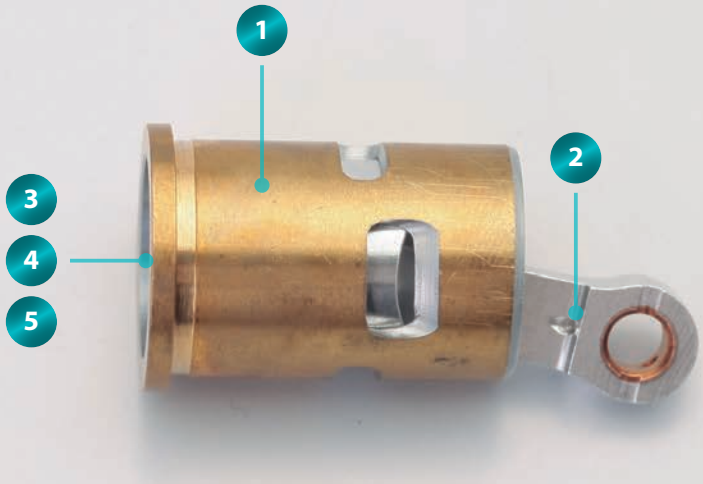
Stage 57

The crankcase piston

Your parts



1 Cylinder
2 Connecting rod
3 Piston
4 Piston pin
5 Piston pin stopper

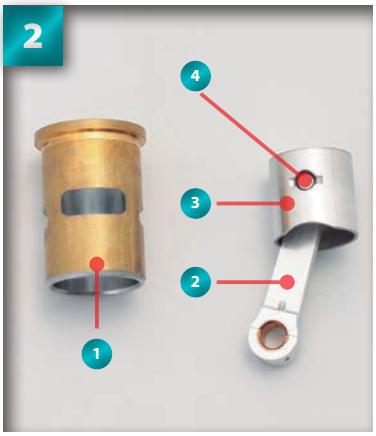
Tools and materials

Tweezers, or needle-nose pliers
Air blower
Paper towel
Crankcase assembly (Stage 56)
Plastic bag

1

Gently remove the piston from the cylinder.

2



Your separated parts should look like this, with the piston connected to the connecting rod by the piston pin.

Inspect the cylinder. There are four holes in its metalwork, but the only one with a bevelled lower edge is at the front, known as the front intake port.

3

Directly opposite the front intake port is the rear scavenging port, through which waste gas is ejected.

4

5

There are two smaller ports on either side. These will support the front intake port.

6

Take a close look at the piston itself. It is connected to the rod by the piston pin, which is in turn prevented from falling out by the piston pin stopper (highlighted).

At the lower end of the connecting rod there are a number of grooves and holes. These help circulate the lubrication oil while in motion.

7

Looking down into the piston shows the connecting rod, piston pin and stopper (circled).

8

9

Holding the crankcase assembly as shown, rotate the crankshaft so that its connecting pin (circled) is at the bottom of the crankcase, known as 'bottom dead centre'.

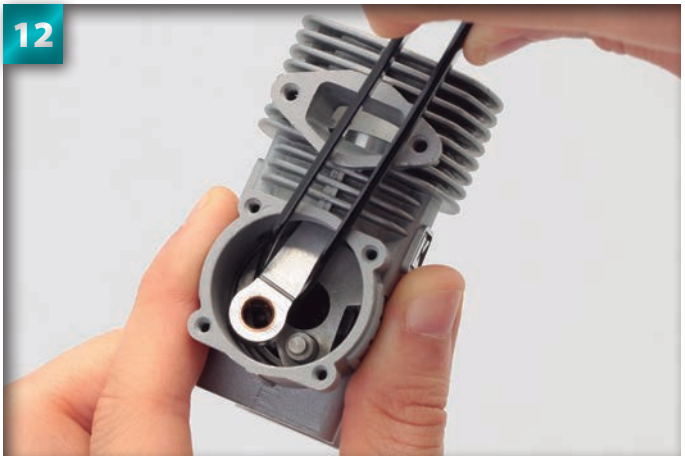
10

Slowly slide the piston, connecting rod side first, into the top of the crankcase. Make sure the bottom edge of the piston that has a shallow, curved indent in it faces the front of the crankcase.

11

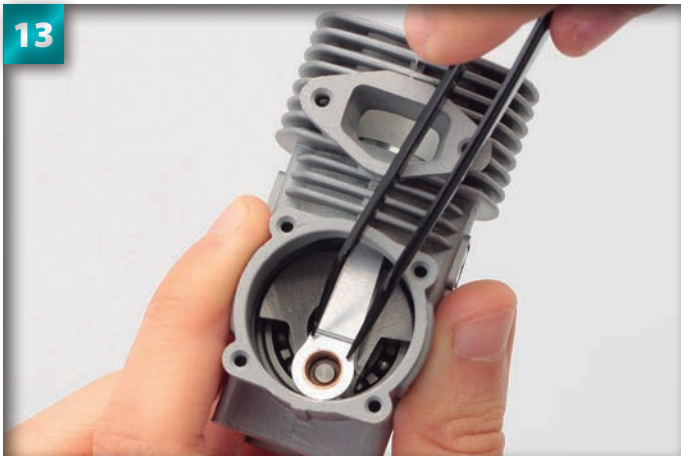
Your assembly should look like this.

12



Use tweezers, or needle-nose pliers wrapped in tissue, to lift the connecting rod over and on top of the pin of the crankshaft.

13



Carefully join the parts, but do not force them. Move them from side to side until they fit effortlessly together.

14

Once the parts are fitting together comfortably, press the rod completely onto the pin using your thumb.

15

Now slowly rotate the crankshaft so that the pin is at the top of the crankcase, with the counterweight at the bottom.

16

The piston should be sitting flush with the top edge of the crankcase chamber.

From the side, the parts should look like this.

17

With the back side of the crankcase and the rear scavenging port both facing you, line up the cylinder with the raised piston.

18

19

Once aligned, gently slide over the piston so that the cylinder enters the crankcase.

20

Lower the cylinder into the crankcase, stopping to check the alignment of the rear port is at the point circled.

Your assembly should look like this from the front. Note the position of the side ports, and make sure that the front intake port is not visible.

21

Turning the cylinder gently from side to side, continue to lower the part into the crankcase. Make sure that the piston remains in its current position.

22

Make sure that the rear scavenging port at the back of the assembly is in line with the exhaust port of the crankcase. The photo shows the incorrect positioning of the parts – note the misaligned edge of the rear scavenging port (circled).

This photo shows how your assembly should look, with the scavenging port fully aligned with the exhaust port (see dotted red lines).

Press the cylinder down with both thumbs. It does not matter if the piston moves a little.

Your assembly should look like this, with the cylinder just above the top edge of the crankcase.

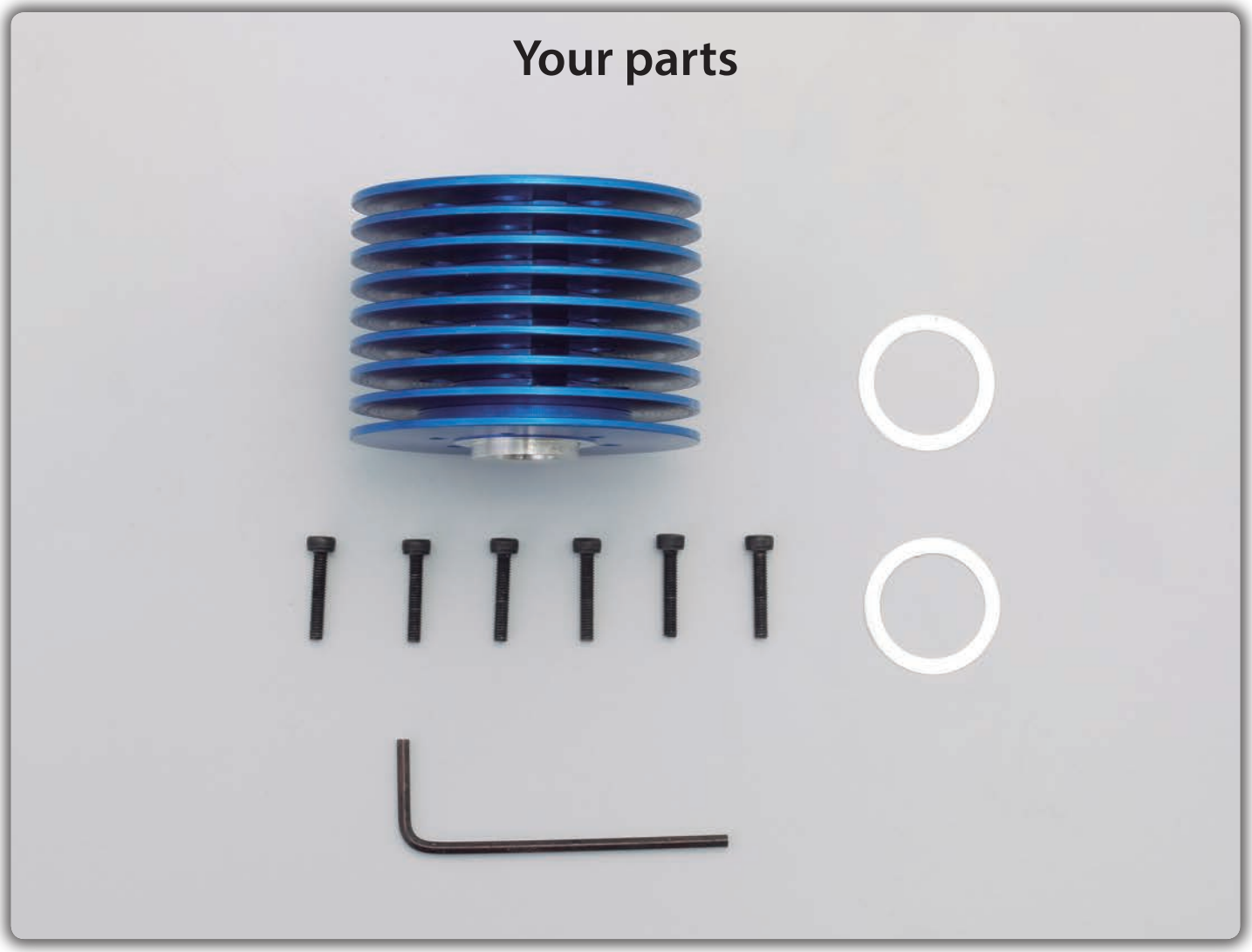
To complete the stage, blow into the crankcase to make sure no dust settles inside the chamber. Using a modelling air blower will help with this if you have one.

Assembled parts

Store your assembled parts in a sealed plastic bag.

Installing the cylinder head

Your parts



Cylinder head
2.5 × 14mm cap screws × 6
Gaskets × 2
2mm Allen key

Tools and materials

Crankcase assembly (Stage 57)
Sealable plastic bag

1

Familiarise yourself with the cylinder head. The large hole in the top will accommodate the glowstarter plug, and the six smaller holes will be used for screws to attach the part to the crankcase.

2

At the bottom there is a raised circular section with a threaded hole at its centre.

Viewed from the side, there are two thin cylinders inside the cooling fins of the part. This helps to further dissipate heat.

3

Place the first gasket around the raised section at the bottom of the cylinder head. The gasket is very thin, so take care.

4

5

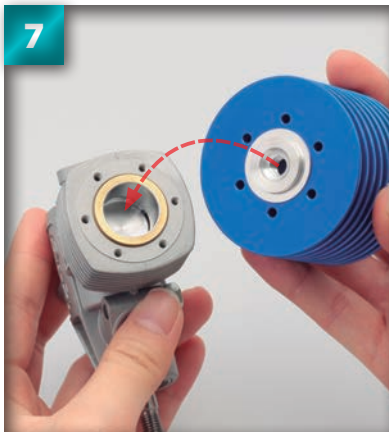
It does not matter which way round the gasket goes.

6

Place the second gasket on top of the first.

Position the cylinder head, gasket-side first, onto the top of the crankcase.

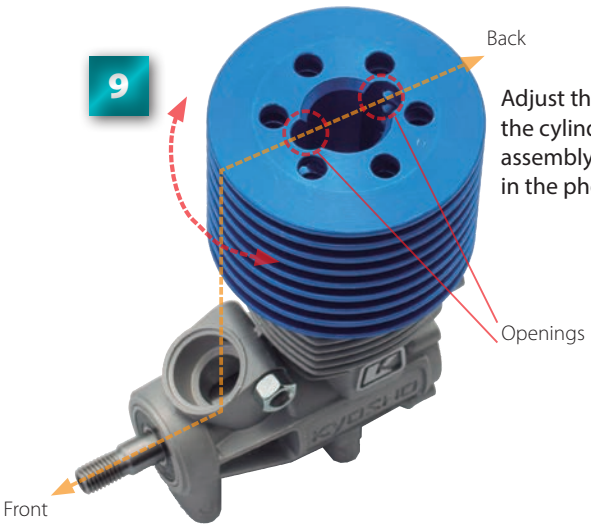
7



Making sure the gaskets do not fall off, join the parts as shown in the photo.

8

9

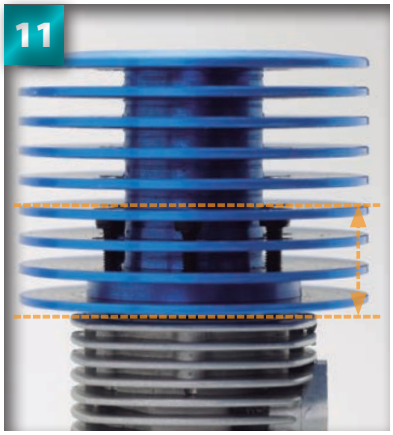


Adjust the orientation of the cylinder head until your assembly resembles the one in the photo.

10

With the assembly still in exact alignment, lower each 2.5 × 14mm cap screw into the holes in the top of the cylinder head.

11

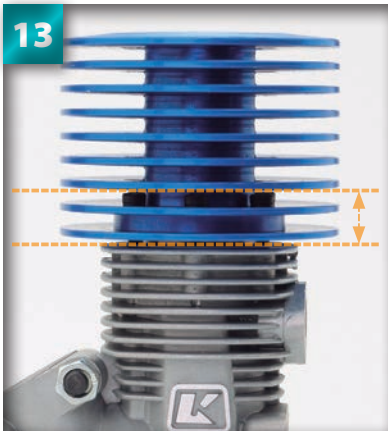


Guide the cap screws down through the fins until they rest four fins up from the bottom (orange arrows).

Lower the longer end of the 2mm Allen key into the first hole, and when it meets the cap screw head, tighten carefully into place as shown in the photo for Step 13.

12

13



Tighten each screw lightly until they are sitting inside their respective holes, protruding up to about the third fin.

Assembled parts

This stage is now complete. It is vital that dust does not get into the crankcase parts, so try to store in a dust-free environment, preferably in a sealed plastic bag.

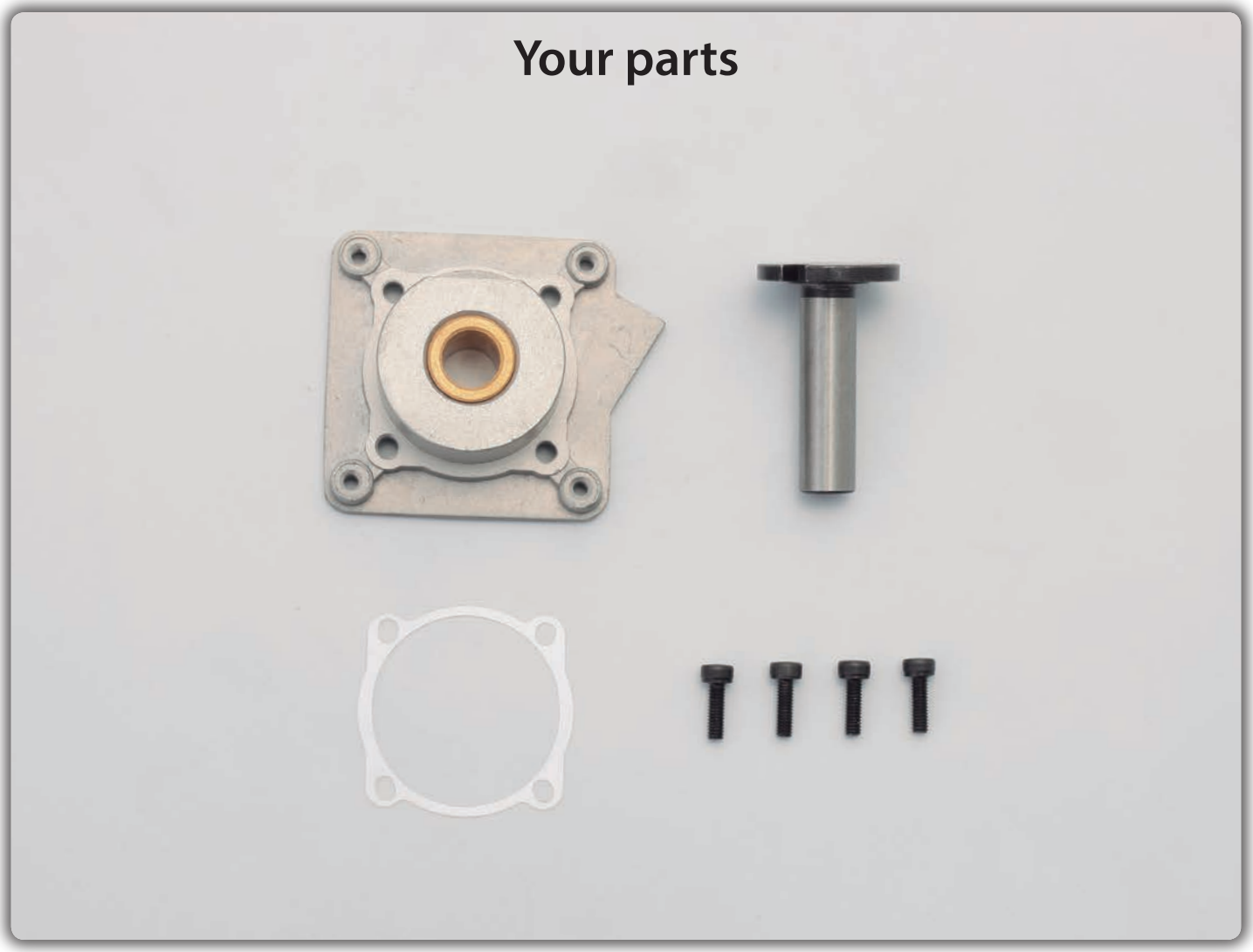
To complete the assembly, tighten each screw fully following the diagonal screwing pattern shown in the photo.

14

Stage 59

Fitting the rear plate

Your parts



Starter holder rear plate
Recoil starter shaft
Gasket
2.5 × 8mm cap screws × 4

Tools and materials

2mm Allen key (Stage 58)
Crankcase assembly (Stage 58)
Plastic bag

1

Fit the gasket over the central raised section of the rear plate. It does not matter which way round the gasket goes.

2

Line up the gasket so that the four holes line up with those on the rear plate.

Place the recoil starter shaft into the hole in the rear plate.

3

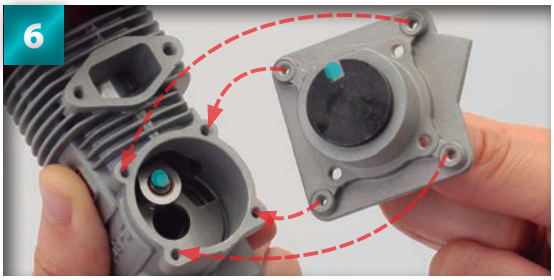
Take the crankcase assembly and rotate the crankshaft so that it looks like this.

4

5

Hold the rear plate as shown, with the triangular projection to the right. Rotate the back of the recoil starter shaft until the notch (circled) is facing the top edge.

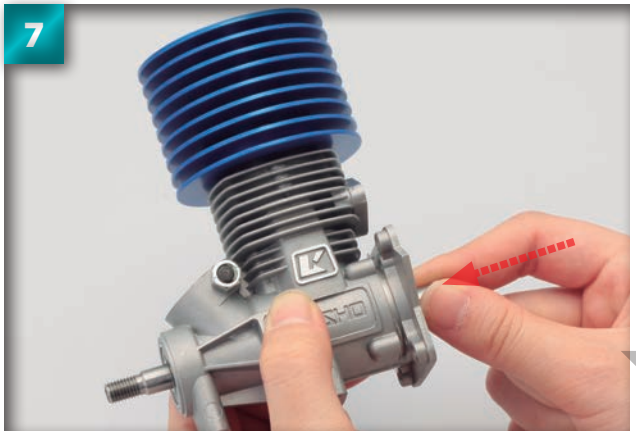
6



Holding the shaft in place, line up the rear plate to the back opening of the crankcase. The red arrows show how the screw holes will line up, and the blue dots show how the notch will accommodate the piston's connecting pin.

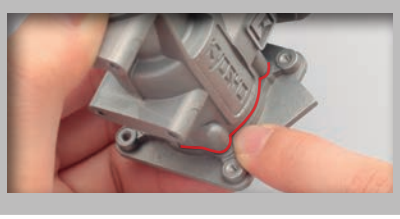
Carefully push the parts together so that the rear plate seals the crankcase, with the notch and pin joining neatly inside.

7



Tip!

If the gasket gets dislodged as you join the parts, adjust it carefully with tweezers. It should sit perfectly level with the edge of the crankcase (see red line).



Make sure the parts are joined neatly.

Place one of the 2.5 × 8mm cap screws into the top-right hole.

Lightly tighten, using the 2mm Allen key.

Repeat for the remaining three cap screws.

Once all four cap screws are in lightly, tighten each fully following the diagonal pattern shown in the photo.

Assembled parts

Store the assembly away safely in a plastic bag until next time.

Stage 60

Installing the recoil starter

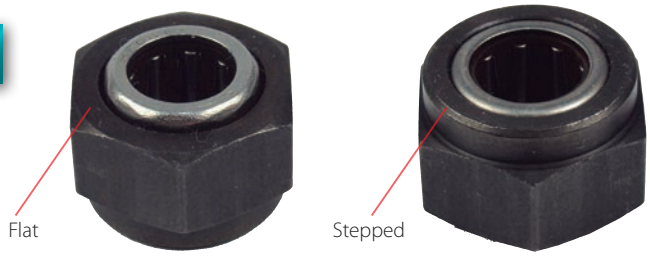
Your parts

Pre-assembled recoil starter
One-way bearing
2.5 × 8mm flange screws × 4

Tools and materials

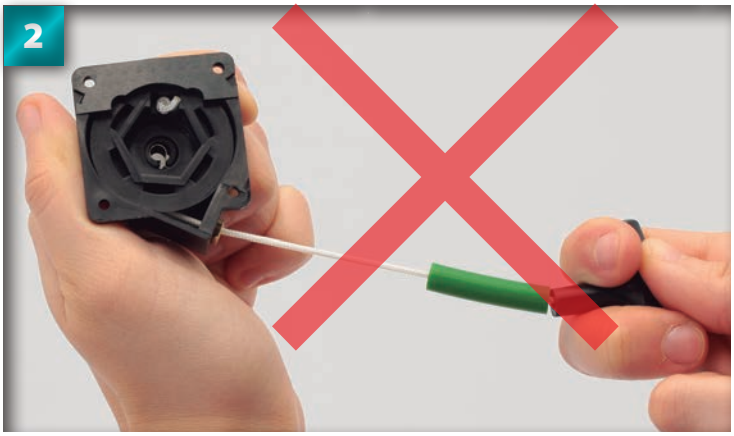
Phillips screwdriver
Crankcase assembly (Stage 59)
Plastic bag

1



Inspect the one-way bearing. The bearing can be rotated one way but not the other, so it is very important it is fitted correctly. Make a note of the flat and stepped sides, shown in the photo.

2



Do not pull the cord of the recoil starter. It is only temporarily assembled at this stage, and could be damaged if used prematurely.

Place the one-way bearing, stepped side first, into the hexagonal hole in the back of the recoil starter.

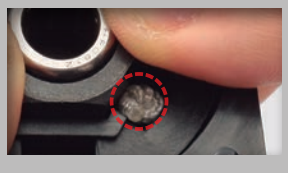
3

4

Press the bearing into place so that it fits neatly.

Tip!

Make sure the knot from the recoil cord does not obstruct the bearing.



5

Your assembly should look like this at this stage.

Making sure you have the parts aligned as in the photo (see circles), line up the back of the recoil starter assembly to the back of the crankcase.

6

Carefully press the parts together.

7

Make sure the parts are aligned, and that the four screw holes are unobstructed.

Place the first of the 2.5 × 8mm flange screws into the top right hole.

Tighten with a screwdriver lightly.

Tighten the remaining screws into place. Do not overtighten, as the black plastic of the recoil starter case is soft and may warp under too much pressure.

You can now test the recoil cord. Do not pull too hard, though. It should be pulled back into the case when released.

Assembled parts

This stage is complete. Do not overuse the recoil cord, as there is no lubricating oil inside the chamber and the friction at this stage could damage the internal parts. Store safely away in a sealed plastic bag until next time.