

# Assembly and Operating Manual

## RHL

### Pneumatic angular gripper



## Imprint

### Copyright:

This manual is protected by copyright. The author is SCHUNK GmbH & Co. KG. All rights reserved. Any reproduction, processing, distribution (making available to third parties), translation or other usage - even excerpts - of the manual is especially prohibited and requires our written approval.

### Technical changes:

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

**Document number:** 1402835

**Version:** 02.00 | 24/06/2019 | en

© SCHUNK GmbH & Co. KG

All rights reserved.

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

SCHUNK GmbH & Co. KG  
Spann- und Greiftechnik

Bahnhofstr. 106 – 134  
D-74348 Lauffen/Neckar

Tel. +49-7133-103-0

Fax +49-7133-103-2399

info@de.schunk.com

schunk.com

## Table of contents

<b>1</b>	<b>General</b> .....	<b>4</b>
1.1	About this manual .....	4
1.1.1	Presentation of Warning Labels .....	4
1.1.2	Applicable documents .....	5
1.2	Warranty .....	5
1.3	Scope of delivery .....	5
<b>2</b>	<b>Basic safety notes</b> .....	<b>6</b>
2.1	Intended use.....	6
2.2	Not intended use.....	6
2.3	Constructional changes .....	6
2.4	Spare parts .....	6
2.5	Gripper fingers .....	7
2.6	Ambient conditions and operating conditions .....	7
2.7	Personnel qualification.....	8
2.8	Personal protective equipment.....	9
2.9	Notes on safe operation.....	9
2.10	Transport.....	10
2.11	Malfunctions.....	10
2.12	Disposal .....	10
2.13	Fundamental dangers.....	11
2.13.1	Protection during handling and assembly .....	11
2.13.2	Protection during commissioning and operation .....	12
2.13.3	Protection against dangerous movements.....	12
2.13.4	Protection against electric shock.....	13
2.14	Notes on particular risks.....	14
<b>3</b>	<b>Technical data</b> .....	<b>15</b>
3.1	Dimensions .....	16
3.2	Table for pressure, gripping force and finger length .....	16
<b>4</b>	<b>Assembly</b> .....	<b>17</b>
4.1	Assembly .....	17
4.2	Air connection .....	18
<b>5</b>	<b>Maintenance</b> .....	<b>19</b>
5.1	Assembly, connection and maintenance.....	19
5.1.1	Assembly.....	19
5.1.2	Air connection .....	20
<b>6</b>	<b>Translation of original declaration of incorporation</b> .....	<b>21</b>
6.1	Annex to Declaration of Incorporation.....	22

# 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](#) [► 5] 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 \*

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

- Pneumatic angular gripper RHL in the version ordered
- Fitting for hose  $\varnothing$  2.2 x 0.5 installed

## 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, Link Technische Daten.
- 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, Link Technische Daten.
- 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:

<b>Trained electrician</b>	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.
<b>Qualified personnel</b>	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.
<b>Instructed person</b>	Instructed persons were instructed by the operator about the delegated tasks and possible dangers due to improper behaviour.
<b>Service personnel of the manufacturer</b>	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.

#### 2.13.4 Protection against electric shock

##### Possible electrostatic energy

Components or assembly groups may become electrostatically charged. When the electrostatic charge is touched, the discharge may trigger a shock reaction leading to injuries.

- The operator must ensure that all components and assembly groups are included in the local potential equalisation in accordance with the applicable regulations.
- While paying attention to the actual conditions of the working environment, the potential equalisation must be implemented by a specialist electrician according to the applicable regulations.
- The effectiveness of the potential equalisation must be verified by executing regular safety measurements.

## 2.14 Notes on particular risks



### **⚠ DANGER**

#### **Risk of fatal injury from suspended loads!**

Falling loads can cause serious injuries and even death.

- Stand clear of suspended loads and do not step within their swiveling range.
- Never move loads without supervision.
- Do not leave suspended loads unattended.
- Wear suitable protective equipment.



### **⚠ WARNING**

#### **Risk of injury from objects falling and being ejected!**

Falling and ejected objects during operation can lead to serious injury or death.

- Take appropriate protective measures to secure the danger zone.



### **⚠ WARNING**

#### **Risk of injury due to unexpected movements!**

If the power supply is switched on or residual energy remains in the system, components can move unexpectedly and cause serious injuries.

- Before starting any work on the product: Switch off the power supply and secure against restarting.
- Make sure, that no residual energy remains in the system.



### **⚠ WARNING**

#### **Risk of injury from crushing and impacts!**

Serious injury could occur during the base jaw procedure and when breaking or loosening the gripper fingers.

- Wear suitable protective equipment.
- Do not reach into the open mechanism or the movement area of the product.



### **⚠ WARNING**

#### **Risk of injury from sharp edges and corners!**

Sharp edges and corners can cause cuts.

- Use suitable protective equipment.

### 3 Technical data

	RHL
Actuation	Pneumatic, filtered compressed air (10 µm) <b>Important:</b> The gripper must be operated with dry compressed air.
Operating pressure range	2 - 6 bar
Compressed air connection	M3
Centering	via centering bore $\varnothing \pm^{0.03}_0$
Grip type	Angular gripper, actuated with compressed air on one side with spring return
Moment of inertia	0.0034 kgcm <sup>2</sup>
Installation position	Any
Operating temperature	5°C - 60°C
emitted airborne sound	70 dB (A)

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

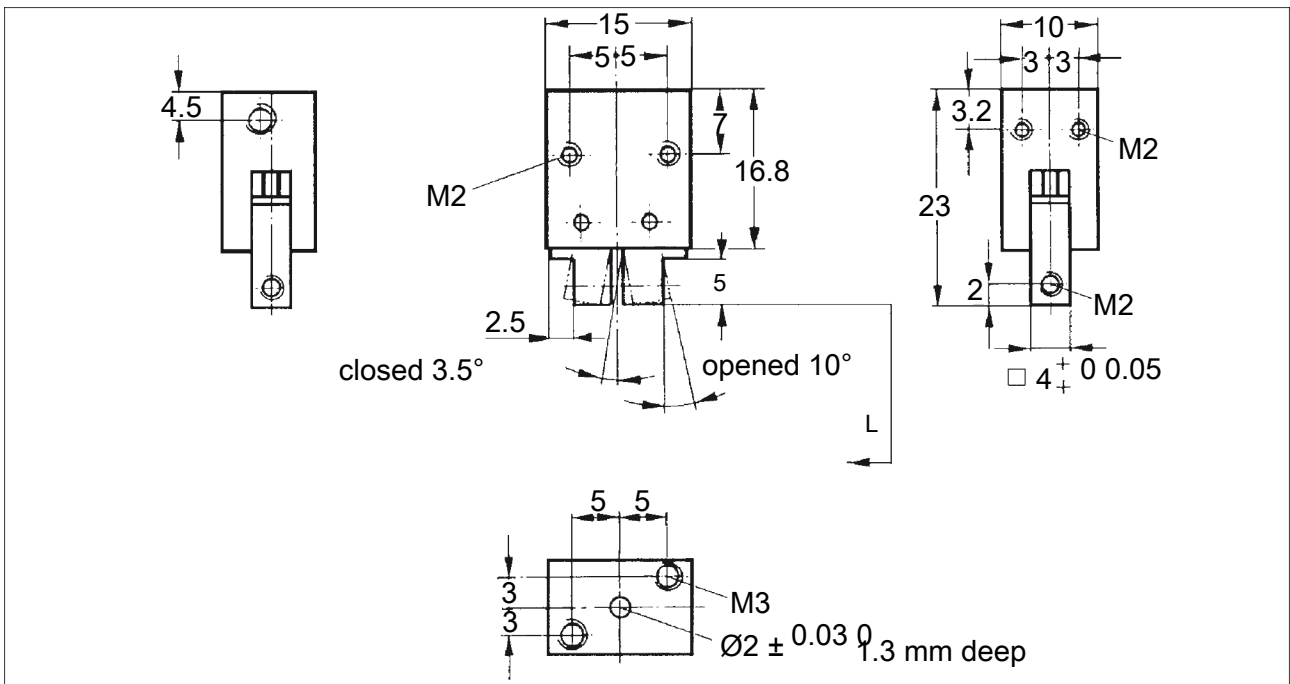
Type	ID	Gripping force in N at 6 bar *	Max. workpiece weight in g **	Cycle time in sec. ***	min. life span in cycles	Mass in g	Repeat accuracy in mm
RHL-0	360 170	3.5	18	0.2	10 000 000	8.5	± 0.03

\* at end of fingers

\*\* with form-fit gripping

\*\*\* measured at 6 bar

### 3.1 Dimensions



### 3.2 Table for pressure, gripping force and finger length

Finger length in mm		L = 0	L = 5	L = 10	L = 20	Gripping force in N
Actuating pressure in bar	6	3.5	2.1	1.54	1.2	
	5	3	1.8	1.3	0.87	
	4	2	1.2	0.9	0.58	
	3	1	0.6	0.44	0.29	
		Gripping force in N				

## 4 Assembly

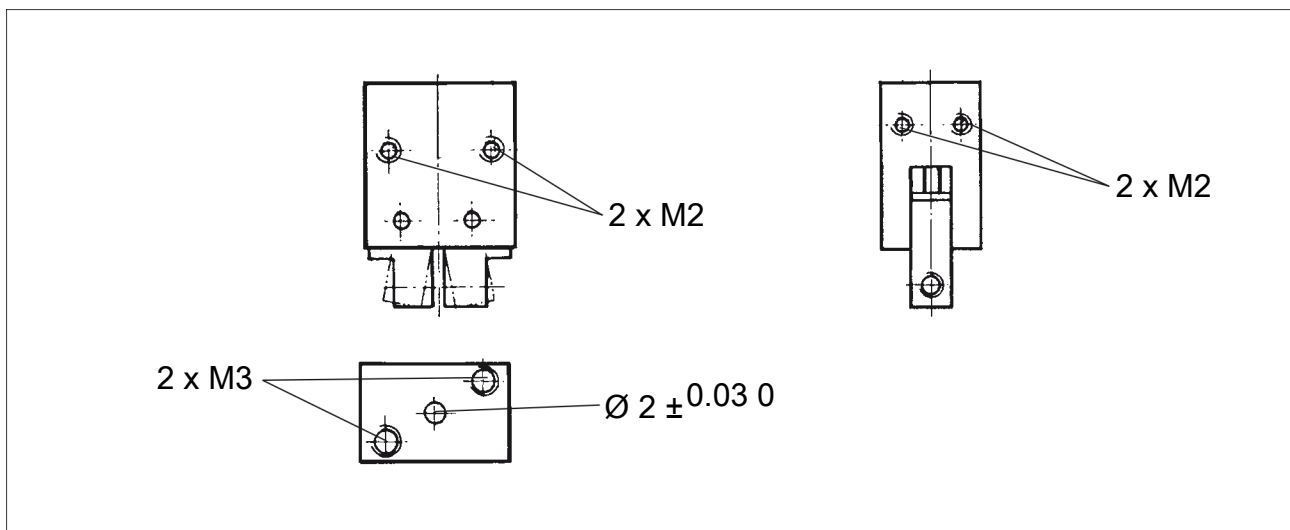
### 4.1 Assembly

#### **NOTICE**

The power supply of the gripper must be switched off for assembly. Also observe the safety notes on page 3.

#### **NOTE**

Unless otherwise specified, all the gripper's mounting screws must be tightened to a torque as per DIN or as given in the manufacturer's details. Unless otherwise specified, all the screws and nuts are to be secured with Loctite No. 243.



## 4.2 Air connection

### NOTICE

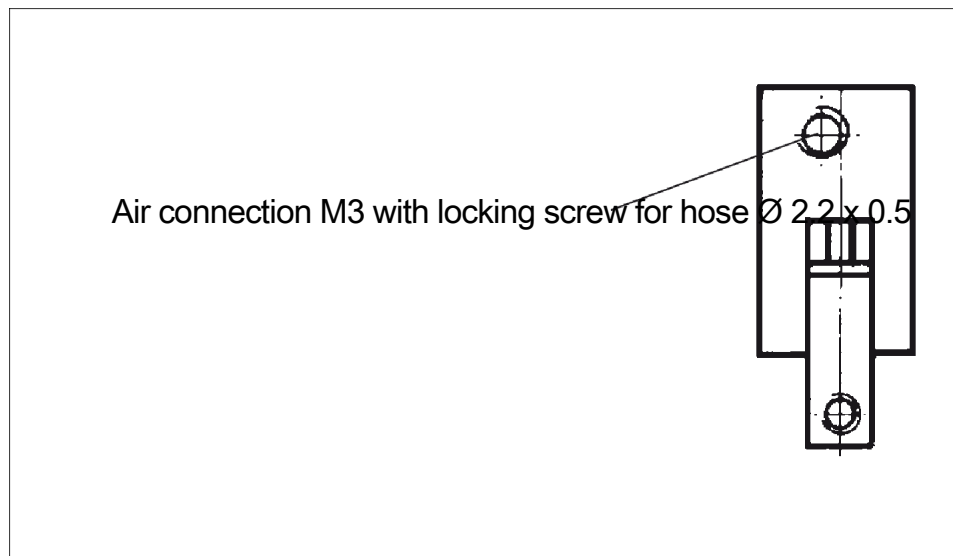
#### Damage to the gripper is possible!

If the maximum permissible finger weight or the permissible mass moment of inertia of the fingers is exceeded, the gripper can be damaged.

- A jaw movement always has to be without jerks and bounce.
- You must therefore implement sufficient reduction and/or damping.
- Observe the diagrams and information in the catalog data sheet.

### NOTICE

The power supply to the gripper must be switched off when connecting. Also observe the safety notes on page 3.



### NOTE

Before switching on, check that:

- all plugged connections are correctly and firmly connected
- all mounting screws have been tightened

## 5 Maintenance

The gripper is maintenance-free.

If the gripper gets dirty, wipe it carefully with a cloth.

Also check that the piston chamber is clean and dry!

Do not use solvents.

### 5.1 Assembly, connection and maintenance

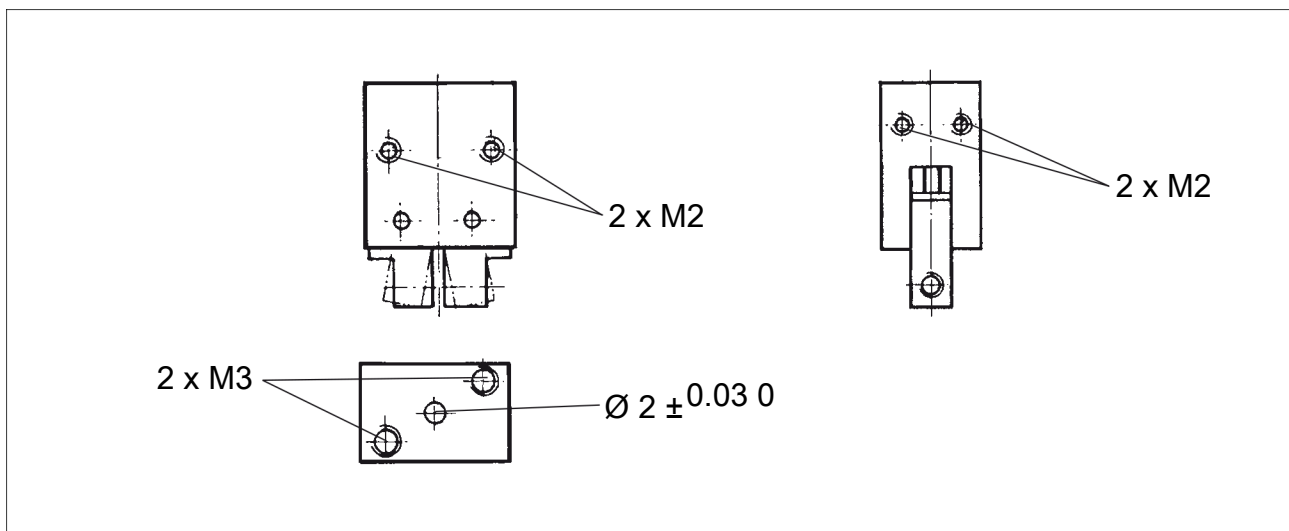
#### 5.1.1 Assembly

##### **NOTICE**

**The power supply of the gripper must be switched off for assembly. Also observe the safety notes on page 3.**

##### **NOTE**

Unless otherwise specified, all the gripper's mounting screws must be tightened to a torque as per DIN or as given in the manufacturer's details. Unless otherwise specified, all the screws and nuts are to be secured with Loctite No. 243.



### 5.1.2 Air connection

#### **NOTICE**

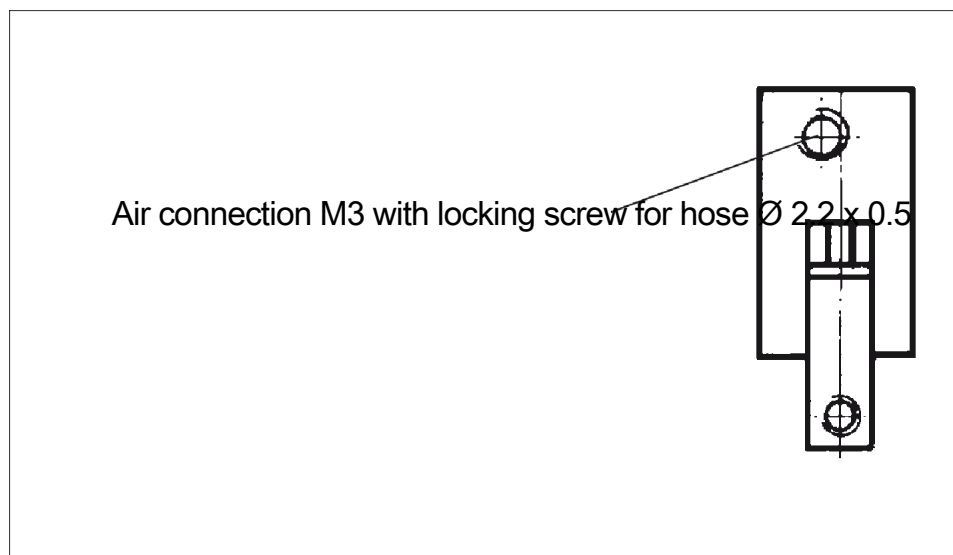
##### **Damage to the gripper is possible!**

If the maximum permissible finger weight or the permissible mass moment of inertia of the fingers is exceeded, the gripper can be damaged.

- A jaw movement always has to be without jerks and bounce.
- You must therefore implement sufficient reduction and/or damping.
- Observe the diagrams and information in the catalog data sheet.

#### **NOTICE**

**The power supply to the gripper must be switched off when connecting. Also observe the safety notes on page 3.**



#### **NOTE**

Before switching on, check that:

- all plugged connections are correctly and firmly connected
- all mounting screws have been tightened



## 6.1 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	Pneumatic angular gripper
Type designation	RHL
ID number	

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
1.3.6	Risks related to variations in operating conditions			X

<b>1.3</b>	<b>Protection against mechanical hazards</b>			
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
<b>1.4</b>	<b>Required characteristics of guards and protective devices</b>			
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
<b>1.5</b>	<b>Risks due to other hazards</b>			
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
<b>1.6</b>	<b>Maintenance</b>			
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	

Translation of original declaration of incorporation

<b>1.7</b>	<b>Information</b>			
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		
	<b>The classification from Annex 1 is to be supplemented from here forward.</b>			
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	