protection hose.	
6	Open up the hose clamps in both ends and disassembled slide sleeves.	Shown in the figure, Upper arm cable package parts on page 310
7	Remove the <i>rubber retainer</i> at tool end.	Shown in the figure, Upper arm cable package parts on page 310
8	Slip cables and hoses through protection hose.	
9	Rotate package if stuck. • Avoid putting stress to signal cable.	
10	If tight: 1 pull out the hoses one by one 2 pull out the power cable 3 pull out the signal cables.	
11	Clean cable and hoses from grease.	

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4 Repair

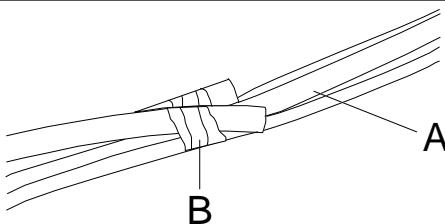
4.2.14 Repair of process cable package

Continued

	Action	Note
12	<p>Check carefully if cable and hoses is damaged.</p> <ul style="list-style-type: none">• Change if required.• Normally, protection hose and hose reinforcement changed at the same time	

Refitting

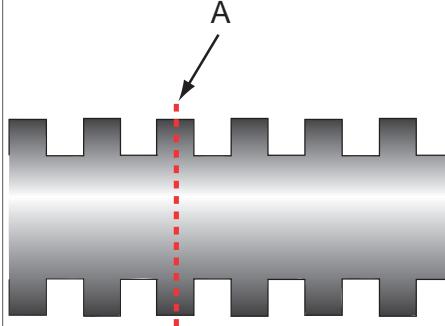
The procedure below details how to refit the DressPack upper arm cable package.

	Action	Note
1	<p> CAUTION</p> <p>The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.</p>	
2	Do not twist hoses and cables inside the protective hose.	
3	Measure and mark proper position for front and rear rubber retainer with reinforced tape.	
4	Assemble rear rubber retainer. <ul style="list-style-type: none">• Check the individual order related to the rubber retainer and between the different parts.	
5	<p> Note</p> <p>Put the reinforced tape at parts that will end outside the protective hose.</p>	 <p>xx0500001559</p> <p>Parts:</p> <ul style="list-style-type: none">• A: Cables and hoses• B: Reinforced tape
6	<p> Note</p> <p>Do not apply grease closer than the 100 mm from cable and rubber retainers, and it is very important that grease is not present on the hoses and cable inside the rubber retainer.</p>	
7	Put cables and hoses on a flat and clean surface.	
8	Straighten weld cable, signal cables and hoses.	

Continues on next page

4.2.14 Repair of process cable package

Continued

Action	Note
9 Inspect the protective hose to make sure its ends has been correctly cut.	 xx0300000061 <p>Parts:</p> <ul style="list-style-type: none"> A: Place where to cut the protective hose (on top of a ridge).
10 Fit <i>hose reinforcement</i> to protective hose.	See Upper arm cable package parts on page 310
11 Slip cables and hoses inside protective hose.	<p> Note</p> <p>Keep cables and hoses straight during assembly, and not lose orientation relative each other during assembly.</p>
12 Assemble rubber retainer at the tools side with the same orientation as the rear one.	
13 Remove reinforced tape when slide sleeves are assembled.	
14 Straighten package well and double-check measurements.	<p> Note</p> <p>Protective hose should be measured in released mode and not after being stretched.</p>
15 Assemble front rubber retainer. <ul style="list-style-type: none"> Open up front rubber retainer on the tool side and push signal cables back 50 mm into the protection hose. 	<p> Note</p> <p>The weld cable should not be pushed in the protective hose. Rubber retainers in combination with hoses and weld cable should take the “pulling forces” within the process cable package. The forces should not be transferred to the signal cables.</p>
16 Fit the slide sleeves.	See Replacement of slide sleeves on page 323.

Continues on next page

4 Repair

4.2.14 Repair of process cable package

Continued

	Action	Note
17	 CAUTION Verify that hoses can withstand 500 N static load without leading to any motion between hoses and rubber retainer relative.	
18	Remove plastic film at the tool end (avoid grease on the pins) and assemble the connectors	Use recommended insertion tool, see <i>Toolkit cables</i> .
19	Check that all cables are connected according to circuit diagram and use the proper tools	See <i>Toolkits, DressPack/SpotPack on page 351</i>
20	Check that the strain relief for the cables are correct.	
21	Mount the fittings on the hoses and double check for leakage.	
22	If protective sleeves has been fitted, refit them at the same position as before.	
23	The package is ready for assembly on the robot.	

4.2.15 Adjusting tension arm unit

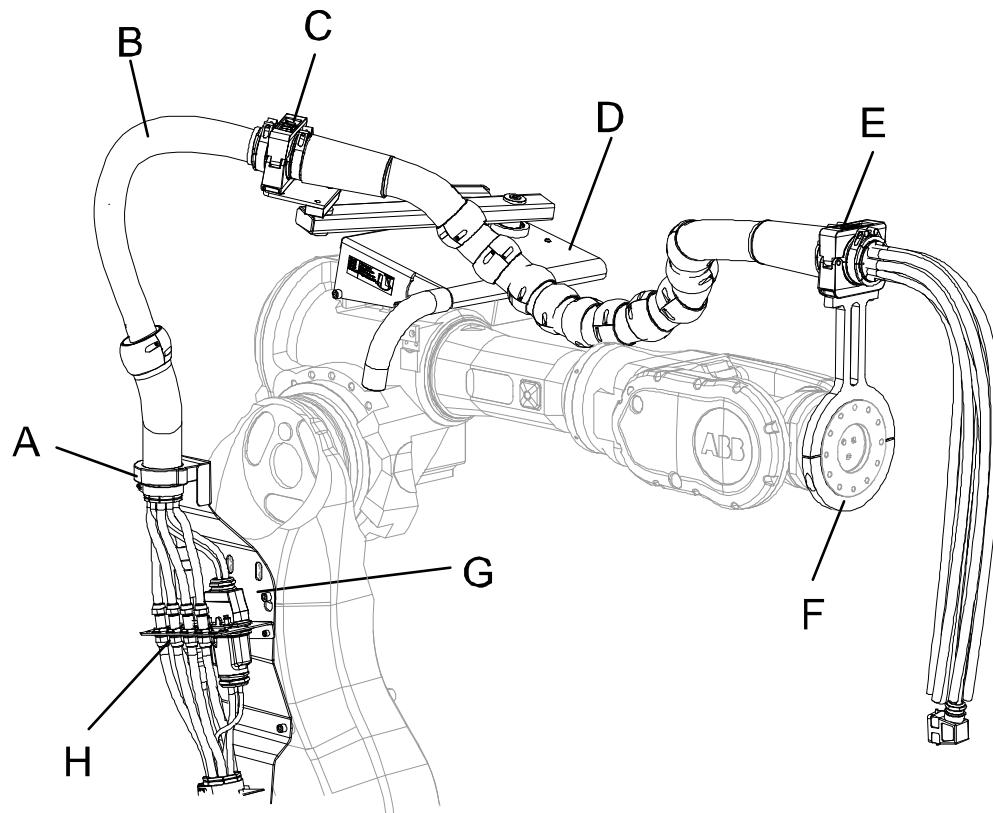


Note

This section is not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI.

Location of tension arm unit

This section describes how to adjust the tension arm unit.



xx0500001490

A	Gripping clamp (lower arm)
B	Process cable package, upper arm
C	Ball joint housing (tension arm unit)
D	Tension arm unit
E	Ball joint housing (process cable support axis 6)
F	Process cable support axis 6, complete
G	Lower arm plate
H	Connection plate

General

Spring tension has influence on lifetime of the upper arm harness and shall not be higher than necessary.

Continues on next page

4 Repair

4.2.15 Adjusting tension arm unit

Continued

Tension is optimized for normal length of upper arm harness working vertically.

- The arm of the tension unit shall "float" a little when the robot is moving.
Short upper arm harness for working horizontally may need less tension.
Long upper arm harness on shelf mounted robots may need a higher tension.

Required equipment

Equipment	Note
Standard tool kit DressPack/SpotPack	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .

Adjustment values

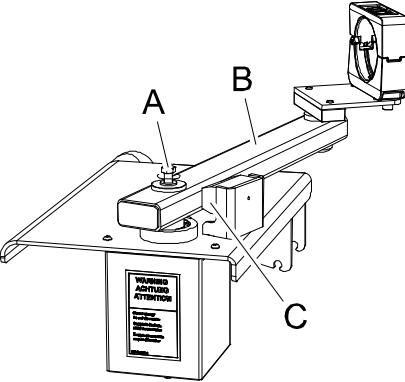
At delivery all tension arm are pre-tensioned 3/4 of a turn.

Spring force must be adjusted to fit valid cycle. Approximate values:

- Spot welding ~ 3/4 turn
- Material Handling~ 1/2 - 3/4 turn

Procedures

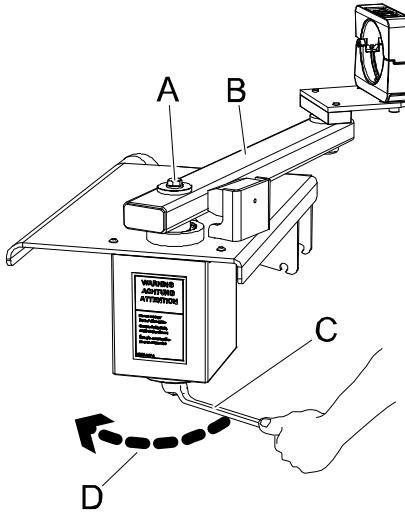
The procedure below details how to adjust the tension arm unit spring.

	Action	Note
1	 DANGER Turn off all: <ul style="list-style-type: none">electric power supplyhydraulic pressure supplyair pressure supply to the robot, before entering the robot working area.	
2	 WARNING In order to avoid accidents place the robot in a service position (upper arm slightly upwards) with the <i>tension arm</i> resting against the <i>damper</i> .	 <p>xx0500001503</p> <ul style="list-style-type: none">A: Upper screw M12B: Tension armC: Damper
3	Loosen the <i>upper screw</i> (<i>M12</i>), with a 18 mm standard wrench approximately 10-15 mm.	

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4.2.15 Adjusting tension arm unit

Continued

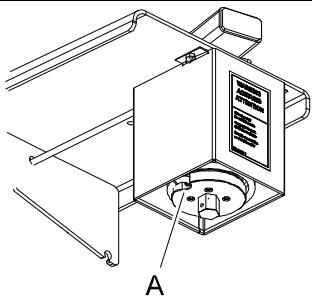
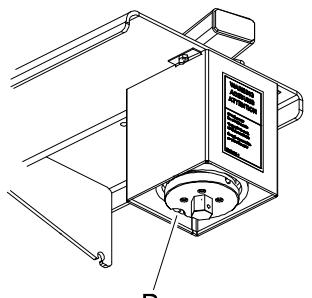
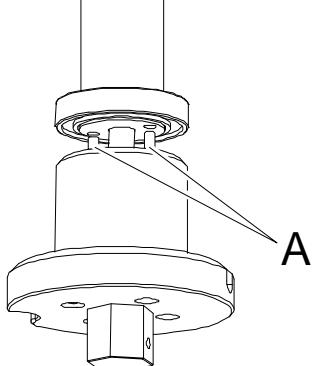
Action	Note
4  Tip The next step is best performed by two persons working together.	
5  Note Release the tension in the spring bolt with a 27 mm <i>standard wrench</i> , while tapping the <i>upper screw</i> with a rubber mallet. Hold the wrench in a firm position as the spring force now will try to rotate the wrench to the left.	 xx0500001504 Parts: <ul style="list-style-type: none"> • A: Upper screw M12 • B: Tension arm • C: Standard wrench (27 mm) • D: Direction in which the spring force will rotate the wrench
6 To <i>increase</i> the force: pull the wrench backward . To <i>decrease</i> the force: push the wrench forward .	

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4 Repair

4.2.15 Adjusting tension arm unit

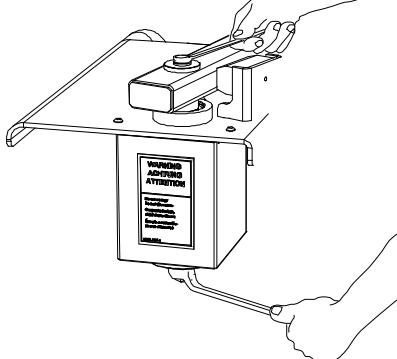
Continued

Action	Note
7 Carefully lower the spring and use the wrench to adjust appropriate spring force.	  xx0500001562 <p>View:</p> <ul style="list-style-type: none"> • A: Showing the spring with no tension • B: Showing the spring with $\frac{3}{4}$ tension (270°).
8 Secure the spring force by lifting up the spring and fit into hole circle. The spring could be set in steps of 1/8 of a turn.	View of inside.  xx0500001509 <ul style="list-style-type: none"> • A: Guide pins
9  Tip The next step is best performed by two persons working together.	

Continues on next page

4.2.15 Adjusting tension arm unit

Continued

	Action	Note
10	Fasten the spring by tightening the upper screw (M12) while holding the spring bolt in a firm position.	 xx0500001507

4 Repair

4.3.1 Replacement of hose reinforcement

4.3 DressPack cable package, general

4.3.1 Replacement of hose reinforcement



Note

This section is not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI.

Overview

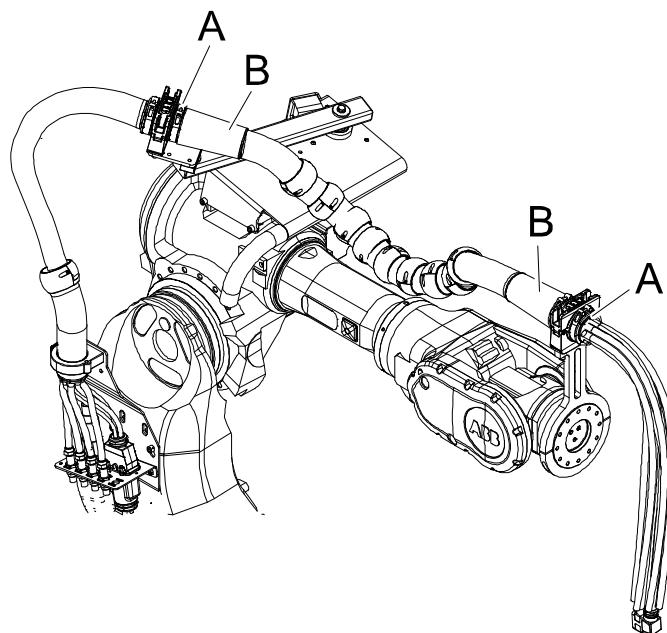
All work detailed below is to be performed on a workbench!

How to remove the DressPack upper arm harness from the robot is detailed in section [Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245](#) or [Replacing the cable package IRBDP SW5 CE \(SpotPack Basic\) on page 259](#).

Location of hose reinforcement

The hose reinforcement is located as shown in the figure below.

Figure shows IRB 6600.



xx0500001533

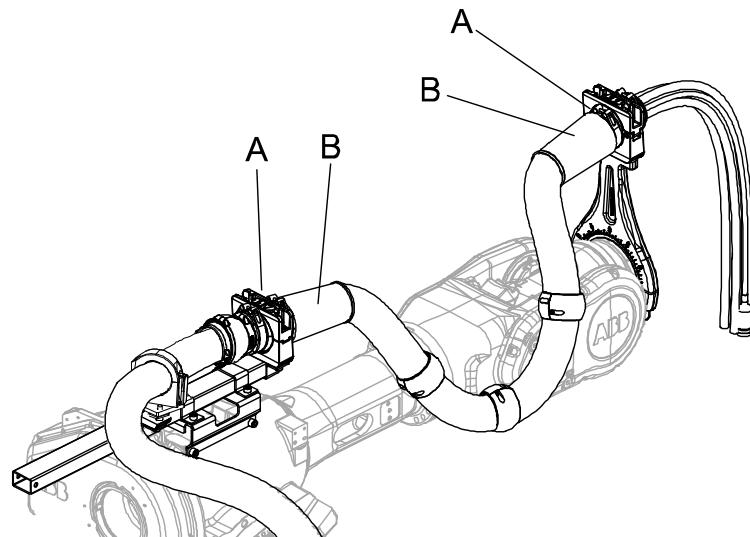
A	Slide sleeves
B	Hose reinforcement

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4.3.1 Replacement of hose reinforcement

Continued

IRBDP SW 5 CE



xx0800000089

A	Slide sleeves
B	Hose reinforcement

Required equipment

Equipment, etc.	Spare part no.	Art. no.	Note
Hose reinforcement	3HAC022194-001		
Standard Toolkit, DressPack/SpotPack		3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack</i> on page 351.
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.

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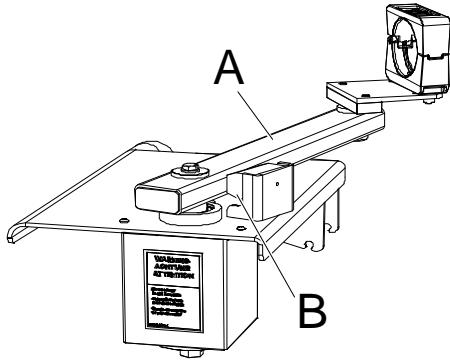
4 Repair

4.3.1 Replacement of hose reinforcement

Continued

Removal

The procedure below details how to remove the hose reinforcement.

Action	Note
1 (Not applicable to cable package IRBDP SW5 CE.)  WARNING The tension arm unit pulls the hose package backwards! Hence, in order to avoid accidents, the robot must be positioned in a way that the arm of the tension arm unit is placed in its rear position. The <i>tension arm</i> must rest on the <i>damper</i> before the disassembly of the upper arm starts!	 xx0500001794 Parts: <ul style="list-style-type: none">• A: Tension arm• B: Damper
2 Perform the procedure for replacement and the first steps of the procedure for repair of the cable package. This will give access to the slide sleeves.	Detailed in section Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245 Detailed in section Replacing the cable package IRBDP SW5 CE (SpotPack Basic) on page 259 . Detailed in section Repair of process cable package on page 309 .
3 Pull the hose reinforcements off the protective hose.	Make sure that the protective hose is not damaged. If the protective hose is damaged, replace it!

Refitting

The procedure below details how to refit the hose reinforcement.

Action	Note
1 Select the hose reinforcement.	Article number is specified in the chapter Spare parts on page 355 .
2 Gently push the hose reinforcement on to the protective hose.	Make sure the hose reinforcement rib align with the slide sleeve on assembly.
3 Perform the last steps of the procedure for repair of the process cable package. The refit the cable package on the robot.	Detailed in section Repair of process cable package on page 309 . Detailed in section Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245 . Detailed in section Replacing the cable package IRBDP SW5 CE (SpotPack Basic) on page 259 .

4.3.2 Replacement of slide sleeves



Note

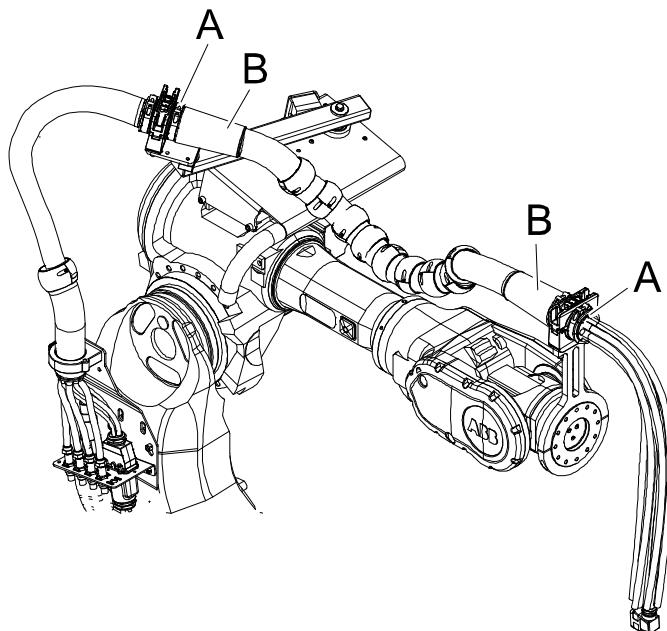
This section is not applicable to cable packages IRBDP SW6 UI and IRBDP MH6 UI.

Location of slide sleeves

The slide sleeves are located as shown in the figure below.

Replacement of slide sleeves is possible to be performed without removing the DressPack from the robot. However replacement may also be performed on a work bench. How to remove the DressPack from the robot is detailed in section [Replacing the cable packages IRBDP MH2 UE and IRBDP SW2 UE on page 245](#) or [Replacing the cable package IRBDP SW5 CE \(SpotPack Basic\) on page 259](#).

Figure shows IRB 6600.



xx0500001533

A	Slide sleeves
B	Hose reinforcement

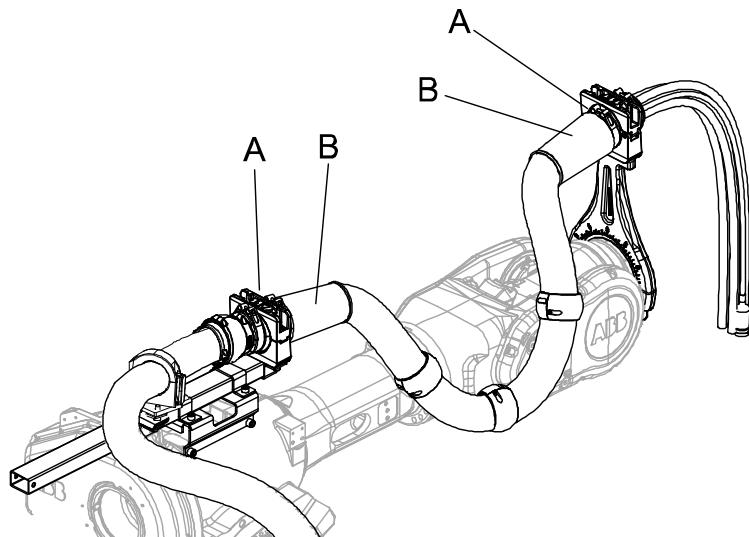
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4 Repair

4.3.2 Replacement of slide sleeves

Continued

IRBDP SW 5 CE



xx0800000089

A	Slide sleeves
B	Hose reinforcement

Required equipment

Equipment, etc.	Art. no.	Note
Slide sleeves	3HAC16208-1	
Standard Toolkit, DressPack/Spot-Pack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
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.

Removal

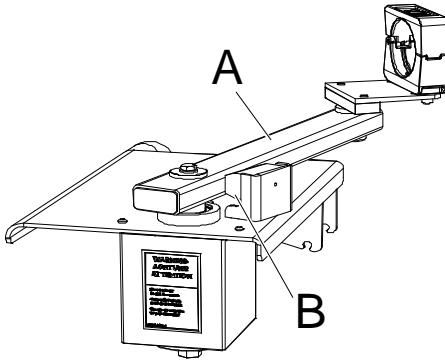
The procedure below details how to remove the slide sleeves.

	Action	Note
1	Move the robot to a position where the upper arm is pointing slightly upwards and the tension arm unit is resting against the damper.	

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4.3.2 Replacement of slide sleeves

Continued

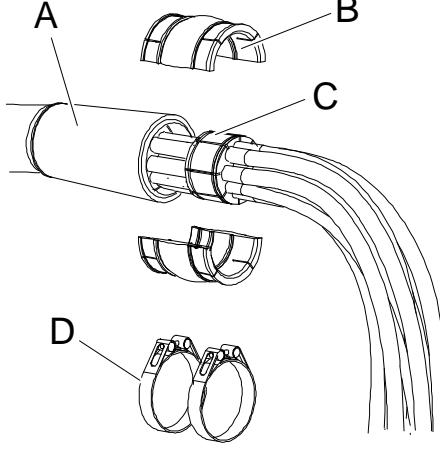
Action	Note
<p>2 (Not applicable to cable package IRBDP SW5 CE.)</p> <p>WARNING</p> <p>The tension arm unit pulls the hose package backwards! Hence, in order to avoid accidents, the robot must be positioned in a way that the arm of the tension arm unit is placed in its rear position.</p> <p>The <i>tension arm</i> must rest on the <i>damper</i> before the disassembly of the upper arm starts!</p>	 <p>xx0500001794</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Tension arm • B: Damper
<p>3 DANGER</p> <p>Turn off all:</p> <ul style="list-style-type: none"> • electric power supply • hydraulic pressure supply • air pressure supply <p>to the robot, before entering the robot working area.</p>	
<p>4 CAUTION</p> <p>The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.</p>	
5 Mark the positions of the rubber grommets on cables and hoses with reinforced tape.	
6 Disconnect all hose and cable connectors.	This is only needed if the work is going to be done on a workbench.
7 Open ball joint housings.	
8 Remove the process cable from the ball joint housings.	

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4 Repair

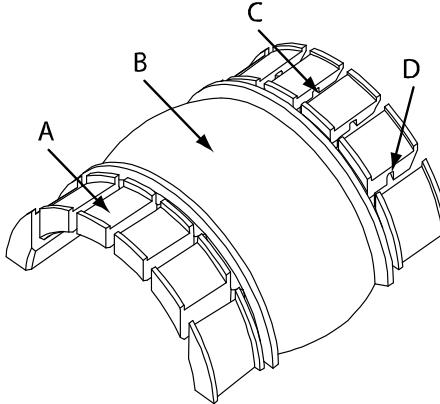
4.3.2 Replacement of slide sleeves

Continued

Action	Note
9 Open the <i>hose clamps</i> .	 <p>xx0500001795</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Hose reinforcement • B: Slide sleeve • C: Rubber grommet • D: Hose clamp
10 Remove and replace the slide sleeves, one at a time.	

Refitting

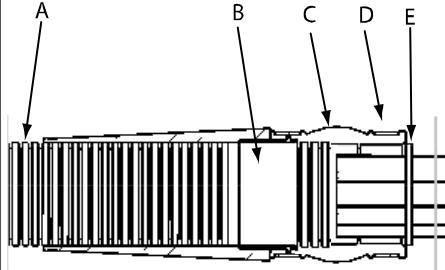
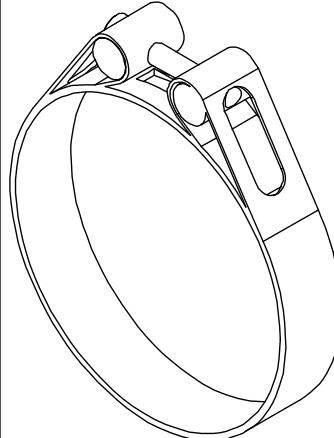
The procedure below details how to refit the slide sleeves.

Action	Note
1 Refit the slide sleeves over the hose reinforcement. Make sure the slide sleeves are turned the right way.	 <p>xx0300000249</p> <p>Parts:</p> <ul style="list-style-type: none"> • A: Hose clamp surface, farthest from the protective hose • B: Slide sleeve slide surface, slightly concave • C: Hose clamp surface, closest to the protective hose • D: Groove for locking the hose reinforcement

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4.3.2 Replacement of slide sleeves

Continued

Action	Note
2 The figure to the right, shows the fitting positions of the <i>slide sleeves</i> on the <i>cable/hose retainer</i> .	<p>The figure shows a cross section of the slide sleeves:</p>  <p>xx0400001007</p> <p>Parts:</p> <ul style="list-style-type: none"> A: Protective hose B: Hose reinforcement C: Slide sleeves D: Hose clamp E: Cable/Hose retainer
3 Secure the slide sleeves with <i>hose clamps</i> . In applications where a large number of cables/hoses are used, aluminum cable clamps may be used, to compress the entire package. The slide sleeves are correctly tightened when a fully tightened aluminum cable clamp (for example on the tension arm unit) and the process cable support axis 6 allows some swivelling.	<p>Make sure both clamps face the same way!</p> <p>Make sure the gaps between the slide sleeve halves are close to identical and <i>do not coincide</i> with the vertical cuts in the hose and cable retainer!</p>  <p>xx0300000250</p> <ul style="list-style-type: none"> Hose clamp
4 Check that the cables and hoses are in the right position.	Use the makings of the reinforced tape done earlier.
5 Refit the cable package in the ball joint housing.	
6 Reconnect cable and hose connectors.	

4 Repair

4.4.1 Replacement of Air supply circuit

4.4 Water & Air unit

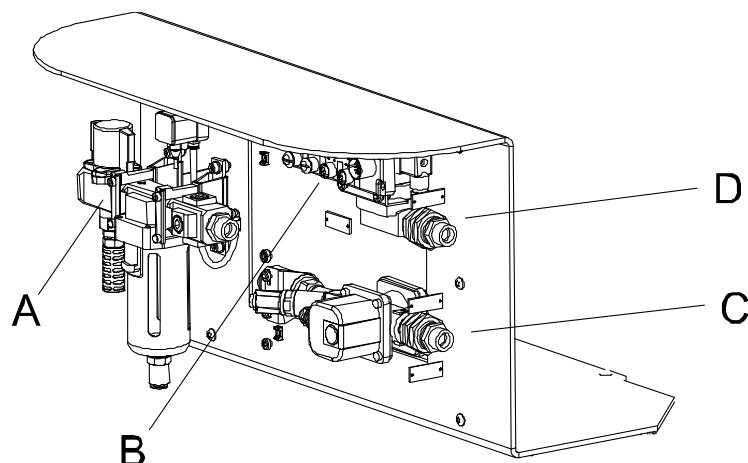
4.4.1 Replacement of Air supply circuit

Location of Air supply circuit, type S

The Air supply circuit is located as shown in the figure below.

There are two versions available of the Air supply circuit - *with* an Electrical Proportional Valve (EP) or *without* one.

The figure shows the Air supply circuit *without* Electrical Proportional valve.



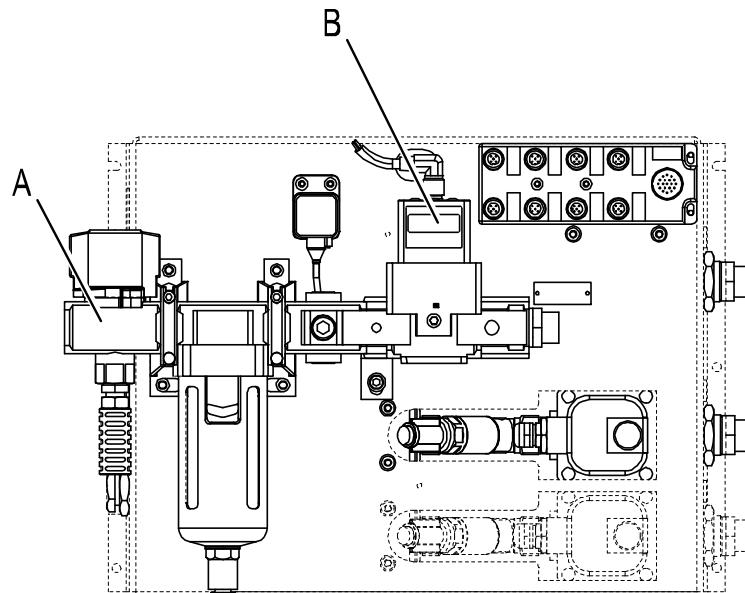
xx0600003293

A	Air supply circuit
B	Split box
C	Water return circuit
D	Water in circuit

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4.4.1 Replacement of Air supply circuit Continued

The figure shows the Air supply circuit *with* an Electrical Proportional valve.



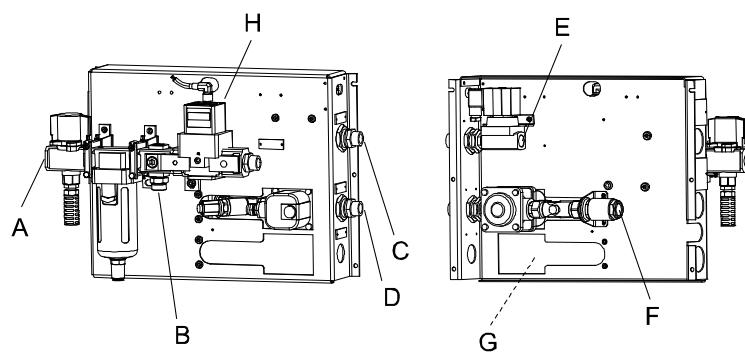
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A	Air supply circuit
B	Electrical Proportional Valve (EP)

Location of Air supply circuit, type Sb

The Air supply circuit is located as shown in the figure below.

There are two versions available of the Air supply circuit - *with* an Electrical Proportional Valve (EP) or *without* one.



xx0800000124

A	Air supply circuit
B	PROC 1 on robot base
C	PROC 2 on robot base
D	PROC 3 on robot base
E	Shop water supply
F	Shop water drain
G	PROC 4 on robot base (option)

Continues on next page

4 Repair

4.4.1 Replacement of Air supply circuit

Continued

H	Electrical Proportional Valve (EP)
---	------------------------------------

Required equipment

Equipment	Art. no.	Note
Water and air unit	See <i>Spare parts</i> .	A number of versions are available. The Water and Air unit assembly contains all required hardware for fitting and connecting.
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351</i> .
Circuit diagram	3HAC026208-001	SpotPack

General precautions



Note

If the water and air unit is equipped with an Electrical proportional valve, the valve retains the set pressure on the output side (temporarily), when power or incoming air is shut off.

Removal

The procedure below details how to remove the Air supply circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see the *Spare parts* section.

	Action	Note
1	CAUTION The system contains compressed air! Observe the safety information in section <i>Safety risks related to pneumatic/hydraulic systems on page 28</i> .	
2	Turn off the hand operated air valve on the air supply circuit.	The air hoses on the robot will be decompressed.
3	With the option Electrical proportional valve: In addition to turning off the hand operated valve on the air supply circuit (see above), <i>the output pressure of the Electrical Proportional valve must be reduced separately</i> either by changing the reference signal to zero first and/or exhausting it with a separate valve. It is also possible to exhaust air pressure by activating attached units to consume any residual pressure.	Note Reducing the pressure of the Electrical Proportional valve by changing the reference signal to zero, must be done <i>before</i> the air supply is turned off since the power supply to the Electrical proportional valve is turned off automatically at insufficient air pressure.
4	Turn off the shop floor air supply to the Water and Air unit.	
5	Remove the hose of the compressed air supply of the workshop.	

Continues on next page

4.4.1 Replacement of Air supply circuit

Continued

Action	Note
6 Remove the Proc 1 hose from the air supply unit.	
7 Remove the Proc 4 hose from the air supply unit.	Only if the option Proportional valve has been selected.
8 Disconnect the pressure switch tube from the Air circuit Cross interface.	
9 Disconnect the pressure switch connector on the split box, according to the circuit diagram.	
10 Disconnect the pressure switch from the mounting plate.	
11 If the option proportional valve is selected, disconnect the proportional valve connectors on the split box according to the circuit diagram.	
12 Unscrew the four attachment screws holding the air supply circuit and remove it.	

Refitting

The procedure below details how to refit the air supply circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see the *Spare parts* section.

Action	Note
1 Fit the air supply circuit with its four attachment screws.	
2 Connect the proportional valve connectors on the split box according to the circuit diagram.	Only if the option Proportional valve has been selected.
3 Connect the pressure switch to the mounting plate.	
4 Connect the pressure switch connector on the split box according to the circuit diagram.	
5 Connect the pressure switch tube from the Air circuit Cross interface.	
6 Connect the Proc 4 hose from the Air supply unit. ! CAUTION Do not tighten the brass couplings for water and air with excessive force.	Only if the option Proportional valve has been selected. Tightening torque, brass couplings 1/2": 31 Nm
7 Connect the Proc 1 hose from the Air supply unit. ! CAUTION Do not tighten the brass couplings for water and air with excessive force.	Tightening torque, brass couplings 1/2": 31 Nm
8 Connect the hose of the compressed air supply of the workshop.	
9 Turn on the air supply to the Water and Air unit.	
10 Turn on the hand operated air valve on the air supply circuit.	The hoses at the robot will be compressed.
11 See if there are any leakages.	Tighten if there is leakage.

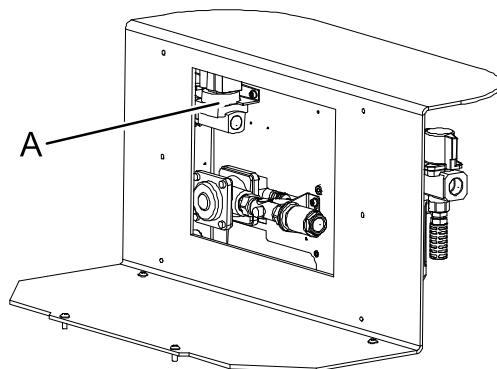
4 Repair

4.4.2 Replacement of Water-in circuit

4.4.2 Replacement of Water-in circuit

Location of Water-in circuit, type S

The water in circuit is located on the rear side of the Water and air unit as shown in the figure.

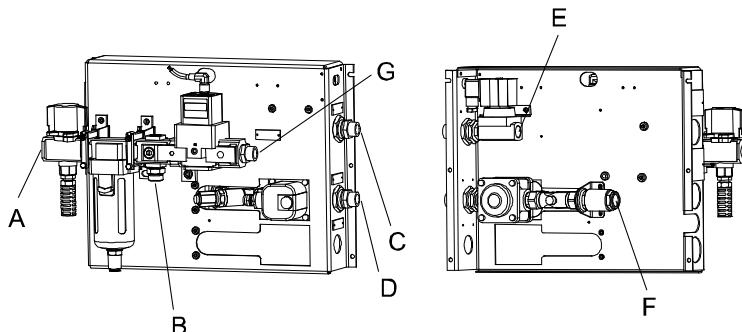


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A	Water-in circuit
---	------------------

Location of Water-in circuit, type Sb

The water in circuit is located on the rear side of the Water and air unit as shown in the figure.



xx0800000122

A	Air supply circuit
B	PROC 1 on robot base
C	PROC 2 on robot base
D	PROC 3 on robot base
E	Water-in circuit
F	Water drain
G	PROC 4 on robot base (option)

Continues on next page

Required equipment

Equipment	Art. no.	Note
Water and Air unit	See <i>Spare parts section!</i>	A number of versions are available. The Water and Air unit assembly contains all required hardware for fitting and connecting.
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section <i>Toolkits, DressPack/SpotPack on page 351.</i>
Circuit diagram	3HAC026208-001	SpotPack

Removal

The procedure below details how to remove the water-in circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see the *Spare parts* section.

	Action	Note
1	Turn off the water supply to the Water and Air unit.	
2	Remove the hose of the water supply of the workshop to the Water-in circuit.	
3	Remove the Proc 2 hose from the Water and Air unit.	
4	Remove the Pushlok nipple.	
5	Loosen the locking nut.	
6	Unscrew the two attachment screws holding the water-in circuit.	
7	Remove the Water-in circuit from the mounting plate.	
8	Remove the DIN-connector from the electrical water valve.	

Refitting

The procedure below details how to refit the water-in circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see the *Spare parts* section.

	Action	Note
1	Attach the DIN-connector to the electrical water valve.	
2	Fit the water-in circuit with its two attachment screws on the mounting plate.	
3	Tighten the locking nut.	
4	Fit the Pushlok nipple.	
5	Connect the Proc 2 hose on the Water and Air unit.	Tightening torque, brass couplings 1/2": 31 Nm
	 CAUTION Do not tighten the brass couplings for water and air with excessive force.	

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4 Repair

4.4.2 Replacement of Water-in circuit

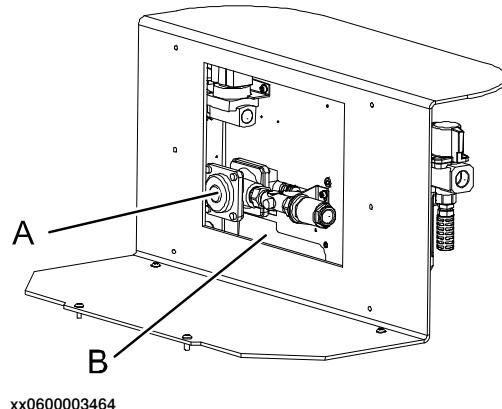
Continued

	Action	Note
6	Connect the hose of the workshop water supply to the Water-in circuit.	
7	Turn on the water supply to the Water and Air unit.	
8	Check for leakages.	Tighten if there are any leaks.

4.4.3 Replacement of Water-return circuit

4.4.3 Replacement of Water-return circuit**Location of Water-return circuit, type S**

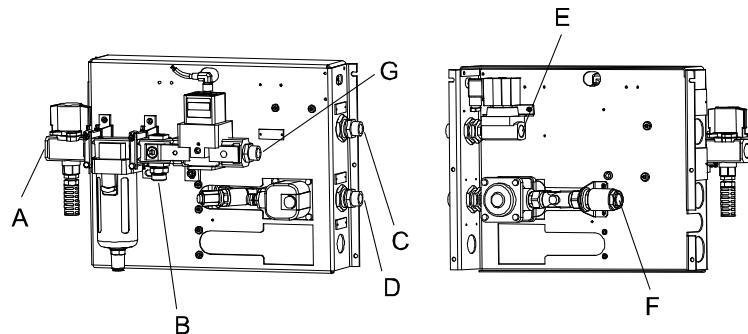
The Water-return circuit (or circuits) is located on the rear side of the Water and air unit as shown in the figure.



A	Water-return circuit
B	Position for second Water-return circuit

Location of Water-return circuit, type Sb

The Water-return circuit (or circuits) is located on the rear side of the Water and air unit as shown in the figure.



A	Air supply circuit
B	PROC 1 on robot base
C	PROC 2 on robot base
D	PROC 3 on robot base
E	Water-in circuit
F	Water-return circuit
G	PROC 4 on robot base (option)

Continues on next page

4 Repair

4.4.3 Replacement of Water-return circuit

Continued

Required equipment

Equipment	Art. no	Note
Water and Air unit	See Spare Parts section.	A number of versions are available. The Water and Air unit assembly contains all required hardware for fitting and connecting.
Standard toolkit, DressPack/SpotPack	3HAC17290-7	The contents are defined in section Toolkits, DressPack/SpotPack on page 351 .
Circuit diagram	3HAC026208-001	SpotPack

Removal

The procedure below details how to remove the water-return circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see *Spare parts* section.

	Action	Note
1	Turn off the water supply to the Water and Air unit.	
2	Turn off the shop water drain from the Water and Air unit.	
3	Remove the hose of the shop floor water drain from the Water-return circuit.	One water-return: <ul style="list-style-type: none">• Disconnect the hose from the check valve Second water-return: <ul style="list-style-type: none">• Disconnect the hose from the bulkhead connector.
4	Loosen the locking nut.	Only if the option <i>Second water return</i> has been selected.
5	Remove the Proc 3 hose from the Water and Air unit.	
6	Remove the Proc 4 hose from the Water and Air unit.	Only if the option <i>Second water return</i> has been selected.
7	Remove the Pushlok nipple (or nipples) for return water.	
8	Loosen and remove the locking nut (or nuts).	
9	Unscrew the two attachment screws securing the mounting bracket (or brackets).	
10	Remove the Water-return circuit (or circuits) from the mounting plate.	

Refitting

The procedure below details how to refit the water-return circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see *Spare parts* section.

	Action	Note
1	Place the Water-return circuit (or circuits) on the mounting plate.	

Continues on next page

4.4.3 Replacement of Water-return circuit

Continued

Action	Note
2 Fit the two attachment screws securing the mounting bracket (or brackets).	
3 Fit and tighten the locking nut (or nuts).	
4 Fit the Pushlok nipple (or nipples).	
5 Connect the Proc 3 hose from the Water and Air unit. ! CAUTION Do not tighten the brass couplings for water and air with excessive force.	Tightening torque, brass couplings 1/2": 31 Nm
6 Connect the Proc 4 hose from the Water and Air unit. ! CAUTION Do not tighten the brass couplings for water and air with excessive force.	Tightening torque, brass couplings 1/2": 31 Nm Only if the option <i>Second water return</i> has been selected.
7 Tighten the locking nut, at the shop floor side.	Only if the option <i>Second water return</i> has been selected.
8 Connect the hose of the shop water drain to the water-return circuit.	
9 Turn on the water supply to the Water and Air unit.	
10 Activate the electrical valve.	
11 First turn on and then turn off the shop water drain.	This is done in order to evacuate all air in the circuit.
12 Wait a couple of minutes and check for leakage.	Tighten if there is any leakage.
13 Turn on the shop water drain.	

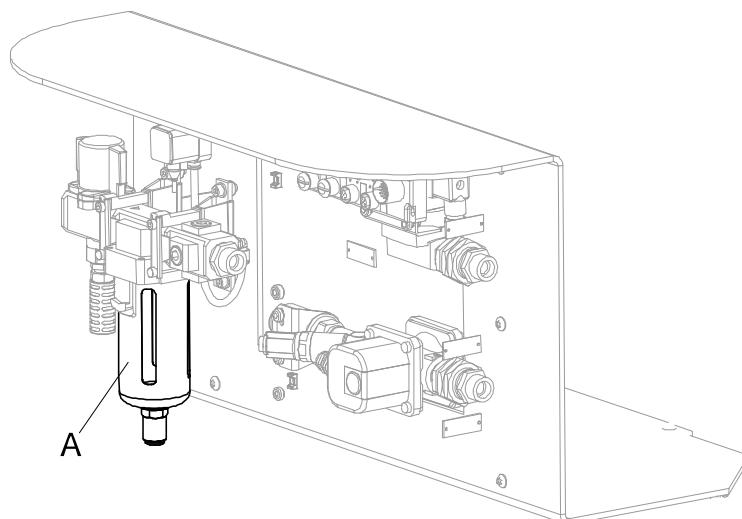
4 Repair

4.4.4 Replacement of Air filter element

4.4.4 Replacement of Air filter element

Replacement of air filter

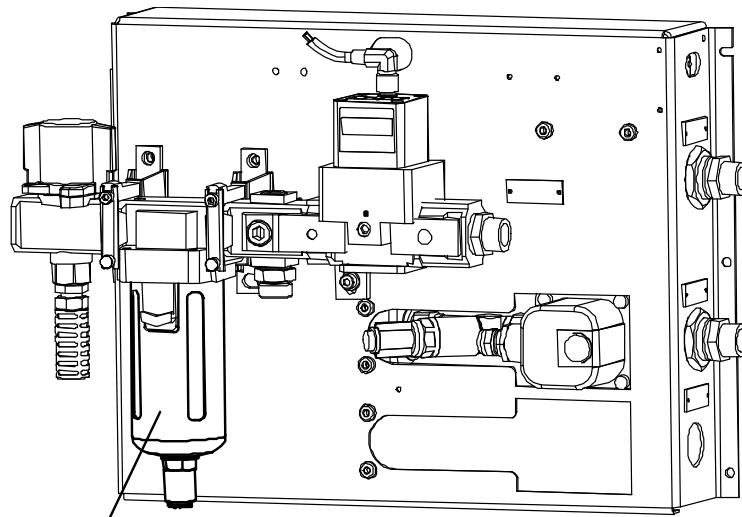
Type S



xx0700000400

A	Air filter
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Type Sb



A

xx0800000125

A	Air filter
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Continues on next page

4.4.4 Replacement of Air filter element

Continued

The procedure below details how to replace the air filter element on the Water and Air unit.

Action	Note
1 Turn off the hand operated air valve and make sure that the air filter is not pressurized.	
2 Remove the bowl assembly, by following these steps: <ul style="list-style-type: none"> • Push the bowl assembly lock button. • Lift the bowl assembly. • Rotate the bowl assembly 45° (right or left). • Pull out the assembly. 	
3 Remove the baffle, filter element and deflector by rotating the baffle counterclockwise by hand.	
4 Fit the deflector to the body assembly. Mind the fitting direction of the deflector (concave in which the element goes into).	Deflector direction: Concave, facing the filter element.
5 Fit the new filter element by inserting it to the deflector concave.	
6 Fit the baffle by inserting it to the filter element. Mind the fitting direction of the baffle (convex to which the element goes).	Baffle direction: Convex, facing the filter element.
7 Tighten the baffle to settle the baffle, filter element and deflector by rotating the baffle counterclockwise until it contacts the element and deflector lightly. Rotate approximately one half revolution counterclockwise further in order to tighten them.	Tightening torque: 0.9 Nm
8 Fit the bowl assembly. Match the mating mark of the body and the bowl assembly to insert the assembly to the body. Rotate the assembly 45° (right or left) until the lock button is tossed up to fit the bowl assembly.	 Note Check that the lock button has tossed up!

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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 ⁱ	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 ⁱⁱ	Arc welding equipment - Part 1: Welding power sources
EN IEC 60974-10 ⁱⁱ	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)

ⁱ Only robots with protection Clean Room.

ⁱⁱ 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

6 Reference information

6.2 Applicable safety standards

Continued

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 (Molykote, Gleitmo or equivalent) with allen head screws

The following table specifies the recommended standard tightening torque for *screws lubricated with Molykote 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 ⁱ	Tightening torque (Nm) Class 12.9, lubricated ⁱ
M8	28	35
M10	55	70
M12	96	120
M16	235	280
M20	460	550
M24	790	950

ⁱ Lubricated with Molykote 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
 CAUTION The robot weighs 1,340 kg (IRB6640), 1,405 kg (IRB6640ID). 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, water panel

This toolkit contains tools needed for water panel:

Qty	Article number	Tool	Note
1	-	Socket head cap 4 mm	For water panel
2	-	Ring-open-end spanner, 36 mm	For water panel

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	

Continues on next page

6 Reference information

6.6 Toolkits, DressPack/SpotPack

Continued

Qty	Article number	Tool	Note
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

6.7 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.

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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 DressPack for lower arm SW - IRBDP SW2 LE

General

This section describes the spare parts for DressPack lower arm cable package for Spot welding.

Spare parts for cable package

Qty	Spare part	Article number	Note
0.87m	Protection hose	3HAC5320-2	Only available per whole meters
1	End jaw	3HAC14512-1	
1	Clamp jaw	3HAC14590-1	
1	Hose and cable retainer	3HAC14811-12	
1	Hose clamp diam= 79-87	3HAC5325-3	
2	Gripping clamp	3HAC14280-1	
1	Velcro strap	3HAC12625-1	
2	Strap (balancing device)	3HAC024008-001	

7.3 DressPack lower arm MH - IRBDP MH 2 LE

Overview

The following section details spare parts for DressPack lower arm MH external cable package.

DressPack lower arm MH, external

Article number: 3HAC027807-001

Qty	Parts	Article number	Note
1	Process cable package 1-2 MH	3HAC028811-001	CPS, 1 hose Paracom
1	Process cable package 1-2 MH	3HAC028812-001	CPS/CBUS, 1 hose Parabuscom
1	Process cable package 1-2 MH	3HAC034141-001	Paracom Ethernet, 1 hose
1	Material set lower arm MH, axes 1-2	3HAC028071-001	

Spare parts for cable package

Qty	Parts	Article number	Note
1	Strap, velcro	3HAC12625-1	
1	Strap	3HAC024008-001	

7 Spare parts

7.4 DressPack for lower arm MH - IRBDP MH1 LI

General

The following section details spare parts for DressPack lower arm internal cable package.

Lower arm Internal cable package

Qty	Parts	Article number	Note
1	Process Cable Package 1-3 MH, CPS, 1 hose	3HAC028811-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640 - 205/2.75 IRB 6640 - 130/3.2 Paracom Ethernet
1	Process Cable Package 1-3 MH, CPS/CBUS, 1 hose	3HAC028812-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640 - 205/2.75 IRB 6640 - 130/3.2 Parabuscom
1	Process Cable Package 1-3 MH, CPS/Ethernet, 1 hose	3HAC034141-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640 - 205/2.75 IRB 6640 - 130/3.2 Parallel Ethernet
1	Material set Internal MH	3HAC028071-001	Connection axis 3

Spare parts for cable package

Qty	Parts	Article number	Note
1	Strap, velcro	3HAC12625-1	
1	Strap	3HAC024008-001	

7.5 DressPack lower arm MH, Foundry Prime

General

The following section details spare parts for DressPack lower arm MH (Foundry Prime) cable package.

Lower arm MH, Foundry Prime

Article number: 3HAC028256-001

Qty	Parts	Article number	Note
1	Process cable 1-3 MH Prime	3HAC028286-001	
1	Material set lower arm MH FP	3HAC028238-001	

Spare parts for cable package

Qty	Parts	Article number	Note
1	Strap, velcro	3HAC12625-1	
1	Strap	3HAC024008-001	

7 Spare parts

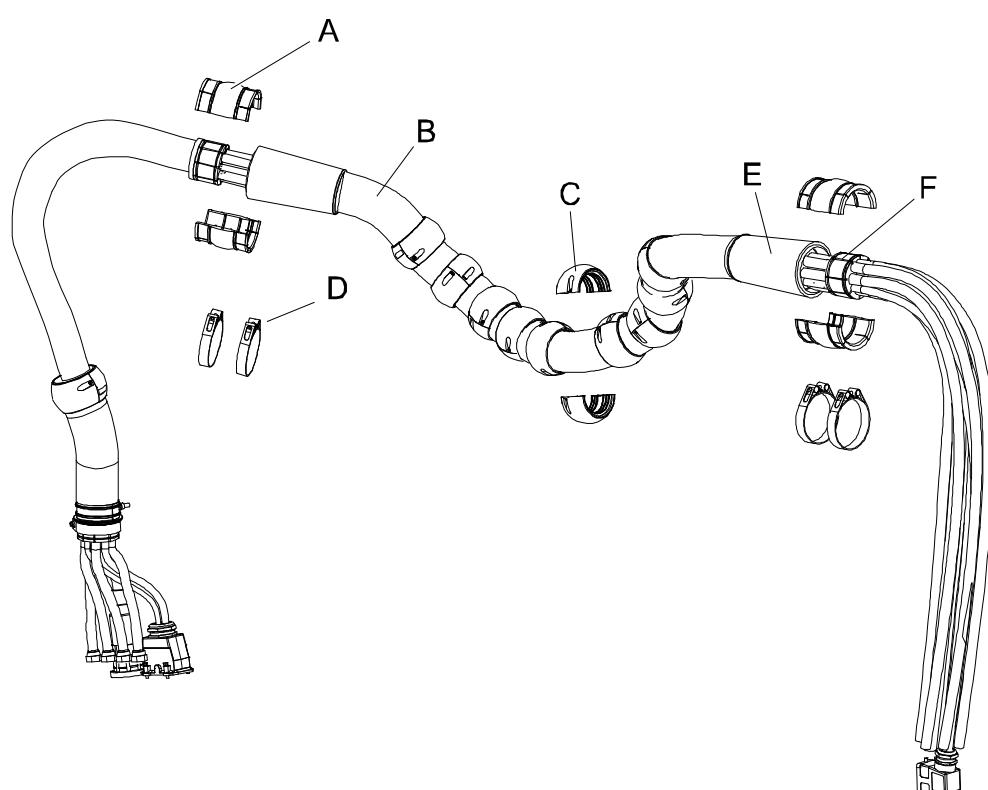
7.6 DressPack for upper arm SW - IRBDP SW2 UE

General

The following section details spare parts for DressPack upper arm cable package for spot welding.

Wear parts

Some parts are more exposed to wear. These parts are listed as wear parts in the parts list, and are shown in the illustration below.



xx0500001549

A	Sliding sleeve
B	Protective hose
C	Protective sleeve
D	Hose clamp
E	Hose reinforcement
F	Hose and cable retainer
G	Cable star
H	Clamp jaw

Continues on next page

Spare Parts, Process Cable Upper arm SW 2

Qty	Parts	Article number	Note
1	Process Cable Package Upper arm SW, CPS/Ethernet, 4 hoses	3HAC023170-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom + Ethernet
1	Process Cable Package Upper arm SW, CPS 4 hoses	3HAC038554-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom + Ethernet
1	Process Cable Package Upper arm SW, CPS/Ethernet, 4 hoses	3HAC023170-002	IRB 6640-130/3.2 Paracom + Ethernet
1	Process Cable Package Upper arm SW, CPS/Ethernet, 4 hoses	3HAC038554-002	IRB 6640-130/3.2 Paracom + Ethernet
1	Process Cable Package Upper arm SW, CPS+SP/Ethernet, 4 hoses	3HAC023171-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom + Ethernet Servo gun
1	Process Cable Package Upper arm SW, CPS+SP/Ethernet, 4 hoses	3HAC038555-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom + Ethernet Servo gun
1	Process Cable Package Upper arm SW, CPS+SP/Ethernet, 4 hoses	3HAC023171-002	IRB 6640-130/3.2 Paracom + Ethernet Servo gun
1	Process Cable Package Upper arm SW, CPS+SP/Ethernet, 4 hoses	3HAC038555-002	IRB 6640-130/3.2 Paracom & Servogun Ethernet
1	Process Cable Package Upper arm SW, CPS/CBUS 4 hoses	3HAC023172-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Parabuscom
1	Process Cable Package Upper arm SW, CPS/CBUS 4 hoses	3HAC023172-002	IRB 6640-130/3.2 Parabuscom
1	Process Cable Package Upper arm SW, CPS/CBUS+SP 4 hoses	3HAC023173-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Parabuscom Servo gun

Continues on next page

7 Spare parts

7.6 DressPack for upper arm SW - IRBDP SW2 UE

Continued

Qty	Parts	Article number	Note
1	Process Cable Package Upper arm SW, CPS/CBUS+SP 4 hoses	3HAC023173-002	IRB 6640-130/3.2 Parabuscom Servogun

Spare Parts for Cable Package

Qty	Spare part	Article number	Note
3 m	Protection hose	3HAC5320-2	Wear part
11	Protective sleeve	3HAC021580-001	Wear part
2	Hose reinforcement	3HAC022194-001	Wear part
1	Hose clamp Diam=79-87	3HAC5325-3	
4	Hose clamp Diam=94-102	3HAC5325-2	
1	Clamp jaw	3HAC14590-1	
1	Cable star	3HAC023875-001	
4	Slide sleeve	3HAC16208-1	Wear part
2	Hose and cable retainer	3HAC14811-1	
1	Velcro strap	3HAC12625-1	
1	Strap holder	3HAC024716-001	
1	Strap, velcro	3HAC024008-004	
2	Hose reinforce protection (UL, UR)	3HAC17221-1	

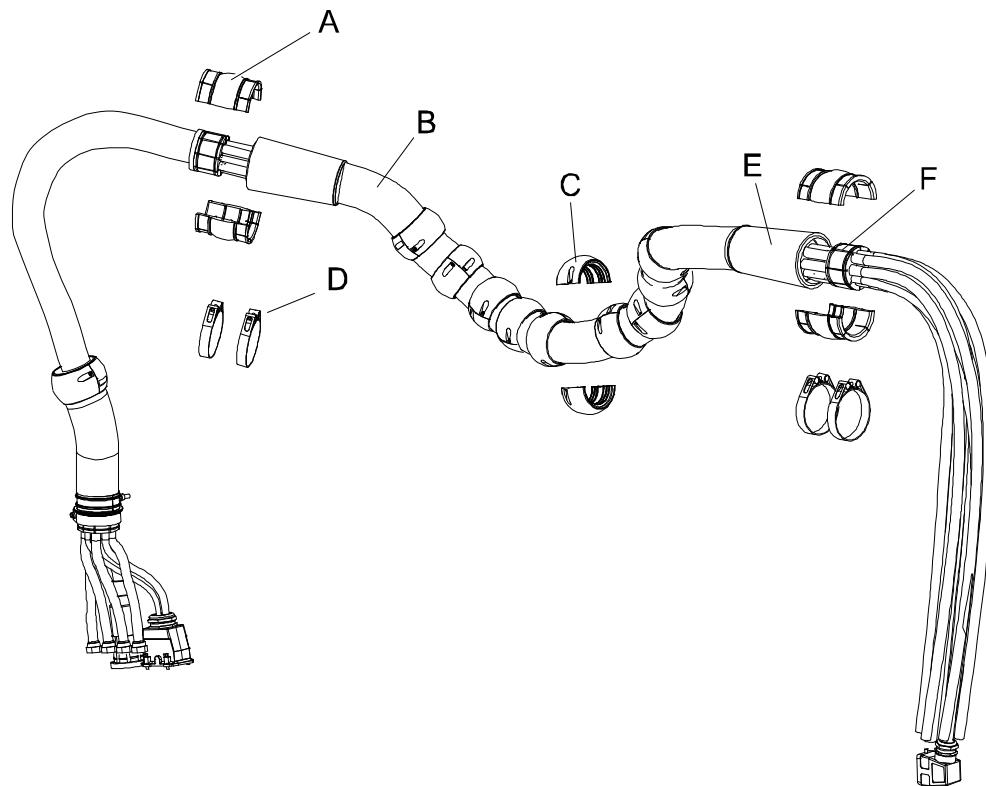
7.7 DressPack for Upper arm MH - IRBDP MH2 UE

General

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

Wear parts

Some parts are more exposed to wear. These parts are marked as wear parts in the parts list, and are shown in the illustration below.



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A	Sliding sleeve
B	Protective hose
C	Protective sleeve
D	Hose clamp
E	Hose reinforcement
F	Hose and cable retainer
G	Cable star
H	Clamp jaw

Continues on next page

7 Spare parts

7.7 DressPack for Upper arm MH - IRBDP MH2 UE

Continued

Upper arm cable package IRBDP MH2

Qty	Parts	Article number	Note
1	Process Cable Package Upper arm MH, CPS/Ethernet, 1 hose	3HAC023252-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom + Ethernet
1	Process Cable Package Upper arm MH, CPS/Ethernet, 1 hose	3HAC038553-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom Ethernet
1	Process Cable Package Upper arm MH, CPS/Ethernet, 1 hose	3HAC023252-002	IRB 6640-130/3.2 Paracom Paracom + Ethernet
1	Process Cable Package Upper arm MH, CPS/Ethernet, 1 hose	3HAC038553-002	IRB 6640-130/3.2 Paracom Ethernet
1	Process Cable Package Upper arm MH, CPS/CBUS 1hose	3HAC023253-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Parabuscom
1	Process Cable Package Upper arm MH, CPS/CBUS 1hose	3HAC023253-002	IRB 6640-130/3.2 Parabuscom
2	Hose reinforce protection (UL, UR)	3HAC17221-1	

Spare parts for cable package

Qty	Spare part	Article number	Note
3m	Protection hose	3HAC5320-2	Wear part
11	Protective sleeve	3HAC021580-001	Wear part
2	Hose reinforcement	3HAC022194-001	Wear part
1	Hose clamp Diam=79 mm	3HAC5325-3	
4	Hose clamp Diam=94 mm	3HAC5325-2	
1	Clamp jaw	3HAC14590-1	
1	Cable star	3HAC023875-002	
4	Slide sleeve	3HAC16208-1	Wear part
2	Hose and cable retainer	3HAC14811-1	

7.8 DressPack upper arm MH - IRBDP MH3 UE

General

The following section describes spare parts for DressPack upper arm cable package.

Spare parts for cable package

Parts	Art.no.	Note
Protection hose	3HAC024692-060	Wear part
Hose upper arm MH3	3HAC024692-047	
Clamp half	3HAC024692-051	
Gripping clamp	3HAC024692-013	
Velcro strap	3HAC12625-1	
Protective sleeve, NW 52	3HAC032661-001	Wear part

7 Spare parts

7.9 DressPack for - IRBDP MH2 CE and IRBDP SW2 CE

General

The following section details spare parts for cable packages IRBDP MH2 CE and IRBDP SW2 CE.

Lower/Upper arm cable package

Part	Article number	Note
Process Cable Package lower/upper arm SW, CPS, 4 hoses	3HAC022486-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom Paracom+Ethernet
Process Cable Package lower/upper arm SW, CPS, 4 hoses	3HAC022486-002	IRB 6640-130/3.2 Paracom
Process Cable Package SW, CPS/Ethernet + SP 3 hoses	3HAC038557-001	Paracom Ethernet
Process Cable Package Lower/Upper arm SW, CPS+SP 4 hoses	3HAC022487-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Paracom Servogun
Process Cable Package Lower/Upper arm SW, CPS+SP 4 hoses	3HAC022487-002	IRB 6640-130/3.2 Paracom Servogun
Process Cable Package Lower/Upper arm SW, CPS/CBUS 4 hoses	3HAC022488-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Parabuscom
Process Cable Package Lower/Upper arm SW, CPS/CBUS 4 hoses	3HAC022488-002	IRB 6640-130/3.2 Parabuscom
Process Cable Package Lower/Upper arm SW, CPS/CBUS+SP 4 hoses	3HAC022491-001	IRB 6640-180/2.55 IRB 6640-235/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 Parabuscom Servogun
Process Cable Package Lower/Upper arm SW, CPS/CBUS+SP 4 hoses	3HAC022491-002	IRB 6640-130/3.2 Parabuscom Servogun

Continues on next page

7 Spare parts

7.9 DressPack for - IRBDP MH2 CE and IRBDP SW2 CE

Continued

Part	Article number	Note
Material Set lower arm SW	3HAC027621-001	IRB 6640-180/2.55 IRB 6640-230/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 IRB 6640-130/3.2
Material Set upper armSW	3HAC022484-001	IRB 6640-180/2.55 IRB 6640-230/2.55 IRB 6640-185/2.8 IRB 6640-205/2.75 IRB 6640-130/3.2

Spare parts for cable package

Qty	Spare part	Article number	Note
	Protection hose	3HAC5320-2	Wear part 4 m
	Protective sleeve	3HAC021580-001	Wear part
	Hose reinforcement	3HAC022194-001	Wear part
	Hose reinforce protection (UL, UR)	3HAC17221-1	
4	Slide sleeve	3HAC16208-1	Wear part
2	Hose clamp Diam = 79-87	3HAC5325-3	
4	Hose clamp Diam = 94-102	3HAC5325-2	
	Clamp jaw	3HAC14590-1	
	End jaw	3HAC14512-1	
	Cable star	3HAC023875-001	
	Middle jaw	3HAC14290-1	
	Swivel	3HAC027389-001	
	Hose clamp and cable retainer	3HAC14811-12	
	Strap, velcro	3HAC12625-1	
	Hose support	3HAC024102-090	
	Bracket, hose support	3HAC024102-049	

Spare Parts included in Material set Lower arm

Qty	Spare part	Article number	Note
2	Gripping clamp	3HAC14280-1	
1	Velcro strap	3HAC12625-1	
2	Strap (balancing cylinder)	3HAC024008-001	

Spare Parts included in Material set Upper arm

Qty	Spare part	Article number	Note
1	Tension arm unit	3HAC022307-001	

Continues on next page

7 Spare parts

7.9 DressPack for - IRBDP MH2 CE and IRBDP SW2 CE

Continued

Qty	Spare part	Article number	Note
1	Ball joint housing	3HAC021601-001	
1	Damper (Tension arm unit)	3HAC022307-048	Wear part
1	Harness support axis 6 complete	3HAC025495-001	
	Plate	3HAC022307-041	
1	Gripping clamp	3HAC14280-1	

7.10 SpotPack Basic cable package - IRBDP SW 5 CE

Overview

The following section details spare parts for SpotPack Basic cable package IRBDP SW 5 CE.

SpotPack Basic cable package - IRBDP SW 5 CE

Parts	Article no.	Note
Material set lower arm SW	3HAC029500-003	
Material set lower arm SW	3HAC029506-001	

Wear parts of cable package

Parts	Article no.	Note
Protection hose	3HAC5320-2	Wear part
Hose reinforcement	3HAC022194-001	Wear part
Protective sleeve	3HAC021580-001	Wear part

Spare parts for cable package

Parts	Spare part no.	Note
CS cable, axes 2-6	3HAC029391-001	
Weld cable 25 mm ²	3HAC029392-001	
Servo Power, axes 2-6	3HAC029580-001	
Resolvercable,R2.FB7	3HAC030638-001	
Hose blue	3HAC029507-001	
Hose green	3HAC029507-002	
Hose red	3HAC029507-003	
Hose black	3HAC029507-004	
Hose protection	3HAC031582-001	
Swivel complete	3HAC027389-001	
Hose clamp Diam=79-87	3HAC5325-3	
Slide sleeve	3HAC16208-1	
Hose clamp Diam=94-102	3HAC5325-2	
Hose & cable retainer 60	3HAC026156-003	
Plastic clamp	3HAC026549-005	
Strap, velcro	3HAC12625-1	
Strap	3HAC024008-001	
Gripping clamp	3HAC14280-1	
End jaw	3HAC14512-1	
Ball joint housing	3HAC021601-001	

Continues on next page

7 Spare parts

7.10 SpotPack Basic cable package - IRBDP SW 5 CE

Continued

Parts	Spare part no.	Note
Process cable support axis 6	3HAC025495-003	

7.11 DressPack cable package for - IRBDP SW6 LE/UI and IRBDP MH6 LE/UI (Lean ID)

7.11 DressPack cable package for - IRBDP SW6 LE/UI and IRBDP MH6 LE/UI (Lean ID)**Material set, lower arm**

Part	Article number	Note
Material set, lower arm IRBDP SW6 LE and IRBDP MH6 LE	3HAC042634-001	

DressPack lower arm - IRBDP SW6 LE (Spotwelding)

Part	Article number	Note
Process cable package IRBDP SW6 LE	3HAC042381-001	Paracom
Process cable package IRBDP SW6 LE	3HAC042381-002	Paracom Servo gun
Process cable package IRBDP SW6 LE	3HAC042382-001	Parabus com
Process cable package IRBDP SW6 LE	3HAC042382-002	Parabus com Servo gun
Process cable package IRBDP SW6 LE	3HAC042383-001	Paramulti
Process cable package IRBDP SW6 LE	3HAC042383-002	Paramulti Servo gun

DressPack lower arm - IRBDP MH6 LE (Materialhandling)

Part	Article number	Note
Process cable package IRBDP MH6 LE	3HAC043042-001	Paracom
Process cable package IRBDP MH6 LE	3HAC043043-001	Parabus com
Process cable package IRBDP MH6 LE	3HAC043044-001	Paramulti

Material set, upper arm

Part	Article number	Note
Material set, upper arm IRBDP SW6 UI and IRBDP MH6 UI	3HAC042635-001	

DressPack upper arm - IRBDP SW6 UI (Spotwelding)

Part	Article number	Note
Process cable package IRBDP SW6 UI	3HAC042384-001	Paracom
Process cable package IRBDP SW6 UI	3HAC042384-002	Paracom Servo gun
Process cable package IRBDP SW6 UI	3HAC042385-001	Parabus com
Process cable package IRBDP SW6 UI	3HAC042385-002	Parabus com Servo gun
Process cable package IRBDP SW6 UI	3HAC042386-001	Paramulti

Continues on next page

7 Spare parts

7.11 DressPack cable package for - IRBDP SW6 LE/UI and IRBDP MH6 LE/UI (Lean ID)

Continued

Part	Article number	Note
Process cable package IRBDP SW6 UI	3HAC042386-002	Paramulti Servo gun

DressPack upper arm - IRBDP MH6 UI (Materialhandling)

Part	Article number	Note
Process cable package IRBDP MH6 UI	3HAC043045-001	Paracom
Process cable package IRBDP MH6 UI	3HAC043046-001	Parabus com
Process cable package IRBDP MH6 UI	3HAC043047-001	Paramulti

Sub cables

Part	Article number	Note
FB, axes 3-6	3HAC035762-001	
SP, axes 3-6	3HAC035763-001	
CPS, axes 3-6	3HAC035764-001	
CBUS, axes 3-6	3HAC035765-001	
Ethernet, upper arm	3HAC034204-002	

Wear parts

Part	Article number	Note
Protection hose, lower arm L=1400 mm and L=990 mm	3HAC5320-2	 Note Spare part is only delivered per meter.
Protection hose, upper arm L=500 mm	3HAC042173-002	
Protection hose, upper arm L=1080 mm	3HAC042173-003	
Hose reinforcement funnel	3HAC032916-001	
Protective sleeve, rotary	3HAC032660-001	
Ball joint housing	3HAC037065-001	
Clamp insert	3HAC042483-001	
Middle jaw	3HAC14290-1	
Cable and hose retainer	3HAC035251-001	

Other parts

Part	Article number	Note
Wrist protection plate	3HAC036119-001	
Axis 6 cable support	3HAC036119-010	
Bearing housing	3HAC039815-001	

7.12 Process cable package - IRB66X0ID

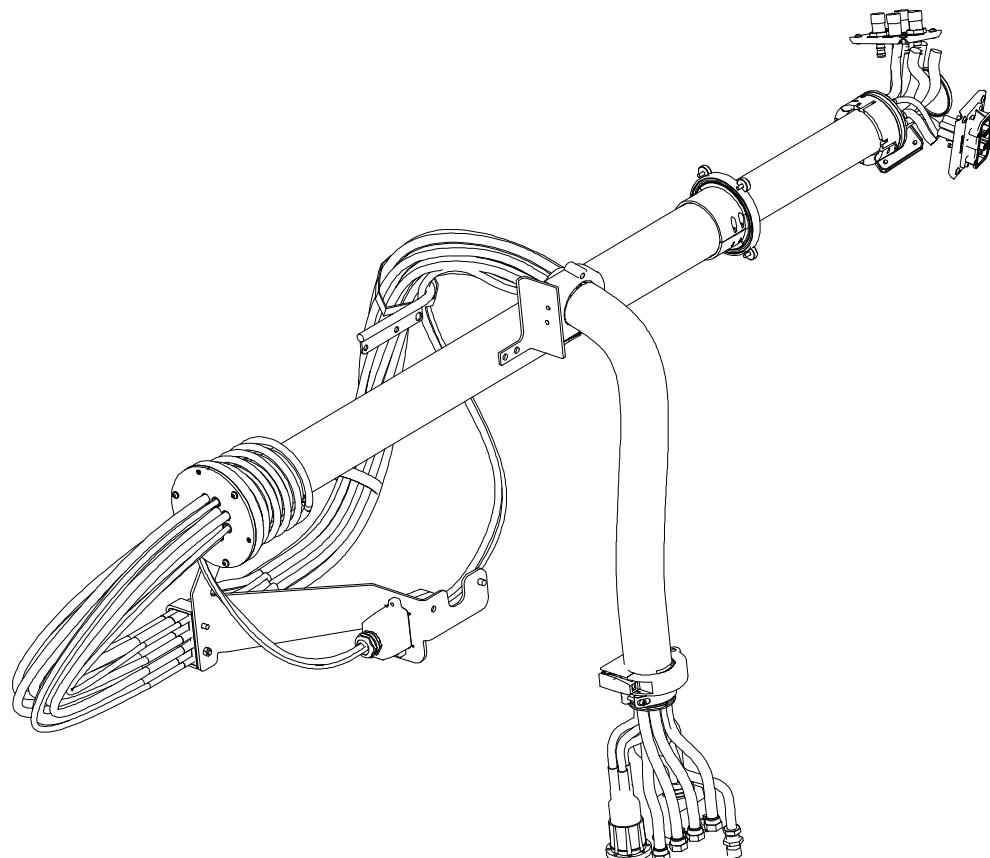
Process cable package upper arm, spare part list

The item in the list is the complete process cable package.

Article number: 3HAC025529-001

Qty	Description	Spare part number	Note
1	Cable harness	3HAC025532-001	Paracom Parabuscom
1	Cable harness	3HAC041028-001	Paramulti

Process cable package upper arm



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7 Spare parts

7.13 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 ax.3	3HAC024577-001	
CP/CS, Proc. 1 on base	3HAC16667-1	
Weld, Proc. 1-4 on base	3HAC17201-1	
Weld, Proc. 2-4 ax. 3	3HAC17202-1	
Weld, Proc. 1-4 ax.6 (35 mm ²)	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	

7.14 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	3HAC023278-001	
Material set 7:th axis	3HAC023055-003	

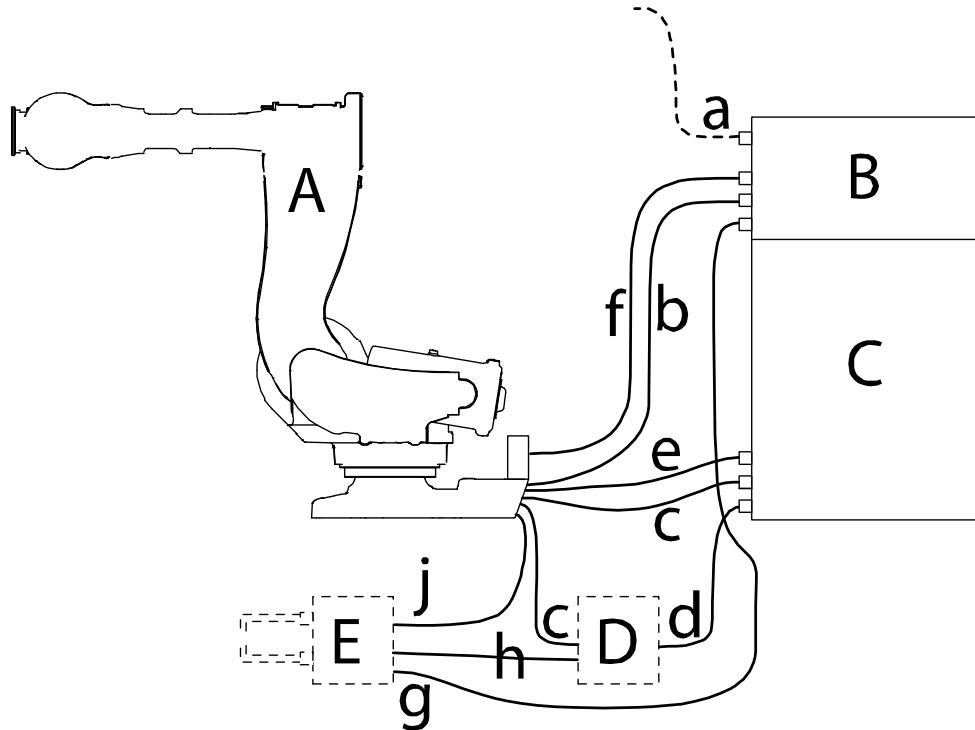
7 Spare parts

7.15 DressPack, floor, standard

7.15 DressPack, floor, standard

Illustration

The illustration below shows the complete unit in question as well as its components. Any callouts refer to the table in section [Parts on page 376](#).



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Parts

Item	Description	Art. no.	Remark
b	Floor weld cable	3HAC 16847-1	7 m 3 x 35 mm ² MC connector
b	Floor weld cable	3HAC 16847-2	15 m 3 x 35 mm ² MC connector
b	Floor weld cable	3HAC16847-4	22 m 3 x 35 mm ² MC connector
	Harness CP/CS, axis 7	3HAC 14959-1	15 m Not used with e! Used with d.
	Harness CP/CS, axis 7	3HAC 14959-4	7 m Not used with e! Used with d.

Continues on next page

Item	Description	Art. no.	Remark
	Harness CP/CS, axis 7	3HAC 14959-5	30 m Not used with e! Used with d.
	Cable harness DDU	3HAC 15910-1	5 m Used with c.
	Harness CP/CS PROFIB	3HAC 17200-1	15 m For ProfiBus communication. Not used with c!
	Harness CP/CS PROFIB	3HAC 17200-4	7 m For ProfiBus communication. Not used with c!
	Harness CP/CS PROFIB	3HAC 17200-5	30 m For ProfiBus communication. Not used with c!
	Harness CP/CS CAN	3HAC 14890-1	15 m For CANBus communication. Not used with c!
	Harness CP/CS CAN	3HAC 14890-4	7 m For CANBus communication. Not used with c!
	Harness CP/CS CAN	3HAC 14890-6	30 m For CANBus communication. Not used with c!
	Harness CP/CS IBS	3HAC 15644-1	15 m For InterBus communication. Not used with c!
	Harness CP/CS IBS	3HAC 15644-4	7 m For InterBus communication. Not used with c!
	Harness CP/CS IBS	3HAC 15644-5	30 m For InterBus communication. Not used with c!
	Harness CP/CS	3HAC 17147-1	7 m No databus communication. Not used with c!
	Harness CP/CS	3HAC 17147-2	15 m No databus communication. Not used with c!
	Harness CP/CS	3HAC 17147-3	30 m No databus communication. Not used with c!
f	Cable to split box	3HAC 16844-1	7 m Used with water and air unit.
f	Cable to split box	3HAC 16844-2	15 m Used with water and air unit.

Continues on next page

7 Spare parts

7.15 DressPack, floor, standard

Continued

Item	Description	Art. no.	Remark
f	Cable to split box	3HAC 16844-13	22 m Used with water and air unit.
	Cable to split box	3HAC 16844-3	30 m Used with water and air unit.
	Process cable to stat gun,	3HAC 16873-1	7 m
g	Process cable to stat gun	3HAC025117-001	7 m
	Process cable to stat gun	3HAC 16873-2	15 m
g	Process cable to stat gun	3HAC025117-002	15 m
g	Process cable to stat gun	3HAC025117-003	22 m
	Process cable to stat gun	3HAC 16873-3	30 m
g	Process cable to stat gun	3HAC025117-006	30 m
	Harness servo gun	3HAC 15386-4	7 m
	Harness servo gun	3HAC 15386-1	15 m
	Harness servo gun	3HAC 15386-5	30 m
	SMB signal cable, 7 m	3HAC 16425-1	7 m

7.16 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, 7 m	3HAC022978-001	Parallel DeviceNet
Harness-CP/CS/DeviceNet, 15 m	3HAC022978-002	Parallel DeviceNet
Harness-CP/CS/DeviceNet, 22 m	3HAC022978-006	Parallel DeviceNet
Harness-CP/CS/DeviceNet, 30 m	3HAC022978-003	Parallel DeviceNet
Harness-CS floor cable, 7 m	3HAC029393-001	Parallel
Harness-CS floor cable, 15 m	3HAC029393-002	Parallel
Harness-CP floor cable, 7 m	3HAC029396-002	24V
Harness-CP floor cable, 15 m	3HAC029396-001	24V
Harness-CP/CS/InterBus, 7 m	3HAC023024-001	InterBus
Harness-CP/CS/InterBus, 15 m	3HAC023024-002	InterBus
Harness-CP/CS/InterBus, 22 m	3HAC023024-006	InterBus
Harness-CP/CS/InterBus, 30 m	3HAC023024-003	InterBus
Harness-CP/CS/Pbus, 7 m	3HAC022988-001	ProfiBus
Harness-CP/CS/Pbus, 15 m	3HAC022988-002	ProfiBus
Harness-CP/CS/Pbus, 22 m	3HAC022988-006	ProfiBus
Harness-CP/CS/Pbus, 30 m	3HAC022988-003	ProfiBus
Harness-CP/CS, 7 m	3HAC022957-001	Parallel
Harness-CP/CS, 15 m	3HAC022957-002	Parallel
Harness-CP/CS, 22 m	3HAC022957-006	Parallel
Harness-CP/CS, 30 m	3HAC022957-003	Parallel

7 Spare parts

7.17 DressPack - Water and air unit

Overview

The following section details spare parts for DressPack Water and air unit.

Water and air unit

Parts	Article no.	Note
Water and air unit	3HAC048636-001	Basic
Water and air unit	3HAC048636-002	2:nd water return
Water and air unit	3HAC048636-003	E/P valve

Hoses for Water and air unit

Parts	Article number	Note
Air hose if E/P valve	3HAC16845-2	Orange
Air hose if E/P valve	3HAC16845-4	Black
Hose water and air unit (3 pcs)	3HAC16845-1	Orange
Hose water and air unit (3 pcs)	3HAC16845-5	Black

8 Circuit diagram

8.1 Circuit diagrams

Overview

The circuit diagrams are not included in this manual, but delivered as separate documents on the documentation DVD. See the article numbers in the tables below.

Controllers

Product	Article numbers for circuit diagrams
<i>Circuit diagram - IRC5</i>	3HAC024480-011
<i>Circuit diagram - IRC5 Compact</i>	3HAC049406-003
<i>Circuit diagram - IRC5 Panel Mounted Controller</i>	3HAC026871-020
<i>Circuit diagram - Euromap</i>	3HAC024120-004
<i>Circuit diagram - Spot welding cabinet</i>	3HAC057185-001

DressPack/SpotPack

Product	Article numbers for circuit diagrams
<i>Circuit diagram - DressPack 6650S/7600</i>	3HAC022327-002
<i>Circuit diagram - DressPack 8700</i>	3HAC053524-002
<i>Circuit diagram - DressPack 6650S/7600</i>	3HAC026209-001
<i>Circuit diagram - DressPack 6620</i>	3HAC026136-001
<i>Circuit diagram - DressPack IRB 6640, IRB 6650S, IRB 7600</i>	3HAC026209-001
<i>Circuit diagram - DressPack 6660</i>	3HAC029940-001
<i>Circuit diagram - DressPack 6700</i>	3HAC044246-002
<i>Circuit diagram - SpotPack SWC IRC5 M2004</i>	3HAC026208-001
<i>Circuit diagram - SpotPack SWC IRC5 Design 2014 PROFINET</i>	3HAC044736-001

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