SUBARU IMPREZA 555 WRC'97

ZA 555 WRC

A face with fearless expression, with large overhanging fenders, and a towering wing, the Impreza 555 World Rally Car stands proudly without hiding its own abilities. The aura emitted from its whole body can rightfully call itself the Rally King. Why is this car so strong and attractive? To unlock the secret, we opened the doors, raised the hood, and removed the tires. Inside the glamorous body, a refined machine was lurking.

Photos/ Yuki Sawada, Shoji Mita Text/Shoji Mita Translation Trey Bicanek

The World Rally Car Developed in 9 Months

Introducing the 1997 Subaru World Rally Car. The Impreza 555 World Rally Car gave Subaru its 3rd consecutive Manufacturer's title with 7 wins in its first year. Machine troubles occured frequently, and the road was not flat, but the pursuit of rivals Ford and Mitsubishi were cut off by the consecutive wins of Colin McRae in the final stage. The first year closed with the honor of being a champion.

The Impreza World Rally Car was created to comply with the new rally regulations, but the car was largely the Group A Impreza. The new regulations provided a wider degree of freedom, alleviating the regulations that bound the potential of the Group A car, and allowing it to be made into a more efficient rally car. So what are the differences between a Group A car and a World Rally Car? With WRC, the manufacturer can modify the base model according to WRC regulations, but with Group A, the manufacturer would have to produce 2500 special models. The new World Rally regulations take the good things of Group A today and make it work more efficiently. Everyone will say that the WR car is the same as the best Group A car in many ways but it increases the capacity of the car's performance in any environment.

Let's start with the characteristic styling. Peter Stevens, who worked on the Lotus Elan, Lotus Esprit, and Jaguar XJR15, was in charge of the design. He was in charge of shaping the front and rear fenders according to regulations, overall aerodynamics, and even the cockpit dashboard. The base of the WR car is the Impreza 2 door. The reason for this is that the regulations do not allow the doors to be modified, which would hinder the modeling of the rear fender if the 4 door model was chosen. The shape of the front bumper can be changed but the opening area is regulated. The rear spoiler width and height must not exceed the sillhouete of the car and the air outlet of the hood has a specified size limit.

Detailed Explanation

IMPR

THE STRONGEST WORLD RALLY CAR THAT WON THE WORLD RALLY CHAMPIONSHIP THREE TIMES IN A ROW

EXTERIOR

By Peter Stevens's hand, the Impreza has evolved into its final form

❶ The engine hood has an air outlet with an area that meets the regulations. The hood scoop that normally introduces air to the top-mount intercoler is now ducted to cool the turbo. ❷ THe roof antena is for a Kenwood radio for communnication with the crew. Behind the antenna is a mandatory GPS installed to monitor "illegal services." ❸ The rear spoiler was created through wind tunnel testing and is one major defining feature of the World Rally Car. ❹ The auxiliary lamps hae been using Hella Xenon gas discharge bulbs since 1997. The number of ralys using lamppods has gradually decreasing. ❺ The area of the front opening hsas been expanded since the 1998 model, and is an identification point of the 98 model.

The final design decision was made after repeated tests at MIRA's (Motor Industry Research Association) wind tunnels with the aim of increasing downforce and reducing drag. With the leadership of Lapworth and cooperation of Stevens, Prodrive completed the WR car in 9 months. Just before Cataloniia Rally the WR car debuted in Monte Carlo in 1997 at an unusually fast pace, unveiling it on November 2, 1996 and obtaining a homologation in December.

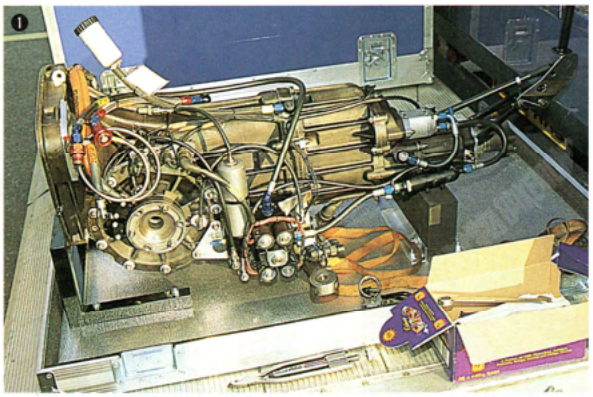
Engines and drive systems are one key component of the WR car regulations. In the case of Imprezas, the engine is the conventional EJ20, but by reviewing the main body details, adopting a newly designed intake manifold, and a more efficient exhaust manifold, the max output is 300 horsepower. Maximum torque has been increased from the 45kg-m of the Group A car to an impressive 48kg-m at 4800rpm. In addition, due to the adoption of newly designed crossmembers and engine mounts, the engine is shifted 25mm backwards, improving weight distribution. WRC regulations allowed for Subaru to change the position and accompaying piping of the intercooler and increase its capacity to 9L. It is said that the installation position and size were based on the wind tunnel testing conducted at MIRA.

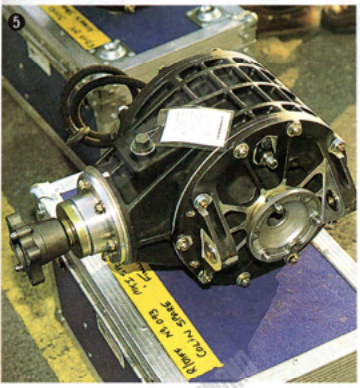
However, similar to Group A, a 34mm restrictor on the turbocharger inlet is required, limiting power to Group A levels, and not satisfying the driver's need for power. An additional feature of the WR car is a catalyst to address enironmental concerns. The transmission is the conentional Prodrive 6-speed semi-automatic transmission, but the gearbox has been shortened to account for the updated engine position. However, it is not the sequential-type transmission adopted by Ford and Mitsubishi. The front and center differentials are active-type and the rear is mechanical. In terms of suspension, the total track width expanded to 1770mm and became a wide track specification. The stroke of the suspension also increased. In response to Colin McRae's opinion, a narrow tread specification that utlized some New Zealand Group A parts also appreared.

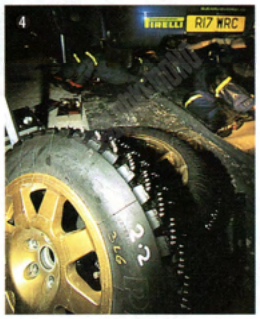
DRIVE-TRAIN

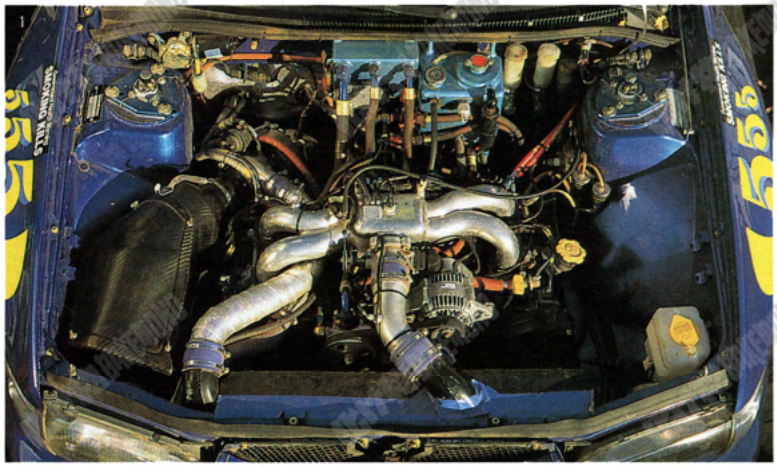
Transmitting the Powerful Torque of the Highly Tuned EJ20 to the Road

❶ Prodrive 6 speed transmission. Originally it was semi-automatic but is now only manually operated. The steering column of the World Rally Car does not have the operating lever like the group A. ❷ This wheel was made by Speedline until 1997 and this design dominated among Impreza users around the world. ❸ From 1998, they switched to a wheel made by OZ. This picture is from the Monte Carlo race. ❹ Second round of 1998 season studded tires. The protruding volume on the pin is suprisingly large, which is the source of intense grip on the water, but if a tire like this rolls over your foot.... ❺ Rear differential. The front and center are active but the rear is purely mechanical.





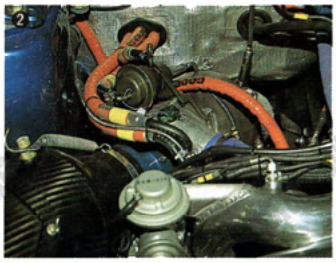




ENGINE

Fully tuned EJ20 doesn't maintain that boxer rumble sound

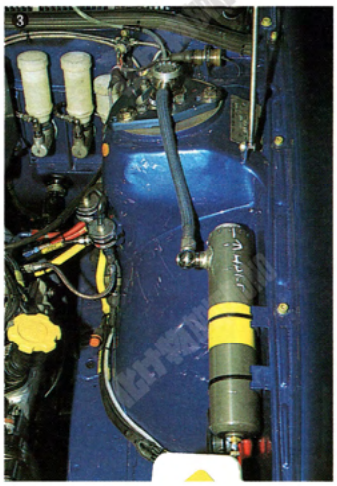
❶ This is the engine bay of the McRae car that won the championship in Australia in 1997. Its equipped with a front mount intercooler, giving it a new impression. ❷ IHI-Made turbo. You can see it sealed with a green plate after receiving the turbo vehicle inspection. ❸ Backside of the hood. The part with the 555 sticker blocks off the scoop that originally provided air to the top-mount intercooler, but a vent to cool the turbo is added. ❹ These are spare turbo chargers, still sealed with a red plate. ❺ 1998 specification engine. This is lately the same as the 1997 model , however most of the internal parts have been thoroughly reviewed.

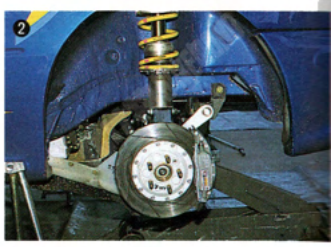


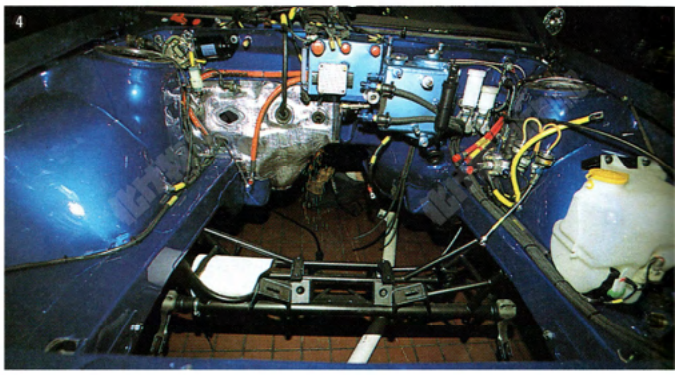
SUSPENSION

The suspension that comes from the wisdom of Prodrive continues to evolve

❶❷ 1998 tarmac suspension. ❶ Front ❷ Rear. For gravel stages, Alcon large diameter discs are installed. The shock absorbers are Bilstein manufactured with Prodrive tuning. ❸ 1998 shock absorber reservoir tanks are installed along the sides of the engine bay. In the 1998 Swedish Rally, Active Suspension was first installed on Piero Liatti's cars. ❹ The engine bay of a 1998 safari spec car before the engine is installed. Due to the high speeds and poor road conditions for the safari, the chassis rails were carefully reinforced on both sides.



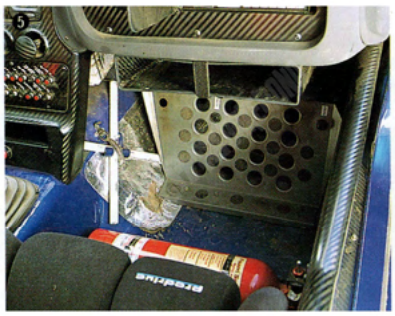




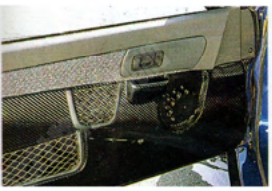
COCKPIT

Coordinated cockpit to completely dispel the anxiety of the crew

❶ The cockpit protects the driver and co-driver with a sturdy rollcage. If you remove the protection board with the sponsor's logos, ❷ you can see the side crossbar. The picture shows a 97 spec car. In 98, an additional auxiliary bar is added. ❸ The roof ventilator is the simplest and most reliable way to get outside air to two crew members.



❹ 1997 Spec Cockpit. The steering wheel is made by Sparco. Behind it is a carbon fiber dash, and to the lower right you can see a Prodrive 6 speed shift knob. ❺ Co-driver aluminum foot rest, where there is also a horn button and reset button. Co-driver Nicky Grist sinks deeply into his seat while stepping on this and ❻ operating the Coralba navigation computer located in the co-driver dash.



The side window crank shown in the picture seems to be easy to operate. This is also a carbon fiber part.

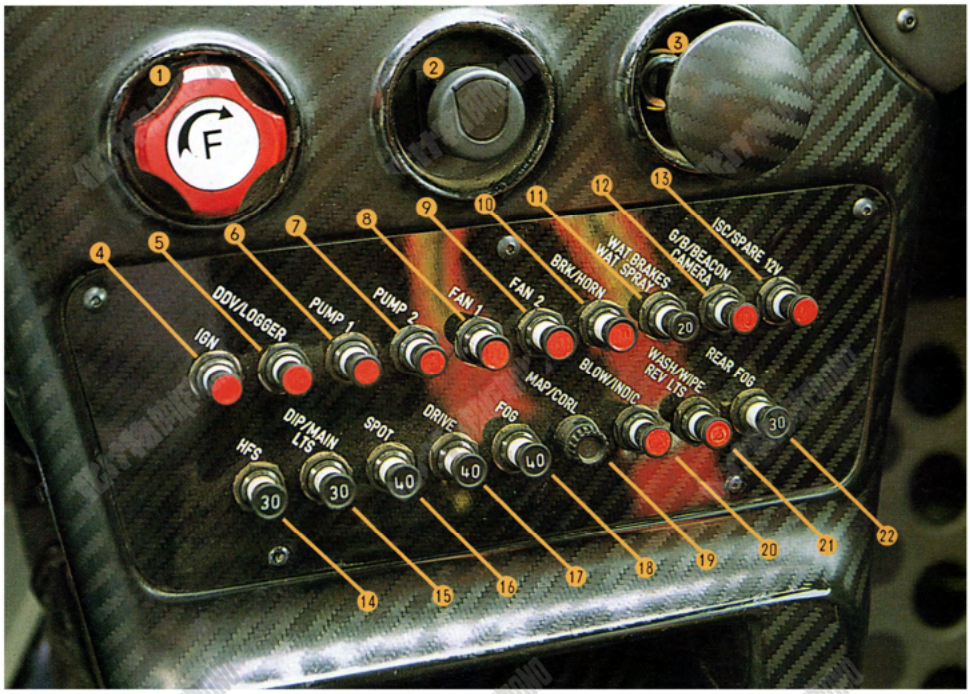
Carbon fiber hand brake lever. Careful consideration to operaton is given, such as being offset toward the driver.

The rear side window is easy to remove, making maintenance easier in a normally difficult to reach location.

Kenwood wireless is installed behind the seat, and you can see the computer on the right. There is another computer removed.

CENTER CONSOLE

Efficiently arranged switches also contain immeasurable technology



1 Brake Bias (front/rear) Dial
2 Heater Air Volume Adjustment Dial
3 Heater Temperature Control
4 **IGN** - Ignition Power Supply Button
5 **DDV/ LOGGER** - Data Logger Power Supply Button
6 **PUMP1** - Fuel Pump 1 Power Supply Button
7 **PUMP2** - Fuel Pump 2 Power Supply Button
8 **FAN1** - Radiator Fan 1 Power Supply Button
9 **FAN2** - Radiator Fan 2 Power Supply Button
10 **BRK/HORN** - Brake Light and Horn Power SupplyButton
11 **WAT. BRAKES** - Intercooler Water Spray and Water-Cooled **WAT. SPRAY** Brakes Pump Power Supply Button.
12 **G/B/BEACON - CAMERA**
13 **ISC/SPARE** - 12V Spare Battery Button
14 **HFS** - Heated Front Screen
15 **DIP/MAIN LTS** - Headlight Power Supply Button
16 **SPOT** - Spot Lamp Power Supply Button
17 **DRIVE** - Driving Lights Power Supply BUtton
18 **FOG** - Foglight Power Supply Button
19 **MAP/CORL** - Engine Control Computer Map Switching Dial
20 **BLOW/INDIC-** Heater and Indicator Power Supply Button
21 **WASH/WIPE REV LTS**
22 **REAR FOG**

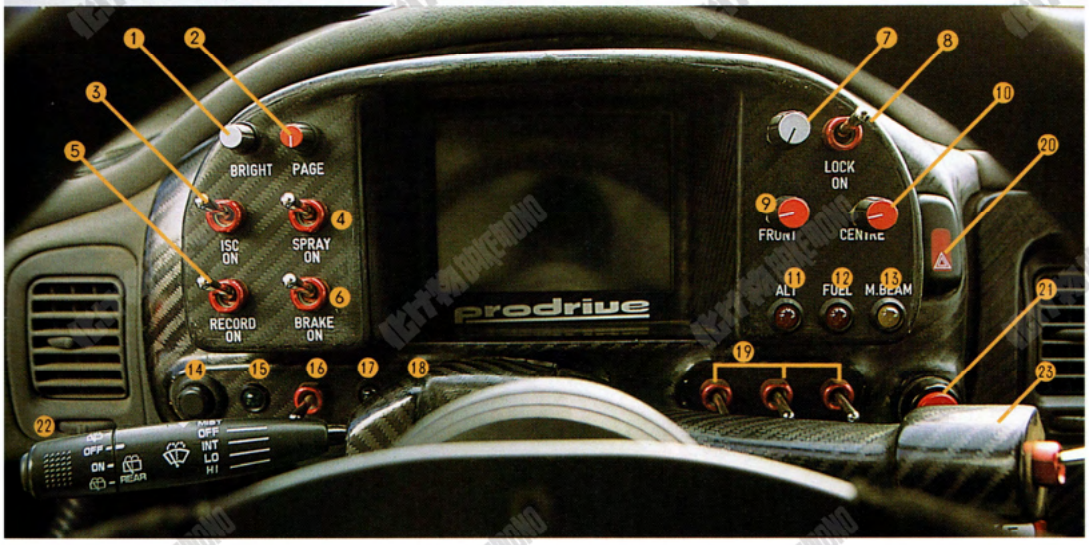
IMPREZA 555 WRC

MONITOR DISPLAY

A fighter-plane-like display instantly transmits information to McRae

The liquid crystal display in the binnacle can display as much as 18 kinds of information, toggleable via a selector switch. ❶❷Alongside the RPM you can switch between various measurements such as oil temp and water temp ❷ the display here is switched to a white background, used in bright areas. ❸ display various data recorded in the logger at once.

1 **BRIGHT** – Monitor Display Dial for Brightness
2 **PAGE** – Monitor Display Dial to Change Page
3 **ISC ON** – Computer Switch
4 **SPRAY ON** – Intercooler Water Spray Switch
5 **RECORD ON** – Data Logger Switch
6 **BRAKE ON** – Water-Cooled Brakes
7 Power Mode Switching Dial
8 **LOCK ON** – Center Differential
9 **FRONT** – Front-Diff Transfer Ratio Change Dial
10 **CENTER** – Center-Diff Transfer Ratio Change Dial
11 **ALT** – Low Power Warning Light
12 **FUEL** – Low Fuel
13 **M.BEAM** – Front Headlight Indicator
14 Horn Button
15 Wireless Indicator
16 Monitor Display Switch
17 Wireless Indicator
18 Reverse Light Switch
19 Foglight Switch
20 Hazard Lights Button
21 Starter Button
22 Wiper Lever
23 Blinker Swich



While based on the narrow track base STi Impreza, the World Rally car's parts greatly diverge from the original. While the impreza WR car's suspension inherited good handling, it is delicately influenced by the road surface.

The minimalist tachometer/water temp gauge setup of the Group A car has evolved into a fully digitized display in the World Rally Car. Replacing the old analog meters is a large LCD monitor, on which you can cycle through 18 items via a switch. Engineers and drivers can communicate instantly with the same information.

For the World Rally Car, the intercooler was moved to the front, so there is no need for a hood scoop, but in order to cherish the image of the Impreza, it was left as it was. Initially the air from here was also introduced into the cockpit, but it caused trouble with the inside of the window becoming cloudy, so after 3 safari races, it was switched back to the conventional roof ventilator method. Now the hood scoop serves only to cool the turbo.

Also, because it has a two-door body, the rear side window is removable for rear suspension replacement and maintenance. This also had the consequence of making the window easier to come off due to impacts on the side of the body. In this way, the Impreza World Rally cars have seen new ingenuity everywhere and troubleshooting happens in each rally. However, it is also true that the participation schedule of all 14 races affected the aging schedule, and delayed responding to engine trouble that occured frequently in the middle.
In 1998, a new Toyota Corolla car will participate in the full scale battle, and the Impreza World Rally car will reach its critical moment.

STi & Prodrive

The Japanese-British Professional Corps that Created Impreza WRC

President and CEO of STI
Takemasa Yamada

In the early Legacy years, he experienced many hardships as an engine developer. 8 years later in '97, now president of STI, he was deeply moved to see the success of the boxer engine in the New Zealand WRC.

Prodrive Technical Director
David Lapworth

It's been 18 years since he entered this world in 1980 at Peugeot Talvo Sports. The Porsche and BMWs he worked on left a lot of glory, and now his success with Subaru has solidified his reputation in the rally world.

STI- Subaru Technica International was established in 1988 as a subsidiary to control Subarus motorsport activities, and 1998 marks the 10th anniversary. On the other hand, its ben 14 years since Prodrive was established, based on David Richards and David Lapworth's extensive rally experience. 9 years ago, the two companies joined hands and took their first steps toward the WRC challenge the following year in the 1990 Acropolis Rally.
Prodrive, which has been involved in the research and development of rally and race cars, has collaborated with STI to raise the Legacy and Impreza to become first class machines. They saw the advantage of Subaru's original horizontally opposed engine + symmetric 4wd system, and proved this out as an ideal rally car system. These acheivements became the driving force to become a winning car in the Impreza's debut as a World Rally Car.
Prodrive's factory and development facility is based in Banbury, near Oxford, central England. Currently David Lapworth is the Technical Director and John Spiller is the Team Manager.

An orderly Prodrive factory. Imprezas here are being prepped for safari.

TRUNK ROOM

The trunk space is effectively equipped to prepare for unexpected situations

Rally cars are all equipped with various tools for each rally, including spare tires. ❶ is an Australian Rally Spec trunk space. In front of the spare tire is a fuel cell. The item on top of the tire is a jack. This is normally fixed to the inside of the tire, but this picture was taken immediately after a rally.
❷ is a Swedish Rally Spec trunk space. If you get stuck, even a Works WRC driver will need to dig himself out with a shovel.