

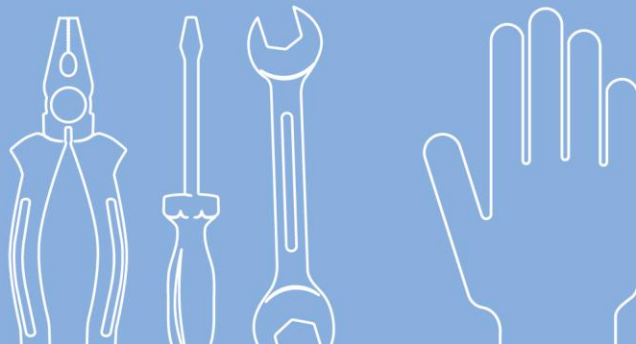
Installation, Operating and Maintenance Instructions

Electric Chain Hoist

66/04

stationary with suspension eye
with monorail push travel trolley
with monorail hand geared trolley
with monorail electric trolley

AKS
AKR
AKH
AKE



 **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 ISO 9001.

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

After assembly, each product is subject to a final test with overload.

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

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 allows a safe and efficient use of equipment. Images of this manual are for a principle understanding and can be different from the real design.

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.


1.1 Indications to determine the used part of the theoretical usage life.

For motor driven units.

The equipment (rope hoists, chain hoists, winches as well as crane hoisting units) are classified in drive groups (duty classification) according to their intended mode of operation, running times and load collectives and dimensioned according to the requirements derived from these.

They are thus only designed for a limited period of use with regard to the overall dimensioning and certification.





After the total period of use as elapsed, measures must be taken where parts are checked and exchanged as per indication by the manufacturer. After that a new maximum usage period is determined. See also the valued accident prevention regulations, "winches, lifting and pulling devices".

 NOTICE!
Commitment
A general overhaul may only be performed by HADEF or by a specialized company, authorized by HADEF!

2 Safety

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

The appropriate use of the hoists is vertical lifting and lowering of unguided loads up to the maximum rated load. In combination with trolleys, loads can also be moved horizontally.

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.

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.
- Ensure good visibility during operations
- Use the equipment only for its intended purpose
- The equipment is only intended for moving goods. Persons must not be moved under any circumstances.
- Never load the equipment beyond the specified permissible load capacity.
- Observe the relevant national accident prevention regulations.
- Should the hoist be used outside of Germany, please pay attention to the national regulations that apply.
- Building walls, ceilings, floors or constructions - on which the units are mounted or suspended - must be checked by a structural engineer for sufficient stability.
- After the unit has been standing for a longer period of time, visually inspect all components that are important for its function and replace damaged components with new original spare parts.
- Do not use a defective unit; listen for abnormal operating noises.
- In case of malfunctions, stop the operation immediately and rectify the fault.
- Report damage and defects immediately to a responsible person
- When working with the unit, warn persons in the immediate vicinity.
- Observe the provisions for load suspension equipment in accordance with the relevant national regulations for the positive and non-positive slinging of loads.
- The sling or load must be securely attached to the load hook and rest on the bottom of the hook.
- The safety latches of hooks must be closed.
- The housing must not be in contact with anything.
- Stop lowering the load when the bottom block or the load is being set down or is prevented from being lowered further.
- The loose chain end may not be charged or locked.
- The load chain must not be twisted.
- Twisted chains must be aligned before attaching the load.
- The correct alignment of the chain links can be seen from the weld seams.
- The chain links must always be aligned in one direction.
- Do not bounce the load or hook against something.
- Check brakes daily before commencing work.
- The devices are not suitable for continuous operation. The duty cycles of the motors (see the technical data chapter) as well as the remaining life time of the equipment in accordance with FEM group and usage (see calculation of remaining safe working period) must be observed.

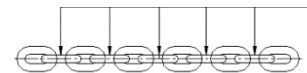


Illustration 1

WARNING!

The following is not allowed:

- to lift another load than the nominal safe working load
- to manipulate the sliding clutch if units are equipped with
- The use of elongated or damaged chains or wire ropes. Replace them immediately by new, original parts.
- Never loop the load chain around a load nor place or pull the chain over edges.
- Never repair damaged load hooks (e.g. by hammering), but replace them by original hooks.

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 Description

4.1 Areas of application

The devices must be as far as possible installed in a covered room.

If they are used in the open, protect the units against the effects of weather such as rain, hail, snow, direct sunshine, dust, etc. - we recommend to use a cover in parking position. If the device is set up in a continuously humid environment with strong temperature fluctuations, the correct functionings are endangered by the forming of condensation.

During longer downtimes of motor-operated units, the brake may reduce the function by corrosion.

NOTICE!

Use only in the intended atmosphere with a humidity of up to 100%, but not under water!

DANGER!

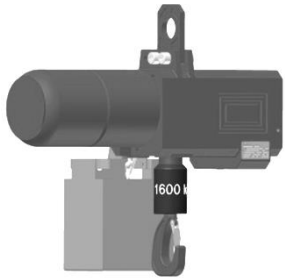
In particular, use is not permitted:

- for tearing loose fixed loads, dragging of loads as well as diagonal pulling
- for pulling against a fixed point without additional safety and/or measuring equipment against exceeding the nominal load
- 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

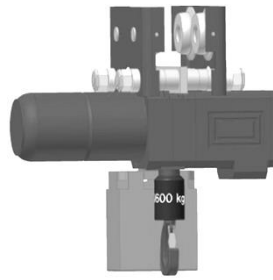
4.2 Design

HADEF electrical chain hoists are equipped with a suspension eye for stationary use. The one and two chain fall devices may optionally be equipped with a suspension hook.

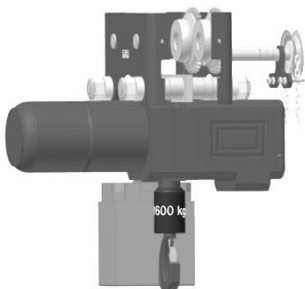
All devices can also be supplied with monorail trolley with push travel, hand geared or electric drive.



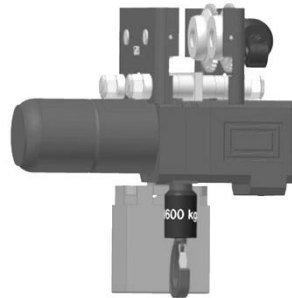
Type 66/04 AKS - stationary



Type 66/04 AKR - with push travel trolley



Type 66/04 AKH with hand geared trolley



Type 66/04 AKE with electric trolley

Operational limit switches for lifting and lowering as standard for all hoists AK4–AK10 with contactor control.

4.3 Functions

The lifting gear and motor-driven trolley are moved by pressing the buttons on the control switch. The spring-pressure brake installed in the electric motor of the lifting gear prevents the independent lowering of the load after the push button has been released.

By using a frequency converter, the speed is infinitely variable.

Hand geared trolleys are moved to the left or right by pulling one of the two stands of the endless hand chain.

In combination with push travel trolleys the trolley is moved by pushing or pulling the load or, without load, by pulling the load chain.

NOTICE!

The best protection against functional failures in case of extreme environmental impact is the regular use of the equipment.

If the hoist is not used very often, we recommend to carry out a test run at least once a week and to switch on the motor several times during this test run.

In our experience, this will prevent the brake from sticking.

4.4 Important components

NOTICE!

All hoists are fitted with high-quality lifting gears of the reliable AK series.

4.4.1 Motor

	Type of chain hoist
Electric motor	66/04 AK
	28/06E
	29/06E, 29/06EEL Big Bag, 29/06E-Synchro
	90/09EX, 91/09EX

4.4.2 Gear

Lifting gear with ventilation screw

AK 4-8 Precision Spur Gear

AK9+10 Precision Planetary Gear

Trolley gear

Combination of worm gear and motor

Closed design - ventilation not necessary.

4.4.3 Control

Control switch with emergency stop

Classification of control according to lifting gear sizes

Hubwerk	Kind of control			
	Direct control	low voltage control	Radio control	Frequency control
AK4-7	x	x	x	x
AK8-10	-	x	x	x
Alle Ex	-	x	x	-

4.4.4 Overload protection

Type	Slipping clutch	electric limit switch	mechanical stop by spring assembly*
66/04AK,	AK4-8	AK9+10	AK4-10
28/06E,	AK4-8	AK9+10	AK4-10
29/06E,	AK4-8	AK9+10	AK4-10
29/06E-Syncro	AK4-7	-	AK4-7
29/06EEL Big Bag	AK4-7	-	AK4-7
All Ex	AK4-8	AK9+10	-

*optional



DANGER!

The overload protection serves exclusively to protect against damage to the device due to overloading when moving loads. Its function must not be integrated into the operational work process!

4.4.5 Load chain

acc. to EN 818-7 high quality chain

4.4.6 Load hook

Hook in ball bearing with safety catch.

4.4.7 Chain container

According to hoist type made of coated fabric, plastic or of steel plate.

4.4.8 Rotation direction/ Phase sequence relay

Protection against wrong net connection

(only with low voltage control)

4.4.9 Safety limit switch (lifting/lowering)

automatic stop when the load chain does not run correctly

(only applicable for hoists with tensioning device)

4.4.10 Emergency limit switch (only for AK9 lifting unit)

Automatic switch-off and horn if the load chain does not run smoothly through the unit.

4.4.11 Operation limit switch

operational driving into upper and lower hook position

(optional for direct control)

4.4.12 Special components

only for hoists that are used in area at risk of explosion

4.4.13 Emergency brake release - hoist (option)

Manual emergency brake release for lowering the load in case of power supply failure by means of lever (A).

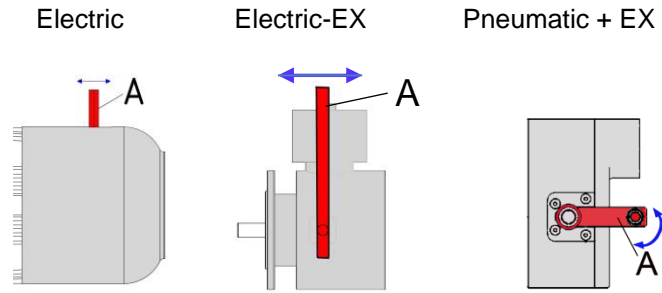


Illustration. 2

4.4.14 Overheat protection electric motor (Only for contactor control)


	Default	Optional	Electro-EX
Lifting/Lowering	PTO	PTC**	PTC**
Drive	-	PTO* / PTC**	PTC**

* thermocouple ** PTC thermistor with tripping device

4.5 2nd brake (optional)

Additional safety device to hold the load.

Opens in parallel with the main brake. Closes with a slight time delay after the work process.

 **CAUTION!**

If there is minimal lowering of the load after the work process, check the main brake and repair if necessary!

5 Technical data

Table 1

Capacity/ chain falls kg	Type	lifting speed m/min	duty classi- fication FEM 9.511/ ISO 4301	motor output kW	operation time ED %	current consump- tion A	cos φ	noise emission at 1m distance tolerance +2 dB(A) db(A)	weight at 3m suspension, or track height kg				weight per m add. lift kg
									S	R	H	E	
250/1	AK402	16/4,0	3m/M6	0,88/0,18	40/25	2,3/1,1	0,81/0,51	60	65	77	79	91	0,8
500/1	AK405	6,0	3m/M6	0,75	100	2,1	0,76	56	65	77	79	91	0,8
500/1	AK405 AW*)	6,0	3m/M6	0,75	100	4,9	0,97	56	65	77	79	91	0,8
500/1	AK405	9,4/2,3	3m/M6	0,88/0,18	40/25	2,3/1,1	0,81/0,51	60	65	77	79	91	0,8
630/1	AK406	6,0	3m/M6	0,75	100	2,1	0,76	56	65	77	79	91	0,8
630/1	AK406 AW*)	6,0	3m/M6	0,75	100	4,9	0,97	56	65	77	79	91	0,8
630/1	AK406	9,4/2,3	3m/M6	0,88/0,18	40/25	2,3/1,1	0,81/0,51	60	65	77	79	91	0,8
1000/2	AK410	3,0	3m/M6	0,75	100	2,1	0,76	56	75	87	89	101	1,4
1000/2	AK410 AW*)	3,0	3m/M6	0,75	100	4,9	0,97	56	75	87	89	101	1,4
1000/2	AK410	4,5/1,1	3m/M6	0,88/0,18	40/25	2,3/1,1	0,81/0,51	60	75	87	89	101	1,4
1000/1	AK610	8,0/2,0	3m/M6	1,8/0,44	40/25	5,3/2,5	0,78/0,68	67	100	124	126	141	1,3
1000/1	AK610 AW*)	8,0	3m/M6	1,75	40/25	11	0,96	67	100	124	126	141	1,3
1250/2	AK412	4,5/1,1	3m/M6	0,88/0,18	40/25	2,3/1,1	0,81/0,51	60	75	87	89	101	1,4
1250/1	AK612	8,0/2,0	3m/M6	1,8/0,44	30/20	5,3/2,5	0,78/0,68	67	100	124	126	141	1,3
1250/1	AK612 AW*)	8,0	3m/M6	1,75	30/20	11	0,96	67	100	124	126	141	1,3
1600/1	AK716	8,0/2,0	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	125	164	167	181	2,1
1600/1	AK716	11,0/2,6	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	130	164	167	181	2,1
2000/2	AK620	4,0/1,0	3m/M6	1,8/0,44	40/25	5,3/2,5	0,78/0,68	70	105	128	131	146	2,5
2000/2	AK620 AW*)	4,0	3m/M6	1,75	40/25	11	0,96	70	105	128	131	146	2,5
2000/1	AK820	10,0/2,5	3m/M6	4/1,1	40/25	10,0/6,0	0,85/0,64	70	130	168	172	186	3,1
2500/2	AK625	4,0/1,0	3m/M6	1,8/0,44	40/25	5,3/2,5	0,78/0,68	70	105	128	131	146	2,5
2500/2	AK725	5,5/1,3	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	130	168	172	186	3,9
2500/1	AK825	8,0/2,0	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	130	168	172	186	3,1
3200/2	AK732	5,5/1,3	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	130	168	172	186	3,9
4000/2	AK840	5,0/1,25	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	135	168	172	191	5,6
5000/2	AK850	4,0/1,0	3m/M6	4,0/1,1	40/25	10,0/6,0	0,85/0,64	70	135	173	177	203	5,6

*) AW= alternating current 230V/50hZ

Table 2

Capacity/ chain falls kg	Type	lifting speed m/min	duty classi- fication FEM 9.511/ ISO 4301	motor output kW	operation time ED %	current consump- tion A	cos φ	noise emission at 1m distance tolerance +2 dB(A) db(A)	weight at 3m suspension, or track height kg				weight per m add. lift kg
									S	R	H	E	
5000/1	AK905	5,4/1,35	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	260	340	345	358	6
5000/1	AK905	8,0/2,0	3m/M6	8,5/2,0	40/25	18,2/6,5	0,89/0,67	75	270	350	355	368	6
6300/1	AK906	5,4/1,35	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	260	340	345	358	6
6300/1	AK906	8,0/2,0	3m/M6	9,0/2,2	25/25	21,0/7,5	0,80/0,60	75	270	350	355	368	6
10000/2	AK910	2,8/0,7	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	350	432	437	450	11,7
10000/2	AK910	4,0/1,0	3m/M6	8,5/2,0	40/25	18,2/6,5	0,89/0,67	75	360	442	447	460	11,7
10000/1	AK1010	5,8/1,4	3m/M6	12,0/2,5	40/25	28,0/9,0	0,85/0,60	*)		*)	*)	*)	*)
12000/2	AK912	2,8/0,7	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	350	432	437	450	11,7
12000/2	AK912	4,0/1,0	3m/M6	9,0/2,2	25/25	21,0/7,5	0,80/0,60	75	360	442	447	460	11,7
12500/1	AK1012	5,8/1,4	3m/M6	12,0/2,5	40/25	28,0/9,0	0,85/0,60	*)		*)	*)	*)	*)
15000/3	AK915	1,8/0,45	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	450	824	830	850	17,4
15000/3	AK915	2,6/0,6	3m/M6	8,5/2,0	40/25	18,2/6,5	0,89/0,67	75	460	834	840	860	17,4
20000/4	AK920	1,35/0,35	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	565	1008	1015	1040	23,1
20000/4	AK920	2,0/0,5	3m/M6	8,5/2,0	40/25	18,2/6,5	0,89/0,67	75	575	1018	1025	1050	23,1
20000/2	AK1020	2,9/0,7	3m/M6	12,0/2,5	40/25	28,0/9,0	0,85/0,60	*)		*)	*)	*)	*)
25000/5	AK925	1,1/0,27	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	605	1127	1135	1165	28,8
25000/5	AK925	1,6/0,4	3m/M6	8,5/2,0	40/25	18,2/6,5	0,89/0,67	75	615	1137	1145	1175	28,8
25000/2	AK1025	2,9/0,7	3m/M6	12,0/2,5	40/25	28,0/9,0	0,85/0,60	*)		*)	*)	*)	*)
30000/6	AK930	1,0/0,2	3m/M6	5,5/1,4	40/25	12,5/5,6	0,88/0,59	75	665	*)	*)	*)	32,5
30000/6	AK930	1,3/0,3	3m/M6	8,5/2,0	40/25	18,2/6,5	0,89/0,67	75	675	*)	*)	*)	32,5
30000/3	*)												
35000/3	*)												
40000/4	*)												
45000/4	*)												
50000/4	*)												

*) This information was not available at the printing deadline.

HADEF chain hoists AK+AP+AT 4-10 are fitted with high-quality load chains. These chains meet all technical requirements as per EN 818-7-T.

Type AK+AP+AT	chain
4	5 x 15
6	7 x 21
7	9 x 27
8	11,3 x 31
9	16 x 45
10	23,5x66

Trolleys

capacity kg	hoisting unit Type	Trolley Type	Trolley Type	Trolley Type	travel speed m/min	travel motor output kW	max. wheel pressure daN **)	setting range for beam flange width from - to	
								Load bolt 1N mm	Load bolt 1N mm
250/1	AK402...	AFR 10	AFH 10	AFE 10	16/4	0.25/ 0.06	150	50-179	180-310
500/1	AK405...	AFR 10	AFH 10	AFE 10			150	50-179	180-310
630/1	AK406...	AFR 10	AFH 10	AFE 10			192	50-179	180-310
1000/2	AK410...	AFR 10	AFH 10	AFE 10			257	50-179	180-310
1000/1	AK610...	AFR 20	AFH 20	AFE 20			387	66-185	186-310
1250/2	AK412...	AFR 20	AFH 20	AFE 20			374	66-185	186-310
1250/1	AK612...	AFR 20	AFH 20	AFE 20			397	66-185	186-310
1600/1	AK716...	AFR 32	AFH 32	AFE 32			501	74-196	197-310
2000/2	AK620...	AFR 20	AFH 20	AFE 20			510	66-185	186-310
2000/1	AK820...	AFR 32	AFH 32	AFE 32			622	74-196	197-310
2500/2	AK625...	AFR 25	AFH 25	AFE 25			639	66-185	186-310
2500/2	AK725...	AFR 32	AFH 32	AFE 32			639	74-196	197-310
2500/1	AK825...	AFR 32	AFH 32	AFE 32			639	74-196	197-310
3200/2	AK732...	AFR32	AFH 32	AFE 32			764	74-196	197-310
3200/2	AK832...	AFR 32	AFH 32	AFE 32		1220	74-196	197-310	
4000/2	AK840...	AFR50	AFH50	AFE50		1486	74-192	193-310	
5000/2	AK850...	AFR 50	AFH 50	AFE 50		1520	74-192	193-310	
5000/1	AK905...	-	AFH 50	AFE 50		2100	119-215	216-312	
6300/1	AK906...	-	AFH 50	AFE 50		2615	119-215	216-312	
10000/2	AK910...	-	AFH 100	AFE 100		3520	119-215	216-312	

Trolleys

capacity kg	hoisting unit Type	Trolley Type	Trolley Type	Trolley Type	travel speed m/min	travel motor output kW	max. wheel pressure daN **)	setting range for beam flange width from - to	
								Load bolt 1N mm	Load bolt 1N mm
10000/1	AK1010...	-	1x22/90 10t 1x19/90 10t	2x22/90E10t	16/4	2x0,42/0,1	*)	119-160	161-310
12000/2	AK912...	-	AFH 100	AFE 100	16/4	0.42/0.10	4200	119-215	216-312
12500/1	AK1012...	-	1x22/90 10t 1x19/90 10t	2x22/90E10t	16/4	2x0,42/0,1	*)	119-160	161-310
15000/3	AK915...	-	AFH 200	AFE 200	16/4	2x0,55/0,18	4970	160-310	-
20000/4	AK920...	-	AFH 200	AFE 200	16/4	2x0,55/0,18	6785	160-310	-
20000/2	AK1020...	-	1x22/90 16t 1x19/90 16t	2x22/90E16t	16/4	2x075/0,18	*)	160-310	-
25000/5	AK925...	-	AFH 250	AFE 250	16/4	2x 1,0/0,25	7800	160-310	-
25000/2	AK1025...	-	1x22/90 16t 1x19/90 16t	2x22/90E16t	16/4	2x075/0,18	*)	160-310	-
30000/6	AK930...	*)	*)	*)	*)	*)	*)	*)	*)
30000/3	AK1030...	*)	*)	*)	*)	*)	*)	*)	*)
35000/3	AK1035...	*)	*)	*)	*)	*)	*)	*)	*)
40000/4	AK1040...	*)	*)	*)	*)	*)	*)	*)	*)
45000/4	AK1045...	*)	*)	*)	*)	*)	*)	*)	*)
50000/4	AK1050...	*)	*)	*)	*)	*)	*)	*)	*)

*) This information was not available by the print deadline

**) Wheel pressure including the weight of the hoisting device and trolley at nominal load and 3 m suspension height.

3-phase current motor 400V/50Hz or alternating current motor 230V/50Hz.

IP55 – F – max. 1000 m above sea level.

Order-related Special data, refer to the motor nameplate.

6 Installation

6.1 Stationary hoist AKS + APS

Stationary designs are supplied with a suspension eye. A suspension hook is available as option.

They are usually supplied assembled in full. In exceptional circumstances, the suspension eye/ suspension hook is not assembled.

If a change is made from a one to a two chain fall design the suspension eye or the suspension hook must be adjusted.

! WARNING!

The hoist must always hang centrally under the beam or under its suspension point.

AK+AP 4-8, single and double chain falls

For single or double chain falls, the suspension eye (1) or the suspension hook must be connected to the two or three holes of the housing (2) so that the load is placed centrally under the suspension point.

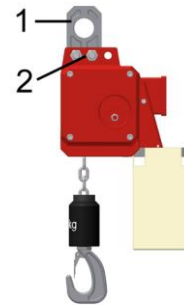


Illustration 3

AK+AP 4-8, modification from single chain fall to double chain falls

In case of modification from single to double chain falls or vice versa, it is important that the suspension eye (1) or the suspension hook is moved to a position so that the load hangs centrally again.

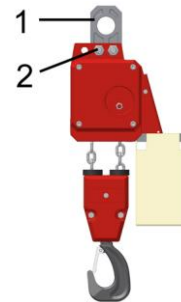


Illustration 4

AK+AP 9-10, single and several chain falls

The stationary type with suspension eye can optionally also be supplied with suspension hook. As standard they are supplied assembled in full.

The hoist with suspension eye (1) is fitted with two holes. Assemble the suspension eye (1) between the two brackets (2).

Insert the bolt.

In order to avoid confusion of the holes, they have different sizes.

The larger hole must take the entire load and part of the proper weight of the hoist. The smaller hole must take the remaining weight. The bolts must be chosen according to their loading.

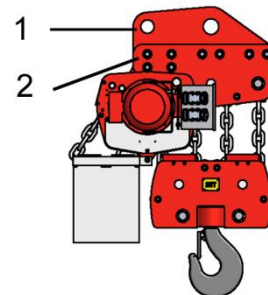


Illustration 5

! CAUTION!

If this is not observed it may damage the chain feed-in.

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

6.2 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.

6.3 Assembly on the beam AK+AP 402 to AK+AP 912

6.3.1 Outline:

- Side plate (1)
- load bolt (2)
- hexagon nuts (3)
- safety nuts (4)
- distance tubes (5)
- washers (6)
- traverse (7)
- beam width (B)
- gauge (X)

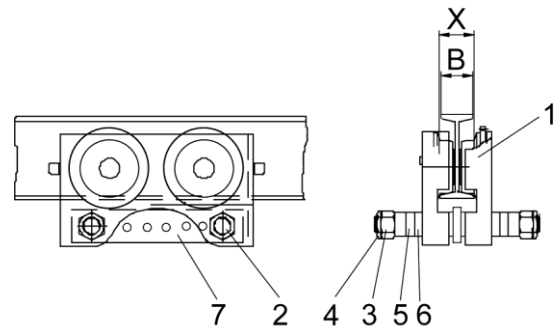


Illustration 6

6.3.2 Procedure

- 1 Pre-assemble the side plates (1) to fit the gauge "X".
- 2 Push on the unit at the face of the beam flange.

If this is not possible for lack of space or fixed end stops the trolley can also be installed on the beam from below.

- 1 Unscrew the hexagon nut (3) and safety nuts (4) at one side and pull apart the side plates (1) as far until it is possible to push the trolley onto the beam flange from below.
- 2 Push the trolley together again until it reaches the correct wheel gauge (X).
- 3 Secure the washers (6) and distance tubes (5) by tightening the hexagon nuts (3) and the safety nuts (4).
- 4 Make sure the washers (6) and distance tubes (5) are placed symmetrically.



WARNING!

The hoist must always hang centrally under the beam or under its suspension point.



CAUTION!

The distance "X" between the wheel flanges of the trolley wheels must exceed the flange width "B" of the beam by 2-3 mm (1-1,5 mm each side).

Traverse for trolley installation for chain hoists with 1-and 2-falls

AK4 - AK8

Dimensions mm	AK+AP 402+405	AK+AP 410	AK+AP 610	AK+AP 620	AK+AP 716	AK+AP 732	AK+AP 820	AK+AP 832+840	AK+AP 850
H2	50	50	65	65	75	75	100	100	100
M	M 12	M 12	M 16	M 16	M 20	M 20	M 24	M 24	M 24
L	215	215	245	245	290	290	380	380	454
L1	82,7	107,5	87,25	122,25	101,25	144,75	190	190	227
L2	24,6	24,6	34,5	34,5	43,5	43,5	50,3	50,3	50,3
S	15	15	15	15	20	20	20	20	20

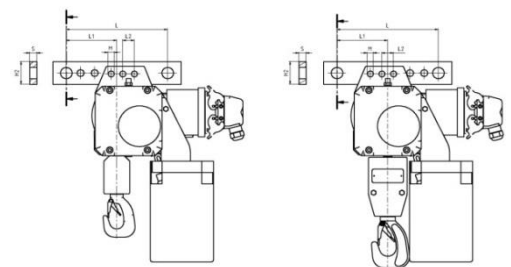


Illustration 7

6.4 Assembly on the beam AK+AP 915 - 930, AK+AP1010 - 1050

6.4.1 Outline:

- side plates (1)
- load bars (2)
- washers (3)
- traverse (4)
- safety rings (5)
- hexagon screws (6)
- safety nuts (7)
- serrated lock washer (8)
- beam flange width (B)
- gauge (X)

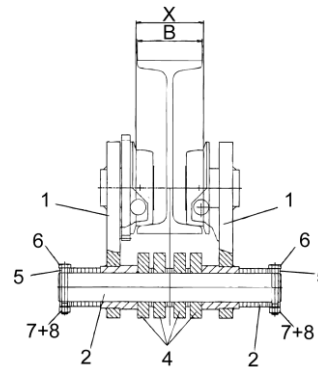


Illustration 8

6.4.2 Procedure

- 1 Pre-assemble the side plates (1) to fit the gauge "X".
- 2 Push on the unit at the face of the beam flange.

If this is not possible for lack of space or fixed end stops the trolley can also be installed on the beam from below.

- 1 Remove the safety rings (5) and safety screws (6) at one side.
- 2 Pull apart the side plates (1) as far until it is possible to push the trolley onto the beam flange from below.
- 3 Push the trolley together again until it reaches the correct wheel gauge (X).
- 4 Place the washers (3) again.
- 5 Make sure the washers (3) are placed symmetrically.
- 6 Secure the hexagon screws (6) with serrated lock washers (8) and safety nuts (7).
- 7 Place the safety ring (5) again.



WARNING!

The hoist must always hang centrally under the beam or under its suspension point.



CAUTION!

The distance "X" between the wheel flanges of the trolley wheels must exceed the flange width "B" of the beam by 3-5 mm (1,5-2,5 mm each side) .

dimensions mm	AK+AP							
	905	906	910	912	915	920	925	930
A	635	635	635	635	720	850	980	1440
A1	412	412	486	486	553	630	705	940
A2	72	72	146	146	217	290	370	435
B1	105	105	80	80	80	80	80	80
B2	139	139	104	104	107	107	107	145
C	70	70	148	148	157	168	179	205
C1	50	50	53	53	60	80	90	80
C2	55	55	65	65	65	90	100	110
D	52	52	61	61	61	71	76	80
D1	33	33	41	41	41	61	61	61

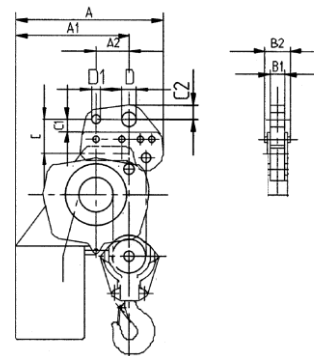


Illustration 9

dimensions mm	AK+AP1010 AK+AP1012	AK+AP1020 AK+AP1025	AK+AP1030 AK+AP1050
A	660	774	*)
A2	107	214	*)
B1	80	80	*)
B2	222	222	*)
C1	4205	80	*)
C2	65	110	*)
D	50	76,5	*)
D1	50	61,5	*)

*) This information was not available at the printing deadline.

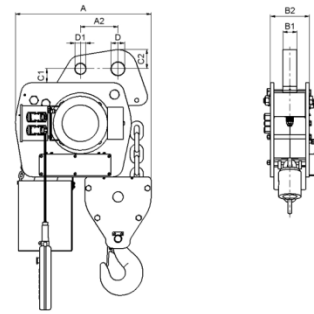


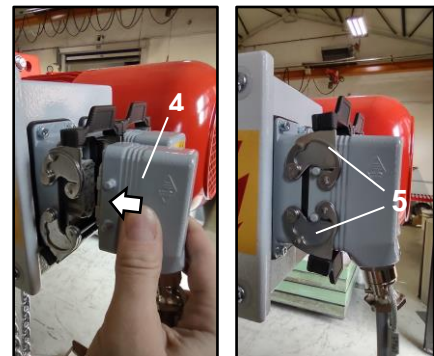
Illustration 10

6.5 Pedant control installation

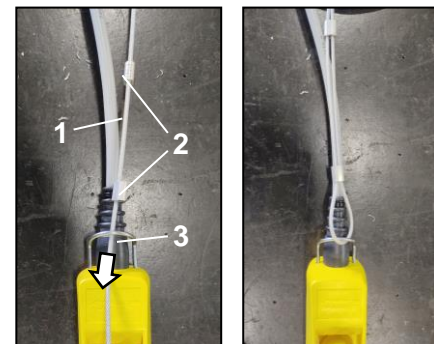
The pendant control is supplied with strain relief cable

- 1 Strain relief rope
- 2 Press thimble
- 3 Mounting bracket
- 4 Control cable plug
- 5 Safety clip

- Plug the control cable into the control box and lock.



- Put the press thimbles (2) on the lower end of the strain relief cable (1).
- Guide the cable (1) through the fastening bracket (3) of the pendant station.
- loop the rope (1) around the fixing bracket and guide it back through the press thimbles (2).



- Set the required height of the pendant station and crimp the press thimbles (2) with blunt pliers.

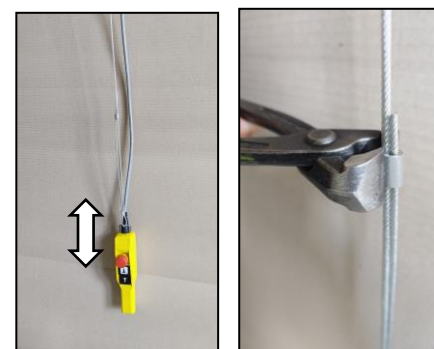
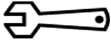
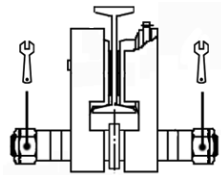
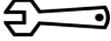
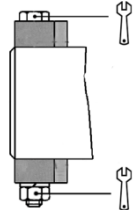
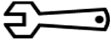
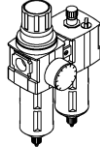







Illustration 11

WARNING!

The height of the pendant control must be selected so that the control cable is never under strain!

6.6 Tools

Capacity	Size	Tool	Use	
0,5t 1t 1,5t + 2t 2,5t + 3,2t + 4,0t 5t + 6,3t 7,5t + 10t	SW27 SW36 SW46 SW55 SW60 SW75		Load bar	
12,5t 16t – 60t	SW22 SW24		Load bar with fixing ring	
only if pneumatic drive exist	div.		Pneumatic connections	
	div.		 	

7 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.

Control buttons

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

Emergency stop



Illustration 12

Arrow keys = drive left / right

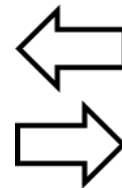


Illustration 13

Arrow keys = Lifting / Lowering

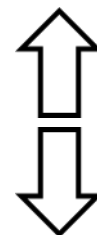


Illustration 14

System start (optional)



Illustration 15

Push button functions (E)

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

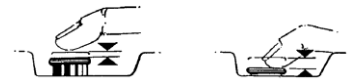



Illustration 16

Red Emergency-Stop button

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



Illustration 17

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

Emergency release – Hoist (as option)

In order to be able to drain the load in the event of a power supply failure, it is possible to release the brake manually by means of lever (A).

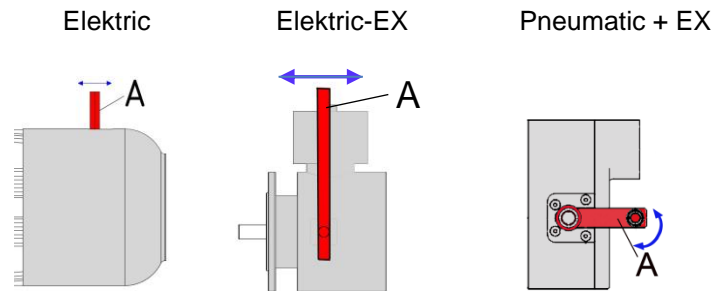


Illustration 18

 **DANGER!**

The emergency drain may only be used in the event of a power supply failure and not in the event of a technical fault on the unit!

 **NOTE!**

A minimum weight of approx. 20% of the rated load is necessary for lowering. This value depends on application and ambient conditions!

 **CAUTION!**

Run in of chain into the chain container for hoist with double lifting mechanism
 For a correct run in of chain into both chain containers, the lowering operation must be carried out, without load, at certain intervals, until both chain container are empty.
For motorized devices with operating limit switches "lowering"
 Lower until the operating limit switch is released.
 Non-observance can lead to device damages!

 **CAUTION!**

For motorised units with emergency limit switch (AK9 hoist unit)
 After the emergency limit switch has been triggered, it must first be unlocked by a short lifting or lowering process (in the opposite direction to the triggering process). Then check the chain and limit switches for the cause of the fault!

8 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.
- When changing the motor turning direction, allow the motor to come to a standstill first.
- The prescribed maintenance intervals must be adhered to.
- Observe the duty cycle, i.e. intermittent operation S3-40% ED (as per VDE 0530) means that in a period of 10 minutes the motor can operate – no matter the height of the load – for 4 minutes. It is therefore irrelevant whether the 4 minutes are continuous (i.e., in case of very high lifting heights) or are made in intervals.
- 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 must always be closed.



DANGER!

In particular, use is not permitted:

- for tearing loose fixed loads, dragging of loads as well as diagonal pulling
- for pulling against a fixed point without additional safety and/or measuring equipment against exceeding the nominal load
- 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



NOTICE!

The overload is set at the factory according to the specifications in the test book. During operation, the nominal load of the unit must not be exceeded!

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 test 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 by the approved supervision authorities (ZÜS).

8.2 Power supply

8.2.1 Mains connection

Hoist motor technical data can be found in the "Technical data" chapter.

The following tables show the assignment of the fuses.

- Select connection cross-sections as per VDE 0100.
- Put sleeves on the ends of the cables.
- Insert the connection cable into the connection plug without strain.
- Secure lines as per VDE 0100.

8.2.2 Control line connection

Pendant with cable and plug-in connection. Plug-in before use.

Any changes of the power supply cable must only be effected by qualified personnel.

8.2.3 Power connection of the brake

The low-maintenance D.C. spring-pressure brakes are connected at the factory according to the wiring diagram.

8.2.4 Wiring diagram

Wiring diagrams are situated in the terminal box or can be requested from HADEF by mentioning of serial number.

8.2.5 Assignment recommendation of line cross-sections and fuses

Assignment of line cross-sections and fuses must be done acc. to VDE0100.

For total motor output add all motor output data. The technical data of the motors are found in chapter „Technical Data“ resp.on the motor name plates.

Motor output up to	Fuse Slow-blow	Start up-/ Nominal current	Line cross section (mm ²) for line length L (m)		
			L < 50	50 < L < 100	100 < L < 150
kW	A	I _a / I _n			
1,1	10	3-7- times	1,5	2,5	4
2,2	16				6
4	20		4	10	
5,5	35		6		
12	50		10		

NOTICE!

The values listed in the table refer to 400V/50 Hz three-phase current and are recommendations.
The exact determination of the supply line must be carried out on site by a specialist.

Alternating current design

Motor output	Fuse Slow-blow	Start up-/ Nominal current	Line cross section (mm ²) for line length L (m)		
			L < 50	50 < L < 100	100 < L < 150
kW	A	I _a / I _n			
0,55	10	3-7fach	1,5	-	-
2,2	16		2,5		

NOTICE!

The values listed in the table refer to 230V/50 Hz alternating current current and are recommendations.
The exact determination of the supply line must be carried out on site by a specialist.

8.3 Gear

NOTICE!


For transport, some gear types are fitted with a plug screw. Replace the plug screw by a ventilation screw (attached) before putting the unit into operation.

8.4 Load chain





- Before commissioning the load chain must be aligned and oiled.
- Move safety note and fixing wire away from the chain.


8.5 Power operated hoists with chain container:

Due to the transport and / or installation of the hoist on the beam, the position of the load chain in the chain container can change unfavorably.


 WARNING!

It is mandatory before the first commissioning:

- that the complete load chain without load with the utmost care from the chain container is driven 
- i.e. when lowering, pay special attention to the load chain on the chain container side, so that the load chain can run properly through the hoist without being twisted 
- only after the chain container is completely empty, the load chain without load, can be returned to the chain container 
- during the running in of the load chain, lubricate it over its entire length 

 CAUTION!

Do not use grease for lubrication of load chain.
Without lubrication, manufacturer's warranty and/or liability will be void.

 NOTICE!

Continuous, thorough lubrication will increase the life of the chain considerably.

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.
- The chains are correctly placed, oiled and in good condition.

10 Functional test

10.1 Checks before the initial start-up

Lifting gear

- Load chains must not be twisted.
- Lubricate the load chain with gear oil or suitable chain lubricant before first loading.

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

Lifting gear

Check lifting and lowering functions, initially without a load. The buttons of the control switch are marked with the symbols for lifting and lowering. The movement direction of the load (lifting or lowering) must correspond with the push buttons (lifting or lowering). This is the factory setting.

If the device lowers when the "lift" button is operated and lifts when the "lower" button is operated, the two phases of the net connection must be swapped.

The function of the end switch is to be checked initially by operating the end switch by hand. Then carefully move to the end position. If required, adjust end switch.

Then check the brake function under load. After releasing the buttons of the control switch, the load must be securely held.

Trolleys

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

NOTICE!

The limit switch function will only work if the movement direction of the load (lifting - lowering) corresponds to the push buttons of the control switch.

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

11.3 Replacing the load chain

CAUTION!

If there is any visible damage and when the conditions for replacement are reached (i.e. one or several dimensions in the table have been reached, there is corrosion or elongation), the chain must be replaced.

When replacing the chain, also check the chain wheels.

Procedure:

- Only insert new chains in an unloaded state.
- Remove chain from its fastening at the end and attach a chain link which is open at the side.
- A chain link which is open at the side, can easily be produced by grinding out a small piece. The opening must have the same thickness as the chain link.
- Hang a new original chain (same size and oiled) in the side opened chain link and insert it.



Illustration 19

NOTICE!

The weld seam of the chain must be on the outside.

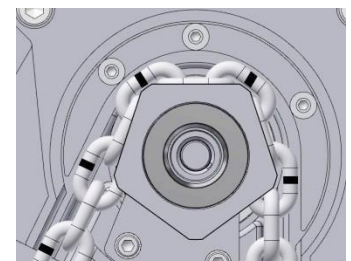


Illustration 20

- Make sure the chain is not installed twisted.
- Make sure the chain links are aligned in one direction.
- Assemble the chain to the end fastening.

Running of the chain into the chain container:

- Always run chains into the chain container by using the motor.

CAUTION!

Fill in the chain always motor driven.

Never run the chain in by hand, as there is a risk of knotting which can cause malfunctions and damage to the device.

Only for AK+AP 4-8

Chain end fastening 2 chain falls
Type with threaded bolt (1)

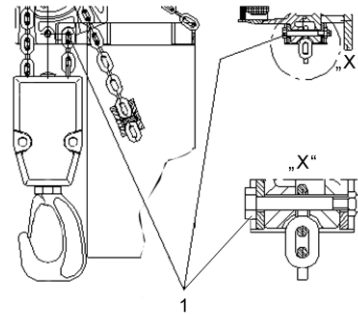


Illustration 21

chain threaded bolt AK+AP 4-8

	AK+AP4	AK+AP6	AK+AP7	AK+AP8
dn mm	6	8	10	12
dv mm	5,4	7,2	9	11

Exchange the bolt if the wear limit "dv" is reached.

Max. permitted wear < 10%.

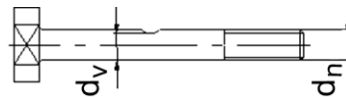


Illustration 22

11.4 Brake motor AK 4-8

Brake: 180 V DC

Chain hoist	Nominal brake moment	Nominal air gap	air gap max.	Rotor strength min.
Type	(Nm)	(mm)	(mm)	(mm)
AK 4	10	0,2	0,8	5,5
AK 6	20	0,3	0,8	7,5
AK 7	28	0,3	0,9	9,5
AK 8	28	0,3	0,9	9,5

11.5 Brake motor AK 9-10

Brake: 180 V DC

Chain hoist	Nominal brake moment	Nominal air gap SLü	air gap max.	Rotor strength min.
Type	(Nm)	(mm)	(mm)	(mm)
AK 9-10	32	0,3	0,7	8,0

11.5.1 Assembling the brake

- 1 Insert the retaining ring (1) into the shaft slot.
- 2 Insert the feather key (2) into the motor shaft.
- 3 Fix hub (3) with retaining ring (1).
- 4 Assemble the friction plate (4) if existent.
- 5 Push the rotor (5) onto the hub (3).
- 6 Lock the magnet body with the 3 fastening screws (6).
- 7 Set air gap "a" (refer to "adjusting the air gap")
- 8 Assemble the dust-protection ring (7) if existent.

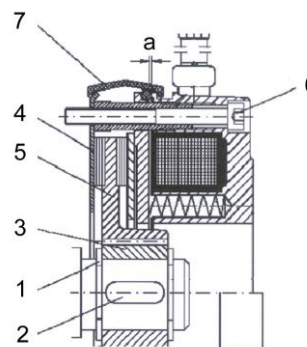


Illustration 23

9 Electric connection

11.5.2 Disassembly of the brake

Disassembly is performed in reverse order to the assembly.

11.5.3 Adjusting the air gap

View "X" on the brake.

- 1 Loosen the locking screws (6) by half a turn.
- 2 Turn the cap screws (8) into the magnetic body (9) anti-clockwise.
- 3 By turning the locking screws (6) clockwise, move the magnetic body (9) towards the anchor plate (10) using a feeler gauge until nominal air gap "a" is reached (see table).
- 4 Unscrew the cap screws (8) from the magnetic body clockwise.
- 5 Tighten the locking screws (6).
- 6 Check the air gap again and re-adjust if necessary.

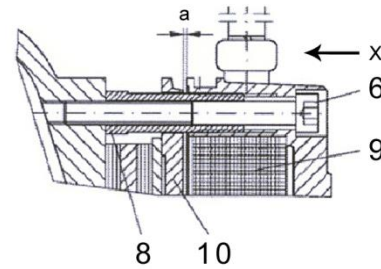


Illustration 24

11.6 Overload protection

If the hoist does not lift the permitted load, the overload protection must be adjusted. Adjustment may only be done by a service company, authorised by the manufacturer!

DANGER!

The factory setting of the overload protection is secured by a seal. Any guarantee becomes invalid if this setting is changed. Should maintenance be necessary, please contact a service company that is authorised by the manufacturer.

DANGER!

The overload protection serves exclusively to protect against damage to the device due to overloading when moving loads. Its function must not be integrated into the operational work process!

Depending on the type of hoist, the following variants are possible:

11.6.1 Slipping clutch

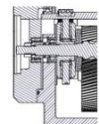


Illustration 25

11.6.2 Mechanical spring assembly

In case of overload the load must be lowered until it reaches the ground so that the spring assembly can release. Only thereafter it is possible to repeat the lifting motion.

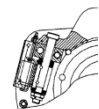


Illustration 26



Illustration 27

11.6.3 Electronic hoisting power limiter (as option, except serial AT)

Power consumption of the hoist motor is measured during lifting movement of a load by an adjustable power measuring device (overload guard). The setting is made via a separate relay for main and creep lifting speed. Power consumption of the motor is load-dependent and increases with the load. If the set value is exceeded, the relay responds and switches the motor off via switching elements. After the overload protection has been activated the LOWER button must be pressed first so that the LIFT function can be activated again. Before lifting again the load must be reduced to the nominal load!



Illustration 28

12 Inspection

12.1 General Overhaul for motor-driven units

The validated, national accident prevention regulations must be observed and the measures to reach "safe working periods (S.W.P.)" according to FEM 9.755.

After the "theoretical working time D" has been elapsed, the owner/user must take motor driven devices out of operation and effect a General Overhaul.

Further use of the equipment is only allowed after a licensed qualified person has proofed

- that further use is possible without doubt

and

- the conditions for further use have been determined

These conditions have to be written down in the test book.

The owner/user is responsible to make sure that these conditions are observed.

12.2 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.

12.2.1 Components to be checked

The following must be checked:

- Dimensions of load chain, load hooks, pawls, bolts, ratchet wheels, brake linings.
The dimensions must be compared to the dimensions in the tables.
- A visual inspection for deformations, cracks and corrosion must be carried out.

12.2.2 Inspection intervals

	at commissioning	daily checks	1st maintenance after 3 months	Inspection and maintenance every 3 months	Inspection and maintenance every 12 months	Inspection and maintenance every 36/60 months
Inspection of the equipment by a qualified person (periodic inspection)					X	
screw connections	X				X	
brake function - brake discs	X	X				
overload protection as slipping clutch (if relevant)	X				X	
overload protection by current cut-off (electric hoist) (if relevant)	X				X	
overload protection by air relieve valve (pneumatic hoist) (if relevant)	X				X	
load chain, clean and oil	X	X*)	X	X		
load chain, elongation and wear				X		
load hook, cracks and deformation					X	
Bearings of chain pulleys, check and lubricate					X	
Hoist gear, oil change						X*)
Trolley wheels, wear					X	
Trolley wheels, lubricate toothed wheels	X*)		X*)	X*)		

*) see chapter "maintenance"

12.3 Checking the load chain

CAUTION!

The load chain must be tested over its entire length!

The measure of the load chain must be carried out especially in the areas which are subject to the highest wear. Through the lifting movement, these are the contact points of the chain with sprocket wheel and deflection pulleys.

acc. DIN 685-part 5

L11 = pitch increase over 11 chain links

L1 = pitch increase over 1 chain link

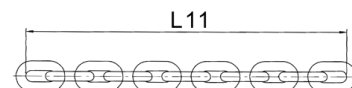


Illustration 29

dm= detected link diameter $(d1+d2)/2$

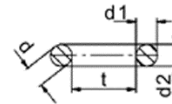


Illustration 30

Chain dimensions

Dimension	Chain dimension					
	5x15	7x21	9x27	11,3x31	16x45	23,5x66
L11	171,4	238,8	300,8	348,1	505,6	743,0
L1	16,0	22,4	28,1	32,7	47,4	69,5
dm	4,6	6,5	8,2	10,2	14,4	21,2

WARNING!

When the dimensions listed in the table are reached due to wear or deformation, the chain must be replaced!

For load chains made of stainless steel, the separately wear dimensions on the "Inspection certificate – Load chain" apply!

12.4 Checking the load hook

load hook and suspension AK 4 - AK 8

a1/a2 = biggest hook mouth width

h1 = eye dimension

t1/t2 = thickness of hook base

load hook AK 9 + AK10

X = biggest hook mouth width

Y = measurement from hook no. 6 up

H = thickness of hook base

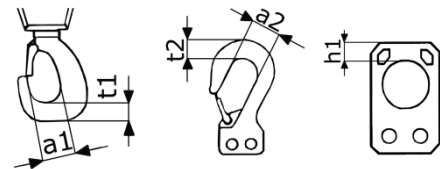


Illustration 31

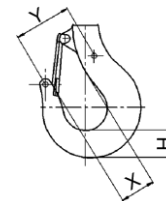


Illustration 32

Dimensions for load and suspension hook and eye for AK+AP 4-8

Dimension	AK+AP4		AK+AP6		AK+AP7		AK+AP8	
	Susp. a load		Susp. a load		Susp. a load		Suspension	
	1-str.	2-str.	1-str.	2-str.	1-str.	2-str.	1-str.	2-str.
Hook size	500/630	1000/1250	1000/1250	1600/2500	1600/2500	3000/4000	2500/5000	2500/5000
a1 max.	37,5	43,5	43,5	60,0	60,0	69,5	--	--
a2 max.	39,0	39,0	57,0	57,0	57,0	66,0	60	60
h1 min.	18,0	18,0	31,0	31,0	31,0	40,0	40,5	40,5
t1 min.	17,1	20,9	20,9	27,6	27,6	40,0	--	--
t2 min.	21,9	21,9	33,4	33,4	33,4	63	77	77
							Load hook	
Hook No.	--	--	--	--	--	--	1	1,6
X	--	--	--	--	--	--	40	45
H	--	--	--	--	--	--	40	48

Please fill in the measured values before commissioning:

Capacity	kg
a1	mm
a2	mm
h1	mm
t1	mm
t2	mm
X	Mm
H	mm

Dimensions for load and suspension hook and eye for AK+AP 9-10

Dimension	Capacity in kg / falls				
	5000/1 6300/1	10000/2 10000/1 12000/2 12500/1	15000/3 20000/4 20000/2 25000/5 25000/2	30000/6 30000/3 35000/3	40000/2x4 40000/4 45000/4 50000/4
Hook no.	1,6	4	6	10	12
X	45	56	--	--	--
Y	--	--	130	160	180
H	48	67	85	106	118

Please fill in the measured values before commissioning:

Capacity	kg
X or Y	mm
H	mm

WARNING!

When the dimension of the hook opening width is deformed by more than 10% or the bottom thickness is worn out by more than 5% due to wear, the hook must be replaced!

For load hooks made of stainless steel, the separate information on the "Inspection certificate – Load hook" applies!

12.5 Inspection – Gear – Oil level

Check oil level all 3 month.

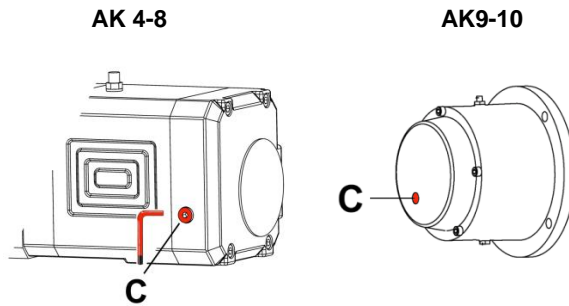
	Locking screw(C)	Tool
AK 4 – AK 6	M10	SW8
AK 7 – AK 8	M12	SW10

Solve the locking screw (C) a bit. (do not remove)
 If oil drips out = level OK.
 Tighten the screw.

If no oil drips out, carry out maintenance and oil change.
 (see chapter maintenance)

AK 9 - 10	Oil gauge glass (C)
-----------	---------------------

Oil gauge glass half full = level OK
 No oil observable = carry out maintenance and oil change.
 (see chapter maintenance)






13 Service

13.1 Load chain

Wear at the links is mainly due to insufficient maintenance of the chain.

To ensure optimal lubrication of the links, the chain must be lubricated at regular intervals, depending on usage.



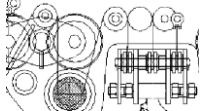
- Lubricate the chain with oil that creeps.
- Always lubricate the chain when it is not under load so that the oil can wet the links affected by wear. It is not sufficient to lubricate the chain from the outside, as this will not ensure the formation of a lubricating film within the links. The adjacent link points must always be lubricated to prevent excessive wear.
- If the same lifting operations are carried out constantly, the switching area from a lifting to a lowering movement must be given special attention.
- Thoroughly effected lubrication of the chain will prolong the life of the chain by approx. 20 times, compared to dry run with unlubricated chain.
- Wash dirty chain with petroleum or a similar cleaner, under no circumstances heat the chain.
- If there are environmental influences that foster wear, such as sand, a dry lubricant should be used, e.g. graphite powder.
- When lubricating the chain's condition of wear should be checked.

Use		Recommendation		Interval
Load chain		oil for example: FUCHS RENOLIN PG 220 or special chain lubricant Use NO grease!	0,2 l	3 month

CAUTION!




Do not use grease for lubrication of load chain.
 Without lubrication, manufacturer's warranty and/or liability will be void.

13.2 Pulleys

Use		Recommendation		Interval
Pulleys		FUCHS RENOLIN PG220	Acc. to demand	12 month

13.3 Load hook

- Check bearings and pulleys yearly
- Clean and lubricate the bearings of hooks and pulleys with grease
- Slight bearings are maintenance free
- When bearings resp. slight bearings are worn of, change the complete pulley

Use		Recommendation		Interval
Load hook bearing		FUCHS RENOLIN PG220	Acc. to demand	12 month

13.4 Hoist gear

- Low maintenance.
- Regular lubricant checks required
- Exchange synthetic lubricants after 3 years
- Shorter maintenance intervals for particularly difficult operating conditions, e.g. increased dust and pollution loads or constant operation of the hoist with the highest load
- Lubricant: synthetic, viscosity VG 220

A = Oil fill in or air discharge screw
 B = Oil drain plug
 C = Oil level glass

AK4 – AK8

AK9+AK10

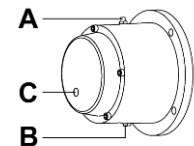
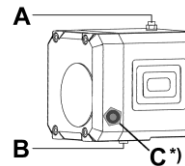


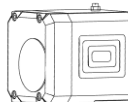
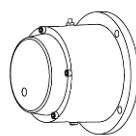





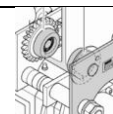

Illustration 33

Use		Recommendation		Interval
Spur gear		FUCHS RENOLIN PG 220	AK/AP4 – 0,45 l AK/AP6 – 1,00 l AK/AP7 – 1,90 l AK/AP8 – 1,90 l	Lubricant change 3 years
Planetary gear		FUCHS RENOLIN PG 220	AK/AP9 = 0,35 l AK/AP10 = 3 l	Lubricant change 3 years
Spur gear *) Planetary gear			Maximum fill level = gauge full filled Minimum fill level = gauge half filled	

*) only by explosion proof electrical equipment

13.5 Trolley

- Trolleys are lifetime lubricated, Refill lubricant is normally not necessary.
- Lubricate gear rim and pinion drive each ¼ year or if required more often, with grease.

Use		Recommendation		Interval
Pulleys Gear rim Drive pinion		FUCHS RENOLIT FEP2	0,1 kg	3 month
Travelling gear If available		SHELL Tivela S320	---	Life time lubrication

13.6 Electric motor

For the motor it is sufficient to keep the cooling airways clean and monitor the roller bearing and its lubrication status.

A high temperature fat must be used if the roller bearing is replaced.

CAUTION!
 Brake linings and surfaces must always be clean and fat-free. Even very small amounts of dirt can reduce the braking moment considerably.

13.7 Lubricant selection

FUCHS	SHELL	ESSO	ARAL	MOBIL	TOTAL	CASTROL	KLÜBER
Renolin PG 220	Omala S4 WE 220	Glycolube 220	Degol GS 220	Glygoyle 30	CARTER SY 220	--	Klübersynth GH 6-220
Renolin PG 320	Omala S4 WE 320	Glygolube 320	Degol GS 320	Glygoyle 320	--	--	Klübersynth GH 6-320
Renolin PG 460	Omala S4 WE 460	Glygolube 460	Degol GS 460	Glygoyle 460	--	Alphasyn PG 460	Klübersynth GH 6-460
Renolit FEP2	Alvania EP2	Unirex EP2	--	Mobilux EP2	MULTIS EP2	--	--
Renolin B10 VG32	Tellus Oil 32	--	--	--	--	--	--
Stabylan 5006	--	--	--	--	--	Optimol Viscoleb 1500	Klüberoil 4UH 1-1500
Chain lubricant OKS 451							

13.8 Lubricant for food industry – selection (as option*)

	MOLYDUVAL	SHELL	MOBIL	CASTROL	KLÜBER
Gear	SYNTHOLUBE A 220 LM	Cassida Fluid GL 220	Glygoyle 220	Optimol GT 220	Klübersynth UH1 6-220
Driving gear	SYNTHOLUBE A 220 LM	Cassida Fluid GL 220	Glygoyle 320	Optimol GT 320	Klübersynth UH1 6-320
Load chain	--	--	Lubricant FM 100	Optimol Viscoleb 1500	--
Load hook Pulley Spur gear Pinion	--	FM Grease HD 2	Mobilegrease FM 222	--	--

* must be mentioned by order

14 Trouble

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 Hoists	No main power	Check connection to mains supply
		Phase sequence not correct (with low voltage control)	exchange 2 phases <i>(see warning note at the plug)</i>
Hoist motor does not run	Electric Hoists	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 alternating current 1).	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 atmosphere, the motor must be returned to the manufacturer for repair!*	
	Pneumatic hoists and winches	Operation pressure/ quantity of air is too low After prolonged standstill	Check connection to mains supply See maintenance - pneumatic motor
Hoist motor runs – load is not lifted	For motor driven chain hoists and winches	Overload protection is activated - (with overload)	Reduce the load to nominal load
		Overload protection is activated - (with =< nominal load)	Check settings and reset if necessary
		No or incorrect power transmission	Let the unit be repaired by an expert For EX-hoists, please clarify with the manufacturer what to do!*
Hoist motor is running – chain does not lower	For motor driven chain hoists.	Blockage due to chain link pointing sideways in the feed from the chain container*	Check the chain - lubricate if necessary and/or select a larger chain container so that the chain can be properly arranged before the inlet
Motor hums and uses excessive current	Electric hoists and winches	Defective coil	Motor must be repaired by a specialist If the unit is suitable for explosive atmosphere, 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 atmosphere, the motor must be returned to the manufacturer for repair!*
		Brake does not release	See problem "Brake does not release"
		Defect of capacitor (only for alternating current 1).	Replace the capacitor
		Defect of starter relay (only for alternating current 1).	Replace the starter relay
Motor does not brake or has excessive afterrunning.	Electric hoists and winches	Switching error after intervention in the electric circuit	Check the electric connection of the brake acc. to the wiring diagram
	For motor driven units.	Brake linings are worn or dirty.	Brake lining carrier must be changed completely If the unit is suitable for explosive atmosphere, the brake 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 atmosphere, the brake must be returned to the manufacturer for repair!*
		Air gap of main brake too large; brake lining of main brake worn or dirty	Readjust air gap, if necessary replace lining carrier If the unit is suitable for explosive atmosphere, the brake must be returned to the manufacturer for repair!*
Brake does not release	Electric hoists and winches	Brake rectifier defective	Replace the brake rectifier If the unit is suitable for explosive atmosphere, the brake must be returned to the manufacturer for repair!*
		Brake current relay defective	Replace the brake current relay
		Brake coil is defective	Replace the brake coil If the unit is suitable for explosive atmosphere, the brake 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 atmosphere, the brake must be returned to the manufacturer for repair!*
	Pneumatic hoists and winches	Power drop in the mains power line > 10%	Provide correct power supply voltage
		Operation pressure/ quantity of air is too low	Check connection to mains supply
Fuses burnt out or motor contactor is triggered	Electric hoists and winches	Short circuit in component	Eliminate the short circuit
		Motor has a short circuit in the body or windings	Correct the problem by a specialist For EX-hoists, please clarify with the manufacturer what to do!*
		Motor is switched incorrectly	Correct the switching
Unit stops and honks	Motorised units with AK9 hoist unit	Wrong type of fuse	Replace the fuse with correct one <i>(see table "fuses")</i>
		Chain cannot run through the unit without error Operating limit switch is stuck / defective	Check / align / clean and lubricate chain if necessary Clean operating limit switch and repair if necessary.

*) 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 Electric wiring diagrams

Electric wiring diagrams are attached to the consignment or included in the terminal box.

Except for units supplied without control.

17.2 Radio control (as option)

Should the unit be fitted with radio control, a manual for radio control is attached to the consignment.