Superior Clamping and Gripping

Product Information

Quick change system SWS 110

Modular. Robust. Flexible.

Quick-change system SWS

Pneumatic tool changing system with patented locking system

Field of application

Can be used wherever short changeover times between a handling device and a tool (pallet, gripper)

Advantages – Your benefits

Complete series of 14 sizes for optimal size selection and a broad application range

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

Manual emergency unlocking possible no counter-forces from springs

All functional components made from hardened steel for high mechanical resilience of the changing system

Wide range of electric, pneumatic, and fluid modules for universal energy transmission possibilities

Integrated pneumatic feed-through for a safe power supply of the handling modules and tools

Possibility of transmission of fluid systems with self-sealing couplings possible

Adapter side coding via plug connector possible

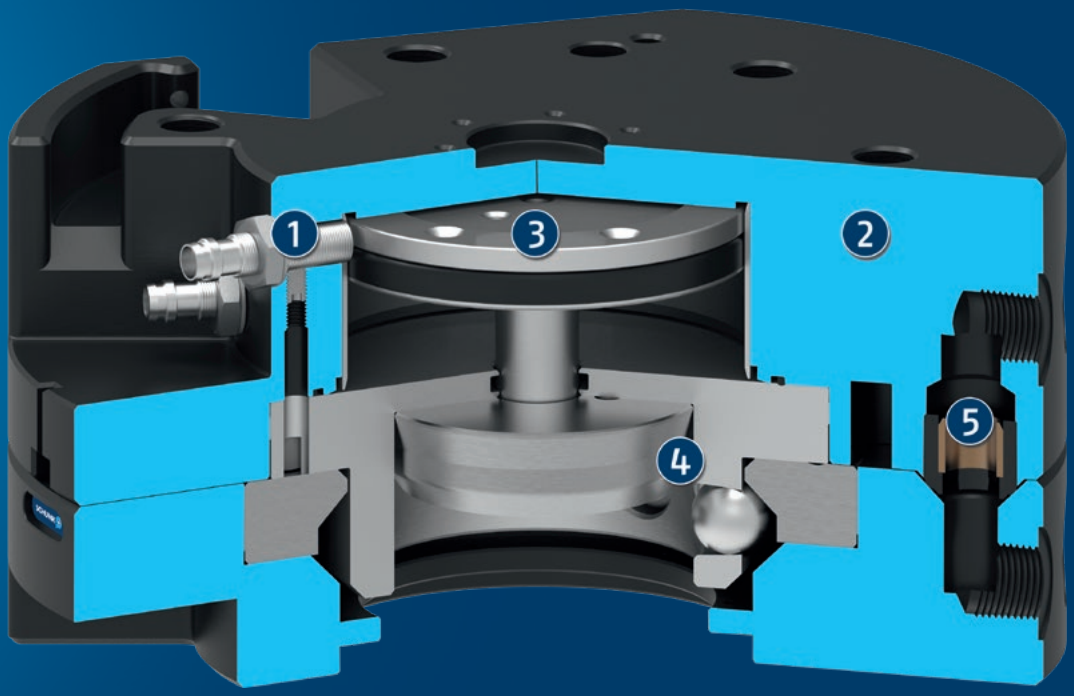
Suitable storage racks for all sizes to ensure the optimum adaption to each application

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

Sizes	Handling weight	Moment load Mx	Moment load Mz
Quantity: 14	1.4 .. 300 kg	2.8 .. 7170 Nm	3.45 .. 3800 Nm

Functional description

Automatic exchange of the end effector (e.g. gripper, pallets, vacuum gripping systems, pneumatically or electrically driven tools, welding guns, etc.) increases the flexibility of your robot.
The quick-change system (SWS) consists of a quick-change master (SWK) and a quick-change adapter (SWA). The SWK is mounted onto the robot, and couples 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 **Sensor monitoring of the locking device**
optional, for process-reliable monitoring of the locking condition

② **Housing**
is weight-optimized due to the use of high-strength aluminum alloy

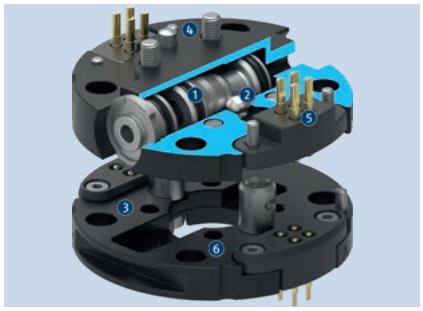
③ **Drive**
pneumatic, efficient, and easy to handle

④ **Locking mechanism**
load-free locking and unlocking, fail-safe in locked condition

⑤ **Air feed-through**
without interfering contours due to the integration into the housing. Also suitable for vacuum.

Detailed functional description

Sectional diagram SWS-001

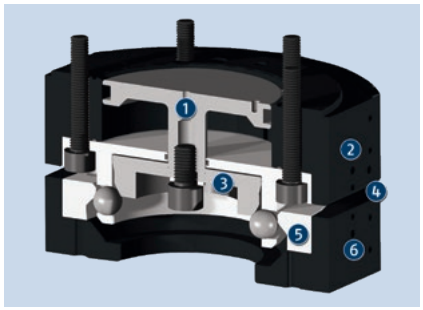


1. Drive
pneumatic, efficient, and easy to handle
2. Locking mechanism
load-free locking and unlocking, fail-safe in locked condition
3. Housing
is weight-optimized due to the use of high-strength aluminum alloy
4. Centering and mounting possibilities
by using a standardized ISO 9409 interface for robots
5. Electric feed-through
no interfering contour, as integrated in the housing
6. Air feed-through
without interfering contours due to the integration into the housing. Also suitable for vacuum.

Quick-change system in unlocked position

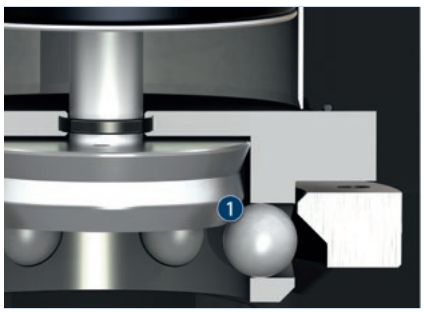
1. Adapter plate
2. Quick-change master SWK
3. Electrical module, robot-side
4. Locking mechanism
5. Locking ring
6. Quick-change adapter SWA
7. Electrical module, tool-side

Section view in ready-to-lock position



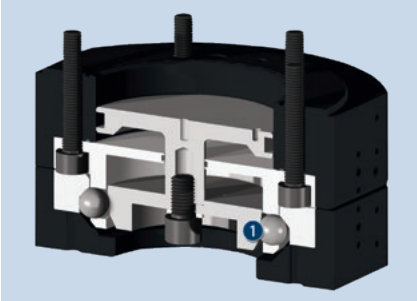
1. Piston
2. Quick-change master SWK
3. Locking piston
4. No-Touch-Locking™
5. Locking ring
6. Quick-change adapter SWA

Detail view of the locking ball position in ready-to-lock position



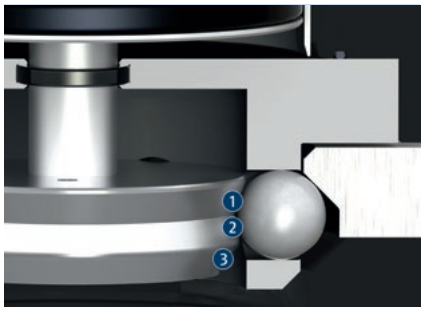
1. Hardened locking ball is on the 1st taper of the cam. The 1st taper allow head and tool to be separate while locking.

Section view of the quick-change system in locked position



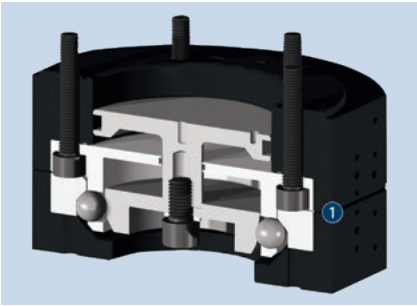
1. When the piston is actuated, the locking balls are pushed under the hardened steel ring and the adapter is pulled onto the head.

Detail view of the locking ball in locked position



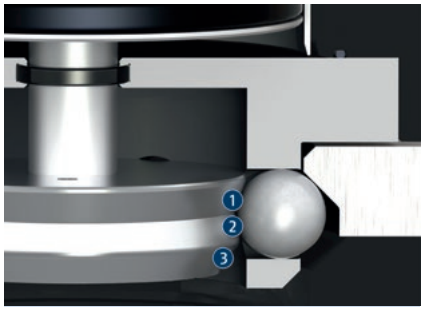
1. Hardened steel balls on the 2nd taper of the cam create extremely high locking forces.
2. Fail-safe reverse taper
3. 1st taper of the cam

Section view of the quick-change system in fail-safe position



1. The master and the adapter can only be separated from one another in the self-locking status if the piston is pneumatically actuated with the unlock air pressure.

Detail view of locking ball while in fail-safe position



1. In the case of pressure loss, the locking piston is held in place by the cylindrical part of the locking piston. The friction from the piston seal prevents the piston from moving from its own weight or vibrations. The head and adapter can only be separated by pneumatic actuation of the piston.
2. Fail-safe reverse taper
3. 1st taper of the cam

General notes about the series

Actuation: pneumatic, with filtered compressed air as per ISO 8573-1:2010 [7:4:4].

Operating principle: locking balls actuated by pistons for locking

Energy transmission: variable via attachment feed-through modules, depending on the unit size

Housing: The housing consists of high-strength, hard-coated aluminum alloy. The functional components are made of hardened steel.

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

Warranty: 24 months

Harsh environmental conditions: Please note that use under harsh environmental conditions (e.g. in the coolant area, cast and grinding dust) can considerably reduce the service life of the units, and we will not take over any warranty. However, in many cases we can find a solution. Please contact us for assistance.

Handling weight: is the weight of the total load attached to the flange. When designing, the permissible forces and moments have to be paid attention to. Please note that exceeding the recommended handling weight will shorten the lifespan.

Application example

Insertion tool for assembly of small to medium-sized workpieces. The tool can be used in both clean and dirty environments. Due to its quick-change system, other tools can alternately be fixed to the robot flange.

1. Quick-change system SWS
2. Electric feed-through
3. Tolerance compensation unit TCU-Z
4. 3-finger centric gripper PZN-plus

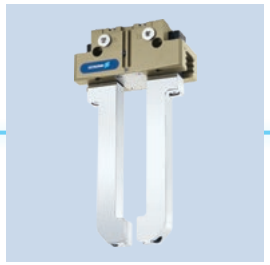
SCHUNK offers more ...

The following components make the product even more productive – the suitable addition for the highest functionality, flexibility, reliability, and controlled production.

Compensation unit

Anti-collision and overload protection sensor

Rotary feed-through



Universal gripper

Inductive proximity switches

Electronic module

Storage rack

ⓘ For more information on these products can be found on the following product pages or at schunk.com.

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 touch.
Patented fail-safe locking mechanism: A large piston diameter and an outside clamping locking increase the permissible moment capacity. Steel parts made of low corrosion Rc 58.

Selection of a Quick-change System SWS

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

- Calculate 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 quick-change adapter.
- Calculate the weight (W) of the heaviest end effector.
- Multiply W and D to find an approximate static moment (M) (or a moment based on 1 g of acceleration).
- Choose a quick-change system with a high moment load equal to or greater than M.

Due to their potentially high accelerations, robots can generate moments that are two or three times higher than M.

2. Pneumatic and electrical Systems

Determine the number of pneumatic connections and electrical contacts required. 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 feed-through of pneumatics. O-rings seal the pneumatic locking mechanism. These O-rings are resistant to most chemical influences and also withstand temperatures ranging from -25 to +65 °C. Please contact us if you should need information on temperatures or chemical influences in particular environments.

4. Precision Applications

Always comply with the specifications if you work with applications that require high repeat accuracy.
Please note: A quick-change system has an influence on force and moment, payload, size, and repeat accuracy of the robot.

Sizes SWS

Designation	Recommended handling weight [kg]	Max. moment [Nm]		Pneumatic feed-throughs	Air connections locked and unlocked
		M_x and M_y	M_z		
SWS 001	1.4	2.8	3.45	4x M5	M5
SWS 005	8	37.5	51	6x M5	M5
SWS 007	16	75	102	5x M5	M5
SWS 011	16	75	102	6x M5	M5
SWS 020	25	169.5	220	12x M5	M5
SWS 021	25	169.5	230	8x G1/8"	M5
SWS 040Q	50	471	648	8x G1/8"	G1/8"
SWS 041	50	471	648	6x G3/8"; 4x G1/8"	G1/8"
SWS 046	50	678	882		G1/8"
SWS 060	75	591	326	8x G1/8"	G1/8"
SWS 071	79	1185	378	8x G1/4"	G1/8"
SWS 076	100	1626	210-3	5x G3/8"	G1/8"
SWS 110	150	2352	2352	8x G3/8"	G1/8"
SWS-160	300	7170	3800	5x G3/8"; 4x G1/2"	G1/8"
SWS-L 210	300	7600	4060		
SWS-L 310	510	9900	9600		
SWS-L 510	700	10900	10500		
SWS-L 1210	1350	13500	16200		

Bestellbeispiel SWS

SW K – 110 – R19 – G19 – SM

Description
SW

Page
K = head (robot side)
A = Adapter (tool side)

Size

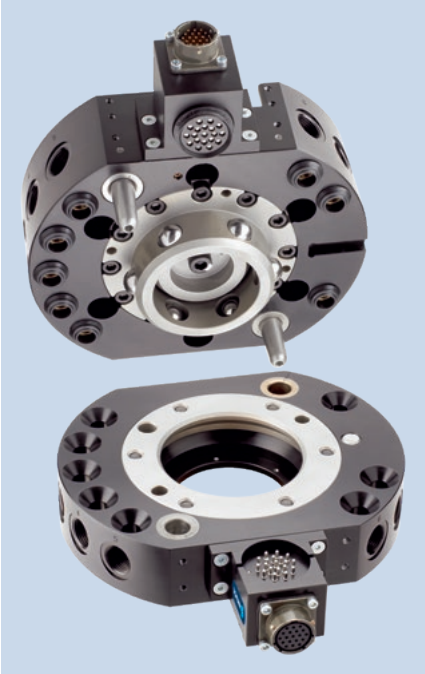
Optional module
Rxx, Sxx, Gxx, Kxx = electric module
Pxx = pneumatic module (anodized aluminum housing, not suitable for liquids)
Vxx = Vacuum module
Fxx = Fluid module (stainless steel, self-sealing)
000 = Unused option

Proximity switch monitoring
SG = Inductive proximity switch (SWK-040Q/076)
SM = Inductive proximity switch (SWK-007/110/160)
SQ = Inductive proximity switch (SWK-011H/020H/021H)
SIP-IN = monitoring prepared, inductive proximity switch included (SWK-011/020/021/027/041/046/060/071)

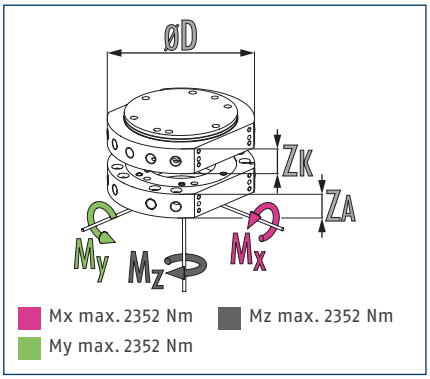
More versions on request

SWS 110

Quick change system



Dimensions and maximum loads



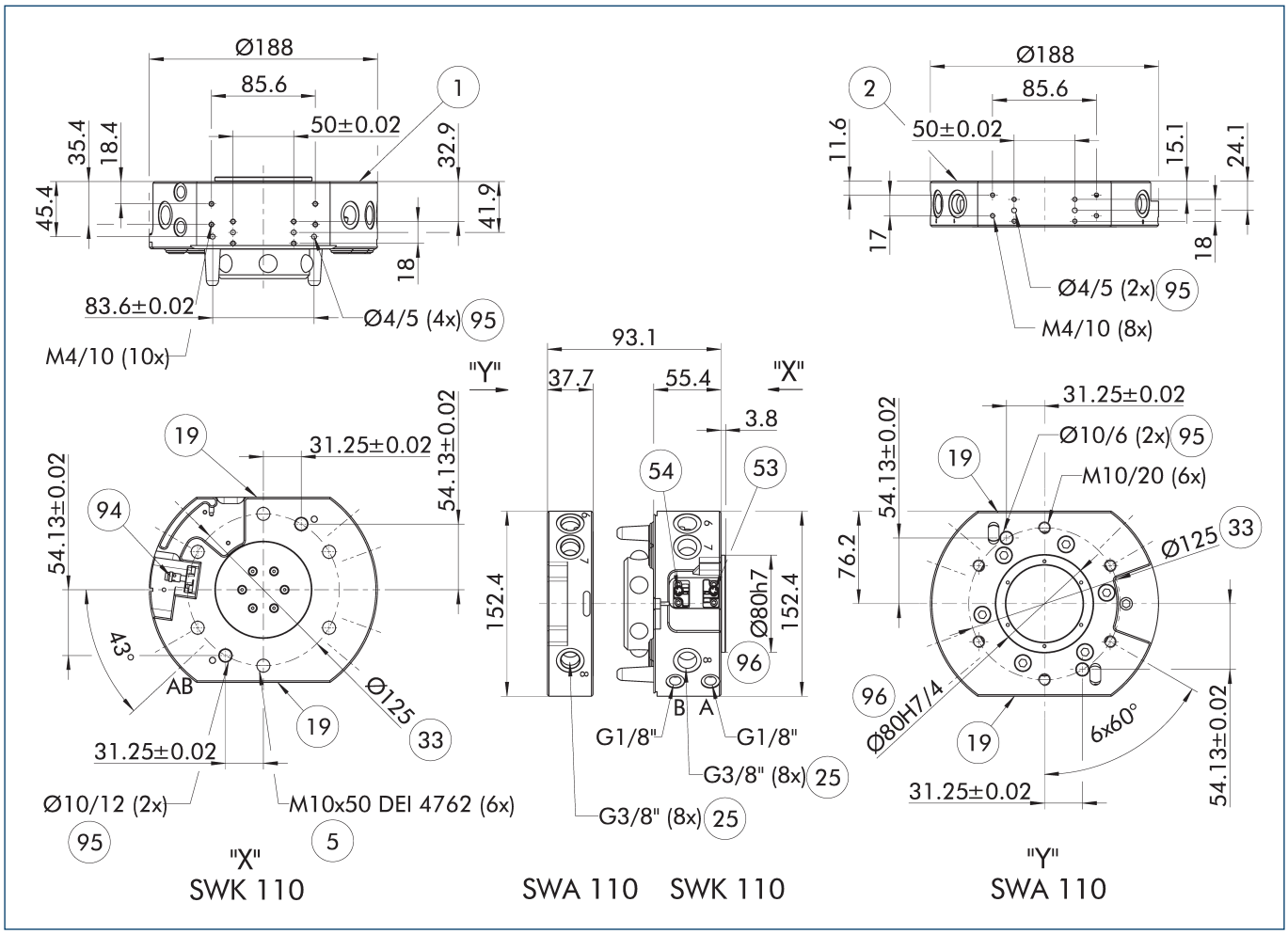
ⓘ This is the max. sum of all forces and moments which are permitted to act on the change system for ensuring proper functioning.

Technical data

Description		SWK-110-000-000-SM	SWA-110-000-000
		Quick-change master	Quick-change adapter
ID		0302412	0302411
Recommended handling weight	[kg]	150	150
Piston stroke monitoring		integrated	
Locking force	[N]	12000	12000
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	4	2.2
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		8x G3/8"	8x G3/8"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±1	±1
Robot-side connection		ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10
Min./max. ambient temperature	[°C]	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9
Dimensions Ø D x Z*	[mm]	188 x 55.5	188 x 37.6
Screw connection diagram		2 x J	2 x J

* Please note that the heights of the change master (ZK) and change adapter (ZA) differ. The sum represents the total height of a coupled change system.

Main view



The drawing shows the basic design of the quick-change system without dimensional consideration of the options described below.

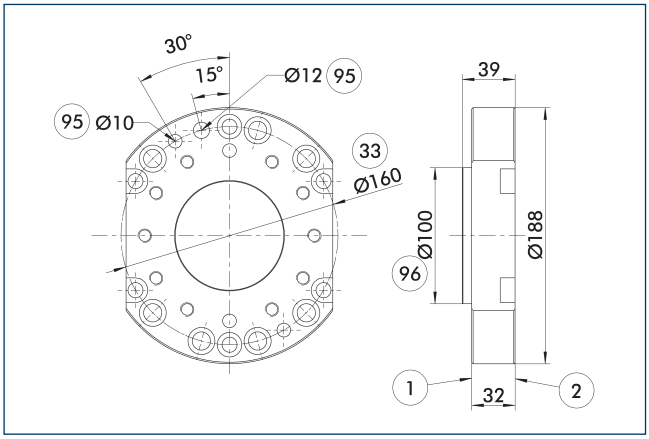
A, a Air connection locked
B, b Air connection unlocked

(1) Robot-side connection
(2) Tool-side connection
(5) Through hole for connection with screws
(19) Mounting surface for options
(25) Pneumatic feed-throughs
(33) DIN ISO-9409 bolt circle
(53) Monitoring Position unlocked
(54) Monitoring Position locked
(94) Optional proximity switch
(95) Fit for centering pins
(96) Fit for centering

SWS 110

Quick change system

Adapter plate ISO-A160-M10/M12-R



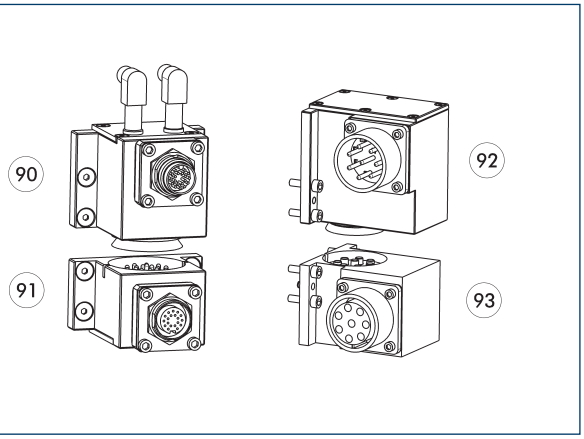
1 Robot-side connection
2 Tool-side connection
33 DIN ISO-9409 bolt circle
95 Fit for centering pins
96 Fit for centering

Robot side adapter plate

Description	ID	
Robot side		
A-SWK-110/210-ISO-A160-M10/M12	0302225	

ⓘ Adapter plate for robots with M10 or M12 mounting patterns

Electric feed-through module



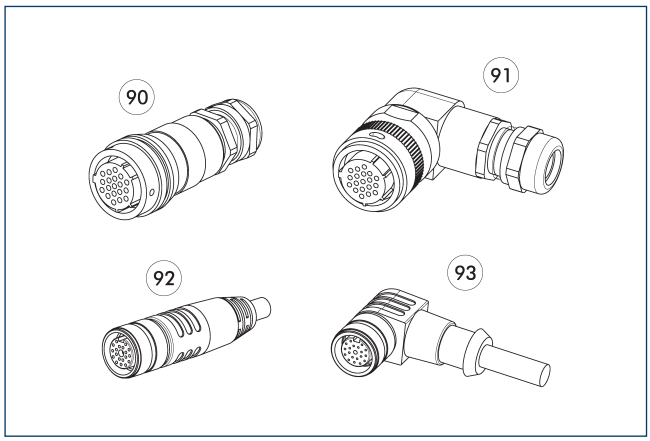
90 Electric module with metric thread, robot-side
91 Electric module with metric thread, tool-side
92 Electric module with MIL-Spec thread, robot-side
93 Electric module with MIL-Spec thread, tool-side

Modules for transmission of electrical signals.

Description	ID	No. Pins
Feed-through module for communication on the robot side		
SWO-RE5-K	9957444	
SWO-TP-K	9871166	
Feed-through module for communication on the tool side		
SWO-RE5-A	9957445	
SWO-TP-A	9871165	
Feed-through module for power on the robot side		
SWO-MT8-K	9937157	
Feed-through module for power on the tool side		
SWO-MT8-A	9937158	
Feed-through module for signal on the robot side		
SWO-R19-K	9935815	19
SWO-R19R-K	9942391	15
SWO-R26-K	9935819	26
SWO-RF19-K	9948654	19
Feed-through module for signal on the tool side		
SWO-R19-A	9935816	19
SWO-R26-A	9935820	26
SWO-RF19-A	9948657	19

ⓘ For more detailed information and further modules and matching cable connectors, see catalog chapter "SWO" or visit our website.

Cable connector/cable extension



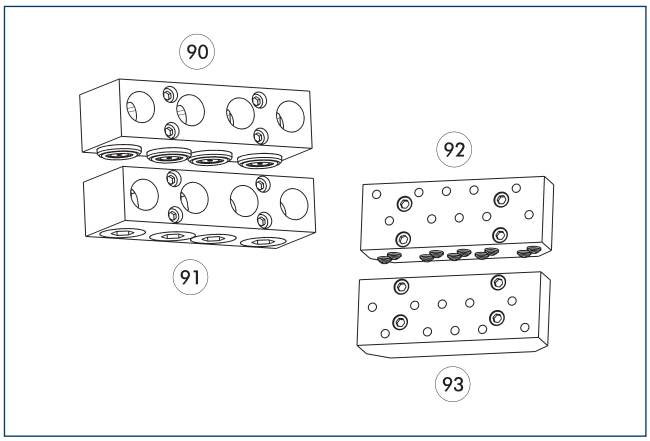
(90) Connection plug / socket straight
(91) Connection plug / socket at an angle
(92) Connection plug / socket straight with extension cable
(93) Connection plug / socket at an angle with extension cable

Other cable lengths on request.

Description	ID	Length
		[m]
Angled cable connector, robot-side		
KAS-19B-K-90-C	0301294	
KAS-26B-K-90-C	0301296	
KAS-36B-K-90	0301274	
Angled cable connector, tool-side		
KAS-19B-A-90-C	0301295	
KAS-26B-A-90-C	0301297	
KAS-36B-A-90	0301275	
Angled cable connector with cable, robot-side		
KV-10-SWK-19F-90	0302173	10
KV-5-SWK-19F-90	0302172	5
Angled cable connector with cable, tool-side		
KV-3-SWA-19F-90	0302175	3
Straight cable connector, robot-side		
KAS-08G-K-0	0301268	
KAS-19B-K-0-C	0301283	
KAS-26B-K-0-C	0301290	
KAS-36B-K-0	0301272	
Straight cable connector, tool-side		
KAS-08G-A-0	0301269	
KAS-19B-A-0-C	0301284	
KAS-26B-A-0-C	0301291	
KAS-36B-A-0	0301273	
Straight cable connector with cable, robot-side		
KV-10-SWK-19F-0	0302171	10
KV-5-SWK-19F-0	0302170	5
Straight cable connector with cable, tool-side		
KV-3-SWA-19F-0	0302174	3

ⓘ For more detailed information and other cable connectors, see catalog chapter "Options" or visit our website.

Pneumatic / fluid feed-through modules



(90) Self-sealing fluid module, robot-side
(91) Self-sealing fluid module, tool-side
(92) Pneumatic module, robot-side
(93) Pneumatic module, tool-side

Modules for transferring fluids (air, vacuum or fluid).

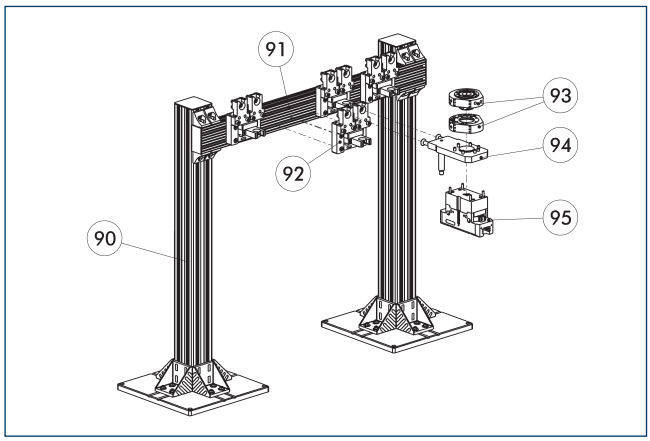
Description	ID	No. of fluid feed-throughs
Feed-through module for liquids on the robot side		
SWO-FG4-K	9937333	4
Feed-through module for liquids on the tool side		
SWO-FG4-A	9937334	4
Feed-through module for pneumatics on the robot side		
SWO-P186-K	9939024	6
Feed-through module for pneumatics on the tool side		
SWO-P186-A	9939025	6

ⓘ For other pneumatic and fluid modules, see catalog chapter "Options" or visit our website.

SWS 110

Quick change system

SWM-M modular storage rack

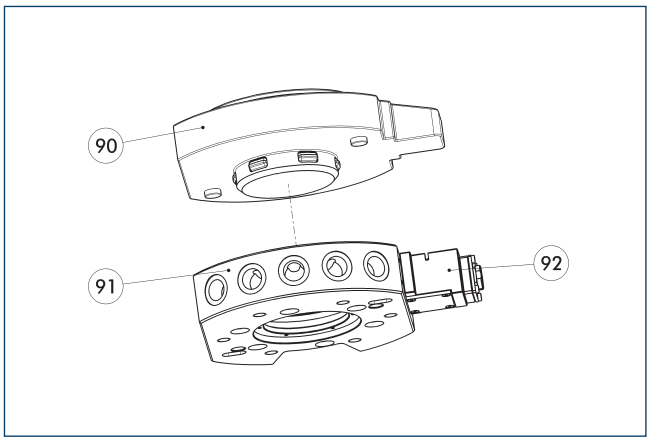


(90) Base plate with upright profile
(91) Horizontal profile
(92) Storage module
(93) Quick-change system SWS
(94) Intermediate plate
(95) Parallel gripper

The modular storage rack is designed for the specific size. The system's modular design allows you to compile your individual storage rack. This provides you with a storage rack that meets your individual requirements, taking into account the number of tools, deposition positions, and tool size. For further information please refer to the chapter "SWM storage rack"

Description	ID	
Storage module		
SWM-TSM-MM-4018	0303214	
Cross profile		
SWM-TSM-HM-3317	0303228	
SWM-TSM-HM 3323	0303229	
Sensor		
IN-B180-S-M12	0303244	
Sensor bracket		
SWM-TSM-SM-4205	0303245	
Vertical profile		
SWM-TSM-PM-3318	0303226	
SWM-TSM-PM-3322	0303227	
Intermediate plate		
SWM-TSM-TP-4059	0303220	

Dust cover SWD-110

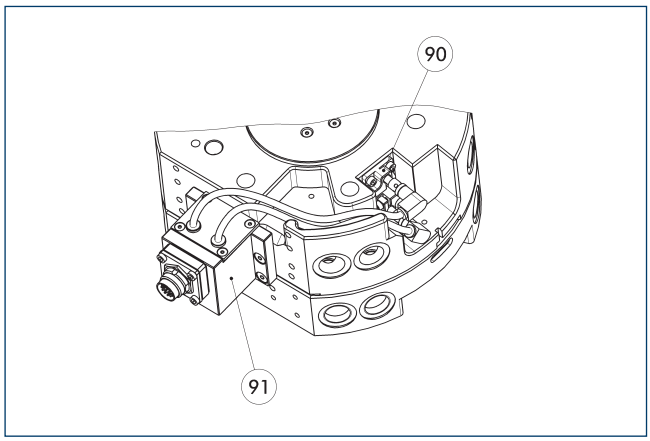


(90) Dust cover SWD
(91) Quick-change adapter SWA
(92) Optional electrical module

The protection cover protects the quick-change adapter in the storage rack against dust and chips. The cover has an integrated clip mechanism which is actuated by locking/unlocking the changing master, allowing the robot to remove the cover from one adapter and placed on another adapter

Description	ID	
Dust cover		
SWD-110-R00-000	0302260	

Assembly situation of the locking monitoring



(90) AS-SWK 110

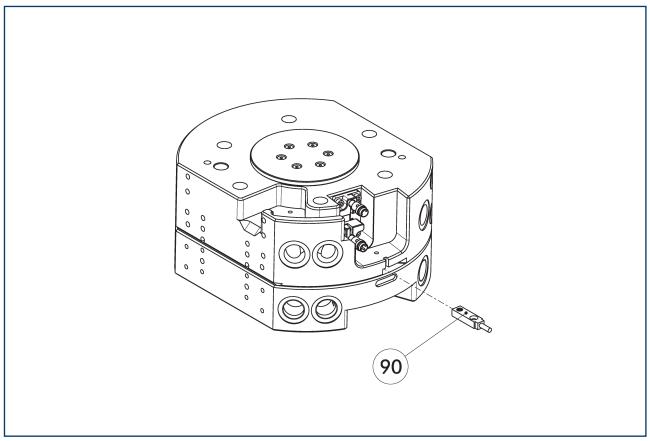
(91) Optional electrical module ...R-master with integrated sensor connection

The drawing shows the quick-change system with integrated piston stroke monitoring and built-in proximity switch; this is directly connected to the electric modules.

Description	ID	
Attachment kit for proximity switch		
AS-SWK-110/160 Anbausatz inklusive Sensor	9957835	

ⓘ The -SG/-SM/-SQ/-IN variants of the SWK include the piston stroke monitoring option. An additional order of the mounting kit is not necessary. The scope of delivery of a mounting kit contains one preset sensor with holder each, meaning that two mounting kits are required per SWK.

Installation situation presence monitoring



(90) Sensor for presence control

Description	ID	
Inductive proximity switches		
INK 8-SL	0302456	

ⓘ For each SWK, a proximity switch is required for presence monitoring.

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