

Flexible. Modular. Strong.

SWS-L Quick-change System

Pneumatic tool changing system with patented locking system for heavy loads.

Field of Application

Can be used wherever short changeover times between a handling device and a tool (gripper, pallets, welding gun) are required

Advantages – Your benefit

Patented fail-safe locking mechanism for safe connection between quick-change master and quick-change adapter

Manual emergency unlocking possible no counter-forces from springs

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

The same option modules for all sizes that permits the use of standard parts in the production line

Possibility of transmission of electric devices SWS 041 storage module

As standard, many option modules can be attached for highest flexibility of your application

Adapter coding via electric module possible

Suitable storage racks for all sizes to ensure the optimal adaption to each application

ISO flange pattern for easy assembly to most types of robots without needing additional adapter plates



Sizes
Quantity: 4



Handling weight
300 .. 1350 kg



Moment load M_x
7600 .. 13500 Nm



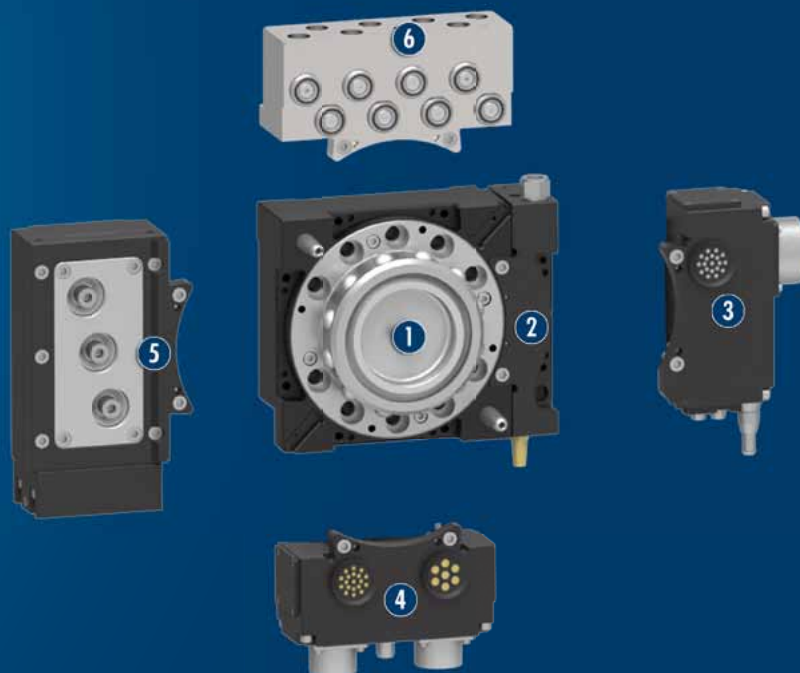
Moment load M_z
4060 .. 16200 Nm

Functional Description

Due to the automatic change of the robot tool (e.g. gripper, vacuum gripping system, pneumatically or electrically driven tools, welding guns ...) flexibility of your robot is increased.

The SWS quick-change system consists of a SWK quick-change master and a SWA quick-change adapter. 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.



① **SWK quick-change master**
with patented locking

② **Valve adapter**
with integrated valve for control of the unit

③ **Control module**
for control of the valve adapter and additional signal transmission to the tool

④ **E-module**
for separate transmission of power and sensor signals for servo drives, for example

⑤ **Welding current module**
for high current loads

⑥ **Fluid module, self-sealing**
for drip-free transfer of liquid media

General Notes to the Series

Actuation: pneumatic, with filtered compressed air as per DIN ISO 8573-1: 7 4 4

Operating principle: Locking balls actuated by pistons

Pass through: Variable via attachment modules, depending on the type

Housing: The housing is made of high-tensile, hard-coated aluminum alloy. The functional parts are made of hardened steel.

Scope of delivery: Operating and maintenance instructions, manufacturer's declaration

Warranty: 24 months (details, general terms and conditions and operation manuals can be downloaded at www.schunk.com)

Harsh environmental conditions: Please note that use in harsh environmental conditions (e.g. in the coolant area, cast and grinding dust) can considerably reduce the service lifetime of the units, and could void warranty. However, in many cases we can find a solution. Please contact us.

Handling weight: The weight of the total load attached to the flange. The design must take into account the permissible forces and moments. Please note that the life span will be reduced if the maximum handling weight is exceeded.

Application example

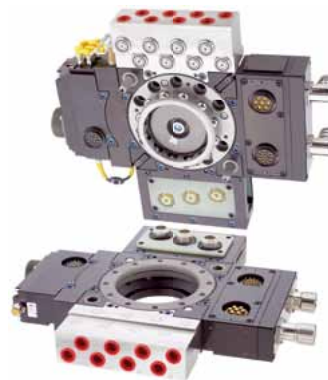
Heavy-load gripper unit with robot quick-change system for changing the handling devices such as grippers and electrode holders.

- 1 SWS-L Quick-change System
- 2 PZN-plus 3-Finger Universal Gripper



SCHUNK offers more ...

The following components make the SWS-L even more productive – the perfect complement for highest functionality, flexibility, and process reliability.



SWM-L Storage Rack



Cable Connector



Optional Electrical Module



Pneumatic Optional Modules



Extension Cable



Adapter Plates



Inductive Proximity Switches

① Further information regarding the products can be found on the following products pages or at www.schunk.com. Please contact us for further information: SCHUNK technical hotline +49-7133-103-2696

Options and special Information

No-Touch-Locking™: Locking without touching. Ensures that the SWS is securely locked even when the SWK and SWA do not contact.

Patented fail-safe locking mechanism: Large piston diameter and outward ball travel increase moment load. All locking parts are made of Rc 58 stainless steel.

Selection of a SWS Quick-change System

1. Determining the Size

Quick Method:

When low or medium forces and moments act upon the SCHUNK quick-change system, you should choose a quick-change system with a payload that is comparable to that of your robot.

If high moments and forces act upon the SCHUNK quick-change system, please use the following method, which is more precise.

More Precise Method:

The forces and moments are a critical factor in choosing a suitable quick-change system. Proceed as follows to estimate the most unfavorable moment:

- Calculate for the approximate center of gravity (COG) of the heaviest end effector that will be used. Calculate the distance (D) from the COG to the bottom of the tool plate.
- Calculate the mass (m) of the heaviest end effector.
- Multiply m, D and gravity (9,81 m/s²) to determine the approximate static moment (M) (or a moment based on 1 g acceleration).
- Choose a quick-change system with a high moment load that is equal to or greater than M.

Due to their potentially high acceleration, robots can generate moments that are two to three times higher than M. The quick-change systems are designed for absorbing dynamic moments that are three times higher than their static moments.

2. Pneumatic and electrical System

Determine the number of required pneumatic connections and electrical contacts. Larger quick-change systems feature a higher number of pneumatic connections and electrical contacts.

3. Temperature and Chemicals

SCHUNK quick-change systems use nitrile seals for the pneumatic supply to the tool plate. O-rings seal the pneumatic locking mechanism. These O-rings are resistant to most chemical influences and also withstand temperatures in the range from -25 to 65 °C. Please contact your SCHUNK representative if you need information on temperatures or chemical influences in particular environments.

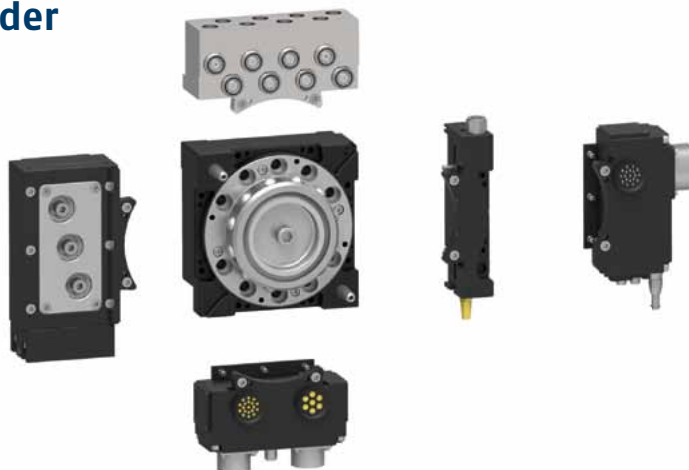
4. Precision Applications

Always be sure to comply with the specifications if you work with applications that require high repeat accuracy.

SWS Sizes

Designation	Recommended handling weight [kg]	Dynamic moment [Nm]		Static moment [Nm]		Pneumatic feed-throughs	Air connections locked and unlocked
		M _x and M _y	M _z	M _x and M _y	M _z		
SWS-001	1.4	2.8	3.45	0.983	1.15	4 x M5	M5
SWS-005	8	37.2	50.7	12.4	16.9	6 x M5	M5
SWS-011	16	74.7	101.7	24.9	33.9	6 x M5	M5
SWS-020	25	169.5	234	56.5	78	12 x M5	M5
SWS-021	25	169.5	234	56.5	78	8 x G1/8"	M5
SWS-027	38	254.1	298.2	84.7	99.4	8 x G1/8"	G1/8"
SWS-040Q	50	678	678	226	226	8 x G1/8"	G1/8"
SWS-041	50	471	648	157	216	6 x G3/8"; 4 x G1/8"	G1/8"
SWS-060	75	591	882	197	294	8 x G1/8"	G1/8"
SWS-071	79	1185	1185	395	395	8 x G1/4"	G1/8"
SWS-076	100	1626	2103	542	701	5 x G3/8"	G1/8"
SWS-110	150	2352	2352	784	784	8 x G3/8"	G1/8"
SWS-160	300	7170	3800	2390	1267	5 x G3/8"; 4 x G1/2"	G1/8"
SWS-210	270	8130	6780	2710	2260		
SWS-300	450	9870	8460	3290	2820	10 x G3/8"	G1/4"
SWS-310	510	9870	9480	3290	3160		
SWS-510	700	14580	10500	4860	3500		
SWS-1210	1350	16260	16260	5420	5420		

SWS-L sample order



SW K - 210 BM/BT - JF2 DA2 - FC2 - PA2 - EF5 - SM

Designation

SW

Side

K = Master (robot side)

A = Adapter (tool side)

Size

210 = SWS-210

310 = SWS-310

510 = SWS-510

Collar or step on the mounting surface

A = No collar (head side), no step (tool side)

B = 80 mm step / collar (only for 210)

C = 100 mm step / collar (only for 210, 310)

D = 125 mm step / collar (only for 310, 510)

E = 160 mm collar (only for 510)

Jxx: Locking and unlocking adapter or a valve adapter (only on surface 'A')

Note: A Jxx module, locking and unlocking adapter or a valve adapter must be mounted on surface A. Signal modules are mounted on the Jxx module. When combining two modules (i.e. JC2 and DD4) on surface A, the description 'A' is a combination of Jxx- and the SWK-210BM-JC2DD4-AA2-0-0-SM

Option modules

Axx = Pneumatic module (anodized aluminum housing, not suitable for fluids)

Dxx = DeviceNet modules

Exx = Servo modules

Fxx = Fluid modules (stainless steel, self-sealing)

Pxx = Power module for welding current

Sxx = Signal modules

Uxx = Stud welding modules

Vxx = Signal modules with valve actuation

'0' = Option not used

A selection of available modules can be found in the chapter "SWS-L" Options.

Additional variants on request.

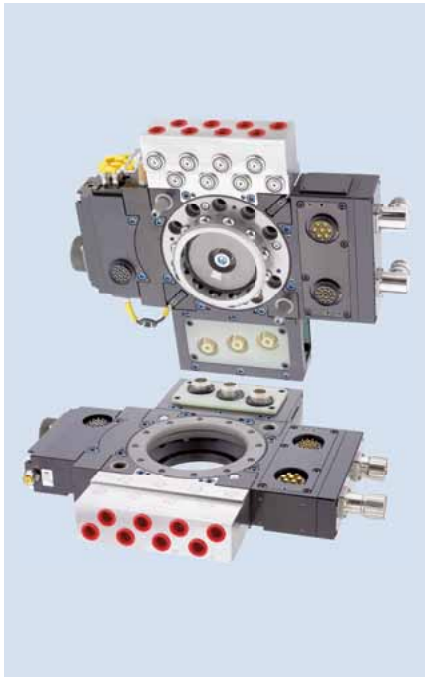
Proximity switch monitoring

SM = Inductive proximity switch PNP

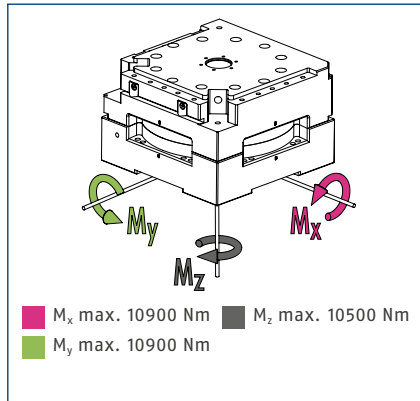
0 = No proximity switch

Additional variants on request





Forces and moments



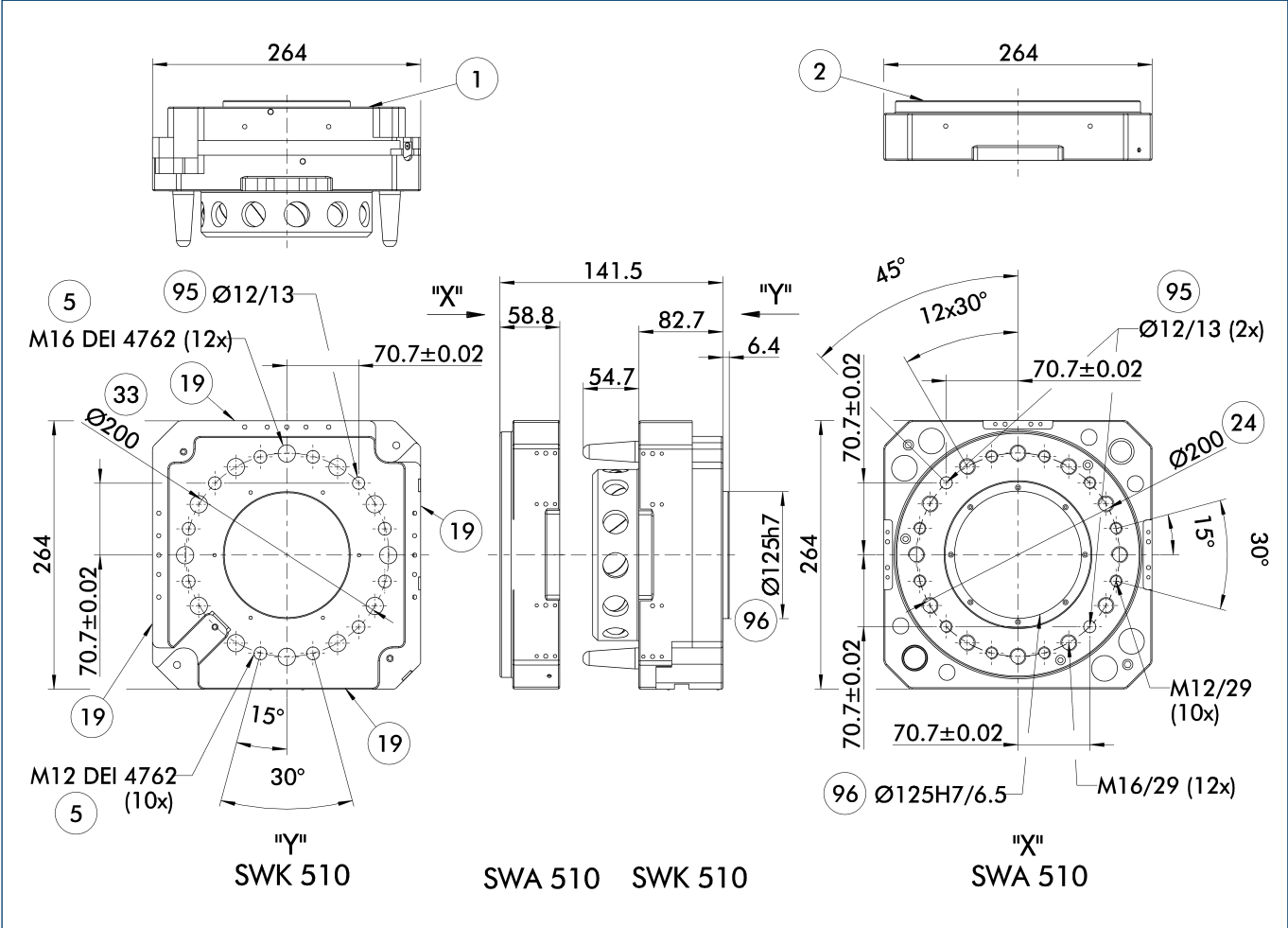
ⓘ This is the max. sum of all forces and moments (from acceleration or deceleration, process forces or moments, emergency stop situations, etc.) which are permitted to act on the tool change system while still ensuring proper functioning.

Technical data

Description		SWK-510DM-0-0-0-0-SM	SWA-510DT-0-0-0-0
		Miniature change master	Quick-change adapter
Recommended handling weight	[kg]	700	700
Piston stroke monitoring		integrated	
Presence monitoring		integrated	
Locking force	[N]	62000	62000
Repeat accuracy	[mm]	0.01	0.01
Mass	[kg]	19.3	8.7
min. / max. locking distance	[mm]	2.5	2.5
max. permissible XY offset	[mm]	±2	±2
max. permissible angular offset	[°]	±1	±1
min. / max. ambient temperature	[°C]	5/60	5/60
min. / max. operating pressure	[bar]	5/6.9	5/6.9
Robot side connection		ISO 9409-1-200-6-M12 ISO 9409-1-200-12-M16	ISO 9409-1-200-6-M12 ISO 9409-1-200-12-M16



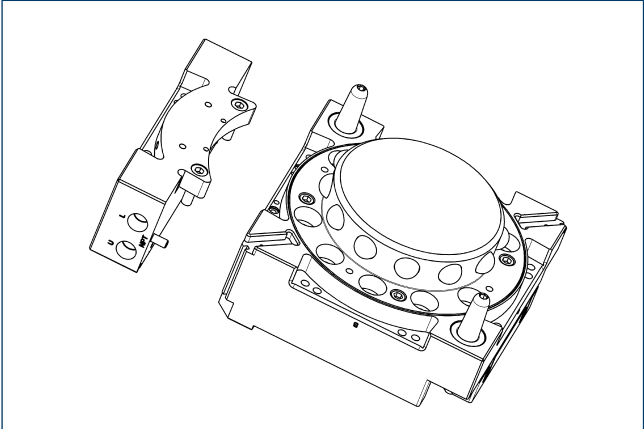
Main view



The drawing shows the basic design of the quick-change system and does not take into consideration the dimensions of any options described below.

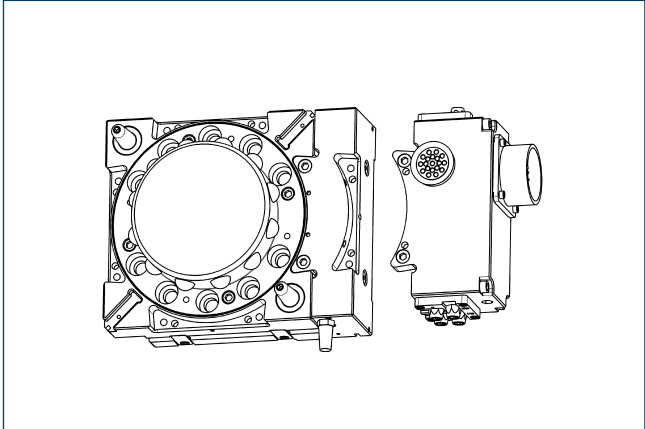
- ① Robot side connection
- ② Tool side connection
- ⑤ Through-hole for connection with screws
- ⑨ Mounting surface for options
- ②④ Bolt circle
- ③③ DIN ISO-9409 bolt-hole circle diameter
- ⑨⑤ Fit for a centering pin
- ⑨⑥ Fitting for centering

Actuation



The SWK must be actuated either with a control adapter or a valve adapter with integrated valves. They must be taken into account when selecting the options.

Optional modules



This unit can be equipped with different optional modules for transmitting electric signals, pneumatics or fluids. Please ask for details.