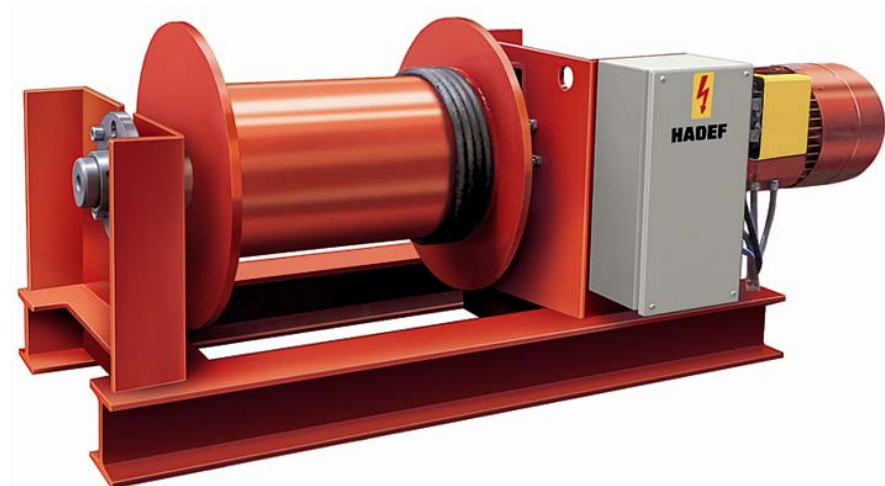




Installation,- Operating and Maintenance Instructions

HADEF Elektric Wire Rope Winch

Type 45/10E



HADEF

Internet download: www.doc.hadef.de/b4510e_gb.pdf

NOTE!

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

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Heinrich de Fries GmbH wird im Weiteren als HADEF bezeichnet.

Originalbetriebsanleitung in deutscher Sprache.

Eine Kopie kann bei HADEF schriftlich angefordert werden.

Änderungen vorbehalten.



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

Translation of the original operating and maintenance instructions

A copy is available from HADEF on request.

Subject to changes.

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1 Information

HADEF products meet European Union requirements, in particular the EU Machine Directive (2006/42/EG).

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

For the operation of hoists, the accident prevention regulations BGV D8, BGV D6 and BGR 500 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. 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.

NOTE!

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. (i.e. DIN 15020, ISO 4301/1, FEM 1.001, FEM 9.511). 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 accident prevention regulations BGV D 8, winches, lifting and pulling devices.

NOTE!

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.



NOTE!

Gives advice for use and other useful information.



Danger from electricity.



Danger from explosive area.

2.2 Duty of care of the owner

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.
- Devices for use in area prone to explosion must (from customer's side) be earthed with a shunting resistor of $< 10^6 \Omega$ 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 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 jewellery.
- Do not wear cloths 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, carried out by a licensed qualified person in accordance with the accident prevention regulations UVV BGV D6 before initial operation.

- The permitted environmental temperature during equipment operation is -20°C up to $+40^{\circ}\text{C}$!
- Defective devices and load suspension devices must not be used until they have been repaired! Only original HADEF 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 by the user!

Vertical lifting and lowering of unguided loads, horizontal movement of loads and inclined movement of loads, movement of flaps, covers etc.

2.4.1 Winches with disengaging clutch (as option)

- Only for pulling out the uncharged wire rope
- Only for horizontal load
- Only for special kinds of use (i.e. lowering of floaters in liquids) when there is no danger for persons or danger of damage of material.



NOTE!

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

The owner and operator have sole liability for all personal injury and damage to property arising from inappropriate use.



DANGER!

It is not allowed:

- pulling loose of stuck loads, dragging of loads and inclined pulling is not allowed.
- in explosive atmosphere, except the unit is especially modified for it and marked by an indication label
- to transport people
- persons must not stand under a suspended load

2.5 Basic safety measures

- Observe installation-, operation and maintenance instruction.
- Take notice of caution notes at units and in the manual
- Observe safety distances.
- Take care for a free view on the load.
- Only use the hoists appropriately.
- The equipment is to be used exclusively for movement of goods. Under no circumstances my persons be moved.
- Never load the devices beyond their working load limit.
- Pay attention to the accident prevention regulations (UVV).
- Should the hoist be used outside of Germany, please pay attention to the national regulations that apply.
- Supporting structures and load-attached devices used in conjunction with this equipment must provide an adequate safety factor to handle the rated load plus the weight of the equipment. In case of doubt, consult a structural engineer.
- If the equipment has not been used for a period of time, carry out visual checks of all main components such as chains, load hooks etc. and replace any damaged parts with new, original spare parts before putting the equipment back into operation!
- Do not use a hoist that is defective, pay attention to any abnormal noise it makes during operation.
- Stop working immediately in case of disturbances and remedy failures.
- Any damage and faults must be reported to a responsible supervisor immediately.
- If the unit is put into motion, any persons in the immediate vicinity must be informed by calling to them!
- Please pay attention to the regulations for load carrying devices UVV BGR500 for both positive and non-positive methods of attaching loads.
- The lifting tackle or the load must be securely attached to the hook and be seated at the bottom of the hook.
- The safety catch of hooks must be closed.
- When charged, the housing may not be in contact somewhere.
- 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.



WARNING!

The following is not allowed:

- to lift another load than the nominal safe working load
- 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

HADEF 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



NOTE!

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.

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 functioning of the motor and the brake are endangered by the forming of condensation.

Ambient temperature: - 20°C up to + 40°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!

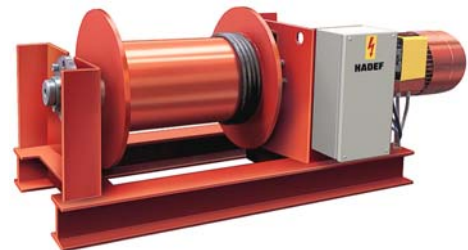
4.2 Design

HADEF electric wire rope winches Type 45/10 E have been developed for stationary use.

Stable frame fitted with assembly holes.

Serial winch with ungrooved drum.

Grooved drum as option.



4.2.1 Wire rope exit

For winches with ungrooved drum and winches without overload protection, the wire rope exit can be chosen during assembly in nearly all directions.

The wire rope feed out direction is determined for winches with overload protection.

For winches with grooved drum, the winding direction of the wire rope is given by the grooves on the drum.

Winding direction "A" is supplied as standard.

In case of changes of the winding direction of the wire rope, electrical wiring must also be changed according to the wiring diagram.



Wire rope exit

NOTE!

For winches with grooved drum the direction of unwinding the wire rope cannot be changed afterwards.

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.

4.4 Important components

4.4.1 Hoist motor

3-phase current 400V/ 50Hz

Other voltages and frequencies are available on request.

4.4.2 Lifting gear

Planetary gear

NOTICE!

As standard, the gear is filled with oil. For transport reasons, a plug screw is fitted for some winches - replace the plug screw by a ventilation screw (attached) before putting the unit into operation. In other cases the ventilation screw is already assembled.

4.4.3 Limit switch

To stop the wire rope path.

Serial winch is a lifting winch.

Pulling winch as option.

Function: Operational and emergency limit switch.

It is possible to connect an external electric limit switch.

4.4.4 Overload protection by current cut-off

Serially fitted with electronic overload protection for units of 1000 kg and up.

Electronic overload protection for units up to 1000 kg available as option.

The overload protection is adjusted by the manufacturer according to the regulations that apply. The overload protection prevents lifting a load that is too heavy by switching off the hoisting motor. When putting the winch into operation or after current of the winch has been cut off or after the overload protection has operated, press the button "lowering" shortly to re-activate the relay. A re-adjustment i.e. for maintenance reasons is possible.

4.4.5 Control

- Low voltage control (direct control depends on the kind of unit)
- Indirect control with phase sequence relay. The phases must be exchanged if the turning direction is wrong.
- Units with limit switch are fitted with low voltage control.
- Radio control is available as option.

4.4.6 Control switch

- Control switch suitable for single hand use.
- The control switch housing is made of shock- and fracture-proof plastic.
- The control cable is fitted with stress-relief rope (not applicable for radio control).
- 2 step buttons for 2 wire rope speeds

4.4.7 Pressure roller (as option)

For winding up of the wire rope.

4.4.8 Slack rope switch (as option)

Avoids slack rope when the rope is uncharged.

5 Technical data

FEM 9.511 group – 1Bm

	Wire rope speed	Rope layers										
Capacity	1	kg	2000	3200	4000	5000	6300	8000	10000	12500	16000	20000
	2	kg	1750	2800	3500	4400	5500	7050	8800	11000	14000	17500
	3	kg	1550	2500	3100	3900	4950	6300	7800	9900	12500	15500
	4	kg	1400	2250	2800	3600	4450	5700	7100	9000	11400	14000
	5	kg	1300	2050	2500	3200	4050	5200	6500	8200	10400	13000
Wire rope Ø		mm	10	12	13	14	16	18	20	22	25	28
nec. min. breaking load		kN	71	114	142	178	224	284	355	444	568	710
Wire rope storage	1	m	20	23	22	25	20	22	22	22	22	22
	2	m	45	52	49	55	52	50	50	52	47	50
	3	m	72	84	80	88	84	84	84	87	84	84
	4	m	103	120	112	126	120	120	120	122	120	120
	5	m	135	160	150	165	155	155	155	160	160	160
Wire rope speed	I	m/min	3,5/14	2/9	1,5/6	1/5	¼	1/3,5	0,7/2,5	0,6/2,2	0,5/1,8	---
	II	m/min	5,5/23	3/12,5	2,5/11	2/8	1,7/7	1,3/5,5	¾	0,8/3,5	0,6/2,5	0,5/2,1
	III	m/min	8,5/35	4,5/19	3,5/14	3/12	2,5/10	1,9/7,5	1,5/6	1,2/4,5	0,9/3,5	0,8/3
	I	m/min	4/16	2,5/10	2/7,5	1,5/5,5	1/5	1/4	0,8/3	0,6/2,5	0,5/2	---
	II	m/min	6/27	3,5/14,5	3/12,5	2/9	1,9/7,5	1,5/6	1,2/5	1/4	0,7/2,8	0,6/2,4
	III	m/min	9,5/40	5/22	4/16,5	3,5/14,5	3/11	2/8,5	1,7/6,5	1,3/5	1/3,9	0,8/3,4
	I	m/min	4,5/18	2,5/11,5	2/8,5	1,5/6,5	1,5/5,5	1,1/4,5	0,9/3,5	0,7/2,8	0,6/2,3	---
	II	m/min	7/30	4/16	3,5/14	2,5/10	2/8,5	1,7/7	1,3/5,5	1,1/4,5	0,8/3,2	0,6/2,7
	III	m/min	11/44,5	5,5/24,5	4,5/18,5	4/16	3/12,5	2/9,5	1,9/7,5	1,5/6	1,1/4,4	0,9/3,8
	I	m/min	5/20	3/12,5	2/9,5	1,8/7,3	1,5/6,5	1,2/5	1/4	0,8/3	0,6/2,5	---
	II	m/min	8/33	4,5/18	3,8/15	2,5/11	2,5/9,5	1,8/7,5	1,5/6	1,2/5	0,8/3,5	0,7/2,9
	III	m/min	12/49,5	6/27	5/20	4,5/18	3,5/14	2,5/10,5	2,1/8	1,7/6,5	1,2/4,9	1/4,2
	I	m/min	5,5/22	3,5/14	2,5/10	2/7,5	2/7	1,4/5,5	1,1/4,3	0,9/3,5	0,7/2,8	---
	II	m/min	8,5/36,5	5/20	4/16,5	3/12,5	2,5/10,5	2/8	1,6/6,5	1,3/5,4	1,9/3,8	0,8/3,2
	III	m/min	13,5/54,5	7/30	5,5/22	5/19,5	4/15,5	2,5/11,5	2,3/9	1,8/7	1,385,3	1,1/4,6
Motor output	I	kW	1,4/5,5	1,4/5,5	1,4/5,5	1,4/5,5	1,4/5,5	1,4/5,5	1,4/5,5	1,4/5,5	1,4/5,5	---
	II	kW	2/8,5	2/8,5	2/8,5	2/8,5	2/8,5	2/8,5	2/8,5	2/8,5	2/8,5	2/8,5
	III	kW	2,5/12	2,5/12	2,5/12	2,5/12	2,5/12	2,5/12	2,5/12	2,5/12	2,5/12	2,5/12
Current consumption	I	A	5,6/12,5	5,6/12,5	5,6/12,5	5,6/12,5	5,6/12,5	5,6/12,5	5,6/12,5	5,6/12,5	5,6/12,5	---
	II	A	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2	6,5/18,2
	III	A	9/28	9/28	9/28	9/28	9/28	9/28	9/28	9/28	9/28	9/28
Noise emission* max. approx.		dB(A)	70	70	70	70	70	70	70	70	70	70
Weight without rope approx.	I	kg	260	305	310	415	455	685	700	815	1210	---
	II	kg	300	345	400	450	495	725	740	855	1250	1320
	III	kg	365	410	415	515	555	785	810	915	1320	1390

3-phase 400V/50Hz, S3-25/40%ED, protection class IP55, isolation class F

Data for special design equipment are mentioned on the type plate.

*measured at a distance of 1 m from the surface of the unit and 1.6 m over the assembly area (tolerance +2dB(A))

6 Installation

Please observe the following points in order to avoid any damage to equipment or injury of person:

- Wear safety gloves.
- Install the winch on a stable ground.
- Make sure attachment surface is flat and that installation is made stress-free, - use shim parts if necessary.
- The winch must be set up and attached in such a way that it cannot change position neither by the load nor by other influences.

6.1 Winch assembly

capacity	fastening screws strength class 8.8		A	B	O	P	Q	R	S	T
1st layer	Tightening moment									
kg	ØM / Nm	number	mm	mm	mm		mm	mm	mm	mm
2000	M12 / 87	16	1450	544	70	100	700	100	480	56
3200	M12 / 87	16	1450	544	70	100	700	100	480	56
4000	M12 / 87	16	1450	544	70	100	700	100	480	56
5000	M16 / 214	16	1530	620	90	75	700	75	590	70
6300	M16 / 214	16	1530	620	90	75	700	75	590	70
8000	M22 / 530	16	1650	724	100	120	690	220	520	86
10000	M22 / 530	16	1650	724	100	120	690	220	520	86
12500	M22 / 530	16	1650	724	100	120	690	220	520	86
16000	M24 / 670	16	1850	1000	150	200	700	200	600	120
20000	M24 / 670	16	1850	1000	150	200	700	200	600	120

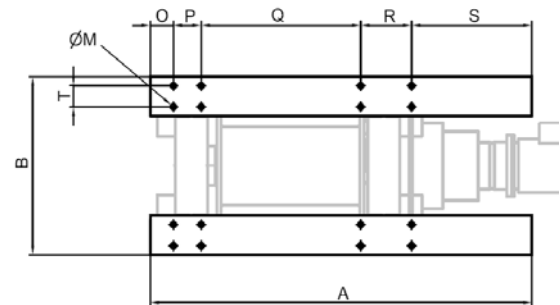


Illustration 1

All 16 screws must be assembled all the time.

Acc. order are differences possible.

6.2 Selection of wire ropes

- Stainless wire ropes and special wire ropes are available on request.
- Diameter and nec. minimum breaking load must be acc. to the data mentioned in the table in chapter "Technical Data" resp. acc. to the details mentioned on the type plate.

Recommendation of wire ropes

- Steel-reinforced wire ropes
- For larger pulling rope forces, fibre-core wire ropes can also be used.
- For unguided loads, - non-twisting or at least twist-resistant wire ropes.
- For several rope layers wound through the drum, - steel-reinforced wire ropes.



WARNING!

It is not allowed to use plastic wire ropes or plastic-coated wire ropes.

6.3 Wire rope fastening

If the winch is fitted with overload protection, the winding direction of the wire rope is determined.

Winding direction "A" is supplied as standard.

When the winding direction is changed, electrical wiring in the terminal box must be changed accordingly.

The kind of wire rope fastening and the winding direction are determined for winches with grooved drum by the direction of the grooves on the drum.

Before cutting the wire rope, wrap it firmly with a fine binding wire or strong adhesive tape.

6.3.1 Wire rope fastening

The wire rope is fastened with retainer key. The retainer key is attached to the consignment for winches supplied without wire rope.

- Push the wire rope through the hub of the flanged wheel and through the key pocket.
- Pull some centimeters out.
- Wrap it completely round the retainer key (1)
- Place it back into the key pocket.

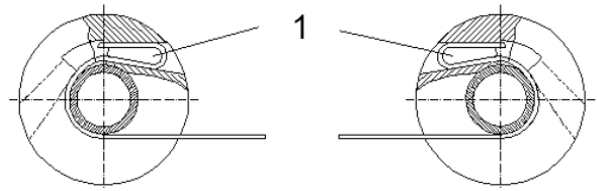


Illustration 2

By pulling the wire rope, the retainer key gets stuck into the pocket. It locks the wire rope safely. It may be necessary to insert the retainer key a little bit into the hub with a soft tool before the wire rope can be loaded.

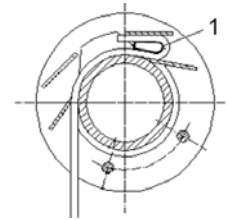


Illustration 3

Depending on the direction the rope is wound round the drum there are two wire rope exit angles.

See chapter "Installation".

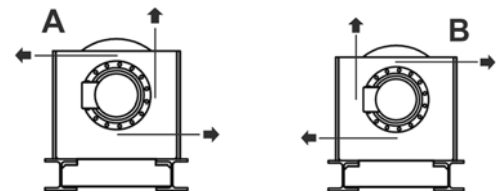


Illustration 4

6.4 Winding up of wire rope

The wire rope must always be wound up tensioned. When the last wire rope layer is wound onto the drum, the flanged wheel must exceed the top layer by at least 1 1/2 times of the wire rope diameter.

NOTE!

According to DIN 15020 regulations and to the accident prevention regulations BGV D8, the wire rope length must be chosen so that at least 2 rope layers remain on the drum when the wire rope is unwinded.

6.5 Wire rope deflection

- Wire rope pulleys must be installed in a position centrally to the rope drum.
- In order to ensure correct winding up of the wire rope on the drum, the max. wire rope deflection angle must not be exceeded.
- maximum wire rope deflection angle
 - 4° for standard wire ropes
 - 2° for non-twisting resp. twist-resistant wire ropes
- The minimum dimension (M) from the drum until the middle of the pulley must be adhered to.

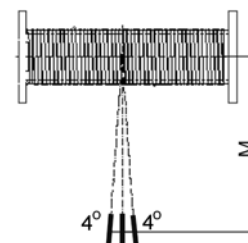


Illustration 5

NOTE!

Should the drum be extended and for some models with limit switch, the distance "M" must be increased. Standard values:

15x 1/2 drum length for standard wire ropes

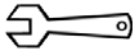
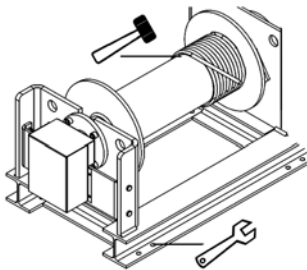
30x 1/2 drum length for twist-resistant or non-twisting wire ropes

6.5.1 Wire rope pulley (provided by the customer)

table dimension "M" for standard drum length

Capacity kg	"M" min. at 4 wire rope deflection m
2000	4
3200	4,6
4000	4,4
5000	4,6
6300	4,6
8000-20000	4,5

6.6 Tools

Capacity	Size	Tool	Use	
2000-4000 kg 5000-6300 kg 8000-12500 kg 16000+20000 kg	SW19 SW24 SW32 SW36		Winch fastening	
2000-20000 kg	div.		Rope installation	
2000-20000 kg	div.		div.	
2000-20000 kg	div.		div.	
2000-20000 kg	div.		div.	

6.7 Table of screws

Tighten the screws with tightening moment mentioned in the table

Thread	Tightening moment (Nm) in property class	
	8.8	10.9
M 6	10,4	15,3
M 8	25,3	37,2
M 10	51	75
M 12	87	128
M 14	139	205
M 16	214	314
M 18	280	390
M 20	431	615
M 22	530	750
M 24	742	1159
M 27	1000	1400
M 30	1350	1900
M 33	2000	2800

coefficient of friction 0,12 - 0,14 μ ges

7 Operation

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.

The shown control switches are only for the optical information. They can be different acc. the delivery.

Pendant control lifting/lowering

- 1 Emergency-Stop
- 2 Lifting (slow - fast)
- 3 Lowering (slow - fast)



Illustration 6

Pendant control – lifting/lowering

- 1 Emergency stop
- 2 Lifting (slow - fast)
- 3 Lowering (slow - fast)



Illustration 7

Radio control

- 1 Lowering (slow - fast)
- 2 Lifting (slow - fast)
- 3 no function
- 4 no function
- 5 no function
- 5 no function
- 6 no function
- 7 no function
- 8 start
- 9 start
- 10 emergency stop



Illustration 8

Push button functions

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

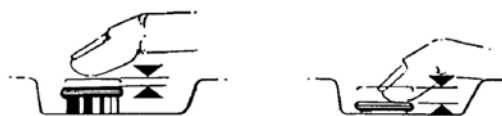


Illustration 9

Red Emergency-Stop button

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

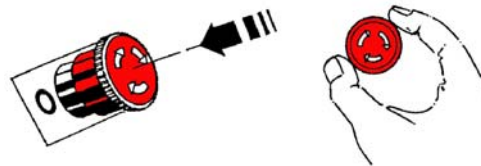


Illustration 10

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.



DANGER!

It is not allowed:

- pulling loose of stuck loads, dragging of loads and inclined pulling is not allowed.
- in explosive atmosphere, except the unit is especially modified for it and marked by an indication label
- to transport people
- persons must not stand under a suspended load

9 Commissioning

9.1 General

Should the unit be used in Germany, please observe the accident prevention regulations, in particular BGV D8, BGV D 6 and BGR 500 (VBG 9a).

For other countries: Inspections as above. Please observe the national rules and regulations and the instructions in this manual!

NOTE!

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 quality person” before putting in operation.

An exception is “hoists ready for operation” acc. To BGV D6 II§25(4) with EU-declaration of conformity.

Definition “qualified person” (former expert)

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

Definition “licensed qualified person” (former approved expert)

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

9.2 Power supply

9.2.1 Mains connection

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

The following tables show the assignment of the wiring diagrams and the fuses at 400 Volt 3-phase current.

- 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.

9.2.2 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.

9.2.3 Power connection of the brake

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

NOTE!

The power supply cable must be equipped by the customer with slow-blow fuses and mains connection switch.

CAUTION!

Precondition for actuation of the overload protection is the correct winding direction of the wire rope!

This may be mixed up for winches with three phase current motor.

The symbols on the control switch than do not match to the wiring direction of the wire rope.

In this case, the winch must be stopped immediately.

Exchange two phases of the main current supply.

Test the winding direction of the wire rope.

9.2.4 Wiring diagram assignment

Capacity kg	wire rope speed Type	Drawing number
2000 – 16000	I	5.56.262.00.00
2000 – 20000	II	5.56.262.00.01
2000 – 20000	III	5.56.262.00.02

Wiring diagrams for special control are situated in the terminal box.

9.2.5 Assigning of line cross-sections and fuses

Capacity kg	Lifting speed Type	Motor output up to kW	Nominal current at 400 V/ 50 Hz A	fuse slow-blow A	cable cross-section mm ²	
					L < 50 m	L > 50 m < 100 m
2000 - 20000	I	1,4/5,5	5,6/12,5	25	4	6
	II	2/8,5	6,5/18,2	32	4	6
	III	2,5/12	9/28	50	6	10

9.3 Gear

Should the gear not be closed, the level of lubricant must be checked before putting the device into operation.

NOTE!

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 Wire rope

Wire ropes must be free from corrosion, dirt or damage.

They must be lubricated before commissioning.

No lubrication shortens the lifetime of the wire rope and the maintenance intervals.



WARNING!

It is not allowed to use plastic wire ropes or plastic-coated wire ropes.

9.5 Limit switch for wire rope path

The limit switch (if exist) must be adjusted before commissioning and after maintenance work has been made. Intermediate checks for correct function are necessary.

The switching point for the upper load position must be set in such a way that even in case of unfavourable cable winding the permitted highest load position is not overrunned. In individual cases it may be necessary for the customer to install an external emergency switch. The limit switch for the lowest load position is always driven exactly independently of the cable length.

NOTE!

An exact driving up to the upper end position is only possible in the first wire rope layer with grooved rope drum.

Exactness decreases with larger wire rope length and several wire rope layers.

10 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 wire ropes are winded up correctly, are lubricated and are in good condition.

11 Functional test

11.1 Checks before the initial start-up

- Check lifting by moving up/down and slow/fast without load.
- Suspend the nominal load and check the function of the brake.

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" 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.

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 Brake motor

Winch speed	Motor output kW	Brake Type	Brake V DC	Nominal brake moment Nm	Nominal air gap mm	Air gap max. mm	Min. rotor strength mm
I	1,4/5,5	BFK 12	180	32	0,3	0,45	8
II	2/8,5	FD 17	180	60	0,3	0,45	11,5
III	2,5/12	BFK 16	180	80	0,3	0,45	8

12.4 Electronic overload protection - load limiter

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 immediately 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 11

Start (A)

First read nominal current from the motor type plate.

Start-up delay (START) has a setting range of 0 to 2 seconds. It should prevent the motor from being switched off immediately at start-up when start-up power is high. Setting is made at approx. 2 seconds (regulator in position completely right at 2s, display "1" (U/t) shines "green" until the start-up delay has expired.)

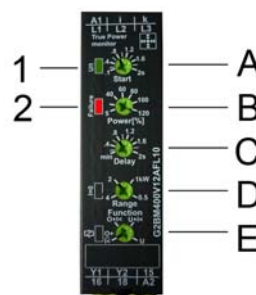
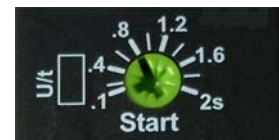


Illustration 12



Range (D)

Setting value must always be = or > as the existing power.

Nominal power kW	current A
0,5	0-3
1	0-6
2	0-9
4	0-12



Illustration 13

for larger power consumption, current converters are used

Power (B) - Main lift

Turn the regulator totally to the right side at 120 %
Lift the testing load and reduce the value of the potentiometer "B" (Power) slowly (turn left) until the relay actuates and cuts off the power so that the lifting movement stops.



Illustration 14

Power (B) - Creep speed

Proceed as mentioned above but with the setting for creep speed.

In case of overload/overcurrent, the indicator "2" shines RED (Failure).

Delay (C)

The value must always be set totally to the left side at 0s.



Illustration 15

Function (E) - Overload

Turn the regulator totally to the left side at O+|<



Illustration 16

12.5 Limit switch for wire rope path

12.5.1 Setting of the switching points

At first, adjust the cams for "lowering". Therefore lower the load to its lowest end position and adjust the cams.

- 1 Unscrew the screws of the cover and remove the cover.
- 2 Loosen the central screw (1)
- 3 Set the switching point of every cam disc (A+B) with set screw (2A+2B).
- 4 Tighten the central screw (1) again.
- 5 Install the cover again and make sure the rubber seal is placed correctly.

Make sure that 2-3 rope layers remain on the drum in the lowest load position.

Adjustment for "lifting" is done analogous.

Afterwards drive carefully to the end positions to check correct adjustment.

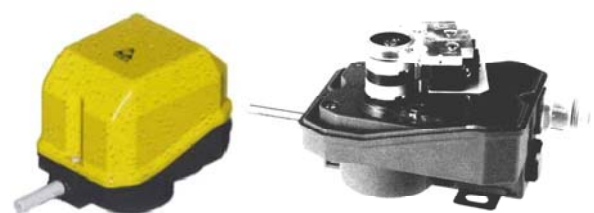


Illustration 17

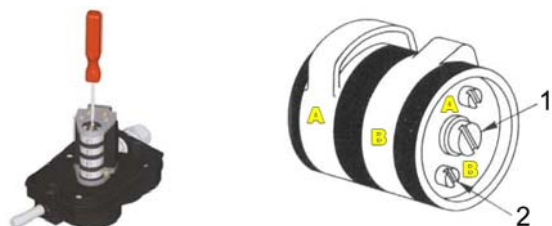


Illustration 18

12.6 Pressure roller (as option)

Adjustment

- Release the screw (1)
- Turn the square (2) as far until the pressure roller puts enough pressure on the wire rope.
- Hold the square and tighten the screw (1) again.

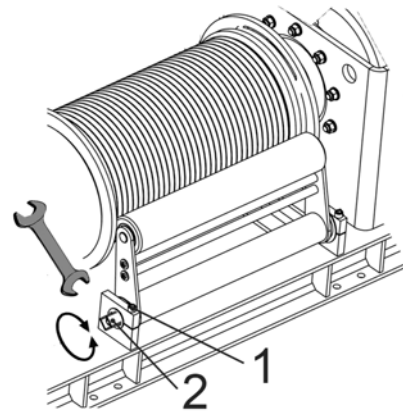


Illustration 19

12.7 Slack rope switch (as option)

12.7.1 Adjustment

Illustration - horizontally

Other versions are possible.

- Insert the wire rope (1) under the guiding pulley (4) and tighten it by the load.
- Release the locking screw at the eccentric (6).
- Turn the eccentric until it gets contact to the tappet of the limit switch (3).
- Secure the eccentric (6) with the locking screw.
- Switch on the winch in direction "Lowering" and relieve the wire rope (1).
- Repeat this procedure if necessary until the best switching point is found.

- 1 wire rope
- 2 rope drum
- 3 Spindle limit switch
- 4 Guiding pulleys
- 5 roller lever
- 6 eccentric
- 7 switching shaft

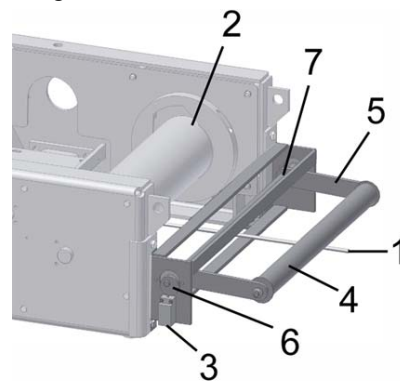


Illustration 20



NOTE!

Connection is, normally, effected in our factory, it is shown in the diagram.

12.7.2 Setting for wire rope exit exceeding 45°

Further setting is necessary if the wire rope exit exceeds 45°

- Release the screw (1) slightly
- Turn the square (2) until the roller puts pressure on the wire rope.
- Hold the square (2) and tighten the screw (1) again.

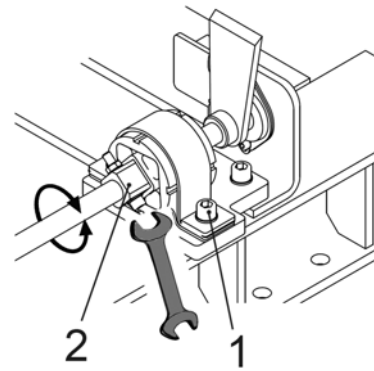


Illustration 21

13 Inspection

13.1 General Overhaul for motor-driven units

The accident prevention regulations VBG D8 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.

13.2 Periodic checks

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

In Germany it is necessary to observe the accident prevention regulations BGV D6, BGV D8, BGR 500 as well as DIN 15020 (Basics for cable drives). In other countries, the above mentioned tests and the national safety regulations apply.

13.3 Wire rope

Adequate performance of the servicing and monitoring work acc. to DIN 15020 page 2 "Basics for cable drives – monitoring during use".

A visual check must be effected before every new work shift.

- Wear
- Deformation
- Fissures
- Corrosion

Report any damage immediately to the responsible person and exchange damaged or worn wire ropes and load tackles.

13.4 Inspection intervals

	on commissioning	daily checks	1st service after 3 months	inspection, service every 3 months	inspection, service every 12 months
Inspection of the equipment by a qualified person (periodic inspection)					X
Check screw connections	X				X
Check brake function	X	X			
check brake air gap (only for electric devices) *)					X
check overload protection if existent					X
clean and lubricate the wire rope	X		X	X	
check wire rope and wire rope end fastenings for damage and wear		X			
check the load tackle and load hook for cracks and deformation					X

*) not for EX design

check oil level of the lifting gear	X			X	
lifting gear, oil change					X *)

*) see chapter "maintenance"

14 Service

14.1 Wire rope

Wire ropes have to be exchanged by new, original wire ropes if they show corrosion, fracture or if they are worn.

Checks:

- Fastening screws must be checked before commissioning and at least every 3 months, - tighten them if necessary.
- Kind and number of broken threads.
- Position of the broken threads
- Timing sequence of occurrence of breaks.
- Reduction of the wire rope diameter.
- Corrosion
- Abrasion
- Deformation
- Heat influence
- Operation time
- Wire rope fastening



CAUTION!

The wire rope must be replaced immediately should even one strand be broken.

14.2 Gear

The gears need low maintenance. The maintenance is restricted to regular lubricant checks and exchanging the lubricant.

We recommend shorter maintenance intervals in case of severe operating conditions, e.g. increased dust or dirt or constant operation of the winch with full load.

The gears are filled with synthetic oil at the factory, viscosity 220.

Please take quantities and oil recommended from the following table.

14.3 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

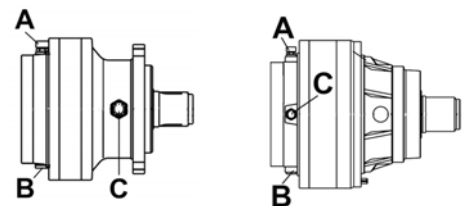
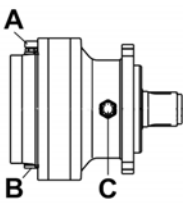
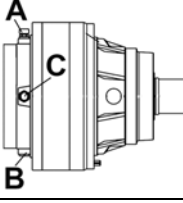
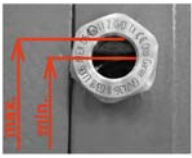


Illustration 22

Use		Recommendation	Capacity kg			Interval
Planetary gear		FUCHS RENOLIN PG 220	2000	I - II	1,1 l	Change of lubricant 3 years
			2000	III	0,9 l	
			3200 + 4000	I - II - III	2,0 l	
			5000	I	2,5 l	
			5000	II - III	2,3 l	
			6300	I - II	3,3 l	
			6300	III	3,1 l	
			8000 + 10000	I - II - III	5,0 l	
Planetary gear		FUCHS RENOLIN PG 220	12500	I - II - III	5,7 l	Change of lubricant 3 years
			16000	I - II - III	10,6 l	
			20000	II - III	12,6 l	
Planetary gear					Maximal quantity = viewing glass completely full Minimum quantity = viewing glass half filled	

14.4 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.

14.5 Lubricant selection

FUCHS	SHELL	ESSO	ARAL	MOBIL	CASTROL	KLÜBER
Renolin PG 220	Tivela S 220	Glycolube 220	Degol GS 220	Glygoyle 30	--	Klubersynt GH 6-220
Renolin PG 320	Tivela S 320	Glycolube 320	Degol GS 320	Glygoyle 320	--	Klubersynt GH 6-320
Renolit FEP 2	Alvania EP 2	Unirex EP 2	--	Mobilux EP 2	--	--
Renolin B10 VG32	Tellus Oil 32	--	--	--	--	--
Stabylan 5006	--	--	--	--	Optimol Viscoleb 1500	Klüberoil 4UH 1-1500

15 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.

16 Remedy

Problem	Cause	Remedy
Hoist motor does not run	No mains voltage	Check the mains connections
	Fuse burnt out	Replace the fuse
	Defective switching unit in the push button	Replace the switching unit
	Break in the control cable	see „problem brake does not release“
	Brake does not release	see „problem brake does not release“
Hoist motor runs – load is not lifted	Defective switching unit in the push button	Replace the switching unit
	Defect of capacitor (only for alternating current)	Replace the capacitor
	Overload protection is activated (with overload)	Reduce the load to nominal load
Motor hums and uses excessive current	Overload protection is activated (at a load $\leq$ nominal load)	Check settings and reset if necessary
	Defective coil	Motor must be repaired by a specialist
	Rotor is rubbing	
	Defect of capacitor (only for alternating current)	Replace the capacitor
Damaged coil	Brake does not release	See "problem brake does not release"
Motor does not brake or has excessive after-running	Overload (mechanical or electrical)	Motor must be repaired by a specialist
	Brake linings are worn or greasy	Brake lining must be changed completely
	Air gap is too large	Re-adjust the air gap
	Switching error after intervention in the electric circuit	Check brake connection acc. to the wiring diagram
Brake does not release	Brake rectifier defective	Replace brake rectifier
	Brake current relay defective	Replace brake current relay
	Brake coil is defective	Replace the brake coil
	Permissible air gap is exceeded due to worn out brake lining	Re-adjust the air gap and exchange the brake linings if necessary
	Power drop in the mains power line $> 10\%$	Provide correct power supply voltage
Fuses burn out or motor contactor is triggered	Motor or wiring short-circuit	Correct the short-circuit
	Motor has a short-circuit in the body or windings	Have the problem corrected by a specialist
	Motor is incorrectly wired	Correct the wiring
	Wrong type of fuse	Replace the fuse with correct one

17 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.

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 (as option)

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