ROBOTICS

Product manual

DressPack IRB 6620

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Product manual

DressPack IRB 6620

IRC5

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Keep for future reference.

Additional copies of this manual may be obtained from ABB.

Original instructions.

Table of contents

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Overview of this manual

About this manual

This manual contains instructions for:

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

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

Usage

This manual shall be used during:

- installation on the DressPack system
- maintenance on the DressPack system
- repair work on the DressPack 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.
Spare parts	Complete spare part list incuding wear parts shown in exploded views.
Circuit diagrams	References to article numbers for circuit diagrams.

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References

Reference	Document ID
Safety manual for robot - Manipulator and IRC5 or OmniCore controller [i]	*3HAC031045-001*
Product specification - IRB 6620	*3HAC025861-001*
Product manual - IRB 6620	*3HAC027151-001*
Product manual - IRC5	*3HAC021313-001*
Circuit diagrams, IRB 6620	*3HAC025090-001*
Circuit diagram - DressPack 6620	*3HAC026136-001*
Circuit diagram - DressPack 6620	*3HAC026208-001*
Operating manual - IRC5 with FlexPendant	*3HAC050941-001*
Technical reference manual - System parameters	*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: • New section in the *Repair* chapter, *Water and air unit IRBWA 2*, is added. • Cable packages *IRBDP MH 3 LE* and *IRBDP MH 3 UE* added. • Product name principle is changed. (Detailed in section *Product name principles on page 15*.) • Sections Earth fault protection and Contactor added in *Installation of Spot welding cabinet* .
B	The following has been added or changed: • The process cable package *IRBDP SW 5 CE* (DressPack Basic) has been implemented throughout the manual. • Chapter *Spot welding Cabinet* has been updated.
C	The following has been added or changed: • List of spare parts for upper arm cable package updated, *DressPack cable package upper arm - IRBDP MH 3 UE on page 233*.

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Revision	Description
D	The following has been added or changed: • List of spare parts updated with new spare part number for Ethernet cables. • Corrected spare part numbers, see *DressPack Basic cable package - IRBDP SW 5 CE on page 234*. • Decommissioning chapter added. • Circuit diagrams are not included in this document but delivered as separate files. See *Circuit diagrams on page 241*. • List of standards updated, see *Applicable standards on page 218*. The chapter *Safety* is updated with: • Updated safety signal graphics for the levels *Danger* and *Warning*, see *Safety signals in the manual on page 19*. • New safety labels on the manipulators, see *Safety symbols on manipulator labels on page 20*. • Revised terminology: *robot* replaced with *manipulator*.
E	The following has been added or changed: • Some general tightening torques have been changed/added, see updated values in *Screw joints on page 221*. • Information about option 782-13 Bosch MFDC PROFINET added to *Installation of DressPack floor on page 107*. The section is also clarified, information about connections etc. is referred to the circuit diagram
F	The following has been added or changed: • Information in section *Installation of DressPack floor on page 107* clarified regarding connections whether PROFINET is available or not. • Torques added for brass couplings for water and air
G	The following has been added or changed: • Grease name change (Optitemp RB1 → Optitemp RB2)
H	Published in release R16.2. The following updates are done in this revision: • Information about Spot welding cabinet removed. *Product manual - Spot welding cabinet IRC5* (*3HAC058524-001*) describes the Spot welding cabinet.
J	Published in release R17.2. The following updates are done in this revision: • Updated list of applicable standards.
K	Published in release R18.1. The following updates are made in this revision: • Clarified procedure for tension adjustment, see *Adjusting tension arm unit on page 189*. • Safety section restructured.
L	Published in release R18.2. The following updates are made in this revision: • Updated tightening torque for process cable support axis 6. (Was 70 Nm, is 47 Nm)
M	Published in release 21C. The following updates are made in this revision: • Caution regarding handling connectors with care included in Installation and Repair chapters.
N	Published in release 22B. The following updates are made in this revision: • Added information about using mounting tools and tightening the M12 Ethernet/PROFINET floor cable connector with a tightening torque.
P	Published in release 22C. The following updates are made in this revision: • Added more specific information about what torque tool to use for M12 Ethernet/PROFINET connectors throughout the manual.
Q	Published in release 23D. The following updates are made in this revision: • Added more specific information about materials, tightening torque and lubrication for couplings.

Product documentation

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.

Tip

All documents can be found via myABB Business Portal, *www.abb.com/myABB*.

Product manuals

Manipulators, controllers, DressPack, 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.
- Troubleshooting.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with corresponding figures (or references to separate spare parts lists).
- References to circuit diagrams.

Technical reference manuals

The technical reference manuals describe reference information for robotics products, for example lubrication, the RAPID language, and system parameters.

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, software).
- How to install included or required hardware.
- How to use the application.

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- 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 troubleshooters.

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 *rear attachment screws, gearbox.*	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 *sealing, axis 2* 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 17*.

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.

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Examples

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

1 Safety

1.1 Safety information

1.1.1 Limitation of liability

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.

The information does not cover how to design, install and operate a robot system, nor does it cover all peripheral equipment that can influence the safety of the robot system.

In particular, liability cannot be accepted if injury or damage has been caused for any of the following reasons:

- Use of the robot in other ways than intended.
- Incorrect operation or maintenance.
- Operation of the robot when the safety devices are defective, not in their intended location or in any other way not working.
- When instructions for operation and maintenance are not followed as intended.
- Non-authorized design modifications of the robot.
- Repairs on the robot and its spare parts carried out by in-experienced or non-qualified personnel.
- Foreign objects.
- Force majeure.

Spare parts and equipment

ABB supplies original spare parts and equipment which have been tested and approved for their intended use. The installation and/or use of non-original spare parts and equipment can negatively affect the safety, function, performance, and structural properties of the robot. ABB is not liable for damages caused by the use of non-original spare parts and equipment.

1.1.2 Requirements on personnel

General

Only personnel with appropriate training are allowed to install, maintain, service, repair, and use the robot. This includes electrical, mechanical, hydraulics, pneumatics, and other hazards identified in the risk assessment.

Persons who are under the influence of alcohol, drugs or any other intoxicating substances are not allowed to install, maintain, service, repair, or use the robot.

The plant liable must make sure that the personnel is trained on the robot, and on responding to emergency or abnormal situations.

Personal protective equipment

Use personal protective equipment, as stated in the instructions.

1.2 Safety signals and symbols

1.2.1 Safety signals in the manual

Introduction to safety signals

This section specifies all safety signals used in the user manuals. Each signal consists of:

- A caption specifying the hazard level (DANGER, WARNING, or CAUTION) and the type of hazard.
- Instruction about how to reduce the hazard to an acceptable level.
- A brief description of remaining hazards, if not adequately reduced.

Hazard levels

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

Symbol	Designation	Significance
	DANGER	Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in serious injury.
	WARNING	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in serious injury.
	ELECTRICAL SHOCK	Signal word used to indicate a potentially hazardous situation related to electrical hazards which, if not avoided, could result in serious injury.
	CAUTION	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in slight injury.
	NOTE	Signal word used to indicate important facts and conditions.
	TIP	Signal word used to indicate where to find additional information or how to do an operation in an easier way.

1.2.2 Safety symbols on manipulator labels

Introduction to symbols

This section describes safety symbols used on labels (stickers) on the manipulator.

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 symbols on the labels on the product must be observed. Additional symbols added by the integrator must also be observed.

Types of symbols

Both the manipulator and the controller are marked with symbols, containing important information about the product. This is important for all personnel handling the robot, for example during installation, service, or operation.

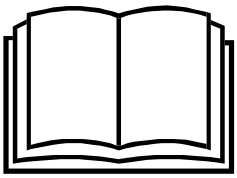
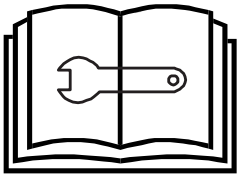
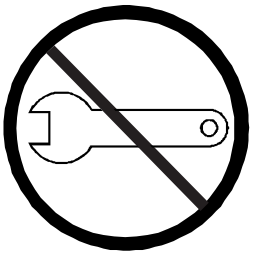
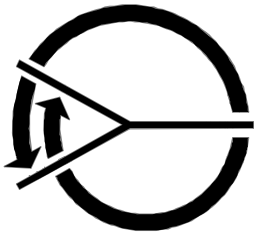
The safety labels are language independent, they only use graphics. See *Symbols on safety labels on page 20*.

The information labels can contain information in text.

Symbols on safety labels

Symbol	Description
 xx0900000812	**Warning!** Warns that an accident *may* 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.

Continues on next page

Symbol	Description
 xx0900000813	**See user documentation** Read user documentation for details. Which manual to read is defined by the symbol: • No text: *Product manual*. • EPS: *Application manual - Electronic Position Switches*.
 xx0900000816	**Before disassembly, 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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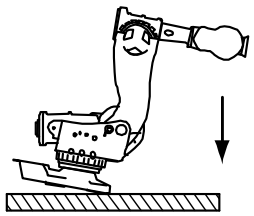
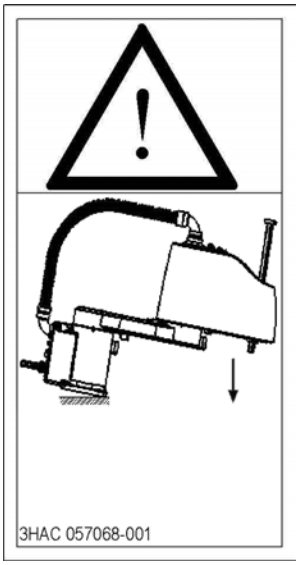
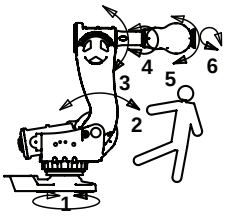
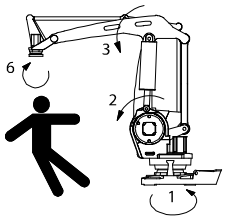
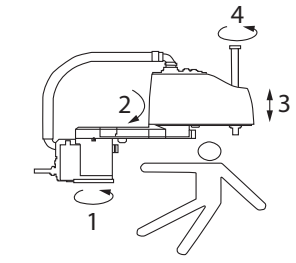
1.2.2 Safety symbols on manipulator labels

Continued

Symbol	Description
 xx0900000810  xx1500002402	**Tip risk when loosening bolts** The robot can tip over if the bolts are not securely fastened.
  xx0900000817	**Crush** Risk of crush injuries.

Continues on next page

Symbol	Description
 xx0900000818  xx1300001087	**Heat** Risk of heat that can cause burns. (Both signs are used)
 xx0900000819  xx1000001141  xx1500002616	**Moving robot** The robot can move unexpectedly.

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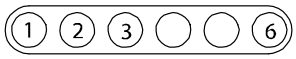
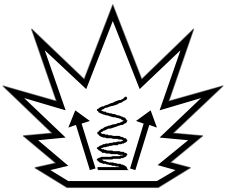
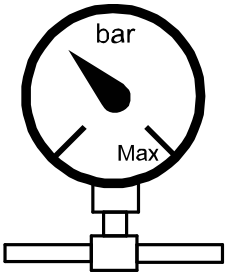
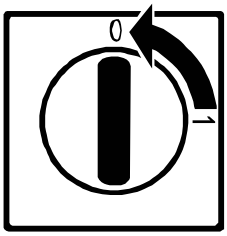
1.2.2 Safety symbols on manipulator labels
Continued

Symbol	Description
 xx0900000820  xx1000001140	**Brake release buttons**
 xx0900000821	**Lifting bolt**
 xx1000001242	**Adjustable 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**

Continues on next page

Symbol	Description
 xx1000001144	**No mechanical stop**
 xx0900000825	**Stored energy** Warns that this part contains stored energy. Used in combination with *Do not disassemble* symbol.
 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.

1.3 Robot stopping functions

Protective stop and emergency stop

The protective stops and emergency stops are described in the product manual for the controller.

For more information see:

- *Product manual - IRC5*

1.4 Safety during installation and commissioning

National or regional regulations

The integrator of the robot system is responsible for the safety of the robot system.

The integrator is responsible that the robot system is designed and installed in accordance with the safety requirements set forth in the applicable national and regional standards and regulations.

The integrator of the robot system is required to perform a risk assessment.

Layout

The robot integrated to a robot system shall be designed to allow safe access to all spaces during installation, operation, maintenance, and repair.

If robot movement can be initiated from an external control panel then an emergency stop must also be available.

Consider exposure to hazards, such as slipping, tripping, and falling.

Hazards due to the working position and posture for a person working with or near the robot shall be considered.

Hazards due to noise emission from the robot needs to be considered.

Consider hazards from other equipment in the robot system, for example, that guards remain active until identified hazards are reduced to an acceptable level.

Allergenic material

See *Environmental information on page 215* for specification of allergenic materials in the product, if any.

Securing the robot to the foundation

The robot must be properly fixed to its foundation/support, as described in the respective product manual.

When the robot is installed at a height, hanging, or other than mounted directly on the floor, there will be additional hazards.

Using lifting accessories and other external equipment

Ensure that all equipment used during installation, service and all handling of the robot are in correct condition for the intended use.

Electrical safety

Incoming mains must be installed to fulfill national regulations.

The power supply wiring to the robot must be sufficiently fused and if necessary, it must be possible to disconnect it manually from the mains power.

The power to the robot must be turned off with the main switch and the mains power disconnected when performing work inside the controller cabinet. Lock and tag shall be considered.

Harnesses between controller and manipulator shall be fixed and protected to avoid tripping and wear.

Continues on next page

Wherever possible, power on/off or rebooting the robot controller shall be performed with all persons outside the safeguarded space.

Note

Use a CARBON DIOXIDE (CO_2) extinguisher in the event of a fire in the robot.

Safety devices

The integrator is responsible for that the safety devices necessary to protect people working with the robot system are designed and installed correctly.

When integrating the robot with external devices to a robot system:

- The integrator of the robot system must ensure that emergency stop functions are interlocked in accordance with applicable standards.
- The integrator of the robot system must ensure that safety functions are interlocked in accordance with applicable standards.

Other hazards

The risk assessment should also consider other hazards arising from the application, such as, but not limited to:

- Water
- Compressed air
- Hydraulics

End-effector hazards require particular attention for applications which involve close human collaboration with the robot.

Pneumatic or hydraulic related hazards

Note

The pressure in the complete pneumatic or hydraulic systems must be released before service and maintenance.

All components in the robot system that remain pressurized after switching off the power to the robot must be marked with clearly visible drain facilities and a warning sign that indicates the hazard of stored energy.

Loss of pressure in the robot system may cause parts or objects 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.

All pipes, hoses, and connections have to be inspected regularly for leaks and damage. Damage must be repaired immediately.

Verify the safety functions

Before the robot system is put into operation, verify that the safety functions are working as intended and that any remaining hazards identified in the risk assessment are mitigated to an acceptable level.

1.5 Safety during operation

Automatic operation

Verify the application in the operating mode manual reduced speed, before changing mode to automatic and initiating automatic operation.

Unexpected movement of robot arm

WARNING

Hazards due to the use of brake release devices and/or gravity beneath the manipulator shall be considered.

1.6 Safety during maintenance and repair

1.6.1 Safety during maintenance and repair

General

Corrective maintenance must only be carried out by personnel trained on the robot.

Maintenance or repair must be done with all electrical, pneumatic, and hydraulic power switched off, that is, no remaining hazards.

Hazards due to stored mechanical energy in the manipulator for the purpose of counterbalancing axes must be considered before maintenance or repair.

Never use the robot as a ladder, which means, do not climb on the controller, manipulator, including motors, or other parts. There are hazards of slipping and falling. The robot might be damaged.

Make sure that there are no tools, loose screws, turnings, or other unexpected parts remaining after maintenance or repair work.

When the work is completed, verify that the safety functions are working as intended.

Hot surfaces

Surfaces can be hot after running the robot, and touching these may result in burns. Allow the surfaces to cool down before maintenance or repair.

Allergic reaction

Warning	Description	Elimination/Action
 **Allergic reaction**	When working with lubricants there is a risk of an allergic reaction.	Make sure that protective gear like goggles and gloves are always worn.

Gearbox lubricants (oil or grease)

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

Note

Take special care when handling hot lubricants.

Warning	Description	Elimination/Action
 **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.

Continues on next page

Warning	Description	Elimination/Action
 **Allergic reaction**	When working with lubricants there is a risk of an allergic reaction.	Make sure that protective gear like goggles and gloves are always worn.
 **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.
 **Do not overfill**	Overfilling of gearbox lubricant can lead to internal over-pressure inside the gearbox which in turn may: • damage seals and gaskets • completely press out seals and gaskets • prevent the robot from moving freely.	Make sure not to overfill the gearbox when filling it with oil or grease. After filling, verify that the level is correct.
 **Do not mix types of oil**	Mixing types of oil may cause severe damage to the gearbox.	When filling gearbox oil, do not mix different types of oil unless specified in the instructions. Always use the type of oil specified for the product.
 **Oil residues**	Oil residues might be present in a drained gearbox and spilled when separating a motor and gearbox during repair.	Make sure that protective gear like goggles/protective visor, gloves and arm protection are always worn during this activity. Put oil absorbent cloth or paper at appropriate locations to catch any oil residues.
 **Heat up the oil**	Warm oil drains quicker than cold oil.	Run the robot before changing the gearbox oil, if possible.
 **Specified amount depends on drained volume**	The specified amount of oil or grease is based on the total volume of the gearbox. When changing the lubricant, the amount refilled may differ from the specified amount, depending on how much has previously been drained from the gearbox.	After filling, verify that the level is correct.

Continues on next page

1.6.1 Safety during maintenance and repair
Continued

Warning	Description	Elimination/Action
 **Contaminated oil in gearboxes**	For lifetime reasons always drain as much oil as possible from the gearbox. The magnetic oil plugs will gather residual metal chips.	

Hazards related to batteries

Under rated conditions, the electrode materials and liquid electrolyte in the batteries are sealed and not exposed to the outside.

There is a hazard in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery container. As a result under certain circumstances, electrolyte leakage, electrode materials reaction with moisture/water or battery vent/explosion/fire may follow.

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.

See safety instructions for the batteries in *Material/product safety data sheet - Battery pack* (*3HAC043118-001*).

Related information

See also the safety information related to installation and operation.

1.7 Safety during troubleshooting

General

When troubleshooting requires work with power switched on, special considerations must be taken:

- Safety circuits might be muted or disconnected.
- Electrical parts must be considered as *live*.
- The manipulator can move unexpectedly at any time.

DANGER

Troubleshooting on the controller while powered on must be performed by personnel trained by ABB or by ABB field engineers.

A risk assessment must be done to address both robot and robot system specific hazards.

Related information

See also the safety information related to installation, operation, maintenance, and repair.

1.8 Safety during decommissioning

General

See section *Decommissioning on page 215*.

If the robot is decommissioned for storage, take extra precaution to reset safety devices to delivery status.

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
- Tipdresser

2.2 DressPack cable package

2.2.1 Overview

General

Installing, programming and operating the ABB DressPack 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.

CAUTION

The cabling is sensitive to mechanical damage. Handle it with care to avoid damage to the cabling or the connector, avoid any kind of tilt or skew.

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 ±110°.

For more information, please contact local ABB.

Effects on armload and performance

Note

The extra weight of the DressPack products will affect the armload data and the performance of the robot. The effect differs depending on which type of DressPack product. See *DressPack - arm load parameters and LoadId*.

2.2.2 Installation activities

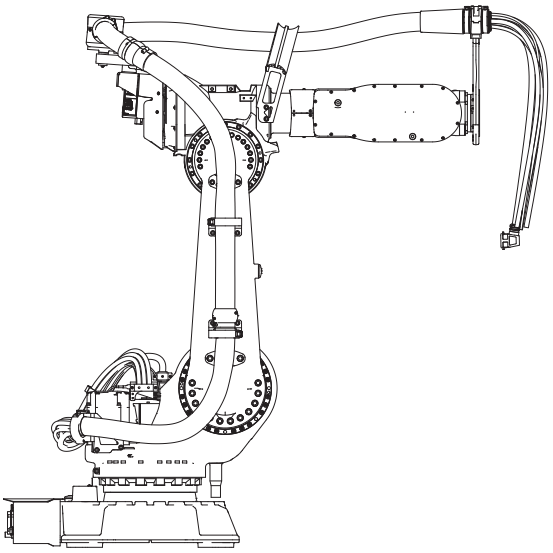
General

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

> **CAUTION**
>
> Connect the male and female connectors perfectly aligned horizontally to avoid any kind of tilt or skew.

Location

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



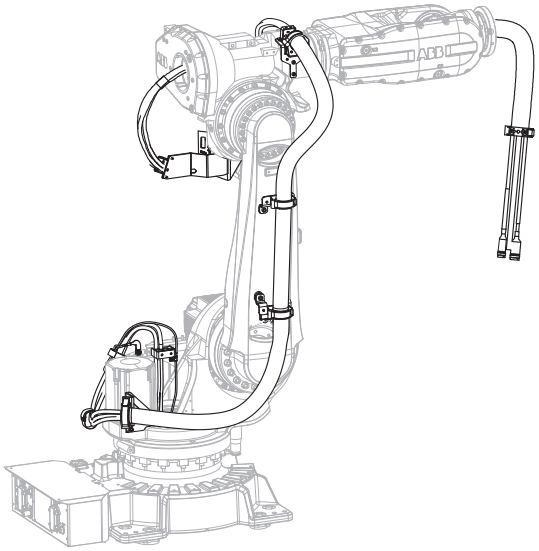
xx0600003150

	DressPack lower/upper arm (continuous) cable package - IRBDP MH2 CE and IRBDP SW2 CE

Continues on next page

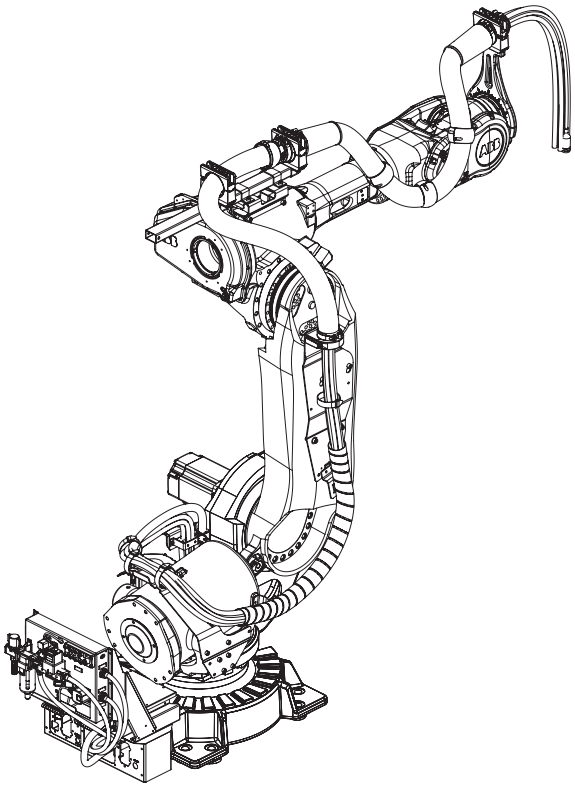
2.2.2 Installation activities

Continued



xx0700000617

	DressPack lower and upper arm cable package - IRBDP MH3 LE and IRBDP MH3 UE



xx0800000127

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

Continues on next page

Procedures, DressPack continuous cable package

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

	For information about:	Also see
1	Fitting the *attachments* of the continuous cable package.	Also see
2	Inspecting the lower arm equipment after installation.	This is detailed in section *Inspection, DressPack lower arm on page 90*.
3	Inspecting the upper arm equipment after installation.	This is detailed in section *Inspection, DressPack upper arm on page 91*.
4	Inspecting the DressPack equipment during programming.	Detailed in section, *Inspection during programming and test-running on page 103*
5	Adjustment of the cable package.	Detailed in section *Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE on page 95*.

Procedures, DressPack cable packages with division point

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

	For information about:	Also see
1	Fitting the lower arm *cable package* IRBDP MH3 LE.	This is detailed in section *Fitting the lower arm cable package - IRBDP MH 3 LE on page 70*.
2	Fitting the lower arm *cable package* IRBDP MH3 UE.	This is detailed in section *Fitting the upper arm cable package - IRBDP MH 3 UE on page 79*.
3	Inspect the lower arm equipment after installation.	For more information, see *Inspection, DressPack lower arm on page 90*.
4	Inspect the upper arm equipment after installation.	For more information, see *Inspection, DressPack upper arm on page 91*.
5	Inspection of the DressPack equipment during programming.	For more information, see *Inspection during programming and test-running on page 103*.
6	Adjustment of the upper arm cable package.	For more information, see *Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE on page 95*.

Procedures, DressPack Basic cable package - IRBDP SW5 CE

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

	For information about:	Also see
1	Fitting attachments of IRBDP SW5 CE (DressPack Basic)	Described in section *Fitting the attachments of IRBDP SW5 CE (DressPack Basic) on page 57*.
2	Fitting the cable package IRBDP SW5 CE (DressPack Basic)	Described in section *Fitting the cable package IRBDP SW5 CE (DressPack Basic) on page 84*.
3	Inspection during programming and test-running	Detailed in section *Inspection during programming and test-running on page 103*.

Continues on next page

2.2.2 Installation activities

Continued

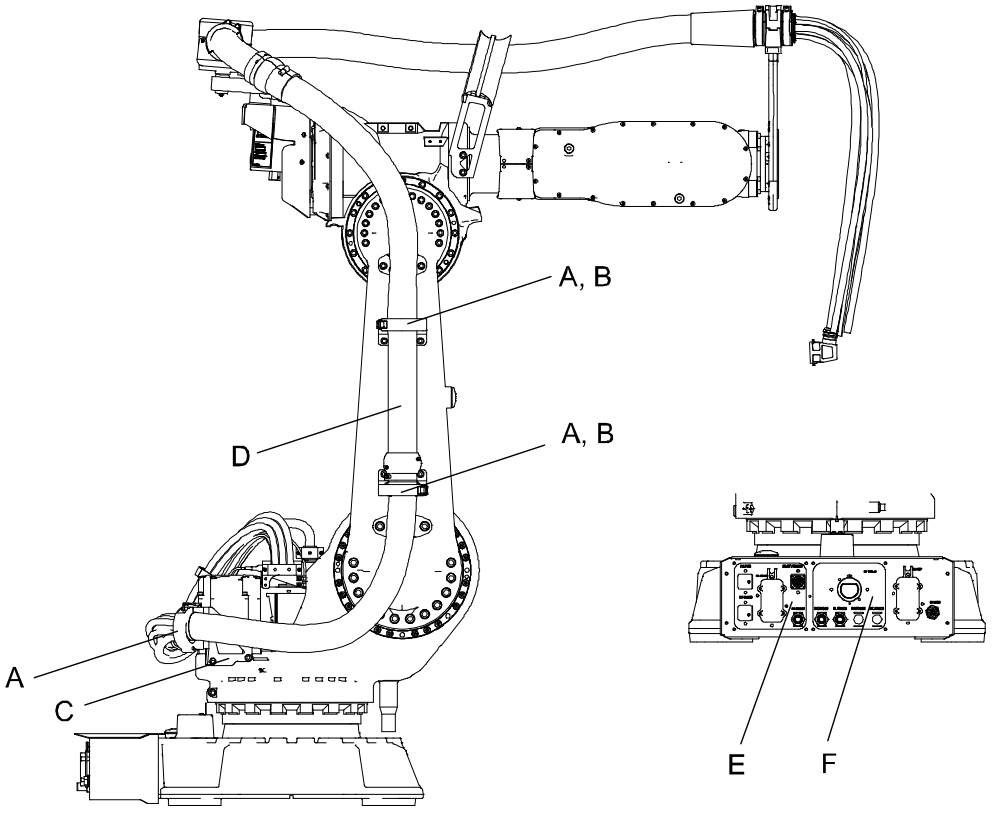
	For information about:	Also see
4	Adjustments of the process cable package IRBDP SW5 CE (DressPack Basic)	Detailed in section *Adjustment of the cable package - IRBDP SW5 CE (DressPack Basic) on page 101*.

2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE

Location of cable package attachments - IRBDP MH 2 CE and IRBDP SW 2 CE

The location of the cable package attachments of IRBDP MH 2 CE and IRBDP SW 2 CE, are shown in the figures below.

The lower arm part of cable package IRBDP MH 2 CE and IRBDP SW 2 CE.



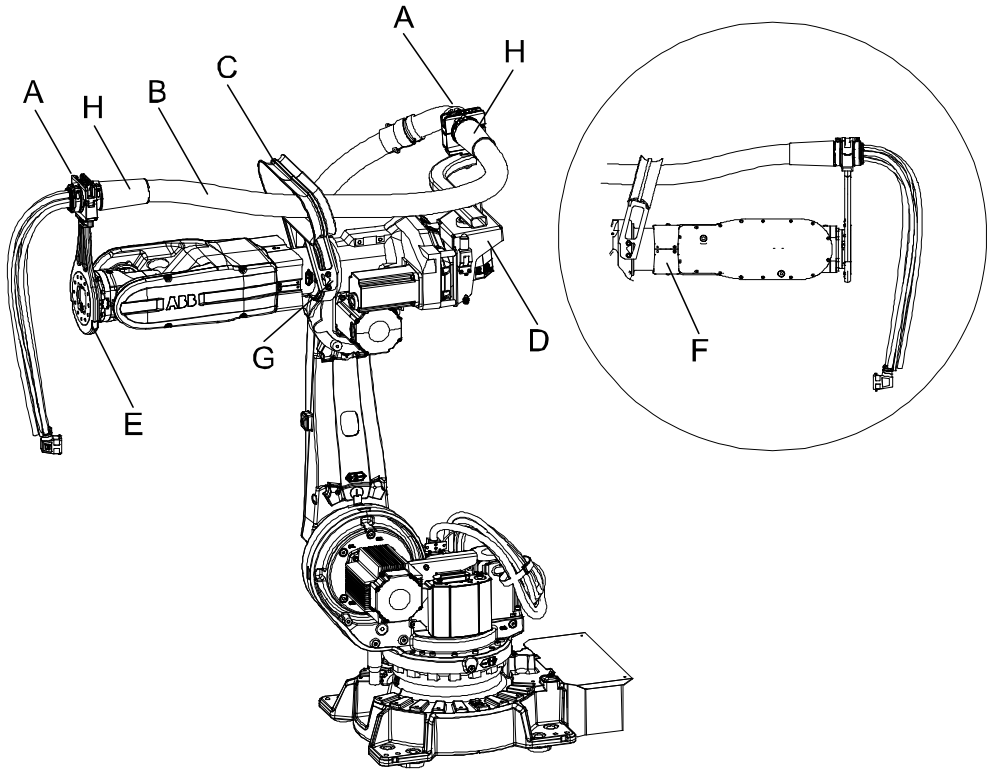
xx0600003148

A	Gripping clamp
B	Bracket, lower arm
C	Bracket, back lower
D	Process cable package
E	Customer plate
F	Process plate

Continues on next page

2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE
Continued

The upper arm part of the cable package IRBDP MH 2 CE and IRBDP SW 2 CE.



xx0600003149

A	Ball joint housing
B	Process cable package
C	Hose support
D	Tension arm unit
E	Process cable support, axis 6
F	Arm protection
G	Bracket, hose support
H	Hose reinforcement

Required equipment

The following equipment are required for fitting the cabling package attachments.

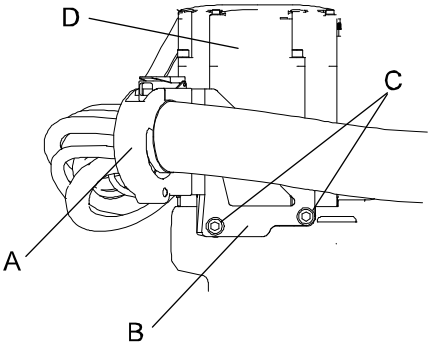
Equipment	Art. no	Note
Locking liquid	3HAB7116-1	Loctite 243. For locking the screws.
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		These procedures include references to the tools required.

Continues on next page

2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE
Continued

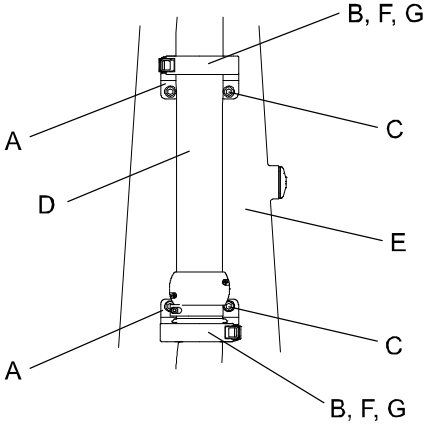
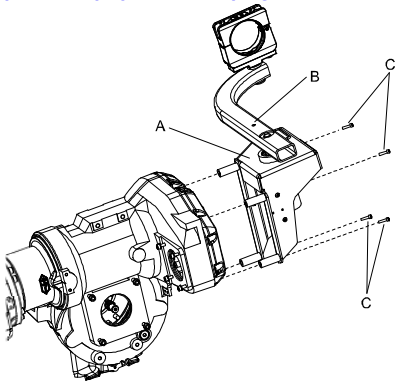
Procedure

The following procedure details how to install the lower and upper cable attachments for the DressPack cable package - IRBDP MH 2 CE and IRBDP SW 2 CE.

	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	Fit the *gripping clamp* to the *bracket, back lower* and attach it to the frame of the robot. Lock the screws with *locking liquid*. The screws are supplied with the kit.	The article no. is specified in section *Required equipment on page 42*.  xx0600003169 Parts: • A: Gripping clamp • B: Bracket, back lower • C: Attachment screws, bracket M10x16 quality 8.8 • D: Motor, axis 1

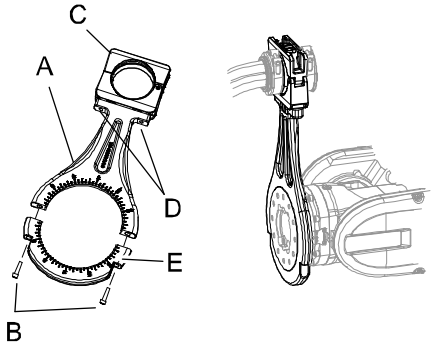
Continues on next page

2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE
Continued

	Action	Note
3	Fit the *bracket, lower arm* with its *attachment screws*. Lock the screws securing the brackets with *locking liquid*. Then fit the *gripping clamp* on the bracket with its *attachment screws* and *washer 2 holes*. The screws are supplied with the kit.	The article no. is specified in section *Required equipment on page 42*.  xx0600003170 Parts: • A: Bracket, lower arm • B: Gripping clamp • C: Attachment screws, bracket M10x16 quality 8.8 (2+2 pcs) • D: Process cable package • E: Lower arm • F: Attachment screws, gripping clamp M8x16 quality 8.8 (2+2 pcs) • G: Washer 2 holes
4	Fit the *tension arm unit* on the robot arm with its *attachment screws*. It is possible to use the Ø10 mm hole with a suitable lifting equipment, to lift the tension arm unit. Lock the screws with *locking liquid*. The screws are supplied with the kit.	The article no. is specified in section *Required equipment on page 42*.  xx0600003185 Parts: • A: Tension arm unit • B: Ø10 mm hole • C: Attachment screws M12x80 Gleitmo 12.9 (4 pcs). Tightening torque: 70 Nm.

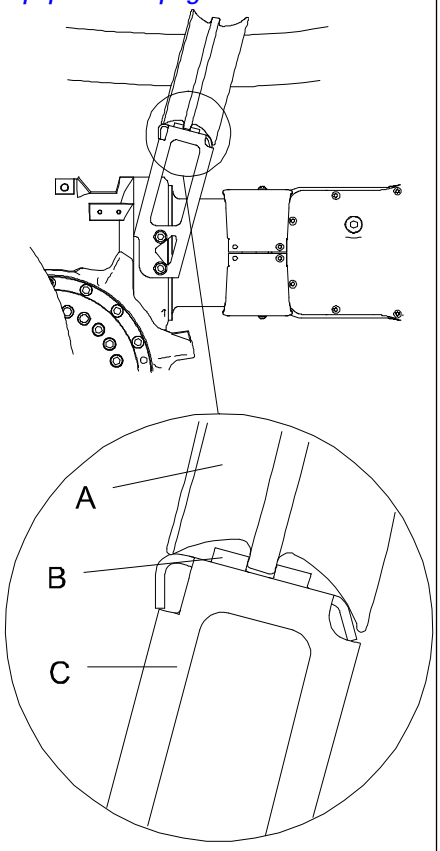
Continues on next page

2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE
Continued

	Action	Note
5	Fit the *process cable support, axis 6* by performing the following steps: • Remove the lower half of the *process cable support axis 6* by removing its *attachments screws*. • Fit the parts from "behind" the robot turning disk. • Make sure the process cable support is turned correctly. • Pull the assembly forwards until it is seated against the rear of the turning disk. Attachment screws are supplied with the kit. **Note** Make sure the gaps between the clamp and support are equal. **Note** Lock the M10x40 screws with *locking liquid* . (No locking liquid on the M12x80 screws)	The article no. is specified in section *Required equipment on page 42*.  xx0600003172 Parts: • A: Process cable support, axis 6 • B: Attachment screws M12x80 Gleitmo 12.9 (2 pcs). Tightening torque: 47 Nm. • C: Ball joint housing • D: Attachment screws M10x40 quality 8.8 (2 pcs)

Continues on next page

2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE
Continued

	Action	Note
6	Fit the *bracket, hose support* to the *hose support* . Lock the screws with *locking liquid*.	Art. no. is specified in section *Required equipment on page 42*.  xx0600003199 Parts: • A: Hose support • B: Attachment screws M6x16 quality 8.8 (3 pcs) • C: Bracket, hose support

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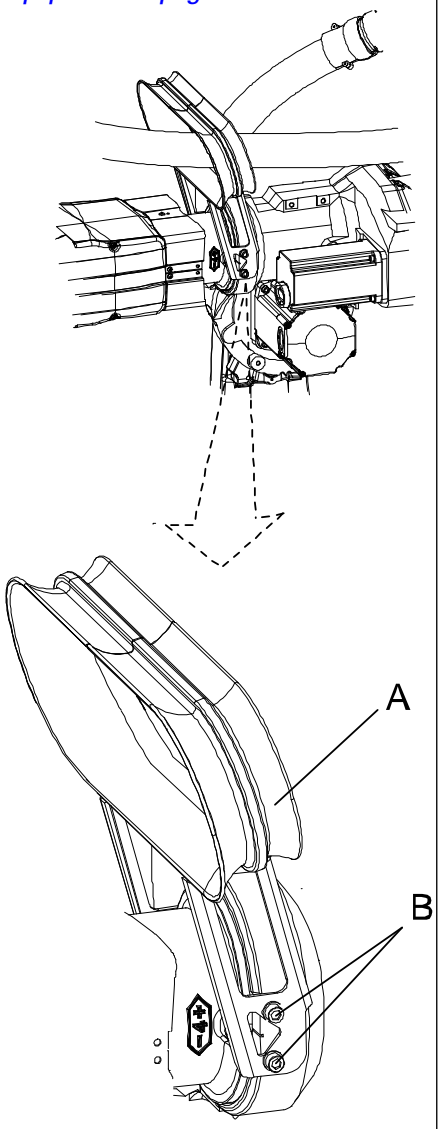
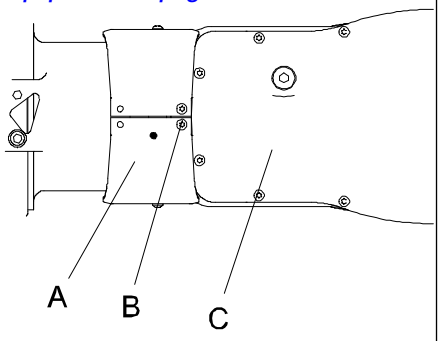
2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE
Continued

	Action	Note
7	Fit the *hose support* with its bracket fitted, on the upper arm. Lock the screws with *locking liquid*.	Art. no. is specified in section *Required equipment on page 42*.  xx0600003200 Parts: • A: Hose support • B: Attachment screws M8x16 quality 8.8 (4 pcs)

Continues on next page

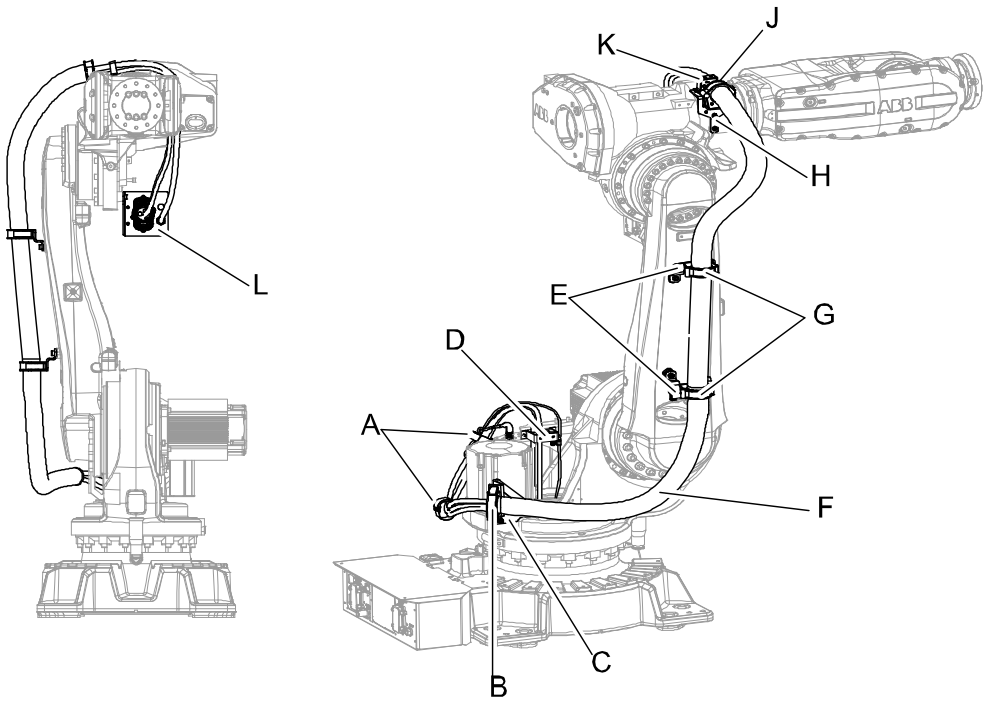
2.2.3 Fitting the attachments of the continuous cable package - IRBDP MH 2 CE and IRBDP SW 2 CE *Continued*

	Action	Note
8	Fit the *arm protection* with its attachment screws. Lock screws with *locking liquid*.	Art. no. is specified in section *Required equipment on page 42*.  xx0600003201 Parts: • A: Arm protection (2 pcs) • B: Attachment screws M6x16 quality 8.8 (6 pcs) • C: Wrist

2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE

Location of cable package attachments - IRBDP MH 3 LE and IRBDP MH 3 UE

Attachments of the cable package IRBDP MH 3 LE.



xx0700000579

A	Strap velcro
B	Gripping clamp (on frame)
C	Bracket back lower
D	Metal clamp with rubber clamp
E	Bracket lower arm
F	Process cable package
G	Gripping clamp (on lower arm)
H	Bracket for clamp
J	Gripping clamp (on upper arm)
K	Metal clamp with rubber clamp
L	Connection plate ax 3

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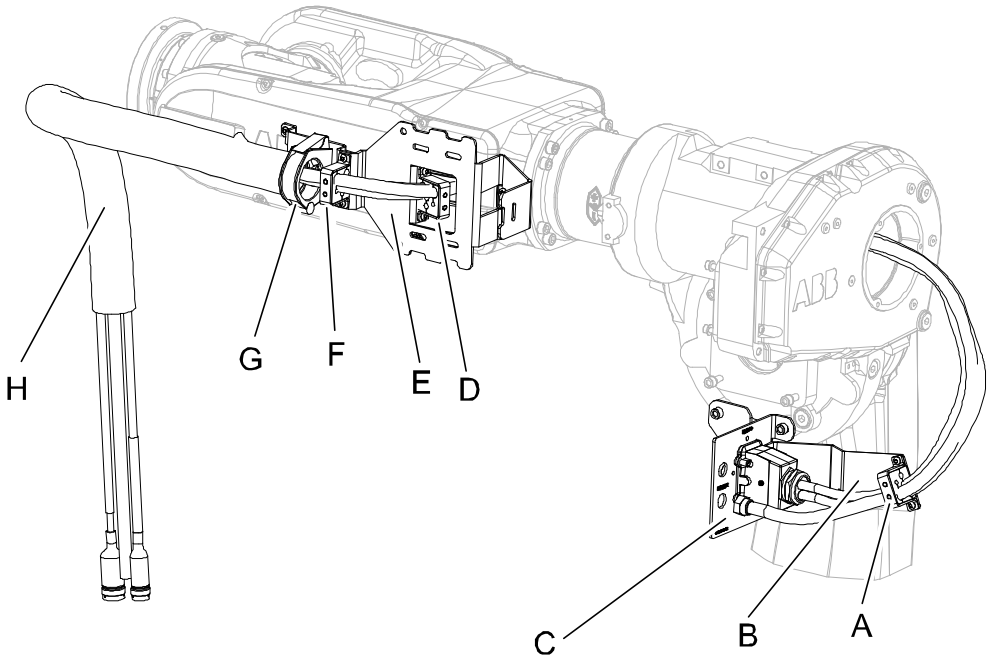
2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE
Continued

Attachments of the cable package IRBDP MH 3 UE.



xx0700000580

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

Required equipment

The following equipment is required for fitting the attachments of cable package IRBDP MH 3 LE and IRBDP MH 3 UE.

Equipment	Article number	Note
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Required consumables

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

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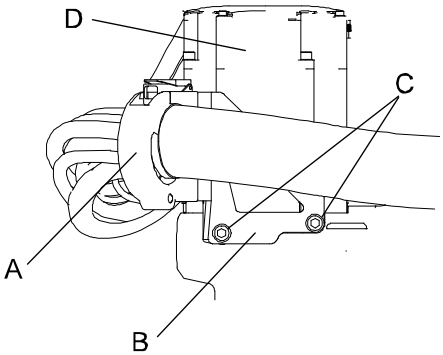
Fitting of the attachments

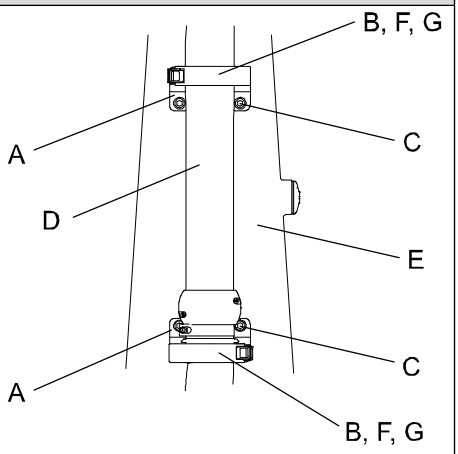
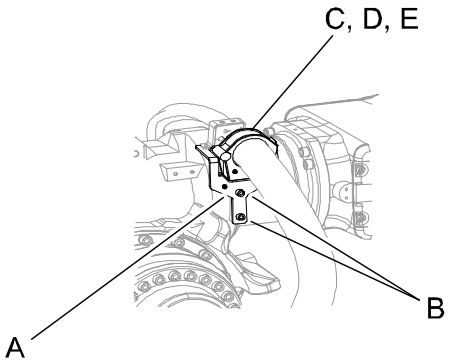
The following procedure describes how to fit the cable package attachments of IRBDP MH 3 LE and IRBDP MH 3 UE.

All screws are supplied with the kit.

	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	Fit the gripping clamp to the bracket back lower and attach it to the frame of the robot. Lock screws with locking liquid (Loctite 243).	 xx0600003169 Parts: • A: Gripping clamp • B: Bracket, back lower • C: Attachment screws, M10x16 8.8 (2 pcs) • D: Motor, axis 1

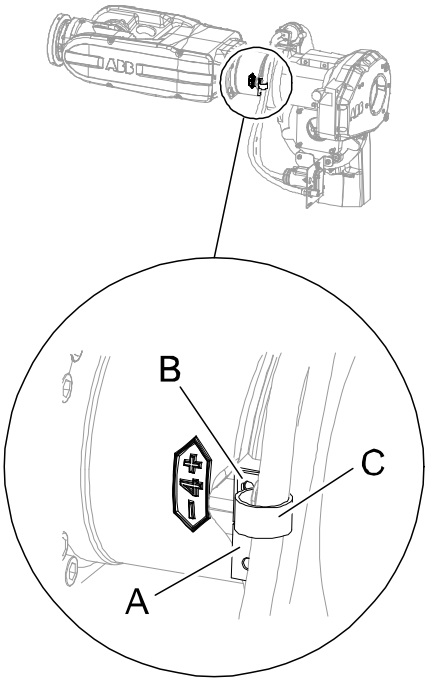
Continues on next page

2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE
Continued

	Action	Note
3	Fit the bracket lower arm. Lock screws with locking liquid (Loctite 243).	 xx0600003170 Parts: • A: Bracket, lower arm • B: Gripping clamp • C: Screws, M10x16 (2+2 pcs) • D: Process cable package • E: Lower arm • F: Screws, M8x16 8.8-A2F (2+2 pcs) • G: Washer 2 holes (2 pcs)
4	Fit the gripping clamp on the bracket, lower arm with its attachment screws and the washer 2 holes. Lock screws with locking liquid (Loctite 243).	
5	Fit the bracket for clamp with its attachments screws. Lock screws with locking liquid (Loctite 243).	 xx0700000584 Parts: • A: Bracket for clamp • B: Screws, M8x16 8.8-A2F (2 pcs) • C: Gripping clamp • D: Screws, M8x16 8.8-A2F (2 pcs) • E: Washer 2 holes
6	Fit the gripping clamp on the bracket with its attachment screws and the washer 2 holes. Lock screws with locking liquid (Loctite 243).	

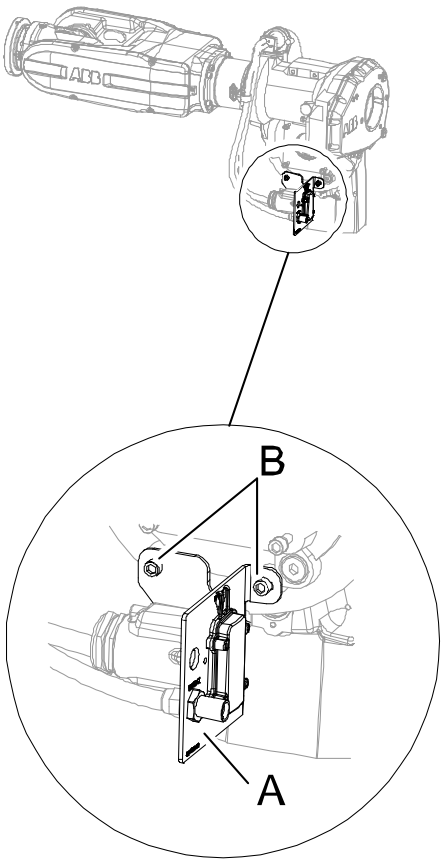
Continues on next page

2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE
Continued

	Action	Note
7	Fit the cable fixing bracket with its attachments screws. Lock screws with locking liquid (Loctite 243).	 xx0700000585 Parts: • A: Cable fixing bracket • B: Screws, M8x16 8.8-A2F (2 pcs) • C: Velcro strap

Continues on next page

2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE
Continued

	Action	Note
8	Fit the connection plate to axis 3 with its attachment screws. Lock screws with locking liquid (Loctite 243).	 xx0700000588 Parts: • A: Connection plate • B: Screws, M10x16 8.8-A3F (2 pcs)

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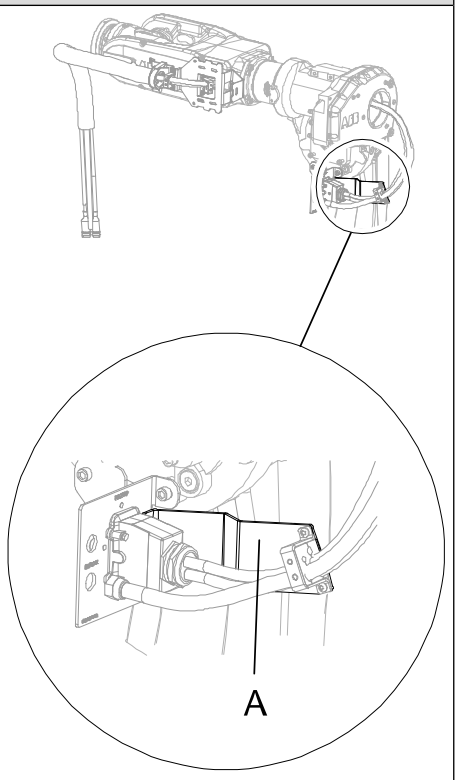
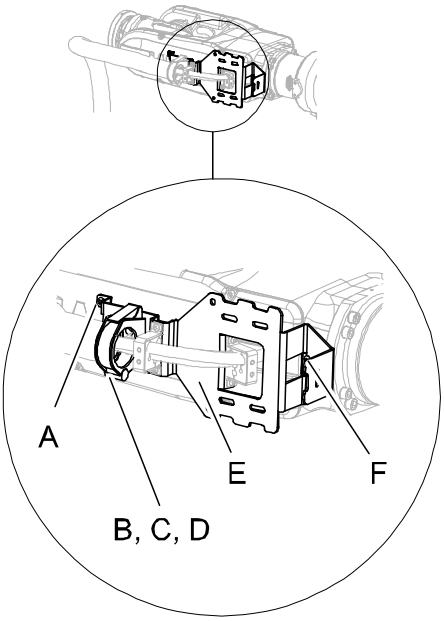
2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE
Continued

	Action	Note
9	Fit the bracket for metal clamp to the connection plate with its attachment screws.	 xx0700000592 Parts: • A: Bracket for metal clamp • Screw, M8x25, 8.8-A2F (2 pcs) • Nut, M8 (2 pcs)

Continues on next page

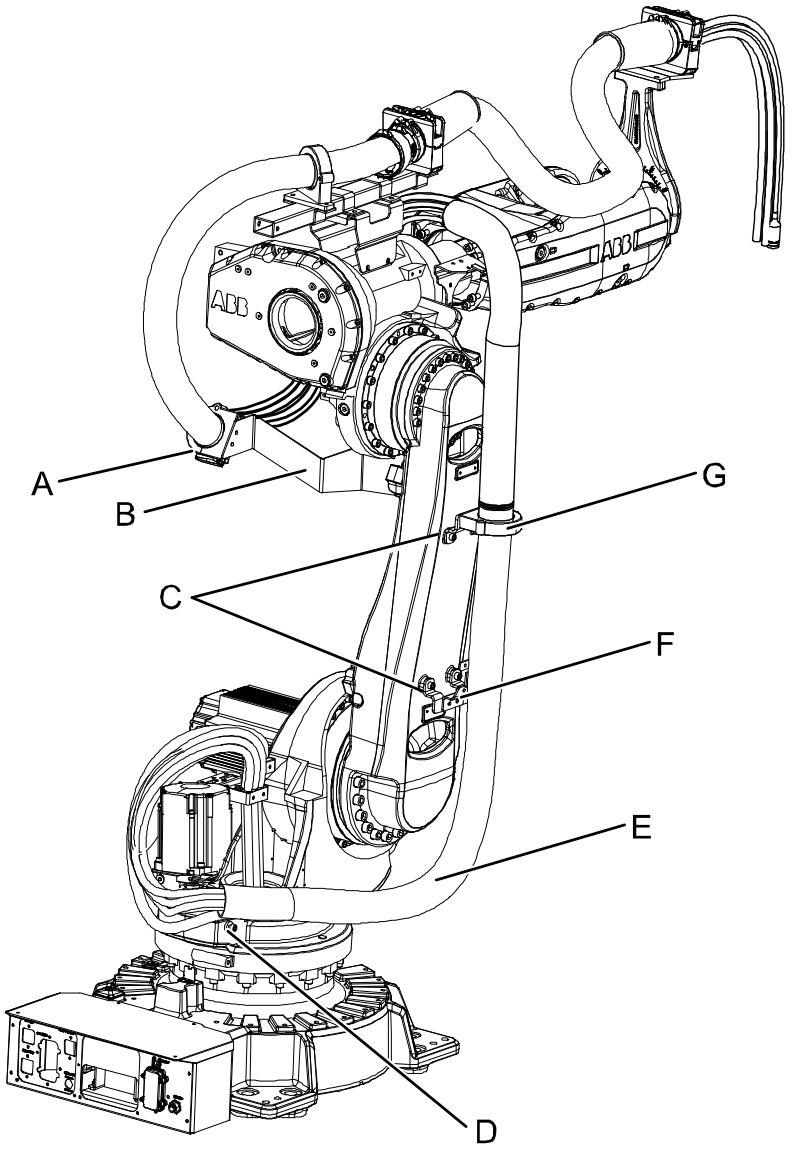
2.2.4 Fitting the attachments of the cable package - IRBDP MH 3 LE and IRBDP MH 3 UE
Continued

	Action	Note
10	Fit bracket at wrist with its attachment screws. Lock screws with locking liquid (Loctite 243).	 xx0700000594 Parts: • A: Screw, M6x16 8.8-A2F (2 pcs) • B: Gripping clamp • C: Screw, M8x16 8.8-A2F (2 pcs) • D: Washer 2 holes • E: Bracket at wrist • F: Screws, M6x12 8.8-A2F (2 pcs)
11	Fit the gripping clamp on the bracket with its attachment screws and the washer 2 holes. Lock screws with locking liquid (Loctite 243).	

2.2.5 Fitting the attachments of IRBDP SW5 CE (DressPack Basic)

Location of the attachments

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



xx0800000110

A	Gripping clamp (axis 3 clamp mount)
B	Axis 3 clamp mount (fitted on Axis 3 cable bracket)
C	Lower brackets
D	Bracket back lower + Spiral hose clamp
E	Spiral hose
F	Spiral hose clamp
G	Gripping clamp (lower bracket)

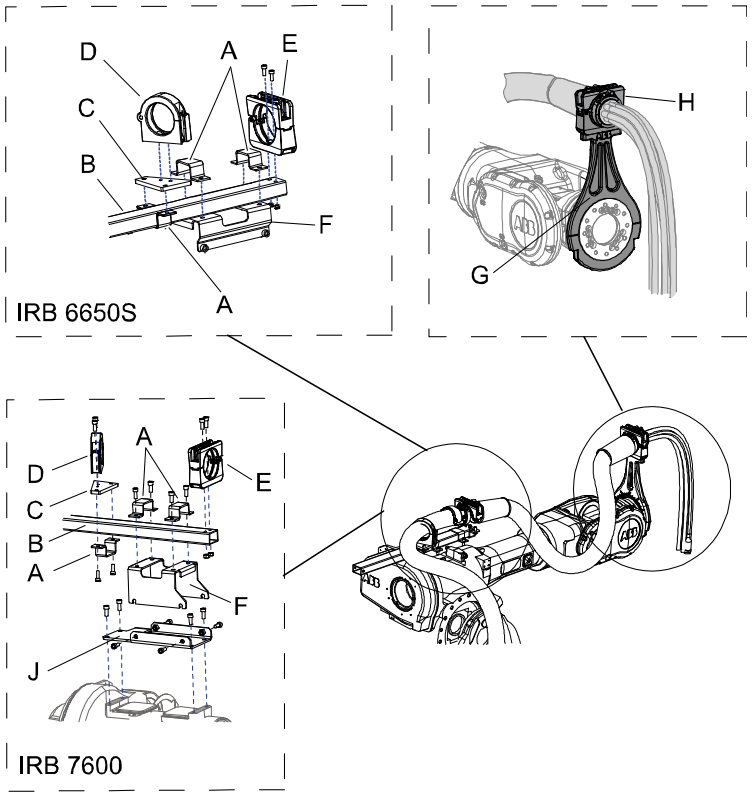
Continues on next page

2.2.5 Fitting the attachments of IRBDP SW5 CE (DressPack Basic)
Continued

Location of upper attachments

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

The figure below shows the robot model IRB 66X0.



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	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
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.

Continues on next page

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 (DressPack basic).

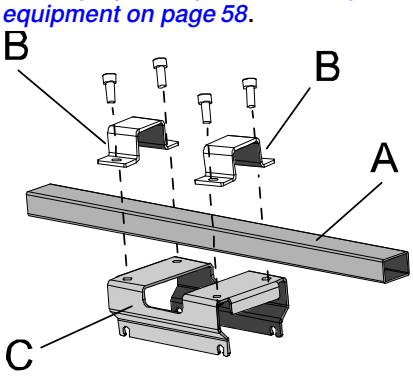
	Action	Note
1	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
2	Fit the *bracket back lower* to the frame with its attachment screws. Also fit the *spiral hose clamp* on the bracket back lower, Lock screws with *locking liquid*.	Shown in the figure *Location of the attachments on page 57*.
3	Fit the *lower brackets* with its *attachment screws*. Lock screws securing the lower brackets lower arm with *locking liquid*.	Shown in the figure *Location of the attachments on page 57*.
4	Fit the *spiral hose clamp* on the bottom lower bracket.	Shown in the figure *Location of the attachments on page 57*.
5	Fit a *gripping clamp* on the top lower bracket with its *attachment screws* and *washer 2 holes*. Lock screws with *locking liquid*.	
6	Fit the *axis 3 clamp mount* on the *axis 3 cable bracket* with its attachment screws and nuts.	Shown in the figure *Location of the attachments on page 57*.
7	Fit a *gripping clamp* on the axis 3 clamp mount with its attachment screws and washer 2 holes.	Shown in the figure *Location of the attachments on page 57*.

Continues on next page

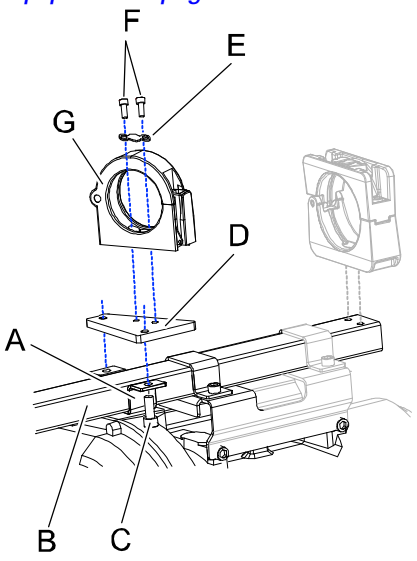
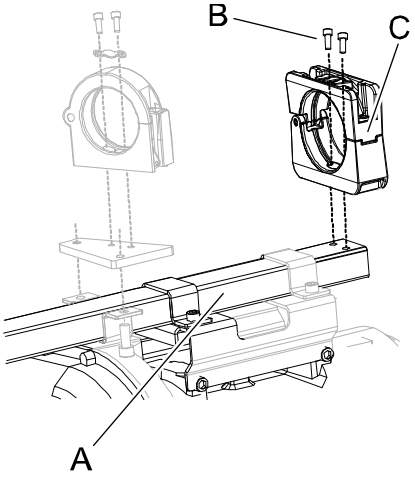
2.2.5 Fitting the attachments of IRBDP SW5 CE (DressPack Basic)
Continued

Fitting cable attachments - upper end

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

	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	Fit the *adjustable bracket* to the *axis 3 bracket* with its *brackets* and attachment screws. Lock screws with *locking liquid*.	Locking liquid is specified in *Required equipment on page 58*.  xx0800000076 Parts: • A: Adjustable bracket • B: Bracket • C: Axis 3 bracket

Continues on next page

	Action	Note
3	Fit the *gripping clamp* to the *angled clamp bracket* with its *attachment screws* and *washer 2 holes*. Lock screws with *locking liquid*. Then fit the angled clamp bracket with the gripping clamp already fitted on the *adjustable bracket* with the *bracket* and its *attachment screws*. **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 *Adjustment of the cable package - IRBDP SW5 CE (DressPack Basic) on page 101*.	Locking liquid is specified in *Required equipment on page 58*.  xx0800000107 Parts: • 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
4	Fit the *ball joint housing* to the *adjustable bracket* with the *bracket* and its *attachment screws* and *washer 2 holes*. **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 *Adjustment of the cable package - IRBDP SW5 CE (DressPack Basic) on page 101*.	 xx0800000108 Parts: • A: Adjustable bracket • B: Attachment screw M10x25 quality 8.8-A3F (2 pcs) • C: Ball joint housing
5	Fit the *spiral hose bracket* to the upper arm.	

Continues on next page

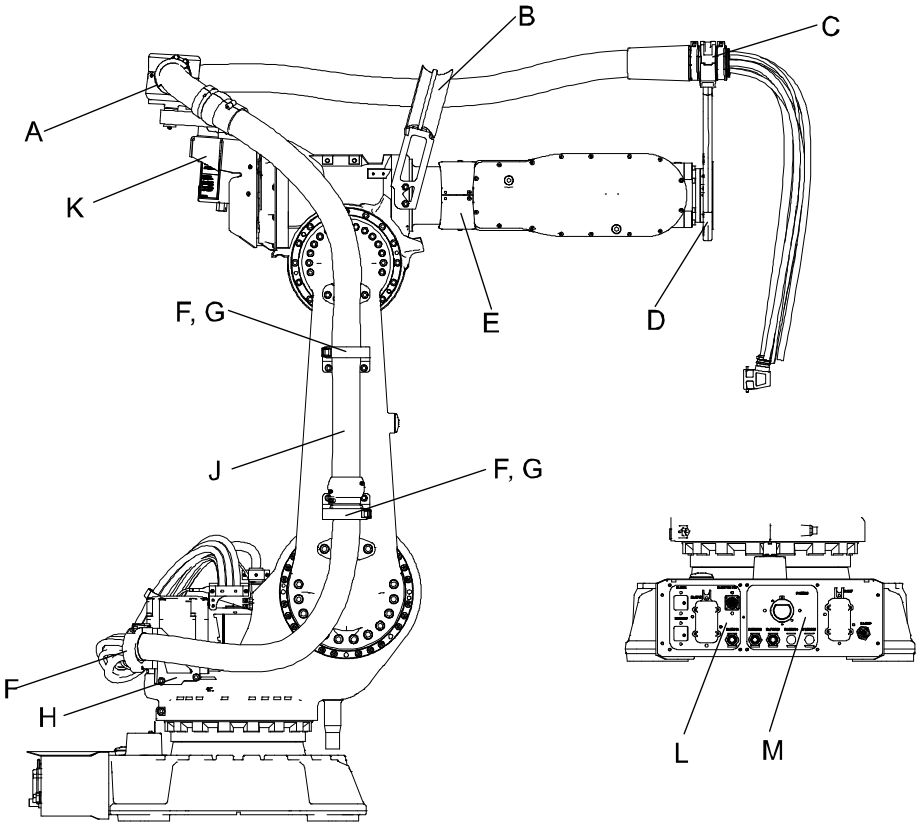
2.2.5 Fitting the attachments of IRBDP SW5 CE (DressPack Basic)
Continued

	Action	Note
6	Fit the *harness support axis 6* to the turning disk with its attachment screws. Lock screws with *locking liquid*.	Shown in the figure *Location of upper attachments on page 58*. Locking liquid is specified in *Required equipment on page 58*.
7	Fit the *ball joint housing* the harness support axis 6 with its attachment screws. Lock screws with *locking liquid*.	Shown in the figure *Location of upper attachments on page 58*. Locking liquid is specified in *Required equipment on page 58*.

2.2.6 Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE

Location of cable package - IRBDP MH2 CE andIRBDP SW2 CE

The cable package, IRBDP MH2 CE andIRBDP SW2 CE consists of the parts shown in the illustration below.



xx0600003151

A	Ball joint housing, back end
B	Hose support
C	Ball joint housing, front end
D	Process cable support axis 6, complete
E	Arm protection
F	Gripping clamp
G	Bracket, lower arm
H	Bracket, back lower
J	Process cable package
K	Tension arm unit
L	Customer plate
M	Process plate

Continues on next page

2.2.6 Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE
Continued

Required equipment

The following equipment are required for installation of the cable package IRBDP MH2 CE andIRBDP SW2 CE.

Equipment	Art. no.	Note
Cable package IRBDP SW2 CE	For spare part number see chapter: • *Spare parts on page 229*.	A number of versions are available.
Cable package IRBDP MH2 CE		A number of versions are available. See *Spare parts* chapter.
Circuit diagram	3HAC026136-001 3HAC026208-001	DressPack DressPack

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
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

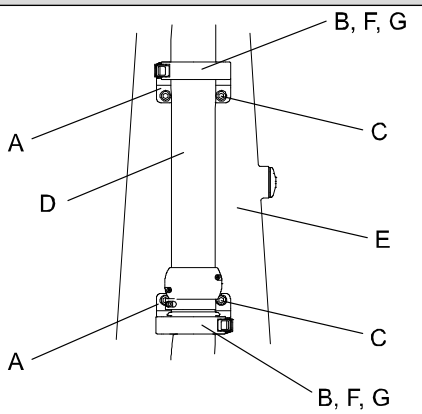
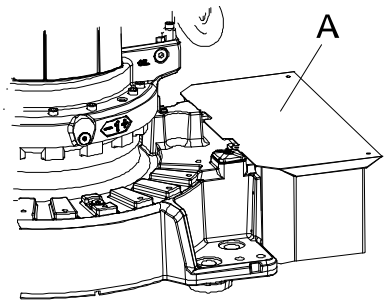
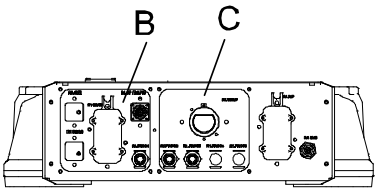
Consumable	Article number	Note
Locking liquid	3HAB7116-1	Loctite 243 For locking the gripping clamps.

Procedure

Use this procedure to fit the cable package IRBDP MH2 CE andIRBDP SW2 CE.

	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

	Action	Note
3	Secure the cable package to the *upper* and *lower gripping clamps* on the lower arm.	 xx0600003170 • A: Bracket lower arm • B: Gripping clamp • C: Attachment screws, bracket M10x16 quality (2+2 pcs) • D: Process cable package • E: Lower arm • F: Attachment screw, gripping clamp M8x18 quality 8.8 (2+2 pcs) • G: Washer 2 holes
4	Remove the *top cover plate* in the back of the robot base.	  xx0600003174 Parts: • A: Top cover plate • B: Customer plate • C: Process plate

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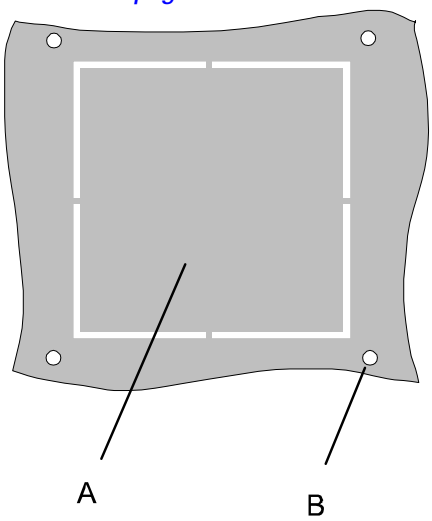
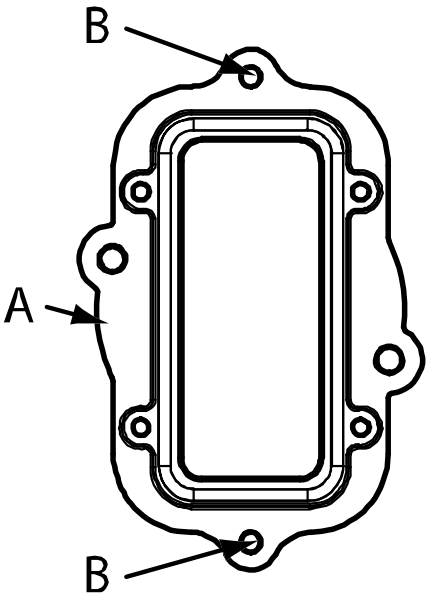
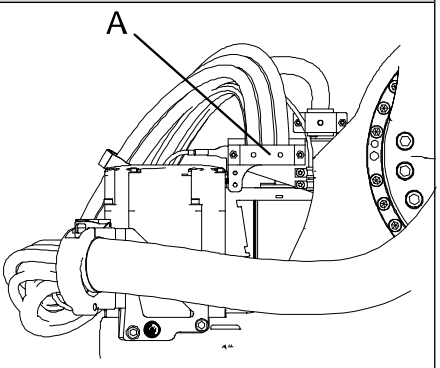
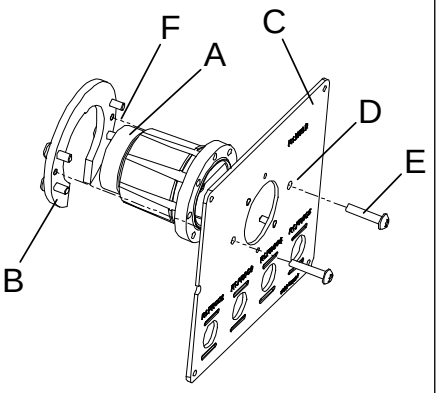
2.2.6 Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE

Continued

	Action	Note
5	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. Fit process and customer plates.	Shown in the figure *Location of cable package - IRBDP MH2 CE andIRBDP SW2 CE on page 63*.  xx0700000404 Parts: • A: Removable part of backplate • B: Holes for attachment screws **Note** Only needed when the DressPack cable package is fitted for the first time.
6	Fit the *adapter complete* to the customer plate with its two *attachment screws*. Screws are supplied with the kit.	 xx0300000195 Parts: • A: Adapter complete • B: Attachment screws M6x16 quality 8.8-A2F (2 pcs)

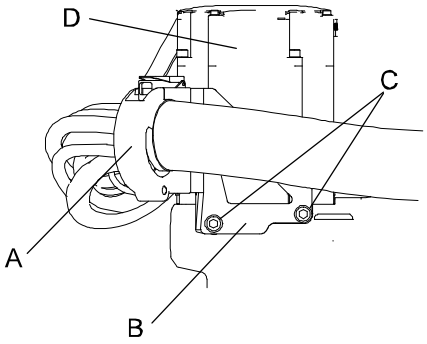
Continues on next page

	Action	Note
7	Run the cables down through the center hole of gearbox axis 1in the following order: • Signal cables • Hoses, slightly to the right of the signal cables. Check: • Check that signal cables and hoses do not end up between the motor cables! • Check that cables and hoses do not cross each other.	 xx0600003188 • A: Cable holder bracket axis 1
8	Attach the cable holder bracket with its attachment screws M10x16 quality 8.8 (3 pcs). Lock the screws with *locking liquid*. Screws are supplied with the kit.	Art. no. is specified in section *Required equipment on page 64*.
9	**Spot welding applications only**: Run the *weld power cable*, slightly to the right of the signal cable and hoses in order to facilitate the connecting of cables in the robot base.	Check that the weld power cable do not end up between other cables and hoses.
10	**Spot welding applications only**: Fit the weld power cable to the rear of the *process plate*, with two *attachment screws* using the *weld connector bracket*. Do not tighten the attachment screws at this point. Screws are supplied with the kit.	 xx0300000196 Parts (as seen from above): • 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

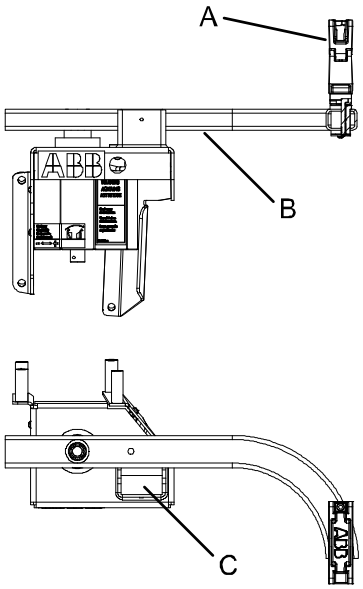
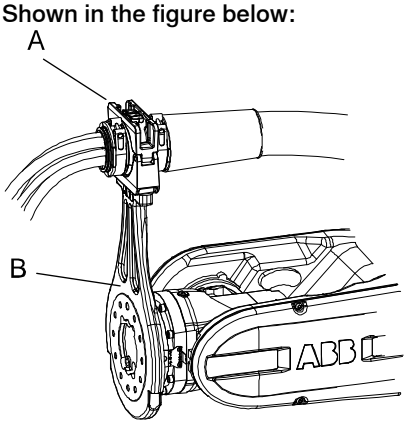
Continues on next page

2.2.6 Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE

Continued

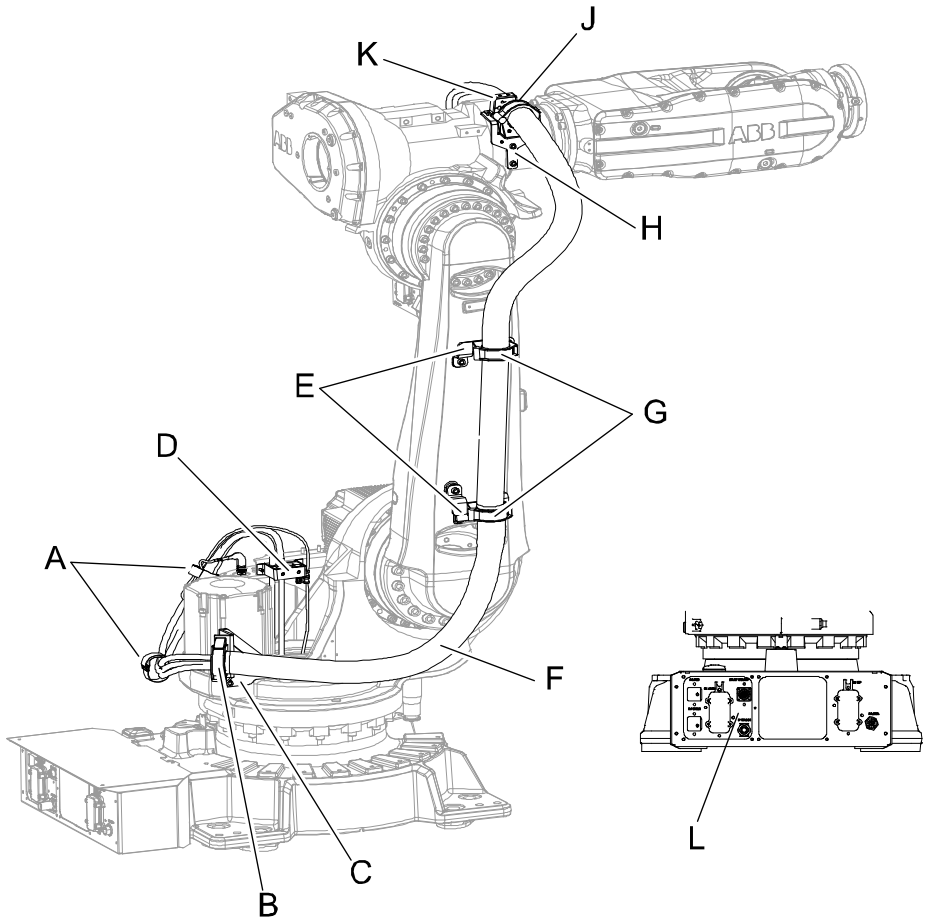
	Action	Note
11	Fit the connectors to the *customer plate* and *process plate* previously fitted to the *connection plate, base*. Screws are supplied with the kit. **CAUTION** Do not tighten the brass couplings for water and air with excessive force. **CAUTION** If the M12 Ethernet connector is not tightened correctly, there is a risk that the connector can loosen and the cable shield gets disconnected, which will require retightening with the correct torque tools. For secure connection, always tighten at the knurled screw with correct torque and by using proper torque tool, e.g. M12 dynamometric screwdriver SW15 (09 99 000 0646 (article number at Harting Technology Group)).	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass. Tightening torque, Ethernet M12: 0.6 Nm. Shown in the figure in section *Location of cable package - IRBDP MH2 CE andIRBDP SW2 CE on page 63*. Recheck all cables and hoses for straining or twisting. Reroute if required! Screw dimension: M6x20
12	**Tip** 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.	The weld power attachments screws are shown in figure above!
13	Secure the hoses and cables to the *gripping clamp, frame*.	 xx0600003169 • A: Gripping clamp, frame • B: Bracket, back lower • C: Attachment screws, bracket M10x16 quality 8.8 (2 pcs) • D: Motor, axis 1
14	Run the front end of the process cable package through the *hose support*.	Shown in the figure in section *Location of cable package - IRBDP MH2 CE andIRBDP SW2 CE on page 63*.

Continues on next page

	Action	Note
15	Straighten the cable package out and place it in the *ball joint housing* on the *tension arm*. Secure it. The figure shows the position of the tension unit.	 xx0600003187 Parts: • A: Ball joint housing • B: Tension arm unit • C: Damper
16	Place the front end of the cable package in the ball joint housing on the process cable support axis 6, and secure it.	Shown in the figure below:  xx0600003173 • A: Ball joint housing • B: Process cable support, axis 6

2.2.7 Fitting the lower arm cable package - IRBDP MH 3 LE

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



xx0700000596

A	Strap velcro
B	Gripping clamp (on frame)
C	Bracket back lower
D	Metal clamp with rubber clamp
E	Bracket lower arm
F	Protection hose (Cable package)
G	Gripping clamp (on lower arm)
H	Bracket for clamp
J	Gripping clamp (on upper arm)
K	Metal clamp with rubber clamp
L	Customer plate (Only IRB 6620)

Continues on next page

Required equipment

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

Equipment	Article number	Note
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Required consumable

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

Fitting of the lower arm cable package IRBDP MH3 LE

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

All screws are supplied with the kit.

How to fit cable package IRBDP MH 3 UE is described in section *Fitting the upper arm cable package - IRBDP MH 3 UE on page 79*.

	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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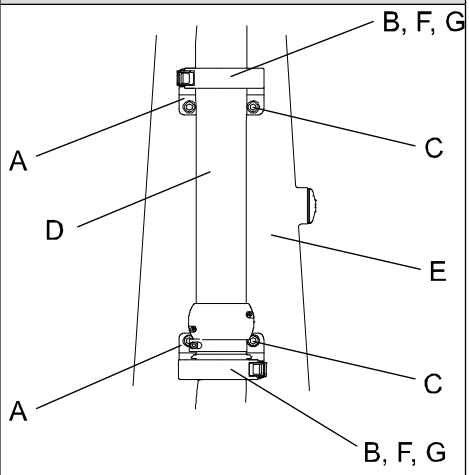
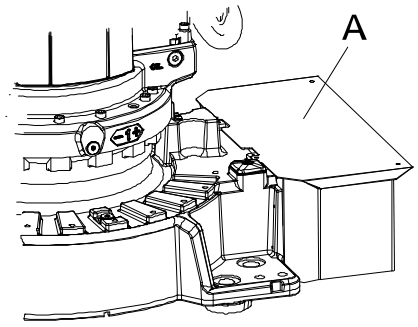
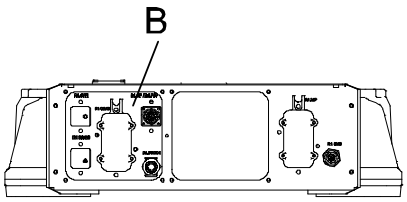
2.2.7 Fitting the lower arm cable package - IRBDP MH 3 LE

Continued

	Action	Note
3	Secure the cable package to the *upper* and *lower gripping clamps* on the lower arm.	 xx0600003170 Parts: • A: Bracket, lower arm • B: Gripping clamps, upper and lower • C: Attachment screws, bracket M10x16 quality 8.8-A3F (2+2 pcs) • Process cable package • E: Lower arm • F: Attachment screw, gripping clamp M8x18 quality 8.8-A2F (2+2 pcs) • G: Washer 2 holes
4	Remove the *top cover plate* in the back of the robot base.	  xx0700000618 Parts: • A: Top cover plate • B: Customer plate

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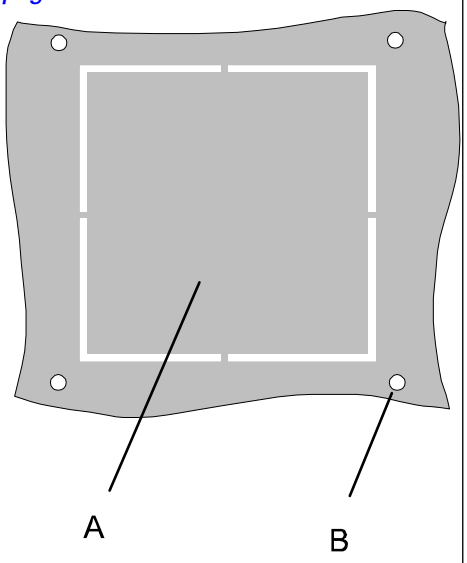
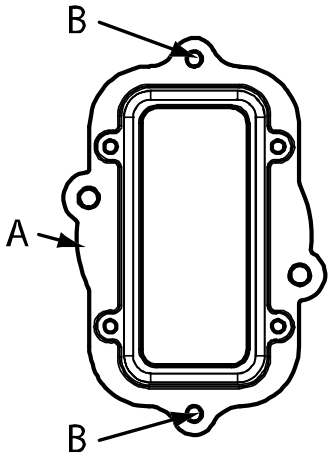
	Action	Note
5	Hit the removable part of the backplate with a plastic mallet or similar without damaging other parts of the backplate to remove it. Fit process and customer plates. **Note** Only needed when the DressPack cable package is fitted for the first time.	Shown in the figure *Location of the lower arm cable package - IRBDP MH 3 LE on page 70*.  xx0700000404 Parts: • A: Removable part of backplate • B: Holes for attachment screws
6	Fit the *adapter complete* to the customer plate with its two *attachment screws*.	 xx0300000195 Parts: • A: Adapter complete • B: Attachment screws M6x16 quality 8.8-A2F (2 pcs) (Screws are supplied with the kit.)

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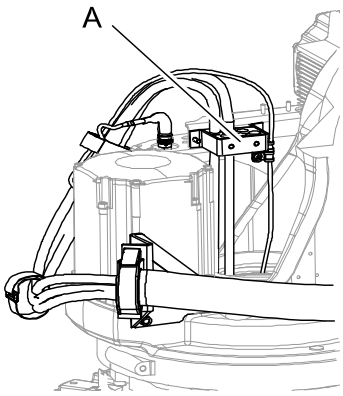
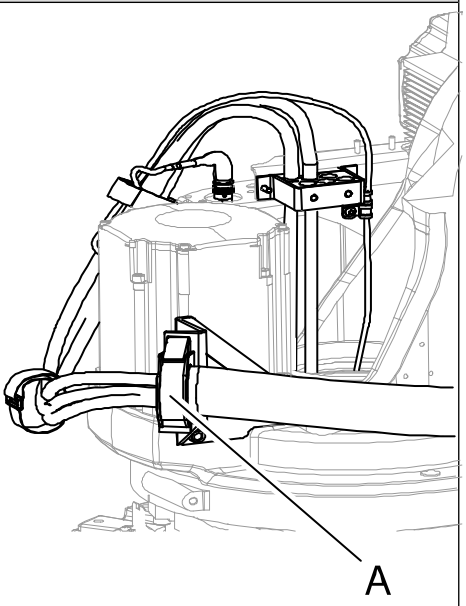
2.2.7 Fitting the lower arm cable package - IRBDP MH 3 LE

Continued

	Action	Note
7	Run the cables down through the centre hole of gearbox axis 1 in the following order: • Signal cable • Hoses, slightly to the right of the signal cable Check: • that signal cable and hoses *does not* end up between the motor cables • that cables and hoses *are not* crossing each other.	 xx0700000598 Parts: • A: Cable holder bracket
8	Attach the *cable holder bracket* with its attachment screws. Lock the screws with *locking liquid*.	Screws, M10x16, quality 8.8-A3F (3 pcs) (Screws are supplied with the kit.)
9	**CAUTION** Do not tighten the brass couplings for water and air with excessive force.	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
10	Fit the connectors to the *customer plate,* previously fitted to the *connection plate, base*.	Shown in the figure in section *Location of the lower arm cable package - IRBDP MH 3 LE on page 70*. Recheck all cables and hoses for straining or twisting. Reroute if required! Screw dimension: M6x20 (Screws are supplied with the kit.)

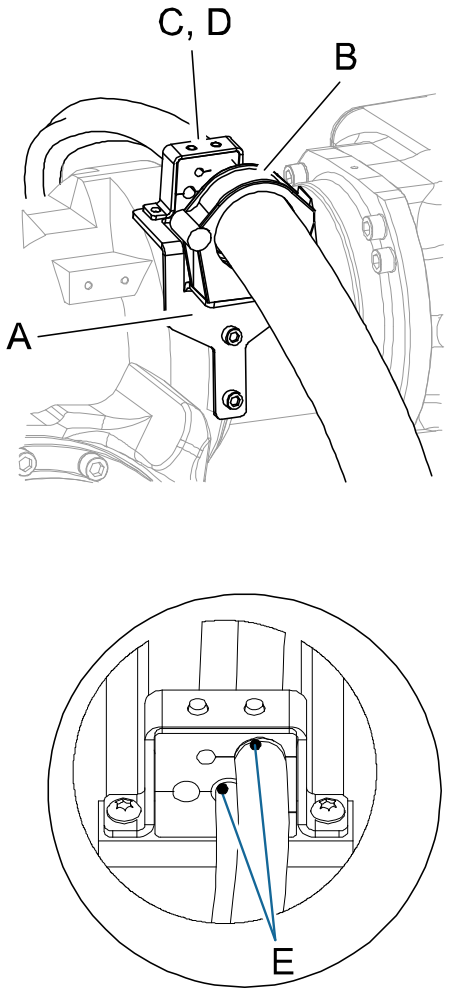
Continues on next page

	Action	Note
11	Secure the hoses and cables to the *gripping clamp, frame*.	 xx0700000600 Parts: • A: Gripping clamp, frame

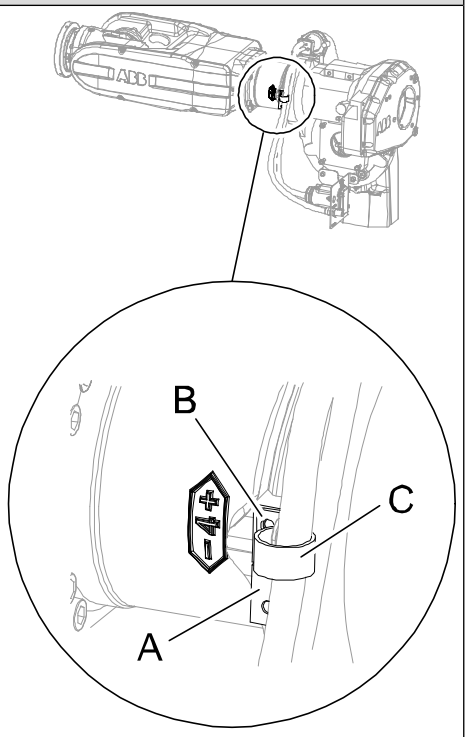
Continues on next page

2.2.7 Fitting the lower arm cable package - IRBDP MH 3 LE

Continued

	Action	Note
12	Fit the cable package in the *gripping clamp, upper arm*. Fit the cables and hoses to the *bracket for clamp* with the *metal clamp with rubber clamp*. Lock screws with *locking liquid*. **Note** The *white markings* on the cables shall be visible just outside the *rubber clamp*.	 xx0700000602 Parts: • A: Bracket for clamp • B: Gripping clamp (on upper arm) • C: Metal clamp with rubber clamp • D: Attachment screws M6x16 quality 8.8-A2F (2 pcs) • E: White markings on cables

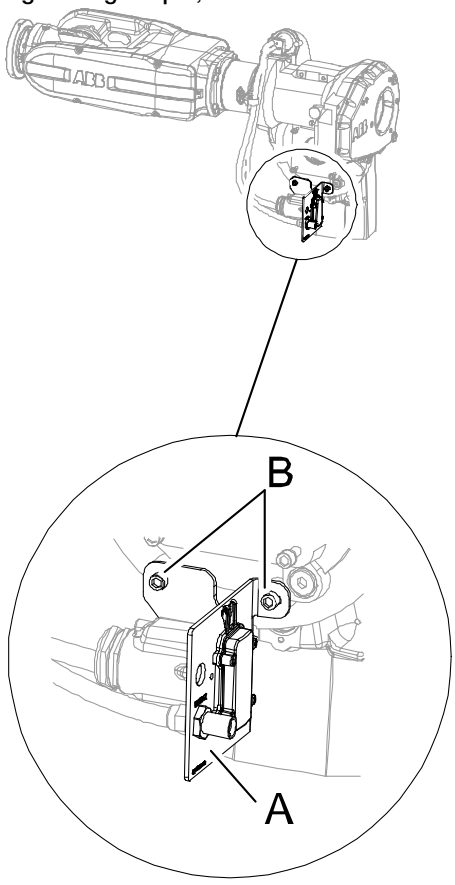
Continues on next page

	Action	Note
13	Secure the cables and hose to the *cable fixing bracket* with a *velcro strap*.	 xx0700000585 Parts: • A: Cable fixing bracket • B: Attachment screws M8x16 quality 8.8_A2F (2 pcs) • C: Velcro strap

Continues on next page

2.2.7 Fitting the lower arm cable package - IRBDP MH 3 LE

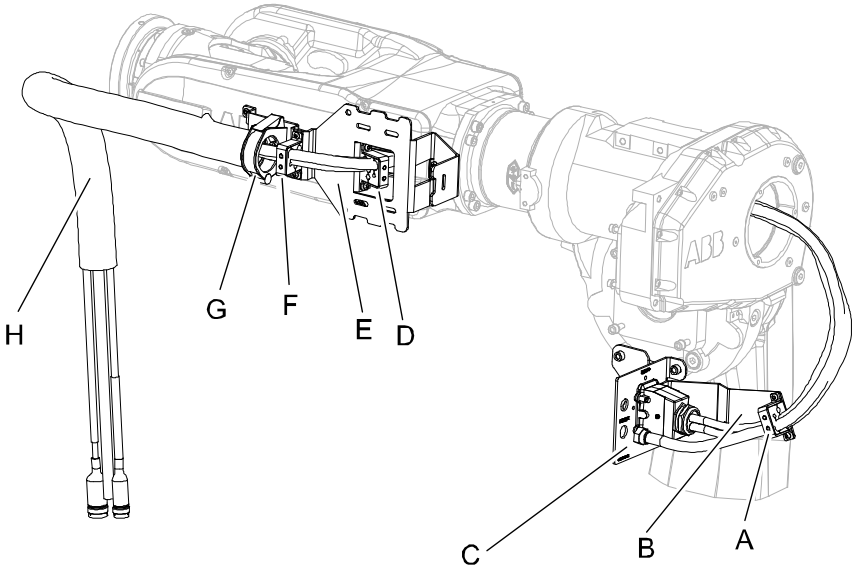
Continued

	Action	Note
14	Connect all cables and hose to the connection plate. **CAUTION** Do not tighten the brass couplings for water and air with excessive force. **CAUTION** If the M12 Ethernet connector is not tightened correctly, there is a risk that the connector can loosen and the cable shield gets disconnected, which will require retightening with the correct torque tools. For secure connection, always tighten at the knurled screw with correct torque and by using proper torque tool, e.g. M12 dynamometric screwdriver SW15 (09 99 000 0646 (article number at Harting Technology Group)).	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass. Tightening torque, Ethernet M12: 0.6 Nm.  xx0700000588 Parts: • A: Connection plate • B: Attachment screws

2.2.8 Fitting the upper arm cable package - IRBDP MH 3 UE

Location of upper arm cable package - IRBDP MH 3 UE

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



xx0700000580

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

Required equipment

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

Equipment	Article number	Note
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Required consumable

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

Continues on next page

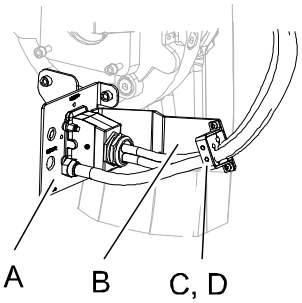
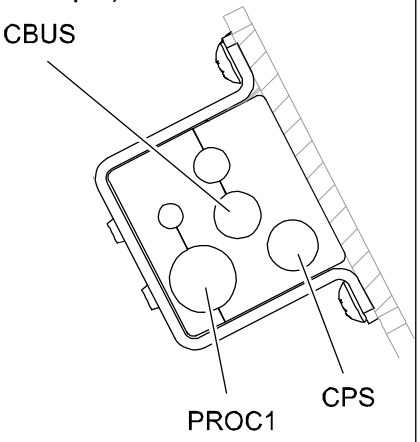
2.2.8 Fitting the upper arm cable package - IRBDP MH 3 UE
Continued

Fitting of the upper arm cable package IRBDP MH3 UE

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

	Action	Note
1	**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.	
3	Push the customer signal and power cables as well as air hose into the upper arm tube from the rear and pull it out of the hole on the side of the wrist where the bracket at wrist is placed. Arrange cables and hose so no cables or hoses are twisted. **Note** Be careful not to damage the motor cables!	See figure *Location of upper arm cable package - IRBDP MH 3 UE on page 79*.

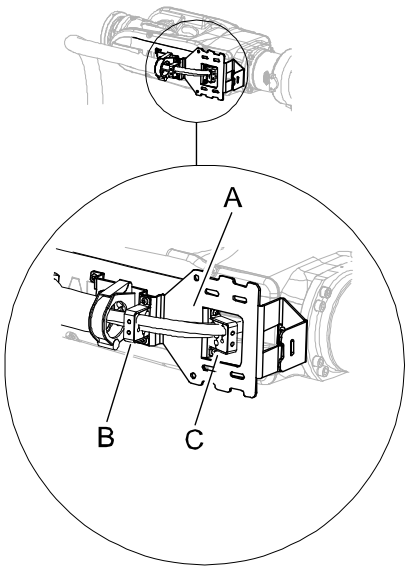
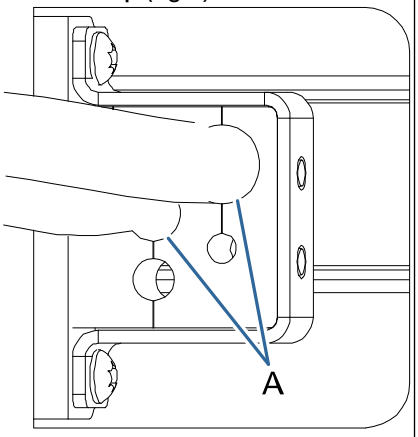
Continues on next page

	Action	Note
4	Connect cables and hose of the cable package to the connection plate.	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass. Tightening torque, Ethernet M12: 0.6 Nm.
5	Fit the metal clamp with rubber clamp with its attachment screws. Lock screws with locking liquid (Loctite 243). **CAUTION** Do not tighten the brass couplings for water and air with excessive force. **Note** Place cables and hose in the correct position! See figure! **CAUTION** If the M12 Ethernet connector is not tightened correctly, there is a risk that the connector can loosen and the cable shield gets disconnected, which will require retightening with the correct torque tools. For secure connection, always tighten at the knurled screw with correct torque and by using proper torque tool, e.g. M12 dynamometric screwdriver SW15 (09 99 000 0646 (article number at Harting Technology Group)).	 xx0700000605 Parts: • A: Connection plate • B: Bracket for metal clamp • C: Metal clamp with rubber clamp • D: Screws, M6x16, 8.8-A2F (2 pcs)  xx0700000369

Continues on next page

2.2.8 Fitting the upper arm cable package - IRBDP MH 3 UE

Continued

	Action	Note
6	Fit the cables and hose to the bracket at wrist with the metal clamp with rubber clamp (right). Lock screws with locking liquid (Loctite 243). **Note** The *green color markings* on the cables shall be visible just outside of the right metal clamp with rubber clamp.	 xx0700000606 Parts: • A: Bracket at wrist • B: Metal clamp with rubber clamp (left) • C: Metal clamp with rubber clamp (right)  xx0700000607 • A: Green color markings

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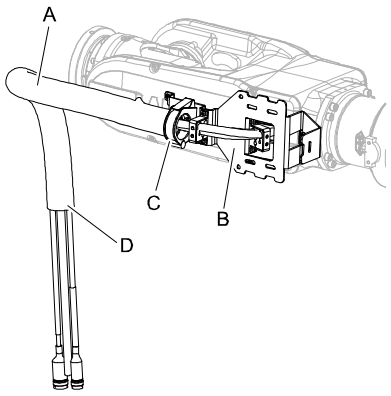
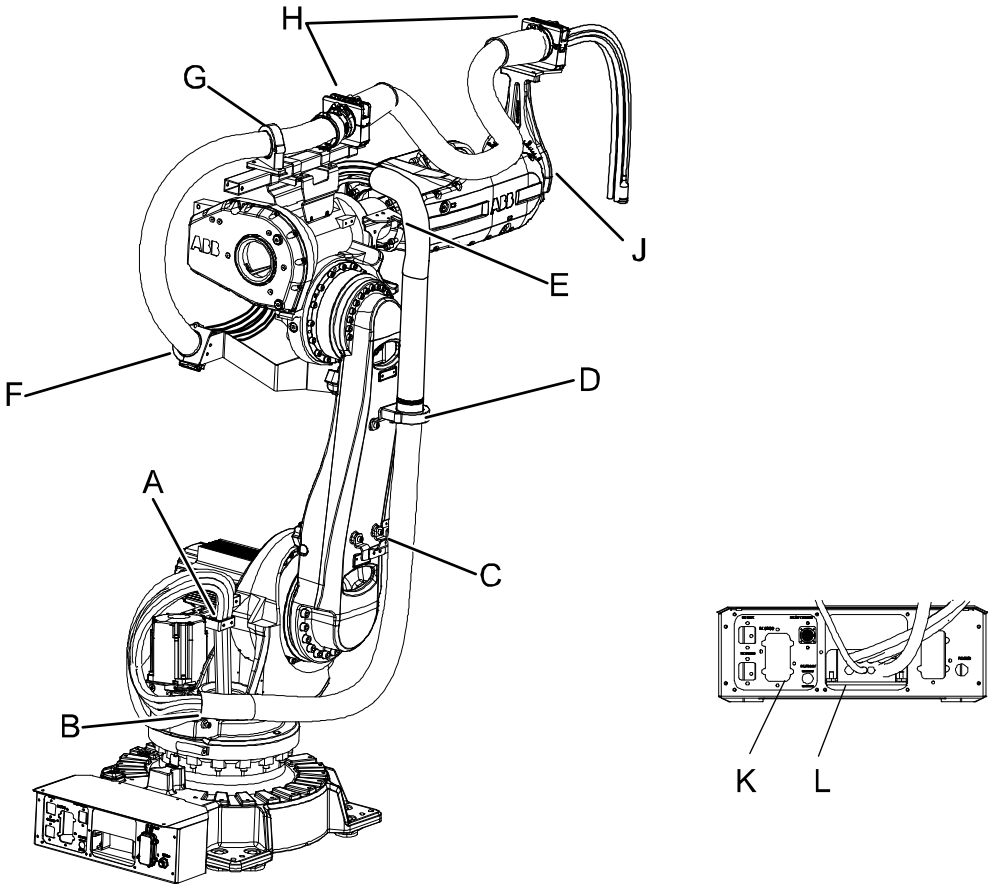
	Action	Note
7	Put the protection hose in the gripping clamp, on the bracket at wrist. If needed, cut the protection hose to desired length.	 xx0700000609 Parts: • A: Protection hose • B: Bracket at wrist • C: Gripping clamp with clamp halves • D: Place for gripping clamp at tool
8	Push the cables and hose through the protection hose.	
9	Pull the cables and hose back so the desired free length out of the protection hose is achieved.	
10	Fit the cables and hose to the bracket at wrist with the metal clamp with rubber clamp (left). Lock screws with locking liquid (Loctite 243).	See figure above.
11	**Note** When delivered there are no adjustments made to the final location of air hose and cables. Air hose and cables are pulled out completely through the protection hose. The whole package is then wrapped around the arm when delivered. How to adjust the cable package IRBDP MH 3 UE is detailed in section *Adjustments of the cable package - IRBDP MH3 UE on page 99*.	
12	Fit a gripping clamp at the other end of the protection hose. The protection hose is to be fitted on the tool with this gripping clamp with clamp halves.	See position in figure above.

2.2.9 Fitting the cable package IRBDP SW5 CE (DressPack Basic)

Location of the cable package

The location of the cable package IRBDP SW5 CE (DressPack 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 (DressPack Basic) on page 57*.



xx0800000111

A	Cable and hose clamp
B	Spiral hose clamp (bracket back lower)
C	Spiral hose clamp (lower bracket)
D	Gripping clamp (lower bracket)
E	Spiral hose clamp (spiral hose bracket)
F	Gripping clamp (axis 3 clamp mount)
G	Gripping clamp (adjustable bracket)
H	Ball joint housing
J	Process cable support axis 6
K	Customer plate
L	Clamp holder with plastic clamp

Continues on next page

Required equipment

Equipment	Art. no.	Note
Cable package IRBDP SW5 CE (DressPack Basic)	For spare part number see chapter: • *Spare parts on page 229*.	A number of variants are available.

Required tools

Equipment	Article number	Note
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
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 (DressPack Basic).

	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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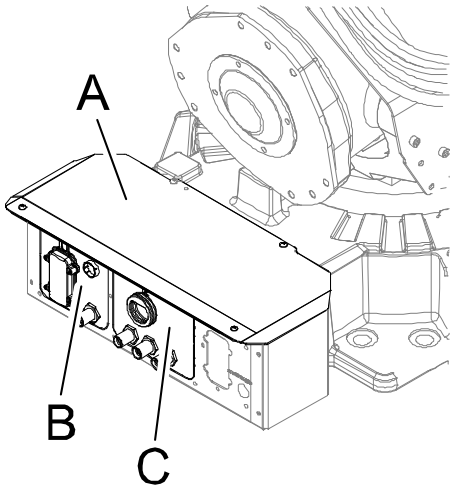
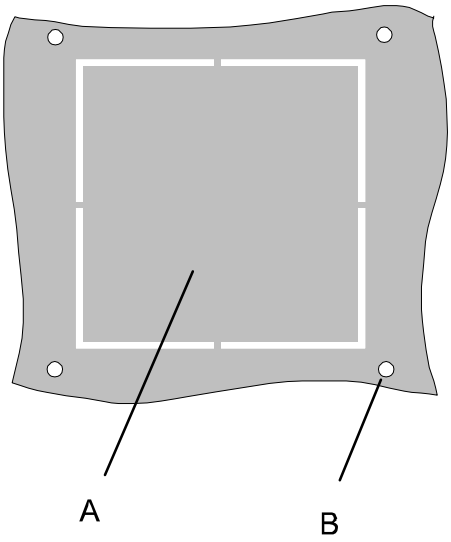
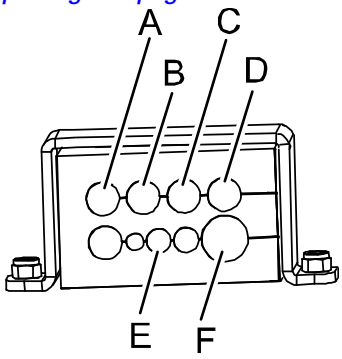
2.2.9 Fitting the cable package IRBDP SW5 CE (DressPack Basic)

Continued

	Action	Note
3	Remove the *rear top cover plate* in the back of the robot base.	 xx0700000329 Parts: • A: Rear top cover plate
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. **Note** Only needed when the cable package is fitted for the first time!	 xx0700000404 Parts: • 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: • 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 frame with the *cable and hose clamp*.	Shown in the figure *Location of the cable package on page 84*.

Continues on next page

	Action	Note
7	Fit the process cable package to the *clamp holder with plastic clamp*. Position of cables and hoses is shown in the figure. **CAUTION** Do not tighten the brass couplings for water and air with excessive force. **CAUTION** If the M12 Ethernet connector is not tightened correctly, there is a risk that the connector can loosen and the cable shield gets disconnected, which will require retightening with the correct torque tools. For secure connection, always tighten at the knurled screw with correct torque and by using proper torque tool, e.g. M12 dynamometric screwdriver SW15 (09 99 000 0646 (article number at Harting Technology Group)).	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass. Tightening torque, Ethernet M12: 0.6 Nm. Shown in the figure *Location of the cable package on page 84*.  xx0800000079 Positions: • A: PROC 1 (blue) • B: PROC 2 (green) • C: PROC 3 (red) • D: PROC 4 (black) • E: Signal cable • F: Weld cable

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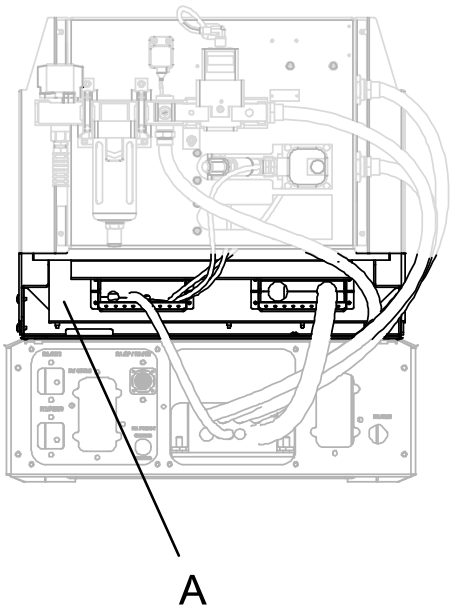
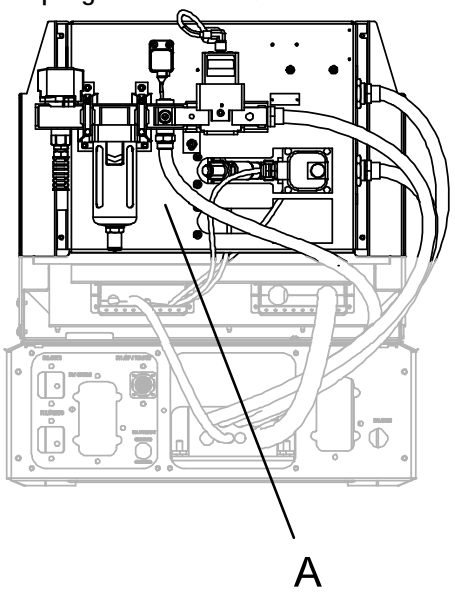
2.2.9 Fitting the cable package IRBDP SW5 CE (DressPack Basic)
Continued

	Action	Note
8	Fit the process cable package to the *connection box*.	 xx0800000082 Parts: • A: Connection box

Continues on next page

	Action	Note
9	Fit the process cable package to the *water and air unit*. **CAUTION** Do not tighten the brass couplings for water and air with excessive force.	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.  xx0800000083 Parts: • A: Water and air unit
10	Fit the process cable package to the bracket back lower with the *spiral hose clamp*.	Shown in the figure *Location of the cable package on page 84*.
11	Fit the process cable package to the lower bracket with the *spiral hose clamp*.	Shown in the figure *Location of the cable package on page 84*.
12	Fit the process cable package to the *gripping clamp* on the *lower bracket*.	Shown in the figure *Location of the cable package on page 84*.
13	Secure the process cable package with the velcro straps.	Shown in the figure *Location of the cable package on page 84*.
14	Fit the process cable package to the *gripping clamp* on the axis 3 clamp mount.	Shown in the figure *Location of the cable package on page 84*.
15	Fit the process cable package to the *gripping clamp* on the *adjustable bracket*.	Shown in the figure *Location of the cable package on page 84*.
16	Fit the process cable package in the *ball joint housing* on the *adjustable bracket*.	Shown in the figure *Location of the cable package on page 84*.
17	Fit the process cable package on the *ball joint housing* on the *process cable support axis 6*.	Shown in the figure *Location of the cable package on page 84*.

2.2.10 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.

Inspecting the process cable package

	Action	Note
1	*Do not bend* any cable or hose excessively! **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 *any sharp corner of something* (not just the robot itself)!	
7	Make sure all connection points are well tightened and sealed in order to avoid leaks.	

Inspecting the 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: • For *standard tightening torques* - See tightening torque table in chapter References. • For *non standard tightening torques* see chapter *Installation*.

2.2.11 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

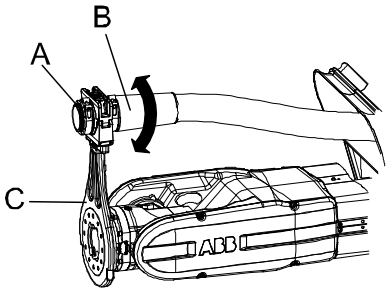
	Action	Note
1	Inspect all attachments, brackets and any other hardware securing or guiding the protective hose.	Described in section *Attachments and brackets on page 91*.
2	Inspect the process cable package.	Detailed in section *Cables and hoses on page 92*.
3	Make sure all cables and hoses are securely fixed and connected.	Detailed in section *Securing and connecting on page 93*.

Attachments and brackets

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

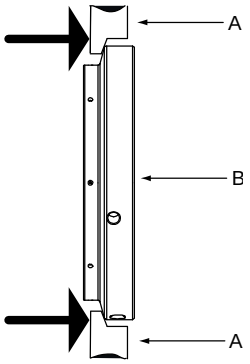
Note

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

	Action	Note
1	Make sure the sliding surfaces of the slide sleeve has not been damaged. Check this with normal hand force: • grab hold of the package • pull and turn to make sure that the package is free to slide. **Note** A damaged surface may potentially prevent the cable package from rotating causing excessive wear.	 xx0600003176 • A: Slide sleeve, slide surface • B: Hose reinforcement • C: Process cable support, axis 6

Continues on next page

2.2.11 Inspection, DressPack upper arm
Continued

	Action	Note
2	Check that the *process cable support, axis 6* is pushed forward completely against the *turning disk, axis 6*. See illustration!	 xx0400001040 Parts: • 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 *process cable support, axis 6* 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.

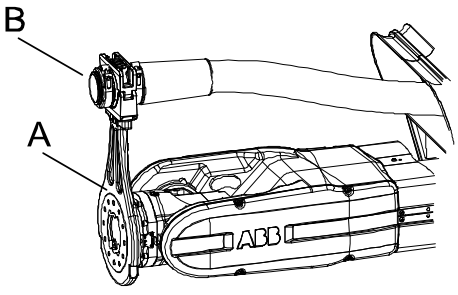
	Action	Note
1	*Do not bend* any cable or hose excessively.	Minimum bending radius is approximately 10 x the cable or hose diameter.
2	Make sure no cables or hoses are twisted.	
3	Make sure that all hoses and cables to gun or gripper are long enough to avoid stretching during any part of the cycle. **Note** **(Not applicable to cable package IRBDP MH3 UE)** 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!	**(Not applicable to cable package IRBDP MH3 UE)** Do not strap closer than 400 mm from slide sleeve.
4	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.
5	Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure in a way that may cause wear.	

Continues on next page

	Action	Note
6	Make sure that no hoses or cables, or parts there of, touch any part of the *surrounding equipment* in a way that may cause wear.	
7	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.	
8	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: • 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.	
3	**(Not applicable to cable package IRB-DP MH3 UE)** *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. Whenever strapping the cables/hoses to the process cable support, axis 6, make sure the assembly is free to swivel properly. **Note** Do not strap closer than 400 mm from the slide sleeve!	 xx0600003177 • A: Process cable support, axis 6 • B: Slide sleeve
4	When securing cables and hoses with cable ties: *never* overtighten the ties! This may damage the equipment.	
5	Make sure that the cable package have been properly connected at the base as well as at the tool on the robot turning disk.	

Continues on next page

2.2.11 Inspection, DressPack upper arm
Continued

	Action	Note
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!	

2.3 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 99*.

General

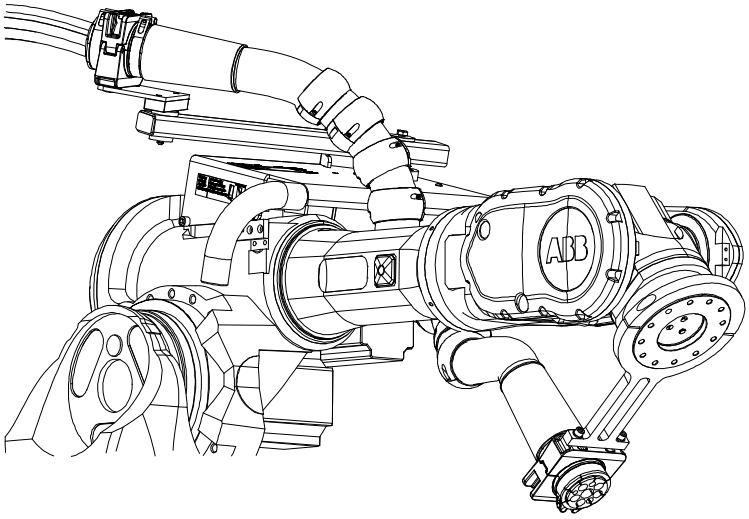
The instructions below details how to adjust the routing of the DressPack to avoid reducing its life.

How to adjust the tension arm unit, see section *Adjusting tension arm unit on page 189*.

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.	

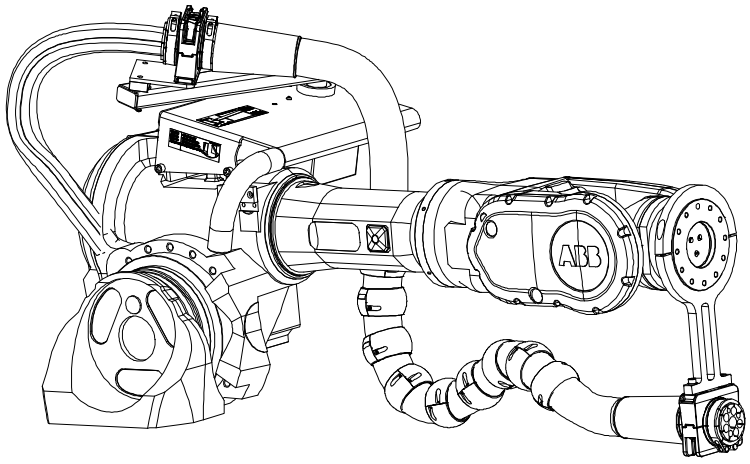
Continues on next page

2.3.1 Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE
Continued

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.

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



xx0500001561

	Action	Note
1	Adjust the tension arm unit to reduce the slack in the hose package *Adjusting tension arm unit on page 189*.	
2	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.	
3	After changing the DressPack installation, it needs to be inspected to ensure the function.	Detailed in section *Preventive inspection, DressPack upper end on page 138*.

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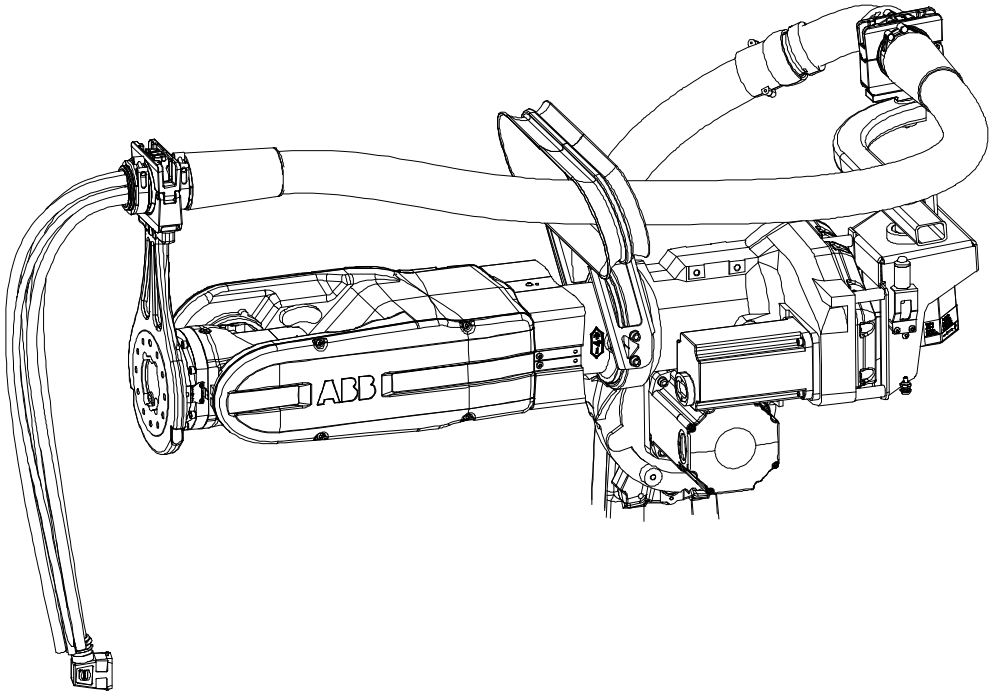
Hoses and cables too long

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.



xx0600003164

	Action	Note
1	Cut the weld cable and hoses to a length that will suit the application before making any connections to the tool. **Note** Do not pull back the cables and hoses through the protective hose! Note the length of cables and hoses to make it easier for a later change to a spare cable package.	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.
2	Loop the excess hoses and cables in a way that enables securing them with *cable clamps* or similar allowing quick replacement of the package.	When securing cables and hoses with cable ties: *never* overtighten the ties! 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.	Detailed in section*Preventive inspection, DressPack upper end on page 138*.

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2.3.1 Adjustments of - IRBDP MH2 UE and IRBDP SW2 UE
Continued

Process cable package too short

If the DressPack upper arm 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 95* section for article numbers!
2	Make sure all attachments and supports are *fitted correctly*.	Detailed in section *Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE on page 63*. If required adjust their fitting positions! When securing cables and hoses with cable ties: *never* overtighten the ties! This may damage the equipment.
3	**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 189*.
4	After changing the upper part of the DressPack installation, it needs to be inspected to ensure the function.	Detailed in section *Preventive inspection, DressPack upper end on page 138*.

2.3.2 Adjustments of the cable package - IRBDP MH3 UE

Overview

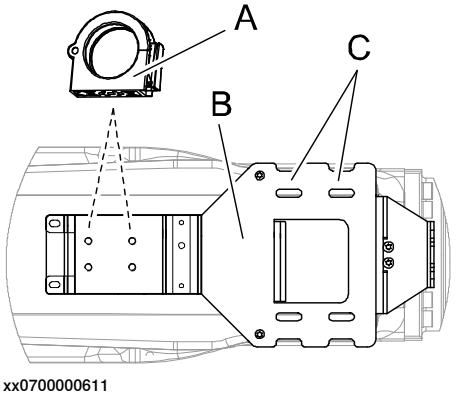
The procedure below details how to adjust the routing of the upper arm cable package -IRBDP MH3 UE, in order to avoid reducing its life.

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: • 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 *gripping clamp* in the best suitable position on the *bracket*. Choose one of the positions shown in the figure.	 xx0700000611 Parts: • A: Gripping clamp • B: Bracket at wrist • C: Position for straps

Continues on next page

2.3.2 Adjustments of the cable package - IRBDP MH3 UE
Continued

	Action	Note
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.

2.3.3 Adjustment of the cable package - IRBDP SW5 CE (DressPack 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 DressPack Basic before commissioning.

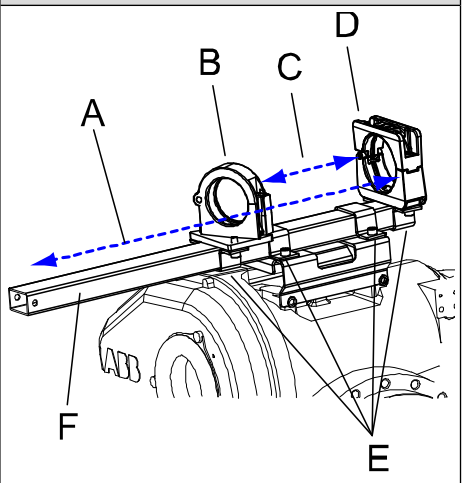
It is possible to place the ball joint housing and gripping clamp in different positions on the adjustable bracket in order to get the smoothest movements possible of the process cable package and preventing premature wear.

	Action	Note
1	**DANGER** Turn off all: • 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 *ball joint housing* and *gripping clamp* on the adjustable bracket with the brackets and attachment screws.	Detailed in section *Fitting the attachments of IRBDP SW5 CE (DressPack Basic) on page 57*. **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. **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.
4	Fit the process cable package in the ball joint housing and gripping clamp.	Detailed in section *Fitting the cable package IRBDP SW5 CE (DressPack Basic) on page 84*.

Continues on next page

2.3.3 Adjustment of the cable package - IRBDP SW5 CE (DressPack 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 *ball joint housing* and *gripping clamp* 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 *adjustable bracket* 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. **Note** If the process cable package is fitted wrongly it will result in too much rubbing against the robot. This will result in increased wear of the cable package.	 xx0800000109 Parts: • 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 *gripping clamp* on the adjustable bracket, fit it 420 mm behind the *ball joint housing*.	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.	

2.3.4 Inspection during programming and test-running

General

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

Checking the cable package at the upper end

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

IRBDP MH3 LE & IRBDP MH3 UE

	Action	Note
1	Inspect the DressPack upper arm installation before programming and test-running.	See section *Inspection, DressPack upper arm on page 91*.
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 91*.
5	Make sure that no parts of the DressPack are in contact with the surroundings.	
6	**(Only applicable if process cable support axis 6 is used!)** Make sure no combined rotating movements of axes 5 and 6 causes collisions between the cables/hoses or the process cable support axis 6, and the upper arm. Such movements may also cause excessive cable/hose bending.	Collisions and excessive bending will increase the risk of damaging the equipment. Minimum bending radius: 10x cable/hose diameter.

Checking the DressPack at the lower end

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

	Action	Note
1	Inspect the DressPack at the lower arm installation before programming and test-running.	See section *Inspection, DressPack lower arm on page 90*
2	Check the operating cycle of the robot, to make sure the movement pattern of the robot does not cause extensive wear or straining on the cable package.	If required, re-program the robot movement pattern!
3	If any of the actions recommended above, causes changes of the DressPack installation, it must be reinspected.	See section *Inspection, DressPack lower arm on page 90*

2.4 DressPack Armload 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

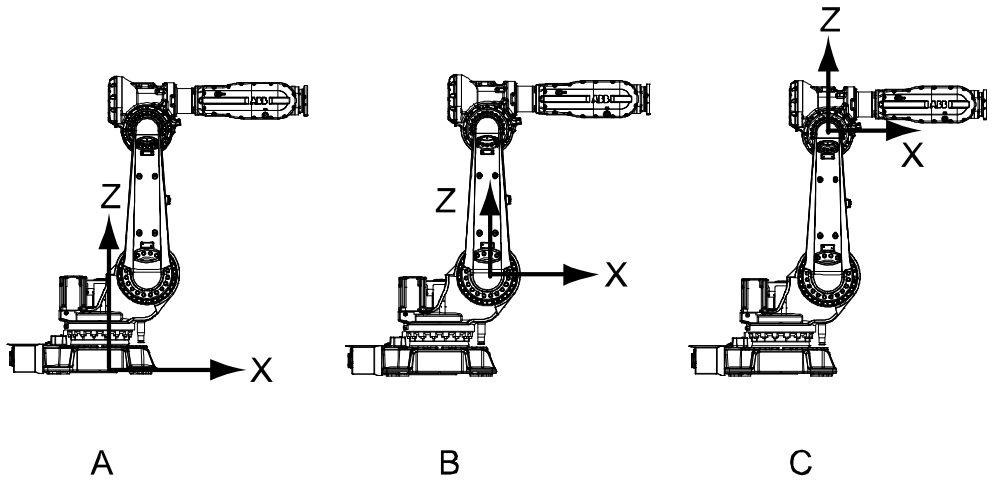
The extra weight of the DressPack products will affect the arm load data and the performance of the robot. The effect differs depending on which type of DressPack product being used.

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.



xx0600003186

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

Continues on next page

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 6620	8.5	-0.177	0.000	0.265

Lower arm - axis 2	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6620	4.7	-0.028	-0.178	0.255

Upper arm - axis 3	Mass [kg]	Mass CenterX [m]	Mass CenterY [m]	Mass CenterZ [m]
IRB 6620	36.4	-0.183	0.017	0.314

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 6620	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.

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

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.

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

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

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

Continues on next page

2.4.1 DressPack - arm load parameters and LoadId
Continued

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 6620	4.9	-0.191	0	0

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*.

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

Define the arm loads, typically:

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

The used arm load is defined for each arm, irb_1, irb_2, and irb_3.

Procedures Step 2 - load identification

It is recommended to use the load identification service routine 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 the load identification service routine.	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 *Procedures Step 1 - Arm load data on page 106*.

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 application, while others are used also in other applications.

The configuration of the components differs between different application types.

Types of application

Some typical applications are specified below:

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

Connection points

The cables and connections points between the components are all detailed and illustrated in the circuit diagram for the current application. See references to the circuit diagrams in *References on page 10*.

Required equipment

Equipment, etc.	Article number	Note
DressPack floor	For spare part number see chapter: • *Spare parts on page 229*.	A number of versions are available.
M12 torque screwdriver and M12 assembly tool (bit)	TSD 04 SAC (article number at Phoenix Contact) SAC BIT M12-D15 (article number at Phoenix Contact)	Order both parts and assemble. The screwdriver has a preset torque of 0.4 Nm. Used to tighten M12 Ethernet connectors.  xx2200001262
Standard toolkit	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Continues on next page

2.5.1 Installation of DressPack floor
Continued

Reference documents

Document	Document number	Note
Circuit diagram - DressPack 6620	*3HAC026136-001*	

Installation

The procedure below details how to install the DressPack floor. Also refer to the current circuit diagram according to *References on page 10* and the *Spare parts on page 229* chapter.

	Action	Note
1	 **DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the safeguarded space.	
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 107*.
4	Whenever possible, run all cables/hoses in cable ducts or trenches. Make sure these meet the required standards.	Make sure: • 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	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 229* chapter.

Continues on next page

	Action	Note
8	Connect the CP/CS cable to the manipulator and controller cabinet connectors. **Note** If the M12 Ethernet/PROFINET connector is not tightened correctly, there is a risk that the connector can loosen and the cable shield gets disconnected, which will require retightening with the correct torque tools. For secure connection, always tighten with correct torque and by using proper torque tool, e.g. assembly tool SAC BIT M12-D15 and torque screwdriver TSD 04 SAC with preset torque of 0.4 Nm.	See circuit diagram and the *Spare parts on page 229* chapter. Tightening torque, Ethernet/PROFINET M12: 0.4 Nm.
9	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 229* chapter.
10	If used, connect the functional ground cable to the robot base and to the spot welding cabinet.	See circuit diagram.

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.

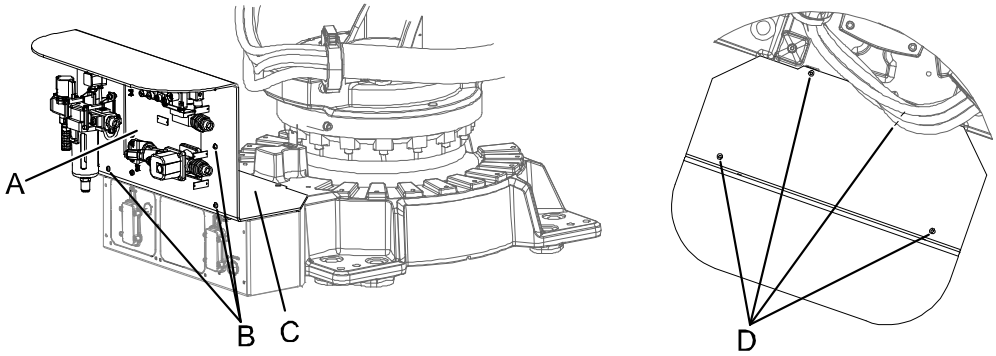
	Action	Note
1	Make sure that the cable package is properly connected at the robot base as well as at the other end.	
2	Make sure that no hoses or cables, or parts thereof, are routed in such a way that they are subjected to wear, for example hoses being run over by fork lifts etc.	
3	Make sure that no 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. **Note** If the M12 Ethernet/PROFINET connector is not tightened correctly, there is a risk that the connector can loosen and the cable shield gets disconnected, which will require retightening with the correct torque tools. For secure connection, always tighten with correct torque and by using proper torque tool, e.g. assembly tool SAC BIT M12-D15 and torque screwdriver TSD 04 SAC with preset torque of 0.4 Nm.	Tightening torque, Ethernet/PROFINET M12: 0.4 Nm.

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.



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 coupling 1/2": 31 Nm.
- Stainless steel coupling 1/2": 49 Nm.
- Brass coupling 3/8": 17 Nm.
- Mixed metals: Use the lower tightening torque value of the two metals.

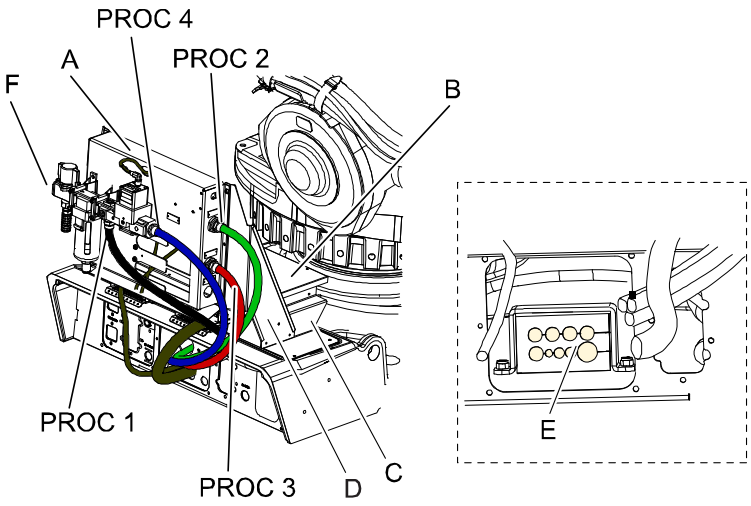
Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

Continues on next page

2.6.1 Installation of Water and air unit
Continued

Location of Water and air unit, type Sb (DressPack 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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

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

Continues on next page

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

Parameter	Value
Water quality	Normal filtered industrial water quality, 80 to 100 mesh.
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 229*.	A number of versions are available.
Water and air unit, type Sb	For spare part number see chapter: • *Spare parts on page 229*.	A number of versions are available.
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Reference documents

Document	Document number	Note
Circuit diagram - DressPack for spot-welding SWC IRC5 M2004	*3HAC026208-001*	Valid for all robots without PROFINET.
Circuit diagram - DressPack SWC IRC5 Design 2014 PROFINET	*3HAC044736-001*	Valid for all robots with option 782-13 Bosch MFDC PROFINET.

Installation of Water and air unit, type S

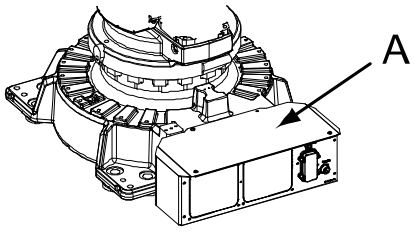
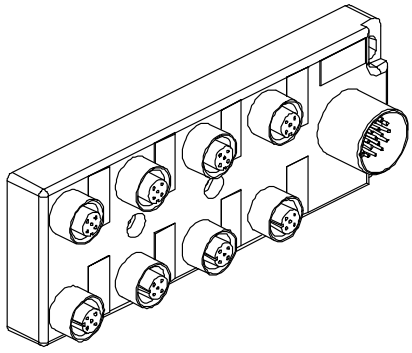
The procedure below details how to install the Water and Air unit, type S on the robot base.

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

Continues on next page

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.	 xx0600003269 Parts: • 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 111*.
4	Connect the water and air supplies. **CAUTION** Do not tighten the brass couplings for water and air with excessive force.	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass. Specified in section *Connections to Water and Air unit, type S on page 117* below.
5	Connect the split box cable for Water and Air unit with the split box at the Water and Air unit.	 xx0600003347 Parts: • Split box

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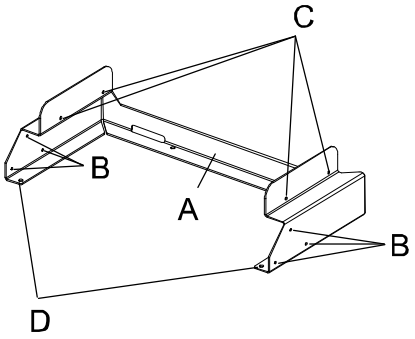
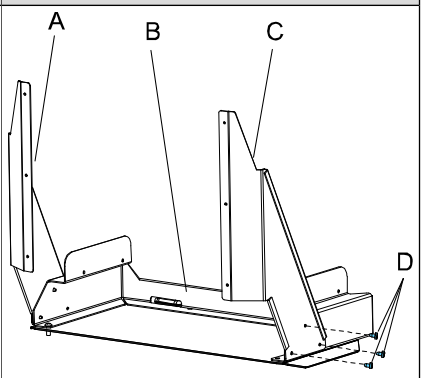
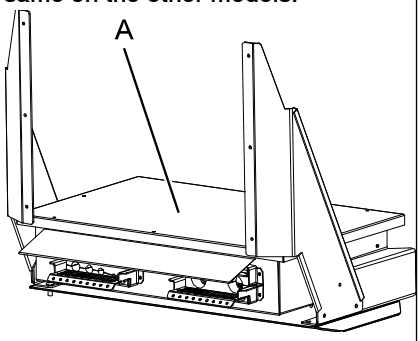
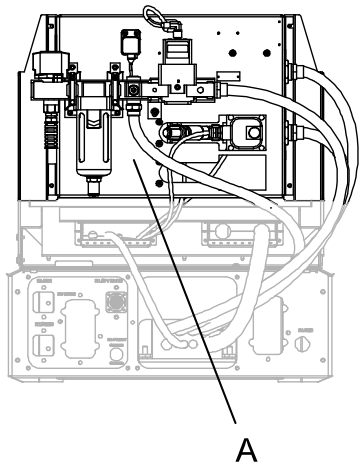
Installation of Water and air unit, type Sb

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: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
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 bracket connection box using the attachment screws removed earlier.	 xx0800000119 Parts: • 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

Continues on next page

2.6.1 Installation of Water and air unit
Continued

	Action	Note
4	Fit the bracket right and left to the bracket connection box with its attachment screws.	 xx0800000116 Parts: • A: Bracket left • B: Bracket connection box • C: Bracket right • D: Attachment screws
5	Fit the connection box to the brackets with its attachment screws.	The figure shows the connection box fitted on IRB 6640. The principle is the same on the other models.  xx0800000120 Parts: • A: Connection box
6	Fit the water and air unit to the brackets with its attachment screws (Fastite).	 xx0800000121

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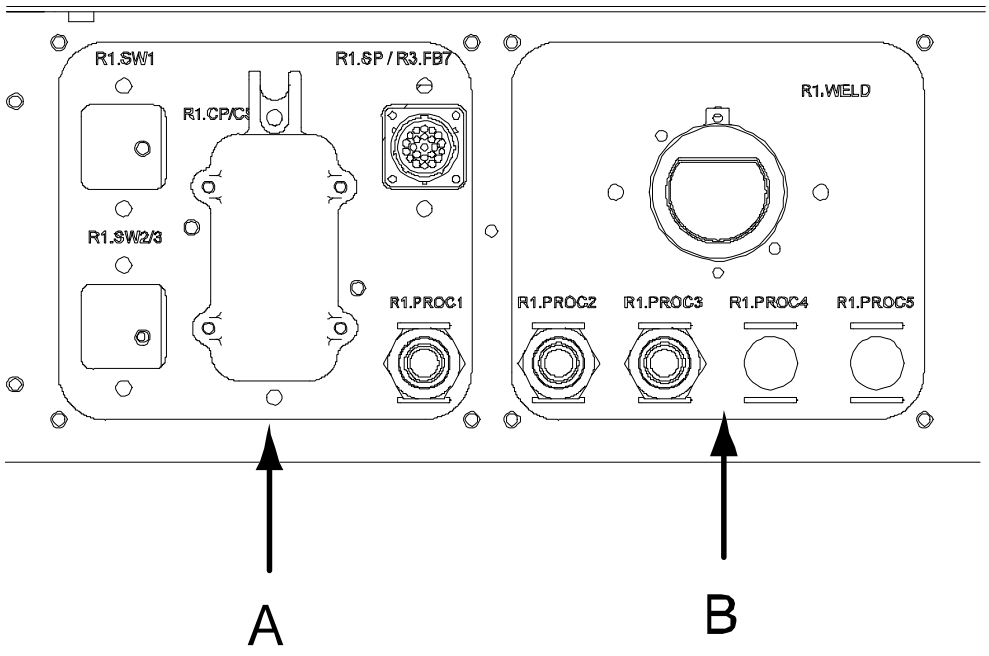
Connections to Water and Air unit, type S

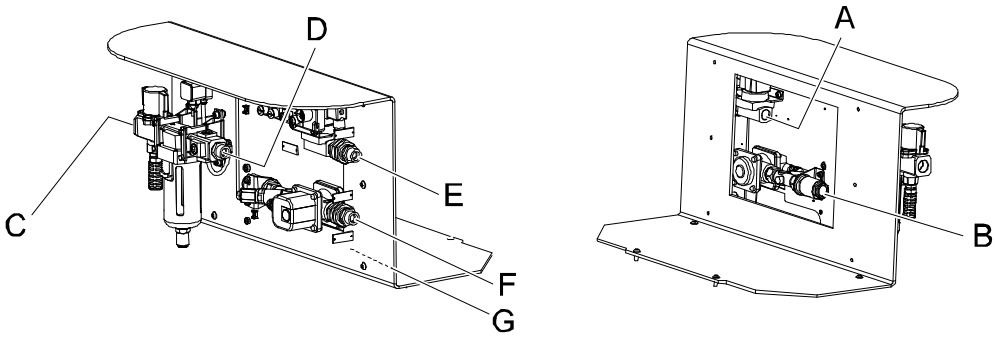
The figure shows the connections at the robot base.



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

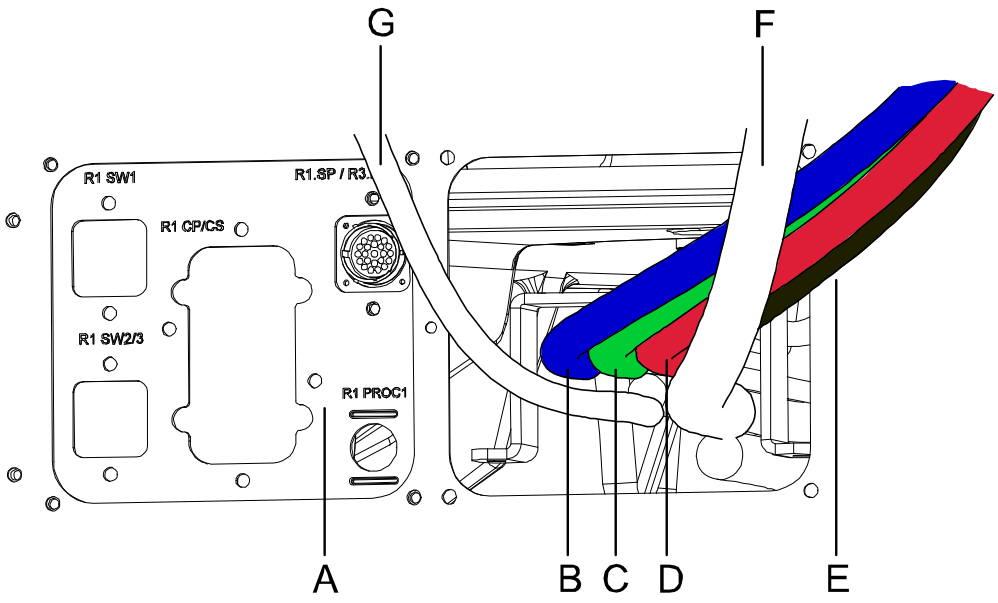
2.6.1 Installation of Water and air unit
Continued

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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

Connections to Water and Air unit, type Sb

The figure shows the connections at the robot base.



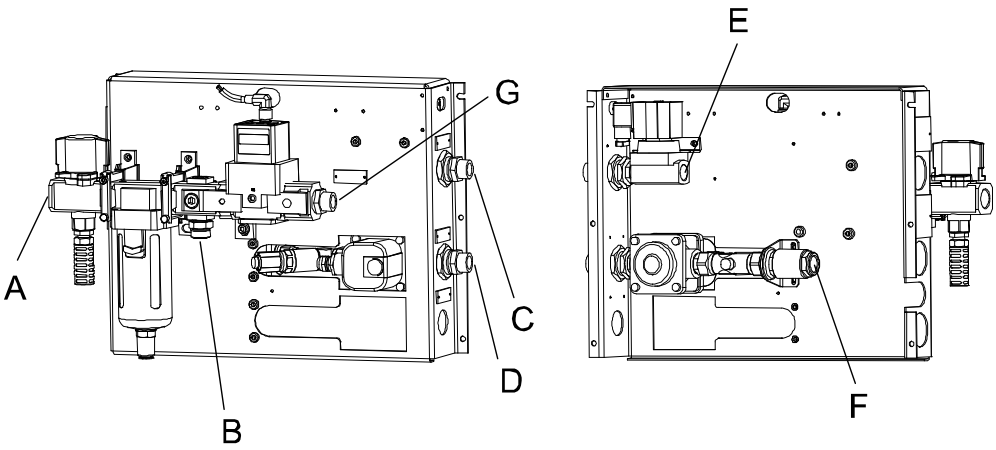
xx0800000123

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

Continues on next page

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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.



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.	

Continues on next page

2.6.1 Installation of Water and air unit
Continued

	Action	Note
2	**Type S**: Connect the hose to the fitting with a G½" 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 117*. Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
3	**Type Sb**: Connect the hose to the fitting with a G½" 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 118*. Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

Shop compressed air supply

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

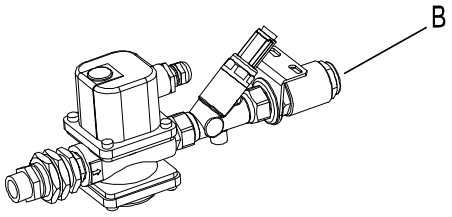
	Action	Note
1	**Type S**: Connect the air hose to the fitting with a G½" thread on the air shut off valve (C). **CAUTION** Do not tighten the brass couplings for water and air with excessive force.	Shown in the figure in section *Connections to Water and Air unit, type S on page 117*. Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

Continues on next page

	Action	Note
2	**Type Sb**: Connect the air hose to the fitting with a G½" 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 118*. Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

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.

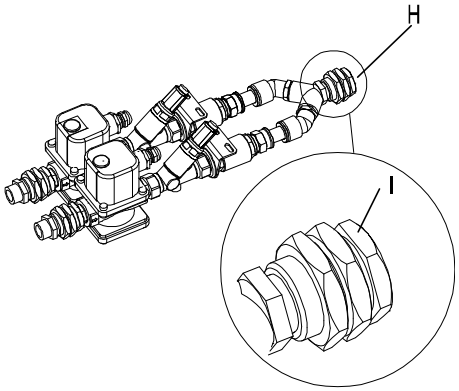
	Action	Note
1	Route the water drain hose through the lower hole in the mounting plate.	
2	Connect the hose to the fitting with a G½" thread on the check-valve. **CAUTION** Do not tighten the brass couplings for water and air with excessive force.	 xx0600003348 • B: Water drain connection, one water return

Continues on next page

2.6.1 Installation of Water and air unit
Continued

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
1	Connect the hose to the *bulkhead fitting* with a G½" thread. **CAUTION** Do not tighten the brass couplings for water and air with excessive force. **Note** Any rotation of the bulkhead fitting must be avoided when mounting. Hold the *outer part of the bulkhead fitting* with a suitable tool, in order to prevent rotation.	 xx0600003349 Parts: • 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
1	**CAUTION** Do not tighten the brass couplings for water and air with excessive force.	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
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 117*. Shown in the figure in section *Connections to Water and Air unit, type Sb on page 118*.
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 117*. Shown in the figure in section *Connections to Water and Air unit, type Sb on page 118*.
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 117*. Shown in the figure in section *Connections to Water and Air unit, type Sb on page 118*.

Continues on next page

	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 117*. Shown in the figure in section *Connections to Water and Air unit, type Sb on page 118*.
6	Secure all connectors.	See *Tightening torques* in section *Screw joints on page 221*.

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.

2.6.3 Return water flow switch setting

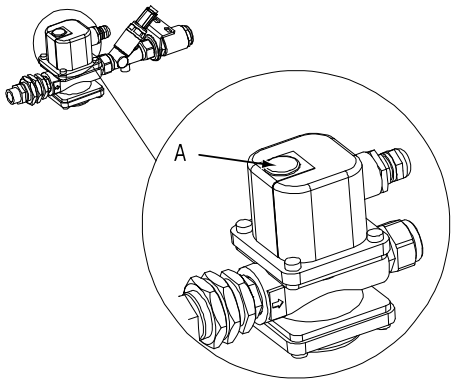
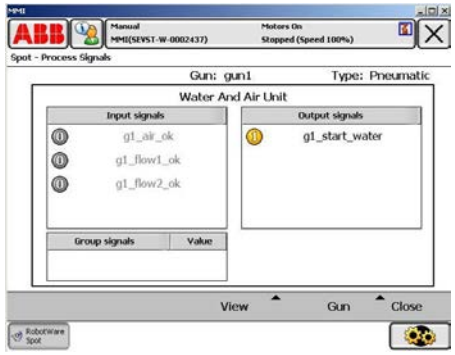
Introduction

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 124*.
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: • A: Flow switch
5	Depending on initial value, increase or decrease the set value until the **g_flow_ok** changes, by observing the *Process Signals window* on the FlexPendant. **Note** The indicated flow level may differ from real flow as the flow switch is affected by the water pressure.	 xx0600003355 • 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.

2.6.4 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

2.7 Installation of Tipdresser

2.7.1 Installation of Tipdresser (option)

Overview

Note

The following general information about the tipdresser is important to notice:

- Tipdresser is not available as standard! It may be ordered as an option.
- Cutterholders are not included!
- What cutterholder to use depends on what weldgun tips are used.
- Cutterholders must be ordered separately!
- Software to the Tipdresser is not supplied by ABB Robotics.
- Use the following email address for more information about the tipdresser: products.olofstrom@se.abb.com

Intended use

The Tipdresser is used to form electrods. It is intended to restore the original shape of the welding electrods after the deformation that occurs after a period of use.

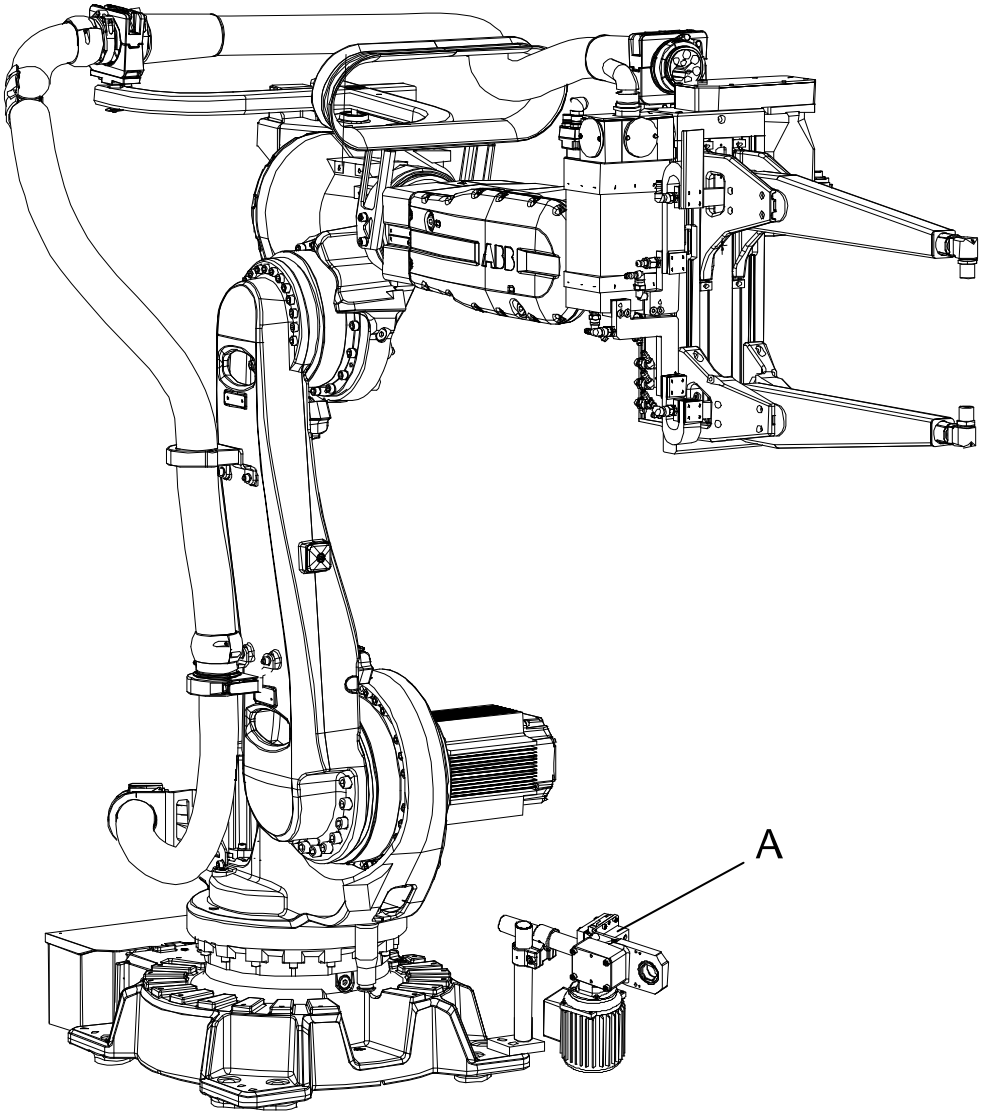
The Tipdresser is intended to be integrated into the existing spot welding cabinet.

Continues on next page

2.7.1 Installation of Tipdresser (option)
Continued

Location of Tipdresser

The Tipdresser is located in one of the four corners of the robot base. It can be fitted in different positions depending on use. The figure below shows an example.



xx0600003202

A	Tipdresser

Description of electrical functionality

The flowchart below describes the electrical functionality of the Tipdresser.

- QB101 = Circuit breaker
- MS101 = Motor starter
- K103 = Contactor
- SWC = Spot welding Cabinet

Continues on next page

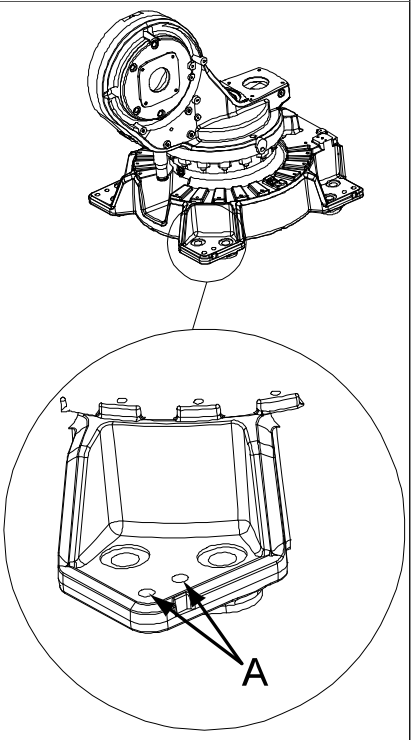
xx0600003196

Procedure

The procedure below details how to fit the Tipdresser to the robot base.

Note

The integration of the Tipdresser shall be performed by the user!

	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	**DANGER** Rotary cutters may cause injured fingers and hands.	
3	The Tipdresser is fitted on the robot base, in one of the four corners of the base. **Note** Fork lifting pockets must be removed before fitting the Tipdresser!	 xx0600002927 • A: Attachment holes for Tip-dresser
4	Fit the Tipdresser with M20x40 screws (2 pcs) in the holes intended for forklift pockets.	Tightening torque: 300 Nm

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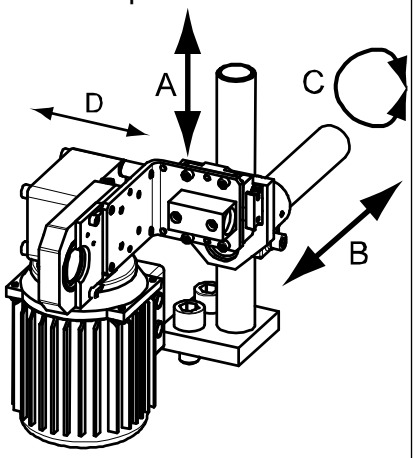
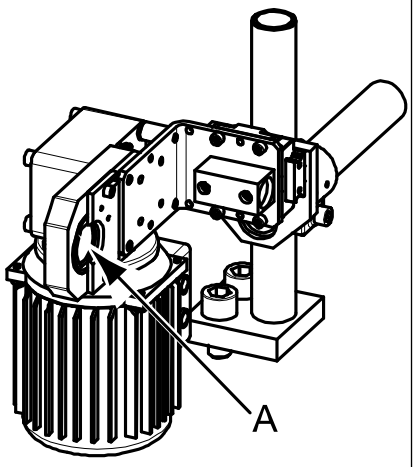
2.7.1 Installation of Tipdresser (option)

Continued

	Action	Note
5	It is possible to fit the Tipdresser in several positions. See figure to the right!	The figure below shows within what limits the Tipdresser can be fitted:  xx0600003197 • A: Adjustable ±120 mm • B: Adjustable ±98 mm • C: Turnable 360° • D: Equalizing ±8 mm
6	Fit the Tipdresser on its holders in such a position that it will function as supposed with the spot welding tool used.	
7	Connect the Tipdresser cable to the its motor.	
8	Connect the Tipdresser cable to the spot welding cabinet, connector XS105.	
9	Arrange the cable from the Tipdresser to the spot welding cabinet in a secure way that it does not get damaged while the robot is in motion.	
10	Fit the cutterholder on the Tipdresser. **Note** Cutterholder must be ordered separately!	 xx0600003198 • A: Place for cutterholder

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 17* before performing any service work.

The maintenance must be done by qualified personnel in accordance with the safety requirements set forth in the applicable national and regional standards and regulations.

3.2 Maintenance schedule and component lives

3.2.1 Maintenance schedule

General

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

Wear parts

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

The following parts are considered as wear parts:

- Protection sleeves
- Protective hose
- Hose reinforcement
- Slide sleeves
- Damper

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 145*
Inspection	All cables	Regularly[i]	*Preventive inspection of all cables, DressPack on page 136*
Inspection	DressPack cable package	Regularly *i*	*Preventive inspection, DressPack upper end on page 138*
Cleaning	DressPack cable package	Regularly *i*	*Cleaning, DressPack upper arm on page 148*
Cleaning	Water & Air unit	Regularly *i*	*Cleaning, Water and air unit on page 150*

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

3.3 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	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Inspection

The procedure below details how to inspect all cables included in the DressPack 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: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the safe-guarded space.	
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 148*.
3	Make sure that all bolts are fastened.	Recommended tightening torques are specified in section *Screw joints on page 221*.
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.

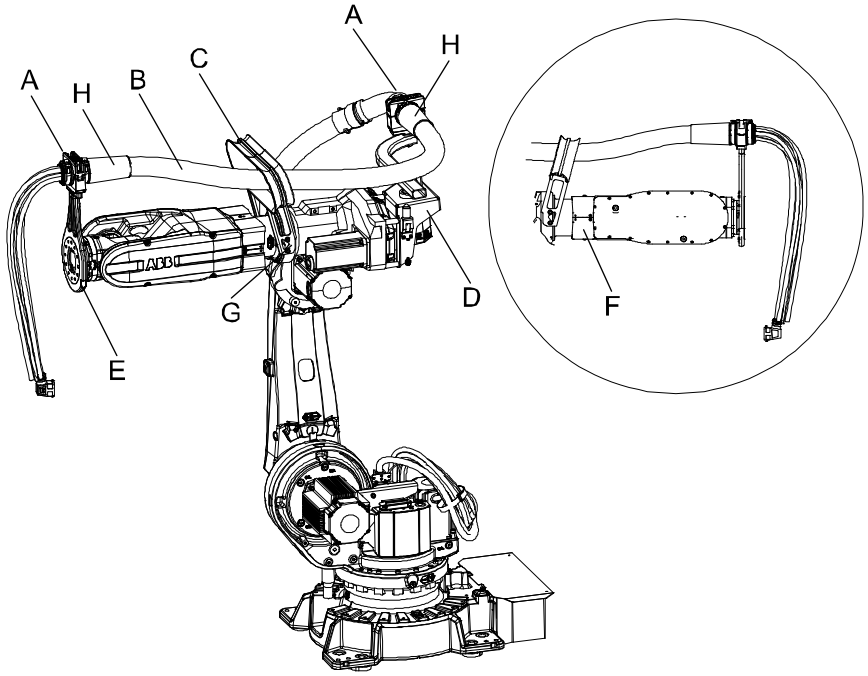
Continues on next page

	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 157*. 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 180*.
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 35* 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 183*.

3.3.2 Preventive inspection, DressPack upper end

Location of DressPack upper end

The figure shows the upper arm part of cable package IRBDP MH 2 CE / IRBDP SW 2 CE.

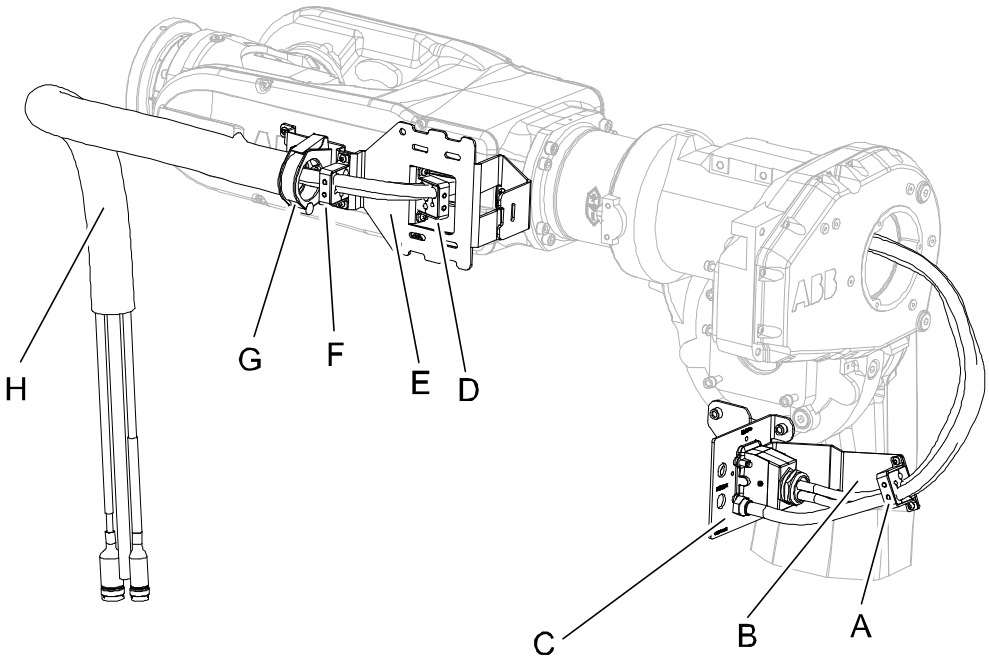


xx0600003149

A	Ball joint housing
B	Process cable package
C	Hose support
D	Tension arm unit
E	Process cable support axis 6, complete
F	Arm protection
G	Bracket, hose support
H	Hose reinforcement

Continues on next page

The figure shows the cable package IRBDP MH 3 UE.



xx0700000580

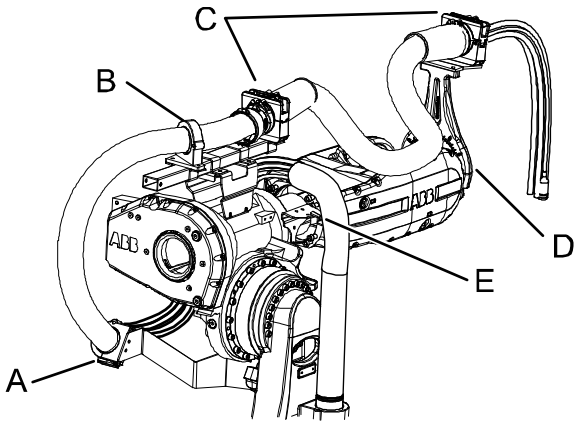
A	Metal clamp with rubber clamp
B	Bracket for metal clamp
C	Connection plate, ax 3 (delivered with the cable package IRBDP MH 3 LE)
D	Metal clamp with rubber clamp (right)
E	Bracket at wrist
F	Metal clamp with rubber clamp (left)
G	Gripping clamp & clamp halves
H	Protection hose

Continues on next page

3.3.2 Preventive inspection, DressPack upper end

Continued

The figure shows the cable package IRBDP SW 5 CE.



xx0800000112

A	Gripping clamp (axis 3 clamp mount)
B	Gripping clamp (adjustable bracket)
C	Ball joint housing
D	Process cable support axis 6
E	Spiral hose bracket

Required equipment

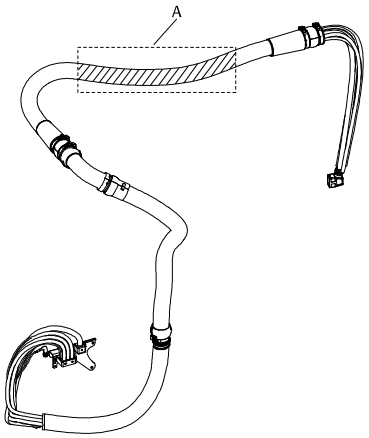
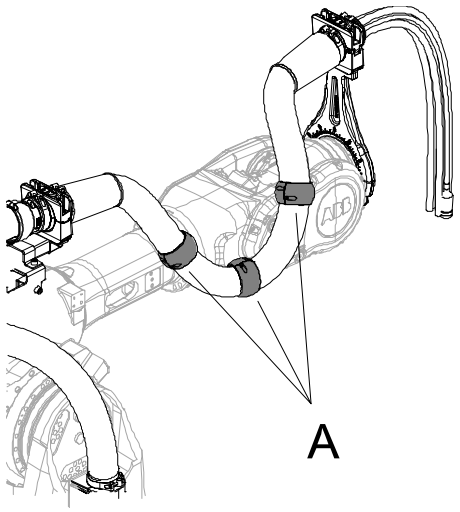
Equipment	Article number	Note
Standard toolkit	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

Inspection - Robot standing still

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

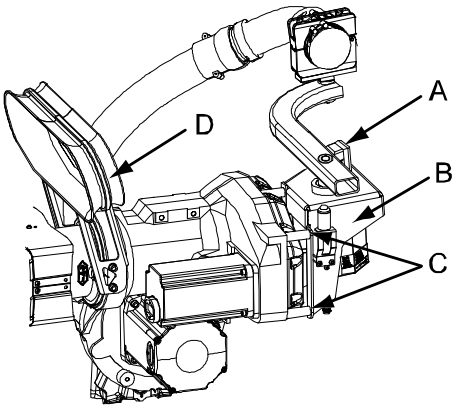
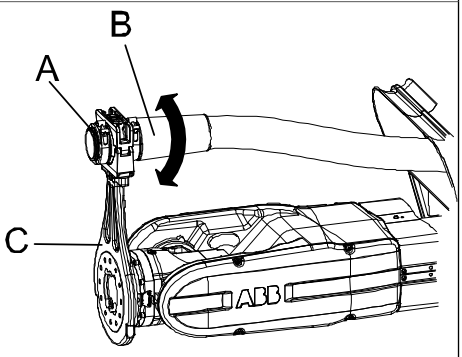
	Action	Note
1	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the safeguarded space.	
2	Make sure that the DressPack is not contaminated.	If required, clean as detailed in section *Cleaning, DressPack upper arm on page 148*.
3	Make sure that all bolts are fastened.	Recommended standard tightening torques are specified in section *Screw joints on page 221*.

Continues on next page

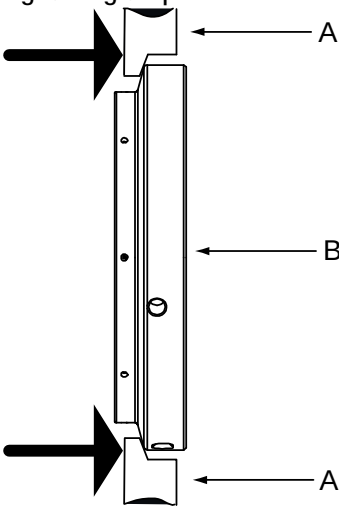
	Action	Note
4	Check the position and state of the *protective sleeves*. Place these where they prevent the protection hose from rubbing against the upper arm of the robot, as much as possible. **Note** When fitting several protective sleeves, always leave a space between them (approximately the width of one slide sleeve). **Note** Protective sleeves are not available as standard! If required, protective sleeves may be fitted and can be ordered as spare part!	 xx0600003190 Parts: • A: Area where protective sleeves may be fitted, if needed. IRBDP SW5 CE  xx0800000084 Parts: • A: Protective sleeves Make a note of where the protective sleeves were positioned to facilitate replacing them in the future. If required, replace the protective sleeves.
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.	
7	Make sure that the cable package is properly connected at: • the connection plate • the robot base • the lower arm • the tool on the turning disc of the robot.	

Continues on next page

3.3.2 Preventive inspection, DressPack upper end
Continued

	Action	Note
8	Make sure that all connections are fastened and that there are no leaks.	Re-tighten if necessary.
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 end on page 138*.
10	**(Not applicable to cable package IRBDP MH3 UE)** Inspect the rubber *damper*. Make sure it is not chipped or damaged in any other way.	 xx0600003179 Parts: • A: Damper • B: Tension arm unit • C: Attachment screws (3 pcs) • D: Hose support If required, replace the damper.
11	**(Not applicable to cable package IRBDP MH3 UE, IRBDP MH6 UI and IRBDP SW6)** Make sure the *sliding surfaces* 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!	 xx0600003176 Parts: • A: Slide sleeve slide surface • B: Hose reinforcement • C: Process cable support axis 6 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 140*. If required, replace the slide sleeves as detailed in section *Replacement of slide sleeves on page 197*.

Continues on next page

	Action	Note
12	**(Not applicable to cable package IRBDP MH3 UE)** 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: • A: Process cable support axis 6 • B: Turning disc axis 6
13	**(Not applicable to cable package IRBDP MH3 UE, IRBDP MH6 UI and IRBDP SW6)** Visually inspect the *hose reinforcement* to make sure there are no cracks or other damage.	Shown in the figure in section *Location of DressPack upper end on page 138*. If required, replace the hose reinforcement as detailed in the section *Replacement of hose reinforcement on page 194*.
14	Check all cable clamps securing the process cable package and protective hose for tightness.	Tightening torques are specified either in: • 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 at the upper arm when the robot is moving in reduced speed.

WARNING

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

Secure the following before work starts:

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

	Action
1	Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure in a way that may cause wear.

Continues on next page

3.3.2 Preventive inspection, DressPack upper end
Continued

	Action
2	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.

Inspection - Full speed

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

WARNING

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

Secure the following before work starts:

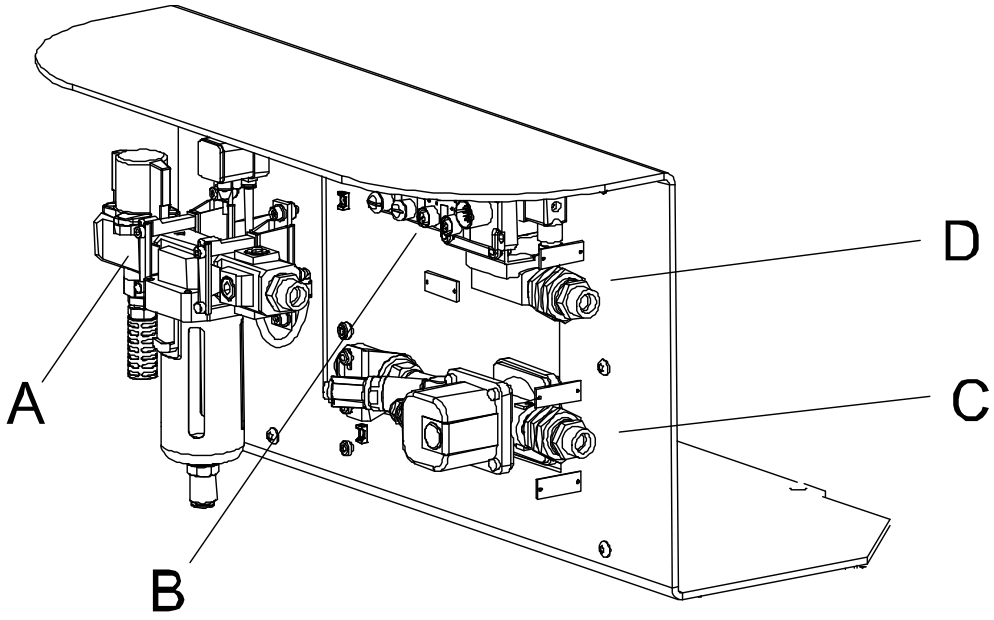
- Check that all emergency stops are fully functional.
- Close and activate all safety equipment (safety gates and/or safety curtains etc.).

	Action	Note
1	Make sure that no hoses or cables, or parts thereof, touch any part of the robot structure (or something in the vicinity of it) in a way that may cause wear.	
2	Make sure all cables and hoses move smoothly together during operation and that no part of the cable package moves in a different pattern.	
3	**(Not applicable to cable package 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.	

3.3.3 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.

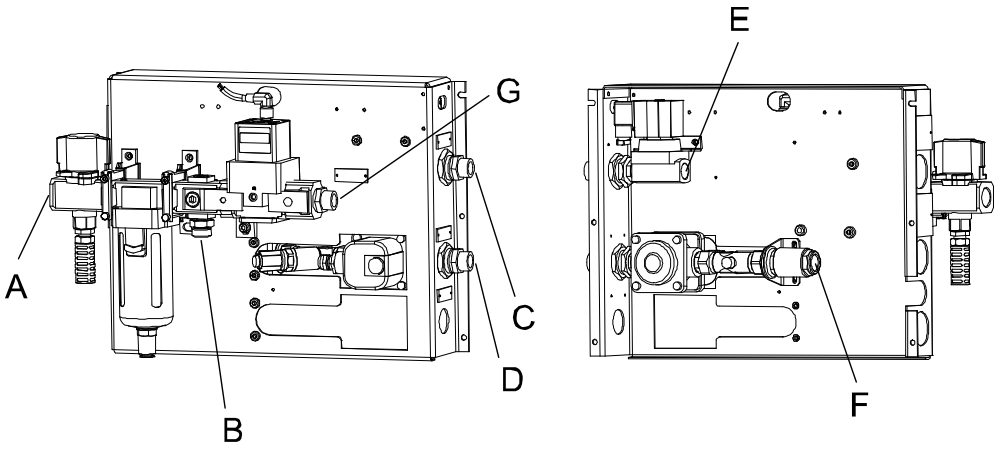


xx0600003293

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

3.3.3 Preventive inspection of Water and air unit
Continued

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	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.

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 150*.
2	Check that the bolts are fastened.	Recommended tightening torques are specified in section *Tightening torque on page 222*.
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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.

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!

Continues on next page

	Action	Note
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.

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.	

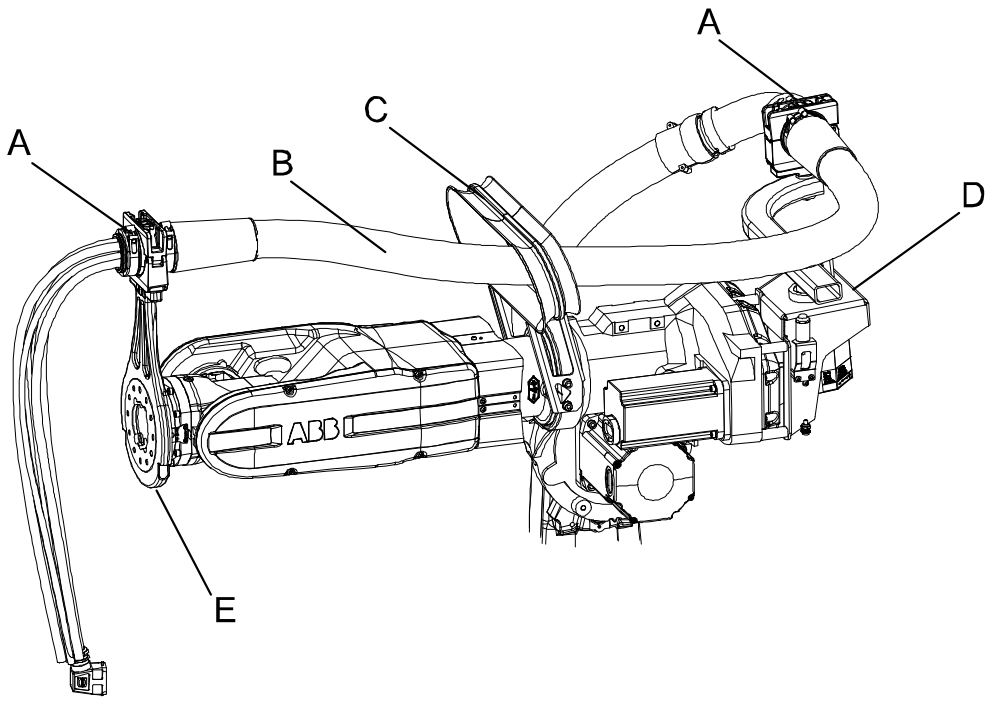
3.4 Cleaning activities

3.4.1 Cleaning, DressPack upper arm

Overview

This section is not applicable to cable package IRBDP MH 3 UE.

Location DressPack upper arm

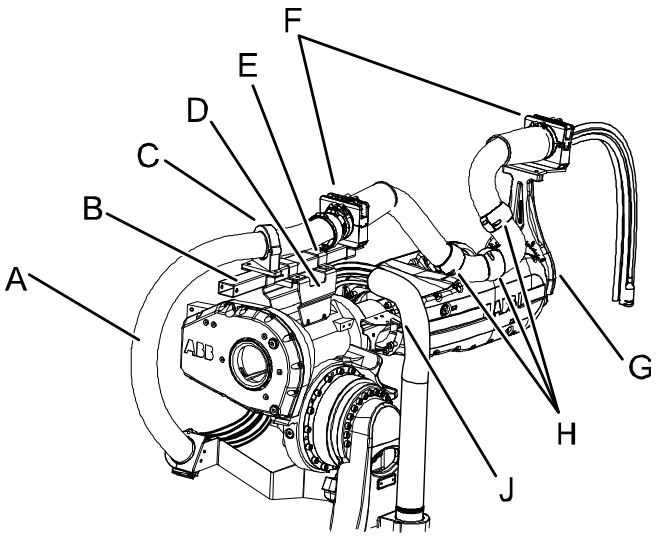


xx0600003167

A	Slide sleeve slide surface
B	Process cable package
C	Hose support
D	Tension arm unit
E	Process cable support axis 6, complete

Continues on next page

The figure shows cable package IRBDP SW 5 CE.



xx0800000113

A	Process cable package IRBDP SW 5 CE, upper end
B	Adjustable bracket
C	Gripping clamp
D	Axis 3 bracket
E	Bracket
F	Ball joint housing
G	Process cable support axis 6
H	Slide sleeves
J	Spiral hose bracket

Required equipment

Equipment	Art. no.	Note
Standard toolkit	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Dry rag and medium soft brush		For cleaning the protective hose ribs.

Cleaning

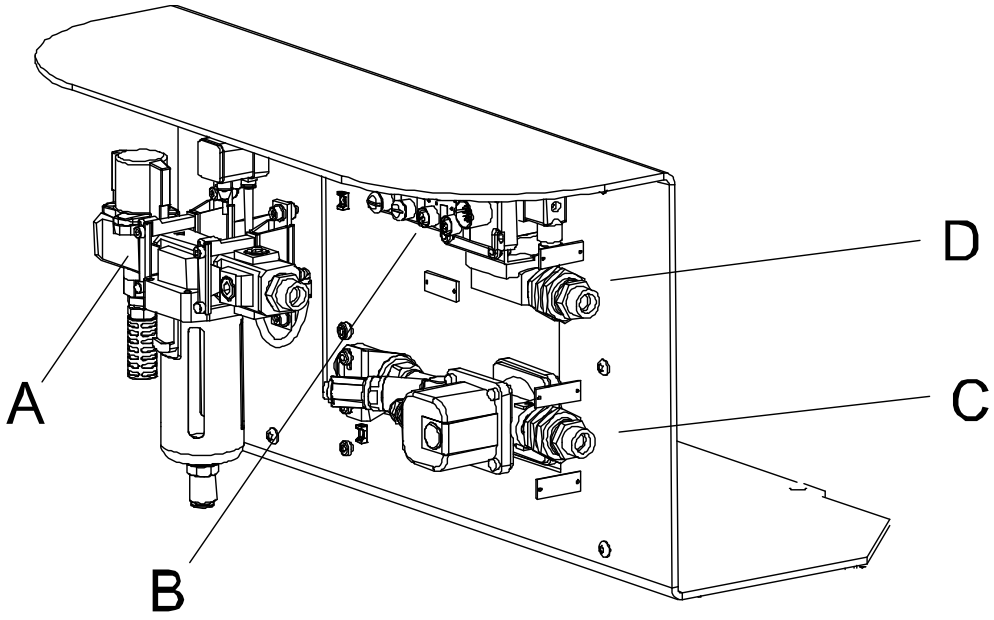
The procedure below details how to clean the DressPack upper arm.

	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 *Required equipment on page 136*.
2	Clean the slide sleeves of any sort of contamination.	

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.

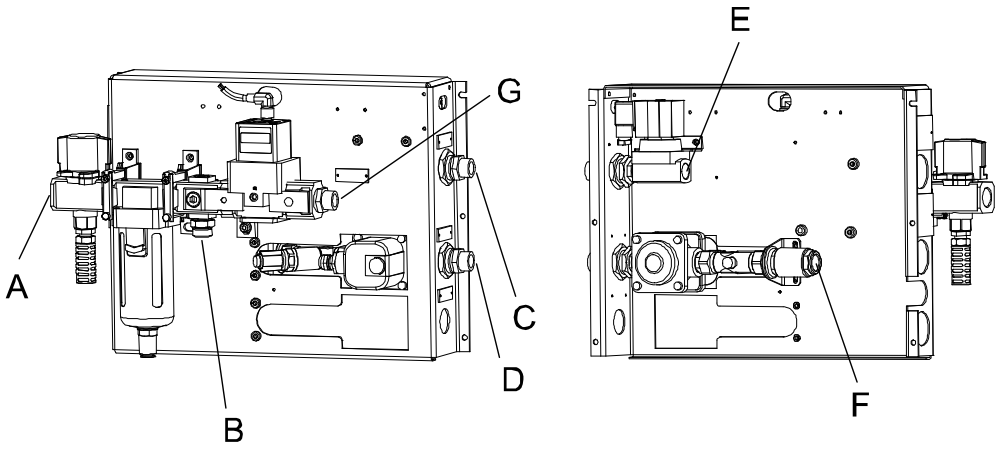


xx0600003293

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

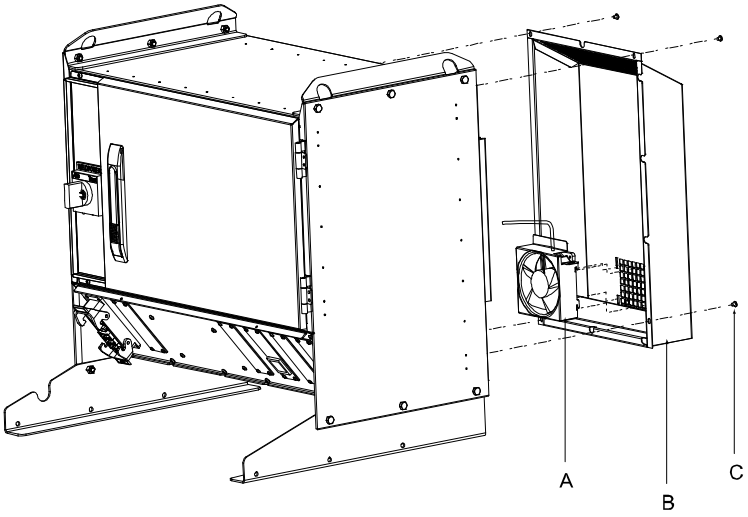
	Action	Note
1	Peridically inspect the resin bowl for cracks or other deterioration.	If found, replace the bowl with a new one.
2	Periodically inspect the cleanliness of the resin bowl.	If the resin bowl is dirty, replace it with a new one or clean it. Use a household (neutral) detergent when cleaning, 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 211*.
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 211*.
5	Replace if the filter element is broken.	Replacement of the air filter is detailed in section *Replacement of Air filter element on page 211*.

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)

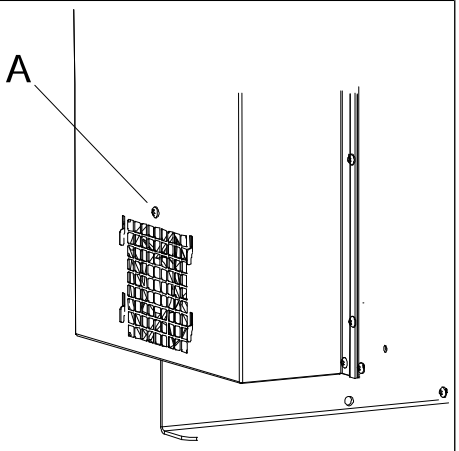
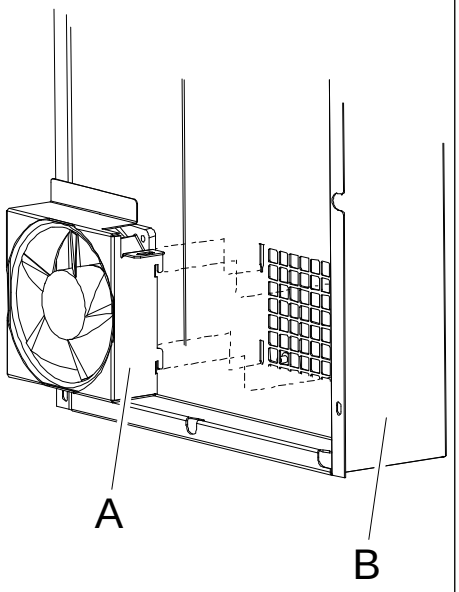
Required equipment

Equipment	Article number	Note
Standard toolkit DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
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 152* Screw M5x9 Fastite (4 pcs)
3	Disconnect the fan connector.	

Continues on next page

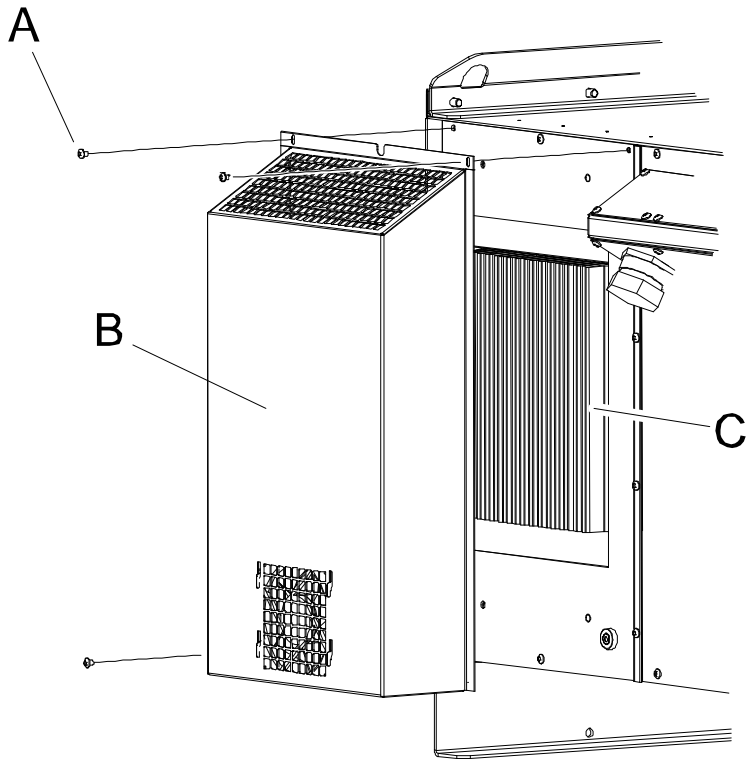
	Action	Note
4	Remove the stop screw.	 xx0500002232 • A: Stop screw
5	Lift out the fan holder with fan.	 xx0500002234 • A: Fan holder with fan • B: Fan casing
6	Clean the fan.	
7	Refit according to the steps above, in reverse order.	

3.4.4 Cleaning the Weld timer cooling fins

Overview

Use this procedure to clean the weld timer cooling fins.

Location



xx0500002240

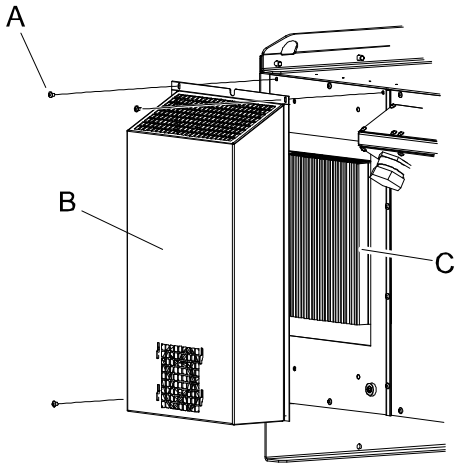
A	Attachment screws M5x9 Fastite screw (3 pcs)
B	Fan casing
C	Cooling fins

Required equipment

Equipment	Art.no.	Note
Standard toolkit DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Vacuum cleaner		

Continues on next page

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.	 xx0500002240 • 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 repair activities for the DressPack. Each procedure contains the information required to perform the activity, for example spare parts numbers, required special tools, and materials.

> **WARNING**
>
> Repair activities not described in this chapter must only be carried out by ABB.

Report replaced units

> **Note**
>
> When replacing a part on the DressPack, report to your local ABB the serial number, the article number, and the revision of both the replaced unit and the replacement unit.
>
> This is particularly important for safety equipment to maintain the safety integrity of the installation.

Safety information

Make sure to read through the chapter *Safety on page 17* before commencing any service work.

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.

> **CAUTION**
>
> The cabling is sensitive to mechanical damage. Handle it with care to avoid damage to the cabling or the connector, avoid any kind of tilt or skew.

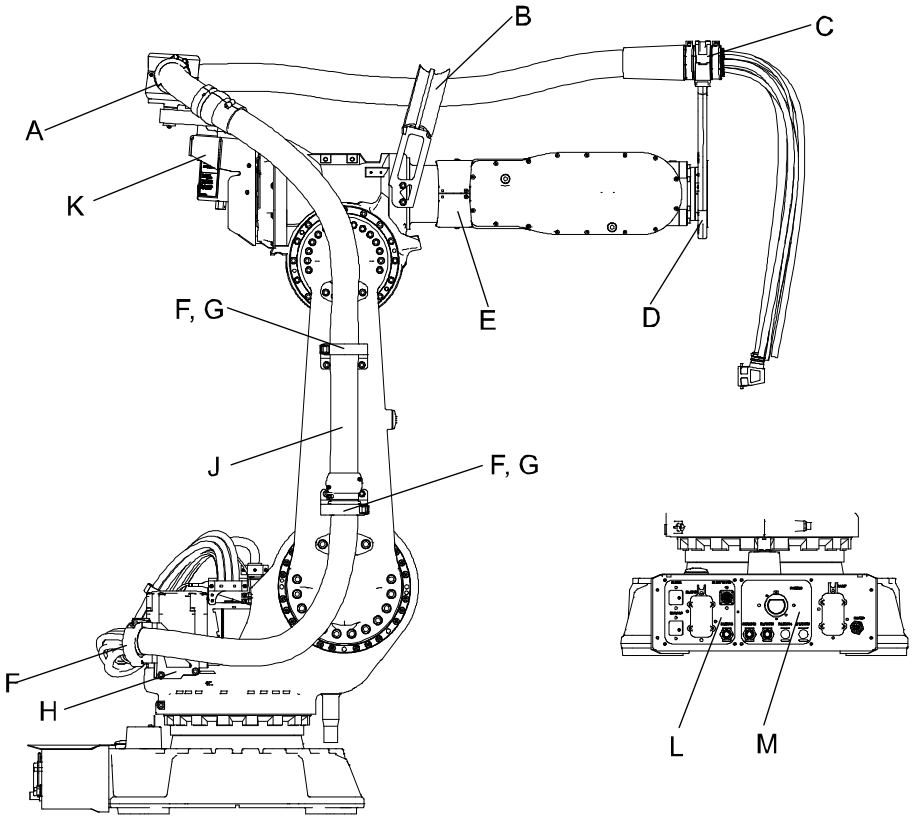
Procedures

For information about:	Also see
Replacement of the cable package IRBDP MH2 CE and IRBDP SW2 CE.	Described in section *Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE on page 159*.
Replacement of *process cable package lower arm - IRBDP MH 3 LE*.	Described in section *Replacement of the lower arm cable package - IRBDP MH 3 LE on page 165*.
Replacement of *process cable package upper arm - IRBDP MH 3 UE*.	Described in section *Replacement of upper arm cable package - IRBDP MH 3 UE on page 170*.
Replacing the cable package IRBDP SW5 CE (DressPack Basic).	Described in section *Replacing the cable package IRBDP SW5 CE (DressPack Basic) on page 173*.
Replacement of *tension arm unit*	Described in section *Replacement of tension arm unit on page 177*
Replacement of *hose reinforcement*	Described in section *Replacement of hose reinforcement on page 194*.
Replacement of *slide sleeves*	Described in section *Replacement of slide sleeves on page 197*.
Repair of *process cable package*	Described in section *Repair of process cable package on page 183*
Adjusting *tension arm unit*	Described in section *Adjusting tension arm unit on page 189*

4.2.2 Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE

Location

This section details how to replace the cable package IRBDP MH2 CE and IRBDP SW2 CE. 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.



xx0600003151

A	Ball joint housing (tension arm unit)
B	Hose support
C	Ball joint housing (process cable support axis 6)
D	Process cable support axis 6, complete
E	Arm protection
F	Gripping clamp
G	Bracket, lower arm
H	Bracket, back lower
J	Process cable package
K	Tension arm unit
L	Customer plate
M	Process plate

Continues on next page

4.2.2 Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE
Continued

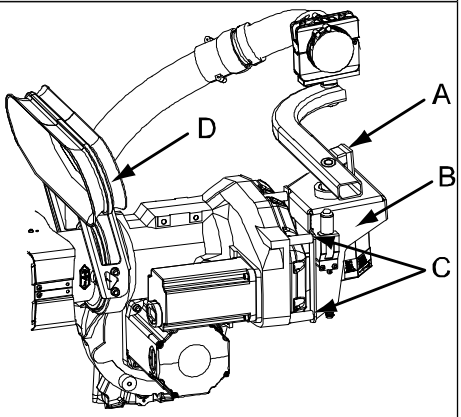
Required equipment

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

Equipment	Art. no.	Note
Cable package IRBDP MH2 CE		A number of versions are available. See *Spare Parts chapter*.
Cable package IRBDP SW2 CE		A number of versions are available. See *Spare Parts chapter*.
Locking liquid	3HAB7116-1	Loctite 243. For locking the metal clamps.
Standard toolkit, DressPack	3HAC17290-7	The contents are described in section *Toolkit, DressPack*.
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	3HAC026136-001 3HAC026208-001	

Procedure

The procedure below details how to remove the cable package IRBDP MH2 CE andIRBDP SW2 CE 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 *tension arm* resting against the *damper*.	 xx0600003179 Parts: • A: Damper • B: Tension arm unit • C: Attachment screws (4 pcs) • D: Hose support

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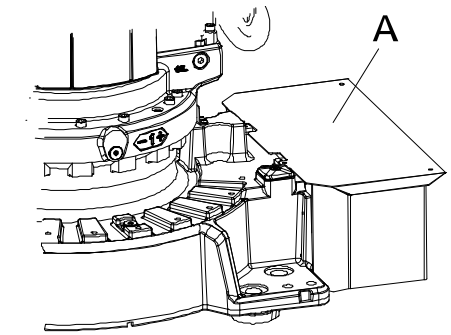
	Action	Note
2	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
3	**CAUTION** The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
4	Disconnect all hoses at tool side.	
5	Remove the *cover plate* in the back of the robot base.	 xx0600003174 Parts: • A: Cover plate • B: Customer plate • C: Process plate

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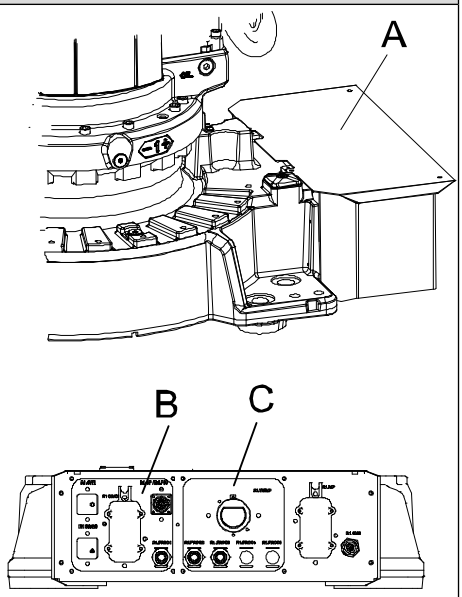
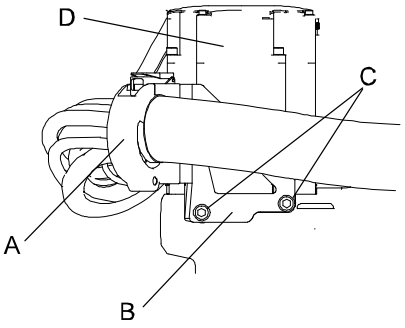
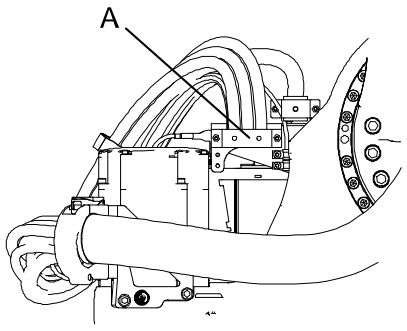
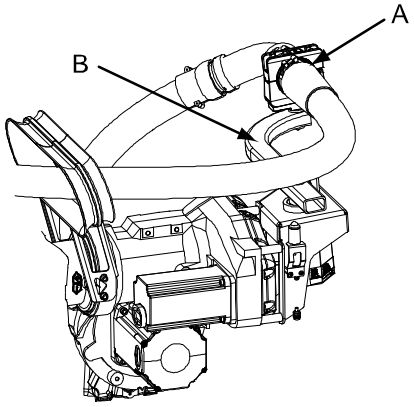
4.2.2 Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE

Continued

	Action	Note
6	Disconnect all hoses and connectors from the *customer* and *process plates*.	 xx0600003174 Parts: • A: Cover plate • B: Customer plate • C: Process plate
7	Open the gripping clamp on the base frame, and remove the cable package.	 xx0600003169 Parts: • A: Gripping clamp • B: Bracket, back lower • C: Attachment screws, bracket M10x16 quality 8.8 • D: Motor axis 1
8	Loosen the weld cable clamp and pull the *weld cable* up through the centrum hole of gearbox axis 1.	

Continues on next page

	Action	Note
9	Loosen the complete *cable and hose clamp*.	 xx0600003188 Parts: • A: Cable clamp (Attachment screws M10x16, 3 pcs are not visible in this figure)
10	Pull the *hoses* up through the centrum hole of gearbox axis 1.	
11	Pull the *cables* up through the centrum hole gear box axis 1.	
12	Disconnect all cables at tool side.	
13	Open the *ball joint housing* on the *process cable support, axis 6* and remove the cable package.	
14	Open the *ball joint housing* on the *tension arm unit*, and remove the cable package.	 xx0600003180 Parts: • A: Ball joint housing • B: Tension arm unit

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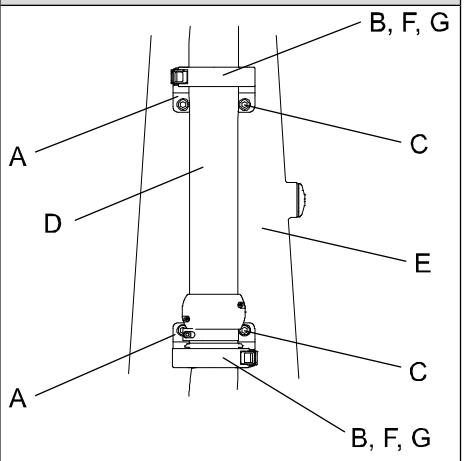
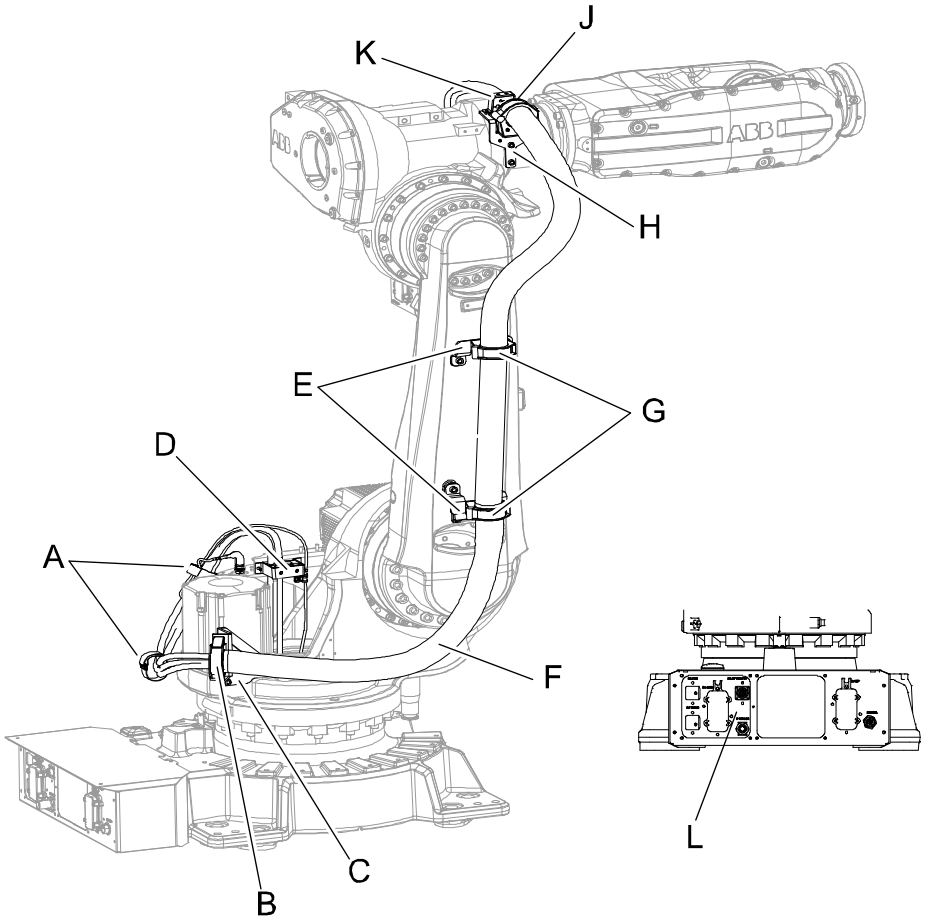
4.2.2 Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE
Continued

	Action	Note
15	Open the upper and lower *gripping clamps* on the lower arm and remove the cable package.	 xx0600003170 Parts: • A: Bracket lower arm • B: Gripping clamp • C: Attachment screws, bracket M10x16 quality 8.8 (2 pcs) • D: Process cable package • E: Lower arm • F: Attachment screws, gripping clamp M8x16 quality 8.8 (2 + 2 pcs) • G: Washer 2 holes
16	Fit the new or repaired cable package.	Detailed in section, *Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE on page 63*

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

Location

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



xx0700000596

A	Strap velcro
B	Gripping clamp (on frame)
C	Bracket back lower
D	Metal clamp with rubber clamp
E	Bracket lower arm
F	Protection hose (Cable package)
G	Gripping clamp (on lower arm)
H	Bracket for clamp
J	Gripping clamp (on upper arm)
K	Metal clamp with rubber clamp
L	Customer plate (Only IRB 6620)

Continues on next page

4.2.3 Replacement of the lower arm cable package - IRBDP MH 3 LE
Continued

Required equipment

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

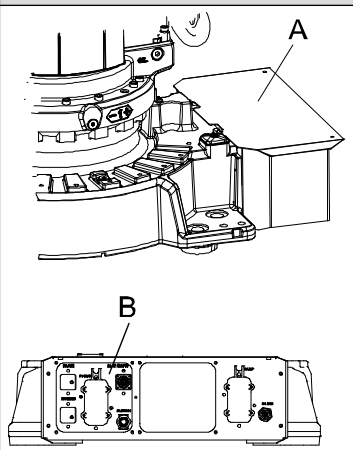
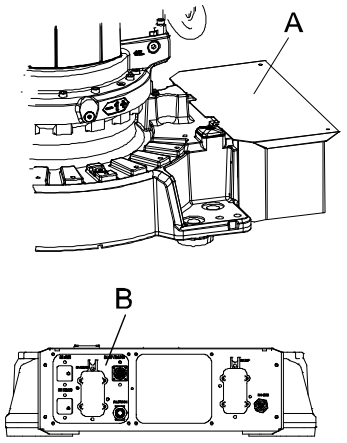
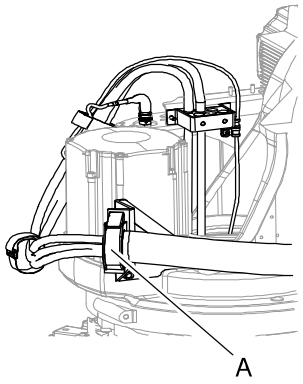
Equipment	Article number	Note
Cable package IRBDP MH 3 LE		
Locking liquid	3HAB 7116-1	Loctite 243 For locking screws.
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Circuit diagram	3HAC026136-001 3HAC026208-001	

Procedure

The procedure below describes how to remove the cable package IRBDP MH 3 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.	

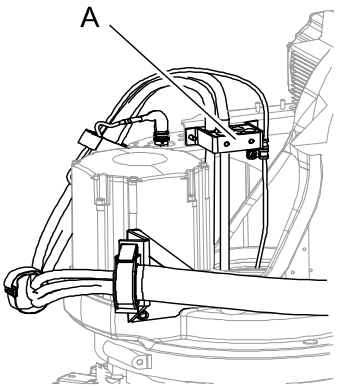
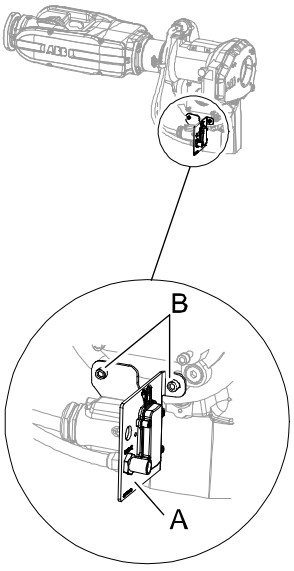
Continues on next page

	Action	Note
3	Remove the *cover plate* in the back of the robot base.	 xx0700000618 Parts: • A: Cover plate • B: Customer plate
4	Disconnect all hoses and connectors from the *customer* and *process plates*.	 xx0700000618 Parts: • A: Cover plate • B: Customer plate
5	Open the *gripping clamp* on the base frame and remove the cable package.	 xx0700000600 Parts: • Gripping clamp

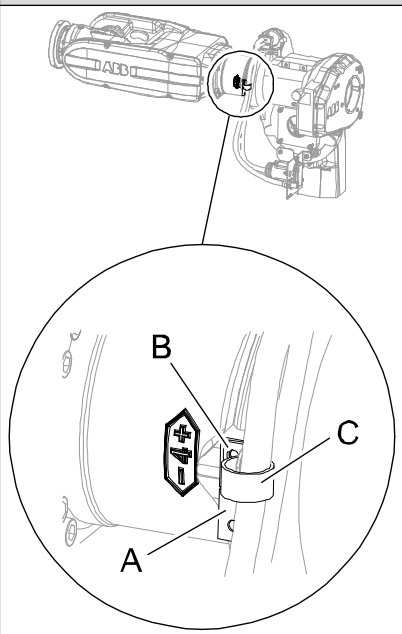
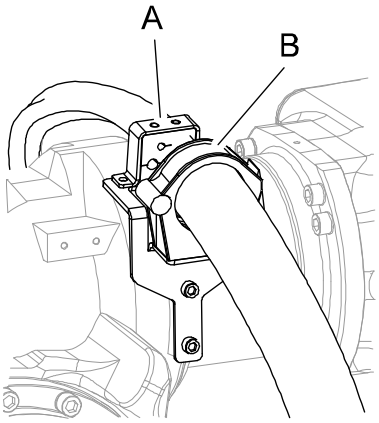
Continues on next page

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

Continued

	Action	Note
6	Remove the complete *cable holder bracket*, with metal clamp, from the base.	 xx0700000598 Parts: • A: Cable holder bracket
7	Pull hose and cables up through the centrum hole gearbox axis 1, in the following order: 1 Hose 2 Cables	
8	Disconnect all cable and hose connectors from the *connection plate*.	 xx0700000588 Parts: • A: Connection plate • B: Attachment screws

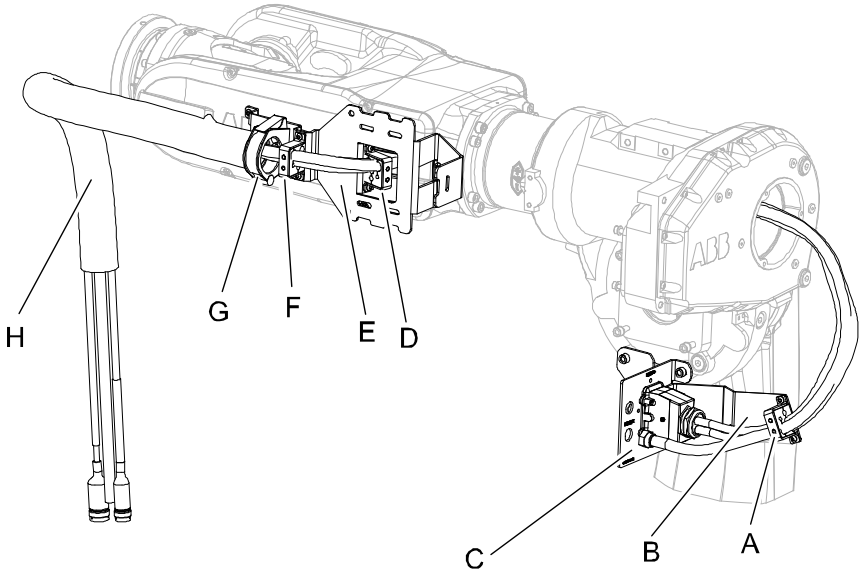
Continues on next page

	Action	Note
9	Loosen the velcro strap around cables and hose at the cable fixing bracket.	 xx0700000585 Parts: • A: Cable fixing bracket • B: Attachment screws • C: Velcro strap
10	Remove the *metal clamp with rubber clamp* on the upper arm.	 xx0700000614 Parts: • A: Metal clamp with rubber clamp • B: Gripping clamp
11	Open the *gripping clamp*.	See figure above!
12	Open the upper and lower gripping clamps on the lower arm and remove the cable package.	Shown in the figure in section *Location on page 165*.
13	Fit the new or repaired cable package.	Detailed in section *Fitting the lower arm cable package - IRBDP MH 3 LE on page 70*.

4.2.4 Replacement of upper arm cable package - IRBDP MH 3 UE

Location

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



xx0700000580

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

Required equipment

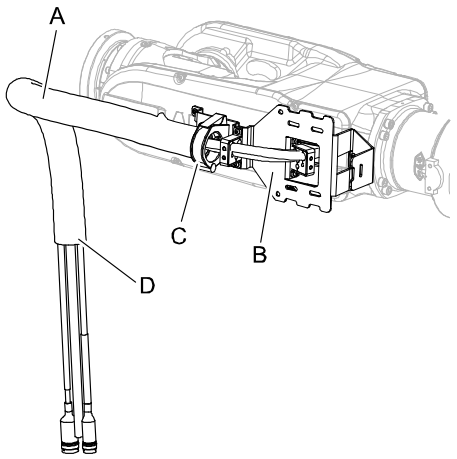
The following equipment is required for replacement of the cable package IRBDP MH 3 UE.

Equipment	Art. no.	Note
Cable package IRBDP MH 3 UE		
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		These procedures include references to the tools required.
Circuit diagram	3HAC026209-001	

Continues on next page

Procedure

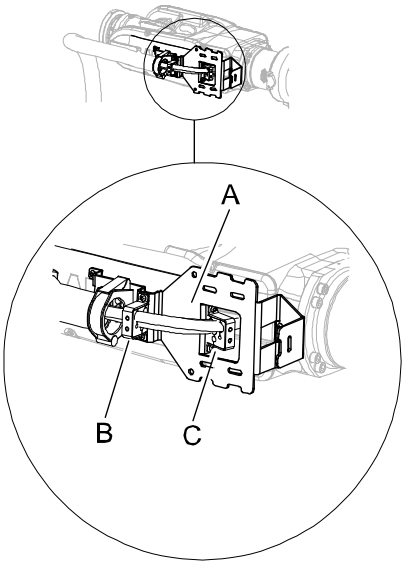
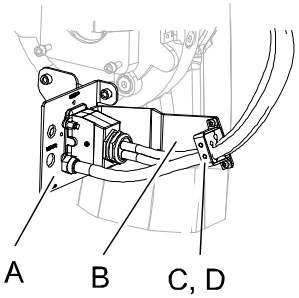
The procedure below details how to remove the cable package IRBDP MH 3 UE from the robot, before it is disassembled.

	Action	Note
1	**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.	
3	Open the gripping clamp at the front end of the cable package.	
4	If the cables has been put in a loop and fitted with straps on the bracket at wrist, remove the straps.	
5	Open the gripping clamp on the bracket at wrist.	 xx0700000609 Parts: • A: Protection hose • B: Bracket at wrist • C: Gripping clamp • D: Place for gripping clamp (front)

Continues on next page

4.2.4 Replacement of upper arm cable package - IRBDP MH 3 UE

Continued

	Action	Note
6	Remove the *metal clamp with rubber clamp* - left and right - on *bracket at wrist*.	 xx0700000606 Parts: • A: Bracket at wrist • B: Metal clamp with rubber clamp (left) • C: Metal clamp with rubber clamp (right)
7	Remove the *metal clamp with rubber clamp* on the *bracket for metal clamp*.	 xx0700000605 Parts: • A: Connection plate • B: Bracket for metal clamp • C: Metal clamp with rubber clamp • D: Attachment screws
8	Disconnect all cable and hose connectors from the *connection plate*.	Shown in the figure above!
9	Pull out the cable package from the upper arm and put it in a safe place.	
10	Refit the new or repaired cable package.	Detailed in section *Fitting the upper arm cable package - IRBDP MH 3 UE on page 79*.

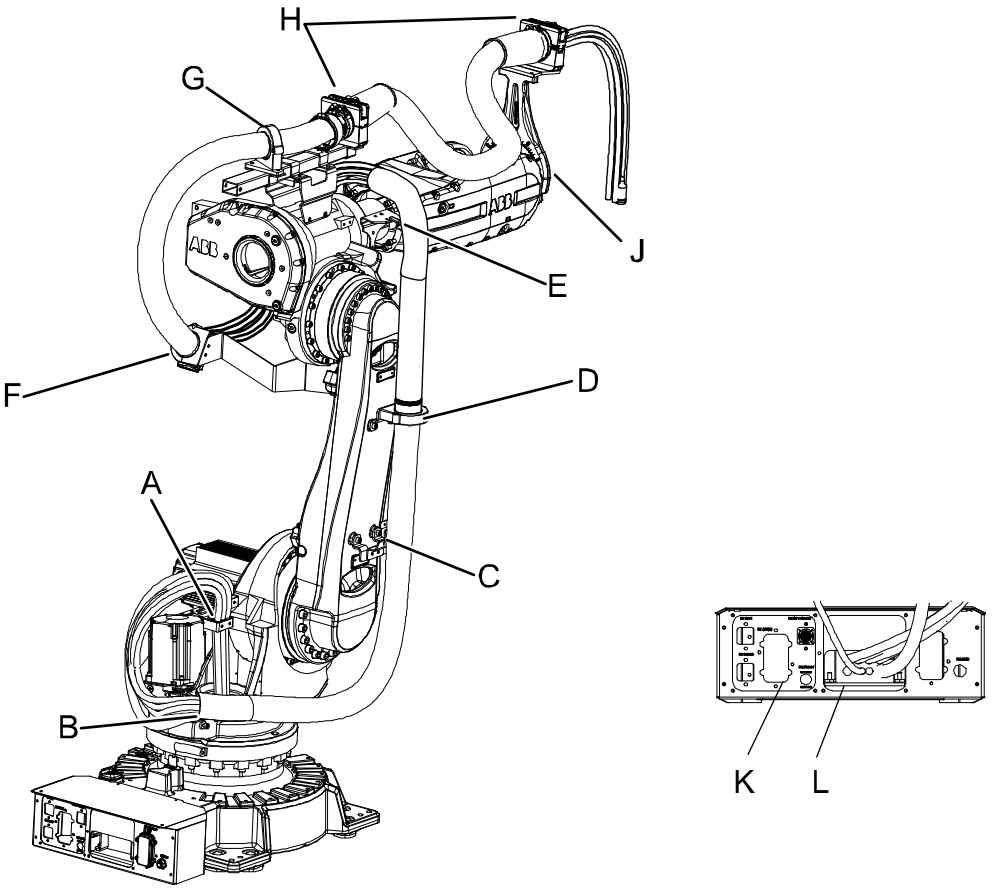
4.2.5 Replacing the cable package IRBDP SW5 CE (DressPack Basic)

Overview

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

Location of the cable package IRBDP SW5 CE

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



xx0800000111

A	Cable and hose clamp
B	Spiral hose clamp (bracket back lower)
C	Spiral hose clamp (lower bracket)
D	Gripping clamp (lower bracket)
E	Spiral hose clamp (spiral hose bracket)
F	Gripping clamp (axis 3 clamp mount)
G	Gripping clamp (adjustable bracket)
H	Ball joint housing
J	Process cable support axis 6
K	Customer plate

Continues on next page

4.2.5 Replacing the cable package IRBDP SW5 CE (DressPack Basic)
Continued

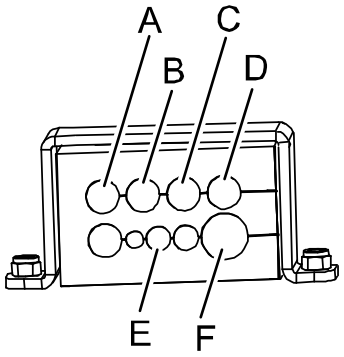
L	Clamp holder with plastic clamp

Required equipment

Equipment	Art. no.	Note
Cable package IRBDP SW5 CE	For spare part number see chapter: • *Spare parts on page 229*.	
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
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: • 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 *clamp holder with plastic clamp* in the back of the robot base, securing the cable package.	 xx0800000079 Parts: • Clamp holder with plastic clamp

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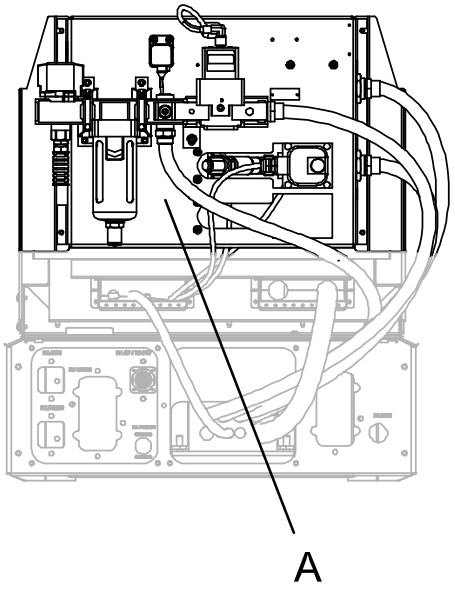
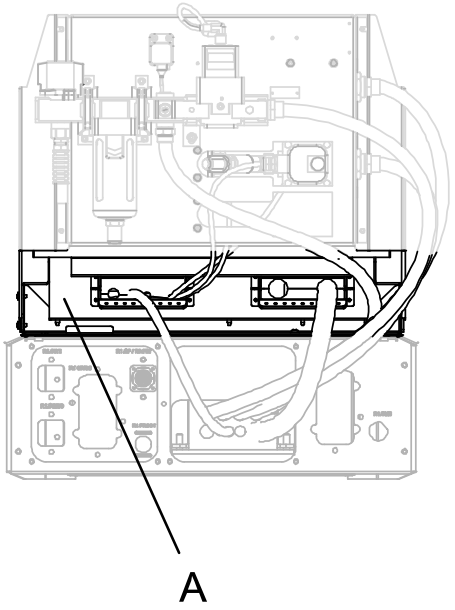
	Action	Note
4	Disconnect all cables and hoses at the *water and air unit*.	 xx0800000083 Parts: • A: Water and air unit
5	Disconnect all cables and hoses at the *connection box*.	 xx0800000082 Parts: • A: Connection box
6	Pull the lower end of the cable package carefully up through the center hole in gearbox axis 1. Order of disassembly: 1 Hoses 2 Signal cables	
7	Loosen the *spiral hose clamp* on the bracket back lower.	Shown in the figure *Location of the cable package IRBDP SW5 CE on page 173*.

Continues on next page

4.2.5 Replacing the cable package IRBDP SW5 CE (DressPack Basic)
Continued

	Action	Note
8	Loosen the *spiral hose clamp* on the lower bracket.	Shown in the figure *Location of the cable package IRBDP SW5 CE on page 173*.
9	Open the *gripping clamp* on the lower bracket.	Shown in the figure *Location of the cable package IRBDP SW5 CE on page 173*.
10	Open the *gripping clamp* on the axis 3 cable bracket.	Shown in the figure *Location of the cable package IRBDP SW5 CE on page 173*.
11	Open the *gripping clamp* on the adjustable bracket.	Shown in the figure *Location of the cable package IRBDP SW5 CE on page 173*.
12	Open the *ball joint housings* at the process cable support axis 6 and adjustable bracket.	Shown in the figure *Location of the cable package IRBDP SW5 CE on page 173*.
13	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 (DressPack Basic) on page 84*.	

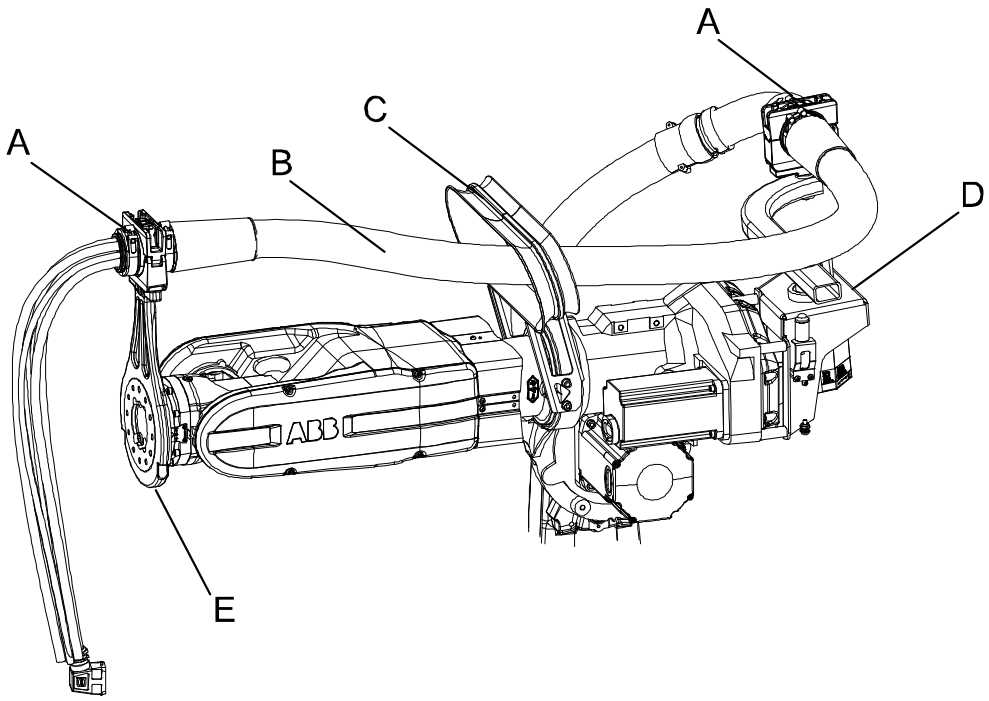
4.2.6 Replacement of tension arm unit

Note

This section is not applicable to cable package IRBDP MH 3 UE.

Location of tension arm unit

The tension arm is located as shown in the figure.



xx0600003167

A	Slide sleeves slide surface
B	Process cable package
C	Hose support
D	Tension arm unit
E	Process cable support, axis 6

Required equipment

Equipment	Spare part no.	Art. no.	Note
Standard Toolkit, DressPack		3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Tension arm unit	3HAC025105-001		
Locking liquid		3HAB7116-1	Loctite 243

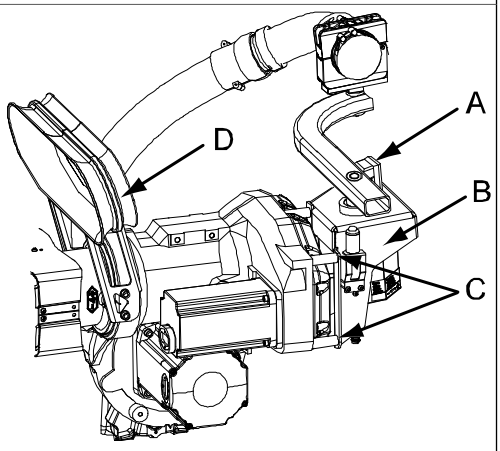
Continues on next page

4.2.6 Replacement of tension arm unit

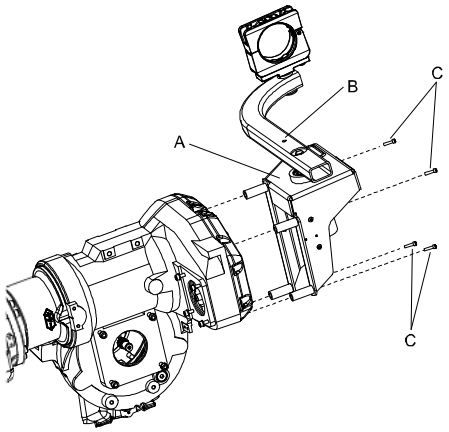
Continued

Procedure

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

	Action	Note
1	**DANGER** Turn off all: • 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 *tension arm* resting against the *damper*).	 xx0600003179 Parts: • A: Damper • B: Tension arm unit • C: Attachment screws • D: Hose support
5	Remove the cable package from the ball joint housing on the tension arm unit.	Detailed in section *Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE on page 159*.

Continues on next page

	Action	Note
6	Loosen the *attachment screws* M12x25 quality 8.8-A3F (4 pcs) holding the *tension arm unit*. It is possible to use the Ø10 mm hole with suitable lifting accessory, to lift the tension arm unit.	 xx0600003185 Parts: • A: Tension arm unit • B: Ø10 mm hole • C: Attachment screws M12x80 (4 pcs)Gleitmo 12.9. Tightening torque: 70 Nm
7	Replace the *tension arm* unit, and tighten the four *attachment screws*. Lock screws with locking liquid.	Art. no. is specified in *Required equipment on page 177*.
8	Refit the cable package.	See section *Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE on page 63*.

4.2.7 Replacement of protective sleeves

Note

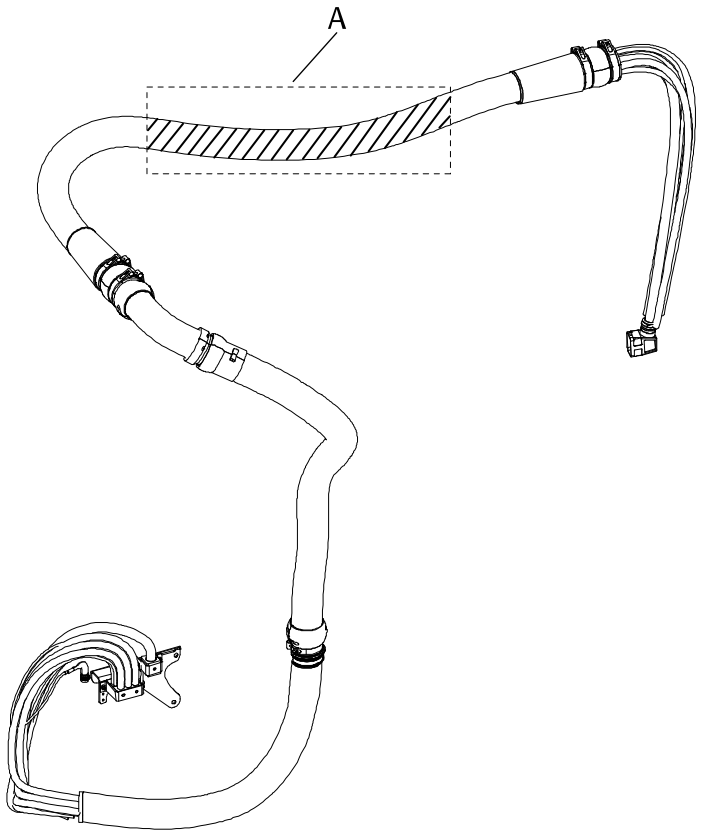
This section is not applicable to cable package IRBDP MH 3 UE.

Note

Protective sleeves are **not** fitted at delivery!

Location of protective sleeve

The protective sleeves can be located in the area shown in the figure below, (if needed).



xx0600003190

A	Area where slide sleeves may be fitted.

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 229*. For spare part number see chapter*DressPack for - IRBDP MH2 CE and IRBDP SW2 CE on page 230*.	
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
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.	

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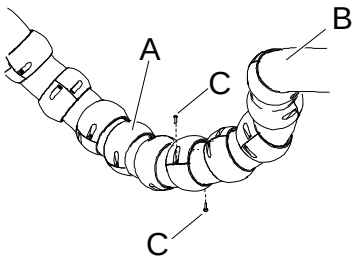
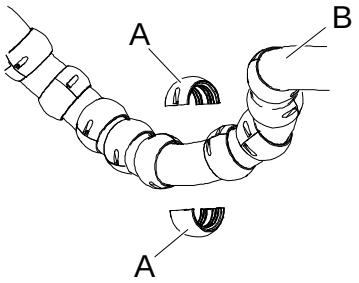
4.2.7 Replacement of protective sleeves

Continued

	Action	Note
3	Remove the two **attachment screws**.	 xx0500001551 Parts: • A: Protective sleeve • B: Protective hose • C: Attachment screw (2 pcs)
4	Split the *protective sleeve*.	 xx0500001550 Parts: • A: Protective sleeve • B: Protective hose
5	Replace or move the protective sleeve.	
6	**Note** When moving or adding protective sleeves, always leave a space between them (approximately the width of one slide sleeve).	
7	Attach the two *attachment screws*.	

4.2.8 Repair of process cable package

Note

This section is not applicable to cable package IRBDP MH 3 UE.

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:

- *Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE on page 159*
- *Replacement of the lower arm cable package - IRBDP MH 3 LE on page 165*
- *Replacing the cable package IRBDP SW5 CE (DressPack Basic) on page 173*

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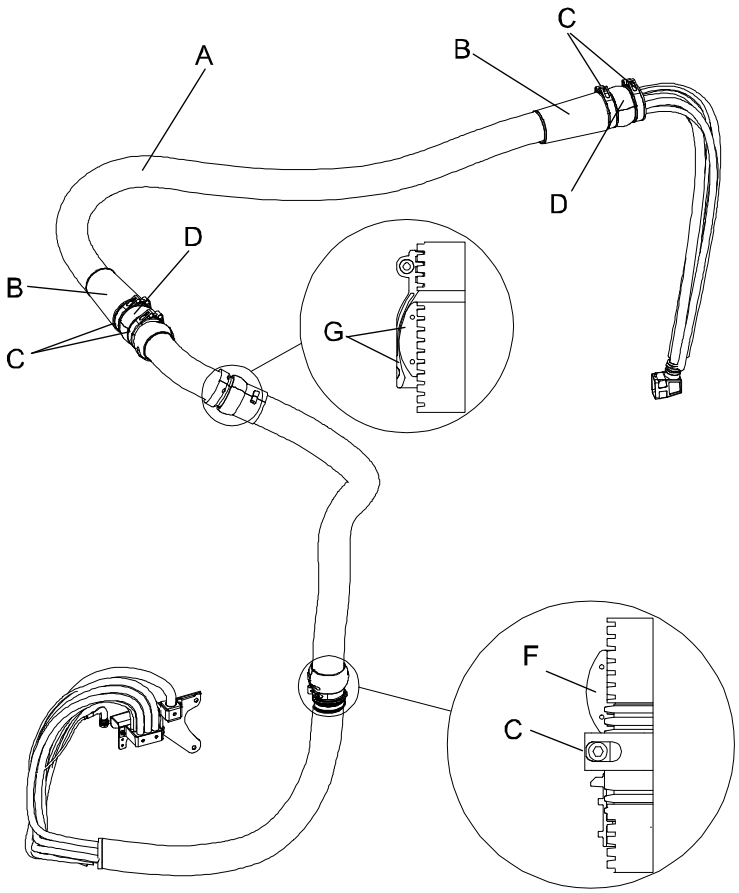
4.2.8 Repair of process cable package
Continued

Upper arm cable package parts

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



xx0600003168

A	Reinforced protection hose, 1880 mm
B	Hose reinforcement
C	Hose clamp
D	Slide sleeve
F	Protective sleeve
G	Swivel

Required equipment

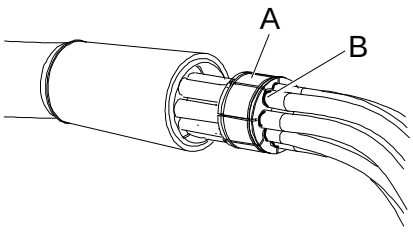
Equipment, etc.	Art. no.	Note
Standard Toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Toolkit cables		The contents are defined in section *Toolkit cables*.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		These procedures include references to the tools required.

Continues on next page

Equipment, etc.	Art. no.	Note
Cable grease	3HAC14807-1	Optitemp RB2
Protective plastic	-	To protect the connector pins during disassembly.
Circuit diagram	3HAC026136-001 3HAC026208-001	

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 *Toolkit cables*.
3	Put plastic film over the pins and tighten with reinforced tape.	
4	Mark the position for *rubber retainer* on cables and hoses with *reinforced tape*.	 xx0500001558 Parts: • 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 184*
7	Remove the *rubber retainer* at tool end.	Shown in the figure, *Upper arm cable package parts on page 184*
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.	

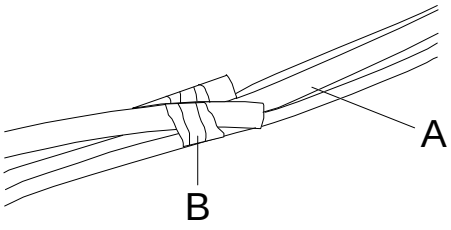
Continues on next page

4.2.8 Repair of process cable package
Continued

	Action	Note
12	Check carefully if cable and hoses is damaged. • 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	**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	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. • Check the individual order related to the rubber retainer and between the different parts.	
5	Secure related positions by reinforced tape. **Note** Put the reinforced tape at parts that will end outside the protective hose.	 xx0500001559 Parts: • A: Cables and hoses • B: Reinforced tape
6	Apply cable grease on cables and hoses. **Note** 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.	
7	Put cables and hoses on a flat and clean surface.	
8	Straighten weld cable, signal cables and hoses.	

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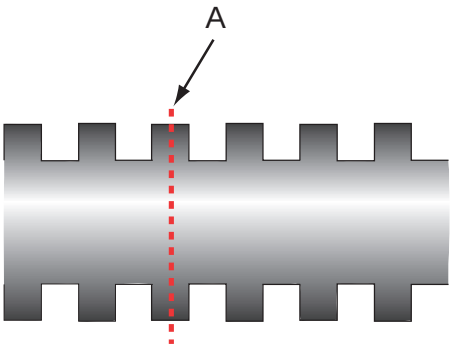
	Action	Note
9	Inspect the protective hose to make sure its ends has been correctly cut.	 xx0300000061 Parts: • A: Place where to cut the protective hose (on top of a ridge).
10	Fit *hose reinforcement* to *protective hose*.	See *Upper arm cable package parts on page 184*
11	Slip cables and hoses inside protective hose. **Note** Keep cables and hoses straight during assembly, and not lose orientation relative each other during assembly.	
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. **Note** Protective hose should be measured in released mode and not after being stretched.	
15	Assemble front rubber retainer. • Open up front rubber retainer on the tool side and push signal cables back 50 mm into the protection hose. **Note** 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.	
16	Fit the slide sleeves.	See *Replacement of slide sleeves on page 197*.

Continues on next page

4.2.8 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 *Toolkit cables*.
19	Check that all cables are connected according to circuit diagram and use the proper tools	See *Toolkits, DressPack on page 225*
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.	

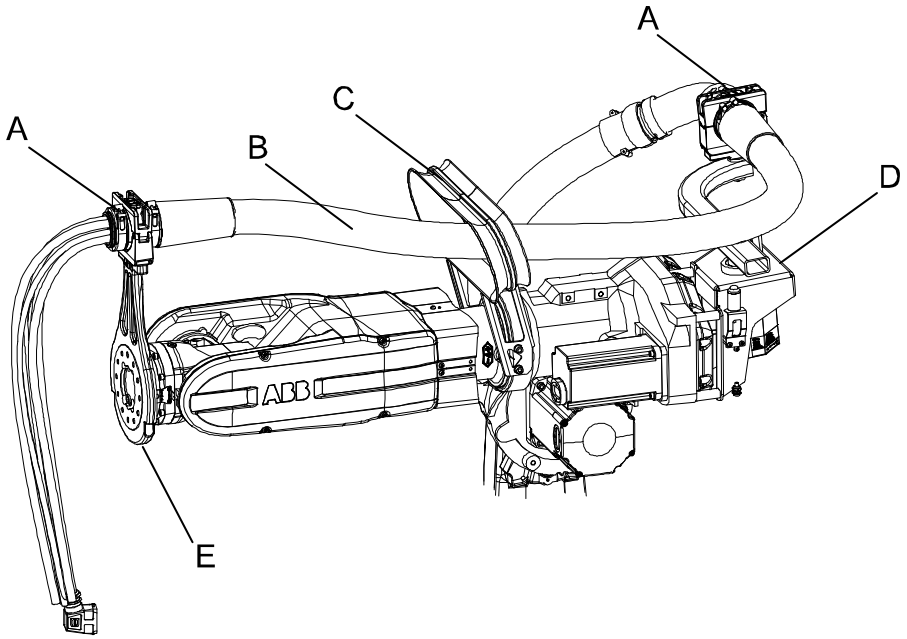
4.2.9 Adjusting tension arm unit

Note

This section is not applicable to cable package IRBDP MH 3 UE.

Location of tension arm unit

This section describes how to adjust the tension arm unit.



xx0600003167

A	Slide sleeve slide surface
B	Process cable package
C	Hose support
D	Tension arm unit
E	Process cable support, axis 6

General

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

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

- The arm of the retracting unit shall ”float” a little when the robot is moving.

Required equipment

Equipment	Note
Standard tool kit DressPack	The contents are defined in section *Toolkits, DressPack on page 225*.

Continues on next page

4.2.9 Adjusting tension arm unit
Continued

Equipment	Note
Wrench 27 mm with extended shaft	To manage holding the spring force properly during adjustment, the wrench needs to have an extended shaft (approximately 0.5 m).

Adjustment values

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

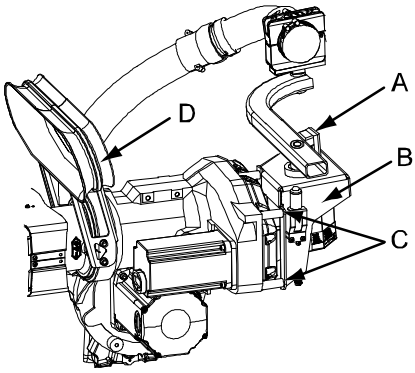
Spring force must be adjusted to fit valid cycle. Approximate values:

- Spot welding ~ ¾ turn
- Material Handling~ ½ - ¾ turn

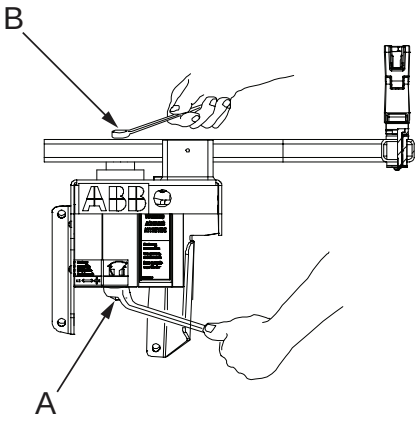
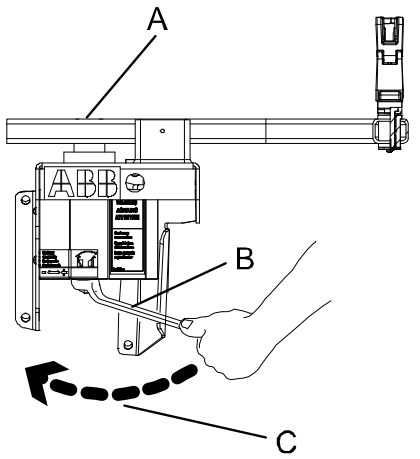
Adjusting tension arm unit

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

Loosening the spring

	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	**WARNING** In order to avoid accidents place the robot in a service position (upper arm slightly upwards) with the *tension arm* resting against the *damper*.	 xx0600003179 Parts: A Damper B Tension arm unit C Attachment screws (3 pcs) D Hose support
3	**DANGER** Loosening the spring bolt in the coming steps will release the spring tension. Two persons are required to perform the procedure in a safe manner.	

Continues on next page

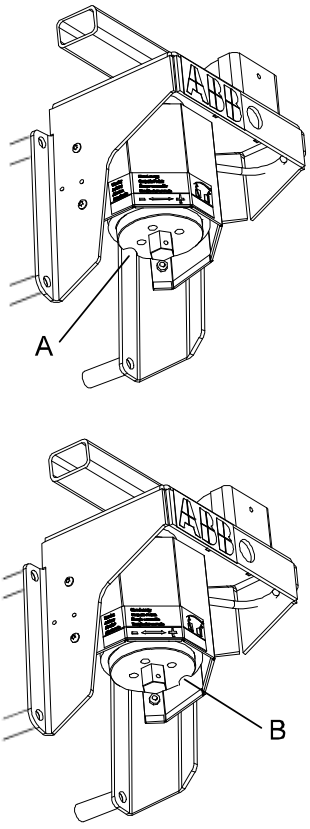
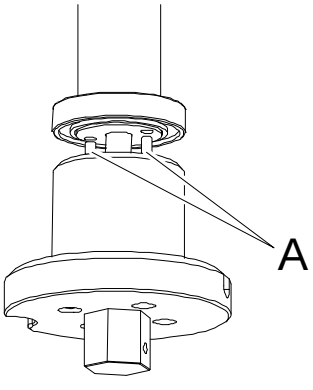
	Action	Note
4	Person 1: Take a grip of the spring bolt with a 27 mm wrench (extended shaft) and be prepared to hold against the spring force. Person 2: Loosen the *upper screw (M12)*, with a 18 mm standard wrench approximately 10-15 mm. **Note** The spring force will probably not be released until when the upper screw is tapped down in the next step, but it is a good idea to be prepared to hold against the force already in this step.	 xx1700002244 A Spring bolt B Upper screw M12x220 (4 pcs)
5	Person 1: Keep holding the 27 mm wrench in a firm position as the spring force now will be released. Person 2: Release the tension in the spring bolt by tapping the *upper screw* with a rubber mallet until the tension is released (when bolt goes down). **DANGER** Hold the wrench in a firm position as the spring force now will try to rotate the wrench to the left.	 xx0600003182 A Upper screw M12 B Standard wrench 27 mm with extended shaft (extension not shown in figure) C Direction in which the spring force will rotate the wrench

Continues on next page

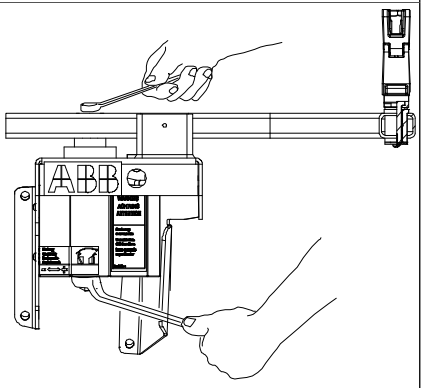
4.2.9 Adjusting tension arm unit

Continued

Adjusting the spring force and securing the spring

	Action	Note
1	Use the wrench to adjust appropriate spring force. Carefully lower the spring if needed. To *increase* the force: pull the wrench right. To *decrease* the force: push the wrench left.	 xx0600003193 View: A Showing the spring with no tension B Showing the spring with ¾ tension (270°).
2	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 A Guide pins

Continues on next page

	Action	Note
3	**Tip** The next step is best performed by two persons working together.	
4	Person 1: Hold the spring bolt in a firm position. Person 2: Fasten the spring by tightening the upper screw (M12).	 xx0600003183

4.3 DressPack cable package, common

4.3.1 Replacement of hose reinforcement

Note

This section is not applicable to cable package IRBDP MH 3 UE.

Overview

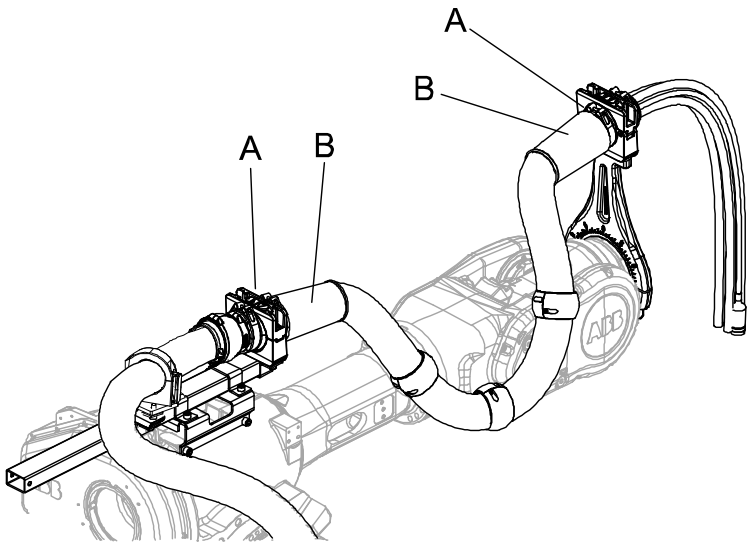
All work detailed below is to be performed on a workbench!

How to remove the DressPack harness from the robot is detailed in section *Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE on page 159*.

Location of hose reinforcement

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

IRBDP SW 5 CE



xx0800000089

A	Slide sleeves
B	Hose reinforcement

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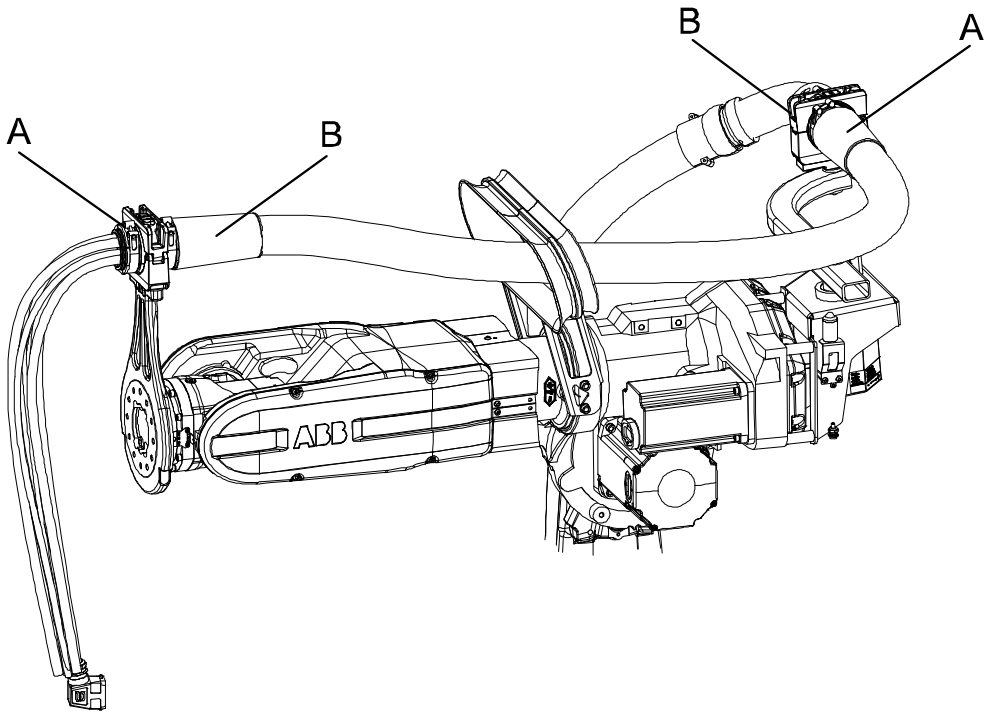


xx0600003166

A	Slide sleeves
B	Hose reinforcement

Required equipment

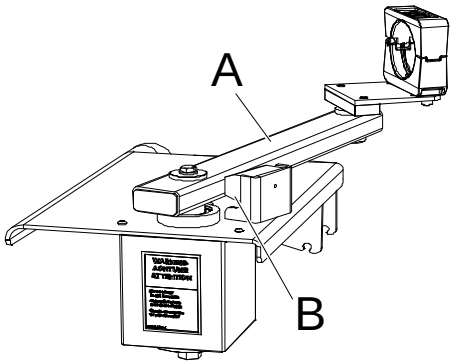
Equipment, etc.	Spare part no.	Art. no.	Note
Hose reinforcement	3HAC022194-001		
Standard Toolkit, DressPack		3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.		-	These procedures include references to the tools required.

Continues on next page

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 *tension arm* must rest on the *damper* before the disassembly of the upper arm starts!	 xx0500001794 Parts: • A: Tension arm • B: Damper
2	Perform the procedure detailed in section *Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE on page 159* and the first steps of the procedure detailed in section *Repair of process cable package on page 183*. This will give access to the slide sleeves.	Detailed in section *Replacing the cable package IRBDP SW5 CE (DressPack Basic) on page 173*.
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 229*.
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 *Repair of process cable package on page 183* and the procedure detailed in section *Fitting the cable package IRBDP SW2 CE and IRBDP MH2 CE on page 63*.	Detailed in section *Repair of process cable package on page 183*. Detailed in section *Replacing the cable package IRBDP SW5 CE (DressPack Basic) on page 173*.

4.3.2 Replacement of slide sleeves

Note

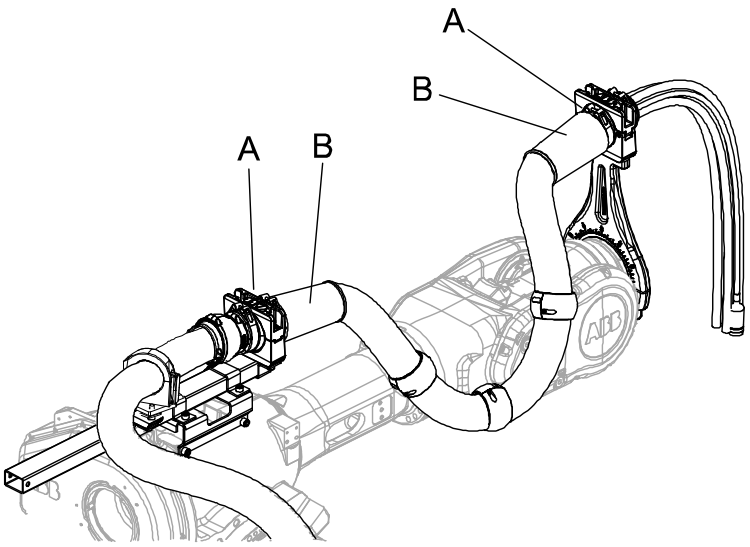
This section is not applicable to cable package IRBDP MH 3 UE, IRBDP MH3 UI, IRBDP SW6, IRBDP MH6.

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 *Replacement of cable package IRBDP MH2 CE and IRBDP SW2 CE on page 159*.

IRBDP SW 5 CE



xx0800000089

A	Slide sleeves
B	Hose reinforcement

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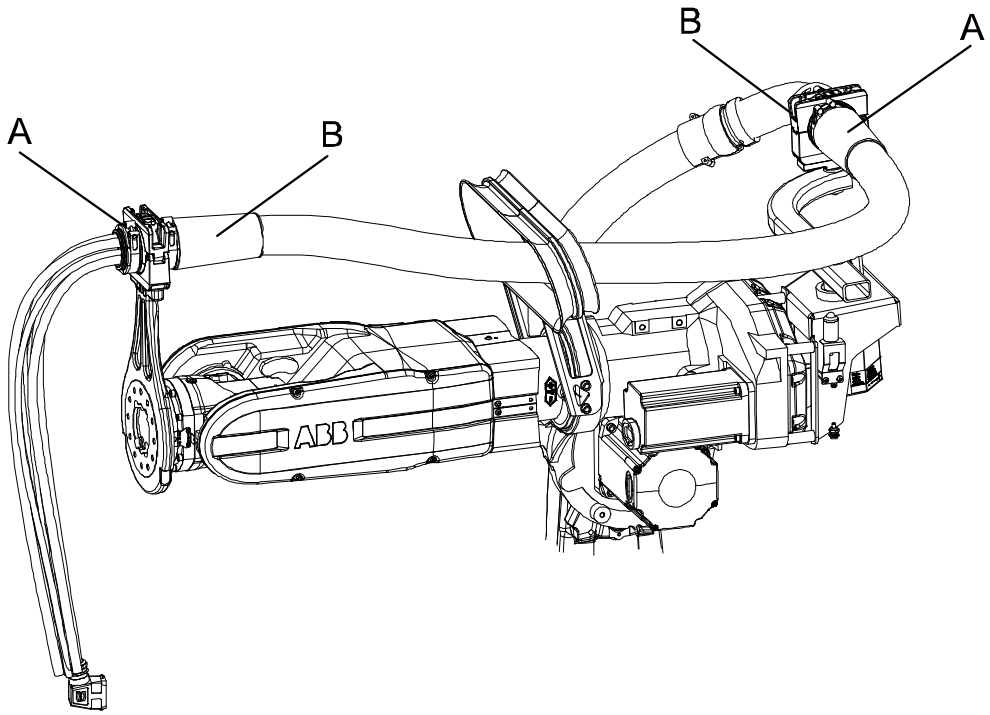
4.3.2 Replacement of slide sleeves

Continued



xx0600003166

A	Slide sleeves
B	Hose reinforcement

Required equipment

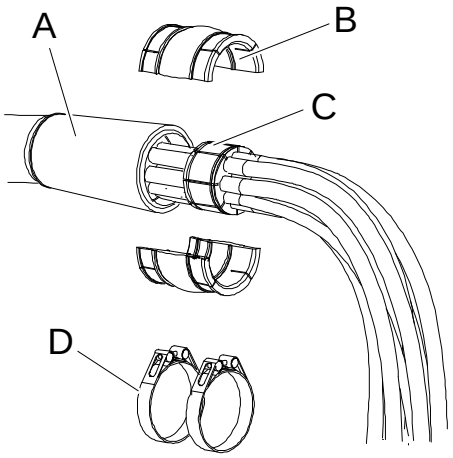
Equipment, etc.	Art. no.	Note
Slide sleeves	3HAC16208-1	
Standard Toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Other tools and procedures may be required. See references to these procedures in the step-by-step instructions below.	-	These procedures 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.	

Continues on next page

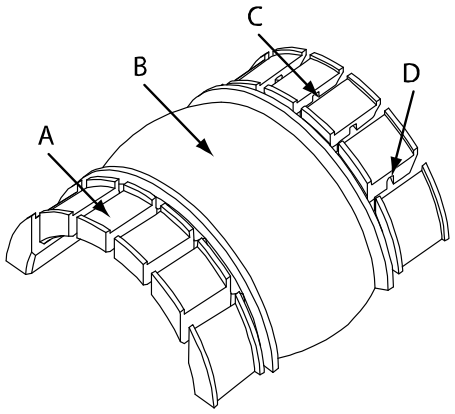
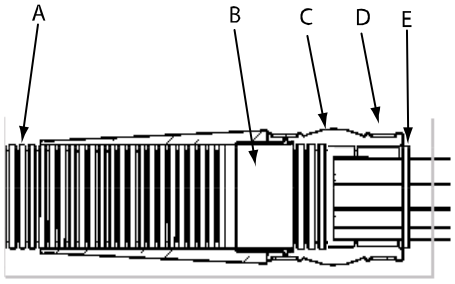
	Action	Note
2	**DANGER** Turn off all: • electric power supply • hydraulic pressure supply • air pressure supply to the robot, before entering the robot working area.	
3	**CAUTION** The cable package is sensitive to mechanical damage. They must be handled with care, especially the connectors, in order to avoid damaging them.	
4	Mark the positions of the rubber grommets on cables and hoses with reinforced tape.	
5	Disconnect all hose and cable connectors.	This is only needed if the work is going to be done on a workbench.
6	Open ball joint housings.	
7	Remove the process cable from the ball joint housings.	
8	Open the *hose clamps*.	 xx0500001795 Parts: • A: Hose reinforcement • B: Slide sleeve • C: Rubber grommet • D: Hose clamp
9	Remove and replace the slide sleeves, one at a time.	

Continues on next page

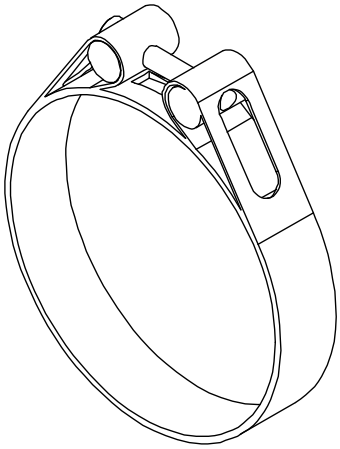
4.3.2 Replacement of slide sleeves
Continued

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.	 xx0300000249 Parts: • A: Hose clamp surface, farthest from the protective hose • B: Slide sleeve slide surface, slightly concaved • C: Hose clamp surface, closest to the protective hose • D: Groove for locking the hose reinforcement
2	The figure to the right, shows the fitting positions of the *slide sleeves* on the *cable/hose retainer*.	The figure shows a cross section of the slide sleeves:  xx0400001007 Parts: • A: Protective hose • B: Hose reinforcement • C: Slide sleeves • D: Hose clamp • E: Cable/Hose retainer

Continues on next page

	Action	Note
3	Secure the slide sleeves with *hose clamps*. 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.	Make sure both clamps face the same way! Make sure the gaps between the slide sleeve halves are close to identical and *do not coincide* with the vertical cuts in the hose and cable retainer!  xx0300000250 • 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.	

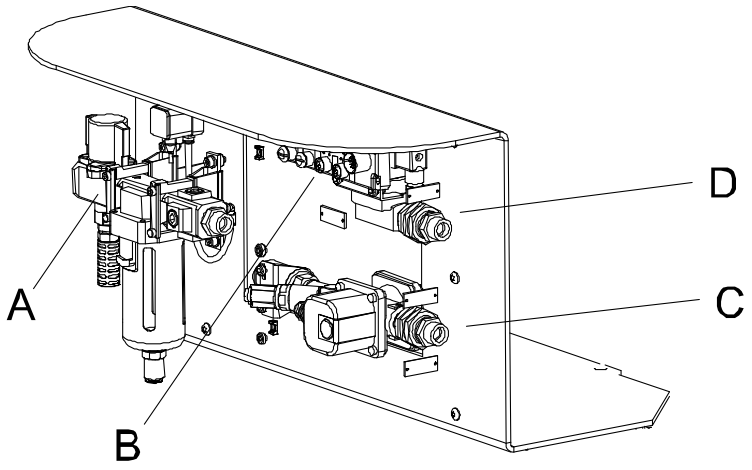
4.4 Water and Air unit

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.

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

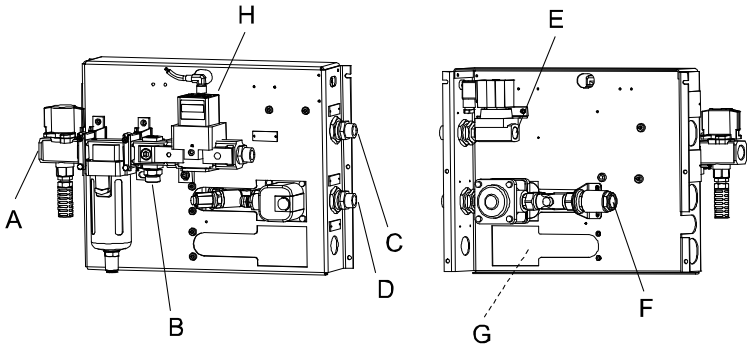


xx0600003293

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

Location of Air supply circuit, type Sb

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



xx0800000124

A	Air supply circuit
B	PROC 1 on robot base
C	PROC 2 on robot base
D	PROC 3 on robot base

Continues on next page

E	Shop water supply
F	Shop water drain
G	PROC 4 on robot base (option)
H	Electrical Proportional Valve (EP)

Required equipment

Equipment	Art. no.	Note
Water and air unit	See *Spare parts*.	A number of versions are available. The Water and Air unit assembly contains all required hardware for fitting and connecting.
Standard toolkit, DressPack	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Circuit diagram	3HAC026208-001	Dresspack for spotwelding

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 *Pneumatic or hydraulic related hazards on page 28*.	
2	Turn off the hand operated air valve on the air supply circuit.	The air hoses on the robot will be decompressed.
3	Turn off the shop floor air supply to the Water and Air unit.	
4	Remove the hose of the compressed air supply of the workshop.	
5	Remove the Proc 1 hose from the air supply unit.	
6	Remove the Proc 4 hose from the air supply unit.	Only if the option Proportional valve has been selected.
7	Disconnect the pressure switch tube from the Air circuit Cross interface.	
8	Disconnect the pressure switch connector on the split box, according to the circuit diagram.	
9	Disconnect the pressure switch from the mounting plate.	
10	If the option proportional valve is selected, disconnect the proportional valve connectors on the split box according to the circuit diagram.	
11	Unscrew the four attachment screws holding the air supply circuit and remove it.	

Continues on next page

4.4.1 Replacement of Air supply circuit
Continued

Refitting

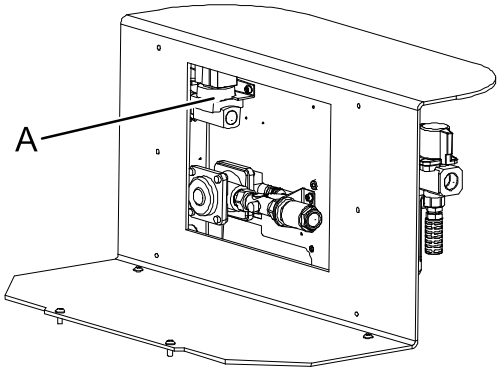
The procedure below details how to refit the air supply circuit. It does not deal with details specific to each version, such as article numbers, connector types etc. For details see the *Spare parts* section.

	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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
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.

4.4.2 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.

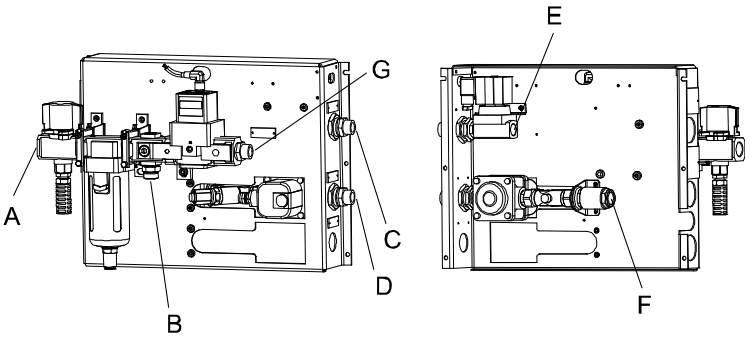


xx0600003462

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

4.4.2 Replacement of Water-in 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	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Circuit diagram	3HAC026208-001	Dresspack for spotwelding

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.	

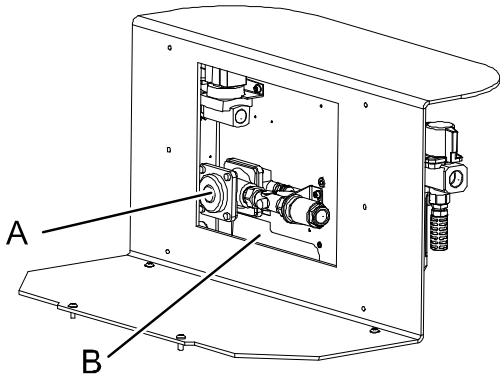
Continues on next page

	Action	Note
5	Connect the Proc 2 hose on the Water and Air unit.  **CAUTION** Do not tighten the brass couplings for water and air with excessive force.	Tightening torque: • Brass coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
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

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.

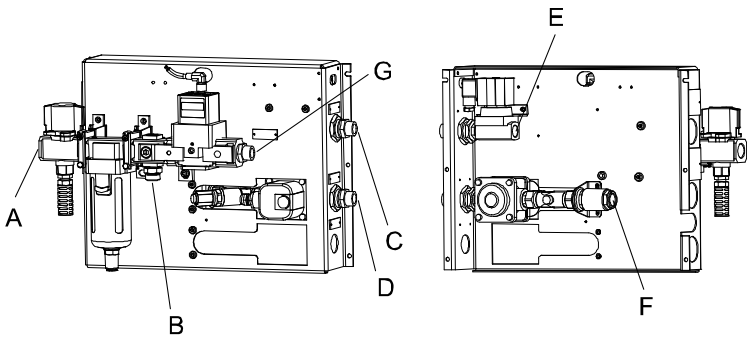


xx0600003464

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.



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-return circuit
G	PROC 4 on robot base (option)

Continues on next page

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	3HAC17290-7	The contents are defined in section *Toolkits, DressPack on page 225*.
Circuit diagram	3HAC026208-001	Dresspack for spotwelding

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: • Disconnect the hose from the check valve Second water-return: • Disconnect the hose from the bulkhead connector.
4	Loosen the locking nut.	Only if the option *Second water return* 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 *Second water return* 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.	
2	Fit the two attachment screws securing the mounting bracket (or brackets).	

Continues on next page

4.4.3 Replacement of Water-return circuit

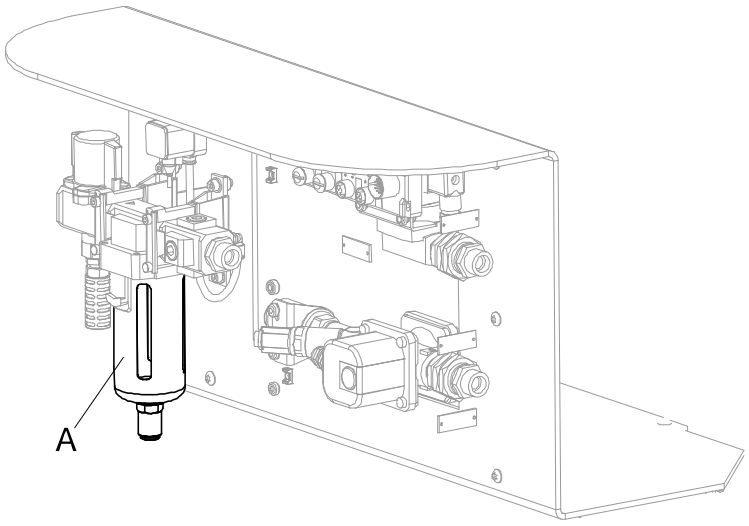
Continued

	Action	Note
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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass.
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 coupling 1/2": 31 Nm. • Stainless steel coupling 1/2": 49 Nm. • Brass coupling 3/8": 17 Nm. • Mixed metals: Use the lower tightening torque value of the two metals. Always apply Molykote P1900 to stainless steel couplings and apply if needed for couplings of mixed metals or brass. Only if the option *Second water return* has been selected.
7	Tighten the locking nut, at the shop floor side.	Only if the option *Second water return* 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.	

4.4.4 Replacement of Air filter element

Replacement of air filter

Type S



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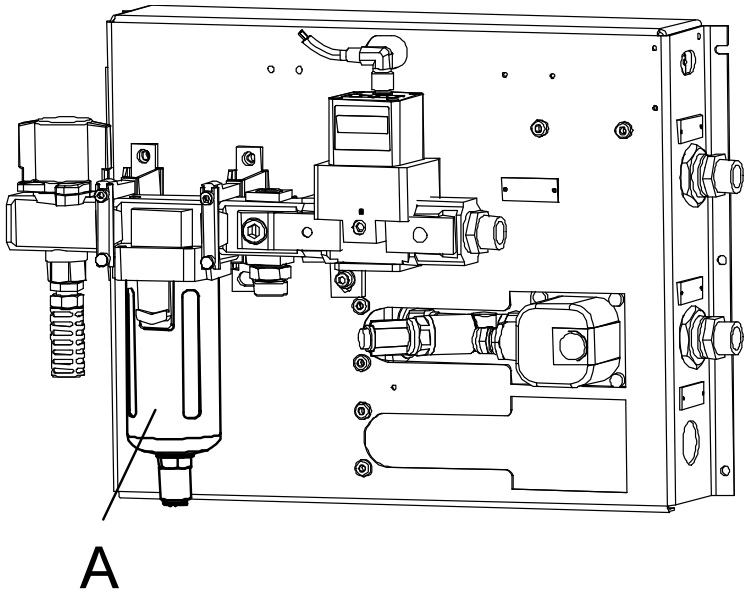
A	Air filter

Type Sb



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A	Air filter

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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: • 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!

4.5 Tipdresser

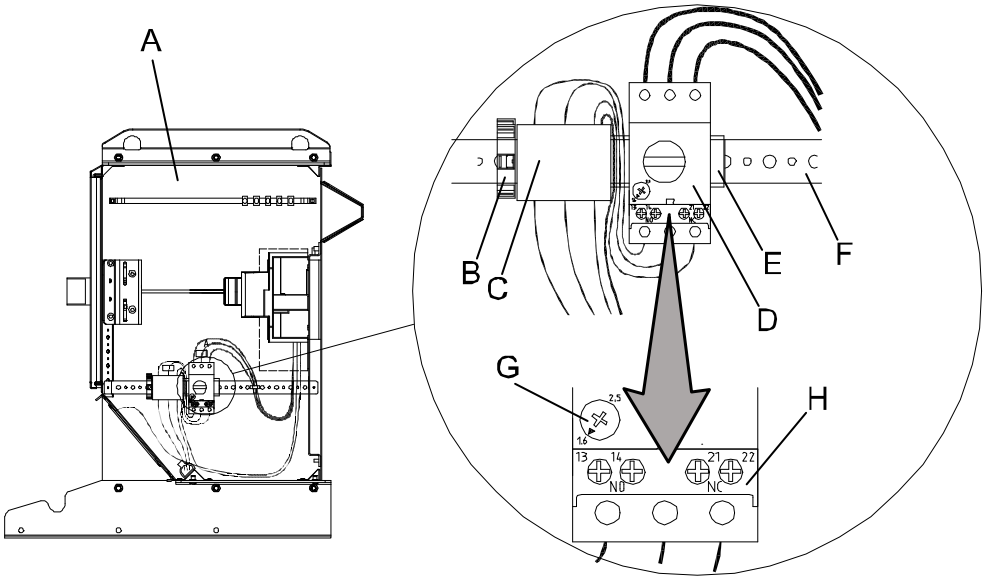
4.5.1 Replacement of Tipdresser parts

Overview

This section details how to replace the tipdresser parts (motor starter, auxiliary switches and motor contactor) in the spot welding cabinet.

Location

Parts described in the procedure are located as shown in the illustration below.



xx0600003247

A	Spot welding cabinet
B	End clamp
C	Motor contactor
D	Motor starter
E	Terminal rail
F	Mounting bracket
G	Screw choosing either 1.6 A or 2.5 A (**NOTE!** Set on 1.6 A on delivery!)
H	Auxiliary switches

Continues on next page

4.5.1 Replacement of Tipdresser parts
Continued

Replacement of motor starter, auxiliary switches and/or motor contactor

The procedure below details how to replace the motor starter, auxiliary switches and motor contactor.

	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 controller IRC5.	
2	The *motor starter* and *motor contactor* are snap locked on the *terminal rail*.	Shown in the figure in section *Location on page 213*.
3	The *auxiliary switches* are snap locked on the *motor starter*.	Shown in the figure in section *Location on page 213*.
4	Release the snap locks when removing.	
5	Snap on the parts in their respective places, when fitting.	
6	Make sure that the snap locks are locked.	

5 Decommissioning

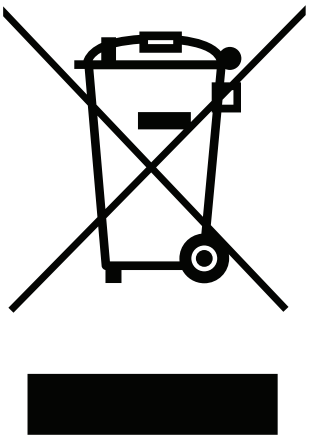
5.1 Environmental information

Introduction

ABB robots contain components in different materials. During decommissioning, all materials should be dismantled, recycled, or reused responsibly, according to the relevant laws and industrial standards. Robots or parts that can be reused or upcycled helps to reduce the usage of natural resources.

Symbol

The following symbol indicates that the product must not be disposed of as common garbage. Handle each product according to local regulations for the respective content (see table below).



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Materials used in the product

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

Dispose components properly according to local regulations to prevent health or environmental hazards.

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

Continues on next page

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.

6 Reference information

6.1 Introduction

General

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

6.2 Applicable standards

> **Note**
>
> The listed standards are valid at the time of the release of this document. Phased out or replaced standards are removed from the list when needed.

General

The product is designed in accordance with ISO 10218-1:2011, Robots for industrial environments - Safety requirements -Part 1 Robots, and applicable parts in the normative references, as referred to from ISO 10218-1:2011. In case of deviations from ISO 10218-1:2011, these are listed in the declaration of incorporation which is part of the product delivery.

Normative standards as referred to from ISO 10218-1

Standard	Description
ISO 9283:1998	Manipulating industrial robots - Performance criteria and related test methods
ISO 10218-2	Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration
ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
ISO 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design
ISO 13850	Safety of machinery - Emergency stop - Principles for design
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

Deviations from ISO 10218-1:2011 for IRC5 with MultiMove

A deviation exists towards ISO 10218-1:2011, paragraph *5.9 Control of simultaneous motion*, for the option MultiMove. See the application manual for MultiMove.

Region specific standards and regulations

Standard	Description
ANSI/RIA R15.06	Safety requirements for industrial robots and robot systems
ANSI/UL 1740	Safety standard for robots and robotic equipment
CAN/CSA Z 434-03	Industrial robots and robot Systems - General safety requirements

Other standards used in design

Standard	Description
ISO 9787:2013	Robots and robotic devices -- Coordinate systems and motion nomenclatures
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments

Continues on next page

Standard	Description
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13732-1:2006	Ergonomics of the thermal environment - Part 1
IEC 60974-1:2012[i]	Arc welding equipment - Part 1: Welding power sources
IEC 60974-10:2014[i]	Arc welding equipment - Part 10: EMC requirements
ISO 14644-1:2015[ii]	Classification of air cleanliness
IEC 60529:1989 + A2:2013	Degrees of protection provided by enclosures (IP code)

i Only valid for arc welding robots. Replaces IEC 61000-6-4 for arc welding robots.
ii Only robots with protection Clean Room.

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 ABB robots.

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. It is recommended by ABB for M6-M20 screw joints. 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.

Generally, screws are lubricated with *Gleitmo 603* mixed with *Geomet 500* or *Geomet 702* in proportion 1:3. *Geomet* thickness varies according to screw dimensions, refer to the following.

Dimension	Lubricant	Geomet thickness
M6-M20 (any length except M20x60)	*Gleitmo 603 + Geomet 500*	3-5 µm
M6-M20 (any length except M20x60)	*Gleitmo 603 + Geomet 720*	3-5 µm
M20x60	*Gleitmo 603 + Geomet 500*	8-12 µm
M20x60	*Gleitmo 603 + Geomet 720*	6-10 µm

Screws lubricated in other ways

Screws lubricated with Molykote 1000 or Molykote P1900 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.

Continues on next page

Lubricant	Article number
Molykote 1000 (molybdenum disulphide grease)	3HAC042472-001
Molykote P1900 (molybdenum disulphide grease)	3HAC070875-001

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.
- 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%**!

Tightening torque for 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.*

Note

A special torque specified in the repair, maintenance or installation procedure overrides the standard torque.

Tightening torque for oil-lubricated screws with allen head screws

The following table specifies the recommended standard tightening torque for *oil-lubricated screws* with *allen head screws.*

Note

A 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

Continues on next page

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
M24	680	960	1150

Tightening torque for lubricated screws (Molykote, Gleitmo or equivalent) with allen head screws

The following table specifies the recommended standard tightening torque for *screws lubricated with Molycote 1000, Gleitmo 603 or equivalent* with *allen head screws.*

Note

A 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]
M5		8
M6		14
M8	28	35
M10	55	70
M12	96	120
M16	235	300
M20	460	550
M24	790	950

[i] Lubricated with Molycote 1000, Gleitmo 603 or equivalent

Water and air connectors

The following table specifies the recommended standard tightening torque for *water and air connectors*.

Note

A special torque specified in the repair, maintenance or installation procedure overrides the standard torque.

Dimension	Material	Tightening torque Nm - Nominal	Tightening torque Nm - Min.	Tightening torque Nm - Max.
ALL	Mixed	The lower tightening torque of the two materials.		
1/8	Brass only	12	8	15
1/4	Brass only	15	10	20
3/8	Brass only	20	15	25
1/2	Brass only	40	30	50
1/2	Stainless steel only	49	47	59
3/4	Brass only	70	55	90

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 arm weighs 25 kg. All lifting accessories used must be sized accordingly.	

6.6 Toolkits, DressPack

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, 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	

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6.6 Toolkits, DressPack
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
1	09 99 000 0646 (article number at Harting Technology Group)	M12 dynamometric screwdriver SW15 Torque tool for Ethernet connectors  xx2200001261	Art. no. from Harting
1	M12 torque screwdriver and M12 assembly tool (bit)	TSD 04 SAC (article number at Phoenix Contact) SAC BIT M12-D15 (article number at Phoenix Contact)  xx2200001262	Order both parts and assemble. The screwdriver has a preset torque of 0.4 Nm. Used to tighten M12 Ethernet connectors.

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.

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.

7.2 DressPack IRB 6620

7.2.1 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 SW, CPS/Ethernet + SP 3 hoses	3HAC024649-001	Paracom Paracom+Ethernet
Process Cable Package SW, CPS/CBus + SP 3 hoses	3HAC024651-001	Parabuscom
Process Cable Package SW, CPS/Ethernet + SP 3 hoses	3HAC038557-001	Paracom Ethernet
Process Cable Package MHCPS/Ethernet, 1 hose	3HAC024654-001	Paracom Paracom+Ethernet
Process Cable Package MHCPS/CBus 1 hose	3HAC024655-001	Parabuscom
Process Cable Package MH CPS/Ethernet, 1 hose	3HAC034141-001	Paracom Ethernet
Material Set Lower Arm MH	3HAC024656-001	
Material Set lower ArmSW	3HAC024652-001	
Material Set upper arm	3HAC024653-001	

Spare parts for cable package

Qty	Spare part	Article number	Note
	Protection hose	3HAC5320-2	Wear part 2.5 m
	Reinforced protection hose	3HAC5320-5	Wear part 2 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	

Continues on next page

Qty	Spare part	Article number	Note
	Swivel	3HAC027389-001	
	Hose clamp and cable retainer	3HAC14811-12	
	Strap, velcro	3HAC12625-1	
	Hose support	3HAC024102-090	
	Bracket, hose support	3HAC024102-049	

7.2.2 DressPack cable package lower arm - IRBDP MH 3 LE

Overview

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

DressPack cable package lower arm - IRBDP MH 3 LE

Article number: 3HAC029595-001

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

Spare parts for cable package

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

7.2.3 DressPack cable package upper arm - IRBDP MH 3 UE

Overview

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

DressPack cable package upper arm - IRBDP MH 3 UE

Article number: 3HAC029596-001

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

Spare parts for cable package

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

7.2.4 DressPack Basic cable package - IRBDP SW 5 CE

Overview

The following section details spare parts for DressPack Basic cable package IRBDP SW 5 CE.

DressPack Basic cable package - IRBDP SW 5 CE

Parts	Article no.	Note
Material set lower arm SW	3HAC029500-002	
Material set lower arm SW	3HAC029506-002	

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	3HAC029391-005	
Weld cable 25 mm^2	3HAC029392-004	
Servo Power, axes 2-6	3HAC029580-004	
Resolvercable,R2.FB7	3HAC030638-004	
Hose blue	3HAC031152-001	
Hose green	3HAC031152-002	
Hose red	3HAC031152-003	
Hose black	3HAC031152-004	
Hose protection	3HAC031582-002	
Hose protection	3HAC031582-003	
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

Parts	Spare part no.	Note
Process cable support axis 6	3HAC025495-003	

7.2.5 Connection kits

General

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

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

Spare parts

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

Spare part	Article number	Note
CP/CS, Proc. 1 on base	3HAC16667-1	
Weld, Proc. 1-4 on base	3HAC17201-1	
Weld, Proc. 1-4 ax.6 (35 mm^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	

7.2.6 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	3HAC026414-001	
Material set 7:th axis	3HAC026558-002	

7.2.7 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

7.2.8 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

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8 Circuit diagram

8.1 Circuit diagrams

Overview

The circuit diagrams are not included in this manual, but are available for registered users on myABB Business Portal, *www.abb.com/myABB*.

See the article numbers in the tables below.

Controllers

Product	Article numbers for circuit diagrams
Circuit diagram - IRC5	*3HAC024480-011*

DressPack

Product	Article numbers for circuit diagrams
Circuit diagram - DressPack IRB 5710 / IRB 5720	*3HAC081433-001*
Circuit diagram - DressPack 6650S/7600 LeanID	*3HAC022327-002*
Circuit diagram - DressPack 6650S/7600	*3HAC026209-001*
Circuit diagram - DressPack 6620	*3HAC026136-001*
Circuit diagram - DressPack IRB 6640, IRB 6650S, IRB 7600	*3HAC026209-001*
Circuit diagram - DressPack 6660	*3HAC029940-001*
Circuit diagram - DressPack 6700	*3HAC044246-002*
Circuit diagram - DressPack IRB 6710 / IRB 6720 / IRB 6730 / IRB 6740	*3HAC087933-001*
Circuit diagram - DressPack 8700	*3HAC053524-002*
Circuit diagram - DressPack for spotwelding SWC IRC5 M2004	*3HAC026208-001*
Circuit diagram - DressPack SWC IRC5 Design 2014 PROFINET	*3HAC044736-001*

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ABB AB
Robotics & Discrete Automation
S-721 68 VÄSTERÅS, Sweden
Telephone +46 10-732 50 00

ABB AS
Robotics & Discrete Automation
Nordlysvegen 7, N-4340 BRYNE, Norway
Box 265, N-4349 BRYNE, Norway
Telephone: +47 22 87 2000

ABB Engineering (Shanghai) Ltd.
Robotics & Discrete Automation
No. 4528 Kangxin Highway
PuDong New District
SHANGHAI 201319, China
Telephone: +86 21 6105 6666

ABB Inc.
Robotics & Discrete Automation
1250 Brown Road
Auburn Hills, MI 48326
USA
Telephone: +1 248 391 9000

abb.com/robotics

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