Assembly and operating manual

SG

Stacking gripper

Superior Clamping and Gripping

SCHUNK

Imprint

Technical changes:

We reserve the right to make alterations for the purpose of technical improvement.

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Dear Customer,

thank you for trusting our products and our family-owned company, the leading technology supplier of robots and production machines.

Our team is always available to answer any questions on this product and other solutions. Ask us questions and challenge us. We will find a solution!

Best regards,

Your SCHUNK team

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1 General

1.1 About this manual

This manual contains important information for a safe and appropriate use of the product.

This manual is an integral part of the product and must be kept accessible for the personnel at all times.

Before starting work, the personnel must have read and understood this operating manual. Prerequisite for safe working is the observance of all safety instructions in this manual.

Illustrations in this manual are provided for basic understanding and may differ from the actual product design.

In addition to these instructions, the documents listed under Applicable documents [▶ 6] are applicable.

1.1.1 Presentation of Warning Labels

To make risks clear, the following signal words and symbols are used for safety notes.

⚠ DANGER

Danger for persons!

Non-observance will inevitably cause irreversible injury or death.

⚠ WARNING

Dangers for persons!

Non-observance can lead to irreversible injury and even death.

⚠ CAUTION

Dangers for persons!

Non-observance can cause minor injuries.

NOTICE

Material damage!

Information about avoiding material damage.

1.1.2 Applicable documents

- General terms of business*
- Catalog data sheet of the purchased product *
- Assembly and operating manual of the gripper *

The documents marked with an asterisk (*) can be downloaded on our homepage **schunk.com**

1.2 Warranty

If the product is used as intended, the warranty is valid for 24 months from the ex-works delivery date under the following conditions:

- Observe the specified maintenance and lubrication intervals
- Observe the ambient conditions and operating conditions

Parts touching the workpiece and wear parts are not included in the warranty.

1.3 Scope of delivery

The scope of delivery includes

- Stacking gripper SG in the version ordered
- Assembly and Operating Manual
- Accessory pack

1.4 Sealing kit

Contents of the sealing kit, Assembly drawing [▶ 24].

ID.-No. of the seal kit

Seal kit for	ID number
SG 47	5520617

2 Basic safety notes

2.1 Intended use

The product is designed exclusively for gripping and temporarily holding workpieces or objects.

- The product may only be used within the scope of its technical data, Technical data [▶ 14].
- When implementing and operating components in safety-related parts of the control systems, the basic safety principles in accordance with DIN EN ISO 13849-2 apply. The proven safety principles in accordance with DIN EN ISO 13849-2 also apply to categories 1, 2, 3 and 4.
- The product is intended for installation in a machine/system. The applicable guidelines must be observed and complied with.
- The product is intended for industrial and industry-oriented use.
- Appropriate use of the product includes compliance with all instructions in this manual.

2.2 Not intended use

It is not intended use if the product is used, for example, as a pressing tool, stamping tool, lifting gear, guide for tools, cutting tool, clamping device or a drilling tool.

- Any utilization that exceeds or differs from the appropriate use is regarded as misuse.

2.3 Constructional changes

Implementation of structural changes

By conversions, changes, and reworking, e.g. additional threads, holes, or safety devices can impair the functioning or safety of the product or damage it.

- Structural changes should only be made with the written approval of SCHUNK.

2.4 Spare parts

Use of unauthorized spare parts

Using unauthorized spare parts can endanger personnel and damage the product or cause it to malfunction.

- Use only original spare parts or spares authorized by SCHUNK.

2.5 Gripper fingers

Requirements for the gripper fingers

Stored energy within the product creates the risk of serious injuries and significant property damage.

- Arrange the gripper fingers in a way that the product reaches either the position "open" or "closed" in a de-energized state.
- Only exchange the gripper fingers when no residual energy remains in the product.
- Make sure that the product and the top jaws are a sufficient size for the application.

2.6 Ambient conditions and operating conditions

Required ambient conditions and operating conditions

Incorrect ambient and operating conditions can make the product unsafe, leading to the risk of serious injuries, considerable material damage and/or a significant reduction to the product's life span.

- Make sure that the product is used only in the context of its defined application parameters, Technical data [▶ 14].
- Make sure that the product is a sufficient size for the application.
- Make sure that the environment is free from splash water and vapors as well as from abrasion or processing dust. Exceptions are products that are designed especially for contaminated environments.

2.7 Personnel qualification

Inadequate qualifications of the personnel

If the personnel working with the product is not sufficiently qualified, the result may be serious injuries and significant property damage.

- All work may only be performed by qualified personnel.
- Before working with the product, the personnel must have read and understood the complete assembly and operating manual.
- Observe the national safety regulations and rules and general safety instructions.

The following personal qualifications are necessary for the various activities related to the product:

Trained electrician	Due to their technical training, knowledge and experience, trained electricians are able to work on electrical systems, recognize and avoid possible dangers and know the relevant standards and regulations.
Qualified personnel	Due to its technical training, knowledge and experience, qualified personnel is able to perform the delegated tasks, recognize and avoid possible dangers and knows the relevant standards and regulations.
Instructed person	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
Service personnel of the manufacturer	Due to its technical training, knowledge and experience, service personnel of the manufacturer is able to perform the delegated tasks and to recognize and avoid possible dangers.

2.8 Personal protective equipment

Use of personal protective equipment

Personal protective equipment serves to protect staff against danger which may interfere with their health or safety at work.

- When working on and with the product, observe the occupational health and safety regulations and wear the required personal protective equipment.
- Observe the valid safety and accident prevention regulations.
- Wear protective gloves to guard against sharp edges and corners or rough surfaces.
- Wear heat-resistant protective gloves when handling hot surfaces.
- Wear protective gloves and safety goggles when handling hazardous substances.
- Wear close-fitting protective clothing and also wear long hair in a hairnet when dealing with moving components.

2.9 Notes on safe operation

Incorrect handling of the personnel

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Avoid any manner of working that may interfere with the function and operational safety of the product.
- Use the product as intended.
- Observe the safety notes and assembly instructions.
- Do not expose the product to any corrosive media. This does not apply to products that are designed for special environments.
- Eliminate any malfunction immediately.
- Observe the care and maintenance instructions.
- Observe the current safety, accident prevention and environmental protection regulations regarding the product's application field.

2.10 Transport

Handling during transport

Incorrect handling during transport may impair the product's safety and cause serious injuries and considerable material damage.

- When handling heavy weights, use lifting equipment to lift the product and transport it by appropriate means.
- Secure the product against falling during transportation and handling.
- Stand clear of suspended loads.

2.11 Malfunctions

Behavior in case of malfunctions

- Immediately remove the product from operation and report the malfunction to the responsible departments/persons.
- Order appropriately trained personnel to rectify the malfunction.
- Do not recommission the product until the malfunction has been rectified.
- Test the product after a malfunction to establish whether it still functions properly and no increased risks have arisen.

2.12 Disposal

Handling of disposal

The incorrect handling of disposal may impair the product's safety and cause serious injuries as well as considerable material and environmental harm.

- Follow local regulations on dispatching product components for recycling or proper disposal.

2.13 Fundamental dangers

General

- Observe safety distances.
- Never deactivate safety devices.
- Before commissioning the product, take appropriate protective measures to secure the danger zone.
- Disconnect power sources before installation, modification, maintenance, or calibration. Ensure that no residual energy remains in the system.
- If the energy supply is connected, do not move any parts by hand.
- Do not reach into the open mechanism or movement area of the product during operation.

2.13.1 Protection during handling and assembly

Incorrect handling and assembly

Incorrect handling and assembly may impair the product's safety and cause serious injuries and considerable material damage.

- Have all work carried out by appropriately qualified personnel.
- For all work, secure the product against accidental operation.
- Observe the relevant accident prevention rules.
- Use suitable assembly and transport equipment and take precautions to prevent jamming and crushing.

Incorrect lifting of loads

Falling loads may cause serious injuries and even death.

- Stand clear of suspended loads and do not step into their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.

2.13.2 Protection during commissioning and operation

Falling or violently ejected components

Falling and violently ejected components can cause serious injuries and even death.

- Take appropriate protective measures to secure the danger zone.
- Never step into the danger zone during operation.

2.13.3 Protection against dangerous movements

Unexpected movements

Residual energy in the system may cause serious injuries while working with the product.

- Switch off the energy supply, ensure that no residual energy remains and secure against inadvertent reactivation.
- Never rely solely on the response of the monitoring function to avert danger. Until the installed monitors become effective, it must be assumed that the drive movement is faulty, with its action being dependent on the control unit and the current operating condition of the drive. Perform maintenance work, modifications, and attachments outside the danger zone defined by the movement range.
- To avoid accidents and/or material damage, human access to the movement range of the machine must be restricted. Limit/ prevent accidental access for people in this area due through technical safety measures. The protective cover and protective fence must be rigid enough to withstand the maximum possible movement energy. EMERGENCY STOP switches must be easily and quickly accessible. Before starting up the machine or automated system, check that the EMERGENCY STOP system is working. Prevent operation of the machine if this protective equipment does not function correctly.

3 Technical data

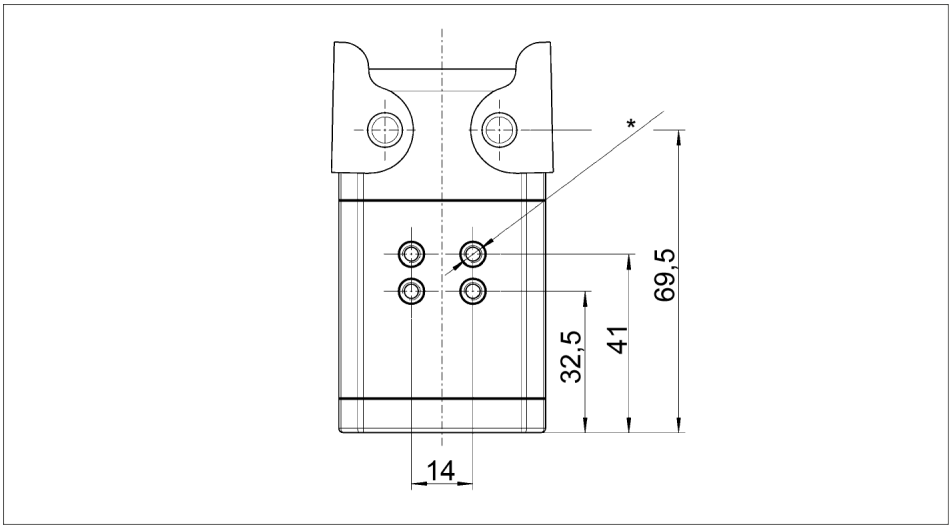
Description	Value
Noise emission [dB(A)]	≤ 70
Pressure medium	Compressed air, compressed air quality according to ISO 8573-1:7 4 4
Min. pressure [bar]	4.0
Max. pressure [bar]	6.5
Nominal working pressure [bar]	6.0
Opening angle per jaw [°]	17.5
About rake angle per jaw up to [°]	1
Closing torque [Nm]	0.95
Weight [kg]	0.41
Recommended workpiece weight [kg]	0.11
Air consumption per double stroke [cm3]	2.8
Closing time [s]	0.02
Opening time [s]	0.02
Max. permissible finger length [mm]	50
Max. permitted weight per finger [kg]	0.07
IP rating	69K
Ambient temperature [°C] Min. Max.	 -10 90
Repeatability [mm]	0.1

More technical data is included in the catalog data sheet. Whichever is the latest version.

4 Assembly and installation

4.1 Assembly

The gripper is fastened by means of the four M4 threads positioned at the side.



NOTE

All flat gaskets used in the SG 47 gripper have FDA approval (reg. no. 21 CFR 177.1550). The manufacturer of the flat gaskets is responsible for the correct material composition, function and certification.

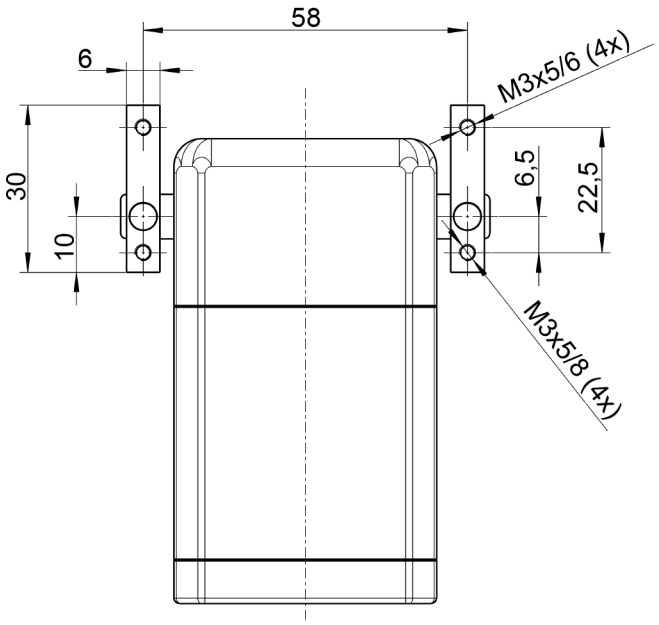
The wipers used on the gripper fingers also have FDA approval (§ 177.2500, CFR 21, »Rubber Articles Intended for Repeated Use« of the Food and Drug Administration (FDA), USA). The manufacturer of the wipers is responsible for the correct material composition, function and certification.

All cover caps installed on the gripper comply with the Code of Federal Regulations, Vol. 21, § 177.2470 »Polyoxymethylene copolymer«, § 178.2010 »Antioxidants and Stabilizers« of the FDA/USA. The manufacturer of the cover caps is responsible also here for the correct material composition, function and certification.

The gripper housing has FDA approval. The composition corresponds to the "Food Contact Notification (FCN)" number 40 "Polyphenylene Sulfide Polymers" of the American Food and Drug Administration (FDA, 21 CFR 178.3297 "Colorants for polymers“, ...) of Effective Premarket Notifications for Food and Contact Substances (FCS)":

4.2 Special connection dimensions

Top jaws can be manufactured order specifically for the customer. They are fastened by means of the two M3 threads on the four fingers.



NOTE

To connect the top jaws to the gripper fingers, we recommend using a flat gasket of PTFE with FDA approval to rule out any hazards due to germs settling and spreading between the gripper fingers and top jaws.

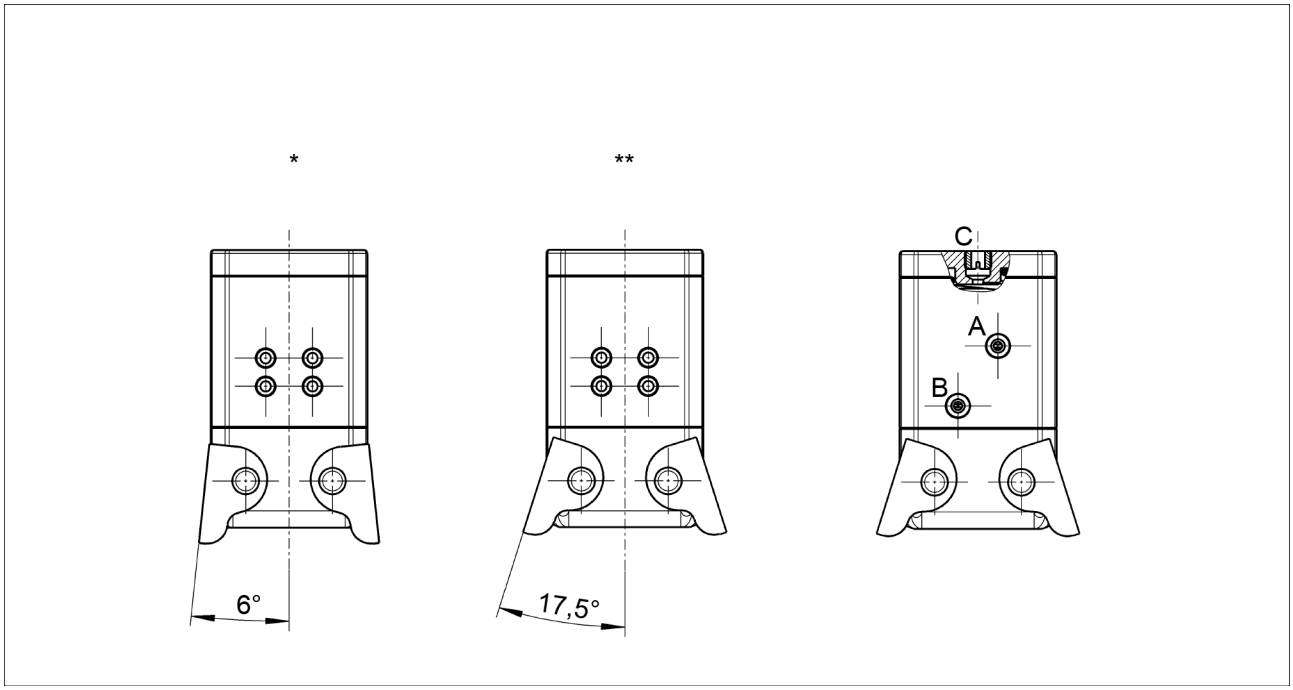
4.3 Start-up

NOTE

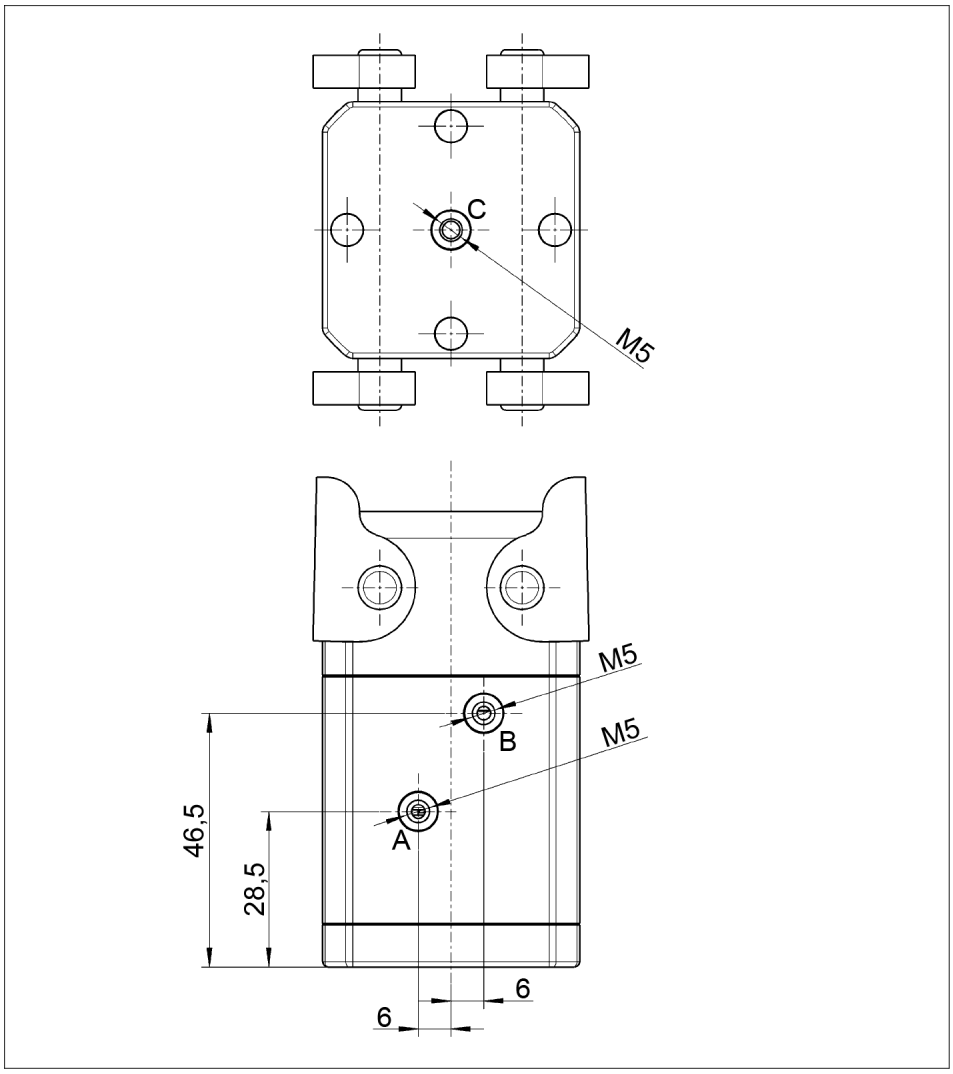
The quick air relief valve must not be attached directly to the gripper to prevent contamination of the food.

Observe the minimum requirement for compressed air quality according to DIN ISO 8573-1.

- The SG 47 collection gripper can perform two different stokes.
- Aerate air connection C on the base side and air connection B at the side and de-aerate air connection A at the side. The gripper's opening angle is 6° per finger.
- In the next step, aerate air connection A at the side and de-aerate air connection B. The gripper's opening angle is 17.5° per finger.
- In order for the gripper to return to its initial position, de-aerate air connections A and C and aerate connection B.



5 Function and handling



The gripper has three M5 air connections to perform two different strokes.

- Stroke 1 → Opening angle of 6° per finger
- Stroke 2 → Opening angle of 17.5° per finger

The gripper is closed via compressed air connection B.

6 Maintenance

6.1 Notes

Original spare parts

Use only original spare parts of SCHUNK when replacing spare and wear parts.

All the seals should be replaced each time maintenance is performed on the gripper Sealing kit [▶ 6].

The complete sealing kit can be ordered from SCHUNK.

Unless specified otherwise, secure all screws and nuts with Loctite no. 243 and tighten them with a tightening torque according to DIN. Loctite no. 243 is registered at the NSF (category code: P1, NSF registration no. 123000). The manufacturer of Loctite no. 243 is responsible for the correct material composition, function and certification.

NOTE

Separate conditions apply with regard to cleaning and maintenance for application in the food industry.

6.2 Maintenance and lubrication intervals

NOTICE

Material damage due to hardening lubricants!

Lubricants harden more quickly at temperatures above 60°C, leading to possible product damage.

- Reduce the lubricant intervals accordingly.

Size	47
Interval (million cycles)	30

6.3 Disassembly of the module

Position of the item numbers Assembly drawing [▶ 24]

- Remove the pressure lines.
- Remove the cover cap (38) and unscrew the set-screw (26).
- Pull the finger (14) off the bolt (7).
- Remove the cover cap (37) and unscrew the screws (23).
- Remove the bottom (11).
- Carefully take out the O-ring (32) and flat gasket (13).
- Pull out the piston (9) with the Z8 seals (35) to the rear.
- Carefully loosen the screw (22).
- Remove the piston (10) with Z8 seal (34).
- Loosen the screw (21) and also pull out the washer (27).
- Remove the cylinder (2) and carefully loosen the flat gasket (13).
- Pull the guide bushing (8) with O-ring (12) to the rear.
- Remove the piston rod (6) and loosen the countersunk screw (24) to allow the strip (5) to be removed.
- Remove the set-screw (25) and take the joint (4) out of the housing (1).
- Carefully push out the bolt (7) and remove the wiper (33).
- Clean all parts thoroughly. Interior parts must not come into contact with cleaning agents used in the food area.
- Check all seals according to the sealing kit Sealing kit [▶ 6]. The complete sealing kit can be ordered from Schunk.

6.4 Servicing and assembling the module

Maintenance

- Clean all parts thoroughly and check for damage and wear.
- Treat all greased areas with lubricant. Recommended types of lubricating grease for the food industry [▶ 23]

- Oil or grease bare external steel parts.
- Replace all wear parts / seals.
  - Position of the wearing parts Assembly drawing [▶ 24]
  - Seal kit Sealing kit [▶ 6]

Assembly

Assembly takes place in the opposite order to disassembly.
Observe the following:

- Unless otherwise specified, secure all screws and nuts with Loctite no. 243 and tighten with the appropriate tightening torque.
- Make sure the individual components are clean for the assembly. No foreign substances must adhere to the parts. This also applies when mounting the gripper to an adapter plate provided by the customer and when flange-mounting top jaws provided by the customer onto the gripping fingers. Clean and disinfect the gripper each time after maintenance.

6.5 Daily cleaning in the food industry

- Faultless continuous operation can only be ensured if the SG 47 gripper is constantly kept clean with impeccable hygiene.
- The gripper should usually be disinfected each time before cleaning (see cleaning agent recommendation in the appendix).
- Disinfectants must not come into contact with food, neither directly nor indirectly. Flush the device therefore with clear water after disinfecting it.

NOTICE

Do not add any aggressive solvents!

6.6 Cleaning the gripper in the food industry

Clean the gripper with a cloth and warm water after using it. Stubborn or encrusted dirt must be soaked. Drying residues should be avoided. Dry residues prolong the cleaning measures or make them more difficult.

To prevent material damage, only approved products may be used. Water hardness layers are to be removed as soon as possible. For this purpose, distribute a cleaning agent, if possible as foam, on the surface to be cleaned. Then remove the loosened dirt with warm water. Make sure you flush thoroughly after cleaning (see cleaning agent recommendation in the appendix). We recommend using low-pressure foam systems (< = 25 bar). Low pressure also prevents the development of aerosols and therefore recontamination of cleaned surfaces

6.7 Recommended cleaning agents for the food industry

NOTE

A cleaning plan and other details can be found in the appendix.

The cleaning agent manufacturers in the appendix are responsible for the chemical composition and function of their cleaning agents. The cleaning agents are only recommendations; the material compatibility and hygiene regulations must be checked by the customer if other cleaning agents are used.

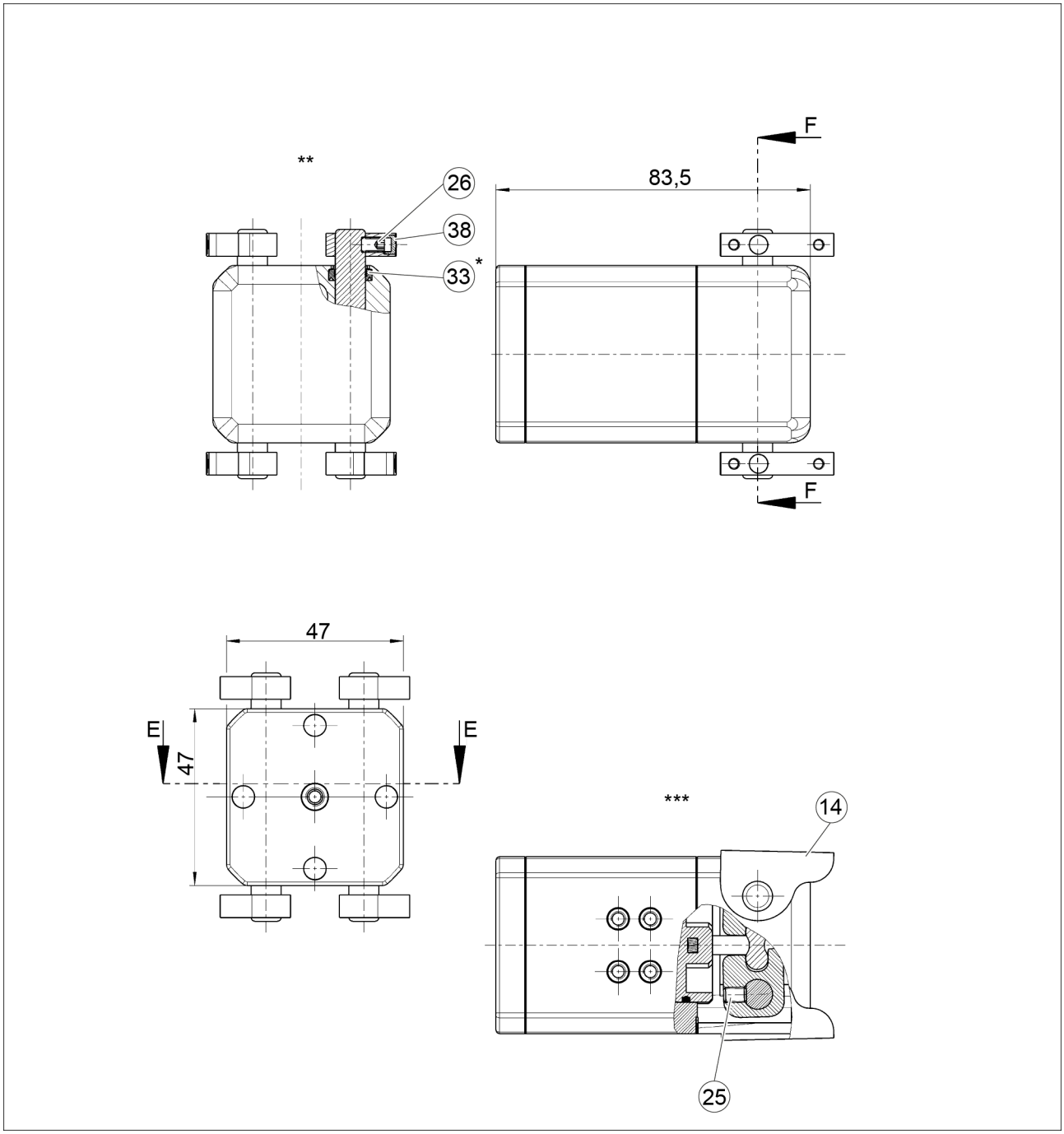
6.8 Recommended types of lubricating grease for the food industry

All individual components moved in the gripper are greased with a synthetic lubricant, Klübersynth UH1 14-222. Klübersynth UH1 14-222 has been developed for the special demands on lubricating grease of the food and pharmaceutical industry. It fulfills the provisions of the German Food and Consumer Goods Act (LFBG, § 5 paragraph 1, § 31 paragraph 1), as well as DIN V 10517 "Food-Processing Lubricants" and meets the American requirements "Guidelines of sec. 21 CRF §178.3570 of FDA regulations". Quality: H1 approval; the manufacturer is responsible for the correct material composition, function and certification of the lubricating grease.

6.9 Maintenance in the food industry

The SG 47 gripper is designed for a long life.
However, if it still needs repair, please contact our service department or our head office directly.

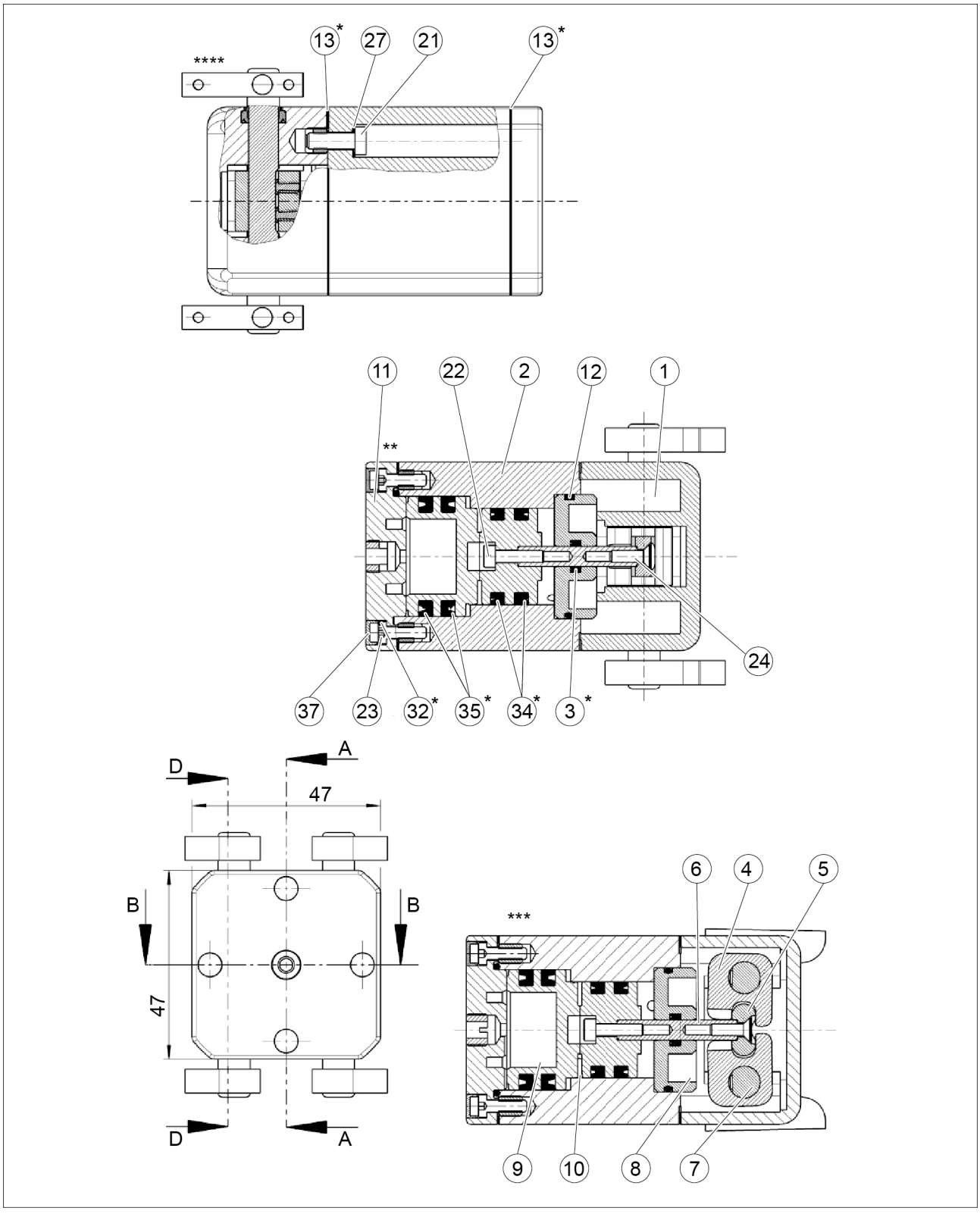
6.10 Assembly drawing



* Wearing part, replace during maintenance.
Included in the seal kit. Seal kit can only be ordered completely.

** Section F-F

*** Section E-E



* Wearing part, replace during maintenance. Included in the seal kit. Seal kit can only be ordered completely.

** Section A-A

*** Section B-B

**** Section D-D

7 Appendix - Cleaning agent recommendation

⚠ WARNING

Cleaning agents and disinfectants must under no circumstances be mixed together!

Never mix acids and chlorine alkali as this produces poisonous chlorine gas.

JohnsonDiversey
Clean is just the beginning

Cleaning agent	Use	Product characteristics
Acifoam* (VF 10)	3-5% and exposure time of max. 10-15 min. Rinse object with clear water and clean with low pressure. Frequency of use: Weekly or as needed	Acidic foam cleaner – decalcifier for the food and beverage as well as dairy industry.
Diverfoam SMS HD* (VF 22)	3-5% and exposure time of max. 10-15 min. Rinse object with clear water and clean with low pressure. Frequency of use: Daily	Highly effective foam cleaner – nonferrous metal-proof, without silicate for the food and beverage as well as dairy industry.
Diverfoam SMS Chlorine* (VF 18)	3-5% and exposure time of max. 10-15 min. Rinse object with clear water and clean with low pressure. Frequency of use: Daily	Chlorine-containing silicate-free foam cleaner, nonferrous metal-proof – for the food and beverage as well as dairy industry.
Suredis* (VT 1)	0.5-2% and exposure time of max. 30 min. Rinse object with clear water and clean with low pressure. Frequency of use: Daily	Surface-active large surface disinfectant, environmentally friendly, DVG-listed for the food and beverage as well as diary industry.
Divosan Forte* (VT 6)	0.25-2% and exposure time of max. 30 min. Rinse object with clear water and clean with low pressure. Frequency of use: Daily	Acidic disinfectant on the basis of a 15% peracetic acid – DVG listed for the food and beverage as well as dairy industry.

* A detailed description of the cleaning agents can be requested from the cleaning agent manufacturer or directly from SCHUNK.

Material compatibility certificate

JohnsonDiversey
Clean is just the beginning

Mallaustraße 50-56
68219 Mannheim

Hereby certifies that a material compatibility test has been conducted with components of the SG 47

SCHUNK
Schunk GmbH & Co. KG
Spann- und Greiftechnik
Bahnhofstraße 106-134
D-74348 Lauffen/Neckar

In the cleaning agents and disinfectants listed below.

Procedure

The specimens listed below were submerged for 14 days at room temperature in 5% application solutions. The evaluation was performed visually and through weight changes. A volumetric analysis is not possible because of the small size.

Cleaning agents and disinfectants

Acifoam	Acidic foam cleaner - decalcifier
Diverfoam SMS HD	Highly effective foam cleaner, nonferrous metal-proof, without silicate
Diverfoam SMS Chlorine	Chlorine-containing, silicate-free, foam cleaner, nonferrous metal-proof
Divosan forte	Acidic disinfectant on the basis of a 15% peracetic acid. DVG listed.
Suredis	Surface-active large-area disinfectant, environmentally friendly. DVG listed.

Specimen description

- Wiper (red) of polyurethane (FDA approved), 94 Shore A
- Plastic specimen of PPS HPV
- Ensat sleeves A2

Result:

The material compatibility of the tested equipment components subjected to the cleaning agents and disinfectants under the above application conditions is to be given a positive rating.

ECOLAB

Recommended ECOLAB product range for the gripper SG 47

The following products can be used for low pressure foam processes / manual cleaning and disinfection.

Cleaning agent	Use	Product characteristics
P3-sterile **	ND-R or M	Combined cleaning agent and disinfectant for manual cleaning tasks, mildly alkaline
P3-topactive LA**	ND-R	Cleaning agent for TFC processes*, mildly alkaline
P3-topax 19**	ND-R	Cleaning agent for foam processes and manual cleaning tasks, alkaline
P3-topax 56**	ND-R	Cleaning agent for foam processes, acidic, contains Zn and Al inhibitors
Pe-topax 66**	ND-R	Cleaning agent with microbicide properties for foam processes (tough contaminations!), alkaline, contains active chlorine
P3-alcodes**	PD	Disinfectant for spray processes – ready to use, neutral
P3-topax 99**	ND-D	Disinfectant for spray and foam processes, mildly alkaline

* TFC process: Modified foam process
(TFC = Thin Film Cleaning) where an increased viscosity is achieved through dilution with water applied to application concentration
ND-R = Low pressure foam process cleaning
ND-D = Low pressure foam process disinfection
M = Manual cleaning
PD = Disinfection during break times

** A detailed description of the cleaning agents can be requested from the cleaning agent manufacturer or directly from SCHUNK.

Ecolab GmbH & Co. OHG
P.O. Box 13 04 06
D-40551 Düsseldorf

Hereby certifies that a material compatibility test was conducted for

Schunk GmbH & Co. KG
Spann- und Greiftechnik

Bahnhofstraße 106-134
D-74348 Lauffen/Neckar

Using the following agents:

Cleaning agent/disinfectants P3-alcodes, P3-steril, P3-topactive LA, P3-topax 19, P3-topax 56, P3-topax 66, P3-topax 99 as well as demineralized water as zero value.

The material compatibility of the tested components/materials

- Wiper (red) of polyurethane (FDA approved), 94 Shore A
- Plastic specimen of PPS HPV
- Ensat sleeves A2

To the P3 products used in the test under the application conditions specified below is to be rated positive.

Ecolab GmbH & Co. OHG

i.V.
Thomas Tyborski

i. V.
Reimund Laaff

Recommended Kärcher product range for the gripper SG 47

Cleaning agent	Use	Product characteristics
RM 734*	Loose dirt, to be removed by sweeping with broom or picking up with vacuum cleaner. Spray or foam the soiled object with FS 2000 prespray device or foam lance and RM 734. Concentration of 5% and exposure time of max. 30 min. Rinse object with clear water and clean with low pressure.	Disinfectant
RM 735*	Loose dirt, to be removed by sweeping with broom or picking up with vacuum cleaner. Spray or foam the soiled object with FS 2000 prespray device or foam lance and RM 735. Concentration of 5% and exposure time of max. 30 min. Rinse object with clear water and clean with low pressure.	Disinfectant
RM 57*	Loose dirt, to be removed by sweeping with broom or picking up with vacuum cleaner. Spray or foam the soiled object with FS 2000 prespray device or foam lance and RM 57. Rinse object with clear water and clean with low pressure.	Foam cleaner (neutral) For oil, grease and protein deposits
RM 58*	Loose dirt, to be removed by sweeping with broom or picking up with vacuum cleaner. Spray or foam the soiled object with FS 2000 prespray device or foam lance and RM 58. Concentration of 5% and exposure time of max. 30 min. Rinse object with clear water and clean with low pressure.	Foam cleaner (alkaline) for oil, grease, soot, protein deposit, sugar glazing
RM 59*	Loose dirt, to be removed by sweeping with broom or picking up with vacuum cleaner. Spray or foam the soiled object with FS 2000 prespray device or foam lance and RM 59. Concentration of 5% and exposure time of max. 30 min. Rinse object with clear water and clean with low pressure.	Foam cleaner (acidic) for mineral soiling: Limestone, beerstone, tartar, etc.

* A detailed description of the cleaning agents can be requested from the cleaning agent manufacturer or directly from SCHUNK.

KÄRCHER

Material compatibility

Of components of gripper SG 47

Procedure:
Respective device-dependent specimens are submerged into a cleaning agent solution (concentration of 5%) at a room temperature of 22-23 °C.
After a residence time of 30 minutes the specimens are removed, rinsed with clear water and dried.

Analysis: Visible damage is assessed according to the following aspects:
Discoloration, corrosion, brittling and swelling.
The untreated original component serves as reference.

Structure of the specimen after rinsing and drying	Material compatibility max. 100 %
No visible damage, swelling or discoloration	100
Slight corrosion discernible, only partial, no more than 10% of the surface, no discoloration, brittling or swelling	80
Slight corrosion discernible, only partial, no more than 30% of the surface, very slight discoloration, no brittling or swelling	60
Medium corrosion discernible, partial, no more than 60% of the surface, medium discoloration, slight brittling or swelling visible.	failed
Corrosion discernible, more than 60% of the surface damaged. Heavy discoloration, brittling or swelling visible.	failed

Cleaner:
RM 57 (5%) Foam cleaner, neutral
RM 58 (5%) Foam cleaner, alkaline
RM 59 (5%) Foam cleaner, acidic
RM 734 (5%) Foam disinfectant cleaner, alkaline with active chlorine
RM 735 (5%) Disinfectant with quaternary ammonium compound bases. DVG and DGHM listed.

Sample:
The material compatibility of the tested components/materials:

- Wiper (red) of polyurethane (FDA approved), 94 Shore A
- Plastic specimen of PPS HPV
- Ensat sleeves A2

Is evaluated as positive compared to the Kärcher products tested.
Conclusion:
The products RM 57/ RM 58/ RM 59/ RM 734 and RM 735 can be used for the cleaning of the above-mentioned components provided that the concentration, exposure time and procedure described for these products is adhered to.

Note

No final 100% statement can be made on the material resistance of the components for the tested cleaning agents. Since the material is subject to a constant aging process and, furthermore, tension, vibrations and fluctuations in temperature may occur during the operation of the device. This circumstance may have a negative effect on the material resistance in combination with cleaning agents.

Kärcher hereby certifies that for

SCHUNK GmbH & Co. KG
Spann- und Greiftechnik

Bahnhofstr. 106-134
D-74348 Lauffen/Neckar, Germany,

a material resistance test has been performed with the cleaning agents/disinfectants specified above.

8 Translation of original declaration of incorporation

in terms of the Directive 2006/42/EG, Annex II, Part 1.B of the European Parliament and of the Council on machinery.

Manufacturer/ Distributor	SCHUNK GmbH & Co. KG Spann- und Greiftechnik Bahnhofstr. 106 – 134 D-74348 Lauffen/Neckar

We hereby declare that on the date of the declaration the following partly completed machine complied with all basic safety and health regulations found in the directive 2006/42/EC of the European Parliament and of the Council on machinery. The declaration is rendered invalid if modifications are made to the product.

Product designation:	Stacking gripper / SG / hydraulic
ID number	0312970 ... 0312979

The partly completed machine may not be put into operation until conformity of the machine into which the partly completed machine is to be installed with the provisions of the Machinery Directive (2006/42/EC) is confirmed.

Applied harmonized standards, especially:

EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction

The manufacturer agrees to forward on demand the relevant technical documentation for the partly completed machinery in electronic form to national authorities.

The relevant technical documentation according to Annex VII, Part B, belonging to the partly completed machinery, has been created.

Person authorized to compile the technical documentation:
Robert Leuthner, Address: see manufacturer's address

Signature: see original declaration

Lauffen/Neckar, June 2019

p.p. Ralf Winkler, Manager for development of gripping system components

9 Annex to Declaration of Incorporation

according 2006/42/EG, Annex II, No. 1 B

1.Description of the essential health and safety requirements pursuant to 2006/42/EC, Annex I that are applicable and that have been fulfilled with:

Product designation	Stacking gripper
Type designation	SG
ID number	0312970 ... 0312979

To be provided by the System Integrator for the overall machine		⇓
Fulfilled for the scope of the partly completed machine	⇓	
Not relevant	⇓	

1.1	**Essential Requirements**			
1.1.1	Definitions		X	
1.1.2	Principles of safety integration		X	
1.1.3	Materials and products		X	
1.1.4	Lighting		X	
1.1.5	Design of machinery to facilitate its handling		X	
1.1.6	Ergonomics		X	
1.1.7	Operating positions			X
1.1.8	Seating			X

1.2	**Control Systems**			
1.2.1	Safety and reliability of control systems		X	
1.2.2	Control devices		X	
1.2.3	Starting		X	
1.2.4	Stopping		X	
1.2.4.1	Normal stop		X	
1.2.4.2	Operational stop		X	
1.2.4.3	Emergency stop		X	
1.2.4.4	Assembly of machinery		X	
1.2.5	Selection of control or operating modes		X	
1.2.6	Failure of the power supply			X

1.3	**Protection against mechanical hazards**			
1.3.1	Risk of loss of stability			X
1.3.2	Risk of break-up during operation			X
1.3.3	Risks due to falling or ejected objects			X
1.3.4	Risks due to surfaces, edges or angles		X	
1.3.5	Risks related to combined machinery			X

1.3	Protection against mechanical hazards			
1.3.6	Risks related to variations in operating conditions			X
1.3.7	Risks related to moving parts		X	
1.3.8	Choice of protection against risks arising from moving parts			X
1.3.8.1	Moving transmission parts		X	
1.3.8.2	Moving parts involved in the process			X
1.3.9	Risks of uncontrolled movements			X

1.4	Required characteristics of guards and protective devices			
1.4.1	General requirements			X
1.4.2	Special requirements for guards			X
1.4.2.1	Fixed guards			X
1.4.2.2	Interlocking movable guards			X
1.4.2.3	Adjustable guards restricting access			X
1.4.3	Special requirements for protective devices			X

1.5	Risks due to other hazards			
1.5.1	Electricity supply		X	
1.5.2	Static electricity		X	
1.5.3	Energy supply other than electricity		X	
1.5.4	Errors of fitting		X	
1.5.5	Extreme temperatures			X
1.5.6	Fire			X
1.5.7	Explosion			X
1.5.8	Noise			X
1.5.9	Vibrations			X
1.5.10	Radiation	X		
1.5.11	External radiation	X		
1.5.12	Laser radiation	X		
1.5.13	Emissions of hazardous materials and substances			X
1.5.14	Risk of being trapped in a machine	X		
1.5.15	Risk of slipping, tripping or falling	X		
1.5.16	Lightning			X

1.6	Maintenance			
1.6.1	Machinery maintenance		X	
1.6.2	Access to operating positions and servicing points		X	
1.6.3	Isolation of energy sources		X	
1.6.4	Operator intervention		X	
1.6.5	Cleaning of internal parts		X	

1.7	**Information**			
1.7.1	Information and warnings on the machinery		X	
1.7.1.1	Information and information devices		X	
1.7.1.2	Warning devices		X	
1.7.2	Warning of residual risks		X	
1.7.3	Marking of machinery	X		
1.7.4	Instructions	X		
1.7.4.1	General principles for the drafting of instructions	X		
1.7.4.2	Contents of the instructions	X		
1.7.4.3	Sales literature	X		

	The classification from Annex 1 is to be supplemented from here forward.			
2	Supplementary essential health and safety requirements for certain categories of machinery			X
2.1	Foodstuffs machinery and machinery for cosmetics or pharmaceutical products			X
2.2	Portable hand-held and/or guided machinery			X
2.2.1	Portable fixing and other impact machinery			X
2.3	Machinery for working wood and material with similar physical characteristics			X
3	Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery		X	
4	Supplementary essential health and safety requirements to offset hazards due to lifting operations		X	
5	Supplementary essential health and safety requirements for machinery intended for underground work			X
6	Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons		X	