ROBOTICS

Product manual

Tip dresser swing arm SE-HL/R-1500

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Product manual

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SE-HR-1500

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Additional copies of this manual may be obtained from ABB.

Original instructions.

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Overview of this manual

About this manual

This manual contains instructions for:

- mechanical and electrical installation of the weld accessories
- maintenance of the weld accessories
- mechanical and electrical repair of the weld accessories.

Usage

This manual should be used during:

- installation, from lifting the equipment to its work site and securing it to the foundation, to making it ready for operation
- maintenance work
- repair work and calibration.

Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance personnel
- repair personnel.

Prerequisites

Maintenance/repair/installation personnel working with a tip dresser swing arm must:

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

References

Documentation referred to in the manual, is listed in the table below.

Document title	Document ID
Customer documentation (Tip dresser swing arm assembly drawings, part lists, dimensions)	*3HWT91800655* *3HWT91800664* *3HWT91800677* *3HWT91800678*
Electrical drawing for tip dresser swing arm electrical cabinet	*3HWT91209559*
Software documentation - FP Stationary servo spot welding Type HSe	*See project documentation delivery*
Line builder layout for FP type HSe	*See project documentation delivery*
Electrical drawing for FP type HSe	*See project documentation delivery*
Product manual for controller	*See project documentation delivery*
Product manual spot welding cabinet	*See project documentation delivery*

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Revisions

Revision	Description
A	First edition.
B	Safety chapter is customized. Overall updates of information such as values, descriptions and images are done throughout the manual.

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.

The documentation for products from ABB BiW - Global Solution Center is accessed at *https://swacdocabb.com*.

Product manuals

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

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

Continues on next page

Continued

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 all information required for the installation or service activity and can be printed out separately when needed for a certain service procedure.

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 13*.

Illustrations

The product 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 product models, can be illustrated with illustrations that show a different product model than the one that is described in the current manual.

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1 Safety

1.1 General 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 complete system, nor does it cover all peripheral equipment that can influence the safety of the entire system.

In particular, liability cannot be accepted if injury/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.
- Non-authorized design modifications made in or around the robot.
- Repairs carried out by in-experienced or non-qualified personnel.
- Foreign objects.
- Force majeure.

Nation/region specific regulations

To protect personnel, the complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the robot is installed.

To be observed by the supplier of the complete system

The integrator is responsible 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 and machines:

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

Continues on next page

1.1.1 Limitation of liability
Continued

The integrator of the final application is required to perform an assessment of the hazards and risks (HRA).

> **Note**
>
> The integrator is responsible for the safety of the final application.

Safe access

The robot system shall be designed to allow safe access to all areas where intervention is necessary during operation, adjustment, and maintenance.

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

Safety zones, which must be crossed before admittance, must be set up in front of the robot's working space. Light beams or sensitive mats are suitable devices.

Turntables or the like should be used to keep the operator out of the robot's working space.

Safe handling

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

Safe design

Emergency stop buttons must be positioned in easily accessible places so that the robot can be stopped quickly. If any of the buttons do not stop all the robot work cell motion, each emergency stop button must be marked and placed so there is no risk for using the wrong button stop. If more than one emergency stop is provided, each should indicate its designated safety function.

Grippers/end effectors must be designed so that they do not drop work pieces/tools in the event of a power failure or a disturbance to the controller.

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

1.1.2 Protective stop and emergency stop

Overview

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

1.2 Safety actions

1.2.1 Fire extinguishing

Note

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

1.2.2 Make sure that the main power has been switched off

Description

Working with high voltage is potentially lethal. Persons subjected to high voltage may suffer cardiac arrest, burn injuries, or other severe injuries. To avoid these personal injuries, switch off the main power on the controller before proceeding work.

1.3 Safety risks

1.3.1 Safety risks during installation and service work on Tip dresser swing arm

Requirements on personnel

Only persons who know the Tip dresser swing arm and are trained in the operation and handling of the Tip dresser swing arm are allowed to maintain the Tip dresser swing arm. Persons who are under the influence of alcohol, drugs or any other intoxicating substances are not allowed to install, maintain, repair, or use the Tip dresser swing arm.

- Those in charge of operations must make sure that safety instructions are available for the installation in question.
- Those who install or service/maintain the Tip dresser swing arm must have the appropriate training for the equipment in question and in any safety matters associated with it.
- Personnel should be trained on responding to emergency or abnormal situations.

General risks during installation and service

The instructions in the product manual must always be followed.

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

To avoid damaging the Tip dresser swing arm, make sure that there are no loose screws, turnings, or other parts inside the product after work has been performed.

If any part of the safety system is not working as intended, commissioning or test run shall not be performed until the issues are resolved by authorized personnel.

Safety risks during operational disturbances

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

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

Spare parts and special equipment

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

Continues on next page

Personal protective equipment

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

Protective gloves

Sheet metal parts may have sharp edges and welded parts in general may be hot after welding. When handling such parts, use protective gloves.

Hearing protection

Material handling, surrounding processes and operations can cause high noise levels. User hearing protection when being near the production cell.

Goggles

There might be a risk of weld spatter from near by weld process which can cause eye injuries. There might also be a risk of processing chips/dust being spread due to the cleaning functionality of the cutter. Use goggles within the production cell.

Protective shoes

At a workplace where lifting and handling of parts occur, protective shoes shall always be used.

Padlock

When intervention is needed, the power supply must be turned off to the machines within the danger area and the main safety switch padlocked.

Allergenic material

See *Environmental information on page 93* for specification of allergenic materials in the product, if any.

1.3.2 Risks associated with live electric parts

Voltage related risks, general

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

Although troubleshooting may, on occasion, need to be carried out while the power supply is turned on, the robot must be turned off (by setting the main switch to OFF) when repairing faults, disconnecting electric leads, and disconnecting or connecting units.

The main supply to the robot must be connected in such a way that it can be turned off from outside the working space of the robot.

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

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

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

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

1.3.3 Hot parts may cause burns

Description

During normal operation, many parts become hot. Touching these may cause burns.

There is also a risk of fire if flammable materials are put on hot surfaces.

Safe handling

Always use your hand, at some distance, to feel if heat is radiating from the potentially hot component before actually touching it.

Wait until the potentially hot component has cooled if it is to be removed or handled in any other way.

Do not put anything on hot metal surfaces, e.g. paper or plastic.

1.3.4 Safety risks related to spot welding

Environment

WARNING

Spot welding generates fumes. The GWT X9 must be used in a ventilated environment.

WARNING

The GWT X9 must be used in a safety cell. Access to the cell must be monitored according to local safety legislation.

WARNING

Welding arcs and welding sparks can emerge from the welding process.

The robot cell must be provided with protection that prevents the spread of the welding arcs and welding spatter outside the cell.

CAUTION

The GWT X9 is intended to be used in normal indoor industrial environments; it is not intended for use in extremely dusty, humid or explosive environments.

Work piece

WARNING

The work piece for welding should be free of oils and other residues that may cause fire, poisonous fumes or other inconveniences.

Electricity

WARNING

Electrical appliances can be energized for 60 seconds after the power supply is turned off.

Continues on next page

Magnetic and electro-magnetic fields

WARNING

When welding, strong magnetic and electromagnetic fields can emerge. It is therefore inappropriate for people using pacemakers to stay near welding with high currents.

Always consult a medical expert before working with or close to welding with high currents if you are using a pacemaker.

Movements and lifting of Tip dresser swing arm

CAUTION

When lifting and moving machinery and equipment, the moving parts must be secured from sudden movements, and only approved lifting equipment may be used.

1.4 Safety signals

1.4.1 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.

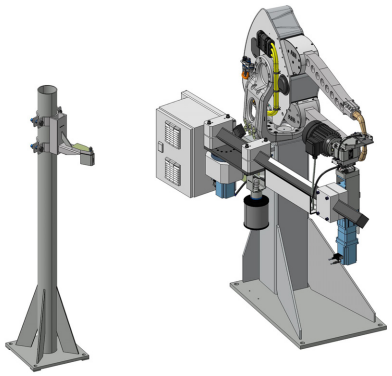
2 Product description

2.1 Machine function and description

2.1.1 Tip dresser swing arm

General

The swing arm with its dresser unit is used to shape (tip dress) the electrodes on a stationary spot weld gun after a certain amount of spot welds.



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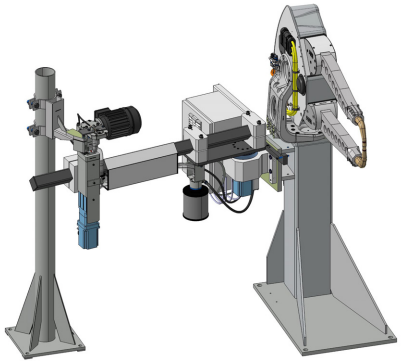
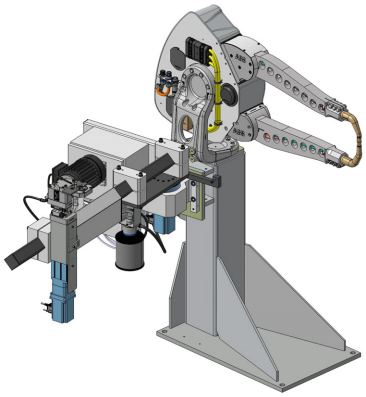
Swing arm, tip dresser and weld gun in dressing position. Zero position for the electric motor-swing motion.



xx2200000366

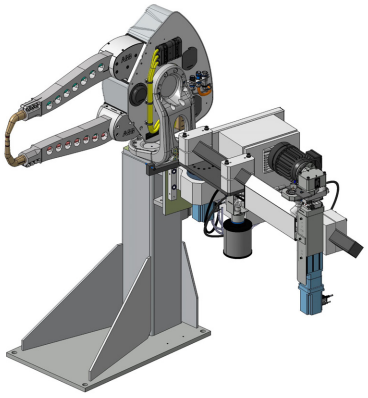
Swing arm and tip dresser in home position and weld gun in weld position.

The tip dresser swing arm is offered with the framework mounted either to the left or to the right.



xx2200000367

Swing arm framework to the left



xx2200000368

Swing arm framework to the right

The tip dresser swing arm with electrical cabinet, but without weld gun and stand, weighs approximately 100 kg.

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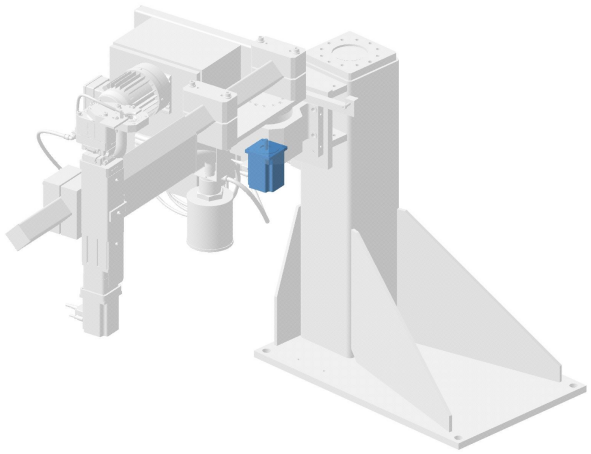
2.1.1 Tip dresser swing arm
Continued

Electric motor - swing motion

The electric motor performs the swing motion of the swing arm between home position and tip dressing position.



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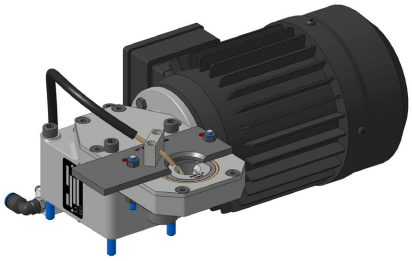
Dresser unit

The dresser unit can be ordered for swing arm framework to the left or swing arm framework to the right and with drive unit.

The dresser unit consists of drive unit, cutter holder, retainer and cleaning unit.

Upper and lower electrodes are dressed simultaneously by the dresser unit.



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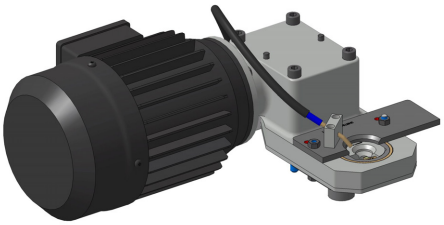
Dresser unit, for swing arm to the left



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Dresser unit, for swing arm to the right

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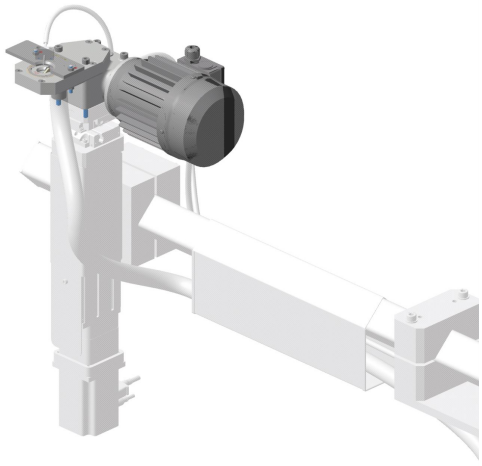
Drive unit

The drive unit consists of electric motor and worm gearbox.

Attached to the drive unit is a cutter holder which holds a total cut.



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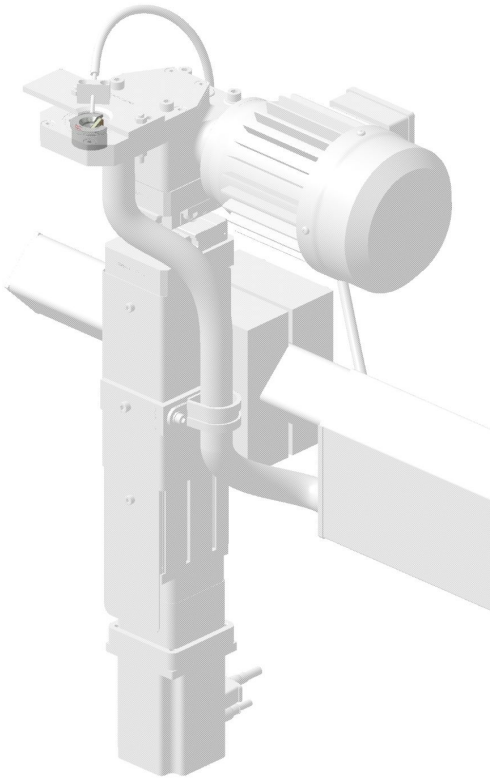
Cutter holder

The cutter holder holds the cut that shapes the electrodes. The cut that can be used is total cut. It shapes the electrode in one step.



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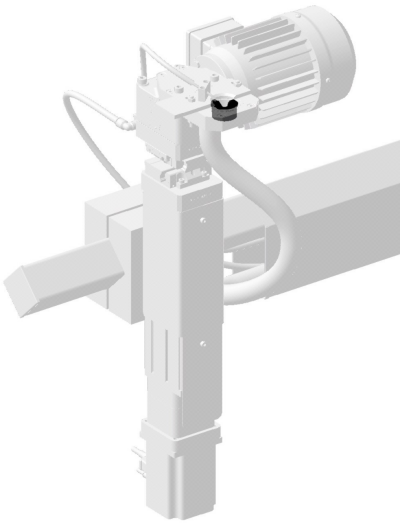
2.1.1 Tip dresser swing arm
Continued

Retainer

The retainer keeps the cutter holder in position in the drive unit. The reference surface is underneath the retainer. This is used when measuring the height of the fixed electrode. Measurement of the electrode height is done when a new fixed electrode is installed, and after each dressing of the fixed electrode.



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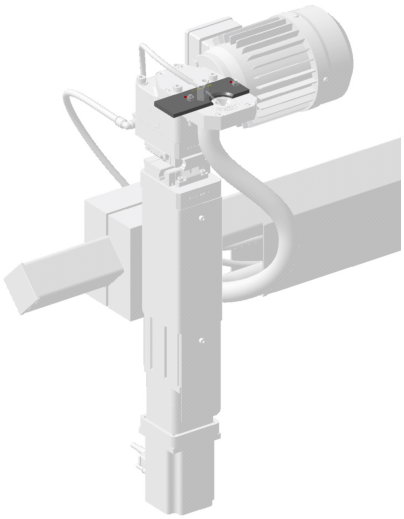
Cutter holder



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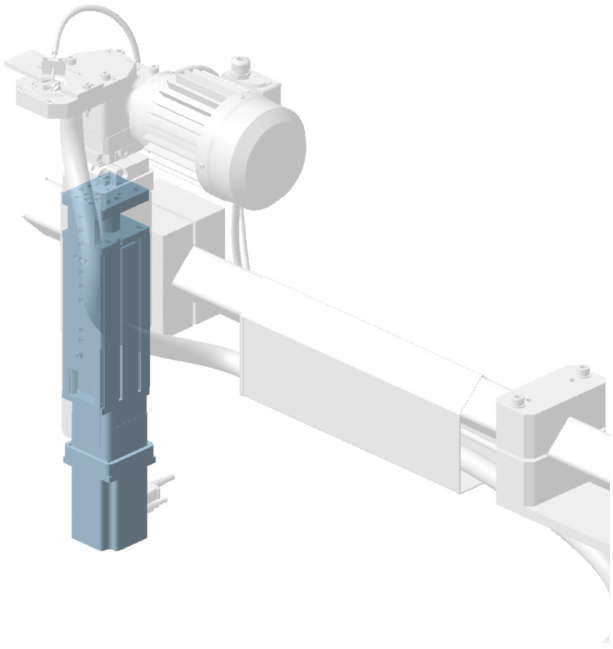
Retainer

Cylinder unit - lift motion

The cylinder unit - lift motion performs a motion before tip dressing is performed.



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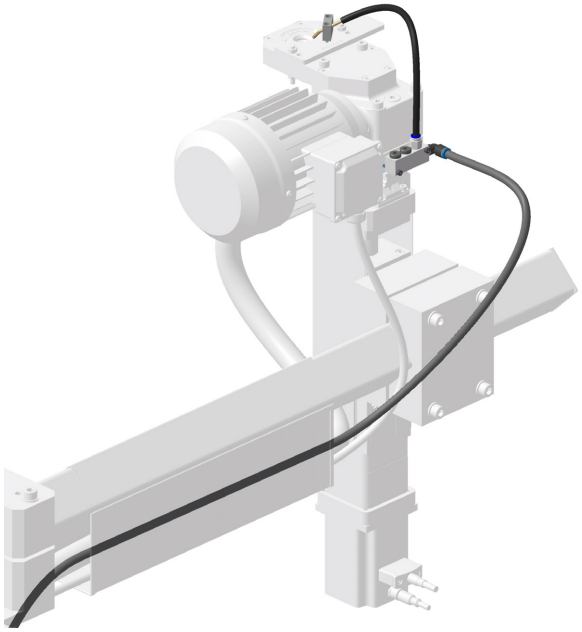
Cleaning unit

The cleaning unit cleans the cutter holder during electrode processing. The cleaning unit has one nozzle for blowing.



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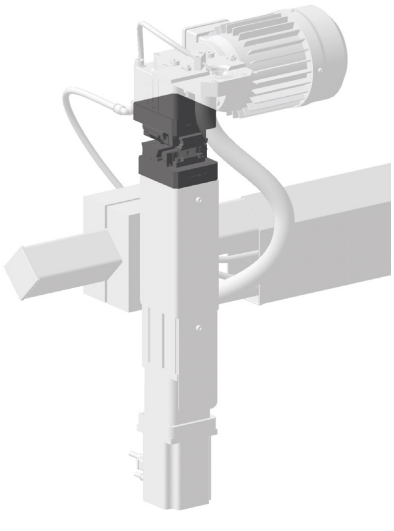
Cleaning unit

Indexing unit

The indexing unit allows movements in X- and Y-direction. It allows ±8 mm in all directions. It allows movements to center the electrodes in the dresser unit when tip dressing is performed.



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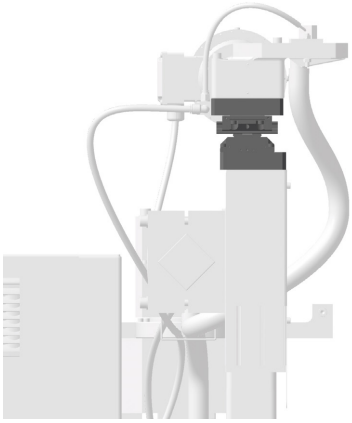

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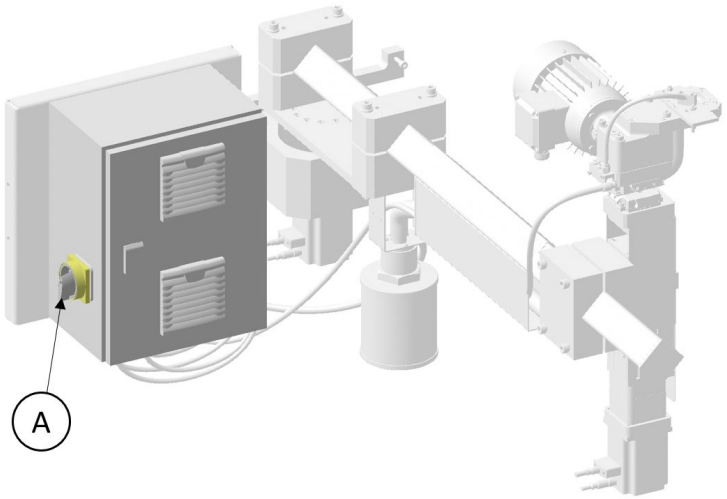
2.1.1 Tip dresser swing arm
Continued

Tip dresser swing arm electrical cabinet

Tip dresser swing arm electrical cabinet has a safety switch (position A). The safety switch brakes the circuit to the cylinder unit - lift motion and electric motor - swing motion.

See electrical drawing (3HWT91209559) for tip dresser swing arm electrical cabinet.

The placement of the tip dresser swing arm electrical cabinet can be changed to another location, as long as the cables are long enough. All illustrations in this document shows default placement.



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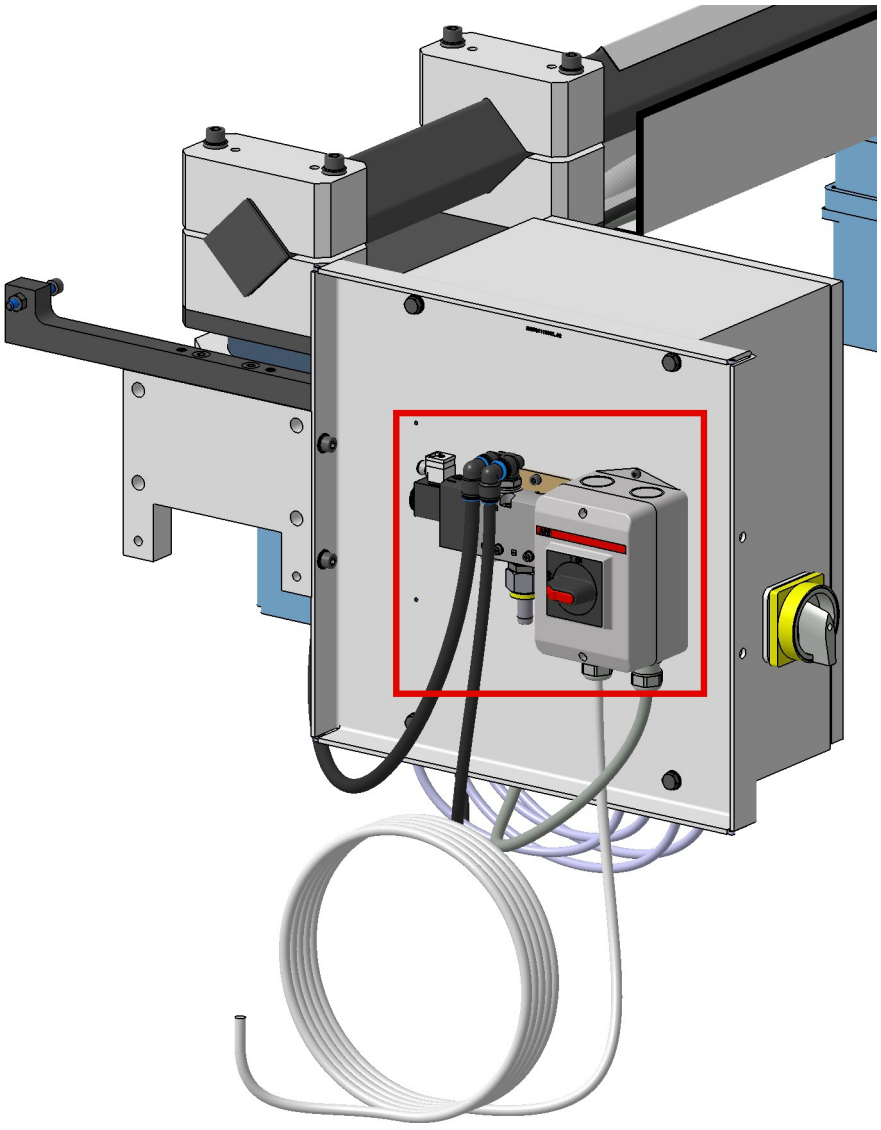
Connection point

The connection point includes the safety switch and the pneumatic unit with air valve for the tip dresser. Also see *Safety switches on page 38*.

The placement of the safety switch for the tip dresser can be changed to another location, as long as the cables are long enough. All illustrations in this document shows default placement.



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2.1.1 Tip dresser swing arm
Continued

Technical data

Electrode force	Value
Recommended	0.8-1.3 kN
Maximum	1.5 kN

Dressing time	Value
Recommended	1-3 seconds/cutter holder

Weight	Value
Electrode dresser – including stand	16 kg approximately 53 kg

Pneumatic system for blowing away cuttings	Value
Recommended air pressure	0.6 MPa (6 bar)
Maximum air pressure	1 MPa (10 bar)
Air connection, incoming air (hose)	Ø 1/2″

Noise level	Value
Without blowing	54 dB(A) equivalent
With blowing (reduced pressure ~ 3 bars)	87 dB(A) equivalent
With blowing (reduced pressure ~ 6 bars)	98 dB(A) equivalent

2.2 Machine-labeling, models, codes and options

Key for type and designation

Key	Note
S	Tip dresser swing arm.
E	Single dresser unit.
L	Left mounting. (Tip dreser swing arm).
R	Right mounting. (Tip dresser swing arm).
H	Horizontal mounting.

Models and codes

Models and codes	Example
E - Single	SE
U - With Vacuum unit extraction	SE-U
H - Horizontal mount	SE-U-H
R - Right mount	SE-U-HR
L - Left mount	SE-A-HL
Length swing arm	SE-U-HL 1500

Example

Dresser unit	On swing arm
Single dresser unit processing	SE-U-HR 1500

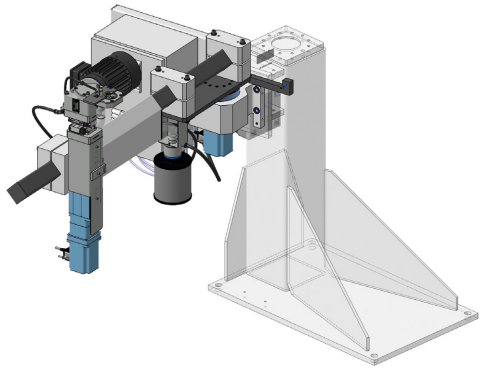
Continues on next page

2.2.1 Options

General

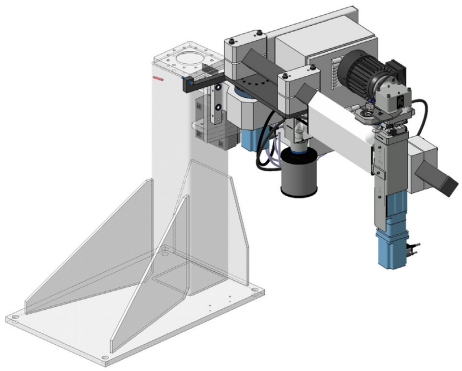
The tip dresser swing arm can be ordered with the following options.

Tip dresser swing arm with swing arm framework to the left



xx2200000370

Tip dresser swing arm with swingarm framework to the right



xx2200000371

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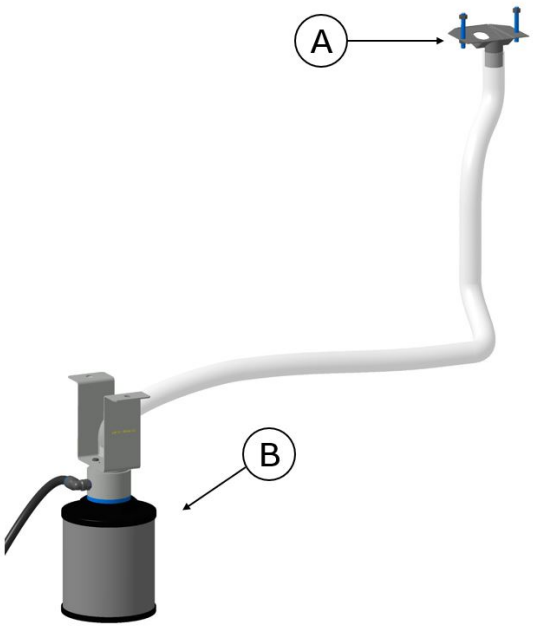
Chip collector

The chip collector is used to collect the chips from the welding electrodes during tip dressing.



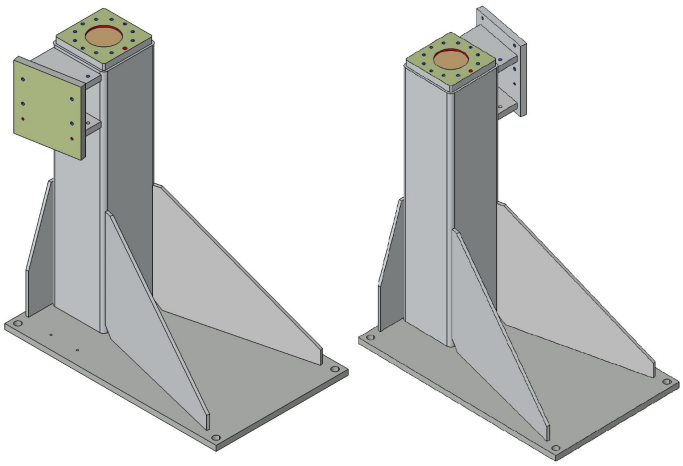
xx2200000372

A	Chip collector nozzle The chip collector upper can be ordered in different variants depending on cut size.
B	Chip collector container

Stand

The stand is used for mounting both the weld gun and swing arm.

There are both a left and right version available both for the X9 and C9 welding guns.



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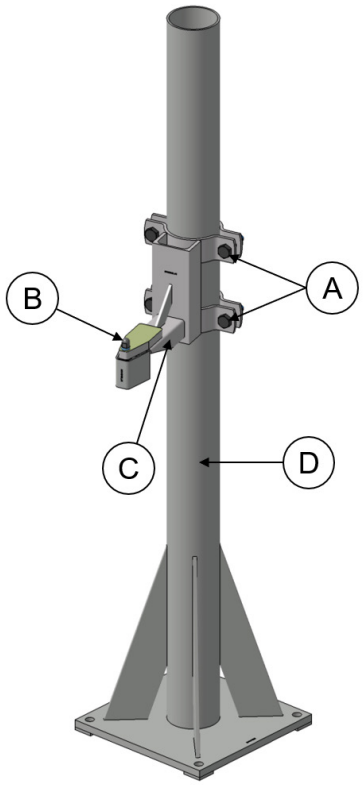
2.2.1 Options
Continued

Reference stand

The TCP reference lug (position B) is used as a reference for the tip dresser swing arm measurement function.



xx2000000231

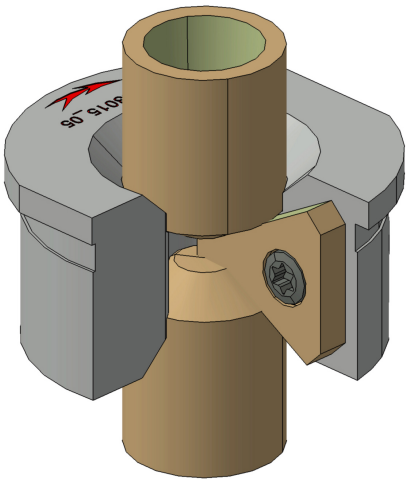
A	Screws (4 pcs) and nuts (4 pcs) for adjusting the height of adjustable console.
B	Reference lug.
C	Adjustable console.
D	Stand.

Continues on next page

Cutter holder

The cutter holder includes the total cut.

It is important that the processing of the electrodes is made perpendicular to the cutter holder. See examples below.



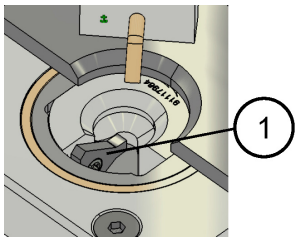
xx1700000499

Cutter holder for total cut

Total cut

DANGER

The rotating cut can lead to injury of fingers and hands. Make sure the cut is not rotating before accessing the dresser unit and/or cut.

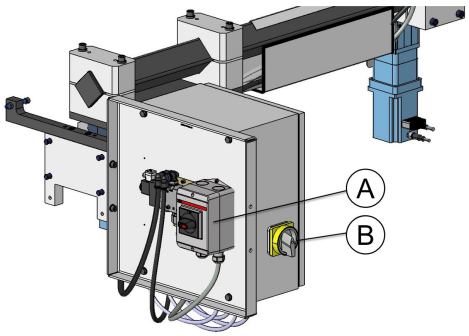


xx1600001937

1	Total cut restores the electrode top diameter and trims the top surface. Total cut is available in the following sizes: Ø 8, 13, 16 and 20 mm.

2.3 Machine switches

Safety switches



xx2200000488

A	Safety switch. Closing breaking electrical energy into dresser unit's electrical motor.
B	Safety switch. Closing main power to Tip dresser swing arm electric motor - swing motion and cylinder unit - lift motion.

2.4 Festo step servo

2.4.1 Description

Electrical hardware

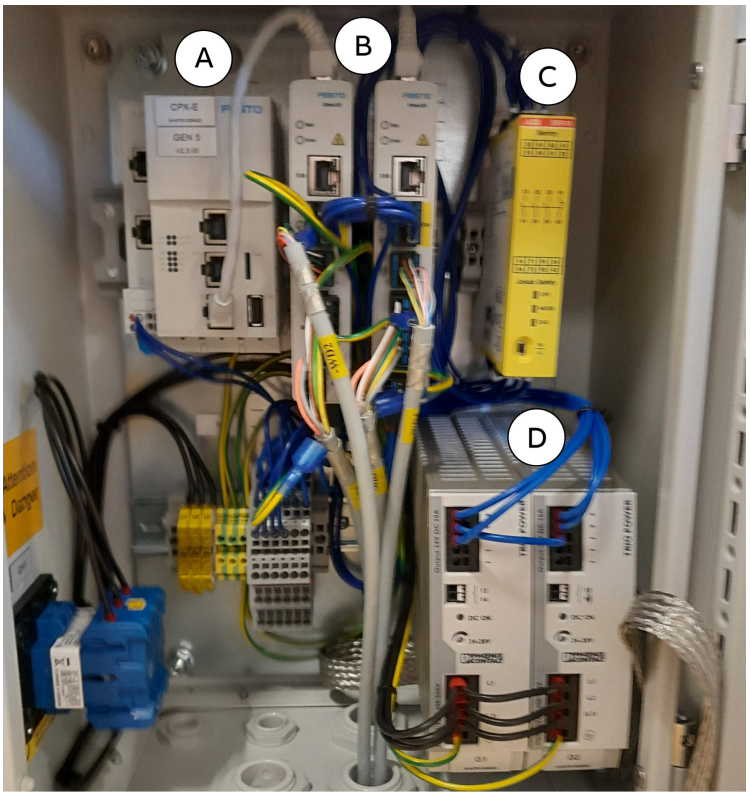
This swing arm is using two servo drivers, connected through Ethercat and Profinet.

The servos are configured with parameters from ABB.

Tip dresser swing arm cabinet

The tip dresser swing arm cabinet is connected to the robot cabinet and the servo motors.

Included components:



xx2200000364

- CPX-PLC (position A) – Signal logic and position controller for dress arm.

  Note

  CPX-PLC is preloaded with program.

- CMMT 1, 2 (position B) – Servo power modules for the motors.

  Note

  CMMT is preloaded with program.

Continues on next page

2.4.1 Description
Continued

- RT2 (position C) – Personal safety contact (connections X1 in circuit diagram). RT2 enables when the robot is in motor on state.
- G1,2 (position D) – Power unit, 400 V to 24, 48 V, for step servos.

Signal `doEnableDressArm` from robot activates dress arm servos.

2.4.2 Troubleshooting

Required documentation

Equipment	Document number	Note
Electrical drawing for tip dresser swing arm electrical cabinet	3HWT91209559	For dresser unit single

General

The diagnostic message appendix in the electrical drawings includes the troubleshooting, error codes and actions to be taken.

2.5 Software

General

For all software matters, see *Software documentation - FP Stationary servo spot welding Type HSe*.

3 Installation and commissioning

3.1 Introduction

General

This chapter contains assembly instructions and information for installing the Tip dresser swing arm at the working site.

See also the product manual for the robot controller.

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

Safety information

Before any installation work is commenced, all safety information must be observed.

There are general safety aspects that must be read through, as well as more specific safety information that describes the danger and safety risks when performing the procedures. Read the chapter *Safety on page 13* before performing any installation work.

Note

Always connect the Tip dresser swing arm and the robot to protective earth and residual current device (RCD) before connecting to power and starting any installation work.

For more information see the product manual for the robot controller.

Required equipment

Qty	Equipment	Product (example)
1	Standard toolkit	See *Standard toolkit on page 101*.
-	Other equipment may be required. See references to these in the step-by-step instructions below.	

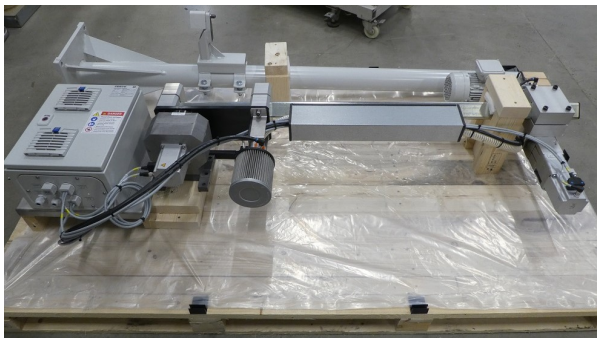
3.2 Packing, handling and transport

Transport, lifting and moving machinery and equipment

When lifting or moving equipment, the moving parts must be secured from sudden movements. Only approved lifting equipment shall be used.

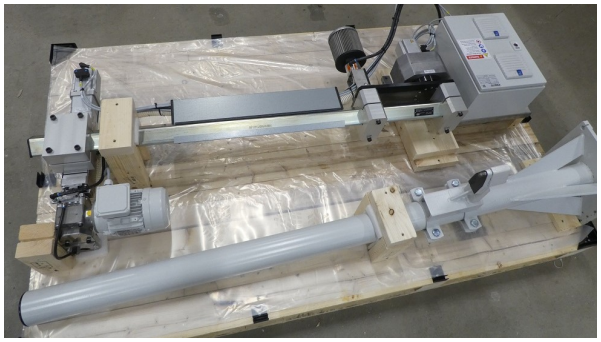
Pallet

The tip dresser swing arm is attached onto a pallet with screws and slings for transport, the pallet is handled by forklift and pallet lift.



xx2200000491

xx2200000490



xx2200000493

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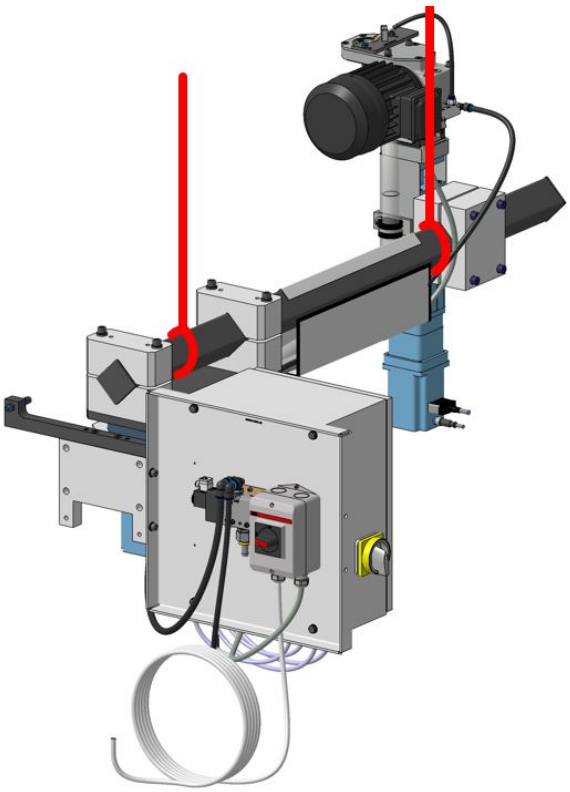
Handling

The tip dresser swing arm should not be manually handled to/from the pallet to the place for installation. Use forklift or overhead crane to lift the tip dresser swing arm.

When lifting machines and equipment, only approved lifting equipment shall be used.

Continues on next page

See example of where to attach lifting slings to the swing arm in the illustration below.



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Weight

Tip dresser swing arm with electrical cabinet has a weight of about 100 kg.

3.3 Unpacking, installation and test run

3.3.1 Unpacking

General

Follow the suppliers / manufacturers instructions for unpacking, lifting and handling operations.

Procedure

Note

It is recommended that the pallet is transported as close to the installation area as possible before unpacking.

	Action	Note
1	Remove the lid and sides from the pallet.	
2	Make sure that the included equipment is according to the accompanying documents.	
3	Remove all screws and nuts which secures the equipment.	
4	Detach all slings which secures the equipment.	
5	Detach the equipment from all support structures.	
6	Prepare tip dresser swing arm for lift/handling, according to *Handling on page 44*.	

3.3.2 Installation/assembly of the equipment

General

- Where the lighting conditions do not meet current requirements, additional appropriate lighting shall be used.
- During assembly and disassembly make sure only authorized personnel have access to the machine.
- Prior to switching of energy supplies, personnel shall be warned, the risk of sudden movements can occur.
- Check that the cables and hoses cannot get squeezed and damaged prior to commissioning.

General preparation

The tip dresser swing arm delivery can consist of different equipment depending on the configuration. The preparation of the installation area depends of the tip dresser swing arm configuration. The below preparation cases consists of a tip dresser swing arm configuration with all options. There are two preparation cases:

- Tip dresser swing arm with ABB welding gun stand. See *Swing arm on ABB welding gun stand on page 48*.
- Tip dresser swing arm on other stand. See *Swing arm on other stand on page 54*.

Continues on next page

3.3.2.1 Swing arm on ABB welding gun stand

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.
Two dowel pins	-	Ø 8 mm m6

References

Document title	Document ID
Tip dresser swing arm assembly instruction drawing	*3HWT91800655* *3HWT91800664* *3HWT91800677* *3HWT91800678*

Foundation

The foundation must withstand the static loads caused by the weight of the equipment and the dynamic loads generated by the movement of the tip dresser swing arm.

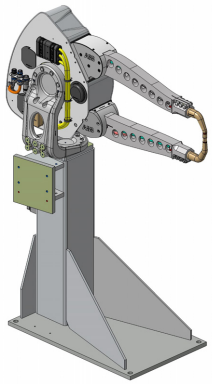
Mounting foundation bolts

Chemical anchor bolts, bolting towards steel foundation, are recommended to secure the stand to the floor. However, the mounting bolts are not supplied since they must be selected on the basis of the material the foundation is made of.

Choose mounting bolts so that they:

- Are suitable for the foundation.
- Can bear the static load, indicated in the assembly drawing of the tip dresser swing arm.
- Fit in the holes in the weld gun stand, Ø 24 mm and the ref. stand, Ø18.

Installation procedure

	Action	Note
1	Install the stand where it is supposed to be installed. Also see *Mounting foundation bolts on page 48*.	 xx2200000494

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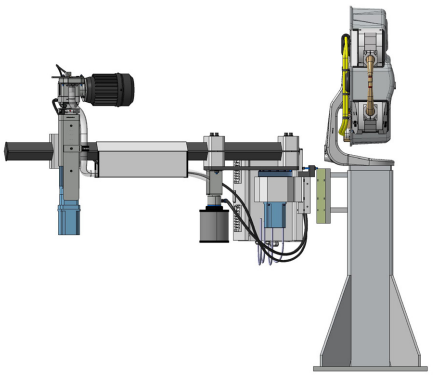
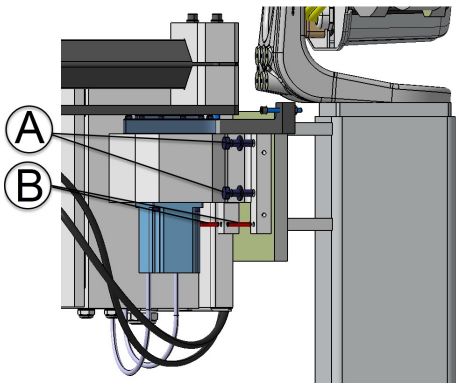
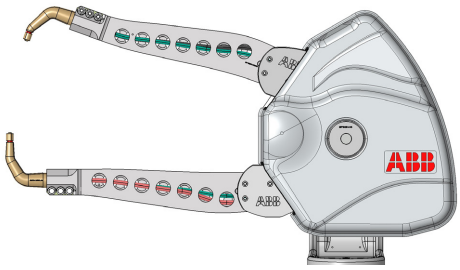
	Action	Note
2	Lift and align the swing arm so that the swing arm mounting plate is in same height as the corresponding plate on the stand. See *Handling on page 44*.	 xx2200000495
3	Fasten the swing arm to the stand with accompanying fasteners. Tighten the screws by hand. Assemble the two pins (B). If necessary, use the plastic mallet. Finally tighten the screws using standard torque. See *Bolts, screws, tightening torques on page 98*.	 xx2200000496
4	Remove lifting equipment from swing arm.	
5	Open the welding gun to fully open position.	 xx2200000497

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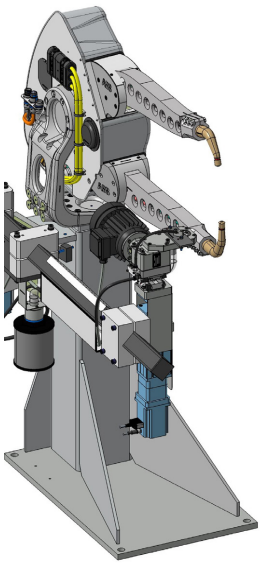
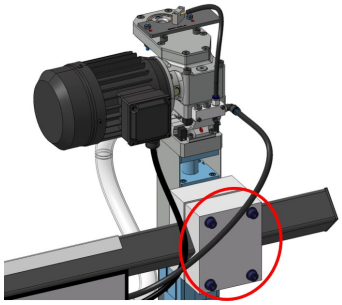
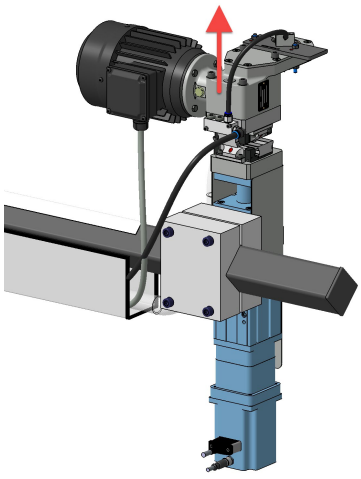
3.3.2.1 Swing arm on ABB welding gun stand

Continued

	Action	Note
6	Swing the swing arm close to the dressing position/towards the weld gun.	 xx2200000498
7	Loosen the bracket screws attached to the swingarm framework. **Note** Loosen them just so that the unit can be moved back and forth on the arm.	 xx2000000330
8	Grab the dresser unit and lift it carefully to its upper position.	 xx2200000499

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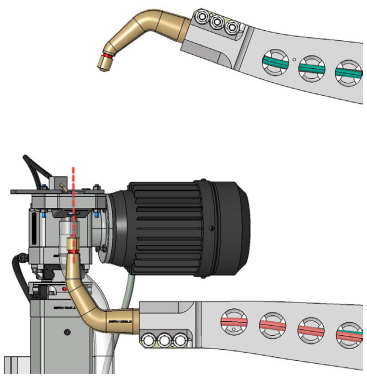
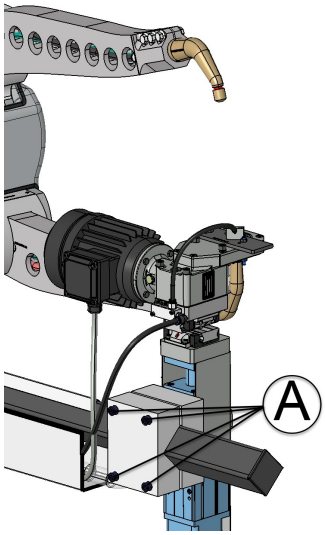
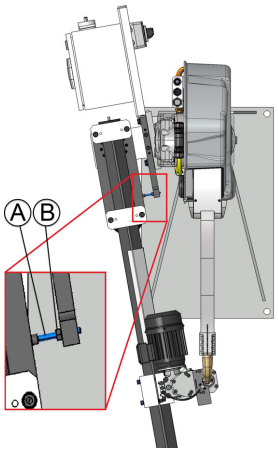
	Action	Note
9	**CAUTION** Make sure that the dresser unit is levelled above the fixed electrode before approaching the fixed electrode.	 xx2200000500
10	Adjust the position of the dresser unit so that the cutter holder is centered on top of the fixed electrode.	
11	Tighten the four screws (position A) in the bracket when correct position is achieved. This is done with the dresser unit resting on the fixed electrode cap. Tightening torque: 50 Nm.	 xx2200000501
12	Adjust the set screw (position A) so that it meets the swing arm structure. Lock it in place by tightening the nut (position B). The nut can be place on both sides of the bracket. **Note** This is done with the dresser unit resting on the fixed electrode cap.	 xx2200000502

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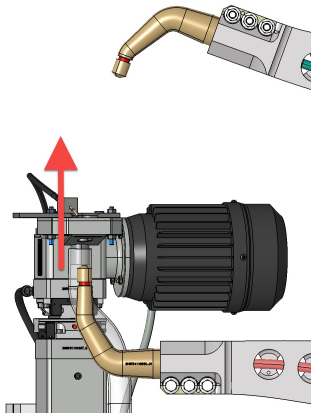
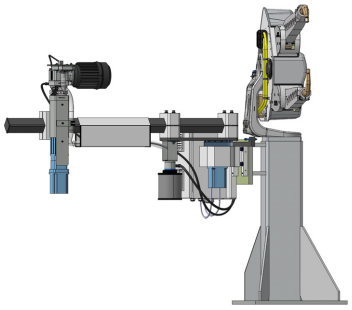
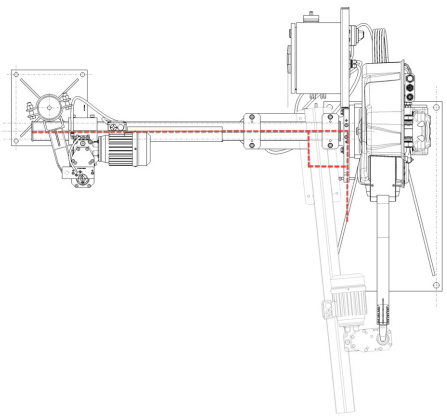
3.3.2.1 Swing arm on ABB welding gun stand

Continued

	Action	Note
13	Grab the dresser unit and lift it carefully up and towards its home position.	 xx2200000510
14	Swing the swing arm to its suggested home position.	 xx2200000511
15	The Home position of the swing arm is at a 90° angle to the mounting bracket of the stand. The angle can be decreased if needed. Place the reference stand so that the swing arm is approximately 5 mm from colliding with it when in Home position.	 xx2200000512

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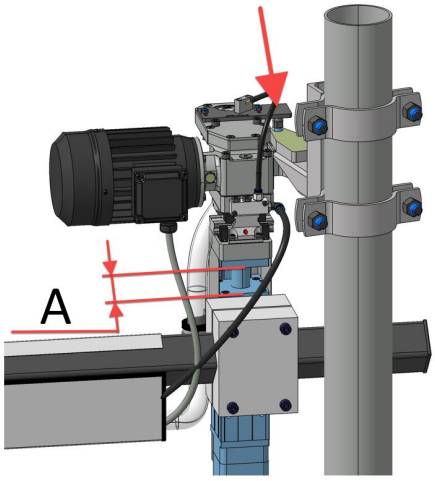
	Action	Note
16	Position the reference lug directly below the retainer. Adjust the height of the adjustable console on the reference stand if necessary. The lift cylinder shall be ejected about 40 mm from its bottom position when positioned on the reference lug (A = 40 mm). **Note** When the dresser unit is lowered to reference position, the dresser unit shall rest on the reference lug.	 xx2200000505
17	Fasten the reference stand to the floor. See *Mounting foundation bolts*. Hole diameter in the reference stand is Ø18 mm.	
18	The mechanical installation is complete. Continue with the electrical/pneumatic installation, see *Communication, electrical and pneumatic on page 56*.	

Note

When the mechanical installation is complete, the tip dresser swing arm framework can be shortened if necessary. Cut the swing arm framework so that it sticks out approximately 150 mm behind the bracket.

3.3.2.2 Swing arm on other stand

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.
Laser leveling device	-	Recommended to ease installation
Two dowel pins	-	Ø 8 mm H7

References

Document title	Document ID
Tip dresser swing arm assembly instruction drawing	*3HWT91800655* *3HWT91800664* *3HWT91800677* *3HWT91800678*

Installation procedure

CAUTION

Make sure that the fastening surface on the spot weld structure meet the flatness tolerances according to illustrations below.

Note

The Home position used In the installation procedure is about 90° from the dressing position. This might not be the best position in all environments. Determine most suitable Home position for each installation and use that position.

	Action	Note
1	Use e.g. a laser beam on top of the fixed electrode to measure and mark where on the spot weld structure the swing arm is to be mounted.	For dimensions, see the Assembly instruction drawing in the customer documentation.
2	Make a small mark where the holes (A) are supposed to be made. See Measurements in illustrations above.	**CAUTION** Make sure to use measurements from the illustration matching the swing arm to be installed (swing arm with framework to the left or right).
3	Make a center punch to mark the center of the holes.	
4	To fasten the swing arm to the spot weld structure, drill holes and thread to match selected screws.	

Continues on next page

	Action	Note
5	Lift and align the swing arm so that the swing arm mounting plate in height where it is supposed to be mounted.	See *Handling on page 44*.
6	Fasten the swing arm to the spot weld structure and tighten by hand.	
7	Swing the swing arm carefully as close to dressing position as possible. Make sure the swing arm is horisontal, e.g. by using a leveling tool.	
8	Torque tighten the screws.	See *Bolts, screws, tightening torques on page 98*.
9	Remove lifting equipment from swing arm.	
10	Follow step 5 - 17 in previous procedure for Tip dresser swing arm with ABB weld gun stand.	See *Swing arm on ABB welding gun stand on page 48*
11	Drill two holes Ø 8 mm H7.	For dimensions, see the Assembly instruction drawing in the customer documentation.
12	Insert the dowel pins in the holes. If necessary, use the plastic mallet.	See *Standard toolkit on page 101*.
13	The mechanical installation is complete. Continue with the electrical/pneumatic installation, see *Communication, electrical and pneumatic on page 56*.	

Note

When the mechanical installation is complete, the swing arm framework can be shortened if necessary. Cut the swingarm framework so that it sticks out approximately 150 mm behind the bracket.

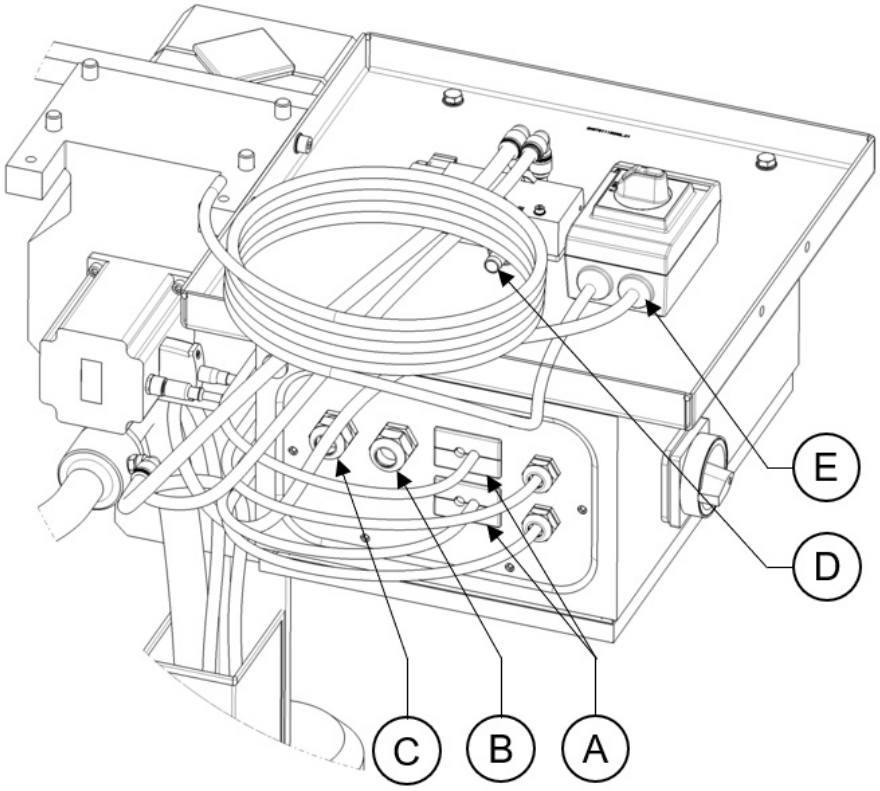
3.3.2.3 Communication, electrical and pneumatic

General

The tip dresser swing arm requires the following to function as intended:

- Two 400/480 V AC connections (480 V AC for installation in the US)
- Profinet
- Compressed air
- Emergency stop and 24 V connection (generic interface)

General illustration showing electrical and communication cable lead-throughs and connection point for pneumatic.



xx2000000402

A	Signal, cable lead-through
B	3 phase 400/480 V AC, cable lead-through (480 V AC for installation in the US)
C	Safety signal 24 V, cable lead-through
D	Pneumatic connection
E	3 phase 400/480 V AC, cable lead-through (480 V AC for installation in the US)

Electrical installation

The electrical power is connected to the tip dresser swing arm electrical cabinet and to the safety switch. See *Festo step servo on page 39*.

Continues on next page

For detailed information, see electrical drawing:

- For tip dresser swing arm with drive unit single, 3HWT91209559.

Pneumatic installation

Install the pneumatic line to the air valve, connection interface PUSH-LOK 15 mm L-1/2″ INV. (1/2-M22x1.5).

Communication installation

The Profinet communication is connected between the tip dresser swing arm electrical cabinet and the robot cabinet. Also see *Festo step servo on page 39*.

For more information, see *Software documentation - FP Stationary servo spot welding Type HSe*.

3.3.3 Test run

General

- Test run is planned and a responsible person shall be appointed. Where applicable, establish responsibilities in accordance with the Work Environment Act.
- When performing the test run, temporary protection shall be installed to avoid contact with tip dressing process that can cause damage.
- The area used for test run shall be sealed off to prevent unauthorized access.

Test run procedure

See *Commissioning stationary spot welding* chapter in *Software documentation - FP Stationary servo spot welding Type HSe*.

3.4 Dismantling, scrapping and storage

Dismantling, scrapping of the equipment

- Before dismantling, disconnect and secure energy supplies to the equipment and robot before assembly.
- Check that the pressurized system is depressurized. If system is not depressurized, depressurize the system.
- Secure each equipment from sudden movements before removal.
- When lifting equipment, only approved lifting equipment shall be used.
- Disposal of any fluids or other hazardous waste must be in accordance with environmental legislation.
- In other respects, the respective manufacturers / suppliers instructions must be followed.
- Workplace for assembly or disassembly of the machine must be sealed off to prevent unauthorized access.
- Where the light conditions do not meet current requirements, appropriate light must be used.

Shutdown / storage of equipment

- Disconnect and secure energy supplies to the equipment and robot.
- Check that the pressurized system is depressurized. If system is not depressurized, depressurize the system.
- Secure each equipment from sudden movements before moving.
- Keep / store the equipment in a tempered and moisture-free space, protect the equipment from dust and other unwanted particles.

3.5 Connection and requirements for premises

Workplaces

The equipment is to be installed so that there is enough space for the performance of work. Also, access ways and workplaces shall be kept free of materials that can cause slipping and tripping hazards.

Mechanical connection / installation, stability and fixation

The floor and/or foundation must meet the strength requirements of the applicable load forces from the machinery and equipment. See the assembly drawing in the customer documentation for weight of the tip dresser swing arm.

Machinery and equipment are connected / fixed to the ground with 4 expansion bolts / chemical anchors or equivalent.

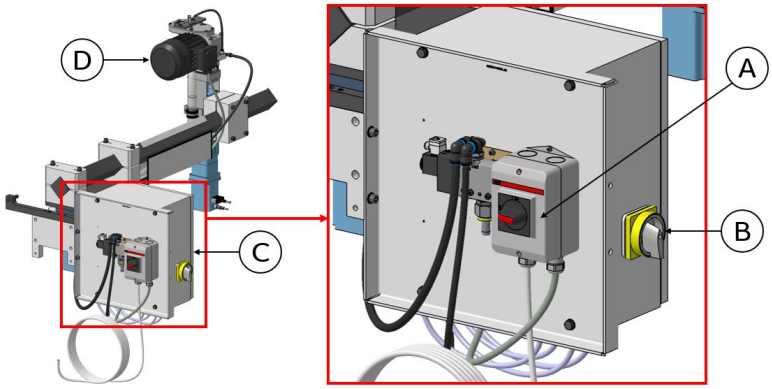
This is detailed in section *Mounting foundation bolts on page 48*.

Electrical connection

xx0200000024

Electrical installation must be performed only by authorized personnel.

Electrical appliances can be powered by up to 60 seconds after the power supply is turned off.



xx2200000374

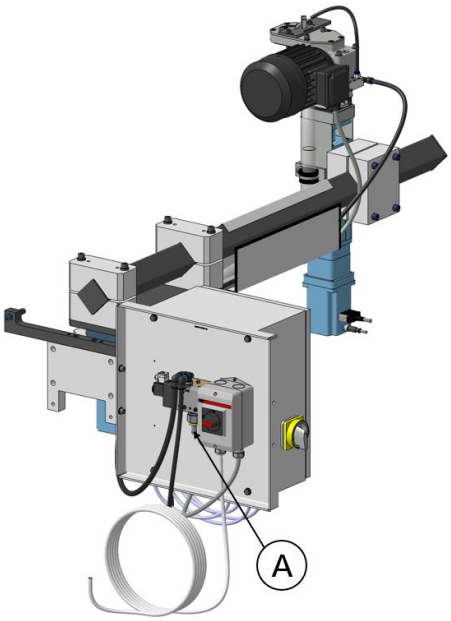
A	Safety switch for the dresser unit. Electrical connection to the safety switch, 3 x 400 (480 for US) V AC, fixed installation. Located at the left side of swing arm electrical cabinet.
B	Safety switch for the electrical cabinet. Electrical connection to the safety switch, 3 x 400 (480 for US) V AC, fixed installation. Located at the side of swing arm electrical cabinet.
C	Swing arm electrical cabinet. Electrical connection to the cabinet, 3 x 400 (480 for US) V AC, fixed installation. Installation point is located at the bottom of the swing arm electrical cabinet.
D	Electric Motor. Operation of dresser unit via the transmission gear. Power to the electric motor is distributed from the safety switch (A).

Continues on next page

Check before commissioning

Check that all protective earth connections works as intended. If not, the equipment must not be connected or be put into operation before remedy by authorized personnel.

Pneumatic connection / installation



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A	Pneumatic connection. Connect the hose with quick coupling (PUSH-LOK 15 mm L-1/2″ INV. (1/2-M22x1.5)) to the valve. Max air pressure: 10 bar, 1.0 MPa.

WARNING

When working around tip dresser swing arm, ear protectors must be used.

Noise level without blowing	Noise level with blowing reduced pressure, approximately 3 bar, 0.3 MPa	Noise level with blowing, full pressure, approximately 6 bar, 0.6 MPa
54 dB(A) eqv.	87 dB(A) eqv.	98 dB(A) eqv.

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4 Maintenance

4.1 Introduction

General

This chapter contains a schedule of the maintenance activities and how to perform them. Maintenance should be performed when needed and according to the pre-defined schedule.

Required equipment

Qty	Equipment	Product (example)
1	Standard toolkit	See *Standard toolkit on page 101*.
-	Other equipment may be required. See references to these in the step-by-step instructions below.	See *Special tools on page 102*.

Safety information

Observe all safety information before conducting any service work!

There are general safety aspects that must be read through, as well as more specific safety information that describes the danger and safety risks when performing the procedures.

Read the chapter *Safety on page 13* before performing any service work!

Note

If the Tip dresser swing arm is connected to power, always make sure that the Tip dresser swing arm is connected to protective earth before starting any maintenance work!

4.2 Maintenance schedule and expected component life

4.2.1 Specification of maintenance intervals

Introduction

The intervals are specified in different ways depending on the type of maintenance activity to be carried out and the working conditions of the Tip dresser swing arm:

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

4.2.2 Maintenance schedule

Scheduled and non-predictable maintenance

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

Non-predictable situations also give rise to inspections of the Tip dresser swing arm. Any damages must be attended to immediately!

Activities and intervals, standard equipment

The table below specifies the required maintenance activities and intervals:

Maintenance activities	Every 3 months	Every 6 months	Every 12 months	Reference
Checking activities				
Check the drive unit [i]			X	See *Replace the drive unit on page 70*
Check plain bearings [ii]		X		See *Replace the plain bearings*
Check oil level in worm gear box [iii]			X	See *Check oil level in worm gear box on page 87*.
Check the indexing unit [iv]	X			See *Replace indexing unit on page 76*.
Check total cut [v]		X		See *Replace the total cut on page 78*.
Check the cylinder unit - lift motion [vi]			X	See *Replace the cylinder unit - lift motion on page 80*.
Check the electric motor - swing motion [vii]			X	See *Replace the electric motor - swing motion on page 85*.
Check fasteners [viii]			X	See *Mechanical functions and connections on page 90*.
Check the electrical installation			X	See *Electrical functions and connections on page 90*.
Check of the pneumatic structure			X	See *Pneumatic functions and connections on page 90*.
Check communication connections			X	See *Other connections on page 90*.
Lubrication activities				
Lubricate equalizing suspension bracket	X			See *Equalizing suspension bracket on page 69*.

i Only replace when broken.
ii Only replace if worn out or broken.
iii Refill if necessary.
iv Only replace when broken.
v Only replace if dressing is inadequate.
vi Only replace when broken.
vii Only replace when broken.

Continues on next page

4.2.2 Maintenance schedule
Continued

[viii] First check after 6 months operation, then yearly checks.

4.3 Precautions to observe before maintenance

Precautions

Always turn the power supplies to the Tip dresser swing arm and other machines in the safety zone off. Lock the main switch.

WARNING

Welding arms and cooling systems are hot after welding. Let them cool down before any maintenance work is performed.

CAUTION

Make sure that the cooling system is not pressurized.

Intervention

- When intervention is needed, the relevant personnel must be informed about the procedure.
- Intervention shall only be done using the intended access route.
- Personnel performing the procedure must ensure that all energy supplies are switched off to the machines within the danger area.
- Check that the pneumatic system is depressurized.
- If necessary, the safety switch will be padlocked.

Electrical residual voltage

- Electrical appliances may be powered by up to 60 seconds after the power supply is turned off.
- Check the voltage potential prior to start of service or maintenance work.
- In some cases, work on energized equipment is needed.
- If so, it is extremely important then that special caution and that safe work practices are used.
- Electric- and pneumatic diagrams must be kept up to date, regardless of the extent of change.

Elevated equipment

WARNING

Elevated equipment will be secured in the elevated position before the intervention and maintenance.

Continues on next page

Troubleshooting

WARNING

If the error not can be detected, the competent staff will immediately be called. It is absolutely forbidden by unauthorized making procedures and troubleshooting in machinery and equipment.

Additional extension and rebuilding

WARNING

The supplier does not accept any liability for refurbishment or using equipment other than what was intended at the time of delivery.

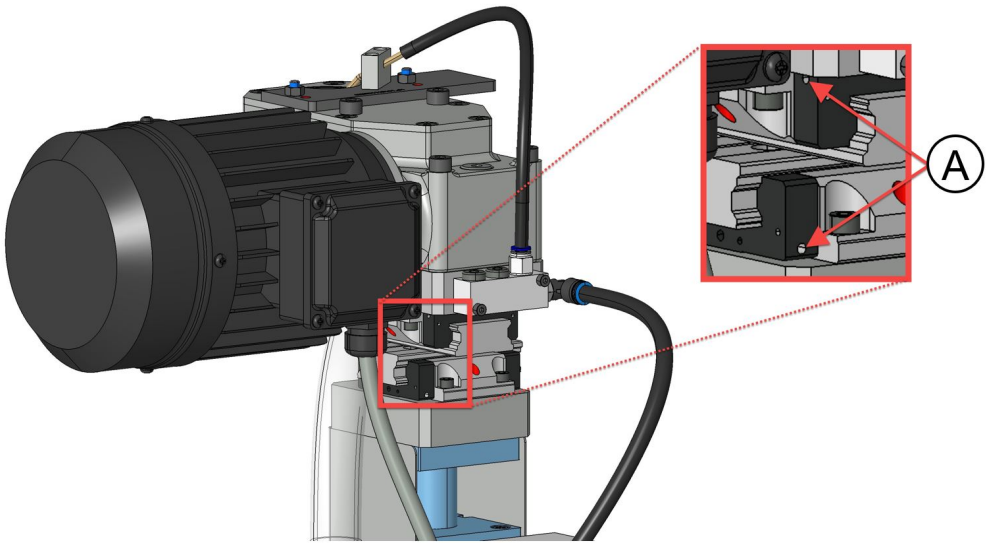
Facility protective and safety devices must not be altered or removed. Unauthorized alterations and changes to the machine are prohibited for safety reasons.

4.4 Lubricating activities

4.4.1 Equalizing suspension bracket

Location of equalizing suspension bracket grease nipples

The grease nipples (A) are located as shown in illustration below.



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Required equipment

Equipment	Article number	Note
Grease pump	-	Use a slim nozzle with the grease pump that fits a grease nipple of type DIN 3405.

Required consumables

Use one of the below listed consumables.

Equipment	Article number	Note
Grease	-	Castrol Tribol GR 100-2PD

Lubricating equalizing suspension bracket

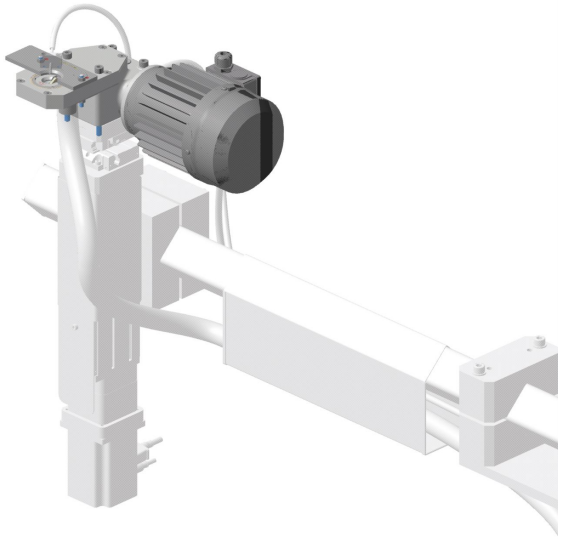
Pos.	Description
1	Funnel grease nipple. Lubricate the equalizing suspension bracket via two nipples (A), 4 times / year, or shorter intervals at extremely dirty environment. Grease until the grease comes out of the wagon opposite end, wipe off excess grease.
2	After lubrication pull/push the X and Y functions to their end positions several times to spread out the grease.

4.5 Replacing activities

4.5.1 Replace the drive unit

Location of drive unit

The drive unit is located as shown below.



xx2000000325

Required spare parts

See the spare part lists included in the Tip dresser swing arm customer documentation.

Required tools and equipment

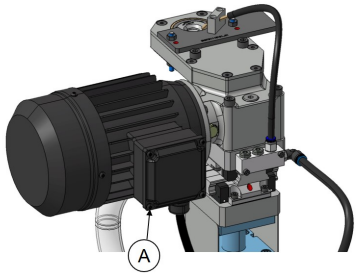
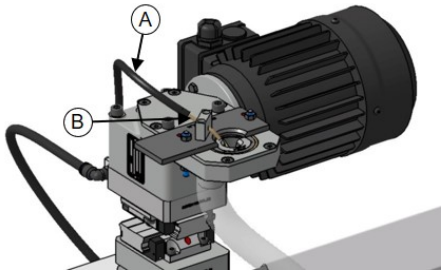
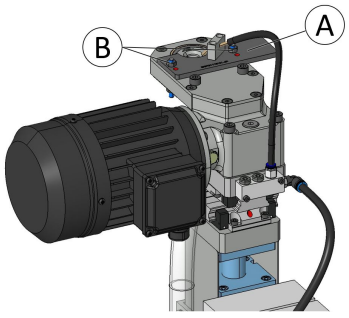
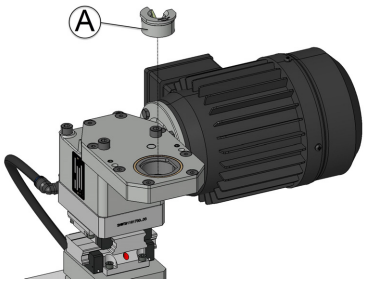
Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.

Drive unit replacement

The swingarm should be in Home position.

	Action	Note
1	Cut the electrical power to the dresser unit and to the swing arm.	This is detailed in section *Safety switches on page 38*.

Continues on next page

	Action	Note
2	Remove the four screws from the motor cover (A).	 xx2000000336
3	Disconnect the electrical wires, and pull the whole cable out of the electrical motor.	
4	Reassemble the motor cover and the four screws.	
5	Pull the pneumatic hose (A) out of the nozzle (B).	 xx2000000340
6	Remove the retainer (A) by removing the two nuts (B)	 xx2200000922
7	Take the cutter holder (A) out of the drive unit.	 xx2200000514

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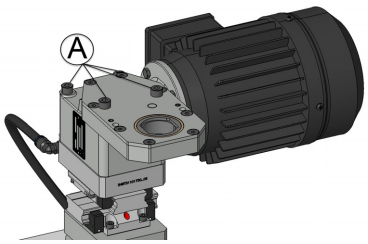
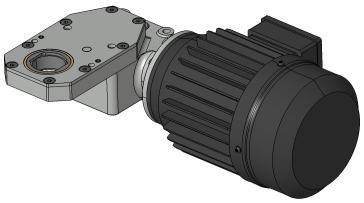
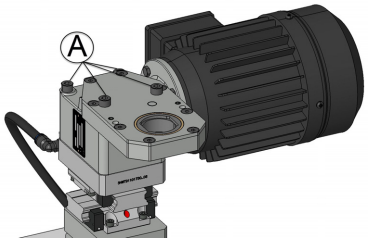
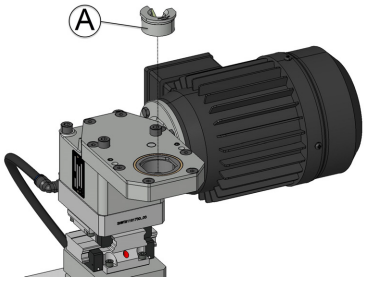
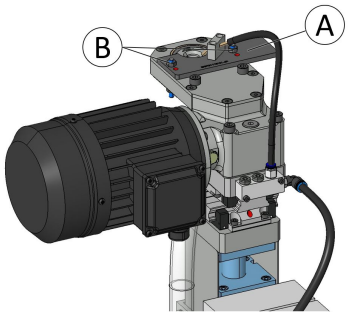
4.5.1 Replace the drive unit

Continued

	Action	Note
8	**CAUTION** Do not drop the drive unit during removal of the screws in the procedure step below. The drive unit weights about 6.5 kg. While holding the drive unit, remove the four screws (A) connecting the drive unit to the equalizing unit.	 xx2200000517
9	Examine the new drive unit. Make sure the mounting surface is clean and that there are no damages on the unit.	 xx2200000515
10	Assemble the new drive unit by re-assembling the four screws (A). Tighten the screws with tightening torque 24 Nm.	 xx2200000517
11	Install the cutter holder (A) into the drive unit.	 xx2200000514
12	Reassemble the retainer (A) by retightening the two nuts (B). See *Bolts, screws, tightening torques on page 98*.	 xx2200000922

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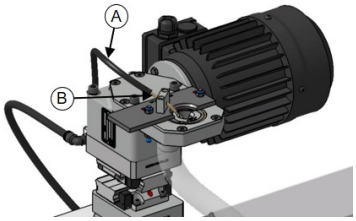
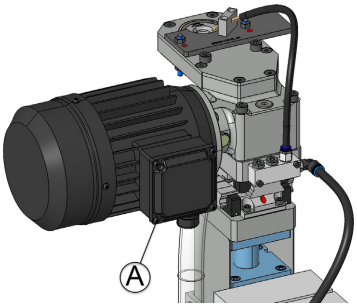
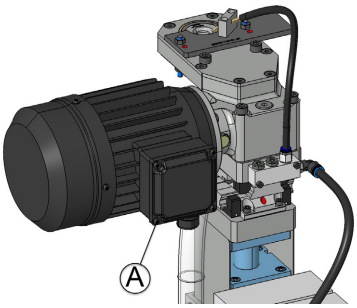
	Action	Note
13	Install the pneumatic hose (A) onto the nozzle (B).	 xx2000000340
14	Remove the four screws from the motor cover (A).	 xx2200000516
15	Insert the electrical cables into the cable lead-through on the electrical motor and connect the wires. Connect the wires according to electrical drawing for Function package handling robot type HSe.	
16	Reassemble the motor cover and the four screws (A).	 xx2200000516

4.5.2 Replace the plain bearings

Required spare parts

Spare part	Article number	Note
Plain bearing	91209007	2 bearings needed for drive unit single. 4 bearings needed for drive unit double.

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.
Locking ring plier	-	

Required consumables

Consumable	Article number	Note
Glue	-	Recommended: Loctite 603
Grease	-	Recommended: Klüber Unimolly Plus
Brake clean	-	-

Plain bearing replacement

The worm gearbox will be checked once a year and then refilled if needed (during normal use). If heavier use, the plain bearing should be replaced twice a year. It is to ensure its function.

	Action	Note
1	Remove the drive unit according to the procedure described in chapter *Drive unit replacement*.	

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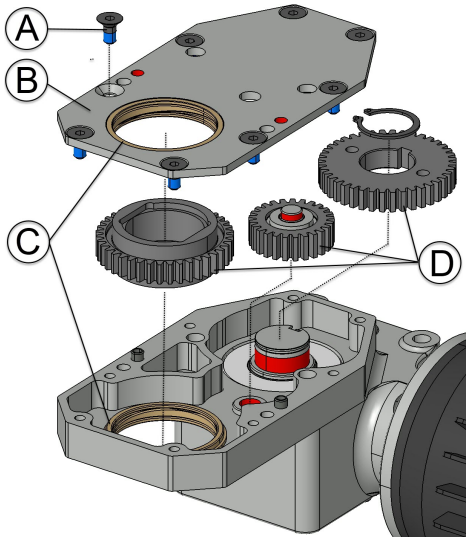
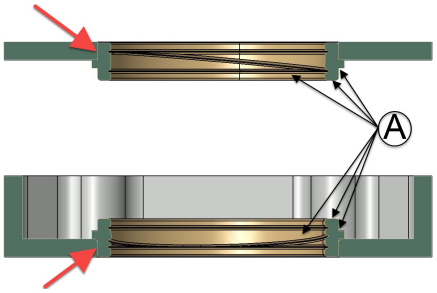
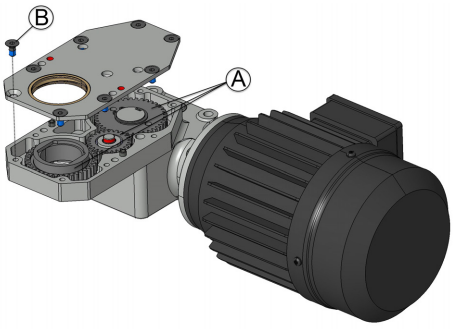
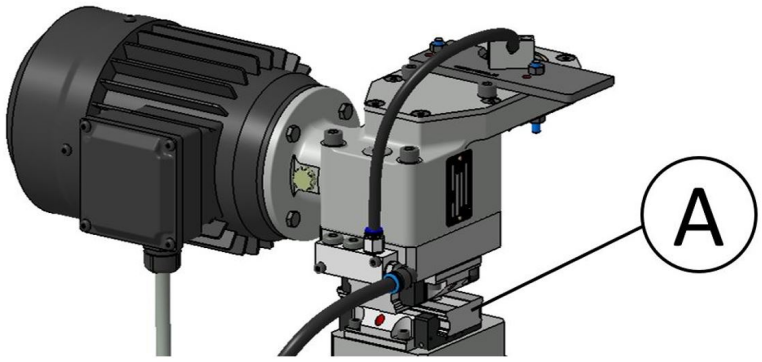
	Action	Note
2	Remove the cover cap screws (A), 8 pcs.	 xx2200000520
3	Remove the protective cover (B).	
4	Remove the gears (D) and remove the upper and lower slide bearings (C). A plier can be used to remove the locking ring.	
5	Thoroughly wipe clean the surfaces of the gears (D). Especially the surfaces of the gear where the slide bearings will be installed.	
6	Clean the surfaces of the housing and cover where the new slide bearings will be installed. Use Brake clean Veidec or similar cleaner.	 xx2200000519
7	Install the new slide bearings and glue them to the housing and cover using Loctite 603.	
8	Lubricate the slide bearings (A) with grease. Klüber Unimolly Plus.	
9	Fit each gear (A) back into their original location and lubricate using grease Klüber Unimolly Plus, (use about 0.005 kg)	 xx2200000521
10	Install the protective cover and tighten the screws (B). See *Bolts, screws, tightening torques on page 98* for tightening torque.	
11	Reassemble the drive unit according to the procedure described in chapter *Drive unit replacement*.	

4.5.3 Replace indexing unit

Location of the indexing unit

Position A in illustration shows location of the indexing unit.



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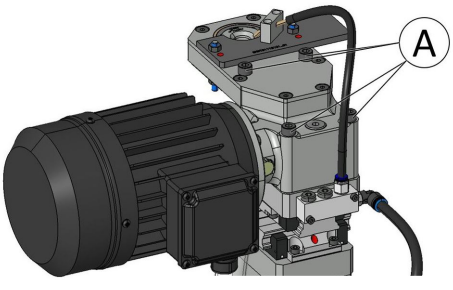
Required spare parts

See the spare part lists included in the tip dresser swing arm customer documentation.

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.

Indexing unit replacement

	Action	Note
1	Do not drop the drive unit during removal of the screws in the procedure step below. The drive unit weights about 6.5 kg. While holding the drive unit, remove the four screws (A) connecting the drive unit to the equalizing suspension bracket. Strap the drive unit to the swing arm using a tension strap or similar. By doing this there is no need to disconnect cables and hoses.	 xx2200000921

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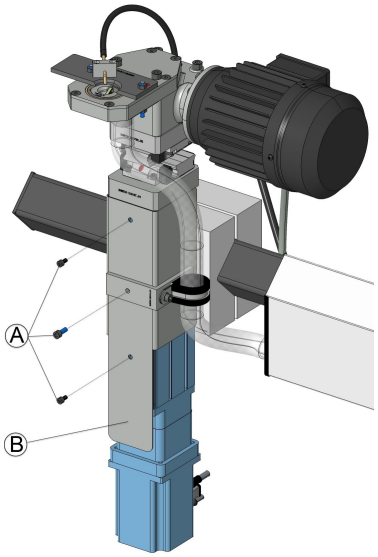
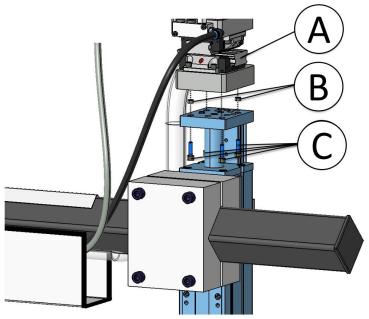
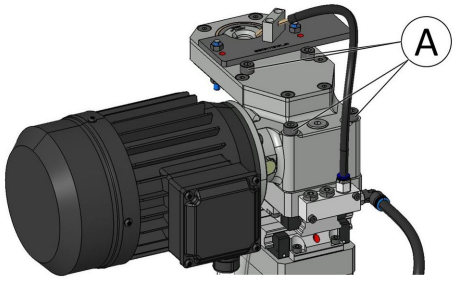
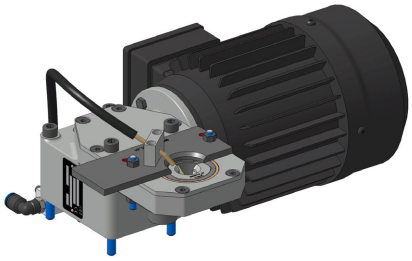
	Action	Note
2	Remove the cover plate (B) by removing the three screws (A).	 xx2200000525
3	Disassemble the indexing unit (A). Remove the four screws (C) and the two centering sleeves (B) **Tip** Place a spacer with length about 100 mm between the cylinder and mounting plate while disassembling.	 xx2200000778
4	Assemble the new indexing unit by following the above steps in reverse.	
5	Reassemble the drive unit using the four screws (A). Tighten the screws with tightening torque 24 Nm.	 xx2200000921

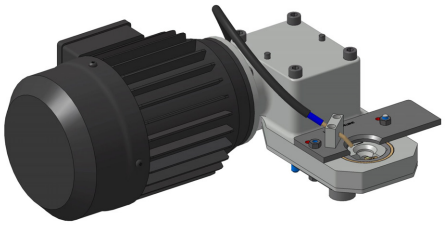
4.5.4 Replace the total cut

Location of the total cut

The total cut is located in the drive unit and they are kept in position by the retainer.



xx2000000218



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Required spare parts

See the spare part lists included in the tip dresser swing arm customer documentation.

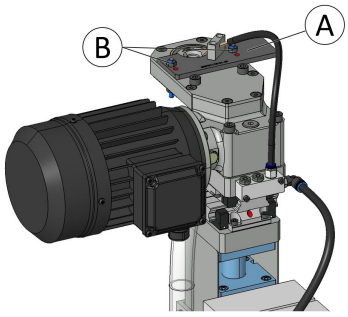
Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.

Required consumables

Consumable		Note
Brake clean	-	-
New, clean cloth	-	-

Total cut replacement

	Action	Note
1	Cut the power to the drive unit and to the swing arm.	This is detailed in section *Safety switches on page 38*.
2	Remove the retainer (A) by removing the two nuts (B)	 xx2200000922

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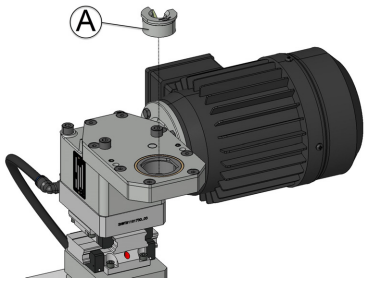
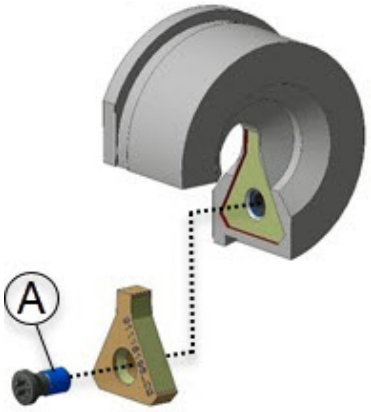
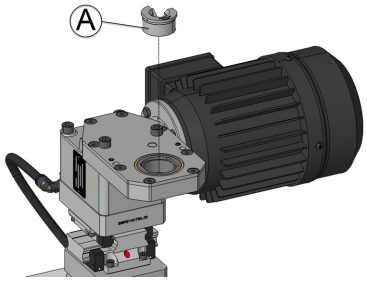
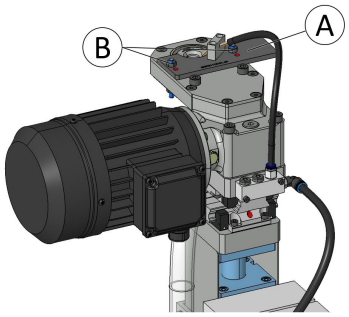
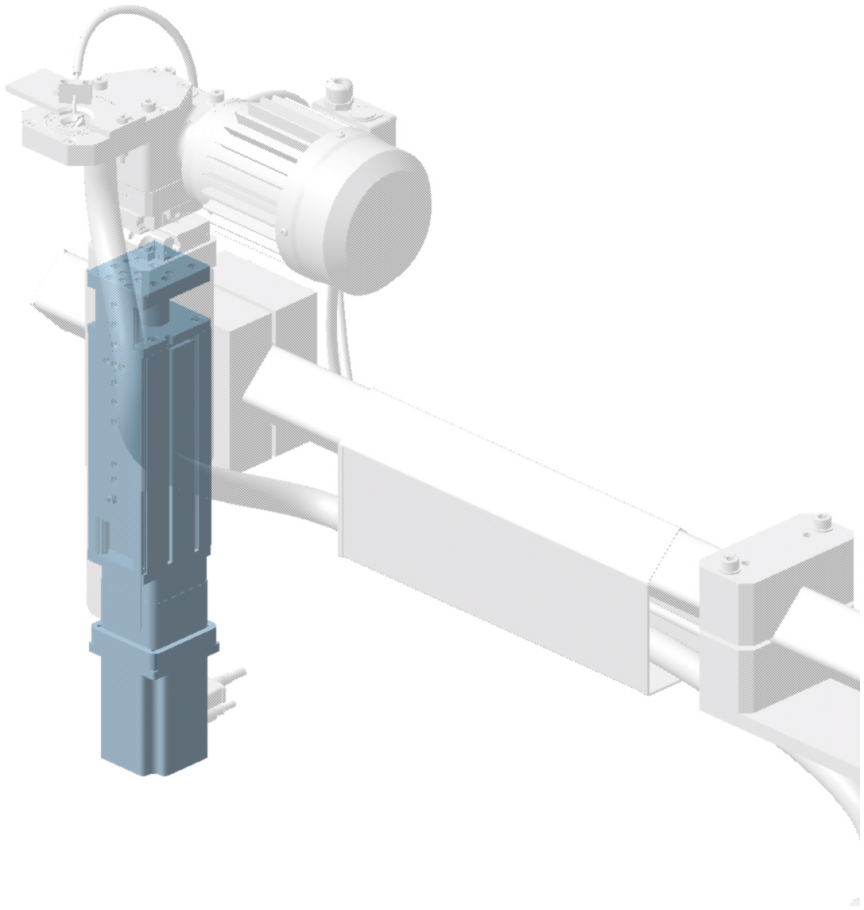
	Action	Note
3	Take the cutter holder (A) out of the drive unit.	 xx2200000514
4	Thoroughly clean the cut insert seat and contact surfaces with Brake clean.	 xx2200000524
5	Check that the cut is located correct in the insert seat before tightening the screw. Tightening torque: 4 Nm	
6	Install the cutter holder (A) into the new drive unit.	 xx2200000514
7	Reassemble the retainer (A) by retightening the two nuts (B). See *Bolts, screws, tightening torques on page 98*.	 xx2200000922

4.5.5 Replace the cylinder unit - lift motion

Location of cylinder unit - lift motion

The cylinder unit - lift motion is located as shown below.



xx2000000326

Required spare parts

See the spare part lists included in the tip dresser swing arm customer documentation.

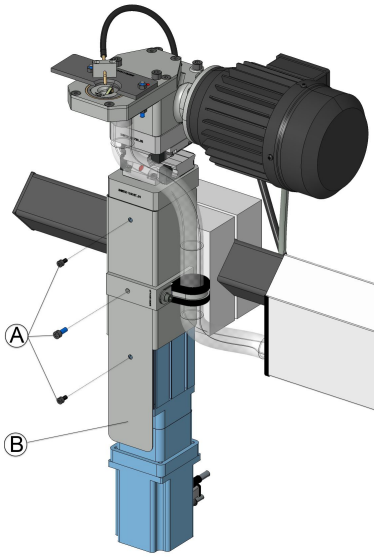
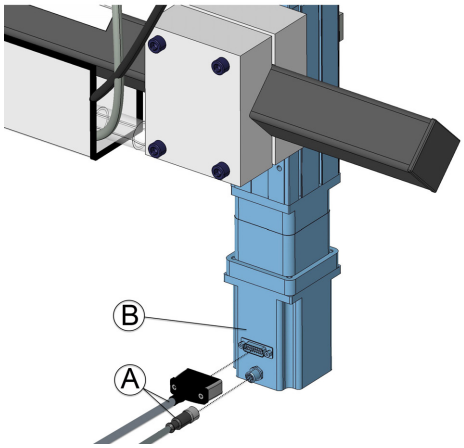
Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.

Continues on next page

Cylinder unit - lift motion replacement

The tip dresser swing arm should be in Home position.

	Action	Note
1	Remove the cover plate (B) by removing the three screws (A)	 xx2200000525
2	Disconnect the two connectors (A) from the motor (B). **CAUTION** Hold the cylinder unit - lift motion while removing the screws. Risk of dropping and damaging the cylinder unit - lift motion. Cylinder unit - lift motion weights about 3.5 kg.	 xx2200000527

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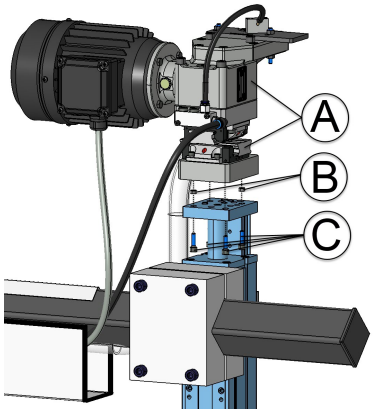
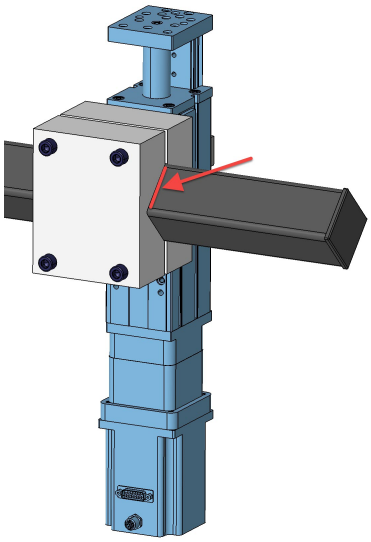
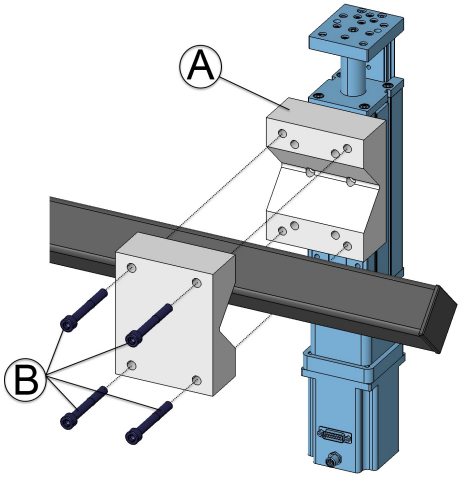
4.5.5 Replace the cylinder unit - lift motion

Continued

	Action	Note
3	Disassemble the dresser unit and equalizer (A) as a whole. Remove the four screws (C) and the two centering sleeves (B) **Tip** Place a spacer with length about 100 mm between the cylinder and mounting plate while disassembling. **CAUTION** Hold on to the drive unit with equalizer while removing the screws to not risk dropping the unit. It weighs about 12,5 kg. Strap the unit to the swing arm using a tension strap or similar. By doing this there is no need to disconnect cables and hoses.	 xx2200000526
4	Make a mark on the arm indicating where the bracket has been positioned. This will make it easier to position the new cylinder unit correct when reassembling.	 xx2200000528
5	Remove the four screws (B) holding the bracket cylinder unit and half the bracket (A) **CAUTION** Hold the cylinder unit - lift motion while removing the screws. Risk of dropping and damaging the cylinder unit - lift motion. Cylinder unit - lift motion wights about 3.5 kg.	 xx2200000532

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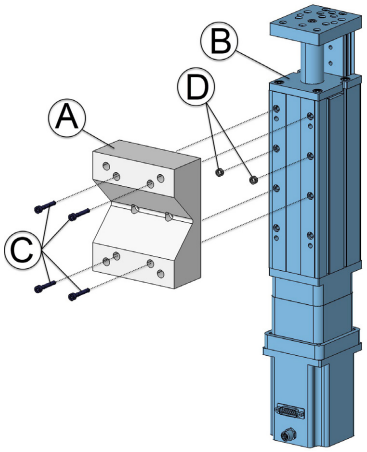
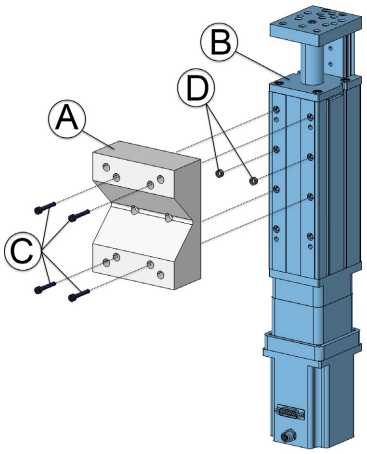
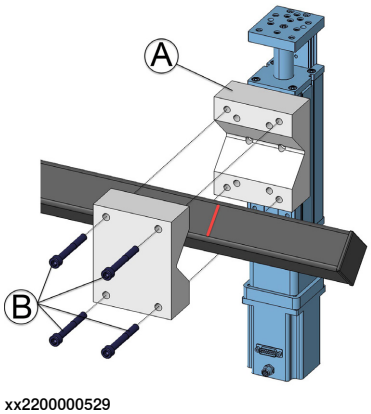
	Action	Note
6	Remove the four M6 screws (C) and the two centering sleeves (D) holding the other half of the bracket (A) to the cylinder unit (B)	 xx2200000531
7	Replace the old cylinder unit - lift motion with a new one.	
8	Place the two centering sleeves (D) in the two middle holes before reassemble the bracket (A) to the new cylinder unit (B). Tighten the screw using standard tightening torque. See *Bolts, screws, tightening torques on page 98*.	 xx2200000531
9	Reassemble the cylinder unit (A) to the arm. Place it according to the mark made earlier on the arm. Tighten the four M6 screws (B). Do not tighten with specific torque, it will be done in a step further ahead.	 xx2200000529

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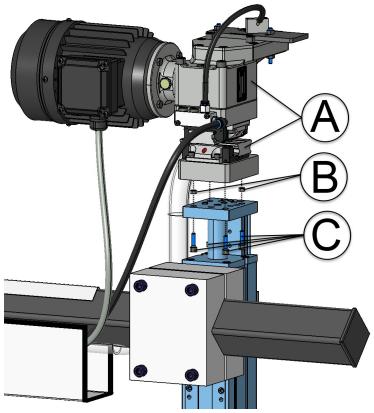
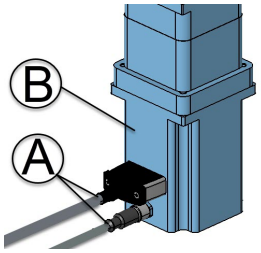
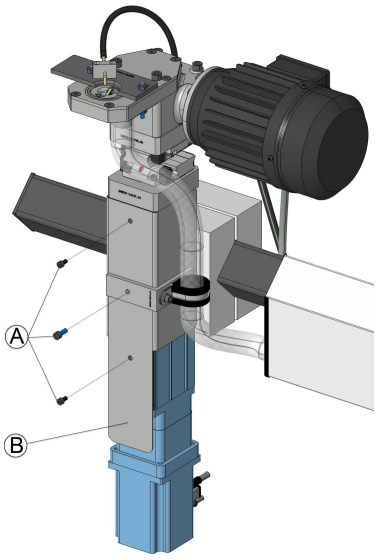
4.5.5 Replace the cylinder unit - lift motion

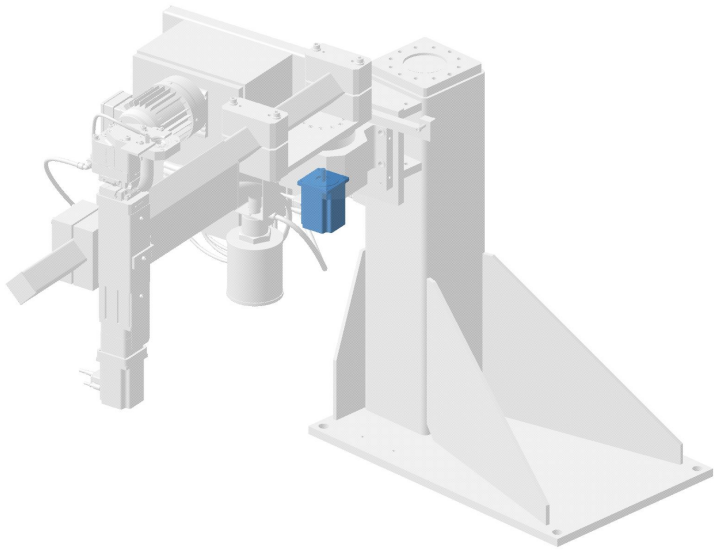
Continued

	Action	Note
10	First re-assemble the two centering sleeves (B) in the diagonal. Possition the dresser unit and equalizer (A) as a whole and tighten the four screws (C). Tighten the screw using standard tightening torque. See *Bolts, screws, tightening torques on page 98*. **Tip** Place a spacer with length about 100 mm between the cylinder and mounting plate while disassembling.	 xx2200000526
11	Re-connect the two connectors (A) to the motor (B).	 xx2200000530
12	Reassemble the three screws (A) holding the cover plate (B). Tightening torque: 9.5 Nm.	 xx2200000525
13	Follow step 5 - 13 in installation procedure of the complete tip dresser swing arm. See *Swing arm on ABB welding gun stand on page 48*	

4.5.6 Replace the electric motor - swing motion

Location of electric motor - swing motion

The electric motor - swing motion is located as shown below.



Required spare parts

See the spare part lists included in the tip dresser swing arm customer documentation.

Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.

Electric motor - swing motion replacement

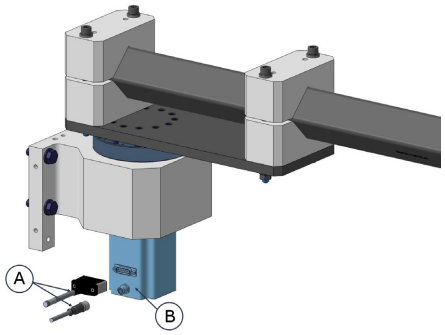
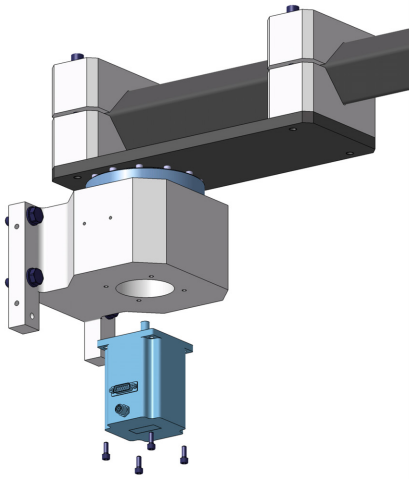
The tip dresser swing arm should be in Home position.

	Action	Note
1	Cut the power to the dresser unit and to the swing arm.	This is detailed in section *Safety switches on page 38*.

Continues on next page

4.5.6 Replace the electric motor - swing motion

Continued

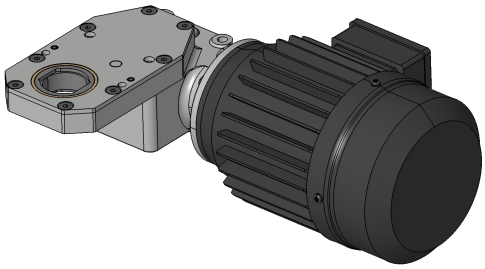
	Action	Note
2	Disconnect the two connectors (A) from the motor (B).	 xx2200000602
3	Remove the four screws holding the bracket and the four screws holding the electric motor - swing motion. **CAUTION** Hold the cylinder unit - swing motion while removing the screws. Risk of dropping and damaging the cylinder unit - swing motion. Cylinder unit - swing motion weights about 3.5 kg.	 xx2000000401
4	Replace the old electric motor - swing motion with a new one.	
5	Re-assemble the four screws holding the electric motor - swing motion.	For tightening torque, see *Bolts, screws, tightening torques on page 98*.

4.6 Check activities

4.6.1 Check oil level in worm gear box

Location of worm gear box

The worm gearbox oil is located inside the worm gearbox in the drive unit, see figure below.



xx2200000515

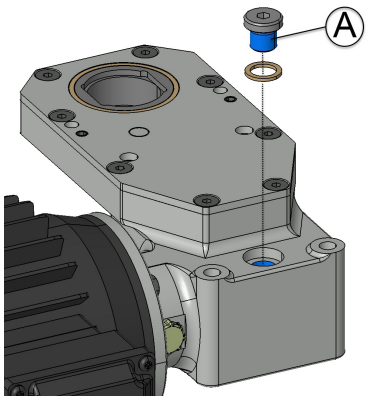
Required tools and equipment

Equipment	Article number	Note
Standard toolkit	-	Content is defined in section *Standard toolkit on page 101*.

Required consumables

Consumable	Article number	Note
Oil	-	Recommended: Renolin CLP 460

Procedure

	Action	Note
1	Remove the oil plug (A).	 xx2200000522

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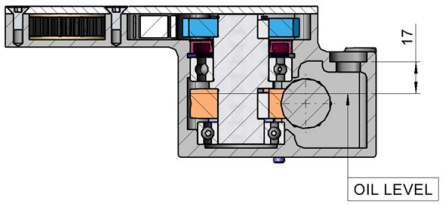
4.6.1 Check oil level in worm gear box

Continued

	Action	Note
2	Measure the distance from the sealing surface for the oil plug to the oil surface. It shall measure 17 mm. If needed fill up with oil: Renolin CLP 460 until you reach 17 mm.	 xx2200000522
3	Re-assemble the oil plug (A).	

4.7 Changing driver

4.7.1 Service change of stepping motor driver

Required documentation

Equipment	Document number	Note
Electrical drawing for tip dresser swing arm electrical cabinet	3HWT91209559	For dresser unit single

4.8 Other protective and maintenance measures

Workplaces

Daily checks and action to secure workplaces and access ways so that they are free from material, liquids, etc. that can cause slipping and tripping hazards.

When welding and grinding on equipment

Before welding, the power must be switched off and the cable connector must be disconnected. (Risk of damage to electrical and electronic equipment may occur.)
Place return conductor - clamp as close to the welding point as possible.

When grinding, the equipment must be totally covered to prevent grind splash, which can cause damage and fire.

Mechanical functions and connections

After 6 months of operations, then yearly checks of the fixings and fasteners.

Check that no abnormal wear, no breakage or deformations has occurred.

If necessary, re-tighten fasteners.

Electrical functions and connections

xx0200000024

Yearly check the electrical installation. Check that the cables and connections are intact, firmly secured and protected, and that they cannot be squeezed or otherwise damaged.

Check that all electrically groundings works as intended, unless the facility may not be connected or be taken into operation before remedy by authorized personnel.

Electrical installation must only be performed by authorized personnel.

Pneumatic functions and connections

Yearly check of the pneumatic structure.

Check that hoses and couplings are intact and properly fastened, and that there are no leakages and that the hoses cannot be squeezed or otherwise damaged.

WARNING

Check that there are no persons within the danger area of the pressurization of the pneumatic system.

Risk of sudden movements may occur.

Other connections

Check yearly that the communication to each function works as intended, and that the connections are fixed and cannot be loose or come off.

Continues on next page

Spare parts lists

See the spare part lists included in the tip dresser swing arm customer documentation.

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5 Decommissioning

5.1 Environmental information

Hazardous material

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

Dispose components properly to prevent health or environmental hazards. Follow national standards and regulations.

Material	Example application
Copper	Cables, motors
Cast iron/nodular iron	Base, lower arm, upper arm
Steel	Drive unit (gears, gear wheel, screws, shafts), plummer block, swing arm mounting plate, shaft cover on swing arm mounting plate, reference stand, cuts, swing arm stand, chip collector bucket
Stainless steel	Reinforcement plates on sides of swing arm close to the plummer blocks
Plastic/rubber	Cables, connectors, sealing on top of plummer block, sealings in gearbox, chip collector hose, chip collector hose sealing in bucket
Oil, grease	Gearboxes
Aluminium	Covers, drive unit cover, swing arm framework

Oil and grease

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

Also note that:

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

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6 Reference information

6.1 Introduction

General

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

6.2 Applicable safety standards

European standards and EU directives

Standard	Description
2006/42/EG	The Machinery Directive Appendix 1 1, Essential health and safety requirements relating to the the design and construction of machinery - General principles Appendix 2 1B, Declarations - Declaration of incorporation of partly completed machinery Appendix 7 B, Relevant technical documentation for partly completed machinery Appendix 6, Installation instructions for partially completed machines
EN 60204-1:2006	Safety of machinery. Electrical equipment of machines. General requirements
2014/35/EU	The Low Voltage Directive (LVD)
2014/30/EU	Electromagnetic Compatibility (EMC) Directive
EN 61000-6-4:2007/A1:2011	Electromagnetic compatibility (EMC). Part 6-4: Generic standards. Emission standard for industrial environments
EN 61000-6-2, edt 3:2005/C1:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

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 Bolts, screws, tightening torques

6.4.1 Bolt and screws

General

Before tightening any screw, observe 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, tighten the screw in a slow, flowing motion.
- Maximum allowed total deviation from the specified value is 10 %!

Note

The bolts used on (or provided with) the Tip dresser swing arm are of 3 different classes, 8.8, 10.9, and 12.9. Unless indicated otherwise, the screws are by default of class 8.8.

6.4.2 Standard tightening torques

Screws

Screw thread size	M5	M6	M8	M10	M12
Tightening torque CLASS 8.8	5.5 Nm	9.5 Nm	23 Nm	46 Nm	79 Nm
Tightening torque CLASS 10.9	8.1 Nm	14 Nm	34 Nm	67 Nm	116 Nm
Tightening torque CLASS 12.9	9.5 Nm	16.4 Nm	40 Nm	79 Nm	136 Nm

Water couplings/fittings

QS fittings

G-thread dimension	Tightening torque [Nm] - Nominal
G1/8	7 Nm
G1/4	9 Nm
G3/8	15.5 Nm
G1/2	26 Nm

R-thread
All R-threads are coated with a sealing material. This coating replaces the conventional sealing ring. Simply screw in the R-thread by hand and tighten it with 1 or 2 turns with a spanner.

NPQH fittings

G-thread dimension	Tightening torque [Nm] - Nominal
G1/8	6 Nm
G1/4	7.5 Nm
G3/8	9 Nm
G1/2	9 Nm

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.

Example

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

	Action	Note
	CAUTION The Tip dresser swing arm weighs XX kg. All lifting accessories used must be sized accordingly!	

6.6 Standard toolkit

General

All service (repairs, maintenance, and installation) procedures contains lists of tools required to perform the specified activity.

All special tools required are listed directly in the procedures while all the tools that are considered standard are gathered in the standard toolkit and defined in the following table.

This way, the tools required are the sum of the standard toolkit and any tools listed in the instruction.

Contents, standard toolkit

Tools

Qty	Tool	Rem.
1	Set of spanners 8-22 mm	
1	Allen keys 3, 4, 5, 6, 8 and 10 mm	
1	Torque wrench 10-140 Nm	
1	Ratchet head for torque wrench 1/2"	
1	Socket head cap 5 mm, 6 mm, 8 mm, 10 mm socket 1/2" bit L = 20 mm	
1	Hex head cap 8 mm, 10 mm, 13 mm, 19 mm socket 1/2" bit L = 20 mm	
1	Plastic mallet	
1	Dowel pin remover	

Consumables

Qty	Tool	Rem.
	Locking liquid	Recommended: Loctite 603 and Loctite 243
	Oil	Recommended: Renolin CLP 460
	Brake clean	
	Klüber Unimolly Plus	

6.7 Special tools

General

All service instructions contain lists of tools required to perform the specified activity. The required tools are a sum of standard tools, for definition see *Standard toolkit on page 101*, and of special tools, listed directly in the instructions and also gathered in this section.

Summary, special equipment

Qty	Equipment	Product
1	Puller tool	 xx2000002637
1	Locking ring plier	

6.8 Lifting accessories and lifting instructions

General

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

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

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

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7 Spare parts

Spare parts lists

See the spare part lists included in the tip dresser swing arm customer documentation.

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