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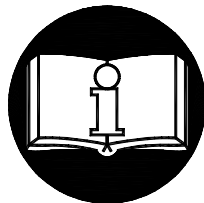
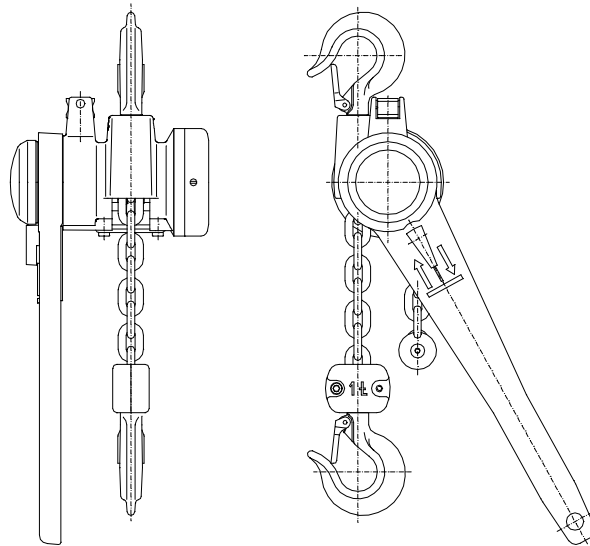
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SAFETY PRINCIPLES, OPERATION AND MAINTENANCE MANUAL FOR

RACK-AND-LEVER JACK

type Z 310, lifting capacity 0,5t, 1,6t, 3,2t a 5t

type Z 310-1, lifting capacity 1t



Read this manual carefully before using this product. This manual contains safety, installation, operation and maintenance information. Make this manual available to all responsible persons.

Keep for further use !

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CONTENT

1	DEFINITION.....	3
2	INTENDED PURPOSE	3
3	SAFETY PRINCIPLES.....	4
	3.1 SAFETY SUMMARY.....	4
	3.2. SAFETY PRINCIPLES	4
	3.2.1 Before use	4
	3.2.2 While operation.....	5
	3.2.3 Risk analysis	5
	3.2.4 Maintenance.....	5
4	PACKING, STORAGE AND MANIPULATION	6
	4.1 PACKING.....	6
	4.2 STORAGE.....	6
	4.3 MANIPULATION.....	6
5	MAIN TECHNICAL PARAMETERS.....	6
	5.1 MECHANICAL CLASSIFICATION.....	7
	5.2 MATERIAL AND VERSION.....	7
6	INSTALLATION OF JACK.....	8
	6.1 CHECKING BEFORE THE INSTALLATION	8
	6.1.1 Load-carrying structure.....	8
	6.2 SUSPENSION OF JACK	8
	6.2.1 Lubrication of chain.....	9
	6.2.2 Checking the chain position.....	9
	6.3 SETTING THE LENGTH OF CHAIN.....	9
	6.4 POSITION OF JACK DURING LIFTING	9
	6.5 LIFTING (PULLING) OR LOWERING.....	10
	6.6 SAFETY OF JACK – INSTRUCTIONS FOR OPERATER.....	10
	6.7 CHECKING BEFORE THE USE	10
7	OPERATION.....	10
	7.1 USE OF JACK.....	10
	7.2 SAFETY WORKING ENVIRONMENT	11
8	INSPECTION OF JACK.....	11
	8.1 INSPECTION	11
	8.1.1 Inspection classification.....	11
	8.1.2 Daily inspection	12
	8.1.3 Regular inspection.....	12
	8.1.4 Occasionally used jack.....	12
	8.1.5 Inspection record.....	12
	8.2 Inspection procedure	12
9	TROUBLE SHOOTING	15
10	LUBRICATION	16
	10.1 GENERALLY.....	16
	10.2 GEARINGS	16
	10.3 LOAD CHAIN.....	16
11	MAINTENANCE.....	16
	11.1 SAFETY PRINCIPLES.....	16
	11.2 EXCHANGE OF THE LOAD CHAIN	17
	11.2.1 SINGLE FALL CHAIN.....	17
	11.2.2 TWO FALL AND THREE FALL CHAIN.....	17
	11. 3 BRAKE ASSEMBLY.....	17
	11. 4 BRAKE ADJUSTMENT.....	18
	11.5 GENERAL INSTRUCTIONS	18
	11.6 INSPECTION	18
	11.7 REPAIR	19
	11.8 TEST.....	19
12	REMOVING FROM OPERATION – LIQUIDATION.....	19
14	FINAL MANUFACTURER’S REQUIREMNT TO CUSTOMER.....	19
	EC DECLARATION OF CONFORMITY.....	20

1 DEFINITION

! DANGER

Danger: is used to indicate the presence of a hazard which will cause a death or severe injury if the warning is ignored.

! WARNING

Warning: is used to indicate the presence of a hazard which can cause death or severe injury if the warning is ignored.

! CAUTION

Caution: is used to indicate the presence of a hazard which can cause minor injury if the warning is ignored. Caution can also indicate dangerous practices.

Lifting capacity (Q): indicates maximum mass of load (working load limit) the jack is designed to support in general service under conditions given by this manual.

2 INTENDED PURPOSE

2.1 Rack-and-lever jack type Z310, lifting capacity 0,5t, 1,6t, 3,2t and 5t and its modification type Z 310-1, lifting capacity 1t (further only jack) is designed solely for manual lifting, lowering and pulling of free loads in arbitrary direction on the workplace. The mass of load during lifting or chain tension must not exceed nominal lifting capacity.

2.2 Design of the jack meets requirements given by Directive of European parliament and Council 98/37/EC in wording of the Czech technical regulation – government order no. 24/2003 Collection of Law as amended and requirements by harmonised Czech technical standards ČSN EN ISO 12100 - 1 , ČSN EN ISO 12100 - 2, ČSN EN 1050 , ČSN EN 13157.

2.3 Design of the jack meets requirements given for the group of machinery I (mining) category M2 according to the Directive of European parliament and Council 94/9/EC in wording of the Czech technical regulation – government order no. 23/2003 Collection of Law as amended and requests by the harmonised Czech technical standard ČSN EN 13463-1 and meets condition for use in environment „dangerous atmospheric conditions 2“ according to the ČSN EN 1127-2 with limitation according to the national regulation – notice Czech Bureau of Mine no.22/89 Collection of Law § 232 clause (1) c) to 1,5% concentration of methane.

2.4 The jack by its design meets requirements specified for the group of devices II (not for mining) category 2 and 3 according to Directive of European parliament and Council 94/9/EC as amended by Czech technical regulation – ministerial order no.23/2003 Collection of Law as amended by harmonised Czech technical standard ČSN EN 13463-1 and complies with the conditions for use in environment „zone 1 and zone 21“ , “zone 2 a zone 22“ according to the ČSN EN 1127-1.

Note: Articles 2.3 and 2.4 are valid for the version of jack to the environment explosion risk.

3 SAFETY PRINCIPLES

3.1 SAFETY SUMMARY

Danger exists when loads are lifted, particularly when the jack is not being used properly or is poorly maintained. Because an accident or serious injury could result, special precautions apply to the operation with jack, during its assembly, maintenance and inspection.

! WARNING

- NEVER** use jack for lifting or transporting people.
- NEVER** lift or transport loads over or near people.
- NEVER** lift more than lifting capacity shown on the jack.
- ALWAYS** make sure the load carrying structure will provide adequate support to handle fully loaded jack and all lifting operations.
- ALWAYS** warn people in surroundings before starting to work.
- ALWAYS** read the operation manual and safety instructions.

Remember proper rigging and lifting techniques are the responsibility of the operator. Check all applicable national directions, regulations and standards for further information about the safe use of your jack.

3.2. SAFETY PRINCIPLES

! WARNING

3.2.1 Before use

- ALWAYS** ensure physically strong, qualified and instructed persons elder 18 years of age, knowing this manual and trained in safety conditions and way of work operate the jack.
- ALWAYS** check the jack every day prior to starting the work according to the article 8.2.(1) „Daily inspection“.
- ALWAYS** make sure the length of chain is long enough for the intended job.
- ALWAYS** use original chain only.
- ALWAYS** ensure the chain was not corroded, clean and oiled.
- ALWAYS** make sure the end stop (anchor) is firmly fasten on the last chain link or to jack body (for two fall versions).
- NEVER** pull loads firmly fixed or of unknown weight.
- NEVER** apply a tension without a necessary knowledge of tensioning forces.
- NEVER** use damaged or worn jack.
- NEVER** use jack with jumped out, damaged or missing safety latch.
- NEVER** use a jack without the visible marking of the lifting capacity.

- NEVER** use modified or deformed hooks.
- ALWAYS** check the function of the brake before starting the work (see art. 8.2 (2) point 6.)
- NEVER** use a jack marked by the label „**OUT OF SERVICE**“.
- NEVER** connect or lengthen the chain.
- ALWAYS** consult use of the jack in non-standard or extreme conditions with manufacturer or the authorised representative.

3.2.2 While operation

- ALWAYS** make sure the load properly seats in the hook.
- ALWAYS** make sure the safety latches work in a correct way.
- ALWAYS** pay attention to the limit positions.
- ALWAYS** use manual power only. Do not lengthen the lever.
- NEVER** tension without knowledge of necessary tensioning forces.
- ALWAYS** we recommend two people operate the jack when lifting a load of mass close to nominal lifting capacity due to the size of operating forces. When pulling loads ensure the jack in such a way, the jack could not fall during sudden release of a load.
- NEVER** use damaged or corroded chain.
- NEVER** use the jack for anchoring loads.
- NEVER** allow swinging the load, causes impacts or vibrations.
- NEVER** use the chain as a sling.
- NEVER** suspend the load on the tip of the hook.
- NEVER** pull the chain over any edge.
- NEVER** weld, cut or provide any operations on suspended load.
- NEVER** use the chain as a welding electrode.
- NEVER** operate the jack, when the chain starts jumping or excessive noise occurs.

3.2.3 Risk analysis

Analysis of possible risks as far as the design, operation and work environment of the jack is concern is mentioned in separate document “Risk analysis”. This document is available on request in service centres.

3.2.4 Maintenance

- ALWAYS** let qualified personnel inspect the jack regularly.
- ALWAYS** ensure the chain was clean and oiled.
- ALWAYS** ensure the sliding parts were greased enough.
- NEVER** add or weld other parts for chain elongation

During maintenance only such measures can be done that will be in conformity with requirements of the manufacture, mentioned in chapter 11 and 14 of this manual.

It is not allowed to provide repairs and maintenance in a different way than specified by the manufacturer. It is especially prohibition of use of no original parts or providing changes of product without the agreement of manufacturer.

4 PACKING, STORAGE AND MANIPULATION

4.1 PACKING

4.1.1 The jacks are supplied assembled, packed in paperboard boxes.

4.1.2 Part of the supply is the following documentation:

- a) Instruction manual
- b) EC declaration of conformity
- c) Certificate of quality and completeness of product and warranty card.
 - c1) Warranty period is stated in warranty card.
 - c2) Warranty does not cover defects caused due to neglecting instructions mentioned in the manual and defects caused by the improper use and malpractice interference.
 - c3) Warranty does not cover changes of the product or use of the non original spare parts without the agreement of the manufacturer.
 - c4) Claim of defects of the product is to be done according to the relevant provisions of the commercial code or according to the wording of the later provisions.
- d) List of service centres (only for the Czech and Slovak republic)

4.2 STORAGE

Store jacks in dry and clean stores free from chemical influences and vapours.

- (1) ALWAYS store jack without suspending any load on it.
- (2) Remove all dust, water and impurities from the jack.
- (3) Lubricate chain, pivots and springs of safety latches of hooks.
- (4) Suspend the jack in a dry place.
- (5) During the further use follow instructions čl.8.1.2 „Daily inspection“ and 8.1.4 „Occasionally used jack“.

4.3 MANIPULATION

During manipulation observe valid technical regulations and standards for manipulation with heavy loads.

5 MAIN TECHNICAL PARAMETERS

Type	Lifting capacity (t)	Number of chain falls	Chain ČSN EN 818-7 (strength class 8)	Operating force (N)	Lifting ¹⁾ speed (m/min)	Range of working temperature	Basic ²⁾ lift (m)	Weight (kg)
Z310	0,5	1	∅5x15	120	0,3	-20°C to +50°C	1,5	7,2
Z310-1	1	1	∅7x21	180	0,33			10,8
Z310	1,6	1	∅9x27	300	0,4			13,8
Z310	3,2	2	∅9x27	350	0,2			23,1
Z310	5	3	∅9x27	400	0,13			30

Notes:

- 1) Calculated on presumption 48 swings of the hand lever per minute.

- 2) Maximum standard lift is 15m. Required lift is necessary to specify in the order.
Lifts over 15 m must be consulted with the manufacturer.

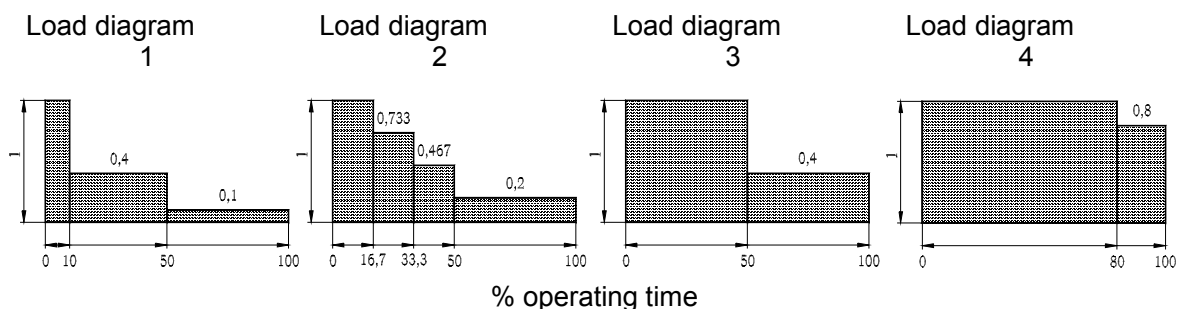
5.1 MECHANICAL CLASSIFICATION

Safety and life of jack is guaranteed under presumption it works in accordance with the specified classification.

Jack is designed for class 1Bm according to the regulation FEM 9.511 – see diagram 5.1. (corresponds to the classification of the mechanism M3 according to the ISO 4301/1). Average daily working time is set by the loading diagram.

Diagram 5.1 MECHANICAL CLASSIFICATION

Load diagram (Load distribution)	Definitions	Cubic mean value	Average daily operating time (h)
1 (light)	Mechanisms or parts thereof, usually subject to very small loads and in exceptional cases only to maximum loads.	$k \leq 0,50$	1 - 2
2 (medium)	Mechanisms or parts thereof, usually subject to small loads but rather often to maximum loads.	$0,50 < k \leq 0,63$	0,5 - 1
3 (heavy)	Mechanisms or parts thereof, usually subject to medium loads but frequently to maximum loads.	$0,63 < k \leq 0,80$	0,25 - 0,5
4 (very heavy)	Mechanisms or parts thereof, usually subject to maximum or almost maximum loads.	$0,80 < k \leq 1,00$	0,12 - 0,25



5.2 MATERIAL AND VERSION

5.2.1 All parts of the jack are made of steel and cast iron, brake inserts of brass or metal-ceramic material.

5.2.2. Materials susceptible to the creation of an incentive spar in accordance with of the annex no.2 article 1.3.1 to the ministerial order no.23/2003 collection of laws and harmonized technical standards ČSN EN 1127-2 article 6.4.4, ČSN EN 1127-1 čl.6.4.4 and ČSN EN 13 463-1 article 8.1. are not used.

5.2.3. Materials with dangerous effects of static electricity in accordance with ČSN EN 1127-2 article 6.4.7, ČSN EN 1127-1 article 6.4.7, ČSN EN 13463-1 article 7.4.3 and ČSN 33 2030 are not used in the jack.

5.2.4 The jack does not exceed the noise value specified in the annex no.2 article 1.7.4 letter f NV 24/2003 collection of laws (directive EP and RE no.98/37/EC).

Note: Articles 5.2.2 and 5.2.3 apply for configuration of jack to the environment with explosion risk.

5.3 DATA ON THE PRODUCT

Every single product is fitted with the label, where the following data are stated:

Standard version:	Version for environment with explosion risk:
Manufacturer designation	Manufacturer designation
Address of manufacturer	Address of manufacturer
Type of product	Type of product
Lifting capacity	Lifting capacity
Serial number	Serial number
Year of production	Year of production
CE marking	CE marking
	Sign of protection type (I M2 for group I , II 2G for group II)

6 INSTALLATION OF JACK

Prior to installing the jack, inspect it carefully for possible damages.

6.1 CHECKING BEFORE THE INSTALLATION

6.1.1 Load-carrying structure

! WARNING

ALWAYS make sure the load-carrying structure is firm enough to support the weight of load and jack. The installation must not be provided onto the structure where the load-carrying capacity cannot be checked.

ALWAYS the user is responsible for the load-carrying structure!

6.2 SUSPENSION OF JACK

! CAUTION

Be careful during suspending a jack on the pendant element and ensure appropriate conditions for suspending according to the environment character (working platform, auxiliary lifting device, etc.), to avoid endanger or injury of people. Use safety equipment when suspending jack in heights to avoid a fall from height.

The user is responsible for creating conditions and providing the installation of the jack.

6.2.1 Lubrication of chain

Put the thin layer of oil on chain preferably by the help of spray. Regular lubrication will avoid wear and corrosion of chain and lengthen its life.

6.2.2 Checking the chain position

Check, whether the hook is not turned over (multi fall jack) and the chain twisted as on fig . 6.2a and 6.2b. If the chain is twisted, return it to its origin position. NEVER suspend a load on twisted chain. The chain is not twisted if the welded parts of all links are in one row.

Fig. 6.2a Chain twisting

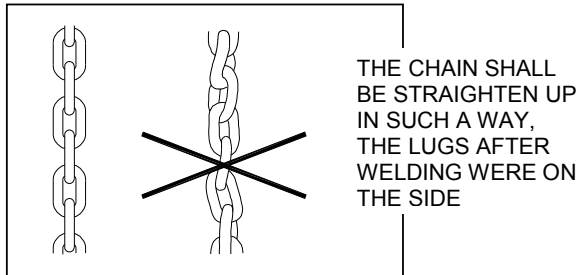
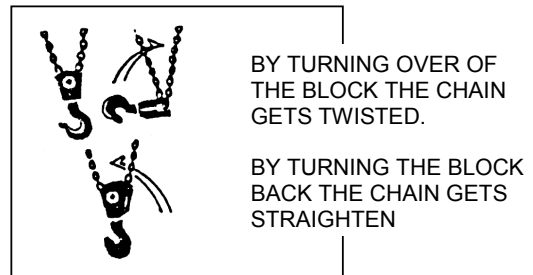


Fig. 6.2b Turning over of the block



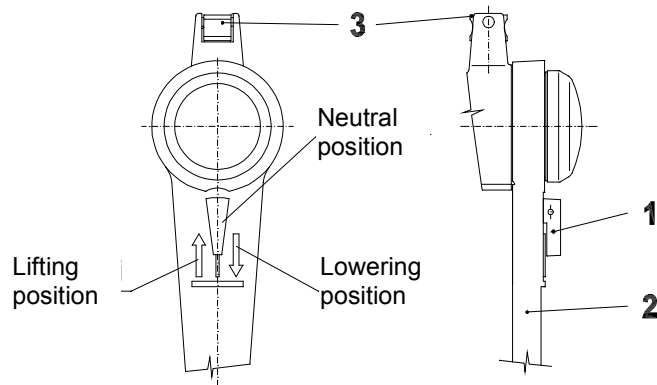
6.3 SETTING THE LENGTH OF CHAIN

We usually need to set the length of chain (span of hooks) to required distance for suspending hooks before lifting or pulling.

Set the selector lever (1) on hand lever (2) to the neutral position – see fig. 6.3 and lift off brake pawl (3). By pulling the chain in arbitrary direction set required position.

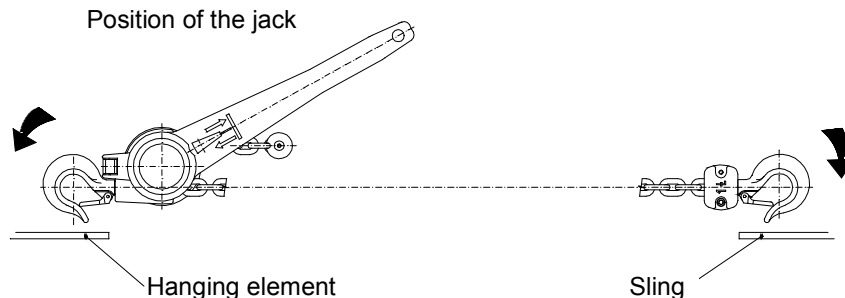
During the chain sliding straighten the chain in such a way to avoid its jamming or accumulation at the body of the jack.

Fig. 6.3 – Setting the length of chain



6.4 POSITION OF JACK DURING LIFTING

The jack must be installed in such a way the axes of hooks and chain under load were in one straight line without the chain twisting.



6.5 LIFTING (PULLING) OR LOWERING

Before lifting set the selector lever (1) on mark lifting – arrow up (see fig. 6.3). Provide lifting by the pendulous motion of the hand lever.

Before lowering a load or releasing of the tight chain shift the selector lever (1) to mark lowering – arrow down (see fig.6.3). By pendulous motion of the of the hand lever lower the load or release the tight chain.

The first motion of hand lever after the change of chain running (after switch of selector lever) is slightly blocked. This condition happened due to stronger tightening of brake especially during manipulation with heavier loads. In this case release brake by the energetic motion of the hand lever release the brake and at the same time the hand lever is unblocked.

6.6 SAFETY OF JACK – INSTRUCTIONS FOR OPERATER

Lifting or lowering can be interrupted in any height of lift. Stability of load position ensures the multi-plate brake.

6.7 CHECKING BEFORE THE USE

! CAUTION

- (1) First look again to the previous articles of this manual and make sure all steps were correctly done and all parts are safely assembled.
- (2) Check, whether hooks are correctly suspended and safety latches snapped in.
- (3) Inspect visually load carrying construction or the suspending elements, whether they are without defects.
- (4) Check the function of a jack without a load by several motions of hand lever.
- (5) Provide several lifting and lowering with a suitable load (10% up to 50% lifting capacity). At the same time check the brake, whether during lowering and stopping the load is hold without slipping.

7 OPERATION

7.1 USE OF JACK

The jack is multiuse device, determined for lifting, lowering and pulling of loads at a workplace. Can be used not only in standard environment but also in environment with explosion risk, if the label is marked with symbol of protection type – see articlel.2.3, 2.4 and 5.3 of this manual.

It is operated solely by the help of hand lever. It is determined for organisation as well as for private persons. Since dealing with heavy loads may involve unexpected danger, all the “Safety instructions” according to the chapter 3 must be followed.

! WARNING

Do not continue to operate if the chain stopper (anchor) or lower block (at two fall types) contacts the jack’s body. Damage of the chain stopper (or lower block) can lead to the fall of the load. During pulling or tensioning sudden movement of the load can happen and thus release and fall of the unsupported jack. Take therefore a special care.

! WARNING

In exceptional cases, when using jacks with a long lift (15m and more) dangerous heating of the brake during lowering of loads can occur (uninterrupted and quick lowering). In these cases it is necessary to lower the load slowly with interruptions.

! WARNING

NEVER suspend a load on jack without prior active pre-lifting of a load by the jack. A fall of a load could happen due to insufficiently tight brake.

! CAUTION

When lifting loads that are to be suspended over to another lifting device (crane, fork lift, etc.) it is necessary to unload the load chain (chains) by hand lever of the jack, not lifting the load by another lifting device. Only the above mentioned procedure ensures problems free releasing of the jack's brake after removing a load.

7.2 SAFETY WORKING ENVIRONMENT

! WARNING

- (1) The operator must be provably familiar with this manual, keep valid safety and hygienic regulations and must be authorised to operate this device.
- (2) Operator must be equipped with helmet, gloves and protective shoes.
- (3) Only verified binding means of appropriate lifting capacity is to be used for binding loads.
- (4) When more persons take part in the operation, always one responsible person, familiar with safety instructions, must be determined for manipulation with the jack.
- (5) The operator must have a clear and unobstructed view of the working area before starting the work. If this is not possible, a second or more persons must serve in the nearby area.
- (6) The operator must check the entire work place is safe and whether there is a possibility of escaping in case of danger before operating the jack.
- (7) During works with the jack a sufficient distance between operator and load must be kept. It is prohibited to lift or lower bulky loads that makes impossible to keep sufficient distance.
- (8) When operating the jack in limited areas, you must prevent the hook or load contact into any obstacle or to the body of the jack.

8 INSPECTION OF JACK

8.1 INSPECTION

8.1.1 Inspection classification

- (1) Initial inspection: prior to initial use. All new or repaired jacks shall be inspected by designated qualified person to ensure compliance with the applicable provisions of this manual.
- (2) Inspection procedure for jacks in regular service is divided into two general classifications based on the intervals of inspections. Intervals of inspections depend on the condition of the critical components and the degree of their wear deterioration or malfunction. The respective intervals are defined in the following way:

(a) Daily inspection: visual examination provided by the operator designated by the user on the beginning of each usage.

(b) Regular inspection: visual inspection provided by the operator designated by the user.

- 1) normal service – annually,
- 2) heavy service – semi annually,
- 3) special or infrequent service – according to the recommendation of the competent person at first usage and according to the directions of the qualified service personnel (maintenance worker).

8.1.2 Daily inspection

Items such as those recommended in paragraph 8.2(1) „Daily inspection“ should be inspected for damages and defects. Provide this inspection also during operation in the interval between regular inspections. A designated personnel shall determine, whether any defects or damages constitute a hazard or will require more detailed inspection.

8.1.3 Regular inspection

Complete inspections of jacks shall be performed as recommended regular inspections. During these inspections the jack can stay on its usual place and dismantling is not necessary. Recommended regular inspection stated in paragraph 8.2(2) must be provided under supervision of the designated personnel to determine whether the disassembly is necessary. These inspections shall include the requirements of daily inspection.

8.1.4 Occasionally used jack

(1) A jack which has been idle for a period of one month or more but less than one year before returning to service shall be given an inspection conforming to the requirements of paragraph 8.1.2.

(2) A jack which has been idle for a period of one year shall be given an inspection conforming to the requirements of paragraph 8.1.3 before it is placed in service.

8.1.5 Inspection record

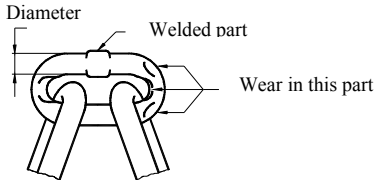
Always keep records about the performed checks, repairs, inspections and maintenance of jacks. Dated records should be maintained in time intervals specified in paragraph 8.1.1 (2)(b) and keep them on place determined by the user.

Defects found by the inspection or recorded during work must be announced to the person responsible for safety and determined by the user.

8.2 Inspection procedure

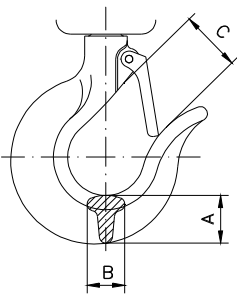
(1) Daily inspection (provided by the operator or responsible person)

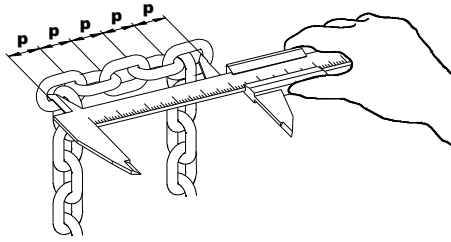
PART	INSPECTION METHOD	LIMIT/CRITERIA FOR DISCARD	REMEDY
1. Function of jack	Visual, hearing	Chain binds, jumps, make an excessive noise, etc..	Clean and lubricate the chain, if the defects is not removed replace the chain

2. Fastening parts.	Visual check of all screws, nuts, rivets etc.	Defective or missing parts. Released parts	Replace by new one. Fasten released parts
3. Hooks (1) Appearance	Visual	Safety latch jump out of the top of hook, bind shank, other visible deformation of hook.	Professional inspection of lifting device – replacing of hook and other damaged parts
(2) Hook rotating	Turn the hook around its axes.	Hook does not rotate fluently or jammed	Clean up and lubricate.
(3) Safety latch	By hand spring of latch.	Safety latch does not return after pushing.	Clean, lubricate, repair or replace
4. Load chain (1) Appearance	Check visually the whole chain	Cracks in the place of welding, transversal notches, deformation, wear, rust	Replacement of the chain
Note: The complete wear of chain cannot be determined by the visual inspection. When showing full wear, check the chain according to “Regular inspection.”			
(2) Lubrication	Visual	Chain is not lubricated	Clean and lubricate the chain
(3) Setting up the chain	Visual check according to the fig.1 whether chain is not turned over	The chain is turned over or twisted, welds are not in the row	Straighten the chain and set it to the normal position
(4) Turning over of the block (only at two falls)	Visual according to the fig.2	The chain is twisted by turning over of the lower block, welds are not in the row	Straighten the chain by reversal turning over of the block

(1) **Regular inspection** (provided by a qualified personnel)

PART	INSPECTION METHOD	LIMIT/CRITERIA FOR DISCARD	REMEDY
1. Fastening parts	Visual check of all screws, nuts, rivets, etc.	Defective or missing parts. Released parts	Replace by new Fasten released parts

2. All parts	Visual check	Wear or damaged parts Contaminated or not lubricated parts	Replace by new parts Dismantle, clean, lubricate and assemble again																																							
3. Name plate – marking of lifting capacity on jack	Visual check	Illegible lifting capacity	Repair or replace by the new one Repair marking on jack																																							
4. Hooks (1) Deformation of hook (opening) (2) Hook wear	Measure dimension „C“ with slide calliper Visual check Measure dimension „A“ and „B“ with slide calliper	Measured value is bigger than set by the diagram Deformation is visible at visual check Do not use hook if dimensions „A“ or „B“ decreased more than 10%	Professional inspection of jack – replacing the hook and other damaged parts Worn or deformed hook replace by the new one																																							
	<table border="1" data-bbox="609 1092 1323 1281"> <thead> <tr> <th rowspan="2">Capacity (t)</th> <th colspan="2">Dimension "A" (mm)</th> <th colspan="2">Dimension "B" (mm)</th> <th>Dimension "C" (mm)</th> </tr> <tr> <th>Standard</th> <th>Limit</th> <th>Standard</th> <th>Limit</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>0,5</td> <td>17,5</td> <td>15,8</td> <td>16</td> <td>14,5</td> <td>24</td> </tr> <tr> <td>1</td> <td>22</td> <td>19,8</td> <td>19</td> <td>17</td> <td>29</td> </tr> <tr> <td>1,6</td> <td>26</td> <td>23,4</td> <td>23</td> <td>20</td> <td>35</td> </tr> <tr> <td>3,2</td> <td>36,5</td> <td>32,8</td> <td>34</td> <td>30,5</td> <td>41</td> </tr> <tr> <td>5</td> <td>42</td> <td>37,8</td> <td>35</td> <td>31,5</td> <td>45</td> </tr> </tbody> </table>	Capacity (t)	Dimension "A" (mm)		Dimension "B" (mm)		Dimension "C" (mm)	Standard	Limit	Standard	Limit	Limit	0,5	17,5	15,8	16	14,5	24	1	22	19,8	19	17	29	1,6	26	23,4	23	20	35	3,2	36,5	32,8	34	30,5	41	5	42	37,8	35	31,5	45
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3,2	36,5	32,8	34	30,5	41																																					
5	42	37,8	35	31,5	45																																					
5. Chain - elongation	Measuring of pitch with slide calliper, measure in place that is most frequently in contact with pulley and nut	Dimension „p“ must not exceed limit values shown in the following diagram	If limit values exceed, ask for replacing the chain																																							



Size of the chain (d)	Number of measured links	Pitch of measured links p x 5		Scraping limit for (d)
		Standard	Limit	
Ø5	5	75	77,3	4,5
Ø7	5	105	108,2	6,3
Ø9	5	135	139,1	8,1

7. End stop (anchor) of chain	Visual check	End stop is not fasten enough to the chain	Fasten the fitting screw, Repair and replace the damaged connection
8. Ratchet pawl - function	Visual check during lifting	Ratchet pawl does not jump behind the teeth of ratchet wheel	Clean, lubricate or replace the spring
9. Rotating of block	Rotate with block by pulling the chain	Block does not rotate fluently	Clean, lubricate or repair
10. Twisting the chain at multi fall versions see article 6.2.2			

9 TROUBLE SHOOTING

Situation	Cause	Remedy
1. Jack does not keep a load.	Brake slips.	Setting the brake or repair according to chapter: „Maintenance.“
2. Jack lifts hard or fails to lift.	(1) Jack is overloaded. (2) Damaged gearing.	(1) Degrease the weight of load to the nominal capacity. (2) Check parts according to the chapter: „Maintenance.“
3. Chain runs improperly, it is jamming.	Damaged or worn out chain or nut.	Check the chain or parts according to: „Regular inspection“ or provide repair according to the chapter:

		„Maintenance.“
4. Jack emits a special sound.	1) Insufficiently lubricated chain. 2) Insufficiently lubricated gear transmission. 3) Worn out pulley.	1) Lubricate the chain. 2) Lubricate the gear with the grease. 3) Replace the pulley.
5. Characteristic sound is not heard when snapping the pawl into the tooth of ratchet wheel.	Loss of pawl function. Rust, impurities, broken spring.	Clean, replace the spring.
6. Safety latch of hook does not work.	(1) Damaged safety latch. (2) Deformed hook.	(1) Repair safety latch. (2) Check the hook – see „Daily inspection“.

10 LUBRICATION

10.1 GENERALLY

Prior to application of the new lubricant, remove the old one, clean parts with a solvent degreaser and apply the new lubricant. Use the grease specified by the manufacturer.

10.2 GEARINGS

Remove the cover on the opposite side of the hand lever. Remove the old lubricant and substitute by the new one. Use the grease PM – A2 or its equivalent.

10.3 LOAD CHAIN

! CAUTION

The wrong maintenance and insufficient lubrication of the chain can cause a serious accident.

ALWAYS lubricate the chain 1 x per week or often according to the demand of service.

ALWAYS lubricate more often in a corrosive environment (sea water, sea climate, acids, etc.) than in ordinary circumstances.

ALWAYS use machine oil according to the ISO – VG 46 or VG 48 or their equivalent.

11 MAINTENANCE

11.1 SAFETY PRINCIPLES

! WARNING

With exception of the exchange of the chain, only qualified personnel (service organisations) trained in safety and maintenance of these jacks can carry on maintenance, professional inspections and test.

ALWAYS use only parts supplied by the manufacture.

It is not permitted to carry on repairs and maintenance in other way than specified by the manufacturer. It means particularly forbiddance of using unoriginal spare parts or providing changes on the product without the approval of the manufacturer.

ALWAYS check the function of the jack after carrying on the maintenance.

ALWAYS mark damaged or repaired jack with a suitable safety sign (for example: „OUT OF WORK“).

NEVER do maintenance when a load is suspended on the jack.

NEVER work with the jack that is under repair!

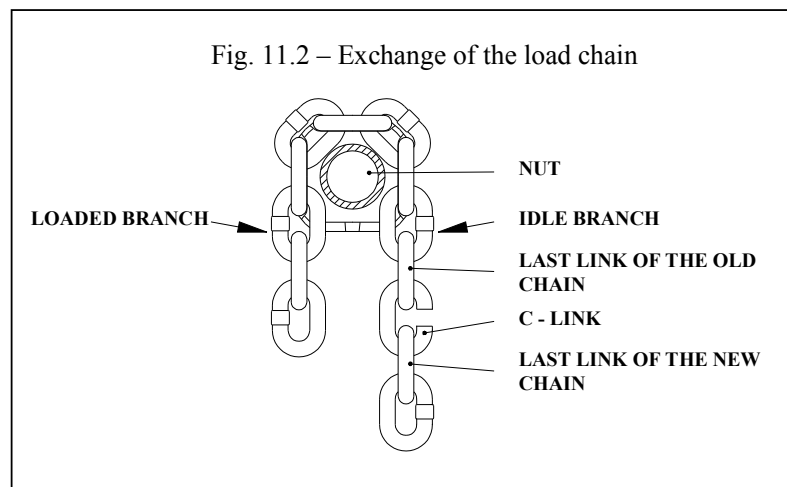
11.2 EXCHANGE OF THE LOAD CHAIN

11.2.1 SINGLE FALL CHAIN

Unscrew the screw and remove the end stop (anchor) of the chain. Hook C link see fig.11.2 behind the last link of the free end of chain.

Provide lowering until the end of the chain is slipped out enough. Manipulation with the chain can be make easier by following the procedure mentioned in article 6.3.

Fasten the end stop by the screw again to the last link of the free end of chain. Fasten the coupling with the hook on the other end of the chain. Check, whether the chain is not twisted.



11.2.2 TWO FALL AND THREE FALL CHAIN

Remove the end stop (anchor) of the chain. Dismantle fastening of the other end of chain from the pulley fork (pulley – three fall).

Hook C link see fig.11.2 behind the last link of the free end of chain. Provide lowering until the end of chain is slipped enough. Fasten by the screw the end stop to the last link of the free end of chain. Pull the end of chain through the pulley in the block and put the fork pin and secure by the cotter pin. Check the chain is not twisted.

11. 3 BRAKE ASSEMBLY

See fig.11.3

Remove cover (1) on the side of hand lever – rocking out for example by the screw driver. Bend out (unlock) tab of the tab washer (3) and unscrew (2) nut. Remove screw segment (4), spring (5) and then remove the whole hand lever from the shaft. Then you can take out the brake insert (7), ratchet wheel (8), second brake insert (7) and support plate (9). After inspection according to the article 11.6 provide assembly in opposite process.

After assembly it is necessary to adjust the brake according to the instruction mentioned in the article 11.4.

11.4 BRAKE ADJUSTMENT

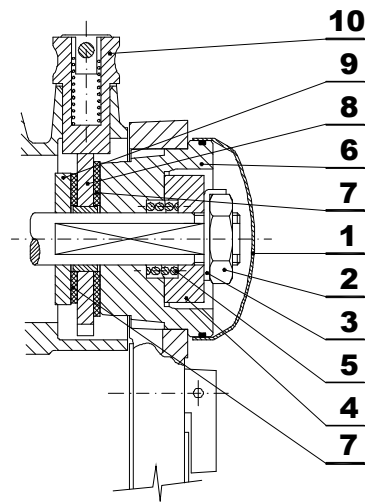
Remove cover (1) on side of the hand lever – pulling out for example by the screw driver.

Bend (unlock) tab of the lock washer (3) and fasten slightly (2) the nut. Teeth of the screw segment (4) must engaged the teeth of the carrier wheel (6). Thus fastened nut release about 1/6 turn it is 60° and secure by the lock washer (3). Put the cover (1). Provide testing of the brake with the suitable load.

Fig. 11.3 – Assembly and brake adjustment

Legend:

- 1- cover
- 2- nut
- 3- lock washer
- 4- screw segment
- 5- spring
- 6- carrier wheel
- 7- brake insert
- 8- ratchet wheel
- 9- thrust washer
- 10- braking pawl



11.5 GENERAL INSTRUCTIONS

The following instructions give general important information about the dismantling, inspection, repair and assembly. If the jack was dismantled from any reason, proceed according to the following instructions.

1. Provide maintenance in the clean environment.
2. **NEVER** dismantle jack more than necessary to provide repair.
3. **NEVER** use excessive force during dismantling parts.
4. **NEVER** use heat as a means during dismantling parts if they are determined for further use.
5. Keep the workplace clean and free from foreign substances that could get into bearings or other moving parts.
6. If you grip a part in a vice, ALWAYS use a suitable insert to protect surface of parts.

11.6 INSPECTION

Check all dismantled parts, whether are suitable for further use.

1. Check all gears including the shaft, whether are not worn and are free from scratches or cracks.
2. Check, whether threaded parts have not damaged thread.
3. Brake inserts, ratchet wheel and thrust washer (positions 7, 8, 7 and 9 on fig. 11.3) clean with wire brush and check their condition.
4. Measure the thickness of brake inserts (see chart 11.6)

Chart 11.6

Thickness of insert (mm)	Limit (mm)	Wear (mm)
2,5	2	0,5

11.7 REPAIR

Worn or damaged parts must be replaced. Remove small burrs and scratches or other small surface defects and flatten out with fine grinding stone or abrasive cloth.

11.8 TEST

The load test must be performed at all repaired jacks by the qualified personnel with a load exceeding nominal lifting capacity about 10% to check function and brake of the jack.

12 REMOVING FROM OPERATION – LIQUIDATION

The jack does not contain any harmful substances, its parts are made from steel, cast iron and brass. After removing from operation gives it to firm dealing with liquidation of metal scrap.

13. RELATED DOCUMENTATION

13.1 EC declaration of conformity

13.2 The instruction manual was elaborated in accordance with the technical regulations, technical standards and national regulations:

- Ministerial order No.24/2003 of the Coll. of Law as amended (Directive of EP and Council 98/37/EC)
- Ministerial order No.23/2003 of the Coll. of Law as amended (Directive of EP and Council 94/9/EC)
- ČSN EN ISO 12100 - 1
- ČSN EN ISO 12100 – 2
- ČSN EN 1050
- ČSN EN 13157
- ČSN EN 1127 – 2
- ČSN EN 1127 - 1
- ČSN EN 13463 – 1
- Regulation of CBM (Czech Bureau of Mine) No.22/89 of the Collection of Law
- ČSN 33 2030.

14. FINAL REQUIREMENTS OF THE MANUFACTURER TO A CUSTOMER

Any changes of the product, eventually use of unoriginal spare parts can be realised only based on approval of the manufacturer.

When not observing this condition the manufacturer does not guarantee safety of this product. In such a case the manufacturer warranty does not apply to the product.



EC Declaration of Conformity



Manufacturer **BRANO a.s.**
747 41 Hradec nad Moravicí, Opavská 1000
The Czech republic
ID No.: 45193363 TIN: CZ45193363

We declare under our sole responsibility that the product

Name:	Rack and lever jack
Type:	Z310, Z310-1/1t
Parameters:	Lifting capacity: 0,5t; 1,6t; 3,2t; 5t;

Description and purpose of use:

Hand operated lifting device intended solely for manual lifting, lowering and pulling of free load by the help of link chain under normal atmospheric condition in workplace and observing the assigned maximum lifting capacity of the jack.

Is in conformity with the following directives and standards:

NV ČR no. 24/2003 Collection of Law., directive RE no. 98/37/EC, ČSN EN ISO 12100-1 2004(EN ISO 12100-1:2003), ČSN EN ISO 12100-2:2004 (EN ISO 12100-2:2003), ČSN EN1050:2001(EN1050:1996), ČSN EN 614-1:1997, ČSN EN 1037:1997, ČSN EN 349:1994, ČSN EN 294:1994, ČSN EN 953:1998

The following authorized body had a share in conformity assessment:

Hradec nad Moravicí 1.9.2004

Ing. Alena Šimečková

Ing.Zdeněk Pavlíček

Place

Date

Director SBU ZZ

Manager Q SBU ZZ