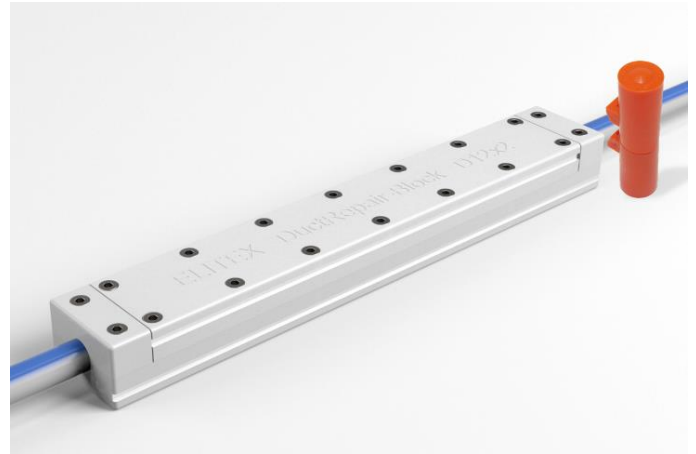


## Microduct $\varnothing$ 7-20 mm 200/400 mm Length DuctRepair-Block DuctRepair-Boxx

Installation Instruction

### Application

Till today there was no sustainable solution for entire restoration of damaged microducts available, which were already installed with a fiber optic cable. Entire restoration means, not only a sealed repair, rather a full capability of cable blow in and out like an intact microduct. This solution applies i.e. for microducts which have been pulled out from plugs due to material shrinkage of the duct or also due to elongation by relocation of microducts in a trench. For those applications, Elitex has developed the DuctRepair-Block. It is designed like a divisible coupling which replace a damaged or missing microduct part. The DuctRepair block enables a seamless transition of the inner diameter as well as a pressure and pull tight fixation of the microducts. The solution is available for 200 mm or 400 mm, extended distance could be reached by cascade of necessary blocks. The DuctRepair-Block is suits for permanent direct bury into soil. Optional the Duct-Repair-Block can be marked with a DuctMarker and therefore detected with a locator even after years (see data sheet DuctMarker).



*DuctRepair-Block 200 mm with DuctMarker*

### Scope of delivery

DuctRepair-Block consist of below listed components:

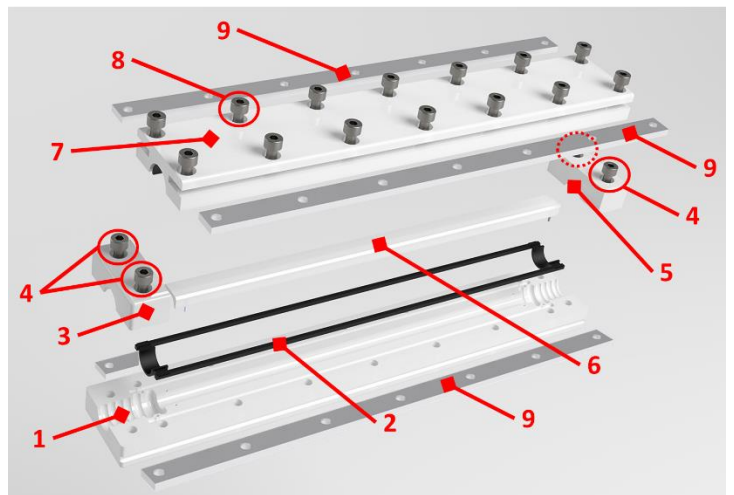
- 1 = DuctRepair-Block bottom part with sealing (2) and thread rail (9) preinstalled
- 3 = Strain relief left and right (5) and screws (4) preinstalled.
- 6 = Protection tunnel with dowels
- 7 = DuctRepair-Block top part (7), thread rail (9) and screws (8) preinstalled.

18x Allen screw M4 for size 200 mm

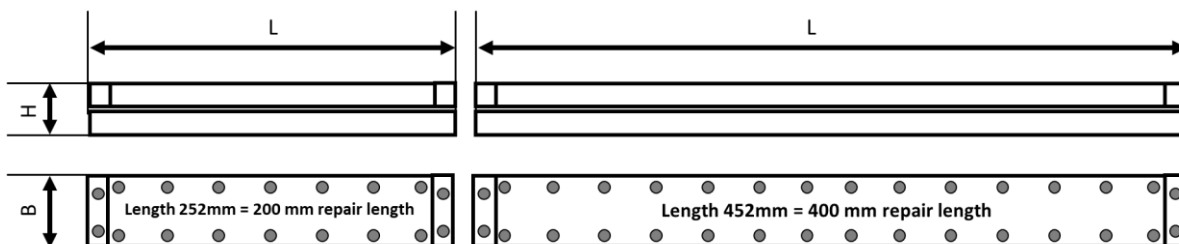
32x Allen screw M4 for size 400 mm

Installation instruction short guide

All main parts are marked with corresponding size of microduct i.e. 12x2.



*Exploded view DuctRepair-Block 200 mm*



Size	7-200/400	10-200/400	12-200/400	14-200/400	16-200/400	20-200/400
Length [mm]	252/452	252/452	252/452	252/452	252/452	252/452
Width [mm]	33	36	39	40	42	46
Height [mm]	26	26	26	26	36	36



To jump directly to the desired chapter, simply click with the mouse on the corresponding chapter.

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### 1.0 Tool Set DuctRepair-Boxx

To ensure that the DuctRepair-Block achieves the specified values for tensile strength, capability of cable blow in and out performance and product tightness, Elitex has developed a precision tool set. For accurate assembly in the set contains an axial and circular cutter, spacers and all necessary tools. The tools are available separately as well as all spare parts. The foam covered case serves also enough space for several DuctRepair blocks for the repair dimension 200 mm.. In addition, the case also contains two DuctMarkers to find the connection point with locator even after years.

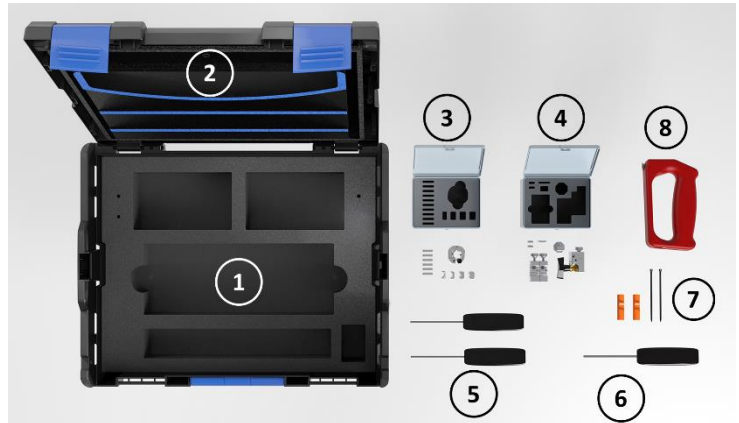


Item	Order No.
Tool Set DuctRepair-Boxx	01-083-Boxx

#### Scope of delivery

DuctRepair-Boxx contains:

- 1 = Transport case with space for DuctRepair-Blocks\*
- 2 = Product documentation with installation instruction for every tool and DuctRepair-Block
- 3 = DuctTool, circular cutter-kit for microducts
- 4 = DuctTool, axial cutter-kit for microducts
- 5 = 2x Allen key 2.5 mm for tool adjustment
- 6 = 1x Allen key 3.0 mm for assembling of DuctRepair-Block
- 7 = 1 PU (2 pieces) DuctMarker with cable tie
- 8 = Safety jacket stripper or jacket stripper



*DuctRepair-Boxx (tools like displayed or similar)*



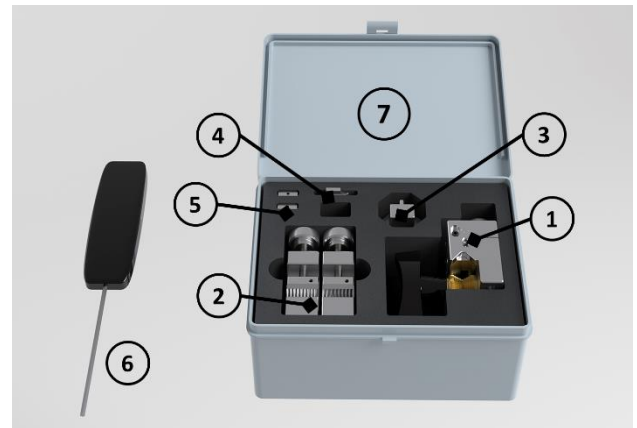
**\*Note:** The DuctRepair-Blocks are not included in the delivery content and should be ordered separately according to microduct size to be repaired (details see last page).

### 1.1 DuctTool-axial cutter-kit for microducts

DuctTool axial cutter kit contains:

- 1 = axial cutter with mounted blade
  - 2 = 2x spacers
  - 3 = gauge for adjustment of cutting depth
  - 4 = gauge for adjustment of outer diameter
  - 5 = 2x spare blade
  - 6 = Allen key 2.5 mm for tool adjustment
  - 7 = tool box
- Further details see data sheet DuctTool-axial cutter.

Item	Order No.
DuctTool Axial Cutter-Kit	01-084-Kit



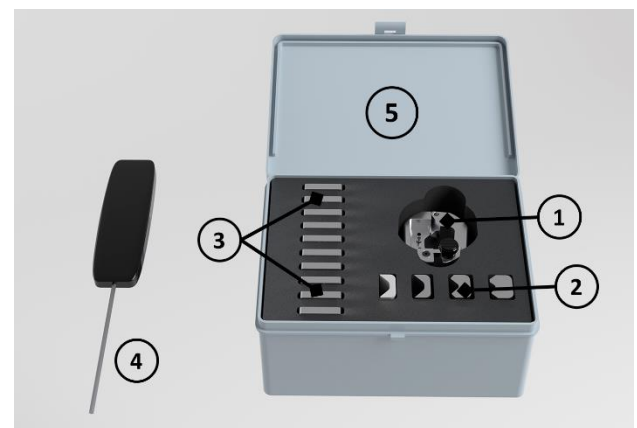
### 1.2 DuctTool circular cutter for microducts

DuctTool circular cutter kit contains

- 1 = circular cutter base body
  - 2 = V-Block for  $\varnothing$  7-10/12-14/16-20 mm
  - 3 = incl. one blade block each microduct wall thickness 0.75/1.0/1.3/1.5/2.0/2.5 mm
  - 4 = Allen key 2.5 mm for tool adjustment
  - 5 = tool box
- The circular cutter comes pre-mounted with on V-block and one blade block.

Further Details see data sheet DuctTool-circular cutter.

Item	Order No.
DuctTool-Circular Cutter-Kit	01-085-Kit



## 2.0 Assembly instructions Tool DuctRepair BOXX and DuctRepair-Block

### 2.0.1 Preparation of the construction site

Please refer to the assembly instructions DuctRepair-Block in relation with the instructions for the tools DuctTool. In case of installation with different tools, no warranty is given for the function and specification according to the technical data sheet DuctRepair-Block. Every assembly step is also available as a video.



Installation Video

### 2.0.2 Important notes for the preparation of the damaged sector

- The sector for repair must be sufficiently exposed.
- In order to achieve a durable sealing performance, the assembly area and especially the microduct must be clean.
- In case of installation with different tools, they must have a limitation for the depth of cutting for axial and radial cut.

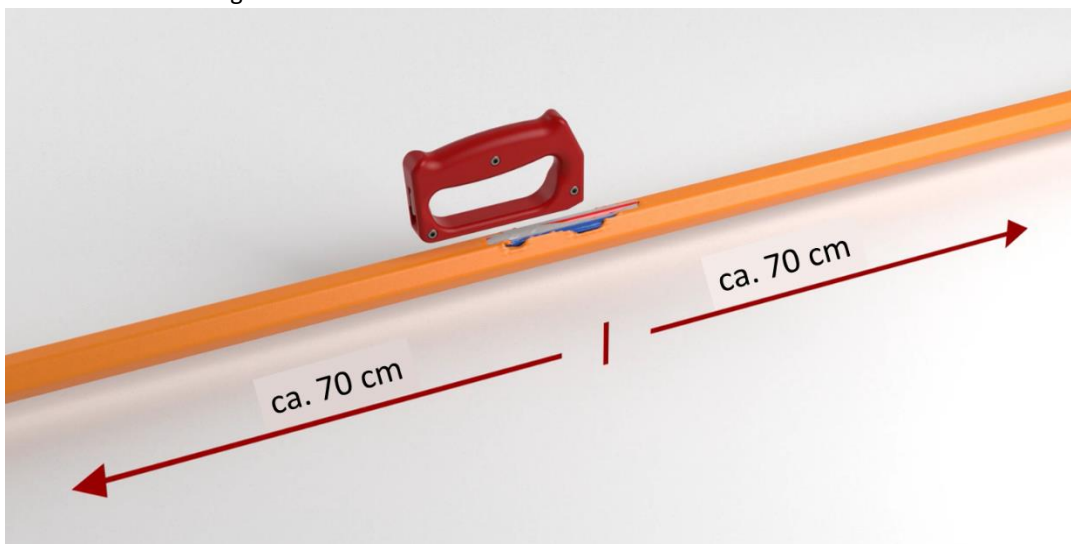


### 2.0.3 Inspection of damaged sector

- Verification of microduct type and size, outer and inner diameter, wall thickness
- Check whether the damaged microduct contains already a fiber optic cable.

### 2.0.4 Preparation of the damaged sector

- Cleaning of the service area from coarse dirt, and microduct to repair from entire dirt.
- Remove any plastic chips or damage residues from the microduct
- In case of microduct bundle, open the bundle jacket/sheet with a safety jacket stripper/knife from the middle of sector for about 70 cm to the left and right.



Caution



**Risk of injury due to sharp tools!**

Careless handling of cutting tools may lead to severe injuries

### 2.0.5 Preparation of the tools

Note: In any way possible, preparation and adjustment of the tools should be done in the installers van and not in the trench. Use a shelf space for preparation of tools.

The term of the individual tool parts and listing of the kit content, could be found at the inner lid side of the respective boxes.



## 2.1 Preparation axial cutter

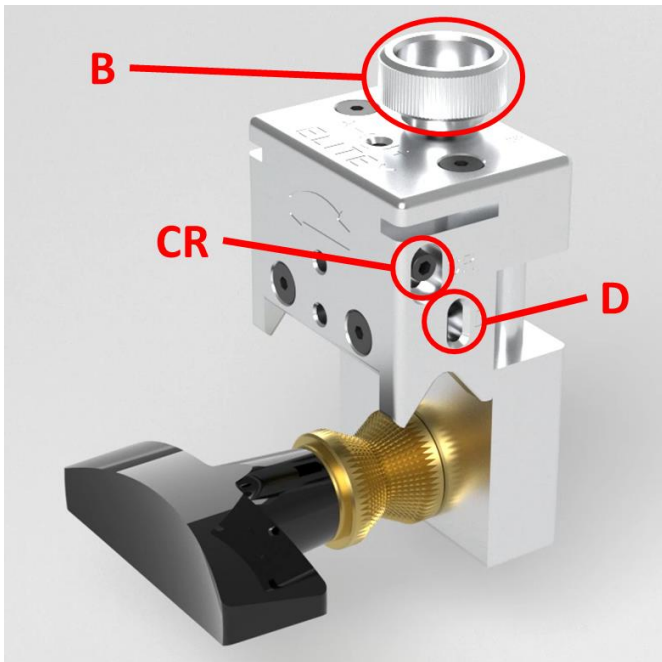
In any way possible, preparation and adjustment of the tools should be done in the installers van and not in the trench.



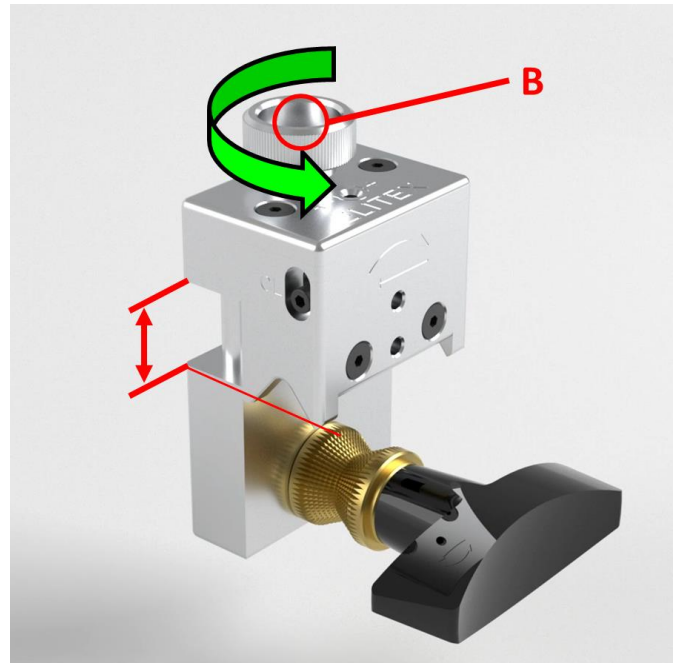
**Note:** All relevant screws for adjustment are indicated with letters at the axial cutter. The direction of rotation of the adjustment screw [A] for the knife is marked with symbol (+) and (-). Plus (+) counterclockwise means the blade cuts deeper into the microduct.



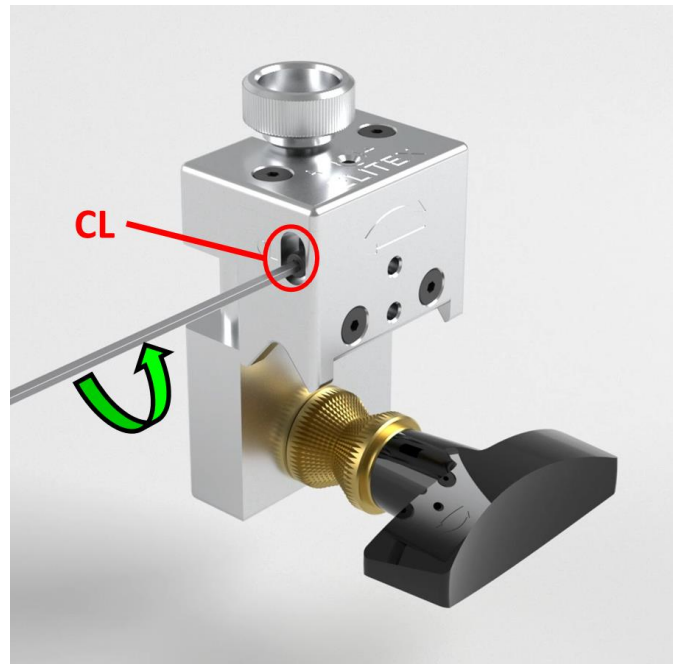
Axial cutter left side  
A = Adjusting screw for blade  
CL = Locking screw V-Block left



Axial cutter right side  
B = Clamp screw for setting microduct diameter  
D = Locking screw for blade  
CR = Locking screw V-Block right



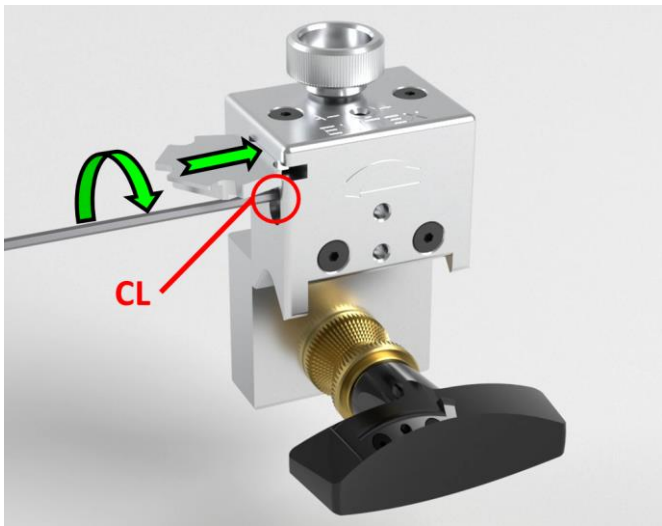
2.1.1 Remove the axial cutter from the tool box and open it by turning the screw [B] to the indicated position. The V-Block must be in line with the edge of the bottom body (red line).



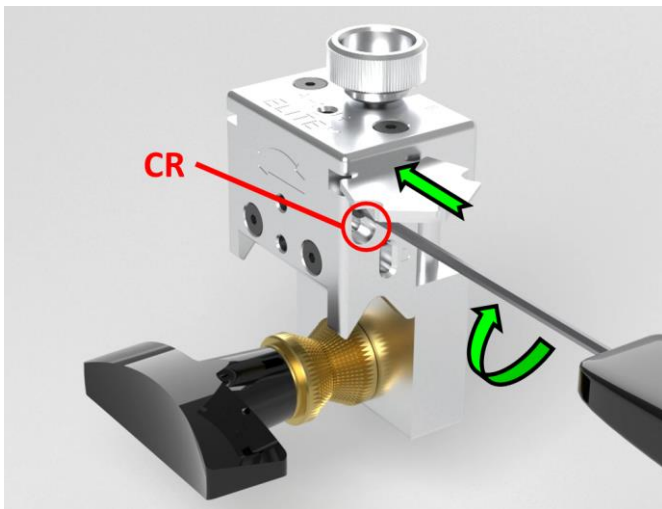
2.1.2 Open screw [CL] of the left V-Block with Allen key 2.5 mm.




2.1.3 Remove the gauge for adjustment of outer diameter from the toolbox and insert it with the required external diameter of the microduct, i.e. 7 mm.



2.1.4 Tighten screw [CL] and remove the gauge.

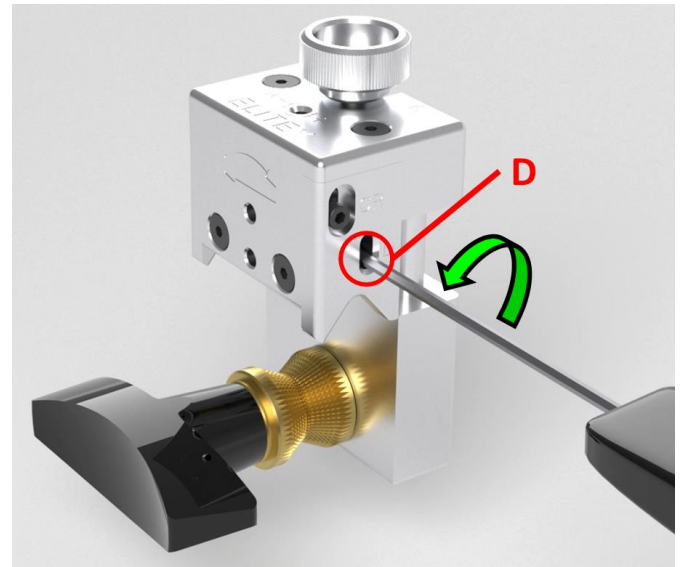


2.1.5 Repeat same procedure at the opposite right side with screw [CR].

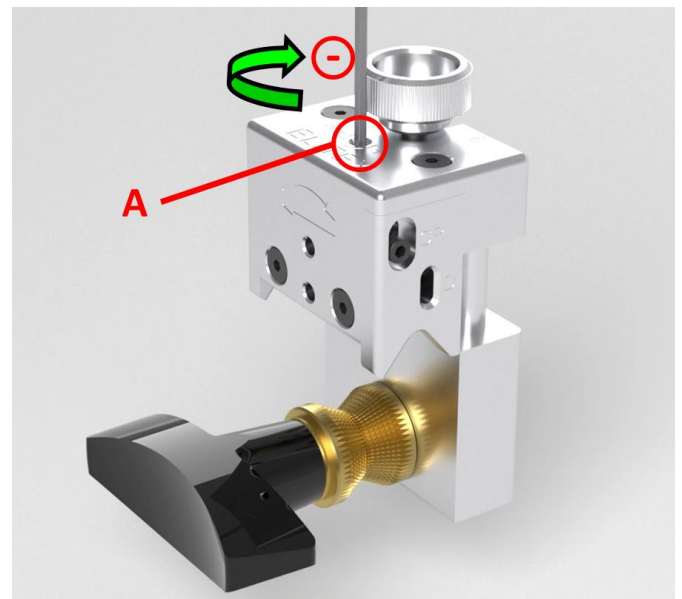
 **Note:** For microducts with an outer diameter of 20 mm, the V-Blocks left and right remain in retracted position. The gauge for adjustment of outer diameter is not required for this adjustment.

### 2.1.6 Checking zero position of blade

Before adjusting of cutting depth, the blade must be retracted into the zero 0 position.



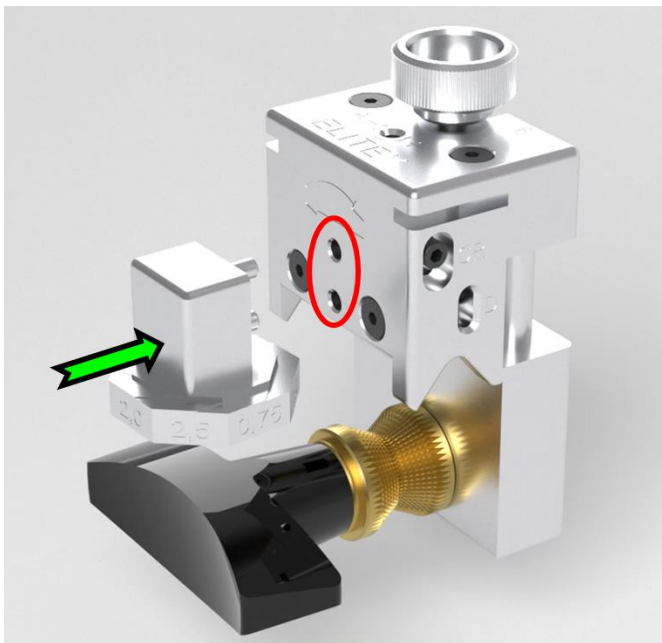
2.1.7 Loosen locking screw for blade [D] with Allen key 2.5 mm.



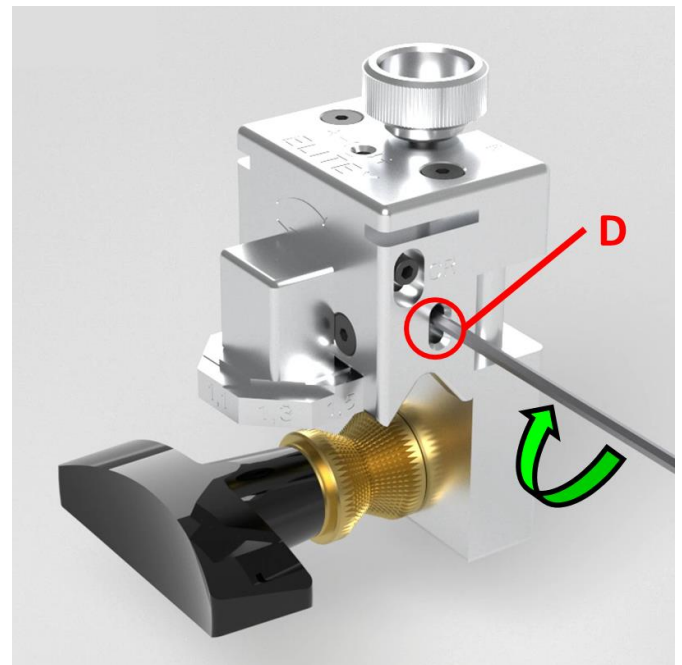
2.1.8 Turn adjusting screw [A] for the cutting depth of blade in clockwise direction [-] till the stop.



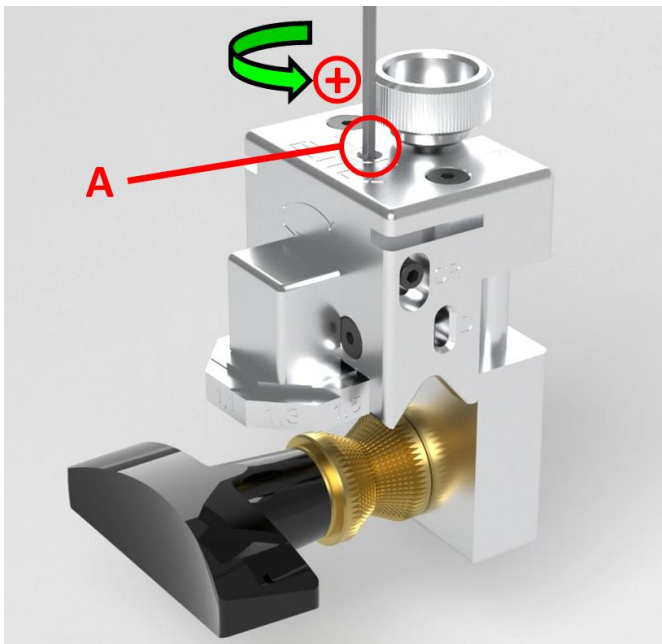
2.1.9 Twist dial of gauge for adjustment of cutting depth till the required wall thickness of microduct appears, i.e. 2.0 mm.



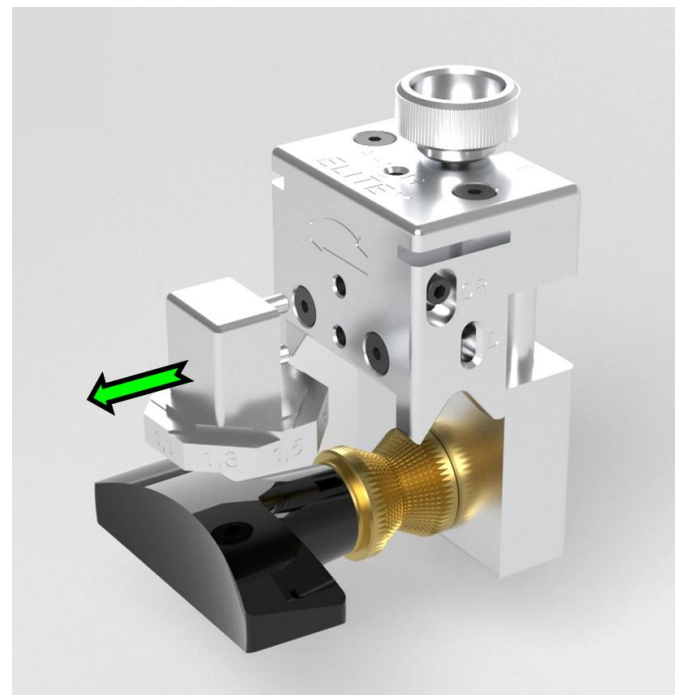
2.1.10 Insert gauge for adjustment of cutting depth into the marked holes on the axial cutter.



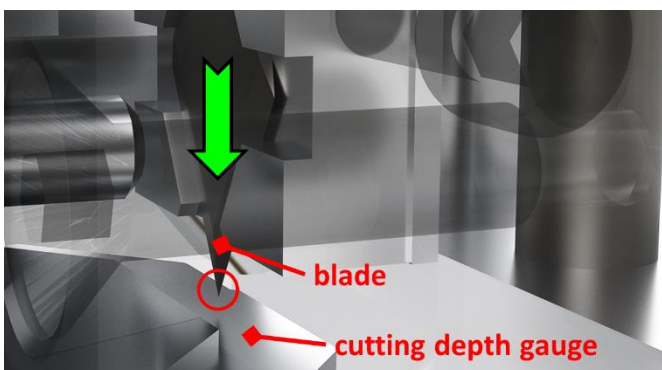
2.1.12 Tighten locking screw for blade [D] with Allen key 2.5 mm.





2.1.11 **Carefully** turn adjusting screw [A] for the cutting depth of blade in counterclockwise direction [+] until a slight drag is palpable.



2.1.13 **Carefully** pull out the gauge for adjustment of cutting depth from the axial cutter. If gauge doesn't come loose easy, blade may touch the gauge already too strong. Afterwards check whether the blade is in correct position and not bent or broken. To do this, hold the axial cutter against a light source (daylight) and inspect the area of the blade.



 **Note:** The blade must be **carefully** positioned. Even a slight drag indicates that tip of the blade touches gauge already. Extending the blade forcefully can lead to bending or breakage of the blade.

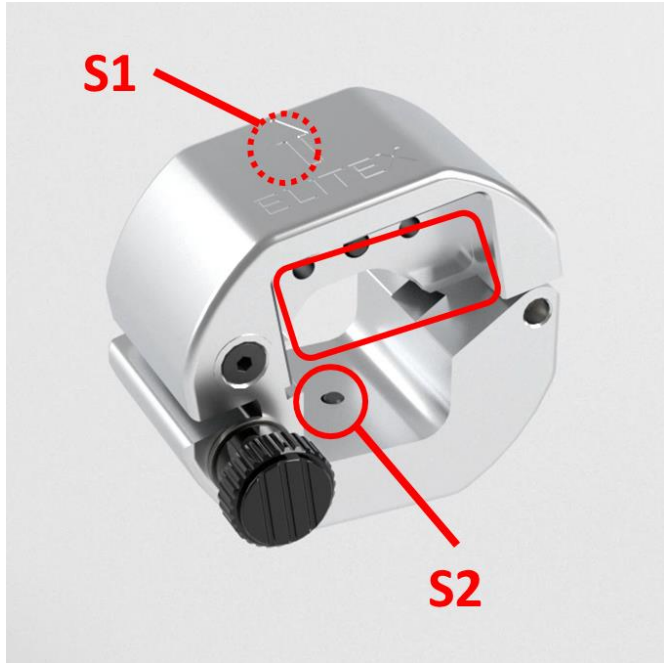
 **Note:** Before adjusting the blade, it is always necessary to loosen the locking screw [D] and tighten it afterwards. If the blade is not locked for cutting, the preset cutting depth may change.

**The axial cutter is now ready for use.**



## 2.2 Preparation circular cutter

In any way possible, preparation and adjustment of the tools should be done in the installers van and not in the trench.



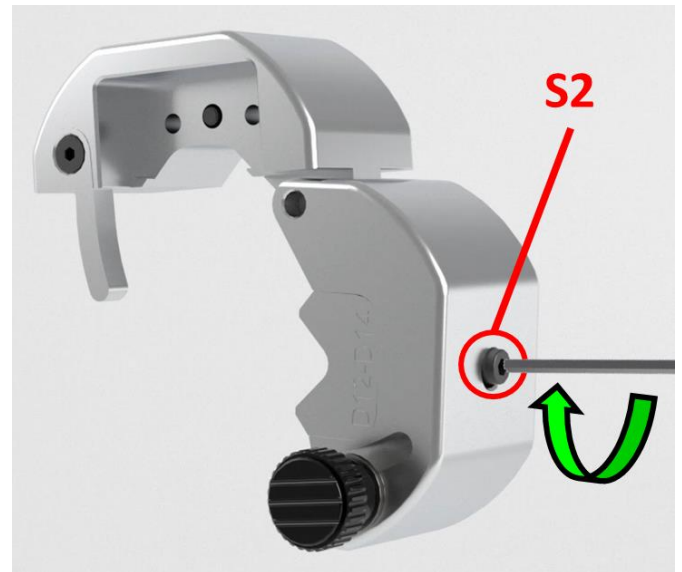
S1 = Locking screw for blade block (on back side)  
Area for blade block = red rectangle  
S2 = Locking screw for V-Block (on bottom side)  
Locking screws are mounted captive in base body.



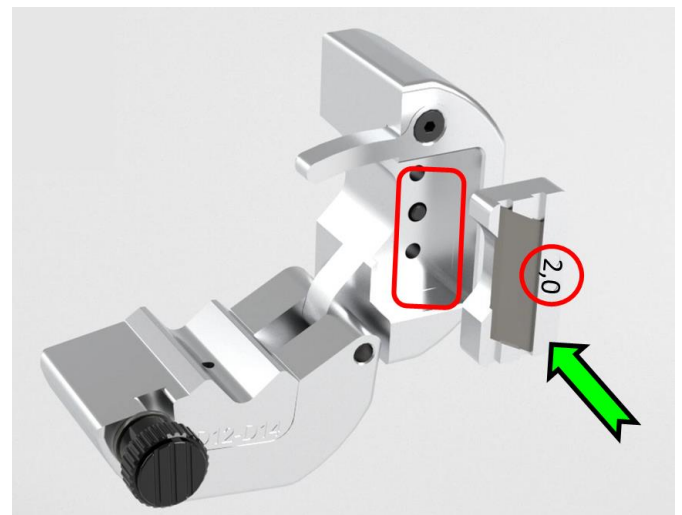
2.3.1 Loosen the clamping screw for the upper part and flip upper part open.



2.3.2 Insert the V-Block with requested outer diameter of the microduct into the base body, i.e. D12-D14 mm.

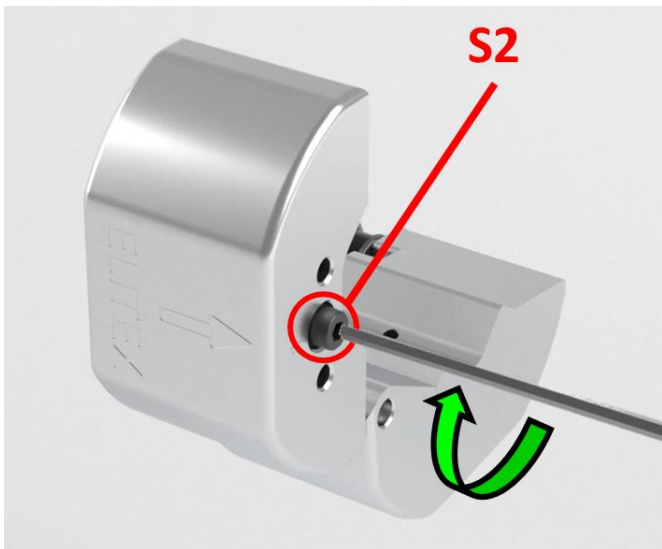


2.3.3 Tighten the safety screw [S2] on the bottom side of body with Allen key 2.5 mm.



2.3.4 Insert the blade block with requested wall thickness of the microduct into the rectangular recess, i.e. 2.0 mm





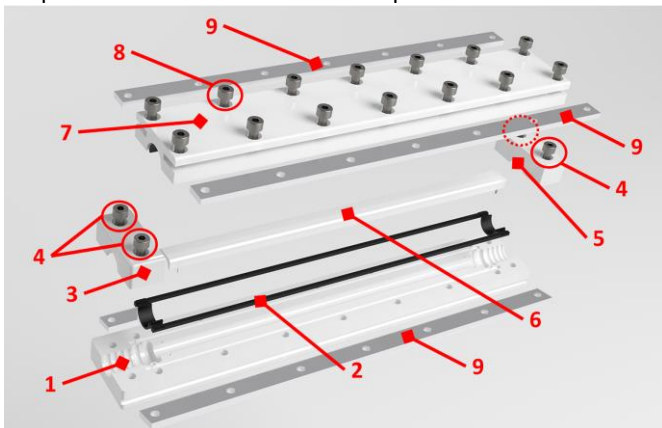
2.3.5 Tighten the locking screw [S2] for the blade block



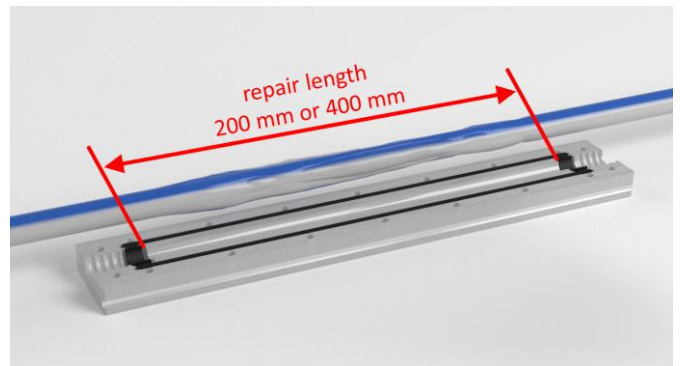
2.3.6 Flip shut upper part and tighten clamping screw. The circular cutter is now ready for use.

#### 2.4 Installation of the DuctRepair-Block

Prepare the construction site and microduct as described in chapter 2.1. In any way possible, preparation and adjustment of the tools should be done in the installers van. Prepare the tool as described in chapter 2.2 and 2.3.



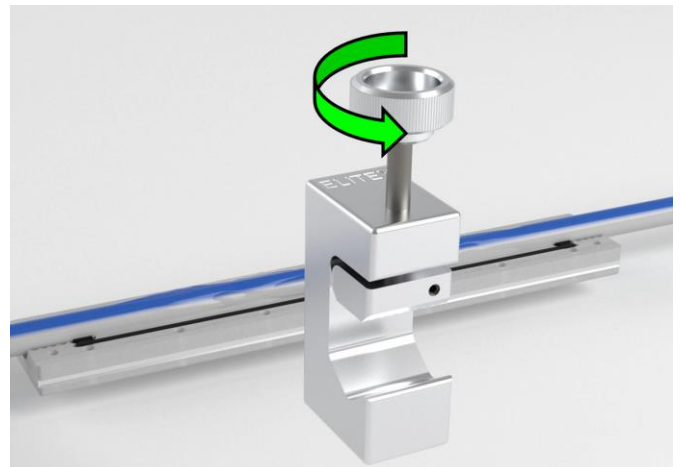
- 1 = DuctRepair-Block bottom part, sealing [2] preinstalled
  - 3 = Strain relief left and right [5] and screws [4] preinstalled.
  - 6 = Protection tunnel with dowels
  - 7 = DuctRepair-Block top part [7], screws M4 [8] preinstalled
  - 9 = Thread rails preinstalled in top and bottom part
- 18x/32x Allen screw M4 for size 200/400 mm



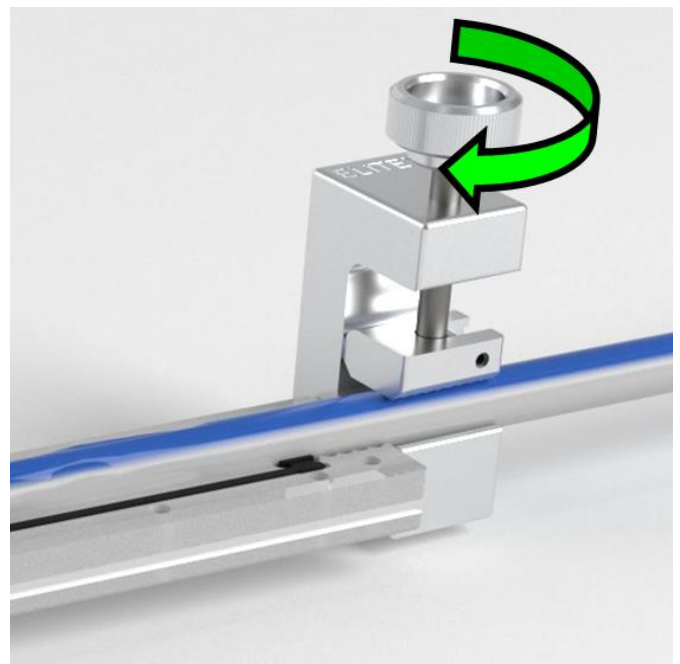
2.4.1 Select the size of the DuctRepair block 200/400 mm according to the required repair length. Position the lower part best possible centered under the damaged sector.



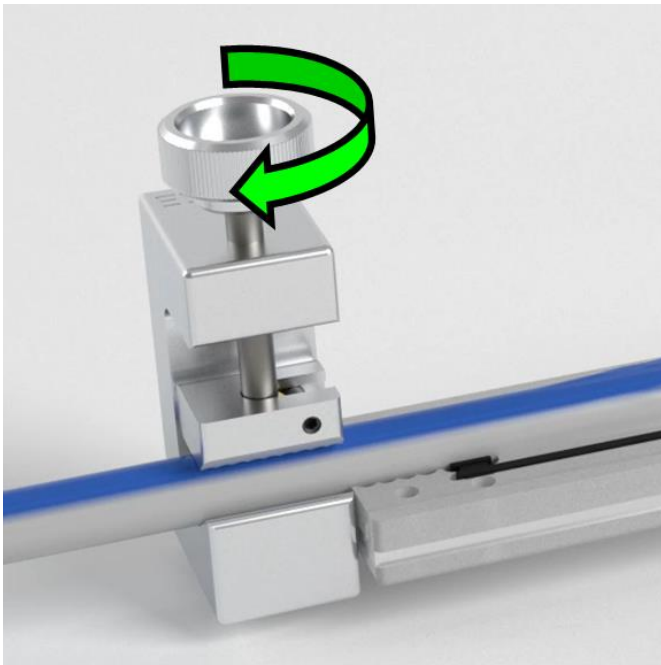
**Note:** Make sure that the preinstalled seals are not damaged or dirty.



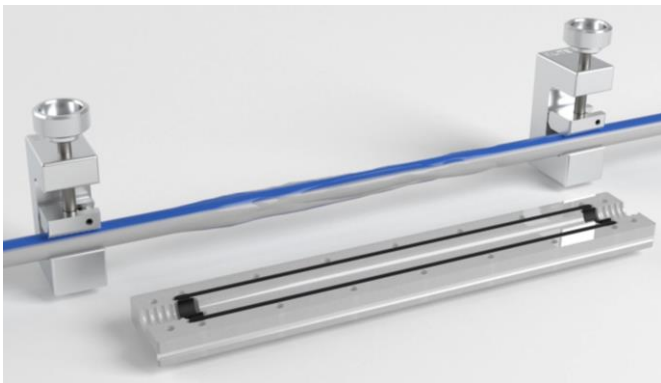
2.4.2 Loosen clamp screw from spacer counterclockwise.



2.4.3 Attach the spacer next to the DuctRepair block at the stop. Tighten clamp from the spacer clockwise. Don't squeeze the microduct.



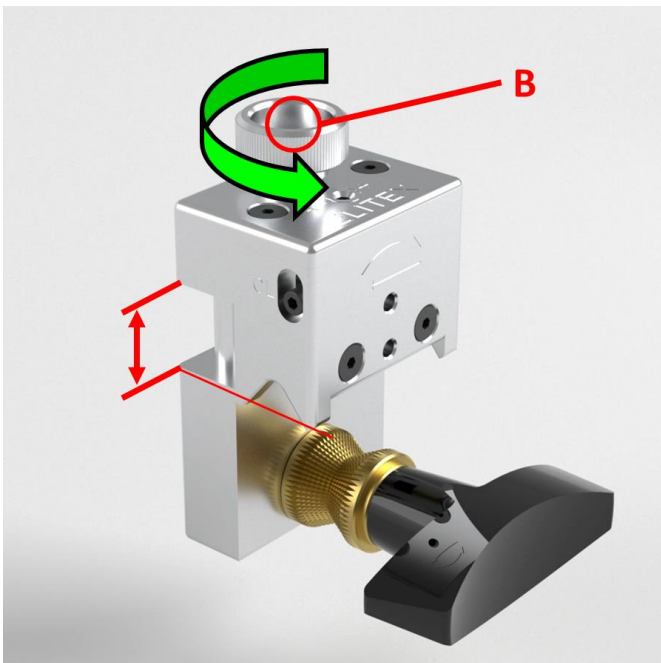
2.4.4 Repeat the same procedure with the second spacer at the opposite side.



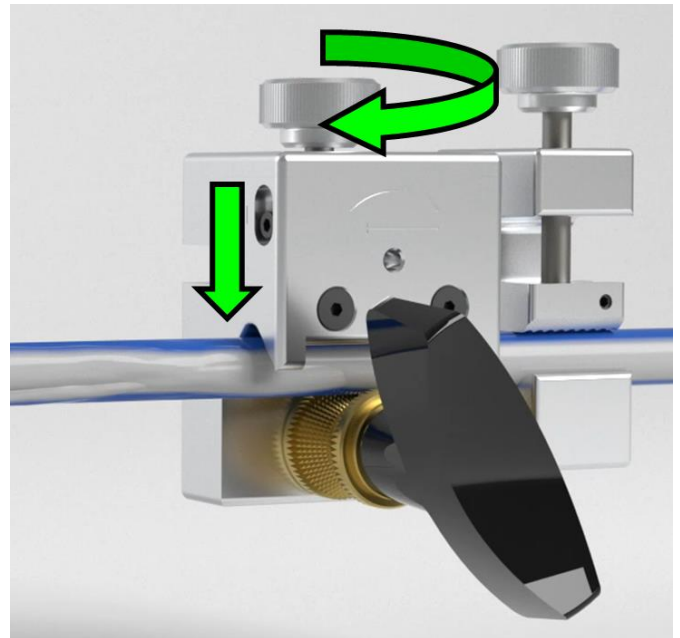
2.4.5 Remove the DuctRepair-Block bottom part and place it in a clean area.

**2.5 Axial cut**

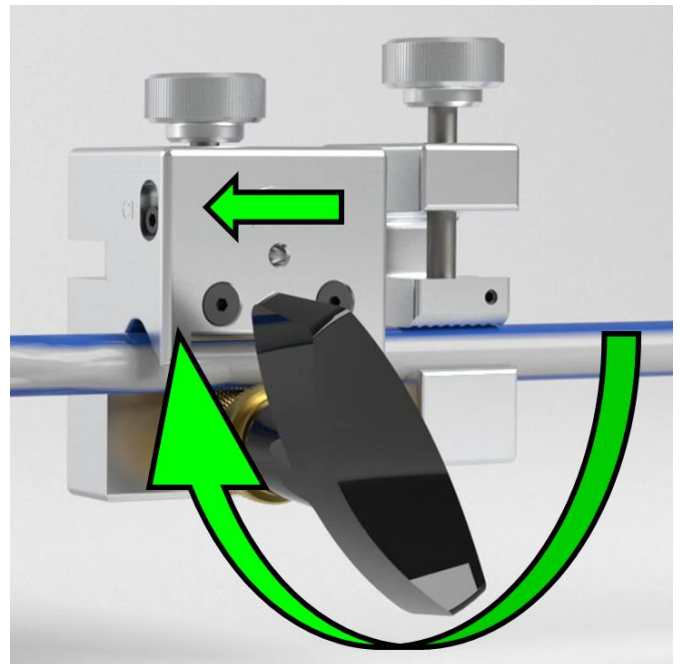
In any way possible, preparation of the tool should be done in the installers van. Prepare the tool as described in 2.1.



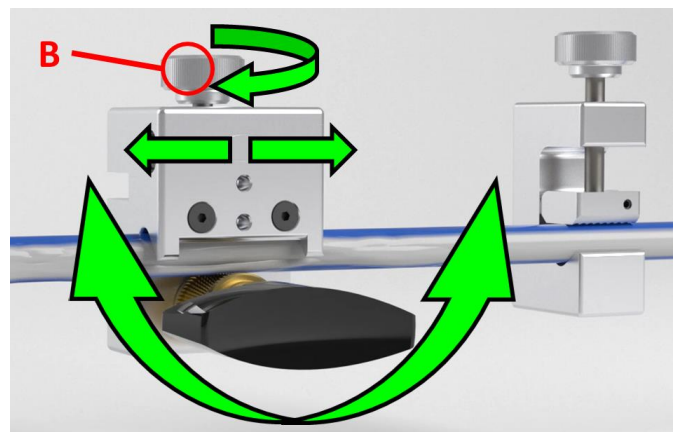
2.5.1 Open axial cutter with clamping screw [B] sufficiently, so it fits over the microduct.



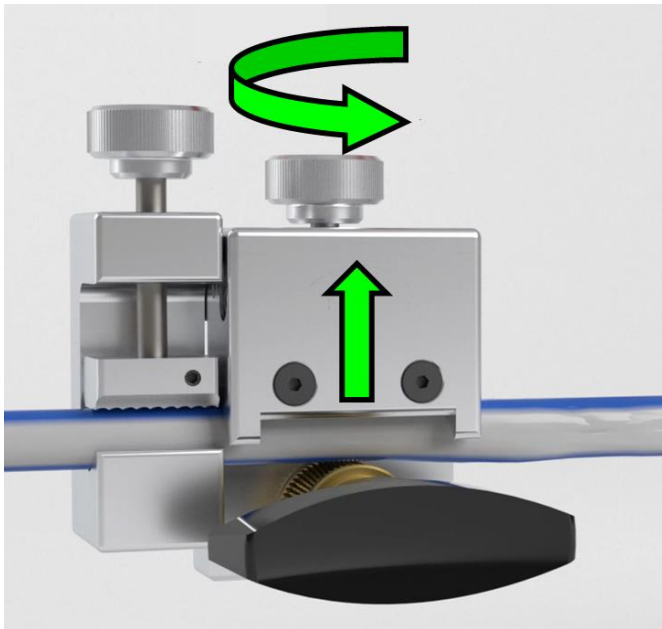
2.5.2 Position the axial cutter with clamping screw upwards next to stop of the right spacer. Tighten the clamping screw [B] firmly.



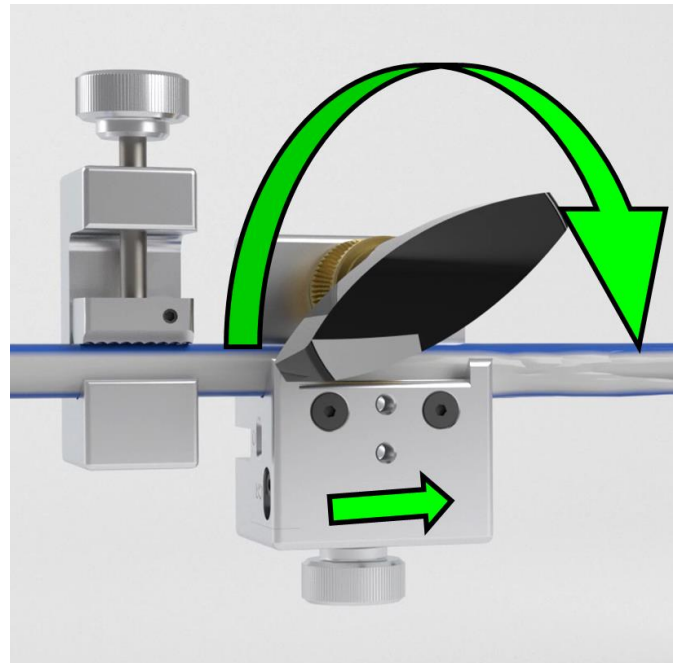
2.5.3 For the 1<sup>st</sup> cut with the axial cutter, twist the handle clockwise, then the tool cuts to the left direction.



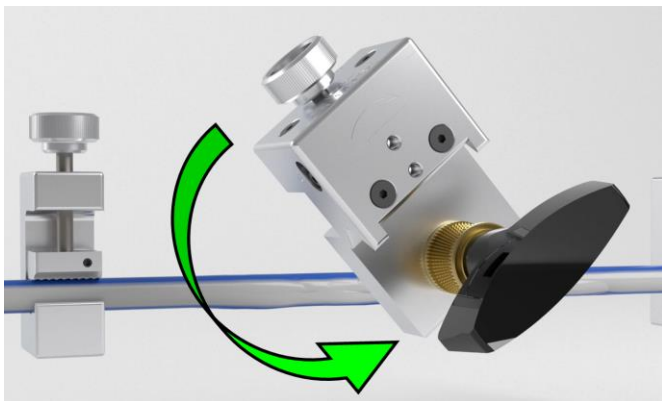
2.5.4 In case of uneven or severe deformed microduct, possibly cut back and forth by twisting handle left right. It might be necessary to readjust the clamp screw [B].



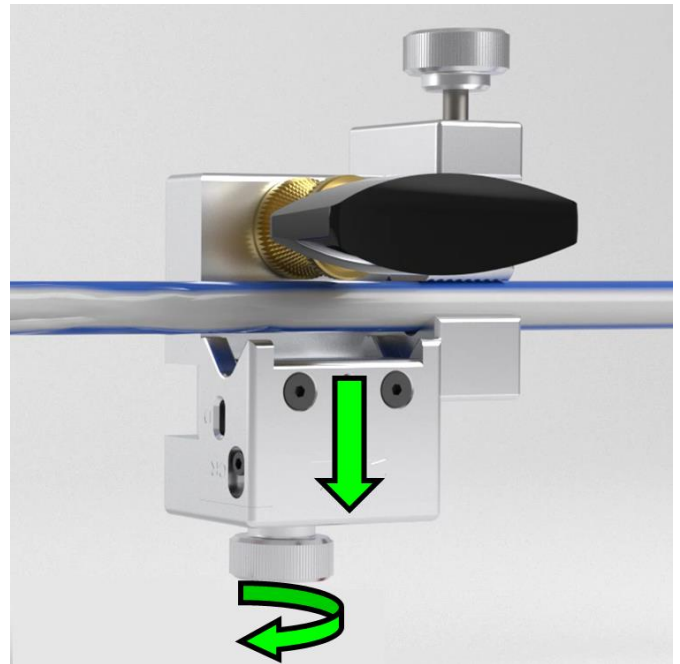
2.5.5 Cut with the axial cutter till the stop on the left spacer and then open the clamping screw [B].



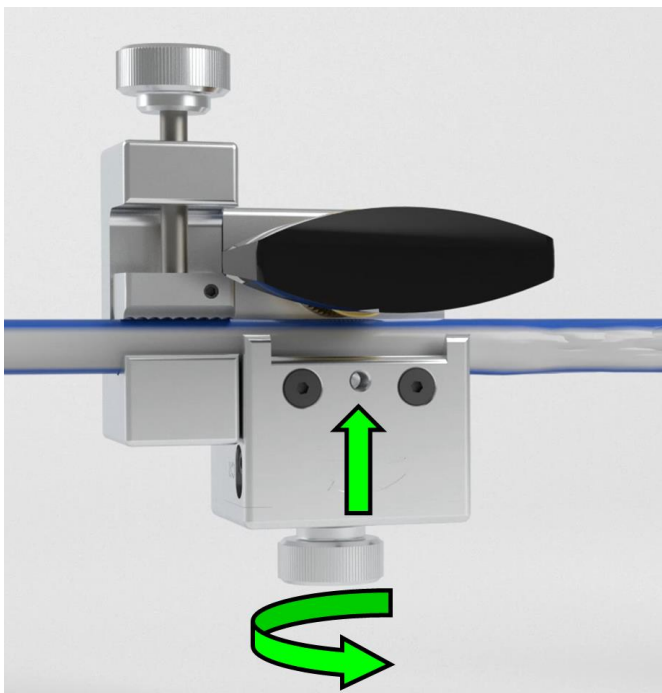
2.5.8 For the 2nd cut with the axial cutter, twist the handle counterclockwise, then the tool cuts to the right direction.



2.5.6 Remove axial cutter from microduct and twist it upside down (180°).



2.5.9 Cut with the axial cutter till the stop on the right spacer, then open the clamping screw [B] and remove the tool.



2.5.7 Position the axial cutter with clamping screw downwards next to stop of the left spacer. Tighten the clamping screw [B] firmly.

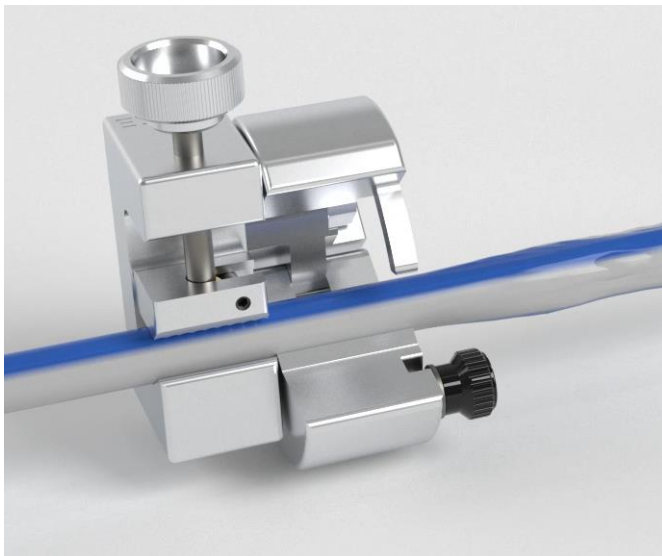


## 2.6 Circular cut

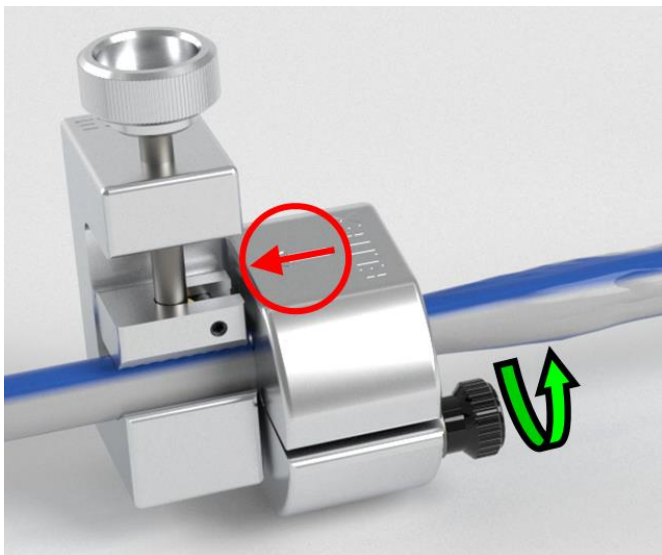
In any way possible, preparation of the tool should be done in the installers van. Prepare the tool as described in 2.2.



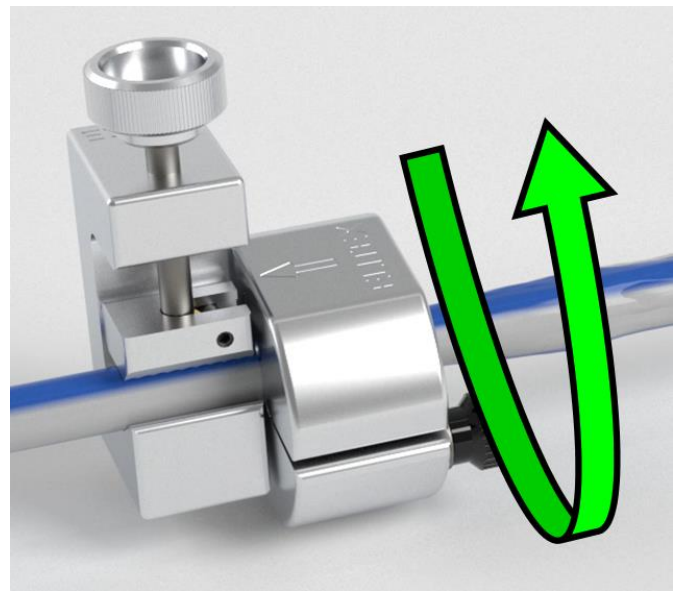
2.6.1 Loosen the clamping screw for the upper part and flip upper part open



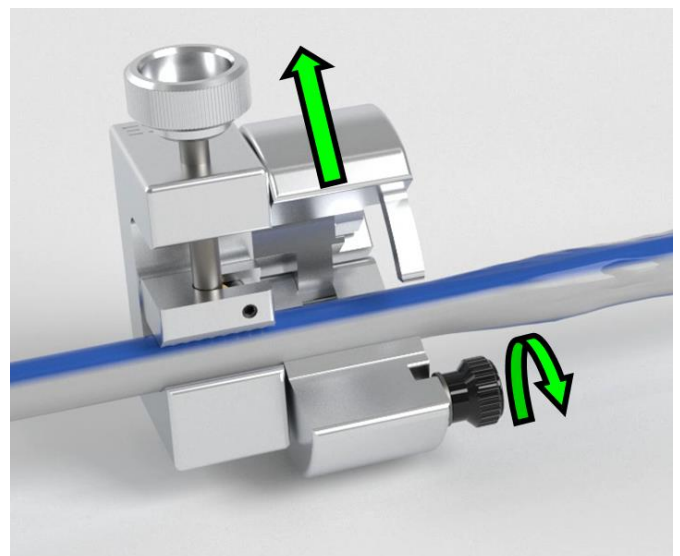
2.6.2 Mount the circular cutter next the left spacer on the stop.



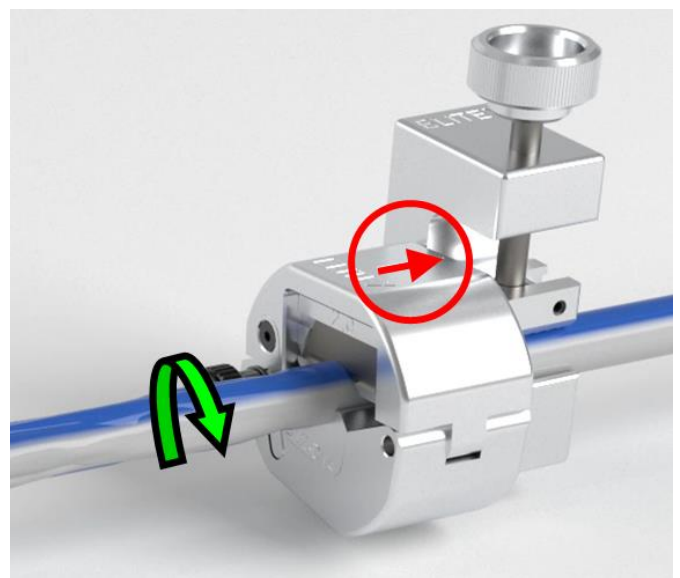
2.6.3 The arrow on the circular cutter must point towards the left spacer. Tightly press the upper part onto the lower part and fix the clamping screw.



2.6.4 Rotate circular cutter twice to cut microduct.

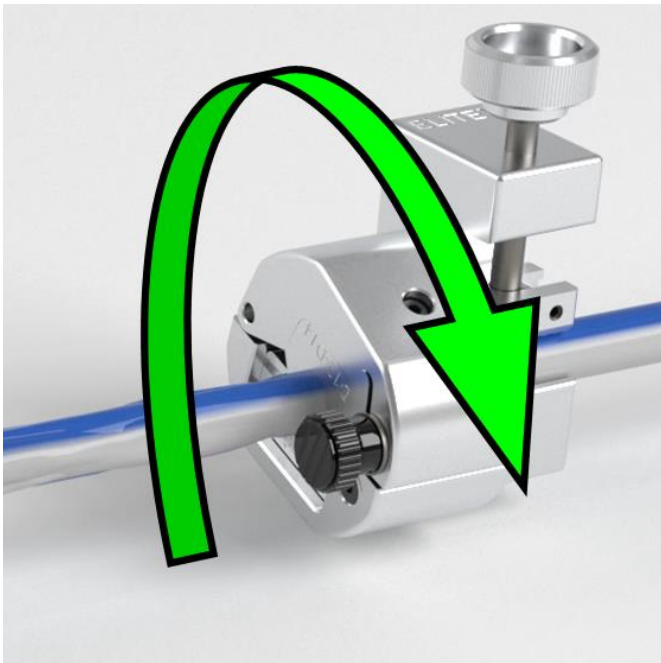


2.6.5 Open the clamping screw, flip upper part open and remove the circular cutter.

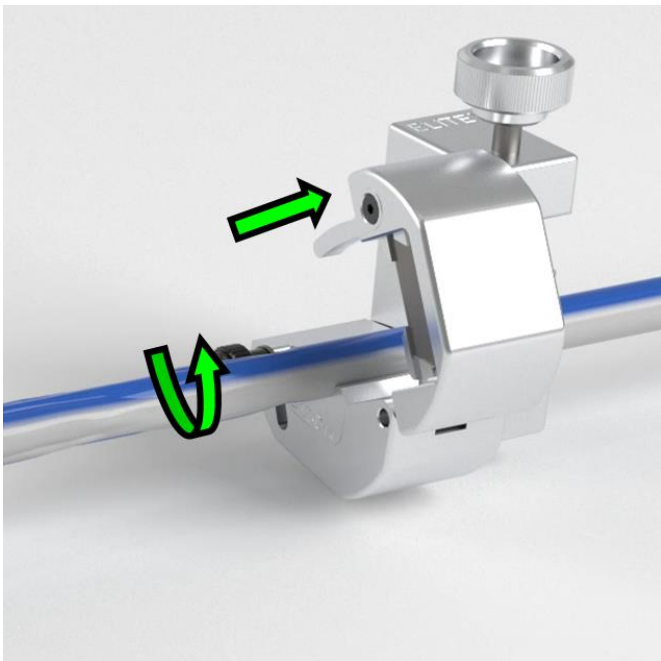


2.6.6 Mount the round cutter next to the right spacer on the stop. The arrow on the round cutter must point towards the spacer. Tightly compress the upper part and lower part and fix them with the clamping screw.

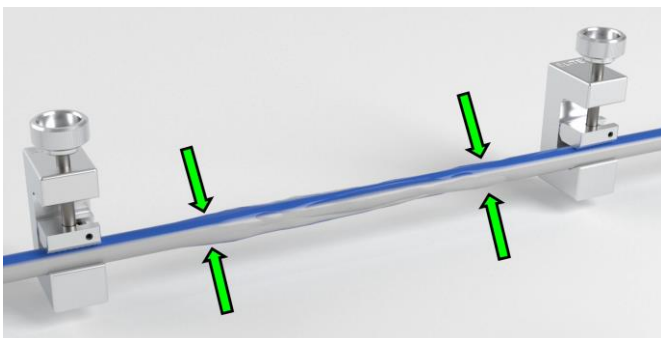




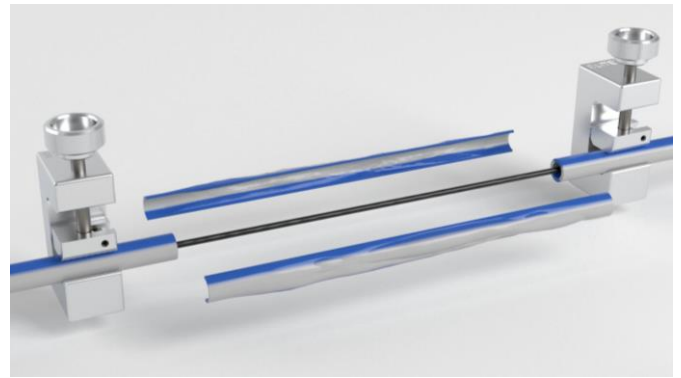
2.6.7 Rotate circular cutter twice to cut microduct.



2.6.8 Open the clamping screw, flip upper part open and remove the circular cutter.



2.6.9 Squeeze the microduct to separate the duct halves.



2.6.10 Remove the resulting duct halves.

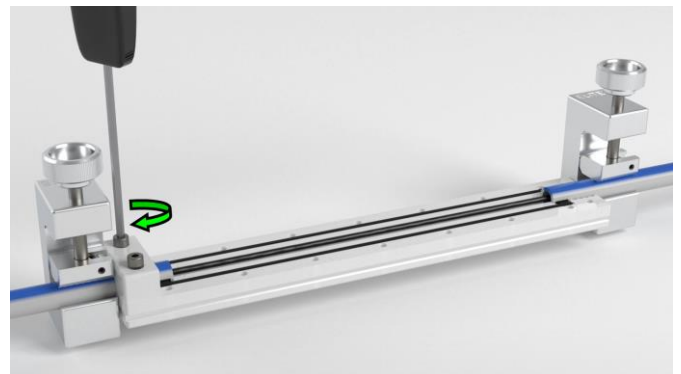


**Note:** Make sure that the distance between the microduct ends does not change.

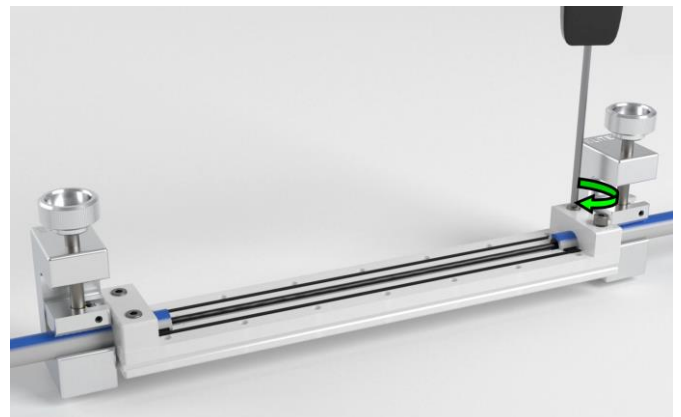
## 2.7 Assembling DuctRepair-Block



2.7.1 The ends of the microducts and the cable must be entire clean. Insert the microduct ends into the recesses in the DuctRepair-Block bottom part.



2.7.2 Attach the left strain relief with 3 mm Allen key. Tightening torque >5 Nm.



2.7.3 Then attach the right strain relief with 3 mm Allen key. Tightening torque >5 Nm.



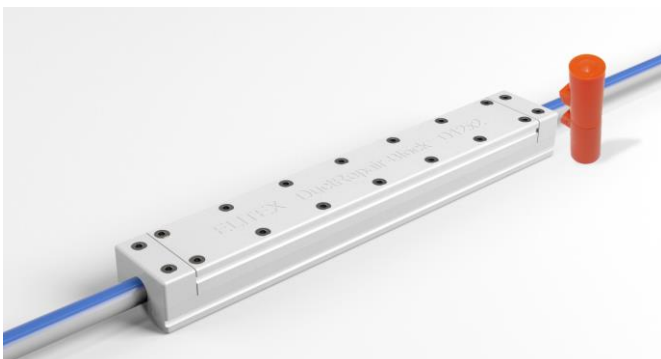
2.7.4 Insert the protection tunnel into the bottom part. Watch out for fitting dowels into the holes in bottom part.



2.7.5 Mount top part onto the bottom part and tighten screws crisscross-with 3 mm Allen key starting from the center. Tightening torque >5 Nm



2.7.6 Loosen clamp screws of spacers and remove them from the microduct.

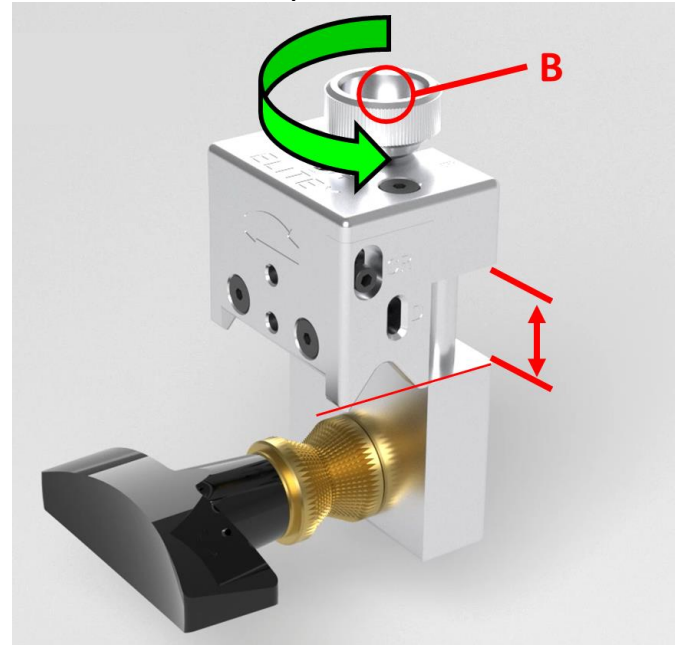


2.7.7 Optionally, a DuctMarker could be attached with cable ties at the microduct. If any possible in a vertical position. Thus the DuctRepair-Block can be detected with a common locator even after years.

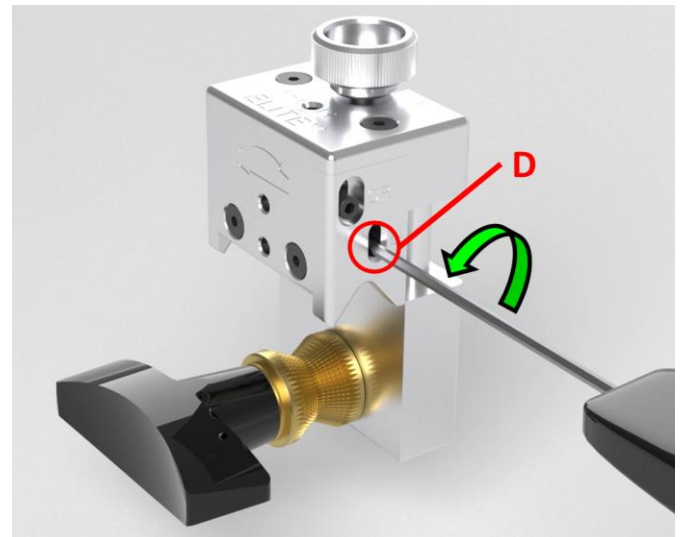
**The DuctRepair-Block is now fully assembled**

### 3 Blade replacement

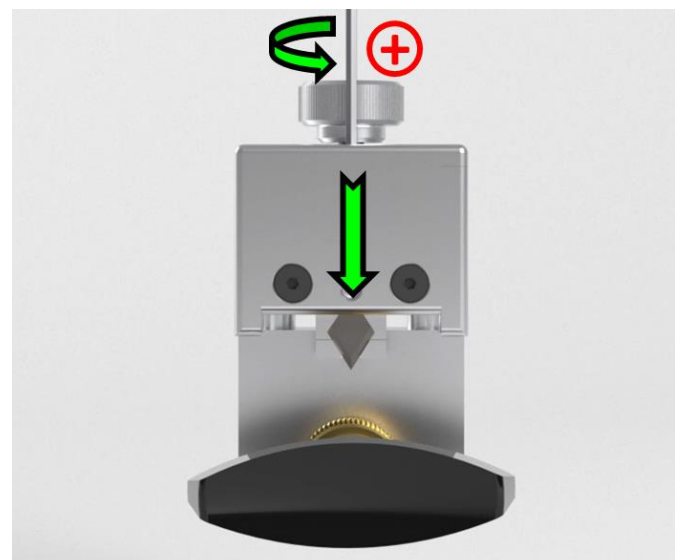
#### 3.1 Axial cutter blade replacement



3.1.1 Open the axial cutter by turning the screw [B] counterclockwise till the indicated position. The V-Block must be in line with the edge of the bottom body (red line).



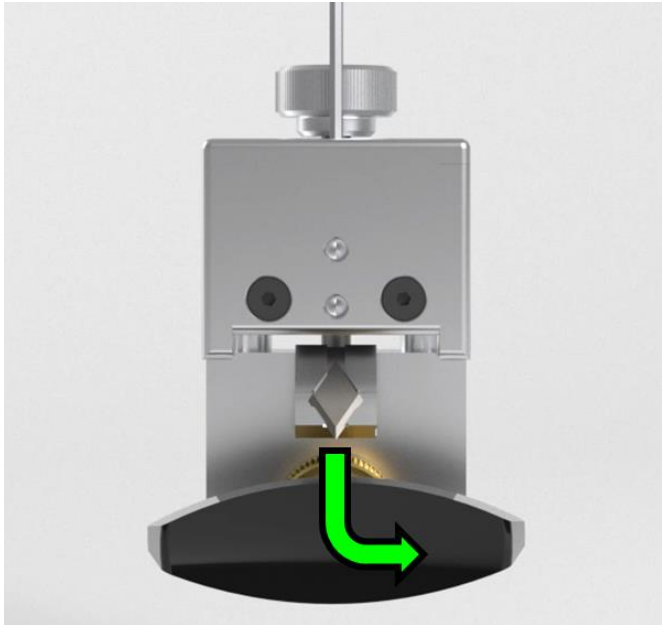
3.1.2 Loosen the locking screw [D9] from the blade.



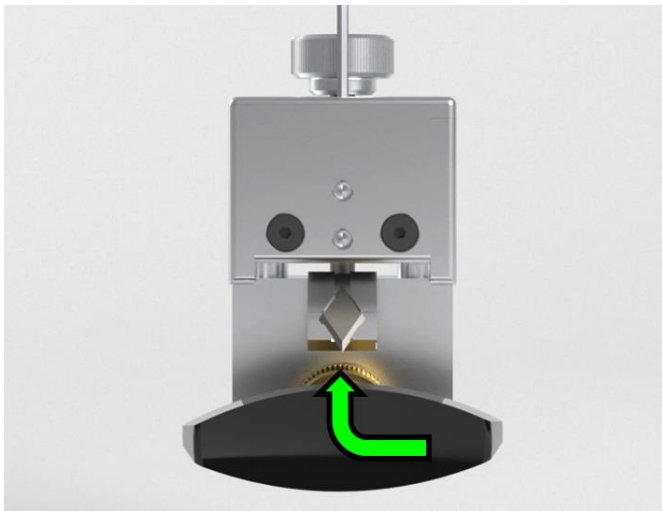
3.1.3 Turn adjusting screw [A] for the cutting depth counterclockwise to direction (+) till blade comes loose.



**Note:** Remove the blade **carefully** because the knife is very sharp or can have burrs if broken.



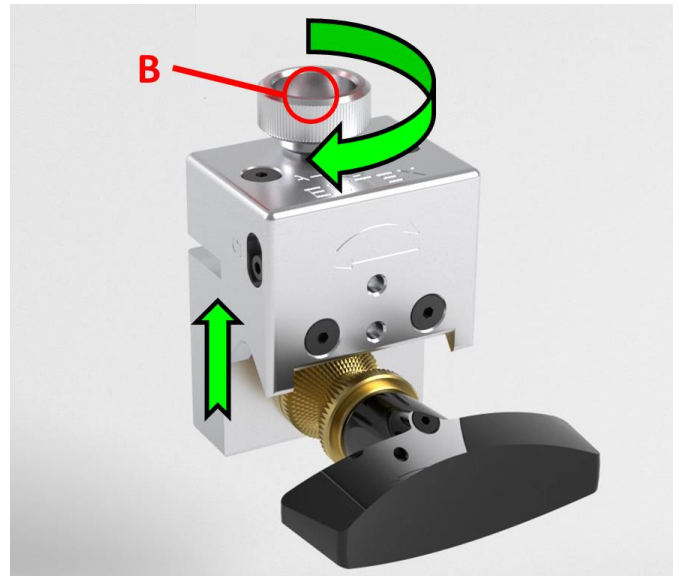
3.1.4 When the blade is loose, swivel it forward and remove to the side.



3.1.5 Insert new blade in reverse order.

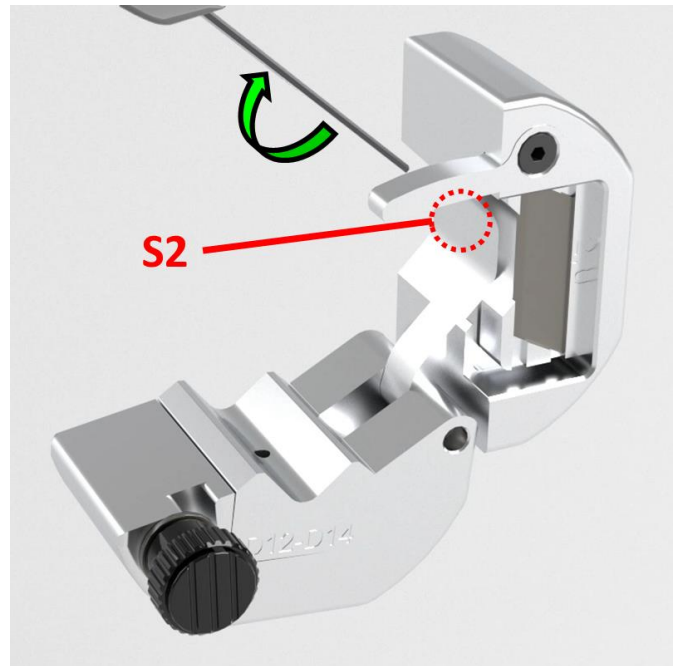


3.1.6 Turn adjusting screw {A} for cutting depth clockwise to direction (-) till the knife is in position zero at the upper stop.



3.1.7 Then close the axial cutter again with clamp screw B or adjust the cutting depth as described in 2.2.1.

### 3.2 Circular cutter blade replacement

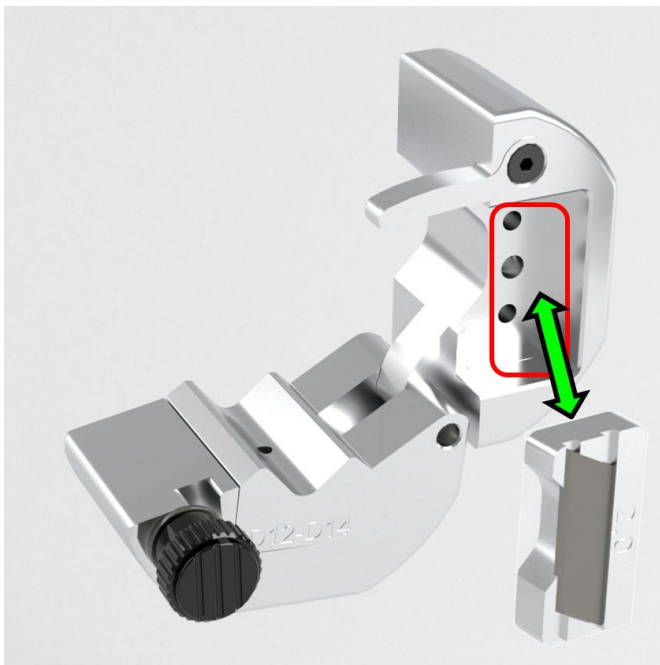


3.2.1 Loosen locking screw (at back side of top part) with Allen key 2.5 mm and remove blade block.



**Note:** Remove the blade block **carefully** because the knife is very sharp or can have burrs if broken.





3.2.2 Replace the blade block and reinstall it in reverse order.



3.2.3 Flip shut upper part and tighten clamping screw.

#### 4 Follow-up

Always after installation clean all tools, check blade and function, before storing them back in the case.

##### Axial cutter

Check the axial cutter blade for damage and adjust blade always back into the zero position, see chapter tool preparation. Adjust with clamping screw [B] upper and lower body to the smallest diameter.

##### Circular cutter

Check the blade if damaged and flip shut upper part and tighten clamping screw.

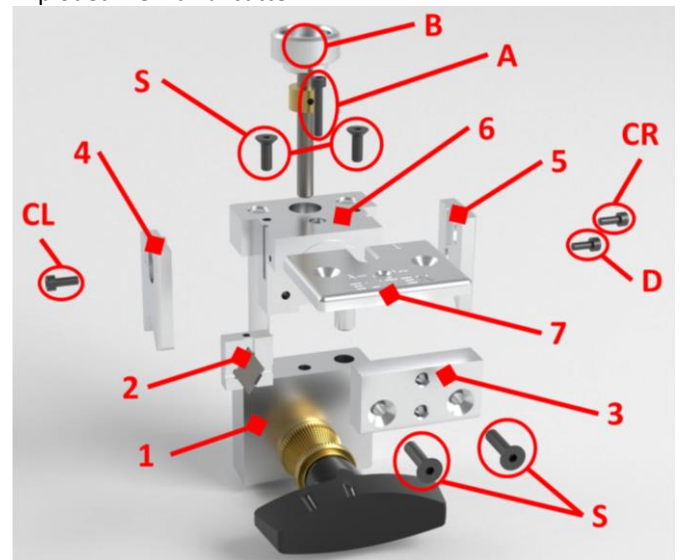
**If knives have been replaced, always order spare parts immediately (see spare parts list chapter 4.1).**

#### 4.1 Tool maintenance

For inspection and cleaning of the tools they can be dismantled with enclosed Allen key 2.5 mm.

##### 4.1.1 Axial cutter

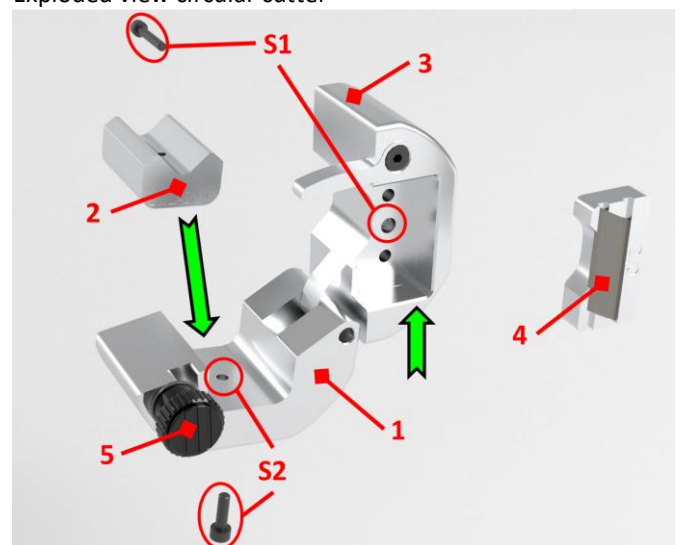
Exploded view axial cutter



- A = Adjusting screw for blade
- B = Clamp screw for setting microduct diameter
- D = Locking screw for blade
- CL = Locking screw V-Block left
- CR = Locking screw V-Block right
- S = Mounting screw for top and front plate
- 1 = Axial bottom body with handle
- 2 = Blade block
- 3 = Cover plate top body front
- 4 = V-Block left
- 5 = V-Block right
- 6 = Axial body top part
- 7 = Cover plate top body top side

##### 4.1.2 Circular cutter

Exploded view circular cutter

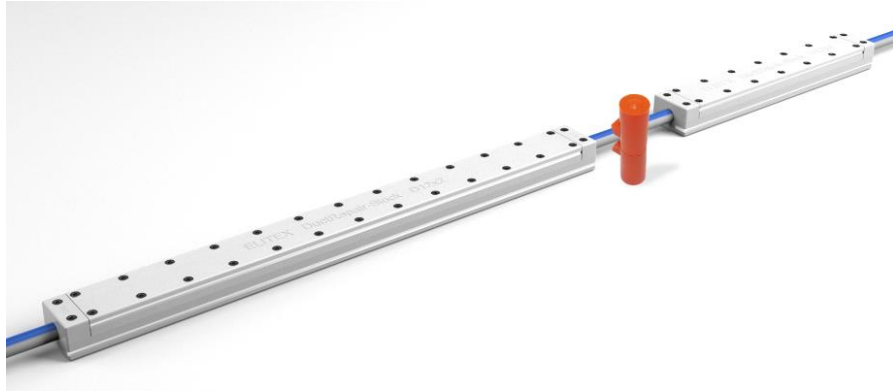
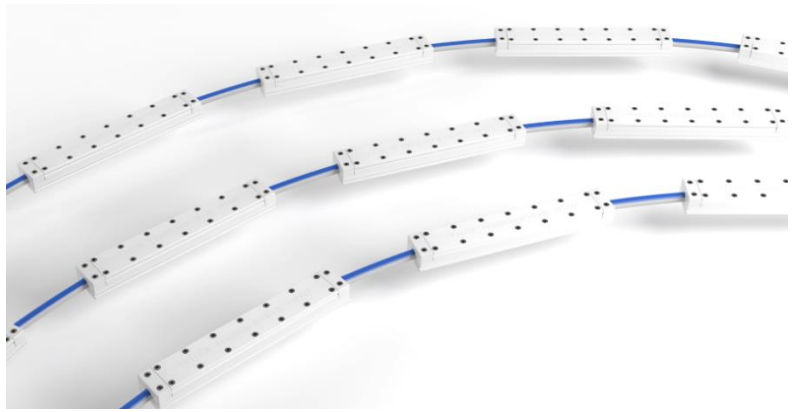


- 1 = Circular base body bottom part
  - 2 = V-Block
  - 3 = Circular base body top part
  - 4 = Blade block
  - 5 = Clamp screw
  - S1 = Locking screw for blade block (on back side)
  - S2 = Locking screw for V-Block (on bottom side)
- Locking screws [S1/S2] are mounted captive in base body.

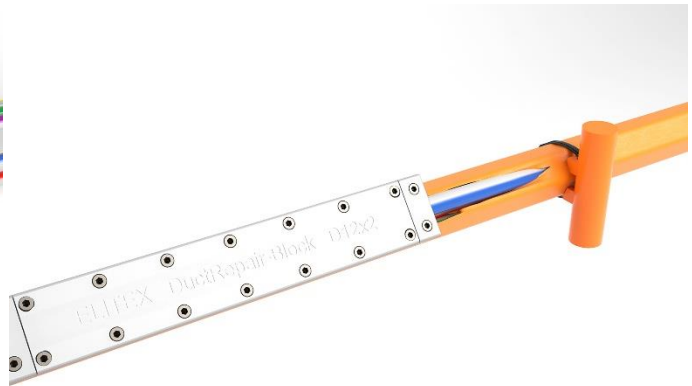
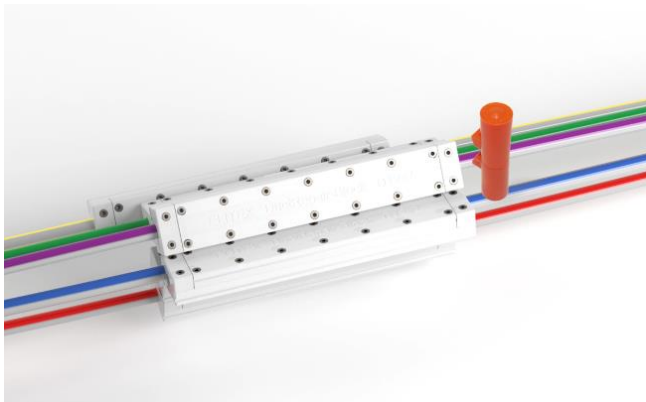


## 5 Application examples

Cascade of several DuctRepair-Blocks (size 200 mm) in a curve arrangement to repair a damaged microduct over a longer distance.



Cascade of several DuctRepair-Blocks (size 200 and 400 mm) to repair a damaged microduct over a longer distance (see special instruction extension distance repair). Optionally, a DuctMarker could be attached with cable ties at the microduct. If any possible in a vertical position. Thus, the DuctRepair-Block can be detected with a common locator even after years.



Arrangement of several DuctRepair-Blocks (size 200 mm) next to each other, to repair a damaged microduct bundle. Optionally, a DuctMarker could be attached with cable ties at the microduct. If any possible in a vertical position. Thus, the DuctRepair-Block can be detected with a common locator even after years

## 6 Ordering code DuctRepair-Block

Diameter (thick walled microduct)	Order No. size 200 mm	Order No. size 400 mm
DuctRepair Block Ø 7 x 1,5 x size [mm]	01-067-04/RS252-7	01-067-04/RS452-7
DuctRepair Block Ø 10 x 2,0 x size [mm]	01-068-04/RS252-10	01-068-04/RS452-10
DuctRepair Block Ø 12 x 2,0 x size [mm]	01-069-04/RS252-12	01-069-04/RS452-12
DuctRepair Block Ø 14 x 2,0 x size [mm]	01-070-04/RS252-14	01-070-04/RS452-14
DuctRepair Block Ø 16 x 2,0 x size [mm]	01-071-04/RS252-16	01-071-04/RS452-16
DuctRepair Block Ø 20 x 2,5 x size [mm]	01-072-04/RS252-20	01-072-04/RS452-20
Diameter (thin walled microduct)	Order No. size 200 mm	Order No. size 400 mm
DuctRepair Block Ø 7 x 0,75 x size [mm]	01-078-04/RS252-7	01-078-04/RS452-7
DuctRepair Block Ø 10 x 1,0 x size [mm]	01-079-04/RS252-10	01-079-04/RS452-10
DuctRepair Block Ø 12 x 1,1 x size [mm]	01-080-04/RS252-12	01-080-04/RS452-12
DuctRepair Block Ø 14 x 1,3 x size [mm]	01-081-04/RS252-14	01-081-04/RS452-14
DuctRepair Block Ø 20 x 2 x size [mm]	01-082-04/RS252-20	01-082-04/RS452-20

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DuctRepair

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