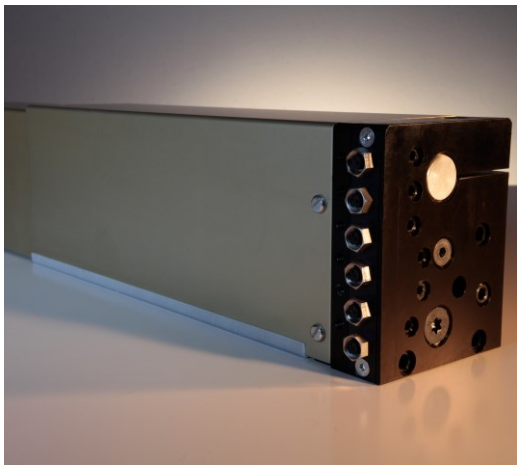
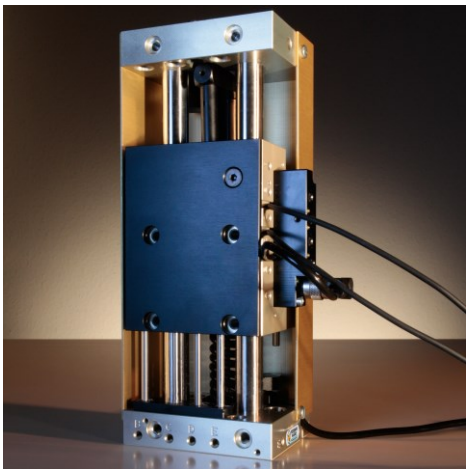
FRIEDEMANN WAGNER
Handhabungstechnik

Installation and Operating Instructions

Linear Unit

Type: LEN; VEN; ZWP





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

Telephone: +49 (0) 7426 / 94900-0
Fax: +49 (0) 7426 / 94900-9
Internet: http://www.wagnerautomation.de
Email: info@wagnerautomation.de

Edition 04/2017
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.

Copyright

Document name:
Dss737 BA_722_Lineareinheit-LEN_VEN_ZWP-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: Linear Unit

Type: LEN-6-X-X-H-X-X-P / VEN-6-X-X-H-X-X-P / ZWP-6-VEN

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 linear 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 linear 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

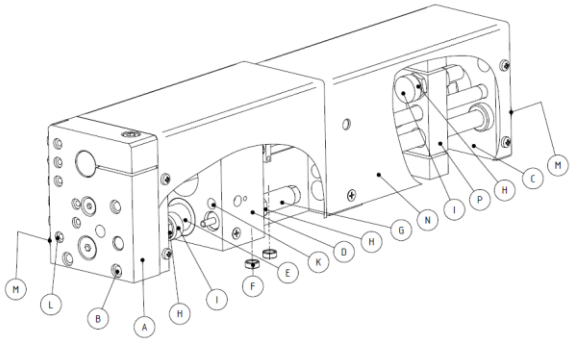
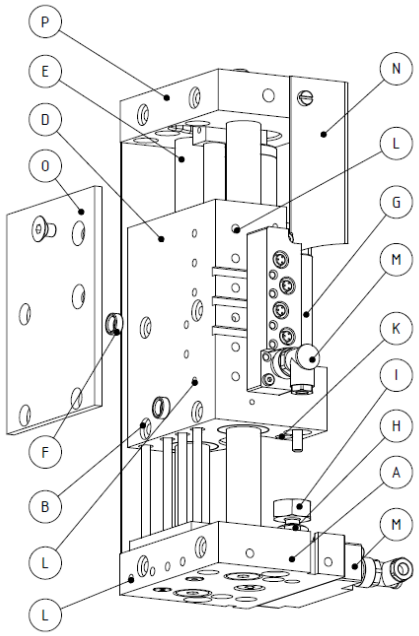
LEN-6-I-X-H-6-6-P	VEN-6-I-X-H-4-4-P
	

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

The LEN / VEN / ZWP linear unit consists of the following main components:	
(A) Head plate	**(H)** Lock nuts for the stop screws
(B) Bores for fastening with centering rings	**(I)** Stop screws
(C) Connection plate	**(K)** Position of the proximity switches
(D) Guide head	**(L)** Air grommets
(E) Guide shafts	**(M)** Signal grommets
(F) Centering rings	**(N)** Cover
(G) Hydraulic shock absorber	**(O)** Cover plate for VEN (option)
	(P) End plate

2.2 Intended use

The linear units were developed to move components or superstructures a defined distance horizontally or vertically. 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 linear unit. The following table explains the type key:

Module	Design size	Version	Stroke	Shock absorber	Energy feedthrough	Drive
LEN	6	I B	100 200 300 400	H	0-0 6-0 6-6	-P
VEN	6	I B	60 120 180 240 300	H	0-0 4-0 4-4	-P
ZWP	6	VEN	60 120 180 240 300	H	4-0	-P
Linear units Intermediate positions		**I=**integration **B=**basic model **VEN=**only for VEN		**H** hydraulic	**0-** pneumatic **-0** electric	**-P** pneumatic

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).
- The threaded bores and centering rings enable easy mounting.
- The speed can be adjusted freely with an external exhaust regulator (not included in the delivery).
- Completely equipped for immediate use.
- Use of the units LEN-6 and VEN-6 for “pick and place” applications.
- Movement to a third position via ZWP-6 intermediate position unit.

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

	LEN-6-B-X-H-0-0-P	LEN-6-I-X-H-6-0-P	LEN-6-I-X-H-6-6-P	VEN-6-B-X-H-0-0-P	VEN-6-I-X-H-4-0-P	VEN-6-I-X-H-4-4-P	ZWP-6-VEN-X-H-4-0-P
Guide	4 linear bushings, sealed on hardened, ground steel shafts			4 linear bushings, sealed on hardened, ground steel shafts			-
Version	Fully equipped			Fully equipped			
Stop	Face			Face			
Cover	●			●			-
Energy feedthrough	-	Air	Air/Signal	-	Air	Air/Signal	Air
Energy feedthrough	0-0	6-0	6-6	0-0	4-0	4-4	4-0
Stroke lengths [mm]	100/200/300/400			60/80/120/240/300			
Adjustment range [mm] Type	19 mm (retracted) 30 mm (extended)			14 mm (retracted) 34 mm (extended)			Complete way
Repeatability [mm]	±0.02						±0.03
Push force at 6 bar [N]	210			150			-
Retraction force at 6 bar [N]	140			85			-
Shock absorbers hydraulic	●			●			●
Cylinder Ø [mm]	25			20			16
Drive	Compressed air (4-8 bar), constant, filtered (10 µm) and dry						
Connection	M5						
Control	4/2; 5/2 directional-control valve, bistable						
Housing material	High strength aluminum, anodized						
Stop system material	Steel						

○ Option /● Included in delivery

Module	LEN-6-B-X-H-0-0-P				LEN-6-I-X-H-6-0-P LEN-6-I-X-H-6-6-P			
Stroke length [mm]	100	200	300	400	100	200	300	400
Weight [kg]	6	7.1	8.2	9.3	6.5	7.6	8.7	9.8
Air consumption double stroke [cm3]	98.2	196	295	393	98.2	196	295	393
Max. payload [kg]	20	15	12	9	20	15	12	9

Module	VEN-6-B-X-H-0-0-P					VEN-6-I-X-H-4-0-P VEN-6-I-X-H-4-4-P				
Stroke length [mm]	60	120	180	240	300	60	120	180	240	300
Weight [kg]	2.2	2.8	3.1	3.7	3.9	2.8	3.2	3.7	4.1	4.5
Air consumption double stroke [cm3]	37.7	75.4	113	151	189	37.7	75.4	113	151	189
Max. payload [kg]	11	10	9	8	7	11	10	9	8	7

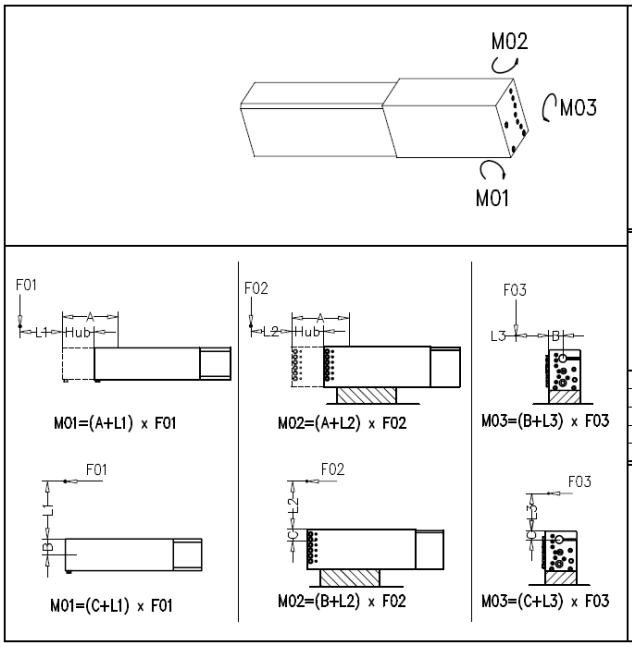
Module	ZWP-6-VEN-X-H-4-0-P				
Stroke length [mm]	60	120	180	240	300
Weight [kg]	1.24	1.26	1.28	1.3	1.32
Air consumption double stroke [cm3]	8	8	8	8	8
Max. payload [kg]	11	10	9	8	7

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.
- Linear 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 linear 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 Characteristics and allowable loads

LEN-6



Linearunit LEN-6-...-100/200/300/400

Zulässige Belastungen statisch/dynamisch
Allowable loads static/dynamic

M01zul [Nm]	M02zul [Nm]	M03zul [Nm]	$C_{st/dyn}$ [N]	A [mm]	B [mm]	C [mm]
118/174	118/174	62/91	1981/2911	74+Hub	37	23

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

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

Lebensdauerberechnung mit Kräften
Lifetime calculation with forces

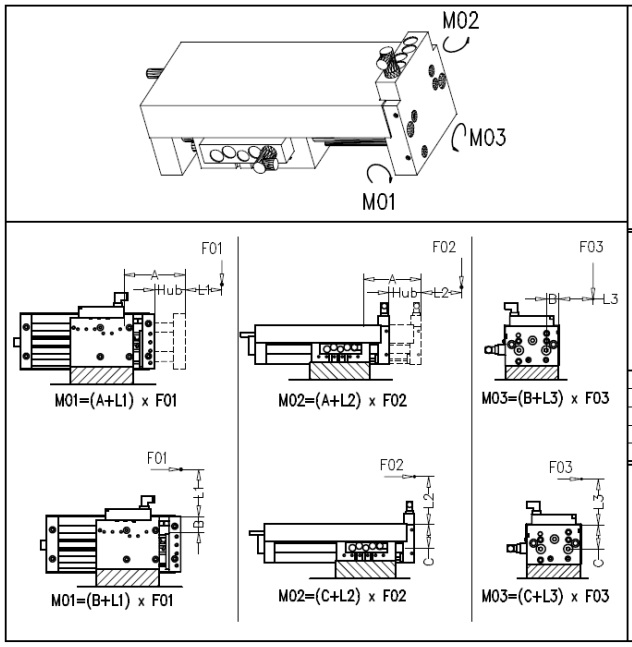
$$L=\left(\frac{C}{F}\right)^3 \times 10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
M_{eff}	effektives (benötigtes) Moment [Nm]	effective (needed) moment [Nm]
C	dynamische Tragzahl [N]	dynamic load rating [N]
F	dynamische Belastung [N]	dynamic load force [N]

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

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

VEN-6



Linearunit VEN-6-...-100/200/300/400

Zulässige Belastungen statisch/dynamisch
Allowable loads static/dynamic

M01zul [Nm]	M02zul [Nm]	M03zul [Nm]	$C_{st/dyn}$ [N]	A [mm]	B [mm]	C [mm]
60/91	60/91	38/58	1624/2469	50+Hub	24	42

Lebensdauerberechnung mit Momenten
Lifetime calculation with moments

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

Lebensdauerberechnung mit Kräften
Lifetime calculation with forces

$$L=\left(\frac{C}{F}\right)^3 \times 10^5$$

L	Lebensdauer [m]	lifetime [m]
M_{zul}	zulässiges Moment [Nm]	allowable moment [Nm]
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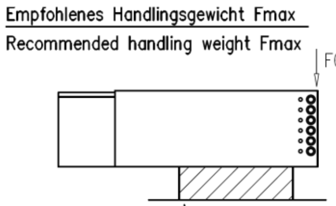
F	dynamische Belastung [N]	dynamic load force [N]

Bei kombinierten Belastungen muss folgende Gleichung erfüllt sein:
By combined loads it must be met next equation:

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

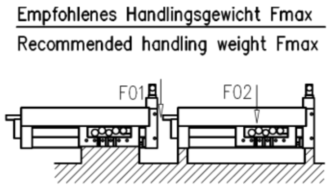
Recommended payload

LEN-6



Hub/Stroke(mm)	F01(N)
100	200N
200	150N
300	120N
400	90N

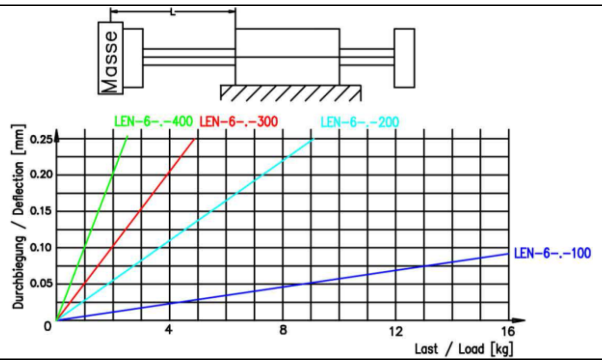
VEN-6

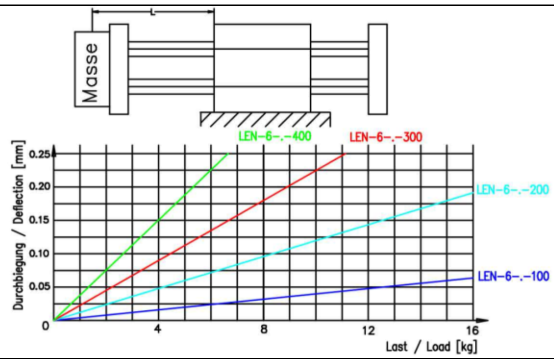


Hub/Stroke(mm)	F01(N)	F02(N)
60	110N	360N
120	100N	240N
180	90N	200N
240	80N	170N

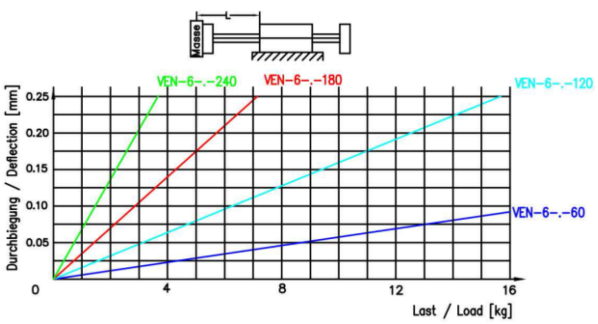
Deflection

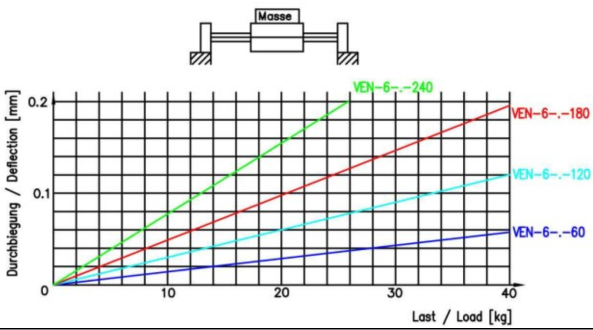
LEN-6

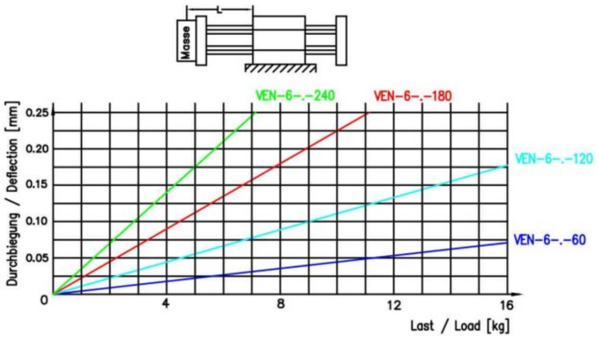




VEN-6







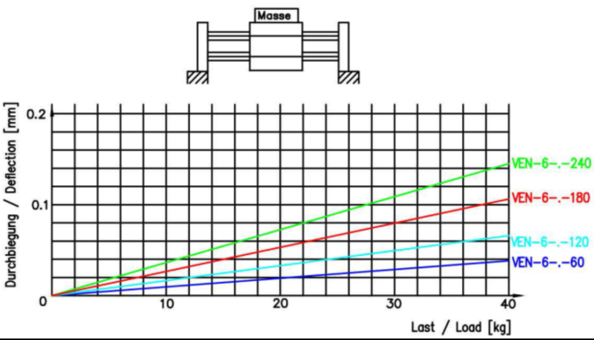


Fig. 2-2 Characteristics and loads

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 linear 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 linear unit before any service, maintenance or modification work. Make sure there are no residual energies present.
- Only use the linear units if they are in perfect technical condition and do not carry out any unauthorized modifications.
- The linear 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 linear 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 linear 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**.*

Otherwise the unit will be damaged.
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**.*

Otherwise the unit will be damaged.
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

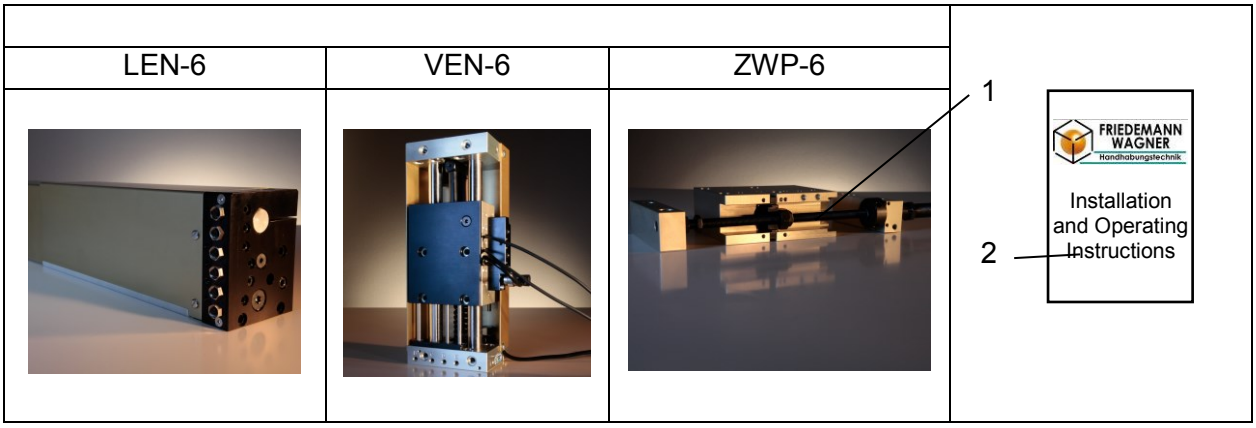


Fig. 5-1 Scope of delivery of the device

The scope of delivery comprises:

LEN-6	VEN-6	ZWP-VEN-6
• Linear unit with sheet metal cover • Set of shock absorbers and proximity switches (mounted) • 3 pc. M6x30 cylinder head screws in unit LEN-6 for mounting of the unit VEN-6 • These installation and operating instructions with declaration of incorporation • 4 pc. ZR-6 centering rings • Cardboard packaging **Version LEN-6–I-X-H-6-6-P:** • Connection cable, 5 m, 10-wire with 12-pole connector • 6 pc. connectors, 3-pole • 6 pc. O-rings, 3.3 x 2.4 **Version LEN-6–B-X-H-0-0-P** • Connection cable, 5 m, 4-wire, with 4-pole connector **Version LEN-6–I-X-H-6-0-P** • Connection cable, 5 m, 4-wire, with 4-pole connector • 6 pc. O-rings, 3.3 x 2.4	• Linear unit with sheet metal cover • Set of shock absorbers and proximity switches (mounted) • These installation and operating instructions with declaration of incorporation • 4 pc. ZR-6 centering rings • Cardboard packaging **Version VEN-6–I-X-H-4-4-P:** • Multiway connectors (mounted) • 6 pc. O-rings, 3.3 x 2.4	• Cylinder block • Counterplate with mounted shock absorber • Threaded rod, preassembled • Front plate • These installation and operating instructions with declaration of incorporation • 8 pc. ZR-6 centering rings • Cardboard packaging • 3 pc. M6x70 cylinder head screws • 16 pc. O-rings, 3.3 x 2.4

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

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

5.3 Mounting

WARNING

Disconnect the linear 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 linear unit

WARNING

When mounting in a vertical position, the slide must always be moved to bottommost position before mounting.

Otherwise light to serious injuries can result from sudden moving masses.

Avoid these dangerous situations!

▶ Place at least 2 diagonally offset centering rings (F) (are included in the delivery) in the holes (B) provided.

▶ Screw the VEN-6 tight with screws.

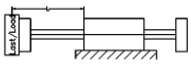
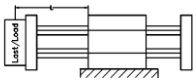
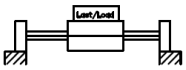
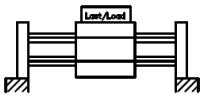
▶ There is a stand available as accessory for mounting of the LEN-6-X.

NOTICE

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

NOTICE

The linear units can also be mounted upright. If used as such, note the allowable loads specified in chapter 2.3.3.

Normal mode		Portal mode (only VEN-6)	
			

5.3.2 Mounting of the ZWP-VEN-6 intermediate position unit

WARNING

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

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

The intermediate position unit makes it possible to move to a third position in the application for VEN-6.

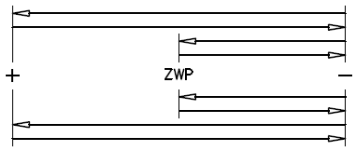


Fig. 5-2 Possible motion sequences with intermediate position unit

The intermediate position unit is delivered dismantled, cf. chapter 5.1 Scope of delivery. To mount the 3 units LEN, VEN and ZWP, proceed as follows:

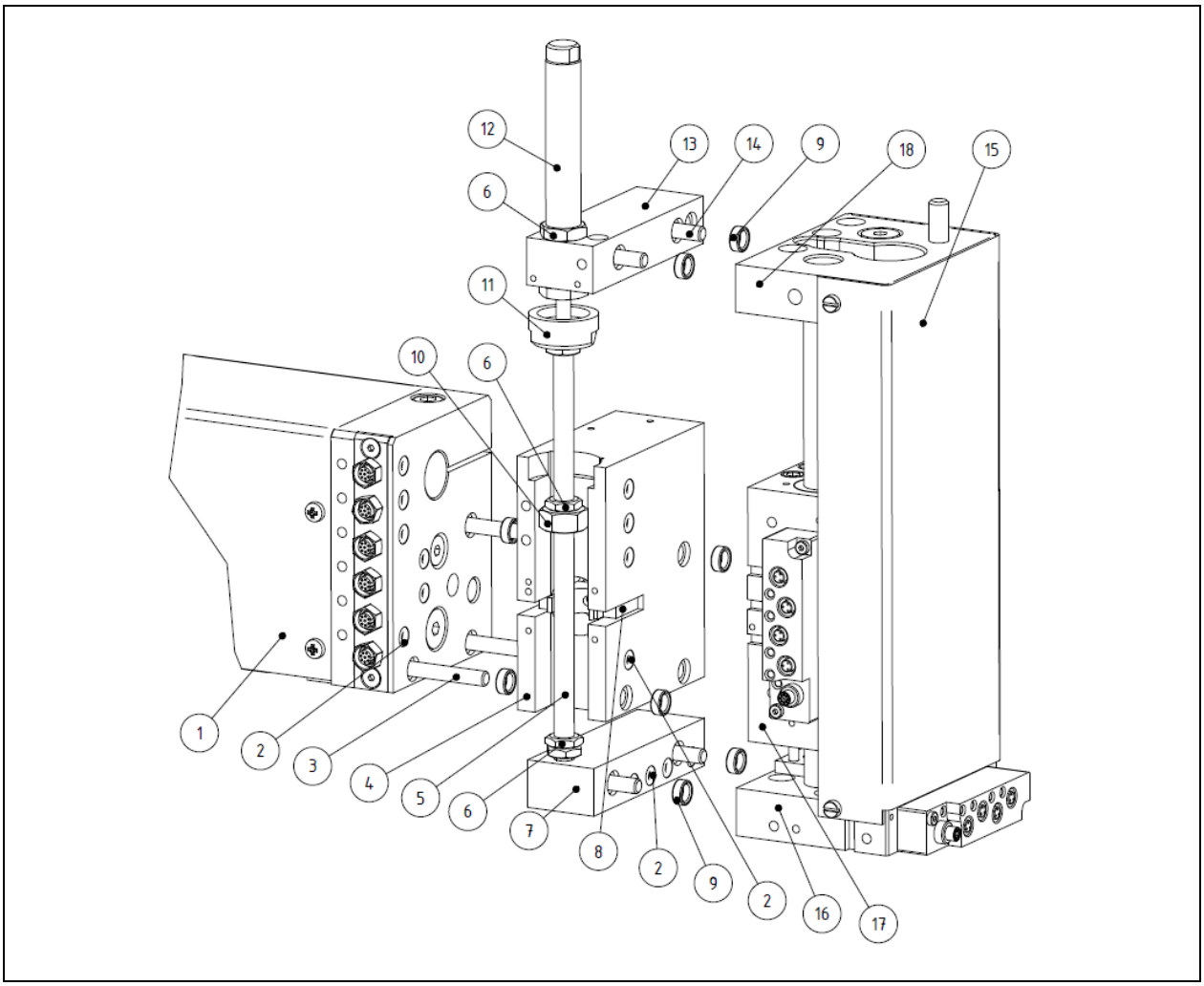


Fig. 5-3 Mounting of the ZWP-VEN-6 intermediate position unit

- ▶ Remove the cover (1) of the LEN-6. Place the enclosed M6x70 screws (3) through the through holes of the head plate (2) of the LEN-6*.
- ▶ Place the centering rings (9) in the head plate of the LEN-6 and place the cylinder block (4) of the ZWP over the protruding screws.
- ▶ Place the centering rings (9) in the guide head (17) of the VEN-6 and then fastening the 3 elements by tightening the screws. The cylinder block (4) of the ZWP is now fixed in sandwich form.
- ▶ Then mount the front plate (7) of the ZWP on the head plate (16) of the VEN-6.
- ▶ Adjust the stroke roughly with the help of the middle two hexagonal nuts (6+10) (size 17 and 13) before mounting. Impact is from above on the stop surface (8).

- ▶ Then insert the threaded rod (5) first into the front plate (7) and then into the counterplate (13) with mounted shock absorber (12).
- ▶ Mount the counterplate (13) on the end plate (18) of the VEN-6.
- ▶ Later use the upper stop of the toroidal area (11) for fine adjustment (+/- 1.5 mm).
- ▶ If the stroke needs to be changed beyond fine adjustment, it might be necessary in the case of ZWP-6-VEN-60 to dismount the counterplate (13) to readjust the stroke.
- ▶ From a free stroke of 120 mm, the stop nuts (6+10) that need to be adjusted can be reached by moving the guide head (17).
- ▶ Set the end-position damping if necessary (cf. separate chapter 5.3.5.2).

* If the ZWP is used without LEN, an own mounting possibility must be fabricated, possibly with other screws. A cover plate VSP-6-VEN is available as accessory for this case of application in order to close the air grommets.

NOTICE

If a centering ring 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

5.3.3 Mounting of superstructures

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

▶ Fasten the superstructures with screws (19) in the threaded holes with the centering rings (9) provided.

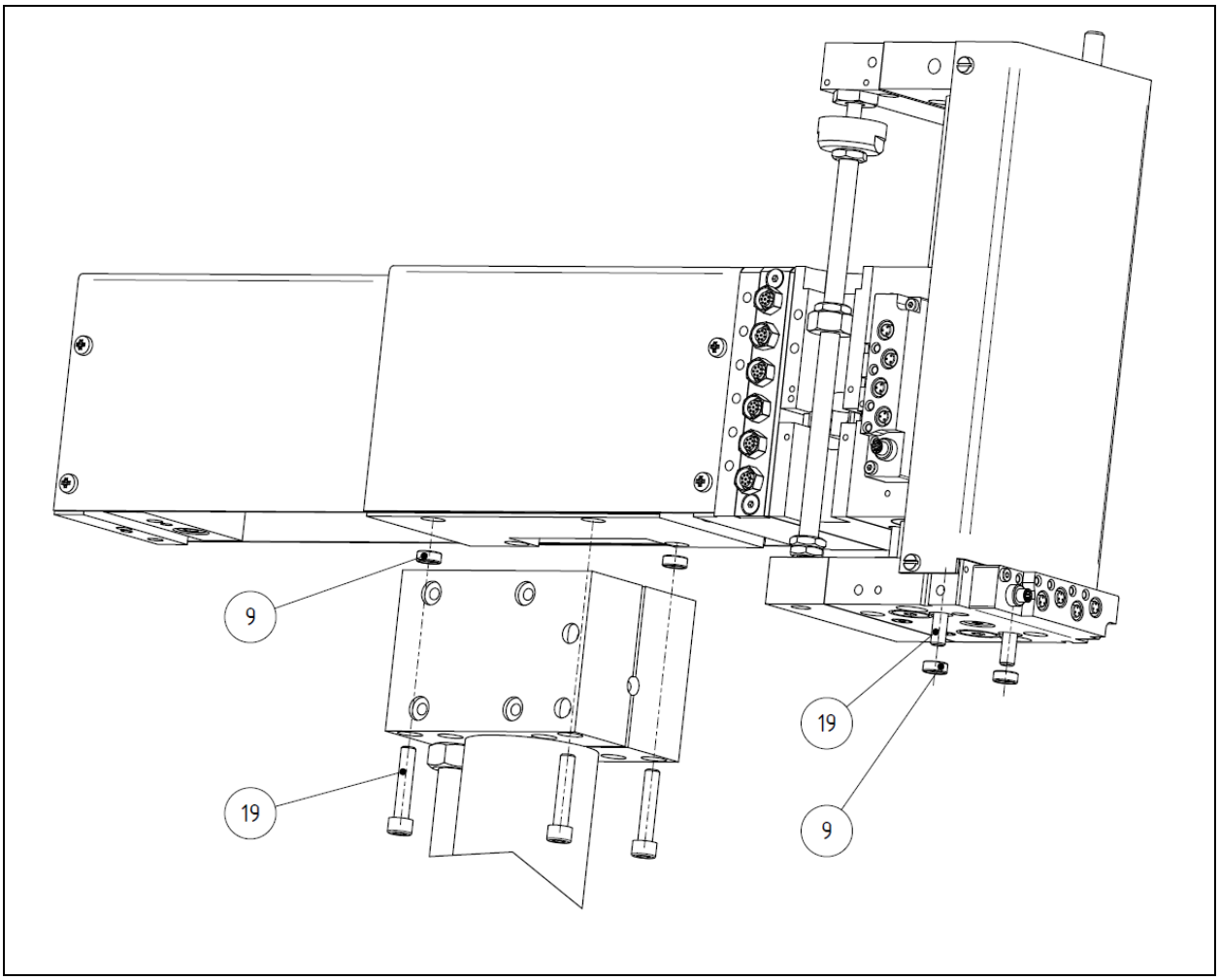


Fig. 5-4 Mounting and mounting of superstructures

5.3.4 Connection examples

WARNING

Disconnect the linear 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 linear unit can be connected.

NOTICE

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

5.3.4.1 Example of standard pneumatic connection

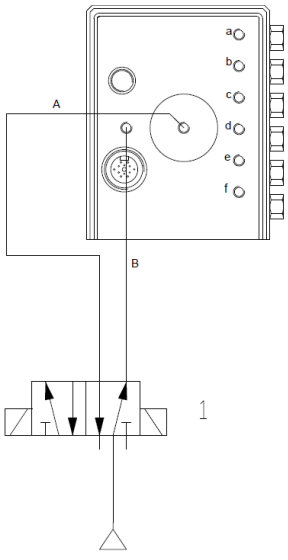
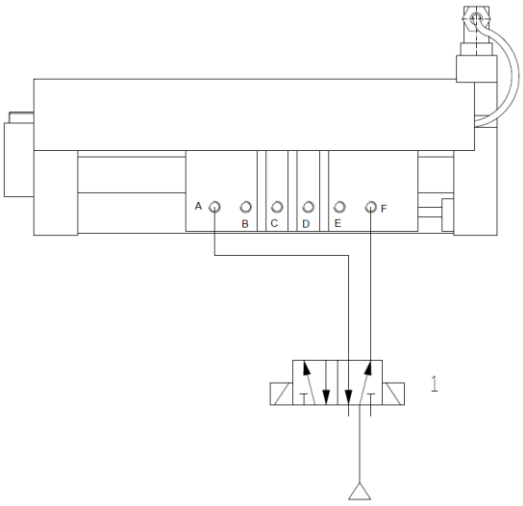
LEN-6	VEN-6
	

Fig. 5-5 Standard circuit

- Compressed air connection A (extend)
- Compressed air connection B/F (retract)
- 5/2 control valve, bistable

5.3.4.2 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.

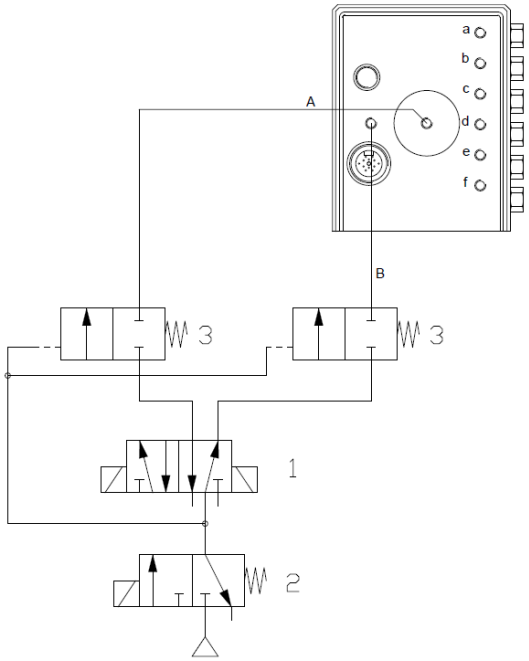
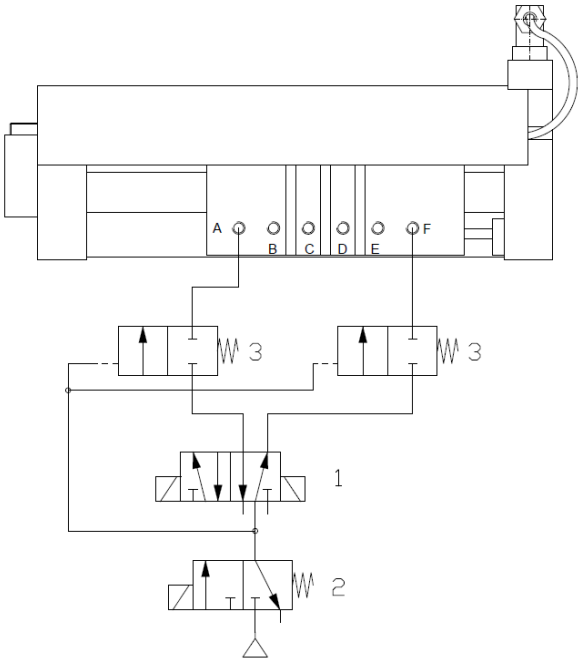
LEN-6	VEN-6
	

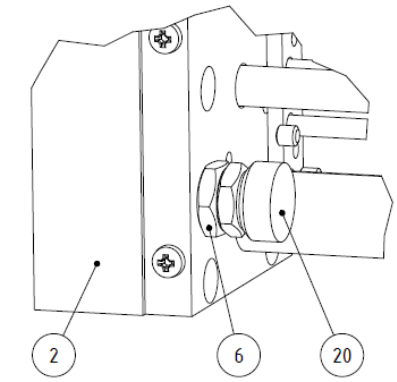
Fig. 5-6 Emergency stop circuit

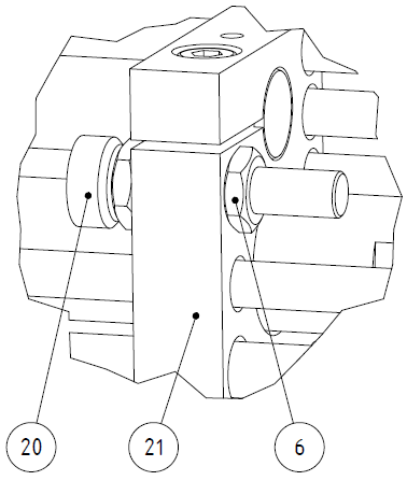
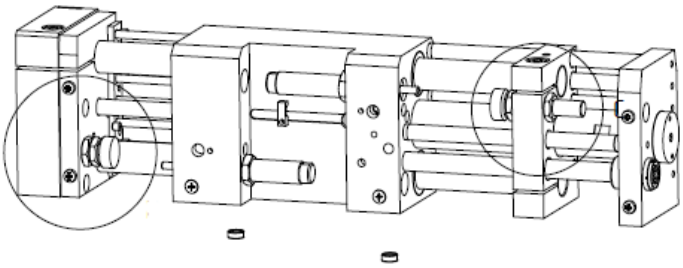
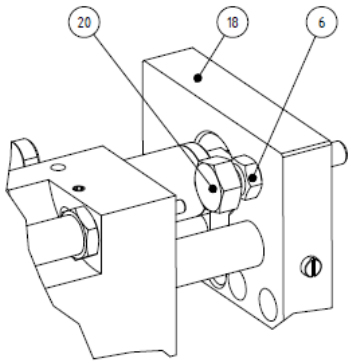
A. Compressed air connection A (extend)
B. Compressed air connection B/F (retract)
1. 5/2 control valve, bistable
2. 3/2 control valve, monostable / emergency stop
3. Piloted non-return valve

5.3.5 Adjustment possibilities for the linear unit

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

▶ Dismount the cover.

<table>
<tr>
<td>LEN-6
 


</td>
<td> 
▶ The stop system works by way of two stop screws (2), which are locked differently with nuts (6) for design reasons.
▶ Loosen the hexagonal nuts (6), turn the stop screw in or out and then lock the stop screw against the head plate (2) and end plate (21) with the hexagonal nuts (6).</td>
</tr>
<tr>
<td>VEN-6
 
</td>
<td>▶ The stop system works by way of hexagonal stop screws (20), each of which is locked with a nut (6).
▶ Loosen the hexagonal nut (2), turn the stop screw in or out and then lock the stops again against the head plate (16) and end plate (18) with the hexagonal nut (2).</td>
</tr>
</table>

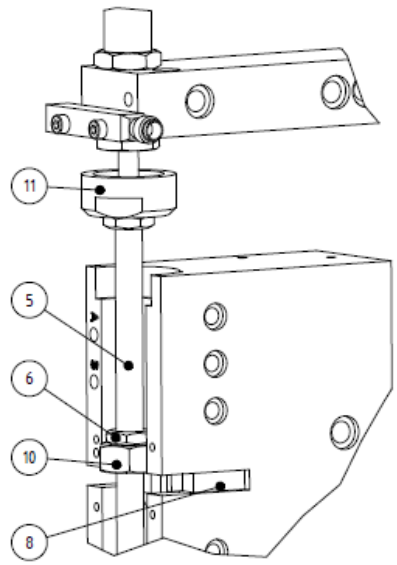
ZWP-6-VEN  	▶ The stop system works by way of hexagonal nuts (6+10) from above on a U-shaped stop surface (8). ▶ Loosen the two middle hexagonal nuts (6+10) of the threaded rod (5). ▶ Turn the threaded rod to the required position for stroke adjustment and then lock the two nuts against each other again. ▶ Use the upper stop of the toroidal area (11) for fine adjustment (+/- 1.5 mm). ▶ Cf. also chapter 5.3.2 Mounting of the ZWP in this regard.

Fig. 5-7 Adjustment possibilities for the linear unit

After adjusting the stroke, it might be necessary to readjust the shock absorber, 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.*

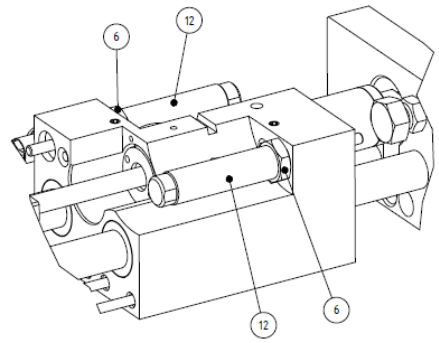
The speed can be adjusted to the load by an external exhaust regulator (not included in the delivery). If the regulator is set too fast, this will cause hard stopping and bouncing. This can also have a negative effect on the lifetime of the linear unit and even result in destruction of its mechanical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

5.3.5.2 Set shock absorber

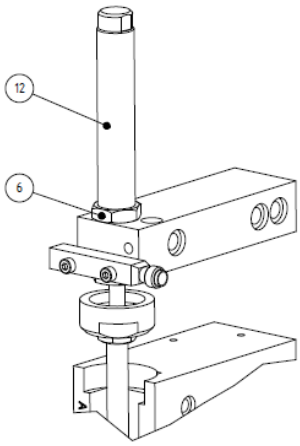
	WARNING
	Take special care whenever carrying out adjustment work and keep sufficiently far away from danger zones. ***Otherwise light to serious injuries can result.*** *Wear personal protective equipment such as gloves or safety glasses if necessary.*

The strength of the shock absorber must be adjusted to the load. If the shock absorber is set too hard, it is possible for the linear unit to bounce and it does not reach end position. If the shock absorber is set too soft, this will cause hard stopping and bouncing. This can also have a negative effect on the lifetime of the linear unit and even result in destruction of its mechanical components.

- ▶ Depending on the mass being moved and the speed, there are kinetic energies in the system that are absorbed by hydraulic shock absorbers.
- ▶ The units LEN-6, VEN-6 and ZWP-6-VEN are already equipped in their standard configuration with adjustable hydraulic shock absorbers of the type STD-14-W.
- ▶ To adjust, dismount any covers present.
- ▶ Move the head plate manually to end position and leave it there.

Unit	Mount for shock absorber
LEN-6 / LEN-6 	▶ The mount for the shock absorber (12) is located in the central guide head. The shock absorbers are locked with a hexagonal nut (6).

ZWP-6-VEN



▶ The shock absorber (12) is located in the counterplate, clamped by a hexagonal nut (6).

Fig. 5-8 Mounts for shock absorbers

NOTICE

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

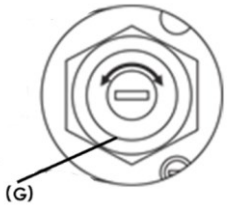


Fig. 5-9 Set shock absorber for STD-14

Set shock absorber harder

Turn the adjusting screw to the right.

Set shock absorber softer

Turn the adjusting screw to the left.

NOTICE

Only adjust the damping action with the adjusting screw (STD-14). If the damping action is still too hard even though the adjusting screw is open, the damping action must be adjusted via the shock absorber stroke.

Pressurize the system with compressed air and let the linear unit drive into the end positions. Adjustment is correct when the end positions are reached without visible delay and without bouncing.

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 linear 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.
- ▶ Start a trial run.
- ▶ Set the required speed.
- ▶ Set the shock absorbers.
- ▶ End the trial run.

5.4.1 Mounting and connection of proximity switches (partly accessories)

WARNING

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

Otherwise light to serious injuries can result.

Avoid these dangerous situations!

NOTICE

The standard ZWP-6-VEN 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 linear 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 - this can lead to damage and destruction of parts.

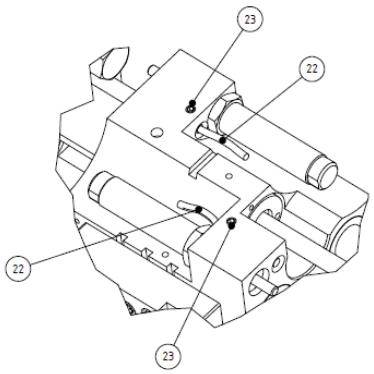
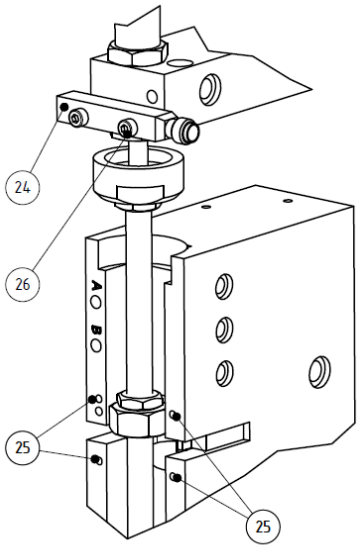
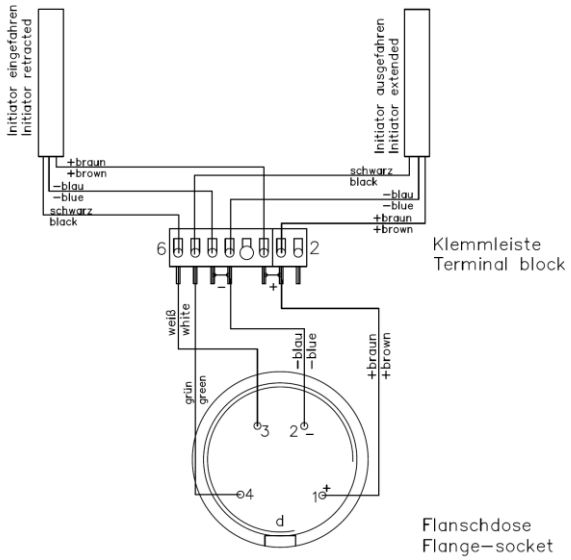
Unit	Mounting/Replacement
LEN-6 / VEN-6 	The proximity switch sets (22) are already mounted in the guide head. If replacement is necessary, take off the cover and loosen the set screws (23). After fine adjustment, clamp the proximity switches again with the set screws (2 Nm). Set the proximity switches 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 because otherwise the linear unit will not reach end position. Due to the very compact construction of VEN-6, there are grooves in the support of the guide head for the cables.
ZWP-6-VEN 	The quadratic proximity switches (24) from the range of accessories are fastened at the corresponding threaded bores (25) with M3x12 screws (26). No further adjustments must be made to these proximity switches. The upper proximity switch reports that the intermediate position has been reached and the proximity switch in the area of the stop reports when the stop has been extended.

Fig. 5-10 Mounting and connection of proximity switches

5.4.2 Connection of the integrated proximity switches

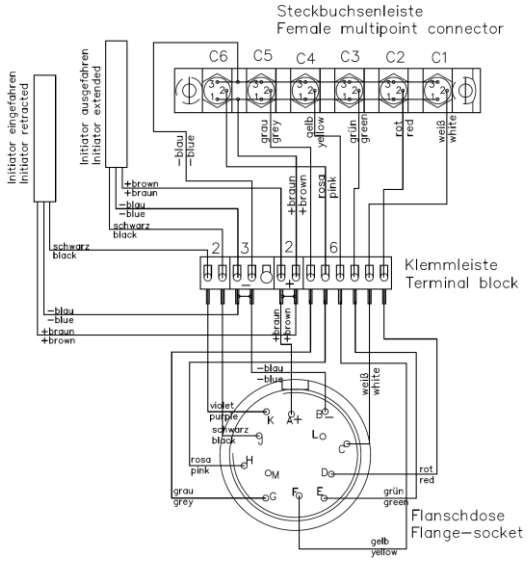
LEN	VEN
The versions LEN-6-B-X-H-0-0-P and LEN-6-I-X-H-6-0-P have a 4-pole M16x0.75 socket at the connection plate with cable, 5 m including connector, for connection of the integrated proximity switches.	The proximity switches are mounted and equipped with cables with free ends.
The version LEN-6-I-X-H-6-6-P has a 12-pole M16x0.75 at the connection plate with enclosed cable, 5 m with connector, for connection of the integrated proximity switches and the implemented signals.	

Assignment 4-pole socket



Color	Pole	Function
Green	4	Proximity switch: extended
White	3	Proximity switch: retracted
Blue	2	-
Brown	1	+

Assignment 12-pole socket



Color	Pole	Function
Black	J	Proximity switch: extended
Violet	K	Proximity switch: retracted
Blue	B	-
Brown	A	+
White	C	C1
Red	D	C2
Green	E	C3
Yellow	F	C4
Gray	G	C5
Pink	H	C6

Fig. 5-11 Connection of the integrated proximity switches

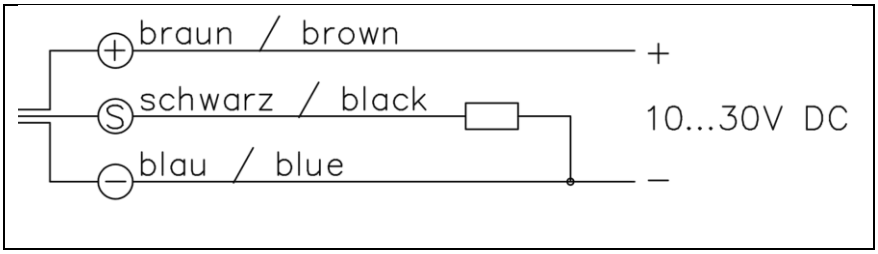


Fig. 5-12 Connection diagram for proximity switches

Technical data

Type	NSS-O8-K-29	NSI-Q8-K-44	NSI-Q8-S-59
Switching distance	0.8 mm	1.5 mm	1.5 mm
Circuit type	PNP	PNP	PNP
Switching characteristic	NO	NO	NO
Supply voltage	10-30 V DC	10-30 V DC	10-30 V DC
Current consumption	<10 mA	<10 mA	<10 mA
Switching current	Max. 100 mA	Max. 200 mA	Max. 200 mA
Switching frequency	Max. 1.5 kHz	Max. 3 kHz	Max. 3 kHz
LED	Yes	Yes	Yes
Protected against polarity reversal	Yes	Yes	Yes
Short-circuit proof	Yes	Yes	Yes
Protection	IP 67	IP 67	IP 67
LEN-6, VEN-6	●		
ZWP-6-VEN	(●)	●	●

5.4.3 Repair / Replacement of the hydraulic shock absorber

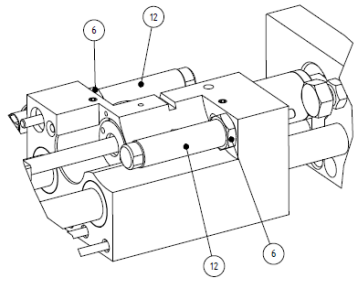
WARNING

Work may only be carried out by specially trained personnel because the device is pressurized.

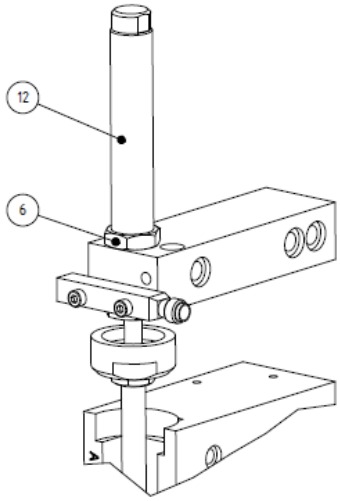
Otherwise light to serious injuries can result.

Avoid these dangerous situations!

LEN-6 and VEN-6



ZWP-6-VEN



- Loosen the hexagonal nut (6).
- To dismount the shock absorber (12), screw it out of the mount anticlockwise. Screw in the new shock absorber (12) until its housing rests against the stop. Cf. chapter 5.3.5.2 / Set shock absorber
- Then screw the shock absorber (12) out again by at least half a revolution and lock it with the hexagonal nut (6).
- The action of the shock absorber can be influenced/set by screwing in or out. This is particularly necessary when third-party shock absorbers that cannot be adjusted externally with an adjusting screw are used. In this case screw the shock absorber out a little further!
- Proceed in the same way to replace the second shock absorber.

  Pressurize the system with compressed air and let the linear unit drive into the end positions. Adjustment is correct when the end positions are reached without visible delay and without bouncing.

Fig. 5-13 Repair / Replacement of the hydraulic shock absorber

Technical data

Type	STD-14-W
Fastening	M14 x 1
Stroke	12 mm
Impact speed (min./max.)	0.4/5.0 m/s
Absorption	30 Nm
Damping work max.	50,000 Nm/h
Material	Steel
Weight	0.065 kg

5.4.4 Air grommets

In linear units with air grommets, connect the compressed air supply hoses to the connections of the device (identifier A, B, etc.). Connect the mounted peripherals by tapping the air for the peripherals directly at the linear unit in accordance with the corresponding letter for the supply.

NOTICE

The units LEN and VEN are matched to each other.
LEN-6-I-X-H-6-X-P has 6 air grommets. Six matching O-rings are therefore included in the delivery of the LEN-6.

Two connections are tapped for operation of the VEN-6. VEN-6-I-X-H-4-X-P therefore has 4 remaining air grommets.

NOTICE

The head plate of the LEN-6 is delivered ex works with individually closed air grommets on the front side.
Tapping for integration is effected on the side so that the head plate can be used for loads. If, however, the front-side air grommets are used, their set screws and balls must first be removed. Matching 3.3x2.4 O-rings are enclosed with the delivery for use of the front grommets.

In this case the side outlets must be closed with M5 sealing plugs (not included in the delivery).

NOTICE

Malfunctions will occur if compressed air openings are not blocked.

Therefore make sure that unused connection possibilities are blocked.

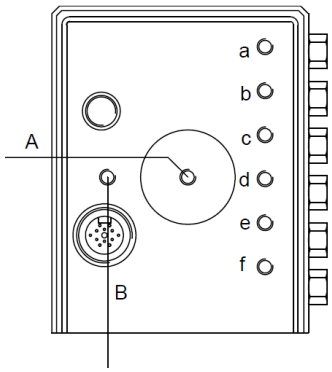
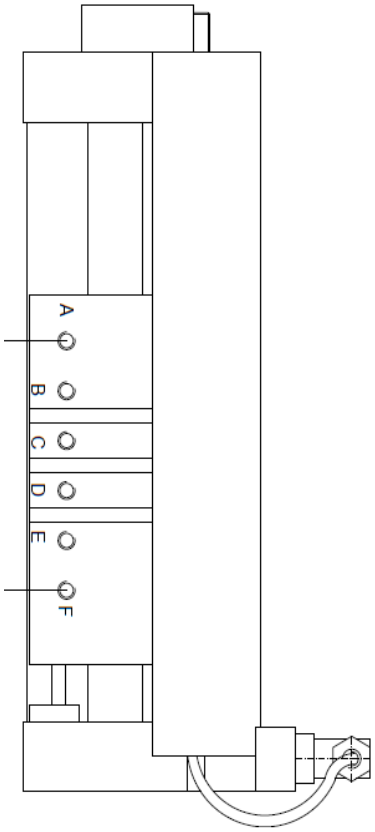
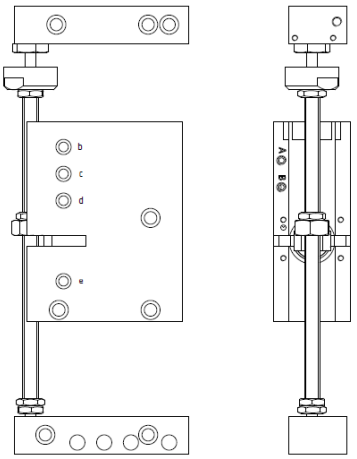
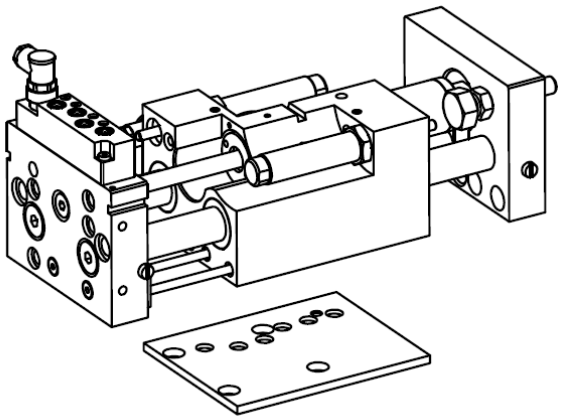
LEN	VEN	ZWP
		
LEN A: extend; B: retract	**VEN** A: extend; F: retract	**ZWP** A: extend; B: retract

Fig. 5-14 Air grommets

Operation LEN with VEN+ZWP	Operation LEN only with VEN	VEN in operation with ZWP-6-VEN
a: Extend VEN b: Grommet c: Grommet d: Retract ZWP e: Extend ZWP f : Retract VEN	a: Extend VEN b: Grommet c: Grommet d: Grommet e: Grommet f : Retract VEN	B: Grommet C: Grommet D: Grommet E: Grommet Connection directly at the cylinder block of the ZWP A: Extend B: Retract For this, the set screws and balls must first be removed from the front connections A and B and the side grommets closed with a cover plate (accessory).

NOTICE

If the linear unit VEN-6 is mounted without the matching unit LEN-6, the air grommets not needed can be closed "en bloc" with a cover plate (accessory).



First place 2 centering rings in the VEN diagonally. Then place 6 O-rings in the cover plate to seal the channels.
Fasten this component to the VEN with a countersunk screw.

For further mounting, position the centering rings directly over the centering rings in the grommet bore of the plate (projection for further mounting).

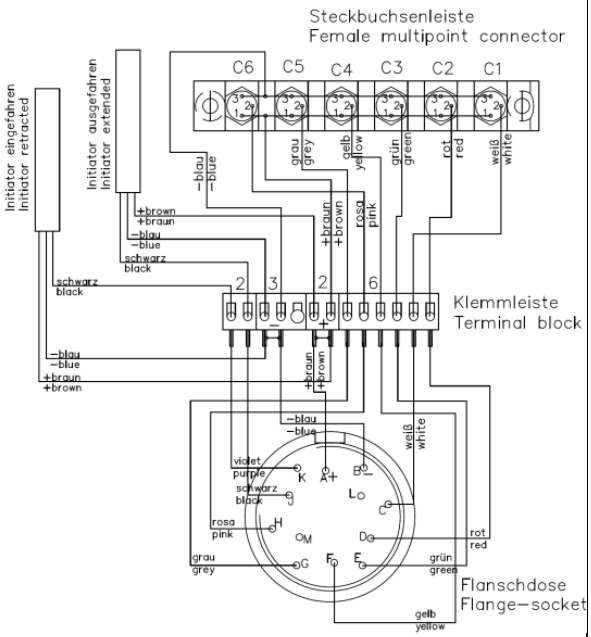
5.4.5 Electric signal grommets

NOTICE

The two units are matched to each other. LEN-6-I-X-H-6-6-P has 6 signal grommets. Two connections are tapped for operation of the VEN-6; VEN-6-I-X-H-4-4-P therefore has 4 remaining signal grommets.

LEN-6-I-X-H-6-6-P

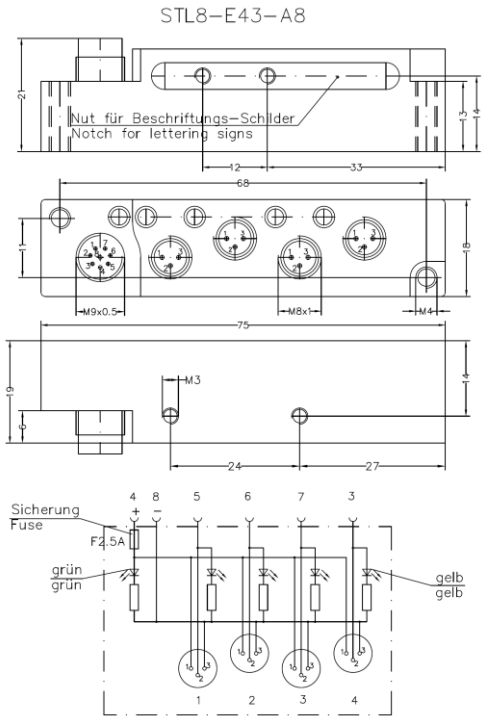
The signal lines can be connected on the side at the front of the LEN-6 via 6 individual three-pole connection sockets (C1-C6) and are collected at the 12-pole socket.



Color	Pole	Function
Black	J	Proximity switch: extended
Violet	K	Proximity switch: retracted
Blue	B	-
Brown	A	+
White	C	C1
Red	D	C2
Green	E	C3
Yellow	F	C4
Gray	G	C5
Pink	H	C6

VEN-6-I-X-H-4-4-P

Connect the signal transmitters via the 3-pole sockets on the multiway connector at the head plate (input). This multiway connector (IP 67) collects the signals and passes them through the unit to the multiway connector on the guide head (long side of the VEN).
From there they can then be forwarded, e.g. to the controller or the LEN-6-I-X-6-6-P.



If the VEN is operated without LEN, signals from the superstructures can be tapped by the front plate multiway connector directly at the 8-pole connector and forwarded to the controller per bus. In this case the multiway connector at the guide head is bypassed. Alternatively, the multi-pole plug connection at the multiway connector of the guide head can be detached and, using a matching mating connector, a bus to the controller installed.

Fig. 5-15 Electric signal grommets

6 Maintenance/Servicing

WARNING

Disconnect the linear 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 linear unit can age depending on use; we therefore recommend that you send the device in to us for servicing every 3 years, after 10,000,000 cycles (for ZWP 20,000,000 cycles) or should you notice a fault in the movement.

Only clean the linear 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 regulator correctly
	Air ducts are blocked	Clean air ducts with compressed air
No movement	Connected incorrectly	Connect compressed air connections correctly
	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 and pressurize with compressed air
	Regulator is turned in too far	Set regulator correctly
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 5.4.3.
End position is not reached No switching signal	Shock absorber turned in too far	Mount shock absorber (G) correctly, see chapter 5.4.3
	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.
- 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).

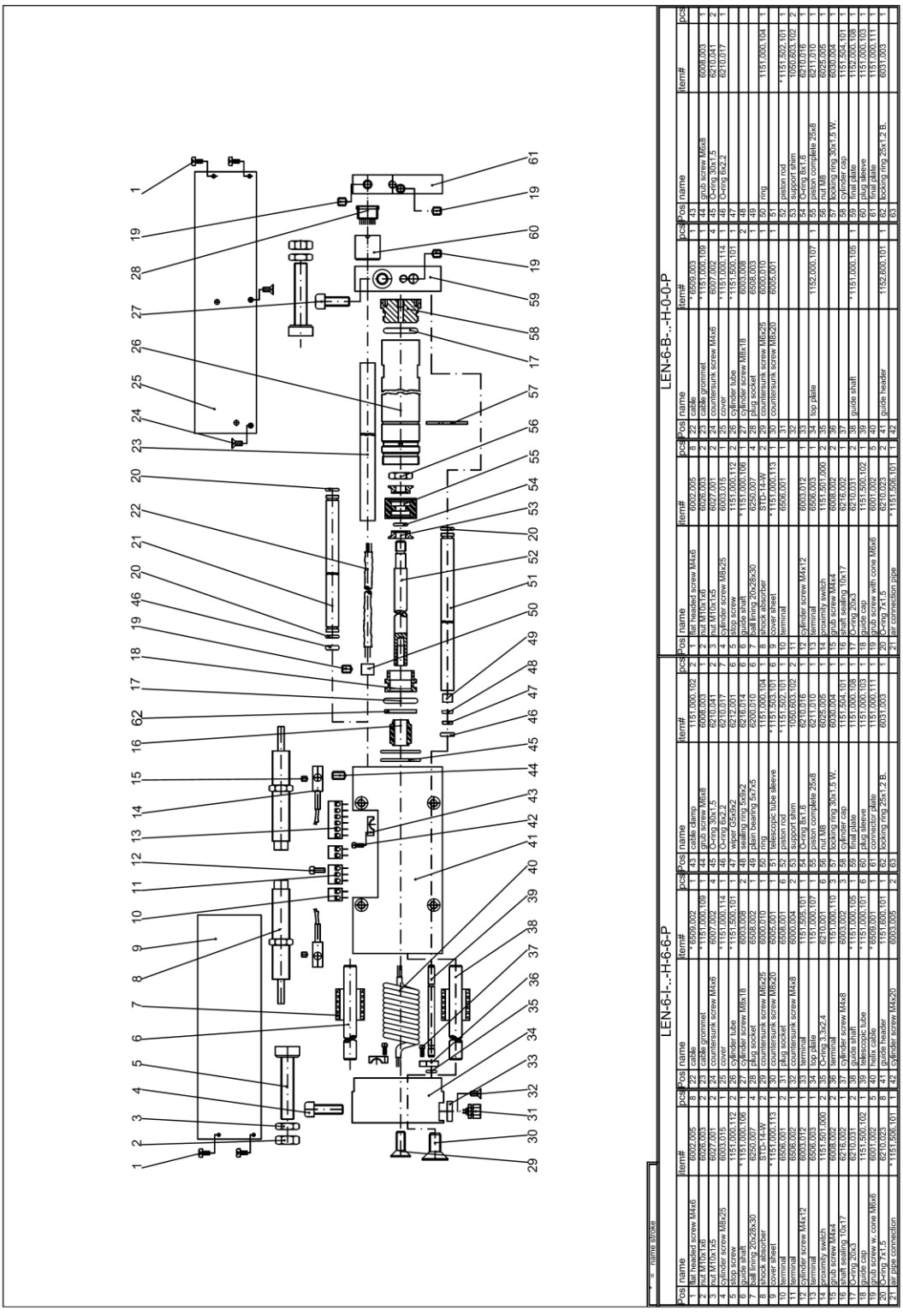
All parts touched by media must be decontaminated before disposal. Hazardous substances are to be removed from the device.
For proper disposal of hazardous substances, observe the material safety data sheets (MSDS) and current applicable disposal regulations.

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

LEN-6



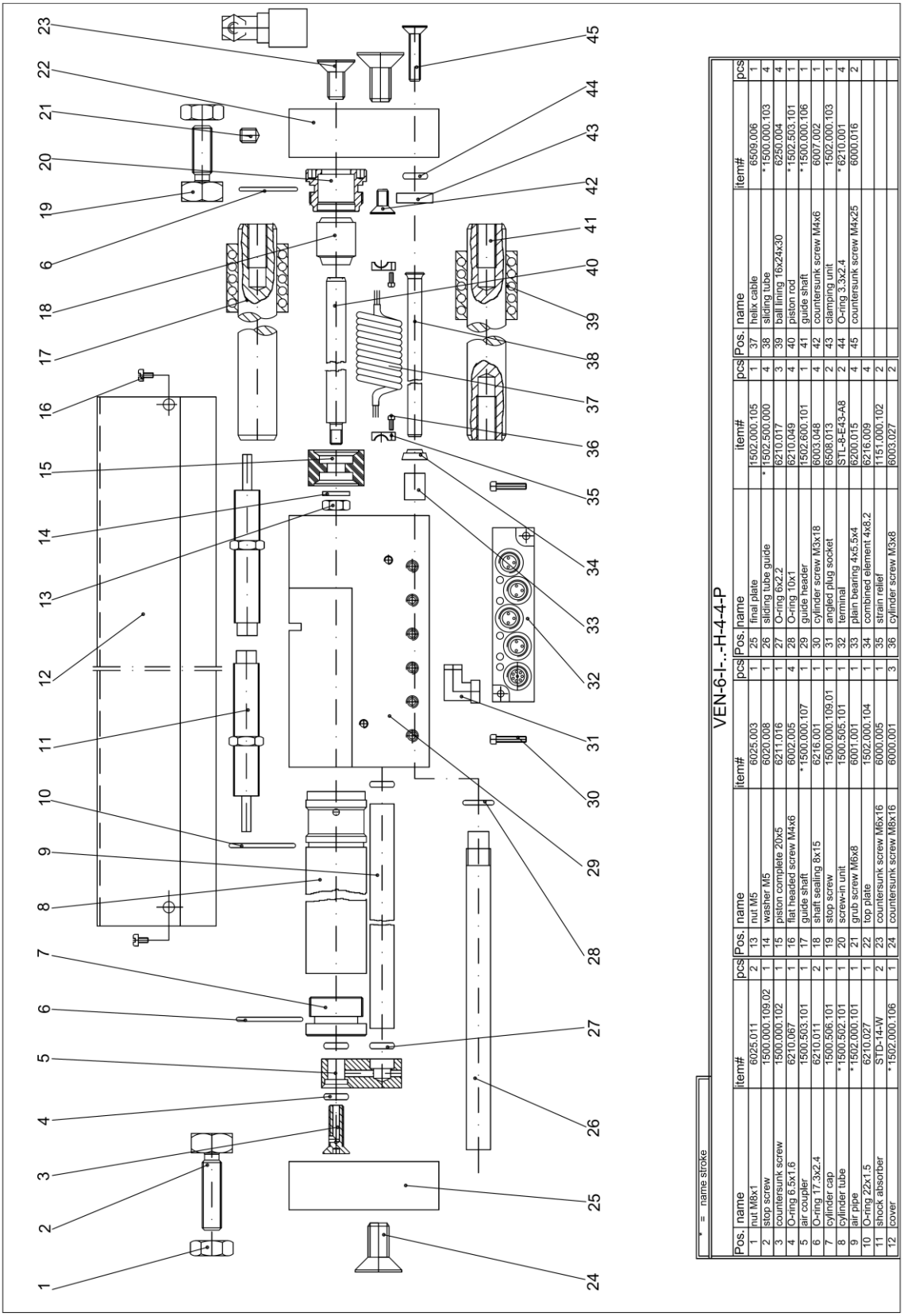
LEN-6-I-..-H-6-6-P

Pos	name	item#	pcs
1	flat headed screw M4x6	6002.005	8
2	nut M10x1x6	6026.003	2
3	nut M10x1x5	6027.001	2
4	countersunk screw M8x25	6027.002	4
5	stop screw	6212.001	2
6	guide shaft	6218.014	2
7	ball lining 20x28x30	6250.007	4
8	shock absorber	STD-14-W	2
9	cover sheet	6305.001	1
10	terminal	6506.003	2
11	terminal	6506.004	2
12	cylinder screw M4x12	6003.012	1
13	terminal	6506.003	1
14	proximity switch	6211.010	1
15	grub screw M4x4	6025.005	1
16	nut M8	6210.001	6
17	O-ring 3,3x2,4	6210.004	1
18	guide cap	6305.002	2
19	grub screw w. cone M6x8	6001.002	5
20	O-ring 7x1,5	6210.023	8
21	air pipe connection	1151.506.101	1
22	cable	*8599.002	1
23	cable grommet	**1151.000.109	1
24	countersunk screw M4x6	6007.002	4
25	cover sheet	6212.002	2
26	cylinder tube	*1151.000.112	2
27	cylinder screw M8x18	*1151.000.106	1
28	plug socket	6308.002	1
29	countersunk screw M8x25	6000.010	1
30	countersunk screw M8x20	6305.001	1
31	terminal	6506.004	2
32	support shim	1050.803.102	2
33	terminal	1151.506.101	1
34	top plate	1151.000.107	1
35	O-ring 3,3x2,4	6210.001	1
36	terminal	6506.002	2
37	cover cap	6305.003	2
38	guide shaft	*1151.000.105	1
39	telescopic tube	*1151.000.101	1
40	helix cable	*8599.001	1
41	guide header	*1151.600.101	1
42	cylinder screw M4x20	6003.005	2
43	cable clamp	1151.000.102	2
44	grub screw M6x8	6008.003	1
45	O-ring 30x1,5	6210.041	4
46	O-ring 5,2x2,4	6210.035	2
47	washer 5,5x8x2	6212.011	6
48	sealing ring 5x8x2	6218.014	6
49	plain bearing 5x7x5	6200.010	6
50	ring	1151.000.104	1
51	telescopic tube sleeve	*1151.303.101	1
52	cover sheet	*1151.000.113	1
53	support shim	1050.803.102	2
54	O-ring 8x1,8	6210.016	1
55	piston complete 25x8	6211.010	1
56	nut M8	6026.003	1
57	locking ring 30x1,5 W.	6030.004	1
58	guide sleeve	*1151.303.101	1
59	final plate	1151.000.111	1
60	plug sleeve	1151.000.103	1
61	final plate	1151.000.111	1
62	locking ring 25x1,2 B.	6031.003	1
63			

LEN-6-B-..-H-0-0-P

Pos	name	item#	pcs
1	flat headed screw M4x6	6002.005	8
2	nut M10x1x6	6026.003	2
3	nut M10x1x5	6027.001	2
4	countersunk screw M4x6	6007.002	4
5	stop screw	6212.001	2
6	guide shaft	*1151.000.106	1
7	ball lining 20x28x30	6250.007	4
8	shock absorber	STD-14-W	2
9	cover sheet	*1151.000.113	1
10	terminal	6506.001	1
11			
12	cylinder screw M4x12	6003.012	1
13	terminal	6506.003	1
14	proximity switch	1151.501.000	2
15	grub screw M4x4	6006.002	2
16	shaft collar 10x17	6210.031	2
17	O-ring 20x2,5	6210.051	2
18	guide cap	1151.500.102	1
19	grub screw with cone M6x8	6001.002	5
20	O-ring 7x1,5	6210.023	2
21	air connection pipe	*1151.506.101	1
22	cable	*8599.003	1
23	cable grommet	**1151.000.109	1
24	countersunk screw M4x6	6007.002	4
25	cover sheet	6212.002	2
26	cylinder tube	*1151.500.101	1
27	cylinder screw M8x18	6003.008	2
28	plug socket	6508.003	1
29	countersunk screw M8x25	6000.010	1
30	countersunk screw M8x20	6005.001	1
31			
32			
33	top plate	1152.000.107	1
34			
35			
36			
37			
38	guide shaft	*1151.000.105	1
39			
40			
41	guide header	1152.600.101	1
42			
43			
44	grub screw M6x8	6008.003	1
45	O-ring 30x1,5	6210.041	2
46	O-ring 5,2x2,4	6210.035	4
47			
48			
49			
50	ring	1151.000.104	1
51			
52	piston rod	*1151.502.101	1
53	support shim	1050.803.102	2
54	O-ring 8x1,8	6210.016	1
55	piston complete 25x8	6211.010	1
56	nut M8	6026.005	1
57	locking ring 30x1,5 W.	6030.004	1
58	guide sleeve	*1151.303.101	1
59	final plate	1152.000.108	1
60	plug sleeve	1151.000.103	1
61	final plate	1151.000.111	1
62	locking ring 25x1,2 B.	6031.003	1
63			

VEN-6

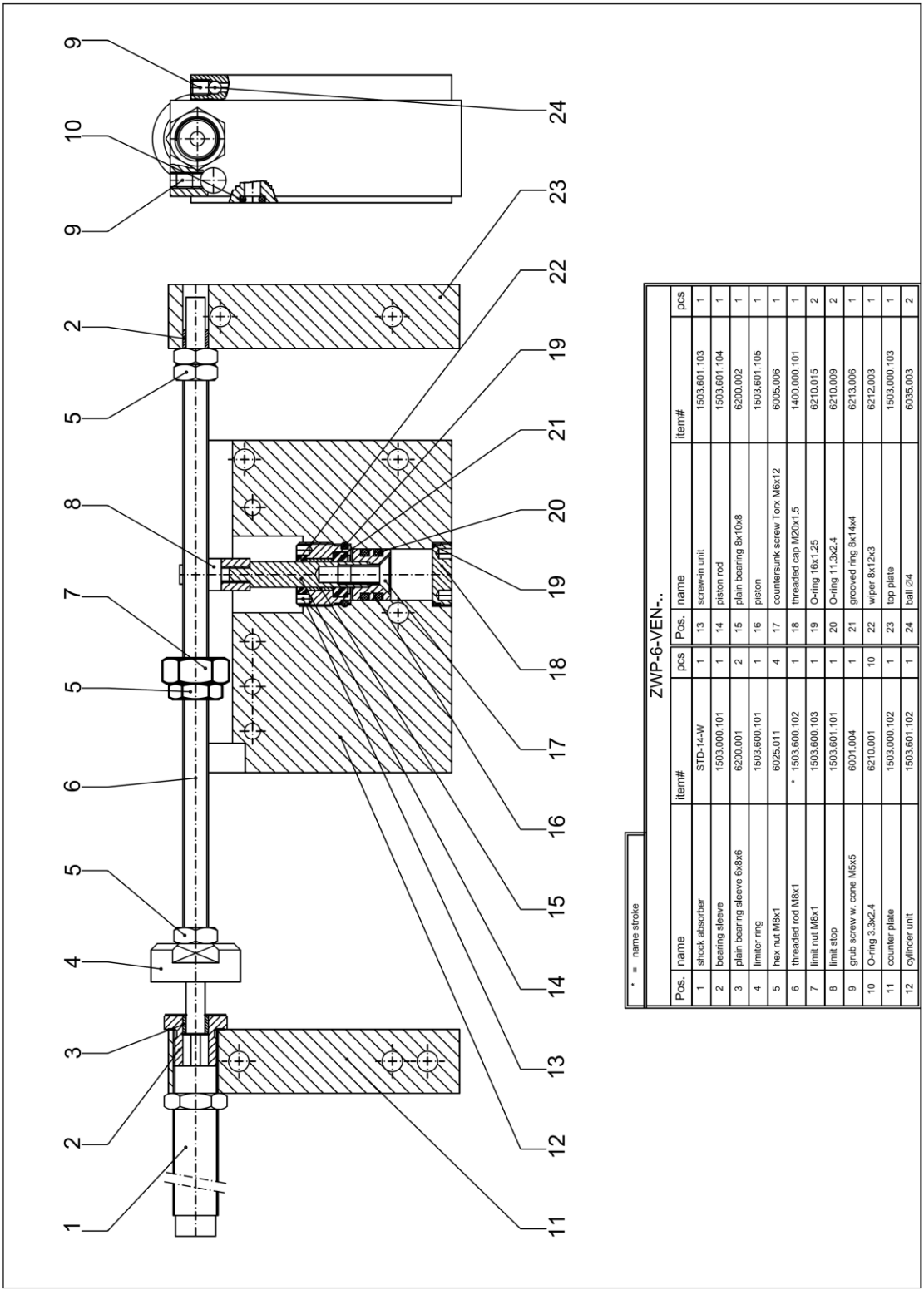


VEN-6-I-..-H-4-4-P

* = name stroke

Pos.	name	item#	pcs	Pos.	name	item#	pcs	Pos.	name	item#	pcs	Pos.	name	item#	pcs
1	nut M8x1	6025.011	2	13	nut M5	6025.003	1	25	final plate	1502.000.105	1	37	helix cable	6509.006	1
2	stop screw	1500.000.109.02	1	14	washer M5	6020.008	1	26	sliding tube guide	* 1502.500.000	4	38	sliding tube	* 1500.000.103	4
3	countersunk screw	1500.000.102	1	15	piston complete 20x5	6211.016	1	27	O-ring 6x2.2	6210.017	3	39	ball lining 16x24x30	6250.004	4
4	O-ring 6.5x1.6	6210.067	1	16	flat headed screw M4x6	6002.005	4	28	O-ring 10x1	6210.049	4	40	piston rod	* 1502.503.101	1
5	air coupler	1500.503.101	1	17	guide shaft	* 1500.000.107	1	29	guide header	1502.600.101	1	41	guide shaft	* 1500.000.106	1
6	O-ring 17.3x2.4	6210.011	2	18	shaft sealing 8x15	6216.001	1	30	cylinder screw M3x18	6003.048	4	42	countersunk screw M4x6	6007.002	1
7	cylinder cap	1500.506.101	1	19	stop screw	1500.000.109.01	1	31	angled plug socket	6508.013	2	43	clamping unit	1502.000.103	1
8	cylinder tube	* 1500.502.101	1	20	screw-in unit	1500.505.101	1	32	terminal	STL-8-E43-A8	2	44	O-ring 3.3x2.4	* 6210.001	4
9	air pipe	* 1502.000.101	1	21	grub screw M6x8	6001.001	1	33	plain bearing 4x5.5x4	6200.015	4	45	countersunk screw M4x25	6000.016	2
10	O-ring 22x1.5	6210.027	1	22	top plate	1502.000.104	1	34	combined element 4x8.2	6216.009	4				
11	shock absorber	STD-14-W	2	23	countersunk screw M6x16	6000.005	1	35	strain relief	1151.000.102	2				
12	cover	* 1502.000.106	1	24	countersunk screw M8x16	6000.001	3	36	cylinder screw M3x8	6003.027	2				

ZWP-6-VEN



ZWP-6-VEN-..

* = name stroke										
Pos.	name	item#	pcs	Pos.	name	item#	pcs
1	shock absorber	STD-14-W	1	13	screw-in unit	1503.601.103	1
2	bearing sleeve	1503.000.101	1	14	piston rod	1503.601.104	1
3	plain bearing sleeve 6x8x6	6200.001	2	15	plain bearing 8x10x8	6200.002	1
4	limiter ring	1503.600.101	1	16	piston	1503.601.105	1
5	hex nut M8x1	6025.011	4	17	countersunk screw Torx M6x12	6005.006	1
6	threaded rod M8x1	* 1503.600.102	1	18	threaded cap M20x1.5	1400.000.101	1
7	limit nut M8x1	1503.600.103	1	19	O-ring 16x1.25	6210.015	2
8	limit stop	1503.601.101	1	20	O-ring 11.3x2.4	6210.009	2
9	grub screw w. cone M5x5	6001.004	1	21	grooved ring 8x14x4	6213.006	1
10	O-ring 3.3x2.4	6210.001	10	22	wiper 8x12x3	6212.003	1
11	counter plate	1503.000.102	1	23	top plate	1503.000.103	1
12	cylinder unit	1503.601.102	1	24	ball ∅4	6035.003	2

Fig. 9-1 Spare part list

9.2 Accessories

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

	LEN-6	VEN-6	ZWP
Centering rings	ZR-6	ZR-6 ZR-9	ZR-6
Proximity switches	NSS-O8-K-29	NSS-O8-K-29	NSI-Q8-K-44
5 m connection cable, 4-wire	●		
5 m connection cable, 10-wire	● (LEN-6-I)		
5 m connection cable, 8-wire		●	
Shock absorbers	STD-14-W	STD-14-W	STD-14-W
Fastening screws M6x30	●	●	
Connector, 3-pole	●	●	
Stand	●		
Sheet metal cover	●	●	
ZWP-6		●	
Multiway connector STL-8-E43-A8		●	
Cover plate VSP-6-VEN With fastening and sealing material 8 x ZR-6 centering rings 6 x O-rings 3.3 x 2.4 Countersunk screw		●	●
Accessories LEN/VEN-6 6 x connectors 3 x cylinder head screws M6x30 1 x 5 m cable	●		
4 x ZR-6 centering rings 6 x O-rings 3.3 x 2.4	●	●	
3 x cylinder head screws M6x70			●