

PURPOSE

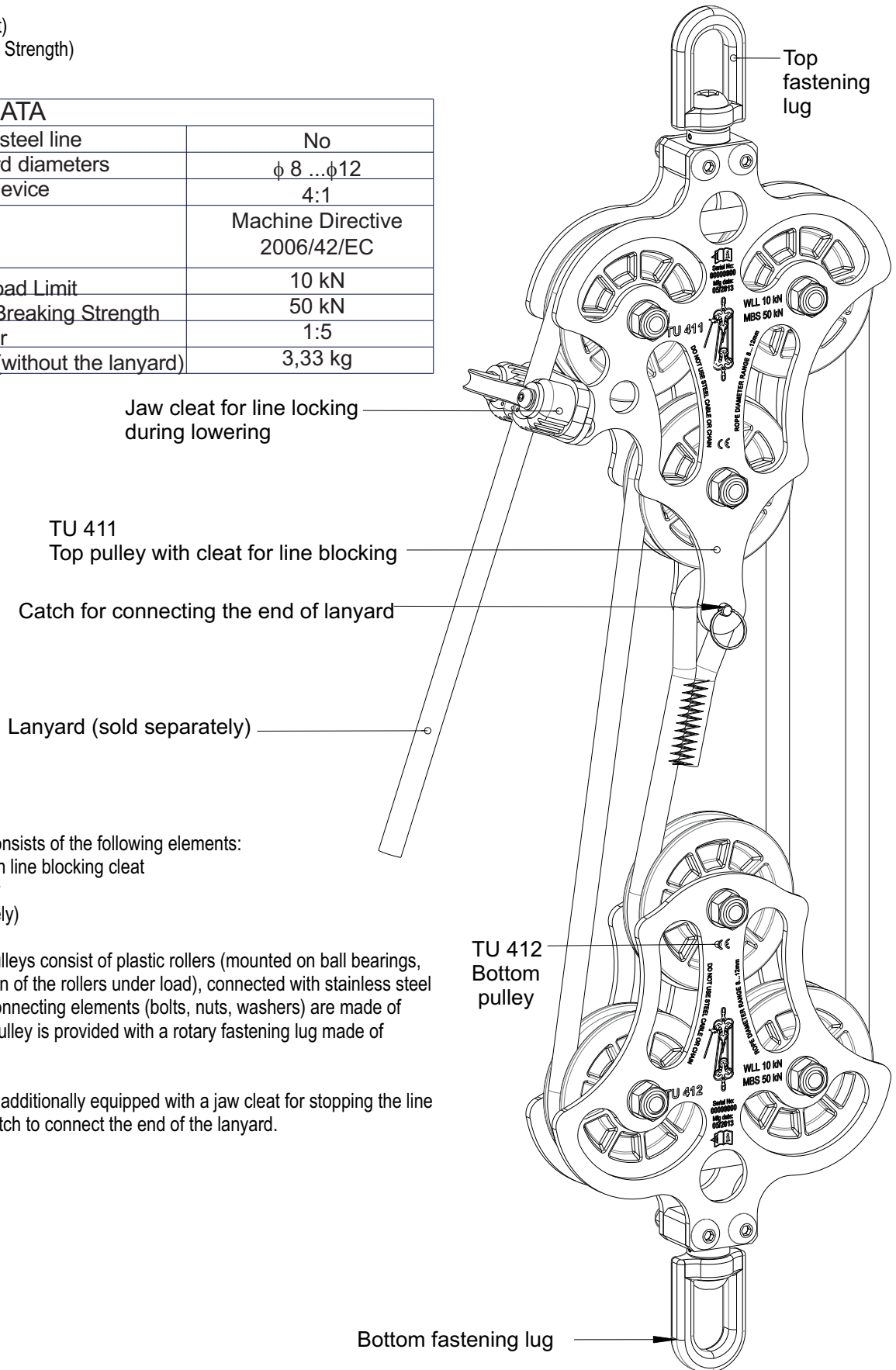
The TU 410 pulley may be used in arboriculture (sectional tree felling) and load shipment. The equipment is designed to hoist and lower loads. The device is not designed for use as personal fall arresting equipment.

KEY DEFINITIONS

- WLL (Working Load Limit)
- MBS (Minimum Breaking Strength)
- SF (Safety Factor)

TECHNICAL DATA

Possible use with steel line	No
Admissible lineyard diameters	φ 8 ...φ12
Gear ratio of the device	4:1
Conformity with	Machine Directive 2006/42/EC
WLL – Working Load Limit	10 kN
MBS – Minimum Breaking Strength	50 kN
SF – Safety Factor	1:5
Weight of the set (without the lanyard)	3,33 kg



DESIGN

The TU 410 pulley set consists of the following elements:

- a) TU 411 - top pulley with line blocking cleat
- b) TU 412 - bottom pulley
- c) Lanyard (sold separately)

Both (top and bottom) pulleys consist of plastic rollers (mounted on ball bearings, which ensure free rotation of the rollers under load), connected with stainless steel sheets. The axles and connecting elements (bolts, nuts, washers) are made of galvanized steel. Each pulley is provided with a rotary fastening lug made of aluminium.

The top TU 411 pulley is additionally equipped with a jaw cleat for stopping the line during lowering and a catch to connect the end of the lanyard.

BASIC PRINCIPLES OF USE AND GENERAL SAFETY RULES

- The device is not designed for use as a personal fall arrester equipment.
- The device is subject to the EU Directive 89/686/EEC.
- Prior to each application the device should be examined carefully. The inspection should be carried out by the user of the device. Should any defects be found or incorrect operation of the device detected, the device should be withdrawn from use.
- While the device is in use it should be protected against mechanical, chemical and thermal damage.
- Any upgrading or modification of the device without the prior written consent by the manufacturer is forbidden.
- Any repairs should be done solely by the manufacturer of the device or his authorised representative.
- It is forbidden to connect any elements of the device which may mutually disturb any of their functions.
- There are many hazards which may affect the operation of the device, therefore it is necessary to apply any means of precaution and follow safety rules to ensure correct operation of the device. The following should particularly be in focus:
 - §Kinks, cuts or wear of the lanyard
 - §Exposure to climatic conditions
 - §Extreme temperatures
 - §Chemical reagents
 - §Electric conductivity, etc.
- This product is designed for use in normal atmospheric conditions (-40oC ... +50oC).
- Humid environment and icing may reduce the strength and load-carrying capacity of the device. In case of operation in an aggressive environment please contact the manufacturer or vendor.
- The structure on which the device is mounted must be stable. The static strength of the structure element must be at least twice greater than the weight of the hoisted load.
- The durability of connections between the structure, the pulley and the load should be checked to avoid accidental disconnecting of any of the elements.
- Particular care should be taken when blocking the lanyard with the use of the jaw cleat, do not allow any employees within the area directly beneath the hoisted load.

INSPECTION

Inspection of the device is necessary to maintain the proper state of repair of the equipment and to ensure user safety, which depends on continuous efficiency and durability of the device.

Prior to any use of the pulley, it is necessary to:

- Inspect all elements of the device in terms of any damage (mechanical, chemical and thermal), excessive wear, corrosion, cuts, wear, incorrect operation.
- Check connections between elements to avoid accidental loosening or disconnection of elements.

In case any irregularities are found the device should be withdrawn from use.

WITHDRAWAL FROM USE

The device should be promptly withdrawn from use in case of any doubts as to its state of repair, ensuring safe use and should not be used again before obtaining a written confirmation of completion of detailed inspection by the manufacturer or his authorised representative.

Any repair or servicing should be carried out solely by the manufacturer of the device or his authorised representative.

MAINTENANCE AND STORAGE

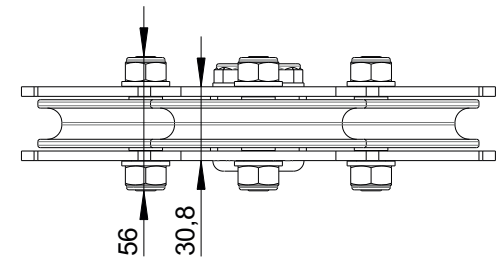
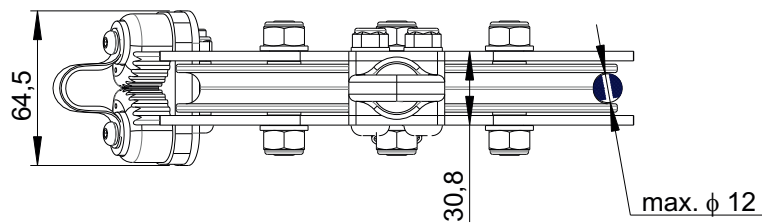
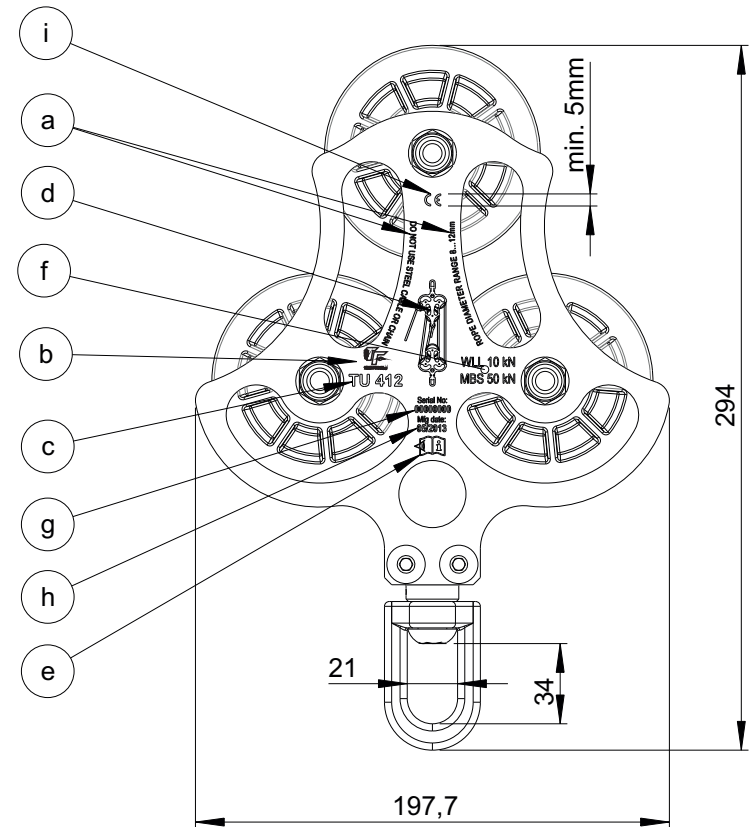
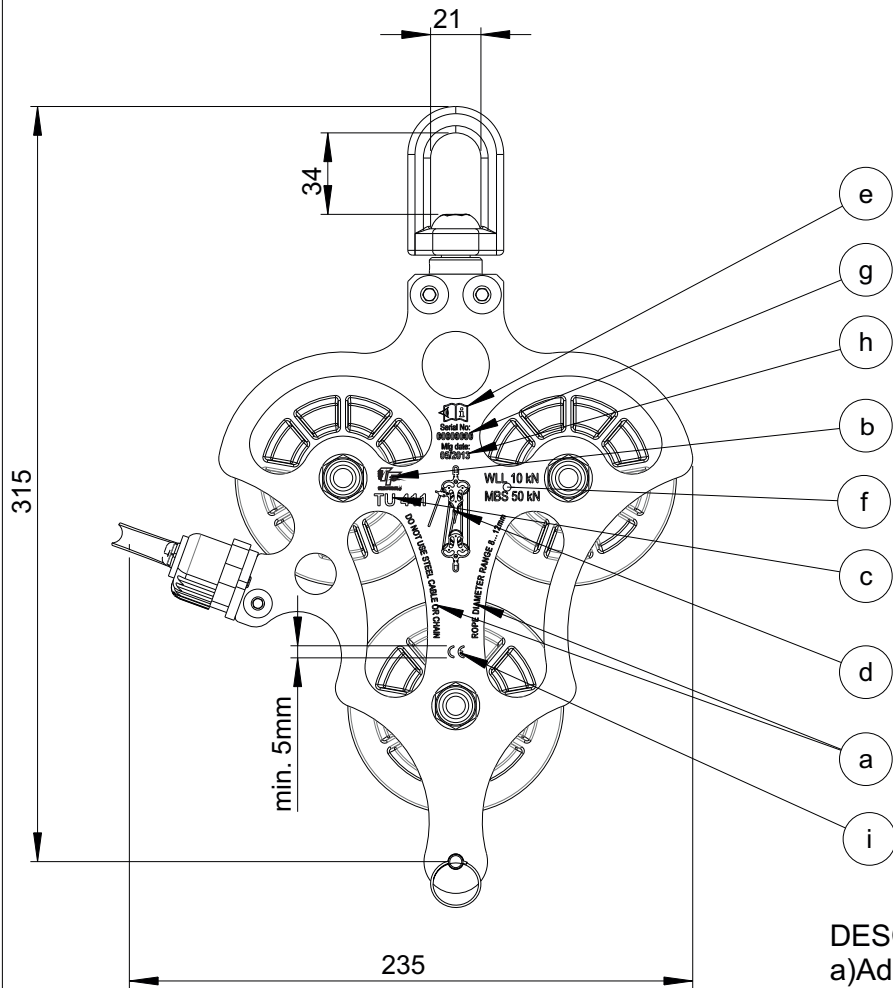
The device may be washed and disinfected without damage to the materials used for its manufacture. In the case of textile products use mild detergents for delicate textiles, hand or machine wash and rinse with water. Plastic elements may be cleaned with water. Wet or moist equipment should be left to dry and kept away from sources of heat.

The device should be stored in loose packaging in well ventilated space, away from direct operation of UV radiation, humid surroundings, sharp edges, extreme temperatures and caustic substances.

SHIPMENT

The device should be shipped in packaging (e.g. in a bag resistant to moisture or plastic bag or in crates made of steel or plastic), to protect it against damage and moisture.

DEVICE DIMENSIONS / LABELLING

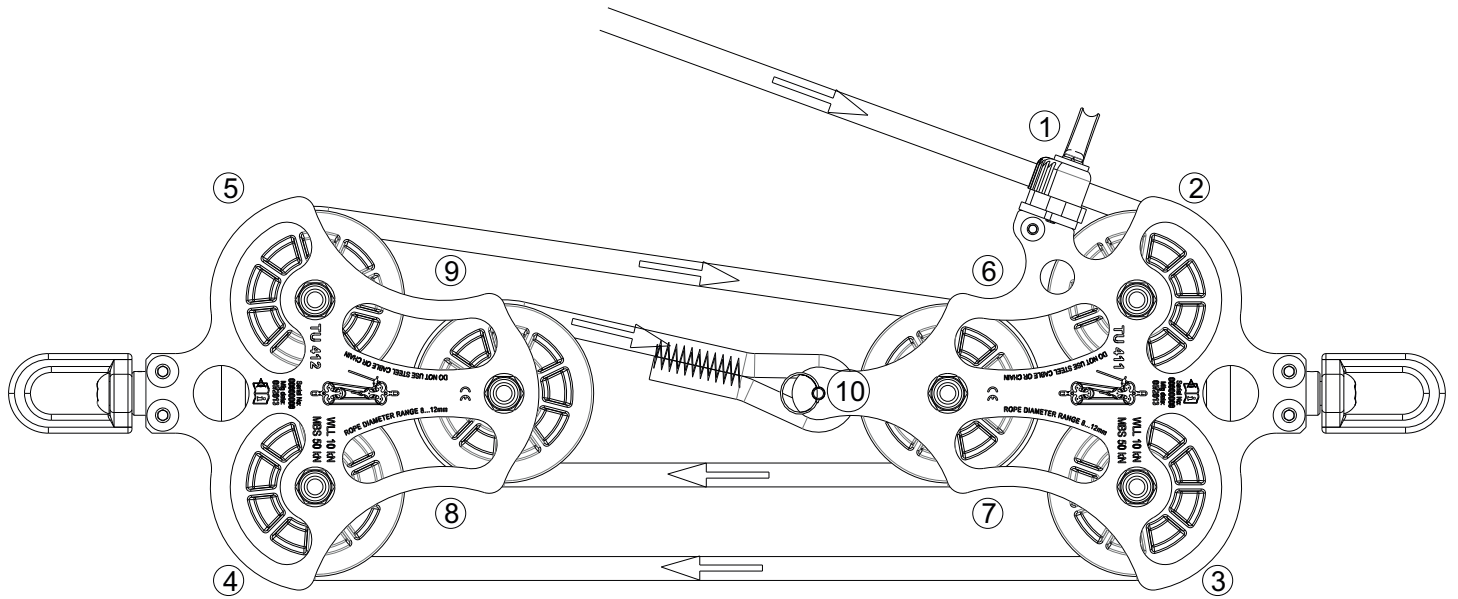


DESCRIPTION OF LABELLING

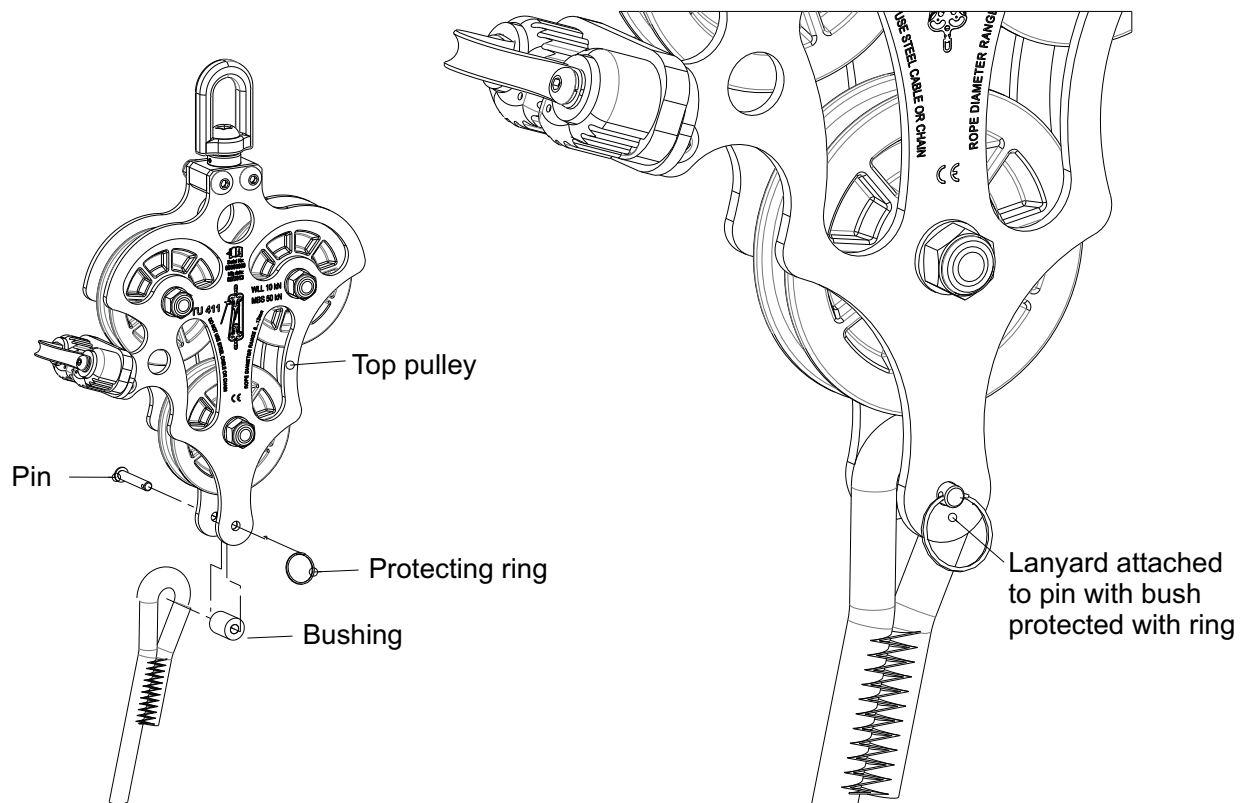
- a) Admissible lanyard parameters
- b) Manufacturer's mark
- c) Reference number
- d) Diagram showing correct mounting of the lanyard
- e) Note: read the instructions for use
- f) Admissible load
- g) Serial number
- h) Month and year of production
- i) CE marking

LANYARD INSTALLATION

1. Pull the end of lanyard, provided with a loop, through the pulley elements as shown in the drawing (the respective pictogram is also provided on each pulley), in the sequence of digits.



1. Dismantle the pin protected by a ring and remove the plastic bushing.
2. Place the bushing in the lanyard loop.
3. Place the lanyard loop with bushing between the sheets of the top pulley.
4. Drive the pin through the openings in the pulley sheets and the opening in the bushing.
5. Protect the pin against accidental removal with the protecting ring.



ADMISSIBLE LOAD

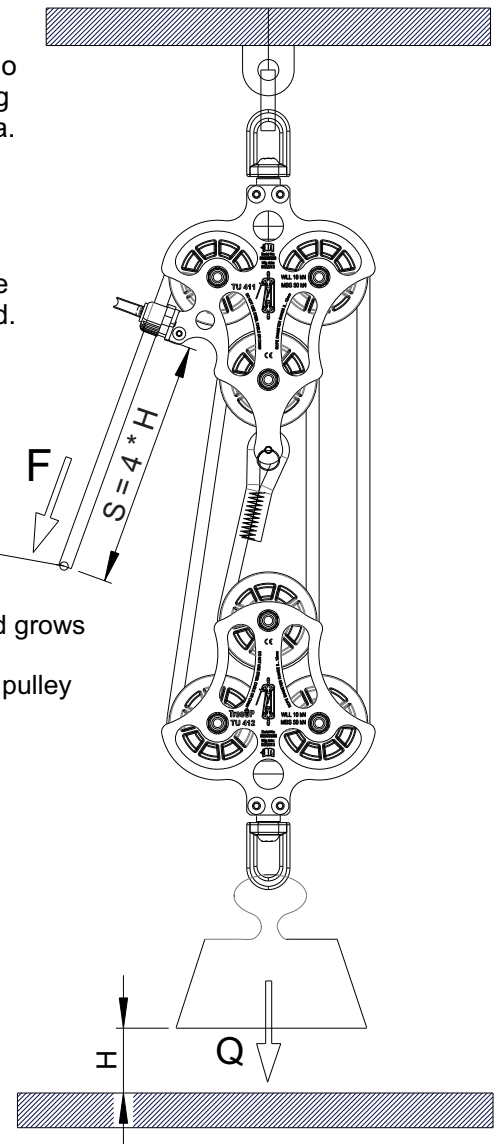
The TU 410 pulley is designed to hoist and lower loads of "Q" mass, with gear ratio of 1:4, which theoretically allows ¼ reduction of the force "F" required for hoisting or lowering the load. This is the ideal case. In reality there are losses resulting i.a. from rigidity of lanyard and friction occurring in bearings.

The value of efficiency adopted for rolling bearing is $\eta=0.95$.

The work load limit (WLL) for the TU 410 pulley is 10kN (~1000 kg). The theoretical force required for hoisting such load is 2.5 kN (~250 kg).

In order to further reduce the force required for hoisting/lowering the load the use of other hoisting/lowering equipment, attached to the free lanyard end) is allowed.

Possibility of use of additional hoisting-lowering equipment attached to the free lanyard end



REQUIRED LENGTH OF LANYARD

With the reduction of force required to hoist or lower a load, the length of "S" lanyard grows fourfold to hoist it by height "H".

Example: to hoist a load to the height $H=3\text{m}$, the length of lanyard to be pulled from pulley $S = 4 * H = 4 * 3\text{m} = 12\text{m}$

This should be taken into account when selecting the required length of lanyard.

Reference number of lanyard for TU 410 lanyard:

TU 410 – 200 – D – L

where:

D – lanyard diameter [mm] (between $\varnothing 8$ and $\varnothing 12\text{mm}$)

L – lanyard work length [m]

The length of lanyard required to wind around all rollers of the pulley is 2.3m and is automatically added to the ordered work length of the lanyard.

Jaw cleat blocking lanyard

(3b)

(2)

(3a)

(1)

Lanyard

20°

45°

Lanyard in blocked position

HOISTING / BLOCKING / LOWERING

(1)LOAD HOISTING

During hoisting the lanyard moves with respect to the jaws of the jaw cleat, opening them.

(2)BLOCKING THE LOWERING MOTION

When the lanyard is let loose (when the inclination to the vertical does not exceed 20°) the jaws close on the lanyard and prevent automatic lowering of the load.

(3a) (3b) LOWERING OF THE LOAD

In order to lower the load in a controlled way pull the lanyard out of plumb in the direction away from the hoisted load by an angle of about 45°. This operation ensures the necessity for the employee to step away from the lowered load to a safe distance, increasing the safety of work with the device.

ATTENTION!

When blocking the lanyard with the use of the jaw cleat take particular care and do not allow employees to stay within the area directly beneath the suspended load.

IDENTITY CARD

ENTRIES IN THE IDENTITY CARD ARE THE RESPONSIBILITY OF THE DEVICE USER'S WORK PLACE. THE IDENTITY CARD SHALL BE FILLED IN BEFORE THE FIRST RELEASE OF THE DEVICE FOR USE. ANY INFORMATION ON THE DEVICE (NAME, SERIAL NUMBER, DATE OF PURCHASE AND RELEASE FOR USE, USER'S NAME, INFORMATION ABOUT REPAIRS AND INSPECTIONS AS WELL AS WITHDRAWAL FROM USE) SHALL BE ENTERED INTO THE IDENTITY CARD OF THE GIVEN DEVICE.

NAME/MODEL OF DEVICE	
REF. NUMBER	
SERIAL NUMBER	
DATE OF PRODUCTION	
DATE OF PURCHASE	
DATE OF FIRST USE	
USER'S NAME	

TECHNICAL REVIEWS

	DATE	REASON FOR SERVICING/REPAIR	DAMAGE FOUND, REPAIRS MADE, OTHER REMARKS	NAME AND SIGNATURE OF COMPETENT PERSON	DATE OF NEXT INSPECTION
1					
2					
3					
4					
5					
6					
7					
8					
9					