Joining tool for attaching small to medium-sized workpieces. The tool can be used in both clean and dirty environments. The quick-change system means that it can be used alternately with other tools on the robot flange.

**Application example**

1. DPZ-plus 100 3-Finger Centric Gripper
2. FUS-213C Insertion Unit
3. SWS-041 Quick-change System
Quick-change System

Pneumatic tool changing system with patented locking system

Area of application

Can be used wherever short changeover times between a handling device and a tool (gripper, electrode holder) are required

Your advantages and benefits

Complete series with 15 sizes
for an optimum selection of sizes and a wide range of applications

Patented self-retaining locking system
for a safe connection between the quick-change head and the quick-change adapter

Drive incorporated into the housing
for compact dimensions and fewer interfering contours

All functional components made from hardened steel
for a greater change system load bearing capacity

Wide range of cable connectors
for universal energy transmission options

Integrated air feed-through
for safe energy supply to the handling modules and tools

Transmission options for other media
with optional self-sealing couplings

Adapter coding
possible via plug connection

Storage racks to fit all sizes
available as an accessory for reliable positioning of your tools

ISO flange
for easy attachment to most types of robots without additional adapter plates

General information on the series

Working principle
Piston-activated locking bearings

Material
Housing made from high-strength, hard-coated aluminum, functional components made from hardened steel

Actuation
Pneumatic, with filtered compressed air (10 µm): dry or lubricated

Operating pressure range
From 4.5 bar to 6 bar

Maintenance
Prelubricated – relubrication recommended after 2 million cycles

Ambient temperature
From 5 °C to 60 °C

Energy transmission
Variable via attachment modules, depending on the type

Monitoring for the locking mechanism
via inductive proximity switches, depending on the size

Self-locking
Mechanical when locking

Warranty
24 months
Function description

Automatic changing of the robot tool (e.g. gripper, vacuum lifting devices, pneumatically or electrically driven tools, electrode holders etc.) increases the flexibility of your robot.

The quick-change system (SWS) consists of a quick-change head (SWK) and a quick-change adapter (SWA). The SWK, mounted onto the robot, couples up the SWA mounted onto your tool. A pneumatically driven locking piston, with its patented design, ensures that the connection is secure. After coupling, pneumatic and electric feed-throughs automatically supply your robot tool.
Use in extreme ambient conditions

Please note that use in extreme ambient conditions (e.g. in the coolant zone, in the presence of abrasive dust) can significantly reduce the life span of these units and we cannot accept any liability for this reduction. However, in many cases we have a solution at hand. Please ask for details.

For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question.

General information on the series

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

SIP sensor interface plate

Storage racks

Cable connectors

Electronic modules

Accessories

www.schunk.com
Detailed function description

**SWK - SWA before locking**

- Piston
- Locking piston
- No-Touch-Locking™
  (no robot pressure force needed when locking)
- Hardened steel insert

**Locked position**

- When the piston is actuated the locking balls are pushed under the hardened steel ring and the adapter is pulled onto the head.

**SWK - SWA when locked**

- Locking piston on the second locking piston bevel
- First locking bevel

**In the event of a drop in air pressure, the locking piston is held by the cylindrical part of the locking piston. The piston seal friction prevents the piston from moving due to its own weight or because of vibrations. The head and the adapter can only be separated by pneumatic actuation of the piston.**

**SWK - SWA in self-locking position**

- Locking ball on the cylindrical part of the locking piston. Compressed air is needed to detach it.
Selecting the quick-change system

1. Size selection
   a. Simple size determination
      If the change system is subject to very low forces and moments you can select the quick-change head on the basis of the maximum payload.
      Choose a quick-change system which has a maximum payload larger than the useful load of your robot.
      Choose the accurate method if the change system is subject to higher moments.
   b. The accurate method
      Selecting the correct quick-change system depends on the moment load which the system is subject to.
      Proceed as follows to calculate the maximum moments.
      - Determine the center of gravity and the weight (m in Newtons) of your heaviest tool (gripper, adapter plate and tool)
      - Determine the distance (D in meters) from the center of gravity to the underside of the quick-change adapter (SWA)
      - Calculate the static moment (m x D)
      - Select a quick-change system with a permissible moment that is equal to or greater than the moment you have calculated

   Robot movements can also have an effect on the change system. Dynamic moments can come into effect which are 2 - 3 times greater than the static moments you have calculated. The SWS quick-change systems are designed for handling dynamic moments which can be up to three times greater than the static moments.

2. Pneumatics and electrics
   Determine the number and sizes of the pneumatic and electric feed-throughs.

3. Temperature and chemicals
   Nitrile seals on the quick-change units ensure optimum air feed-through. Buna N O-rings seal the piston chamber very effectively.
   Both materials are resistant to many chemicals and are suited to temperatures between 5 °C and 60 °C.

SWS sizes at a glance

<table>
<thead>
<tr>
<th>Designation</th>
<th>SWS-005</th>
<th>SWS-011</th>
<th>SWS-020</th>
<th>SWS-021</th>
<th>SWS-040</th>
<th>SWS-041</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended handling weight (kg)</td>
<td>8</td>
<td>16</td>
<td>25</td>
<td>25</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Locking force at 5.5 bar (N)</td>
<td>690</td>
<td>1068</td>
<td>2314</td>
<td>2314</td>
<td>4540</td>
<td>4540</td>
</tr>
<tr>
<td>Static moment Mx and My (Nm)</td>
<td>12.5</td>
<td>25</td>
<td>56.5</td>
<td>56.5</td>
<td>157</td>
<td>157</td>
</tr>
<tr>
<td>Static moment My (Nm)</td>
<td>17</td>
<td>34</td>
<td>78</td>
<td>78</td>
<td>216</td>
<td>216</td>
</tr>
<tr>
<td>Pneumatic feed-through</td>
<td>6x M5</td>
<td>6x M5</td>
<td>12x M5</td>
<td>8x G 1/8&quot;</td>
<td>8x G 1/8&quot;</td>
<td>6x G 3/8&quot;</td>
</tr>
<tr>
<td>Air connections, locked and unlocked</td>
<td>M5</td>
<td>M5</td>
<td>M5</td>
<td>M5</td>
<td>G 1/8&quot;</td>
<td>G 1/8&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Designation</th>
<th>SWS-060</th>
<th>SWS-071</th>
<th>SWS-110</th>
<th>SWS-150</th>
<th>SWS-300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended handling weight (kg)</td>
<td>75</td>
<td>79</td>
<td>150</td>
<td>200</td>
<td>455</td>
</tr>
<tr>
<td>Locking force at 5.5 bar (N)</td>
<td>7387</td>
<td>8075</td>
<td>12149</td>
<td>16109</td>
<td>35333</td>
</tr>
<tr>
<td>Static moment Mx and My (Nm)</td>
<td>197</td>
<td>395</td>
<td>784</td>
<td>1356</td>
<td>3870</td>
</tr>
<tr>
<td>Static moment My (Nm)</td>
<td>294</td>
<td>395</td>
<td>784</td>
<td>1130</td>
<td>2825</td>
</tr>
<tr>
<td>Pneumatic feed-through</td>
<td>8x G 1/8&quot;</td>
<td>8x G 1/4&quot;</td>
<td>8x G 3/8&quot;</td>
<td>10x G 3/8&quot;</td>
<td>10x G 3/8&quot;</td>
</tr>
<tr>
<td>Air connections, locked and unlocked</td>
<td>G 1/8&quot;</td>
<td>G 1/8&quot;</td>
<td>G 1/8&quot;</td>
<td>G 1/8&quot;</td>
<td>G 1/4&quot;</td>
</tr>
</tbody>
</table>
## Technical data

<table>
<thead>
<tr>
<th>Designation</th>
<th>SWS-300</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum payload</td>
<td>455 kg</td>
<td>A larger payload is possible with smaller moments</td>
</tr>
<tr>
<td>Static moment load Mx</td>
<td>3870 Nm</td>
<td></td>
</tr>
<tr>
<td>Static moment load My</td>
<td>3870 Nm</td>
<td></td>
</tr>
<tr>
<td>Dynamic moment load Mx</td>
<td>11610 Nm</td>
<td></td>
</tr>
<tr>
<td>Dynamic moment load My</td>
<td>2825 Nm</td>
<td></td>
</tr>
<tr>
<td>Static moment load Mz</td>
<td>8475 Nm</td>
<td></td>
</tr>
<tr>
<td>Static moment load Mz</td>
<td>3870 Nm</td>
<td></td>
</tr>
<tr>
<td>Locking force (at 6 bar)</td>
<td>35333 N</td>
<td>In the event of higher tensile forces the system “falls” into the self-locking position</td>
</tr>
<tr>
<td>Repeat accuracy</td>
<td>0.015 mm</td>
<td>Tested at 1 million cycles</td>
</tr>
<tr>
<td>Weight</td>
<td>19.1 kg</td>
<td>11.8 kg head; 7.3 kg adapter</td>
</tr>
<tr>
<td>Min./max. distance on locking</td>
<td>10 mm</td>
<td>No-Touch-Locking™ technology allows the parts to be coupled without the head and the adapter touching</td>
</tr>
</tbody>
</table>

### Information on moment load

Selecting the correct quick-change system depends on the moment load which the system is subject to.

1. Determine the center of gravity and the weight (m in Newtons) of your heaviest tool (gripper, adapter plate and tool)
2. Determine the distance (D in meters) from the center of gravity to the underside of the quick-change adapter (SWA)
3. Calculate the static moment (m x D)
4. Select a quick-change system with a permissible moment that is equal to or greater than the moment you have calculated

Robot movements can also have an effect on the change system. Dynamic moments can come into effect which are 2 - 3 times greater than the static moments you have calculated. The SWS quick-change systems are designed for handling dynamic moments which can be up to three times greater than the static moments.

### Moment load

- Mx max. 3870 Nm
- My max. 3870 Nm
- Mz max. 2825 Nm

### Product description

- **Integrated electric module with five feed-throughs**
- **Integrated sensor for presence monitoring**
  - The sensor issues a signal when there is a distance of 1.5 mm between the head and the adapter.
- **No-Touch-Locking™**
  - Latching without touching. Ensures that the SWS is securely locked even when the SWK and SWA do not touch. A maximum distance of 10 mm is possible.
- **Patented, self-retaining locking system**
  - A larger piston diameter and the OD locking mechanism increase the permissible moment load.
- **Air feed-through with specially developed rubber seals**

### Patent, self-retaining locking system

A larger piston diameter and the OD locking mechanism increase the permissible moment load.
Main views

The drawing shows the quick-change system in the basic version, the dimensions do not include the options described below.

Electrical options

<table>
<thead>
<tr>
<th>Designation</th>
<th>Detailed data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>R19</td>
<td>See “SWS options” chapter</td>
</tr>
<tr>
<td>R26</td>
<td>See “SWS options” chapter</td>
</tr>
<tr>
<td>G19</td>
<td>See “SWS options” chapter</td>
</tr>
<tr>
<td>G26</td>
<td>See “SWS options” chapter</td>
</tr>
<tr>
<td>MT8</td>
<td>See “SWS options” chapter</td>
</tr>
<tr>
<td>MT14</td>
<td>See “SWS options” chapter</td>
</tr>
</tbody>
</table>

* 250 VAC grounding done by customer
* * 500 VAC grounding done by customer

How to order (example)

Option B: SWK-300-000-000 (SWK-300, head side, no option)
Option A: (SWA-300, adapter plate side, with MT8 option)

K = head
A = adapter

SWS-300-MT8-000
(SWA-300, head side, with MT8 option)

SWS-300-R19-F02
(SWA-300, head side, with R19 option and F02 option)
SWS-300
Tool Changing · Quick-change System · Medium Load

Typical set-up on the robot

1. Adapter plate on ISO flange
2. Quick-change head SWK
3. Quick-change adapter SWA
4. Option 1: Electric modules (e.g. R19)
5. Cable connector for option 1
6. Option 2

Quick-change connector R19

Option: Miniature quick-change connector with protected contact and splash-proof contact pins (5 Amp/250 VAC per pin). With tool coding as an option.
R19 = 19-pin

Designation ID Fits Description
R19 head 9935815 SWK 19 pins, 5 Amp/250 VAC* E option with miniature quick-change connector
R19 adapter 9935816 SWA 19 pins, 5 Amp/250 VAC* E option with miniature quick-change connector
R14 adapter 9935100 SWA tool coding 0-9 tools, 5 Amp/250 VAC* 14 pins can be used by customer – see drawing, fits R19 head
R10 adapter 9941385 SWA tool coding 0-99 tools, 5 Amp/250 VAC* 10 pins can be used by customer – see drawing, fits R19 head

* 250 VAC grounding done by customer

Cable connectors

Cable connector for the connection between the R19 module and the cable

<table>
<thead>
<tr>
<th>Cable connectors for</th>
<th>ID</th>
<th>Designation</th>
<th>ID</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>R19; R14; R10 adapter</td>
<td>0301240</td>
<td>KAS-19B-A0</td>
<td>0301248</td>
<td>KAS-19B-A90</td>
</tr>
<tr>
<td></td>
<td>0301241</td>
<td>KAS-19B-A0</td>
<td>0301249</td>
<td>KAS-19B-A90</td>
</tr>
</tbody>
</table>

Design information for adapter plate

2. Tool-side connection

Adapter design recommendation. An adapter is required to seal the piston chamber.
Standard adapter plates for ISO flanges

Adapter plate A125
For mounting the SWK-300 directly to a flange in accordance with ISO 9409-1-125-6-M10

<table>
<thead>
<tr>
<th>Designation</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-SWK-300/ISO-A-125</td>
<td>0302215</td>
</tr>
</tbody>
</table>

Adapter plate A160
For mounting the SWK-300 directly to a flange in accordance with ISO 9409-1-160-6-M10/ISO 9409-1-160-11-M12

<table>
<thead>
<tr>
<th>Designation</th>
<th>ID</th>
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</thead>
<tbody>
<tr>
<td>A-SWK-300/ISO-A-160</td>
<td>0302216</td>
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</tbody>
</table>

Adapter plate A200
For mounting the SWK-300 directly to a flange in accordance with ISO 9409-1-200-6-M12/ISO 9409-1-200-12-M16

<table>
<thead>
<tr>
<th>Designation</th>
<th>ID</th>
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</thead>
<tbody>
<tr>
<td>A-SWK-300/ISO-A-200</td>
<td>0302217</td>
</tr>
</tbody>
</table>
Typical set-up on the robot

when using the SIP piston stroke control

1. Adapter plate on ISO flange
2. SIP piston stroke control
3. Proximity switch
4. Quick-change head SWK
5. Quick-change adapter SWA
6. Option 1 (example: R19)
7. Cable connector (KAS) for option 1
8. Option 2

Mode of operation of the SIP

Locked

1. Sensor for locked (INW 80/S 0301508 or 0301408)
2. Sensor target

Unlocked

1. Sensor for unlocked (INW 80/S 0301508 or 0301408)
2. Sensor target

Using the piston stroke control it is possible to monitor the locked and unlocked position of the quick-change head by means of inductive proximity switches.

Minimum height of adapter plate for SIP-300

The drawing shows the minimum height of the adapter plate needed for installing a piston stroke control.

1. Suitable adapter plates for ISO flanges available on request.

Proximity switch installation position

Inductive proximity switch

<table>
<thead>
<tr>
<th>Designation</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>INW 80/S-M12</td>
<td>0301508</td>
</tr>
<tr>
<td>INW 80/S-M8</td>
<td>0301408</td>
</tr>
</tbody>
</table>

Inductive proximity switch in conjunction with R19-W

<table>
<thead>
<tr>
<th>Designation</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>INC 80/S-M8</td>
<td>0301475</td>
</tr>
</tbody>
</table>
Electronic module R19-W

With connector option for proximity switch

The piston stroke control proximity switches can be monitored via the R19-W electronic module. In order to do this, the cables are connected directly to the module.

<table>
<thead>
<tr>
<th>Designation</th>
<th>ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R19-W</td>
<td>9942041</td>
<td>19 pins 5 A/250 VAC*, 15 are free and 4 pins are needed for the proximity switches</td>
</tr>
</tbody>
</table>

* 250 VAC grounding done by customer

Option also available for other electronic modules