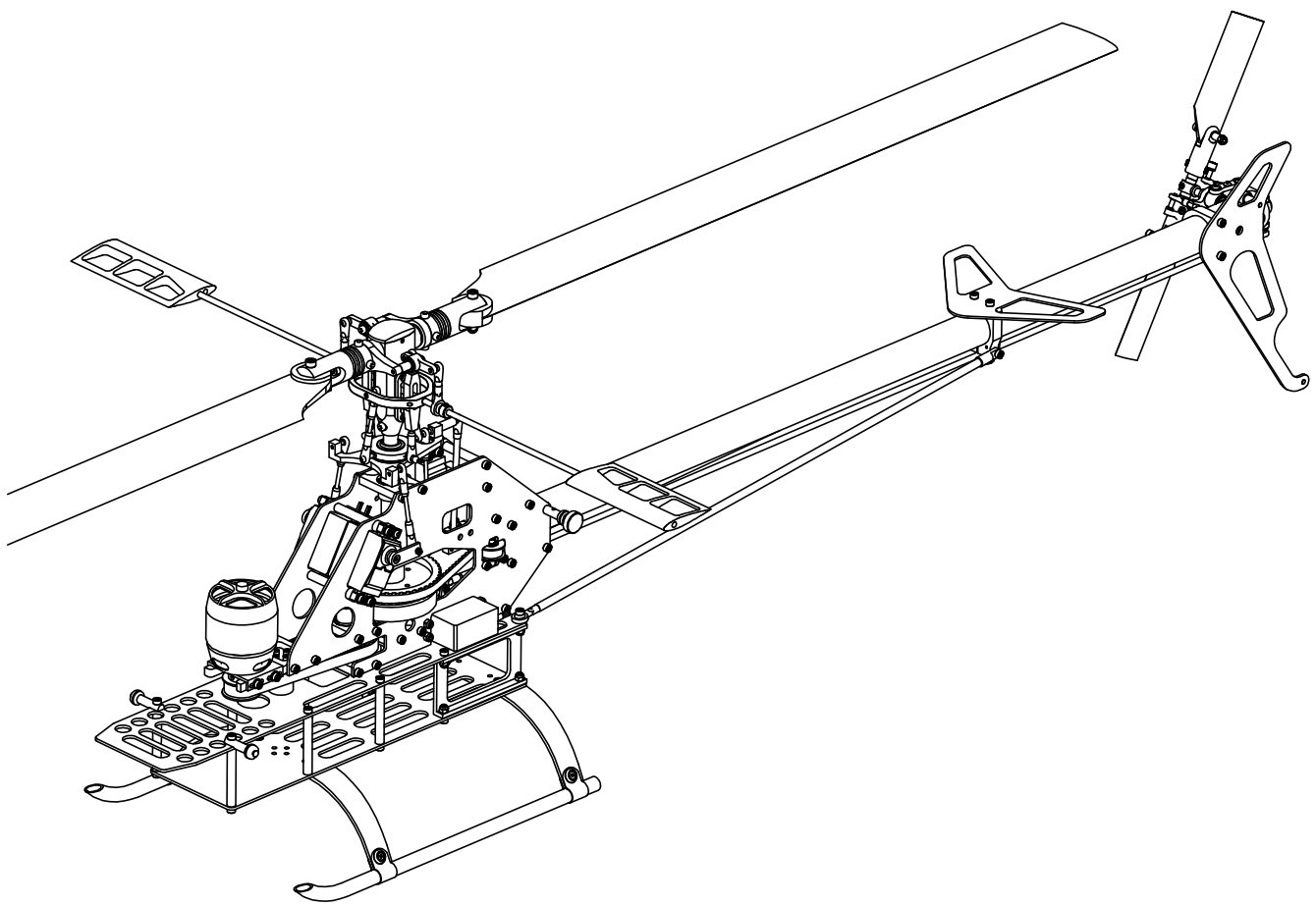


mini-Joker

Ord.-No. 4000
manual



minicopter

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Version 5

Date: july 12th 2007

minicopter

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Congratulations on the purchase of your *mini-Joker* - helicopter.

The small brother of our popular Joker-series has got some new features to increase its range of use. From beginners training to use in scale bodies, as a photo helicopter to extreme 3D flight; all of them are achieved without modifications.

New items include a completely new design of mainframe, which gives better protection for the Lipobattery and offers a greater range of possible battery dimensions, a new tail rotor with single-piece CNC housing and double sided slider-linkage and last but not least a completely redesigned MFS-rotorhead. As always you can expect an excellent quality of all parts and a long life expectancy of the model. So flying and servicing will give you a great deal of fun for a long time.

The manual contains many detailed graphics so that you should have no problems when building the helicopter. Please take a little time to study the manual before beginning to get an overview of the building process.

The kit contains some hexagon wrenches. Additionally you need the following tools:

Tools:

Thin walled socket wrenches to fit 5,5 and 7 mm nuts.

Open wrench 4/5,5 mm

Hexagon wrenches for 2/2.5/3 mm bolts

Hexagon wrench 4 mm a.f. (2 recommended for the feathering spindle)

Thin nosed pliers with 45° cranked head

Phillips screwdriver small

Screw lock Loctite 243 blue

Special Tools:

Special open wrench 5,5mm for restricted access to the nuts part-no. 707

Ball joint pliers e.g. Robbe S 1360

Pitch gauge e.g. Robbe S1366

Paddle gauge e.g. Robbe S1368

Lubricants:

Axial bearings: normal machine lubricant (from tool suppliers)

Autorotation coupling: grease or synthetic motor oil

The gear wheels and the belt drives don't use lubricant.

Recommended RC-equipment:

Receiver: Dual conversion PCM-system

Swash-plate servos: Futaba S9202, S9252, S9255 or similar

Gyro: Futaba GY 401 with servo S9254

If you have problems when building your model please contact us. We will help you!

And now: Much fun by building your *mini-Joker* !

Safety rules:

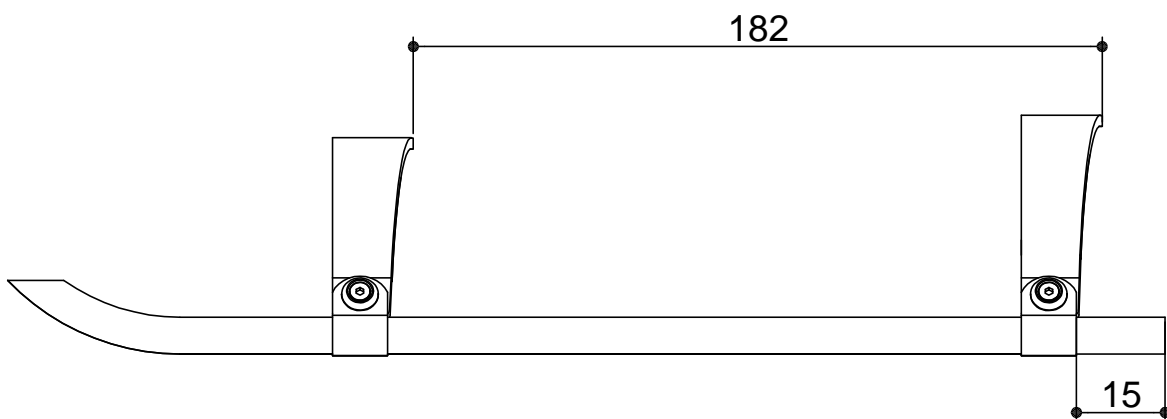
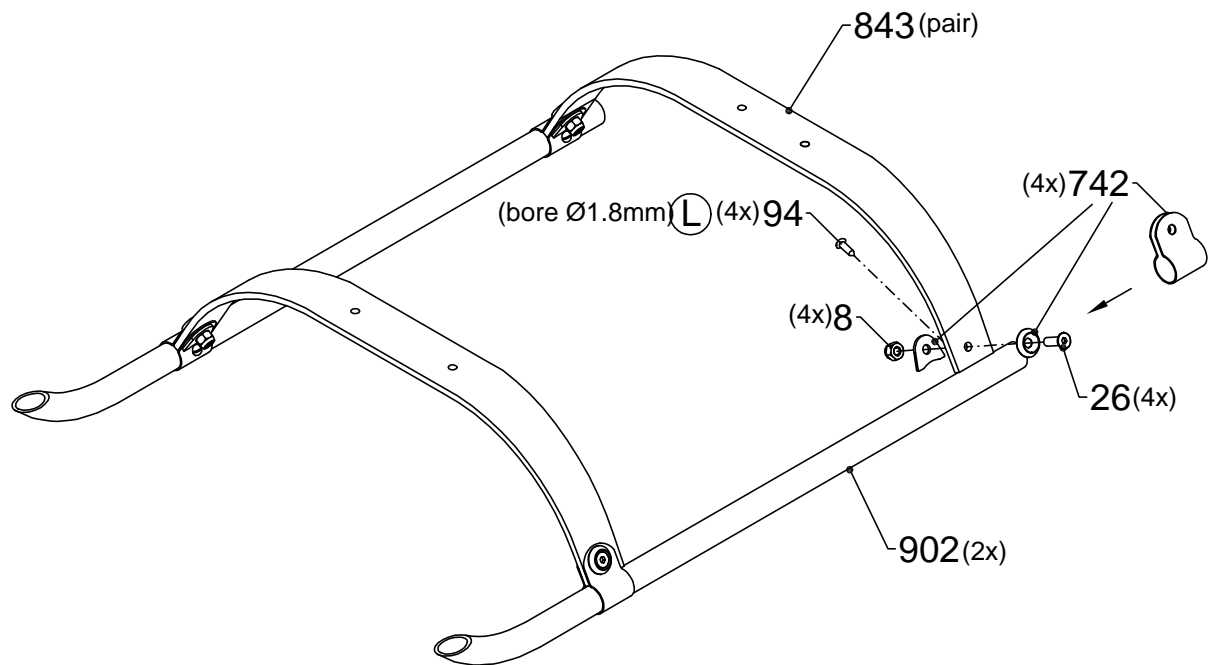
Radio controlled helicopters are **not toys**. Incorrect use of such models can cause accidents with serious injuries. Therefore please bear the following rules in mind:

- Before performing an engine test run on your workbench, remove the complete mainrotor-head including all rods and the tail-rotor blades. Make certain that nothing can come into contact with the tail-rotor.
- As soon as the battery packs are connected, in an electric helicopter, there is the possible danger of sudden unexpected start so please make sure that the areas around the main and tail rotors are kept free of any obstructions.
- Don't switch the controller off and on rapidly when spooling up. Wait a few seconds before retrying.
- In hovering flight please keep at least 5 metres from the helicopter.
- When other people or animals are in the vicinity please keep the helicopter at least 20 metres away from them.
- Don't engage in forward flight when your battery is nearly empty unless you can auto-rotate in any circumstances. For landing calculate a security reserve of at least 30 seconds or better one minute. Empty the battery while hovering. For safety rules for Lipo batteries please follow the rules on the packs.
- If using Lipos fit the Lipo battery just before the flight and remove it just after the flight and then always keep the battery packs in a special metal case.
- Don't empty the battery completely when hovering, otherwise the battery can be damaged.
- For the first flight get a partner to inform you of the flight time at 30 second intervals so that you get a feeling for electric flight. With some experience you can sense an empty battery by giving full pitch for a moment if the rotor speed collapses then you should find a landing spot immediately.
- Practise auto-rotations with running engine as soon as possible.
- When you see that a crash is unavoidable try to stop the engine before hitting the ground.

Liability exclusion:

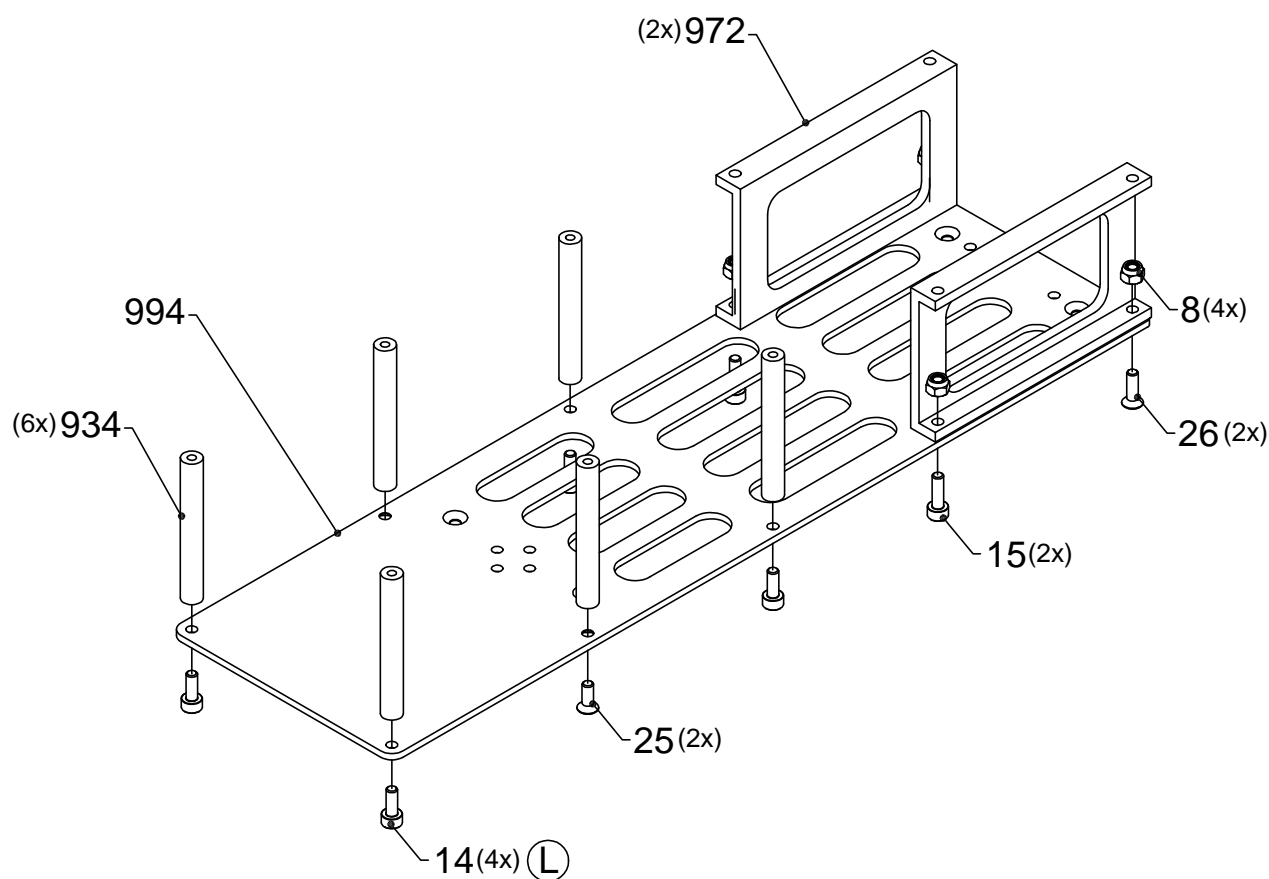
As we have no control over your assembly, adjustments or use **we cannot accept any liability nor give any guarantees.**

Vellmar, June 2006



(L) = use Loctite

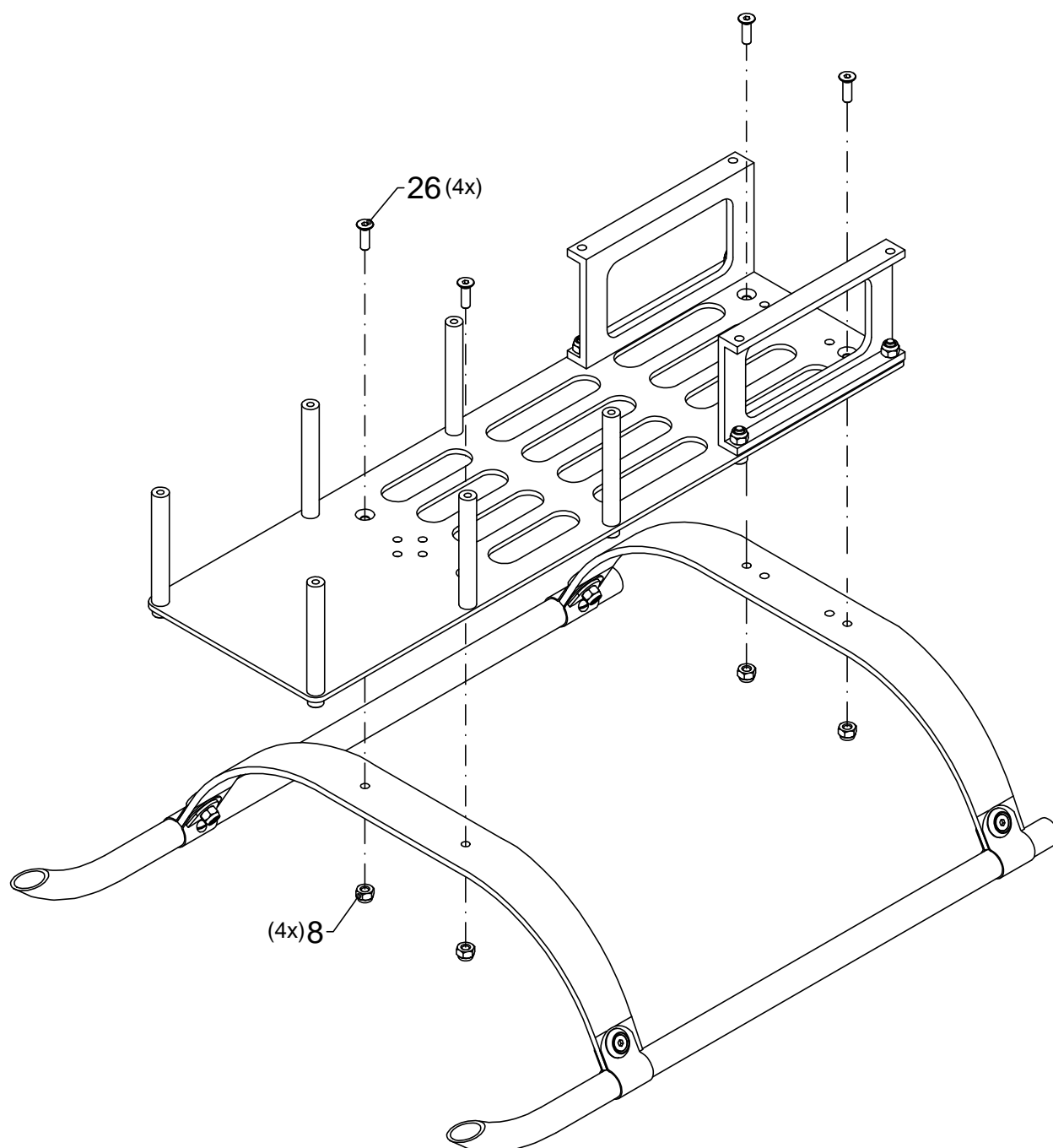
2a



- 8 = lock nut M3
- 14 = hex screw M3 x 8
- 15 = hex screw M3 x 10
- 25 = hex countersunk screw M3 x 8
- 26 = hex countersunk screw M3 x 10

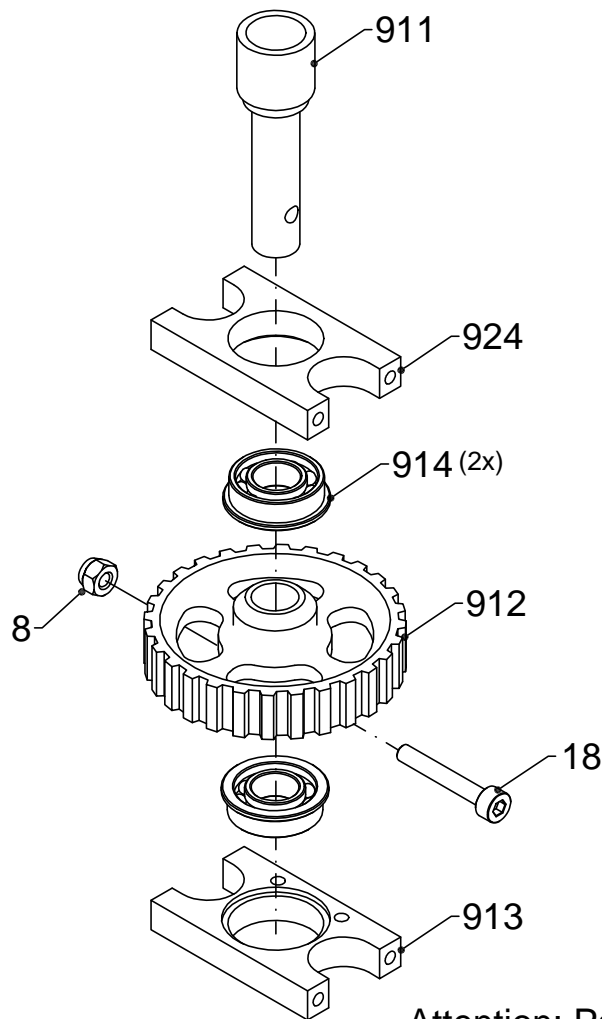
(L) = use Loctite

2b



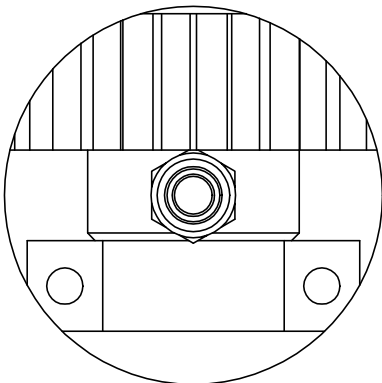
Fix the nuts first after Step 10!

8 = lock nut M3
26 = hex countersunk screw M3 x 8

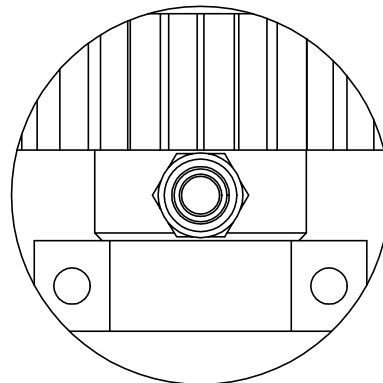


Attention: Part 913 is WITH threads!

position of locknut M3:

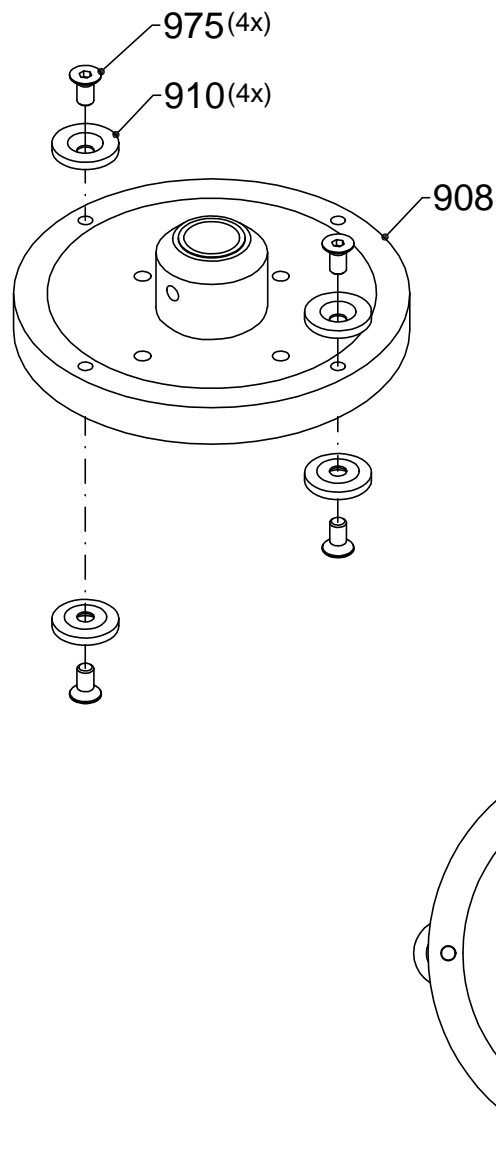


wrong!

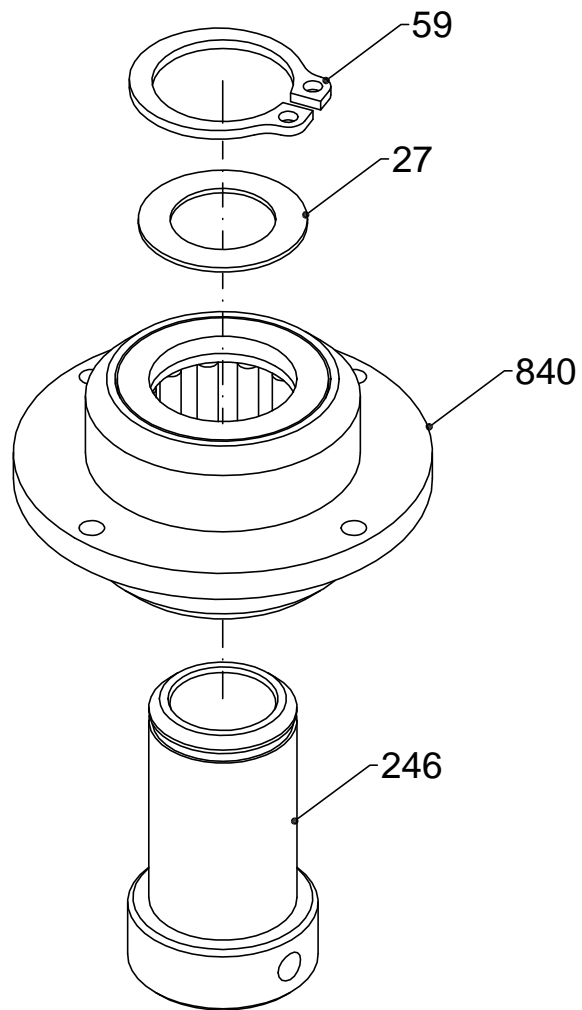


correct!

8 = lock nut M3
18 = hex screw M3 x20



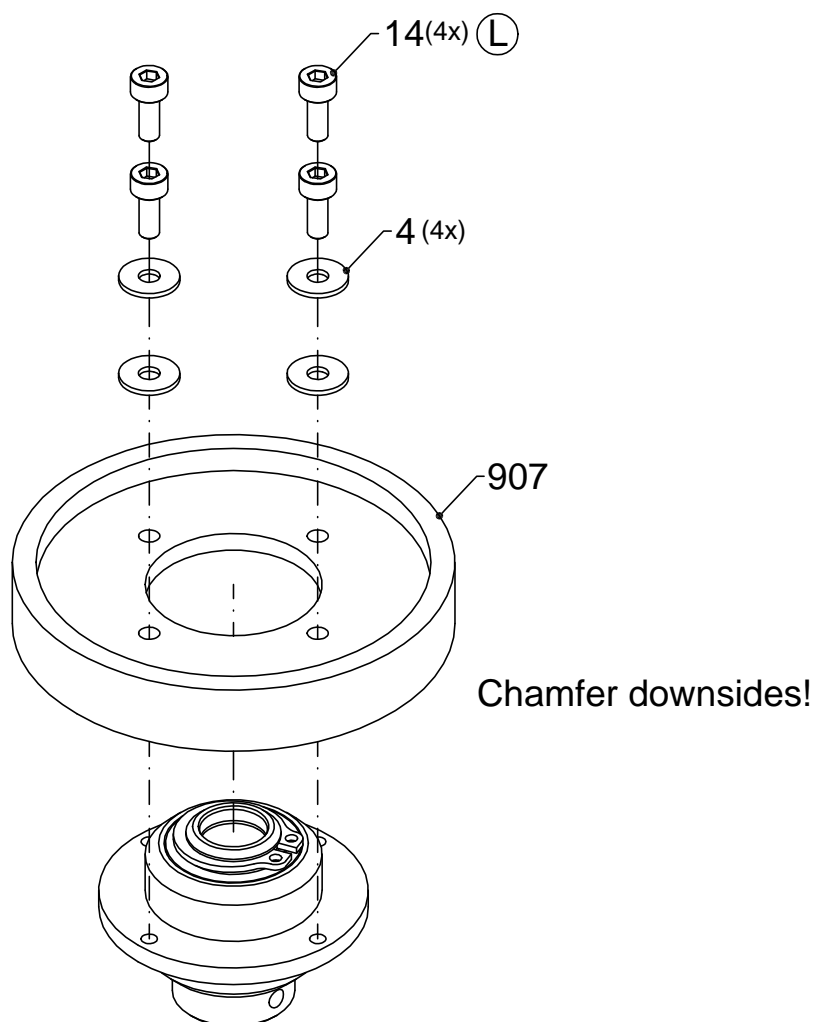
975 = countersunk screw M3 x 4



27 = washer 14x20x0.2

59 = snap ring 14

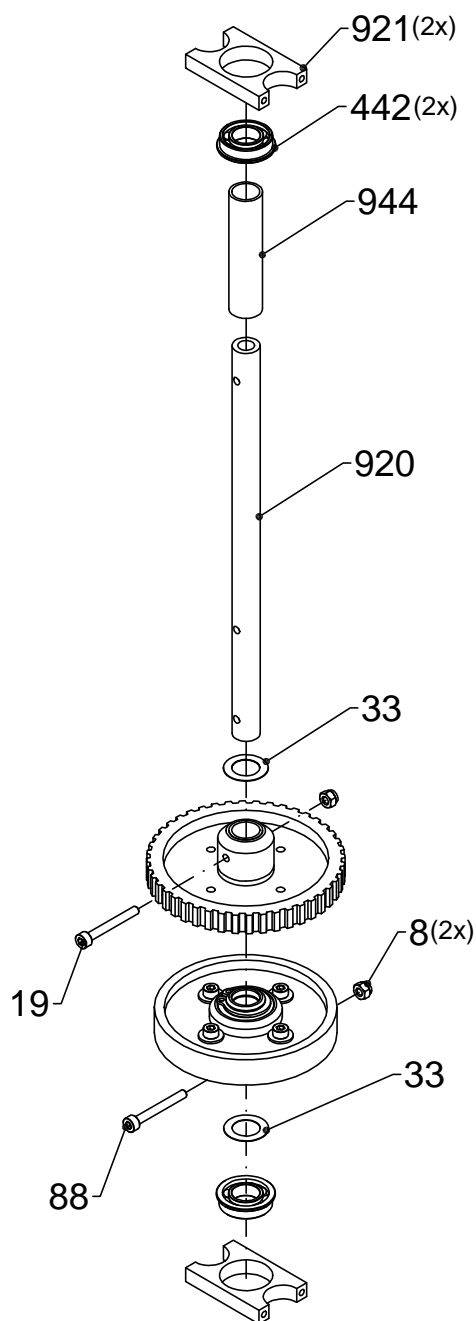
6a



4 = washer M3 large
14 = hex screw M3 x 8

Ⓛ = use Loctite

6b



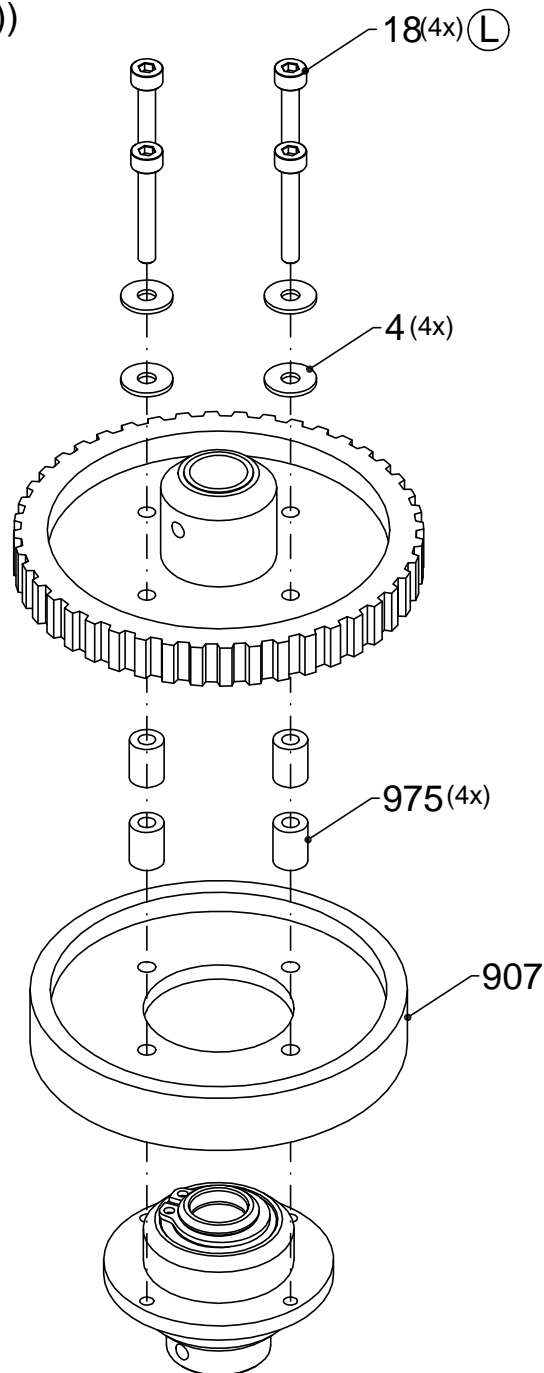
- 8 = locknut M3
- 19 = hex screw M3 x 25
- 33 = washer 10 x 16 x 0,2
- 88 = hex screw M3 x 23 special

(L) = use Loctite

Optional: Stationary tailrotor during AR

Conversion set: Ord.-No.: 842

(4 (4x) + 18 (4x) + 975 (4x))



Tip: Insert mainshaft temporarily to ensure concentric mounting

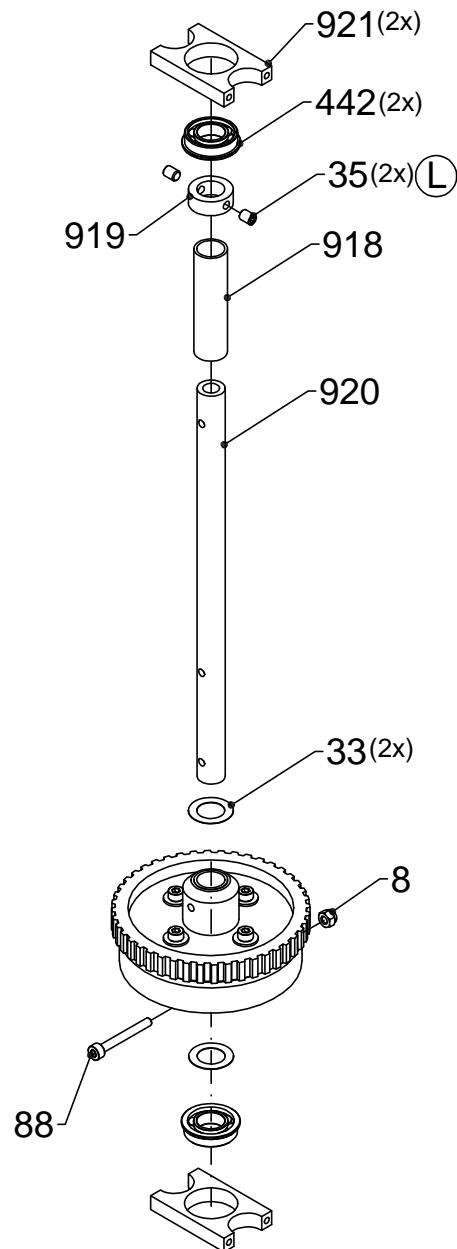
4 = washer M3 large
18 = hex screw M3 x 20

(L) = use Loctite

Optional: Stationary tailrotor during AR

Conversion kit: Ord.-No.: 842

(4 (4x) + 18 (4x) + 975 (4x))



8 = lock nut M3

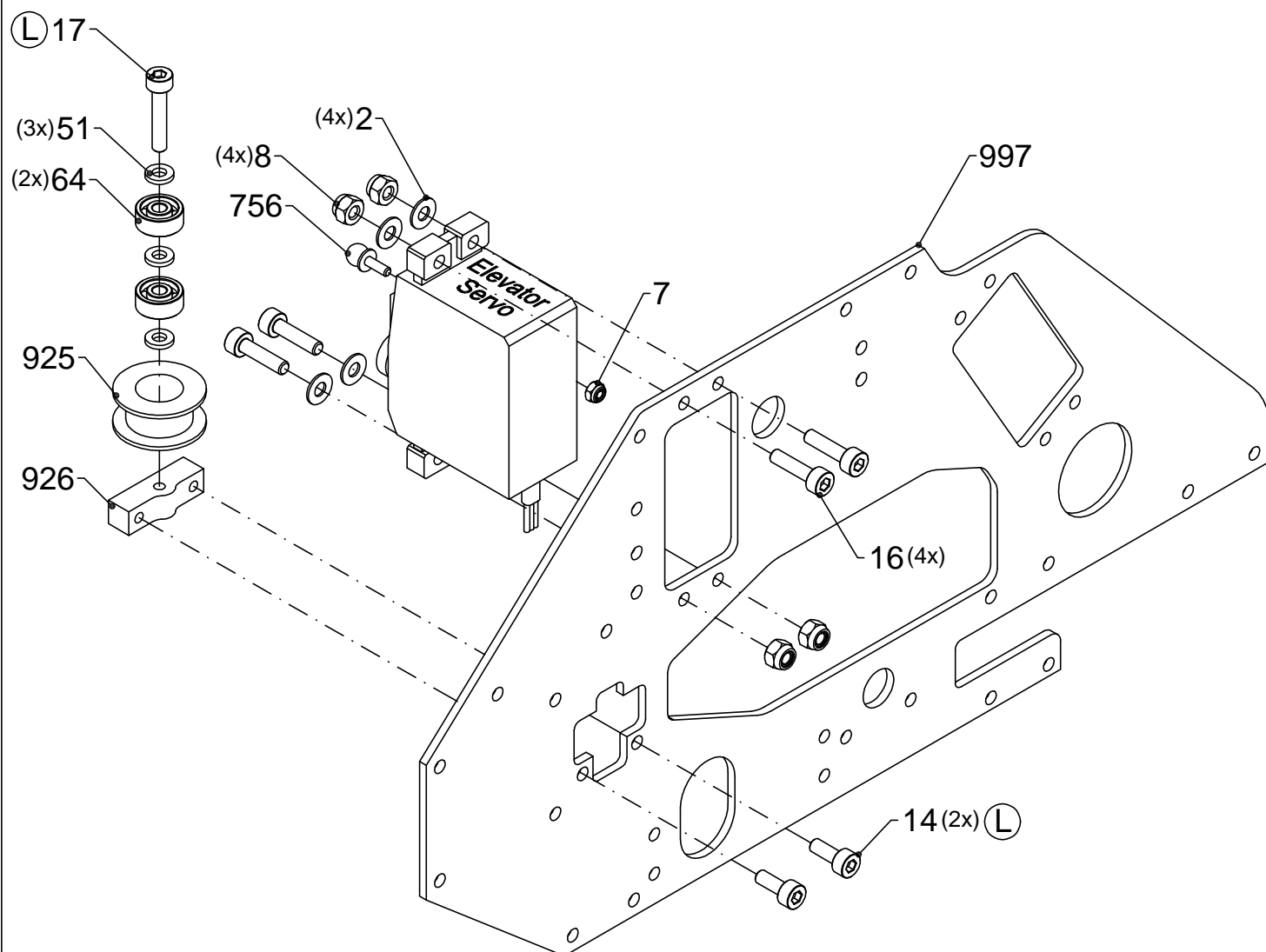
33 = shim 10 x 16 x 0.2

35 = grub screw M4 x 5

88 = hex screw M3 x 23 special

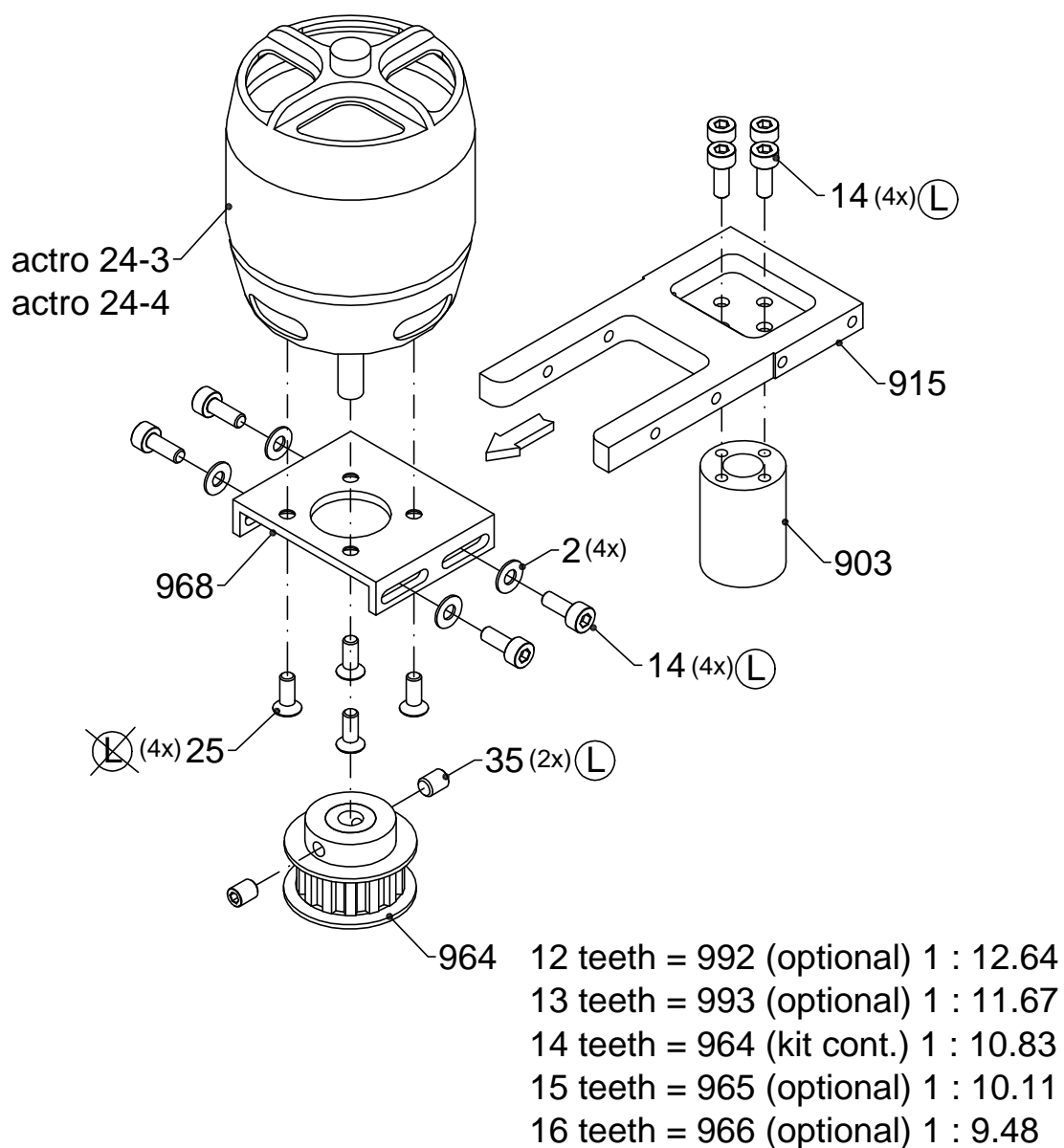
(L) = use Loctite

7b



- 2 = washer M3
- 7 = lock nut M2
- 8 = lock nut M3
- 14 = hex screw M3 x 8
- 16 = hex screw M3 x 12
- 17 = hex screw M3 x 16
- 51 = shim 3 x 6 x 1

Ⓛ = use Loctite



2 = washer M3

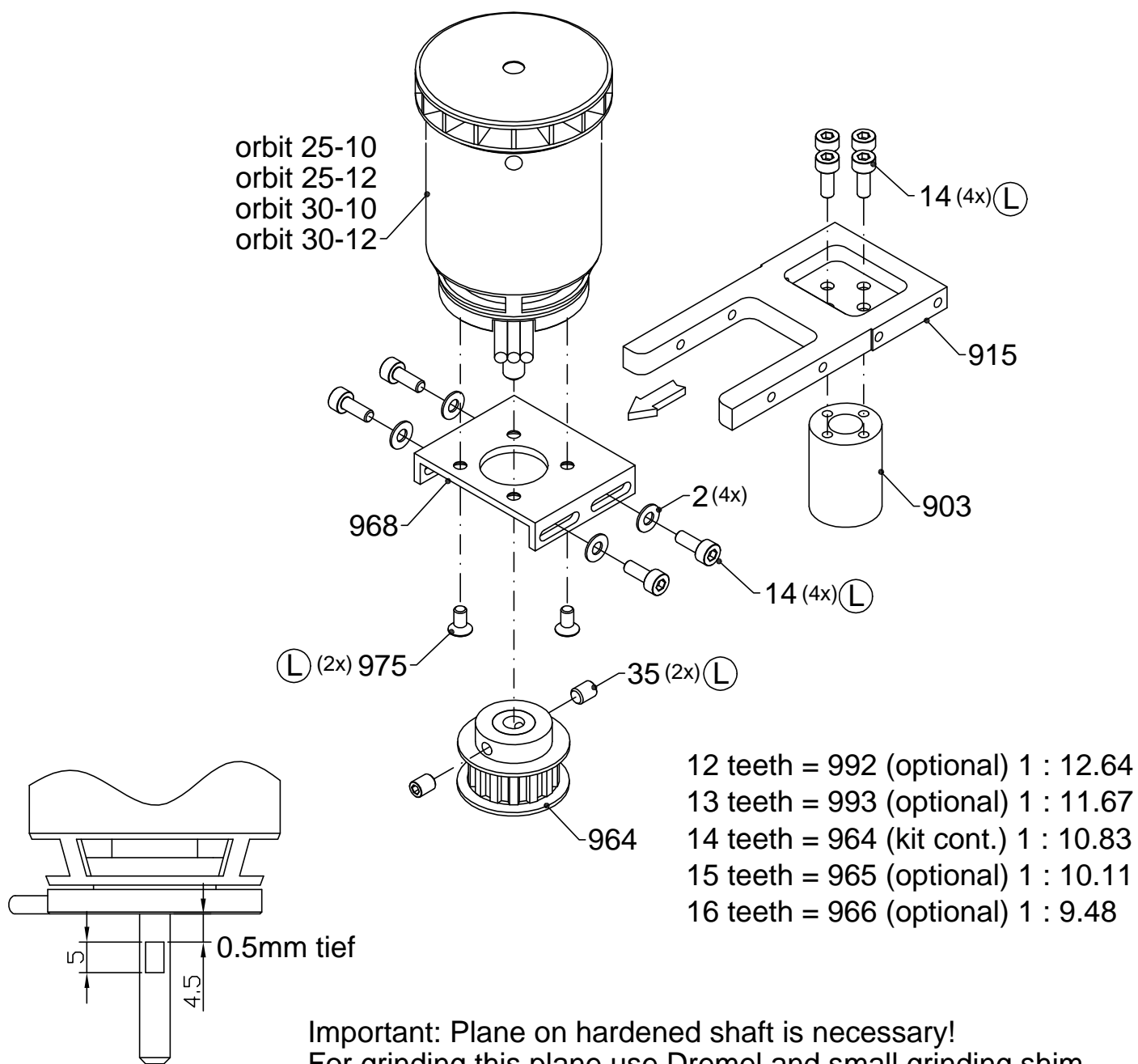
14 = hex screw M3 x 8

25 = hex countersunk screw M3 x 8

35 = grub screw M4 x 5

(L) = use Loctite

(X) = do not use Loctite



Important: Plane on hardened shaft is necessary!
For grinding this plane use Dremel and small grinding shim.
Grind careful, plane should be really flat!

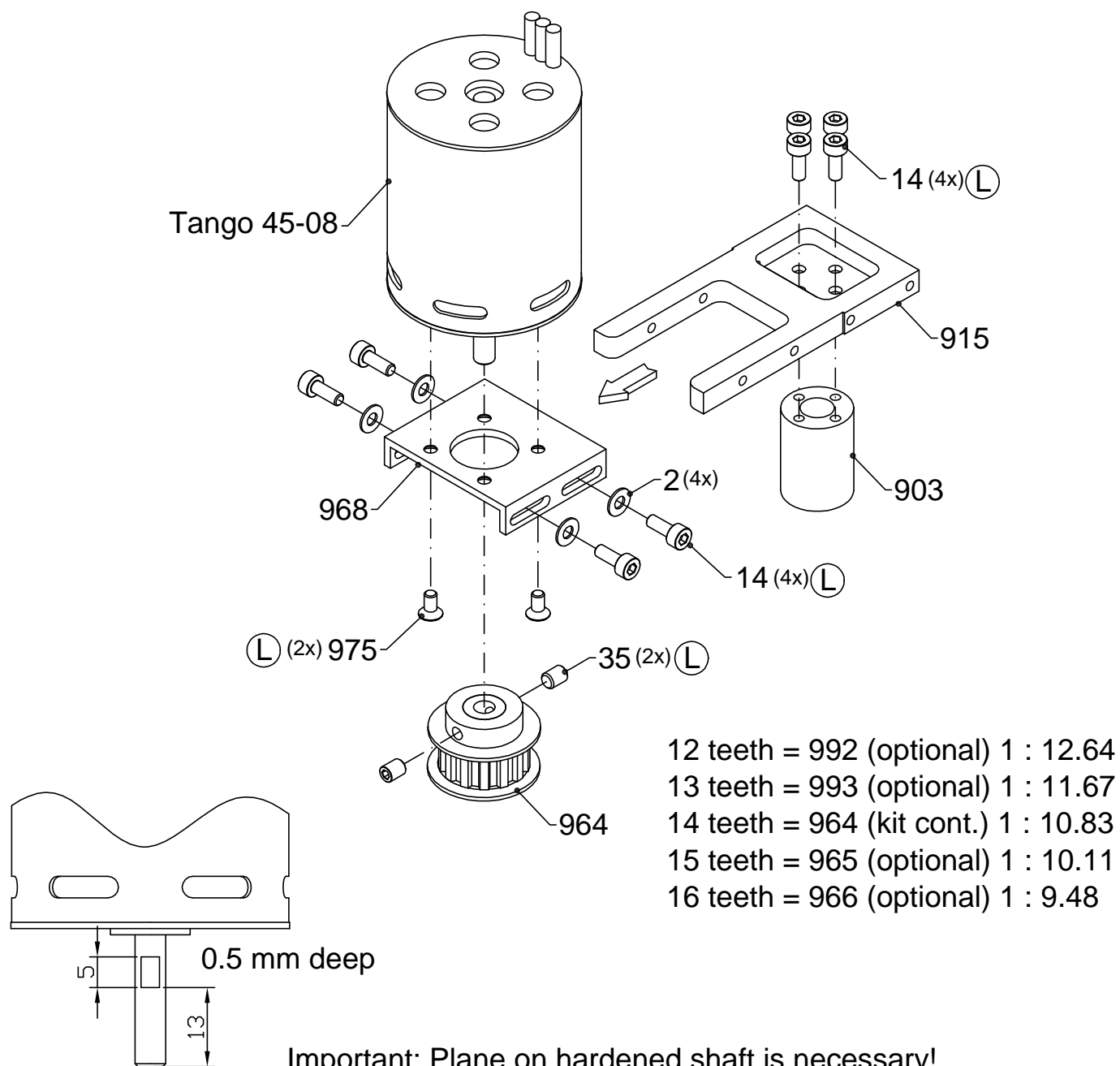
2 = washer M3

14 = hex screw M3 x 8

35 = grub screw M4 x 5

975 = hex countersunk screw M3 x 6

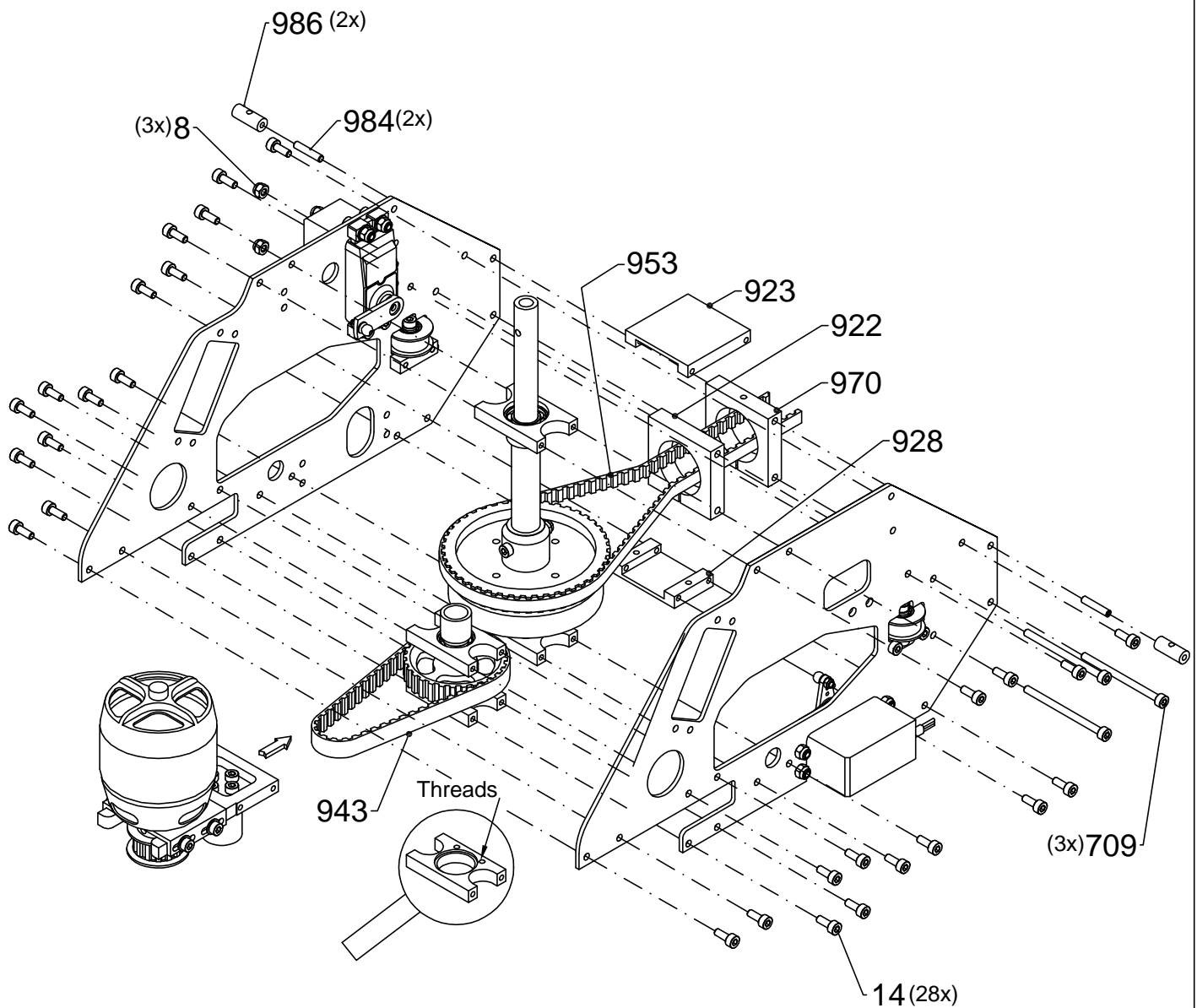
(L) = use Loctite



Important: Plane on hardened shaft is necessary!
 For grinding this plane use Dremel and small grinding shim.
 Grind careful, plane should be really flat!

2 = washer M3
 14 = hex screw M3 x 8
 35 = grub screw M4 x 5
 975 = hex countersunk screw M3 x 6

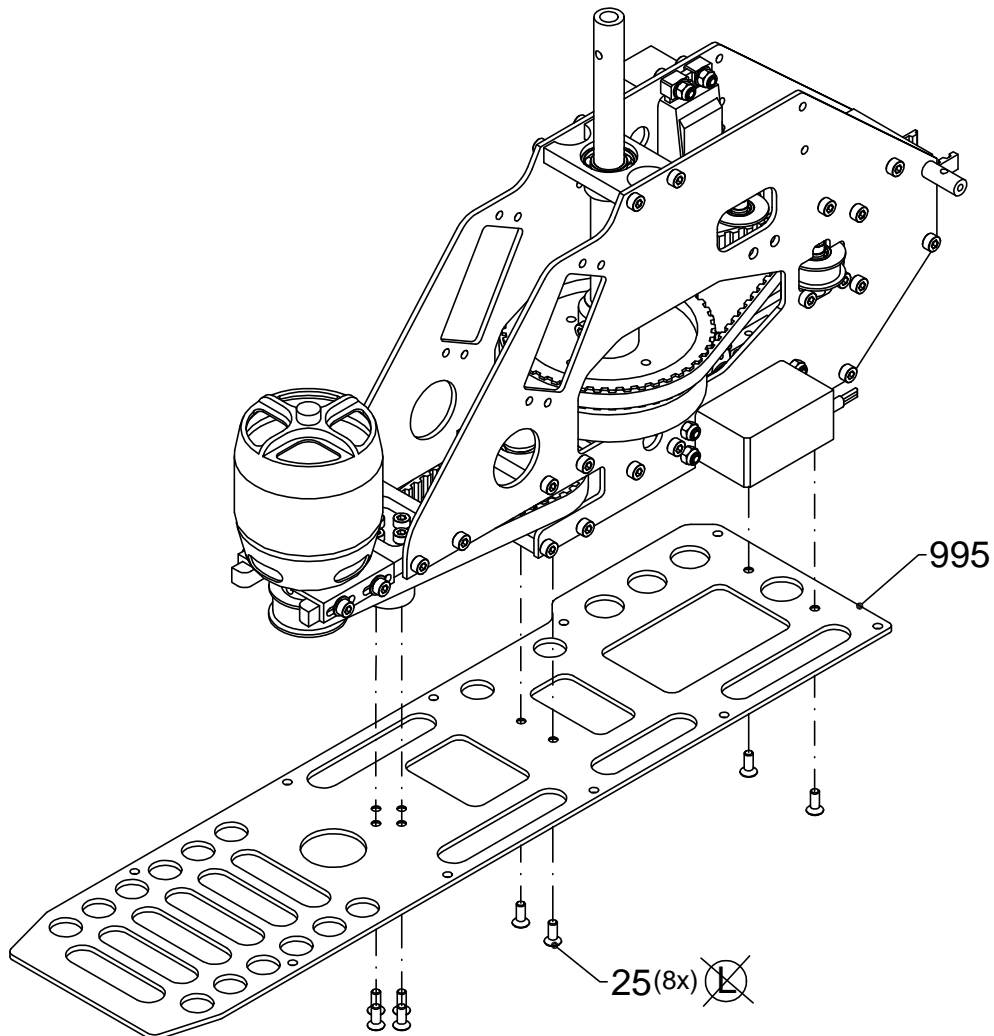
Ⓛ = use Loctite




Make sure that both belts are placed correct before mounting the frames.

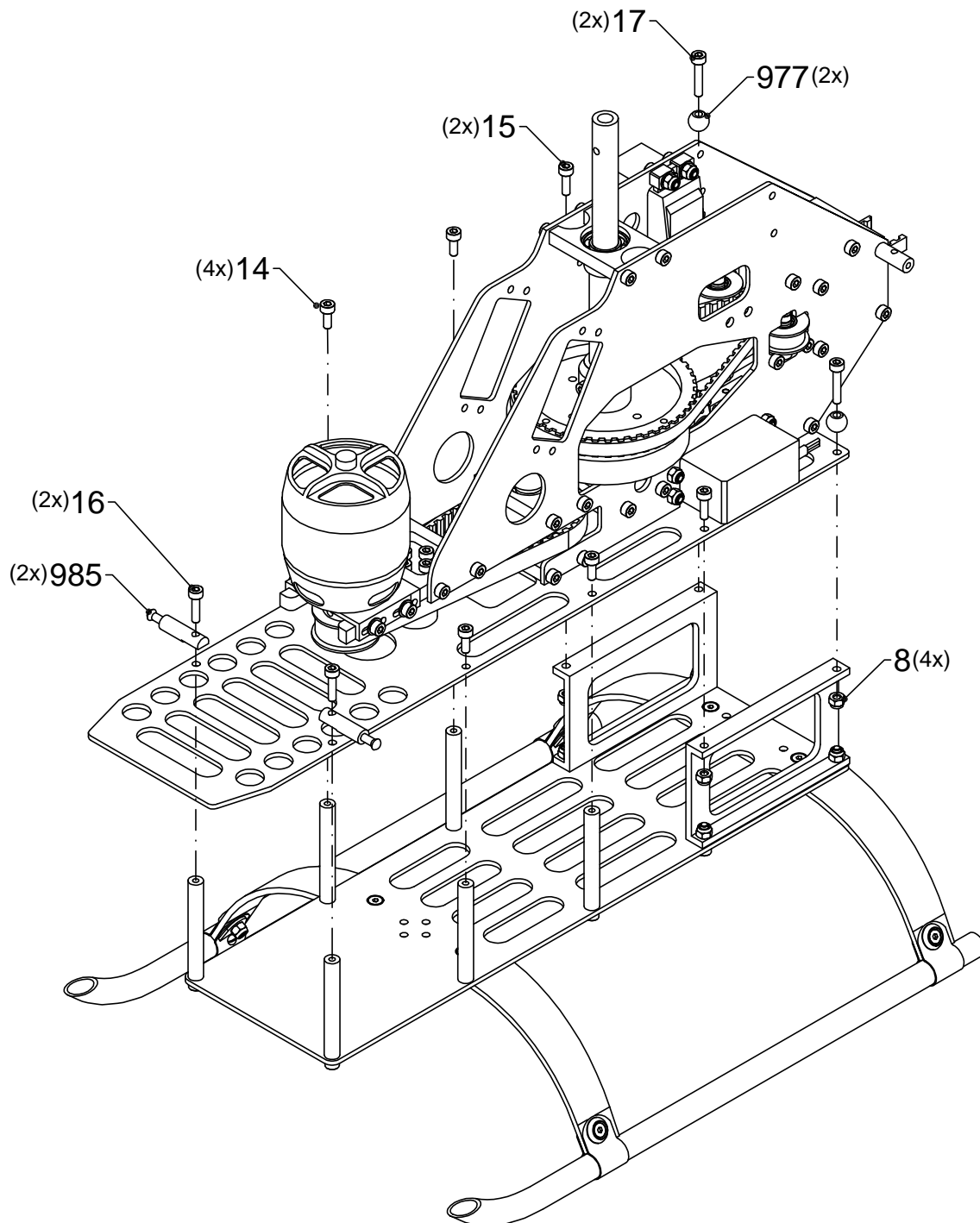
8 = lock nut M3
 14 = hex screw M3 x 8
 709 = hex screw M3 x 45

10a

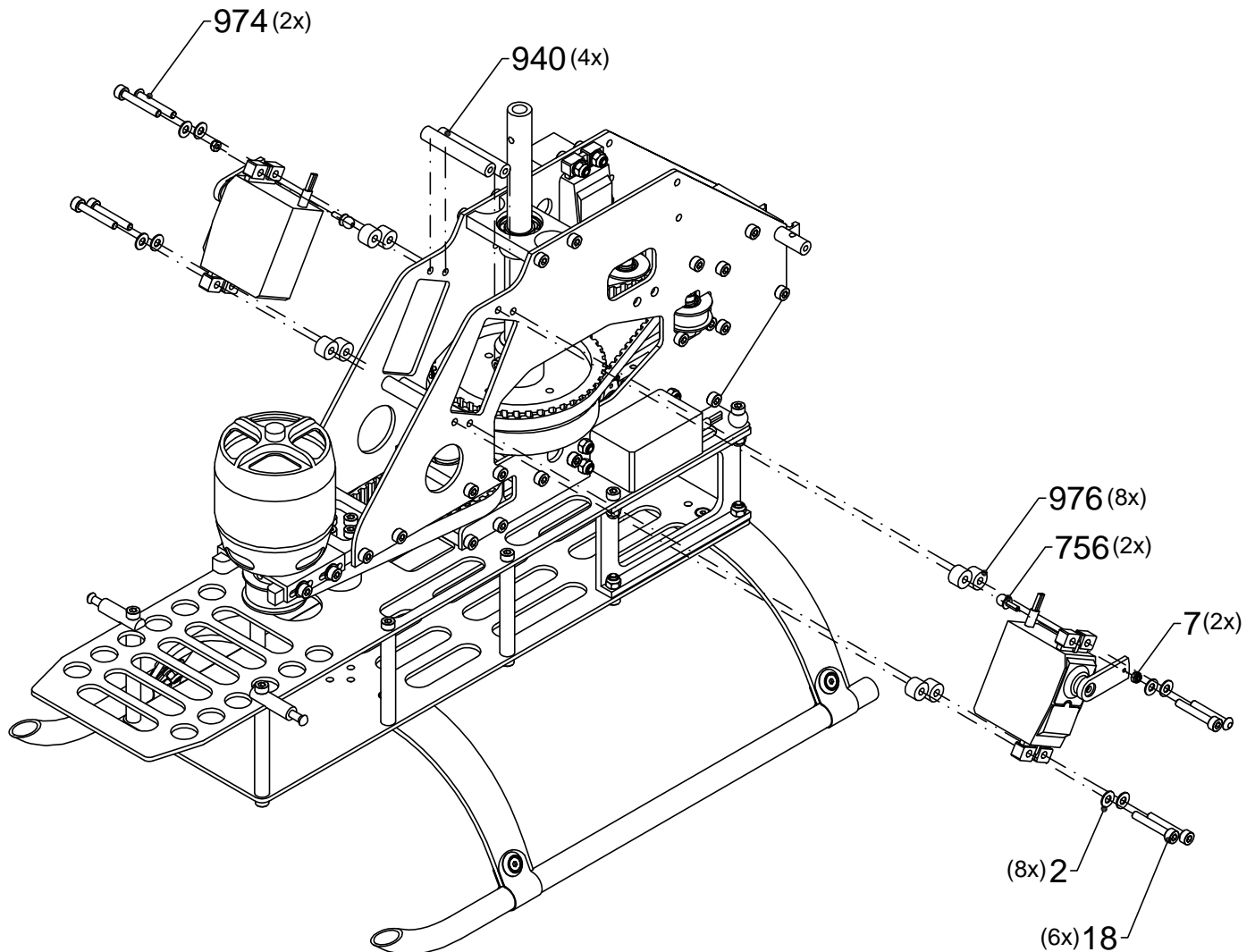


25 = hex countersunk screw M3 x 8

 = do not use Loctite



- 8 = lock nut M3
14 = hex screw M3 x 8
15 = hex screw M3 x 10
16 = hex screw M3 x 12
17 = hex screw M3 x 16



Part 940 is 37 mm long!

Part 987 (page 11b) is 36.5 mm long!

Servo horn length of all swashplate servos: 19-20 mm

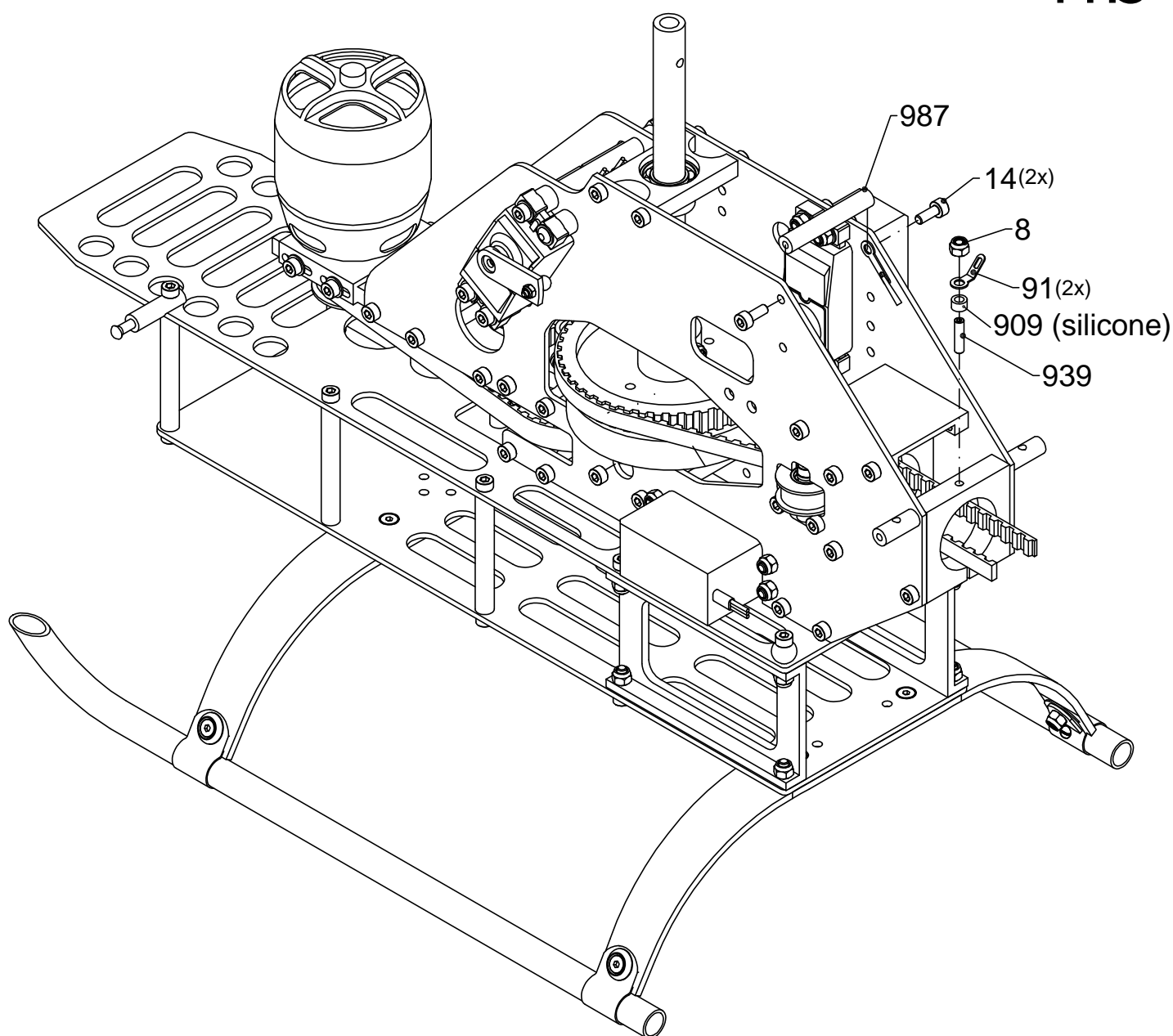
2 = washer M3

7 = lock nut M2

18 = hex screw M3 x 20

974 = hex lense screw M3 x 20

11b

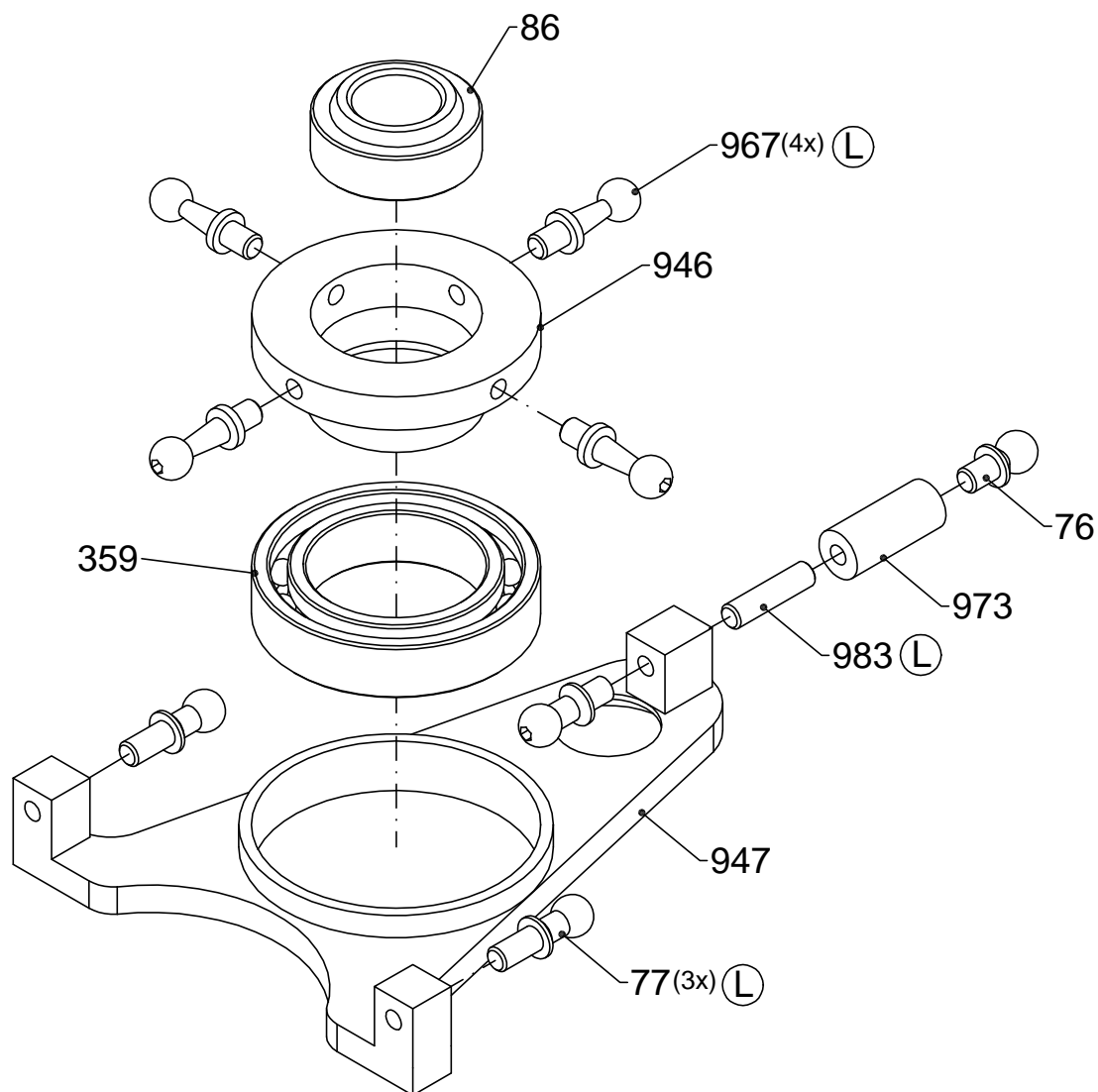


Fix screw 939 first when tailboom is tightened correctly (after bag 14) and then as deep as an electric contact is guaranteed /ring cutter on screw!). Do not bore before!
The tailboom is then a little bit squeezed. Solder cable eyes with cable to realize electric contact between boom and frame. Important to avoid electric interferences!

8 = lock nut M3
14 = hex screw M3 x 8

(L) = use Loctite

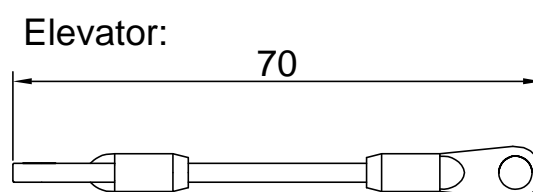
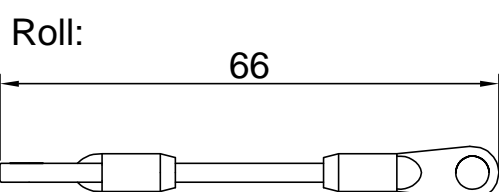
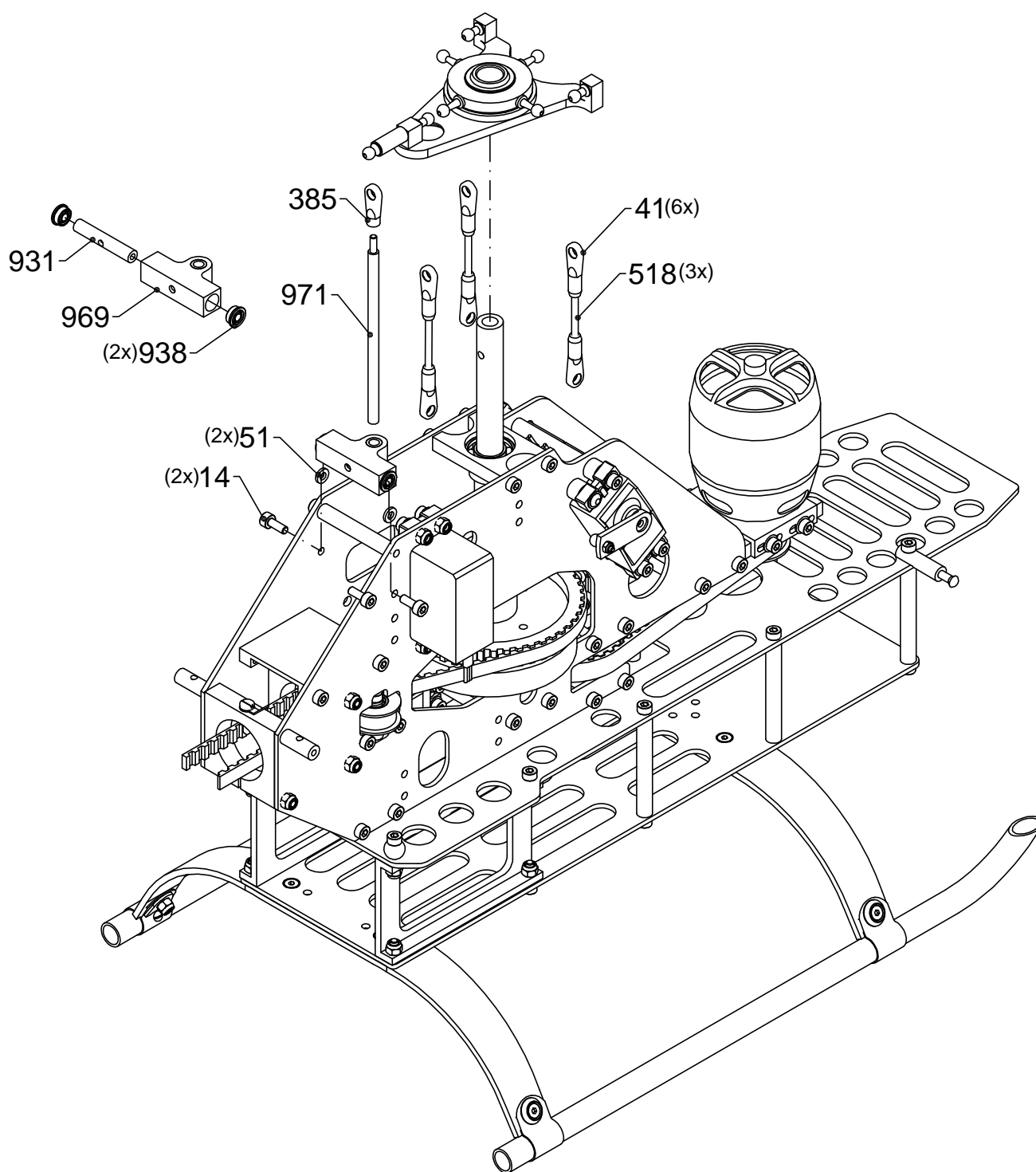
12a

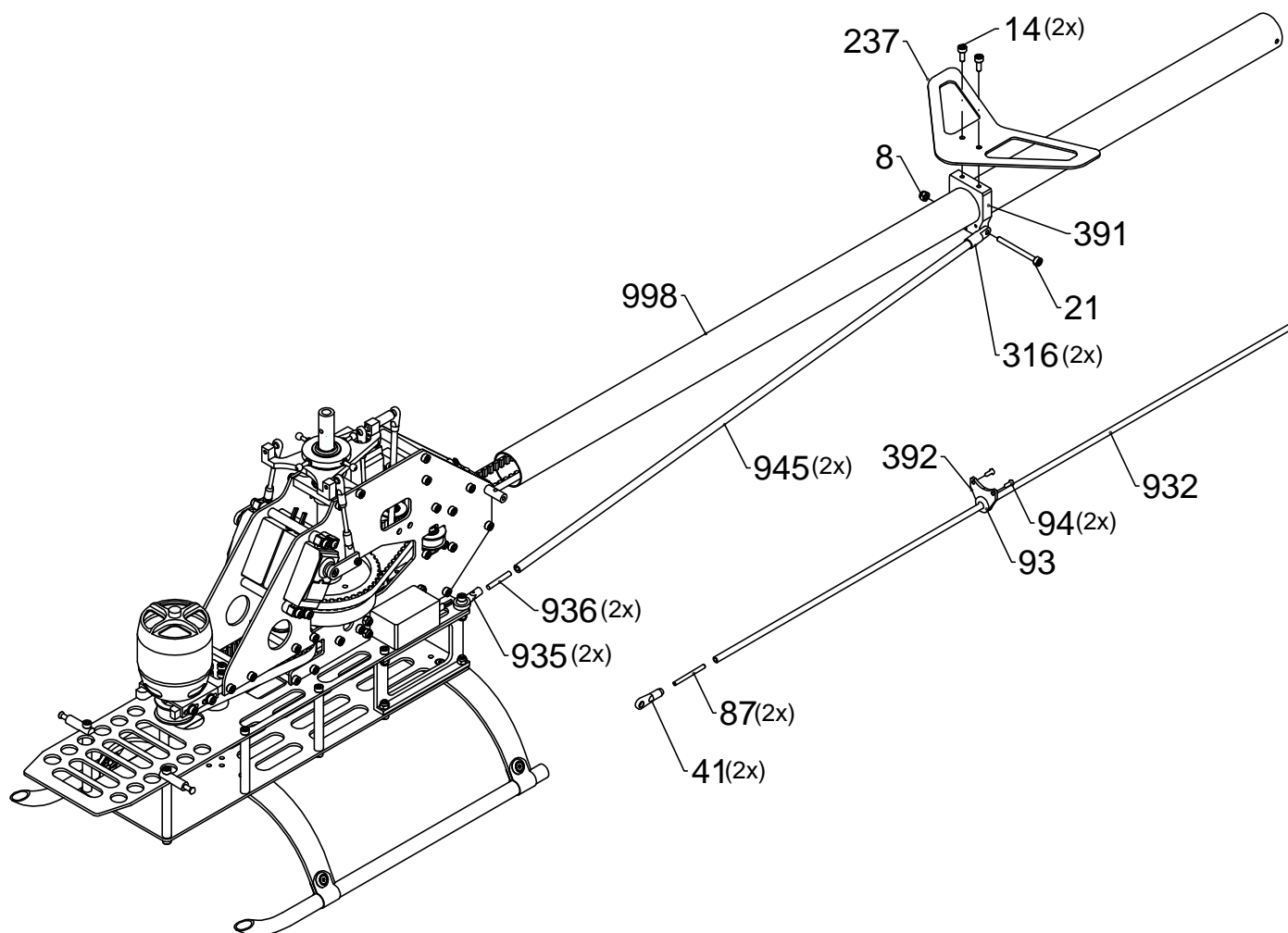


76 = joint bolt M3 x 4
 77 = joint bolt M3 x 6
 967 = joint bolt M3 x 9
 983 = grub screw M3 x 10

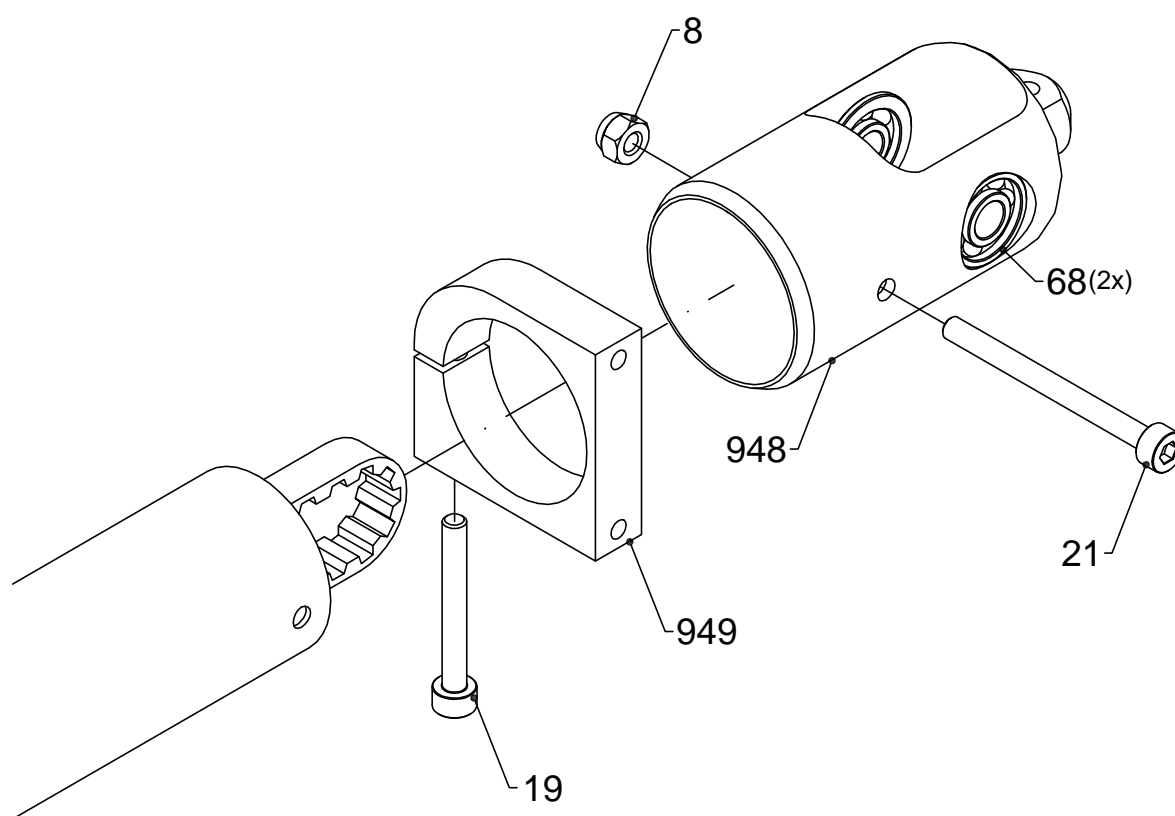
(L) = use Loctite

12b





- 8 = lock nut M3
- 14 = hex screw M3 x 8
- 21 = hex screw M3 x 35
- 93 = rubber grommet 5mm
- 94 = tapper screw 2.2 x 6.5



Drill holes in tailboom after mounting the tailgear housing (with pressure!) using a Ø3.0mm drill.

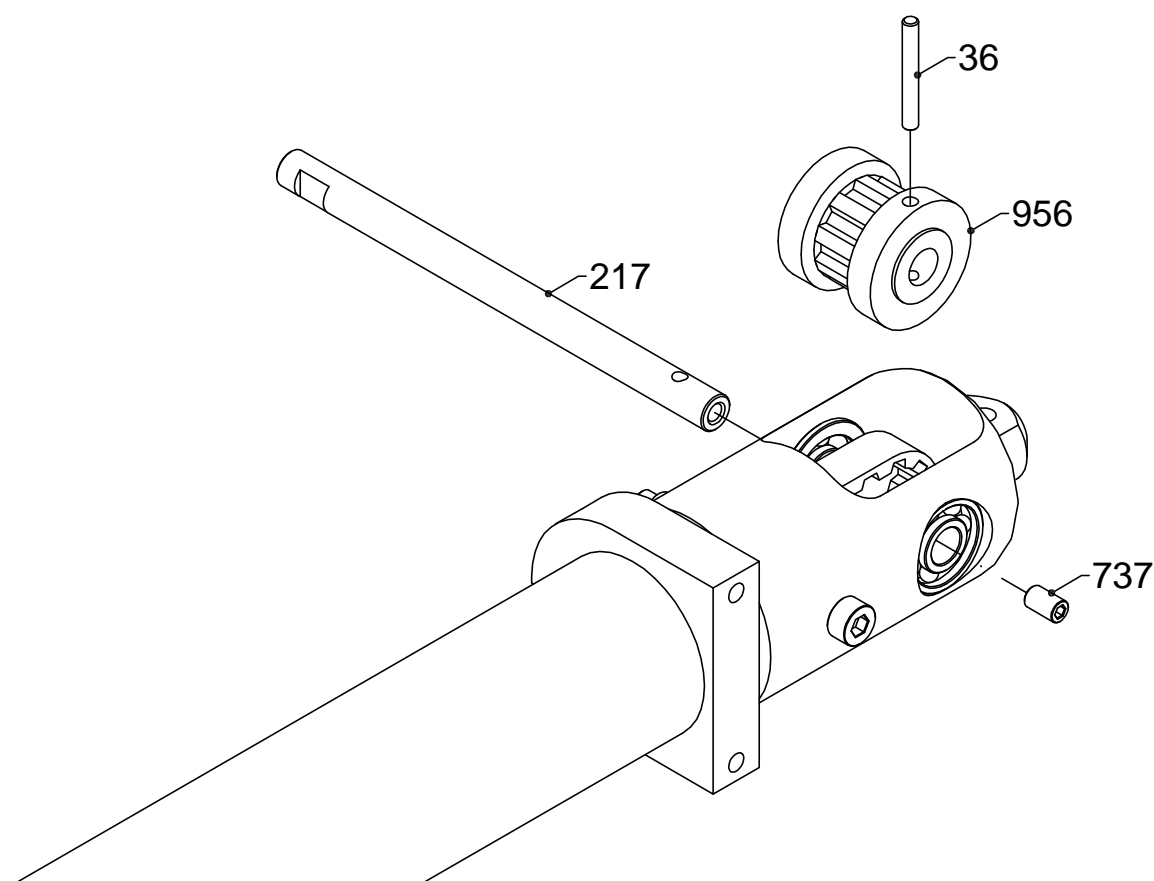
For a right turn mainrotor (cw) turn belt 90 degree to the left (seen from tail in front direction).

For left turn mainrotor (ccw; optional) turn belt 90 degree to the right!

8 = lock nut M3

19 = hex screw M3 x 25

21 = hex screw M3 x 35

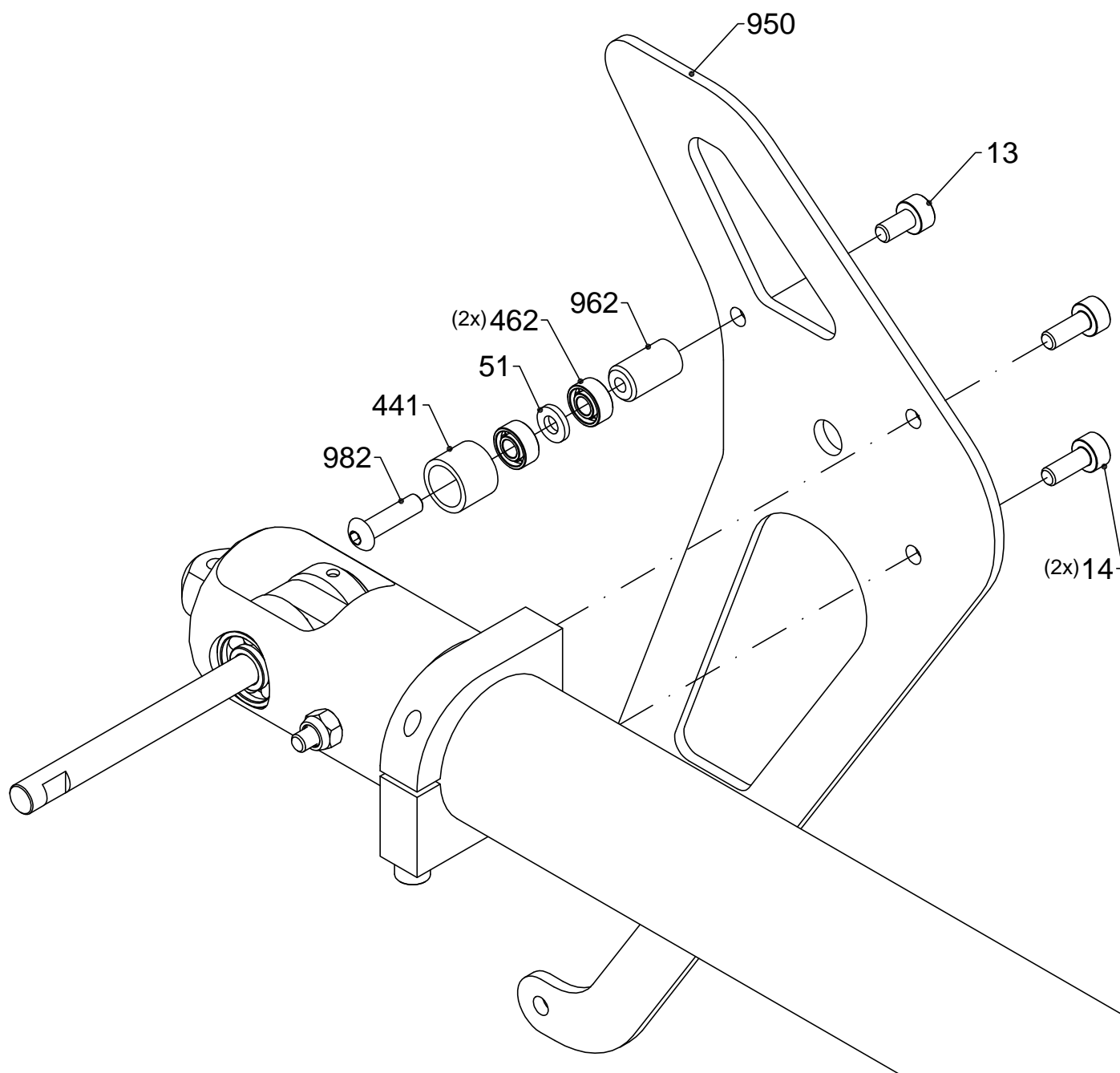


Mounting of belt wheel:

1. Remove belt from big front belt wheel.
2. Pull belt up- and backwards out of the housing.
3. Insert belt wheel into the belt.
4. Pull belt for- and downward into the housing.
5. Insert tailrotor shaft.
6. Add pin and grub screw.
7. Mount belt again on the front belt wheel.
8. Justate the belt tension moving the tailboom.

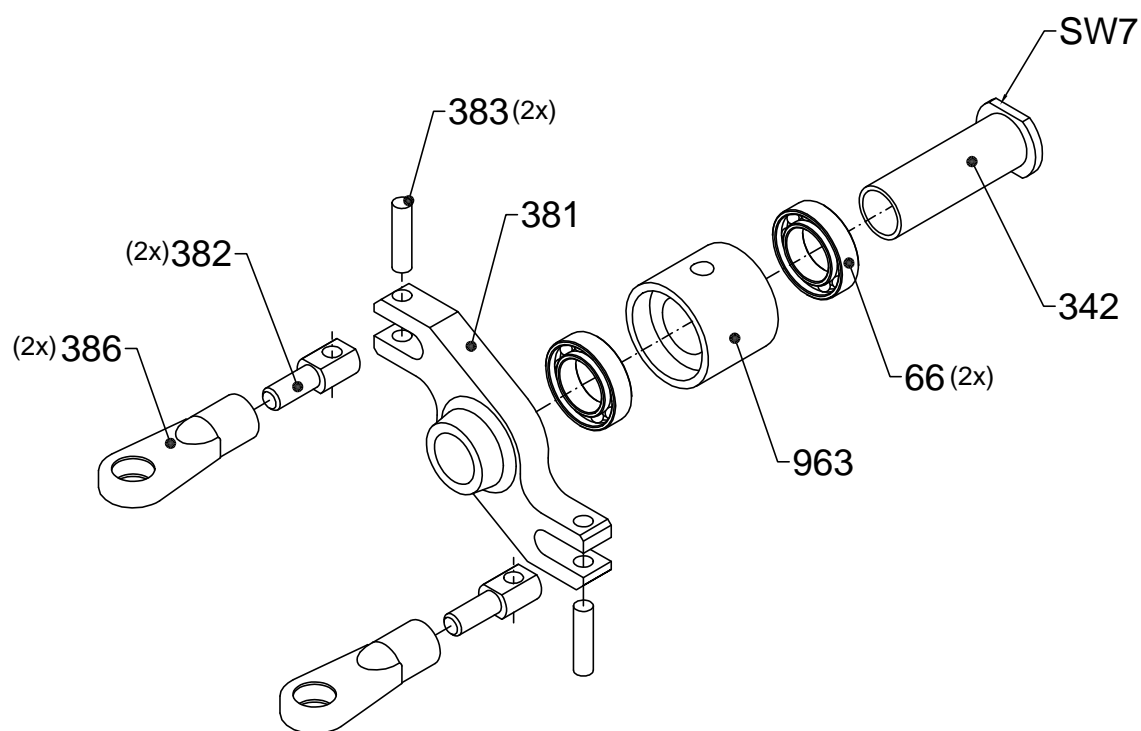
36 = solid pin 1.96 mm
737 = grub screw M3 x 5

14c



Attention: Roller may not run with the belt!
Distance to belt 0.2-0.3mm!

- 13 = hex screw M3 x 6
- 14 = hex screw M3 x 8
- 51 = washer 3 x 6 x 1
- 982 = hex lense screw M3 x 12

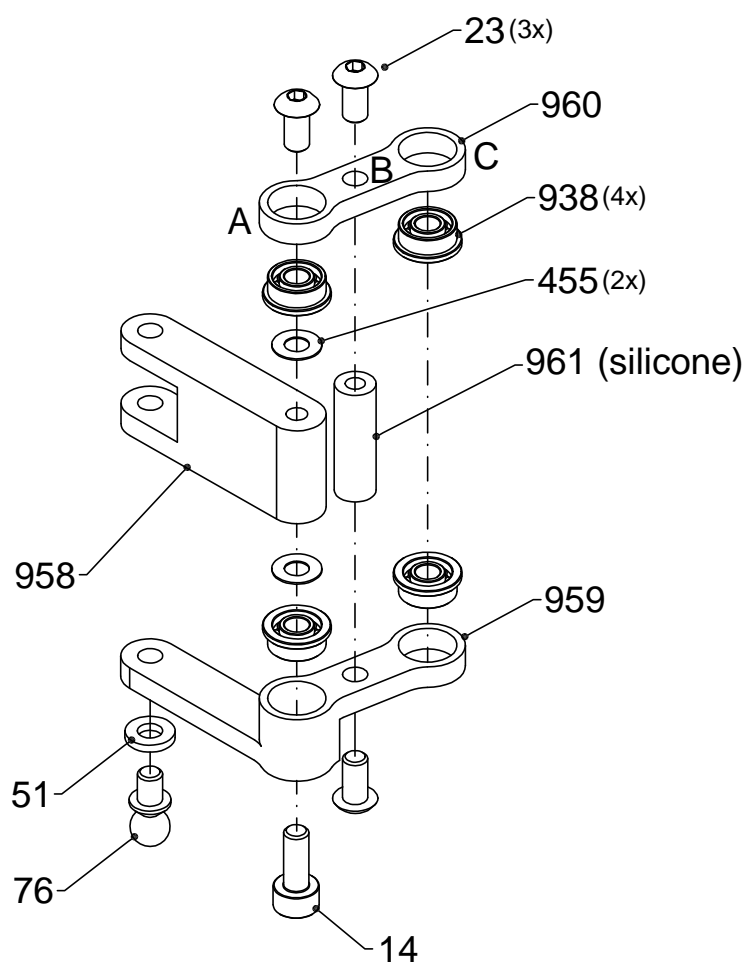


66 = ball bearing 6 x 10 x 2.5

Oil ball bearings frequently!

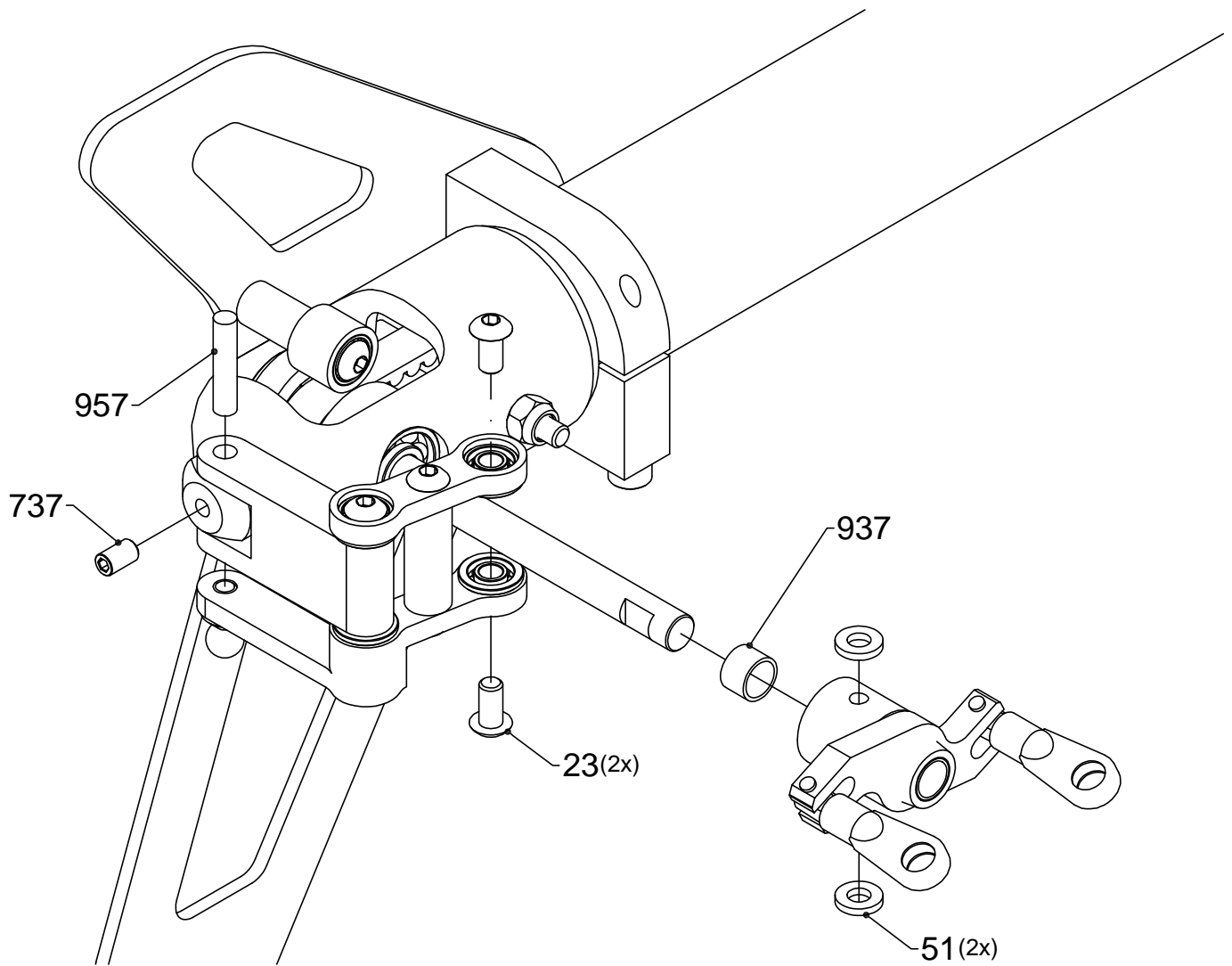
Tip: Don't screw in by hand,
but press bridge on in a vice
(check for squareness)!

Attention: Distance between hole A and B is shorter than distance from hole B to C!

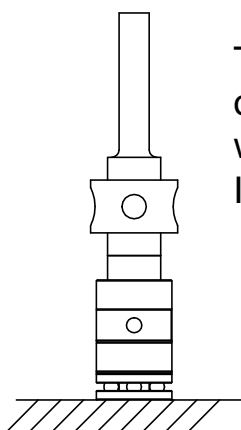


14 = hex screw M3 x 8
 23 = hex lense screw M3 x 8
 51 = washer 3 x 6 x 1
 455 = washer 3 x 6 x 0.2

16b

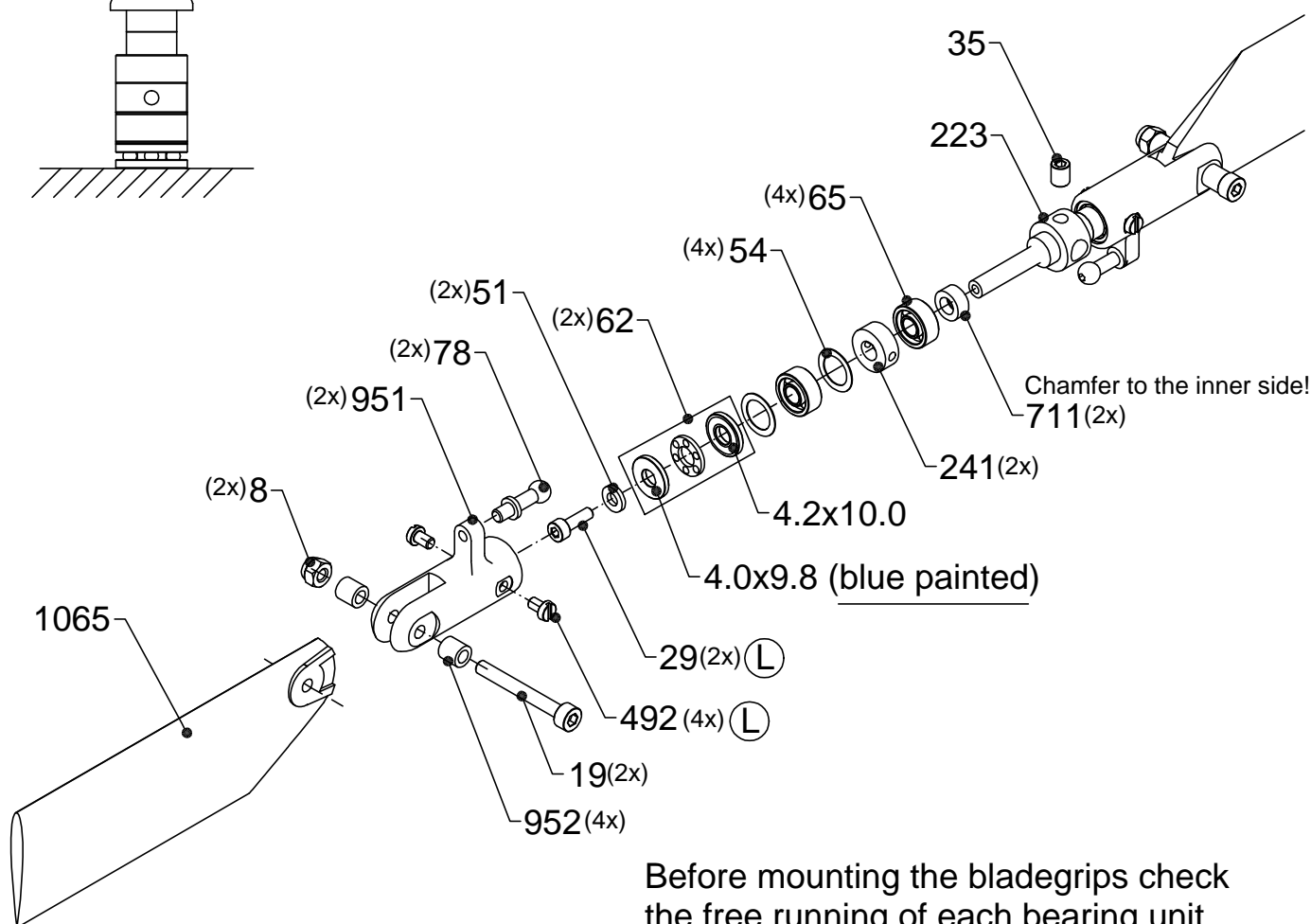


737= grub screw M3 x 5
23 = hex lense screw M3 x 6
51 = washer 3 x 6 x 1



Tip: Press each unit without screw and shim onto a table. The ball bearings must just turn free without noticable end play.

If not free then sand the alu bush 711 a liittle bit.

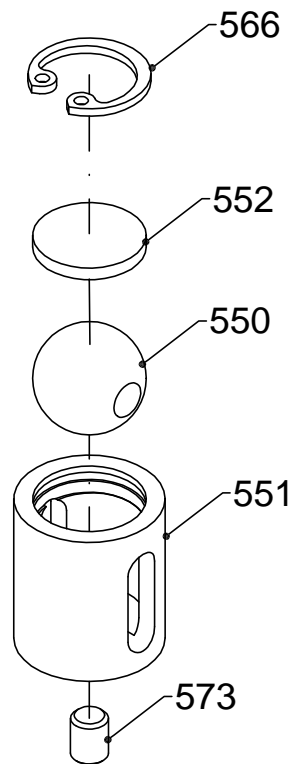


Before mounting the blade grips check the free running of each bearing unit, if required shorten bush 711 a little bit (remove from side with chamfer with sandpaper)!

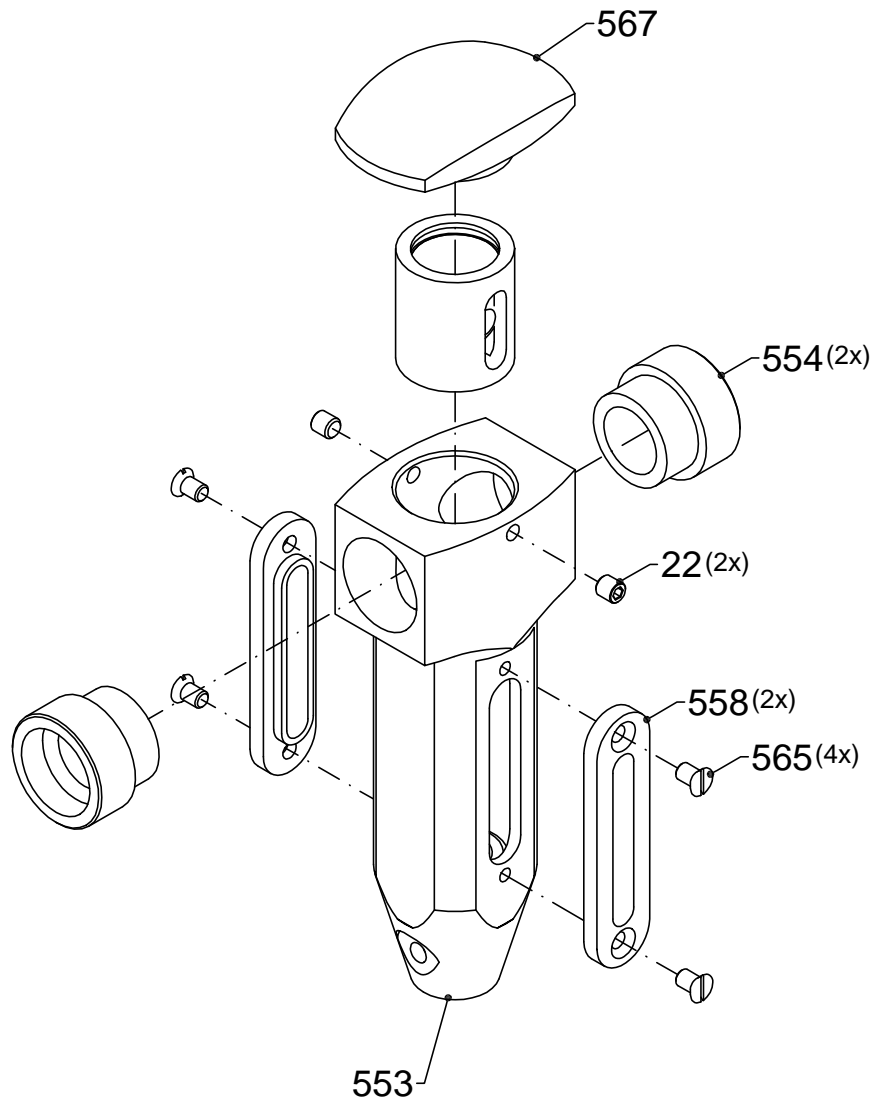
Important: Blue painted thrust bearing washer must be mounted at the outside!

- 8 = lock nut M3
- 19 = hex screw M3 x 25
- 35 = grub screw M4 x 5
- 54 = washer 7 x 10 x 0.2
- 62 = axle bearing B4
- 78 = joint bolt M3 x 9
- 492 = cylindric screw M2.5 x 4
- 982 = hex lense screw M3 x 12

(L) = use Loctite

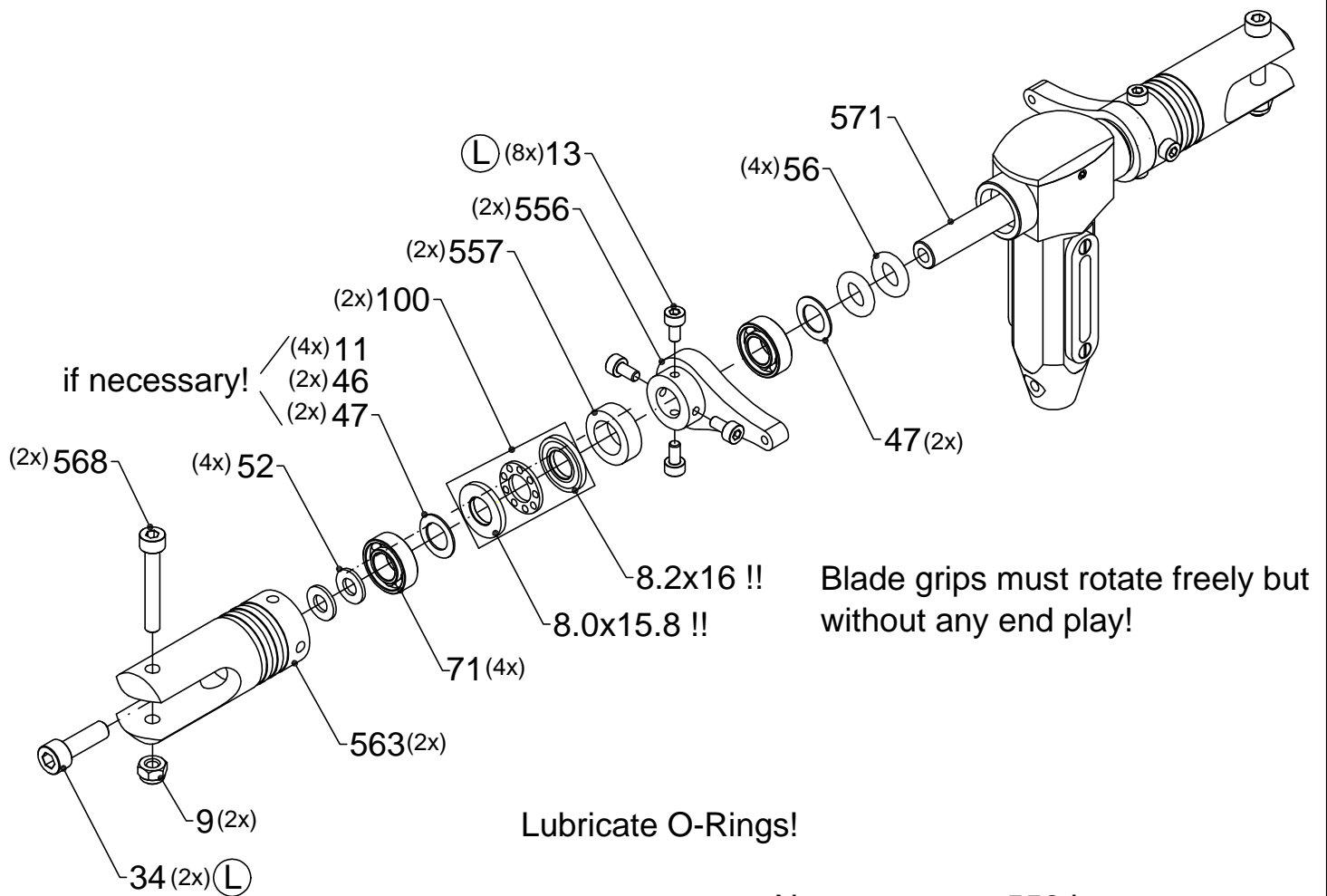


573 = grub screw M4 x 4



22 = grub screw M3 x 3

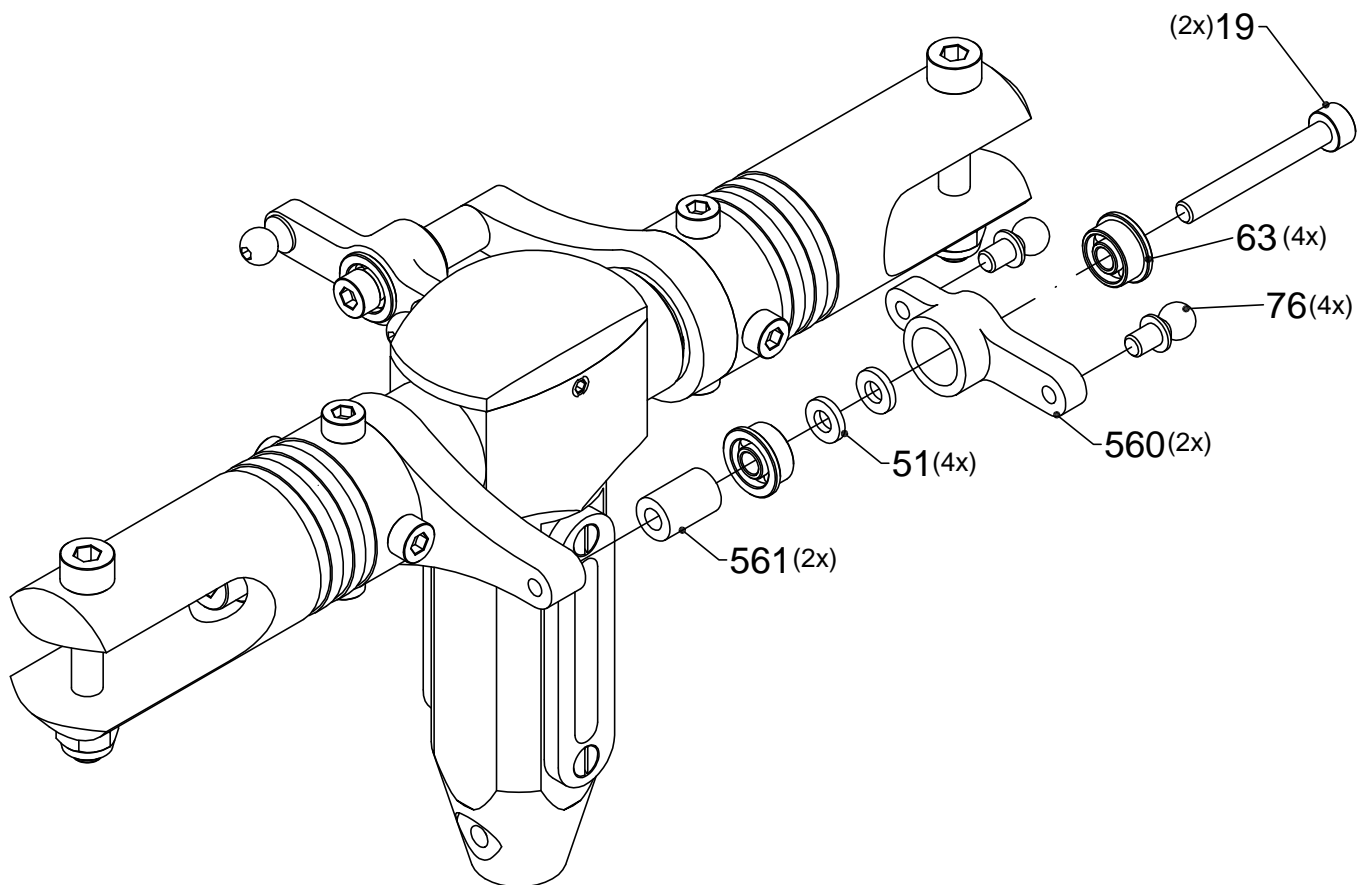
565 = countersunk screw M2.5 x 4



- 11 = washer 8x14x0.2
- 13 = hex screw M3 x 6
- 34 = hex screw M5 x 12 12.9
- 46 = washer 8x14x0.1
- 47 = washer 8x14x0.5
- 52 = washer 5x10x1
- 71 = ball bearing 8 x 16 x 5
- 100 = axle bearing B8

(L) = use Loctite

19b



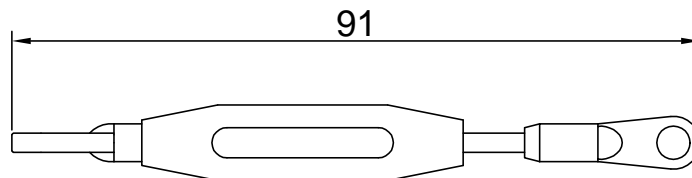
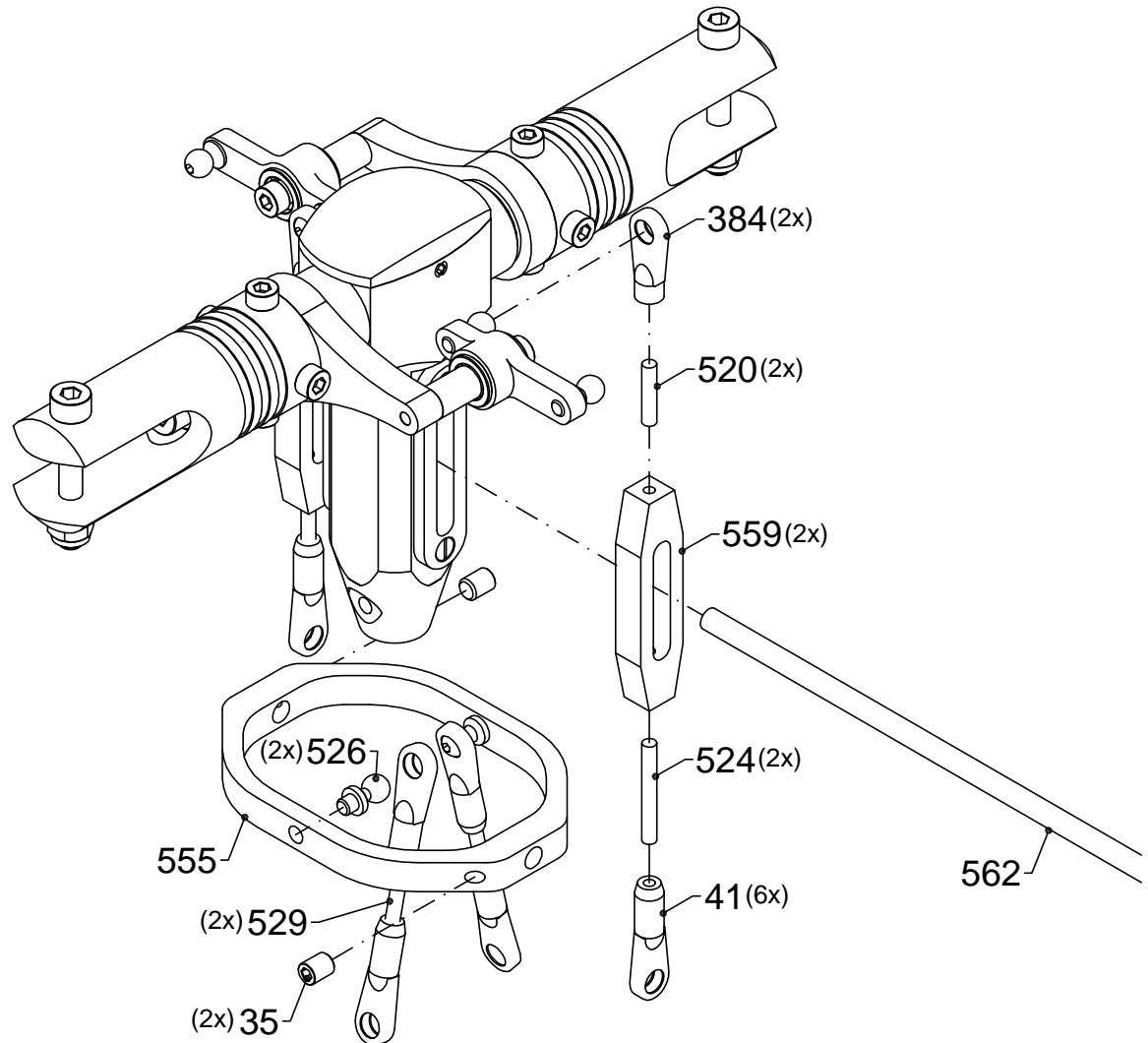
19 = hex screw M3 x 25

51 = washer 3 x 6 x 1

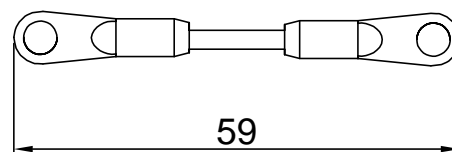
76 = joint bolt M3 x 4

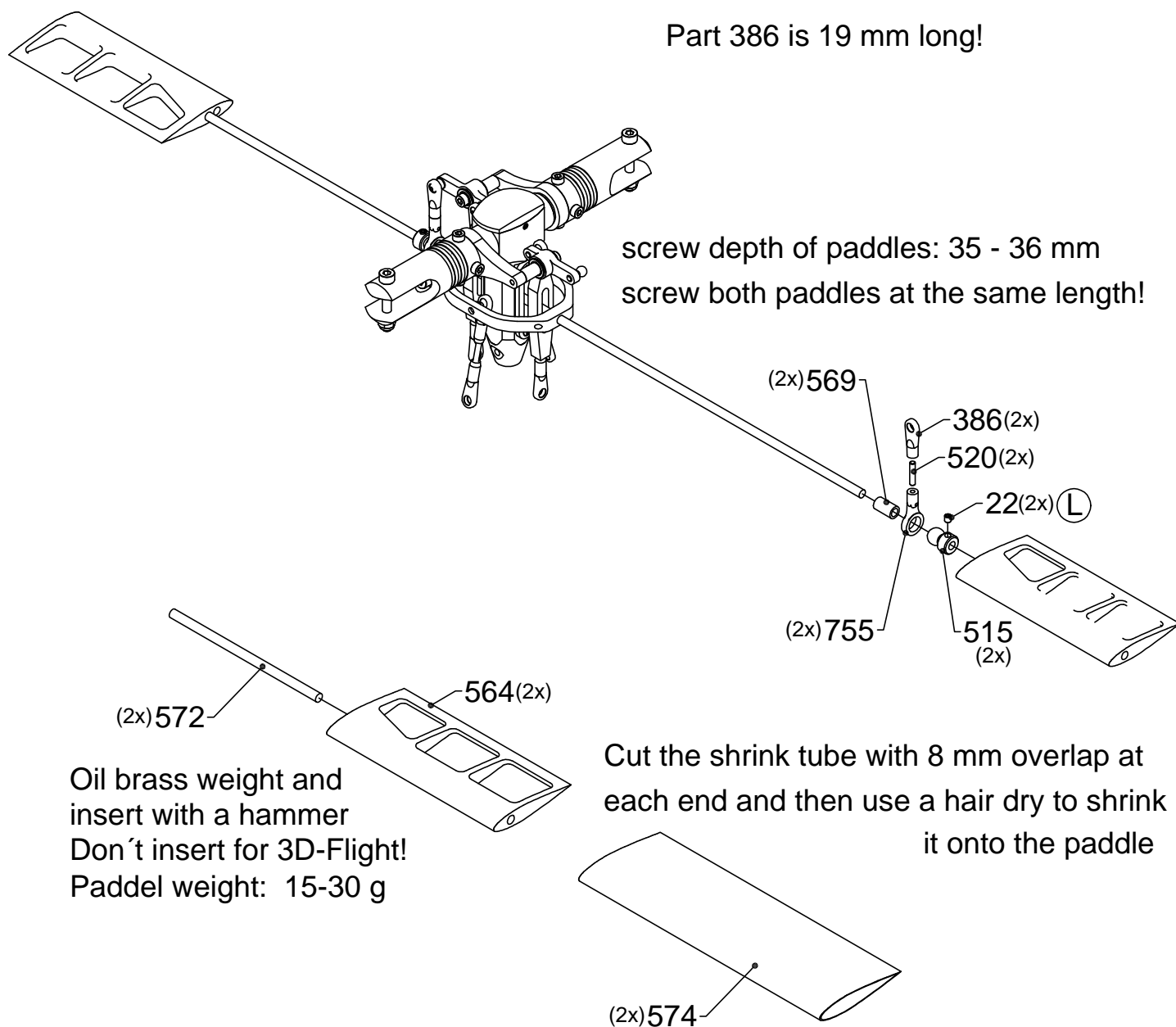
20a

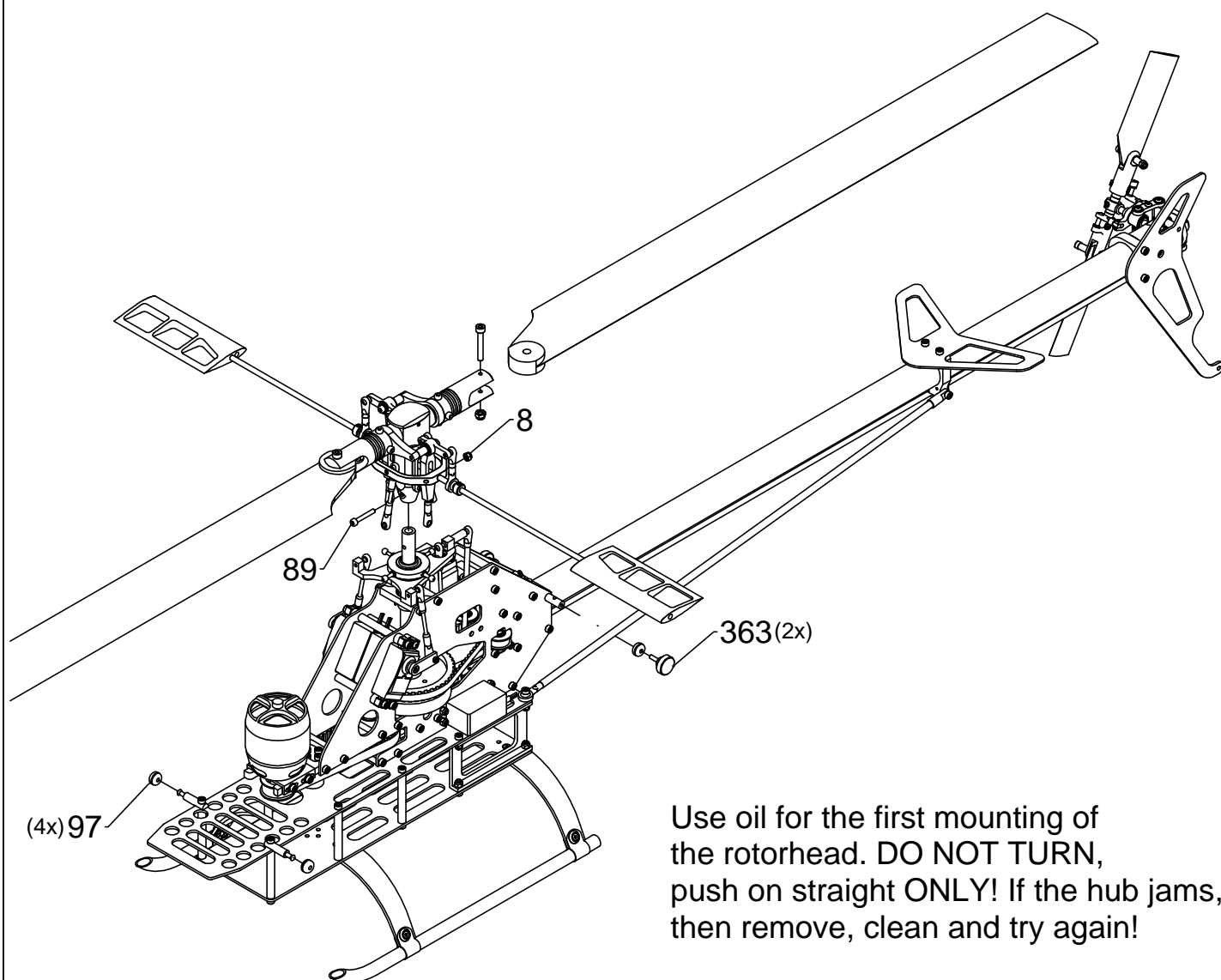
Part 384 is 17 mm long!



520 = control rod 12 mm long
 524 = control rod 26 mm long
 529 = control rod 31 mm long
 35 = grub screw M4 x 5
 526 = joint bolt M3 x 5.5





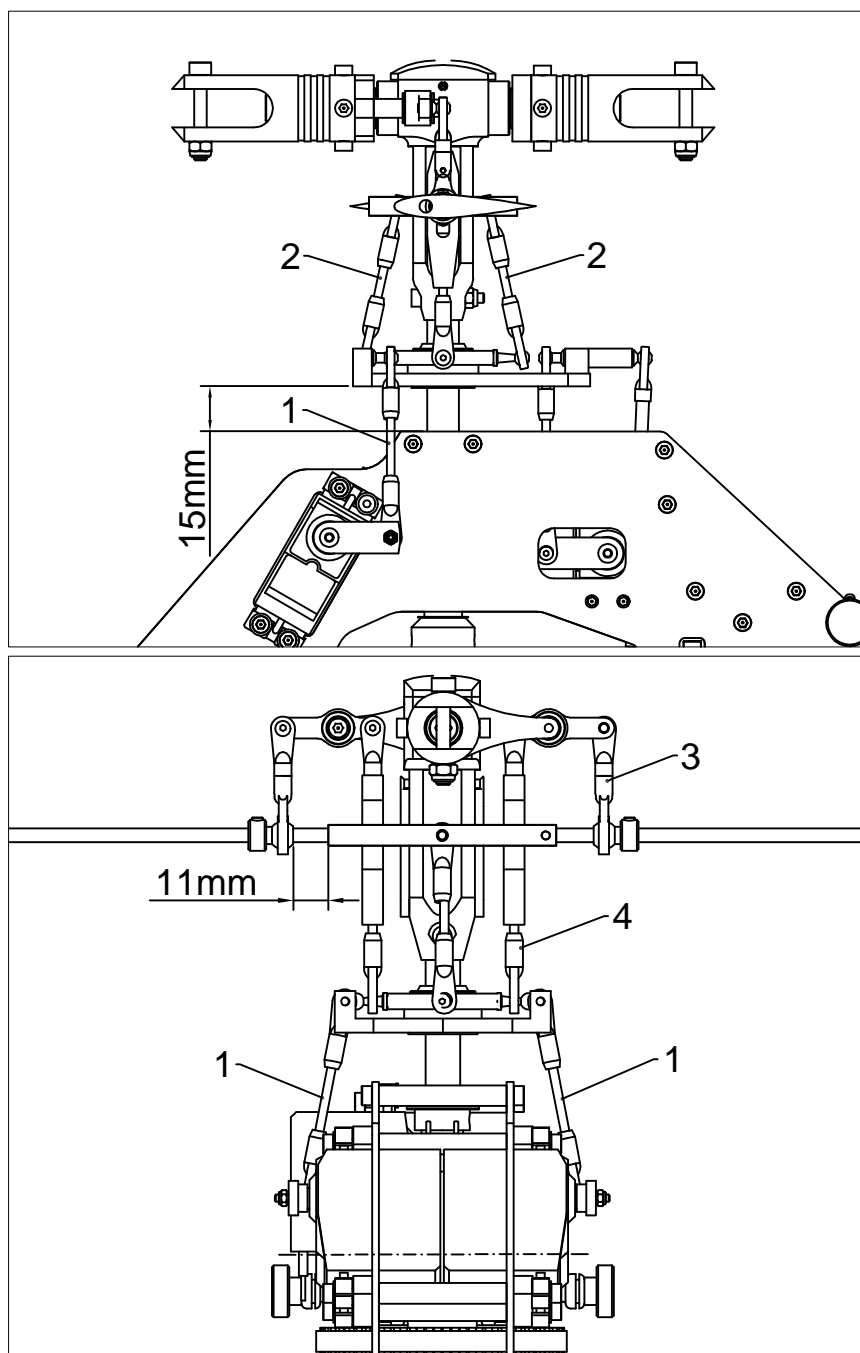


Use oil for the first mounting of the rotorhead. DO NOT TURN, push on straight ONLY! If the hub jams, then remove, clean and try again!

8 = lock nut M3

89 = hexagon socket screw M3 x19 special

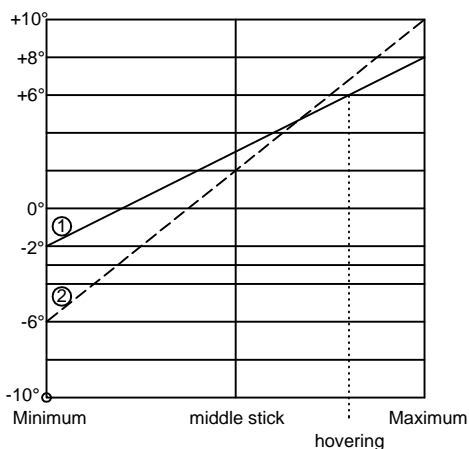
97 = rubber grommet 3 mm



1. All servo horns must be in horizontal position.
2. Adjust pushrods (1) to level the swashplate (Distance to frame edge: 15mm).
3. Adjust pushrods (2) to the Hiller bridge until the flybar is centered in the brass lined slots.
4. Double ball links (3) between flybar and mixer arm are 42 mm long.
5. Adjust the lower ball links (4) between swash plate and mixer arms until the mixer arms are horizontal.
6. With a pitch gauge check the actual blade pitch and adjust lower ball links of rod 4 until both blades are at zero degrees pitch.

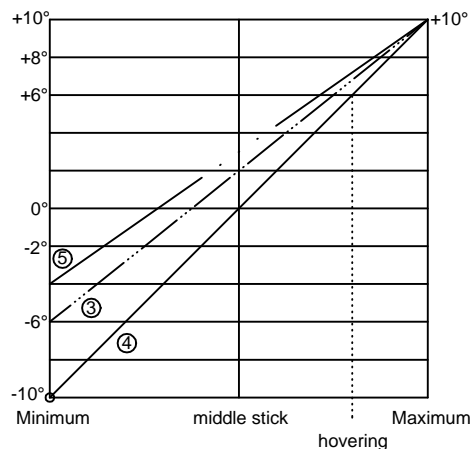
Pitch gauge

1. normal flight, 1400 1/min



- ① Hovering/Beginner
- ② Forward flight/Advanced

2. aerobatic, 1800 bis 2000 1/min



- ③ Aerobatic FAI
- ④ Aerobatic 3D
- ⑤ Autorotation

Recommended rotorspeed: 1400 - 2000 1/min

Deflections:

Elevator: Hovering 1400 1/min: 15° 20% Exponential
 Forward flight 1400 1/min: 20° 10% Exponential
 Aerobatic 2000 1/min: 20° 10% Exponential

Roll: Hovering 1400 1/min: 15° 20% Exponential
 Forward flight 1400 1/min: 20° 10% Exponential
 Aerobatic 2000 1/min: 20° 10% Exponential

Tailrotor: All Phases: +26°/-10° 40-50% Exponential

