Quick-Change System
SWS-001
Installation and Operating Manual
Imprint

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Dear customer,
congratulations on choosing a SCHUNK product. By choosing SCHUNK, you have opted for the highest precision, top quality and best service.
You are going to increase the process reliability of your production and achieve best machining results – to the customer's complete satisfaction.
SCHUNK products are inspiring.
Our detailed assembly and operation manual will support you.
Do you have further questions? You may contact us at any time – even after purchase.

Kindest Regards

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1 About this manual

This instruction is an integral part of the product and contains important information for a safe and proper assembly, commissioning, operation, maintenance and help for easier trouble shooting. Before using the product, read and note the instructions, especially the chapter "Basic safety notes".

1.1 Warnings

To make risks clear, the following signal words and symbols are used for safety notes.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Signal Word</th>
<th>Important Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚨 DANGER 🚨</td>
<td>Danger for persons.</td>
<td>Non-compliance will inevitably cause irreversible injury or death.</td>
</tr>
<tr>
<td>🚨 WARNING 🚨</td>
<td>Dangers for persons.</td>
<td>Ignoring a safety note like this can lead to irreversible injury and even death.</td>
</tr>
<tr>
<td>🚨 CAUTION 🚨</td>
<td>Dangers for persons.</td>
<td>Non-observance can cause minor injuries.</td>
</tr>
<tr>
<td>🚨 NOTICE 🚨</td>
<td>Material damage</td>
<td>Information about avoiding material damage.</td>
</tr>
</tbody>
</table>

1.2 Applicable documents

- General terms of business
- Catalog data sheet of the purchased product
- Assembly and Operating manuals of the accessories

The documents listed here, can be downloaded on our homepage [www.schunk.com](http://www.schunk.com)
2 Basic safety notes

2.1 Intended use

The produkt (SWS Quick-Change systems consisting of SWK Quick-Change Head and SWA Quick-Change Adapter) was designed for quick changing parts and automation components at a robot in context of the technical data.

The product is intended for installation in a machine/system. The requirements of the applicable guidelines must be observed and complied with.

The product may be used only in the context of its defined application parameters (☞ 4, Page 11).

The product is designed for industrial use.

To use this unit as intended, it is also essential to observe the technical data and installation and operation notes in this manual and to comply with the maintenance intervals.

2.2 Not intended use

Use which is not specified as an intended use is for instance when the product is for example used as a pressing tool, stamping tool, lifting tool, guide for tools, cutting tool, tensioning mean, boring tool.

2.3 Ambient conditions and operating conditions

- Make sure that the product has a sufficient size for the application.
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Exceptions are products that are designed especially for contaminated environments.
2.4 Product safety

Dangers arise from the product, if:

- the product is not used in accordance with its intended purpose.
- the product is not installed or maintained properly.
- the safety and installation notes are not observed.

Avoid any manner of working that may interfere with the function and operational safety of the product.

Wear protective equipment.

NOTE
More information are contained in the relevant chapters.

2.4.1 Protective equipment

Provide protective equipment per EC Machinery Directive.

2.4.2 Constructional changes, attachments, or modifications

Additional drill holes, threads, or attachments that are not offered as accessories by SCHUNK may be attached only with permission of SCHUNK.

2.5 Personnel qualification

The assembly, initial commissioning, maintenance, and repair of the product may be performed only by trained specialist personnel. Every person called upon by the operator to work on the product must have read and understood the complete assembly and operating manual, especially the chapter "Basic safety notes" (☞ 2, Page 6). This applies particularly to personnel only used occasionally, such as maintenance personnel.

2.6 Using personal protective equipment

When using this product, you must comply with the relevant health and safety at work rules and you must use the required personal safety equipment (minimum: category 2).
2.7 Notes on particular risks

Generally valid:

- Remove the energy supplies before installation, modification, maintenance, or adjustment work.
- Make sure that no residual energy remains in the system.
- Do not move parts by hand when the energy supply is connected.
- Do not reach into the open mechanism or the movement area of the unit.
- Perform maintenance, modifications, and additions outside the danger zone.
- Secure the product during all operations against uncontrolled activation.
- Take a precautionary approach by maintenance and disassembly.
- Only specially trained staff should disassemble the product.

⚠️ WARNING
Risk of injury from objects falling and being ejected

- The danger zone must be surrounded by a safety fence during operation.

⚠️ WARNING
Risk of injury when the machine/system moves unexpectedly.

⚠️ WARNING
Remove all temporary protective materials (caps, plugs, tape, etc.) on the locking face of Tool Changer and modules prior to operation.
Failure to do so will result in damage to Tool Changers, modules, and end-of-arm tooling and could cause injury to personnel.
**WARNING**

Injury or equipment damage can occur with power or air on.
- Do not perform maintenance or repair on Tool Changer or modules with power or air on.
- Turn off power and air before performing maintenance or repair on Tool Changer or modules.

**WARNING**

Failure to keep area clear will result in damage to Tool Changer, modules, or end-of-arm tooling and could cause injury to personnel.
- During operation, the area between the quick-change master SWK and quick-change tool SWA must be kept clear.

**WARNING**

Using the Tool Changer in applications other than intended will result in damage to Tool Changer, modules, or end-of-arm tooling and could cause injury to personnel.
- The Tool Changer is only to be used for intended applications and applications approved by the manufacturer.

**CAUTION**

The quick-change master SWK locking mechanism must not be actuated without being mounted to the robot interface plate. Damage to the Cover Plate and O-ring may result.
- Always attach the quick-change master SWK to the robot interface plate prior to attempting any operations.
3 Warranty

If the product is used as intended, the warranty is valid for 24 months from the date of delivery from the production facility under the following conditions:

• Intended use in 1-shift operation
• Observe the mandatory maintenance and lubrication intervals
• Observe the environmental and operating conditions

Parts touching the work piece and wear parts are not part of the warranty.
4 Technical Data

Specifications such as payload, moment capacity, repeatability, and weight for model can be found in the product catalog and on our website.

Drawings also can be found in the product catalog and on our website. 2-D and 3-D models are also available on our website.

Contact SCHUNK for specific information and drawings regarding your installation. We encourage you to use our service department to review your designs and answer your questions.

<table>
<thead>
<tr>
<th>SWK Quick-Change Head and SWA Quick-Change Adapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested Payload Limit</td>
</tr>
<tr>
<td>Operating Pressure Range</td>
</tr>
<tr>
<td>Coupling Force @ 5 bar</td>
</tr>
<tr>
<td>Static Moment Capacity: (x, y)</td>
</tr>
<tr>
<td>(z)</td>
</tr>
<tr>
<td>Positional Repeatability</td>
</tr>
<tr>
<td>Weight</td>
</tr>
<tr>
<td>Max. Recommended distance between SWK and SWA</td>
</tr>
</tbody>
</table>
5 Product Overview

The Tool Changer consists of two primary parts: The quick-change head SWK and the quick-change adapter SWA. The quick-change head is attached to a robot while end-effectors such as grippers, material handlers, etc. are attached to one or more quick-change adapter SWA.

The locking mechanism consists of a cam, alignment posts, and chrome-steel balls. Tapered pins located on the SWK mate with alignment locking posts in the SWA to ensure repeatable alignment during the coupling process. Extreme pressure grease is applied to the posts on the SWA to enhance performance and maximize the life of the locking mechanism.

The Tool Changer has four M5 integrated pneumatic only pass-through ports and is equipped with M5 elbow fittings for 6mm diameter tubing.

Both the SWK and the SWA have two mounting pockets that support optional modules for support of various utility pass-through connections. An electrical module E04 module provides four signal connections, providing the capability of up to eight signal connections to the Tool Changer.
5.1 SWK Quick-Change Head

The SWK quick-change head includes an anodized aluminum body, hardened stainless-steel locking mechanism and hardened steel alignment pins. The SWK is attached to the robot using four mounting holes for M3 flathead screws. The four M3 x 14 socket flathead cap screws are included with the Tool Changer.

The SWK is equipped with four M5 ports for pass-through air only and two M3 threaded ports for Lock and Unlock air. The four O-rings seal the pneumatic connection between the SWK and SWA. The Lock and Unlock air ports are equipped with M3 adjustable elbow fittings for 4mm diameter tubing. The SWK has two mounting pockets that support optional modules for electrical or other pass-through connections.
5.2 Quick-Change Adapter SWA

The SWA quick-change adapter is made of an anodized aluminum body. Harden stainless-steel alignment locking posts provide reliable and repeatable coupling of the SWA. An end-effector can be mounted with mounting holes on the bottom of the SWA.

The SWA is equipped with four M5 x 0.8 ports for pass through air only and is equipped with four M5 elbow fittings for 6mm diameter tubing. The SWA has two mounting pockets that support optional modules for electrical or other pass-through connections.

Grooves are provided for interfacing with an optional tool stand. A dowel pin on the SWA aligns with a pocket in the master plate to ensure proper coupling orientation.
6 Assembly

6.1 SWK Quick-Change Head Assembly

1. Clean the debris from the robot wrist and SWK mounting surface prior to installation.
2. Apply Loctite 222® to the four M3 x 14 socket flat head cap screws supplied.
3. Assemble SWK to robot wrist, align the four mounting holes in the SWK to the holes in the robot wrist and attach with the four M3 x 14 socket flat head cap screws. Torque to 0.8 Nm.
4. Pneumatic lines and electrical cables can be installed after the SWK is attached. The pneumatic lines and electrical cables must be bundled, and strain-relieved in a manner that allows for freedom of movement during operation (See 6.4, Page 20).

⚠️ CAUTION

Failure of some critical electrical and/or pneumatic lines to function properly may result in injury to personnel and equipment.

- All pneumatic fittings and tubing must be capable of withstanding the repetitive motions of the application without failing.
- The routing of electrical and pneumatic lines must minimize the possibility of stress pullout, kinking, rupture, etc.
6.2 SWA Quick-Change Adapter Assembly

1 Clean the debris from the end-effector and SWA mounting surfaces prior to installation.

2 The end-effector is attached to the SWA using the four M3 x 0.5 mounting holes with mounting fasteners supplied by the user. Removable thread locker (Loctite 222®) or fasteners with pre-applied adhesive should be used for all mounting fasteners.

**NOTICE**

Fasteners that extend beyond the mating surface will create a gap between the SWK and SWA and not allow the locking mechanism to fully engage. This could cause damage to the equipment.

- Make sure the mounting fasteners are flush or below the mating surface of the SWA.
- Do not use mounting fastener that extend beyond the SWA mating surface.

3 Pneumatic lines and electrical cables are attached, bundled, and must be strain-relieved in a manner that allows for freedom of movement during operation. For electrical cabling instructions: ([6.4, Page 20](#)).
6.3 Lock/Unlock Pneumatic Connections and Valving

**CAUTION**

Failure to use a 4-way valve and properly vent to atmosphere may cause the locking mechanism to operate incorrectly and may cause the Tool Changer to not lock or unlock as expected. This could result in damage to the product, attached tooling, or personnel.

Air must be supplied to the “Lock” air port on the SWK to move the internal piston, which moves the cam, and forces the locking balls outward. The locking balls move outward until they contact the alignment locking post on the mating SWA. This will rigidly engage the SWK and SWA providing high load capacity and positional accuracy. In a fail-safe condition the cam profile prevents the SWA from becoming disengaged in the event that there is a loss of air in the locked state. To unlock the SWA from the SWK, lock air must be vented and air supplied to the “Unlock” air port on the SWK.

6.3.1 Air Requirements

For proper operation of the Tool Changer, the SWK must be supplied with clean, dry, non-lubricated air supplied between 4.5 – 5.5 bar.

**NOTICE**

Possible damage to the locking mechanism could occur.

- Do not use the Tool Changer in the fail-safe condition for extended periods of time.
- Do not transport the Tool Changer in the fail-safe condition.
6.3.2 Valve Requirements and Connections

As with all pneumatic piston arrangements, smooth operation requires proper porting of the supplied and vented air. It is recommended that a single 4-way valve be used to actuate the locking mechanism in the SWK. The valve may be of either 4-port or 5-port configuration. It is imperative that when air is supplied to the Lock or Unlock Port on the SWK, that the opposite port be vented to atmosphere (i.e., when air is supplied to the Lock Port, the Unlock Port must be open to the atmosphere.) Failure to vent trapped air or vacuum on the inactive port will negate the locking force of the Tool Changer mechanism. The Lock and Unlock Ports are threaded for M3 connections.

**NOTICE**

The Tool Changer locking mechanism will not function properly when connected to a single 3-way valve as this type of valve is incapable of venting trapped air pressure from within the Tool Changer.

Connect the Lock and Unlock supply air to a single 4-way valve with either 4 or 5 port configuration.
### 6.3.3 Manual Uncouple SWK and SWA

It is possible to manually uncouple the SWK and SWA if air is completely lost. This is not standard procedure and should only be use when no other alternative is available.

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the tool is attached to the master it must be secured in the tool stand or in a location where the tool weight is supported before manually uncoupling. Use of manually uncoupling is restricted to contingency situations. Using the manual override will release the tool and may cause damage to equipment.</td>
</tr>
<tr>
<td>• Do not manually uncouple the SWK and SWA if the tool is not secured.</td>
</tr>
</tbody>
</table>

Manual Uncouple Master and Tool Plates

1. Remove the Unlock air tubing.
2. Unscrew the M3 elbow fitting from the SWK.
3. Using a 1.5mm Ball end Allen wrench, insert it through the Unlock air port and push the locking piston to the unlocked position.
4. Separate the SWA from the SWK, supporting the SWA and tool if attached.
6.4 Wiring and Electrical Connections for Optional Modules

1. Both the SWK and SWA have removable optional modules for electrical pass-through connections. The electrical connections have to be soldered to the connection pins.

2. Remove the M2 screw from the optional module using a 1.5mm Allen wrench.

3. Remove the optional module from the SWK or SWA.

4. Strip the wire the same length as the notch in the pin.

5. Slide a piece of heat shrink tubing over the wire.

6. Solder the wire to the pin.
7 Slide the heat shrink tubing over the soldered connections and apply heat using a heat gun until the heat shrink restricts tightly over the connection.

8 Repeat this for all the connections.

9 Replace the optional module to the SWK or SWA and secure with the M2 screw using a 1.5mm Allen Wrench. Torque to approximately 0.24 Nm.
### 7 Operational Considerations

The SWK locking mechanism is pneumatically driven to couple and uncouple with the alignment Locking Posts on the SWA. The SWK utilizes air ports to provide Lock and Unlock pressure to the locking mechanism.

<table>
<thead>
<tr>
<th><strong>WARNING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>During operation, the area between the SWK and SWA must be kept clear.</td>
</tr>
<tr>
<td>Failure to keep area clear will result in damage to Tool Changer, modules, or end-of-arm tooling and could cause injury to personnel.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe, reliable operation of the Tool Changer is dependent on a continuous supply of compressed air at a pressure of 4.5 - 5.5 bar.</td>
</tr>
<tr>
<td>Robot motion should be halted if the air supply pressure drops below 4 bar for any reason.</td>
</tr>
</tbody>
</table>

#### 7.1 Coupling Sequence

<table>
<thead>
<tr>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Before attempting to couple or uncouple, ensure that pass-through air pressure and electrical signals are off.</td>
</tr>
<tr>
<td>Equipment could be damaged if air pressure and electrical signals are not turned off.</td>
</tr>
</tbody>
</table>

1. Prior to coupling and with air supplied to the Unlock Port, position the SWK above the SWA.

2. Move the SWK toward the SWA so that the two SWA alignment locking posts enter the alignment holes on the SWK. **Note:** Take care to program the robot so that the SWK and SWA are aligned axially and are parallel to each other as close-ly as possible. This will minimize tool movement and subsequent wear during lock-up. **Note:** Make sure the visual alignment indicators on the SWK and the SWA are aligned properly before coupling to ensure proper orientation.
When the two faces are within the specified No-Touch™ distance, release the pressure from the Unlock Port and supply air to the Lock Port

**Note:** The SWA will be drawn toward the SWK and coupled. Air must be maintained on the Lock Port during operation to assure rigid coupling.

A sufficient delay must be programmed between locking valve actuation and robot motion so that the locking process is complete before moving the robot.

The fail-safe design prevents the SWA from being released in the event of air-pressure loss to the Lock Port, thereby increasing safety and reliability. Positional accuracy may not be maintained during air loss, but will be regained once air pressure is re-established to the Lock Port.

### 7.2 Uncoupling Sequence

1. Position the SWA in the Tool Stand such that there is little or no contact force between the SWA and Tool Stand.
2. Release air on the Lock Port and apply air to the Unlock Port. **NOTICE!** The air will cause the locking mechanism to be released and the weight of the SWA and attached tooling will assist in its removal. Tool weight assists in uncoupling if the Tool is released in the vertical position only.
3. Move the SWK axially away from the SWA.
4. A sufficient delay must be programmed between unlocking valve actuation and robot motion so that the unlocking process is complete and the SWA is fully released before moving the robot.
7.3 Tool Stand Design

**NOTICE**

During coupling and lock-up, the Tool Stand must allow for movement (float) in a plane parallel to the mating surfaces of the SWK and SWA, and in a direction perpendicular to this plane, towards the SWK.

In most cases, the Tools are stored in a Tool Stand when not being used by the robot. During coupling and lock-up, the Tool Stand must allow for movement (float) in a plane parallel with the mating surfaces of the SWK and SWA (X and Y), and also in a direction towards the SWK (Z). Even slight misalignment between the SWK and SWA can generate high forces during lock-up if the SWA is not allowed to float into place during lock-up. These high forces can cause excessive wear and even jamming of the end-effector and robot. The degree of float required depends on the accuracy of the robot’s positioning and the repeatability of the Tool location in the Tool Stand during lock-up. See the following figure and table for recommended maximum allowable float (offsets) prior to coupling. The Tool Stand should be designed to minimize misalignment during coupling and uncoupling. In some cases, greater offsets than shown in the following table can be accommodated by the SWK and the SWA, but will increase wear. Ideally, the Tool should be hanging vertically in the Tool Stand so that gravity acts to uncouple the SWA from the SWK during unlocking. It is possible to design Tool Stands that hold Tools in the horizontal position, but care must be taken that the necessary compliance is provided during coupling and uncoupling. In general, “horizontal-position” SWA cause more wear on the locking mechanism and locating features of the Tool and Tool Stand. Lock-up should occur with the SWK in the No-Touch™ locking zone (see the following table), but not touching the SWA. When air is supplied to the lock port, the SWK should draw the SWA into the locked position.
**NOTICE**

Tool Stand design is critical to proper operation of the Tool Changer. Improperly designed Tool Stands can cause misalignments that will cause jamming and/or excessive wear of Tool Changer components. Improperly designed Tool Stands can cause misalignments that will cause jamming and/or excessive wear of Tool Changer components.

Tool Stands may also need to incorporate means for covering Tools and electrical modules to protect them in dirty environments, such as grinding or welding.

---

**Offset Prior to Coupling**

<table>
<thead>
<tr>
<th>No-Touch Zone Z Offset (Max)* (mm)</th>
<th>X and Y Offset (Max)** (mm)</th>
<th>Cocking Offset (Max) (degrees)</th>
<th>Twisting Offset (Max) (degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+1</td>
<td>±1</td>
<td>±0.7</td>
<td>±3</td>
</tr>
</tbody>
</table>

* Maximum values shown. Decreasing actual values will minimize wear during coupling/uncoupling.

** Actual allowable values may be higher in some cases, but higher offsets will increase wear during coupling.
7.3.1 Tool Locating Features

The Tool must be positively located in the Tool Stand. A variety of methods may be used to accomplish this. Whatever method is chosen, it is important that the required compliance or “float” be built into the locating system. Other Tool locating feature methods include balls and detents, dowel pins in notched V-grooves, etc. Please consult SCHUNK for recommendations or assistance with locating feature design for your particular tooling. Cylindrical (not tapered) dowel pins should not be used as they provide too much surface engagement. During coupling and uncoupling, the Tool can bind on these straight (cylindrical) pins due to misalignment of the SWK and the SWA. Robot programming and locational repeatability are important in Tool pick-up and drop-off.

7.3.2 Tool Stands Sensors

It is suggested that the customer provide a sensor that detects the presence of a properly seated Tool in the Tool Stand. The sensor may be used prior to coupling to ensure there is a Tool properly seated in the stand. Sensors may also be used as the robot starts to move away after uncoupling. This provides a fail-safe measure in the event that a Tool should become jammed in the stand or if the Tool should fail to release properly from the robot. Proximity sensors should be located so that the sensing face is vertical to prevent swarf or other debris from falling on the sensor and creating false readings.
8 Maintenance

General Under normal conditions, no special maintenance is necessary, however it is recommended that periodic inspections be performed to assure long-lasting performance and to assure that unexpected damage has not occurred. For a schedule and items that should be visually inspected at regular intervals (8.1, Page 27).

Spare parts are available from SCHUNK. Please call for recommendations.

NOTICE The cleanliness of the work environment strongly influences the trouble-free operation of the changer. The dirtier the environment, the greater the need for protection against debris. Protection of the entire End of Arm Tooling, the SWK, the SWA and all of the modules may be necessary. Protective measures include the following:

• Placement of Tools Stands away from debris generators.
• Covers incorporated into the Tool Stands, guards, deflectors, air curtains, and similar devices the End of Arm Tooling and the Tool Stand Design.

8.1 Preventive Maintenance

The Tool Changer and optional modules are designed to provide a long life with regular maintenance. A visual inspection and preventive maintenance schedule is provided in the following Table below depending upon the application. Assembly details are provided in (11, Page 35) of this manual.

Preventative Maintenance Checklist

<table>
<thead>
<tr>
<th>Application(s)</th>
<th>Tool Change Frequency</th>
<th>Inspection Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Usage, Material Handling, Docking Station</td>
<td>More than 1 per minute</td>
<td>Weekly</td>
</tr>
<tr>
<td></td>
<td>Less than 1 per minute</td>
<td>Monthly</td>
</tr>
<tr>
<td>Wet or Humid Environments</td>
<td>All</td>
<td>Weekly</td>
</tr>
<tr>
<td>Welding/Servo/Deburring, Foundry Operations (Dirty Environments)</td>
<td>All</td>
<td>Weekly</td>
</tr>
</tbody>
</table>
## Locking Mechanism

**NOTE**

Locking mechanism components are subject to corrosion from water. If these components get wet, they must be dried and greased immediately.

- Inspect and lubricate Locking Mechanism (Alignment locking posts). Over time lubricants can become contaminated with process debris. Therefore, it is recommended to thoroughly clean the existing grease and replace with new as needed ([Sec. 8.2, Page 29](#)).
- Inspect alignment locking posts for wear. Excessive wear may be an indication of poor robot position during pickup/drop-off. Adjust robot position as needed.
- Inspect alignment locking post ball sockets race for wear. Wear on the ball sockets could be an indication of excessive loading.

## Mounting Fasteners

- Inspect mounting fasteners, verify they are tight and have the proper torque.

## Interface Connections

- Inspect pneumatic connections for cuts in hoses, abrasions, or wear. If signs of wear are apparent, tighten connections and secure lines so that they allow freedom of movement during operation and do not rub or obstruct other components.
- Inspect electrical cables for cuts, abrasions, or wear. If signs of wear are apparent, check connections and secure cables so that they allow freedom of movement during operation and do not rub or obstruct other components.

## Rubber O-rings

- Inspect for wear, abrasion, and cuts. If worn or damaged, replace ([Sec. 8.3, Page 30](#)).

## Electrical Contacts

- Clear debris from area of the contacts using compressed air. Do not directly clean contacts as abrasion may occur and the performance of the contact may be compromised.
- Inspect electrical contacts for wear or damage ([Sec. 8.4, Page 31](#)).
### 8.2 Cleaning and Lubrication of the Locking Mechanism

1. The locking mechanism must be in the Unlock state before cleaning.

2. Use a clean rag to thoroughly remove the existing lubricant and debris from the outer surface of the alignment locking posts on the SWA. Clean the inner surfaces and ball sockets of the alignment locking posts by pushing the rag through in the narrow passages with a small shaft.

3. Clean the inner surfaces, balls, and alignment pins of the SWK by pushing the rag into the narrow socket with a small shaft.

4. Apply a moderate coating of lubricant to the alignment locking posts inside and out.
5 No application of lubrication is necessary on the SWK components.

8.3 Rubber O-ring Inspection and Replacement

1 The rubber O-ring seals the air passage from the SWK to the SWA. If the O-rings become cut or damaged they need to be replaced.

2 Remove damaged rubber O-ring by pinching with finger tips or prying with finger nail and pulling the O-ring out of the body.

3 Dip new O-ring in water to aid in installation.

4 Insert the rubber O-ring into the bore.

5 Press the O-ring in by hand until it is seated completely in the bore.
8.4 Spring Pin Replacement

Replacing spring pins may be necessary if they become damaged or worn. The following procedure describes the replacement of the spring pins.

Spring Pin Removal

1. Using your finger nails, catch the spring pin under the head.
2. Gently and evenly pull the spring pin out until it clears the pin block. Gently and evenly pull the spring pin out until it clears the pin block.

Spring Pin Insertion

3. Start new spring pin into the pin block by hand.

**NOTICE**

Use of excessive force can cause socket to move in pin block and damage pin block assembly.

This may require the replacement of entire pin block assembly.

- Gently push spring pin into the block until you feel a click.
- Do not use excessive force to push spring pin into pin socket.
4 Using the Pin pusher tool gently push the pin into the block until you feel a click. 

**NOTICE! The pin socket has two sets of dimples that the spring pin will click into.**

5 Check to see if the spring pin is at the proper height by comparing it to other original spring pins. If not continue to push the pin into the block until you feel a click or the pin is at the proper height.
9 Troubleshooting

The system contains few components and provides trouble-free operation once properly installed. The following table is provided to assist with troubleshooting the system.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Tool Changer is not operating properly check the following conditions prior to any further troubleshooting.</td>
<td>Pneumatic connections incorrect or air supplied is insufficient.</td>
<td>Ensure that the Tool Changer has proper pneumatic connections and air is supplied at a minimum of 4.5 bar. ([6.3, Page 17])</td>
</tr>
<tr>
<td></td>
<td>Air or vacuum trapped in a de-energized Lock or Unlock port or incorrect valve type.</td>
<td>Ensure that no air or vacuum can be trapped in a de-energized Lock or Unlock Port and 4 way type valve is used (pressure must be vented to atmosphere). ([6.3, Page 17])</td>
</tr>
<tr>
<td>SWK will not Lock or Unlock to Tool (locking piston does not move)</td>
<td>SWK and SWA not within specified No-Touch distance.</td>
<td>Adjust position to be within specified No-Touch distance. ([7.3, Page 24])</td>
</tr>
<tr>
<td></td>
<td>Debris caught between SWK and SWA</td>
<td>Inspect and remove any debris between SWK and SWA and retry.</td>
</tr>
<tr>
<td>Unlock switch fails to operate.</td>
<td>Air supplied to Unlock (U) port is insufficient.</td>
<td>Ensure that air is supplied at a minimum of 4.5 bar to the Tool Changer Unlock (U) port. ([6.3, Page 17])</td>
</tr>
<tr>
<td></td>
<td>Air or vacuum trapped in a Lock (L) air port.</td>
<td>Ensure that the SWK cam is fully retracted and that there is no air trapped in the Lock (L) air port.</td>
</tr>
</tbody>
</table>
## 10 Recommended Spare Parts

<table>
<thead>
<tr>
<th>Assembly</th>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWK</td>
<td>0302290</td>
<td>SWK-001-000-000</td>
</tr>
<tr>
<td>SWA</td>
<td>0302291</td>
<td>SWA-001-000-000</td>
</tr>
<tr>
<td><strong>Electrical modules</strong></td>
<td>9960359</td>
<td>Electrical Module, E04-K, 4-Pin, 3Amp/50VAC Master</td>
</tr>
<tr>
<td></td>
<td>9960360</td>
<td>Electrical Module, E04-A, 4-Pin, 3Amp/50VAC Tool</td>
</tr>
</tbody>
</table>
11 Drawings

11.1 Tool Changer

Notes:
1. SWS-001 is designed for extremely light payloads.
2. Optional Ed Electrical Modules shown. Total 8 pins @ 3 Amp @ 50 VAC. Electrical connections not shown for clarity. Wires attached will require additional clearance.
3. Electrical connections not shown for clarity. Wires attached will require additional clearance.
4. Master Plate can be handled with the Unload Tooling in the holding position when using a 020 mF capacitor, until Unlocking Mechanism is activated.
5. Dowel and grooves serve as an interface for an optional Tool Tooling.

SWS-001 Tool Changer
Quick-change head SWK-001
quick change adapter SWA-001
11.2 E04 Electrical Module

Notes:
1. The E04 is a customer configurable 4-pin module designed to fit the SWS-301.
2. Provides gold plated contacts with solder connections in a miniature size. Contacts are rated at 3A/60V.
3. Maximum recommended wire gauge is Ø 0.3 mm.
12 Translation of original declaration of incorporation


Manufacturer/Distributor: SCHUNK GmbH & Co. KG Spann- und Greiftechnik
                      Bahnhofstr. 106 – 134
                      D-74348 Lauffen/Neckar

We hereby declare that on the date of the declaration the following incomplete machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

Product designation: Quick-Change / SWS-001 / pneumatic

ID number

The incomplete machine may not be put into operation until conformity of the machine into which the incomplete machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery to state offices.

The special technical documents according to Appendix VII, Part B belonging to the incomplete machine have been compiled.

Person authorized to compile the technical documentation:
Robert Leuthner, Address: see manufacturer's address

Signature – see original declaration

Lauffen/Neckar, July 2015

p.p. Ralf Winkler,
Head of Gripping Systems Development