



Installation, Operating and Maintenance Instructions

Monorail Trolley

20/94AF-EX

as monorail push travel trolley
as monorail hand geared trolley
as monorail pneumatic trolley



AFR
AFH
AFP

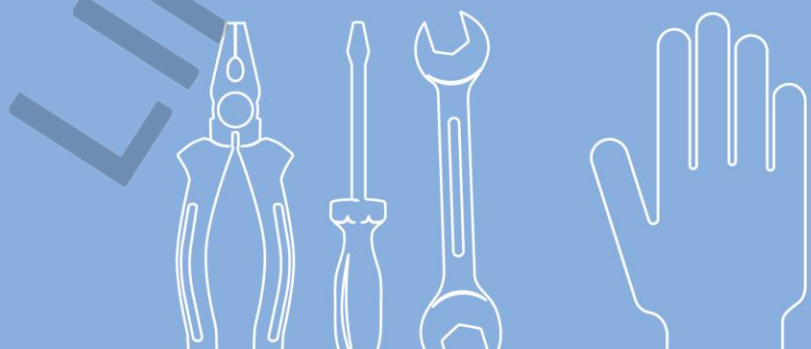
Explosion proof design

⊕ II 2G Ex h IIB T4 Gb or ⊕ II 2D Ex h IIIA T135°C Db

⊕ II 2G Ex h IIB T3 Gb or ⊕ II 2D Ex h IIIA T200°C Db



 DANGER!	
	<p>Not to be used with IIC gases and IIB gases hydrogen sulphide and ethylene oxide and light metal and shock sensitive dusts.</p> <p>It is not allowed to use the equipment in area at risk from explosion where gas AND dust does both exist at the same time!</p>




NOTICE!

The installation or mounting instructions for incomplete machines you'll find in chapter "Installation".

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Heinrich De Fries GmbH will be named HADEF in the following text.

Original operating- and maintenance instructions in German language.

Translation in other languages is made of the German original.

A copy may be requested in writing or is available for download on www.hadef.com

Subject to changes.

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1 Information

The products meet European Union requirements, in particular the validated EU Machine Directive.

The entire company works acc. to a certified quality assurance system as per EN ISO 9001.

The production of components at our work is subject to strict, intermediate checks.

After assembly, the products are subject to a final test with overload.

For the operation of hoists, the national accident prevention apply in Germany, amongst others.

Lifting equipment for use in areas prone to explosion complies with current legislation, standards and regulations and is classified in the applicable Ex-protection class.

The stated performance of the devices and meeting any warranty claims require adherence to all instructions in this manual.

Before delivery, all products are packed properly. Check the goods after receipt for any damage caused during transport. Report any damage immediately to the forwarding agent.

This manual serves for safe and efficient use of this hoist. Illustrations serve to explain something and may differ from the illustration of the existing unit as they only serve as an example.



Documentation of component manufacturers that may be supplied additionally, must be observed, in case of differences between these documentation and our manuals, the specification of the our manual must be observed.

NOTICE!

We refer to the prescribed equipment tests before initial start-up, before putting back into operation and the regular periodic inspections.





In other countries any additional national regulations must be observed.

2 Safety

 DANGER!	
	To assess the intended use of the devices correctly, the user must carry out an Ex-zone classification. The classification must be carried out in accordance with all current legislation, standards and regulations for areas prone to explosion!

2.1 Warning notice and symbols

Warnings and notice are shown as follows in these instructions:

 DANGER!	This means that there is a high risk that leads, if it is not avoided, to death or severe injury.
 WARNING!	This means that there is a risk that could lead, if it is not avoided, to death or severe injury.
 CAUTION!	This means that there is little risk that could lead, if it is not avoided, to slight injury or damage to the device or its surrounding.
 NOTICE!	Gives advice for use and other useful information.



Danger from electricity.



Danger from explosive area.

2.2 Duty of care of the owner



DANGER!

Failure to follow the instructions of this manual can lead to unpredictable hazards.
For any resulting damage or personal injury, HADEF assumes no liability.

The unit was designed and built following a risk analysis and careful selection of the harmonized standards that are to be complied with, as well as other technical specifications. It therefore represents state-of-the-art technology and provides the highest degree of safety.

Our delivery includes the hoist supplied beginning at its suspension and ending at the load hook and if supplied with control, the control line/hose that leads to the hoist. Further operating material, tools, load attaching devices as well as main energy supply lines must be assembled according to the valid rules and regulations. For explosion-proof equipment, all these parts must be approved for use in area prone to explosion, or they must be suitable for use in area prone to explosion. The owner is responsible for this.

However, in everyday operation this degree of safety can only be achieved if all measures required are taken. It falls within the duty of care of the owner/user of the devices to plan these measures and to check that they are being complied with.

Complete the operating and installation instructions by any instructions (regarding supervision or notifications) that are important for the special kind of use of the equipment, i.e. regarding organization of work, work flow and human resources.

In particular, the owner/user must ensure that:

- The unit is only used appropriately.
- The device is only operated in a fault-free, fully functional condition, and the safety components, in particular, are checked regularly to ensure that it is functioning properly.
- The required personal protective equipment for the operators, service and repair personnel is available and is used.
- The operating instructions are always available at the location where the equipment is used and that they are legible and complete.
- The unit is only operated, serviced and repaired by qualified and authorized personnel.
- This personnel is regularly trained in all applicable matters regarding safety at work and environmental protection, and that they are familiar with the operating manual and, in particular, the safety instructions it contains.
- Any safety and warning signs on the devices are not removed and remain legible.
- customers equipment at site must comply with currently applicable ATEX-regulations



WARNING!

It is not allowed to make constructive changes of the equipment!

2.3 Requirements for the operating personnel

The units may only be operated by qualified persons that are appropriately trained and that are familiar with it. They must have their employer's authorization for operation of the units.

Before starting work, the operating personnel must have read the operating and installation instructions, especially the chapter "Safety Instructions".

This is especially important for operating personnel that rarely uses the equipment, i.e. for installation or maintenance work.



DANGER!

In order to avoid severe injury, please pay attention to the following when using the equipment:


- Use protective clothes/equipment.
- Do not wear long hair hanging down open.
- Do not wear rings or other jewelry.
- Do not wear clothes that are too big/wide.
- Do not reach into ropes, chains, drive parts or other moving parts with your hands

2.4 Appropriate use

Horizontal movement on beams up to the maximum rated load.

The permitted safe working load of the devices must not be exceeded! An exception can be made during the load test before initial operation, carried out by a licensed qualified person.

- Defective devices and load suspension devices must not be used until they have been repaired! Only original spare parts must be used. Non-compliance will result in any warranty claims becoming void.
- Liability and warranty will become void if unauthorized modifications of the units are made by the user!
- The permissible ambient temperature when operating the devices:

Type of drive	Device classification for	
	not explosive atmosphere	Explosive atmosphere according to  ATEX ⁾ ^{**}
Manually driven	-20°C/+50°C	-20°C/+40°C
Motor driven	-20°C/+40°C	-20°C/+40°C

) * At an atmospheric pressure range from 0.8bar to 1.1bar and an oxygen content of approx. 21%

) ** Devices of this category have been specially modified and labeled by the manufacturer

DANGER!

The ambient temperature range must not be exceeded!

NOTICE!

If the units are not used as intended, safe operation is not guaranteed.

The operator alone is responsible for all personal injury and damage to property resulting from improper use.

DANGER!





It's only allowed to use the unit in the EX-classification which is named on the type plate; or in lower classes.



2.5 Basic safety measures

- Observe installation-, operation and maintenance instruction.
- Take notice of caution notes at units and in the manual
- Observe safety distances.
- Take care for a free view on the load.
- Only use the hoists appropriately.
- The equipment is to be used exclusively for movement of goods. Under no circumstances my persons be moved.
- Never load the devices beyond their working load limit.
- Pay attention to the accident prevention regulations (UVV).
- Should the hoist be used outside of Germany, please pay attention to the national regulations that apply.
- Supporting structures and load-attached devices used in conjunction with this equipment must provide an adequate safety factor to handle the rated load plus the weight of the equipment. In case of doubt, consult a structural engineer.
- If the equipment has not been used for a period of time, carry out visual checks of all main components such as chains, load hooks etc. and replace any damaged parts with new, original spare parts before putting the equipment back into operation!
- Do not use a hoist that is defective, pay attention to any abnormal noise it makes during operation.
- Stop working immediately in case of disturbances and remedy failures.
- Any damage and faults must be reported to a responsible supervisor immediately.
- If the unit is put into motion, any persons in the immediate vicinity must be informed by calling to them!
- Please pay attention to the regulations for load carrying devices UVV for both positive and non-positive methods of attaching loads.

- The lifting tackle or the load must be securely attached to the hook and be seated at the bottom of the hook.
- The safety catch of hooks must be closed.
- When charged, the housing may not be in contact somewhere.

	 DANGER!
	Special safety measures for use in areas prone to explosion.

- No use in zone 0 or zone 20
- Not to be used with IIC gases and IIB gases hydrogen sulphide, ethylene oxide and light metal and shock sensitive dusts!
- No use in temperature class T5 or T6.
- It is not allowed to use the equipment in area at risk from explosion where gas AND dust does both exist at the same time!
- During assembly and operation of explosion-proof equipment, the relevant regulations of i.e. BG-Chemie about the use of equipment in area at risk from explosion, must be adhered to by the user/owner.
- Please make sure that external ventilation is sufficient.
- Please wear conductive shoes. Gloves should have a shunt resistance of $< 10^8 \Omega$.
- It is not allowed to take off clothes.
- The surface temperature of the devices could increase by a variety of external circumstances. For this reason, the surface temperature is to be monitored.
- Avoid ignitable dust deposits.
- Remove dust deposits daily before commencing work and ensure that dust cannot settle between moving parts.
- Never remove dust with compressed air - remove it with a wet bolt of cloth.
- Defective units or units that show abrasion of its surface rust on chains, hooks, or suspension devices, must be taken out of service.
- Please observe the prescribed intervals.
- Assembly and maintenance work must only be carried out in an atmosphere not prone to explosion.
- Check the grease level of the bearings regularly
- Exchange friction surfaces in time and (an exception to this are electric units - maintenance of the brakes must only be effected by HADEF).
- Protect the device from impact, friction, rough handling and moisture.

	 DANGER!
	The operator is responsible for professional equipotential bonding (earthing) for power-operated devices!

Special scope

Use of different EX-zones is depended from the EX-classification of the unit. Find the EX-classification on its type plate.

Unit classified in EX-classification	No use in EX-zone
3G	0,20,1,21,22
3D	0,20,1,21,2
2G	0,20,21,22
2D	0,20,1,2

2.6 Explosion protection

The EX classification of the unit is indicated on a separate plate, situated on the unit.



Illustration 1

Example of ATEX classification:

CE	⊕ Ex	II	2	G	Ex h	IIB	T4	Gb
CE	CE-marking				European Union			
⊕ Ex	explosion-proof operating material							
II	device group / application	I			danger of mine damp			
		II			other areas prone to explosion			
2	device category		1		for use in zone 0			
			2		for use in zone 1			
			3		for use in zone 2			
G	EX atmosphere			G	...caused by gas, steam, fog			
				D	...caused by dust			
Ex h	type of protection				for mechanical devices, including e. g.			
					“c” construction safety			
					“k” encapsulation of liquids			
IIB	explosion group II (gases)			IIA	limit gap widths (MESG) > 0,9 mm			
				IIB	limit gap widths (MESG) ≤ 0,9 to ≥ 0,5 mm			
				IIC	limit gap widths (MESG) < 0,5 mm			
T4	Temperature class - gases (for dust only the temperature in °C is stated)			T1	limit temperature 450 °C			
				T2	limit temperature 300 °C			
				T3	limit temperature 200 °C			
				T4	limit temperature 135 °C			
				T5	limit temperature 100 °C			
				T6	limit temperature 85 °C			
Gb	EPL (equipment protection level)				e.g. Group II (for gases, vapours, mist):			
				Ga	level of protection: very high (complies with zone 0)			
				Gb	level of protection: high (complies with zone 1)			
				Gc	level of protection: enhanced (complies with zone 2)			


2.6.1 EX-Category


EX - Zone	1+21 2+22	1+21 2+22
Device category	2	2
Expl.-group of gases	IIB	IIB
Expl.-group of dust	IIIA	IIIA
Temperature class - gases	T4	T3
Temperature class - dust	T135°C	T200°C

DANGER!

The classification for the device can be found on the EX-type plate on the unit.
The device must only be used in the classification stated or in a lower classification.

2.6.2 Surface temperature of the devices

 **DANGER!**
 The temperature class mentioned on the EX-type plate on the unit must be observed, - make sure that the max. surface temperature is even fallen short of.

 **DANGER!**
 The maximum surface temperature of the equipment must always be lower than the ignition temperature of the gas/vapour/dust/air mixture. Equipment which has been classified in higher temperature classes is, of course, also approved for use in applications with lower temperature classes. As gas/air mixtures for T5 do not occur with normal use, and only very rarely occur for T6, for specific gas/air mixtures such as carbon disulphide (IIC), our hoists are not rated for these temperature classes and must not be used for these classes.

Temperature class	Ignition temperature of gas °C	max. surface temperature of the operating material in °C
T1	>450	450
T2	>300 <450	300
T3	>200 <300	200
T4	>135 <200	135
T5	>100 <135	100
T6	>85 <100	85

2.6.3 EX zone classification

Areas that are prone to explosion are classified into zones. The owner must determine the zone that exists. Information on the zone classification can be found in IEC 60079-10 and in national standards. The following table contains an overview of the zone classification in combination with the device category.

Gases Vapours Mist	device category (Gases)	Dust	device category (dust)	explosive atmosphere is present
Zone 0	1G	Zone 20	1D	continuously, long-term or frequently
Zone 1	2G	Zone 21	2D	occasionally
Zone 2	3G	Zone 22	3D	rarely or short-term

2.6.4 Explosion hazards ... recognizing and preventing!

are flammable substances present?	NO	→	no explosion protection measures required
YES			
Can an explosive mixture be generated by sufficient dispersion in the air?	NO		NO explosion protection measures required
YES			
Evaluation of sources and quantity of explosive atmosphere required!			
Is the build-up of a hazardous, explosive atmosphere possible?	NO	→	no explosion protection measures required
YES			

EXPLOSION PROTECTION MEASURES REQUIRED !

Prevent the build-up of hazardous, explosive atmospheres as much as possible!			
has the build-up of a hazardous, explosive atmosphere been completely prevented?	YES	→	No further explosion protection measures required
NO			

FURTHER EXPLOSION PROTECTION MEASURES REQUIRED !

Hazardous, explosive atmosphere present			
	continuously, long-term or frequently	occasionally	rarely and short-term
gases, vapours mist from dusts	Zone 0 Zone 20	Zone 1 Zone 21	Zone 2 Zone 22
Gases, vapours Mist and dust	during fault-free operation (normal operation) and during predictable faults and during rare malfunctions	Prevention of effective ignition sources* during fault-free operation (normal operation) and during predictable faults	
	<ul style="list-style-type: none"> in zones 20,21 and 22 the ignition potential of dust deposits must also be considered 		

has the ignition of a hazardous, explosive atmosphere been completely prevented?	YES	→	No further explosion protection measures required
NO			

FURTHER EXPLOSION PROTECTION MEASURES REQUIRED!

Design measures limiting the effect of an explosion to a non-hazardous level

3 Transport and Storage

CAUTION!

Transport may only be done by qualified personnel. No liability for any damage resulting from improper transport or improper storage.

3.1 Transport

The devices are checked and if so adequately packed before delivery.

- Do not throw or drop the equipment.
- Use adequate means of transport.

Transport and means of transport must be suitable for the local conditions.

3.2 Safety device for transport

NOTICE!

Should a safety device for transport exist, please remove it before commissioning.

3.3 Storage

- Store the equipment at a clean and dry place.
- Protect the equipment against dirt, humidity and damage by an appropriate cover.
- Protect hooks, wire ropes, chains and brakes against corrosion.

DANGER!

Units that show corrosion must be taken out of service!

4 Technical data

Capacity	Load bar size for beam flange width from - to		Output AFP kW
	1N mm	2N mm	
1t	50-179	180-310	0,75
2t	66-185	186-310	0,75
2,5t	66-185	186-310	0,75
3,2t	74-196	197-310	0,75
4t	74-196	197-310	0,75
5t	74-192	193-310	0,75
6,3t	119-215	216-312	0,75
7,5t	119-215	216-312	0,75
10t	119-215	216-312	0,75
12t	119-215	216-312	0,75
15t	160-310	---	2x 0,75
20t	160-310	---	2x 0,75
25t	160-310	---	2x 0,75

Travel speed:


Pneumatic trolley 8 m/min

Operating pressure:

Pneumatic trolley 6 bar

Air consumption per motor 1,2m³/min

Weights

															
		500kg	1t	2t	2,5t	3,2t	4t	5t	6,3t	7,5t	10t	12t	15t	20t	25t
AFR	N1	8	13	29	29	58	58	71	159	--	--	--	--	--	--
	N2	10	14	31	31	62	62	73	164	--	--	--	--	--	--
AFH*	N1	9	17	34	34	64	64	76	165	165	165	165	**	**	**
	N2	11	18	36	36	68	68	80	170	170	170	170	**	**	**
AFP	N1	--	39	55	55	84	84	97	186	186	186	186	**	**	**
	N2	--	40	58	58	89	89	100	190	190	190	190	**	**	**

*without hand chain, **on request

5 Installation

DANGER!

Assembly, disassembly and maintenance operations must only be carried out in an atmosphere not prone to explosion!

The assembly and installation depends on the local environment. The hoist must be suspended in a way that it can position itself freely.

5.1 Trolley

For assembly on a beam a travel limit must be placed at either end of the track.

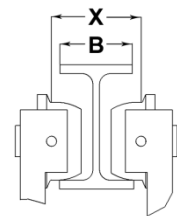
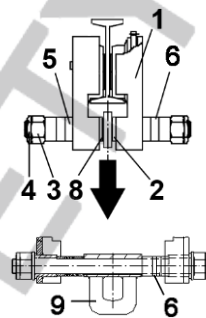
This must be attached so that any elastic limitation buffer or the trolley wheels are driven against them in their end position when moving.

Generally, additional lifting gear (e.g. fork lift, lifting platforms) will be required for the assembly. These must take the weight of the devices securely.

5.2 Adjusting the gauge

The trolley can be adjusted to various beam flange widths. Adjustment to the relevant beam flange width "B" depends on the type and size and is to be made as follows:

- There are distance tubes (5) and/or washers (6) situated on the load bars (2) of the trolley.
- Dimension "X" is set by placing washers (6) from the outer to the inner side ("X" increases) or from the inner to the outer side ("X" decreases).
- Washers (6) and rubber discs (depended on type) leave a distance for the load hook. It is important that the load hangs in the middle under the beam so that the two side plates are equally loaded.
- The suspension eye (9) (if existent) for bigger load bolts must still be swivelling after it has been secured.
- Tighten the hexagon nut (3) and safety nuts (4) again.
- Check correct flange width "B" and dimension "X". Adjustment must be repeated if necessary.



- | | |
|---|--------------------------------|
| 1 | side plates |
| 2 | load bars |
| 3 | hexagon nut |
| 4 | safety nuts |
| 5 | distance tubes |
| 6 | washers |
| 7 | --- |
| 8 | rubber disc (depended on type) |
| 9 | suspension eye |

5.3 Installation on the beam

- 1 Tighten the hexagon nut (3) and safety nuts (4).
- 2 Push on the trolley at the face of the beam flange.
- 3 If this is not possible, the trolley can also be mounted on the beam from below.
- 4 Therefore, remove the hexagon nut (3) and the safety nut (4) on the side without gear.
- 5 Pull apart the side plates (1) as far until it is possible to push the trolley onto the beam flange from below. Afterwards, push the trolley together to correct gauge.
- 6 Secure the washers (6) and distance tubes (5) by tightening the hexagon nuts (3) and the safety nuts (4).

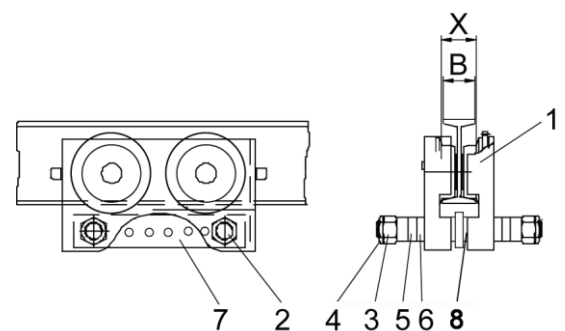


Illustration 2

5.3.1 Bolt securing with collar

Securing the load bolts with set collars (1) and safety screws (3).

- In order to adjust the beam flange width dismantle the safety screws (3) at one trolley side.
- After adjustment of dimension "X" and installation on the beam, install the safety screws (3) again and secure them with a nut (4).
- When pulling apart the side plates, the trolley drive shaft will also be moved.
- To do this, loosen the safety screws at the stern tube bearing and secure them again after the side plates have been pushed together.

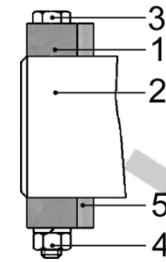


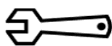
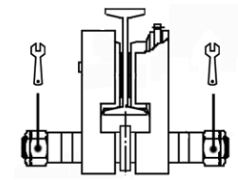

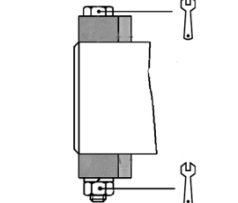


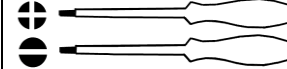

Illustration 3

- 1 set collar
- 2 load bar
- 3 safety screw
- 4 hexagon nut
- 5 washer

CAUTION!

The distance "X" between the wheel flanges of the trolley wheels must be for trolleys up to 3,2 t: 2-3 mm (1-1,5 mm each side) bigger and for trolleys from 4 t up: 3-5 mm (1,5-2,5 mm each side) bigger than the flange width "B" of the beam

5.4 Tools

Capacity	Size	Tool	Use	
0,5t 1t to 2t to 3,2t to 6,3t to 10t	SW27 SW36 SW46 SW55 SW60 SW75		Load bar	
12,5t to 60t	SW22 SW24		Load bar with fixing ring	
	diff.			

6 Control

Only people that are familiar with the operation of the lifting devices and cranes may be entrusted with their operation. They must be authorized by the employer for the operation of the equipment. The employer must ensure that the operating instructions are available near the equipment and that they are accessible for the operating personnel.

Monorail push travel trolleys are moved by pushing the load.

Monorail hand geared trolleys are moved by pulling the hand chain.

Control buttons

Control symbols shown are for optical information only and can vary depending on the control module.

Emergency stop



Illustration 4

Arrow keys = drive left / right



Illustration 5

System start (optional)



Illustration 6

Push button functions (E)

Relieved push button = stand still
 push button half pushed = slow speed
 push button pushed completely = fast speed



Illustration 7

Push button functions (P)

Relieved push button = stand still
 push button pushed = respective movement



Illustration 8

Red Emergency-Stop button

button pushed = stand still
 turn the button clockwise = free functions



Illustration 9

NOTICE!

Lockable Emergency-Stop buttons must first be opened with the key before unlocking!

7 Operation

The following, important points must be observed when operating the equipment:

- Read the safety instructions.
- Never load the devices beyond their working load limit.
- The prescribed maintenance intervals must be adhered to.

DANGER!

In particular, use is not permitted:

- in potentially explosive atmospheres, unless the equipment has been modified for this purpose and this is shown on special type plates it carries for this purpose.
- in reactor containments
- for transporting persons
- for holding lifted loads
- for scenic use
- when persons are under suspended loads

8 Commissioning

8.1 General

The operator of the unit is responsible for the entire system.

According to the Ordinance on Industrial Safety and Health, a hazard analysis must be carried out by the operator.

Observe the respective national standards, regulations and directives of the responsible bodies at the place of operation.

NOTICE!

Hoists up to 1000 kg capacity and without motor-driven trolleys of hoisting unit must be tested by a “qualified person” before putting into operation for the first time.

Hoists of 1000 kg capacity and up or with more than one motor-driven hoist movement; i.e. lifting and trolley movement, must be tested by a “licensed qualified person” before putting in operation.

An exception is “hoists ready for operation” acc. validated national regulations with EU-declaration of conformity.

Definition “qualified person” (former expert)

A “qualified person” has learned, due to occupational training and experience and the job that the person has done, the skills needed to tests the material for one’s work.

Definition “licensed qualified person” (former approved expert)

A “licensed qualified person” has, due through special occupational training, knowledge about testing of the material for one’s work and knows the national accident prevention regulations and other prescriptions and technical regulations. This person must test the material for one’s work regularly with regard to design and kind of use. The license will be given to qualified person be the approved supervision authorities (ZÜS).

8.2 Compressed air connection

Before commencing work on the equipment, the main air supply line must be closed and secured against inadvertent opening!

8.2.1 Main connection

- The connections must be made according to the pneumatic connection diagram.
- Connect to the existent hose nozzle.
- The hose must be secured with a hose clamp.

Nominal width of the air connection hose

0,52-0,75 kW - NW 13 mm

1,5 kW - NW 19 mm

2,5 kW - NW 25 mm

If hose length exceeds 15 m, a larger cross section must be selected.

8.2.2 Control hose connection

Control switches with hoses are connected at the factory, unless otherwise agreed.

8.2.3 Maintenance unit

It is important that an automatic maintenance unit, consisting of oiler, filter ,water separator and air pressure reducer is installed in the main air supply - if not assembled by the manufacturer this must be assembled by the customer.

It serves for the necessary preparation of the operation air so that the pneumatic motor can work trouble-free. Installation must be as close as possible to the motor; - in no cases should the distance to the motor exceed 10 m.

Should higher pressure occur in the supply net, it will be reduced to the operating pressure of 6 bar by the pressure reducing valve. The oiler enriches the air with oil. Setting of oil addition: approx. 2 drops of oil must be added per minute.

NOTICE!

HADEF does not assume any responsibility for damage caused by non-observance of the instructions.

CAUTION!

Should the unit be assembled at the customer, the maintenance unit is supplied without oil.

Before putting the unit into operation, the main air supply line must be cleaned and the oiler of the maintenance unit must be filled with oil. Should this not be done the unit may be severely damaged.


CAUTION!

The maintenance units are not approved for use with synthetic oil.
They must not be connected to compressed air systems which are supplied by compressors with synthetic lubricants.

9 Safety check

Before putting into service initially or when putting back into service, it must be checked whether:

- All fastening screws (if existent), socket pins, flap socket and safety devices are tightened and secured.
- The oil levels in the gear boxes are sufficient.
- All movements of the load comply with the symbols on the control switch.

10 Functional test

10.1 Checks before the initial start-up

Trolley drive

- The open-lying teeth of the trolley drive must be lubricated.

Hand gear for hand geared trolley

- Ensure correct fit of the hand chain; it must not be twisted and must hang freely.

10.2 Functional test

Trolleys

Carefully move the trolley to the end positions and check the positions of the end stops.

11 Maintenance

11.1 General

All monitoring, servicing and maintenance operations are to ensure correct functioning of the equipment; they must be effected with utmost care.

- Only “qualified persons” may do this work.
- Servicing and maintenance work must only be done when the hoist is not loaded.
- Records must be kept of all test results and measures taken.

11.2 Monitoring

The monitoring and servicing intervals stated are valid for operation under normal conditions and single-shift operation. In case of severe operating conditions (e.g. frequent operation with full load) or special environmental conditions (e.g., heat, dust, etc.), the intervals must be shortened correspondingly

12 Inspection

12.1 Periodic checks

Independently from the regulations of the individual countries, lifting devices must be checked at least yearly by a qualified person or licensed qualified person regarding its functional safety.

	at commissioning	daily checks	1st maintenance after 3 months	Inspection Maintenance every 3 months	Inspection Maintenance every 12 months	
check screw connections	X				X	
check the bearings					X	
check the trolley wheels					X	
check lubrication of the driving pinion	X				X	
buffers - check correct position and wear	X				X	
Have the equipment checked by an expert (periodic inspection)					X	
*as far as applicable						
remove dust (do not use compressed air to do so)		X				
Check device for corrosion			X	X		
check lubrication/ grease - bearings			X	X		
check lubrication/ grease - driving pinion			X	X		
name plates - check for existence and legibility					X	

13 Service

Maintenance must be effected by lubricating the driving pinions (for hand geared trolleys) and by checking the rubber end stops.

13.1 Lubricant - Selection


FUCHS	SHELL	ESSO	MOBIL	TOTAL	CASTROL	KLÜBER
Renolit FEP 2	Alvania EP 2	Unirex EP 2	Mobilux EP 2	MULTIS EP2	--	--
Stabylan 5006	--	--	--	--	Optimol Viscoleb 1500	Klüberoil 4UH 1-1500
--	--	--	--	--	--	Wolfracoat 99113
Chain lubricant OKS 451						


13.2 Lubricant for food industry – Selection (as option*)

	SHELL	MOBIL	CASTROL	KLÜBER
Gearing	FM Grease HD2	Mobilgrease FM 222	--	Klüberoil 4UH 1-1500 N
Load chain	--	Lubricant FM 100	Optimol Viscoleb 1500	--
Load hook; Pulleys Gear rim; Drive pinion	FM Grease HD2	Mobilgrease FM 222	--	--

* must be mentioned by order

14 Trouble

 **DANGER!**




Assembly, disassembly and maintenance operations must only be carried out in an atmosphere not prone to explosion!

Please pay attention to the following in case of problems:

- Troubles with the equipment must only be repaired by qualified personnel.
- Secure the unit against unintended operation start.
- Put up a warning note indicating that the unit is not to be used.
- Secure the working area of moving parts of the unit.
- Please read the chapter "Safety instructions".

Notes on the repair of faults are found in the following table.

For the repair of failures please contact our service department.

 **CAUTION!**

Trouble caused by wear or damage to parts such as wire ropes, chains, chain wheels, axes, bearings, brake parts, etc., must be remedied by replacing the parts with original spare parts.

15 Remedy

Problem*	Unit	Cause	Remedy
Unit cannot be switched on	Electric trolley	No main power	Check connection to mains supply
		Phase sequence not correct (with low voltage control)	Exchange 2 phases (see wiring note at the plug)
Motor runs in opposite direction	Electric trolley	Phase sequence / rotating field wrong (with three-phase direct control)	Exchange 2 phases (see wiring note at the plug)
Motor does not run	Electric trolley	Fuse burnt out	Replace the fuse
		Defective switching unit in the control button switch	Replace the switching unit
		Interruption in the control cable	Check control cable and replace if necessary.
		Defect of capacitor (only for one-phase alternating current)	Replace the capacitor
		Overheat protection has tripped*	Allow engine to cool
	Defective coil - mechanic or electric overload	Motor must be repaired by a specialist If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*	
	Pneumatic trolley	Operation pressure / quantity of air is too low After prolonged standstill	Check connection to mains supply See maintenance - pneumatic motor
	Motor driven trolley	No or incorrect power transmission	Check driving pinion and repair if necessary, check condition of trolley wheels / contact to main beam surface and repair / adjust if necessary If the unit is suitable for explosive atmospheres, please clarify with the manufacturer what to do!
Motor hums and uses excessive current	Electric trolley	Defective coil	Motor must be repaired by a specialist If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Rotor is rubbing	Motor must be repaired by a specialist If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		(Optional) brake does not release	See problem "(Optional) brake does not release"
		Defect of capacitor (only for one-phase alternating current)	Replace the capacitor
		Defect of starter relay (only for one-phase alternating current)	Replace the starter relay
Phase failure (only three-phase direct control)	Find the cause and repair		
Motor does not brake or has excessive afterrunning.	Electric trolley	Switching error after intervention in the electric circuit	Check the electric connection of the brake acc. to the wiring diagram
	Motor driven trolley	Brake linings are worn or dirty.	Brake lining carrier must be changed completely If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Air gap is too large	Re-adjust the air gap If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
(Optional) brake does not release	Electric trolley	Brake rectifier defective	Replace the brake rectifier If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Brake current relay defective	Replace the brake current relay If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Brake coil is defective	Replace the brake coil If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Permissible air gap is exceeded due to worn out brake lining	Re-adjust the air gap and exchange the brake lining if necessary If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Power drop in the mains power line > 10%	Provide correct power supply voltage
	Pneumatic trolley	Operation pressure / quantity of air is too low	Check connection to mains supply
Fuses burnt out or motor contactor is triggered	Electric trolley	Short circuit in component	Eliminate the short circuit
		Motor has a short circuit in the body or windings	Correct the problem by a specialist If the unit is suitable for explosive atmospheres, the motor must be returned to the manufacturer for repair*
		Motor is switched incorrectly Wrong type of fuse	Correct the switching Replace the fuse with correct one
Trolley runs very slowly or not at all	All trolleys	Driving pinion dirty or blocked.	Clean the driving pinion and lubricate it, if necessary, exchange worn parts
	Hand geared trolley	Hand chain is twisted or blocked	Place the hand chain correctly

*) as far as applicable

16 Decommissioning

WARNING!

It is essential that the following points are observed in order to prevent damage to the equipment or critical injury when the device is being decommissioned:

It is mandatory that all steps for decommissioning the machine are carried out in the indicated sequence:

- First secure the working area for decommissioning, leaving plenty of space.
- Read the chapter "Safety instructions".
- Disassembly is carried out in reverse order to the assembly.
- Please make sure that all operating material is disposed of in accordance with environmental regulations.

16.1 Temporary decommissioning

- Measures are as above.
- Also read the chapter "Transport and storage".

16.2 Final decommissioning/disposal

- Measures are as above.
- After disassembly, ensure that the disposal of the equipment and any materials it contains is carried out in accordance with environmental regulations.

17 Additional documents

17.1 Pneumatic connections diagram

The pneumatic connections diagram is attached to the consignment.

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