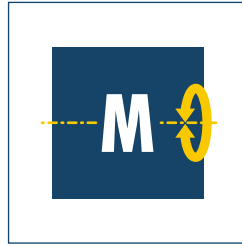




**Sizes**  
005 .. 602



**Handling weight**  
up to 1000 kg



**Moment load  $M_x$**   
up to 13000 Nm

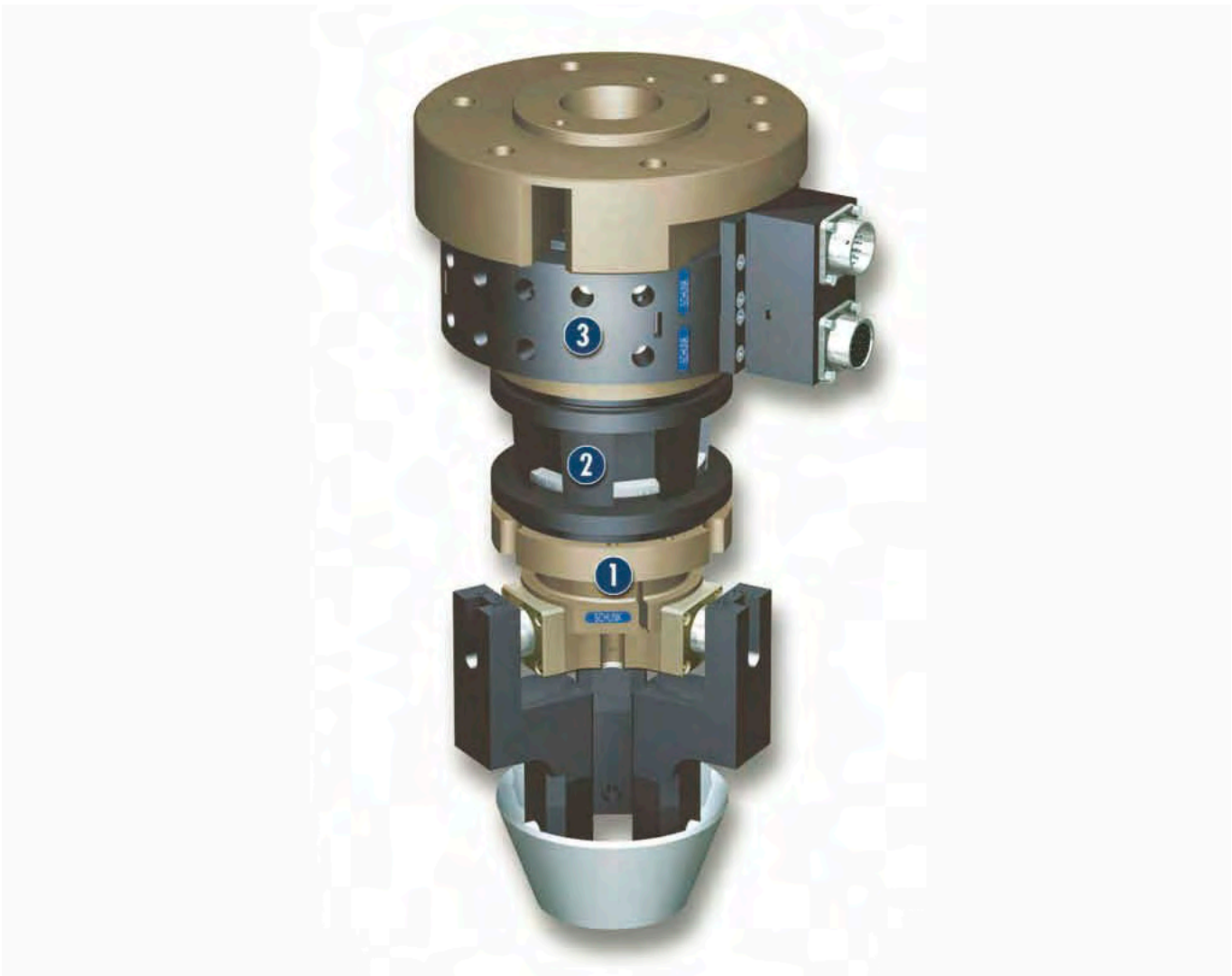


**Moment load  $M_y$**   
up to 13000 Nm



**Moment load  $M_z$**   
up to 5500 Nm

### Application example



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.

- 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

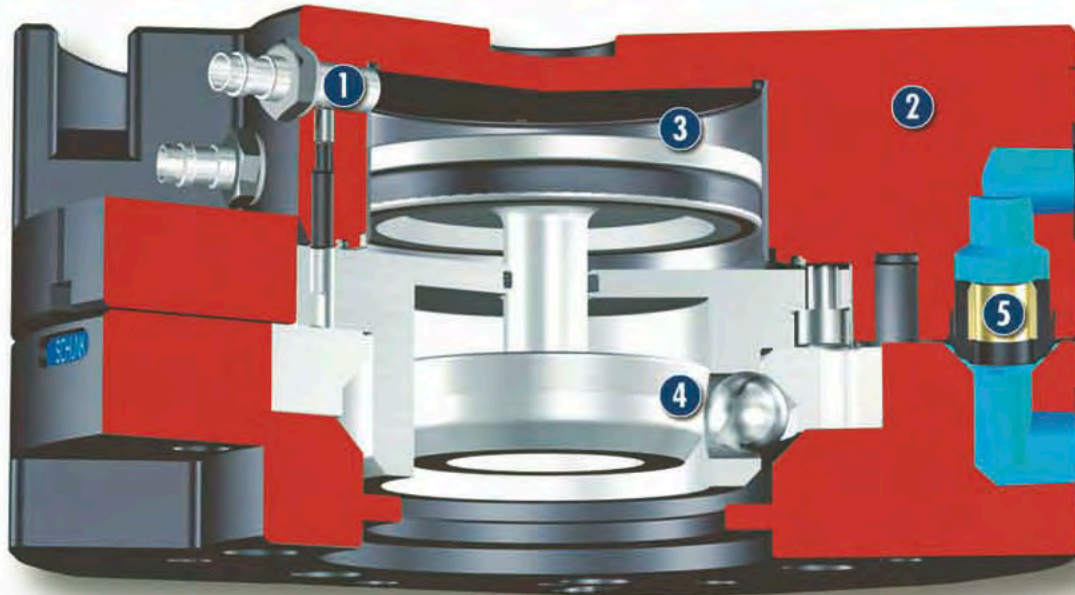
#### Self-locking

Mechanical when locking

#### Warranty

24 months

### Sectional diagram



- 1 Sensor monitoring for the locking mechanism**  
incorporated into the housing in the SWS-110, optional with other sizes
- 3 Drive**  
pneumatic and powerful with extremely easy handling
- 5 Pneumatics feed-through**  
incorporation into the housing therefore no interfering contours, also suitable for vacuums
- 2 Housing**  
weight-reduced through the use of a high-strength aluminum alloy
- 4 Locking mechanism**  
trouble-free locking and unlocking, self-locking in locked position

### 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.

## 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



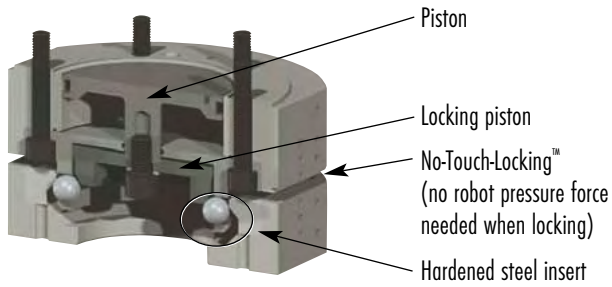
① For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question.

## General information on the series

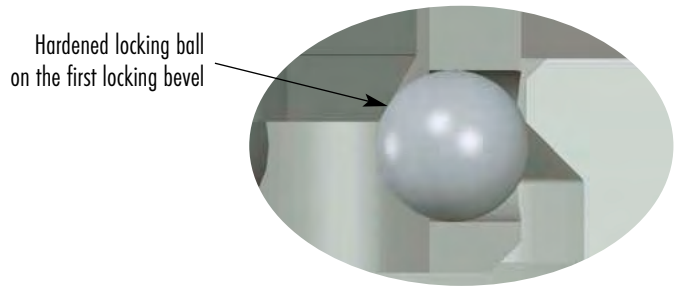
### Use in extreme ambient conditions

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.

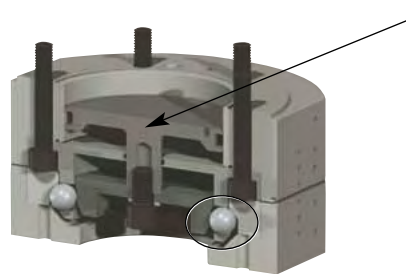
### Detailed function description



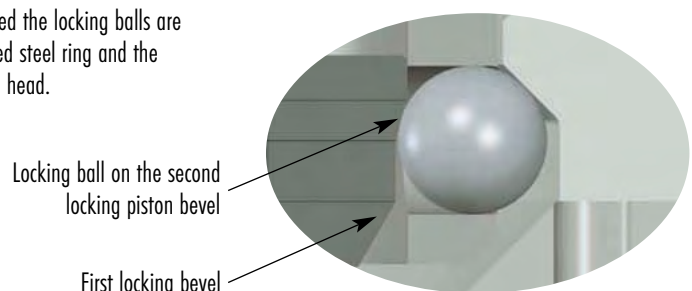
SWK - SWA before locking



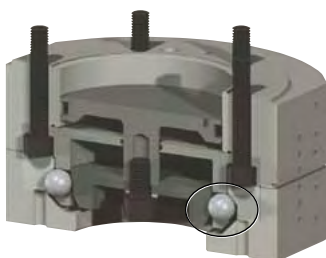
Detailed view



SWK - SWA when locked



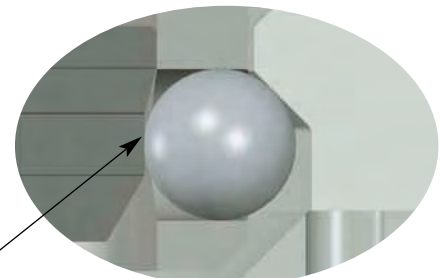
Detailed view



SWK - SWA in self-locking position

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.

Locking ball on the cylindrical part of the locking piston. Compressed air is needed to detach it.



Detailed view

## 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

| Designation                          |      | SWS-005 | SWS-011 | SWS-020 | SWS-021   | SWS-040   | SWS-041   |
|--------------------------------------|------|---------|---------|---------|-----------|-----------|-----------|
| Recommended handling weight          | [kg] | 8       | 16      | 25      | 25        | 50        | 50        |
| Locking force at 5.5 bar             | [N]  | 690     | 1068    | 2314    | 2314      | 4540      | 4540      |
| Static moment $M_x$ and $M_y$        | [Nm] | 12.5    | 25      | 56.5    | 56.5      | 157       | 157       |
| Static moment $M_z$                  | [Nm] | 17      | 34      | 78      | 78        | 216       | 216       |
| Pneumatic feed-through               |      | 6x M5   | 6x M5   | 12x M5  | 8x G 1/8" | 8x G 1/8" | 6x G 3/8" |
| Air connections, locked and unlocked |      | M5      | M5      | M5      | M5        | G 1/8"    | G 1/8"    |

| Designation                          |      | SWS-060   | SWS-071   | SWS-110   | SWS-150    | SWS-300    |
|--------------------------------------|------|-----------|-----------|-----------|------------|------------|
| Recommended handling weight          | [kg] | 75        | 79        | 150       | 200        | 455        |
| Locking force at 5.5 bar             | [N]  | 7387      | 8075      | 12149     | 16109      | 35333      |
| Static moment $M_x$ and $M_y$        | [Nm] | 197       | 395       | 784       | 1356       | 3870       |
| Static moment $M_z$                  | [Nm] | 294       | 395       | 784       | 1130       | 2825       |
| Pneumatic feed-through               |      | 8x G 1/8" | 8x G 1/4" | 8x G 3/8" | 10x G 3/8" | 10x G 3/8" |
| Air connections, locked and unlocked |      | G 1/8"    | G 1/8"    | G 1/8"    | G 1/8"     | G 1/4"     |



### Product description

**8 x G 1/8" air feed-throughs incorporated into a small, compact changer**

#### No-Touch-Locking™

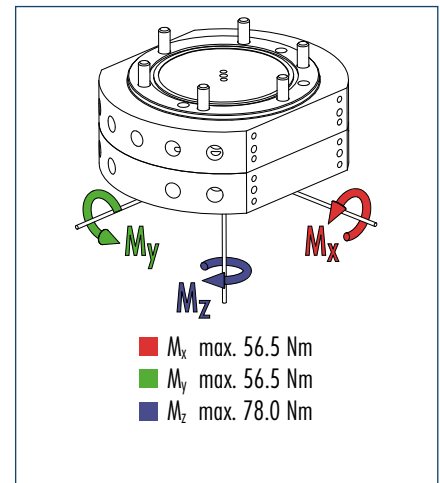
Locking without touching. Ensures that the SWS is securely locked even when the SWK and SWA do not touch. A maximum distance of 3 mm is possible.

#### Patented, self-retaining locking system

A larger piston diameter and the outwards gripping locking mechanism increase the permissible moment load. Steel components made from stainless Rc 58.

**Air feed-through with specially developed rubber seals**

### Moment load



① The dynamic moment load can be up to three times larger than the static moment load. Tests have shown that the system will only begin to fail in the event of 12-fold static moment.

### Technical data

| Designation                        | SWS-021             |            |   |
|------------------------------------|---------------------|------------|---|
| Maximum payload                    | [kg]                | 25         | A larger payload is possible with smaller moments   |
| Static moment load $M_{xy}$        | [Nm]                | 56.5       |   |
| Static moment load $M_z$           | [Nm]                | 78         |   |
| Dynamic moment load $M_{xy}$       | [Nm]                | 169.5      |   |
| Dynamic moment load $M_z$          | [Nm]                | 234        |   |
| Locking force (at 6 bar)           | [N]                 | 2314       | In the event of higher tensile forces the system "falls" into the self-locking position               |
| Repeat accuracy                    | [mm]                | 0.015      | Tested at 1 million cycles  |
| Weight                             | [kg]                | 0.8        | 0.5 kg head; 0.3 kg adapter   |
| Max. distance on locking           | [mm]                | 3.0        | No-Touch-Locking™ technology allows the parts to be coupled without the head and the adapter touching |
| Pneumatic energy transmission      | 8x pneumatic G 1/8" | Max. 7 bar |   |
| Maximum permissible XY offset      | [mm]                | ± 1        | Maximum permissible XY offset when locking  |
| Maximum permissible angular offset | [°]                 | ± 2        | Maximum permissible angular offset around the Z axis when locking                                     |

### Information on moment load

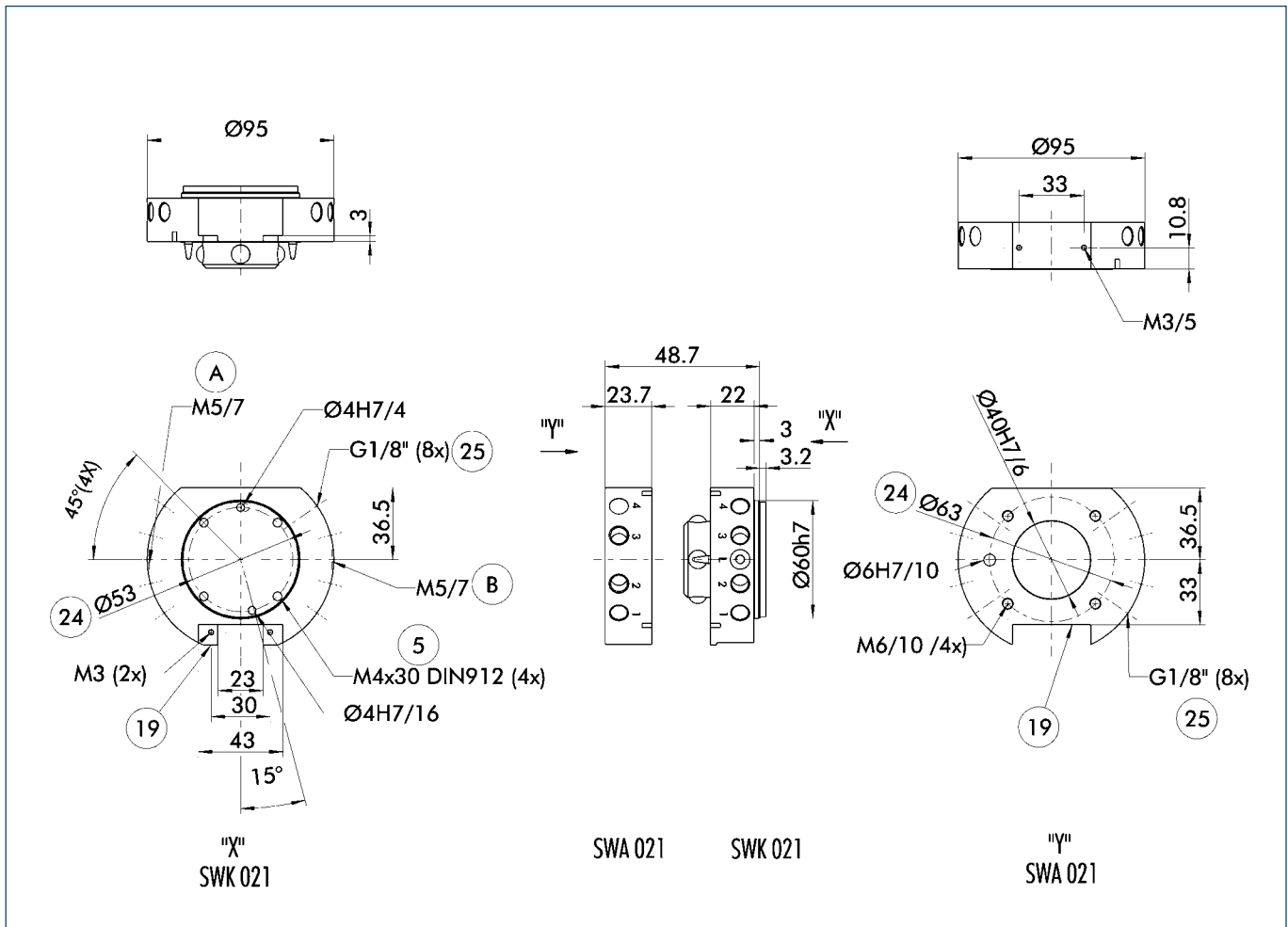
Selecting the correct quick-change system depends on the moment load which the system is subject to.

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.

### Main views



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

- A Locked air connection
- B Unlocked air connection
- ⑤ Through-bore for screw connection with screw (enclosed)
- ⑱ Screw connection area for options
- ⑲ Bolt pitch circle
- ⑳ Air feed-through

### Electrical options

| Designation |   | Detailed data sheet       |
|-------------|---|---------------------------|
| K19         | 19 pins, 3 A/50 V, MS connector               | See "SWS options" chapter |
| K26         | 26 pins, 3 A/50 V, MS connector               | See "SWS options" chapter |
| KM14        | 14-pin, (12x5 A/250 VAC* and 2x13 A/250 VAC*) | See "SWS options" chapter |

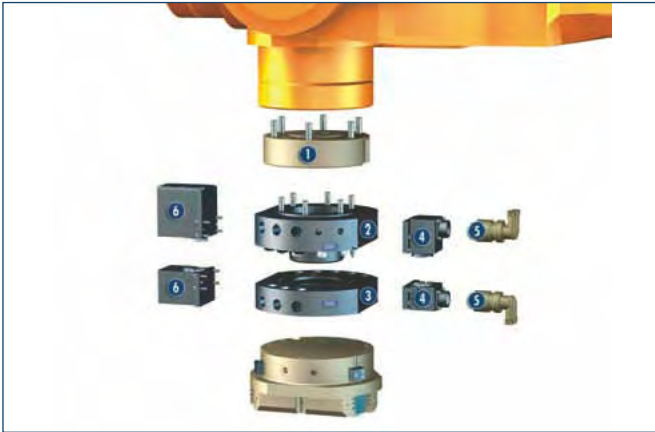
\* 250 VAC grounding done by customer

### How to order (example)

SW  -021-   -000

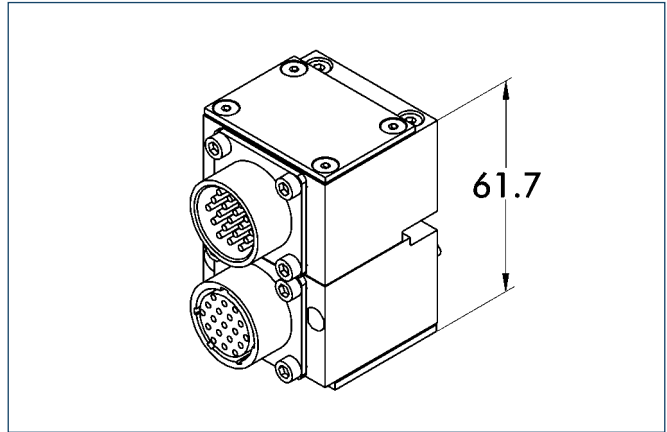
| SWS-021                     | Examples  |
|-----------------------------|---|
| Option<br>(000 = no option) | SWK-021-000-000<br>(SWK-020, head side, no option)                |
| K = head<br>A = adapter     | SWA-021-K19-000<br>(SWA-021, adapter plate side, with K19 option) |

### 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. K19)
- ⑤ Cable connector for option 1
- ⑥ Option 2

### Quick-change connector K19/ K26



Option: Miniature quick-change connector with protected contact and splash-proof contact pins (3 Amp/50 VAC per pin)  
K19 = 19-pin

| Designation | ID      | Fits Description  |
|-------------|---------|---|
| K19 head    | 9937328 | SWK 19 pin, 3 Amp/50 VAC E option with miniature quick-change connector |
| K19 adapter | 9937329 | SWA 19 pin, 3 Amp/50 VAC E option with miniature quick-change connector |

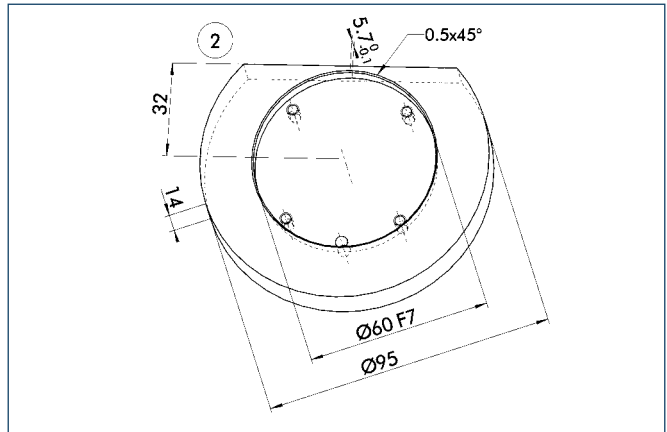
### Cable connectors



Cable connector for the connection between the K19 module and the cable

|                      | Straight |             | 90°     |              |
|----------------------|----------|-------------|---------|--------------|
| Cable connectors for | ID       | Designation | ID      | Designation  |
| K19 head             | 0301240  | KAS-19B-K-0 | 0301248 | KAS-19B-K-90 |
| K19 adapter          | 0301241  | KAS-19B-A-0 | 0301249 | KAS-19B-A-90 |

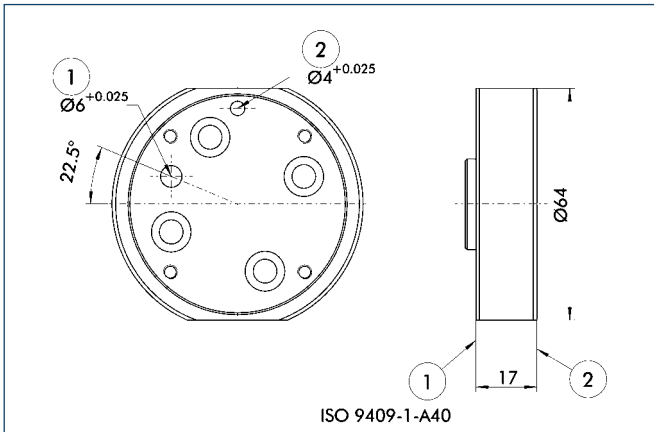
### Design information for adapter plate



② Tool-side connection

Adapter design recommendation. An adapter is required to seal the piston chamber.

### Standard adapter plates for ISO flanges

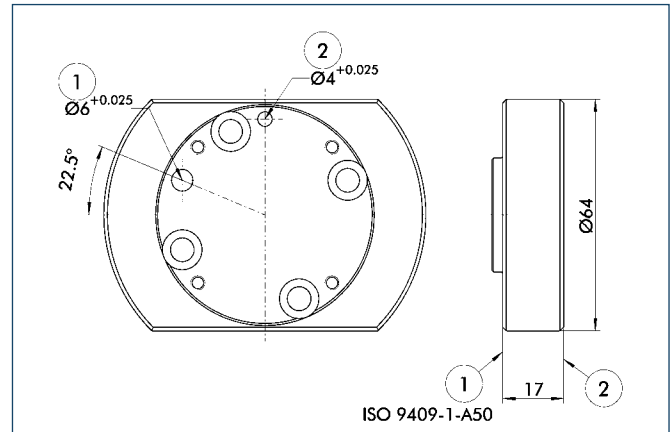


- ① Robot-side connection
- ② Tool-side connection

#### Adapter plate A40

For mounting the SWK-021 directly to a flange in accordance with ISO 9409-1-40-M6

| Designation        | ID      |
|--------------------|---------|
| A-SWK-020-ISO-A-40 | 0302200 |

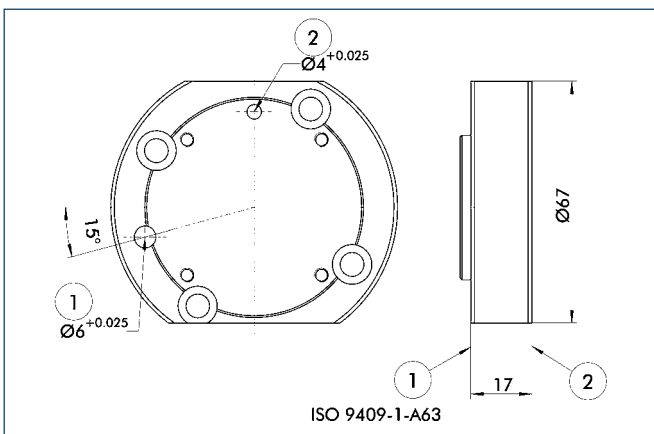


- ① Robot-side connection
- ② Tool-side connection

#### Adapter plate A50

For mounting the SWK-021 directly to a flange in accordance with ISO 9409-1-50-4-M6

| Designation        | ID      |
|--------------------|---------|
| A-SWK-020-ISO-A-50 | 0302201 |



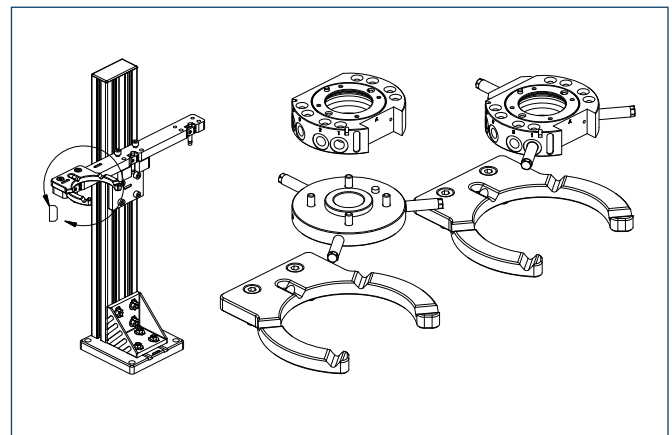
- ① Robot-side connection
- ② Tool-side connection

#### Adapter plate A63

For mounting the SWK-020 directly to a flange in accordance with ISO 9409-1-63-4-M6

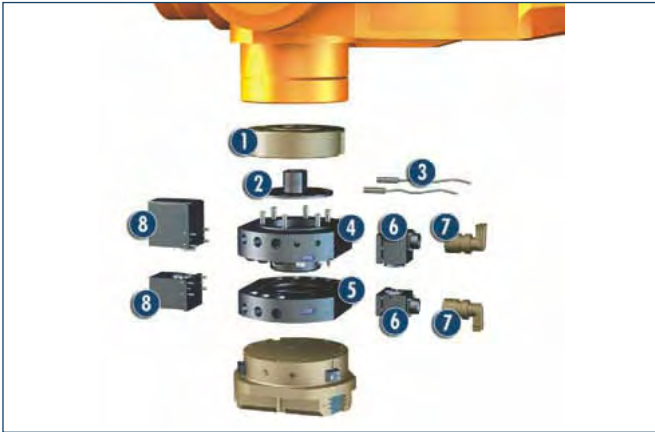
| Designation        | ID      |
|--------------------|---------|
| A-SWK-020-ISO-A-63 | 0302202 |

### Modular quick-change rack SWM-S



The modular “small” quick-change rack has been designed for the SWS-021 size. The system’s modular structure enables you to assemble your rack on an individual basis. Depending on the number of tools, the storage position and the tool size allows you to create a rack tailor-made to your application. The option of utilizing unused air feed-throughs for attaching the workpiece bolts is a unique feature.

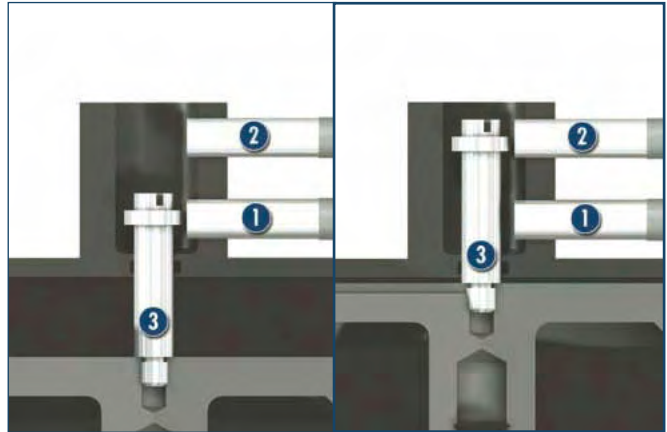
### Typical set-up on the robot



#### 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: K19)
- ⑦ Cable connector (KAS) for option 1
- ⑧ Option 2

### Mode of operation of the SIP



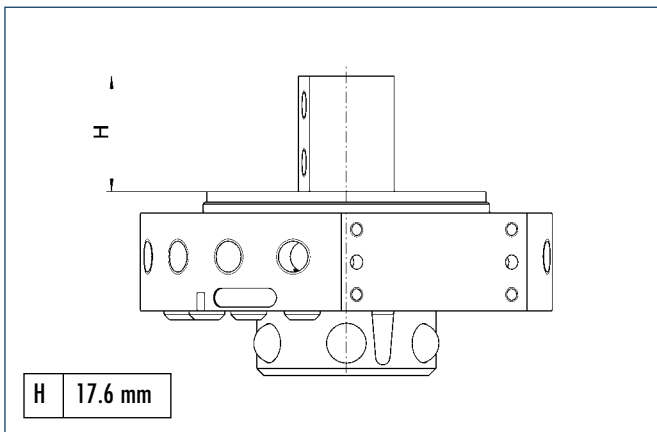
#### Locked

#### Unlocked

- ① Sensor for locked IN 41/S 9941216
- ② Sensor for unlocked
- ③ 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-021

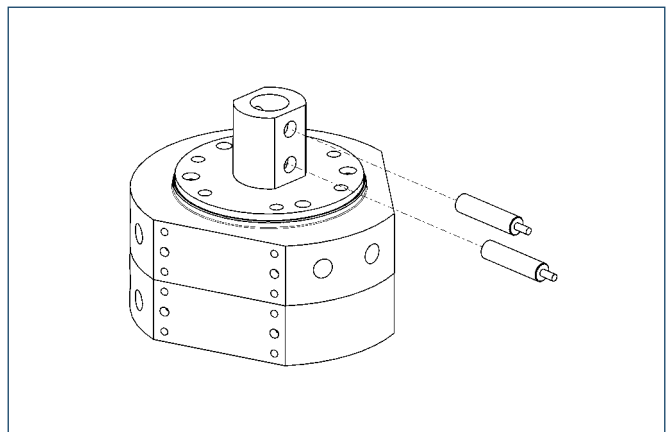


H 17.6 mm

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

| Designation | ID      |
|-------------|---------|
| IN 41/S     | 9941216 |