

Dear customer,

Congratulations!

You have chosen the best product we know how to make with our 30 years of experience and passion for precision.

Please follow the instructions in this manual to avoid mistakes and save time.

In case you need further information or you have further requests we will be glad to be at your disposal.

With best regards,

Your GRIP GmbH

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Auto Connector

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1 Operation

The Auto Connector is a mechanical tool changing system. The locking and unlocking mechanism is activated through the robots own movement. The system does not require an additional energy source.

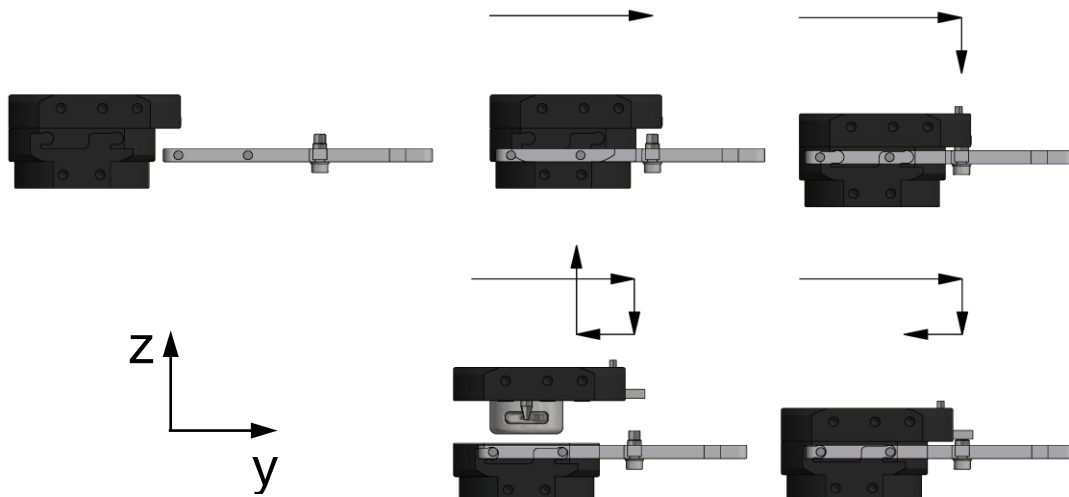
Lowering the system onto the tray engages the slider pin with the slider. A subsequent robot movement releases the lock and simultaneously positions the lower assembly in its parking position. The upper assembly can then be separated from the lower assembly through an axial movement (see Image 1). The two assemblies are reunited by lowering the upper assembly into the lower assembly. A linear motion applied to the slider pin forces the slider into the upper assembly, locking the two assemblies together.

A spring-loaded locking pin (Image 14, pos. 10) ensures the two assemblies remain locked together.

When the system is locked, the locking pin is recessed and flush with the upper assembly.

When the system is unlocked, the locking pin protrudes from the upper assembly. This indicates, that the system is not locked. Please take special care, when the system is unlocked.

Image 1



2 Safety

2.1 Symbol



This symbol indicates possible hazards to persons or the Auto Connector.

2.2 Intended use

The Auto Connector AC has been designed as an interface between handling device and tool (e.g. gripper). Furthermore, the Auto Connector can also be used in special solutions, automation and also as a general mechanical standard interface. The unit may only be used in the context of its technical specifications. The system is intended for the installation in a machine. The requirements of the applicable instructions must be considered and adhered to.

2.3 Environmental and operating conditions

Use this unit only in dry and splash-proof environments at room temperature as well as within the application parameters defined in the technical specifications. Not adhering to the technical specifications will void the warranty. Exceptions are units designed especially for the respective conditions.

2.4 Safety indication

Dangers may arise from the unit, if:

- the product is not installed or inserted properly,
- the system is not used for its intended purpose,
- the safety and installation notes are not observed.

Everyone who is responsible for assembly, commissioning and maintenance must read and understand the complete operating instructions. Improper use, which affects the function and operational safety of the Auto Connector, is prohibited.

**NOTICE!**

The unit may only be operated if the machine in which the unit is installed complies with the relevant provisions of the machinery directive 2006/42/EC.

**NOTICE!**

Make sure that the tool change process (after setup) has been tested and runs with high reliability.

**NOTICE!**

Make sure that the end effectors you want to use are suitable for automatic tool changes.

**NOTICE!**

Some electric end effectors are equipped with a failsafe function that stops the robot program if the end effector is disconnected from the robot during the execution of the robot program. Ask your end effector manufacturer how to bypass this failsafe function.

**CAUTION!**

The energy transmission (electric, vacuum, air pressure) to the tool must be switched off and any residual electric current, air pressure, vacuum, etc. in the system must be eliminated before a tool change can take place. Failure to do so may result in hardware damage (e.g. damage to electrical connectors) or injury.

**WARNING!**

Make sure that the Auto Connector's pathways are free of obstructions, so that the system and its respective tools can navigate freely.

**WARNING!**

Never install the tray in such a way that the tool can fall out of the tray due to gravity or vibration!

**WARNING!**

Ensure that the end effector cannot pose a risk to human health or hardware, should it fall out of its tray.

**WARNING!**

Connecting and disconnecting an end effector from its power and control source may in some cases pose a risk to human health. Therefore, make sure that power and control are switched off before connecting/disconnecting end effectors.

**WARNING!**

Make sure that there are no persons in the workspace of the Auto Connector while the robot application is in operation. Otherwise, injuries may occur.

**WARNING!**

After each tool change sequence and before starting work with the tools, ensure that the system is properly locked and that the locking pin is in the secured position. The locking pin is only in the secure position when it is fully recessed into the upper assembly.

3 Warranty

If the product is used as intended in 1-shift operation the warranty is valid for 24 months from the ex-works delivery date under observance the mandatory maintenance and lubrication intervals and the given operating conditions. Generally parts touching the work piece and wear parts are not part of the warranty. Wear parts are listed in chapter 9.1. The unit is considered to be defective if its basic function "Lock" is no longer functioning.

4 Scope of delivery

- Auto Connector as shown in Image 13 depending on the part number

5 Technical data

Refer to technical data sheets: TD-AC063-EN

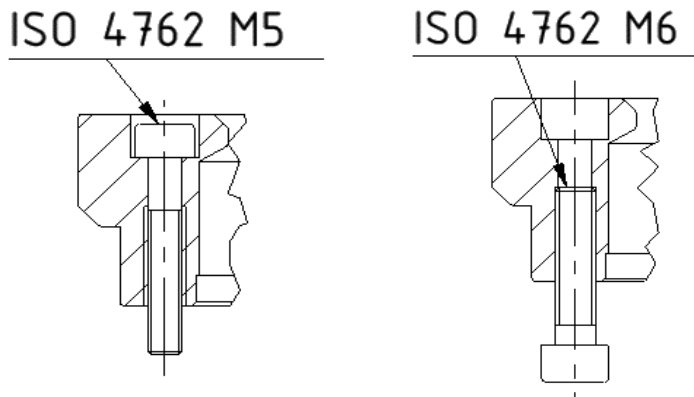
6 Setup

6.1 Assembly

The upper assembly of the changing system is mounted on the robot flange, manipulator or similar actuators. It can be centered with the help of a centering disk. The angular alignment is determined by means of a fitting hole. The lower assembly is mounted to grippers, measuring devices or other tools. For this purpose, there are through holes in the lower assembly for screws of size ISO 4762 M5, as well as M6 internal threads for direct screwing into the lower assembly (see Image 2). If the exchange systems cannot be mounted directly, adapter flanges must be used. Only use screws according to DIN 912 or ISO 4762 for mounting. The screw-in depths of the screws must be observed. We recommend the use of "medium strength" threadlocker. For angular alignment, all sizes have a fitting hole. These are designed according to ISO 9409.

Optionally, the Auto Connector can be equipped with an energy feed-through (SEK). The SEK enables the simultaneous coupling of electrical feedthroughs. It is mounted to the upper or lower assembly with two cylinder screws and positioned with two cylindrical pins each. For further installation instructions, please refer to the installation and operating instructions for the SEK.

Image 2



CAUTION!

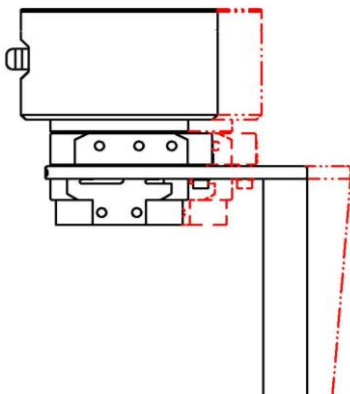
Ensure the power supply is switched off when servicing the system!



NOTICE!

Attach the tray of the Auto Connector to a fixed profile or surface. Make sure that the Auto Connector's pathways are free of obstructions, so that the system and its respective tools can navigate freely. Make sure that the support plate cannot move. A translational movement can hinder the locking or unlocking process (see Image 3).

Image 3



6.2 Programming

The Auto Connector is a mechanical tool changing system. The locking and unlocking mechanism is activated through the robots own movement. The system does not require an additional energy source. A movement sequence as defined by the manufacturer must be performed by the robot so that the system can be locked and unlocked (see Image 1 and 4).

Teach reference position:

Please use the templates supplied (pos. 35) to teach the exact reference position. To start, place the lower assembly (pos. 4) in the tray (pos. 30). The arrows on the lower assembly must correspond with the arrows on the tray. Insert the templates on either side of the lower assembly, between the lower assembly and the tray.

Ensure that the tips of the templates are facing outwards (see Image 6). The templates guarantee the correct alignment and position of the system. Make sure the upper assembly is unlocked (pos. 2 "slider" extended). Lower the upper assembly onto the lower assembly until it comes into contact with the templates. Ensure that the slider pin (pos. 31) is flush with the top of the slider (see Image 5). This is the reference position from which the other traverse points are to be programmed. The reference position is considered to be the zero point with the coordinates $P(X|Y|Z) = (0|0|0)$.

Alignment of the coordinate system as shown in Image 6.



NOTICE!

Raise the upper assembly/robot arm to remove the templates.

The programming of the locking and unlocking path (see Image 4) is done without templates!

Point sequence for the movement pattern

Lock:

Ensure that the upper and lower assemblies of the Auto Connector are separated. The lower assembly is in the parked position and the upper assembly is mounted on the robot flange. The following sequence points must be executed by the robot flange for locking to take effect.

P (X|Y|Z)
P1 (0|0|21,5)
P2 (0|0|0) **X** reference position
P3 (0|8,8|0)
P4 (0|9,3|0)
P3 (0|8,8|0)
P5 (0|8,8|9,5)
P6 (0|-77|9,5)

Unlock:

Ensure that the upper and lower assemblies of the Auto Connector are locked and not in the parked position.

The following sequence points must be executed by the robot flange for unlocking to take effect.

P (X|Y|Z)
P6 (0|-77|9,5)
P5 (0|8,8|9,5)
P3 (0|8,8|0)
P2 (0|0|0)
P7 (0|-0,5|0)
P2 (0|0|0) **X** reference position
P1 (0|0|21,5)



NOTICE!

All points must be executed linearly and with high point accuracy!



NOTICE!

The described motion sequence should be run with a maximum speed of 100mm/s!

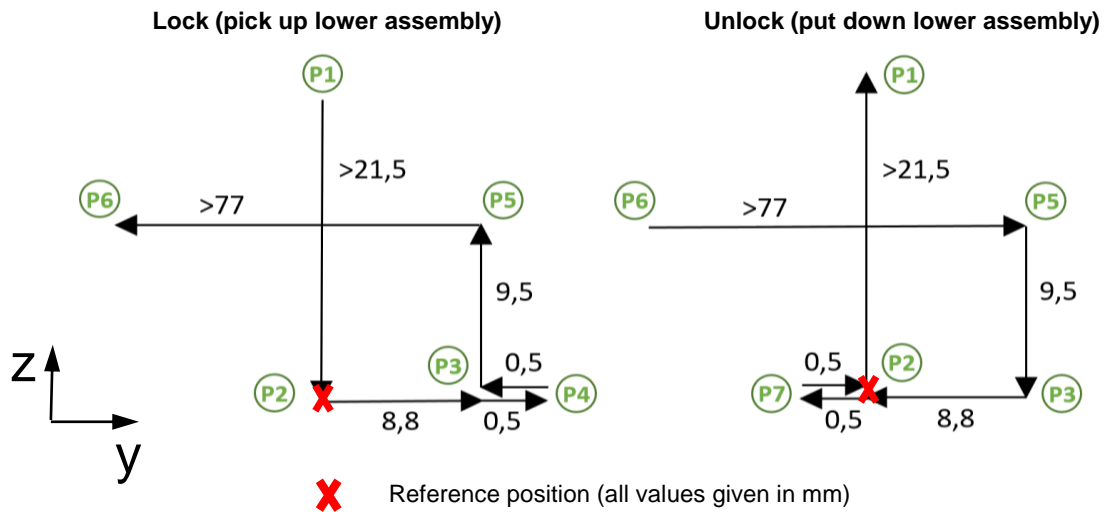
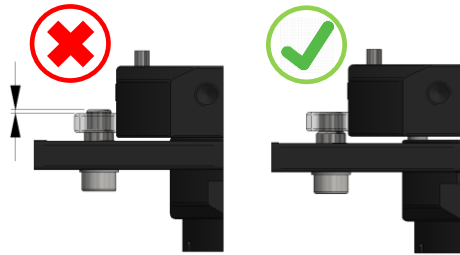


NOTICE!

The above defined points represent the ideal coordinates. Be sure to adjust for elastic deformation!

Image 4

Motion sequence (travel in mm)
(please program this motion sequence of the robot flange):

**Image 5****Image 6****NOTICE!**

The programmed motion sequence must be checked at regular intervals. Dependent upon the repetition accuracy of the robot type, it may be necessary to reprogram the system to prevent wear and to ensure safe operation!

6.3 Additional items

Centering disc

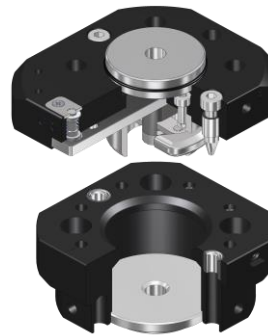
In order to achieve precise alignment, we offer a corresponding centering disc as an additional item for each size (see Image 7).

The use of a centering disc ensures that the upper assembly and/or lower assembly of the Connector are properly centered. Installation on both the upper assembly and lower assembly is possible (as shown in image 8).

Image 7



Image 8



Sensors

The Auto Connector can be equipped with reliable sensor technology via various additional items. By integrating inductive sensors, selected system states such as the locking status or the correct park position of the lower assembly in the storage plate can be detected.

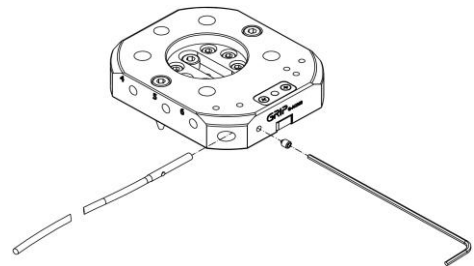
For this purpose, the articles offered can simply be inserted into the holes provided for this purpose in the upper assembly, lower assembly and tray and fixed in place using set screws (see images 9, 10 and 11).

Locking status:

The position of the locking pin in the upper assembly is used to detect the locking status.

In the locked state, it is fully recessed in the upper assembly and is detected by the sensor. If the locking pin is lifted by unlocking the system, the inductive sensor loses the signal. Only this variant is available for the AC063. Larger sizes have an additional hole for sensing the open state.

Image 9



Status park position:

A sensor is inserted and fixed with a set screw in a drilling inside the tray to detect the correct park position. The lower part must also be equipped with a sensor screw, which activates the sensor as soon as it detects the screw. This signals the correct positioning. For order numbers of the additional items, see 9.1 (Accessory, spare and wear parts).

Image 10

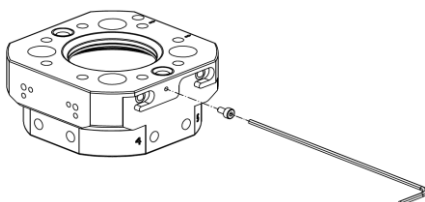
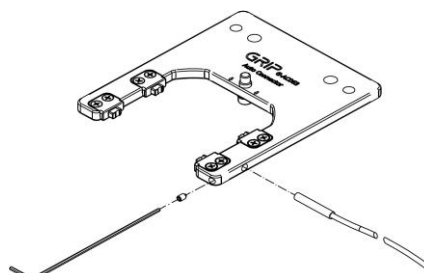
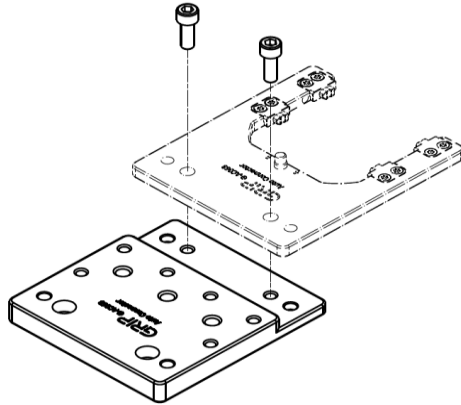


Image 11



Tray extension

The use of end effectors with large dimensions can lead to collisions when parking. For this reason, we offer a tray extension to increase the distance to the mounting profile (see image 12). This can be mounted in different positions and offers the following extensions: 26 mm, 40 mm, 54 mm, 80 mm.

Image 12**7 Maintenance and care**

At regular intervals, all moving parts must be checked for proper functioning and sufficient lubrication. The fitting surfaces, pneumatic seals, the locking pin and all other moving parts must be kept clean and lightly greased. Dirt particles on the flange surfaces can impair safe locking and must therefore be removed. If any of the components show signs of wear, they must be replaced in order to be able to guarantee the complete function and safety of the system.

Spare parts and accessories of the AC can be found on our homepage:
www.grip-gmbh.com

7.1 Torque specifications

M2 – 0,35 Nm; M3 – 1 Nm; M4 – 2 Nm; M5 – 4 Nm; M6 – 8,5 Nm; M8 – 20,6 Nm; M10 – 41 Nm; M12 – 71 Nm

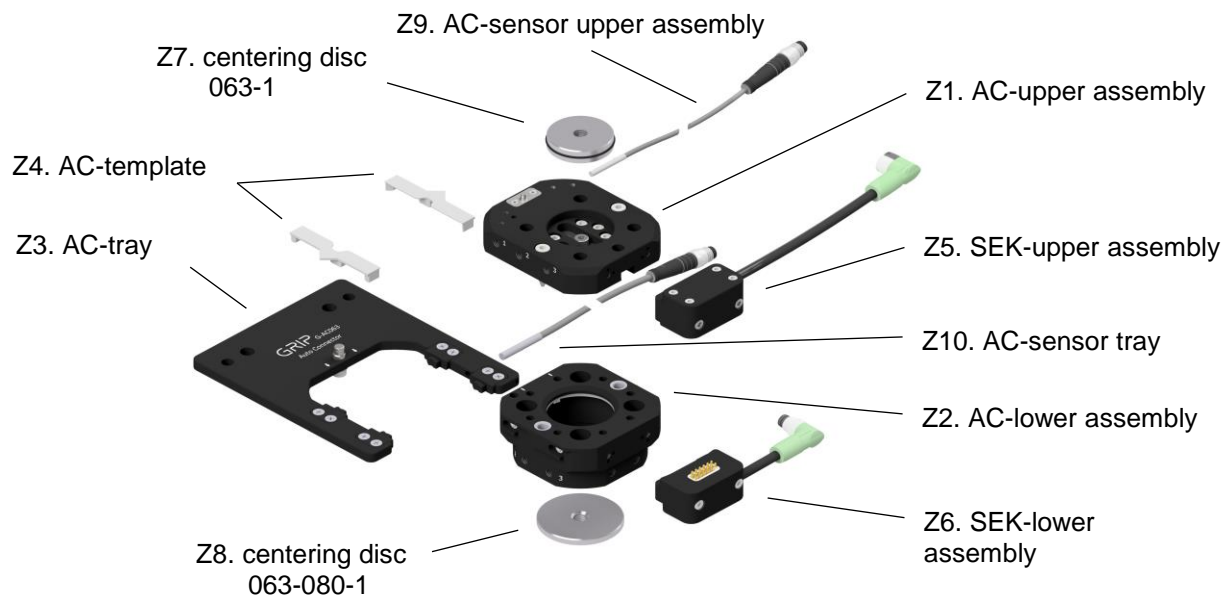
7.2 Compressed air connection

Requirements for compressed air according to ISO 8573-1: 6 4 4.

8 Components

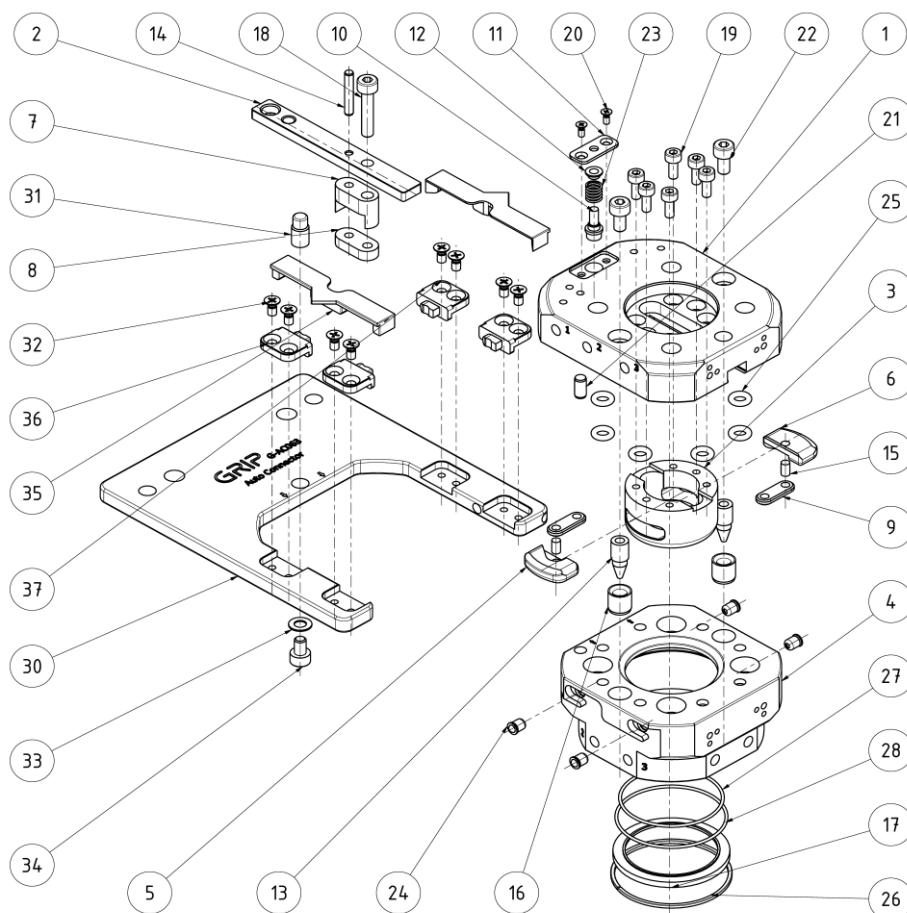
8.1 Product overview

Image 13



8.2 Exploded view

Image 14



9 Parts list

Pos.	Description	Quantity	Pos.	Description	Quantity
1	Upper assembly	1	19	Cylinder screw pin	6
2	Slider	1	20	Countersunk screw	2
3	Tappet	1	21	Cylindrical pin	1
4	Lower assembly	1	22	Cylinder screw upper assembly	2
5	Jaw 1	1	23	Spring	1
6	Jaw 2	1	24	Spring plunger	4
7	Carrier	1	25	O-ring	8
8	Connecting link (slider)	1	26	Circlip	1
9	Connecting link (jaws)	2	27	O-ring	1
10	Locking pin	1	28	O-ring	1
11	Spring cover	1	30	Tray	1
12	Spring seat	1	31	Slider pin	1
13	Positioning pin	2	32	Countersunk screw	8
14	Cylinder bolt slider	1	33	Washer	1
15	Cylinder bolt jaw	2	34	Cylinder screw	1
16	Drill bushing	2	35	Template	2
17	Locking ring	1	36	Supporting piece L	2
18	Cylinder screw slider	1	37	Supporting piece R	2

9.1 Accessory, spare and wear parts, depending on size

Pos.	Description	Order-No.	Quantity
23	Spring	EG-AC063-DF01	1
25	Gasket kit for Auto Connector (8 x O-ring)	EG-AC063-DS	8
36;37	AC063 supporting pieces	EG-AC063-A1-A-S01	4
Z1.	Auto Connector upper assembly	G-AC063-2OEP	1
Z2.	Auto Connector lower assembly	G-AC063-2UEP	1
Z3.	Tray	G-AC063-A1-01	1
Z4.	Template 063	ZG-AC063-A1-S1	2
Z5.	SEK energy feed-through, upper assembly	G-SEK100-O-1FE12-300-M8	1
Z6.	SEK energy feed-through, lower assembly	G-SEK100-U-1FE12-40-M8	1
Z7.	Centering disc	G-ZS063-1	1
Z8.	Centering disc	G-ZS063-080-1	1
Z9.	Sensor, query upper assembly	ZG-AC-IN1-150-M8	1
Z10.	Sensor, query lower assembly	ZG-AC-IN2-300-M8	1
	Sensor flag, M2	ZG-AC063-IN2-SF1	1
	Tray extension	ZG-AC063-DP	1

10 EC-Declaration of incorporation

according to the Machinery Directive 2006/42/EC, annex II B

The producer / distributor GRIP GmbH Handhabungstechnik
Alter Hellweg 70
D-44379 Dortmund, Germany

hereby declares that the following products

Product designation: Auto Connector (AC)

Functional description: Systems for the semi-automatic and form-closed exchange of components such as grippers and tools on robots or receptacles

Type designation: G-AC063

The provisions of the above-mentioned directives -including their effective amendments- comply with the time of the declaration.

He further states that the following essential requirements of the Machinery Directive 2006/42/EC were applied and observed:
annex I, numerics: 1.1.2; 1.1.3; 1.1.5; 1.3.2; 1.7.4

He further states that the specific technical documentation has been drawn up in accordance with annex VII, Part B.

The following harmonized standard has been applied:

EN ISO 12100:2010 Safety of Machinery- Basic concepts, general principles for design- Part 1:
Basic terminology and methodology

Safety of Machinery- Basic concepts, general principles for design- Part 2:
Technical principles

In the case of reasoned requests, the specific documents shall be sent to the national authorities as follows: Post

The product mentioned above may only be put into operation if it has been established applicable that the unit, into which the above-mentioned product is to be incorporated, complies with the provisions of the Machinery Directive 2006/42 / EC.

Authorized representative: Dipl.-Ing. (FH) Hasan Canti

Location: Dortmund
Date: 18.12.2023



Dipl.-Ing. (FH) Hasan Canti
Executive Director