Superior Clamping and Gripping

SCHUNK®

Robot Accessories

Perfection in End-of-Arm Competence

Robot Accessories

Perfection in End-of-Arm Competence

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schunk.com

Follow us

Superior Clamping and Gripping

Jens Lehmann stands for safe, precise gripping and holding. As a brand ambassador of the SCHUNK team, the No. 1 goalkeeper represents our global competence leadership for gripping systems and clamping technology. The top performance of SCHUNK and Jens Lehmann are characterized by dynamics, precision, and reliability.

For more information visit our website:
schunk.com/lehmann

Jens Lehmann

Henrik A. Schunk, Kristina I. Schunk, brand ambassador Jens Lehmann, and Heinz-Dieter Schunk

Top Performance in the Team

SCHUNK is the world's No. 1 for gripping systems and clamping technology – from the smallest parallel gripper to the largest chuck jaw program.

In order to boost efficiency, SCHUNK customers have bought more than 2,000,000 precision toolholders, 1,000,000 SCHUNK grippers, and 100,000 lathe chucks and stationary workholding systems so far.

This makes us proud and motivates us to attain new top performances.

As a competence leader, we recognize and develop standards with a large potential for the future, which will drive the rapid progress in many industries.

Our customers profit from the expert knowledge, the experience, and the team spirit of more than 3,500 employees in our innovative family-owned company.

The Schunk family wishes you improved end results with our quality products.

Heinz-Dieter Schunk Henrik A. Schunk Kristina I. Schunk

Superior Clamping and Gripping

It's time to use your machine's

With superior components, find potentials in your machine where you would least expect to find them.

Make full use of your machine's potential – with the extensive product portfolio from SCHUNK.

SCHUNK, the competence leader for gripping systems and clamping technology, can now open up the full potential of your processing machines and production processes. Reduce costs by combining accurate, flexible workpiece machining with dynamic production automation.

SCHUNK Synergy – when everything fits together.

With SCHUNK Synergy, you benefit from superior components from our innovative family-owned company and the result of a perfectly harmonized interplay of gripping systems and clamping technology. The more SCHUNK, the more efficient it is.

SCHUNK®

full potential!

"Gripping systems and clamping technology – the perfectly adjusted interplay makes you a champion in terms of productivity. We call it SCHUNK Synergy.

Let's have a look where the potentials in your machines are hidden."

Jens Lehmann

SCHUNK No. 1 Products for higher Productivity ...

up to 20 tons load handling
MAGNOS magnetic lifting technology

... in your Lathe

... in your Lathe

60 seconds jaw change
Lathe chucks ROTA-S plus 2.0 and ROTA THW plus

300% better surface quality
TENDOTURN – innovative **hydraulic expansion toolholders,** for lathes and turning/milling centers

1,200 standard chuck jaws
The world's largest **chuck jaw program** for every chuck type

... for your Automated Machine Loading

300 kg lifting force
Robot coupling NSR-A
for pallet handling – space-saving and extremely flexible

… in your Automated Handling System

No. 1 unique
PGN-plus-P, the world-proven gripper on the market – Now with permanent lubrication in the multi-tooth guidance

more than 500 standard combinations
for **line and room gantries** from the modular system

100% cycle increase
Universal swivel unit SRU-plus 20-S, the new benchmark in top performance

90% faster gripper change
Quick-change system SWS – fully automatic gripper change within seconds

… for your Automated Machine Loading

… in your Machining Center

90% less set-up costs
with **VERO-S**, due to set-up during processing time

100% control
TANDEM® **clamping force block KSP plus** with jaw monitoring

30% more productivity
Automated machine loading with the **SCHUNK gripper PGN-plus-P** with **spindle interface GSW**

20 mm height
VERO-S NSE *mini* – the pneumatic **quick-change pallet system** in a very flat design

… in your Automated Handling System

… in your Machining Center

… in your Automated Asse

75,000 customized solutions
Hydraulic expansion technology for tool or workpiece clamping

0.3 mm shank diameter
TRIBOS mini sets a benchmark in micro machining

100% encapsulated
KONTEC centric clamping vise KSK fully functional in harsh environments

less than **3** µ run-out accuracy
TRIBOS-SVL super-slim tool extension optimized interfering contours

5-sided workpiece machining
in one set-up – **MAGNOS magnetic clamping technology**

up to **85,000** RPM
TRIBOS-S predestined for high-speed cutting

... in your Automated Assembly

180% better gripping force – mass ratio

EGP – The powerful electronic **gripper for small components** with integrated electronics

∞ combination options

SCHUNK modular assembly system

25% greater gripping force

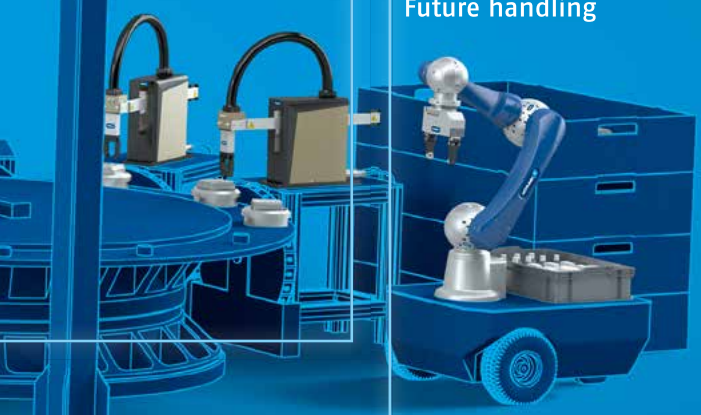
MPG-plus – The most powerful pneumatic **miniature gripper** in the market

110 picks per minute

PPU-E – The fastest pick & place unit in the market, **PPU-P** with 90 picks/min

... in your Service Robotics Application

Future handling



6 degrees of freedom

Powerball lightweight arm LWA 4P

The lightweight arm with the world's most compact performance. Used on mobile platforms

less than 3 µ run-out accuracy

TRIBOS-R with unique patented **polygonal clamping technology**

100% suitable for all SCHUNK toolholders

TENDO-SVL tool extension – optimized interfering contours and super-slim

up to 80 bar coolant-proof or peripheral coolant

Versatile clamping range with **intermediate sleeves GZB-S**

more than 35 years of experience in **TENDO hydraulic expansion technology. TENDO**, the original. With 29 interfaces, versatile, with 3 µ run-out accuracy

2,000 Nm torque with Ø 32 mm

TENDO E compact for large volume cutting, boring, reaming, and threads

0 µ permanent run-out accuracy

TENDO zero, perfect vibration damping, resulting in up to 50% longer service life

Robot Accessories

Perfection in End-of-Arm Competence

Robot accessories from SCHUNK include an extensive line of modules for the mechanical, sensor, and power connections of handling modules and robots. Quick-change systems, rotary feed-throughs, collision and overload modules, force sensors, compensation units, and insertion units ensure optimal interplay between the robot arm and gripper. This cutting edge technology "Made in Germany" requires our continuous innovative drive.

Strong arguments for SCHUNK robot accessories:

- Extensive product line from one source
- Suitable for nearly all robot types
- Easy integration
- Compact design
- Series with perfectly matching sizes

Content

Robots: Equipped by SCHUNK

The SCHUNK End-of-Arm Competence for your Robot. From the standard Component to the standard Gripping System.

SCHUNK provides the most comprehensive range of modules for the mechanical, sensory, and power connection of handling devices and robots. Quick-change systems, rotary feed-throughs, collision and overload sensors, force sensors as well as compensation units and insertion units ensure optimum interplay between the robot arm and gripper. The basis for this cutting-edge technology "Made in Germany" is our constant innovation.

Equipped by SCHUNK

Feeding through

Over **50** process-stable pneumatic, electrical or combined SCHUNK rotary feed-throughs.
schunk.com/feeding-through


DDF 2


DDF-SE

Protecting

Over **60** collision and overload sensors used to monitor, record and avoid collisions.
schunk.com/protecting


OPR


OPS

Measuring

Over **150** sensors for precise measurement of forces and torques.
schunk.com/measuring


FTN


FTW

Changing

More than **100** precise quick-change systems for flexible, fast change of effectors.
schunk.com/changing


SWS


SHS


EWS

Compensating

Over **90** components to compensate position deviations and tolerances between robot and the tool.
schunk.com/compensating


AGE-Z 2


TCU

SCHUNK Grippers

The world's most extensive gripper portfolio with over **2,550** pneumatic and electric components. **schunk.com/grippers**


PGN-plus-P


PZN-plus


DPG-plus


PHL


EGA


EGN

Machining

Flexible SCHUNK deburing spindles for the use on robots with up to **65,000** revolutions per minute.
schunk.com/machining

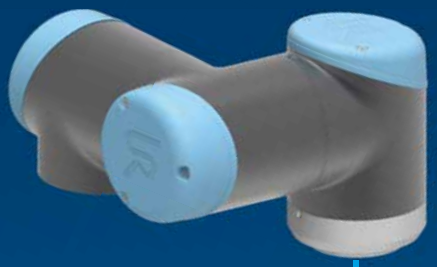

FDB


FDB-AC

Further product information is available at:
schunk.com/robot-accessories

The new SCHUNK End-of-Arm Modular System

The most comprehensive modular Gripping System for all Universal Robots on the Market.



The new SCHUNK End-of-Arm modular system, exclusively for Universal Robots, facillitates the individual and fast automation of handling and assembly tasks. The modular system provides a combination of a force/torque sensor, change system and a wide range of grippers.

Up to 36 product combination possibilities

schunk.com/eoa-ur

Collaborating SCHUNK Grippers

Collaborating gripper for small components

Co-act EGP-C

Electric SCHUNK Grippers

Gripper for small components

EGP

Measuring

6-axis force/torque sensor FT-AXIA
completely with adapter plates.

FT-AXIA

Changing

Manual change system SHS
Quick-change master (SHK) and quick-change adapter (SHA) with suitable through-feeding module.

SHS

Pneumatic SCHUNK Grippers

Pneumatic gripping systems with direct connection and integrated micro valves, sensor system with connection cable.

PGN-plus-P

KGG

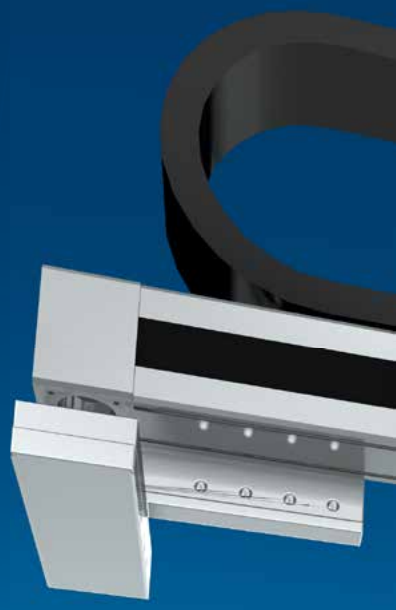
PSH

PZN-plus

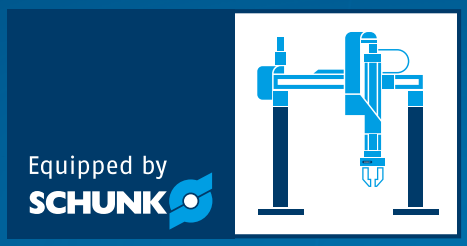
JGP

Gantry Systems: Equipped by SCHUNK

SCHUNK End-of-Arm Competence for your Gantry. Over 4,000 Components for Handling and Assembly.



With the linear module product offering combined with rotary modules, swivel units, grippers, quick-change systems, rotary indexing tables and sensor systems, SCHUNK opens up new perspectives for cost and use-optimized automation solutions.
Designed to be compact and from the modular system: From the axis right up to the gripper finger and combined for customized axis system handling solution.



Change Systems

More than **100** precise change systems for flexible, fast change of effectors.
schunk.com/changing

SWS SHS

Rotary Modules

Over **600** components are available for rotatory movements. Variable from 180° to infinite rotation.
schunk.com/rotary-modules

SRM SRU-plus SRH-plus ERM

ERS PR 2 ERD

Compensation Units

Over **90** components to compensate position deviations and tolerances between the robot and the tool.
schunk.com/compensating

TCU AGE-S

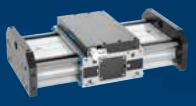
Linear Modules

More than **450** components, pneumatic and electric components with up to **7,000 mm** stroke. The most comprehensive offering on the market. **schunk.com/linear-modules**


Beta


Delta


Gamma


LDT


LDK


LDN


PMP

Gantry Solutions

More than **500** combination possibilities can be configured as standard! Besides the SCHUNK standard gantry range, individual axis systems can be implemented individually and easily. **schunk.com/gantry-solutions**


LPP


LPE


RPE

SCHUNK Grippers

The world's most comprehensive gripper portfolio with over **2,550** pneumatic and electric components. **schunk.com/grippers**

PGN-plus-P


PZN-plus


PWG-plus


PSH

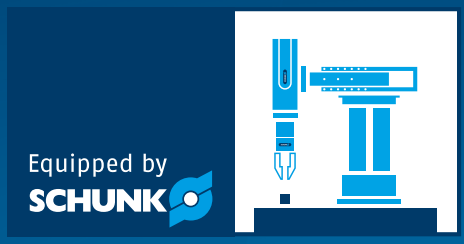

PGN-plus-E

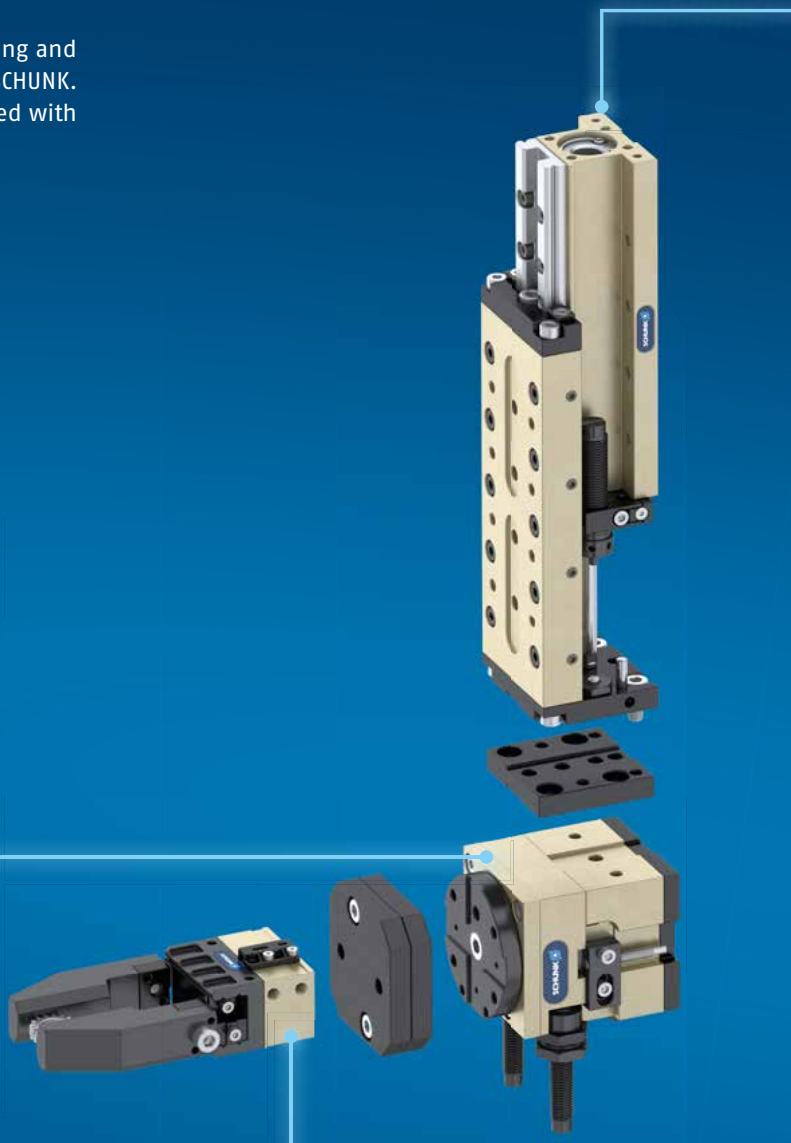

EGL

Assembly Automation: Equipped by SCHUNK

100% Flexiblity with the Modular System.

Design an infinite number of applications for small parts handling and assembly automation with the modular assembly system from SCHUNK. An incredible variety of automated solutions can be implemented with standard modules from the SCHUNK modular system.





Rotary Modules

Over **600** components available for rotatory movements. Variable from 180° to infinite rotation.
schunk.com/rotary-modules


RM-F


RM-W


RST-D


ERD


ERS

SCHUNK Grippers

The world's most comprehensive gripper portfolio with over **2,550** pneumatic and electric components.
schunk.com/grippers


MPG-plus


MPG


KGG


PGN-plus-P


MPZ


PZN-plus


SWG


PWG-plus


GAP


EGP


PGN-plus-E

Linear Modules

More than **450** pneumatic and electric components with up to **7,000 mm** stroke. The most comprehensive program on the market.
schunk.com/linear-modules


LM

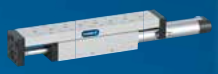

CLM


KLM

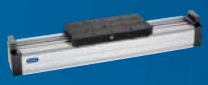

HLM


ELP


ELB


ELM


ELS


PMP

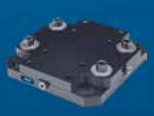

Delta


Beta

SCHUNK Pillar Assembly System

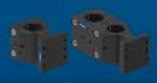
100% flexible. Achieves a virtually infinite number of possibilities for combining components. Pillars up to **1,000 mm** in length.
schunk.com/pillar-assembly-system

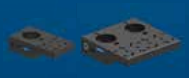

Media feed-through


VEH


SOE


AMEH/AMDH


AMEV/AMDV


APEH/APDH


STG/STR

Cobots: Equipped by SCHUNK

The Mega Trend of Human-Robot Collaboration

From robots that replace workers to robots that serve as helpful colleagues, the field of robotic automation is experiencing a new trend that represents a huge challenge for component manufacturers.
Whenever full automation of production or assembly lines is not the most economically feasible option, it is necessary to single out individual processes to be delegated between humans and robots. In such situations, autonomous cobots, meaning robots used in the worker's immediate environment, can handle non-ergonomic or monotonous tasks such as assisting with lifting or positioning loads. This reduces the physical workload for workers and makes the process more efficient. At the same time, humans and robots working hand in hand helps to minimize space requirements and to increase flexibility.

The number of robotic assistance systems will increase in the future, especially with regard to assembly applications, and a universal networking at the component level will be vital.

As the competence leader for gripping systems and clamping technology, SCHUNK is intensively commited to this new challenge.

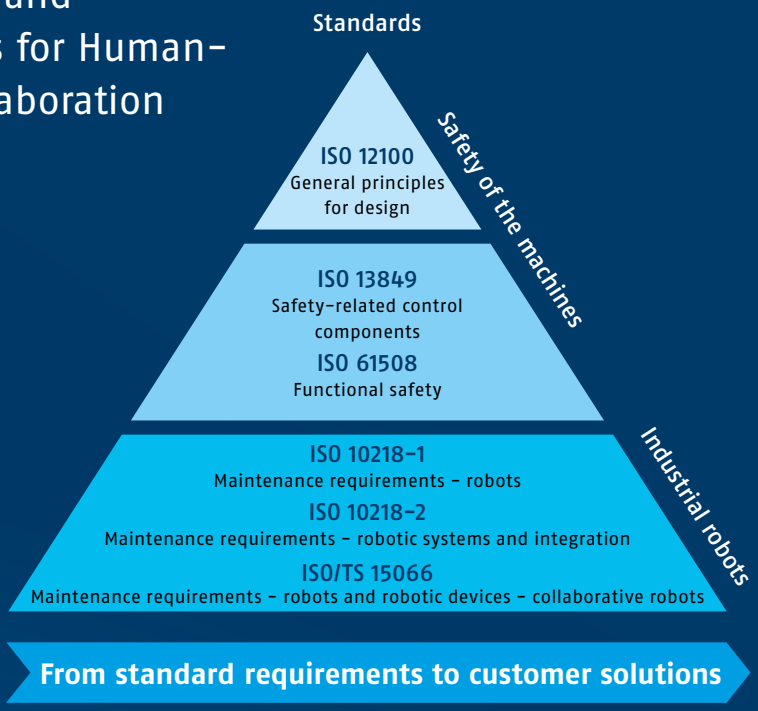
The new SCHUNK Grippers for Collaborative Operations

co-act JL1 Gripper

co-act EGP-C Gripper

co-act EGL-C Gripper

Standards and Guidelines for Human-Robot Collaboration



The listed standards and guidelines are not exhaustive. For every application the applicability of further standards or guidelines have to be determined.

The Path toward the optimum Gripper for your HRC Application

To determine the optimum gripper for collaborative applications, the properties of the task, workpiece, and gripper must be taken into account.

The **SCHUNK Co-act team** recommends a structured approach, considering all factors and parameters.

Step 1

Task description and feasibility check

- Are the task and workpiece suitable for human-robot collaboration?

Step 2

Selection of the robot or cobot

- Definition of the basic system with mechanical and electrical connection of the peripheral devices
- Ensuring a defined control

Step 3

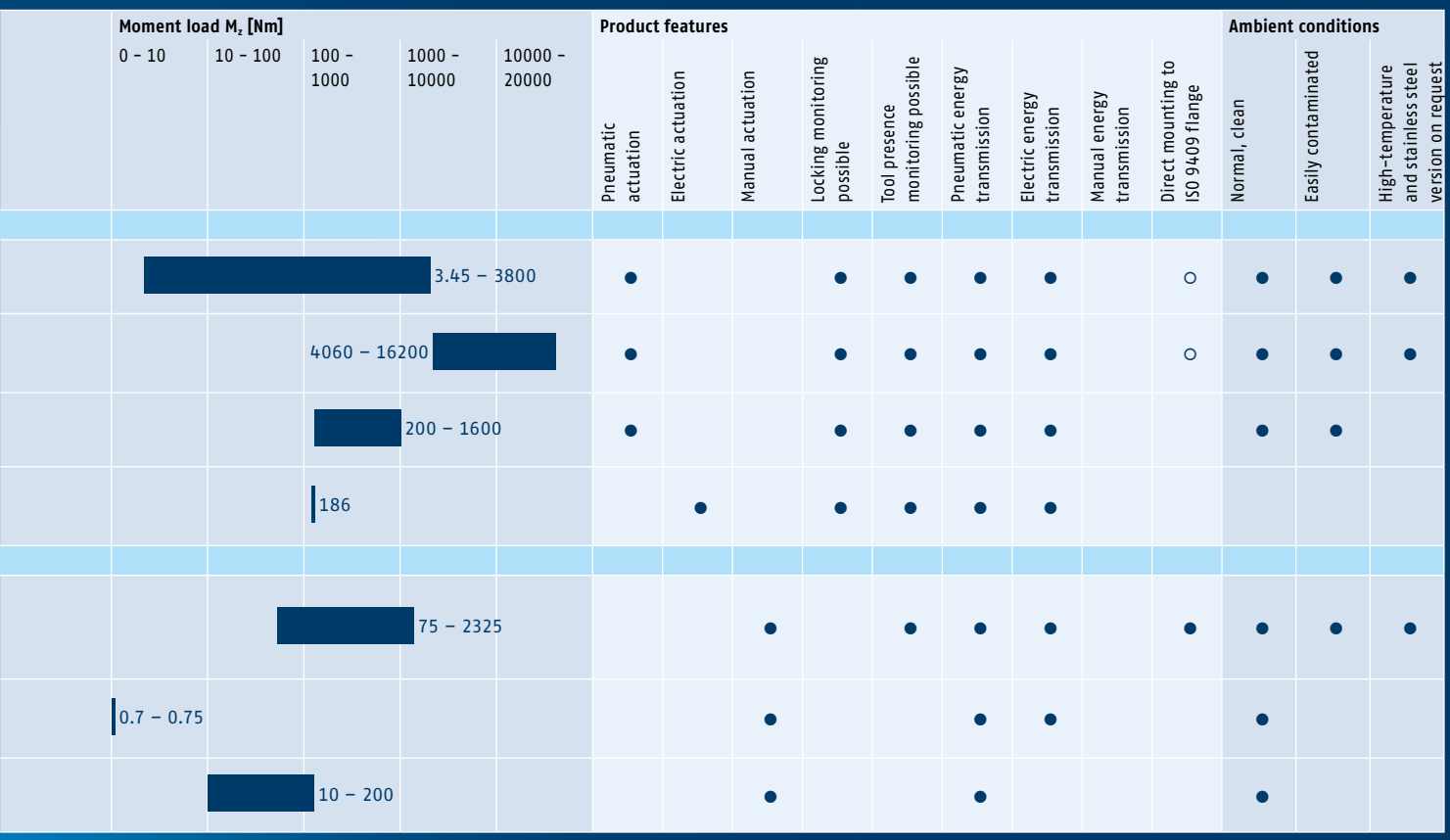
Selecting the gripper in collaboration with the SCHUNK Co-act team considering the following points:

- Workpiece with respect to gripping position, required gripping force, and required stroke
- Pick & Place position and in turn analysis of the interfering contour
- Connection to the superordinate mechanical and electrical periphery
- Clamping and shearing points on the gripper or the attached fingers

Changing

Product Quickfinder

	Page		Recommended handling weight [kg]				Moment load M_{xy} [Nm]			
			0 - 10	10 - 100	100 - 1000	1000 - 1500	0 - 100	100 - 1000	1000 - 10000	10000 - 15000
Automatic systems										
Quick-change system SWS • With patented locking	24				1.4 – 300				2.8 – 7170	
Quick-change system SWS-L • With patented locking • For heavy loads	54			300 – 1350					7600 – 13500	
Pallet change system NSR-A • With patented locking	76							75 – 600		
Quick-change system EWS • With patented locking • Conol via digital I/O	82			18				150		
Manual systems										
Manual change system SHS • Integrated air and signal feed-through • Locking monitoring	88				9 – 58				45 – 960	
Miniature change system MWS • Integrated air feed-through • Compatible with SCHUNK gripper	98		0.5 – 1.0				0.5 – 1.0			
Compact change system CWS • Integrated air feed-through	104				10 – 28				20 – 160	



● = Very highly suitable ◐ = Highly suitable ○ = Suitable in customized version

Modular. Robust. Flexible.
Quick-change System SWS

Pneumatic tool-change system with patented locking system

Field of Application

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

Advantages – Your benefits

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

Patented fail-safe locking mechanism for safe 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 change 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

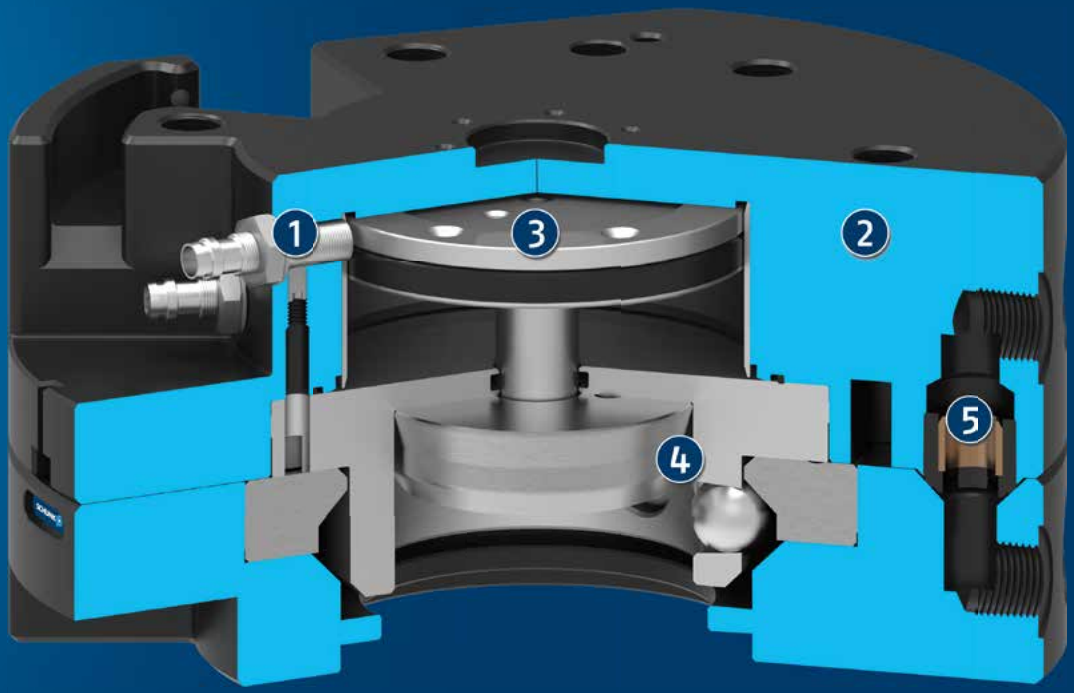
Suitable storage racks for all sizes to ensure the optimum adaption to each application

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

Sizes	Handling weight	Moment load M_x	Moment load M_z
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 safe. After coupling, pneumatic and electric feed-throughs automatically supply your robot tool.



① **Sensor monitoring of the locking**
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, powerful, and easy to handle

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

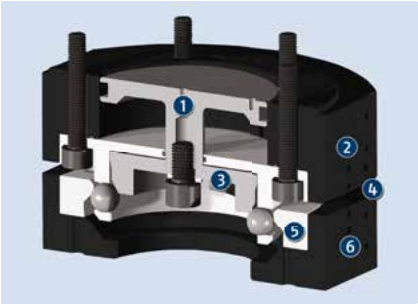
⑤ **Air feed-through**
Without interfering contours due to the integration into the housing. Also suitable for vacuum.

Detailed Functional Description

Quick-change system in unlocked position

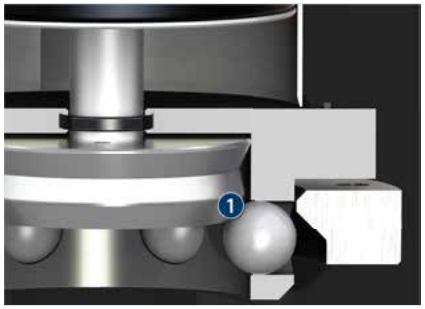
1. Adapter plate
2. Quick-change master SWK
3. Electrical module, robot-side
4. Locking mechanism
5. Locking ring
6. Quick-change adapter SWA
7. Electrical module, tool-side

Sectional diagram in ready-to-lock position



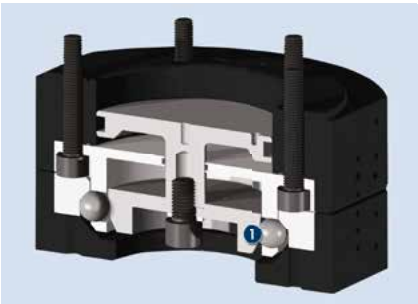
1. Piston
2. Quick-change master SWK
3. Locking piston
4. No-Touch-Locking™
5. Locking ring
6. Quick-change adapter SWA

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



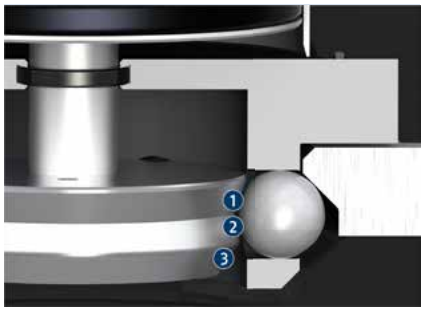
1. Hardened locking ball is on the first taper of the cam. The first taper allow master and tool to be separate while locking.

Sectional diagram 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 master.

Detail view of the locking ball in locked position

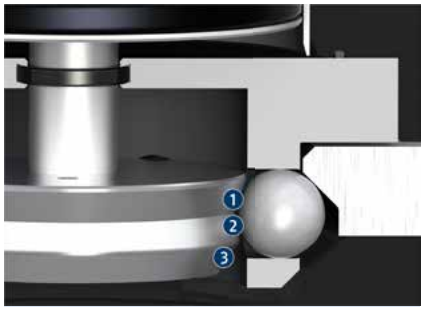


1. Hardened steel balls on the second taper of the cam create extremely high locking forces.
2. Fail-safe reverse taper
3. First taper of the cam

Sectional diagram 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 master and adapter can only be separated by pneumatic actuation of the piston.
2. Fail-safe reverse taper
3. First taper of the cam

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.

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 SWS even more productive – the suitable addition for the highest functionality, flexibility, reliability, and controlled production.

Compensation unit

Collision and overload sensor

Rotary feed-through

Universal gripper

Inductive proximity switch

Electronic module

Storage rack

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

Options and special Information

No-Touch-Locking™: Locking without touching. Ensures that the SWS is safely 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	6x 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		

Ordering Example SWS

SW K - 110 - R19 - G19 - SM

Description
SW

Side
K = Master (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

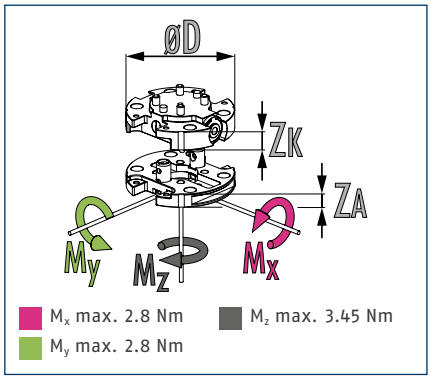
Proximity switch monitoring (for SWS 007/011H/020H/021H/040Q/076/110/160)
MMS = Magnetic switch (SWK-007)
SG = Inductive proximity switch (SWK-040Q/076)
SM = Inductive proximity switch (SWK-110/160)
SQ = Inductive proximity switch (SWK-011H/020H/021H)
SIP = Monitoring prepared, inductive proximity switch not included (SWK-001/005/011/020/021/027/041/046/060/071)
0 = Monitoring possible, not included in the scope of delivery

More versions on request

SWS 001

Changing | Automatic Systems | 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.

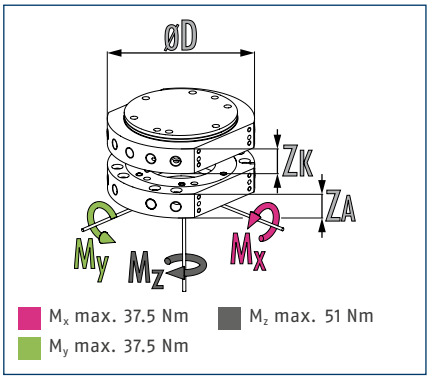
Technical data

Description		SWK-001-000-000	SWA-001-000-000	SWK-001-E04-E04	SWA-001-E04-E04
		Quick-change master	Quick-change adapter	Quick-change master	Quick-change adapter
ID		0302290	0302291	0302292	0302293
Recommended handling weight	[kg]	1.4	1.4	1.4	1.4
Locking force	[N]	170	170	170	170
Repeat accuracy	[mm]	0.01	0.01	0.01	0.01
Weight	[kg]	0.03	0.02	0.08	0.04
Max. distance when locking	[mm]	1	1	1	1
Air connection thread pneumatic feed-through		4x M5	4x M5	4x M5	4x M5
Lock/unlock main connection		M3		M3	
Number of electrical feed-throughs				8	8
Voltage	[V]			50	50
Max. current	[A]			3	3
Max. permissible XY-axis offset	[mm]	±0.3	±0.3	±0.3	±0.3
Max. permissible angular offset	[°]	±0.8	±0.8	±0.8	±0.8
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9	4.5/6.9	4.5/6.9
Dimensions Ø D x Z*	[mm]	45 x 10.9	45 x 6	45 x 10.9	45 x 6
Mounting pattern		S1	S1	S1	S1

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws

Dimensions and maximum loads



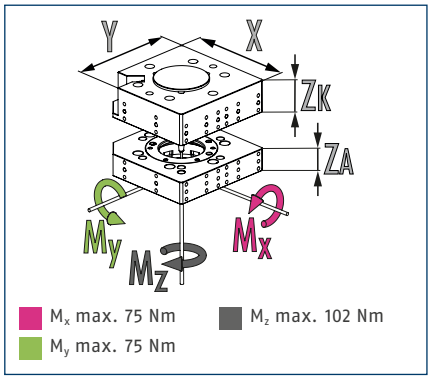
ⓘ This is the max. sum of all forces and moments which are permitted to act on the change system for ensuring proper functioning.

Technical data

Description		SWK-005-000-000	SWA-005-000-000
		Quick-change master	Quick-change adapter
ID		0302307	0302308
Recommended handling weight	[kg]	8	8
Locking force	[N]	690	690
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	0.27	0.09
Min. distance when locking	[mm]	1.5	1.5
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		6x M5	6x M5
Lock/unlock main connection		M5	
Max. permissible XY-axis offset	[mm]	±1	±1
Max. permissible angular offset	[°]	±2	±2
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]	49 x 17.5	49 x 26
Mounting pattern		S5	S5

* 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.

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-007-000-000-MMS	SWA-007-000-000
		Quick-change master	Quick-change adapter
ID		1365503	1365513
Recommended handling weight	[kg]	16	16
Piston stroke monitoring		Integrated	
Locking force	[N]	1100	1100
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	0.16	0.08
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		5x M5	5x M5
Lock/unlock main connection		M5	
Max. permissible XY-axis offset	[mm]	±1	±1
Max. permissible angular offset	[°]	±2	±2
Robot-side connection		ISO 9409-1-31.5-4-M5	ISO 9409-1-31.5-4-M5
Min./max. ambient temperature	[°C]	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9
Dimensions X x Y x Z*	[mm]	52.1 x 48.3 x 28.4	52.1 x 48.3 x 17.1
Mounting pattern		S7	S7

* 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.

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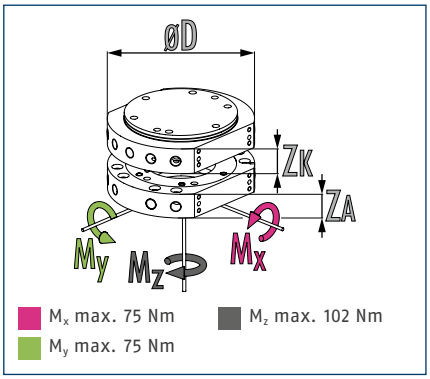
Dimensions and maximum loads



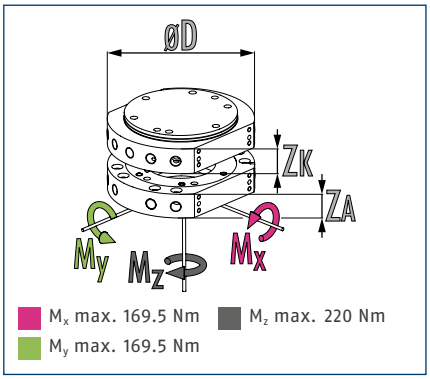
ⓘ This is the max. sum of all forces and moments which are permitted to act on the change system for ensuring proper functioning.

Technical data

Description		SWK-011-000-000	SWK-011HM-000-000-SQ	SWA-011-000-000
		Quick-change master	Quick-change master for hollow wrist robots	Quick-change adapter
ID		0302316		0302317
Recommended handling weight	[kg]	16	16	16
Piston stroke monitoring		Optional	Integrated	
Locking force	[N]	1100	1100	1100
Repeat accuracy	[mm]	0.015	0.015	0.015
Weight	[kg]	0.13	0.29	0.09
Max. distance when locking	[mm]	3	3	3
Air connection thread pneumatic feed-through		6x M5	6x M5	6x M5
Lock/unlock main connection		M5	M5	
Max. permissible XY-axis offset	[mm]	±1	±1	±1
Max. permissible angular offset	[°]	±2	±2	±2
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9	4.5/6.9
Dimensions Ø D x Z*	[mm]	50 x 15.5	50 x 46.4	50 x 20.6
Mounting pattern		S7	S7	S7

* 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.

Dimensions and maximum loads



M_x max. 169.5 Nm
M_z max. 220 Nm
M_y max. 169.5 Nm

ⓘ 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-020-000-000	SWK-020HM-000-000-SQ	SWA-020-000-000
		Quick-change master	Quick-change master for hollow wrist robots	Quick-change adapter
ID		0302322		0302323
Recommended handling weight	[kg]	25	25	25
Piston stroke monitoring		Optional	Integrated	
Locking force	[N]	2300	2300	2300
Repeat accuracy	[mm]	0.015	0.015	0.015
Weight	[kg]	0.69	0.68	0.32
Max. distance when locking	[mm]	3	3	3
Air connection thread pneumatic feed-through		12x M5	12x M5	12x M5
Lock/unlock main connection		M5	M5	
Max. permissible XY-axis offset	[mm]	±1	±1	±1
Max. permissible angular offset	[°]	±2	±2	±2
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9	4.5/6.9
Dimensions Ø D x Z*	[mm]	90 x 18.7	90 x 46	90 x 23.7
Mounting pattern		K	K	K

* 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.

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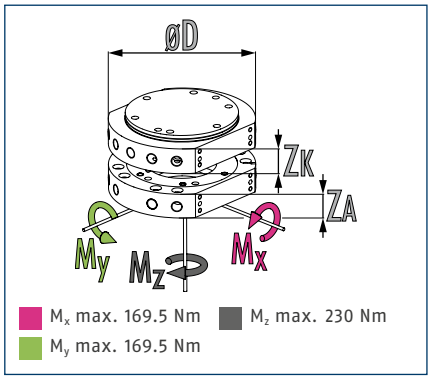
Dimensions and maximum loads



ⓘ 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

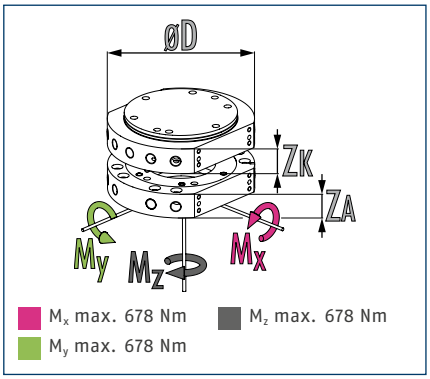
Description		SWK-021-000-000	SWK-021HM-000-000-SQ	SWA-021-000-000
		Quick-change master	Quick-change master for hollow wrist robots	Quick-change adapter
ID		0302326		0302327
Recommended handling weight	[kg]	25	25	25
Piston stroke monitoring		Optional	Integrated	
Locking force	[N]	2300	2300	2300
Repeat accuracy	[mm]	0.015	0.015	0.015
Weight	[kg]	0.5	0.7	0.3
Max. distance when locking	[mm]	3	3	3
Air connection thread pneumatic feed-through		8x G1/8"	8x G1/8"	8x G1/8"
Lock/unlock main connection		M5	M5	
Max. permissible XY-axis offset	[mm]	±1	±1	±1
Max. permissible angular offset	[°]	±1	±1	±1
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9	4.5/6.9
Dimensions Ø D x Z*	[mm]	95 x 22.1	95 x 58.9	95 x 23.8
Mounting pattern		K-flat A/S21 flat B	K-flat A/S21 flat B	K-flat A/S21 flat B

* 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.

SWS 040

Changing | Automatic Systems | Quick-change System

Dimensions and maximum loads



M_x max. 678 Nm
M_z max. 678 Nm
M_y max. 678 Nm

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

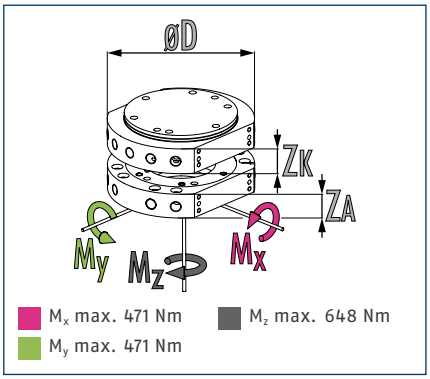
Technical data

Description		SWK-040Q-000-000-SG	SWA-040-000-000
		Quick-change master	Quick-change adapter
ID		0302364	0302343
Recommended handling weight	[kg]	50	50
Piston stroke monitoring		Integrated	
Locking force	[N]	5650	4500
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	1.27	0.6
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		8x G1/8"	8x G1/8"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±2	±2
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]	115 x 35.2	115 x 27.1
Mounting pattern		J	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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws

Dimensions and maximum loads



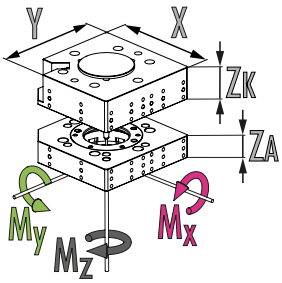
ⓘ This is the max. sum of all forces and moments which are permitted to act on the change system for ensuring proper functioning.

Technical data

Description		SWK-041-000-000	SWA-041-000-000
		Quick-change master	Quick-change adapter
ID		0302346	0302347
Recommended handling weight	[kg]	50	50
Piston stroke monitoring		Optional	
Locking force	[N]	4500	4500
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	1.4	0.7
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		6x G3/8"	6x G3/8"
Air connection thread pneumatic feed-through		4x G1/8"	4x G1/8"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±2	±2
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]	130 x 32.3	130 x 27
Mounting pattern		J	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.

Dimensions and maximum loads



M_x max. 678 Nm
M_z max. 882 Nm
M_y max. 678 Nm

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

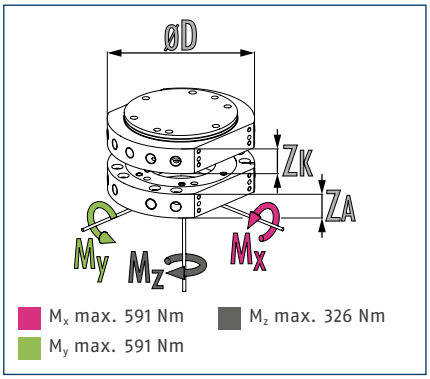
Technical data

Description		SWK-046-0-0-000-0-SM	SWA-046-0-0-000-0
		Quick-change master	Quick-change adapter
ID		1330577	1315663
Recommended handling weight	[kg]	50	50
Piston stroke monitoring		Integrated	
Locking force	[N]	5800	5800
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	1.95	1.03
Max. distance when locking	[mm]	2.5	2.5
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±1.5	±1.5
Max. permissible angular offset	[°]	±2	±2
Robot-side connection		ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8
Min./max. ambient temperature	[°C]	5/60	5/60
Min./max. operating pressure	[bar]	4.5/6.9	4.5/6.9
Dimensions X x Y x Z*	[mm]	129.5 x 129.5 x 39.1	129.5 x 129.5 x 27
Mounting pattern		5 x J	5 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws

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

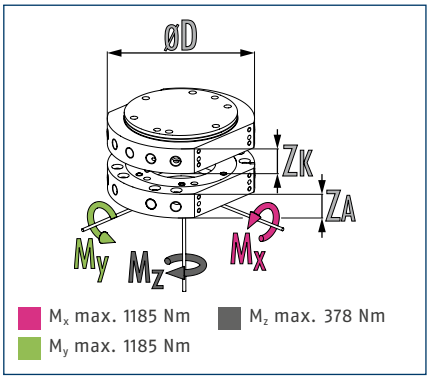
Description		SWK-060-000-000	SWA-060-000-000
		Quick-change master	Quick-change adapter
ID		0302362	0302363
Recommended handling weight	[kg]	75	75
Piston stroke monitoring		Optional	
Locking force	[N]	7400	7400
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	1.3	0.7
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		8x G1/8"	8x G1/8"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±1	±1
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]	130 x 24.1	130 x 23.1
Mounting pattern		K-flat A/S60 flat B	K-flat A/S60 flat B

* 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.

SWS 071

Changing | Automatic Systems | Quick-change System

Dimensions and maximum loads



M_x max. 1185 Nm
M_z max. 378 Nm
M_y max. 1185 Nm

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

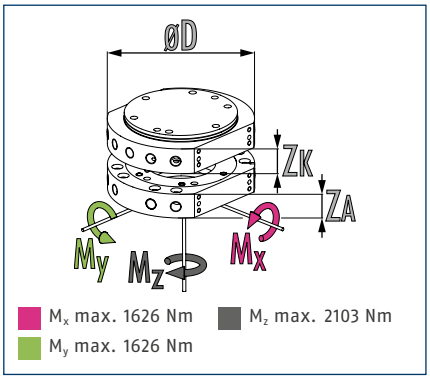
Technical data

Description		SWK-071-000-000	SWA-071-000-000
		Quick-change master	Quick-change adapter
ID		0302370	0302371
Recommended handling weight	[kg]	79	79
Piston stroke monitoring		Optional	
Locking force	[N]	8100	8100
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	1.8	1.3
Max. distance when locking	[mm]	3	3
Air connection thread pneumatic feed-through		8x G1/4"	8x G1/4"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±1	±1
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]	150 x 30.2	150 x 32.1
Mounting pattern		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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws

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

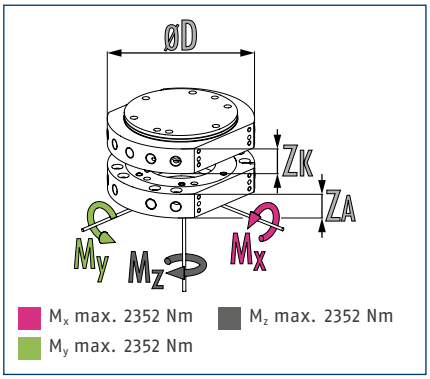
Description		SWK-076-000-000-SG	SWA-076-000-000
		Quick-change master	Quick-change adapter
ID		0302392	0302391
Recommended handling weight	[kg]	100	100
Piston stroke monitoring		Integrated	
Locking force	[N]	12000	12000
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	2.25	1.4
Min. distance when locking	[mm]	1	1
Max. distance when locking	[mm]	2	2
Air connection thread pneumatic feed-through		5x G3/8"	5x G3/8"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±1	±1
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]	160 x 37.3	160 x 30.9
Mounting pattern		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.

SWS 110

Changing | Automatic Systems | 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.

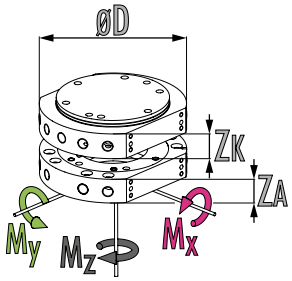
Technical data

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
Mounting pattern		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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws

Dimensions and maximum loads



For values see technical data table

ⓘ 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-160-000-000-SM	SWA-160-000-000
		Quick-change master	Quick-change adapter
ID		0302440	0302441
Recommended handling weight	[kg]	300	300
Piston stroke monitoring		Integrated	
Locking force	[N]	31000	31000
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	6.44	2.86
Max. distance when locking	[mm]	2.54	2.54
Air connection thread pneumatic feed-through		5x G3/8"	5x G3/8"
Air connection thread pneumatic feed-through		4x G1/2"	4x G1/2"
Lock/unlock main connection		G1/8"	
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±1	±1
Robot-side connection		ISO 9409-1-125-10-M10	ISO 9409-1-125-10-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]	217 x 55.5	217 x 37.6
Mounting pattern		2 x J	2 x J

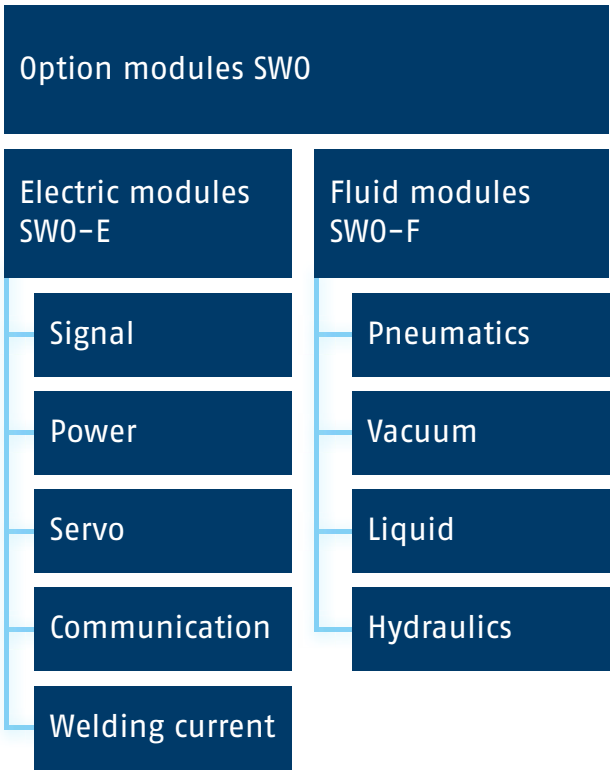
* Please note that the heights of the change master (ZK) and change adapter (ZA) differ. The sum represents the total height of a coupled change system.

Option Modules SWO

The flexibility of the SCHUNK quick-change system is characterized by the large number of different modules offered, making it possible to transmit a broad range of media. Due to the wide variety of available modules, only a few of the most important modules will be featured in the following chapter. On request, we can assist you in finding the right module for your application's requirements.

If a standard module is not available, special designs are also available.

The following overview divides the modules into different groups consisting of SWO-E electric and SWO-F fluid modules:



Depending on the size of the quick-change system, various modules are available due to the different mounting pattern diagrams. Different adapter plates are available for many of the combinations. Please contact our technical consultants for more information. You can find an overview of the direct mounting pattern diagrams for the individual sizes in the following table:

Description of the mounting pattern diagram	Suitable for sizes
S1	SWS 001
S5	SWS 005
	SHS 040 and 050 via adapter plate
S7	SWS 007, SWS 011
S21	SWS 021 side B
S60	SWS 060 side B
K	SWS 020, SWS 021 side A, SWS 060 side A
	SHS 063 and 080 via adapter plate
J	SWS 040Q, SWS 041, SWS 046, SWS 071, SWS 076, SWS 110, SWS 160
	SHS 100, SHS 125

Electric Modules SWO-E

In the following tables you can find a selection of the most important electric modules, which make a variety of electrical energy transmission options possible via the quick-change system. In addition, SCHUNK offers a range of different plug connectors for a large selection of modules.

Modules for Signal Transmission

The following modules are used for transmitting electric signals. They feature easily replaceable, spring-loaded pins, making them suitable for a wide range of change cycles. There is a large selection of different mechanical plug connectors.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
E04 Adapter	9960360	S1	3 A/50 VDC	Solder contacts	4 pins may be used by customer, axial cable outlet
E04 Master	9960359				
E06 Adapter	9962998	S1	3 A/50 VDC	Solder contacts	6 pins may be used by customer, axial cable outlet
E06 Master	9962997				
B15 Adapter	9937327	S5	3 A/50 VDC	D-Sub	15 pins may be used by customer, radial cable outlet
B15 Master	9937326				
E2A Adapter	9941290	S5	3 A/50 VDC	Solder contacts	20 pins may be used by customer
E2A Master	9941289				
E3A Adapter	9941632	S5	3 A/50 VDC	Solder contacts	30 pins may be used by customer
E3A Master	9941631				
EM8-005 Adapter	9966151	S5	1.5 A/30 VDC	Threaded cap M8	8 pins may be used by customer, radial cable outlet
EM8-005 Master	9966150				
A15 Adapter	9936356	S7	3 A/50 VDC	D-Sub	15 pins may be used by customer, radial cable outlet
A15 Master	9936357				
EM8-011 Adapter	9966154	S7	1.5 A/30 VDC	Threaded cap M8	8 pins may be used by customer, radial cable outlet
EM8-011 Master	9966153				

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
K12 Adapter	9948702	K	2 A/50 VDC	Threaded cap M12	12 pins may be used by customer, radial cable outlet
K12 Master	9948701				
K19 Adapter	9937329	K	3 A/50 VDC	Amphenol PT bayonet lock	19 pins may be used by customer, radial cable outlet
K19 Master	9937328				
K19P Master	9949315				19 pins (15 pins may be used by customer, piston stroke monitoring, plug-on version)
K19H Master	1326096				
K19W Master	9949316				
K26 Adapter	9937799	K	3 A/50 VDC	Amphenol PT bayonet lock	26 pins may be used by customer, radial cable outlet
K26 Master	9937798				
K26P Master	1301550				26 pins (22 pins may be used by customer, piston stroke monitoring system, plug-on version)
KF19 Adapter	9959887	K	3 A/50 VDC	Threaded cap M16	19 pins may be used by customer, radial cable outlet
KF19 Master	9959886				
KF19P Master	9872377				19 pins (15 pins may be used by customer, piston stroke monitoring system, plug-on version)
KG19 Adapter	9950144	K	3 A/50 VDC	Amphenol PT bayonet lock	19 pins may be used by customer, radial cable outlet, cable outlet can be swiveled in 5 positions
KG19 Master	9950140				
G19 Adapter	9940650	J	3 A/250 VAC	Amphenol PT bayonet lock	19 pins may be used by customer, radial cable outlet, cable outlet can be swiveled in 5 positions
G19 Master	9940649				
G19R Master	9949311				19 pins (15 pins may be used by customer, piston stroke monitoring plug-on version, cable outlet can be swiveled in 5 positions)
G19W Master	9949312				
G26 Adapter	9941561	J	3 A/250 VAC	Amphenol PT bayonet lock	26 pins may be used by customer, cable outlet can be swiveled in 5 positions
G26 Master	9941560				
G26W Master	9956897				26 pins (22 pins may be used by customer, piston stroke monitoring plug-on version, cable outlet can be swiveled in 5 positions)
G26R Master	9959953				
GF19 Adapter	9948658	J	3 A/125 VAC	Threaded cap M16	19 pins may be used by customer, radial cable outlet, cable outlet can be swiveled in 5 positions
GF19 Master	9948655				
NB8 Adapter	30086745	J	3 A/24 VDC	Threaded cap M12	11 pins may be used by customer, inductive transmission, including 0.24 m connection cable
NB8 Master	30086744				
R19 Adapter	9935816	J	5 A/250 VAC	Amphenol PT bayonet lock	19 pins may be used by customer, radial cable outlet
R19 Master	9935815				
R19R Master	9942391				19 pins (15 pins may be used by customer, piston stroke monitoring plug-on version)
R19W Master	9942041				
R26 Adapter	9935820	J	3 A/250 VAC	Amphenol PT bayonet lock	26 pins may be used by customer, radial cable outlet
R26 Master	9935819				
R26R Master	9949320				26 pins (22 pins may be used by customer, piston stroke monitoring plug-on version)
R26W Master	9942076				
R32 Adapter	9941388	J	3 A/250 VAC	Amphenol PT bayonet lock	32 pins may be used by customer, radial cable outlet
R32-H Master	9941387				
R32R Master	9948853				32 pins may be used by customer, piston stroke monitoring plug-on version
R32W Master	9942418				
RF19 Adapter	9948657	J	3 A/50 VDC	Threaded cap M16	19 pins may be used by customer, radial cable outlet
RF19 Master	9948654				
RF19R Master	9949324				19 pins (15 pins may be used by customer, piston stroke monitoring plug-on version)
RF19W Master	9949325				
RF5 Adapter	9873395	J	9 A/250 VAC	Threaded cap 7/8"	5 pins may be used by customer, radial cable outlet
RF5 Master	9873394				
RK19 Adapter	9965783	J	3 A/30 VDC	Intercontec M23 threaded cap	19 pins may be used by customer, radial cable outlet
RK19 Master	9965782				
S19 Adapter	9935818	J	5 A/250 VAC	Amphenol PT bayonet lock	19 pins may be used by customer, axial cable outlet
S19 Master	9935817				
S26 Adapter	9935822	J	3 A/250 VAC	Amphenol PT bayonet lock	26 pins may be used by customer, axial cable outlet
S26 Master	9935821				
T19 Adapter	9935824	J	5 A/250 VAC	Amphenol MS threaded cap	19 pins may be used by customer, radial cable outlet
T19 Master	9935823				
X7B Adapter	9948162	J	75 0 hm	Amphenol RF BNC	1 pins may be used by customer, for coax cables
X7B Master	9948161				
X7D Adapter	9961321	J	5 A/500 VAC	Amphenol RF BNC	1 pins may be used by customer, for coaxial cables
X7D Master	9961320				
X7J Adapter	9957487	J	5 A/1500 VAC	LEMO FAA Push Pull	1 pins may be used by customer
X7J Master	9957486				

Module for Power Transmission

The following modules are used for transmitting electrical power. They feature easily replaceable, spring-loaded pins, making them suitable for a wide range of change cycles. There is a large selection of different mechanical plug connectors.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
MT14 Adapter	9935528	J	13 A/500 VAC/700 VDC	Amphenol MS threaded cap	14 pins may be used by customer, lateral cable outlet
MT14A Master	9948446				
MT6 Adapter	9952052	J	20 A/400 VAC/570 VDC	Amphenol MS threaded cap	6 pins may be used by customer, lateral cable outlet
MT6 Master	9952053				
MT8 Adapter	9937158	J	20 A/500 VAC/700 VDC	Amphenol MS threaded cap	8 pins may be used by customer, lateral cable outlet (right)
MT8 Master	9937157				
MT8L Adapter	9949317				8 pins may be used by customer, lateral cable outlet (left)
MT8L Master	9949318				
MT9 Adapter	9955847	J	28 A/500 VAC/700 VDC	Amphenol MS threaded cap	9 pins may be used by customer, radial cable outlet
MT9 Master	9955846				
MTA6 Adapter	9962217	J	45 A/500 VAC/700 VDC	Amphenol MS threaded cap	6 pins may be used by customer, radial cable outlet (1 pin ground connection at housing)
MTA6 Master	9962216				
MTB8 Adapter	9957481	J	13 A/500 VAC/700 VDC	Burndy UT bayonet lock	8 pins may be used by customer, lateral cable outlet
MTB8 Master	9957480				
MTC8 Adapter	9962651	J	13 A/500 VAC/700 VDC	Special M23 threaded cap	8 pins may be used by customer, lateral cable outlet (right)
MTC8 Master	9962650				
MTCA8L Adapter	9962654	J	13 A/500 VAC/700 VDC	Intercontec M23 threaded cap	8 pins may be used by customer, lateral cable outlet (left)
MTCA8L Master	9962653				
MTR14-Adapter	9949943	J	13 A/500 VAC/700 VDC	Amphenol MS threaded cap	14 pins may be used by customer, radial cable outlet
MTR14 Master	9949942				

Modules for Servo Signal Transmission

On request, we can check whether a module is already available for your application. Otherwise, we are happy to offer you a special design.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
KM14 Adapter	9941480	K	5 A/250 VAC 13 A/250 VAC	Amphenol PT bayonet lock	14 pins may be used by customer (12 pins for each 5 A/250 VAC, and 2 pins for each 13 A/250 VAC)
KM14 Master	9940812				
REP10 Adapter	9965724	J	15 A/150 VAC 5 A/150 VAC	Intercontec M23 threaded cap	9 pins may be used by customer (3 pins for each 15 A/150 VAC, and 6 pins for each 5 A/150 VAC)
REP10 Master	9965723				
RES10 Adapter	1331667	J	3 A/42 VDC	JAE bayonet lock and threaded cap M8	8 pins may be used by customer, additional 2 pins on the tool side for battery, radial cable outlet
RES10 Master	1331663			JAE bayonet lock	8 pins may be used by customer, radial cable outlet
RES10B Adapter	1330275	J	3.5 A/160 VAC	Intercontec M23 threaded cap	10 pins may be used by customer, radial cable outlet
RES10B Master	1330274				

Modules for Communication Transmission

A broad selection of standard electric modules are available for transmitting different bus communication types.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
KE7 Adapter	9960994	K	4 A/125 VAC	Threaded cap M8 and M12	3 pins for voltage supply and 4 pins for Ethernet/PROFINET/EtherCAT
KE7 Master	9960993				
KF6 Adapter	9965144	K	4 A/60 VAC/VDC	Threaded cap M12	Compatible with Murr Cube67
KF6 Master	9965143				
GB8 Adapter	9959904	J	0.5 A/48 VDC	Threaded cap M12 X-coded	Gigabit Ethernet transmission, meets CAT6 requirements
GB8 Master	9959903				
GD4 Adapter	30088165	J	4 A/250 VAC	Threaded cap M12	4 pins may be used by customer, radial cable outlet, cable outlet can be swiveled in 5 positions
GD4 Master	30088161				
RD5 Adapter	9872359				5 pins for DeviceNet
RD5 Master	9872358				
RE5 Adapter	9957445	J	2 A/60 VAC	Threaded cap M12 D-coded	4 pins for Ethernet/PROFINET/EtherCAT
RE5-HMaster	9957444				
RF6 Adapter	9873025	J	4 A/60 VAC/VDC	Threaded cap M12	Compatible with Murr Cube67
RF6 Master	9873024				
RF8 Adapter	9962934	J	2 A/75 VDC	Threaded cap M12	Compatible with DRIVE-CLIQ
RF8 Master	9962933				
RP5 Adapter	9962721	J	5 A/150 VAC	Threaded cap M12 B-coded	5 pins for PROFIBUS
RP5 Master	9962720				
TB Adapter	9900045	J	5 A/24 VAC	Threaded cap M12 B-coded and threaded cap 7/8"	5 pins for PROFIBUS and 5 pins for voltage supply
TB Master	9900044				
TD Adapter	9942106	J	5 A/24 VAC	Threaded cap 7/8"	5 pins for DeviceNet and 4 pins for voltage supply
TD Master	9942105				
TE Adapter	9900050	J	5 A/24 VAC	Threaded cap M12 D-coded and threaded cap 7/8"	4 pins for Ethernet/PROFINET/EtherCAT and 4 pins for voltage supply
TE Master	9900049				
TP Adapter	9871165				4 pins for Ethernet/PROFINET/EtherCAT and 5 pins for voltage supply
TP Master	9871166				

Modules for Welding Current Transmission

Especially for welding applications, SCHUNK offers suitable modules for transmitting particularly high currents and voltages.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
PG1 Adapter	9871836	J	200 A/800 VAC	Lead terminal 35 mm²; AWG 2	1 pin for grounding in welding applications
PG1 Master	9871835				
PG3 Adapter	1316807	J	200 A/800 VAC	Ring terminal up to 35 mm²	1 pin for grounding in welding applications
PG3 Master	1316809				
X7C Adapter	9951827	J	3 A/2000 VAC/30 kHz	Bulkhead SHV	1 pin can be used by the customer, for ultrasonic welding applications
X7C Master	9951826				
X7G Adapter	9958866	J	3 A/2000 VAC		
X7G Master	9958865				
PG04570 Adapter	9941344	J	600 A/800 VAC	Lead terminal 120 mm²; AWG 4/0	1 pin for grounding in welding applications
PG04568 Master	9941343				

Fluid Modules SWO-F

In the following tables, you receive an overview of available fluid modules that make transmitting various kinds of fluid media possible via the SCHUNK quick-change system.

All modules are available by default, also in the Viton version.

Module for Pneumatic Feed-through

The following modules are used for the process-reliable feed-through of compressed air and feature a reliable and durable seal, especially for a very high number of changing cycles.

A variety of pneumatic modules with open and self-sealing ports are available in different quantities and sizes.

Designation	ID	Mounting pattern diagram	Connection	Max. operating pressure	Cv value	Remark
P05 Adapter	9936896	J	10x M5	8	0.25	For pneumatic and vacuum
P05 Master	9936895					
P12A Adapter	9957033	J	2x G1/2"	8	7.6	For pneumatic and vacuum, axial through-hole
P12L Adapter	9949340				7.7	For pneumatic and vacuum, connections on the left
P12R Adapter	9951848				7.8	For pneumatic and vacuum, connections on the right
P12A Master	9949339				7.5	For pneumatic and vacuum, axial through-hole
P14 Adapter	9935825	J	2x G1/4"	8	1.03	For pneumatic and vacuum
P14 Master	9935830					
P186A Adapter	9948322	J	6x G1/8"	8	0.65	For pneumatic and vacuum, axial through-hole
P186A Master	9948321					
P186 Adapter	9939025					For pneumatic and vacuum
P186 Master	9939024					
P18 Adapter	9935827	J	4x G1/8"	8	0.65	For pneumatic and vacuum
P18 Master	9935826					
P238 Adapter	9940580	J	2x G3/8"	8	2.45	For pneumatic and vacuum
P238 Master	9940578					
P38A Adapter	9937843	J	4x G3/8"	8	2.45	For pneumatic and vacuum, axial through-hole
P38A Master	9937842					
P48 Adapter	9961331					For pneumatic and vacuum
P48 Master	9961330					
P8M5 Adapter	9872068	J	8x M5	8	0.25	For pneumatic and vacuum, axial or radial through-hole possible
P8M5 Master	9872067					

Module for Vacuum Feed-through

The following modules are used for process-reliable vacuum feed-through. They feature an axial passage and vacuum-optimized seals for high volumetric flows.

Designation	ID	Mounting pattern diagram	Connection	Remark
V112A Adapter	9956421		G1-1/2"	For vacuum, axial outlet
V112A Master	9956420			
V200A Adapter	30076025	J	G2"	For vacuum, axial outlet
V200A Master	30076024			
V34 Adapter	9937336	J	G3/4"	For vacuum, radial outlet
V34 Master	9937335			
VF1 Adapter	9873256	J	G1"	For vacuum, axial outlet
VF1 Master	9873255			
V300 Adapter	9962936		G3"	For vacuum, axial outlet
V300 Master	9962935			

Modules for Liquid Feed-through

The following modules are used for process-reliable liquid feed-through and feature a robust stainless steel housing and self-sealing ports. This prevents virtually all fluid loss and prevents possible corrosion.

Designation	ID	Mounting pattern diagram	Connection	Max. operating pressure	Cv value	Remark
FG2 Adapter	9936818	J	2x G3/8"	6.9 bar	1.4	Self-sealing master and adapter side
FG2 Master	9936817					
FG4 Adapter	9937334	J	4x G3/8"	6.9 bar	1.4	Self-sealing master and adapter side
FG4 Master	9937333					

Module for Hydraulic Feed-through

The following modules are used for hydraulic feed-through and feature self-sealing ports.

Designation	ID	Mounting pattern diagram	Connection	Max. operating pressure	Cv value	Remark
F2HG14A Adapter	30089379	J	2x G1/4"	158 bar	0.46	Self-sealing master and adapter side, only one inlet permitted per module
F2HG14A Master	30089378					
F2HG14B Adapter	1326393	J	2x G1/4"	496 bar	0.46	Self-sealing master and adapter side, only one inlet permitted per module
F2HG14B Master	1226392					

Flexible. Modular. Strong.

Quick-change System SWS-L

Pneumatic tool-change 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, pallet, welding gun) are required.

Advantages – Your benefits

Patented fail-safe locking mechanism for safe 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 change system

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

Possibility of transmission of electric media for a safe power supply of the handling modules and tools

As standard, many feed-through modules can be attached for highest flexibility of your application

Adapter side coding via plug connector possible

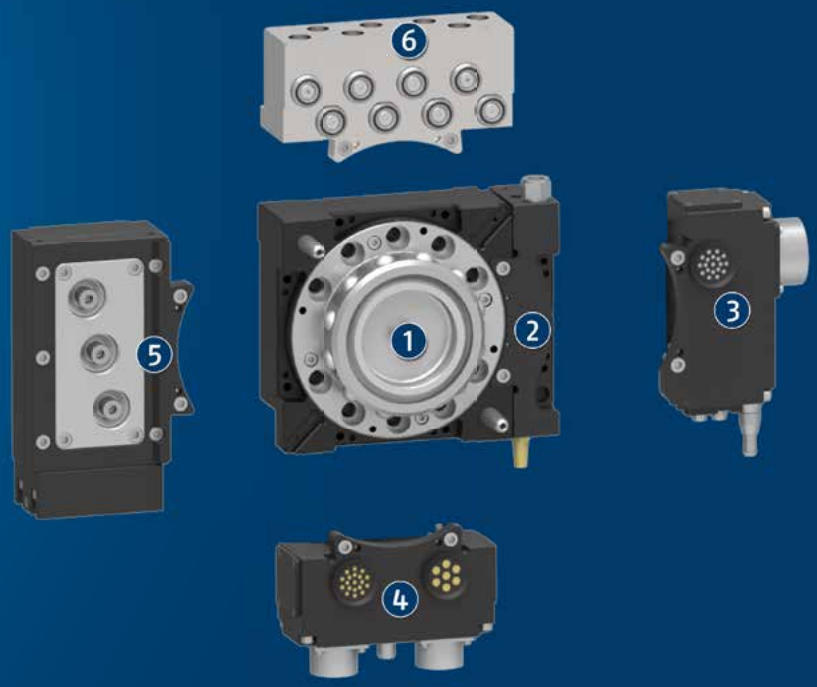
Suitable storage racks for all sizes to ensure the optimum adaption to each application

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

Sizes	Handling weight	Moment load M_x	Moment load M_z
Quantity: 4	300 .. 1350 kg	7600 .. 13500 Nm	4060 .. 16200 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 safe. After coupling, pneumatic and electric feed-throughs automatically supply your robot tool.



① **Locking piston**
Self-locking and robust

② **Pneumatic supply module**
With integrated valve for supply of the SWK

③ **Control module**
For actuation of the SWK and additional signal transmission

④ **Servo signal 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 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

Heavy-duty gripping unit with robot quick-change system for changing the handling devices such as grippers and welding tongs.

1. Quick-change system SWS-L
2. 3-finger universal gripper PZN-plus

SCHUNK offers more ...

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

Heavy-duty gripper

Storage rack

Electric module

Fluid feed-through

Inductive proximity switch

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

Options and special Information

No-Touch-Locking™: Locking without touching. Ensures that the SWS is safely 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.

Ordering Example SWS-L

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

Description
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 (master 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)

Pneumatic supply modules (on surface A only)

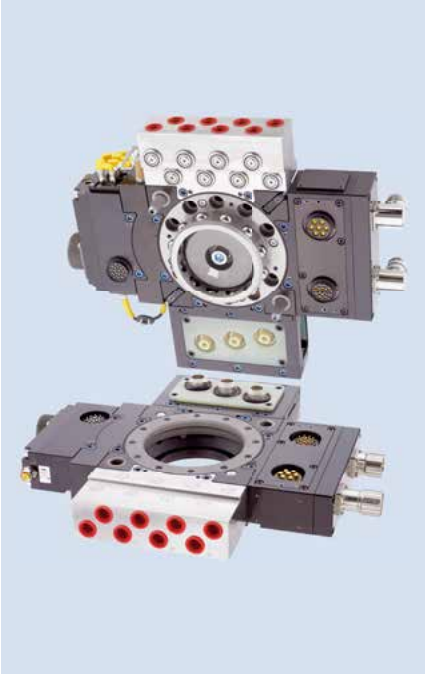
Note: A pneumatic supply module must be mounted on surface A. Control modules can be mounted on the pneumatic supply module. If two modules are combined (e.g. JB2 and SA2) on surface A, the designation will be a combination SWK-210BM-JB2SA2-AA2-0-0-SM

Optional modules
Axx = Pneumatic module (anodized aluminum housing, not suitable for liquids)
Dxx = DeviceNet module
Exx = Servo modules
Fxx = Fluid module (stainless steel, self-sealing)
Pxx = Pneumatic module (anodized aluminum housing, not suitable for liquids)
Sxx = Signal modules
Uxx = Stud welding modules
Vxx = Vacuum module
0 = Unused option
A selection of available modules can be found in the chapter "SWS-L" options.

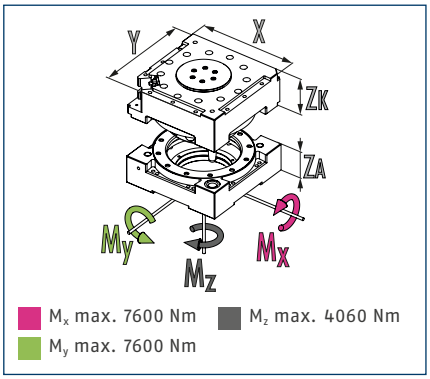
Proximity switch monitoring
SM = Inductive proximity switch PNP
0 = Monitoring possible, not included in the scope of delivery

More versions on request

SWS-L 210



Dimensions and maximum loads



M_x max. 7600 Nm
M_z max. 4060 Nm
M_y max. 7600 Nm

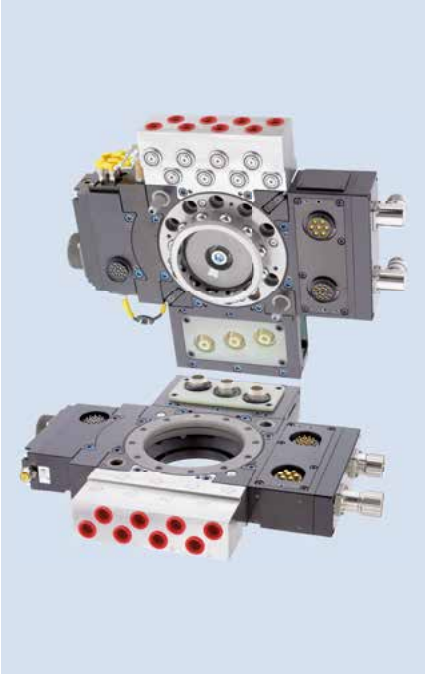
ⓘ This is the max. sum of all forces and moments which are permitted to act on the change system for ensuring proper functioning.

Technical data

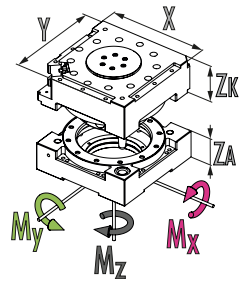
Description		SWK-210BM-0-0-0-0-SM	SWA-210CT-0-0-0-0
		Quick-change master	Quick-change adapter
ID			9948542
Recommended handling weight	[kg]	300	300
Piston stroke monitoring		Integrated	
Locking force	[N]	31000	31000
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	5.2	2.6
Max. distance when locking	[mm]	2.5	2.5
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]	5/6.9	5/6.9
Dimensions X x Y x Z*	[mm]	160 x 160 x 57.1	160 x 160 x 46.1
Mounting pattern		L1 side A/L side B/C/D	L1 side A/L side B/C/D

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws-l



Dimensions and maximum loads



M_x max. 9900 Nm M_z max. 9600 Nm
M_y max. 9900 Nm

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

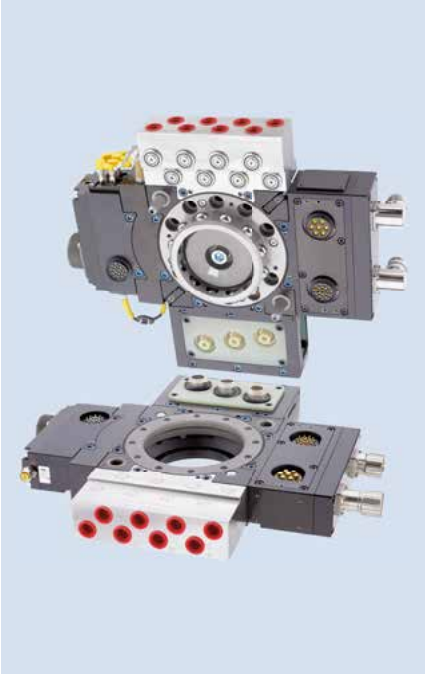
Technical data

Description		SWK-310DM-0-0-0-0-SM	SWA-310DT-0-0-0-0
		Quick-change master	Quick-change adapter
ID			9948544
Recommended handling weight	[kg]	510	510
Piston stroke monitoring		Integrated	
Locking force	[N]	38000	38000
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	12.5	7.5
Max. distance when locking	[mm]	2.5	2.5
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±1	±1
Robot-side connection		ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12
Min./max. ambient temperature	[°C]	5/60	5/60
Min./max. operating pressure	[bar]	5/6.9	5/6.9
Dimensions X x Y x Z*	[mm]	244 x 244 x 68	244 x 244 x 52
Mounting pattern		L2 side A/L side B/C/D	L2 side A/L side B/C/D

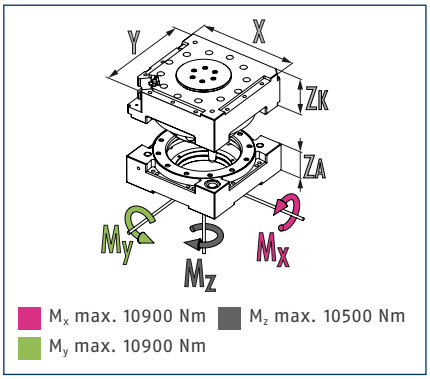
* Please note that the heights of the change master (ZK) and change adapter (ZA) differ. The sum represents the total height of a coupled change system.

SWS-L 510

Changing | Automatic Systems | Quick-change System



Dimensions and maximum loads



M_x max. 10900 Nm M_z max. 10500 Nm
M_y max. 10900 Nm

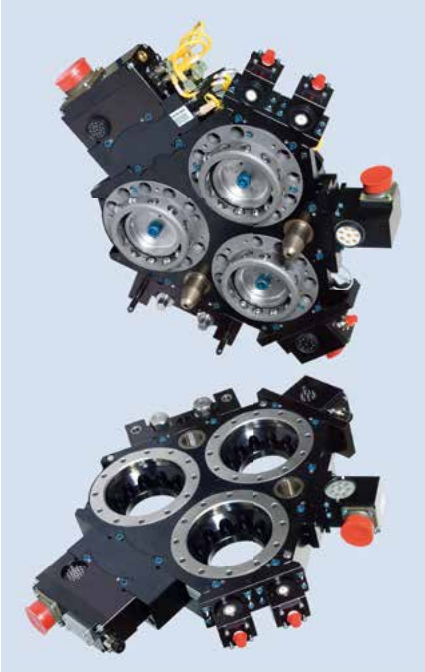
ⓘ This is the max. sum of all forces and moments which are permitted to act on the change system for ensuring proper functioning.

Technical data

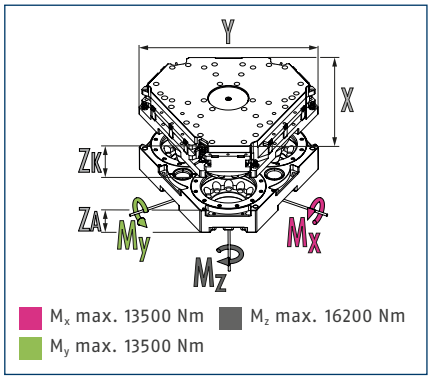
Description		SWK-510DM-0-0-0-0-SM	SWA-510DT-0-0-0-0
		Quick-change master	Quick-change adapter
ID		9948545	9948546
Recommended handling weight	[kg]	700	700
Piston stroke monitoring		Integrated	
Locking force	[N]	62000	62000
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	19.3	8.7
Max. distance when locking	[mm]	2.5	2.5
Max. permissible XY-axis offset	[mm]	±2	±2
Max. permissible angular offset	[°]	±1	±1
Robot-side connection		ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12
Min./max. ambient temperature	[°C]	5/60	5/60
Min./max. operating pressure	[bar]	5/6.9	5/6.9
Dimensions X x Y x Z*	[mm]	264 x 264 x 82.7	264 x 264 x 58.8
Mounting pattern		L2 side A/L side B/C/D	L2 side A/L side B/C/D

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/sws-l



Dimensions and maximum loads



M_x max. 13500 Nm M_z max. 16200 Nm
M_y max. 13500 Nm

ⓘ 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

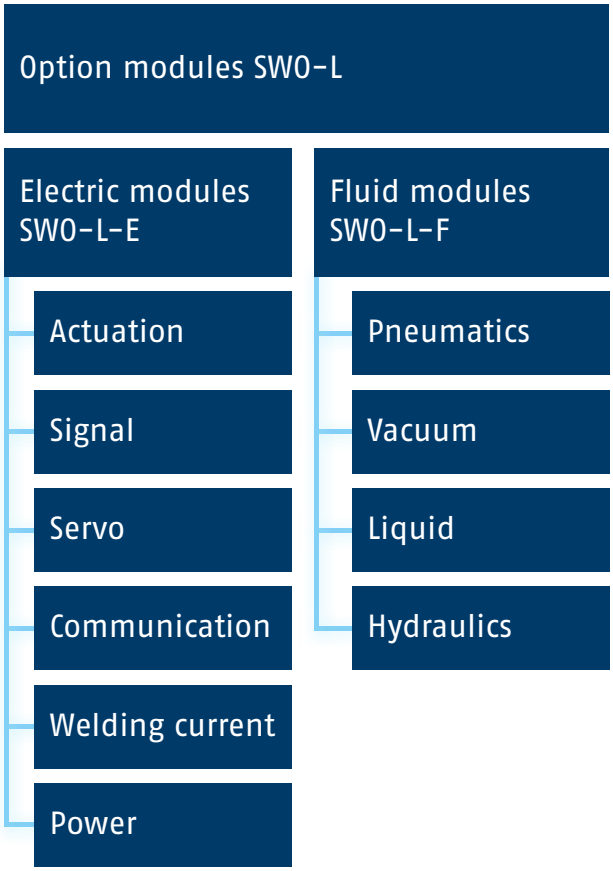
Description		SWK-L-1210AM-0-0-0-0-0-0-SL	SWA-L-1210AT-0-0-0-0-0-0
		Quick-change master	Quick-change adapter
Recommended handling weight	[kg]	1350	1350
Piston stroke monitoring		Integrated	
Locking force	[N]	93000	93000
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	18	10
Max. distance when locking	[mm]	1	1
Max. permissible XY-axis 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
Dimensions X x Y x Z*	[mm]	305 x 351 x 68.1	305 x 351 x 54.1
Mounting pattern		L2 side A/L side B/C/D/E/F	L2 side A/L side B/C/D/E/F

* 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.

Option Modules SWO-L

The flexibility of SCHUNK quick-change system is characterized by the large number of different modules offered, making it possible to transmit a broad range of media. Due to the wide variety of available modules, only a few of the most important modules will be featured in the following chapter. On request, we can assist you in finding the right module for your application's requirements. If a standard module is not available, special designs are also offered.

The following overview divides the modules into different groups consisting of electric modules SWO-L-E and fluid modules SWO-L-F:



Depending on the size of the quick-change system, various modules are available due to the different mounting pattern diagrams. You can find an overview of the mounting pattern diagrams individual sizes in the following table. Adapters are available for the heavy load quick-change system SWS-L for mounting all SWO modules with mounting pattern diagram J:

Description of the mounting pattern diagram	Suitable for sizes
L	All sizes for SWS-L sides B/-C/-D/-E/-F
L1	SWS-L 210 side A
L2	SWS-L 310, SWS-L 510, SWS-L 1210, side A for each
J	All sizes via adapter plates

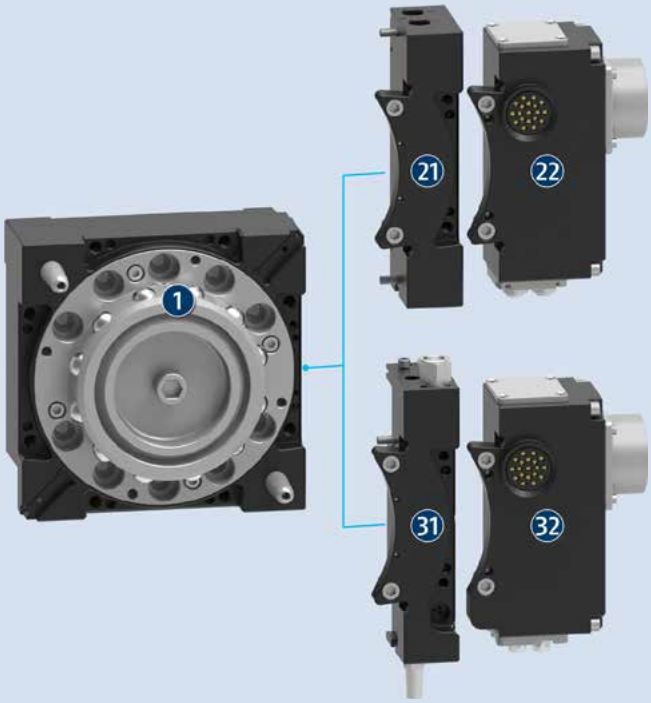
Electric Modules SWO-L-E

In the following tables you can find a selection of the most important electric modules, which make a variety of electric energy transmission options possible via the quick-change system. In addition, SCHUNK offers a range of different plug connectors for a large selection of modules.

Modules for Control

The control of heavy load quick-change systems SWS-L takes place via pneumatic supply modules. In addition, the locking and unlocking of the quick-change master can be done via a control module option.

The pneumatic supply modules supply the locking mechanism of the quick-change master (SWK-L) with pneumatics. Depending on the module used, control is carried out via a customer-side valve or via an integrated mono- or bi-stable magnetic valve. Depending on the module used, the valve can be connected to the control unit by a customer-supplied cable or by a suitable control module, which can be screwed directly into the pneumatic supply modules on the outlet side.



1. Heavy load quick-change master SWK-L
21. Pneumatic supply module without valve and with 2x G1/4" connections for locking and unlocking the SWK-L
22. Signal module
31. Pneumatic supply module with integrated valve
32. Control module for locking and unlocking the SWK-L

Pneumatic Supply Modules

Designation	Mounting pattern diagram	Plug connection	Connection	Remark
SWO-L-20-1192 Adapter	L1 and L2			Spacer on tool side when using all other pneumatic supply modules.
SWO-L-JB11 Adapter	L1 and L2			Spacer on tool side when using a pneumatic supply module JB10 or JB13 on the SWK-L.
SWO-L-JR4 Adapter	L1 and L2			Spacer on tool side when using a pneumatic supply module JU4 or JU5 on the SWK-L.
SWO-L-JB2 Master	L1		2x G1/4"	Pneumatic connection when using with external, customer-side valve.
SWO-L-JB3 Master	L2			
SWO-L-JB10 Master	L1		2x G1/4"	Pneumatic connection when using with external, customer-side valve. Integrated sensor distributor combines the connections of the integrated proximity switches of the SWK. Additional mounting surface for modules with mounting surface J.
SWO-L-JB13Master	L2			
SWO-L-JD2 Master	L1	M8 3 Pin	1x G1/4"	Valve module with mono-stable directional control valve for controlling the SWK. M8 3-pin connection for control via suitable control module or direct connection with customer-side interface.
SWO-L-JD3 Master	L2			
SWO-L-JF2 Master	L1	M8 3 Pin	1x G1/4"	Valve module with bi-stable directional control valve for controlling the SWK. M8 3-pin connection for control via suitable control module or direct connection with customer-side interface.
SWO-L-JF3 Master	L2			
SWO-L-JU2 Master	L1		1x G1/4"	Valve module with bi-stable directional control valve for controlling the SWK. Integrated pin block for control via appropriate control module.
SWO-L-JU3 Master	L2			
SWO-L-JU4 Master	L1		1x G1/4"	Valve module with redundant, bi-stable directional control valves for controlling the SWK. Integrated pin block for control via appropriate control module.
SWO-L-JU5 Master	L2			

Control Modules

Designation	Mounting pattern diagram	Plug connection	Connection	Remark
SWO-L-VA6 Master	L	5 A/250 VAC	Amphenol MS threaded cap	Control module for use with SWO-L-JU2 Master and SWO-L-JU3 Master, 19 pins can be used by the customer.
SWO-L-VB7Z1 Master				Control module for use with SWO-L-JU2 Master and SWO-L-JU3 Master, 14 pins can be used by the customer.
SWO-L-DKL Adapter	L	5 A/24 VDC	M12 and 7/8" threaded cap	Transmission of EtherNet/IP, tool coding from 0 to 99999 via EtherNet/IP, connection option for non-contact safety switch (detection of the tool-side storage position).
SWO-L-DKL Master				Control module for use with SWO-L-JU4 Master and SWO-L-JU5 Master, feed-through and control of the SWK via EtherNet/IP (including various diagnostic and safety functions) possible.
SWO-L-DL4 Adapter	L	10 A/24 VDC	AIDA Push Pull	Transmission of PROFINET, tool coding from 0 to 99999 via PROFINET, connection option for safety switch for detecting the storage position (TSI tool side).
SWO-L-DL4 Master		5 A/24 VDC		Control module for use with SWO-L-JU2 Master and SWO-L-JU3 Master, feed-through and control of the SWK via PROFINET (including various diagnostic and safety functions) possible.
SWO-L-DL9 Adapter	L	10 A/24 VDC	AIDA Push Pull	Transmission of PROFINET, tool coding from 0 to 99999 via PROFINET, connection option for contactless safety switch for detecting the storage position (TSI tool side).
SWO-L-DL9 Master		5 A/24 VDC		Control module for use with SWO-L-JU4 Master and SWO-L-JU5 Master, feed-through and control of the SWK via PROFINET (including various diagnostic and safety functions) possible.

Modules for Signal Transmission

The following modules are used for transmitting electrical signals. They feature easily replaceable, spring-loaded pins, making them suitable for a wide range of change cycles. There is a large selection of different mechanical plug connectors.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
SWO-L-SA2 Adapter	9948555	L	5 A/250 VAC	Amphenol MS threaded cap	19 pins can be used by the customer, compatible with control modules from the VA series.
SWO-L-SA2 Master	9948563				19 pins can be used by the customer (4 proximity switch from the piston stroke monitoring system detachable).
SWO-L-SA3 Adapter	9948556				15 pins can be used by the customer, integrated binary tool coding 0 to 9, compatible with control modules from the VA series.
SWO-L-SA4 Adapter	9948557				11 pins can be used by the customer, integrated binary tool coding 0 to 99, compatible with control modules from the VA series.
SWO-L-SA5 Adapter	9948558				7 pins can be used by the customer, integrated binary tool coding 0 to 999, compatible with control modules from the VA series.
SWO-L-VB2 Adapter	9948560				16 pins can be used by the customer, compatible with control modules from the VB series, storage position sensor detachable (TSI tool side).
SWO-L-VB3 Adapter	9948561				12 pins can be used by the customer, binary tool coding 0 to 9, compatible with control modules from the VB series, storage position sensor detachable (TSI tool side).
SWO-L-VB4 Adapter	9948562				8 pins can be used by the customer, binary tool coding 0 to 99, compatible with control modules from the VB series, storage position sensor detachable (TSI tool side).

Module for Servo Signal Transmission

Servo signal modules from SCHUNK offer the option of transmitting power and encoder signals that are electrically isolated from one another via the same module.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
SWO-L-ED8 Adapter	30084159	L	3 A/160 VAC 13 A/630 VAC	M23	18 pins can be used by the customer (6 pins for each 13 A/630 VAC and 12 pins for each 3 A/160 VAC)
SWO-L-ED8 Master	30084158				

Modules for Communication Transmission

A variety of electric modules are available for enabling various bus communication types by default across the SCHUNK change systems.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
SWO-L-VG3 Adapter	9900056	L	10 A/24 VDC	M12 and 7/8" threaded cap	5 pins for the transmission of PROFIBUS signals and 5 pins for auxiliary power supply
SWO-L-VG3 Master	9900055				

Modules for Welding Current Transmission

Especially for welding applications, SCHUNK offers suitable modules for transmitting particularly high currents and voltages.

Designation	ID	Mounting pattern diagram	Electric data	Plug connection	Remark
SWO-L-PA2 Adapter	9948900	L	200 A/600 VAC	Lead terminal up to 35 mm²	3 pins for welding applications
SWO-L-PA2 Master	9948899				
SWO-L-PA15 Adapter	9961034	L	200 A/600 VAC	2 lead terminal up to 35 mm² and one up to 25 mm²	2 pins for welding applications and 1 pin for grounding
SWO-L-PA15 Master	9961029				

Module for Power Transmission

For the SWS-L heavy load change system, the SWO-E modules can be used with a number of mechanical plug connections to transmit electric power. These can be easily mounted via an adapter plate and feature easily replaceable, spring-loaded pins, making them suitable for a wide range of changing cycles.

Fluid Modules SWO-L-F

In the following tables, you can find an overview of available fluid modules that make transmitting various kinds of fluid media possible via the SCHUNK quick-change system. All modules are available as standard, also in the Viton version.

Module for Pneumatic Feed-through

The following modules are used for the process-reliable feed-through of compressed air and feature a reliable and durable seal, especially for a very high number of changing cycles. A variety of pneumatic modules with self-sealing or open ports are available.

Designation	ID	Mounting pattern diagram	Connection	Cv value	Note
SWO-L-AK2 Adapter	9948573	L	10x G1/4"	1.40	Self-sealing ports for compressed air.
SWO-L-AK2 Master	9948572				
SWO-L-AF2 Adapter	9948565	L	8x G3/8"	2.45	Open ports for compressed air and vacuum.
SWO-L-AF2 Master	9948564				
SWO-L-AH3-Adapter	9948570	L	8x G3/8"	1.60	Open ports for compressed air.
SWO-L-AH2 Adapter	9948569		4x + 4x G3/8"		4 x self-sealing and 4 x open ports for compressed air.
SWO-L-AH2 Master	9948568		8x G3/8"		Self-sealing ports for liquids and compressed air.
SWO-L-AG2 Adapter	9948567	L	2x G3/4" + 4x G3/8"	1.60	4 x self-sealing ports for compressed air, 2 x ports for vacuum.
SWO-L-AG2 Master	9948566				
SWO-L-AQ2 Adapter	9948894	L	4x G1/2"	3.10	Self-sealing ports for compressed air.
SWO-L-AQ2 Master	9954327				
SWO-L-FC3 Adapter	9948580	L	8x G3/8"	1.60	Open ports for compressed air, stainless steel housing.
SWO-L-FC2 Adapter	9948579		4x + 4x G3/8"		4 x self-sealing ports for liquids and 4 x open ports for compressed air, stainless steel housing.
SWO-L-FC2 Master	9948578		8x G3/8"		Self-sealing ports for liquids and compressed air, stainless steel housing.
SWO-L-AP5 Adapter	1378146	L	1x G1/2"	1.60	Self-sealing ports for liquids.
SWO-L-FH12 Adapter	1378141		4x G1/2"		Self-sealing ports for liquids, stainless steel housing.
SWO-L-FH12 Master	1378135				

Modules for Liquid Feed-through

The following modules are used for process-reliable liquid feed-through and feature a robust stainless steel housing and self-sealing connections. This is a precaution preventing virtually all fluid loss and possible corrosion.

Designation	ID	Mounting pattern diagram	Connection	Cv value	Remark
SWO-L-AH4 Adapter	9948571	L	8x G3/8"	1.60	Self-sealing ports for liquids and compressed air.
SWO-L-AH2 Master	9948568				
SWO-L-AM2-Adapter	9948577	L	2x G1/2"	1.60	Self-sealing ports for liquids.
SWO-L-AM2 Master	9948576				
SWO-L-FC2 Adapter	9948579	L	8x G3/8"	1.60	4x self-sealing ports for liquids and 4x open ports for compressed air, stainless steel housing.
SWO-L-FC2 Master	9948578				Self-sealing ports for liquids and compressed air. Stainless steel housing.
SWO-L-AP5 Adapter	1378146	L	1x G1/2"	1.60	Self-sealing ports for liquids.
SWO-L-FH12 Adapter	1378141		4x G1/2"		Self-sealing ports for liquids, stainless steel housing.
SWO-L-FH12 Master	1378135				

Module for Hydraulic Feed-through

The following modules are used for hydraulic feed-through and feature self-sealing ports.

Designation	ID	Mounting pattern diagram	Connection	Max. operating pressure	Cv value	Remark
SWO-L-HB3 Adapter	9948585	L	2x G3/8"	158 bar	1.23	Hydraulic module for the transmission of hydraulic fluid up to 158 bar operating pressure
SWO-L-HB3 Master	9948584					
SWO-L-HB6 Adapter	9965174	L	2x G3/8"	496 bar	1.23	Hydraulic module for the transmission of hydraulic fluid up to 496 bar operating pressure
SWO-L-HB6 Master	9965463					
SWO-L-HB9 Adapter	1313100	L	2x G1/2"	496 bar	2.26	Hydraulic module for the transmission of hydraulic fluid up to 496 bar operating pressure
SWO-L-HB9 Master	1313099					

Module for Vacuum Feed-through

For the SWS-L heavy-duty change system, the appropriate modules from chapter SWO-F can be used for process-reliable vacuum feed-through. These can be mounted easily via an adapter plate and feature an axial feed-through and vacuum-optimized seals for high volumetric flow.

SCHUNK Modular Storage Racks SWM

The storage racks SWM are perfectly suitable for applications that require short change times between robot and tool.
SCHUNK offers three systems:

Systems SWM-S and SWM-M

Suitable for small and medium-sized SCHUNK change systems. The extruded upright profiles are extremely sturdy, making them excellently suitable for mounting on platforms. Mounting modules can be optionally equipped with proximity switches. The proximity switches allow you to monitor or control the assigned places. The quick-change adapter is deposited without force and without the use of holding mechanics. This ensures trouble-free changing cycles.

System SWM-L

Suitable for SCHUNK change systems in the heavy load range. Sturdy, heavy-duty welded steel construction with a longevity and maximum flexibility. The system can be customized to individual application requirements on request.

Your added value

Modular system allows for flexible, application-specific assembly
Additional support points for precise positioning of the storage area and repeat accuracy
Aluminum profiles (SWM-S/M) or stable welded construction (SWM-L) as mounting options, or use of your existing design
Corrosion-free, hardened storage points for a long service life
On option sensor monitoring is available
Standardized intermediate plates available for all sizes
Optional dirt protection cover to protect the deposited tools available

System SWM-S: Suitable for change systems in the sizes SWS 005 up to SWS 021.

System SWM-M: Suitable for change systems in the sizes SWS 040 up to SWS 110.

System SWM-L: Suitable for the sizes SWS 160 and SWS-L 210 up to SWS-L 510.

Storage Racks SWM-S

Modular Storage Racks for Quick-change Systems from Size SWS 005

The SCHUNK storage rack offers stability, flexibility, and a long service life. Modularity makes it possible to configure the ideal storage rack for any application.
A compact design with several tools per stand. Our storage racks feature an easy-to-integrate customized solution for individual modules or the option of assembling a complete package including extruded upright profiles, dirt cover, and a sensor system.

Advantages – Your benefits

The modular system enables customized storage racks

Storage points with a high degree of repeat accuracy for the change adapter

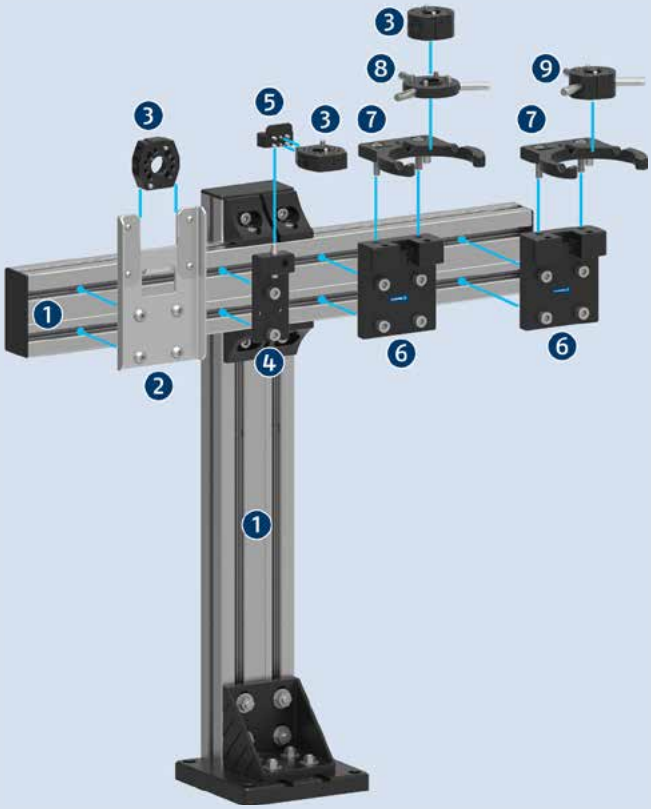
Optional sensors and switches for presence control of the quick-change adapter in the storage rack

Optional dust cover for protecting the tool against dust, spatter, and other kinds of contamination

Application Example

Different storage options can be used for small quick-change adapters starting from size 005, depending on the respective size. In addition to a system with **storage tray** for the quick-change adapter with integrated groove, there is also a **Pin & Bushing** storage system and a system with **Pin & Rack storage**, where the bolts can be screwed directly into the quick-change adapter or mounted onto a horizontal intermediate plate.

1. Aluminum profile
2. Storage tray
3. Quick-change adapter
4. Storage module Pin & Bushing
5. Vertical intermediate plate Pin & Bushing
6. Fixing block Pin & Rack
7. Storage module Pin & Rack
8. Horizontal intermediate plate Pin & Rack
9. Quick-change adapter including mounted alignment pins



Storage Racks SWM-M

Modular Storage Racks for Quick-change Systems from Size SWS 040

The SCHUNK storage rack offers stability, flexibility, and a long service life. Modularity makes it possible to assemble the optimally fitting storage rack for any application.
A compact design with several tools per stand. Our storage racks feature an easy to integrate customized solution for individual modules or the option of assembling a complete package including the extruded upright profiles, dirt cover, and a sensor system.

Advantages – Your benefits

Modular system enables customized storage racks

Repeatable set-down points for the change adapter

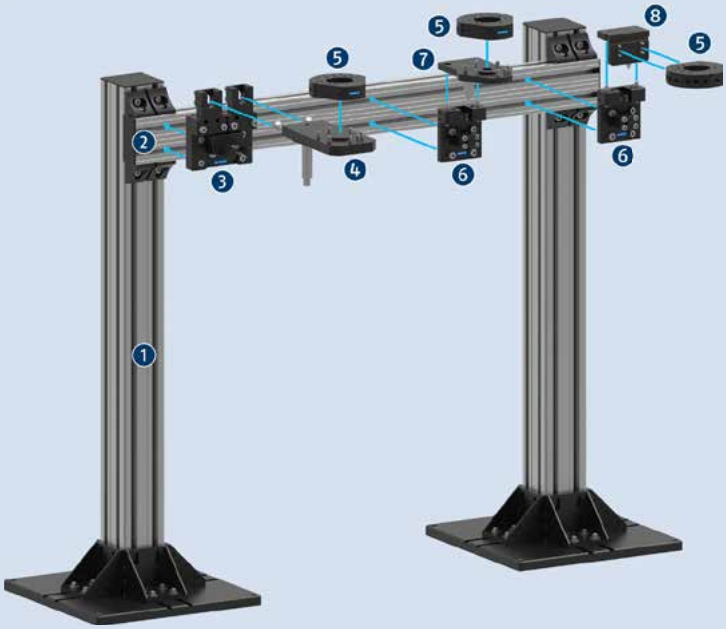
Optional sensors and switches for presence control of the quick-change adapter in the storage rack

Optional dust cover for protecting the tool again dust, spatter, and other contamination

Application Example

Different storage options can be used for medium-sized quick-change adapters starting from size 040, depending on the respective size. In addition to the **Pin & Rack storage** system with horizontal intermediate plate, a **Pin & Bushing** storage system can be used, where vertical or horizontal intermediate plates can be mounted onto the quick-change adapter.

1. Aluminum profile, vertical
2. Aluminum profile, horizontal
3. Storage module Pin & Rack
4. Horizontal intermediate plate Pin & Rack
5. Quick-change adapter
6. Storage module Pin & Bushing
7. Horizontal intermediate plate Pin & Bushing
8. Vertical intermediate plate Pin & Bushing



Storage Racks SWM-L

Modular Storage Racks for Quick-change System from Size SWS 160

The SCHUNK storage rack offers stability, flexibility and a long service life. Modularity makes it possible to assemble the optimum fitting storage rack for any application.
A compact design with several tools per stand. Our storage racks feature an easy to integrate customized solution for individual modules or the option of assembling a complete package including the extruded upright profiles, dirt cover, and a sensor system.

Advantages – Your benefits

Compact hooks or Pin & Rack storage allows the quick-change adapter to be placed effectively

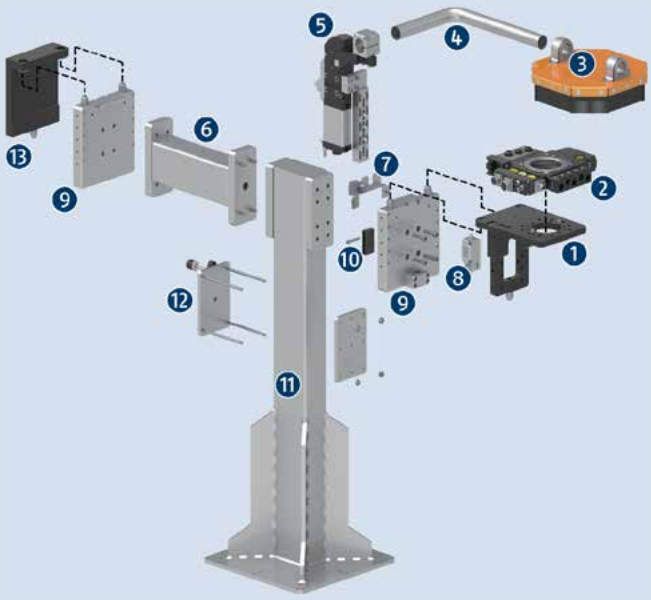
Robust, powder-coated, welded storage stands for longevity, even under difficult conditions

Optional sensors and switches for presence control of the dust cover and Tool Stand Interlock (TSI)

Optional dust cover for protecting the tool against dust, spatter, and other contamination

Application Example with Pin & Bushing

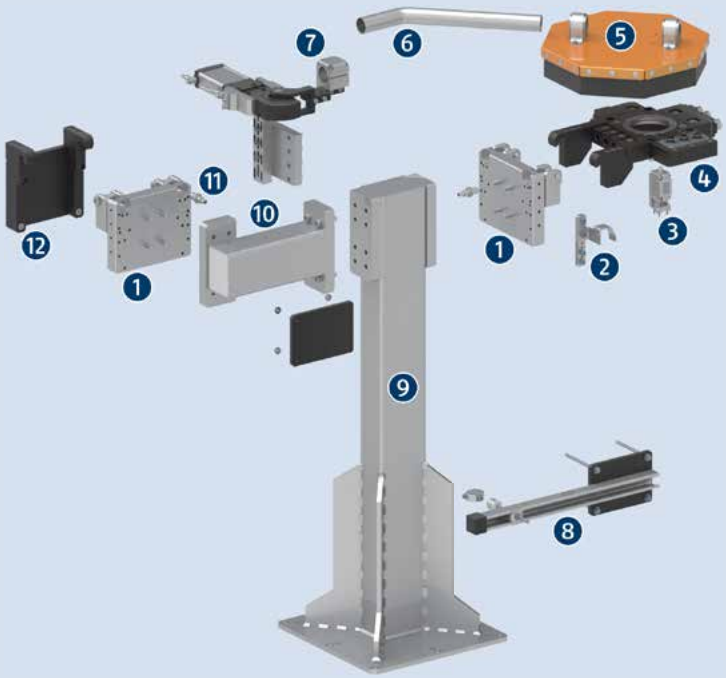
The storage system is available in a rigid or flexible version. The horizontal intermediate plate offers screw-on options for the quick-change adapter and your tool. Your tool can be screwed directly to the vertical intermediate plate, allowing the quick-change adapter to be flexibly mounted to your tool. The modular system is supplemented with a dust cover and optional sensor system. The Tool Stand Interlock (TSI) sensor system acts as a protection, ensuring that unlocking is only possible at the storage area.



1. Horizontal intermediate plate Pin & Bushing
2. Quick-change Adapter
3. Dust cover
4. Shield arm for dust cover
5. Swing clamping element for dust cover
6. Extensions
7. Sensor system for presence control
8. Sensor system TSI
9. Storage module Pin & Bushing
10. Control cam TSI
11. Weldment
12. Tool support
13. Vertical intermediate plate with Pin & Bushing

Application Example with Hook Suspension

Attaching hooks directly to the side of the quick-change adapter offers a compact solution. Your tool can be screwed directly to the vertical intermediate plate, allowing the quick-change adapter to be flexibly mounted to your tool. The modular system is supplemented with a dust cover and optional sensor system. The Tool Stand Interlock (TSI) sensor system acts as a protection, ensuring that unlocking is only possible at the storage area.



1. Storage module Hook & Hanger
2. Control cam TSI
3. Sensor technology TSI
4. Quick-change adapter including hooks
5. Dust cover
6. Shield arm for dust cover
7. Swing clamping element for dust cover
8. Tool support
9. Weldment
10. Extensions
11. Sensor system for presence control
12. Vertical intermediate plate with Hook & Hanger

Compact. Loadable. Precise.
Pallet-change System NSR-A

Pneumatic pallet-change system with patented locking system

Field of Application

For automatic change of tools such as pallets in machining centers.

Advantages – Your benefits

Time saving through automatic pallet change

Very compact design for space-saving exchange and direct coupling on the machine table

Form-fit, patented locking system with self-retention and high locking force

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

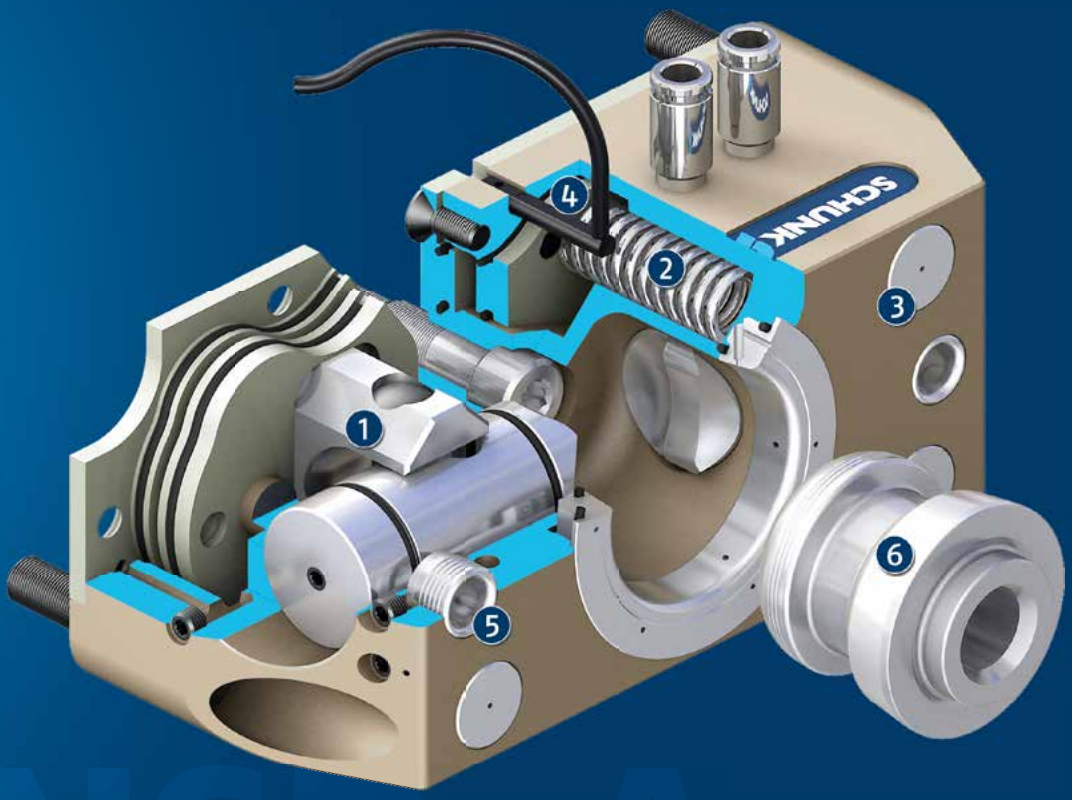
Integrated piston stroke monitoring and tool presence sensing for condition monitoring

Wide product line of electric and fluid modules for universal energy transmission possibilities

Sizes	Moment load M_x	Moment load M_z
Quantity: 2	75 .. 600 Nm	200 .. 1600 Nm

Functional Description

The pallet-change system (NSR-A) consists of a change master (NSR-A) and a clamping pin (NSR-SPA). The NSR-A is mounted onto the robot, and couples the NSR-SPA mounted onto the tool. A pneumatically driven locking piston with its patented design, ensures a safe connection. After coupling, pneumatic and electric feed-throughs supply the end effector.



① **Locking mechanism**
Self-locking and robust

② **Pressure springs**
Integrated spring for maintaining the locking force

③ **Housing**
With integrated function for cleaning of contact surfaces via compressed air

④ **Piston stroke monitoring**
Monitoring of locking

⑤ **Anti-twist protection**
For safety transmission of the clamping force

⑥ **Conical clamping pin**
For mounting of the end effector

General Notes about the Series

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

Operating principle: Interior wedge-hook kinematics

Energy transmission: Optional via electrical modules and/or fluid modules.

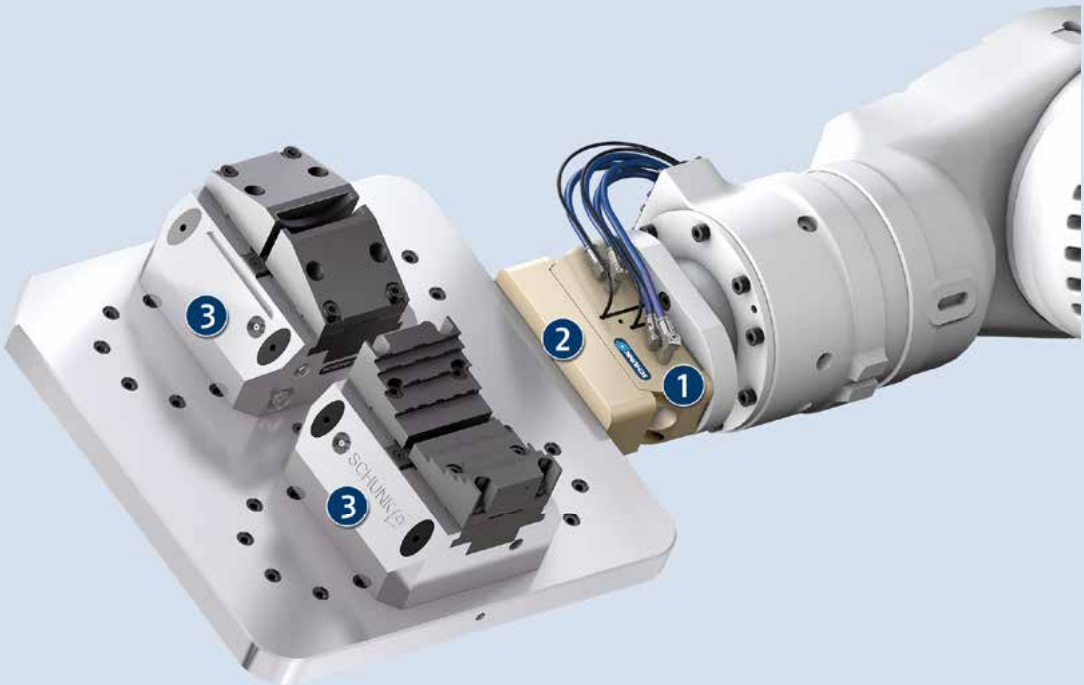
Housing: The housing consists of high-strength, hard-coated aluminum alloy. The functional components are made of hardened steel.

Scope of delivery: Robot-side mounting screws

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

The slim pallet-change system NSR-A allows pallet handling extremely close to the machine table and in confined spaces. The tool can be used in clean as well as dirty environments, and is supplied with energy.

1. Pallet-change master NSR-A
2. Pallet-change adapter NSR-SPA PKL
3. Pneumatically actuated clamping force block KSP plus

SCHUNK offers more ...

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

Parallel gripper

Clamping force block

Quick-change pallet system

Electric module

Magnetic gripper

Inductive proximity switch

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

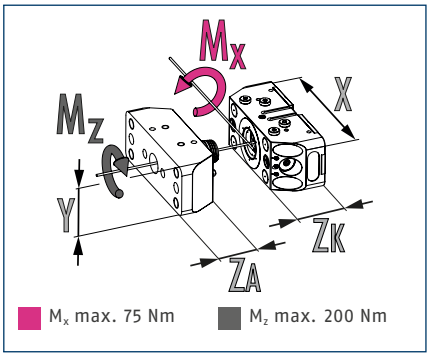
Options and special Information

Locking mechanism: The high locking force creates an exceptionally rigid system, which allows for high moment loading. The handling of heavy pallets is significantly easier and much more safe.

NSR-A 100

Changing | Automatic Systems | Pallet-change System

Dimensions and maximum loads



ⓘ The indicated values are the maximum mechanical loads. Loads caused by dynamics have to be considered in the interpretation for finding the suitable unit.

Technical data

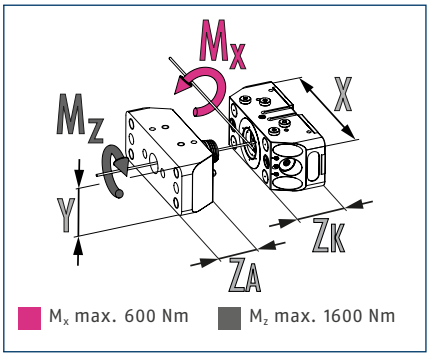
Description		NSR-A 100-000-000	NSR-SPA 100-PKL-0-SB	NSR-SPA 100-PKL-90-SB
		Pallet change master	Pallet adapter	Pallet adapter
ID		0303170	0303179	0303180
Version			Straight	Angled
Piston stroke monitoring		Optional		
Locking force	[N]	4000		
Repeat accuracy	[mm]	<0.005	<0.005	<0.005
Weight	[kg]	0.4	0.34	0.36
Max. distance when locking	[mm]	1	1	1
Lock/unlock main connection		M5		
Min./nom./max. operating pressure	[bar]	5/6/6		
Min. pressure to unlock	[bar]	5		
Air purge connection		M5		
Max. air pressure air pressure	[bar]	6		
Min./max. ambient temperature	[°C]	15/60	15/60	15/60
Dimensions X x Y x Z*	[mm]	100 x 39.5 x 37.8	100 x 39.5 x 31	100 x 39.5 x 52

* 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.

ⓘ The scope of delivery for a pallet adapter already includes a clamping pin. However it can also be ordered separately.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/nsr-a

Dimensions and maximum loads



ⓘ The indicated values are the maximum mechanical loads. Loads caused by dynamics have to be considered in the interpretation for finding the suitable unit.

Technical data

Description		NSR-A 160-000-000	NSR-SPA 160-PKL-0-SB	NSR-SPA 160-PKL-90-SB
		Pallet change master	Pallet adapter	Pallet adapter
ID		0303160	0303169	0303167
Version			Straight	Angled
Piston stroke monitoring		Optional		
Locking force	[N]	15000		
Repeat accuracy	[mm]	0.02	0.02	0.02
Weight	[kg]	1.6	0.9	1.2
Max. distance when locking	[mm]	1	1	1
Lock/unlock main connection		M5		
Min./nom./max. operating pressure	[bar]	5/6/6		
Min. pressure to unlock	[bar]	5		
Air purge connection		M5		
Max. air pressure air pressure	[bar]	6		
Min./max. ambient temperature	[°C]	15/60	15/60	15/60
Dimensions X x Y x Z*	[mm]	159 x 60 x 62	159 x 60 x 37	159 x 60 x 90

* 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.

ⓘ The scope of delivery for a pallet adapter already includes a clamping pin. However it can also be ordered separately.

Electric. Robust. Precise.

Electric Change System EWS

Electric tool-change system with patented locking system

Field of Application

For universal use in applications where no pneumatic power supply is available.

Advantages – Your benefits

Control via digital I/O for easy commissioning and rapid integration into existing systems

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

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

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

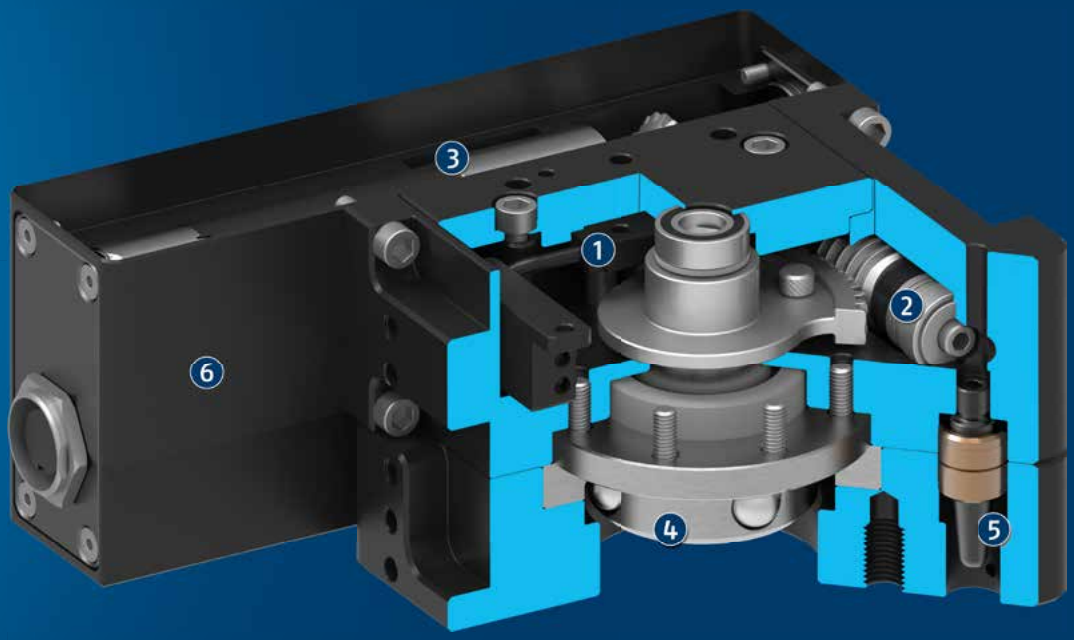
Adapter side coding possible via electric modules

Standardized, suitable storage racks for easy storage of the adapter sides

Sizes	Handling weight	Moment load M_x	Moment load M_z
Quantity: 1	18 kg	150 Nm	186 Nm

Functional Description

The electric change system (EWS) consists of a change master (EWK) and a change adapter (EWA). The EWK mounted onto the robot, couples with the EWA mounted on the tool. An integrated electric motor ensures safe locking via digital inputs. Due to the patented, self-retaining locking system, the system remains locked even in the event of a power failure or emergency stop.



① **Sensor for lock monitoring**
For reliable monitoring of the locking condition

② **Gear**
For the efficient conversion of the rotary motor motion into a linear motion for the piston actuation

③ **Driven by servomotor**
For precise control of the locking process

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

⑤ **Centering pin**
For maximum positioning accuracy and moment loads

⑥ **Integrated control electronics**
For compact and easy motor control

General Notes about the Series

Actuation: Servo-electric, via brushless DC servomotor

Operating principle: Locking balls actuated by pistons for locking

Energy transmission: Variable via feed-through modules

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

Scope of delivery: Fastening screws

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

Handling tool in machining center for loading and unloading of raw material and workpieces with change system for the grippers. For storing the changer there are storage racks in use.

1. 2-finger parallel gripper PGN-plus-E for handling of raw material
2. 2-finger parallel gripper PGN-plus-E for processed workpieces
3. Electric tool-change system EWS
4. Storage rack SWM for change system

SCHUNK offers more ...

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

Collision and overload sensor

Compensation unit

Rotary feed-through

Universal gripper

Electric module

Storage rack

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

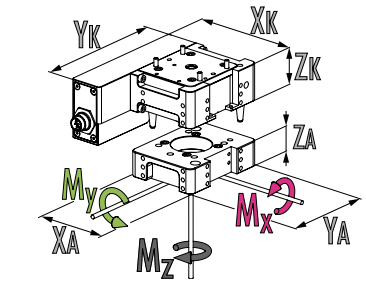
Options and special Information

No-Touch-Locking™: Locking without touching. Ensures that the EWS is safely locked even when the EWK and EWA do not touch.
Patented fail-safe locking mechanism: Due to the self-retention and the outside clamping locking, the permissible moment capacity increases. Steel parts made of low corrosion Rc 58.

EWS 018

Changing | Automatic Systems | Quick-change System

Dimensions and maximum loads



M_x max. 150 Nm
M_z max. 186 Nm
M_y max. 150 Nm

ⓘ 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		EWK 018-000-000	EWA 018-000-000
		Quick-change master	Quick-change adapter
ID		1000401	1000419
Recommended handling weight	[kg]	18	18
Lock sensing		Integrated	
Repeat accuracy	[mm]	0.015	0.015
Weight	[kg]	1.41	0.42
Max. distance when locking	[mm]	1	1
Max. voltage	[V]	24	
Max. current	[A]	3	
Max. permissible XY-axis offset	[mm]	±1	±1
Max. permissible angular offset	[°]	±0.7	±0.7
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions X x Y x Z*	[mm]	111.1 x 145.8 x 38.9	76.2 x 99.1 x 26.5

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ews

Flexible. Compact. Intuitive.

Manual Change System SHS

Manual tool-change system with integrated air feed-through, locking monitoring, and optional electric feed-through

Field of Application

Excellently suitable for use in the flexible production of products with a comprehensive range of variants in which reliable manual changes are required.

Advantages – Your benefits

Series with six unit sizes for optimum size selection and a broad application range

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

The locking lever is opened sideways this allows the changer to be easily operated even in confined spaces

Optional locking and presence monitoring thus increased process reliability

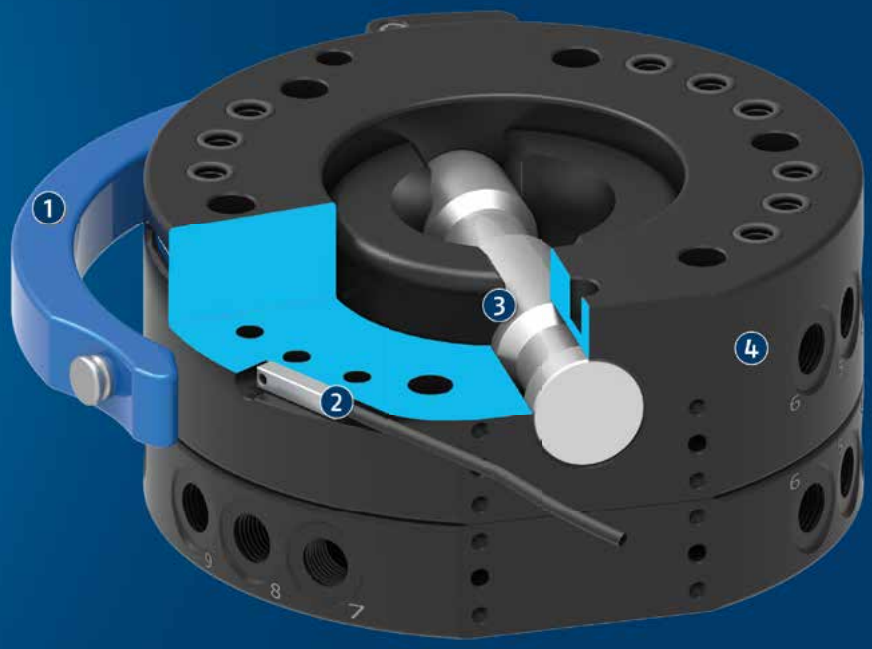
Wide range of electric, pneumatic, and fluid modules for universal energy transmission possibilities

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

Sizes	Handling weight	Moment load M_x	Moment load M_z
Quantity: 6	9 .. 58 kg	15 .. 320 Nm	25 .. 775 Nm

Functional Description

The manual change system (SHS) consists of a manual change master (SHK) and a manual change adapter (SHA). The manual change master (SHK) is form-fit locked with the manual change adapter (SHA), and due to the patented locking it is free from play. A pin is pushed forward or backward via a locking lever for locking or unlocking. An integrated pneumatic feed-through supplies the tool with energy.



① **Locking lever**
For manual actuation

② **Lock sensing**
Optional, for process-reliable monitoring of the locking condition

③ **Locking bolt**
Made of corrosion-free steel for easy and safe locking

④ **Air feed-through**
Without interfering contours due to the integration into the housing. Also suitable for vacuum.

General Notes about the Series

Actuation: Manual via locking lever

Operating principle: By turning the locking lever, the master and adapter are locked and unlocked.

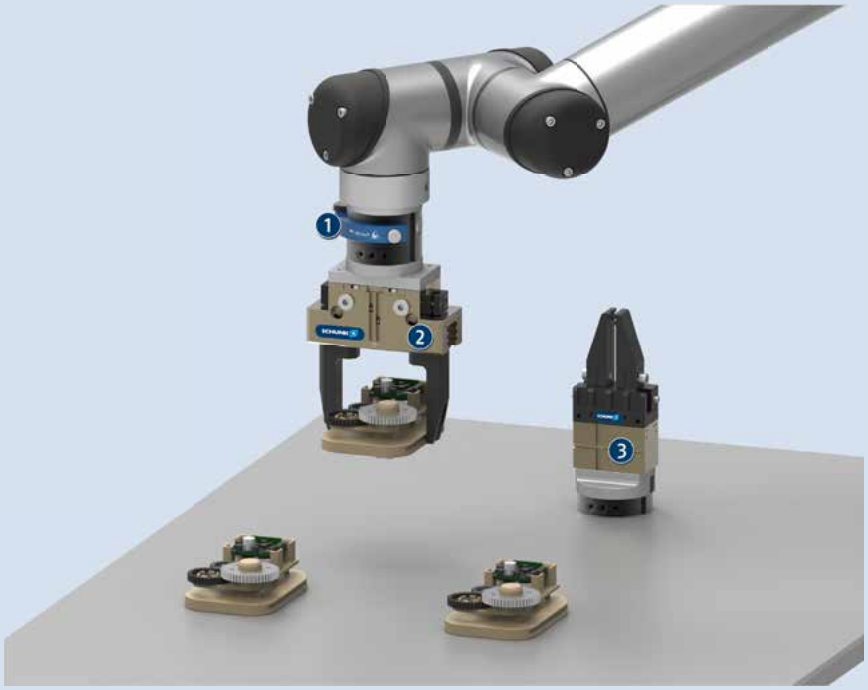
Energy transmission: Optional via electrical modules and/or fluid modules. Pneumatic feed-through already integrated.

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

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

Handling tool with manual tool-change system for gripping of middle-sized and small parts.

1. Manual change system SHS
2. 2-finger parallel gripper PGN-plus-P with customized gripper fingers
3. 2-finger parallel gripper MPG-plus with customized gripper fingers

SCHUNK offers more ...

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

Rotary feed-through

Compensation unit

Collision and overload sensor

Universal gripper

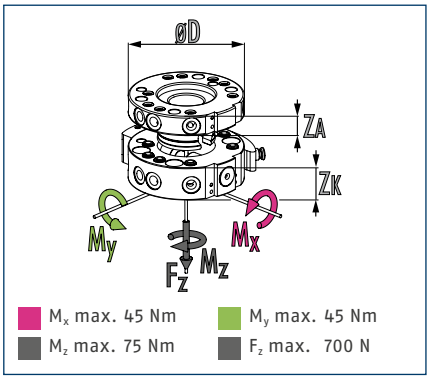
Inductive proximity switch

Electric module

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

SHS 040

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.

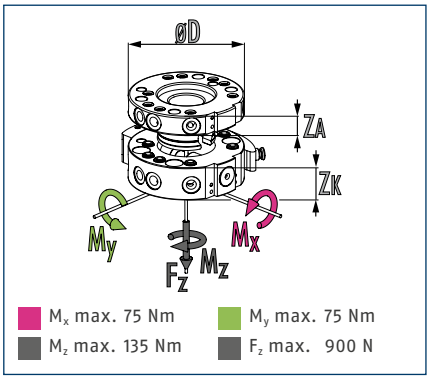
Technical data

Description		SHK-040-000-000	SHA-040-000-000
		Manual change master	Manual change adapter
ID		0310400	0310401
Recommended handling weight	[kg]	9	9
Lock sensing		Optionally via attachment kit	
Repeat accuracy	[mm]	0.02	0.02
Weight	[kg]	0.14	0.075
Max. distance when locking	[mm]	1	1
Number of pneumatic feed-throughs		4	4
Feed-throughs can be used radially		2	4
Pitch circle diameter	[mm]	40	40
Connection flange according to		ISO 9409-1-40-4-M6	
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z*	[mm]	50 x 24	50 x 15
Mounting pattern		S5/S7 via adapter plate	S5/S7 via adapter plate

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/shs

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

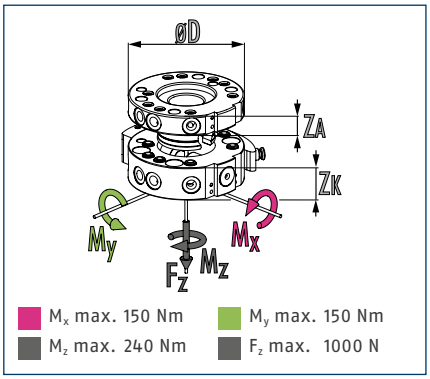
Description		SHK-050-000-000	SHA-050-000-000
		Manual change master	Manual change adapter
ID		0310410	0310411
Recommended handling weight	[kg]	11	11
Lock sensing		Optionally via attachment kit	
Repeat accuracy	[mm]	0.02	0.02
Weight	[kg]	0.25	0.1
Max. distance when locking	[mm]	1	1
Number of pneumatic feed-throughs		6	6
Feed-throughs can be used radially		3	6
Pitch circle diameter	[mm]	50	50
Connection flange according to		ISO 9409-1-50-4-M6	
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z*	[mm]	63 x 26.5	63 x 16
Mounting pattern		S5/S7 via adapter plate	S5/S7 via adapter plate

* 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.

SHS 063

Changing | Manual Systems | Manual 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.

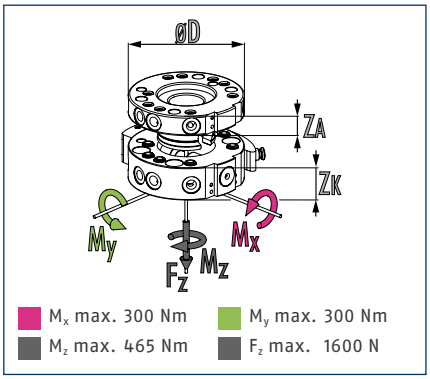
Technical data

Description		SHK-063-000-000	SHA-063-000-000
		Manual change master	Manual change adapter
ID		0310420	0310421
Recommended handling weight	[kg]	18	18
Lock sensing		Optionally via attachment kit	
Repeat accuracy	[mm]	0.02	0.02
Weight	[kg]	0.41	0.2
Max. distance when locking	[mm]	1	1
Number of pneumatic feed-throughs		6	6
Feed-throughs can be used radially		3	6
Pitch circle diameter	[mm]	63	63
Connection flange according to		ISO 9409-1-63-4-M6	
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z*	[mm]	80 x 28.5	80 x 18
Mounting pattern		K via adapter plate	K via adapter plate

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/shs

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.

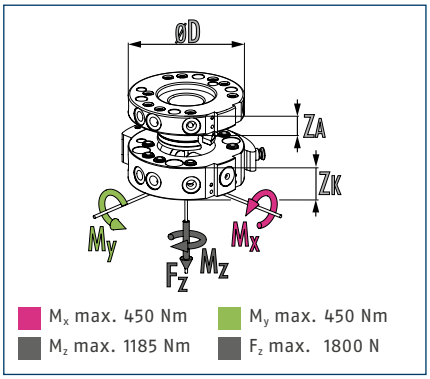
Technical data

Description		SHK-080-000-000	SHA-080-000-000
		Manual change master	Manual change adapter
ID		0310430	0310431
Recommended handling weight	[kg]	36	36
Lock sensing		Optionally via attachment kit	
Repeat accuracy	[mm]	0.02	0.02
Weight	[kg]	0.74	0.35
Max. distance when locking	[mm]	1	1
Number of pneumatic feed-throughs		9	9
Feed-throughs can be used radially		4	9
Pitch circle diameter	[mm]	80	80
Connection flange according to		ISO 9409-1-80-6-M8	
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z*	[mm]	100 x 30	100 x 18
Mounting pattern		K via adapter plate	K via adapter plate

* 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.

SHS 100

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.

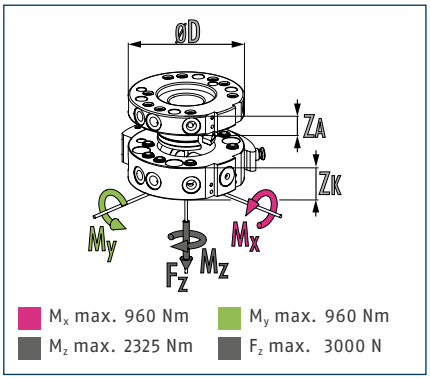
Technical data

Description		SHK-100-000-000	SHA-100-000-000
		Manual change master	Manual change adapter
ID		0310440	0310441
Recommended handling weight	[kg]	43	43
Lock sensing		Optional	
Repeat accuracy	[mm]	0.02	0.02
Weight	[kg]	1.3	0.55
Max. distance when locking	[mm]	1	1
Number of pneumatic feed-throughs		12	12
Feed-throughs can be used radially		6	12
Pitch circle diameter	[mm]	100	100
Connection flange according to		ISO 9409-1-100-6-M8	
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z*	[mm]	125 x 38	125 x 28
Mounting pattern		J	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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/shs

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		SHK-125-000-000	SHA-125-000-000
		Manual change master	Manual change adapter
ID		0310450	0310451
Recommended handling weight	[kg]	58	58
Lock sensing		Optional	
Repeat accuracy	[mm]	0.02	0.02
Weight	[kg]	2.8	1.2
Max. distance when locking	[mm]	1	1
Number of pneumatic feed-throughs		12	12
Feed-throughs can be used radially		6	12
Pitch circle diameter	[mm]	125	125
Connection flange according to		ISO 9409-1-125-6-M10	
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z*	[mm]	160 x 50	160 x 28
Mounting pattern		J	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.

Modular. Compact. Flexible.

Miniature Change System MWS

Manual tool-change system with integrated air feed-through and optional electric feed-through

Field of Application

Ideally suitable for the use in micro systems technology and particulary for handling tiny components.

Advantages – Your benefits

Extremely flat design for less interfering contours

Easy handling without additional tools quickly and easily removable at any time

Center bore for feed-through of parts, camera, laser beams, etc.

Integrated feed-through for six pneumatic or four electrical signals

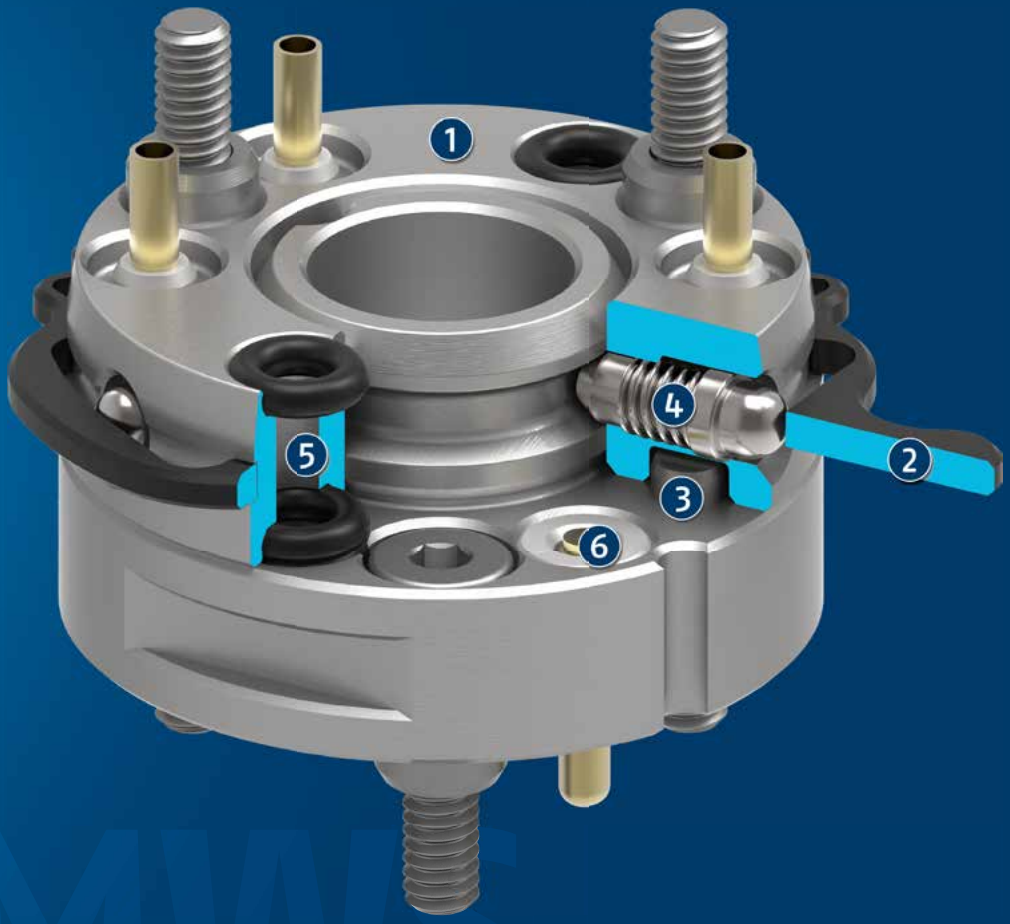
Suitable storage rack to ensure the optimum adaption to each application

ISO mounting pattern for simple assembly; in compliance with DIN 32565 level 4

Sizes	Handling weight	Moment load M_x	Moment load M_z
Quantity: 2	0.5 .. 1 kg	0.5 .. 1 Nm	0.2 .. 0.75 Nm

Functional Description

The miniature change system (MWS) consists of a miniature change master (MWK) and a miniature change adapter (MWA).
A form-fit connection is established between the miniature change master (MWK) and the miniature change adapter (MWA) by actuating the locking ring. An integrated pneumatic feed-through safely provides the tool with electricity.



① **Screw surface**
Compliant with DIN 32565 level 4

② **Drive ring**
For safe locking and unlocking

③ **Anti-twist protection**
For exact coupling and maximum precision

④ **Locking mechanism**
Fail-safe and robust

⑤ **Pneumatic feed-through**
No interfering contour, as integrated in the housing

⑥ **Electric feed-through**
For electrical energy and signal transmission

General Notes about the Series

Actuation: Manual

Operating principle: By turning the locking lever, the master and adapter are locked and unlocked.

Energy transmission: Integrated pneumatic and electric feed-throughs

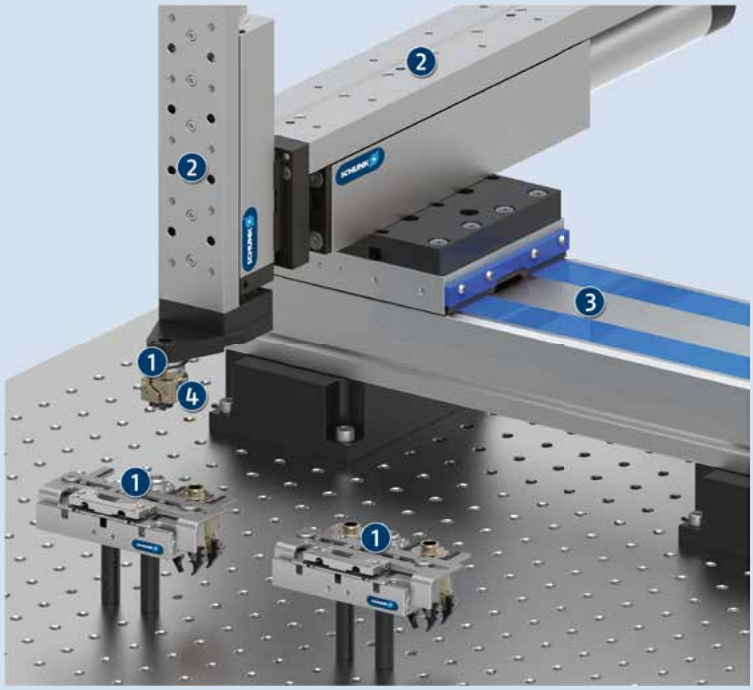
Housing: Stainless steel

Scope of delivery: Electrical feed-throughs, O-rings for pneumatic feed-throughs, and small components for mounting

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

Automated assembly of writing utensils: Lead refills are inserted into mechanical pencils. The MWS ensures fast exchange of the grippers and tools.

1. Miniature change system MWS
2. Electric linear module ELM
3. Flat linear module Delta
4. Miniature gripper MWPG

SCHUNK offers more ...

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

Gripper for small components

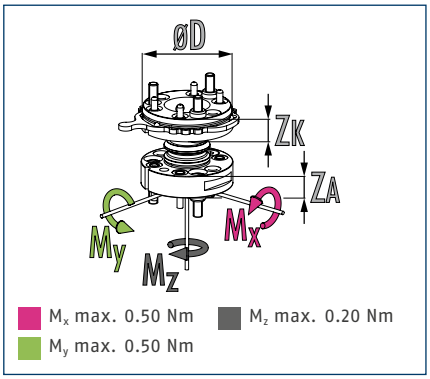
Gripper for small components

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

MWS 020

Changing | Manual Systems | Miniature 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.

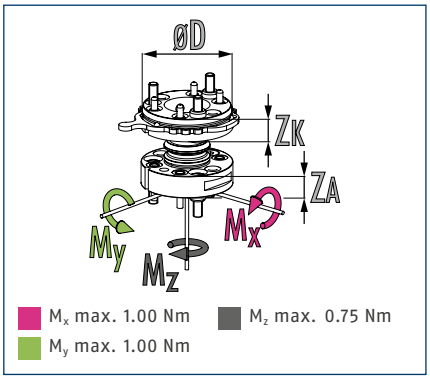
Technical data

Description		MWK-020-2P-0E	MWA-020-2P-0E	MWK-020-2P-4E	MWA-020-2P-4E
		Miniature change master	Miniature change adapter	Miniature change master	Miniature change adapter
ID		0305623	0305624	0305611	0305612
Recommended handling weight	[kg]	0.5	0.5	0.5	0.5
Repeat accuracy	[mm]	0.1	0.1	0.1	0.1
Weight	[g]	7	9	7	9
Min./max. distance when locking	[mm]	0.25	0.25	0.25	0.25
No. of fluid feed-throughs		2	2	2	2
Number of electrical feed-throughs				4	4
Voltage	[V]			24	24
Max. current	[A]			1	1
Max. permissible XY-axis offset	[mm]	±0.3	±0.3	±0.3	±0.3
Max. permissible angular offset	[°]	±0.8	±0.8	±0.8	±0.8
Dimensions Ø D x Z*	[mm]	20 x 5	20 x 5	20 x 5	20 x 5

* 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/mws

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		MWK-030-2P-0E	MWA-030-2P-0E	MWK-030-2P-4E	MWA-030-2P-4E	MWK-030-2P-6E	MWA-030-2P-6E
		Miniature change master	Miniature change adapter	Miniature change master	Miniature change adapter	Miniature change master	Miniature change adapter
ID		0305633	0305634	0305641	0305642	0305643	0305644
Recommended handling weight	[kg]	1	1	1	1	1	1
Repeat accuracy	[mm]	0.1	0.1	0.1	0.1	0.1	0.1
Weight	[g]	12	16	12	16	12	16
Min./max. distance when locking	[mm]	0.25	0.25	0.25	0.25	0.25	0.25
No. of fluid feed-throughs		2	2	2	2	2	2
Number of electrical feed-throughs				4	4	6	6
Voltage	[V]			24	24	24	24
Max. current	[A]			1	1	1	1
Max. permissible XY-axis offset	[mm]	±0.3	±0.3	±0.3	±0.3	±0.3	±0.3
Max. permissible angular offset	[°]	±0.8	±0.8	±0.8	±0.8	±0.8	±0.8
Dimensions Ø D x Z*	[mm]	30 x 5	30 x 5	30 x 5	30 x 5	30 x 5	30 x 5

* 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.

Compact. Flat. Productive.

Compact Change System CWS

Compact, manual change system with integrated air feed-throughs for the most important SCHUNK gripping and compensation modules

Field of Application

Ideally suitable for the use in laboratory technology and assembly automation.

Advantages – Your benefits

High productivity through fast manual gripper change, especially with small and medium-sized lot sizes

Flat and weight-optimized through direct assembly of the gripper onto the change system without adapter plate

Series with five unit sizes for optimum size selection and a broad application range

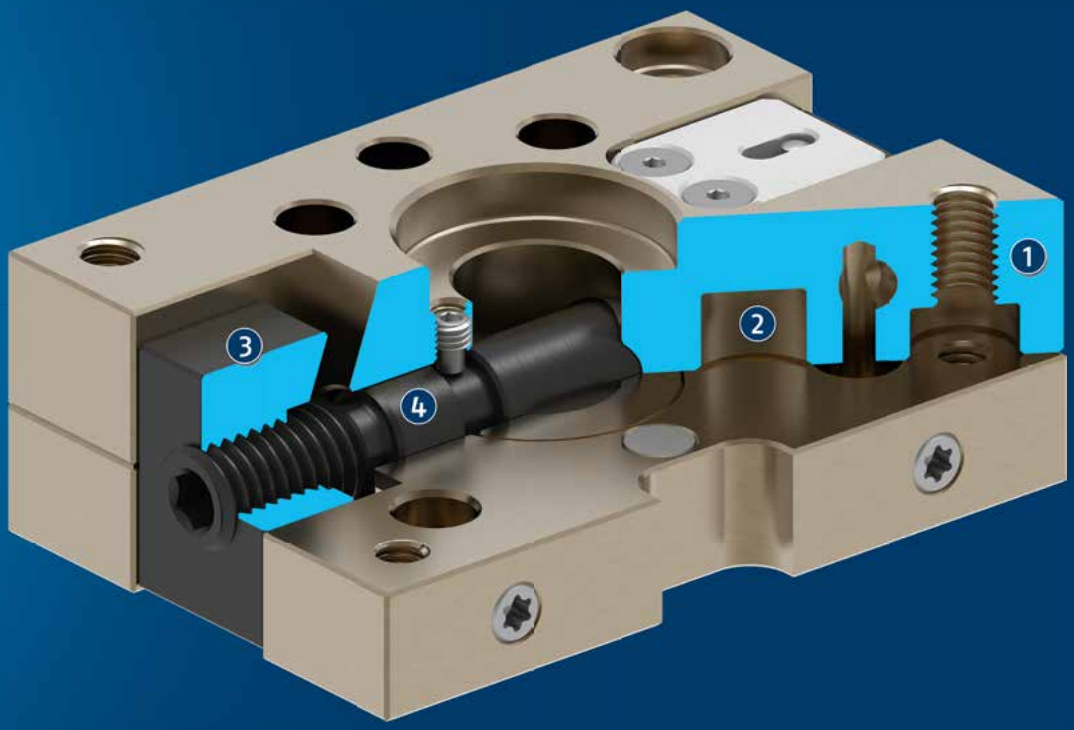
Integrated pneumatic feed-through for safe energy supply of the grippers

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

Sizes	Handling weight	Moment load M_x	Moment load M_z
Quantity: 5	10 .. 28 kg	20 .. 110 Nm	10 .. 200 Nm

Functional Description

The compact change system (CWS) consists of a change master (CWK) and a change adapter (CWA).
A form-fit connection is established between the CWK and the CWA with two clamping jaws connected via a threaded spindle. The gripper is safely supplied with pneumatic power by up to four integrated pneumatic feed-throughs.



① **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

② **Air feed-through**
No interfering contour, as integrated in the housing

③ **Clamping jaw**
For a form-fit safe hold

④ **Drive spindle**
For manually locking and unlocking the change system

General Notes about the Series

Actuation: Manually via Allen key, provided by the customer

Operating principle: By turning the threaded spindle, the clamping jaws are clamped or unclamped

Energy transmission: Integrated pneumatic feed-through

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

Scope of delivery: Centering sleeves for mounting and direct connection

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

Flexible assembly unit for various product versions. Easy and quick gripper change using a quick-change-system.

1. Compact change system CWS
2. 2-finger parallel gripper PGN-plus
3. Linear module LM

SCHUNK offers more ...

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

Rotary feed-through

Collision and overload sensor

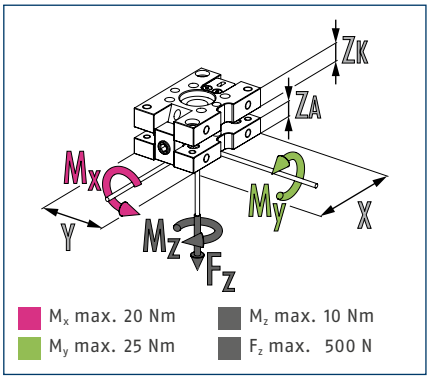
Tolerance compensation unit

Universal gripper

Angular gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

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

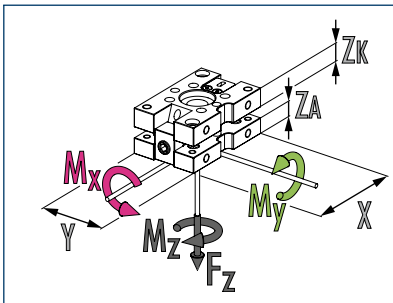
Description		CWK-050-P	CWA-050-P
		Compact change master	Compact change adapter
ID		0305750	0305751
Recommended handling weight	[kg]	10	10
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	0.05	0.02
Number of pneumatic feed-throughs		4	4
Min./max. ambient temperature	[°C]	5/60	5/60
Direct connection to*			PGN-plus 50
Dimensions X x Y x Z**	[mm]	42 x 35 x 10	42 x 35 x 10

* also suitable for other grippers with the same mounting pattern diagram

** 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/cws

Dimensions and maximum loads



M_x max. 40 Nm
M_z max. 40 Nm
M_y max. 60 Nm
F_z max. 700 N

ⓘ 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		CWK-064-P	CWA-064-P
		Compact change master	Compact change adapter
ID		0305764	0305765
Recommended handling weight	[kg]	16	16
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	0.075	0.032
Number of pneumatic feed-throughs		4	4
Min./max. ambient temperature	[°C]	5/60	5/60
Direct connection to*			PGN-plus 64
Dimensions X x Y x Z**	[mm]	52 x 36 x 10	52 x 36 x 10

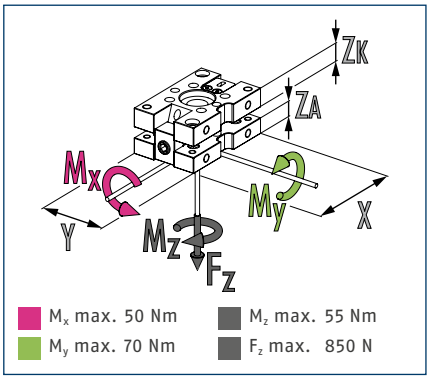
* also suitable for other grippers with the same mounting pattern diagram

** 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.

CWS 080

Changing | Manual Systems | Compact 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

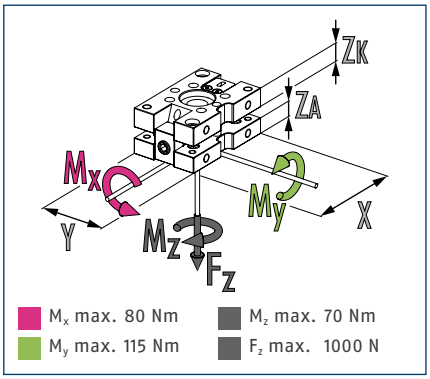
Description		CWK-080-P	CWA-080-P
		Compact change master	Compact change adapter
ID		0305780	0305781
Recommended handling weight	[kg]	20	20
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	0.115	0.045
Number of pneumatic feed-throughs		4	4
Min./max. ambient temperature	[°C]	5/60	5/60
Direct connection to*			PGN-plus 80
Dimensions X x Y x Z**	[mm]	63 x 42 x 12	63 x 42 x 10

* also suitable for other grippers with the same mounting pattern diagram

** 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/cws

Dimensions and maximum loads



M_x max. 80 Nm
M_z max. 70 Nm
M_y max. 115 Nm
F_z max. 1000 N

ⓘ 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		CWK-100-P	CWA-100-P
		Compact change master	Compact change adapter
ID		0305800	0305801
Recommended handling weight	[kg]	24	24
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	0.185	0.07
Number of pneumatic feed-throughs		4	4
Min./max. ambient temperature	[°C]	5/60	5/60
Direct connection to*			PGN-plus 100
Dimensions X x Y x Z**	[mm]	81 x 50 x 12	81 x 50 x 10

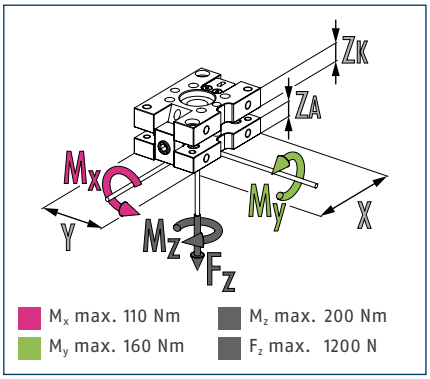
* also suitable for other grippers with the same mounting pattern diagram

** 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.

CWS 125

Changing | Manual Systems | Compact 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		CWK-125-P	CWA-125-P
		Compact change master	Compact change adapter
ID		0305825	0305826
Recommended handling weight	[kg]	28	28
Repeat accuracy	[mm]	0.01	0.01
Weight	[kg]	0.32	0.125
Number of pneumatic feed-throughs		4	4
Min./max. ambient temperature	[°C]	5/60	5/60
Direct connection to*			PGN-plus 125
Dimensions X x Y x Z**	[mm]	100 x 60 x 12	100 x 60 x 10

* also suitable for other grippers with the same mounting pattern diagram

** 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.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/cws

Feeding Through

Product Quickfinder

	Page		Recommended handling weight [kg]			Moment load M_{xy} [Nm]		
			0 – 100	100 – 200	200 – 300	0 – 50	50 – 100	100 – 600
Rotary feed-through								
Rotary feed-through for robots DDF 2 • Media feed-through for compressed air and electrical signals • For use on robot	116		6 – 250			15 – 550		
Stationary rotary feed-through								
Stationary rotary feed-through DDF-SE • Media feed-through for compressed air and electrical signals • For stationary applications	132						50 – 180	

Moment load M_z [Nm]			Number of air feed-throughs		Number of electric feed-throughs		Product features			Ambient conditions	
0 - 100	100 - 250	250 - 500	0 - 5	5 - 10	0 - 5	5 - 10	Direct mounting to ISO 9409 flange	Continuous rotary movement	Feed-through vacuum	Normal, clean	Slightly dirty
10 – 400			2 – 4		4 – 10		●	●	○	●	●
				4 – 6		6 – 8		●		●	●

● = Very highly suitable ◐ = Highly suitable ○ = Suitable in customized version

Powerful. Flexible. Energy-efficient.

Rotary Feed-through DDF 2

For feeding through electric signals and air for the use on robots even when they are endlessly rotating

Field of Application

Robot applications and rotary indexing table with unlimited rotational movement.

Advantages – Your benefits

Combined air and electric feed-through for extensive supply to your gripping system/tool

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

Complete series of 12 sizes for best selection of size

Electrical plug for easy change in case of cable break at the robot arm or gripper

Shaft made of steel adapted performance for modern robots

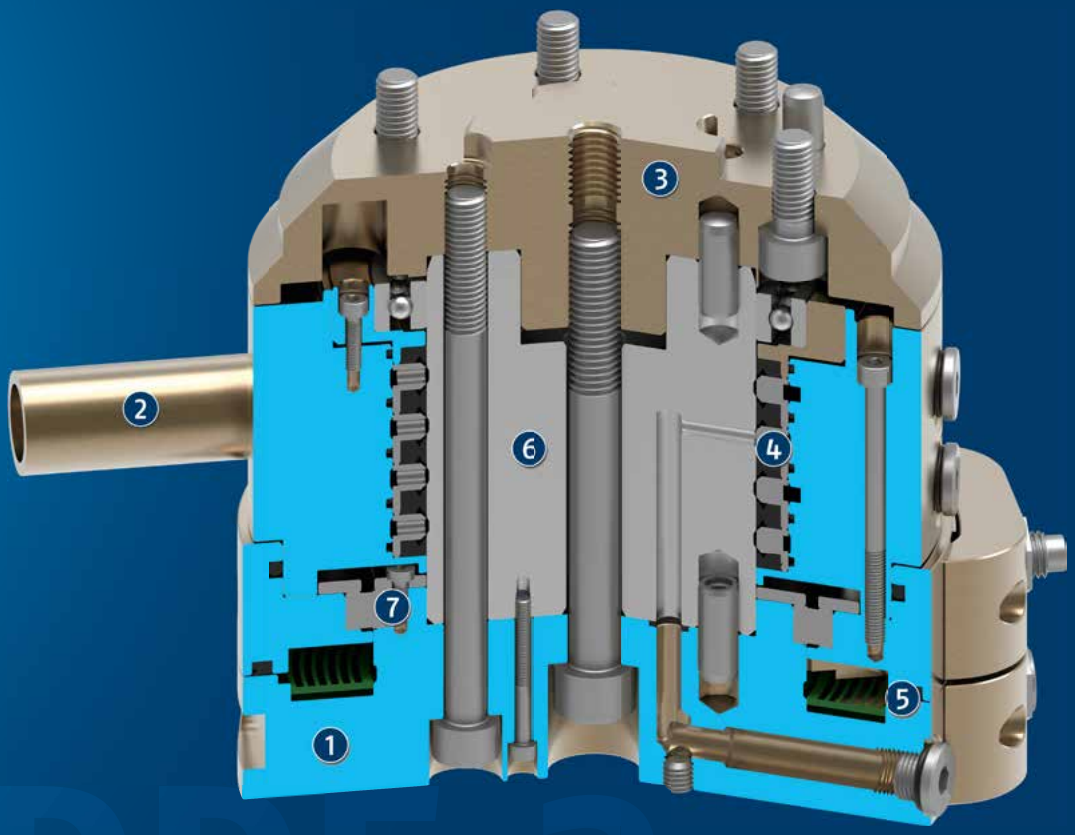
Three versions in one unit Version 1: for feed-through of pneumatics and electrical signals,
~Version 2: for feed-through of pneumatics,
~Version 3: for feed-through of electric signals

Newly developed, smooth running and particularly long lasting seals ensure a low starting and continuous torque, so that smaller and more economical drives can be used and that particularly small rotary movements are possible.

Sizes	Max. RPM	Air	Electric
Quantity: 12	90 .. 120 1/min	feed-throughs 2 .. 4	feed-through 4 .. 10

Functional Description

The DDF 2 facilitates endless rotation of the robot axis by more than 360°, without hoses and cables twisting around the axis. Integrated air feed-throughs and slip ring contacts reliably supply the tool with air and electricity, even at high speeds.
The integrated ISO flange is mounted on the flange of the robot. A ring surrounds the shaft. The ring is connected to a non-rotating part of the robot via a torque support. When the robot flange turns, the shaft turns in the ring. A slip ring which is integrated in the shaft and the housing, thereby transmits electrical signals from the fixed housing into the rotating shaft. Electric signals and up to four pneumatic lines are fed through.



① **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

② **Torque support**
For torque support at the robot

③ **ISO flange**
For easy assembly on the robot flange

④ **Pneumatic feed-through**
For supply of grippers, linear units or other actuators

⑤ **Slip ring**
For feeding through of up to ten electrical signals

⑥ **Steel shaft**
For transmission of the rotary movement

⑦ **Rolling-contact bearing**
For transmission of the rotary motion without play

General Notes about the Series

Mounting: Standardized ISO 9409 interface (robot-side)

Housing: High-strength, hard-coated aluminum alloy

Scope of delivery: Cable connector, small components for mounting, operating and maintenance instructions, 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 axes. Due to the rotary feed-through, the axes can be turned several times to an unlimited extent (> 360°). The slip ring contacts and air feed-throughs are integrated in the rotary feed-through reliably supply the gripper with power.

1. Rotary feed-through DDF 2
2. Quick-change system SWS
3. 3-finger centric gripper PZN-plus

SCHUNK offers more ...

The following components make the product DDF 2 even more productive – the suitable addition for the highest functionality, flexibility, reliability, and controlled production.

Quick-change system

Universal gripper

Universal gripper

Angular gripper

Compensation unit

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

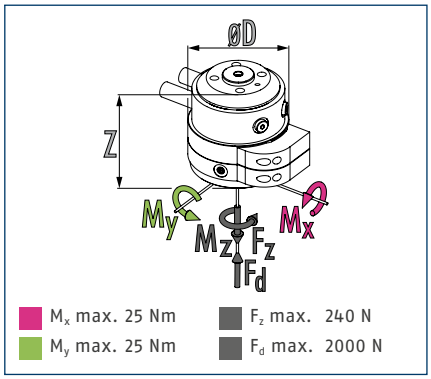
Options and special Information

Version with pneumatic and electrical feed-throughs: 2 to 4 air feed-throughs for up to 10 bar and 4 to 10 electrical feed-throughs for 1 A/60 V signals
Version with air feed-throughs: 2 to 4 pneumatic feed-throughs for up to 10 bar
Version with electrical feed-throughs: 4 to 10 electrical feed-throughs for 1 A/60 V signals
Suitable for compressed air applications: Please contact us for further information.

DDF 2 031

Feeding Through | Rotary Feed-through for Robots

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

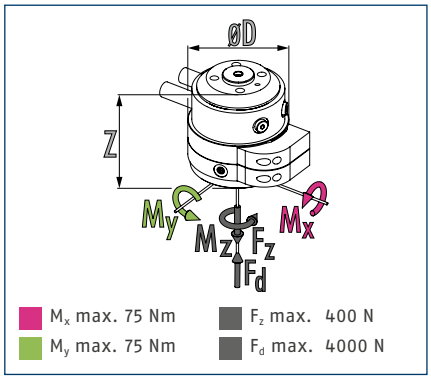
Technical data

Description		DDF 2-031-P2-E4	DDF 2-031-P2	DDF 2-031-E4
ID		0323034	0323035	0323036
Recommended handling weight	[kg]	6	6	6
Max. drive speed	[1/min]	120	120	120
Max. speed of rotation	[°/s]	720	720	720
Nominal torque	[Nm]	0.8	0.8	0.5
Starting torque	[Nm]	1.3	1.3	0.7
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		2	2	
Air connection thread air feed-through		2x M5	2x M5	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	100	100	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		4		4
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	0.5	0.45	0.35
Robot-side connection		ISO 9409-1-31.5-4-M5	ISO 9409-1-31.5-4-M5	ISO 9409-1-31.5-4-M5
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	12	12	12
Max. dynamic bending moment M_y*	[Nm]	12	12	12
Max. dynamic torsional moment M_z*	[Nm]	8	8	8
Max. shear force F_q*	[N]	60	60	60
Dimensions Ø D x Z	[mm]	63 x 56	58 x 50	63 x 34.8

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-2

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

Technical data

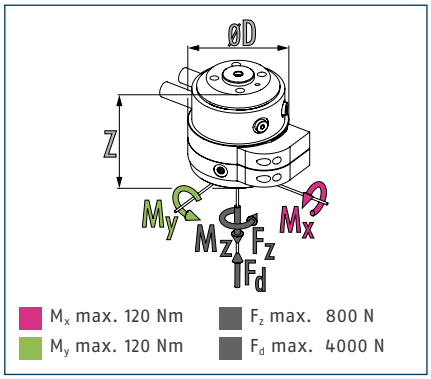
Description		DDF 2-040-P2-E4	DDF 2-040-P2	DDF 2-040-E4
ID		0323046	0323038	0323039
Recommended handling weight	[kg]	10	10	10
Max. drive speed	[1/min]	120	120	120
Max. speed of rotation	[°/s]	720	720	720
Nominal torque	[Nm]	1.5	1.5	1
Starting torque	[Nm]	2	2	1.3
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		2	2	
Air connection thread air feed-through		2x M5	2x M5	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	200	200	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		4		4
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	0.9	0.75	0.45
Robot-side connection		ISO 9409-1-40-4-M6	ISO 9409-1-40-4-M6	ISO 9409-1-40-4-M6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	25	25	25
Max. dynamic bending moment M_y*	[Nm]	25	25	25
Max. dynamic torsional moment M_z*	[Nm]	20	20	20
Max. shear force F_q*	[N]	100	100	100
Dimensions Ø D x Z	[mm]	78 x 62	73 x 55	78 x 36

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

DDF 2 040-1

Feeding Through | Rotary Feed-through for Robots

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

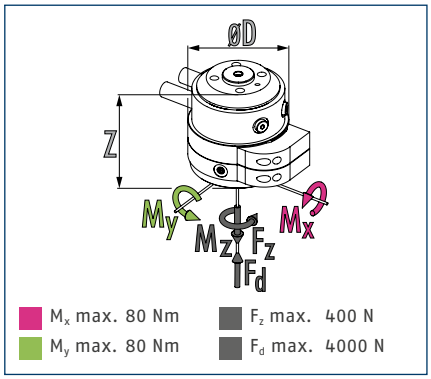
Technical data

Description		DDF 2-040-1-P4-E6
ID		0323048
Recommended handling weight	[kg]	20
Max. drive speed	[1/min]	110
Max. speed of rotation	[°/s]	660
Nominal torque	[Nm]	3
Starting torque	[Nm]	4.5
Angle of rotation	[°]	>360
No. of fluid feed-throughs		4
Air connection thread air feed-through		4x M5
Max. pressure per connection	[bar]	10
Rate of flow at 6 bar (per channel)	[l/min]	110
Max. air pressure air pressure	[bar]	1
Number of electrical feed-throughs		6
Max. voltage	[V]	60
Max. current strength	[A]	1
Weight	[kg]	2
Robot-side connection		ISO 9409-1-40-4-M6
Min./max. ambient temperature	[°C]	5/60
Max. dynamic bending moment M_x*	[Nm]	55
Max. dynamic bending moment M_y*	[Nm]	55
Max. dynamic torsional moment M_z*	[Nm]	45
Max. shear force F_q*	[N]	200
Dimensions Ø D x Z	[mm]	95 x 98

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-2

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

Technical data

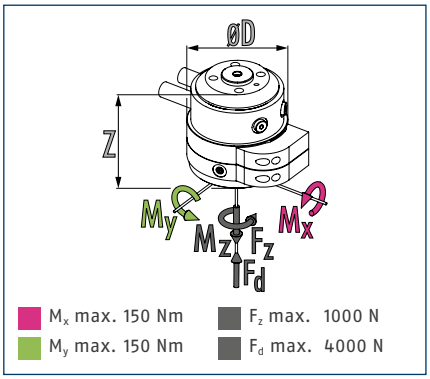
Description		DDF 2-050-P2-E4	DDF 2-050-P2	DDF 2-050-E4
ID		0323056	0323059	0323060
Recommended handling weight	[kg]	10	10	10
Max. drive speed	[1/min]	120	120	120
Max. speed of rotation	[°/s]	720	720	720
Nominal torque	[Nm]	1.5	1.5	1
Starting torque	[Nm]	2	2	1.3
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		2	2	
Air connection thread air feed-through		2x M5	2x M5	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	200	200	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		4		4
Max. voltage	[V]	60		
Max. current strength	[A]	1		
Weight	[kg]	0.95	0.75	0.45
Robot-side connection		ISO 9409-1-50-4-M6	ISO 9409-1-50-4-M6	ISO 9409-1-50-4-M6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	25	25	25
Max. dynamic bending moment M_y*	[Nm]	25	25	25
Max. dynamic torsional moment M_z*	[Nm]	20	20	20
Max. shear force F_q*	[N]	100	100	100
Dimensions Ø D x Z	[mm]	78 x 32	73 x 55	78 x 36

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

DDF 2 050-1

Feeding Through | Rotary Feed-through for Robots

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

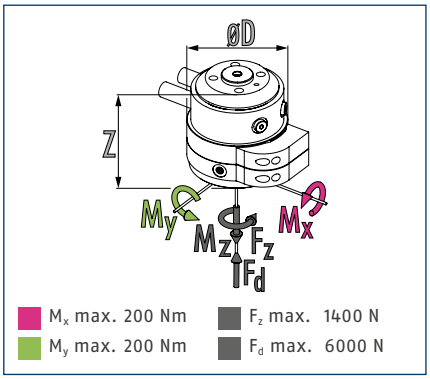
Technical data

Description		DDF 2-050-1-P4-E6
ID		0323058
Recommended handling weight	[kg]	25
Max. drive speed	[1/min]	110
Max. speed of rotation	[°/s]	660
Nominal torque	[Nm]	3
Starting torque	[Nm]	4.5
Angle of rotation	[°]	>360
No. of fluid feed-throughs		4
Air connection thread air feed-through		4x M5
Max. pressure per connection	[bar]	10
Rate of flow at 6 bar (per channel)	[l/min]	110
Max. air pressure air pressure	[bar]	1
Number of electrical feed-throughs		6
Max. voltage	[V]	60
Max. current strength	[A]	1
Weight	[kg]	2.1
Robot-side connection		ISO 9409-1-50-4-M6
Min./max. ambient temperature	[°C]	5/60
Max. dynamic bending moment M_x*	[Nm]	60
Max. dynamic bending moment M_y*	[Nm]	60
Max. dynamic torsional moment M_z*	[Nm]	50
Max. shear force F_q*	[N]	250
Dimensions Ø D x Z	[mm]	95 x 98

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-2

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

Technical data

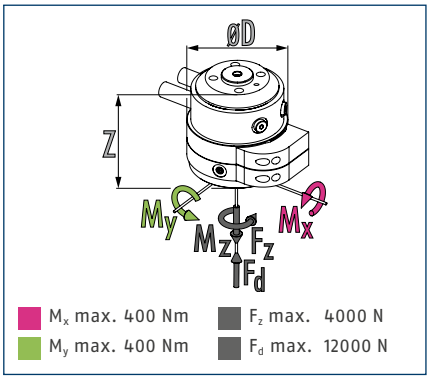
Description		DDF 2-063-P4-E6	DDF 2-063-P4	DDF 2-063-E6
ID		0323068	0323069	0323070
Recommended handling weight	[kg]	35	35	35
Max. drive speed	[1/min]	110	110	110
Max. speed of rotation	[°/s]	660	660	660
Nominal torque	[Nm]	3	3	2
Starting torque	[Nm]	4.5	4.5	2.5
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		4	4	
Air connection thread air feed-through		4x M5	4x M5	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	110	110	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		6		6
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	2.2	1.95	0.95
Robot-side connection		ISO 9409-1-63-4-M6	ISO 9409-1-63-4-M6	ISO 9409-1-63-4-M6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	85	85	85
Max. dynamic bending moment M_y*	[Nm]	85	85	85
Max. dynamic torsional moment M_z*	[Nm]	60	60	60
Max. shear force F_q*	[N]	350	350	350
Dimensions Ø D x Z	[mm]	95 x 97.5	93 x 89	95 x 48

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

DDF 2 080

Feeding Through | Rotary Feed-through for Robots

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

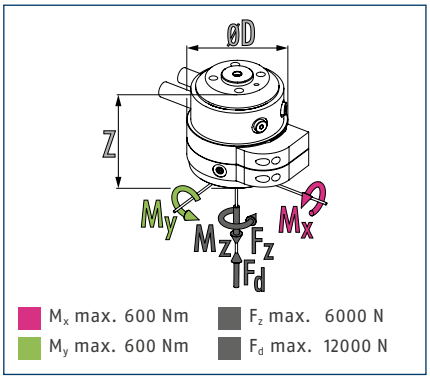
Technical data

Description		DDF 2-080-P4-E6	DDF 2-080-P4	DDF 2-080-E6
ID		0323092	0323082	0323083
Recommended handling weight	[kg]	100	100	100
Max. drive speed	[1/min]	100	100	100
Max. speed of rotation	[°/s]	600	600	600
Nominal torque	[Nm]	8	8	3
Starting torque	[Nm]	10	10	3.5
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		4	4	
Air connection thread air feed-through		4x G1/8"	4x G1/8"	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	240	240	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		6		6
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	5.9	5.3	2.6
Robot-side connection		ISO 9409-1-80-6-M8	ISO 9409-1-80-6-M8	ISO 9409-1-80-6-M8
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	250	250	250
Max. dynamic bending moment M_y*	[Nm]	250	250	250
Max. dynamic torsional moment M_z*	[Nm]	180	180	180
Max. shear force F_q*	[N]	1000	1000	1000
Dimensions Ø D x Z	[mm]	136 x 128.5	120 x 114	136 x 64

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-2

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

Technical data

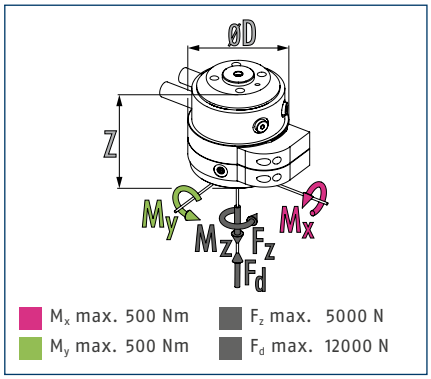
Description		DDF 2-080-1-P4-E10
ID		0323093
Recommended handling weight	[kg]	150
Max. drive speed	[1/min]	90
Max. speed of rotation	[°/s]	540
Nominal torque	[Nm]	22
Starting torque	[Nm]	25
Angle of rotation	[°]	>360
No. of fluid feed-throughs		4
Air connection thread air feed-through		4x G1/8"
Max. pressure per connection	[bar]	10
Rate of flow at 6 bar (per channel)	[l/min]	370
Max. air pressure air pressure	[bar]	1
Number of electrical feed-throughs		10
Max. voltage	[V]	60
Max. current strength	[A]	1
Weight	[kg]	13.1
Robot-side connection		ISO 9409-1-80-6-M8
Min./max. ambient temperature	[°C]	5/60
Max. dynamic bending moment M_x*	[Nm]	400
Max. dynamic bending moment M_y*	[Nm]	400
Max. dynamic torsional moment M_z*	[Nm]	300
Max. shear force F_q*	[N]	1500
Dimensions Ø D x Z	[mm]	200 x 152.9

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

DDF 2 100

Feeding Through | Rotary Feed-through for Robots

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

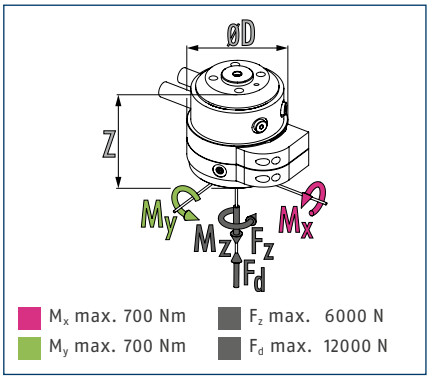
Technical data

Description		DDF 2-100-P4-E6	DDF 2-100-P4	DDF 2-100-E6
ID		0323112	0323114	0323115
Recommended handling weight	[kg]	125	125	125
Max. drive speed	[1/min]	100	100	100
Max. speed of rotation	[°/s]	600	600	600
Nominal torque	[Nm]	8	8	3
Starting torque	[Nm]	10	10	3.5
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		4	4	
Air connection thread air feed-through		4x G1/8"	4x G1/8"	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	240	240	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		6		6
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	6.1	5.5	2.8
Robot-side connection		ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	290	290	290
Max. dynamic bending moment M_y*	[Nm]	290	290	290
Max. dynamic torsional moment M_z*	[Nm]	200	200	200
Max. shear force F_q*	[N]	1250	1250	1250
Dimensions Ø D x Z	[mm]	136 x 128.5	125 x 114	136 x 64

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-2

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

Technical data

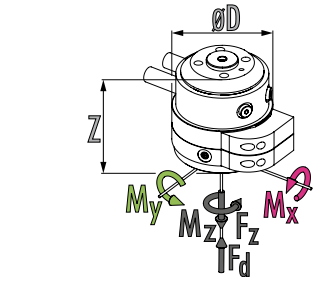
Description		DDF 2-100-1-P4-E10
ID		0323113
Recommended handling weight	[kg]	175
Max. drive speed	[1/min]	90
Max. speed of rotation	[°/s]	540
Nominal torque	[Nm]	22
Starting torque	[Nm]	25
Angle of rotation	[°]	>360
No. of fluid feed-throughs		4
Air connection thread air feed-through		4x G1/8"
Max. pressure per connection	[bar]	10
Rate of flow at 6 bar (per channel)	[l/min]	370
Max. air pressure air pressure	[bar]	1
Number of electrical feed-throughs		10
Max. voltage	[V]	60
Max. current strength	[A]	1
Weight	[kg]	13.3
Robot-side connection		ISO 9409-1-100-6-M8
Min./max. ambient temperature	[°C]	5/60
Max. dynamic bending moment M_x*	[Nm]	450
Max. dynamic bending moment M_y*	[Nm]	450
Max. dynamic torsional moment M_z*	[Nm]	350
Max. shear force F_q*	[N]	1750
Dimensions Ø D x Z	[mm]	200 x 152.9

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

DDF 2 125

Feeding Through | Rotary Feed-through for Robots

Dimensions and maximum loads



M_x max. 900 Nm
M_y max. 900 Nm
F_z max. 9000 N
F_d max. 18000 N

ⓘ Static forces and moments which may act on the rotary feed-through.

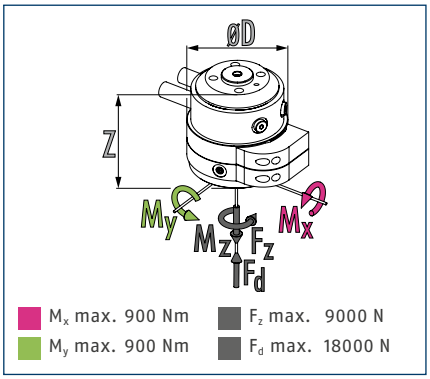
Technical data

Description		DDF 2-125-P4-E10	DDF 2-125-P4	DDF 2-125-E10
ID		0323137	0323133	0323134
Recommended handling weight	[kg]	225	225	225
Max. drive speed	[1/min]	90	90	90
Max. speed of rotation	[°/s]	540	540	540
Nominal torque	[Nm]	22	22	10
Starting torque	[Nm]	25	25	12
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		4	4	
Air connection thread air feed-through		4x G1/8"	4x G1/8"	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	370	370	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		10		10
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	13.9	13.4	5.9
Robot-side connection		ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	520	520	520
Max. dynamic bending moment M_y*	[Nm]	520	520	520
Max. dynamic torsional moment M_z*	[Nm]	400	400	400
Max. shear force F_q*	[N]	2250	2250	2250
Dimensions Ø D x Z	[mm]	200 x 156.9	200 x 147.5	200 x 76

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-2

Dimensions and maximum loads



ⓘ Static forces and moments which may act on the rotary feed-through.

Technical data

Description		DDF 2-160-P4-E10	DDF 2-160-P4	DDF 2-160-E10
ID		0323173	0323162	0323163
Recommended handling weight	[kg]	250	250	250
Max. drive speed	[1/min]	90	90	90
Max. speed of rotation	[°/s]	540	540	540
Nominal torque	[Nm]	22	22	10
Starting torque	[Nm]	25	25	12
Angle of rotation	[°]	>360	>360	>360
No. of fluid feed-throughs		4	4	
Air connection thread air feed-through		4x G1/8"	4x G1/8"	
Max. pressure per connection	[bar]	10	10	
Rate of flow at 6 bar (per channel)	[l/min]	370	370	
Max. air pressure air pressure	[bar]	1	1	1
Number of electrical feed-throughs		10		10
Max. voltage	[V]	60		60
Max. current strength	[A]	1		1
Weight	[kg]	14.2	13.8	6.2
Robot-side connection		ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10
		ISO 9409-1-160-11-M12	ISO 9409-1-160-11-M12	ISO 9409-1-160-11-M12
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. dynamic bending moment M_x*	[Nm]	550	550	550
Max. dynamic bending moment M_y*	[Nm]	550	550	550
Max. dynamic torsional moment M_z*	[Nm]	400	400	400
Max. shear force F_q*	[N]	2500	2500	2500
Dimensions Ø D x Z	[mm]	200 x 156.9	200 x 147.5	200 x 76

* This is the max. total of all payloads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

Robust. Reliable. Flexible.

Stationary Rotary Feed-through DDF-SE

For feeding through electric signals and air for stationary use

Field of Application

For the use on rotary indexing tables and motor-driven applications.

Advantages – Your benefits

Combined air and electric feed-through for extensive supply to your gripping system/tool

Standardized shaft end for easy gear assembly

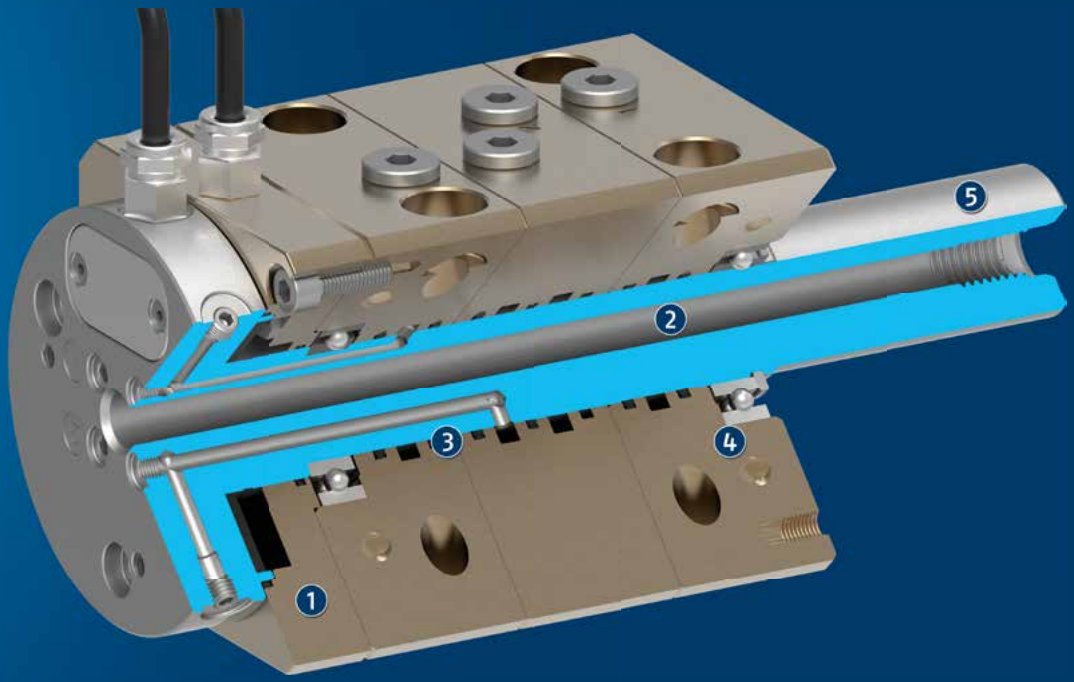
Revolutions up to 500 RPM ensures a reliable supply of air and electrical power for your gripping system, even with fast rotations of up to 500 RPM

Center bore available for simple feeding through of cables

Sizes	Max. RPM	Air	Electric
Quantity: 2	300 .. 500 1/min	feed-throughs 4 .. 6	feed-throughs 6 .. 8

Functional Description

The DDF-SE allows rotary motions of more than 360° of your tool without hoses and cables twisting around the axis. Integrated slip ring contacts supply the tool with energy, even at higher speeds (500 RPM).
Electrics and up to six air lines are fed through. The drive motor is flange-mounted with a standard shaft end with keyway. In order to minimize the axial offset between the motor and DDF-SE, a coupling should be provided.



① **Slip ring**
For feeding-through up to eight electrical signals

② **Center bore**
Continuous for workpieces, sensor systems, and actuators

③ **Air feed-through**
For supply of grippers, linear units or other actuators

④ **Ball bearings**
For absorption of high forces and moments

⑤ **Steel shaft with keyway**
For fast and direct mounting

General Notes about the Series

Mounting: Bores and threads for stationary use

Energy transmission: Air and electrical signals

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

Scope of delivery: Connection cable with open wire strands

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

The gripper is supplied with energy via a rotary feed-through while a component is turned during stationary applications.

1. Stationary rotary feed-through DDF-SE
2. 2-finger parallel gripper PSH
3. Universal swivel finger GFS

SCHUNK offers more ...

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

Manual change system

Universal gripper

Universal gripper

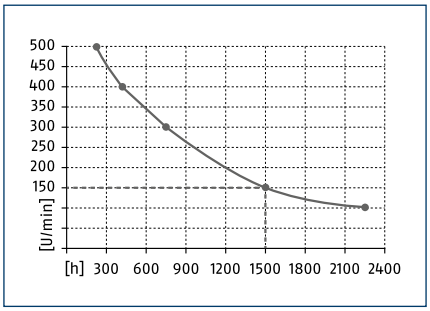
Angular gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

DDF-SE 80

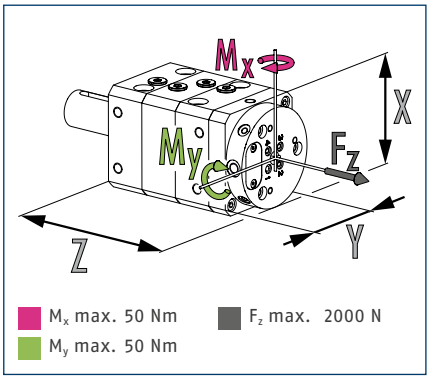
Feeding Through | Stationary Rotary Feed-through

Life time of seals



Life time of seals (with 6 bar pressure); example: DDF-080 SE is driven at a constant 150 RPM in 3-shift operation (24 hours). Life time of seals: The seals should be replaced after 1,500 hours. (Seal kit available from SCHUNK)

Dimensions and maximum loads



M_x max. 50 Nm
F_z max. 2000 N
M_y max. 50 Nm

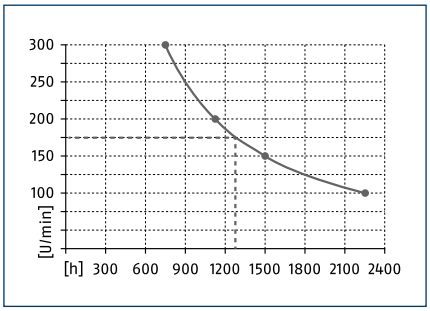
ⓘ This is the max. total of all loads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

Technical data

Description		DDF-SE-080
ID		0323280
Max. RPM	[RPM]	500
Continuous torque	[Nm]	4
Starting torque	[Nm]	6
Angle of rotation	[°]	>360
No. of fluid feed-throughs		4
Max. pressure per connection	[bar]	10
Number of electrical feed-throughs		6
Max. voltage	[V]	60
Max. current	[A]	1
Weight	[kg]	3.3
Min./max. ambient temperature	[°C]	5/60
Dimensions X x Y x Z	[mm]	80 x 80 x 127
Max. static bending moment M_x	[Nm]	60
Max. static bending moment M_y	[Nm]	60

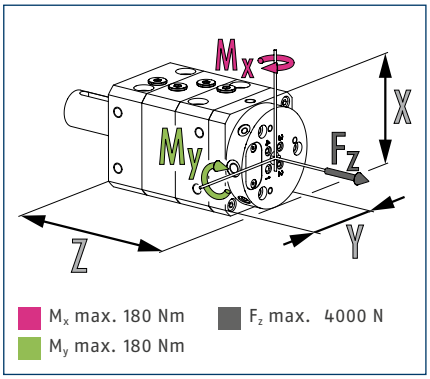
More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ddf-se

Life time of seals



Life time of seals (with 6 bar pressure); example: DDF-120 SE is driven at a constant 175 RPM in a 3-shift operation (24 hours). Life time of seals: The seals should be replaced after 1,300 hours. (The seal kit is available from SCHUNK)

Dimensions and maximum loads



M_x max. 180 Nm
F_z max. 4000 N
M_y max. 180 Nm

ⓘ This is the max. total of all loads (acceleration forces and torques, process forces, emergency stops, etc.), which can affect a rotary feed-through, in order to ensure error-free function.

Technical data

Description		DDF-SE-120
ID		0323285
Max. RPM	[RPM]	300
Continuous torque	[Nm]	13
Starting torque	[Nm]	20
Angle of rotation	[°]	>360
No. of fluid feed-throughs		6
Max. pressure per connection	[bar]	10
Number of electrical feed-throughs		8
Max. voltage	[V]	60
Max. current	[A]	1
Weight	[kg]	9
Min./max. ambient temperature	[°C]	5/60
Dimensions X x Y x Z	[mm]	120 x 120 x 221
Max. static bending moment M_x	[Nm]	250
Max. static bending moment M_y	[Nm]	250

Protecting

Product Quickfinder

	Page		Moment load M_{xy} [Nm]			Axial deflection [mm]	
			0 – 500	500 – 1000	1000 – 2000	0 – 10	10 – 20
Collision and overload sensors							
Collision and overload sensor OPS • Manual reset	140		7.5 – 430				8 – 12
Collision and overload sensor OPR • Automatic reset	148		6 – 2000			5.1 – 16	

	Angular deflection [mm]		Rotary deflection [mm]			Product features		Ambient conditions		
	0 - 10	10 - 20	0 - 20	20 - 40	40 - 60	Pneumatic actuation	Optional with integrated spring	Normal, clean	Slightly dirty	Humid
±5 – ±12					±45 – ±60	●		●		
	±8 – ±13			±20 – ±25		●	●	●	●	●

● = Very highly suitable ◐ = Highly suitable ○ = Suitable in customized version

Compliant. Highly responsive. Simplified monitoring.

Collision and Overload Sensor OPS

For protecting robots and handling units against damage resulting from collisions or overload conditions

Field of Application

Standard solution for all robot applications whereby the robot, the tool or the workpiece are to be protected against greater damages in case of a collision.

Advantages – Your benefits

Triggering force and torque can be adjusted via the operating pressure for optimum monitoring of your robots and components during the process

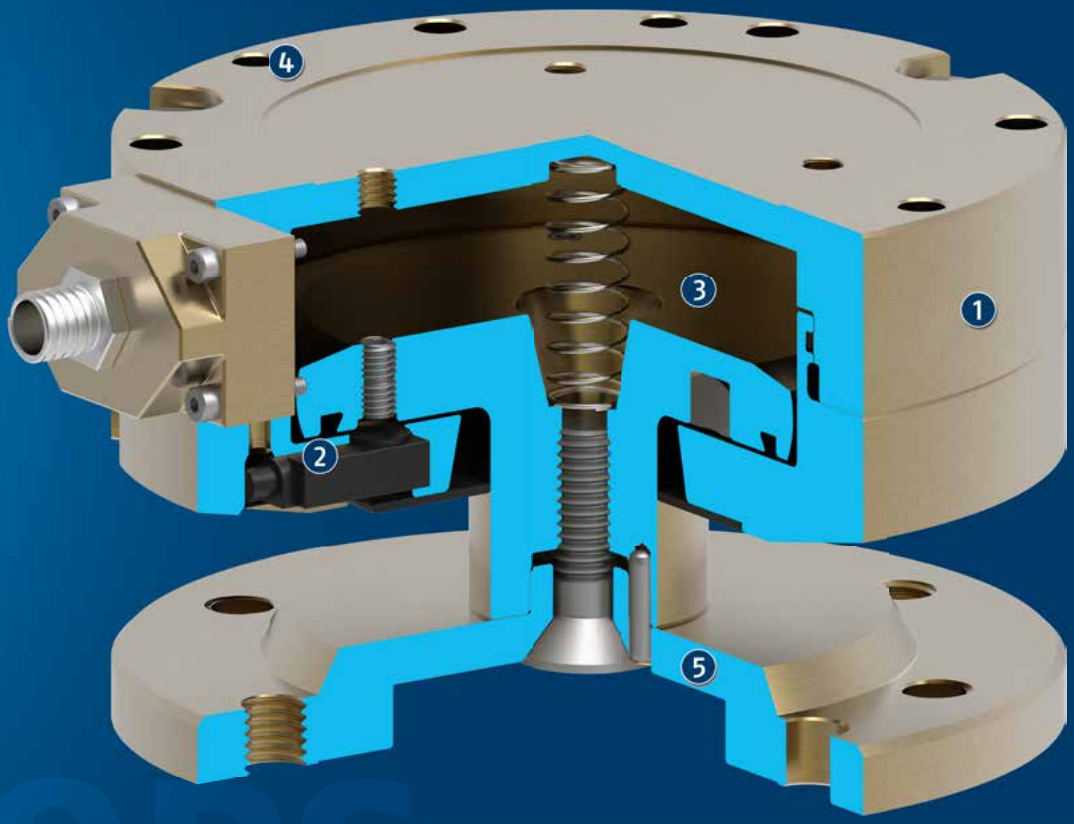
Integrated monitoring for signal transmission without delay in case of collisions so that the robot can be stopped immediately

ISO adapter plates as an option for easy assembly to most of robot types without any manufacturing expenses

Sizes	Triggering force F_d	Trigger moment M_x	Trigger moment M_y	Trigger moment M_z
Quantity: 4	500 .. 7000 N	7.5 .. 430 Nm	7.5 .. 430 Nm	15 .. 450 Nm

Functional Description

In case of a collision, the mounting flange is deflected, simultaneously a sensor is actuated, and its signal triggers the system's emergency stop mechanism.
After deflection a manual reset of the OPS can be done and the system can be returned into its original position.



① **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

② **Sensor system**
For reliable electronic monitoring

③ **Pneumatic piston**
For easy setting the responsive sensitivity by pressure

④ **Centering and mounting possibilities**
For easy and fast assembly

⑤ **Mounting flange**
Deflects in the event of a collision

General Notes about the Series

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

Scope of delivery: Angular plug with 5 m cable and open wire strand, operating and maintenance instructions, 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.

Application Example

Assembly unit for intermediate sleeves with various diameters. The unit is equipped with a collision sensor to prevent damages.

1. 2-finger parallel gripper PFH-mini with workpiece-specific gripper fingers
2. Collision sensor OPS

SCHUNK offers more ...

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

Quick-change system

Manual change system

Rotary feed-through

Universal gripper

Universal gripper

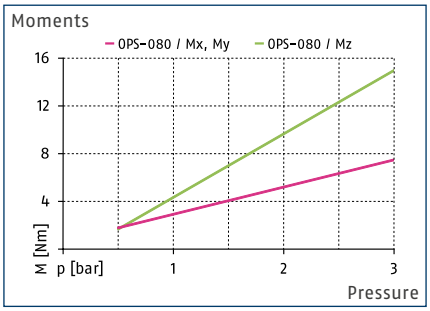
Angular gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

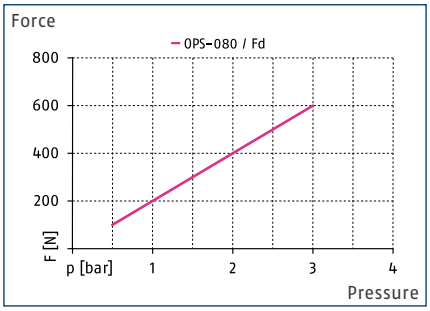
OPS 080

Protecting | Collision and Overload Sensor

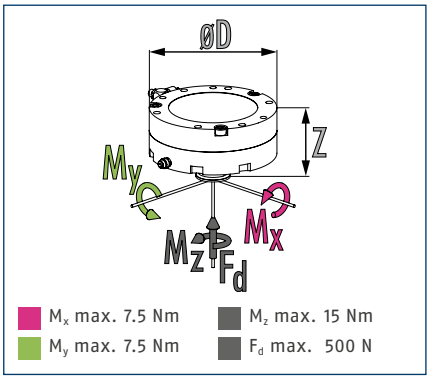
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



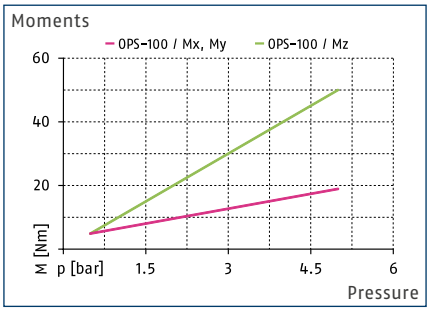
ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

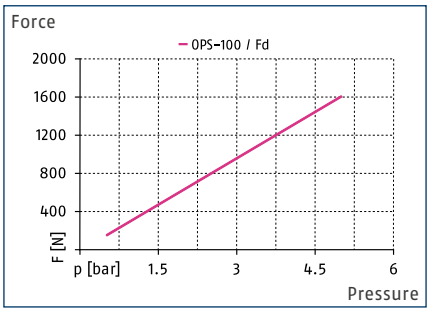
Description		OPS-080
ID		0321125
Axial deflection	[mm]	12
Angular deflection	[°]	12
Deflection rotatory	[°]	360
Min. triggering moment, angular M_x, M_y	[Nm]	2
Supply voltage	[V]	10/30
Repeat accuracy	[mm]	±0.02
Responsiveness	[mm]	0.1
Repeat accuracy, rotary	[min]	5
Min./nom./max. operating pressure	[bar]	0.5/-/3
Weight	[kg]	0.4
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	80 x 56

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ops

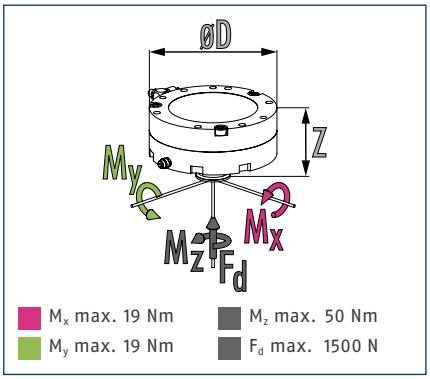
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

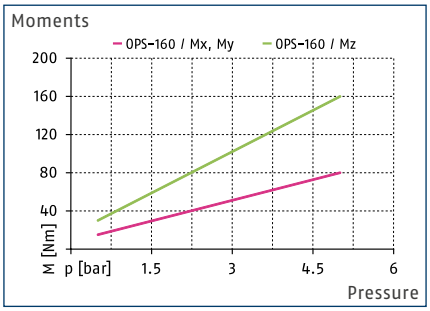
Technical data

Description		OPS-100
ID		0321130
Axial deflection	[mm]	14
Angular deflection	[°]	12
Deflection rotatory	[°]	360
Min. triggering moment, angular M_x, M_y	[Nm]	5
Supply voltage	[V]	10/30
Repeat accuracy	[mm]	±0.02
Responsiveness	[mm]	0.1
Repeat accuracy, rotary	[min]	5
Min./nom./max. operating pressure	[bar]	0.5/-/5
Weight	[kg]	0.7
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	100 x 63

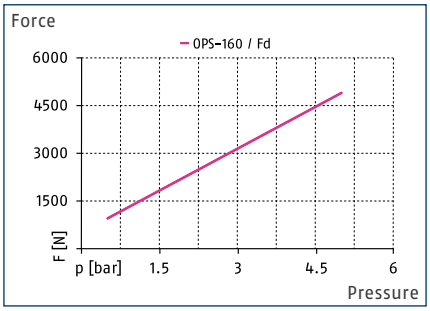
OPS 160

Protecting | Collision and Overload Sensor

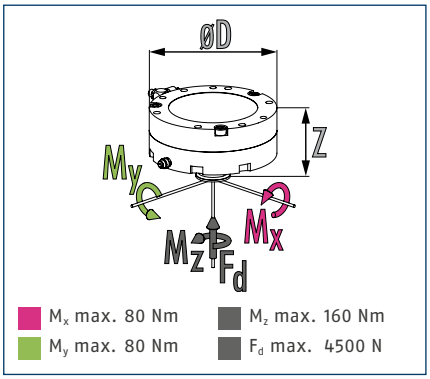
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



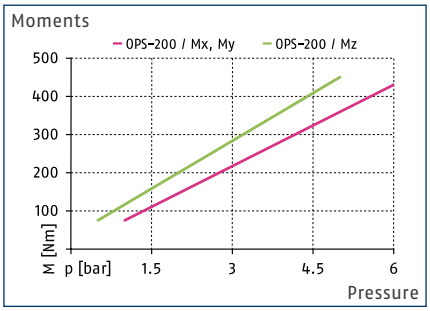
ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

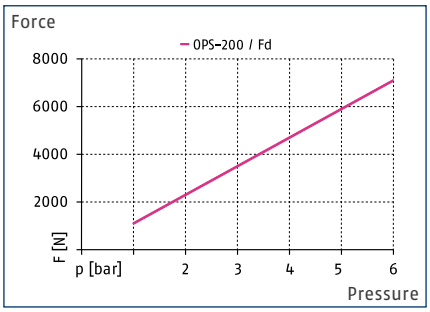
Description		OPS-160
ID		0321135
Axial deflection	[mm]	8
Angular deflection	[°]	5
Deflection rotatory	[°]	360
Min. triggering moment, angular M_x, M_y	[Nm]	30
Supply voltage	[V]	10/30
Repeat accuracy	[mm]	±0.02
Responsiveness	[mm]	0.2
Repeat accuracy, rotary	[min]	5
Min./nom./max. operating pressure	[bar]	0.5/-/5
Weight	[kg]	4.3
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	160 x 79

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ops

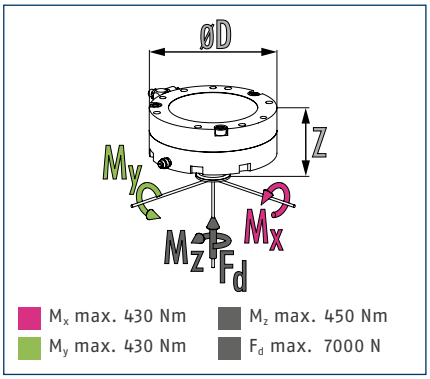
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

Description		OPS-200	OPS-200-VS
ID		0321140	0321141
Axial deflection	[mm]	9.5	9.5
Angular deflection	[°]	4	4
Deflection rotatory	[°]	360	45
Min. triggering moment, angular M_x, M_y	[Nm]	90	90
Supply voltage	[V]	10/30	10/30
Repeat accuracy	[mm]	±0.05	±0.05
Responsiveness	[mm]	0.3	0.3
Repeat accuracy, rotary	[min]	5	5
Min./nom./max. operating pressure	[bar]	1/-/6	1/-/6
Weight	[kg]	7	7
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z	[mm]	200 x 90	200 x 90

Compliant. Highly responsive. Automatic Reset.

Collision and Overload Sensor OPR

For monitoring robots and handling units in the event of a collision or overload conditions

Field of Application

Ideal solution for all robot applications whereby the robot, the tool or the workpiece are to be protected against greater damages in case of a collision.

Advantages – Your benefits

Automatic reset for faster production restart after a collision

Triggering force and torque can be adjusted via the operating pressure for optimum protection of your robots and components

Integrated monitoring for signal transmission without delay in case of collisions so that the robot can be stopped immediately

ISO adapter plates as an option for easy assembly to most of robot types without any manufacturing costs/work

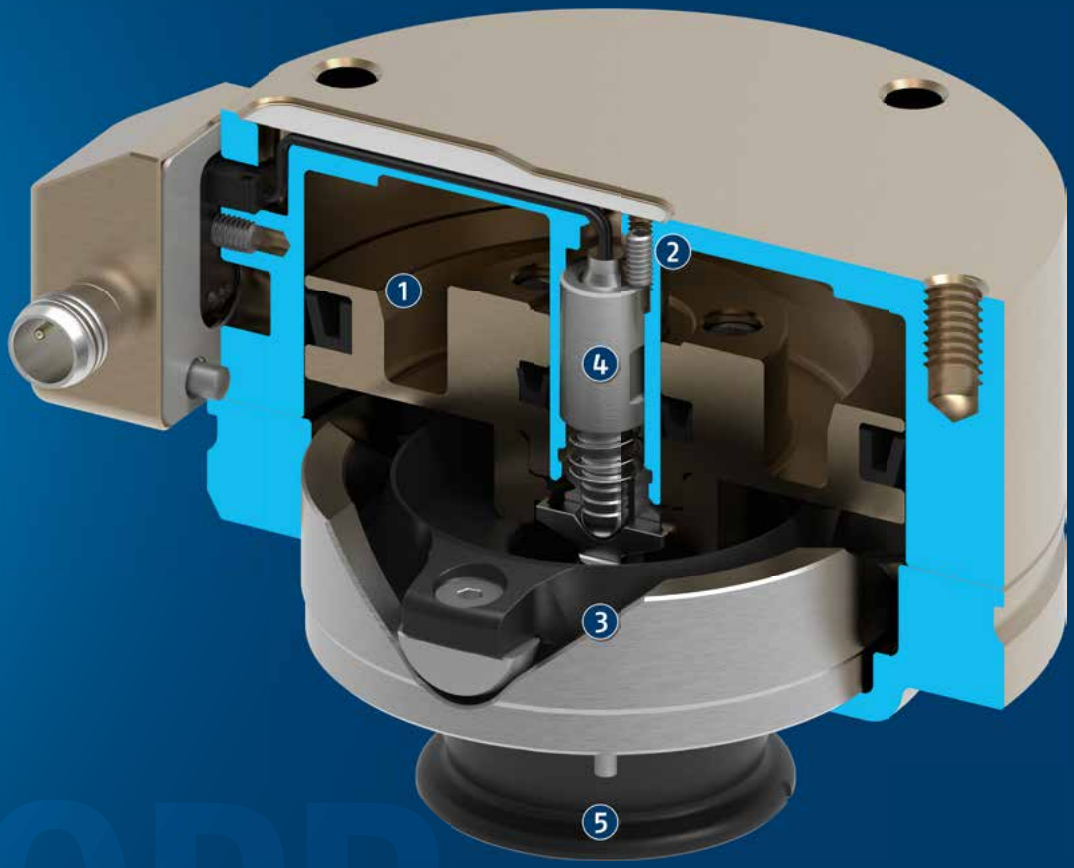
On option also with integrated springs for maintaining the position in the event of pressure loss

Mechanical flexibility in the event of collisions for compensation of the robot's reaction pathway in the event of a collision or overload

Sizes	Triggering force F_d	Trigger moment M_x	Trigger moment M_y	Trigger moment M_z
Quantity: 7	440 .. 14000 N	6 .. 2000 Nm	6 .. 2000 Nm	6.9 .. 1500 Nm

Functional Description

In case of a collision, the mounting flange is deflected, and simultaneously actuates a sensor. Its signal triggers the system's emergency stop mechanism.
The OPR automatically returns to zero position when the tool moves away from the collision object. Production can continue immediately as manual resetting is not necessary.



① **Pneumatic piston**
For easy setting the responsive sensitivity by pressure

② **Adjustment screw**
For adjusting the switching point

③ **Bearing seat**
For absorption of high forces and moments

④ **Monitoring**
Via mechanical switch

⑤ **Mounting flange**
Deflects in the event of a collision

General Notes about the Series

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

Operating principle: Integrated cylinder pistons

Splash water protection: Optional

Scope of delivery: Angular plug with 5 m cable and open wire strand, operating and maintenance instructions, 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.

Application Example

Triple transfer unit for repackaging small cardboard boxes

1. 2-finger angular gripper SWG
2. Collision sensor OPR

SCHUNK offers more ...

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

Quick-change system

Manual change system

Rotary feed-through

Universal gripper

Angular gripper

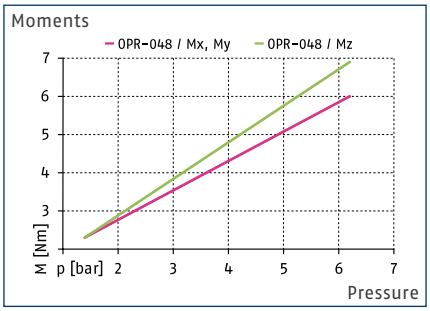
Universal gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

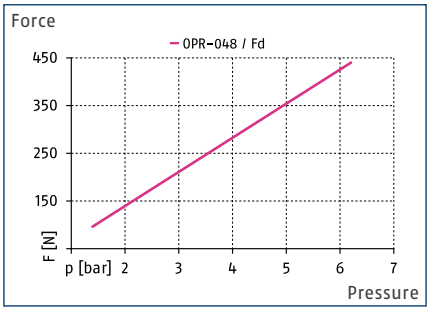
OPR 048

Protecting | Collision and Overload Sensor

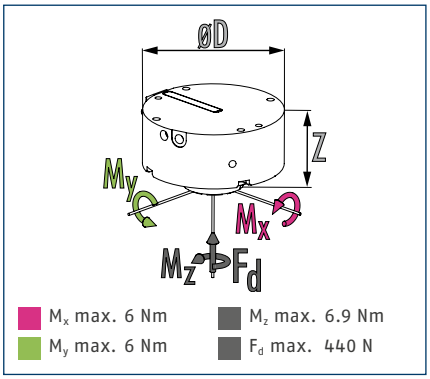
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



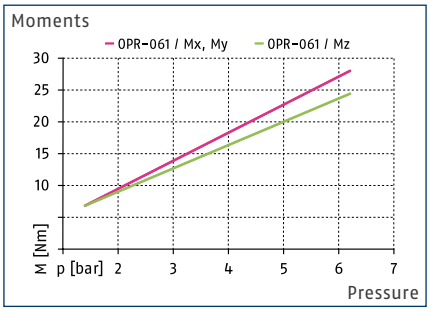
ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

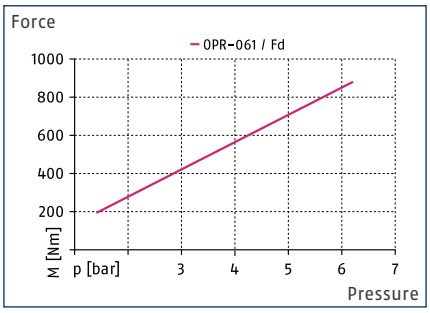
Description		OPR-048-P00	OPR-048-P05	OPR-048-P10	OPR-048-P15
ID		0321341	0321342	0321343	0321344
Axial deflection	[mm]	5.1	5.1	5.1	5.1
Angular deflection	[°]	13	13	13	13
Deflection rotatory	[°]	20	20	20	20
Min. triggering moment, angular M_x, M_y	[Nm]	2.3	2.7	3.2	3.6
Min. triggering torque, rotatory M_z	[Nm]	2.3	2.7	3.1	3.5
Spring triggering force	[N]		24	48	72
Spring release torque, angular	[Nm]		0.4	0.9	1.3
Spring release torque, rotatory	[Nm]		0.4	0.8	1.2
Supply voltage	[V]	10/30	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5	1.4/-/5.2
Weight	[kg]	0.24	0.25	0.25	0.25
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	48 x 39	48 x 39	48 x 39	48 x 39

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/opr

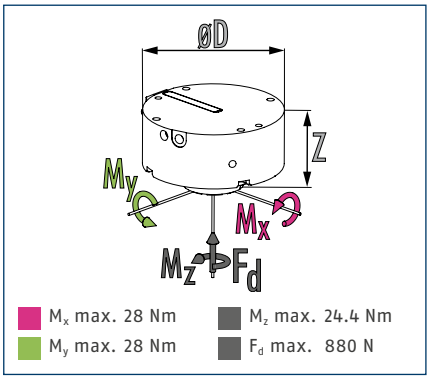
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

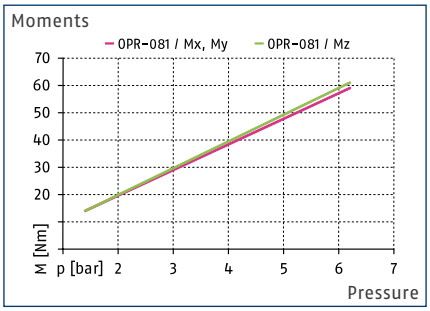
Technical data

Description		OPR-061-P00	OPR-061-P05	OPR-061-P10	OPR-061-P15
ID		0321361	0321362	0321363	0321364
Axial deflection	[mm]	5.6	5.6	5.6	5.6
Angular deflection	[°]	11	11	11	11
Deflection rotatory	[°]	20	20	20	20
Min. triggering moment, angular M_x, M_y	[Nm]	6.8	8.6	10.3	12.1
Min. triggering torque, rotatory M_z	[Nm]	6.8	8.5	10.1	11.8
Spring triggering force	[N]		48	96	144
Spring release torque, angular	[Nm]		1.8	3.5	5.3
Spring release torque, rotatory	[Nm]		1.7	3.3	5
Supply voltage	[V]	10/30	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5	1.4/-/5.2
Weight	[kg]	0.32	0.33	0.33	0.33
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	60 x 45.1	60 x 45.1	60 x 45.1	60 x 45.1
Options and their characteristics					
Splash-proof version		OPR-061-P00-S	OPR-061-P05-S	OPR-061-P10-S	OPR-061-P15-S
ID		0321365	0321366	0321367	0321368
Protection class IP		65	65	65	65

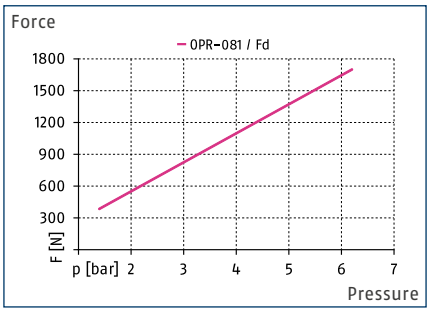
OPR 081

Protecting | Collision and Overload Sensor

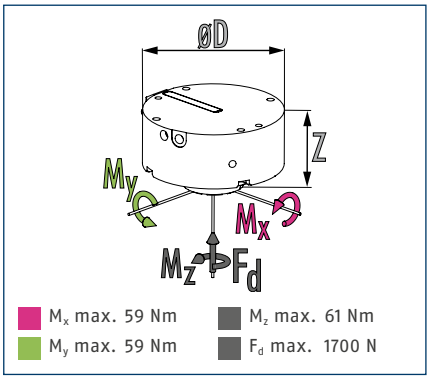
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



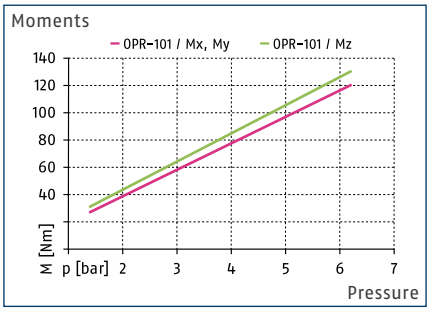
ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

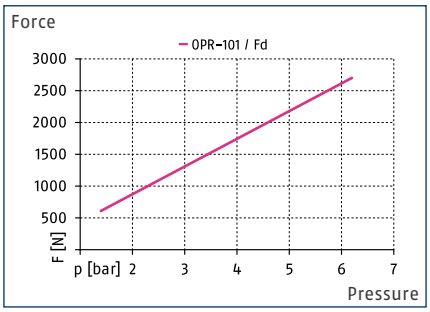
Description		OPR-081-P00	OPR-081-P05	OPR-081-P10	OPR-081-P15
ID		0321381	0321382	0321383	0321384
Axial deflection	[mm]	8.6	8.6	8.6	8.6
Angular deflection	[°]	13	13	13	13
Deflection rotatory	[°]	25	25	25	25
Min. triggering moment, angular M_x, M_y	[Nm]	14	17.3	20.6	24
Min. triggering torque, rotatory M_z	[Nm]	14	17.5	21	24.5
Spring triggering force	[N]		95	191	286
Spring release torque, angular	[Nm]		3.3	6.6	10
Spring release torque, rotatory	[Nm]		3.5	7	10.5
Supply voltage	[V]	10/30	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5	1.4/-/5.2
Weight	[kg]	0.58	0.6	0.6	0.6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	80 x 55.4	80 x 55.4	80 x 55.4	80 x 55.4
Options and their characteristics					
Splash-proof version		OPR-081-P00-S	OPR-081-P05-S	OPR-081-P10-S	OPR-081-P15-S
ID		0321385	0321386	0321387	0321388
Protection class IP		65	65	65	65

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/opr

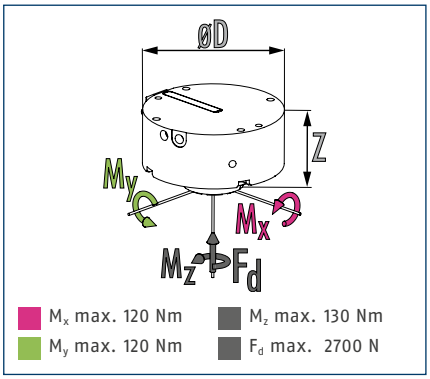
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

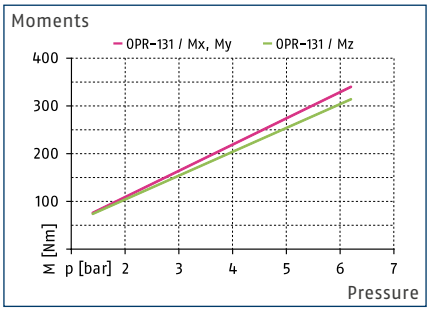
Technical data

Description		OPR-101-P00	OPR-101-P05	OPR-101-P10	OPR-101-P15
ID		0321401	0321402	0321403	0321404
Axial deflection	[mm]	10	10	10	10
Angular deflection	[°]	12	12	12	12
Deflection rotatory	[°]	25	25	25	25
Min. triggering moment, angular M_x, M_y	[Nm]	27	33.6	40.3	46.9
Min. triggering torque, rotatory M_z	[Nm]	31	39	46.9	54.9
Spring triggering force	[N]		151	303	454
Spring release torque, angular	[Nm]		6.6	13.3	19.9
Spring release torque, rotatory	[Nm]		8	15.9	23.9
Supply voltage	[V]	10/30	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5	1.4/-/5.2
Weight	[kg]	1.2	1.3	1.3	1.3
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	100.1 x 63	100.1 x 63	100.1 x 63	100.1 x 63
Options and their characteristics					
Splash-proof version		OPR-101-P00-S	OPR-101-P05-S	OPR-101-P10-S	OPR-101-P15-S
ID		0321405	0321406	0321407	0321408
Protection class IP		65	65	65	65

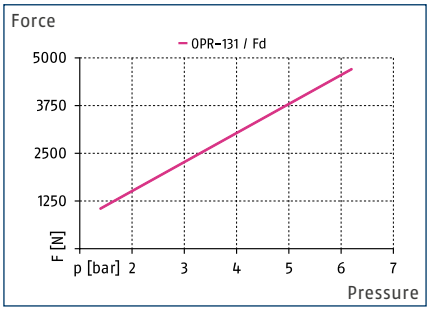
OPR 131

Protecting | Collision and Overload Sensor

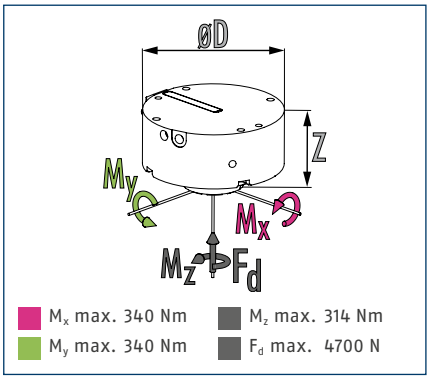
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



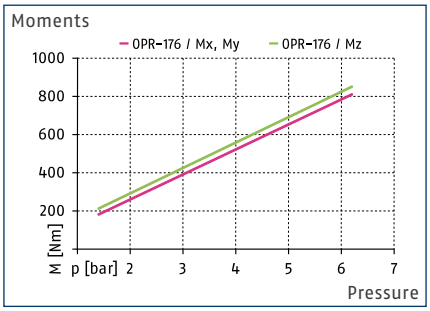
ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

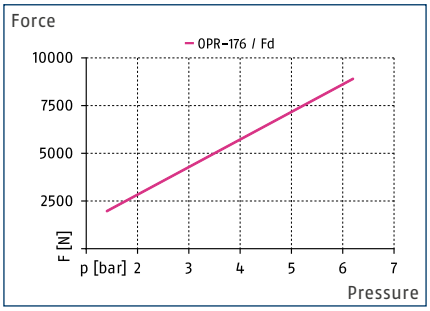
Description		OPR-131-P00	OPR-131-P05	OPR-131-P10
ID		0321431	0321432	0321433
Axial deflection	[mm]	11.5	11.5	11.5
Angular deflection	[°]	10	10	10
Deflection rotatory	[°]	20	20	20
Min. triggering moment, angular M_x, M_y	[Nm]	76	94.8	113.7
Min. triggering torque, rotatory M_z	[Nm]	74	92.6	111.1
Spring triggering force	[N]		262	523
Spring release torque, angular	[Nm]		18.8	37.7
Spring release torque, rotatory	[Nm]		18.6	37.1
Supply voltage	[V]	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5
Weight	[kg]	2.3	2.4	2.4
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	130 x 75	130 x 75	130 x 75
Options and their characteristics				
Splash-proof version		OPR-131-P00-S	OPR-131-P05-S	OPR-131-P10-S
ID		0321435	0321436	0321437
Protection class IP		65	65	65

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/opr

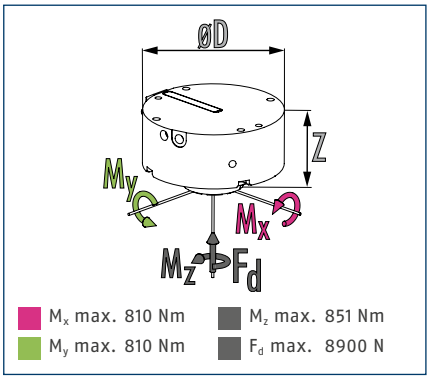
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

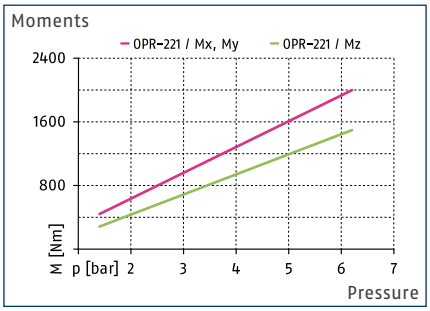
Technical data

Description		OPR-176-P00	OPR-176-P05	OPR-176-P10	OPR-176-P15
ID		0321476	0321477	0321478	0321479
Axial deflection	[mm]	16	16	16	16
Angular deflection	[°]	10	10	10	10
Deflection rotatory	[°]	20	20	20	20
Min. triggering moment, angular M_x, M_y	[Nm]	180	223.5	266.9	310
Min. triggering torque, rotatory M_z	[Nm]	211	263.7	316	369
Spring triggering force	[N]		494	988	1483
Spring release torque, angular	[Nm]		43.5	86.9	130
Spring release torque, rotatory	[Nm]		52.7	105	158
Supply voltage	[V]	10/30	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5	1.4/-/5.2
Weight	[kg]	5.4	5.5	5.5	5.5
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	175 x 100.1	175 x 100.1	175 x 100.1	175 x 100.1
Options and their characteristics					
Splash-proof version		OPR-176-P00-S	OPR-176-P05-S	OPR-176-P10-S	OPR-176-P15-S
ID		0321480	0321481	0321482	0321483
Protection class IP		65	65	65	65

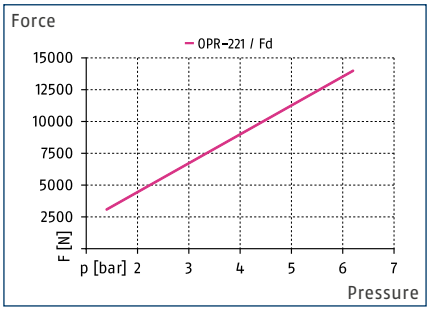
OPR 221

Protecting | Collision and Overload Sensor

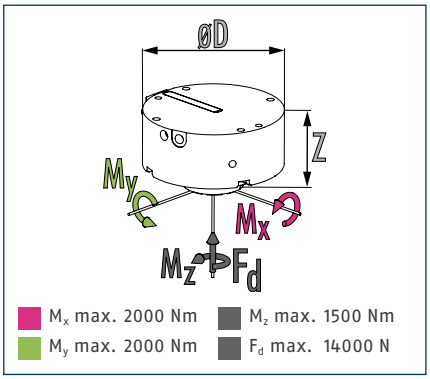
Triggering torque M_x, M_y, M_z



Triggering force F_d



Dimensions and maximum loads



ⓘ The design of a collision sensor is defined by the occuring forces and moments in your application.

Technical data

Description		OPR-221-P00	OPR-221-P05	OPR-221-P10	OPR-221-P15
ID		0321521	0321522	0321523	0321524
Axial deflection	[mm]	16	16	16	16
Angular deflection	[°]	8	8	8	8
Deflection rotatory	[°]	20	20	20	20
Min. triggering moment, angular M_x, M_y	[Nm]	440	549	722	766
Min. triggering torque, rotatory M_z	[Nm]	282	337.2	392	448
Spring triggering force	[N]		767	1534	2301
Spring release torque, angular	[Nm]		109	217	326
Spring release torque, rotatory	[Nm]		55.2	110	166
Supply voltage	[V]	10/30	10/30	10/30	10/30
Repeat accuracy	[mm]	±0.025	±0.025	±0.025	±0.025
Responsiveness	[mm]	0.5	0.5	0.5	0.5
Repeat accuracy, rotary	[min]	5	5	5	5
Min./nom./max. operating pressure	[bar]	1.4/-/6.2	1.4/-/5.9	1.4/-/5.5	1.4/-/5.2
Weight	[kg]	11.4	11.7	11.7	11.7
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60
Dimensions Ø D x Z	[mm]	220 x 118.1	220 x 118.1	220 x 118.1	220 x 118.1
Options and their characteristics					
Splash-proof version		OPR-221-P00-S	OPR-221-P05-S	OPR-221-P10-S	OPR-221-P15-S
ID		0321525	0321526	0321527	0321528
Protection class IP		65	65	65	65

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/opr

Compensating

Product Quickfinder

	Page		Compensation stroke XY [mm]			Compensation stroke Z [mm]			Angular compensation [°]		
			0 – 5	5 – 10	10 – 15	0 – 5	5 – 10	10 – 15	0 – 5	5 – 10	
Compensation units											
Compensation unit Z AGE-Z 2 • Compensation and locking in Z-axis	162						8 – 10				
Compensation unit XY AGE-XY • Compensation in XY plane • Locking in X and Y-axis	170			±2.5 – ±4							
Compensation unit AGE-F AGE-F • Compensation in X and Y-axis • Integrated spring reset into base position	180			±1.5 – ±5							
Compensation unit XYZ AGE-S • Compensation and locking in X, Y and Z-axis	188				±4 – ±12		10 – 14				
Tolerance compensation unit											
Tolerance compensation unit TCU-P • Compensation unit for X, Y and Z-axis • Mounting pattern suitable for parallel grippers	198								±1 – ±2		
Tolerance compensation unit TCU-Z • Compensation unit for X, Y and Z-axis • Mounting pattern compatible with centric grippers	210								±1		
Insertion unit											
Insertion unit FUS • Compensation in X and Y-axis	222					±1.3 – ±2.2			±1 – ±1.1		

Rotatory compensation [°]			Horizontal additional payload [kg]			Vertical additional payload [kg]			Product features				Ambient conditions		
0 – 5	5 – 10	10 – 20	0 – 10	10 – 50	50 – 100	0 – 20	20 – 100	100 – 200	Direct mounting to ISO 9409 flange	Pneumatic locking	Position memory	Monitoring via sensor system	Normal, clean	Slightly dirty	High temperature on request
						5 – 12			●	●		●	●		●
	±12 – ±16		4 – 10			6 – 15			●	●	●	● (MMS)	●		●
			1.5 – 32			9 – 160						● (MMS)	●		
			5.5 – 100						●	●	●	●	●	●	●
±1 – ±2			0.5 – 0.8							●		●	●	●	
±1 – ±1.5			3 – 60							●		●	●	●	
	±2.5 – ±5									●		●	●	●	

● = Very highly suitable ◐ = Highly suitable ○ = Suitable in customized version

Compact. Compliant. Productive.

Compensation Unit AGE-Z 2

Compensation unit compensating in Z-direction

Field of Application

Palletizing, joining, and assembly of workpieces.

Advantages – Your benefits

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

Locking for switching the unit rigidly in a defined, extended or retracted position

Compact design for minimum installation height

Can be combined with AGE-XY without additional adapter plate

Sizes
Quantity: 3

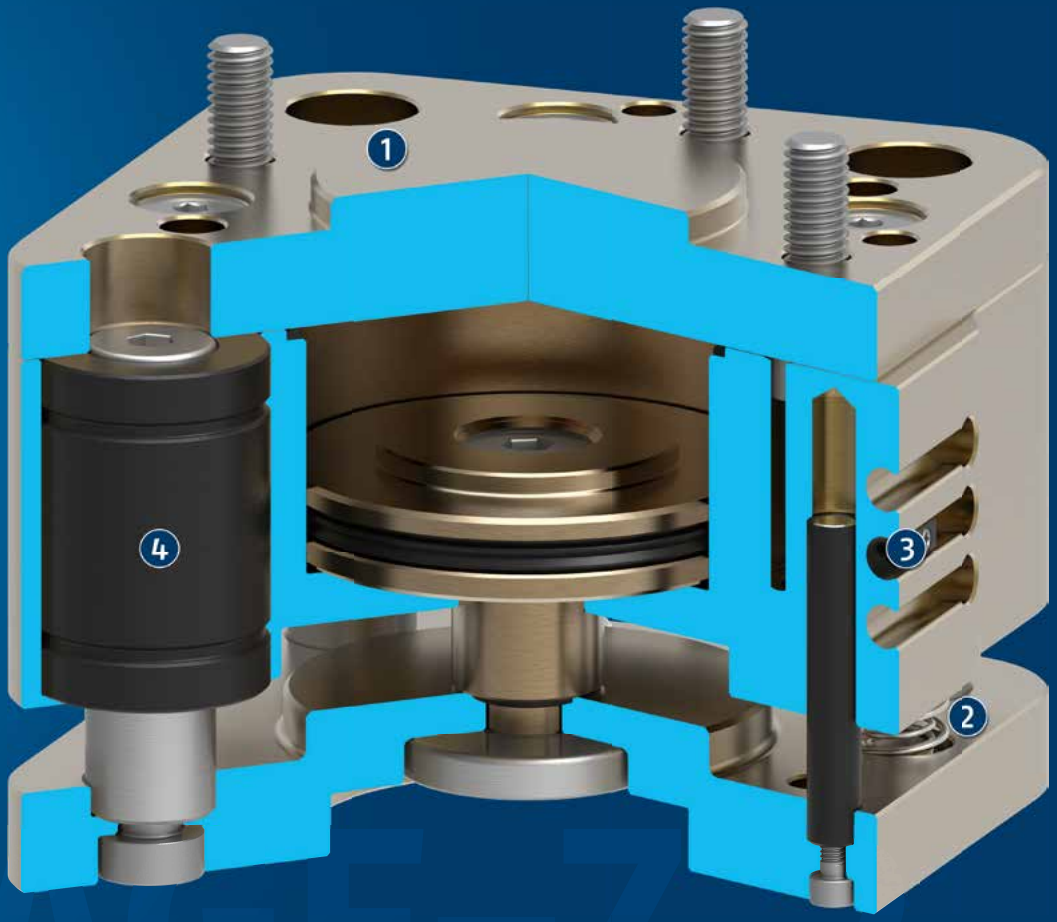
Handling weight
5 .. 12 kg

Compensation Z
8 .. 10 mm

Functional Description

The compensation unit AGE-Z 2 allows for Z-compensation of different collection and deposition positions. The compensation unit runs on a ball-guide that is free from play. Pressure springs determine the rigidity of the AGE-Z 2. It can be increased by additionally actuating the pneumatic cylinder.

The cylinder also ensures the unit to be locked in the event of dynamic movements. Monitoring of the retracted and the extended position is done by a magnetic switch.



① **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

② **Pressure springs**
For defined pressure forces when depositing

③ **Monitoring groove**
Stroke monitoring of the locking piston with magnetic switches

④ **Scope-free ball bearings**
For great torque capacity at minimum size

General Notes about the Series

Guidance system: Scope-free ball bearings

Monitoring: Via magnetic switch or inductive proximity sensor

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

Housing: Hard anodized aluminum alloy, functional parts made of hardened steel

Scope of delivery: Robot-side mounting screws

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

Handling tool with compensation unit and change system for handling of rotation-symmetrical workpieces with horizontal offset in set-down position.

1. Compensation unit AGE-Z 2
2. 3-finger centric gripper PZN-plus
3. Quick-change system SWS
4. Electric module
5. Cable connector

SCHUNK offers more ...

The following components make the product AGE-Z 2 even more productive – the suitable addition for the highest functionality, flexibility, reliability, and controlled production.

Quick-change system

Manual change system

Collision and overload sensor

Universal gripper

Magnetic switch

Inductive proximity switch

Electric magnetic gripper

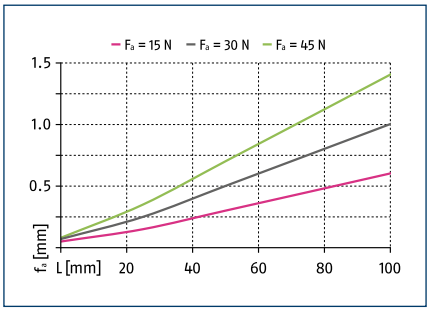
Universal gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

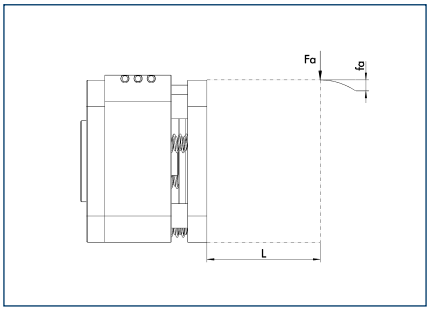
AGE-Z 2 50

Compensating | Compensation Unit Z

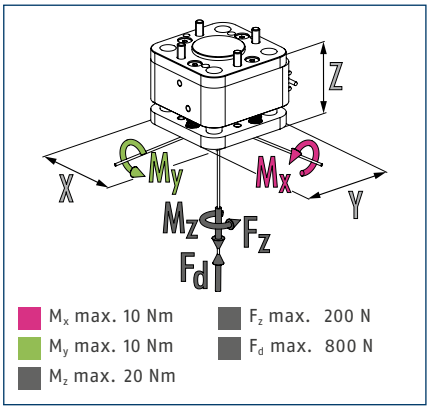
Load chart



Deflection



Dimensions and maximum loads



ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

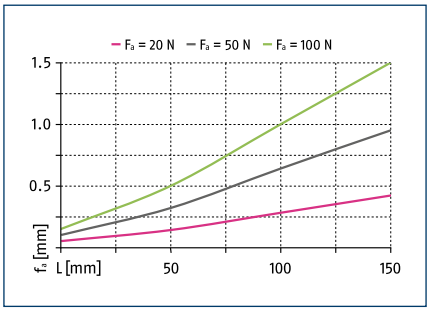
Technical data

Description		AGE-Z 2-050-1	AGE-Z 2-050-2
ID		0324453	0324454
Compensation Z	[mm]	8	8
Recommended handling weight	[kg]	5	5
Locking force retracted at 6 bar	[N]	300	280
Locking force extended at 6 bar	[N]	500	500
Min. spring force	[N]	20	40
Max. spring force	[N]	40	60
Min./nom./max. operating pressure	[bar]	2.5/-/6	2.5/-/6
Repeat accuracy	[mm]	0.02	0.02
Robot-side connection		ISO 9409-1-50-4-M6	ISO 9409-1-50-4-M6
Weight	[kg]	0.55	0.55
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions X x Y x Z	[mm]	64 x 64 x 53	64 x 64 x 53

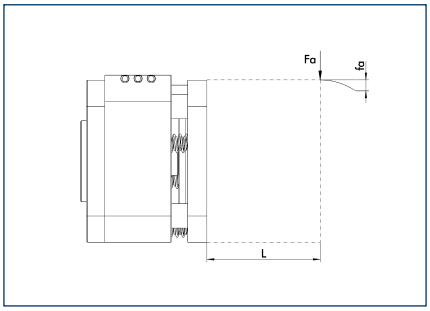
ⓘ The diagram shows the AGE-Z 2 deflection under load and in the unlocked state.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-z-2

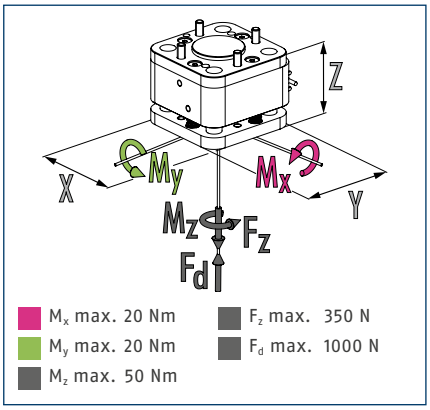
Load chart



Deflection



Dimensions and maximum loads



M_x max. 20 Nm	F_z max. 350 N
M_y max. 20 Nm	F_d max. 1000 N
M_z max. 50 Nm	

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

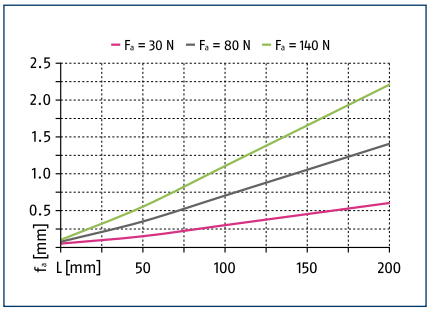
Description		AGE-Z 2-063-1	AGE-Z 2-063-2
ID		0324466	0324467
Compensation Z	[mm]	8	8
Recommended handling weight	[kg]	9	9
Locking force retracted at 6 bar	[N]	800	750
Locking force extended at 6 bar	[N]	900	900
Min. spring force	[N]	40	60
Max. spring force	[N]	60	100
Min./nom./max. operating pressure	[bar]	2.5/-/6	2.5/-/6
Repeat accuracy	[mm]	0.02	0.02
Robot-side connection		ISO 9409-1-63-4-M6	ISO 9409-1-63-4-M6
Weight	[kg]	0.8	0.8
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions X x Y x Z	[mm]	80 x 80 x 59.5	80 x 80 x 59.5

ⓘ The diagram shows the AGE-Z 2 deflection under load and in the unlocked state.

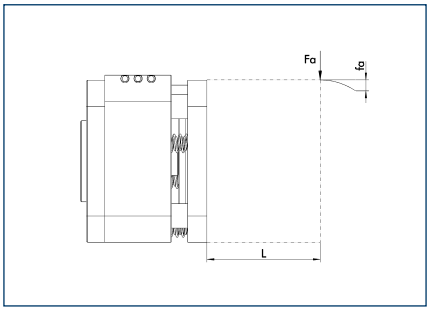
AGE-Z 2 80

Compensating | Compensation Unit Z

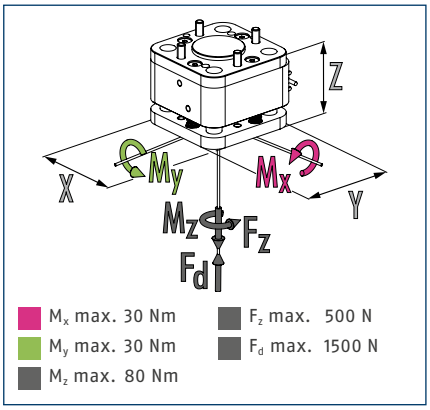
Load chart



Deflection



Dimensions and maximum loads



- M_x max. 30 Nm
- M_y max. 30 Nm
- M_z max. 80 Nm
- F_z max. 500 N
- F_d max. 1500 N

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-Z 2-080-1	AGE-Z 2-080-2
ID		0324483	0324484
Compensation Z	[mm]	10	10
Recommended handling weight	[kg]	12	12
Locking force retracted at 6 bar	[N]	1450	1450
Locking force extended at 6 bar	[N]	1500	1500
Min. spring force	[N]	70	90
Max. spring force	[N]	100	120
Min./nom./max. operating pressure	[bar]	2.5/-/6	2.5/-/6
Repeat accuracy	[mm]	0.02	0.02
Robot-side connection		ISO 9409-1-80-6-M8	ISO 9409-1-80-6-M8
Weight	[kg]	1.7	1.7
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions X x Y x Z	[mm]	105 x 105 x 65	105 x 105 x 65

ⓘ The diagram shows the AGE-Z 2 deflection under load and in the unlocked state.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-z-2

Compact. Smooth. Robust.

Compensation Unit AGE-XY

Compensation unit with X-Y lateral compliance

Field of Application

Palletizing, joining, and assembly of workpieces.

Advantages – Your benefits

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

Robust sliding guide for high moment load at minimum space

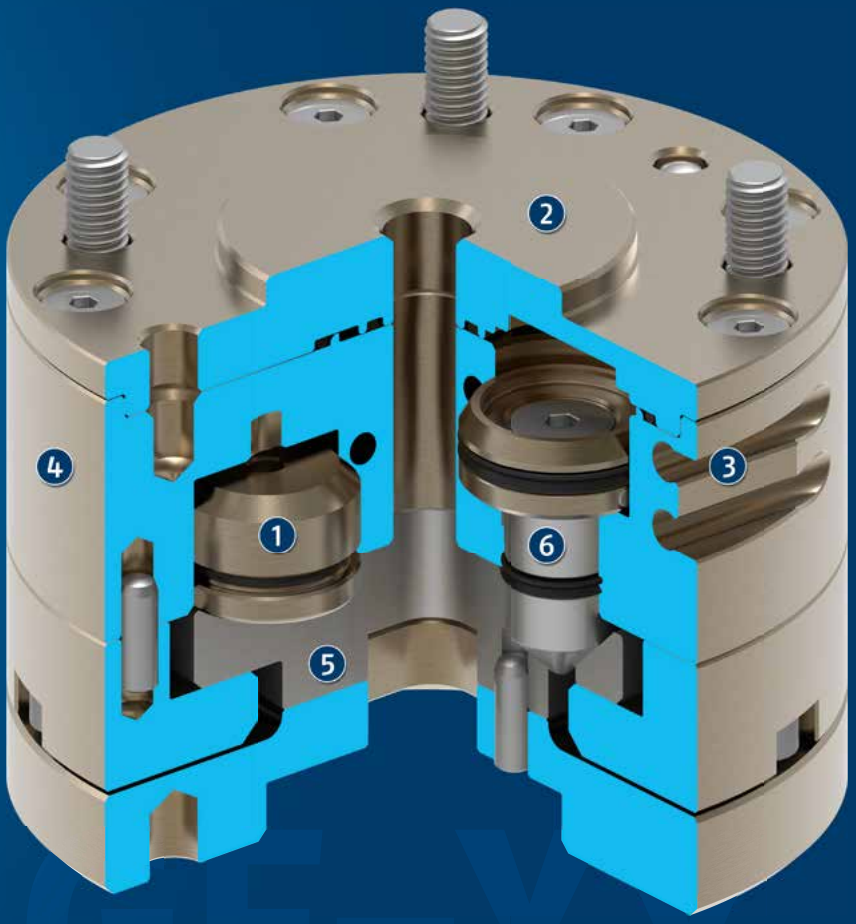
Centrical locking for centering the unit in a defined position

Pneumatic position storage for eccentric locking in a deflected position

Sizes	Handling weight	Compensation XY	Rotary compensation angle
Quantity: 3	6 .. 15 kg	±2.5 .. 4 mm	±12 .. 16°

Functional Description

The compensation unit AGE-XY allows the release of the linear movement in the X- and Y-axis by robots or handling units. After the compensation process, the workpiece can be centrically aligned again.



① **Position memory**
Pneumatically actuated locking in any eccentric position via frictional connection

② **Direct assembly**
By using a standardized ISO 9409 interface for robots

③ **Monitoring**
Stroke monitoring of the locking piston with magnetic switches

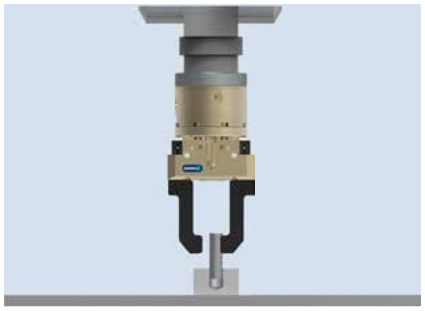
④ **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

⑤ **Compensation body**
For compensation of rotational deviations and position errors on the XY plane

⑥ **Centrical locking**
Pneumatically actuated locking in centric position via form-fit locking

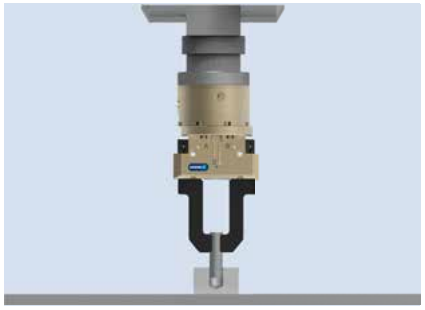
Detailed Functional Description

Workpiece removal: AGE unlocked – gripper opened



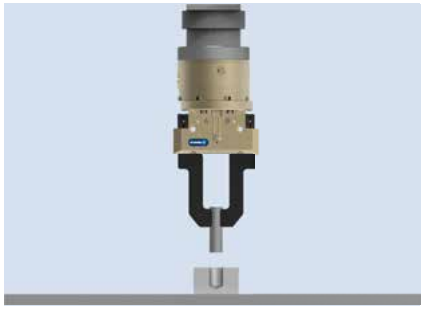
The robot travels towards the workpiece with a gripping unit consisting of an AGE (compensation unit) and gripper.
There is an offset due to tolerances/inaccuracies.

Workpiece removal: AGE unlocked – gripper closed



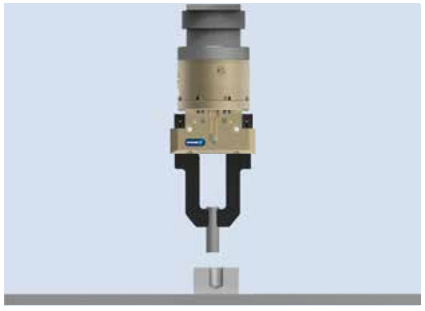
An unlocked AGE can be used to compensate the existing offset between the gripper and workpiece axes.

Workpiece removal: AGE locked (position memory) – gripper closed



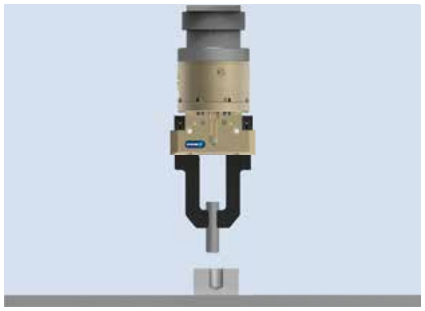
The robot removes the workpiece.
The deflected position of the AGE can be locked via the integrated position memory.

Workpiece removal: AGE centrically locked – gripper closed



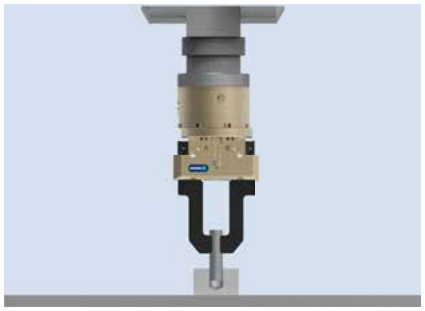
The position memory of the AGE is unlocked and the centered AGE lock is activated.
The original axis offset is no longer necessary, as the gripper and robot axis are now centered relative to one another.

Workpiece mounting: AGE centrically locked – gripper closed



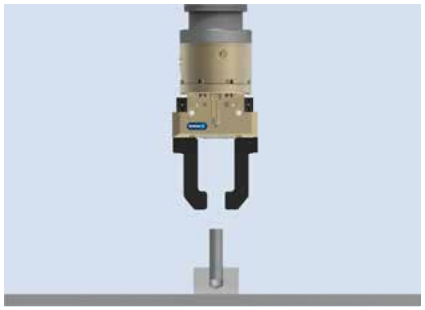
The robot travels towards the workpiece with a gripping unit consisting of an AGE (compensation unit) and gripper.
There is an offset due to tolerances/inaccuracies.

Workpiece mounting: AGE unlocked – gripper closed



An unlocked AGE can be used to compensate the existing axial offset between the gripper and workpiece axes and the workpiece can be joined.

Workpiece mounting: AGE unlocked – gripper opened



The robot moves away from the center of compliance with the gripper unit, the unit is then centrically locked, and the gripper is closed.

General Notes about the Series

Guidance system: Robust sliding guide

Monitoring: By magnetic switch

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

Housing: Hard anodized aluminum alloy, functional parts made of hardened steel

Scope of delivery: Robot-side mounting screws

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

Compensation unit for inserting a pin in a bore with a roughly toleranced position. The compensation unit compensates for the planar offset without turning or tilting the workpiece.

1. 2-finger parallel gripper PGF with top finger and workpiece
2. Compensation unit AGE-XY

SCHUNK offers more ...

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

Quick-change system

Manual change system

Collision and overload sensor

Universal gripper

Magnetic switch

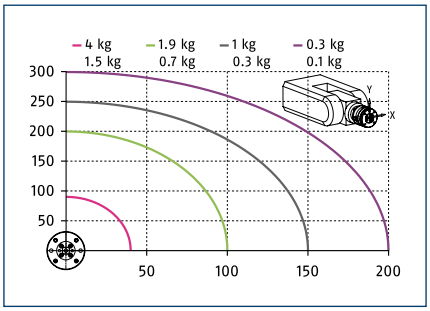
Universal gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

AGE-XY 050

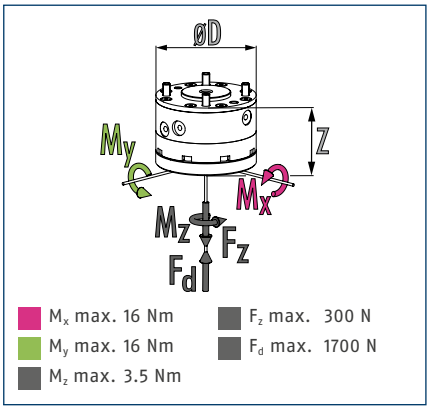
Compensating | Compensation Unit XY

Load chart



ⓘ Position of the allowable center of mass as a function of the payload for horizontal applications. A higher value of mass is valid for centrical locking, and a lower value of mass for position storage.

Dimensions and maximum loads



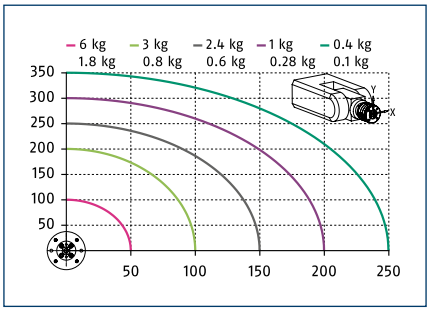
ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-XY-050	AGE-XY-050-P
ID		0324450	0324451
Compensation XY	[mm]	±2.5	±2.5
Deflection rotatory	[°]	±12	±12
Recommended handling weight, vertical	[kg]	6	6
Recommended handling weight, horizontal	[kg]	4	4
Recommended handling weight position storage	[kg]		1.5
Locking force	[N]	235	235
Max. load force locked	[N]	130	130
Max. radial force, position storage	[N]		45
Rotation moment position storage	[Nm]		1.2
Max. distance shifting force Z	[mm]	120	120
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1
Robot-side connection		ISO 9409-1-50-4-M6	ISO 9409-1-50-4-M6
Weight	[kg]	0.46	0.47
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z	[mm]	65 x 48	65 x 48

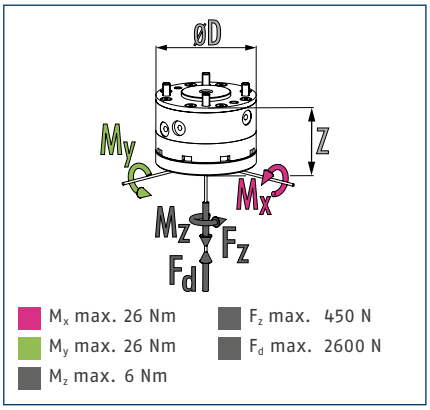
More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-xy

Load chart



ⓘ Position of the allowable center of mass as a function of the payload for horizontal applications. A higher value of mass is valid for centrical locking, and a lower value of mass for position storage.

Dimensions and maximum loads



M_x max. 26 Nm
M_y max. 26 Nm
M_z max. 6 Nm
F_z max. 450 N
F_d max. 2600 N

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

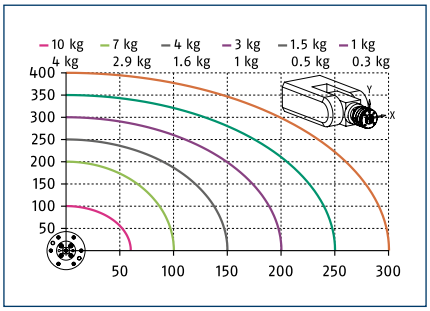
Technical data

Description		AGE-XY-063	AGE-XY-063-P
ID		0324463	0324464
Compensation XY	[mm]	±3	±3
Deflection rotatory	[°]	±12	±12
Recommended handling weight, vertical	[kg]	9	9
Recommended handling weight, horizontal	[kg]	6	6
Recommended handling weight position storage	[kg]		1.8
Locking force	[N]	370	370
Max. load force locked	[N]	200	200
Max. radial force, position storage	[N]		50
Rotation moment position storage	[Nm]		1.7
Max. distance shifting force Z	[mm]	160	160
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1
Robot-side connection		ISO 9409-1-63-4-M6	ISO 9409-1-63-4-M6
Weight	[kg]	0.83	0.85
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z	[mm]	80 x 56	80 x 56

AGE-XY 080

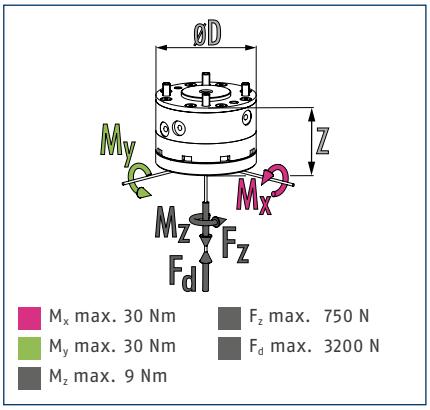
Compensating | Compensation Unit XY

Load chart



ⓘ Position of the allowable center of mass as a function of the payload for horizontal applications. A higher value of mass is valid for centrical locking, and a lower value of mass for position storage.

Dimensions and maximum loads



ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-XY-080	AGE-XY-080-P
ID		0324480	0324481
Compensation XY	[mm]	±4	±4
Deflection rotatory	[°]	±16	±16
Recommended handling weight, vertical	[kg]	15	15
Recommended handling weight, horizontal	[kg]	10	10
Recommended handling weight position storage	[kg]		4
Locking force	[N]	580	580
Max. load force locked	[N]	310	310
Max. radial force, position storage	[N]		145
Rotation moment position storage	[Nm]		4
Max. distance shifting force Z	[mm]	200	200
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1
Robot-side connection		ISO 9409-1-80-6-M8	ISO 9409-1-80-6-M8
Weight	[kg]	1.49	1.5
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z	[mm]	100 x 62	100 x 62

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-xy

Flat. Flexible. Compact.

Compensation Unit AGE-F

Compensation unit with X-Y lateral compensation and integrated spring reset

Field of Application

Palletizing, joining, and assembly of workpieces.

Advantages – Your benefits

Spring reset in three different spring strengths for a defined, centric position at a repeat accuracy of 0.02 mm

Direct assembly of grippers therefore no need for additional adapter plates

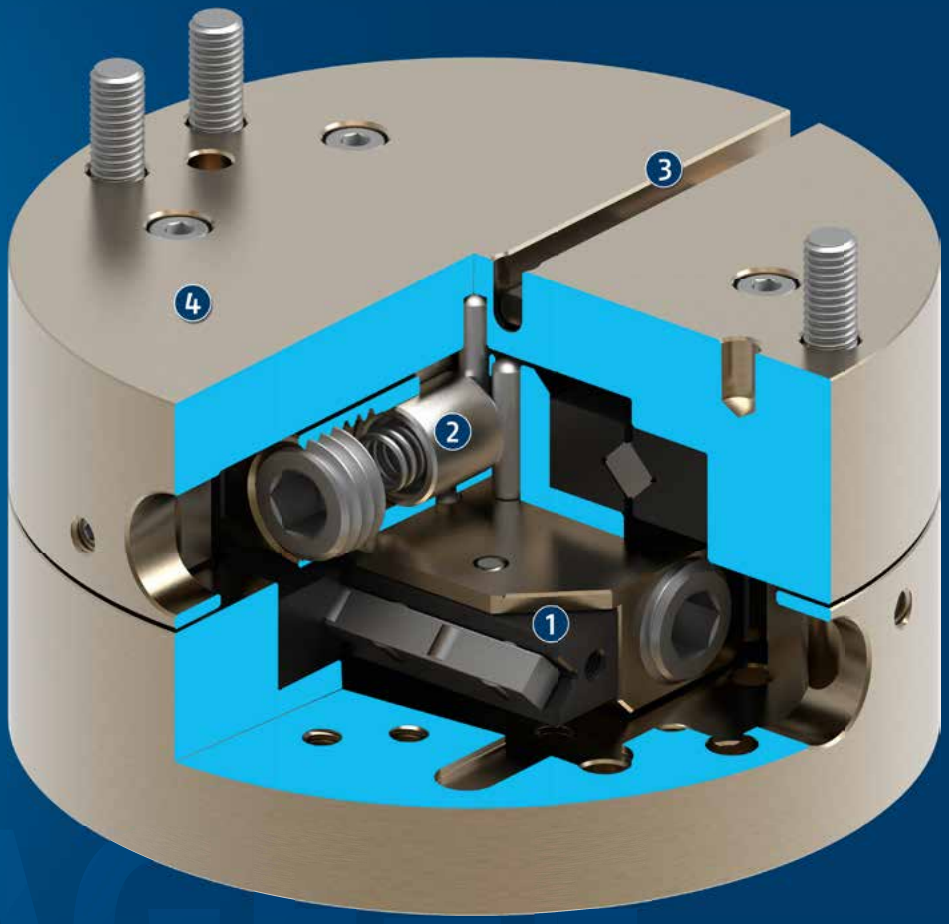
Cross roller guides for smooth compensation at low compensation forces

Adjustable compensation stroke for minimizing interfering contours

Sizes	Handling weight	Compensation XY
Quantity: 4	1.5 .. 32 kg	±1.5 .. 5 mm

Functional Description

The compensation unit AGE-F enables the activation of the linear movement in the X and Y axis of the robots or handling units. For example, this allows axis offset of workpieces to be compensated and centrically aligned again.



① **Linear guide**
Smooth-running cross roller guide

② **Spring-actuated reset**
Different spring forces for centering without pneumatics

③ **Slot for magnetic switch**
For monitoring the compensating stroke in X and Y direction

④ **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

General Notes about the Series

Guidance system: Smoothly running cross roller guides

Monitoring: By magnetic switch

Actuation: Spring reset with spring forces

Housing: Hard anodized aluminum alloy, functional parts made of hardened steel

Scope of delivery: Including robot-sided mounting screws

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

Compensation unit for mounting a pin in a bore with a roughly toleranced position. The compensation unit compensates for the planar offset without turning or tilting the workpiece.

1. Compensation unit AGE-F
2. 2-finger parallel gripper PGN-plus

SCHUNK offers more ...

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

Quick-change system

Manual change system

Universal gripper

Universal gripper

Magnetic switch

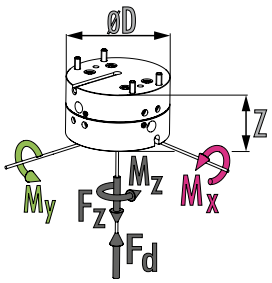
Angular gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

AGE-F 031

Compensating | Compensation Unit XY

Dimensions and maximum loads



- M_x max. 3.5 Nm
- M_y max. 3.5 Nm
- M_z max. 6 Nm
- F_z max. 100 N
- F_d max. 200 N

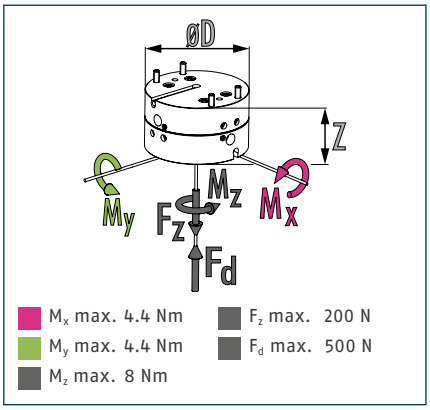
ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-F-XY-031-1	AGE-F-XY-031-2	AGE-F-XY-031-3
ID		0324900	0324901	0324902
Compensation XY	[mm]	±1.5	±1.5	±1.5
Recommended handling weight	[kg]	1.5	1.5	1.5
Min. resetting force	[N]	1.5	4	5.5
Max. resetting force	[N]	3.5	5.5	7
Spring rate	[N/mm]	1	1	1.3
Repeat accuracy	[mm]	±0.01	±0.01	±0.01
Weight	[kg]	0.123	0.123	0.123
Min./max. ambient temperature	[°C]	5/80	5/80	5/80
Dimensions Ø D x Z	[mm]	45 x 27	45 x 27	45 x 27

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-f

Dimensions and maximum loads



- M_x max. 4.4 Nm
- M_y max. 4.4 Nm
- M_z max. 8 Nm
- F_z max. 200 N
- F_d max. 500 N

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

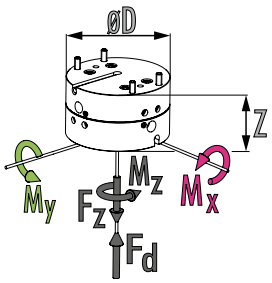
Technical data

Description		AGE-F-XY-040-1	AGE-F-XY-040-2	AGE-F-XY-040-3
ID		0324920	0324921	0324922
Compensation XY	[mm]	±2	±2	±2
Recommended handling weight	[kg]	4	4	4
Min. resetting force	[N]	3	4	4.5
Max. resetting force	[N]	5	7	9
Spring rate	[N/mm]	0.5	1.3	2
Repeat accuracy	[mm]	±0.01	±0.01	±0.01
Weight	[kg]	0.23	0.23	0.23
Min./max. ambient temperature	[°C]	5/80	5/80	5/80
Dimensions Ø D x Z	[mm]	55 x 32	55 x 32	55 x 32

AGE-F 063

Compensating | Compensation Unit XY

Dimensions and maximum loads



- M_x max. 10 Nm
- M_y max. 10 Nm
- M_z max. 21 Nm
- F_z max. 300 N
- F_d max. 3000 N

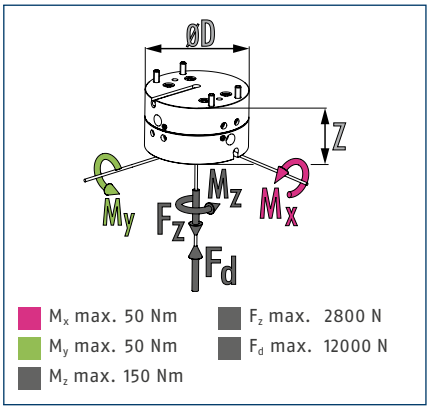
ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-F-XY-063-1	AGE-F-XY-063-2	AGE-F-XY-063-3
ID		0324940	0324941	0324942
Compensation XY	[mm]	±4	±4	±4
Recommended handling weight	[kg]	12.5	12.5	12.5
Min. resetting force	[N]	12	16	20
Max. resetting force	[N]	25	38	55
Spring rate	[N/mm]	2	4.8	6.8
Repeat accuracy	[mm]	±0.01	±0.01	±0.01
Weight	[kg]	0.78	0.78	0.78
Min./max. ambient temperature	[°C]	5/80	5/80	5/80
Dimensions Ø D x Z	[mm]	85 x 47	85 x 47	85 x 47

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-f

Dimensions and maximum loads



- M_x max. 50 Nm
- M_y max. 50 Nm
- M_z max. 150 Nm
- F_z max. 2800 N
- F_d max. 12000 N

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-F-XY-080-1	AGE-F-XY-080-2	AGE-F-XY-080-3
ID		0324960	0324961	0324962
Compensation XY	[mm]	±5	±5	±5
Recommended handling weight	[kg]	32	32	32
Min. resetting force	[N]	39	85	90
Max. resetting force	[N]	70	130	150
Spring rate	[N/mm]	6.8	15	25
Repeat accuracy	[mm]	±0.01	±0.01	±0.01
Weight	[kg]	3.13	3.13	3.13
Min./max. ambient temperature	[°C]	5/80	5/80	5/80
Dimensions Ø D x Z	[mm]	135 x 75	135 x 75	135 x 75

Modular. Precise. Robust.

Compensation Unit AGE-S

Compensation unit compensating in XY- and Z-direction

Field of Application

Palletizing, joining, and assembly of workpieces.

Advantages – Your benefits

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

Three compensation directions in one unit compact design for minimum installation height

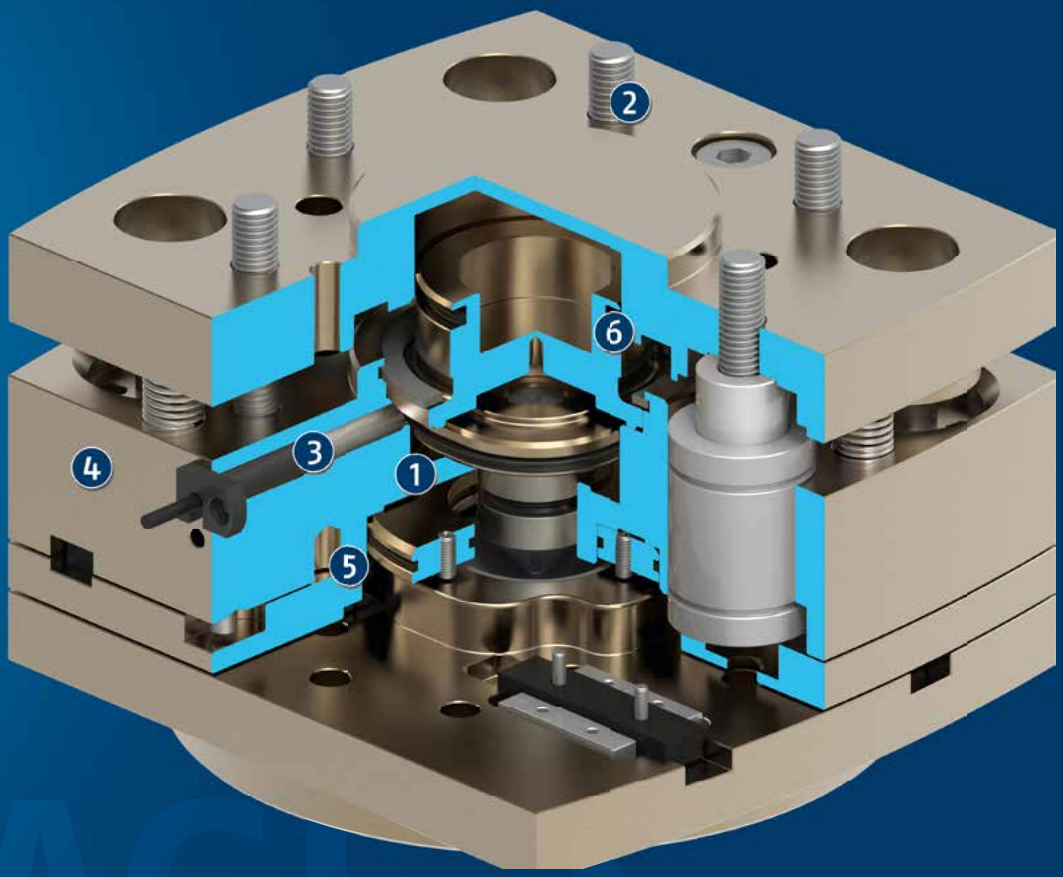
Centrical locking for setting the unit rigidly in a defined, centric position

Pneumatic position memory for eccentric locking in a deflected position

Sizes	Handling weight	Compensation XY	Compensation Z
Quantity: 4	9 .. 160 kg	±4 .. 12 mm	10 .. 14 mm

Functional Description

The compensation unit AGE-S extends the AGE series (AGE-XY/AGE-Z/AGE-F) for the medium and heavy load range, and provides perfect compensation in all automation tasks. Robust and high-precision linear guides with excellent guiding stability permit maximum handling weights at maximum compensation paths.
During handling in XY- as well as Z-direction, the unit can be set rigid using the integrated pneumatic lock and eccentrically locked using the position memory in XY-direction.



① **Position memory**
Pneumatically actuated locking in any eccentric position via friction lock connection

② **Direct assembly**
By using a standardized ISO 9409 interface for robots

③ **Monitoring**
Stroke monitoring of the locking piston with electronic magnetic switch

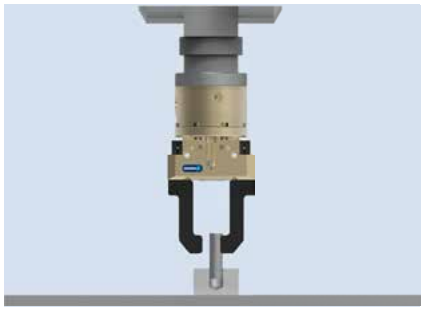
④ **Housing**
Is weight-optimized due to the use of high-strength aluminum alloy

⑤ **Compensation body**
For compensating positioning errors in the XY-plane

⑥ **Centrical locking**
Pneumatically actuated locking in centric position via form-fit locking

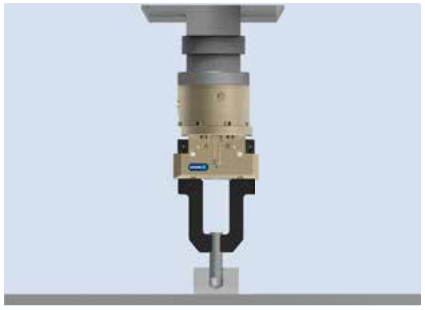
Detailed Functional Description

Workpiece removal: AGE unlocked – gripper opened



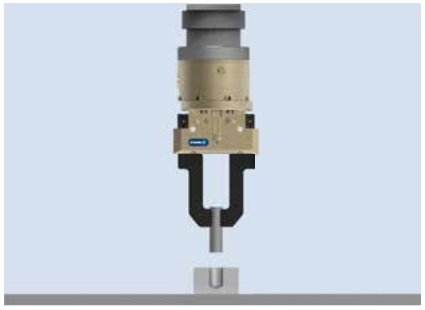
The robot travels towards the workpiece with a gripping unit consisting of an AGE (compensation unit) and gripper.
There is an offset due to tolerances/inaccuracies.

Workpiece removal: AGE unlocked – gripper closed



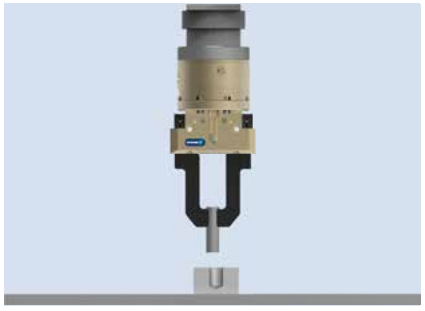
An unlocked AGE can be used to compensate the existing offset between the gripper and workpiece axes.

Workpiece removal: AGE locked (position memory) – gripper closed



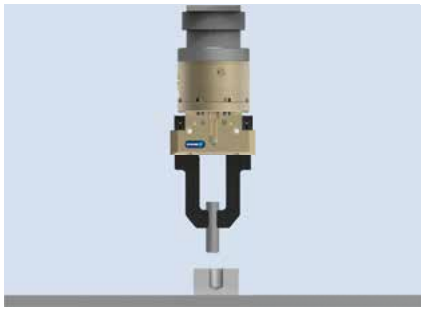
The robot removes the workpiece.
The deflected position of the AGE can be locked via the integrated position memory.

Workpiece removal: AGE centrically locked – gripper closed



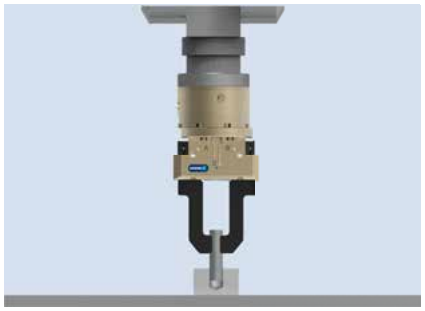
The position memory of the AGE is unlocked and the centered AGE lock is activated.
The original axis offset is no longer necessary, as the gripper and robot axis are now centered relative to one another.

Workpiece mounting: AGE centrically locked – gripper closed



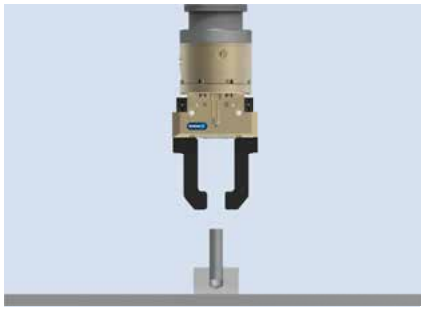
The robot travels towards the workpiece with a gripping unit consisting of an AGE (compensation unit) and gripper.
There is an offset due to tolerances/inaccuracies.

Workpiece mounting: AGE unlocked – gripper closed



An unlocked AGE can be used to compensate the existing offset between the gripper and workpiece axes and the workpiece can be joined.

Workpiece mounting: AGE unlocked – gripper opened



The robot moves away from the center of compliance with the gripper unit, the unit is then centrically locked, and the gripper is closed.

General Notes about the Series

Guidance system: Robust linear guidances

Monitoring: XY locking and unlocking via a magnetic switch and Z-stroke via inductive proximity switch

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

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

Scope of delivery: Robot-side mounting screws

Warranty: 24 months

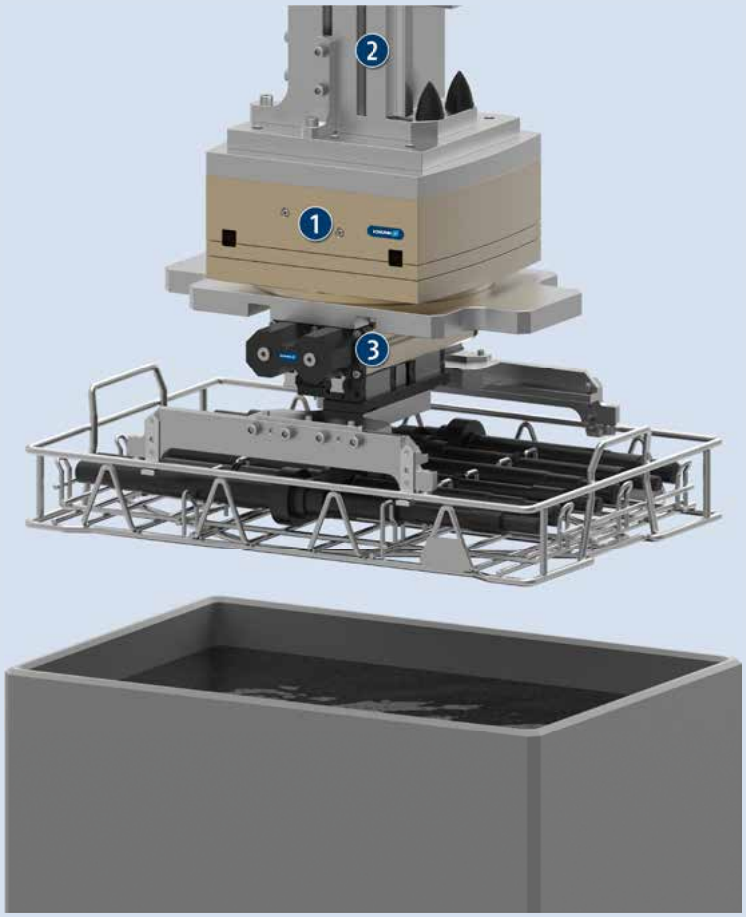
Harsh environmental conditions: Please note that use under harsh environmental conditions (e.g. in the coolant area, cast and grinding dust) can considerably reduce the service life of the units, and we will not take over any warranty. However, in many cases we can find a solution. Please contact us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

Picking and placing components in an undefined position, using the compensation unit and a long-stroke gripper.

1. Compensation unit AGE-S-XY
2. Linear module Gamma 90
3. 2-finger long-stroke gripper PHL



SCHUNK offers more ...

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

Quick-change system

Collision and overload sensor

Universal gripper

Universal gripper

Magnetic switch

Inductive proximity switch

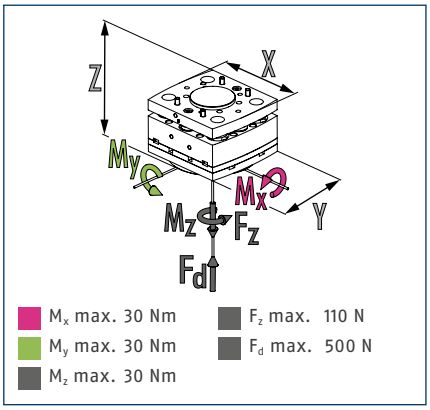
Magnetic gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

AGE-S 100

Compensating | Compensation Unit XYZ

Dimensions and maximum loads



- M_x max. 30 Nm
- M_y max. 30 Nm
- M_z max. 30 Nm
- F_z max. 110 N
- F_d max. 500 N

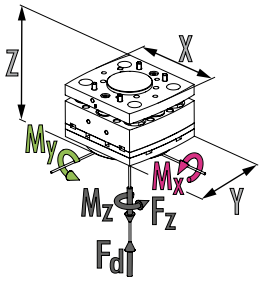
ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-S-XYZ-100-0	AGE-S-XYZ-100-P	AGE-S-XY-100-0	AGE-S-XY-100-P	AGE-S-Z-100-0
ID		0324502	0324504	0324500	0324503	0324501
Compensation XY	[mm]	±4	±4	±4	±4	
Compensation Z	[mm]	10	10			10
Recommended handling weight, vertical	[kg]	9	9	9	9	9
Recommended handling weight, horizontal	[kg]	5.5	5.5	5.5	5.5	5.5
Locking force	[N]	800	800	800	800	
Max. radial force, position storage	[N]		126		126	
Piston stroke Z	[N]	800	800			800
Min. spring force	[N]	240	240			240
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1	0.1	0.1	0.1
Robot-side connection		ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8
Tool-side connection		ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8	ISO 9409-1-100-6-M8
Weight	[kg]	3.6	3.6	2.6	2.6	3.2
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60	5/60
Dimensions X x Y x Z	[mm]	142 x 125 x 85.5	142 x 125 x 85.5	142 x 125 x 59	142 x 125 x 59	142 x 125 x 79

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-s

Dimensions and maximum loads



- M_x max. 55 Nm
- M_y max. 55 Nm
- M_z max. 55 Nm
- F_z max. 220 N
- F_d max. 850 N

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

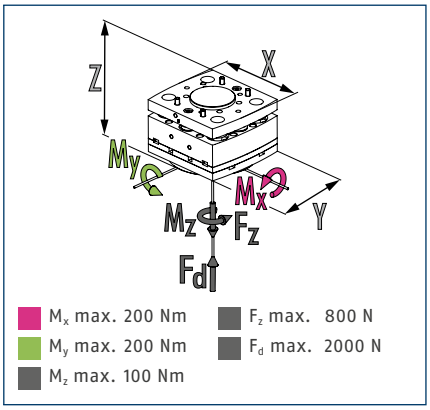
Technical data

Description		AGE-S-XYZ-125-0	AGE-S-XYZ-125-P	AGE-S-XY-125-0	AGE-S-XY-125-P	AGE-S-Z-125-0
ID		0324527	0324529	0324525	0324528	0324526
Compensation XY	[mm]	±7	±7	±7	±7	
Compensation Z	[mm]	12	12			12
Recommended handling weight, vertical	[kg]	18	18	18	18	18
Recommended handling weight, horizontal	[kg]	11	11	11	11	11
Locking force	[N]	1100	1100	1100	1100	
Max. radial force, position storage	[N]		198		198	
Piston stroke Z	[N]	1200	1200			1200
Min. spring force	[N]	360	360	0	0	360
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1	0.1	0.1	0.1
Robot-side connection		ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10
Tool-side connection		ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10	ISO 9409-1-125-6-M10
Weight	[kg]	7.4	7.4	5.3	5.3	6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60	5/60
Dimensions X x Y x Z	[mm]	175 x 160 x 110	175 x 160 x 110	175 x 160 x 76.5	175 x 160 x 76.5	175 x 160 x 96.5

AGE-S 160

Compensating | Compensation Unit XYZ

Dimensions and maximum loads



- M_x max. 200 Nm
- M_y max. 200 Nm
- M_z max. 100 Nm
- F_z max. 800 N
- F_d max. 2000 N

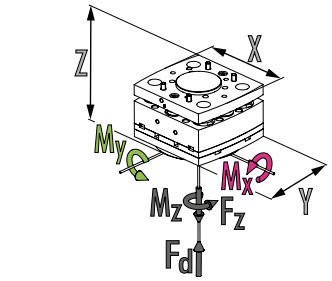
ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-S-XYZ-160-0	AGE-S-XYZ-160-P	AGE-S-XY-160-0	AGE-S-XY-160-P	AGE-S-Z-160-0
ID		0324562	0324564	0324560	0324563	0324561
Compensation XY	[mm]	±10	±10	±10	±10	
Compensation Z	[mm]	14	14			14
Recommended handling weight, vertical	[kg]	60	60	60	60	60
Recommended handling weight, horizontal	[kg]	40	40	40	40	40
Locking force	[N]	1800	1800	1800	1800	
Max. radial force, position storage	[N]		309		309	
Piston stroke Z	[N]	1900	1900			1900
Min. spring force	[N]	640	640			640
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1	0.1	0.1	0.1
Robot-side connection		ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10
Tool-side connection		ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10	ISO 9409-1-160-6-M10
Weight	[kg]	14.5	14.5	10.5	10.5	11.8
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60	5/60
Dimensions X x Y x Z	[mm]	215 x 200 x 137	215 x 200 x 137	215 x 200 x 97	215 x 200 x 97	215 x 200 x 123

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/age-s

Dimensions and maximum loads



- M_x max. 500 Nm
- M_y max. 500 Nm
- M_z max. 250 Nm
- F_z max. 2000 N
- F_d max. 4000 N

ⓘ This is the max. total of all moments and loads (acceleration forces and torques, process forces etc.), which can affect a compensation unit, in order to ensure error-free function.

Technical data

Description		AGE-S-XYZ-200-0	AGE-S-XYZ-200-P	AGE-S-XY-200-0	AGE-S-XY-200-P	AGE-S-Z-200-0
ID		0324602	0324604	0324600	0324603	0324601
Compensation XY	[mm]	±12	±12	±12	±12	
Compensation Z	[mm]	14	14			14
Recommended handling weight, vertical	[kg]	160	160	160	160	160
Recommended handling weight, horizontal	[kg]	100	100	100	100	100
Locking force	[N]	2700	2700	2700	2700	
Max. radial force, position storage	[N]		492		492	
Piston stroke Z	[N]	3000	3000			3000
Min. spring force	[N]	1100	1100			1100
Min./nom./max. operating pressure	[bar]	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8	2.5/6/8
Repeat accuracy	[mm]	0.1	0.1	0.1	0.1	0.1
Robot-side connection		ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12
Tool-side connection		ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12	ISO 9409-1-200-6-M12
Weight	[kg]	29.5	29.5	21	21	23.5
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60	5/60
Dimensions X x Y x Z	[mm]	270 x 250 x 166.5	270 x 250 x 166.5	270 x 250 x 118	270 x 250 x 118	270 x 250 x 146

Compact. Flexible. Productive.

Tolerance Compensation Unit TCU-P

For compensation of small locational and positional deviations in mounting and handling applications

Field of Application

For universal use in clean and slightly dirty environments, particularly in the fields of assembly automation and tool machine loading.

Advantages – Your benefits

Compensation of workpiece-related tolerances and position inaccuracies reduce risk of jamming, necessary assembly forces are reduced, and wear of the workpiece and handling device is minimized

Direct assembly of parallel grippers therefore no additional adapter plates required

Compact design low height and weight

Pneumatic locking long life time of the elastomers, rigid unit during travel

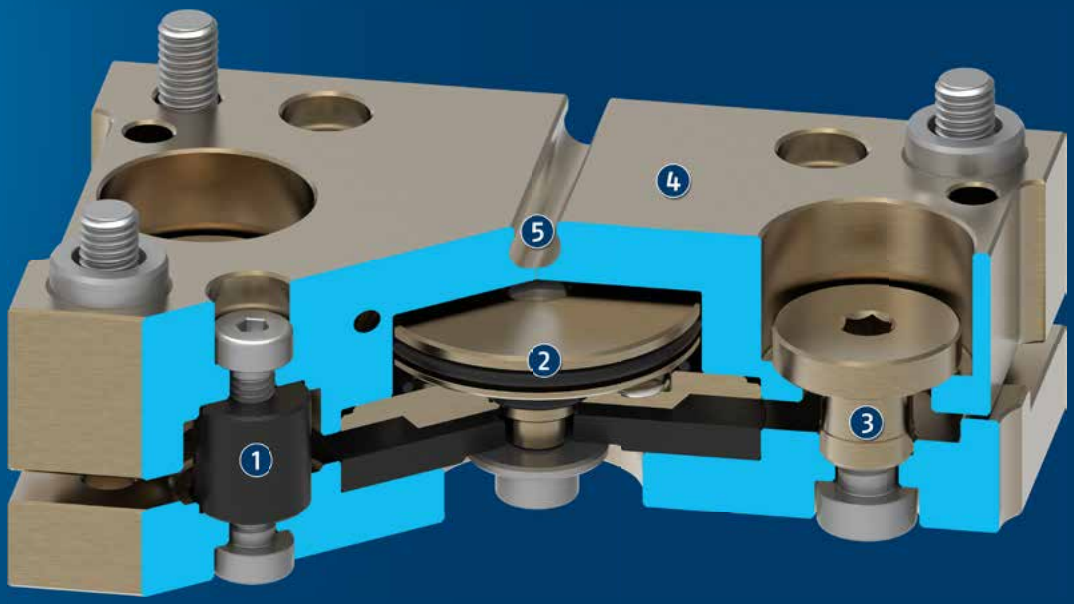
Monitoring of locking for process-reliable sequences and shorter cycle times

Sizes	Workpiece weight	Deflection
Quantity: 8	3 .. 60 kg	1°

Functional Description

The function of the tolerance compensation unit (TCU) is based on interaction between the two base plates, which are connected to each other with a set of flexible elastomer elements. As a result, the TCU can compensate tolerances around the X, Y, and Z axes, allowing it to correct angular errors, and causing a rotational compensation.

A pneumatic locking is also available as an option to allow the compensation unit to be set to rigid. As a result, it is possible to prevent the tool or the gripper vibrating during movement of the robot arm or the linear axis. This increases the application's repeat accuracy and extends the service life of the elastomer elements.



① **Elastomer**
Allows compensation movement

② **Locking mechanism**
For a rigid connection between the machine and tool sides

③ **Overload pin**
To protect the elastomers

④ **Interface machine side**
The same mounting pattern as on the tool side

⑤ **Monitoring groove**
For electronic magnetic switch

General Notes about the Series

Monitoring: By magnetic switch

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

Material: Elastomer material

Housing: Aluminum alloy

Scope of delivery: Robot-side mounting screws

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

In applications where several grippers are used, the tolerance variations of the workpieces are compensated by the tolerance compensation units. The application is also monitored by a collision sensor.

1. Tolerance compensation unit TCU
2. Collision sensor OPS
3. 2-finger parallel gripper JGP with workpiece-specific gripper fingers

SCHUNK offers more ...

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

Angular gripper

Universal gripper

Collision and overload sensor

Pressure maintenance valve

Magnetic switch

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

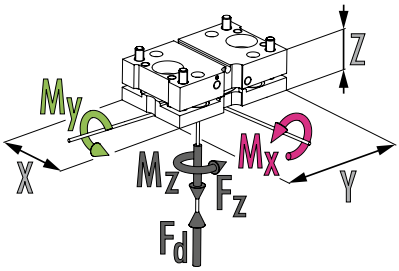
Options and special Information

Monitoring of the locking: By magnetic switch
Connections: Two plug-in connections for hose
Ambient temperature: -10 °C to 90 °C
Operating pressure: From 4 bar up to 8 bar

TCU-P 050

Compensating | Tolerance Compensation Unit

Dimensions and maximum loads



M_x max. 15 Nm
M_z max. 15 Nm
M_y max. 5 Nm

ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

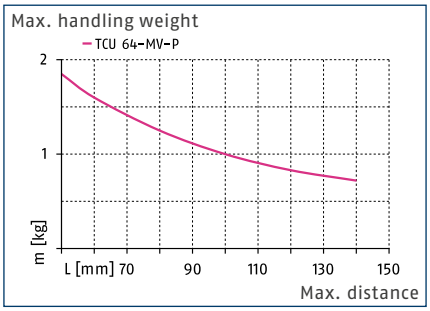
Technical data

Description		TCU-P-050-3-OV
ID		0324757
Locking		Without locking
Hardness of the elastomer	[Shore]	68
Deflection X	[°]	1
Deflection Y	[°]	1
Deflection Z	[°]	1.5
Weight	[kg]	0.1
Min./max. ambient temperature	[°C]	-10/90
Max. force F_d	[N]	500
Direct connection to*		PGN-plus 50
Dimensions X x Y x Z	[mm]	30 x 42 x 18.6

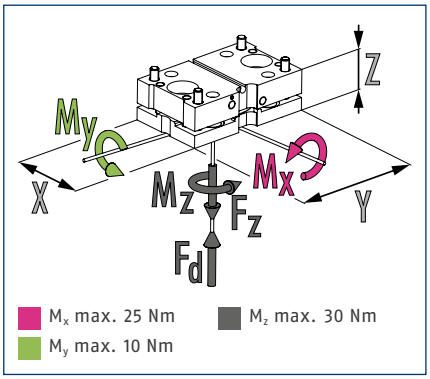
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-p

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

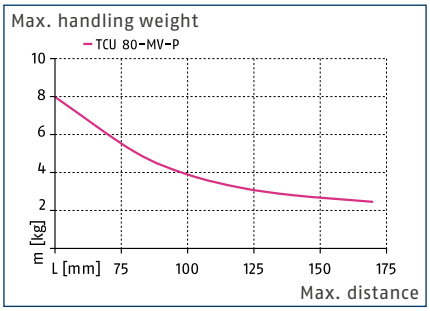
Description		TCU-P-064-3-MV	TCU-P-064-3-OV
ID		0324774	0324775
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1.5	1.5
Deflection Z	[°]	2	2
Repeat accuracy	[mm]	0.1	
Weight	[kg]	0.1	0.08
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	1	
Locking moment M_y	[Nm]	0.8	
Locking moment M_z	[Nm]	2	
Locking moment F_z	[N]	30	
Max. force F_d	[N]	1100	1100
Direct connection to*		PGN-plus 64	PGN-plus 64
Dimensions X x Y x Z	[mm]	36 x 52 x 22.2	36 x 52 x 19.5

* also suitable for other grippers with the same mounting pattern diagram

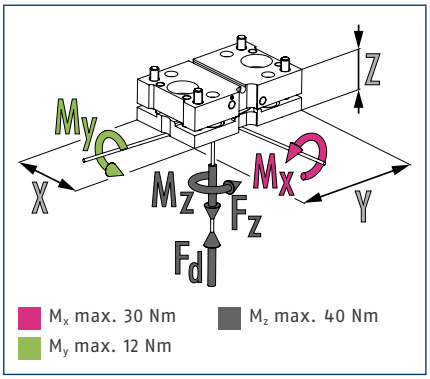
TCU-P 080

Compensating | Tolerance Compensation Unit

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

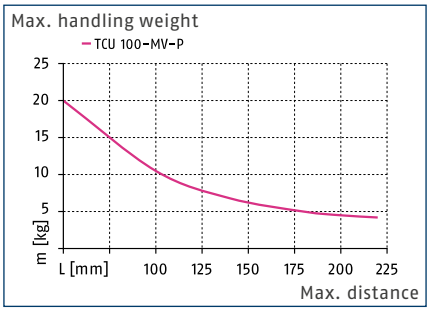
Technical data

Description		TCU-P-080-3-MV	TCU-P-080-3-OV
ID		0324792	0324793
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1.5	1.5
Deflection Z	[°]	2	2
Repeat accuracy	[mm]	0.1	
Weight	[kg]	0.15	0.1
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	4	
Locking moment M_y	[Nm]	3	
Locking moment M_z	[Nm]	6	
Locking moment F_z	[N]	70	
Max. force F_d	[N]	1500	1500
Direct connection to*		PGN-plus 80	PGN-plus 80
Dimensions X x Y x Z	[mm]	42 x 63 x 24.1	42 x 63 x 19.6

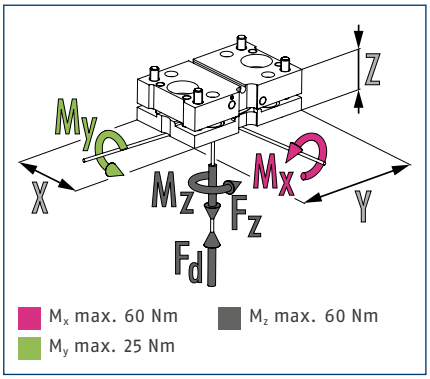
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-p

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

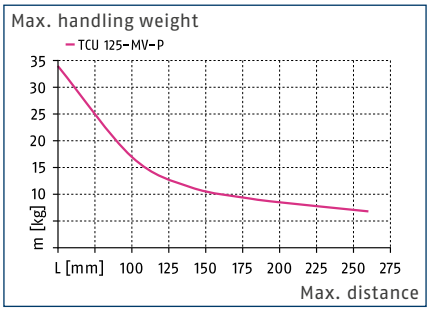
Description		TCU-P-100-2-MV	TCU-P-100-3-OV
ID		0324808	0324811
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1.5	1.5
Deflection Z	[°]	1.2	1.2
Repeat accuracy	[mm]	0.05	
Weight	[kg]	0.27	0.22
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	15	
Locking moment M_y	[Nm]	8	
Locking moment M_z	[Nm]	25	
Locking moment F_z	[N]	200	
Max. force F_d	[N]	2000	2000
Direct connection to*		PGN-plus 100	PGN-plus 100
Dimensions X x Y x Z	[mm]	50 x 81 x 25.3	50 x 81 x 22.6

* also suitable for other grippers with the same mounting pattern diagram

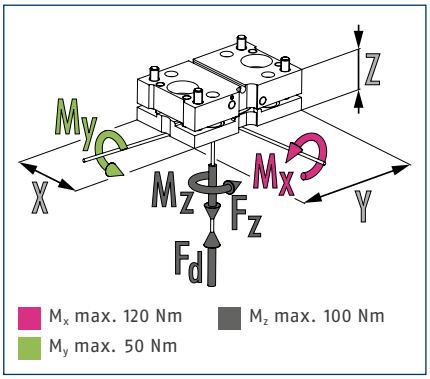
TCU-P 125

Compensating | Tolerance Compensation Unit

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

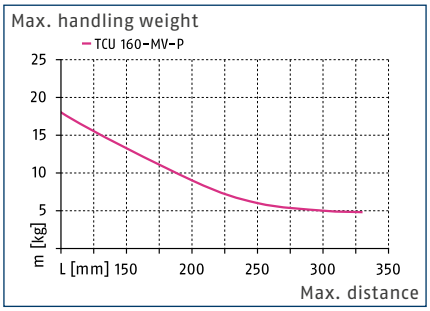
Technical data

Description		TCU-P-125-3-MV	TCU-P-125-3-OV
ID		0324828	0324829
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1.5	1.5
Deflection Z	[°]	1.5	1.5
Repeat accuracy	[mm]	0.05	
Weight	[kg]	0.4	0.3
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	25	
Locking moment M_y	[Nm]	10	
Locking moment M_z	[Nm]	40	
Locking moment F_z	[N]	300	
Max. force F_d	[N]	2800	2800
Direct connection to*		PGN-plus 125	PGN-plus 125
Dimensions X x Y x Z	[mm]	60 x 100 x 28.3	60 x 100 x 23.6

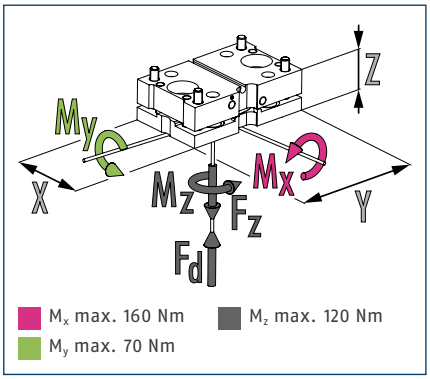
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-p

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

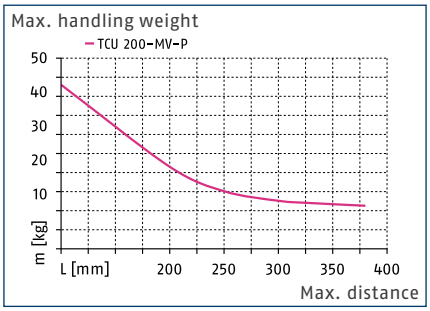
Description		TCU-P-160-3-MV	TCU-P-160-3-OV
ID		0324846	0324847
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	2	2
Deflection Z	[°]	1.5	1.5
Repeat accuracy	[mm]	0.02	
Weight	[kg]	0.7	0.55
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	30	
Locking moment M_y	[Nm]	18	
Locking moment M_z	[Nm]	50	
Locking moment F_z	[N]	400	
Max. force F_d	[N]	4300	4300
Direct connection to*		PGN-plus 160	PGN-plus 160
Dimensions X x Y x Z	[mm]	72 x 125 x 32.9	72 x 125 x 32.4

* also suitable for other grippers with the same mounting pattern diagram

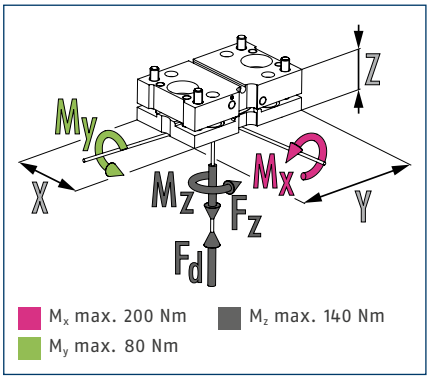
TCU-P 200

Compensating | Tolerance Compensation Unit

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

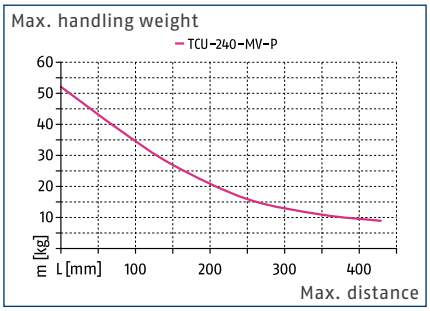
Technical data

Description		TCU-P-200-3-MV	TCU-P-200-3-OV
ID		0324864	0324865
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	2	2
Deflection Z	[°]	1.5	1.5
Repeat accuracy	[mm]	0.02	
Weight	[kg]	1.3	1
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	50	
Locking moment M_y	[Nm]	25	
Locking moment M_z	[Nm]	75	
Locking moment F_z	[N]	700	
Max. force F_d	[N]	5000	5000
Direct connection to*		PGN-plus 200	PGN-plus 200
Dimensions X x Y x Z	[mm]	100 x 154 x 36.2	100 x 154 x 34.9

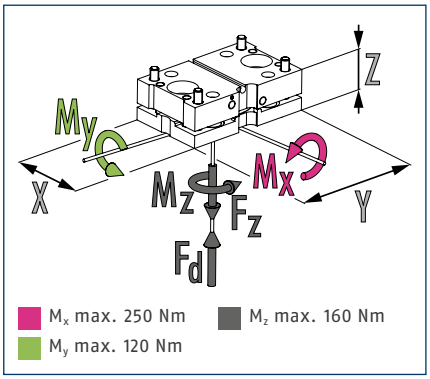
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-p

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

Description		TCU-P-240-3-MV	TCU-P-240-3-OV
ID		0324730	0324731
Locking		With locking	Without locking
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1.5	1.5
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.02	
Weight	[kg]	2.1	1.8
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	70	
Locking moment M_y	[Nm]	40	
Locking moment M_z	[Nm]	90	
Locking moment F_z	[N]	800	
Max. force F_d	[N]	6200	6200
Direct connection to*		PGN-plus 240	PGN-plus 240
Dimensions X x Y x Z	[mm]	115 x 186 x 40.8	115 x 186 x 42

* also suitable for other grippers with the same mounting pattern diagram

Compact. Flexible. Productive.

Tolerance Compensation Unit TCU-Z

For compensation of small locational and positional deviations in mounting and handling applications

Field of Application

For universal use in clean and slightly dirty environments, particularly in the fields of assembly automation and machine tool loading.

Advantages – Your benefits

Compensation of workpiece-related tolerances and position inaccuracies reduced risk of jamming, necessary assembly forces are reduced and wear of the workpiece and handling device is minimized

Direct assembly of a centric gripper therefore no additional adapter plates required

Compact design low height and weight

Pneumatic locking long life time of the elastomers, rigid unit during travel

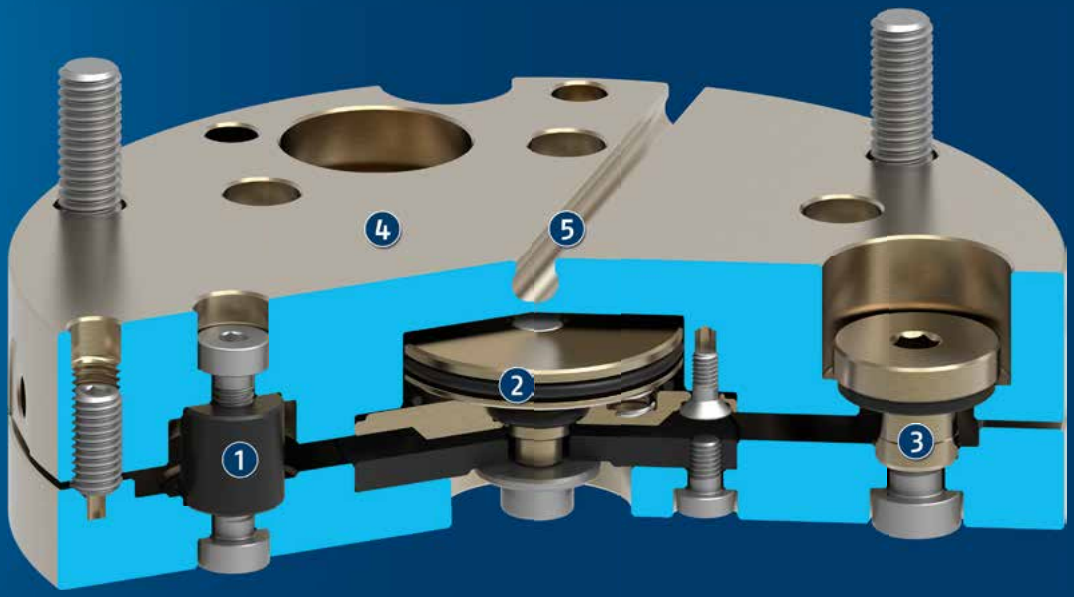
Monitoring of locking for process-reliable sequences and shorter cycle times

Sizes	Workpiece weight	Deflection
Quantity: 7	3 .. 60 kg	1°

Functional Description

The function of the tolerance compensation unit (TCU) is based on interaction between the two base plates, which are connected to each other with a set of flexible elastomer elements. As a result, the TCU can compensate tolerances around the X, Y, and Z axes, allowing it to correct angular errors, and causing a rotational compensation.

A pneumatic locking is also available as an option to allow the compensation unit to be set to rigid. As a result, it is possible to prevent the tool or the gripper vibrating during movement of the robot arm or the linear axis. This increases the application's repeat accuracy and extends the service life of the elastomer elements.



① **Elastomer**
Allows compensation movement

② **Locking mechanism**
For a rigid connection between the machine and tool sides

③ **Overload pin**
To protect the elastomers

④ **Interface machine side**
The same mounting pattern as on the tool side

⑤ **Monitoring groove**
For electronic magnetic switch

General Notes about the Series

Monitoring: By magnetic switch

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

Material: Elastomer material

Housing: Aluminum alloy

Scope of delivery: Robot-side mounting screws

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-throughs
3. Tolerance compensation unit TCU-Z
4. 3-finger centric gripper PZN-plus

SCHUNK offers more ...

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

Collision and overload sensor

Universal gripper

Magnetic switch

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

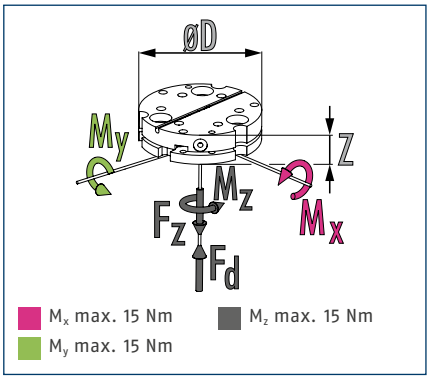
Options and special Information

Monitoring of the locking: By magnetic switch
Connections: Two plug-in connections for hose
Ambient temperature: -10 °C to 90 °C
Operating pressure: From 4 bar up to 8 bar

TCU-Z 050

Compensating | Tolerance Compensation Unit

Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

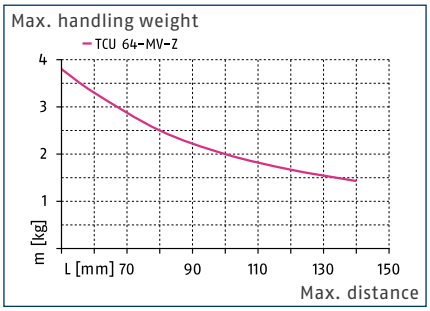
Technical data

Description		TCU-Z-050-3-OV
ID		0324749
Hardness of the elastomer	[Shore]	68
Deflection X	[°]	1
Deflection Y	[°]	1
Deflection Z	[°]	1.5
Weight	[kg]	0.09
Min./max. ambient temperature	[°C]	-10/90
Max. force F_d	[N]	500
Direct connection to*		PZN-plus 50
Dimensions Ø D x Z	[mm]	50 x 18.6

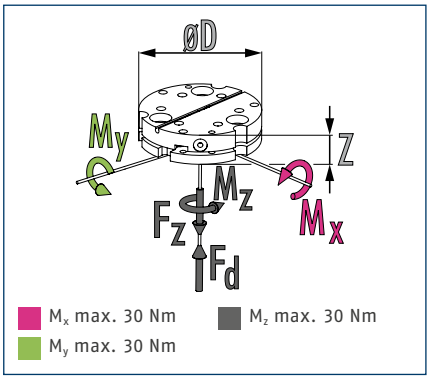
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-z

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

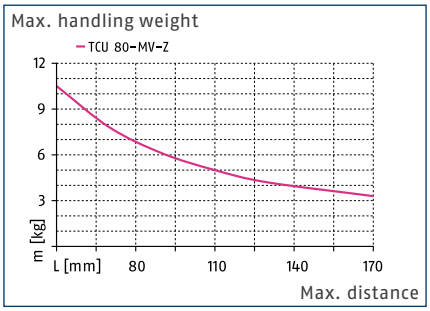
Description		TCU-Z-064-3-MV	TCU-Z-064-3-OV
ID		0324766	0324767
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1	1
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.1	
Weight	[kg]	0.18	0.15
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	1	
Locking moment M_y	[Nm]	1	
Locking moment M_z	[Nm]	4	
Locking moment F_z	[N]	30	
Max. force F_d	[N]	1100	1100
Direct connection to*		PZN-plus 64	PZN-plus 64
Dimensions Ø D x Z	[mm]	64 x 22.3	64 x 19.6

* also suitable for other grippers with the same mounting pattern diagram

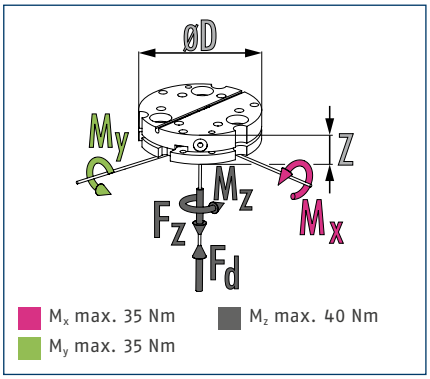
TCU-Z 080

Compensating | Tolerance Compensation Unit

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

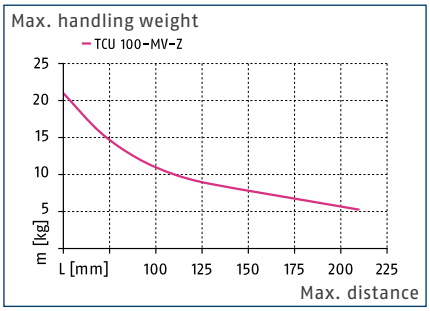
Technical data

Description		TCU-Z-080-3-MV	TCU-Z-080-3-OV
ID		0324784	0324785
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1	1
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.05	
Weight	[kg]	0.25	0.3
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	5	
Locking moment M_y	[Nm]	5	
Locking moment M_z	[Nm]	6	
Locking moment F_z	[N]	100	
Max. force F_d	[N]	1500	1500
Direct connection to*		PZN-plus 80	PZN-plus 80
Dimensions Ø D x Z	[mm]	80 x 24.1	80 x 20.4

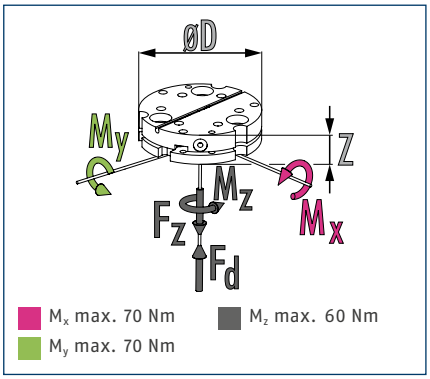
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-z

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

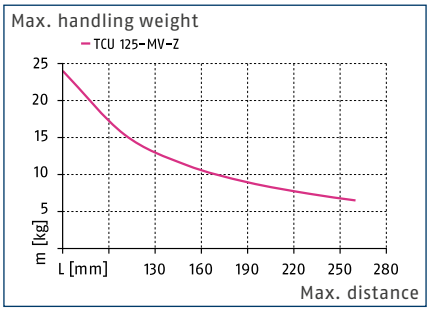
Description		TCU-Z-100-2-MV	TCU-Z-100-2-OV
ID		0324798	0324799
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1	1
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.05	
Weight	[kg]	0.48	0.47
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	10	
Locking moment M_y	[Nm]	10	
Locking moment M_z	[Nm]	20	
Locking moment F_z	[N]	150	
Max. force F_d	[N]	2000	2000
Direct connection to*		PZN-plus 100	PZN-plus 100
Dimensions Ø D x Z	[mm]	100 x 25	100 x 22.6

* also suitable for other grippers with the same mounting pattern diagram

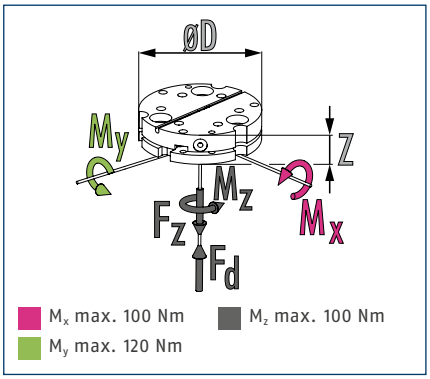
TCU-Z 125

Compensating | Tolerance Compensation Unit

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

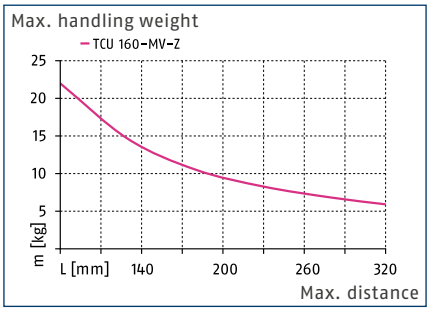
Technical data

Description		TCU-Z-125-3-MV	TCU-Z-125-3-OV
ID		0324820	0324821
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1	1
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.05	
Weight	[kg]	0.85	0.65
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	25	
Locking moment M_y	[Nm]	25	
Locking moment M_z	[Nm]	25	
Locking moment F_z	[N]	350	
Max. force F_d	[N]	2800	2800
Direct connection to*		PZN-plus 125	PZN-plus 125
Dimensions Ø D x Z	[mm]	125 x 28.3	125 x 23.6

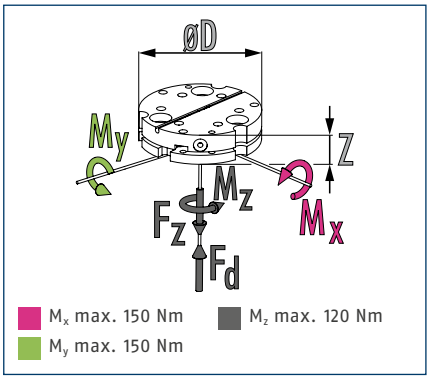
* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-z

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

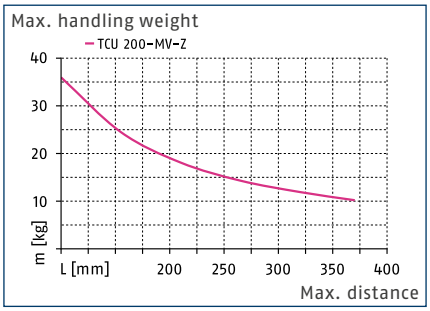
Description		TCU-Z-160-3-MV	TCU-Z-160-3-OV
ID		0324838	0324839
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1	1
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.05	
Weight	[kg]	1.63	1.35
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	30	
Locking moment M_y	[Nm]	30	
Locking moment M_z	[Nm]	30	
Locking moment F_z	[N]	400	
Max. force F_d	[N]	4300	4300
Direct connection to*		PZN-plus 160	PZN-plus 160
Dimensions Ø D x Z	[mm]	160 x 33	160 x 28.5

* also suitable for other grippers with the same mounting pattern diagram

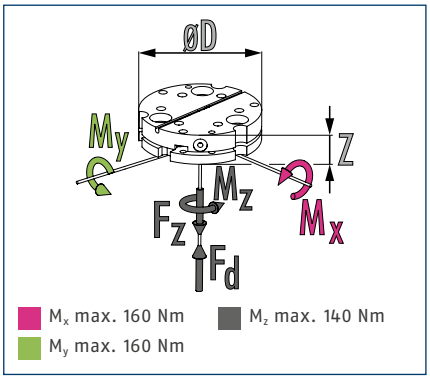
TCU-Z 200

Compensating | Tolerance Compensation Unit

Load chart



Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

Description		TCU-Z-200-3-MV	TCU-Z-200-3-OV
ID		0324856	0324857
Hardness of the elastomer	[Shore]	68	68
Deflection X	[°]	1	1
Deflection Y	[°]	1	1
Deflection Z	[°]	1	1
Repeat accuracy	[mm]	0.02	
Weight	[kg]	2.75	2.45
Min./max. operating pressure	[bar]	4/8	
Min./max. ambient temperature	[°C]	-10/90	-10/90
Locking moment M_x	[Nm]	100	
Locking moment M_y	[Nm]	100	
Locking moment M_z	[Nm]	50	
Locking moment F_z	[N]	800	
Max. force F_d	[N]	5000	5000
Direct connection to*		PZN-plus 200	PZN-plus 200
Dimensions Ø D x Z	[mm]	200 x 36.2	200 x 28.5

* also suitable for other grippers with the same mounting pattern diagram

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/tcu-z

Compliant. Precise. Reliable.

Insertion Unit FUS

Symmetrical insertion unit with centric locking and monitoring

Field of Application

Assembly tasks with very little play among the parts to be aligned.

Advantages – Your benefits

Pneumatic, centric locking puts the unit back to a defined zero position and protects the elastomers

Layered elastomer construction soft and flexible when aligning, rigid when pressing in

Compensates alignment errors thereby reducing the danger of jamming

Sizes
Quantity: 16

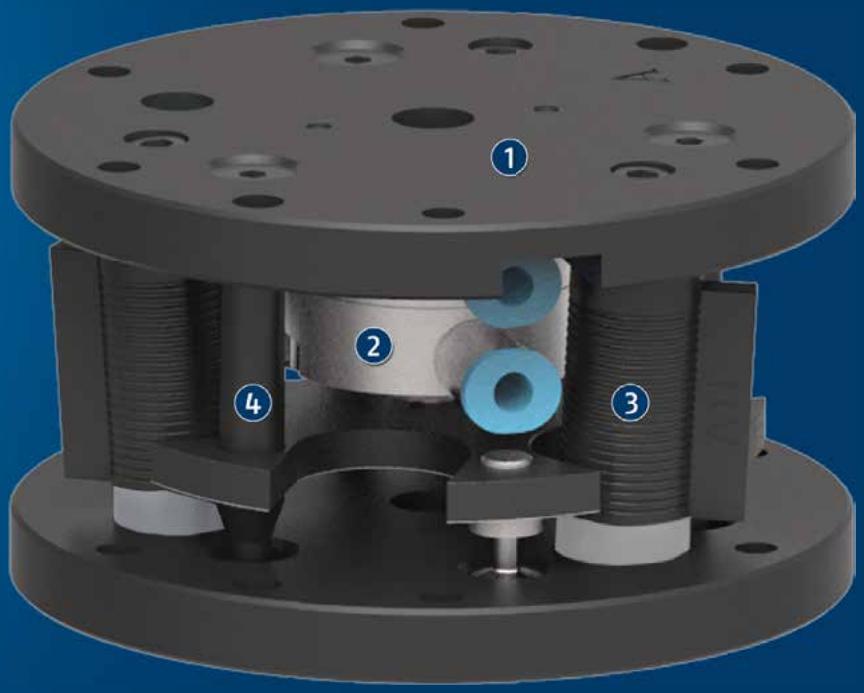
Compensation XY
1.7 .. 2.2 mm

Rotary compensation angle
2.5 .. 5°

Functional Description

The FUS' function is based on the interaction between the two base plates, which are connected to each other by a set of three or six flexible elastomer elements. As a result, the FUS can compensate tolerances in the X and Y directions, allowing the correction of angle errors and causing a rotational compensation.

The FUS offers pneumatic locking to allow the compensation unit to be set to rigid. As a result, it is possible to prevent the tool or the gripper vibrating during movement of the robot arm or the linear axis. This increases the application's repeat accuracy and extends the service life of the elastomer elements.



① **Adapter flange**
Individual mounting pattern diagrams can be easily integrated

② **Pneumatic locking**
For a rigid connection between the machine and tool sides

③ **Elastomers**
Allows compensation movement

④ **Overload pin**
To protect the elastomers

General Notes about the Series

Monitoring: By inductive proximity switch

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

Material: Elastomer material

Housing: Aluminum

Scope of delivery: Without mounting screws

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

Handling unit for precisely inserting a pin into a fitting bore

1. Insertion unit FUS
2. 3-finger centric gripper PZN-plus

SCHUNK offers more ...

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

Quick-change system

Manual change system

Universal gripper

Universal gripper

Inductive proximity switch

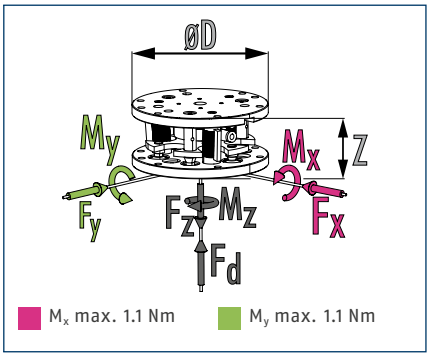
Angular gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

FUS 001-30

Compensating | Insertion Unit

Dimensions and maximum loads



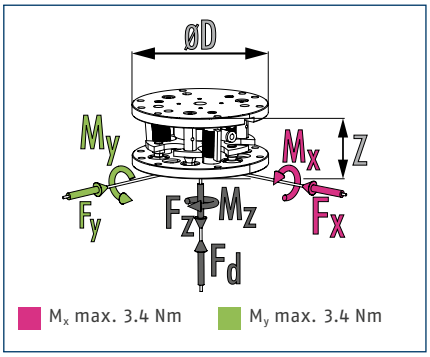
ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

Description		FUS-001-30
ID		0320280
Locking		Without locking
Compensation XY	[mm]	1.7
Angular deflection	[°]	1
Rotary compensation angle	[°]	4.5
Rigidity shift	[N/mm]	7.5
Compensation center distance	[mm]	23
Repeat accuracy	[mm]	±0.05
Weight	[kg]	0.05
Min./max. ambient temperature	[°C]	5/60
Max. force F_x/F_y vertical installation	[N]	22
Max. force F_x/F_y horizontal installation	[N]	3
Max. force F_d	[N]	160
Dimensions Ø D x Z	[mm]	30 x 38

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fus

Dimensions and maximum loads



ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

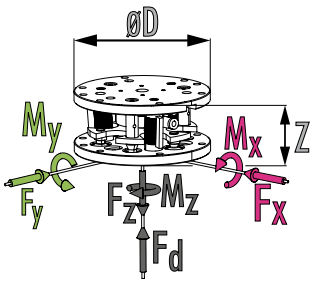
Technical data

Description		FUS-001
ID		0320518
Locking		With locking
Compensation XY	[mm]	1.7
Angular deflection	[°]	1
Rotary compensation angle	[°]	4.5
Rigidity shift	[N/mm]	1.7
Compensation center distance	[mm]	23
Repeat accuracy	[mm]	±0.026
Weight	[kg]	0.18
Min./max. operating pressure	[bar]	5/6
Min./max. ambient temperature	[°C]	5/60
Max. force F_x/F_y vertical installation	[N]	22
Max. force F_x/F_y horizontal installation	[N]	6.7
Locking moment F_z	[N]	22
Max. force F_d	[N]	360
Dimensions Ø D x Z	[mm]	56.9 x 41.5

FUS 100

Compensating | Insertion Unit

Dimensions and maximum loads



For values see technical data table

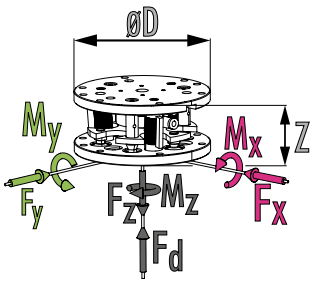
ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

Description		FUS-111B	FUS-112B	FUS-113B
ID		0320519	0320522	0320525
Locking		With locking	With locking	With locking
Compensation XY	[mm]	2.2	2.2	2.2
Angular deflection	[°]	1.1	1.1	1.1
Rotary compensation angle	[°]	5	5	5
Rigidity shift	[N/mm]	11	7	27
Compensation center distance	[mm]	120	69	61
Repeat accuracy	[mm]	±0.026	±0.026	±0.026
Weight	[kg]	0.31	0.31	0.31
Min./max. operating pressure	[bar]	5/6	5/6	5/6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. force F_x/F_y vertical installation	[N]	45	45	80
Max. force F_x/F_y horizontal installation	[N]	8.9	8.9	27
Locking moment F_z	[N]	44	44	80
Max. force F_d	[N]	1300	530	1300
Dimensions Ø D x Z	[mm]	80 x 45	80 x 45	80 x 45
Moments M_x max./M_y max.	[Nm]	5.1/5.1	5.1/5.1	7.9/7.9

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fus

Dimensions and maximum loads



For values see technical data table

ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

Description		FUS-211A	FUS-211B	FUS-211C	FUS-212A	FUS-212B	FUS-212C
ID		0320527	0320528	0320529	0320530	0320531	0320532
Locking		With locking	With locking	With locking	With locking	With locking	With locking
Compensation XY	[mm]	2.2	2.2	2.2	2.2	2.2	2.2
Angular deflection	[°]	1.1	1.1	1.1	1.1	1.1	1.1
Rotary compensation angle	[°]	4	4	4	4	4	4
Rigidity shift	[N/mm]	11	11	23	7	7	14
Compensation center distance	[mm]	140	150	150	81	91	86
Repeat accuracy	[mm]	±0.026	±0.026	±0.026	±0.026	±0.026	±0.026
Weight	[kg]	0.5	0.5	0.5	0.5	0.5	0.5
Min./max. operating pressure	[bar]	5/6	5/6	5/6	5/6	5/6	5/6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60	5/60	5/60	5/60
Max. force F_x/F_y vertical installation	[N]	53	53	107	62	62	125
Max. force F_x/F_y horizontal installation	[N]	8.9	8.9	18	8.9	8.9	18
Locking moment F_z	[N]	53	53	110	62	62	120
Max. force F_d	[N]	1300	1400	2700	620	710	1300
Dimensions Ø D x Z	[mm]	99.1 x 45	99.1 x 45	99.1 x 45	99.1 x 45	99.1 x 45	99.1 x 45
Moments M_x max./M_y max.	[Nm]	6.8/6.8	7.3/7.3	14/14	6.8/6.8	7.3/7.3	14/14

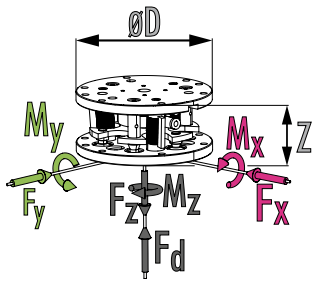
FUS 200

Compensating | Insertion Unit

Description		FUS-213A	FUS-213B	FUS-213C
ID		0320533	0320534	0320535
Locking		With locking	With locking	With locking
Compensation XY	[mm]	2.2	2.2	2.2
Angular deflection	[°]	1.1	1.1	1.1
Rotary compensation angle	[°]	4	4	4
Rigidity shift	[N/mm]	26	26	52
Compensation center distance	[mm]	74	82	79
Repeat accuracy	[mm]	±0.026	±0.026	±0.026
Weight	[kg]	0.5	0.5	0.5
Min./max. operating pressure	[bar]	5/6	5/6	5/6
Min./max. ambient temperature	[°C]	5/60	5/60	5/60
Max. force F_x/F_y vertical installation	[N]	98	98	196
Max. force F_x/F_y horizontal installation	[N]	27	27	54
Locking moment F_z	[N]	98	98	196
Max. force F_d	[N]	1360	1400	2770
Dimensions Ø D x Z	[mm]	99.1 x 45	99.1 x 45	99.1 x 45
Moments M_x max./M_y max.	[Nm]	8.5/8.5	9/9	17.5/17.5

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fus

Dimensions and maximum loads



For values see technical data table

ⓘ The forces and torques are maximum values when unlocked and may occur simultaneously. When locked, only the loads caused by the weight and acceleration are permissible.

Technical data

Description		FUS-413C	FUS-413D
ID		0320338	0320339
Locking		With locking	With locking
Compensation XY	[mm]	2.2	2.2
Angular deflection	[°]	1	1
Rotary compensation angle	[°]	2.5	2.5
Rigidity shift	[N/mm]	60	120
Compensation center distance	[mm]	225	225
Repeat accuracy	[mm]	±0.026	±0.026
Weight	[kg]	1.6	1.8
Min./max. operating pressure	[bar]	5/6	5/6
Min./max. ambient temperature	[°C]	5/60	5/60
Max. force F_x/F_y vertical installation	[N]	196	391
Max. force F_x/F_y horizontal installation	[N]	27	54
Locking moment F_z	[N]	200	395
Max. force F_d	[N]	2750	5490
Dimensions Ø D x Z	[mm]	159 x 50.1	159 x 50.1
Moments M_x max./M_y max.	[Nm]	22.6/22.6	45.2/45.2

Measuring

Product Quickfinder

	Page		Range of measurement F_{xy} [N]			Range of measurement F_z [N]		
			0 – 500	500 – 20000	20000 – 40000	0 – 1000	1000 – 20000	20000 – 100000
6-axis force/torque sensors								
Force/torque sensor FT • Precise measuring in six degrees of freedom	234		±12 – ±40000			±17 – ±88000		
Force/torque sensor FT-AXIA • Precise measuring in six degrees of freedom • Integrated electronics	260		±200 – ±500			±360 – ±900		

Range of measurement M_{xy} [Nm]				Range of measurement M_z [Nm]				Product features				
0 - 100	100 - 1000	1000 - 3000	3000 - 6000	0 - 100	100 - 1000	1000 - 3000	3000 - 6000	IP60	IP64	IP65	IP68	Without IP protection
±0.12 – ±6000				±0.12 – ±6000				●		●	●	●
±8 – ±20				±8 – ±20					●			

● = Very highly suitable ◐ = Highly suitable ○ = Suitable in customized version

Robust. Flexible. Precise.

6-Axis Force/Torque Sensor FT

Rigid 6-axis force/torque sensor for precision measuring in all six degrees of freedom

Field of Application

Universally applicable in robotic applications such as haptics, medicine, grinding, testing, inserting, and research and development.

Advantages – Your benefits

Many sizes with different measuring ranges

The sensor measures in all six degrees of freedom forces as well as moments

Rotation and translation of the coordinates system in all three directions in space

Integrated temperature compensation to ensure the defined measuring accuracy

Easy integration into the process due to easy interface compatibility

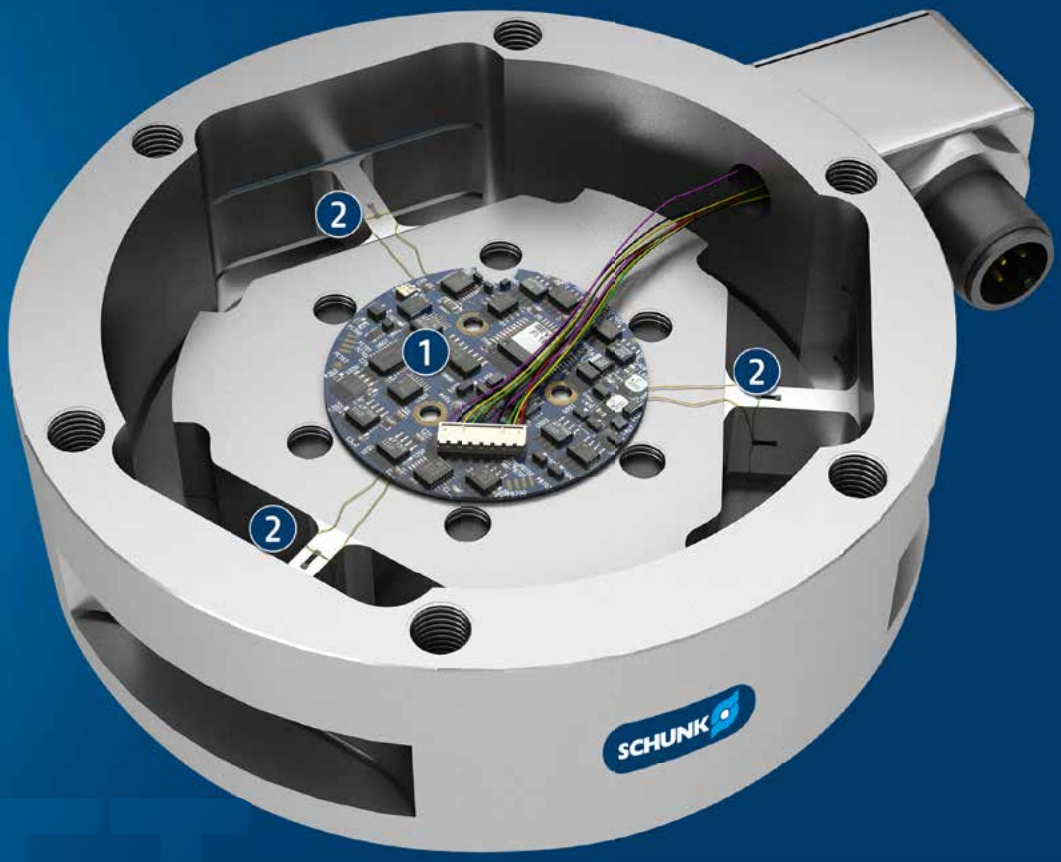
Robust design due to a higher overload range for a long service life

IP protection class IP60, 65, 68 available as an option

Sizes	Measuring range of force	Measuring range of moment load
Quantity: 16	±8 .. 88000 N	±0.05 .. 6000 Nm

Functional Description

The strain gauges (DMS) of the 6-axis force/torque sensors measure the strain applied in all six degrees of freedom (F_x, F_y, F_z, M_x, M_y and M_z). The DMS signals are amplified in the sensor.



① **Electronics**
Integration into housing means no interfering contours (from size Gamma)

② **Resistance strain gauges**
Silicon gauges provide a signal 75 times stronger than conventional foil gages. This signal is amplified resulting in near-zero noise distortion.

General Notes about the Series

Measuring accuracy: < 1% of the upper limit value of the measuring range at 22 °C

Evaluation via: EtherNet/IP, EtherCAT, PROFINET, WiFi, DeviceNet, DAQ, USB, RS232, analog

Splash water protection: IP60, 65, 68 optional erhältlich

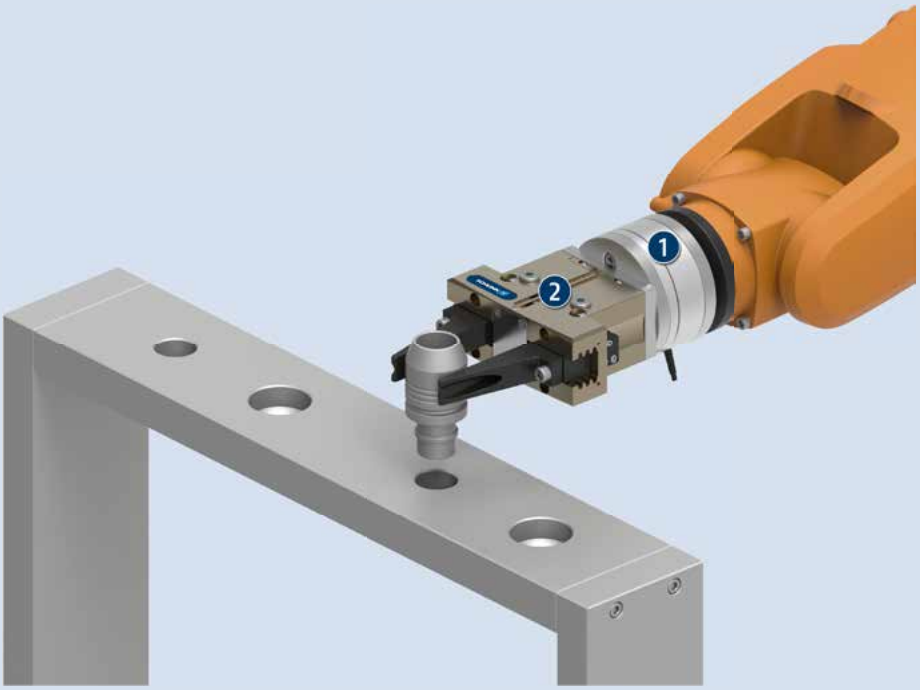
Housing: Aluminum and stainless steel

Scope of delivery: Electronic processor and connection cable

Warranty: 12 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

Gripping unit with force/torque sensor for quality control of piston diameters

1. 6-axis force/torque sensor FT for insertion into the measuring station
2. 2-finger parallel gripper PGN-plus-P for handling of workpieces

SCHUNK offers more ...

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

EtherNet/IP-Version

DAQ version

Stand-alone version

Wireless version

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

Options and special Information

6-axis force/torque sensor: Strain gauges (DMS) measure the strain applied in all six degrees of freedom (F_x, F_y, F_z, M_x, M_y and M_z). The DMS signals are amplified in the sensor. Due to the size, the amplifier board for the Nano and Mini series is located in the power supply box (IFPS) instead of the sensor.
Power supply box: With the nano and mini sensors the sensor cables are soldered in the sensor. At larger sensors a plug at the sensor housing is for the attachment of the sensor cables. The highly flexible sensor cable protects the sensor signals against electrical fields and mechanical payloads.
Sensor cables: With the nano and mini sensors the sensor cables are soldered in the sensor. At larger sensors a plug at the sensor housing is for the attachment of the sensor cables. The highly flexible sensor cable protects the sensor signals against electrical fields and mechanical payloads.
Amplifier board/Multiplex board/Net box: The amplifier board converts the signals of the resistance strain gauges into a signal usable for the DAQ Card and NET-box. The Multiplex- board boosts the signals from the resistance strain gauges and sends them to the controller.
Net-Box: In order to process the data, the primary function of the Net-Box is to communicate with the sensor and with the user's equipment. Communication can be established via EtherNet/IP and CAN. The Net-Box can also respond to DeviceNet commands and communicate via the CAN connection.
Stand-alone-controller: The Stand-Alone-Controller is connected with the sensor or the Multiplex Box. It converts the multiplexed DMS signals into forces and moments. Functions like e.g. tool transformation are implemented in the controller.

General Information

The SCHUNK 6-axis force/torque sensors (FT sensor) measure 6 components of force and moment (F_x, F_y, F_z, M_x, M_y, M_z). The SCHUNK FT sensors use silicon strain gauges, which provide for excellent noise immunity. The following interfaces are available for all sizes: **FTN (EtherNet, DeviceNet with optional PROFINET), FTW (WLAN IEEE 802.11), FTD (PCI, USB), FTS (analog voltage 0 – 10 V, DIO).**

Characteristics

The SCHUNK FT sensors feature diverse high-performance functions:

- **Zero point offset:**
  Moves and/or rotates the FT reference system.
- **Demo program:**
  Enables settings and data logging.
- **Zeroing:**
  Provides a simple way to compensate the tool weight.
- **Threshold comparison:**
  Generates an output code if a user-defined threshold is exceeded (FTN and FTS).
- **Built-in temperature compensation:**
  Ensures accuracy of the measurements over a large temperature range.
- **Overload:**
  SCHUNK FT sensors are particularly robust and durable. The safety factor can be up as high as 40 times the measurement range, depending on the particular size.
- **Immune measurement signal:**
  Silicon strain gauges provide a signal 75 times stronger than conventional foil strain gauges and reduce the signal noise to virtually zero.
- **IP protection class:**
  SCHUNK FT sensors are optionally available in versions IP60, 65 or 68.

Accuracy

Accuracy is the difference between the applied load and the actual load measured.
The maximum measuring inaccuracy refers to the maximum value that can be measured with the sensor (see example below for Gamma SI-32-2.5).
The reproducibility or repeatability is the difference between the measured values when the same load is applied each time.

Note:
Often it is irrelevant to know the size of the actual measured load. It is crucial that the same load always results in the same measured values.

Example: Gamma SI-32-2.5

Name	Calibration	F_x	F_y	F_z	T_x	T_y	T_z
Gamma	SI-32-2.5	0.75%	1.00%	0.75%	1.00%	1.25%	1.00%

F_x max. measurement range is 32 N, max. measurement inaccuracy is 0.24 N.
F_z max. measurement range is 100 N, max. measurement inaccuracy is 0.75 N.

Resolution

The resolution is the smallest change in the load that represents a change in the output values of the measured forces and moments.
The smaller the resolution of an FT sensor, the larger is the sensitivity of the sensor. This is important when the application requires a "tactile sense."

Technical Data

Type	Analysis	Output speed	Latency time
FTN	Via Ethernet, DeviceNet optionally with PROFINET Standard mode RDT mode	 7000 Hz 7000 Hz	 500 µs 288 µs
FTW	Via WLAN IEEE 802.11, 2.4 GHz or 5.0 GHz	1200 Hz	833 µs
FTD	Via DAQ card (PCI)	16.67 kHz up to 41.67 kHz	1/output speed
FTS	Analog voltage 0 – 10 V or DIO RS-232 Analog voltage	 560 Hz 2500 Hz	 2585 µs 800 µs

Application in Practice

SCHUNK 6-axis force/torque sensors are already used in a variety of robot-controlled applications:

- **Joining processes:**
  Joining or assembly of workpieces by using a robot.
- **Deburring, polishing, grinding:**
  Optimum results due to constant pressures.
- **Force/torque feedback:**
  Controlling of manipulators (e.g. defusing of bombs).
- **Medicine:**
  Development of artificial limbs and simulating of surgery.
- **Product tests:**
  Tactile measurements for automotive parts and smartphone displays.
- **Research and development:**
  Used in many universities and research facilities due to very precise and reproducible measurements.
- **Service robotics:**
  Flexible and versatile due to the compact design.

The force/torque feedback between the robot and SCHUNK FT sensor allows a significantly increase in quality of the automated grinding of supply air chambers for fireplaces.

FTN – the All-rounder for your Interfaces

The FTN sensor is connected to the system via EtherNet/IP or DeviceNet (optional PROFINET).
The web browser interface facilitates configuration and adjustment of the FTN sensor.

Product features

- Fully ODVA™-compliant EtherNet/IP interface (optionally available with PROFINET).
- The FTN system NetBox has the IP65 protection class.
- The NetBox is supplied using Power over Ethernet (PoE) or an external power supply (11 V to 24 V).
- Up to 16 sensor calibrations can be stored permanently in the system and selected by the user.

Scope of delivery:
FT sensor, sensor cable, NetBox, optional RJ45 adapter

1. FT sensor
2. Sensor cables
3. NetBox
4. Optionally with RJ45 adapter

FTW – Pocket-size Radio Transmission System (WLAN)

The FTW is a pocket-size radio transmission system (WLAN) for up to six SCHUNK force/torque sensors.
The FTW can transmit the signals for data collection, real-time motion control, or user-defined signal processing to the user's host devices.

Product features

- The FTW system is a radio-based transmission system for up to 6 SCHUNK FT sensors.
- The voltage supply can be provided by battery or power supply unit. The wireless standard 802.11b/g/n 2.4 GHz or 5.0 GHz is used.
- The FTW can transmit up to 1,200 six-axis measurements per second to the host device.

Scope of delivery:
FT sensor with cable, charger, radio transmission system

1. Radio transmission system
2. Charger for battery
3. FT sensor with cable

FTD – for simple Data Collection via PC

The FTD sensor is connected to the PC by means of a DAQ card. The 6 analog output signals from the sensor are converted to digital signals by means of the electronics in the DAQ card. Afterwards, the software (provided by the customer) uses the calibration matrix to graphically display the occuring forces and torques on the PC.

Product features

- Maximum possible output speed
- Numerous DAQ cards can be used
- Dual calibration possible

Scope of delivery:
FT sensor, sensor cable, power supply box, optionally DAQ card (PCI or USB)

1. FT sensor with sensor cable
2. Power supply box
3. Optional with DAQ card (PCI)
4. Optional with DAQ card (USB)
5. Cable for DAQ card

FTS – the autonomous Measuring System

The FTS sensor is connected by means of the RS-232 interface, analog outputs and/or single I/O connections. The stand-alone controller digitalizes the 6 analog output signals of the sensor, and uses the calibration matrix to calculate the forces and torques in all six directions (F_x, F_y, F_z, M_x, M_y, M_z).

Product features

- Autonomous measuring system
- Dual calibration possible
- Discrete I/O (e. g. good/bad inspection)
- Integrated RS-232 interface allows direct configuration on the PC
- Measured forces and torques are output via analog voltages (±5 V/±10 V)

Scope of delivery:
FT sensor, sensor cable, stand-alone controller

1. FT sensor with sensor cable
2. Stand-alone controller (left: rear view; right: front view)
3. Amplifier box (MUX box)
4. Connection cable from amplifier box to stand-alone controller

Selection Scheme for 6-Axis Force/Torque Sensors

1. Calculating the expected forces and moments

Generally, the moment load is the decisive variable in selecting a sensor. The tool weight and application process generate forces that can act upon the sensor as moments. The moment is calculated from the applied force (static and dynamic) multiplied by the lever arm. The lever arm is the distance from the point of application of the force to the zero point of the sensor. The design must also take the forces and moments into account that can act upon the sensor outside of normal operation.

2. Pre-selection of the sensor based on forces and moments

Use the table below for this step.

3. Definition of the resolution

Check whether the resolution of the sensor matches your requirements. As a rule of thumb, the larger the measurement range, the lower the resolution.

Example

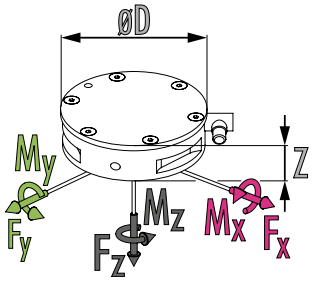
The maximum expected force that will act upon the sensor is 98 N (10 kg). This force acts upon the sensor from a distance of 25 cm. Therefore the moment is 24.5 Nm.

The FT-Delta-SI-330-30 would be suitable for this application (measuring range 330 N and 30 Nm).

Quick Overview FT

Designation	Max. F_x, F_y [±N]	Max. F_z [±N]	Max. M_x, M_y, M_z [±Nm]	Weight [kg]	Diameter [mm]	Height [mm]
Nano17 Titanium	32	56.4	0.2	0.00907	17	14
Nano17	50	70	0.5	0.00907	17	14
Nano17 IP65/IP68	50	70	0.5	0.0408	20	22
Nano25	250	1000	6	0.0635	25	22
Nano25 IP65/IP68	250	1000	6	0.136	28	27
Nano43	36	36	0.5	0.0408	43	11
Mini40	80	240	4	0.0499	40	12
Mini40 IP65/IP68	80	240	4	0.272	53	21
Mini45	580	1160	20	0.0907	45	16
Mini45 IP65/IP68	580	1160	20	0.39	58	25
Mini58	2800	6800	120	0.499	58	30
Mini58 IP60	2800	6800	120	0.522	82	36
Mini58 IP65/IP68	2800	6800	120	0.803	66	38
Mini85	1900	3800	80	0.635	85	30
Gamma	130	400	10	0.254	75	33
Gamma IP60	130	400	10	0.467	99	40
Gamma IP65	130	400	10	1.09	110	52
Gamma IP68	130	400	10	1.98	110	52
Delta	660	1980	60	0.912	94	33
Delta IP60	660	1980	60	1.81	120	47
Delta IP65	660	1980	60	1.77	130	52
Delta IP68	660	1980	60	2.63	100	52
Theta	2500	6250	400	4.99	150	61
Theta IP60	2500	6250	400	8.62	190	74
Theta IP65 / IP68	2500	6250	400	9	160	75
Omega85	1900	3800	80	0.658	85	34
Omega85 IP65/IP68	1900	3800	80	1.91	93	39
Omega160	2500	6250	400	2.72	160	56
Omega160 IP60	2500	6250	400	7.67	190	58
Omega160 IP65/IP68	2500	6250	400	7.26	170	66
Omega191	7200	18000	1400	9.41	190	64
Omega191 IP60	7200	18000	1400	14.1	238	73.7
Omega191 IP65/IP68	7200	18000	1400	13.2	204	74.8
Omega250 IP60	16000	32000	2000	31.8	290	95
Omega250 IP65/IP68	16000	32000	2000	31.8	290	95
Omega331	40000	88000	6000	47	330	110

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

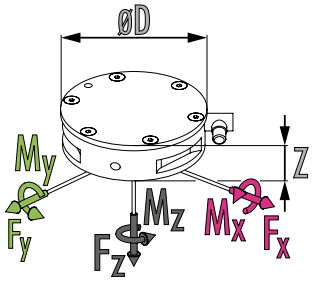
Technical data FTN

Description		FTN-Nano-17 SI-12-0.12	FTN-Nano-17 SI-25-0.25	FTN-Nano-17 SI-50-0.5
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.0091	0.0091	0.0091
Calibration		SI-12-0.12	SI-25-0.25	SI-50-0.5
Range of measurement F_x, F_y	[N]	±12	±25	±50
Range of measurement F_z	[N]	±17	±35	±70
Range of measurement M_x, M_y	[Nm]	±0.12	±0.25	±0.5
Range of measurement M_z	[Nm]	±0.12	±0.25	±0.5
Overload F_x, F_y	[N]	±250	±250	±250
Overload F_z	[N]	±480	±480	±480
Overload M_x, M_y	[Nm]	±1.6	±1.6	±1.6
Overload M_z	[Nm]	±1.8	±1.8	±1.8
Resonant frequency F_x, F_y, M_z	[Hz]	7200	7200	7200
Resonant frequency F_z, M_x, M_y	[Hz]	7200	7200	7200
Resolution F_x, F_y	[N]	0.004	0.007	0.015
Resolution F_z	[N]	0.004	0.007	0.015
Resolution M_x, M_y	[Nmm]	0.015	0.035	0.065
Resolution M_z	[Nmm]	0.015	0.035	0.065
Dimensions Ø D x Z	[mm]	17 x 14.5	17 x 14.5	17 x 14.5
Technical data devaiations for FTD				
Description		FTD-Nano-17 SI-12-0.12	FTD-Nano-17 SI-25-0.25	FTD-Nano-17 SI-50-0.5
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Nano-17 SI-12-0.12	FTW-Nano-17 SI-25-0.25	FTW-Nano-17 SI-50-0.5
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Nano-17 SI-12-0.12	FTS-Nano-17 SI-25-0.25	FTS-Nano-17 SI-50-0.5
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.007	0.015	0.025
Resolution F_z	[N]	0.007	0.015	0.025
Resolution M_x, M_y	[Nmm]	0.035	0.065	0.125
Resolution M_z	[Nmm]	0.035	0.065	0.125

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ft

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data FTN

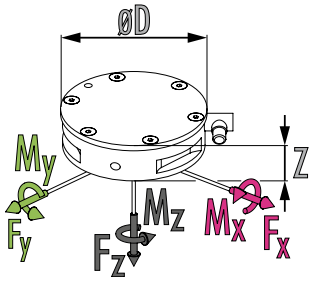
Description		FTN-Nano-17-T SI-8-0.05	FTN-Nano-17-T SI-16-0.1	FTN-Nano-17-T SI-32-0.2
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.01	0.01	0.01
Calibration		SI-8-0.05	SI-16-0.1	SI-32-0.2
Range of measurement F_x, F_y	[N]	±8	±16	±32
Range of measurement F_z	[N]	±14.1	±28.2	±56.4
Range of measurement M_x, M_y	[Nm]	±0.05	±0.1	±0.2
Range of measurement M_z	[Nm]	±0.05	±0.1	±0.2
Overload F_x, F_y	[N]	±160	±160	±160
Overload F_z	[N]	±310	±310	±310
Overload M_x, M_y	[Nm]	±1	±1	±1
Overload M_z	[Nm]	±1.2	±1.2	±1.2
Resonant frequency F_x, F_y, M_z	[Hz]	3000	3000	3000
Resonant frequency F_z, M_x, M_y	[Hz]	3000	3000	3000
Resolution F_x, F_y	[N]	0.015	0.003	0.06
Resolution F_z	[N]	0.015	0.003	0.06
Resolution M_x, M_y	[Nmm]	0.085	0.02	0.035
Resolution M_z	[Nmm]	0.07	0.015	0.03
Dimensions Ø D x Z	[mm]	17 x 14.5	17 x 14.5	17 x 14.5
Technical data devaiations for FTD				
Description		FTD-Nano-17-T SI-8-0.05	FTD-Nano-17-T SI-16-0.1	FTD-Nano-17-T SI-32-0.2
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Nano-17-T SI-8-0.05	FTW-Nano-17-T SI-16-0.1	FTW-Nano-17-T SI-32-0.2
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Nano-17-T SI-8-0.05	FTS-Nano-17-T SI-16-0.1	FTS-Nano-17-T SI-32-0.2
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.003	0.006	0.015
Resolution F_z	[N]	0.003	0.006	0.015
Resolution M_x, M_y	[Nmm]	0.02	0.035	0.065
Resolution M_z	[Nmm]	0.015	0.03	0.055

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

FT Nano25

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

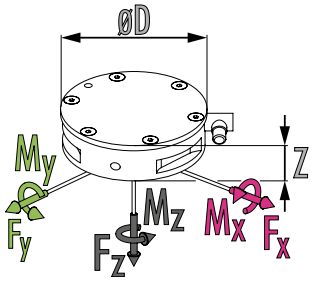
Technical data FTN

Description		FTN-Nano-25 SI-125-3	FTN-Nano-25 SI-250-6
Evaluation via		EtherNet/IP	EtherNet/IP
Weight	[kg]	0.063	0.063
Calibration		SI-125-3	SI-250-6
Range of measurement F_x, F_y	[N]	±125	±250
Range of measurement F_z	[N]	±500	±1000
Range of measurement M_x, M_y	[Nm]	±3	±6
Range of measurement M_z	[Nm]	±3	±3.4
Overload F_x, F_y	[N]	±2300	±2300
Overload F_z	[N]	±7300	±7300
Overload M_x, M_y	[Nm]	±43	±43
Overload M_z	[Nm]	±63	±63
Resonant frequency F_x, F_y, M_z	[Hz]	3600	3600
Resonant frequency F_z, M_x, M_y	[Hz]	3800	3800
Resolution F_x, F_y	[N]	0.025	0.045
Resolution F_z	[N]	0.065	0.125
Resolution M_x, M_y	[Nm]	0.001	0.002
Resolution M_z	[Nm]	0.001	0.002
Dimensions Ø D x Z	[mm]	25 x 21.6	25 x 21.6
Technical data devaiations for FTD			
Description		FTD-Nano-25 SI-125-3	FTD-Nano-25 SI-250-6
Evaluation via		DAQ	DAQ
Technical data deviating, FTW			
Description		FTW-Nano-25 SI-125-3	FTW-Nano-25 SI-250-6
Evaluation via		Wireless	Wireless
Technical data deviations for FTS			
Description		FTS-Nano-25 SI-125-3	FTS-Nano-25 SI-250-6
Evaluation via		Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.045	0.085
Resolution F_z	[N]	0.125	0.25
Resolution M_x, M_y	[Nm]	0.002	0.003
Resolution M_z	[Nm]	0.001	0.002

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ft

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data FTN

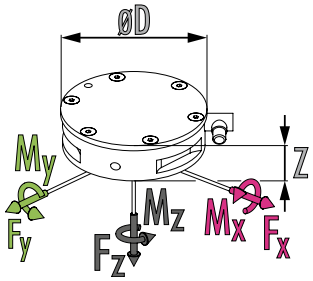
Description		FTN-Nano-43 SI-9-0.125	FTN-Nano-43 SI-18-0.25	FTN-Nano-43 SI-36-0.5
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.039	0.039	0.039
Calibration		SI-9-0.125	SI-18-0.25	SI-36-0.5
Range of measurement F_x, F_y	[N]	±9	±18	±36
Range of measurement F_z	[N]	±9	±18	±36
Range of measurement M_x, M_y	[Nm]	±0.13	±0.25	±0.5
Range of measurement M_z	[Nm]	±0.13	±0.25	±0.5
Overload F_x, F_y	[N]	±300	±300	±300
Overload F_z	[N]	±380	±380	±380
Overload M_x, M_y	[Nm]	±3.2	±3.2	±3.2
Overload M_z	[Nm]	±4.6	±4.6	±4.6
Resonant frequency F_x, F_y, M_z	[Hz]	2800	2800	2800
Resonant frequency F_z, M_x, M_y	[Hz]	2300	2300	2300
Resolution F_x, F_y	[N]	0.002	0.004	0.008
Resolution F_z	[N]	0.002	0.004	0.008
Resolution M_x, M_y	[Nm]	0.001	0.001	0.001
Resolution M_z	[Nm]	0.001	0.001	0.001
Dimensions Ø D x Z	[mm]	43 x 11.5	43 x 11.5	43 x 11.5
Technical data devaiations for FTD				
Description		FTD-Nano-43 SI-9-0.125	FTD-Nano-43 SI-18-0.25	FTD-Nano-43 SI-36-0.5
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Nano-43 SI-9-0.125	FTW-Nano-43 SI-18-0.25	FTW-Nano-43 SI-36-0.5
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Nano-43 SI-9-0.125	FTS-Nano-43 SI-18-0.25	FTS-Nano-43 SI-36-0.5
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.004	0.008	0.015
Resolution F_z	[N]	0.004	0.008	0.015
Resolution M_x, M_y	[Nm]	0.001	0.001	0.001
Resolution M_z	[Nm]	0.001	0.001	0.001

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

FT Mini40

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data FTN

Description		FTN-Mini-40 SI-20-1	FTN-Mini-40 SI-40-2	FTN-Mini-40 SI-80-4
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.049	0.049	0.049
Calibration		SI-20-1	SI-40-2	SI-80-4
Range of measurement F_x, F_y	[N]	±20	±40	±80
Range of measurement F_z	[N]	±60	±120	±240
Range of measurement M_x, M_y	[Nm]	±1	±2	±4
Range of measurement M_z	[Nm]	±1	±2	±4
Overload F_x, F_y	[N]	±810	±810	±810
Overload F_z	[N]	±2400	±2400	±2400
Overload M_x, M_y	[Nm]	±19	±19	±19
Overload M_z	[Nm]	±20	±20	±20
Resonant frequency F_x, F_y, M_z	[Hz]	3200	3200	3200
Resonant frequency F_z, M_x, M_y	[Hz]	4900	4900	4900
Resolution F_x, F_y	[N]	0.005	0.01	0.02
Resolution F_z	[N]	0.01	0.02	0.04
Resolution M_x, M_y	[Nm]	0.001	0.001	0.001
Resolution M_z	[Nm]	0.001	0.001	0.001
Dimensions Ø D x Z	[mm]	40 x 14	40 x 14	40 x 14
Technical data devaiations for FTD				
Description		FTD-Mini-40 SI-20-1	FTD-Mini-40 SI-40-2	FTD-Mini-40 SI-80-4
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Mini-40 SI-20-1	FTW-Mini-40 SI-40-2	FTW-Mini-40 SI-80-4
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Mini-40 SI-20-1	FTS-Mini-40 SI-40-2	FTS-Mini-40 SI-80-4
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.01	0.02	0.04
Resolution F_z	[N]	0.02	0.04	0.08
Resolution M_x, M_y	[Nm]	0.001	0.001	0.001
Resolution M_z	[Nm]	0.001	0.001	0.001

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

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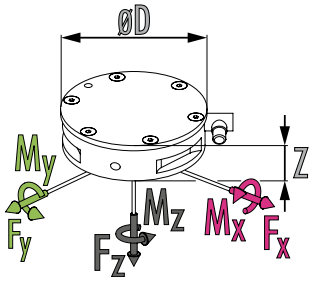
Dimensions and maximum loads



For values see technical data table

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Technical data FTN

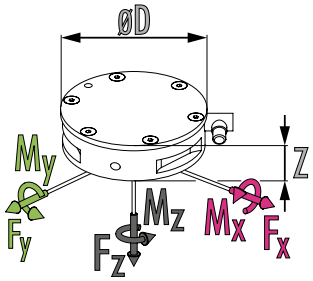
Description		FTN-Mini-45 SI-145-5	FTN-Mini-45 SI-290-10	FTN-Mini-45 SI-580-20
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.091	0.091	0.091
Calibration		SI-145-5	SI-290-10	SI-580-20
Range of measurement F_x, F_y	[N]	±145	±290	±580
Range of measurement F_z	[N]	±290	±580	±1160
Range of measurement M_x, M_y	[Nm]	±5	±10	±20
Range of measurement M_z	[Nm]	±5	±10	±20
Overload F_x, F_y	[N]	±5100	±5100	±5100
Overload F_z	[N]	±10000	±10000	±10000
Overload M_x, M_y	[Nm]	±110	±110	±110
Overload M_z	[Nm]	±140	±140	±140
Resonant frequency F_x, F_y, M_z	[Hz]	5600	5600	5600
Resonant frequency F_z, M_x, M_y	[Hz]	5400	5400	5400
Resolution F_x, F_y	[N]	0.25	0.125	0.25
Resolution F_z	[N]	0.25	0.125	0.25
Resolution M_x, M_y	[Nm]	0.005	0.003	0.005
Resolution M_z	[Nm]	0.003	0.001	0.003
Dimensions Ø D x Z	[mm]	45 x 15.7	45 x 15.7	45 x 15.7
Technical data devaiations for FTD				
Description		FTD-Mini-45 SI-145-5	FTD-Mini-45 SI-290-10	FTD-Mini-45 SI-580-20
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Mini-45 SI-145-5	FTW-Mini-45 SI-290-10	FTW-Mini-45 SI-580-20
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Mini-45 SI-145-5	FTS-Mini-45 SI-290-10	FTS-Mini-45 SI-580-20
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.125	0.25	0.5
Resolution F_z	[N]	0.125	0.25	0.5
Resolution M_x, M_y	[Nm]	0.003	0.005	0.01
Resolution M_z	[Nm]	0.001	0.003	0.005

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

FT Mini58

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

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Technical data FTN

Description		FTN-Mini-58 SI-700-30	FTN-Mini-58 SI-1400-60	FTN-Mini-58 SI-2800-120
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.345	0.345	0.345
Calibration		SI-700-30	SI-1400-60	SI-2800-120
Range of measurement F_x, F_y	[N]	±700	±1400	±2800
Range of measurement F_z	[N]	±1700	±3400	±6800
Range of measurement M_x, M_y	[Nm]	±30	±60	±120
Range of measurement M_z	[Nm]	±30	±60	±120
Overload F_x, F_y	[N]	±21000	±21000	±21000
Overload F_z	[N]	±48000	±48000	±48000
Overload M_x, M_y	[Nm]	±590	±590	±590
Overload M_z	[Nm]	±800	±800	±800
Resonant frequency F_x, F_y, M_z	[Hz]	3000	3000	3000
Resonant frequency F_z, M_x, M_y	[Hz]	5700	5700	5700
Resolution F_x, F_y	[N]	0.17	0.333	0.75
Resolution F_z	[N]	0.295	0.585	1.25
Resolution M_x, M_y	[Nm]	0.006	0.015	0.025
Resolution M_z	[Nm]	0.003	0.006	0.015
Dimensions Ø D x Z	[mm]	58 x 30	58 x 30	58 x 30
Technical data devaiations for FTD				
Description		FTD-Mini-58 SI-700-30	FTD-Mini-58 SI-1400-60	FTD-Mini-58 SI-2800-120
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Mini-58 SI-700-30	FTW-Mini-58 SI-1400-60	FTW-Mini-58 SI-2800-120
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Mini-58 SI-700-30	FTS-Mini-58 SI-1400-60	FTS-Mini-58 SI-2800-120
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.333	0.67	1.5
Resolution F_z	[N]	0.585	1.17	2.5
Resolution M_x, M_y	[Nm]	0.001	0.025	0.045
Resolution M_z	[Nm]	0.006	0.015	0.025

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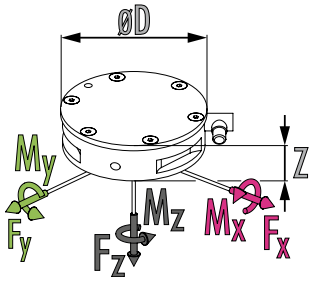
Dimensions and maximum loads



For values see technical data table

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Technical data FTN

Description		FTN-Mini-85 SI-475-20	FTN-Mini-85 SI-950-40	FTN-Mini-85 SI-1900-80
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.635	0.635	0.635
Calibration		SI-475-20	SI-950-40	SI-1900-80
Range of measurement F_x, F_y	[N]	±475	±950	±1900
Range of measurement F_z	[N]	±950	±1900	±3800
Range of measurement M_x, M_y	[Nm]	±20	±40	±80
Range of measurement M_z	[Nm]	±20	±40	±80
Overload F_x, F_y	[N]	±13000	±13000	±13000
Overload F_z	[N]	±27000	±27000	±27000
Overload M_x, M_y	[Nm]	±500	±500	±500
Overload M_z	[Nm]	±610	±610	±610
Resonant frequency F_x, F_y, M_z	[Hz]	2400	2400	2400
Resonant frequency F_z, M_x, M_y	[Hz]	3100	3100	3100
Resolution F_x, F_y	[N]	0.08	0.16	0.325
Resolution F_z	[N]	0.11	0.215	0.43
Resolution M_x, M_y	[Nm]	0.003	0.007	0.013
Resolution M_z	[Nm]	0.002	0.005	0.009
Dimensions Ø D x Z	[mm]	85 x 29.8	85 x 29.8	85 x 29.8
Technical data devaiations for FTD				
Description		FTD-Mini-85 SI-475-20	FTD-Mini-85 SI-950-40	FTD-Mini-85 SI-1900-80
Evaluation via		DAQ	DAQ	DAQ
Technical data deviating, FTW				
Description		FTW-Mini-85 SI-475-20	FTW-Mini-85 SI-950-40	FTW-Mini-85 SI-1900-80
Evaluation via		Wireless	Wireless	Wireless
Technical data deviations for FTS				
Description		FTS-Mini-85 SI-475-20	FTS-Mini-85 SI-950-40	FTS-Mini-85 SI-1900-80
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.16	0.325	0.645
Resolution F_z	[N]	0.214	0.43	0.86
Resolution M_x, M_y	[Nm]	0.007	0.015	0.03
Resolution M_z	[Nm]	0.005	0.009	0.02

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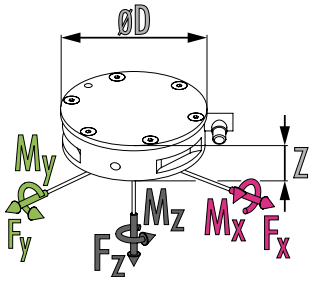
FT Gamma

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

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Technical data FTN

Description		FTN-Gamma SI-32-2.5	FTN-Gamma SI-65-5	FTN-Gamma SI-130-10
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.255	0.255	0.255
Calibration		SI-32-2.5	SI-65-5	SI-130-10
Range of measurement F_x, F_y	[N]	±32	±65	±130
Range of measurement F_z	[N]	±100	±200	±400
Range of measurement M_x, M_y	[Nm]	±2.5	±5	±10
Range of measurement M_z	[Nm]	±2.5	±5	±10
Overload F_x, F_y	[N]	±1200	±1200	±1200
Overload F_z	[N]	±4100	±4100	±4100
Overload M_x, M_y	[Nm]	±79	±79	±79
Overload M_z	[Nm]	±82	±82	±82
Resonant frequency F_x, F_y, M_z	[Hz]	1400	1400	1400
Resonant frequency F_z, M_x, M_y	[Hz]	2000	2000	2000
Resolution F_x, F_y	[N]	0.006	0.015	0.025
Resolution F_z	[N]	0.015	0.025	0.05
Resolution M_x, M_y	[Nm]	0.001	0.001	0.001
Resolution M_z	[Nm]	0.001	0.001	0.001
Dimensions Ø D x Z	[mm]	75.4 x 33.3	75.4 x 33.3	75.4 x 33.3
Technical data devaiations for FTD				
Description		FTD-Gamma SI-32-2.5	FTD-Gamma SI-65-5	FTD-Gamma SI-130-10
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Gamma SI-32-2.5	FTS-Gamma SI-65-5	FTS-Gamma SI-130-10
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.015	0.025	0.05
Resolution F_z	[N]	0.025	0.05	0.1
Resolution M_x, M_y	[Nm]	0.001	0.002	0.003
Resolution M_z	[Nm]	0.001	0.002	0.003

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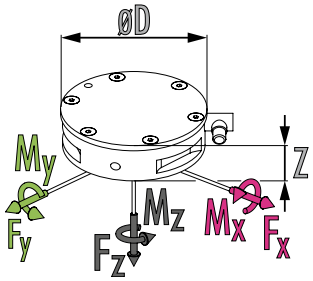
Dimensions and maximum loads



For values see technical data table

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Technical data FTN

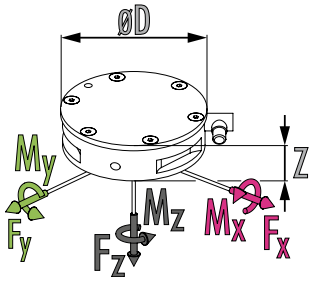
Description		FTN-Delta SI-165-15	FTN-Delta SI-330-30	FTN-Delta SI-660-60
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.913	0.913	0.913
Calibration		SI-165-15	SI-330-30	SI-660-60
Range of measurement F_x, F_y	[N]	±165	±330	±660
Range of measurement F_z	[N]	±495	±990	±1980
Range of measurement M_x, M_y	[Nm]	±15	±30	±60
Range of measurement M_z	[Nm]	±15	±30	±60
Overload F_x, F_y	[N]	±3700	±3700	±3700
Overload F_z	[N]	±10000	±10000	±10000
Overload M_x, M_y	[Nm]	±280	±280	±280
Overload M_z	[Nm]	±400	±400	±400
Resonant frequency F_x, F_y, M_z	[Hz]	1500	1500	1500
Resonant frequency F_z, M_x, M_y	[Hz]	1700	1700	1700
Resolution F_x, F_y	[N]	0.035	0.065	0.125
Resolution F_z	[N]	0.065	0.125	0.25
Resolution M_x, M_y	[Nm]	0.002	0.004	0.008
Resolution M_z	[Nm]	0.002	0.004	0.008
Dimensions Ø D x Z	[mm]	94.5 x 33.3	94.5 x 33.3	94.5 x 33.3
Technical data devaiations for FTD				
Description		FTD-Delta SI-165-15	FTD-Delta SI-330-30	FTD-Delta SI-660-60
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Delta SI-165-15	FTS-Delta SI-330-30	FTS-Delta SI-660-60
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.065	0.125	0.25
Resolution F_z	[N]	0.125	0.25	0.5
Resolution M_x, M_y	[Nm]	0.004	0.008	0.015
Resolution M_z	[Nm]	0.004	0.008	0.015

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

FT Theta

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

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Technical data FTN

Description		FTN-Theta SI-1000-120	FTN-Theta SI-1500-240	FTN-Theta SI-2500-400
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	4.99	4.99	4.99
Calibration		SI-1000-120	SI-1500-240	SI-2500-400
Range of measurement F_x, F_y	[N]	±1000	±1500	±2500
Range of measurement F_z	[N]	±2500	±3750	±6250
Range of measurement M_x, M_y	[Nm]	±120	±240	±400
Range of measurement M_z	[Nm]	±120	±240	±400
Overload F_x, F_y	[N]	±20000	±20000	±20000
Overload F_z	[N]	±51000	±51000	±51000
Overload M_x, M_y	[Nm]	±2000	±2000	±2000
Overload M_z	[Nm]	±2000	±2000	±2000
Resonant frequency F_x, F_y, M_z	[Hz]	680	680	680
Resonant frequency F_z, M_x, M_y	[Hz]	820	820	820
Resolution F_x, F_y	[N]	0.25	0.5	0.5
Resolution F_z	[N]	0.25	0.5	1
Resolution M_x, M_y	[Nm]	0.025	0.05	0.05
Resolution M_z	[Nm]	0.0125	0.025	0.05
Dimensions Ø D x Z	[mm]	155 x 61.1	155 x 61.1	155 x 61.1
Technical data devaiations for FTD				
Description		FTD-Theta SI-1000-120	FTD-Theta SI-1500-240	FTD-Theta SI-2500-400
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Theta SI-1000-120	FTS-Theta SI-1500-240	FTS-Theta SI-2500-400
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.5	1	1
Resolution F_z	[N]	0.5	1	2
Resolution M_x, M_y	[Nm]	0.05	0.1	0.1
Resolution M_z	[Nm]	0.025	0.05	0.1

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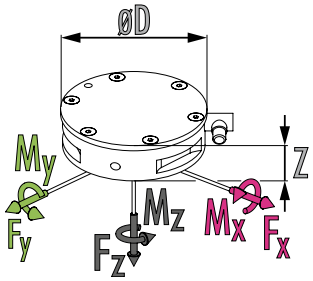
Dimensions and maximum loads



For values see technical data table

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Technical data FTN

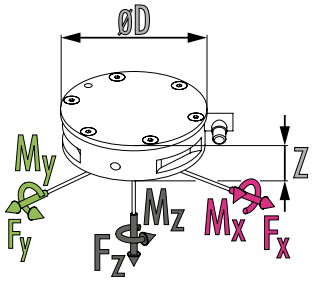
Description		FTN-Omega85 SI-475-20	FTN-Omega85 SI-950-40	FTN-Omega85 SI-1900-80
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	0.658	0.658	0.658
Calibration		SI-475-20	SI-950-40	SI-1900-80
Range of measurement F_x, F_y	[N]	±475	±950	±1900
Range of measurement F_z	[N]	±950	±1900	±3800
Range of measurement M_x, M_y	[Nm]	±20	±40	±80
Range of measurement M_z	[Nm]	±20	±40	±80
Overload F_x, F_y	[N]	±13000	±13000	±13000
Overload F_z	[N]	±27000	±27000	±27000
Overload M_x, M_y	[Nm]	±500	±500	±500
Overload M_z	[Nm]	±610	±610	±610
Resonant frequency F_x, F_y, M_z	[Hz]	2100	2100	2100
Resonant frequency F_z, M_x, M_y	[Hz]	3000	3000	3000
Resolution F_x, F_y	[N]	0.075	0.145	0.285
Resolution F_z	[N]	0.11	0.215	0.43
Resolution M_x, M_y	[Nm]	0.003	0.007	0.015
Resolution M_z	[Nm]	0.002	0.005	0.009
Dimensions Ø D x Z	[mm]	85 x 33.4	85 x 33.4	85 x 33.4
Technical data devaiations for FTD				
Description		FTD-Omega85 SI-475-20	FTD-Omega85 SI-950-40	FTD-Omega85 SI-1900-80
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Omega85 SI-475-20	FTS-Omega85 SI-950-40	FTS-Omega85 SI-1900-80
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.145	0.285	0.575
Resolution F_z	[N]	0.215	0.43	0.86
Resolution M_x, M_y	[Nm]	0.007	0.015	0.03
Resolution M_z	[Nm]	0.005	0.009	0.02

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

FT Omega160

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

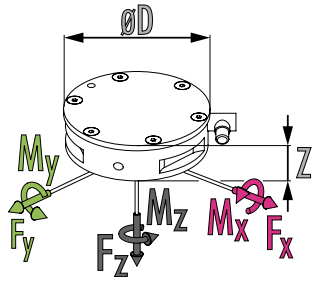
Technical data FTN

Description		FTN-Omega-160 SI-1000-120	FTN-Omega-160 SI-1500-240	FTN-Omega-160 SI-2500-400
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	2.72	2.72	2.72
Calibration		SI-1000-120	SI-1500-240	SI-2500-400
Range of measurement F_x, F_y	[N]	±1000	±1500	±2500
Range of measurement F_z	[N]	±2500	±3750	±6250
Range of measurement M_x, M_y	[Nm]	±120	±240	±400
Range of measurement M_z	[Nm]	±120	±240	±400
Overload F_x, F_y	[N]	±18000	±18000	±18000
Overload F_z	[N]	±48000	±48000	±48000
Overload M_x, M_y	[Nm]	±1700	±1700	±1700
Overload M_z	[Nm]	±1900	±1900	±1900
Resonant frequency F_x, F_y, M_z	[Hz]	1300	1300	1300
Resonant frequency F_z, M_x, M_y	[Hz]	1000	1000	1000
Resolution F_x, F_y	[N]	0.25	0.25	0.5
Resolution F_z	[N]	0.25	0.5	0.75
Resolution M_x, M_y	[Nm]	0.025	0.05	0.05
Resolution M_z	[Nm]	0.015	0.025	0.05
Dimensions Ø D x Z	[mm]	156.5 x 55.9	156.5 x 55.9	156.5 x 55.9
Technical data devaiations for FTD				
Description		FTD-Omega-160 SI-1000-120	FTD-Omega-160 SI-1500-240	FTD-Omega-160 SI-2500-400
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Omega-160 SI-1000-120	FTS-Omega-160 SI-1500-240	FTS-Omega-160 SI-2500-400
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.5	0.5	1
Resolution F_z	[N]	0.5	1	1.5
Resolution M_x, M_y	[Nm]	0.05	0.1	0.1
Resolution M_z	[Nm]	0.025	0.05	0.1

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ft

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data FTN

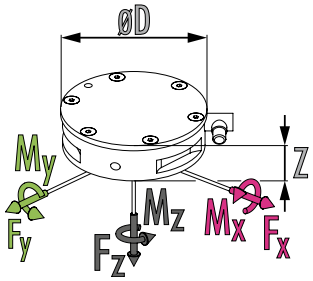
Description		FTN-Omega-191 SI-1800-350	FTN-Omega-191 SI-3600-700	FTN-Omega-191 SI-7200-1400
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	9.41	9.41	9.41
Calibration		SI-1800-350	SI-3600-700	SI-7200-1400
Range of measurement F_x, F_y	[N]	±1800	±3600	±7200
Range of measurement F_z	[N]	±4500	±9000	±18000
Range of measurement M_x, M_y	[Nm]	±350	±700	±1400
Range of measurement M_z	[Nm]	±350	±700	±1400
Overload F_x, F_y	[N]	±36000	±36000	±36000
Overload F_z	[N]	±110000	±110000	±110000
Overload M_x, M_y	[Nm]	±6800	±6800	±6800
Overload M_z	[Nm]	±6800	±6800	±6800
Resolution F_x, F_y	[N]	0.375	0.75	1.5
Resolution F_z	[N]	0.75	1.5	3
Resolution M_x, M_y	[Nm]	0.055	0.105	0.21
Resolution M_z	[Nm]	0.035	0.07	0.14
Dimensions Ø D x Z	[mm]	190 x 64	190 x 64	190 x 64
Technical data devaiations for FTD				
Description		FTD-Omega-191 SI-1800-350	FTD-Omega-191 SI-3600-700	FTD-Omega-191 SI-7200-1400
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Omega-191 SI-1800-350	FTS-Omega-191 SI-3600-700	FTS-Omega-191 SI-7200-1400
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	0.75	1.5	3
Resolution F_z	[N]	1.5	3	6
Resolution M_x, M_y	[Nm]	0.105	0.21	0.42
Resolution M_z	[Nm]	0.07	0.14	0.28

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

FT Omega250

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

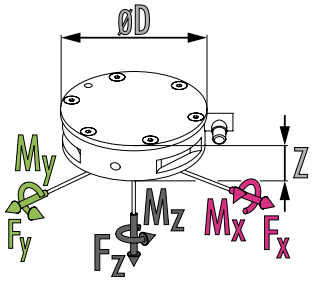
Technical data FTN

Description		FTN-Omega-250 SI-4000-500	FTN-Omega-250 SI-8000-1000	FTN-Omega-250 SI-16000-2000
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	31.8	31.8	31.8
Calibration		SI-4000-500	SI-8000-1000	SI-16000-2000
Range of measurement F_x, F_y	[N]	±4000	±8000	±16000
Range of measurement F_z	[N]	±8000	±16000	±32000
Range of measurement M_x, M_y	[Nm]	±500	±1000	±2000
Range of measurement M_z	[Nm]	±500	±1000	±2000
Overload F_x, F_y	[N]	±160000	±160000	±160000
Overload F_z	[N]	±330000	±330000	±330000
Overload M_x, M_y	[Nm]	±21000	±21000	±21000
Overload M_z	[Nm]	±25000	±25000	±25000
Resonant frequency F_x, F_y, M_z	[Hz]	780	780	780
Resonant frequency F_z, M_x, M_y	[Hz]	770	770	770
Resolution F_x, F_y	[N]	1	2	4
Resolution F_z	[N]	2	4	8
Resolution M_x, M_y	[Nm]	0.125	0.25	0.5
Resolution M_z	[Nm]	0.125	0.25	0.5
Dimensions Ø D x Z	[mm]	295 x 94.9	295 x 94.9	295 x 94.9
Technical data devaiations for FTD				
Description		FTD-Omega-250 SI-4000-500	FTD-Omega-250 SI-8000-1000	FTD-Omega-250 SI-16000-2000
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Omega-250 SI-4000-500	FTS-Omega-250 SI-8000-1000	FTS-Omega-250 SI-16000-2000
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	2	4	8
Resolution F_z	[N]	4	8	16
Resolution M_x, M_y	[Nm]	0.25	0.5	1
Resolution M_z	[Nm]	0.25	0.5	1

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ft

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data FTN

Description		FTN-Omega-331 SI-10000-1500	FTN-Omega-331 SI-20000-3000	FTN-Omega-331 SI-40000-6000
Evaluation via		EtherNet/IP	EtherNet/IP	EtherNet/IP
Weight	[kg]	47	47	47
Calibration		SI-10000-1500	SI-20000-3000	SI-40000-6000
Range of measurement F_x, F_y	[N]	±10000	±20000	±40000
Range of measurement F_z	[N]	±22000	±44000	±88000
Range of measurement M_x, M_y	[Nm]	±1500	±3000	±6000
Range of measurement M_z	[Nm]	±1500	±3000	±6000
Overload F_x, F_y	[N]	±240000	±240000	±240000
Overload F_z	[N]	±520000	±520000	±520000
Overload M_x, M_y	[Nm]	±32000	±32000	±32000
Overload M_z	[Nm]	±36000	±36000	±36000
Resolution F_x, F_y	[N]	2	3	6
Resolution F_z	[N]	4	8	20
Resolution M_x, M_y	[Nm]	0.375	0.75	1.5
Resolution M_z	[Nm]	0.19	0.375	0.75
Dimensions Ø D x Z	[mm]	330 x 107	330 x 107	330 x 107
Technical data devaiations for FTD				
Description		FTD-Omega-331 SI-10000-1500	FTD-Omega-331 SI-20000-3000	FTD-Omega-331 SI-40000-6000
Evaluation via		DAQ	DAQ	DAQ
Technical data deviations for FTS				
Description		FTS-Omega-331 SI-10000-1500	FTS-Omega-331 SI-20000-3000	FTS-Omega-331 SI-40000-6000
Evaluation via		Stand-alone	Stand-alone	Stand-alone
Resolution F_x, F_y	[N]	3	6	15
Resolution F_z	[N]	8	20	33
Resolution M_x, M_y	[Nm]	0.75	1.5	3
Resolution M_z	[Nm]	0.375	0.75	1.5

ⓘ Please note that the dimensions and resolutions of the IP protection versions differ from the basic version.

Precise. Reliable. Robust.

6-Axis Force/Torque Sensor FT-AXIA

Rigid 6-axis force/torque sensor for precision measuring in all six degrees of freedom

Field of Application

Universally applicable in robotic applications such as haptics, medicine, grinding, testing, inserting, and research and development.

Advantages – Your benefits

Compact design due to space-saving set-up with integrated electronics

Two calibrations are available whereby two measurement ranges can be controlled via web interface

Plug & Work directly compatible for KUKA and Universal Robots via software module

Cost saving despite high precision due to optimized manufacturing

Robust design ensures due to a high overload range with protection against damage even with short-term overload

Version with LED display for status display on the sensor without evaluation via the controller

Sizes	Measuring range of force	Measuring range of moment load
Quantity: 1	±200 N	±8 Nm

Functional Description

The strain gauges (DMS) of the 6-axis force/torque sensors measure the strain applied in all six degrees of freedom (F_x, F_y, F_z, M_x, M_y and M_z). The signals of the DMS are evaluated in the sensor and provided.

① **Electronics**
No interfering contour, as integrated in the housing

② **Resistance strain gauges**
Silicon gauges provide a signal 75 times stronger than conventional foil gages. This signal is amplified resulting in near-zero noise distortion.

Detailed Functional Description

The 6-axis force/torque sensor is connected to the control line via the sensor cable. The control line is divided into voltage supply and data transfer. The connection between the controller and sensor is made via EtherNet or EtherCAT depending on the model. The following components are included in the scope of delivery:

1. FT-AXIA
2. Sensor cables
3. Control line

General Notes about the Series

Measuring accuracy: < 2% of the upper limit value of the measuring range at 22 °C

Evaluation via: EtherCAT, EtherNet

Splash water protection: IP64

Housing: Aluminum

Warranty: 12 months

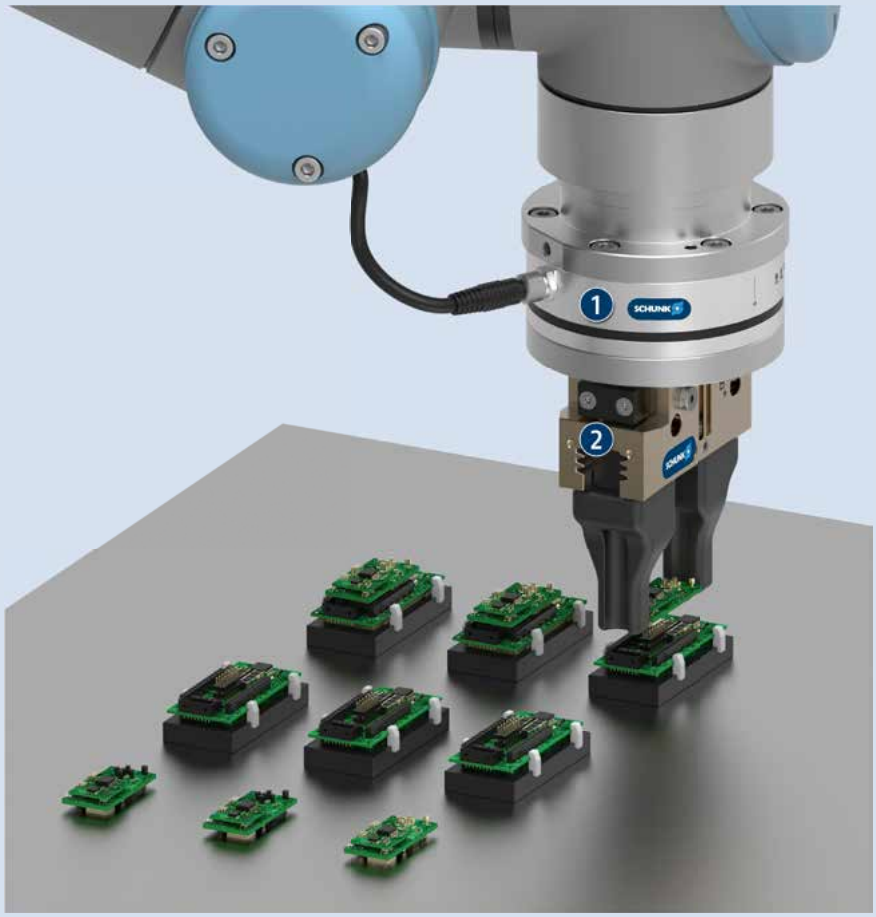
Harsh environmental conditions: Please note that use under harsh environmental conditions (e.g. in the coolant area, cast and grinding dust) can considerably reduce the service life of the units, and we will not take over any warranty. However, in many cases we can find a solution. Please contact us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

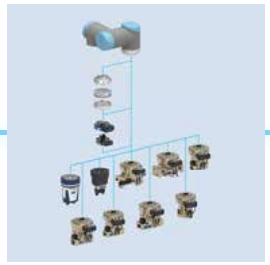
Gripping unit in combination with force/torque sensor for delicate assembly of printed circuit boards

1. 6-axis force/torque sensor FT-AXIA
2. 2-finger parallel gripper PGN-plus-P



SCHUNK offers more ...

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



End-of-Arm modular system for Universal Robots

Manual change system

Quick-change system

Rotary feed-through

Universal gripper

Universal gripper

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

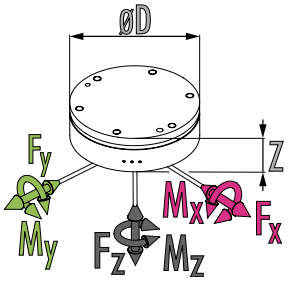
Options and special Information

6-axis force/torque sensor: Strain gauges (DMS) measure the strain applied in all six degrees of freedom (F_x, F_y, F_z, M_x, M_y and M_z). The signals from the DMS are directly processed in the sensor, and are made available as forces and moments via various communication protocols.
Sensor cable: The sensor cable connects the sensor to the control line via a 6-pin M8 connector through an 8-pin M12 connector. The power supply and communication line are integrated into the sensor cable and shielded. The highly flexible sensor line protects the sensor signals against electric fields and mechanical loads.
Control line: The control line is a Y-distribution cable and is connected to the sensor line via an M12 socket. It supplies the sensor with voltage via a 3-pin open wire strand and allows separate communication with the sensor via EtherNet or EtherCAT via an RJ-45 connector, depending on the version.

FT-AXIA 80

Measuring | Force/Torque Sensor

Dimensions and maximum loads



For values see technical data table

ⓘ All forces and torques acting on the sensor must be within the specified measurement range. Exceeding the measurement range will reduce the maximum number of load cycles and may lead to damage of the sensor. Please contact us if your application exceeds the measurement range.

Technical data

Description		FTE-AXIA 80	FTN-AXIA 80
ID		1324514	1324513
Evaluation via		EtherCAT	EtherNet
Sensor cable		4 m, M8 plug on an M12 plug	4 m, M8 plug on an M12 plug
Control line		Y distributor 4 m, M12 plug on RJ-45 plug and 3-pin power supply (open wire strand)	Y distributor 4 m, M12 plug on RJ-45 plug and 3-pin power supply (open wire strand)
Weight	[kg]	0.3	0.3
Calibration 1		SI-200-8	SI-200-8
Range of measurement F_x, F_y	[N]	±200	±200
Range of measurement F_z	[N]	±360	±360
Range of measurement M_x, M_y	[Nm]	±8	±8
Range of measurement M_z	[Nm]	±8	±8
Calibration 2		SI-500-20	SI-500-20
Range of measurement F_x, F_y	[N]	±500	±500
Range of measurement F_z	[N]	±900	±900
Range of measurement M_x, M_y	[Nm]	±20	±20
Range of measurement M_z	[Nm]	±20	±20
Overload F_x, F_y	[N]	±2500	±2500
Overload F_z	[N]	±4500	±4500
Overload M_x, M_y	[Nm]	±100	±100
Overload M_z	[Nm]	±100	±100
Resonant frequency F_x, F_y, M_z	[Hz]	2200	2200
Resonant frequency F_z, M_x, M_y	[Hz]	2600	2600
Resolution F_x, F_y	[N]	0.1	0.1
Resolution F_z	[N]	0.1	0.1
Resolution M_x, M_y	[Nm]	0.005	0.005
Resolution M_z	[Nm]	0.005	0.005
Dimensions Ø D x Z	[mm]	82 x 25.4	82 x 25.4
Kit for Universal Robots			
Description			FTN-AXIA 80-UR
ID			1324512

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/ft-axia

Machining

Product Quickfinder

	Page		Power [W]			Compensation path [mm]		
			0 – 500	500 – 1000	1000 – 1200	0 – 5	5 – 10	10 – 15
Deburring spindle								
Deburring spindle FDB • Flexible in X and Y-axis	270		150 – 1040					±5.1 – ±9.1
Deburring spindle FDB-AC • Flexible in X and Y-axis • 90° design	280		250				±4.1	
Polishing spindle								
Polishing spindle MFT • Axially flexible	286			390				±15

	Recommended compensation path [mm]		Compensation force [N]			Idle speed [RPM]			Product features			Ambient conditions	
	0 - 5	5 - 10	0 - 20	20 - 60	60 - 100	5000 - 20000	20000 - 50000	50000 - 75000	Pneumatic actuation	Radial compensation	Axial compensation	Normal, clean	Slightly dirty
	±2.5 – ±4.8		3.1 – 89				25000 – 65000		●	●		●	●
	±2		1 – 25				30000		●		●	●	●
		±7.5		14 – 74		5600			●		●	●	●

● = Very highly suitable ◐ = Highly suitable ○ = Suitable in customized version

Compliant. Robust. Precise.

Deburring Spindle FDB

Flexible deburring spindle for use in robotic applications

Field of Application

Standard solution for flexible and robot-guided deburring of all sorts of workpieces.

Advantages – Your benefits

Flexible high-frequency spindle for maximum flexibility when deburring

Pneumatically adjustable rigidity of the cutting spindle via compressed air for clean chamfer edges in every installation position

High speeds for high feed rates

Flexible use on the robot arm or as a stationary unit

Axis locking function available to restrict the compensation path on the X-axis.

Sizes
Quantity: 6

Max. speed
25000 .. 65000 RPM

Power
150 .. 1040 W

Functional Description

The drive of the unit is carried out via a pneumatic spindle with a speed up to 65,000 RPM – depending on the module size. The spindle is swivel mounted for being able to maintain the tolerances of the whole machining contour.

The maximum stroke at the milling cutter tip is ±9 mm. The force (rigidity) is needed for moving (oscillating) the spindle. It is controlled by a second air connection. Depending on the pressure, the force on the milling cut surface is between 3.1 N and 89 N.

① **Pneumatic spindle**
High-performance spindle with up to 65,000 RPM

② **Ring cylinder**
For adjusting the contact pressure to the workpiece

③ **Bearing**
To suspend the oscillating pneumatic spindle

④ **Air connection**
For actuation of the ring cylinder

⑤ **Air connection**
With large cross-section for compressed air motor

General Notes about the Series

Mounting: On the robot arm or as a stationary unit

Actuation: Pneumatic, with filtered compressed air (10 microns): dry and non-lubricated

Scope of delivery: Spindle with collet and pneumatic screw connections.

Warranty: 24 months

Ambient conditions: Please note that the unit is not suitable for use in an area where coolants or cutting fluids are present.

Application Example

Robot-guided deburring with change system for spindles

1. Compliant deburring spindle FDB
2. Quick-change system SWS
3. Clamping force block with workpiece

SCHUNK offers more ...

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

Quick-change system

Force/torque sensor

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

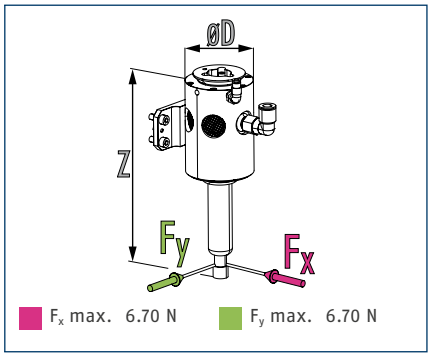
Options and special Information

Universally: Its flexible mounting options mean the FDB deburring spindle is not restricted to use on a robot arm. It can also be used as a fixed tool with a moving workpiece.
Axis locking function: The RS version enables compensation in one direction. This function is integrated in sizes 900 and 1040.

FDB 150

Machining | Deburring Spindle

Dimensions and maximum loads



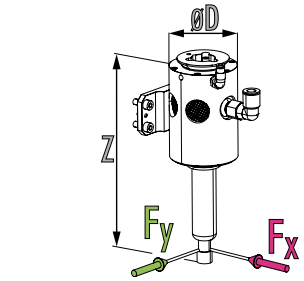
ⓘ The indicated forces show the maximum payload.

Technical data

Description		FDB-150	FDB-150-RS
ID		0322200	0322205
Power	[W]	150	150
Max. compensation X	[mm]	±5	±5
Max. compensation Y	[mm]	±5	0
Axis fixation			Integrated
Recommended compensation path	[mm]	±2.5	±2.5
Min. compensation force	[N]	3.1	3.1
Max. compensation force	[N]	6.7	6.7
Min. compensating pressure	[bar]	1.4	1.4
Max. compensation pressure	[bar]	4.1	4.1
Idle speed	[RPM]	65000	65000
Operating pressure	[bar]	6.2	6.2
Noise emission	[dB(A)]	<78	<78
Idle air consumption	[l/s]	1.4	1.4
Stalled air consumption	[l/s]	3.8	3.8
Collet diameter	[mm]	3	3
Weight	[kg]	1.11	1.11
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z	[mm]	82.6 x 193.7	82.6 x 193.7

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fdb

Dimensions and maximum loads



F_x max. 42.30 N F_y max. 42.30 N

ⓘ The indicated forces show the maximum payload.

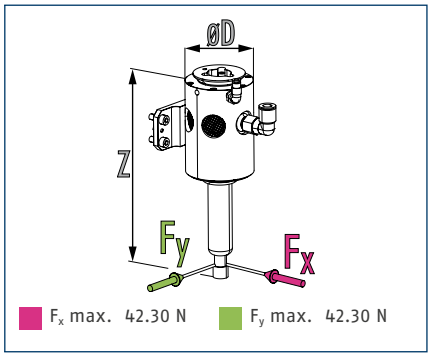
Technical data

Description		FDB-300
ID		0322202
Power	[W]	300
Max. compensation X	[mm]	±7.5
Max. compensation Y	[mm]	±7.5
Axis fixation		
Recommended compensation path	[mm]	±3.8
Min. compensation force	[N]	12.7
Max. compensation force	[N]	42
Min. compensating pressure	[bar]	0.3
Max. compensation pressure	[bar]	4.1
Idle speed	[RPM]	30000
Operating pressure	[bar]	6.2
Noise emission	[dB(A)]	<78
Idle air consumption	[l/s]	5.6
Stalled air consumption	[l/s]	10.2
Collet diameter	[mm]	6
Weight	[kg]	1.15
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	72.6 x 226.4

FDB 340

Machining | Deburring Spindle

Dimensions and maximum loads



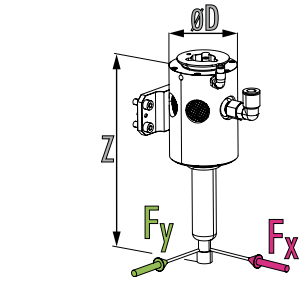
ⓘ The indicated forces show the maximum payload.

Technical data

Description		FDB-340	FDB-340-RS
ID		0322201	0322208
Power	[W]	340	340
Max. compensation X	[mm]	±7.5	±5.5
Max. compensation Y	[mm]	±7.5	0
Axis fixation			Integrated
Recommended compensation path	[mm]	±3.8	±2.8
Min. compensation force	[N]	12.7	9.8
Max. compensation force	[N]	42	38.3
Min. compensating pressure	[bar]	0.3	0.3
Max. compensation pressure	[bar]	4.1	4.1
Idle speed	[RPM]	40000	40000
Operating pressure	[bar]	6.2	6.2
Noise emission	[dB(A)]	<78	<78
Idle air consumption	[l/s]	5.6	5.6
Stalled air consumption	[l/s]	10.2	10.2
Collet diameter	[mm]	6	6
Weight	[kg]	1.15	1.13
Min./max. ambient temperature	[°C]	5/60	5/60
Dimensions Ø D x Z	[mm]	72.6 x 226.4	72.6 x 226.4

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fdb

Dimensions and maximum loads



F_x max. 42.30 N F_y max. 42.30 N

ⓘ The indicated forces show the maximum payload.

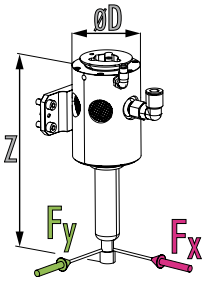
Technical data

Description		FDB-660
ID		0322203
Power	[W]	660
Max. compensation X	[mm]	±9
Max. compensation Y	[mm]	±9
Axis fixation		
Recommended compensation path	[mm]	±4.5
Min. compensation force	[N]	18.4
Max. compensation force	[N]	45
Min. compensating pressure	[bar]	0.3
Max. compensation pressure	[bar]	4.1
Idle speed	[RPM]	40000
Operating pressure	[bar]	6.2
Noise emission	[dB(A)]	<78
Idle air consumption	[l/s]	9.4
Stalled air consumption	[l/s]	17.9
Collet chuck		ER-11
Collet diameter	[mm]	6
Weight	[kg]	2.22
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	101.2 x 261.3

FDB 900

Machining | Deburring Spindle

Dimensions and maximum loads



F_x max. 89.00 N F_y max. 89.00 N

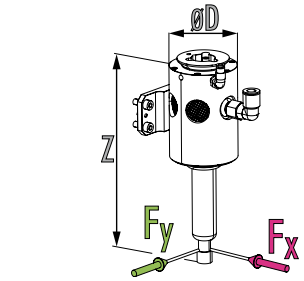
ⓘ The indicated forces show the maximum payload.

Technical data

Description		FDB-900
ID		0322240
Power	[W]	900
Max. compensation X	[mm]	±9
Max. compensation Y	[mm]	±9
Axis fixation		Optionally via adjustment screws
Recommended compensation path	[mm]	±4.5
Min. compensation force	[N]	28.9
Max. compensation force	[N]	86.7
Min. compensating pressure	[bar]	1
Max. compensation pressure	[bar]	4.1
Idle speed	[RPM]	25000
Operating pressure	[bar]	6.2
Noise emission	[dB(A)]	<78
Idle air consumption	[l/s]	9
Stalled air consumption	[l/s]	19
Collet chuck		ER-11
Collet diameter	[mm]	6
Weight	[kg]	3.4
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	107.2 x 272.2

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fdb

Dimensions and maximum loads



F_x max. 89.00 N F_y max. 89.00 N

ⓘ The indicated forces show the maximum payload.

Technical data

Description		FDB-1040
ID		0322245
Power	[W]	1040
Max. compensation X	[mm]	±9
Max. compensation Y	[mm]	±9
Axis fixation		Optionally via adjustment screws
Recommended compensation path	[mm]	±4.5
Min. compensation force	[N]	28.9
Max. compensation force	[N]	86.7
Min. compensating pressure	[bar]	1
Max. compensation pressure	[bar]	4.1
Idle speed	[RPM]	40000
Operating pressure	[bar]	6.2
Noise emission	[dB(A)]	<78
Idle air consumption	[l/s]	9
Stalled air consumption	[l/s]	19
Collet chuck		ER-11
Collet diameter	[mm]	6
Weight	[kg]	4.53
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	107.2 x 272.2

Compliant. Reliable. Flexible.

Deburring Spindle FDB-AC

Flexible deburring spindle for use in robotic applications

Field of Application

Standard solution for flexible and robot-guided deburring of all sorts of workpieces.

Advantages – Your benefits

Flexible high-frequency spindle for maximum flexibility when deburring

Pneumatically adjustable rigidity of the cutting spindle via compressed air for clean chamfer edges in every installation position

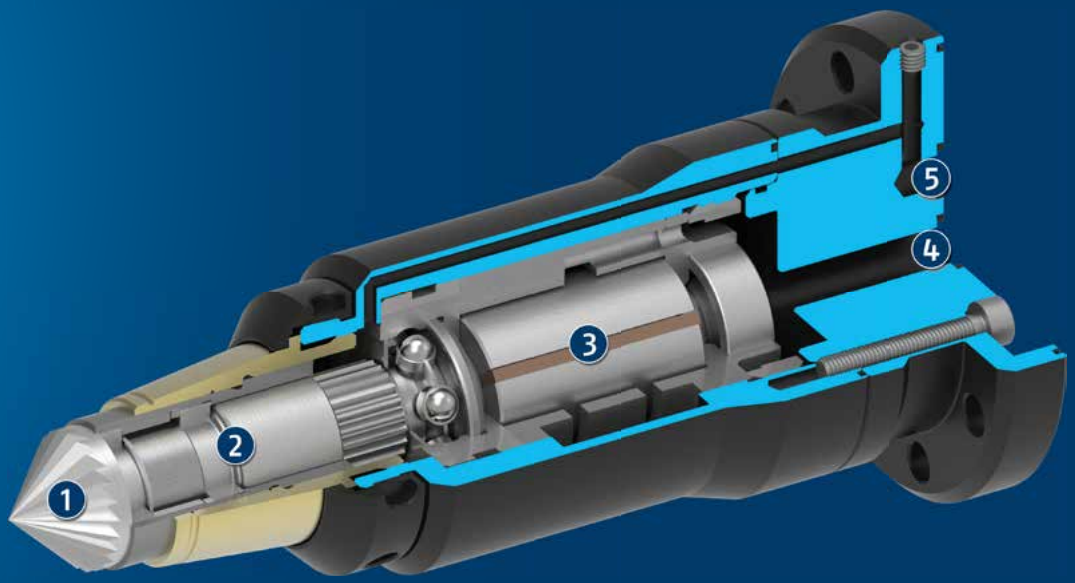
High speeds for high feed rates

Flexible use on the robot arm or as a stationary unit

Sizes	Max. speed	Power
Quantity: 2	25000 .. 30000 RPM	250 W

Functional Description

The unit is driven by a pneumatic spindle in straight and 90° version at a speed up to 30,000 RPM. For being able to follow the tolerances of the machining contour, the spindle is axially seated.
The maximum distance at the milling cutter tip amounts to ±9 mm. The force (rigidity) is needed for moving the spindle (axially). It is controlled by a second air connection. Depending on the pressure, the force on the milling cut surface is between 1 N and 25 N.



① **Milling cutter**
Conical 90° for optimum deburring

② **Compensation piston**
For adjusting the contact pressure to the workpiece

③ **Pneumatic spindle**
High performance spindle with up to 30,000 RPM

④ **Pneumatic connection for the spindle**
With large cross-section for compressed air motor

⑤ **Pneumatic connection for the compensation**
Adjustable rigidity of the spindle via oiled compressed air

General Notes about the Series

Mounting: On the robot arm or as a stationary unit

Actuation: Pneumatic, via oiled compressed air

Scope of delivery: Clamping tool and milling cutters

Warranty: 24 months

Ambient conditions: Please note that the unit is not suitable for use in an area where coolants or cutting fluids are present.

Application Example

Robot-guided deburring of connecting rod cast parts with change for the spindle

1. Quick-change system SWS
2. Flexible deburring spindle FDB-AC
3. Clamping force block

SCHUNK offers more ...

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

Quick-change system

Manual change system

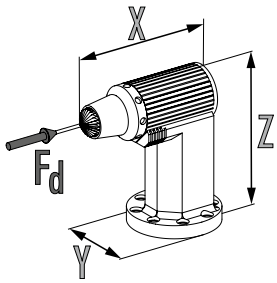
Force/torque sensor

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

FDB-AC 90

Machining | Deburring Spindle

Dimensions and maximum loads



F_d max. 25.00 N

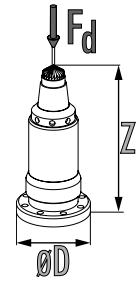
ⓘ The indicated forces show the maximum payload.

Technical data

Description		FDB-AC-90
ID		0322206
Power	[W]	250
Max. compensation path	[mm]	±4.1
Recommended compensation path	[mm]	±2
Min. compensation force	[N]	1
Max. compensation force	[N]	25
Min. compensating pressure	[bar]	1
Max. compensation pressure	[bar]	3
Idle speed	[RPM]	25000
Operating pressure	[bar]	6.2
Noise emission	[dB(A)]	<87
Idle air consumption	[l/min]	396
Weight	[kg]	0.5
Min./max. ambient temperature	[°C]	5/60
Dimensions X x Y x Z	[mm]	98 x 54 x 91.05

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/fdb-ac

Dimensions and maximum loads



F_d max. 25.00 N

ⓘ The indicated forces show the maximum payload.

Technical data

Description		FDB-AC-180
ID		0322207
Power	[W]	250
Max. compensation path	[mm]	±4.1
Recommended compensation path	[mm]	±2
Min. compensation force	[N]	1
Max. compensation force	[N]	25
Min. compensating pressure	[bar]	1
Max. compensation pressure	[bar]	3
Idle speed	[RPM]	30000
Operating pressure	[bar]	6.2
Noise emission	[dB(A)]	<87
Idle air consumption	[l/min]	396
Weight	[kg]	0.51
Min./max. ambient temperature	[°C]	5/60
Dimensions Ø D x Z	[mm]	54 x 118.6

Productive. Compliant. Robust.

Polishing Spindle MFT

Compliant polishing spindle for use on a robot

Field of Application

Standard solution for flexible and robot-guided polishing of various workpieces and for different surfaces.

Advantages – Your benefits

Flexible high-frequency spindle for maximum flexibility when polishing

Adjustable stiffness of the spindle via compressed air for smooth surfaces in every application

High speeds for high feed rates

Sensor system optional for retracted/extended stroke and speed monitoring

Sizes	Max. speed	Power
Quantity: 1	5600 RPM	390 W

Functional Description

The tool mounting of the MFT is used for clamping steel brushes, grinding and cup wheels, polishing brushes, deburring cutters and similar tools for surface finishing. The contact pressure against the tool is controlled by the air pressure, and can be between 14 N (at 0.34 bar) and 74 N (at 4.1 bar).

The MFT is also optimal for uneven surfaces since it can compensate in the axial direction up to 15 mm while still applying a constant application pressure. This force control guarantees high stiffness perpendicular to the surface and the desired compensation in the machining direction.

① **Tool mounting**
For different tool diameters

② **Dust cover**
Protects the bearings from contamination

③ **Pneumatic spindle**
High performance spindle with up to 5600 RPM

④ **Bearing**
For compensation of the pneumatic spindle

⑤ **Silencer**
For exhaust air

General Notes about the Series

Mounting: On the robot arm or as a stationary unit

Actuation: Pneumatically, via dried, filtered and preferably oiled compressed air

Warranty: 24 months

Ambient conditions: Please note that the unit is not suitable for use in an area where coolants or cutting fluids are present.

Application Example

Robot-guided polishing with change system for spindles

1. Polishing spindle MFT
2. Quick-change system SWS
3. Clamping force block

SCHUNK offers more ...

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

Quick-change system

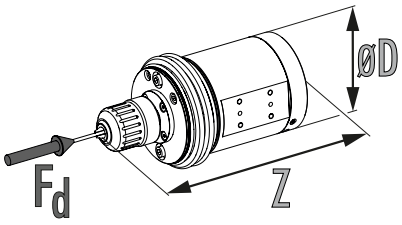
Manual change system

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

MFT 390

Machining | Polishing Spindle

Dimensions and maximum loads



For values see technical data table

ⓘ The indicated forces show the maximum payload.

Technical data

Description		MFT-390-F-0-0	MFT-390-F-R-0	MFT-390-F-0-T	MFT-390-F-R-T
ID		0322250	0322251	0322252	0322253
Forward sensor		Yes	Yes	Yes	Yes
Retract sensor		No	Yes	No	Yes
Tachometer sensor		No	No	Yes	Yes
Recommended compensation path	[mm]	±4.5	±4.5	±4.5	±4.5
Max. compensation path	[mm]	±7.7	±7.7	±7.7	±7.7
Weight	[kg]	3.3	3.3	3.3	3.3
Compliance force at 0.35 bar	[N]	9.7	9.7	9.7	9.7
Compliance force at 4.1 bar	[N]	45	45	45	45
Idle speed	[RPM]	5600	5600	5600	5600
Noise emission	[dB(A)]	<75	<75	<75	<75
Speed under load	[RPM]	2600	2600	2600	2600
Power at 2600 RPM	[W]	390	390	390	390
Starting torque	[Nm]	1.4	1.4	1.4	1.4
Nominal torque	[Nm]	2.7	2.7	2.7	2.7
Operating pressure	[bar]	6.2	6.2	6.2	6.2
Idle air consumption	[l/s]	9	9	9	9
Clamping diameter	[mm]	9.5	9.5	9.5	9.5
Dimensions Ø D x Z	[mm]	94.9 x 202.7	94.9 x 202.7	94.9 x 202.7	94.9 x 202.7

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/mft

Modular. Flexible. Easy.

End-of-Arm Modular System for Universal Robots

The modular gripping system consists of electrically and pneumatically controlled grippers, quick-change modules, and force/torque sensors that are specifically adapted to robot arms from Universal Robots.

Field of Application

The gripper should be used in a clean environment, particularly in automated assembly.

Advantages – Your benefits

Comprehensive modular system consisting of grippers, change system and force/torque sensor for fast and easy entry into automation

Pre-assembled gripping unit with robot interface therefore no mounting kits or external valves required

Plug & Work with the interfaces to match Universal Robots

UR plug-in installation modules included in the scope of delivery for fast and easy commissioning

Up to 36 combination possibilities cover all automation applications

Functional Description

The components of the modular system are prepared for mechanic and electric direct connection to the Universal Robots sizes 3, 5, and 10. The pneumatic gripping units additionally include integrated micro valves, meaning no external valves are required.

① **FT-AXIA 80**
6-axis force/torque sensor

② **SHS 50**
Manual change system

③ **Co-act EGP-C 40**
Collaborating gripper for small components

④ **EGP 40**
Electric gripper for small components

⑤ **KGG 100-80**
Pneumatic long-stroke gripper

⑥ **PSH 22-1**
Pneumatic long-stroke gripper

⑦ **JGP 80-1**
Pneumatic universal gripper

⑧ **JGP 100-1**
Pneumatic universal gripper

⑨ **PGN-plus-P 80-1**
Pneumatic universal gripper

⑩ **PGN-plus-P 100-1**
Pneumatic universal gripper

⑪ **PZN-plus 64**
Pneumatic centric gripper

General Notes about the Series

Gripping force: Is the arithmetic sum of the individual force applied to each jaw at distance P (see illustration)

Finger length: The maximum permissible finger length applies until the nominal operating pressure is achieved. With higher pressures, the finger length must be reduced proportionally to the nominal operating pressure.

Repeat accuracy: Is defined as a distribution of the end position for 100 consecutive strokes.

Actuation: Control via digital I/O

Scope of delivery: USB stick with plug-in installation module are included in the scope of delivery.
Assembly and operating manual with declaration of incorporation.
Pre-assembled units

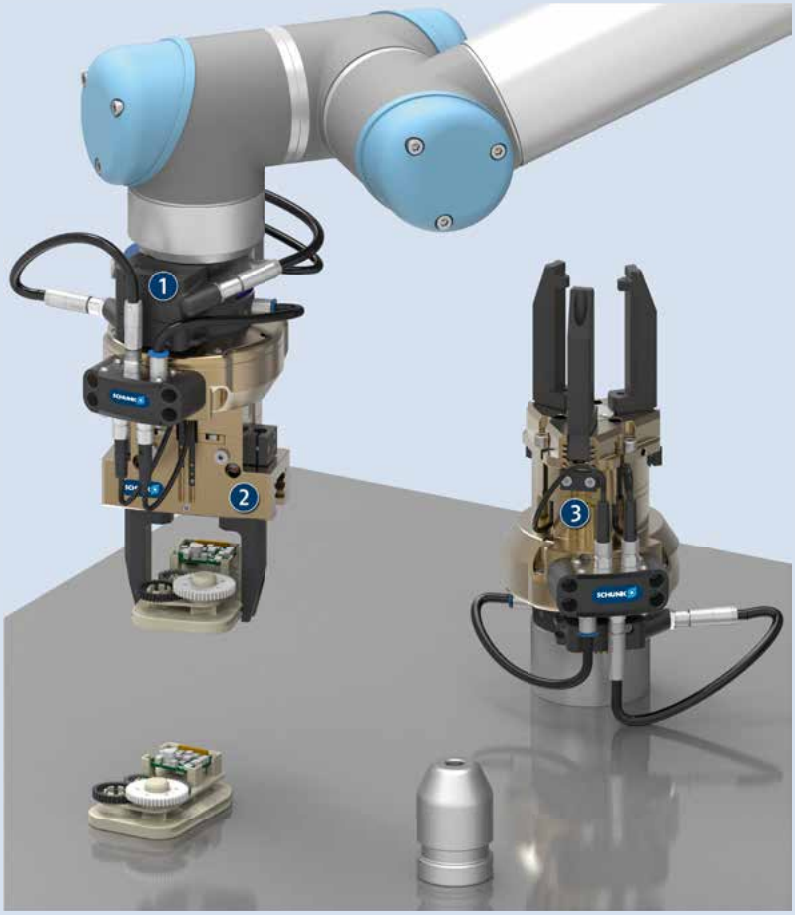
Workpiece weight: Is calculated for force-fit gripping with a coefficient of static friction of 0.1 and a safety factor of 2 against workpiece slippage at acceleration due to gravity g. For form-fit or capture gripping, there are significantly higher permissible workpiece weights.

Closing and opening times: Are purely the times that the base jaws or fingers are in motion. Valve switching times, hose fill times, or PLC reaction times are not included, and are to be considered when cycle times are calculated.

Application Example

End-of-Arm gripping units for Universal Robots for flexible handling of various workpieces. By combining change system and gripping unit, the gripper can be exchanged to suit the workpiece.

1. Manual change system SHS
2. 2-finger parallel gripper PGN-plus-P
3. 3-finger centric gripper PZN-plus



SCHUNK offers more ...

The following components make the product End-of-Arm modular system for Universal Robots even more productive – the suitable addition for the highest functionality, flexibility, reliability, and controlled production.

Universal intermediate jaw

Jaw quick-change system

Finger blank

Finger blank with jaw quick-change system

Attachment fingers

ⓘ Further information on these products can be found on the following product pages or at schunk.com. Please contact us: SCHUNK technical hotline +49-7133-103-2696

End-of-Arm Modular System

Technical data

Description		Co-act EGP-C 40-N-N-URID	EOA-UR3510-EGP 40	EOA-UR3510-KGG 100-80	EOA-UR3510-PSH 22-1	EOA-UR3510-JGP 80-1	EOA-UR3510-JGP 100-1
ID		1326455	1320370	1327748	1327747	1348129	1348128
Function		Gripping	Gripping	Gripping	Gripping	Gripping	Gripping
Robot compatibility		UR 3/5/10	UR 3/5/10	UR 3/5/10	UR 3/5/10	UR 3/5/10	UR 3/5/10
Standard components		Co-act EGP-C 40-N-N-URID	EGP 40	KGG 100-80	PSH 22-1	JGP 80-1	JGP 100-1
Stroke per jaw	[mm]	6	6	40	28	8	10
Max. gripping force	[N]	140	140	175	320	415	660
Weight	[kg]	0.6	0.7	1.2	1.7	1.33	1.72
Recommended workpiece weight	[kg]	0.7	0.7	0.9	1.6	2.1	3.3

Description		EOA-UR3510-PGN-plus-P 80-1	EOA-UR3510-PGN-plus-P 100-1	EOA-UR3510-PZN-plus 64-1	EOA-UR3510-FTN-AXIA 80	EOA-UR3510-SHK-050	EOA-UR3510-SHA-050
ID		1327751	1327750	1327749	1357169	1334788	1334789
Function		Gripping	Gripping	Gripping	Measuring	Changing	Changing
Robot compatibility		UR 3/5/10	UR 3/5/10	UR 3/5/10	UR 3/5/10	UR 3/5/10	UR 3/5/10
Standard components		PGN-plus-P 80-1	PGN-plus-P 100-1	PZN-plus 64-1	FT-AXIA 80	SHS 50	SHS 50
Stroke per jaw	[mm]	8	10	6			
Max. gripping force	[N]	550	870	580			
Weight	[kg]	1.38	1.8	1.22	0.51	0.35	0.14
Recommended workpiece weight	[kg]	2.75	4.35	2.9		11	11
Max. dynamic bending moment M_x/ M_y	[Nm]					25	25
Max. dynamic bending moment M_z	[Nm]					45	45
Min. measuring range F_x, F_y	[N]				200		
Max. measuring range F_x, F_y	[N]				500		
Min. measuring range F_z	[N]				360		
Max. measuring range Fz	[N]				900		
Min. moment measuring range	[Nm]				8		
Max. moment measuring range	[Nm]				20		

ⓘ You can find more technical values in the catalog chapter for the respective standard component.
If you combine a Co-act EGP-C 40 with a force/torque sensor, a cable extension, ID 1339964 is required.
If you combine an EGP 40 with a force/torque sensor, the adapter plates ID 1355667 and a cable extension ID 1339964 are required. For a combination of an EGP 40 with a change-system, an adapter plate IF 1355667 is required.

More detailed, up-to-date information on the SCHUNK product including drawings, CAD data, and operating manuals are available online at: schunk.com/eoa-ur

Index

Robot Accessories

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Competent and skilled personnel ensure optimal availability of your SCHUNK products, and make sure that their value will be maintained.

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- Fast supply of original spare parts
- Reduction of down-times
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- Fast and trouble-free

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- Avoiding unplanned failures of workholding and toolholding equipment

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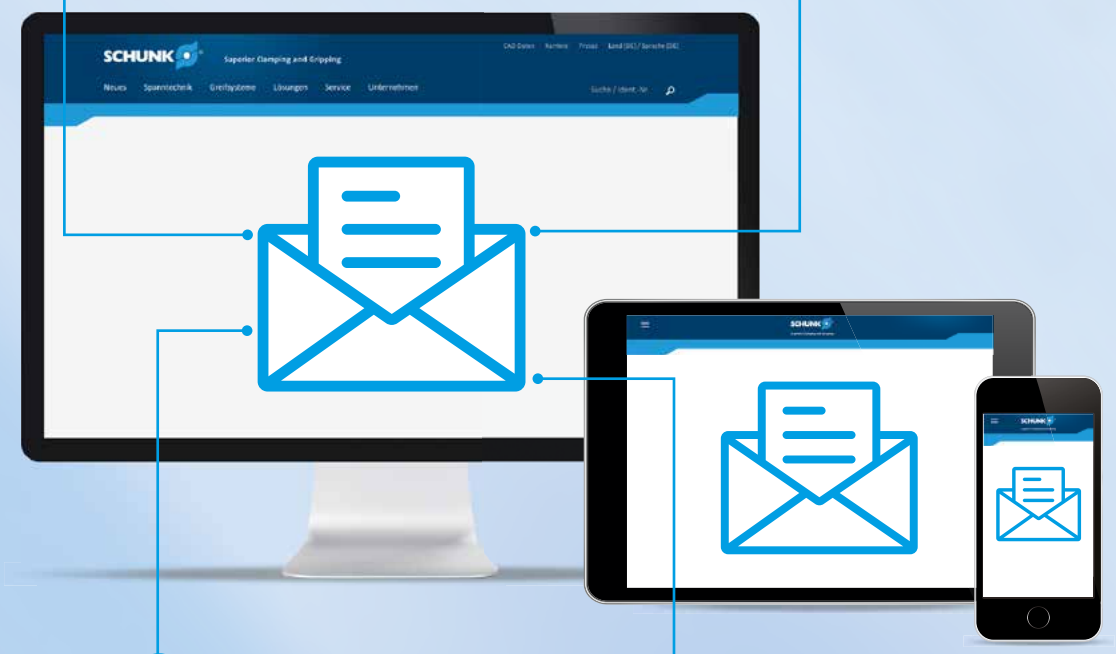

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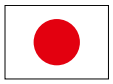

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No. 1

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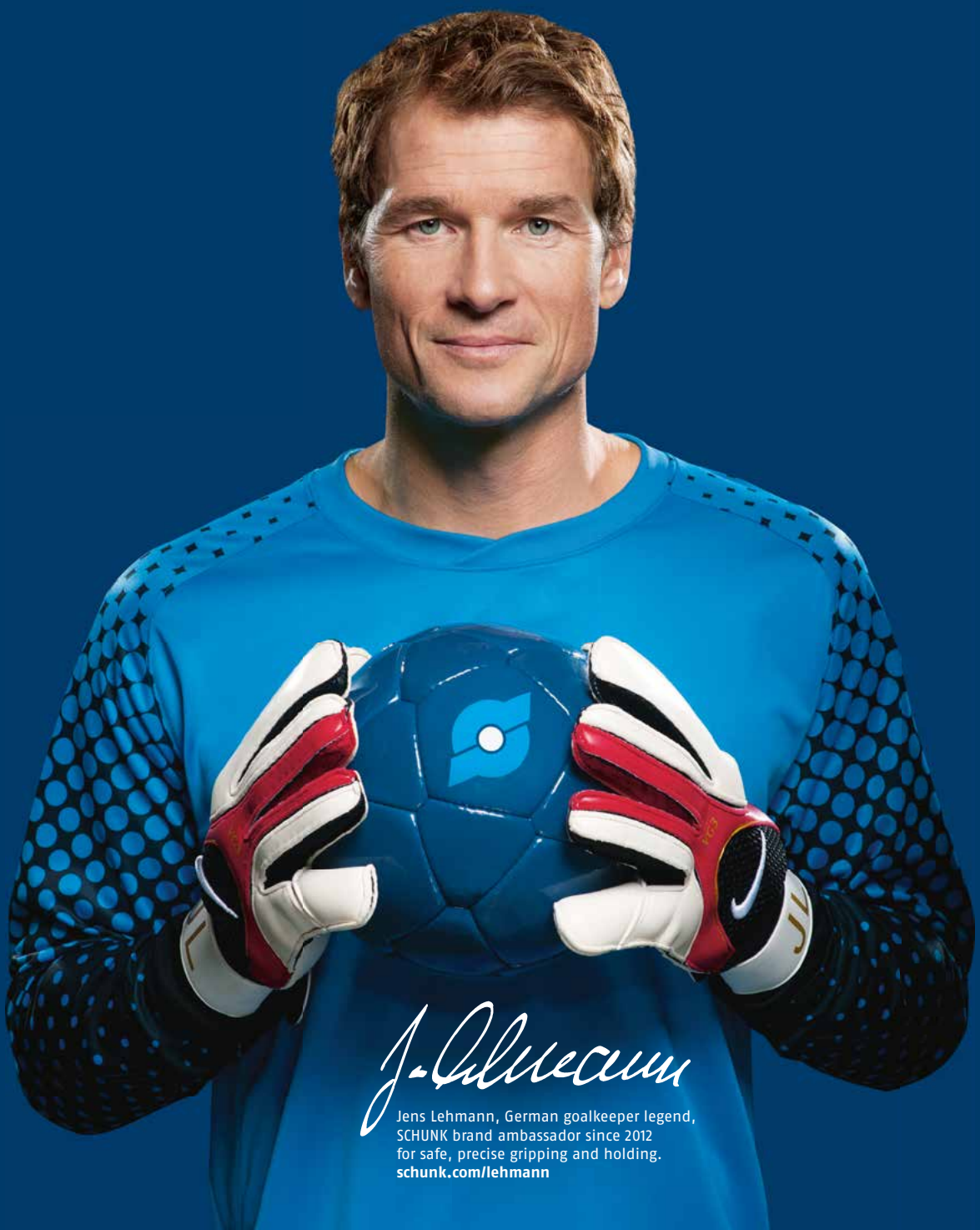

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