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INTRODUCTION

This inventory will give you a detailed insight into the workings of the Nissan team, who have put 3D printing into practice with tools, jigs and fixtures throughout their assembly line. Since the parts vary widely across applications, specifications of each 3D printed component will be provided, including the material used, cost per part, size and total printing time.

For the full story on Nissan's journey into 3D printing, read our case study in:

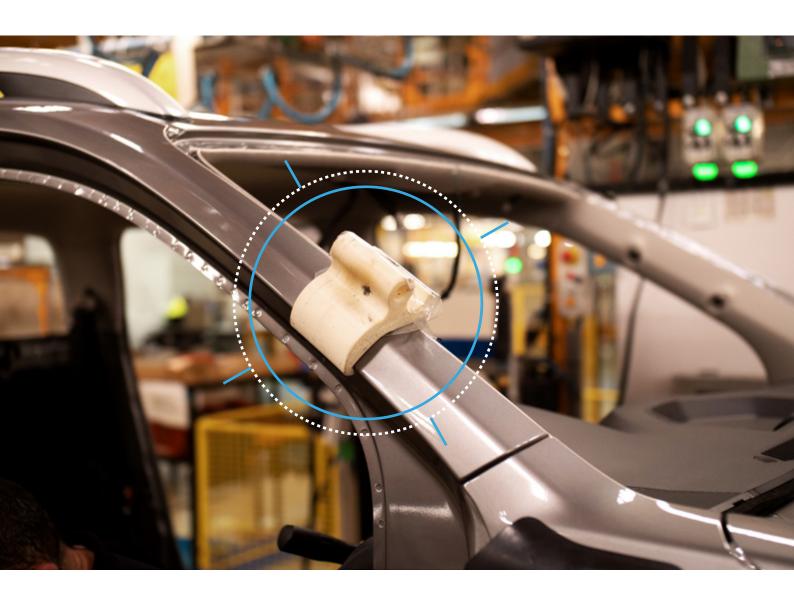
www.bcn3d.com/nissan



Windshield centring gauge fixture





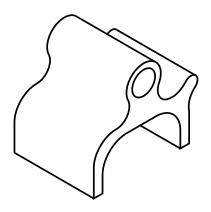


Features

Material:	TPU	Cost:	8€
Printing time:	14 h.	Size:	100 x 120 x 80 mm

Description

This part functions as a gauge to ensure the correct distance between the A-pillar of the car and the windshield. Conveniently, the securing of the distance one side automatically secures the other.



Windshield centring gauge fixture





Robot positioning sensor jig Anti-rust application nozzle





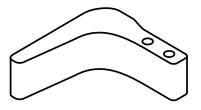
Features

Material:	Sensor ABS Nozzle ABS	Cost:	Sensor 2,30€ Nozzle 0,70€
Printing	Sensor 7 h.	[] Size:	Sensor 120 x 30 x 15 mm

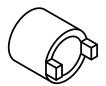
Description

This completely autonomous robot can be found in the middle of the assembly line. Its use is to administer an anti-rust protection, similar to silicone, that is deposited on the outer face of the door hinge in order to protect against rust in case of potential water ingress.

2 printed parts can be found in the tip of the robot. The first is the yellow sensor, which positions the robot correctly. The second is the white nozzle, which is responsible for the application of the anti-rust. This part is a consumable at Nissan, with 50 parts currently being fabricated every month.



Robot positioning sensor jig



Anti-rust application nozzle







Lateral drill positioning tool



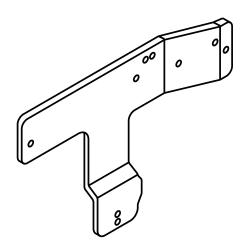


Features

Material:	ABS	© Cost:	18,50€
Printing time:	32 h. / part	[Size:	700 x 700 x 12 mm

Description

This large tool, of around 700mm wide and 700mm tall, is formed of two connected parts and indicates the drill placement to the operator. Bushings are incorporated into the part, so that the drill bit does not damage the plastic, which is ABS in this case, and so that the part lasts longer.



Lateral drill positioning tool

Roof upholstery protection tool







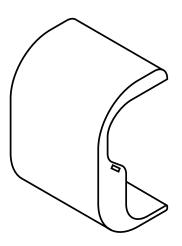
Features

Material:	TPU	© Cost:	10,35€
Printing time:	18 h.	[] Size:	100 x 100 x 12 mm

Description

This tool is anchored to the upper pillar of the car when inserting the car floor carpet. The part protects the roof upholstery from any breakage caused by the insertion of the carpet.

Without this tool, subsequent damage to the upholstery subsequently would entail a recovery job with many hours of rework would be required.



Roof upholstery protection tool





Lower drill positioning tool



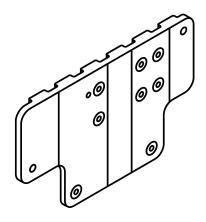


Features

Material:	ABS	© Cost:	21,50€
Printing time:	15 h. / part	[] Size:	1000 x 400 x 15 mm

Description

The biggest part you can find today in Nissan, this tool is composed of 5 connected parts with a total longitud of 1 metre. This tool indicates the drill placement to the operator. The tool incorporates some bushings so that the part lasts longer and does not damage the plastic, which in this case is ABS.



Lower drill positioning tool

Hood support tool





Features

Material:	PLA	€ Cost:	2,65€
Printing time:	10 h.	[Size:	120 x 60 x 40 mm

Description

This part supports the hood of the car by performing automatic movements of opening and closing. This part has the negative shape of the hood, allowing the weight of the hood to be distributed across the whole part and to not leave any mark or dent on the hood of the car.

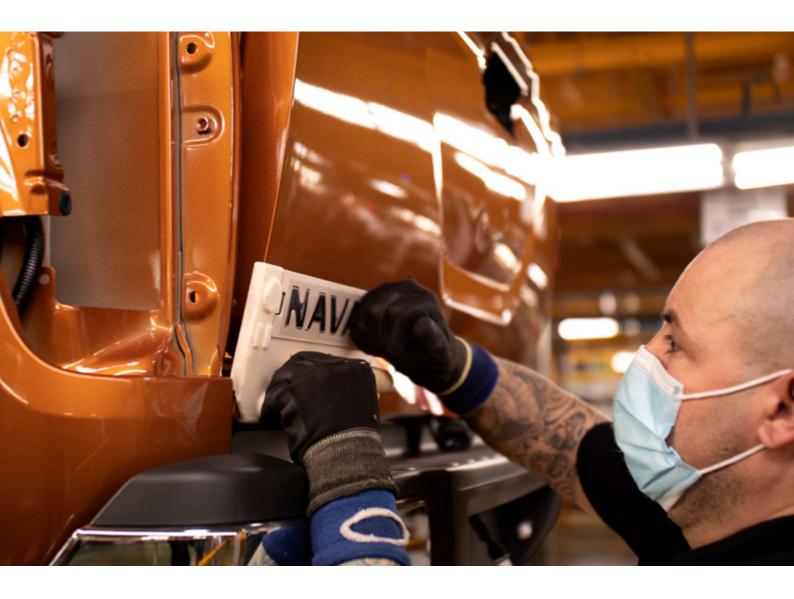


Hood support tool



Car logo positioning template jig



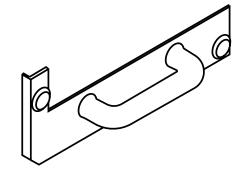


Features

Material:	ABS	© Cost:	3,45€
Printing time:	12 h.	[] Size:	300 x 80 x 3 mm

Description

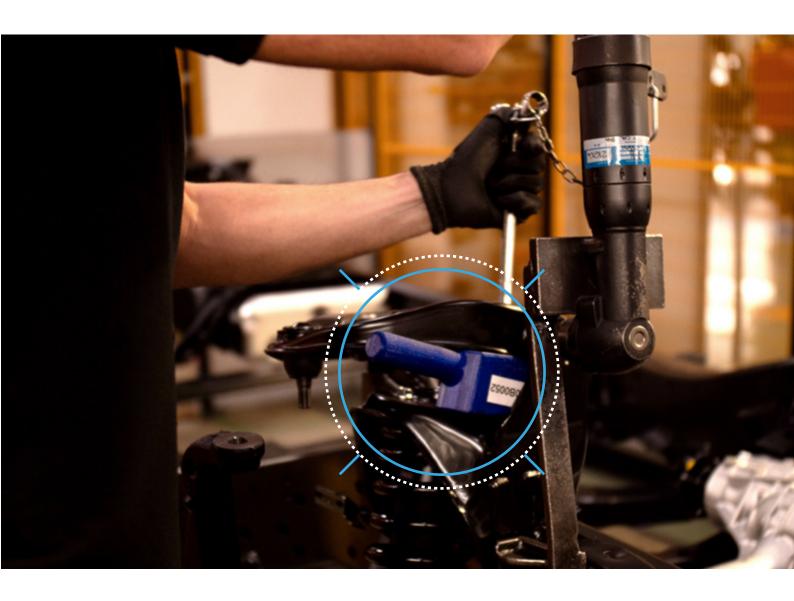
This template allows the operator to position the sticker of the vehicle's nomenclature in the correct place. This template has a neodymium magnet inside that allows the part to adhere firmly to the sheet metal.



Car logo positioning template jig

Front trapeze dimension gauge fixture



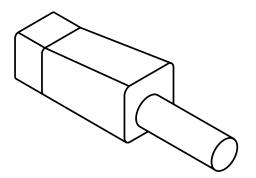


Features

Material:	TPU	(Cost:	11,50€
Printing time:	20 h.	Size:	250 x 90 x 90 mm

Description

This part is a gauge that secures the tightening dimension of the front suspension assembly, for both the left and right side. Inside the part there is a neodymium magnet to secure the part to the chassis at the time of measurement.



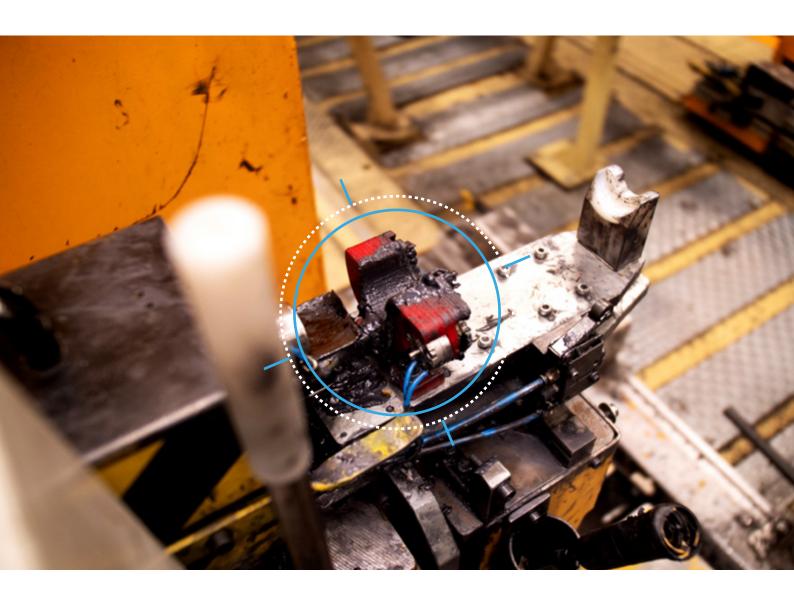
Front trapeze dimension gauge fixture





Drive shaft insertion tool



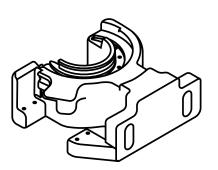


Features

Material:	TPU	Cost:	9,20€
Printing time:	16 h.	Size:	100 x 100 x 40 mm

Description

This tool allows the operator to insert the drive shaft into the car's differential. The tool also incorporates a small motor that distributes grease evenly over the entire surface of the drive shaft's homokinetics.

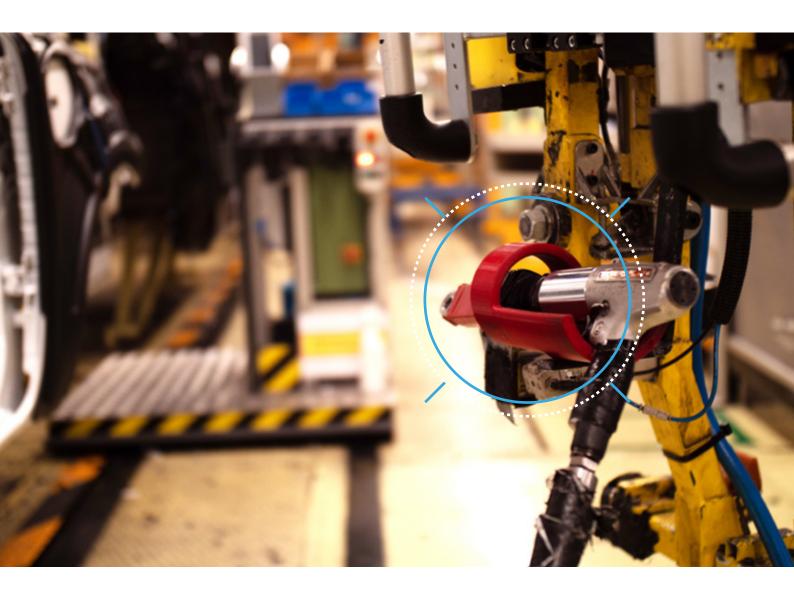


Drive shaft insertion tool



Screwdriver support jig



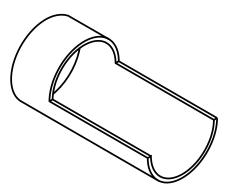


Features

Material:	TPU	Cost:	6,90€
Printing time:	12 h.	Size:	90 x 90 x 200 mm

Description

This part acts as support for the screw gun that facilitates the mounting of the Nissan Navara doors. It prevents the gun from falling or staying in a bad position.



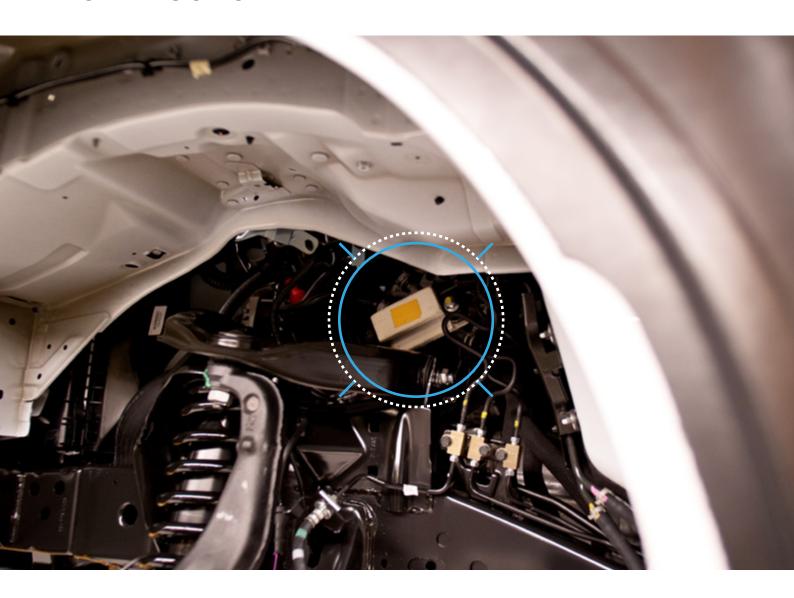
Screwdriver support jig





Steering column tightening gauge



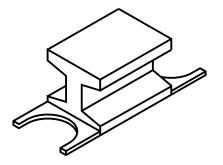


Features

Material:	ABS	(E)) Cost:	2,90€
Printing time:	10 h.	Size:	80 x 40 x 40 mm

Description

This part is a gauge that ensures the same depth dimension in all cases when tightening between the column and the steering box.



Steering column tightening gauge



Anti-fall support cover



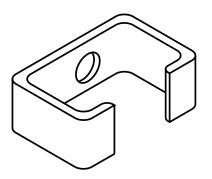


Features

Material:	TPU	© Cost:	1 € / part
Printing time:	2 h. / part	[] Size:	50 x 20 x 30 mm

Description

These supports, formed of 4 parts, can be found in 30 AGV cars in the Nissan Navara assembly line. Specifically, the support isolates and protects the car parts, with a cover fastened on the outside of the vehicle to prevent it from receiving any blows or scratches during transportation.



Anti-fall support cover



Magnetic belt holder fixture





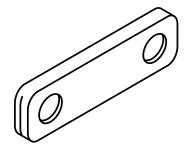


Features

Material:	TPU	© Cost:	5,75 €
Printing time:	10 h.	[] Size:	200 x 30 x 50 mm

Description

This part serves as temporary support that, via a metal on the inside, immobilizes the seatbelt with the B-pillar of the car. It allows the operator to perform certain operations in the interior of the vehicle (e.g. inserting supports, the seats, fixing of the cables), without the risk of the buckle colliding with the vehicle's sheet metal and causing scratches, which would entail reworks.



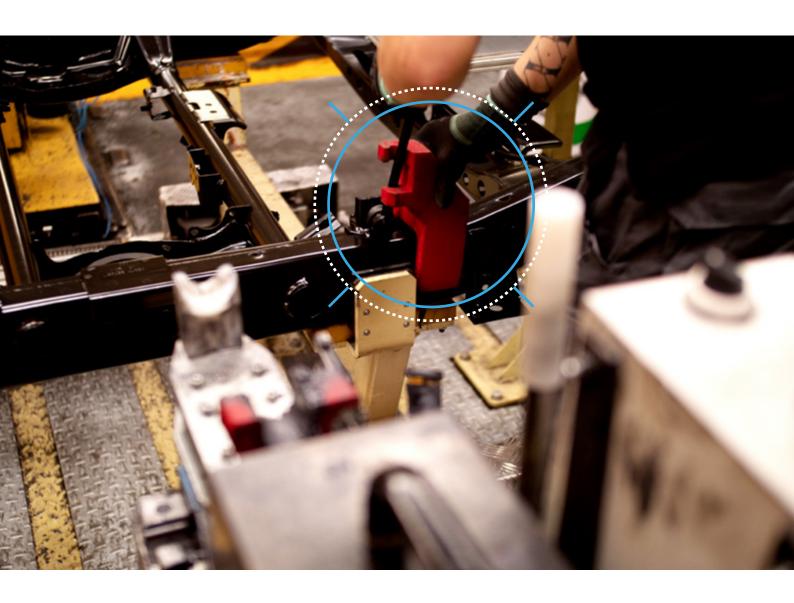
Magnetic belt holder fixture





Suspension tie rod tool



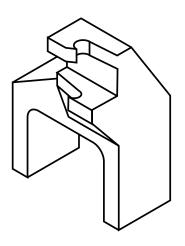


Features

Material:	TPU	Cost:	9,20 €
Printing time:	16 h.	Size:	60 x 60 x 200 mm

Description

Temporary tool that maintains the vertical position of the suspension tie rod, freeing the operator from handling it while it is being assembled with the suspension.



Suspension tie rod tool

Temporary water pump support fixture





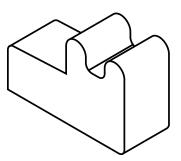


Features

Material:	TPU	Cost:	3,45 €
Printing time:	6 h.	Size:	60 x 60 x 40 mm

Description

Temporary support that secures the set of the water pump coolant so that the operator can easily mount the part to the vehicle. As it is a very large assembly, the part allows it to be fixed and avoids bad postures that can make the assembly of the set difficult.



Temporary water pump support fixture

Tail light positioning gauge jig





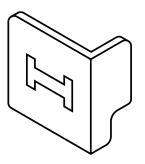


Features

Material:	TPU	Cost:	0,40 €
Printing time:	40 min.	Size:	30 x 30 x 3 mm

Description

This piece is a gauge that allows the operator to ensure the correct tolerance of the sheet metal with the car tail light. Inside the printed part is a small neodymium magnet that allows the part to adhere firmly to the car's sheet metal.



Tail light positioning gauge jig

Protective kit box support fixture





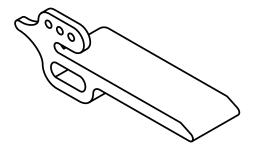


Features

Material:	TPU	© Cost:	2,30 €
Printing time:	4 h.	[] Size:	150 x 30 x 7 mm

Description

This part protects the car's paint and chassis from any scratches, dents or bumps that may be caused by the kit box. The kit boxes arrive at the assembly line through the AGV (Automated guided vehicle), and are customized boxes for each vehicle reference where the unique components for that version are included. The operator uses these components to mount them on the car, and support the kit box, in this case, in the trunk of the Nissan Navara pickup. These protectors, made of TPU, are installed directly on each kit box. Nissan currently has more than 60 printed parts for each of the Navara kit boxes.



Protective kit box support fixture

Electronic box pre-assembly support jig





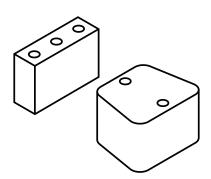
Features

Material:	ABS	Cost:	5,75 €
Printing time:	10 h. (for both parts)	Size:	80 x 80 x 40 mm

Description

This set of 2 parts serves as support when preparing a subset in the kitbox, which is performed by the operator themselves. This support facilitates the preassembly of the electronic control box before it is later mounted on the vehicle.

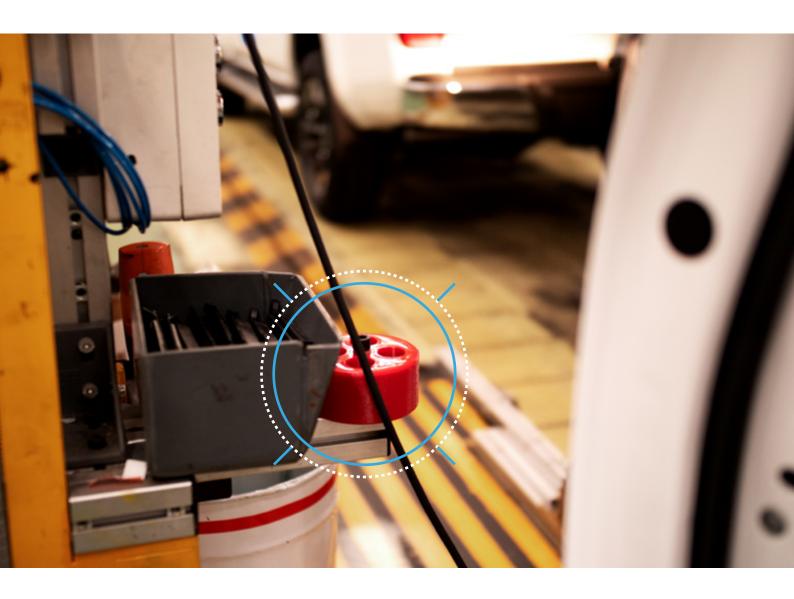
This part can currently be found in 30 kit boxes at Nissan.



Electronic box pre-assembly support jig

Assembly line door protector



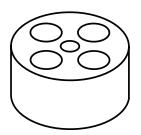


Features

Material:	TPU	Cost:	4€
Printing time:	7 h.	Size:	120 x 120 x 50 mm

Description

This part is a rotating wheel installed in the workstation of the assembly line. It serves as protection against scratches and blows from the workstation to the car door plate. In the assembly line you will find constant movement, so if the operator in the workstation does not close the car door by mistake, the workstation will hit the door when it reaches the same height as the structure. The printed protector avoids these damages, reducing risk and avoiding rework.



Assembly line door protector

Catalytic converter support bracket





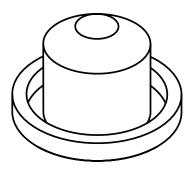
Features

Material:	TPU	© Cost:	4,60€
Printing time:	8 h.	[] Size:	70 x 70 x 40 mm

Description

This piece forms part of the AGV (Automated guided vehicle) trolleys, responsible for transporting certain components to the assembly line. This part in particular serves as support for the catalyst part of the exhaust pipe.

This part can currently be found in about 30 AGVs at Nissan.



Catalytic converter support bracket

Flexible skirting board protector



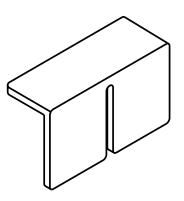


Features

Material:	TPU	© Cost:	0,40 €
Printing time:	40 min.	Size:	100 x 45 x 5 mm

Description

This small part is installed in the skirting board of each one of the moving workstations of the line, and serves as protection against everything that it can encounter.



Flexible skirting board protector



3D PRINTING THROUGHOUT THE WHOLE ASSEMBLY LINE

The pioneering Nissan team have gone above and beyond by using 3D printed tools, jigs and fixtures to remold their workflow to save a remarkable amount of time and costs. The diversity between the parts and their functions follow the car's evolution from creation to completion, and provide functionality and reliability, and a range of applications throughout.

For the full story on Nissan's journey into 3D printing, read our case study in:

www.bcn3d.com/nissan



