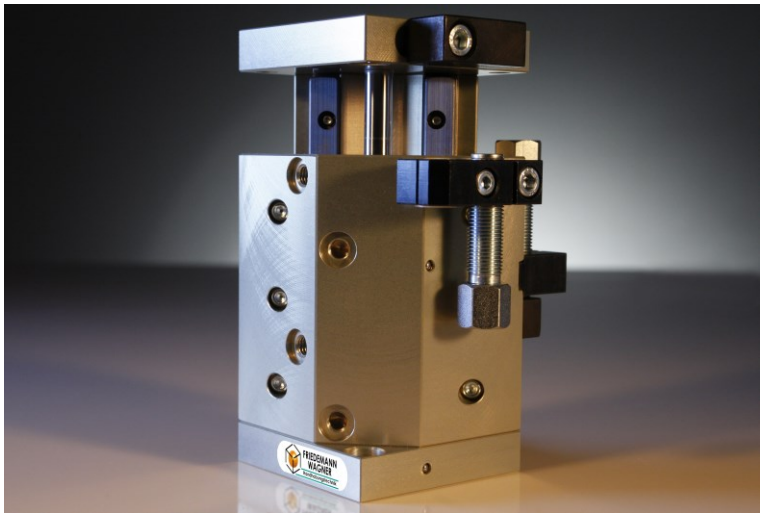
FRIEDEMANN WAGNER
Handhabungstechnik

Installation and Operating Instructions

Lifting Unit

Types: HEK, HE



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Edition 4/2017
Translation of Original Installation and Operating Instructions

NOTICE

Important! – Read carefully before use – Keep for future reference!

The installation and operating instructions are an integral part of the device and must be available to the operating and maintenance personnel at all times.

The safety information contained in them must be heeded accordingly.

If the device is resold, these installation and operating instructions must always be delivered with it as well.

The latest version is to be found on the Internet at the manufacturer's website: http://www.wagnerautomation.de

Warranty and guarantee conditions:
See chapter 6.1, Warranty and guarantee conditions.

The **warning and safety symbols** are explained in chapters 3.1 and 3.1.1.

Translation
If the device is sold to a country in the EEA, these installation and operating instructions must be translated into the language of the country in which the device is to be used. Should the translated text be unclear, the original installation and operating instructions (German) must be consulted or the manufacturer contacted for clarification.

Document name:
Dss738 BA_723_Hubeinheit_04_08_2016_Druckversion gez_7_2016.doc

1 Contents

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1.4 Declaration of incorporation

Friedemann Wagner GmbH
Robert-Bosch-Straße 5
D-78559 Gosheim / Germany

Declaration of incorporation

pursuant to the

- **EC Machinery Directive 2006/42/EC**
- **EC EMC Directive 2014/30/EU**

We hereby declare that the design of the

Designation: Lifting Unit

Type: HEK-X-K-X-X-X-X-P; HE-X-N-X-X-X-X-P

as delivered complies with the above directives.
Harmonized DIN EN standards applied pursuant to the Official Journals for the directives:

Directive / Standard	Title
DIN EN ISO 82079-1 :2012	Preparation of instructions for use – Structuring, content and presentation – Part 1: General principles and detailed requirements
2006/42/EC	**EC Directive: Machinery** *effective from 2009-12-29*
DIN EN ISO 12100 :2010	Safety of machinery – General principles for design – Risk assessment and risk reduction

- This declaration only applies to the lifting unit in the state in which it was placed on the market.
- The essential health and safety requirements according to Annex I of the Machinery Directive were applied and are fulfilled.
- The following chapters in Annex I of the Machinery Directive 2006/42/EC were considered in the risk assessment:
  1.1.2, 1.1.3, 1.1.5, 1.2.6, 1.3.1, 1.3.2, 1.3.3, 1.3.4, 1.3.6, 1.3.7, 1.3.8.2, 1.3.9,
  1.4.1, 1.4.2.1, 1.5.3, 1.5.4, 1.5.9, 1.5.11, 1.5.15, 1.6.1, 1.6.4, 1.7.1, 1.7.2, 1.7.3, 1.7.4.
- The special technical file according to Annex VII B was compiled and will be presented to the competent national authorities in electronic form on demand.
- **The lifting unit may not be put into service until the final machinery into which it is incorporated has been declared in conformity with the provisions of the directives.**
- The person authorized to compile the technical documentation is:
  Name: Mr. Andreas Wagner
  Address: Robert-Bosch-Straße 5, D-78559 Gosheim / Germany

Gosheim, April 2017

.....
Authorized Signature
(A. Wagner, Managing Director)

2 Overview and intended use

2.1 Overview of the device

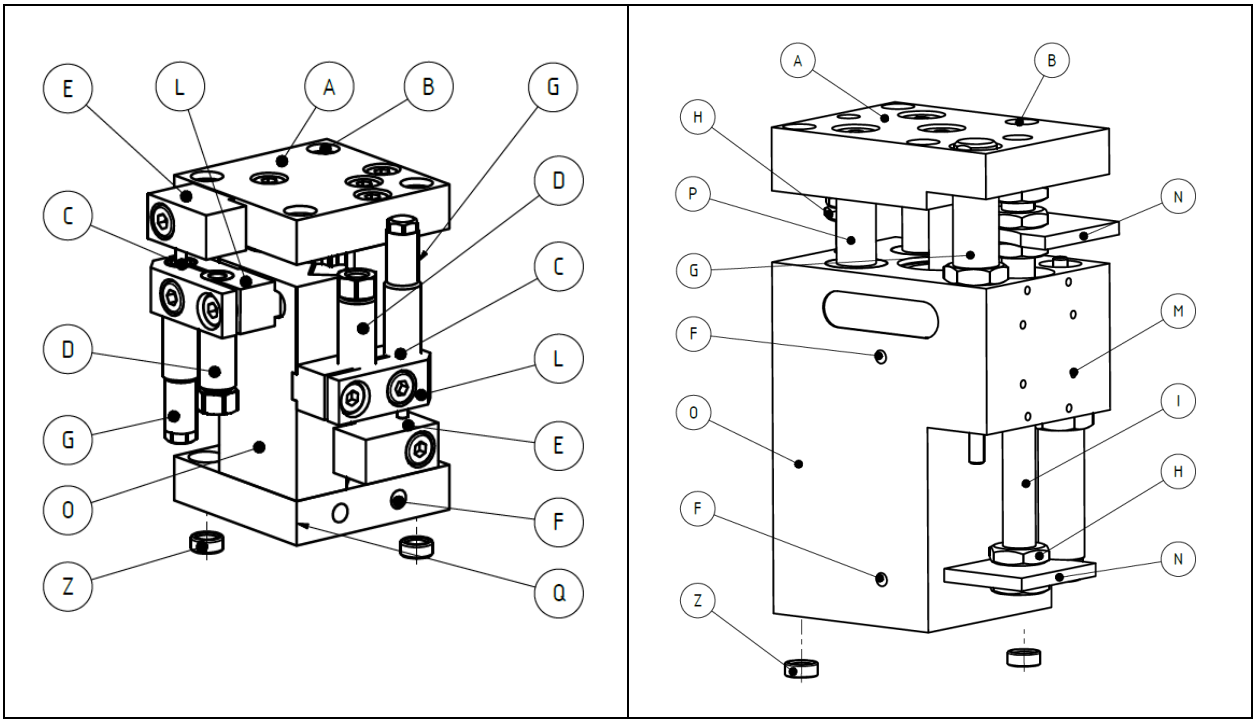


Fig. 2-1 Diagram of the parts of the lifting unit

The lifting unit consists of the following main components:	
(A) Head plate	**(H)** Hexagonal nut
(B) Bores to fasten the unit and superstructures	**(I)** Stepless lift adjustment on both sides via threaded rod
(C) Threaded bores for mounting of shock absorbers	**(M)** Threaded bores for mounting of proximity switches
(D) Stop screws with mount for proximity switch	**(N)** Stop plates, hardened
(E) Stops, hardened	**(O)** Housing
(F) Air connections	**(P)** Guide shaft
(G) Hydraulic shock absorber	**(Q)** Base plate
(L) Stop holder	**(Z)** Centering ring

2.2 Intended use

The lifting units were developed to move components or superstructures a defined distance vertically or horizontally. They are suitable for positioning in assembly work or processing of components.

This device was developed, designed and built exclusively for industrial and light-industrial use. Private use is prohibited.

DANGER

This device is intended solely for the purpose described above. Any other use or modification of the device without the written consent of the manufacturer is deemed improper.

*Modification without written agreement will lead to **serious to deadly injuries**.*
The manufacturer accepts no liability for resultant damage. The risk is borne solely by the operator. The device may only be put into operation when it has been ensured that all safety devices have been installed and are fully functional.

Proper use of the device in accordance with its intended purpose includes compliance with the manufacturer's instruction handbooks and operating manuals and performance of all specified maintenance and service work.

Foreseeable misuse:

NOTICE

Products that could form explosive dust/air or gas/air mixtures may not be processed in critical concentrations (above LEL)!
The device does not fulfil any EX requirements and may therefore also not be installed and operated in ATEX zones!
**) LEL = Lower Explosive Limit*

The device is not suitable for use in machining operations, especially of aluminum, titanium and magnesium, as, depending on product compositions, particle sizes, chip sizes and distribution of quantities, potentially explosive atmospheres can result. The final decision on use lies in the end user's judgment.

2.2.1 Product identification

The type key is laser-engraved on the connection side of the lifting unit. The following table explains the type key:

Module	Design size	Version	Stroke	Shock absorber	Energy feedthrough	Drive
HE HEK TAS	4 6 9	K N	10 25 50 75 100	K H	0-0	-P -K
		K= cross roller guide N= normal		K=unavailable H=hydraulic	0- = pneumatic -0 = electric	P=pneumatic K= unavailable

*TAS=Tandem stop system

2.2.2 Incorporation information (for the partly completed machinery) for the constructor of the final machinery

- Control is effected via a 4/2 or 5/2 directional-control valve (not included in the delivery).
- Superstructures can be mounted very easily using centering rings and screws.
- There are mounts available for proximity switches for monitoring of end positions.
- Shock absorbers (accessories) can be fitted for end-position damping.
- The speed can be adjusted freely with an external regulator (not included in the delivery).

After considering the above points, the integrator of the final machinery can put this device into service as a safe device.

He must supply overall instructions for use and a declaration of conformity for the complete machinery and affix a type plate with CE marking to the machinery. The responsibility for the risk assessment for the complete machinery lies internally with the integrator.

2.3 Technical data

2.3.1 Dimensions and weight

	HEK-4-K-X-X-X-P		HEK-6-K-X-X-X-P		HE-6-N-10/25-X-X-X-P		HE-6-N-50/75/100-X-X-X-P			HE-9-N-25-X-X-X-P	HE-9-N-50/75/100-X-X-X-P		
Guide	Cross roller guide				Sealed ball guide		Sealed linear bushing			Sealed ball guide	Sealed linear bushing		
Design	Compact				Robust								
Stroke lengths [mm]	10/25		25/50		10/25		50/75/100			25	50/75/100		
Push force at 6 bar [N]	80		185		150		220			470	360		
Retraction force at 6 bar [N]	55		175		120		200			340	325		
Cylinder Ø [mm]	1x16		1x25		2x16		1x 25			2x25	1x32		
Air consumption double stroke [cm³]	Stroke 10	Stroke 25	Stroke 25	Stroke 50	Stroke 10	Stroke 25	Stroke 50	Stroke 75	Stroke 100	Stroke 10	Stroke 50	Stroke 75	Stroke 100
	3.7	9.3	23.8	47.7	6	14	33	50	66	33	56	84	112
Adjustment range [mm]	10	14	23		0 -10	0 -25	0-50	0-75	0-100	0-25	0-50	0-75	0-100
Adjustment range both sides	•	•	•										
Weight [kg]	0.5	0.74	1.14	1.32	0.7	1	1.6	2	2.4	2.3	3.8	4.2	4.6
Drive	Compressed air (4-8 bar), constant, filtered (10 µm) and dry												
Control	4/2 or 5/2 directional-control valve, bistable												
Connection	M5									G 1/8			
Housing material	High strength aluminum, anodized												
Stop system material	Hardened steel		Hardened steel										
Stop screw material	Hardened steel		Hardened steel										
Guide shaft material					Cf53, hardened		Cf53, hardened			Cf53, hardened	Cf53, hardened		
Energy feedthrough	0-0		0-0		0-0		0-0			0-0	0-0		
Accessory TAS*	-		-		TAS-6-HE-10	TAS-6-HE-25	-			TAS-9-HE-25	-		

*TAS=Tandem stop system (accessory) to improve repeatability and force distribution (prevents one-sided tilting) with mounting possibility for hydraulic shock absorbers (accessories).

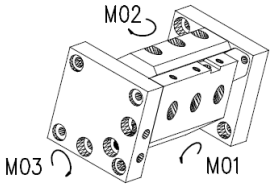
- Cross roller guide (version K) - for high moment loads and precision
- Ball guide (version N), sealed - for harsh operating conditions with high precision

2.3.2 Environmental conditions

- Operation only in closed rooms and low-vibration environments (no potentially explosive or condensing atmospheres).
- No operation in environments with spray water, vapors, process dusts or abrasion dusts.
- Lifting units with proximity switches should not be used in areas with static discharges, high-frequency oscillations or strong magnetic fields. Otherwise it can happen that the proximity switches for recognition of the end positions deliver wrong signals.
- The lifting units are only suitable for use in environments with spray water to a limited extent. It might be necessary to protect them against ingressing spray water with a suitable cover.

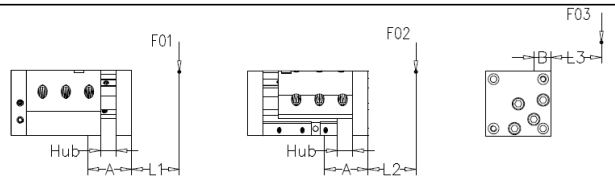
2.3.3 Load diagrams

HEK-4-K-X-X-X-P



Zulässige Belastungen
(statisch / dynamisch)
allowable loads
(static / dynamic)

	M01 [Nm]	M02 [Nm]	M03 [Nm]	A [mm]	B [mm]	C [mm]
HEK-4-K-10	15	15	20	$19+\frac{Hub}{2}$	10	16.5
HEK-4-K-25	21	21	20	$26+\frac{Hub}{2}$	10	16.5

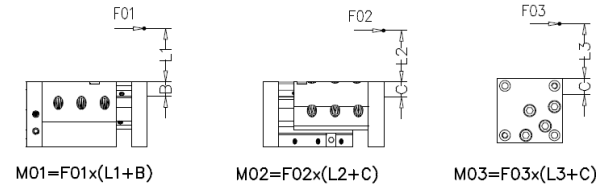


M01=F01x(L1+A) M02=F02x(L2+A) M03=F03x(L3+B)

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

$$L=\left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
M_{eff}	effektives (benötigtes) Moment [Nm]	effective (needed) moment [Nm]

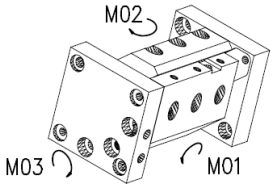


M01=F01x(L1+B) M02=F02x(L2+C) M03=F03x(L3+C)

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
In combined loads situations the next equation must be met:

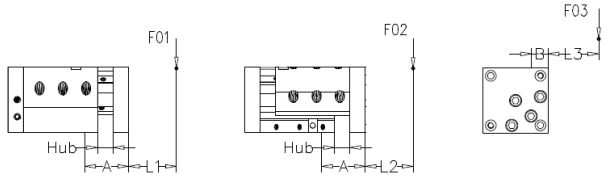
$$\frac{M01_{eff}}{M01_{zul}}+\frac{M02_{eff}}{M02_{zul}}+\frac{M03_{eff}}{M03_{zul}} \leq 1$$

HEK-6-K-X-X-X-P



Hubeinheit HEK-6	M01 [Nm]	M02 [Nm]	M03 [Nm]	A [mm]	B [mm]	C [mm]
HEK-6-K-25	33	33	56	$33+\frac{Hub}{2}$	11	17
HEK-6-K-50	33	33	56	$45+\frac{Hub}{2}$	11	17

Zulässige Belastungen
(statisch / dynamisch)
allowable loads
(static / dynamic)



M01=F01x(L1+A) M02=F02x(L2+A) M03=F03x(L3+B)

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

$$L=\left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
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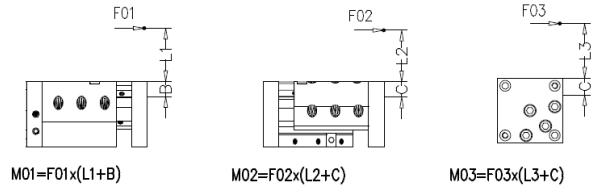
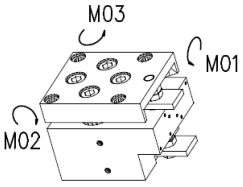


M01=F01x(L1+B) M02=F02x(L2+C) M03=F03x(L3+C)

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
In combined loads situations the next equation must be met:

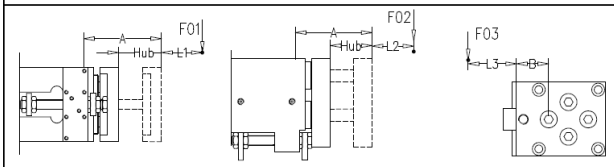
$$\frac{M01_{eff}}{M01_{zul}}+\frac{M02_{eff}}{M02_{zul}}+\frac{M03_{eff}}{M03_{zul}} \leq 1$$

HE-6-N-10/25-K-X-X-X-P



Zulässige Belastungen
(statisch / dynamisch)
allowable loads
(static / dynamic)

	M01 [Nm]	M02 [Nm]	M03 [Nm]	A [mm]	B [mm]	C [mm]
HE-6-N-10	1.39	1.39	5.69	$25+\frac{Hub}{2}$	26	30
HE-6-N-25	2.57	2.57	8.22	$32,5+\frac{Hub}{2}$	26	30

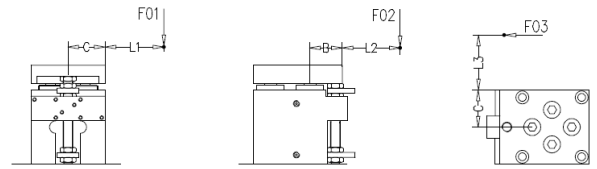


M01=F01x(L1+A) M02=F02x(L2+A) M03=F03x(L3+B)

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

$$L=\left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
M_{eff}	effektives (benötigtes) Moment [Nm]	effective (needed) moment [Nm]

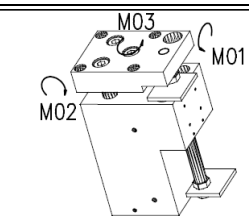


M01=F01x(L1+C) M02=F02x(L2+B) M03=F03x(L3+C)

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
In combined loads situations the next equation must be met:

$$\frac{M01_{eff}}{M01_{zul}}+\frac{M02_{eff}}{M02_{zul}}+\frac{M03_{eff}}{M03_{zul}} \leq 1$$

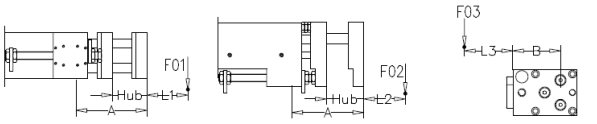
HE-6-N-50/75/100-K-X-X-X-P



Zulässige Belastungen
(statisch / dynamisch)
allowable loads
(static / dynamic)

HE-6-N-50/75/100

	M01 [Nm]	M02 [Nm]	M03 [Nm]	A [mm]	B [mm]	C [mm]
dynamisch	28	28	30	$46+\frac{Hub}{2}$	61	14

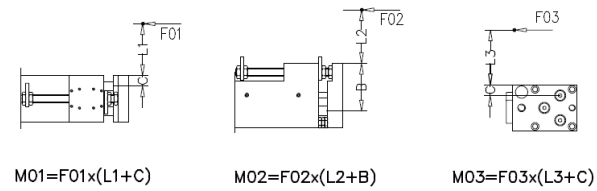


M01=F01x(L1+A) M02=F02x(L2+A) M03=F03x(L3+B)

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

$$L=\left(\frac{M_{zul}}{M_{eff}}\right)^3 \times 10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
M_{eff}	effektives (benötigtes) Moment [Nm]	effective (needed) moment [Nm]

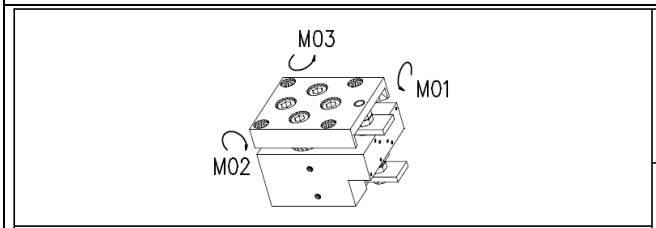


M01=F01x(L1+C) M02=F02x(L2+B) M03=F03x(L3+C)

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
In combined loads situations the next equation must be met:

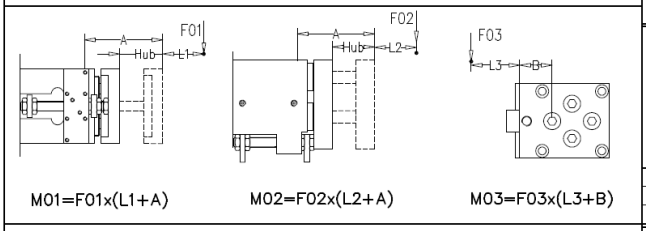
$$\frac{M01_{eff}}{M01_{zul}}+\frac{M02_{eff}}{M02_{zul}}+\frac{M03_{eff}}{M03_{zul}} \leq 1$$

HE-9-N-25-K-X-X-X-P



Zulässige Belastungen
(statisch / dynamisch)
allowable loads
(static / dynamic)

	M01 [Nm]	M02 [Nm]	M03 [Nm]	A [mm]	B [mm]	C [mm]
HE-9-N-25	10	10	48.75	$42.5+\frac{Hub}{2}$	32.5	45

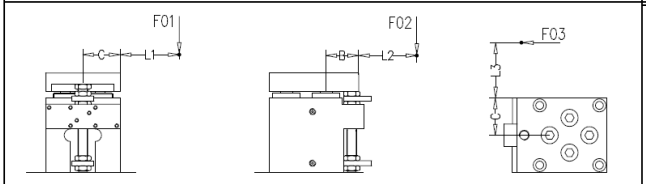


M01=F01x(L1+A) M02=F02x(L2+A) M03=F03x(L3+B)

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

$$L=\left(\frac{M_{zul}}{M_{eff}}\right)^3 x10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
M_{eff}	effektives (benötigtes) Moment [Nm]	effective (needed) moment [Nm]

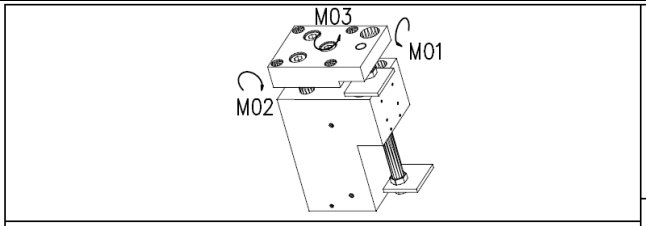


M01=F01x(L1+C) M02=F02x(L2+B) M03=F03x(L3+C)

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
In combined loads situations the next equation must be met:

$$\frac{M01_{eff}}{M01_{zul}}+\frac{M02_{eff}}{M02_{zul}}+\frac{M03_{eff}}{M03_{zul}} \leq 1$$

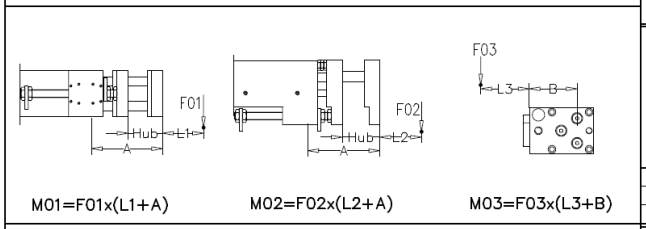
HE-9-N-50/75/100-K-X-X-X-P



Zulässige Belastungen
(statisch / dynamisch)
allowable loads
(static / dynamic)

HE-9-N-50/75/100

	M01 [Nm]	M02 [Nm]	M03 [Nm]	A [mm]	B [mm]	C [mm]
dynamisch	43	43	72	$57+\frac{Hub}{2}$	73	20

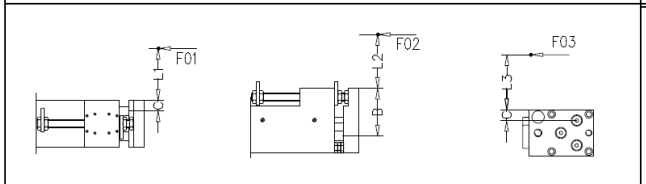


M01=F01x(L1+A) M02=F02x(L2+A) M03=F03x(L3+B)

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

$$L=\left(\frac{M_{zul}}{M_{eff}}\right)^3 x10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
M_{eff}	effektives (benötigtes) Moment [Nm]	effective (needed) moment [Nm]



M01=F01x(L1+C) M02=F02x(L2+B) M03=F03x(L3+C)

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
In combined loads situations the next equation must be met:

$$\frac{M01_{eff}}{M01_{zul}}+\frac{M02_{eff}}{M02_{zul}}+\frac{M03_{eff}}{M03_{zul}} \leq 1$$

Fig. 2-2 Load diagrams

NOTICE

If attachments or stops are mounted, it is advisable to do this with retracted slide. The specified moments may not be exceeded under any circumstances.

2.3.4 General data

Operating temperature range:

Temperature range device:	+ 5° … + 65° C
Relative air humidity:	max. 70 %, non-condensing

Storage conditions:

Minimum temperature:	- 10° C
Maximum temperature:	+ 50° C
Relative air humidity:	max. 70 %, non-condensing

3 Safety

3.1 Notes and explanations

DANGER

"DANGER" warns of dangerous situations. Avoid these dangerous situations!

Otherwise serious injuries or death will result.

WARNING

"WARNING" warns of dangerous situations. Avoid these dangerous situations!

Otherwise serious injuries or death can result.

CAUTION

"CAUTION" in combination with the warning symbol warns of dangerous situations. Avoid these dangerous situations!

Otherwise minor or light injuries could result.

NOTICE

*"NOTICE" gives recommendations on how to proceed. Ignoring these recommendations will **not lead to personal injuries**.*

*Follow the recommendations to **avoid damage to the unit** and problems in general!*

NOTICE

References to installation and operating instructions / documentation are marked with a book symbol (see external documentation).

*Follow the recommendations to **avoid damage to the unit** and problems in general!*

3.1.1 Explanation of safety symbols used

	***DANGER***
	Crushing hazards, dangers of injuries to the hands *(closing movements of mechanical parts).* ***Ignoring this warning will result in serious injuries or death.*** *Do not carry out any manual work on such parts during movements.*

	***WARNING***
	Mandatory: Safety boots *must be* ***worn.*** ***Ignoring this warning could result in serious injuries or death.*** *Take note of the dangers to the lower limbs.*

	***WARNING***
	Mandatory: Protective gloves *must be* ***worn.*** ***Ignoring this warning could result in serious injuries or death.*** *Take note of the dangers to the hands.*

	***WARNING***
	Mandatory: Hands *must be* ***washed.*** ***Ignoring this warning could result in serious injuries or death.*** *Take note of the dangers due to deficient hygiene.*

	***NOTICE***
	The ***environment sign*** *marks actions to protect the environment (warning of environmental pollution, in the chapter Disposal).* ***Damage to the environment will result if ignored.*** *Improper disposal can result in serious damage to the environment.*

3.2 Safety precautions (to be carried out by the operator)

- The lifting units may only be installed, serviced and modified by qualified skilled personnel. This personnel must have read and understood the operating instructions.
- The energy and compressed air supply must be disconnected from the lifting unit before any service, maintenance or modification work. Make sure there are no residual energies present.
- Only use the lifting units if they are in perfect technical condition and do not carry out any unauthorized modifications.
- The lifting units can be heavy. Secure them so that they cannot fall down.
- In the event of an emergency, malfunction or other irregularity, switch off the lifting unit, disconnect it from the energy and compressed air supply and lock against reconnection.
- Carry out a visual inspection of the compressed air lines regularly. Operation with damaged compressed air lines is prohibited.
- Make sure that the technical specifications and environmental conditions specified in the product documentation are adhered to.
- The lifting unit may only be operated in accordance with its intended use.
- Take note of the valid regulations on accident prevention and environmental protection.
- Implement the safeguards required by EC directives.
- Pressurize your complete equipment with compressed air slowly to avoid uncontrolled movements.
- Only put your equipment into service if you are sure that no personnel or foreign objects can be caught by the moving parts.

3.3 Safety inspections and tests

Factory inspections and tests by the manufacturer.

1. Risk assessment according to Machinery Directive 2006/42/EC (to Annex I) and to DIN EN ISO 12100:2010.

4 General warnings

4.1 Dangers

The safety systems and safety instructions described in these installation and operating instructions are to be heeded accordingly.

DANGER

Pay attention to the possible ***danger of injuries to the hands and/or body*** *when carrying out adjustment, maintenance and repair work!*

Otherwise serious injuries or death will result.
The machine builder must implement safety equipment to ensure safe operation.

4.2 Spare and wearing parts

Spare parts and accessories that have not been supplied by us have also not been tested and approved by us. The fitting and/or use of such products could therefore negatively affect the design characteristics of your device.
We accept no liability whatsoever for damage arising from the use of non-original parts and accessories.

Standard parts can be bought through the specialized trade.

NOTICE

Part lists *and* ***technical data sheets*** *are to be found in the* ***technical reference documents****.*

Damage can arise if the technical reference documents are ignored.

NOTICE

Lists *of* ***spare parts*** *and* ***wearing parts*** *are to be found in the* ***technical reference documents****.*

Damage can arise if the technical reference documents are ignored.

Service

When necessary, these parts can be obtained from:

Friedemann Wagner GmbH
Robert-Bosch-Straße 5
D-78559 Gosheim / Germany
Telephone: +49 (0) 7426 / 94900-0
Fax: +49 (0) 7426 / 94900-9
Email: info@wagnerautomation.de

5 Installation

5.1 Scope of delivery

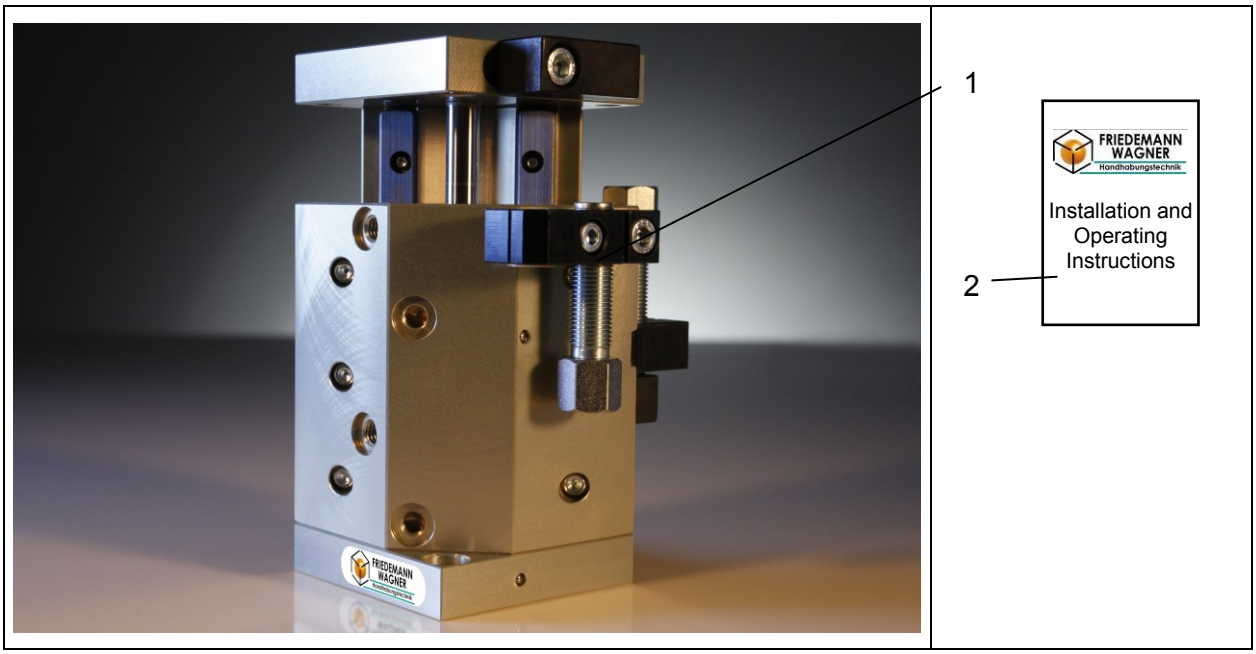


Fig. 5-1 Scope of delivery of the device

The scope of delivery comprises:

1 Lifting unit
2 These installation and operating instructions with declaration of incorporation
3 Centering rings
4 Cardboard packaging
5 For tandem stop systems: screws and centering rings

5.2 Transport and packaging

The customer is sent a specification of the scope of delivery before shipment begins. It contains details on:

- date of delivery,
- number and type of transport units.

The devices are carefully inspected and packed before shipment, but it is nevertheless still possible that they might become damaged during transit.

5.2.1 Delivery (also of spare and replacement parts)

Receiving inspection:

- Check the shipment against the delivery note to ensure that it is complete!

If the packaging is damaged

- Check the shipment itself for damage (visual inspection)!

Complaints

If the shipment was damaged during transit:

- Immediately contact the last carrier!
- Keep the packaging material (for possible inspection by the carrier or for return shipment).

Packaging for return shipment

Use the original packaging material as far as possible.

5.2.2 Temporary storage/Storage conditions

The freight packaging of the device and spare and replacement parts is designed for a storage period of 3 months from delivery.

After dismantling of the device, it must be stored properly to enable reuse.

NOTICE

Temporary storage: Store with desiccant in a dry factory hall.

Otherwise the unit will be damaged.
Moisture could penetrate into the device and cause major damage.

Storage conditions

-See chapter 2.3.4, Technical data

- No direct sunlight.
- No exposure to direct rain, condensation, water.

5.3 Mounting

WARNING

Disconnect the lifting unit from the compressed air supply and lock against reconnection.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

5.3.1 Mounting of the lifting unit

NOTICE

If the lifting unit is mounted vertically, it must be checked whether the push force and end-position damping suffice for the respective application in question.

- ▶ Place at least 2 diagonally offset centering rings (Z) (are included in the delivery) in the holes (B) provided.
- ▶ Screw the lifting unit tight with the screws (Y).
- ▶ Adjust the stroke length (cf. separate chapter 5.3.5).
- ▶ Mount the shock absorbers and proximity switches (cf. separate chapters 5.3.5.2 and 5.4.1).

NOTICE

If a centering ring (Z) is stuck in a hole, you can remove it from the hole easily with a threaded screw. The centering rings have an internal thread specifically for this purpose. Simply screw a suitable screw into the thread of the centering ring and pull the screw plus centering ring out of the hole.

Centering ring	Internal thread
ZR-4	M5
ZR-6	M8
ZR-9	M10

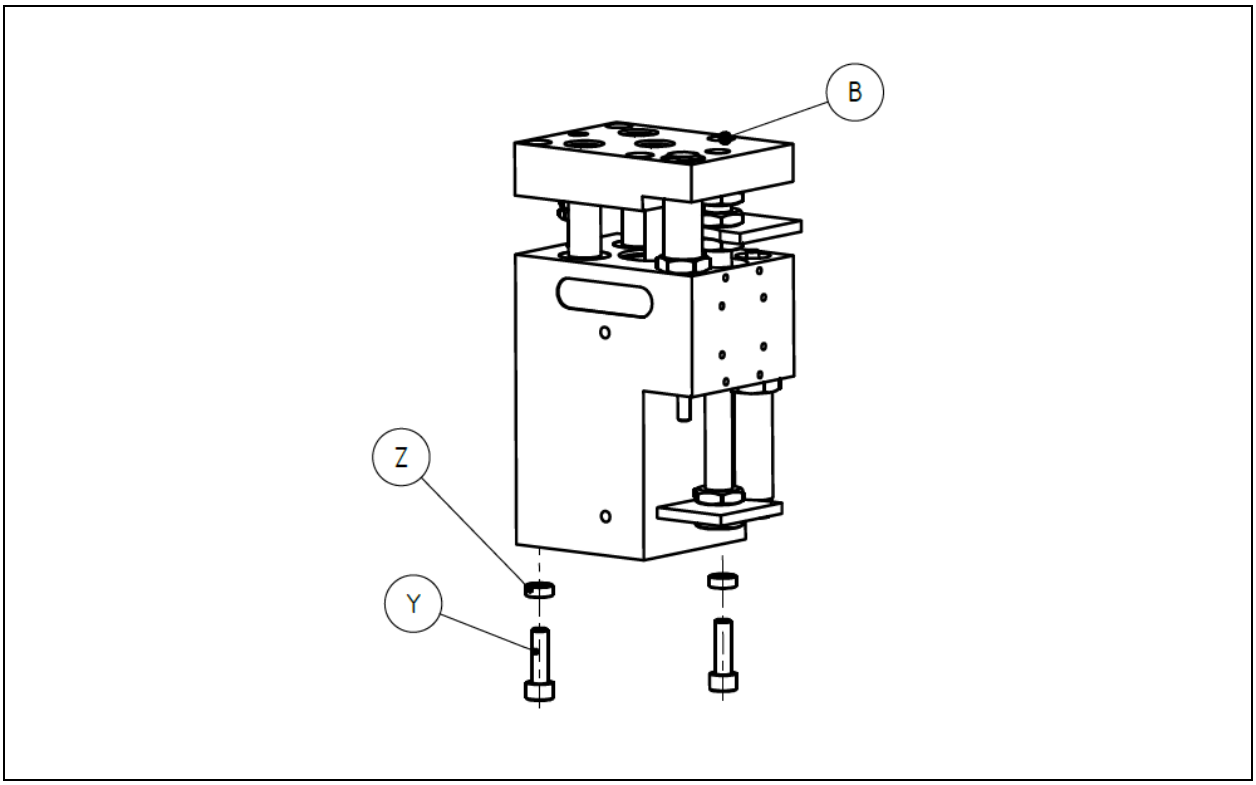


Fig. 5-2 Mounting of the lifting unit

5.3.2 Mounting of superstructures

	WARNING
	Disconnect the lifting unit from the compressed air supply and lock against reconnection. ***Otherwise light to serious injuries can result.*** *Avoid these dangerous situations!*

▶ Fasten the superstructures in the holes (B) with the centering rings.

5.3.3 Connection examples

WARNING

Disconnect the lifting unit from the compressed air supply and lock against reconnection.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

NOTICE

The following figures show connection examples and illustrate how the lifting unit can be connected.

NOTICE

A function check must be carried out with compressed air after connection.

Lifting Unit	Position of air connection	Movement of head plate
HEK-4	Right	Lower
HEK-4	Left	Lift
HEK-6	Right	Lift
HEK-6	Left	Lower
HE-6/HE-9	Bottom	Lift
HE-6/HE-9	Top	Lower

5.3.3.1 Example of standard pneumatic connection

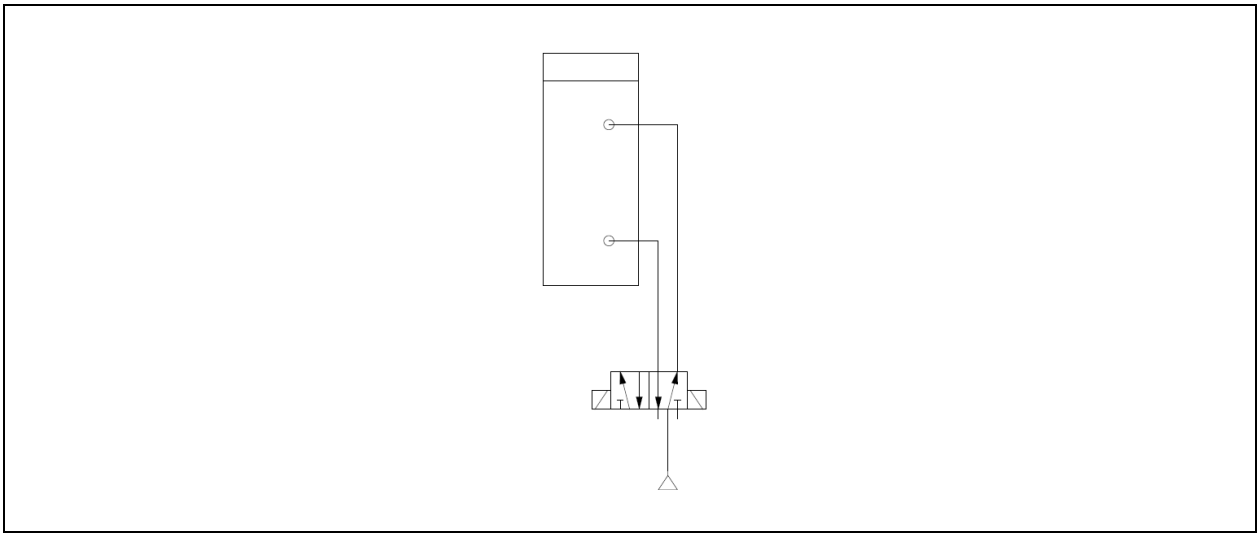


Fig. 5-3 Standard circuit

A. Compressed air connection (lift/lower, cf. table)

B. Compressed air connection (lift/lower, cf. table)

1. 5/2 control valve, bistable

5.3.4 Example of pneumatic connection with EMERGENCY STOP circuit

WARNING

In the event of a sudden loss of pressure the payload can drop uncontrolled into one end position. To prevent this, piloted non-return valves are recommended.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

NOTICE

Please note that suitable emergency stop systems (e.g. systematic shutdown) and restart systems (e.g. correct valve switching sequence, pressure buildup valves) are needed for pneumatic actuators. Unwanted blocking of the compressed air supply can lead to unwanted situations.

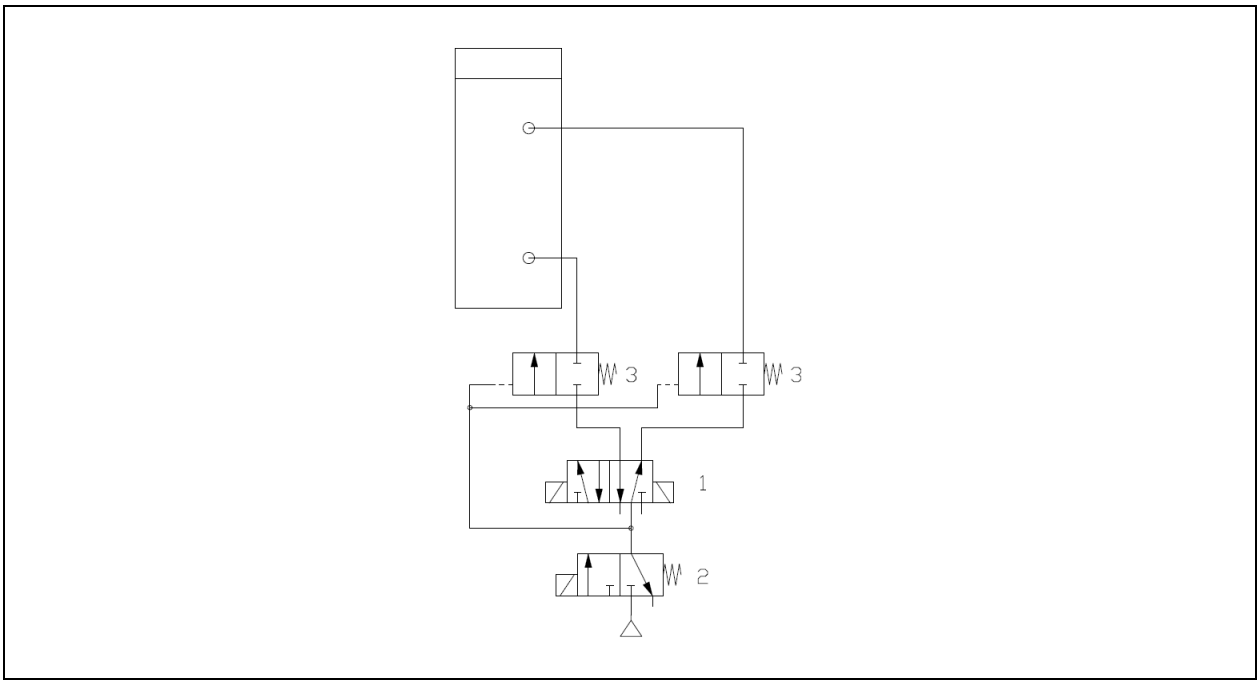
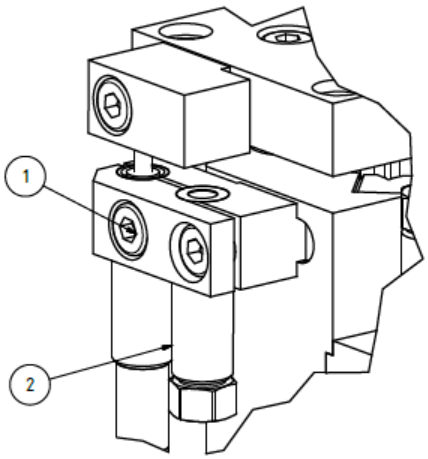
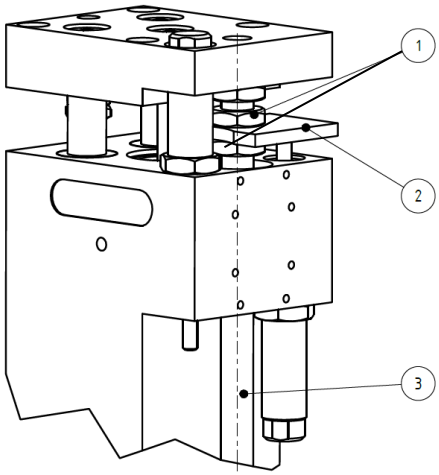


Fig. 5-4 Emergency stop circuit

A. Compressed air connection (lift/lower, cf. table)
C. Compressed air connection (lift/lower, cf. table)
1. 5/2 control valve, bistable
2. 3/2 control valve, monostable / emergency stop
3. Piloted non-return valve

5.3.5 Adjustment possibilities for the lifting unit

The device is always delivered in its respective “maximum stroke” setting. To adjust, proceed as follows:

HEK lifting units 	Loosen the clamping screw (1) (hexagonal socket head) of the stop screw. Adjust the stop screws (2) on one or both sides to limit the stroke. Adjust the shock absorbers (cf. separate chapter 5.3.5.2) if necessary and fasten the stop screws again with the clamping screws (1).
HE lifting units 	Loosen the two nuts (1) above and below the stop plate (2). Adjust the stroke length with the stop plates (2) and threaded rod (3) and lock the two nuts (1) again. Set the shock absorbers (cf. separate chapter 5.3.5.2).

5.3.5.1 Set speed

WARNING

Take special care whenever carrying out adjustment work and keep sufficiently far away from danger zones.

Otherwise light to serious injuries can result.

Wear personal protective equipment such as gloves or safety glasses if necessary.

The speed can be adjusted by an external exhaust regulator (not included in the delivery). If the movement is set too fast, this will cause hard stopping and bouncing. This can also have a negative effect on the lifetime of the lifting unit and even result in destruction of its mechanical components.

5.3.5.2 Set shock absorber

WARNING

Take special care whenever carrying out adjustment work and keep sufficiently far away from danger zones.

Otherwise light to serious injuries can result.
Wear personal protective equipment such as gloves or safety glasses if necessary.

The strength of the shock absorber must be adjusted to the load. If the shock absorber (G) is set too hard, it is possible for the superstructure to bounce and it takes too long for it to reach end position. If the shock absorber (G) is set too soft, this will cause hard stopping and bouncing. This can also have a negative effect on the lifetime of the lifting unit and even result in destruction of its mechanical components.

NOTICE

The shock absorbers are pre-set on delivery. It is, however, possible that the damping action needs to be set softer or harder.

- ▶ Depending on the mass being moved and the speed, there are kinetic energies in the system that are absorbed by hydraulic shock absorbers.
- ▶ Move the head plate manually to end position and leave it there.

- ▶ To mount the shock absorber (G), screw it into the mount clockwise.
- ▶ Screw in the shock absorber (G) until its housing rests against the stop.
- ▶ Then screw the shock absorber (G) out again by at least half a revolution and lock it with the hexagonal nut.
- ▶ The action of the shock absorber can be influenced/set by screwing in or out. This is particularly necessary when shock absorbers that cannot be adjusted externally with an adjusting screw are used. Adjust damping via the stroke.
- ▶ Proceed in the same way to mount the second shock absorber.
- ▶ Pressurize the system with compressed air and let the lifting unit drive into the end positions. Adjustment is correct when the end positions are reached without visible delay and without bouncing.

	NOTICE
	Only adjust the damping action with the adjusting screw (STD-14). If there is no adjusting screw available, the shock absorber should be adjusted via the shock absorber stroke.

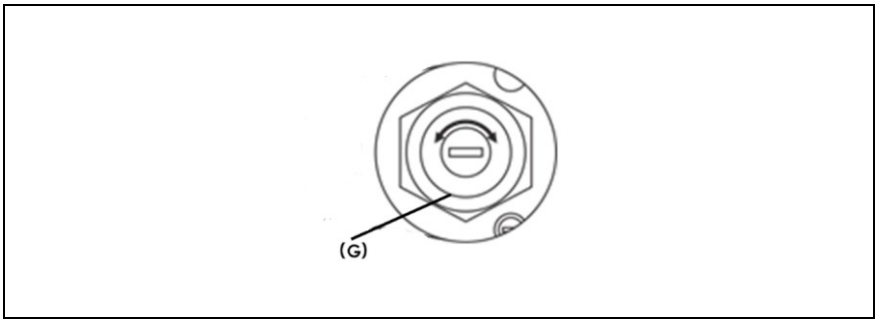


Fig. 5-5 Set shock absorber for STD-14

Set shock absorber harder

Turn the adjusting screw to the right.

Set shock absorber softer

Turn the adjusting screw to the left.

5.4 Startup

WARNING

Risk of injury from moving masses.
Make sure that no personnel or foreign objects can be caught by moving parts.
Disconnect the lifting unit from the compressed air supply.

Otherwise serious injuries or death can result.

Avoid these dangerous situations!

- ▶ Do not overload the devices.
- ▶ Adjust the stroke length (cf. chapter 5.3.5).
- ▶ Connect all air hoses and signal cables correctly.
- ▶ Pre-set the shock absorbers.
- ▶ Pre-set the sensors.
- ▶ Close all regulators and then open them again by one revolution.
- ▶ Make sure that no personnel or foreign objects can be caught by moving parts.
- ▶ Pressurize your equipment slowly with compressed air. (Lift / Lower cf. table chapter 5.3.3)
- ▶ Start a trial run.
- ▶ Set the proximity switches (if available).
- ▶ Set the required speed.
- ▶ Set the shock absorbers.
- ▶ End the trial run.

5.4.1 Mounting of proximity switches (accessories)

WARNING

Disconnect the lifting unit from the compressed air supply and lock against reconnection.

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

NOTICE

The standard device does not come with proximity switches. However, to query end positions, it is necessary to retrofit proximity switches. The proximity switches can be obtained separately as accessories.

NOTICE

The lifting units with proximity switches should not be used in areas with static discharges, high-frequency oscillations or strong magnetic fields. Otherwise it can happen that the proximity switches for recognition of the end positions deliver wrong signals.

NOTICE

Make sure that the proximity switches do not extend over the stop surface of the stop screws - this can lead to damage and destruction of parts.

Unit	Mounting
HEK- 4/6	The proximity switches are mounted in the stop screws. In this connection also see chapter 5.3.5 regarding adjustment of the stroke lengths.
HEK-4-*	Insert the cylindrical switch into the stop as far as it goes and then lock the switch with the clamping screw (max. 2 Nm / size 8). The inside cone fastens the switch in place.
HEK-6-*	Insert the proximity switch set and simply fasten the switches with the thumb screws. Make sure that the proximity switches do not extend over the stop surface of the stop screws - this can lead to damage and destruction of parts.
HE-6/9	The proximity switches are cuboid in shape and are screwed into the matching threaded bores. It is not possible to adjust the switching distance here.

▶ Connect the proximity switches with the cables.

- ▶ Make sure that the switches and their connections cannot be crimped or damaged by lifting movements.
- ▶ Set the proximity switches so that the LED of the switch lights up when the respective end position is reached. Make sure that the switch signal does not set in too soon.

Technical data

Type	NSS-O6,5-S-65	NS-I-04-K/S-27	NSI-Q8-K-44-M	NSI-Q8-K-59-M
Switching distance	1.5 mm	0.8 mm	1.5 mm	1.5 mm
Circuit type	PNP	PNP	PNP	PNP
Switching characteristic	NO	NO	NO	NO
Supply voltage	10-30 V DC	10-30 V DC	10-30 V DC	10-30 V DC
Current consumption	<10 mA	<10 mA	<10 mA	<10 mA
Switching current	Max. 200 mA	Max. 100 mA	Max. 200 mA	Max. 200 mA
Switching frequency	Max. 5 kHz	Max. 3 kHz	Max. 3 kHz	Max. 3 kHz
LED	Yes	Yes	Yes	Yes
Protected against polarity reversal	Yes	Yes	Yes	Yes
Short-circuit proof	Yes	Yes	Yes	Yes
Protection	IP 67	IP 67	IP 67	IP 67
Lifting unit	HEK-6	HEK-4	HE-6/9	HE-6/9

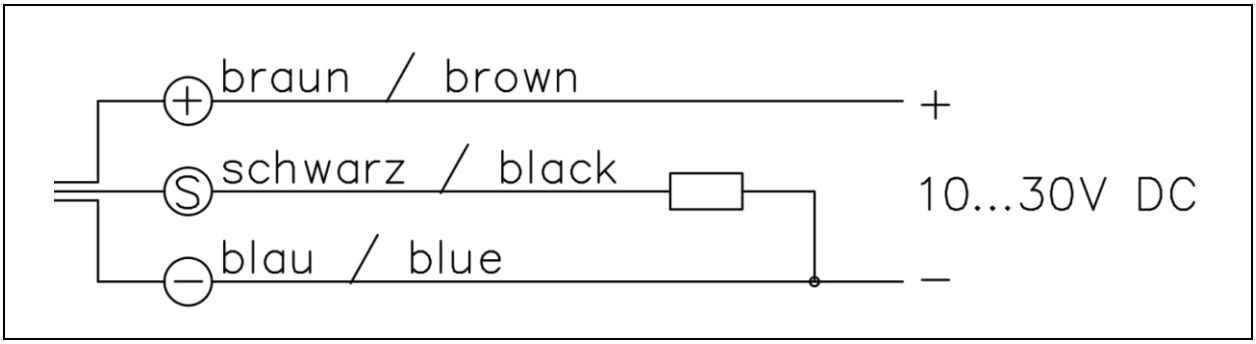


Fig. 5-6 Connection diagram

5.4.2 Repair / Replacement of the hydraulic shock absorber

	***WARNING***
	Work may only be carried out by specially trained personnel because the device is pressurized.
	Otherwise light to serious injuries can result.
	Avoid these dangerous situations!

- ▶ To mount the shock absorber (G), screw it out of the mount anticlockwise.
- ▶ See the instructions in chapter 5.3.5.2 Set shock absorber.
- ▶ Proceed in the same way to mount the second shock absorber.
- ▶ Pressurize the system with compressed air and let the lifting unit drive into the end positions. Adjustment is correct when the end positions are reached without visible delay and without bouncing.

Shock absorbers / Lifting units	STD-8-M	STD-10-S	STD-14-W
HEK-4-K-X-X-X-X-P	●		
HEK-6-K-X-X-X-X-P			●
HE-6-N-10/25-X-X-X-P*		●	
HE-6-N-50/75/100-X-X-X-P			●
HE-9-N-25-X-X-X-P*			●
HE-9-N-50/75/100-X-X-X-P			●

***Only with matching tandem stop system (TAS)**

Technical data

Type	**STD-8-M**	**STD-10-S**	**STD-14-W**
For HE	**HEK-4K**	**HE-6-N-10 HE-6-N.25 Each with TAS**	**HEK-6-K HE-6/9-N-50/75/100 HE-9-N-25**
Fastening	M8x1	M10x1	M14 x 1
Stroke	5 mm	8 mm	12 mm
Impact speed (min./max.)	0.8-2.2 m/s	1.8-3.5 m/s	0.4-5.0 m/s
Absorption	4 Nm	10 Nm	30 Nm
Damping work max.	9,000 Nm/h	18,000 Nm/h	50,000 Nm/h
Material	Steel		
Weight	0.012 kg	0.025 kg	0.065 kg

5.5 Mounting of a tandem stop system (TAS)

A tandem stop system (TAS) from the range of accessories serves to improve repeatability and force distribution. It prevents one-sided tilting and contains fastening possibilities for hydraulic shock absorbers (accessories).

- Included in the delivery are matching screws and centering rings. Use these and the holes for centering rings to screw one.
- Loosen the nuts of the threaded rod.
- Adjust the stroke length of the system and the TAS via the stop plates and lock with the nuts again.
- Adjust the shock absorbers (cf. separate chapter 5.3.5.2) and fasten the stop screws again with the lock nuts.

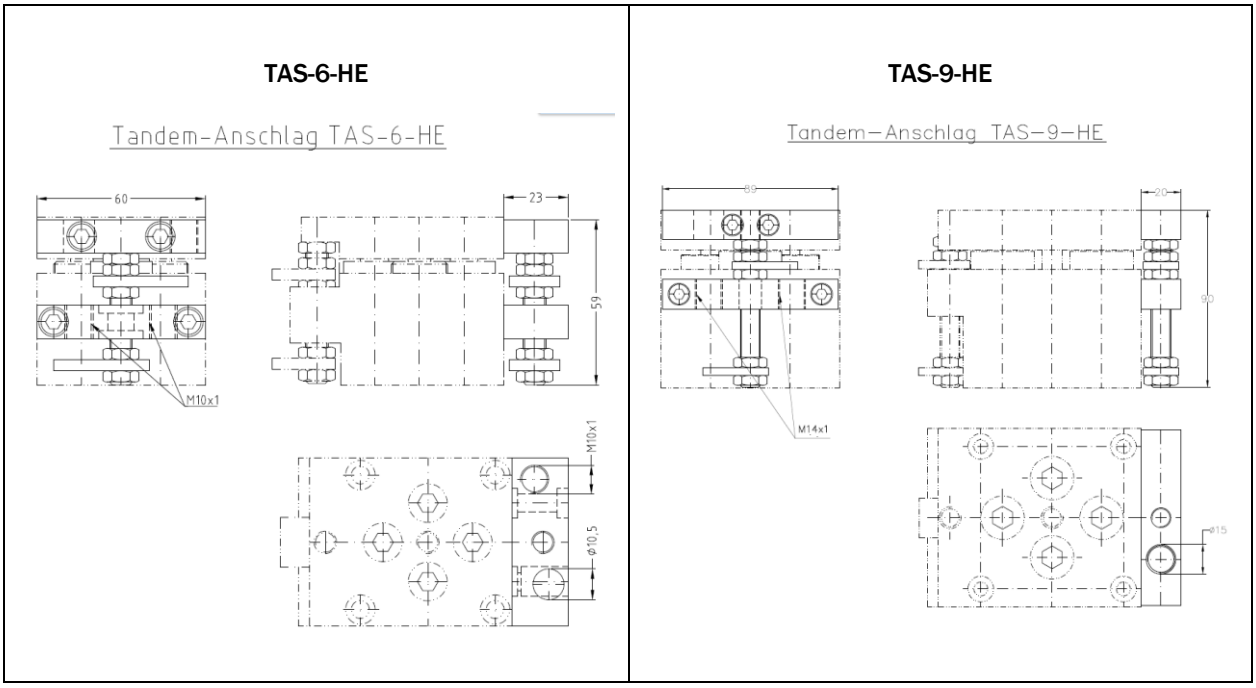


Fig. 5-7 Tandem stop system

6 Maintenance/Servicing

WARNING

Disconnect the lifting unit from the compressed air supply and lock against reconnection!

Otherwise light to serious injuries can result.

Make sure there are no residual energies present.

NOTICE

If you have opted for use with an oil/air mixture, the device should then later not be operated otherwise because the lubricating film could fail.

Shock absorbers

The hydraulic shock absorbers are wearing parts. They should therefore be inspected at regular intervals (about every 2,000,000 strokes). Defective shock absorbers can cause consequential damage. Our STD14 are reparable, and we therefore recommend you arrange the possibility of repair with our customer service.

Servicing

After a modification/repair, all moving parts and their guides should be smeared with our special grease.

The seals and the grease inside the lifting unit can age depending on use; we therefore recommend that you send the device in to us for servicing every 3 years, after 15,000,000 cycles (for HE-9 after 10,000,000 cycles) or should you notice a fault in the movement.

Only clean the lifting unit with soft cloths and agents that do not damage the material.

Contact with aggressive media and grinding dust should be avoided.

6.1 Warranty and guarantee conditions

The statutory warranty period of the manufacturer / distributor is 24 months from the date of delivery.
For spare parts, we guarantee delivery according to chapter (see also DIN EN 82079-1).

We grant a warranty of 24 months (from the date of delivery ex works) on the proviso that the device is treated correctly in 1-shift operation and the application and environmental conditions are complied with. This includes replacement or repair of defective parts of Friedemann Wagner GmbH.

Wearing parts (e.g. shock absorbers) are not covered by the warranty.

During the warranty period repairs may only be carried out or authorized by Friedemann Wagner GmbH.

7 Troubleshooting

Fault	Cause	Correction
Irregular movement	Regulator is turned in too far	Set external regulator correctly
	Air ducts are blocked	Clean air ducts with compressed air
No movement	Connected incorrectly	Connect compressed air connections correctly, see chapter 5.3.3
	Indexing unit controlled incorrectly	Check program and change
	Incorrect switching signal or signal sets in too soon	Set proximity switch correctly, see chapter 5.4.1
	Faulty switching	Interchange compressed air connections if necessary
	Regulator is turned in too far	Set regulator correctly, see chapter 5.3.5.1
Proximity switch emits incorrect signals No switching signal	Proximity switch is set incorrectly	Set proximity switch correctly, see chapter 5.4.1.
	Proximity switch is defective	Replace proximity switch, see chapter 5.4.1
End-position stop too hard	Shock absorber (G) is set incorrectly	Set shock absorber (G) correctly, see chapter 5.3.5.2
	Shock absorber (G) is defective	Replace shock absorber (G), see chapter 5.4.2.
End position is not reached No switching signal	Shock absorber turned in too far	Mount shock absorber (G) correctly, see chapter 5.4.2
	Pressure too low	Increase air pressure
	Load too high	Keep to technical data

Table 1 Troubleshooting

You can obtain further help from:

Friedemann Wagner GmbH, D-78559 Gosheim / Germany
Telephone: +49 (0) 7426 / 94900-0
Fax: +49 (0) 7426 / 94900-9
Email: info@wagnerautomation.de

8 Dismantling / Disposal

Dismantling

Dismantling work may only be carried out by skilled personnel. Make sure the shutdown procedure is followed before beginning dismantling work.
Further, the following must be followed where applicable / available:

- Release the energy in the pressure accumulator.
- Make sure there are no residual energies in the system anymore.
- Release all tensioned springs.

Disposal

The device is primarily made of steel and to a certain extent also of aluminum (except for the electrical equipment) and is to be disposed of in accordance with local environmental protection regulations applicable **at the time** of disposal.
Dispose of according to properties, existing laws and regulations as, for example:

- electric and electronic scrap (circuit boards), PC system, keyboard, mouse, monitor (according to WEEE regulations);
- batteries, fluorescent lamps/energy-saving lamps (collection points);
- plastics (housing), rubber;
- metal, steel, copper, aluminum (separated by sorts).

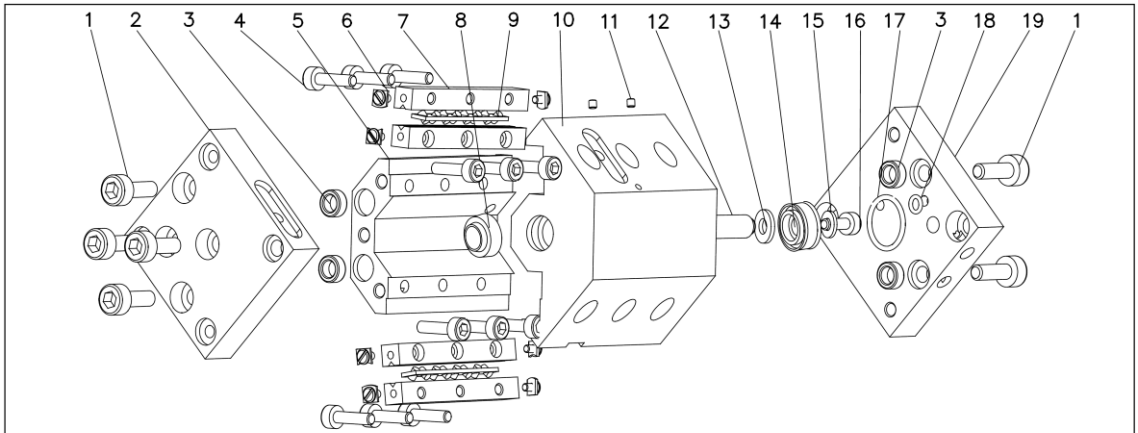
All parts touched by media must be decontaminated before disposal. Hazardous substances are to be removed from the device.
For proper disposal of hazardous substances, observe the material safety data sheets (MSDS) and current applicable disposal regulations.

Oils, solvents, cleaning agents and contaminated cleaning materials (brushes, cloths, etc.) must be disposed of according to local regulations, the applicable disposal codes and the information in the manufacturer's material safety data sheets.

9 Spare part lists and accessories

9.1 Spare part lists

HEK-4



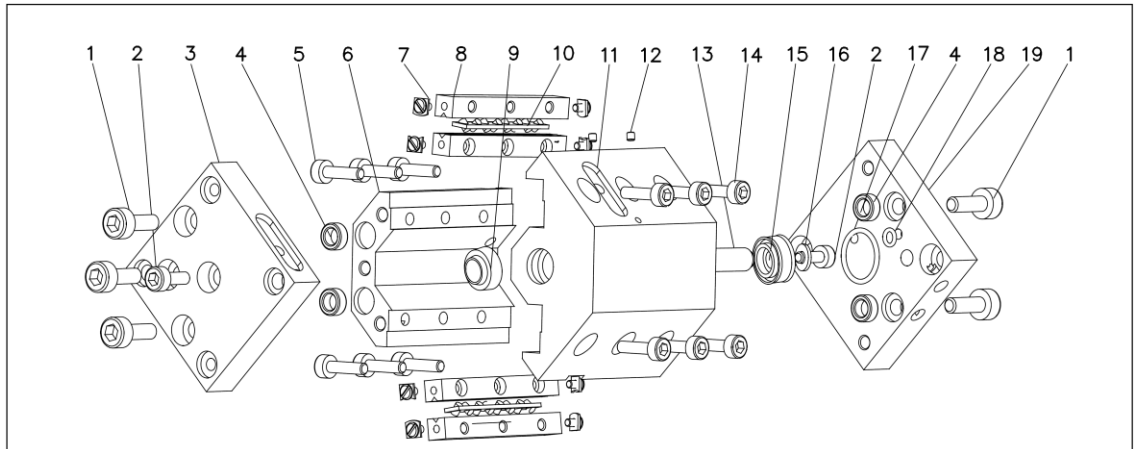
HEK-4-K-10

Pos.	name	item#	pcs
1	cylinder screw M4x12	6003.012	6
2	upper plate	1376.000.101	1
3	center ring ZR-4	1805.000.103	4
4	cylinder screw M3x10	6003.029	8
5	guiding plate	1376.000.102.01	1
6	stopscrew	6272.003	4
7	guiding track 8x8x48	6270.010	4
8	seal/wiper ring 6x11.2	6216.006	1
9	roller cage KBN 3x7	6271.009	2
10	housing	1376.000.103.01	1
11	threaded pin M3x3	6001.009	2
12	piston rod	1376.000.104.01	1
13	washer d6 (plastic)	6020.017	1
14	piston complete 16x4.5x6.5	6211.005	1
15	washer M3	6020.012	1
16	cylinder screw M3x6	6003.038	1
17	O-ring 15x1.5	6210.025	1
18	O-ring 3x1.5	6210.064	1
19	base plate	1376.000.105	1

HEK-4-K-25

Pos.	name	item#	pcs
1	cylinder screw M4x12	6003.012	6
2	upper plate	1376.000.101	1
3	center ring ZR-4	1805.000.103	4
4	cylinder screw M3x10	6003.029	12
5	guiding plate	1376.000.102.02	1
6	stop screw	6272.003	4
7	guiding track 8x8x66	6270.011	4
8	seal/wiper ring 6x11.2	6216.006	1
9	roller cage KBN 3x8	6271.010	2
10	housing	1376.000.103.02	1
11	threaded pin M3x3	6001.009	3
12	piston rod	1376.000.104.02	1
13	washer d6 (plastic)	6020.017	1
14	piston complete 16x4.5x6.5	6211.005	1
15	washer M3	6020.012	1
16	cylinder screw M3x6	6003.038	1
17	O-ring 15x1.5	6210.025	1
18	O-ring 3x1.5	6210.064	1
19	base plate	1376.000.105	1

HEK-6



pre-load guiding tracks with a torque of 20Ncm.

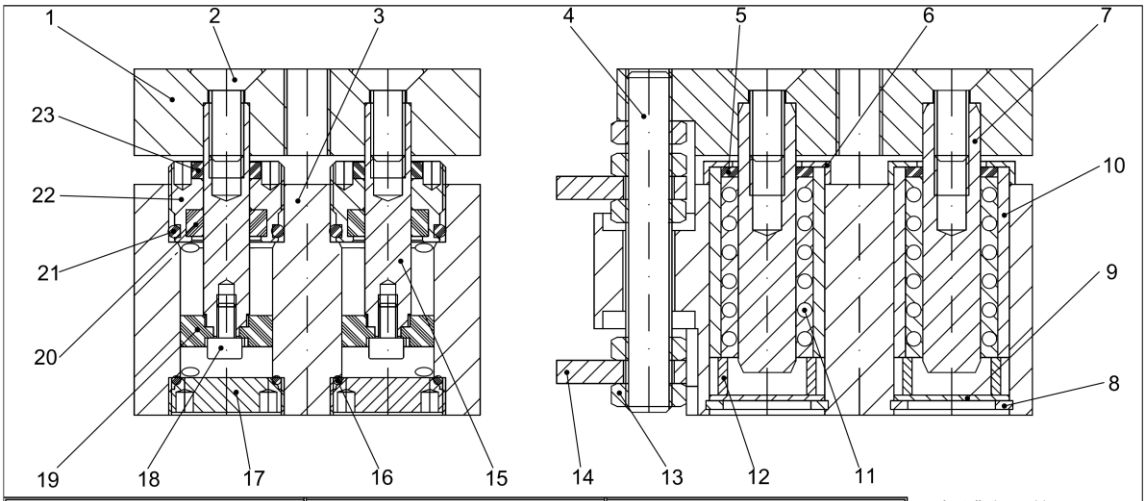
HEK-6-K-25

Pos.	name	item#	pcs
1	cylinder screw M6x14	6003.037	5
2	cylinder screw M4x10	6003.035	2
3	upper plate	1402.000.101	1
4	center ring ZR-6	1805.000.102	4
5	cylinder screw M3x18	6003.048	6
6	guiding plate	1402.000.102.01	1
7	stop plate	6272.002	4
8	cross roller bearing 9x9x75	6270.006	4
9	seal/wiper ring 8x14.2	6216.005	1
10	roller cage KBN4x7	6271.005	2
11	housing	1402.000.103.01	1
12	threaded pin M4x4	6001.003	3
13	piston rod	1402.000.104.01	1
14	cylinder screw M3x14	6003.003	6
15	piston complete 25x7x8.8	6211.004	1
16	washer M4	6020.009	1
17	O-ring 24.8x1.5	6210.028	1
18	O-ring 3.3x2.4	6210.001	1
19	base plate	1402.000.105	1

HEK-6-K-50

Pos.	name	item#	pcs
1	cylinder screw M6x14	6003.037	5
2	cylinder screw M4x10	6003.035	2
3	upper plate	1402.000.101	1
4	center ring ZR-6	1805.000.102	4
5	cylinder screw M3x18	6003.048	6
6	guiding plate	1402.000.102.02	1
7	stop plate	6272.002	8
8	cross roller bearing 9x9x75	6270.006	4
9	seal/wiper ring 8x14.2	6216.005	1
10	roller cage KBN4x7	6271.005	2
11	housing	1402.000.103.02	1
12	threaded pin M4x4	6001.003	3
13	piston rod	1402.000.104.02	1
14	cylinder screw M3x14	6003.003	6
15	piston complete 25x7x8.8	6211.004	1
16	washer M4	6020.009	1
17	O-ring 24.8x1.5	6210.028	1
18	O-ring 3.3x2.4	6210.001	1
19	base plate	1402.000.105	1

HE-6-10/25 and HE-9-25



HE-6-N-10

Pos.	name	item#	pcs
1	upper plate	1400.000.102	1
2	countersunk screw Torx M6x16	6005.002	4
3	guiding plate	1400.600.101.01	1
4	threaded rod	1400.000.106.01	1
5	wiper G10x14x3A	6212.010	2
6	spacer	1400.600.102	2
7	guiding shaft	1400.000.103.02	2
8	locking ring 20x1 B.	6031.001	2
9	cap	1400.000.105	2
10	guiding bush 14x20x33	6256.003	2
11	ball cage 10x30	6251.002	2
12			
13	nut M8x1x4	6027.004	5
14	switch plate	1400.000.107	2
15	piston rod	1400.601.101.01	2
16	O-ring 16x1,25	6210.015	2
17	cover cap	1400.000.101	2
18	cylinder screw M4x8	6003.002	2
19	piston complete 16x4,5	6211.005	2
20	lip seal 8x14x4	6213.006	2
21	O-ring 16x1,25	6210.015	2
22	screw-in element	1400.602.101.02	2
23	wiper G8x12x3	6212.003	2

HE-6-N-25

Pos.	name	item#	pcs
1	upper plate	1400.000.102	1
2	countersunk screw Torx M6x16	6005.002	4
3	guiding plate	1400.600.101.02	1
4	threaded rod	1400.000.106.02	1
5	wiper G10x14x3A	6212.010	2
6	spacer	1400.600.102	2
7	guiding shaft	1400.000.103.02	2
8	locking ring 20x1 B.	6031.001	2
9	cap	1400.000.105	2
10	guiding bush 14x20x37	6256.002	2
11	ball cage 10x43	6251.003	2
12	bush	1400.000.104	2
13	nut M8x1x4	6027.004	5
14	switch plate	1400.000.107	2
15	piston rod	1400.601.101.02	2
16	O-ring 16x1,25	6210.015	2
17	cover cap	1400.000.101	2
18	cylinder screw M4x8	6003.002	2
19	piston complete 16x4,5	6211.005	2
20	rod seal 8x15	6216.001	2
21	O-ring 16x1,25	6210.015	2
22	screw-in element	1400.602.101.02	2
23			

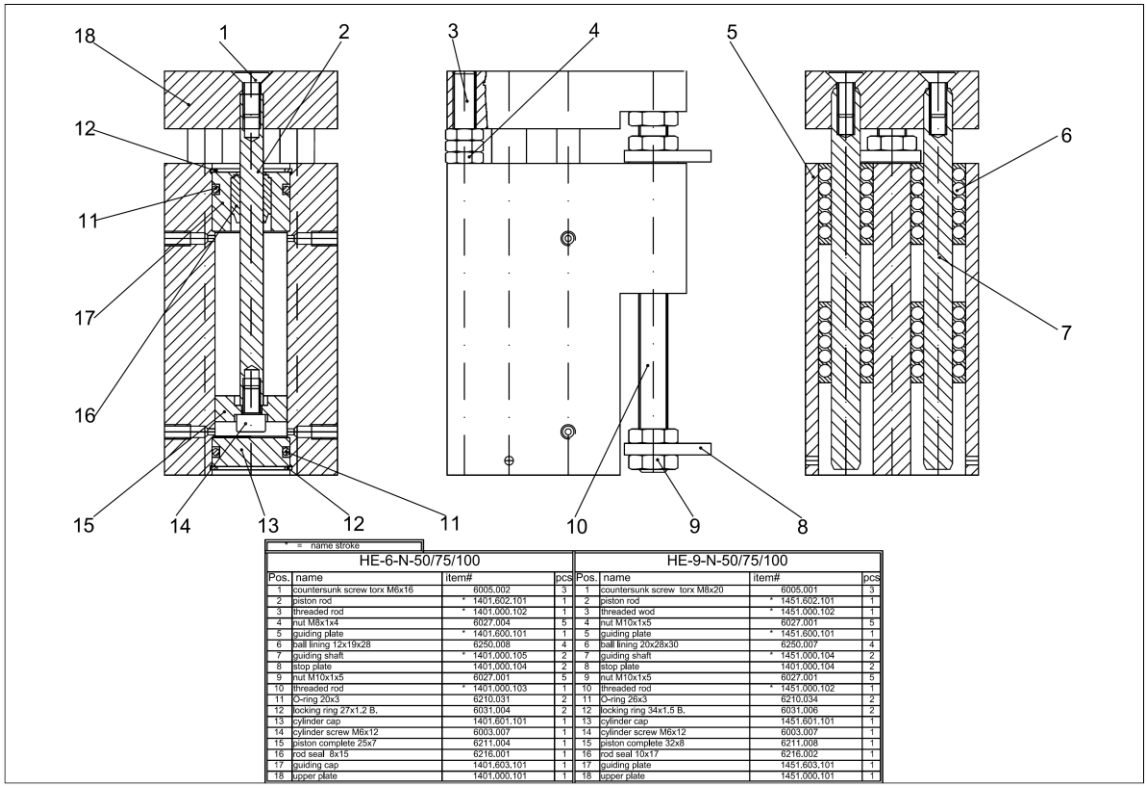
HE-9-N-25

Pos.	name	item#	pcs
1	upper plate	1450.000.102	1
2	countersunk screw Torx M8x20	6005.001	4
3	guiding plate	1450.600.101	1
4	threaded rod	1450.000.103	1
5	wiper G16x22x3	6212.006	2
6	spacer	1450.600.102	2
7	guiding shaft	1450.000.106	2
8	locking ring 28x1,2 B.	6031.005	2
9	cap	1450.000.105	2
10	guiding bush 22x28x47	6256.001	2
11	ball cage 16x48	6251.001	2
12			
13	nut M10x1x5	6027.001	5
14	switching plate	1450.000.104	2
15	piston rod	1450.601.101	2
16	O-ring 24,8x1,5	6210.028	2
17	cover cap	1450.000.101	2
18	cylinder screw M6x10	6004.006	2
19	piston complete 25x7	6211.004	2
20	rod seal 10x17	6216.002	2
21	O-ring 24,8x1,5	6210.028	2
22	screw-in element	1450.602.101	2
23			

Installation guide:

mounting of the rod seal: short lip in direction outside housing. piston seal sided with 2 slots to hexagon socket screw.

HE-6-50/75/100 and HE-9-50/75/100



* = name stroke

HE-6-N-50/75/100

Pos.	name	item#	pcs
1	countersunk screw torx M6x16	6005.002	3
2	piston rod	* 1401.602.101	1
3	threaded rod	* 1401.000.102	1
4	nut M8x1x4	6027.004	5
5	guiding plate	* 1401.600.101	1
6	ball lining 12x19x28	6250.008	4
7	guiding shaft	* 1401.000.105	2
8	stop plate	1401.000.104	2
9	nut M10x1x5	6027.001	5
10	threaded rod	* 1401.000.103	1
11	O-ring 20x3	6210.031	2
12	locking ring 27x1,2 B.	6031.004	2
13	cylinder cap	1401.601.101	1
14	cylinder screw M6x12	6003.007	1
15	piston complete 25x7	6211.004	1
16	rod seal 8x15	6216.001	1
17	guiding cap	1401.603.101	1
18	upper plate	1401.000.101	1

HE-9-N-50/75/100

Pos.	name	item#	pcs
1	countersunk screw torx M8x20	6005.001	3
2	piston rod	* 1451.602.101	1
3	threaded wod	* 1451.000.102	1
4	nut M10x1x5	6027.001	5
5	guiding plate	* 1451.600.101	1
6	ball lining 20x28x30	6250.007	4
7	guiding shaft	* 1451.000.104	2
8	stop plate	1401.000.104	2
9	nut M10x1x5	6027.001	5
10	threaded rod	* 1451.000.102	1
11	O-ring 26x3	6210.034	2
12	locking ring 34x1,5 B.	6031.006	2
13	cylinder cap	1451.601.101	1
14	cylinder screw M6x12	6003.007	1
15	piston complete 32x8	6211.008	1
16	rod seal 10x17	6216.002	1
17	guiding plate	1451.603.101	1
18	upper plate	1451.000.101	1

Fig. 9-1 Spare part list

9.2 Accessories

The following accessories are available from us for the lifting units.

Designation	Type	Remark
Proximity switches	NS-I-04-K/S-27	HEK-4
	NSS-O6,5-S-65	HEK-6
	NSI-Q8-K-44-M NSI-Q8-K-59-M	HE-6 HE-9
Hydraulic shock absorber	STD-8-M	HEK-4
	STD-14-W	HEK-6 HE-6-N-50/75/100 HE-9-N-25* HE-9-N-50/75/100
	STD-10-S	HE-6-N-10/25*
Centering ring	ZR-4	HEK-4
	ZR-6	HEK-6 HE-6
	ZR-9	HE-9
Tandem stop system	TAS-6-HE-10	HE-6-N-10
	TAS-6-HE-25	HE-6-N-25
	TAS-9-HE-25	HE-9-N-25

* Only in combination with matching TAS