



# Installation,- Operating and Maintenance Instructions

**HADEF Ratchet Lever Hoist**

**Type 53/07 + 53/07A**



**HADEF**

 **NOTICE!**

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

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

Original operating- and maintenance instructions in German language.

Translation in other languages is made of the German original.

A copy may be requested in writing or is available for download on [www.hadef.com](http://www.hadef.com)

Subject to changes.

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## 1 Information

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

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

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

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

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

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

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

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

### **NOTICE!**




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

In other countries any additional national regulations must be observed.

## 2 Safety

### 2.1 Warning notice and symbols

Warnings and notice are shown as follows in these instructions:

|   |  |
|---|--|
|  <b>DANGER!</b>  | This means that there is a high risk that leads, if it is not avoided, to death or severe injury.  |
|  <b>WARNING!</b> | This means that there is a risk that could lead, if it is not avoided, to death or severe injury.  |
|  <b>CAUTION!</b> | This means that there is little risk that could lead, if it is not avoided, to slight injury or damage to the device or its surrounding. |

**NOTICE!**

Gives advice for use and other useful information.



Danger from electricity.



Danger from explosive area.

## 2.2 Duty of care of the owner

**DANGER!**

Failure to follow the instructions of this manual can lead to unpredictable hazards.

For any resulting damage or personal injury, HADEF assumes no liability.

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

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

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

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

In particular, the owner/user must ensure that:

- The unit is only used appropriately.
- The device is only operated in a fault-free, fully functional condition, and the safety components, in particular, are checked regularly to ensure that it is functioning properly.
- The required personal protective equipment for the operators, service and repair personnel is available and is used.
- The operating instructions are always available at the location where the equipment is used and that they are legible and complete.
- The unit is only operated, serviced and repaired by qualified and authorized personnel.
- This personnel is regularly trained in all applicable matters regarding safety at work and environmental protection, and that they are familiar with the operating manual and, in particular, the safety instructions it contains.
- Any safety and warning signs on the devices are not removed and remain legible.
- 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 jewelry.
- Do not wear clothes that are too big/wide.
- Do not reach into ropes, chains, drive parts or other moving parts with your hands

## 2.4 Appropriate use

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

- The permissible ambient temperature during operation of manual driven devices is  $-20^{\circ}\text{C} / +50^{\circ}\text{C}$  and at all power driven devices  $-20^{\circ}\text{C} / +40^{\circ}\text{C}$ !
- 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 becoming void.
- Liability and warranty will become void if unauthorized modifications of the units are made by the user!
- Vertical lifting, lowering, pulling and tightening of loads.
- It must be assured that the unit can position itself in true alignment to the load.

**DANGER!**

Ratchet hoists with ship hook can be used for tightening!

Only ship hooks can be loaded on its point!

The ratchet hoist is "a unit ready for operation" acc. to the valid national regulations and obtains the declaration of conformity CE.

**NOTICE!**

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.
- The use in area at risk from explosion.
- In reactor containment vessels.
- To transport people with the equipment.
- The device is not suitable for use on stages and in studios!
- Persons must not stand under a suspended load.
- Motor drive of the equipment.
- Blocking of the loose chain end.
- Charging the loose chain end.
- Dragging of loads with motor-driven hoists.

## 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 may persons be moved.
- Never load the devices beyond their working load limit.
- Pay attention to the accident prevention regulations (UVV).
- Should the hoist be used outside of Germany, please pay attention to the national regulations that apply.
- Supporting structures and load-attached devices used in conjunction with this equipment must provide an adequate safety factor to handle the rated load plus the weight of the equipment. In case of doubt, consult a structural engineer.
- If the equipment has not been used for a period of time, carry out visual checks of all main components such as chains, load hooks etc. and replace any damaged parts with new, original spare parts before putting the equipment back into operation!
- Do not use a hoist that is defective, pay attention to any abnormal noise it makes during operation.
- Stop working immediately in case of disturbances and remedy failures.
- Any damage and faults must be reported to a responsible supervisor immediately.
- If the unit is put into motion, any persons in the immediate vicinity must be informed by calling to them!
- Please pay attention to the regulations for load carrying devices UVV for both positive and non-positive methods of attaching loads.
- The lifting tackle or the load must be securely attached to the hook and be seated at the bottom of the hook.
- The safety catch of hooks must be closed.
- When charged, the housing may not be in contact somewhere.
- Stop lowering the load when the bottom block or 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.
- Don't bump against something with load or hook
- We recommend a unit with sliding clutch to prevent overload, when the unit is used for tightening,
- Motor drive is prohibited.

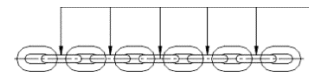


Illustration 1

 **WARNING!**

The following is not allowed:

- to lift another load than the nominal safe working load
- to manipulate the sliding clutch
- The use of elongated or damaged chains. Replace worn out chains immediately by new, original chains.
- 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.
- Do not operate the hoist by stepping on the lever with a foot.
- Never use an elongation piece for the lever.
- It is prohibited to charge the load hook at its point. (Only allowed for hoists with shipyard hook)
- It is prohibited to weld or cut when a load is suspended.
- It is prohibited to swing the load.
- It is prohibited to use the load chain for earthing during welding.
- Do not use the hoist when it makes abnormal noise.
- Do not use the lever without rubber handle.
- Do not leave a lifted load unintended for a longer period of time.

### 3 Transport and Storage



#### **CAUTION!**

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

#### 3.1 Transport

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

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

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

#### 3.2 Safety device for transport



#### **NOTICE!**

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

#### 3.3 Storage

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

## 4 Description

#### 4.1 Areas of application

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

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

Ambient temperature -20°C up to +50°C. Power-operated units -20 up to +40°C. Humidity 100 % or less but not under water



#### **DANGER!**

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

#### 4.2 Design

HADEF ratchet lever hoists are compact hoists with suspension hook for stationary use.

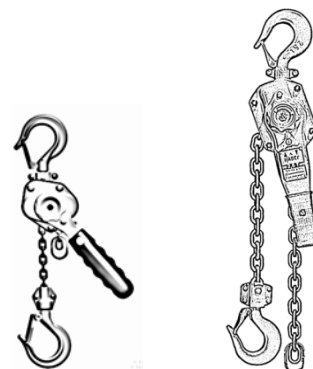


Illustration 2

**4.3 Functions**

The load is lifted, lowered or tensioned by operating the lever. The load pressure brake prevents automatic lowering of the load.

 **NOTICE!**

If used "overhead" or "lashing" undefined forces may appear. We recommend to use a hoist with slipping clutch for these cases.

 **NOTICE!**

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

**4.4 Important components**

- Gear

Gear components are made of high-quality material.

- Load pressure brake

Holds the load in any position.

A new brake system is used for the hoists (except for the Aluminium Ratchet Lever Hoists). Brake discs have sintered brake linings which are designed for the lifetime of the devices when used as intended.

According to DIN 13157 lifetime is 1500 operating cycles (lifting/lowering movements) with 300 mm lift with nominal load.

- Housing

Depending on the model made from steel plate or aluminium.

- Load chain

According to EN 818-7-T high quality chain. All components match precisely to each other. Therefore please only use original chains.

- Load hook with safety catch

Forged steel. Rotating, this facilitates attaching the load and avoids twisting of the chain.

- Ship hook with safety catch – as option

Ratchet Lever Hoists of capacity 1600 kg and 3200 kg can be fitted with ship hook - as option

The hook tip may only be loaded for tightening.

For lift and lower use, the load must lie on the hook base and the hook safety catch must be closed.

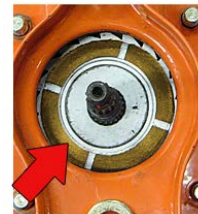


Illustration 3



Bild 4

|   |  |
|---|--|
|  |  <b>DANGER!</b> |
|   | In hazardous area, the load on the hook tip is prohibited!   |

- Free-wheeling of chain

For pulling through of the uncharged chain.

**5 Technical data**

|                                |    |     |          |      |          |          |          |          |          |          |         |         |         |
|--------------------------------|----|-----|----------|------|----------|----------|----------|----------|----------|----------|---------|---------|---------|
| Capacity                       | kg | 250 | 500      | 750  | 1500     | 3000     | 800      | 1000     | 1600     | 2500     | 3200    | 6300    | 9000    |
| Type                           |    | A   | A        | A    | A        | A        | -        | -        | -        | -        | -       | -       | -       |
| with shipyard hook as option   |    | -   | -        | -    | -        | -        | -        | -        | S        | -        | S       | -       | -       |
| Number of chain falls          |    | 1   | 1        | 1    | 1        | 2        | 1        | 1        | 1        | 1        | 1       | 2       | 3       |
| Load chain dimensions          | mm | 3x9 | 4,2x12,2 | 5x15 | 7,1x20,1 | 7,1x20,1 | 5,6x15,8 | 5,6x15,8 | 7,1x20,1 | 9,0x24,8 | 10x28,1 | 10x28,1 | 10x28,1 |
| low headroom dimension         | mm | 200 | 250      | 260  | 330      | 432      | 280      | 300      | 335      | 375      | 395     | 540     | 680     |
| lever force approx.            | N  | 200 | 240      | 290  | 320      | 335      | 290      | 360      | 340      | 370      | 370     | 380     | 390     |
| weight* approx.                | kg | 1,5 | 2,5      | 3,4  | 5,9      | 11       | 5,7      | 5,9      | 8,0      | 11,2     | 15,0    | 26,0    | 40,0    |
| weight per add. m lift approx. | kg | 0,2 | 0,4      | 0,6  | 1,1      | 2,2      | 0,7      | 0,7      | 1,1      | 1,7      | 2,3     | 4,7     | 7,0     |



## 5.1 Main dimensions

| Dimensions<br>mm | Capacity in kg |       |      |      |      |      |      |      |      |      |      |      |
|------------------|----------------|-------|------|------|------|------|------|------|------|------|------|------|
|                  | 250            | 500   | 750  | 1500 | 3000 | 800  | 1000 | 1600 | 2500 | 3200 | 6300 | 9000 |
| Typ              | A              | A     | A    | A    | A    | -    | -    | -    | -    | -    | -    | -    |
| A                | 76             | 81    | 92   | 109  | 160  | 119  | 119  | 126  | 150  | 159  | 217  | 304  |
| B                | 87             | 100,5 | 105  | 122  | 122  | 144  | 144  | 159  | 173  | 190  | 190  | 190  |
| C                | 32             | 34,5  | 35,5 | 42,5 | 50   | 35,5 | 42,5 | 42,5 | 47   | 50   | 60   | 85   |
| D                | 140            | 180   | 180  | 220  | 220  | 245  | 245  | 265  | 265  | 415  | 415  | 415  |
| E                | 55,5           | 62,5  | 64   | 68,5 | 68,5 | 97   | 97   | 100  | 102  | 112  | 112  | 112  |
| F                | 11             | 12    | 14   | 21,5 | 24,5 | 14   | 15   | 19   | 21   | 24,5 | 34   | 41,5 |
| G                | 21             | 24,5  | 28,5 | 35   | 43   | 26,5 | 29   | 32   | 36,5 | 39   | 50   | 72,5 |
| H                | 200            | 250   | 260  | 330  | 432  | 280  | 300  | 335  | 375  | 395  | 540  | 680  |

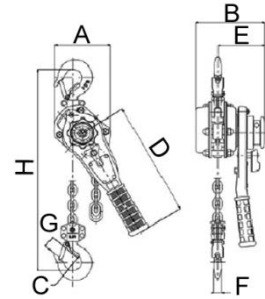


Illustration 5

## 6 Installation

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

- Please read chapter "Safety".
- Before loading the hoist make sure the hooks are placed safely. The safety catch of the hook must be closed.
- Make sure that the fastening position cannot be changed either by the load nor by other influences.

## 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.

### 7.1 Devices from 250 kg up to 3000 kg capacity (Type A)

Before start up please make sure the free-wheeling mechanism is deactivated.

Forcible pulling may possibly close the brake and stop the chain. Should this be the case place the switching pin in position "DN", do some lowering operation movements and begin lifting again.

#### Lifting or pulling

Turn the switching pin in position "UP" for lifting or pulling and move the load by operating the hand lever.

- A Chain pin
- B Switching pin
- C Lever

#### Lowering or relieving

Turn the switching pin in position "DN", lowering or relieving and move the load by operating the hand lever.

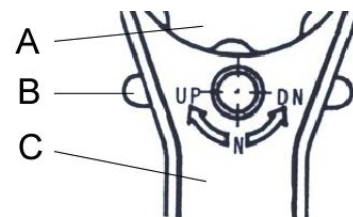


Illustration 6

#### 7.1.1 Free-wheeling of chain



**DANGER!**

Never activate the free-wheeling mechanism if the hoist is under charge.

#### Switching ON the free-wheeling mechanism

- switch in middle position



Illustration 7

- Turn the free-wheeling mechanism anti-clockwise, if necessary pull the loose fall of the chain jerkily.
- The chain can be pulled through in both directions.



Illustration 8

**Switching OFF the free-wheeling mechanism**

- Turn the free-wheeling mechanism clockwise, if necessary pull the chain fall jerkily.
- Free-wheeling mechanism is switched OFF.
- The chain cannot be pulled through any longer and working operation can be proceeded.



Illustration 9

**7.2 Devices from 800 kg up to 9000 kg**

Before start up please make sure the free-wheeling mechanism is deactivated.

Forcible pulling may possibly close the brake and stop the chain. Should this be the case place the switching pin in position "▼", do some lowering operation movements and begin lifting again.

**Lifting or pulling**

Turn the switching pin in position (1) lifting or pulling as marked on the type plate and move the load by operating the hand lever.

**Lowering or relieving**

Turn the switching pin in position (2) lowering or relieving and move the load by operating the hand lever.

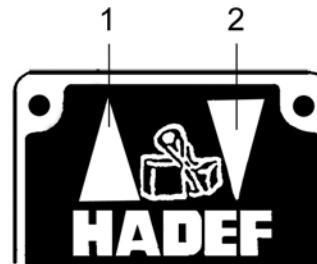



Illustration 10

**7.2.1 Free-wheeling of chain**

When the unit is used appropriately, unintended activation of the free-wheeling mechanism under load is impossible. Opening of the brake system with only small load is possible, this is no mistake.

 **DANGER!**  
Never activate the free-wheeling mechanism if the hoist is under charge.

**Switching ON the free-wheeling mechanism**

- Place the switch knob in middle position.



Illustration 11

- Pull the free-wheeling wheel upwards in direction ▲ .
- The chain can be pulled through in both directions.

A free-wheeling OFF  
B free-wheeling switched ON

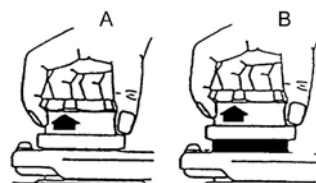


Illustration 12

### Switching OFF the free-wheeling mechanism

- Turn the free-wheeling wheel with one hand in direction ◀ and pull the load chain at the same time.
- Free-wheeling wheel turns back to position OFF.
- Free-wheeling mechanism is switched OFF

C Switch OFF the free-wheeling.  
D free-wheeling OFF

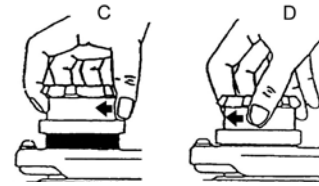



Illustration 13

## 7.3 Brake and pawl

The brake system needs a minimum load of 3% of the capacity.

Only this minimum load makes sure that the load-pressure-brake closes correctly. When the brake closes correctly, the load is safely held.

|  |
|--|
|  <b>DANGER!</b> |
| Working situations with no guarantee that the minimum load is charged, are forbidden!            |

The brake remains closed (stuck) if:

- The ratchet lever hoist is uncharged without lowering the load, i.e. in case of vertical lifting/lowering or in case of horizontal pulling/tensioning.
- The load hook is pulled against the housing and got stuck there.

The chain does not move, the load cannot be lowered.

Remedy:

- Charge the ratchet lever hoist again
- Release the brake by setting down the load.
- OR: Turn the switching pin to position "Lowering" and release the hand lever with a strong jerk in direction "▼".

## 8 Commissioning

### 8.1 General

Should the unit be used in Germany:

Please observe the validated, national accident prevention regulations.

For other countries:

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

### NOTICE!

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

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

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

#### Definition "qualified person" (former expert)

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

#### Definition "licensed qualified person" (former approved expert)

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

## 8.2 Load chain

- Before commissioning the load chain must be aligned and oiled.
- For the first commissioning of motorized hoists, chain oil is supplied with the delivery.
- Move safety note and fixing wire away from the chain.



### **CAUTION!**

Do not use grease for lubrication of load chain.

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



### **NOTICE!**

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

## 9 Safety check

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

- All fastening screws (if existent), socket pins, flap socket and safety devices are tightened and secured.
- The chains are correctly placed, oiled and in good condition.

## 10 Maintenance

### 10.1 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.

### 10.2 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

### 10.3 Replacing the load chain



### **CAUTION!**

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

When replacing the chain, also check the chain wheels.

Procedure:

- Only insert new chains in an unloaded state and as the chains that are currently in the device – i.e. not twisted.
- Remove chain from its fastening at the end and attach a chain link which is open at the side.
- A chain link which is open at the side, can easily be produced by grinding out a small piece. The opening must have the same thickness as the chain link.
- Hang a new original chain (same size and oiled) in the side opened chain link and insert it.
- 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 14

## 11 Inspection

### 11.1 Periodic checks

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

#### 11.1.1 Components to be checked

The following must be checked:

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



### CAUTION!

When the wear limit is reached, the part must be exchanged by a new, original part.

|  | at commissioning | daily checks | 1st maintenance after 3 months | Inspection Maintenance every 3 months | Inspection Maintenance every 12 months |
|--|------------------|--------------|--------------------------------|---------------------------------------|--|
| Check screw connections  | X                |              |                                |                                       | X                                      |
| Check lifting, lowering functions.                                     | X                | X            |                                |                                       |  |
| Check brake function   | X                | X            |                                |                                       |  |
| for ratchet lever hoists: Check free-wheeling mechanism of the chain   | X                | X            |                                |                                       |  |
| Brake - check wear of brake lining                                     |                  |              |                                |                                       | X                                      |
| Check chain wheels, ratchet wheels and pawls.                          |                  |              |                                |                                       | X                                      |
| Clean and lubricate the load chain.                                    | X                |              | X                              | X                                     |  |
| Check the load chain for elongation and wear                           |                  |              |                                |                                       | X                                      |
| Check the load hook for cracks and deformation                         |                  |              |                                |                                       | X                                      |
| Load hook - check the safety catch                                     | X                | X            |                                |                                       |  |
| Check and lubricate the bearing of the chain pulleys.                  |                  |              | X                              |                                       | X                                      |
| Check the chain pulleys  |                  |              | X                              | X                                     |  |
| Have the equipment checked by a qualified person (periodic inspection) |                  |              |                                |                                       | X                                      |



### WARNING!

If one or several of the dimensions fall below or exceed the dimensions in the table, or if cracks or corrosion are found, the parts must be replaced with original spare parts.

### 11.2 Checking the load chain



### CAUTION!

The load chain must be tested over its entire length!

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

acc. DIN 685-part 5

$L_{11}$  = pitch increase over 11 chain links

$L_1$  = pitch increase over 1 chain link

$d_m$  = detected link diameter  $(d_1+d_2)/2$

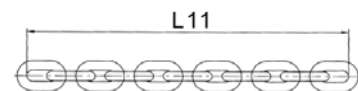


Illustration 15

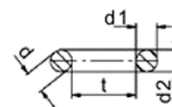


Illustration 16

**Chain dimensions**

Table 1

| Dimensions<br>mm | Chain size |       |          |       |          |        |       |          |          |
|------------------|------------|-------|----------|-------|----------|--------|-------|----------|----------|
|                  | 3x9        | 4x12  | 4,2x12,2 | 5x15  | 5,6x15,8 | 5,6x17 | 6x18  | 6,3x19,1 | 7,1x20,1 |
| L11              | 105,6      | 136,6 | 138,2    | 170,6 | 179,1    | 194,2  | 203,9 | 216,4    | 227,9    |
| L1               | 9,9        | 12,7  | 12,8     | 15,7  | 16,6     | 18     | 18,9  | 20       | 21,2     |
| dm               | 2,7        | 3,6   | 3,8      | 21,2  | 5,0      | 5,0    | 5,4   | 5,7      | 6,4      |

Table 2

| Dimensions<br>mm | Chain size |        |       |        |       |         |       |       |       |
|------------------|------------|--------|-------|--------|-------|---------|-------|-------|-------|
|                  | 7,1x21     | 7,9x23 | 8x24  | 9x24,8 | 9x27  | 10x28,1 | 10x30 | 13x36 | 16x45 |
| L11              | 238,5      | 260,6  | 272,1 | 281,2  | 300,8 | 318,6   | 340,7 | 408,3 | 505,6 |
| L1               | 22,3       | 24,1   | 25,3  | 26,1   | 28,1  | 29,6    | 31,8  | 37,9  | 47,4  |
| dm               | 6,4        | 7,1    | 7,2   | 8,1    | 8,2   | 9,0     | 9,0   | 11,9  | 14,4  |

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

**11.3 Checking the load hook**

Load hook

X = measuring distance hook mouth width

Y = measured length from hook no. 6

H = thickness of hook saddle

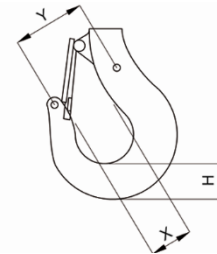


Illustration 17

Dimensions for load and suspension hooks


| Dimension<br>mm | 53/07A  |         |         |         |       |
|-----------------|---------|---------|---------|---------|-------|
| kg              | 250     | 500     | 750     | 1500    | 3000  |
| X or Y          | 21/35,5 | 24,5/42 | 35,5/42 | 35,5/52 | 43/62 |
| H               | 13      | 15,6    | 20      | 26,5    | 31    |

Please fill in the measured values before commissioning:

|          |    |
|----------|----|
| Capacity | kg |
| X or Y   | mm |
| H        | mm |

| Dimension<br>mm | 53/07     |           |         |         |         |         |      |
|-----------------|-----------|-----------|---------|---------|---------|---------|------|
| kg              | 800       | 1000      | 1600    | 2500    | 3200    | 6300    | 9000 |
| X or Y          | 26,5/41,5 | 31,5/49,4 | 35,5/52 | 41/58,6 | 43/61,9 | 53/84,3 | 64/- |
| H               | 20        | 22        | 26,5    | 29      | 31,2    | 45,5    | 60,4 |

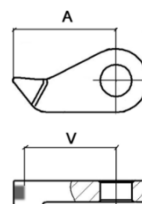
Dimensions for ship hooks

| Dimension<br>mm |  |  |  |  |  | 1600  |  | 3200  |  |  |
|-----------------|---|--|--|--|--|-------|--|-------|--|--|
| X or Y          |   |  |  |  |  | 38/50 |  | 40/65 |  |  |
| H               |   |  |  |  |  | 32    |  | 38    |  |  |

**! CAUTION!**  
When the dimension of hook opening width is deformed more than 10% or when the dimension of the hook bottom thickness is fallen short of by 5% due to wear, the hook must be replaced.

**11.4 Checking - pawl**

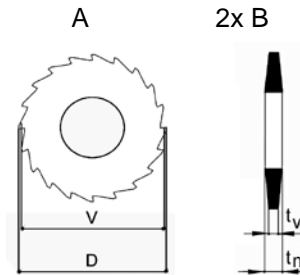
| Typ | kg        | A<br>mm | V <sub>min</sub><br>mm |
|-----|-----------|---------|------------------------|
| A   | 250-3000  | 14,5    | 13,8                   |
| -   | 800-1600  | 22      | 20,5                   |
| -   | 2500      | 29,2    | 27,7                   |
| -   | 3200-9000 | 31      | 29,5                   |



## 11.5 Checking – Brake System

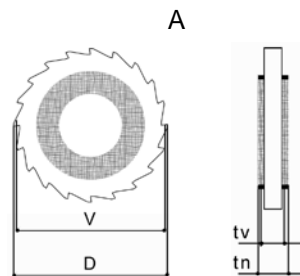
Ratchet wheel (A) and brake linings (B)

| Typ |           | D  | V <sub>min</sub> | t <sub>n</sub> | t <sub>v</sub> <sub>min</sub> |
|-----|-----------|----|------------------|----------------|-------------------------------|
|     | kg        | mm | mm               | mm             | mm                            |
| A   | 250       | 36 | 35               | 3              | 2,7                           |
| A   | 500       | 40 | 39               | 2,5            | 2,2                           |
| A   | 750       | 45 | 44               | 2,5            | 2,2                           |
| A   | 1500-3000 | 60 | 59               | 3,5            | 3                             |

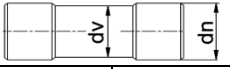
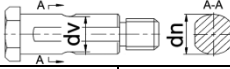
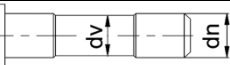
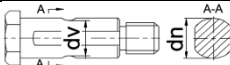


Ratchet wheel (A) with brake linings

|      | D  | V <sub>min</sub> | t <sub>n</sub> | t <sub>v</sub> <sub>min</sub> |
|------|----|------------------|----------------|-------------------------------|
| kg   | mm | mm               | mm             | mm                            |
| 800  | 64 | 61               | 8              | 6                             |
| 1000 | 64 | 61               | 8              | 6                             |
| 1600 | 64 | 61               | 8              | 6                             |
| 2500 | 64 | 61               | 8              | 6                             |
| 3200 | 74 | 71               | 8              | 6                             |
| 6300 | 74 | 71               | 8              | 6                             |
| 9000 | 74 | 71               | 8              | 6                             |



## 11.6 Checking – Suspension and load hook bolt

| Type |           | Suspension bolt   |                   | Load hook bolt   |                   |
|------|-----------|---|-------------------|--|-------------------|
|      |           | dn  | dv <sub>min</sub> | dn   | dv <sub>min</sub> |
|      | kg        | mm  | mm                | mm   | mm                |
| A    | 250       | 8   | 7,4               | 5  | 4,6               |
| A    | 500       | 10  | 9,2               | 6,5  | 6                 |
| A    | 750       | 12  | 11,1              | 7,5  | 6,89              |
| A    | 1500-3000 | 12  | 11,4              | 10,2   | 9,57              |
|      |           |  |                   |  |                   |
|      | 800       | 12  | 11,1              | 7,5  | 6,9               |
|      | 1600      | 12  | 11,4              | 10,2   | 9,7               |
|      | 2500      | 14  | 13,3              | 11,5   | 11                |
|      | 3200      | 16  | 15,2              | 13   | 12,4              |
|      | 6300      | 16  | 15,2              | 13   | 12,4              |
|      | 9000      | 16  | 15,2              | 13   | 12,4              |
|      |           |  |                   |  |                   |




## 12 Service

### 12.1 Load chain

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



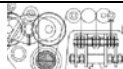
To ensure optimal lubrication of the links, the chain must be lubricated at regular intervals, depending on usage.

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

| Use        |  | Recommendation   |  | Interval |
|------------|---|--|---|----------|
| Load chain |  | oil for example: FUCHS RENOLIN PG 220<br>or special chain lubricant<br>Use <b>NO</b> grease! | 0,2 l   | 3 month  |




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

**12.2 Pulleys**

| Use     |  | Recommendation         |  | Interval |
|---------|---|------------------------|---|----------|
| Pulleys |  | FUCHS<br>RENOLIN PG220 | Acc. to demand  | 12 month |

**12.3 Load hook**

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

| Use               |   | Recommendation         |  | Interval |
|-------------------|---|------------------------|--|----------|
| Load hook bearing |  | FUCHS<br>RENOLIN PG220 | Acc. to demand   | 12 month |

**12.4 Gear**

Regular checks of lubrication are necessary. The teeth must be cleaned and re-lubricated after approx. 3 years. We recommend to use a lubricant of class EP2 or similar products. In case of severe conditions of use (e.g. dust, regular lifting of the nominal load, etc.), please shorten maintenance intervals.

**12.5 Gear spring pressure brake**

During the check, brake lining wear is verified. The brake linings must be replaced when the wear limit is already reached at one position of the lining, - as this can be the case when wear of the linings is irregular.

**CAUTION!**  
The brake linings must be free from fracture. Avoid oil, grease, dirt and humidity on the brake linings as this increases wear.

The brake lining for the ratchet lever hoist is tested for the whole product lifetime - under the precondition of appropriate use - and must only be replaced in case of extraordinary wear.

**NOTICE!**

According to EN 13157 lifetime is 1500 operating cycles (lifting/lowering movements) with 300 mm lift with nominal load and normal operation conditions.

Use by heavy conditions can shorten the product lifetime. In these cases, the thickness of the brake lining must be checked more than 1x yearly. The ratchet wheel with the brake lining must be replaced when the wear limit is reached or wear of the lining (one side) is clearly visible.



## 12.6 Lubricant - Selection

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

## 12.7 Lubricant for food industry – Selection (as option\*)

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

\* must be mentioned by order

## 13 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.

## 14 Remedy

Check the ratchet lever hoist by listening to the noise it makes:

Lifting: Move the lever forward and backwards - it should make click

Lowering: Only move the lever backwards not forward - it should make click

| Problem  | Cause   | Remedy  |
|--|---|---|
| Load is not lifted   | Overload  | Reduce the load to nominal load   |
|  | Load got stuck  | Set the load free again   |
|  | Brake linings are worn  | Do maintenance and exchange the brake linings   |
|  | Load chain is twisted   | Align the load chain  |
|  | Defect of chain, gear or chain wheels                               | Do maintenance and replace defective parts by original spare parts  |
|  | Pawl does not engage properly                                       | Check the pawl and replace it if necessary  |
|  | Switching pin - wrong position                                      | Chose correct position of switching pin   |
|  | Pawl spring is missing  | Do maintenance and replace defective parts by original spare parts  |
| It is difficult to lift the load   | Overload  | Reduce the load to nominal load   |
|  | Dirty chains, gear or chain wheels                                  | Do maintenance, lubricate chains, gear and chain wheels   |
|  | Defect of chain, gear or chain wheels                               | Do maintenance and replace defective parts by original spare parts  |
| Load is lifted with interruptions  | Pawl spring is missing or defective                                 | Do maintenance and replace defective parts by original spare parts  |
| Hoist does not lift without load   | Brake spring is missing   | Do maintenance and replace defective parts by original spare parts  |
| Hoist does not lift the whole distance long                                    | Hook sticks, chain is twisted                                       | Place hooks and chains in correct position  |
| The brake remains closed (stuck),  | the hoist was unloaded without lowering the load                    | Suspend the load again, lower the load, unload the hoist  |
|  | The load hook was pulled against the housing and got stuck there.   | Release the hook, suspend the load again, lower the load, unload the hoist.   |
| Hoist does not lower the load  | Brake too tight   | Turn the switching pin to position "▼" resp. "DN" and move the hand lever while pulling the chain at the load side. |
|  | Brake without function due to rust                                  | Effect periodic inspection and replace rusty parts.   |
| Load slips down partially during lowering                                      | Foreign-object between the brake discs                              | Remove the foreign-object, clean the surface (Do not lubricate.)  |
| Load slips down during lowering  | Brake lining is missing, installed incorrectly or worn Bremsbelages | Replace the brake lining resp. install it correctly   |
| Switching pin does not function  | Defect or deformation   | Check and replace, if necessary.  |
| Load slips down when the switching pin is switched to free-wheeling mechanism. | Chain spring is missing or defective.                               | Do maintenance and replace defective parts by original spare parts.   |
| Ratchet lever blocked when lifting and lowering *)                             | Lock has triggered  | Device must be repaired by a qualified person   |

\*) nur bei Geräten mit Verriegelungsmechanismus

## 15 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.

### 15.1 Temporary decommissioning

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

### 15.2 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.

---

## **16 Documents available on request**

Installation instruction – brake system

**These works may only be done by „qualified persons“.**