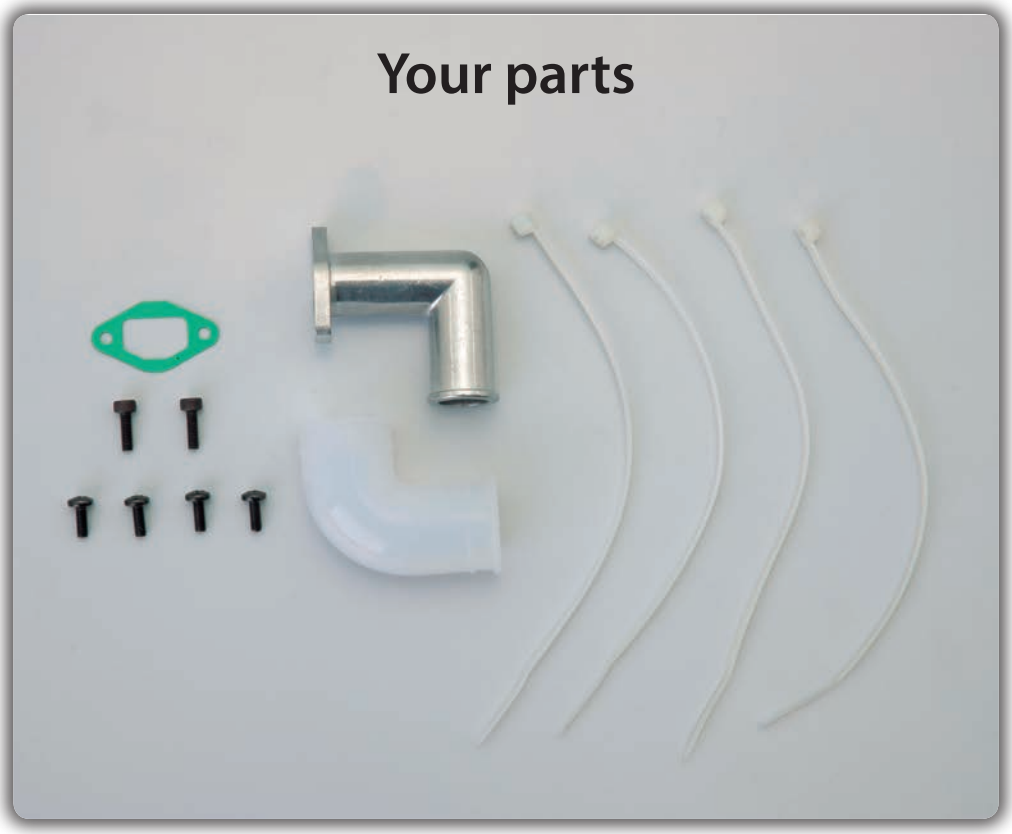
Stage 53

Completing the body, and assembling the silencer



Manifold
Gasket
3 × 10mm cap screws × 2
3 × 8mm binding-head screws × 4
Silicon joint pipe
Cable tie (M) × 4

Tools and materials

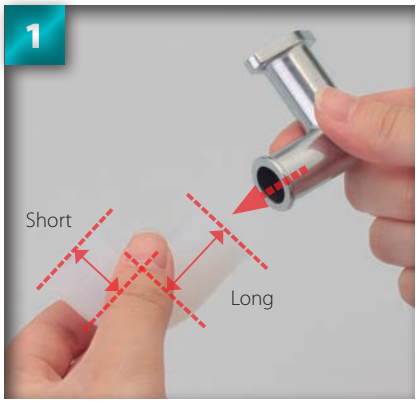
Superglue
Multi-purpose adhesive
Masking tape
Cutting mat
Body (Stage 52)
Phillips screwdriver
Cutter
Knife
Tweezers
Spatula

Rubber bushes (Stage 51)
13 Rubber bushes S × 2
14 Tapered rubber bushes S × 2
15 Tapered rubber bushes W × 2

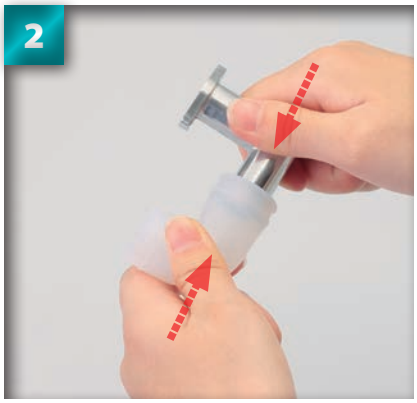
Window parts (Stage 52)
1 Front window
2 Side windows front × 2
3 Side windows middle × 2
4 Side windows rear × 2
5 Rear windows × 2
6 Small rear windows × 2
7 4.5 × 8mm washers × 4

Window collars × 4 (Stage 33)
2 × 4mm binding-head screws × 12 (Stage 50)
2 × 6mm self-tapping screws × 2 (Stage 49)
Side mirrors (Stage 4)
Antenna (Stage 4)
Wipers × 2 (Stage 49)
Sticker sheet (Stage 2)
Wheel caps × 4 (Stages 1, 2, 17 & 19)
Front roof panel (Stage 35)
Rear roof panel (Stage 35)

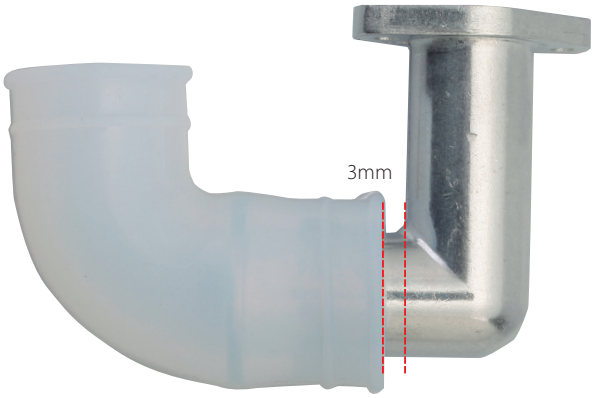
The silencer



Slide the round tip of the manifold into the longer side of the L-shaped silicon joint pipe, as shown.

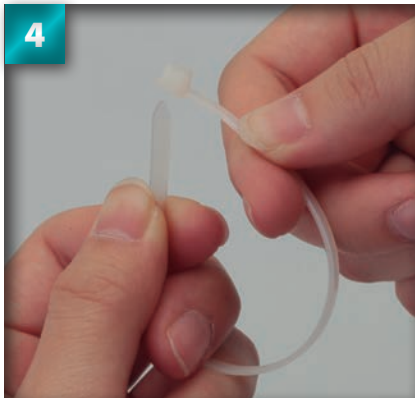


Slowly push the manifold into the tube.



Slide it further into the joint pipe until a gap of 3mm is left exposed.

Create a wide loop with one of the cable ties.



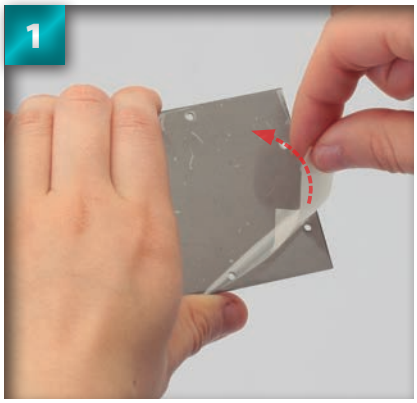
Pass this along the silicon joint pipe to the area between the ridges, marked in red.

Pull the end of the cable tie so that it tightens around the manifold.

Cut the excess strap at about 5mm from the ratchet.

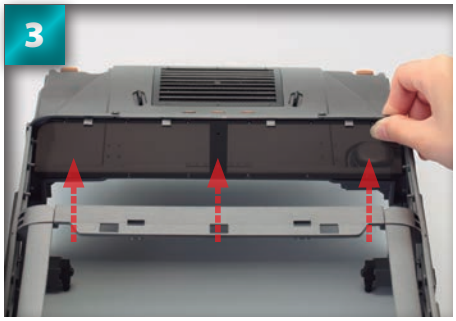
The manifold assembly is complete.

The windows



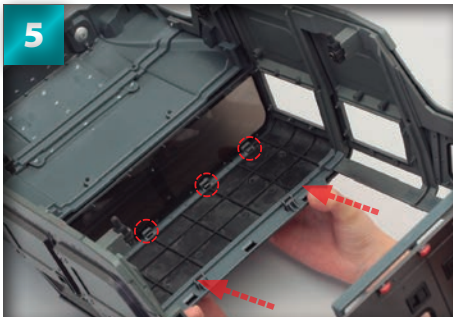
Carefully peel the protective film from each window.

Position the front window level with the front window frame on the inside of the bodywork. It does not matter which way round the window is facing.



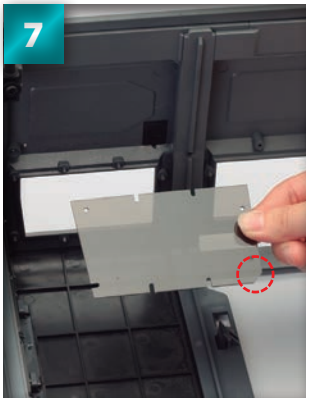
Press into place so that the window sits inside the window frame.

Next, lower the front roof panel onto the front of the body frame, so that the arrowed joints fit into their corresponding hooks.



Turn the assembly upside down, then press the roof panel into place, applying pressure from the back towards the window frame so that each joint slots into place.

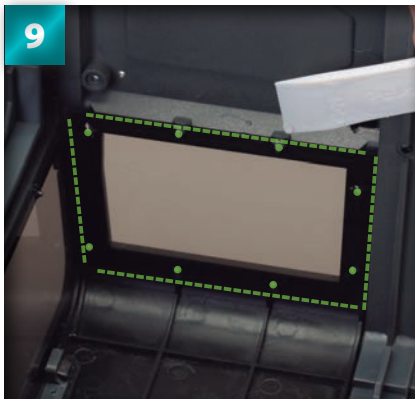
Use a spatula to carefully apply a modest amount of multi-purpose adhesive to the green-bordered sections, as well as the highlighted pins. Do not use too much adhesive as it can ruin the surface of the windows.



Next, take the first of the front side windows. There is no difference between the left and right side, but make sure the side with the cut corner is at the rear of the pane.

Press into the first front side window frame, so that the frame's pins fit into the slots in the window.

In the same way as you did for the front window, apply a small amount of multi-purpose adhesive to the edge of the window and the pins.



Now place the rear side window to the inside of the rear side window frame. Again, the left and right parts are not different, but make sure to align the angled edge with the one shown in the photo.

Press into place.

Apply multi-purpose adhesive to the edges and pins.

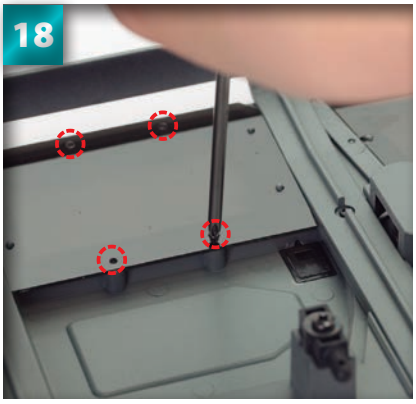
In preparation for the smaller rear window, apply a little multi-purpose adhesive to the inside edge of the rear window frame.

Very carefully place the first small rear window onto the frame, making sure no adhesive spreads to the visible part of the window.

Gently press the window into place. Do not press too hard, as this will force the adhesive into the centre of the pane.

Again using the cut corner for orientation (circled), press the first middle side window into its frame.

Place the first of the 2 × 4mm screws saved from Stage 50 into the arrowed hole.



Repeat for the remaining three holes (circled), again using the 2 × 4mm screws from Stage 50. Once the window is secured, turn the assembly over and repeat for the side window in the opposite side of the bodywork.

19

Slide the first rear window into the corresponding window frame at the angle shown. The side with no indentations should go in first.

20

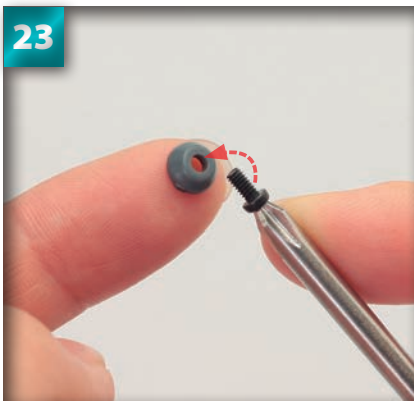
Press into place gently, then repeat for the second rear window.

Press the first of the washers (Stage 52) onto the arrowed screw hole.

21

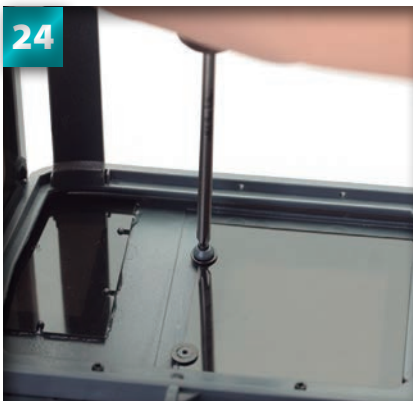
22

Repeat for the remaining washers, so that all four are in place, as shown.



23

Place the 2 × 4mm binding-head (Stage 50) screw into the narrower side of the window collar (Stage 33).



24

Place the combined parts over the first of the window frame's screw holes, and tighten. Repeat for the remaining three holes to fasten both windows into place.

25

Your rear windows should look like this.

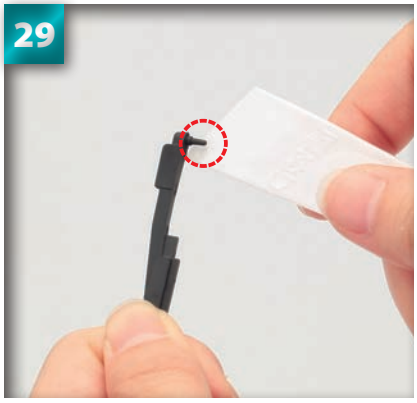
Take the left side mirror and position it next to the front left door.

26

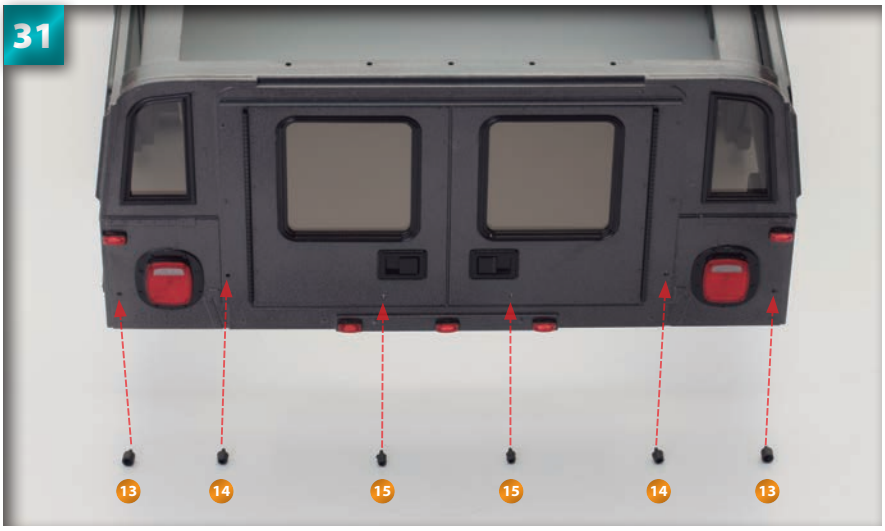
Press firmly into place.

From the inside, insert a 2 × 6mm self-tapping screw and tighten to secure the mirror. Repeat Steps 26-28 for the right mirror.

Apply a small amount of multi-purpose adhesive to the small nib at the base of the first wiper.



Place the wiper into the hole above the front window – it can be set at any angle. Then repeat Steps 29-30 for the second wiper, making sure to set it at the same angle as the first.



Prepare the various rubber bushes supplied with Stage 51 (rubber bushes S × 2, tapered rubber bushes S × 2 and rubber bushes W × 2), and line them up against the photo.
Note: the tapered rubber bushes S should only be used if tail lights B have been used (as photographed). The US tail lights A do not need these parts. Look at Steps 33-34 for what to do concerning the holes for the S bushes.

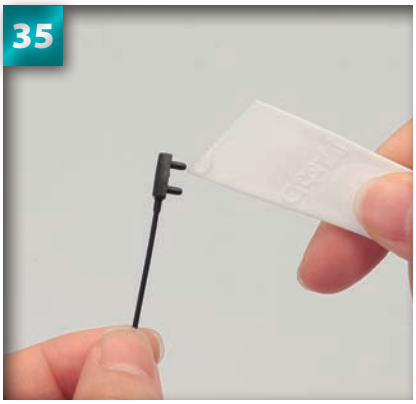
Press the first rubber bush S into its hole.

Dab with superglue from the inside. Repeat Steps 32-33 for all the bushes – even if tail lights B have been used.

34

Your bushes should look like this, for models using tail lights B. For tail light A assemblies, use a knife to shave off the protruding tip of the tapered rubber bushes S, so that the mounting hole is filled.

35



Dab the nibs of the antenna supplied with Stage 4.

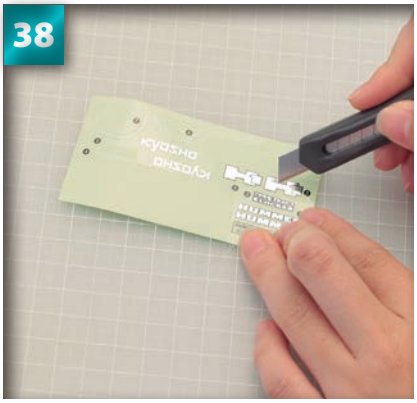
Set the antenna into its position just ahead of the left mirror.

36

Press into place.

37

38



Very carefully cut out the first H1 logo from the sticker sheet from Stage 2.

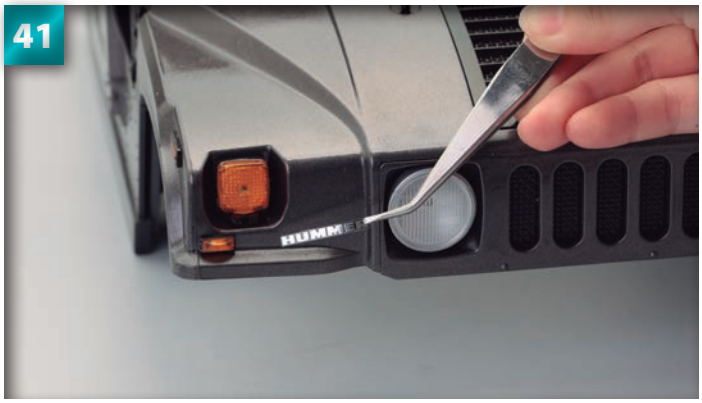
39

Peel off with tweezers, then place on the raised 'H1' on the side of the bodywork, beneath the antenna. Repeat for the opposite side.

40

Next, cut out and peel off the TORQ TRACK ELOCKER, and place diagonally below and left of the right fog light.

41



Place the first HUMMER sticker below and right of the left fog light.

Cut out the fuel cap wording stickers (Nos. 6 and 7) and apply to the rims of both fuel caps.

The stickers should look like this.

The second HUMMER logo sticker can be placed at the bottom corner of the rear left door, though this is optional.

Take each saved wheel cap and press these into place at the centre of the wheels.

Assembled parts

The body of your RC HUMMER H1 is now complete. However, in its current condition it is only suitable as a display model. If you want to use it as an RC car, you will need to strengthen the joints and protect it before using.

Keep all assembled and unused parts to one side.

Stage 54

Attaching the silencer

Your parts

Silencer (pre-assembled)
Exhaust pipe
Silencer stay

3 × 10mm binding-head self-tapping screw
3 × 10mm countersunk screw
3mm flange nut

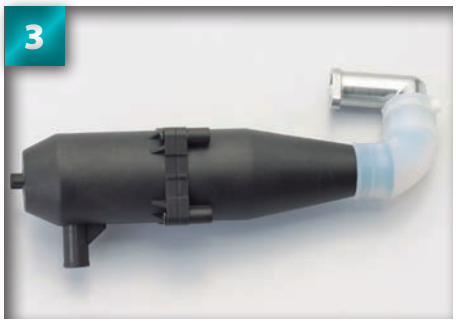
Tools and materials

Phillips screwdriver
Cutters
Cross wrench (Stage 8)

Main chassis assembly (Stage 53)
Manifold (Stage 53)
Cable tie M (Stage 53)

Take the manifold assembly from Stage 53 and position the silicon tube opening next to the large nozzle at the end of the silencer.

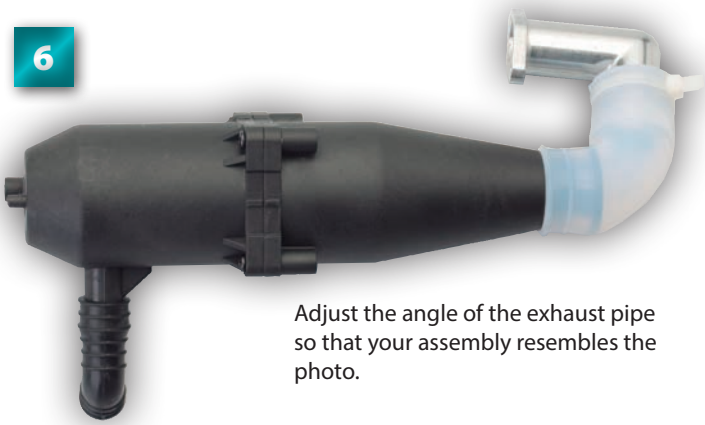
Push the silicon tube onto the nozzle.



Push along the nozzle until your assembly looks like this.

Next, place the exhaust pipe next to the smaller exhaust nozzle, longer side first.

Push the part into place.



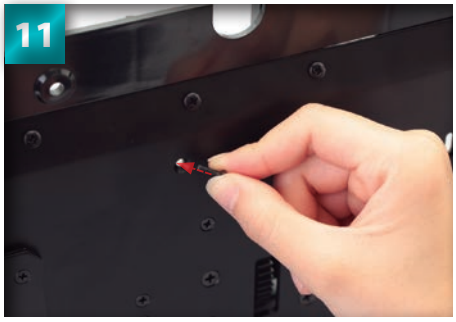
Adjust the angle of the exhaust pipe so that your assembly resembles the photo.

Make a 3cm loop in one of the cable ties, then place the exhaust pipe through this.

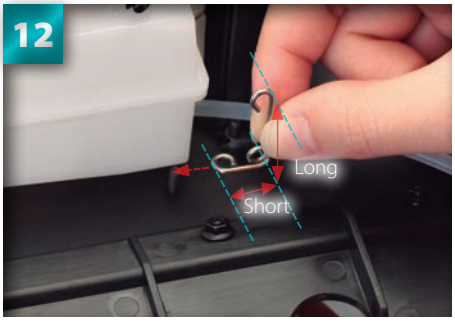
Slide the loop along to the section marked in red.

Pull the end of the cable tie to tighten the loop.

Trim the excess to about 5mm using cutters.



Place the main chassis assembly on its side, then place the 3 × 10mm countersunk screw through the hole in the front left section, as shown.



Holding the screw in place with your fingertip, turn the assembly over and place the loop of the shorter arm of the silencer stay over its protruding tip.

Still holding the screw head from beneath, place the 3mm flange nut over the tip of the screw, wide side first.

Tighten, first by hand.

Then place the arm of the cross wrench marked '5.5' over the flange nut, and press down on the flange nut to hold the silencer stay in place.

With the chassis on its side, use the cross wrench and screwdriver to tighten the screw and flange nut fully.

The orientation of the silencer stay beneath the flange nut should be the same as in the photo, with the longer arm reaching upwards. If yours is different, rotate it by hand, loosening the nut if necessary.

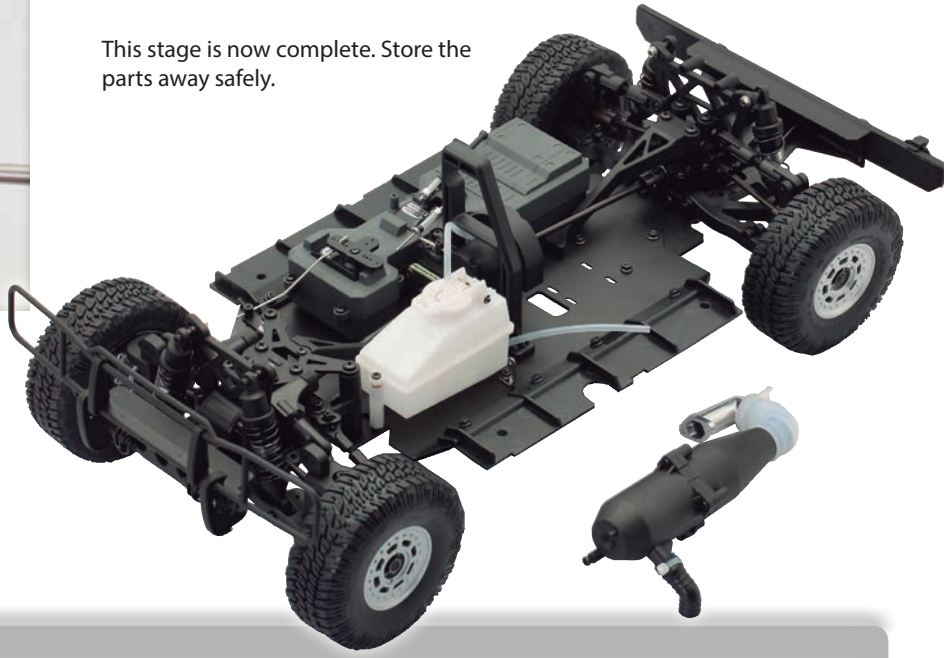
Place the binding-head self-tapping screw into the larger of the screw holes at the end of the silencer.

19

Tighten with the screwdriver, but not too tightly at this stage.

Assembled parts

This stage is now complete. Store the parts away safely.



The work of the silencer.

When the fuel is burned in a combustion engine, a series of small explosions occur, and each of these force the burned gas out and towards the exhaust pipe. However, the explosions also create sound waves that are forced into the exhaust pipe along with the gas. In order to prevent these sound waves racing out the exhaust pipe uninhibited and creating a loud noise, a silencer is fitted.

The silencer you will use for your Hummer H1 and supplied with this stage is pre-assembled, but is made up of three main components: the expansion chamber at the front, which connects to the manifold; the internal silencer cone in the centre; and the exhaust pipe section at the rear.

When sound waves are forced into the expansion chamber, they expand, and on meeting the conically shaped silencer cone, are rebounded back towards the entry point. Here, they meet incoming sound waves, and due to the shape of the silencer cone, cancel out – at least in some part – the new sound waves. Meanwhile, the exhaust gas is sucked out to the exhaust pipe and ejected into the air.

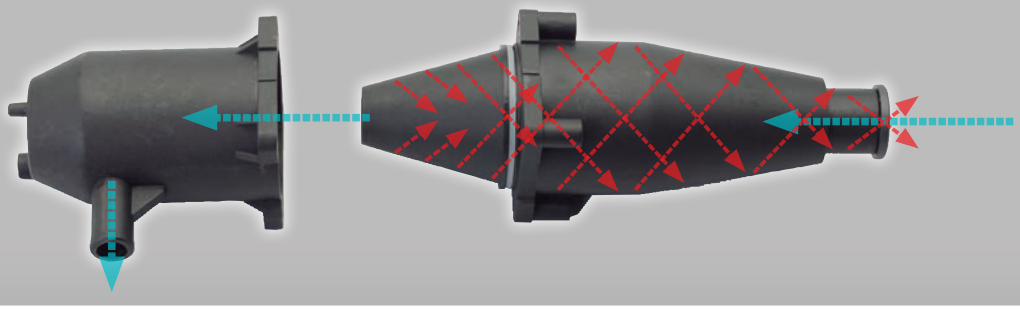
Additionally, the exhaust end of the silencer is connected by a pipe directly into the top of the fuel tank, where the pressure generated by the exhaust fumes is carried, pushing more unburnt fuel from the tank into the engine.

Exhaust pipe end

Silencer cone

Expansion chamber

The three parts of your Hummer H1's silencer.

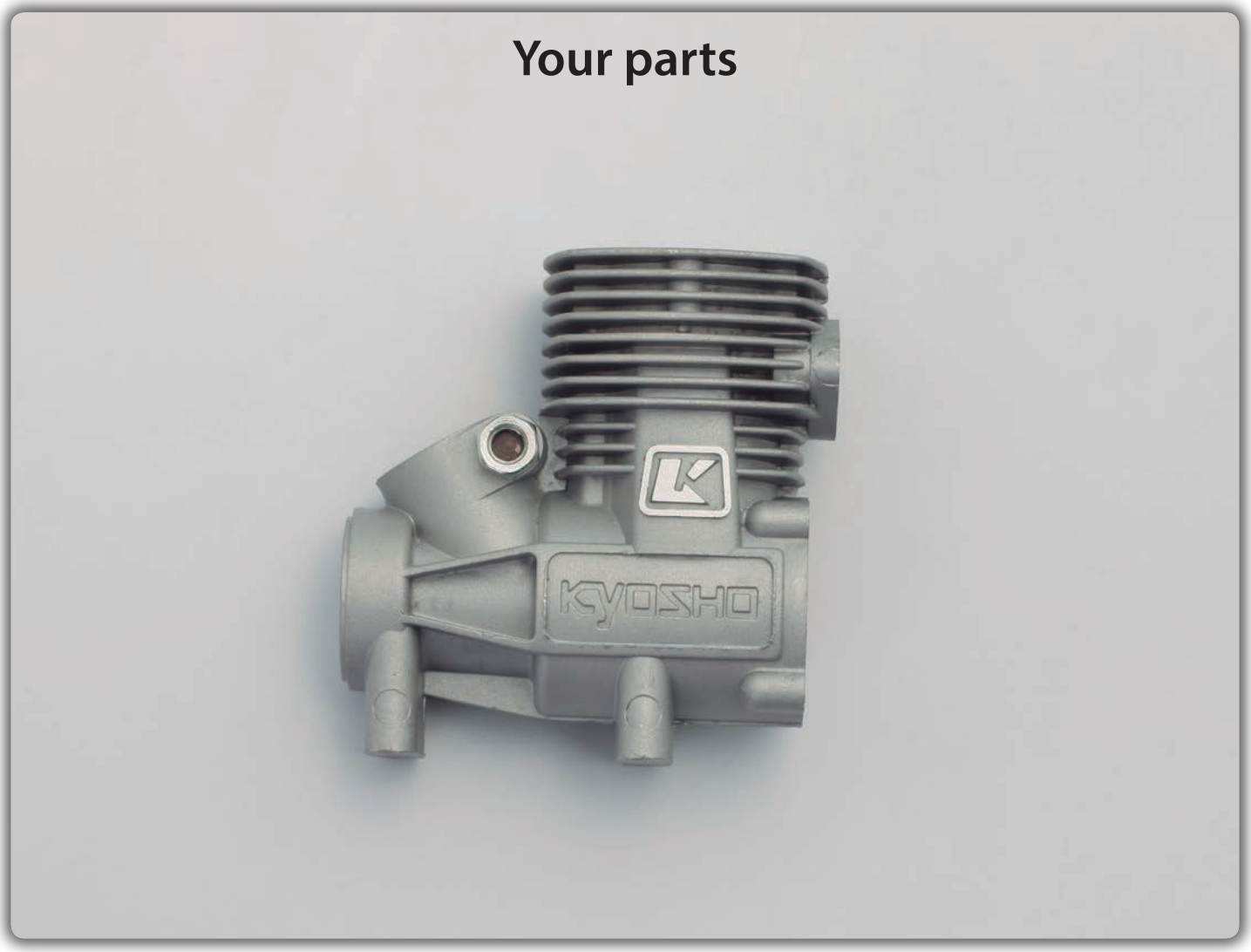


Burned gas (blue arrows) enters the silencer and is ejected from the exhaust pipe, while the accompanying sound waves (red arrows) are rebounded inside the expansion chamber, where they cancel each other out, minimising engine noise.

Stage 55

An introduction to the engine: the crankcase

Your parts



Crankcase
Carburettor shaft (attached)
Carburettor nut (attached)

1

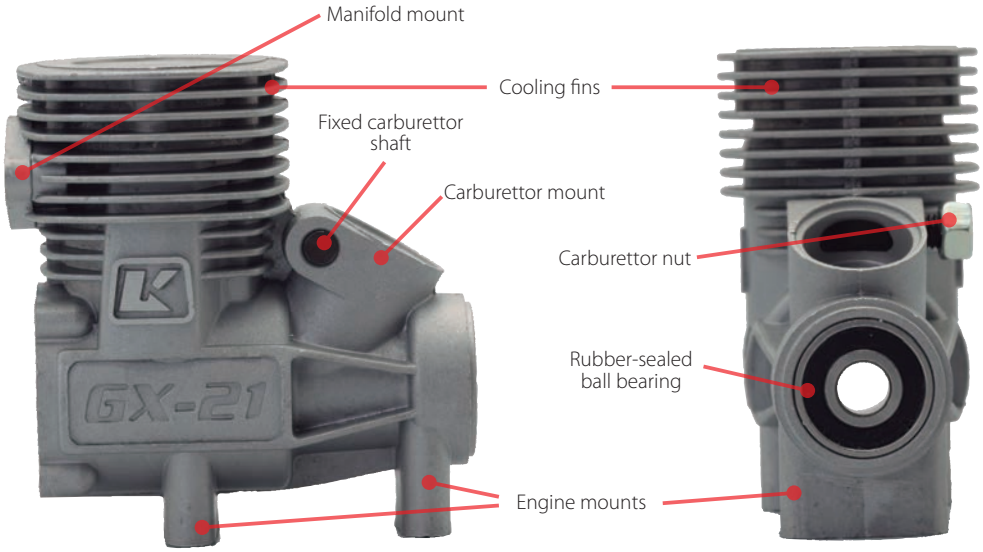
KYOSHO is engraved on the left side of the crankcase.

GX-21 is engraved on the right side.

The crankcase is different on each side, so make a note of which side is which. In addition, make sure to note that the front end features the output shaft, with its rubber-sealed ball bearing.

2

The photos, right, show the various parts of the crankcase. The use of a rubber-sealed ball bearing is to prevent foreign matter entering, as well as to maintain internal engine pressure.

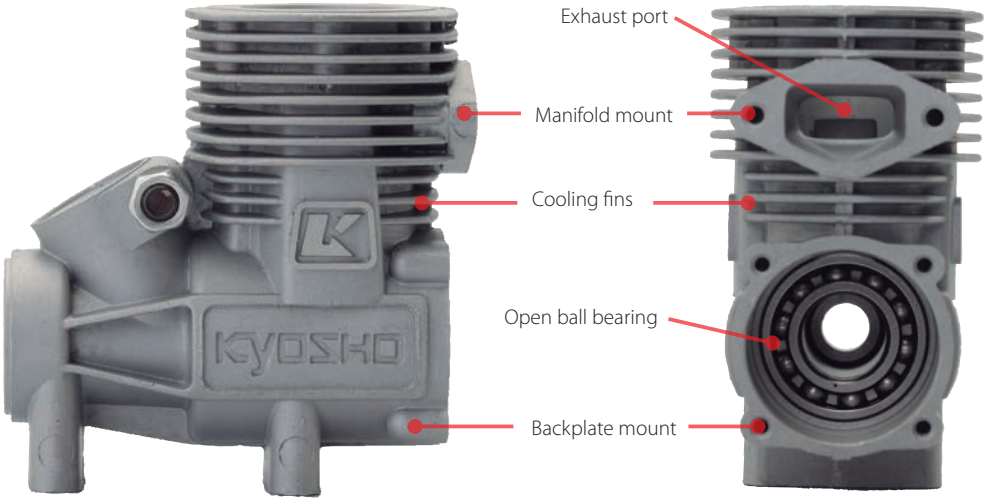


Right side

Front

3

These photos show the left side and rear views.



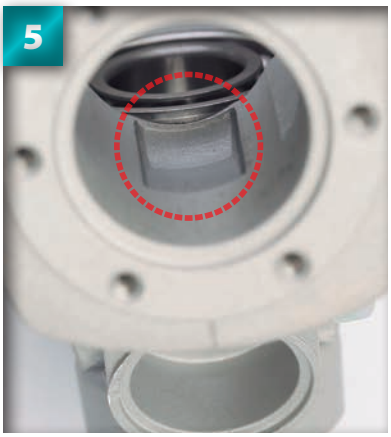
Left side

Rear

4

In your Hummer's two-stroke engine, the ball bearings at the rear of the crankcase are not covered. This is because the fuel mixture will provide the necessary lubrication.

5



Inside the cylindrical chamber of the crankcase, you will see a recess. This is carefully shaped to help guide the fuel mixture into the hollowed centre of the crankshaft from the carburettor.

6

Loosen the carburettor nut by hand.

You will see the contour of the nut shaft matches the inside rim of the carburettor shaft. By adjusting this, the carburettor itself will be held in place once fitted.

In the coming stages you will fit the carburettor into the shaft at the front of the engine's crankcase. To hold it in place, you will use the carburettor nut.

7

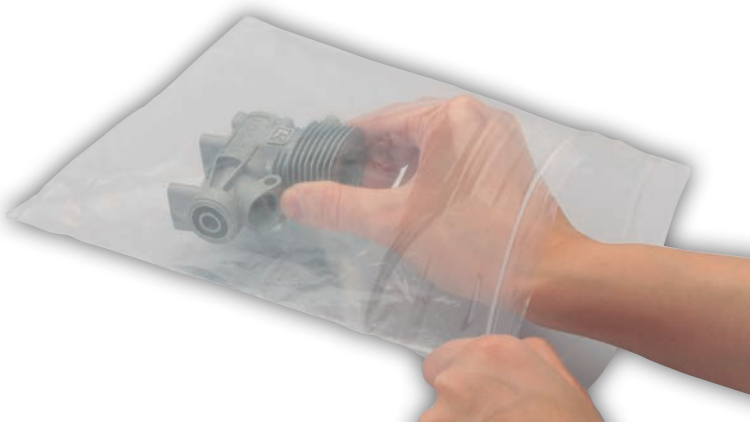
When viewed from above, you will be able to see a cylindrical recess in the base of the crankcase. This will accommodate the engine's counterweight, also fitted at a later stage.

8

The exhaust port is also visible from this angle, at the back of the upright section.

9

Store this part away safely, as it is especially important not to allow this engine part to become dusty or scratched.



Fitting the crankshaft

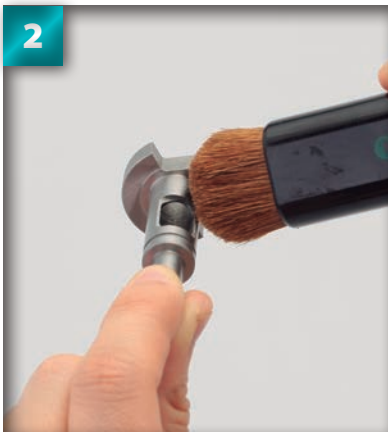
Your parts

Crankshaft

Tools and materials

Brush
Crankcase (Stage 55)

Inspect the inside cavity of the crankshaft. Make sure there is no dust inside.



A small amount of oil has been applied to the crankshaft to prevent rusting. Dust is likely to have settled on it, so brush this away before proceeding.

Place the crankshaft into the opening at the rear of the crankcase, as shown.

Hold the shaft perfectly level with the opening in the crankcase, and slowly push the parts together. Be careful to avoid knocking into the bearings.

The crankshaft's tip should appear in the centre of the rubber-sealed ball bearing at the front of the crankcase.

Continue to push gently, so that the tip emerges from the front.

Turn the assembly around and pull the tip of the crankshaft.

Pull the crankshaft along until the rear end rests against the open ball bearing on the inside of the crankcase, just ahead of the recess for the counterweight, as shown.

Assembled parts

Store the assembly carefully away in a sealed plastic bag.

The crankshaft explained

The purpose of the crankshaft is to turn the up-and-down motion generated by the piston into a circular one, which is then used to turn the driveshaft. The construction of the crankshaft is key to this.

The rotational motion of the crankshaft is perpetuated by the counterweight, set opposite the pin connected to the piston. As the chamber fills with the air-fuel mixture administered by the carburettor, the piston is pushed upwards. When the fuel reaches the top of the chamber, a spark plug ignites the mixture, causing a small explosion that pushes the pin down and the counterweight up around the central axis, turning the crankshaft.

The momentum of the counterweight prompts it to continue spinning around the central axis, in turn helping push more fuel into the chamber.

This is done by taking in a mixture of air and fuel from the carburettor into the crankshaft's hollowed mixture inlet, which it then administers to the chamber inside the crankcase, beginning the cycle again.