

Automated Socket Changer

Printed Matter No. 9846 0451 01
Publication Date 2022-04-26

Attachments

Valid from Serial No. -

Instruction Supplement

ASC kit 1/2"	4027045001
ASC kit 1"	4027045002
ASC kit 3/8"	4027045003
ASC kit 3/4"	4027045004



	⚠ WARNING
	<p>Read all safety warnings and instructions</p> <p>Failure to follow the safety warnings and instructions may result in electric shock, fire and/or serious injury.</p> <p>Save all warnings and instructions for future reference</p>

Atlas Copco

Table of Contents

Instruction Supplement.....	3
Overview.....	3
Applications	3
Mechanism Overview	3
Environmental Conditions	4
Installation	4
Installation Instructions.....	4
Operation.....	5
General Operation Safety Precautions.....	5
Configuration Recommendations	6
The Pick-Up Process.....	6
The Release Process	8
Service.....	9
Maintenance Instructions	9
Recycling	9
Recycling Instructions	9

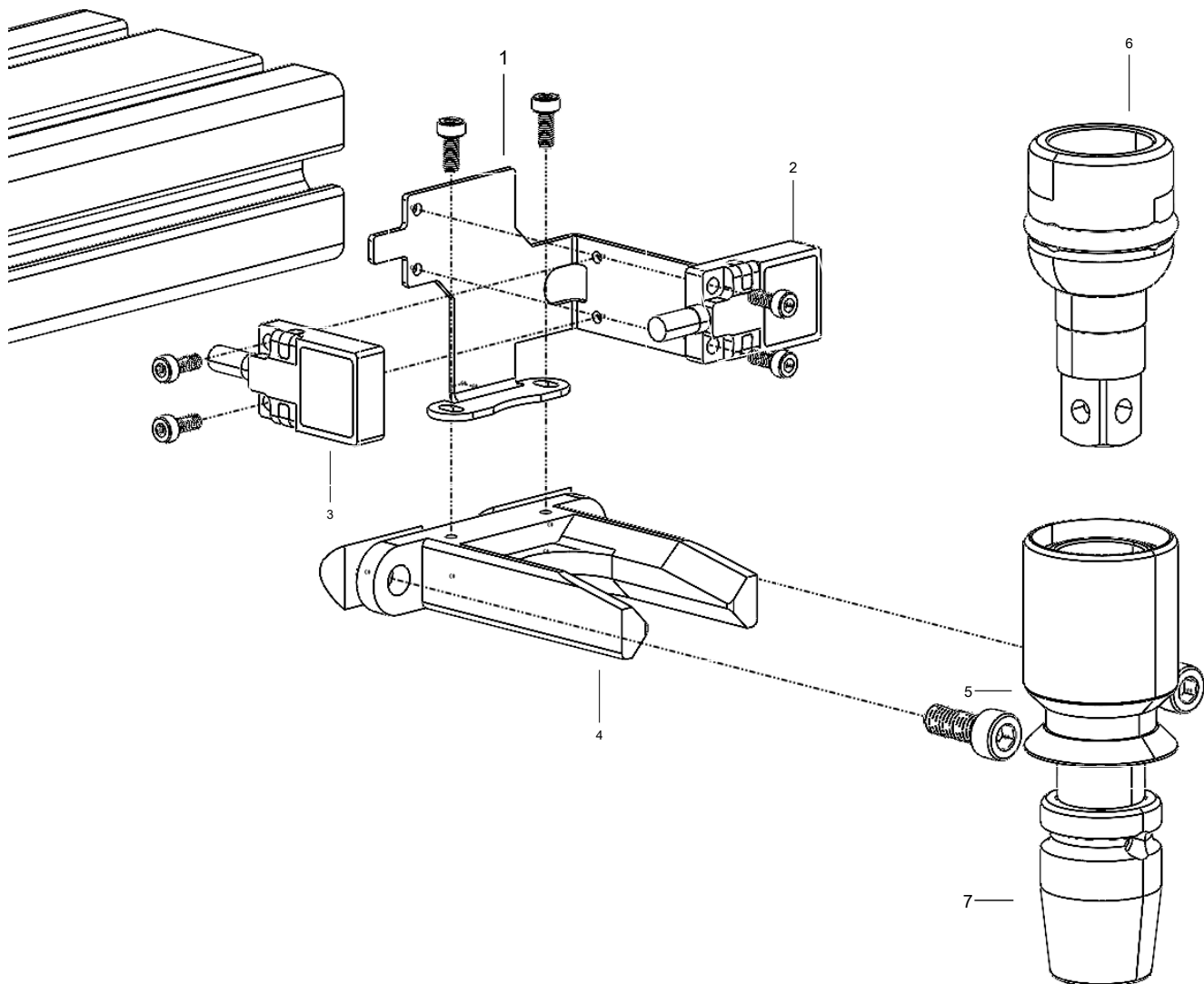
Instruction Supplement

Overview

Applications

- The workable material depends on the tools where the Automated Socket Changer is installed.
- The Automated Socket Changer can only be used as part of a machine or work unit which is certified before use.
- The Automated Socket Changer is currently designed to attach directly to QST spindles. For further information, refer to the QST documentation in ServAid.

Mechanism Overview



1	Sensor mounting bracket
2	Sensor 2
3	Sensor 1
4	Socket dock
5	Socket changer
6	Tool adapter

The **Automated Socket Changer** is developed to meet customer's demands so that sockets can be changed automatically for auto-stations. The system consists of a tool adapter, a socket changer body, a socket dock, two sensors and a sensor mounting bracket.

The **tool adapter** is attached to a spindle, preferably QST, but others can also be used. The tool adapter has a guided pocket to reduce the system radial play. Every spindle is equipped with one adapter, which is fix-mounted on it. The spindle will pick-up a socket changer with a tool adapter. The whole system can have an infinite number of socket changers as long as the motion unit, such as a robot, can reach where socket changers are placed.

The **socket changer** works similarly to a manual socket changer. The outer ring can move up and down to activate the lock mechanism inside. Once the outer ring is pushed upwards, an adapter can drive in full. Once the outer ring returns back to the initial position, the adapter will be locked in position. The socket or bit will be attached to the lower part of the socket changer. The socket changer is a common component. Different sockets or bits can be attached as long as they have the same connector size.

The **socket dock** is mounted at a fixed location and can hold a socket changer in position when it is not in use. It is strongly recommended to mount the dock horizontally for easier programming of the robot movement.

The **socket or bit** is the required tool to perform the screw or nut tightening process. The sockets or bits are attached to the socket changer. Every socket or bit needs a socket changer. The change of one socket or bit means the change of one socket or bit together with one socket changer.

The **sensor 1** will detect if there is a socket changer on the dock.

The **sensor 2** will detect if the tool adapter is fully engaged. Only a fully engaged tool adapter can perform the pick-up process correctly.

Environmental Conditions

Operate the equipment in a closed and dry environment with a temperature ranging from +5° C to +50° C.

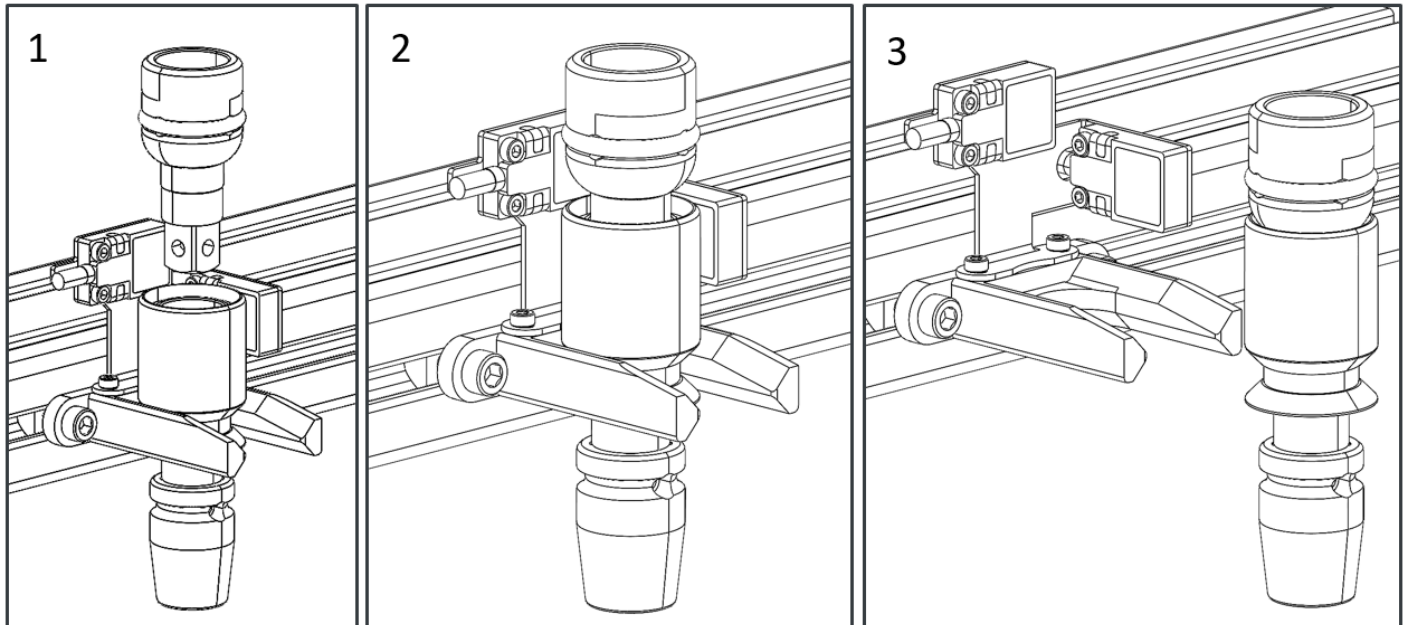
Do not operate this product in environments where there is a possibility of explosion, i.e, saturated with gas or inflammable substances.

Installation

Installation Instructions

1. Install the socket dock on a profile or metal sheet with the two mounting holes on the side. Mind the orientation.
2. Install the socket dock as horizontal as possible. Vertical installation is also possible, but not recommended since normally sockets or bits are attached to the socket changer and, if it is installed vertically, it could be difficult to hold the socket changer in position.
3. Mount the sensors on the sensor mounting bracket with the provided M3x16 socket head screws.
4. Mount the sensor mounting bracket with the attached sensors to the socket dock with the provided M3x16 socket head screws.
5. Connect the sensor cables to the control station (tightening controller, robot controller, PLC, etc.).
6. Recommended programming steps for the pick-up process:
 - Joint movement to the upper position over the socket changer. See illustration 1.
 - Start tool rotation. Recommended to do about 4000° (keep rotating before reaching the dock position) at 200 rpm or higher.
 - Linear movement to the socket dock position. See illustration 2.
 - Wait for the signal from sensor 2 that detects the engagement between the tool adapter and the socket changer.
 - Linear movement to position. See illustration 3.
 - Joint movement to approach tightening position.

7. Recommended programming steps for the release process:
- Joint movement to position. See illustration 3.
 - Linear movement to dock position. See illustration 2.
 - Confirm correct position with signal from sensor 1.
 - Linear movement to up position. See illustration 1.



Operation

General Operation Safety Precautions

WARNING Crushing Hazard



Pay attention to moving parts when operating the tool. Moving parts can pinch or crush and sharp objects can cause bodily injuries, especially to the hands.

- ▶ Keep hands and fingers away from moving parts.
- ▶ Always wear protective gloves when changing components, making repairs or removing a blockage. Remove the protective gloves before starting the tool.

WARNING Entanglement Hazard

Do not wear protective gloves when operating the tool. Protective gloves can be caught and wound up by the rotation drive of the tool leading to risk of fingers getting crushed or cut.

- ▶ Do not wear protective gloves when operating the tool or when working in tightening operations.
- ▶ Wear protective gloves during assembly and installation operations.
- With respect to the intended use of the equipment, all possible hazards have been minimized or eliminated. However, some residual risks remain innate to the functionality of the equipment itself. It is the end user's responsibility to provide operation training to the operators and specialized personnel regarding the equipment use, maintenance and other.
- Read this document before operating the tool.
- Wear safety gloves except when operating the tool.
- Use foot protection.
- Wear safety glasses.

- Protect the tool from the external environment during transportation.
- Lock the pneumatic shut-off valve during maintenance and repair.
- Do not operate the product when under maintenance.
- Do not reach into the area of the tool spindle or socket while operating the tool.
- Do not move into the working area of the equipment while in operation.

Configuration Recommendations

Run the finding stage and the tightening program at a relative high speed for a finding stage so that the adapter can sit into the socket changer easily. If the tool adapter does not engage properly, try again a second or, if necessary, a third time. Normally, the engage process will succeed at the first time if the parameters are chosen properly and the position is well aligned.

Add a CCW step at the end of the tightening program to release the friction generated by counter torque. The CCW angle needs to be determined according to the tools used. This step is only to release this counter torque, do not run too much backwards. CCW movement is not a must. The recommended CCW angle value for the tightening program is 3 degrees.

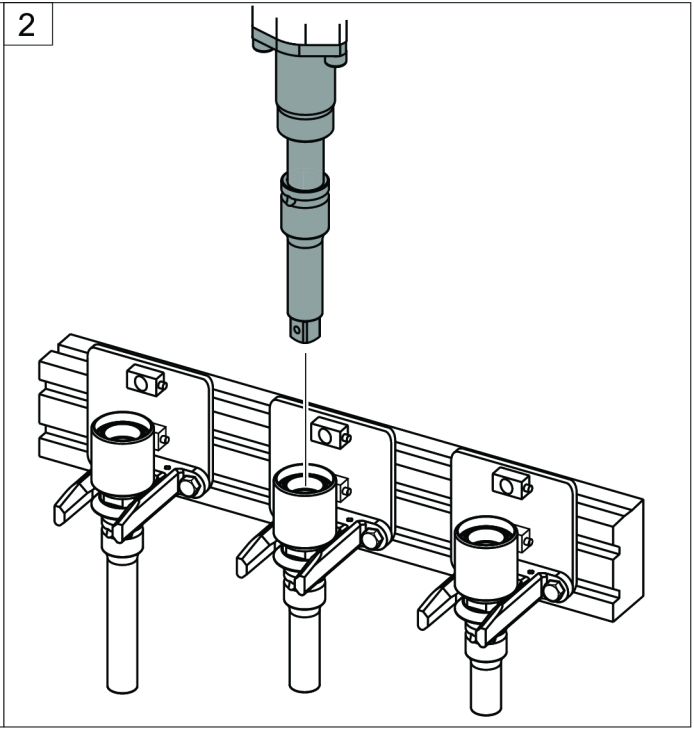
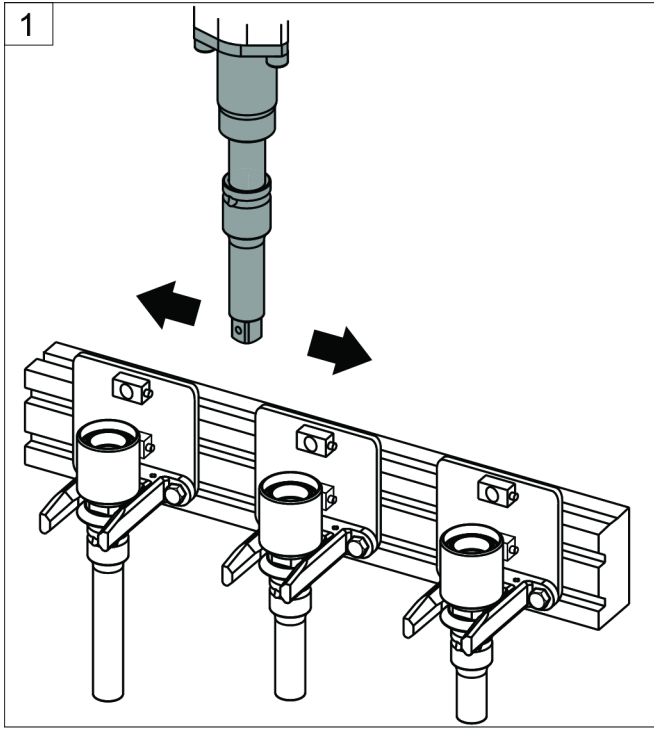
The Pick-Up Process

WARNING Crushing Hazard

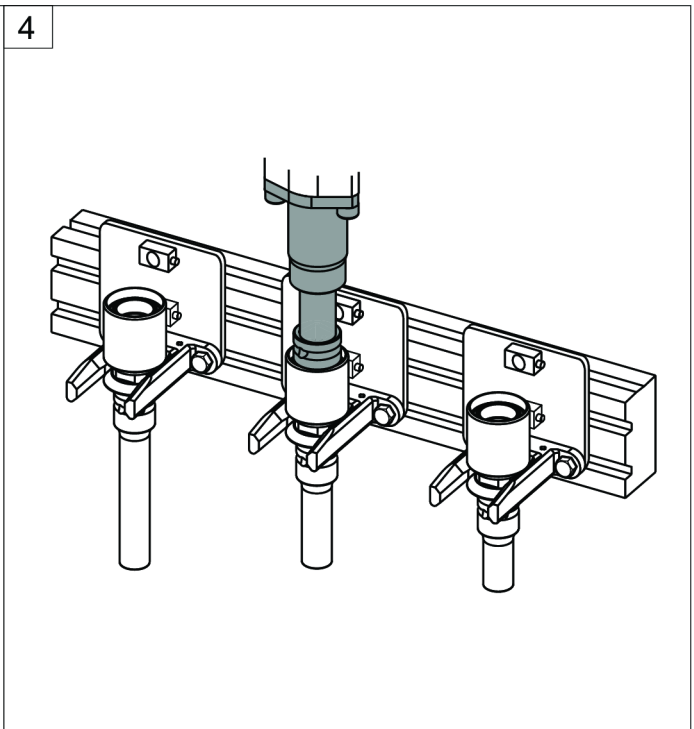
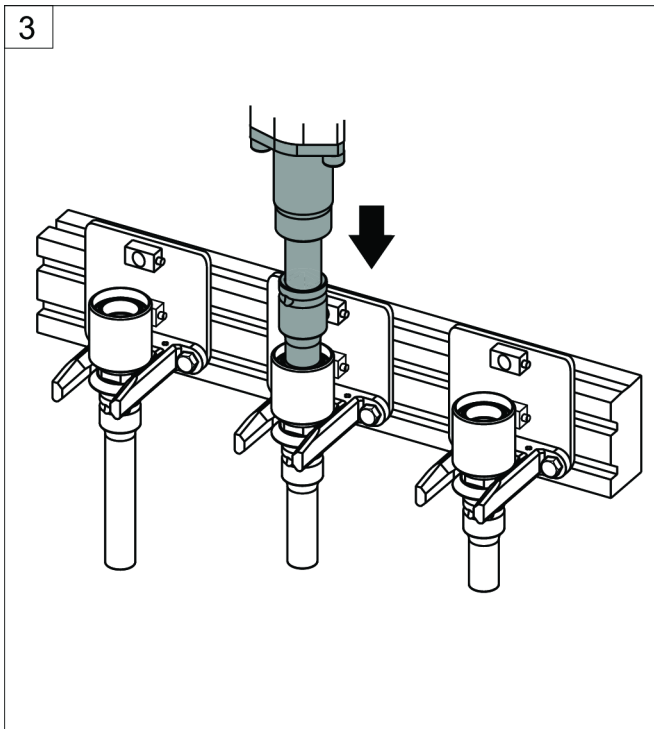


Pay attention to moving parts when operating the tool. Moving parts can pinch or crush and sharp objects can cause bodily injuries, especially to the hands.

- ▶ Keep hands and fingers away from moving parts.
 - ▶ Always wear protective gloves when changing components, making repairs or removing a blockage. Remove the protective gloves before starting the tool.
1. Check initial status. Before picking-up a socket or bit, make sure of that system is in its initial status.
 - Check that the socket changer is in position.
 - Check that no tool adapter is on the socket changer.
 - Check that the tightening trigger signal is released.
 - Check that no socket changer is on the tool adapter.
 2. Locate the tool adapter and find the socket changer.
 - Move the tool adapter with the robot arm (or other mechanisms like a gantry) to the top of desired socket or bit. See illustration 1.
 - Start the finding stage program on the controller and then move down the tool adapter to the socket changer. Use a program with a speed of 200 rpm and a large angle target like 3000 degrees, this will keep the tool running until the tool adapter is engaged and the tool will stop when the trigger is released. See illustration 2.
 - The tool adapter will engage the socket charger when moved down. The sensor 2 will receive a signal when the tool adapter is fully engaged and then the trigger can be released to stop the finding stage. See illustration 3.
 3. Leave the socket dock.
 - Move the tool adapter together with the socket or bit horizontally away from the dock. Now the socket or bit can be used in the tightening process. See illustration 4.



21977477003



21977480971

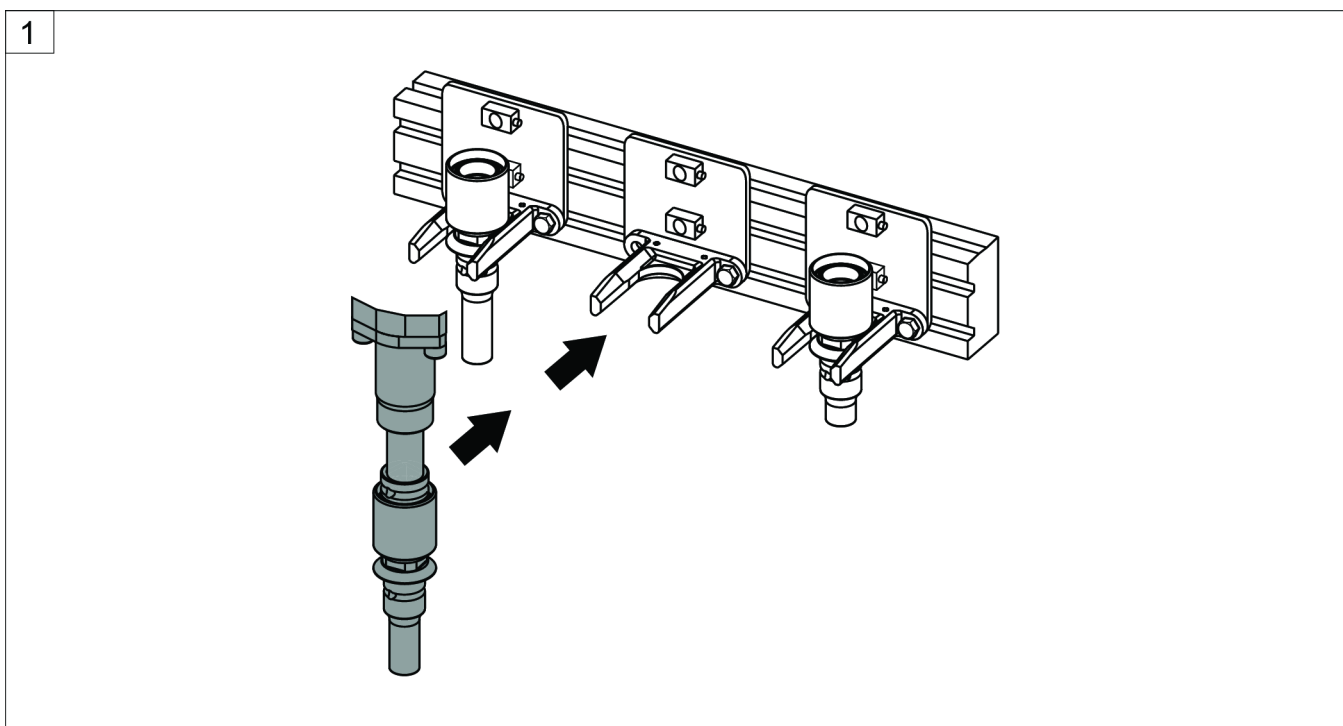
The Release Process

WARNING Crushing Hazard



Pay attention to moving parts when operating the tool. Moving parts can pinch or crush and sharp objects can cause bodily injuries, especially to the hands.

- ▶ Keep hands and fingers away from moving parts.
 - ▶ Always wear protective gloves when changing components, making repairs or removing a blockage. Remove the protective gloves before starting the tool.
1. Check initial status. Before releasing the socket changer, make sure of that system is in its initial status
 - Check that no socket changer in on the socket dock.
 - Check that the tightening trigger signal is released.
 - Check that there is a socket changer on the tool adapter.
 2. Locate the socket changer.
 - Move the socket changer with the tool adapter to the socket dock. When moved into the dock position, the outer ring on the socket changer will expand. This unlocks the connection to the tool adapter.
 - After arriving at the dock position, both sensors shall be ON, which means that the socket changer and the tool adapter are in position. These sensor signals can be used for the purpose of diagnosis in PLC/robot logic. See illustration 1.
 3. Tool adapter leave.
 - Move the tool adapter upwards with a robot arm. Since the tool adapter is already unlocked by the socket changer, it can now leave easily and go to the next socket changer.
 - Find a new socket or idle spot.
 - The release process is finished. A new process can now be started by picking-up a new socket.



21977484939

Service

Maintenance Instructions

Maintenance must be carried out by specialized personnel of the company that uses the equipment. For extraordinary maintenance, refer exclusively to Atlas Copco.

Recycling

Recycling Instructions

When a product has served its purpose it has to be recycled properly. Dismantle the product and recycle the components in accordance with the local legislation.

Original instructions



**Atlas Copco Industrial
Technique AB**
SE-10523 STOCKHOLM
Sweden
Telephone: +46 8 743 95 00
www.atlascopco.com

© Copyright 2022, Atlas Copco Industrial Technique AB. All rights reserved.
Any unauthorized use or copying of the contents or part thereof is prohibited.
This applies in particular to trademarks, model denominations, part numbers
and drawings. Use only authorized parts. Any damage or malfunction caused
by the use of unauthorized parts is not covered by Warranty or Product
Liability.

Out of respect to wildlife and nature, our technical literature is printed on
environmentally friendly paper.