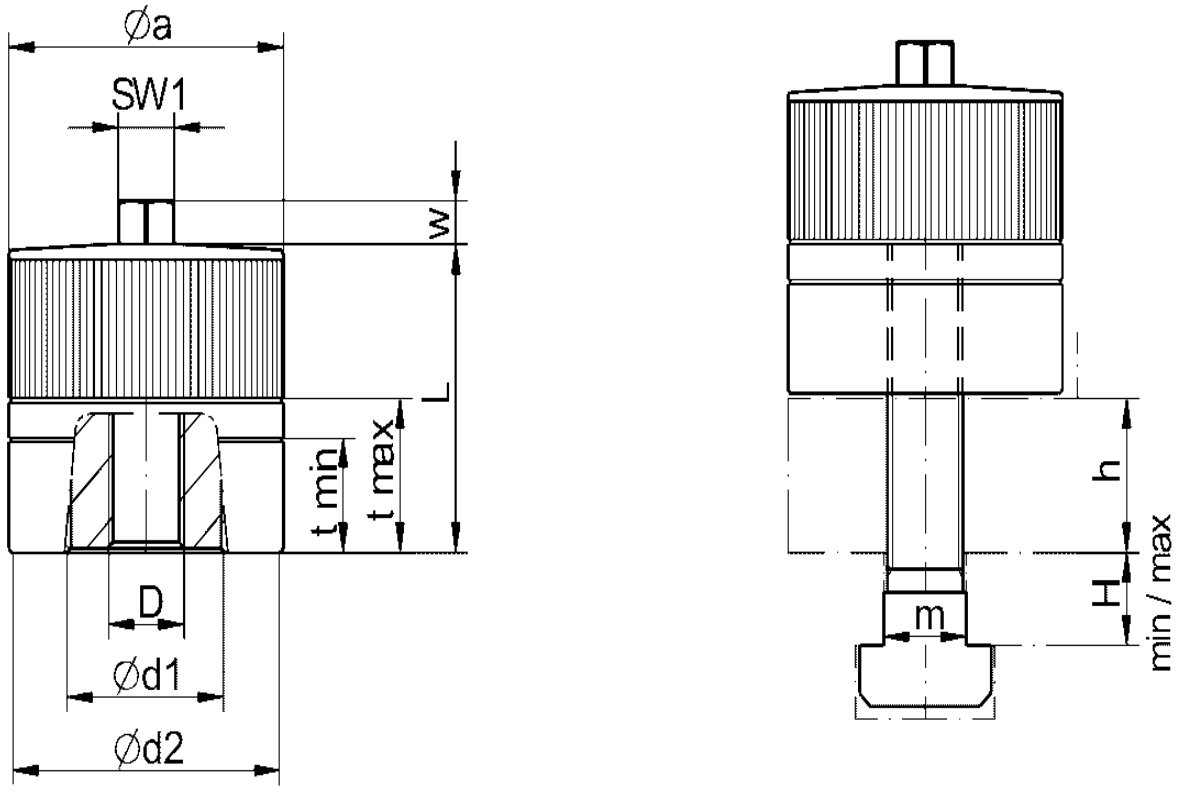
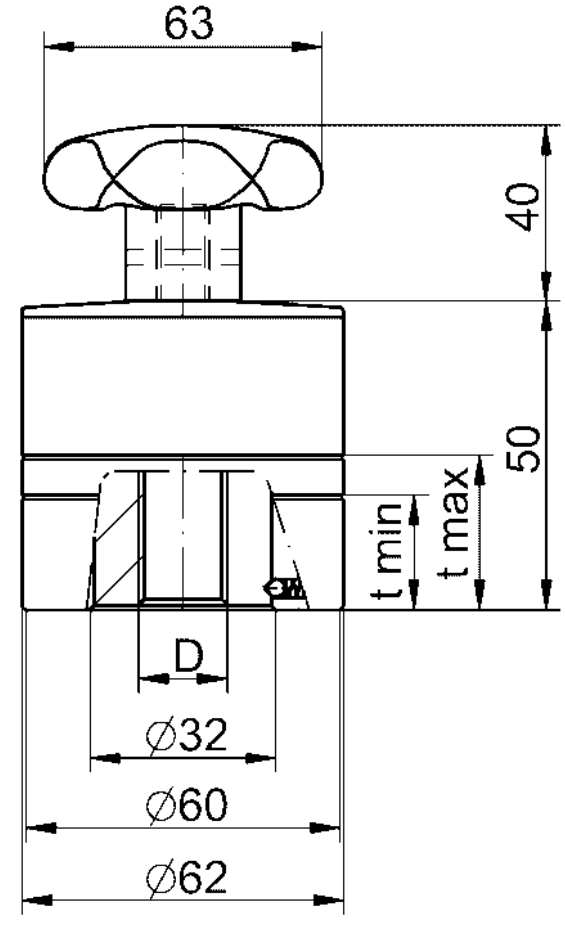
# Operating instructions mechanical clamping nuts ESB, ESBG, ESBS, ESBT

## Contents

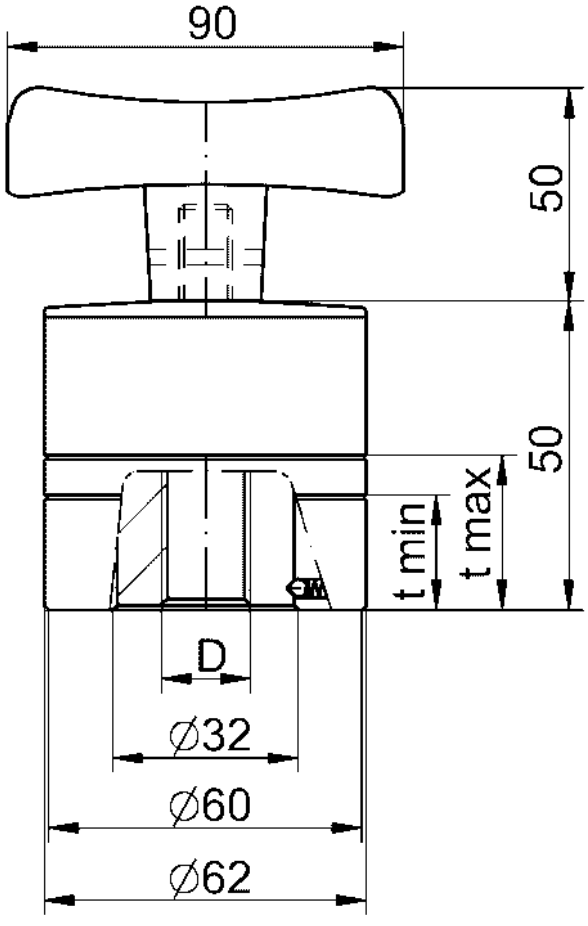
## 1. Assembly drawings



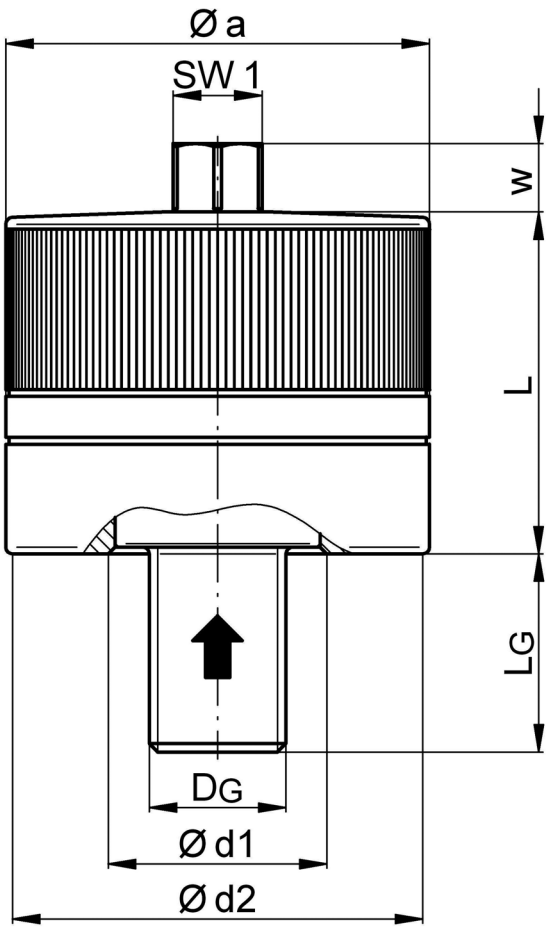

**Power clamping nut ESB**




**Power clamping nut ESBS with stargrip**




**Power clamping nut ESBT with T-grip**




**Power clamping nut ESBG with stud bolt**

## 2. Construction and function

### 2.1 Construction

Placed inside the the mechanical power clamping nut there is an integrated planetary gear to strengthen the manual tightening torque, which is protected by a housing made of nitro carburated steel, as well as a cover of aluminum. It‘s operable by a centered mounted hexagonal bolt ‚SW1‘.

Especially designed for tool clamping in presses and punches, the types ESB, ESBS, ESBT and ESBG can be used in many ways all over engineering.

By selection of materials, the mechanical clamping nut is sufficiently protected against corrosion in normal applications. For higher load, we also offer a variant of the clamping nut with sealed cover for increased corrosion protection.

### 2.2 Function

Firstly, the clamping nut is manually screwed onto the bolt until the bearing surface, then the pinion is activated by turning ‚SW1‘. The direction of rotation of SW1 corresponds with the slope direction of the thread (e. g. clockwise rotation in right-hand thread) during tightening and feeding the clamping nut. The standard version is supplied with right-hand thread. Special designs with left-hand thread can be produced on customer demands.

Due to the gear ratio the tightening torque is multiplied and transmitted into the actual mother part with stud hole thread, whose rotational motion causes the clamping stroke of the screwed in tension bolt. Depending on the operating torque the clamping force will be built safely.
**The mechanical power clamping nuts are self-locking in every clamping position.**

In series ESBS and ESBT with T-handle, or star handle there is an additional locking mechanism which automatically switches from quick delivery on power clamping.

## 3. Dimensioning

### 3.1 Dimensioning of clamping nut size

**The nominal clamping force is the force that is generated by the planetary gearset at the specified nominal torque and transferred onto the threaded bolt (= preload).**

Mainly through occuring operating forces (weights of tools, cutting forces,...) the load, which pulls on the threated bolt of the clamping nut, can increase significantly. The maximum static load, which has to be withstand by the clamping nut and/or the threaded bolt without fail, is therefore higher, and may be up to a multiple of the nominal clamping force.

In dynamic processes, for example during clamping of press tools, the sum of all operating forces should always be less than the applied preload (= nominal clamping force), otherwise the clamped parts could ‚lift' from each other and the clamping nuts could be ‚shaken loose'.

**Because the operating forces which occur are usually unknown, a sufficient safety factor should be taken into account of the selection of the clamping nut size.** If the selected size does not fit for dimensional reasons or if you expect an high personal injury or property damage when miscalculating, the actual operating forces should be determined by experiment.

### 3.2 Dimensioning of thread size

Often the size of thread is already specified by the application, whereby you may have to avoid the chosen clamping nut size and choose another one. For bigger threads thats normaly not a problem as long the specified mounting room is sufficient. But if you need to choose a big size with smaller thread you'll have to ensure that the maximum tensile load of the threaded bolt is lower than the clamping force of the clamping nut and thus can not be used with the maximum tightening torque.

We therefore recommend for **threaded bolt ≤ M24 strength class 12.9** (min. 10.9) and **minimum strength class 8.8 for threaded bolt ≥ M30** to ensure the specified data**.**

## 4. Checking screw-in depth

### 4.1 Minimum Screw-in depth ‚$t_{min}$'

The minimum depth is essential to the clamping force to be transmitted securely.

### 4.2 Maximum screw-in depth ‚$t_{max}$'

A too long bolt abuts on the blind hole of the clamping nut before the required clamping force can be applied.

### 4.3 Checking the length of pin

To check the lenght of pin, two check marks (grooves) are attached to the clamp nut housing, these show the minimum and maximum depth (**$t_{min}$ / $t_{max}$**) of the threaded bolt.

### 4.4 Definition of Screw-in depth ‚t', and distance of infeed ‚s'

**A clamping stroke, s' up to 1 mm is taken into account in the marking for the maximum screw-in depth ($t_{max} = s_{min}$).**

Please ask yourself the following questions if a reduction of srew-in depth is necessary before choosing your type:

- Are the parts deformed, so they aren't lying flat on each other and initially have to jig/flatten?
- Are the components highly elastic so that they stretch or compress?
- Do several points of separation exist, so that the jigging of the parts can add up?

- Does the stud still have axial play until it fits (eg. B. T-slots)?
- How long is the threaded bolt? Because it also expands proportionally to its own length!

**We always recommend for the screw-in depth ‚t' to select approximately the midpoint between the two marks on the housing of the clamping nut!**

***If the ESB offers insufficient clamping stroke we also have clamping nuts of type ESD with through thread available***

## 5. Usage

### 5.1 Tightening

Firstly, the clamping nut gets manually screwed by turning the housing on the bolt until the housing of the clamping nut is seated. When the clamping nut is seated it is held by friction, then the clamping force can be initiated by turning on the operating hexagon SW1.

#### 5.1.1 Possible Problems

1. When turning on it is necessary to ensure that the bolts CAN not rotate.
2. Stiff and/or damaged threads may cause that the integrated threaded nut stops and inlaying gear rotates backwards.

#### 5.1.2 Solution Options on 5.1.1.2

a.) Better lubrication of the thread
b.) Holding the drive pinion with a wrench and turning the housing manually.
c.) Holding the housing by hand, Turning on with wrech via gear mechanism.
=> If this also fails, the bolt must be replaced, or in case of a damaged thread in the clamping nut the nut itself <=

**!ATTENTION! The tightening torque specified in the data sheet is sufficient to ensure the appropriate clamping force reliably. To protect the drive and tensioning mechanism against overload, or increased abrasion, the default tightening torque should be exceeded in any case by more than 25%!**

**->!!The operation of the clamping nut should be carried out exclusively at room temperature!!<-**

### 5.2 Releasing

Firstly, loosen the tension by turning on the control-hexagon SW1 against the stretching direction (usually right-hand thread), thus the clamping mechanism is relieved. Now the housing can be manually rotated from the bolt

### 5.3 Utilities

1. Ring spanner or socket key with ratchet for small clamping nut sizes
2. Torque wrench for all clamping nut sizes

## 6. Maintenance

Under normal operating conditions, the clamping nuts are maintenance-free. The thread of the clamping nut, however, should be lubricated at regular intervals with a suitable grease paste. The ESB is by default allowed for operating temperatures up to 473 K, special versions up to 673 K are available. Also, clamping nuts with grease nipples in the cap are available for special demands, so a lubrication of the planetary gear can be done.

# 7. Supplements

## 7.1 Warranty

The warranty period is 12 months starting with date of delivery when used in the intended one-shift operation, or max. 10,000 tensions. The warranty does not cover damage caused by improper operation. Any warranty claims are determined by repair or intervention, carried out by unauthorized persons and the use of utilities and spare parts, which aren‘t matching our power clamping nut.

## 7.2 Safety regulations

Regardless of the instructions listed in this manual, the (German) statutory safety and accident prevention regulations are valid. Any person who is responsible for the operation, maintenance and repair of the clamping nut must have read and understood the operating instructions before commissioning. Repairer of the clamping nut are basically responsible for workplace safety. Following all valid safety and regulatory instructions is an requirement to prevent damages to persons and the product during maintenance and repair work. Proper repair of ENEMAC products asumes accordingly trained staff. The duty of training is up to the operator or repairer. It is to ensure that the operator and future repairer are properly trained for the product

## 7.3 Copy right



## 7.4 Spare Parts

Only spare parts, which correspond to the requierements specified by ENEMAC or supplier are allowed. This is always guaranteed with original spare parts. Improper repairs, as well as incorrect spare parts lead to the exclusion of product liability or warranty. When ordering spare parts it is essential to specify type, size and the identification number of the clamping nut to avoid incorrect deliveries

## 7.5 Proviso

We reserve the right for technical changes. Changes, errors and misprints shall not justify any titles of indemnity.

**Attachment:** data-sheet

ENEMAC GmbH
Daimler Ring 42
63839 Kleinwallstadt
GERMANY

+49 (0) 6022 7107-0
info@enemac.de
www.enemac.de