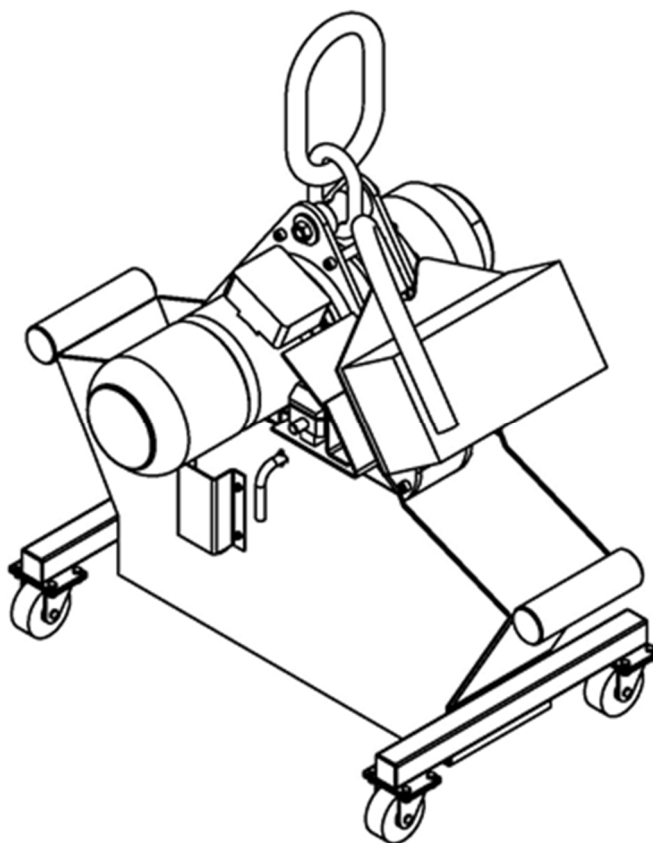




Operating and Maintenance Instructions

HADEF Electric Transportation Device

stationary with suspension eye



HADEF

 **NOTICE!**

Installation or assembly instructions for incomplete machines are found in chapter "Installation".

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

The original operating and maintenance instructions are made out in German language.

Translations in other languages have been made from the German original.

A copy is available from HADEF on written request.

Subject to changes.

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1 INFORMATION

HADEF products meet European Union requirements, in particular the valid EU Machine Directive.

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

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

After assembly, HADEF products are 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 HADEF products are packed properly. Please 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 product. Illustrations serve to explain something and may differ from the illustration of the existing unit as they only serve as an example.

 **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 valid national regulations must be observed.

1.1 Notes to determine the theoretical time of use

For motor driven units.

The equipment (cable and chain hoists, winches as well as crane lifting devices) are classified as per running times and loading groups in correspondence with their planned operating method and dimensioned to the requirements derived from these.

They have been therefore designed from the whole conception of measurement for a limited duration of use.

After the total period of use has 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 valid accident prevention regulations, "winches, lifting and pulling devices".

 **NOTICE!**




Definition


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.

 **EX** Danger from explosive area.

2.2 Duty of care of the owner

 DANGER!	Inobservance of these instructions may lead to unforeseeable danger. HADEF assumes no liability for any damage to property or injury of persons resulting from this.
--	---

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 equipment, in particular, is 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 machine is only operated, serviced and repaired by qualified and authorised 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.
- Devices for use in area prone to explosion must (from customer's side) be earthed with a shunting resistor of $< 106 \Omega$ against earth.

**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 persons that are appropriately trained and that are familiar with it. They must have their employer's authorisation 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 jewellery.
- Do not wear cloth that are too big/wide.

2.4 Appropriate use

- The permitted safe working load of the devices must not be exceeded! An exception can be made during the load test before first start-up, carried out by a licensed expert.
- The permitted environmental temperature during equipment operation is -20°C up to $+60^{\circ}\text{C}$!
- 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 on HADEF becoming void.
- Liability and warranty will become void if unauthorized modifications of the units are made!

Vertical lifting and lowering of non-guided loads.

**DANGER!**

The following use is not allowed:

- Pulling loose of stuck loads, dragging of loads and inclined pulling.
- The use in an area at risk from explosion. Exception is made when the unit is modified to be explosion-proof and this is shown on special type plates it carries for this purpose.
- In reactor containment.
- To transport people with the equipment.
- For use on stages and in studios!
- Persons must not stand under a suspended load.
- The use of a 4-point attachment is not allowed. It is only allowed to use the device with a 3-point attachment

**NOTICE!**

If the units are not used appropriately, it is not possible to ensure safe operation.

The owner/user has sole liability for all personal injury and damage to property arising from inappropriate use.

2.5 Basic safety measures

- Pay attention to the operating and maintenance instructions.
- Pay attention to any warning notice attached to the equipment or mentioned in the manual.
- Please adhere the safety distances.
- Please insure good sight during operation.
- Only use the hoists appropriately.
- The equipment is to be used exclusively for the movement of goods. Under no circumstances may persons be moved.
- Never load the devices beyond their permitted working load limit.
- Please observe the accident prevention regulations (UVV).
- Should the equipment 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, please consult a structural engineer.
- If the equipment has not been used for a period of time, carry out visual checks of all main components and replace any damaged parts with new, original spare parts.
- Do not use a hoist that is defective, pay attention to any abnormal noise it makes during operation.
- In case of trouble stop operation immediately and eliminate the defect.
- 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 hook safety catches must always be closed.
- The housing may not be in contact somewhere.
- Stop lowering the load when the load is being set down or is prevented from being lowered further.
 - 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.

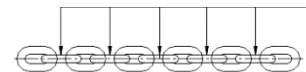


Illustration 1

- Check brake function (if the unit is fitted with brake) 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.

 **WARNING!**

The following is not allowed:

- To lift a load that exceeds the nominal load.
- To manipulate the slipping clutch.(if fitted with slipping clutch)
- 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).

They must be replaced 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

HADEF hoists and cranes are checked and adequately packed before dispatch.

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 chains, hooks, wire ropes and brakes against corrosion.

4 Description

4.1 Areas of application

If they are used in the open, protect the units against the effects of weather such as rain, hail, snow, direct sunshine, dust, etc. If the device is set up in a continuously humid environment with strong temperature fluctuations, the correct functioning of the motor and the brake are endangered by the forming of condensation.

Ambient temperature: -20°C/+60°C. Humidity: 100 % or less but not under water

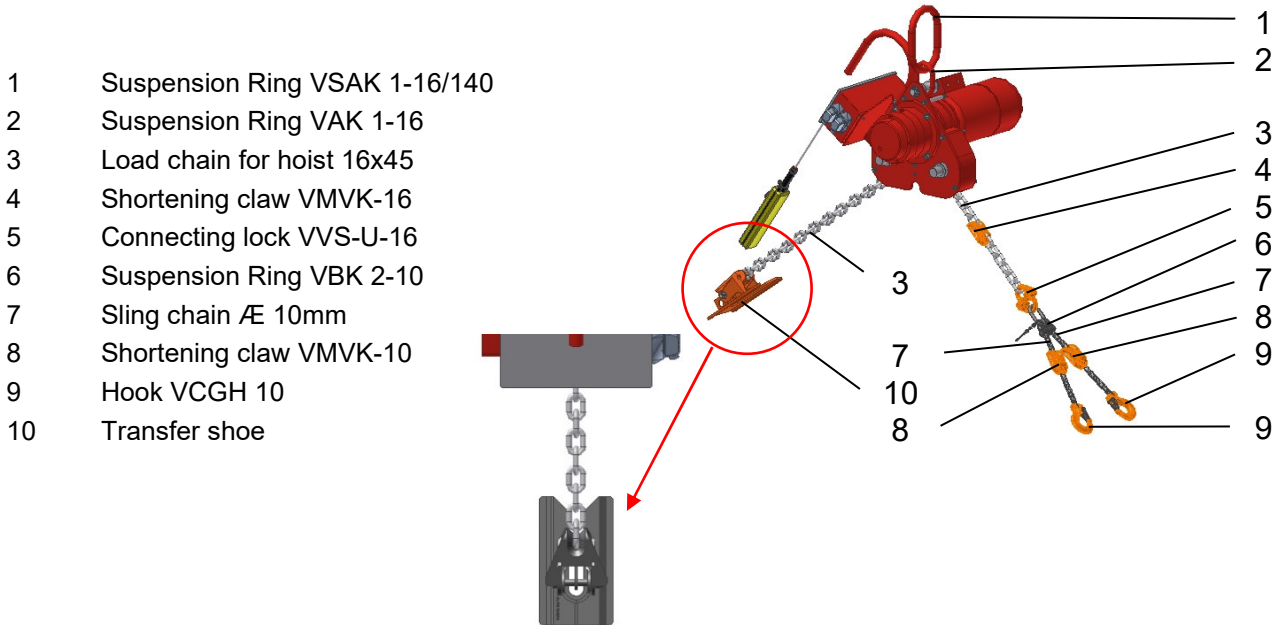
During longer periods of standstill, corrosion may reduce the function of the brake.

**DANGER!**

It is not permitted to use the unit in an area at risk from explosion!

4.2 Design

HADEF Electric Transportation Devices are fitted with a suspension ring to be suspended in a crane hook. The load chain is additionally fitted with sling systems to fix the load.



4.3 Functions

The lifting gear are operated by pressing the push 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.

 **NOTICE!**

The best protection against functional failures in case of extreme environmental conditions 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 HADEF AK series.

4.4.1 Motor

HADEF Electric Transportation Devices are driven, according to the type, by three-phase motors for 600V/60 Hz, 480v/60Hz or 400V/50Hz.

4.4.2 Motor brake

Electric brake with additional mechanical brake release.

4.4.3 Gear

Planetary gear with ventilation screw.

4.4.4 Control/Control switch

Remote control with Emergency-Stop. Additional plug-in pendant control.

The remote control switch has been designed for single hand use. The control casing is made from plastic that resists impacts and breaks.

4.4.5 Load chain

HADEF Electric Transportation Devices are fitted with high quality load chain 16x45. These chains meet all technic requirements acc. to EN 818-7. The load chains specially fit HADEF chain wheels and may only be replaced by original chains from HADEF.

4.4.6 Load hook and Sling chains

Special sling chains and load hooks are used to connect the load, - they are connected with the hoist chain by safety elements. The safety catch of the hook prevents the load from slipping out of the hook unintentionally.

4.4.7 Chain container

The chain container, running on wheels, is made of steel plate and adjusted in size and form to the special conditions of use.

4.4.8 Rotation direction/ Phase sequence relay

Protection against wrong net connection

4.4.9 Safety limit switch / Operation limit switch

Prevents that the chain runs completely through and out of the hoist.

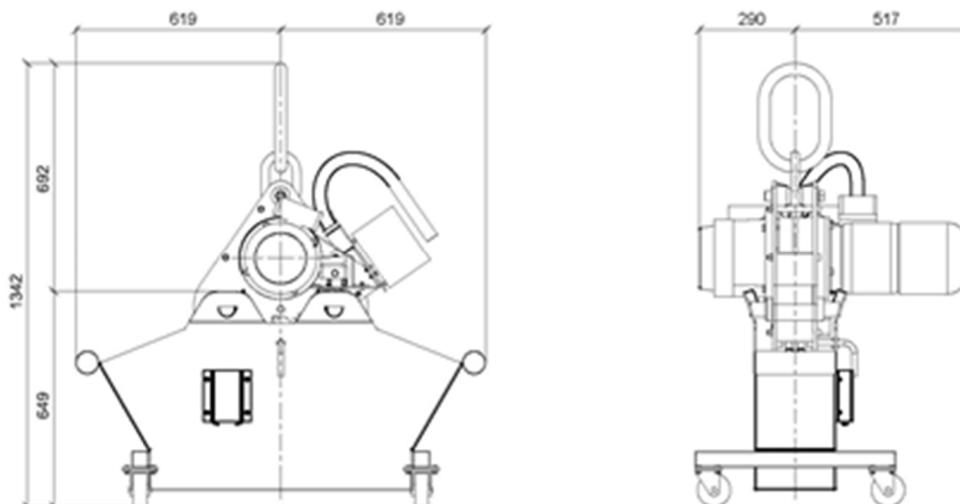
4.4.10 Overheating protection of the electric motors

Standard overheating protection by thermal detector (PTO)

5 Technical data

Capacity kg	lifting speed m/min	duty classification FEM 9.511 ISO 4301 Theor. service life	motor output kW	operation time ED %	current consumption 1) 600V-60Hz 2) 480V-60Hz 3) 400V-50Hz A	cos phi	noise emission at 1m distance tolerance +2dB(A)	weight approx. kg
6000	6,4/1,6	2m/M5 – 1600h	5,5/1,4	25/40	1) 8,3/3,75 2) 12,5/6,4 3) 12,5/6,4	0,88/0,59	75	400

5.1 Dimensions




6 Assembly

The units are supplied completely with suspension ring, - they must only be suspended in the crane hook and electric connection must be made.

It is essential to observe the following points in order to prevent damage or critical injuries when setting up the device:

- Set-up operations – assembly and installation of the device – must only be performed by qualified personnel observing the safety indications.
- The equipment must be inspected for any transport damage before starting assembly.
- Please also read the “General safety instructions” chapter.

 **WARNING!**
 Assembly depends on the local environment. The hoist must be suspended in a way that it can position itself freely.

6.1 Assembly of sling device - hook and connection lock

 **NOTICE!**

Due to its dimensions, the arrangement of the components of the sling system is given - depending on the diameter of the chain links.

Hooks and connection locks are connected with bolt to the chain and secured with split pins.



Illustration 2

 **WARNING!**
 Bolts and split pins may only be used once.

6.2 Assembly of sling device - shortening claw

Pull the loose chain fall through the cross slot. Clip the chain into the locking slot (where provided) and push in [A] the safety pin - split pin.

Thereby the multi-shortening-claw is tightly fixed in the chain fall. Preferably take the 3rd chain link - number 3 after the suspension chain link and assemble it into the shortening slot and secure it.

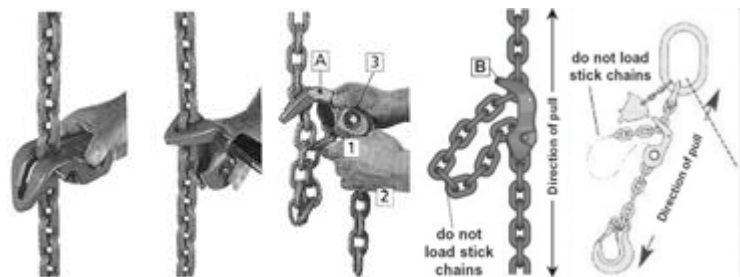


Illustration 3

Handling:

Swing out the shortening claw to the side. With uncharged chain, insert the chain link of the loaded side into the pick-up pocket, [1] pull in the chain fall down [2]. If necessary unlock the safety bolt. Safety bolt locks again automatically. Check correct locking. To loosen proceed in reverse order. At the same time push the safety bolt [3] sideways.

If the shortening claw [A] is used without safety pin - split pin, make sure that the chain is always suspended entirely in the locking slot. [B]

When the shortened chain is lifted/pulled, make sure that the chain is always suspended entirely in the locking slot [B].

6.3 Assembly of the transfer shoe

The transfer shoe (2) must be installed on the chain end at the side where the terminal box (1) is situated.

Assemble the transfer shoe (2) as shown in direction "▲".

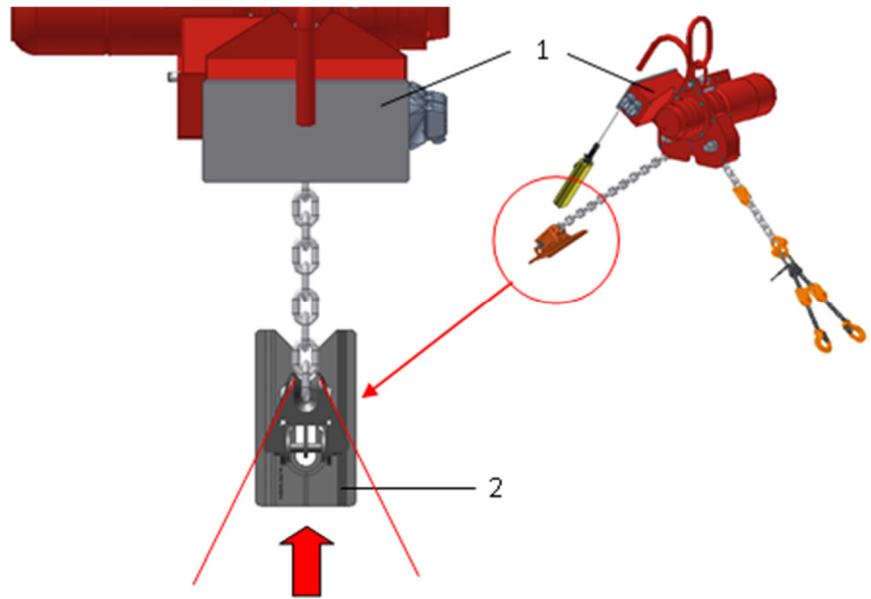


Illustration 4

6.4 Assembly of the limit switch

The limit switch is assembled and adjusted in the factory.

- 1 Angle
- 2 Spring
- 3 Screw
- 4 Side plate
- 5 Screw
- 6 Eccenter
- 7 Shaft
- 8 Screw
- 9 Switch
- 10 Screw
- 11 Limit switch lever

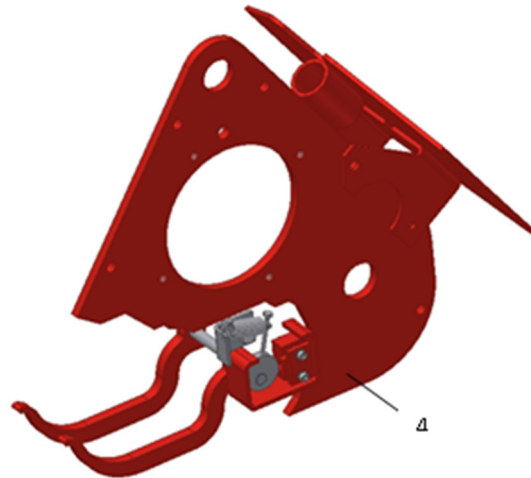
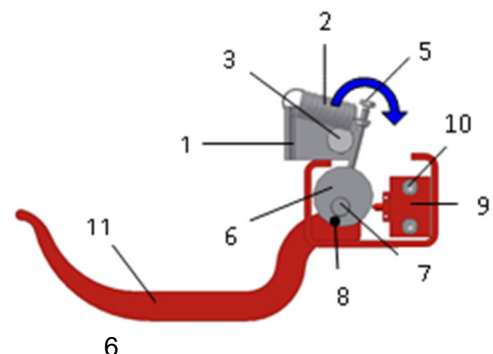


Illustration 5

Assembly sequence:

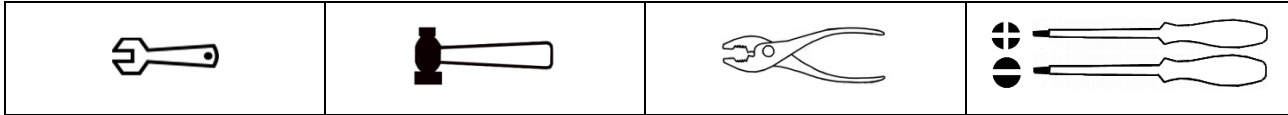
1. Bolt on the angle (1) incl. spring (2) with screw (3) onto the side plate (4) acc. to illustration.
2. Push the end of the spring (2) over the screw shaft (5) and screw in the screw (5) in the thread of the eccentric (6).
3. Push the eccentric (6) onto the shaft (7).
4. Turn the eccentric (6) with light tension on the spring in direction of arrow and lock it with the screw (8).
5. Tighten the switch (9) slightly with screws (10).
6. Install the contact pin of the limit switch thoroughly, with contact to the eccentric (6).

Illustration



⚠ CAUTION!
Test the switch-off function by actuating the limit switch lever (11) by hand.

6.5 Tools



7 Operation

Only people that are familiar with the operation of the lifting devices may be entrusted with their operation. They must be authorised 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.

The pendant control shown is only taken as an example and can differ according to the type of hoist supplied.

Control switch - Radio control

The functions of the push buttons on the control switch are made out according to customers specifications.

- Press both "start" buttons approx. 3 seconds at the same time, in order to activate control.
- When control is activated the "Start-button" on the left side is the horn.
- Functions according to illustration.



Illustration 7

Control switch - Emergency Pendant Control

To operate the unit in case of failure of the radio control.

- Release the connection cable of the radio control at the terminal box.
- unplug
- insert the control cable of the pendant control into the unit
- secure it with the two securing clips
- Functions according to illustration.

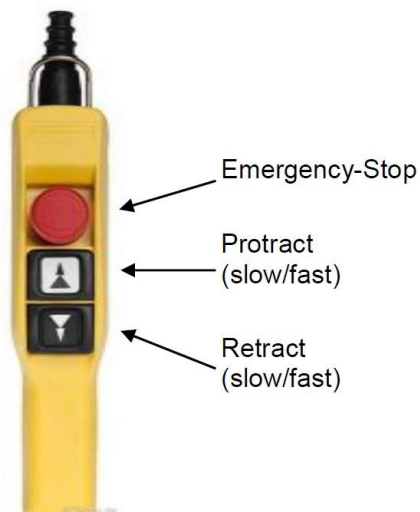


Illustration 8

Push button functions

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

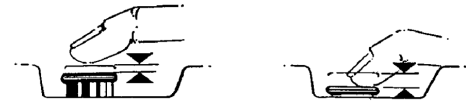


Illustration 9

Red Emergency-Stop button

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

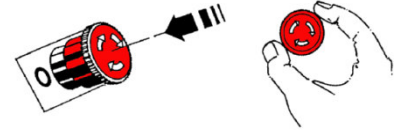


Illustration 10

Mechanical brake release

Opening the brake manually using the lever (A)

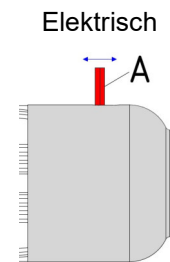



Illustration 11

 **DANGER!**
 The brake must never be operated manually under load!

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 S4-40% 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!**

Use is not allowed:

- Pulling loose or stuck loads, dragging of loads and inclined pulling.
- The use in an area at risk from explosion. Exception is made when the unit is modified to be explosion-proof and this is shown on special type plates it carries for this purpose.
- In reactor containment.
- To transport people with the equipment.
- For use on stages and in studios!
- Persons must not stand under a suspended load.

9 Putting into operation

9.1 General

If used in Federal Republic of Germany:

In the FRG the accident prevention regulations must be observed.

If used in other countries:

Test as above. Observe the national regulations and the indications in this manual!

 **NOTICE!**

The unit/units must be tested by a "certified qualified person" before putting into operation.

An exception are "units ready for operation" acc. to the valid national rules and regulations, with EU-declaration of conformity.

Definition "qualified person" (former "Sachkundiger" - 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 "anerkannter Sachverständiger" approved expert)

A "licensed qualified person" has, due to 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 and evaluate the material for one's work regularly with regard to design and kind of use. The license will be given to the qualified person by the approved supervision authorities (ZÜS).

9.2 Power connection



DANGER!

Before working with the device the mains connection switch must be switched off or the connection plug disconnected from the connection box and secured against unintentional switching on again. The connections must be made as shown in the wiring diagram.

9.2.1 Mains connection

Select connection cross-section as per cable type acc. to national regulations. Hoist motor technical data can be found in the "Technical data" chapter.

- 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.

The securement/fuses of the electric cables are shown in the following table.

9.2.2 Assigning of line cross-sections and fuses

motor out-put kW	nominal current at 1) 600V-60Hz 2) 480V-60Hz 3) 400V-50Hz max. A	fuse slow-blow A	Start up/ Nominal-current I _a / I _n	line cross-section (mm ²) for cable length L (m)			
				L < 50			
5,5/1,4	1) 8,3/3,75 2) 12,5/6,4 3) 12,5/6,4	16	4,3/2,2	4,0			

9.2.3 Control line connection

Control switch with cable and plug-in connection as standard. Plug-in before use.

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

9.2.4 Power connection of the brake

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

9.2.5 Wiring diagrams

The current wiring diagram is inside the terminal box or can be ordered from HADEF - please indicate the serial number in this case.

9.3 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.

9.4 Load chain

- Before commissioning the load chain must be aligned and lubricated.
- Remove the emergency lable and its fixing strip from the chain.

CAUTION!

Do not use fat to lubricate the load chain.

Without lubrication, manufacturer's warranty and/or liability will be void.

NOTICE!

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

9.5 Load hook

The safety catch of the load hook must be able to move freely and be self-closing. In any case, read the safety indications.

10 Safety check

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

- All fastening screws (if existent), set bolts, collapsible plugs and safety devices do exist and 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.

11 Functional test

11.1 Checks before initial start-up

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

11.2 Functional test

Check lifting by moving it up/down without load and from slow to fast.

The function of the end switch is to be checked by operating the end switch by hand. Afterwards, carefully move to the end position and re-adjust if necessary.

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

NOTICE!

The limit switch function will only work if the movement direction of the load corresponds with the push buttons of the control switch.

12 Maintenance

12.1 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" (experts) may do this work.
- Servicing and maintenance work must only be done when the unit is not loaded.
- Records must be kept of all test results and measures taken.

12.2 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

12.3 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 and replace them if necessary.

Procedure:

- Only insert new chains in an unloaded state and in the same way as the chains that are currently in the device – i.e. not twisted.
- Remove the 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.
- 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.



Illustration 12

Running of the chain into the chain container:



CAUTION!

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

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

 **NOTICE!**

The weld seam of the chain must lie to the outer side and must not be in contact with the chain nuts.

12.4 Brake motor

Brake: 180 V DC

Chain hoist Type	Nominal brake mo- ment (Nm)	Nominal air gap SLü (mm)	Air gap max. (mm)	Rotor strength min. (mm)
AK9-10	32	0,3	0,7	8,0

12.4.1 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 If existand, install the friction plate (4).
- 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 If existand, install the dust protection ring (7).
- 9 Electric connection

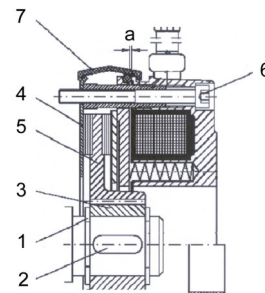


Illustration 13

12.4.2 Disassembly of the brake

Disassembly is performed in reverse order to the assembly.

12.4.3 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 until there is resistance.
- 5 Tighten the locking screws (6).
- 6 Check the air gap again and re-adjust if necessary.

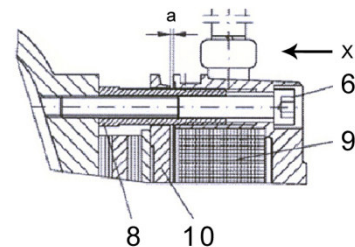


Illustration 14

13 Inspection

13.1 General Overhaul for motor-driven units

The valid 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 proved

- 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.

13.2 Periodic checks

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

13.2.1 Components to be checked

The following must be checked:

- Dimensions of load chains, 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.

13.2.2 Inspection intervals

	at Commissioning	daily checks	1st main-tenance after 3 months	Inspection and maintenance every 3 months	Inspection and maintenance every 12 months	Inspection and maintenance every 36/ 60 months
Screw connections	X				X	
Brake function	X	X				
Brake – air gap					X	
Hoist chain - cleaning & lubrication	X	X*)	X	X		
load chain, elongation and wear				X		
load hook, cracks and deformation					X	
Bearings of chain pulleys, check and lubricate					X	
bottom block - end stops				X		
Hoist gear, oil level				X		
Hoist gear, oil change						X*)
Check sling chains and accessories	X	X		X		
inspection of the equipment by an expert (periodic inspection)					X	
*) see chapter "lubrication"						

13.3 Checking the load chain

 **CAUTION!**

The load chain must be checked over its entire length!
Dimensions of the load chain must be checked especially where there is high wear. Caused by the lifting motion this are the contacts between chain and chain sprocket and the deflection pulleys.

acc. to DIN 685 - part 5

L11 = pitch increase over 11 chain links

L1 = pitch increase over 1 chain link

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

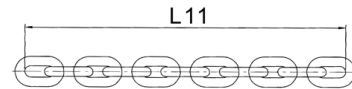


Illustration 15

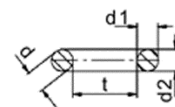


Illustration 16

Chain dimensions

Wear for chains

Di- men- sions	load chain	sling chain
	16x45	10x13
L11	504,9	336,6
L1	47,4	31,5
dm	14,4	9,0
Lp 1	79,31	51,5

 **WARNING!**

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

13.4 Inspection - Hooks

	Hooks	
	for chain $\varnothing 16$	for chain $\varnothing 10$
Type	VCGH 16	VCGH 10
F max.	87	65



Illustration 17

 **WARNING!**

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

13.5 Check of the suspension rings

	Suspension rings		
	for chain $\varnothing 16$	for chain $\varnothing 16$	for chain $\varnothing 10$
Type	VAK 1-16	VSAK 1-16/140	VBK 2-10
F max.			
dm	23,4	28,8	16,2
L1	189	273	89,25



Illustration 18

 **WARNING!**

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

13.6 Check - Gear - Oil Level

Check the oil level every 3 months

Oil sight glass (C)

Sight glass half full = level o.k.

no oil can be seen = effect maintenance and change oil
(see chapter maintenance)

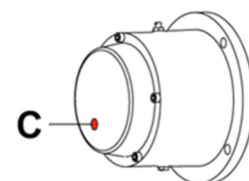


Illustration 19




14 Maintenance

14.1 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 a lubricant that creeps.
- Lubricate the chain when it is not under load to make sure the oil reaches the chain links subject to 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 of the chain.
- 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		i.e. FUCHS RENOLIN PG 220 use chain lubricant, do NOT use fat!	0,2 l	3 months



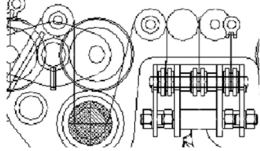


CAUTION!

Do not use fat to lubricate the load chain.



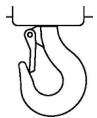
Without lubrication, manufacturer's warranty and/or liability will be void.

14.2 Chain pulleys

Use		Recommendation		Interval
Chain pulleys		FUCHS RENOLIN PG220	as necessary	12 months

14.3 Load hook

- The load hooks and deflection pulleys must be checked once a year.
- The hook bearings and deflection pulleys must be cleaned and lubricated once a year.
- The plain bearing bushes are maintenance-free.
- Should the bearing or plain bearing bushes be worn, the complete deflection pulley must be exchanged.

Use		Recommendation		Interval
Load hook Storage (plain bearing bushes are maintenance- free)		FUCHS RENOLIN PG220	as necessary	12 months

14.4 Hoist gear

- Low maintenance
- Regular checks of lubrication are necessary.
- Lubricant should be changed every 3 years.
- We recommend shorter maintenance intervals in case of difficult operating conditions, e.g. increased dust or dirt or constant operation of the device with full load.
- lubricant: synthetic, viscosity VG 220

A = oil insertion or ventilation screw
 B = oil blow off screw
 C = oil level viewing glass

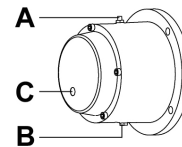


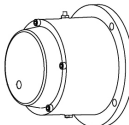
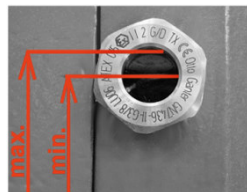



Illustration 20

Use		Recommendation		Interval
Planetary gear		FUCHS RENOLIN PG 220	0,35 l	exchange of lubricant 3 years
Planetary gear			Maximal quantity = viewing glass completely full Minimum quantity = viewing glass half filled	

14.5 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 grease-free. Even very small amounts of dirt can reduce the braking moment considerably.

14.6 Selection of lubricant

FUCHS	SHELL	ESSO	ARAL	MOBIL	TOTAL	CASTROL	KLÜBER
Renolin PG 220	Tivela S 20	Glycolube 220	Degol GS 220	Glygoyle 30	CARTER SY 220	--	Klübersynth GH 6-220
Renolin PG 320	Tivela S 320	Glycolube 320	Degol GS 320	Glygoyle 320	--	--	Klübersynth GH 6-320
Renolin PG 460	Tivela S 460	Glycolube 460	Degol GS 460	Glygoyle 460	--	Alphasyn PG 460	Klübersynth GH 6-460
RENOLIT FEP2	Alvania EP 2	Unirex EP 2	--	Mobilux EP 2	MULTIS EP2	--	--
RENOLIN B10 VG32	Tellus Oil 32	--	--	--	--	--	--
Stabylan 5006	--	--	--	--	--	Optimol Viscoleb 1500	Klüberoil 4UH 1-1500


Chain lubricant OKS 451

15 Trouble

Please pay attention to the following in case of problems:

- Troubels 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 can be found in the following table.
For the repair of defects, 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.

16 Remedy

Problem*	Unit	Cause	Remedy
Unit cannot be switched on	Electric hoists and winches	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 and winches	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 1phase).	Replace the capacitor
		Overheating protection was activated*	Let the motor cool down
		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!
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 overhauled 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	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 1phase).	Replace the capacitor
		Defect of starter relay (only for alternating current 1phase).	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 (Electro-EX) 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 (Electro-EX) 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!
		Power drop in the mains power line > 10%	Provide correct power supply voltage
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
		Wrong type of fuse	Replace the fuse with correct one <i>(see table "fuses")</i>

*) as far as applicable

17 Putting out of service



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.

17.1 Temporary decommissioning

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

17.2 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.

18 Additional documents

18.1 Electric wiring diagrams

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

Except for units supplied without control.

18.2 Radio control

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