SERPENT 720

1/10TH SCALE 4WD COMPETITION CAR

INSTRUCTION MANUAL
INTRODUCTION

Rising to the challenge of improving upon their race-winning Serpent 710, the engineers at Serpent once again came up with a formidable challenger, destined for the Winners’ Circle. The Serpent 720 is evolution realized in a performance package, with a focus on ease of assembly and tuning. You are now part of the worldwide network of Serpent drivers, which gives you superior technical support and access to many benefits that only Serpent drivers can enjoy.

The Serpent 720 offers many of the same specifications and features that made the Serpent 710 into a top-competition racecar. The new, refined chassis design allows for faster cornering and better overall handling in high-grip conditions, while the optimized internal gear ratios showcase the improved performance on smaller technical tracks. The Serpent 720’s new, reinforced parts are easier to assemble and maintain, and improve on the already impressive geometry of its predecessor. Other features include identical left/right wishbones, new Serpent RCC shock absorbers, improved CG, standard front and rear gear differentials, an improved braking system, to name only a few.

Refinement, attention to detail, and unsurpassed performance can be summed up in one word... Serpent.

INSTRUCTIONS

Serpent’s long tradition of excellence extends to their instruction manuals, and this instruction manual is no exception. The easy-to-follow layout is richly illustrated with 3D-rendered full-color images to make your building experience quick and easy. Following the instructions will result in a well-built, high-performance racecar that will soon be able to unleash its full potential at the racetrack.

This instruction manual has been divided into sections that will logically lead you through the assembly process of your Serpent 720. Follow the assembly steps in the order presented to ensure that no problems occur during assembly. Each step indicates all the fasteners and small parts used. Bag numbers identify the kit bag(s) that contains the appropriate parts.

SETUP

In certain assembly steps you need to make basic adjustments, which will give you a good initial setup for your Serpent 720. Fine-tuning the initial setup is an essential part of building a high-performance racecar like your Serpent 720. The separate Serpent 720 Setup Book is an invaluable resource for making adjustments to your Serpent 720 and understanding the concepts behind those adjustments.

EXPLODED VIEWS AND PARTS LIST

The exploded views and parts lists for the Serpent 720 are contained in a separate Serpent 720 Reference Guide. The exploded views show all the parts of a particular assembly step along with the Serpent part number. The parts lists indicate the part number and name of each part for easy reference when ordering.

SAFETY

Included with your Serpent 720 kit is a document entitled “Read This First” that covers safety precautions for the assembly and use of this product. We strongly recommend that you thoroughly read and understand that document, and follow all the precautions.

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Each step contains a variety of numbers, lines, and symbols. The numbers represent the order in which the parts should be assembled. The lines and symbols are described below.

<table>
<thead>
<tr>
<th>LINE / SYMBOL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Step number; the order in which you should assemble the indicated parts</td>
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<tr>
<td></td>
<td>Length after assembly</td>
</tr>
<tr>
<td></td>
<td>Assembly path of one item into another</td>
</tr>
<tr>
<td></td>
<td>Group of items (within lines) should be assembled first</td>
</tr>
<tr>
<td></td>
<td>Direction the item should be moved</td>
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<tr>
<td></td>
<td>Glue one item to another</td>
</tr>
<tr>
<td></td>
<td>Press/Insert one item into another</td>
</tr>
<tr>
<td></td>
<td>Connect one item to another</td>
</tr>
<tr>
<td></td>
<td>Gap between two items</td>
</tr>
<tr>
<td>A</td>
<td>Refer to Serpent 720 Setup Book - Section A: Basic Setup</td>
</tr>
<tr>
<td>B</td>
<td>Refer to Serpent 720 Setup Book - Section B: Advanced Setup</td>
</tr>
<tr>
<td>GR TL CA OW</td>
<td>Apply graphite grease (GR), threadlock (TL), CA glue (CA) or Serpent’s One-way Lube (OW). (Items not included.)</td>
</tr>
</tbody>
</table>

The printed instruction manual included with your Serpent 720 kit is very complete, though due to continuous product development, more up-to-date information is provided at our Serpent.com web portal. This state-of-the-art R/C technology portal is where Serpent racers from all over the world meet and exchange their ideas, and share useful information and experiences about their Serpent cars.

All information about the Serpent 720 is accessible from the Serpent 720 product page on Serpent.com. You can access this page by going to the Products section, and then search for the ‘Serpent 720’ product name. From the Serpent 720 product page you will find the very latest information about your Serpent 720: reports by team drivers and other experts, tips and tricks, FAQ, forums, setups, image gallery, downloadable files, and even streaming video of the Serpent 720 on how to further improve the car. The latest version of the instruction manual (including team and racer tips, and part lists and option lists) will be made available as downloadable PDF-files and online viewable pages under ‘I-Manual.’
1.0 PREPARATION

STEP 1.1  BAG D

SHOCK ABSORBERS
Fill ALL 4 shock absorbers with shock oil using the following steps

1. Unscrew the bottom half of the pre-assembled shock absorbers.

2. FILLING
Fill the shock body with the supplied shock absorber oil.

BLEEDING
Let the oil settle and allow the air to escape.

STEP 1.2

1. Massage some shock oil into the shock sponge before re-assembling the shock absorber.

2. With the shock body filled with oil, slowly screw the bottom half of the pre-assembled shock back onto the shock body.

IMPORTANT! Do not cross thread!

Oil will overflow through the built-in bleed channel in the threads.

Shock Length
68mm for all shocks

Learn about shock damping
**STEP 1.3**

**GEAR DIFFERENTIALS**
Fill BOTH pre-assembled front & rear gear diffs with diff oil using the following steps.

**STEP 1.4**

**STEP 1.5**

**FRONT DIFF:** Use **50,000** diff oil

**REAR DIFF:** Use **30,000** diff oil

Fill the space around the gears with the indicated Serpent Diff Oil until level with the top of the casing. Rotate the output shaft to allow the grease to fill all gaps in and around the gears.
**STEP 1.6**

**IMPORTANT!**
Make sure to set O-ring in place.

---

**STEP 1.7**

**IMPORTANT!**
The mounting screws are different for the front and rear differential so please be sure to use the correct ones.

- Front Diff - Long Screws
- Rear Diff - Short Screws

Do not overtighten screws.
2.0 FRONT ASSEMBLY

**STEP 2.1**

**BAG 1**

- **H9**
  - M3x4mm
- **H10**
  - M3x10mm

Learn about front roll center adjustment

4. Make sure L + R inserts are in equal but opposite positions (mirrored).

| Right | Left |

**STEP 2.2**

**BAG 2**

- **H11**
  - M3x8mm
- **H9**
  - M3x4mm

Set front anti-roll bar

4. Press anti-roll bars into mounts far enough so the bars do not bind when the suspension is compressed.
**STEP 2.3 BAG B12**

- B12 3.5x9.5mm
- E14 M3x16mm

**STEP 2.4 BAG 3**

- G11 M3x8mm
- L3 M3

---

**CompetitionX**
A WEB SITE FOR THE SERIOUS RACER

**SERPENT**
**STEP 2.5**

**BAG U**

**U13**

12x18mm

- **LEFT FRONT ECCENTER**

Change the position of **BOTH** eccentric hubs to adjust front belt tension. Both hubs should have the same position.

- **Note proper orientation of diff.**

**STEP 2.6**

**BAG 4**

**B13**

3.5x13mm

**H11**

M3x8mm

- **Set front downstops**

- **Downstop screws**
Assemble both front upper arms using the indicated steps.

**IMPORTANT!**
Install front inserts so they match their corresponding rear inserts (step 2.1)

**STEP 2.8**

Set caster

Spacer placement
**STEP 2.9**  **BAG 5, U**

**H8**
M3x3mm

**P1**
2x10mm

**U11**
10x15mm

Assemble both steering blocks using the indicated steps. L + R steering blocks are mirrored.

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**STEP 2.10**  **BAG 6**

Set front track-width and camber

---

**STEP 2.11**  **BAG U**

**B5**
2.9x9.5mm

**U6**
6x13mm
**STEP 2.12**

**BAG 7**

H16
M4x4mm

R7
7mm

**STEP 2.13**

**B5**
2.9x9.5mm

**G10**
M3x6mm
3.0 REAR ASSEMBLY

**STEP 3.1**
**BAG 8, E10**
- E10 M3x6mm
- P7 2.5x14mm
- R3 3mm

1. Roughen the metal plates with sandpaper before gluing.

**STEP 3.2**
**BAG 9, 10, B13, U**
- B13 3.5x13mm
- H17 M4x6mm
- R7 7mm
- U6 6x13mm

1. Note orientation of front inserts. Ensure **BOTH** inserts have the same position.

Learn about rear roll center adjustment.
**STEP 3.3**

- **E10**
  - M3x6mm
- **E11**
  - M3x8mm
- **H12**
  - M3x10mm

Assemble both rear lower arms using the indicated steps.

Set rear downstops

**STEP 3.4**

- **BAG U**
  - **U13**
    - 12x18mm

Change the position of **BOTH** eccentric hubs to adjust rear belt tension. Both hubs should have the same position.

**STEP 3.5**

- **BAG 11, E11**
  - **E11**
    - M3x8mm
  - **E13**
    - M3x12mm

Learn about rear camber rise adjustment

Upper camber link mounting hole
**STEP 3.6**

**BAG E11**

- **E11**
  - M3x8mm
- **P1**
  - 2x10mm

![Diagram of E11 and P1 components]

**STEP 3.7**

**BAG 12, E11**

- **E11**
  - M3x8mm
- **E13**
  - M3x12mm

![Completed assembly]

**STEP 3.8**

**IMPORTANT!**

Install rear inserts so they match their corresponding front inserts (step 3.2)

![Roll centre insert orientation]
**STEP 3.9**

**BAG E11**

- **B13**
  - 3.5x13mm
- **E11**
  - M3x8mm

**STEP 3.10**

**BAG 13**

- **H8**
  - M3x3mm
- **P1**
  - 2x10mm
- **U11**
  - 10x15mm

Assemble both rear uprights using the indicated steps.

**STEP 3.11**
**STEP 3.12**

**R2 2mm**

Set rear track-width, camber and toe

Learn more about camber rise adjustment

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**TOP VIEW**

- FRONT
- REAR

16.5mm 16.5mm

**Upper camber link mounting hole**

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**STEP 3.13**

**U3 4x8mm**

- 1

- 2

---

**CompetitionX**

A WEB SITE FOR THE SERIOUS RACER
**STEP 3.14**

**BAG 15, E11**

- **E11**
  - M3x8mm
- **H8**
  - M3x3mm

---

**STEP 3.15**

- **H16**
  - M4x4mm
- **R7**
  - 7mm

---

Completed assembly

Anti-roll bar wishbone mounting position
**STEP 4.1**

**BAG 16, E11**

- E10 M3x6mm
- E11 M3x8mm
- E13 M3x12mm

Note the orientation of the servo mounting screw blocks. Reverse the default orientation to mount a smaller servo.

**STEP 4.2**

**BAG 17**

- E14 M3x16mm

Securely attach receiver to mounting plate.

**RACING TIP:** To protect the receiver against fuel and moisture, seal the wired receiver into a rubber balloon before mounting it.

Note the orientation of the servo mounting screw blocks. Reverse the default orientation to mount a smaller servo.

Use the following servo arms with these brands of servos:
- 23 - Sanwa / KO / JR
- 24 - Hitec
- 25 - Futaba

**STREET SERVO:**
Servo output shaft must be towards FRONT of car.
**STEP 4.3**

- **E11**
  - M3x8mm
- **E12**
  - M3x10mm

**STEP 4.4**

- **E11**
  - M3x8mm
- **H9**
  - M3x4mm

**FUEL CAP FITTING PLACEMENT**

- **CW** tracks: Fitting on **RIGHT** side.
- **CCW** tracks: Fitting on **LEFT** side.
5.0 RADIO PLATE MOUNTING

STEP 5.1  BAG B12

B12 3.5x9.5mm

STEP 5.2  BAG 19, U

E11  M3x8mm
G11  M3x8mm
R4   4mm
U3   5x8mm

Completed assembly
**STEP 5.4 BAG 20, E10**

**E10**
M3x6mm

**IMPORTANT!** Ensure the front suspension moves up and down freely without binding.

Set front toe

---

**STEP 5.5 BAG E11**

**E11**
M3x8mm

**G11**
M3x8mm

Assemble L & R steering rods:

72mm

1:1
STEP 6.1  BAG 21, E13

E13  M3x12mm

H8  M3x3mm

Start with screw head flush with bottom edge of hole. Both screws must be set equally.

Learn about shift point and shoe gap

TO SHIFT LATER  
Tighten both screws equally

TO SHIFT EARLIER  
Loosen both screws equally

STEP 6.2

G10  M3x6mm

1st Gear 59T

G10  1

G10  2

G10  3

G10  4
**ADJUSTING THE 2-SPEED SHOE GAP**

Loosened the two gap-setting set screws to allow the shoes to rest on the drive adaptor.

Install the 2-speed shoes in the 2nd gear drum, but do NOT install the 1st gear.

There should be equal but minimal spacing between the 2-speed shoes and the 2nd gear drum. Tighten BOTH gap setting set screws until the shoes touch the inside surface of the aluminum 2nd gear drum, then loosen BOTH set screws by 1/2 turn each. The 2nd gear should spin freely.

Install the first gear.
7.0 SHOCK ATTACHMENT

**STEP 7.1** BAG E12

- **E12** M3x10mm

**STEP 7.2** BAG E10

- **E10** M3x6mm

- Set front shock position
- Learn about shock adjustment (damping, springs, preload)

**STEP 7.3** BAG E12, E13

- **E12** M3x10mm
- **E13** M3x12mm

Note the shock mount holes used.
Front Shock = Short Spring
**STEP 7.4**  
**BAG 23, E11**

E11  
M3x8mm

P1  
2x10mm

---

**STEP 7.5**  
**BAG E10**

E10  
M3x6mm

Rear Shock = Long Spring

Set rear shock position

Learn about shock adjustment (damping, springs, preload)

Note the shock mount holes used.
**STEP 8.1**

**BAG 24**

**IMPORTANT!** Use the cone that comes with your engine.

**IMPORTANT!** Tighten flywheel nut securely.

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**STEP 8.2**

*Learn about clutch shoes and flyweights*
**STEP 8.3**

Initial clutch spring tension

1.5mm

**STEP 8.4**

1. 2nd Gear 23T
2. 1st Gear 17T

**STEP 8.5**

**BAG 25**

F13 M3x12mm

**IMPORTANT!** Install thrust bearing plates as shown

- A Large inner dia.
- B Small inner dia.

A 5.2mm
B 5.0mm
STEP 8.6

1. Install only the clutchbell and the thrustbearing assembly on the engine crankshaft. Push the clutchbell onto the clutch shoe, and then measure the distance A as indicated.

2. Pull the clutchbell away from the clutch shoe, and then measure the distance B as indicated.

3. The clutch gap is A - B; the correct gap is 0.7mm. If the clutch gap is greater than 0.7mm, you can easily calculate the thickness of shims required to set the correct gap:
   Thickness of shims required (in mm) = A - B - 0.7
   For example, using the values A=1.3mm, B=0.3mm
   Shim thickness = 1.3 - 0.3 - 0.7 = 0.3mm

4. Place shims between the outer thrustbearing plate and the rim of the thrustbearing carrier as shown.

STEP 8.7

ADJUSTING THE END PLAY

**M11**
5x8x0.1mm
5x8x0.3mm

**U4**
5x10mm

Place small shims to remove all but a small amount of end play
9.0 FINAL ASSEMBLY

STEP 9.1  
BAG 26

EF19  
M4x10mm

F13  
M3x12mm

Adjust gear mesh to proper gap.

STEP 9.2  
BAG E11, U

E11  
M3x8mm

E28  
M3x14mm

U3  
5x8mm

V3  
5x8mm

Completed assembly
**STEP 9.3**

- **E18** M4x8mm
- **H17** M4x6mm

**Side belt tension adjustment**
- Looser
- Tighter

**STEP 9.4**

- **C5** 2.5x10mm
- **E11** M3x8mm
- **E12** M3x10mm
- **H8** M3x3mm

**Carb Linkage**
Cut one of the long pieces to 5cm

**Brake Linkage**

Use the following servo arms with these brands of servos:
- 23 - Sanwa / KO / JR
- 24 - Hitec
- 25 - Futaba

Completed throttle/brake linkage
**STEP 9.5**

**IMPORTANT!** Before installation, check that fuel line and pressure line are free from debris and not blocked.

**STEP 9.6**

Mounted foam tires not included

- Rear tires (wide)
- Front tires (narrow)
Securely attach a AAA 5-cell receiver battery pack to the battery tray (not included).

**Note:** Serpent offers the pre-built 5-Cell battery set (#801173) for the Serpent 720. For more information, see the appropriate product page on serpent.com.