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Monoposto Technical Specification Tatuus F4 2025

**For
Monoposto & Tiedeman Trophy
Championships**



This specification incorporates the following documents;

 2021_fia_f4_1st_gen_homologation_11.01.21.pdf	 Technical_Bulletin_F4_002-19_AutotecnicaMotori.pdf
 2021_fia_f4_1st_gen_technical_regulations_11.01.21.pdf	 Technical_Bulletin_F4_002-20_AutotecnicaMotori.pdf
 07216_160406_F4_CorrezioneECUTWaterTAir_ENG.pdf	 Technical_Bulletin_F4_003-19_AutotecnicaMotori.pdf
 20190213-DOCT-SL75LW-DIFFERENTIAL-4-SATELLITES-F4.pdf	 Technical_Bulletin_F4_004-19_AutotecnicaMotori.pdf
 EngineLoom_V10.pdf	 Technical_Bulletin_F4_006-19_AutotecnicaMotori.pdf
 f4_registered_manufacturers_0.pdf	 Technical_Bulletin_F4_007-19_AutotecnicaMotori.pdf
 F4_Spare_Parts_Catalogue_Promoter.pdf	
 Part_Classification_T014_2019_v5.60.pdf	
 Screenshot 2025-01-16 230730.png	
 Screenshot 2025-01-16 231023.png	
 Spare_parts_list_T014_v_5.8.pdf	
 t014_spare_parts_list_v4.7.pdf	
 Tatuus TO14 Technical Manual.pdf	
 Technical Manual Engine 414-F4 Release 1.3.pdf	
 Technical Manual Engine 414-F4 Release 1.5.pdf	
 Technical Manual Engine 414-F4 Release 1.6.pdf	
 Technical Manual Engine 414-F4.pdf	
 Technical_Bulletin_001-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_002-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_003-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_004-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_005-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_006-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_007-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_008-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_009-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_010-17_AutotecnicaMotori.pdf	
 Technical_Bulletin_F4_001-20_AutotecnicaMotori.pdf	

These documents shall be considered as a single technical document for technical compliance purposes for Monoposto Championship regulations.

The intention of this specification is to provide a reference document to enable the technical aspects of the original championship cars to be maintained to allow a home for these cars in Monoposto Championships.

Monoposto Championship regulations take precedence over this specification. The organiser (Monoposto Racing Club) reserve the right to amend this specification as may be considered necessary for the stability of the championships..

None of the Sporting or Commercial aspect of the original championship regulations are applicable to any Monoposto Championships.

Where original regulations are not specifically mentioned in Monoposto Regulations, the Monoposto Regulations apply.

Tatuus FIA Gen 1 F4 Cars were used in various European F4 Championships, Italian, Spanish and German. These cars were also used in GB4 Championship. It is the entrants responsibility to provide relevant championship regulations to ensure compliance of their vehicle.

This specification is for Tatuus Gen 1 chassis T014-F4 fitted with Abarth 1.4 414-F4. This is the only allowable configuration.

Engines shall be sealed as the manufacturers instructions. Seal may be original manufacturers, Motorsport UK or other ASN or manufactures approved agents.

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2021 FORMULA 4 – 1ST GEN TECHNICAL REGULATIONS

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ARTICLE 1: DEFINITIONS

1.1 Formula 4 car:

Automobile designed solely for speed races on circuits or closed courses.

1.2 Automobile:

Land vehicle running on at least four non-aligned complete wheels, of which at least two are for steering and at least two for propulsion.

1.3 Land vehicle:

A locomotive device propelled by its own means, moving by constantly taking real support on the earth's surface, and of which the propulsion and steering are under the control of a driver aboard the vehicle.

1.4 Bodywork:

All entirely sprung parts of the car in contact with the external air stream, except the rollover structures and the parts definitely associated with the mechanical functioning of the Power Unit, transmission and running gear. Airboxes and radiators are considered to be part of the bodywork.

1.5 Wheel:

Flange and rim. Complete wheel: flange, rim and tyre.

1.6 Automobile make:

In the case of Formula racing cars, an automobile make is a complete car. When the car manufacturer fits a Power Unit which it does not manufacture, the car shall be considered a hybrid and the name of the Power Unit manufacturer shall be associated with that of the car manufacturer. The name of the car manufacturer must always precede that of the Power Unit manufacturer.

Should a hybrid car win a Championship Title, Cup or Trophy, this will be awarded to the manufacturer of the car.

1.7 Event:

An event shall consist of official practice and the race.

1.8 Weight:

Is the weight of the car with the driver, wearing his complete racing apparel, at all times during the event.

1.9 Racing weight:

Is the weight of the car in running order with the driver aboard and all fuel tanks full.

1.10 Cubic capacity:

The volume swept in the cylinders of the engine by the movement of the pistons. This volume shall be expressed in cubic centimetres. In calculating engine cubic capacity, the number π shall be 3.1416.

1.11 Supercharging:

Increasing the weight of the charge of the fuel/air mixture in the combustion chamber (over the weight induced by normal atmospheric pressure, ram effect and dynamic effects in the intake and/or exhaust system) by any means whatsoever. The injection of fuel under pressure is not considered to be supercharging.

1.12 Intake system:

All the elements between the cylinder head and the external side of the air restrictor.

1.13 Main structure:

The fully sprung structure of the vehicle to which the suspension and/or spring loads are transmitted, extending longitudinally from the foremost front suspension on the chassis to the rearmost one at the rear.

1.14 Sprung suspension:

The means whereby all complete wheels are suspended from the body/chassis unit by a spring medium.

1.15 Active suspension:

Any system which allows control of any part of the suspension or of the trim height when the car is moving.

1.16 Cockpit:

The volume which accommodates the driver.

1.17 Survival cell:

A continuous closed structure containing all fuel tanks and the cockpit.

1.18 Composite structure:

Non-homogeneous materials which have a cross section comprising either two skins bonded to each side of a core material or an assembly of plies which form one laminate.

1.19 Telemetry:

The transmission of data between a moving car and anyone connected with the entry of that car.

1.20 Semi-automatic gearbox:

One which, when the driver calls for a gear change, takes over the control of one or more of the Power Unit, clutch and gear selectors momentarily to enable the gear to be engaged.

1.21 Cockpit padding:

Non-structural parts placed within the cockpit for the sole purpose of improving driver comfort and safety. All such material must be quickly removable without the use of tools.

1.22 Single supplier parts:

The following parts must be from a single supplier for all competitors in a championship:

- Power Unit including ECU and mechanical engine installation such as bellhouse, spaceframe, brackets, etc.
- Gearbox including optional paddle shift system
- Suspension dampers
- Rims

1.23 Car centre line:

The straight line running through the point halfway between the centres of the two forward skid block holes and the centre of the rear skid block hole (see Drawing 1.6).

1.24 Engine:

The internal combustion engine including ancillaries, [sensors, actuators and control](#) and actuator systems necessary for its proper function.

1.25 Power Unit:

The engine, complete with its ancillaries, the energy recovery system and all [sensors, actuators and control](#) actuation systems necessary to make them function at all times.

1.26 Energy Recovery System (ERS):

A system that is designed to recover energy from the car, store that energy and make it available to propel the car and, optionally, to drive any ancillaries and actuation systems necessary for its proper function.

1.27 Motor Generator Unit (MGU):

The Motor Generator Unit is the electrical machine mechanically linked to the [powertrain](#) as part of the ERS.

1.28 Energy Store (ES):

The [part of ERS that stores electrochemical or mechanical energy, including its safety control electronics and a minimal housing.](#)

1.29 DC-DC Converter:

An electronic circuit connected to the Energy Store and whose function is to regulate multi-level voltage outputs for use by the electrical and electronic components of the car and power unit. A DC-DC converter may only consume energy from the energy store and cannot recover energy into the Energy Store. The components directly supplied by the DCDC or indirectly supplied through the non ERS energy storage cannot be used to propel the car or to provide energy to the pressure charging system.

1.30 Auxiliary circuit:

The auxiliary circuit includes the ECU, engine actuators, [auxiliary battery, alternator\(if fitted\), fuel pump, rain light, radio, camera, logger, GCU, gearshift compressor and/or gear shift actuators.](#)

1.31 Power circuit:

The [power circuit consists of all those parts of the electrical equipment that are used for driving the vehicle. It](#) includes the ES, its safety management, the inverter, the MGU, [cables and harnesses.](#)

1.32 Maximum working voltage:

[Highest value of AC voltage \(rms\) or of DC voltage that can occur under any normal operating conditions according to the manufacturer's specifications, disregarding transients and ripple.](#)

1.33 Battery management system (BMS):

[The BMS is a set of important safety systems of the ES. It must detect internal faults and must trigger power reduction delivered from/to the battery or shutdown the ERS if the BMS considers that the ES is operating unsafely.](#)

1.34 ES cells:

[The elementary part of the ES that produces and stores electricity through electro-chemical reactions.](#)

ARTICLE 2: REGULATIONS

2.1 Role of the FIA:

The following technical regulations for Formula 4 cars are issued by the FIA.

2.2 Publication date for amendments:

Each year in December at the latest, the FIA will publish all changes made to these regulations. All such changes will take effect on the second 1 January following their publication.

Changes made for safety reasons may come into force without notice.

2.3 Permanent compliance with regulations:

Automobiles must comply with these regulations in their entirety at all times during an event.

2.4 Measurements:

All measurements must be made while the car is stationary on a flat horizontal surface.

2.5 Technical passport and FIA chassis test report:

All competitors must be in possession of a technical passport for their car which will be issued by the relevant ASN and must accompany the car at all times.

Furthermore, all competitors must be in possession of an FIA chassis test report (see Appendix 2 to the Formula 4 Technical Regulations) for their car which the relevant rolling chassis manufacturer must provide together with each survival cell.

No car will be permitted to take part in an event unless the passport and the FIA chassis test report are available for inspection at initial scrutineering.

2.6 Eligible cars:

Only cars homologated as FIA Formula 4 cars are eligible in an event.

2.7 Modifications to car design:

2.7.1 General

The complete car is divided into three types of part.

Type 1: These parts must be supplied by the manufacturer and used exactly as supplied. Repairs may be carried out only by the manufacturer.

Type 2: These parts are Type 1 parts with specific restrictions. Only the modifications indicated in the homologation may be carried out. Repairs are allowed only in the range described in the homologation.

Type 3: These parts are unrestricted, provided that they are used as designed by the manufacturer and do not fulfil any additional function.

The above-mentioned parts classification and the user manual form part of the homologation, both documents will be supplied by the respective manufacturer.

The adding of colour or thin adhesive film up to a thickness of 0.5 mm is not considered as a modification, provided that the colour or film fulfils only an optical function.

2.7.2 Standard mounting parts

Standard mounting parts, such as screws, nuts, bolts, washers and lock washers, are considered as Type 3 parts unless specifically mentioned in the homologation. They may be replaced with equivalent or superior standard parts.

The thread type, size, length and pitch must remain the same.

The use of locking wire is permitted.

Any type of standard mounting part which has an influence on the car set-up is considered as a Type 1 part unless specifically mentioned in the homologation.

Only Type 3 washers may be removed.

Washers may be added only for facilitating and improving mechanical installation. They may influence the set-up of the car only when specifically mentioned in the homologation.

2.7.3 Protections

Heat protections, mechanical protections (such as abrasion protection or tape) and protections for driver comfort may be added, provided that their sole function is the protection of the relevant element and unless specifically mentioned in the homologation.

2.7.4 Bodywork

The modification of bodywork parts and bodywork supports is allowed only to ensure proper installation despite manufacturing tolerances.

2.7.5 Quick couplings

The use of quick couplings for brake, clutch and fuel lines is allowed, provided that FIA-approved dry couplings are used.

ARTICLE 3: BODYWORK AND DIMENSIONS

3.1 Wheel centre line:

The centre line of any wheel shall be deemed to be halfway between two straight edges, perpendicular to the surface on which the car is standing, placed against opposite sides of the complete wheel at the centre of the tyre tread.

3.2 Height measurements:

All height measurements will be taken normal to and from the reference plane.

3.3 Overall width:

The overall width of the car including complete wheels shall not exceed 1750 mm, with the steered wheels in the straight ahead position.

3.4 Width ahead of the rear wheel centre line:

The maximum width of the bodywork situated behind a point lying 280 mm behind the front wheel centre line and the rear wheel centre line is 1400 mm.

3.5 Width behind the rear wheel centre line:

3.5.1 Bodywork behind the rear wheel centre line must not exceed 900 mm in width.

3.5.2 Except for attachment, the rear wing end plates must be flat with no holes, apertures or slots.

Screw heads and washers for the sole purpose of attaching the end plates to the wing will be ignored when assessing whether the car is in compliance with Article 3.5.

3.6 Overall height:

No part of the bodywork may be more than 950 mm above the reference plane.

3.7 Front bodywork:

3.7.1 The bodywork situated forward of a point lying 400 mm forward of the front wheel centre line is limited to a maximum width of 1400 mm.

3.7.2 All bodywork situated forward of a point lying 400 mm forward of the front wheel centre line, and more than 200 mm from the centre line of the car, must be no less than 50 mm and no more than 330 mm above the reference plane.

3.7.3 Except for attachment, the front wing endplates must be flat with no holes, apertures or slots and, in order to prevent tyre damage to other cars, at least 10 mm thick within a radius of 5 mm on all edges. The front wing endplates must fit into the volume formed by planes running 690 mm [+ 0 mm/- 1 mm] and 700 mm parallel to the car centre line and normal to the reference plane, 400 mm and 910 mm forward of and parallel to the front wheel centre line and normal to the reference plane and 50 mm and 330 mm above and parallel to the reference plane.

3.7.4 No bodywork is allowed inside a volume formed by: the reference plane; a plane 140 mm above the reference plane; a plane vertical to the reference plane, normal to the car centre line and 400 mm forward of the front wheel centre line; and a plane vertical to the reference plane, normal to the car centre line and 550 mm behind the front wheel centre line.

3.7.5 No bodywork, except for front wing endplates, may extend above a diagonal line from a point 150 mm forward of the front wheel centre line and 560 mm above the reference plane to a point 50 mm rearward of the forwardmost point of the impact-absorbing structure defined by Article 15.3.5 and 250 mm above the reference plane. No bodywork, except for front wing endplates, situated forward of the forwardmost point of this diagonal line may be more than 250 mm above the reference plane.

Screw heads and washers for the sole purpose of attaching the end plates to the wing will be ignored when assessing whether the car is in compliance with Article 3.7.

3.8 Front wing main plane:

3.8.1 The aerofoil section of the front wing must conform to the sets of dimensions given in Drawing 1.3. Each of the dimensions given must remain nominally at the same height above the reference plane over the entire width.

A tolerance of ± 1.0 mm will be permitted on any stated dimension.

3.8.2 The front wing end plates must be orientated vertical to the reference plane, parallel to the car centre line and directly attached to the homologated front wing main plane (meaning no other parts are allowed between the homologated front wing main plane and the front wing end plate).

3.8.3 With the exception of the front wing end plates and the attachment points (inserts/holes) for the homologated front wing hangers (including spacers or shims between the hangers and the main plane), the front wing main plane must be a single, smooth, rigid, continuous element without any slots, gaps, attachments or dividers in order that only one single continuous section may be contained within any cross section taken parallel to the car centre line and normal to the reference plane.

3.8.4 On either side of the car, within 15 mm from the trailing edge of the front wing main plane, one L-shaped gurney flap with a height of maximum 15 mm may be attached (above and below). For this purpose, homologated inserts/holes are permitted in this area.

3.8.5 No bodywork is allowed inside a volume formed by the reference plane, two longitudinal planes which run normal to the reference plane and 300 mm parallel to the car centre line either side and two planes which run normal to the reference plane and parallel to and 450 mm and 1010 mm forward of the front wheel centre line, except for the following components:

- a) homologated frontal impact-absorbing structure;
- b) homologated front wing hangers;
- c) homologated front wing hanger covers;
- d) homologated front wing main plane (as per homologation drawing).

3.8.6 Spacers or shims between the front wing hangers and the front wing main plane or the frontal impact-absorbing structure are allowed for the sole purpose of bringing the front wing main plane to its legal position.

3.9 Bodywork in front of the rear wheels:

3.9.1 With the exception of rear-view mirrors (including their supports), no part of the bodywork lying 280 mm forward of the rear wheel centre line and more than 550 mm above the reference plane may project more than 310 mm each side of the car centre line.

Formula 4 cars homologated as from 01.01.2019:

With the exception of rear-view mirrors (including their supports), no part of the bodywork lying 280 mm forward of the rear wheel centre line and more than 550 mm above the reference plane may project more than 350 mm each side of the car centre line.

3.9.2 No bodywork forward of the rear wheel centre is allowed above a plane normal to the centre line, which is defined by the following two points:

- a point 900 mm forward of the rear wheel centre line and 950 mm above the reference plane;
- a point above the rear wheel centre and 550 mm from the reference plane.

3.9.3 Any vertical cross section of bodywork normal to the car centre line situated in the volumes defined below must form one tangent continuous curve on its external surface. This tangent continuous curve may not contain any radius less than 75 mm:

a) the volume between 50 mm forward of the rear wheel centre line and 300 mm rearward of the rear face of the cockpit entry template, which is more than 25 mm from the car centre line and more than 600 mm above the reference plane;

b) the volume between 300 mm rearward of the rear face of the cockpit entry template and 75 mm rearward of the rear face of the cockpit entry template, which is more than 125 mm from the car centre line and more than 600 mm above the reference plane;

c) the volume between 300 mm rearward of the rear face of the cockpit entry template and 900 mm rearward of the front wheel centre line, which is more than 380 mm from the car centre line and more than 100 mm above the reference plane.

d) The volume between the rear face of the cockpit entry template and 450 mm forward of the rear face of the cockpit entry template, which is more than 125 mm from the car centre line and more than 675mm above the reference plane.

e) The volume between 50 mm forward of the rear wheel centre line and 300 mm rearward of the rear face of the cockpit entry template, which is more than 350 mm from the car centre line and more than 100 mm above the reference plane.

The surfaces lying within this volume, which are situated more than 55 mm forward of the rear wheel centre line, must not contain any apertures (other than those permitted by Article 3.9.4) or contain any vertical surfaces which lie normal to the car centre line.

Formula 4 cars homologated as from 01.01.2019:

b) the volume between 300 mm rearward of the rear face of the cockpit entry template and 150 mm rearward of the rear face of the cockpit entry template, which is more than 125 mm from the car centre line and more than 600 mm above the reference plane;

d) The volume between the rear face of the cockpit entry template and 450 mm forward of the rear face of the cockpit entry template, which is more than 125 mm from the car centre line and more than 695 mm above the reference plane.

3.9.4 Once the relevant bodywork surfaces are defined in accordance with Article 3.9, apertures may be added for the following purposes only:

a) a single aperture either side of the car centre line for the purpose of the exhaust exit. The bodywork edge of this aperture may have a maximum distance of 10 mm to any point lying on the circumference of the exhaust pipe;

b) rectangular apertures either side of the car centre line for the purpose of allowing suspension members and driveshafts to protrude through the bodywork. No such aperture may have an area greater than 5000 mm² when projected onto the surface itself. No point of such an aperture may be more than 100 mm from any other point on the aperture.

c) two apertures on each side of the car centre line for the purpose of the sidepod air exit. The apertures must be symmetrical around the car centre line and may be no more than 300 mm forward of the rear wheel centre line. No bodywork which is more than 100 mm above the reference plane may lie behind the aperture and forward of the rear wheel centre line.

3.9.5 No bodywork which is more than 100 mm above the reference plane and more than 310 mm from the car centre line is allowed between the rear wheel centre line and 240 mm forward of the rear wheel centre line.

Only devices for the sole purpose of connecting the floor to the chassis are permitted within this volume.

3.10 Bodywork between the rear wheels:

In plan view, no bodywork which is more than 550 mm above the reference plane is permitted outside a line defined by the following two points:

- one point lying 280 mm forward of the rear wheel centre line and 230 mm from the car centre line;
- one point lying on the rear wheel centre line and 200 mm from the car centre line.

3.11 Bodywork behind the rear wheel centre line:

3.11.1 No bodywork behind a point lying 250 mm behind the rear wheel centre line may incorporate more than two aerofoil sections. The upper aerofoil sections used in this area must conform to the set of dimensions given in Appendix 1 Drawing 4. The lower aerofoil sections used in this area must conform to the set of dimensions given in Appendix 1 Drawing 5. Each of the dimensions given must remain nominally at the same height above the reference plane over the entire width of the relevant aerofoil section.

No holes, apertures or slots are permitted in any of these aerofoil sections.

No trim tabs may be added to any of these aerofoil sections.

A tolerance of ± 1.0 mm will be permitted on any stated dimension.

Only the mandatory aerofoil sections may be attached to the rear wing end plates.

3.11.2 No bodywork which is more than 550 mm above the reference plane is allowed between the rear wheel centre and 250 mm behind the rear wheel centre line.

3.11.3 All bodywork situated behind the rear wheel centre line must be no more than 860 mm and no less than 310 mm above the reference plane.

No bodywork which is more than 310 mm above the reference plane and between the rear wheel centre line and 250 mm behind the rear wheel centre line may be more than 200 mm from the car centre line.

The above mentioned restrictions will be applied except for the following components:

- a) homologated rear impact-absorbing structure;
- b) homologated rear wing support;
- c) homologated gearbox casing;
- d) homologated rear light;
- e) homologated jacking points attached to the rear impact-absorbing structure.

3.12 Bodywork around the front wheels:

3.12.1 In plan view, there must be no bodywork in the area formed by two longitudinal lines parallel to and 220 mm and 875 mm from the car centre line and two transversal lines, one 400 mm forward and one 280 mm behind the front wheel centre line.

In plan view, no bodywork is permitted within an area defined by a line normal to the car centre line and 280 mm behind the front wheel centre line, a line normal to the car centre line and 850 mm behind the front wheel centre line, a line 875 mm parallel to the car centre line and a line running through a point 220 mm from the car centre line and 280 mm behind the front wheel centre line and a point 310 mm from the car centre line and 850 mm behind the front wheel centre line.

This does not apply to any parts of the rear-view mirrors (including their supports), which are visible in the described area, provided each of these areas does not exceed 9000 mm² when projected to a plane above the car which is parallel to the reference plane. The rear-view mirror supports must have a circular cross section.

3.12.2 Except for the rollover structures and the windscreen, no bodywork forward of a point lying 850 mm forward of the rear face of the cockpit entry template is allowed above a plane normal to the centre line, which is defined by the following two points:

- a point 150 mm forward of the front wheel centre line and 560 mm above the reference plane;
- a point 850 mm forward of the rear face of the cockpit entry template and 580 mm above the reference plane.

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Except for the rollover structures and the windscreen, no bodywork forward of a point lying 850 mm forward of the rear face of the cockpit entry template is allowed above two planes normal to the centre line, which are defined by the following points:

- a plane through a point 150 mm forward of the front wheel centre line and 560 mm above the reference plane and a point on the front wheel centre line and 600 mm above the reference plane;
- a plane through a point on the front wheel centre line and 600 mm above the reference plane and a point 875 mm forward of the rear face of the cockpit entry template and 625 mm above the reference plane.

3.12.3 Except for the rollover structures, the cockpit rim edge, the inside of the cockpit, the windscreen and the attachment of the frontal impact-absorbing structure, any intersection of any bodywork above the reference plane and 400 mm forward of and 900 mm behind the front wheel centre line which is visible from above or beneath the car with a lateral or longitudinal vertical plane should form one continuous line, with a minimum radius of 10 mm for bodywork more than 60 mm and 1 mm for bodywork less than 60 mm above the reference plane and which is visible from above and beneath the car respectively.

3.12.4 Except for the rollover structures, the cockpit rim edge, the inside of the cockpit, the windscreen and the attachment of the frontal impact-absorbing structure, any vertical cross section normal or parallel to the car centre line of any bodywork visible from above, lying more than 900 mm forward of the rear face of the cockpit entry template and less than 330 mm forward of the front wheel centre line, which is less than 220 mm from the car centre line, should form one continuous line with a minimum radius of 25 mm for normal and 50 mm for parallel cross sections.

3.12.5 Except the front wing defined by Article 3.8 and the attachment of the frontal impact-absorbing structure, any vertical cross section normal or parallel to the car centre line of any bodywork visible from above, lying more than 330 mm forward of the front wheel centre line and more than 50 mm behind the forwardmost point, which is less than 220 mm from the car centre line, may only have a continuous, convex shape with a minimum radius of 25 mm for normal and 50 mm for parallel cross sections.

3.13 Bodywork facing the ground:

All sprung parts of the car situated more than 550 mm behind the front wheel centre line and forward of the rear wheel centre line, and which are visible from underneath, must form surfaces which lie on one of two parallel planes, the reference plane or the step plane. This does not apply to any parts of rear-view mirrors which are visible, provided each of these areas does not exceed 9000 mm² when projected to a horizontal plane above the car. The step plane must be 50 mm above the reference plane.

Additionally, the surface formed by all parts lying on the reference plane must:

- a) extend from a point lying 550 mm behind the front wheel centre line to a point lying 280 mm forward of the rear wheel centre line;
- b) have minimum and maximum widths of 300 mm and 500 mm respectively;
- c) be symmetrical about the car centre line;
- d) be made of wood at least 10 mm thick.
For the sole purpose of incorporating a production flywheel, a cut-out, symmetrical to the car centre line with a maximum width of 180 mm, maximum length of 120 mm and a maximum depth of 5 mm, may be added on the upper side.

All parts lying on the reference and step planes, in addition to the transition between the two planes, must produce uniform, solid, hard, continuous, rigid (no degree of freedom in relation to the body/chassis unit), impervious surfaces under all circumstances.

The peripheries of the surfaces formed by the parts lying on the reference and step planes may be curved upwards with maximum radii of 25 and 50 mm respectively. The surface formed by the parts lying on the reference plane must be connected at its extremities vertically to the parts lying on the step plane and any corner which forms the transition between the two planes may have a maximum radius of 25 mm.

To help overcome any possible manufacturing problems, and not to permit any design which may contravene any part of these regulations, dimensional tolerances are permitted on bodywork situated more than 550mm behind the front wheel centre line and forward of the rear wheel centre line.

A vertical tolerance of +/- 5 mm is permissible across the surfaces lying on the reference and step planes and a horizontal tolerance of 5 mm is permitted when assessing whether a surface is visible from beneath the car.

All sprung parts of the car situated behind a point lying 280 mm forward of the rear wheel centre line, which are visible from underneath and more than 150 mm from the car centre line, must be at least 50 mm above the reference plane.

In an area lying 700 mm or less from the car centre line, and from 450 mm forward of the rear face of the cockpit entry template to the rear wheel centre line, any intersection of any bodywork visible from beneath the car with a lateral or longitudinal vertical plane should form one continuous line which is visible from beneath the car.

Compliance with Article 3.13 must be demonstrated with all unsprung parts of the car removed.

3.14 Skid block:

3.14.1 Beneath the surface formed by all parts lying on the reference plane, a rectangular skid block must be fitted. This skid block may comprise more than one piece but must:

- a) extend longitudinally from a point lying 550 mm behind the front wheel centre line to a point lying 280 mm forward of the rear wheel centre line;
- b) be made from wood;
- c) have a width of 300 mm with a tolerance of ± 2 mm;
- d) Have a minimum thickness of 2.0 mm.
- e) have a uniform thickness of at least 4.8 mm when new;
- f) have no holes or cut-outs other than those necessary to fit the skid block to the car;
- g) have three precisely placed 80 mm diameter holes the positions of which are detailed in Drawing 1.6;
- h) be fixed symmetrically about the centre line of the car in such a way that no air may pass between it and the surface formed by the parts lying on the reference plane.

- 3.14.2** The front and rear edge of a new skid block may be chamfered over a distance of 50 mm to a depth of 3 mm.
- 3.14.3** In order to establish the conformity of the skid block after use, its thickness will be measured only around the three 80 mm diameter holes; the minimum thickness must be respected in at least one place on the circumference of all three holes.

3.15 Overhangs:

With the exception of the structure required by Article 15.4.2 and the FIA-approved rear light and any jacking point attached to this structure, no part of the car shall be more than 500 mm behind the rear wheel centre line or more than 1010 mm in front of the front wheel centre line.

No part of the bodywork more than 200 mm from the longitudinal car centre line may be more than 910 mm in front of the front wheel centre line.

3.16 Aerodynamic influence:

Any specific part of the car influencing its aerodynamic performance (with the exception of non-structural shrouds protecting wheel tethers which are being used solely for this purpose):

- a) must comply with the rules relating to bodywork;
- b) must be rigidly secured to the entirely sprung part of the car (rigidly secured means not having any degree of freedom);
- c) must remain immobile in relation to the sprung part of the car.

Any device or construction that is designed to bridge the gap between the sprung part of the car and the ground is prohibited under all circumstances.

No part having an aerodynamic influence and no part of the bodywork, with the exception of the skid block in Article 3.14 above, may under any circumstances be located below the reference plane.

3.17 Wheelbase and track:

Wheelbase: 2750 mm \pm 10 mm

Minimum track: 1200 mm.

3.18 Bodywork flexibility:

- 3.18.1** Bodywork may deflect no more than 5 mm vertically when a 50 kg load is applied vertically to it 700 mm forward of the front wheel centre line and 575 mm from the car centre line, this point being the centre of the adapter described below. The load will be simultaneously applied on both sides of the front wing main plane in a downward direction using a rectangular adapter 300 mm long and 150 mm wide with the 300 mm edges running parallel to the car centre line. The adapter must follow the shape of the front wing in the area defined above and the teams must supply the latter when such a test is deemed necessary. During the test the car must sit on the skid block and the deflection is measured on both sides of the front wing main plane and at the car centre line, the car centre line figure being deducted from the LHS and RHS figures.
- 3.18.2** In order to ensure that the requirements of Article 3.18 are respected, the FIA reserves the right to introduce further load/deflection tests on any part of the bodywork that appears to be (or is suspected of) moving while the car is in motion.

3.19 Power Unit cooling ducts:

The Power Unit cooling duct surface must be at least 75,000 mm² in total. This is measured to a projection onto a plane vertical to the reference plane and normal to the car centre line and must be maintained up to the radiator surface. Further, any intersection taken normal to the car centre line and vertical to the reference plane must form a continuous line up to the radiator.

Devices for the sole purpose of connecting the floor to the chassis and to protect the radiators are allowed within the radiator duct and may pass through the bodywork. The devices and passages through the bodywork must have a circular cross section with a diameter no greater than 5 mm and 7 mm respectively or a rectangular cross section of 25 mm x 2 mm and 30 mm x 5 mm respectively.

3.20 Upper bodywork:

3.20.1 When viewed from the side, the car must have bodywork in the area bounded by four lines: one vertical 30 mm behind the rear face of the cockpit entry template, one horizontal 550 mm above the reference plane, one horizontal 860 mm above the reference plane, and one diagonal which intersects the 860 mm horizontal at a point 850 mm forward of the rear wheel centre line and the 550 mm horizontal at a point lying 50 mm forward of the rear wheel centre line.

With exception of the local extensions mentioned in Article 3.22, any bodywork within this area must be arranged symmetrically about the car centre line and, when measured 200 mm vertically below the diagonal boundary line, must have minimum widths of 150 mm and 50 mm respectively at points lying 850 mm and 50 mm forward of the rear wheel centre line. This bodywork must lie on or outside the boundary defined by a linear taper between these minimum widths.

3.20.2 In order that a car may be lifted quickly in the event of it stopping on the circuit, the principal rollover structure and the engine cover must incorporate an unobstructed opening designed to permit a strap, whose section measures 60mm x 30mm, to pass through it.

3.21 Space for exhaust system:

The sidepods must be designed such that an exhaust system including a cylindrical muffler with a diameter of 150 mm and a length of 600 mm may be fitted on either side of the car.

The last 50 mm of the tailpipe must have a cylindrical shape with a circular cross section. The major axis of the cylinder may have an angle between 0 and 15 degrees to the car centre line (the exhaust exit facing away from the car centre line) and may have an angle between 0 and 90 degrees to the reference plane (the exhaust exit facing upwards and rewards). The centre of the circular cross section at the end of the tailpipe must have a minimum height of 280 mm above the reference plane.

No bodywork may be within a cone at 45° and measuring 200 mm in length, which is concentric to the major axis of the tailpipe and facing towards the exhaust flow direction.

All exhaust gas must pass through this tailpipe.

3.22 Space for Power Unit and intake system:

The car must be designed such that a Power Unit and intake system with the maximum dimensions given in Article 5.3 may be fitted. If necessary for the installation of the Power Unit, it must be possible to add local extensions to the defined bodywork.

3.23 Space for radiators:

The car must be designed such that a radiator with the following dimensions may be fitted on either side of the car:

- minimum height: 400 mm
- minimum width: 600 mm
- minimum thickness: 30 mm

The above-mentioned dimensions include pipes and connections.

The shorter edge of the rectangular cooling surface must be positioned normal to the reference plane.

In plan view, the longer edge of the rectangular cooling surface must have a minimum angle of 30° to the car centre line.

ARTICLE 4: WEIGHT

4.1 Minimum weight:

The weight of the car must not be less than 570 kg.

Adjustments to the minimum weight may be specified within the sporting regulations of each championship to compensate different Power Unit weights. However, the power to weight ratio (without driver) may not be less than 3 kg/HP.

4.2 Ballast:

Ballast can be used provided it is secured in such a way that tools are required for its removal. It must be possible to fix seals if deemed necessary by the scrutineers.

4.3 Adding during the race:

The adding to the car during the race of any liquid or other material whatsoever or the replacement during the race of any part with another that is materially heavier is forbidden.

ARTICLE 5: POWER UNIT

5.1 Power Unit homologation:

Only Power Units which have been homologated in accordance with the Formula 4 Homologation Regulations may be used during an event.

All such Power Units should be delivered in such a condition that the seals can be fitted.

5.2 General engine specification:

5.2.1 Only 4-stroke (Otto principle) engines with reciprocating pistons are permitted.

5.2.2 Turbocharged engines are permitted.

5.2.3 The engine may be structural or be fitted with an additional space frame.

5.3 Main Power Unit and intake system dimensions:

5.3.1 The height of the crankshaft rotational axis must be at $160 \text{ mm} \pm 1 \text{ mm}$ above the reference plane.

5.3.2 The length between front and rear mounting flanges (Power Unit including bellhousing and/or spaceframe) must be $700 \text{ mm} \pm 0.5 \text{ mm}$.

5.3.3 The Power Unit -to-chassis mounting points must be arranged in accordance with Drawing 2.1.

5.3.4 The bell housing or space frame-to-gearbox mounting surface must be arranged in accordance with Drawing 1.9d.

5.3.5 The Power Unit including bell housing or space frame and intake system but excluding the ES, must comply with the maximum dimensions given in Drawing 2.2. If necessary for the installation of the Power Unit, local extensions may be added.

5.3.6 The air intake must be situated on top of the engine, behind or inside the principal roll structure.

5.3.7 All air feeding the engine must pass through the main rollover structure of the car.

5.3.8 The bellhouse or space frame must provide the forward pickup points of the lower rear wishbone in accordance with Drawings 1.9a and 1.9e.

5.4 Clutch:

The clutch should be designed such that the lifetime of all parts exceeds 10,000 km.

5.5 Power Unit Control Unit:

5.5.1 The ECU must provide the common connector defined by Article 8.7.

5.5.2 The Power Unit manufacturer must provide a mechanism that allows the scrutineers to accurately identify the ECU software version loaded.

5.5.3 The following channels must be available via CAN for the chassis data logging system:

- Throttle pedal position only in case of a drive-by-wire system
- Engine rpm
- Auxiliary battery voltage
- Water temperature
- Oil temperature
- Oil pressure

- ERS and Power Unit error codes.

5.5.4 The following channels, when they exist, must be available for Power Unit support and scrutineering purposes only:

- Ignition cut
- Ignition timing
- Injection timing
- Fuel mass
- Global fuel mass correction factor
- Lambda
- Air temperature
- Airbox/inlet pressure
- Throttle valve position
- MGU: Speed and temperatures (winding, rotor, bearings)
- Inverter: Power Module temperature, Iq and Id current and existing diagnostic channel
- ES: State of charge, cells temperature, voltage, current and existing diagnostic channel.
- DCDC: Voltages, currents, temperatures and existing diagnostic channels.

5.6 Engine rev limiter

Any rev limiter other than for over-rev protection or any function or construction, designed to help the driver finding a predefined rev level for starting, is forbidden.

5.7 General electrical safety:

The maximum working voltage on the car must never exceed 60V DC or 30V AC.

5.8 Power circuit:

The outer covering of cables and harness of the traction circuit not within enclosures or behind barriers shall be marked in purple or orange.

Power circuit cables and harnesses must be inside the bodywork.

5.9 Energy Store (ES)

Liquid cooling is forbidden.

The ES must be surrounded by a fire proof enclosure (V0 level of acceptance respecting the "UL94" US standard).

The technology for the ES is free but it must have the suitable UN certification for transportation.

The Energy Store must be equipped with a contactor which will isolate the ES cells of the other parts of the car when a shutdown is requested.

The Energy Store must be equipped with a fuse to protect the ERS in case of a short circuit. The fuse shall be located as close as possible to the ES cells.

The energy store must be equipped with a BMS. Should it be required due to the technology of the ES, the ES must be fitted with a pressure release valve. The vapour exiting this valve must be directed outside the cockpit.

External charging of the Energy Store during pitstops is prohibited.

5.10 Motor Generator Unit (MGU)

The MGU must be mechanically linked to the engine before the main clutch.

ARTICLE 6: PIPING AND FUEL TANKS

6.1 Fuel tanks:

6.1.1 The fuel tank must be a single rubber bladder conforming to or exceeding the specifications of FIA Standard FT3-1999, the fitting of foam within the tank however is not mandatory. A list of approved materials may be found in FIA Technical List No.1 (List of fuel bladders homologated according to the FIA Standards FT3-1999, FT3.5-1999, FT5-1999) on the FIA website.

6.1.2 All the fuel stored on board the car must be situated between the front face of the Power Unit and the driver's back when viewed in lateral projection.

Furthermore, no fuel can be stored more than 300 mm forward of the highest point at which the driver's back makes contact with his seat.

However, a maximum of 2 litres of fuel may be kept outside the survival cell, but only the quantity which is necessary for the normal running of the engine.

6.1.3 Fuel must not be stored more than 400 mm from the car's longitudinal centre line.

6.1.4 No rubber bladders shall be used more than 5 years after the date of manufacture, unless inspected and recertified by the manufacturer for a period of up to another 2 years.

6.2 Fittings and piping:

6.2.1 All apertures in the fuel tank must be closed by hatches or fittings which are secured to metallic or composite bolt rings bonded to the inside of the bladder.

The bolt hole edges must be no less than 5 mm from the edge of the bolt ring, hatch or fitting.

All hatches and fittings must be sealed with the gaskets or "O" rings supplied with the tank.

6.2.2 All fuel lines between the fuel tank and the engine must have a self-sealing breakaway valve. This valve must separate at less than 50% of the load required to break the fuel line fitting or to pull it out of the fuel tank.

6.2.3 No lines containing fuel, cooling water or lubricating oil may pass through the cockpit.

6.2.4 All lines must be fitted in such a way that any leakage cannot result in the accumulation of fluid in the cockpit.

6.2.5 No hydraulic fluid lines may have removable connectors inside the cockpit.

6.2.6 When flexible, all lines must have threaded connectors and an outer braid which is resistant to abrasion and flame.

6.2.7 All fuel and lubricating oil lines must have a minimum burst pressure of 41 bar at the maximum operating temperature of 135°C.

6.2.8 All hydraulic fluid lines which are not subjected to abrupt changes in pressure, with the exception of lines under gravity head, must have a minimum burst pressure of 408 bar at the maximum operating temperature of 204°C when used with steel connectors and 135°C when used with aluminium connectors.

6.2.9 All hydraulic fluid lines subjected to abrupt changes in pressure must have a minimum burst pressure of 816 bar at the maximum operating temperature of 204°C.

6.3 Crushable structure:

The chassis must include a crushable structure surrounding the fuel tank with the exception of the access hatches, this structure being an integral part of the car's main structure and of the survival cell, and conforming to the following specifications:

- 6.3.1** The crushable structure must be a honeycomb sandwich construction based on a fire-resistant core of a minimum crushing strength of 18 N/cm² (25 lb/in²). It shall be permitted to pass water pipes through this core, but not fuel, lubricating oil or electrical lines.

The sandwich construction must include two skins of 1.5 mm thickness having a tensile strength of minimum 225 N/mm² (14 tons/in²).

- 6.3.2** The minimum thickness of the sandwich construction must be 10 mm.

6.4 Tank fillers:

- 6.4.1** Tank fillers must not protrude beyond the bodywork. Any breather pipe connecting the fuel tank to the atmosphere must be designed to avoid liquid leakage when the car is running and its outlet must not be less than 250 mm from the cockpit opening.

All tank fillers must be designed to ensure an efficient locking action which reduces the risk of accidental opening following a crash impact or incomplete locking after refuelling.

- 6.4.2** All cars must be fitted with a self-sealing connector which can be used by the scrutineers to obtain fuel from the tank.

This connector must be of the type approved by the FIA.

6.5 Refuelling:

- 6.5.1** Refuelling during the race is forbidden.
- 6.5.2** Refuelling the car on the grid by any other means than by gravity from a maximum head of two metres above the ground is forbidden.
- 6.5.3** Any storage of fuel on board the car at a temperature of more than ten degrees Celsius below the ambient temperature is forbidden.
- 6.5.4** The use of any specific device, whether on board or not, to decrease the temperature of the fuel below the ambient temperature is forbidden.

ARTICLE 7: OIL AND COOLING SYSTEMS

7.1 Location of oil tanks:

All oil storage tanks must either form an integral part of the engine or be located within the gearbox or bell housing no more than 270 mm and no less than 110 mm in front of the rear wheel centre line.

All oil storage tanks, if situated outside the main structure of the car, must be surrounded by a 10 mm thick crushable structure.

No part of the oil reservoir for engine lubrication may be situated more than 200 mm laterally from the car centre line.

7.2 Longitudinal location of oil system:

No other part of the car containing oil may be situated behind the complete rear wheels.

7.3 Catch tank:

When a car's lubrication system includes an open type sump breather, this breather must vent into a catch tank of at least 2 litres capacity, located forward of the rear wheel centre line.

The use of additional vent pipes for the purpose of venting a catch tank rearwards to the back of the car is not permitted. Measures must be taken to ensure that no liquid can leak from any aeration system.

7.4 Transverse location of oil system:

No part of the car containing oil may be more than 625 mm from the car centre line.

7.5 Oil replenishment:

No oil replenishment is allowed during a race.

7.6 Cooling fluids:

Only ambient air, water, anti-freeze and oil are permitted in the car cooling systems.

7.7 Water radiators:

The water radiator must come from mass production for road cars.

Water radiators have to be installed according the following provisions:

The shorter edge of the rectangular cooling surface must be positioned normal to the reference plane.

In plan view, the longer edge of the rectangular cooling surface must have a minimum angle of 30° to the car centre line.

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In case a water radiator is used on the same side with an intercooler for a turbo charged engine, the position of the water radiator is free.

If a radiator is used on only one side of the car, the unused radiator space must be covered with mesh of a similar size to the radiator.

ARTICLE 8: ELECTRICAL SYSTEMS

8.1 Starter:

A starter with an electrical or other source of energy carried aboard the car, and able to be controlled by the driver when seated normally, must be fitted.

The starter must be capable of starting the engine at all times.

An exception to this requirement may be granted if an MGU is fitted with enough capability.

8.2 Starting the engine:

A supplementary device temporarily connected to the car may be used to start the engine both on the grid and in the pits.

8.3 Auxiliary battery:

The auxiliary battery must be installed inside the survival cell, on the floor behind the driver's seat.

The use of a battery with any kind of lithium technology is prohibited.

8.4 Energy Store (ES) position:

The ES must be located either in the survival cell or in a protected enclosure. In any case the ES must be isolated from the cockpit.

No part of the ES may lie:

- In front of the front most point of the back of driver's seat
- Behind the engine
- More than 350mm from the car center line.

8.5 Accident data recorders:

The recorder must be fitted and operated:

- a) by being rigidly attached to the survival cell using the fixation holes provided;
- b) in accordance with the instructions of the ADR manufacturer;
- c) symmetrically about the car centre line and with its top facing upwards;
- d) with each of its 12 edges parallel to an axis of the car;
- e) less than 50 mm above the reference plane;
- f) in a position within the cockpit which is readily accessible at all times from inside the cockpit without the need to remove the skid block or floor;
- g) in a position which is normally accessible at the start and finish of an Event;
- h) so that the entire unit lies between 40% and 60% of the wheelbase of the car;
- i) with its main connector facing forwards;
- j) so that its remote status light is visible when the driver is in the cockpit;
- k) so that the download connector is easily accessible without the need to remove bodywork.

The recorder must be selected from those within the FIA Institute ADR programme.

8.6 Data logger, sensors, dashboard and/or steering wheel display:

8.6.1 Data logger

The chassis may be equipped with a data logging system.

The ECU may be used as data logger. In case the ECU doesn't provide such functions, it must be possible to add a standalone data logger without modifying or changing the chassis loom.

It must be possible to restrict competitor access to at least the channels defined by Article 5.5.4. The channels must be stored for Power Unit support and scrutineering purposes.

8.6.2 Sensors

The chassis may be equipped with only the following sensors:

- Acceleration (1 3-axial sensor)
- Wheel speeds front axle (2 sensors)
- Steering angle (1 sensor)
- Brake pressure front/rear (2 sensors)
- Lap timer/trigger (1 sensor)
- Gear (1 sensor)
- Throttle pedal or valve (1 sensor) only in case of a mechanical throttle

8.6.3 Dashboard/steering wheel display

The car may be equipped with a dashboard or steering wheel display. A functional check for the sensors mentioned in Article 8.6.2 must be possible only by using the dashboard or steering wheel display.

8.7 Electrical system connection interfaces:

The purpose of the regulations under Article 8.7 below is to minimise the effort when changing the make of Power Unit.

The connection interfaces, connector specifications / positions and chassis loom wiring defined by Appendix 3 are mandatory.

8.8 Throttle fail safe :

Every car must be equipped with a throttle fail safe algorithm, which, in case throttle and brake pedal are pressed at the same time, overrides the throttle and cuts the engine or closes the throttle and cuts the power to the MGU.

The function and the parameter of the fail-safe algorithm must be communicated to the FIA.

ARTICLE 9: TRANSMISSION TO THE WHEELS

Preamble

The gearbox should be developed or designed to ensure that the life between revisions, where practicable, exceeds 10,000 km.

9.1 Gearbox and semi-automatic shift system homologation:

Only gearboxes and semi-automatic shift systems which have been homologated in accordance with the Formula 4 Homologation Regulations may be used during an event.

9.2 Four-wheel drive:

Four-wheel drive cars are forbidden.

9.3 Type of gearbox:

9.3.1 All cars must have no more than six forward gears.

9.3.2 The maximum number of numerical change gear ratio pairs a competitor has available to him during a Championship season and all such gear ratio pairs must be declared in the sporting regulations of a Championship.

9.3.3 No forward gear ratio pair may be:

- a) Less than 12.75 mm wide when measured across the gear tooth at the root diameter or at any point 1 mm above or below the root diameter. Above this area, each side of the gear teeth may be chamfered by a maximum of 10°. In addition, a chamfer or radius not exceeding 2.0 mm may be applied to the sides and the tip of the teeth.
- b) Less than 600 g (excluding any integral shaft or collar). If an integral shaft or collar is to be excluded, the mass of this may be shown by calculation assuming the gear to be 12.75 mm wide and the shaft geometry to be the same as that where slide-on gears are used.

9.3.4 The distance between the centres of layshaft and mainshaft may be no less than 74,8 mm and no more than 79 mm.

9.3.5 Gear ratios must be made from steel.

9.3.6 The rotational axis of the layshaft must be in line with the crankshaft's rotational axis. All other rotational axes must also be parallel to the reference plane.

9.3.7 From the clutch to the rear wheels, only two pairs of reduction gears are allowed per ratio (except for the reverse gear).

9.3.8 Transverse gearboxes or gearboxes forward of the rear wheel axis are forbidden.

9.3.9 Automatic gearboxes, torque biasing, differentials with limited slip and locked differentials are prohibited.

9.3.10 Forced lubrication is forbidden.

9.4 Reverse gear:

All cars must have a reverse gear which, at any time during the event, can be selected while the engine is running and used by the driver when seated normally.

9.5 Traction control:

No car may be equipped with a system or device which is capable of preventing the driven wheels from spinning under power or of compensating for excessive torque demand by the driver.

Any device or system which notifies the driver of the onset of wheel spin is prohibited.

9.6 Rear suspension pickup points and mounting points:

The gearbox must provide the following pickup points:

- Rear suspension in accordance with Drawings 1.9a and 1.9b
- Suspension damper and rocker arms in accordance with Drawings 1.9a, 1.9b and 1.9f
- Gearbox to Power Unit mounting points in accordance with Drawing 1.9d
- Rear crash box in accordance with Drawings 1.9a and 1.9c

The maximum outer shape of the gearbox protruding inside the rear crashbox must be respected as described in 1.9c.

9.7 Driveshafts:

Driveshafts must be made from steel. They must be solid and have an outside diameter of not less than 21 mm.

The CV joint assembly must not form an integral part of the driveshaft assembly and must be a homokinetic type joint.

9.8 Semi-automatic shift system:

The ECU may be used as gearbox control unit. In case the ECU doesn't provide such functions, it must be possible to add a standalone gearbox control unit without modifying or changing the chassis or gearbox loom.

Only electric or pneumatic semi-automatic shift systems are permitted.

The manufacturer responsible for the gearbox control unit must provide a mechanism that allows the scrutineers to accurately identify the software version loaded on the gearbox control unit.

9.9 Shifting aid:

9.9.1 A single automatic ignition cut which is completely controlled by the homologated ECU is permitted during one manual gear change. A different cut time for each gear may be homologated once during the ECU homologation period by the Power Unit manufacturer.

9.9.2 A device which prohibits driver downshift attempts, if the calculated engine rpm for the destination gear would be higher than the maximum engine rpm allowed by the Power Unit manufacturer, is permitted and must be controlled by the homologated ECU.

ARTICLE 10: SUSPENSION AND STEERING

10.1 General:

The suspension must be a double triangle wishbone configuration with a pushrod.

10.1.1 Front suspension

The front suspension must consist only of two dampers including springs, two rocker arms and one anti-roll bar. Any kind of third element is forbidden.

The anti-roll bar must be a torsion type bar. The torsion bar must be a solid bar made from conventional steel-based alloy and must have a circular cross section. It may be adjustable with up to 5 different settings on each side of the torsion bar.

The rocker arms must be directly actuated by the pushrods. The dampers and the anti-roll bar must be directly actuated by the rocker arms.

The rocker arm support and the dampers must be situated on top of the survival cell. The anti-roll bar must be situated on top or in front of the survival cell.

10.1.2 Rear suspension

The rear suspension must consist only of two dampers including springs, two rocker arms and one anti-roll bar. Any kind of third element is forbidden.

The anti-roll bar must be a torsion type bar. The torsion bar must be a solid bar made from conventional steel-based alloy and must have a circular cross section. It may be adjustable with up to 5 different settings on each side of the torsion bar.

The rocker arms must be directly actuated by the pushrods. The dampers and the anti-roll bar must be directly actuated by the rocker arms.

The pickup points in accordance with Drawings 1.9a, 1.9b and 1.9f must be used.

The pickup points for the rear anti-roll bar attachment must be within the area defined by Drawing 1.10.

10.2 Active suspension:

Active suspension is forbidden.

10.3 Chromium plating:

Chromium plating of any steel suspension component is forbidden.

10.4 Suspension members:

10.4.1 All suspension members must be made from conventional steel based alloy.

10.4.2 In order to help prevent a wheel becoming separated in the event of all suspension members connecting it to the car failing, flexible tethers each with a cross sectional area greater than 110mm² must be fitted. The sole purpose of the tethers is to prevent a wheel becoming separated from the car, they should perform no other function.

The tethers and their attachments must also be designed in order to help prevent a wheel making contact with the driver's head during an accident.

Each wheel must be fitted with one tether which complies with FIA standard 8864-2013 providing a minimum energy absorption of 6kJ (FIA Technical List N^o.37).

Each tether must have its own separate attachment which :

- a) Is able to withstand a tensile force of 70kN.
- b) Is able to accommodate a tether end fitting with a minimum inside diameter of 15mm.

Each tether must exceed 450mm in length and must utilise end fittings which result in a tether bend radius greater than 7.5mm.

10.4.3 The cross sections of each member of each suspension component must be either circular, oval (symmetrical with two sides being flat and parallel to each other and the other two sides semi-circular) or elliptic (the complete outer shape following the mathematical function $x^2/a^2 + y^2/b^2 = 1$ with x,y being the coordinates and a,b the half-axes) with an aspect ratio no greater than 2:1. The cross section must be symmetrical around its two major axes and remain the same over its entire length.

All suspension components may, however, have sections with a different cross section, provided that these are adjacent to their inner and outer attachments, have an aspect ratio less than 2:1 and form no more than 30% of the total distance between the attachments of the relevant member. In addition 2/3 of the above defined sections may have an aspect ratio great than 2:1.

For the sole purpose of protecting wheel tethers and brake lines, non-structural shrouds are admitted. The overall cross section including the non-structural shroud must remain symmetrical around its major axis with an aspect ratio no greater than 3:1.

10.4.4 No major axis of a cross section of a suspension member may subtend an angle greater than 5° to the reference plane when measured parallel to the car centre line.

The major axis of a cross section of one wishbone arm must be parallel to the other one.

10.4.5 Brackets for fixing the suspension members to the survival cell may have only one flat, plane surface in contact with the outside of the survival cell. The attachment surface on the survival cell side may be recessed only up to 1 mm.

When assessing whether the car is in compliance with Article 10.4.5, the side intrusion panel defined in Article 15.3.8 is not considered as survival cell.

10.4.6 Flexible joints of any kind are forbidden.

10.4.7 The rear wishbones and track rod may have only 4 attachment points on either side of the car, which means that one attachment point must be used jointly for wishbone and track rod.

10.5 Sprung suspension:

Cars must be fitted with sprung suspension.

In order to avoid mass dampers, the suspension system must be so arranged that its response results only from changes in load applied to the wheels.

The springing medium must not consist solely of bolts located through flexible bushes or mountings.

There must be movement of the wheels to give suspension travel in excess of any flexibility in the attachments.

10.6 Springs:

Only conventional coil springs may be used.

Spring rates must lie between 500 lbs/in and 1000 lbs/in.

10.7 Suspension damper:

10.7.1 Only conventional hydraulic, single tube dampers with one piston and maximum two-way adjustment are permitted.

10.7.2 Damper fluid may be pressurised.

10.7.3 Damper characteristics may vary only as a function of damper piston speed, created only by suspension movement. Any other variation of damper characteristics, such as those which vary as a function of position, frequency or acceleration, is prohibited.

10.7.4 The use of blow-off valves, inertia valves, external electronic inputs, the storage of energy or any hydraulic connections between dampers is prohibited.

10.7.5 Only one type of damper for front and rear is permitted (except for top eye).

10.7.6 The damper must comply with the following specification:

- Stroke: no less than 40 mm and no more than 50 mm
- Maximum outer diameter: 55 mm
- Compatible with 36 mm ID springs
- Optional external canister with max. 170 mm length and 50 mm diameter
- Fully extended length between pickup points 310 mm
- Bolt diameter of fixation points 8 mm or 5/16"

10.7.7 The use of any kind of bump stop is prohibited.

10.8 Suspension uprights:

10.8.1 Only one type of upright may be used for all four wheels. The upright must be a solid part made from machined aluminium-based alloy or casting. Sheet metal is forbidden.

Only the following parts may be attached to the upright:

- Wheel speed sensors (only front upright)
- Suspension members
- Brake callipers
- Wheel bearing
- Wheel tether

10.8.2 The complete upright assembly front and rear must have a minimum weight of 12,000 g at any time.

For the stipulation of the weight of an upright assembly, only the wheel, the bolts of the uniball joints, the driveshaft, the wheel tethers and the brake or sensor lines (at the first connection) may be removed.

10.9 Wheel bearings:

The wheel bearings must be fully encapsulated 3rd generation bearings coming from a road car.

Each wheel bearing must have a minimum weight of 2400 g and comply with the dimensions given in Drawing 1.7.

10.10 Steering:

10.10.1 The steering must consist of a mechanical link between the driver and the wheels. From the steering wheel to the front wheels, only one pair of gear ratios is allowed. One or two cardan joints are allowed between the steering wheel and the steering rack.

10.10.2 Four-wheel steering is forbidden.

10.10.3 The steering wheel, steering column and steering rack assembly must be subjected to an impact test. Details of this test procedure may be found in Article 16.3.

10.10.4 No part of the steering wheel or column, nor any part fitted to them, may be closer to the driver than a plane formed by the entire rear edge of the steering wheel rim. All parts fixed to the steering wheel must be fitted in such a way as to minimise the risk of injury in the event of a driver's head making contact with any part of the wheel assembly.

ARTICLE 11: BRAKES

11.1 Separate circuits:

All cars must have a brake system which has at least two separate circuits operated by the same pedal. This system must be designed so that if leakage or failure occurs in one circuit, the pedal shall still operate the brakes on at least two wheels.

11.2 Brake discs:

11.2.1 Brake discs must be made from ferrous material.

11.2.2 The disc bell must form an integral part of the brake disc.

11.2.3 Brake discs may neither be drilled nor have grooves. They must be ventilated discs with a minimum thickness of 19.9 mm when new.

11.2.4 The weight of a used brake disc must not be less than 4200 g.

11.2.5 The brake disc must comply with the dimensions given in Drawing 1.8.

11.2.6 The brake disc must come from mass production for road cars.

11.3 Brake callipers:

The weight of a brake calliper must not be less than 1300 g.

Monobloc callipers are forbidden. Only callipers made from casting are admitted.

A maximum of 2 pistons per calliper are permitted.

A brake calliper providing a function of any kind whatsoever that moves the brake piston backwards when releasing the brake pedal is forbidden.

Only two type of calliper per car are admitted.

Viewed from the side, no part of the brake calliper may lie between two lines rectangular to each other, starting from the front wheel centre line at 45 degrees below a horizontal plane through the front wheel centre line.

Any type of floating calliper installation is forbidden.

11.4 Air ducts:

Air ducts for the purpose of cooling brakes or any other parts with a similar function are forbidden.

Formula 4 cars homologated as from 01.01.2019:

Air ducts on rear wheels for the purpose of cooling brakes or any other parts with a similar function are forbidden.

11.5 Liquid cooling:

Liquid cooling of any part of the braking system is forbidden.

11.6 Brake pressure modulation:

Anti-lock brakes and power braking are forbidden.

11.7 Brake pads

A competitor may choose at maximum between three different types of homologated brake pads.

For one championship, the total number of brake pads may be more than three. The brake pad types will be then split into groups of three each. A competitor has to choose one group for the complete season.

The brake pads available must be defined in the Sporting Regulations of each Championship.

ARTICLE 12: WHEELS AND TYRES

12.1 Location:

Complete wheels must be external to the bodywork in plan view, with the rear aerodynamic device removed.

12.2 Wheel material:

All wheels must be a single piece type, made from aluminium-based alloy.

12.3 Dimensions and weights:

12.3.1 Minimum/Maximum complete front wheel width: 200 mm/250 mm

Minimum/Maximum complete rear wheel width: 240 mm/290 mm

Wheel bead diameter: 330 mm (± 2.5 mm)

12.3.2 These measurements will be taken horizontally at axle height.

12.3.3 The weight of a rim must not be less than 5000 g.

12.3.4 The rim must have 12 bores for drive pegs, homogeneously distributed on an 100 mm diameter perpendicular to the rotational axis.

12.3.5 The inner diameter of the rim, which is in contact with the wheel hub, must have a diameter of 56,5 mm.

12.4 Maximum number of wheels:

The number of wheels is fixed at four.

12.5 Wheel attachment:

12.5.1 A safety spring must be in place on the wheel nut throughout the event and must be replaced after each wheel change. These springs must be painted dayglo red or orange.

12.5.2 Wheel nuts may only have flat, plane or cylindrical surfaces in contact with rims.

12.6 Pressure control valves:

Pressure control valves on the wheels are forbidden.

12.7 Aerodynamic influence :

Any device, construction or part of the wheel that is designed for the purpose of guiding or influencing the airflow through the wheel, or whose purpose is anything other than transferring load from the tyre to the wheel hub, is forbidden.

ARTICLE 13: COCKPIT

13.1 Cockpit opening:

In order to ensure that the opening giving access to the cockpit is of adequate size, the template shown in Drawing 1 will be inserted into the survival cell and bodywork.

During this test the steering wheel, steering column, seat and all padding may be removed and:

- a) the template must be held horizontal and lowered vertically from above the car until its lower edge is 525 mm above the reference plane;
- b) referring to Drawing 1.1, the rear edge of the template must be 1600 mm \pm 10 mm behind the front wheel centre line.

Any measurements made from the cockpit entry template (when referred to in Articles 3.9.3, 3.12.2, 3.12.4, 3.13, 3.20, 13.1, 14.3.3, 15.2.2, 15.3.6 and 18.7), must also be made while the template is held in this position.

Furthermore, the forward extremity of the cockpit opening, even if structural and part of the survival cell, must be at least 50 mm in front of the steering wheel.

The driver must be able to get in and out of the cockpit without it being necessary to open a door or remove any part of the car other than the steering wheel. When seated normally, the driver must be facing forwards and the rearmost part of his crash helmet may be no more than 125 mm forward of the rear edge of the cockpit entry template.

From his normal seated position, with all seat belts fastened and while wearing his usual driving equipment, the driver must be able to remove the steering wheel and get out of the car within 5 seconds and then replace the steering wheel in a total of 10 seconds.

For this test, the position of the steered wheels will be determined by the scrutineer and, after the steering wheel has been replaced, steering control must be maintained.

13.2 Steering wheel:

13.2.1 The steering wheel must be fitted with a quick-release mechanism. Its method of release must be by pulling a concentric flange installed on the steering column behind the wheel.

13.2.2 The steering wheel rim must be continuously closed but the shape is free.

Formula 4 cars homologated as from 01.01.2019:

13.2.3 The centre of the steering wheel may be no more than 690mm forward of the plane C-C.

13.3 Internal cross section:

The internal cross section of the cockpit from the soles of the driver's feet to behind his seat shall at no point be less than 70,000 mm².

A free vertical cross section, which allows the template shown in Drawing 1.2 to be passed vertically through the cockpit, must be maintained over its entire length.

The only things that may encroach on these two areas are the steering wheel and padding.

The driver, seated normally with his seat belts fastened and with the steering wheel removed, must be able to raise both legs together so that his knees are past the plane of the steering wheel in the rearward direction. This action must not be obstructed by any part of the car.

13.4 Clutch, brake and throttle pedal :

The clutch, brake and throttle pedal may only be operated by the driver's foot. Any device or construction that is designed to influence the clutch or brake pressure or the throttle opening by any other means is forbidden.

The only exception to the above are homologated functionalities provided by the ECU.

ARTICLE 14: SAFETY EQUIPMENT

14.1 Fire extinguishers :

- 14.1.1 All cars must be fitted with a fire extinguishing system which must discharge into the cockpit and into the Power Unit compartment from the FIA Technical List N°16 : "Extinguisher systems homologated by the FIA".
- 14.1.2 The number of nozzles in the cockpit and Power Unit compartment must be the same as described in the installation manual (the manuals are listed on the FIA website).
- 14.1.3 Each pressure vessel must be equipped with a means of checking its pressure which may vary according to the type of extinguishant used. The fill pressure is indicated on the FIA label.
- 14.1.4 All parts of the extinguishing system must be situated within the survival cell and all extinguishing equipment must withstand fire.
- 14.1.5 Any triggering system having its own source of energy is permitted, provided it is possible to operate all extinguishers should the main electrical circuits of the car fail.

The driver must be able to trigger the extinguishing system manually when seated normally with his safety belts fastened and the steering wheel in place.

Furthermore, a means of triggering from the outside must be combined with the circuit breaker switch. It must be marked with a letter "E" in red inside a white circle of at least 50mm diameter with a red edge.

- 14.1.6 The system must work in any position, even when the car is inverted.
- 14.1.7 Extinguisher nozzles must be suitable for the extinguishant and be installed in such a way that they are not directly pointed at the driver's face.

14.2 Master switch:

- 14.2.1 The driver, when seated normally with safety belts fastened and the steering wheel in place, must be able to cut off all electrical circuits to the ignition, all fuel pumps and the rear light by means of a spark-proof circuit breaker switch. It must also [shutdown the ERS system](#).

This switch must be located on the dashboard and must be clearly marked by a symbol showing a red spark in a white-edged blue triangle.

- 14.2.2 There must also be an exterior switch, with a horizontal handle, which is capable of being operated from a distance by a hook. This switch must be situated at the base of the main rollover structure on the right hand side. It must be clearly marked by a symbol showing a red spark inside a white-edged, blue equilateral triangle; each side of this triangle must be at least 50 mm long.

14.3 Rear-view mirrors:

- 14.3.1 All cars must have at least two mirrors mounted so that the driver has visibility to the rear and along both sides of the car.
- 14.3.2 The reflective surface of each mirror must be at least 150 mm wide, this being maintained over a height of at least 50 mm. Additionally, each corner may have a radius no greater than 10 mm.
- 14.3.3 No part of the mirror's reflective surface may be less than 250 mm from the car centre line, less than 550 mm forward or more than 750 mm forward of the rear edge of the cockpit entry template.

No part of the rear-view mirrors, the mirror housings or the mirror mountings may be situated more than 500 mm from the car centre line.

14.3.4 The scrutineers must be satisfied by a practical demonstration that the driver, when seated normally, can clearly define the vehicles behind him.

For this purpose, the driver shall be required to identify any letter or number, 150 mm high and 100 mm wide, placed anywhere on boards behind the car, the positions of which are detailed below:

Height : from 400 mm to 1000 mm from the ground.

Width : 2000 mm either side of the centre line of the car.

Position : 10 m behind the rear axle line of the car.

14.4 Safety belts:

The wearing of two shoulder straps, one abdominal strap and two straps between the legs is mandatory. These straps must be securely fixed to the car and must comply with FIA standard 8853/98 or 8853-2016.

Formula 4 cars homologated as from 01.01.2019:

The wearing of two shoulder straps, one abdominal strap and two straps between the legs is mandatory. These straps must be securely fixed to the car and must comply with FIA standard 8853-2016.

14.5 Rear light:

All cars must have a red light that must be in working order throughout the event, which:

- a) is a model approved by the FIA for F3 cars;
- b) faces rearwards at 90° to the car centre line;
- c) is clearly visible from the rear;
- d) is not mounted more than 100 mm from the car centre line;
- e) is at least 280 mm above the reference plane;
- f) is no less than 450 mm behind the rear wheel centre line, measured to the face of the lens and parallel to the reference plane;
- g) can be switched on by the driver when seated normally in the car,
- h) must have a minimum peak intensity of 800 Lux covering a minimum angle of 8 degrees vertically and 25 degrees horizontally, when measured at a distance of 1m from the centre of the rear face at 23°C ambient temperature after 15 minutes warm up duration powered from a 12V DC supply,
- i) should flash at maximum 4Hz frequency with a minimum 40% duty cycle,

The measurements being taken to the centre of area of the lens.

The performance of any design will be verified by the FIA Technical Department before approval.

14.6 Headrests and head protection:

14.6.1 All cars must be equipped with three areas of padding for the driver's head which :

- a) Are so arranged that they can be removed from the car as one part.
- b) Are located by two horizontal pegs behind the driver's head and two fixings, which are clearly indicated and easily removable without tools, at the front corners.
- c) Are made from a material which is corresponding to the specification :
CONFOR CF45 (Blue) or CONFOR CF45M (Blue) (FIA Technical List n°17)
- d) Are covered, in all areas where the driver's head is likely to make contact, with two plies of Aramid fibre/epoxy resin composite pre-preg material in plain weave 60gsm fabric with a cured resin content of 50% (+/-5%) by weight.
Alternatively, one ply of 60 gsm and one ply of 170 gsm may be used.

Headrests manufactured after the 1.1.2017 must be constructed of one ply of 60 gsm and one ply of 170 gsm Aramid fibre following the above specifications.

- e) Are positioned so as to be the first point of contact for the driver's helmet in the event of an impact projecting his head towards them during an accident.

14.6.2 The first area of padding for the driver's head must be positioned behind him and be between 75 mm and 90 mm thick over an area of at least 40,000 mm². If necessary, and only for driver comfort, an additional piece of padding no greater than 10mm thick may be attached to this headrest provided it is made from the same material.

14.6.3 The two further areas of padding for the driver's head must be installed each side of him. The upper surfaces of these areas of padding must be at least as high as the survival cell over their entire length.

Each area of padding must be between 75mm and 90mm thick over an area of at least 40000mm², at least 25000mm² of which must lie directly alongside the driver's helmet. The thickness will be measured perpendicular to the car centre line.

Furthermore, any void between these areas of padding and the area described in Article 14.6.2 must also be completely filled with the same material.

If necessary, and only for driver comfort, an additional piece of padding no greater than 20mm thick may be attached to this headrest provided it is made from the same material which incorporates a low friction surface.

14.6.4 Forward of the side areas of padding further cockpit padding must be provided on each side of the cockpit rim. The purpose of the additional padding is to afford protection to the driver's head in the event of an oblique frontal impact and must therefore be made from the same material as the other three areas of padding.

These extensions must:

- a) Be symmetrically positioned about the car centre line and a continuation of the side areas of padding.
- b) Be positioned with their upper surfaces at least as high as the survival cell over their entire length.
- c) Have a radius on their upper inboard edge no greater than 10mm.
- d) Be positioned in order that the distance between the two is no less than 320mm.
- e) Be as high as practicable within the constraints of driver comfort.

14.6.4 All of the padding described above must be so installed that if movement of the driver's head, in any expected trajectory during an accident, were to compress the foam fully at any point, his helmet would not make contact with any structural part of the car.

Furthermore, for the benefit of rescue crews the method of removal must also be clearly indicated.

14.6.5 No part of the padding described above may obscure sight of any part of the driver's helmet when he is seated normally and viewed from directly above the car.

14.7 Seat, seat fixing and removal :

14.7.1 In order that an injured driver may be removed from the car in his seat following an accident, all cars must be fitted with a seat complying with the FIA Specification for Extractable Seats in Open Cockpit Cars.

14.7.2 If the seat is secured, it must be done so with no more than two bolts. If bolts are used they must :

- a) Be clearly indicated and easily accessible to rescue crews.
- b) Be fitted vertically.
- c) Be removable with the same tool for all teams and which is issued to all rescue crews.

14.7.3 The seat must be equipped with receptacles which permit the fitting of belts to secure the driver and one which will permit the fitting of a neck support.

14.7.4 The seat must be removable without the need to cut or remove any of the seat belts.

A test must be carried out on the seat when fitted to a fully representative car with the driver present. Once the buckle has been released it must be possible to extract the seat from the car without any further adjustment of the harness. The seat must be moved in a direction following the vertical axis of the car.

14.7.5 Any seat made from foam must be covered with a non-flammable and non-combustible material.

14.8 Head and neck supports:

No head and neck support worn by the driver may be less 25 mm from any structural part of the car when he is seated in his normal driving position.

14.9 Towing device:

Each car must be equipped at the rear with a sturdy towing device which must be marked in fluorescent red.

ARTICLE 15: CAR CONSTRUCTION

15.1 Materials used for car construction:

- 15.1.1 The use of magnesium is forbidden.
- 15.1.2 The use of titanium and ceramic materials is forbidden. Ceramic materials (e.g. Al_2O_3 , SiC , B_4C , Ti_5Si_3 , SiO_2 , Si_3N_4) – these are inorganic, non-metallic solids.
- 15.1.3 No parts of the car may be made from metallic materials with a beryllium content greater than 3% m/m .
- 15.1.4 Within composite structures, the strain-to-failure of any fibrous reinforcing material must not be less than 1.5%.
- 15.1.5 The use of carbon or aramid fibre reinforcing materials in composite structures is forbidden except in the survival cell, frontal impact-absorbing structure, rear impact-absorbing structure, rollover structures, headrest and wheel tethers.
- 15.1.6 The front wing profile must be made of aluminium-based alloy, carbon or glass fibre reinforcing materials.
- The rear wing profiles must be made of aluminium-based alloy.
- The front wing endplates must be made from plastics or wood.
- The rear wing endplates must be made of aluminium-based alloy.
- 15.1.7 Any repairs to the survival cell or nosebox must be carried out in accordance with the manufacturer's specifications, in a repair facility approved by the manufacturer.
- 15.1.8 The car may not be used in another event until the technical passport has been completed satisfactorily.
- 15.1.9 In exception to the above, ERS materials are free.

15.2 Roll structures:

- 15.2.1 The basic purpose of safety structures is to protect the driver. This purpose is the primary design consideration.
- 15.2.2 All cars must have two roll structures.
- The highest point of the principal roll structure may be no more than 30 mm behind the rear edge of the cockpit entry template. The secondary structure must be in front of the steering wheel but no more than 250 mm forward of the top of the steering wheel rim in any position.
- The two roll structures must be of sufficient height to ensure that the driver's helmet and his steering wheel are at least 70 mm and 50 mm respectively below a line drawn between their highest points at all times.
- 15.2.3 The principal structure must pass a static load test, details of which may be found in Article 17.1.
- Furthermore, each car manufacturer must supply detailed calculations which clearly show that the principal structure is capable of withstanding the same load when the longitudinal component is applied in a forward direction. Alternatively, and only following a request from the car manufacturer, the principal roll structure may be subjected to a further static load test using the same procedure as laid out in Article 17.1, but carried out in a forward direction.
- The secondary structure must be capable of withstanding a vertical load of 75 kN applied to the top of the structure. Each car manufacturer must supply detailed calculations which clearly show that the structure is capable of withstanding the vertical load of 75 kN. Alternatively, and only following a request from the car manufacturer, the secondary roll structure may be subjected to a static load test, details of which may be found in Article 17.2.
- 15.2.4 The design concept of the roll structures required by Article 15.2.2 shall be free. However, the principal roll structure must have a minimum structural cross section, in vertical projection, of 10,000 mm^2 , across a horizontal plane passing 50 mm lower than its highest point.

Formula 4 cars homologated as from 01.01.2019:

15.2 Roll structures :

- 15.2.1** All cars must have two roll structures which are designed to help prevent injury to the driver in the event of the car becoming inverted.

The principal structure must be at least 940mm above the reference plane at a point 30mm behind the rear face of the cockpit entry template.

The secondary roll structure, which is not considered part of the survival cell, must be positioned symmetrically about the car centre plane with its front fixing axis 975mm forward of the rear face of the cockpit entry template and 640mm above the reference plane. The mounting faces for the rearward fixings must lie on a plane parallel to and 675mm above the reference plane.

The driver's helmet and steering wheel must be arranged such that they lie below a line drawn between the front fixing axis of the secondary roll structure and a point 75mm vertically below the highest point of the principal roll structure.

- 15.2.2** The principal structure must pass a static load test details of which may be found in Article 17.1.

Furthermore, each car manufacturer must supply detailed calculations which clearly show that the principal structure is capable of withstanding the same load when the longitudinal component is applied in a forward direction. Alternatively, and only following a request from the car manufacturer, the principal roll structure may be subjected to a further static load test using the same procedure as laid out in Article 17.1, but carried out in a forward direction.

- 15.2.3** The secondary roll structure attachments to the survival cell must pass four static load tests details of which may be found in Article 17.2.

- 15.2.4** The principal roll structure must have a minimum enclosed structural cross section of 10000mm², in vertical projection, across a horizontal plane 50mm below its highest point. The area thus established must not exceed 200mm in length or width and may not be less than 10000mm² below this point.

- 15.2.5** The secondary roll structure must comply with the FIA standard 8869-2018 Part 2 (Steel).

- 15.2.6** In addition to the volume allowed by article 3.12.2, the secondary roll structure may have a fairing attached, provided it is situated on top of the survival cell within a volume defined by the following planes:

- Two planes parallel to the car centre line, which are defined by points 15mm and 40mm from the car centre line and 700mm and 635mm above the reference plane
- Two planes to the car centre line and 880mm and 1125mm respectively forward of the rear face of the cockpit entry template
- Two planes parallel to and 700mm and 635mm above the reference plane

15.3 Survival cell specifications:

- 15.3.1** In order that every survival cell is readily identifiable by scrutineers, each one produced must incorporate three permanently embedded FIA-approved transponders which are accessible for verification at any time.

- 15.3.2** The survival cell must extend from behind the fuel tank in a rearward direction to a point at least 150 mm in front of the front wheel centre line.

The survival cell must have an opening for the driver, the minimum dimensions of which are given in Article 13.1. Any other openings in the survival cell must be of minimum size to allow access to mechanical components.

The safety structures described in Article 15.2 must be a part of the survival cell or solidly attached to it.

15.3.3 All Power Unit mounting points on the survival cell as shown in Drawing 2.1 must lie in one plane which is normal to the reference plane and normal to the car centre line. A tolerance of 2 mm in X-direction (along the car centre line) is permitted for manufacturing tolerances and the use of steel bushes.

15.3.4 When he is seated normally, the soles of the driver's feet, resting on the pedals in the inoperative position, shall not be situated to the fore of the vertical plane passing through the front wheel centre line.

Should the car not be fitted with pedals, the driver's feet at their maximum forward extension shall not be situated to the fore of the above-mentioned vertical plane.

15.3.5 In front of the survival cell, an impact-absorbing structure must be fitted. This structure need not be an integral part of the survival cell but must be solidly attached to it.

It must have a single external cross section, in horizontal projection, of more than 9000 mm² at a point 50 mm behind its forwardmost point. Furthermore:

- a) no part of this cross section may lie more than 200 mm or less than 130 mm above the reference plane;
- b) the centre of area of this section must be no more than 160 mm above the reference plane and no less than 750 mm forward of the front wheel centre line.

It must have one single external cross section, in horizontal projection, of more than 100,000 mm² at its rearmost point. The centre of area of this section must be no more than 325 mm above the reference plane.

From the point 50 mm behind its forwardmost point, the external cross section, in horizontal projection, must increase and may not stay constant or diminish. The only exception that may be made is for its attachment to the survival cell.

The first 100 mm behind its forwardmost point must be exchangeable and/or repairable without exchanging the complete impact-absorbing structure.

15.3.6 The survival cell (as presented for the crash test/with all removable parts removed) must weigh a minimum of 52 kg (without side intrusion panels as per Article 15.3.8).

The minimum external width of the survival cell forward of the front wheel centre line is 360 mm.

The minimum external width of the survival cell behind the front wheel centre line is 380 mm.

The above-mentioned external width must be maintained for a minimum height of 250 mm along the whole length of the survival cell.

The minimum external width of the survival cell 720 mm forward of the rear face of the cockpit entry template is 600 mm.

The minimum external width of the survival cell from a point 200 mm forward of the rear face of the cockpit entry template to a point 350 mm forward of the rear face of the cockpit entry template is 660 mm.

The above-mentioned external width must be maintained for a minimum height of 250 mm at minimum 200 mm above the reference plane.

Measured at a point lying above the front wheel centre line, the minimum internal height of the survival cell must be at least 300 mm over a width of at least 150 mm, maintained for a minimum length of 100 mm.

Measured from the reference plane, the minimum height of the survival cell between the two rollover structures is 550 mm.

The surface parallel to and 150 mm above the reference plane, from 150 mm forward of to 550 mm behind the front wheel centre line, symmetrical to the car centre line and 350 mm wide, must lie inside the survival cell.

When the test referred to in Article 13.1 is carried out and the template is in position with its lower edge 525 mm above the reference plane, the shape of the survival cell must be such that no part of it is visible when viewed from either side of the survival cell and from behind the survival cell.

The parts of the survival cell which are situated each side of the driver's head must be no more than 550 mm apart.

In order to ensure that the driver's head is not unduly exposed and for him to maintain good lateral visibility he must, when seated normally and looking straight ahead with his head as far back as possible, have his eye visible when viewed from the side. The centre of gravity of his head must lie below the top of the survival cell at this position. When viewed from the side of the car, the centre of gravity of the driver's head will be deemed to be the intersection of a vertical line passing through the centre of his ear and a horizontal line passing through the centre of his eye.

The minimum height of the survival cell behind the driver is 750 mm from the reference plane. This height must be maintained for at least 100 mm either side of the car centre line and from the rear edge of the cockpit opening to a point at least 150 mm rearwards on the car centre line. Outside this prescribed minimum area of 200 mm x 150 mm the height may decrease at a linear rate to a height of 655 mm from the reference plane with a maximum angle of 70° measured parallel to the reference plane and normal to the car centre line and must join the horizontal line at 655 mm with a radius of at least 20 mm.

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The minimum height of the survival cell behind the driver is 780 mm from the reference plane. This height must be maintained for at least 100 mm either side of the car centre line and from the rear edge of the cockpit opening to a point at least 150 mm rearwards on the car centre line. Outside this prescribed minimum area of 200 mm x 150 mm the height may decrease at a linear rate to a height of 655 mm from the reference plane with a maximum angle of 70° measured parallel to the reference plane and normal to the car centre line and must join the horizontal line at 655 mm with a radius of at least 20 mm.

The surfaces joining the prescribed minimum area of 200 mm x 150 mm at a height of 750 mm from the reference plane and the area of the survival cell at the height of 655 mm from the reference plane must be flat or have a concave radius, this radius being applied after the straight line with the correct angle connecting the two areas has been defined.

From the rear edge of the cockpit entry template until the rear end of the survival cell, each cross section of the survival cell taken normal to the car centre line must:

- a) be symmetrical about the car centre line on its external shape.
- b) have a minimum height of 655 mm maintained over a total width of at least 520 mm.

An exception to this might be made for any opening in this area accessing the fuel tank and/or refuelling connectors.

15.3.7 In order to give additional protection to the driver in the event of a side impact, a flat test panel of uniform construction, which is designed and constructed in order to represent a section of the survival cell sides, must pass a strength test. Details of the test procedure may be found in Article 18.4.

With the exception of local reinforcement and/or inserts, the lateral parts of the survival cell must be manufactured to the same specification as a single panel which satisfies the requirements of Article 18.4. Parts to this tested specification must cover an area which:

- a) begins at least 250 mm high at the front wheel centre line;
- b) tapers at a linear rate to at least 350 mm high at the front of the cockpit opening and remains at this height to the rear of the survival cell;
- c) is no less than 100 mm above the reference plane between the front of the cockpit opening and the rear of the survival cell.

Any openings or cut-outs in this area must be of the minimum size to allow access to mechanical components.

15.3.8 Once the requirements of Articles 15.2.3, 15.3.2, 15.3.4, 15.3.6, 15.3.7, 15.4.1, 15.4.3, 15.4.4, 16.1, 17.1, 17.2, 18.1, 18.2, 18.3, 18.4, 18.6 and 18.7 have been met, panels no less than 7.3 mm thick must then be permanently attached to the survival cell sides. These panels must:

- a) in a longitudinal sense, cover the area lying between two vertical planes, one 50 mm behind the front wheel centre line and one 50 mm to the rear of the template. A 50 mm horizontal linear taper may be included at both ends;
- b) in a vertical sense, cover an area which has been constructed in accordance with Article 15.3.7;
- c) cover the area around any front suspension attachment, which lies behind the front wheel centre line. Cut-outs are allowed only for suspension attachment brackets. The cut-out may not exceed a surface of 1500mm² for each attachment point;
- d) Be constructed from 11 plies of S2 Glass according to the following precise lay-up details:

The panel shall be constructed from S2 Glass or a FIA approved substitute, impregnated with a toughened, elevated cure temperature, epoxy resin system.

The construction of the panel shall be quasi isotropic and shall avoid darts, joins or gaps in any ply, apart from those required to cover complex geometry and cut outs for wiring.

The panel will be bonded to the chassis over the entire surface area with the prescribed film or paste adhesive.

S2 Glass Woven Roving – 814 gsm:

Minimum average weight [814]gsm, weave style plain, 1980 tex / 250 yield, impregnated with an epoxy resin.

Matrix System:

MTM 228 or a FIA approved substitute

S2 Glass Woven Roving – 812 gsm:

Minimum average weight [812]gsm, weave style plain, 600 tex, impregnated with an epoxy resin.

Matrix System:

E3 or a FIA approved substitute

Adhesive (to chassis):

Film adhesive 150gsm 3M AF163-2, paste adhesive 3M 9323 B/A, Huntsman Araldite® 420 A/B, Elantas Elan-tech® AS 89.1/AW 89.1 or a FIA approved substitute

Stacking Sequence (0 degree represents longitudinal axis of the chassis) :

- Outer surface.
- 11 plies S2 Glass
(0/90, +/-45, 0/90, +/-45, 0/90, +/-45, 0/90, +/-45, 0/90, +/-45, 0/90)
- Inner surface

Thickness:

The minimum thickness of the cured panel, excluding the adhesive, shall be [7.3]mm.

Area Weight:

The minimum area weight of the cured panel, excluding the adhesive, shall be [13200]gsm.

Voids:

The panel shall be essentially void free.

Examples of Compliant Materials:

1. Supplied by Cytec:
S2 Glass MTM228/PG001-32%RW
2. Supplied by Microtex:
S2 Glass 81VP25E3-31%RW

15.4 Survival cell safety requirements:

15.4.1 The survival cell and the frontal impact-absorbing structure described in Article 15.3.5 must pass an impact test against a solid vertical barrier placed at right angles to the car centre line. Details of the test procedure may be found in Article 16.1.

15.4.2 An impact-absorbing structure must be fitted behind the gearbox symmetrically about the car centre line with its rearmost point between 650mm and 720mm behind the rear wheel centre line.

The rearmost face of the impact structure must be a rectangular section no less than 100mm wide, this minimum width must be maintained over a height of at least 130mm and each corner may incorporate a radius no greater than 10mm.

Except for fixation, the external cross section, in horizontal projection, forward of the rearmost face of the impact structure may not diminish.

The structure which was subjected to the test described in Article 18.5 must pass an impact test and be constructed from materials which will not be substantially affected by the temperatures it is likely to be subjected to during use. Details of this test procedure may be found in Article 16.2.

15.4.3 The survival cell must be subjected to three separate static side load tests:

- 1) in the cockpit area on a vertical plane passing through the centre of the seat belt lap strap fixing;
- 2) in the fuel tank area on a vertical plane passing through the centre of area of the fuel tank in side elevation;
- 3) on a vertical plane passing halfway between the front wheel axis and the top of the first rollover structure.

Details of the test procedures may be found in Article 18.2.

15.4.4 To test the attachments of the frontal and rear impact-absorbing structures, static side load tests must be carried out. Details of these test procedures may be found in Articles 18.3 and 18.5.

15.4.5 A calculation has to be provided, showing that the maximum acceptable load of inserts for front suspension pickup points behind the front wheel centre line is significantly higher than the maximum load of the corresponding suspension members.

15.4.6 A frontal anti-intrusion panel must be permanently attached to front face of the survival cell. No part of the panel may be less than 150mm in front of the front wheel centre line. For the sole purpose of increasing locally the thickness of the panel, the minimum distance to the front wheel centre line may be locally decreased to 130mm. Cut-outs for mechanical installation may be add to the frontal anti-intrusion panel but must be kept to the necessary minimum. The panel must pass the static load test as described in Article 18.8.

ARTICLE 16: IMPACT TESTING

16.1 Frontal test:

All parts which could materially affect the outcome of the test must be fitted to the test structure, which must be solidly fixed to the trolley through its Power Unit mounting points but not in such a way as to increase its impact resistance.

The fuel tank must be fitted and must be full of water.

A dummy weighing at least 75 kg must be fitted, with the safety belts described in Article 14.4 fastened. However, with the safety belts unfastened, the dummy must be able to move forwards freely in the cockpit.

The extinguishers, as described in Article 14.1, must also be fitted.

For the purposes of this test, the total weight of the trolley and test structure shall be 650 kg and the velocity of impact 12 metres/sec.

The resistance of the test structure must be such that during the impact:

- a) the average deceleration over the first 150 mm of deformation does not exceed 5g;
- b) the average deceleration of the trolley does not exceed 25g;
- c) the peak deceleration in the chest of the dummy does not exceed 60g for more than 3ms.

Furthermore, there must be no damage to the survival cell or to the mountings of the safety belts or fire extinguishers.

This test must be carried out in the presence of an FIA technical delegate in an approved testing centre on the survival cell subjected to the tests described in Articles 17.1, 17.2, 18.2, 18.3, 18.4, 18.6 and 18.7, and on a frontal impact-absorbing structure identical to the one which was subjected to the test described in Article 18.3.

16.2 Rear test:

All parts which will be fitted behind the rear face of the Power Unit and which could materially affect the outcome of the test must be fitted to the test structure. If suspension members are to be mounted on the structure they must be fitted for the test. The structure and the gearbox must be solidly fixed to the ground and a solid object, having a mass of 560 kg and travelling at a velocity of 10 m/s, will be projected into it.

The object used for this test must be flat, measure 450 mm wide by 550 mm high and may have a 10 mm radius on all edges. Its lower edge must be at the same level as the car reference plane and must be so arranged to strike the structure vertically and at 90° to the car centre line.

During the test, the striking object may not pivot in any axis and the crash structure may be supported in any way, provided that this does not increase the impact resistance of the parts being tested.

The resistance of the test structure must be such that during the impact:

- a) the peak deceleration over the first 225mm of deformation does not exceed 27g;
- b) The maximum deceleration does not exceed 27g for more than a cumulative 15ms, this being measured only in the direction of impact.

Furthermore, all structural damage must be contained within the area behind the rear wheel centre line.

16.3 Steering column test:

For the purposes of this test, these parts must be fitted to a representative test structure; any other parts which could materially affect the outcome of the test must also be fitted. The test structure must be solidly fixed to the ground and a solid object, having a mass of 8 kg and travelling at a velocity of 7 m/s, will be projected into it.

The object used for this test must be hemispherical with a diameter of 165 mm.

For the test, the centre of the hemisphere must strike the structure at the centre of the steering wheel along the same axis as the main part of the steering column.

During the test the striking object may not pivot in any axis and the test structure may be supported in any way, provided that this does not increase the impact resistance of the parts being tested.

The resistance of the test structure must be such that during the impact the peak deceleration of the object does not exceed 80 g for more than 3 ms.

After the test, the steering wheel quick-release mechanism must still function normally.

ARTICLE 17: ROLL STRUCTURE TESTING

17.1 Principal roll structure test:

The principal roll structure shall be subjected to a static load test. A load equivalent to 13.2 kN laterally, 49.5 kN longitudinally in a rearward direction and 66 kN vertically, must be applied to the top of the structure through a rigid flat pad which is 200 mm in diameter and perpendicular to the loading axis.

During the test, the roll structure must be attached to the survival cell which is supported on its underside on a flat plate, fixed to it through its Power Unit mounting points and wedged laterally, but not in a way as to increase the resistance of the structure being tested.

Under the load, the deformation must be less than 50 mm measured along the loading axis, and any structural failure limited to 100 mm below the top of the roll structure when measured vertically.

This test must be carried out in the presence of an FIA technical delegate and using measuring equipment verified by the FIA.

17.2 Secondary roll structure test:

The secondary roll structure may be subjected to a static load test (see Article 15.2.3). A vertical load of 75 kN must be applied to the top of the structure using a rigid flat pad which is 100 mm in diameter and perpendicular to the loading axis.

Under the load, the deformation must be less than 50 mm measured along the loading axis, and any structural failure limited to 100 mm below the top of the roll structure when measured vertically.

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17.2 Secondary roll structure test :

17.2.1 All tests must be carried out in the presence of an FIA technical delegate and by using measuring equipment which has been calibrated to the satisfaction of the FIA technical delegate.

17.2.2 The loads may be applied using a 150mm diameter pad or through a spherical joint whose centre lies in the specified loading position.

Rubber 3mm thick may be used between the load pads and the roll structure.

17.2.3 For each test, peak loads must be applied in less than three minutes and be maintained for five seconds.

17.2.4 After five seconds of application there must be no failure of any part of the survival cell or of any attachment between the structure and the survival cell.

17.2.5 A load equivalent to 116kN vertically downward and 46kN longitudinally rearward must be applied at a position 785mm forward of the rear face of the cockpit entry template and 810mm above the reference plane and positioned on the car centre plane.

During the test, the structure must be attached to the survival cell which is supported on its underside on a flat plate, fixed to it through its Power Unit mounting points.

17.2.6 A load equivalent to 93kN laterally inward and 83kN longitudinally rearward must be applied at a position 590mm forward of the rear face of the cockpit entry template and 790mm above the reference plane to the outer surface of the structure.

During the test, the survival cell may be supported in any way provided this does not increase the strength of the attachments being tested.

17.2.7 A load of 150kN vertically upward must be applied simultaneously on the two forward fasteners of the rear attachment on the side which was determined by the FIA technical delegate.

The load must be applied through fasteners identical to the ones used for the secondary roll structure. A dummy rear attachment may be used.

Alternatively a load of 75 kN may be applied separately on each of the two forward fasteners.

During the test, the survival cell may be supported in any way provided this does not increase the strength of the attachments being tested.

17.2.8 A load equivalent to 88kN vertically upward and 88kN longitudinally rearward must be applied on the axis of the front attachment.

The load must be applied through structure and fasteners identical to the ones used for the secondary roll structure.

During the test, the survival cell may be supported in any way provided this does not increase the strength of the attachments being tested.

ARTICLE 18: STATIC LOAD TESTING

18.1 Conditions applicable to all static load tests:

18.1.1 The static load tests in Articles 18.2, 18.3, 18.4, 18.5, 18.6 and 18.7 must be carried out in the presence of an FIA technical delegate and using measuring equipment verified by the FIA.

Any significant modification introduced into any of the structures tested shall require that part to undergo a further test.

18.1.2 In order to ensure that all survival cells are manufactured in the same way, each constructor must submit the weight of every survival cell produced. These weights will be compared with that of the survival cell which was subjected to the tests in Articles 18.2, 18.3, 18.4, 18.6 and 18.7. If any survival cell weighs less than 95% of the one previously tested, it will then have to be subjected to the tests above.

The FIA reserves the right to carry out the static load tests in Articles 17.1, 18.2, 18.3, 18.4, 18.6 and 18.7 at random on any other chassis produced by the manufacturer.

These tests will be carried out with 80% of the load referred to in these Articles and during these tests the deflection of the reference chassis may not be exceeded by more than 20%.

18.2 Survival cell side tests:

For the tests described in Article 15.4.3, a pad 100 mm long and 300 mm high, with a maximum radius on all edges of 3 mm and conforming to the shape of the survival cell, shall be placed against the outermost sides of the survival cell with the lower edge of the pad at the lowest part of the survival cell at that section. Rubber 3 mm thick may be used between the pads and the survival cell.

A constant transverse horizontal load of 20 kN shall be applied, in less than 3 minutes, to the pads at their centre of area through a ball-jointed junction, and maintained for a minimum of 30 seconds.

Under these load conditions, there shall be no structural failure of the inner or outer surfaces of the survival cell and permanent deformation must be less than 1 mm after the load has been released for 1 minute. The deformation will be measured at the top of the pads across the inner surfaces. In test 1, deflection across the inner surfaces of the survival cell must not exceed 20 mm.

18.3 Nose push off test:

To test the attachments of the frontal impact-absorbing structure to the survival cell, a static side load test shall be performed on a vertical plane passing 400 mm in front of the front wheel axis.

A constant transversal horizontal load of 30 kN must be applied to one side of the impact-absorbing structure using a pad identical to the one used in the lateral tests in Article 18.2. The centre of area of the pad must pass through the plane mentioned above and the mid-point of the height of the structure at that section.

After 30 seconds of application, there must be no failure of the structure or of any attachment between the structure and the survival cell.

During the test, the survival cell must be resting on a flat plate and secured to it solidly but not in a way that could increase the strength of the attachments being tested.

18.4 Side intrusion test:

18.4.1 The test must be carried out in accordance with FIA Test Procedure 02/00, in the presence of an FIA technical delegate and using measuring equipment which has been calibrated to the satisfaction of the FIA technical delegate.

18.4.2 The test panel must be 500 mm x 500 mm and will be tested by forcing a rigid truncated cone through the centre of the panel at a rate of 2 mm (\pm 1 mm) per second until the displacement exceeds 150 mm.

During the first 100 mm of displacement, the load must exceed 150 kN and the energy absorption must exceed 6000 J. There must be no damage to the fixture or border before these requirements have been met.

18.5 Rear impact structure push off test:

To test the attachments of the rear impact structure to the gearbox, a static side load test shall be performed. During the test the gearbox and the structure must be solidly fixed to the ground but not in a way that could increase the strength of the attachments being tested.

A constant transversal horizontal load of 30 kN must then be applied to one side of the impact-absorbing structure, using a pad identical to the ones used in the lateral tests in Article 18.2, at a point 470 mm behind the rear wheel centre line.

The centre of area of the pad must pass through the plane mentioned above and the mid-point of the height of the structure at the relevant section. After 30 seconds of application, there must be no failure of the structure or of any attachment between the structure and the gearbox.

18.6 Fuel tank floor test:

A further static load test must be carried out on the survival cell from beneath the fuel tank. A pad 200 mm in diameter must be placed in the centre of area of the fuel tank and a vertical upwards load of 10 kN applied in less than 3 minutes through a ball-jointed junction. The load must be maintained for a minimum of 30 seconds.

Under these load conditions, there must be no structural failure of the inner or outer surfaces of the survival cell and permanent deformation must be less than 0.5 mm after the load has been released for 1 minute, the measurement being taken at the centre of area of the pad.

18.7 Cockpit rim test:

A further static load test must be carried out on the survival cell. Two pads, each of which is 100 mm in diameter, must be placed on both sides of the cockpit rim with their upper edges at the same height as the top of the cockpit side and with their centres at a point 250 mm forward of the rear edge of the cockpit entry template longitudinally. A constant transverse horizontal load of 15 kN will then be applied at 90° to the car centre line, in less than 3 minutes, through a ball-jointed junction. The load must be maintained for a minimum of 30 seconds.

Under the load, there must be no structural failure of the inner or outer surfaces of the survival cell and the total deflection must not exceed 20 mm. The permanent deformation must be less than 1.0 mm after the load has been released for 1 minute, the measurements being taken at the centre of area of the pad.

18.8 Frontal anti-intrusion panel test:

During the test, the panel must be attached to the survival cell. For the purpose of this test, a section of the survival cell from minimum the highest point of the secondary roll structure to the front end may be used.

The secondary side intrusion panel according to Article 15.3.8 may be fitted to the survival cell during the test. Mechanical components may be fitted to the front face of the survival cell and the frontal anti-intrusion panel during the test.

The load will be applied through a rigid impactor, 100mm wide and 130mm high. The cross section must remain constant over at least 150mm longitudinally. Each corner of the impactor may incorporate a radius no greater than 10mm.

Rubber 3 mm thick may be used between the impactor and the frontal anti-intrusion panel.

A constant longitudinal, rearward and horizontal load of 200 kN shall be applied, in less than 3 minutes, to the centre of area of the front face of the survival, through a ball-jointed junction, and maintained for a minimum of 10 seconds.

During the test, the deflection must be less than 50.0 mm, the measurements being taken at the centre of area of the impactor. In addition, during the test, no part of the frontal anti-intrusion panel may be less than 100 mm in front of the front wheel centre line.

ARTICLE 19 : FUEL

19.1 Fuel :

The fuel must comply with ISC Appendix J Article 252.9.1.

19.2 Air :

Only air may be mixed with the fuel as an oxidant.

ARTICLE 20: FINAL TEXT

The final text for these regulations shall be the English version, which will be used should any dispute arise over their interpretation.

Headings and typeface in this document are for ease of reference only and do not form part of these Technical Regulations.

APPENDIX 1

CHASSIS-RELATED DRAWINGS

Points for aerofoil section number 1, all dimensions are in millimetres (see Drawing 1.3):

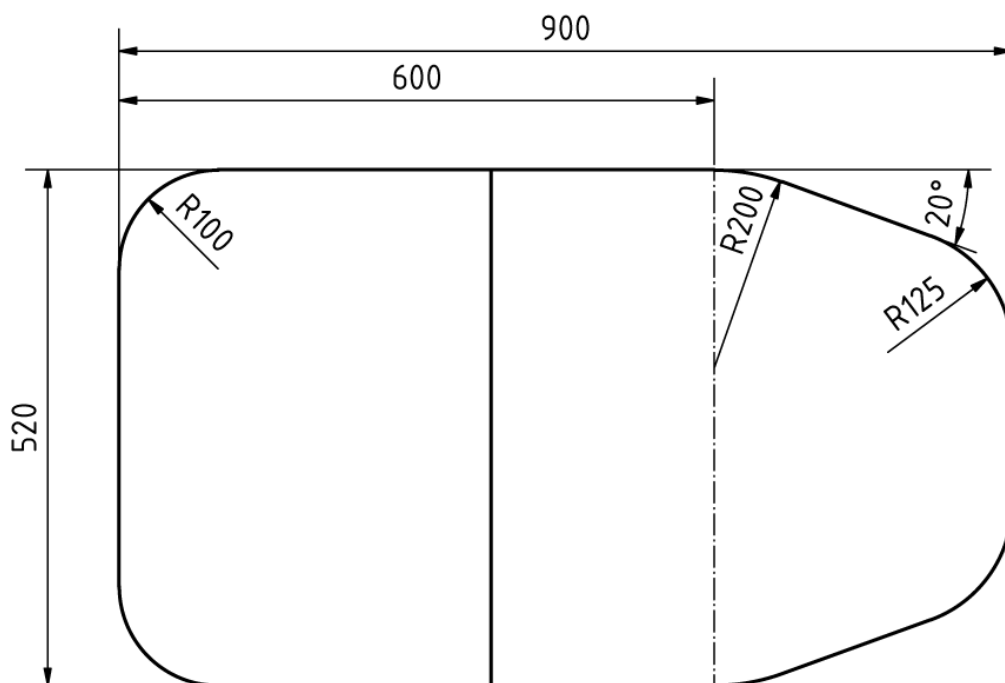
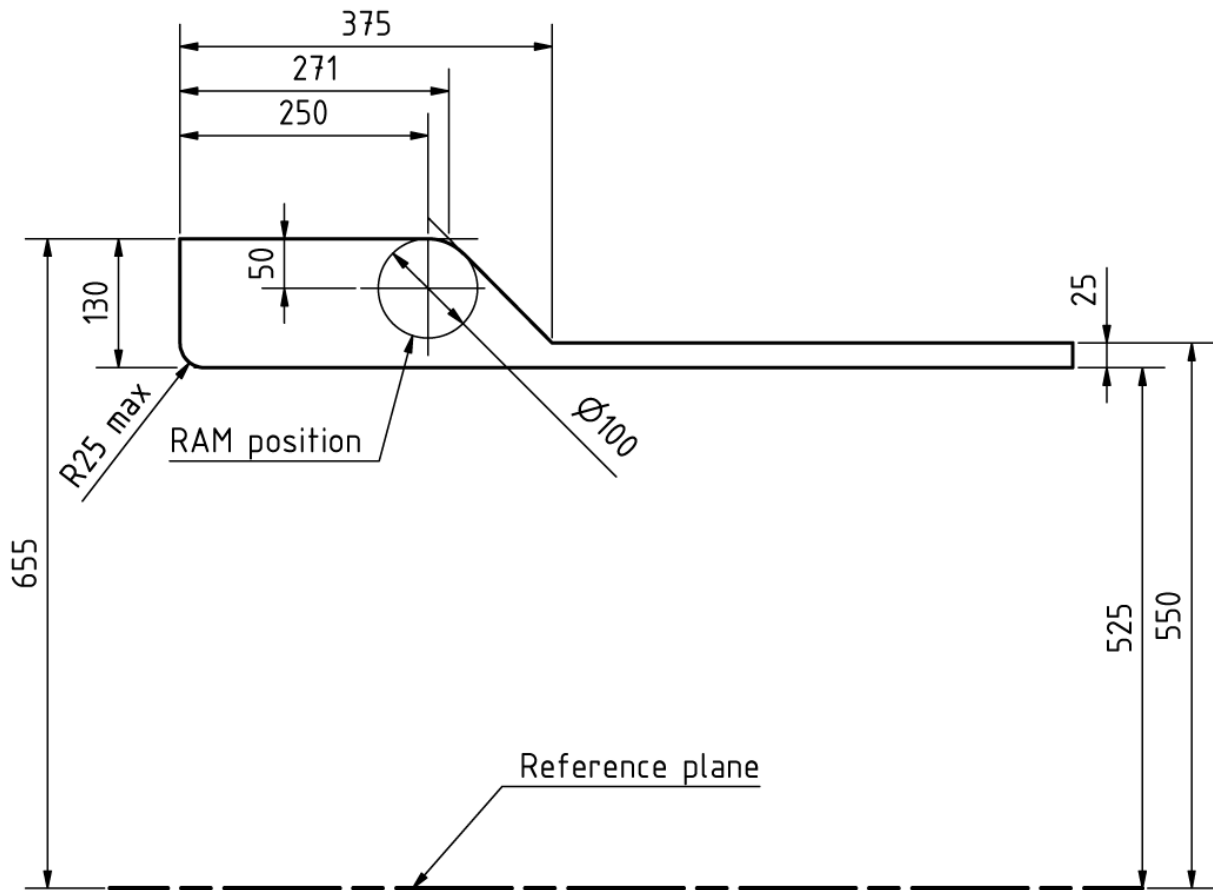
1	00.00	00.00	14	-151.58	07.65	27	-263.58	-27.64	40	-112.41	-33.36
2	-11.40	-02.79	15	-163.33	07.59	28	-252.44	-31.35	41	-100.87	-31.19
3	-23.08	-03.94	16	-175.07	07.36	29	-241.00	-33.96	42	-89.38	-28.77
4	-34.82	-03.88	17	-186.80	06.95	30	-229.40	-35.82	43	-77.95	-26.11
5	-46.54	-03.20	18	-198.53	06.31	31	-217.73	-37.06	44	-66.56	-23.24
6	-58.22	-02.03	19	-210.24	05.41	32	-206.02	-37.97	45	-55.22	-20.18
7	-69.86	-00.49	20	-221.92	04.28	33	-194.29	-38.58	46	-43.94	-16.93
8	-81.48	01.20	21	-233.58	02.86	34	-182.55	-38.85	47	-32.72	-13.46
9	-93.11	02.85	22	-245.17	00.96	35	-170.81	-38.78	48	-21.59	-09.71
10	-104.76	04.36	23	-256.66	-01.45	36	-159.07	-38.43	49	-10.54	-05.75
11	-116.43	05.67	24	-267.93	-04.72	37	-147.35	-37.77	50	00.43	-01.54
12	-128.12	06.72	25	-277.16	-11.42	38	-135.66	-36.71			
13	-139.84	07.40	26	-273.74	-21.83	39	-124.01	-35.22			

Points for aerofoil section number 2, all dimensions are in millimetres (see Drawing 1.4):

1	00.00	00.00	14	-129.20	-20.46	27	-222.52	-42.50	40	-92.00	-43.84
2	-08.62	-05.50	15	-139.42	-19.80	28	-212.92	-46.08	41	-82.28	-40.62
3	-18.00	-09.56	16	-149.64	-19.16	29	-203.06	-48.82	42	-72.68	-37.10
4	-27.80	-12.48	17	-159.86	-18.56	30	-193.06	-50.94	43	-63.14	-33.36
5	-37.72	-15.06	18	-170.08	-18.08	31	-182.94	-52.50	44	-53.70	-29.42
6	-47.70	-17.32	19	-180.30	-17.76	32	-172.76	-53.54	45	-44.34	-25.26
7	-57.76	-19.20	20	-190.54	-17.68	33	-162.54	-54.12	46	-35.08	-20.92
8	-67.88	-20.64	21	-200.78	-17.90	34	-152.30	-54.20	47	-25.90	-16.38
9	-78.08	-21.58	22	-211.00	-18.46	35	-142.08	-53.76	48	-16.86	-11.60
10	-88.30	-22.04	23	-221.16	-19.66	36	-131.90	-52.80	49	-07.98	-06.52
11	-98.54	-22.04	24	-231.02	-22.34	37	-121.76	-51.28	50	00.70	-01.08
12	-108.76	-21.66	25	-237.22	-29.56	38	-111.74	-49.26			
13	-118.98	-21.10	26	-231.48	-37.60	39	-101.82	-46.76			

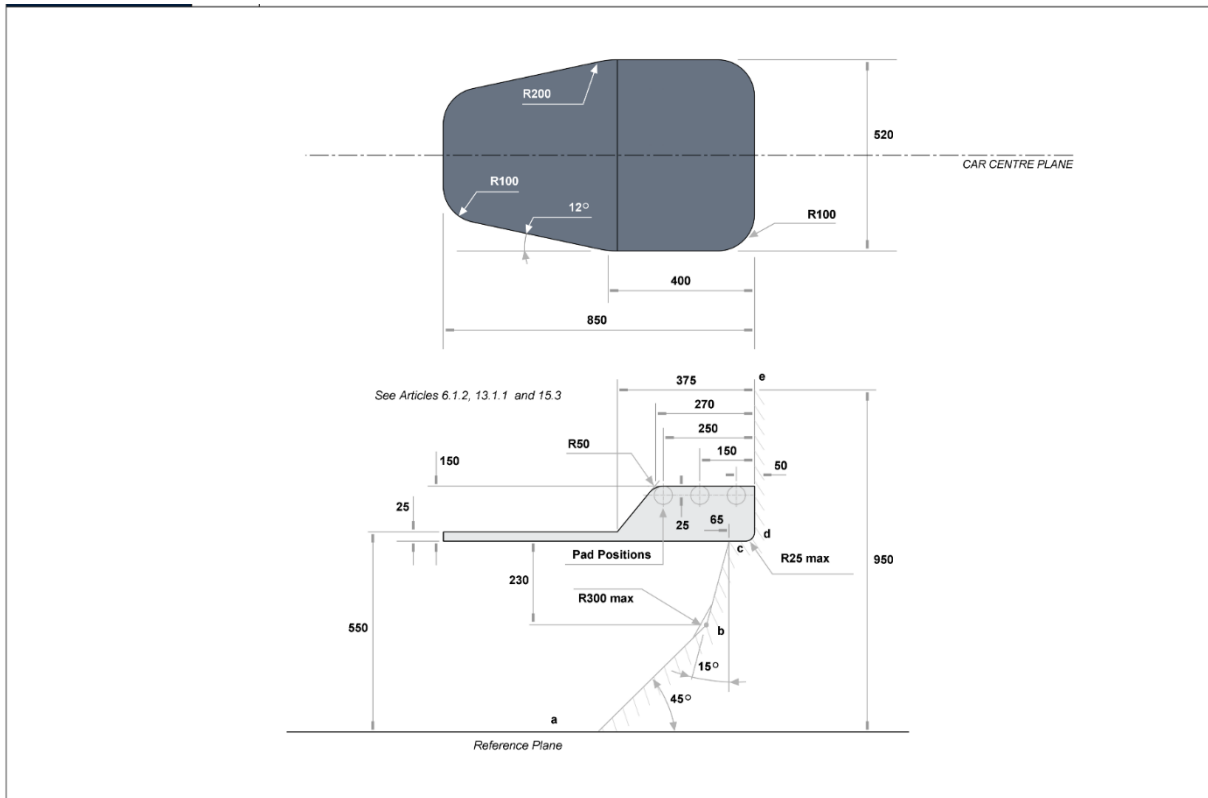
Points for aerofoil section number 3, all dimensions are in millimetres (see Drawing 1.5):

1	163.07	00.00	21	59.33	-40.21	41	01.91	-17.91	61	113.59	-01.70
2	164.08	-01.19	22	53.95	-40.11	42	03.45	-16.76	62	120.07	-02.33
3	160.86	-03.91	23	48.67	-39.85	43	06.86	-15.04	63	126.34	-03.02
4	157.66	-06.63	24	43.43	-39.45	44	10.31	-13.39	64	132.59	-03.78
5	154.56	-09.14	25	38.20	-38.81	45	15.32	-11.20	65	137.90	-04.47
6	151.54	-11.46	26	33.00	-37.95	46	20.42	-09.22	66	143.20	-05.18
7	147.47	-14.30	27	27.53	-36.78	47	24.00	-07.95	67	147.47	-05.77
8	143.26	-16.99	28	22.17	-35.38	48	27.58	-06.81	68	151.77	-06.38
9	138.86	-19.56	29	17.32	-33.86	49	33.35	-05.18	69	151.94	-06.40
10	134.26	-22.02	30	12.55	-32.16	50	39.14	-03.73	70	152.12	-06.42
11	128.27	-24.94	31	09.50	-30.96	51	46.86	-02.21	71	153.01	-06.50
12	122.10	-27.69	32	06.55	-29.69	52	54.64	-01.12	72	153.90	-06.43
13	116.76	-29.79	33	05.08	-29.03	53	60.71	-00.53	73	154.76	-06.25
14	111.38	-31.70	34	03.71	-28.40	54	66.80	-00.20	74	155.60	-05.94
15	103.48	-34.11	35	02.34	-27.51	55	73.18	-00.03	75	156.39	-05.51
16	95.48	-36.22	36	01.22	-26.29	56	79.55	00.00	76	157.12	-05.00
17	87.17	-37.92	37	00.43	-24.82	57	86.31	-00.10	77	163.07	00.00
18	78.77	-39.12	38	00.05	-23.22	58	93.09	-00.33			
19	71.75	-39.78	39	00.13	-21.29	59	100.10	-00.66			
20	64.72	-40.13	40	00.76	-19.48	60	107.16	-01.14			

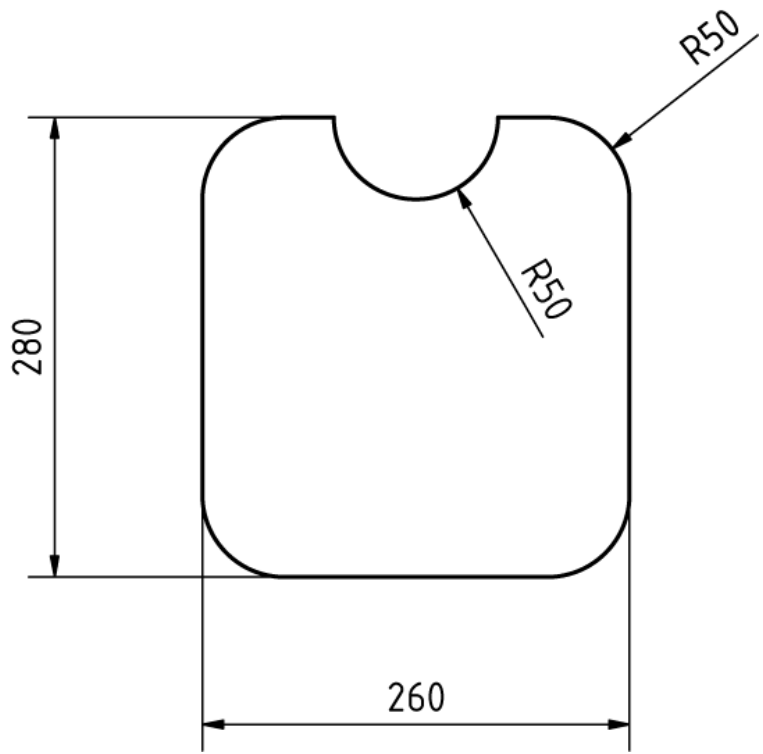


Drawing 1.1

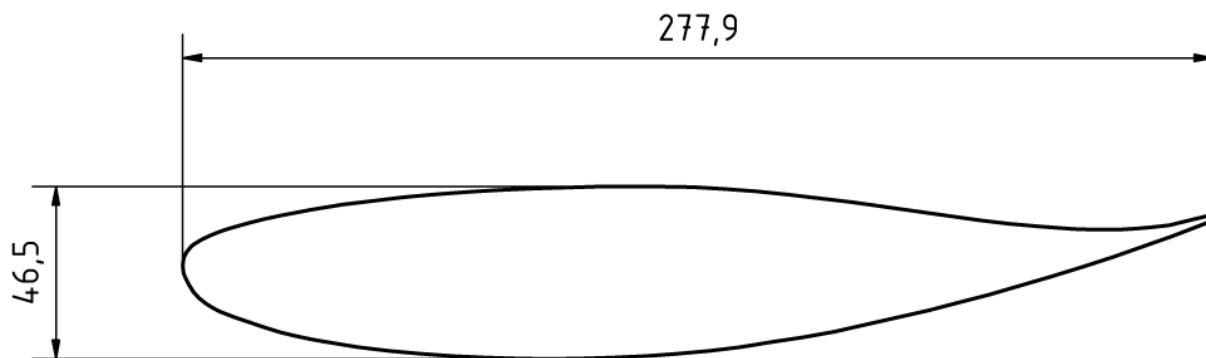
Formula 4 cars homologated as from 01.01.2019:



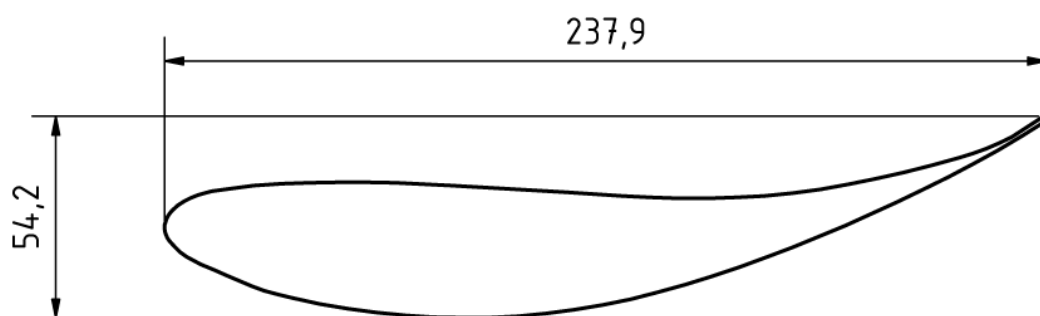
Drawing 1.1



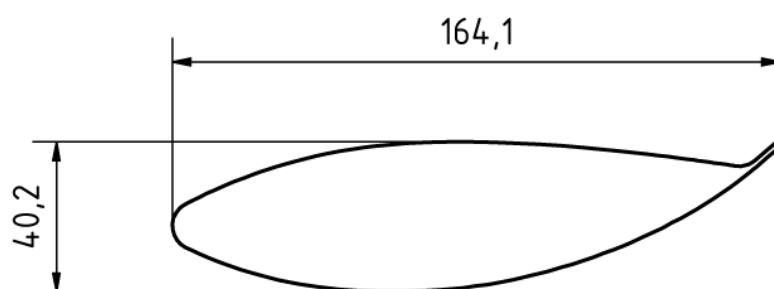
Drawing 1.2



Drawing 1.3

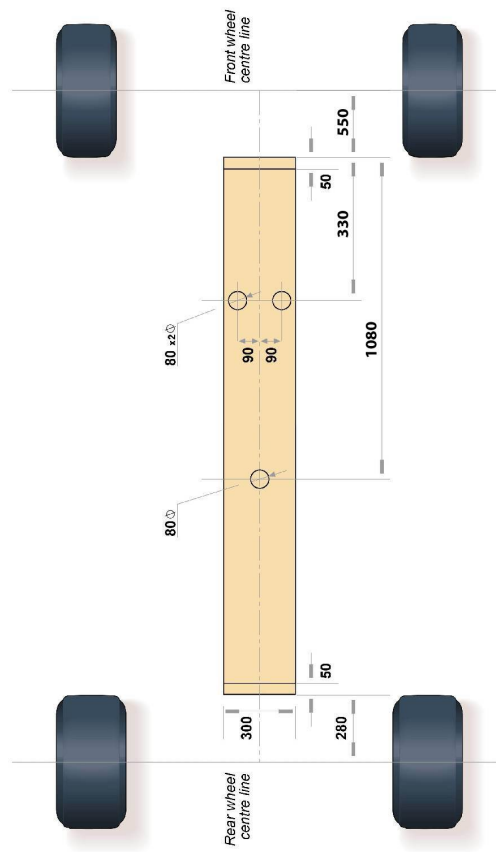


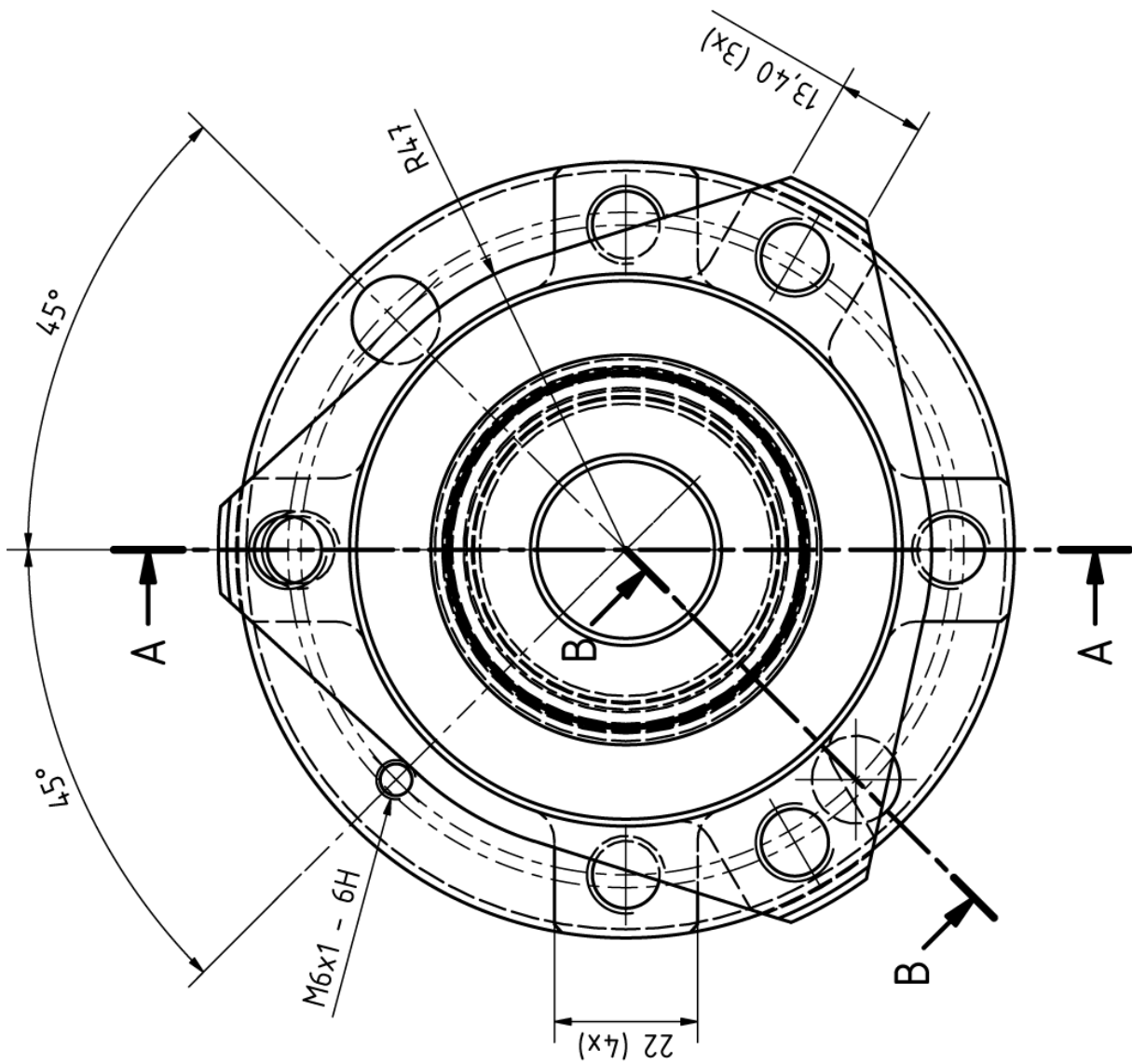
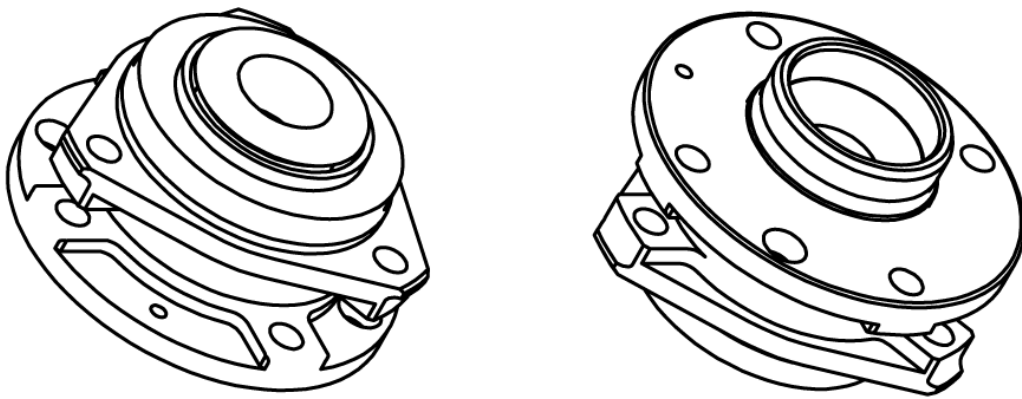
Drawing 1.4



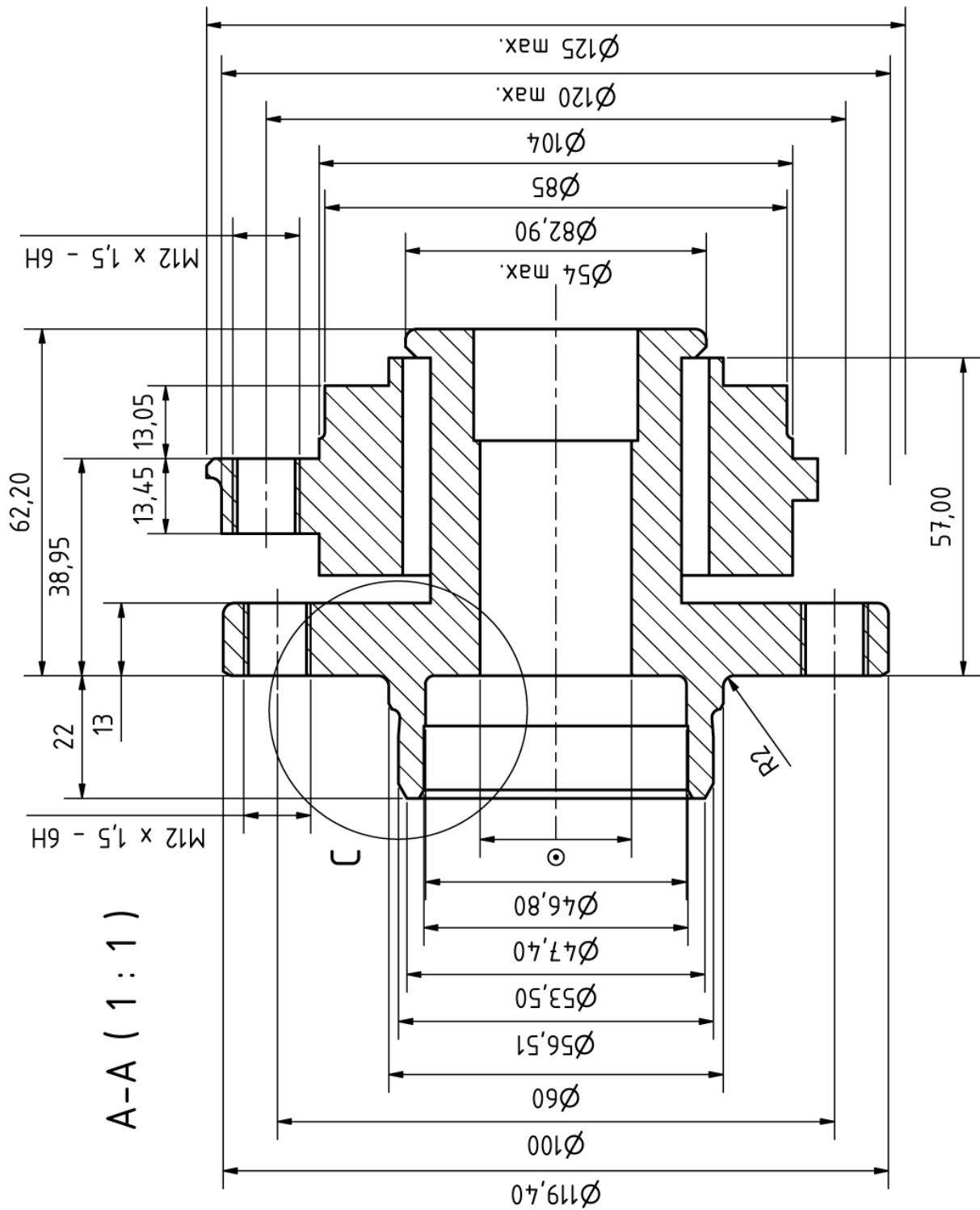
Drawing 1.5

Drawing 6 Skid Block Dimensions





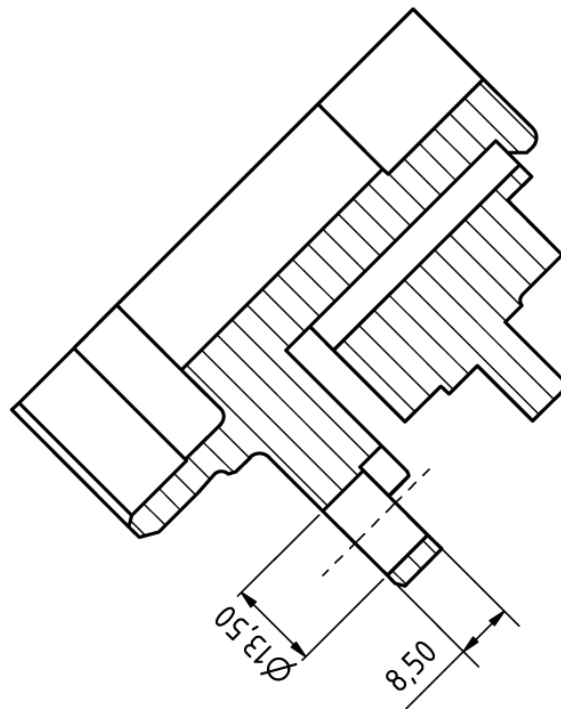
Drawing 1.7a



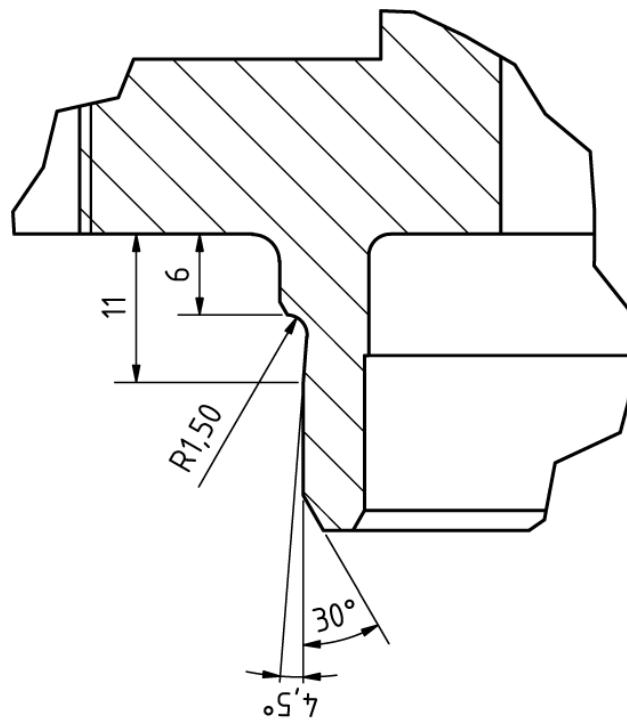
Drawing 1.7b

Number of teeth	33
Reference diameter	26,194
Normal module	0,79375
Helix angle	0°
Hand of helix	Straight
Lead	∞
Root diameter	27,94
Base radius	11,342

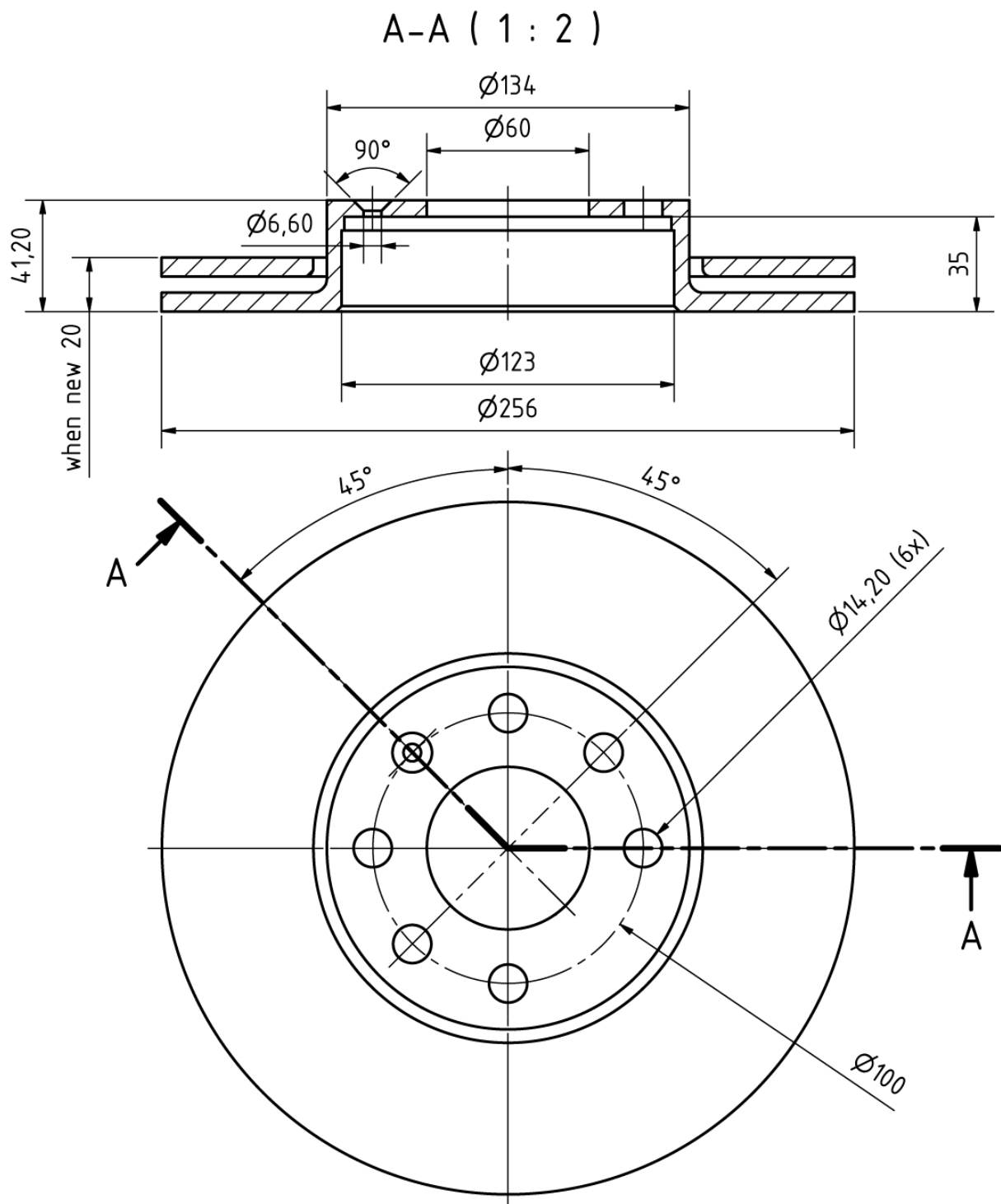
B-B (1 : 1)



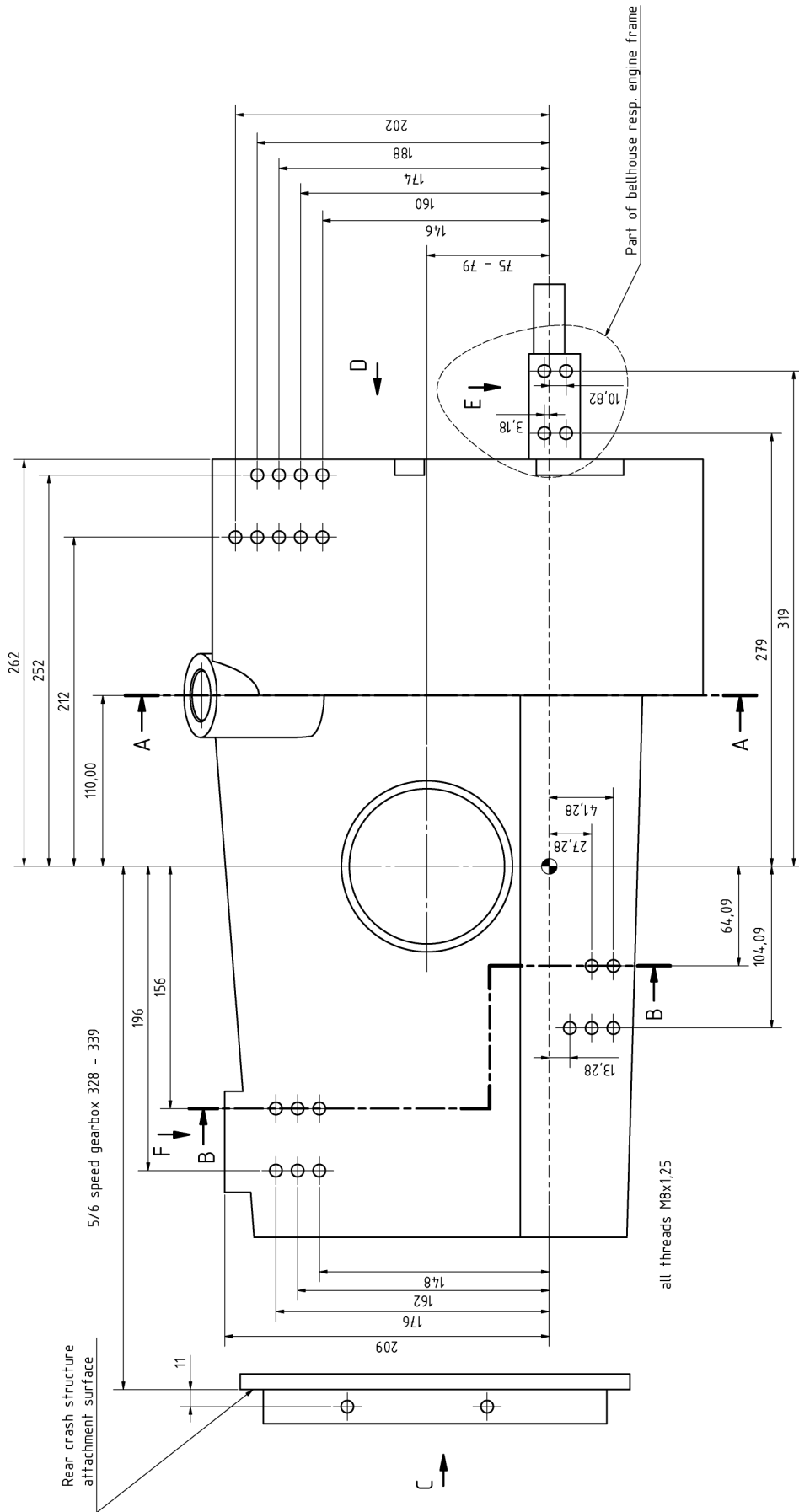
C (2 : 1)



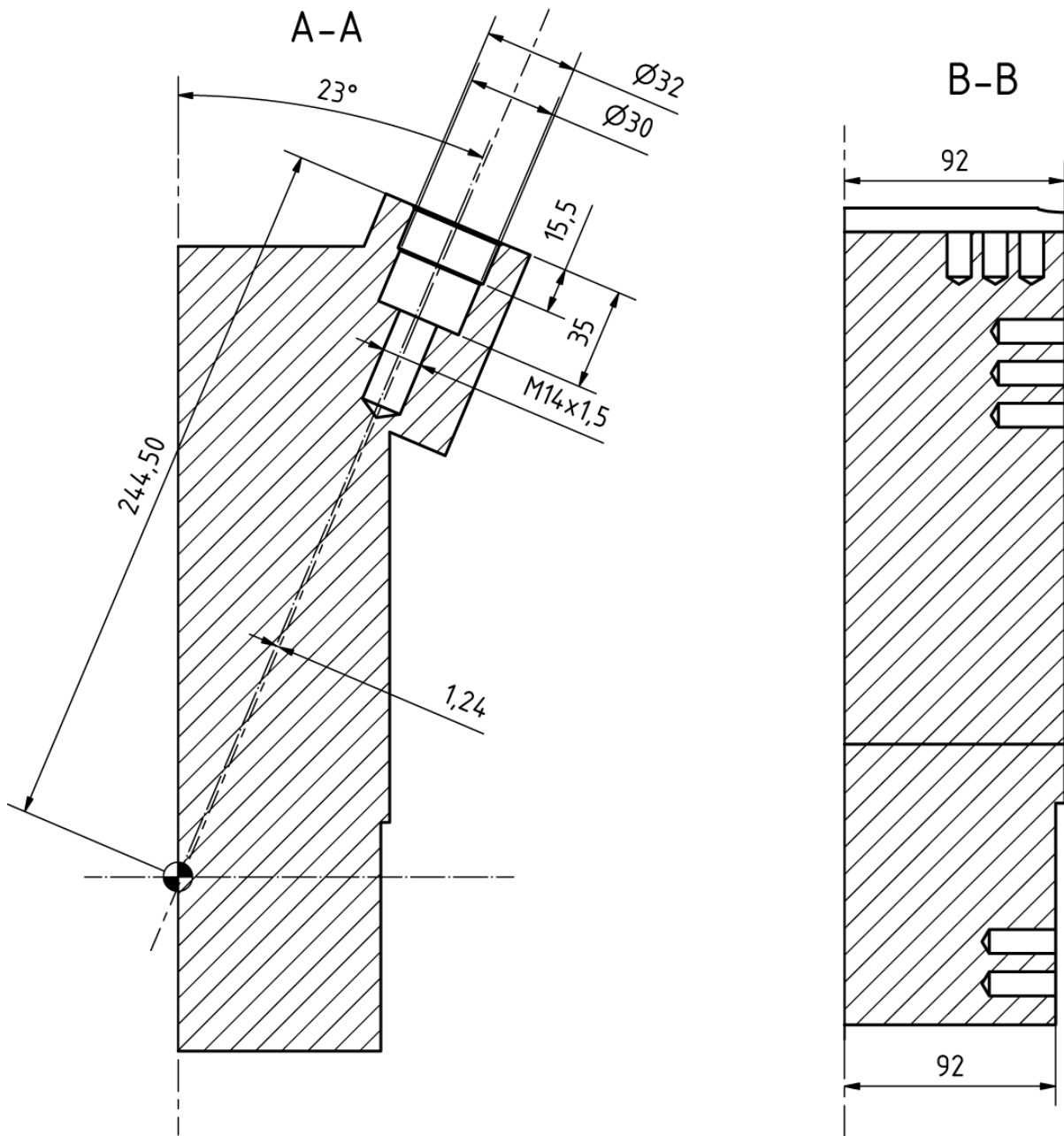
Drawing 1.7c



Drawing 1.8

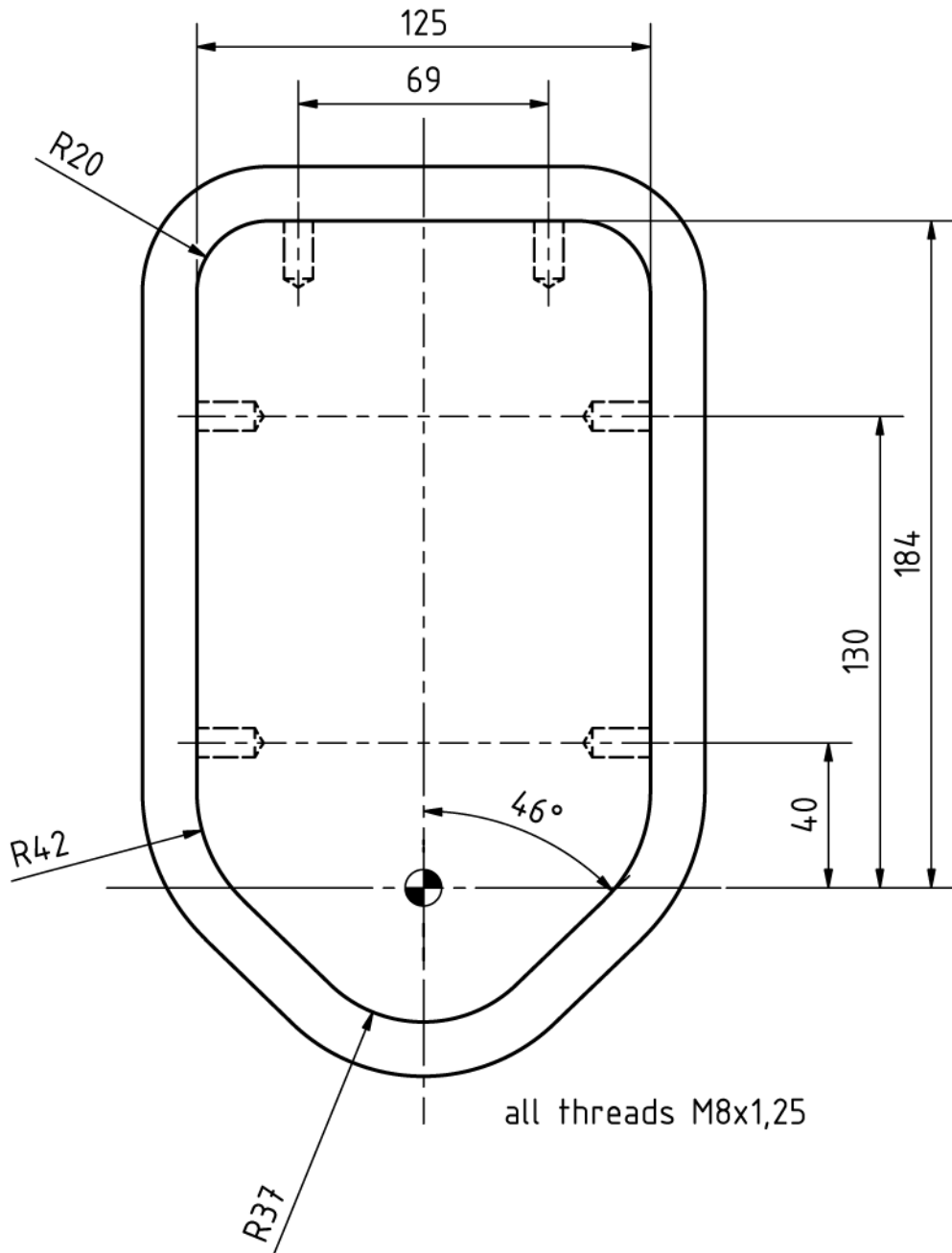


Drawing 1.9a



Drawing 1.9b

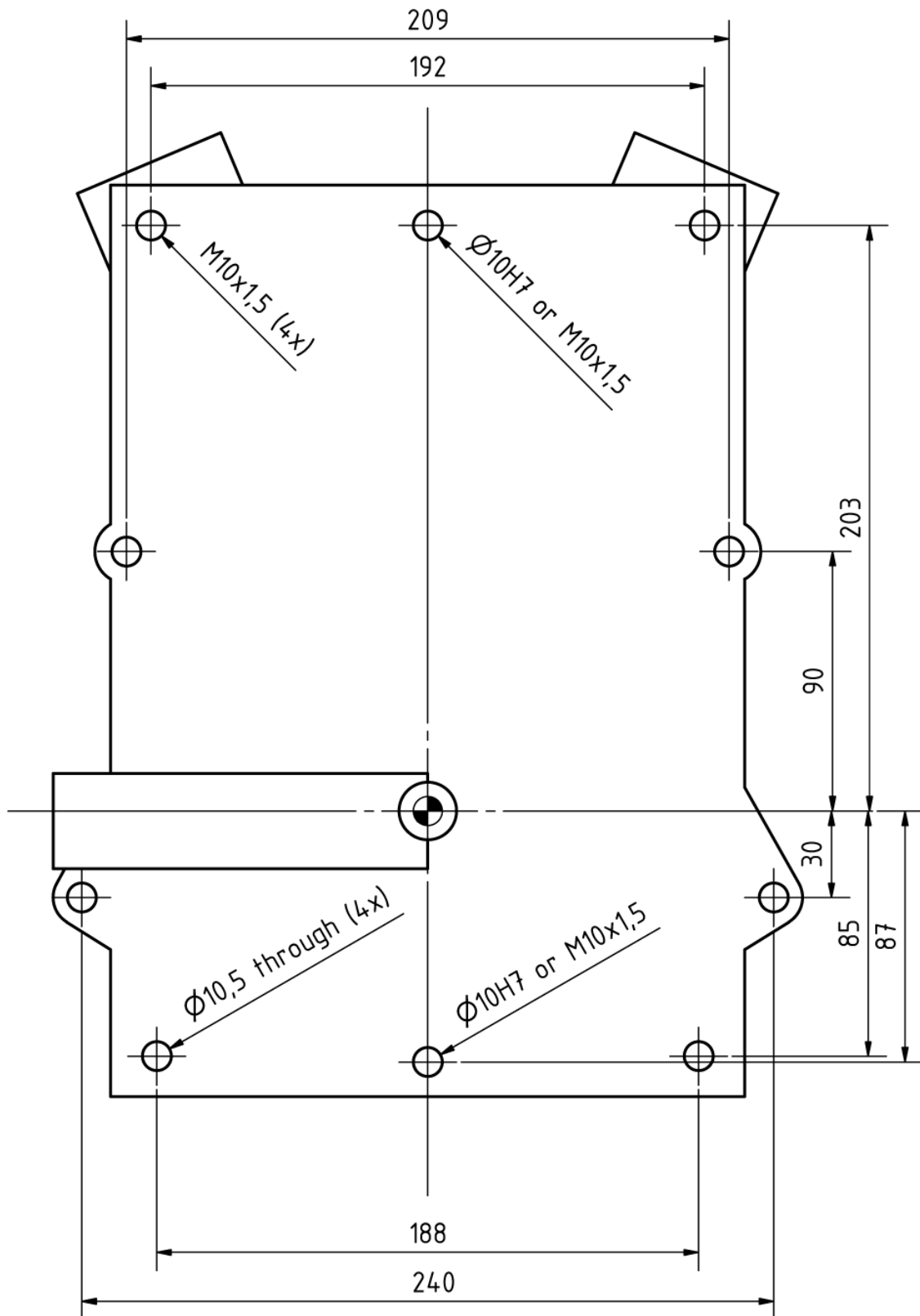
View C



The two upper points are optional for the attachment of a towing device.
If these do not exist, different points for a rear towing device need to be available.

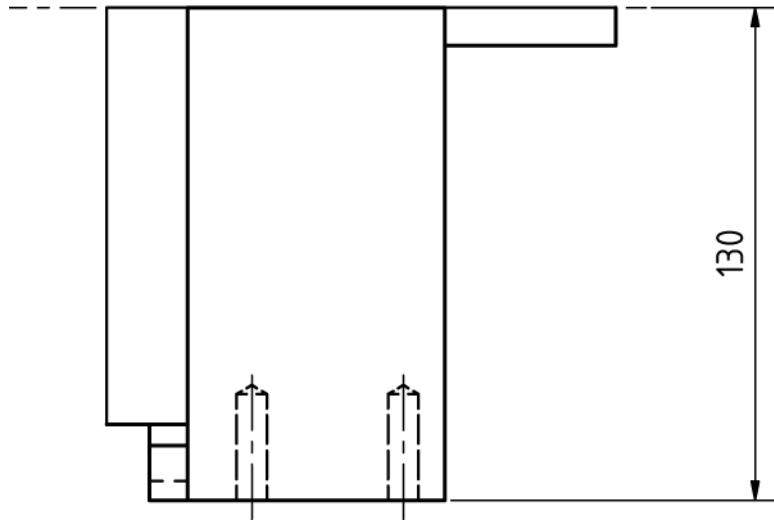
Drawing 1.9c

View D



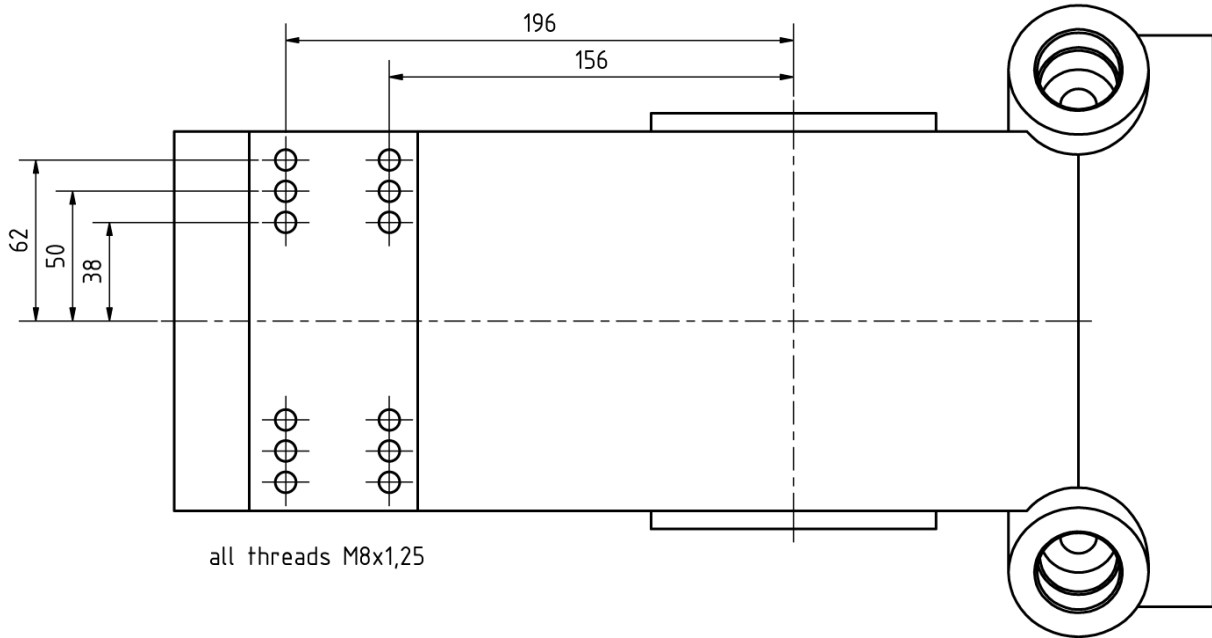
Drawing 1.9d

View E

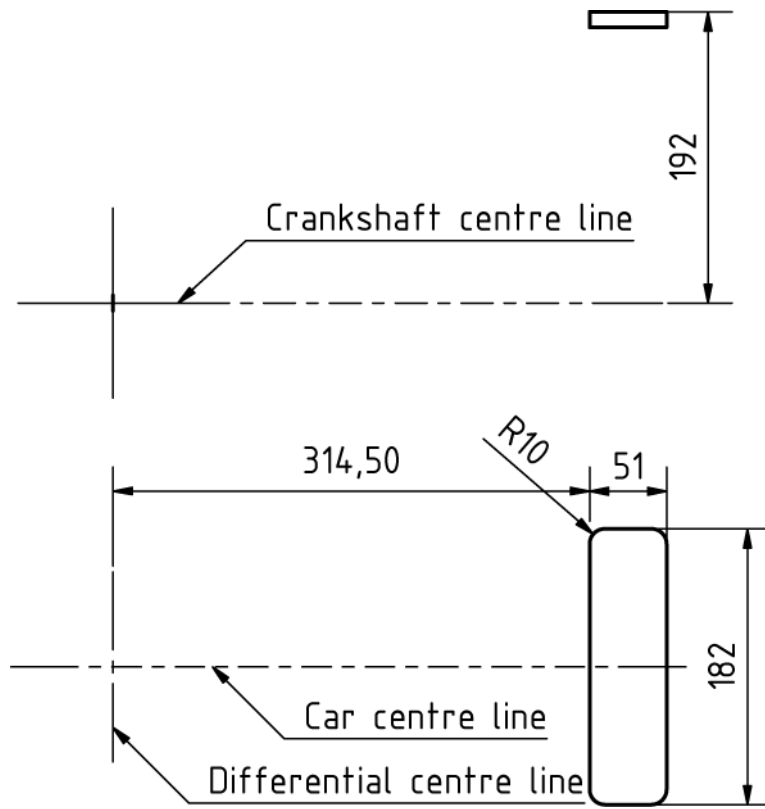


Drawing 1.9e

View F



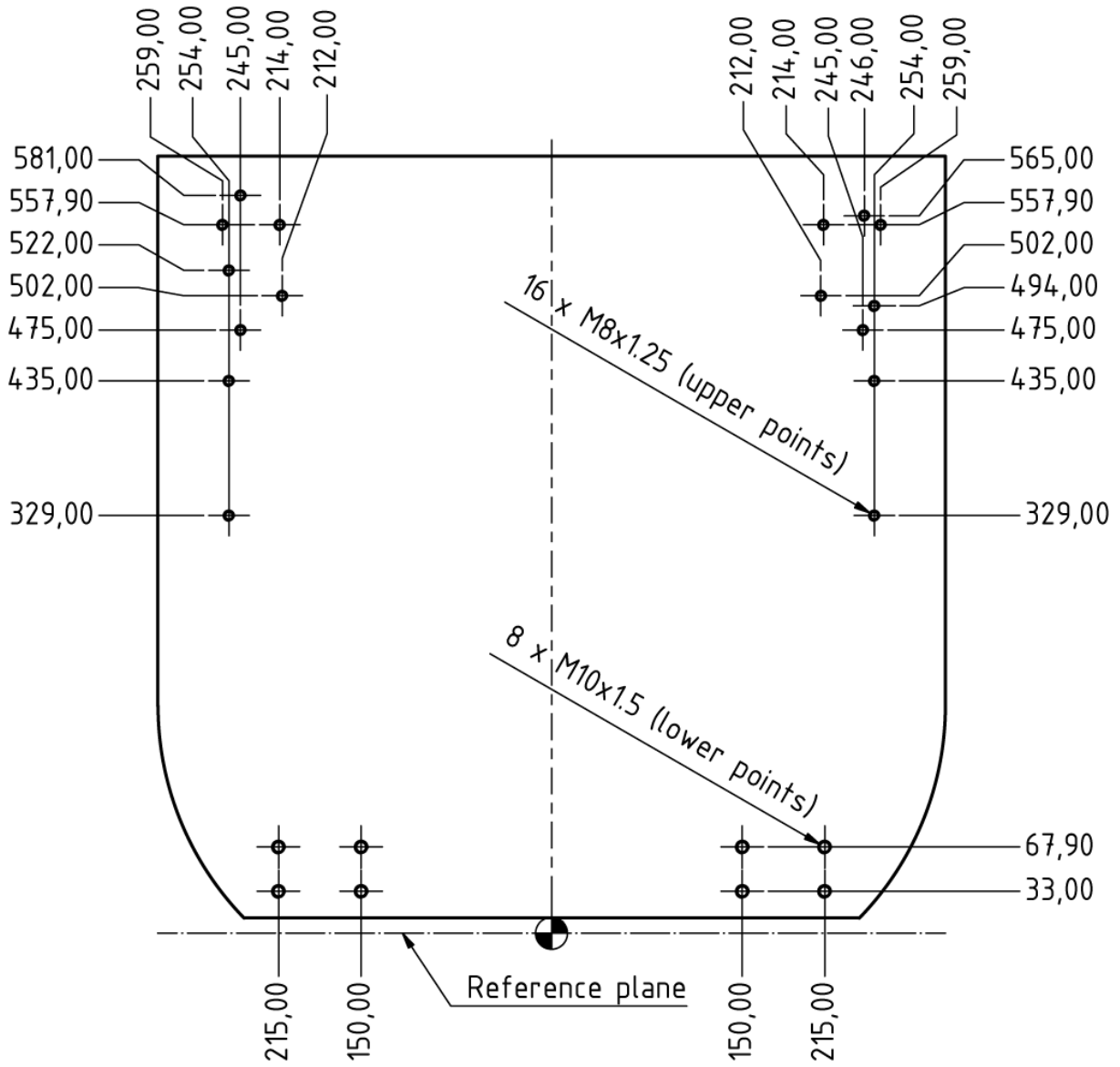
Drawing 1.9f



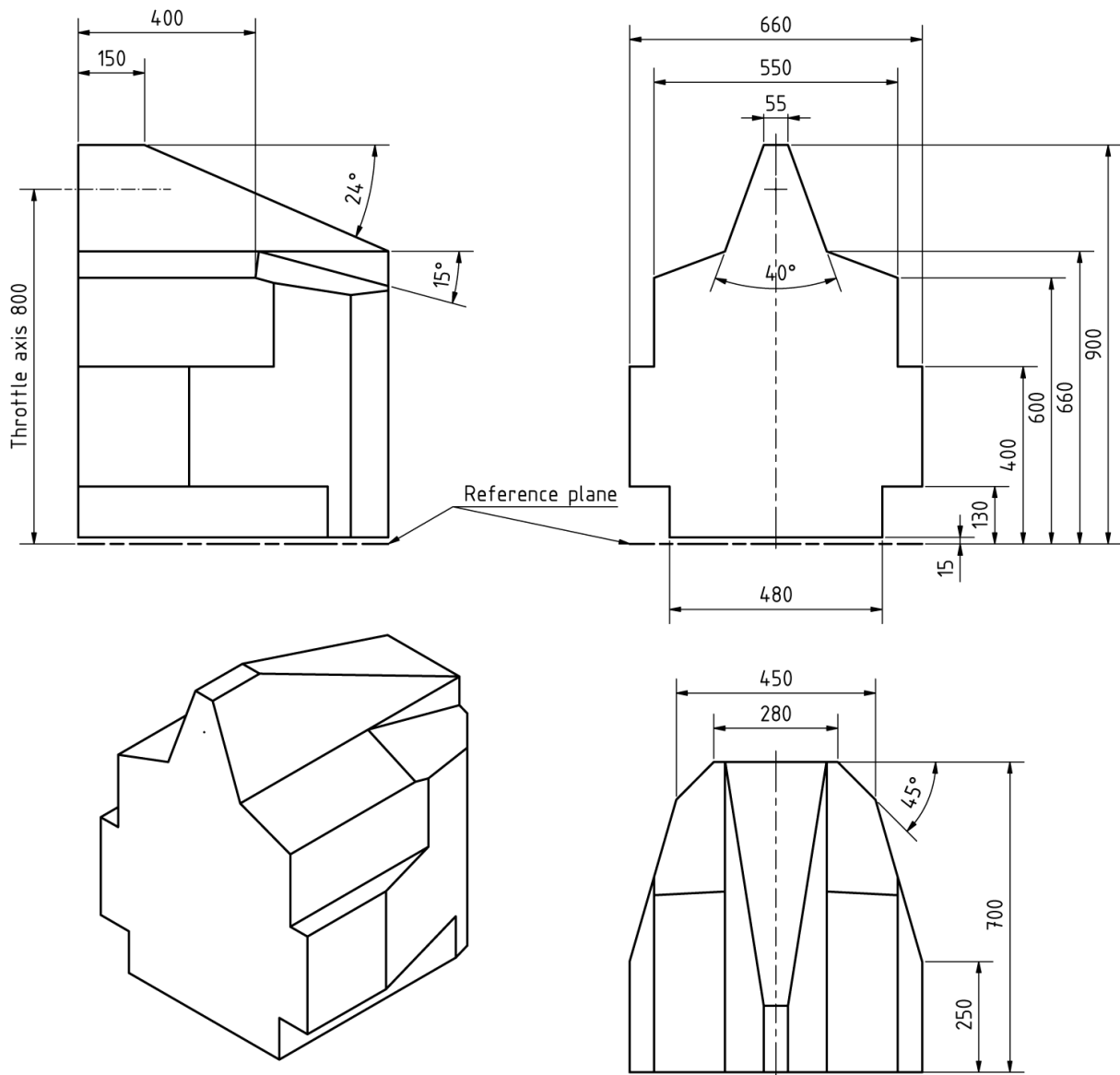
Drawing 1.10

APPENDIX 2

POWER UNIT - RELATED DRAWINGS



Drawing 2.1



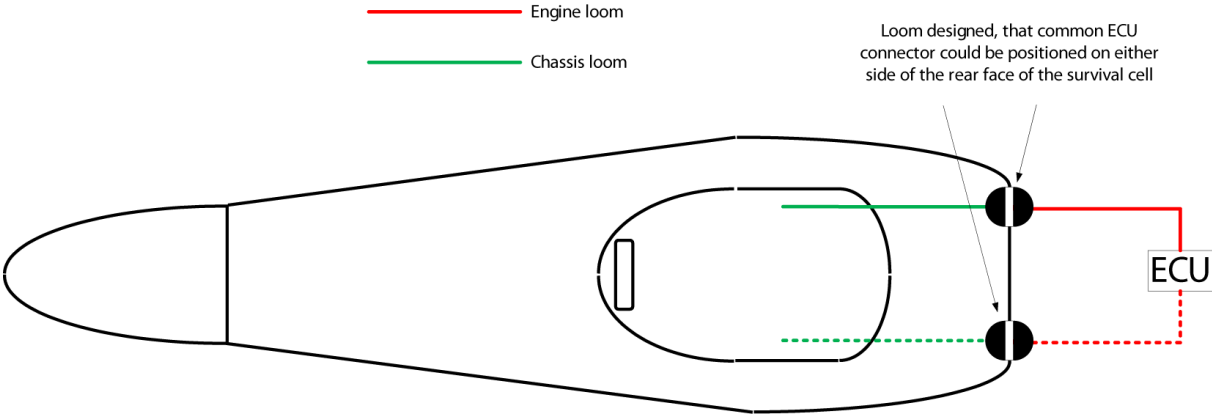
A radius of maximum 80mm may be added to the edges of the template.

Drawing 2.2

APPENDIX 3

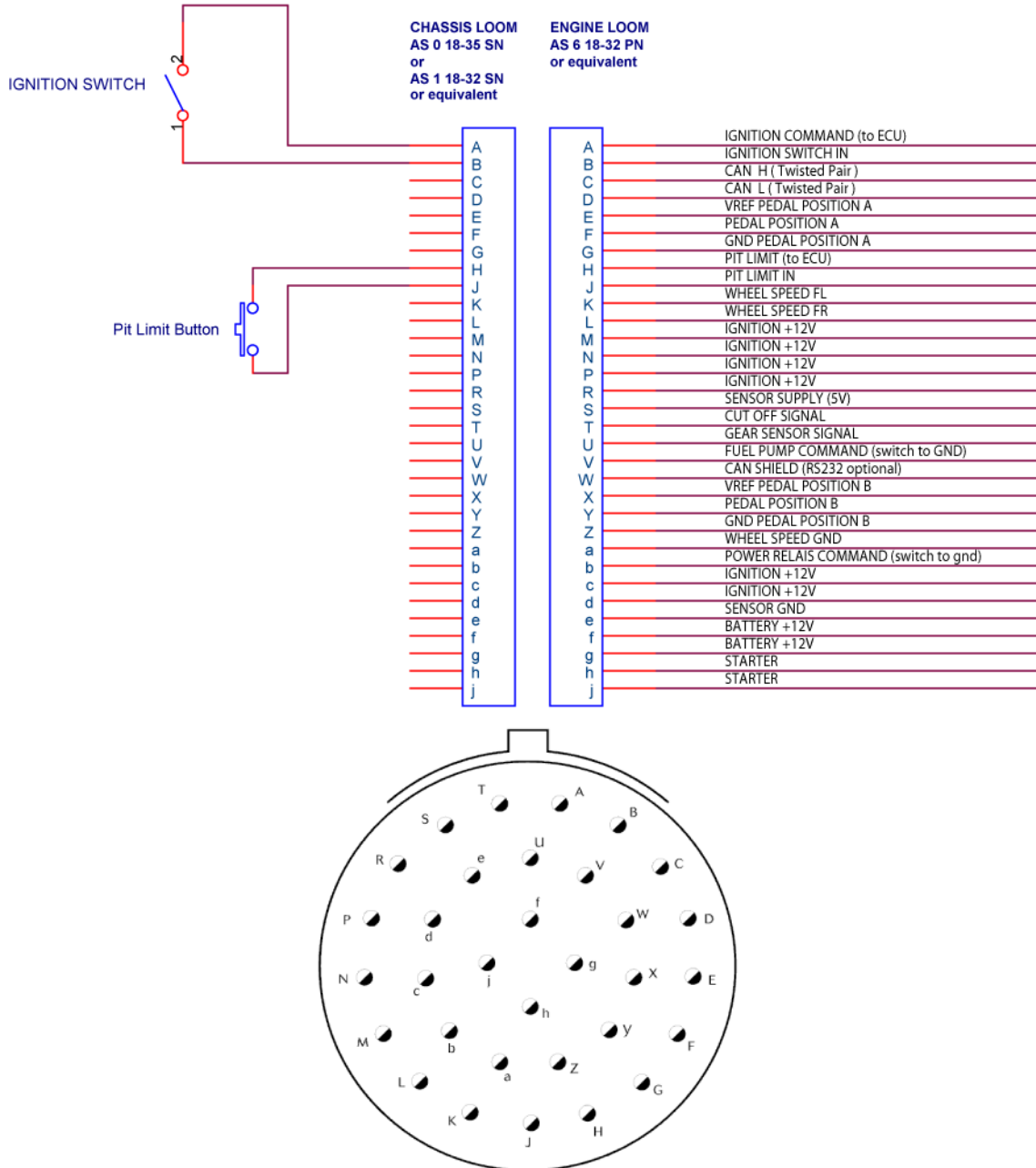
ELECTRICAL SYSTEM CONNECTION INTERFACES

Positioning of the ECU connector:



Connection / pin layout:

Chassis loom connection



<i>Pin No.</i>	<i>Description</i>	<i>Min. diameter AWG</i>	<i>M/O for engine manufacturer</i>	<i>Notes</i>
A	ENGINE ENABLE / IGNITION SIGNAL	22	M	+12V or 0V feed (manufacturer option)
B	IGNITION SIGNAL SWITCH IN	22	M	ground to activate ("active low")
C	CAN 1 H (TWISTED PAIR)	22	M	standard CAN wiring requirements
D	CAN 1 L (TWISTED PAIR)	22	M	standard CAN wiring requirements
E	VREF PEDAL POSN A	22	M	+5V from ECU (limited current source capability)
F	PEDAL POSN A	22	M	0-5V signal to ECU
G	GND PEDAL POSN A	22	M	analog ground from ECU (limited current sink capability)
H	PIT LIMIT SIGNAL	22	O	+12V or 0V feed (manufacturer option)
J	PIT LIMIT SIGNAL IN	22	M	ground to activate ("active low")
K	LF WHEEL SPEED	22	M	0-5V frequency input (active on +Ve or -Ve crossing of 2.5V)
L	RF WHEEL SPEED	22	M	0-5V frequency input (active on +Ve or -Ve crossing of 2.5V)
M	IGNITION +12V	18	M	switched +12V from battery (via master switch)
N	IGNITION +12V	18	O	switched +12V from battery (via master switch)
P	IGNITION +12V	18	O	switched +12V from battery (via master switch)
R	IGNITION +12V	18	O	switched +12V from battery (via master switch)
S	SENSOR +5V	22	M	+5V from ECU (limited current source capability)
T	GEAR SHIFT/CUT SIGNAL	22	M	ground to activate ("active low")
U	GEAR POSITION SIGNAL	22	O	0-5V signal to ECU
V	FUEL PUMP COMMAND	22	M	ECU controlled : ground to activate ("active low")
W	CAN SHIELD / RS232		O	RS232 optional
X	VREF PEDAL POSN B	22	O	+5V from ECU (limited current source capability)
Y	PEDAL POSN B	22	M	0-5V signal to ECU
Z	GND PEDAL POSN B	22	O	analog ground from ECU (limited current sink capability)
a	WHEEL SPEED GND	22	M	chassis ground
b	POWER RELAY COMMAND	22	O	ECU controlled : ground to activate ("active low")
c	IGNITION +12V	18	O	switched +12V from battery (via master switch)
d	IGNITION +12V	18	O	switched +12V from battery (via master switch)
e	SENSOR GND	22	M	analog ground from ECU (limited current sink capability)
f	BATTERY +12V	18	M	+12V from battery (via master switch)
g	BATTERY +12V	18	O	+12V from battery (via master switch)
h	STARTER	18	M	feed to starter solenoid (from high current switch/relay on chassis side)
j	STARTER	18	M	feed to starter solenoid (from high current switch/relay on chassis side)
			M = mandatory	
			O = optional	

APPENDIX 4

APPROVAL OF SAFETY STRUCTURES

Approval of Safety Structures for Formula 4 cars

1) Safety structures

The following safety structures need to be approved by the FIA:

- a) Survival cell.
- b) Front and rear rollover structures.
- c) Frontal impact-absorbing structure.
- d) Rear impact-absorbing structure.

To approve any of the above structures, the presence of an FIA technical delegate is necessary. The static load tests need to be carried out with measuring equipment verified by the FIA; the dynamic impact tests need to be carried out at an FIA-approved institute.

2) Request for approval

In order for one of the above-mentioned safety structures to be approved, the FIA must receive a request from the rolling chassis manufacturer beforehand at the following address:

FIA Technical Department
2 Chemin de Blandonnet
CH 1215 Geneva 15
Switzerland
Tel.: +41 22 544 44 00
Fax: +41 22 544 44 50

3) Approval procedure

Having received a request for any of the above-mentioned tests, the FIA will arrange a date and venue with the rolling chassis manufacturer and will appoint a technical delegate to supervise these scheduled tests.

For each trip made by an FIA technical delegate to supervise any scheduled tests, the manufacturer will be charged a fee, which is levied annually by the FIA ([€2812 for 2021](#)).

Once all the safety structure tests have been carried out successfully and the manufacturer has settled the FIA fee, he will receive the FIA chassis test report for his car.

The rolling chassis manufacturer is obliged to supply all his customers with a copy of the FIA chassis test report together with the survival cell.

SUMMARY

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ARTICLE 2: Chassis Homologation

- 2.1 Compliance with Technical Regulations
- 2.2 Price/cost requirements
- 2.3 Chassis homologation perimeter
- 2.4 Options
- 2.5 Mandatory selling of parts
- 2.6 Single supplier parts

ARTICLE 3: Power Unit Homologation

- 3.1 Compliance with Technical Regulations
- 3.2 Cost/lifetime requirements
- 3.3 Power output
- 3.4 Mechanical Power Unit installation
- 3.5 Power Unit space template
- 3.6 Minimum current provided by alternator
- 3.7 Power Unit homologation perimeter

ARTICLE 4: Homologation procedure

- 4.1 General
- 4.2 Halo update

ARTICLE 5: Changes to homologated parts

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APPENDIX 2: POWER UNIT POWER OUTPUT

APPENDIX 3: POWER UNIT SPARE PARTS

APPENDIX 4: MANDATORY IN POWER UNIT PERIMETER

APPENDIX 5: APPROVAL OF SAFETY STRUCTURES

ARTICLE 1: Manufacturer registration

Only those manufacturers registered and approved as FIA Formula 4 component manufacturers are eligible to homologate FIA Formula 4 chassis and Power Units.

ARTICLE 2: Chassis Homologation

2.1 Compliance with Technical Regulations:

Only chassis and/or components complying fully with the FIA F4 Technical Regulations (ISC Appendix J, Article 274) may be homologated.

Only parts having successfully passed the required crash tests may be homologated.

2.2 Price/cost requirements:

The price of the rolling chassis (as defined in Article 2.3) may not exceed €33,000.

In case the rolling chassis is sold including the 2018 Safety Update Kit, the price may be increased by maximum €2,200.

Formula 4 cars homologated before 01.01.2019:

	Base price	+1.9% for 2020	+1.3% for 2021
Rolling chassis (as defined in Article 2.3)	€33,000	€33,630	€34,067
2018 Safety Update Kit	€2,200	€2,242	€2,271
Complete Datalogging (as per Appendix 1.1)	€6,500	€6,624	€6,710
Total	€41,700	€42,496	€43,048

Formula 4 cars homologated as from 01.01.2019:

The price of the chassis is fixed as follows:

	Base price	+1.9% for 2020	+1.3% for 2021
Rolling chassis (as defined in Article 2.3)	€33,000	€33,630	€34,067
2018 Safety Update Kit	€2,200	€2,242	€2,271
Complete Datalogging (as per Appendix 1.1)	€6,500	€6,624	€6,710
Increase due to Halo and its installation	€13,300	€13,553	€13,729
Total	€55,000	€56,049	€56,777

The spare parts prices mentioned in Appendix 1 must be respected. The sum of prices of single parts must not exceed the price of assemblies mentioned in Appendix 1.

The chassis manufacturer must provide a complete list of spare parts prices, including optional parts, which forms part of the homologation.

The prices for options such as springs, gear ratio pairs and anti-roll bars must not exceed those of the originally supplied variants.

The above-mentioned prices are ex factory/ex works without VAT.

Only the following increase for distributor and on-track service is admitted:

- Manufacturer's home continent:
 - o Retail price from distributor: price ex works + shipping costs

- Retail price with track support: price ex works + shipping costs + 5%
- Overseas
 - Retail price from distributor: price ex works + shipping costs + taxes + 5%
 - Retail price with track support: price ex works + shipping costs + taxes + 10%

The spare parts prices mentioned in Appendix 1 and the homologated spare parts price list may be increased once per year for inflationary adjustment by a rate fixed by the FIA based on the OECD “Key Short-Term Economic Indicator”.

The rate will be published by the FIA at the end of a year for the following year.

For 2019 the increase rate is fixed to 3.9 %.

For 2020 the increase rate is fixed to 1.9 %.

For 2021 the increase rate is fixed to 1.3 %.

The rate is the maximum increase allowed for each part separately.

No increase is allowed in 2019 for the Halo update kit and the spare parts (Appendix 1.2) related to the Halo update kit.

2.3 Chassis homologation perimeter:

2.3.1 The survival cell, headrest, roll hoop, front and rear impact-absorbing structures, front wing support, rear wing support, collapsible steering column, steering rack assembly, fuel system, gearbox and fire extinguishing system must be homologated by the rolling chassis manufacturer before 31 March of the year during which they are intended for use (or the first competitive use if earlier).

The rolling chassis manufacturer may homologate the above-mentioned parts only once between 1 January 2014 and 31 December 2023.

2.3.2 The complete rolling chassis comprising the following parts

- Complete car ready to run without parts mentioned in Articles 2.3.1 and 3.6

Especially:

- Bodywork and wings (front wing material at the choice of the customer)
- Complete suspension (with adjustable or non-adjustable damper) including brakes and driveshafts
- One set of rims without tyres
- Steering wheel, basic display, lap trigger
- Mechanical gearshift
- Basic chassis loom
- Radiators
- Auxiliary battery
- Power Unit installation kit (such as exhaust, silencer, bellhouse, clutch shaft, etc.)
- Basic parts for the options 2.4.4. to 2.4.8

must be homologated by the rolling chassis manufacturer before 31 March of the year during which they are intended for use (or the first competitive use if earlier).

The rolling chassis manufacturer may homologate only one complete car between 1 January 2014 and 31 December 2023.

2.4 Options:

The rolling chassis manufacturer may homologate the following options.

The costs of the options are not included in the cost requirements under Article 2.2 except for those parts mentioned in Article 2.3.2.

The maximum prices given in Appendix 1 must be respected.

2.4.1 Power Unit installation kit

Modifications and different parts (such as exhaust, bellhouse, clutch shaft, etc.) for the sole purpose of installing different Power Units may be homologated.

Any exhaust system must comply with the homologated exhaust geometry of a Power Unit and with the requirements laid down in Article 3.3.

Only one installation kit per chassis and homologated Power Unit is permitted.

With exception to the above, different options may be homologated to suit the requirements of different climatic conditions.

Only one configuration per Championship is allowed. The admitted parts must be defined in the Sporting Regulations of each Championship.

2.4.2 Silencer

In order to incorporate different noise limit requirements, an optional silencer may be homologated.

2.4.3 Rims

Different rims and spacers to adjust track for different rim widths may be homologated.

2.4.4 Springs

Six different springs for the front and six for the rear may be homologated between 1 January 2014 and 31 December 2023.

2.4.5 Anti-roll bars

Two different anti-roll bars for the front and two for the rear per championship may be homologated between 1 January 2014 and 31 December 2023.

2.4.6 L-shaped gurney flap

One L-shaped gurney flap to be attached to the front wing may be homologated between 1 January 2014 and 31 December 2023.

2.4.7 Modifications due to different driver sizes

Modifications and optional parts for the sole purpose of fitting different driver sizes may be homologated.

2.4.8 Gearbox options

15 different pairs of gear ratios may be homologated between 1 January 2014 and 31 December 2023.

2.4.9 Data logging system

One optional data logging system, including sensors and dashboard or steering wheel display, may be homologated.

The homologation includes all necessary parts for the hardware installation as well as the software of the data logger.

The rolling chassis manufacturer may homologate only one optional data logging system between 1 January 2014 and 31 December 2023.

2.4.10 Paddle shift system

One optional paddle shift system may be homologated. The homologation includes all necessary parts for the hardware installation as well as the software of the gearbox control unit.

The rolling chassis manufacturer may homologate only one optional paddle shift system between 1 January 2014 and 31 December 2023.

2.4.11 Damper

Different dampers may be homologated.

The requirements of the FIA F4 Technical Regulations (ISC Appendix J, Article 274) Article 1.22 and 10.7 have to be respected.

2.4.12 Brake pads

Different brake pads may be homologated.

A competitor may choose at maximum between three different types of homologated brake pads.

For one championship, the total number of brake pads may be more than three. The brake pad types will be then split into groups of three each. A competitor has to choose one group for the complete season.

The brake pads available must be defined in the Sporting Regulations of each Championship.

2.4.13 Front wing material

Front wings made from two different materials may be homologated.

Only one type per Championship is allowed. The front wing type must be defined in the Sporting Regulations of each Championship.

2.5 Mandatory selling of parts:

Any rolling chassis manufacturer must make the following homologated parts available on normal commercial terms:

- Survival cell
- Headrest
- Roll hoop
- Fuel system
- Front crash structure
- Front wing support
- Rear crash structure
- Rear wing support
- Collapsible steering column
- Steering rack assembly
- Steering wheel
- Gearbox
- Parts for mechanical Power Unit installation (e.g. brackets, bellhouse, adapter plates, clutch shaft)

These parts must be available for the price indicated in Appendix 1 throughout the homologation period, and a maximum of 3 months will be allowed between the order and the delivery.

Any other manufacturer may homologate a new car using the complete set of the above-listed parts of a car which has already been homologated, without repeating the crash test.

2.6 Single supplier parts

In case of open chassis championships, one type of gearbox including paddle shift system and suspension damper must be determined as a mandatory single supplier part. Only parts which have already been homologated may be chosen.

Modifications and optional parts for the sole purpose of facilitating the installation of these parts may be homologated.

ARTICLE 3: Power Unit Homologation

3.1 Compliance with Technical Regulations:

Only Power Units complying fully with the FIA F4 Technical Regulations (ISC Appendix J, Article 274) may be homologated.

3.2 Cost/lifetime requirements:

The following cost requirements are for a Power Unit perimeter as defined in Article 3.6.

The target lifetime per season is 10,000 km.

3.2.1 Sale concept

Maximum Power Unit price: €10,500

Maximum Power Unit price including 1.9% increase for 2020: €10,700

Maximum Power Unit price including 1.3% increase for 2021: €10,840

Maximum rebuild cost after minimum 10,000 km: €4,000

Maximum rebuild cost after minimum 10,000 km including 1.9% increase for 2020: €4,076

Maximum rebuild cost after minimum 10,000 km including 1.3% increase for 2021: €4,130

Maximum costs per kilometre calculated on a 3-year basis: €0.7/km

3.2.2 Leasing concept

Maximum leasing fee (3-year basis): €6000

Maximum rebuild cost after minimum 10,000 km: €1500

Maximum costs per kilometre calculated on a 3-year basis: €0.7/km

After a 3-year leasing contract, the Power Unit must become the property of the lessee.

3.2.3 Spare parts

The Power Unit manufacturer must provide the prices of spare parts as listed in Appendix 2 which forms part of the homologation. In case the homologated Power Unit perimeter contains type 1 or type 2 parts that are not mentioned in Appendix 2, the list must be extended accordingly.

The total sum of prices of all spare parts listed in Appendix 2 may not be more than 155% of the selling price of the complete Power Unit.

No modifications to the prices of this list are allowed without the prior approval of the FIA.

The above-mentioned prices are ex-factory/ex-works without VAT.

Only the following increase for distributor and on-track service is admitted:

- Manufacturer's home continent:
 - Retail price from distributor: price ex works + shipping costs
 - Retail price with track support: price ex works + shipping costs + 5%
- Overseas
 - Retail price from distributor: price ex works + shipping costs + taxes + 5%
 - Retail price with track support: price ex works + shipping costs + taxes + 10%

The homologated spare parts price list may be increased once per year by a rate fixed by the FIA based on the OECD “Key Short-Term Economic Indicator”.

The rate will be published by the FIA at the end of a year for the following year.

For 2019 the increase rate is fixed to 3.9 %.

[For 2020 the increase rate is fixed to 1.9 %.](#)

[For 2021 the increase rate is fixed to 1.3 %.](#)

The maximum total sum of spare parts prices will be increased accordingly.

The rate is the maximum increase allowed for each part separately.

3.3 Power output:

The power output of the Power Unit should lie between the target power curves shown in Appendix 3. Deviation from this target may be accepted by the FIA during the homologation procedure.

In case a Hybrid Power Unit is used, the upper limit will be increased by 12kW.

The performance criteria between new Power Units must stay within +/- 1.5% on the RPM operating range defined by the FIA, compared to the reference power curve declared by the engine manufacturer during the homologation.

The Power Unit manufacturer must declare the performance tolerance over a lifetime of 10.000km considering ideal conditions (engine dyno). The Power Unit performance has to stay within a band of 2.0% on the RPM operating range defined by the FIA, compared to the reference power curve declared by the Power Unit manufacturer during the homologation.

The exhaust layout modifications to fit a given chassis must be such that Power Unit performance stays the same.

3.4 Mechanical Power Unit installation

Each Power Unit manufacturer must provide a supplier source as well as drawings and CAD models free of IP rights of all parts for the mechanical Power Unit installation (e.g. bellhouse, brackets, adapter plates, clutch shaft) which have been previously homologated for any chassis manufacturer using the respective Power Unit.

3.5 Power Unit space template

Except for the ECU, the Power Unit loom and the intercooler, all parts of the Power Unit (as listed in Article 3.6) have to be positioned within the Power Unit space template as defined by Article 5.3 of the FIA F4 Technical Regulations (ISC Appendix J, Article 274).

If necessary for the installation of the Power Unit, local extensions may be added to the bodywork of the car. The size and shape of the local extensions must be defined during the homologation procedure and form part of the homologation.

3.6 Minimum current provided by alternator

The current provided by the alternator for the electric system of the chassis must be at least 30A.

3.7 Power Unit homologation perimeter

- Engine ready to run including all specific systems except water radiators
- Air intake system including manifold, throttle body, air filter (and intercooler if required)
- Oil filter, oil heat exchanger and oil pumps
- ERS system ([including ES and power circuit wiring](#))
- Alternator (May be replaced by the MGU if present)
- Starter (May be replaced by the MGU if present)
- Flywheel
- Clutch
- Space frame
- Power Unit loom (with common connector)
- Power Unit sensors
- ECU
- ECU software version
- Channels available via CAN for competitors and Power Unit support and scrutineering
- Power Unit power curve
- Spare parts and repairs price list
- Exhaust geometry

[A detailed list of parts inside the power unit perimeter, optional and outside the perimeter can be found in Appendix 4.](#)

[Should the definition of the chassis and engine perimeter be unclear for any part, it will be clarified by the FIA Technical Department on a case by case basis.](#)

ARTICLE 4: Homologation procedure

4.1 General

The complete car (rolling chassis and Power Unit ready to run) must be divided into three types of part.

Type 1: These parts must be supplied by the manufacturer and used exactly as supplied. Repairs may be carried out only by the manufacturer.

Type 2: These parts are Type 1 parts with specific restrictions. Only the modifications indicated in the homologation may be carried out. Repairs are allowed only in the described range.

Type 3: These parts are unrestricted, provided they are used as designed by the manufacturer and do not fulfil any additional function.

Besides the homologation form duly filled in, each manufacturer must provide a complete spare parts list indicating the categorization of parts and the admitted changes (for Type 2 parts).

The parts classification and the user manual form part of the homologation, both documents will be supplied by the respective manufacturer.

The manufacturer must provide the FIA with all necessary details (drawings, pictures, CAD models, etc.) in order to identify the homologated parts.

In particular, the ply book for the main carbon safety elements must be submitted.

The chassis manufacturer has to supply the following aero data:

Downforce (SCz), Drag (SCx) and Balance (%F) as percentage offset from a baseline setup for the following parameter

- Ride height
- Front wing
- Front wing gurney
- Rear wing (upper and lower)

4.2 Halo update

Modifications to homologated F4 chassis and chassis components are allowed only for the sole purpose of installing a Halo.

Modifications to homologated components must be strictly limited to the installation of the Halo, design updates are not allowed.

The perimeter and modifications have to be limited to the absolute necessary minimum for the installation of the Halo.

The Halo update kit perimeter and price will be defined individually for each chassis manufacturer.

Any modification, the Halo update kit perimeter and price have to be approved by the FIA.

ARTICLE 5: Changes to homologated parts

Once homologated, no changes may be made to the design or construction of the homologated parts for the duration of the homologation period. Exceptional changes for the purpose of improving reliability, safety and cost-saving may be approved by the FIA.

Modifications to the homologated survival cell may be carried out by the chassis manufacturer in order to facilitate the installation of new ancillaries, provided this is the sole purpose.

ARTICLE 6: FIA right of veto

The FIA may reject the homologation of any part or construction that is considered not in keeping with the present regulations, not in line with the quality requirements or unreasonable in terms of cost targets.

APPENDIX 1

PRICE LIMITS FOR CONSUMPTION PARTS

Appendix 1.1:

Maximum prices for spare parts	
The sum of prices of single parts must not exceed the price of assemblies.	
Survival cell (including side intrusion panels)	€14,500
Headrest	€1500
Roll hoop	€800
Fuel system	€2800
Collapsible steering column	€650
Steering rack assembly	€1600
Steering wheel (display included, without paddles and quick release)	€1300
Steering wheel (without display, paddles and quick release)	€160
Gearbox (including clutch shaft and output flange)	€8,000
Bellhouse	€1800
Front wing assembly incl. support (aluminium wing)	€750
Front wing assembly incl. support (composite wing)	€ 1000
Front crash structure	€1550
Rear wing assembly incl. support	€950
Rear crash structure	€1850
Complete skid block	€200
Complete set of wooden floor plates	€350
Front suspension comprising (one side): Upper and lower wishbone Track rod Push rod Including uniball joints	€1150
Rear suspension comprising (one side): Upper and lower wishbone Track rod Push rod Including uniball joints	€1000
Upright (bare)	€550
Driveshaft (bare without joints)	€300
Wheel bearing	€130
Brake disc	€100
Rims	€250
Anti-roll bar	€210
Radiator	€300

Complete data logging system (including complete sensors perimeter (Article 8.5.2 F4 Technical Regulations) and on-board camera) and complete paddle shift system and any parts necessary for the implementation of a throttle fail safe algorithm	€6500
Damper, adjustable	€700
Damper, non-adjustable	€400
Brake pads (4 pads)	€150
Frontal Anti-Intrusion panel	€1800
2018 Safety Update Kit (compromising 2018 Rear Impact Structure and Frontal Anti-Intrusion Panel)	€3500

Appendix 1.2:

Formula 4 cars homologated as from 01.01.2019:

Survival cell (including side intrusion panels, prepared for the Halo installation)	€25,000
Headrest	€1,650
Roll hoop	€950
Collapsible steering column	€700
Steel Halo (including fixation)	€3,700

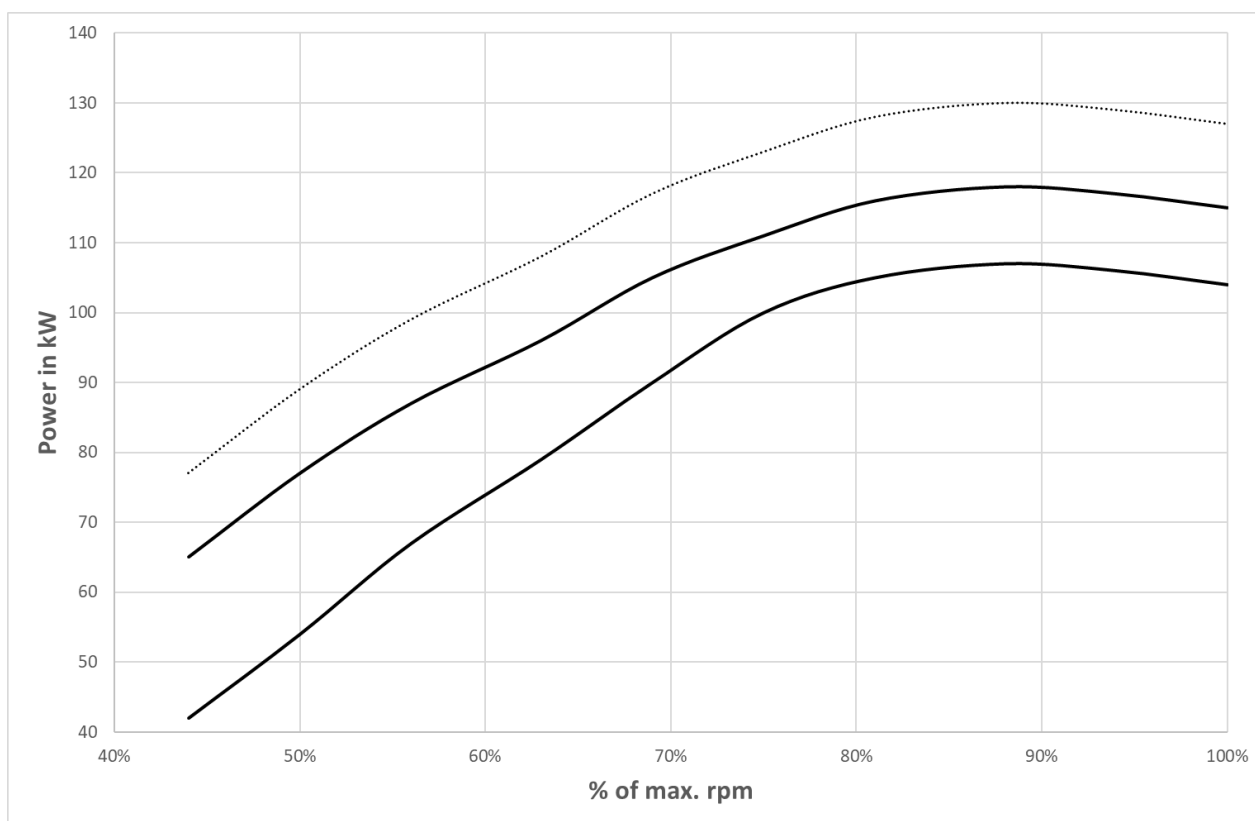
APPENDIX 2

POWER UNIT SPARE PARTS

Power Unit spare parts	
Crankcase	Turbocharger
Cylinder Liner	Waste gate
Crankshaft bearing caps	Waste gate actuator
Crankshaft	Dump valve
Crankshaft shell bearings	Air injection system
Sump / Bedplate	Air injection system actuator
Piston	Exhaust Manifold (for TC engines only)
Rings	
Piston pin (including clips)	Flywheel
Connecting rod	Flywheel mounting screws
Connecting rod screws	Clutch
Connecting rod shell bearings	
Water pump	Intake manifold
Water pump associated pipes	Intake trumpets
Oil pressure pump	Throttle body
Oil pressure pump associated pipes	Air filter
Oil scavenge pump	
Oil scavenge pump associated pipes	Starter
Oil air separator	
Oil filter	Power Unit loom
Oil heat exchanger	Power Unit sensors (Price of each)
	ECU
Cylinder head	
Cylinder head gasket	Spark plug
Camshaft bearing caps	Ignition coils
Inlet camshaft	Alternator
Exhaust camshaft	
Inlet valve	ES
Exhaust valve	ERS Loom
Finger followers / Tappets	MGU
Valve springs	MGU Drive
Cam cover	DC-DC Converter
Camshaft drive cover	
Camshaft drive elements from crankshaft to camshafts	
Injectors	
Injector rail	
Fuel pipes	
High pressure fuel pump	

APPENDIX 3

POWER UNIT POWER OUTPUT



% of max. rpm	Min. Power in kW	Max. Power in kW	Max. Power Hybrid PU in kW
44%	42.0	65.0	77.0
50%	54.0	77.0	89.0
56%	67.0	87.0	99.0
63%	79.0	96.0	108.0
69%	90.0	105.0	117.0
75%	100.0	111.0	123.0
81%	105.0	116.0	128.0
88%	107.0	118.0	130.0
94%	106.0	117.0	129.0
100%	104.0	115.0	127.0

Measured at ambient conditions:

Pressure: 1013 mbar;

Temperature: 20°C;

Humidity: 50%

APPENDIX 4

MANDATORY IN POWER UNIT PERIMETER

<u>MANDATORY IN PERIMETER</u>	<u>OPTION (Eligible to extra charges)</u>	<u>OUTSIDE PERIMETER</u>
<u>Base Engine with its ancillaries, actuators and sensors</u>	<u>Timing belt protection</u>	<u>Exhaust and silencer (if required)</u>
<u>Air intake system including airbox, manifold, throttle body, air filter</u>	<u>Removable Heatshields</u>	<u>Bellhouse</u>
<u>Oil filter, oil pumps and engine mounted oil-water heat exchanger</u>	<u>Clutch reconditioning</u>	<u>Power Unit / Engine mounting studs</u>
<u>Water and oil lines up to first connection</u>	<u>Fluids replacement</u>	<u>Clutch shaft</u>
<u>ERS system</u>	<u>Oil filter replacement</u>	<u>Power Unit / Engine frame (if required)</u>
<u>Alternator (May be replaced by the MGU if present)</u>	<u>Air filter cleaning/replacement</u>	<u>Intercooler including piping (if required)</u>
<u>Starter (May be replaced by the MGU if present)</u>		<u>Oil cooler / heat exchanger (if chassis mounted) including oil lines (if required)</u>
<u>Flywheel including spigot bearing</u>		<u>Water radiator</u>
<u>Clutch</u>		<u>Oil tank</u>
<u>Power Unit loom (with common connector)</u>		
<u>Power Unit sensors including Lambda sensor (if required)</u>		
<u>ECU including Datalogger</u>		
<u>Lap Beacon</u>		

All parts included in the “mandatory in perimeter” column must be included in the selling price and in the price per km (reconditioning price) mentioned in Article 3.2 with the exception of the parts/work listed in the “Option” column.

APPENDIX 5

APPROVAL OF SAFETY STRUCTURES

Approval of Safety Structures for Formula 4 cars

1) Safety structures

The following safety structures must be approved by the FIA:

- a) Survival cell.
- b) Front and rear rollover structures.
- c) Frontal impact-absorbing structure.
- d) Rear impact-absorbing structure.

To approve any of the above structures, the presence of an FIA technical delegate is required. The static load tests must be carried out with measuring equipment verified by the FIA; the dynamic impact tests must be carried out at an FIA-approved institute.

2) Request for approval

In order for one of the above-mentioned safety structures to be approved, the FIA must receive a request from the rolling chassis manufacturer beforehand at the following address:

FIA Technical Department
2 Chemin de Blandonnet
CH 1215 Geneva 15
Switzerland
Tel.: +41 22 544 44 00
Fax: +41 22 544 44 50

3) Approval procedure

Upon receipt of a request for any of the above-mentioned tests, the FIA will arrange a date and venue with the rolling chassis manufacturer and will appoint a technical delegate to supervise these scheduled tests.

For each trip made by an FIA technical delegate to supervise any scheduled tests, the manufacturer will be charged a fee, which is levied annually by the FIA ([€2812 for 2021](#)).

Once all the safety structure tests have been successfully carried out and the manufacturer has settled the FIA fee, he will receive the FIA chassis test report for his car.

The rolling chassis manufacturer is obliged to supply all his customers with a copy of the FIA chassis test report together with the survival cell.

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 003/17

OBJECT: 414-F4 engine, engine warm-up and Toil check

Autotecnica Motori recommends to warm-up the engine before every track session, following what listed below:

- Warm up the engine on the lifter, "N" gear and @idle speed, till T_{Water} = 85°C and T_{Oil} = 70°C
- Warm up the engine on the lifter, upshifting from 1st gear to 6th gear and downshifting from 6th gear to 1st gear till T_{Oil} = 90°C, rpm ≤ 3000. If T_{Water} grows up over 90°C cool it down using fans.
- Leave the pit lane when T_{Oil} > 90°C.
- At least half of the first lap no "Full throttle" to warm up oil > 100°C.

In case of shot time break in between two sessions, just consider what follows:

If T_{Oil} < 95°C → engine revs < 5000 rpm
TPS < 50%

till T_{Oil} > 100°C

A different engine usage could allow to an anomalous block consumption, followed by block replacement during rebuild.

Casalmaggiore, 12 Gennaio 2017

Campionati FIA Formula 4, Bollettino Tecnico 003/17

OGGETTO: motore 414-F4, warm-up motore e controllo Toil

Autotecnica Motori raccomanda di seguire una fase di *engine warm-up* prima di ogni sessione di pista, seguendo le istruzioni sotto riportate:

- Scaldare il motore sui cavalletti, in folle e a regime minimo, sino a che $T_{Water} = 85^{\circ}C$ e $T_{Oil} = 70^{\circ}C$
- Sui cavalletti, inserire le marce dalla prima alla sesta e poi scalare da sesta a prima sino a che $T_{Oil} = 90^{\circ}C$, restando $rpm \leq 3000$. Se T_{Water} oltre $90^{\circ}C$, ridurre con l'utilizzo di ventole sui radiatori.
- Uscire dalla pit lane quando $T_{Oil} > 90^{\circ}C$
- Percorrere almeno metà del primo giro non "*Full Throttle*" sino a che $T_{Oil} > 100^{\circ}C$

In caso di sessioni di pista ravvicinate, considerare quanto segue:

Se $T_{Oil} < 95^{\circ}C \rightarrow$ regime motore < 5000 rpm
TPS $< 50\%$
sino a che $T_{Oil} > 100^{\circ}C$.

Un utilizzo del motore non seguendo quanto sopra descritto potrebbe portare a consumo anomalo del basamento, con conseguente necessità di sostituire lo stesso in fase di revisione.

OBJECT: corrections on ECU calibrations depending on Twater and Tair

As appendix to the 414-F4 engine manual, particularly referring to the engine water and air temperature values, we explain the corrections on the ECU calibrations (about "P_Boost_Target" and "Ignition advance" tables) that Twater and Tair variations involve.

Twater, suggested values: between 80°C and 90°C:

- If Twater < 80°C, ECU implements a reductive correction on "P_Boost_target" table; particularly the correction would be 50 mbar less (than nominal) if Twater = 70°C and 100mbar less if Twater = 65°C.
- If Twater > 90°C, ECU implements a reductive correction on "Ignition advance" table; particularly the correction would be 0,5° less (than nominal) @ 90°C, 1° less @ 100°C, 2° less @ 110°C and 120°C.

Tair:

- If Tair < 40°C, ECU implements a reductive correction on "P_Boost_Target" table; particularly the correction would be 15 mbar less (than nominal) if Tair = 30°C and 30 mbar less for Tair = 20°C;
- If Tair > 40°C, ECU implements an additive correction on "P_Boost_Target" table; particularly the correction would be 15 mbar more (than nominal) if Tair = 50°C and 30 mbar more for Tair = 60°C;
- If Tair > 50°C, ECU implements a reductive correction on "Ignition advance" table; particularly the correction would be 1° less (than nominal) if Tair = 60°C, 1,5° less if 70° < Tair < 80°C, 2° less if Tair > 90°C.

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 004/17

OBJECT: Abarth 414-F4 engine, turbocharger replacement

Anytime a turbocharger is dismantled from the engine during an official FIA F4 event, it has to be sealed by Autotecnica Motori personnel.

If Team decides not to use the turbocharger anymore during official FIA F4 events, the turbocharger will be sealed with a BLUE mechanical seal (Fig. 1).

This operation will cost € 5,00.



Fig. 1 : BLUE sealed turbocharger

If Team decides, immediately before the turbo dismounting, to use again the turbocharger during official FIA F4 events, the turbocharger will be sealed directly with BLUE mechanical seal + RFID (Fig. 2). This operation can be done only if all the mechanical/R-FID seals are undamaged/compliant. The over mentioned sealing will cost € 30,00.

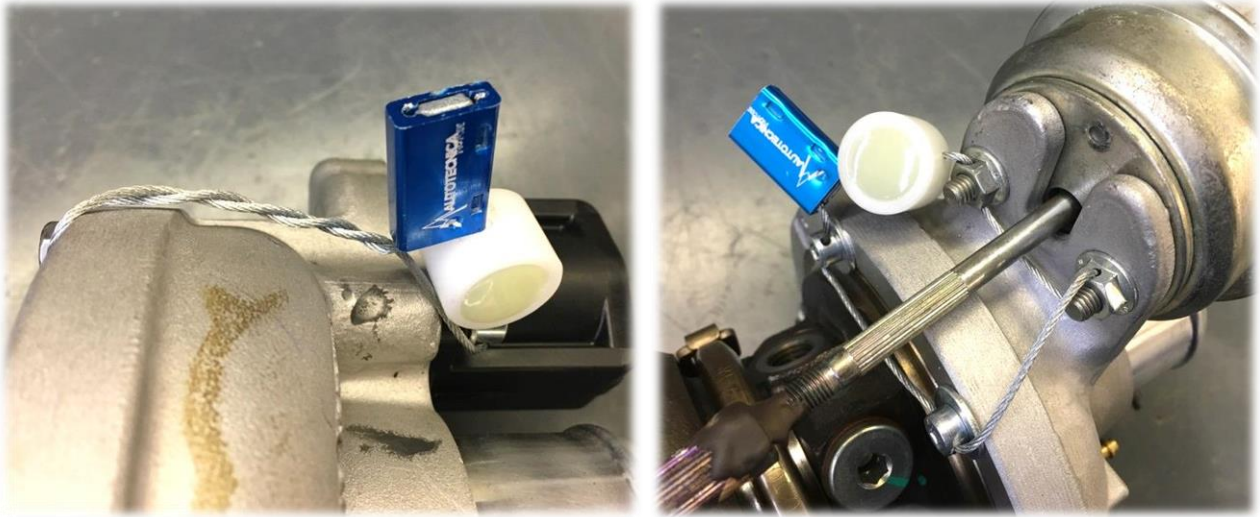


Fig. 2 : BLUE + RFID sealed turbocharger

If Team decides to use again the turbocharger (blue mechanical sealed one) during official FIA F4 events later on, the turbocharger has to be tested on Autotecnica's dyno and then returned to the Team with a BLUE mechanical seal + RFID (Fig. 2).

This test will cost € 210,00 per turbocharger.

If team remove a turbocharger during an unofficial FIA F4 event, the turbocharger will not be sealed and cannot be used anymore in official FIA F4 event.

Casalmaggiore, 12 Gennaio 2017

Campionati FIA Formula 4, Bollettino Tecnico no. 004/17

OGGETTO: motore Abarth 414-F4, sostituzione turbocompressore

Ogni qual volta si renda necessaria/venga richiesta la sostituzione di un turbocompressore durante un evento ufficiale FIA F4, il turbocompressore sostituito dovrà essere sigillato da personale Autotecnica Motori.

Se il team decidesse di non utilizzare nuovamente il turbocompressore durante eventi ufficiali FIA F4, verrà sigillato con sigillo meccanico BLU (Fig. 1).

L'operazione di sigillatura costerà € 5,00.



Fig. 1 : turbo sigillato con sigillo meccanico BLU

Se il Team decidesse, immediatamente prima di smontare il turbo, di volerlo utilizzare nuovamente per eventi ufficiali il turbocompressore verrà sigillato direttamente con sigillo meccanico BLU + RFID (Fig.2), solamente nel caso in cui tutti i sigilli meccanici/R-FID siano integri/conformi.
La sopra citata sigillatura avrà un costo di € 30,00.

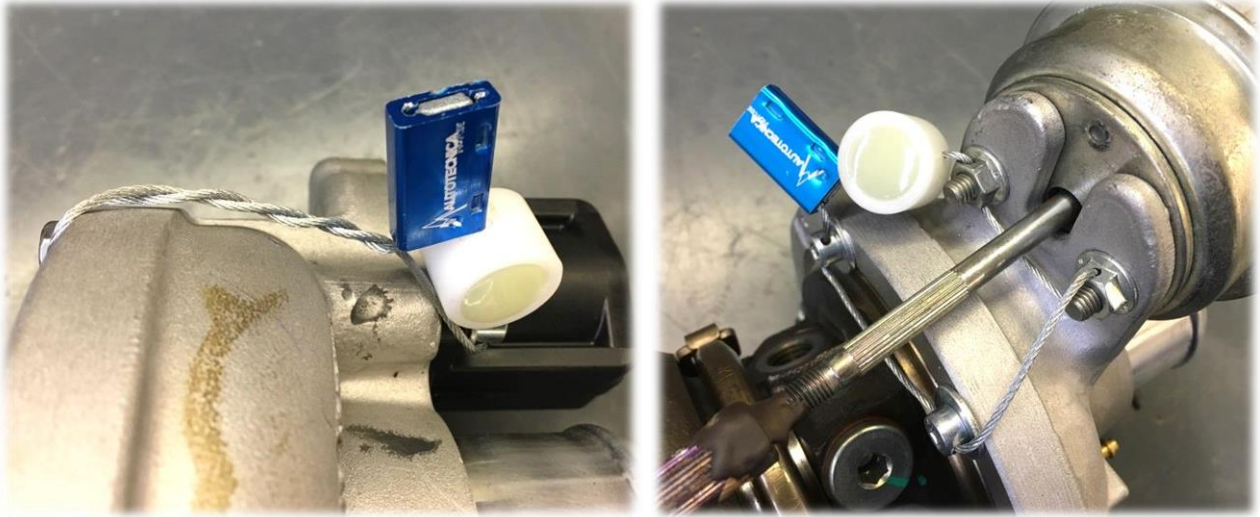


Fig. 2 : turbo sigillato con sigillo meccanico BLU + RFID

Diversamente, se il Team decidesse di rimontare il turbocompressore durante eventi ufficiali FIA F4 in un secondo momento rispetto alla sostituzione, dovrà essere testato in sala prova presso Autotecnica Motori e successivamente riconsegnato al Team con sigillo meccanico BLU + RFID (Fig. 2). Questo servizio avrà un costo di € 210,00 a turbocompressore.

Se il team smontasse autonomamente un turbocompressore durante un evento F4 non ufficiale, Autotecnica non sarà più autorizzata a risigillarlo, dunque non sarà più possibile riutilizzarlo durante eventi ufficiali FIA F4.

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 005/17

OBJECT: 414-F4 engine Keensert/Helicoil fitting – intake/exhaust manifold nuts/studs replacement

It is reminded that FIA Art. 274.2.7.1 and Art.274.2.7.2 state:

2.7 Modifications to car design:

2.7.1 General

The complete car is divided into three types of part.

Type 1: *These parts must be supplied by the manufacturer and used exactly as supplied. Repairs may be carried out only by the manufacturer.*

Type 2: *These parts are Type 1 parts with specific restrictions. Only the modifications indicated in the homologation may be carried out. Repairs are allowed only in the range described in the homologation.*

Type 3: *These parts are unrestricted, provided that they are used as designed by the manufacturer and do not fulfil any additional function.*

The adding of colour or thin adhesive film up to a thickness of 0.5 mm is not considered as a modification, provided that the colour or film fulfils only an optical function.

2.7.2 Standard mounting parts:

Standard mounting parts, such as screws, nuts, bolts, washers and lock washers, are considered as Type 3 parts unless specifically mentioned in the homologation. They may be replaced with equivalent or superior standard parts.

The thread type, size, length and pitch must remain the same.

The use of locking wire is permitted.

Considering that exhaust/intake manifold nuts and studs are not explicitly mentioned in the FIA homologation regulation they could be considered as Type 3.

Nuts and studs of the exhaust/intake manifold may be replaced with equivalent or superior standard parts. As per art 2.7.2, the thread type, size, length and pitch must remain the same.

Keensert/Helicoil fitting on the exhaust/intake manifold thread is allowed considering what below:

- if the threaded hole is a blind one, machining can be done on site (race track) by ATM's or Teams' personnel.
- If damaged thread is in a through hole machining has to be mandatory done at Autotecnica Motori workshop to prevent any engine damage.

Here below it is represented the engine head on both exhaust (Fig. 1) and intake (Fig. 2) side where through holes are red enlightened.

Operation cost has to be evaluated each time.

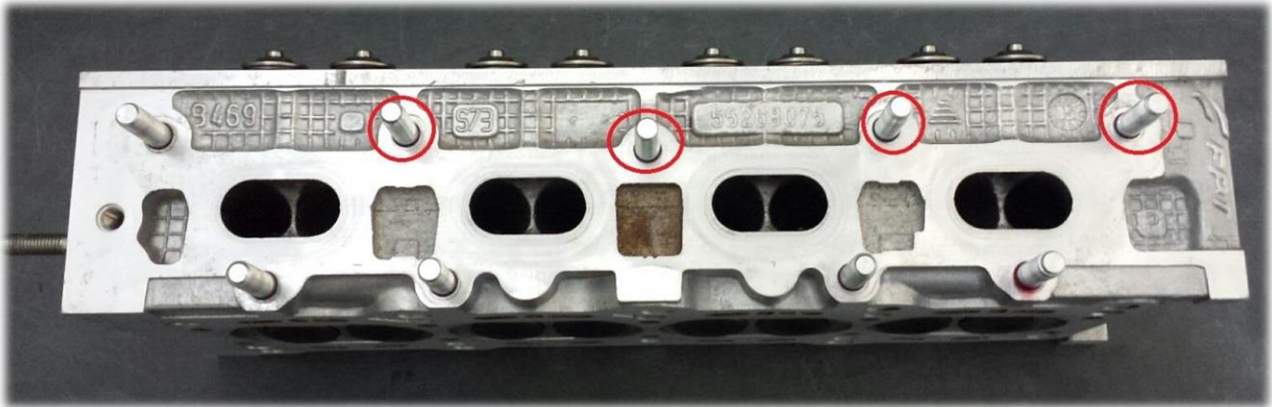


Fig. 1: engine head, exhaust side: through hole are enlightened in red.

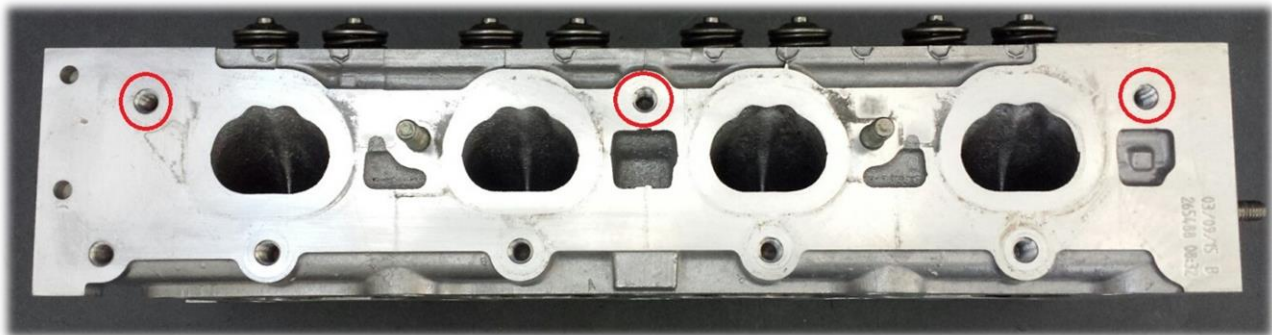


Fig. 2: engine head, intake side: through hole are enlightened in red.

Casalmaggiore, 12 Gennaio 2017

Campionati FIA Formula 4, Bollettino Tecnico no. 005/17

OGGETTO: motore Abarth 414-F4, installazione Keensert/Helicoil – sostituzione prigionieri/dadi cassoncino di aspirazione e collettore di scarico

Si ricorda quanto citato dall' Art. FIA 274.2.7.1 and Art.274.2.7.2:

2.7 Modifications to car design:

2.7.1 General

The complete car is divided into three types of part.

Type 1: *These parts must be supplied by the manufacturer and used exactly as supplied. Repairs may be carried out only by the manufacturer.*

Type 2: *These parts are Type 1 parts with specific restrictions. Only the modifications indicated in the homologation may be carried out. Repairs are allowed only in the range described in the homologation.*

Type 3: *These parts are unrestricted, provided that they are used as designed by the manufacturer and do not fulfil any additional function.*

The adding of colour or thin adhesive film up to a thickness of 0.5 mm is not considered as a modification, provided that the colour or film fulfils only an optical function.

2.7.2 Standard mounting parts:

Standard mounting parts, such as screws, nuts, bolts, washers and lock washers, are considered as Type 3 parts unless specifically mentioned in the homologation. They may be replaced with equivalent or superior standard parts.

The thread type, size, length and pitch must remain the same.

The use of locking wire is permitted.

Considerando che i dadi e i prigionieri del collettore di scarico/cassoncino di aspirazione non sono espressamente citati nel regolamento di omologazione FIA, possono essere considerati appartenenti al "Type 3". Dadi e prigionieri del collettore di scarico/cassoncino di aspirazione potrebbero dunque essere sostituiti con parti simili o di qualità superiore.

Come citato dall'art. 2.7.2., il tipo di filetto, la dimensione, lunghezza e il montaggio devono rimanere gli stessi.

L'installazione di Keensert/Helicoil nelle filettature di fissaggio di cassoncino di aspirazione e collettore di scarico è consentita considerando quanto segue:

- se il filetto è cieco, la lavorazione può essere fatta in loco (pista) da tecnici ATM o da tecnici del Team indistintamente.
- Se il filetto danneggiato è passante la lavorazione deve essere obbligatoriamente effettuata presso la sede di ATM, al fine di prevenire danni al motore stesso.

Di seguito è rappresentato la testa su entrambi i lati di scarico (Fig.1) e aspirazione (Fig.2); i fori passanti sono stati evidenziati con un cerchio rosso.

I costi dell'operazione devono essere valutati caso per caso.

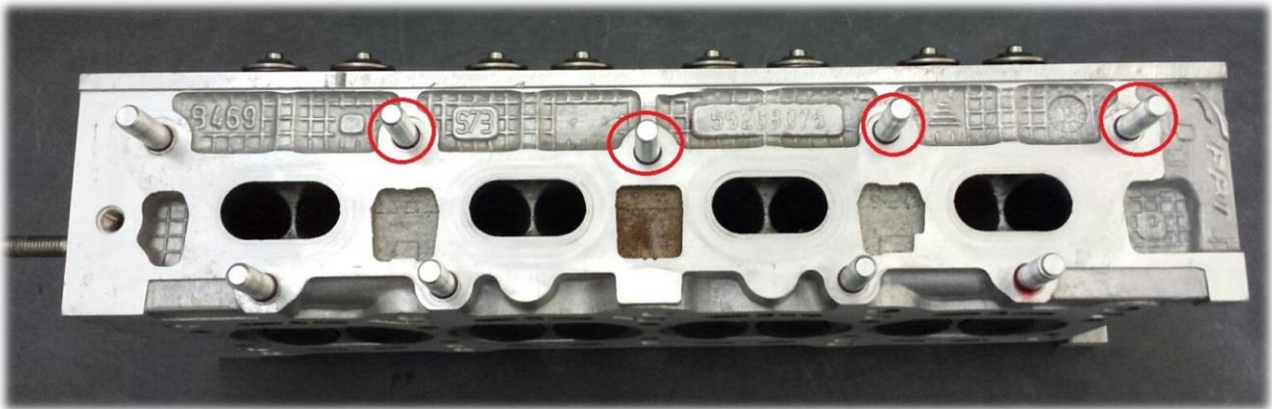


Fig. 1: testa, lato scarico: fori passanti evidenziati in rosso.

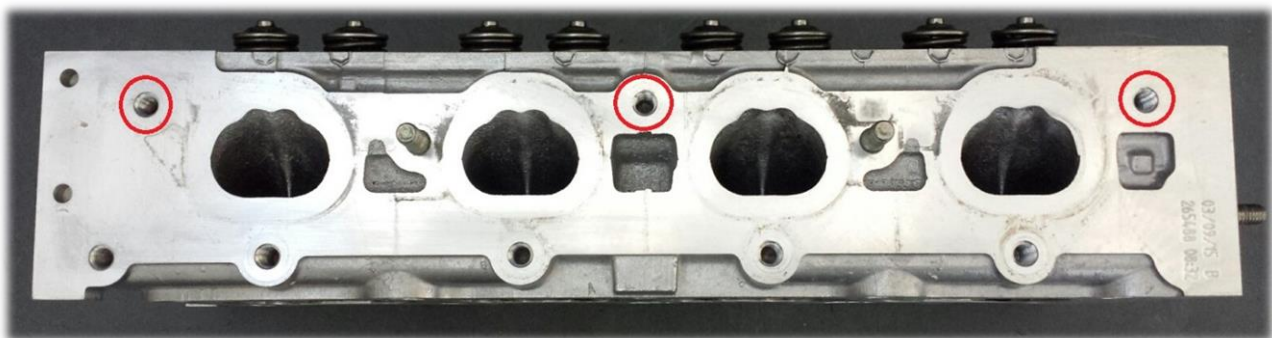


Fig. 2: testa, lato aspirazione: fori passanti evidenziati in rosso.

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 006/17

OBJECT: 414-F4 engine, laser marking

Since January 1st 2017 Autotecnica Motori will not laser mark any used components or parts not directly sold by Autotecnica Motori.

OGGETTO: motore 414-F4, marchiatura laser

Dal 1° Gennaio 2017 Autotecnica Motori non effettuerà più marchiature laser di componenti usati o non direttamente venduti da Autotecnica Motori.

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 007/17

OBJECT: 414-F4 engine, 2017 engine sealing

Since January 1st 2017, a new sealing mode will be introduced.
In detail three engine sealings will be modified as follows.

COMPRESSOR HOUSING-DUMP VALVE

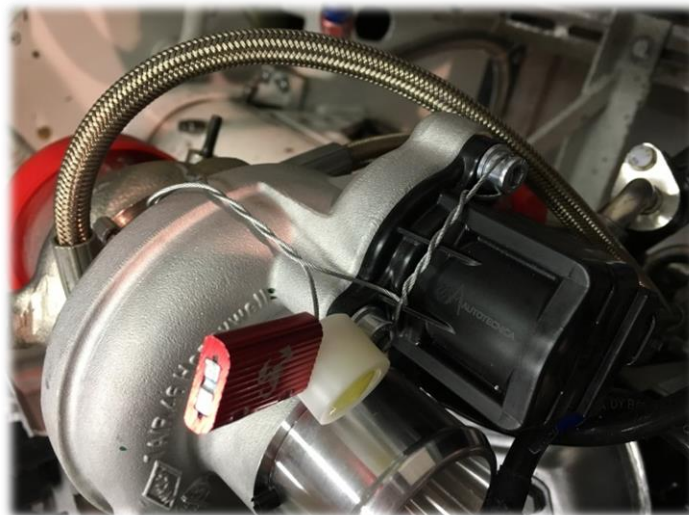


Fig. 1: compressor housing – dump valve, 2017 seal

OIL SUMP

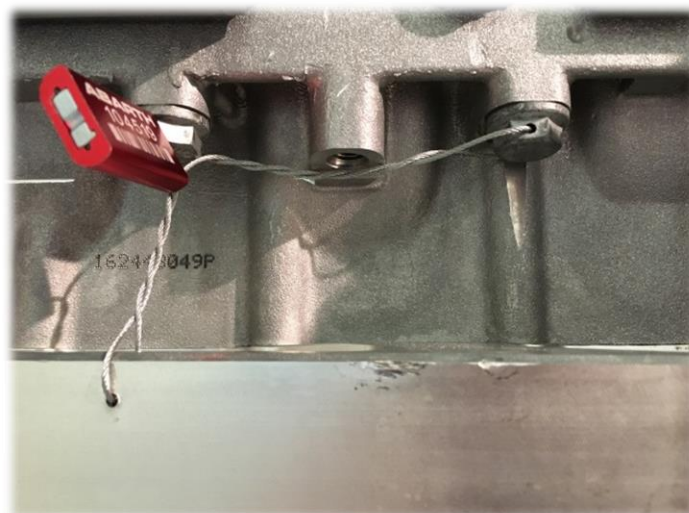


Fig. 2: oil sump, 2017 seal

SMOT SENSOR BRACKET – RPM SENSOR



Fig. 3: RPM sensor bracket – RPM sensor, 2017 seal

Casalmaggiore, 12 Gennaio 2017

Campionati FIA Formula 4, Bollettino Tecnico 007/17

OGGETTO: motore 414-F4, sigillatura 2017

A partire dal 1° Gennaio 2017, una nuova modalità di sigillatura verrà introdotta.
In particolare verrà modificata la modalità con cui tre elementi motore sono già sigillati.

CHIOCCIOLA COMPRESSORE – DUMP VALVE

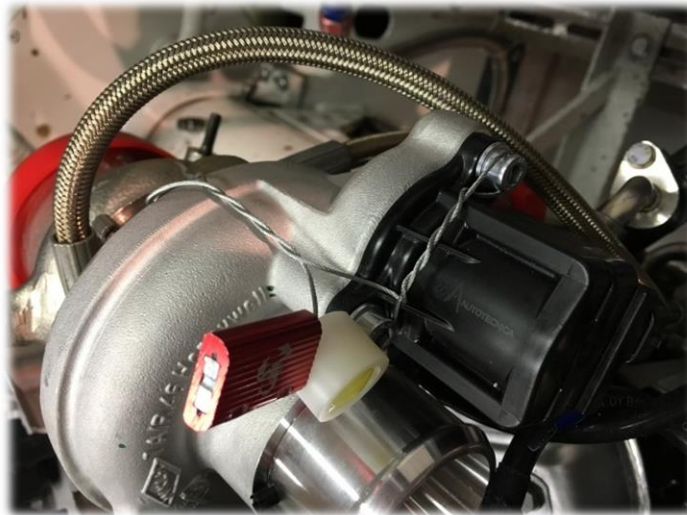


Fig. 1: chiocciola compressore – dump valve, sigillo 2017

CARTER SECCO

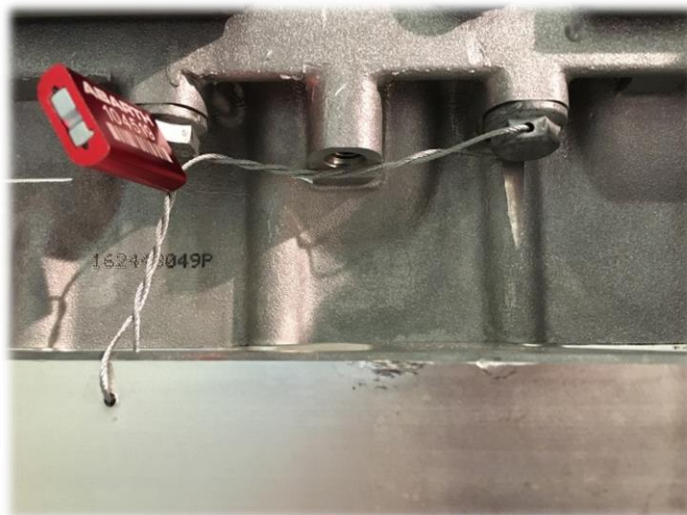


Fig. 2: carter secco, sigillo 2017

SUPPORTO SENSORE SMOT- SENSORE SMOT



Fig. 3: supporto sensore SMOT – sensore SMOT, sigillo 2017

Casalmaggiore, February 27th 2017

FIA Formula 4 Championship, Technical Bulletin no. 008/17

OBJECT: 414-F4 engine, 2017 engine sealing and Dyno test

FIA F4 2017 ADAC Championship

Mandatory pre-season dyno test and 2017 sealing will cost as follow:

- Dyno test + 2017 sealing: € 300,00
- 2017 sealing update: € 50,00 (if engines already tested in 2017)
- Dyno test + 2017 sealing during engine rebuild: NO cost (included in engine rebuild)

Above costs are fixed if no other action is needed. In case of other replacements, the cost will be reconsidered.

All engines have to be delivered to Autotecnica Motori in the following condition:

- Complete engine with turbocharger and WG actuator
- Complete fuel system
- Coils
- Pierburg electrovalve + pipes
- Dump Valve
- Top engine mounting
- Complete flywheel
- Complete intake manifold downstream throttle body
- Alternator
- Oil/water heat exchanger

Furthermore the following components are NOT required:

- Oil pipe from dry sump
- Clutch
- Engine loom
- Water nourice
- Tatuus block reinforce (left side)
- Air intake support
- Blow-by breathe pipe
- ECU
- Silicon hoses

Casalmaggiore, October 4th 2017

FIA Formula 4 Championships, Technical Bulletin no. 009/17

OBJECT: 414-F4 engine, ignition coil specifications

Since October 1st 2017, both Bosch and Eldor coils are allowed and legal on 414-F4 Abarth engines.

The coils have the same specs.

Allowed model/brand:

- Bosch, part number 55213613
- Eldor, part number 55279421
- Eldor, part number 55270223

In Fig. 1 Eldor (p.n. 55279421) and Fig. 2 Bosch (p.n. 55213613) coils are represented.



Fig. 1: Eldor ignition coil



Fig. 2: Bosch ignition coil

Casalmaggiore, 4 Ottobre 2017

Campionati FIA Formula 4, Bollettino Tecnico no. 009/17

OGGETTO: motore 4141-F4, tipologia bobina accensione

Dal 1 Ottobre 2017, sia le bobine di accensione Bosch che le bobine a marchio Eldor sono utilizzabili e conformi sui motori 414-F4 Abarth.

Le bobine hanno le stesse specifiche tecniche.

Modelli/marchi consentiti:

- Bosch, part number 55213613
- Eldor, part number 55279421
- Eldor, part number 55270223

Di seguito riportate in Fig. 1 bobina Eldor (p.n. 55279421) e in Fig. 2 bobina Bosch (p.n. 55213613).



Fig. 1: bobina accensione Eldor



Fig. 2: bobina accensione Bosch

Casalmaggiore, May 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 010/17

OBJECT: 414-F4 engine, virtual Safety Car Strategy

During lasts Italian and German F4 Championships events, has been noticed that the new Virtual safety Car strategy has been tested.

As shown below (Fig. 1), this condition brings to long periods rev limiter.

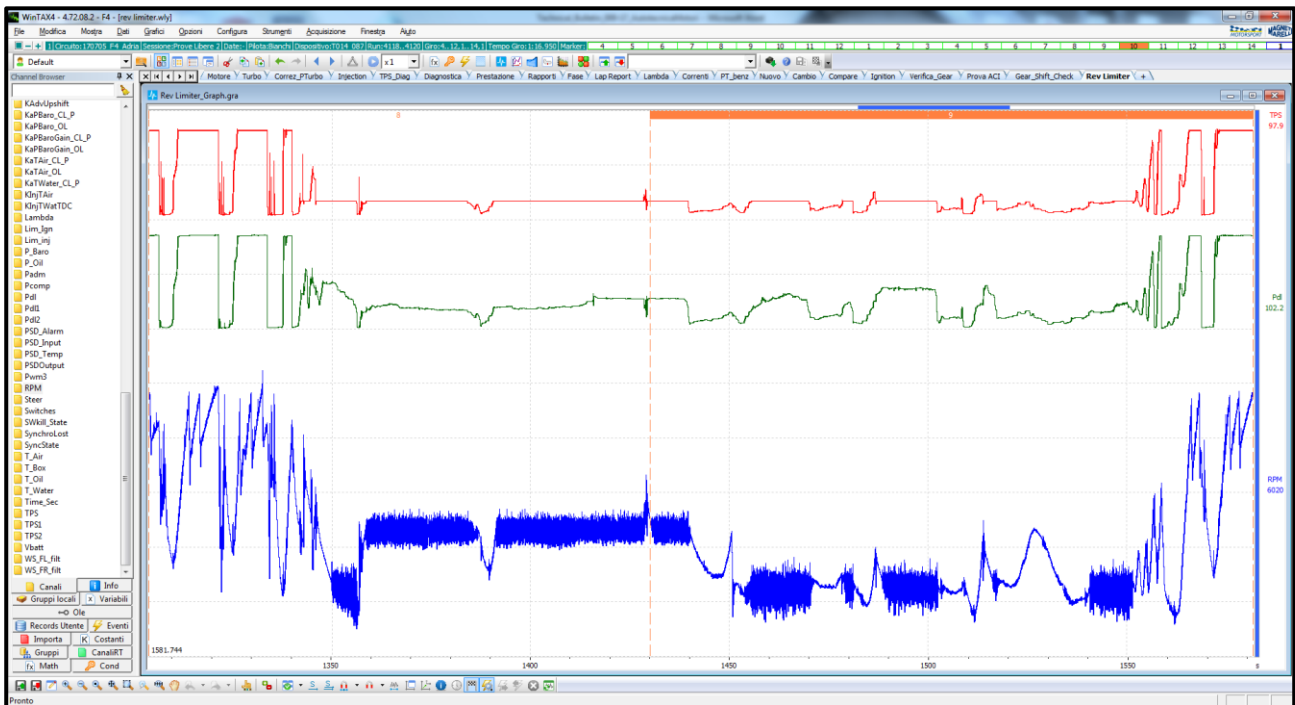


Fig. 1: Virtual Safety Car test

In terms of engine safety, repetitive long period rev limiter (above a total of 120 seconds, with 50 seconds continuous) are not recommended.

Virtual Safety car managed through pit-limiter strategy can be dangerous for engine reliability. We do suggest to develop a different strategy.

Casalmaggiore, 12 Maggio 2017

Campionati FIA Formula 4, Bollettino Tecnico no. 010/17

OGGETTO: motore 4141-F4, strategia Virtual Safety Car

Durante i recenti eventi dei Campionati F4 Italiano e Tedesco, la nuova strategia di Virtual Safety Car è stata testata.

Come riportato a seguire (Fig. 1), questa condizione porta a lunghi periodi di *rev limiter*.

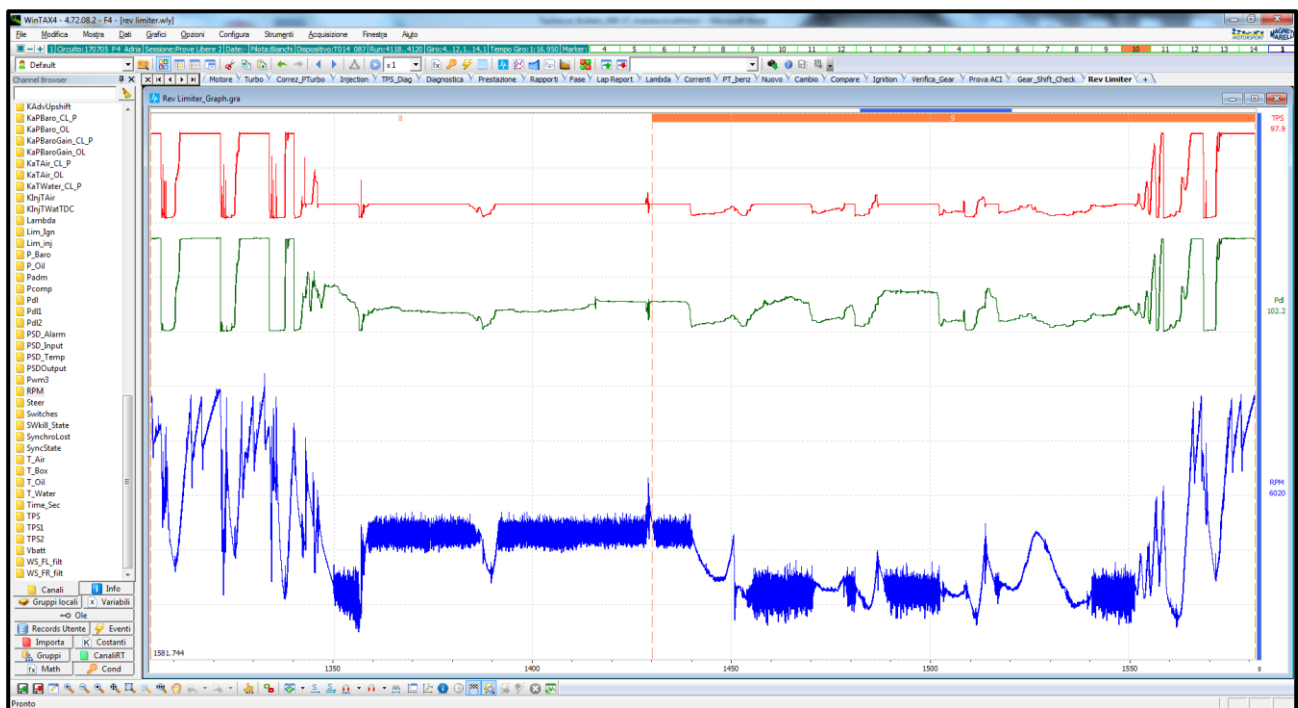


Fig. 1: test Virtual Safety Car

In termini di sicurezza per il motore, intensi limitatori di giri (durante il test sopra riportato si ha una durata totale di circa 120 secondi, con un continuo di 50 secondi) non sono consigliabili.

Utilizzare la strategia *pit-limiter* per condizioni di Virtual Safety Car può essere dannoso per l'affidabilità del motore. Sarebbe quindi consigliato sviluppare una diversa strategia.

Casalmaggiore, January 27th 2019

FIA Formula 4 Championships, Technical Bulletin no. 001/20

OBJECT: 414-F4 engine, 2020 turbo replacement sealing

Copy: FIA Formula 4 Championships - Entrants
SUBJECT: Abarth 414-F4 engine - 2020 turbocharger replacement sealing

As per Technical Bulletin 004/17 (variation in **red**):

Anytime a turbocharger is dismantled from the engine during an official FIA F4 event, it has to be sealed by Autotecnica Motori personnel.

*If Team decides not to use the turbocharger anymore during official FIA F4 events, the turbocharger will be sealed with a **RED** mechanical seal (Fig. 1).*

This operation will cost € 5,00.



OLD

NEW

Fig. 1 : old **BLUE** and **new RED** sealed turbocharger

If Team decides, immediately before the turbo dismounting, to use again the turbocharger during official FIA F4 events, the turbocharger will be sealed directly with **RED** mechanical seal + RFID (Fig. 2). This operation can be done only if all the mechanical/R-FID seals are undamaged/compliant.
The over mentioned sealing will cost € 30,00.



Fig. 2 : old BLUE and new RED + RFID sealed turbocharger

*If Team decides to use again the turbocharger during official FIA F4 events later on, the turbocharger has to be tested on Autotecnica's dyno and then returned to the Team with a **RED** mechanical seal + RFID (Fig. 2). This test will cost € 210,00 per turbocharger.*

If team remove a turbocharger during an unofficial FIA F4 event, the turbocharger will not be sealed and cannot be used anymore in official FIA F4 event.

During 2020 season old turbos with blue seals will still be considered "compliant" if sealed as above. No difference is related to red/blue seal for dismantled turbochargers.

Casalmaggiore, March 4th 2019

FIA Formula 4 Championship, Technical Bulletin no. 002/19

OBJECT: 414-F4 engine, fuel pressure/temperature acquisition loom

Copy:

FIA Formula 4 Championship - Entrants

SUBJECT: Abarth 414-F4 engine – fuel pressure/temperature acquisition loom

Starting from the first 2019 Race of the F4 Championship by FIA it will be mandatory to fit the fuel pressure/temperature acquisition loom to the logger AIM.

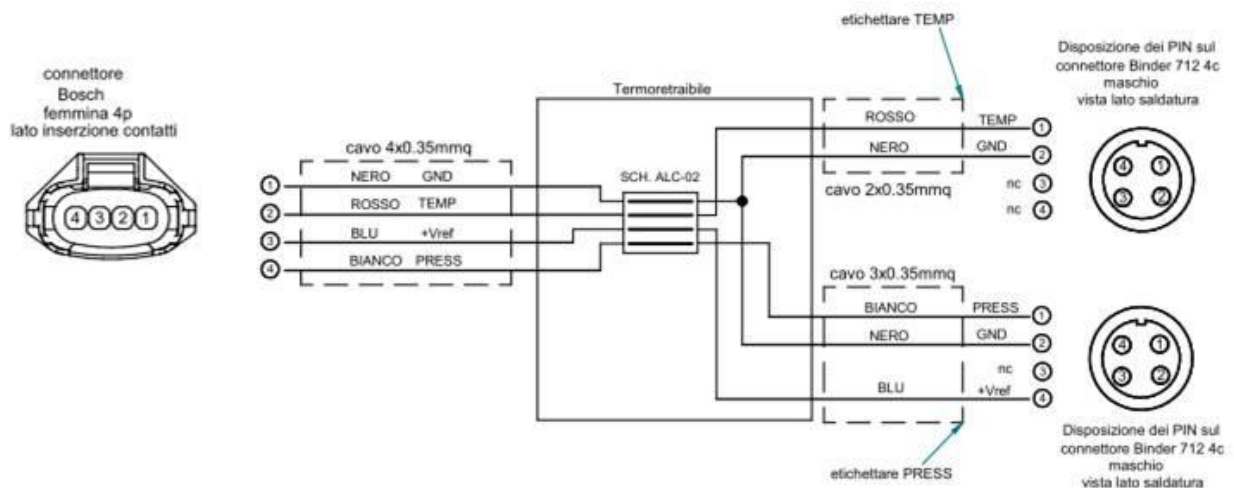
Please find here below specification of the loom, where to connect it and linearization of both sensors.

The linearization of both sensors might be checked by the scrutineer in any moment and it has to match with reference (as reported in this document).

Partendo dalla prima gara del Campionato F4 2019 sarà obbligatorio installare il cablaggio per acquisizione sensore e pressione temperatura attraverso il logger AIM.

Di seguito si riportano le specifiche elettriche del cablaggio, dove collegarli a la linearizzazione di entrambi i sensori.

La linearizzazione di entrambi i sensori potrebbe essere verificata dal delegato tecnico in qualsiasi momento e dovrà essere allineate ai valori di riferimento (riportati in questo documento)



Fuel temperature	
AIM input: Ch5	
Voltage [mv]	Temperature [°C]
0	139,251
1000	67,6025
2000	35,1268
3000	16,0121
4000	-7,99396
5000	-47,5845

Fuel pressure	
AIM input: Ch4	
Voltage [mv]	Pressure [bar]
500	0,5
4500	6

Casalmaggiore, March 23rd 2020

FIA Formula 4 Championships, Technical Bulletin no. 002/20

OBJECT: 414-F4 engine, ECU calibration corrections depending on T_{water} and T_{air}

Copy: FIA Formula 4 Championships - Entrants
 SUBJECT: Abarth 414-F4 engine - ECU calibration corrections depending on T_{water} and T_{air}

As appendix to the 414-F4 engine manual, here below are explained the corrections on ECU calibrations (about "P_Boost_Target" and "Ignition advance" tables) due to T_{water} and T_{air} values.

T_{water}, suggested value: between 80°C and 85°C:

- If T_{water} < 80°C, ECU implements a reductive correction on "P_Boost_target" table; particularly the correction would be 50 mbar less (than nominal) if T_{water} = 70°C and 100mbar less if T_{water} = 65°C.

T _{Water} [°C]	65	70	80
P_Boost_Target Corr. [mbar]	-100	-50	0

- If T_{water} > 85°C, ECU implements a reductive correction on "Ignition advance" table; particularly the correction would be 0,5° less (than nominal) @ 90°C, 1° less @ 100°C, 2° less @ 110°C and 120°C.

NOTE: Ign advance correction is set on a table with following break points and corrections:

T _{Water} [°C]	80	90	100	110	120
IGN Adv Corr. [°crk]	0	-0,5	-1,0	-2,0	-2,0

T_{water} with values between the break-points are linearly interpolated with IGN Adv steps of 0.5°, this means at 84.9°C there is no correction, and 85.1°C it's -0.5°IGN Adv Corr. till 94.9°C, with -1°IGN Adv Corr. at 95.1°C.

T_{air}:

- If T_{air} < 40°C, ECU implements a reductive correction on "P_Boost_Target" table; particularly the correction would be 15 mbar less (than nominal) if T_{air} = 30°C and 30 mbar less for T_{air} = 20°C;

- If T_{air} > 40°C, ECU implements an additive correction on "P_Boost_Target" table; particularly the correction would be 15 mbar more (than nominal) if T_{air} = 50°C and 30 mbar more for T_{air} = 60°C;

T _{Air} [°C]	20	30	40	50	60
P_Boost_Target Corr. [mbar]	-30	-15	0	15	30

- If T_{air} > 50°C, ECU implements a reductive correction on "Ignition advance" table; particularly the correction would be 1° less (than nominal) if T_{air} = 60°C, 1,5° less if 70° < T_{air} < 80°C, 2° less if T_{air} > 90°C.

T _{Air} [°C]	40	50	60	70	80	90
IGN Adv Corr. [°crk]	0	0	-1	-1,5	-1,5	-2

Casalmaggiore, May 21st 2019

FIA Formula 4 Championships, Technical Bulletin no. 003/19

OBJECT: 414-F4 engine, exhaust manifold studs

Copy:

FIA Formula 4 Championships - Entrants

SUBJECT: Abarth 414-F4 engine – exhaust manifold studs

Since May 15th 2019 an alternative exhaust stud is available as Autotecnica Motori spare part.
This stud has to be mounted with its own spacer with following procedure:

Tightening torque = 25Nm

Code: AM000403 spacer

AM000404 stud

Price: € 4,00 spacer

€ 6,00 stud

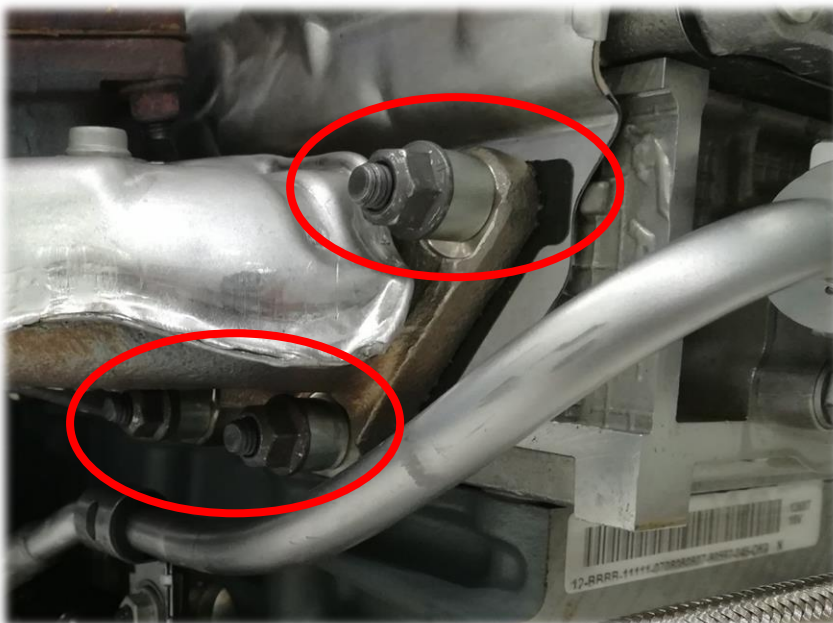


Fig. 1: F4 Exhaust manifold stud

Please note any replacement will be done just in case of damaged stud or engine rebuild in Autotecnica Motori.

Casalmaggiore, May 20th 2019

FIA Formula 4 Championships, Technical Bulletin no. 004/19

OBJECT: 414-F4 engine, fuel pressure/temperature acquisition loom extension

Copy:

FIA Formula 4 Championships - Entrants

SUBJECT: Abarth 414-F4 engine – fuel pressure/temperature acquisition loom extension

In order to fix the issue with the fuel temperature acquisition it is necessary and mandatory to implement an extension to the loom that was previously provided. This extension, shown in Fig 1, has to be fitted between channel 5 of the logger and the original loom without further configuration.



Fig. 1: F4 fuel pressure/temperature acquisition loom extension

For each fuel pressure/temperature loom previously sold Autotecnica Motori will provide one free extension. The following looms will be provided either with the extension or with a built-in adjustment in order for them to work properly, tags will be applied on the looms not to mix the different versions.

Casalmaggiore, July 18th 2019

FIA Formula 4 Championships, Technical Bulletin no. 006/19

OBJECT: 414-F4 engine, turbocharger replacement

Copy:

FIA Formula 4 Championships - Entrants

SUBJECT: Abarth 414-F4 engine – turbocharger replacement

Since July 20th2019, any time a team will require to swap a turbocharger from an engine to another, the operation (turbo dismount from engine “A” and mounted on engine “B”, and vice versa) will have a cost of 70,00€.

This price does NOT include any part that need to be replaced, such as seals, gaskets, nuts, etc.

To proceed with this operation both turbochargers have to be sealed following mandatory condition showed in the Technical Engine Manual.

The cost mentioned above will be applied only for turbo swap BEFORE FP1 and AFTER Race 3.

No extra cost is applied during the race week-end considered as starting from first Free Practice till last Race.

Casalmaggiore, December 6th 2019

FIA Formula 4 Championships, Technical Bulletin no. 007/19

OBJECT: 414-F4 engine, 2020 engine update

Copy: FIA Formula 4 Championships - Entrants
SUBJECT: Abarth 414-F4 engine - 2020 engine update

2020 414-F4 engine update consist of:

- Abarth green seals (Fig. 1)
- CNC machined SMOT sensor support (Fig. 2)
- Dyno test

Every engine delivered after November 1st 2019 will be 2020 updated, therefore it can be used in 2020 FIA Championships.

2020 update cost will be:

- € 35,00 if done during engine rebuild
- € 795,00 if update only



Fig. 1 – 2020 mechanical and mechanical+RFID seals



Fig. 2 – CNC machined SMOT sensor support

SADEV SL75 LW Formula 4
Différentiel 4 satellites/4 planet gears differential
Boîte de vitesses / gearbox
Dossier technique / technical manual

Version : 13/02/2019



Pour tout renseignement complémentaire, vous pouvez contacter notre service commercial

For any additional information, do not hesitate to contact our design and sales department:

Adresse / Company address

SADEV
6 rue Grand'Montains
85110 Saint Prouant
FRANCE

Adresse postale / Mail box address

SADEV
CS80001
85111 Saint Prouant cedex
FRANCE

Tel : (+33)2 51 66 42 68

Fax : (+33)2 51 66 49 60

Web : www.sadev-tm.com

@ : sadev@sadev-tm.com

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1- CARACTERISTIQUES PRINCIPALES

1 - Présentation de la boîte de vitesses

La boîte de vitesses séquentielle SL75-14 LW formula 4, comporte 6 rapports avants, plus une marche arrière. Son poids est d'environ 38 kg sans l'arbre primaire ainsi que le câble de marche arrière.

Le câble MAR ainsi que le potentiomètre sont également fournis.

2 - Données technique

Pour tout renseignement concernant les listes des rapports, veuillez contacter notre service commercial.

Couple conique: 10x31.

MARCHE ARRIERE	
Primaire	14
Renvoi	18
Secondaire	40

3 -Ddifférentiel

Différentiel 4 satellites

1- MAIN FEATURES

1 - General details

the SL75-14 LW formula 4 gearbox is composed of a 6 front speeds + reverse. its weight is approximately 38 kg without input shaft and cable of reverse gear.

The reverse gear unlocking cable and the gearing potentiometer are also provided.

2 - Ratio chart

Contact us to define your gearbox staging
the final drive: 10x31 .

REVERSE GEAR	
Primary	14
Idler	18
Secondary	40

3 -Differential

Free differential.

4 - Lubrification

Capacité: 1.5 litre

1ère vidange	Fréquence des vidanges	Qualité viscosité
Après les 50 premiers km	A chaque meeting	75W140

PRECAUTIONS PARTICULIERES

L'adjonction d'additifs dans l'huile est strictement déconseillée. Les conséquences engendrées ne sont en aucun cas couvertes par le fournisseur de la boîte SADEV.

En cas de complément d'huile dans la boîte de vitesses, ne mélanger aucune autre huile avec celle déjà présente dans la boîte.

STOCKAGE EN UTILISATION

Tout bidon ouvert à l'utilisation doit faire l'objet d'une attention particulière :

- Refermer correctement le bidon après utilisation afin d'interdire l'introduction d'eau ou de matière.
- Stocker les bidons horizontalement, à l'abri des intempéries.
- Ne pas entreposer les bidons à proximité d'une station de lavage.
- Ne pas transvaser l'huile dans des récipients de plus grande capacité.

LAVAGE SOUS PRESSION

Lorsque la boîte de vitesses est déposée, obturer correctement tous les orifices afin d'éviter l'introduction d'eau dans la boîte de vitesses.

4 - Lubrication

Oil capacity: 1.5 Liters

1rst drain	Drain frequency	Viscosity
After a 50Km running-in	Each meeting	75W140

PARTICULAR PRECAUTIONS

No additives should be added to the oil. The resulting consequences are not in any circumstances covered by SADEV. When topping up the rear differential oil, do not mix any other oil with that already in the box.

STORAGE AND USE

Be particularly careful with any bottles which are open when used:

- Close the bottle again properly after use to prevent the introduction of water or dirt.
- Store bottles horizontally, protected from severe weather.
- Do not store bottles close to a washing station.
- Do not decant the oil into larger containers.

WASHING UNDER PRESSURE

When the rear differential is removed, seal all openings correctly to prevent the ingress of water into the rear differential.

2- INFORMATIONS

1 - Composants de collage

Les colles et couples de serrages sont indiqués poste à poste dans les vues éclatées.

Certains composants doivent être enduits de graisse cuivrée, les cas d'utilisation sont décrits dans le manuel de réparation.

ATTENTION:

Les colles et couples de serrages ont été définis lors des séances d'essai et développement. N'utilisez que les produits de marque « LOCTITE »

Ne pas utiliser les composants recommandés entraîne une perte de garantie.

2- INFORMATION

1 - Glue components

Glue components and tightening torque are shown in the 3D exploded view.

WARNING:

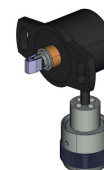
Glue components have been chosen during tests sessions. Only 'Loctite' brand components must be used.

Sadev can't ensure consequences of false glue component choice.

3 - CAPTEUR

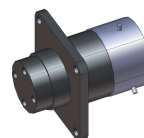
CAPTEUR ROTATIF SANS CONTACT A OREILLES (réf F0089047B) :
 plage de fonctionnement +0.5V à + 4.5V (standard)

- A- Fil rouge : +5Vdc
- B- Fil noir : Masse
- C- Fil orange : signal



Rapport engagé	Voltage (V)	Angle barillet °deg
R	0.583	0
N	0.903	28.75
1	1.222	57.5
2	1.861	115
3	2.5	172.5
4	3.139	230
5	3.778	287.5
6	4.417	345

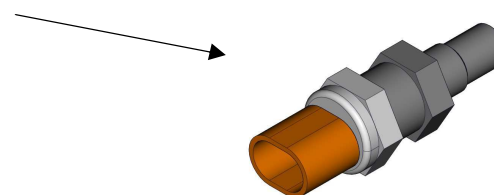
OPTION: Prise complémentaire faisceau: (réf 2001022)
 4 contacts: (réf 2001013)



CONTACTEUR DE COUPURE AVEC REHAUSSE (réf F0077119K)

OPTION

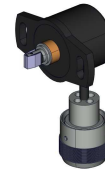
- Prise contacteur + cosses (réf 2001008)



3- SENSORS

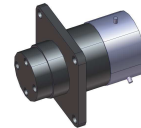
ROTARY SENSOR WITH NO CONTACT 3WING3 (F0089047B):
operational range +0.5V to +4.5V (Standard fit)

- A- Red wire: +5Vdc
- B- Black wire : Ground
- C- Orange wire : Signal

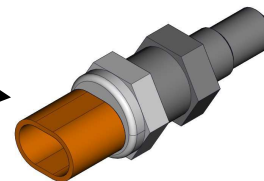


Gear	Voltage (V)	Barell angle °deg
R	0.583	0
N	0.903	28.75
1	1.222	57.5
2	1.861	115
3	2.5	172.5
4	3.139	230
5	3.778	287.5
6	4.417	345

OPTION: Plug wiring harness: (ref2001022)
operational range +0.5V to +4.5V (Not connector)
4 pin: (ref2001013)



POWERSHIFT (ref F0077119K)



OPTION

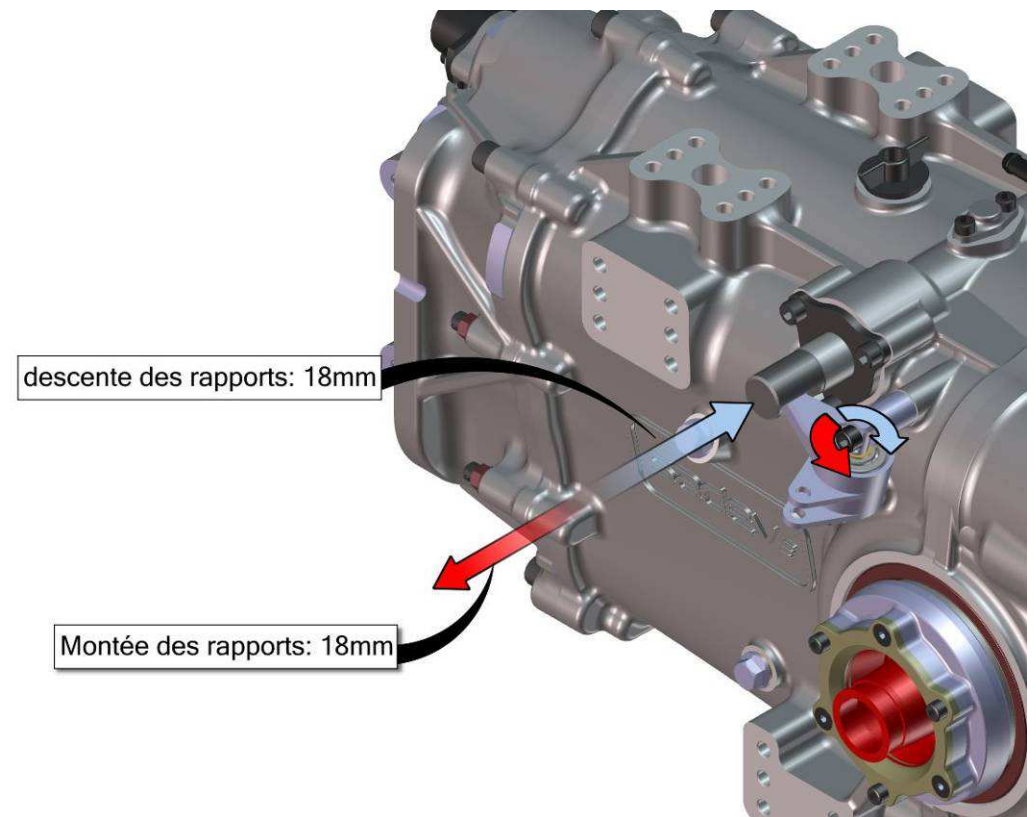
Plug of contactor + terminal (ref 2001008)

4- AXE DE SELECTION

Sens de monté des rapports avec référence de barillet: F00851132 Boîte 6 vitesses

ou barillet F00851133 Boîte 5 vitesses

Grille: M.AR - N- 1 - 2 - 3 - 4 -5 - 6

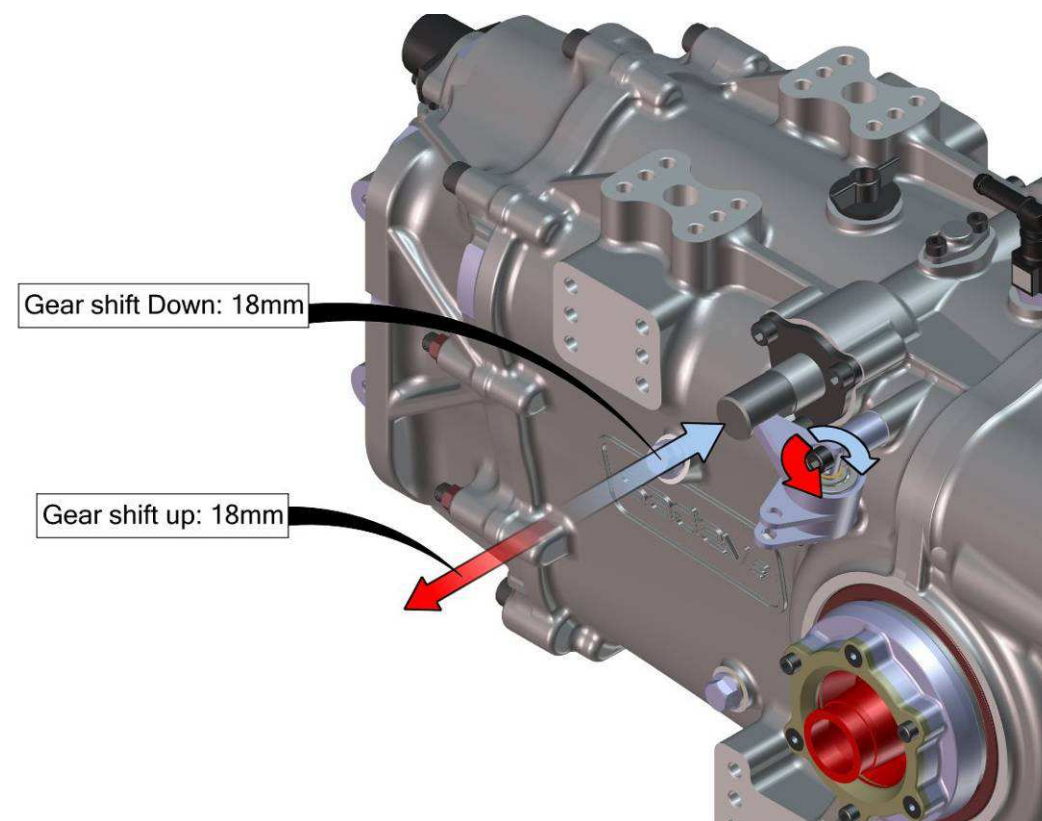


4- SELECTION AXLE





Engage a gear with reference barell: F00851132 6 speed gearbox

or F00851133 5 speed gearbox





Grill: M.AR - N- 1 - 2 - 3 - 4 -5 - 6



5 - OUTILLAGES

IMAGE	REFERENCE	NOM
	FOUT0085001	Plaque anti-écartement
	FOUT0085004	Rapporteur de jeux
	FOUT0085005	Entretoise
	FOUT1908001	Douille écrou primaire
	FACOM	Extracteur de roulement

5 - GEARBOX SPECIAL TOOLS

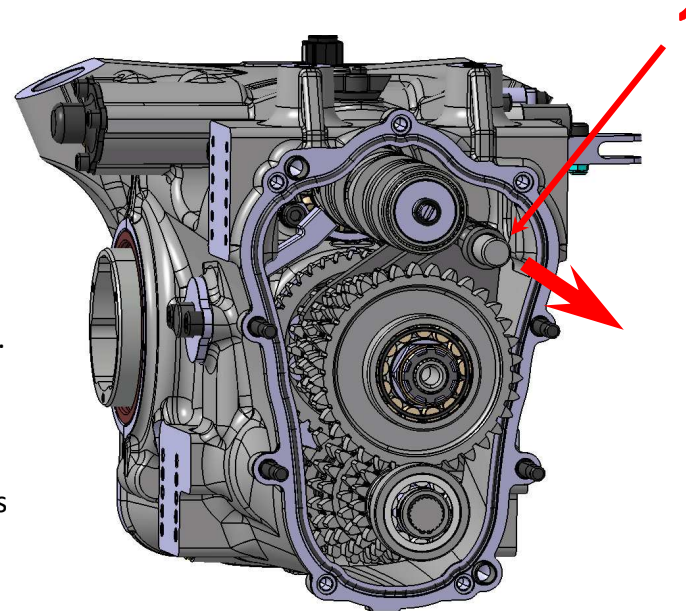
PICTURE	REFERENCE	NAMEL
	<i>FOUT0085001</i>	<i>Locking plate</i>
	<i>FOUT0085004</i>	<i>Play adjuster</i>
	<i>FOUT0085005</i>	<i>Spacer</i>
	<i>FOUT1908001</i>	<i>Primary bolt tool</i>
	FACOM	<i>Bearing extractor</i>

6-INFORMATION MONTAGE

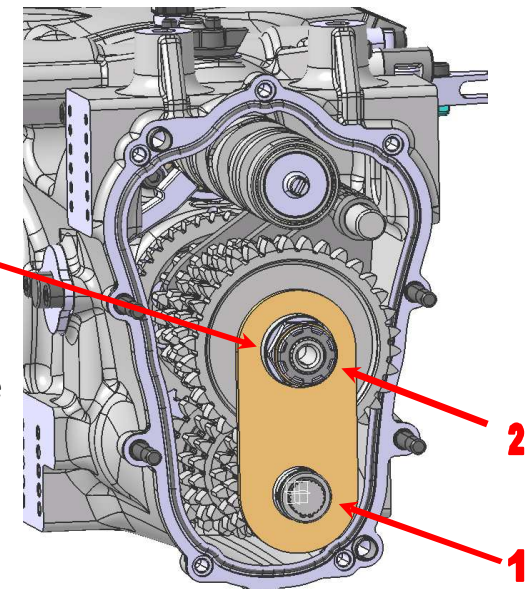
1 - Pignonneries

Dépose:

- Engager la marche arrière.
- Retirer le bouchon de vidange et Vidanger la boîte.
- Déconnecter le potentiomètre, en repérant sa position.
- Retirer le carter arrière.
- Retirer l'axe de fourchette **(1)** et incliner les fourchettes pour libérer les doigts de commande du barillet
- Engager la 2ème vitesse.
- Retirer le circlips & la rondelle cannelée.
- Mettre la plaque anti-écartement des arbres primaire et secondaire FOUT 0085001.
- Dévisser la vis de l'arbre primaire (filetage pas à droite) **(1)** avec l'outil **FOUT 1908001** et l'écrou de l'arbre secondaire (filetage pas à gauche) **(2)**.
- Retirer les pignons l'un après l'autre, une fois repéré le sens d'assemblage des différents éléments



FOUT 0085001

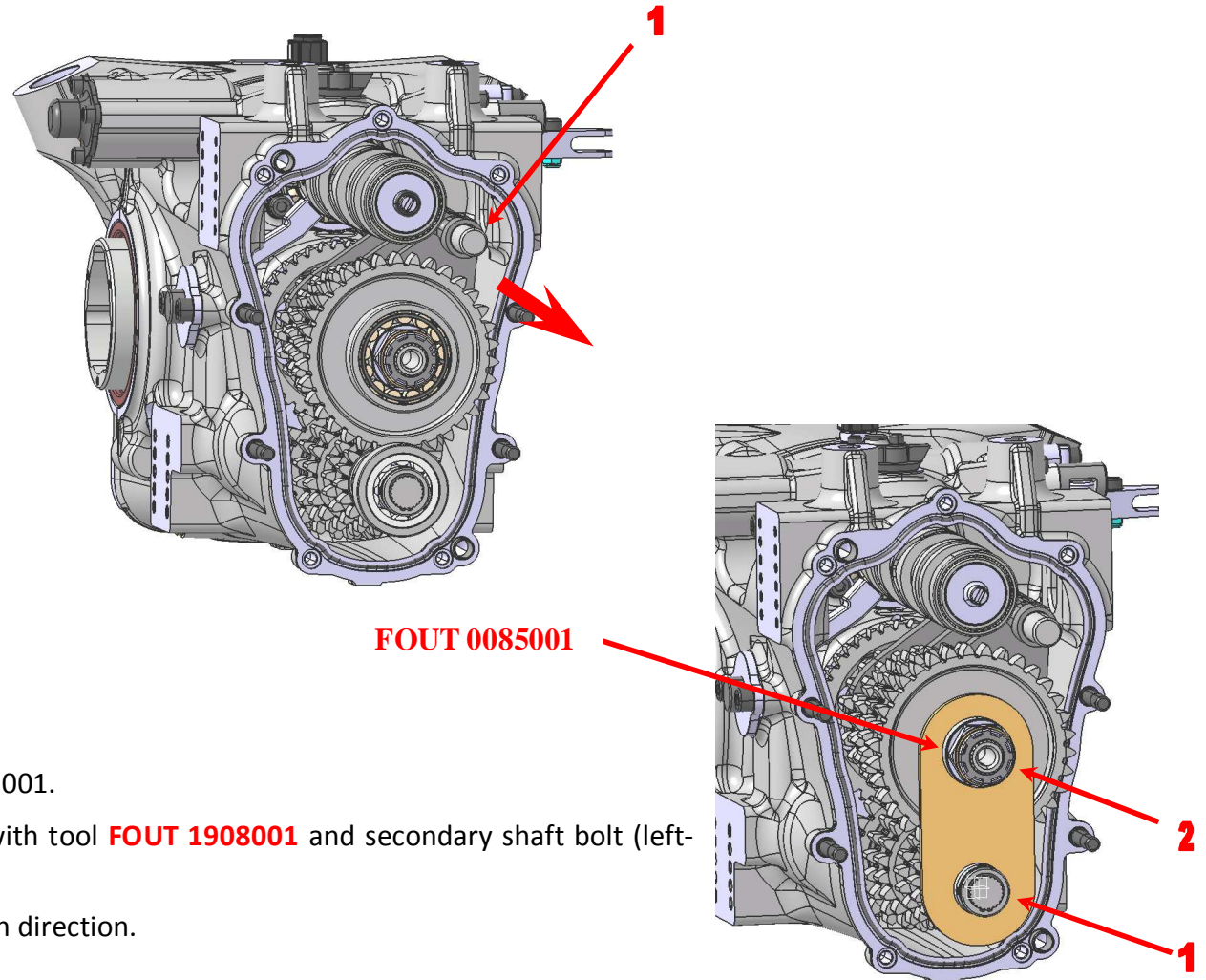


6-REBUILD MANUAL

1 - Gears

Removal :

- Engage reverse gear.
- Drain gearbox through lower drain plug.
- Disconnect the potentiometer, identify the position.
- Remove rear casing.
- Remove fork shaft **(1)** and swing forks to release barrel slope control fingers.
- Engage 2nd gear.
- Remove the circlips & the splined washers.
- Fit primary and secondary shaft lock plate FOUT 0085001.
- Remove primary shaft bolt (right-hand thread) **(1)** with tool **FOUT 1908001** and secondary shaft bolt (left-hand thread) **(2)** .
- Remove gears one after the other marking installation direction.



Remontage:

NOTE : Ne pas retourner les pignons afin de respecter le sens de rotation initial : risque de détérioration des dentures.

- Nettoyer et contrôler le bon état des pièces.
- Si vous devez changer l'arbre secondaire ou les roulements, voir le chapitre 5 pour les jeux.
- Lubrifier légèrement les cages de roulement à aiguilles en utilisant l'huile de boîte de vitesses **(2 éclaté ligne secondaire)**.
- Replacer les pignons l'un après l'autre dans l'ordre inverse du retrait.
- Engager le rapport de 2ème pour empêcher la rotation de la boîte.
- Monter l'arbre primaire et secondaire avec la plaque anti-écartement **FOUT 0085001**.
- Nettoyer et dégraisser les filets des arbres et de leurs vis.
- Déposer de la graisse cuivrée sur la vis du primaire et l'écrou du secondaire.
- Visser l'écrou du primaire et du secondaire aux couples de serrage suivants :
 - Erou arbre primaire : 100 N.m
 - Erou arbre secondaire: 180 N.m
- Remonter la rondelle cannelée & le circlips.
- Replacer les fourchettes à leur emplacement.
- Remplacer le joint du carter arrière.
- Remonter le carter arrière.
- Remonter le potentiomètre en s'assurant de sa bonne position.

NOTE : L'affichage de vitesse doit indiquer la marche arrière.

Refitting :

NOTE : Do not invert the gears so as to ensure their initial rotation direction: risk of reaking teeth.

- Clean and check condition of parts.
- If you need to change the secondary shaft or the head bearing, then see chapter 5 to adjust clearances.
- Lightly lubricate the needle roller bearing cages using gearbox oil **(2 in the secondary explode view)**.
- Replace gears one after the other in the reverse order from removal.
- Engage 2nd gear to prevent gearbox turning.
- Mount the primary/secondary lock plate **FOUT 0085001**.
- Clean and degrease threads on shafts and bolts.
- Screw primary shaft bolt and secondary shaft nut to torques :
 - Primary shaft bolt : 100 N.m
 - Secondary shaft nut : 180 N.m
- Reinstall the splined washers & the circlips.
- Replace forks in initial locations.
- Replace the seal on the rear housing.
- Refit rear casing.
- Connect potentiometer ensuring that its coupling is still correct:.

NOTE : The gear display must indicate reverse.

2 - Différentiel

Démontage :

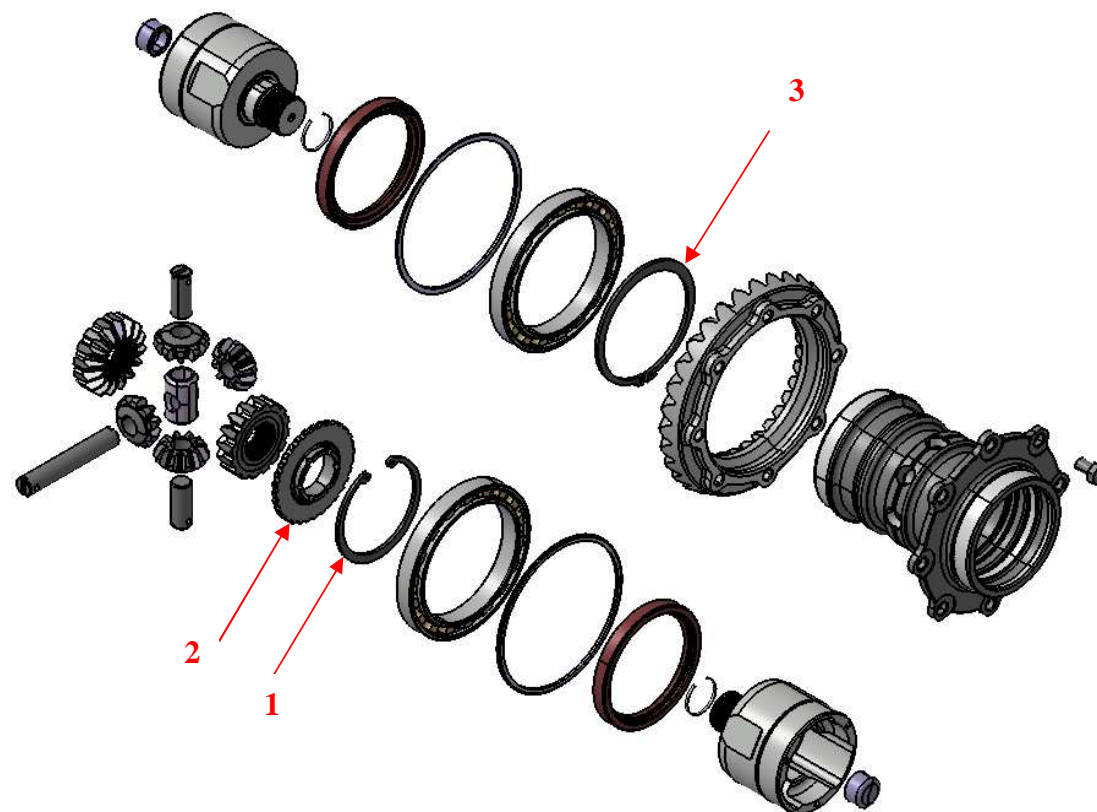
- Vidanger la boîte par les bouchons de vidange inférieurs.
- Retirer les entraîneurs avec un extracteur à inertie.
- Retirer la plaque fermeture de la bâche.
- Retirer la crépine.
- Enlever le carter pont.(vis M10)
- Extraire le différentiel.

Démontage des différents éléments du différentiel :

- Démontage du circlips **(1)**.
- démontage du couvercle boîtier satellite **(2)**.
- Démontez le circlips externe **(3)**
- Retirer les planétaire pour enlever toutes les pièces internes.

Remontage des différents éléments du différentiel :

- Nettoyer les différentes pièces.
- Replacer les différentes pièces dans l'ordre inverse du démontage, lubrifier les pièces avec l'huile de boîte avant de remonter l'ensemble. Remonter l'ensemble des éléments, dans l'ordre inverse du démontage.
- Verrouiller le circlips externe **(3)** avec un fil à freiner. (voir éclaté page 3a)



2 - Differential

Removal :

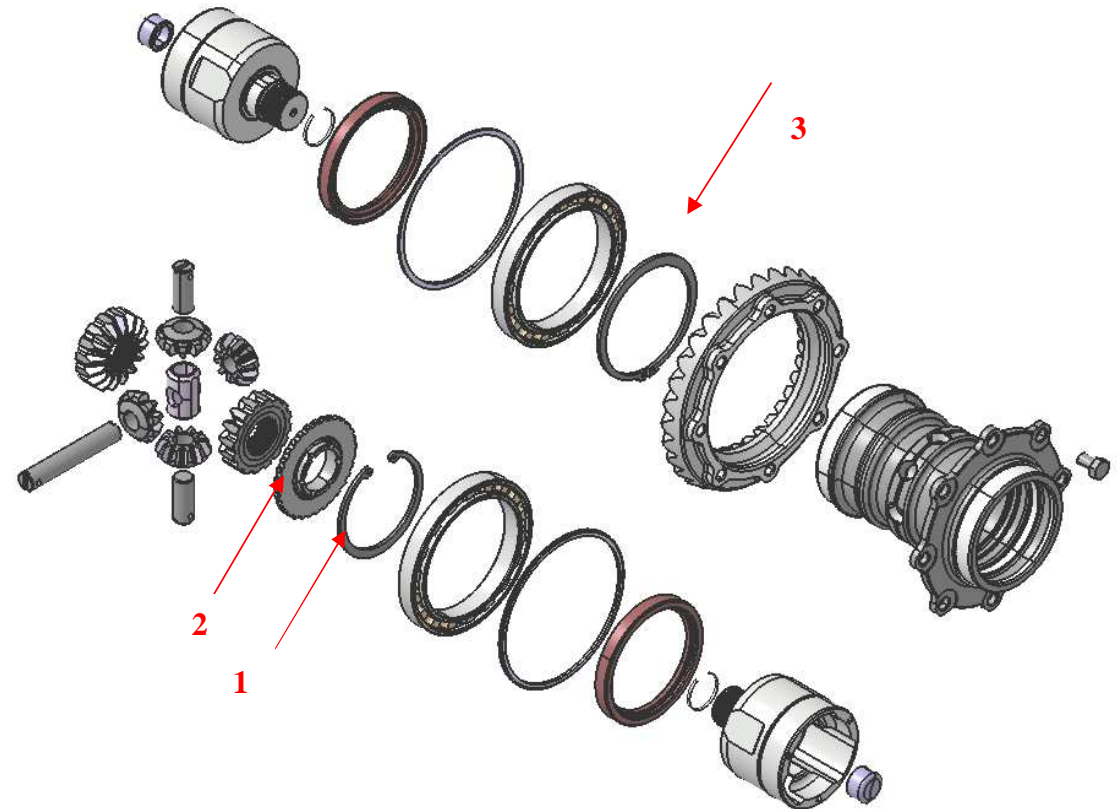
- Drain the box through the lower drain plug.
- Remove the tripod driver with a extractor.
- Remove the locking plate the clutch shaft.
- Remove the strainer.
- Remove differential housing.
- Extract the differential assembly.

Dismantling the differential elements :

- Remove the internal circlip **(1)**.
- Remove the differential cap **(2)**.
- Remove the external circlip **(3)**
- Remove the planet gear axles and after you can remove all the internal parts.

Refitting the differential elements :

- Clean parts.
- Replace parts in the reverse order of installation, lubricating each part with gearbox oil just before installation. Maintain order of parts as noted during dismantling.
- Lock the outer retaining ring **(3)** with a wire to brake. (See page exploded view 3a)



Démontage de la couronne conique :

- Démontez les roulements à billes (2).
- Enlevez les vis de fixation de la couronne (1).

NOTE : les vis sont collées, utiliser un pistolet à air chaud pour le démontage.

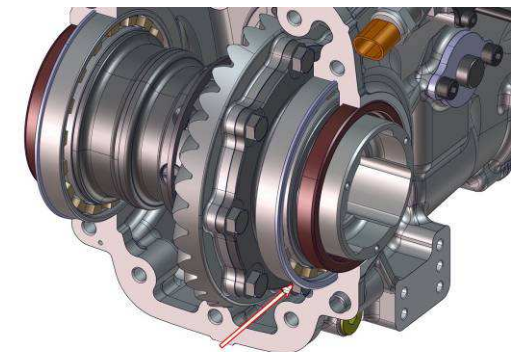
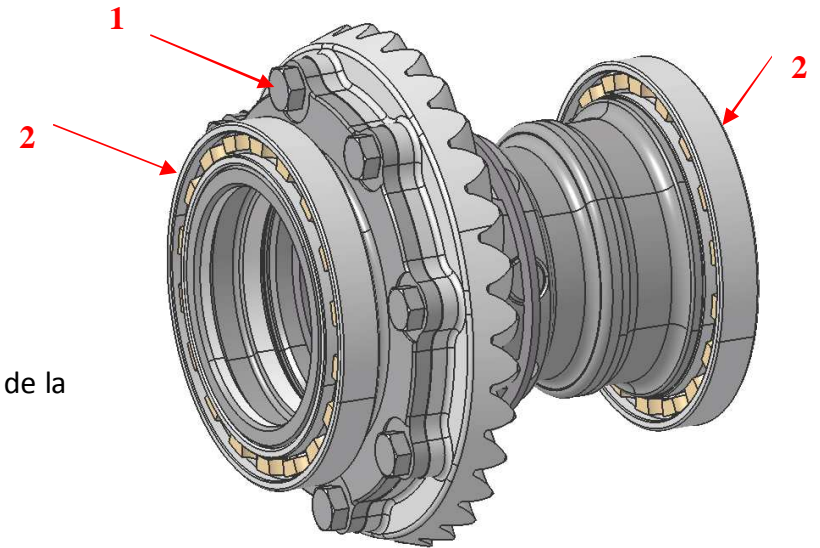
Remontage de la couronne conique :

- Nettoyer et dégraisser à l'aide d'un taraud **M10x100** les taraudages de la couronne.
- Remontage de la couronne sur le boîtier en utilisant de la visserie neuve collée avec de la Loctite blockpress 648. couple de serrage 90 N.m
- Reposer des roulements neufs.
- Effectuer le réglage du jeu de denture (voir le paragraphe 4).

Remontage :

- Nettoyer le plan de joint du carter pont.
- Employer Threebond 1215 (étanchéité des carters)
- Remonter le boîtier de différentiel avec des vis enduites de Loctite 243. Couple de serrage 60 N.m.
- Changer les joints à lèvres.

NOTE : Les cales de réglage du différentiel doivent être montées dans le bon sens. (chanfrein vers l'extérieur)



cale de réglage:chanfrein vers l'extérieur

- **Remove the spiral gear crown :**
- Remove right-hand ball bearing (2).
- Remove crown wheel fixing bolts (1).

NOTE : *The bolts are glued and a hot air gun must be used.*

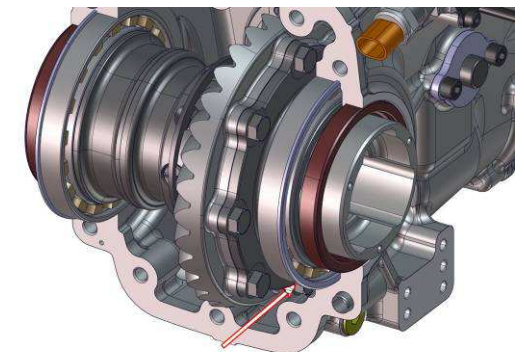
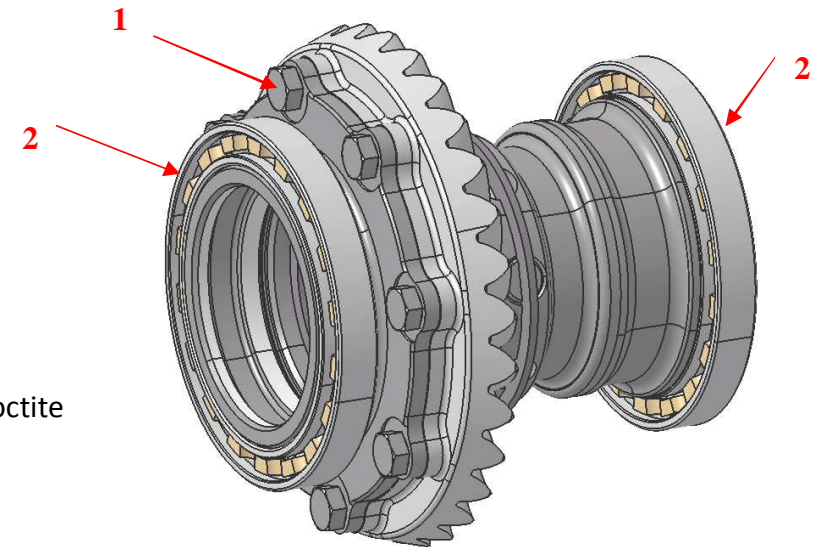
Re-assemble the spiral gear crown :

- Using an M10 x 100 tap, clean and degrease the crown.
- Attach the crown wheel to the housing using new bolts coated with a few drops of Loctite blockpress 648. Tighten bolts to 90 N.m.
- Install new bearings.
- Adjust the various clearances: check toothing clearance (see paragraphs 4).

Re-fitting :

- Clean the jointing plane of drive axle casing.
- Use joint Threebond 1215 (seal housings)
- Attach differential housing to gearbox using bolts covered with a few drops of Loctite 243. Tighten bolts to 60 N.m.
- Change the lip seals.

NOTE : The final drive clearance shims must be mounting in the correct side. (chamfer outwards)



Adjusting shim: chamfer outwards

3 - Remplacement et réglage des différents roulements

Primaire, secondaire roulements d'arbres et barillet

Démontage du roulement de l'arbre primaire et secondaire :

Carter arrière :

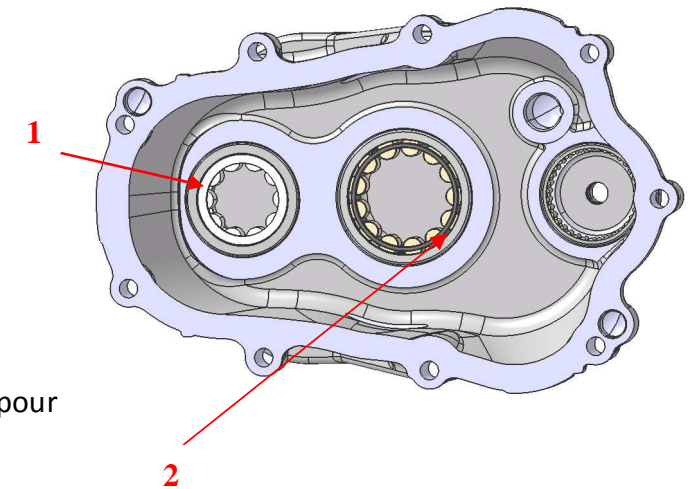
- Vidanger la boîte.
- Déconnecter le potentiomètre et retirer l'ensemble avec le support.
- Démontez le carter arrière.
- Chauffer le carter arrière à 120°.
- Utiliser un extracteur à inertie de type FACOM (extracteur adapter au roulement à extraire) pour sortir le roulement (1) et (2).

NOTE : Vérifier que le logement du roulement n'a pas été endommagé au démontage.

Repose :

Déposer en faible quantité de la loctite "produit de fixation" 518 sur la cage extérieure du roulement

- monter à la presse le roulement sur le carter arrière en prenant soin de bien positionner celui-ci au fond de son logement.
- Pour le changement des roulements du côté du différentiel se référer au paragraphe(5).



3 - Replacement and adjustment of various bearings

Primary, secondary bearing shaft and barrel

Removal of primary and secondary shaft bearing :

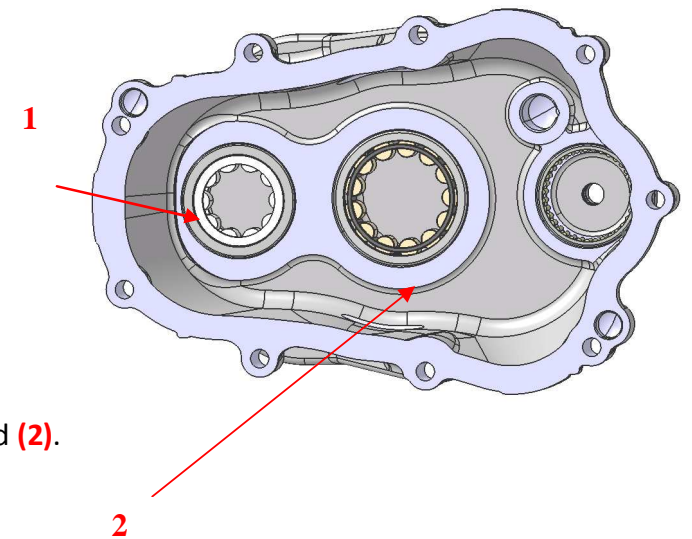
Rear casing side :

- Drain oil through the lower drainage plug.
- Disconnect potentiometer and remove assembly from support.
- Remove rear casing.
- Heat rear casing to 120°.
- Fit a FACOM type extractor (extractor adapter to rolling bearing extract)to exit the bearing(1) and (2).

NOTE : Check that the bearing housing has not been damaged on dismantling.

Refitting :

- Apply a small quantity of Loctite "fixing product" 518 on the outer bearing cage.
- Press fit bearing on the rear casing ensuring this is well seated at the bottom of its housing.
- To change the bearings on the differential side see paragraph(5).



Dépose du roulement de barillet :

Côté carter arrière :

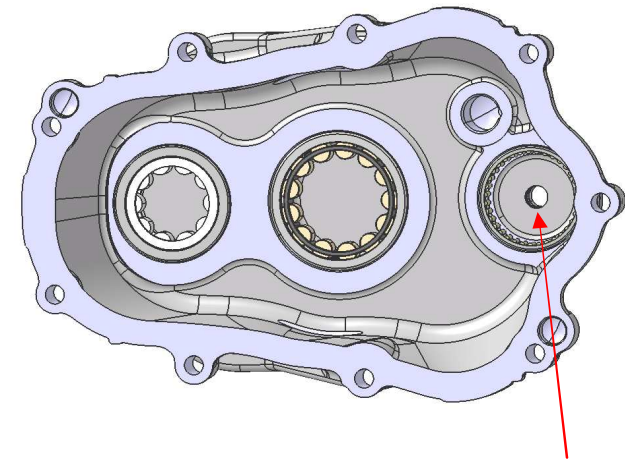
- Chauffer le carter arrière à 120° .
- Positionner l'extracteur FACOM, (extracteur adapter au roulement à extraire), et retirer le roulement **(3)**.

NOTE : Vérifier que le logement du roulement n'a pas été détérioré lors du démontage.

Repose :

- Déposer en faible quantité de la loctite "produit de fixation" 648 sur la cage extérieure du roulement.
- Monter à la presse le roulement sur le carter arrière en prenant soin de bien positionner celui-ci au fond de son logement.

NOTE : Lors du remontage, vérifier que la cage du roulement à aiguille n'a pas été écrasée (faire tourner les aiguilles).



3

Removing the barrel bearing :

Rear casing side :

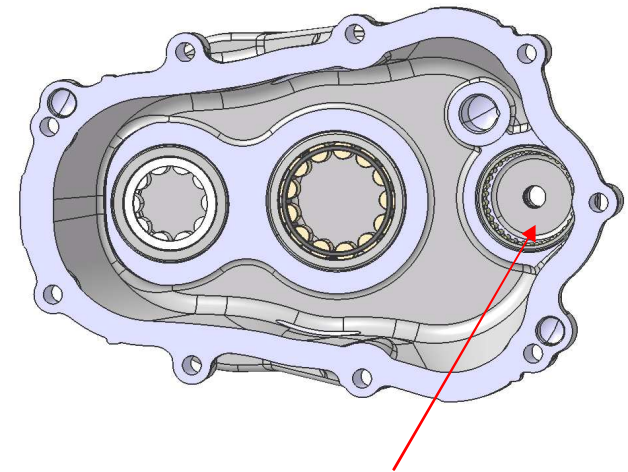
- Heat the casing to 120°
- Fit a FACOM type extractor (extractor adapter to rolling bearing extract)to exit the bearing **(3)**..

NOTE : Check that the bearing housing has not been damaged on dismantling.

Refitting :

- Apply a small quantity of Loctite "fixing product" 648 on the outer bearing cage.
- Press fit the bearing on the rear casing ensuring this is properly seated at the base of its housing.

NOTE : After refitting, ensure that the needle roller cage has not been crushed (rotate the needles).



3

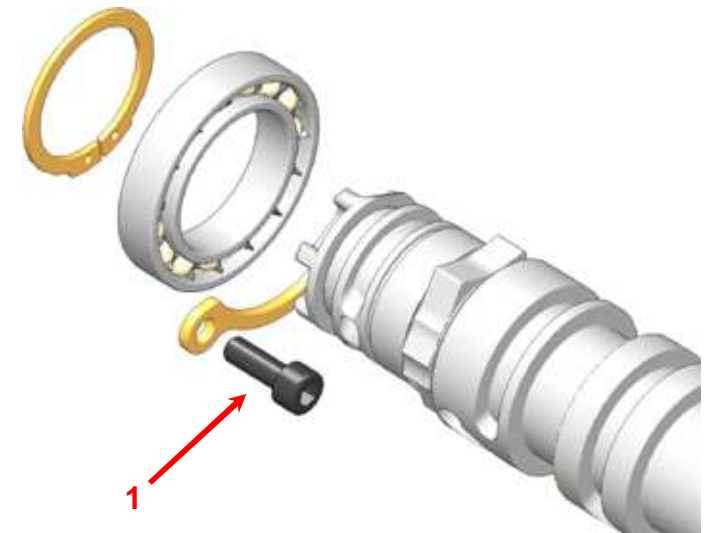
Côté différentiel :

- Vidanger la boîte par l'orifice du bouchon de vidange inférieur.
- Déconnecter le potentiomètre et déposer l'ensemble de son support.
- Déposer le carter arrière.
- Déposer les rapports (voir paragraphe 1).
- Déposer le basculeur de marche arrière (voir paragraphe 8).
- Déposer le guide indexeur.
- Déposer les 2 vis (1) de l'arrêt du roulement de barillet et extraire le barillet.
- Déposer le circlips du barillet.
- Déposer le roulement à la presse (ne pas endommager le barillet).

NOTE : Vérifier que le logement du roulement n'a pas été endommagé au démontage.

Repose:

- Poser à la presse le roulement sur le barillet & remonter le circlips.
- Reposer le barillet (voir paragraphe 7).



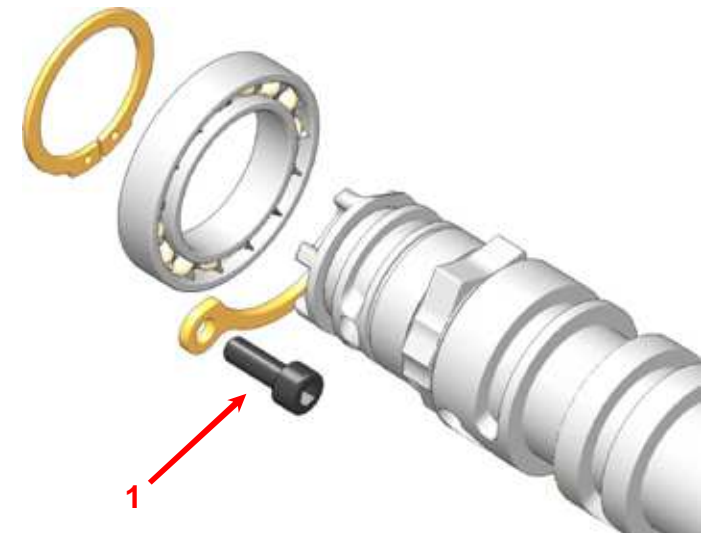
Differential side:

- Drain the box through the lower drain plug.
- Disconnect potentiometer and remove from support.
- Remove rear housing.
- Remove gears (see paragraph 1).
- Remove reverse rocker (see paragraph 8).
- Remove indexer guide.
- Remove the two bolts (1) on the barrel bearing retainer and extract the barrel.
- Remove barrel circlips.
- Remove press bearing (do not damage barrel).

NOTE : Check that the bearing housing has not been damaged on dismantling.

Refitting :

- Press fit the bearing on the barrel & refit circlips.
- Refit barrel (see paragraph 7).



Roulement de différentiel.

Dépose :

- Extraire le différentiel complet (voir paragraphe 2).
- Démontez les roulements gauche et droit.
- Démontez l'arbre secondaire (voir paragraphe 5).

Repose :

- Reposer à la presse les roulements sur le boîtier d'autobloquant
- Remonter l'ensemble différentiel (voir paragraphe 2).

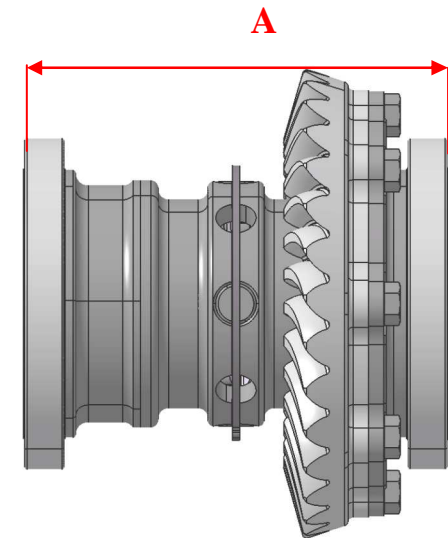
Contrôle de la précontrainte des roulements du différentiel:

- Mesurer la distance **A** entre les deux roulements.
- Noter la valeur gravée sur le fond à l'intérieur du carter principal (**B**) (pour exemple 170,78).
- L'épaisseur de la cale est:

$$C=(B-A)+0.1$$

C= cale gauche + cale droite

Remonter l'arbre du secondaire (voir paragraphe 5), et régler le jeu de fonctionnement du couple conique (voir paragraphe 4)



B

Differential bearing.

Removal :

- Extract the differential assembly (see paragraph 2).
- Remove left and right bearings.
- Remove secondary shaft (see paragraph 5).

Refitting :

- Press the ball bearings on the differential casing.
- Refit the differential assembly (see paragraph 2).

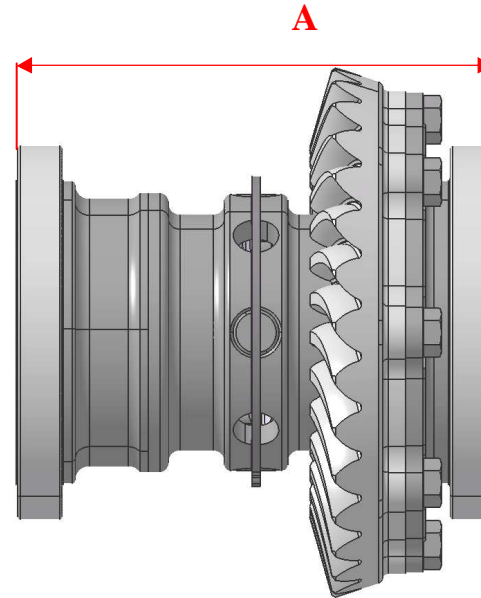
Check preload on differential bearings:

- Measure the distance **A** between the two bearings.
- Note the value engraved on the bottom inside of the main casing (**B**) (for example 170,78).
- The thickness of the shims is:

$$C=(B-A)+0.1$$

C= left shim + right shim

Refit secondary shaft (see paragraph 5), and adjust the final drive operating clearance (see paragraph 4)



B

4 - Réglage du jeu de fonctionnement du couple conique

- Vidanger la boîte par l'orifice du bouchon de vidange inférieur.
- Déposer les rapports (voir paragraphe 1).
- Monter l'outillage **FOUT 0085004** et **FOUT 0085005** sur l'arbre secondaire et serrer l'écrou de secondaire à 18 daN.m.
- Contrôler le jeu entre-dents à l'aide d'un comparateur placé sur l'outillage **FOUT 0085004** (rapporteur de jeu).
- Mesurer le jeu pour chaque dent du pignon (10 dents) en faisant basculer de droite à gauche l'arbre du secondaire. Le jeu ainsi trouvé, doit être compris entre 0.1 mm et 0.2 mm.

Si le jeu entre dents s'avère incorrect, déposer le carter pont, enlever les cales de réglages situées derrière les roulements et réaliser l'opération suivante.

- Si le jeu est trop important : rapprocher la couronne du pignon en augmentant l'épaisseur de la cale de réglage côté couronne et en diminuant d'autant l'épaisseur de la cale côté boîtier.
- Si le jeu est trop faible : éloigner la couronne du pignon en diminuant l'épaisseur de la cale de réglage côté couronne et en augmentant d'autant l'épaisseur de la cale de réglage côté boîtier.

NOTE : toujours conserver l'épaisseur totale des deux cales, constante afin de ne pas modifier la précontrainte des roulements.

- Recontrôler le jeu après chacune de ces opérations.
- Une fois le contrôle du jeu effectué, reposer le différentiel autobloquant (voir paragraphe 2)
- Reposer les rapports (voir paragraphe 1)

4 - Final drive operating clearance

- Drain the box via the lower drain plug.
- Remove gears (see paragraph 1).
- Fit tool **FOUT 0085004** and **FOUT 0085005** on the secondary shaft and tighten the secondary shaft nut to 18 daN.m.
- Check the inter-tooth play using a comparator placed on tool **FOUT 0085004** (clearance indicator).
- Check the play for each tooth on the gear (10 teeth) by rocking the secondary shaft from left to right. The play must be between 0.1 mm and 0.2 mm.
- If the inter-tooth play is incorrect, remove the differential housing.
- Remove the shims behind the bearing and proceed as follows:
 - If the play is excessive : move the crown wheel closer to the pinion by increasing the thickness of the left-hand shim (crown) and reducing the thickness of the right-hand shim (housing) accordingly.
 - If the play is insufficient : move the crown wheel away from the pinion by reducing the thickness of the left-hand shim (crown) and increasing the thickness of the right-hand shim (housing) accordingly.

NOTE : Always keep the total thickness of the two shims constant so as not to affect the preload on the bearings.

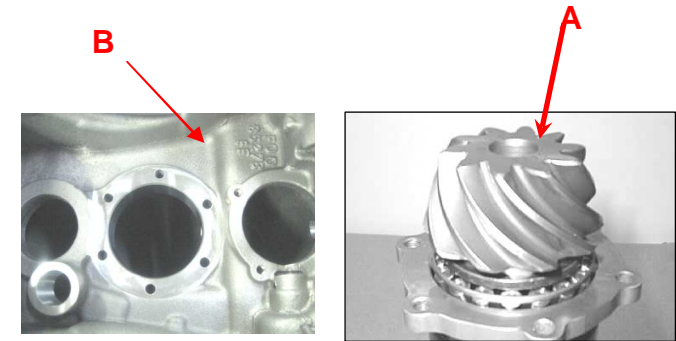
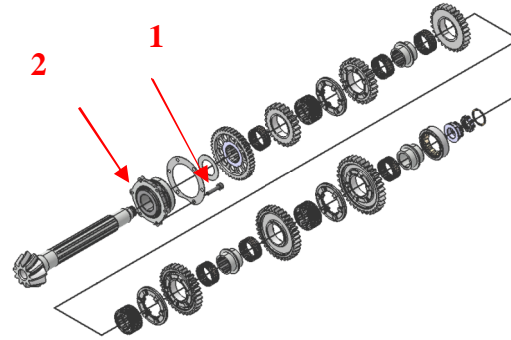
- Recheck clearance after each operation.
- Once the clearance has been checked, refit the differential (see paragraph 2)
- Refit gears (see paragraph 1)

5 - Arbre secondaire

1. Démontage & calcul :

Dépose :

- Vidanger la boîte par l'orifice du bouchon de vidange inf.
- Déposer les rapports (voir paragraphe 1).
- Déposer l'autobloquant (voir paragraphe 2).
- Déposer les vis de fixation de l'arbre secondaire (1). (chauffer si nécessaire)
- Déposer l'arbre secondaire en frappant son extrémité avec un maillet (ne pas détériorer le filetage).
- Démontez le roulement tête de couple (2).
- Déposer la cage de roulement en chauffant uniformément le carter de boîte à 120° autour de la zone concernée.

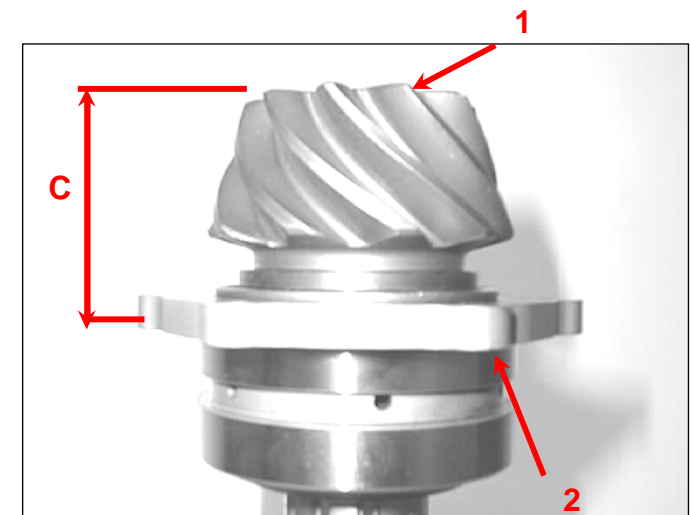


NOTE : Vérifier que le logement de la cage de roulement n'a pas été détérioré lors du démontage.

- **Calcul :** Remonter à la presse le roulement double sur l'arbre secondaire.
Poser l'entretoise **FOUT 0085005** et serrer l'écrou du secondaire à 18 daN.m.
- Noter la cote inscrite sur le dessus du pignon (A), "côte gravée en bout de l'arbre (env 61.4)" ainsi que celle inscrite dans le fond du carter d'autobloquant (B) (pour exemple 110,396).
- Relever la cote (C) entre la face supérieure du pignon d'arbre secondaire (1) et la face inférieure de la cage (2).
- Calcul de la cale, réaliser l'opération suivante:

$$E = B - (A+C)$$

Exemple: $E = 110.396 - (61.4 + 48.70)$ soit $\approx 0.3\text{mm}$



5 - Secondary shaft

1. Removal & calculation :

Removal :

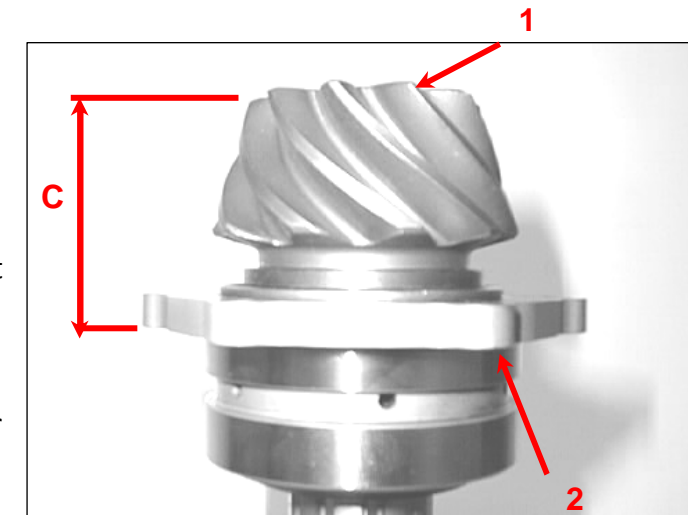
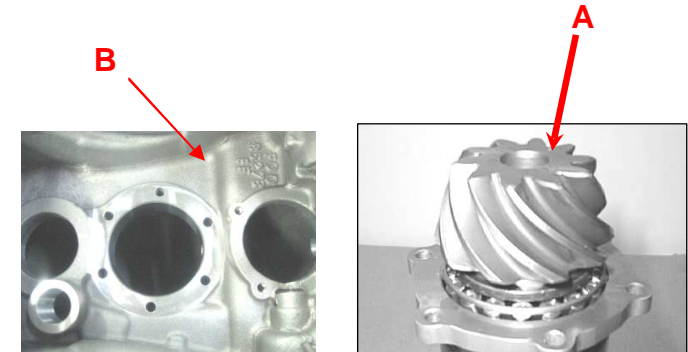
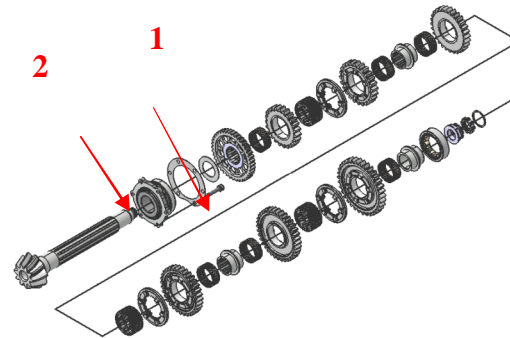
- Drain the box through the lower drain plug.
- Remove gears (see paragraph 1).
- Remove differential (see paragraph 2).
- Remove secondary shaft fixing bolts (1). (heat if necessary)
- Remove secondary shaft by tapping the end with a mallet (do not damage the thread).
- Disassemble the twin head-bearing (2).
- Remove bearing cage by heating the casing uniformly to 120° around the zone concerned.

NOTE : Check that the bearing housing has not been damaged on dismantling.

- **Calculation :** Press fit the twin head-bearing assembly on the secondary shaft.

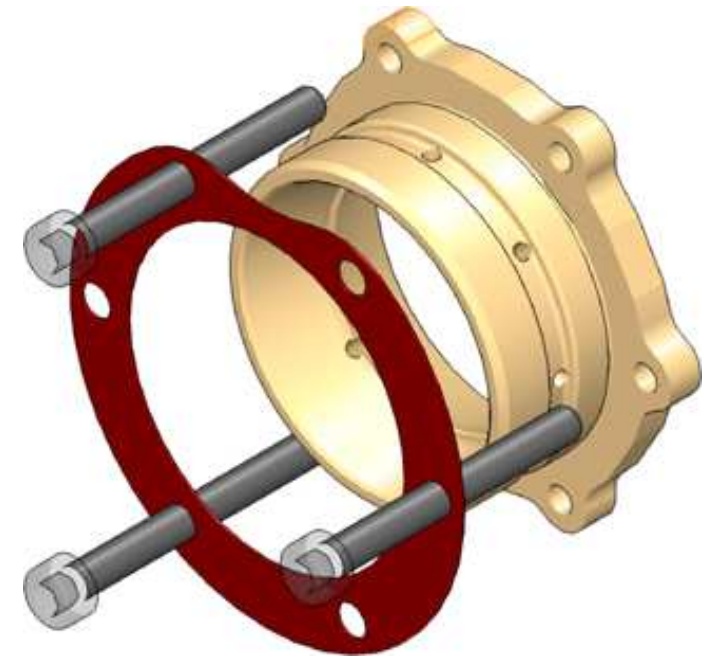
Fit **FOUT 0085005** and tighten the secondary shaft nut to 18 daN.m.

- Note the value engraved on the top of the secondary shaft pinion (A), "dimension engraved at the end of the secondary shaft "(approx 61.4) and that on the bottom inside of the main casing (B) (for example 110,396).
- Measure dimension (C) between the upper face of the secondary shaft pinion (1) and the lower face of the bearing cage (2).
- Calculating the shim, perform the following operation: $E = B - (A+C)$
Example: $E = 110.396 - (61.4 + 48.70)$ soit $\approx 0.3\text{mm}$



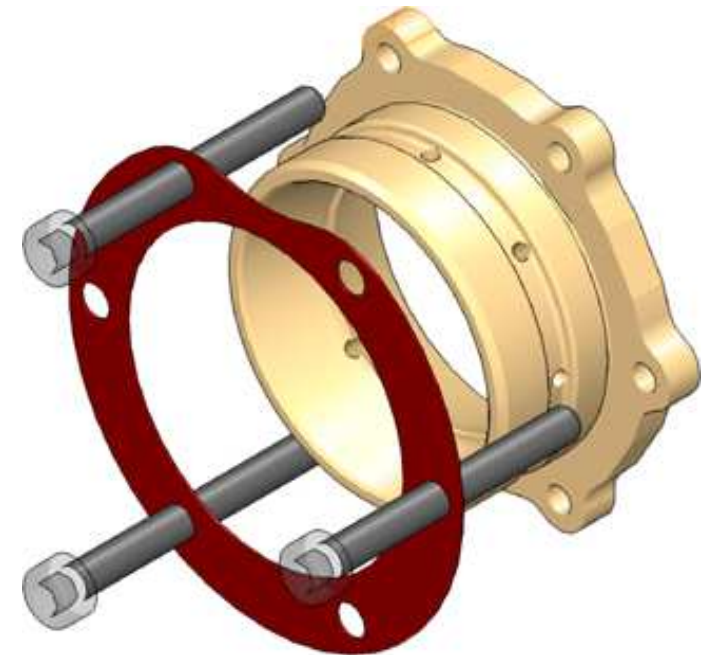
2. Repose de l'arbre secondaire.

- Nettoyer et dégraisser à l'aide d'un taraud M7 x 100, les taraudages de la cage de roulement et les vis.
- préparer la cale correspondant à l'épaisseur calculée.
- Chauffer le carter de boîte jusqu'à ce que la température du logement de la cage de roulement atteigne 120°C.
- Positionner la cage de façon à ce que les perçages coïncident avec ceux de la cale et du carter (poser 3 vis M7x65 et s'en servir comme centreur)
- Remonter en utilisant un maillet.
- Reposer 3 vis de fixation du secondaire de façon à aligner parfaitement les trous.
- Maintenir le serrage jusqu'à ce que la température du carter soit revenue normale.
- Démontez les 3 vis provisoires.
- Reposer les vis de fixation d'arbre secondaire enduites de quelques gouttes de loctite 648 & serrer à 30 N.m.
- Reposer l'autobloquant.
- Contrôler le jeu de fonctionnement du couple conique (voir paragraphe 4).



2. Secondary shaft refitting.

- Using an M7 x 100 tap, clean and degrease the bearing cage threads and bolts.
- Prepare the corresponding shim thickness calculated .
- Heat the gearbox casing until the temperature of the roller cage housing is 120°.
- Position the cage on the centring pins so that its bores coincide with those on the shim and casing. (Cut the head of 3 M7x65 bolts and use them as centring pins)
- Refit it using a mallet.
- Fit 3 secondary shaft fixing bolts so that the casing bores align perfectly opposite the cage threads.
- Hold this fixing until the temperature of the casing returns to normal.
- Remove the 3 temporary fixing bolts.
- Refit the secondary shaft fixing screws coated with a glue of Loctite 648 & tighten to 30 daN.m.
- Refit differential & gears.
- Check the operating play of the conical pair (see paragraph 4).



6 - Arbre d'embrayage

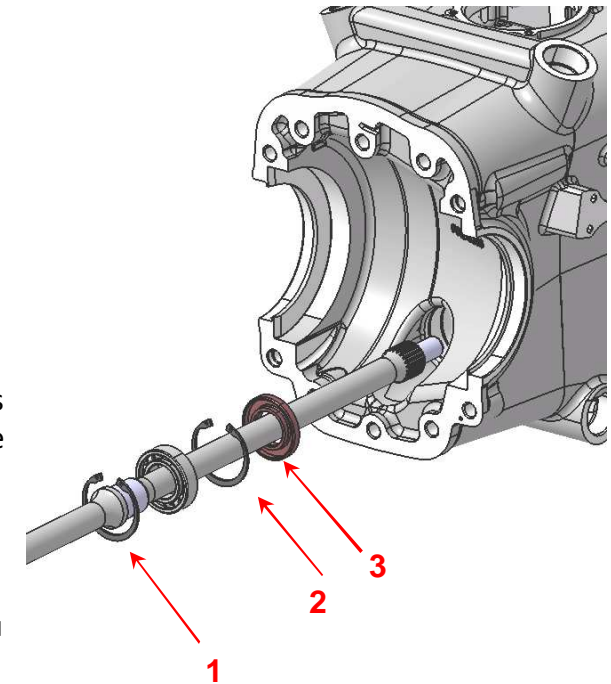
- **démontage**

- Enlever la bâche à huile.
- Démontez le circlips **(1)**.
- Démontez l'arbre d'embrayage avec le roulement.
- Démontez le circlips **(2)**.
- Déposez le joint à lèvres **(3)** (le détruire).
- Déposez le roulement d'arbre d'embrayage.

NOTE : Si l'arbre d'embrayage est bloqué dans l'arbre primaire, déposez le carter arrière ainsi que la vis d'arbre primaire, puis insérez un axe de $\varnothing 10$ à l'intérieur de l'arbre primaire et frappez sur l'arbre d'embrayage pour le débloquer .

Repose :

- Nettoyer et vérifier l'état de l'arbre (cannelures, et portée de roulement) ainsi que du logement du joint à lèvres.
- Changer les pièces défectueuses
- Appliquer de la graisse cuivrée sur les cannelures.
- Remonter le roulement sur l'arbre d'embrayage.
- Remonter le nouveau joint à lèvres, fixer le circlips. **(2)**
- Remonter l'arbre d'embrayage dans le carter, fixer le circlips. **(1)**
- Remonter le carter bâche à huile.(Employer du Threebond 1215)



6 - Input shaft

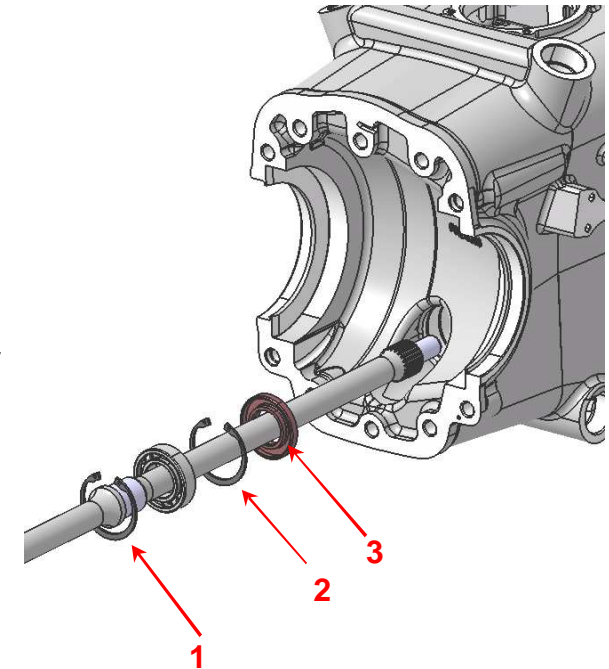
Removing

- Remove the oil tank housing.
- Remove circlip **(1)**.
- Remove the input shaft with the bearing.
- Remove circlip **(2)**.
- Destroy lip seal **(3)** to remove.
- Remove input shaft bearing.

NOTE : If the clutch shaft is seized in the primary shaft, remove the rear casing and bolt on the primary shaft, then insert a shaft \varnothing 10 inside the primary shaft and tap the clutch shaft to release.

Refitting :

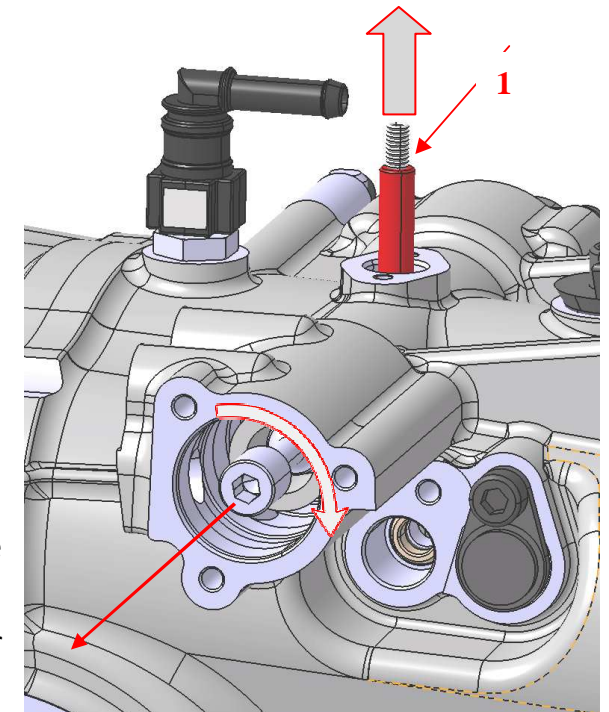
- Clean and check state of shaft (splines and bearing surface) and housing of lip seal.
- Change faulty parts.
- Apply copper grease on the shaft splines .
- Fit the ball bearing on the clutch shaft.
- Fit the new lip seal in place and attach circlip **(2)**
- Fit the clutch shaft in the oil tank housing and attach circlip. **(1)**
- Fit the oil tank housing. (Use joint Threebond 1215)
-



7 - Sélection

Dépose de l'axe de commande :

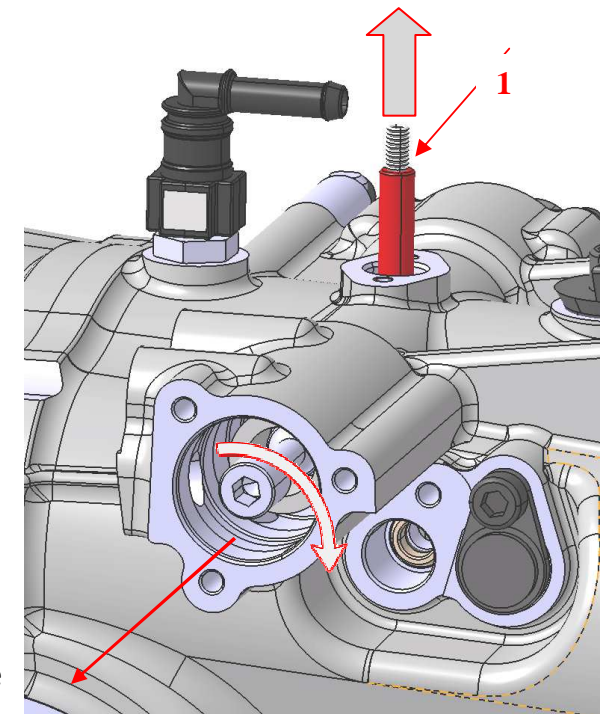
- Engager la marche arrière.
- Déposer les deux vis de fixations du renvoi externe
- Déposer le câble de verrouillage de la marche arrière.
- Retirer le bloc de fermeture de commande gauche.
- Déposer le contacteur.
- Enlever l'entretoise de sélection.
- Déposer le guide poussoir.
- Passer un aimant rond **(1)** de type FACOM (réf. 827.1) par l'orifice du guide de poussoir et soutenir le cliquet double.
- Tout en maintenant le cliquet surélevé, faire pivoter l'axe de commande d'un quart de tour seulement et l'extraire du coté du bloc de fermeture commande.



7 - Selection

Removing the control lever:

- Engage reverse gear
- Remove the two fixing bolts of the selector rocker.
- Remove the reverse gear locking cable.
- Remove left selector closing block.
- Remove the power shift.
- Remove the selector spacer.
- Remove pusher guide.
- Pass a round magnet **(1)** type FACOM (ref. 827.1) through the opening of the pusher guide and support the double clip.
- While holding the clip raised, pivot the control shaft one-quarter of a turn only and extract from the control closing block side.



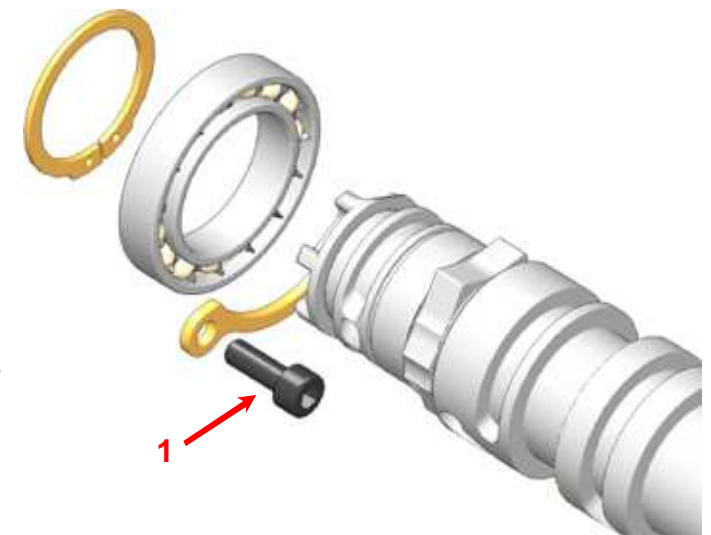
Dépose du barillet de sélection :

- Déposer l'ensemble des rapports (voir paragraphe 1).
- Déposer le basculeur de marche arrière (voir paragraphe 8).
- Déposer le guide indexeur.
- Déposer les 2 vis **(1)** de l'arrêtoir du roulement de barillet et extraire le barillet.

Remontage du barillet de sélection :

- Procéder dans le sens inverse du démontage.
- Nettoyer et dégraisser les 2 vis de fixation de l'arrêtoir et la vis du basculeur de marche arrière.
- Déposer quelques gouttes de Loctite frein filet normal 243 sur les vis de l'arrêtoir du roulement, et de la Locite frein filet fort 270 sur la vis du basculeur de marche arrière.
Serrer au couple:

Vis de l'arrêtoir du roulement :	22 N.m
Vis du basculeur de marche arrière :	55 N.m



Reposer le guide d'indexeur et serrer les vis à 2.5 daN.m , préalablement enduite de quelques gouttes de Loctite frein filet faible 243.

Removing the selector barrel :

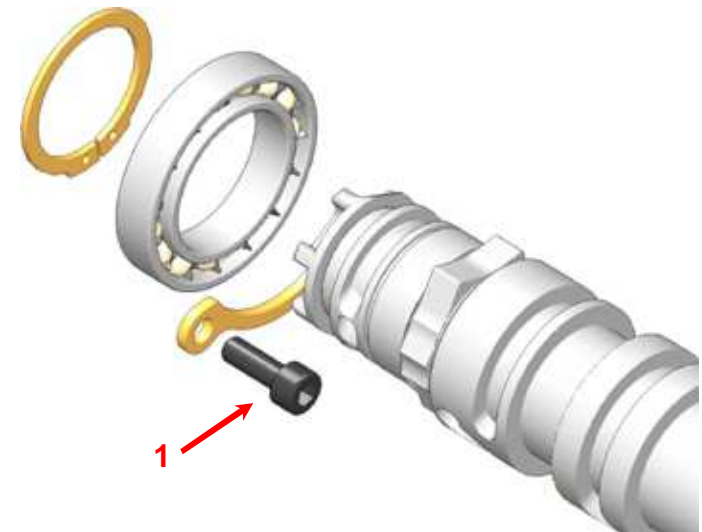
- Remove all gears (see paragraph 1).
- Remove reverse gear rocker (see paragraph 8).
- Remove indexer guide.
- Remove the 2 bolts **(1)** of the barrel retainer bearing and extract barrel.

Refit selection barrel :

- Proceed in the reverse order from removal.
- Clean and degrease the 2 fixing bolts of the retainer and the reverse gear rocker bolt.
- Apply a few drops of Loctite normal threadlock 243 on the bearing retainer bolt and Loctite high-strength threadlock 270 on the reverse gear rocker bolt. Tighten as follows:

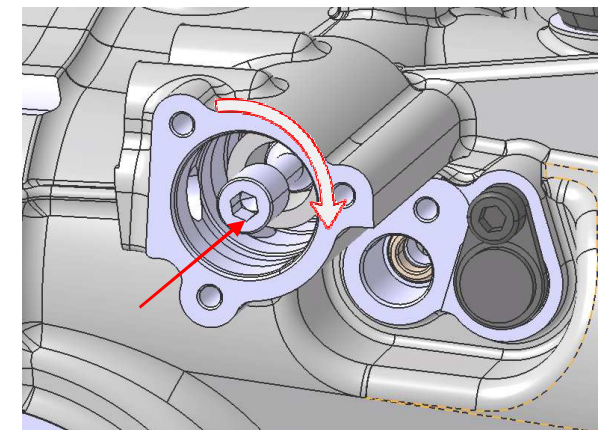
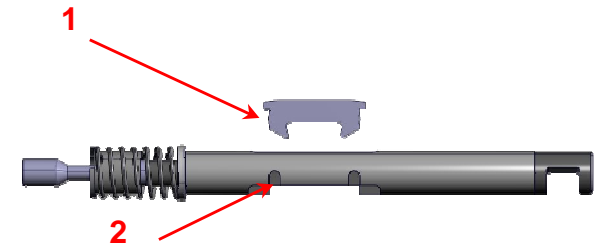
Bearing retainer bolt:	22 N.m
Reverse gear rocker bolt:	55 N.m

Refit indexer guide and tighten bolts to 25 N.m, after coating with a few drops of Loctite low-strength threadlock 243.



Repose de l'axe de commande :

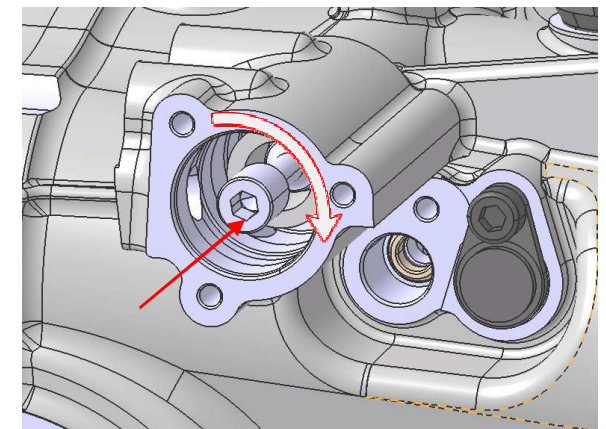
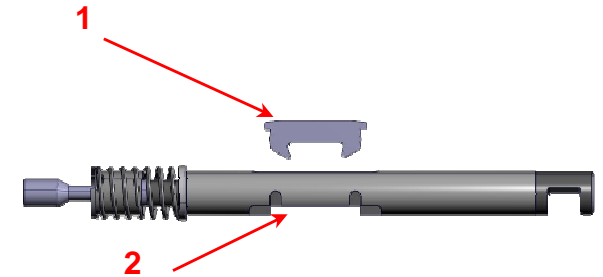
- Mettre le barillet en position de marche arrière.
 - Vérifier l'état du cliquet double (1) et de l'axe de commande (2).
 - S'assurer du bon état des différents joints toriques.
 - Reposer le cliquet double sur l'axe de commande.
 - Insérer l'axe de commande dans le carter en ayant préalablement effectué un quart de tour dans le sens antihoraire. Une fois l'axe en place, retourner celui-ci d'un quart de tour dans le sens horaire.
 - Nettoyer et dégraisser à l'aide d'un taraud M5x80, les taraudages du carter et les vis du guide de poussoir ainsi que celle du bloc de fermeture de commande.
 - Reposer le guide de poussoir. Enduire les vis de Loctite frein filet faible 222 et serrer à 8 N.m..
 - Remonter l'entretoise de sélecteur ainsi que le contacteur.
 - Déposer quelques gouttes de Loctite frein filet 243 sur les vis bloc de fermeture de commande, reposer le bloc. Serrer les vis à 15 N.m.
 - Remonter le câble de verrouillage de marche arrière sur la boîte.
 - Vérifier le bon fonctionnement de la gâchette sur le levier de vitesse.
- Déposer quelques gouttes de Loctite frein filet normal 243 et serrer les vis de l'axe de renvoi externe à 15 N.m.



Refit control lever :

- Put the barrel in reverse gear position.
- Check the condition of the double clip (1) and control shaft (2).
- Check the good condition of the various O-rings and lip seals.
- Refit the double clip on the control lever.
- Insert control lever in casing having first made a quarter turn anti-clockwise. Once the shaft is in place, turn this back a quarter turn clockwise.
- Using an M5 x 80 tap, clean and degrease the casing threads and bolts on the pusher guide.
- Refit pusher guide. Coat threads with Loctite low-strength threadlock 222 and tighten to .8 N.m.
- Refit the selector spacer and the power shift
- Apply a few drops of Loctite threadlock 243 on the bolts of the left selector closing block and refit block. Tighten bolts to 15 N.m.
- Refit reverse gear locking cable on gearbox.
- Check proper function of gate on selector lever.

Apply a few drops of Loctite normal threadlock 243 and tighten the bolts on the external transfer lever to 15 N.m.



8 -Marche arriere

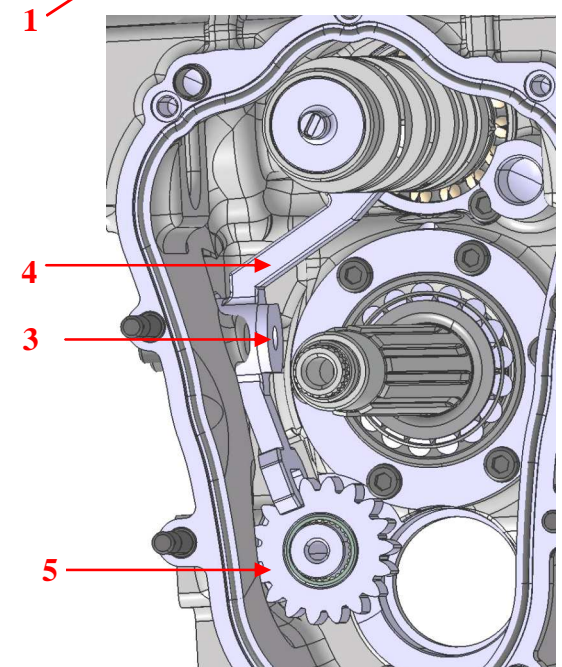
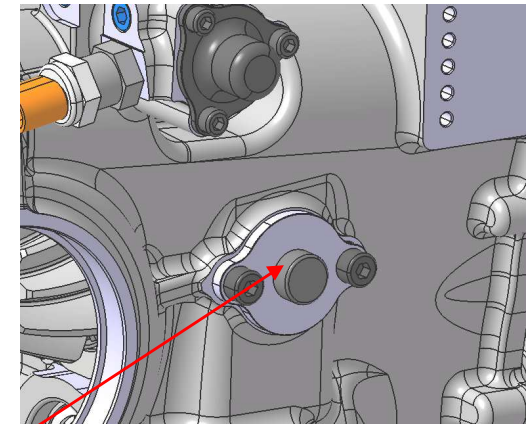
Dépose :

- Déposer l'ensemble des rapports (voir paragraphe 1).
- Retirer l'arbre primaire.
- Retirer le cache de la vis du basculeur (1).
- A l'aide d'une clé plate bloquer en rotation l'écrou du basculeur de marche arrière (3) et desserrer la vis du basculeur.
- Retirer le basculeur (4) et le pignon de renvoi de marche arrière (5).
- Contrôler l'état de l'axe de M.AR.

Si changement de l'axe de M.AR:

- Déposer le différentiel (voir paragraphe 2).
- Déposer la vis d'axe de marche arrière (2).
- Chauffer le carter à 120°C aux alentours de l'axe de marche arrière.
- Déposer l'axe du côté du carter de différentiel en le frappant avec un maillet.

NOTE : Vérifier que l'alésage du carter n'a pas été endommagé.

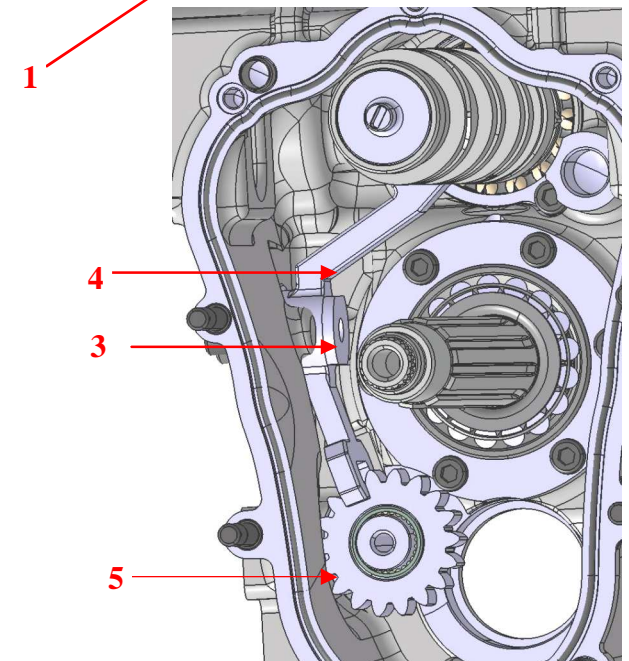
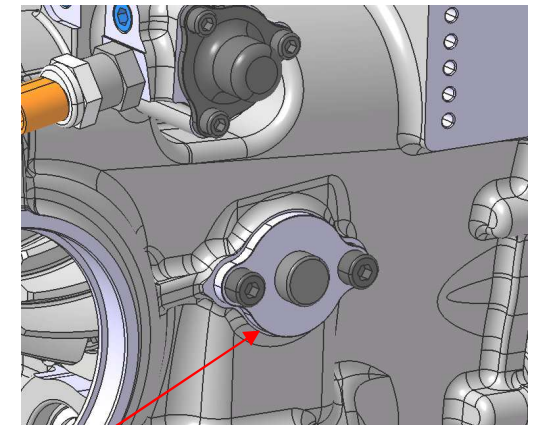


8 -Reverse gear

Remove :

- Remove all gears (see paragraph 1).
- Withdraw primary shaft.
- Withdraw cover on rocker bolt (1).
- Using an open-ended wrench, stop the reverse rocker nut turning (3) and release rocker bolt.
- Withdraw rocker (4) and reverse transfer pinion (5).
- Check condition of the axis of reverse.
- **If change of the axis of reverse:**
- Remove differential (see paragraph 2).
- Remove the axle bolt (2).
- Heat the casing to 120°C around the reverse axle.
- Remove the axle from the gears housing side by tapping with a mallet.

NOTE : Check that the bore of the casing has not been damaged

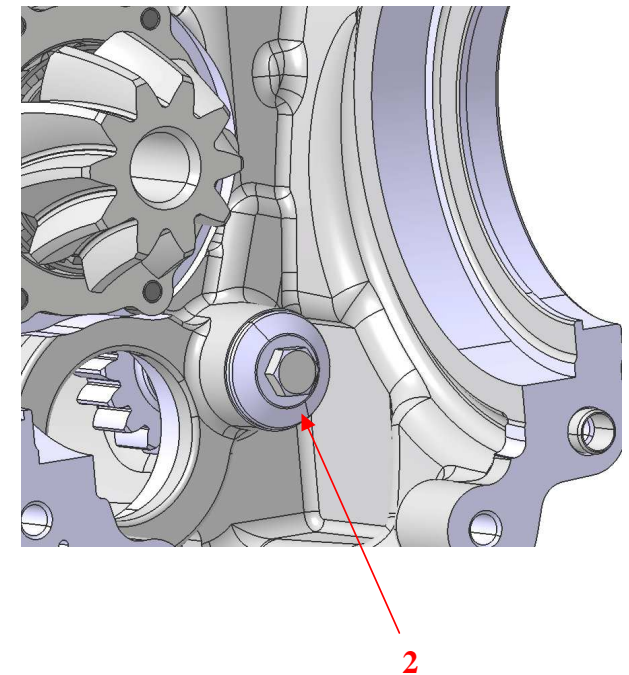


Si changement de l'axe de M.AR:

- Chauffer le carter de la boîte à 120°C aux alentours de l'axe de marche arrière.
- Mettre en position l'axe de marche arrière.
- Reposer l'axe en frappant avec un maillet dans le sens inverse au démontage.
- Reposer l'ensemble différentiel autobloquant.

Sinon repose :

- Nettoyer et contrôler les différentes pièces.
- Monter le pignon de renvoi de marche arrière dans la fourche du basculeur de marche arrière
- Insérer le doigt de commande du basculeur dans la gorge du barillet.
- Nettoyer et dégraisser à l'aide d'un taraud M10x150, la vis et l'écrou de marche arrière.
- Déposer quelques gouttes de Loctite freinfilet fort 270 sur la vis de basculeur. Serrer la vis à 55 N.m tout en empêchant la rotation de l'écrou de marche arrière avec une clé plate.
- Reposer le cache tête de vis.

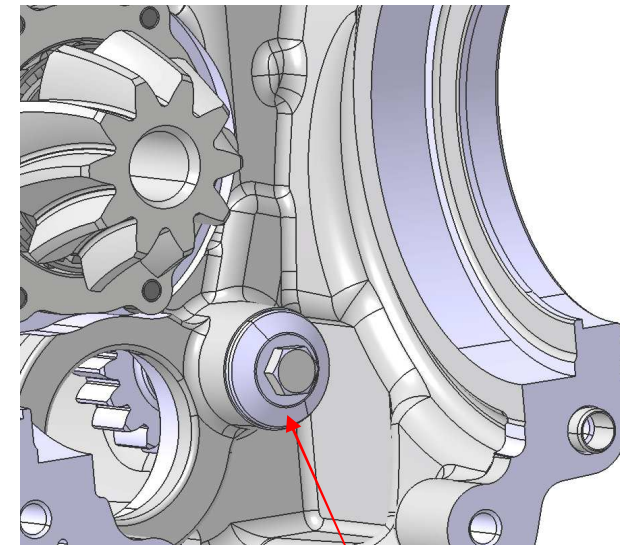


If change of the axis of reverse:

- Heat casing to 120°C around the reverse pin.
- Install the reverse axle.
- Refit shaft by tapping with a mallet in the opposite direction to removal.
- Refit differential assembly.

Refit :

- Clean and check condition of parts.
- Fit the reverse transfer pinion in the fork of the reverse gear rocker.
- Insert the rocker control finger in the barrel groove.
- Using an M10x150 tap, clean and degrease the reverse gear bolt and nut.
- Apply a few drops of Loctite high-strength threadlock 270 to the rocker bolt. Tighten the bolt to 55 N.m while stopping the reverse nut from turning with an open-ended spanner.
- Refit the bolt head cap.



2

7 -PRECONISATION DE MAINTENANCE

Les préconisations de maintenance sont basé sur l'expérience SADEV et les résultats des séances de développement de la BV SL75-14LW F4. Elles seront amenées à changer en fonction des développements futurs.

ELEMENT	ACTION	FREQUENCE
Vérification de la boîte de vitesses	Révision complète pour vérification générale de la pignonne	2000 km pour une application en circuit

SADEV propose 1 KIT REVISIONS

KIT	MAINTENANCE
KITREVSL7514LW	Pochette de révision Contrôle des lignes d'arbres (rapports, écrous, roulements), de la sélection + composants d'étanchéité

Détail du kit de révision KITREVSL7514LW1 (x)

REFERENCE	DESIGNATION	Qté	Attribution	REFERENCE	DESIGNATION	Qté	Attribution
0206003	Joint double lèvres viton Ø 25 x 47 x 7	1	Ligne primaire	0201164	Joint torique nitrile Ø 29 x 2	2	Sélection interne
0602043	Circlips intérieur Ø47	1	Ligne primaire	0201004	Joint torique nitrile Ø 20 x 2,5	1	Sélection interne
0601020	Circlips extérieur Ø18	1	Ligne primaire	0601010	Circlips extérieur Ø40	1	Sélection interne
F1908002	Moyeu à créneaux	1	Ligne primaire	0201020	Joint torique nitrile Ø 16 x 2	1	Sélection interne
F1908003	Rondelle à créneaux	1	Ligne primaire	0599017	Rondelle cuivre 10,2 x 15 x 1	1	Sélection interne
F9024002	Vis d'arbre primaire	1	Ligne primaire	0601042	Circlips extérieur Ø10	2	Sélection externe
0301191	Vis CHC M7 x 30 cl 10.9 brut	6	Ligne secondaire	0201305	Joint torique nitrile Ø 255 x 3	1	Carters
F9002038	Ecrou d'arbre secondaire	1	Ligne secondaire	5002018	Joint de vidange Ø16	2	Carters
F9005010	Rondelle à encoches	1	Ligne secondaire	0599017	Rondelle cuivre 10,2 x 15 x 1	2	Carters
9907004	Anneau expansif Seeger SW30	1	Ligne secondaire	0201014	Joint torique nitrile Ø 8 x 2,5	1	Carters
0204041	Joint simple lèvre viton Ø 85 x 105 x 12	2	Ligne différentiel	0201300	Joint torique nitrile Ø 208 x 3	1	Carters
F0085941	Vis de couronne	8	Ligne différentiel	0301524	Vis CHC M8 x 40 cl 12.9 zingué noir	5	Carters
0601040	Circlips extérieur Ø95 ép. 3 Seeger (4 sat)	1	Ligne différentiel	0499003	Ecrou Simmonds M8	4	Carters
F9047303	Circlips inter Ø85 retouché	1	Ligne différentiel	0599054	Rondelle NORD-LOCK Zn Bi M10 collées	10	Carters
0201017	Joint torique nitrile Ø 10 x 2,5	2	Sélection interne	0301424	Vis CHC M10 x 45 cl 12.9 zingué noir	2	Carters
0801026	Ressort de compression 0,6 x 5,5 x 15,5	1	Sélection interne	0301406	Vis CHC M10 x 35 cl 12.9 brut HK	6	Carters
0201104	Joint torique nitrile Ø 29 x 3	1	Sélection interne	0301052	Vis CHC M10 x 50 cl 10.9 brut	2	Carters
				0201074	Joint torique nitrile Ø 46 x 3	1	Carters

7 -SERVICE PLANNING

The service planning of the gearbox is based on SADEV experience and from the results of the various development campaigns of the SL75-14LW F4 gearbox. The information given about service planning can be updated in the near future .

PARTS	ACTION	FREQUENCY
Gearbox check-up	Complete rebuilding in order to check all the gears	2000 km for an application on the circuit

SADEV propose 1 KIT REVISIONS :

KIT	MAINTENANCE
KITREVS7514LW	Gearbox service Control primary and secondary geartrain, selector, (all safety fixing components, shafts nuts , clips, O'rings seals)

Detail of the rebuilt kit KITREVS7514LW1 (x)

REFERENCE	DESCRIPTION	Qty	Allocation	REFERENCE	DESCRIPTION	Qty	Allocation
0206003	Ø 25 x 47 x 7 Viton lip seal	1	Primary geartrain	0201164	Ø 29 x 2 O'ring	2	Selector
0602043	Ø47 Inner circlips	1	Primary geartrain	0201004	Ø 20 x 2,5 O'ring	1	Selector
0601020	Ø18 Outer circlips	1	Primary geartrain	0601010	Ø40 Outer circlip	1	Selector
F1908002	Hub	1	Primary geartrain	0201020	Ø 16 x 2 O'ring	1	Selector
F1908003	Slotted washer	1	Primary geartrain	0599017	10,2 x 15 x 1 Copper washer	1	Selector
F9024002	Primary bolt	1	Primary geartrain	0601042	Ø10 Outer O'ring	2	Selector
0301191	M7 x 30 cl 10.9 Chc bolt	6	Secondary geartrain	0201305	Ø 255 x 3 O'ring	1	Housing
F9002038	Secondary nuts	1	Secondary geartrain	5002018	Ø16 Drain plug	2	Housing
F9005010	Washer	1	Secondary geartrain	0599017	10,2 x 15 x 1 Copper washer	2	Housing
9907004	SW30 Seeger snap ring	1	Secondary geartrain	0201014	Ø 8 x 2,5 O'ring	1	Housing
0204041	Ø 85 x 105 x 12 Viton O'ring	2	Differential	0201300	Ø 208 x 3 O'ring	1	Housing
F0085941	Crown screw	8	Differential	0301524	M8 x 40 cl 12.9 Chc bolt	5	Housing
0601040	Ø95 ép. 3 Seeger outer circlip	1	Differential	0499003	M8 Simmonds nut	4	Housing
F9047303	Ø85 Inner circlip (rework)	1	Differential	0599054	NORD-LOCK Zn Bi M10 Washer	10	Housing
0201017	Ø 10 x 2,5 O'ring	2	Selector	0301424	M10 x 45 cl 12.9 Chc bolt	2	Housing
0801026	0,6 x 5,5 x 15,5 Spring	1	Selector	0301406	M10 x 35 cl 12.9 Chc bolt	6	Housing
0201104	Ø 29 x 3 O'ring	1	Selector	0301052	M10 x 50 cl 10.9 Chc bolt	2	Housing
				0201074	Ø 46 x 3 O'ring	1	Housing

Intervention dans nos locaux

- Les boîtes de vitesses sont livrées plombées et numérotées.
- L'absence du plomb 'SADEV' nous impose une attitude prudente en cas de problème mineur ou majeur, et vaut pour retenue complète de notre part le cas échéant.

Retour des Boîtes de Vitesses pour révision :

Lors du retour des boîtes de vitesses dans nos locaux, une certaine procédure de livraison est à respecter, afin que notre intervention puisse être globale, et pratique (carter 'fermé' pour passage au banc). On entendra donc comme boîte à réviser, un produit livré avec :

- Boîte de vitesse vidangée de son huile et nettoyée extérieurement
- Butée d'embrayage en place
- Capteur de position barillet, coupure et câble de verrouillage de M-AR en place : "si d'origine sur boîte de vitesse"
- Entrées et sorties de lubrifications fermées par des bouchons dédiés.
- Bouchons de vidange et leurs joints en place, légèrement serrés
- Une fiche navette précisant le kilométrage depuis la dernière révision, disponible à la fin du dossier

Procédure administrative :

1. Contacter le service commercial
2. PREVOIR UN DELAI D'IMMOBILISATION D'ENVIRON 2 à 3 SEMAINES, [à confirmer avec le service commercial.](#)

Intervention personnelle

Les clients désirant procéder par leurs propres moyens à la révision de leur matériel devront passer commande des pièces SAV nécessaires auprès du service commercial SADEV. **SUITE A TOUTE REVISION EFFECTUEE HORS DU RESEAU TECHNIQUE SADEV, NOUS DEGAGEONS TOUTE RESPONSABILITE, EN CAS DE PROBLEME**

In SADEV workshop rebuilding

- The gearboxes are delivered plumbed and numbered.
- SADEV will adopt a careful attitude when receiving a gearbox without any 'SADEV 'seals. This will also be effective if the gearbox shows minor or major damages.

Return gear boxes to revision :

At the time of the return of the gearboxes in our buildings, a certain procedure of delivery has to be respected, so that our intervention can be total, and practical (casing ' closed' for passage to the bench). We must receive the complete product as described below:

- Gear box drained and cleaned
- Release bearing in place
- Oil pump in place.
- Entry and exit of lubrication closed by plugs designed for this purpose (Goodridge, SpeedFlow...)
- Shifters and reverse gears locking solenoid," if original on gearbox "
- Drain plug and drain plug seal in place
- A card specifying the kilometres of the special stages and connection since the last service, available at the end of the technical manual.

Administrative procedure:

1. Contact our sales department
2. APPROXIMATELY 2 TO 3 WEEKS OF DELIVERY TIME MUST BE CONSIDERED, [please confirm with our sales department.](#)

Personal revision

After sale parts for customers who want to proceed a revision by themselves, are delivered only by SADEV sales service.

SADEV IS NOT RESPONSIBLE FOR ANY DAMAGE FOLLOWING A REVISION NOT EXECUTED IN A SADEV AGREED TECHNICAL SERVICE

Fiche navette boîte de vitesses

Card-index technical following

INFORMATIONS	
TEAM	
N° de boîte de vitesses / Gearbox N°	
Date de départ /Starting date	
Date de retour souhaitée / Date required	
Adresse de livraison / Delivery adress	
Adresse de facturation / Invoice adress	
Spécifications demandées / required	
Commentaire sur la revision / Comments on product	

Set-up actuel /Current set-up

Rapports / Gear ratio		
R	Z1	Z2
1		
2		
3		
4		
5		
6		
Autobloquant / Differential		
Accélération / Drive		
Freinage / Brake		
Precharge / Preload (Nm)		

Set-up demandé/ Required set-up

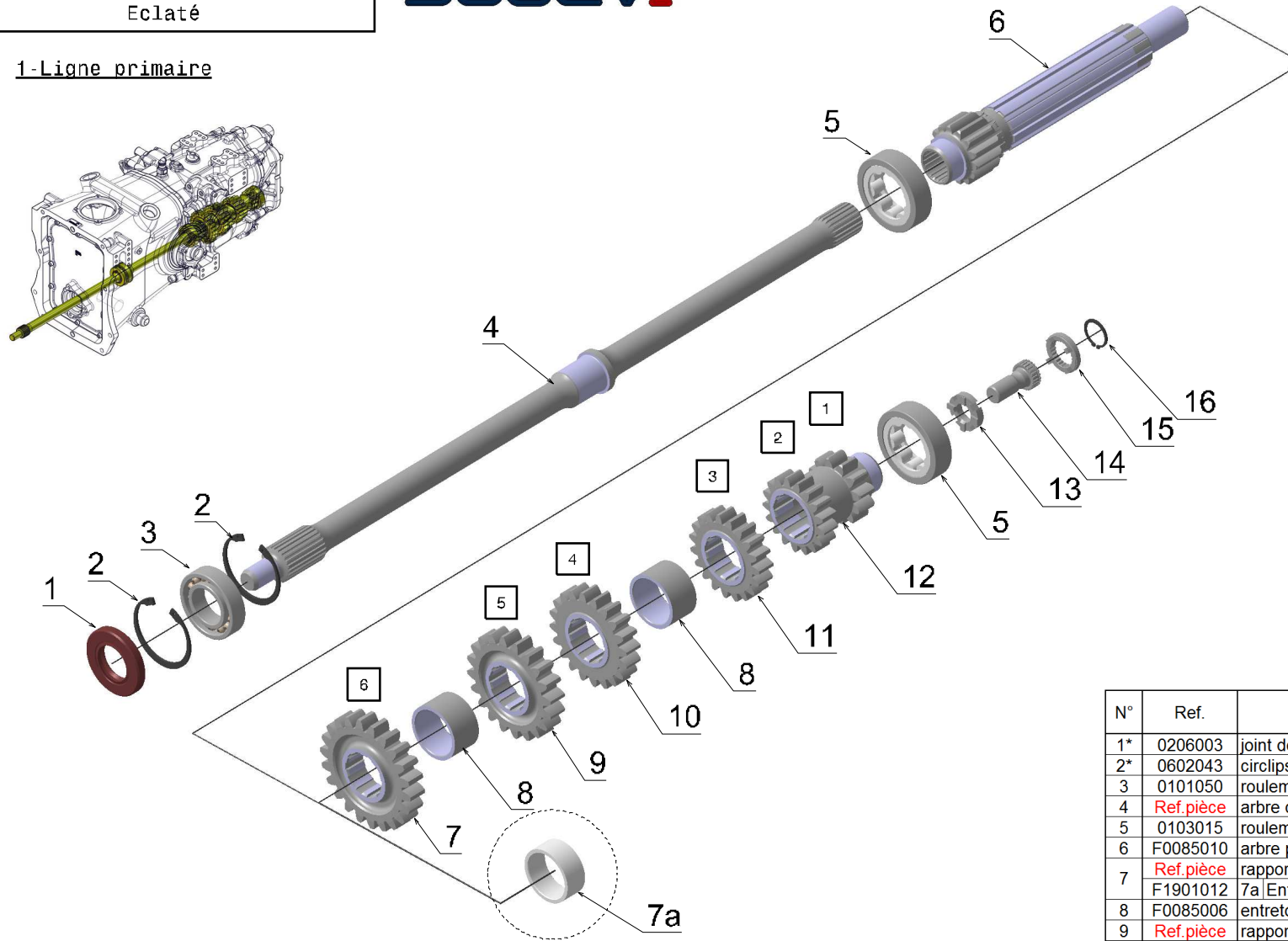
Rapports / Gear ratio		
R	Z1	Z2
1		
2		
3		
4		
5		
6		
Autobloquant / Differential		
Accélération / Drive		
Freinage / Brake		
Precharge / Preload (Nm)		

Km parcourus depuis la dernière révision Usage (km) since last service	
Type d'huile utilisé / Oil type used	
Max temperature	

SADEV Boîte de vitesse
SL75-14-LW-F4
Eclaté

sadev

1-Ligne primaire



N°	Ref.	Désignation	Qté	Couple (N.m)	Colle
1*	0206003	joint double lèvre ø25x47x7	1		
2*	0602043	circlips intérieur ø47	2		
3	0101050	roulement à billes 6005	1	648	
4	Ref.pèce	arbre d'embrayage	1		
5	0103015	roulement NU304	2	518	
6	F0085010	arbre primaire	1		
7	Ref.pèce	rapport de 6ème	1		
	F1901012	7a Entretoise (si boîte 5 rapports)	1		
8	F0085006	entretoise de primaire	2		
9	Ref.pèce	rapport de 5ème	1		
10	Ref.pèce	rapport de 4ème	1		
11	Ref.pèce	rapport de 3ème	1		
12	Ref.pèce	rapport de 1ère-2ème	1		
13*	F1908003	rondelle à crénaux	1		
14*	F9024002	vis d'arbre primaire	1	100	G.C
15*	F1908002	moyeu à crénaux	1		
16*	0601020	circlips intérieur ø18	1		

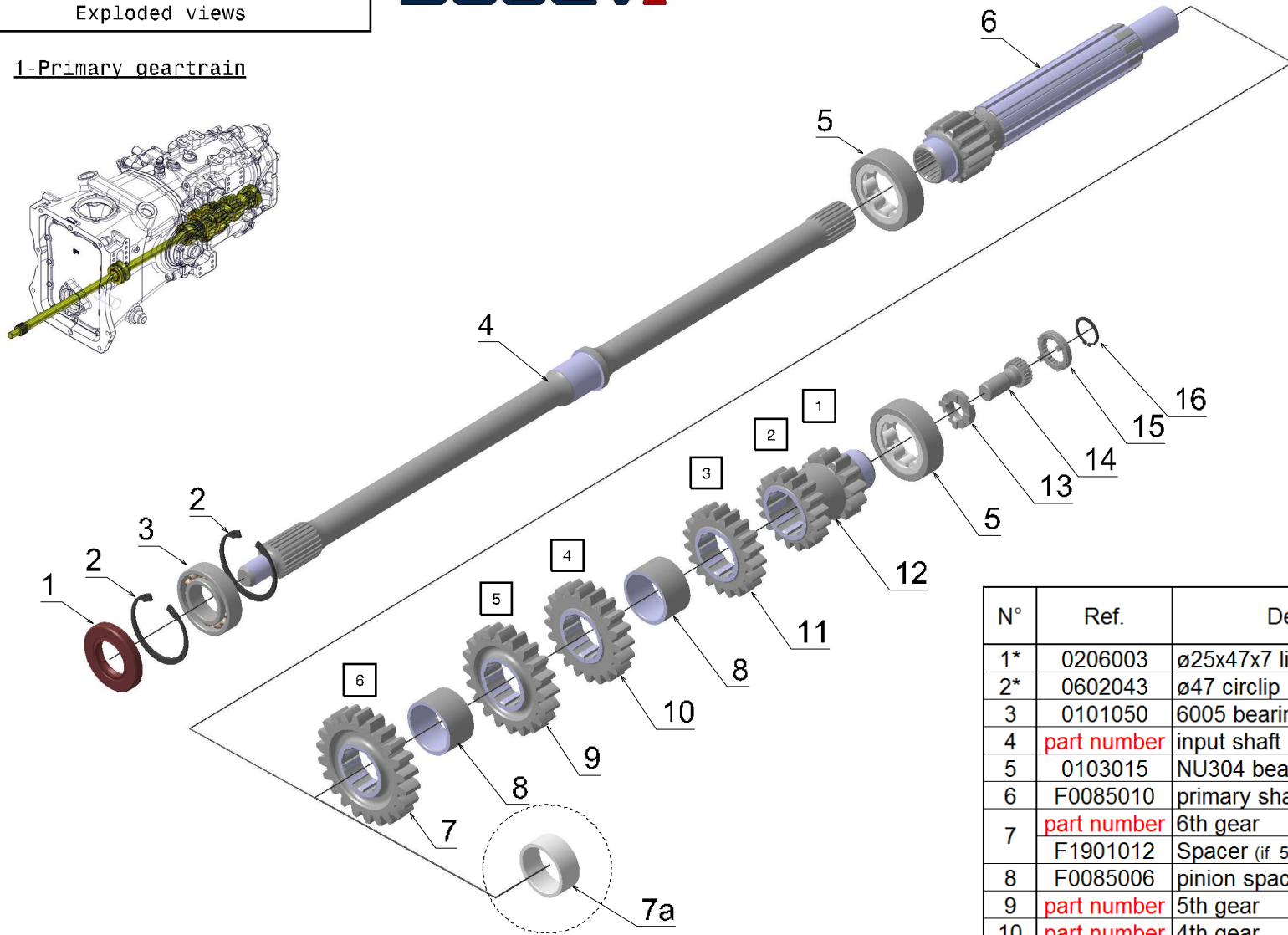
(*) pièces du kits révision KITREVSL7514LW

G.C:Graisse cuivrée

SADEV Gearbox
SL75-14-LW-F4
Exploded views



1-Primary geartrain



N°	Ref.	Description	Qty	Torque (N.m)	Glue
1*	0206003	ø25x47x7 lip seal	1		
2*	0602043	ø47 circlip	2		
3	0101050	6005 bearing	1		648
4	part number	input shaft	1		
5	0103015	NU304 bearing	2		518
6	F0085010	primary shaft	1		
7	part number	6th gear	1		
	F1901012	Spacer (if 5 speed gearbox)	1		
8	F0085006	pinion spacer	2		
9	part number	5th gear	1		
10	part number	4th gear	1		
11	part number	3rd gear	1		
12	part number	1st - 2nd gear	1		
13*	F1908003	stopping washer	1		
14*	F9024002	primary shaft bolt	1	100	C.G
15*	F1908002	stopping hub	1		
16*	0601020	ø18 circlip	1		

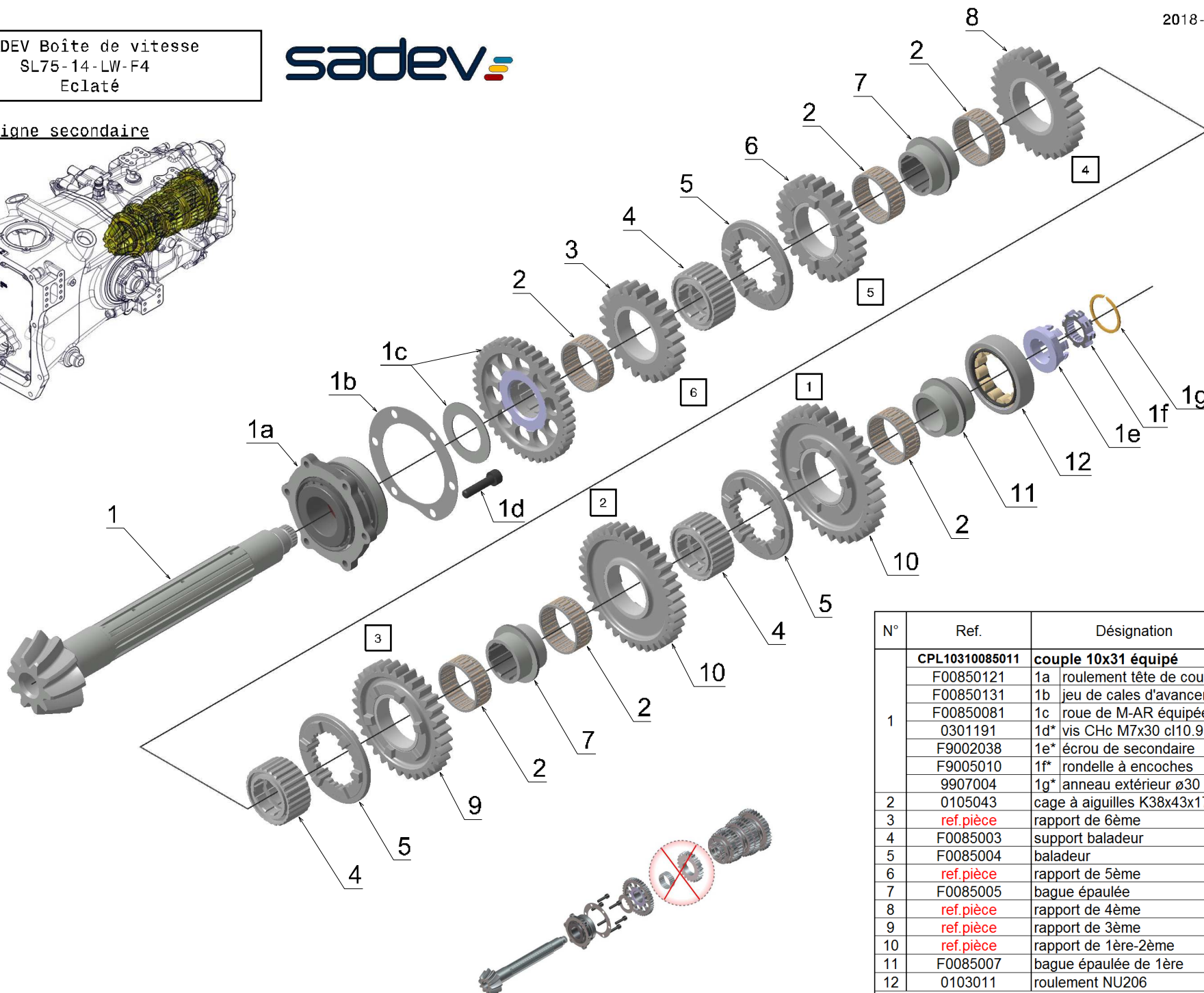
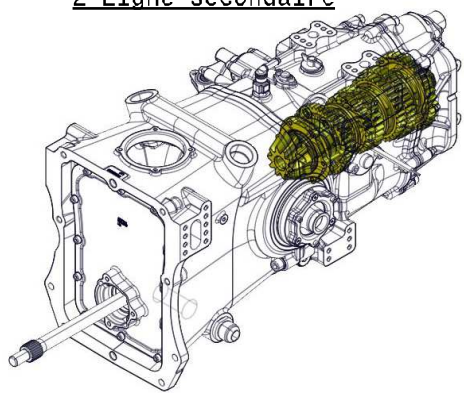
(*) parts included in the rebuilt kit KITREVSL7514LW

C.G: Copper grease

SADEV Boîte de vitesse
SL75-14-LW-F4
Eclaté



2-Ligne secondaire



repère 2 et 3 non présents sur la boîte 5 vitesses

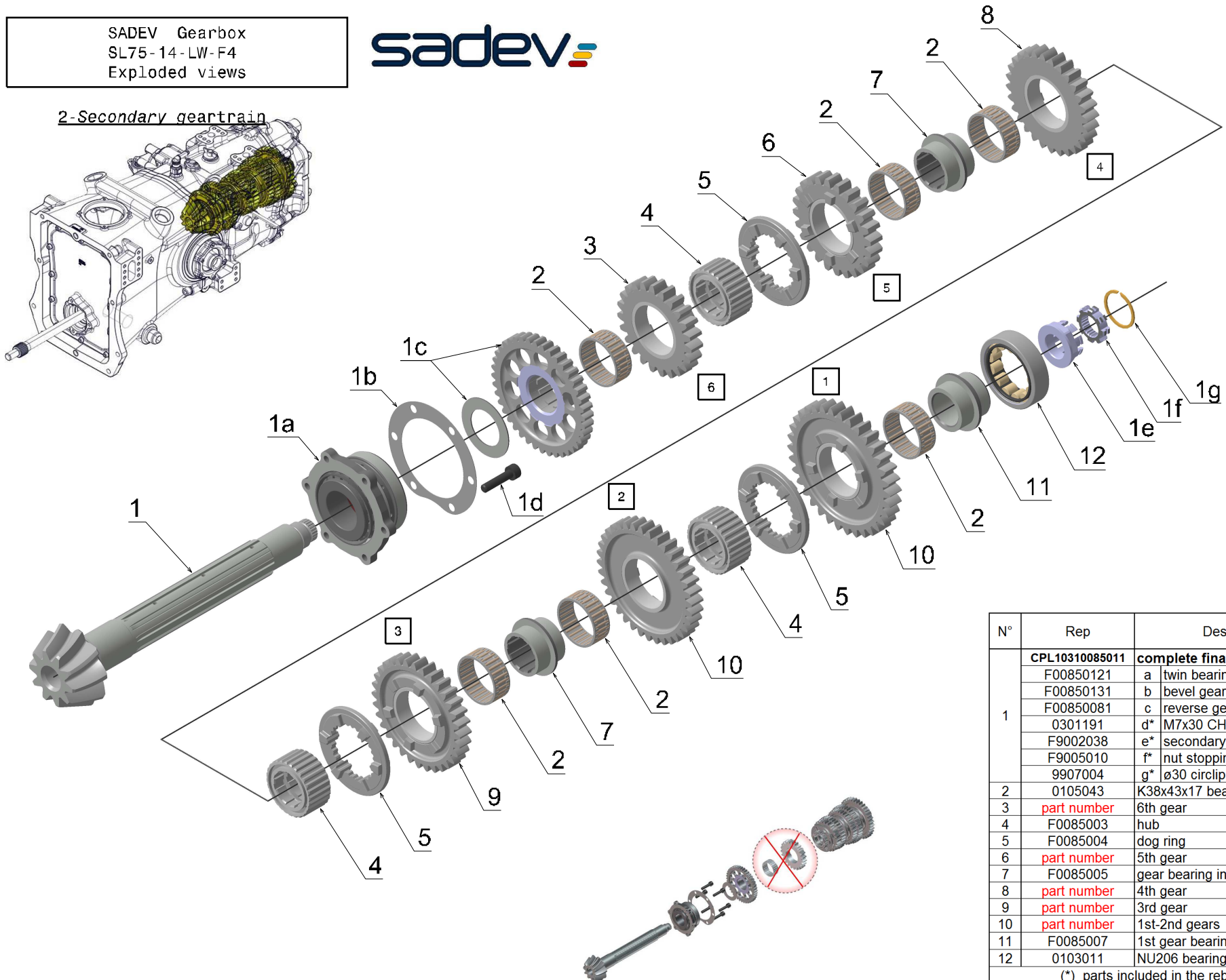
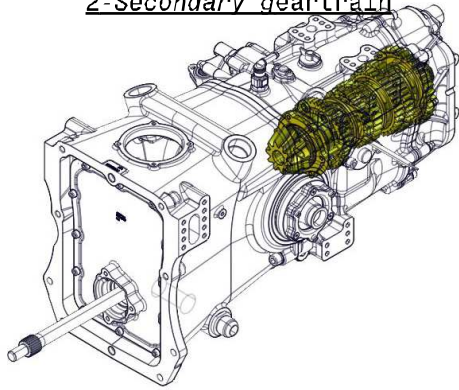
N°	Ref.	Désignation	Qté	Couple (N.m)	Colle
1	CPL10310085011	couple 10x31 équipé	1		
	F00850121	1a roulement tête de couple	1		
	F00850131	1b jeu de cales d'avancement	1		
	F00850081	1c roue de M-AR équipée	1		
	0301191	1d* vis CHc M7x30 cl10.9	6	30	648
	F9002038	1e* écrou de secondaire	1	180	G.C
	F9005010	1f* rondelle à encoches	1		
	9907004	1g* anneau extérieur ø30	2		
2	0105043	cage à aiguilles K38x43x17	6		
3	ref.p pièce	rapport de 6ème	1		
4	F0085003	support baladeur	3		
5	F0085004	baladeur	3		
6	ref.p pièce	rapport de 5ème	1		
7	F0085005	bague épaulée	2		
8	ref.p pièce	rapport de 4ème	1		
9	ref.p pièce	rapport de 3ème	1		
10	ref.p pièce	rapport de 1ère-2ème	1		
11	F0085007	bague épaulée de 1ère	1		
12	0103011	roulement NU206	1		518

(*) pièces du kits révision KITREVSL7514LW

SADEV Gearbox
SL75-14-LW-F4
Exploded views



2-Secondary geartrain



reference 2 and 3 not present on the 5-speed gearbox

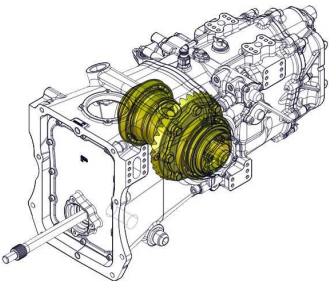
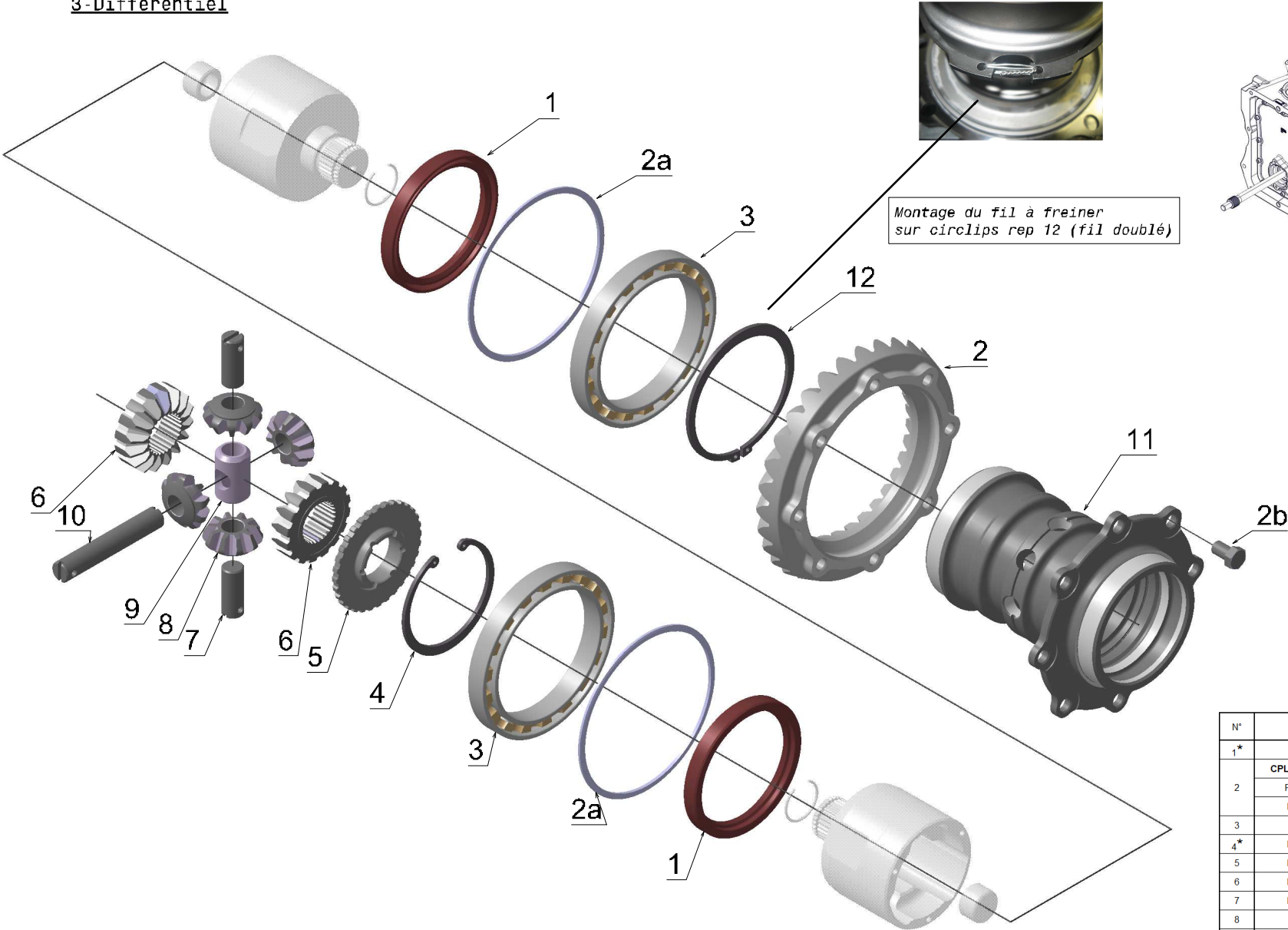
N°	Rep	Description	Qty	Torque (N.m)	Glue
	CPL10310085011	complete final drive 10x31	1		
1	F00850121	a twin bearing assembly	1		
	F00850131	b bevel gear advance shim set	1		
	F00850081	c reverse gear pinion	1		
	0301191	d* M7x30 CHc bolt	6	30	648
	F9002038	e* secondary nut	1	180	C.G
	F9005010	f* nut stopping washer	1		
	9907004	g* ø30 circlip	2		
2	0105043	K38x43x17 bearing	6		
3	part number	6th gear	1		
4	F0085003	hub	3		
5	F0085004	dog ring	3		
6	part number	5th gear	1		
7	F0085005	gear bearing inner race	2		
8	part number	4th gear	1		
9	part number	3rd gear	1		
10	part number	1st-2nd gears	1		
11	F0085007	1st gear bearing inner race	1		
12	0103011	NU206 bearing	1		518

(*) parts included in the rebuilt kit KITREVS7514LW

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Eclaté



3-Differential



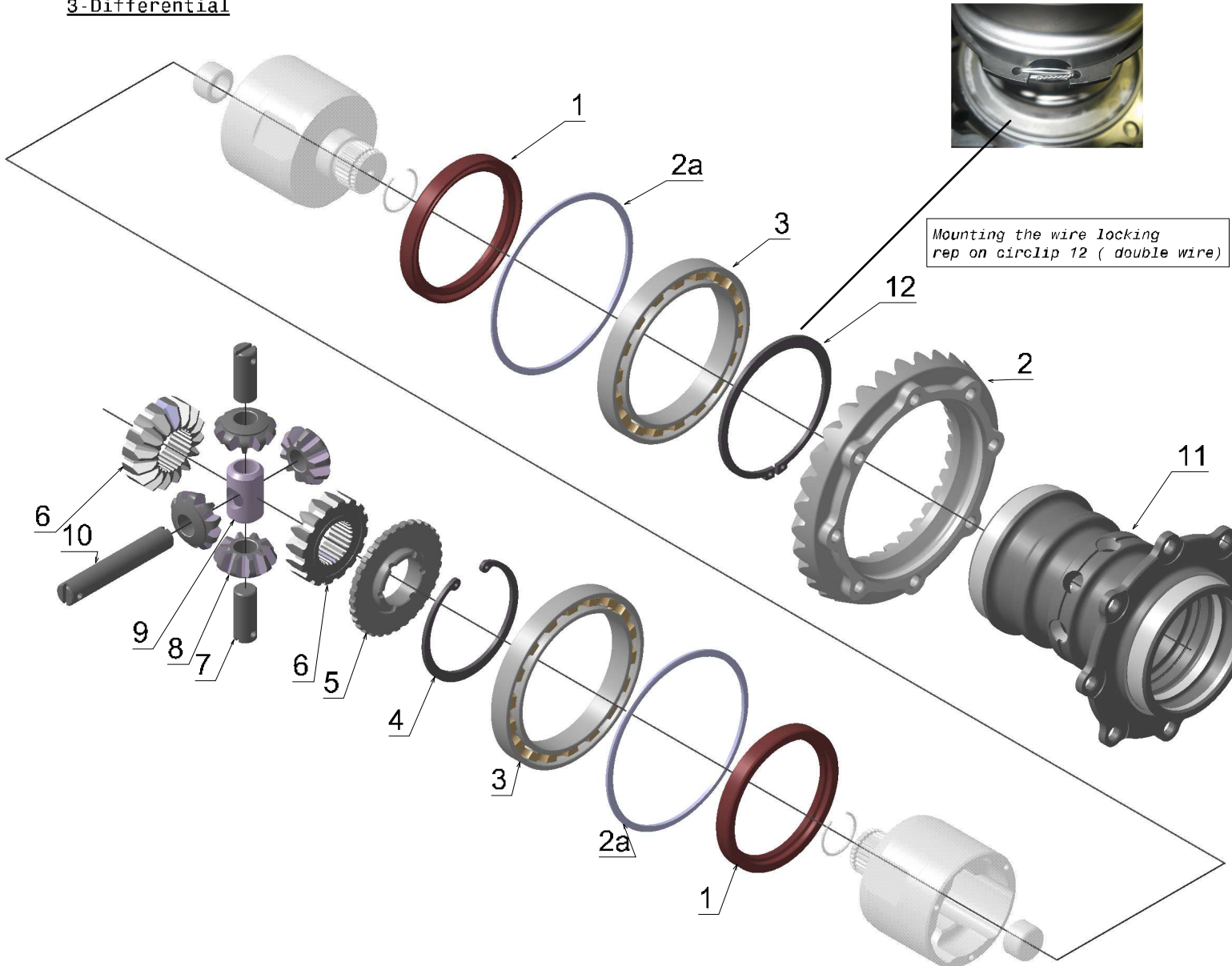
Montage du fil à freiner sur circlips rep 12 (fil doublé)

N°	Ref	Désignation	Qté	Couple (N.m)	Colle
1*	0204041	joint simple lèvre ø85x105x12	2		
	CPL10310085011	couple 10x31 équipé	1		
2	F19103201	a cale de réglage entre dts	2		
	F0085941	b* Vis de couronne	8	90	648
3	0101054	roulement AB 12458 S03	2		
4*	F9047303	circlips intérieur ø85	1		
5	F0085414	couvercle	1		
6	F1910310	planétaire	2		
7	F0044007	demi axe de satellites	2		
8	5099062	satellites	4		
9	F0044006	noix	1		
10	F0044008	axe satellites	1		
11	F0085411	boitier 4 satellites	1		
12*	0601040	circlips extérieur ø95	1		

(*) pièces du kits révision KITREVSL7514LW

SADEV Gearbox
 SL75-14-LW-F4
 Exploded views

3-Differential



N°	Rep	Description	Qty	Torque (N.m)	Glue
1*	0204041	ø85x105x12 lip seal	2		
	CPL10310085011	Complete final drive 10x31	1		
2	F19103201	a final drive clearance shim set	2		
	F0085941	b* Crown screw	8	90	648
3	0101054	AB 12458 S03 bearing	2		
4*	F9047303	ø85 circlip	1		
5	F0085414	differential cap	1		
6	F1910310	sun gear	2		
7	F0044007	half planet gear axle	2		
8	5099062	planet gear	4		
9	F0044006	hub	1		
10	F0044008	planet gear axle	1		
11	F0085411	differential case	1		
12*	0601040	ø95 circlip	1		

(*) parts included in the rebuilt kit KITREVSL7514LW

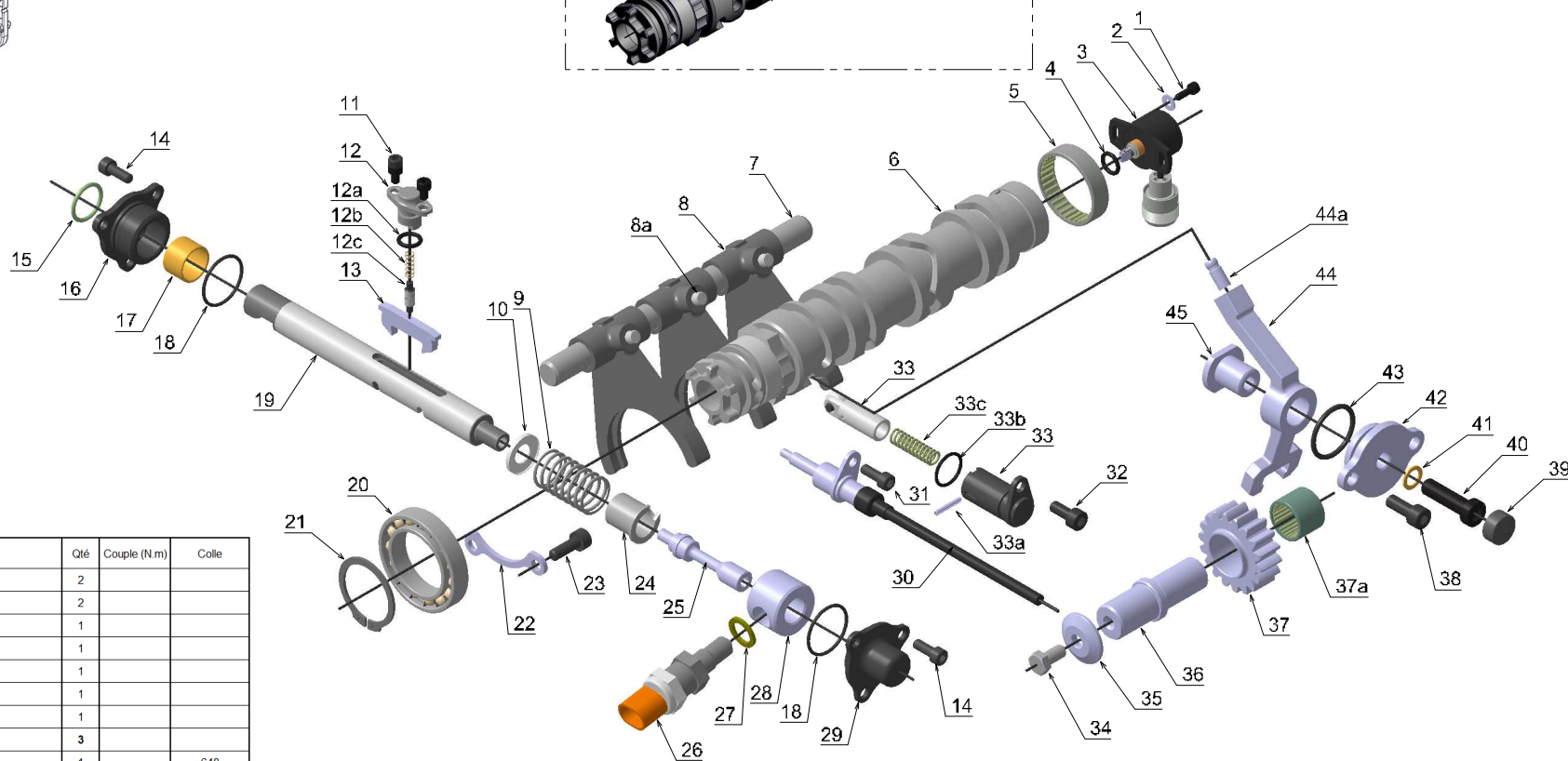
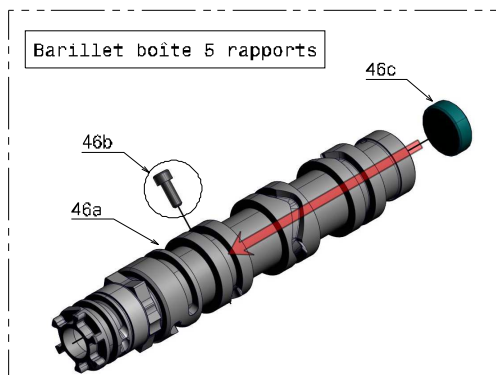
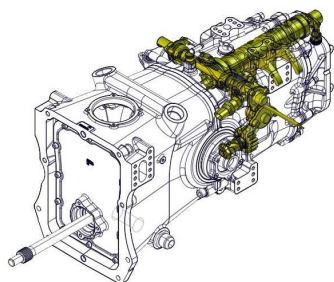
SADEV Boîte de vitesse
SL75-14-LW-F4
Eclaté



Barillet boîte 5 rapports

2018-06-13 réactualisé

4-Selection interne



N°	Ref.	Désignation	Qté	Couple (N.m)	Colle
1	0301425	vis CHc M4x12	2		
2	0502023	rondelle plate ø4	2		
3	F0089047	potentiomètre	1		
4*	0201017	joint torique ø10x2,5	1		
5	0106006	douille à aiguilles HK4012	1		
6	F00851132	barillet équipé version BV6	1		
7	F0085103	axe de fourchette	1		
8	F00851001	fourchette équipée	3		
	F0077120	8a doigt de commande	1		648
9	0801027	ressort de commande	1		
10	F9003667	rondelle d'appui de commande	1		
11	0301394	vis CHc M5x10	2	8	222
12	F14044031	kit poussoir	1		
	0201017	a* joint torique ø10x2,5	1		
	0801026	b* ressort	1		
	F9049071	c poussoir	1		
13	F0059040	cliquet double	1		
14	0301422	vis CHc M6x16	6	15	243
15*	0201004	joint torique ø20x2,5	2		
16	F0085120	bride de commande droite	1		
17	1202004	bague Permaglide PAP2015 P10	1		648
18*	0201164	joint torique ø29x2	2		
19	F0085119	axe de commande	1		
20	0101018	roulement à billes 61908	1		
21*	0601010	circlips extérieur ø40	1		
22	F0085116	arrêt de barillet	1		

23	0301013	vis CHc M7x20	2	22	243
24	F0059022	bague épaulée de commande	1		
25	F9001039	vis épaulée de commande	1	25	243
26	F0077119K	contacteur coupure	1		577
27	F0062011	cale de shifteur	1		
28	F0085122	entrenoise de sélection	1		
29	F0085121	bride de commande gauche	1		
30	F90079901	cable de verrouillage M-AR	1		
31	0301377	vis CHc M6x12	1	15	243
32	0301373	vis CHc M7x16	1	22	243
	F90241281	kit indexeur	1		
	0701069	a goupille ø18x2,5	1		
	0201020	b* joint torique ø16x2	1		
	0801046	c ressort	1		
34	F0085135	vis renvoi M-AR	1	35	270
35	F0085127	rondelle de maintien axe M-AR	1		

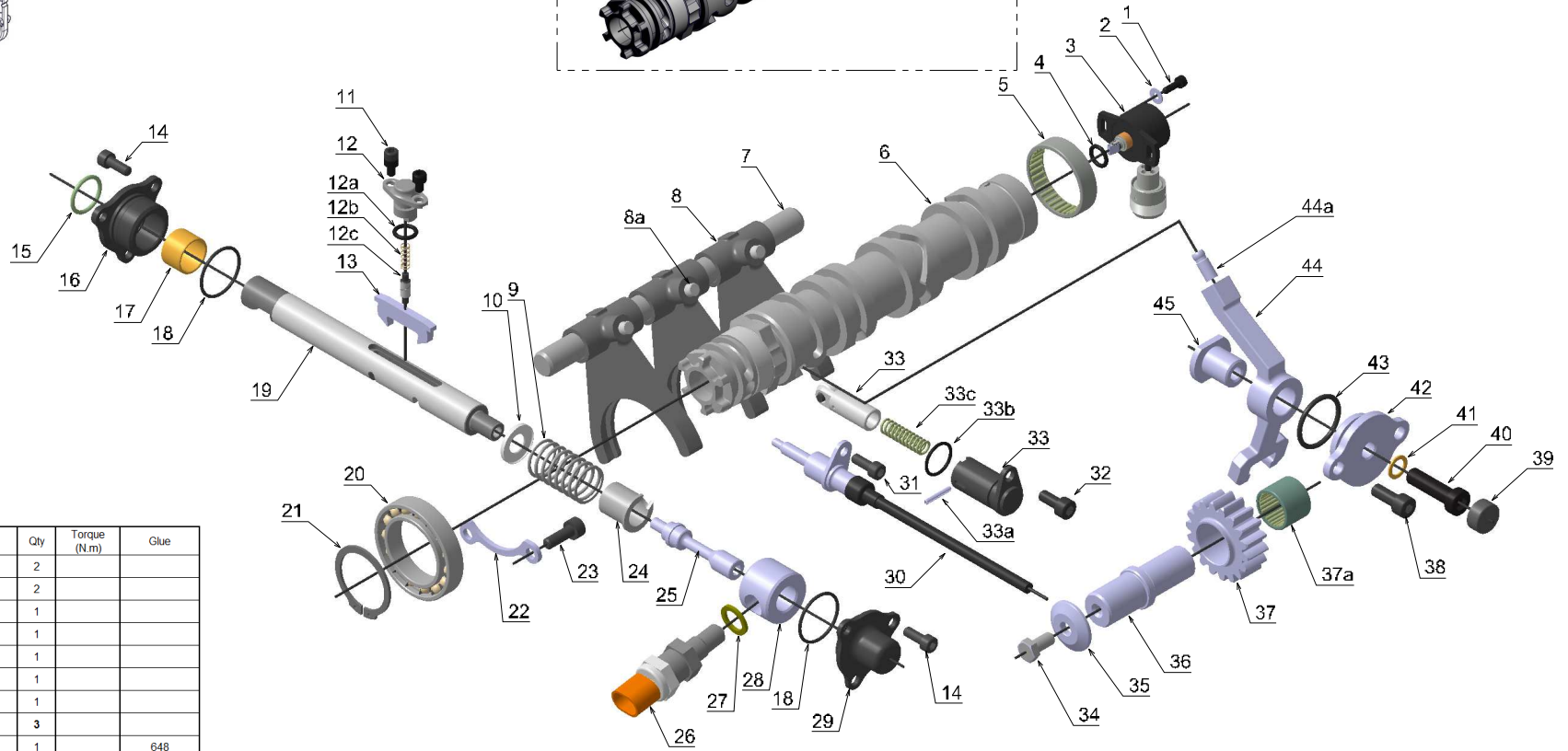
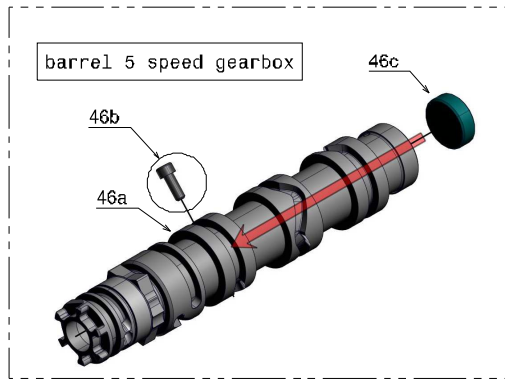
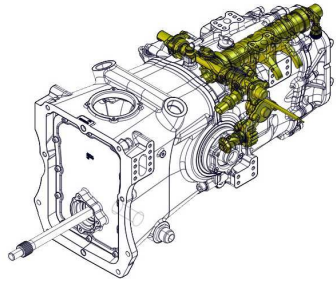
36	F0085126	axe renvoi de M-AR	1		
37	F00850091	renvoi de M-AR équipé	1		
	0106007	37a douille à aiguilles HK2020	1		648
38	0301421	vis CHc M8x20	2	32	270
39	F0085228	cache tête de vis	1		
40	0304006	vis CZHc M10x35	1	55	270
41*	0599017	rondelle cuivre ø10,2x15x1	1		
42	F0085123	support basculeur M-AR	1		
43*	0201104	joint torique ø29x3	1		
	F00851011	basculeur M-AR équipé	1		
44	F0077108	44a doigt de commande M-AR	1		648
45	F0085111	écrou de M-AR	1		
	F00851133	Barillet équipé version BV5	1		
	F00851132	46a barillet équipé	1		
	F1901018	46b Vis CHC M5 x 16 cl 12.9 brut retouchée	1		648
	F1901011	46c Pièce intérieur barillet	1		

(*) pièces du kits révision KITREVSL7514LW

SADEV Gearbox
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Exploded views



4-Internal gear selector



N°	Rep	Description	Qty	Torque (N.m)	Glue
1	0301425	M4x12 CHc bolt	2		
2	0502023	ø4 washer	2		
3	F0089047	potentiometer	1		
4*	0201017	ø10x2,5 O'ring	1		
5	0106006	HK4012 bearing	1		
6	F00851132	barrell assembly 6 speed gearbox	1		
7	F0085103	fork axle	1		
8	F00851001	complete fork	3		
	F0077120	8a selector pin	1		648
9	0801027	selector spring	1		
10	F9003667	selector washer	1		
11	0301394	M5x10 CHc bolt	2	8	222
	F14044031	complete dual pin rock pusher	1		
	0201017	a* ø10x2,5 O'ring	1		
	0801026	b* pusher spring	1		
	F9049071	c pusher	1		
13	F0059040	dual pin rock	1		
14	0301422	M6x16 CHc bolt	6	15	243
15*	0201004	ø20x2,5 O'ring	2		
16	F0085120	right selector closing block	1		
17	1202004	PAP2015 P10 bushing	1		648
18*	0201164	ø29x2 O'ring	2		
19	F0085119	selector axle	1		
20	0101018	61908 bearing	1		
21*	0601010	ø40 circlip	1		
22	F0085116	barrel stop	1		

23	0301013	M7x20 CHc bolt	2	22	243
24	F0059022	selector bushing	1		
25	F9001039	selector axle bolt	1	25	243
26	F0077119K	powershift	1		577
27	F0062011	powershift shim set	1		
28	F0085122	selector spacer	1		
29	F0085121	left selector closing block	1		
30	F90079901	reverse gear unlocking cable	1		
31	0301377	M6x12 CHc bolt	1	15	243
32	0301373	M7x16 CHc bolt	1	22	243
	F90241281	complete indexor	1		
	0701069	a goupille ø18x2,5dowel pin	1		
	0201020	b* ø16x2 O'ring	1		
	0801046	c indexor spring	1		
34	F0085135	reverse gear bolt	1	35	270
35	F0085127	reverse gear washer	1		
36	F0085126	reverse gear axle	1		

37	F00850091	complete reverse gear	1		
	0106007	37a HK2020 bearing	1		648
38	0301421	M8x20 CHc bolt	2	32	270
39	F0085228	bolt hat	1		
40	0304006	M10x35 CZHc bolt	1	55	270
41*	0599017	ø10,2x15x1 copper washer	1		
42	F0085123	rocker guide	1		
43*	0201104	ø29x3 O'ring	1		
44	F00851011	complete reverse gear rocker	1		
	F0077108	44a reverse gear pin	1		648
45	F0085111	reverse gear nut	1		
	F00851133	Barrel assembly 5 speed gearbox	1		
	F00851132	46a barrel assembly	1		
	F1901018	46b M5 x 16 cl 12.9 Chc bolt rework	1		648
	F1901011	46c inner part (barrel)	1		

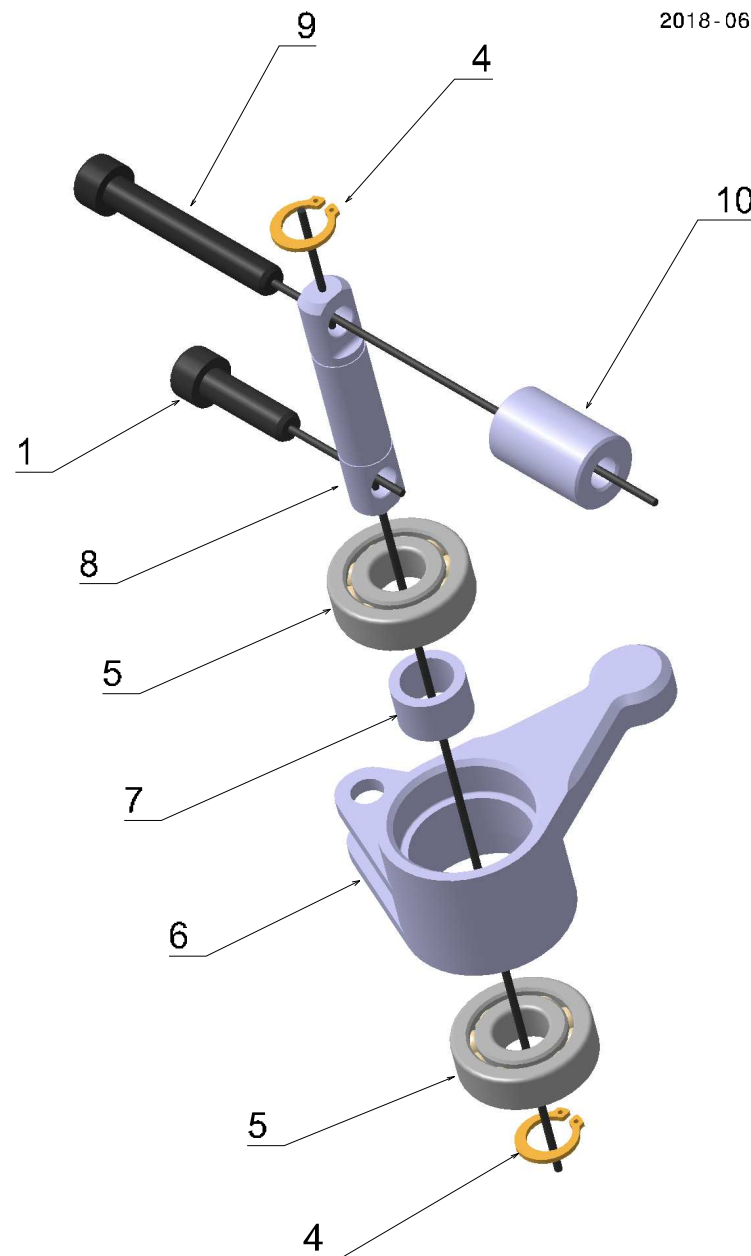
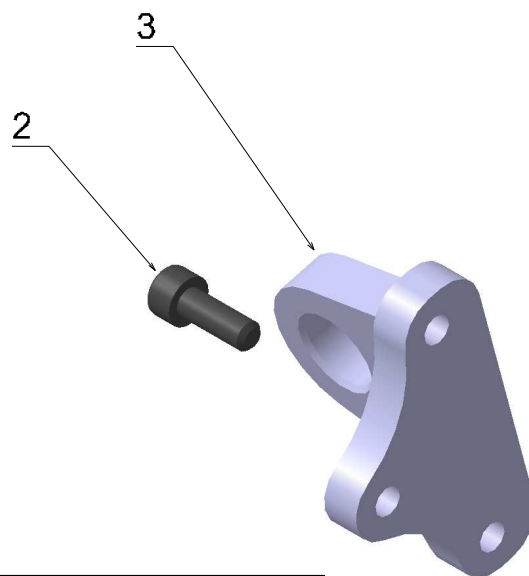
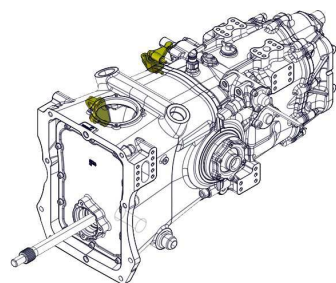
(*) parts included in the rebuilt kit KITREVSL7514LW

SADEV Boîte de vitesse
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Eclaté

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2018-06-13 réactualisé

5-Selection externe



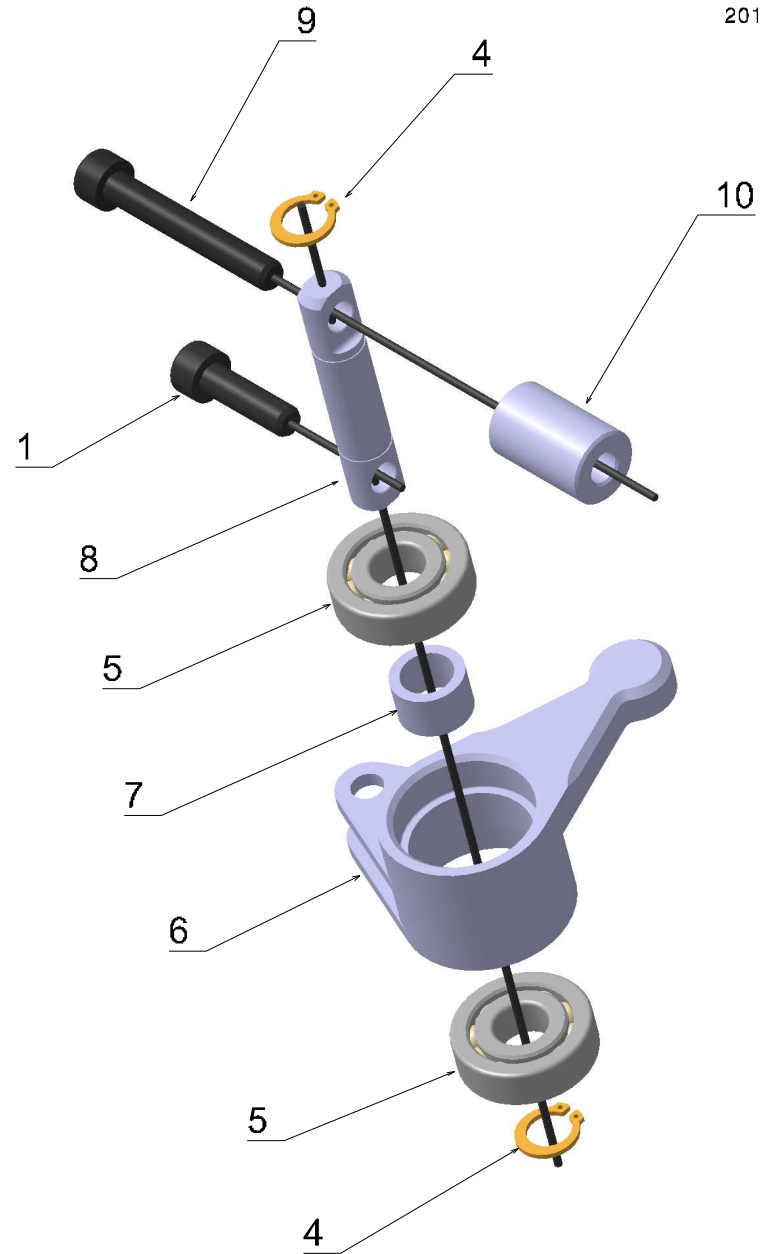
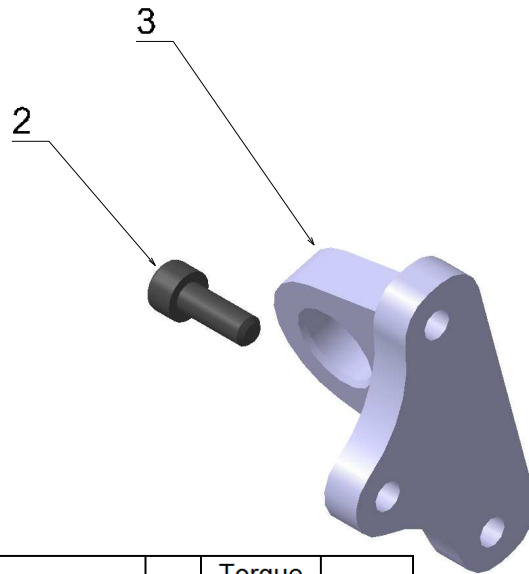
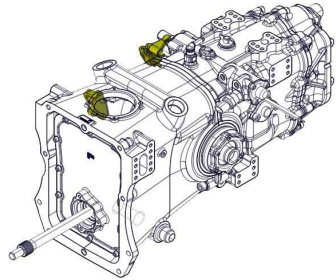
N°	Ref.	Désignation	Qté	Couple de serrage	Colle
1	0301385	Vis CHC M6 x 20 cl 10.9 zingué noir	1	15	243
2	0301422	Vis CHC M6 x 16 cl 10.9 zingué noir	3	15	243
3	F0085996	arrêt de push pull	1		
4*	0601042	circlips extérieur ø10	2		
5	0101035	roulement à billes 6000	2		
6	F0085994	renvoi de commande	1		
7	F0085992	entretoise de roulement	1		
8	F0085124	axe de renvoi externe	1		
9	0301442	vis CHc M6x40	1	15	243
10	F0085131	entretoise sélection externe	1		

(*) pièces du kits révision KITREVSL7514LW

SADEV Gearbox
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 Exploded views



5-External gear selector



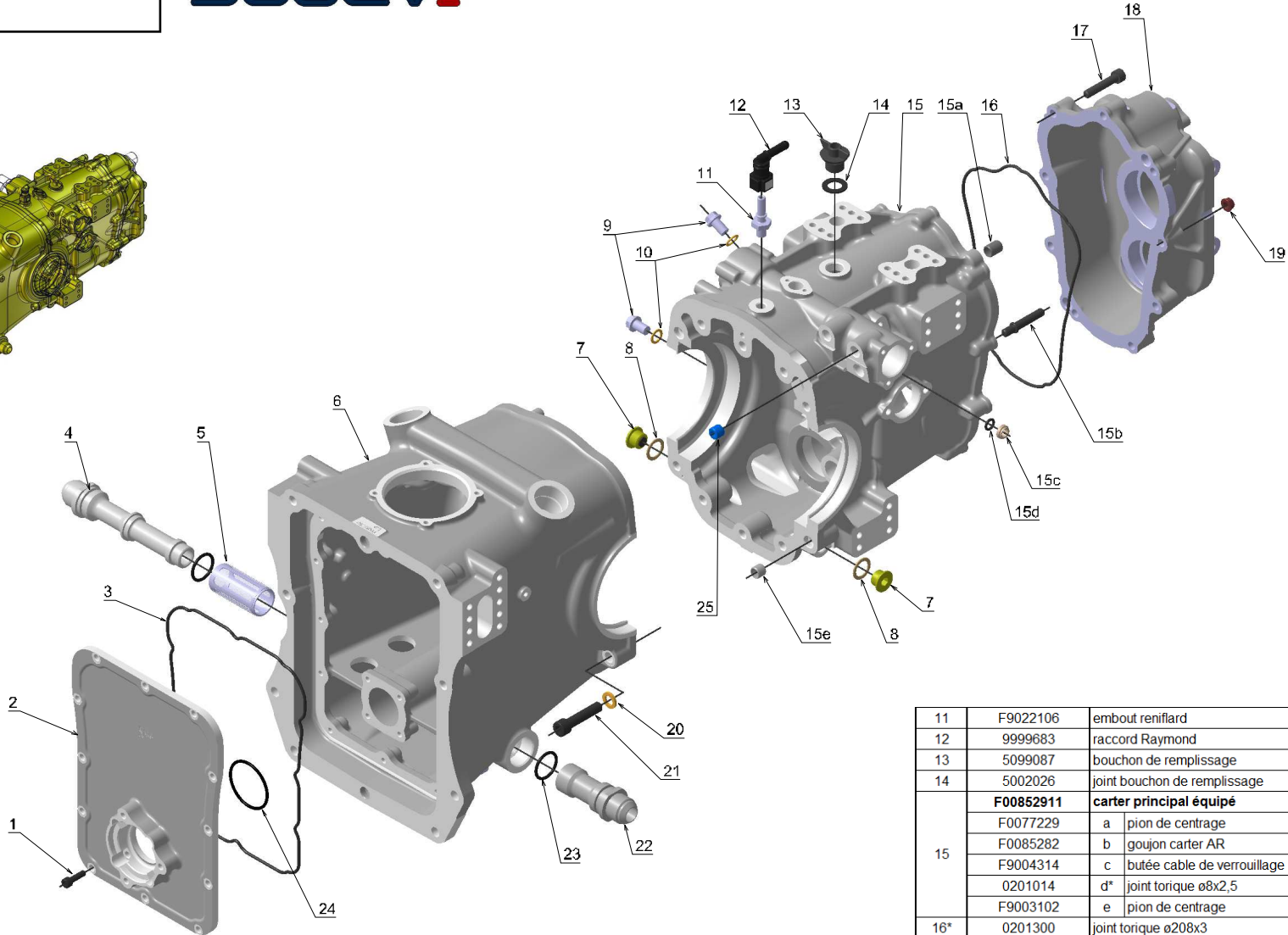
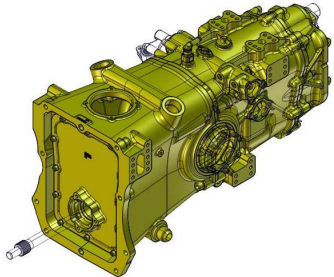
N°	Rep	Description	Qty	Torque (N.m)	Glue
1	0301385	M6x20 CHc bolt	1	15	243
2	0301422	M6 Nylstop nut	3	15	243
3	F0085996	cable stop	1		
4*	0601042	ø10 circlip	2		
5	0101035	6000 bearing	2		
6	F0085994	Selector rocker	1		
7	F0085992	bearing spacer	1		
8	F0085124	selector axle	1		
9	0301442	M6x40 CHc bolt	1	15	243
10	F0085131	selector spacer	1		

(*) parts included in the rebuilt kit KITREVS7514LW

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Eclaté



6-Carters



N°	Ref.	Désignation	Qté	Couple (N.m)	Colle
1	0301385	vis CHc M6x20	16	15	243
2	F0085287	plaque de fermeture bâche	1		
3*	0201305	joint torique ø25x3	1		
4	F9024419	raccord de crépine	1		577
5	F9024432	ensemble crépine	1		
6	F0085289	bâche à huile	1		
7	F1402058	bouchon de vidange	2		
8*	5002018	joint bouchon de vidange	2		
9	F2001138	bouchon	2		577
10*	0599017	rondelle cuivre ø10,2x15x1	2		

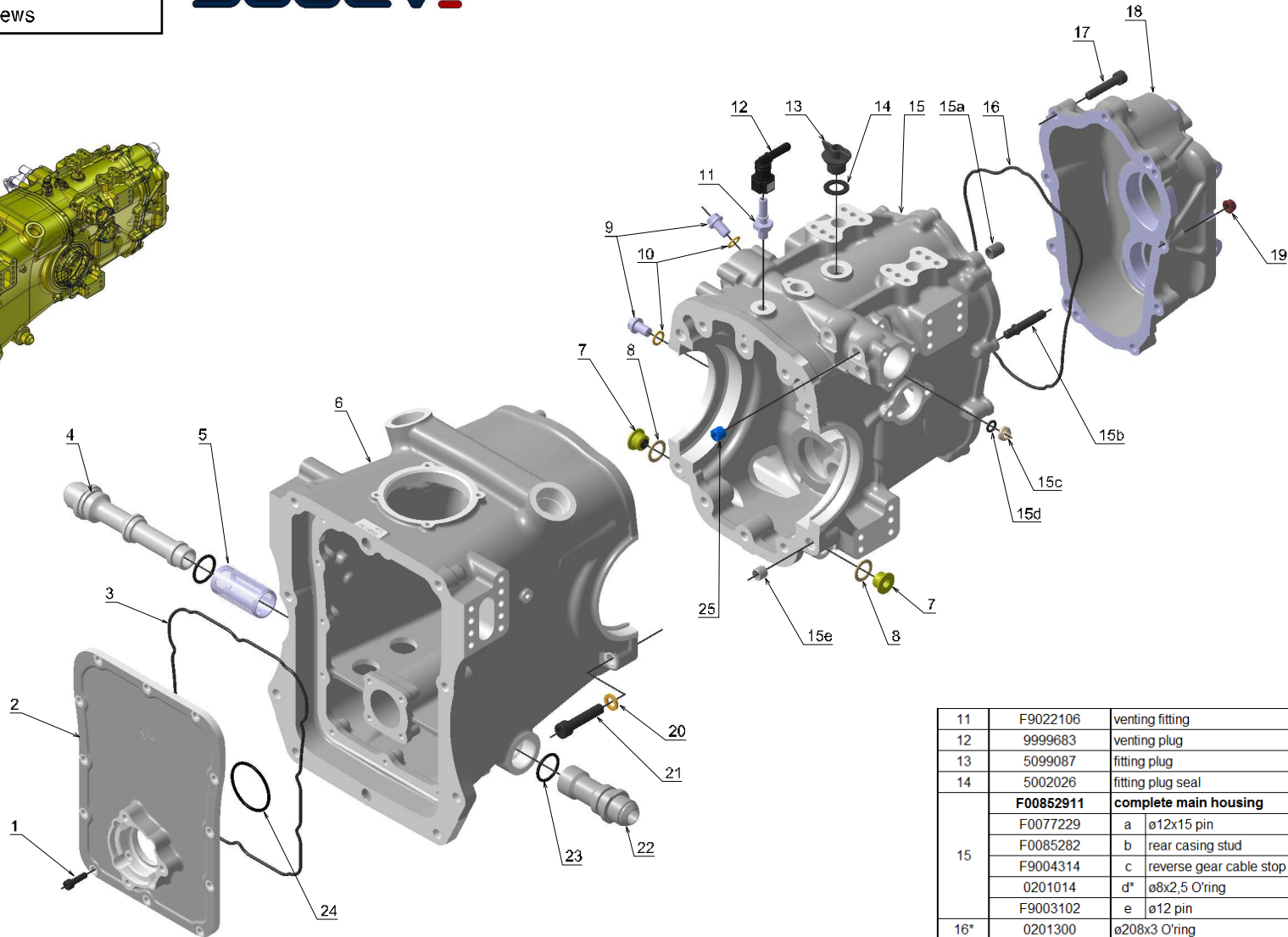
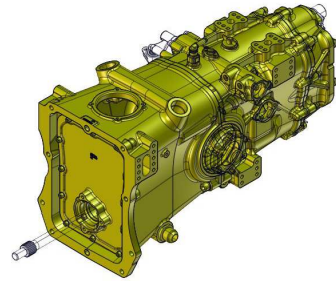
11	F9022106	embout reniflard	1		577
12	9999683	raccord Raymond	1		
13	5099087	bouchon de remplissage	1		
14	5002026	joint bouchon de remplissage	1		
15	F00852911	carter principal équipé	1		
	F0077229	a pion de centrage	2		648
	F0085282	b goujon carter AR	4	25	648
	F9004314	c butée cable de verrouillage	1		518
	0201014	d* joint torique ø8x2,5	1		
15*	F9003102	e pion de centrage	2		648
	0201300	joint torique ø208x3	1		
17*	0301524	vis CHc M8x40	5	25	222
18	F0085292	carter AR	1		
19*	0499003	écrou Simmonds M8x125	4	25	243
20*	0599054	rondelle Nordlock ø10	10		
	0301424	vis CHc M10x45	2	60	243
21*	0301406	vis CHc M10x35	6	60	243
	0301052	vis CHc M10x50	2	60	243
22	F0085255	embout de crépine	1		
23	0201275	joint torique ø24x3	2		
24*	0201074	joint torique ø46x3	1		
25	0302074	vis Hc M12x10	2		577

(*) pièces du kits révision KITREVSL7514LW

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Exploded views



6-Housings



N°	Ref.	Description	Qty	Torque (N.m)	Glue
1	0301385	M6x20 CHc bolt	16	15	243
2	F0085287	oil tank plate	1		
3*	0201305	ø25x3 O'ring	1		
4	F9024419	suction screen fitting	1		577
5	F9024432	suction screen	1		
6	F0085289	Oil tank housing	1		
7	F1402058	drain plug	2		
8*	5002018	drain plug seal	2		
9	F2001138	plug	2		577
10*	0599017	plug seal	2		

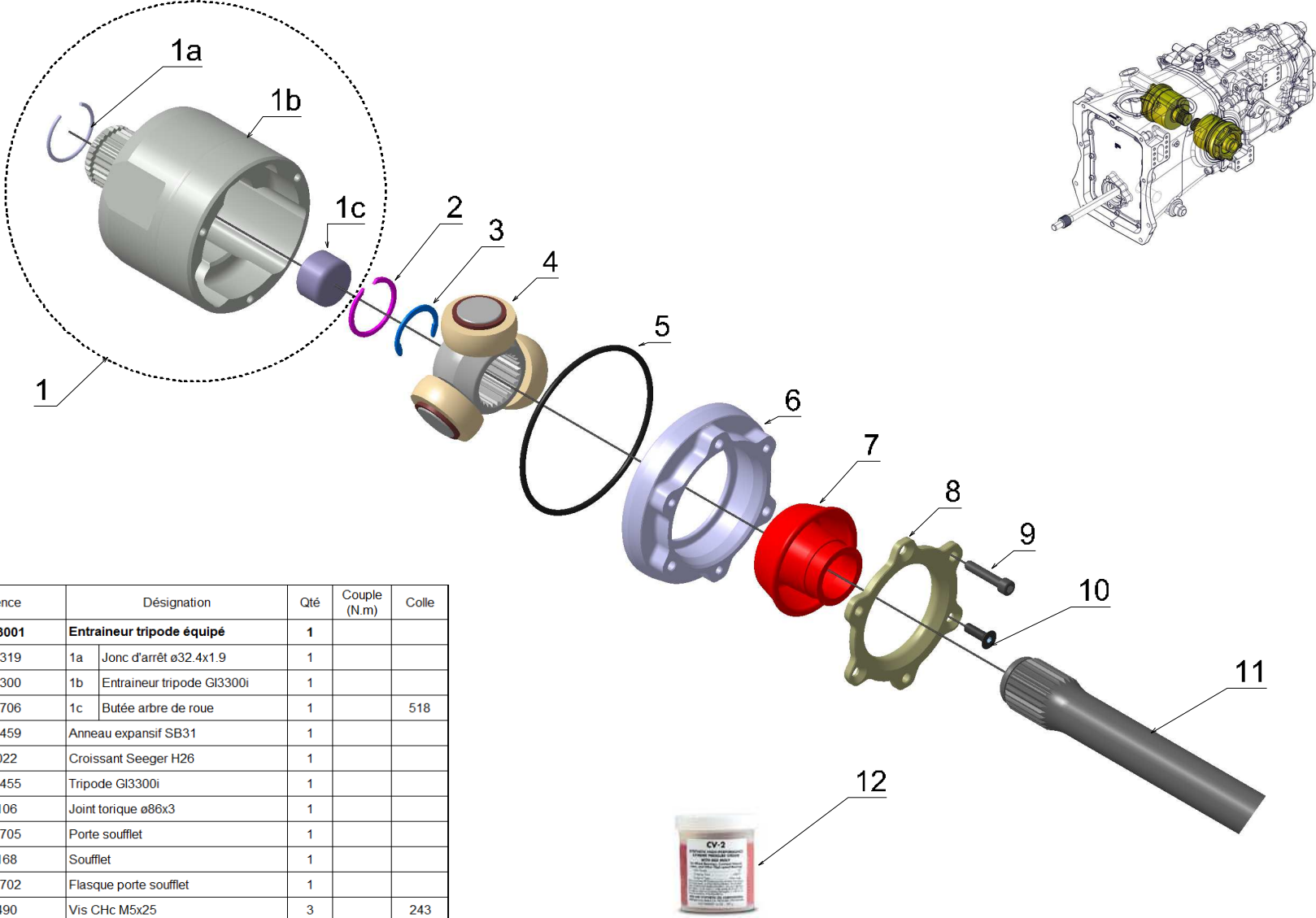
11	F9022106	venting fitting	1		577
12	9999683	venting plug	1		
13	5099087	fitting plug	1		
14	5002026	fitting plug seal	1		
15	F00852911	complete main housing	1		
	F0077229	a ø12x15 pin	2		648
	F0085282	b rear casing stud	4	25	648
	F9004314	c reverse gear cable stop	1		518
	0201014	d* ø8x2,5 O'ring	1		
15*	F9003102	e ø12 pin	2		648
	0201300	ø208x3 O'ring	1		
17*	0301524	M8x40 CHc bolt	5	25	222
18	F0085292	rear housing	1		
19*	0499003	M8x125 Simmonds nut	4	25	243
20*	0599054	ø10 Nordlock washer	10		
21*	0301424	M10x45 CHc bolt	2	60	243
	0301406	M10x35 CHc bolt	6	60	243
	0301052	M10x50 CHc bolt	2	60	243
22	F0085255	suction screen plug	1		
23	0201275	ø24x3 O'ring	2		
24*	0201074	ø46x3 O'ring	1		
25	0302074	M12x10 Hc bolt	2		577

(*) parts included in the rebuilt kit KITREVSL7514LW

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7-Transmission standard

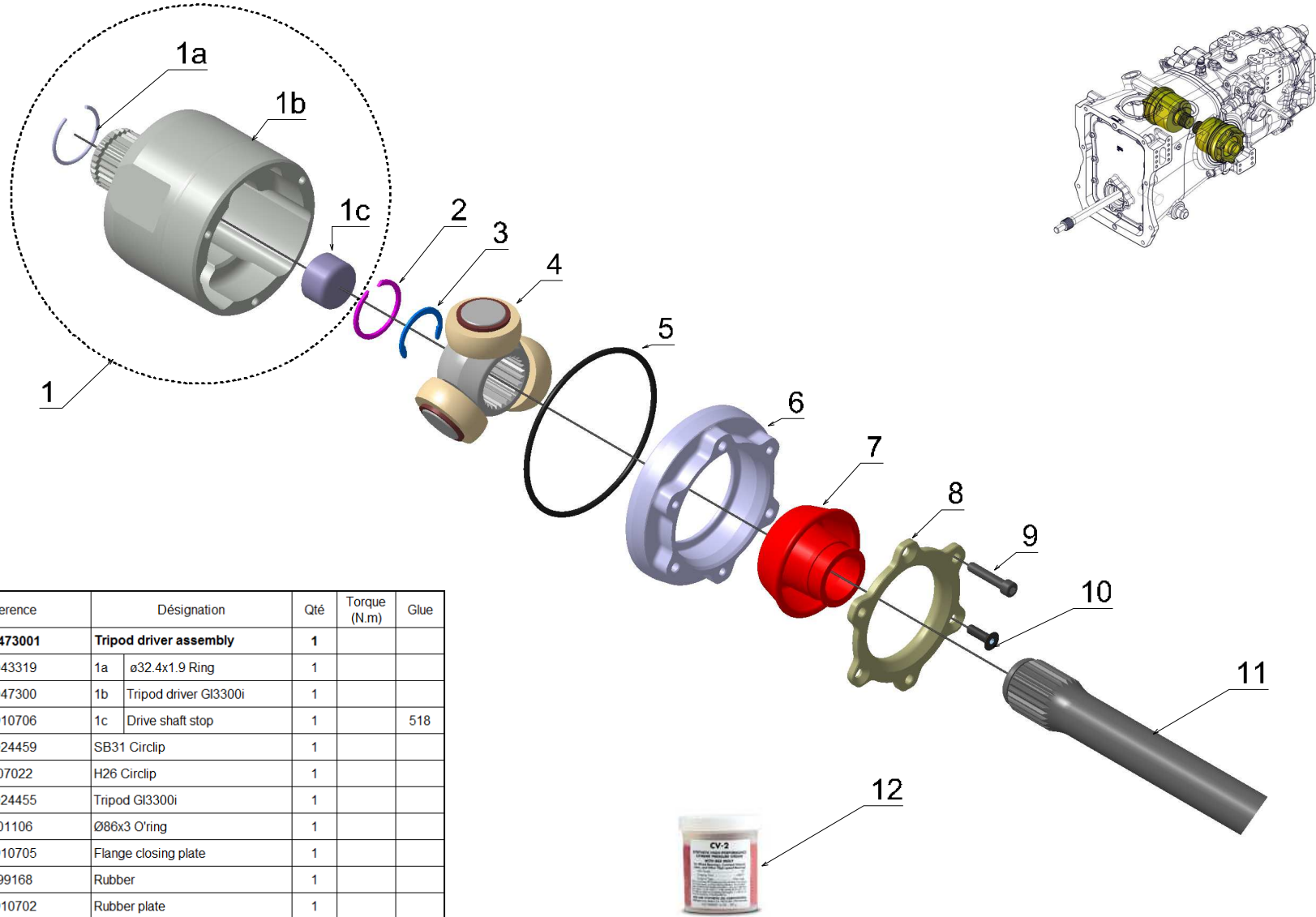


N°	Reference	Désignation	Qté	Couple (N.m)	Colle
1	F90473001	Entraîneur tripode équipé	1		
	F9043319	1a Jonc d'arrêt ø32.4x1.9	1		
	F9047300	1b Entraîneur tripode GI3300i	1		
	F1910706	1c Butée arbre de roue	1		518
2	F9024459	Anneau expansif SB31	1		
3	9907022	Croissant Seeger H26	1		
4	F9024455	Tripode GI3300i	1		
5	0201106	Joint torique ø86x3	1		
6	F1910705	Porte soufflet	1		
7	5099168	Soufflet	1		
8	F1910702	Flasque porte soufflet	1		
9	0301490	Vis CHc M5x25	3		243
10	0303062	Vis FHc M5x16	3		
11	ref suivant vehicule	Arbre de transmission	1		
12	9999250	Graisse	1		

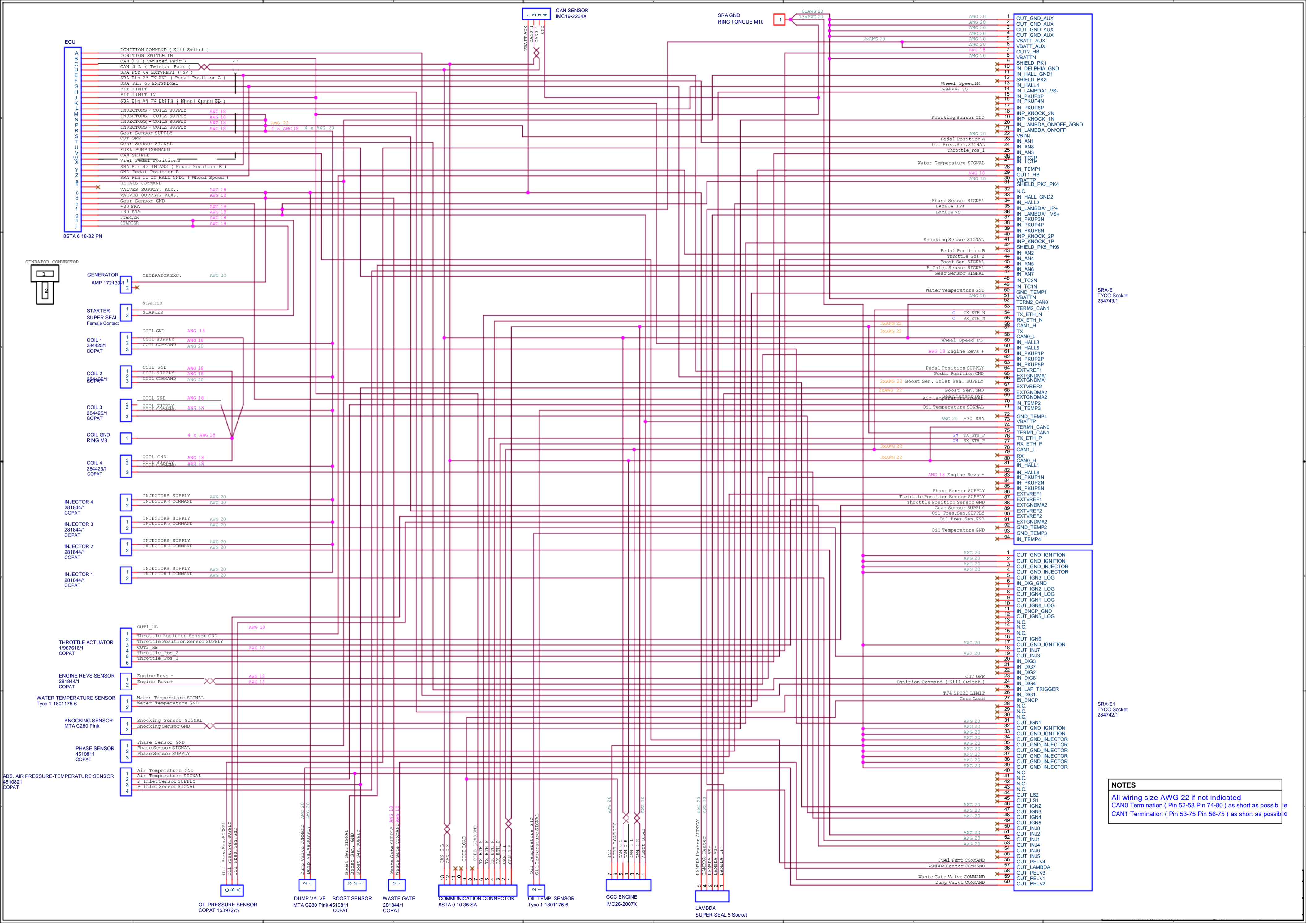
SADEV Gearbox
 SL75-14-LW-F4
 Exploded views



7-Standard transmission



N°	Reference	Désignation	Qté	Torque (N.m)	Glue
1	F90473001	Tripod driver assembly	1		
	F9043319	1a ø32.4x1.9 Ring	1		
	F9047300	1b Tripod driver GI3300i	1		
	F1910706	1c Drive shaft stop	1		518
2	F9024459	SB31 Circlip	1		
3	9907022	H26 Circlip	1		
4	F9024455	Tripod GI3300i	1		
5	0201106	Ø86x3 O'ring	1		
6	F1910705	Flange closing plate	1		
7	5099168	Rubber	1		
8	F1910702	Rubber plate	1		
9	0301490	M5x25 Chc bolt	3		243
10	0303062	M5x16 Fhc bolt	3		
11	according to vehicule	Drive shaft	1		
12	9999250	Grease	1		



NOTES

All wiring size AWG 22 if not indicated
 CAN0 Termination (Pin 52-58 Pin 74-80) as short as possible
 CAN1 Termination (Pin 53-75 Pin 56-75) as short as possible



FEDERATION INTERNATIONALE DE L'AUTOMOBILE

FIA FORMULA 4

Registered Manufacturers

A WORLD IN MOTION

FIA.COM



Company: MYGALE
Contact: Mr. DECSOTER
Email: decoster@mygale.fr
Country: FRANCE



Company: TATUUS
Contact: Mr. DE BELLIS
Email: gianfranco.debellis@tatuus.it
Country: ITALY



Company: DOME
Contact: Mr. FUSHIDA
Email: fushida@dome.co.jp
Country: JAPAN



Company: Onroak
Contact: Mr. CRAWFORD
Email: m.crawford@onroak.com
Country: USA



GEELY

吉利汽车



TOM'S

Company: GEELY
Contact: Mr. WANG
Email:
wangfeng@mitime.com.cn
Country: CHINA

Company: RENAULT
Contact: Mr. ALANORE
Email:
sylvain.alanore@renault.com
Country: FRANCE

Company: TOM'S
Contact: Mr. KOUMI
Email:
s.koumi@tomsracing.jp
Country: JAPAN



HONDA



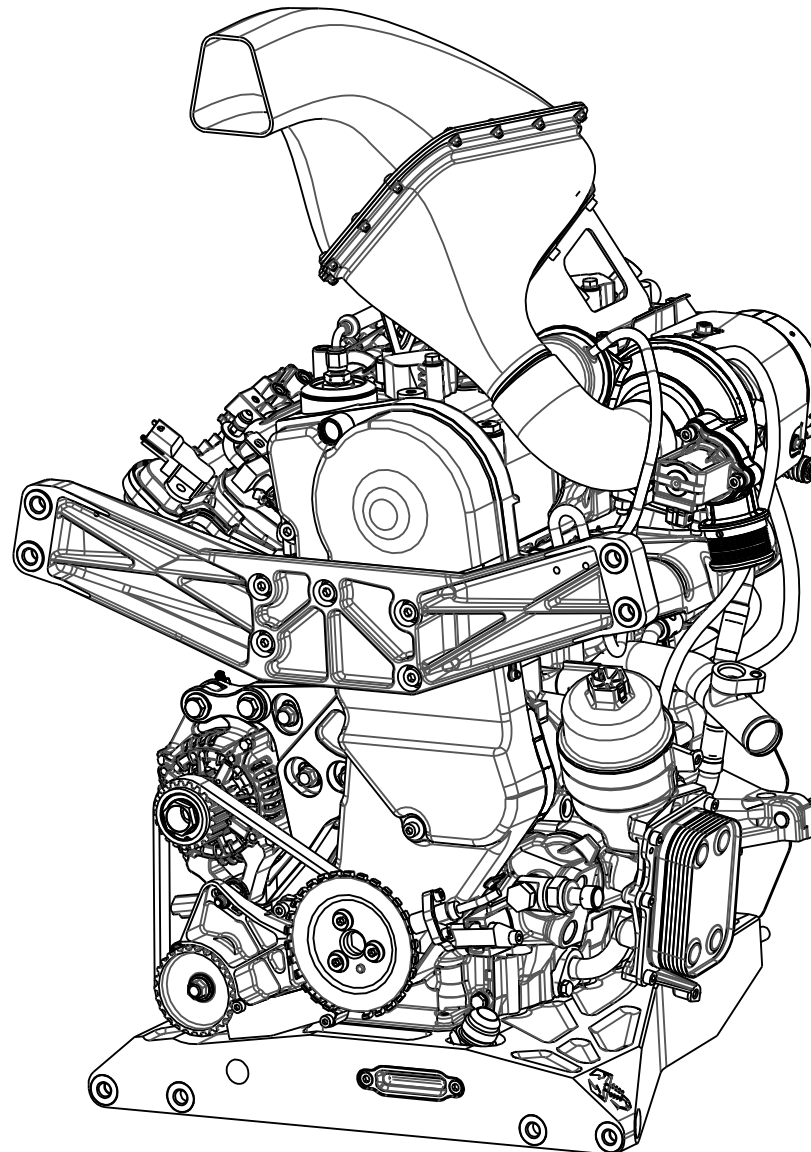
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Contact: Mr. NORTON
Email:
mnorton2@ford.com
Country: UK

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Contact: Mr. BARROW
Email:
JBarrow@hra.com
Country: USA

Company: ABARTH
Contact: Mr. BARBIERI
Email:
Andrea.barbieri@abarth.it
Country: ITALY

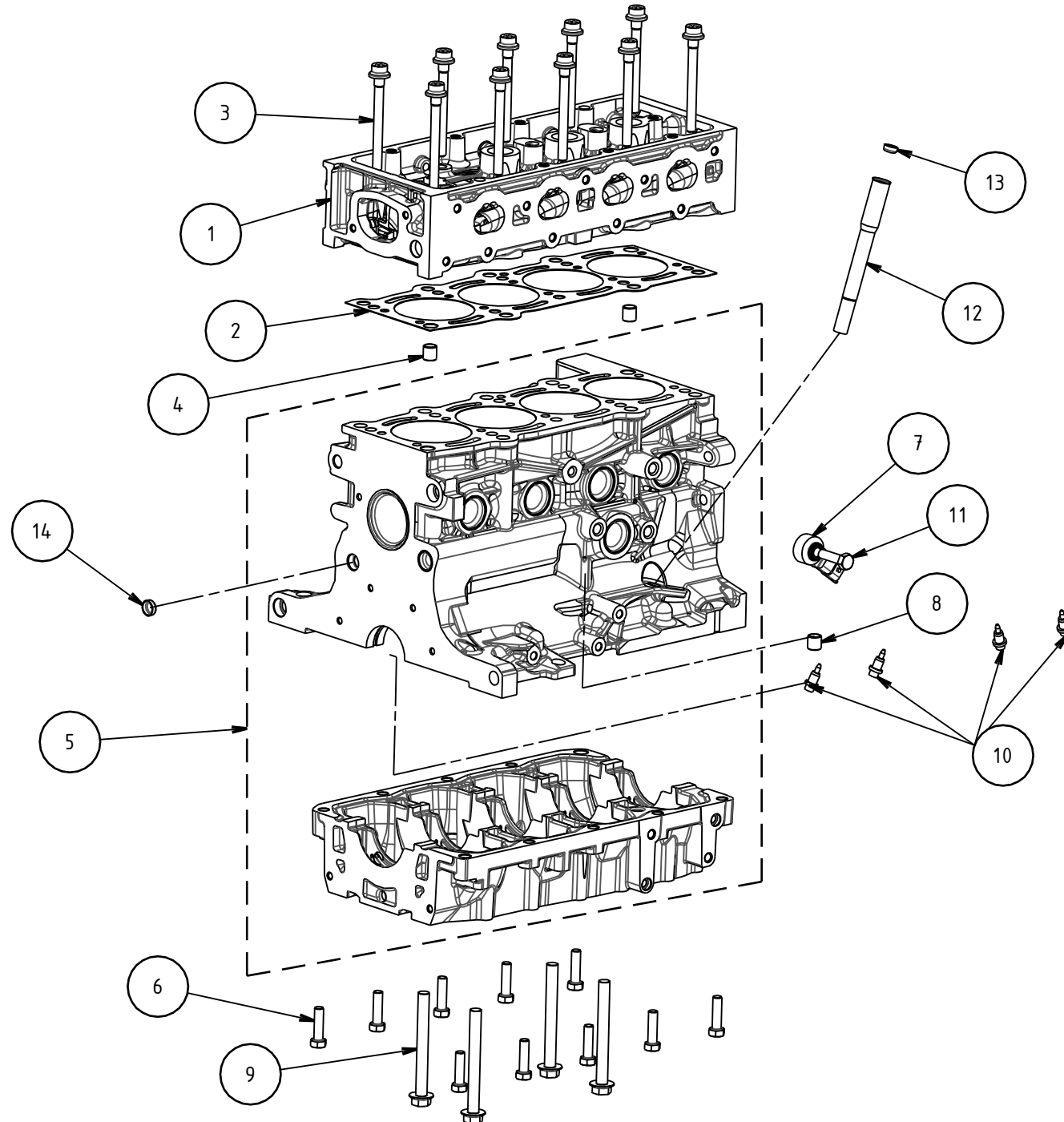
ABARTH 414F4

SPARE PARTS CATALOGUE



1 - Cylinder head and crankcase mounting

Release 23/02/2022



1 - Cylinder head and crankcase mounting

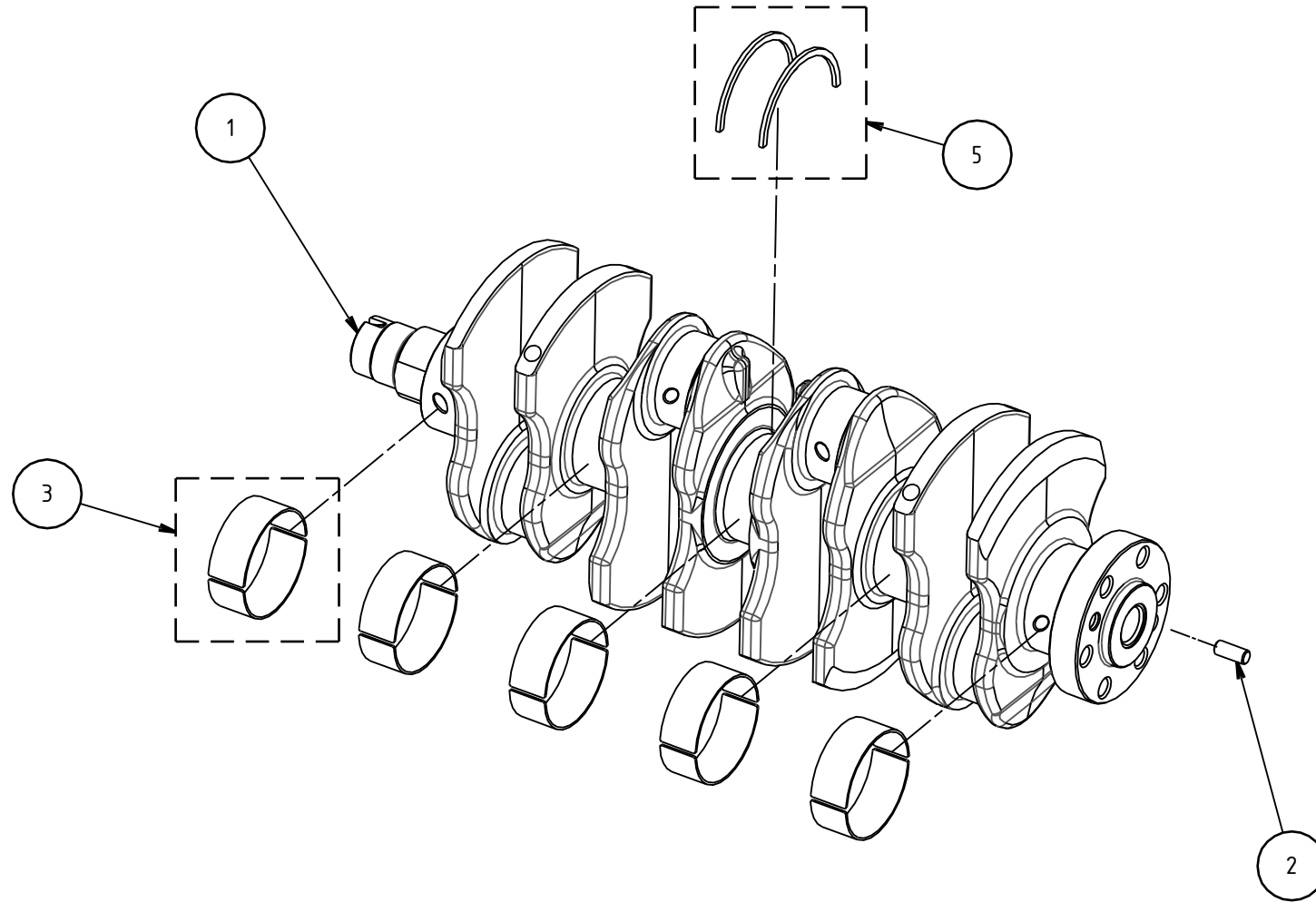
Release 23/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000460	CYLINDER HEAD	1	
2	AM000045	CYLINDER HEAD GASKET	1	-
3	AM000036	CYLINDER HEAD BOLT	10	Tightening torque: 30 Nm + 90°+ 90°
4	AM000035	CYLINDER HEAD BUSH	2	
5	AM000357	ENGINE BLOCK	1	
6	AM000062	CRANKSHAFT BOLT	10	Tightening torque 30 Nm
7	AM000167	KNOCKING SENSOR	1	
8	AM000075	ENGINE BLOCK BUSH	1	
9	AM000063	CRANKSHAFT BOLT	4	Tightening torque 20 Nm + 90°
10	AM000115	OIL SQUIRTER	4	
11	AM501317	HH BOLT M8x30 - 8.8	1	Tightening torque 25 Nm
12	AM000142	ENGINE OIL DIPSTICK PIPE	1	Loctite red 277
13	AM000207	FREEZE PLUG 12	1	Loctite red 277
14	AM000094	FREEZE PLUG 14	1	

2 - Cranckshaft

Release 01/03/2022



2 - Cranckshaft

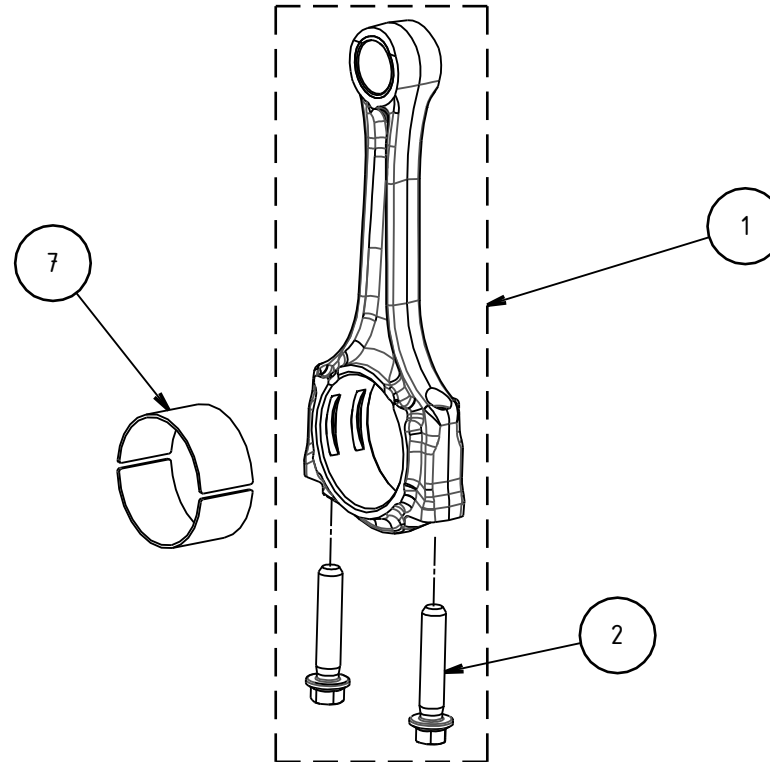
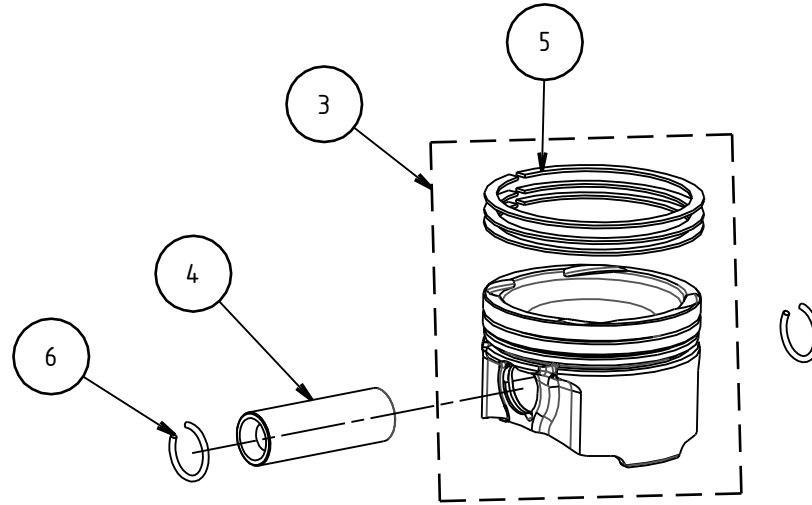
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000058	CRANKSHAFT	1	
2	AM000059	CRANKSHAFT GRUB SCREW	1	
3	AM000050	RED CRANKSHAFT BEARINGS COUPLE 1.836-1.84	5	
3	AM000051	BLUE CRANKSHAFT BEARINGS COUPLE 1.843-1.84	5	
3	AM000052	YELLOW CRANKSHAFT BEARINGS COUPLE 1.848-1.85	5	
5	AM000057	THRUST BEARINGS	1	

3 - Piston and connecting rod

Release 01/03/2022



3 - Piston and connecting rod

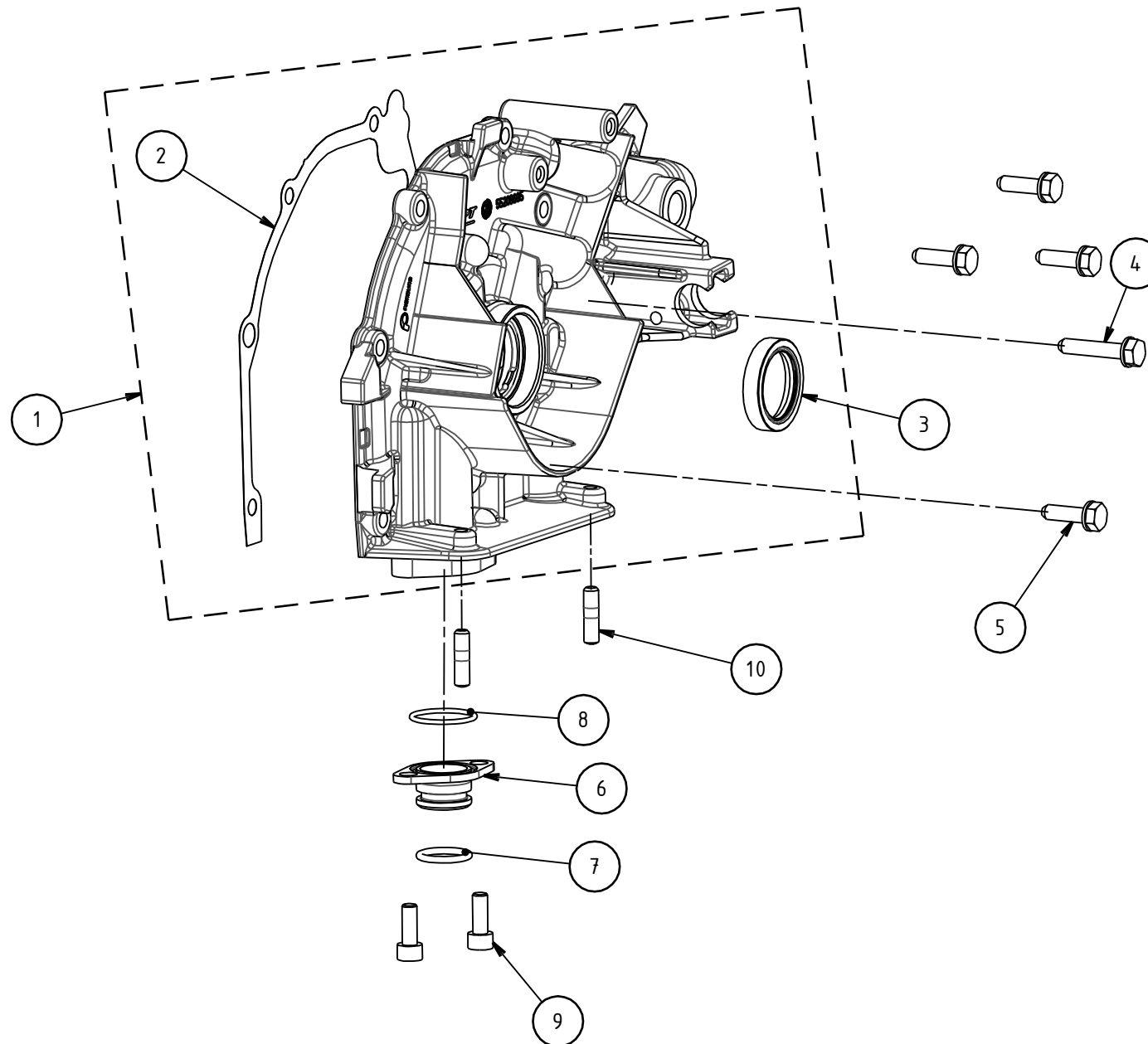
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000060	CONNECTING ROD	4	
2	AM000061	CONNECTING ROD BOLT	8	Tightening torque: 20 Nm + 40°
3	AM000065	PISTON A	4	
3	AM000066	PISTON B	4	
3	AM000067	PISTON C	4	
4	AM000068	PISTON PIN	4	
5	AM000069	PISTON RINGS	4	
6	AM000072	PISTON PIN RING	8	
7	AM000053	CONROD SHELL BEARING 0.000	1	

4 - Oil pump

Release 01/03/2022



4 - Oil pump

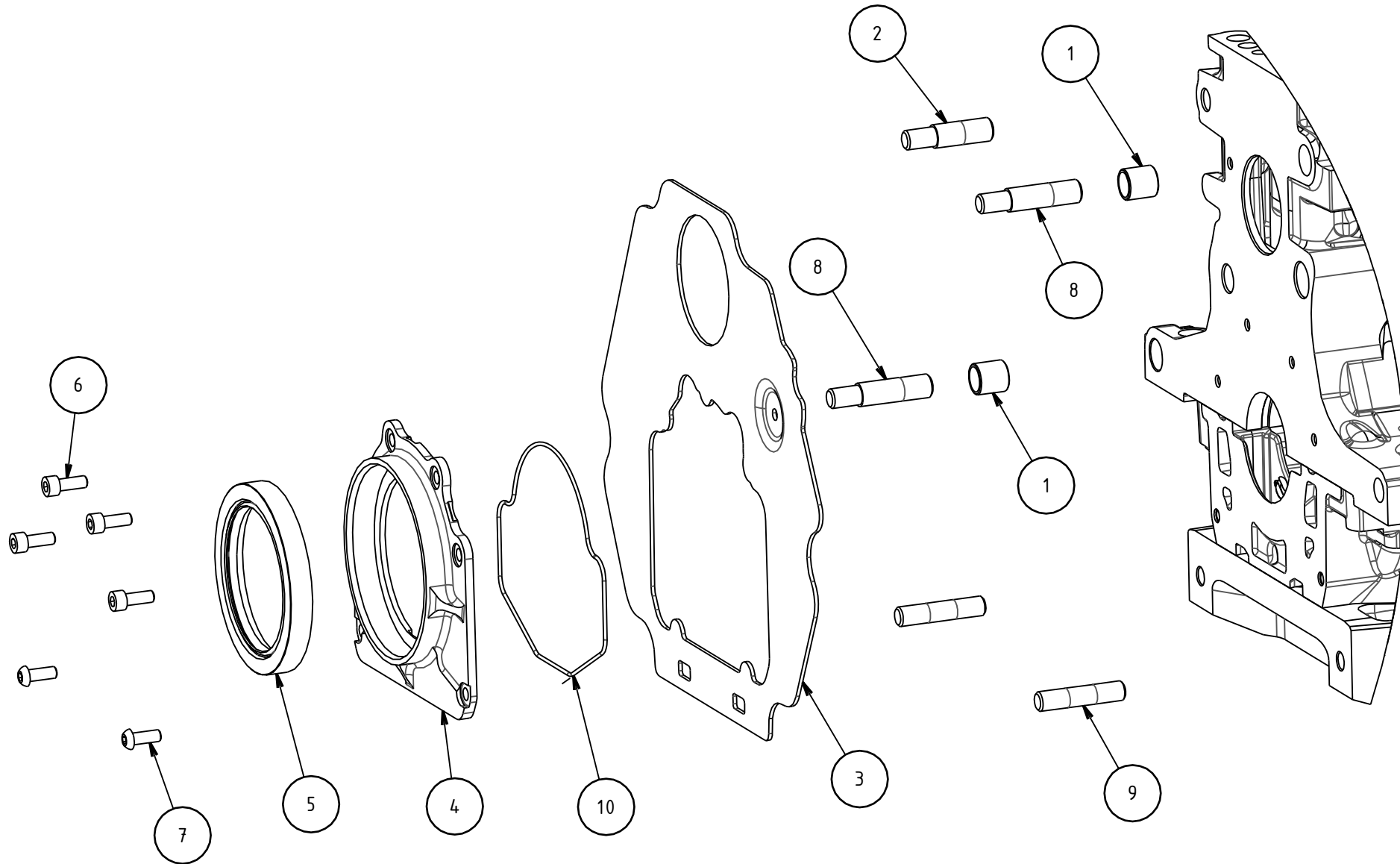
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000111	OIL PUMP	1	
2	AM000112	OIL PUMP GASKET	1	
3	AM000114	SHAFT SEAL 27x37x7 V	1	
4	AM000465	SCREW M6x32	1	Tightening torque: 12 Nm + Loctite blue 243
5	AM000113	OIL PUMP SCREW	4	Tightening torque: 12 Nm + Loctite blue 243
6	AM000136	OIL PUMP JOINT	1	
7	AM500064	OR 17.13 x 2.62 V	1	
8	AM501034	OR 23.52x1.78 V	1	
9	AM500401	CH BOLT M6x16-8.8	2	Tightening torque: 12 Nm + Loctite blue 243
10	AM000228	STUD M6x10	2	

5 - Rear crankshaft seal

Release 02/03/2022



5 - Rear crankshaft seal

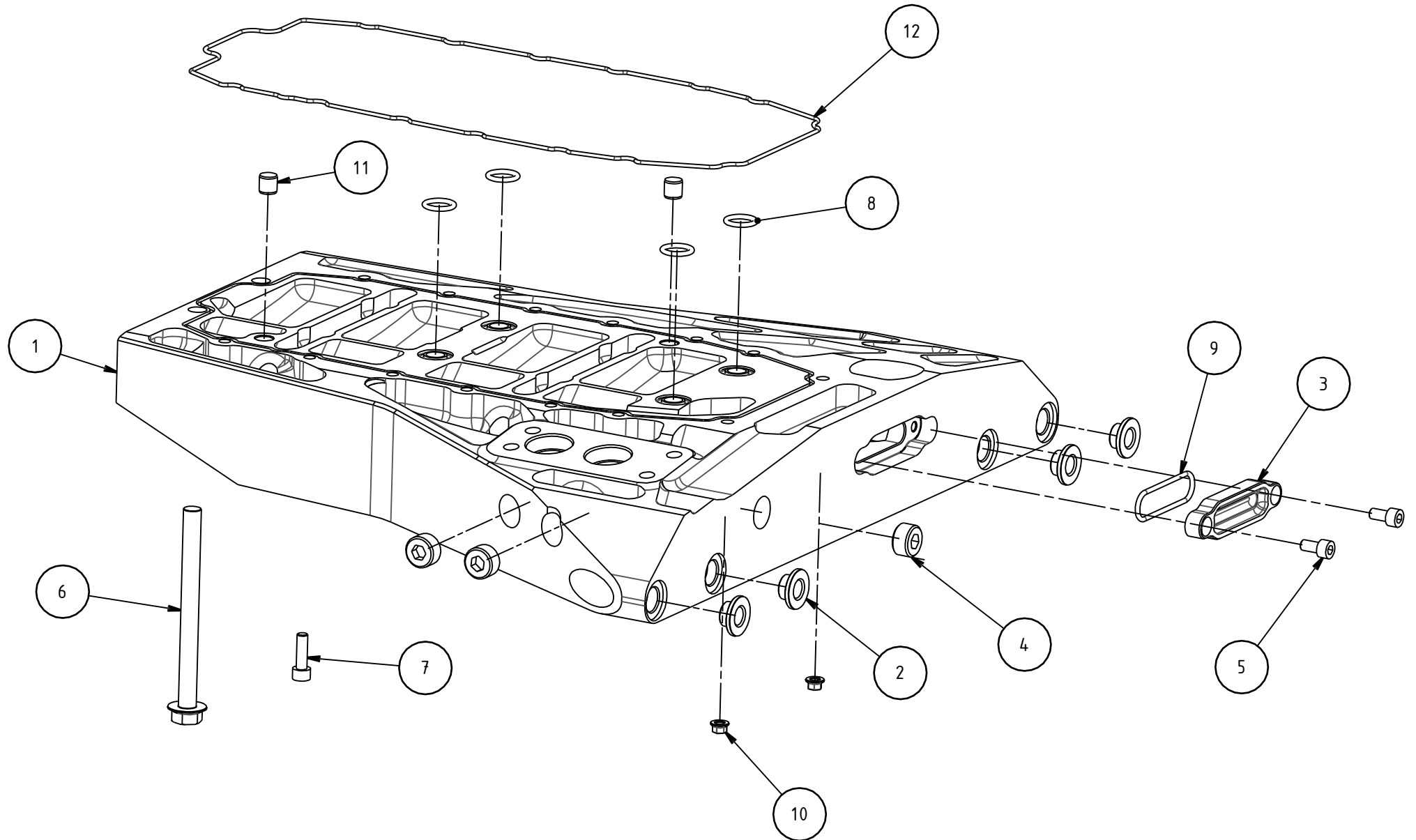
Release 02/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000076	REAR BLOCK BUSH	2	
2	AM000222	BLOCK STUD	1	Tightening torque: 35 Nm + Loctite red 277
3	AM000104	FLYWHEEL CARTER	1	
4	AM000073	CYLINDER BLOCK REAR COVER	1	
5	AM500092	SHAFT SEAL 74x98x12 V	1	
6	AM500401	CH BOLT M6x16-8.8	4	Tightening torque: 10 Nm + Loctite blue 243
7	AM500583	RH BOLT M6x16-8.8	2	Tightening torque: 10 Nm + Loctite blue 243
8	AM000223	BLOCK CENTERING STUD	2	Tightening torque: 35 Nm + Loctite red 277
9	AM000224	DRY SUMP REAR STUD	2	Tightening torque: 35 Nm + Loctite red 277
10	AM019005	FKM OR ROPE 1.78	0.5	

6 - Dry sump

Release 01/03/2022



6 - Dry sump

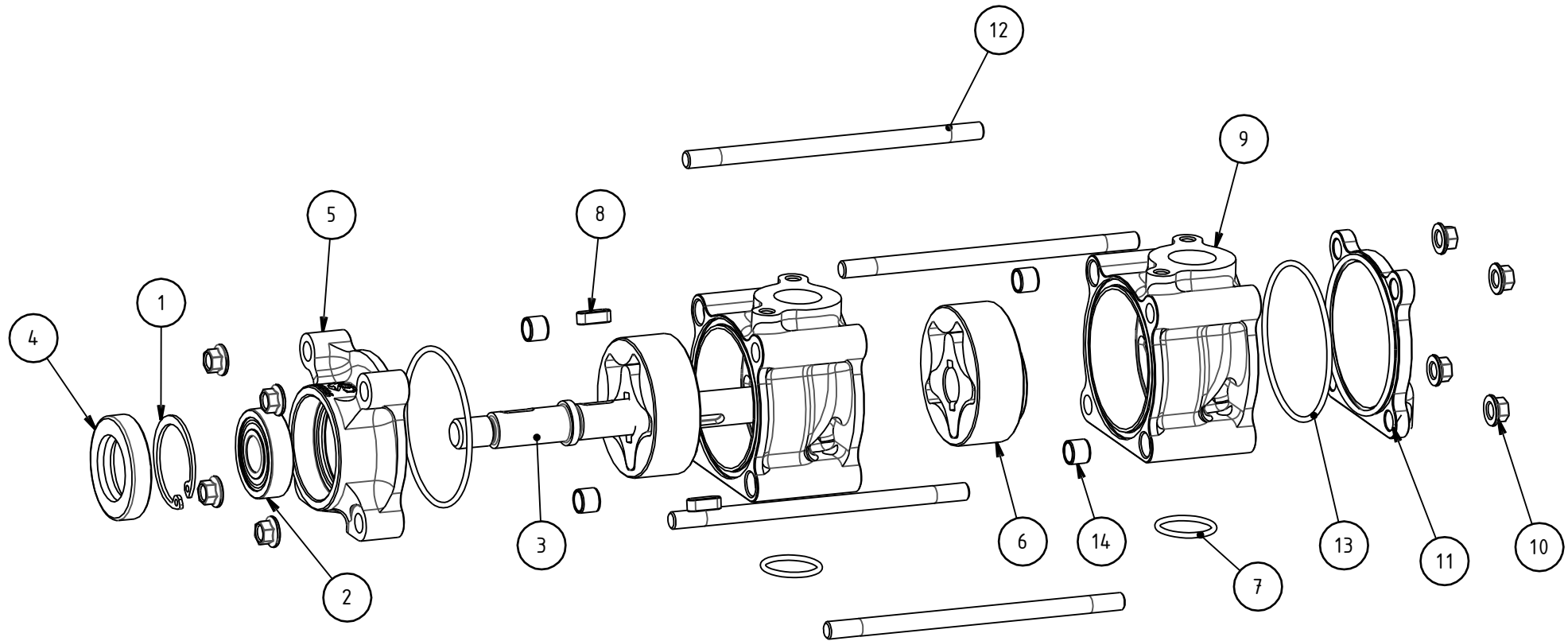
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000385	DRY SUMP	1	
2	AM000071	CHASSIS BUSH	4	
3	AM000070	INTAKE POCKET COVER	1	
4	AM500512	PLUG DIN 906 M18x1.5 S	3	Tightening torque: 30 Nm + Loctite red 277
5	AM500393	CH BOLT M6x12 - 8.8	2	Tightening torque: 12 Nm + Loctite blue 243
6	AM000064	CRANKSHAFT BOLT	6	Tightening torque: 20 Nm + 90°
7	AM500396	CH BOLT M6x20 - 8.8	12	Tightening torque: 12 Nm
8	AM500489	OR 13.95X2.62 V	4	
9	AM501043	OR 40.95x2.62 V	1	
10	AM000196	K-NUT M6x1	2	-
11	AM000138	CENTERING PIN D.10x10-h5	2	
12	AM019006	FKM CABLE O-RING 2MM	1	

7 - Oil scavenge pumps

Release 01/03/2022



7 - Oil scavenge pumps

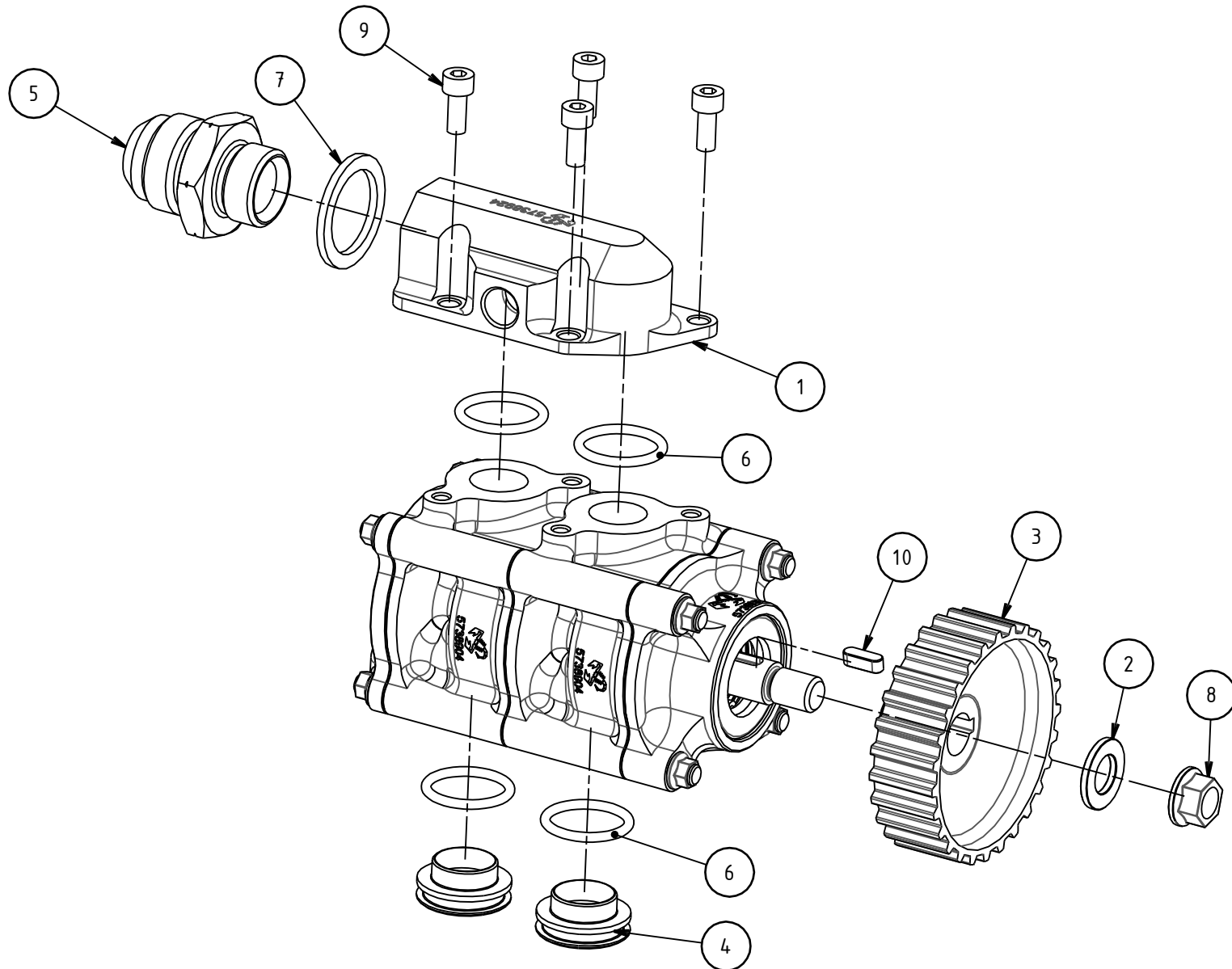
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM500297	SEEGER 30x1.2 I	1	
2	AM000131	BEARING 12x30x8	1	
2	AM501367	BEARING 12x30x8	1	
3	AM000130	OIL PUMP SHAFT	1	
4	AM000132	SEAL 20x35x7-TC-V	1	
5	AM000195	FRONT OIL SCAVENGE PUMPS COVER	1	
6	C00000434	OIL SCAVENGE PUMP ROTORS	2	
7	AM501059	OR 17.16X1.78 V	2	
8	AM000133	PARALLEL KEY 4x4x12	2	
9	AM000193	OIL SCAVENGE PUMP BODY	2	
10	AM000196	K-NUT M6x1	8	-
11	AM000197	REAR OIL SCAVENGE PUMPS COVER	1	
12	AM000199	OIL PUMP STUD	4	
13	AM501060	OR 50.52 x 1.78 V	3	
14	AM500066	CENTERING BUSH 8x6.5	4	

8 - Scavenge oil pumps - auxiliaries

Release 28/02/2022



8 - Scavenge oil pumps - auxiliaries

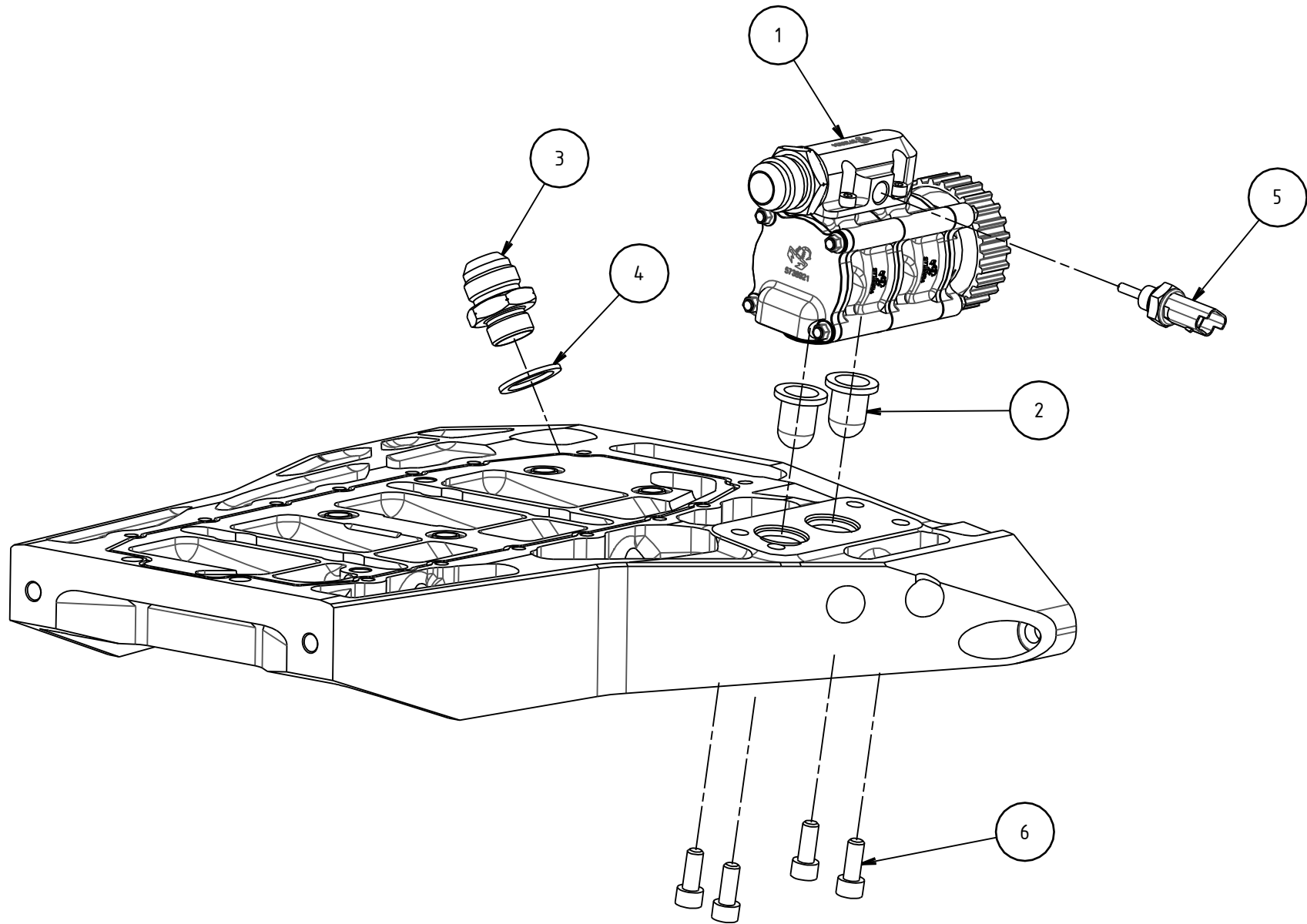
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000198	SCAVENGE OIL PUMP MANIFOLD	1	
2	AM000206	WASHER 11x20x2	1	
3	AM000127	SCAVENGE OIL PUMP PULLEY	1	
4	AM000135	SCAVENGE OIL PUMP PIPE	2	
5	AM000140	ADAPTER M22x1.5 - 1-1/16"x12	1	Tightening torque: 50 Nm + Loctite red 277
6	AM501312	OR 20.29X2.62 V	4	
7	AM000201	OIL JOINT SEALING SPACER	1	
8	AM500378	K-NUT M10x1.25	1	Tightening torque: 35 Nm + Loctite red 277
9	AM500395	CH BOLT M5x12 - 8.8	4	-
10	AM000133	PARALLEL KEY 4x4x12	1	

9 - Dry sump

Release 02/03/2022



9 - Dry sump

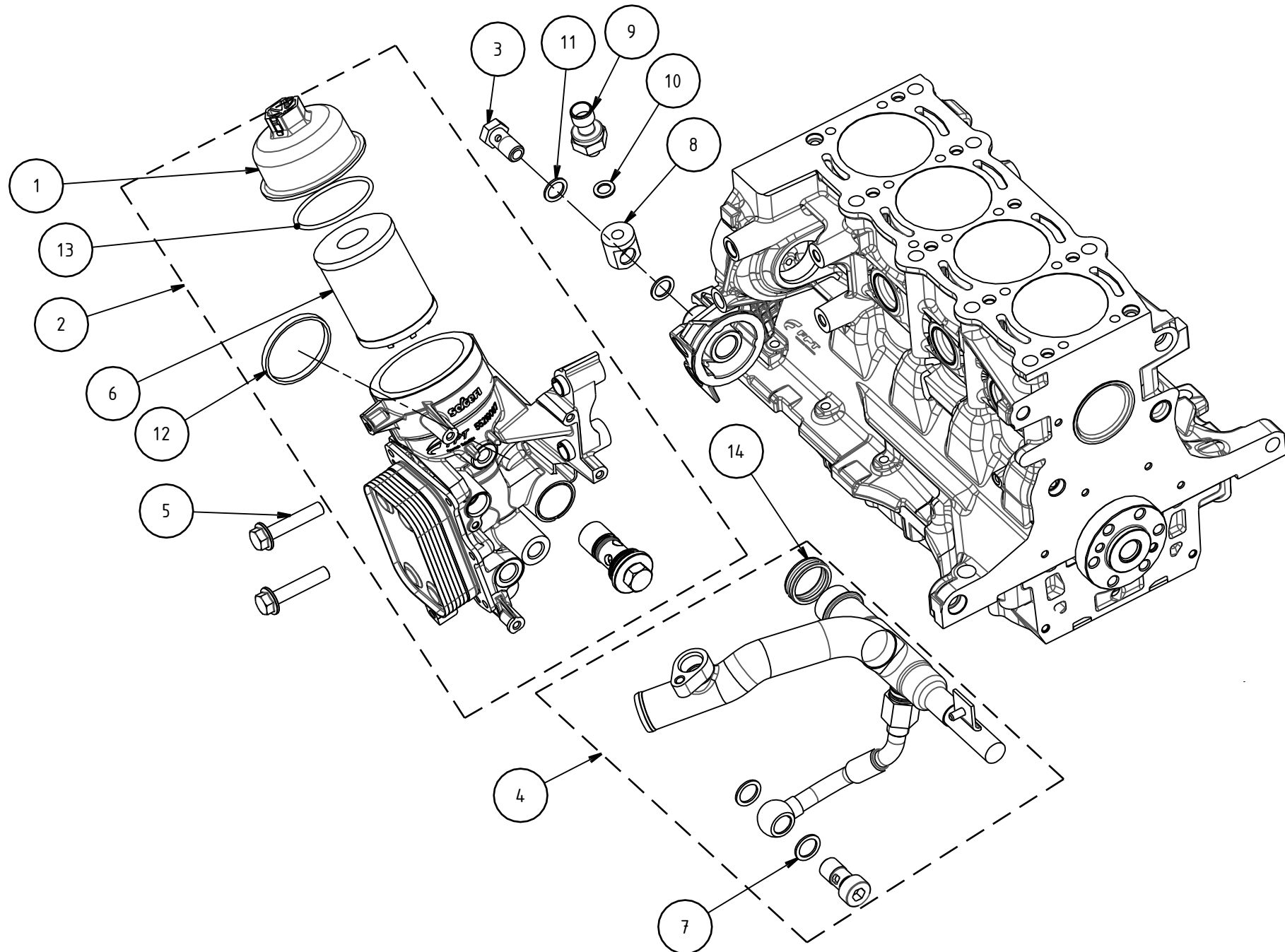
Release 02/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000126	SCAVENGE OIL PUMP	1	
2	AM000139	SCAVENGE OIL PUMP FILTER	2	
3	AM000140	ADAPTER M22x1.5 - 1-1/16"x12	1	Tightening torque: 50 Nm + Loctite red 277
4	AM000201	OIL JOINT SEALING SPACER	1	
5	AM000168	COOLANT & OIL TEMPERATURE SENSOR	1	Tightening torque: 25 Nm + Loctite red 277
6	AM500414	CH BOLT M8x20-8.8	4	

10 - Oil filter system

Release 28/02/2022



10 - Oil filter system

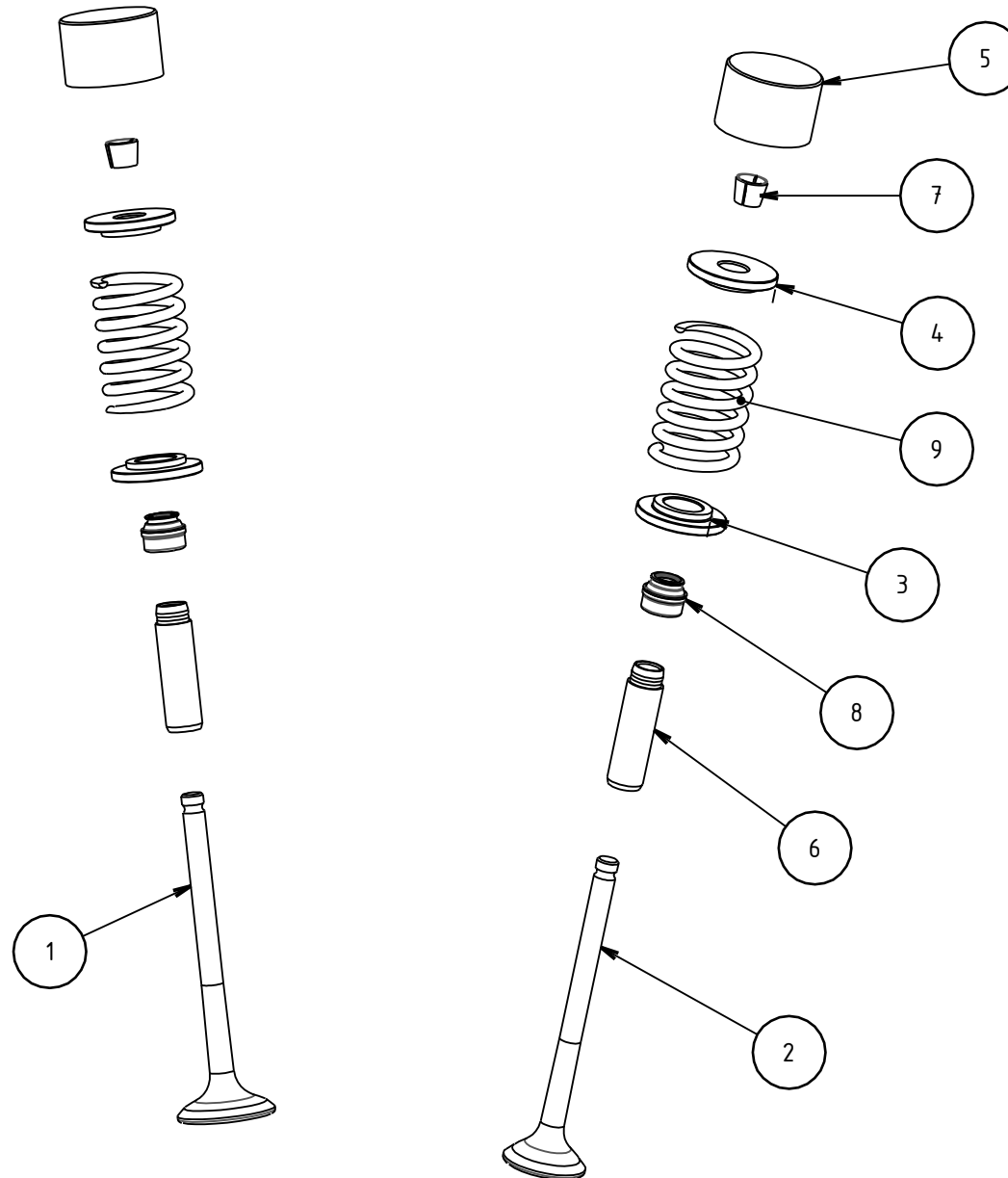
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000118	OIL FILTER CAP	1	
2	AM000159	WATER/OIL HEAT EXCHANGER	1	
3	AM000171	BANJO BOLT M14x1.5	1	
4	AM000347	ENGINE WATER OUTLET JOINT	1	
5	AM000158	HEAT EXCHANGER SCREW	2	
6	AM000116	OIL FILTER CARTRIDGE	1	
7	AM500070	COPPER WASHER 16x22x1.5	2	
8	AM000120	OIL PRESSURE SENSOR BANJO	1	
9	AM000119	OIL PRESSURE SENSOR	1	
10	AM500069	COPPER WASHER 10x16x1.5	1	
11	AM500008	COPPER WASHER 14x20x1.5	2	
12	AM000209	HEAT EXCHANGER SEAL	1	
13	AM000117	OIL FILTER GASKET	1	
14	AM000150	WATER INLET PIPE GASKET	1	

11 - Valve train

Release 28/02/2022



11 - Valve train

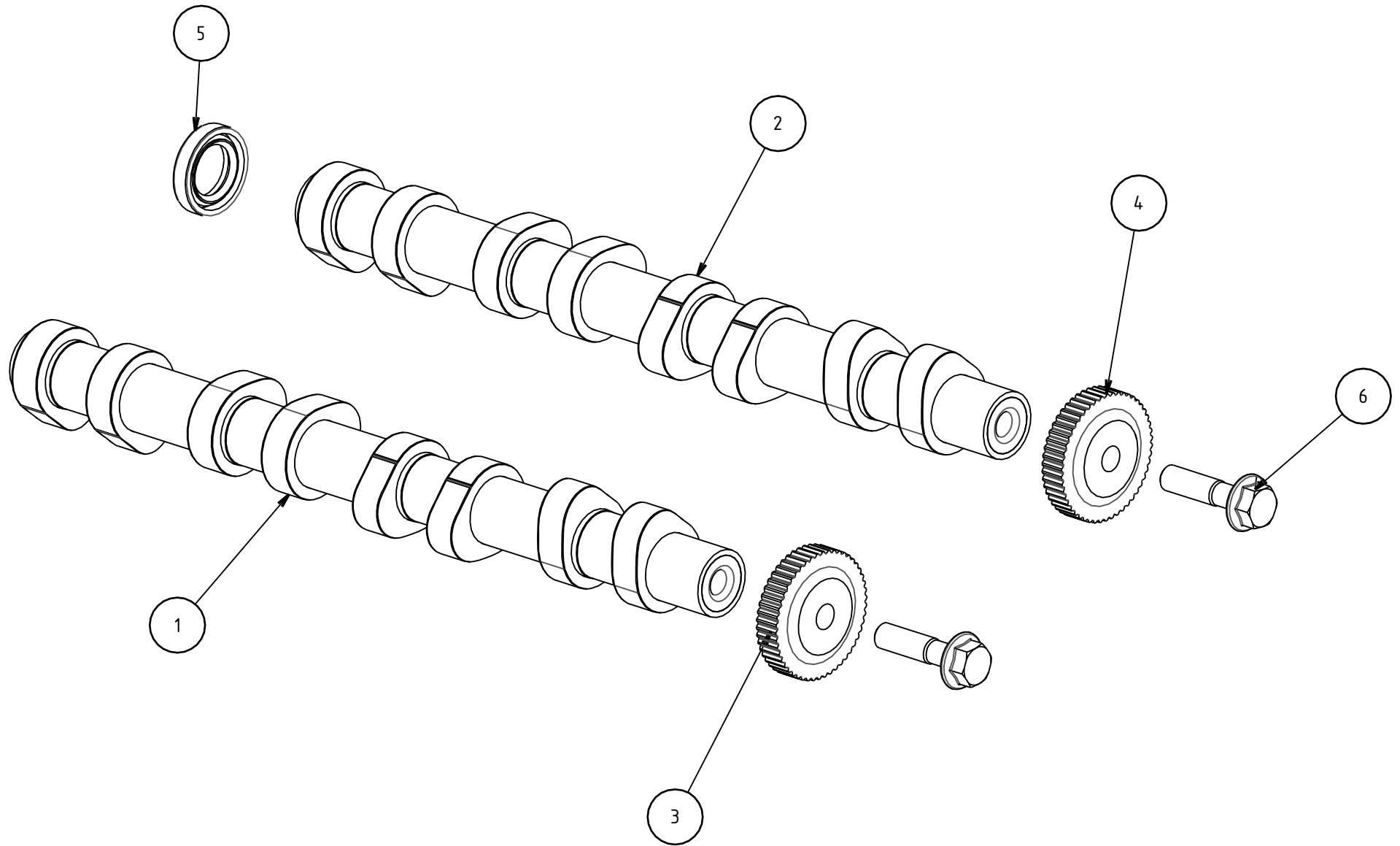
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000037	INTAKE VALVE	8	
2	AM000038	EXHAUST VALVE	8	
3	AM000362	VALVE SPRING PLATE LOWER	16	
4	AM000361	VALVE SPRING PLATE UPPER	16	
5	AM000049	TAPPET	16	
6	AM000464	VALVE GUIDE +0.25	16	
6	AM000463	VALVE GUIDE +0.1	16	
6	AM000462	VALVE GUIDE +0.05	16	
7	AM000048	VALVE KEEPER	32	
8	AM000047	OIL SEAL VALVE	16	
9	AM000046	VALVE SPRING	16	

12 - Camshafts

Release 28/02/2022



12 - Camshafts

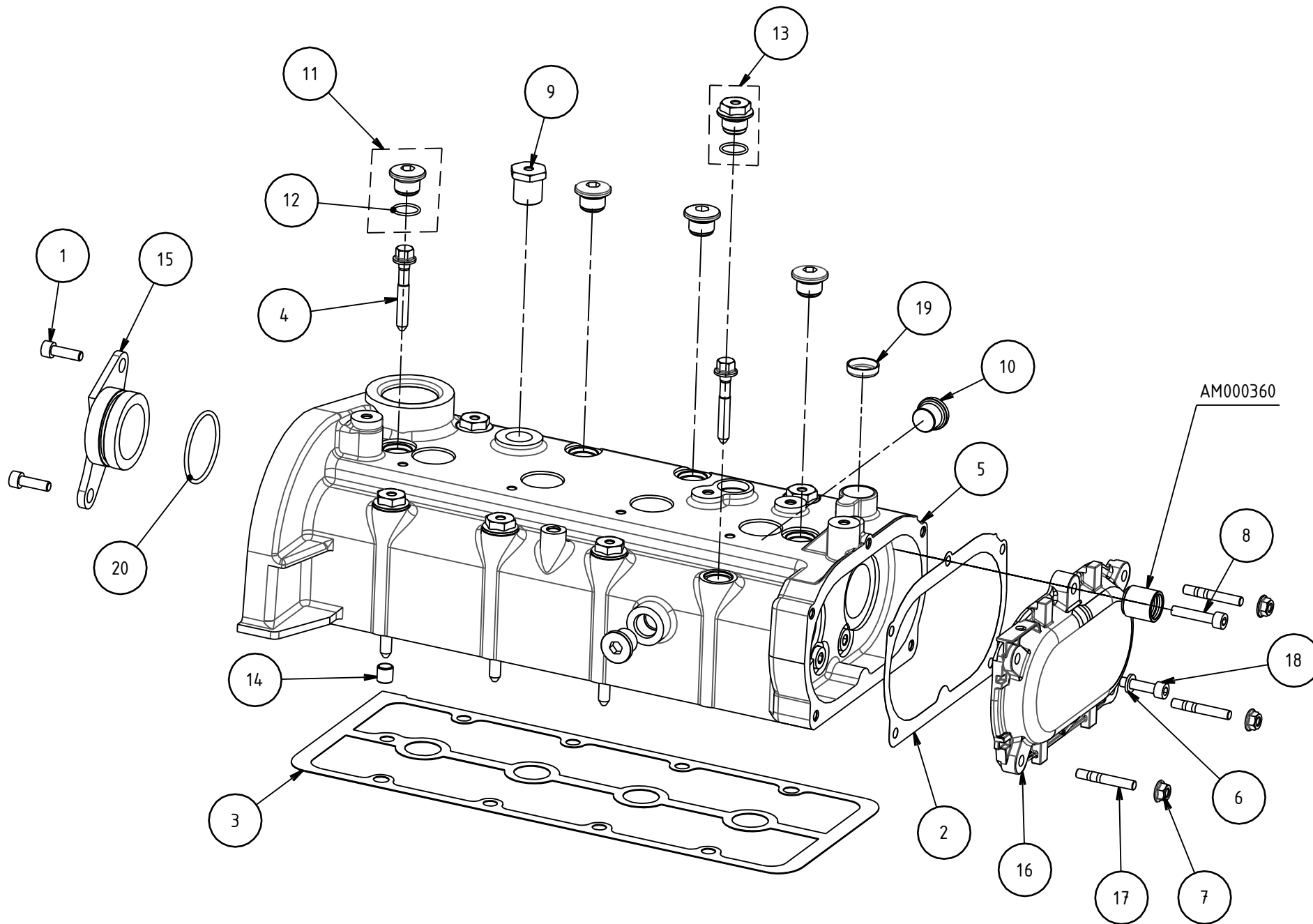
Release 28/02/2022



Index	Code	Description	Quantity	Monting instruction
1	AM000016	INTAKE CAMSHAFT	1	
2	AM000017	EXHAUST CAMSHAFT	1	-
3	AM000020	INTAKE CAMSHAFT GEAR	1	
4	AM000021	EXHAUST CAMSHAFT GEAR	1	
5	AM000025	CAMSHAFT OIL SEAL	1	
6	AM000023	CAMSHAFT GEAR SCREW	2	Tightening torque: 140 Nm + Loctite green 270

13 - Cylinder head

Release 01/03/2022

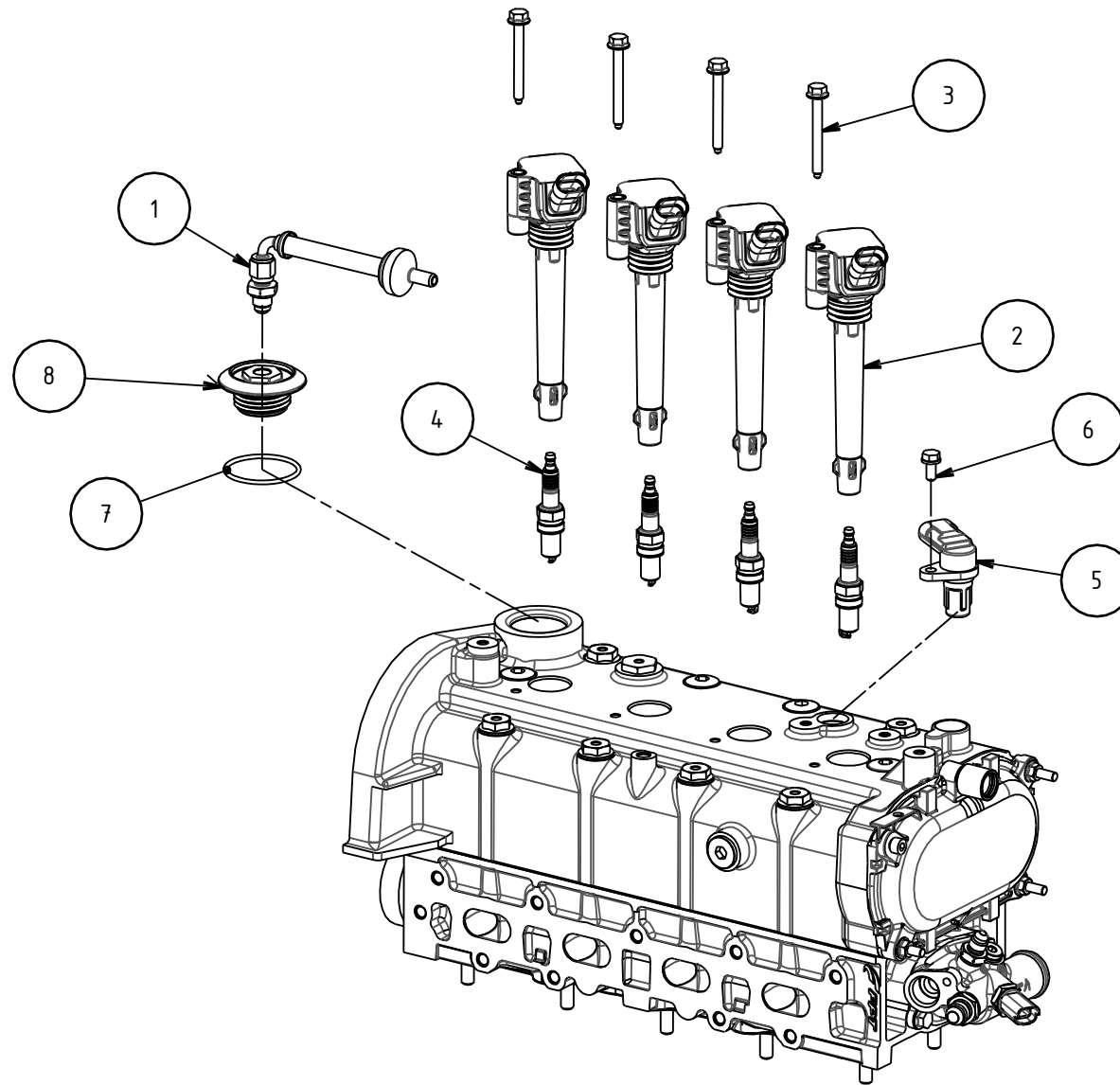


13 - Cylinder head

Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM500396	CH BOLT M6x20 - 8.8	2	Tightening torque: 12 Nm + Loctite blue 243
2	AM000024	REAR COVER GASKET	1	
3	AM000027	CAMSHAFT OVER HEAD GASKET	1	
4	AM000029	TAPPETS CASTLE SCREW	10	Tightening torque: 20 Nm
5	AM000015	CAMSHAFT OVER HEAD	1	
6	AM500764	WASHER 6x12x1.6	1	
7	AM501315	HEXAGONAL NUTS WITH FLANGE M6	3	
8	AM500922	CH BOLT M6x30 - 8.8	1	Tightening torque: 12 Nm + Loctite blue 243
9	AM000031	TAPPETS CASTLE CAP	1	Tightening torque: 25 Nm + Loctite red 277
10	AM000030	TAPPETS CASTLE CAP	2	Tightening torque: 25 Nm + Loctite red 277
11	AM000033	TAPPETS CASTLE CAP	4	Tightening torque: 25 Nm + Loctite red 277
12	AM500972	OR 15X1.5 V	10	
13	AM000032	TAPPETS CASTLE CAP	6	Tightening torque: 25 Nm + Loctite red 277
14	AM000026	TAPPETS CASTLE BUSH	2	
15	AM000018	FRONT CAMSHAFT COVER	1	
16	AM000388	REAR COVER	1	
17	AM000226	REAR COVER STUD	3	
18	AM500397	CH BOLT M6x25 - 8.8	1	Tightening torque: 12 Nm + Loctite blue 243
19	AM000208	FREEZE PLUG 20	1	
20	AM501313	OR 42,86X3,53 V	1	



14 - Cylinder head

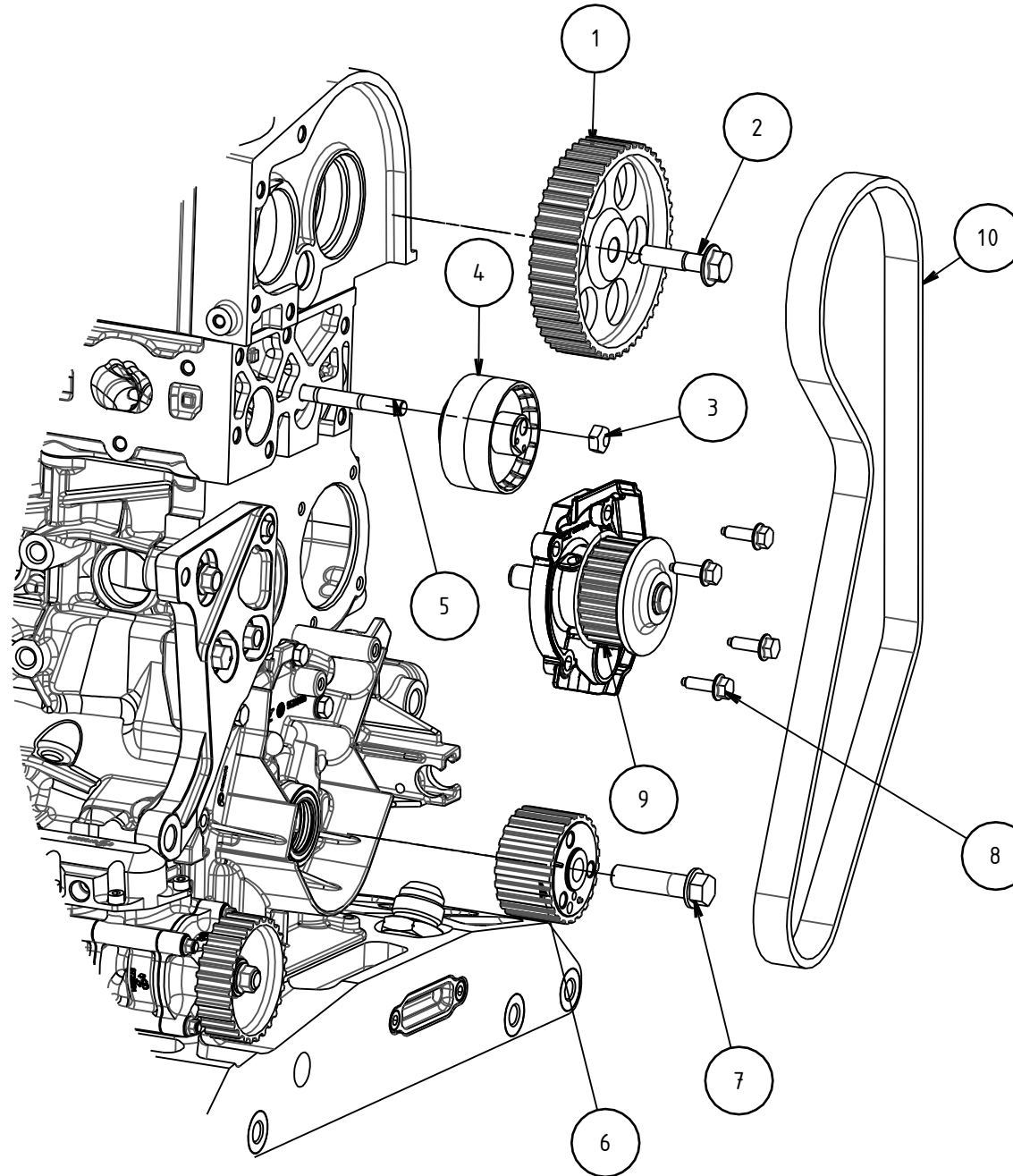
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000143	BLOW BY BREATHER PIPE KIT	1	
2	AM000161	COIL	4	
3	AM000162	COIL SCREW	4	
4	AM000163	SPARK PLUG	4	Tightening torque: 25 Nm
5	AM000166	PHASE SENSOR	1	
6	AM500005	SCREW WITH SPACER	1	
7	AM501323	OR 44.12 x 2.62 V	1	
8	AM000144	OIL PLUG	1	

15 - Timing belt

Release 01/03/2022



15 - Timing belt

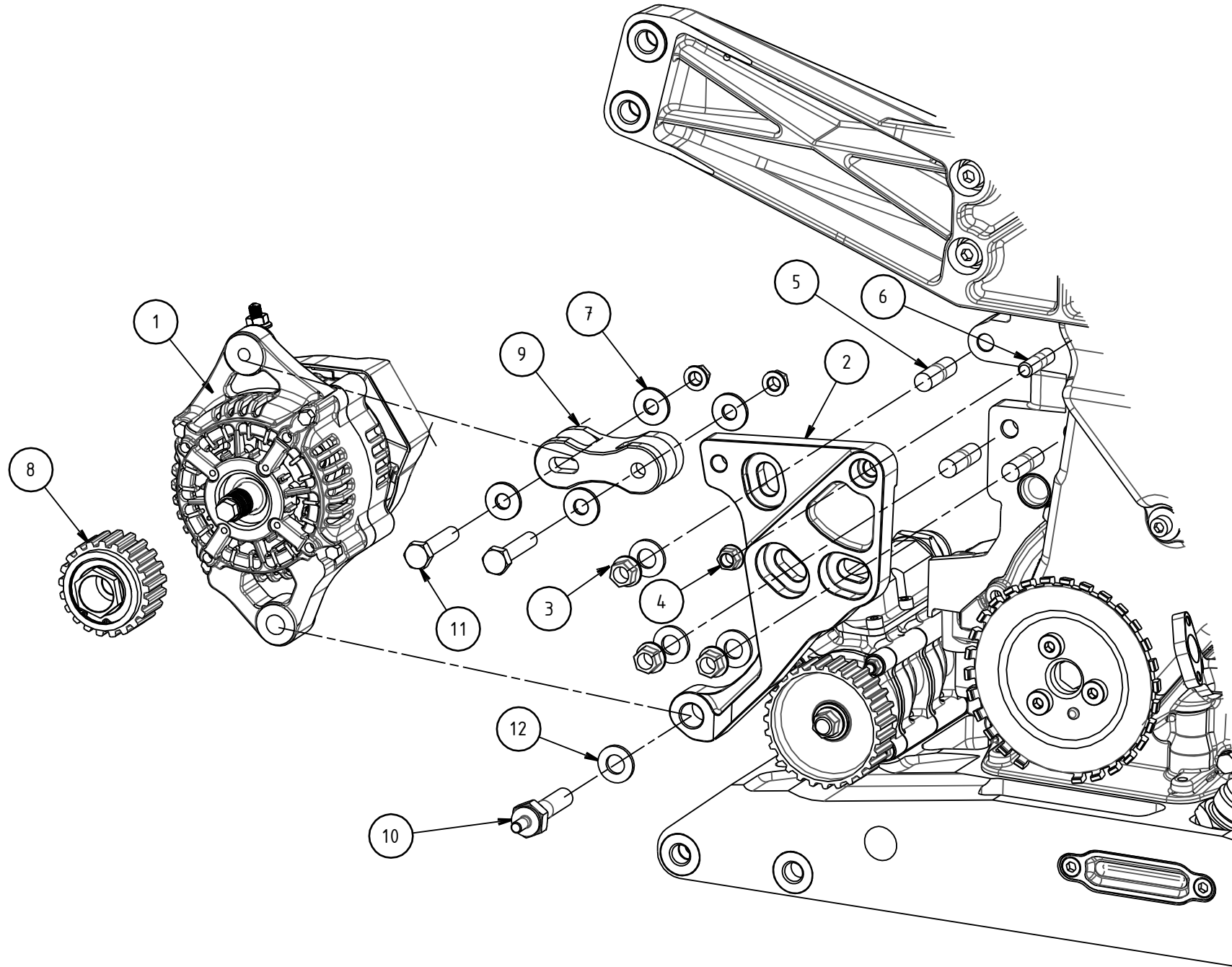
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000022	TIMING SHAFT GEARWHEEL	1	
2	AM000023	CAMSHAFT GEAR SCREW	1	Tightening torque: 140Nm + Loctite green 270
3	AM000042	TIMING BELT BEARING NUT	1	Tightening torque: 25 Nm + Loctite blue 243
4	AM000041	TIMING BELT BEARING	1	
5	AM000225	TIMING BELT BEARING STUD	1	
6	AM000043	CRANKSHAFT GEAR	1	
7	AM000044	TIMING GEAR BOLT	1	
8	AM000156	WATER PUMP SCREW	4	Tightening torque: 12 Nm + Loctite blue 243
9	AM000157	WATER PUMP	1	
10	AM000040	TIMING BELT	1	

16 - Alternator

Release 01/03/2022



16 - Alternator

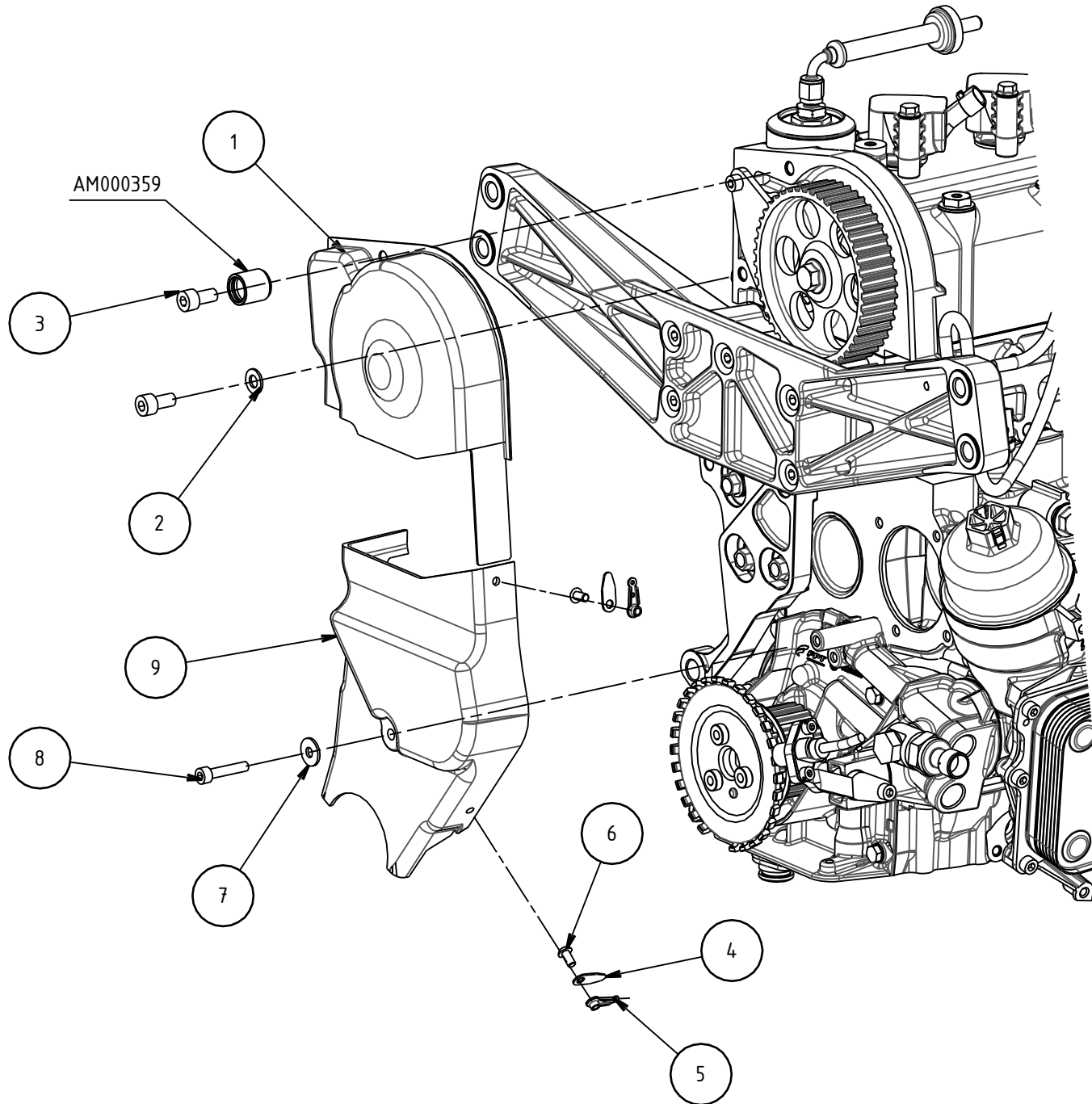
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000170	ALTERNATOR	1	
2	AM000086	ALTERNATOR MOUNTING BRACKET (B)	1	
3	AM500378	K-NUT M10x1.25	3	
4	AM500344	K-NUT M8x1.25	3	-
5	AM000221	ALTERNATOR BRACKET STUD	3	Tightening torque: 20 Nm + Loctite red 277
6	AM000227	ALTERNATOR BRACKET STUD	1	Tightening torque: 20 Nm 4 + Loctite red 277
7	AM500785	WASHER 8x20x2	4	
8	AM000084	ALTERNATOR PULLEY	1	
9	AM000085	ALTERNATOR MOUNTING BRACKET (A)	1	
10	AM000089	ALTERNATOR SCREW	1	
11	AM500786	EH M8x40 - 8.8	2	
12	AM500725	WASHER 10x20x2	4	

17 - Timing cover

Release 28/02/2022



17 - Timing cover

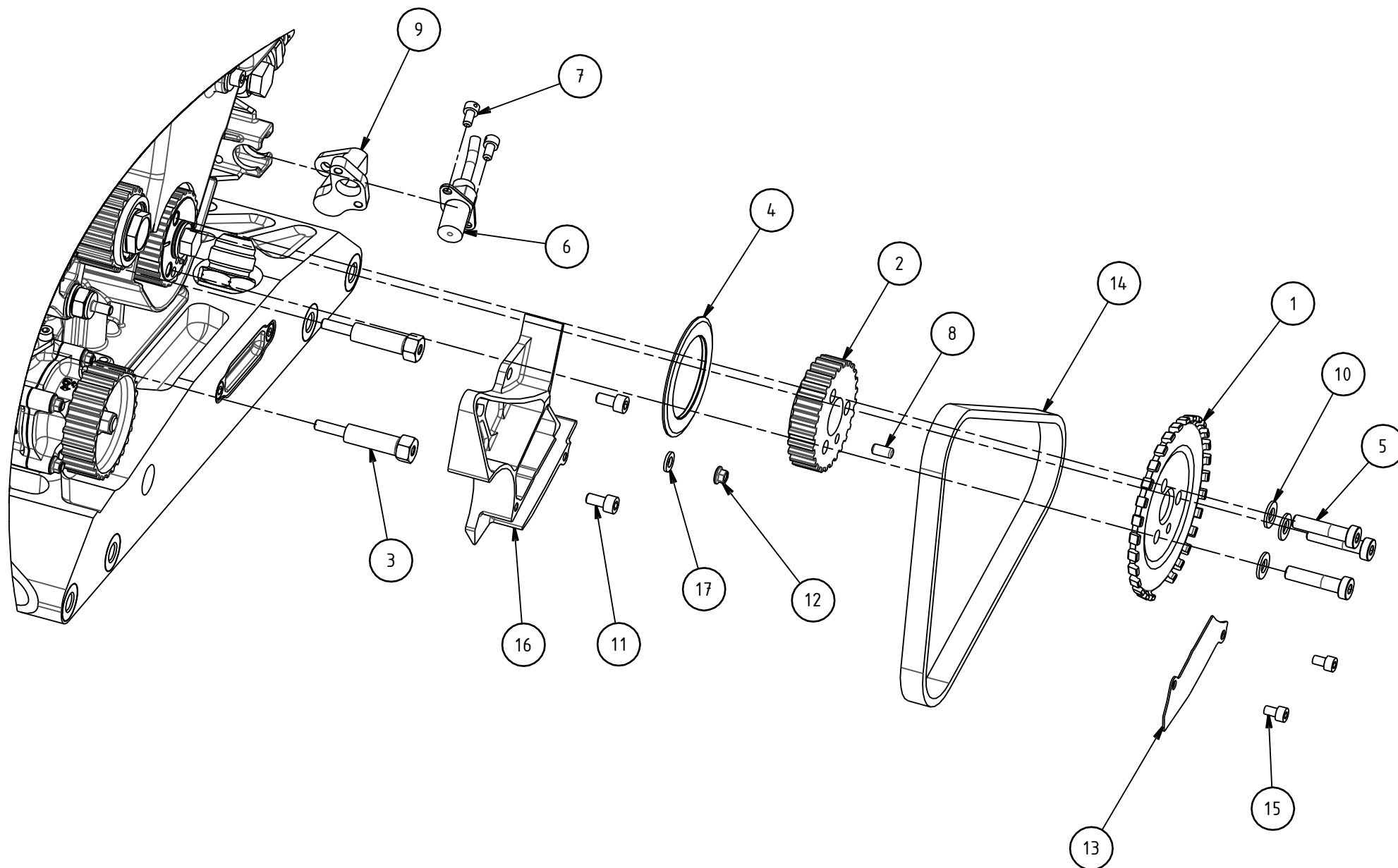
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000340	UPPER CARBON TIMING COVER	1	
2	AM500721	WASHER 8x16x1.5	1	
3	AM500408	CH BOLT M8x16 - 8.8	2	Tightening torque: 25 Nm + Loctite blue 243
4	AM000079	PLATE	2	
5	AM000341	ANCHOR NUT M5	2	
6	AM500612	BH BOLT M5x10 - 8.8	2	
7	AM501016	WASHER 6x18x1.6	1	
8	AM500922	CH BOLT M6x30 - 8.8	1	Tightening torque: 12 Nm + Loctite blue 243
9	AM000339-1	LOWER CARBON TIMING COVER	1	

18 - Auxiliary belt

Release 01/03/2022



18 - Auxiliary belt

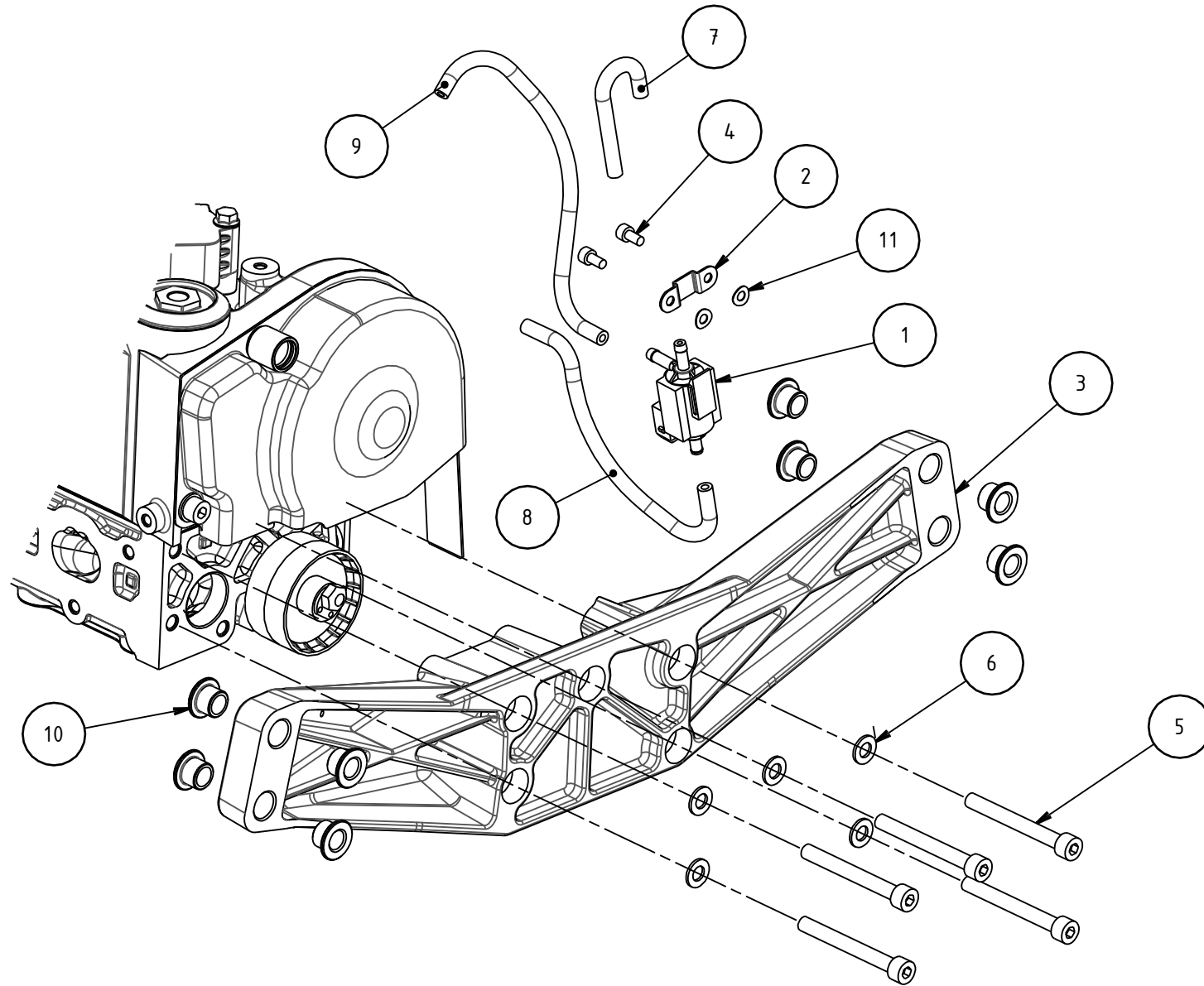
Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000083	TIMING WHEEL	1	
2	AM000081	AUXILIARY DRIVING PULLEY	1	
3	AM000090	AUXILIARY BELT BRACKET SCREW	2	Tightening torque: 12 Nm + Loctite blue 243
4	AM000080	CRANKSHAFT GEAR RING	1	
5	AM000240	CLH BOLT M8x35 - 8.8	3	Tightening torque: 25 Nm + Loctite blue 243
6	AM501190	SMOT SENSOR	1	
7	AM500598	CH BOLT M5x10 - 8.8 - DRILLED	2	
8	AM000082	6X12 SKF CENTERING BUSH	1	
9	AM000165	RPM SENSOR BRACKET	1	
10	AM500721	WASHER 8x16x1.5	3	
11	AM500393	CH BOLT M6x12 - 8.8	2	Tightening torque: 12 Nm + Loctite blue 243
12	AM000196	K-NUT M6x1	1	Tightening torque: 7 Nm + Loctite blue 243
13	AM000092	AUXILIARY BELT PLATE	1	
14	AM000093	AUXILIARY BELT	1	
15	AM500418	CH BOLT M5x8 - 8.8	2	
16	AM000088	AUXILIARY BELT BRACKET	1	
17	AM500764	WASHER 6x12x1.6	1	

19 - Front engine support

Release 28/02/2022

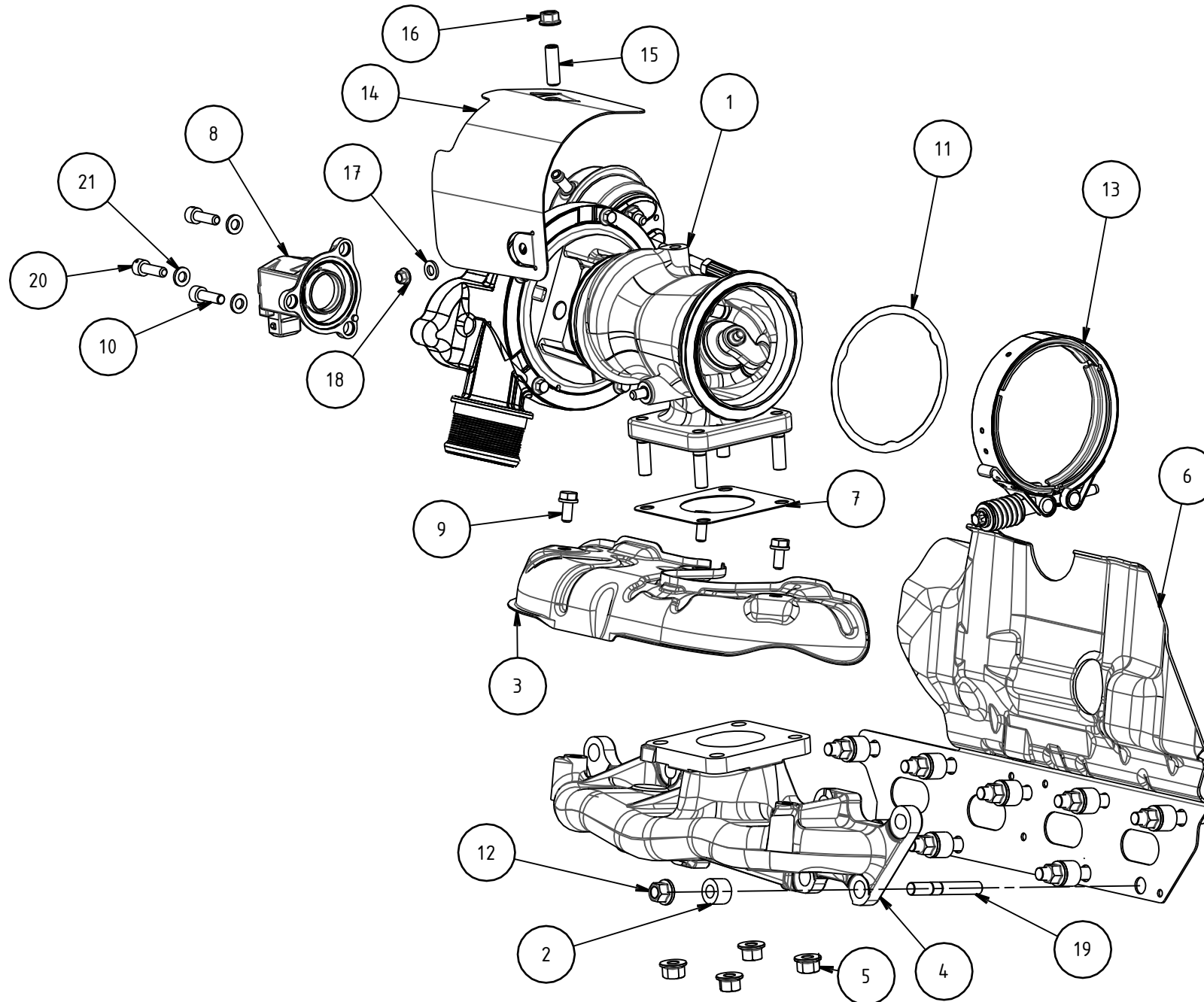


19 - Front engine support

Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000009	WASTEGATE ELECTROVALVE	1	
2	AM000010	WASTEGATE ELECTROVALVE BRACKET	1	
3	AM000097	FRONT ENGINE SUPPORT	1	
4	AM500421	CH BOLT M5x10 - 8.8	2	-
5	AM500752	CH BOLT M8x70 - 8.8	5	Tightening torque: 25 Nm + Loctite blue 243
6	AM500721	WASHER 8x16x1.5	5	
7	AM000013	WASTEGATE PIPE	1	
8	AM000011	WASTEGATE PIPE	1	
9	AM000012	WASTEGATE PIPE	1	
10	AM000451	FRAMEWORK BUSH	8	
11	AM501173	WAVED SPRING WASHERS M5	2	



20 - Turbocharger

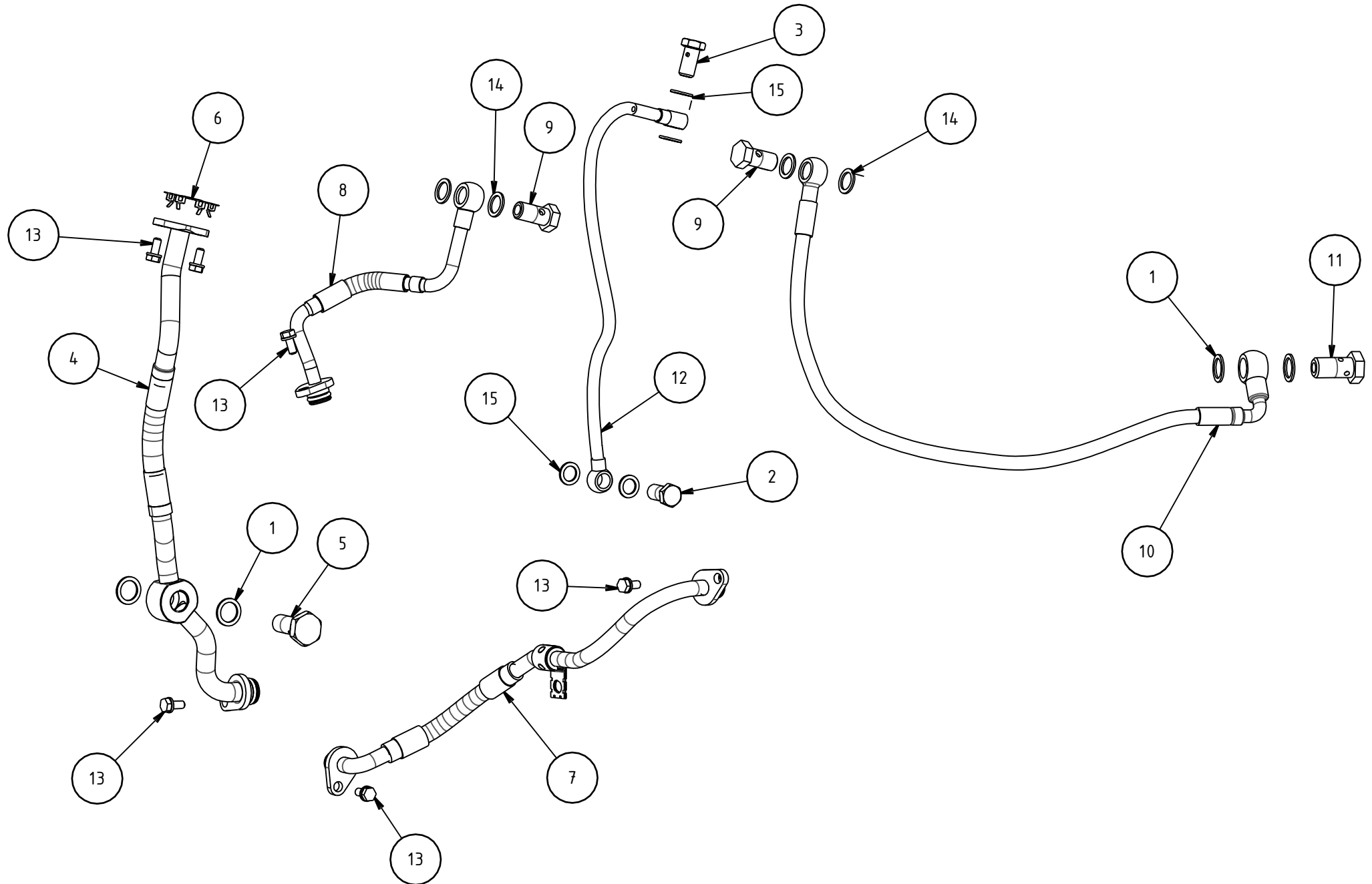
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000039	TURBOCHARGER	1	
2	AM000403	SPACER	9	
3	AM000001	EXHAUST MANIFOLD SHIELD	1	
4	AM000000	EXHAUST MANIFOLD	1	
5	AM000006	TURBO NUT	4	
6	AM000350	EXHAUST HEAD SEAL	1	
7	AM000005	TURBOCHARGER EXHAUST INLET SEAL	1	
8	AM000014	DUMP VALVE	1	
9	AM500005	SCREW WITH SPACER	3	
10	AM500396	CH BOLT M6x20 - 8.8	1	Tightening torque: 12 Nm
11	AM000003	TURBOCHARGER EXHAUST OUTLET SEAL	1	
12	AM000007	EXHAUST MANIFOLD NUT	9	Tightening torque: 12 Nm + copper grease
13	AM000002	V-CLAMP RING	1	
14	AM000452	HEAT SHIELD	1	
15	AM000320	GRUB SCREW M8x25	1	
16	AM500344	K-NUT M8x1.25	1	-
17	AM500764	WASHER 6x12x1.6	1	
18	AM000196	K-NUT M6x1	1	-
19	AM000404	EXHAUST MANIFOLD HEAD STUD	9	
20	AM500596	CH BOLT M6x20 - 8.8 - DRILLED	2	Tightening torque: 12 Nm
21	AM500764	WASHER 6x12x1.6	3	

21 - Cooling pipes

Release 02/03/2022



21 - Cooling pipes

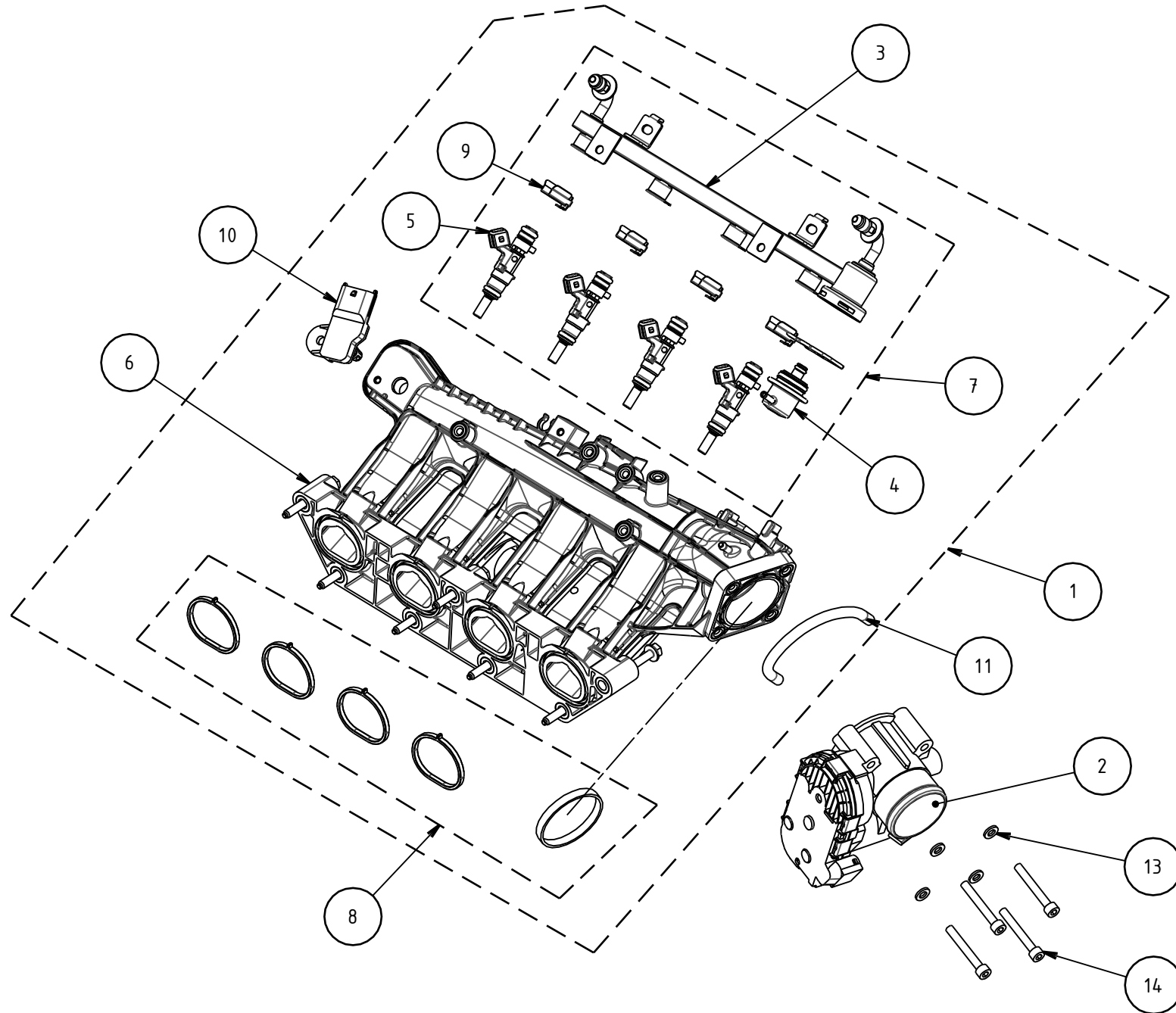
Release 02/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM500070	COPPER WASHER 16x22x1.5	4	
2	AM000121	OIL PIPE JOINT	1	
3	AM000122	TURBO OIL PIPE JOINT WITH FILTER	1	
4	AM000123	TURBOCHARGER OUTLET OIL PIPE	1	
5	AM000124	BANJO BOLT M14x1.5 - 35	1	
6	AM000125	TURBO EXIT OIL PIPE GASKET	1	
7	AM000151	COOLANT PIPE FROM THERMOSTAT TO MODINE	1	
8	AM000152	TURBOCHARGER OUTLET COOLANT PIPE	1	
9	AM000171	BANJO BOLT M14x1.5	2	
10	AM000172	TURBOCHARGER INLET COOLANT PIPE	1	
11	AM000174	HHD BOLT M16x1.5	1	
12	AM000348	FLEXIBLE TURBOCHARGER INLET OIL PIPE	1	
13	AM500005	SCREW WITH SPACER	6	
14	AM500008	COPPER WASHER 14x20x1.5	4	
15	AM500009	COPPER WASHER 12x18x1.5	4	

22 - Intake manifold

Release 08/03/2022



22 - Intake manifold

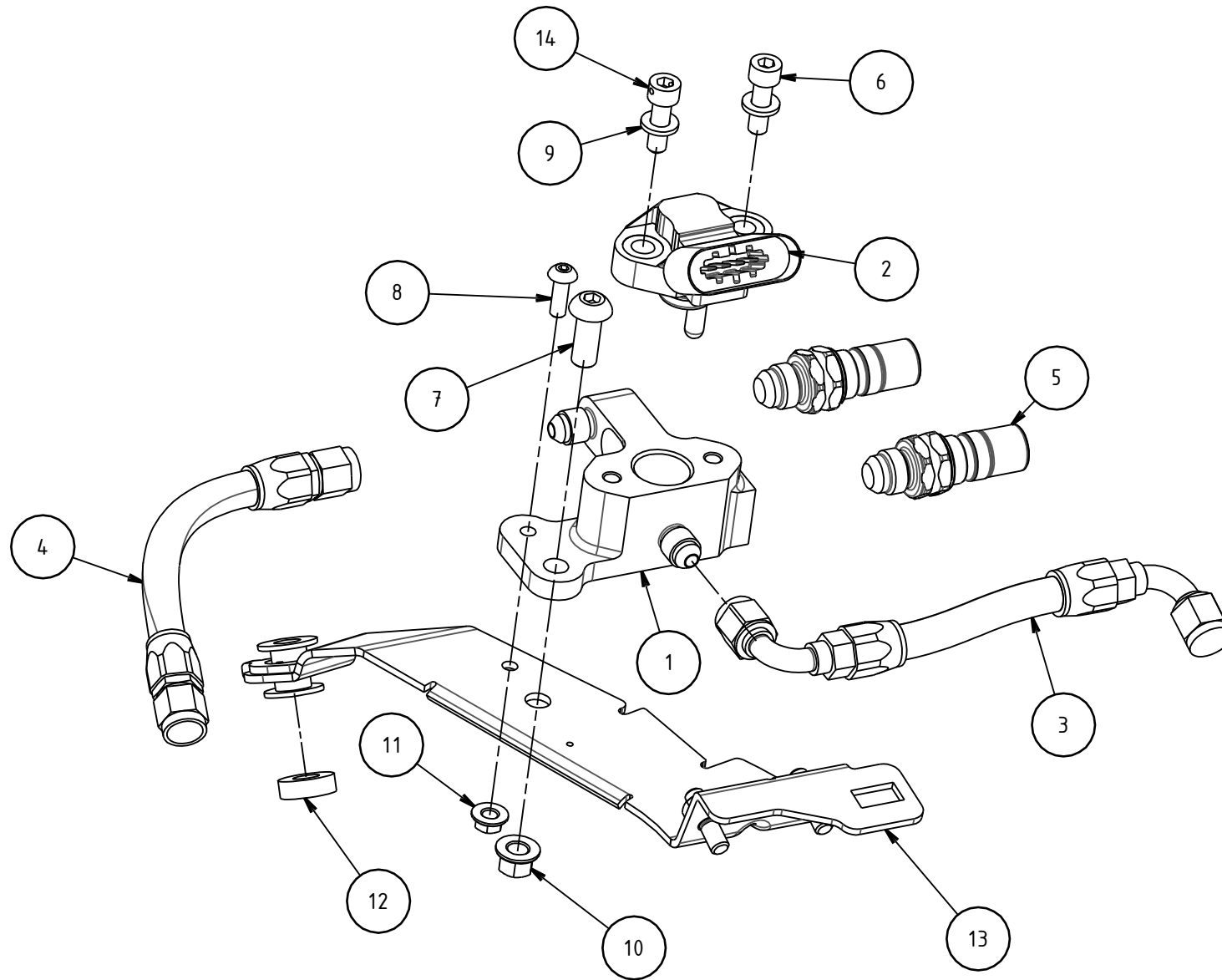
Release 08/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000471	COMPLETE INTAKE MANIFOLD	1	
2	AM000181	THROTTLE BODY	1	
3	AM000182	FUEL RAIL	1	
4	AM000183	FUEL PRESSURE REGULATOR	1	
5	AM000265	INJECTOR	4	
6	AM000352	INTAKE MANIFOLD	1	
7	AM000257	COMPLETE FUEL RAIL	1	
8	AM000180	INTAKE MANIFOLD GASKETS KIT	1	
9	AM000374	INJECTOR CLIP	4	
10	AM000185	PMAP SENSOR	1	
11	AM500141	FUEL PRESURE REGULATOR PIPE	1	
12	AM000178	SCREW	7	Tightening torque: 25 Nm + Loctite red 277
13	AM500764	WASHER 6x12x1.6	4	
14	AM500768	CH BOLT M6x45 - 8.8	4	Tightening torque: 12 Nm

23 - Fuel pressure sensor assembly

Release 28/02/2022



23 - Fuel pressure sensor assembly

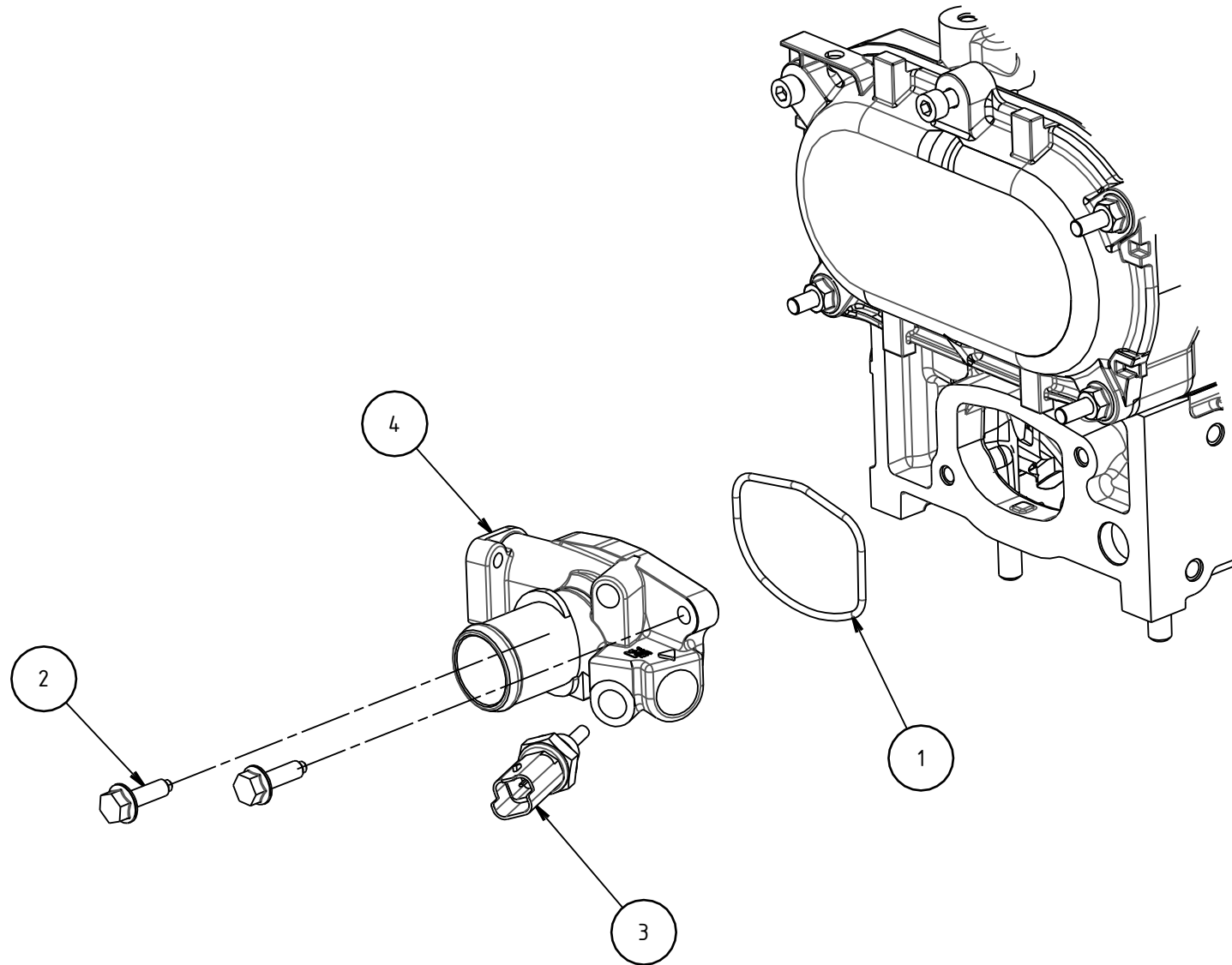
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000401	FUEL PRESSURE SENSOR BRACKET	1	
2	AM000184	FUEL PRESSURE SENSOR	1	
3	AM000400	FUEL RAIL INLET PIPE	1	Tightening torque: 20 Nm + lubricant on thread and mating cone
4	AM000402	FUEL RAIL OUTLET PIPE	1	Tightening torque: 20 Nm + lubricant on thread and mating cone
5	AM500382	STAUBLI SPT08 9/16"x18 M	2	Tightening torque: 20 Nm + lubricant on thread and mating cone
6	AM500396	CH BOLT M6x20 - 8.8	1	-
7	AM501303	RH BOLT M8x20 - 8.8	1	
8	AM501182	RH BOLT M5x15 - 8.8	1	
9	AM500764	WASHER 6x12x1.6	2	
10	AM501185	SELF-LOCKING NUT M8	1	
11	AM501184	SELF-LOCKING NUT M5	1	
12	AM000386	FUEL BRACKET SPACER	1	
13	AM000354	FUEL LINE BRACKET	1	
14	AM500596	CH BOLT M6x20 - 8.8 - DRILLED	1	

24 - Water outlet flange

Release 02/03/2022



24 - Water outlet flange

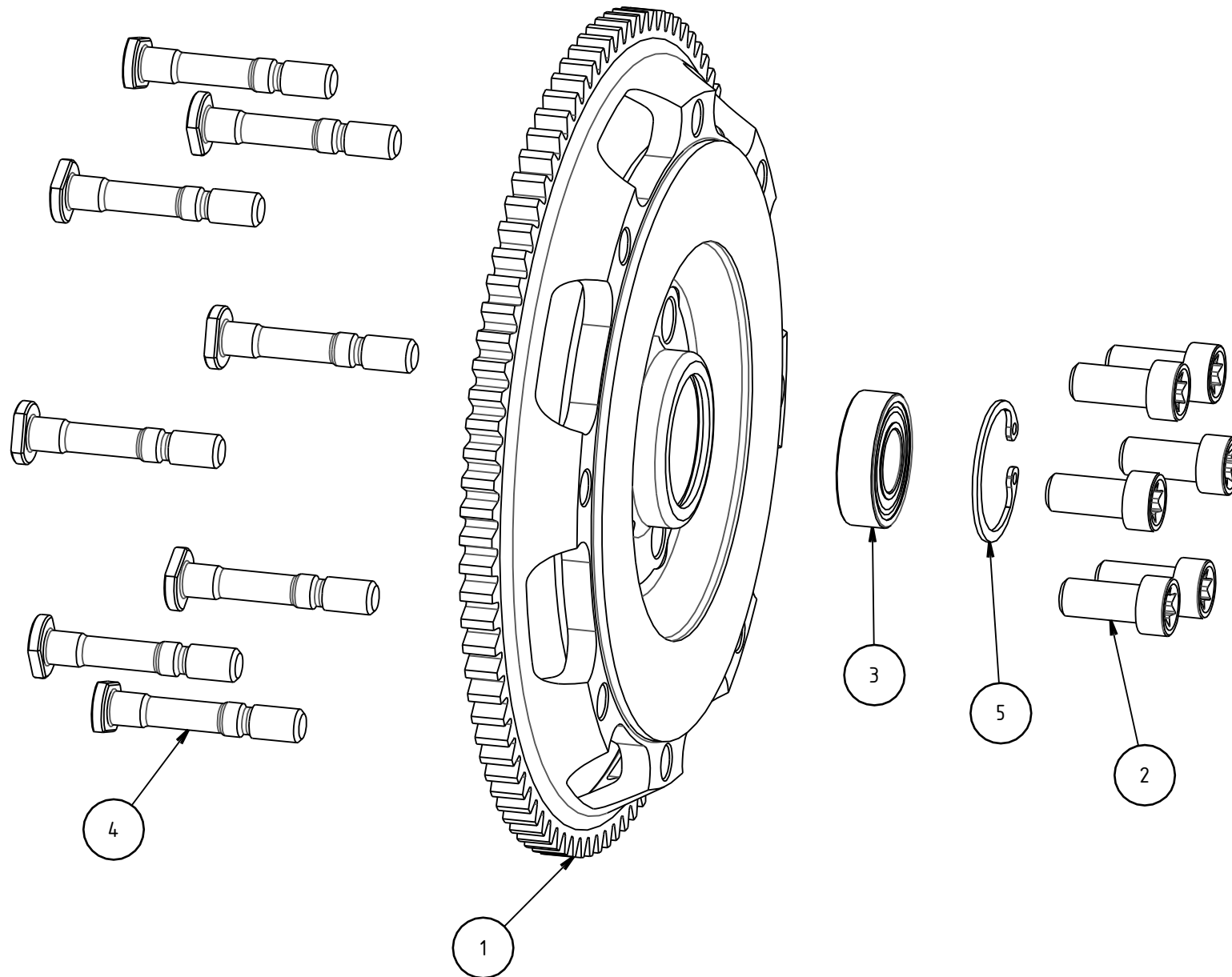
Release 02/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000154	THERMOSTAT SEAL	1	
2	AM000156	WATER PUMP SCREW	2	
3	AM000168	COOLANT & OIL TEMPERATURE SENSOR	1	
4	AM000345	ENGINE WATER OUTLET JOINT	1	

25 - Flywheel

Release 02/03/2022



25 - Flywheel

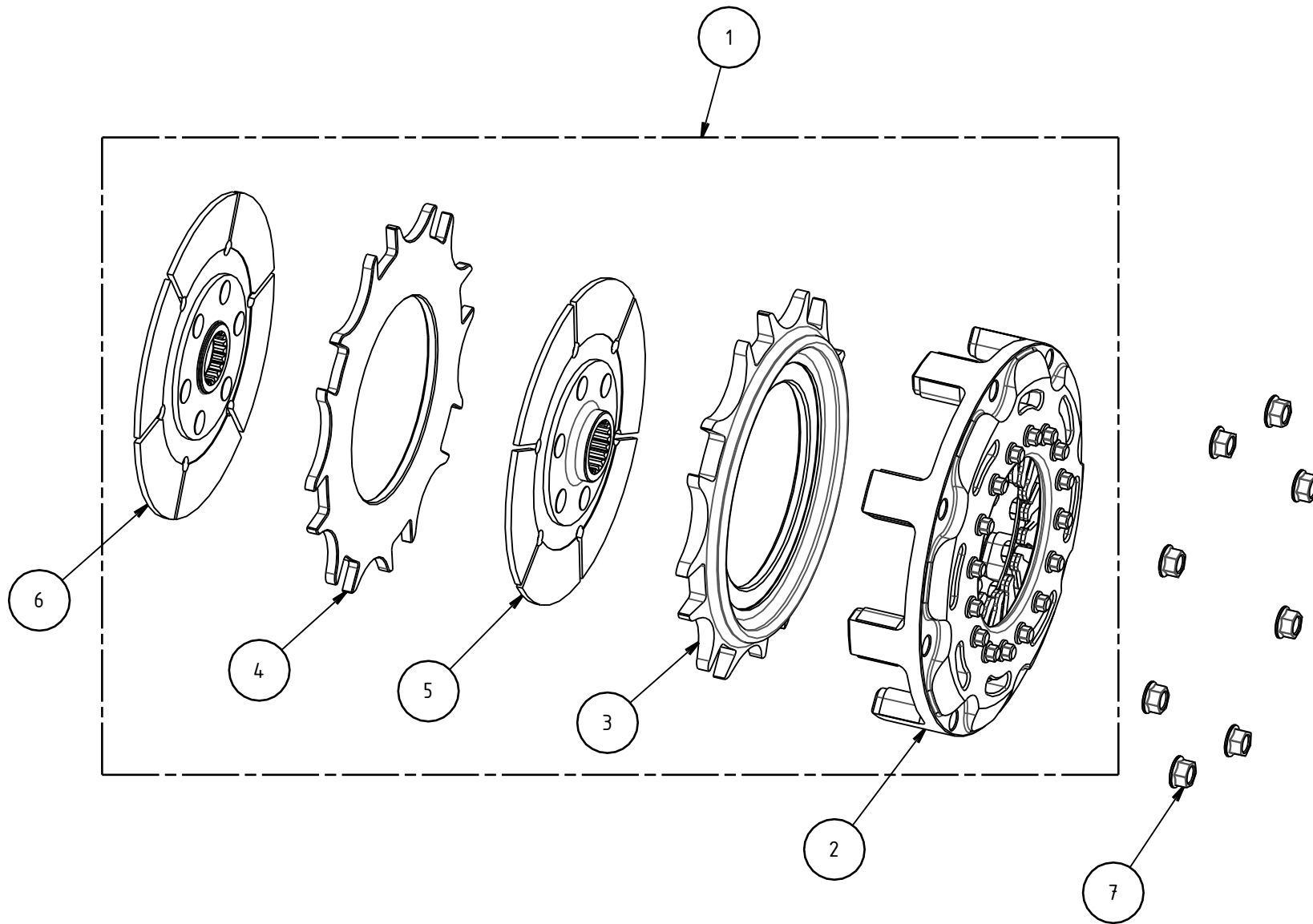
Release 02/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000106	FLYWHEEL	1	
2	AM000107	FLYWHEEL BOLT	6	Tightening torque: 65 Nm + Loctite red 277
3	AM500136	BEARING 15x32x9	1	
4	AM500004	CLUTCH MOUNTING STUD	8	
5	AM000110	SEEGER 32X1.2 (I)	1	

26 - Clutch

Release 28/02/2022



26 - Clutch

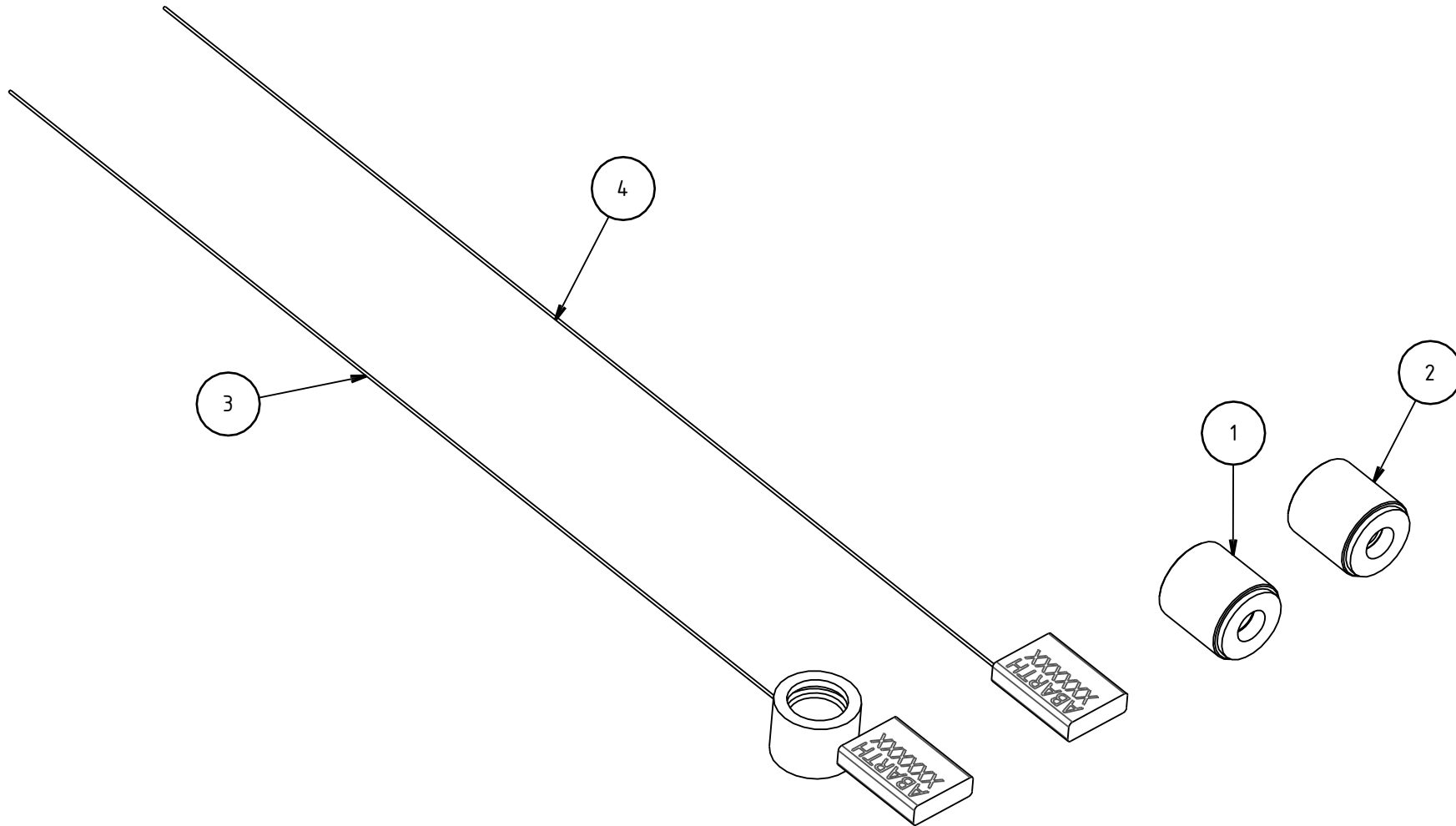
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000098	COMPLETE CLUTCH	1	
2	AM000099	BODY CLUTCH	1	
3	AM000100	PRESSURE CLUTCH PLATE	1	
4	AM000101	INTERMEDIATE CLUTCH PLATE	1	
5	AM000102	CLUTCH DISC - HIGH HUB	1	
6	AM000103	CLUTCH DISC - LOW HUB	1	
7	AM500007	K-NUT M8x1	8	Tightening torque: 25 Nm

27 - Engine seals

Release 28/02/2022



27 - Engine seals

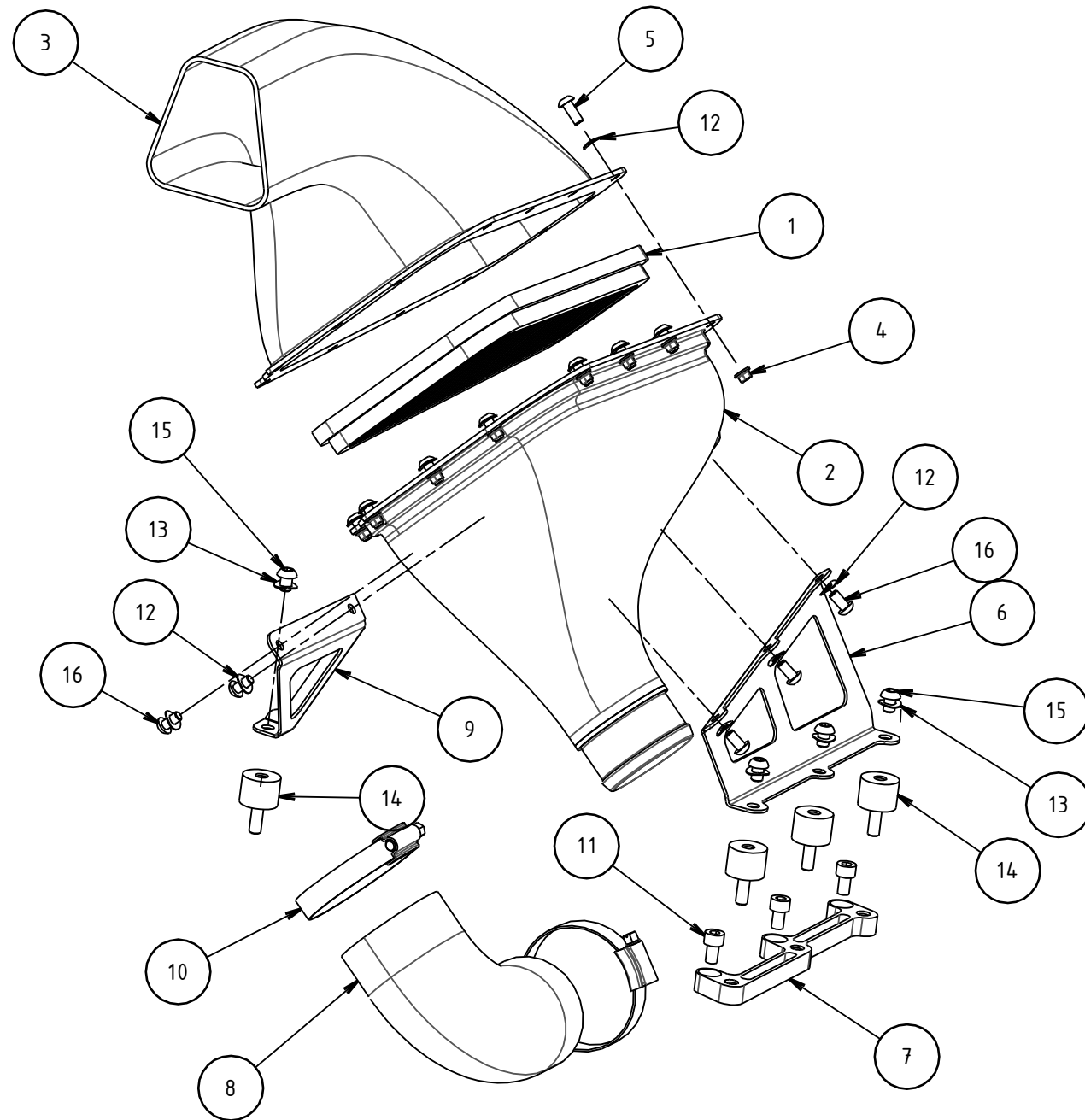
Release 28/02/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000359	SEAL RFID M8	1	
2	AM000360	SEAL RFID M6	1	
3	AM000379	ABARTH BLUE CLOSED RFID SEAL	1	
4	AM000393	ABARTH BLUE SEAL	1	

28 - Airbox

Release 01/03/2022

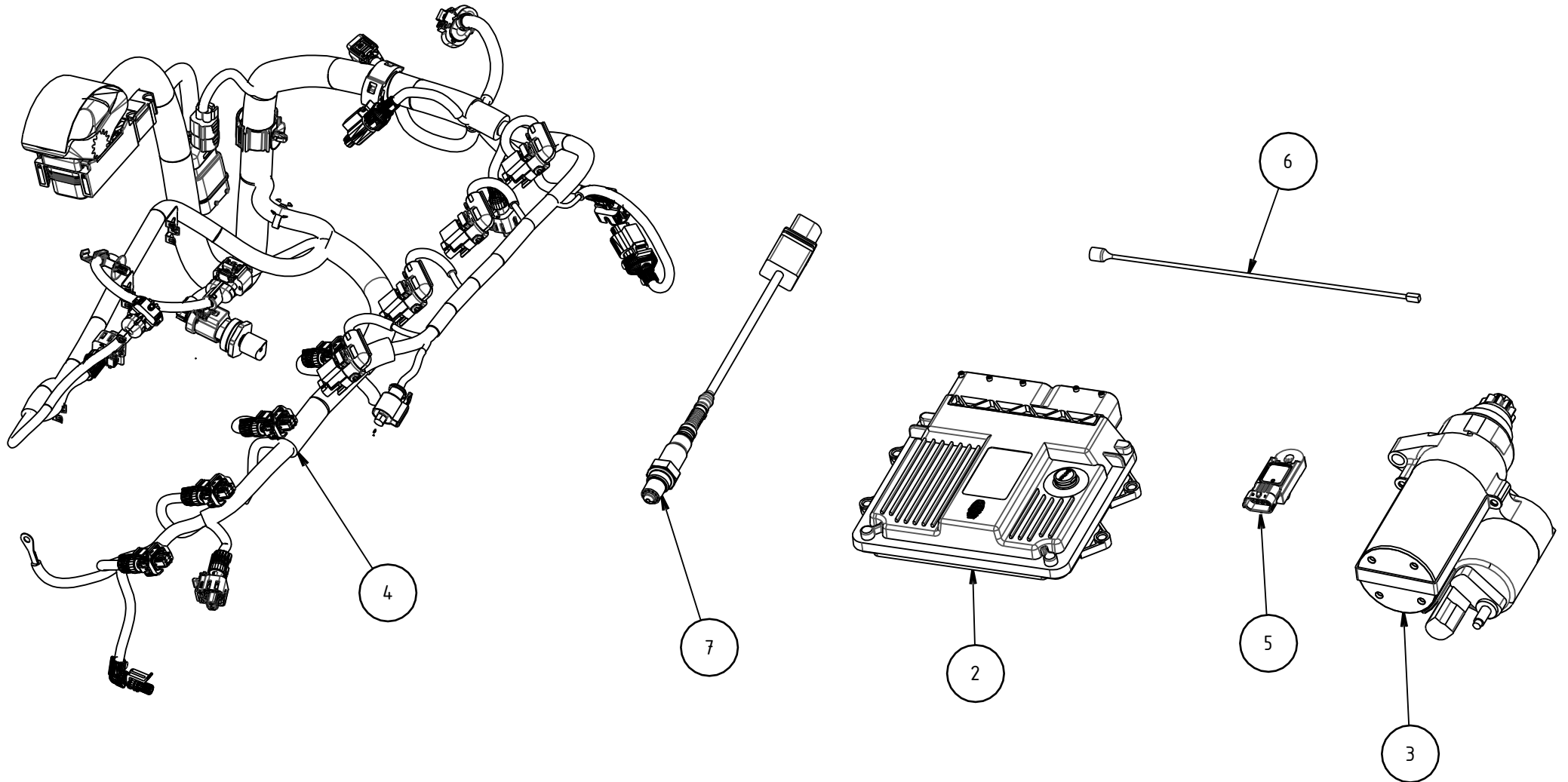


28 - Airbox

Release 01/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000191	AIR FILTER	1	
2	AM000396	LOWER AIRBOX	1	
3	AM000395	UPPER AIRBOX	1	
4	AM500309	K-NUT M5	13	
5	AM500613	RH BOLT M5x12 - 8.8	13	
6	AM000397	AIRBOX LH BRACKET	1	
7	AM000399	AIRBOX MOUNTING BASE	1	
8	AM501175	SILICONE ELBOW 90°-51-70x75	1	
9	AM000398	AIRBOX RH BRACKET	1	
10	AM501176	STEEL CLAMP 12X50-65	2	
11	AM500420	CH BOLT M6x10 - 8.8	3	
12	AM501173	WAVED SPRING WASHERS M5	18	
13	AM501174	WAVED SPRING WASHERS M6	4	
14	AM500346	SILENT BLOCK 20x15 - M6x16 - MF	4	
15	AM501398	RH BOLT M6x8 - 10.9	4	
16	AM500612	BH BOLT M5x10 - 8.8	5	

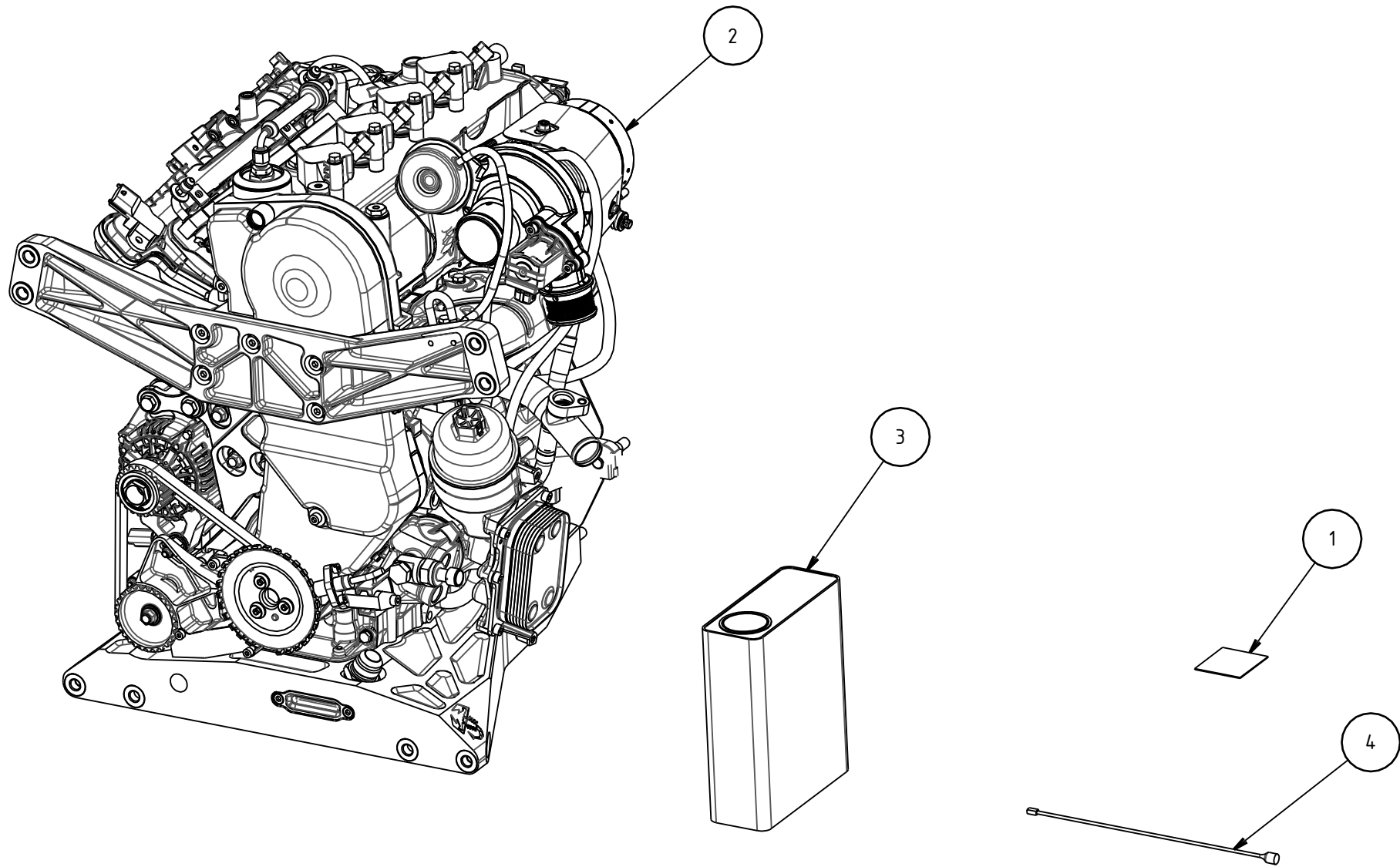


30 - Electronics

Release 12/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000406	P/T FUEL SENSOR LOOM	1	
2	AM000160	ECU	1	
3	AM000175	STARTER	1	
4	AM000176	ENGINE LOOM	1	
5	AM000186	PBOOST SENSOR	1	
6	AM000245	F4 DOWNLOAD LOOM	1	
7	AM000390	LAMBDA SENSOR	1	



31 - Miscellaneous

Release 12/03/2022



Index	Code	Description	Quantity	Mounting instruction
1	AM000246	SOFTWARE DATA DOWNLOADER	1	
2	AM000389	F4 ABARTH SPARE ENGINE	1	
3	AM000235	SELENIA RACING OIL	1	
4	AM000245	F4 DOWNLOAD LOOM	1	



F4 FIA
FORMULA 4

FIA F4 Parts Classification

Release 5.6 (11/03/19)

It is reminded that FIA article 274 article 2.7 states:

2.7 Modifications to car design

2.7.1. General

The complete car is divided into three types of part.

Type 1: These parts must be supplied by the manufacturer and used exactly as supplied. Repairs may be carried out only by the manufacturer.

Type 2: These parts are Type 1 parts with specific restrictions. Only the modifications indicated in the homologation may be carried out. Repairs are allowed only in the range described in the homologation.

Type 3: These parts are unrestricted, provided that they are used as designed by the manufacturer and do not fulfil any additional function.

The adding of colour or thin adhesive film up to a thickness of 0.5 mm is not considered as a modification, provided that the colour or film fulfils only an optical function.

2.7.2. Standard mounting parts

Standard mounting parts, such as screws, nuts, bolts, washers and lock washers, are considered as Type 3 parts unless specifically mentioned in the homologation. They may be replaced with equivalent or superior standard parts.

The thread type, size, length and pitch must remain the same.

The use of locking wire is permitted.

Any type of standard mounting part which has an influence on the car set-up is considered as a Type 1 part unless specifically mentioned in the homologation.

Only Type 3 washers may be removed. Washers may be added only for facilitating and improving mechanical installation. They may influence the set-up of the car only when specifically mentioned in the homologation.

2.7.3. Protections

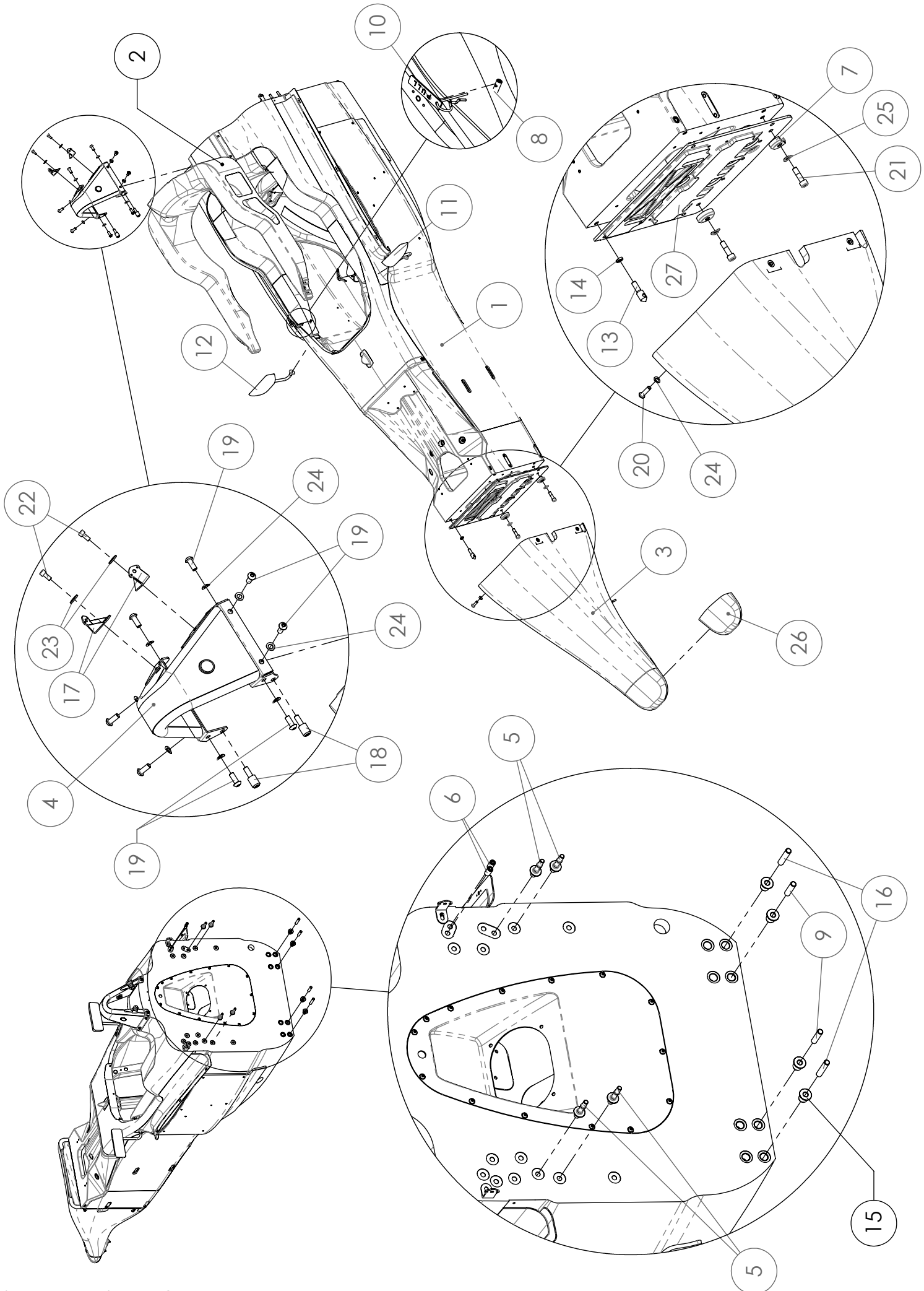
Heat protections, mechanical protections (such as abrasion protection or tape) and protections for driver comfort may be added, provided that their sole function is the protection of the relevant element.

2.7.4. Bodywork

The modification of bodywork parts and bodywork supports is allowed only to ensure proper installation despite manufacturing tolerances.

2.7.5. Quick couplings

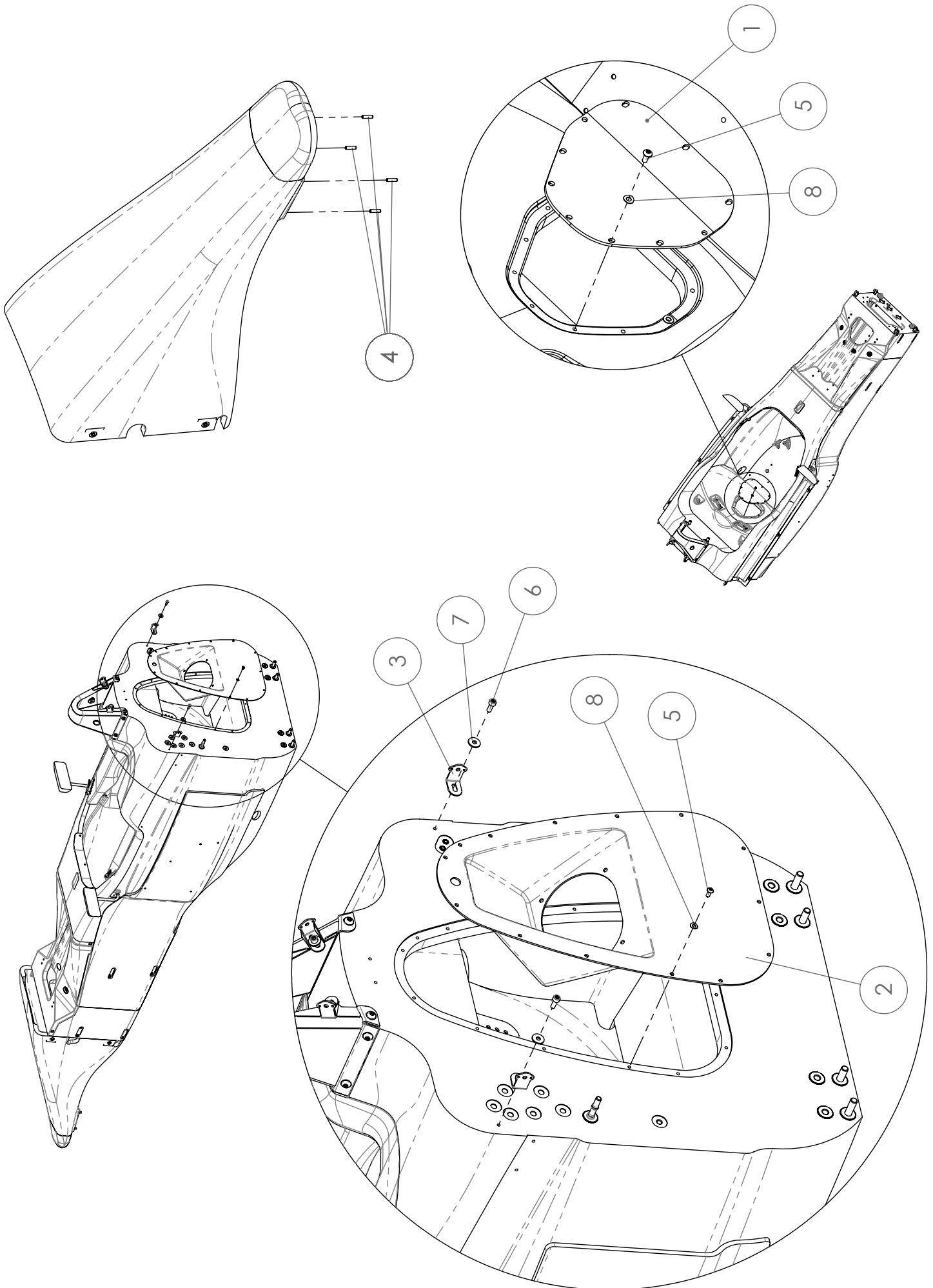
The use of quick couplings for brake, clutch and fuel lines is allowed, provided that FIA-approved dry couplings are used.



01A - CHASSIS

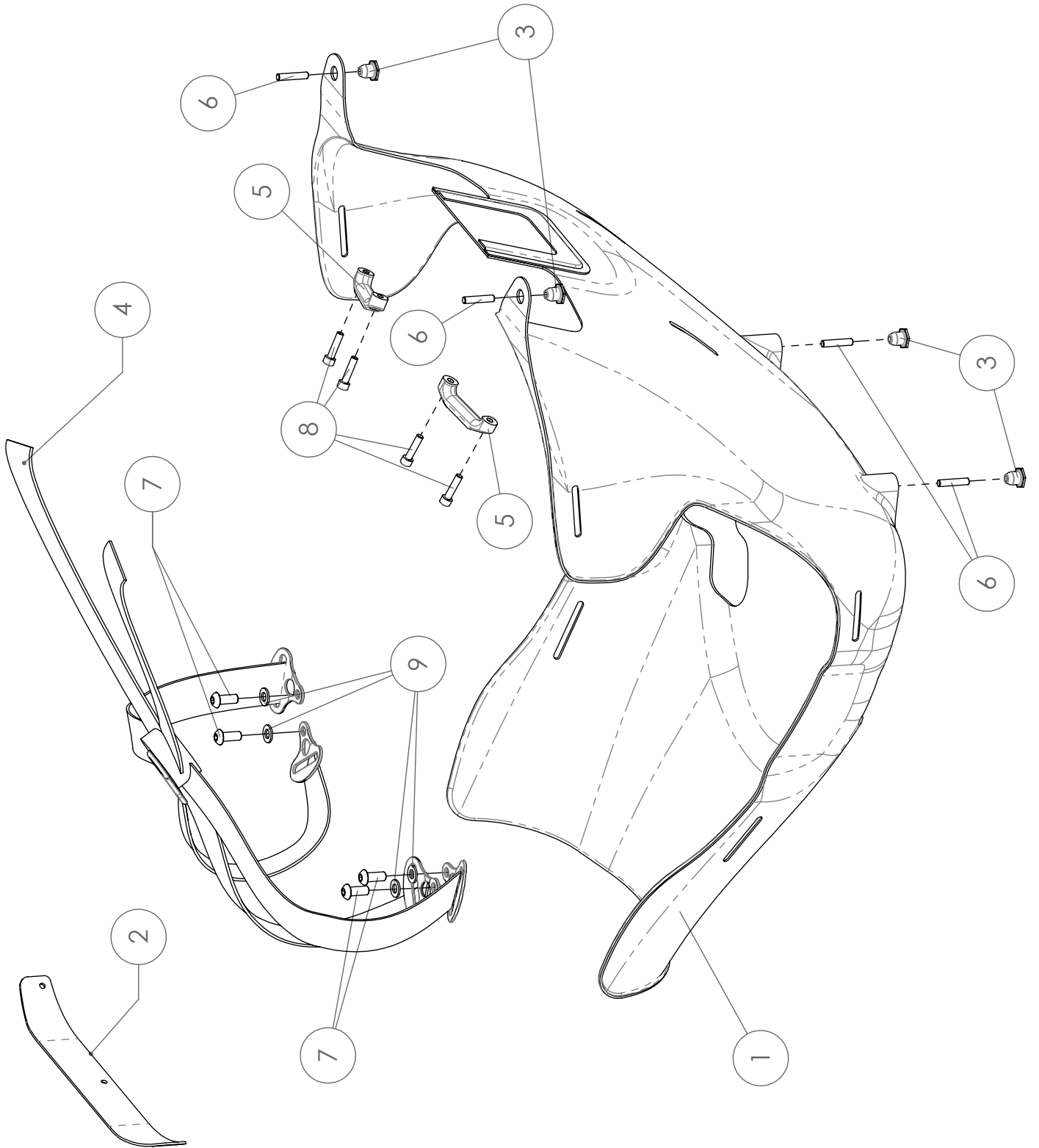
Item	Part Number	Descrizione	Description	1	2	3
1	161401001	Telaio	Monocoque	x		
2	161701002	Poggiatesta	Headrest	x		
3	161401003	Musetto	Nosebox		x	
4	161401004	Rollbar	Rollhoop	x		
5	161401005	Prigioniero	Stud	x		
6	161401014	Boccola	Bush	x		
7	161507014	Anello cavo ritenzione	Tether fitting	x		
8	090901017	Pin	Pin	x		
9	090922011	Prigioniero	Stud	x		
10	091001024	Linguetta	Leader			x
11	040401067	Specchietto Sx	Lh mirror		x	
12	040401066	Specchietto dx	Rh mirror		x	
13	161801030	Spina	Dowel pin	x		
14	030201016	Ghiera	Nose connection ring nut	x		
15	010022016	Boccola attacco motore	Chassis bush			x
16	010022013	Prigioniero	Stud	x		
17	010301024	Squadretta rollbar	Rollbar mounting	x		
18	010101060	Pin posteriore poggiatesta	Headrest pin	x		
19	UNI7380-M8X20	Vite TB	BH bolt	x		
20	UNI7380-M8X30	Vite TB	BH Bolt	x		
21	UNI5931-M10x35	ViteTC M10x1,25x35 cl.12,9	CH Bolt M10x1,25x35 grade 12,9	x		
22	UNI5931-M6X14	Vite TC	CH Bolt			x
23	UNI6593-6	Rondella	Washer			x
24	UNI8840B-8	Rondella ondulata	Crinckle Washer			x
25	UNI8840B-10	Rondella ondulata	Crinckle Washer			x
26	161401003002	Puntalino muso	Front nose		x	
27	161801029	Pannello anti-intrusione	Anti-intrusion panel	x		

- #3-26 161401003 *It is allowed to replace the nose tip according to the procedure reported in the user manual*
- #11 040401067 *It is allowed to shorten or increase the height of the mirror stem*
- #12 040401066 *It is allowed to shorten or increase the height of the mirror stem*
- #19 UNI7380-M8X20 *Type and class of this bolt must be respected*
- #20 UNI7380-M8X30 *Type and class of this bolt must be respected*
- #25 UNI8840B-10 *It is allowed to replace nose tip according to Tatuus procedure.*



01B - CHASSIS

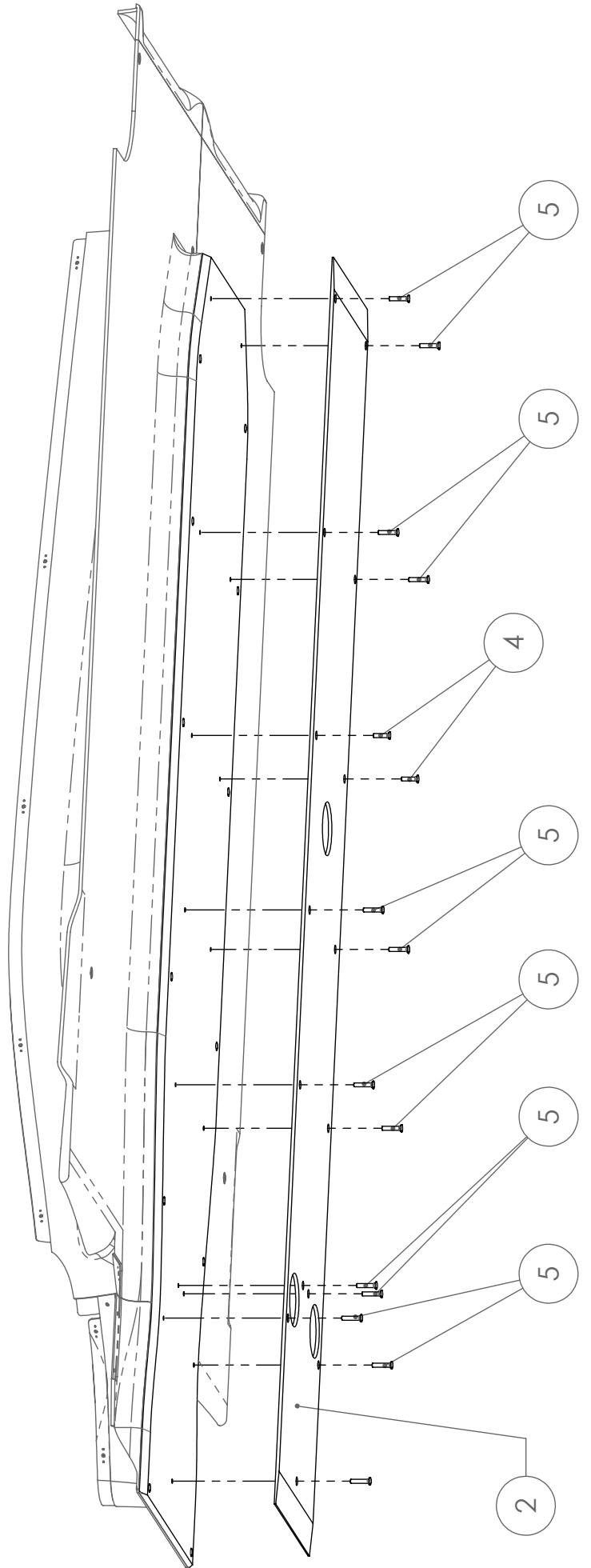
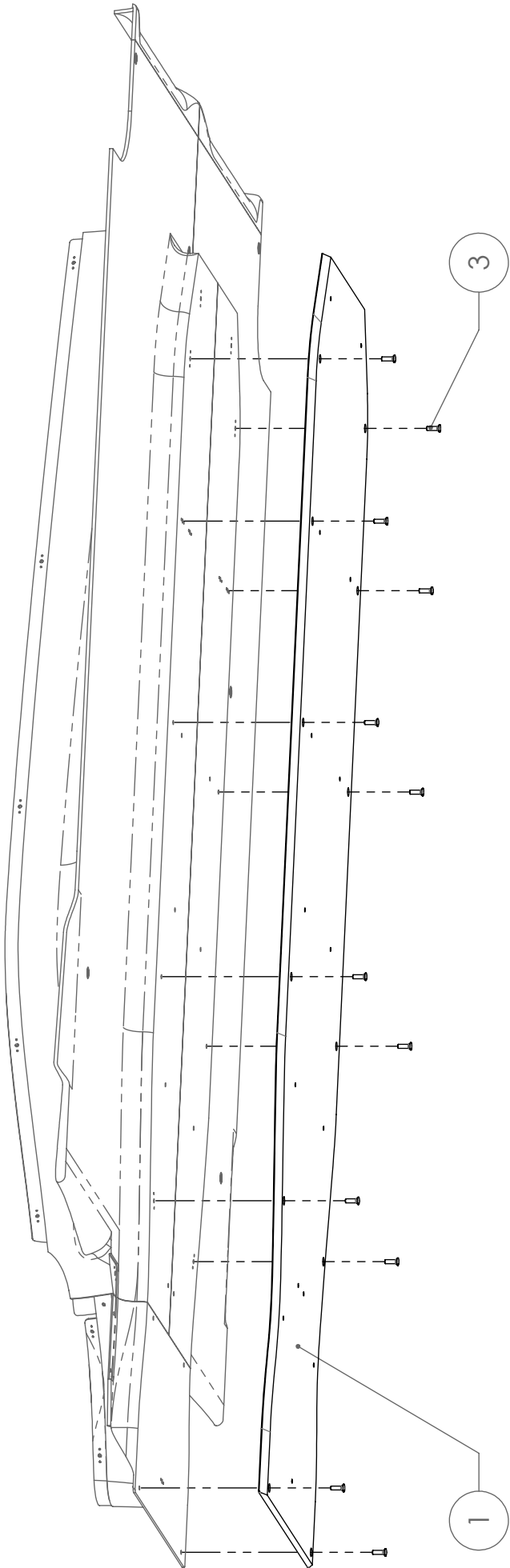
Item	Part Number	Descrizione	Description	1	2	3
1	161401013	Finestra serbatoio	Bulkhead panel	x		
2	161401004007	Chiusura posteriore serbatoio	Fuel tank hatch cover	x		
3	010301025	Staffa carrozzeria	Sidepods mounting	x		
4	010011020	Prigioniero	Stud			x
5	UNI7380-M5X12	Vite TB	BH Bolt			x
6	UNI5931-M6X16	Vite TC	CH Bolt			x
7	UNI6593-6	Rondella	Washer			x
8	UNI8840B-5	Rondella ondulata	Crinkle Washer			x



01C - COCKPIT

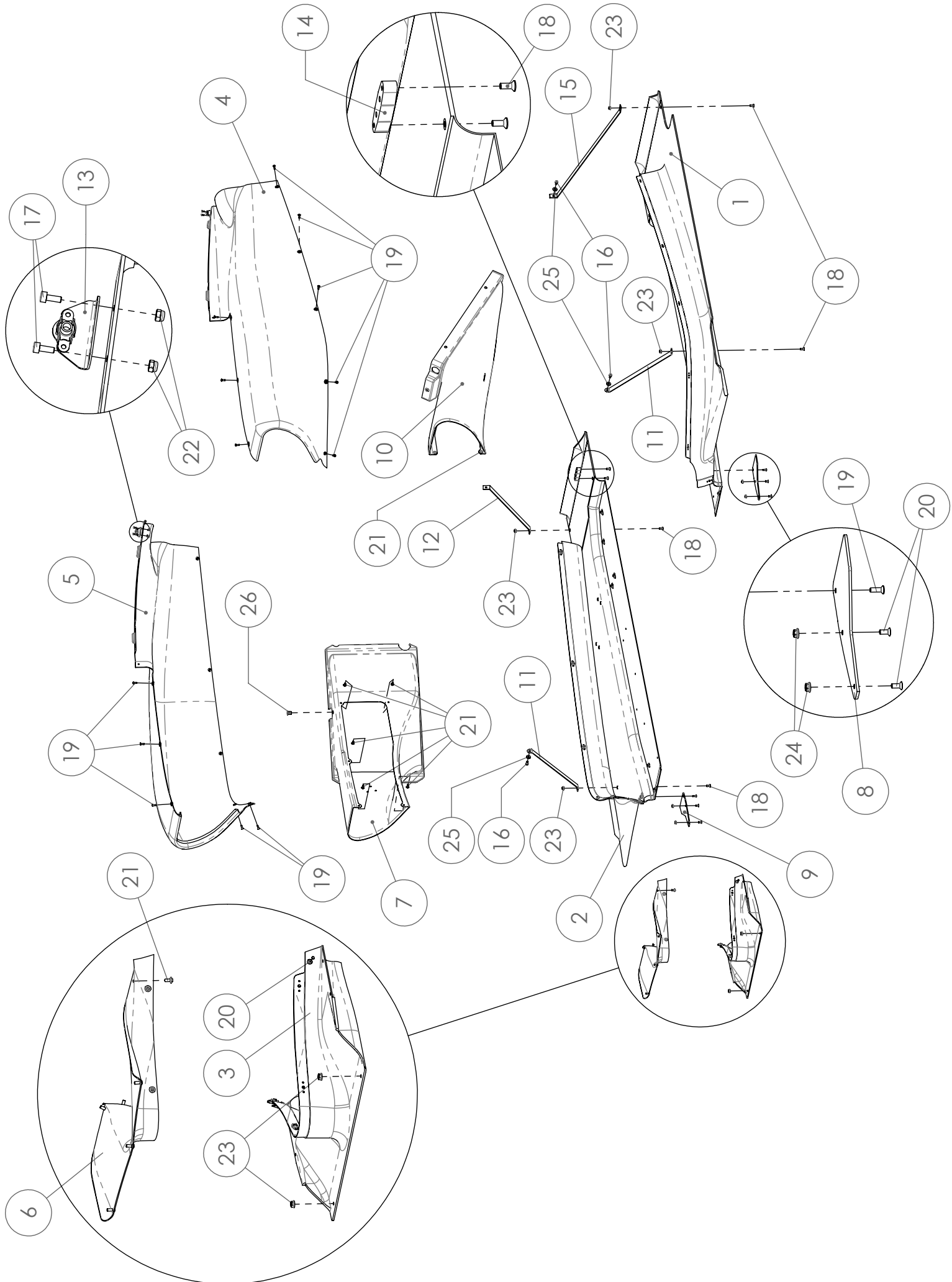
Item	Part Number	Descrizione	Description	1	2	3
1	161401006	Sedile estraibile	Extractable seat		x	
2	161401011	Parabrezza	Wind screen		x	
3	090901012	Centraggio	Pin	x		
4	161801023	Cinture di sicurezza FIA 8853-2016	Safety belts FIA 8853-2016		x	
5	030201010	Attacco cinture superiori	Shoulder belt mount	x		
6	080602013	Prigioniero	Stud			x
7	UNI7380-M8X20	Vite TB	BH Bolt		x	
8	UNI5931-M6X25	Vite TC	CH Bolt		x	
9	UNI6592-8	Rondella	Washer			x

- #1 161401006 *It is allowed a cutout for lower seat belt strap installation (offset 25mm of the original design).
It is allowed to bond a washer on the locating holes as long as the contact area remains plane.*
- #2 161401011 *Windscreen may be removed*
- #4 161801023 *Pr. 090910020 may be used until expire date*
- #7 UNI7380-M8X20 *Type and class of this bolt must be respected*
- #8 UNI5931-M6X25 *Type and class of this bolt must be respected*



02A - WOODEN SKID

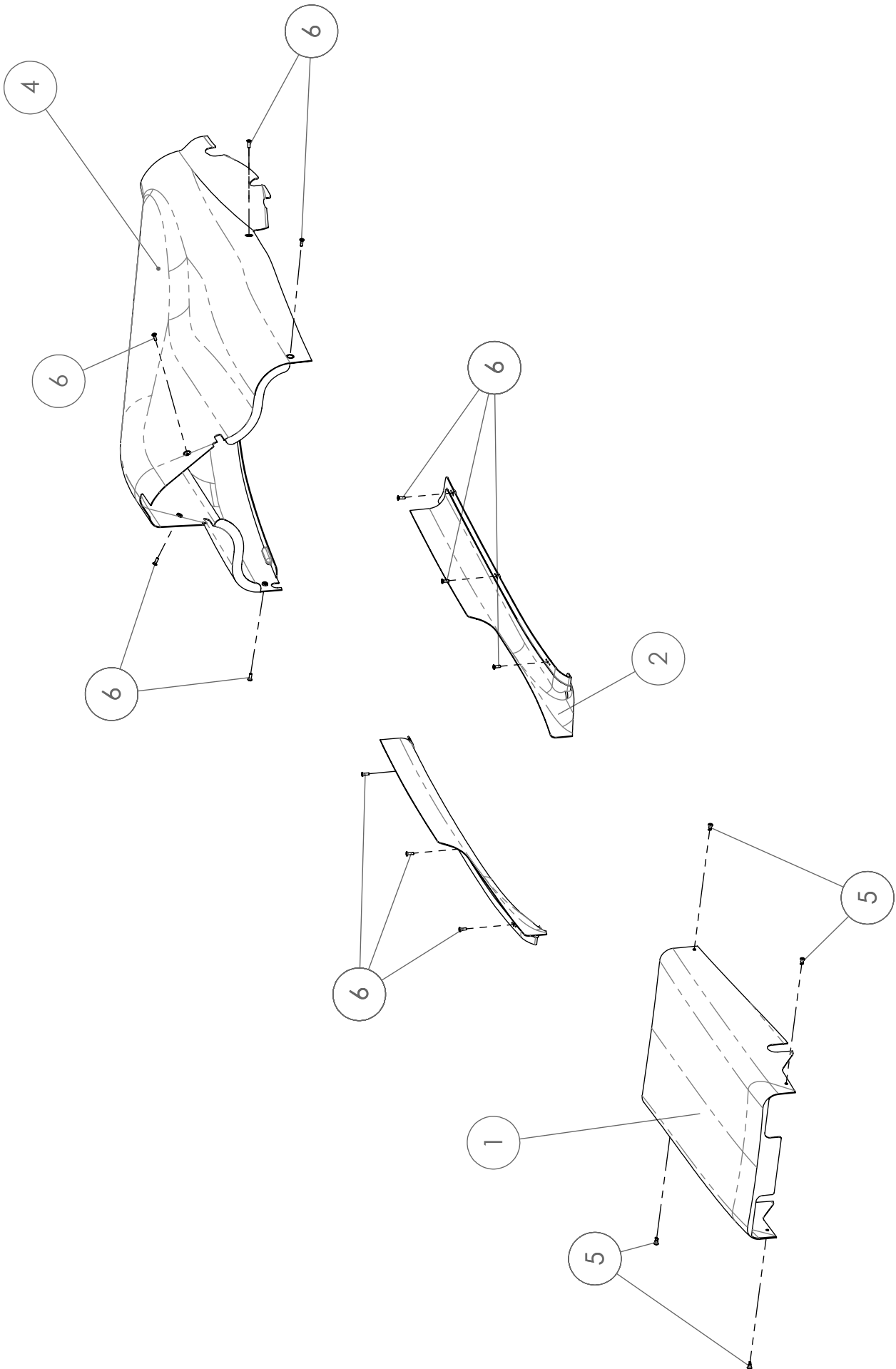
Item	Part Number	Descrizione	Description	1	2	3
1	161402015	Fondo in legno	Wooden plank	x		
2	161402016	Slitta in legno	Skid block	x		
3	UNI5933-TX-M6X20	Vite TS Torx	CSH Torx Bolt			x
4	UNI5933-TX-M6X25	Vite TS Torx	CSH Torx Bolt			x
5	UNI5933-TX-M6X30	Vite TS Torx	CSH Torx Bolt			x



02B - FLOOR

Item	Part Number	Descrizione	Description	1	2	3
1	161402001	Semi-fondo SX	Lh Underfloor		x	
2	161402002	Semi-fondo DX	RH underfloor		x	
3	161402004	Semi-prua inferiore	Bottom Bib		x	
4	161402007	Pancia sinistra	Lh sidepod		x	
5	161402008	Pancia destra	Rh sidepod		x	
6	161402009	Semi-prua superiore	Top bib		x	
7	161402012	Convogliatore DX	Rh radiator duct		x	
8	161402013	Shadow sx telaio	LH chassis shadow	x		
9	161402014	Shadow telaio dx	Rh chassis shadow	x		
10	161402017	Convogliatore SX	Lh radiator duct		x	
11	161402019	Tirante	Floor stay	x		
12	161402020	Tirante	Floor stay	x		
13	090902022	Staffa carrozzeria	Bodywork bracket	x		
14	161402026	Staffa	Underfloor stay	x		
15	161402029	Tirante cambio fondo Sx	Gearbox floor stay	x		
16	UNI5931-M6X12	Vite TC	CH bolt			x
17	UNI5931-M3X8	Vite TC	CH Bolt			x
18	UNI5933-TX-M6X16	Vite TS Torx	CSH Torx Bolt			x
19	UNI5933-TX-M5X16	Vite TS torx	CSH Torx Bolt			x
20	UNI5933-TX-M5X12	Vite TS Torx	CSH Torx Bolt			x
21	UNI7380-TX-M5X12	Vite TB Torx	BH Torx Bolt			x
22	UNI7473-M3	Dado autobloccante	Prevailing torque Nut			x
23	DIN6927-M6	Dado flangiato autobloccante	Prevailing torque Nut			x
24	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut			x
25	UNI6593-6	Rondella larga	Large washer			x
26	E127-0615	Boccola Antivibrante M6	Bush M6			x

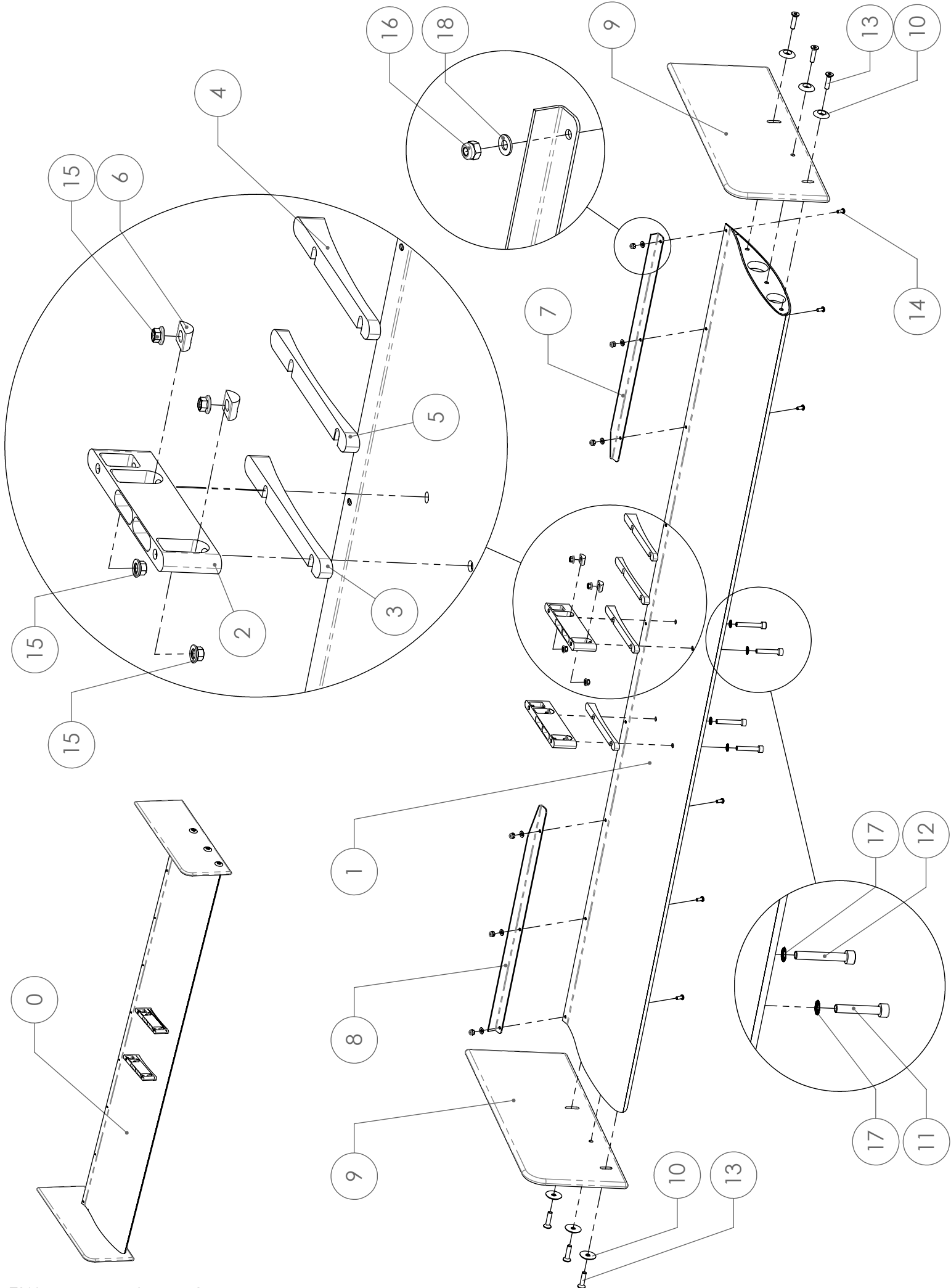
#1	161402001	Bodywork can be repaired provided that a maximum of 4 repairing patches can be enclosed in a 300x300mm each.
#2	161402002	Bodywork can be repaired provided that a maximum of 4 repairing patches can be enclosed in a 300x300mm each.
#3	161402004	Bodywork can be repaired provided that the damaged surface can be enclosed in a 100x100mm square area.
#4	161402007	Bodywork can be repaired provided that the damaged surface can be enclosed in a 100x100mm square area.
#5	161402008	Bodywork can be repaired provided that the damaged surface can be enclosed in a 300x300mm square area.
#6	161402009	Bodywork can be repaired provided that the damaged surface can be enclosed in a 300x300mm square area.
#7	161402012	Blanking and stoneguard are allowed minimum 150mm behind the air duct inlet. Rubber sealing can be added.
#10	161402017	Blanking and stoneguard are allowed minimum 150mm behind the air duct inlet. Rubber sealing can be added.



03 - BODYWORK

Item	Part Number	Descrizione	Description	1	2	3
1	161802003	Cofanetto anteriore	Front cover		x	
2	161402005	Labbro pancia SX	Lh sidepod lip		x	
3	161402006	Labbro pancia dx	Rh sidepod lip		x	
4	161402010	Cofano motore	Engine cover		x	
5	27S32F	Perno ¼ di giro	Quarter turn stud			x
6	UNI5933-TX-M5X16	Vite TS torx	CSH Torx Bolt			x

- #1 161802003 *Bodywork can be repaired provided that the damaged surface can be enclosed in a 300x300mm square area.*
- #2 161402005 *Bodywork can be repaired provided that the damaged surface can be enclosed in a 100x100mm square area.*
- #3 161402006 *Bodywork can be repaired provided that the damaged surface can be enclosed in a 100x100mm square area.*
- #4 161402010 *Bodywork can be repaired provided that a maximum of 4 repairing patches can be enclosed in a 300x300mm each.*



04A - FRONT WING

Item	Part Number	Descrizione	Description	1	2	3
1	161504003	Ala anteriore CF	Front wing CF	x		
2	161404011	Pilone ala	Wing pillar	x		
3	161404015	Regolazione ala anteriore (5°)	Front wing adjuster (5°)		x	
4	161404035	Regolazione ala anteriore (3°)	Front wing adjuster (3°)		x	
5	161404032	Regolazione ala anteriore (7°)	Front wing adjuster (7°)		x	
6	161404017	Boccola	Adjustment bush	x		
7	161404023	Nolder Sx	Lh Gurney		x	
8	161404024	Nolder Dx	Rh Gurney		x	
9	161404025	Bandella anteriore	Front endplate	x		
10	080602008	Rondella speciale	Button washer			x
11	UNI5931-M6X35	Vite TC	CH bolt		x	
12	UNI5931-M6X40	Vite TC	CH bolt		x	
13	UNI5933-M6X25	Vite TS	CSH Bolt			x
14	UNI7380-M4X10	Vite TB	Bolt			x
15	AST-06	K-Nut	K-Nut			x
16	UNI7474-M4	Dado autobloccante basso	Thin prevailing torque nut			x
17	RZS6	Rondella zigrinata	Safety washer			x
18	UNI6592-4	Rondella	Washer			x

#3 #4 #5 161404015 / 035 / 032

Optional item #3 #4 #5

#5 161404023

Gurney may be removed

#6 161404024

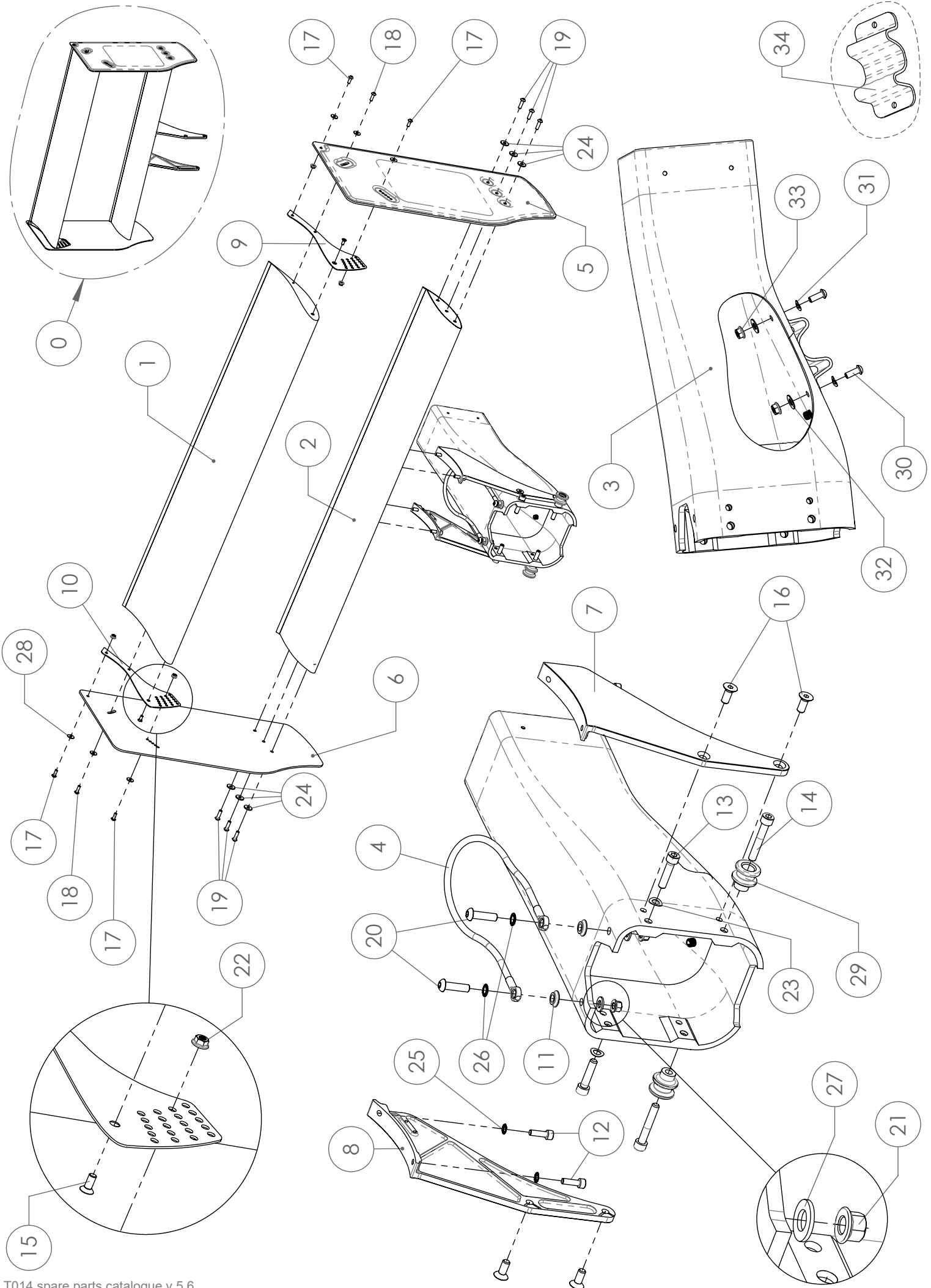
Gurney may be removed

#11 UNI5931-M6X35

It may be replaced by item #12

#12 UNI5931-M6X40

It may be replaced by item #11



04B - REAR WING

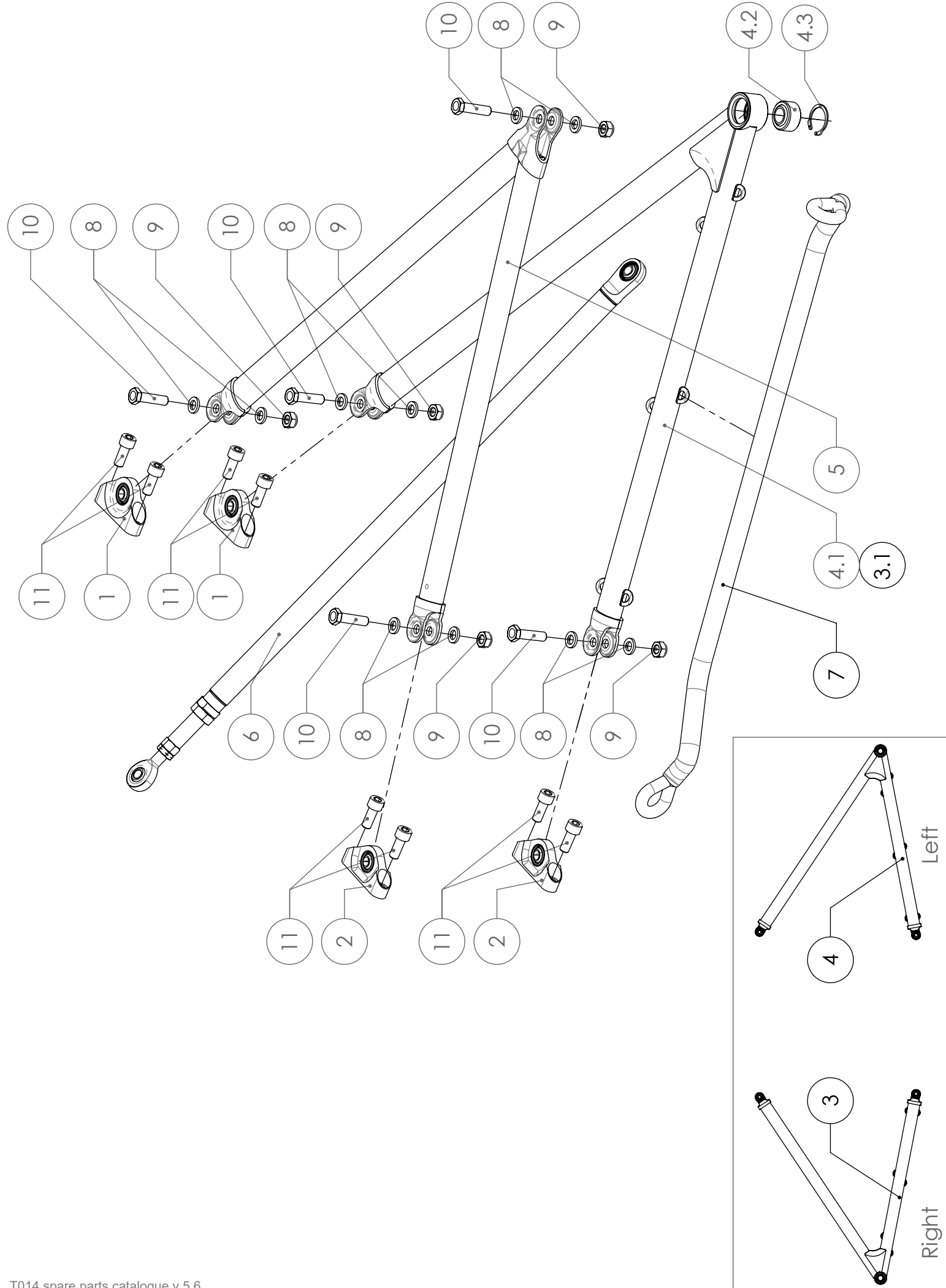
Item	Part Number	Descrizione	Description	1	2	3
1	161404004	Ala superiore	Top main wing	x		
2	161404005	Ala inferiore	Beam wing	x		
3	161804006	Crashbox posteriore	Rear impact structure	x		
4	161404008	Cavo di traino completo	Tow cable	x		
5	161404009	Bandella post. Sx	Lh rear enplate	x		
6	161404010	Bandella post. dx	Rh rear enplate	x		
7	161404019	Palo ala post Sx	Lh rear wing mounting	x		
8	161404020	Palo ala post. Dx	Rh rear wing mounting	x		
9	161404021	Bandella regolazione Sx	Lh adjustment enplate	x		
10	161404022	Bandella regolazione Dx	Rh adjustment enplate	x		
11	010013007	Boccola	Bush			x
12	UNI5931-M6X20	Vite TC	CH bolt			x
13	UNI5931-M8x35	Vite TC M8x35 cl.12,9	CH Bolt M8x35 grade 12,9	x		
14	UNI5931-M8x50	Vite TC M8x50 cl.12,9	CH Bolt M8x50 grade 12,9	x		
15	UNI5933-M5X12	Vite TS	CSH Bolt			x
16	UNI5933-M8X20	Vite TS	CSH Bolt	x		
17	UNI7380-M5X14	Vite TB	BH Bolt			x
18	UNI7380-M5X16	Vite TB	BH Bolt			x
19	UNI7380-M6X20	Vite TB	BH Bolt			x
20	UNI7380-M8X30	Vite TB	BH bolt			x
21	DIN6927-M8	Dado flangiato esagono ridotto	Prevailing torque nut			x
22	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut			x
23	UNI8840B-8	Rondella Ondulata	Crinkle washer			x
24	UNI6593-6	Rondella larga	Large washer			x
25	RZS6	Rondella zigrinata	Safety washer			x
26	RZS8	Rondella zigrinata	Safety Washer			x
27	UNI6592-8	Rondella	Washer			x
28	UNI6593-5	Rondella larga	Large washer			x
29	161704043	Boccola sollevamento	Pick up bush	x		
30	UNI7380-M6x16	Vite TB	BH Bolt			x
31	UNI8840B-6	Rondella ondulata	Crinkle Washer			x
32	RS065160010	Rondella speciale 6,5x16x1	Special Washer 6,5x16x1			x
33	DIN6927-M6	Dado flangiato autobloccante	Prevailing torque nut			x
34	161804007	Gancio sollevamento	Lift Hook	x		

#17 UNI7380-M5X14

Type and class must be respected

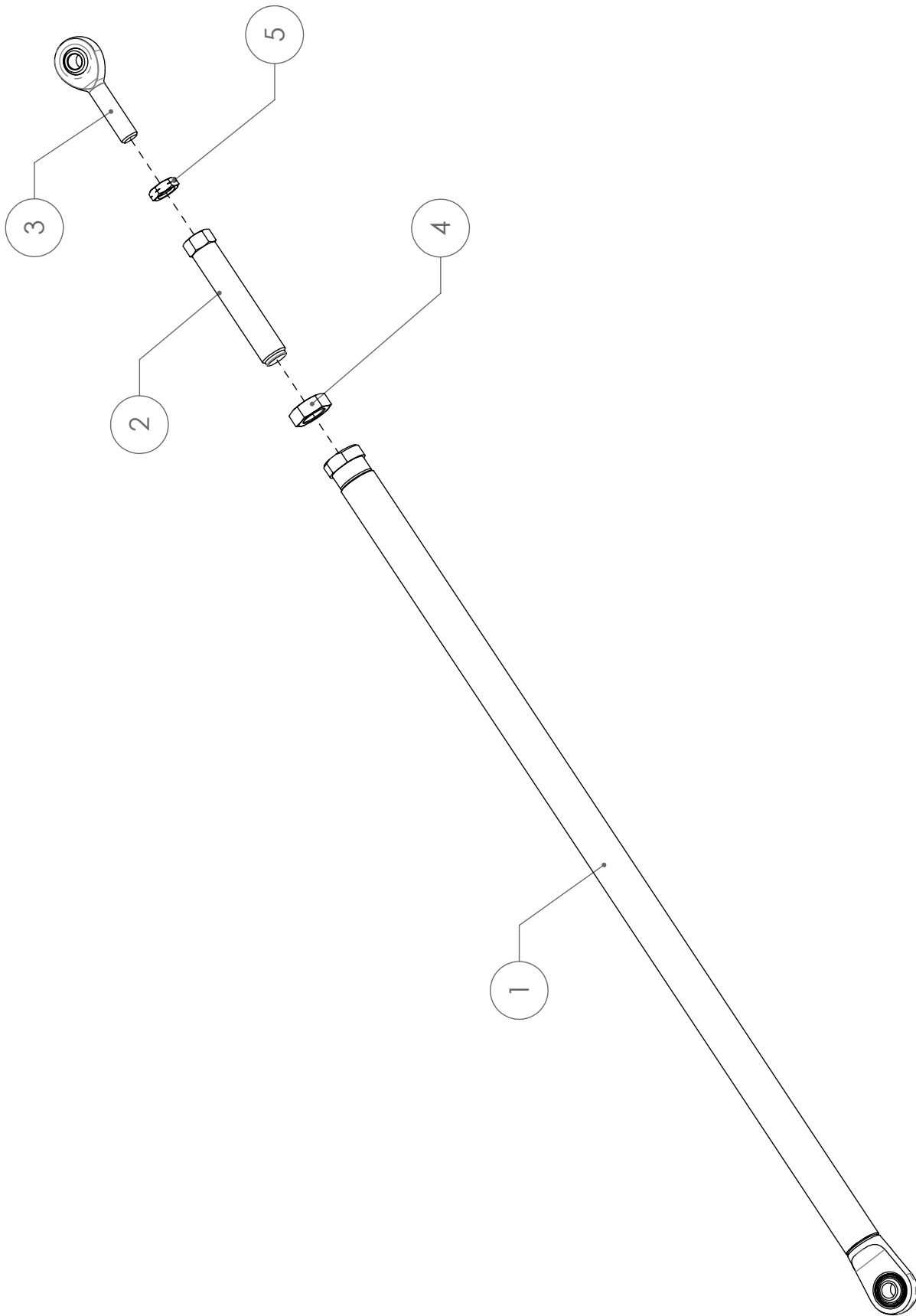
#21 DIN6927-M8

Type and class must be respected



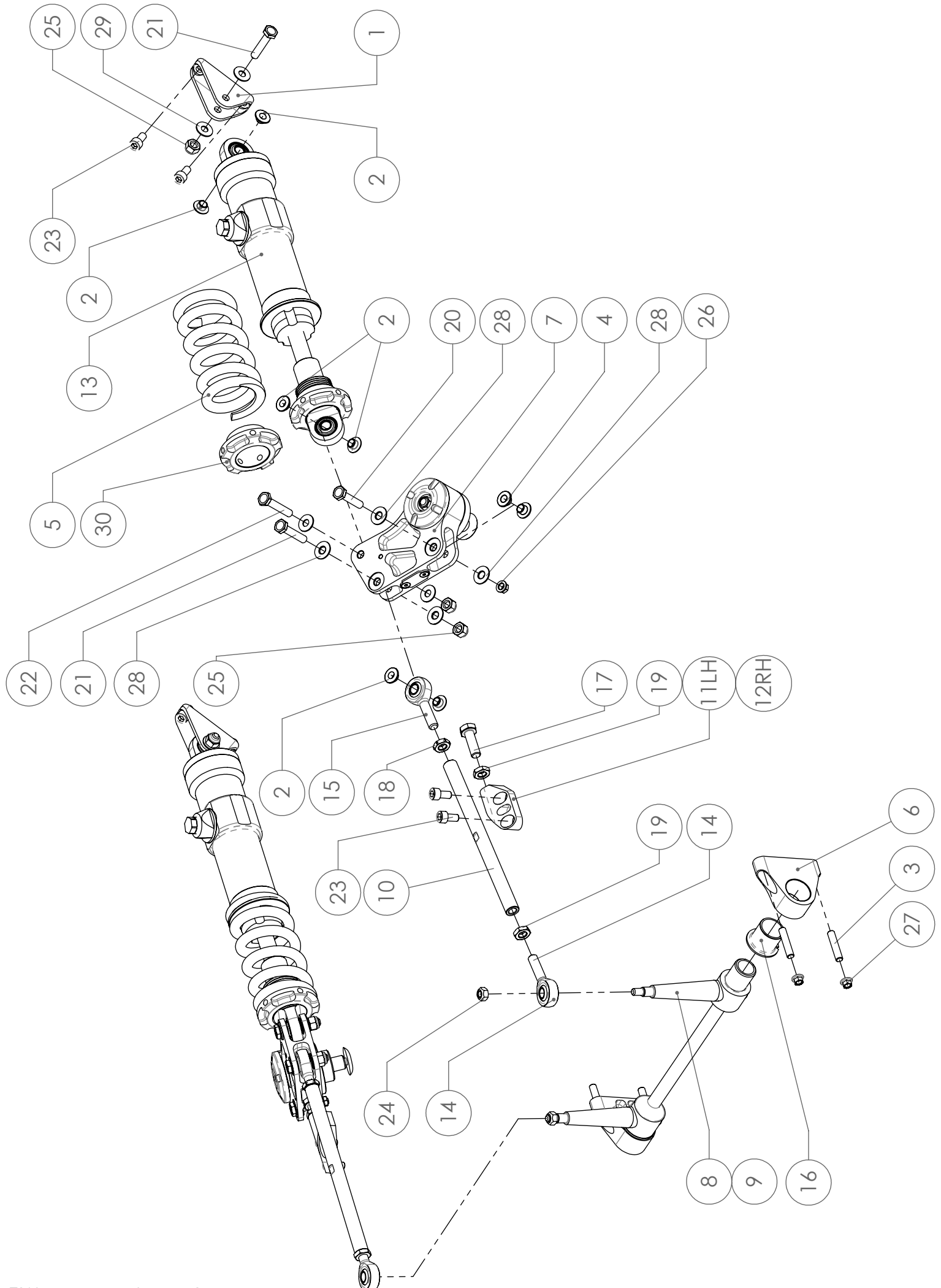
05A - FRONT WISHBONE

Item	Part Number	Descrizione	Description	1	2	3
1	010010028	Attacco sospensione completo	Wishbone bracket assy	x		
2	020210006	Attacco sospensione completo	Wishbone bracket assy	x		
3	161405002	Braccio anteriore inferiore dx completo	Rh front lower wishbone assy			
3.1	161405004	Braccio anteriore inferiore dx	Rh front lower wishbone	x		
4	161405003	Braccio anteriore inferiore sx completo	Lh front lower whisbone assy			
4.1	161405005	Braccio anteriore inferiore sx	Lh front lower whisbone	x		
4.2	UNIBALL-ABWT8	Snodo sferico	Spherical bearing			x
4.3	J25X1,2V	Circlip	Circlip			x
5	161405006	Braccio anteriore superiore	Front top wishbone	x		
6	161405007	Push rod anteriore completo	Front push rod assy			
7	161705010	Cavo di ritenzione 6kJ	Wheel tether 6kJ	x		
8	090910011	Rondella speciale 5/16" Sp.2	Special Flat Washer 5/16" Th.2			x
9	AN365-5/16X24	Dado autobloccante	Self-locking Nut			x
10	AN5-11A	Vite NAS	NAS bolt			x
11	UNI5931-M8X20	Vite TC	CH Bolt			x



05B - FRONT PUSHROD

Item	Part Number	Descrizione	Description	1	2	3
1	161405008	Puntone anteriore	Front push rod	x		
2	010005012	Registro Puntone	Push rod adjuster	x		
3	RE-3/8L	Testa a snodo	Rod end			x
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25			x
5	ANSIB182265-3/8X24L	Dado esagonale Sx	Hex Nut Lh			x



06A - FRONT ROCKERS

Item	Part Number	Descrizione	Description	1	2	3
1	010008009	Staffa ammortizzatore	Damper mounting	x		
2	010008010	Boccola	Bush	x		
3	080602013	Prigioniero	Stud			x
4	080608010	Boccola	Bush	x		
5	080608026A	Molla 600 lb/in	Spring 600 lb/in		x	
	080608026C	Molla 800 lb/in	Spring 800 lb/in		x	
	080608026E	Molla 1000 lb/in	Spring 1000 lb/in		x	
6	151406010	Supporto FARB	FARB bracket	x		
7	161406002	Rocker anteriore completo	Front rocker assy			
8	161406004	FARB ø 11.5	FARB ø 11.5		x	
9	161406005	FARB ø 13.5	FARB ø 13.5		x	
10	161406009	Link FARB	Link FARB	x		
11	161406011	Rebound stop SX	Rebound stop LH	x		
12	161406012	Rebound stop DX	Rebound stop RH	x		
13	161406013	Ammortizzatore anteriore	Front damper	x		
14	RE-8M	Testa a snodo	Rod end			x
15	RE-8ML	Testa a snodo	Rod end			x
16	PAF20215P10	Boccola Flangiata DU	Self-lubricating flanged bush	x		
17	UNI5739-M8X25	Vite TE	HH Bolt			x
18	UNI5589-M8L	Dado esagonale basso	Thin Hex Nut			x
19	UNI5589-M8	Dado esagonale basso	Thin Hex Nut			x
20	AN4-11A	Vite NAS	NAS bolt			x
21	AN4-12A	Vite NAS	NAS bolt			x
22	AN4-13A	Vite NAS	NAS bolt			x
23	UNI5931-M6x12	Vite TC	CH Bolt			x
24	DIN980-M6	Dado autobloccante	Prevailing torque Nut			x
25	AN365-1/4X28	Dado autobloccante	Self-locking Nut			x
26	AST-1/4	K-Nut	K-Nut			x
27	AST-06	K-Nut	K-Nut			x
28	AN960-1/4	Rondella	Washer			x
29	RS065160010	Rondella speciale 6,5x16x1	Special washer 6,5x16x1			x
30	161406013005	Ghiera molla	Plateform			x

#5 080608026A/C/E

Optional item #5

#8 161406004

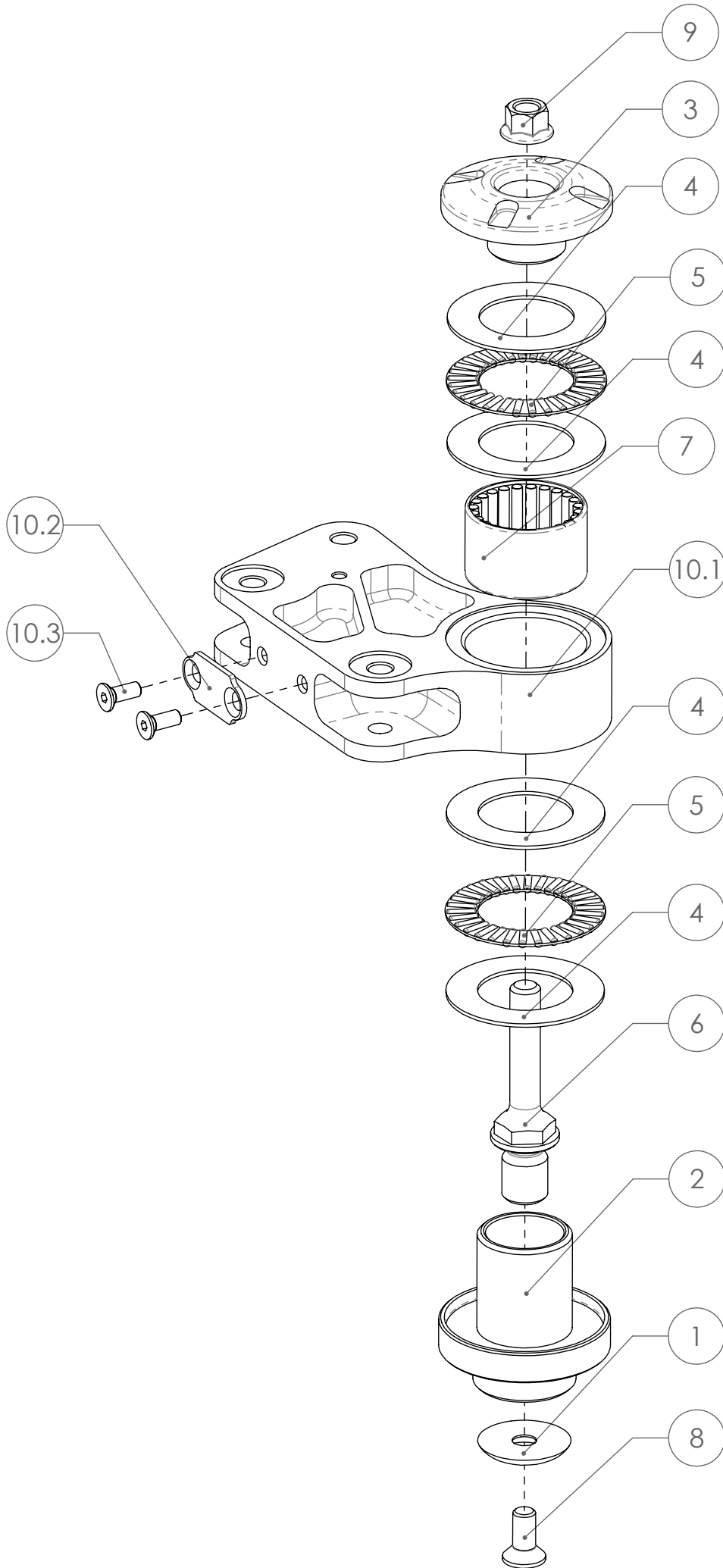
Optional item, may be removed / disconnected

#9 161406005

Optional item, may be removed / disconnected

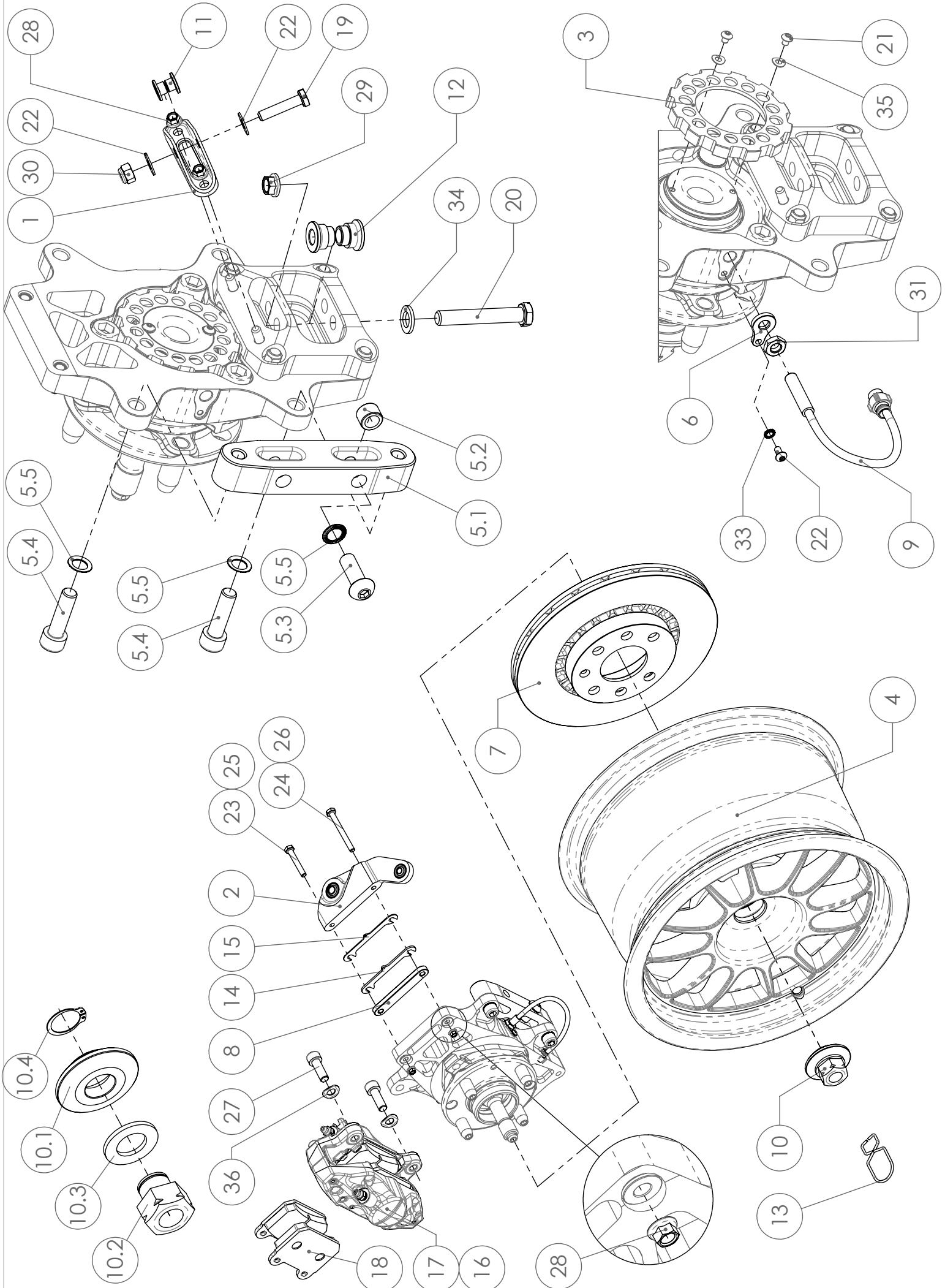
#10 161406009

Optional item, may be removed / disconnected



06B - FRONT ROCKERS

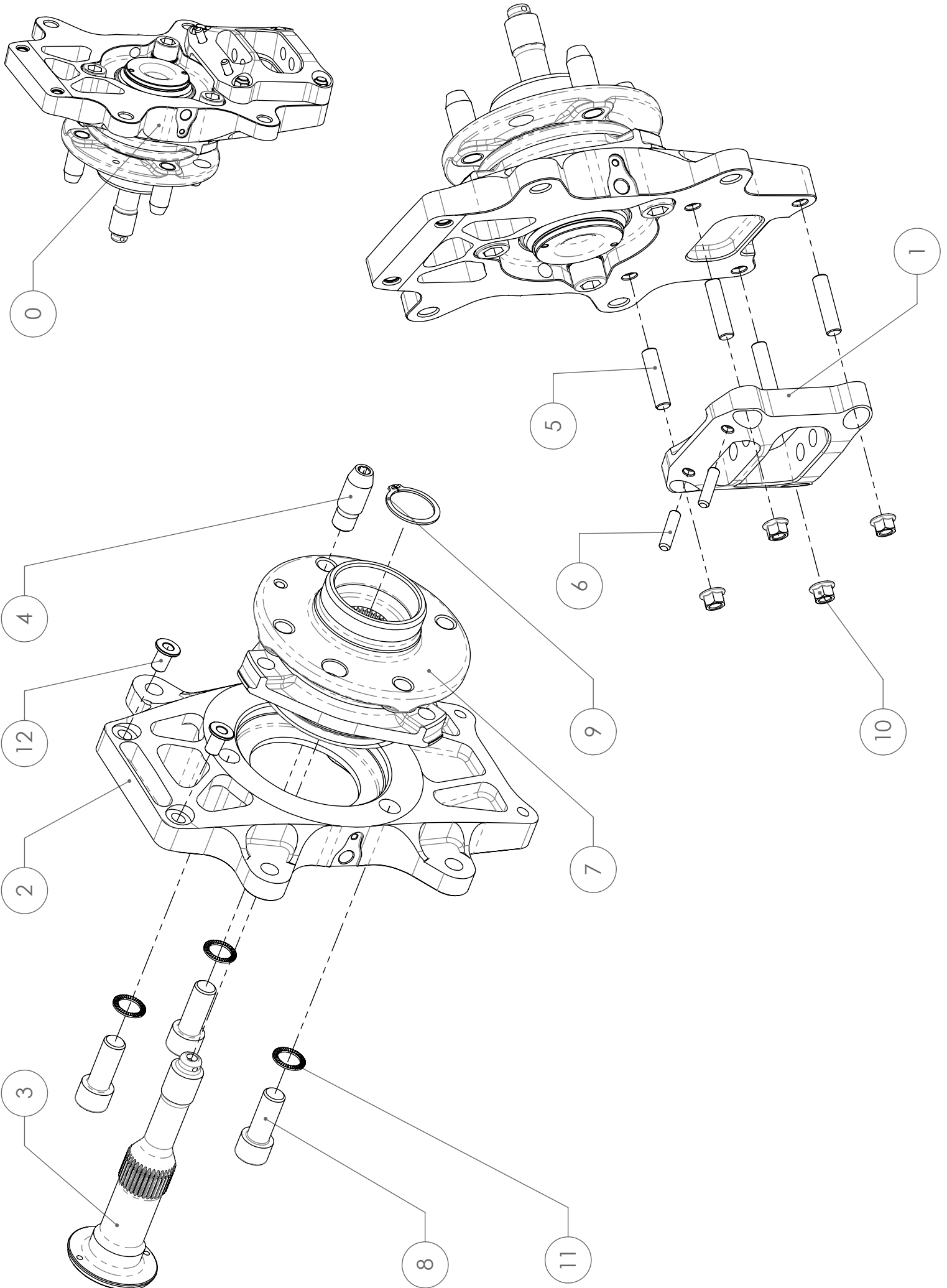
Item	Part Number	Descrizione	Description	1	2	3
1	080602008	Rondella speciale	Button washer	x		
2	151406003	Perno Rocker ant	Front rocker pivot	x		
3	151406004	Registro rocker ant.	Front rocker adjuster	x		
4	AS2542	Controralla	Thrust bearing washer			x
5	AXK2542	Cuscinetto reggispira	Thrust bearing			x
6	151406005	Perno prigioniero rocker ant.	Front rocker stud	x		
7	HK2520	Cuscinetto a rullini	Drawn cup needle roller bearing			x
8	UNI5933-M6X14	Vite TS	CSH Bolt			x
9	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut			x
10.1	161406003	Rocker anteriore	Front rocker	x		
10.2	151406012	Lamiera arresto rocker	Rebound stop flange	x		
10.3	UNI5933-M4X8	Vite TS	CSH Bolt			x



07A - FRONT UPRIGHT

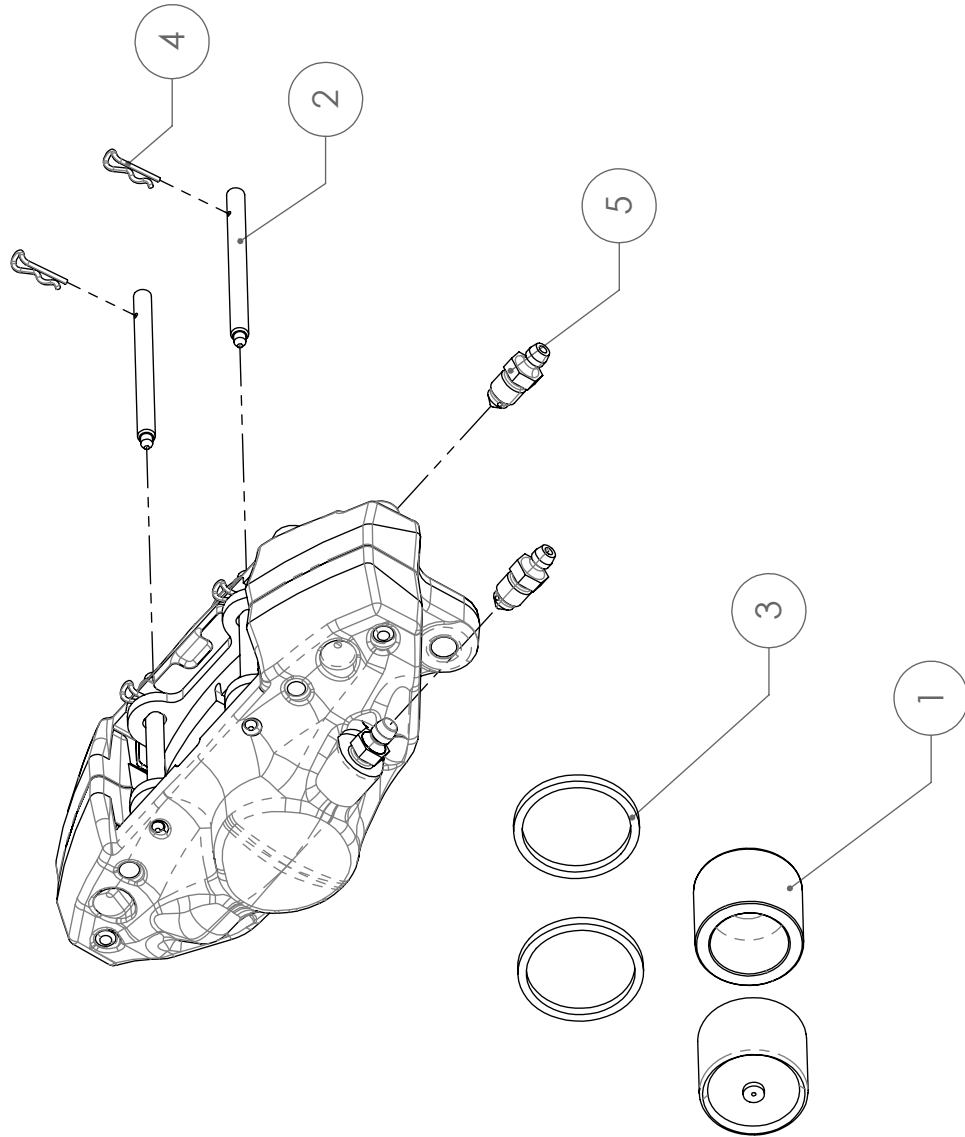
Item	Part Number	Descrizione	Description	1	2	3
1	161407009	Attacco puntone	Pushrod bracket	x		
2	161407011	Ackerman	Ackerman	x		
3	161407013	Ruota fonica	Trigger wheel	x		
4	161407017	Cerchio 8"x13"	Wheel 8"x13"	x		
5	161507023	Assieme fissaggio cavo di ritenzione	Wheel tether bracket assy			
5.1	161507023001	Fissaggio cavo di ritenzione	Tether bracket	x		
5.2	181507014	Boccola	Bush	x		
5.3	UNI7380-M10X30	Vite TB	BH Bolt	x		
5.4	UNI5931-M10X35	Vite TC	CH Bolt	x		
5.5	RZS10	Rondella zigrinata	Safety washer			x
6	101007012	Supporto sensore velocità	Sensor bracket	x		
7	09552724	Disco Freno	Brake disc		x	
8	090907006	Spessore camber 6mm	Camber shim 6mm		x	
9	090907018	Sensore Velocità	Speed sensor	x		
10	090907034	Dado ruota completo DX	Rh wheel nut assy			
10.1	090907033001RH	Campanella dado ruota DX	Right wheel Nut bell	x		
10.2	010407033	Dado ruota DX	Rh wheel nut	x		
10.3	UNI6592-20	Rondella	Washer	x		
10.4	DIN471E21	Seeger	Seeger			x
11	080608010	Boccola	Bush	x		
12	080610006	Boccola ABWT 8	Bush	x		
13	010007018	Clip sicurezza	Safety spring	x		
14	01000726B	Spessore camber 2 mm	Camber shim 2mm		x	
15	01000726A	Spessore camber 1mm	Camber shim 1mm		x	
16	XA6L611	Pinza freno	Brake caliper	x		
17	XA6L612	Pinza freno	Brake caliper	x		
18	FDS1562	Pastiglie Freno (coppia)	Brake pads (Pair)		x	
19	AN4-11A	Vite NAS	NAS Bolt			x
20	AN6-22A	Vite NAS	NAS Bolt			x
21	UNI7380-M4X5	Vite TB	Bolt			x
22	UNI7380-M4X8	Vite TB	BH Bolt			x
23	UNI5737-M6X40	Vite TE cl 10.9	HE Bolt class 10.9		x	
24	UNI5737-M6X60	Vite TE cl 10.9	HE Bolt class 10.9		x	
25	UNI5737-M6X45	Vite TE cl 10.9	HE Bolt class 10.9		x	
26	UNI5737-M6X65	Vite TE cl 10.9	HE Bolt class 10.9		x	
27	UNI5931-M10X30	Vite TC	CH bolt			x
28	AST-06	K-Nut	K-Nut			x
29	AST-3/8	K-Nut	K-Nut			x
30	AN365-1/4X28	Dado autobloccante	Self locking nut			x
31	UNI5589-M8	Dado esagonale basso	Thin hex nut			x
22	AN960-1/4	Rondella AN 960 1/4	Washer AN 960 1/4			x
33	RZS4	Rondella zigrinata	Safety washer			x
34	UNI6592-10	Rondella stretta	Washer			x
35	UNI8840B-4	Rondella Ondulata	Crinkle washer			x
36	UNI8840B-10	Rondella Ondulata	Crinkle washer			x

#7	09552724	Minimum thickness 17.0mm
#8	090907006	Number and stack of shim is free, item may be removed down to a minimum thickness of 1mm
#14	01000726B	Number and stack of shim is free, item may be removed down to a minimum thickness of 1mm
#15	01000726A	Number and stack of shim is free, item may be removed down to a minimum thickness of 1mm
#23	UNI5737-M6X40	May be replaced by item #25
#24	UNI5737-M6X60	May be replaced by item #26
#25	UNI5737-M6X45	May be replaced by item #23
#26	UNI5737-M6X65	May be replaced by item #24



07B - FRONT UPRIGHT

Item	Part Number	Descrizione	Description	1	2	3
1	161407008	Blocco portamozzo anteriore	Front upright mount	x		
2	161407010	Portamozzo	Upright	x		
3	161407012	Perno ruota anteriore	Front wheel axle	x		
4	161407016	Pin trascinatore	Wheel Drive pin	x		
5	030210012	Prigioniero	Stud	x		
6	010011020	Prigioniero	Stud	x		
7	BAR0048VK108	Cuscinetto ruota	Wheel bearing	x		
8	UNI5931-M12X30	Vite TC	CH Bolt			x
9	DIN471A27	Circlip	Circlip			x
10	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut			x
11	RZS12	Rondella zigrinata	Safety washer			x
12	161407018	Boccola	Bush			x



07C - CALIPER

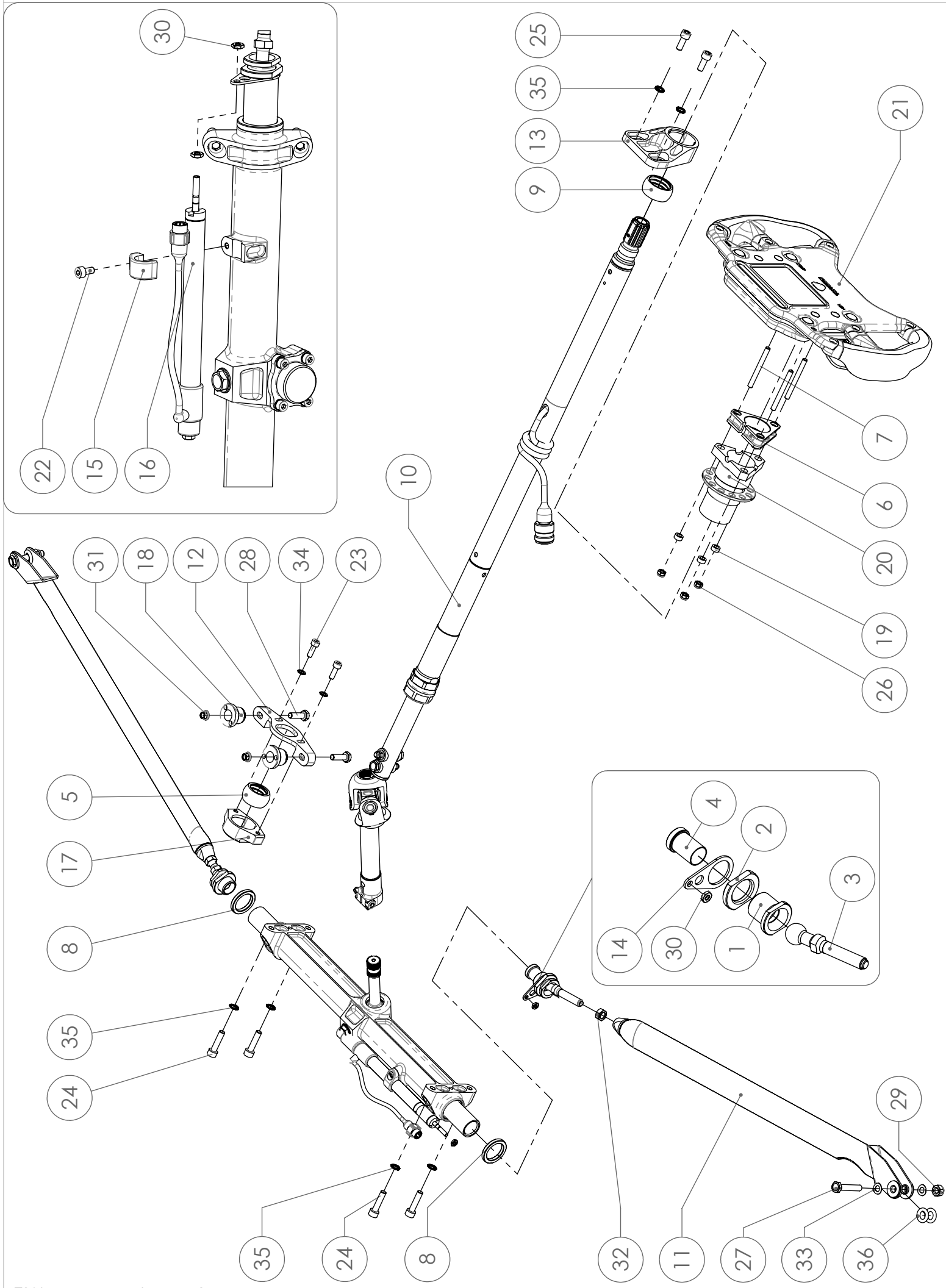
Item	Part Number	Descrizione	Description	1	2	3
1	20A12969	Pistoncino pinza (1x)	Caliper piston (1of)	x		
2	20490810	Perno	Caliper pin	x		
3	105595516	kit guarnizioni (8x)	Caliper seal kit		x	
4	05454227	Molla a R	R-clip			x
5	05281213	Vite spurgo (1x)	Caliper bleed Bolt (1of)	x		

#3 105595516

May be replaced by Brembo ref. 105722444

#4 05454227

Locking wire may be added / replace the clip



09A - STEERING ASSY

Item	Part Number	Descrizione	Description	1	2	3
1	010009011	Boccola terminale cremagliera	Rack-end bush	x		
2	010009013	Dado speciale	Special Nut	x		
3	010009014	Giunto sfera	Ball end joint	x		
4	080609004	Sede snodo sterzo	Ball joint seat	x		
5	080609019	Giunto sferico	Spherical bearing	x		
6	080709010017	Distanziale volante	Steering wheel spacer		x	
7	08070901023C	Prigioniero M5 x 51	Stud M5 x 51		x	
0	08070901023B	Prigioniero M5 x 38	Stud M5 x 38		x	
0	08070901023D	Prigioniero M5 x 64	Stud M5 x 64		x	
0	08070901023E	Prigioniero M5 x 72	Stud M5 x 72		x	
8	080609030	Fine corsa cremagliera	Rack stop	x		
9	080709019	Giunto sferico	Spherical bearing	x		
10	161409004	Assieme piantone	Steering column assy			
11	161509008	Tirante sterzo	Track rod	x		
12	161409010	Supporto piantone	Steering column mounting	x		
13	161409011	Supporto piantone	Steering column mounting	x		
14	161409012	Link potenziometro sterzo	Steering pot link	x		
15	161409013	Supporto potenziometro sterzo	Steering pot bracket	x		
16	161409014	Potenziometro lineare	Linear potentiometer	x		
17	161409015	Supporto piantone	Steering column mounting	x		
18	101009016	Boccola	Bush	x		
19	161409018	Distanziale	Spacer	x		
20	F9024600	Staccavolante	Steering wheel quick release	x		
21	VV213001D	Volante completo	Steering wheel	x		
22	UNI5931-M4X8	Vite TB INOX	BH Bolt Stainless Steel			x
23	UNI5931-M5X15	Vite TC	CH Bolt			x
24	UNI5931-M6x25	Vite TC	CH Bolt			x
25	UNI5931-M6X16	Vite TC	CH Bolt			x
26	UNI7474-M5	Dado autobloccante	Prevailing torque Nut			x
27	AN4-13A	Vite NAS	NAS bolt			x
28	UNI5739-M6X20	Vite TE	HH Bolt			x
29	AN365-1/4X28	Dado autobloccante	Self-locking Nut			x
30	UNI5589-M4	Dado esagonale basso	Thin Hex Nut			x
31	AST-06	K-Nut	K-Nut			x
32	ANSIB182265-5/16X24	Dado 5/16 24 UNF	Nut 5/16_24 UNF			x
33	UNI8840B-6	Rondella ondulata	Crinckle Washer			x
34	RZS5	Rondella zigrinata	Safety washer			x
35	RZS6	Rondella zigrinata	Safety washer			x
36	ORN4036	O-Ring	O-Ring			x

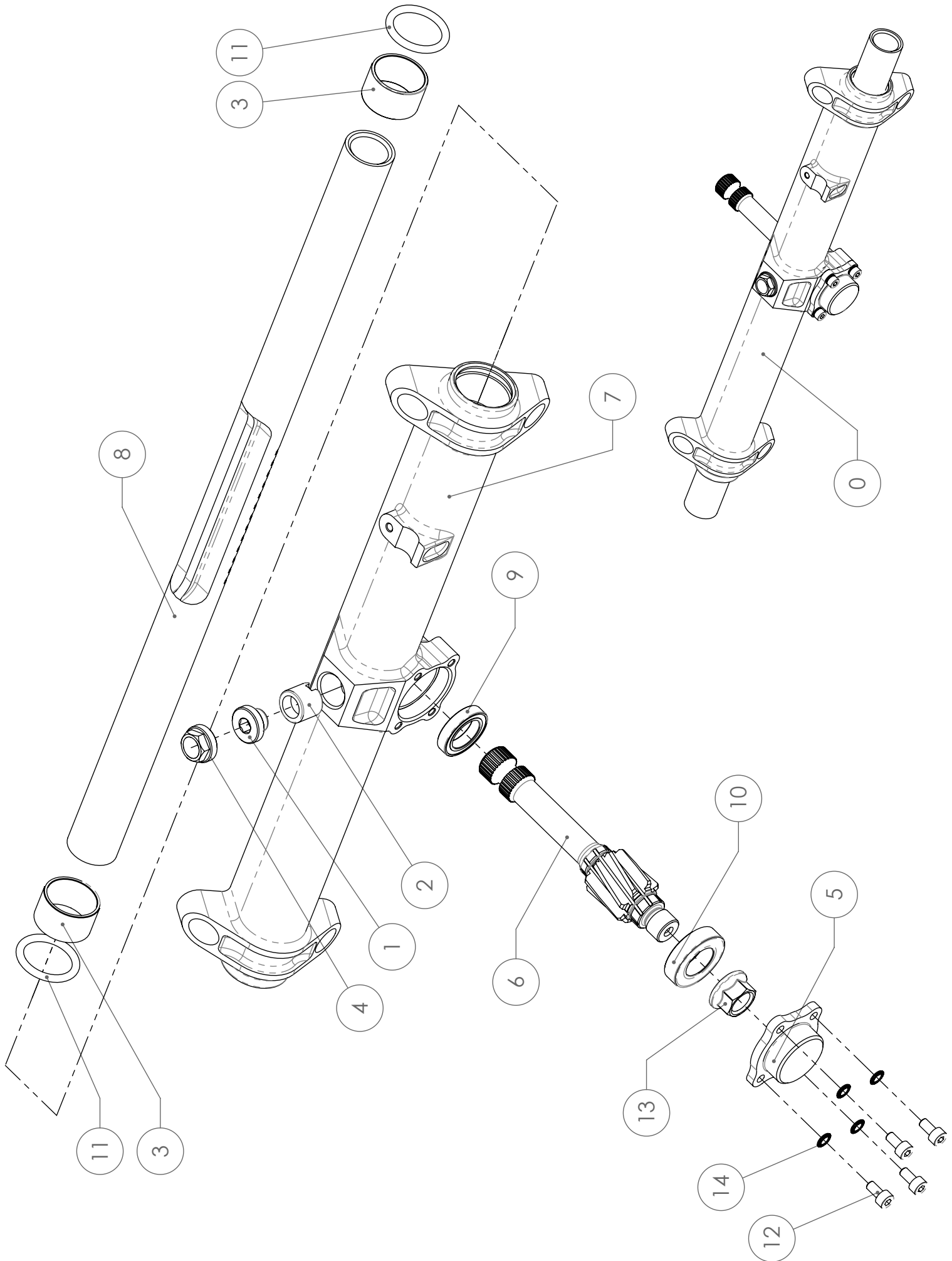
#6 080709010017 *Optional item, a maximum of three spacer can be stack*

#7 08070901023C *Optional stud to be used without shim #6*

#7 08070901023B *Optional stud to be used whit 1of shim #6*

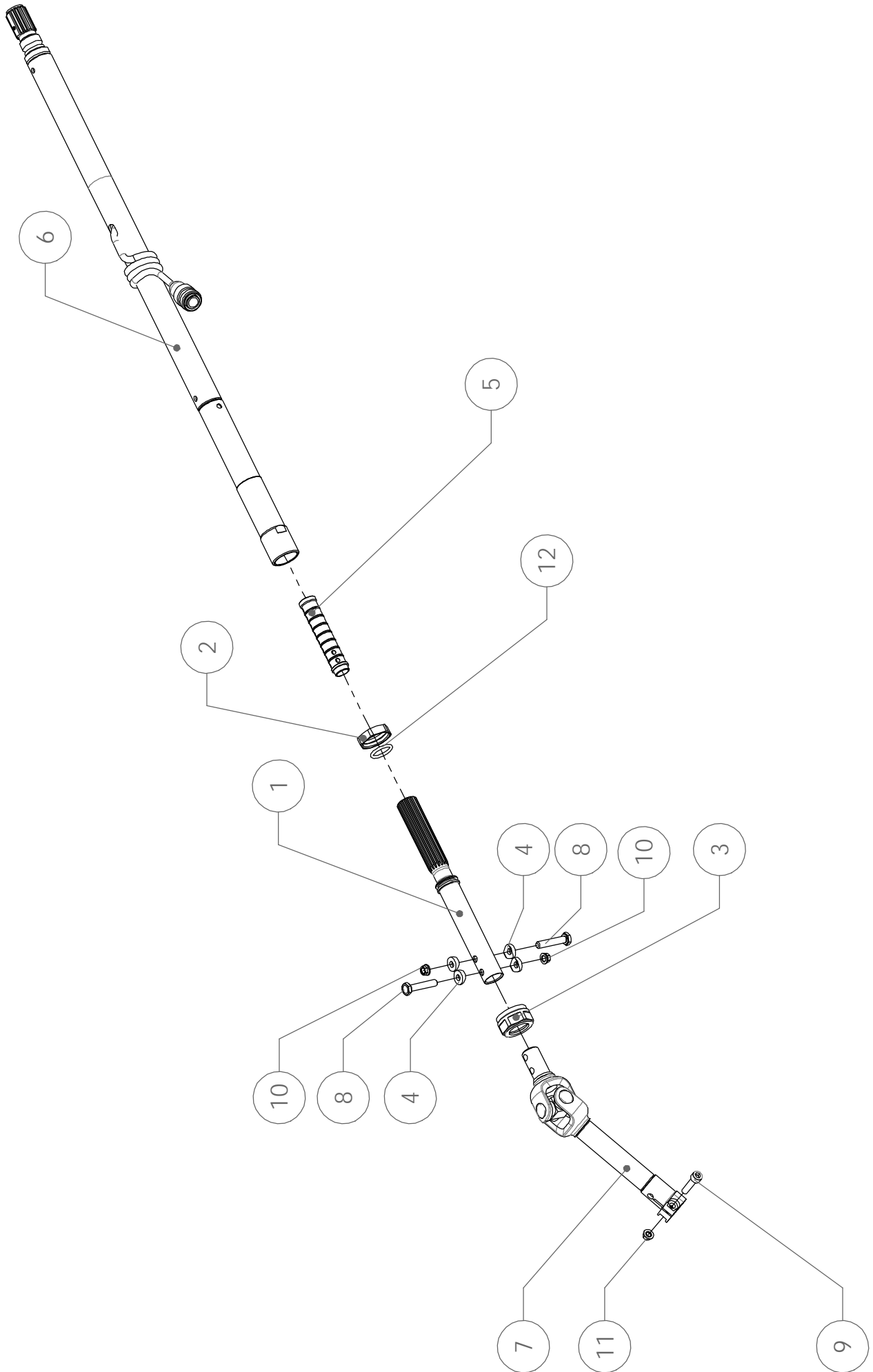
#7 08070901023D *Optional stud to be used whit 2of shim #6*

#7 08070901023E *Optional stud to be used whit 3of shim #6*



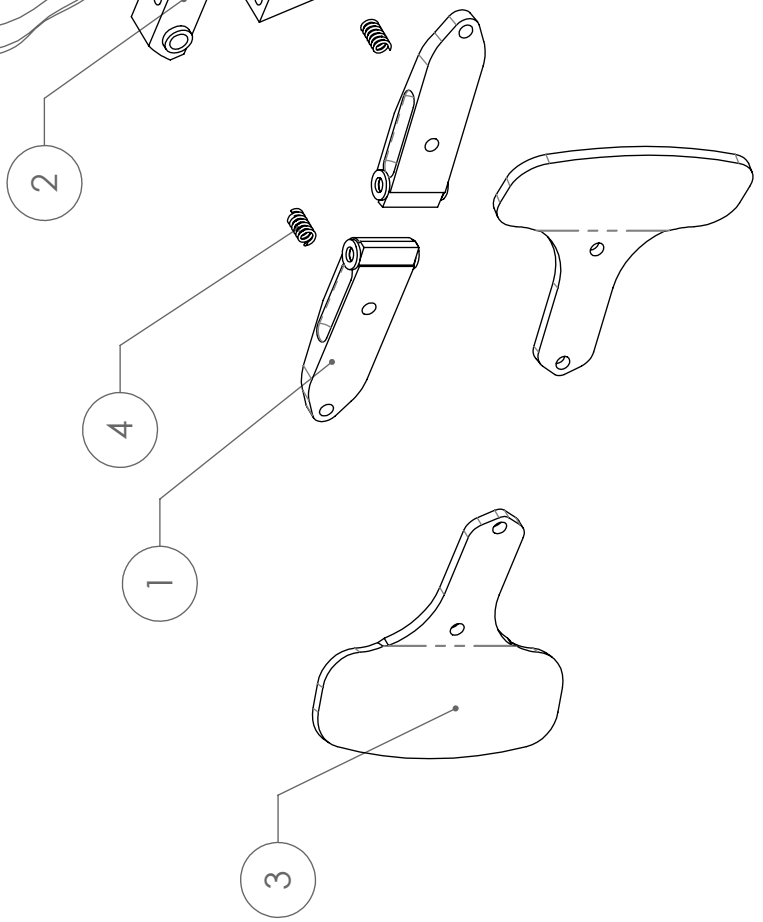
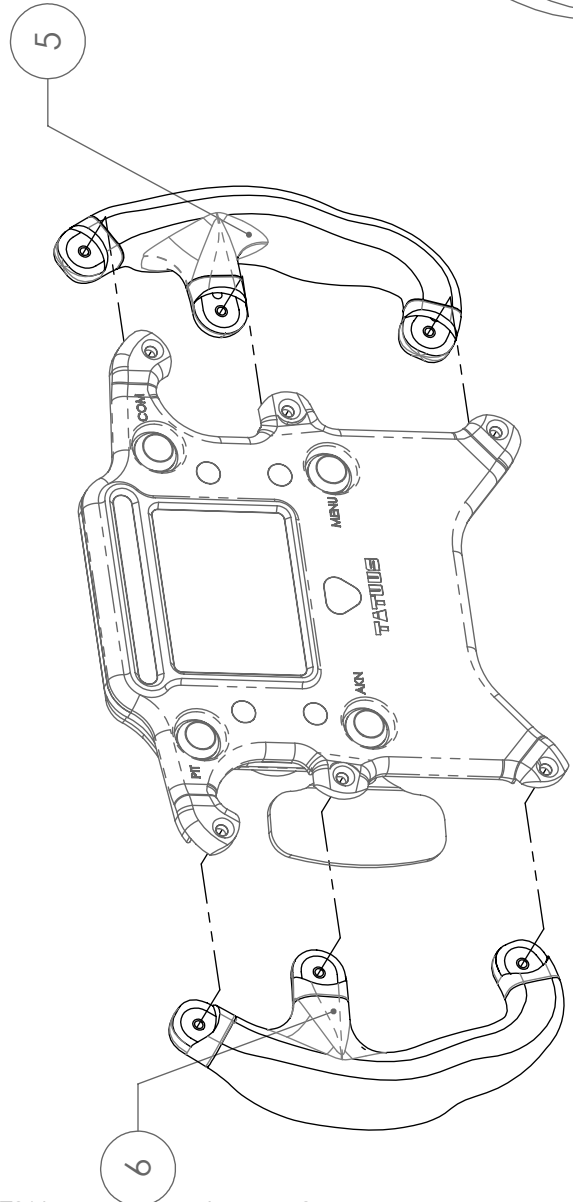
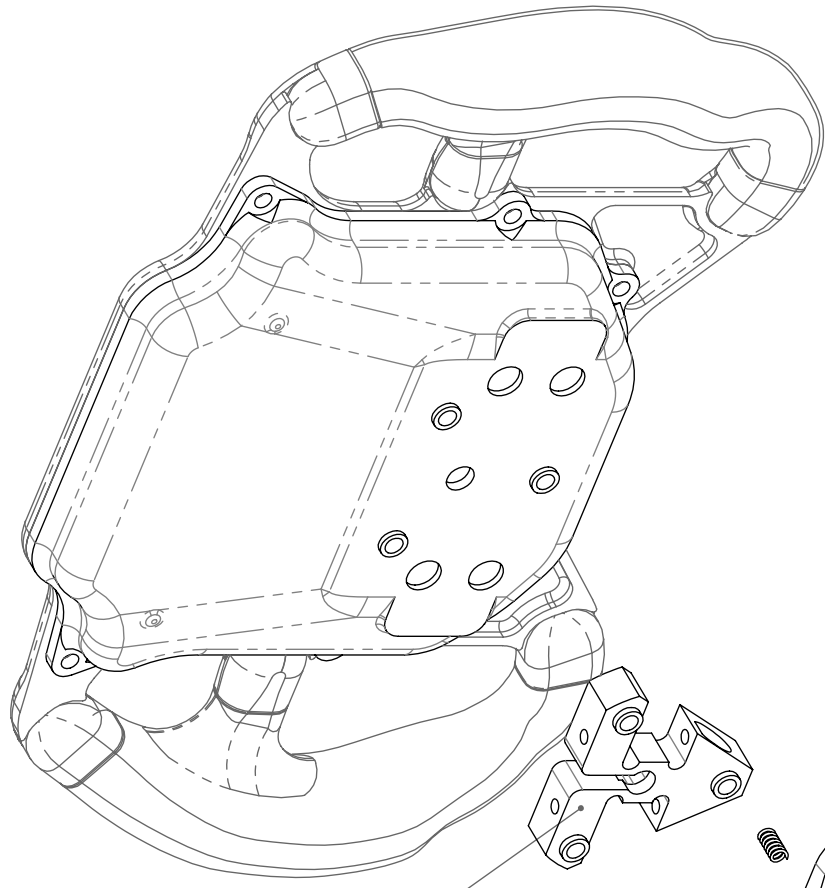
09B - STEERING RACK

Item	Part Number	Descrizione	Description	1	2	3
1	030309011004	Boccola	Bush	x		
2	030309011005	Pastiglia registro	Adjuster spacer	x		
3	030309011006	Boccola iglodur	Iglodur bush	x		
4	030309011014	Ghiera	Ring nut	x		
5	040409055	Tappo cremagliera	Rack adjuster cap	x		
6	090909019	Pignone cremagliera	Rack pinion	x		
7	161409003	Corpo scatola guida	Steering box housing	x		
8	161409009	Cremagliera	Rack	x		
9	61802-2RS1	Cuscinetto	Bearing	x		
10	61902-2RS1	Cuscinetto	Bearing	x		
11	ORN22X3	O-Ring	O-Ring			x
12	UNI5931-M4X8	Vite TB INOX	BH Bolt Stainless Steel			x
13	AST-12	K-Nut	K-Nut			x
14	RZS4	Rondella zigrinata	Safety Washer			x



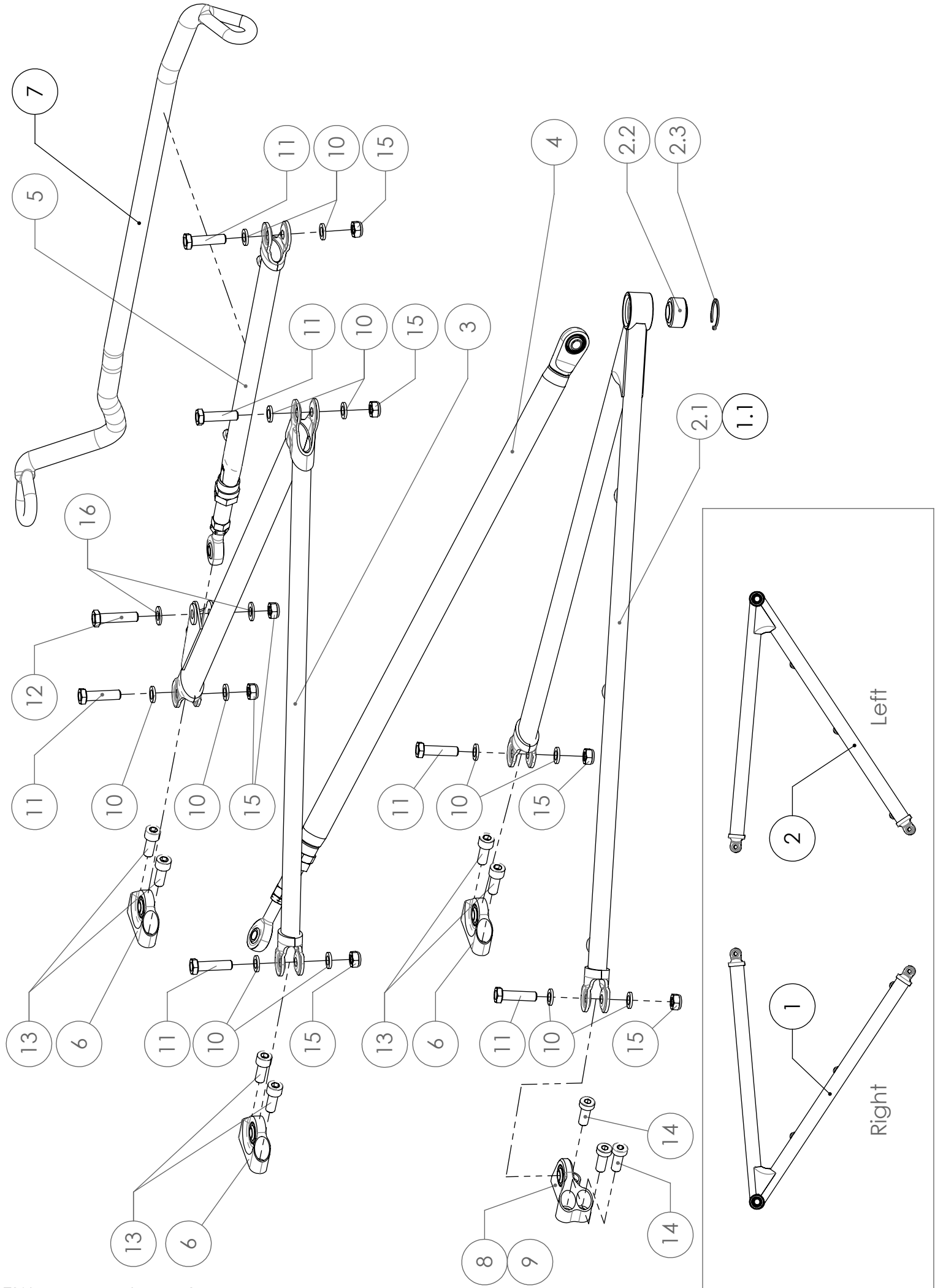
09C - STEERING COLUMN

Item	Part Number	Descrizione	Description	1	2	3
1	080709012	Testa millerighe	Splined shaft	x		
2	080709022	Controgiera	Platform	x		
3	080709023	Ghiera	Ring nut	x		
4	080709025	Rondella speciale	Special washer	x		
5	161409019	Cartuccia deformabile	Steering crashbox	x		
6	161409005	Piantone sterzo	Steering column top end	x		
7	161409006	Terminale piantone	Steering column bottom end	x		
8	AN4-12A	Vite NAS	NAS bolt			x
9	UNI5931-M6X25	Vite TC	CH Bolt			x
10	AST-1/4	K-Nut	K-Nut			x
11	AST-06	K-Nut	K-Nut			x
12	ORN123	O-Ring	O-Ring			x



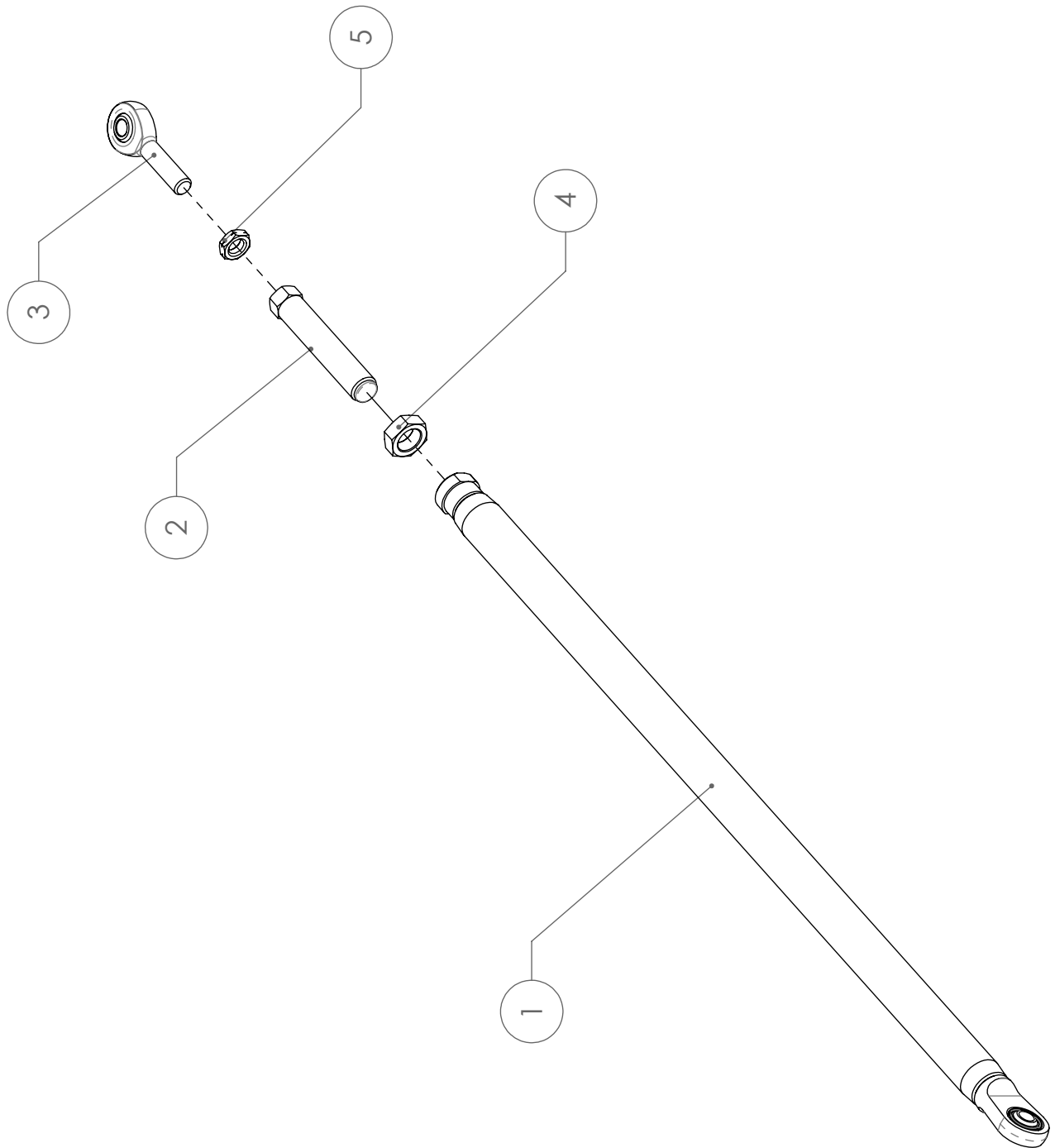
09D - STEERING WHEEL

Item	Part Number	Descrizione	Description	1	2	3
1	VV112012	Supporto palette	Levers bracket	x		
2	VV213010C	Distanziale	Spacer	x		
3	VV213012	Paletta gearshift	Gearshift paddle	x		
4	XS5196C	Molla	Coil	x		
5	05059B010015	Impugnatura volante DX	Rh handgrip	x		
6	05059B010016	Impugnatura volante SX	Lh handgrip	x		



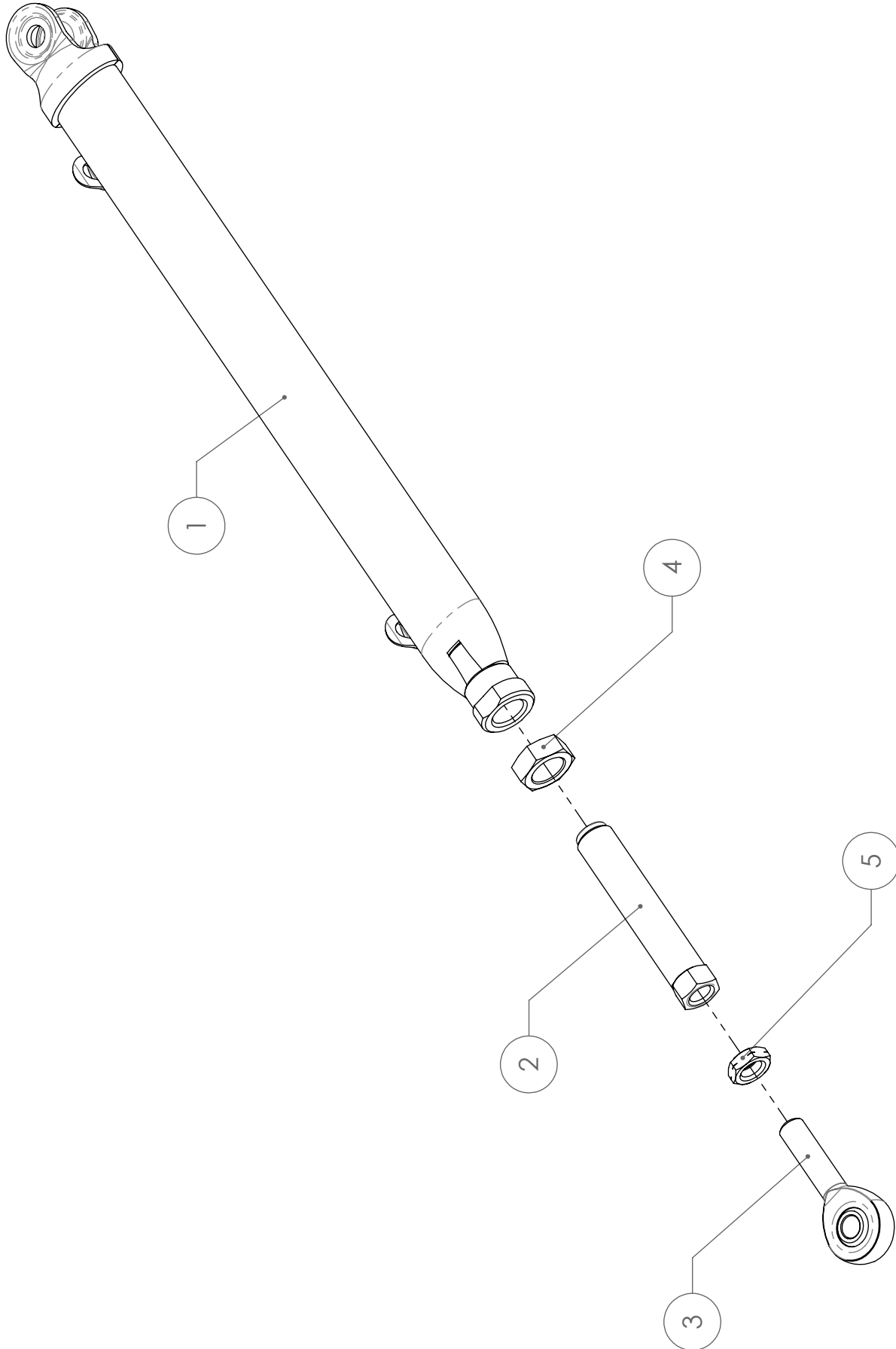
10A - REAR WISHBONE

Item	Part Number	Descrizione	Description	1	2	3
1	161410002	Braccio posteriore inferiore dx completo	Rh rear lower wishbone assy			
1.1	161410004	Braccio posteriore inferiore dx	rh rear lower wishbone	x		
2	161410003	Braccio posteriore inferiore sx completo	Lh rear lower wishbone assy			
2.1	161410005	Braccio posteriore inferiore sx	Lh rear lower wishbone	x		
2.2	UNIBALL-ABWT8	Snodo sferico	Spherical bearing			x
2.3	J25X1,2V	Circlip	Circlip			x
3	161410006	Braccio superiore post.	Rear upper wishbone	x		
4	161410007	Push rod posteriore completo	Rear push rod assy			
5	161410010	Tirante convergenza posteriore completo	Rear tie rod assy	x		
6	161510012	Attacco sospensione post. completo	Rear wishbone bracket assy	x		
7	161705010	Cavo di ritenzione 6kJ	Wheel tether 6kJ	x		
8	161510021	Blocchetto sospensione post. Sx completo	Rear Lh suspension bracket assy	x		
9	161510022	Blocchetto sospensione post. Dx completo	Rear Rh suspension bracket assy	x		
10	090910011	Special Flat Washer 5/16" Sp.2	Special Flat Washer 5/16" Sp.2			x
11	AN5-11A	Vite NAS	NAS bolt			x
12	AN5-12A	Vite NAS	NAS Bolt			x
13	UNI5931-M8X20	Vite TC	CH Bolt			x
14	UNI9327-M8X20	Vite TC	CH Bolt			x
15	AN365-5/16X24	Dado autobloccante	Self-locking Nut			x
16	AN960-5/16	Rondella	Washer			x



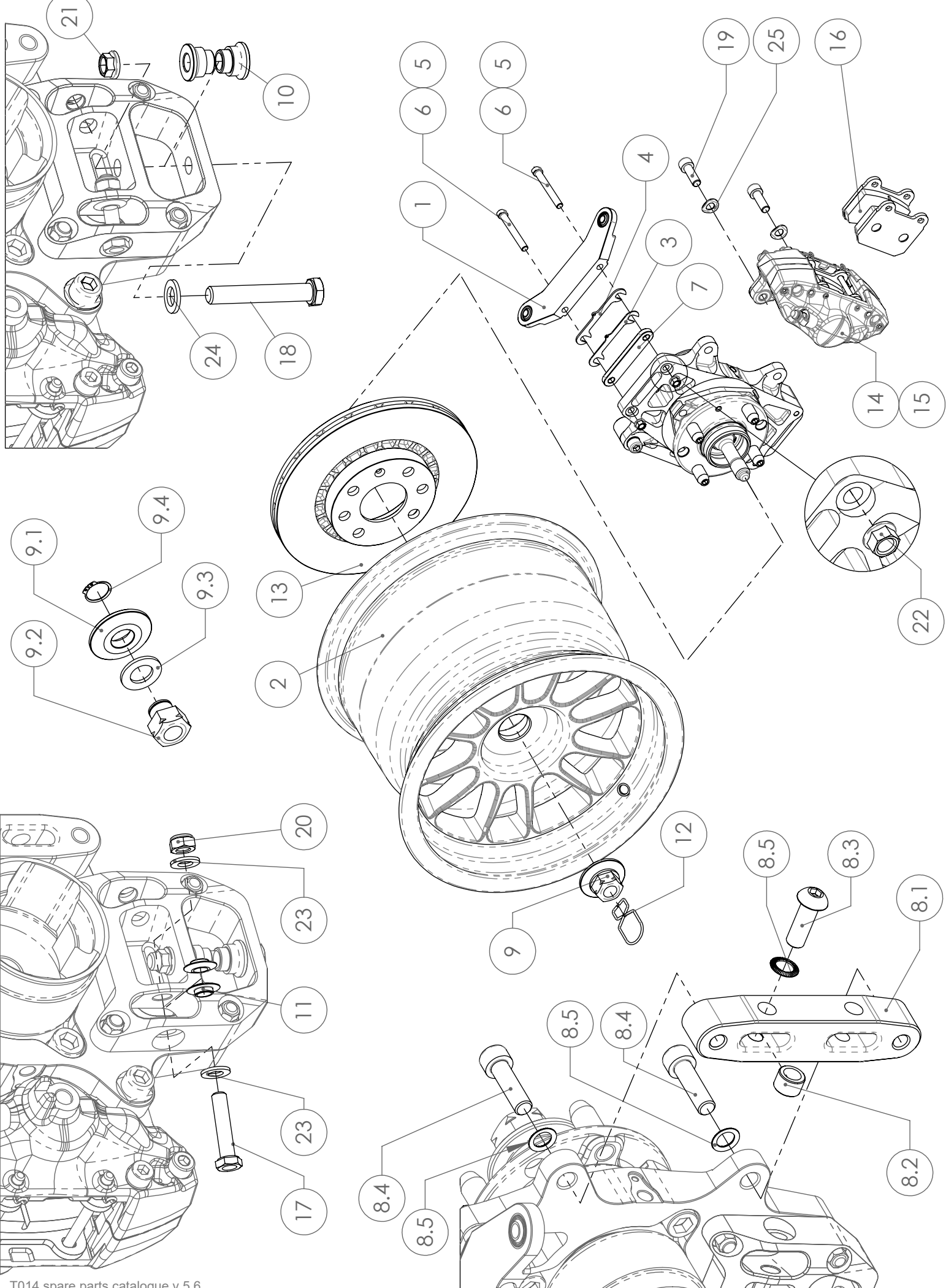
10B - REAR PUSHROD

Item	Part Number	Descrizione	Description	1	2	3
1	161410008	Puntone posteriore	Rear push rod	x		
2	010005012	Registro Puntone	Push rod adjuster	x		
3	RE-3/8L	Testa a snodo	Rod end			x
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25			x
5	ANSIB182265-3/8X24L	Dado esagonale Sx	Hex Nut Lh			x



10C - REAR TIE ROD

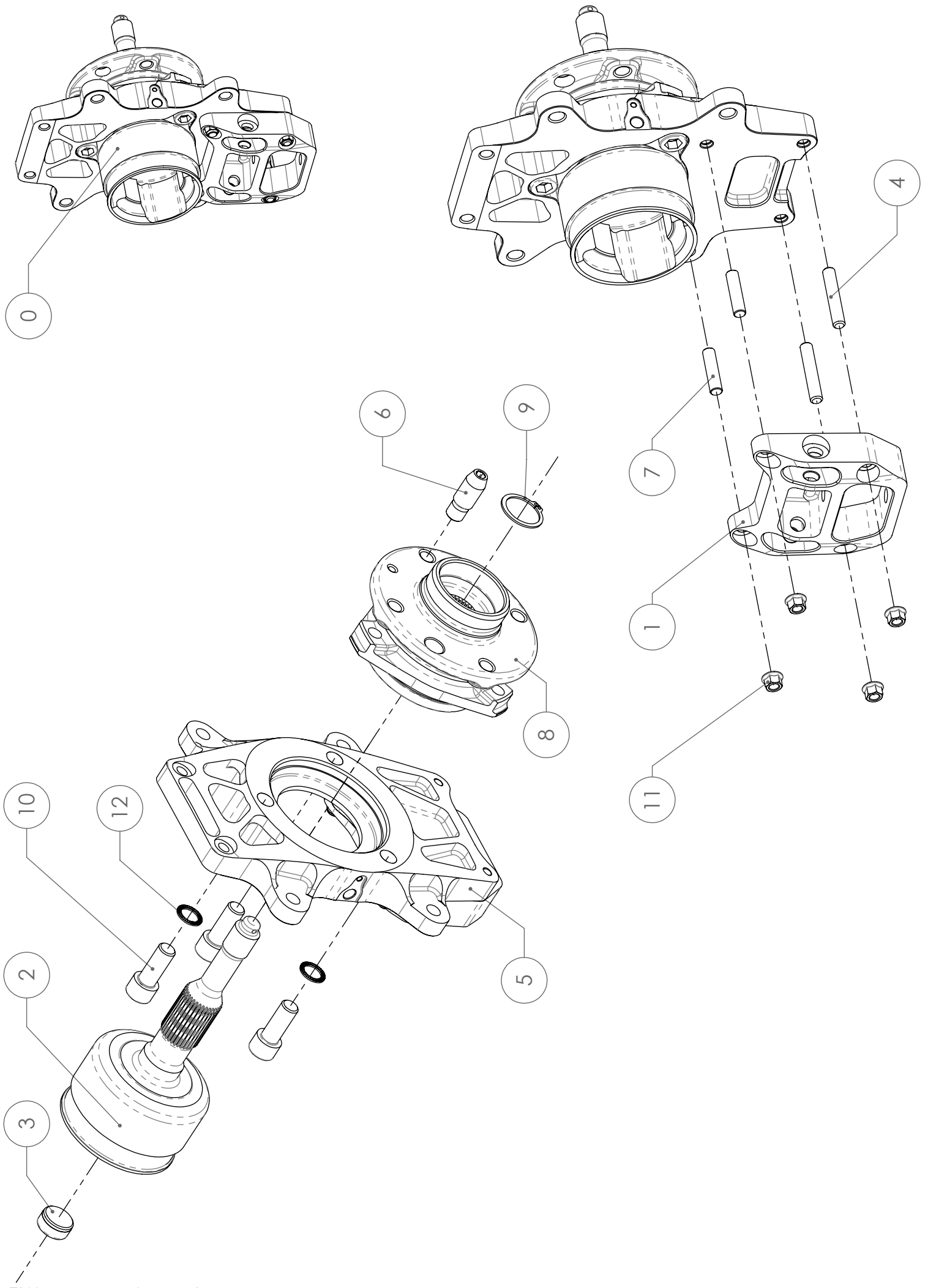
Item	Part Number	Descrizione	Description	1	2	3
1	161410011	Tirante convergenza posteriore	Rear tie rod	x		
2	010005012	Registro Puntone	Push rod adjuster	x		
3	RE-3/8L	Testa a snodo	Rod end			x
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25			x
5	ANSIB182265-3/8X24L	Dado esagonale Sx	Hex Nut Lh			x



11A - REAR UPRIGHT

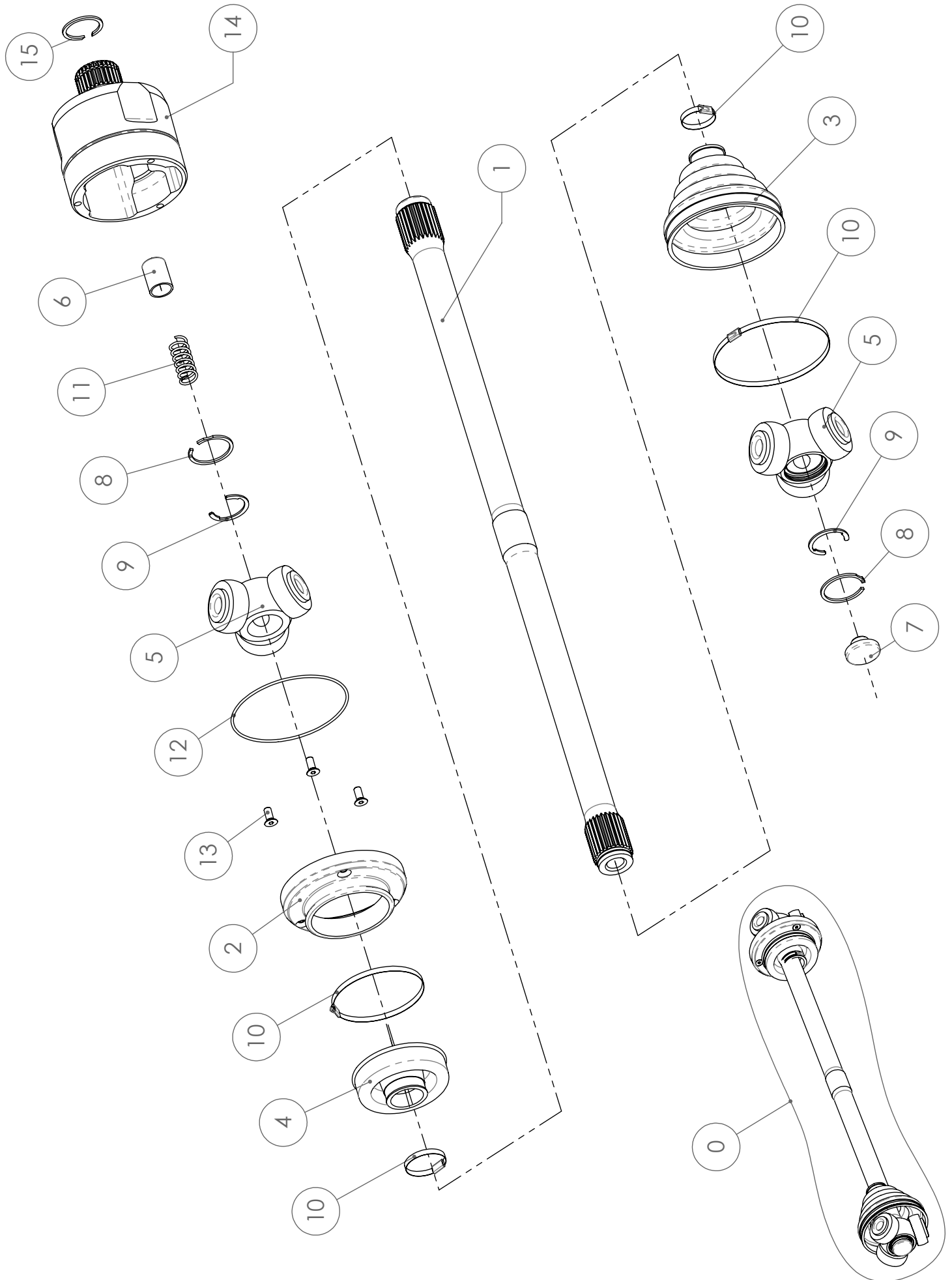
Item	Part Number	Descrizione	Description	1	2	3
1	161411006	Ackerman	Ackerman	x		
2	161411011	Cerchio 10"x13"	Wheel 10"x13"	x		
3	161411016	Spessore camber 1mm	Camber Shim 1mm		x	
4	161411017	Spessore camber 2 mm	Camber Shim 2mm		x	
5	161411018	Special bolt M8x1x65	Vite speciale M8x1x65	x		
6	161411019	Special bolt M8x1x60	Vite speciale M8x1x60	x		
7	161411020	Spessore camber 6mm	Camber shim 6mm		x	
8	161507023	Assieme supporto cavo di ritenzione	Wheel tether bracket assy			
8.1	161507023001	Fissaggio cavo di ritenzione	Tether bracket	x		
8.2	181507014	Boccola	Bush	x		
8.3	UNI7380-M10X30	Vite TB	BH Bolt	x		
8.4	UNI5931-M10X35	Vite TC	CH Bolt	x		
8.5	RZS10	Rondella zigrinata	Safety washer			x
9	090907034	Dado ruota completo DX	Right wheel nut assy			
9.1	090907033001RH	Campanella dado ruota DX	Right wheel Nut bell	x		
9.2	010407033	Dado ruota	Right wheel nut	x		
9.3	UNI6592-20	rondella	washer			x
9.4	DIN471E21	Seeger	Seeger	x		
10	080610006	Boccola ABWT 8	Bush	x		
11	030205004	Boccola ABWT 5	Bush	x		
12	010007018	Clip sicurezza	Safety spring	x		
13	09552724	Disco Freno	brake disc		x	
14	XA6L611	Pinza freno	Brake caliper	x		
15	XA6L612	Pinza freno	Brake caliper	x		
16	FDS1562	Pastiglie Freno (coppia)	Brake pads (Pair)	x		
17	AN5-13A	Vite NAS	NAS Bolt			x
18	AN6-22A	Vite NAS	NAS Bolt			x
19	UNI5931-M10X30	Vite TC	CH bolt			x
20	AN365-5/16X24	Dado autobloccante	Self-locking Nut			x
21	AST-3/8	Dado Astori	Nut			x
22	AST-08X1	K-Nut M8x1.0	K-Nut M8x1.0			x
23	AN960-5/16	Rondella	Washer			x
24	UNI6592-10	Rondella	Washer			x
25	UNI8840B-10	Rondella Ondulata	Crinkle washer			x

#3	161411016	Number and stack of shim is free, item may be removed
#4	161411017	Number and stack of shim is free, item may be removed
#5	161411018	May be replaced by item #6
#6	161411019	May be replaced by item #5
#7	161411020	Number and stack of shim is free, item may be removed
#13	09552724	Minimum thickness 17.0mm



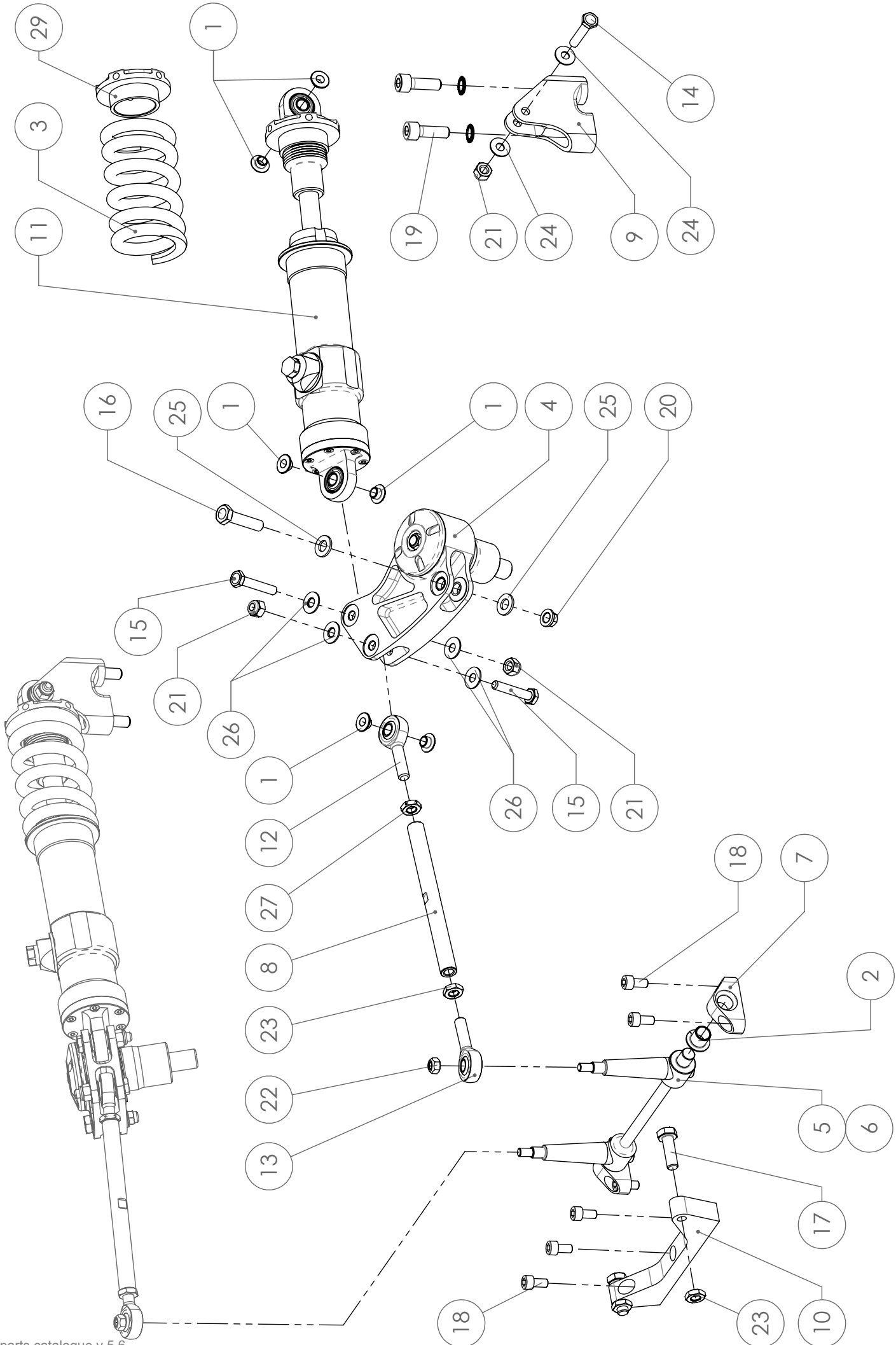
11B - REAR UPRIGHT

Item	Part Number	Descrizione	Description	1	2	3
1	161411008	Blocco portamozzo posteriore	Rear upright mount	x		
2	161411009	Perno ruota posteriore	Rear wheel axle	x		
3	161411010	Tampone semiasse	Driveshaft plunger	x		
4	161411012	Prigioniero	Stud	x		
5	161407010	Portamozzo	Upright	x		
6	161407016	Pin trascinatore	Wheel Drive pin	x		
7	030210012	Prigioniero	Stud	x		
8	BAR0048VK108	Cuscinetto ruota	Wheel bearing	x		
9	DIN471A27	Circlip	Circlip			x
10	UNI5931-M12X30	Vite TC	CH Bolt			x
11	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut			x
12	RZS12	Rondella zigrinata	Safety washer			x



12 - HALFSHAFT

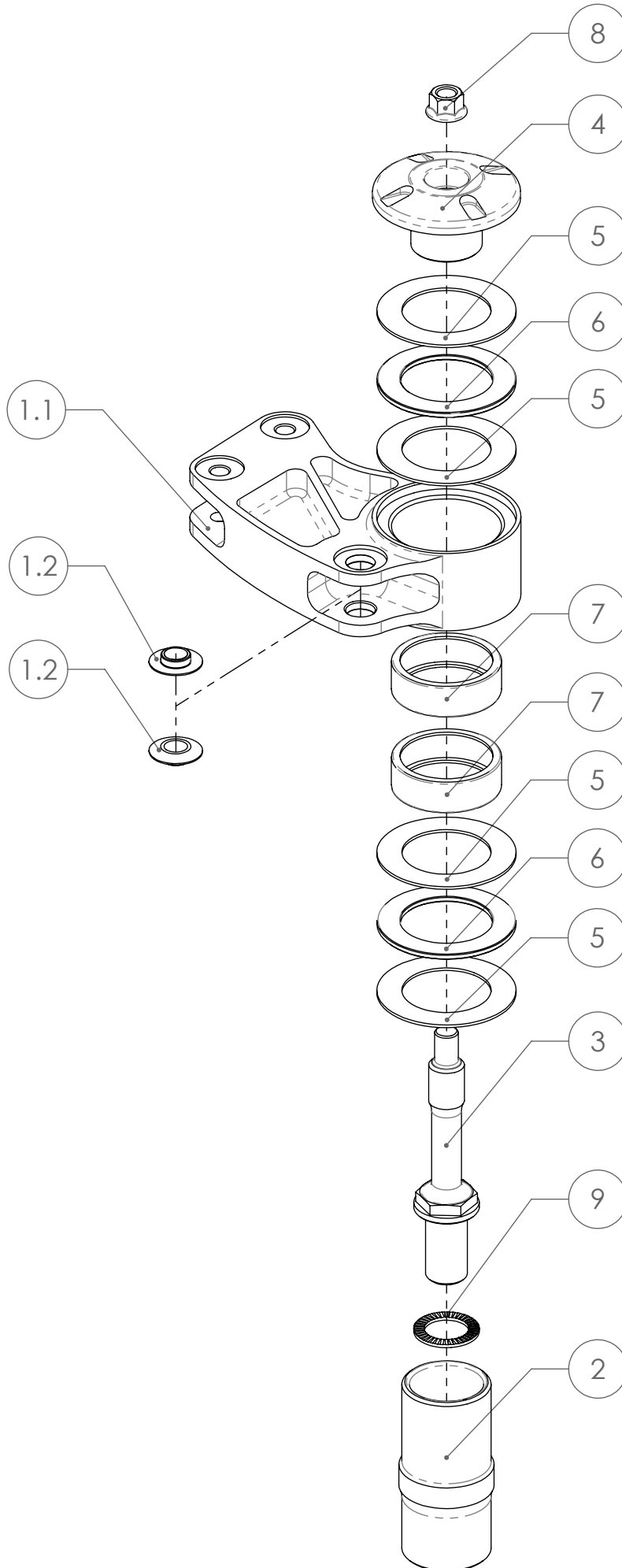
Item	161407016	Pin trascinatore	Wheel Drive pin	1	2	3
1	F0085934	Semiassa	Halfshaft	x		
2	161412002	Flangia portacuffia	Boot carrier	x		
3	090912006	Cuffia lato ruota	Wheel side boot	x		
4	020211037	Cuffia lato cambio	Gear side boot	x		
5	F9024455	Tripode	Tripode	x		
6	F9024451	Pistone semiassa	Halfshaft plunger	x		
7	F9004710	Tappo semiassa	Halfshaft cap	x		
8	F9024459	Circlip	Circlip			x
9	9907022	Circlip	Circlip			x
10	MLT45CP	Fascetta	Clamp			x
11	0801073	Molla	Spring	x		
12	ORN85X3	O-Ring	O-Ring			x
13	UNI5933-M5X12	Vite TS	CSH Bolt			x
14	F90473001	sede tripode	flange	x		
15	F9043319	anello	ring			x



13A - REAR ROCKERS

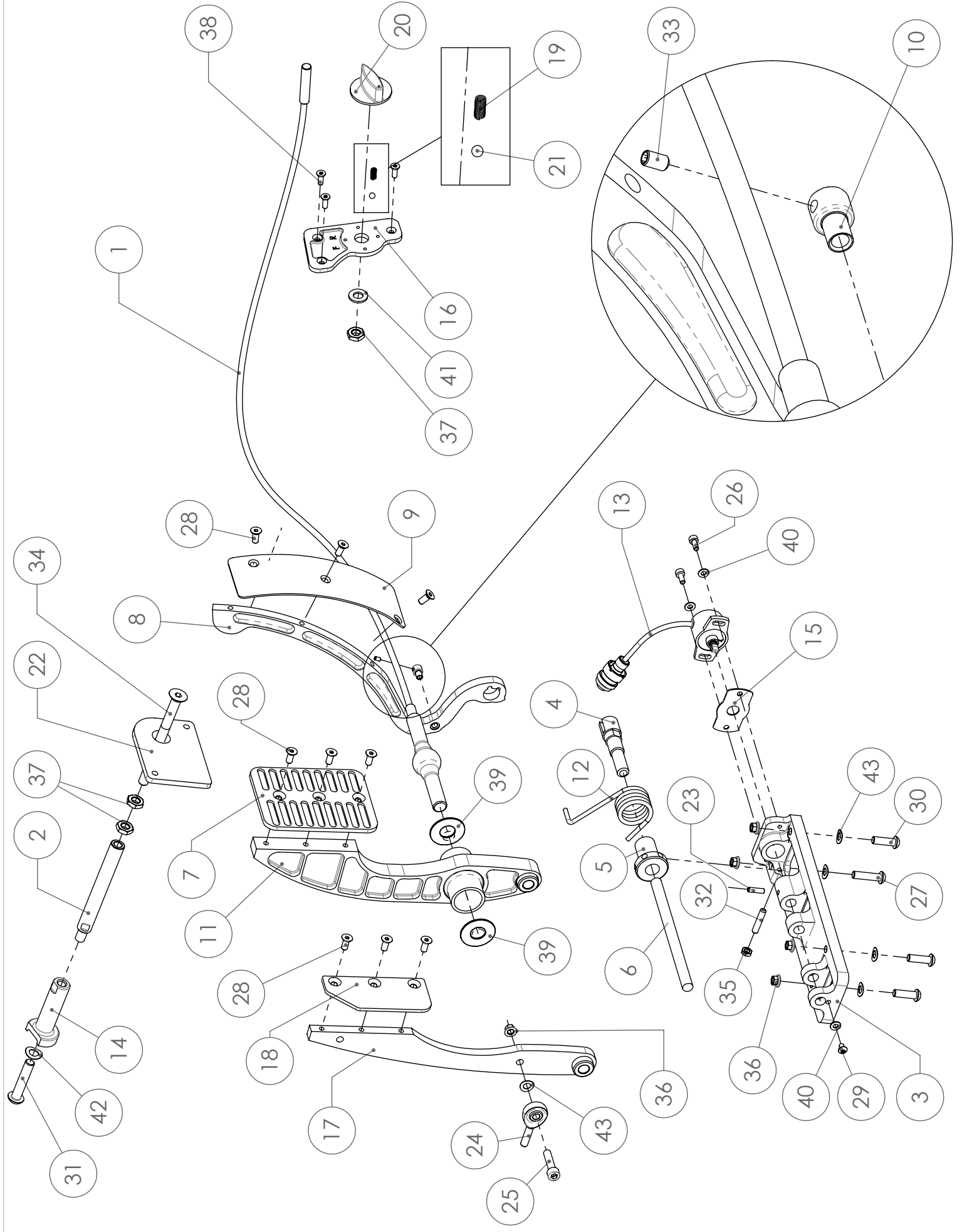
Item	Part Number	Descrizione	Description	1	2	3
1	010008010	Boccola	Bush	x		
2	010013035	Boccola DU	Self-lubricating Bush	x		
3	080608026A	MOLLA 600	Spring		x	
	080608026C	MOLLA 800	Spring		x	
	080608026E	MOLLA 1000	Spring		x	
4	161413002	Rocker posteriore completo	Rear rocker assy			
5	161413004	RARB ø 8	RARB ø 8		x	
6	161413005	RARB ø 10.5	RARB ø 10.5		x	
7	161413009	Supporto RARB	RARB Bracket	x		
8	161413010	Link RARB	Link RARB		x	
9	161413012	Supporto ammortizzatore	Damper bracket	x		
10	161413016	Rebound stop	Rebound stop	x		
11	161406019	Ammortizzatore posteriore	Rear damper	x		
12	RE-8ML	Testa a snodo	Rod end			x
13	RE-8M	Testa a snodo	Rod end			x
14	AN4-12A	Vite NAS	NAS bolt			x
15	AN4-13A	Vite NAS	NAS bolt			x
16	AN5-12A	Vite NAS	NAS bolt			x
17	UNI5739-M8X40	Vite TE	HH Bolt			x
18	UNI5931-M6X12	Vite TC	CH Bolt			x
19	UNI5931-M8X20	Vite TC	CH Bolt			x
20	AST-5/16	K-Nut	K-Nut			x
21	AN365-1/4X28	Dado autobloccante	Self-locking Nut			x
22	DIN980-M6	Dado autobloccante	Prevailing torque Nut			x
23	UNI5589-M8	Dado esagonale basso	Thin Hex Nut			x
24	AN960-1/4	Rondella	Washer			x
25	AN960-5/16	Rondella	Washer			x
26	RS065160010	Rondella speciale 6.5x16x1	Special washer 6.5x16x1			x
27	UNI5589-M8L	Dado esagonale basso	Thin Hex Nut			x
28	RZS8	Rondella zigrinata	Safety Washer			x
29	161406013005	Ghiera molla	Plateform	x		

#3 080608026A/C/E *Optional Item #3*
#5 161413004 *Optional item, may be removed / disconnected*
#6 161413005 *Optional item, may be removed / disconnected*
#8 161413010 *Optional item, may be removed / disconnected*



13B - REAR ROCKER

Item	Part Number	Descrizione	Description	1	2	3
1.1	161413003	Rocker posteriore	Rocker posteriore	x		
1.2	030205004	Boccola ABWT 5	Bush	x		
2	161413013	Perno Rocker post.	Rear rocker pivot	x		
3	161413014	Perno prigioniero rocker	Rear rocker stud	x		
4	161413015	Ghiera rocker	Rocker ring	x		
5	AS3047	Controralla	Thrust Bearing washer			x
6	AXK3047	Cuscinetto reggispinta	Thrust bearing			x
7	HK3012	Cuscinetto a rullini	Drawn cup needle roller bearing			x
8	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut			x
9	RZS14	Rondella zigrinata	Safety washer			x



15 - PEDALS

Item	Part Number	Descrizione	Description	1	2	3
1	161815005	Cavo regolazione frenata	Brake bias cable	x		
2	161425002	Distanziale	Stay		x	
3	090915001	Piastra base pedallera	Pedals mount base	x		
4	090915003	Perno acceleratore	Throttle pedal pivot	x		
5	090915004	Guida molla torsionale	Spring carrier	x		
6	090915005	Perno pedali	Pedals pivot	x		
7	090915006	Piastra pedale freno	Brake pedal pad		x	
8	090915007	Pedale acceleratore	Throttle pedal	x		
9	090915008	Piastra pedale acceleratore	Throttle pedal pad		x	
10	090915010	Arresto molla	Spring holder	x		
11	090915011	Pedale freno	Brake pedal	x		
12	090915012	Molla torsionale	Torsional spring	x		
13	090915013	Potenzimetro acceleratore	Throttle potentiometer	x		
14	090915014	Supporto puntalino	Rod base	x		
15	090915018	Rasamento potenziometro	Potentiometer shim			x
16	090901007	Piastra ripartitore	Bias knob plate	x		
17	010015003	Pedale frizione	Clutch pedal	x		
18	010015006	Piastra pedale frizione	Clutch pedal pad		x	
19	010015033	Molla	Spring	x		
20	010015035	Manopola ripartitore	Brake bias knob	x		
21	010015034	Sfera	Ball			x
22	161415002	Fermo pedale	Pedal stop		x	
23	UNI6873-4	Spina elastica	Slotted spring pin	x		
24	CM6-M6	Testa a snodo	Rod end			x
25	UNI5931-M6X25	Vite TC	CH Bolt			x
26	UNI5931-M4X10	Vite TC	CH Bolt			x
27	UNI7380-M6X25	Vite TB	BH Bolt			x
28	UNI5933-M5X12	Vite TS	CSH Bolt			x
29	UNI7380-M4X6	Vite TB	BH Bolt			x
30	UNI7380-M6X20	Vite TB	BH Bolt			x
31	UNI7380-M8X50	Vite TB	BH Bolt			x
32	UNI5923-M5X25	Grano	Dowel			x
33	UNI5929-M3X5	Grano	Dowel			x
34	UNI5933-M8X100	Vite TS	CSH Bolt			x
35	UNI5589-M5	Dado esagonale basso	Thin Hex Nut			x
36	AST-06	K-Nut	K-Nut			x
37	UNI5589-M8	Dado esagonale basso	Thin Hex Nut			x
38	UNI5933-M4X12	Vite TS	Bolt			x
39	RS130300015	Rondella speciale	Special washer			x
40	UNI6592-4	Rondella	Washer			x
41	UNI6592-8	Rondella	Washer			x
42	UNI8840B-8	Rondella ondulata	Crinkle Washer			x
43	UNI8840B-6	Rondella ondulata	Crinkle Washer			x

#2 161425002

It is allowed to stack up to two rod and cut one for adjustment

#7 090915006

It is allowed to add braces and/or extension to the pedal pad (no modification to standard part)

#9 090915008

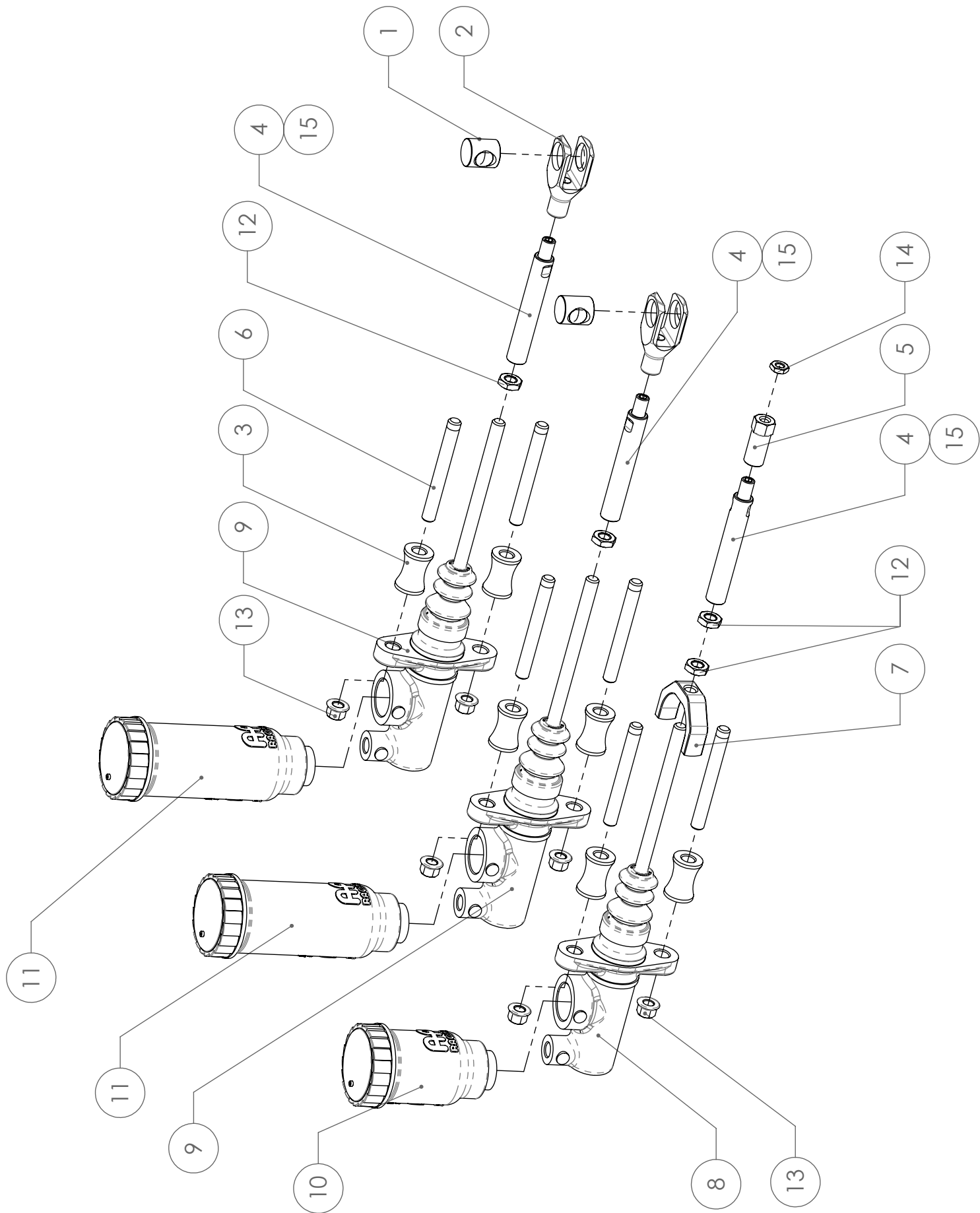
It is allowed to add braces and/or extension to the pedal pad (no modification to standard part)

#18 010015006

It is allowed to add braces and/or extension to the pedal pad (no modification to standard part)

#22 161415002

It is allowed cut the rod for adjustment



16A - MASTER CYLINDERS

Item	Part Number	Descrizione	Description	1	2	3
1	161816006	Boccola	Bush	x		
2	161816007	Forcella ripartitore freni	Brake bias clevis	x		
3	010016011	Distanziale pompe	Master cylinder spacer	x		
4	080616009	Puntalino 73 mm	Master cylinder rod 73 mm		x	
5	090916002	Adattatore	Clutch pedal rod		x	
6	010011019	Prigioniero	Stud	x		
7	101016010	Finecorsa Frizione	Clutch stop	x		
8	CP2623-90	AP master cylinder 5/8"	AP master cylinder 5/8"		x	
9	CP2623-91	AP master cylinder 0.7"	AP master cylinder 0.7"		x	
10	CP4709-12	Serbatoio SMALL AP	AP SMALL reservoir	x		
11	CP4709-11	Serbatoio MEDIUM AP	AP MEDIUM reservoir	x		
12	UNI5589-M8	Dado esagonale basso	Thin Hex Nut			x
13	DIN6927-M8	Dado flangiato autobloccante	Prevailing torque Nut			x
14	UNI5589-M6	Dado esagonale basso	Thin Hex Nut			x
15	161516005	Puntalino 200 mm	Master cylinder rod 200mm		x	

#4 080616009

Maximum two rods can be stacked, refer to user manual for guidelines

#5 090916002

It is allowed to add and stack one of 080616009 or one of 161516005

#8 CP2623-90

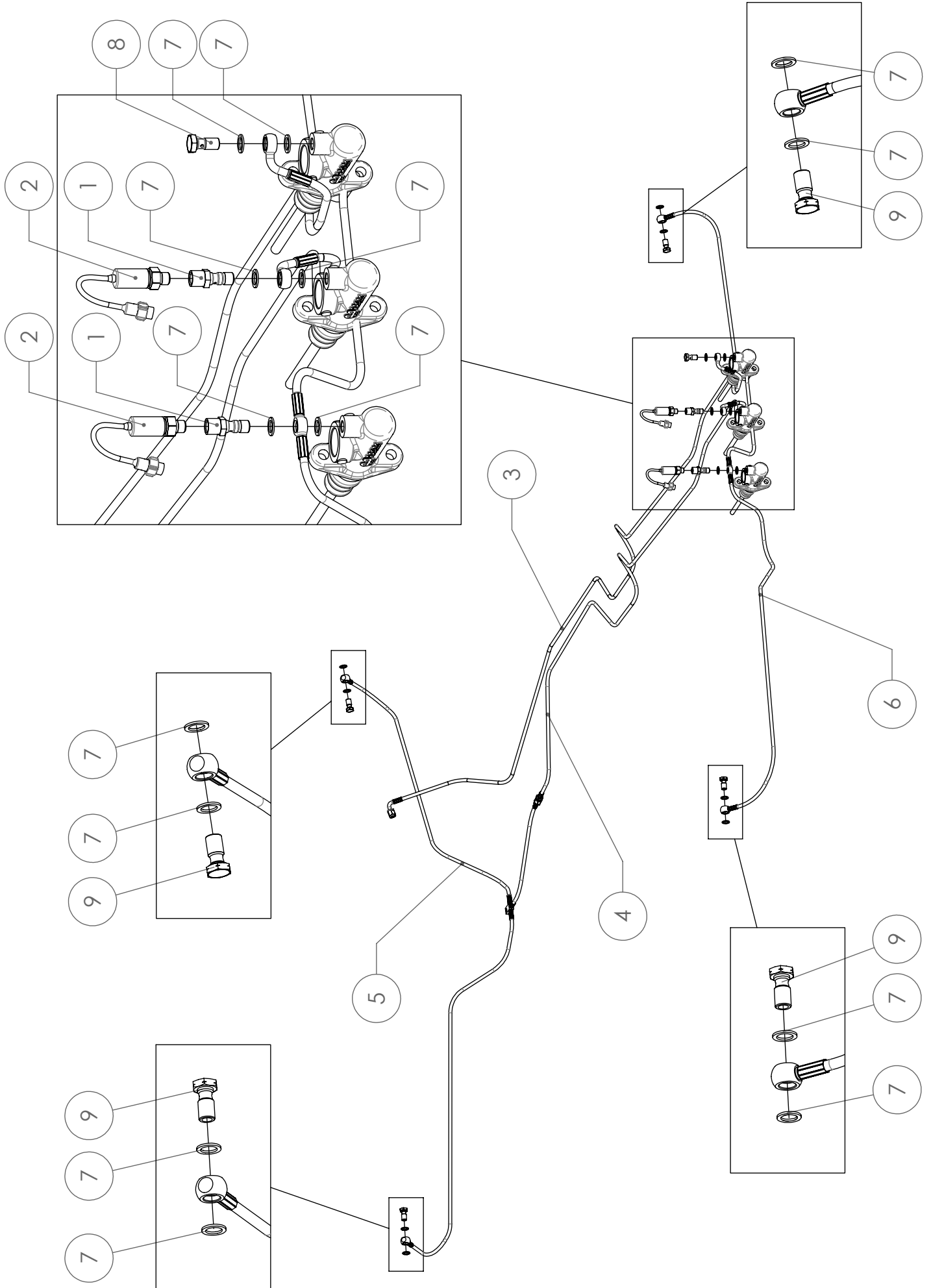
May be replaced by CP2623-91 / Rod could be adjusted following user manual prescriptions

#9 CP2623-91

May be replaced by CP2623-90 / Rod could be adjusted following user manual prescriptions

#15 161516005

This item can replace 080616009



16B - BRAKE-CLUTCH LINES

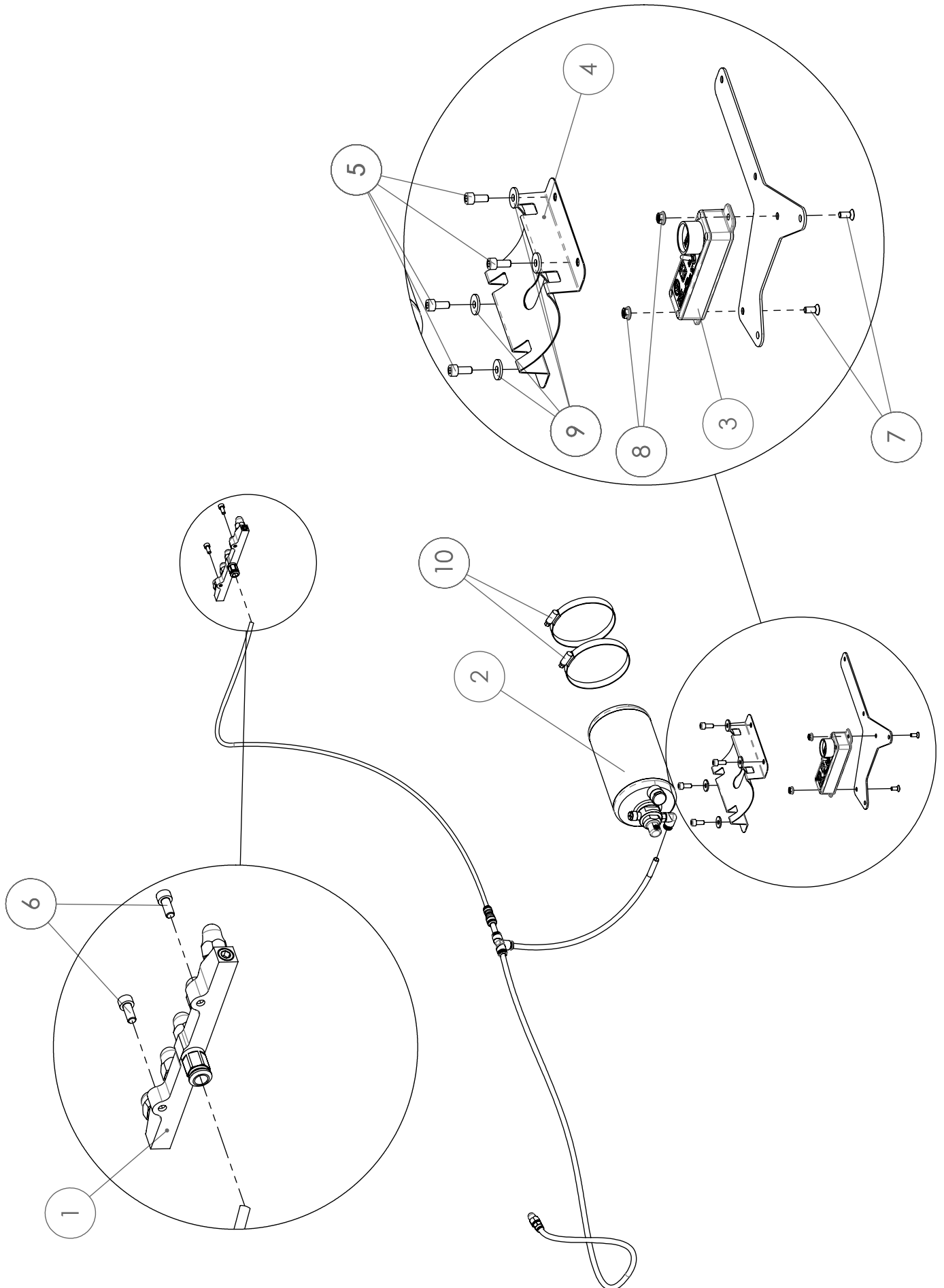
Item	Part Number	Descrizione	Description	1	2	3
1	090916008	Adattatore sensore pressione	Pressure sensor adapter	x		
2	090916001	Sensore pressione (100bar)	Pressure sensor (100bar)	x		
3	161416001	Tubo frizione	Clutch Hose		x	
4	161416002	Tubo freno posteriore	Rear brake hose		x	
5	161416003	Tubo freno post 3 vie	Rear 3-ways brake hose		x	
6	161416004	Tubo freno anteriore	Front brake hose		x	
7	4451603	Rondella	Washer			x
8	77503	Vite banjo	Banjo bolt			x
9	9920331	Vite banjo	Banjo bolt			x

#3 161416001 *Dry break can be added*

#4 161416002 *Dry break can be added*

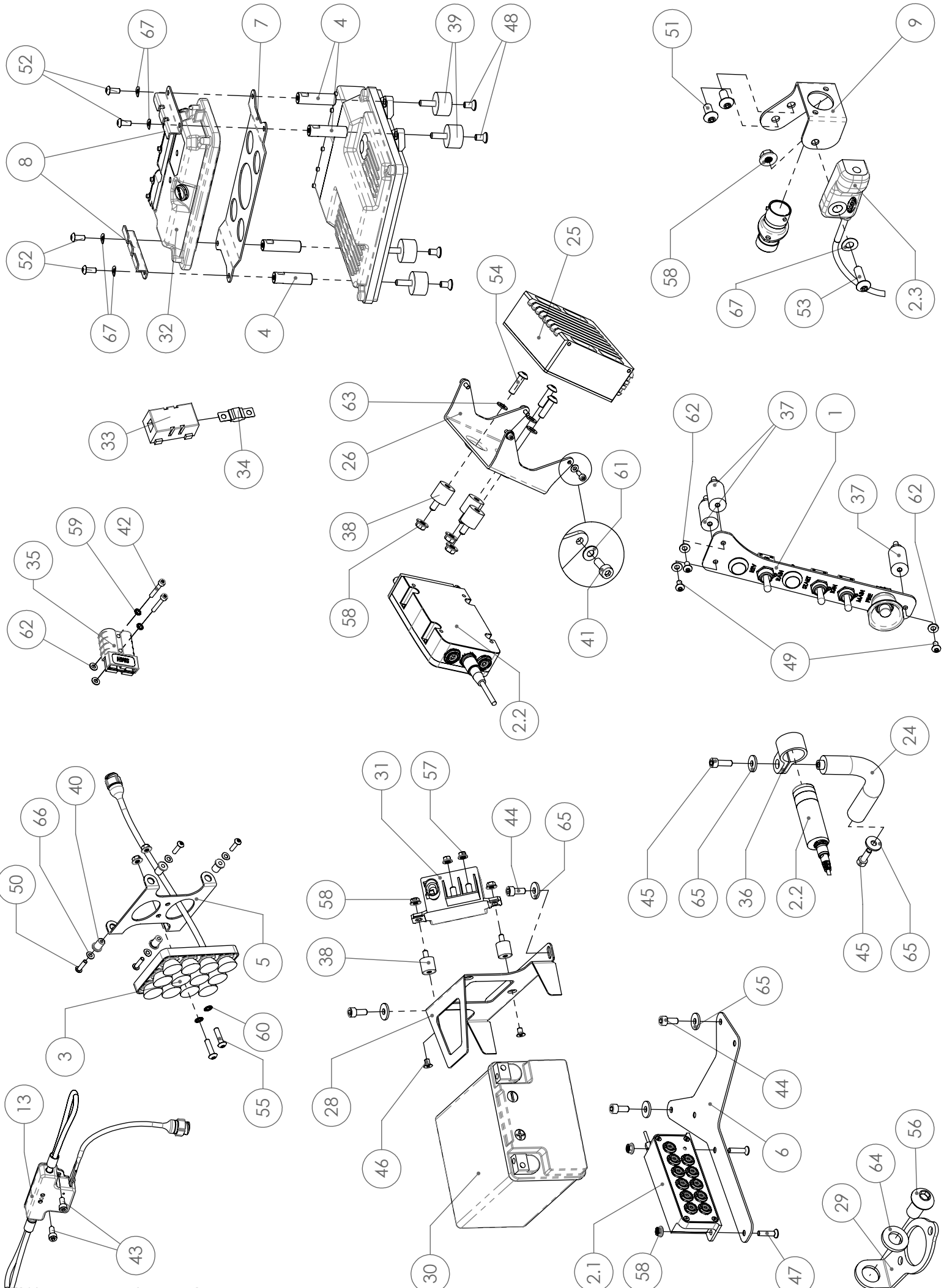
#5 161416003 *Dry break can be added*

#6 161416004 *Dry break can be added*

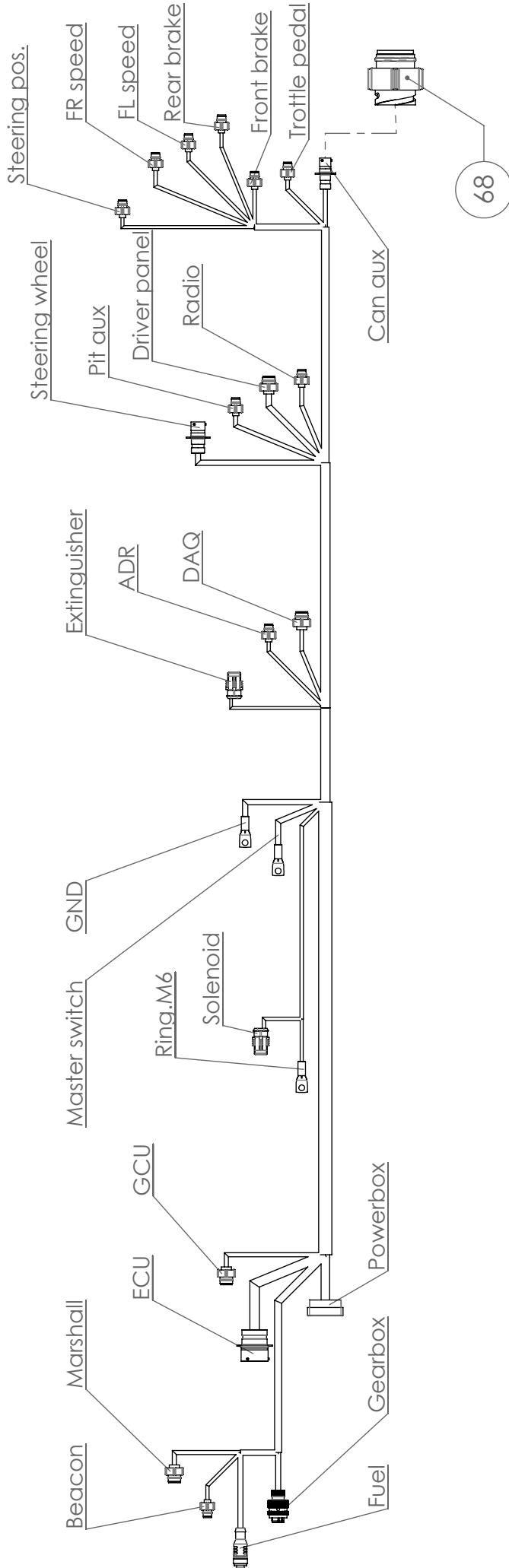


17 - FIRE EXTINGUISHER

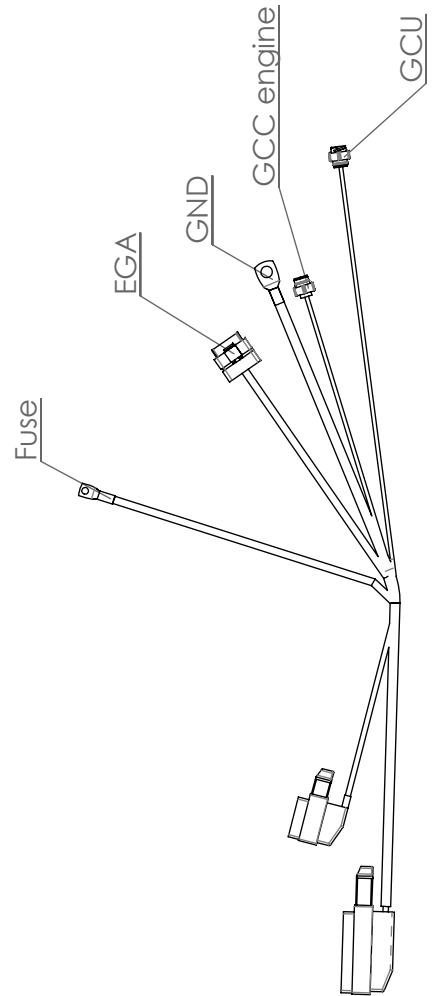
Item	Part Number	Descrizione	Description	1	2	3
1	101017001	Ugelli vano motore	Engine bay extinguisher nozzle	x		
2	CEFAL3	Estintore	Extinguisher bottle	x		
3	CD398	Centralina estintore	Extinguisher control box	x		
4	XCD300	Supporto Estintore	Extinguisher holder	x		
5	UNI5931-M6X14	Vite TC	CH Bolt			x
6	UNI5931-M5X12	Vite TC	CH Bolt			x
7	UNI5933-M5X12	Vite TS	CSH Bolt			x
8	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut			x
9	UNI6593-6	Rondella	Washer			x
10	ABA6487112	Fascetta Aba	Clamp			x



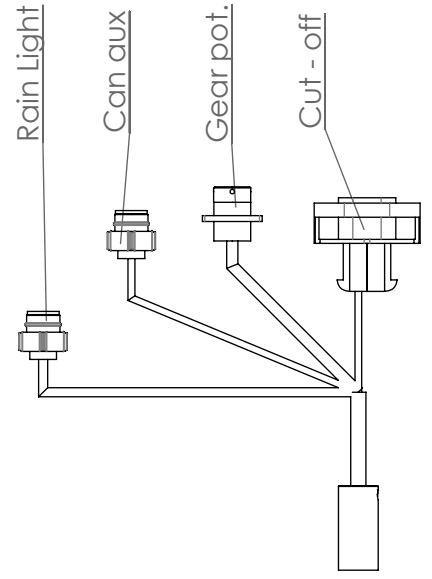
10 CHASSIS LOOM



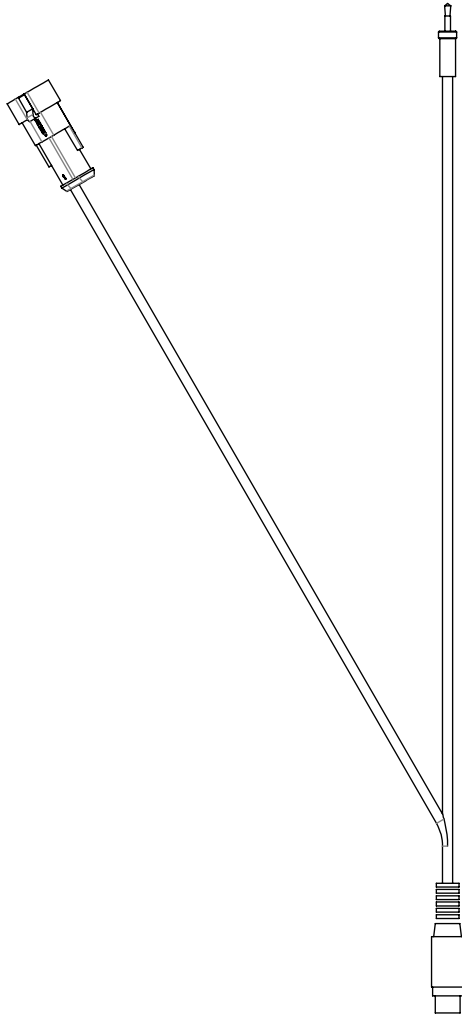
12 GCC LOOM



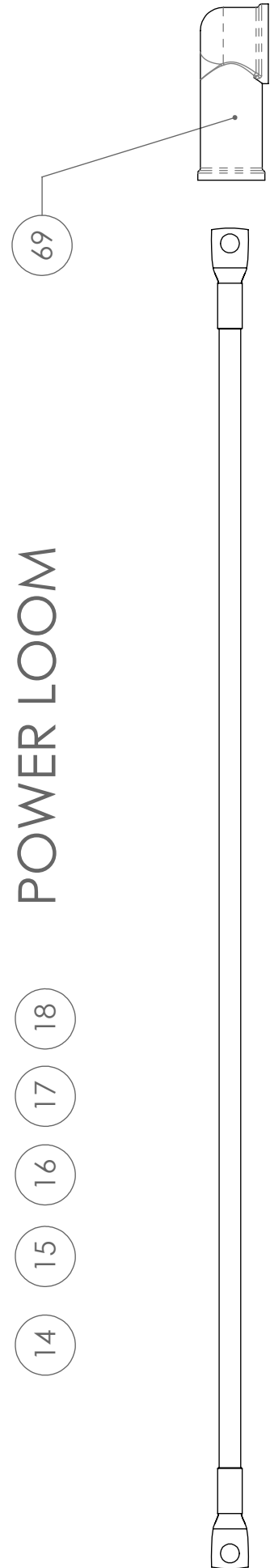
11 GEARBOX LOOM



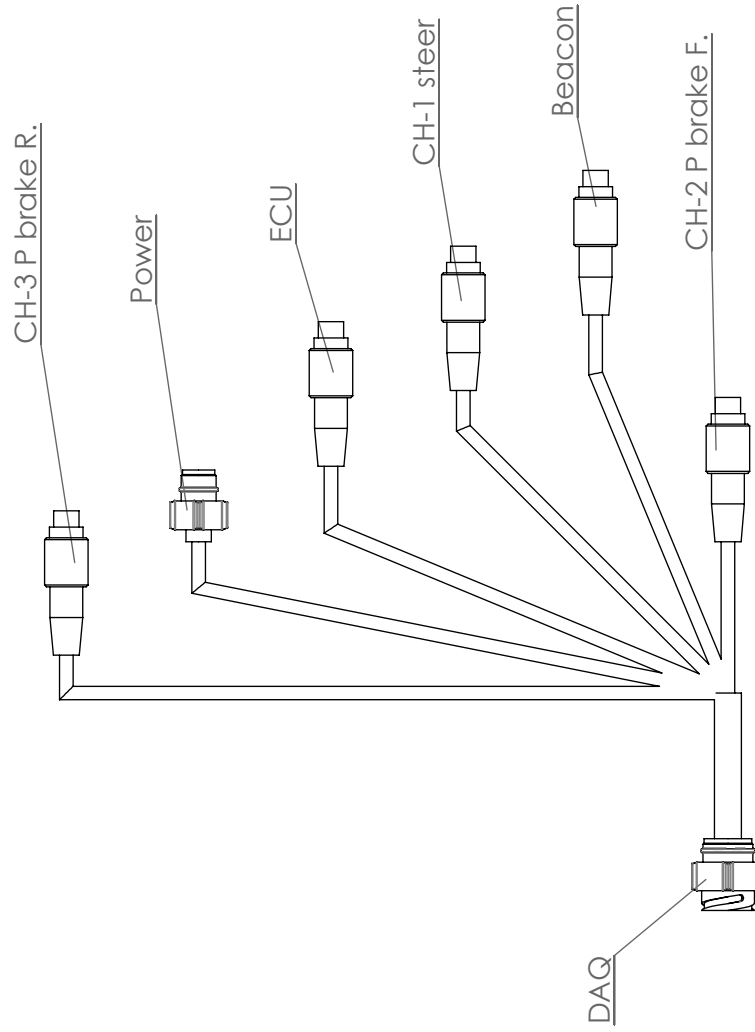
27 OMP EXTINGUISHER LOOM



14 15 16 17 18 69 POWER LOOM

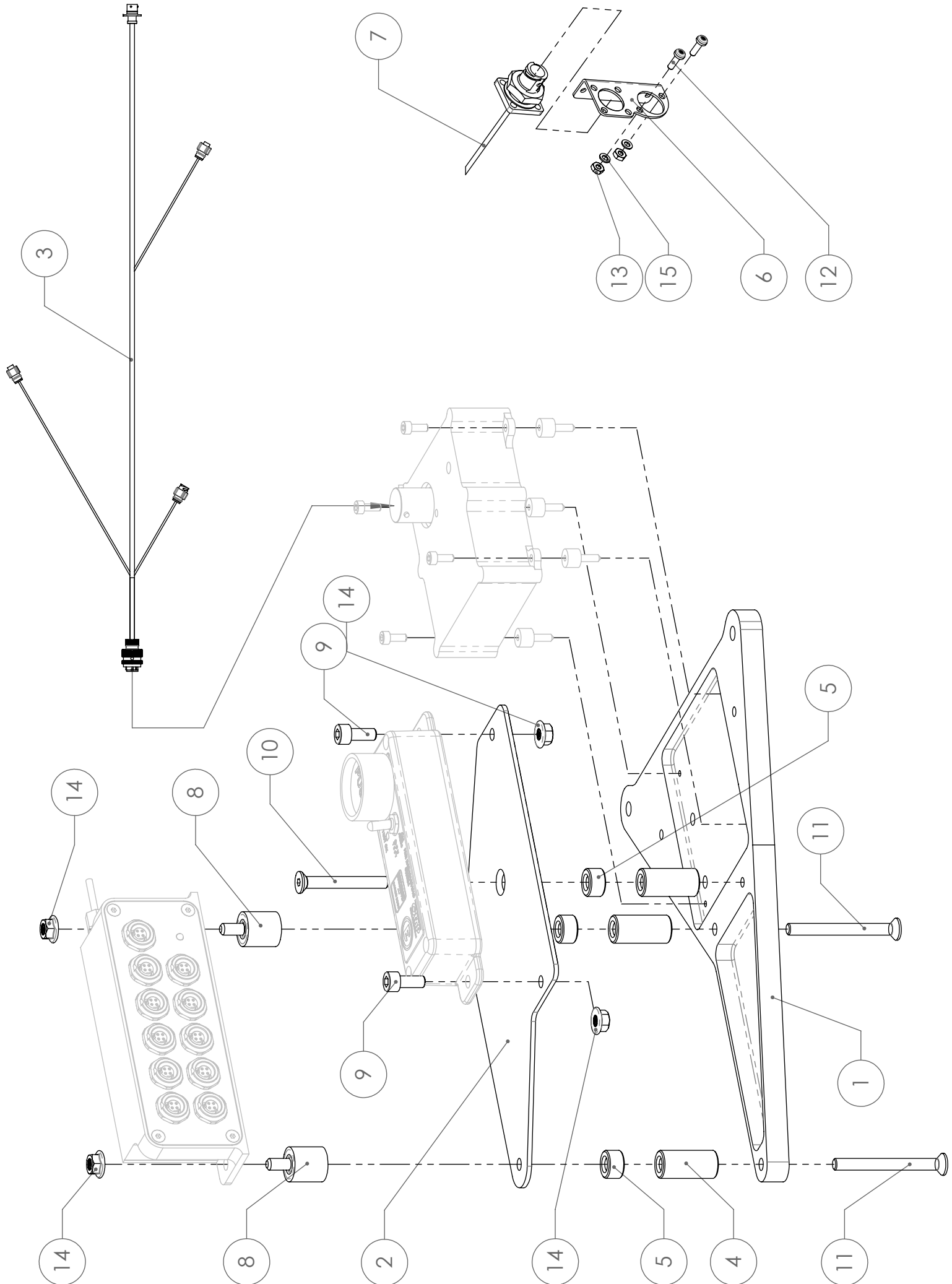


19 AIM EVO4 LOOM



18 - ELECTRIC SYSTEM

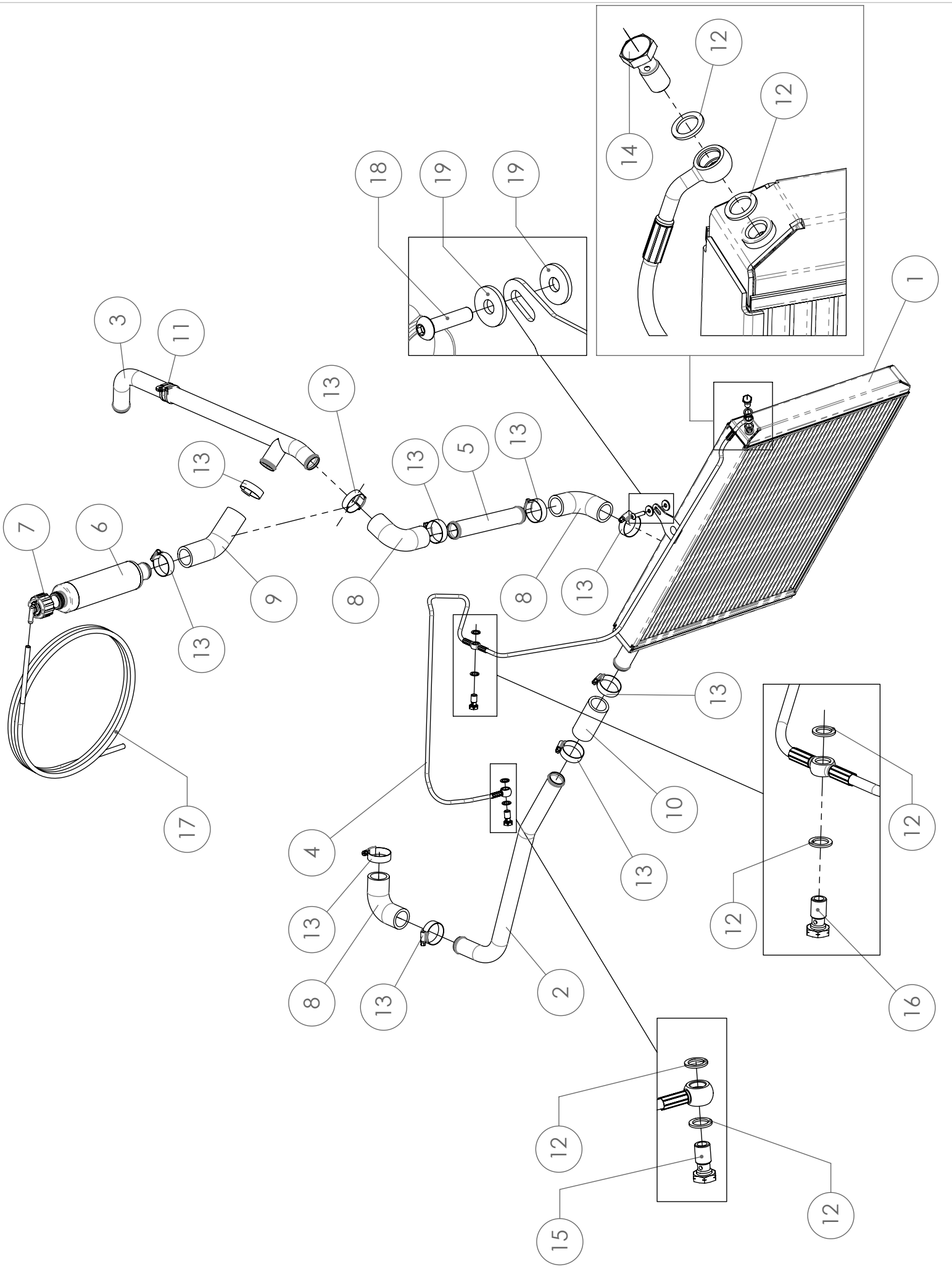
Item	Part Number	Descrizione	Description	1	2	3
1	161418001	Plancia strumenti	Switch panel	x		
2.1	X60E41309	Logger AIMEVO4	Logger AIM	x		
2.2	X96SHG010S0	Camera AIMSMARTYCAM	AIM video system	x		
2.3	X41RX12090	Beacon RX AIM	Lap trigger RX	x		
3	161418003	Fanale posteriore	Rear Light	x		
4	161418005	Distanziale GCC	GCC spacer	x		
5	161718039	Supporto fanale	Rear light bracket	x		
6	161418008	Staffa elettronica	Electronic carrier	x		
7	161418009	Staffa GCC	GCC carrier	x		
8	161418010	Blocco GCC	GCC holder	x		
9	161418011	Staffa beacon	Laptrigger bracket	x		
10	161418015	Impianto vettura	Chassis loom	x		
11	161418016	Impianto cambio	Gearbox loom	x		
12	161418017	Impianto GCC	GCC loom	x		
13	161418018	Marshall switch mk.2	Marshall switch mk.2	x		
14	161418019	+12V batteria - MS	+12V battery - MS	x		
15	161418020	+12V MS - alternatore	+12V MS - alternator	x		
16	161418021	+12V alternatore - starter	+12V alternator - starter	x		
17	161418022	GND batteria - motore	GND battery - engine	x		
18	161418023	+12V Fusibile GCC	+12V Fuse	x		
19	161418024	Impianto DAO AIM	AIM EVO4 loom	x		
20	161418025	Antenna GPS AIM	AIM GPS antenna	x		
21	161418026	Impianto CAN AIM	AIM CAN loom	x		
22	161418027	Impianto LVDS AIM	AIM LVDS loom	x		
23	161418028	Impianto dati AIM	AIM Com loom	x		
24	161418030	supporto camera	camera bracket		x	
25	101018003	Powerbox PSD9	PSD9 Powerbox	x		
26	101018006	Supporto powerbox	PSD9 bracket	x		
27	101018009	Impianto estintore OMP	OMP extinguisher loom	x		
28	090918001	Staffa batteria	Battery holder	x		
29	080701055	supporto connettore scarico dati	download loom bracket	x		
30	ETX15L	Batteria standard	Standard battery	x		
31	TYCO-HCR-300-A	Master switch	Master switch	x		
32	083815307300	GCC	GCC	x		
33	049809002XT	Portafusibile	Fusebox	x		
34	0498080	Fusibile 80A	Fuse	x		
35	030218048	Spina Anderson	Anderson Jack plug			x
36	LST56648A	Staffa di fissaggio Smartycam	Smartycam bracket			x
37	PUFM415X25MF	puffer	Silent Block			x
38	PUFM515X15MF	Puffer	Silent Block			x
39	PUFM625X15MF	Puffer	Silent block			x
40	E0790410	puffer M4	Silent Block			x
41	UNI5931-M3X8	Vite TC	CH bolt			x
42	UNI5931-M4X25	Vite TC	CH bolt			x
43	UNI5931-M5X12	Vite TC	CH bolt			x
44	UNI5931-M6X14	Vite TC	CH bolt			x
45	UNI5931-M6X18	Vite TC	CH Bolt			x
46	UNI5933-M5X8	Vite TS	CSH Bolt			x
47	UNI5933-M5X22	Vite TS	CSH Bolt			x
48	UNI5933-M6X12	Vite TS	CSH Bolt			x
49	UNI7380-M4X8	Vite TB	BH Bolt			x
50	UNI7380-M4X16	Vite TB	Bolt			x
51	UNI7380-M5X10	Vite TB	BH Bolt			x
52	UNI7380-M5X12	Vite TB	BH Bolt			x
53	UNI7380-M5X16	Vite TB	BH Bolt			x
54	UNI7380-M5X18	Vite TB	BH Bolt			x
55	UNI7380-M5X20	Vite TB	BH bolt			x
56	UNI7380-M6X10	Vite TB	BH bolt			x
57	AST-06	Dado Astori M6	Astori Nut M6			x
58	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut			x
59	RZS4	Rondella zigrinata	Washer			x
60	RZS5	Rondella zigrinata	Safety washer			x
61	UNI6592-3	Rondella	Washer			x
62	UNI6592-4	Rondella	Washer			x
63	UNI6592-5	Rondella	Washer			x
64	UNI6592-6	Rondella	Washer			x
65	UNI6593-6	Rondella larga	Large washer			x
66	UNI8840B-4	Rondella ondulata	Crinckle Washer			x
67	UNI8840B-5	Rondella ondulata	Crinckle Washer			x
68	090918020	Terminazione CAN	CAN plug			x
69	2225	Cappuccio terminale potenza	Power insulating cap			x



18F - ADR EMM

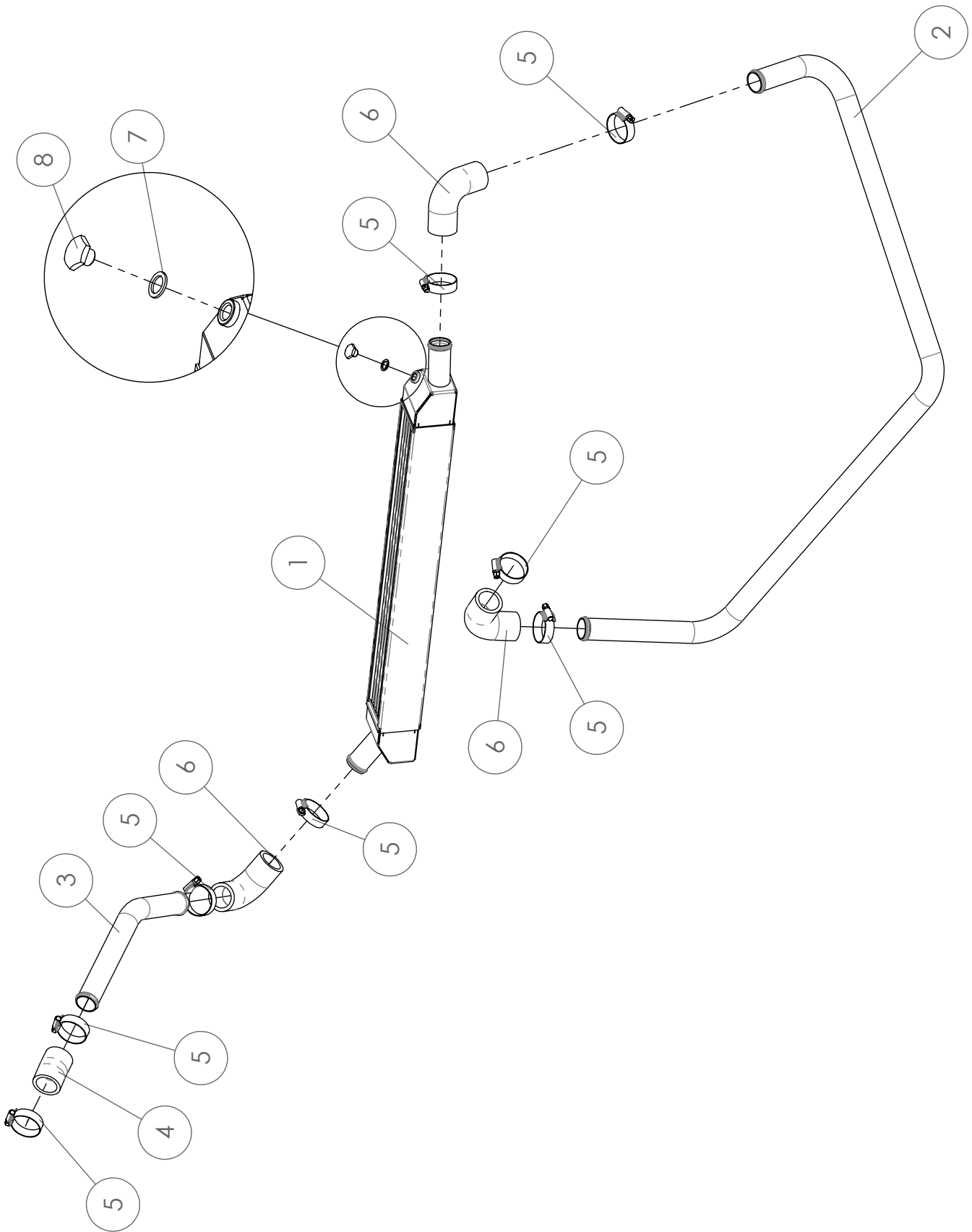
Item	Part Number	Descrizione	Description	1	2	3
1	161518008	Staffa elettronica	Electronic carrier (ADR)		x	
2	161518031	Piastra elettronica (ADR_EM)	Electronic plate (ADR_EM)		x	
3	161518032	Cablaggio ADR	ADR Loom		x	
4	161518033	Distanziale	Spacer		x	
5	161718038	Distanziale	Spacer		x	
6	161518034	Staffa ASL	ASL bracket		x	
7	161518036	LED remoto	Remote LED		x	
8	PUFM515X15MF	Puffer	Silent Block			x
9	UNI5931-M5X12	Vite TC	CH Bolt			x
10	UNI5933-M5X40	Vite TS	CSH Bolt			x
11	UNI5933-M5X50	Vite TS	CSH Bolt			x
12	UNI7687-M2,5X8	Vite TI	CRPH Screw			x
13	UNI5588-M2,5	Dado	Nut			x
14	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut			x
15	UNI6592-2,5	Rondella	Washer			x

All item All the item listed in this page are optional, the installation will be dictated by AsN Sporting Regulation



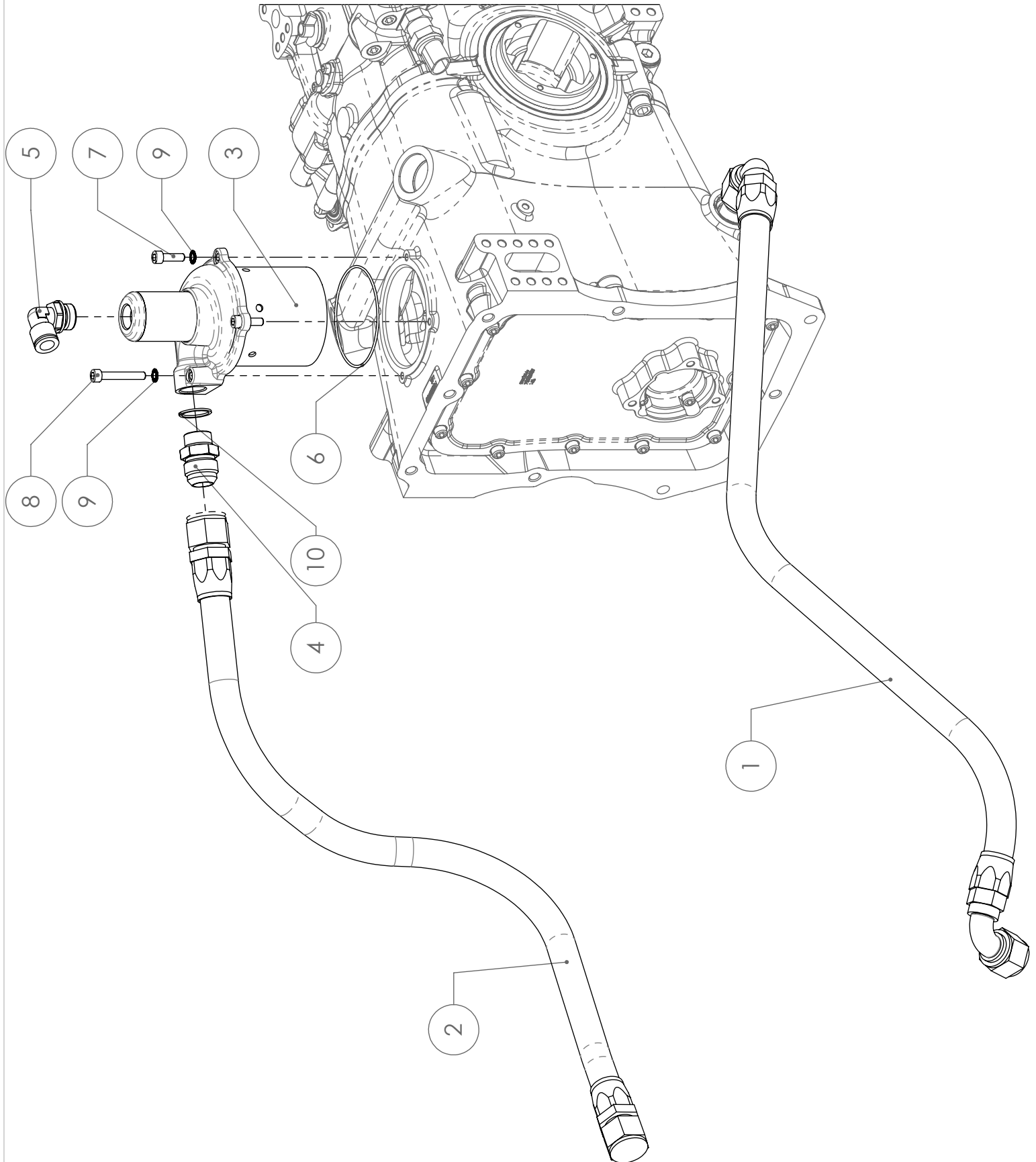
19A - WATER SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161419001	Radiatore	Water radiator	x		
2	161419002	Tubo uscita motore	Engine outlet pipe	x		
3	161419007	Tubo incrocio	Crossing pipe	x		
4	161419012	Tubo sfiato	Bleed line	x		
5	161419013	Tubo	Pipe	x		
6	091019008	Vaso espansione acqua	water tank	x		
7	090919010	Tappo vaso espansione	Water cap	x		
8	E9028	Manicotto	Silicon hose			x
9	E4528	Manicotto	Silicon hose			x
10	SCH28	Manicotto	Silicon hose			x
11	PAS028	Fascetta Ø28	Clamp			x
12	4451603	Rondella rame	Copper washer			x
13	010019016	Fascetta	Clamp			x
14	77503	Vite banjo	Banjo bolt			x
15	9920332P	Vite banjo	Banjo bolt			x
16	9920331	Vite banjo	Banjo bolt			x
17	161419018	Tubo elastolan ø8x6 L670	Elastolan hose ø8x6 L670			x
18	UNI7380-M6X25	Vite TB	BH Bolt			x
19	UNI6593-6	Rondella larga	Large washer			x



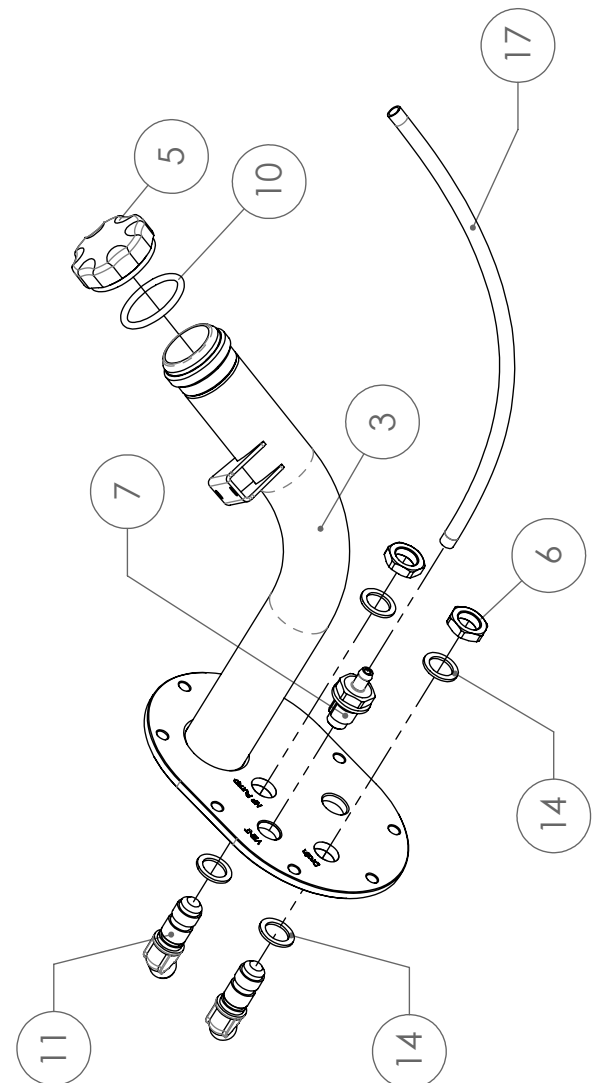
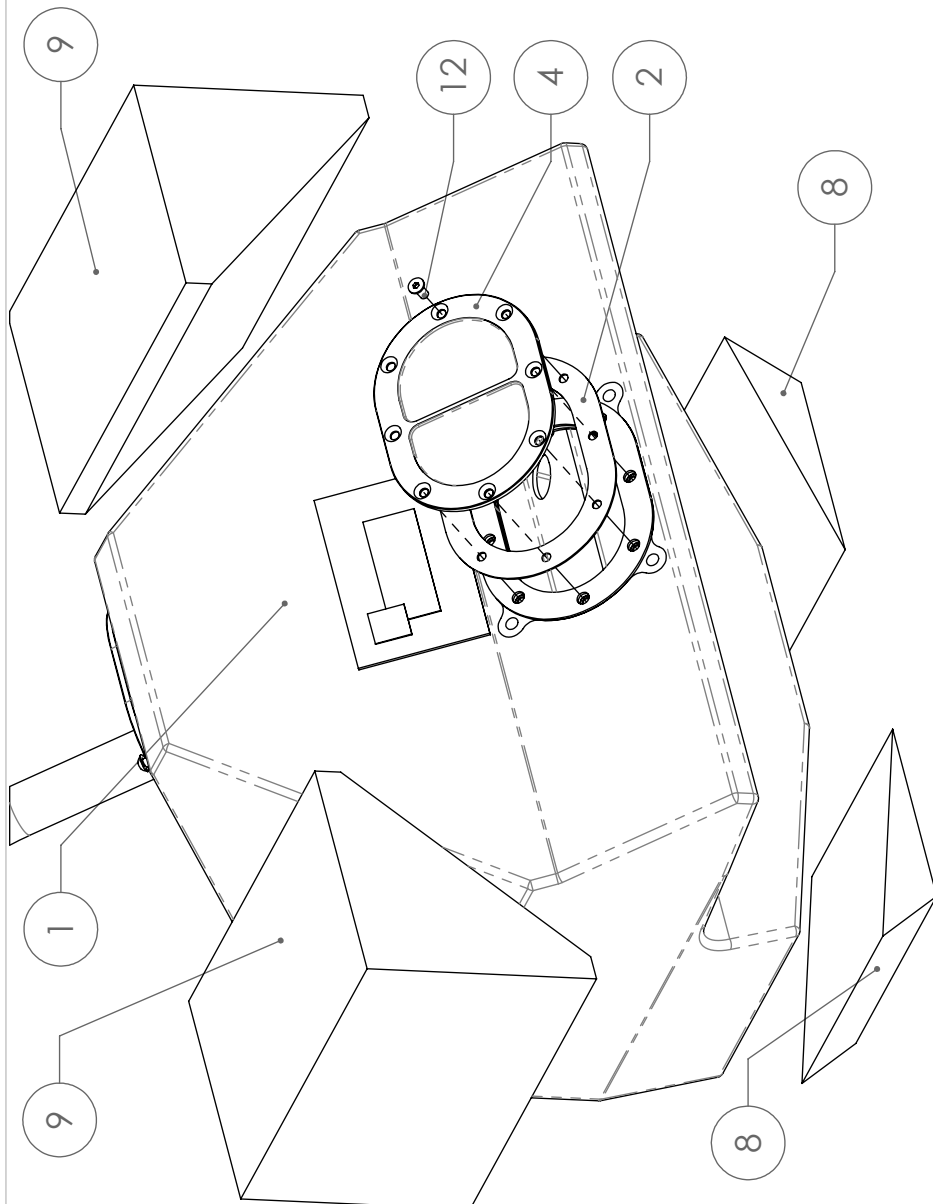
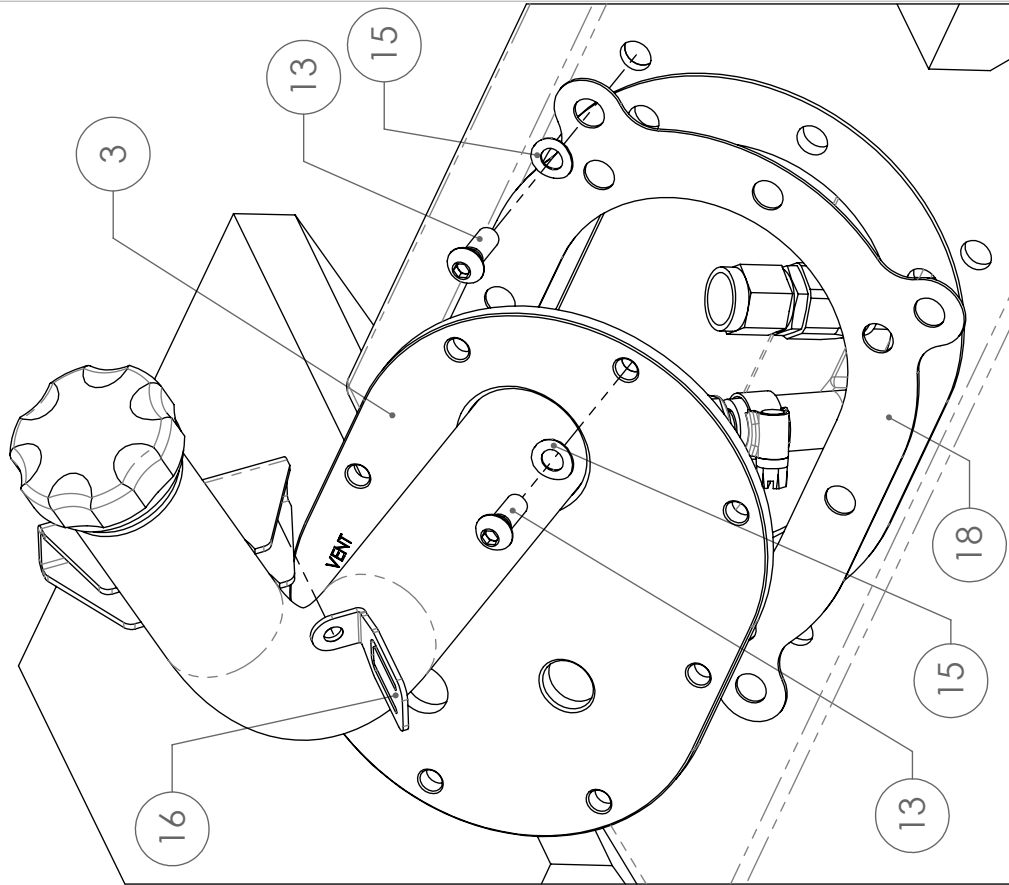
19B - WATER SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161419009	Radiatore	Water radiator	x		
2	161419014	Tubo mandata radiatore	Radiator inlet pipe	x		
3	161419015	Tubo ritorno pompa	Water pump inlet pipe	x		
4	SCH28	Manicotto	Silicon hose			x
5	010019016	Fascetta	Clamp			x
6	E9028	Manicotto	Silicon hose			x
7	4451603	Rondella rame	Copper washer			x
8	010619017	Tappo radiatore	Radiator cap	x		



20 - OIL SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161420001	Tubo ritorno	Tank pipe	x		
2	161720002	Tubo mandata	Engine return oil hose	x		
3	211620001	Degasatore	Swirl pot	x		
4	122215300	Adattatore M22x1.5 - Dash 12	Adaptor M22x1.5 - Dash 12			x
5	RL311212	Raccordo D12 1/2 Gas	Breathing elbow			x
6	ORN2312	O-ring	O-ring			x
7	UNI5931-M6X20	Vite TC	CH bolt			x
8	UNI5931-M6X40	Vite TC	CH bolt			x
9	RZS6	Rondella zigrinata	Safety washer			x
10	RR2226	Rondella di rame	Copper washer			x



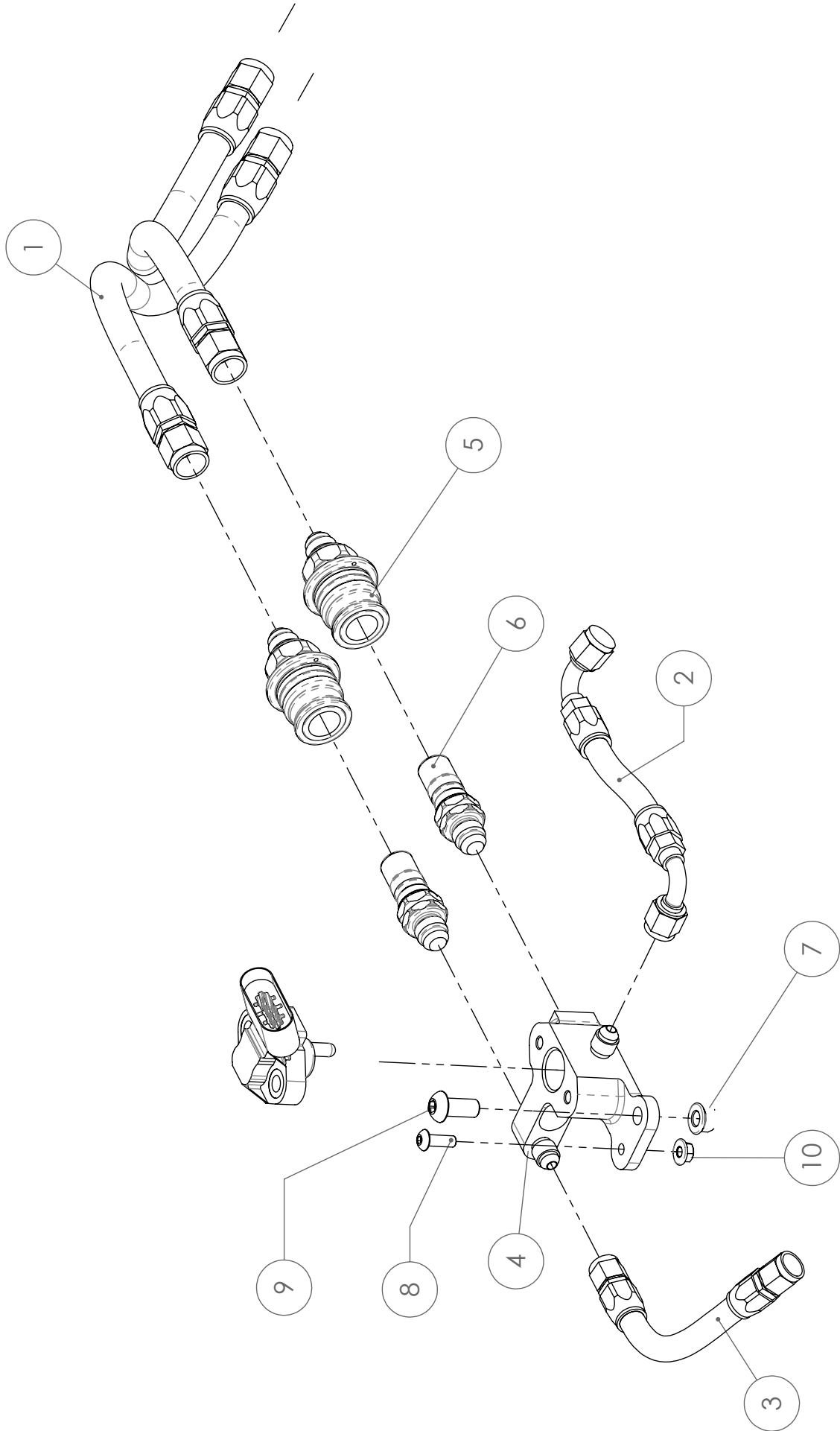
21A - FUEL SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161421001	Serbatoio benzina	Fuel Cell	x		
2	161421003	Guarnizione	Gasket		x	
3	161421004	Flangia serbatoio	Tank rear flange	x		
4	161421005	Flangia anteriore serbatoio	Tank front flange	x		
5	090921005	Tappo benzina	Fuel plug	x		
6	AN92406	Dado 9-16x18 UNF	Nut			x
7	010021017	Valvola Sfiato	Vent valve	x		
8	161421009	Filler inferiore serbatoio	Lower filler	x		
9	161421011	Filler laterale	Side filler	x		
10	ORV4131	O-ring	O-ring			x
11	AN83706	Racc. Passaparete 45° 9/16x18	45° male bulkhead			x
12	UNI5933-M6X14	Vite TS	CSH Bolt			x
13	UNI7380-M6X16	Vite TB	BH Bolt			x
14	RR1420	Rondella	Washer			x
15	UNI8840B-6	Rondella ondulata	Crinkle Washer			x
16	090901019	Squadretta QR	Bracket			x
17	161421014	Tubo elastolan ø8x6 L290	Elastolan hose ø8x6 L290			x
18	161421010	Guarnizione	Gasket			x

#2

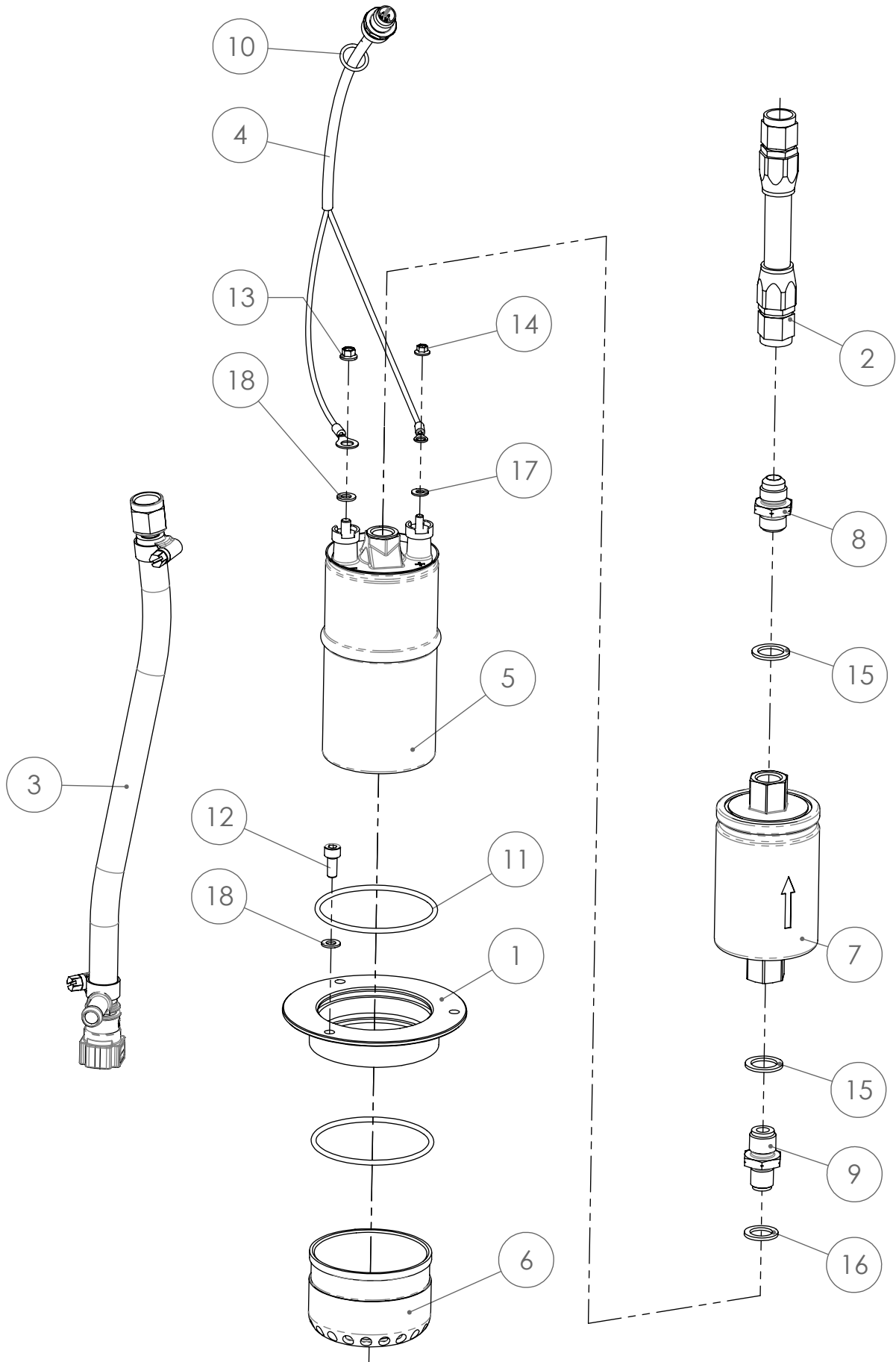
161421003

May be removed



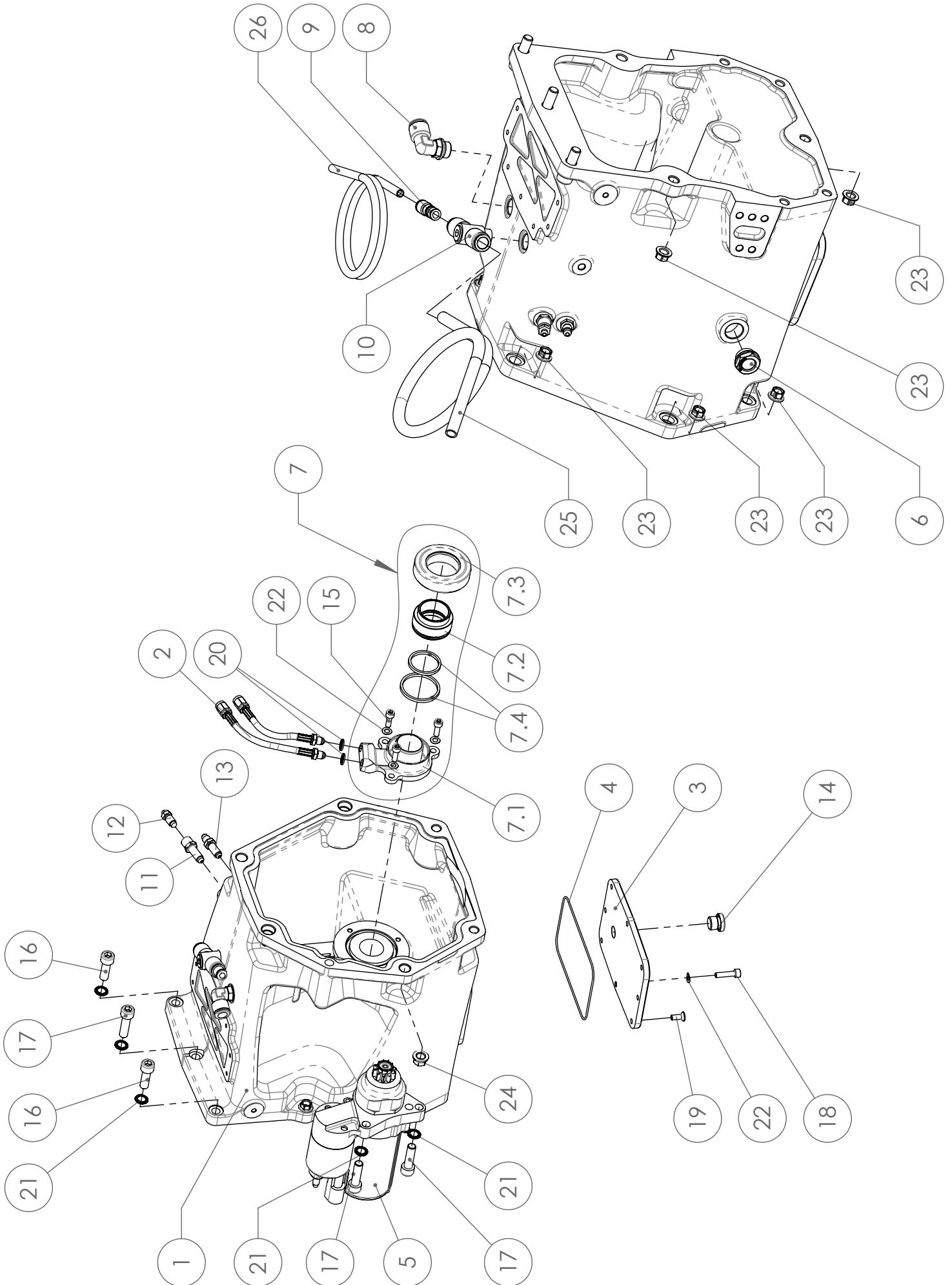
21B - FUEL SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161421007	Tubo benzina	Fuel Hose	x		
2	090921015	Tubo ritorno	Fuel Hose	x		
3	090921014	Tubo mandata	Fuel Hose	x		
4	090921009	Staffa sensore	Fuel sensor bracket	x		
5	SPT083655L	Raccordo rapido femmina	Quick coupling socket	x		
6	SPT087655L	Raccordo rapido maschio	Quick connector plug	x		
7	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut			x
8	UNI7380-M5X15	Vite TB	BH Bolt			x
9	UNI7380-M8X18	Vite TB	BH Bolt			x
10	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut			x



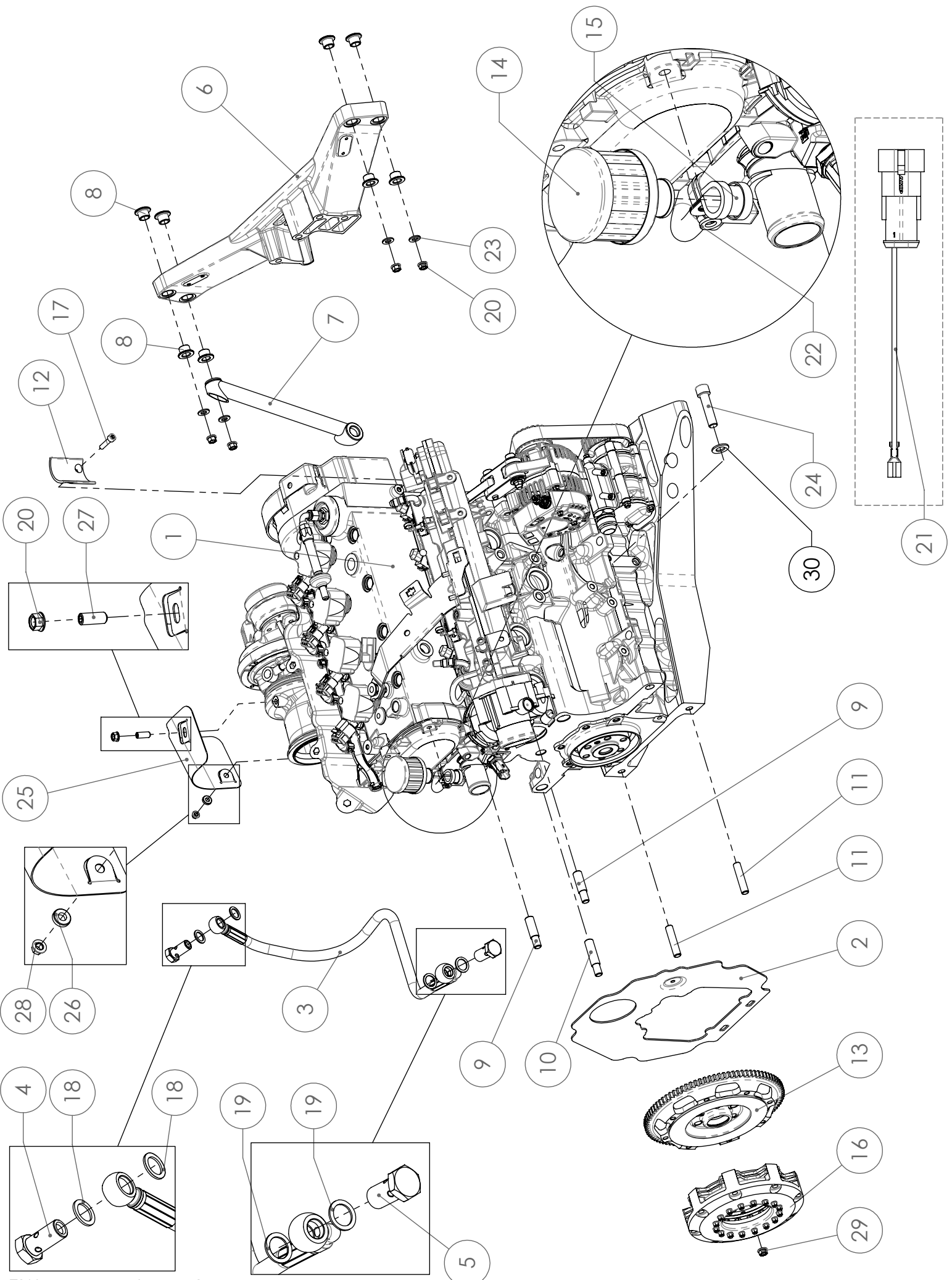
21C - FUEL SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161421002	Supporto pompa HP	Fuel pump carrier	x		
2	161421006	Tubo benzina	Fuel Hose	x		
3	161421008	Tubo ritorno	Fuel Hose	x		
4	161421012	Cablaggio pompa benzina	Tank Loom	x		
5	080621010	Pompa benzina	Fuel pump	x		
6	080821019	Protezione pompa	Fuel pump stay	x		
7	0450905911	Filtro benzina	Fuel filter	x		
8	30606M14	Adattatore 9/16-M14x1.5	Adattatore 9/16-M14x1.5			x
9	148M12M14	Adattatore M12 - M14	Male to male			x
10	ORV2050	O-ring	O-ring			x
11	ORV3237	O-ring	O-ring			x
12	UNI5931-M5X12	Vite TC Inox	CH Bolt Stainless Steel			x
13	AST-05	K-Nut	K-Nut			x
14	AST-04	K-Nut	K-Nut			x
15	RR1420	Rondella	Washer			x
16	RR1218	Rondella	Washer			x
17	UNI6592-4	Rondella	Washer			x
18	UNI6592-5	Rondella	Washer			x



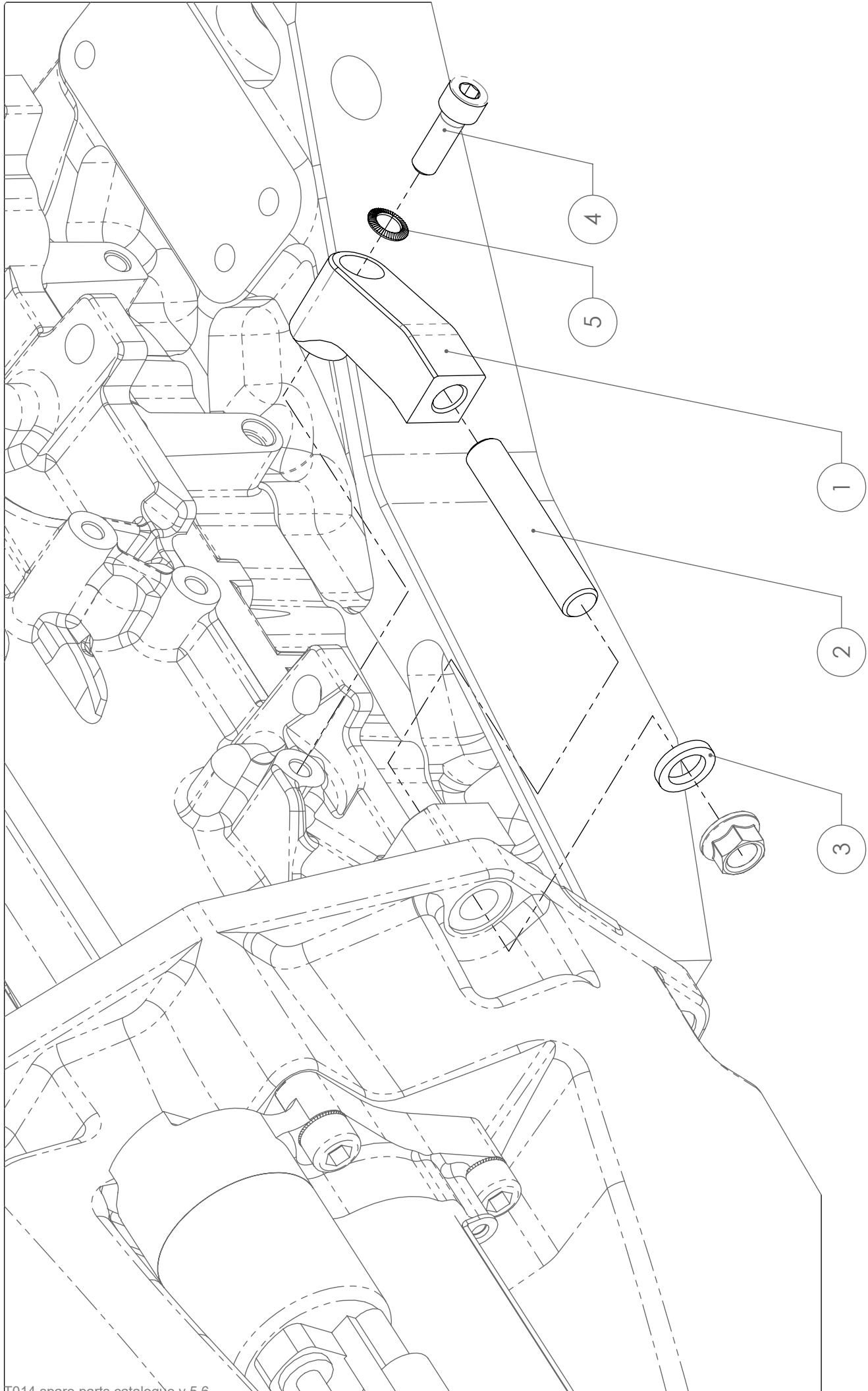
22A - ENGINE

Item	Part Number	Descrizione	Description	1	2	3
1	161422002	Distanziale motore	Engine spacer			
2	161422003	Tubo spurgo/mandata frizione	Clutch bleed/delivery line	x		
3	161422005	Flangia Catch-tank	Catch-tank flange	x		
4	161422011	O-Ring	O-Ring			x
5	(-)	Motorino avviamento	Starter			
6	080722017	Indicatore di livello	Level gauge	x		
7	TAAP3859	Attuatore frizione Completo	Slave cylinder assy			
7.1	TAAP3859001	Corpo attuatore frizione	Slave cylinder body	x		
7.2	TAAP3859002	Pistone attuatore frizione	Slave cylinder piston	x		
7.3	CP3457-9	Release Bearing	Cuscinetto	x		
7.4	CP3759-3	Kit guarnizioni spingidisco	Sleave seal kit	x		
8	RL3112-3/8	Raccordo D12 3/8 Gas	Breathing elbow			x
9	RL812-8	Raccordo 12-8mm	Breathing elbow			x
10	RL161238	Raccordo 12-3/8	Breathing elbow			x
11	ADMFO3X2003X8	Niplo 3/8	Bleed nipple			x
12	CP3720182	Vite spurgo 3/8-24UNF	Bleed bolt			x
13	080624028	passaparete 832-03P	Bulkhead fitting			x
14	DIN3852-M16X1,5	Tappo esagono incassato	Hexagon socket plug			x
15	UNI5931-M6X18	Vite TC	CH Bolt			x
16	UNI5931-M10X30	Vite TC	CH Bolt			x
17	UNI5931-M10X35	Vite TC	CH Bolt			x
18	UNI5931-M6X25	Vite TC	CH Bolt			x
19	UNI5933-M6X16	Vite TS	CSH Bolt			x
20	161422012	Rondella speciale	Special washer			x
21	RZS10	Rondella zigrinata	Crinkle Washer			x
22	UNI8840B-6	Rondella ondulata	Crinkle Washer			x
23	AST-10	K-Nut	K-Nut			x
24	AST-12	K-Nut	K-Nut			x
25	161422020	Tubo elastolan ø12x9 L800	Elastolan hose ø12x9 L800			x
26	161422021	Tubo elastolan ø8x6 L480	Elastolan hose ø8x6 L480			x



22B - ENGINE

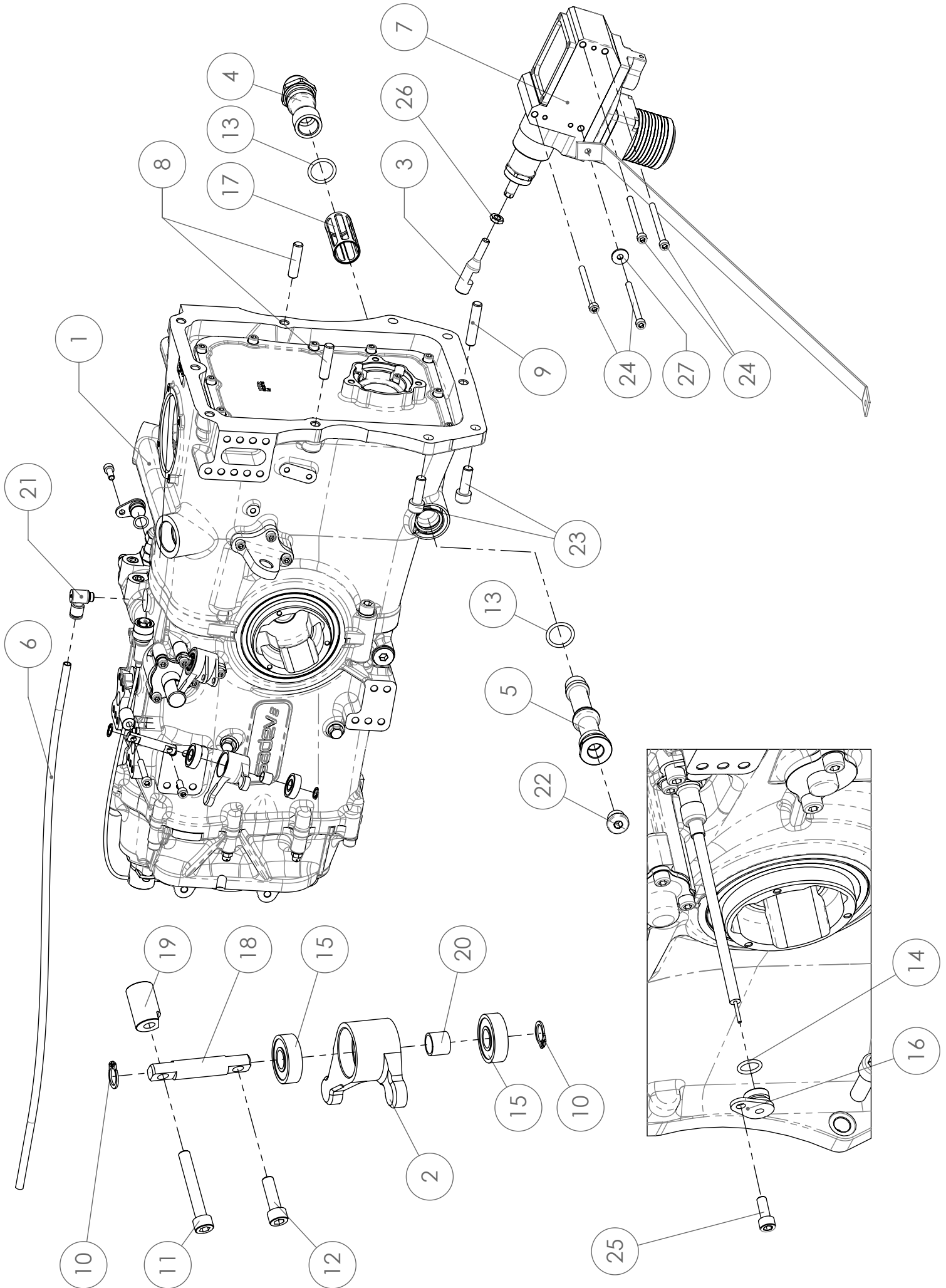
Item	Part Number	Descrizione	Description	1	2	3
1		Motore FPT_140FJT	Engine unit			
2	161422006	Carter protezione frizione	Flywheel protection			
3	161422010	Tubo raffreddamento turbina	Turbo cooling pipe	x		
4	161422014	Vite banjo	Banjo bolt			x
5	161422015	Vite banjo	Banjo bolt			x
6	090922002	Supporto motore	Top engine mounting			
7	090922003	Frame motore	Framework			
8	090922004	Boccola traversa motore	Bush			
9	090922007	Prigioniero	Stud			
10	090922008	Prigioniero	Stud			
11	090922012	Prigioniero	Stud			
12	090922010	Supporto vaso espansione	Water tank bracket			
13	(-)	5738622_m_414TF_volano	Flywheel			
14	CY50	Filtro aria	Air filter			
15	PAS014	Fascetta gommata d14	Clamp			
16	CP6002	Frizione completa	Clutch assy			
17	UNI5931-M6X25	Vite TC	CH Bolt			x
18	RR1420	Rondella rame	Copper washer			
19	RR1622	Rondella rame	Copper washer			
20	AST-08	K-Nut	K-Nut			
21	161422018	cavo motorino avviamento	starter cable			
22	UNI6592-6	Rondella	Washer			x
23	UNI6592-8	Rondella	Washer			
24	UNI5931-M12x50	Vite TC	CH bolt			
25	090922006	Lamiera paracalore turbina	Heat shield			x
26	SW-1/4	Rondella speciale	Special washer			x
27	UNI5929-M8X20	Grano	Stud			x
28	AST-06	K-Nut	K-Nut			x
29	AST-08X1	K-Nut M8x1.0	K-Nut M8x1.0			x
30	UNI6592-12	Rondella	Washer			x



22C - ENGINE

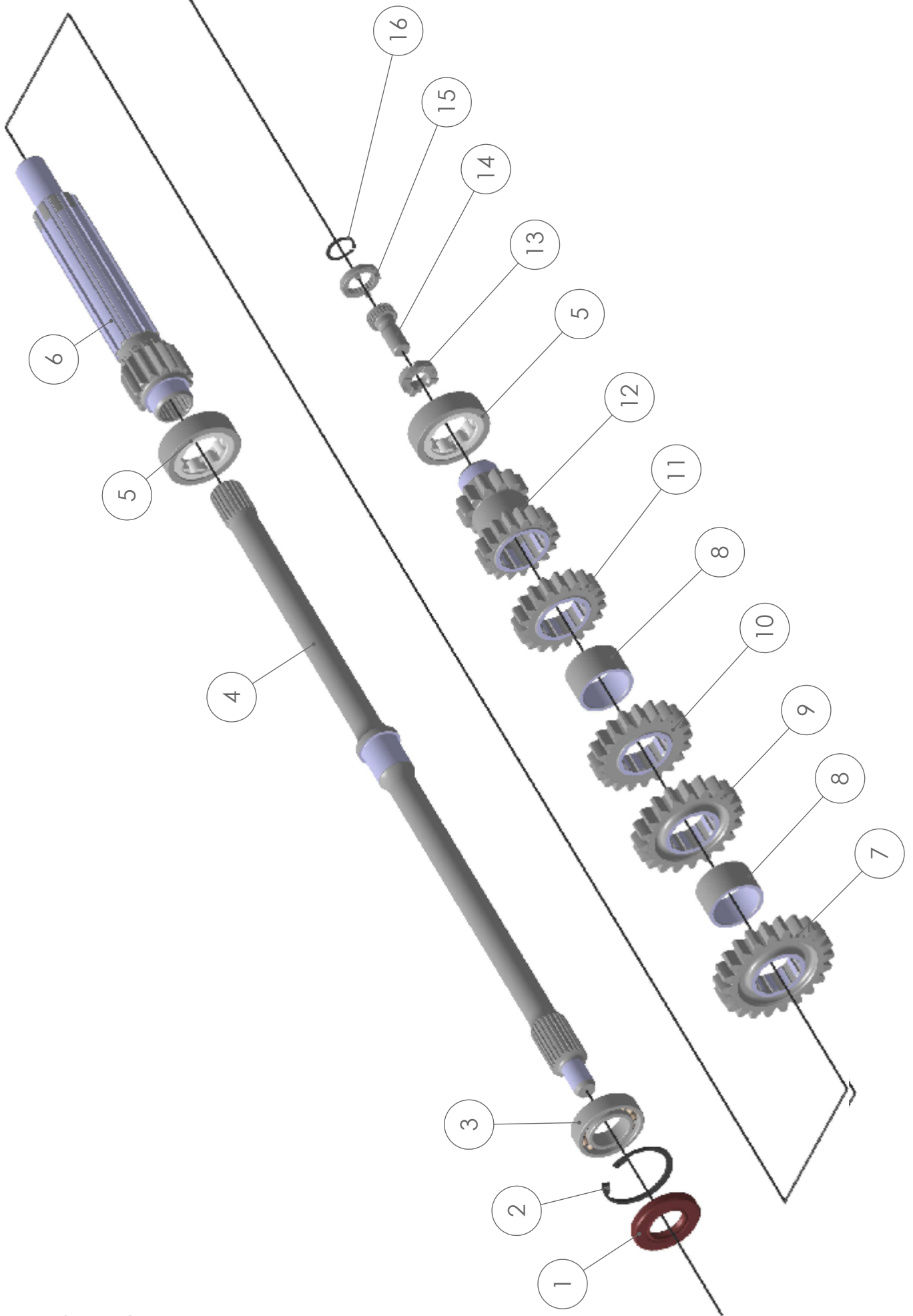
Item	Part Number	Descrizione	Description	1	2	3
1	161422019	Rinforzo motore Abarth	Frame Abarth Engine		x	
2	161522023	Prigioniero	Prigioniero		x	
3	090910012	Rondella Spec. 12,5x19x3	Special flat washer			x
4	UNI5931-M8X25	Vite TC classe 12.9	CH bolt class 12.9			x
5	RZSB	Rondella zigrinata	Safety Washer			x

#1 161422019 *May be removed*
#2 161522023 *May be removed*



24A - GEARBOX

Item	Part Number	Descrizione	Description	1	2	3
2	161424001	Rocker EGA	EGA rocker	x		
3	161424002	Link EGA	Link EGA	x		
4	161424004	Terminale filtro olio	Suction screen plug	x		
5	161424005	Filtro pescaggio olio f0085255	Suction screen fitting f0085255	x		
6	161424007	Tubo elastolan ø8x6 L670	Elastolan hose ø8x6 L670			x
7	083803390600	EGA	EGA	x		
8	090922011	Prigioniero	Stud			x
9	010022013	Prigioniero	Stud			x
10	0601042	f10 circlip	f10 circlip			x
11	0301442	M6x40 Chc bolt	M6x40 Chc bolt			x
12	0301385	M6X20 CHc bolt	M6X20 CHc bolt			x
13	0201275	O-Ring 24x3	O-Ring 24x3			x
14	0201009	O-Ring	O-Ring			x
15	0101035	6000 bearing	6000 bearing			x
16	F9017124	Unlocking cable plug	Unlocking cable plug	x		
17	F9024432	Filtro	Suction screen	x		
18	F0085124	selector axle	selector axle	x		
19	F0085131	selector spacer	selector spacer	x		
20	F0085992	Distanziale	bearing spacer	x		
21	RL15818	Raccordo 1/8" Gas	Fitting			x
22	DIN3852-M18X1,5	Tappo esagono incassato	Hexagon socket plug			x
23	UNI5931-M10X30	Vite TC	CH Bolt			x
24	UNI5931-M6X80	Vite TC	CH Bolt			x
25	UNI5931-M6X16	Vite TC	CH Bolt			x
26	UNI5589-M8	Dado esagonale basso	Thin Hex Nut			x
27	UNI6593-6	Rondella larga	Large washer			x

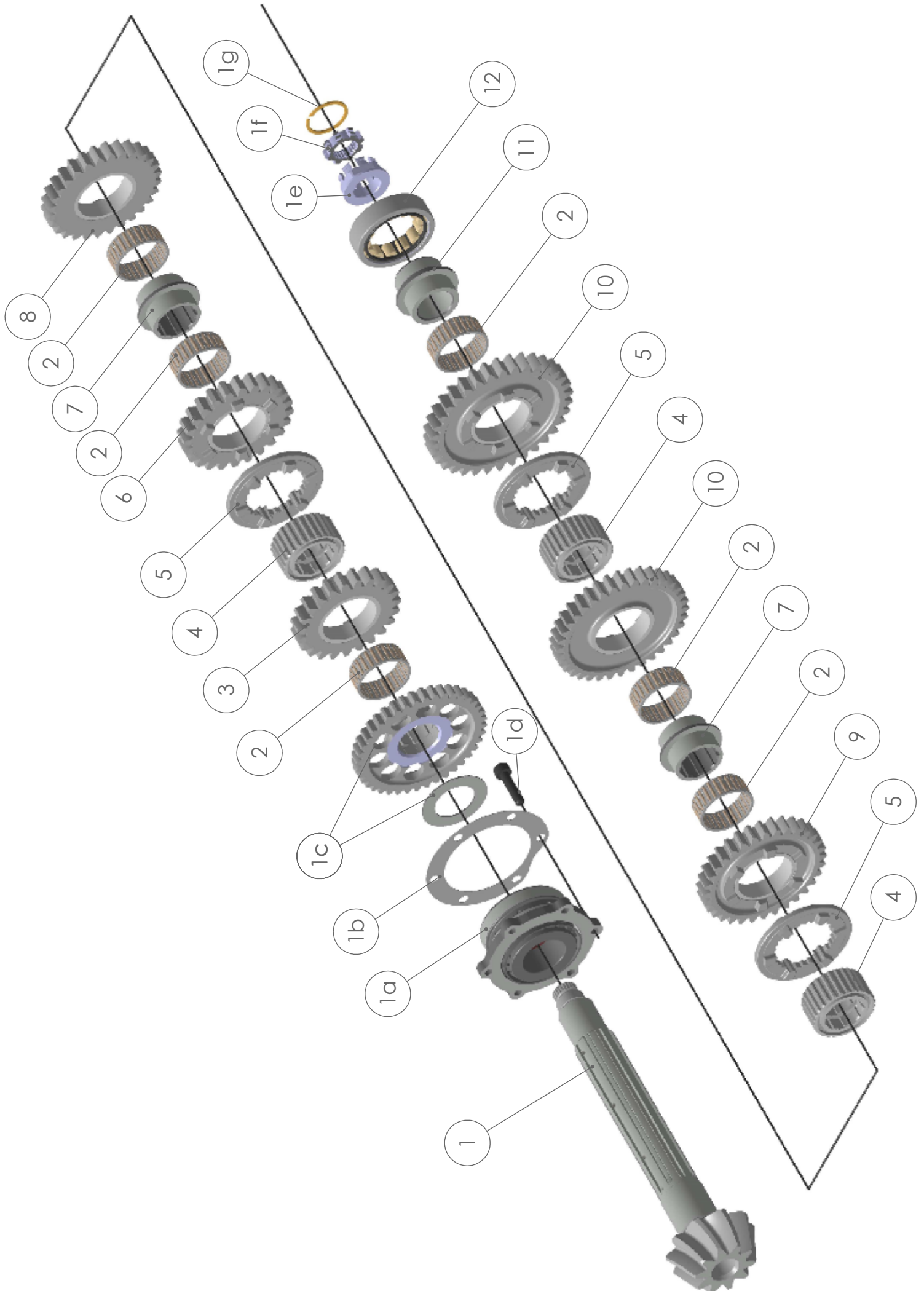


24C - GEARBOX

Item	Part Number	Descrizione	Description	1	2	3
1	0206003	D25x47x7 Guarnizione	D25x47x7 lip seal	x		
2	0602043	D47 Seeger	D47 circlip			x
3	0101050	Cuscinetto a sfere 6005	6005 bearing	x		
4	F0085051	input shaft	input shaft	x		
5	0103015	NU304 bearing	NU304 bearing	x		
6	F0085010	Albero primario	primary shaft	x		
7	C75142522556J	6 [^] marcia	6th gear		x	
7	C75142120556J	6 [^] marcia	6th gear		x	
8	F0085006	pinion spacer	pinion spacer	x		
9	C75142626556J	5 [^] marcia	5th gear		x	
9	C75142527556J	5 [^] marcia	5th gear		x	
10	C75142024556J	4 [^] marcia	4th gear		x	
10	C75142025556J	4 [^] marcia	4th gear		x	
11	C75141827556J	3 [^] marcia	3rd gear		x	
12	C75141630556J	2 [^] marcia	2nd gear		x	
12	E75141435556J	1 [^] marcia	1st gear		x	
13	F1908003	stopping washer	stopping washer			x
14	F9024002	Vite albero primario	primary shaft bolt	x		
15	F1908002	stopping hub	stopping hub	x		
16	0601020	D18 seeger	D18 circlip			x

#7 C75142522556J See list of allowed gear
 #9 C75142626556J See list of allowed gear
 #9 C75142527556J See list of allowed gear
 #10 C75142024556J See list of allowed gear
 #10 C75142025556J See list of allowed gear
 #11 C75141827556J See list of allowed gear
 #12 C75141630556J See list of allowed gear
 #12 E75141435556J See list of allowed gear

	<i>Short gear set</i>	<i>Long gear set</i>
1 st	14/35	14/35
2 nd	16/30	16/30
3 rd	18/27	18/27
4 th	20/25	20/24
5 th	25/27	26/26
6 th	21/20	25/22



24D - GEARBOX

Item	Part Number	Descrizione	Description	1	2	3
1a	F00850121	twin bearing assembly	twin bearing assembly	x		
1b	F00850131	bevel gear advance shim set	bevel gear advance shim set		x	
1c	F00850081	reverse gear pinion	reverse gear pinion	x		
1d	0301191	M7x30 Chc bolt	M7x30 Chc bolt			x
1e	F9002038	secondary nut	secondary nut	x		
1f	F9005010	nut stopping washer	nut stopping washer	x		
1g	9907004	D30 circlip	D30 circlip			x
2	0105043	K38x43x17 bearing	K38x43x17 bearing	x		
3	C75142522556J	6th gear	6th gear		x	
3	C75142120556J	6th gear	6th gear		x	
4	F0085003	hub	hub	x		
5	F0085004	dog ring	dog ring	x		
6	C75142626556J	5th gear	5th gear		x	
6	C75142527556J	5th gear	5th gear		x	
7	F0085005	gear bearing inner race	gear bearing inner race	x		
8	C75142024556J	4th gear	4th gear		x	
8	C75142025556J	4th gear	4th gear		x	
9	C75141827556J	3rd gear	3rd gear		x	
10	C75141630556J	2 [^] marcia	2nd gear		x	
10	E75141435556J	1 [^] marcia	1st gear		x	
11	F0085007	1st gear bearing inner race	1st gear bearing inner race	x		
12	0103011	NU 206 bearing	NU 206 bearing	x		

#1b F00850131 *Number and stack of shim is free*
 #3 C75142522556J *See list of allowed gear*
 #3 C75142120556J *See list of allowed gear*
 #6 C75142626556J *See list of allowed gear*
 #6 C75142527556J *See list of allowed gear*
 #8 C75142024556J *See list of allowed gear*
 #8 C75142025556J *See list of allowed gear*
 #9 C75141827556J *See list of allowed gear*
 #10 C75141630556J *See list of allowed gear*
 #10 E75141435556J *See list of allowed gear*

Short gear set

14/35
 16/30
 18/27
 20/25
 25/27
 21/20

Long gear set

14/35
 16/30
 18/27
 20/24
 26/26
 25/22

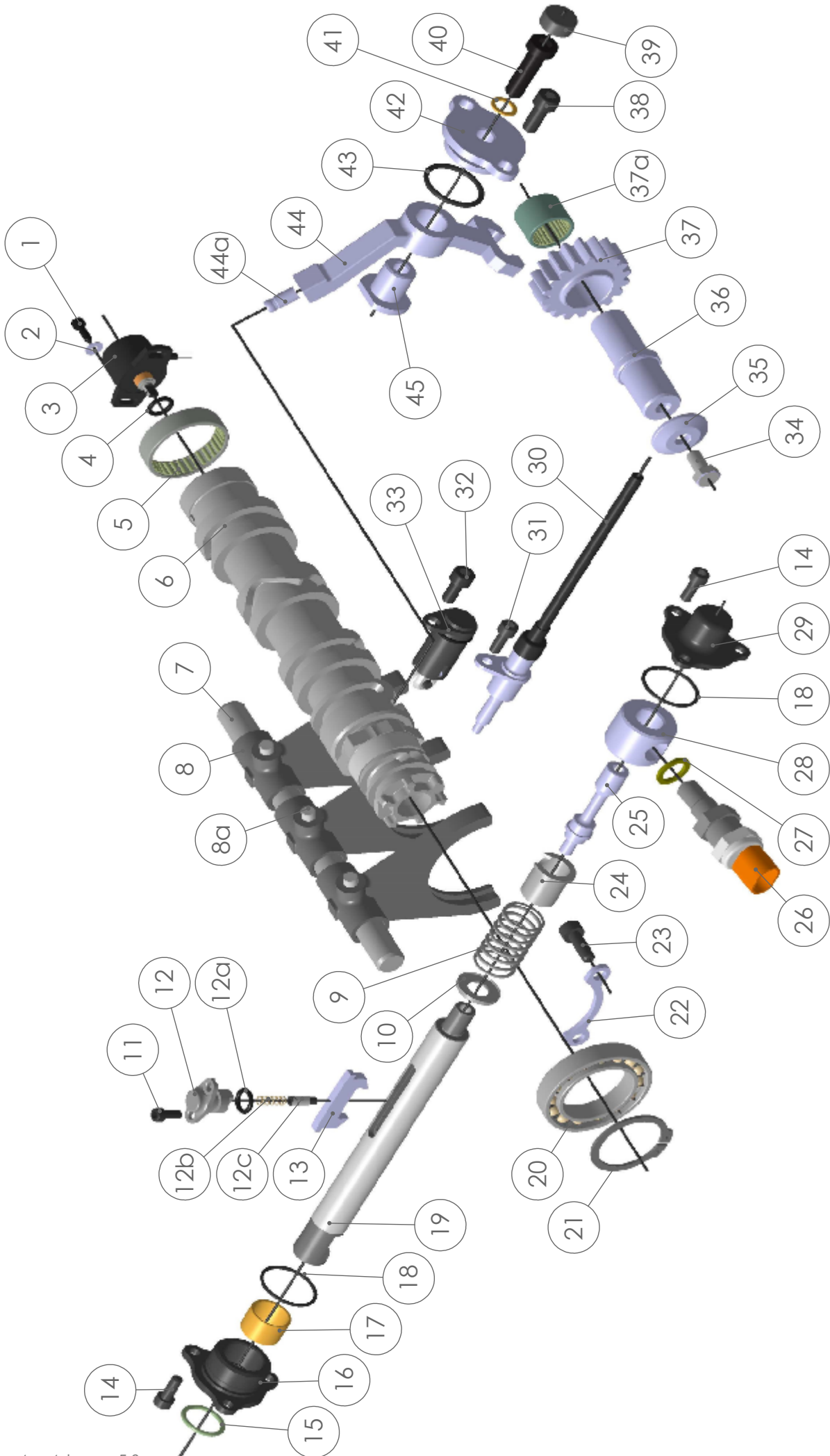


24E - GEARBOX

Item	Part Number	Descrizione	Description	1	2	3
1	0204041	D85x105x12 lip seal	D85x105x12 lip seal	x		
2	CPL10310085011	Complete final drive 10x31	Complete final drive 10x31	x		
2a	F19103201	final drive cleaence shim set	final drive cleaence shim set		x	
2b	0305052	vis H M10x16	vis H M10x16			x
3	0101054	AB 12458 S03 bearing	AB 12458 S03 bearing	x		
4	F9047303	D85 circlip	D85 circlip			x
5	F0085414	differential cap	differential cap	x		
6	F1910310	sun gear	sun gear	x		
7	F0044007	half planet gear axle	half planet gear axle	x		
8	5099062	planet gear	planet gear	x		
9	F0044006	hub	hub	x		
10	F0044008	planet gear axle	planet gear axle	x		
11	F0085411	differential case	differential case	x		
12	0601040	D95 circlip	D95 circlip			x

#2a F1910310

Number and stack of shim is free



24F - GEARBOX

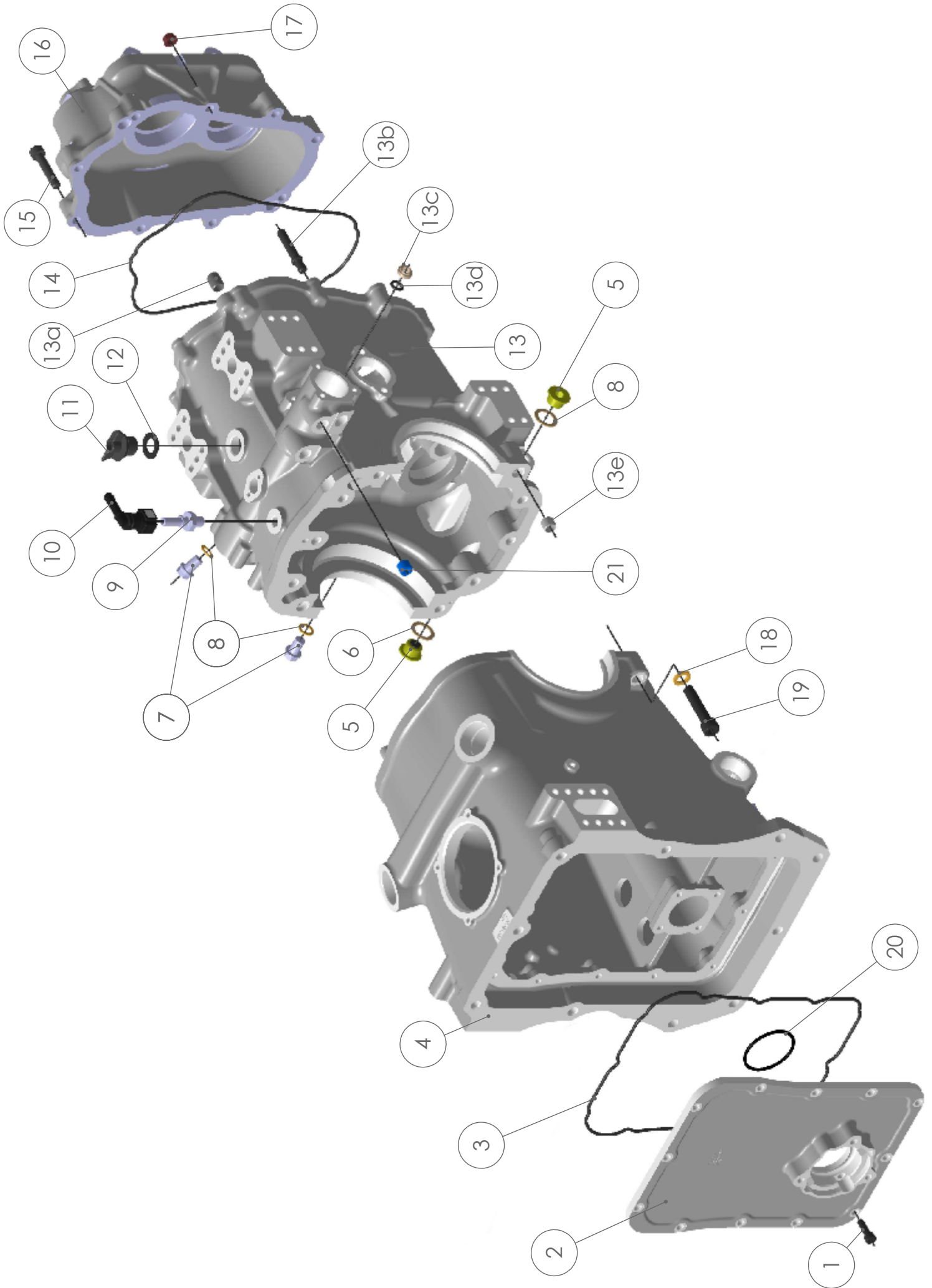
Item	Part Number	Descrizione	Description	1	2	3
1	0301425	M4x12 Chc bolt	M4x12 Chc bolt			x
2	0502023	f4 washer	f4 washer			x
3	F0089047	potentiometer	potentiometer	x		
4	0201017	f10x2.5 o-ring	f10x2.5 o-ring			x
5	0106006	HK 4012 bearing	HK 4012 bearing	x		
6	F00851132	barell	barell	x		
7	F0085103	fork axle	fork axle	x		
8	F00851001	complete fork	complete fork	x		
8a	F0077120	selector pin	selector pin	x		
9	0801053	selector spring	selector spring	x		
10	F9003667	selector washer	selector washer	x		
11	0301394	M5x10 CHc bolt	M5x10 CHc bolt			x
12	F14044031	Complete dual pin rock	Complete dual pin rock	x		
12a	0201017	f10x2.5 o-ring	f10x2.5 o-ring			x
12b	0801026	pusher spring	pusher spring	x		
12c	F0059027	pusher	pusher	x		
13	F0059040	dual pin rock	dual pin rock	x		
14	0301422	M6x16 Chc bolt	M6x16 Chc bolt			x
15	0201004	f20x2.5 o-ring	f20x2.5 o-ring			x
16	F0085120	right selector closing block	right selector closing block	x		
17	1202004	PAP2015 P10 bushing	PAP2015 P10 bushing	x		
18	0201164	f29x2 o-ring	f29x2 o-ring			x
19	F0085119	selector axle	selector axle	x		
20	0101018	61908 bearing	61908 bearing	x		
21	0601010	f40 circlip	f40 circlip			x
22	F0085116	barrel stop	barrel stop	x		
23	0301013	M7x20 CHc bolt	M7x20 CHc bolt			x
24	F0059022	selector bushing	selector bushing	x		
25	F9001039	selector axle bolt	selector axle bolt	x		
26	F0077119K	powershift	powershift	x		
27	F0062011	powershift shim set	powershift shim set		x	
28	F0085122	Selector spacer	Selector spacer	x		
29	F0085121	left selector closing block	left selector closing block	x		
30	F90079901	reverser gear unlocking cable	reverser gear unlocking cable		x	
31	0301377	M6x12 CHc bolt	M6x12 CHc bolt			x
32	0301373	M7x16 CHc bolt	M7x16 CHc bolt			x
33	F90241281	Complete indexor	Complete indexor	x		
0	0701069	goupille f18x2.5dowel pin	goupille f18x2.5dowel pin			x
0	0201020	f16x2 o-ring	f16x2 o-ring			x
0	0801046	indexor spring	indexor spring	x		
34	0305070	M8x16 H bolt	M8x16 H bolt			x
35	F0085127	reverse gear washer	reverse gear washer	x		
36	F0085126	reverse gear axle	reverse gear axle	x		
37	F00850091	Complete reverse gear	Complete reverse gear	x		
37a	0106007	HK 2020 bearing	HK 2020 bearing	x		
38	0301421	M8x20 Chc bolt	M8x20 Chc bolt			x
39	F0085228	bolt hat	bolt hat			x
40	0304006	M10x35 CZHc bolt	M10x35 CZHc bolt			x
41	0599017	f10,2x15x1 cupper washer	f10,2x15x1 cupper washer			x
42	F0085123	rocker guide	rocker guide	x		
43	0201104	f29x3 o-ring	f29x3 o-ring			x
44	F00851011	complete reverse gear rocker	complete reverse gear rocker	x		
44a	F0077108	reverse gear pin	reverse gear pin	x		
45	F0085111	reverse gear nut	reverse gear nut	x		

#27 0301373

May be removed

#30 0201020

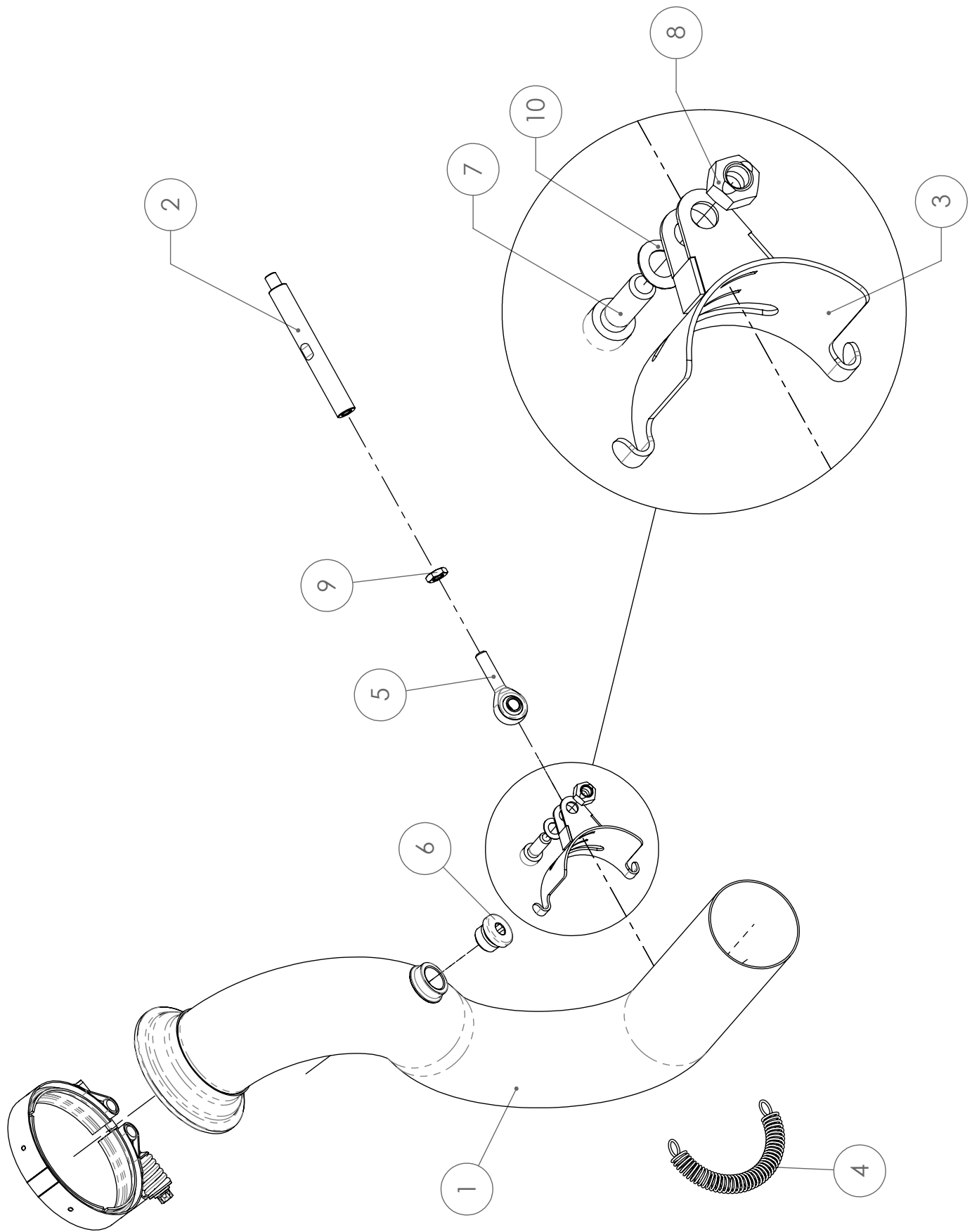
May be removed



24H - GEARBOX

Item	Part Number	Descrizione	Description	1	2	3
1	0301385	M6X20 CHc bolt	M6X20 CHc bolt			x
2	F0085287	oil tank plate	oil tank plate	x		
3	0201305	f255x3 o-ring	f255x3 o-ring			x
4	F0085289	oil tank housing	oil tank housing		x	
5	F1402058	drain plug	drain plug	x		
6	5002018	drain plug seal	drain plug seal			x
7	F2001138	plug	plug	x		
8	0599017	plug seal	plug seal			x
9	F9022106	venting fitting	venting fitting	x		
10	9999683	venting plug	venting plug			x
11	5099087	fitting plug	fitting plug	x		
12	5002026	fitting plug seal	fitting plug seal			x
13	F00852911	main housing	main housing		x	
13a	F0077229	f12x15 pin	f12x15 pin	x		
13b	F0085282	rear casing stud	rear casing stud	x		
13c	F9004314	reverse gear cable stop	reverse gear cable stop			x
13d	0201014	f8x2,5 o-ring	f8x2,5 o-ring			x
13e	F9003102	f12 pin	f12 pin	x		
14	0201300	f208x3 o-ring	f208x3 o-ring			x
15	0301524	M8x40 CHc bolt	M8x40 CHc bolt			x
16	F0085292	rear housing	rear housing		x	
17	0499003	M8x125 simmonds nut	M8x125 simmonds nut			x
18	0599054	f10 nordlock washer	f10 nordlock washer			x
19	0301424	M10x45 CHc bolt	M10x45 CHc bolt			x
0	0301406	M10x35 CHc bolt	M10x35 CHc bolt			x
0	0301052	M10x50 CHc bolt	M10x50 CHc bolt			x
20	0201074	f46x3 o-ring	f46x3 o-ring			x
21	0302074	M12x10 Hc bolt	M12x10 Hc bolt			x

#4 F0085289 Threading could be repaired with a thread repair insert (i.e. Keensert)
 #13 F00852911 Threading could be repaired with a thread repair insert (i.e. Keensert)
 #16 F0085292 Threading could be repaired with a thread repair insert (i.e. Keensert)



25A - EXHAUST SYSTEM

Item	Part Number	Descrizione	Description	1	2	3
1	161425001	Scarico	Exhaust pipe		x	
2	161425002	Distanziale	Stay		x	
3	090925002	Supporto scarico	Exhaust stay		x	
4	020225009	Molla	Spring			x
5	CM8-M8	Testa a snodo	Rod end			x
6	DIN3852-M18X1,5	Tappo esagono incassato	Hexagon socket plug			x
7	UNI5931-M8X25	Vite TC	CH Bolt			x
8	DIN980-M8	Dado autobloccante trilobato	Prevailing torque Nut			x
9	UNI5589-M8	Dado esagonale basso	Thin Hex Nut			x
10	UNI8840B-8	Rondella ondulata	Crinkle Washer			x

#1 161425001

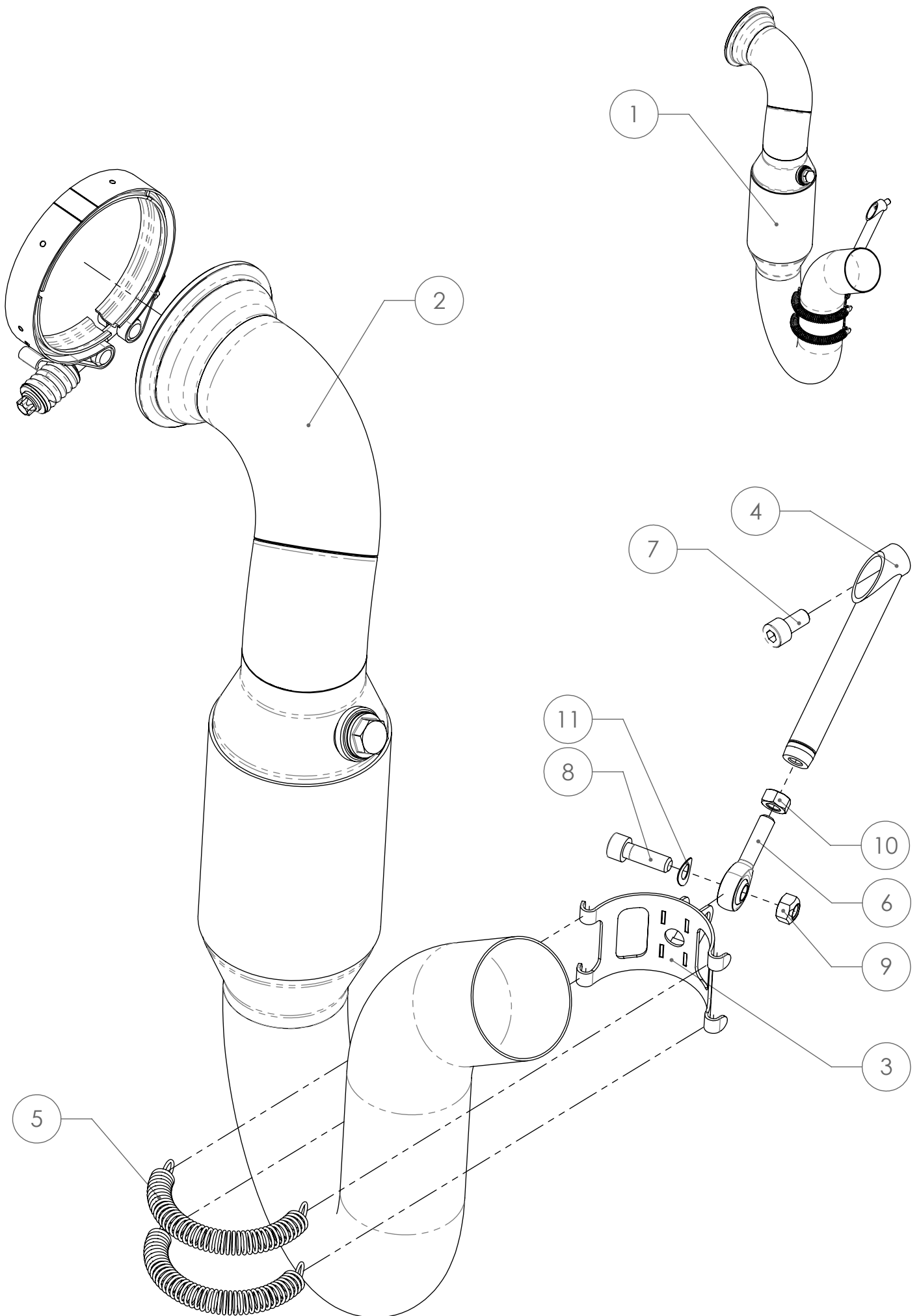
The item may be replaced by 161525001

#2 161425002

The item may be replaced by 161525004

#3 090925002

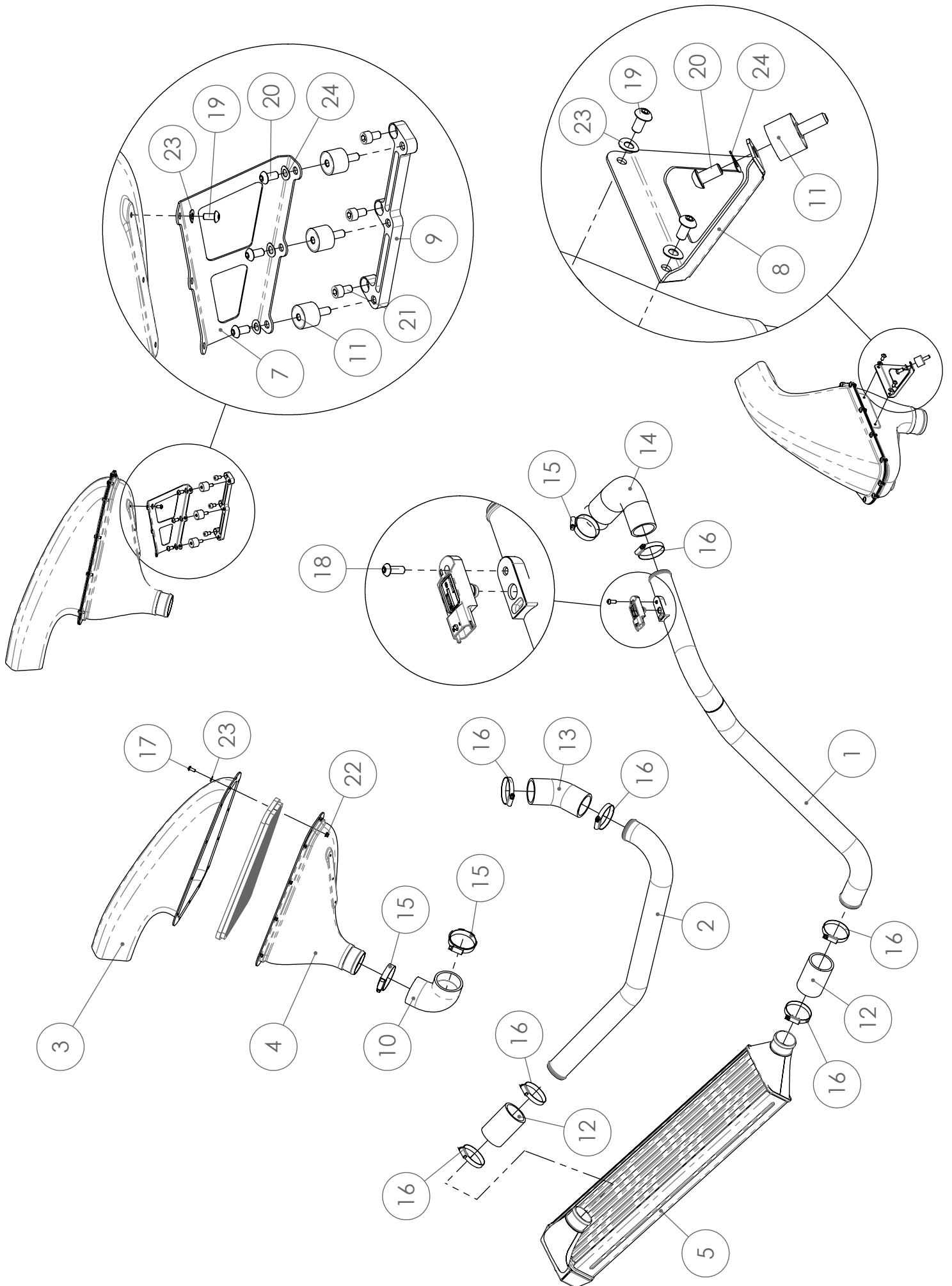
The item may be replaced by 161525003



25B - CATALYTIC EXHAUST

Item	Part Number	Descrizione	Description	1	2	3
2	161525001	Scarico con catalizzatore	Exhaust pipe with catalyzer		x	
3	161525003	Culla scarico	Exhaust bracket		x	
4	161525004	Supporto scarico	Exhaust stay		x	
5	020225009	Molla	Spring			x
6	CM8-M8	Testa a snodo	Rod end			x
7	UNI5931-M8X16	Vite TC	CH bolt			x
8	UNI5931-M8X25	Vite TC	CH Bolt			x
9	DIN980-M8	Dado autobloccante trilobato	Prevailing torque Nut			x
10	UNI5588-M8	Dado esagonale	Hex Nut			x
11	UNI8840B-8	Rondella ondulata	Crinkle Washer			x

#2 161525001 *The item may be replaced by 161425001*
#3 161525003 *The item may be replaced by 090925002*
#2 161525004 *The item may be replaced by 161425002*



26 - AIR INLET

Item	Part Number	Descrizione	Description	1	2	3
1	161426002	Tubo outlet intercooler	Intercooler outlet pipe	x		
2	161426003	Tubo inlet intercooler	Intercooler inlet pipe	x		
3	161426006	Cassoncino superiore	Aircoop			
4	090926001	Air box inferiore	Lower airbox			
5	090926003	Intercooler	Intercooler	x		
7	090926008	Supporto sinistro airbox	Airbox LH bracket			
8	090926009	Supporto destro airbox	Airbox RH bracket			
9	090926010	Base supporto airbox	Airbox mounting base			
10	E9051	Manicotto	Silicon hose			x
11	PUFM620X15MF	Silent block	Silent block			x
12	SCH45	Manicotto	Silicon hose			x
13	E4545	Manicotto	Silicon hose			x
14	RE905145	Manicotto	Silicon hose			x
15	ABA50-65X12	Fascetta	Clamp			x
16	ABA44-56X12	Fascetta	Clamp			x
17	UNI7380-M5X12	Vite TC	CH Bolt			x
18	UNI7380-M6X16	Vite TB	BH Bolt			x
19	UNI7380-M5X10	Vite TB	BH Bolt			x
20	UNI7380-M6X10	Vite TB	BH Bolt			x
21	UNI5931-M6X10	Vite TC	CH Bolt			x
22	AST-05	K-Nut	K-Nut			x
23	UNI8840B-5	Rondella ondulata	Crinckle Washer			x
24	UNI8840B-6	Rondella ondulata	Crinckle Washer			x



2020 SPARE PARTS CATALOGUE

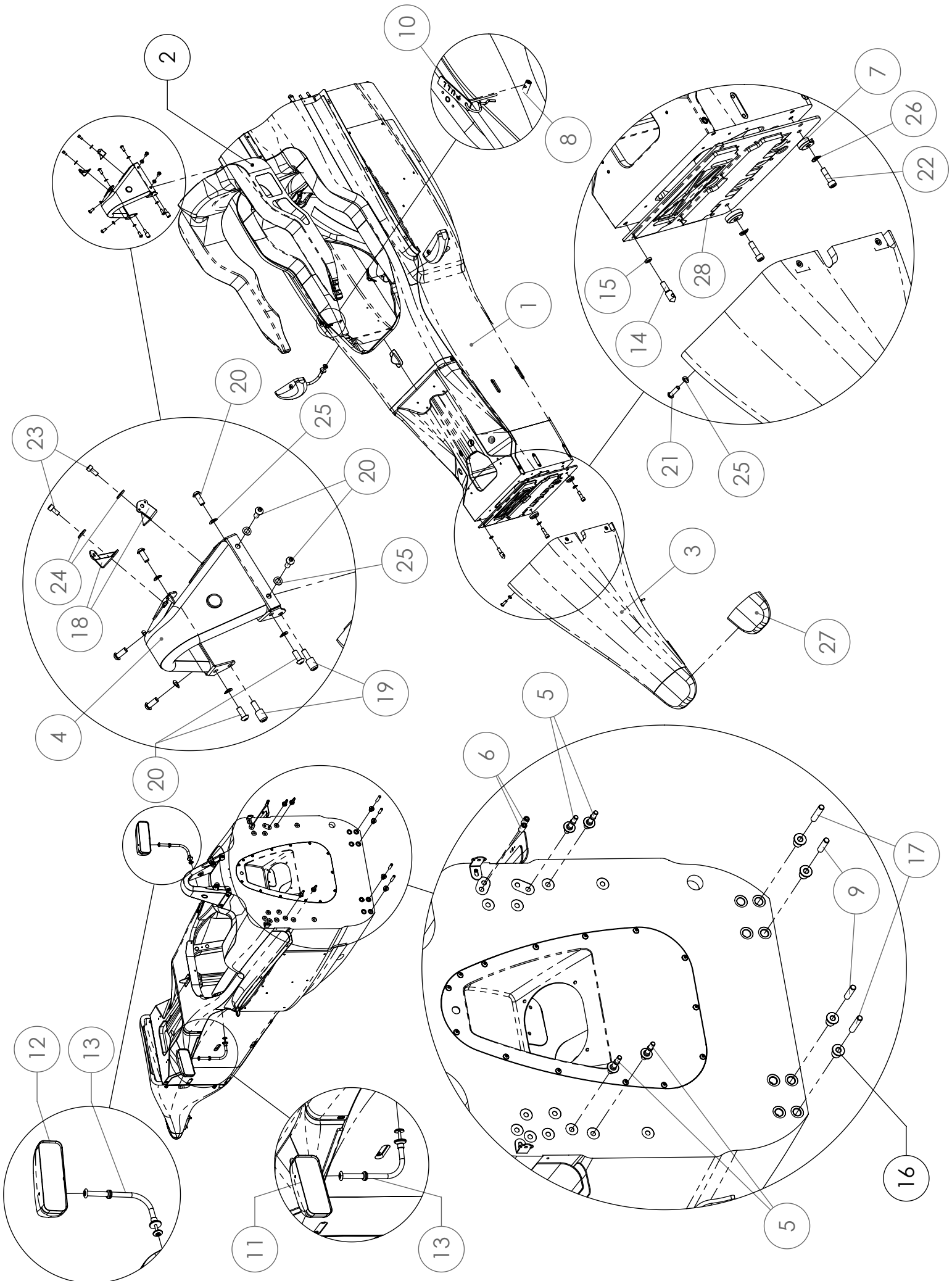
F4 FIA
FORMULA 4

Release 5.8 - 09/03/2020

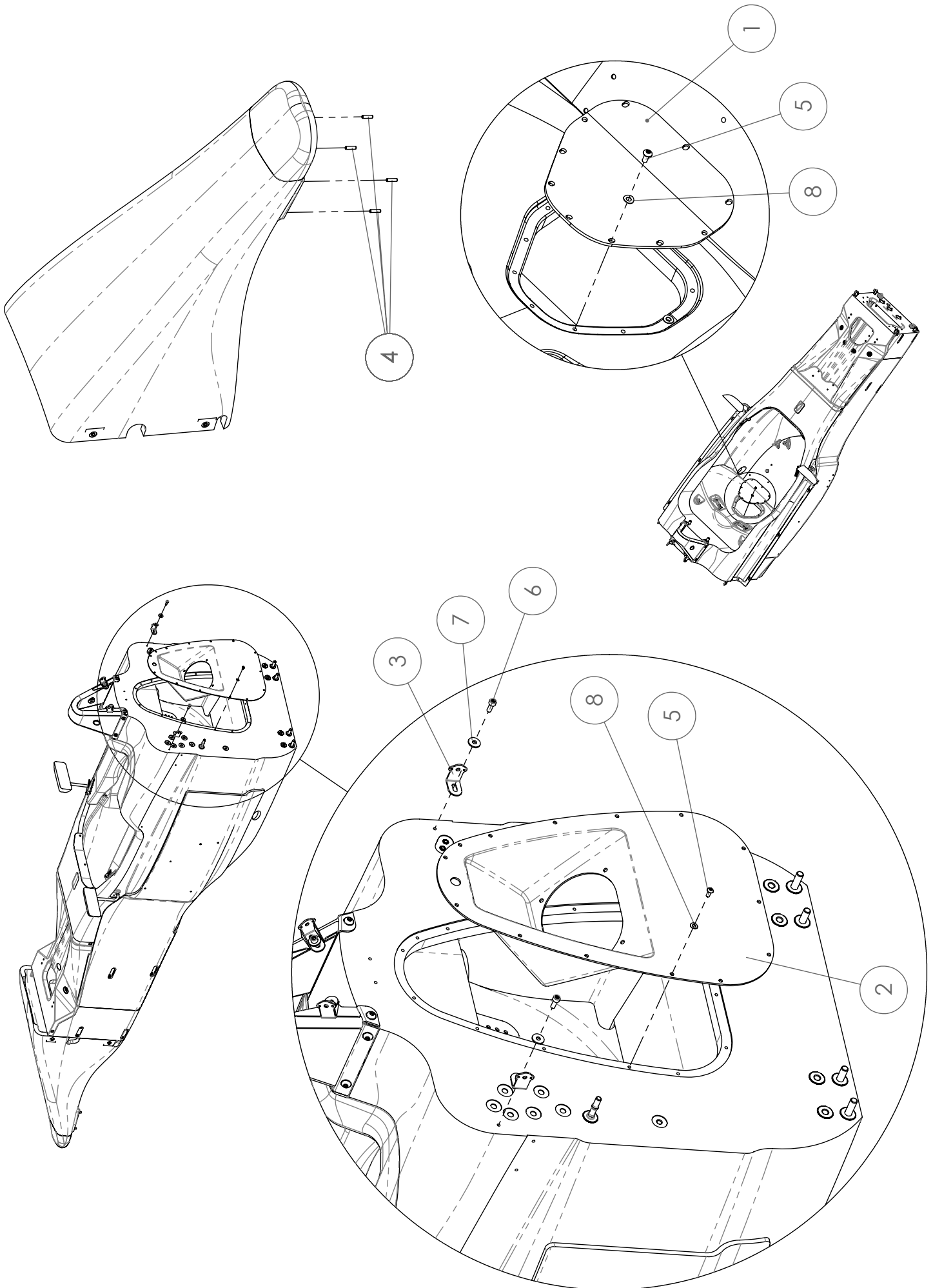
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Release history

Version	Date	Changes	Rev.
v. 4.6.1	02/04/2015	<ul style="list-style-type: none"> • New pages: • Modified pages: COD.09-A, COD.09-B • Removed pages: 	Bulgarelli F.
v. 4.7	23/04/2015	<ul style="list-style-type: none"> • New pages: COD.22-C • Modified pages: COD.01-C, COD.02-A, COD.02-B, COD.06-A, COD.09-A, COD.-09-B, COD.09-C, COD.10-A, COD.13-A, COD.15, COD.18-B, COD.18-D, COD.19, COD.20, COD.21-A, COD.21-C, COD.22-A, COD.24-A, Accessories • Removed pages: 	Bulgarelli F.
v. 4.8	15/07/2015	<ul style="list-style-type: none"> • New pages: • Modified pages: COD.01-A, COD.02-B, COD.04-B, COD.07-A, COD.07-B, COD.09-A, COD.-09-B, COD.10-A, COD.11-A, COD.11-B, COD.15, COD.17, COD.18-C, COD.18-D, COD.19-A, COD.21-A, COD.22-A, COD.24-A, COD.24-F, COD.25-B • Removed pages: 	Bulgarelli F.
v. 4.9	10/09/2015	<ul style="list-style-type: none"> • New pages: COD.18-F • Modified pages: COD.24-E • Removed pages: 	
v. 5.0	23/10/2015	<ul style="list-style-type: none"> • New pages: • Modified pages: COD.02-A, COD.04-A, COD.05-B, COD.07-A, COD.10-A, COD.10-B, COD.10-C, COD.11-A, COD.13-A • Removed pages: 	Bulgarelli F.
V. 5.1	26/02/2016	<ul style="list-style-type: none"> • Modified pages: COD.02-A, COD.06-A, COD.09-D, COD.10-A, COD.13-A 	
v. 5.2	23/02/2017	<ul style="list-style-type: none"> • Modified pages: COD.01-A, COD.02-B, COD.04-A, COD.05-A, COD.09-A, COD.10-A, COD.13-A, COD.17, COD.19-A, COD.20, COD.22-B 	
v. 5.3	01/04/2017	<ul style="list-style-type: none"> • Modified pages: COD.18-F 	
v. 5.4	15/06/2017	<ul style="list-style-type: none"> • Modified pages: COD.04-B 	
v.5.5	23/03/2018	<ul style="list-style-type: none"> • Modified pages: COD.01-A, COD.03, COD.04-B, COD.06-A, COD.09-A, COD.15, COD.16-A, COD.18, COD.22_A, COD.22_B, COD.26 	Bulgarelli F. Vitale F.
v.5.5.1	23/03/2018	<ul style="list-style-type: none"> • Modified pages: COD.04-B 	Bulgarelli F. Vitale F.
v.5.6	14/02/2019	<ul style="list-style-type: none"> • Modified pages: COD.01-C, COD.15, COD.16-A 	Bulgarelli F. Vitale F.
v.5.7	16/01/2020	<ul style="list-style-type: none"> • Modified pages: COD.01-A, COD.05-A, COD.10-A, COD.13-A, COD.18, COD.18-F, COD.19-A, COD.24-E, COD.24-F, 	U.T.

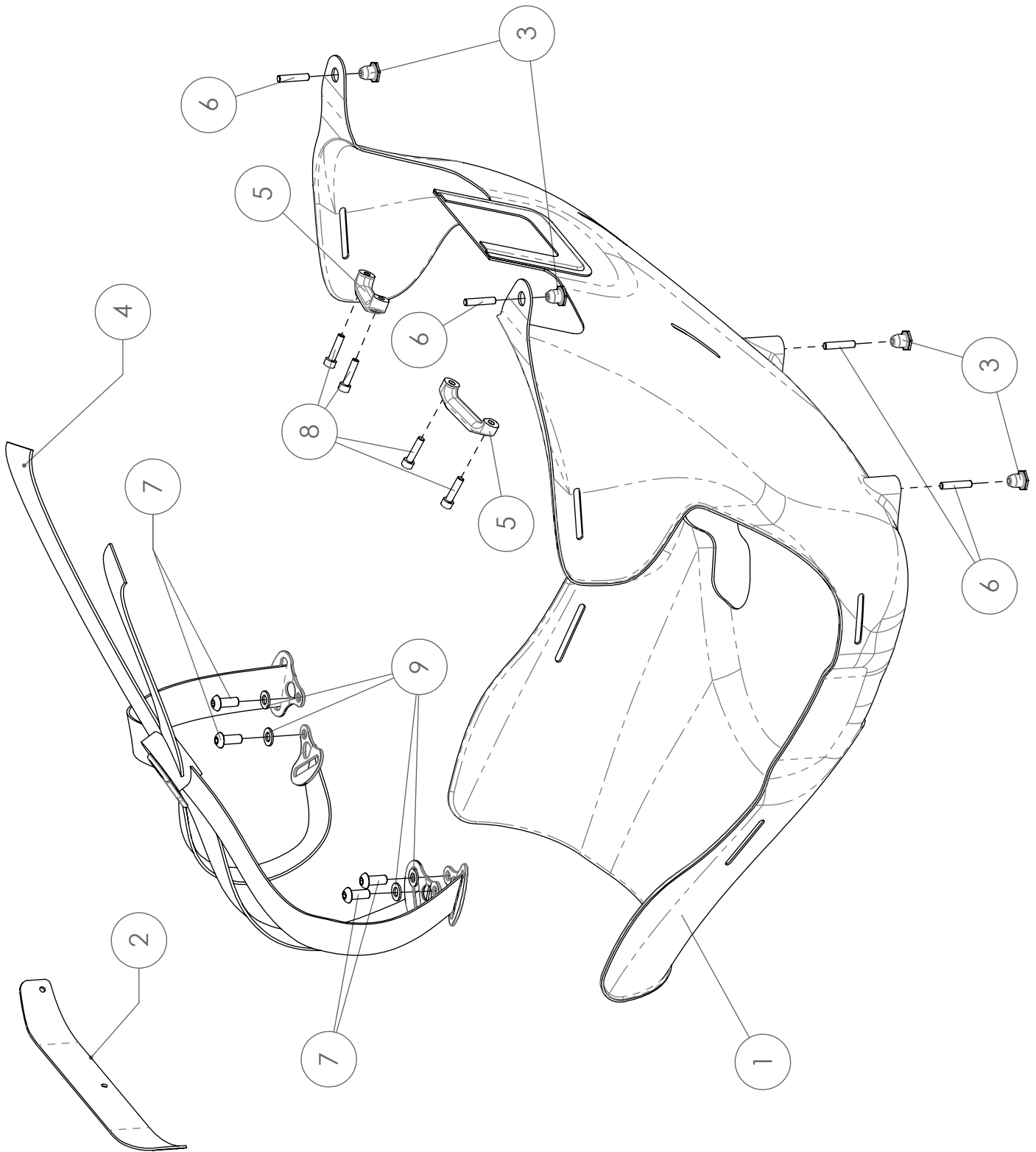


Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161401001	Telaio	Monocoque	€ 15'071.46	1
2	161701002	Poggiatesta	Headrest	€ 1'337.95	1
3	161401003	Musetto	Nosebox	€ 1'611.21	1
4	161401004	Rollbar	Rollhoop	€ 831.59	1
5	161401005	Prigioniero	Stud	€ 31.15	4
6	161401014	Boccola	Bush	€ 8.75	2
7	161507014	Anello cavo ritenzione	Tether fitting	€ 28.73	2
8	090901017	Pin	Pin	€ 11.24	2
9	090922011	Prigioniero	Stud	€ 8.28	2
10	091001024	Linguetta	Leader	€ 35.49	2
11	TM01009	Assieme Gambo completo	Mirror Stem Assy	€ 35.53	2
12	TM01003	Calotta Completa Sx (con Specchio)	Lh Mirror Head (w/ Mirror)	€ 155.30	1
	TM01006	Specchio (ricambio)	Mirror (spare)	€ 24.50	0
13	TM01004	Calotta Completa Dx (con Specchio)	Rh Mirror Head (w/ Mirror)	€ 155.30	1
	TM01006	Specchio (ricambio)	Mirror (spare)	€ 24.50	0
14	161801030	Spina	Dowel pin	€ 35.85	4
15	030201016	Ghiera	Nose connection ring nut	€ 13.01	4
16	010022016	Boccola attacco motore	Chassis bush	€ 40.09	4
17	010022013	Prigioniero	Stud	€ 3.51	2
18	010301024	Squadretta rollbar	Rollbar mounting	€ 33.38	2
19	010101060	Pin posteriore poggiatesta	Headrest pin	€ 34.58	2
20	UNI7380-M8X20	Vite TB	BH bolt	€ 2.05	8
21	UNI7380-M8X30	Vite TB	BH Bolt	€ 2.05	4
22	UNI5931-M10x35	ViteTC M10x1,25x35 cl.12,9	CH Bolt M10x1,25x35 grade 12,9	€ 2.55	2
23	UNI5931-M6X14	Vite TC	CH Bolt	€ 1.74	2
24	UNI6593-6	Rondella	Washer	€ 1.16	2
25	UNI8840B-8	Rondella ondulata	Crinckle Washer	€ 1.16	12
26	UNI8840B-10	Rondella ondulata	Crinckle Washer	€ 1.16	2
27	161401003002	Puntalino muso	Front nose	€ 388.72	1
28	161801029	Pannello anti-intrusione	Anti-intrusion panel	€ 452.85	1



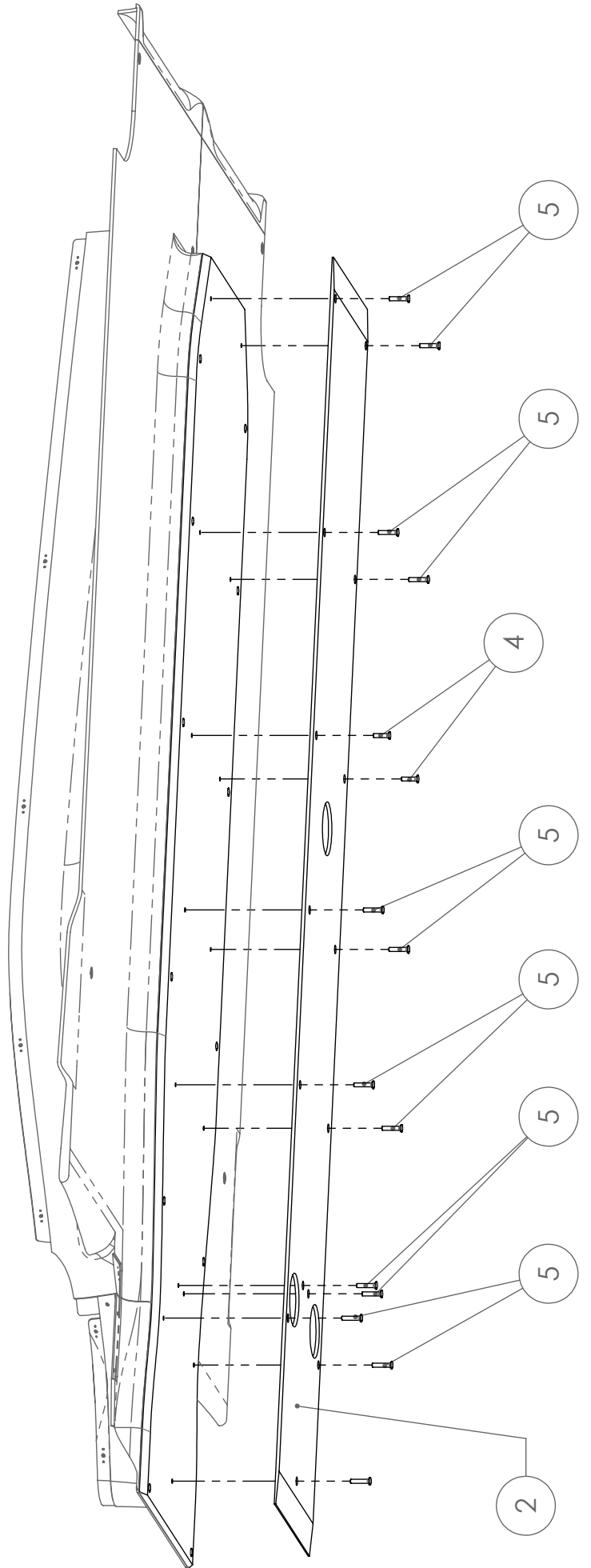
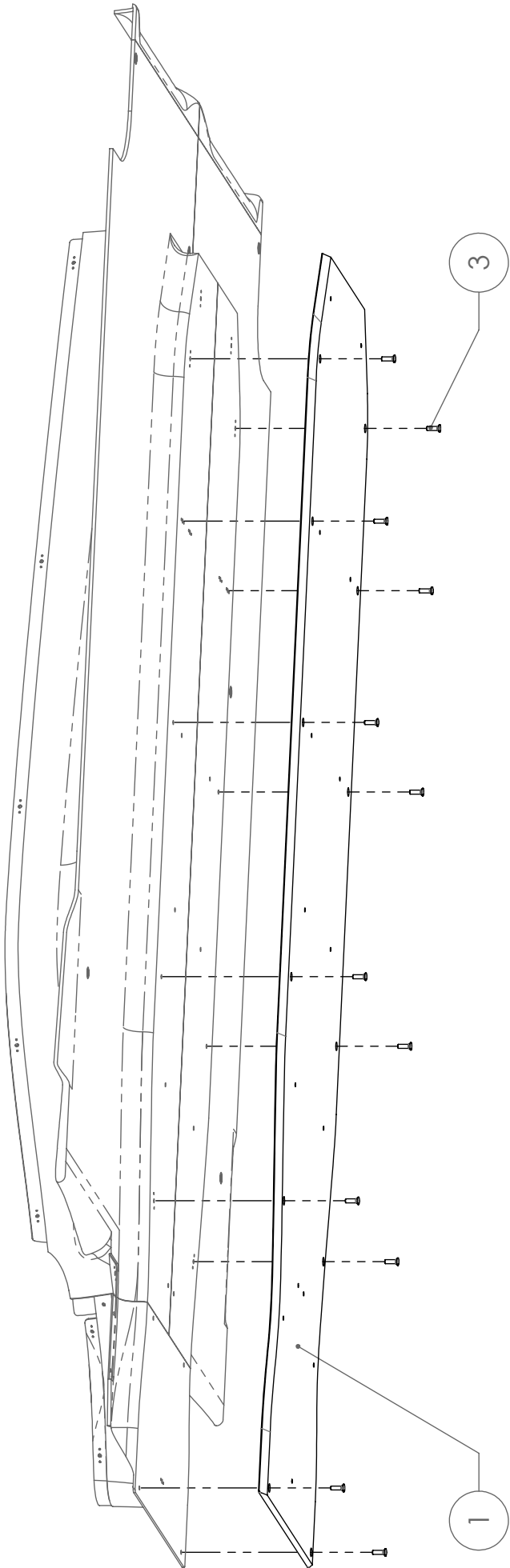
01B - CHASSIS

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161401013	Finestra serbatoio	Bulkhead panel	€ 32.77	1
2	161401004007	Chiusura posteriore serbatoio	Fuel tank hatch cover	€ 325.94	0
3	010301025	Staffa carrozzeria	Sidepods mounting	€ 34.83	2
4	010011020	Prigioniero	Stud	€ 5.38	4
5	UNI7380-M5X12	Vite TB	BH Bolt	€ 1.74	24
6	UNI5931-M6X16	Vite TC	CH Bolt	€ 2.55	2
7	UNI6593-6	Rondella	Washer	€ 1.16	2
8	UNI8840B-5	Rondella ondulata	Crinckle Washer	€ 1.16	24



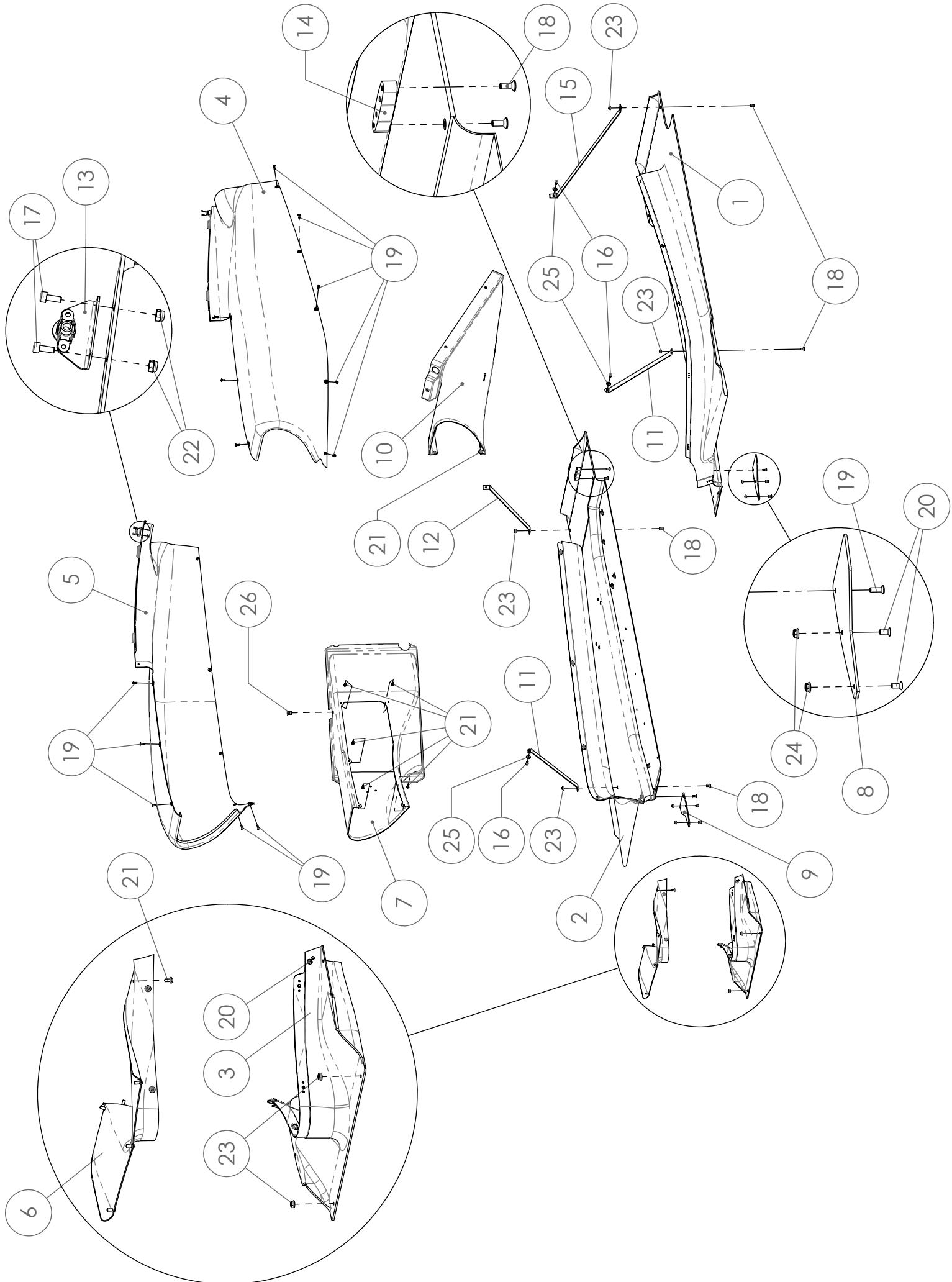
01C - COCKPIT

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161401006	Sedile estraibile	Extractable seat	€ 1'299.56	1
2	161401011	Parabrezza	Wind screen	€ 32.77	0
3	090901012	Centraggio	Pin	€ 35.15	4
4	161801023	Cinture di sicurezza FIA 8853-2016	Safety belts FIA 8853-2016	€ 295.03	1
5	030201010	Attacco cinture superiori	Shoulder belt mount	€ 95.26	2
6	080602013	Prigioniero	Stud	€ 5.41	4
7	UNI7380-M8X20	Vite TB	BH Bolt	€ 2.05	4
8	UNI5931-M6X25	Vite TC	CH Bolt	€ 1.74	4
9	UNI6592-8	Rondella	Washer	€ 1.16	4

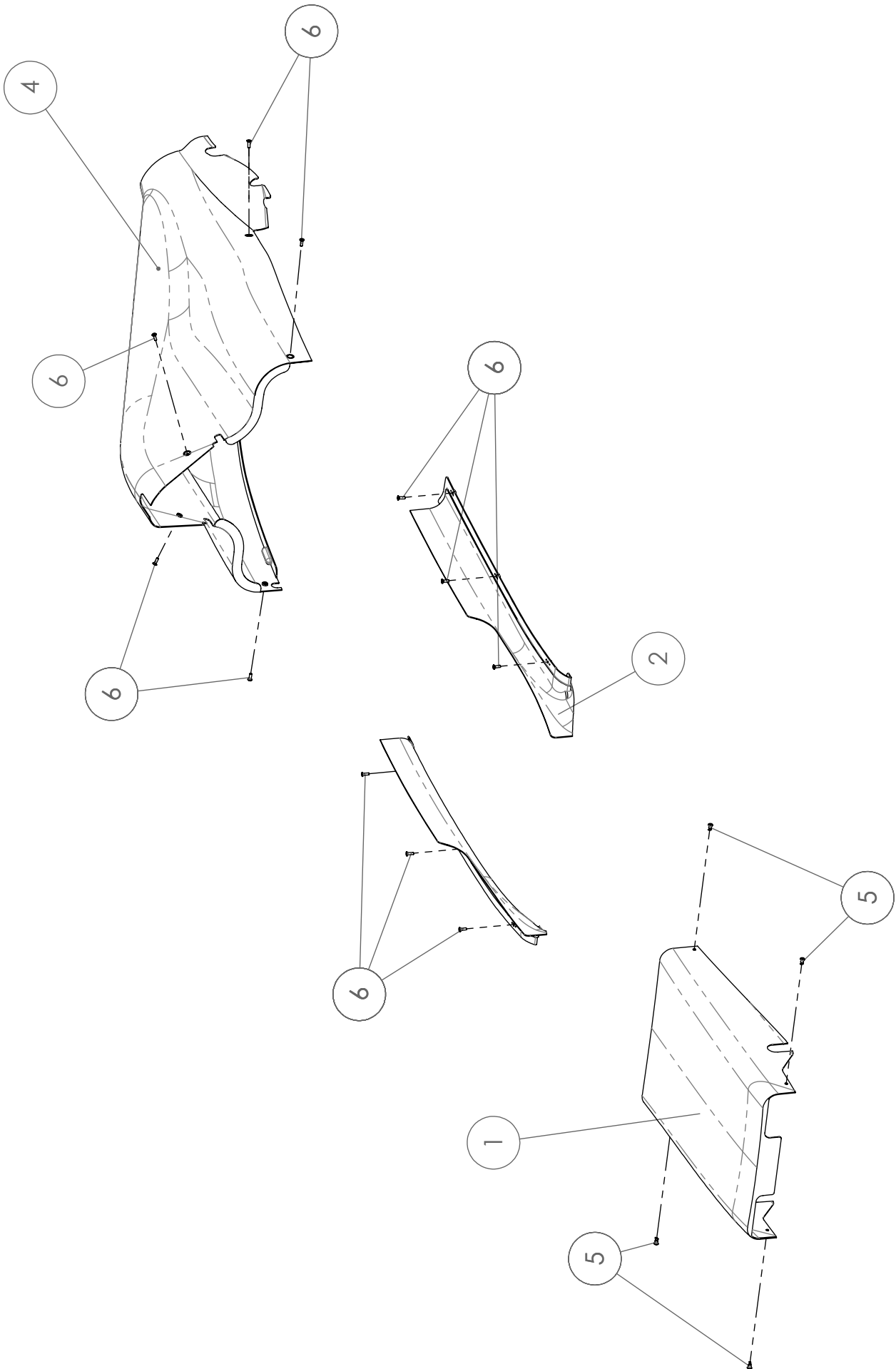


02A - WOODEN SKID

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161402015	Fondo in legno	Wooden plank	€ 142.99	1
2	161402016	Slitta in legno	Skid block	€ 196.54	1
3	UNI5933-TX-M6X20	Vite TS Torx	CSH Torx Bolt	€ 1.74	12
4	UNI5933-TX-M6X25	Vite TS Torx	CSH Torx Bolt	€ 1.74	2
5	UNI5933-TX-M6X30	Vite TS Torx	CSH Torx Bolt	€ 1.74	13

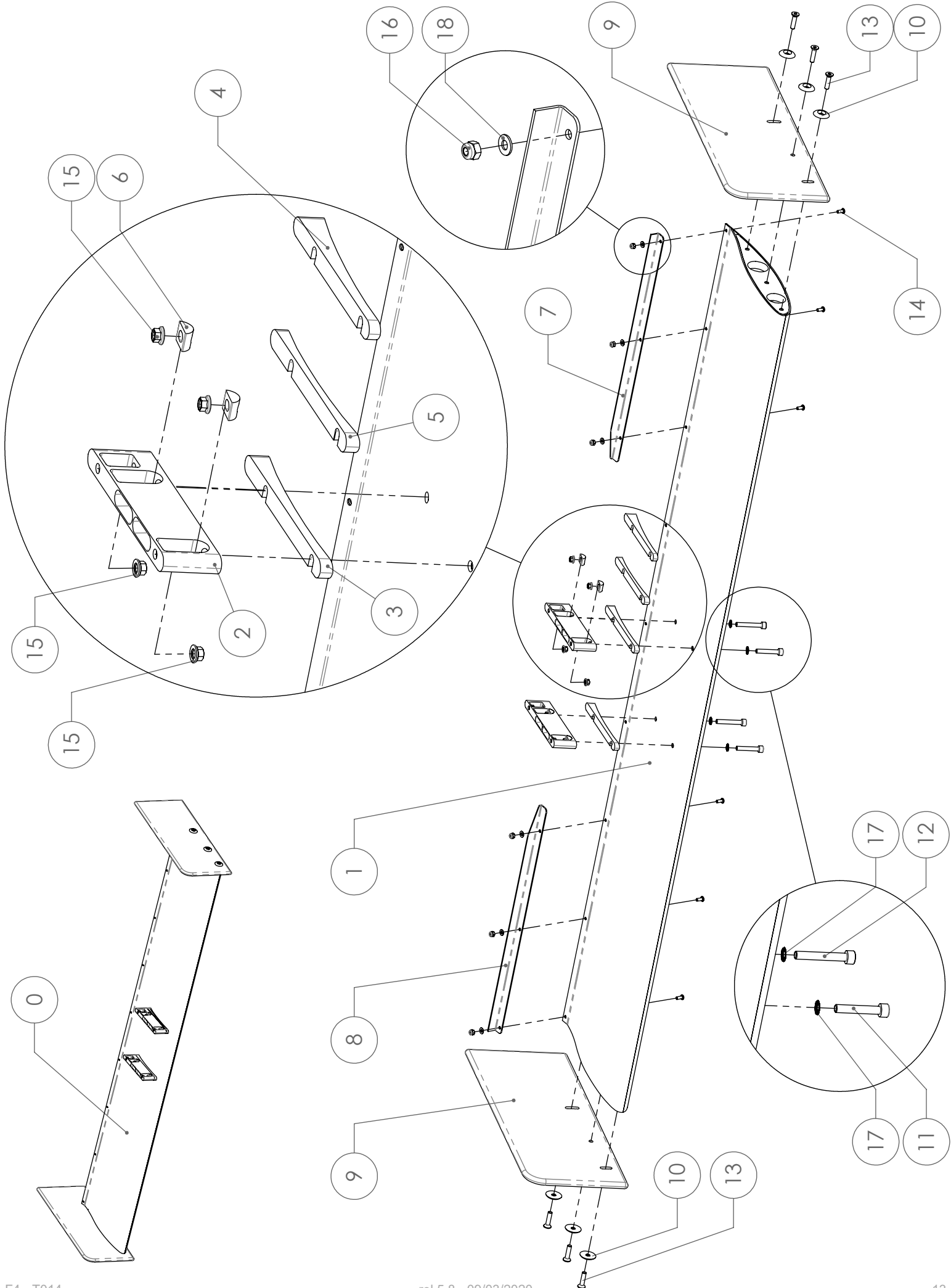


Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161402001	Semi-fondo SX	Lh Underfloor	€ 1'299.34	1
2	161402002	Semi-fondo DX	RH underfloor	€ 1'299.34	1
3	161402004	Semi-prua inferiore	Bottom Bib	€ 447.67	1
4	161402007	Pancia sinistra	Lh sidepod	€ 742.49	1
5	161402008	Pancia destra	Rh sidepod	€ 742.49	1
6	161402009	Semi-prua superiore	Top bib	€ 272.98	1
7	161402012	Convogliatore DX	Rh radiator duct	€ 529.57	1
8	161402013	Shadow sx telaio	LH chassis shadow	€ 28.95	1
9	161402014	Shadow telaio dx	Rh chassis shadow	€ 28.95	1
10	161402017	Convogliatore SX	Lh radiator duct	€ 496.81	1
11	161402019	Tirante	Floor stay	€ 24.69	2
12	161402020	Tirante	Floor stay	€ 24.69	1
13	090902022	Staffa carrozzeria	Bodywork bracket	€ 19.00	2
14	161402026	Staffa	Underfloor stay	€ 68.27	1
15	161402029	Tirante cambio fondo Sx	Gearbox floor stay	€ 24.69	1
16	UNI5931-M6X12	Vite TC	CH bolt	€ 1.74	3
17	UNI5931-M3X8	Vite TC	CH Bolt	€ 1.44	4
18	UNI5933-TX-M6X16	Vite TS Torx	CSH Torx Bolt	€ 1.74	6
19	UNI5933-TX-M5X16	Vite TS torx	CSH Torx Bolt	€ 1.74	18
20	UNI5933-TX-M5X12	Vite TS Torx	CSH Torx Bolt	€ 1.74	6
21	UNI7380-TX-M5X12	Vite TB Torx	BH Torx Bolt	€ 1.74	18
22	UNI7473-M3	Dado autobloccante	Prevailing torque Nut	€ 1.44	4
23	DIN6927-M6	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	6
24	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	4
25	UNI6593-6	Rondella larga	Large washer	€ 1.16	3
26	E127-0615	Boccola Antivibrante M6	Bush M6	€ 7.56	1
	OLV-M5	Olivetta flottante M5	Anchor nut M5		0



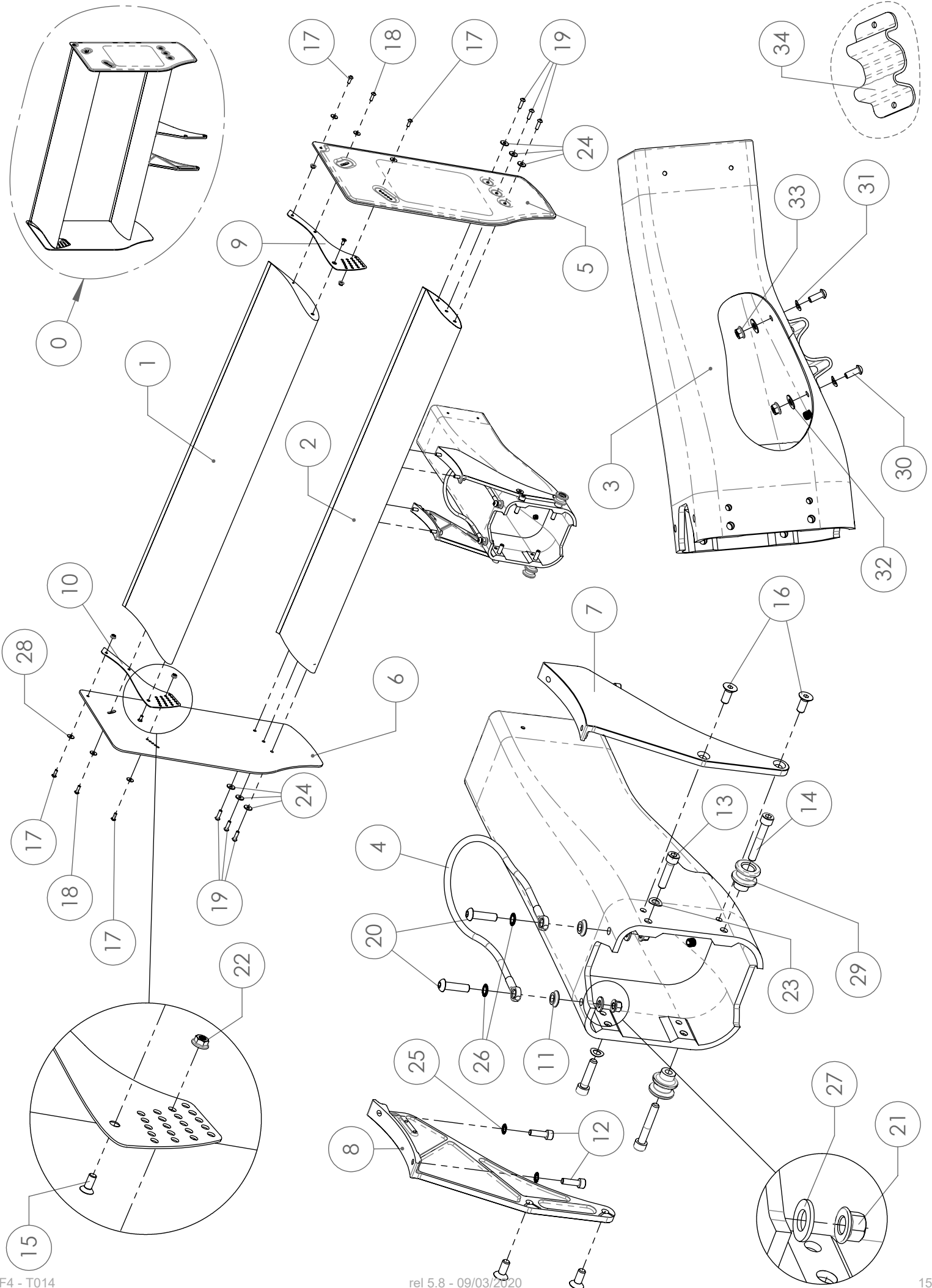
03 - BODYWORK

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161802003	Cofanetto anteriore	Front cover	€ 464.61	1
2	161402005	Labbro pancia SX	Lh sidepod lip	€ 251.70	0
3	161402006	Labbro pancia dx	Rh sidepod lip	€ 251.70	0
4	161402010	Cofano motore	Engine cover	€ 1'397.60	1
5	27S32F	Perno ¼ di giro	Quarter turn stud	€ 11.10	4
6	UNI5933-TX-M5X16	Vite TS torx	CSH Torx Bolt	€ 1.74	6



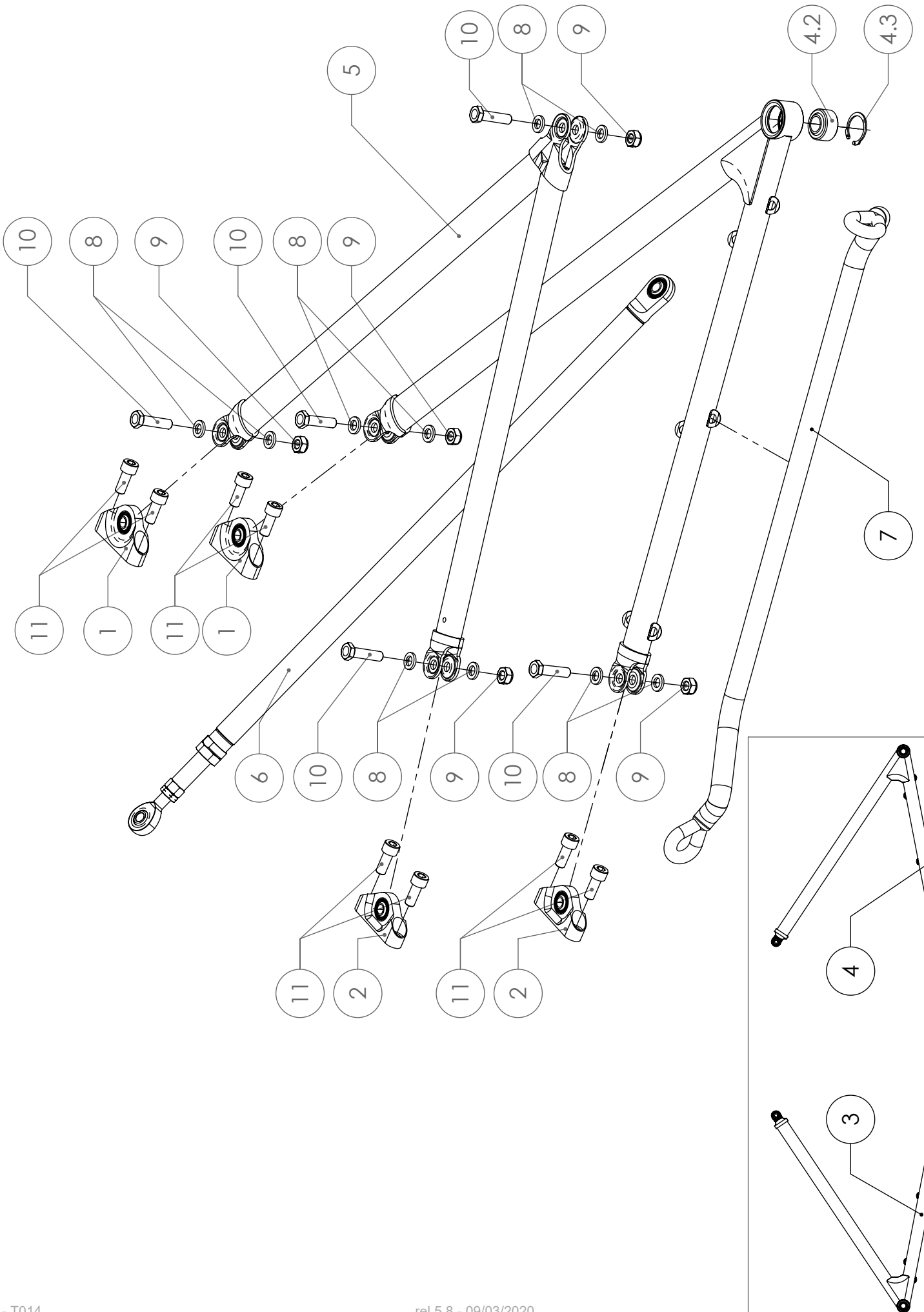
04A - FRONT WING

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161404001	Ala anteriore completa	Front wing assy	€ 1'038.77	0
1	161504003	Ala anteriore CF	Front wing CF	€ 608.88	1
2	161404011	Pilone ala	Wing pillar	€ 102.73	2
3	161404015	Regolazione ala anteriore (5°)	Front wing adjuster (5°)	€ 39.33	2
4	161404035	Regolazione ala anteriore (3°)	Front wing adjuster (3°)	€ 39.33	0
5	161404032	Regolazione ala anteriore (7°)	Front wing adjuster (7°)	€ 39.33	0
6	161404017	Boccola	Adjustment bush	€ 13.67	4
7	161404023	Nolder Sx	Lh Gurney	€ 10.93	0
8	161404024	Nolder Dx	Rh Gurney	€ 10.93	0
9	161404025	Bandella anteriore	Front endplate	€ 45.61	2
10	080602008	Rondella speciale	Button washer	€ 4.64	6
11	UNI5931-M6X35	Vite TC	CH bolt	€ 1.74	2
12	UNI5931-M6X40	Vite TC	CH bolt	€ 1.74	2
13	UNI5933-M6X25	Vite TS	CSH Bolt	€ 1.74	6
14	UNI7380-M4X10	Vite TB	Bolt	€ 1.44	0
15	AST-06	K-Nut	K-Nut	€ 5.26	8
16	UNI7474-M4	Dado autobloccante basso	Thin prevailing torque nut	€ 1.44	0
17	RZS6	Rondella zigrinata	Safety washer	€ 1.16	4
18	UNI6592-4	Rondella	Washer	€ 1.16	0



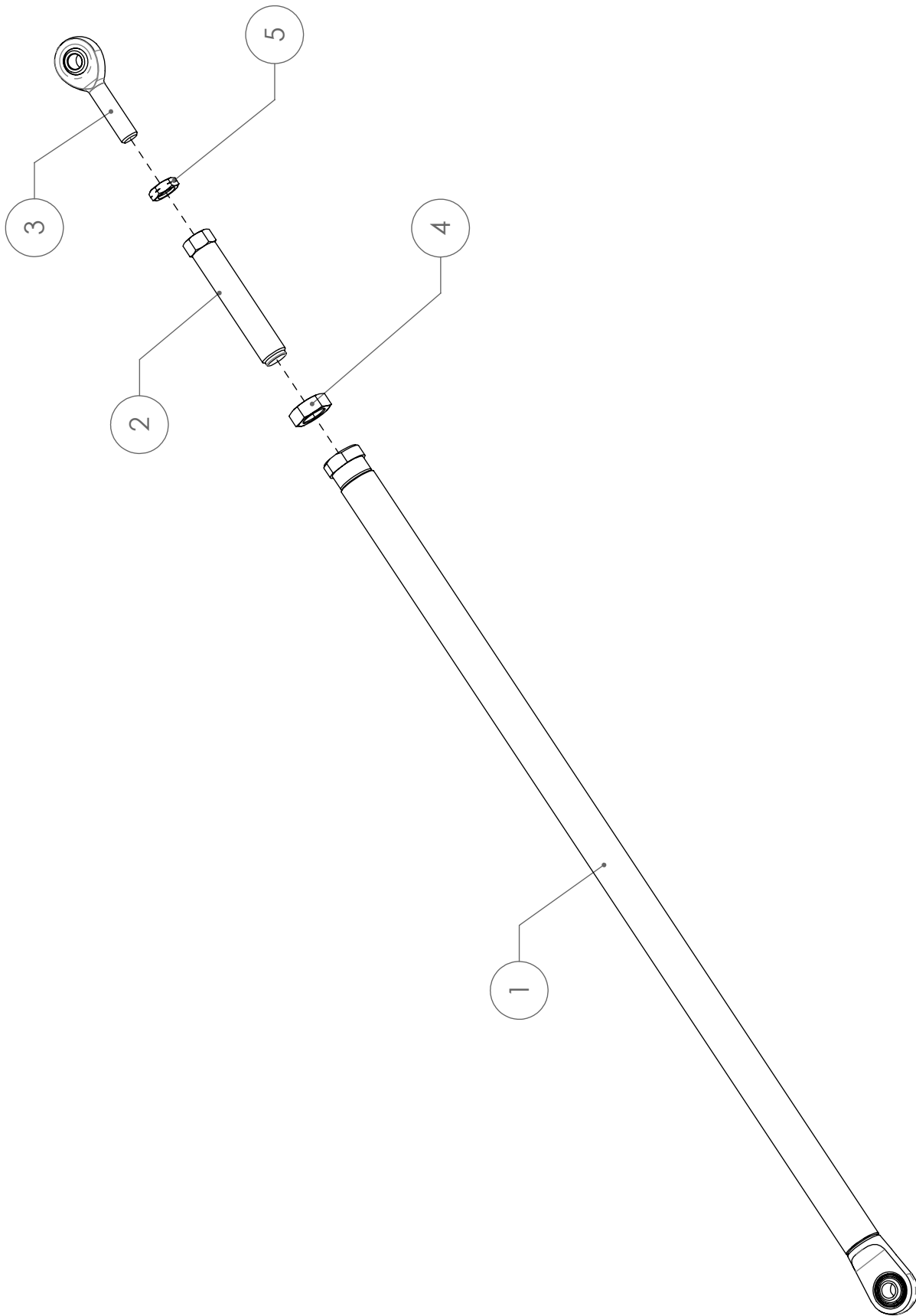
04B - REAR WING

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161404002	Ala posteriore completa	Rear wing assy	€ 987.52	0
1	161404004	Ala superiore	Top main wing	€ 257.30	2
2	161404005	Ala inferiore	Beam wing	€ 324.20	1
3	161804006	Crashbox posteriore	Rear impact structure	€ 1'698.17	1
4	161404008	Cavo di traino completo	Tow cable	€ 13.77	1
5	161404009	Bandella post. Sx	Lh rear enplate	€ 104.98	1
6	161404010	Bandella post. dx	Rh rear enplate	€ 104.98	1
7	161404019	Palo ala post Sx	Lh rear wing mounting	€ 83.37	1
8	161404020	Palo ala post. Dx	Rh rear wing mounting	€ 83.37	1
9	161404021	Bandella regolazione Sx	Lh adjustment enplate	€ 14.68	2
10	161404022	Bandella regolazione Dx	Rh adjustment enplate	€ 14.68	1
11	010013007	Boccola	Bush	€ 15.28	2
12	UNI5931-M6X20	Vite TC	CH bolt	€ 1.74	4
13	UNI5931-M8x35	Vite TC M8x35 cl.12,9	CH Bolt M8x35 grade 12,9	€ 2.05	2
14	UNI5931-M8x50	Vite TC M8x50 cl.12,9	CH Bolt M8x50 grade 12,9	€ 2.05	2
15	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1.74	2
16	UNI5933-M8X20	Vite TS	CSH Bolt	€ 2.05	4
17	UNI7380-M5X14	Vite TB	BH Bolt	€ 1.74	4
18	UNI7380-M5X16	Vite TB	BH Bolt	€ 1.74	2
19	UNI7380-M6X20	Vite TB	BH Bolt	€ 1.74	6
20	UNI7380-M8X30	Vite TB	BH bolt	€ 2.05	2
21	DIN6927-M8	Dado flangiato esagono ridotto	Prevailing torque nut	€ 2.48	2
22	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	4
23	UNI8840B-8	Rondella Ondulata	Crinkle washer	€ 1.16	2
24	UNI6593-6	Rondella larga	Large washer	€ 1.16	6
25	RZS6	Rondella zigrinata	Safety washer	€ 1.16	4
26	RZS8	Rondella zigrinata	Safety Washer	€ 1.16	2
27	UNI6592-8	Rondella	Washer	€ 1.16	2
28	UNI6593-5	Rondella larga	Large washer	€ 1.16	6
29	161704043	Boccola sollevamento	Pick up bush	€ 24.97	2
30	UNI7380-M6x16	Vite TB	BH Bolt	€ 1.74	2
31	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1.16	2
32	RS065160010	Rondella speciale 6,5x16x1	Special Washer 6,5x16x1	€ 1.99	2
33	DIN6927-M6	Dado flangiato autobloccante	Prevailing torque nut	€ 1.98	2
34	161804007	Gancio sollevamento	Lift Hook	€ 93.57	0



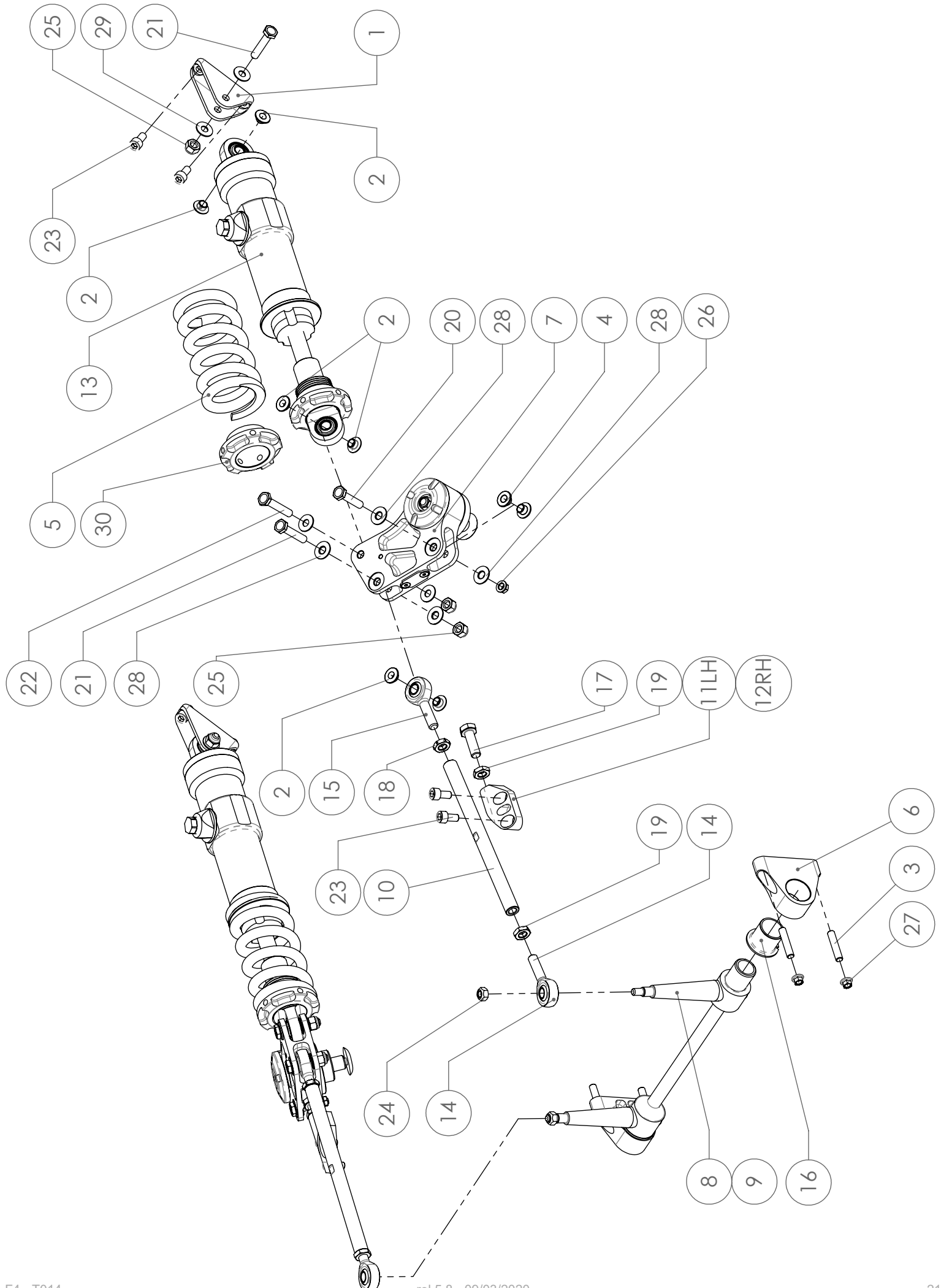
05A - FRONT WISHBONE

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	010010028	Attacco sospensione completo	Wishbone bracket assy	€ 223.41	4
2	020210006	Attacco sospensione completo	Wishbone bracket assy	€ 211.01	4
3	161405002	Braccio anteriore inferiore dx completo	Rh front lower wishbone assy	€ 376.49	1
4	161405003	Braccio anteriore inferiore sx completo	Lh front lower whisbone assy	€ 376.49	1
4.2	UNIBALL-ABWT8	Snodo sferico	Spherical bearing	€ 31.00	0
4.3	J25X1,2V	Circlip	Circlip	€ 1.37	0
5	161405006	Braccio anteriore superiore	Front top wishbone	€ 292.38	2
6	161405007	Push rod anteriore completo	Front push rod assy	€ 206.53	0
7	161705010	Cavo di ritenzione 6kJ	Wheel tether 6kJ	€ 307.73	2
8	090910011	Rondella speciale 5/16" Sp.2	Special Flat Washer 5/16" Th.2	€ 3.52	20
9	AN365-5/16X24	Dado autobloccante	Self-locking Nut	€ 1.98	10
10	AN5-11A	Vite NAS	NAS bolt	€ 4.94	10
11	UNI5931-M8X20	Vite TC	CH Bolt	€ 2.05	16



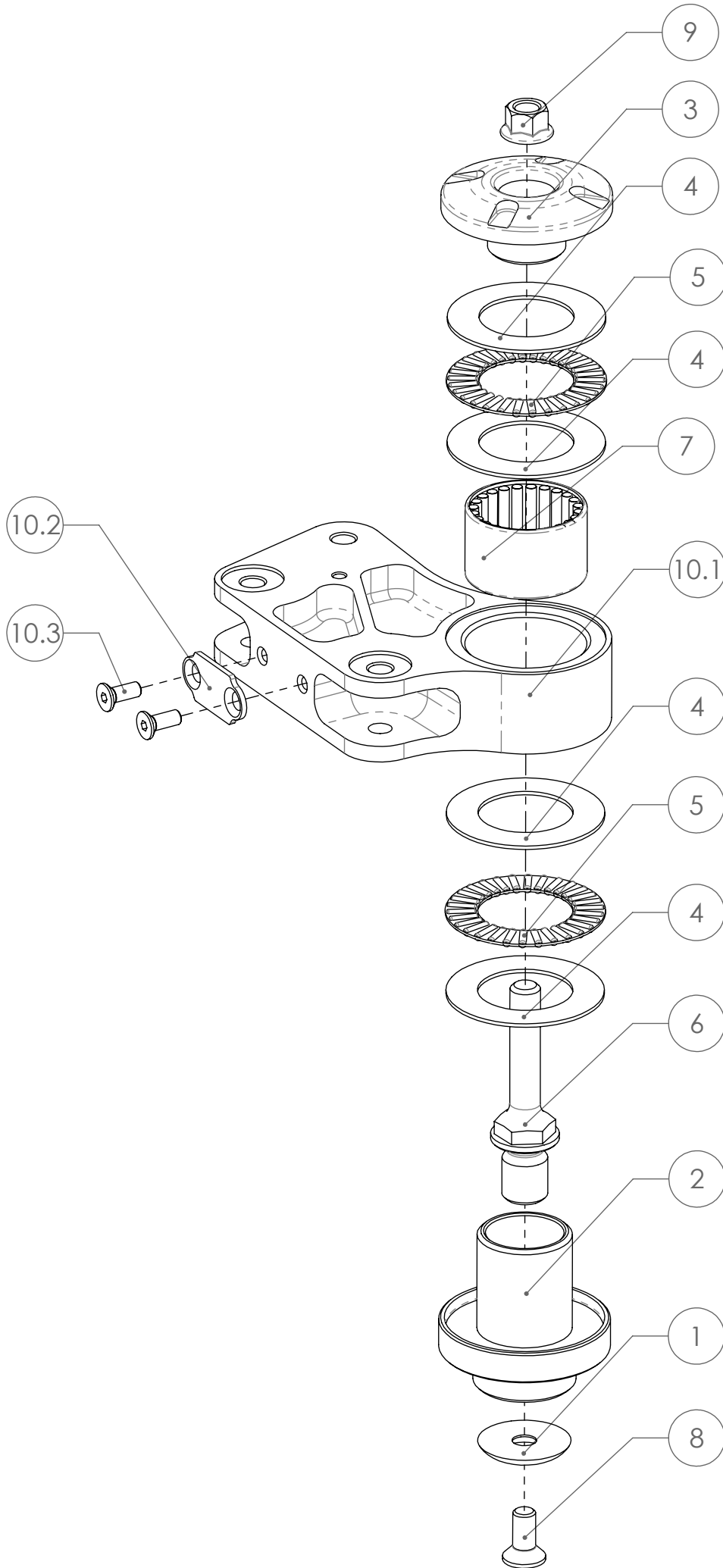
05B - FRONT PUSHROD

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161405008	Puntone anteriore	Front push rod	€ 145.33	2
2	010005012	Registro Puntone	Push rod adjuster	€ 24.45	2
3	RE-3/8L	Testa a snodo	Rod end	€ 36.76	2
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25	€ 6.86	2
5	ANSIB182265-3/8X24L	Dado esagonale Sx	Hex Nut Lh	€ 2.91	2



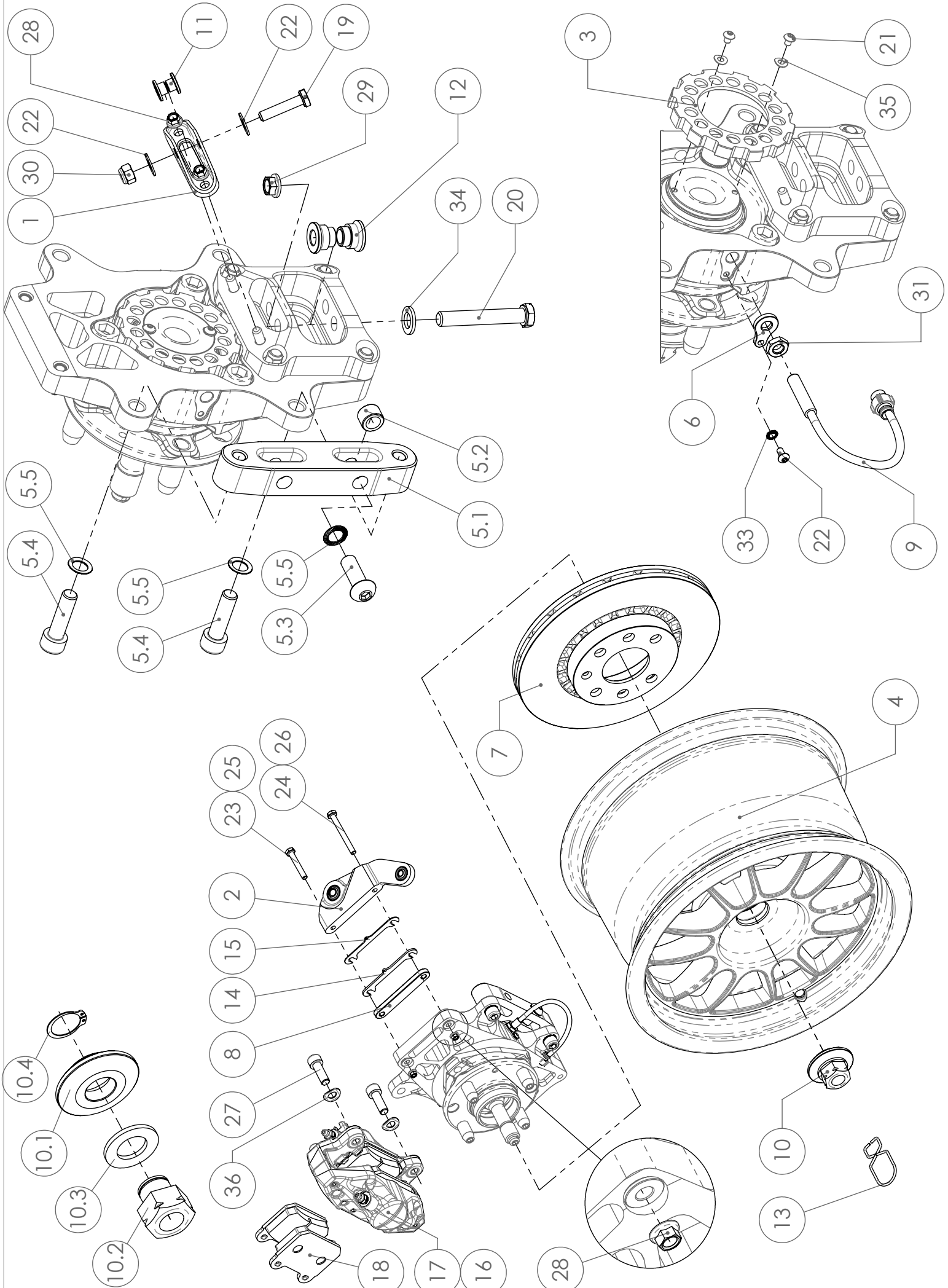
06A - FRONT ROCKERS

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	010008009	Staffa ammortizzatore	Damper mounting	€ 110.74	2
2	010008010	Boccola	Bush	€ 17.64	12
3	080602013	Prigioniero	Stud	€ 5.41	4
4	080608010	Boccola	Bush	€ 29.56	4
5	080608026A	Molla 600 lb/in	Spring 600 lb/in	€ 135.28	2
0	080608026C	Molla 800 lb/in	Spring 800 lb/in	€ 135.28	0
0	080608026E	Molla 1000 lb/in	Spring 1000 lb/in	€ 135.28	0
6	151406010	Supporto FARB	FARB bracket	€ 93.48	2
7	161406002	Rocker anteriore completo	Front rocker assy	€ 567.87	0
8	161406004	FARB ø 11.5	FARB ø 11.5	€ 218.19	1
9	161406005	FARB ø 13.5	FARB ø 13.5	€ 218.19	1
10	161406009	Link FARB	Link FARB	€ 26.55	2
11	161406011	Rebound stop SX	Rebound stop LH	€ 60.62	1
12	161406012	Rebound stop DX	Rebound stop RH	€ 60.62	1
13	161406013	Ammortizzatore anteriore	Front damper	€ 727.64	2
14	RE-8M	Testa a snodo	Rod end	€ 53.54	2
15	RE-8ML	Testa a snodo	Rod end	€ 53.54	2
16	PAF20215P10	Boccola Flangiata DU	Self-lubricating flanged bush	€ 8.67	2
17	UNI5739-M8X25	Vite TE	HH Bolt	€ 2.05	2
18	UNI5589-M8L	Dado esagonale basso	Thin Hex Nut	€ 2.35	2
19	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2.35	4
20	AN4-11A	Vite NAS	NAS bolt	€ 5.17	2
21	AN4-12A	Vite NAS	NAS bolt	€ 5.17	4
22	AN4-13A	Vite NAS	NAS bolt	€ 5.17	2
23	UNI5931-M6x12	Vite TC	CH Bolt	€ 1.74	8
24	DIN980-M6	Dado autobloccante	Prevailing torque Nut	€ 1.98	2
25	AN365-1/4X28	Dado autobloccante	Self-locking Nut	€ 1.98	6
26	AST-1/4	K-Nut	K-Nut	€ 5.26	2
27	AST-06	K-Nut	K-Nut	€ 5.26	4
28	AN960-1/4	Rondella	Washer	€ 1.99	8
29	RS065160010	Rondella speciale 6,5x16x1	Special washer 6,5x16x1	€ 1.99	8
30	161406013005	Ghiera molla	Plateform	€ 74.22	0



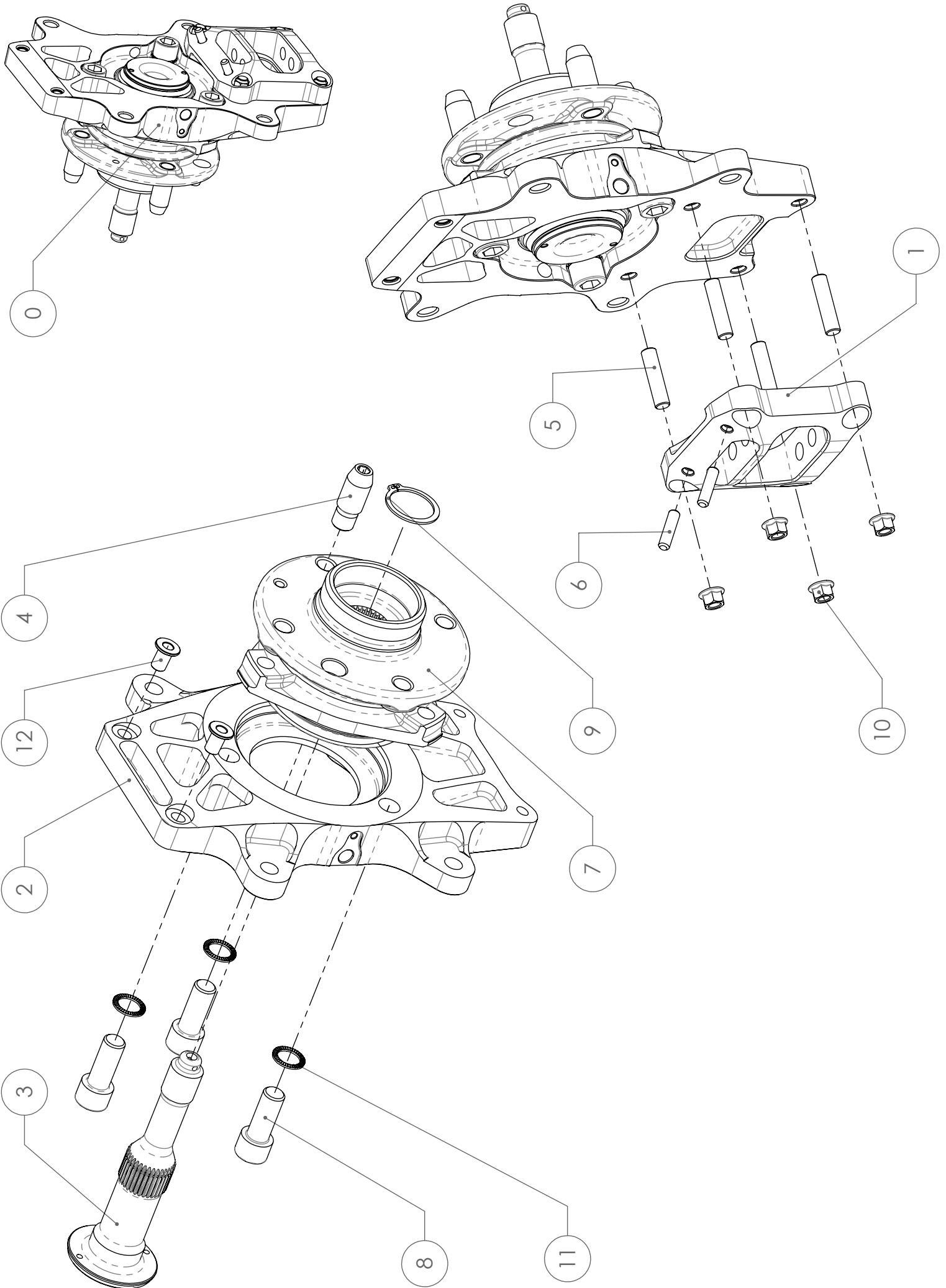
06B - FRONT ROCKERS

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	080602008	Rondella speciale	Button washer	€ 4.64	2
2	151406003	Perno Rocker ant	Front rocker pivot	€ 96.10	2
3	151406004	Registro rocker ant.	Front rocker adjuster	€ 71.54	2
4	AS2542	Controrolla	Thrust bearing washer	€ 7.27	8
5	AXK2542	Cuscinetto reggispinta	Thrust bearing	€ 12.56	4
6	151406005	Perno prigioniero rocker ant.	Front rocker stud	€ 73.72	2
7	HK2520	Cuscinetto a rullini	Drawn cup needle roller bearing	€ 22.76	2
8	UNI5933-M6X14	Vite TS	CSH Bolt	€ 1.74	2
9	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5.42	2
10.1	161406003	Rocker anteriore	Front rocker	€ 251.15	2
10.2	151406012	Lamiera arresto rocker	Rebound stop flange	€ 10.40	2
10.3	UNI5933-M4X8	Vite TS	CSH Bolt	€ 1.44	4



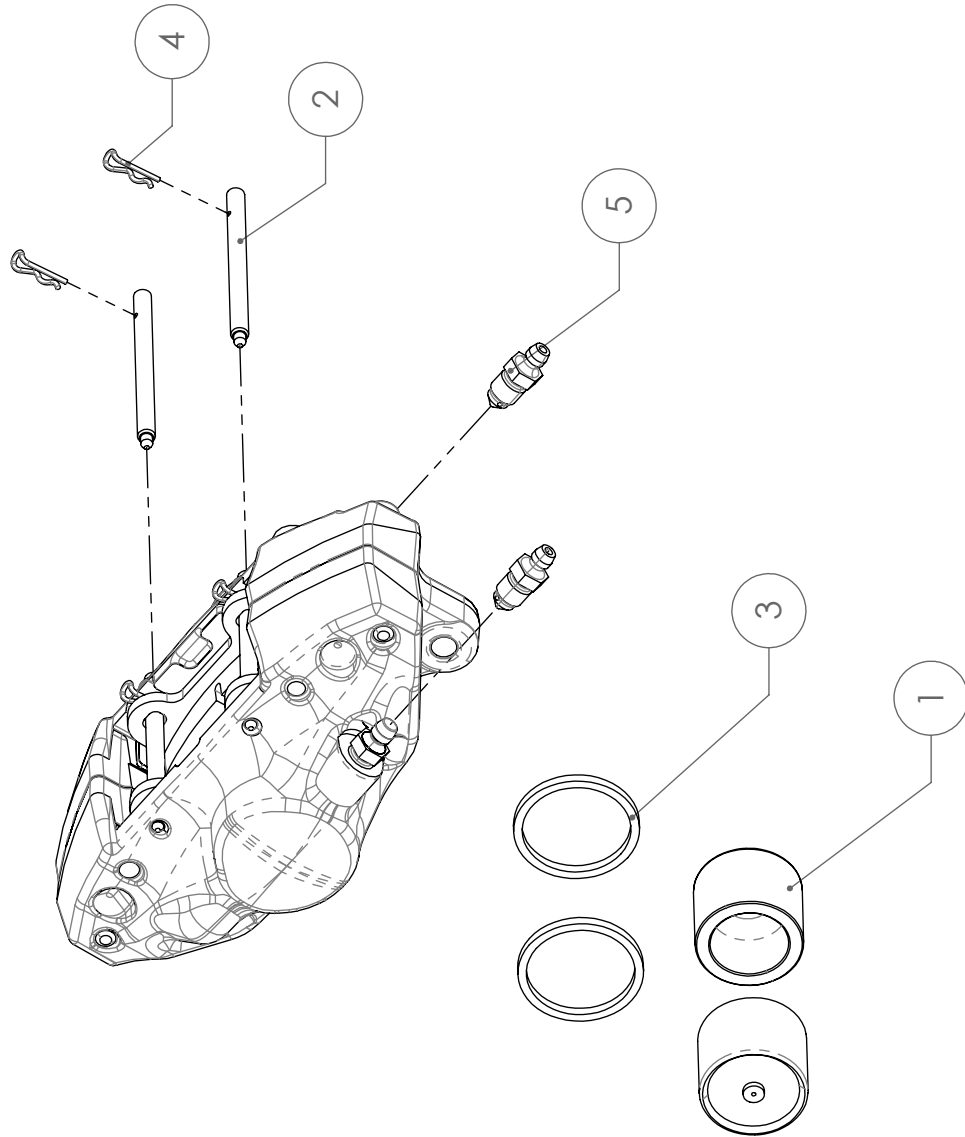
07A - FRONT UPRIGHT

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161407009	Attacco puntone	Pushrod bracket	€ 114.66	2
2	161407011	Ackerman	Ackerman	€ 276.26	2
3	161407013	Ruota fonica	Trigger wheel	€ 173.62	2
4	161407017	Cerchio 8"x13"	Wheel 8"x13"	€ 259.36	2
5	161507023	Assieme fissaggio cavo di ritenzione	Wheel tether bracket assy	€ 133.99	0
5.1	161507023001	Fissaggio cavo di ritenzione	Tether bracket	€ 111.32	2
5.2	181507014	Boccola	Bush	€ 11.67	2
5.3	UNI7380-M10X30	Vite TB	BH Bolt	€ 2.55	2
5.4	UNI5931-M10X35	Vite TC	CH Bolt	€ 2.55	4
5.5	RZS10	Rondella zigrinata	Safety washer	€ 1.16	6
6	101007012	Supporto sensore velocità	Sensor bracket	€ 18.15	2
7	09552724	Disco Freno	Brake disc	€ 82.55	2
8	090907006	Spessore camber 6mm	Camber shim 6mm	€ 35.15	2
9	090907018	Sensore Velocità	Speed sensor	€ 210.73	2
10	090907034	Dado ruota completo DX	Rh wheel nut assy	€ 118.00	0
10.1	090907033001RH	Campanella dado ruota DX	Right wheel Nut bell	€ 49.19	2
10.2	010407033	Dado ruota DX	Rh wheel nut	€ 65.49	2
10.3	UNI6592-20	Rondella	Washer	€ 1.16	2
10.4	DIN471E21	Seeger	Seeger	€ 2.26	2
11	080608010	Boccola	Bush	€ 29.56	4
12	080610006	Boccola ABWT 8	Bush	€ 36.59	4
13	010007018	Clip sicurezza	Safety spring	€ 10.55	2
14	01000726B	Spessore camber 2 mm	Camber shim 2mm	€ 6.63	2
15	01000726A	Spessore camber 1mm	Camber shim 1mm	€ 6.63	2
16	XA6L611	Pinza freno	Brake caliper	€ 245.69	1
17	XA6L612	Pinza freno	Brake caliper	€ 245.69	1
18	FDS1562	Pastiglie Freno (coppia)	Brake pads (Pair)	€ 98.46	2
19	AN4-11A	Vite NAS	NAS Bolt	€ 5.17	2
20	AN6-22A	Vite NAS	NAS Bolt	€ 4.49	2
21	UNI7380-M4X5	Vite TB	Bolt	€ 1.44	6
22	UNI7380-M4X8	Vite TB	BH Bolt	€ 1.44	2
23	UNI5737-M6X40	Vite TE cl 10.9	HE Bolt class 10.9	€ 1.74	2
24	UNI5737-M6X60	Vite TE cl 10.9	HE Bolt class 10.9	€ 1.74	2
25	UNI5737-M6X45	Vite TE cl 10.9	HE Bolt class 10.9	€ 1.74	2
26	UNI5737-M6X65	Vite TE cl 10.9	HE Bolt class 10.9	€ 1.74	2
27	UNI5931-M10X30	Vite TC	CH bolt	€ 2.55	4
28	AST-06	K-Nut	K-Nut	€ 5.26	8
29	AST-3/8	K-Nut	K-Nut	€ 6.71	2
30	AN365-1/4X28	Dado autobloccante	Self locking nut	€ 1.98	2
31	UNI5589-M8	Dado esagonale basso	Thin hex nut	€ 2.35	2
22	AN960-1/4	Rondella AN 960 1/4	Washer AN 960 1/4	€ 1.99	4
33	RZS4	Rondella zigrinata	Safety washer	€ 1.16	2
34	UNI6592-10	Rondella stretta	Washer	€ 1.16	2
35	UNI8840B-4	Rondella Ondulata	Crinkle washer	€ 1.16	4
36	UNI8840B-10	Rondella Ondulata	Crinkle washer	€ 1.16	4



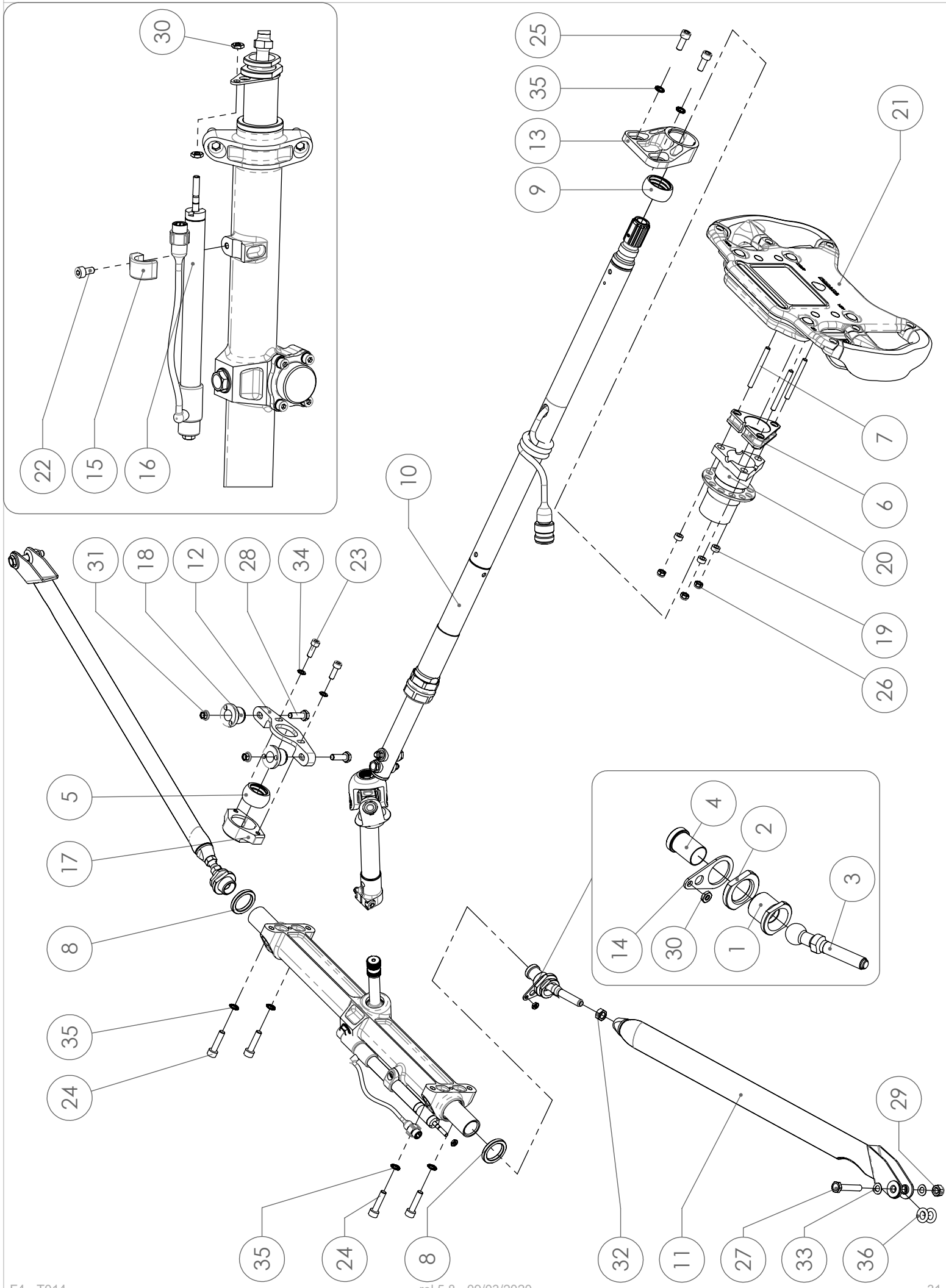
07B - FRONT UPRIGHT

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161407004	Portamozzo completo	Upright assy	€ 1'361.04	0
1	161407008	Blocco portamozzo anteriore	Front upright mount	€ 246.35	2
2	161407010	Portamozzo	Upright	€ 571.21	2
3	161407012	Perno ruota anteriore	Front wheel axle	€ 215.72	2
4	161407016	Pin trascinatore	Wheel Drive pin	€ 34.95	8
5	030210012	Prigioniero	Stud	€ 3.51	8
6	010011020	Prigioniero	Stud	€ 5.38	4
7	BAR0048VK108	Cuscinetto ruota	Wheel bearing	€ 134.83	2
8	UNI5931-M12X30	Vite TC	CH Bolt	€ 2.55	6
9	DIN471A27	Circlip	Circlip	€ 2.26	2
10	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5.42	8
11	RZS12	Rondella zigrinata	Safety washer	€ 1.16	6
12	161407018	Boccola	Bush	€ 24.58	4



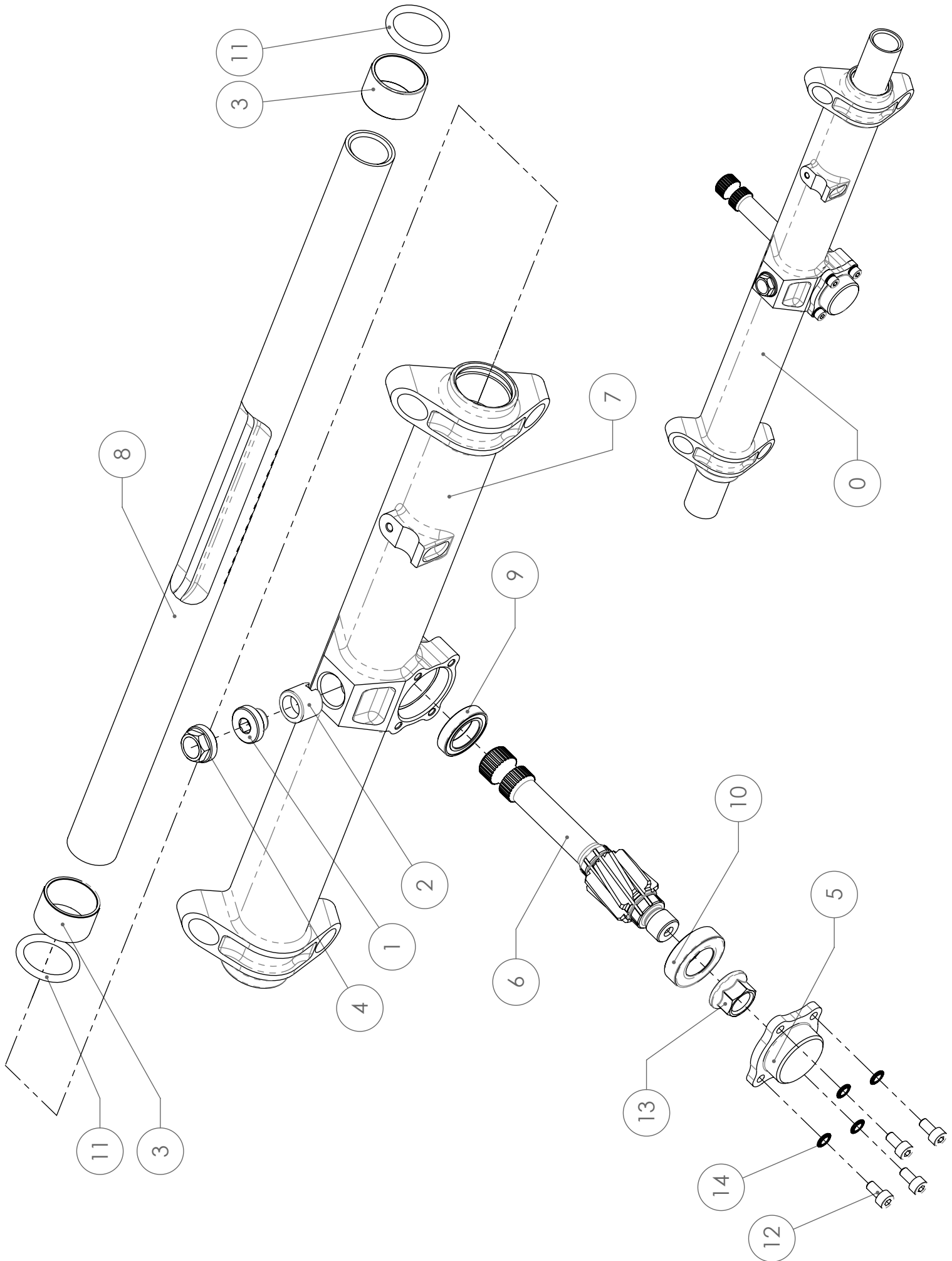
07C - CALIPER

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	20A12969	Pistoncino pinza (1x)	Caliper piston (1 of)	€ 42.60	0
2	20490810	Perno	Caliper pin	€ 4.82	0
3	105595516	kit guarnizioni (8x)	Caliper seal kit	€ 92.72	0
4	05454227	Molla a R	R-clip	€ 3.46	0
5	05281213	Vite spurgo (1x)	Caliper bleed Bolt (1 of)	€ 7.42	0



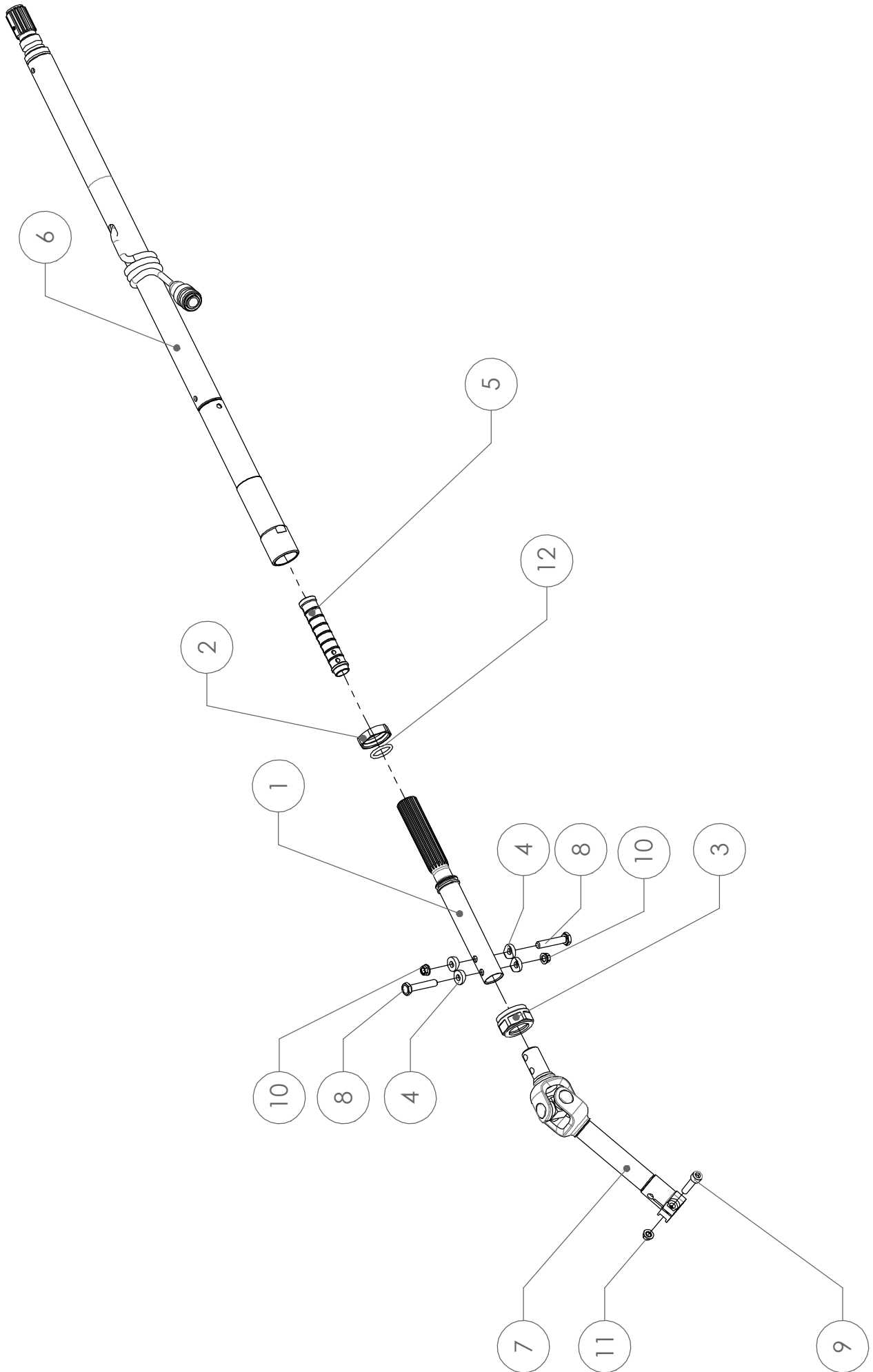
09A - STEERING ASSY

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	010009011	Boccola terminale cremagliera	Rack-end bush	€ 51.07	2
2	010009013	Dado speciale	Special Nut	€ 17.50	2
3	010009014	Giunto sfera	Ball end joint	€ 56.76	2
4	080609004	Sede snodo sterzo	Ball joint seat	€ 48.88	2
5	080609019	Giunto sferico	Spherical bearing	€ 38.97	1
6	080709010017	Distanziale volante	Steering wheel spacer	€ 108.19	1
7	08070901023C	Prigioniero M5 x 51	Stud M5 x 51	€ 6.47	3
0	08070901023B	Prigioniero M5 x 38	Stud M5 x 38	€ 6.47	0
0	08070901023D	Prigioniero M5 x 64	Stud M5 x 64	€ 6.47	0
0	08070901023E	Prigioniero M5 x 72	Stud M5 x 72	€ 6.47	0
8	080609030	Fine corsa cremagliera	Rack stop	€ 11.24	2
9	080709019	Giunto sferico	Spherical bearing	€ 39.30	1
10	161409004	Assieme piantone	Steering column assy	€ 997.57	0
11	161509008	Tirante sterzo	Track rod	€ 210.58	2
12	161409010	Supporto piantone	Steering column mounting	€ 185.64	1
13	161409011	Supporto piantone	Steering column mounting	€ 191.65	1
14	161409012	Link potenziometro sterzo	Steering pot link	€ 6.79	1
15	161409013	Supporto potenziometro sterzo	Steering pot bracket	€ 52.42	1
16	161409014	Potenziometro lineare	Linear potentiometer	€ 340.99	1
17	161409015	Supporto piantone	Steering column mounting	€ 100.47	1
18	101009016	Boccola	Bush	€ 43.55	2
19	161409018	Distanziale	Spacer	€ 7.12	3
20	F9024600	Staccavolante	Steering wheel quick release	€ 345.63	1
21	VV213001D	Volante completo	Steering wheel	€ 2'056.33	1
22	UNI5931-M4X8	Vite TB INOX	BH Bolt Stainless Steel	€ 1.44	1
23	UNI5931-M5X15	Vite TC	CH Bolt	€ 1.74	2
24	UNI5931-M6x25	Vite TC	CH Bolt	€ 1.74	4
25	UNI5931-M6X16	Vite TC	CH Bolt	€ 2.55	2
26	UNI7474-M5	Dado autobloccante	Prevailing torque Nut	€ 1.98	3
27	AN4-13A	Vite NAS	NAS bolt	€ 5.17	2
28	UNI5739-M6X20	Vite TE	HH Bolt	€ 1.74	2
29	AN365-1/4X28	Dado autobloccante	Self-locking Nut	€ 1.98	2
30	UNI5589-M4	Dado esagonale basso	Thin Hex Nut	€ 1.88	1
31	AST-06	K-Nut	K-Nut	€ 5.26	2
32	ANSIB182265-5/16X24	Dado 5/16 24 UNF	Nut 5/16_24 UNF	€ 2.91	2
33	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1.16	4
34	RZS5	Rondella zigrinata	Safety washer	€ 1.16	2
35	RZS6	Rondella zigrinata	Safety washer	€ 1.16	6
36	ORN4036	O-Ring	O-Ring	€ 3.97	4



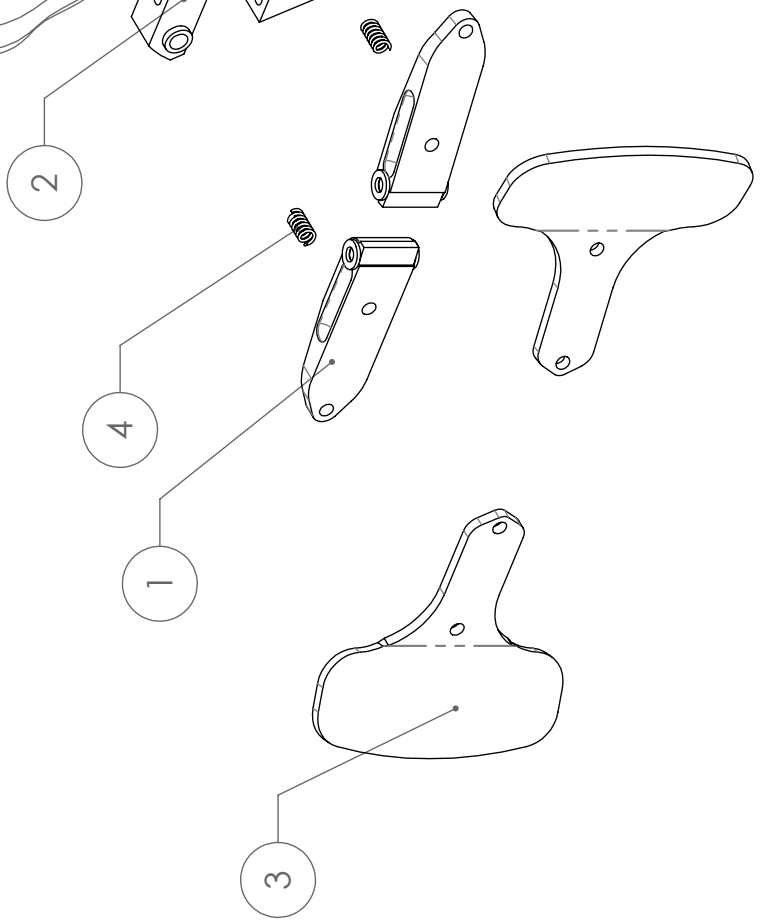
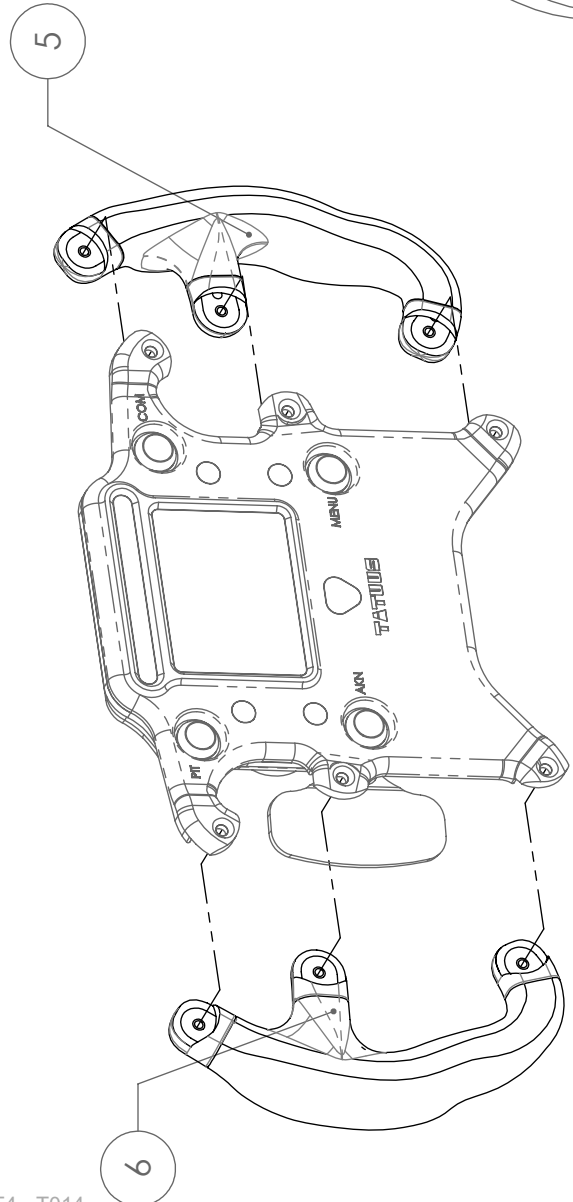
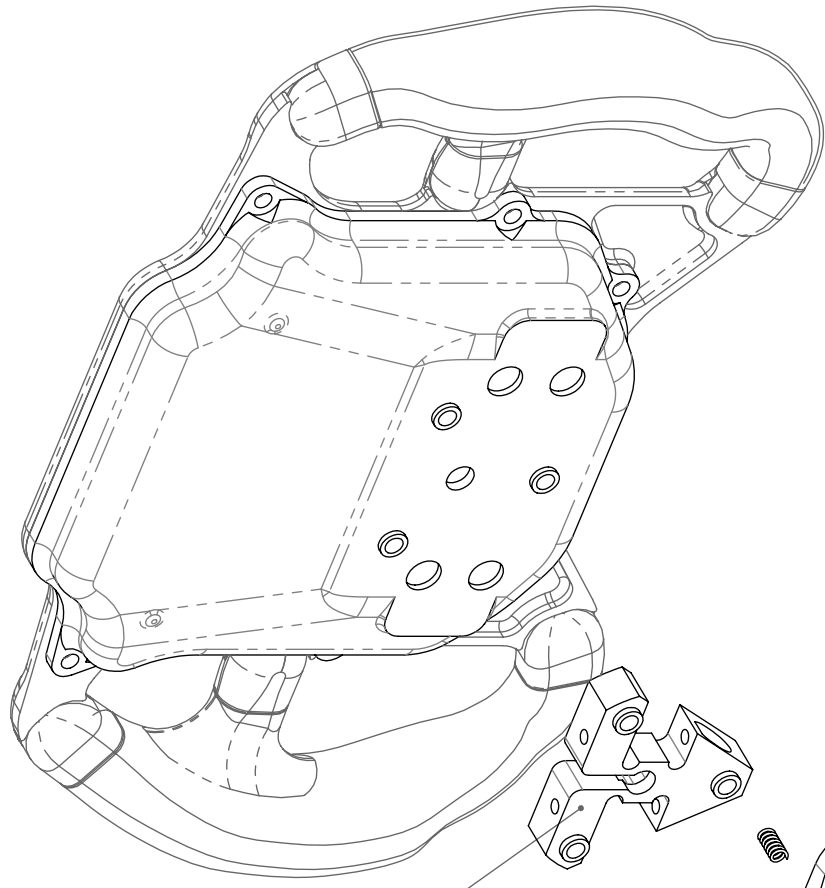
09B - STEERING RACK

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161409002	Scatola guida completa	Steering rack assy	€ 1'662.76	0
1	030309011004	Boccola	Bush	€ 78.55	1
2	030309011005	Pastiglia registro	Adjuster spacer	€ 41.91	1
3	030309011006	Boccola iglodur	Iglodur bush	€ 28.56	2
4	030309011014	Ghiera	Ring nut	€ 81.33	1
5	040409055	Tappo cremagliera	Rack adjuster cap	€ 73.21	1
6	090909019	Pignone cremagliera	Rack pinion	€ 189.43	1
7	161409003	Corpo scatola guida	Steering box housing	€ 819.58	1
8	161409009	Cremagliera	Rack	€ 259.61	1
9	61802-2RS1	Cuscinetto	Bearing	€ 30.30	1
10	61902-2RS1	Cuscinetto	Bearing	€ 31.85	1
11	ORN22X3	O-Ring	O-Ring	€ 7.54	2
12	UNI5931-M4X8	Vite TB INOX	BH Bolt Stainless Steel	€ 1.44	4
13	AST-12	K-Nut	K-Nut	€ 6.71	1
14	RZS4	Rondella zigrinata	Safety Washer	€ 1.16	4



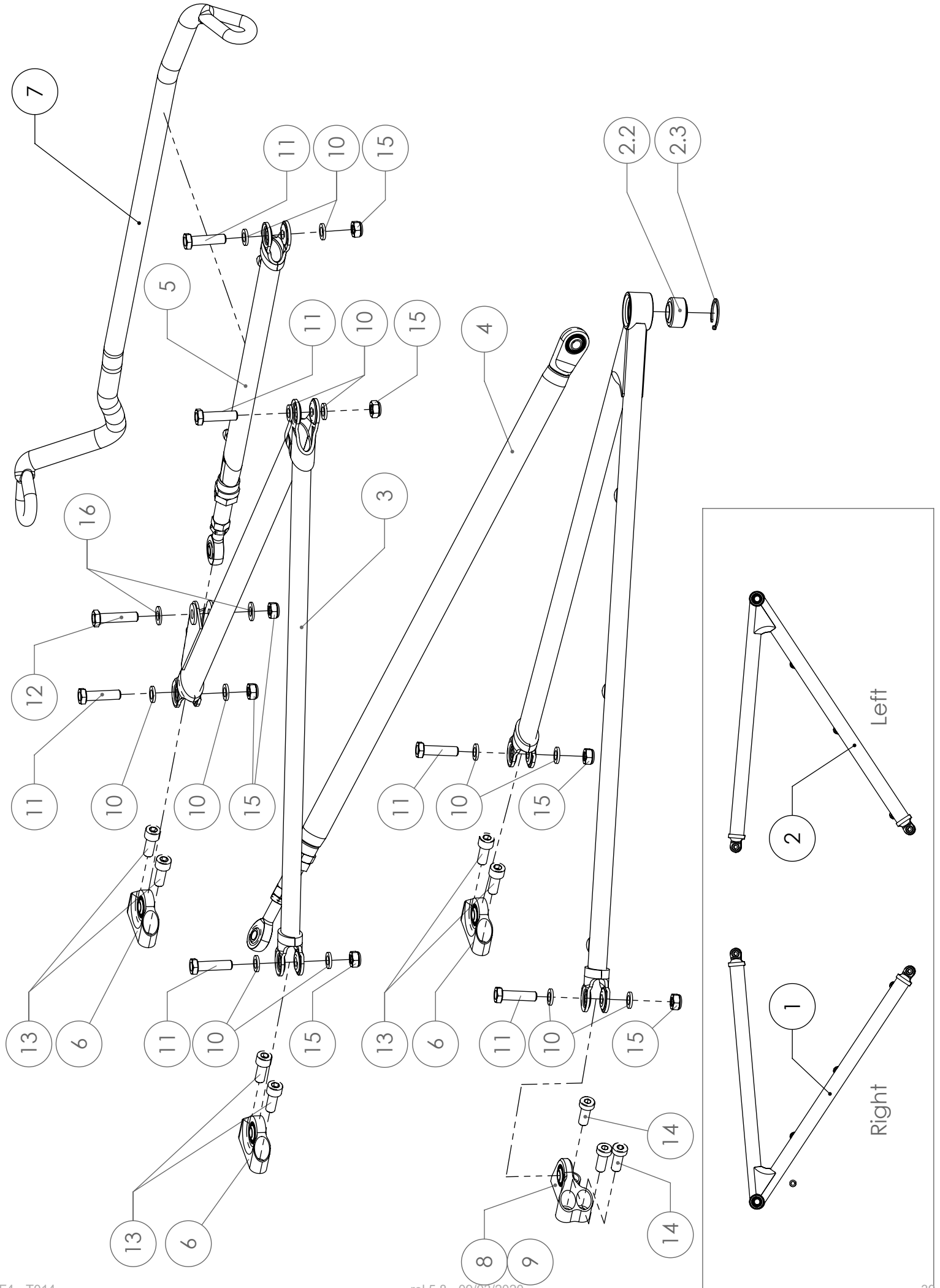
09C - STEERING COLUMN

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	080709012	Testa millerighe	Splined shaft	€ 217.62	1
2	080709022	Controghiera	Platform	€ 27.31	1
3	080709023	Ghiera	Ring nut	€ 75.98	1
4	080709025	Rondella speciale	Special washer	€ 22.92	4
5	161409019	Cartuccia deformabile	Steering crashbox	€ 46.20	1
6	161409005	Piantone sterzo	Steering column top end	€ 439.41	1
7	161409006	Terminale piantone	Steering column bottom end	€ 191.08	1
8	AN4-12A	Vite NAS	NAS bolt	€ 5.17	2
9	UNI5931-M6X25	Vite TC	CH Bolt	€ 1.74	1
10	AST-1/4	K-Nut	K-Nut	€ 5.26	2
11	AST-06	K-Nut	K-Nut	€ 5.26	1
12	ORN123	O-Ring	O-Ring	€ 8.30	1



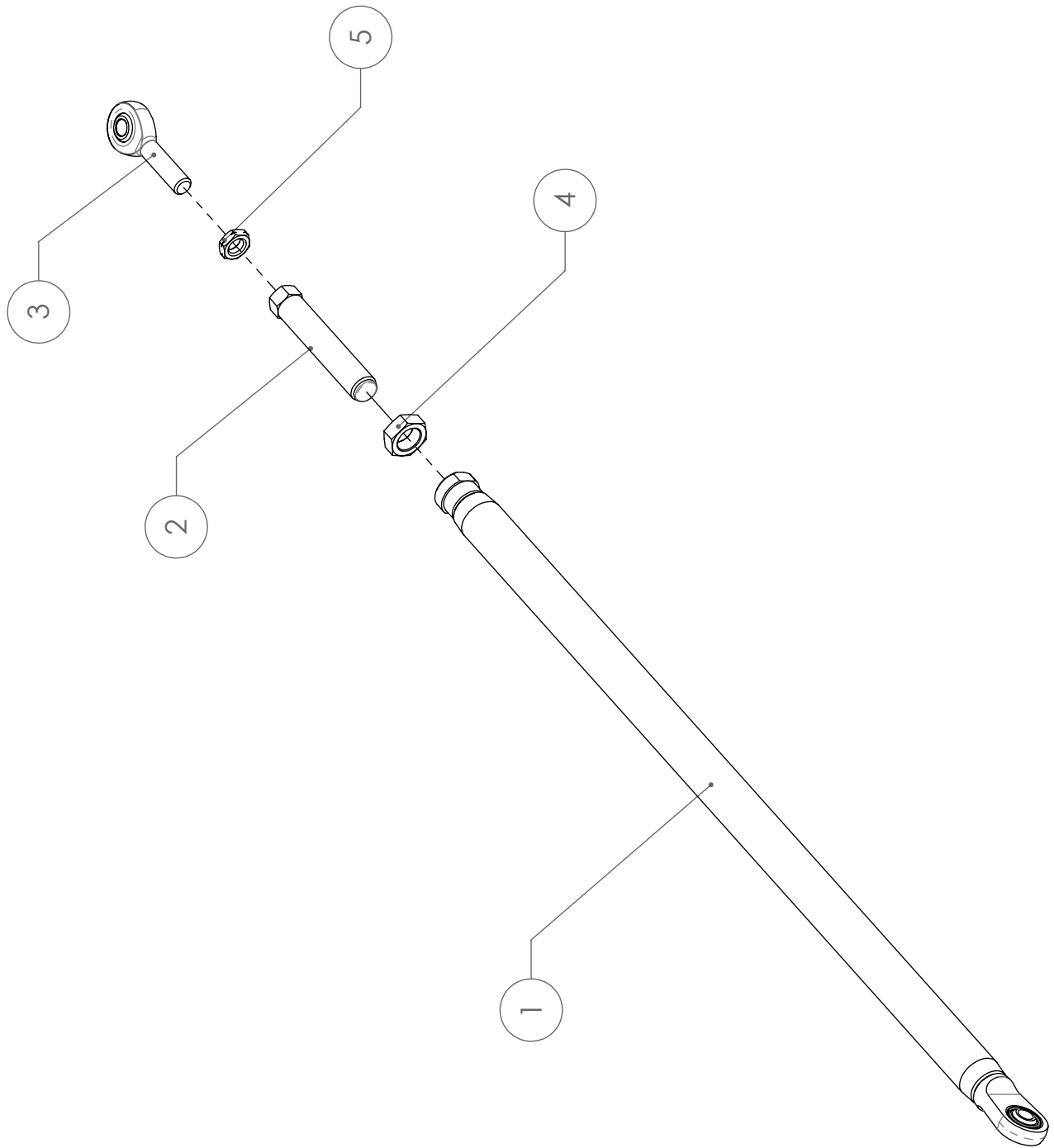
09D - STEERING WHEEL

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	VV112012	Supporto palette	Levers bracket	€ 70.95	0
2	VV213010C	Distanziale	Spacer	€ 228.56	0
3	VV213012	Paletta gearshift	Gearshift paddle	€ 36.76	0
4	XS5196C	Molla	Coil	€ 8.21	0
5	05059B010015	Impugnatura volante DX	Rh handgrip	€ 128.65	0
6	05059B010016	Impugnatura volante SX	Lh handgrip	€ 128.65	0



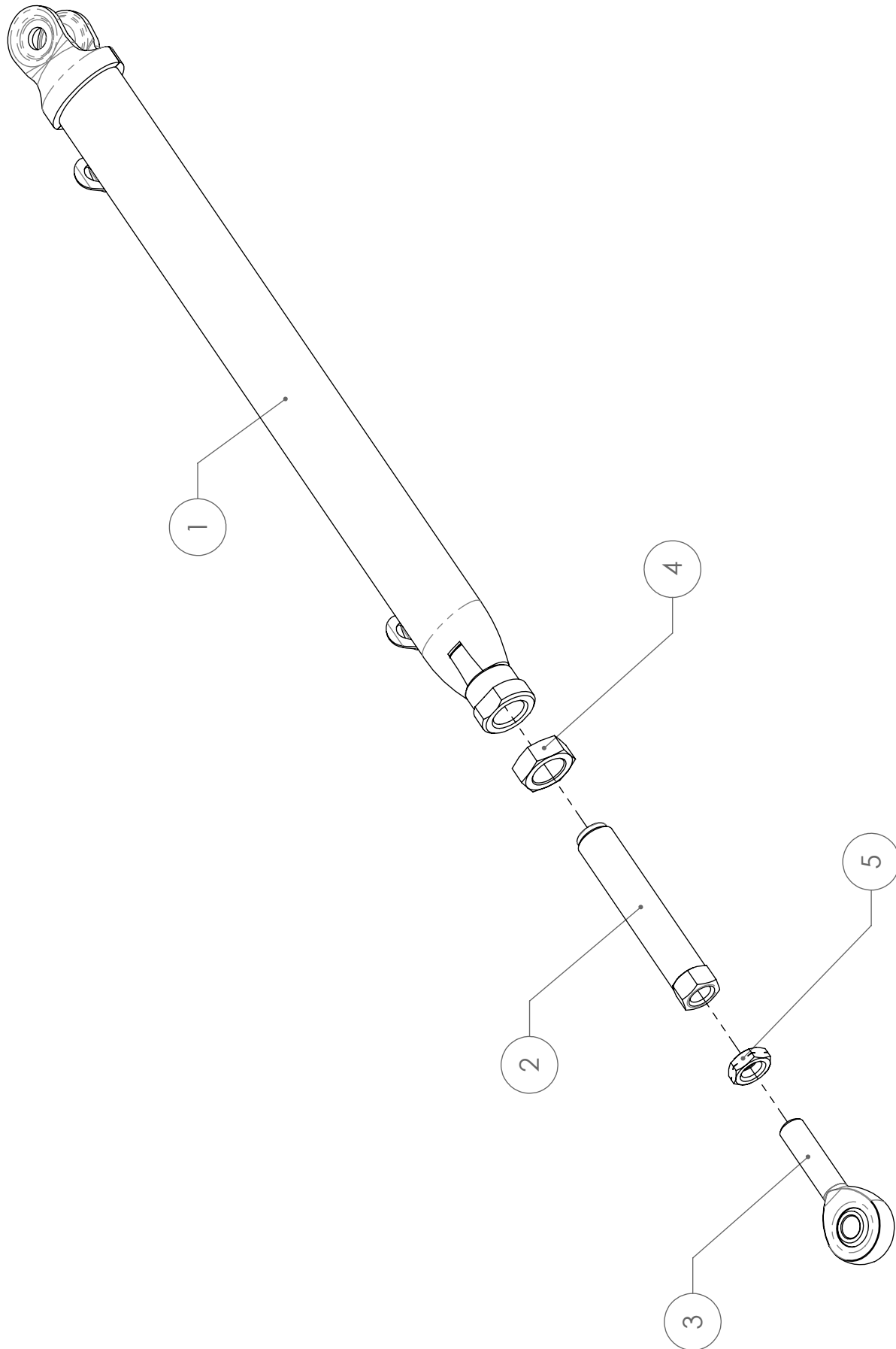
10A - REAR WISHBONE

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161410002	Braccio posteriore inferiore dx completo	Rh rear lower wishbone assy	€ 338.41	1
2	161410003	Braccio posteriore inferiore sx completo	Lh rear lower wishbone assy	€ 338.41	1
2.2	UNIBALL-ABWT8	Snodo sferico	Spherical bearing	€ 31.00	0
2.3	J25X1,2V	Circlip	Circlip	€ 1.37	0
3	161410006	Braccio superiore post.	Rear upper wishbone	€ 292.38	2
4	161410007	Push rod posteriore completo	Rear push rod assy	€ 206.53	0
5	161410010	Tirante convergenza posteriore completo	Rear tie rod assy	€ 200.52	0
6	161510012	Attacco sospensione post. completo	Rear wishbone bracket assy	€ 286.23	6
7	161705010	Cavo di ritenzione 6kJ	Wheel tether 6kJ	€ 307.73	2
8	161510021	Locchetto sospensione post. Sx completo	Rear Lh suspension bracket assy	€ 267.75	1
9	161510022	Locchetto sospensione post. Dx completo	Rear Rh suspension bracket assy	€ 267.75	1
10	090910011	Special Flat Washer 5/16" Sp.2	Special Flat Washer 5/16" Sp.2	€ 3.52	24
11	AN5-11A	Vite NAS	NAS bolt	€ 4.94	12
12	AN5-12A	Vite NAS	NAS Bolt	€ 5.17	2
13	UNI5931-M8X20	Vite TC	CH Bolt	€ 2.05	12
14	UNI9327-M8X20	Vite TC	CH Bolt	€ 2.05	6
15	AN365-5/16X24	Dado autobloccante	Self-locking Nut	€ 1.98	14
16	AN960-5/16	Rondella	Washer	€ 1.99	4



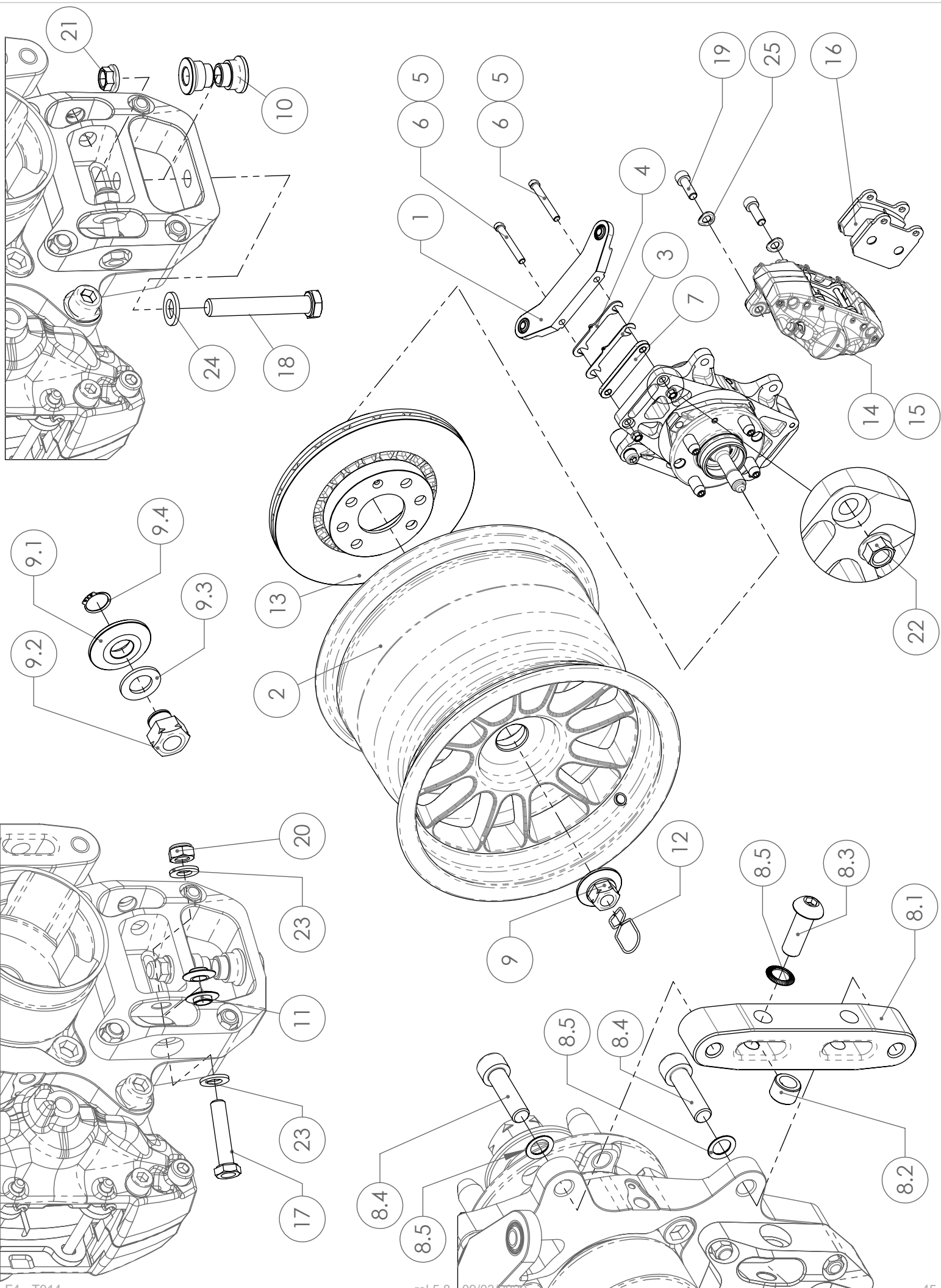
10B - REAR PUSHROD

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161410008	Puntone posteriore	Rear push rod	€ 145.33	2
2	010005012	Registro Puntone	Push rod adjuster	€ 24.45	2
3	RE-3/8L	Testa a snodo	Rod end	€ 36.76	2
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25	€ 6.86	2
5	ANSIB182265-3/8X24L	Dado esagonale Sx	Hex Nut Lh	€ 2.91	2



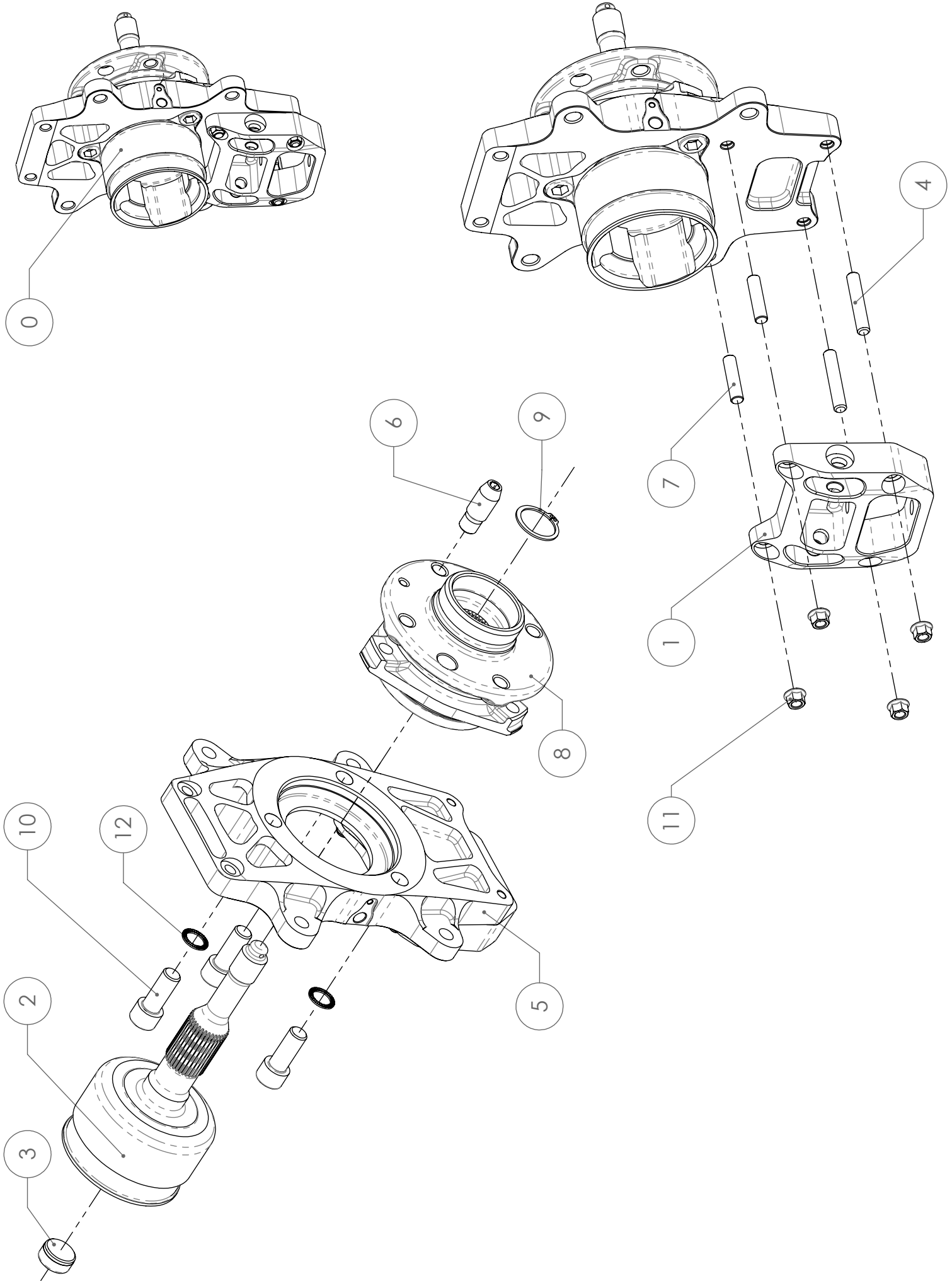
10C - REAR TIE ROD

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161410011	Tirante convergenza posteriore	Rear tie rod	€ 139.33	2
2	010005012	Registro Puntone	Push rod adjuster	€ 24.45	2
3	RE-3/8L	Testa a snodo	Rod end	€ 36.76	2
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25	€ 6.86	2
5	ANSIB182265-3/8X24L	Dado esagonale Sx	Hex Nut Lh	€ 2.91	2



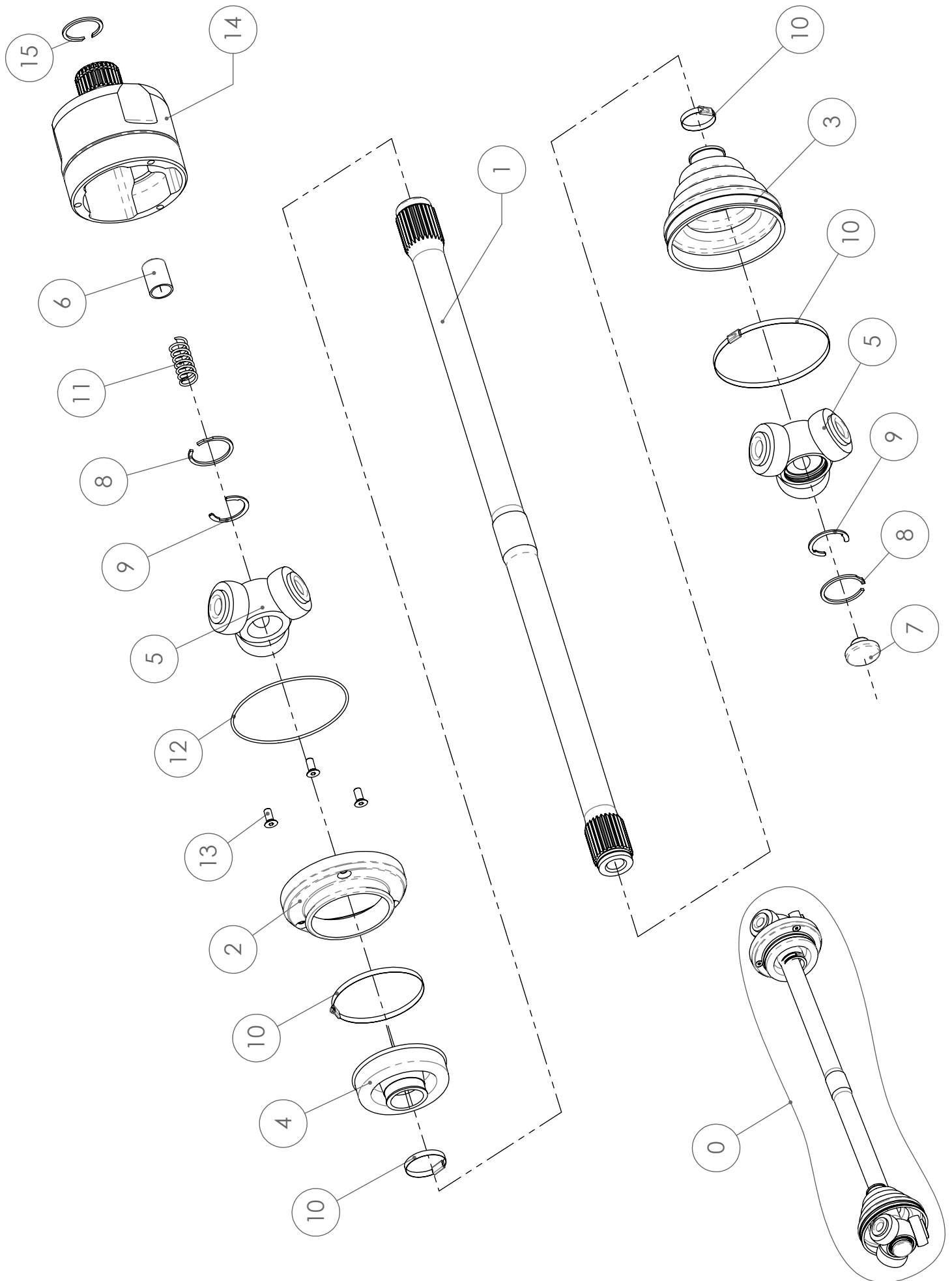
11A - REAR UPRIGHT

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161411006	Ackerman	Ackerman	€ 276.26	2
2	161411011	Cerchio 10"x13"	Wheel 10"x13"	€ 259.36	2
3	161411016	Spessore camber 1mm	Camber Shim 1mm	€ 6.63	2
4	161411017	Spessore camber 2 mm	Camber Shim 2mm	€ 6.63	2
5	161411018	Special bolt M8x1x65	Vite speciale M8x1x65	€ 3.84	0
6	161411019	Special bolt M8x1x60	Vite speciale M8x1x60	€ 3.84	4
7	161411020	Spessore camber 6mm	Camber shim 6mm	€ 35.28	2
8	161507023	Assieme supporto cavo di ritenzione	Wheel tether bracket assy	€ 133.99	0
8.1	161507023001	Fissaggio cavo di ritenzione	Tether bracket	€ 111.32	2
8.2	181507014	Boccola	Bush	€ 11.67	2
8.3	UNI7380-M10X30	Vite TB	BH Bolt	€ 2.55	2
8.4	UNI5931-M10X35	Vite TC	CH Bolt	€ 2.55	4
8.5	RZS10	Rondella zigrinata	Safety washer	€ 1.16	6
9	090907034	Dado ruota completo DX	Right wheel nut assy	€ 118.00	0
9.1	090907033001RH	Campanella dado ruota DX	Right wheel Nut bell	€ 49.19	2
9.2	010407033	Dado ruota	Right wheel nut	€ 65.49	2
9.3	UNI6592-20	Rondella	washer	€ 1.16	2
9.4	DIN471E21	Seeger	Seeger	€ 2.26	2
10	080610006	Boccola ABWT 8	Bush	€ 36.59	4
11	030205004	Boccola ABWT 5	Bush	€ 7.21	4
12	010007018	Clip sicurezza	Safety spring	€ 10.55	2
13	09552724	Disco Freno	brake disc	€ 82.55	2
14	XA6L611	Pinza freno	Brake caliper	€ 245.69	1
15	XA6L612	Pinza freno	Brake caliper	€ 245.69	1
16	FDS1562	Pastiglie Freno (coppia)	Brake pads (Pair)	€ 98.46	2
17	AN5-13A	Vite NAS	NAS Bolt	€ 4.49	2
18	AN6-22A	Vite NAS	NAS Bolt	€ 4.49	2
19	UNI5931-M10X30	Vite TC	CH bolt	€ 2.55	4
20	AN365-5/16X24	Dado autobloccante	Self-locking Nut	€ 1.98	2
21	AST-3/8	Dado Astori	Nut	€ 6.71	2
22	AST-08X1	K-Nut M8x1.0	K-Nut M8x1.0	€ 5.26	4
23	AN960-5/16	Rondella	Washer	€ 1.99	4
24	UNI6592-10	Rondella	Washer	€ 1.16	2
25	UNI8840B-10	Rondella Ondulata	Crinkle washer	€ 1.16	4



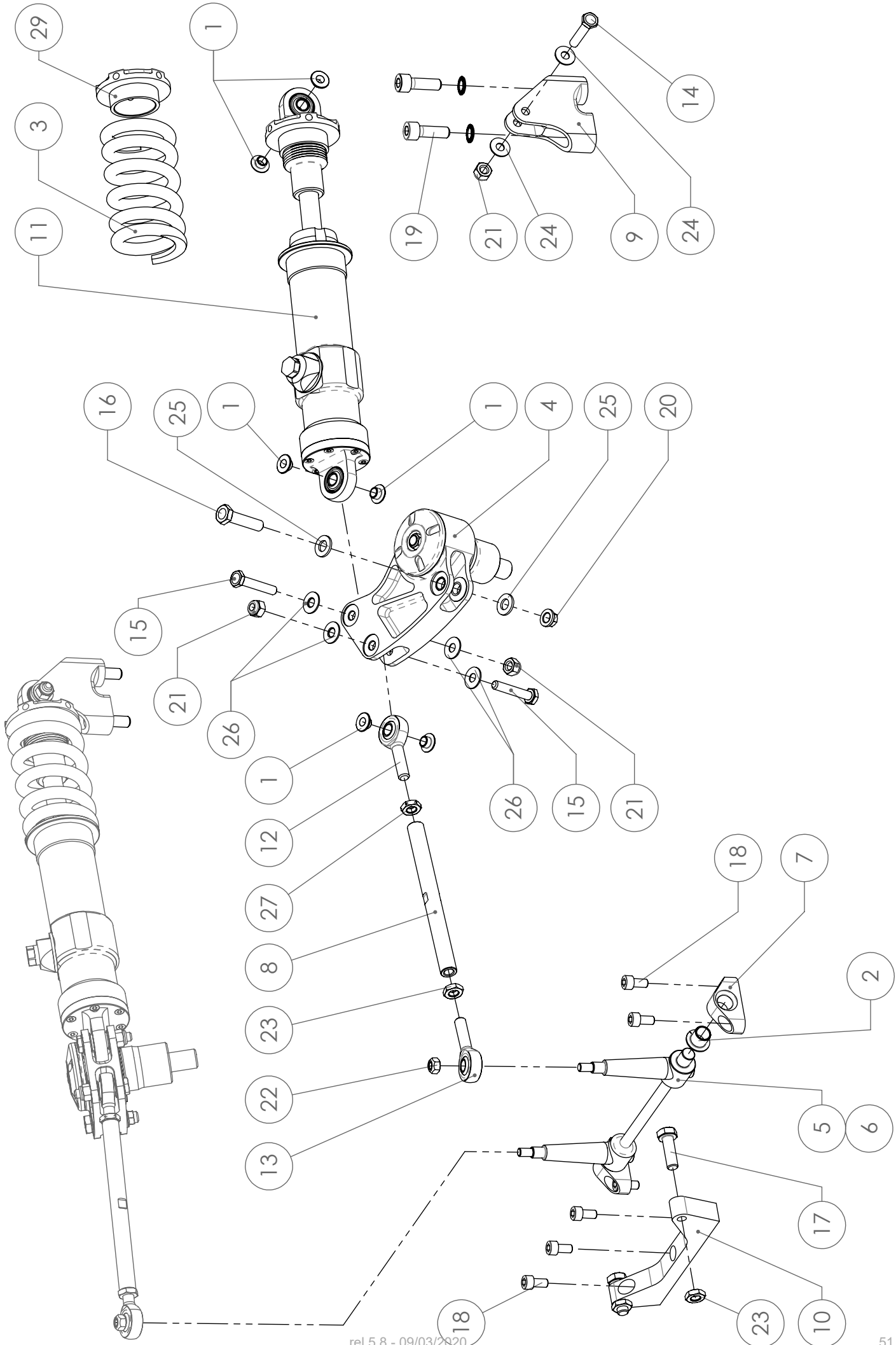
11B - REAR UPRIGHT

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161411004	Portamozzo posteriore completo	Rear upright assy	€ 1'596.45	0
1	161411008	Blocco portamozzo posteriore	Rear upright mount	€ 246.35	2
2	161411009	Perno ruota posteriore	Rear wheel axle	€ 447.84	2
3	161411010	Tampone semiasse	Driveshaft plunger	€ 30.59	2
4	161411012	Prigioniero	Stud	€ 3.51	4
5	161407010	Portamozzo	Upright	€ 571.21	2
6	161407016	Pin trascinatore	Wheel Drive pin	€ 34.95	8
7	030210012	Prigioniero	Stud	€ 3.51	4
8	BAR0048VK108	Cuscinetto ruota	Wheel bearing	€ 134.83	2
9	DIN471A27	Circlip	Circlip	€ 2.26	2
10	UNI5931-M12X30	Vite TC	CH Bolt	€ 2.55	6
11	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5.42	8
12	RZS12	Rondella zigrinata	Safety washer	€ 1.16	6



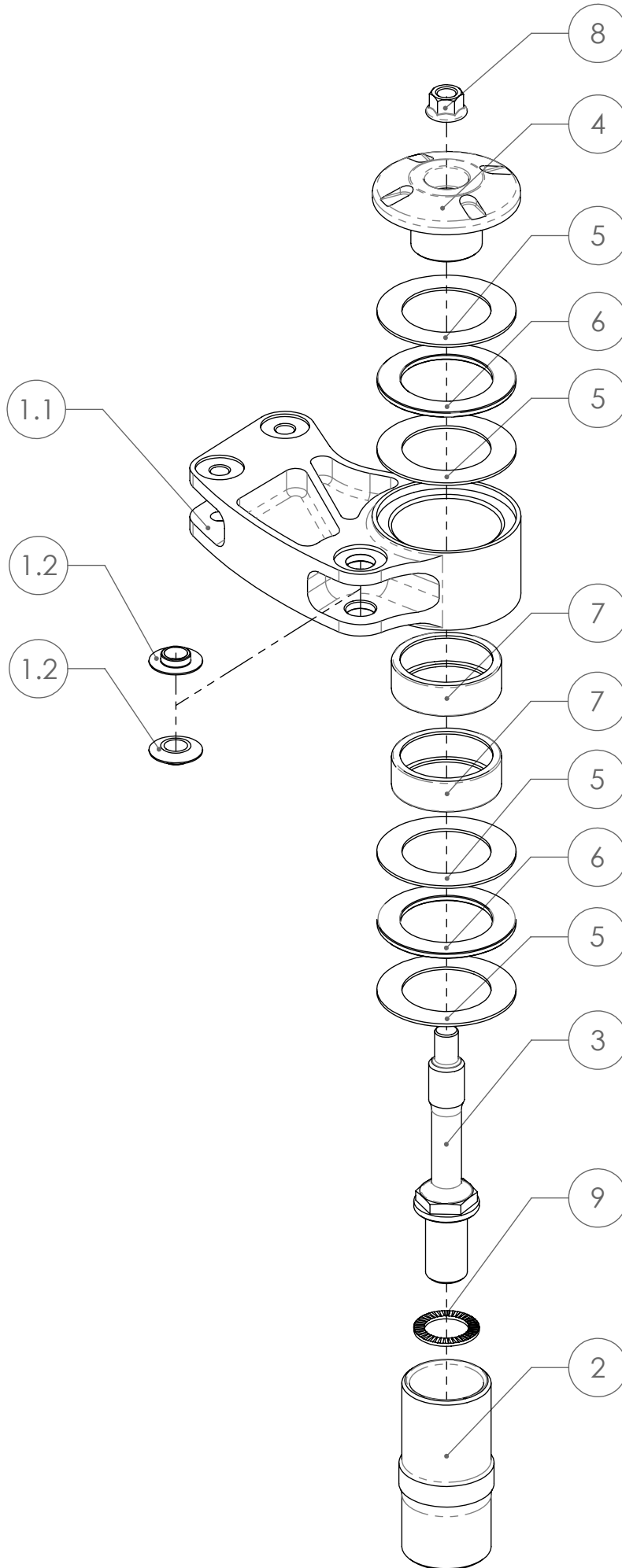
12 - HALFSHAFT

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161412001	Semiassa Completo	Halfshaft Assy	€ 986.43	0
1	F0085934	Semiassa	Halfshaft	€ 311.85	2
2	161412002	Flangia portacuffia	Boot carrier	€ 151.23	2
3	090912006	Cuffia lato ruota	Wheel side boot	€ 30.92	2
4	020211037	Cuffia lato cambio	Gear side boot	€ 6.08	2
5	F9024455	Tripode	Tripode	€ 209.35	4
6	F9024451	Pistone semiassa	Halfshaft plunger	€ 23.84	2
7	F9004710	Tappo semiassa	Halfshaft cap	€ 12.70	2
8	F9024459	Circlip	Circlip	€ 12.70	4
9	9907022	Circlip	Circlip	€ 4.79	4
10	MLT45CP	Fascetta	Clamp	€ 4.86	2
11	0801073	Molla	Spring	€ 19.05	2
12	ORN85X3	O-Ring	O-Ring	€ 8.21	2
13	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1.74	6
14	F90473001	sede tripode	flange	€ 589.62	2
15	F9043319	anello	ring	€ 41.82	2



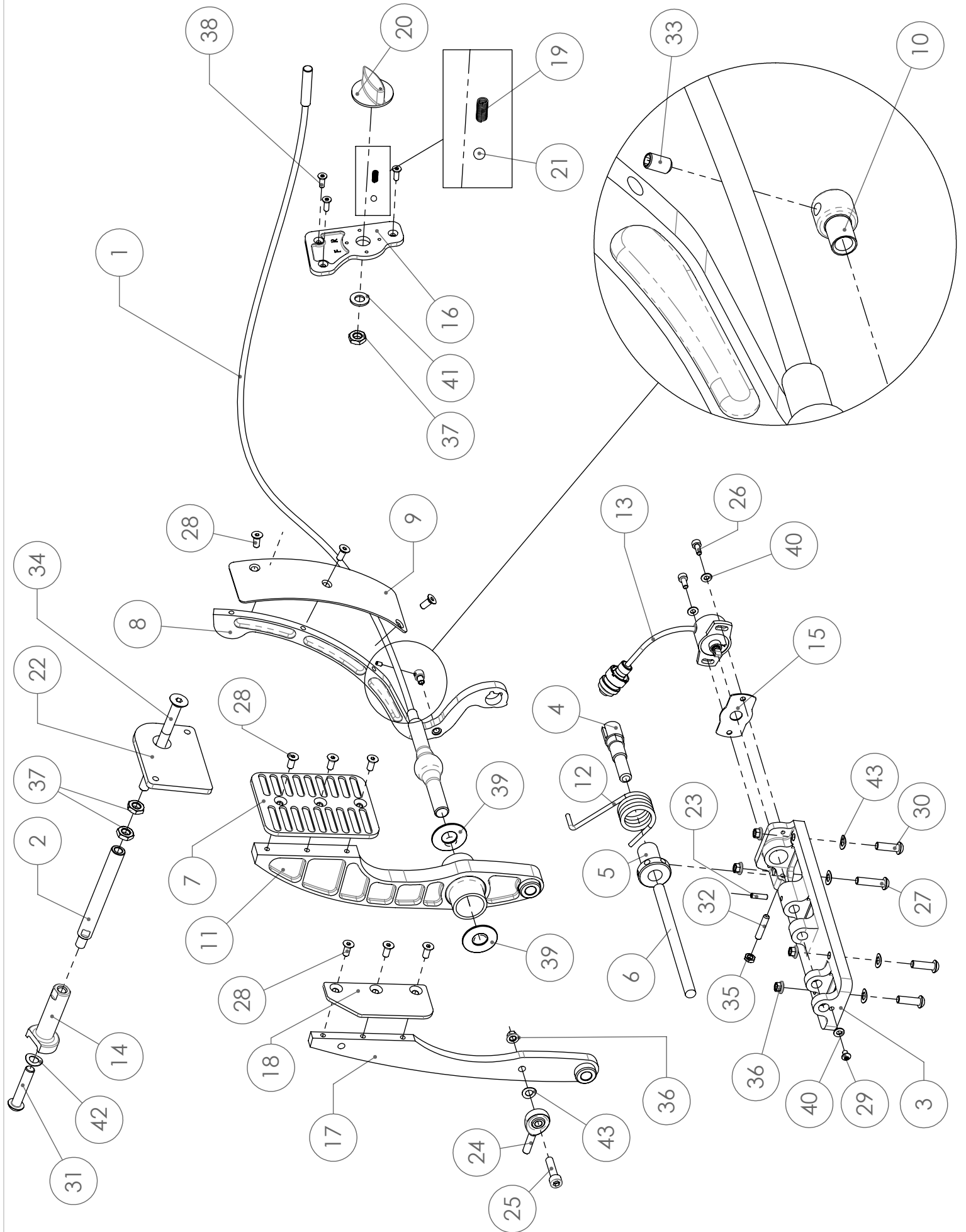
13A - REAR ROCKERS

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	010008010	Boccola	Bush	€ 17.64	12
2	010013035	Boccola DU	Self-lubricating Bush	€ 8.67	2
3	080608026A	MOLLA 600	Spring	€ 135.28	2
0	080608026C	MOLLA 800	Spring	€ 135.28	0
0	080608026E	MOLLA 1000	Spring	€ 135.28	0
4	161413002	Rocker posteriore completo	Rear rocker assy	€ 567.87	0
5	161413004	RARB ø 8	RARB ø 8	€ 218.19	1
6	161413005	RARB ø 10.5	RARB ø 10.5	€ 218.19	1
7	161413009	Supporto RARB	RARB Bracket	€ 85.73	2
8	161413010	Link RARB	Link RARB	€ 26.55	2
9	161413012	Supporto ammortizzatore	Damper bracket	€ 118.60	2
10	161413016	Rebound stop	Rebound stop	€ 85.18	1
11	161406019	Ammortizzatore posteriore	Rear damper	€ 862.60	2
12	RE-8ML	Testa a snodo	Rod end	€ 53.54	2
13	RE-8M	Testa a snodo	Rod end	€ 53.54	2
14	AN4-12A	Vite NAS	NAS bolt	€ 5.17	2
15	AN4-13A	Vite NAS	NAS bolt	€ 5.17	4
16	AN5-12A	Vite NAS	NAS bolt	€ 5.17	2
17	UNI5739-M8X40	Vite TE	HH Bolt	€ 2.05	2
18	UNI5931-M6X12	Vite TC	CH Bolt	€ 1.74	7
19	UNI5931-M8X20	Vite TC	CH Bolt	€ 2.05	4
20	AST-5/16	K-Nut	K-Nut	€ 5.26	2
21	AN365-1/4X28	Dado autobloccante	Self-locking Nut	€ 1.98	6
22	DIN980-M6	Dado autobloccante	Prevailing torque Nut	€ 1.98	2
23	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2.35	6
24	AN960-1/4	Rondella	Washer	€ 1.99	4
25	AN960-5/16	Rondella	Washer	€ 1.99	4
26	RS065160010	Rondella speciale 6.5x16x1	Special washer 6.5x16x1	€ 1.99	8
27	UNI5589-M8L	Dado esagonale basso	Thin Hex Nut	€ 2.35	2
28	RZS8	Rondella zigrinata	Safety Washer	€ 1.16	4
29	161406013005	Ghiera molla	Platform	€ 74.22	0



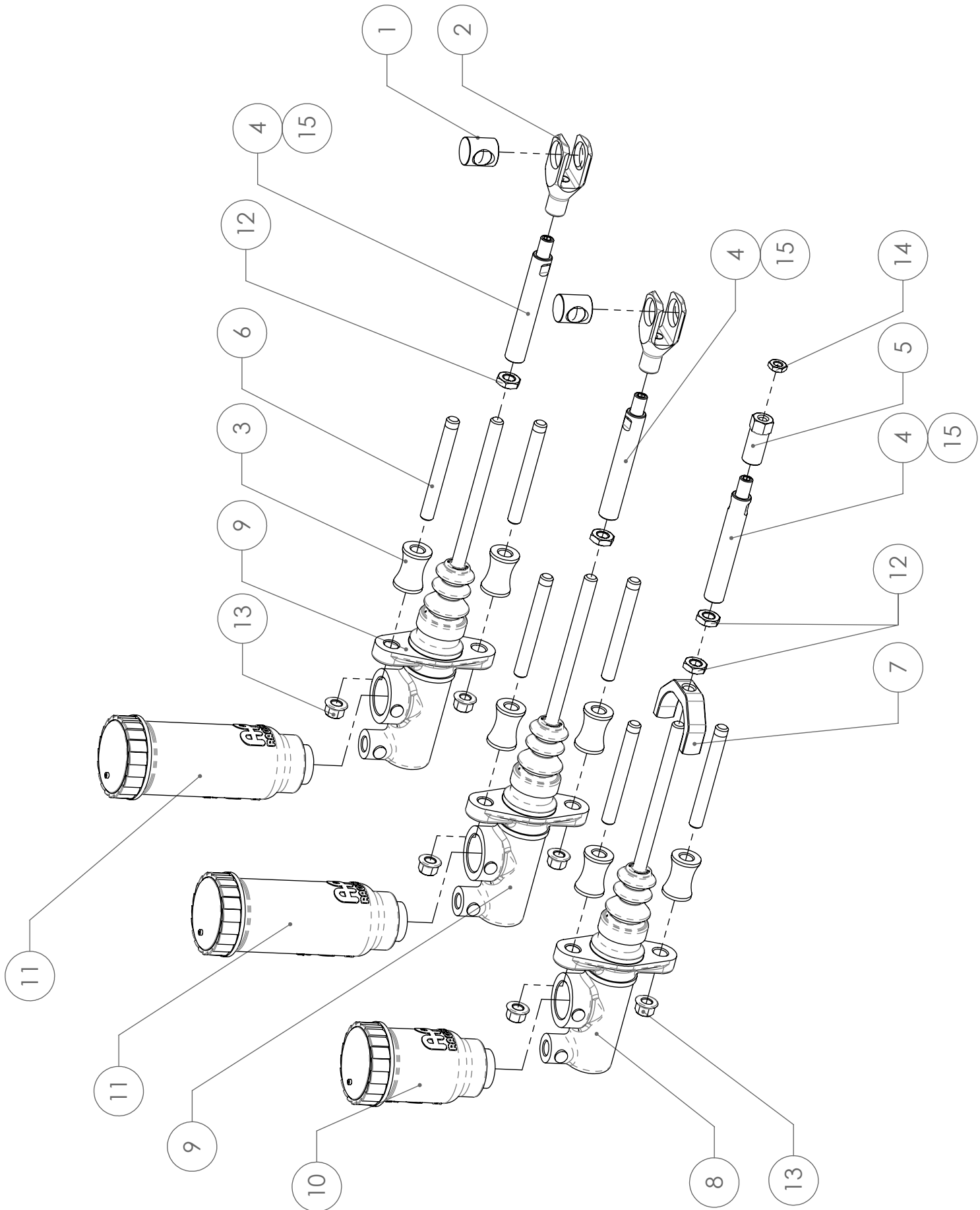
13B - REAR ROCKER

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1.1	161413003	Rocker posteriore	Rocker posteriore	€ 251.15	2
1.2	030205004	Boccola ABWT 5	Bush	€ 7.21	4
2	161413013	Perno Rocker post.	Rear rocker pivot	€ 96.10	2
3	161413014	Perno prigioniero rocker	Rear rocker stud	€ 73.72	2
4	161413015	Ghiera rocker	Rocker ring	€ 71.54	2
5	AS3047	Controralla	Thrust Bearing washer	€ 5.00	8
6	AXK3047	Cuscinetto reggispinta	Thrust bearing	€ 12.56	4
7	HK3012	Cuscinetto a rullini	Drawn cup needle roller bearing	€ 22.76	4
8	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5.42	2
9	RZS14	Rondella zigrinata	Safety washer	€ 1.99	2



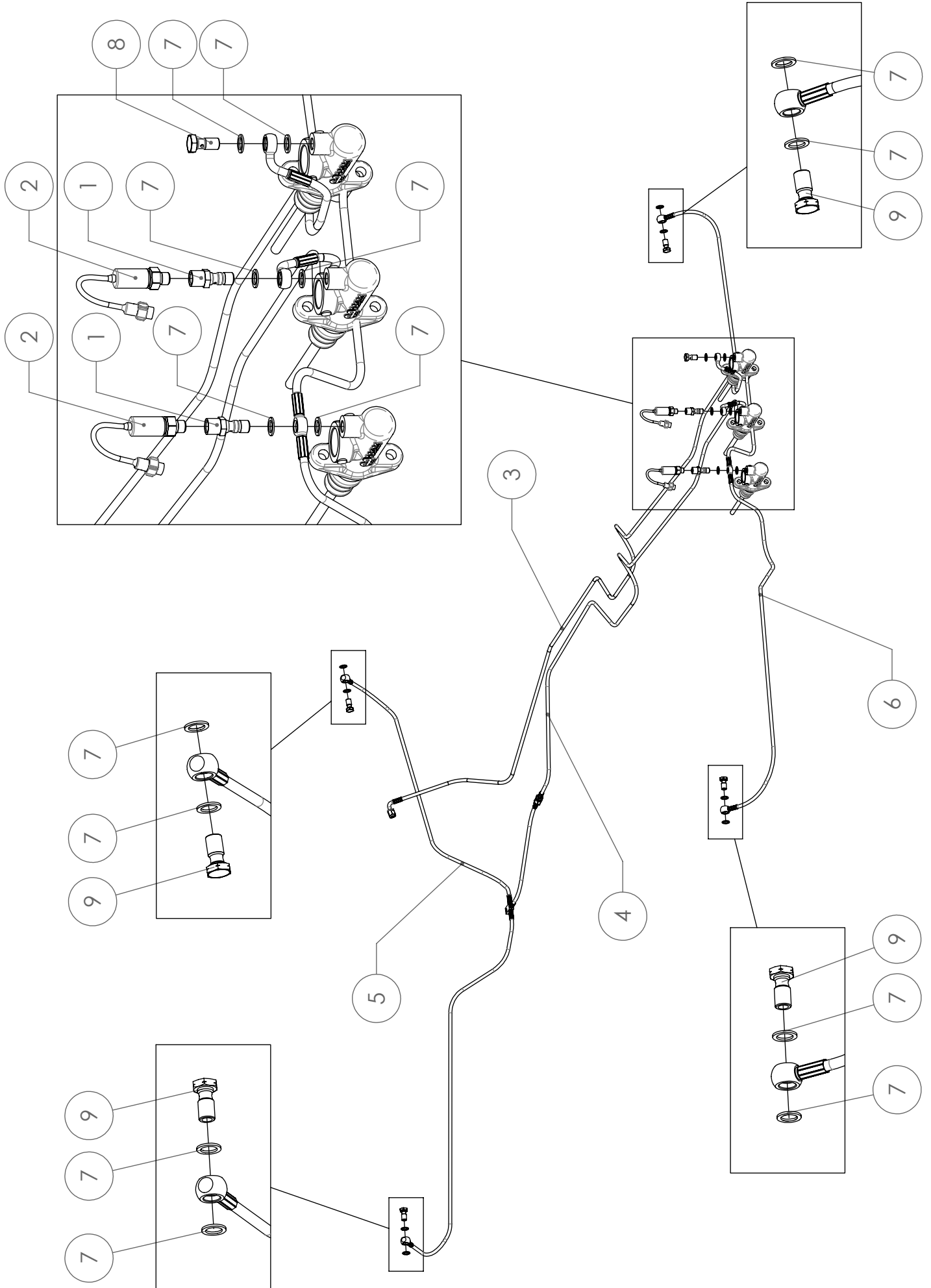
15 - PEDALS

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161815005	Cavo regolazione frenata	Brake bias cable	€ 157.27	1
2	161425002	Distanziale	Stay	€ 26.02	1
3	090915001	Piastra base pedaliera	Pedals mount base	€ 266.23	1
4	090915003	Perno acceleratore	Throttle pedal pivot	€ 81.49	1
5	090915004	Guida molla torsionale	Spring carrier	€ 63.51	1
6	090915005	Perno pedali	Pedals pivot	€ 16.88	1
7	090915006	Piastra pedale freno	Brake pedal pad	€ 61.12	1
8	090915007	Pedale acceleratore	Throttle pedal	€ 133.48	1
9	090915008	Piastra pedale acceleratore	Throttle pedal pad	€ 21.94	1
10	090915010	Arresto molla	Spring holder	€ 17.58	1
11	090915011	Pedale freno	Brake pedal	€ 182.64	1
12	090915012	Molla torsionale	Torsional spring	€ 21.10	1
13	090915013	Potenziometro acceleratore	Throttle potentiometer	€ 281.68	1
14	090915014	Supporto puntalino	Rod base	€ 50.60	1
15	090915018	Rasamento potenziometro	Potentiometer shim	€ 5.99	1
16	090901007	Piastra ripartitore	Bias knob plate	€ 95.31	1
17	010015003	Pedale frizione	Clutch pedal	€ 96.86	1
18	010015006	Piastra pedale frizione	Clutch pedal pad	€ 36.50	1
19	010015033	Molla	Spring	€ 2.09	1
20	010015035	Manopola ripartitore	Brake bias knob	€ 98.47	1
21	010015034	Sfera	Ball	€ 1.15	1
22	161415002	Fermo pedale	Pedal stop	€ 37.15	1
23	UNI6873-4	Spina elastica	Slotted spring pin	€ 1.44	1
24	CM6-M6	Testa a snodo	Rod end	€ 17.78	1
25	UNI5931-M6X25	Vite TC	CH Bolt	€ 1.74	1
26	UNI5931-M4X10	Vite TC	CH Bolt	€ 1.44	2
27	UNI7380-M6X25	Vite TB	BH Bolt	€ 1.74	1
28	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1.74	9
29	UNI7380-M4X6	Vite TB	BH Bolt	€ 1.44	1
30	UNI7380-M6X20	Vite TB	BH Bolt	€ 1.74	3
31	UNI7380-M8X50	Vite TB	BH Bolt	€ 2.05	1
32	UNI5923-M5X25	Grano	Dowel	€ 1.99	1
33	UNI5929-M3X5	Grano	Dowel	€ 1.95	1
34	UNI5933-M8X100	Vite TS	CSH Bolt	€ 2.05	1
35	UNI5589-M5	Dado esagonale basso	Thin Hex Nut	€ 1.98	1
36	AST-06	K-Nut	K-Nut	€ 5.26	5
37	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2.35	3
38	UNI5933-M4X12	Vite TS	Bolt	€ 1.44	3
39	RS130300015	Rondella speciale	Special washer	€ 2.54	2
40	UNI6592-4	Rondella	Washer	€ 1.16	3
41	UNI6592-8	Rondella	Washer	€ 1.16	1
42	UNI8840B-8	Rondella ondulata	Crinkle Washer	€ 1.16	1
43	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1.16	6



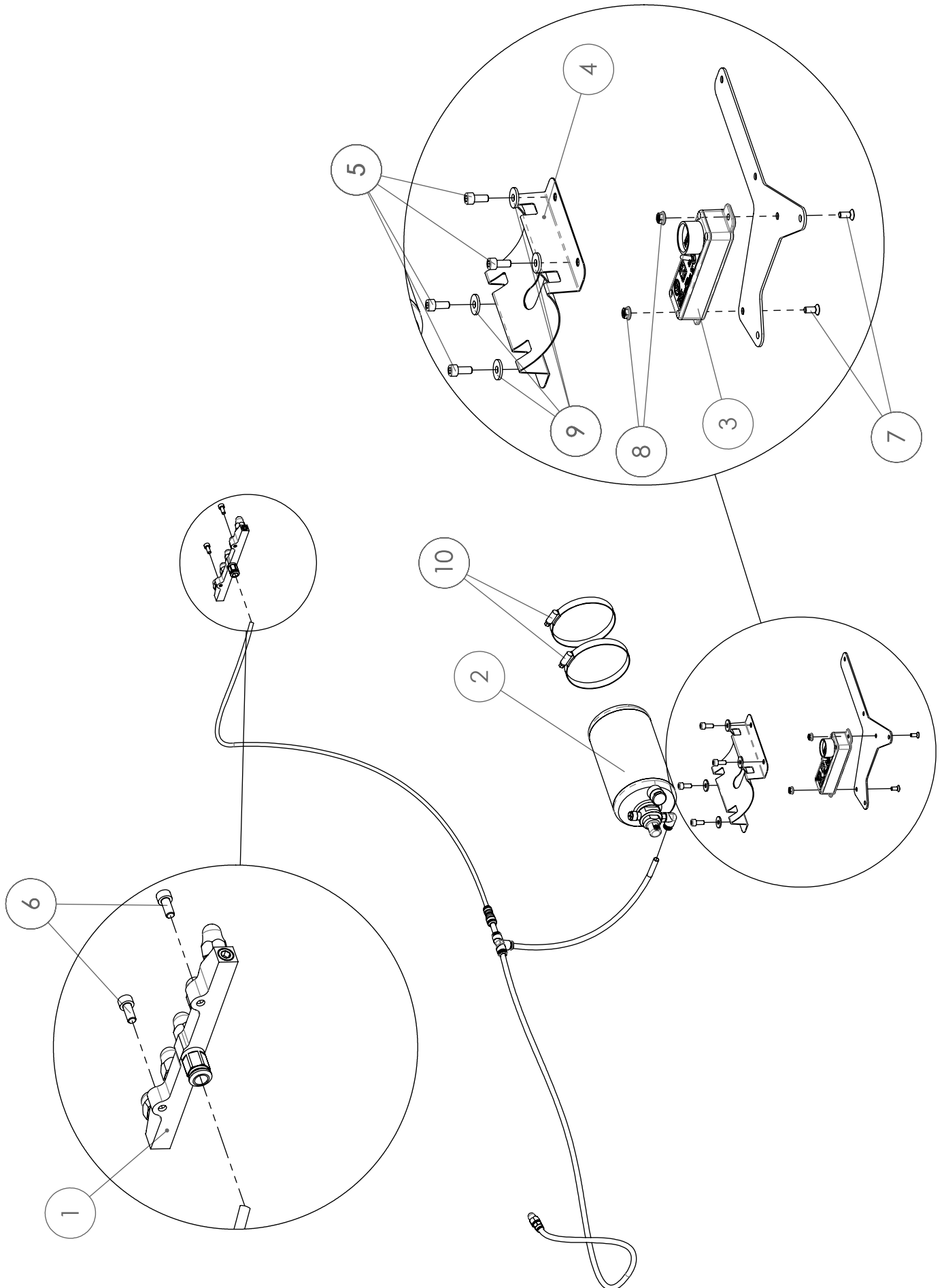
16A - MASTER CYLINDERS

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161816006	Boccola	Bush	€ 22.51	2
2	161816007	Forcella ripartitore freni	Brake bias clevis	€ 67.26	2
3	010016011	Distanziale pompe	Master cylinder spacer	€ 14.67	6
4	080616009	Puntalino 73 mm	Master cylinder rod 73 mm	€ 23.84	3
5	090916002	Adattatore	Clutch pedal rod	€ 31.62	1
6	010011019	Prigioniero	Stud	€ 7.92	6
7	101016010	Finecorsa Frizione	Clutch stop	€ 31.96	1
8	CP2623-90	AP master cylinder 5/8"	AP master cylinder 5/8"	€ 154.14	1
9	CP2623-91	AP master cylinder 0.7"	AP master cylinder 0.7"	€ 154.14	2
10	CP4709-12	Serbatoio SMALL AP	AP SMALL reservoir	€ 46.37	0
11	CP4709-11	Serbatoio MEDIUM AP	AP MEDIUM reservoir	€ 46.37	0
12	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2.35	4
13	DIN6927-M8	Dado flangiato autobloccante	Prevailing torque Nut	€ 2.48	6
14	UNI5589-M6	Dado esagonale basso	Thin Hex Nut	€ 1.98	1
15	161516005	Puntalino 200 mm	Master cylinder rod 200mm	€ 23.84	0



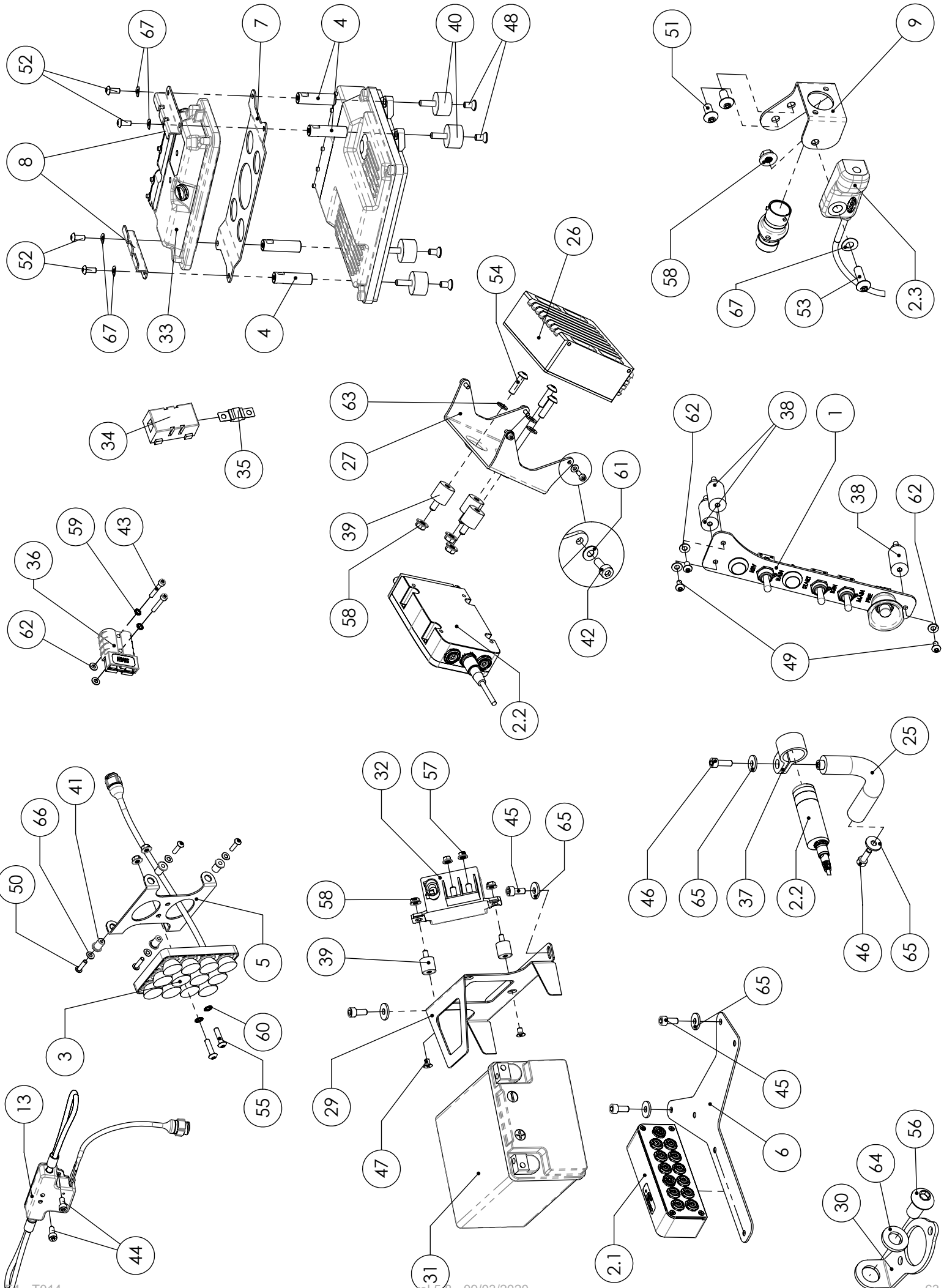
16B - BRAKE-CLUTCH LINES

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	090916008	Adattatore sensore pressione	Pressure sensor adapter	€ 44.97	2
2	090916001	Sensore pressione (100bar)	Pressure sensor (100bar)	€ 337.17	2
3	161416001	Tubo frizione	Clutch Hose	€ 72.90	1
4	161416002	Tubo freno posteriore	Rear brake hose	€ 67.51	1
5	161416003	Tubo freno post 3 vie	Rear 3-ways brake hose	€ 87.61	1
6	161416004	Tubo freno anteriore	Front brake hose	€ 80.73	1
7	4451603	Rondella	Washer	€ 1.70	14
8	77503	Vite banjo	Banjo bolt	€ 4.57	1
9	9920331	Vite banjo	Banjo bolt	€ 4.57	4

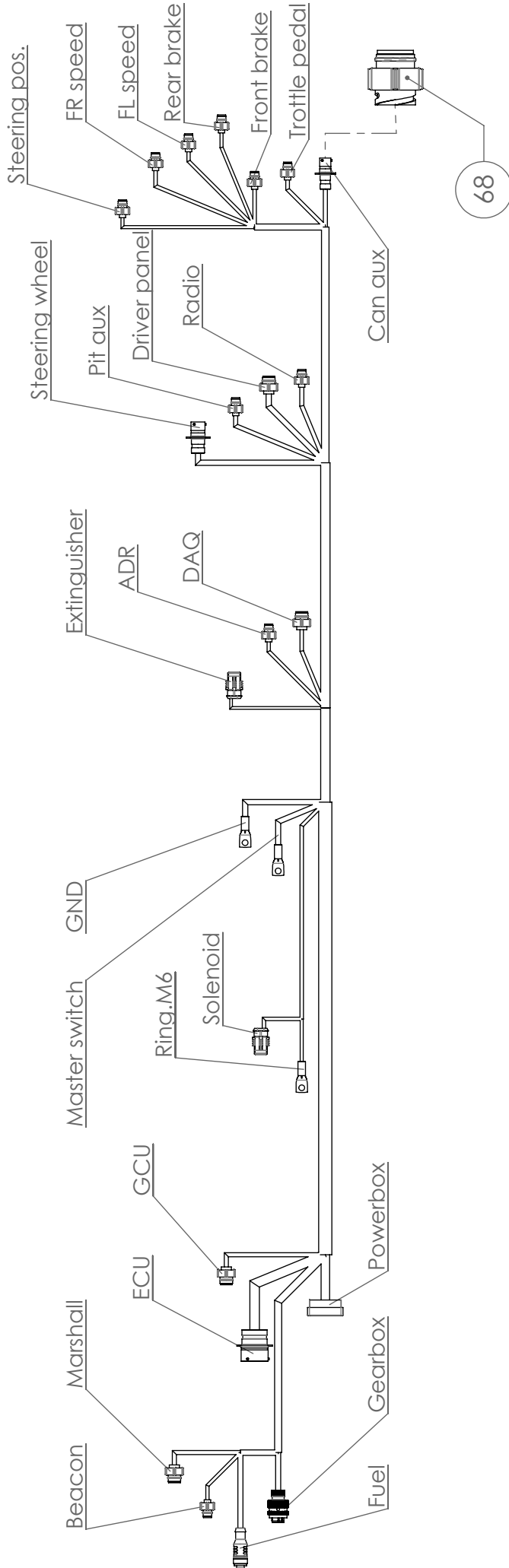


17 - FIRE EXTINGUISHER

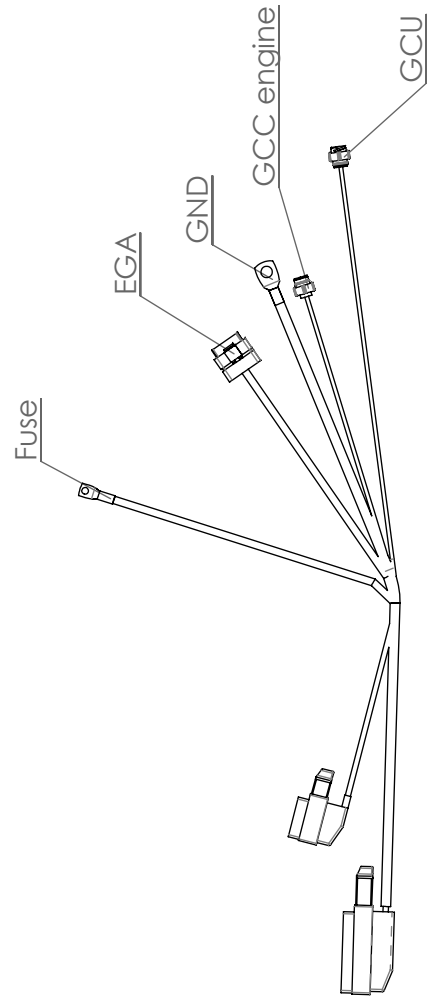
Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	101017001	Ugelli vano motore	Engine bay extinguisher nozzle	€ 70.14	1
2	CEFAL3	Estintore	Extinguisher bottle	€ 694.44	1
3	CD398	Centralina estintore	Extinguisher control box	€ 90.71	0
4	XCD300E	Supporto Estintore	Extinguisher holder	€ 23.49	0
5	UNI5931-M6X14	Vite TC	CH Bolt	€ 1.74	4
6	UNI5931-M5X12	Vite TC	CH Bolt	€ 1.74	2
7	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1.74	2
8	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	2
9	UNI6593-6	Rondella	Washer	€ 1.16	4
10	ABA6487112	Fascetta Aba	Clamp	€ 11.55	0



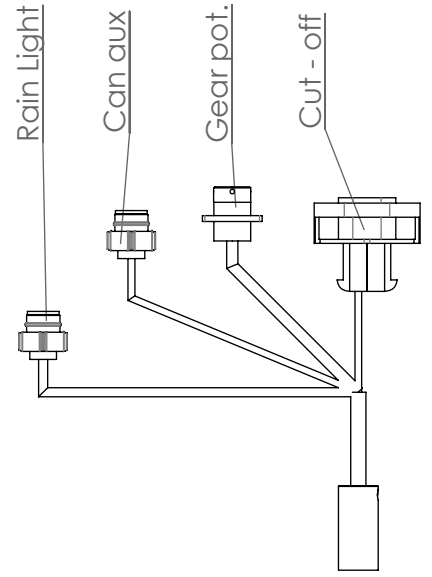
10 CHASSIS LOOM



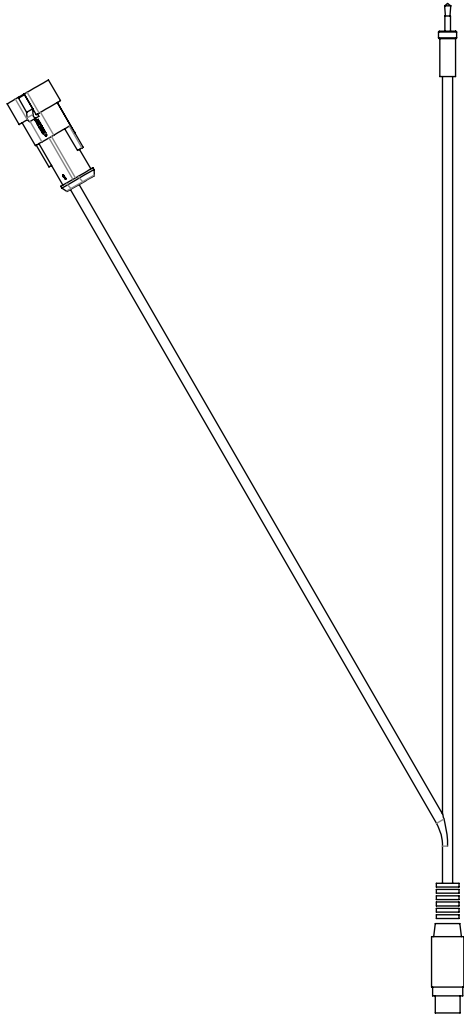
12 GCC LOOM



11 GEARBOX LOOM

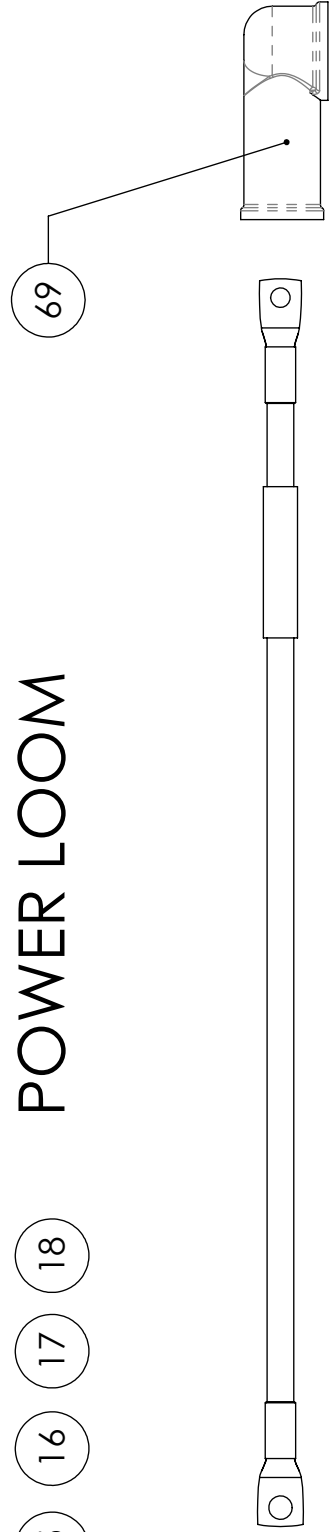


28 OMP EXTINGUISHER LOOM

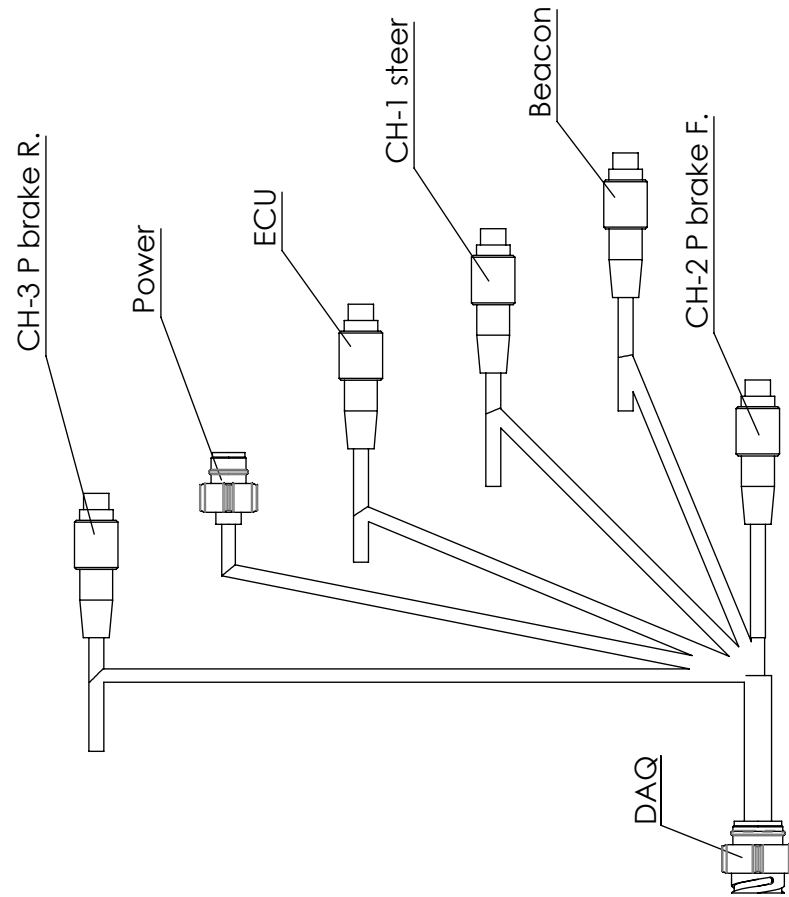


POWER LOOM

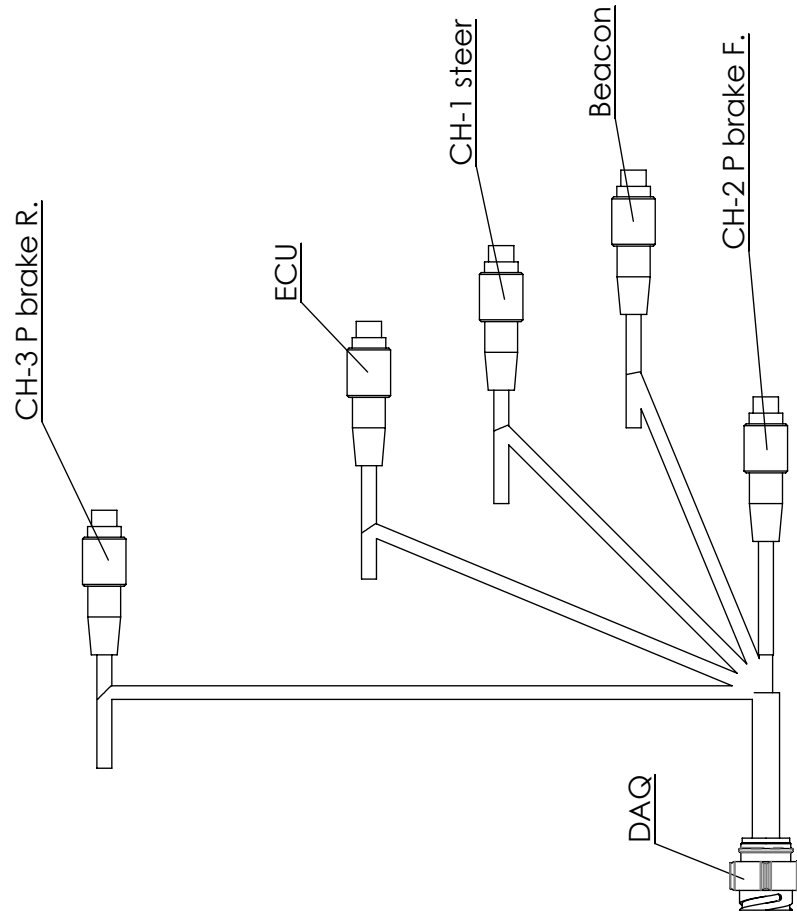
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19 AIM EVO4 LOOM



20 AIM EVO4S LOOM

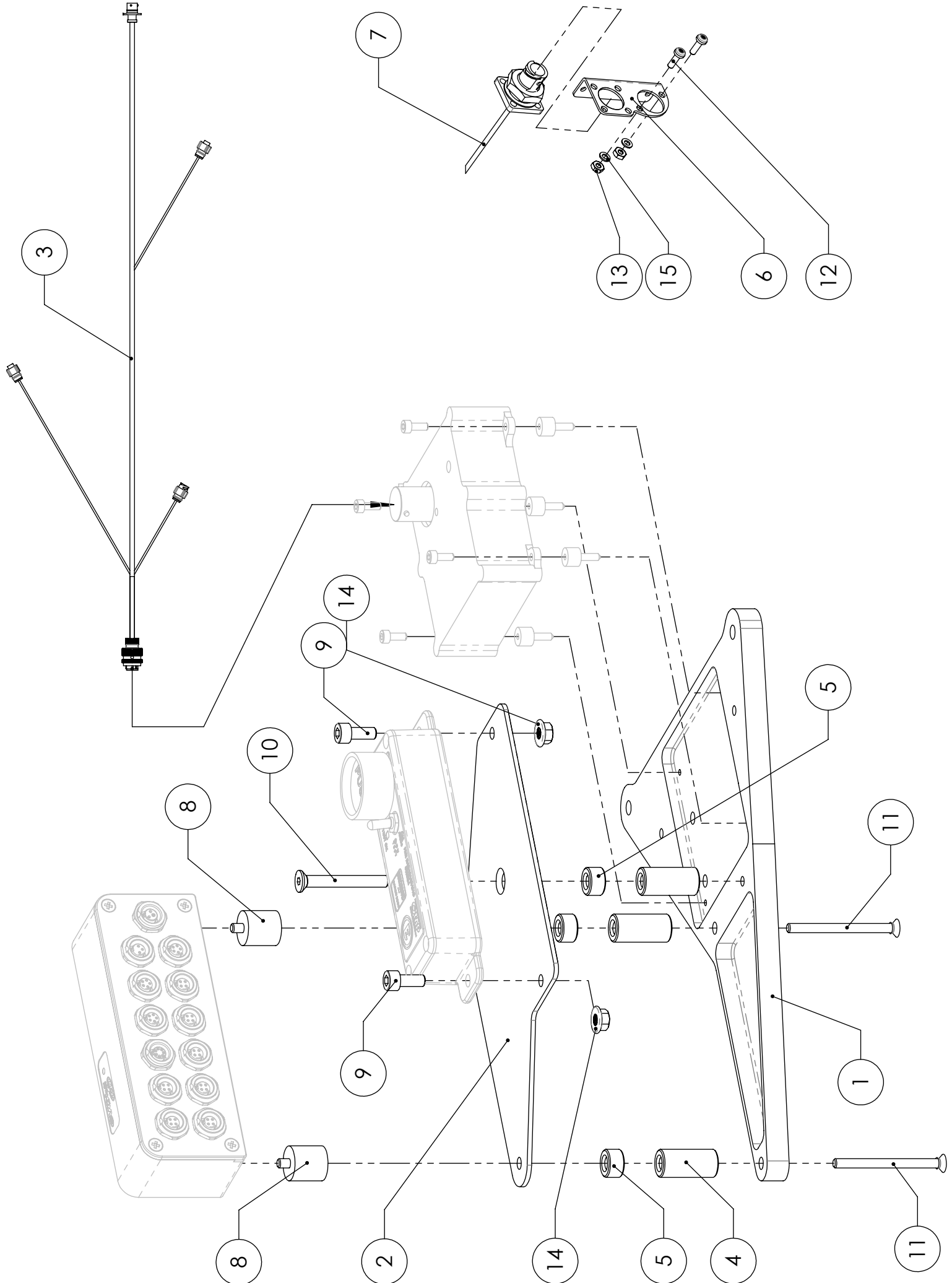


18 - ELECTRIC SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161418001	Plancia strumenti	Switch panel	€ 459.16	1
2.1	X61E4S2203	Logger AIM EVO4S	Logger AIM EVO4S	€ 1'131.08	1
2.2	X96SHG010S0	Camera AIMSMARTYCAM	AIM video system	€ 1'029.19	1
2.3	X41RX12090	Beacon RX AIM	Lap trigger RX	€ 147.42	1
3	161418003	Fanale posteriore	Rear light	€ 360.33	1
4	161418005	Distanziale GCC	GCC spacer	€ 13.67	4
5	161718039	Supporto Fanale	Rear light bracket	€ 52.42	1
6	161418008	Staffa elettronica	Electronic carrier	€ 18.69	1
7	161418009	Staffa GCC	GCC carrier	€ 18.36	1
8	161418010	Blocco GCC	GCC holder	€ 9.84	2
9	161418011	Staffa beacon	Laptrigger bracket	€ 15.30	1
10	161418015	Impianto vettura	Chassis loom	€ 1'707.70	1
11	161418016	Impianto cambio	Gearbox loom	€ 311.20	1
12	161418017	Impianto GCC	GCC loom	€ 543.76	1
13	161418018	Marshall switch mk.2	Marshall switch mk.2	€ 231.81	1
14	161418019	+12V Batteria-MS	+12V Battery-MS	€ 52.42	1
15	161418020	+12V MS - alternatore	+12V MS - alternator	€ 95.01	1
16	161418021	+12V Alternatore-Starter	+12V Alternator-Starter	€ 78.63	1
17	161418022	GND batteria-motore	GND battery-engine	€ 91.74	1
18	161418023	+12V fusibile GCC	+12V fuse	€ 34.95	1
19	161418024	Impianto DAQ AIM EVO4	AIM EVO4 loom	€ 347.23	0
20	161918024	Impianto DAQ AIM EVO4S	AIM EVO4S loom	€ 358.70	1
21	161418025	Antenna GPS AIM	AIM GPS Antenna	€ 70.35	1
22	161418026	Impianto CAN AIM	AIM CAN loom	€ 64.44	1
23	161418027	Impianto LVDS AIM	AIM LVDS loom	€ 130.60	1
24	161418028	Impianto dati AIM	AIM Com loom	€ 84.64	1
25	161418030	Supporto camera	Camera bracket	€ 49.70	1
26	162018041	Powerbox PSD9 (T014 Abarth)	PSD9 Powerbox (T014 Abarth)	€ 761.68	1
27	101018006	Supporto powerbox	PSD9 bracket	€ 32.66	1
28	101018009	Impianto estintore OMP	OMP extinguisher loom	€ 89.12	1
29	090918001	Staffa batteria	Battery holder	€ 35.85	1
30	080701055	supporto connettore scarico dati	download loom bracket	€ 9.32	1
31	ETX15L	Batteria standard	Standard battery	€ 210.05	1
32	TYCO-HCR-300-A	Master switch	Master switch	€ 121.52	1
33	083815307300	GCC	GCC	€ 1'880.20	1
34	04980900ZXT	Portafusibile	Fusebox	€ 22.94	1
35	0498080	Fusibile 80A	Fuse	€ 3.84	1
36	030218048	Spina Anderson	Anderson Jack plug	€ 25.76	1
37	LST56648A	Staffa di fissaggio Smartycam	Smartycam bracket	€ 21.21	1
38	PUFM415X25MF	Puffer	Silent Block	€ 7.56	3
39	PUFM515X15MF	Puffer	Silent Block	€ 7.56	5

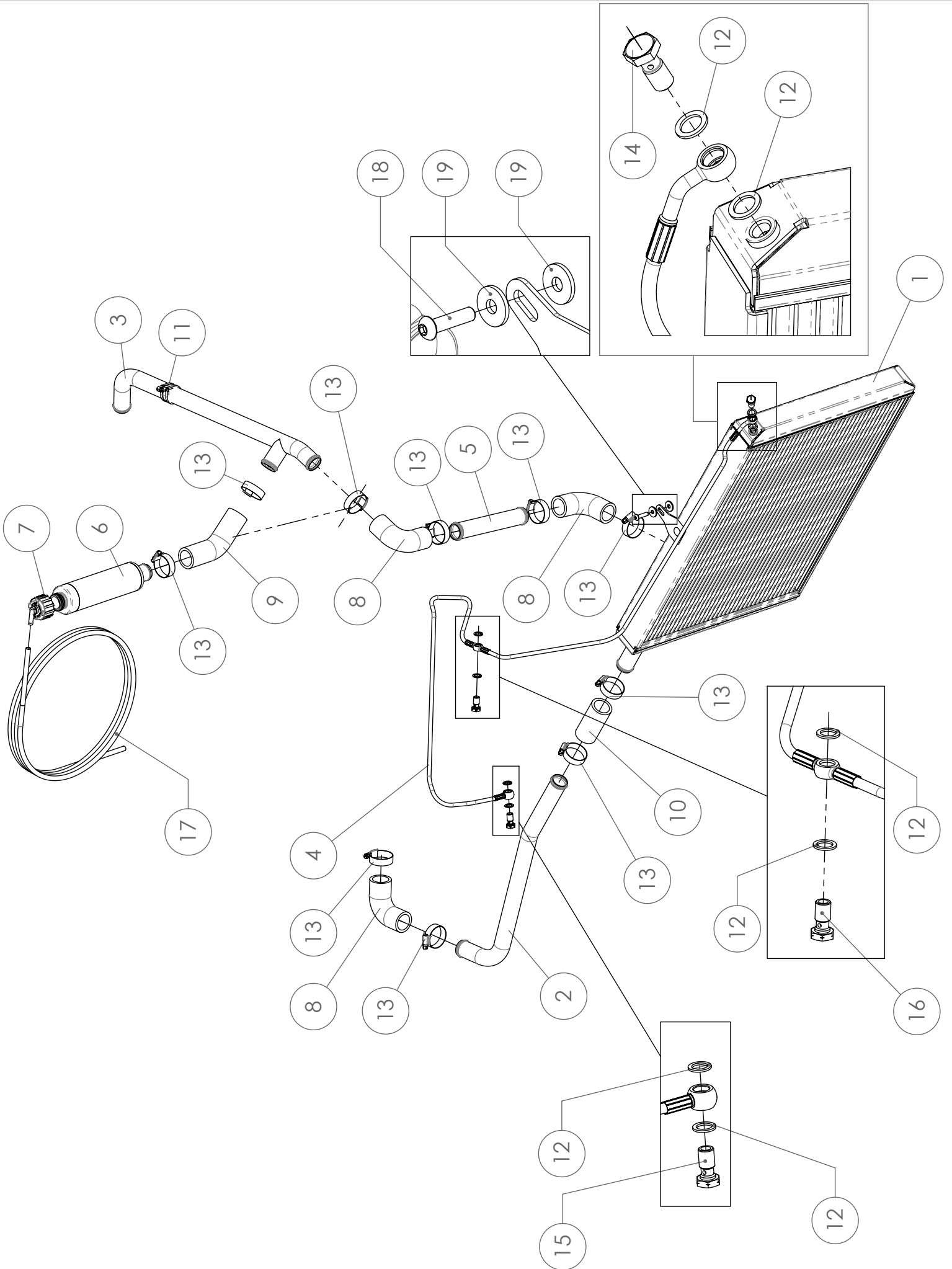
18 - ELECTRIC SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
40	PUFM625X15MF	Puffer	Silent block	€ 7.56	4
41	E0790410	Puffer M4	Silent block	€ 8.21	4
42	UNI5931-M3X8	Vite TC	CH bolt	€ 1.44	4
43	UNI5931-M4X25	Vite TC	CH bolt	€ 1.44	2
44	UNI5931-M5X12	Vite TC	CH Bolt	€ 1.74	2
45	UNI5931-M6X14	Vite TC	CH bolt	€ 1.74	4
46	UNI5931-M6X18	Vite TC	CH Bolt	€ 1.74	2
47	UNI5933-M5X8	Vite TS	CSH Bolt	€ 1.74	2
48	UNI5933-M6X12	Vite TS	CSH Bolt	€ 1.74	4
49	UNI7380-M4X8	Vite TB	BH Bolt	€ 1.44	3
50	UNI7380-M4X16	Vite TB	BH Bolt	€ 1.44	4
51	UNI7380-M5X10	Vite TB	BH Bolt	€ 1.74	2
52	UNI7380-M5X12	Vite TB	BH Bolt	€ 1.74	4
53	UNI7380-M5X16	Vite TB	BH Bolt	€ 1.74	1
54	UNI7380-M5X18	Vite TB	BH Bolt	€ 1.74	3
55	UNI7380-M5X20	Vite TB	BH bolt	€ 1.74	2
56	UNI7380-M6X10	Vite TB	BH bolt	€ 1.74	1
57	AST-06	K-Nut	K-Nut	€ 5.26	2
58	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	8
59	RZS4	Rondella zigrinata	Safety washer	€ 1.16	2
60	RZS5	Rondella zigrinata	Safety washer	€ 1.16	2
61	UNI6592-3	Rondella	Washer	€ 1.16	4
62	UNI6592-4	Rondella	Washer	€ 1.16	5
63	UNI6592-5	Rondella	Washer	€ 1.16	3
64	UNI6592-6	Rondella	Washer	€ 1.16	1
65	UNI6593-6	Rondella larga	Large washer	€ 1.16	6
66	UNI8840B-4	Rondella Ondulata	Crinkle washer	€ 1.16	4
67	UNI8840B-5	Rondella Ondulata	Crinkle washer	€ 1.16	5
68	090918020	Terminazione CAN	CAN plug	€ 51.39	1



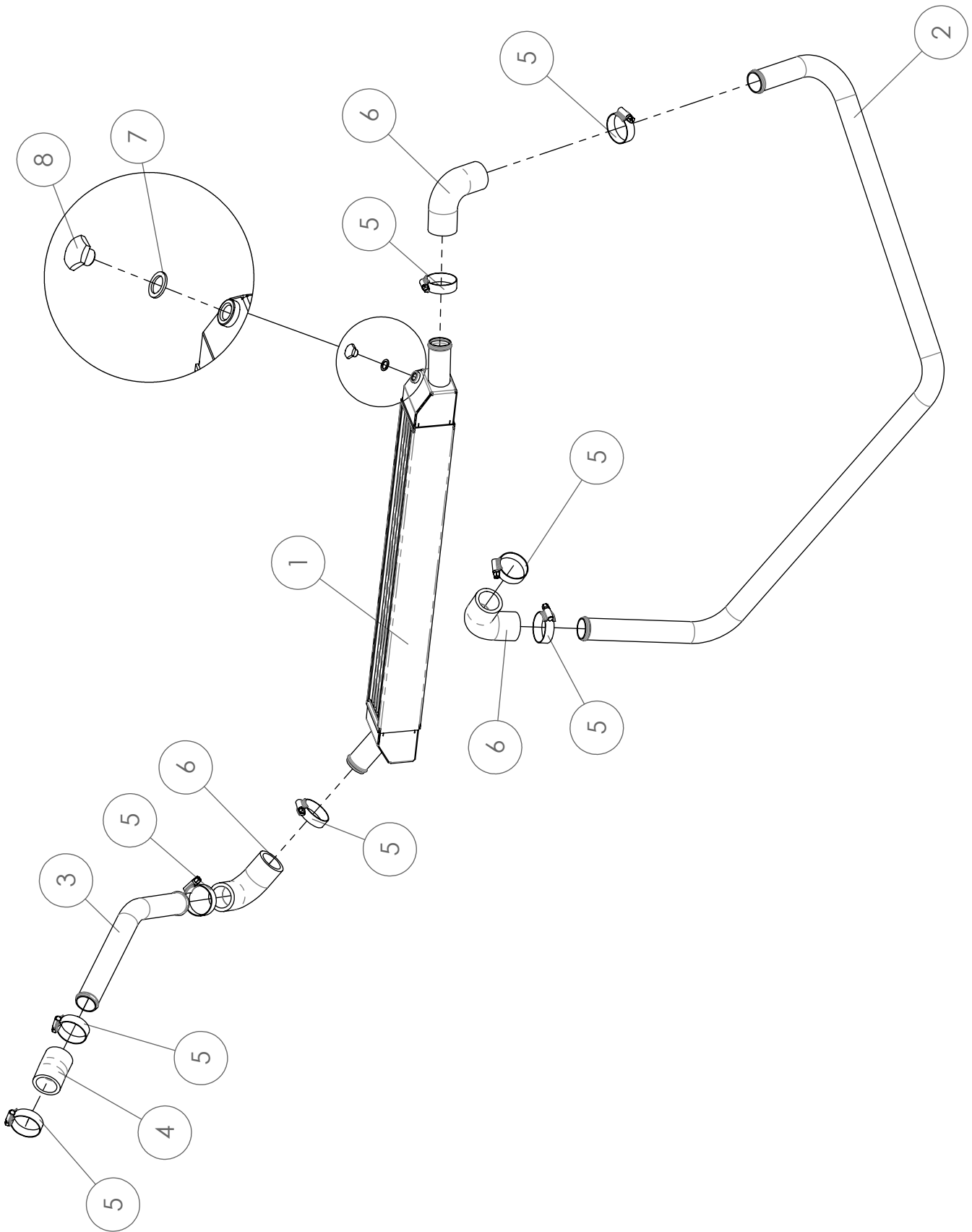
18F - ADR EMM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161518008	Staffa elettronica	Electronic carrier (ADR)	€ 63.61	1
2	161518031	Piastra elettronica (ADR_EM)	Electronic plate (ADR_EM)	€ 18.69	1
3	161518032	Cablaggio ADR	ADR Loom	€ 365.73	1
4	161518033	Distanziale	Spacer	€ 13.67	3
5	161718038	Distanziale	Spacer	€ 3.88	3
6	161518034	Staffa ASL	ASL bracket	€ 15.30	1
7	161518036	LED remoto	Remote LED	€ 86.38	1
8	161918040	PUFM415x15 con stelo tagliato L5	Cut AV bushing (M415x15) L5	€ 11.12	2
9	UNI5931-M5X12	Vite TC	CH Bolt	€ 1.74	2
10	UNI5933-M5X40	Vite TS	CSH Bolt	€ 1.74	1
11	UNI5933-M4X50	Vite TS	CSH Bolt	€ 1.44	2
12	UNI7687-M2,5X8	Vite TI	CRPH Screw	€ 1.44	2
13	UNI5588-M2,5	Dado	Nut	€ 1.44	2
14	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	2
15	UNI6592-2,5	Rondella	Washer	€ 1.16	2
---	161518037	Kit ADR EMM	EMM ADR Kit	€ 641.81	0



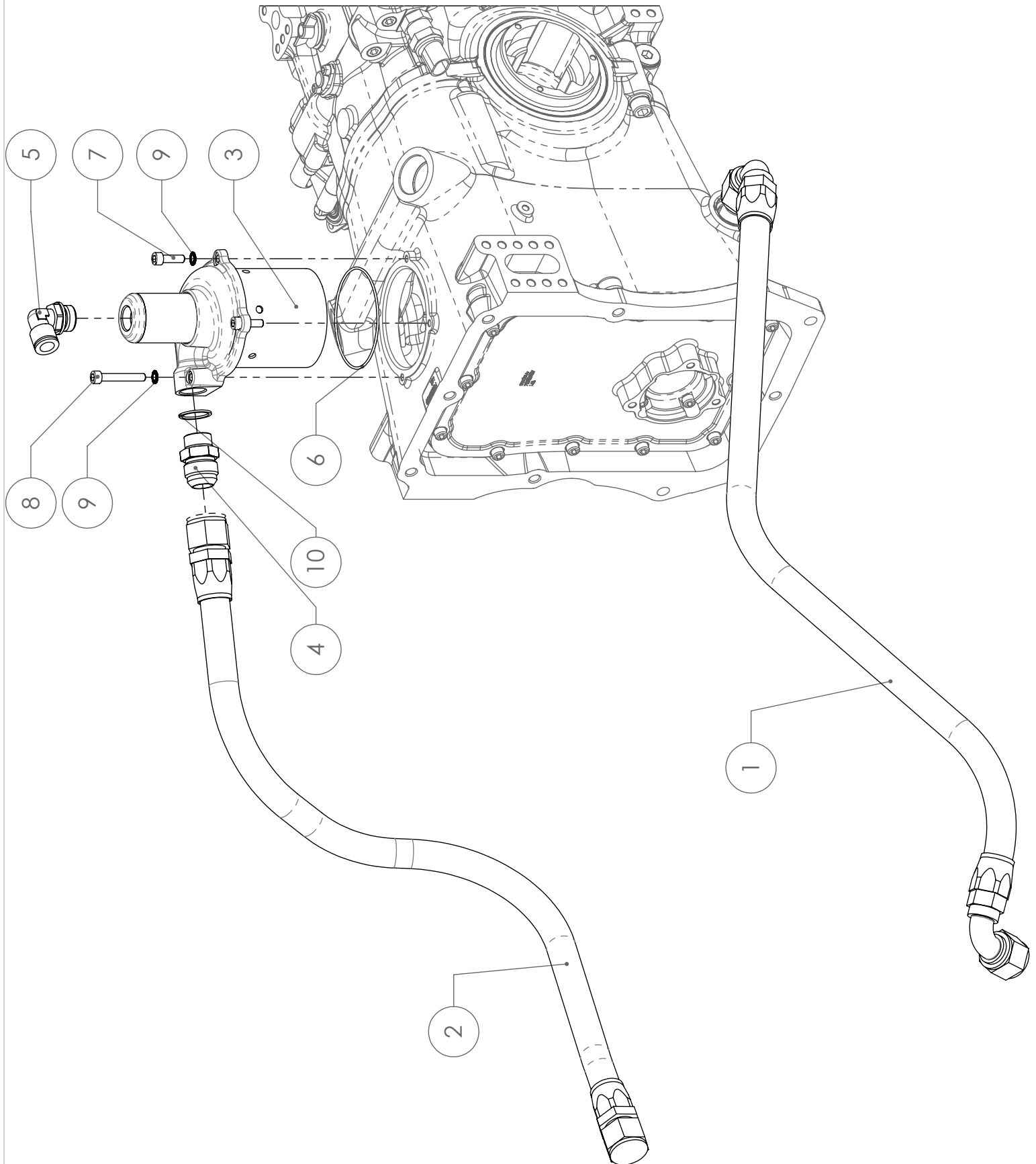
19A - WATER SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161919001	Radiatore	Water radiator	€ 468.28	1
2	161419002	Tubo uscita motore	Engine outlet pipe	€ 180.17	1
3	161419007	Tubo incrocio	Crossing pipe	€ 234.77	1
4	161419012	Tubo sfiato	Bleed line	€ 109.73	1
5	161419013	Tubo	Pipe	€ 49.15	1
6	091019008	Vaso espansione acqua	water tank	€ 194.42	1
7	090919010	Tappo vaso espansione	Water cap	€ 9.92	1
8	E9028	Manicotto	Silicon hose	€ 33.11	3
9	E4528	Manicotto	Silicon hose	€ 38.11	1
10	SCH28	Manicotto	Silicon hose	€ 21.88	1
11	PAS028	Fascetta Ø28	Clamp	€ 6.68	1
12	4451603	Rondella rame	Copper washer	€ 1.70	6
13	010019016	Fascetta	Clamp	€ 4.77	10
14	77503	Vite banjo	Banjo bolt	€ 4.57	1
15	9920332P	Vite banjo	Banjo bolt	€ 4.57	1
16	9920331	Vite banjo	Banjo bolt	€ 4.57	1
17	161419018	Tubo elastolan ø8x6 L670	Elastolan hose ø8x6 L670	€ 8.49	1
18	UNI7380-M6X25	Vite TB	BH Bolt	€ 1.74	1
19	UNI6593-6	Rondella larga	Large washer	€ 1.16	2



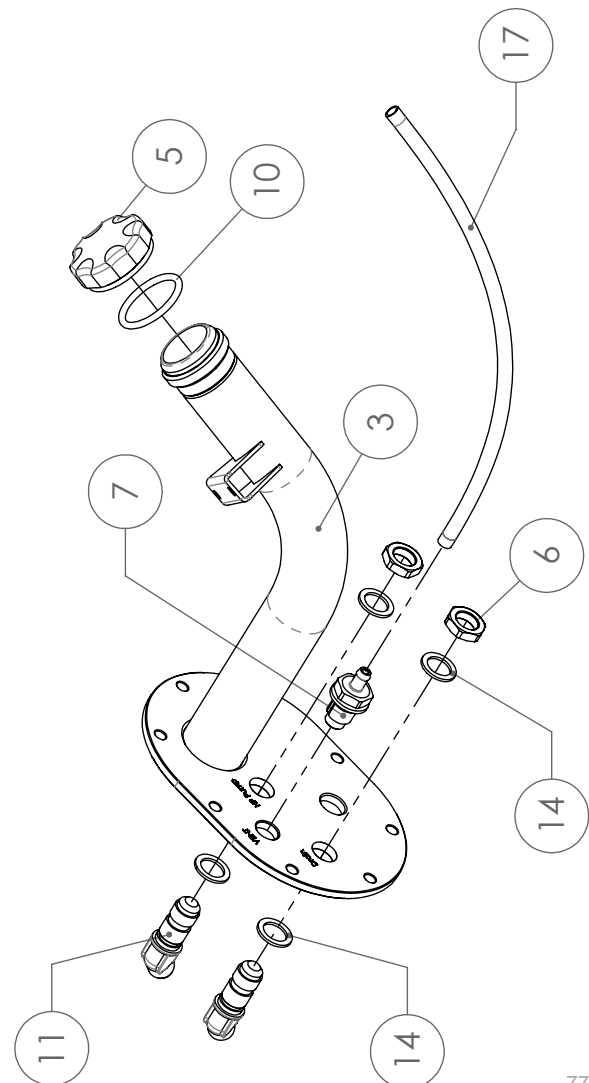
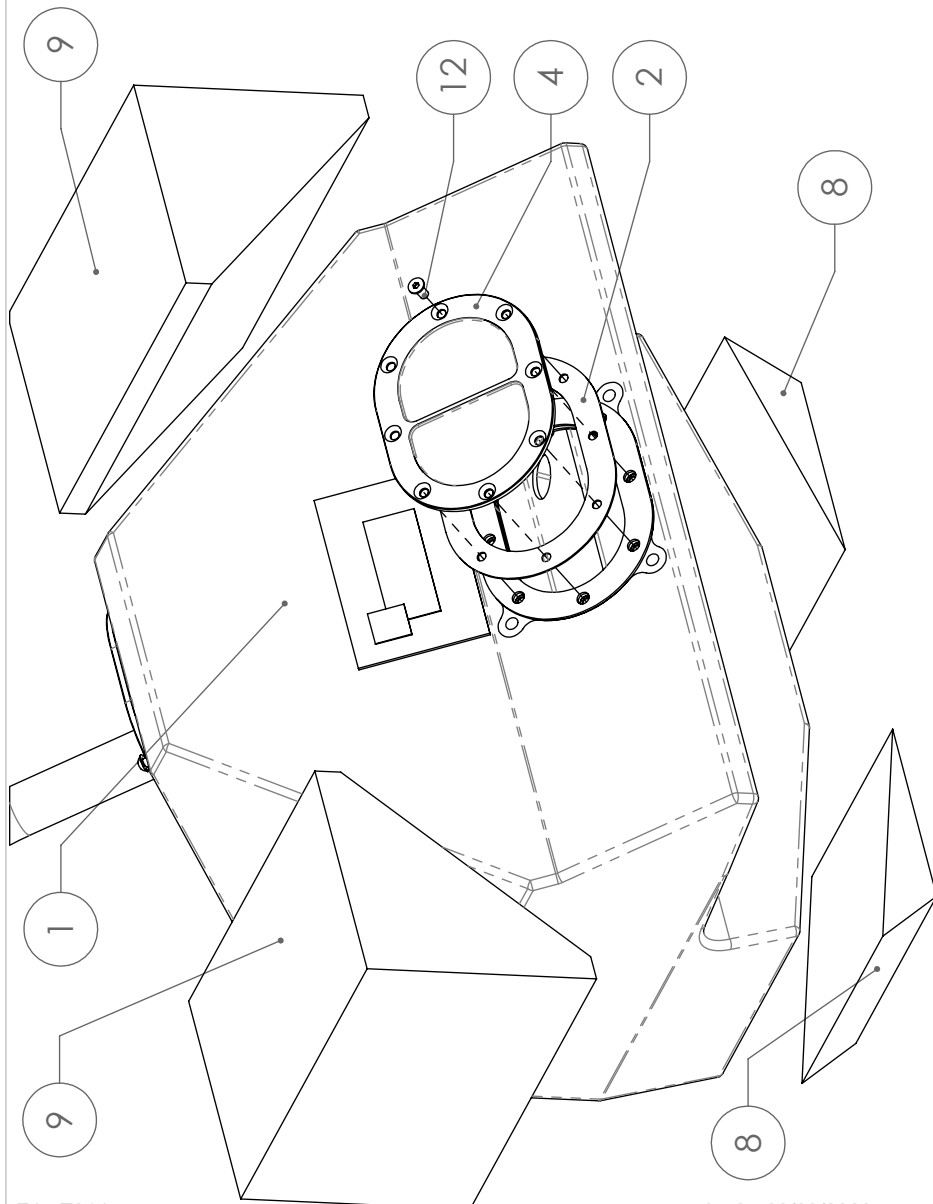
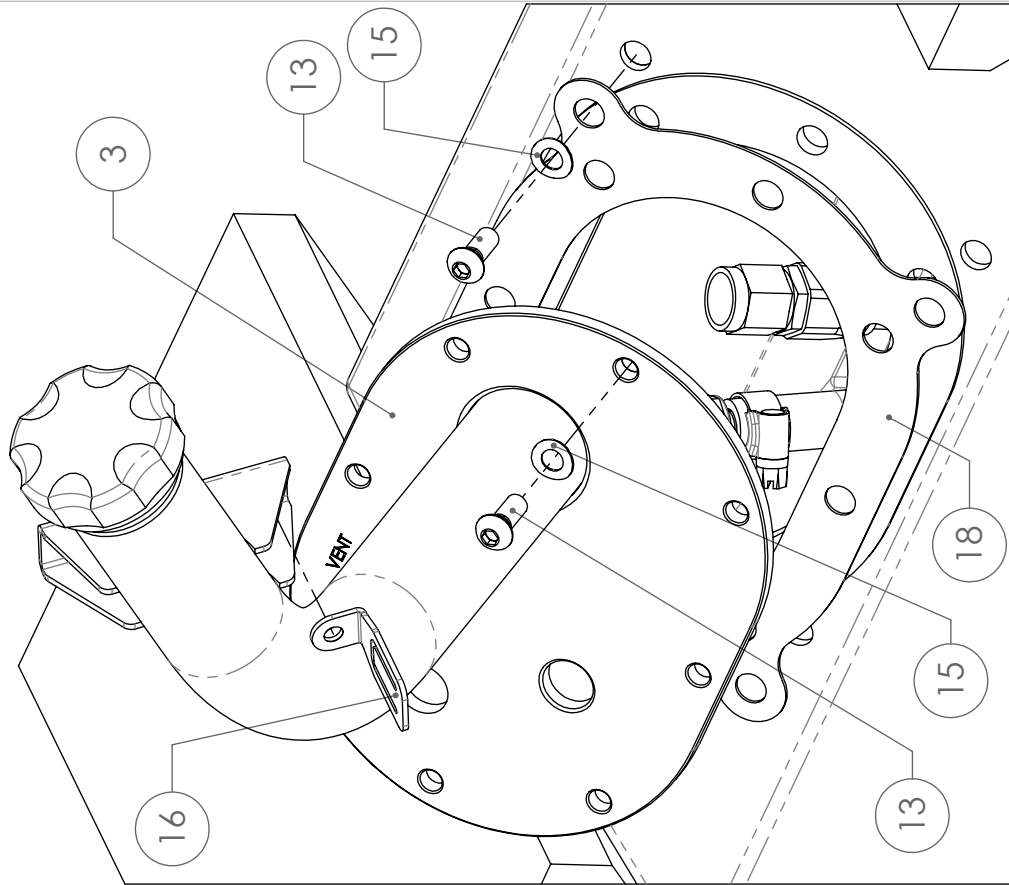
19B - WATER SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161419009	Radiatore	Water radiator	€ 155.41	1
2	161419014	Tubo mandata radiatore	Radiator inlet pipe	€ 245.69	1
3	161419015	Tubo ritorno pompa	Water pump inlet pipe	€ 180.17	1
4	SCH28	Manicotto	Silicon hose	€ 21.88	1
5	010019016	Fascetta	Clamp	€ 4.77	8
6	E9028	Manicotto	Silicon hose	€ 33.11	3
7	4451603	Rondella rame	Copper washer	€ 1.70	1
8	010619017	Tappo radiatore	Radiator cap	€ 3.69	1



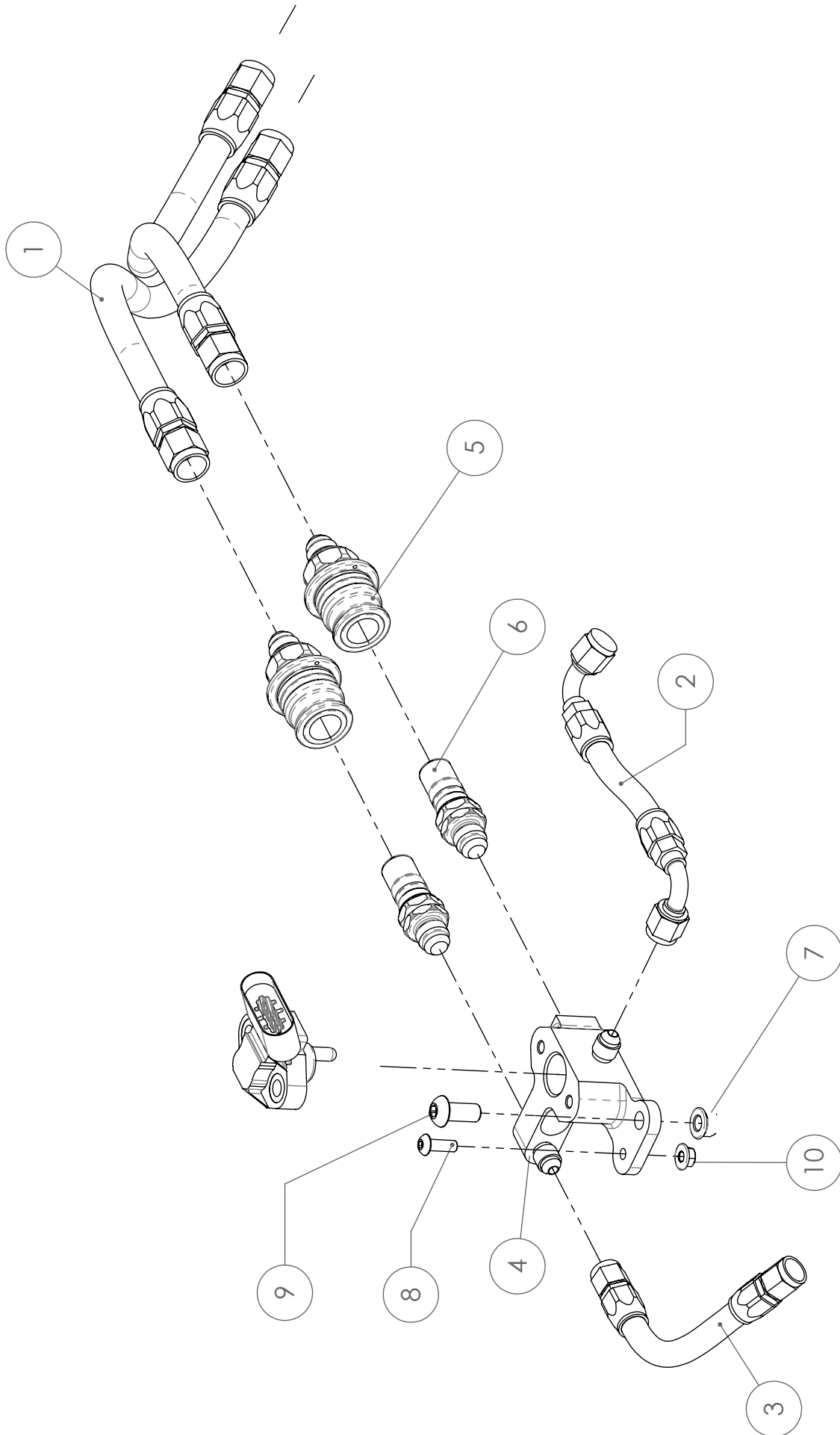
20 - OIL SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161420001	Tubo ritorno	Tank pipe	€ 202.48	1
2	161720002	Tubo mandata	Engine return oil hose	€ 121.69	1
3	211620001	Degasatore	Swirl pot	€ 316.49	1
4	122215300	Adattatore M22x1.5 - Dash 12	Adaptor M22x1.5 - Dash 12	€ 21.31	1
5	RL311212	Raccordo D12 1/2 Gas	Breathing elbow	€ 9.53	1
6	ORN2312	O-ring	O-ring	€ 5.29	1
7	UNI5931-M6X20	Vite TC	CH bolt	€ 1.74	3
8	UNI5931-M6X40	Vite TC	CH bolt	€ 1.74	1
9	RZS6	Rondella zigrinata	Safety washer	€ 1.16	4
10	RR2226	Rondella di rame	Copper washer	€ 1.70	1



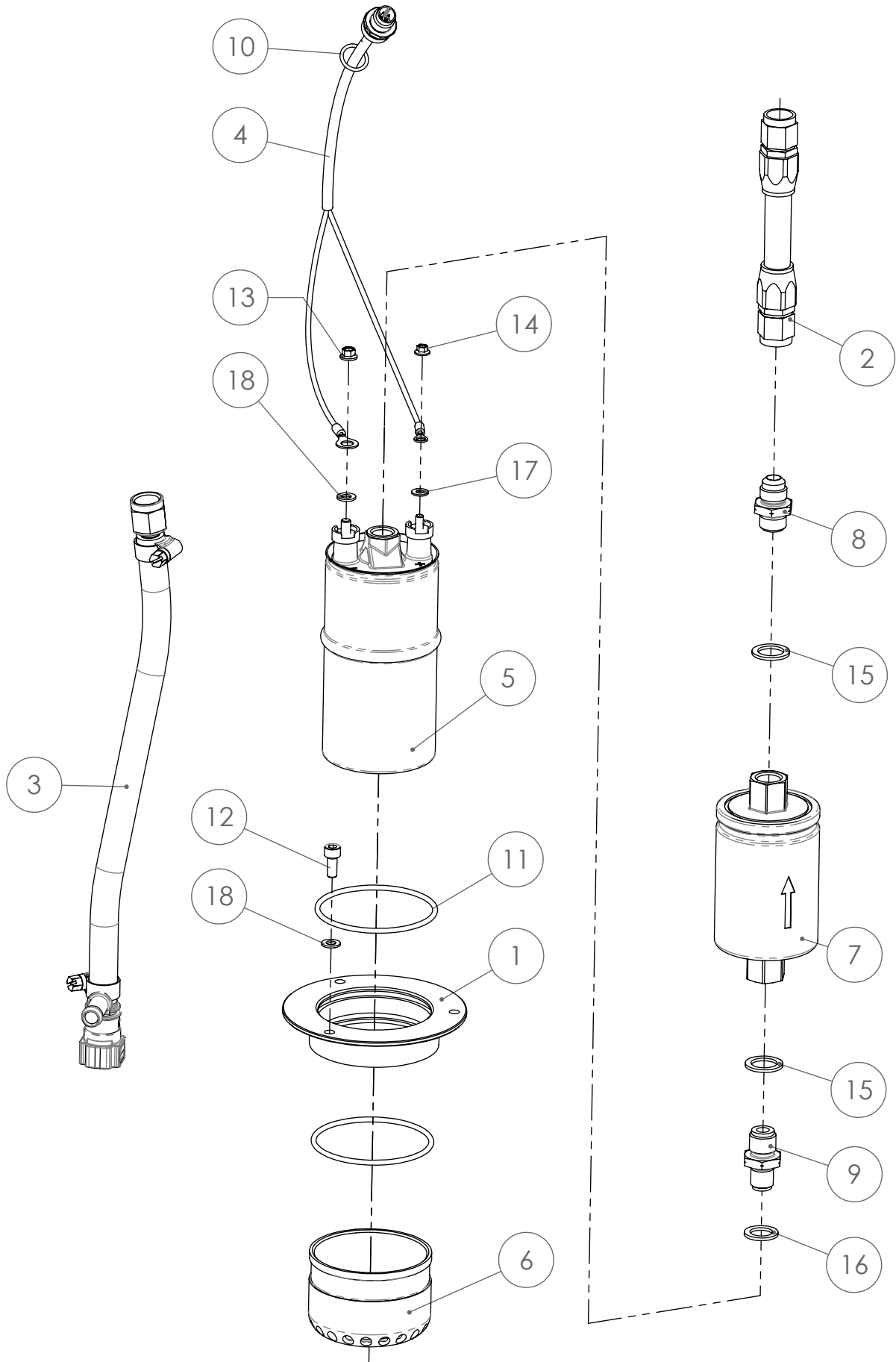
21A - FUEL SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161421001	Serbatoio benzina	Fuel Cell	€ 1'437.78	1
2	161421003	Guarnizione	Gasket	€ 41.14	1
3	161421004	Flangia serbatoio	Tank rear flange	€ 227.86	1
4	161421005	Flangia anteriore serbatoio	Tank front flange	€ 49.80	1
5	090921005	Tappo benzina	Fuel plug	€ 87.82	1
6	AN92406	Dado 9-16x18 UNF	Nut	€ 2.91	2
7	010021017	Valvola Sfiato	Vent valve	€ 98.79	1
8	161421009	Filler inferiore serbatoio	Lower filler	€ 9.58	2
9	161421011	Filler laterale	Side filler	€ 19.65	2
10	ORV4131	O-ring	O-ring	€ 3.52	1
11	AN83706	Racc. Passaparete 45° 9/16x18	45° male bulkhead	€ 25.71	2
12	UNI5933-M6X14	Vite TS	CSH Bolt	€ 1.74	8
13	UNI7380-M6X16	Vite TB	BH Bolt	€ 1.74	12
14	RR1420	Rondella	Washer	€ 1.16	6
15	UNI8840B-6	Rondella ondulata	Crinckle Washer	€ 1.16	12
16	090901019	Squadretta QR	Bracket	€ 39.37	1
17	161421014	Tubo elastolan ø8x6 L290	Elastolan hose ø8x6 L290	€ 4.25	1
18	161421010	Guarnizione	Gasket	€ 41.14	1



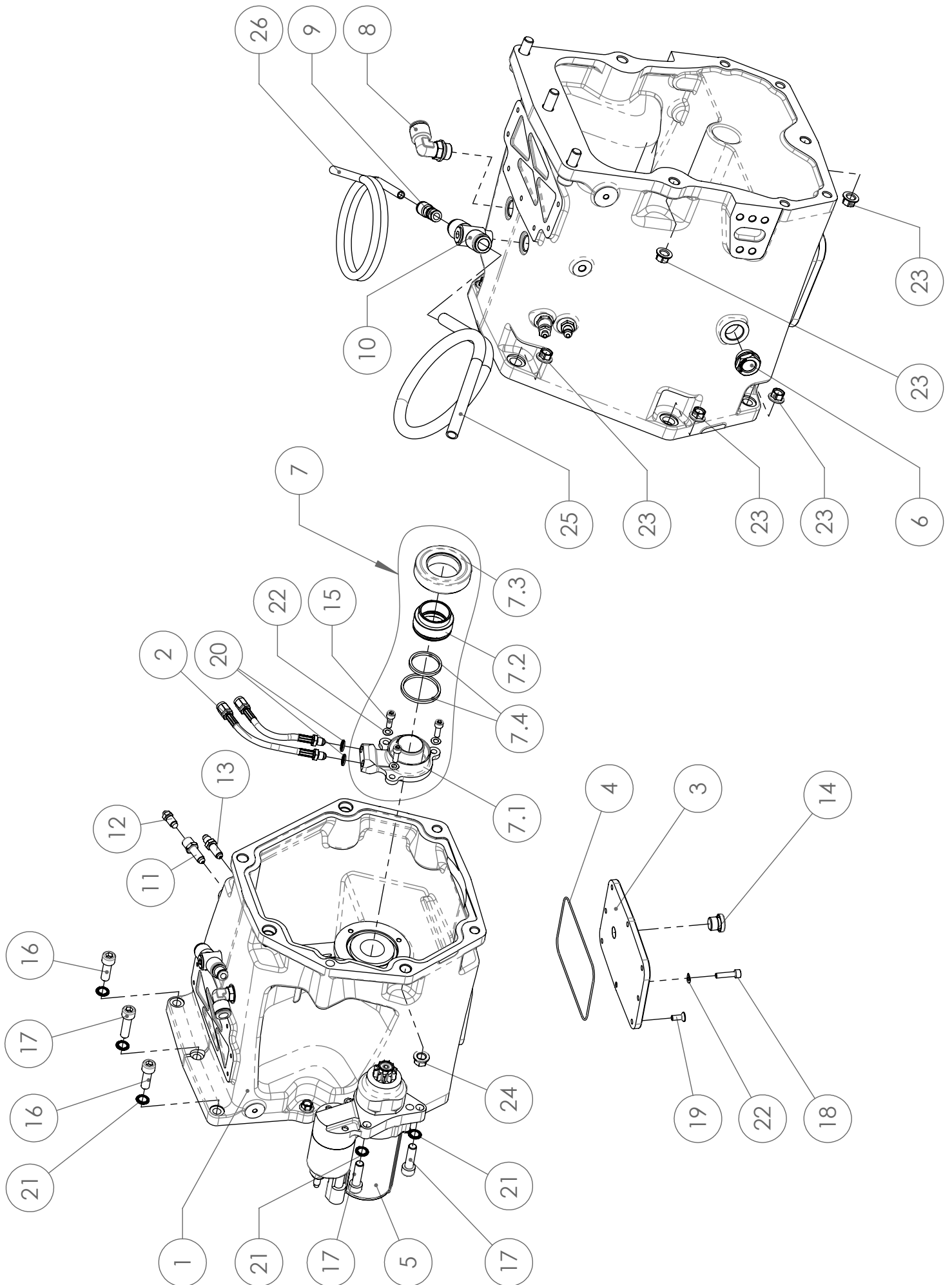
21B - FUEL SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161421007	Tubo benzina	Fuel Hose	€ 56.93	2
2	090921015	Tubo ritorno	Fuel Hose	€ 74.45	1
3	090921014	Tubo mandata	Fuel Hose	€ 38.68	1
4	090921009	Staffa sensore	Fuel sensor bracket	€ 278.17	1
5	SPT083655L	Raccordo rapido femmina	Quick coupling socket	€ 422.59	2
6	SPT087655L	Raccordo rapido maschio	Quick connector plug	€ 325.69	2
7	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5.42	1
8	UNI7380-M5X15	Vite TB	BH Bolt	€ 1.74	1
9	UNI7380-M8X18	Vite TB	BH Bolt	€ 2.05	1
10	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1.98	1

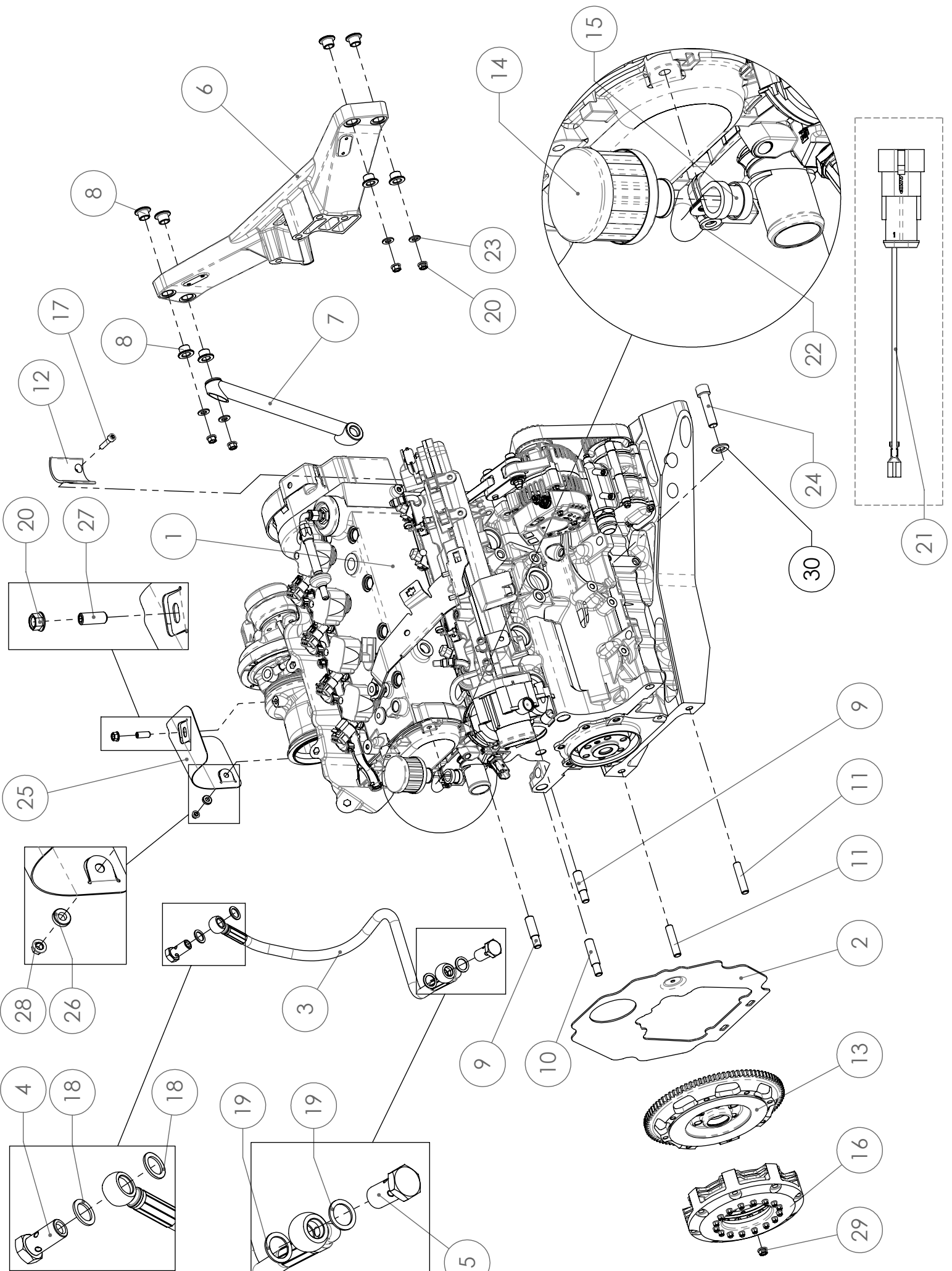


21C - FUEL SYSTEM

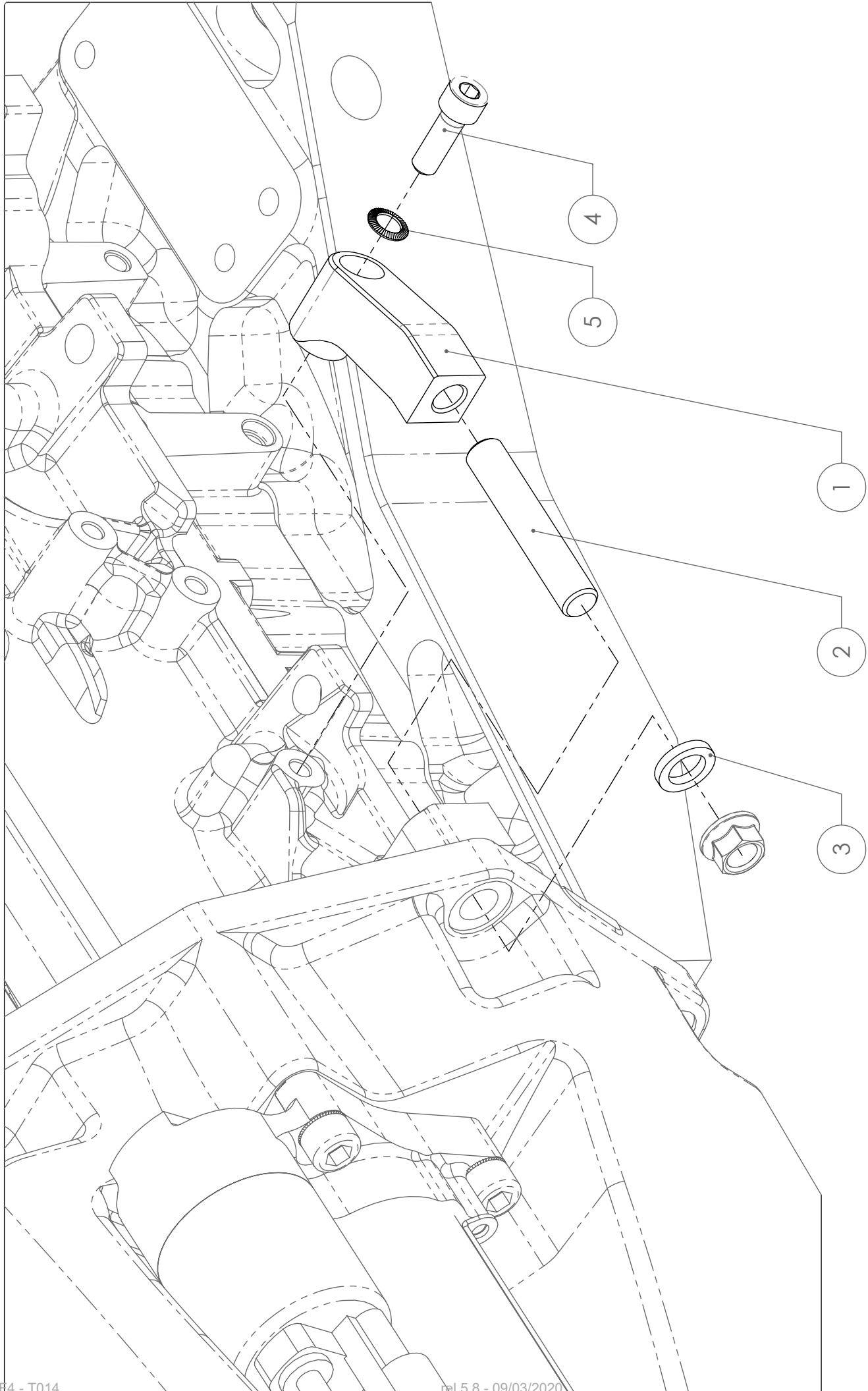
Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161421002	Supporto pompa HP	Fuel pump carrier	€ 93.48	1
2	161421006	Tubo benzina	Fuel Hose	€ 46.53	1
3	161421008	Tubo ritorno	Fuel Hose	€ 26.83	1
4	161421012	Cablaggio pompa benzina	Tank Loom	€ 114.66	1
5	080621010	Pompa benzina	Fuel pump	€ 359.41	1
6	080821019	Protezione pompa	Fuel pump stay	€ 59.04	1
7	0450905911	Filtro benzina	Fuel filter	€ 49.15	1
8	30606M14	Adattatore 9/16-M14x1.5	Adattatore 9/16-M14x1.5	€ 10.70	1
9	148M12M14	Adattatore M12 - M14	Male to male	€ 16.99	1
10	ORV2050	O-ring	O-ring	€ 3.52	1
11	ORV3237	O-ring	O-ring	€ 3.52	2
12	UNI5931-M5X12	Vite TC Inox	CH Bolt Stainless Steel	€ 1.74	3
13	AST-05	K-Nut	K-Nut	€ 5.26	1
14	AST-04	K-Nut	K-Nut	€ 4.93	1
15	RR1420	Rondella	Washer	€ 1.16	2
16	RR1218	Rondella	Washer	€ 1.26	1
17	UNI6592-4	Rondella	Washer	€ 1.16	1
18	UNI6592-5	Rondella	Washer	€ 1.16	1



Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161422002	Distanziale motore	Engine spacer	€ 1'871.07	1
2	161422003	Tubo spurgo/mandata frizione	Clutch bleed/delivery line	€ 31.55	2
3	161422005	Flangia Catch-tank	Catch-tank flange	€ 96.65	1
4	161422011	O-Ring	O-Ring	€ 8.75	1
5	----	Motorino avviamento	Starter	abarth	0
6	080722017	Indicatore di livello	Level gauge	€ 22.49	1
7	TAAP3859	Attuatore frizione Completo	Slave cylinder assy	€ 534.00	0
7.1	TAAP3859001	Corpo attuatore frizione	Slave cylinder body	€ 322.58	1
7.2	TAAP3859002	Pistone attuatore frizione	Slave cylinder piston	€ 97.72	1
7.3	CP3457-9	Release Bearing	Cuscinetto	€ 94.95	1
7.4	CP3759-3	Kit guarnizioni spingidisco	Sleeve seal kit	€ 40.42	1
8	RL3112-3/8	Raccordo D12 3/8 Gas	Breathing elbow	€ 9.53	1
9	RL812-8	Raccordo 12-8mm	Breathing elbow	€ 3.09	1
10	RL161238	Raccordo 12-3/8	Breathing elbow	€ 19.86	1
11	ADMF03X2003X8	Nipplo 3/8	Bleed nipple	€ 12.92	1
12	CP3720182	Vite spurgo 3/8-24UNF	Bleed bolt	€ 9.70	1
13	080624028	passaparete 832-03P	Bulkhead fitting	€ 19.47	1
14	DIN3852-M16X1,5	Tappo esagono incassato	Hexagon socket plug	€ 12.02	1
15	UNI5931-M6X18	Vite TC	CH Bolt	€ 1.74	3
16	UNI5931-M10X30	Vite TC	CH Bolt	€ 2.55	2
17	UNI5931-M10X35	Vite TC	CH Bolt	€ 2.55	3
18	UNI5931-M6X25	Vite TC	CH Bolt	€ 1.74	2
19	UNI5933-M6X16	Vite TS	CSH Bolt	€ 1.74	7
20	161422012	Rondella speciale	Special washer	€ 1.16	2
21	RZS10	Rondella zigrinata	Crinckle Washer	€ 1.16	5
22	UNI8840B-6	Rondella ondulata	Crinckle Washer	€ 1.16	4
23	AST-10	K-Nut	K-Nut	€ 5.26	8
24	AST-12	K-Nut	K-Nut	€ 6.71	1
25	161422020	Tubo elastolan ø12x9 L800	Elastolan hose ø12x9 L800	€ 8.49	1
26	161422021	Tubo elastolan ø8x6 L480	Elastolan hose ø8x6 L480	€ 4.25	1

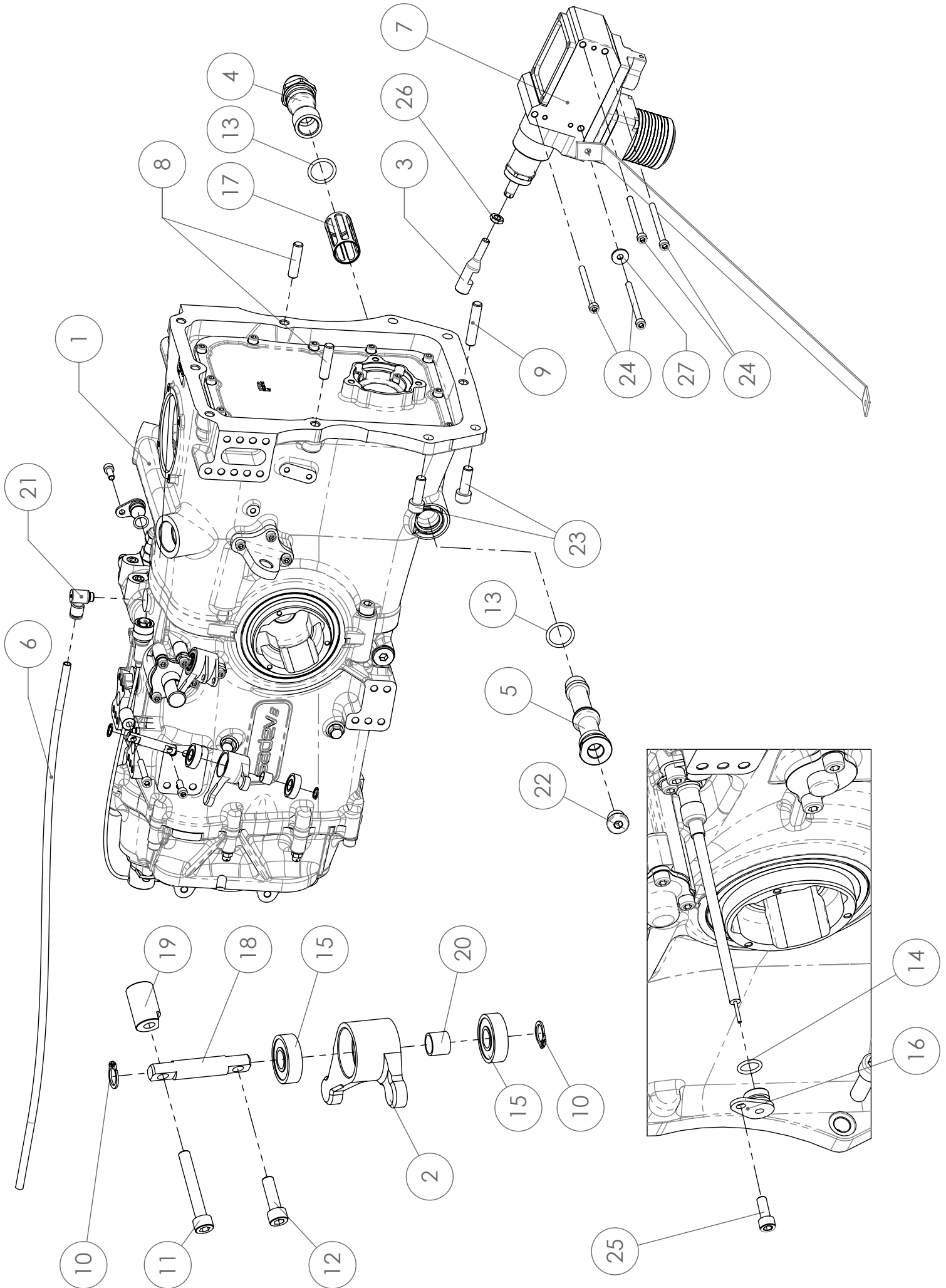


Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	F5742782	Motore FPT_140FJT	Engine unit	abarth	1
2	161422006	Carter protezione frizione	Flywheel protection	abarth	1
3	161422010	Tubo raffreddamento turbina	Turbo cooling pipe	€ 75.69	1
4	161422014	Vite banjo	Banjo bolt	€ 15.41	1
5	161422015	Vite banjo	Banjo bolt	€ 15.85	1
6	090922002	Supporto motore	Top engine mounting	€ 477.66	1
7	090922003	Frame motore	Framework	€ 217.78	1
8	090922004	Boccola traversa motore	Bush	€ 38.38	8
9	090922007	Prigioniero	Stud	abarth	0
10	090922008	Prigioniero	Stud	abarth	0
11	090922012	Prigioniero	Stud	abarth	0
12	090922010	Supporto vaso espansione	Water tank bracket	€ 68.16	1
13	-	5738622_m_414TF_volano	Flywheel	abarth	1
14	CY50	Filtro aria	Air filter	€ 13.67	1
15	PAS014	Fascetta gommata d14	Clamp	€ 4.82	1
16	CP6002	Frizione completa	Clutch assy	Autotecnica	1
17	UNI5931-M6X25	Vite TC	CH Bolt	€ 1.74	1
18	RR1420	Rondella rame	Copper washer	€ 1.16	2
19	RR1622	Rondella rame	Copper washer	€ 1.16	2
20	AST-08	K-Nut	K-Nut	€ 5.26	5
21	161422018	cavo motorino avviamento	starter cable	€ 37.69	1
22	UNI6592-6	Rondella	Washer	€ 1.16	1
23	UNI6592-8	Rondella	Washer	€ 1.16	4
24	UNI5931-M12x50	Vite TC	CH bolt	€ 2.06	1
25	090922006	Lamiera paracalore turbina	Heat shield	€ 25.30	1
26	SW-1/4	Rondella speciale	Special washer	€ 2.40	1
27	UNI5929-M8X20	Grano	Stud	€ 1.74	1
28	AST-06	K-Nut	K-Nut	€ 5.26	1
29	AST-08X1	K-Nut M8x1.0	K-Nut M8x1.0	€ 5.26	8
30	UNI6592-12	Rondella	Washer	€ 1.16	1



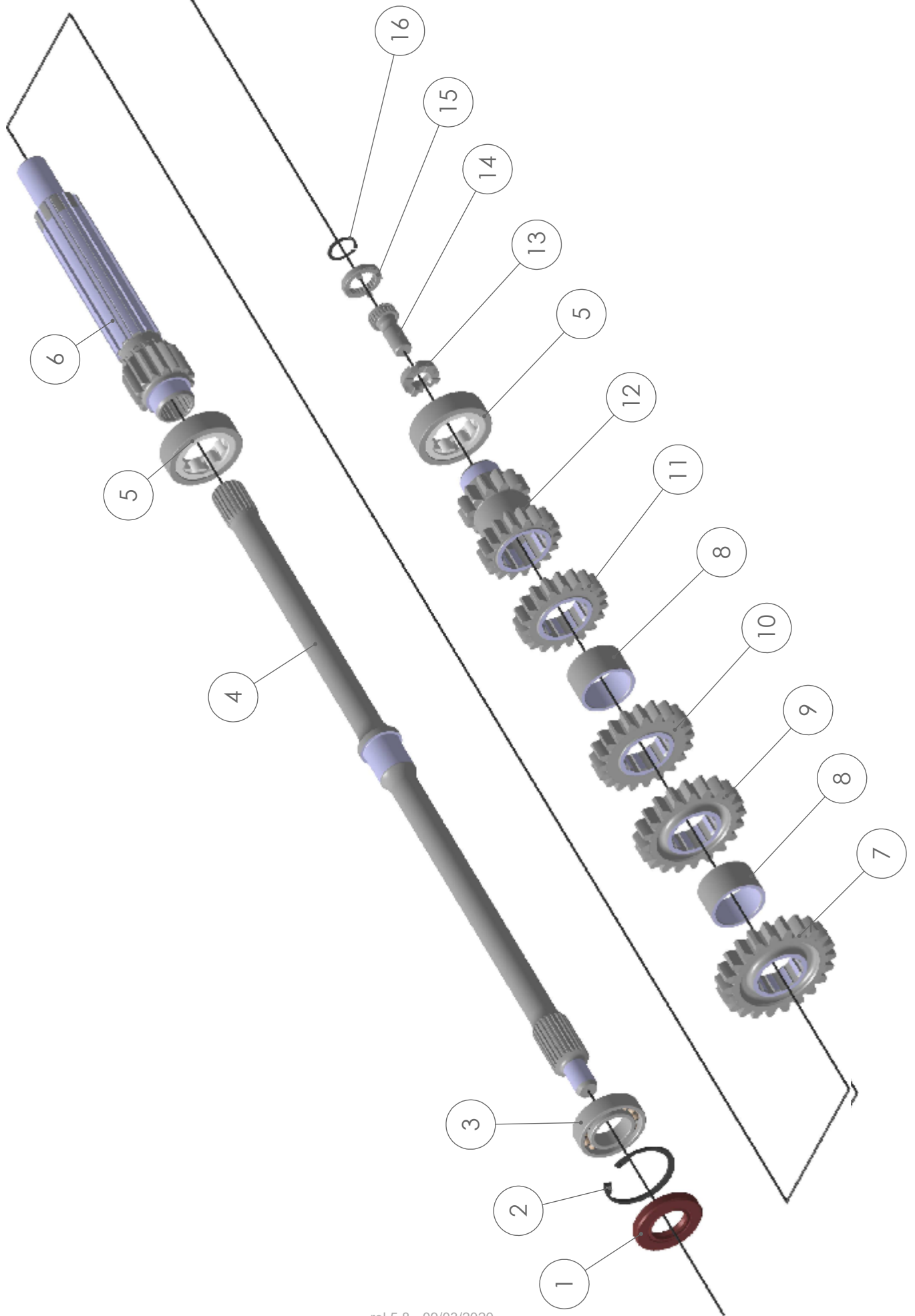
22C - ENGINE

Item	Part Number	Descrizione	Description	Price €	Assy Qty
0	161522024	Kit rinforzo motore Abarth	Abarth Engine frame kit	€ 139.83	0
1	161422019	Rinforzo motore Abarth	Frame Abarth Engine	€ 127.22	0
2	161522023	Prigioniero	Prigioniero	€ 5.94	0
3	090910012	Rondella Spec. 12,5x19x3	Special flat washer	€ 3.52	0
4	UNI5931-M8X25	Vite TC classe 12.9	CH bolt class 12.9	€ 2.05	0
5	RZS8	Rondella zigrinata	Safety Washer	€ 1.16	0



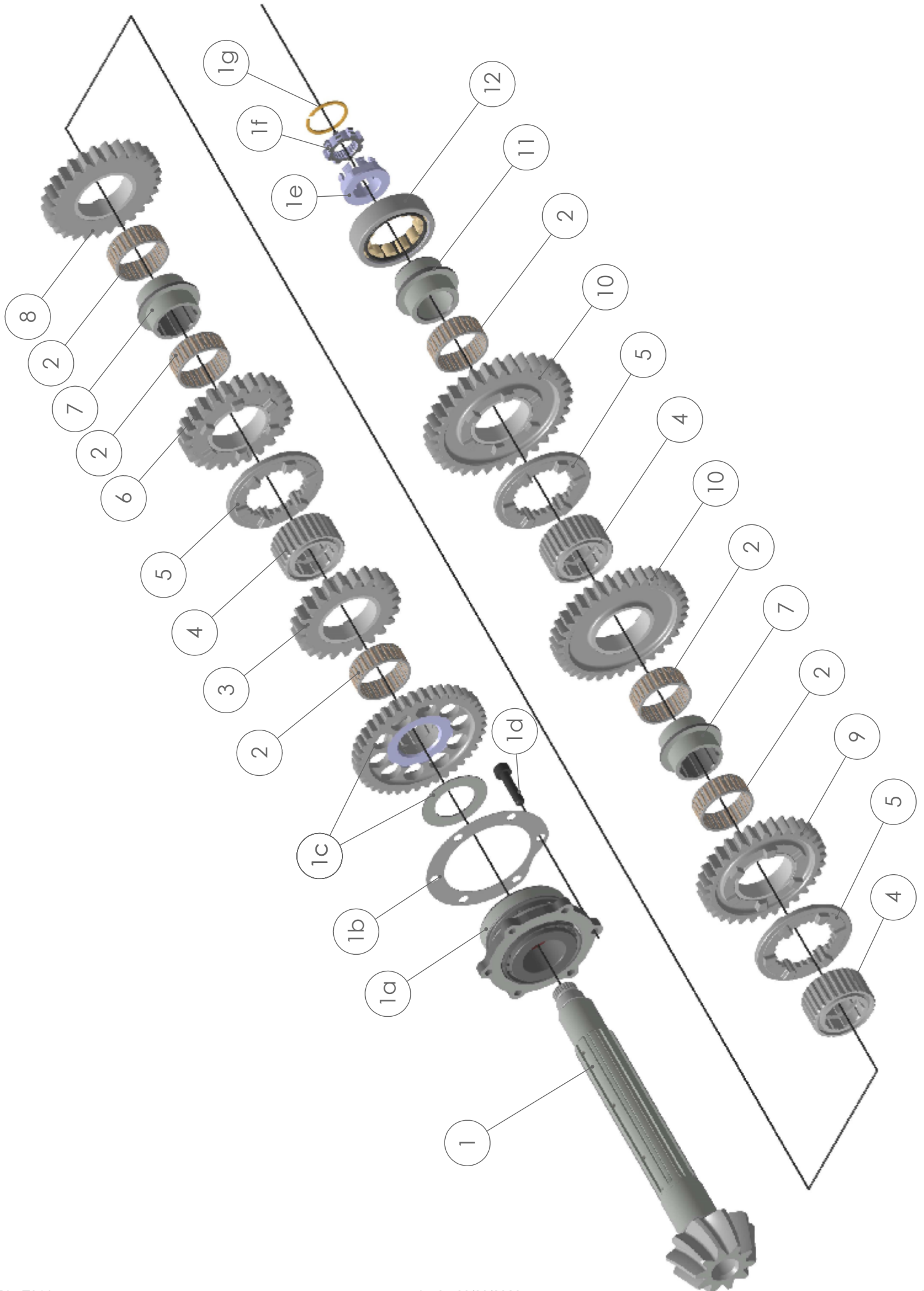
24A - GEARBOX

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	SL7514LW026101001	Cambio completo	Complete gearbox	€ 8'315.86	1
2	161424001	Rocker EGA	EGA rocker	€ 260.32	1
3	161424002	Link EGA	Link EGA	€ 164.35	1
4	161424004	Terminale filtro olio	Suction screen plug	€ 93.15	1
5	161424005	Filtro pescaggio olio f0085255	Suction screen fitting f0085255	€ 79.39	1
6	161424007	Tubo elastolan ø8x6 L670	Elastolan hose ø8x6 L670	€ 4.25	1
7	083803390600	EGA	EGA	€ 3'158.59	1
8	090922011	Prigioniero	Stud	€ 8.28	2
9	010022013	Prigioniero	Stud	€ 3.51	2
10	0601042	f10 circlip	f10 circlip	€ 0.63	2
11	0301442	M6x40 Chc bolt	M6x40 Chc bolt	€ 0.55	1
12	0301385	M6X20 CHc bolt	M6X20 CHc bolt	€ 1.74	1
13	0201275	O-Ring 24x3	O-Ring 24x3	€ 0.55	2
14	0201009	O-Ring	O-Ring	€ 1.16	1
15	0101035	6000 bearing	6000 bearing	€ 8.36	2
16	F9017124	Unlocking cable plug	Unlocking cable plug	€ 40.84	1
17	F9024432	Filtro	Suction screen	€ 77.64	1
18	F0085124	selector axle	selector axle	€ 31.51	1
19	F0085131	selector spacer	selector spacer	€ 10.51	1
20	F0085992	Distanziale	bearing spacer	€ 10.42	1
21	RL15818	Raccordo 1/8" Gas	Fitting	€ 19.51	1
22	DIN3852-M18X1,5	Tappo esagono incassato	Hexagon socket plug	€ 12.02	1
23	UNI5931-M10X30	Vite TC	CH Bolt	€ 2.55	4
24	UNI5931-M6X80	Vite TC	CH Bolt	€ 2.21	4
25	UNI5931-M6X16	Vite TC	CH Bolt	€ 2.55	1
26	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2.35	1
27	UNI6593-6	Rondella larga	Large washer	€ 1.16	1



24C - GEARBOX

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	0206003	D25x47x7 Guarnizione	D25x47x7 lip seal	€ 15.38	1
2	0602043	D47 Seeger	D47 circlip	€ 2.16	1
3	0101050	Cuscinetto a sfere 6005	6005 bearing	€ 8.67	1
4	F0085051	input shaft	input shaft	€ 630.14	1
5	0103015	NU304 bearing	NU304 bearing	€ 43.66	2
6	F0085010	Albero primario	primary shaft	€ 583.38	1
7	C75142522556J	6^ marcia	6th gear	€ 267.65	1
7	C75142120556J	6^ marcia	6th gear	€ 267.65	0
8	F0085006	pinion spacer	pinion spacer	€ 57.41	2
9	C75142626556J	5^ marcia	5th gear	€ 267.65	1
9	C75142527556J	5^ marcia	5th gear	€ 267.65	0
10	C75142024556J	4^ marcia	4th gear	€ 287.85	1
10	C75142025556J	4^ marcia	4th gear	€ 287.85	0
11	C75141827556J	3^ marcia	3rd gear	€ 312.82	1
12	C75141630556J	2^ marcia	2nd gear	€ 312.82	1
12	E75141435556J	1^ marcia	1st gear	€ 312.82	1
13	F1908003	stopping washer	stopping washer	€ 29.55	1
14	F9024002	Vite albero primario	primary shaft bolt	€ 40.25	1
15	F1908002	stopping hub	stopping hub	€ 33.47	1
16	0601020	D18 seeger	D18 circlip	€ 0.63	1



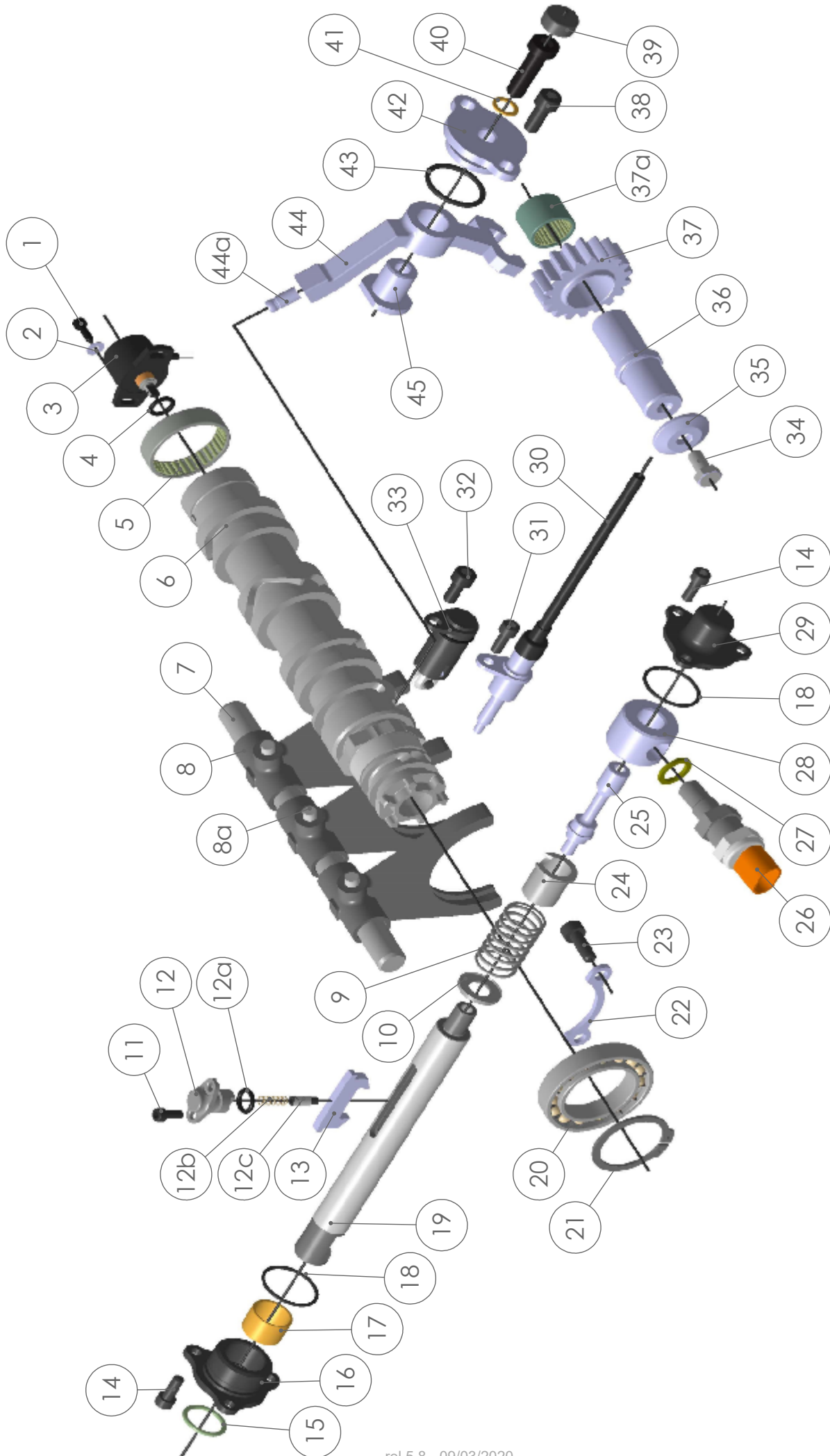
24D - GEARBOX

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	CPL10310085011	Complete final drive 10x31	Complete final drive 10x31	€ 2'362.59	1
1a	F00850121	twin bearing assembly	twin bearing assembly	€ 340.34	1
1b	F00850131	bevel gear advance shim set	bevel gear advance shim set	€ 101.14	1
1c	F00850081	reverse gear pinion	reverse gear pinion	€ 221.10	1
1d	0301191	M7x30 Chc bolt	M7x30 Chc bolt	€ 2.02	1
1e	F9002038	secondary nut	secondary nut	€ 49.28	6
1f	F9005010	nut stopping washer	nut stopping washer	€ 133.65	1
1g	9907004	D30 circlip	D30 circlip	€ 1.53	1
2	0105043	K38x43x17 bearing	K38x43x17 bearing	€ 20.21	2
3	C75142522556J	6th gear	6th gear	€ 267.65	1
3	C75142120556J	6th gear	6th gear	€ 267.65	0
4	F0085003	hub	hub	€ 129.57	1
5	F0085004	dog ring	dog ring	€ 136.25	3
6	C75142626556J	5th gear	5th gear	€ 267.65	1
6	C75142527556J	5th gear	5th gear	€ 267.65	0
7	F0085005	gear bearing inner race	gear bearing inner race	€ 98.92	1
8	C75142024556J	4th gear	4th gear	€ 287.85	1
8	C75142025556J	4th gear	4th gear	€ 287.85	0
9	C75141827556J	3rd gear	3rd gear	€ 312.82	1
10	C75141630556J	2^ marcia	2nd gear	€ 312.82	1
10	E75141435556J	1^ marcia	1st gear	€ 312.82	1
11	F0085007	1st gear bearing inner race	1st gear bearing inner race	€ 111.90	1
12	0103011	NU 206 bearing	NU 206 bearing	€ 56.51	1



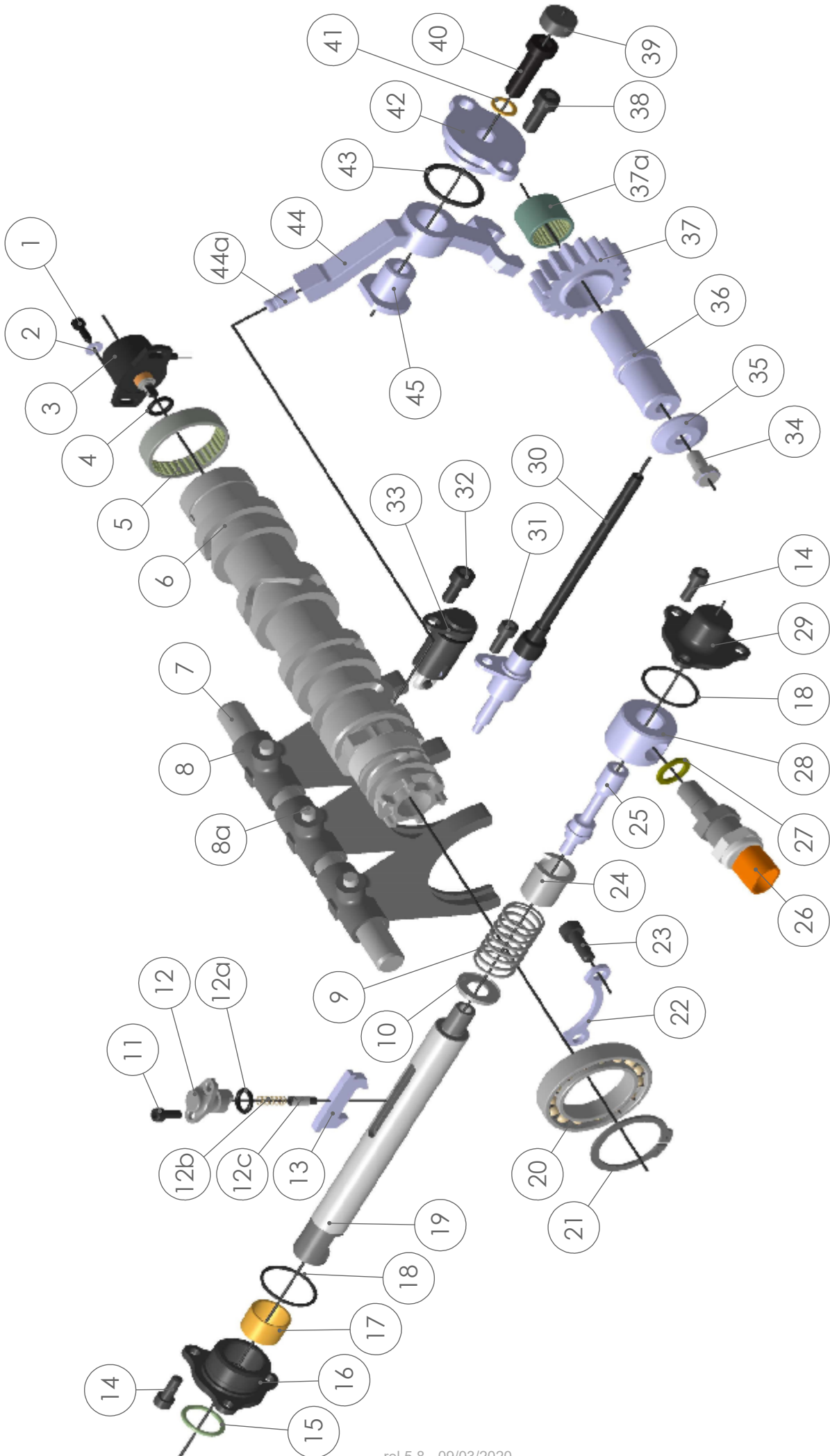
24E - GEARBOX

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	0204041	D85x105x12 lip seal	D85x105x12 lip seal	€ 27.23	2
2	CPL10310085011	Complete final drive 10x31	Complete final drive 10x31	€ 2'362.59	1
2a	F19103201	final drive clearence shim set	final drive clearence shim set	€ 110.77	2
2b	F0085941	vis H M10x16	vis H M10x16	€ 7.61	8
3	0101054	AB 12458 S03 bearing	AB 12458 S03 bearing	€ 72.85	2
4	F9047303	D85 circlip	D85 circlip	€ 13.93	1
5	F0085414	differential cap	differential cap	€ 131.86	1
6	F1910310	sun gear	sun gear	€ 136.37	2
7	F0044007	half planet gear axle	half planet gear axle	€ 44.53	2
8	F0085416	planet gear	planet gear	€ 41.29	4
9	F0044006	hub	hub	€ 50.97	1
10	F0044008	planet gear axle	planet gear axle	€ 45.60	1
11	F0085411	differential case	differential case	€ 548.67	1
12	0601040	D95 circlip	D95 circlip	€ 3.91	1

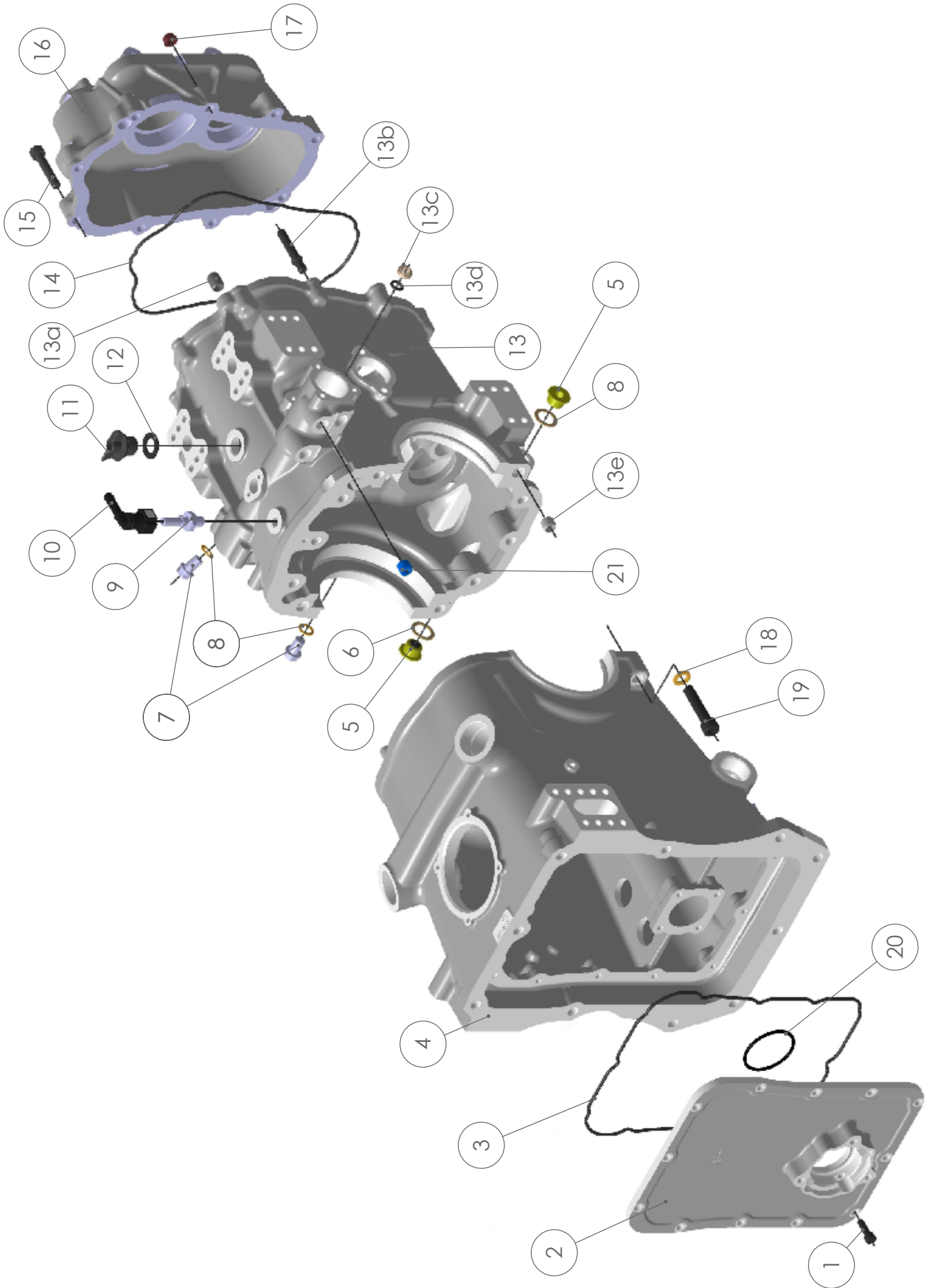


24F - GEARBOX

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	0301425	M4x12 Chc bolt	M4x12 Chc bolt	€ 0.79	2
2	0502023	f4 washer	f4 washer	€ 1.16	2
3	F0089047	potentiometer	potentiometer	€ 214.22	1
4	0201017	f10x2.5 o-ring	f10x2.5 o-ring	€ 2.13	1
5	0106006	HK 4012 bearing	HK 4012 bearing	€ 17.98	1
6	F00851132	barell	barell	€ 823.74	1
7	F0085103	fork axle	fork axle	€ 41.80	1
8	F00851001	complete fork	complete fork	€ 127.42	3
8a	F0077120	selector pin	selector pin	€ 14.13	1
9	0801053	selector spring	selector spring	€ 16.57	1
10	F9003667	selector washer	selector washer	€ 8.11	1
11	0301394	M5x10 CHc bolt	M5x10 CHc bolt	€ 0.59	2
12	F14044031	Complete dual pin rock	Complete dual pin rock	€ 162.58	1
12a	0201017	f10x2.5 o-ring	f10x2.5 o-ring	€ 2.13	1
12b	0801026	pusher spring	pusher spring	€ 12.23	1
12c	F9049071	pusher	pusher	€ 32.20	1
13	F0059040	dual pin rock	dual pin rock	€ 151.46	1
14	0301422	M6x16 Chc bolt	M6x16 Chc bolt	€ 1.74	6
15	0201004	f20x2.5 o-ring	f20x2.5 o-ring	€ 0.58	2
16	F0085120	right selector closing block	right selector closing block	€ 101.48	1
17	1202004	PAP2015 P10 bushing	PAP2015 P10 bushing	€ 6.29	1
18	0201164	f29x2 o-ring	f29x2 o-ring	€ 0.58	2
19	F0085119	selector axle	selector axle	€ 179.50	1
20	0101018	61908 bearing	61908 bearing	€ 55.29	1
21	0601010	f40 circlip	f40 circlip	€ 3.13	1
22	F0085116	barrel stop	barrel stop	€ 11.99	1
23	0301013	M7x20 CHc bolt	M7x20 CHc bolt	€ 2.02	2
24	F0059022	selector bushing	selector bushing	€ 13.24	1

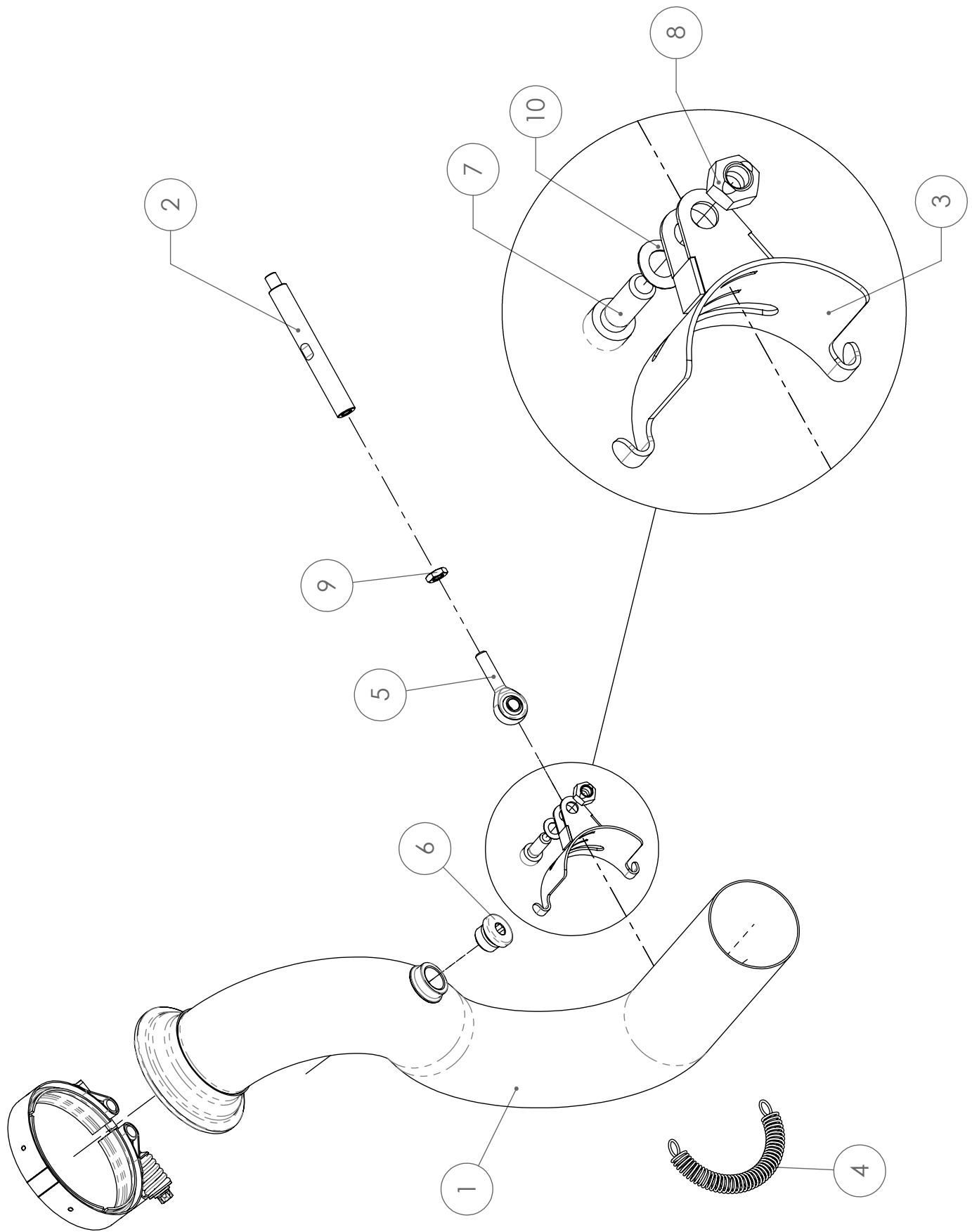


25	F9001039	selector axle bolt	selector axle bolt	€ 42.82	1
26	F0071011	powershift	powershift	€ 56.73	1
27	F0062011	powershift shim set	powershift shim set	€ 20.99	1
28	F0085122	Selector spacer	Selector spacer	€ 30.21	1
29	F0085121	left selector closing block	left selector closing block	€ 104.89	1
30	F90079901	reverser gear unlocking cable	reverser gear unlocking cable	€ 148.17	1
31	0301377	M6x12 CHc bolt	M6x12 CHc bolt	€ 1.74	1
32	0301373	M7x16 CHc bolt	M7x16 CHc bolt	€ 2.02	1
33	F90241281	Complete indexor	Complete indexor	€ 157.74	1
0	0701069	goupille f18x2.5dowel pin	goupille f18x2.5dowel pin	€ 1.74	1
0	0201020	f16x2 o-ring	f16x2 o-ring	€ 0.56	1
0	0801046	indexor spring	indexor spring	€ 23.55	1
34	0305070	M8x16 H bolt	M8x16 H bolt	€ 3.01	1
35	F0085127	reverse gear washer	reverse gear washer	€ 9.98	1
36	F0085126	reverse gear axle	reverse gear axle	€ 48.71	1
37	F00850091	Complete reverse gear	Complete reverse gear	€ 129.36	1
37a	0106007	HK 2020 bearing	HK 2020 bearing	€ 10.55	1
38	0301421	M8x20 Chc bolt	M8x20 Chc bolt	€ 2.05	2
39	F0085228	bolt hat	bolt hat	€ 3.77	1
40	0304006	M10x35 CZHc bolt	M10x35 CZHc bolt	€ 2.55	1
41	0599017	f10,2x15x1 cupper washer	f10,2x15x1 cupper washer	€ 0.96	1
42	F0085123	rocker guide	rocker guide	€ 73.72	1
43	0201104	f29x3 o-ring	f29x3 o-ring	€ 2.46	1
44	F00851011	complete reverse gear rocker	complete reverse gear rocker	€ 193.27	1
44a	F0077108	reverse gear pin	reverse gear pin	€ 18.86	1
45	F0085111	reverse gear nut	reverse gear nut	€ 18.37	1



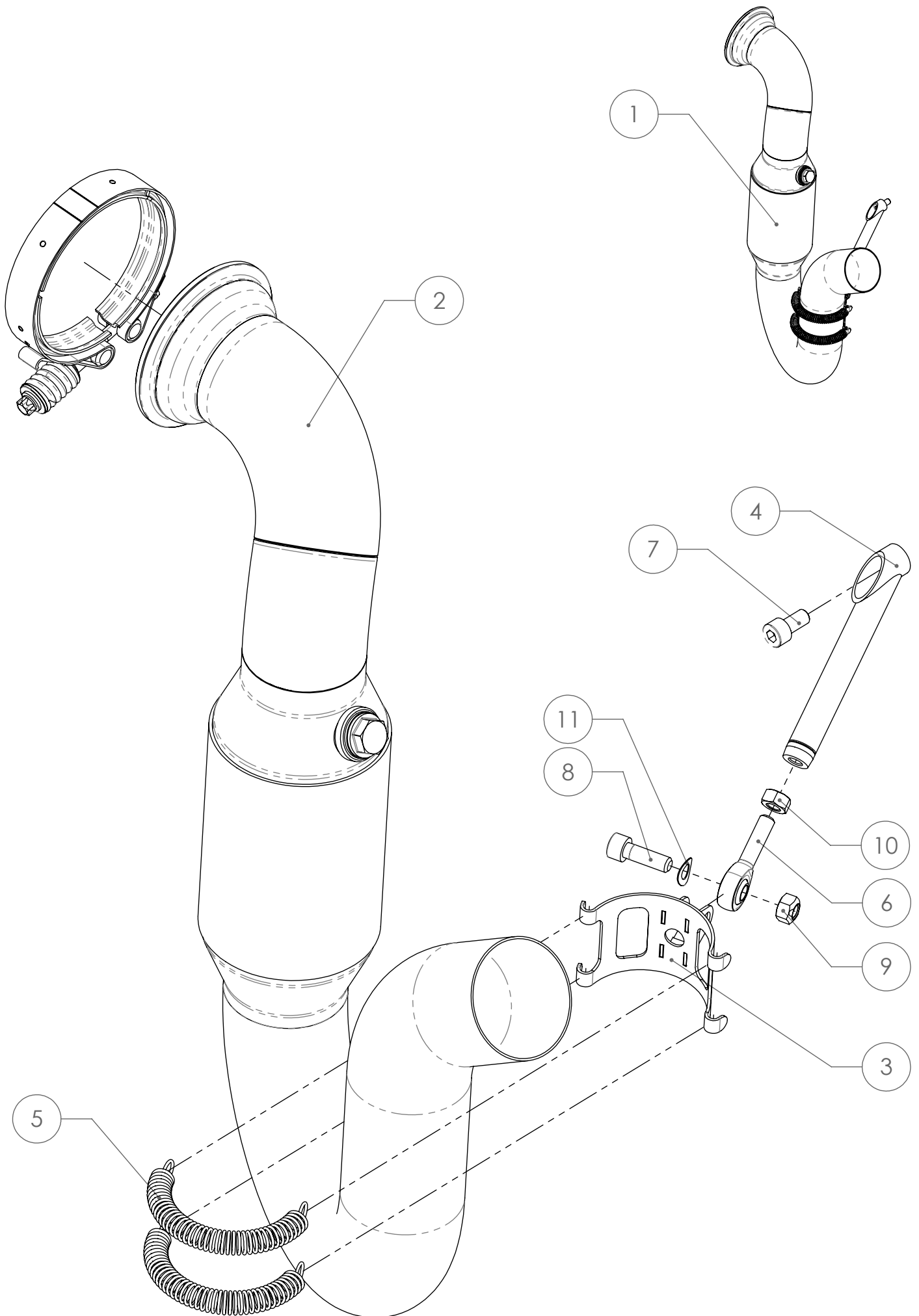
24H - GEARBOX

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	0301385	M6X20 CHc bolt	M6X20 CHc bolt	€ 1.74	16
2	F0085287	oil tank plate	oil tank plate	€ 476.05	1
3	0201305	f255x3 o-ring	f255x3 o-ring	€ 13.07	1
4	F0085289	oil tank housing	oil tank housing	€ 2'243.53	1
5	F1402058	drain plug	drain plug	€ 27.47	2
6	5002018	drain plug seal	drain plug seal	€ 0.88	2
7	F2001138	plug	plug	€ 9.65	2
8	0599017	plug seal	plug seal	€ 0.96	2
9	F9022106	venting fitting	venting fitting	€ 26.29	1
10	9999683	venting plug	venting plug	€ 5.94	1
11	5099087	fitting plug	fitting plug	€ 15.60	1
12	5002026	fitting plug seal	fitting plug seal	€ 4.73	1
13	F00852911	main housing	main housing	€ 1'676.76	1
13a	F0077229	f12x15 pin	f12x15 pin	€ 5.87	2
13b	F0085282	rear casing stud	rear casing stud	€ 17.97	4
13c	F9004314	reverse gear cable stop	reverse gear cable stop	€ 7.23	1
13d	0201014	f8x2,5 o-ring	f8x2,5 o-ring	€ 0.56	1
13e	F9003102	f12 pin	f12 pin	€ 7.29	2
14	0201300	f208x3 o-ring	f208x3 o-ring	€ 6.11	1
15	0301524	M8x40 CHc bolt	M8x40 CHc bolt	€ 0.89	5
16	F0085292	rear housing	rear housing	€ 915.00	1
17	0499003	M8x125 simmonds nut	M8x125 simmonds nut	€ 3.54	4
18	0599054	f10 nordlock washer	f10 nordlock washer	€ 1.16	10
19	0301424	M10x45 CHc bolt	M10x45 CHc bolt	€ 2.55	2
19	0301406	M10x35 CHc bolt	M10x35 CHc bolt	€ 1.01	6
19	0301052	M10x50 CHc bolt	M10x50 CHc bolt	€ 2.53	2
20	0201074	f46x3 o-ring	f46x3 o-ring	€ 1.33	1
21	0302074	M12x10 Hc bolt	M12x10 Hc bolt	€ 3.78	2



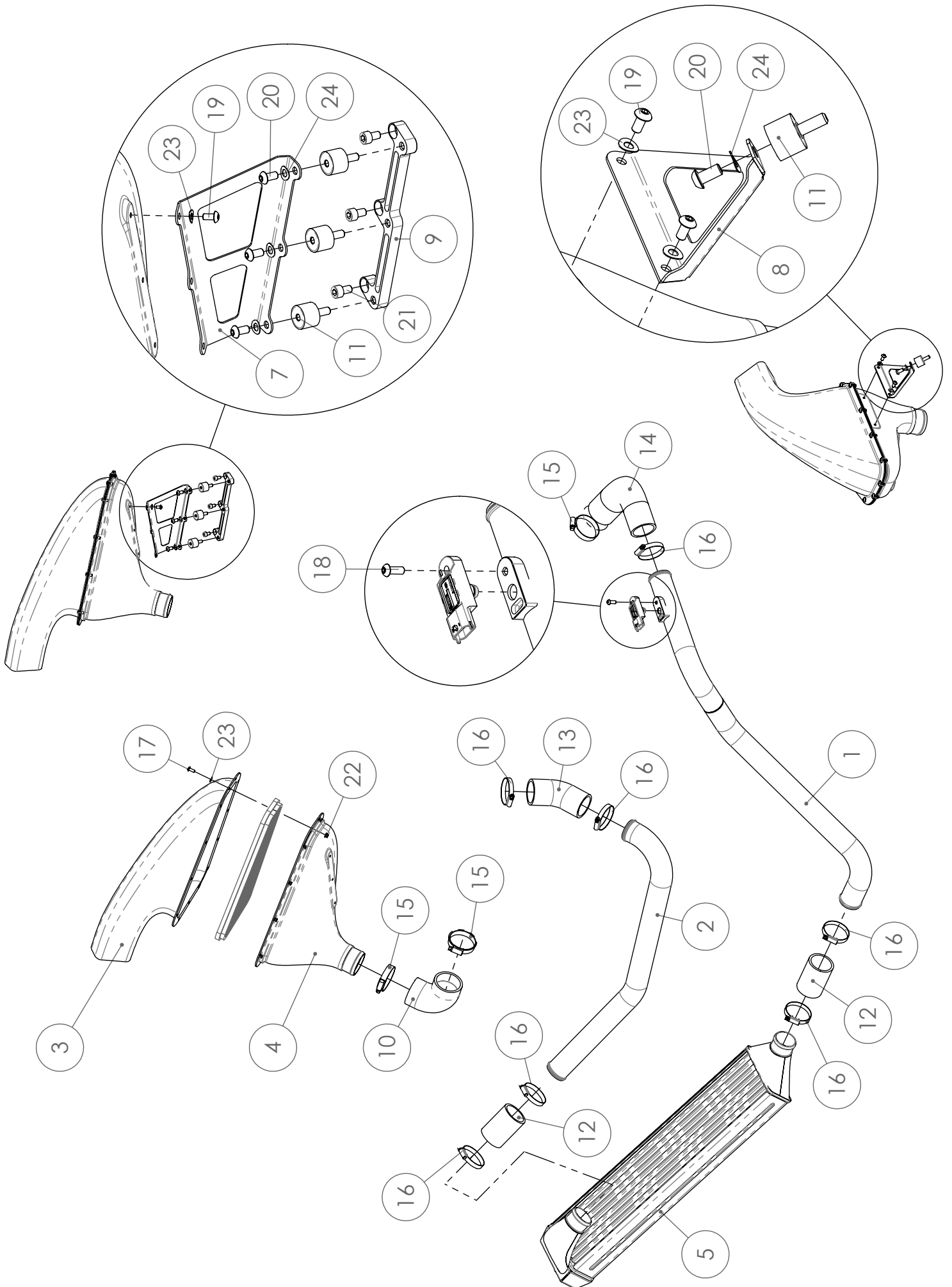
25A - EXHAUST SYSTEM

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161425001	Scarico	Exhaust pipe	€ 391.99	1
2	161425002	Distanziale	Stay	€ 26.02	1
3	090925002	Supporto scarico	Exhaust stay	€ 182.64	1
4	020225009	Molla	Spring	€ 8.93	1
5	CM8-M8	Testa a snodo	Rod end	€ 53.56	1
6	DIN3852-M18X1,5	Tappo esagono incassato	Hexagon socket plug	€ 12.02	1
7	UNI5931-M8X25	Vite TC	CH Bolt	€ 2.05	1
8	DIN980-M8	Dado autobloccante trilobato	Prevailing torque Nut	€ 2.13	1
9	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2.35	1
10	UNI8840B-8	Rondella ondulata	Crinckle Washer	€ 1.16	1



25B - CATALYTIC EXHAUST

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161525006	Kit scarico con catalizzatore	Catalytic exhaust kit	€ 1'625.59	0
2	161525001	Scarico con catalizzatore	Exhaust pipe with catalyzer	€ 1'159.20	1
3	161525003	Culla scarico	Exhaust bracket	€ 84.82	1
4	161525004	Supporto scarico	Exhaust stay	€ 148.42	1
5	020225009	Molla	Spring	€ 8.93	2
6	CM8-M8	Testa a snodo	Rod end	€ 53.56	1
7	UNI5931-M8X16	Vite TC	CH bolt	€ 2.05	1
8	UNI5931-M8X25	Vite TC	CH Bolt	€ 2.05	1
9	DIN980-M8	Dado autobloccante trilobato	Prevailing torque Nut	€ 2.13	1
10	UNI5588-M8	Dado esagonale	Hex Nut	€ 2.04	1
11	UNI8840B-8	Rondella ondulata	Crinckle Washer	€ 1.16	1



26 - AIR INLET

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	161426002	Tubo outlet intercooler	Intercooler outlet pipe	€ 262.06	1
2	161426003	Tubo inlet intercooler	Intercooler inlet pipe	€ 251.15	1
3	161426006	Cassoncino superiore	Airscoop	nd	1
4	090926001	Air box inferiore	Lower airbox	nd	1
5	090926003	Intercooler	Intercooler	€ 679.95	1
7	090926008	Supporto sinistro airbox	Airbox LH bracket	€ 44.97	1
8	090926009	Supporto destro airbox	Airbox RH bracket	€ 39.37	1
9	090926010	Base supporto airbox	Airbox mounting base	€ 96.26	1
10	E9051	Manicotto	Silicon hose	€ 41.80	1
11	PUFM620X15MF	Silent block	Silent block	€ 7.56	4
12	SCH45	Manicotto	Silicon hose	€ 40.42	2
13	E4545	Manicotto	Silicon hose	€ 40.42	1
14	RE905145	Manicotto	Silicon hose	€ 47.44	1
15	ABA50-65X12	Fascetta	Clamp	€ 4.82	3
16	ABA44-56X12	Fascetta	Clamp	€ 5.03	7
17	UNI7380-M5X12	Vite TC	CH Bolt	€ 1.74	13
18	UNI7380-M6X16	Vite TB	BH Bolt	€ 1.74	1
19	UNI7380-M5X10	Vite TB	BH Bolt	€ 1.74	5
20	UNI7380-M6X10	Vite TB	BH Bolt	€ 1.74	4
21	UNI5931-M6X10	Vite TC	CH Bolt	€ 1.74	3
22	AST-05	K-Nut	K-Nut	€ 5.26	13
23	UNI8840B-5	Rondella ondulata	Crinckle Washer	€ 1.16	18
24	UNI8840B-6	Rondella ondulata	Crinckle Washer	€ 1.16	5

ACCESSORIES

Item	Part Number	Descrizione	Description	Price €	Assy Qty
1	FOUT0085001	Locking plate	Locking plate	€ 7.28	0
2	FOUT0085004	Play adjuster	Play adjuster	€ 26.66	0
3	FOUT0085005	Spacer	Spacer	€ 64.24	0
4	FOUT1908001	Primary bolt tool	Primary bolt tool	€ 77.25	0
5	FOUT0085017	Clutch plate centring pin	Clutch plate centring pin	€ 38.29	0



2015 SPARE PARTS CATALOGUE

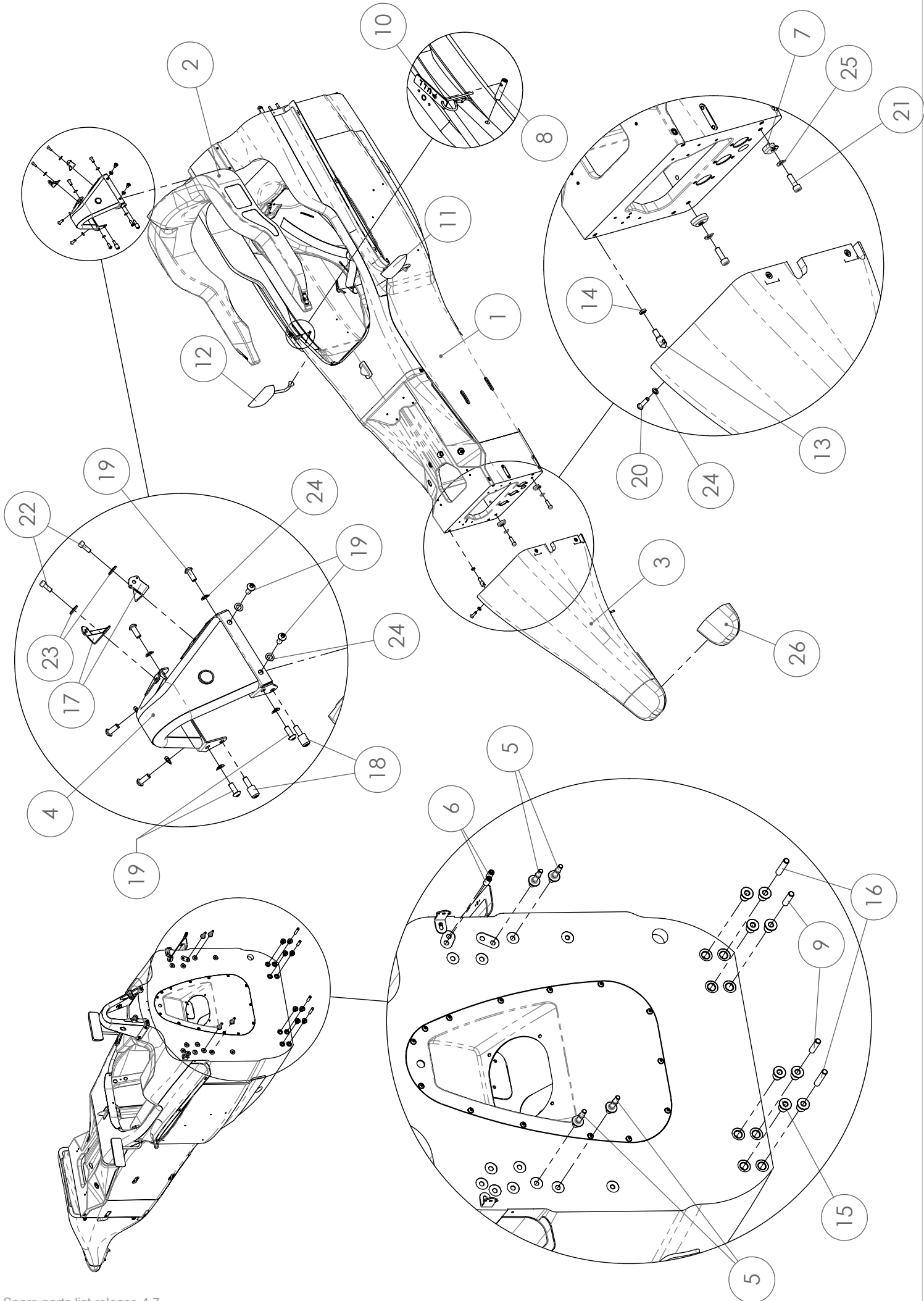
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FORMULA 4

Relase 4.7 23/04/2015

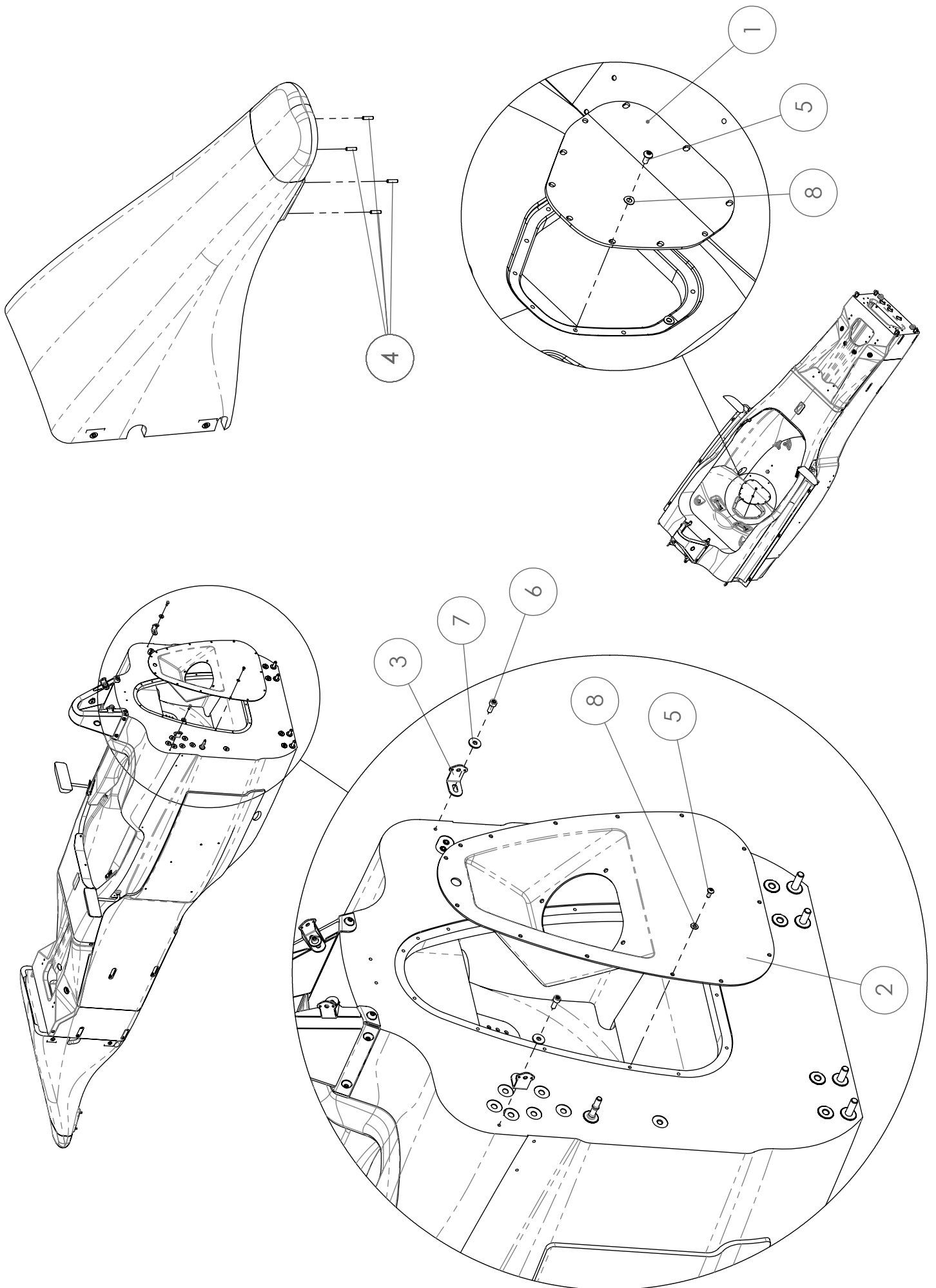
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Release history

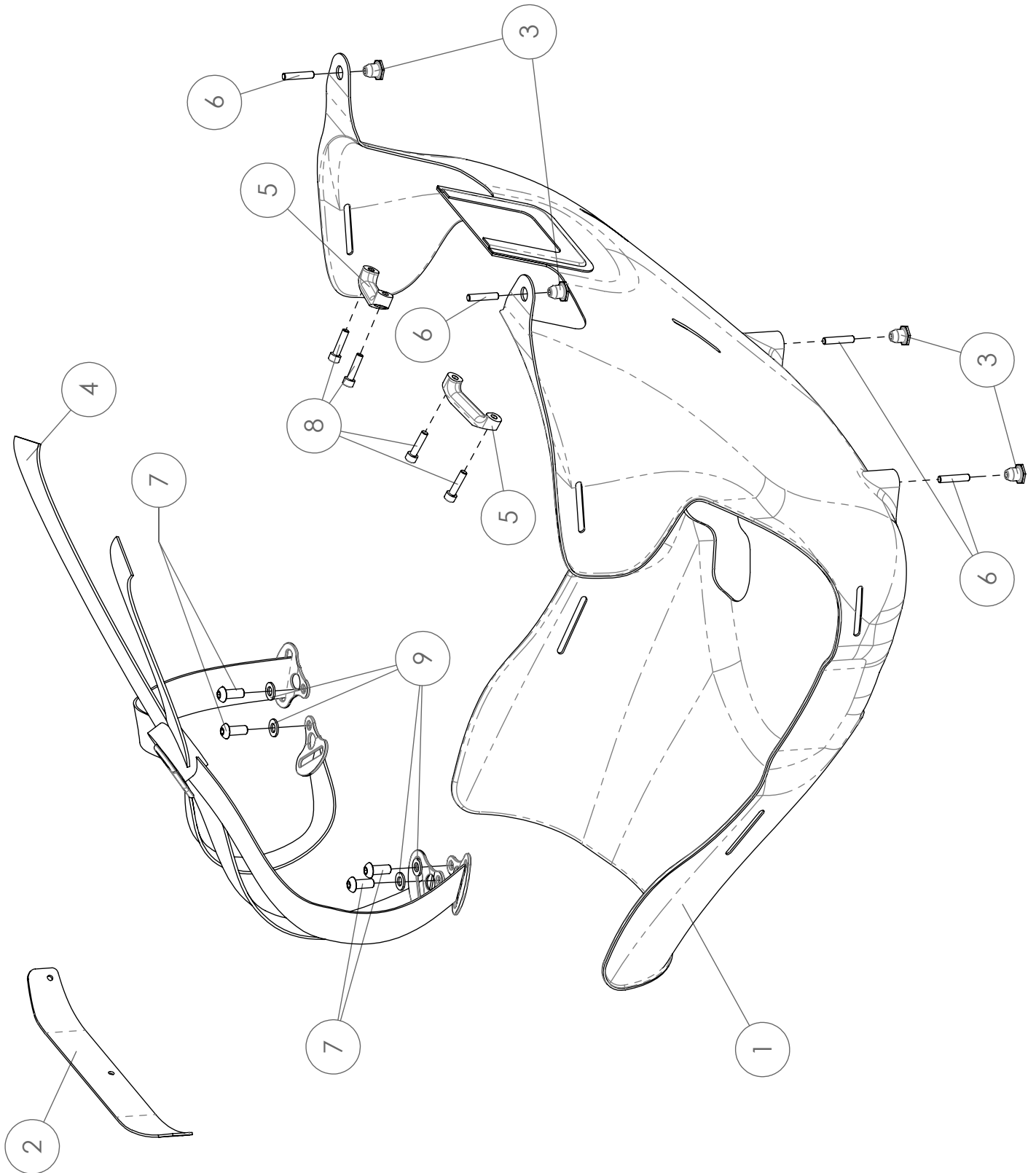
Version	Date	Changes	Rev.
v. 4.3	06/10/2014	<ul style="list-style-type: none"> • New pages • Modified pages: COD.01-A ,COD.01-C, COD.05-B, COD.06-B, COD.07-A, COD.09-A, COD.10-A, COD.10-B, COD.10-C, COD.11-A, COD.15, COD.16-A, COD.18, COD.19-A, COD.19-B, COD.20, COD.21-A, COD.22-A, COD.22-B, COD.24-A, COD.25. • Removed pages: 	Bulgarelli F. Levratti R. Odoardi F.
v. 4.4	28/10/2014	<ul style="list-style-type: none"> • New pages • Modified pages: COD.07-A ,COD.07-B, COD.11-A, COD.12, COD.15, COD.18, COD.20, COD.22-A, COD.22-B, COD.24-A. • Removed pages: 	Bulgarelli F. Levratti R.
v. 4.5	02/12/2014	<ul style="list-style-type: none"> • New pages • Modified pages: COD.01-A, COD.09-A, COD.09-B, COD.12, COD.16-A. • Removed pages: 	Bulgarelli F.
v. 4.6	23/02/2015	<ul style="list-style-type: none"> • New pages: COD.25-A, COD.25-B. • Modified pages: COD.06-B, COD.07-B, COD.10-A, COD.11-B, COD.13-B, COD.16-A, COD.20, COD.22-A, COD.24-A. All even pages reviewed for price update. • Removed pages: 	Bulgarelli F.
v. 4.6.1	02/04/2015	<ul style="list-style-type: none"> • New pages: • Modified pages: COD.09-A, COD.09-B • Removed pages: 	Bulgarelli F.
v. 4.7	23/04/2015	<ul style="list-style-type: none"> • New pages: COD.22-C • Modified pages: COD.01-C, COD.02-A, COD.02-B, COD.06-A, COD.09-A, COD.-09-B, COD.09-C, COD.10-A, COD.13-A, COD.15, COD.18-B, COD.18-D, COD.19, COD.20, COD.21-A, COD.21-C, COD.22-A, COD.24-A, Accessories • Removed pages: 	Bulgarelli F.



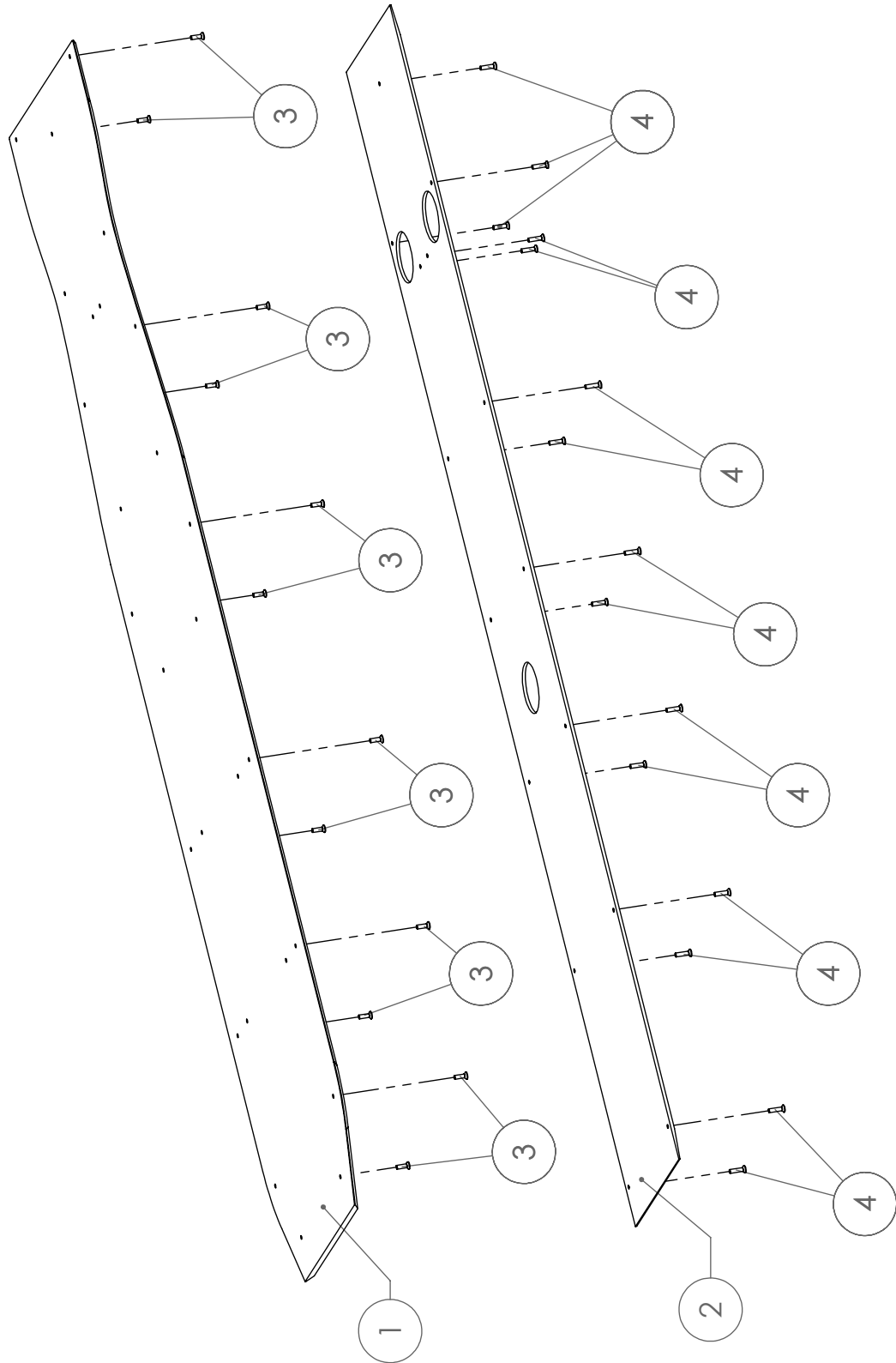
Item	Part Number	Descrizione	Description	Price €
1	161401001	Telaio	Monocoque	€ 14.935,00
2	161401002	Poggiatesta	Headrest	€ 978,50
3	161401003	Musetto	Nosebox	€ 1.596,50
4	161401004	Rollbar	Rollhoop	€ 824,00
5	161401005	Prigioniero	Stud	€ 29,36
6	161401014	Boccola	Bush	€ 8,24
7	161407014	Anello cavo ritenzione	Tether fitting	€ 27,09
8	090901017	Pin	Pin	€ 10,60
9	090922011	Prigioniero	Stud	€ 7,79
10	091001024	Linguetta	Leader	€ 33,46
11	040401067	Specchietto Sx	Lh mirror	€ 127,02
12	040401066	Specchietto dx	Rh mirror	€ 127,02
13	030201017	Spina	Dowel pin	€ 33,81
14	030201016	Ghiera	Nose connection ring nut	€ 12,26
15	010022016	Boccola attacco motore	Chassis bush	€ 37,81
16	010022013	Prigioniero	Stud	€ 3,30
17	010301024	Squadretta rollbar	Rollbar mounting	€ 31,47
18	010101060	Pin posteriore poggiatesta	Headrest pin	€ 32,61
19	UNI7380-M8X20	Vite TB	BH bolt	€ 1,93
20	UNI7380-M8X30	Vite TB	BH Bolt	€ 1,93
21	UNI5931-M10X30	Vite TC M10x1,25x30 c112,9	CH Bolt M10x1,25x30	€ 2,39
22	UNI5931-M6X16	Vite TC	CH Bolt	€ 2,39
23	UNI6593-6	Rondella	Washer	€ 1,07
24	UNI8840B-8	Rondella ondulata	Crinkle Washer	€ 1,07
25	UNI8840B-10	Rondella ondulata	Crinkle Washer	€ 1,07
26	161401003002	Puntalino muso	Front nose	€ 366,68



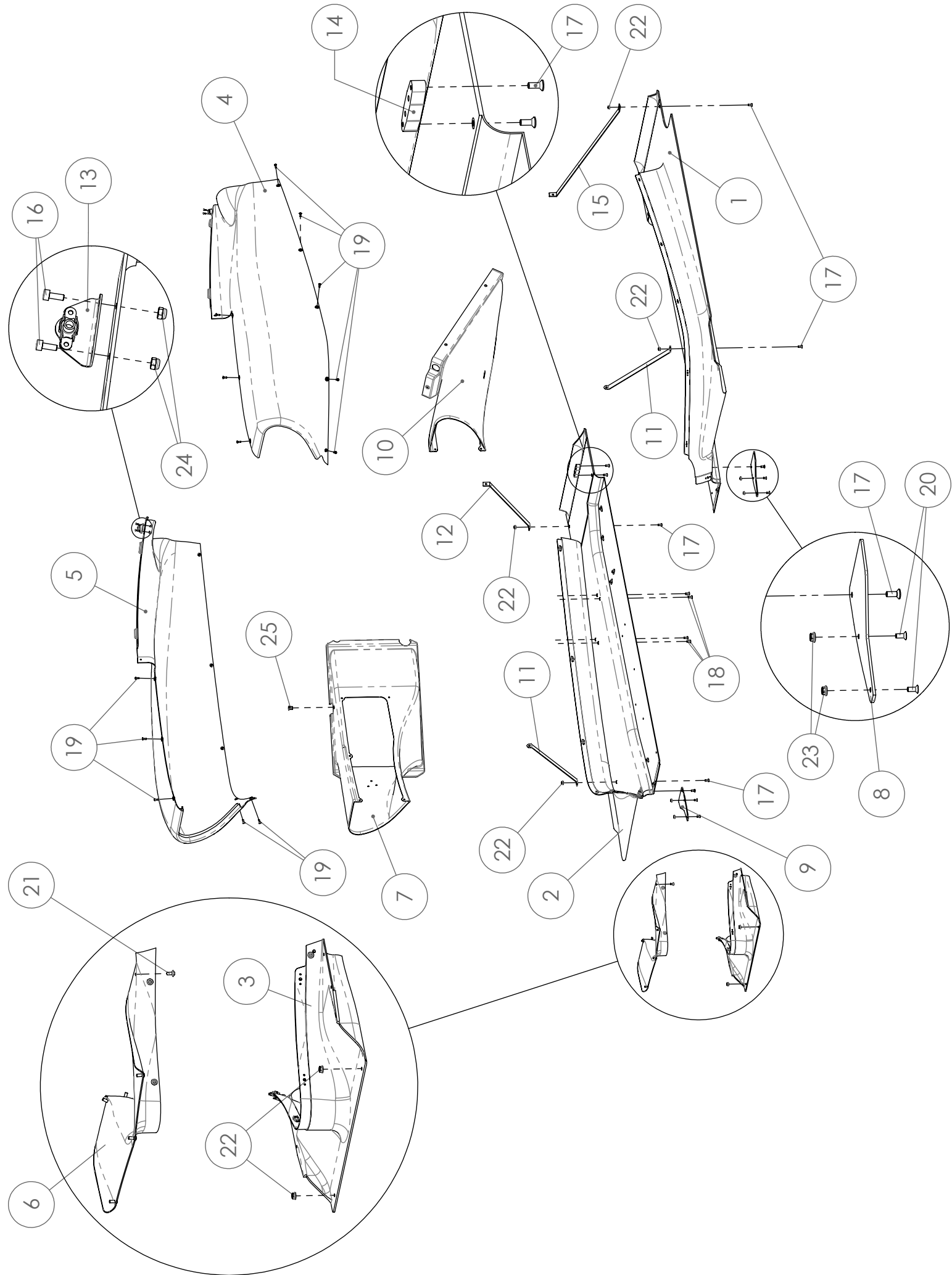
Item	Part Number	Descrizione	Description	Price €
1	161401013	Finestra serbatoio	Bulkhead panel	€ 30,90
2	161401004007	Chiusura posteriore serbatoio	Fuel tank hatch cover	€ 307,46
3	010301025	Staffa carrozzeria	Sidepods mounting	€ 32,85
4	010011020	Prigioniero	Stud	€ 5,05
5	UNI7380-M5X12	Vite TB	BH Bolt	€ 1,63
6	UNI5931-M6X16	Vite TC	CH Bolt	€ 2,39
7	UNI6593-6	Rondella	Washer	€ 1,07
8	UNI8840B-5	Rondella ondulata	Crinkle Washer	€ 1,07



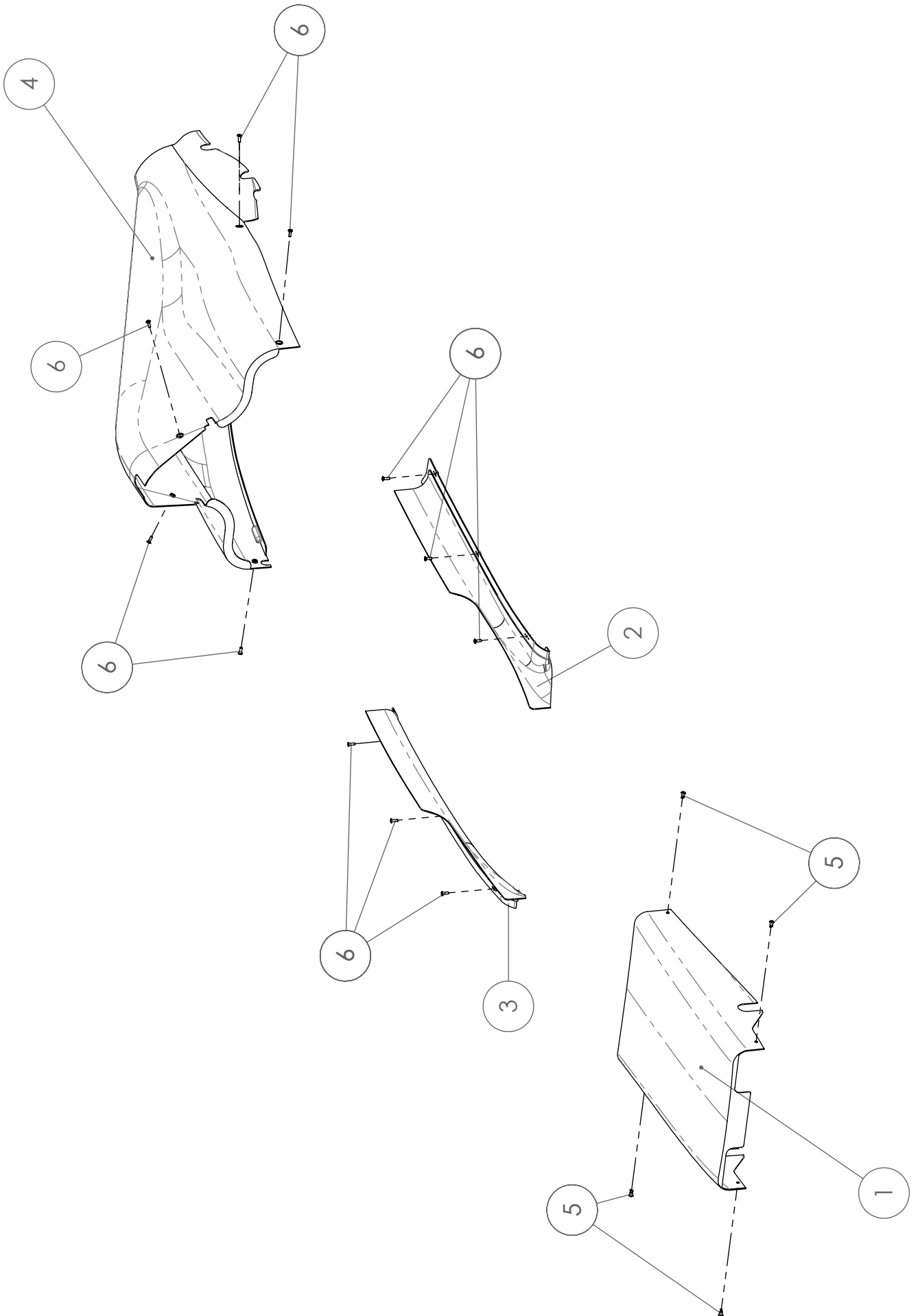
Item	Part Number	Descrizione	Description	Price €
1	161401006	Sedile estraibile	Extractable seat	€ 1.225,91
2	161401011	Parabrezza	Wind screen	€ 30,90
3	090901012	Centraggio	Pin	€ 33,14
4	090901020	Kit Cinture sicurezza	Safety harnesses	€ 278,30
5	030201010	Attacco cinture superiori	Shoulder belt mount	€ 89,85
6	080602013	Prigioniero	Stud	€ 5,08
7	UNI7380-M8X20	Vite TB	BH Bolt	€ 1,93
8	UNI5931-M6X25	Vite TC	CH Bolt	€ 1,63
9	UNI6592-8	Rondella	Washer	€ 1,07



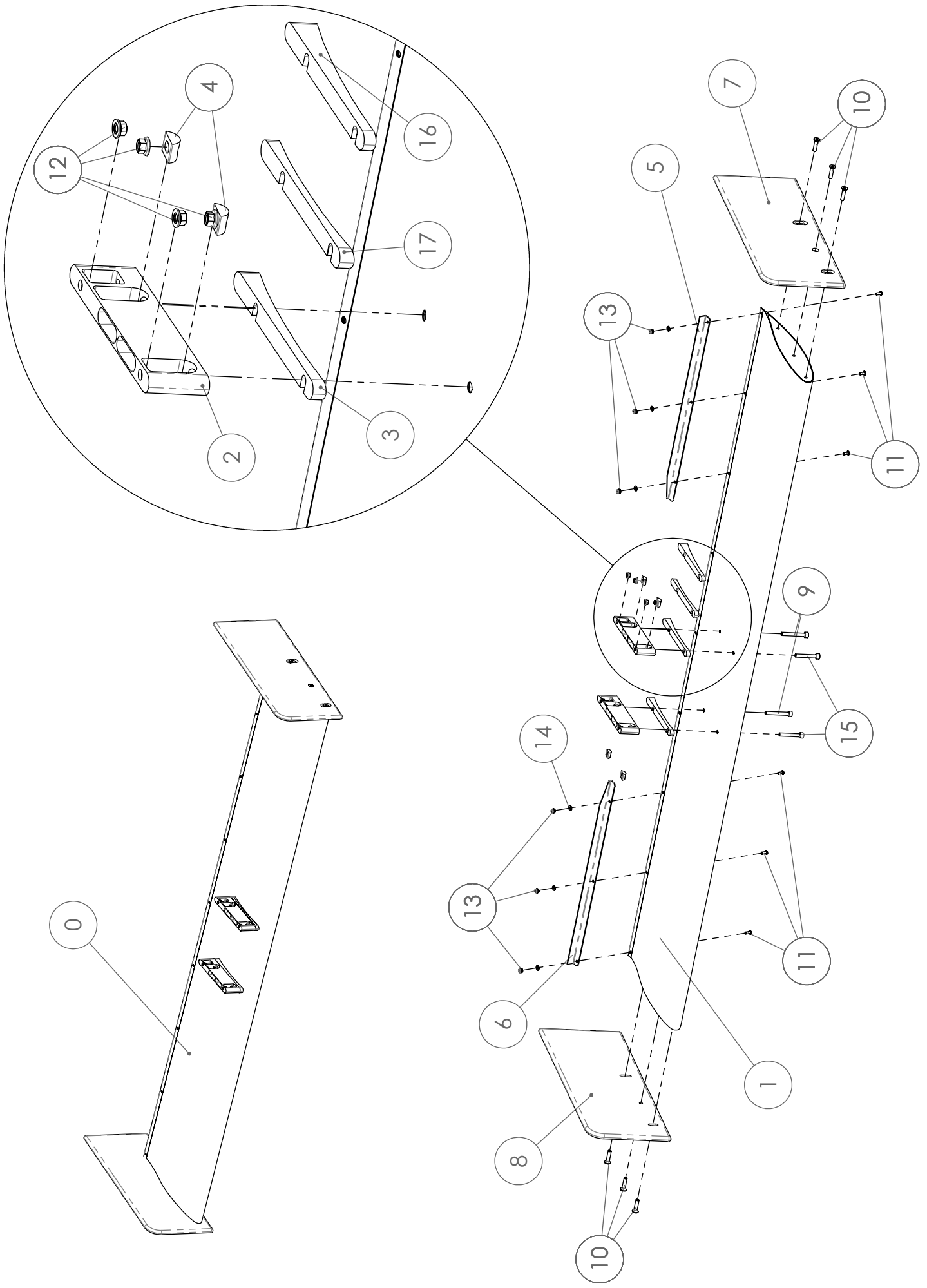
Item	Part Number	Descrizione	Description	Price €
1	161402015	Fondo in legno	Wooden plank	€ 149,87
2	161402016	Slitta in legno	Skid block	€ 206,00
3	UNI5933-TX-M6X20	Vite TS Torx	CSH Torx Bolt	€ 1,63
4	UNI5933-TX-M6X25	Vite TS Torx	CSH Torx Bolt	€ 1,63



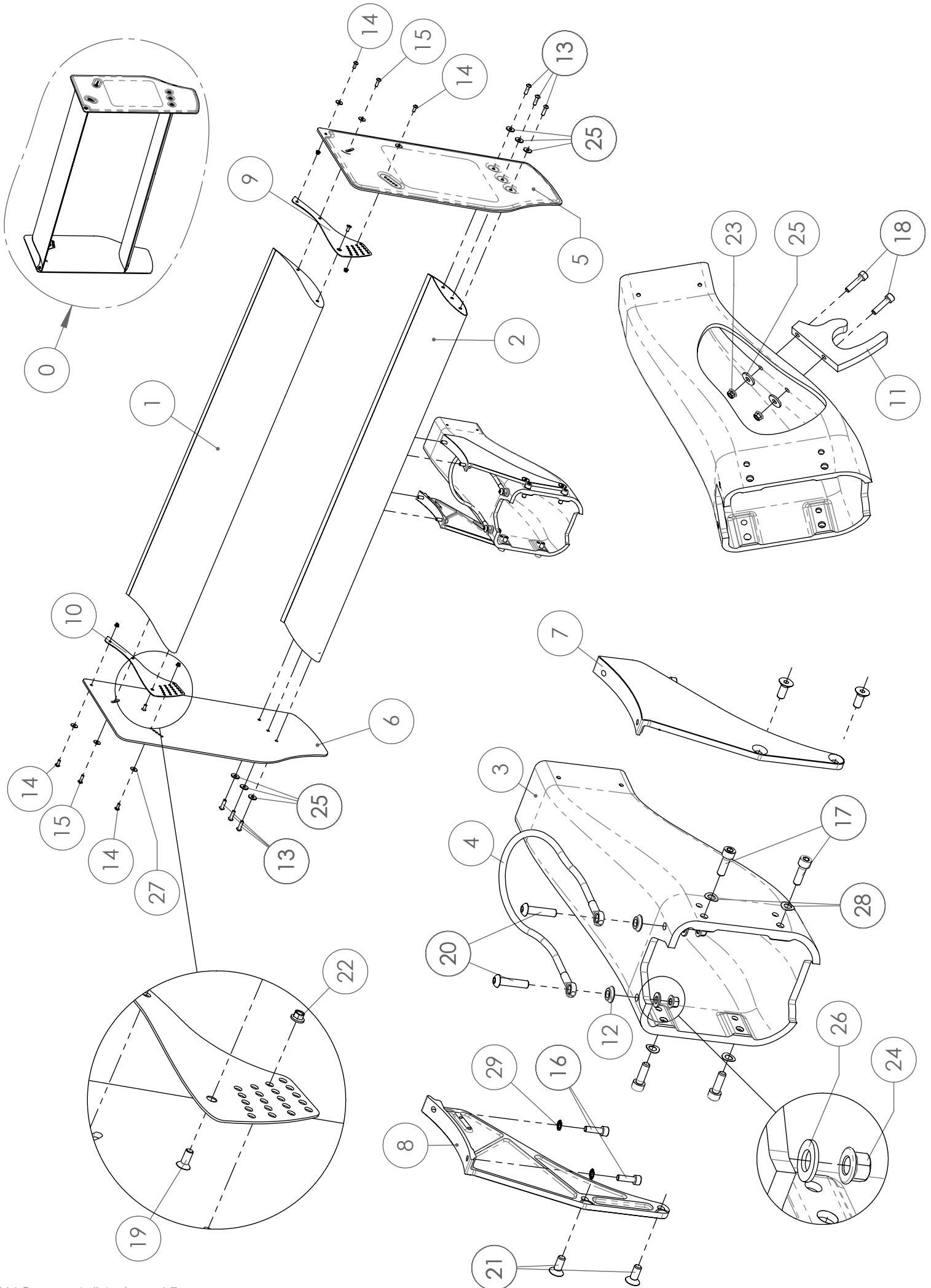
Item	Part Number	Descrizione	Description	Price €
1	161402001	Semi-fondo SX	Lh Underfloor	€ 1.225,70
2	161402002	Semi-fondo DX	RH underfloor	€ 1.225,70
3	161402004	Semi-prua inferiore	Bottom Bib	€ 422,30
4	161402007	Pancia sinistra	Lh sidepod	€ 700,40
5	161402008	Pancia destra	Rh sidepod	€ 700,40
6	161402009	Semi-prua superiore	Top bib	€ 257,50
7	161402012	Convogliatore DX	Rh radiator duct	€ 499,55
8	161402013	Shadow sx telaio	LH chassis shadow	€ 27,30
9	161402014	Shadow telaio dx	Rh chassis shadow	€ 27,30
10	161402017	Convogliatore SX	Lh radiator duct	€ 468,65
11	161402019	Tirante	Floor stay	€ 23,28
12	161402020	Tirante	Floor stay	€ 23,28
13	090902022	Staffa carrozzeria	Bodywork bracket	€ 17,91
14	161402026	Staffa	Underfloor stay	€ 64,38
15	161402029	Tirante cambio fondo Sx	Gearbox floor stay	€ 23,28
16	UNI5931-M3X8	Vite TC	CH Bolt	€ 1,34
17	UNI5933-TX-M6X16	Vite TS Torx	CSH Torx Bolt	€ 1,63
18	UNI5933-TX-M6X10	Vite TS Torx	CSH Torx Bolt	€ 1,63
19	UNI5933-TX-M5X16	Vite TS torx	CSH Torx Bolt	€ 1,63
20	UNI5933-TX-M5X12	Vite TS Torx	CSH Torx Bolt	€ 1,63
21	UNI7380-TX-M5X12	Vite TB Torx	BH Torx Bolt	€ 1,63
22	DIN6927-M6	Dado flangiato autobloccante	Prevailing torque Nut	€ 1,86
23	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1,86
24	UNI7473-M3	Dado autobloccante	Prevailing torque Nut	€ 1,34
25	E127-0615	Boccola Antivibrante M6	Bush M6	€ 7,11
0	OLV-M5	Olivetta flottante M5	Anchor nut M5	€ 5,67



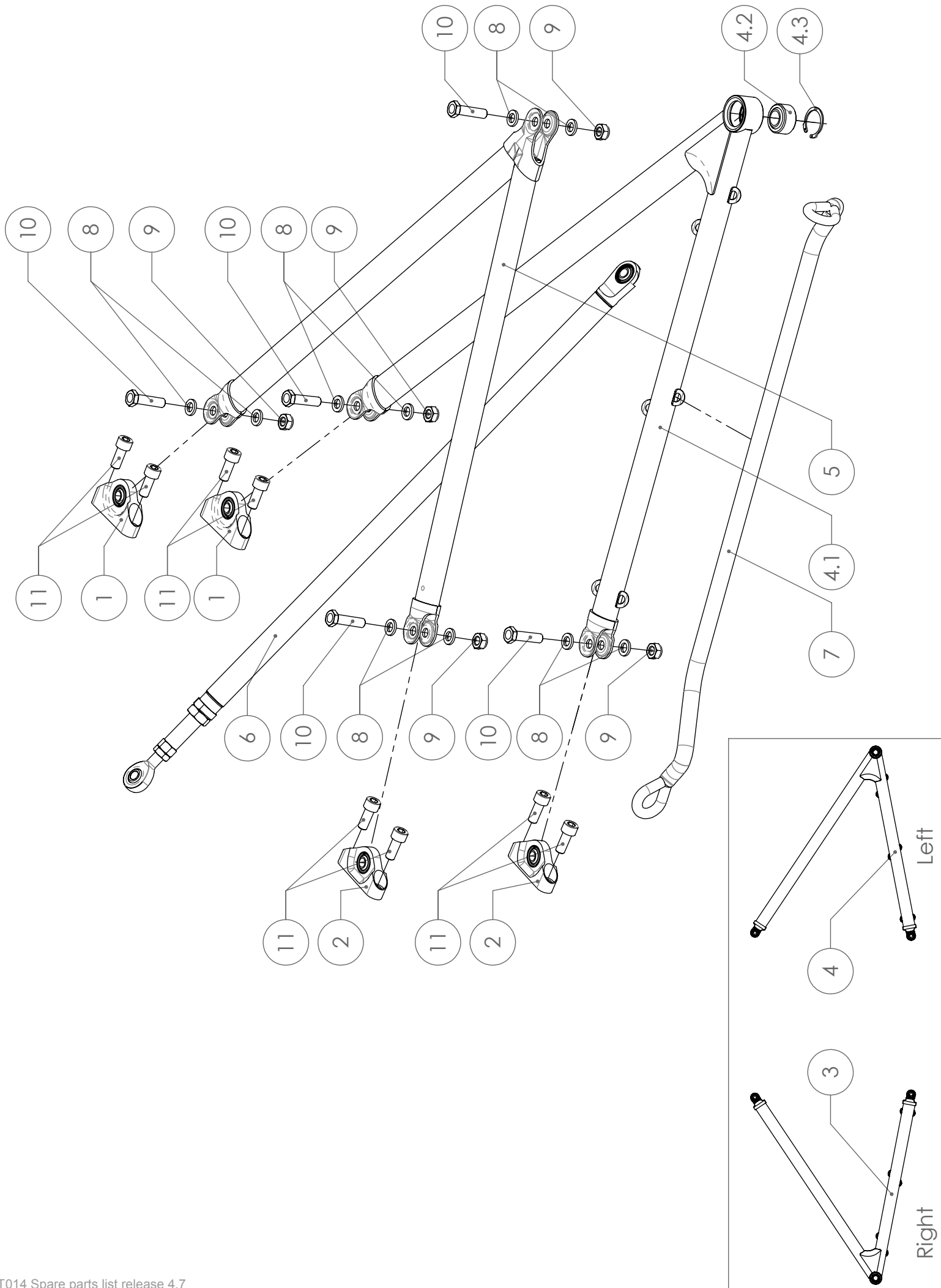
Item	Part Number	Descrizione	Description	Price €
1	161402003	Cofanetto anteriore	Front cover	€ 381,10
2	161402005	Labbro pancia SX	Lh sidepod lip	€ 237,42
3	161402006	Labbro pancia dx	Rh sidepod lip	€ 237,42
4	161402010	Cofano motore	Engine cover	€ 1.318,40
5	27S32F	Perno ¼ di giro	Quarter turn stud	€ 10,46
6	UNI5933-TX-M5X16	Vite TS torx	CSH Torx Bolt	€ 1,63



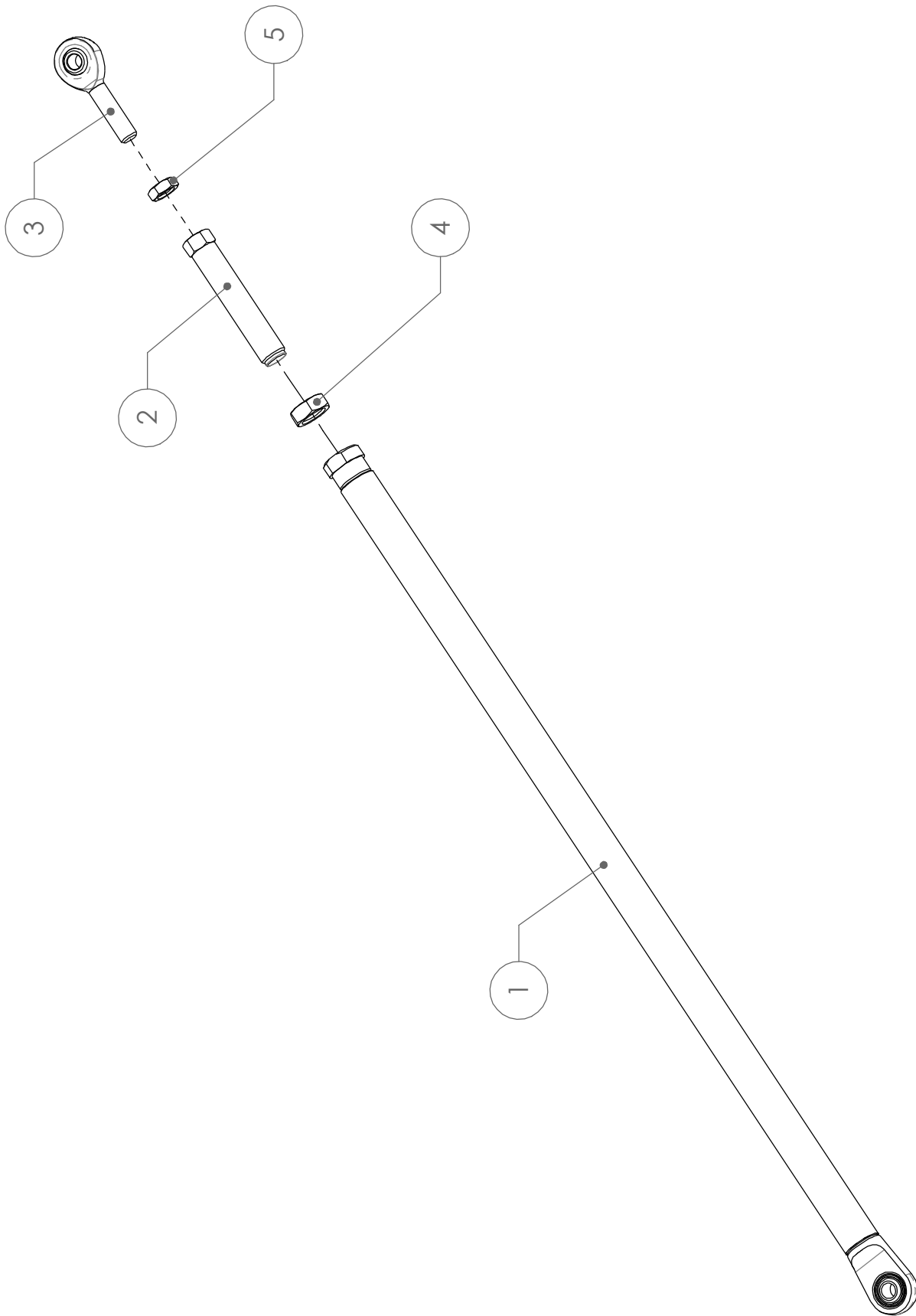
Item	Part Number	Descrizione	Description	Price €
0	161404001	Ala anteriore completa	Front wing assy	€ 766,74
1	161404003	Ala anteriore	Front wing	€ 445,38
2	161404011	Pilone ala	Wing pillar	€ 87,55
3	161404015	Regolazione ala anteriore (5°)	Front wing adjuster (5°)	€ 37,08
4	161404017	Boccola	Adjustement bush	€ 12,88
5	161404023	Nolder Sx	Lh Gurney	€ 10,30
6	161404024	Nolder Dx	Rh Gurney	€ 10,30
7	161404025	Bandella anteriore Sx	Lh front endplate	€ 37,08
8	161404026	Bandella anteriore Dx	Rh front endplate	€ 37,08
9	UNI5931-M6X45	Vite TC	CH Bolt	€ 1,63
10	UNI5933-M6X25	Vite TS	CSH Bolt	€ 1,63
11	UNI7380-M4X10	Vite TB	BH Bolt	€ 1,34
12	AST-06	K-Nut	K-Nut	€ 4,95
13	UNI7473-M4	Dado autobloccante	Prevailing torque Nut	€ 1,34
14	UNI6592-M4	Rondella	Washer	€ 1,07
15	UNI5931-M6X40	Vite TC	CH Bolt	€ 1,63
16	161404035	Regolazione ala anteriore (3°)	Front wing adjuster (3°)	€ 37,08
17	161404032	Regolazione ala anteriore (7°)	Front wing adjuster (7°)	€ 37,08



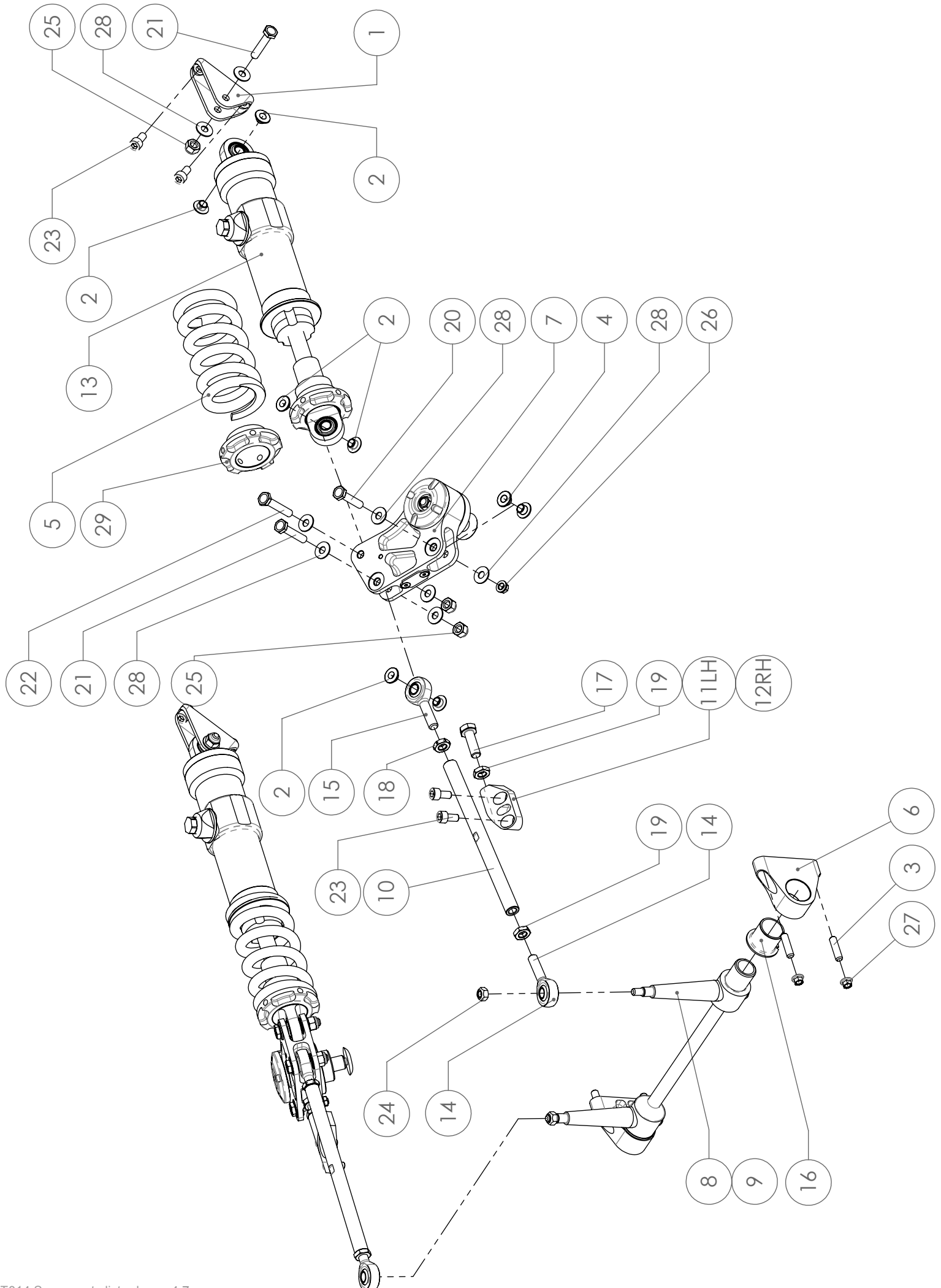
Item	Part Number	Descrizione	Description	Price €
0	161404002	Ala posteriore completa	Rear wing assy	€ 978,50
1	161404004	Ala superiore	Top main wing	€ 309,00
2	161404005	Ala inferiore	Beam wing	€ 339,90
3	161404006	Crashbox posteriore	Rear impact structure	€ 1.442,00
4	161404008	Cavo di traino completo	Tow cable	€ 12,98
5	161404009	Bandella post. Sx	Lh rear enplate	€ 128,75
6	161404010	Bandella post. dx	Rh rear enplate	€ 128,75
7	161404019	Palo ala post Sx	Lh rear wing mounting	€ 131,84
8	161404020	Palo ala post. Dx	Rh rear wing mounting	€ 131,84
9	161404021	Bandella regolazione Sx	Lh adjustment enplate	€ 36,05
10	161404022	Bandella regolazione Dx	Rh adjustment enplate	€ 36,05
11	151402004	Gancio sollevamento	Lift hook	€ 70,56
12	010013007	Boccola	Bush	€ 14,40
13	UNI7380-M6X20	Vite TB	BH Bolt	€ 1,63
14	UNI7380-M5X12	Vite TB	BH Bolt	€ 1,63
15	UNI7380-M5X16	Vite TB	BH Bolt	€ 1,63
16	UNI5931-M6X20	Vite TC	CH Bolt	€ 1,63
17	UNI5931-M8X25	Vite TC	CH Bolt	€ 1,93
18	UNI5931-M6X25	Vite TC	CH Bolt	€ 1,63
19	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1,63
20	UNI7380-M8X35	Vite TB	BH Bolt	€ 1,93
21	UNI5933-M8X20	Vite TS	CSH Bolt	€ 1,93
22	AST-05	K-Nut	K-Nut	€ 4,95
23	DIN6927-M6	Dado flangiato autobloccante	Prevailing torque Nut	€ 1,86
24	DIN6927-M8	Dado flangiato autobloccante	Prevailing torque Nut	€ 2,33
25	UNI6593-6	Rondella	Washer	€ 1,07
26	UNI6592-8	Rondella	Washer	€ 1,07
27	UNI6593-5	Rondella	Washer	€ 1,07
28	UNI8840B-8	Rondella ondulata	Crinkle Washer	€ 1,07
29	RZS6	Rondella zigrinata	Safety washer	€ 1,07



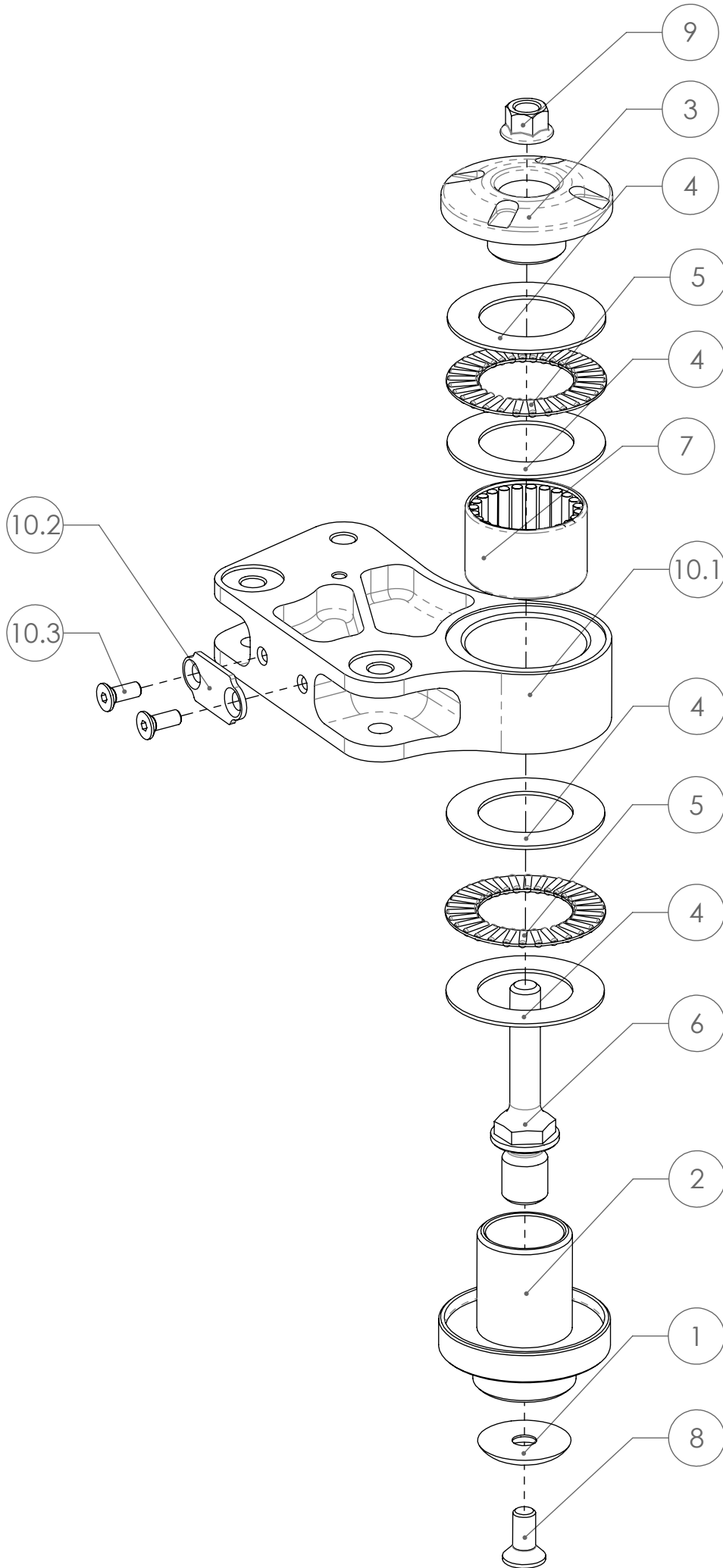
Item	Part Number	Descrizione	Description	Price €
1	010010028	Attacco sospensione completo	Wishbone bracket assy	€ 210,73
2	020210006	Attacco sospensione completo	Wishbone bracket assy	€ 199,03
3	161405002	Braccio anteriore inferiore dx completo	Rh front lower wishbone assy	€ 340,56
4	161405003	Braccio anteriore inferiore sx completo	Lh front lower wishbone assy	€ 340,56
4,1	161405005	Braccio anteriore inferiore sx	Lh front lower wishbone	€ 275,79
4,1	161405004	Braccio anteriore inferiore dx	Rh front lower wishbone	€ 275,79
4,2	UNIBALL-ABWT8	Snodo sferico	Spherical bearing	€ 63,50
4,3	J25X1,2V	Circlip	Circlip	€ 1,28
5	161405006	Braccio anteriore superiore	Front top wishbone	€ 275,79
6	161405007	Push rod anteriore completo	Front push rod assy	€ 296,21
7	161405010	Cavo di ritenzione	Wheel tether	€ 226,60
8	090910011	Rondella speciale 5/16" Sp.2	Special Flat Washer 5/16" Th.2	€ 3,31
9	AN365-5/16X24	Dado autobloccante	Self-locking Nut	€ 1,86
10	AN5-11A	Vite NAS	NAS bolt	€ 4,65
11	UNI5931-M8X20	Vite TC	CH Bolt	€ 1,93



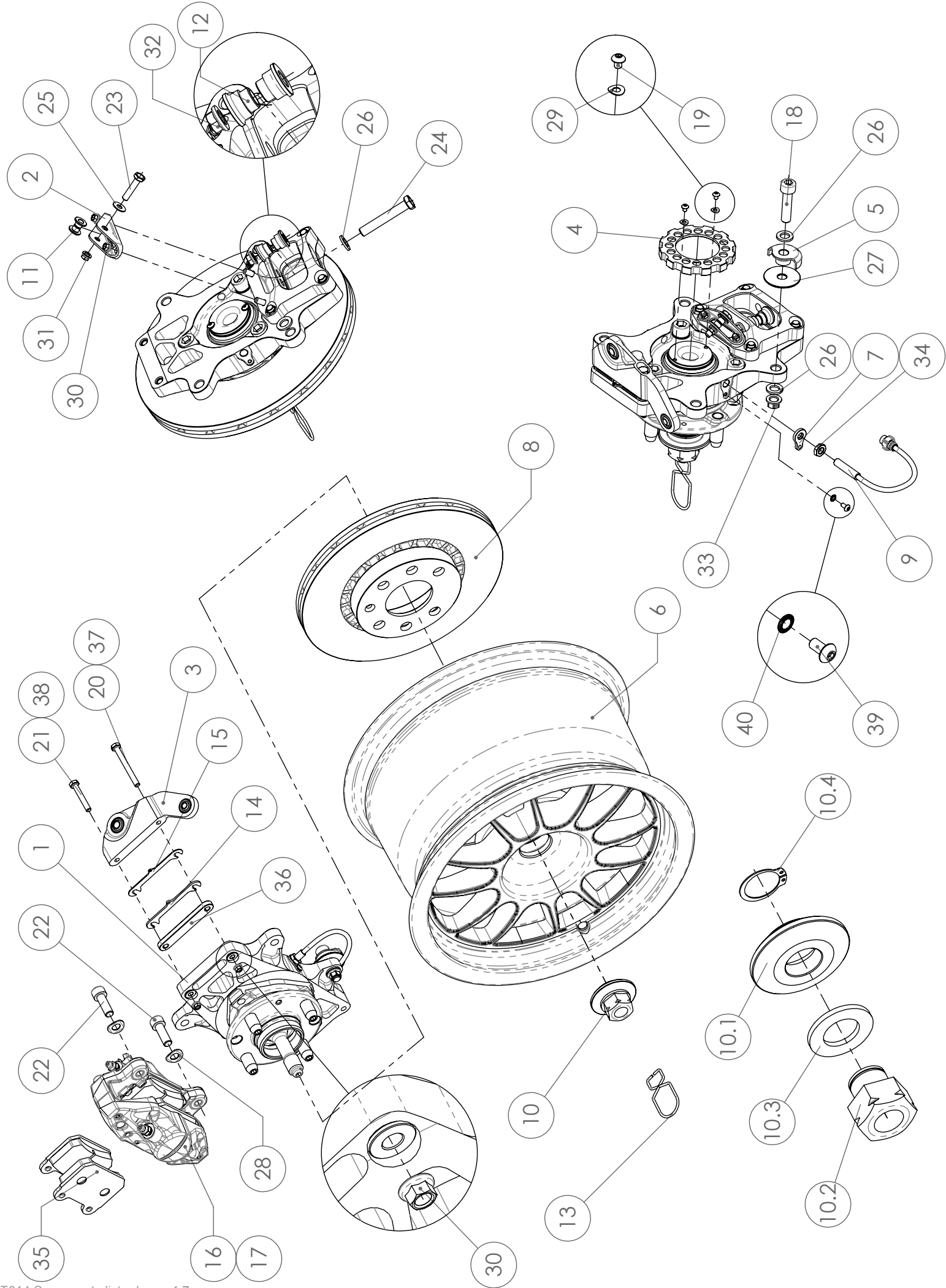
Item	Part Number	Descrizione	Description	Price €
1	161405008	Puntone anteriore	Front push rod	€ 164,80
2	010005012	Registro Puntone	Push rod adjuster	€ 39,56
3	RE-3/8L	Testa a snodo	Rod end	€ 91,86
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25	€ 6,46
5	ANSIB182265-3/8X24	Dado esagonale	Hex Nut	€ 2,73



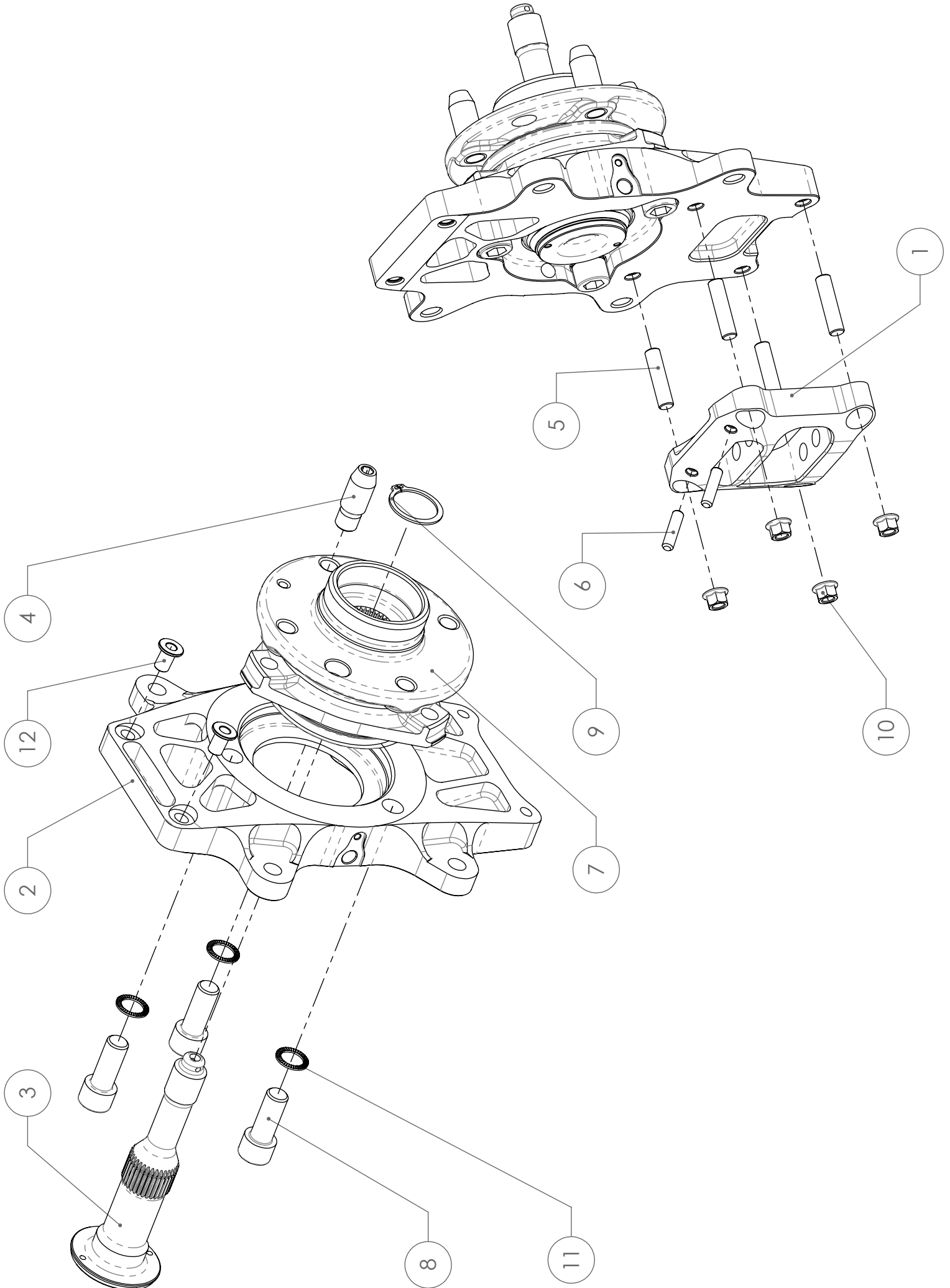
Item	Part Number	Descrizione	Description	Price €
1	010008009	Staffa ammortizzatore	Damper mounting	€ 104,45
2	010008010	Boccola	Bush	€ 16,63
3	010011020	Prigioniero	Stud	€ 5,05
4	080608010	Boccola	Bush	€ 27,87
5	080608026A	Molla 600 lb/in	Spring 600 lb/in	€ 127,60
0	080608026C	Molla 800 lb/in	Spring 800 lb/in	€ 127,60
0	080608026E	Molla 1000 lb/in	Spring 1000 lb/in	€ 127,60
6	151406010	Supporto FARB	FARB bracket	€ 88,17
7	161406002	Rocker anteriore completo	Front rocker assy	€ 535,68
8	161406004	FARB ø 11,5	FARB ø 11,5	€ 286,86
9	161406005	FARB ø 13,5	FARB ø 13,5	€ 286,86
10	161406009	Link FARB	Link FARB	€ 25,03
11	161406011	Rebound stop SX	Rebound stop LH	€ 57,17
12	161406012	Rebound stop DX	Rebound stop RH	€ 57,17
13	161406013	Ammortizzatore anteriore	Front damper	€ 813,70
14	RE-8M	Testa a snodo	Rod end	€ 50,49
15	RE-8ML	Testa a snodo	Rod end	€ 50,49
16	PAF20215P10	Boccola Flangiata DU	Self-lubricating flanged bush	€ 8,16
17	UNI5739-M8X25	Vite TE	HH Bolt	€ 1,93
18	UNI5589-M8L	Dado esagonale basso	Thin Hex Nut	€ 2,20
19	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
20	AN4-11A	Vite NAS	NAS bolt	€ 4,86
21	AN4-12A	Vite NAS	NAS bolt	€ 4,86
22	AN4-13A	Vite NAS	NAS bolt	€ 4,86
23	UNI5931-M6x12	Vite TC	CH Bolt	€ 1,63
24	DIN980-M6	Dado autobloccante	Prevailing torque Nut	€ 1,86
25	AN365-1/4X28	Dado autobloccante	Self-locking Nut	€ 1,86
26	AST-1/4	K-Nut	K-Nut	€ 4,95
27	AST-06	K-Nut	K-Nut	€ 4,95
28	AN960-1/4	Rondella	Washer	€ 1,87
29	161406013005	Ghiera molla	Plateform	€ 70,00



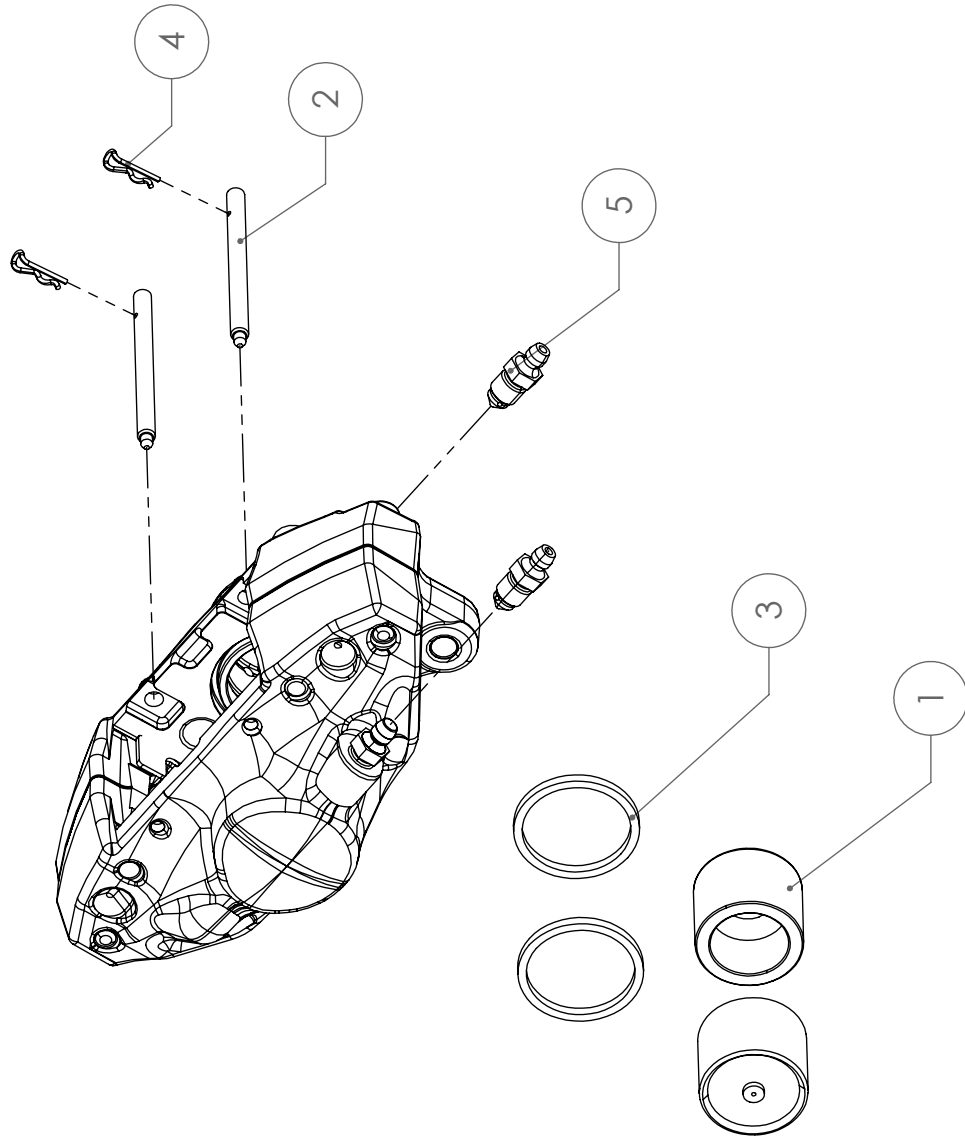
Item	Part Number	Descrizione	Description	Price €
1	080602008	Rondella speciale	Button washer	€ 16,32
2	151406003	Perno Rocker ant	Front rocker pivot	€ 90,64
3	151406004	Registro rocker ant.	Front rocker adjuster	€ 67,47
4	AS2542	Controralla	Thrust bearing washer	€ 6,84
5	AXK2542	Cuscinetto reggispinta	Thrust bearing	€ 11,83
6	151406005	Perno prigioniero rocker ant.	Front rocker stud	€ 69,53
7	HK2520	Cuscinetto a rullini	Drawn cup needle roller bearing	€ 21,45
8	UNI5933-M6X14	Vite TS	CSH Bolt	€ 1,63
9	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5,09
10,1	161406003	Rocker anteriore	Front rocker	€ 236,90
10,2	151406012	Lamiera arresto rocker	Rebound stop flange	€ 9,79
10,3	UNI5933-M4X8	Vite TS	CSH Bolt	€ 1,34



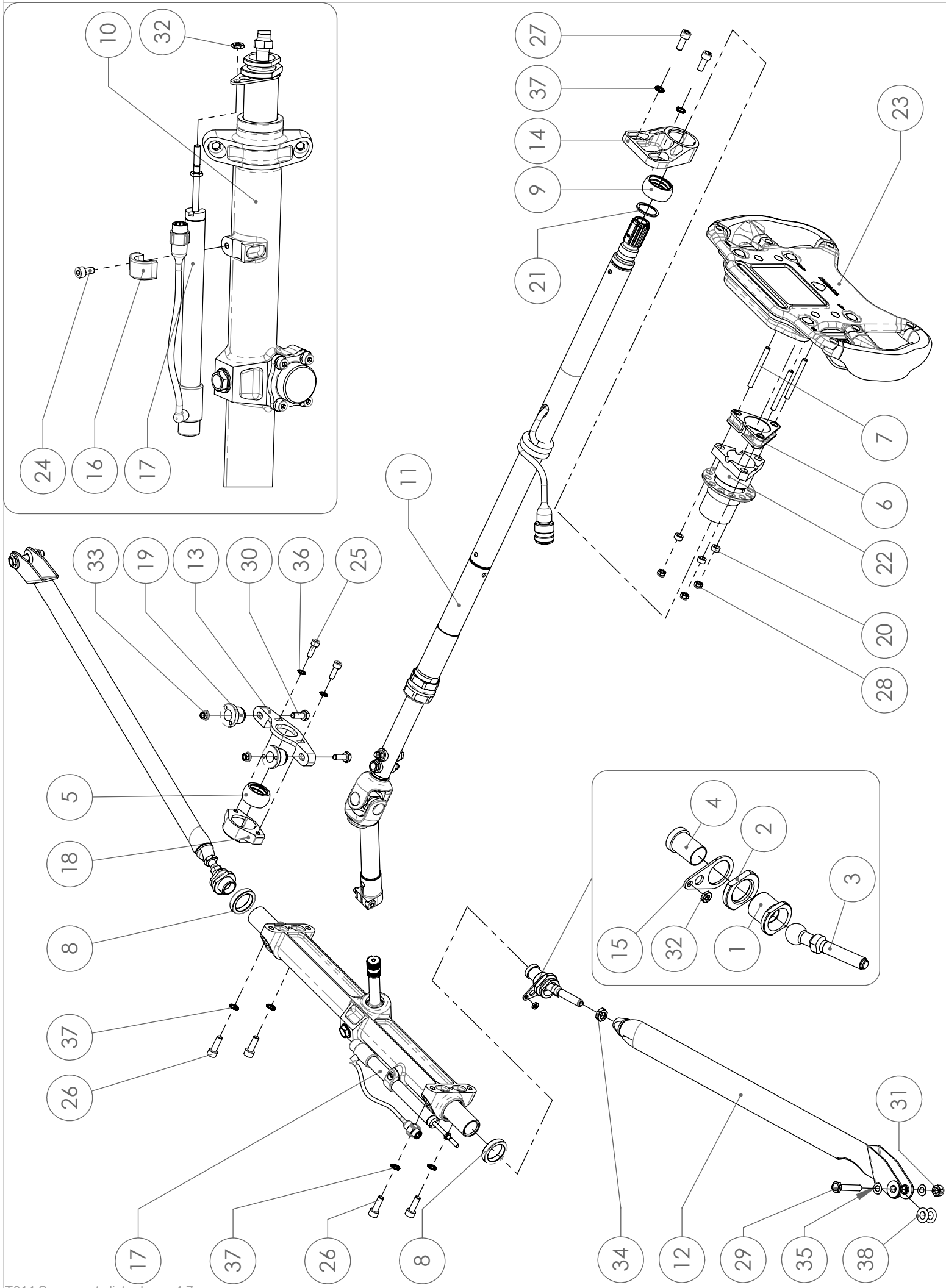
Item	Part Number	Descrizione	Description	Price €
1	161407004	Portamozzo completo	Upright assy	€ 1.318,30
2	161407009	Attacco puntone	Push rod bracket	€ 108,15
3	161407011	Ackerman	Ackerman	€ 260,59
4	161407013	Ruota fonica	Trigger wheel	€ 163,77
5	161407014	Anello cavo ritenzione	Tether fitting	€ 27,09
6	161407017	Cerchio 8"x13"	Wheel 8"x13"	€ 257,50
7	101007012	Supporto sensore velocità	Sensor bracket	€ 17,11
8	09552724	Disco Freno	Brake disc	€ 86,52
9	090907018	Sensore Velocità	Speed sensor	€ 198,78
10	090907034	Dado ruota completo DX	RH wheel nut assy	€ 111,30
10,1	090907033001RH	Campanella dado ruota DX	RH wheel nut bell	€ 46,39
10,2	010407033	Dado ruota DX	RH wheel nut	€ 61,76
10,3	UNI6592-20	Rondella	Washer	€ 1,07
10,4	DIN471E21	Circlip	Circlip	€ 2,11
11	080608010	Boccola	Bush	€ 27,87
12	080610006	Boccola ABWT 8	Bush	€ 34,50
13	010007018	Clip sicurezza	Safety spring	€ 9,94
14	01000726B	Spessore camber 2 mm	Camber Shim 2mm	€ 6,24
15	01000726A	Spessore camber 1mm	Camber Shim 1mm	€ 6,24
16	XA6L612	Pinza freno RHT	Brake caliper RHT	€ 231,75
17	XA6L611	Pinza freno LHT	Brake caliper LHT	€ 231,75
18	UNI5931-M10X40	Vite TC M10x1,25x40 cl.12.9	CH Bolt M10x1,25x40 class12.9	€ 2,39
19	UNI7380-M4X5	Vite TB	BH Bolt	€ 1,34
20	UNI5737-M6X60	Vite TE cl 10.9	HE Bolt class 10.9	€ 1,63
21	UNI5737-M6X40	Vite TE cl 10.9	HE Bolt class 10.9	€ 1,63
22	UNI5931-M10X30	Vite TC	CH Bolt	€ 2,39
23	AN4-11A	Vite NAS	NAS bolt	€ 4,86
24	AN6-22A	Vite NAS	NAS bolt	€ 4,22
25	AN960-1/4	Rondella	Washer	€ 1,87
26	UNI6592-10	Rondella	Washer	€ 1,07
27	161407015	Rondella	washer	€ 10,76
28	UNI8840B-10	Rondella ondulata	Crinkle Washer	€ 1,07
29	UNI8840B-4	Rondella ondulata	Crinkle Washer	€ 1,07
30	AST-06	K-Nut	K-Nut	€ 4,95
31	AST-1/4	K-Nut	K-Nut	€ 4,95
32	AST-3/8	K-Nut	K-Nut	€ 6,32
33	AST-10X1,25	K-Nut	K-Nut	€ 4,95
34	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
35	FDS1562	Pastiglie Freno	Brake pads	€ 103,19
36	090907006	Spessore camber 6mm	Camber shim 6mm	€ 33,14
37	UNI5737-M6X65	Vite TE cl 10.9	HE Bolt class 10.9	€ 1,63
38	UNI5737-M6X45	Vite TE cl 10.9	HE Bolt class 10.9	€ 1,63
39	UNI7380-M4X8	Vite TB	BH Bolt	€ 1,34
40	RZS4	Rondella zigrinata	Safety washer	€ 1,07



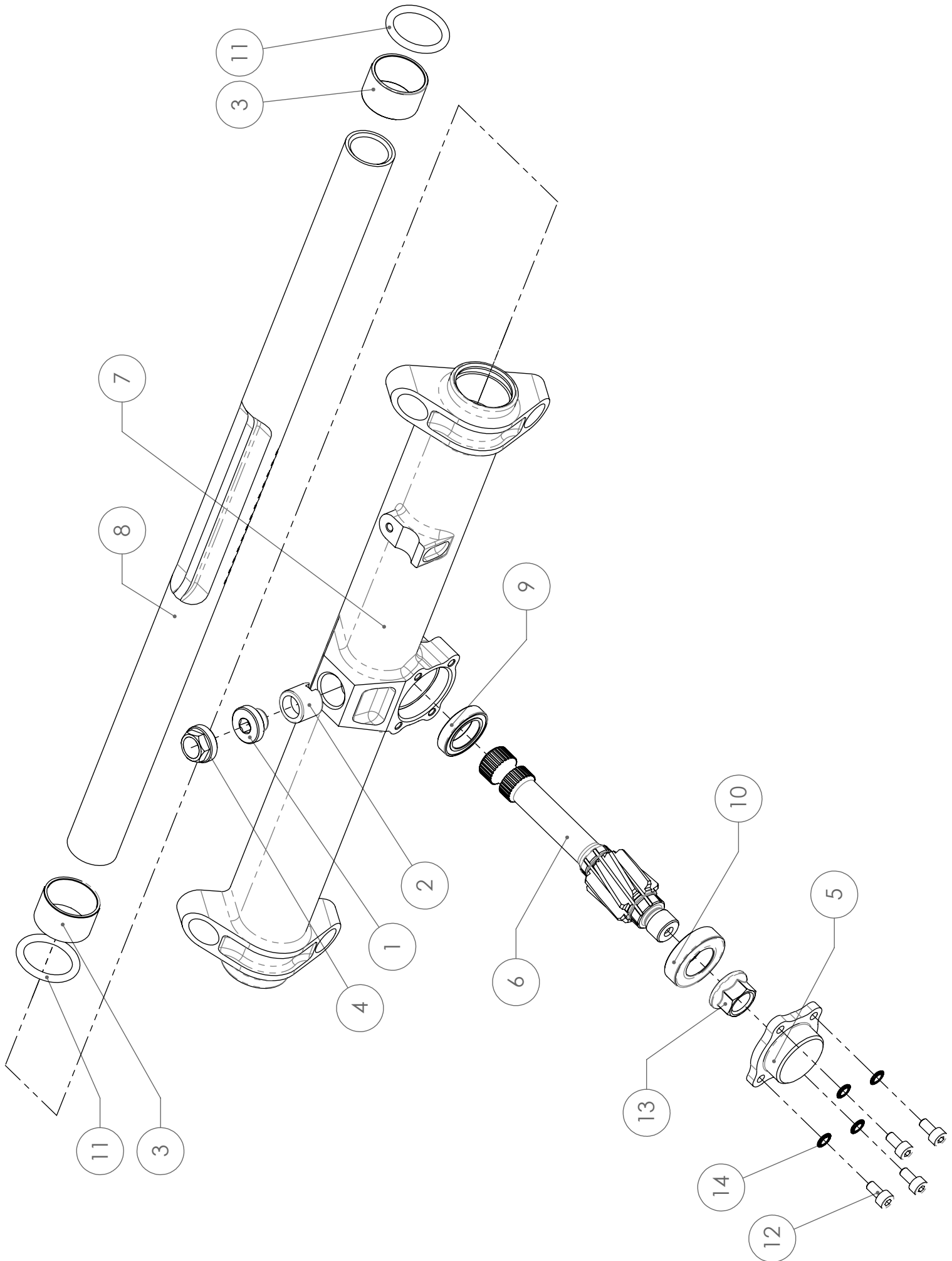
Item	Part Number	Descrizione	Description	Price €
1	161407008	Blocco portamozzo anteriore	Front upright mount	€ 232,37
2	161407010	Portamozzo	Upright	€ 566,50
3	161407012	Perno ruota anteriore	Front wheel axle	€ 203,48
4	161407016	Pin trascinatore	Wheel Drive pin	€ 32,96
5	030210012	Prigioniero	Stud	€ 3,30
6	010011020	Prigioniero	Stud	€ 5,05
7	BAR0048VK108	Cuscinetto ruota	Wheel bearing	€ 133,90
8	UNI5931-M12X30	Vite TC	CH Bolt	€ 2,39
9	DIN471A27	Circlip	Circlip	€ 2,11
10	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5,09
11	RZS12	Rondella zigrinata	Safety washer	€ 1,07
12	161407018	Boccola	Bush	€ 23,18



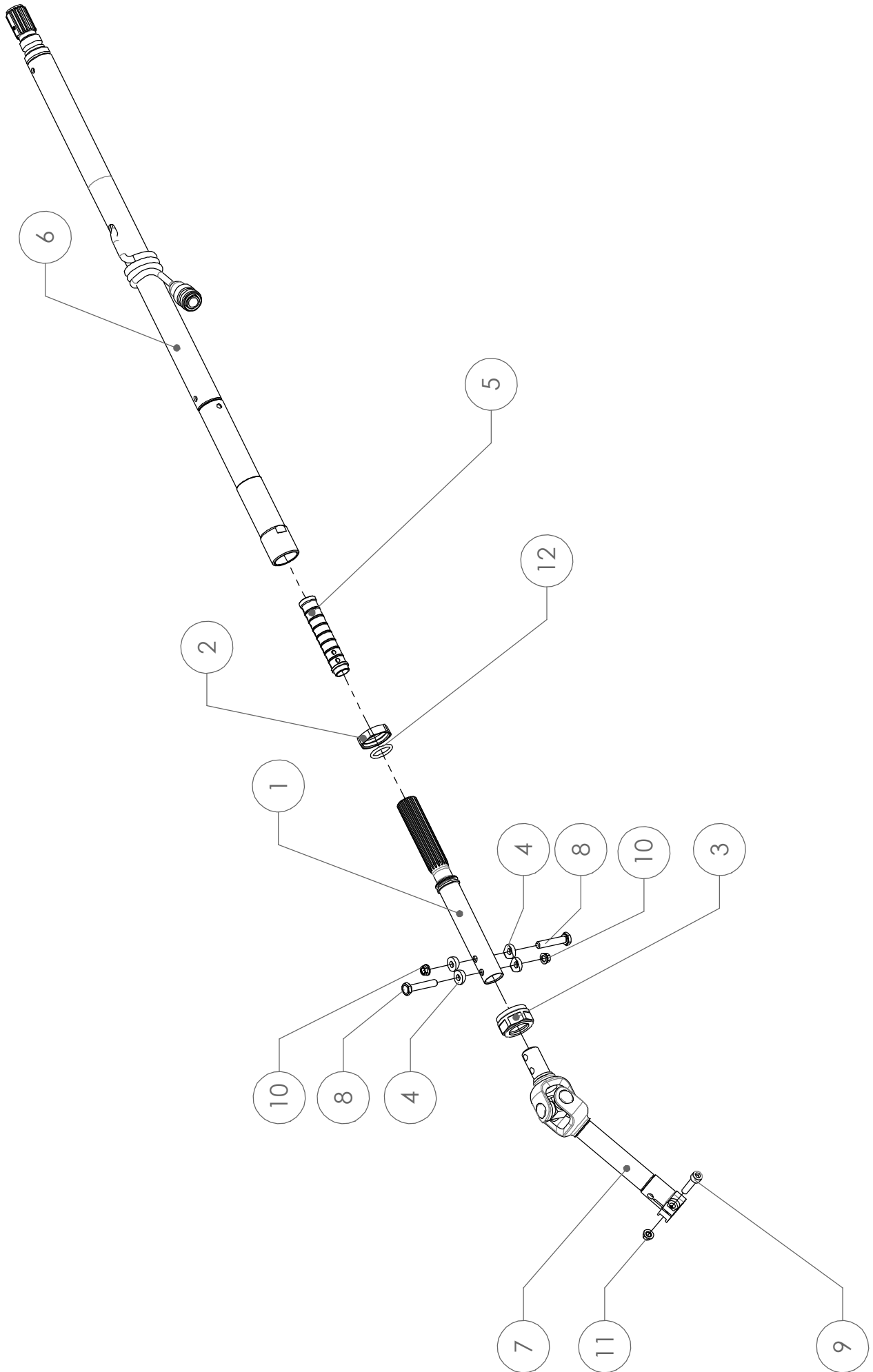
Item	Part Number	Descrizione	Description	Price €
1	20A12969	Pistoncino pinza (1x)	Caliper piston (1 of)	€ 40,17
2	20490810	Perno	Caliper pin	€ 4,54
3	105595516	kit guarnizioni (8x)	Caliper seal kit	€ 87,45
4	05454227	Molla a R	R-clip	€ 3,25
5	05281213	Vite spurgo (1x)	Caliper bleed Bolt (1 of)	€ 6,99



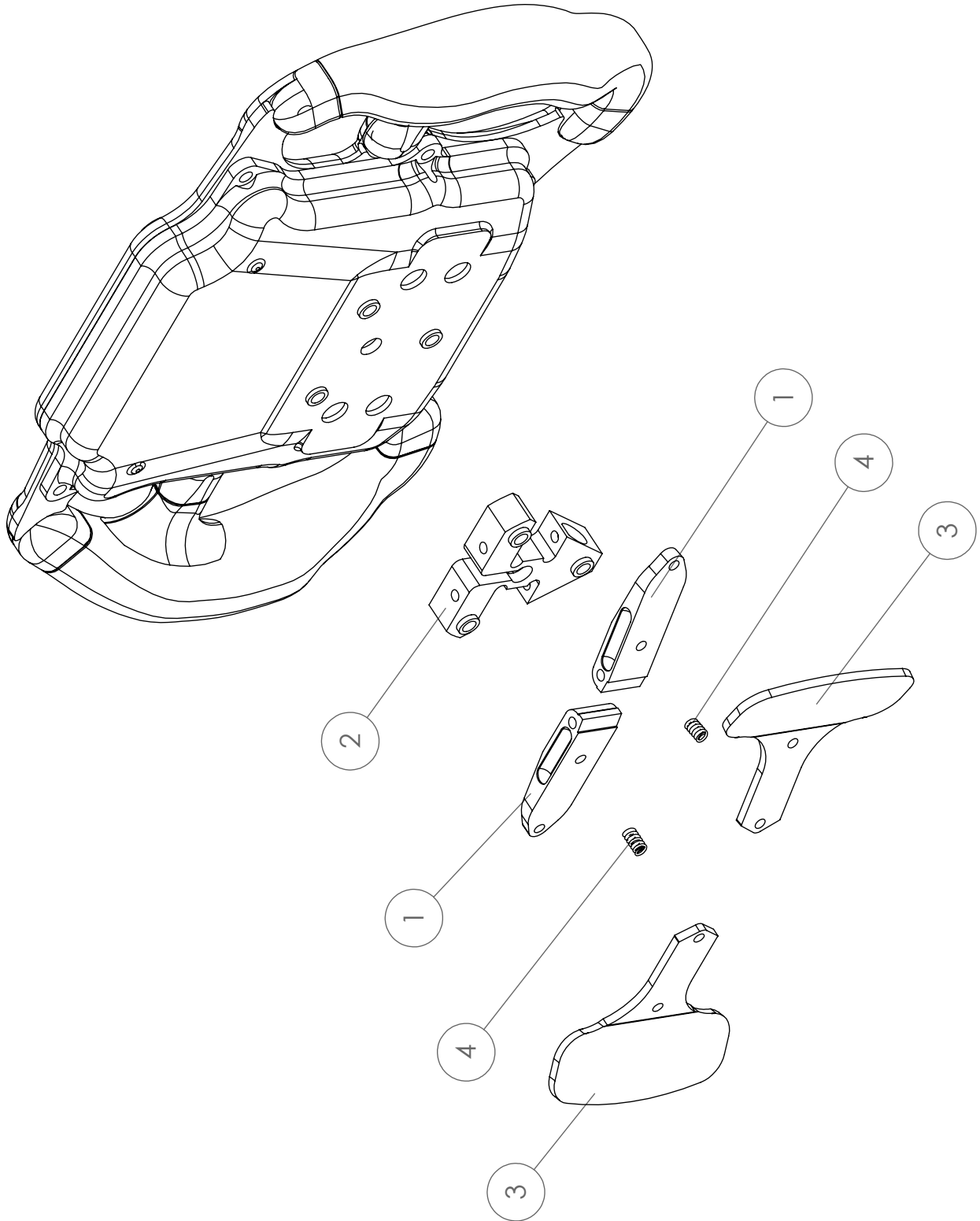
Item	Part Number	Descrizione	Description	Price €
1	010009011	Boccola terminale cremagliera	Rack-end bush	€ 48,16
2	010009013	Dado speciale	Special Nut	€ 16,50
3	010009014	Giunto sfera	Ball end joint	€ 53,53
4	080609004	Sede snodo sterzo	Ball joint seat	€ 46,09
5	080609019	Giunto sferico	Spherical bearing	€ 36,75
6	080709010017	Distanziale volante	Steering wheel spacer	€ 102,04
7	08070901023C	Prigioniero M5 x 51	Stud M5 x 51	€ 6,08
	08070901023B	Prigioniero M5 x 38	Stud M5 x 38	€ 6,08
	08070901023D	Prigioniero M5 x 64	Stud M5 x 64	€ 6,08
8	090909011	Fine corsa cremagliera	Rack stop	€ 10,60
9	080709019	Giunto sferico	Spherical bearing	€ 37,05
10	161409002	Scatola guida completa	Steering rack assy	€ 1.596,19
11	161409004	Assieme piantone	Steering column assy	€ 1.084,26
12	161509008	Tirante sterzo	Track rod	€ 170,26
13	161409010	Supporto piantone	Steering column mounting	€ 175,10
14	161409011	Supporto piantone	Steering column mounting	€ 180,77
15	161409012	Link potenziometro sterzo	Steering pot link	€ 6,39
16	161409013	Supporto potenziometro sterzo	Steering pot bracket	€ 49,44
17	161409014	Potenziometro lineare	Linear potentiometer	€ 321,66
18	161409015	Supporto piantone	Steering column mounting	€ 94,76
19	101009016	Boccola	Bush	€ 41,06
20	161409018	Distanziale	Spacer	€ 6,70
21	161409020	Rondella speciale	Special washer	€ 19,06
22	F9024600	Staccavalante	Steering wheel quick release	€ 326,03
23	VV213001D	Volante completo	Steering wheel	€ 2.523,50
24	UNI5931-M4X8	Vite TB INOX	BH Bolt Stainless Steel	€ 1,34
25	UNI5931-M5X15	Vite TC	CH Bolt	€ 1,63
26	UNI5931-M6X18	Vite TC	CH Bolt	€ 1,63
27	UNI5931-M6X16	Vite TC	CH Bolt	€ 2,39
28	UNI7474-M5	Dado autobloccante	Prevailing torque Nut	€ 1,86
29	AN4-13A	Vite NAS	NAS bolt	€ 4,86
30	UNI5739-M6X16	Vite TE	HH Bolt	€ 1,63
31	AN365-1/4X28	Dado autobloccante	Self-locking Nut	€ 1,86
32	UNI5589-M4	Dado esagonale basso	Thin Hex Nut	€ 1,76
33	AST-06	K-Nut	K-Nut	€ 4,95
34	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
35	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1,07
36	RZS5	Rondella zigrinata	Safety washer	€ 1,07
37	RZS6	Rondella zigrinata	Safety washer	€ 1,07
38	ORN4036	O-Ring	O-Ring	€ 3,73



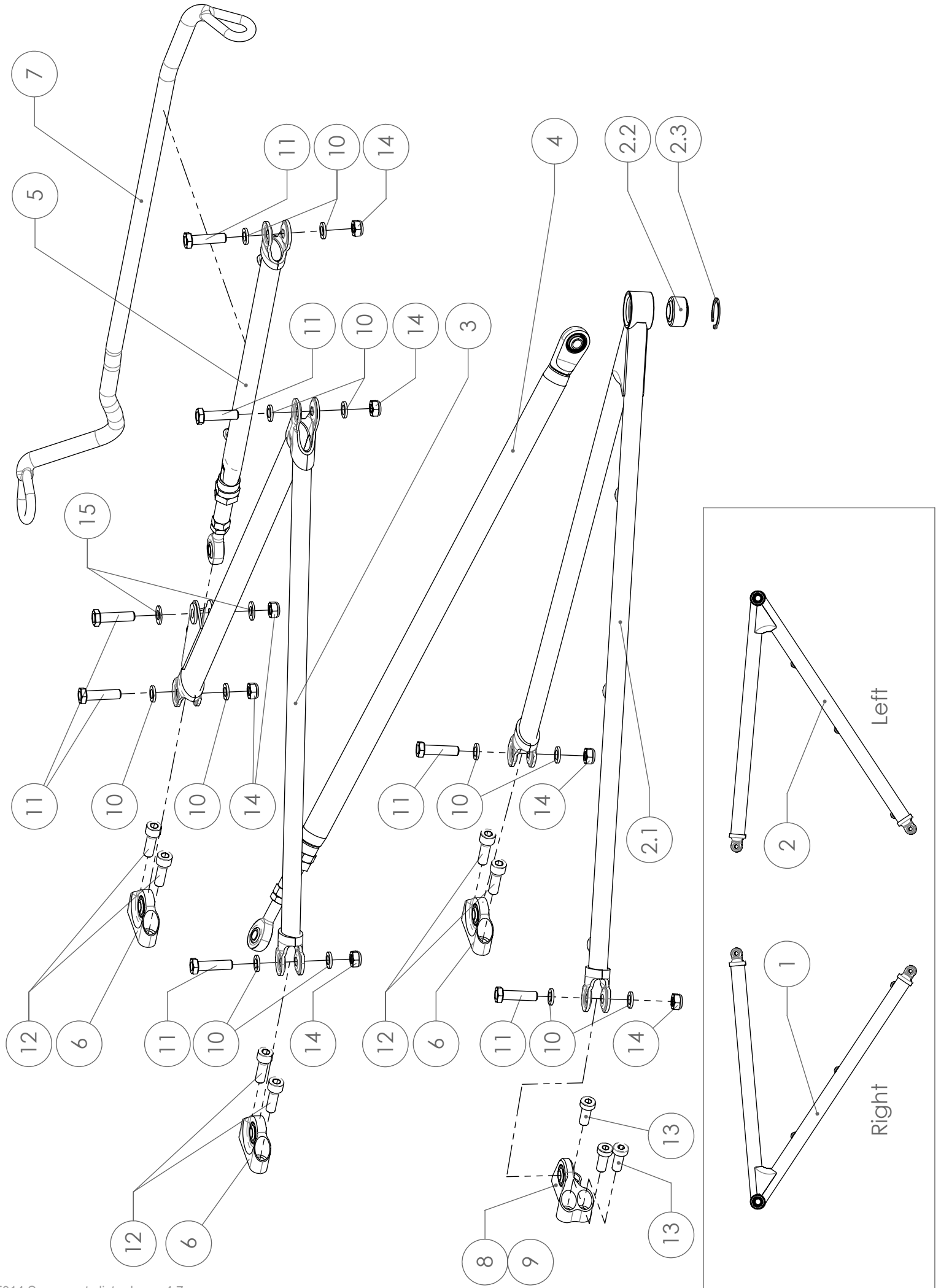
Item	Part Number	Descrizione	Description	Price €
1	030309011004	Boccola	Bush	€ 74,08
2	030309011005	Pastiglia registro	Adjuster spacer	€ 39,52
3	030309011006	Boccola iglodur	Iglodur bush	€ 26,93
4	030309011014	Ghiera	Ring nut	€ 83,50
5	040409055	Tappo cremagliera	Rack adjuster cap	€ 75,84
6	090909019	Pignone cremagliera	Rack pinion	€ 178,67
7	161409003	Corpo scatola guida	Steering box housing	€ 773,12
8	161409009	Cremagliera	Rack	€ 244,88
9	61802-2RS1	Cuscinetto	Bearing	€ 28,57
10	61902-2RS1	Cuscinetto	Bearing	€ 30,03
11	ORN22X3	O-Ring	O-Ring	€ 7,09
12	UNI5931-M4X8	Vite TB INOX	BH Bolt Stainless Steel	€ 1,34
13	AST-12	K-Nut	K-Nut	€ 6,32
14	RZS4	Rondella zigrinata	Safety Washer	€ 1,07



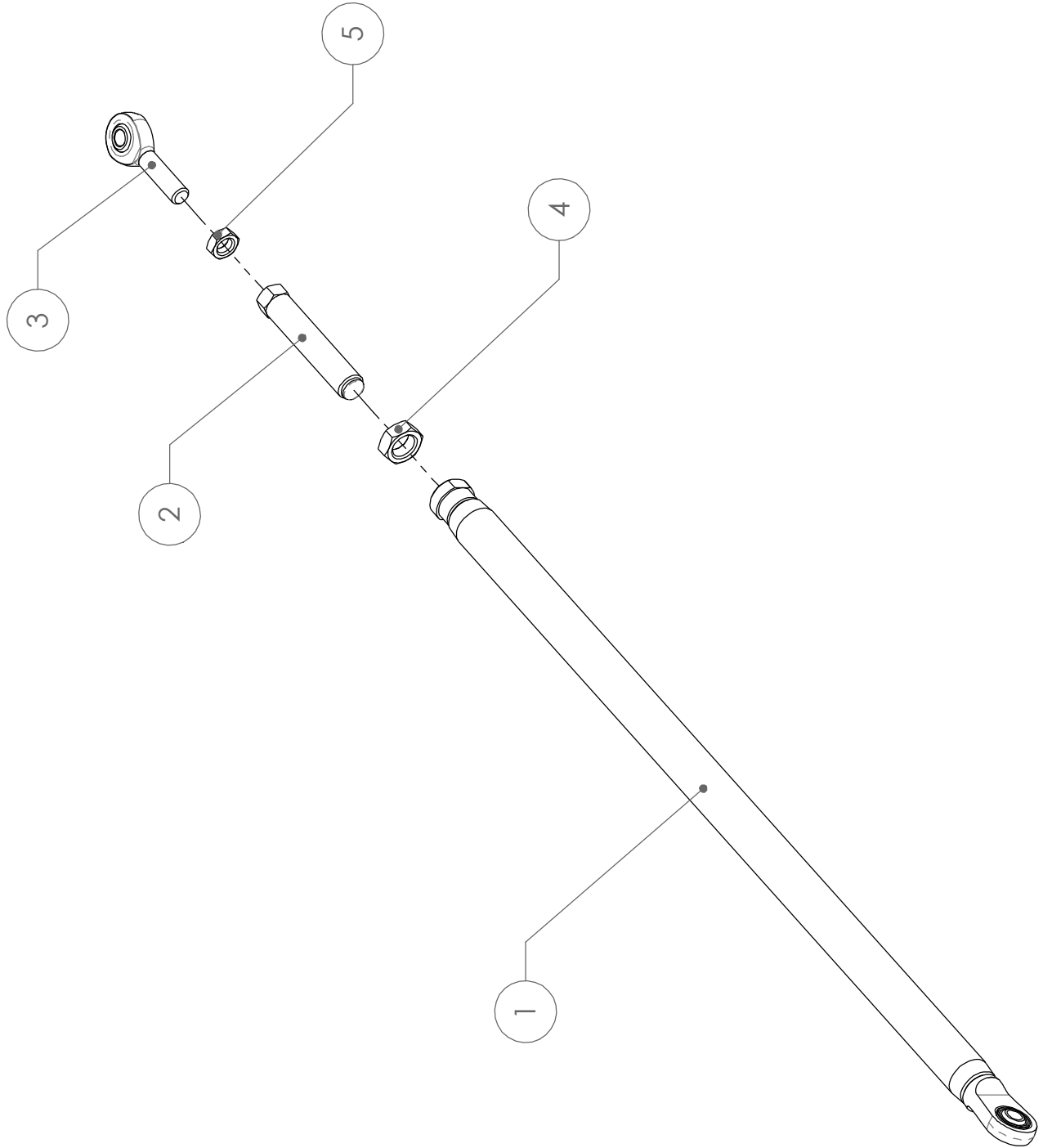
Item	Part Number	Descrizione	Description	Price €
1	080709012	Testa millerighe	Splined shaft	€ 262,56
2	080709022	Controghiera	Platform	€ 37,40
3	080709023	Ghiera	Ring nut	€ 87,20
4	080709025	Rondella speciale	Special washer	€ 21,61
5	161409019	Cartuccia deformabile	Steering crashbox	€ 43,57
6	161409005	Piantone sterzo	Steering column top end	€ 414,50
7	161409006	Terminale piantone	Steering column bottom end	€ 237,52
8	AN4-12A	Vite NAS	NAS bolt	€ 4,86
9	UNI5931-M6X25	Vite TC	CH Bolt	€ 1,63
10	AST-1/4	K-Nut	K-Nut	€ 4,95
11	AST-06	K-Nut	K-Nut	€ 4,95
12	ORN123	O-Ring	O-Ring	€ 7,81



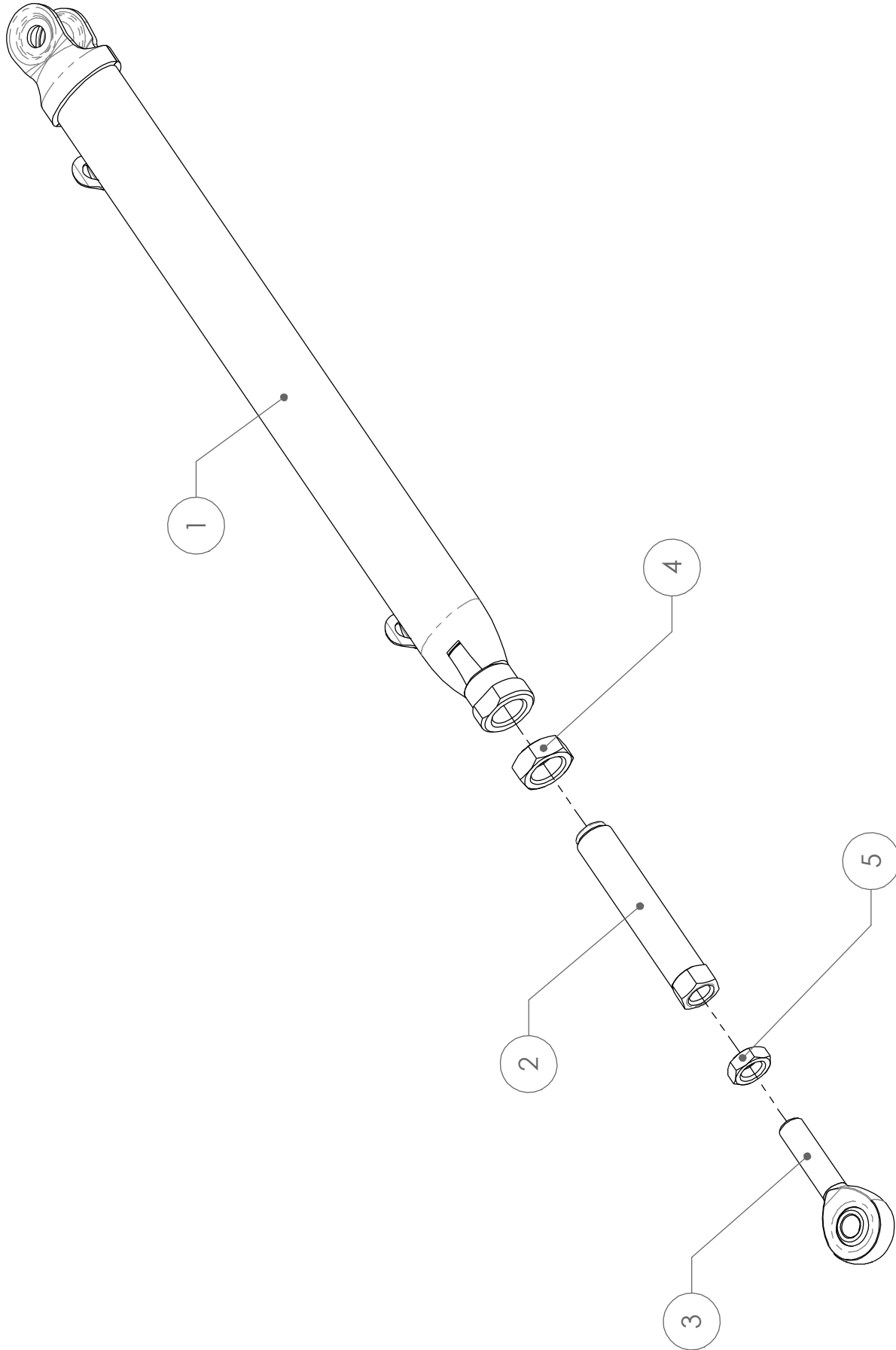
Item	Part Number	Descrizione	Description	Price €
1	VV112012	Supporto palette	Levers bracket	€ 62,06
2	VV213010C	Distanziale	Spacer	€ 203,94
3	VV213012	Paletta gearshift	Gearshift paddle	€ 28,84
4	XS5196C	Molla	Coil	€ 7,73



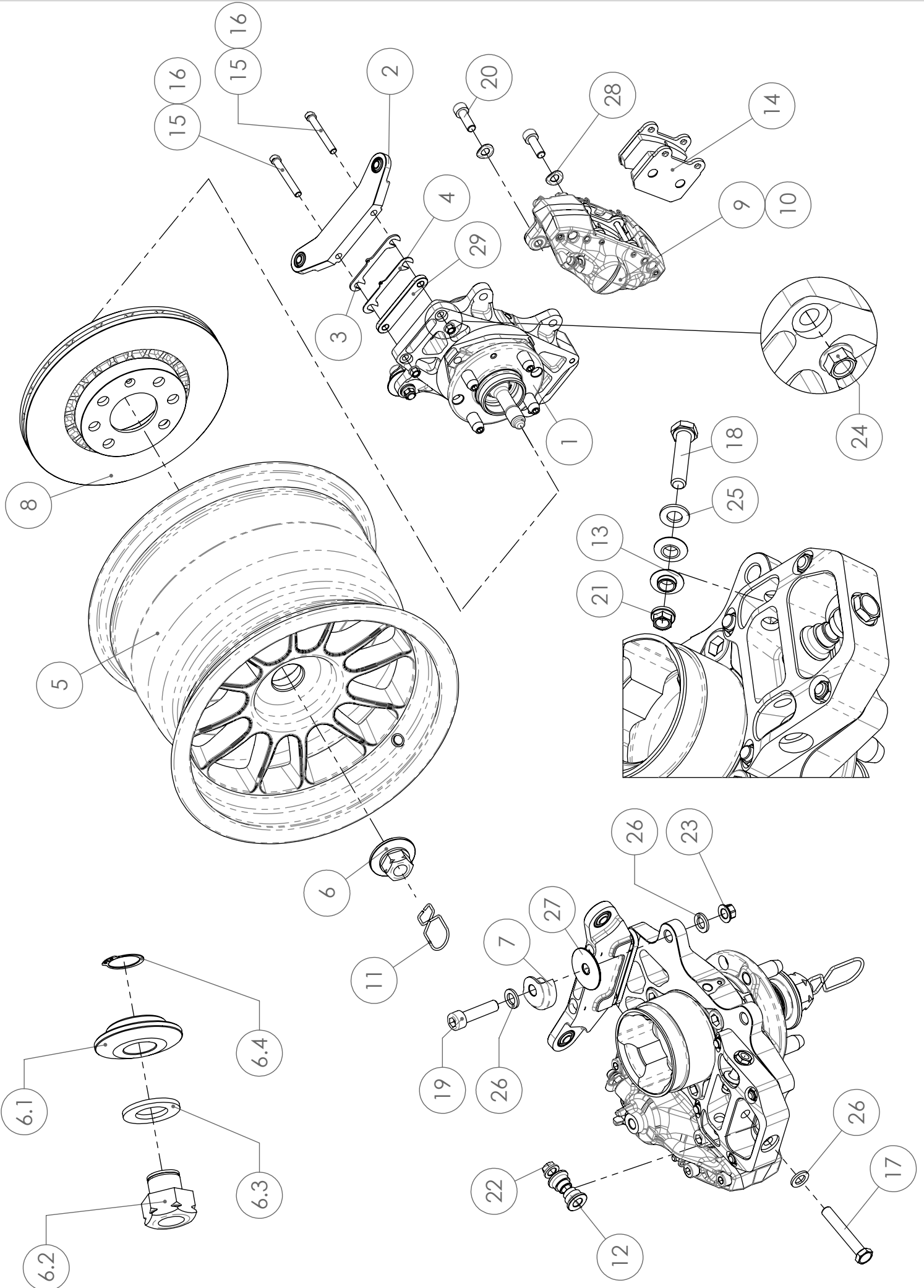
Item	Part Number	Descrizione	Description	Price €
1	161410002	Braccio posteriore inferiore dx completo	Rh rear lower wishbone assy	€ 340,56
2	161410003	Braccio posteriore inferiore sx completo	Lh rear lower wishbone assy	€ 340,56
2,1	161410005	Braccio posteriore inferiore sx	Lh rear lower wishbone	€ 275,79
2,1	161410004	Braccio posteriore inferiore dx	rh rear lower wishbone	€ 275,79
2,2	UNIBALL-ABWT8	Snodo sferico	Spherical bearing	€ 63,50
2,3	J25X1,2V	Circlip	Circlip	€ 1,28
3	161410006	Braccio superiore post.	Rear upper wishbone	€ 275,79
4	161410007	Push rod posteriore completo	Rear push rod assy	€ 296,21
5	161410010	Tirante convergenza posteriore completo	Rear tie rod assy	€ 301,67
6	161410012	Attacco sospensione post. completo	Rear wishbone bracket assy	€ 216,82
7	161405010	Cavo di ritenzione	Wheel tether	€ 226,60
8	161510021	Blocchetto sospensione post. Sx completo	Rear Lh suspension bracket assy	€ 252,56
9	161510022	Blocchetto sospensione post. Dx completo	Rear Rh suspension bracket assy	€ 252,56
10	090910011	Special Flat Washer 5/16" Sp.2	Special Flat Washer 5/16" Sp.2	€ 3,31
11	AN5-11A	Vite NAS	NAS bolt	€ 4,65
12	UNI5931-M8X25	Vite TC	CH Bolt	€ 1,93
13	UNI9327-M8X20	Vite TC	CH Bolt	€ 1,93
14	AN365-5/16X24	Dado autobloccante	Self-locking Nut	€ 1,86
15	AN960-5/16	Rondella	Washer	€ 1,87



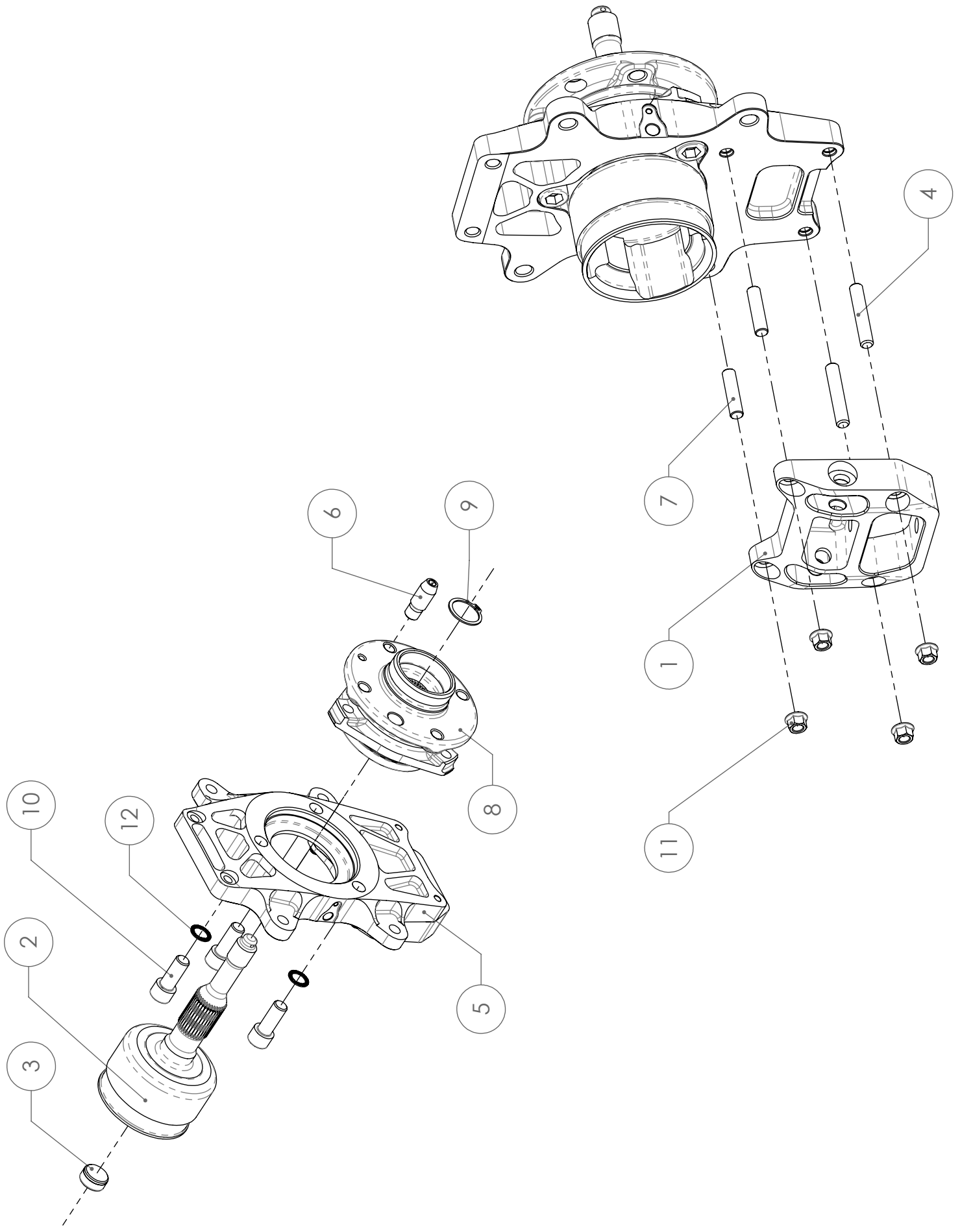
Item	Part Number	Descrizione	Description	Price €
1	161410008	Puntone posteriore	Rear push rod	€ 164,80
2	010005012	Registro Puntone	Push rod adjuster	€ 39,56
3	RE-3/8L	Testa a snodo	Rod end	€ 91,86
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25	€ 6,46
5	ANSIB182265-3/8X24	Dado esagonale	Hex Nut	€ 2,73



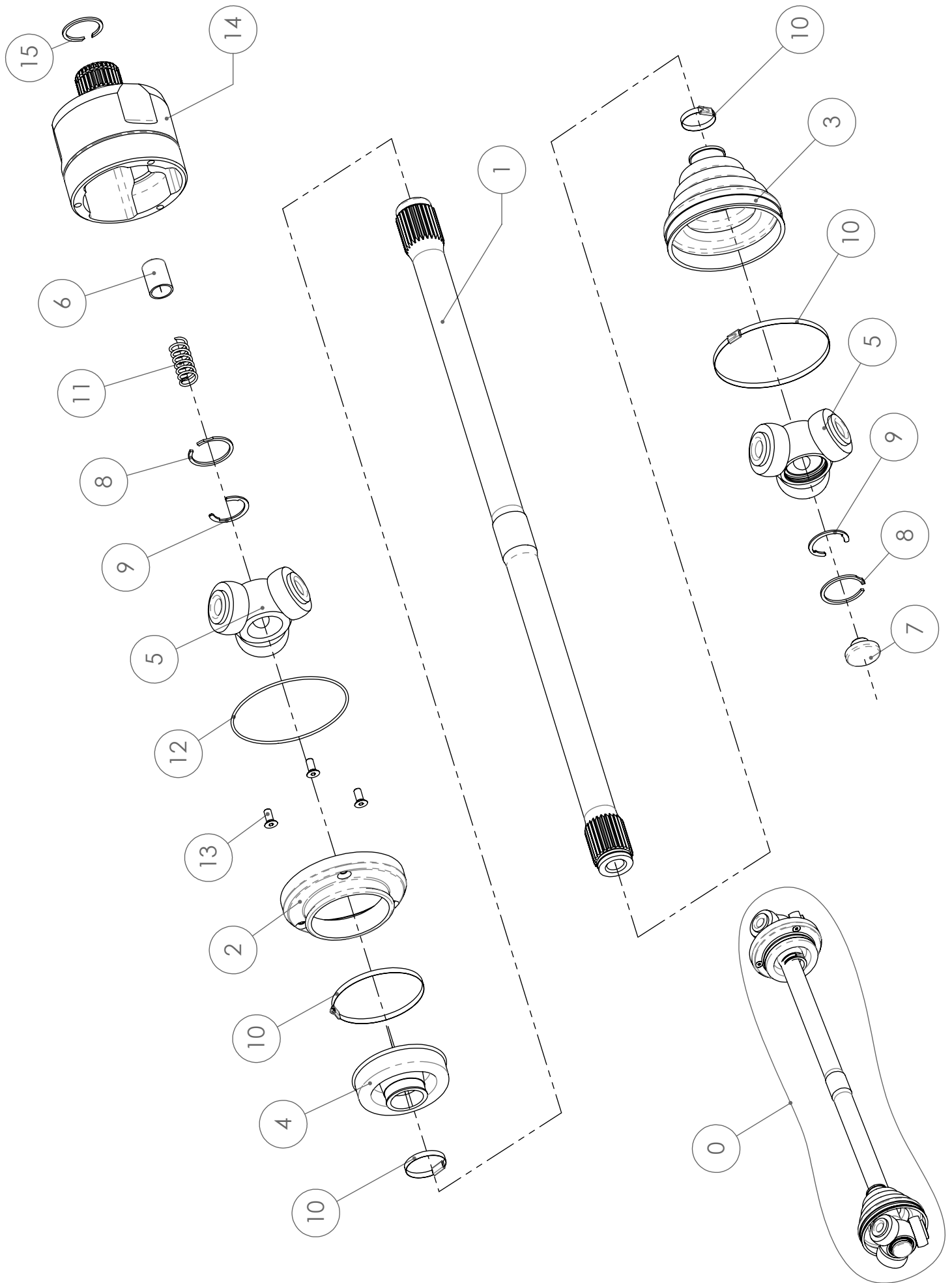
Item	Part Number	Descrizione	Description	Price €
1	161410011	Tirante convergenza posteriore	Rear tie rod	€ 170,26
2	010005012	Registro Puntone	Push rod adjuster	€ 39,56
3	RE-3/8L	Testa a snodo	Rod end	€ 91,86
4	010004014	Dado speciale M14X1,25	Special Nut M14x1,25	€ 6,46
5	ANSIB182265-3/8X24	Dado esagonale	Hex Nut	€ 2,73



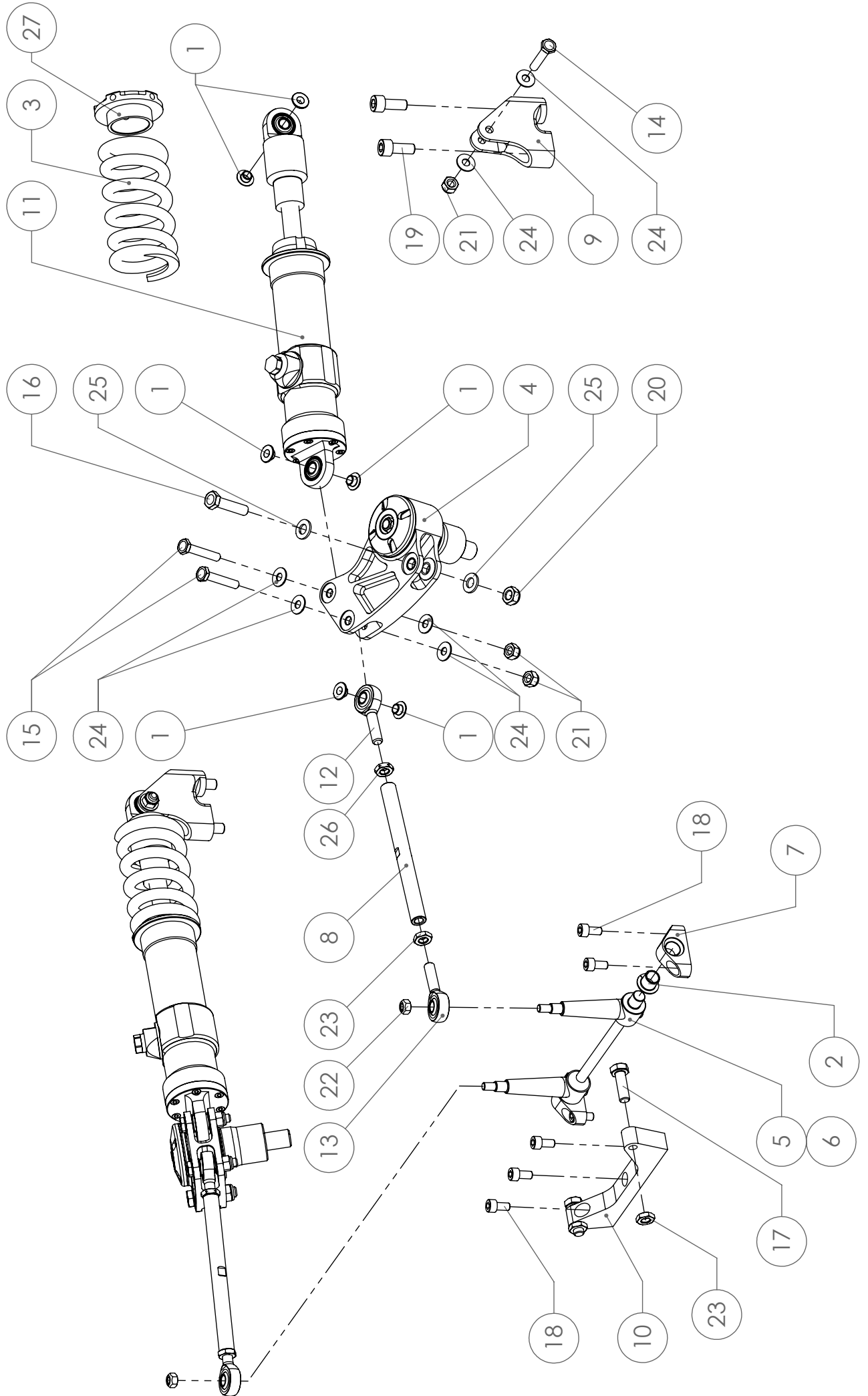
Item	Part Number	Descrizione	Description	Price €
1	161411004	Portamozzo posteriore completo	Rear upright assy	€ 1.540,36
2	161411006	Ackerman	Ackerman	€ 260,59
3	161411017	Spessore camber 2mm	Camber Shim 2mm	€ 6,24
4	161411016	Spessore camber 1mm	Camber Shim 1mm	€ 6,24
5	161411011	Cerchio 10"x13"	Wheel 10"x13"	€ 257,50
6	090907034	Dado ruota completo DX	RH wheel nut assy	€ 111,30
6.1	090907033001RH	Campanella dado ruota DX	RH wheel nut bell	€ 46,39
6.2	010407033	Dado ruota DX	RH wheel nut	€ 61,76
6.3	UNI6592-20	Rondella	Washer	€ 1,07
6.4	DIN471E21	Circlip	Circlip	€ 2,11
7	161407014	Anello cavo ritenzione	Tether fitting	€ 27,09
8	09552724	Disco Freno	Brake disc	€ 86,52
9	XA6L611	Pinza freno LHT	Brake caliper LHT	€ 231,75
10	XA6L612	Pinza freno RHT	Brake caliper RHT	€ 231,75
11	010007018	Clip sicurezza	Safety lock clip	€ 9,94
12	080610006	Boccola ABWT 8	Bush	€ 34,50
13	030205004	Boccola ABWT 5	Bush	€ 27,87
14	FDS1562	Pastiglie Freno	Brake pads	€ 103,19
15	161411019	Vite speciale M8x1x60	Special bolt M8x1x60	€ 3,61
16	161411018	Vite speciale M8x1x65	Special bolt M8x1x65	€ 3,61
17	AN6-22A	Vite NAS	NAS bolt	€ 4,22
18	AN5-13A	Vite NAS	NAS bolt	€ 4,22
19	UNI5931-M10X40	Vite TC M10x1,25x40 cl.12.9	CH Bolt M10x1,25x40 class12.9	€ 2,39
20	UNI5931-M10X30	Vite TC	CH Bolt	€ 2,39
21	AST-5/16	K-Nut	K-Nut	€ 4,95
22	AST-3/8	K-Nut	K-Nut	€ 6,32
23	AST-10X1,25	K-Nut M10X1,25	K-Nut M10X1,25	€ 4,95
24	AST-08X1	K-Nut M8X1.0	K-Nut M8X1.0	€ 4,95
25	AN960-5/16	Rondella	Washer	€ 1,87
26	UNI6592-10	Rondella	Washer	€ 1,07
27	161407015	Rondella	Washer	€ 10,76
28	UNI8840B-10	Rondella ondulata	Crinkle Washer	€ 1,07
29	161411020	Spessore camber 6mm	Camber shim 6mm	€ 33,27



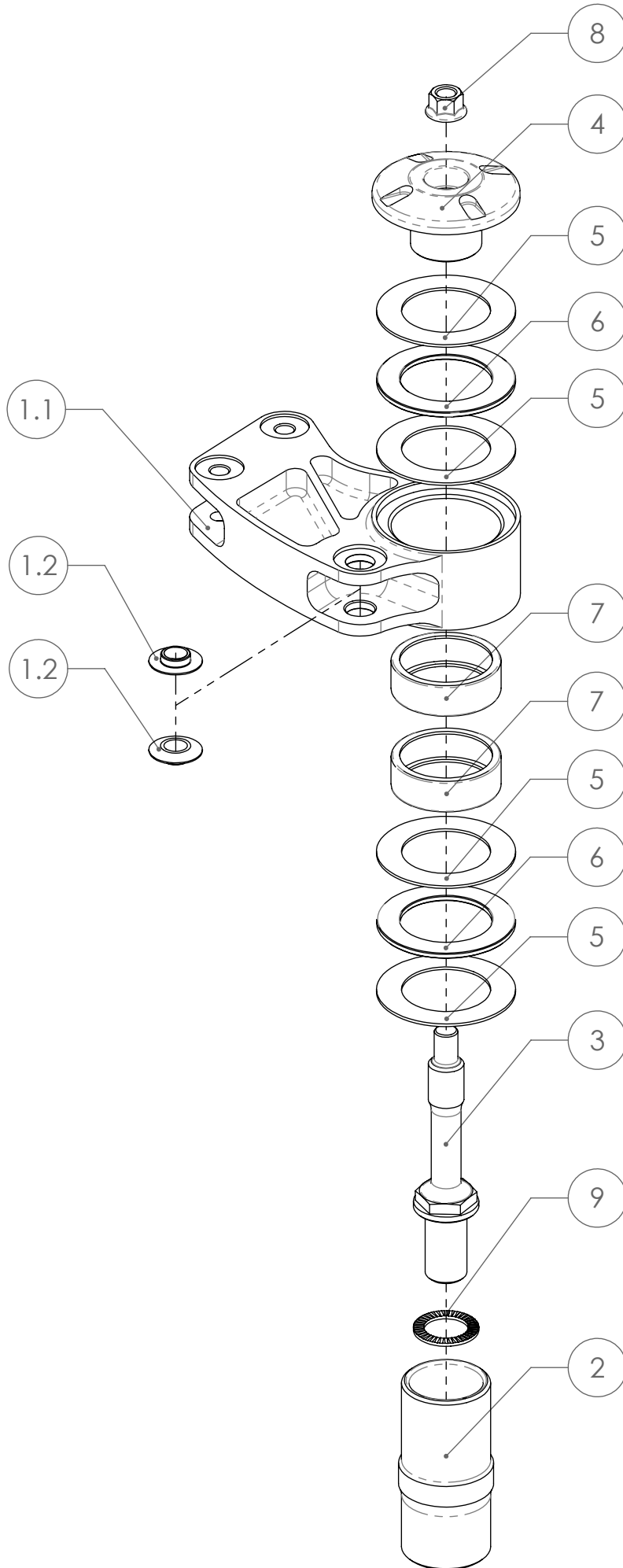
Item	Part Number	Descrizione	Description	Price €
1	161411008	Blocco portamozzo posteriore	Rear upright mount	€ 232,37
2	161411009	Perno ruota posteriore	Rear wheel axle	€ 422,44
3	161411010	Tampone semiasse	Driveshaft plunger	€ 28,84
4	161411012	Prigioniero	Stud	€ 3,30
5	161407010	Portamozzo	Upright	€ 566,50
6	161407016	Pin trascinatore	Wheel Drive pin	€ 32,96
7	030210012	Prigioniero	Stud	€ 3,30
8	BAR0048VK108	Cuscinetto ruota	Wheel bearing	€ 133,90
9	DIN471A27	Circlip	Circlip	€ 2,11
10	UNI5931-M12X30	Vite TC	CH Bolt	€ 2,39
11	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5,09
12	RZS12	Rondella zigrinata	Safety washer	€ 1,07



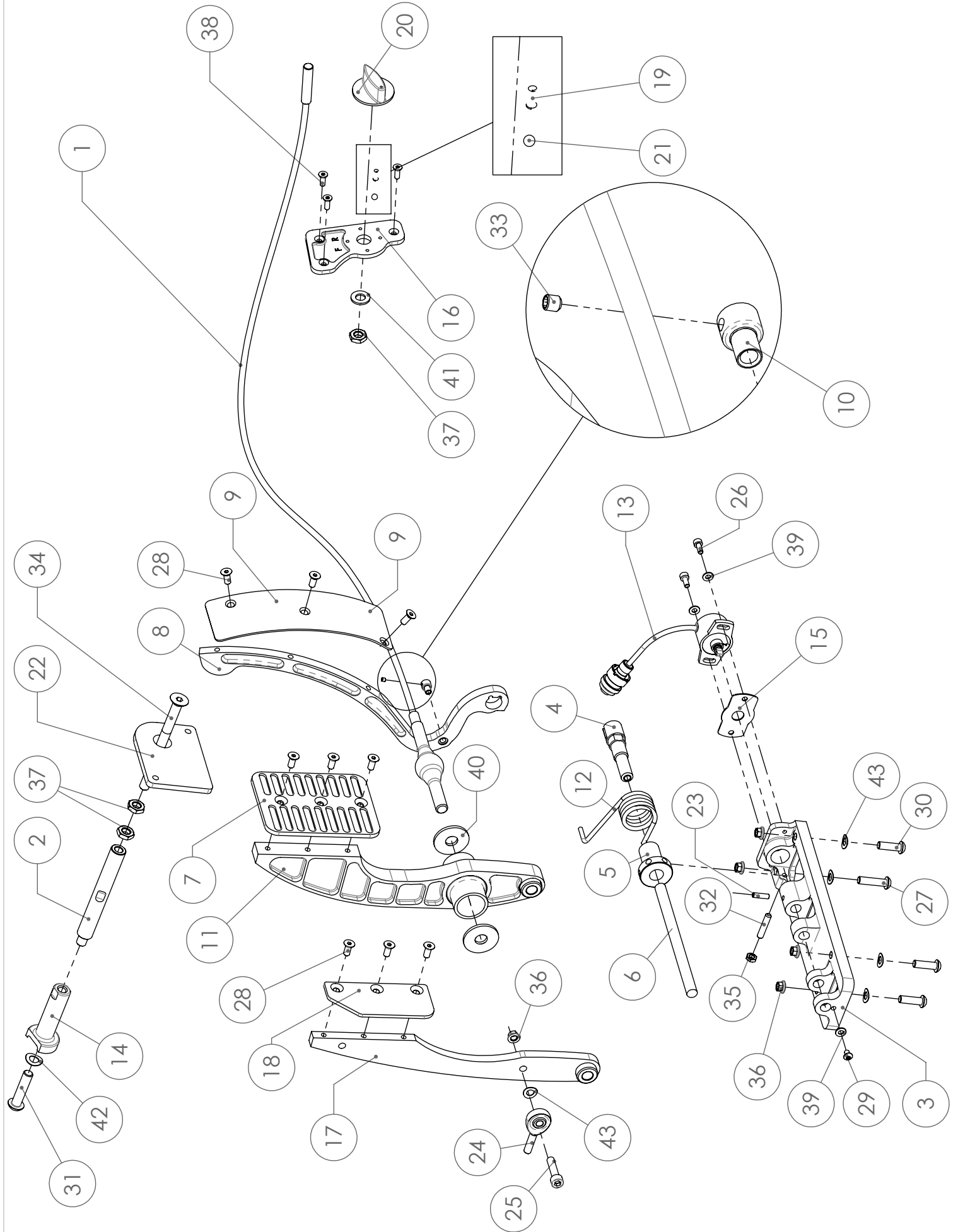
Item	Part Number	Descrizione	Description	Price €
0	161412001	Semiassa Completo	Halfshaft Assy	€ 933,43
1	F0085934	Semiassa	Halfshaft	€ 297,08
2	161412002	Flangia portacuffia	Boot carrier	€ 142,66
3	090912006	Cuffia lato ruota	Wheel side boot	€ 29,15
4	020211037	Cuffia lato cambio	Gear side boot	€ 5,72
5	F9024455	Tripode	Tripode	€ 197,47
6	F9024451	Pistone semiassa	Halfshaft plunger	€ 22,47
7	F9004710	Tappo semiassa	Halfshaft cap	€ 11,97
8	F9024459	Circlip	Circlip	€ 11,97
9	9907022	Circlip	Circlip	€ 4,51
10	MLT45CP	Fascetta	Clamp	€ 4,57
11	0801073	Molla	Spring	€ 17,96
12	ORN85X3	O-Ring	O-Ring	€ 7,73
13	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1,63
14	F90473001	sede tripode	flange	€ 556,20
15	F9043319	anello	ring	€ 39,44



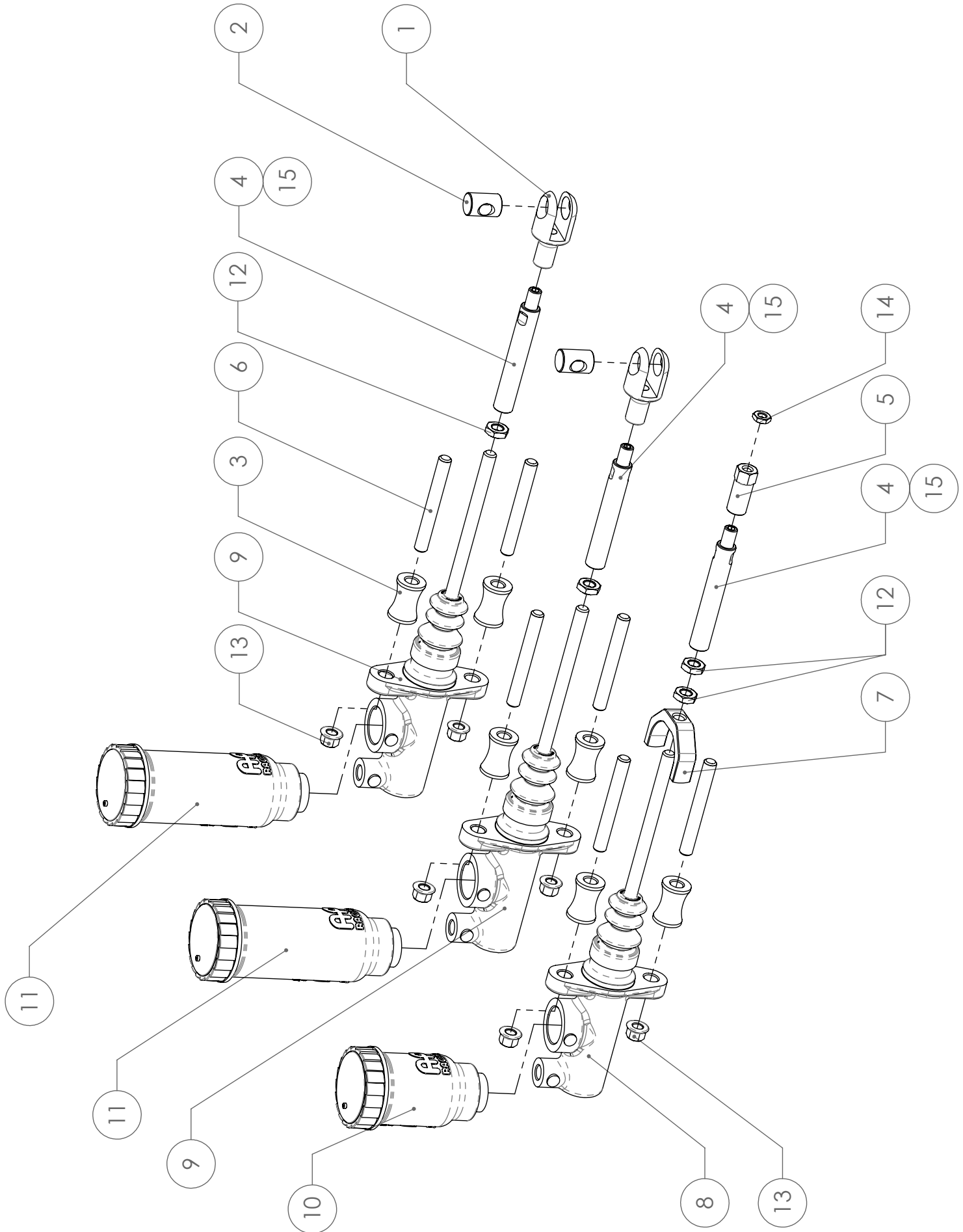
Item	Part Number	Descrizione	Description	Price €
1	010008010	Boccola	Bush	€ 16,63
2	010013035	Boccola DU	Self-lubricating Bush	€ 8,16
3	080608026A	MOLLA 600	Spring	€ 127,60
0	080608026C	MOLLA 800	Spring	€ 127,60
0	080608026E	MOLLA 1000	Spring	€ 127,60
4	161413002	Rocker posteriore completo	Rear rocker assy	€ 535,68
5	161413004	RARB ø 8	RARB ø 8	€ 286,86
6	161413005	RARB ø 10.5	RARB ø 10.5	€ 286,86
7	161413009	Supporto RARB	RARB Bracket	€ 80,86
8	161413010	Link RARB	Link RARB	€ 25,03
9	161413012	Supporto ammortizzatore	Damper bracket	€ 111,86
10	161413016	Rebound stop	Rebound stop	€ 80,34
11	161406019	Ammortizzatore posteriore	Rear damper	€ 813,70
12	RE-8ML	Testa a snodo	Rod end	€ 50,49
13	RE-8M	Testa a snodo	Rod end	€ 50,49
14	AN4-12A	Vite NAS	NAS bolt	€ 4,86
15	AN4-13A	Vite NAS	NAS bolt	€ 4,86
16	AN5-12A	Vite NAS	NAS bolt	€ 4,86
17	UNI5739-M8X40	Vite TE	HH Bolt	€ 1,93
18	UNI5931-M6X12	Vite TC	CH Bolt	€ 1,63
19	UNI5931-M8X20	Vite TC	CH Bolt	€ 1,93
20	AN365-5/16X24	Dado autobloccante	Self-locking Nut	€ 1,86
21	AN365-1/4X28	Dado autobloccante	Self-locking Nut	€ 1,86
22	DIN980-M6	Dado autobloccante	Prevailing torque Nut	€ 1,86
23	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
24	AN960-1/4	Rondella	Washer	€ 1,87
25	AN960-5/16	Rondella	Washer	€ 1,87
26	UNI5589-M8L	Dado esagonale basso	Thin Hex Nut	€ 2,20
27	161406013005	Ghiera molla	Plateform	€ 70,00



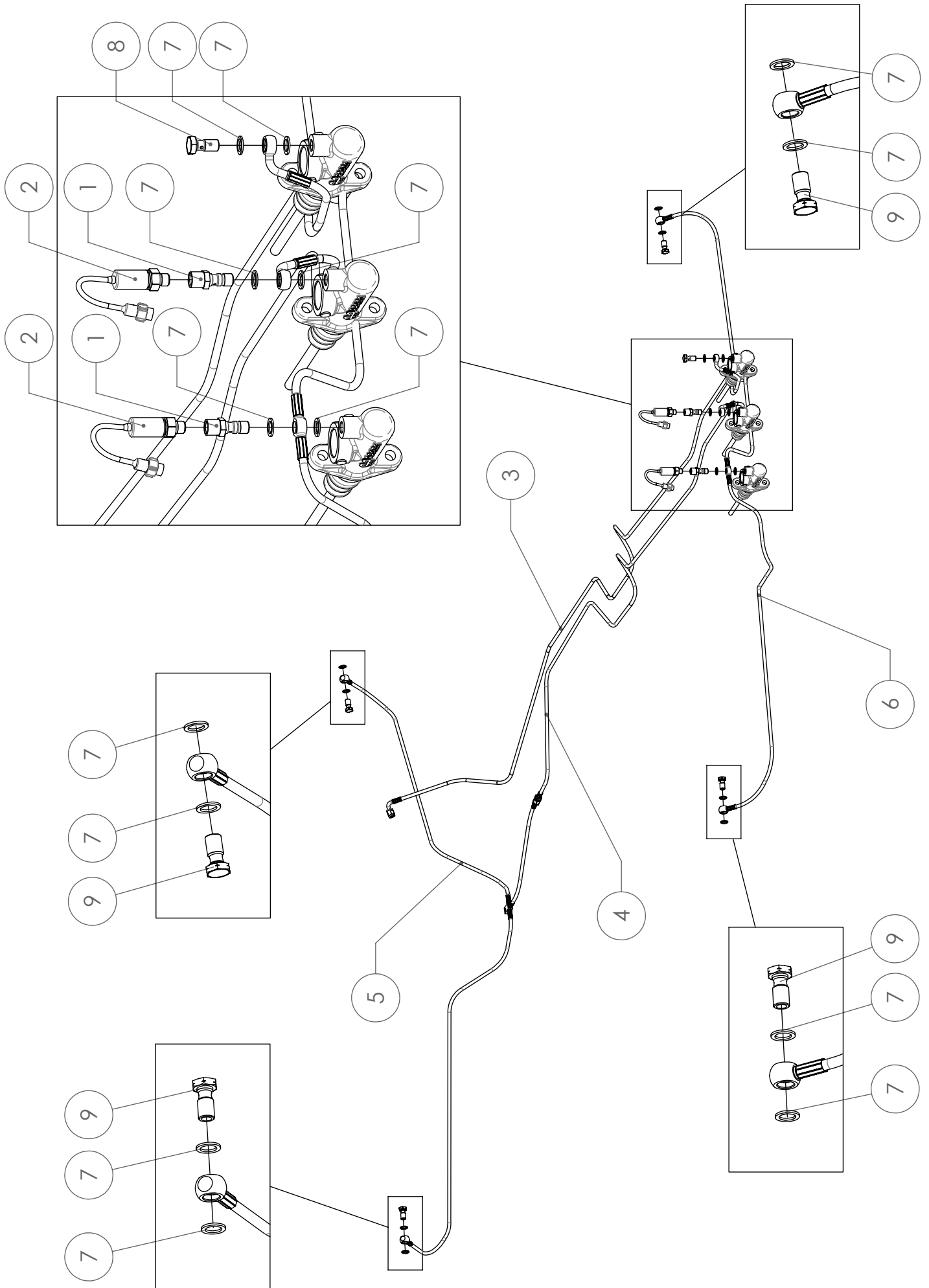
Item	Part Number	Descrizione	Description	Price €
1,1	161413003	Rocker posteriore	Rocker posteriore	€ 236,90
1,2	030205004	Boccola ABWT 5	Bush	€ 27,87
2	161413013	Perno Rocker post.	Rear rocker pivot	€ 90,64
3	161413014	Perno prigioniero rocker	Rear rocker stud	€ 69,53
4	161413015	Ghiera rocker	Rocker ring	€ 67,47
5	AS3047	Controralla	Thrust Bearing washer	€ 4,70
6	AXK3047	Cuscinetto reggispinta	Thrust bearing	€ 11,83
7	HK3012	Cuscinetto a rullini	Drawn cup needle roller bearing	€ 21,45
8	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5,09
9	RZS14	Rondella zigrinata	Safety washer	€ 1,87



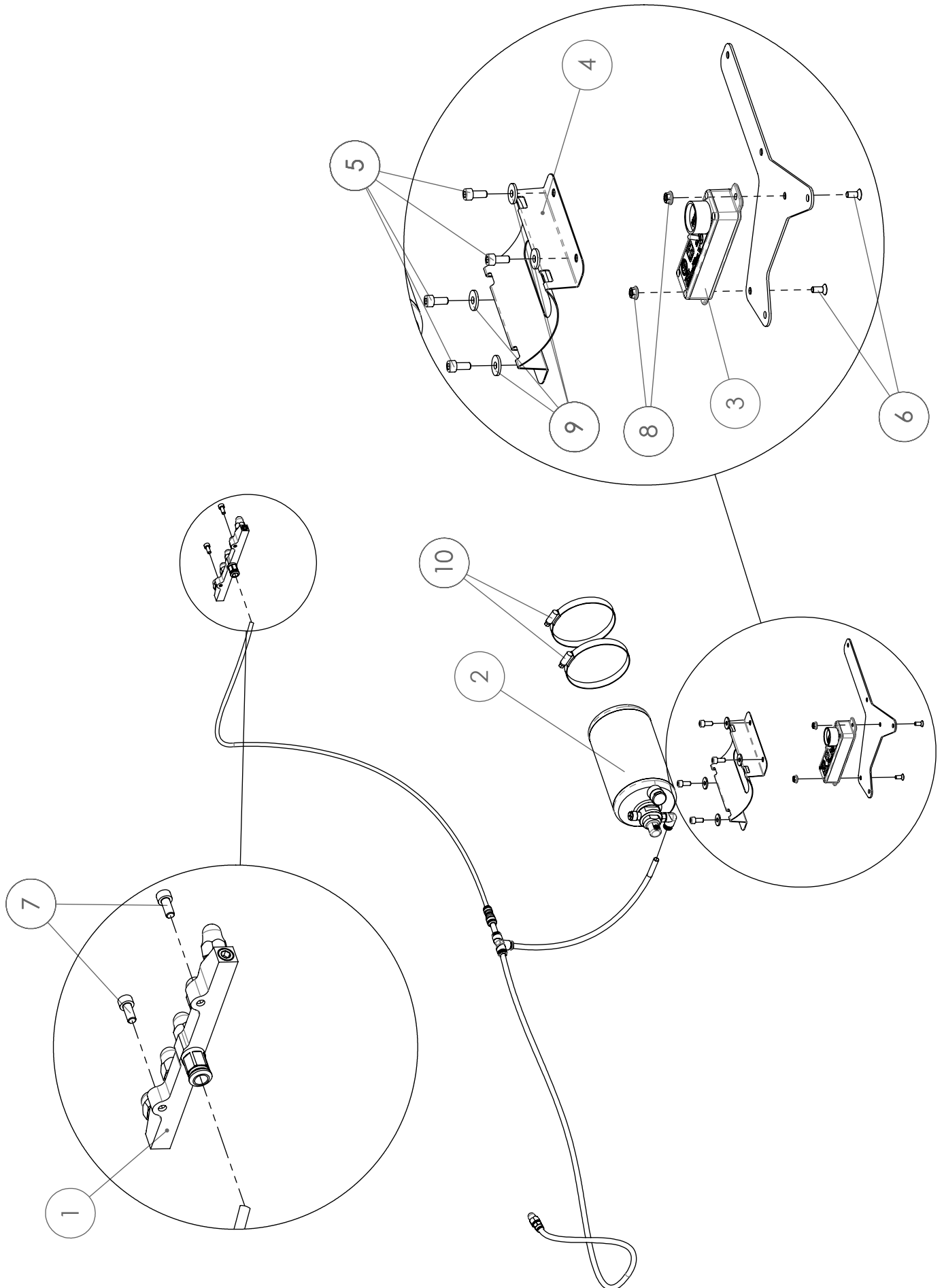
Item	Part Number	Descrizione	Description	Price €
1	010015029	Cavo regolazione frenata	Brake bias cable	€ 129,00
2	161425002	Distanziale	Stay	€ 24,53
3	090915001	Piastra base pedaliera	Pedals mount base	€ 251,13
4	090915003	Perno acceleratore	Throttle pedal pivot	€ 76,86
5	090915004	Guida molla torsionale	Spring carrier	€ 59,90
6	090915005	Perno pedali	Pedals pivot	€ 15,91
7	090915006	Piastra pedale freno	Brake pedal pad	€ 57,65
8	090915007	Pedale acceleratore	Throttle pedal	€ 125,91
9	090915008	Piastra pedale acceleratore	Throttle pedal pad	€ 20,68
10	090915010	Arresto molla	Spring holder	€ 16,57
11	090915011	Pedale freno	Brake pedal	€ 172,28
12	090915012	Molla torsionale	Torsional spring	€ 19,89
13	090915013	Potenziometro acceleratore	Throttle potentiometer	€ 265,70
14	090915014	Supporto puntalino	Rod base	€ 47,71
15	090915018	Rasamento potenziometro	Potentiometer shim	€ 5,64
16	090901007	Piastra ripartitore	Bias knob plate	€ 89,90
17	010015003	Pedale frizione	Clutch pedal	€ 91,35
18	010015006	Piastra pedale frizione	Clutch pedal pad	€ 34,41
19	010015033	Molla	Spring	€ 1,96
20	010015035	Manopola ripartitore	Brake bias knob	€ 92,88
21	010015034	Sfera	Ball	€ 1,06
22	161415002	Fermo pedale	Pedal stop	€ 35,02
23	UNI6873-4	Spina elastica	Slotted spring pin	€ 1,34
24	CM6-M6	Testa a snodo	Rod end	€ 16,75
25	UNI5931-M6X25	Vite TC	CH Bolt	€ 1,63
26	UNI5931-M4X10	Vite TC	CH Bolt	€ 1,34
27	UNI7380-M6X25	Vite TB	BH Bolt	€ 1,63
28	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1,63
29	UNI7380-M4X6	Vite TB	BH Bolt	€ 1,34
30	UNI7380-M6X20	Vite TB	BH Bolt	€ 1,63
31	UNI7380-M8X35	Vite TB	BH Bolt	€ 1,93
32	UNI5923-M5X25	Grano	Dowel	€ 1,87
33	UNI5929-M3X3	Grano	Dowel	€ 1,87
34	UNI5933-M8X100	Vite TS	CSH Bolt	€ 1,93
35	UNI5589-M5	Dado esagonale basso	Thin Hex Nut	€ 1,86
36	AST-06	K-Nut	K-Nut	€ 4,95
37	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
38	UNI5933-M4X12	Vite TS	Bolt	€ 1,34
39	UNI6592-4	Rondella	Washer	€ 1,07
40	UNI6593-10	Rondella	Washer	€ 1,59
41	UNI6592-8	Rondella	Washer	€ 1,07
42	UNI8840B-8	Rondella ondulata	Crinkle Washer	€ 1,07
43	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1,07



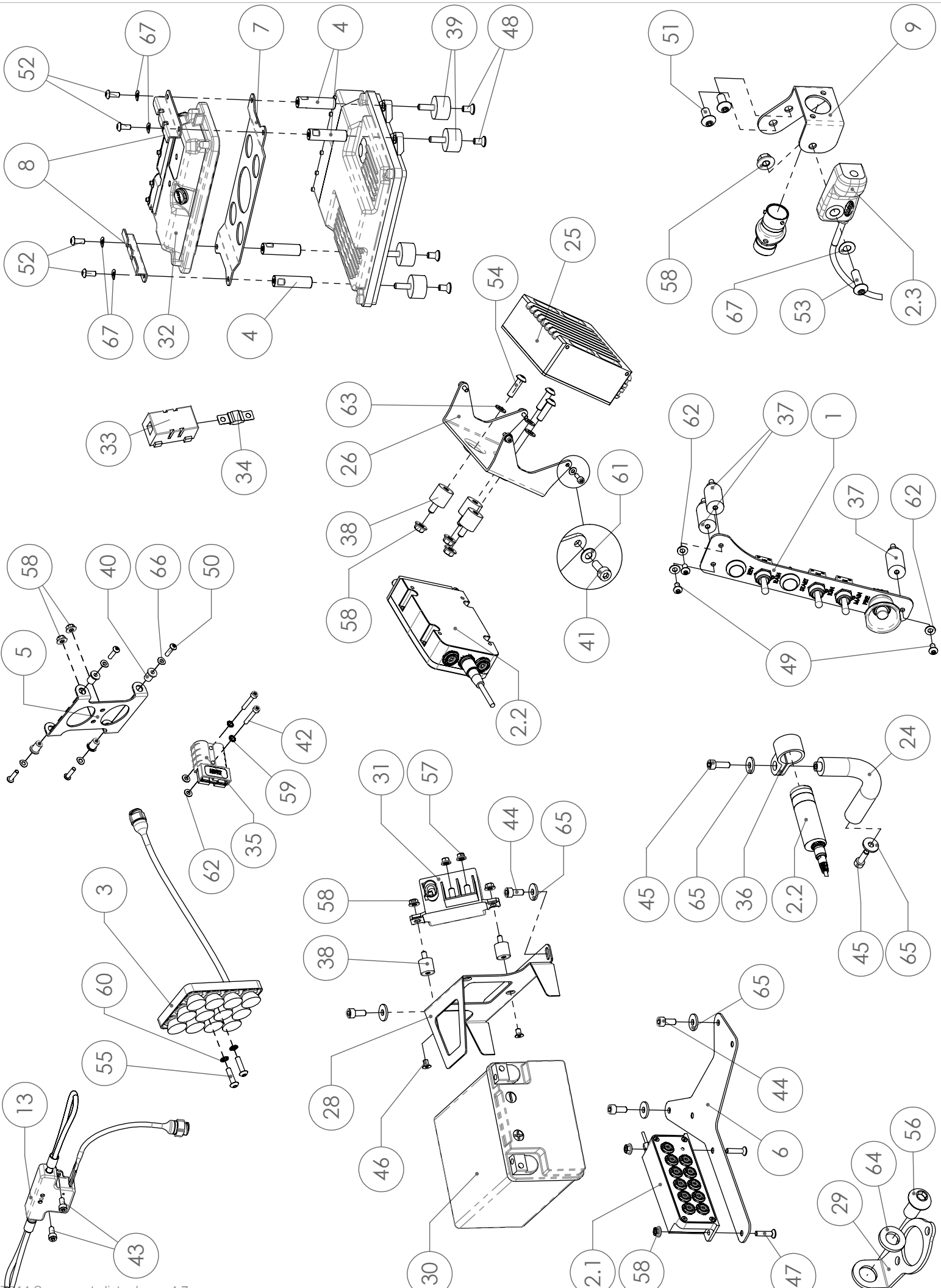
Item	Part Number	Descrizione	Description	Price €
1	010016005	Forcella ripartitore freni	Brake bias clevis	€ 55,16
2	010016006	Boccola	Bush	€ 18,45
3	010016011	Distanziale pompe	Master cylinder spacer	€ 13,82
4	080616009	Puntalino 73 mm	Master cylinder rod 73 mm	€ 22,47
5	090916002	Adattatore	Clutch pedal rod	€ 29,82
6	090916006	Prigioniero	Stud	€ 6,27
7	101016010	Finecorsa Frizione	Clutch stop	€ 30,13
8	CP2623-90	AP master cylinder 5/8"	AP master cylinder 5/8"	€ 145,39
9	CP2623-91	AP master cylinder 0.7"	AP master cylinder 0.7"	€ 145,39
10	CP4709-12	Serbatoio SMALL AP	AP SMALL reservoir	€ 43,72
11	CP4709-11	Serbatoio MEDIUM AP	AP MEDIUM reservoir	€ 43,72
12	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
13	DIN6927-M8	Dado flangiato autobloccante	Prevailing torque Nut	€ 2,33
14	UNI5589-M6	Dado esagonale basso	Thin Hex Nut	€ 1,86
15	161516005	Puntalino 200 mm	Master cylinder rod 200mm	€ 22,47



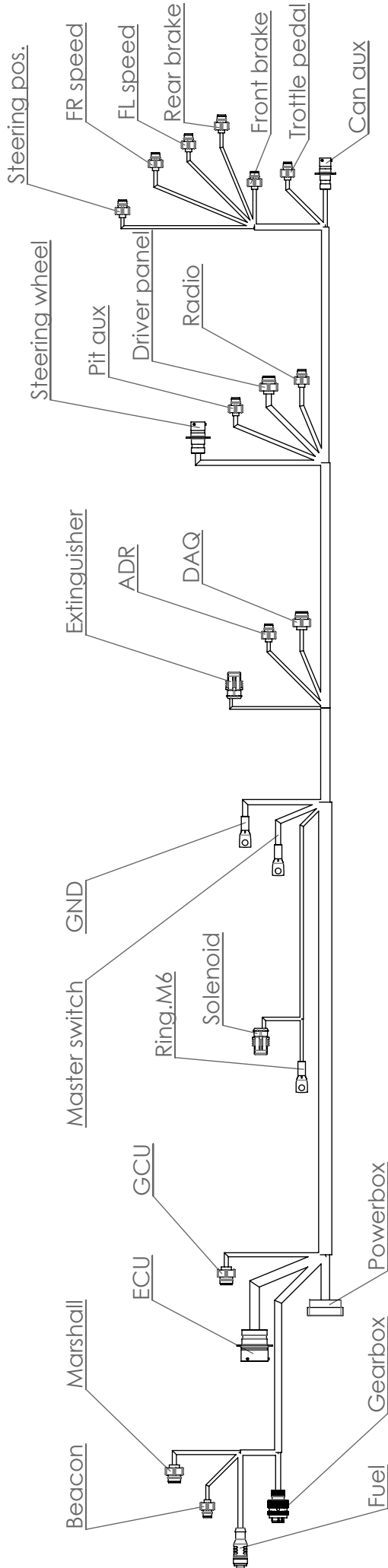
Item	Part Number	Descrizione	Description	Price €
1	090916008	Adattatore sensore pressione	Pressure sensor adapter	€ 42,41
2	090916001	Sensore pressione (100bar)	Pressure sensor (100bar)	€ 318,05
3	161416001	Tubo frizione	Clutch Hose	€ 68,76
4	161416002	Tubo freno posteriore	Rear brake hose	€ 63,67
5	161416003	Tubo freno post 3 vie	Rear 3-ways brake hose	€ 82,63
6	161416004	Tubo freno anteriore	Front brake hose	€ 76,14
7	4451603	Rondella	Washer	€ 1,59
8	77503	Vite banjo	Banjo bolt	€ 4,30
9	9920331	Vite banjo	Banjo bolt	€ 4,30



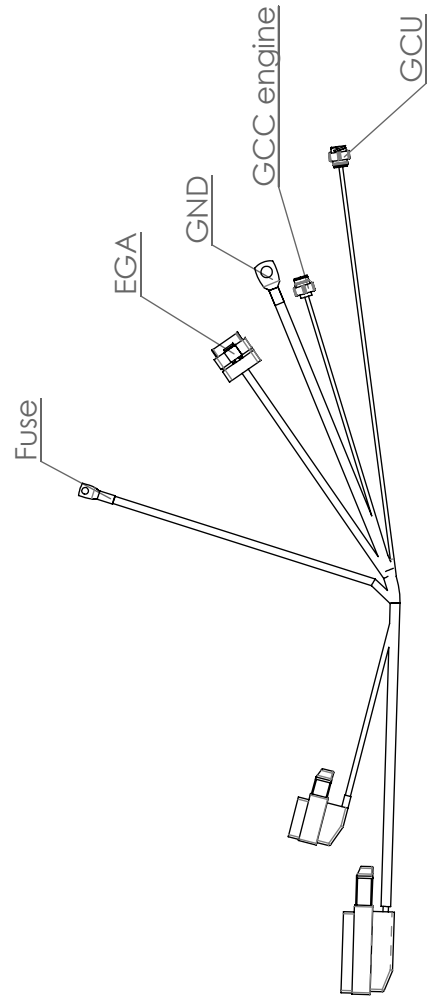
Item	Part Number	Descrizione	Description	Price €
1	101017001	Ugelli vano motore	Engine bay extinguisher nozzle	€ 66,15
2	CEFAL3	Estintore	Extinguisher bottle	€ 655,08
3	CD398	Centralina estintore	Extinguisher control box	€ 85,55
4	CD400	Supporto Estintore	Extinguisher holder	€ 22,15
5	UNI5931-M6X14	Vite TC	CH Bolt	€ 1,63
6	UNI5933-M5X12	Vite TS	CSH Bolt	€ 1,63
7	UNI5931-M5X12	Vite TC	CH Bolt	€ 1,63
8	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1,86
9	UNI6593-6	Rondella	Washer	€ 1,07
10	ABA6487112	Fascetta Aba	Clamp	€ 10,88



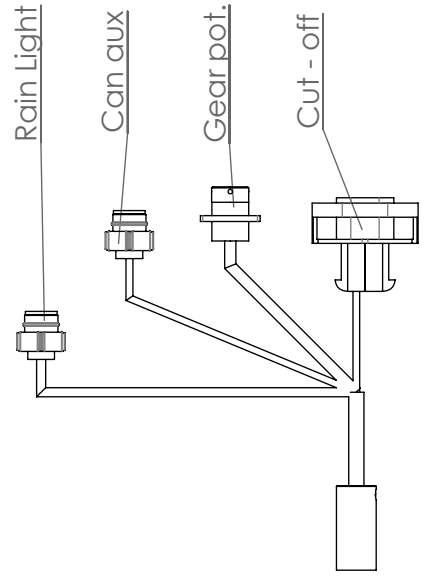
10 CHASSIS LOOM



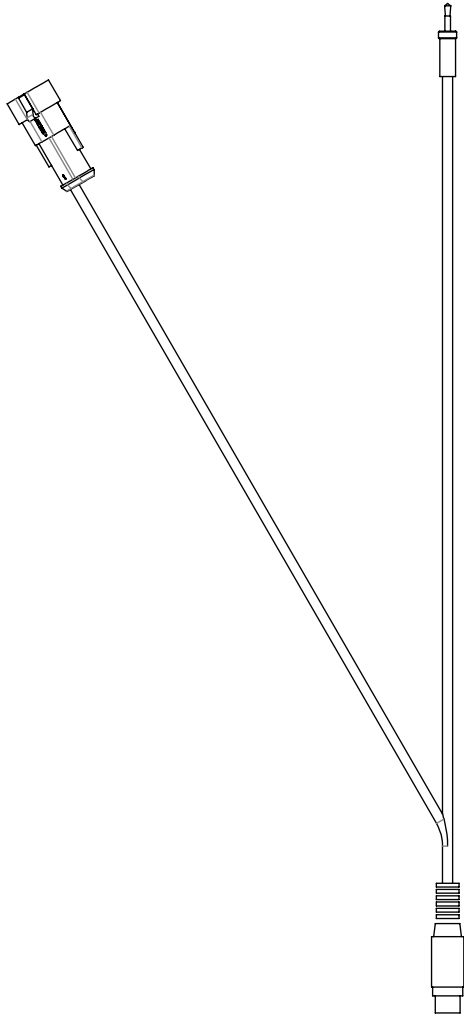
12 GCC LOOM



11 GEARBOX LOOM

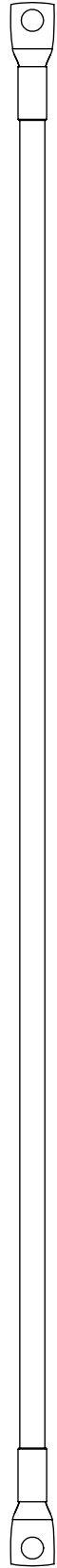


27 OMP EXTINGUISHER LOOM

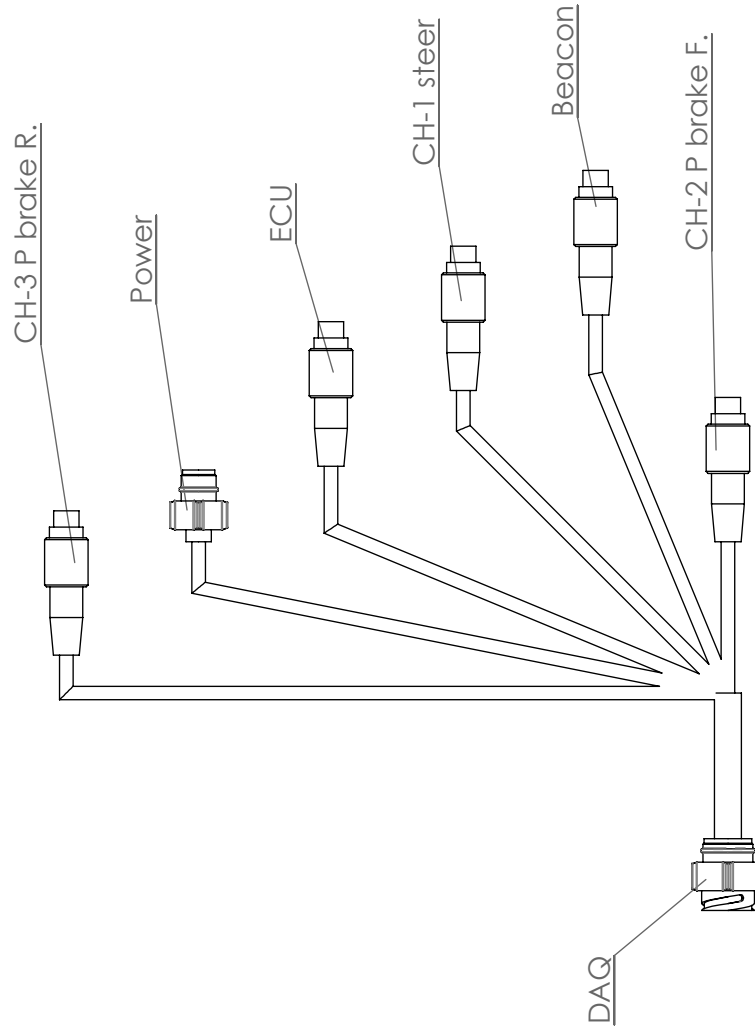


POWER LOOM

- 14
- 15
- 16
- 17
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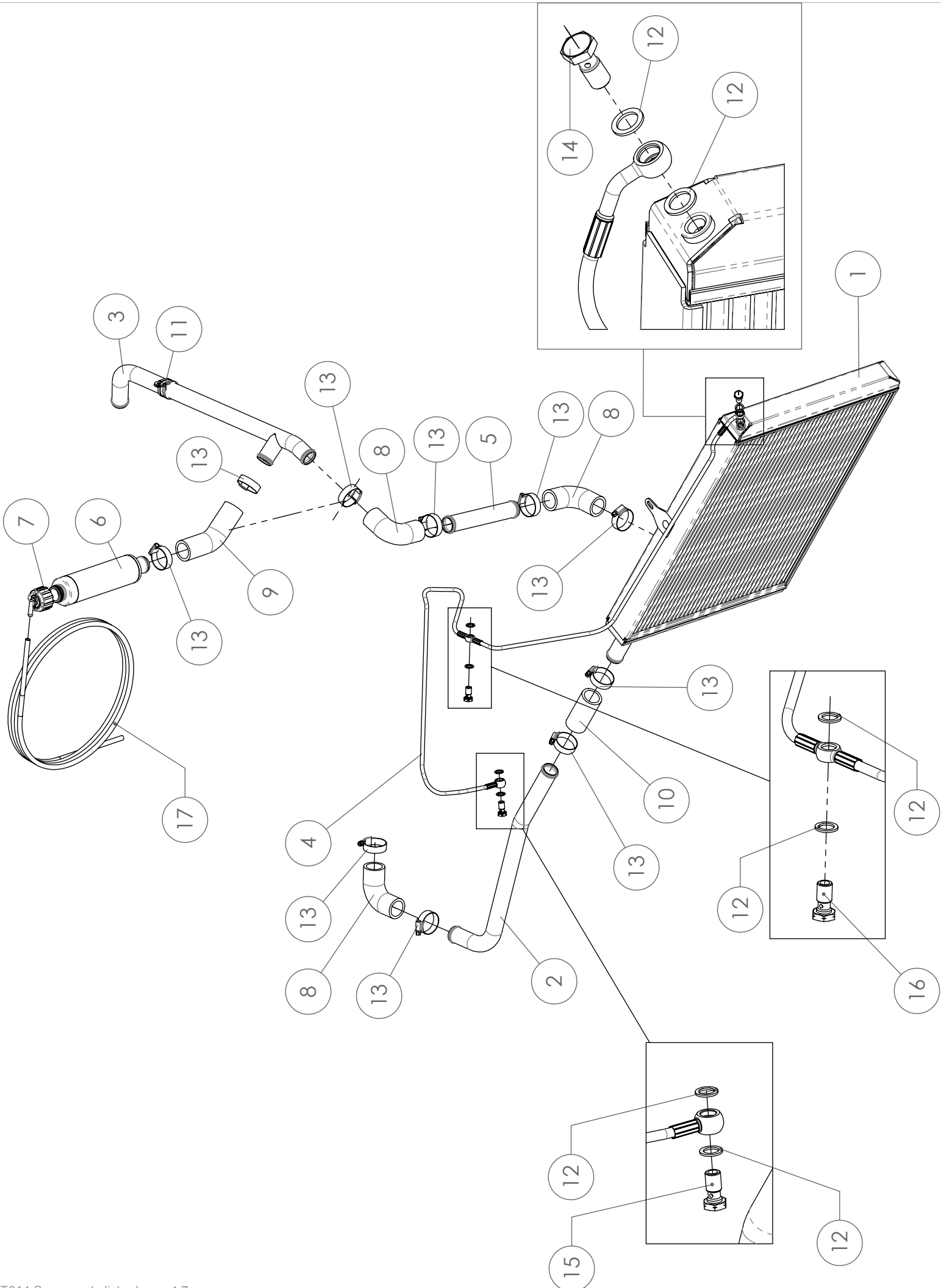


19 AIM EVO4 LOOM

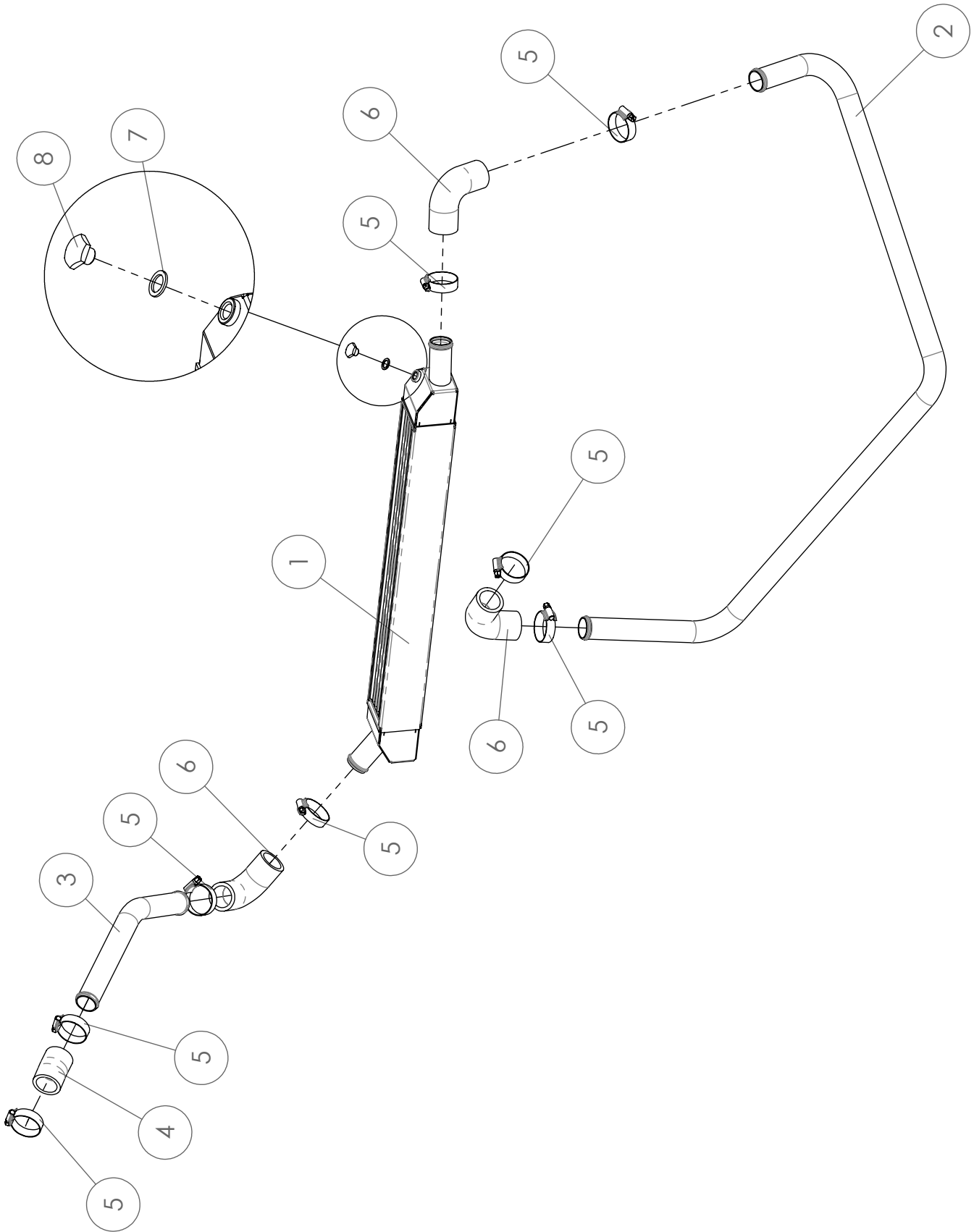


Item	Part Number	Descrizione	Description	Price €
1	161418001	Plancia strumenti	Switch panel	€ 433,12
2,1	X60E41309	Logger AIMEVO4	Logger AIM	€ 1.380,20
2,2	X96SHG010S0	Camera AIMSMARTYCAM	AIM video system	€ 1.297,80
2,3	X41RX12090	Beacon RX AIM	Lap trigger RX	€ 139,05
3	161418003	Fanale posteriore	Rear Light	€ 339,90
4	161418005	Distanziale GCC	GCC spacer	€ 12,88
5	161418007	Supporto fanale	Rear light bracket	€ 49,44
6	161418008	Staffa elettronica	Electronic carrier	€ 17,62
7	161418009	Staffa GCC	GCC carrier	€ 17,31
8	161418010	Blocco GCC	GCC holder	€ 9,27
9	161418011	Staffa beacon	Laptrigger bracket	€ 14,42
10	161418015	Impianto vettura	Chassis loom	€ 1.610,92
11	161418016	Impianto cambio	Gearbox loom	€ 293,55
12	161418017	Impianto GCC	GCC loom	€ 512,94
13	161418018	Marshall switch mk.2	Marshall switch mk.2	€ 218,66
14	161418019	+12V batteria - MS	+12V battery - MS	€ 49,44
15	161418020	+12V MS - alternatore	+12V MS - alternator	€ 89,61
16	161418021	+12V alternatore - starter	+12V alternator - starter	€ 74,16
17	161418022	GND batteria - motore	GND battery - engine	€ 86,52
18	161418023	+12V Fusibile GCC	+12V Fuse	€ 32,96
19	161418024	Impianto DAQ AIM	AIM EVO4 loom	€ 327,54
20	161418025	Antenna GPS AIM	AIM GPS antenna	€ 66,34
21	161418026	Impianto CAN AIM	AIM CAN loom	€ 60,77
22	161418027	Impianto LVDS AIM	AIM LVDS loom	€ 123,19
23	161418028	Impianto dati AIM	AIM Com loom	€ 79,83
24	161418030	supporto camera	camera bracket	€ 46,87
25	101018003	Powerbox PSD9	PSD9 Powerbox	€ 718,50
26	101018006	Supporto powerbox	PSD9 bracket	€ 30,80
27	101018009	Impianto estintore OMP	OMP extinguisher loom	€ 84,05
28	090918001	Staffa batteria	Battery holder	€ 33,81
29	080701055	supporto connettore scarico dati	download loom bracket	€ 8,77
30	ETX15L	Batteria standard	Standard battery	€ 198,13
31	TYCO-HCR-300-A	Master switch	Master switch	€ 114,62
32	083815307300	GCC	GCC	€ 1.773,66
33	04980900ZXT	Portafusibile	Fusebox	€ 21,63
34	0498080	Fusibile 80A	Fuse	€ 3,61
35	030218048	Spina Anderson	Anderson Jack plug	€ 24,28
36	LST56648A	Staffa di fissaggio Smartycam	Smartycam bracket	€ 20,00
37	PUFM415X25MF	puffer	Silent Block	€ 7,11
38	PUFM515X15MF	Puffer	Silent Block	€ 7,11
39	PUFM625X15MF	Puffer	Silent block	€ 7,11
40	E0790410	puffer M4	Silent Block	€ 7,73

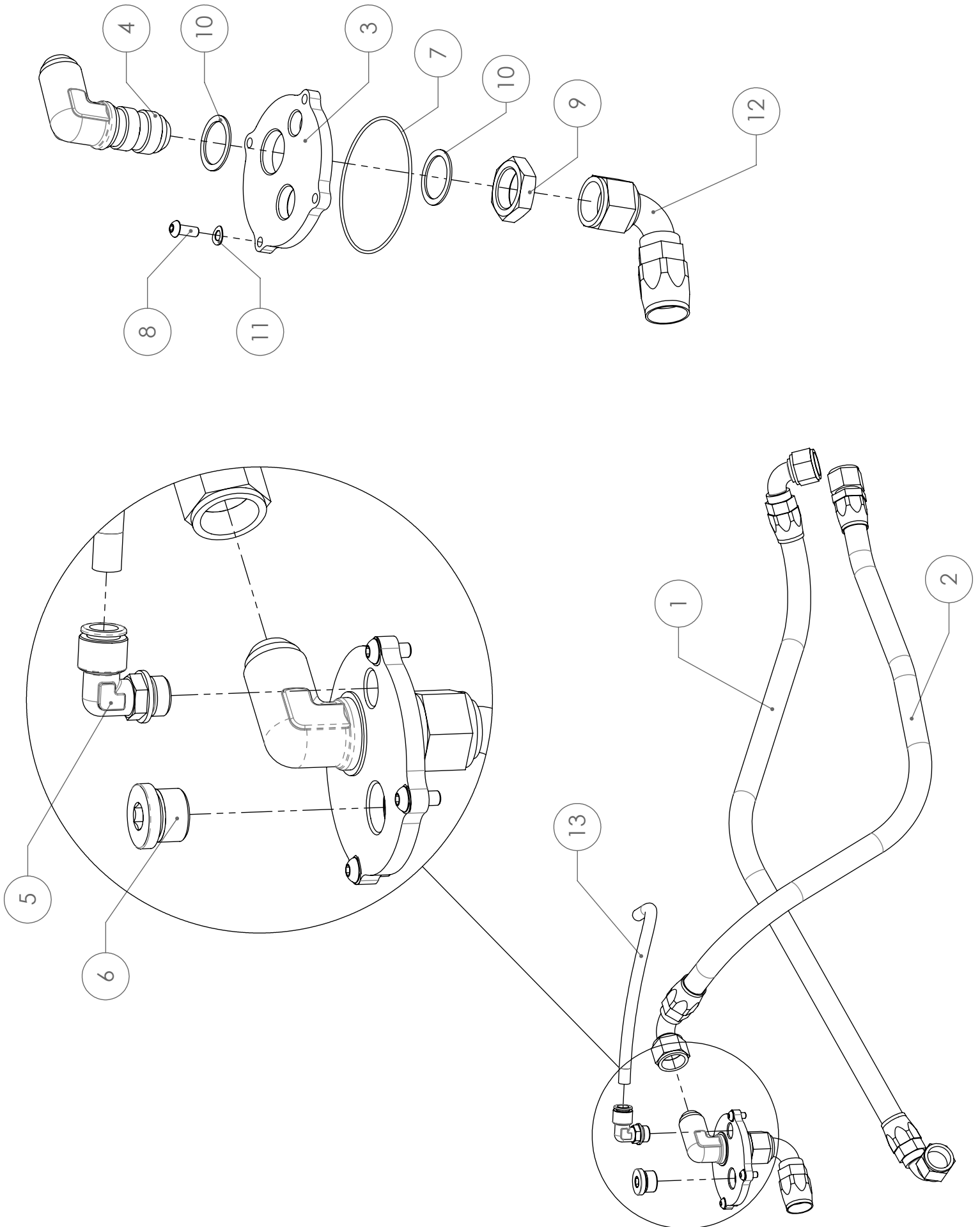
41	UNI5931-M3X8	Vite TC	CH bolt	€ 1,34
42	UNI5931-M4X25	Vite TC	CH bolt	€ 1,34
43	UNI5931-M5X12	Vite TC	CH bolt	€ 1,63
44	UNI5931-M6X14	Vite TC	CH bolt	€ 1,63
45	UNI5931-M6X18	Vite TC	CH Bolt	€ 1,63
46	UNI5933-M5X8	Vite TS	CSH Bolt	€ 1,63
47	UNI5933-M5X22	Vite TS	CSH Bolt	€ 1,63
48	UNI5933-M6X12	Vite TS	CSH Bolt	€ 1,63
49	UNI7380-M4X8	Vite TB	BH Bolt	€ 1,34
50	UNI7380-M4X12	Vite TB	Bolt	€ 1,34
51	UNI7380-M5X10	Vite TB	BH Bolt	€ 1,63
52	UNI7380-M5X12	Vite TB	BH Bolt	€ 1,63
53	UNI7380-M5X16	Vite TB	BH Bolt	€ 1,63
54	UNI7380-M5X18	Vite TB	BH Bolt	€ 1,63
55	UNI7380-M5X20	Vite TB	BH bolt	€ 1,63
56	UNI7380-M6X10	Vite TB	BH bolt	€ 1,63
57	AST-06	Dado Astori M6	Astori Nut M6	€ 4,95
58	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1,86
59	RZS4	Rondella zigrinata	Washer	€ 1,07
60	RZS5	Rondella zigrinata	Safety washer	€ 1,07
61	UNI6592-3	Rondella	Washer	€ 1,07
62	UNI6592-4	Rondella	Washer	€ 1,07
63	UNI6592-5	Rondella	Washer	€ 1,07
64	UNI6592-6	Rondella	Washer	€ 1,07
65	UNI6593-6	Rondella larga	Large washer	€ 1,07
66	UNI8840B-4	Rondella Ondulata UNI 8840 B-4	Wave washer UNI 8840 B-4	€ 1,07
67	UNI8840B-5	Rondella ondulata	Crinkle Washer	€ 1,07



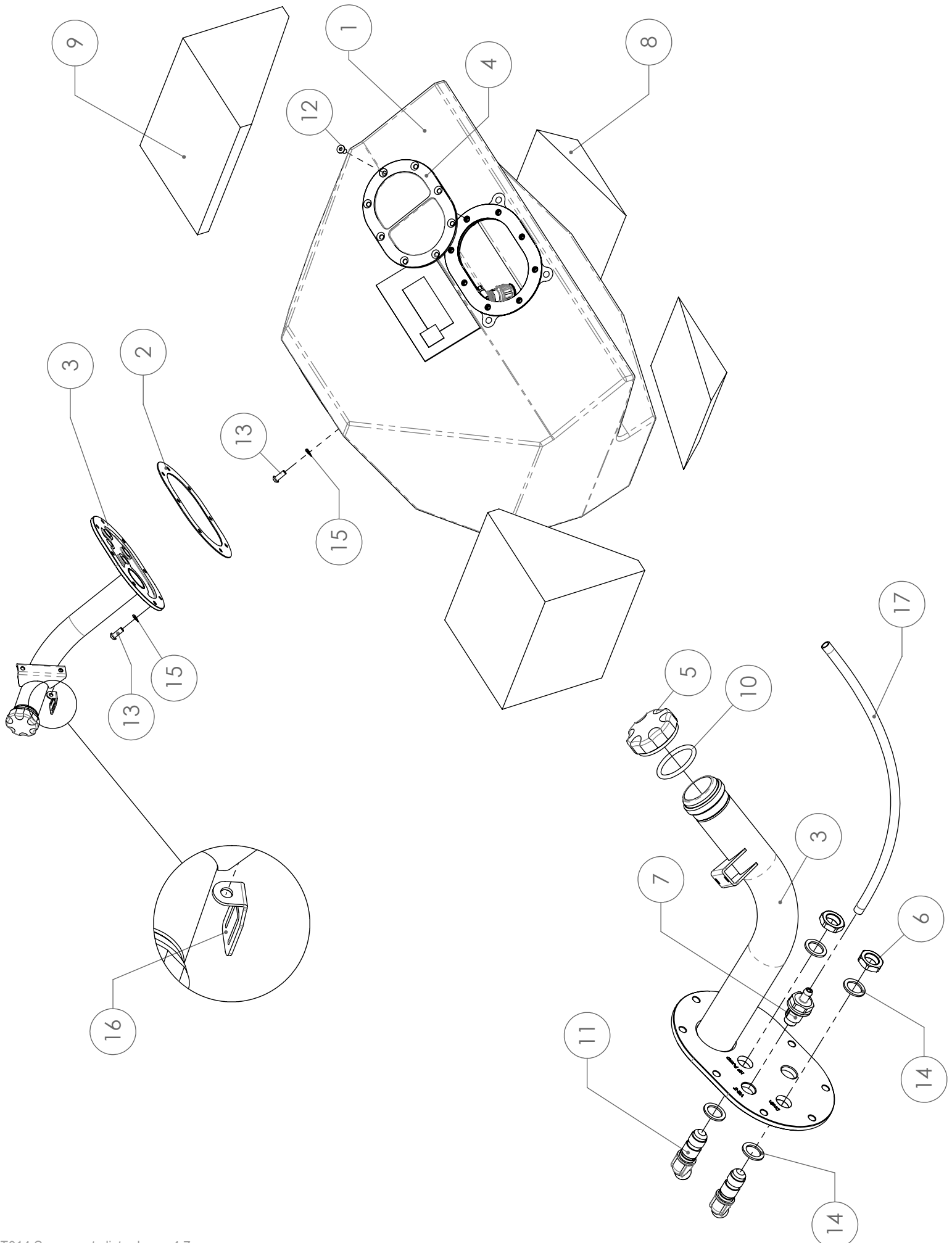
Item	Part Number	Descrizione	Description	Price €
1	161419001	Radiatore	Water radiator	€ 624,06
2	161419002	Tubo uscita motore	Engine outlet pipe	€ 169,95
3	161419007	Tubo incrocio	Crossing pipe	€ 221,45
4	161419012	Tubo sfiato	Bleed line	€ 103,50
5	161419013	Tubo	Pipe	€ 46,35
6	091019008	Vaso espansione acqua	water tank	€ 183,39
7	090919010	Tappo vaso espansione	Water cap	€ 9,34
8	E9028	Manicotto	Silicon hose	€ 31,22
9	E4528	Manicotto	Silicon hose	€ 35,93
10	SCH28	Manicotto	Silicon hose	€ 20,63
11	080624032	Fascetta	Clamp	€ 6,29
12	4451603	Rondella rame	Copper washer	€ 1,59
13	010019016	Fascetta	Clamp	€ 4,49
14	77503	Vite banjo	Banjo bolt	€ 4,30
15	9920332P	Vite banjo	Banjo bolt	€ 2,58
16	9920331	Vite banjo	Banjo bolt	€ 4,30
17	161419018	Tubo elastolan ø8x6 L670	Elastolan hose ø8x6 L670	€ 8,00



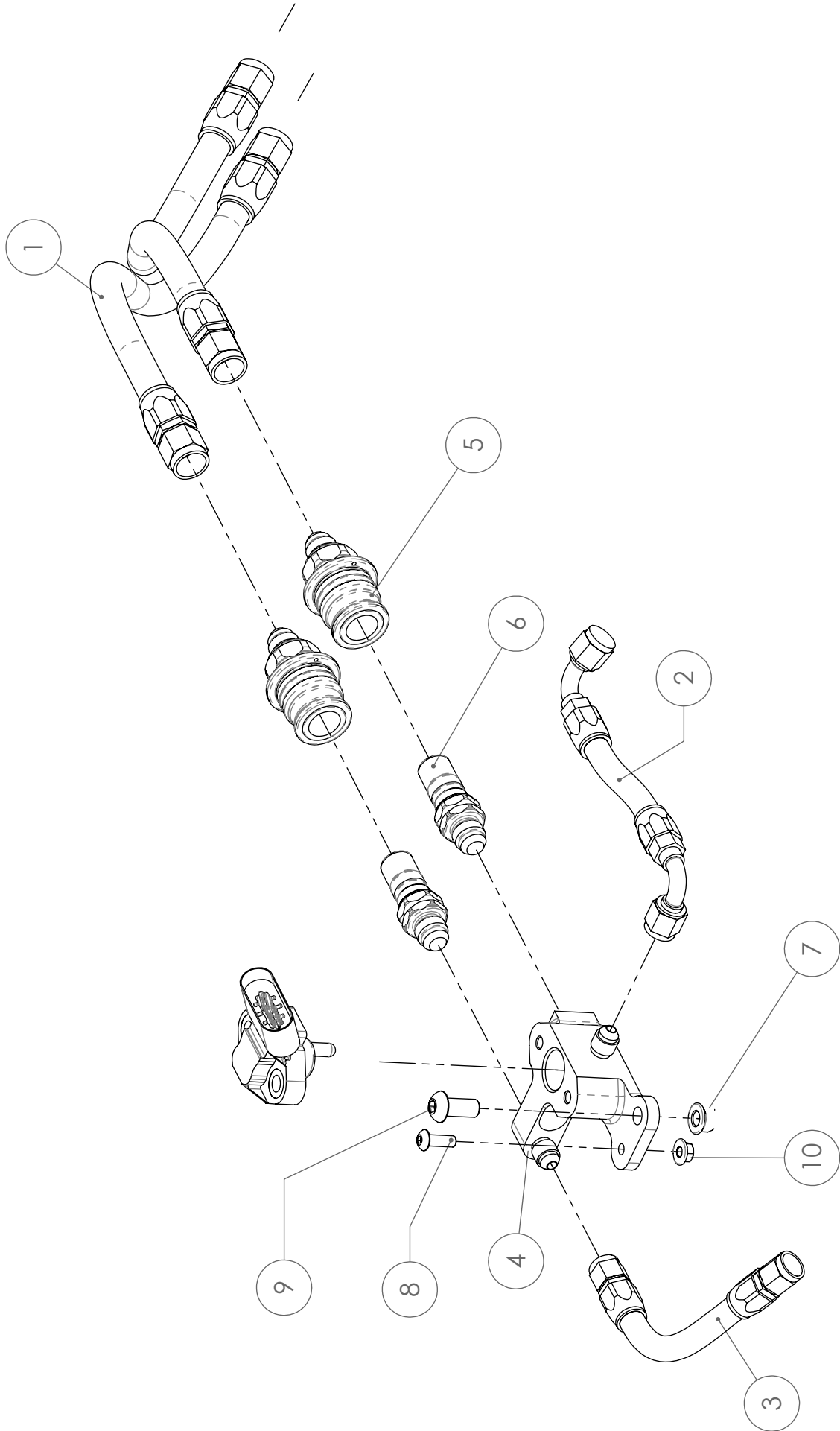
Item	Part Number	Descrizione	Description	Price €
1	161419009	Radiatore	Water radiator	€ 370,80
2	161419014	Tubo mandata radiatore	Radiator inlet pipe	€ 231,75
3	161419015	Tubo ritorno pompa	Water pump inlet pipe	€ 169,95
4	SCH28	Manicotto	Silicon hose	€ 20,63
5	010019016	Fascetta	Clamp	€ 4,49
6	E9028	Manicotto	Silicon hose	€ 31,22
7	4451603	Rondella rame	Copper washer	€ 1,59
8	010619017	Tappo radiatore	Radiator cap	€ 3,47



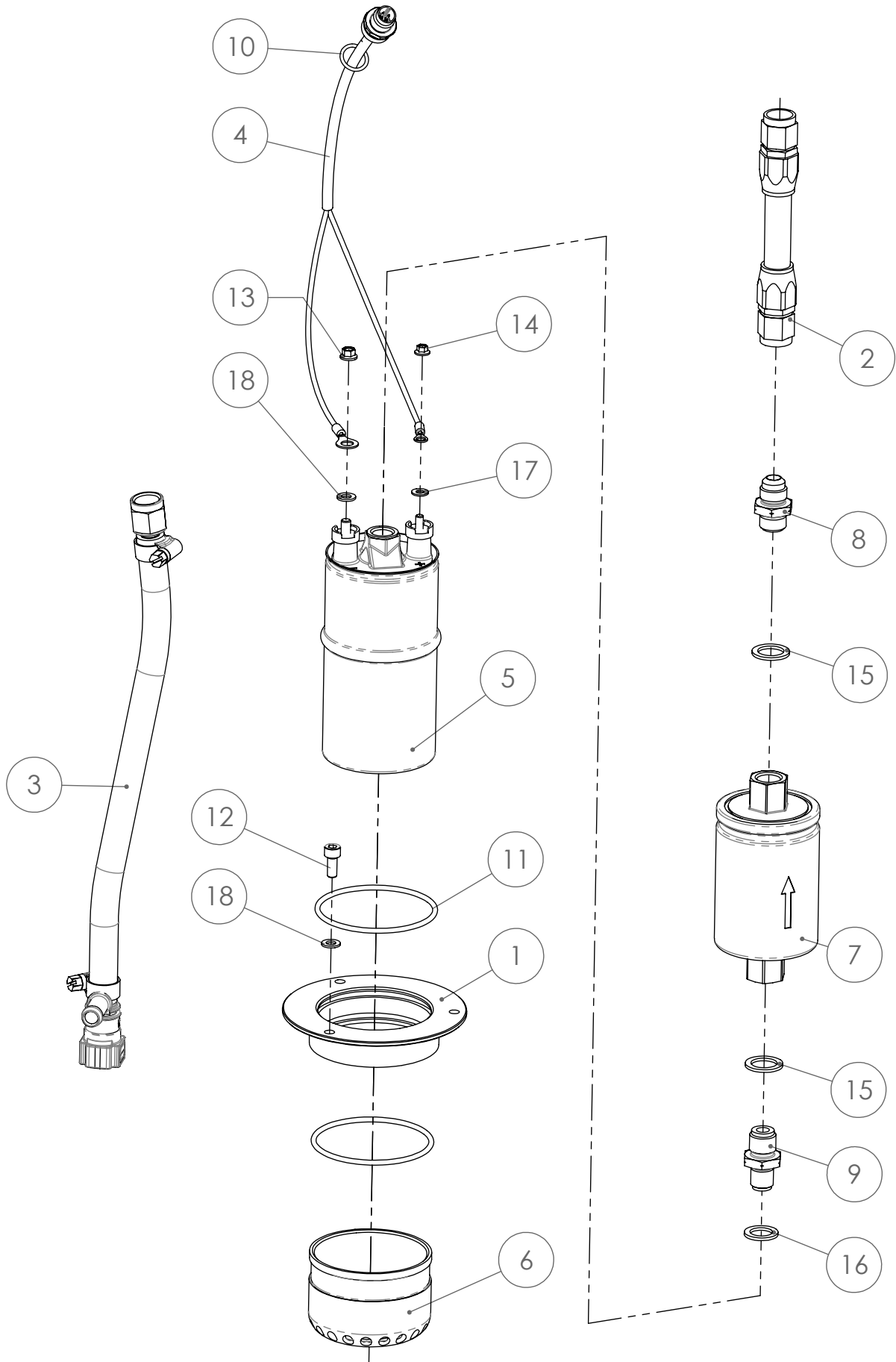
Item	Part Number	Descrizione	Description	Price €
1	161420001	Tubo aspirazione serbatoio	Tank suction hose	€ 191,00
2	161420002	Tubo ritorno serbatoio	Tank return hose	€ 154,91
3	161420003	Flangia serbatoio olio	Oil tank flange	€ 49,75
4	AN83312	Raccordo #12 passaparete 90°	Male elbow	€ 44,29
5	RL3112-3/8	Raccordo pneumatico	Breathing elbow	€ 8,98
6	DIN3852-M22X1,5	Tappo esagono incassato	Hexagon socket plug	€ 11,33
7	080611016	O-Ring	O-Ring	€ 4,98
8	UNI7380-M6X15	Vite TB	BH Bolt	€ 1,63
9	AN92412	Dado	Nut	€ 11,86
10	CW90112	Rondella	Washer	€ 1,17
11	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1,07
12	236-9012	Raccordo # 12 90°Femmina 11/16x12	Hose fitting female #12 90°	€ 43,51
13	161420005	Tubo elastolan ø12x9 L320	Elastolan hose ø12x9 L320	€ 4,00



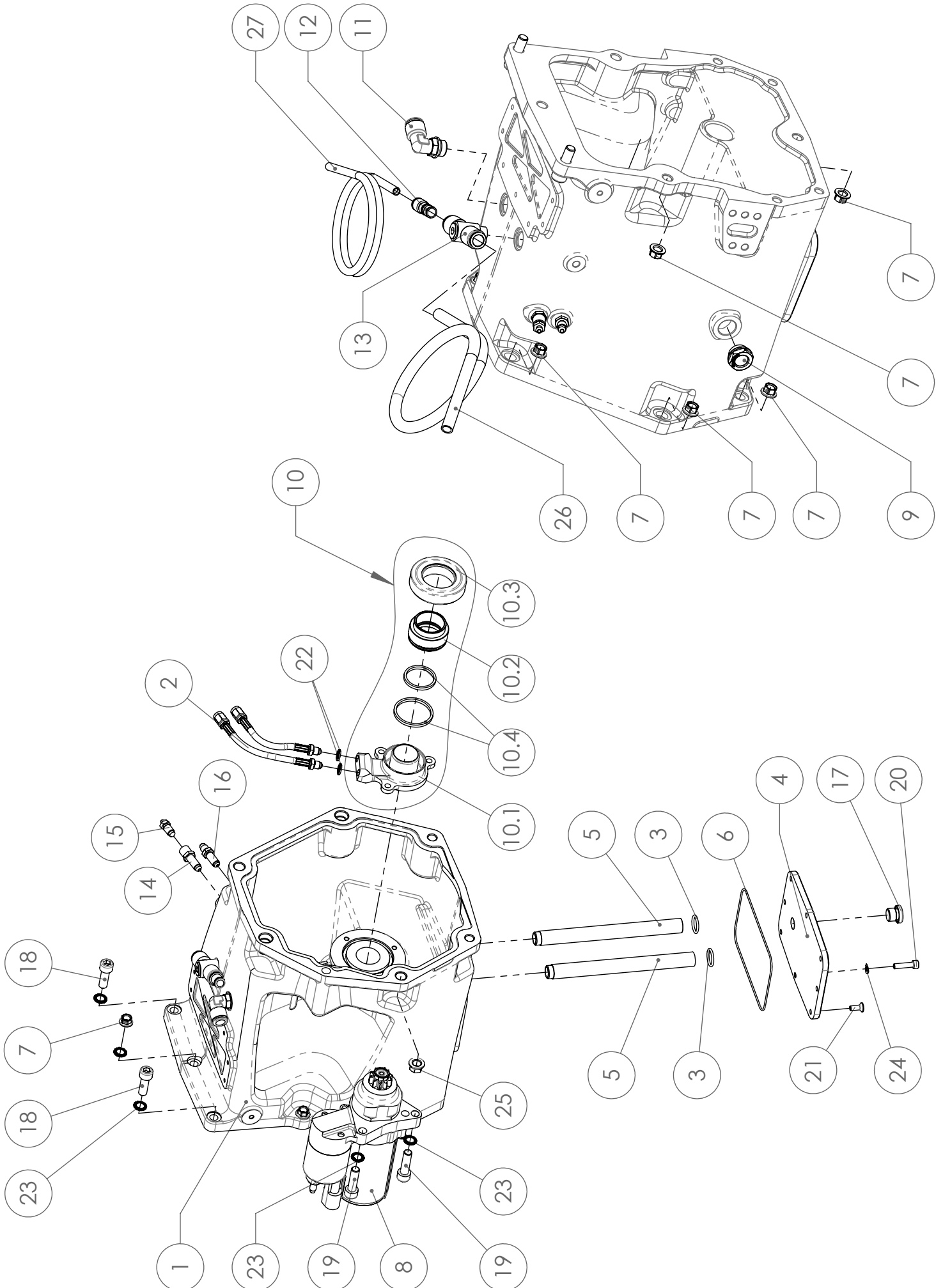
Item	Part Number	Descrizione	Description	Price €
1	161421001	Serbatoio benzina	Fuel Cell	€ 1.648,00
2	161421003	Guarnizione	Seal	€ 26,78
3	161421004	Flangia serbatoio	Tank rear flange	€ 334,24
4	161421005	Flangia anteriore serbatoio	Tank front flange	€ 46,97
5	090921005	Tappo benzina	Fuel plug	€ 82,83
6	AN92406	Dado 9-16x18 UNF	Nut	€ 2,73
7	010021017	Valvola Sfiato	Vent valve	€ 93,18
8	161421009	Filler inferiore serbatoio	Lower filler	€ 12,78
9	161421011	Filler laterale	Side filler	€ 26,21
10	ORV4131	O-ring	O-ring	€ 3,31
11	AN83706	Racc. Passaparete 45° 9/16x18	45° male bulkhead	€ 24,25
12	UNI5933-M6X14	Vite TS	CSH Bolt	€ 1,63
13	UNI7380-M6X16	Vite TB	BH Bolt	€ 1,63
14	RR1420	Rondella	Washer	€ 1,07
15	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1,07
16	090901019	Squadretta QR	Bracket	€ 37,12
17	161421014	Tubo elastolan ø8x6 L290	Elastolan hose ø8x6 L290	€ 4,00



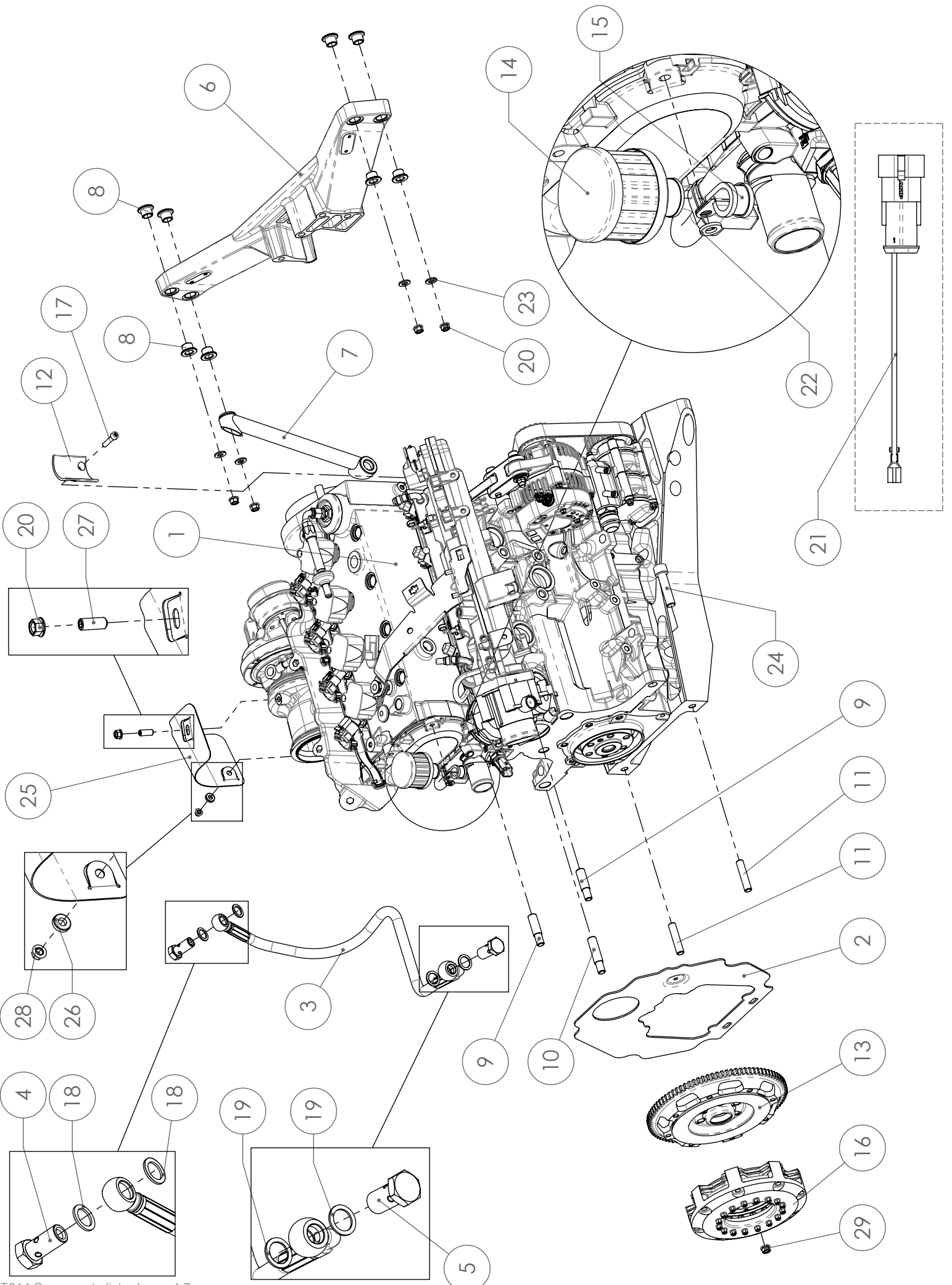
Item	Part Number	Descrizione	Description	Price €
1	161421007	Tubo benzina	Fuel Hose	€ 53,68
2	090921015	Tubo ritorno	Fuel Hose	€ 70,22
3	090921014	Tubo mandata	Fuel Hose	€ 36,47
4	090921009	Staffa sensore	Fuel sensor bracket	€ 262,39
5	SPT083655L	Raccordo rapido femmina	Quick coupling socket	€ 398,64
6	SPT087655L	Raccordo rapido maschio	Quick connector plug	€ 307,22
7	DIN6927-M8ER	Dado flangiato autobloccante	Prevailing torque Nut	€ 5,09
8	UNI7380-M5X15	Vite TB	BH Bolt	€ 1,63
9	UNI7380-M8X18	Vite TB	BH Bolt	€ 1,93
10	DIN6927-M5	Dado flangiato autobloccante	Prevailing torque Nut	€ 1,86



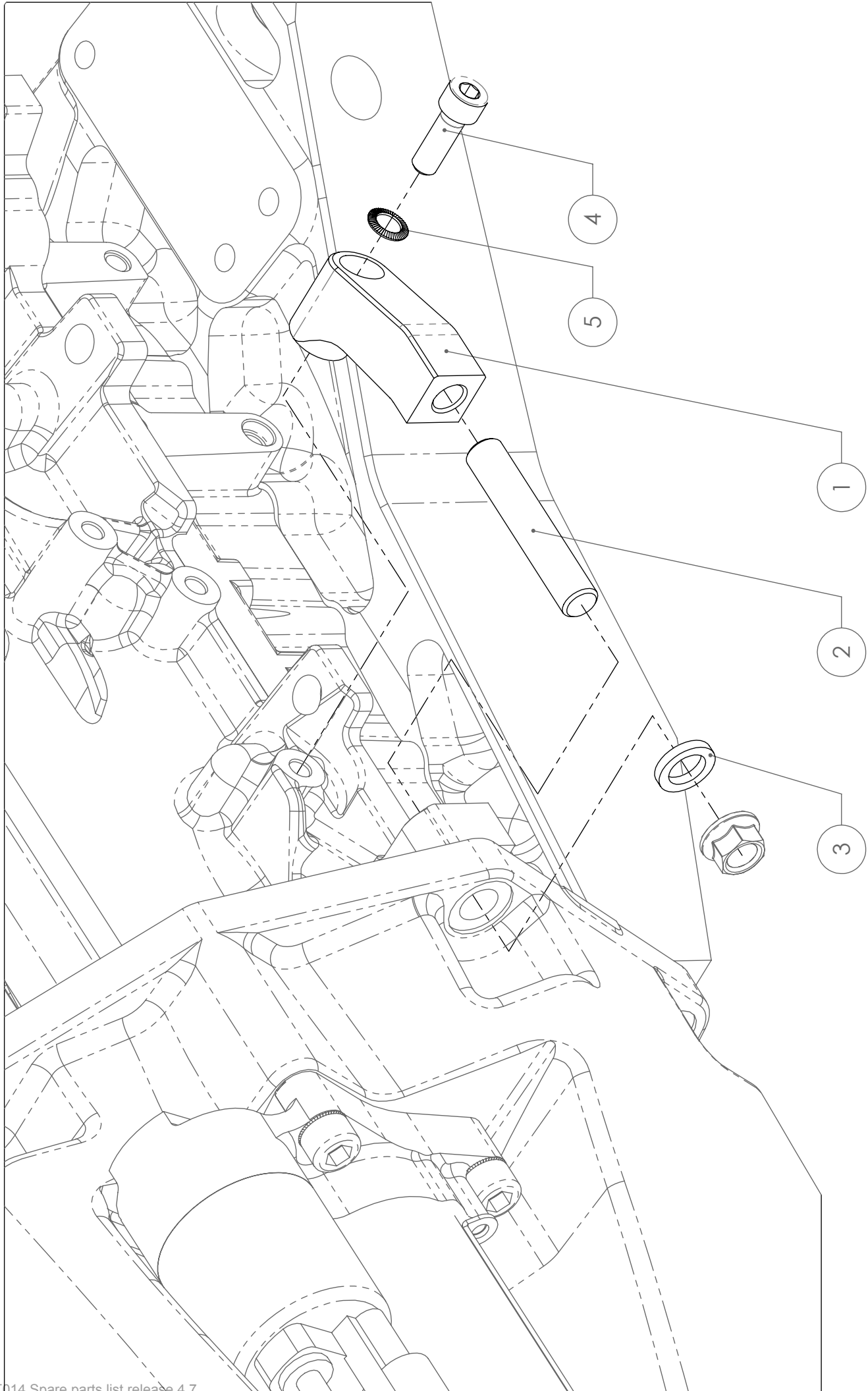
Item	Part Number	Descrizione	Description	Price €
1	161421002	Supporto pompa HP	Fuel pump carrier	€ 88,17
2	161421006	Tubo benzina	Fuel Hose	€ 43,88
3	161421008	Tubo ritorno	Fuel Hose	€ 25,29
4	161421012	Cablaggio pompa benzina	Tank Loom	€ 108,15
5	080621010	Pompa benzina	Fuel pump	€ 478,68
6	080821019	Protezione pompa	Fuel pump stay	€ 55,67
7	0450905911	Filtro benzina	Fuel filter	€ 46,35
8	30606M14	Adattatore 9/16-M12x1.5	Adattatore 9/16-M12x1.5	€ 10,08
9	148M12M14	Adattatore M12 - M14	Male to male	€ 23,15
10	ORV2050	O-ring	O-ring	€ 3,31
11	ORV3237	O-ring	O-ring	€ 3,31
12	UNI7380-M5X16	Vite TB	BH Bolt	€ 1,63
13	AST-05	K-Nut	K-Nut	€ 4,95
14	AST-04	K-Nut	K-Nut	€ 4,64
15	RR1420	Rondella	Washer	€ 1,07
16	RR1218	Rondella	Washer	€ 1,17
17	UNI6592-4	Rondella	Washer	€ 1,07
18	UNI6592-5	Rondella	Washer	€ 1,07



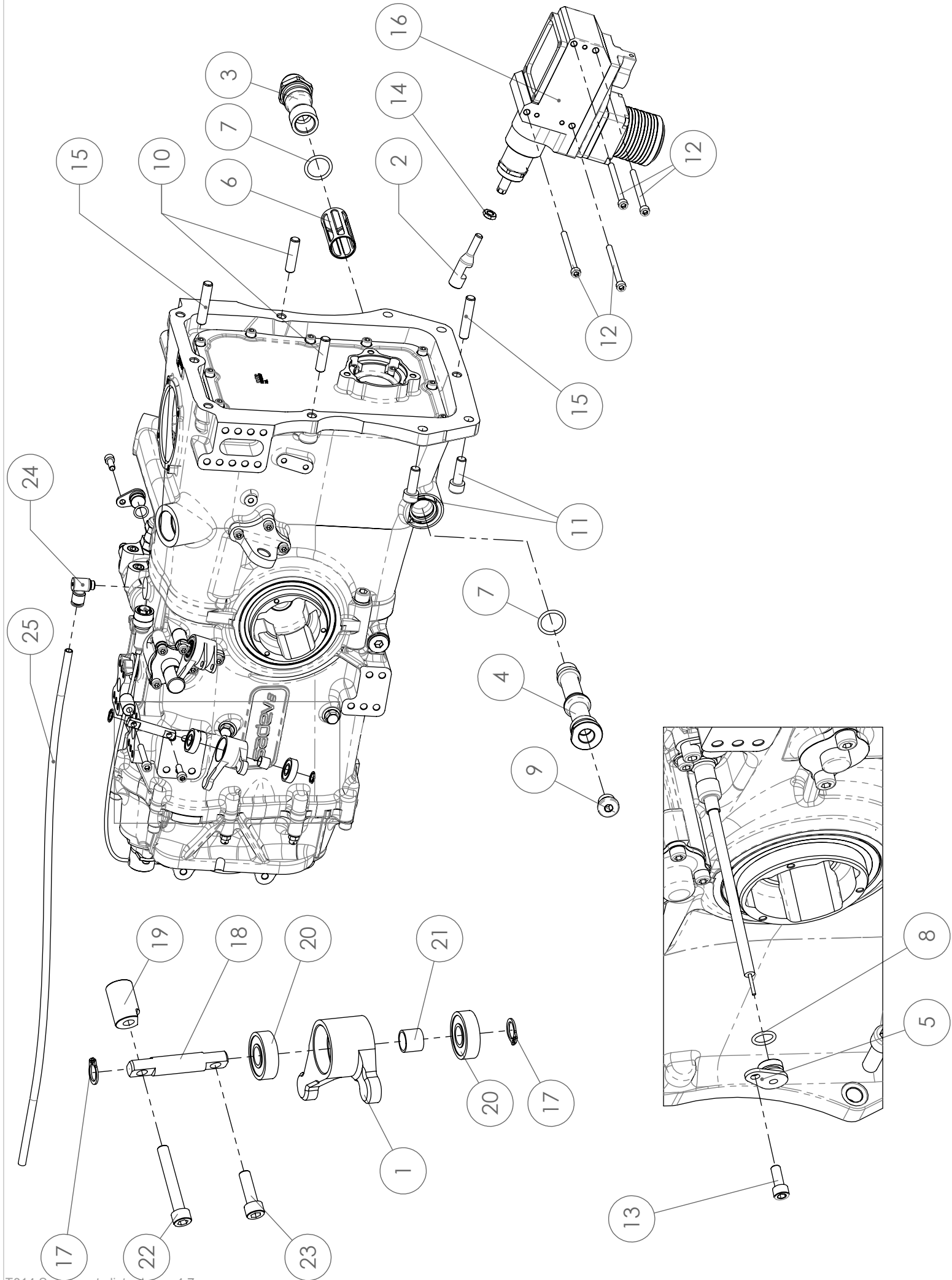
Item	Part Number	Descrizione	Description	Price €
1	161422002	Distanziale motore	Engine spacer	€ 1.915,80
2	161422003	Tubo spurgo/mandata frizione	Clutch bleed/delivery line	€ 29,75
3	ORN123	O-ring	O-ring	€ 7,81
4	161422005	Flangia Catch-tank	Catch-tank flange	€ 91,16
5	161422008	Tubo interno campana	Bleed pipe	€ 29,36
6	161422011	O-Ring	O-Ring	€ 8,24
7	AST-10	K-Nut	K-Nut	€ 4,95
8	090924011	Motorino avviamento	Starter	abarth
9	080722017	Indicatore di livello	Level gauge	€ 21,21
10	TAAP3859	Attuatore frizione Completo	Slave cylinder assy	€ 503,73
10,1	TAAP3859001	Corpo attuatore frizione	Slave cylinder body	€ 304,29
10,2	TAAP3859002	Pistone attuatore frizione	Slave cylinder piston	€ 92,17
10,3	CP3457-9	Release Bearing	Cuscinetto	€ 89,55
10,4	CP3759-3	Kit guarnizioni spingidisco	Sleeve seal kit	€ 38,11
11	RL3112-3/8	Raccordo D12 3/8 Gas	Breathing elbow	€ 8,98
12	RL81210	Raccordo 12-8mm	Breathing elbow	€ 3,87
13	RL161238	Raccordo 12-3/8	Breathing elbow	€ 18,71
14	3215200	Nipplo 3/8	Bleed nipple	€ 12,17
15	CP3720182	Vite spurgo 3/8-24UNF	Bleed bolt	€ 9,13
16	080624028	passaparete 832-03P	Bulkhead fitting	€ 18,35
17	DIN3852-M16X1,5	Tappo esagono incassato	Hexagon socket plug	€ 11,33
18	UNI5931-M10X30	Vite TC	CH Bolt	€ 2,39
19	UNI5931-M10X35	Vite TC	CH Bolt	€ 2,39
20	UNI5931-M6X25	Vite TC	CH Bolt	€ 1,63
21	UNI5933-M6X16	Vite TS	CSH Bolt	€ 1,63
22	161422012	Rondella speciale	Special washer	€ 1,07
23	RZS10	Rondella zigrinata	Crinkle Washer	€ 1,07
24	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1,07
25	AST-12	K-Nut	K-Nut	€ 6,32
26	161422020	Tubo elastolan ø12x9 L800	Elastolan hose ø12x9 L800	€ 8,00
27	161422021	Tubo elastolan ø8x6 L480	Elastolan hose ø8x6 L480	€ 4,00



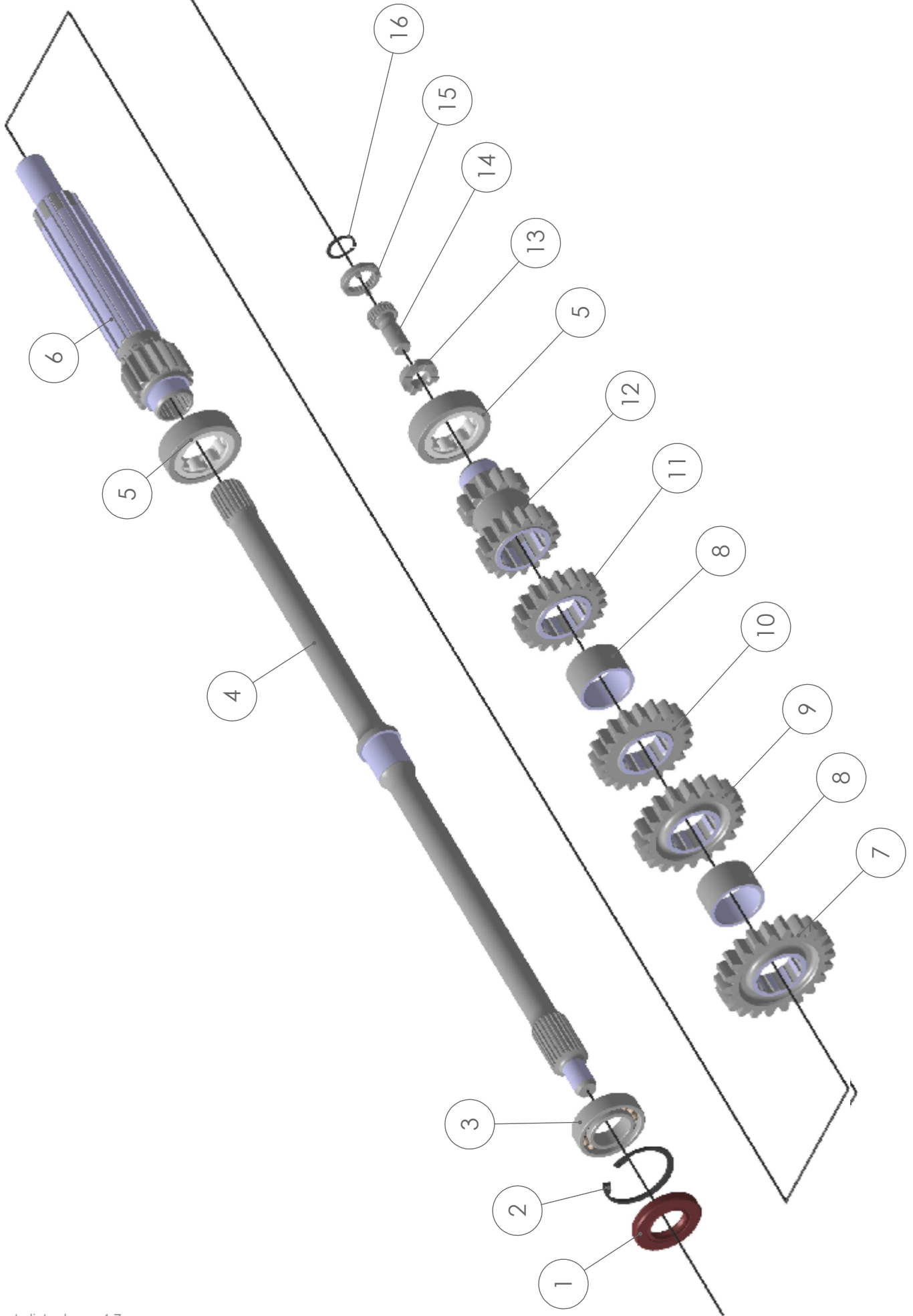
Item	Part Number	Descrizione	Description	Price €
1	0	Motore FPT_140FJT	Engine unit	abarth
2	161422006	Carter protezione frizione	Flywheel protection	abarth
3	161422010	Tubo raffreddamento turbina	Turbo cooling pipe	€ 71,38
4	161422014	Vite banjo	Banjo bolt	€ 14,53
5	161422015	Vite banjo	Banjo bolt	€ 14,94
6	090922002	Supporto motore	Top engine mounting	€ 450,58
7	090922003	Frame motore	Framework	€ 205,42
8	090922004	Boccola traversa motore	Bush	€ 36,19
9	090922007	Prigioniero	Stud	€ 5,59
10	090922008	Prigioniero	Stud	€ 5,59
11	090922009	Prigioniero	Stud	€ 5,59
12	090922010	Supporto vaso espansione	Water tank bracket	€ 64,28
13	0	5738622_m_414TF_volano	Flywheel	abarth
14	CY50	Filtro aria	Air filter	€ 12,88
15	PAS018	Fascetta gommata d18	Clamp	€ 4,54
16	CP6002	Frizione completa	Clutch assy	nd
17	UNI5931-M6X25	Vite TC	CH Bolt	€ 1,63
18	RR1420	Rondella rame	Copper washer	€ 1,07
19	RR1622	Rondella rame	Copper washer	€ 1,07
20	AST-08	K-Nut	K-Nut	€ 4,95
21	161422018	Cavo motorino avviamento	Starter cable	€ 35,54
22	UNI6592-6	Rondella	Washer	€ 1,07
23	UNI6592-8	Rondella	Washer	€ 1,07
24	UNI5931-M12x50	Vite TC	CH bolt	€ 1,94
25	090922006	Lamiera paracalore turbina	Heat shield	€ 23,85
26	SW-1/4	Rondella speciale	Special washer	€ 2,25
27	UNI5929-M8X20	Grano	Stud	€ 1,63
28	AST-06	K-Nut	K-Nut	€ 4,95
29	AST-08X1	K-Nut M8x1.0	K-Nut M8x1.0	€ 4,95



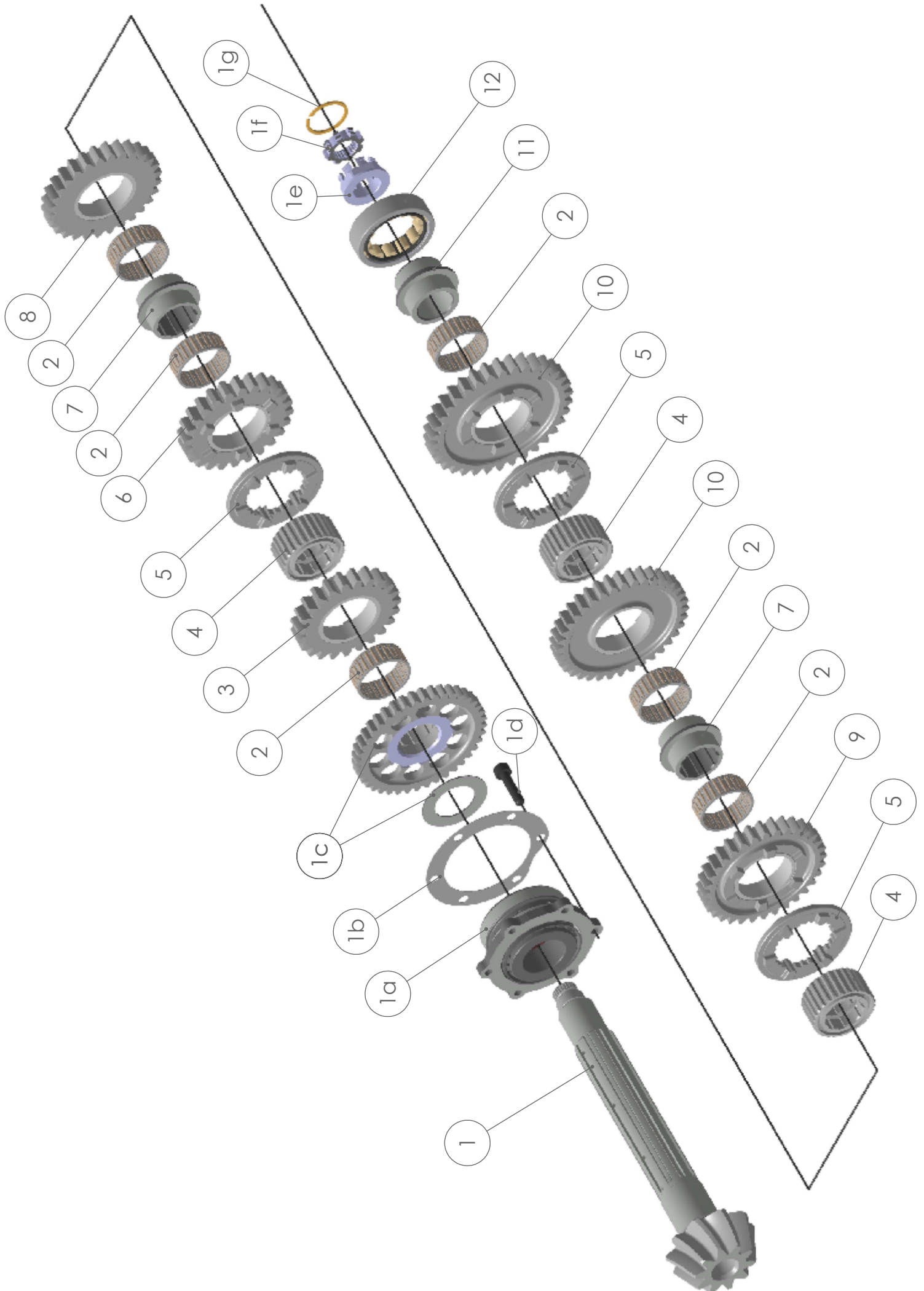
Item	Part Number	Descrizione	Description	Price €
0	161522024	Kit rinforzo motore Abarth	Abarth Engine frame kit	€ 131,90
1	161422019	Rinforzo motore Abarth	Frame Abarth Engine	€ 120,00
2	161522023	Prigioniero	Prigioniero	€ 5,59
3	090910012	Rondella Spec. 12,5x19x3	Special flat washer	€ 3,31
4	UNI5931-M8X25	Vite TC classe 12.9	CH bolt class 12.9	€ 1,93
5	RZS8	Rondella zigrinata	Safety Washer	€ 1,07



Item	Part Number	Descrizione	Description	Price €
1	161424001	Rocker EGA	EGA rocker	€ 245,56
2	161424002	Link EGA	Link EGA	€ 155,02
3	161424004	Terminale filtro olio	Suction screen plug	€ 87,86
4	161424005	Filtro pescaggio olio f0085255	Suction screen fitting f0085255	€ 74,87
5	F9017124	Unlocking cable plug	Unlocking cable plug	€ 38,51
6	F9024432	Suction screen	Suction screen	€ 73,23
7	0201275	O-Ring 24x3	O-Ring 24x3	€ 0,50
8	0201009	O-Ring	O-Ring	€ 1,07
9	DIN3852-M18X1,5	Tappo esagono incassato	Hexagon socket plug	€ 11,33
10	090922011	Prigioniero	Stud	€ 7,79
11	UNI5931-M10X30	Vite TC	CH Bolt	€ 2,39
12	UNI5931-M6X80	Vite TC	CH Bolt	€ 2,06
13	UNI5931-M6X16	Vite TC	CH Bolt	€ 2,39
14	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
15	010022013	Prigioniero	Stud	€ 3,30
16	083803390600	EGA	EGA	€ 3.222,87
17	0601042	f10 circlip	f10 circlip	€ 0,58
18	F0085124	selector axle	selector axle	€ 29,71
19	F0085131	selector spacer	selector spacer	€ 9,90
20	0101035	6000 bearing	6000 bearing	€ 7,87
21	F0085992	bearing spacer	bearing spacer	€ 9,81
22	0301442	M6x40 Chc bolt	M6x40 Chc bolt	€ 0,50
23	0301385	M6X20 CHc bolt	M6X20 CHc bolt	€ 1,63
24	RL15818	Raccordo 1/8" Gas	Fitting	€ 18,39
25	161424007	Tubo elastolan ø8x6 L670	Elastolan hose ø8x6 L670	€ 4,00



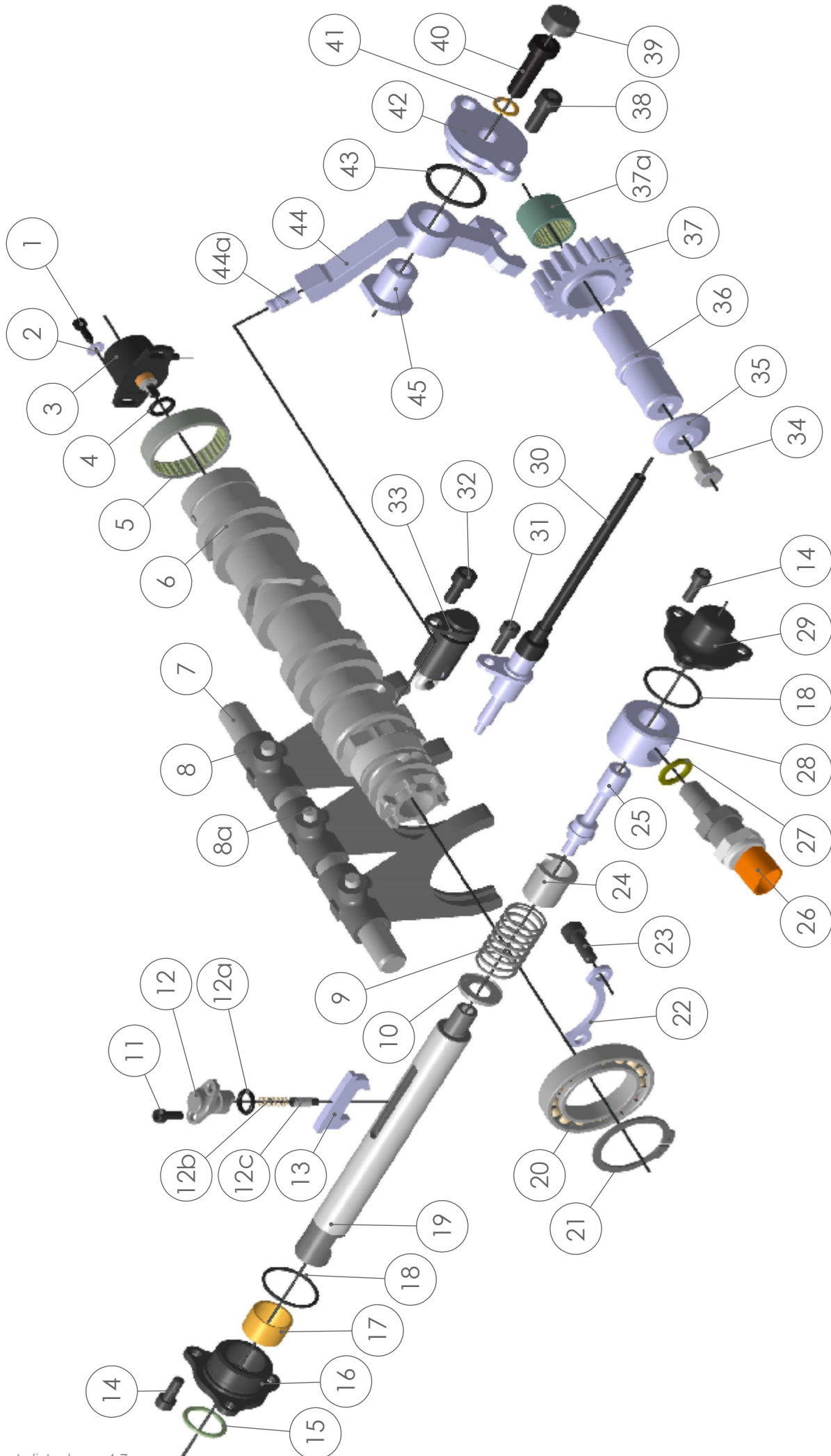
Item	Part Number	Descrizione	Description	Price €
1	0206003	D25x47x7 Guarnizione	D25x47x7 lip seal	€ 14,50
2	0602043	D47 Seeger	D47 circlip	€ 2,01
3	0101050	Cuscinetto a sfere 6005	6005 bearing	€ 8,16
4	F0085051	input shaft	input shaft	€ 594,42
5	0103015	NU304 bearing	NU304 bearing	€ 41,17
6	F0085010	Albero primario	primary shaft	€ 550,32
7	C75142522556J	6^ marcia	6th gear	€ 252,46
7	C75142120556J	6^ marcia	6th gear	€ 252,46
8	F0085006	pinion spacer	pinion spacer	€ 54,14
9	C75142626556J	5^ marcia	5th gear	€ 252,46
9	C75142527556J	5^ marcia	5th gear	€ 252,46
10	C75142024556J	4^ marcia	4th gear	€ 271,53
10	C75142025556J	4^ marcia	4th gear	€ 271,53
11	C75141827556J	3^ marcia	3rd gear	€ 295,08
12	C75141630556J	2^ marcia	2nd gear	€ 295,08
12	E75141435556J	1^ marcia	1st gear	€ 295,08
13	F1908003	stopping washer	stopping washer	€ 27,86
14	F9024002	Vite albero primario	primary shaft bolt	€ 37,95
15	F1908002	stopping hub	stopping hub	€ 31,56
16	0601020	D18 seeger	D18 circlip	€ 0,58



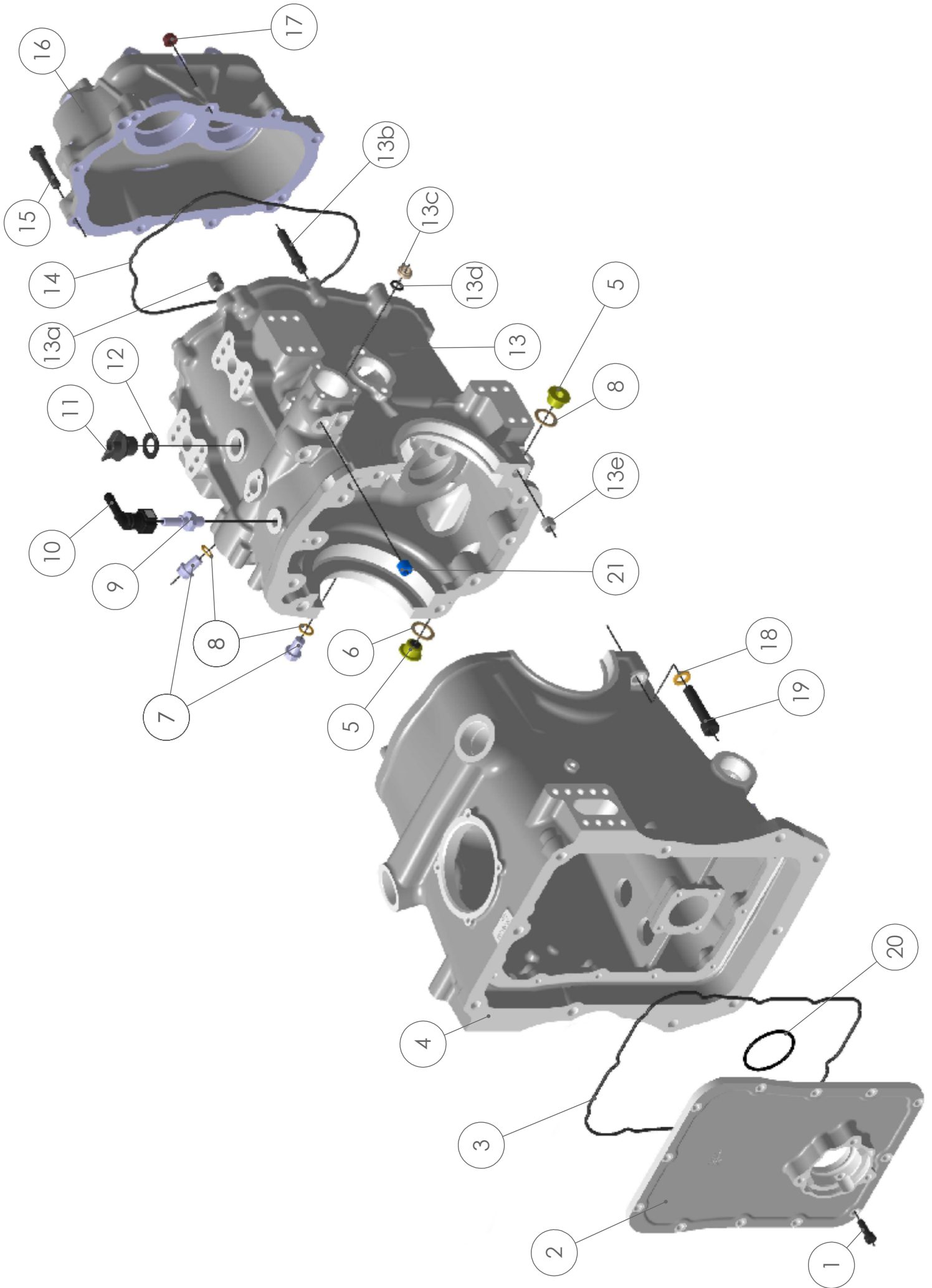
Item	Part Number	Descrizione	Description	Price €
1a	F00850121	twin bearing assembly	twin bearing assembly	€ 321,04
1b	F00850131	bevel gear advance shim set	bevel gear advance shim set	€ 95,39
1c	F00850081	reverse gear pinion	reverse gear pinion	€ 208,56
1d	0301191	M7x30 Chc bolt	M7x30 Chc bolt	€ 1,90
1e	F9002038	secondary nut	secondary nut	€ 46,48
1f	F9005010	nut stopping washer	nut stopping washer	€ 126,06
1g	9907004	D30 circlip	D30 circlip	€ 1,43
2	0105043	K38x43x17 bearing	K38x43x17 bearing	€ 19,05
3	C75142522556J	6th gear	6th gear	€ 252,46
3	C75142120556J	6th gear	6th gear	€ 252,46
4	F0085003	hub	hub	€ 122,22
5	F0085004	dog ring	dog ring	€ 128,51
6	C75142626556J	5th gear	5th gear	€ 252,46
6	C75142527556J	5th gear	5th gear	€ 252,46
7	F0085005	gear bearing inner race	gear bearing inner race	€ 93,30
8	C75142024556J	4th gear	4th gear	€ 271,53
8	C75142025556J	4th gear	4th gear	€ 271,53
9	C75141827556J	3rd gear	3rd gear	€ 295,08
10	C75141630556J	2 [^] marcia	2nd gear	€ 295,08
10	E75141435556J	1 [^] marcia	1st gear	€ 295,08
11	F0085007	1st gear bearing inner race	1st gear bearing inner race	€ 105,55
12	0103011	NU 206 bearing	NU 206 bearing	€ 53,30



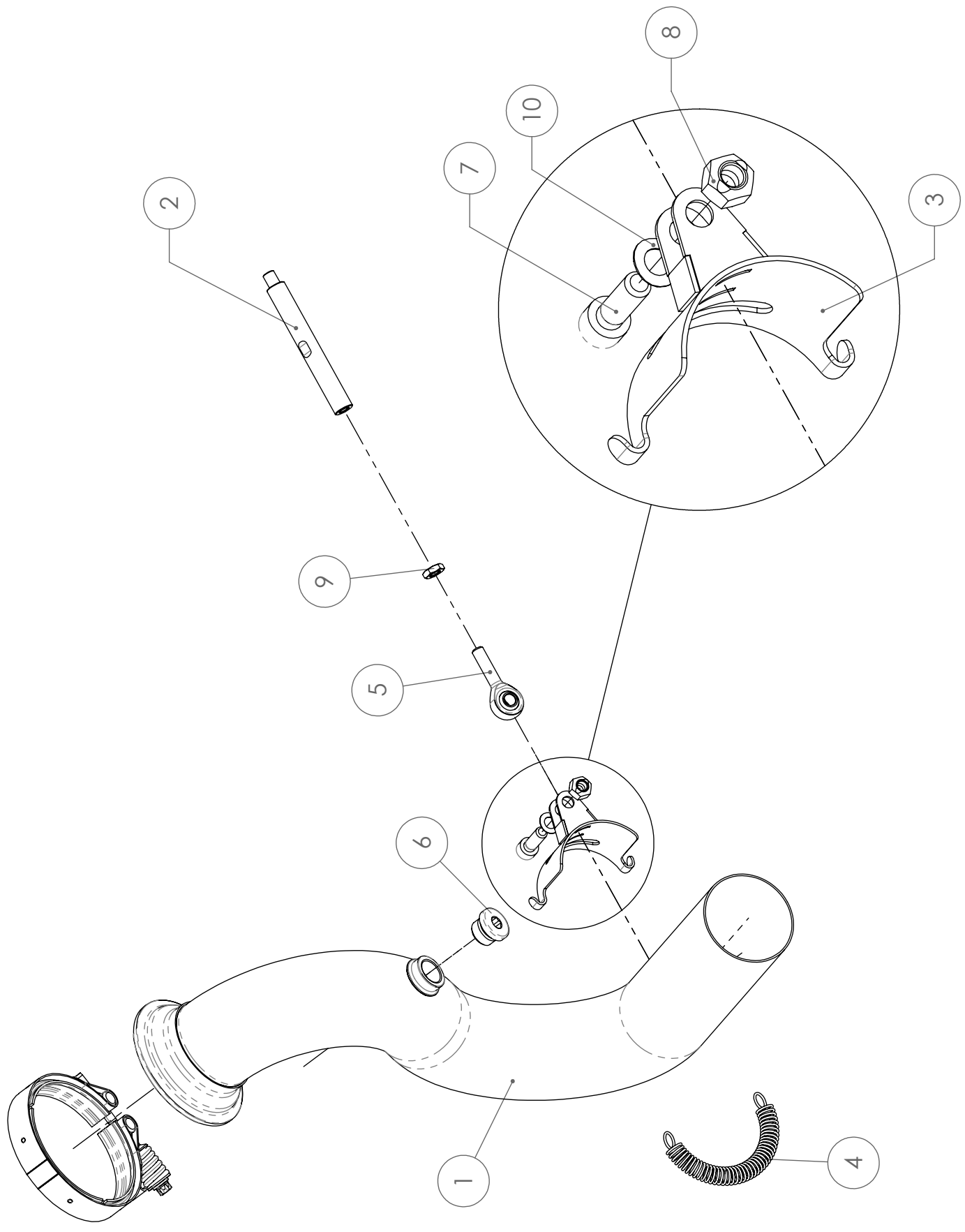
Item	Part Number	Descrizione	Description	Price €
1	0204041	D85x105x12 lip seal	D85x105x12 lip seal	€ 25,67
2	CPL10210085011	Complete final drive 10x31	Complete final drive 10x31	€ 2.228,70
2a	F19103201	final drive clearence shim set	final drive clearence shim set	€ 104,48
2b	0305052	vis H M10x16	vis H M10x16	€ 2,39
3	0101054	AB 12458 S03 bearing	AB 12458 S03 bearing	€ 68,71
4	F9047303	D85 circlip	D85 circlip	€ 13,13
5	F0085414	differential cap	differential cap	€ 124,37
6	F1910310	sun gear	sun gear	€ 128,63
7	F0044007	half planet gear axle	half planet gear axle	€ 41,99
8	5099062	planet gear	planet gear	€ 38,94
9	F0044006	hub	hub	€ 48,06
10	F0044008	planet gear axle	planet gear axle	€ 43,00
11	F0085411	differential case	differential case	€ 517,56
12	0601040	D95 circlip	D95 circlip	€ 3,67



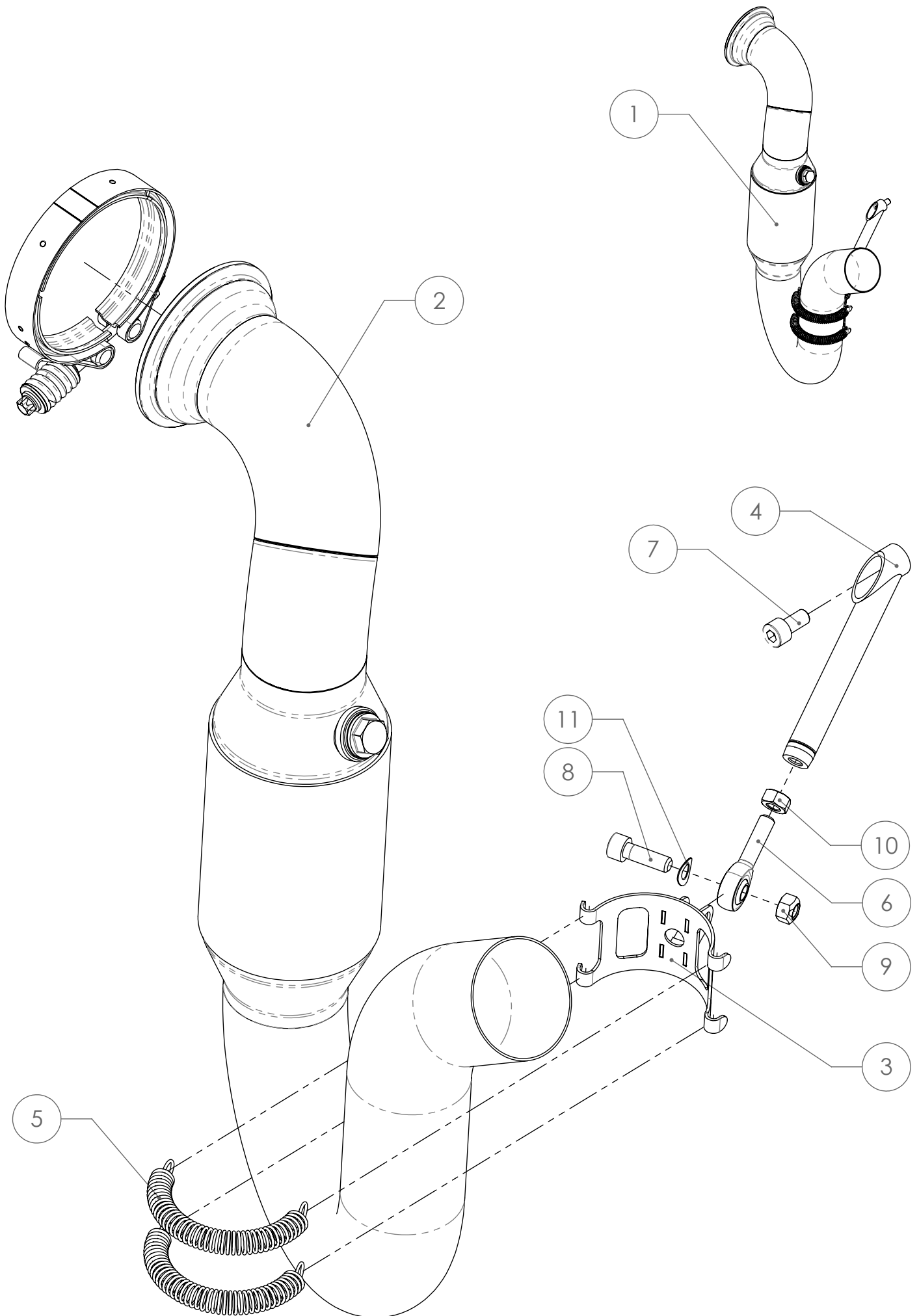
Item	Part Number	Descrizione	Description	Price €
1	0301425	M4x12 Chc bolt	M4x12 Chc bolt	€ 0,73
2	0502023	f4 washer	f4 washer	€ 1,07
3	F0089047	potenziometro	potenziometro	€ 202,06
4	0201017	f10x2.5 o-ring	f10x2.5 o-ring	€ 2,00
5	0106006	HK 4012 bearing	HK 4012 bearing	€ 16,95
6	F00851132	barell	barell	€ 777,05
7	F0085103	fork axle	fork axle	€ 39,42
8	F00851001	complete fork	complete fork	€ 120,19
8a	F0077120	selector pin	selector pin	€ 13,32
9	0801027	selector spring	selector spring	€ 14,24
10	F9003667	selector washer	selector washer	€ 7,64
11	0301394	M5x10 CHc bolt	M5x10 CHc bolt	€ 0,54
12	F14044031	Complete dual pin rock	Complete dual pin rock	€ 153,35
12a	0201017	f10x2.5 o-ring	f10x2.5 o-ring	€ 2,00
12b	0801026	pusher spring	pusher spring	€ 11,53
12c	F0059027	pusher	pusher	€ 30,95
13	F0059040	dual pin rock	dual pin rock	€ 142,86
14	0301422	M6x16 Chc bolt	M6x16 Chc bolt	€ 1,63
15	0201004	f20x2.5 o-ring	f20x2.5 o-ring	€ 0,53
16	F0085120	right selector closing block	right selector closing block	€ 95,71
17	1202004	PAP2015 P10 bushing	PAP2015 P10 bushing	€ 5,92
18	0201164	f29x2 o-ring	f29x2 o-ring	€ 0,53
19	F0085119	selector axle	selector axle	€ 169,32
20	0101018	61908 bearing	61908 bearing	€ 52,14
21	0601010	f40 circlip	f40 circlip	€ 2,94
22	F0085116	barrel stop	barrel stop	€ 11,30
23	0301013	M7x20 CHc bolt	M7x20 CHc bolt	€ 1,90
24	F0059022	selector bushing	selector bushing	€ 12,48
25	F9001039	selector axle bolt	selector axle bolt	€ 40,38
26	F0077119K	powershift	powershift	€ 53,50
27	F0062011	powershift shim set	powershift shim set	€ 19,78
28	F0085122	Selector spacer	Selector spacer	€ 28,48
29	F0085121	left selector closing block	left selector closing block	€ 98,94
30	F90079901	reverser gear unlocking cable	reverser gear unlocking cable	€ 139,76
31	0301377	M6x12 CHc bolt	M6x12 CHc bolt	€ 1,63
32	0301373	M7x16 CHc bolt	M7x16 CHc bolt	€ 1,90
33	F90241281	Complete indexor	Complete indexor	€ 148,78
0	0701069	goupille f18x2.5dowel pin	goupille f18x2.5dowel pin	€ 1,63
0	0201020	f16x2 o-ring	f16x2 o-ring	€ 0,51
0	0801046	indexor spring	indexor spring	€ 22,21
34	0305070	M8x16 H bolt	M8x16 H bolt	€ 2,83
35	F0085127	reverse gear washer	reverse gear washer	€ 9,40
36	F0085126	reverse gear axle	reverse gear axle	€ 45,94
37	F00850091	Complete reverse gear	Complete reverse gear	€ 122,01
37a	0106007	HK 2020 bearing	HK 2020 bearing	€ 9,94
38	0301421	M8x20 Chc bolt	M8x20 Chc bolt	€ 1,93
39	F0085228	bolt hat	bolt hat	€ 3,54
40	0304006	M10x35 CZHc bolt	M10x35 CZHc bolt	€ 2,39
41	0599017	f10,2x15x1 cupper washer	f10,2x15x1 cupper washer	€ 0,90
42	F0085123	rocker guide	rocker guide	€ 69,53
43	0201104	f29x3 o-ring	f29x3 o-ring	€ 2,31
44	F00851011	complete reverse gear rocker	complete reverse gear rocker	€ 182,31
44a	F0077108	reverse gear pin	reverse gear pin	€ 17,77
45	F0085111	reverse gear nut	reverse gear nut	€ 17,32



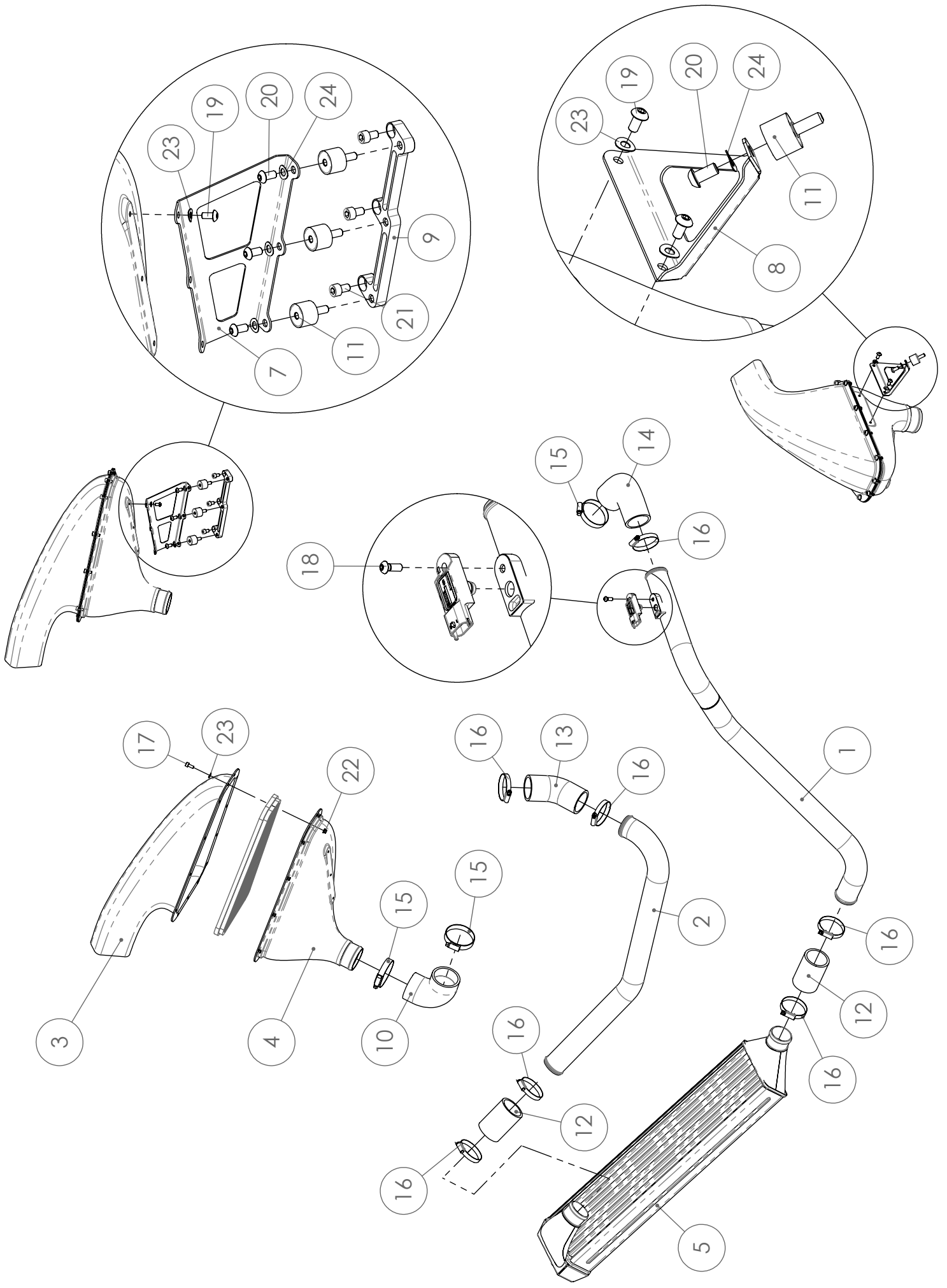
Item	Part Number	Descrizione	Description	Price €
1	0301385	M6X20 CHc bolt	M6X20 CHc bolt	€ 1,63
2	F0085287	oil tank plate	oil tank plate	€ 449,06
3	0201305	f255x3 o-ring	f255x3 o-ring	€ 12,32
4	F0085289	oil tank housing	oil tank housing	€ 2.116,39
5	F1402058	drain plug	drain plug	€ 25,90
6	5002018	drain plug seal	drain plug seal	€ 0,82
7	F2001138	plug	plug	€ 9,09
8	0599017	plug seal	plug seal	€ 0,90
9	F9022106	venting fitting	venting fitting	€ 24,78
10	9999683	venting plug	venting plug	€ 5,59
11	5099087	fitting plug	fitting plug	€ 14,69
12	5002026	fitting plug seal	fitting plug seal	€ 4,45
13	F00852911	main housing	main housing	€ 1.581,73
13a	F0077229	f12x15 pin	f12x15 pin	€ 5,53
13b	F0085282	rear casing stud	rear casing stud	€ 16,94
13c	F9004314	reverse gear cable stop	reverse gear cable stop	€ 6,80
13d	0201014	f8x2,5 o-ring	f8x2,5 o-ring	€ 0,51
13e	F9003102	f12 pin	f12 pin	€ 6,86
14	0201300	f208x3 o-ring	f208x3 o-ring	€ 5,75
15	0301524	M8x40 CHc bolt	M8x40 CHc bolt	€ 0,83
16	F0085292	rear housing	rear housing	€ 863,13
17	0499003	M8x125 simmonds nut	M8x125 simmonds nut	€ 3,33
18	0599054	f10 nordlock washer	f10 nordlock washer	€ 1,07
19	0301424	M10x45 CHc bolt	M10x45 CHc bolt	€ 2,39
19	0301406	M10x35 CHc bolt	M10x35 CHc bolt	€ 0,95
19	0301052	M10x50 CHc bolt	M10x50 CHc bolt	€ 2,37
20	0201074	f46x3 o-ring	f46x3 o-ring	€ 1,24
21	0302074	M12x10 Hc bolt	M12x10 Hc bolt	€ 3,55



Item	Part Number	Descrizione	Description	Price €
1	161425001	Scarico	Exhaust pipe	€ 369,77
2	161425002	Distanziale	Stay	€ 24,53
3	090925002	Supporto scarico	Exhaust stay	€ 172,28
4	020225009	Molla	Spring	€ 8,41
5	CM8-M8	Testa a snodo	Rod end	€ 50,51
6	DIN3852-M18X1,5	Tappo esagono incassato	Hexagon socket plug	€ 11,33
7	UNI5931-M8X25	Vite TC	CH Bolt	€ 1,93
8	DIN980-M8	Dado autobloccante trilobato	Thin Hex Nut	€ 2,00
9	UNI5589-M8	Dado esagonale basso	Thin Hex Nut	€ 2,20
10	UNI8840B-8	Rondella ondulata	Crinkle Washer	€ 1,07



Item	Part Number	Descrizione	Description	Price €
1	161525006	Kit scarico con catalizzatore	Catalytic exhaust kit	€ 1.533,46
2	161525001	Scarico con catalizzatore	Exhaust pipe with catalyzer	€ 1.093,50
3	161525003	Culla scarico	Exhaust bracket	€ 223,50
4	161525004	Supporto scarico	Exhaust stay	€ 140,00
5	020225009	Molla	Spring	€ 8,41
6	CM8-M8	Testa a snodo	Rod end	€ 50,51
7	UNI5931-M8X16	Vite TC	CH bolt	€ 1,93
8	UNI5931-M8X25	Vite TC	CH Bolt	€ 1,93
9	DIN980-M8	Dado autobloccante trilobato	Thin Hex Nut	€ 2,00
10	UNI5588-M8	Dado esagonale	Hex Nut	€ 1,92
11	UNI8840B-8	Rondella ondulata	Crinkle Washer	€ 1,07



Item	Part Number	Descrizione	Description	Price €
1	161426002	Tubo outlet intercooler	Intercooler outlet pipe	€ 247,20
2	161426003	Tubo inlet intercooler	Intercooler inlet pipe	€ 236,90
3	161426006	Cassoncino superiore	Airscoop	nd
4	090926001	Air box inferiore	Lower airbox	nd
5	090926003	Intercooler	Intercooler	€ 641,41
7	090926008	Supporto sinistro airbox	Airbox LH bracket	€ 42,41
8	090926009	Supporto destro airbox	Airbox RH bracket	€ 37,12
9	090926010	Base supporto sirbox	Airbox mounting base	€ 90,79
10	E9051	Manicotto	Silicon hose	€ 39,42
11	PUFM620X15MF	Silent block	Silent block	€ 7,11
12	SCH45	Manicotto	Silicon hose	€ 38,11
13	E4545	Manicotto	Silicon hose	€ 38,11
14	RE905145	Manicotto	Silicon hose	€ 44,73
15	ABA50-65X12	Fascetta	Clamp	€ 4,54
16	ABA44-56X12	Fascetta	Clamp	€ 4,73
17	UNI5931-M5X12	Vite TC	CH Bolt	€ 1,63
18	UNI7380-M6X16	Vite TB	BH Bolt	€ 1,63
19	UNI7380-M5X10	Vite TB	BH Bolt	€ 1,63
20	UNI7380-M6X10	Vite TB	BH Bolt	€ 1,63
21	UNI5931-M6X10	Vite TC	CH Bolt	€ 1,63
22	AST-05	K-Nut	K-Nut	€ 4,95
23	UNI8840B-5	Rondella ondulata	Crinkle Washer	€ 1,07
24	UNI8840B-6	Rondella ondulata	Crinkle Washer	€ 1,07

Item	Part Number	Descrizione	Description	Price €
1	FOUT0085001	Locking plate	Locking plate	€ 6,85
2	FOUT0085004	Play adjuster	Play adjuster	€ 25,14
3	FOUT0085005	Spacer	Spacer	€ 60,59
4	FOUT1908001	Primary bolt tool	Primary bolt tool	€ 72,85
5	FOUT0085017	Clutch plate centring pin	Clutch plate centring pin	€ 36,10



T014 TECHNICAL MANUAL

Release 3.30 (15/03/20)



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1 GENERAL INFORMATION

1.1 RELEASES

Modifications from previous release are in magenta

1.1.1 Release list:

Version	Release Date	Author	Notes
'0.00	05/04/14	Tatuus	Startup version
'0.20	08/05/14	Tatuus	First delivery
'0.60	10/06/14	Tatuus	Added: gearbox maintenance, electronics, tyres, jacking and hub drawings
'1.00	20/06/14	Tatuus	Full release
'1.10	15/11/14	Tatuus	Aero update – Oil level
'2.01	15/03/15	Tatuus	Pedal box adjustments – Damper graphs Rear suspension pickup - Channel list
'2.10	20/04/15	Tatuus	New front ballast position Gearshift reset procedure updated
2.12	01/07/15	Tatuus	Pedal box configuration updates Gearbox oil level ARD compatible ballast guidelines
2.14	Xx/yy/16	Tatuus	Brake balance update
3.01	15/02/17	Tatuus	General update
3.10	20/03/18	Tatuus	2018 edition
3.20	11/03/19	Tatuus	2019 version, FIA 8853-2016 seatbelts
3.30	15/03/20	Tatuus	2020 Edition

1.2 TECHNICAL CONTACTS

1.2.1 Chassis



Tatuus Racing Srl

Via G. Verga, 12
20863 Concorezzo (MB) - Italy
Tel: +39 039 6040828
Fax: +39 039 6041764
e-mail: tatuus@tatuus.it
Web: www.tatuus.it

1.2.2 Abarth Engine



AUTOTECNICA

Via A. Bernardi, 3
26041 Casalmaggiore (CR) - Italy
Contact: Giovanni Delfino
Tel. +39 0375 40174
Fax. +39 0375 40174
Mob. +39 349 3755920

1.2.3 Gearbox



SADEV

6, rue des Grand' Montains
85110 SAINT PROUANT - France
Tél.: +33 2 51 664268
Fax: +33 2 51 664960
E-Mail: sadev@sadev-tm.com

1.2.4 Electronic



Magneti Marelli Holding Spa Motorsport

via A. Borletti, 61/63
20011 Corbetta (MI) -Italy
Tel: +39 02 97227000
Fax: +39 02 97227570



Next Solution Snc

Via Belfiore, 31/D
23900 Lecco - Italy
Tel. +39 0341 289072
Fax +39 0341 370057
E-mail mail@nextsolution.it



AiM Srl

Via Cavalcanti 8,
20063 Cernusco sul Naviglio Milan - Italy
Tel. (+39) 02-9290571
Fax (+39) 02-92118024
E-mail : support@aim-sportline.com

1.2.5 Tires



1.2.6 Brakes



Brembo S.p.A.
Racing Business Unit
Tel: +39 035 605111
bremboracing@brembo.it

1.2.7 Dampers



ORAM Snc
via Primo maggio, 11
22073 Fino Mornasco (CO)
Tel. 031.3542268
Fax 031.3541910
p.iva 10526000152
auto@oramsospensioni.it

1.2.8 Seat belts – Fire Extinguisher



OMP Racing
via Bazzano, 5
16019 Ronco Scrivia (Ge) - Italy
Tel. +39 01096501
Fax. +39 01093569

1.3 GENERAL AGREEMENT AND WARRANTY

Tatuus is proud of the quality, success and reputation of their products and is delighted that you have chosen to use the T014 chassis.

The design of each chassis is the subject of much research and development, technical analysis and detailed testing. However, as with all motorsport products, it is vital that they are correctly maintained and adjusted for each individual circumstance. This manual is intended to ensure that you obtain the maximum performance and reliability from this chassis.

We would stress that after each event or prolonged period of running (suggested to be 5,000km) the chassis should be carefully inspected and stripped as appropriate.

This manual contains lifing recommendations for critical components detailed in section 1.6. If in doubt, please contact our Commercial Department who will advise you or if necessary put you in contact with one of our engineers.

It is important to ensure that all adjustments and tolerances are as specified. The use of parts not supplied by Tatuus will automatically invalidate any warranty or other liability which would normally be assumed by Tatuus.

Your attention is drawn in particular to the following statement:

'Goods intended for motorsport or any related application, or for product development, evaluation or experimentation are supplied subject to the Customer recognizing that such goods may operate under extreme loads and conditions and that it is the Customer's responsibility to ensure that the goods are correctly inspected, adjusted and maintained at all times to suit the specific conditions in which they may be used.'

'Lightweight and weight optimized components are supplied subject to warranty only against manufacturing defects. It is possible that in certain conditions operating life may be reduced. Similarly prototype, experimental or components manufactured to the Customer's design are supplied subject to warranty only against manufacturing defects.'

Furthermore, such components, by their very nature, are not warranted as to their suitability for use or performance.'

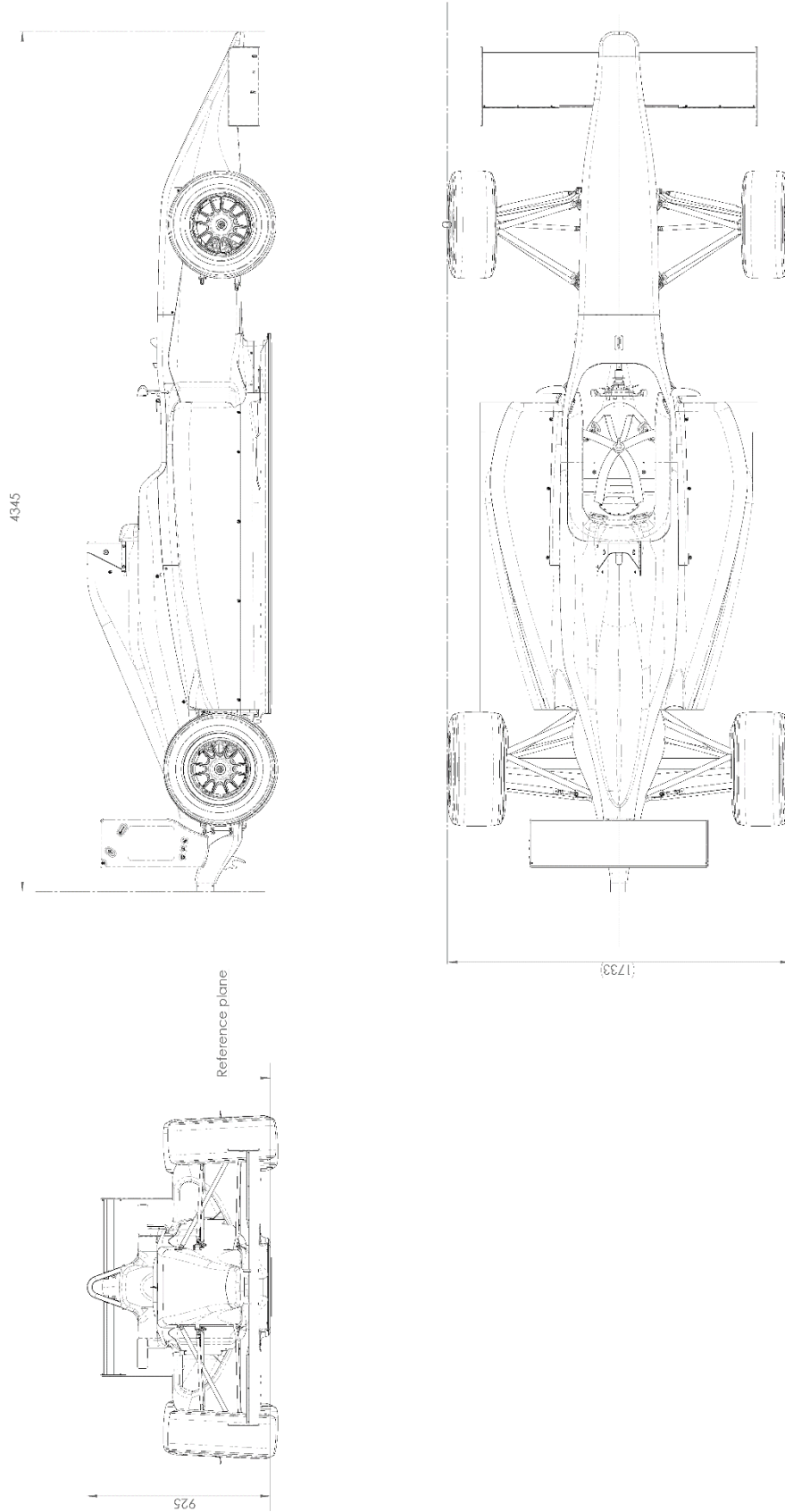
Tatuus shall have no liability to the Customer (other than liability for death or personal injury resulting from Tatuus' negligence) for any loss or damage of any nature arising from any breach of any expressed or implied warranty, term or condition of the contract or from any negligence or breach of statutory or other duty on the part of Tatuus in connection with the performance or purported performance of or failure to perform the contract other than as set out in this Condition. In no circumstances shall Tatuus be liable for any claims for indirect or consequential injury or damage (including loss of profits) arising from any such matters.'

1.4 OVERVIEW

Front track	1514 mm
Rear track	1485 mm
Wheelbase	2750 mm
Overall length	Max 4350 mm
Overall width	Max 1750 mm
Overall Height	950 mm (from reference plane)

Weight	ND (depending on engine installation/championship regulations)
Chassis	Composite Carbon fiber sandwich with Al/Nomex honeycomb, FIA F4 (Ann. J Art.274) homologated
Bodywork	Fiberglass
Front suspension	Push-rod / twin damper / spring
Rear suspension	Push-rod / twin damper / spring
Springs	Helicoidal Eibach
Dampers	Bump and rebound adjustable
Brakes	Brembo caliper and disc
Tires	Pirelli
Wheels	OZ 13"x8" front – 13"x10" rear
Engine	Abarth F414JT
Exhaust	Aros Marmitte
Electronics	ECU/GCU Magneti Marelli - Logger system AIM
Power system	Electronic Powerbox Next Solution
Gearbox	SADEV SL75 LW F4 sequential 6 ratios,
Gearshift	Magneti Marelli EGA
Steering wheel	Tatuus
Battery	DEKA ETX15L
Fuel cell	PREMIER FT3
Seat	Carbon fiber extractable shell (FIA standard).
Seat belts	OMP 6-points, 3" shoulder and lap straps, HANS compatible

1.5 GENERAL INFORMATION



1.6 LIFING CHART

The following chart should be used to ensure that component life is not exceeded and premature failures are prevented by regular inspection. Check and replace in accordance with the recommended distances below.

Mark all parts for lifing purposes and note in build records.

All parts not included in the list require inspection after 20,000km. Visual inspection should identify any part with cracks, scratches, significant wear or corrosion.

NOTES: The table below is provided for guidance on the expected life of key components based on Tatuus' experience of this product in similar applications, however no warranty is implied by figures stated above and lifing targets are no substitute for testing and regular inspection of the chassis. Check all components after any accident or abnormal usage. In doubt, replace the components.

For safety reasons, please contact immediately Tatuus if you discover premature wear or problems.

Many of the components stated above with a maximum 'typical' life of 20,000km may be found to perform successfully for extended mileage however extended running above 20,000km is done at customer's risk.

	Inspection [km]	Limit [km]
Chassis		
Survival cell	10000	20000
Front crashbox	10000	20000
Rear crashbox	10000	20000
Wheel tethers		12 months
Nosebox studs	2500	5000
Engine studs	5000	10000
Floor stays	2500	5000
Brake pedal	2500	5000
Throttle pedal	5000	10000
Front suspension		
Upright	5000	10000
Wheel bearing	5000	10000
Hubs	10000	20000
Hub bolts	2500	5000
Wheel spindle	5000	10000
Wheel nut	5000	10000
Drive pegs	2500	5000
Wishbones	5000	10000
Push-rods	5000	10000
Suspension bracket	5000	10000
Front ackermann	2500	5000
Front anti-roll bar	2500	5000
Rocker assy	5000	10000
Wheels (OZ)	10000	20000

Steering			
	Steering/toe arms	5000	10000
	Steering column	5000	10000
	Steering rack	5000	10000
	Rack/pinion	5000	10000
	Ball joint	1250	5000
Rear suspension			
	Upright	5000	10000
	Wheel bearing	5000	10000
	Outer hub	10000	20000
	Inner hub	5000	10000
	Hub bolts	2500	5000
	Wheel spindle	5000	10000
	Wheel nut	5000	10000
	Drive pegs	2500	5000
	Wishbones	5000	10000
	Push-rods	5000	10000
	Suspension bracket	10000	20000
	Bottom forward bracket	5000	10000
	Rear upright bracket	5000	10000
	Rear anti-roll bar	2500	5000
	Rocker assy	5000	10000
	Wheels (OZ)	10000	20000
Front Wing			
	Front wing	5000	15000
	Front pillars	5000	15000
Rear wing			
	Front wing	5000	15000
	Front pillars	5000	10000
	Front endplates	5000	15000
Transmission			
	Wheel shaft	5000	10000
	Slave cylinder (sealings)	5000	10000
	Release bearing	5000	10000
Gearbox			
	Gearbox internals		see SADEV
	EGA	7500	15000
	EGA rubber mounting	2500	5000

Brake system			
	Brake pedal	2500	5000
	Brake balance bar	5000	10000
	Master cylinders	5000	10000
	Calipers	5000	10000
	Oil lines	5000	10000
Cooling system			
	Radiators	5000	10000
	Water tank cap	2500	5000
	Pipelines	10000	20000
	Silicon hoses	10000	20000
Exhaust			
	Tail pipe	5000	10000
Electrical system			
	Battery	5000	10000
	Switch panel	5000	10000
	Master switch	5000	10000
	Marshall switches	5000	10000
	Chassis loom	10000	20000
	Gearbox loom	10000	20000
	Powerbox	10000	20000
	Steering wheel	10000	20000
	GCU	10000	20000
Extinguisher system			
	Extinguisher bottle		see expire date
	Extinguisher mountings	5000	10000
	Extinguisher pipelines	10000	20000
	Extinguisher CU	10000	20000
Engine lubrication system			
	Oil lines	10000	20000
	Tank filter cartridge	5000	10000
Fuel system			
	Fuel tank		see expire date
	Fuel pump	5000	10000
	Fuel filter	2500	5000
	Fuel hoses	10000	20000

2 SAFETY

This chapter enlists the Homologated Safety Devices, these parts cannot be modified or repaired without the approval of Tatuus.

2.1 CHASSIS

2.1.1 Survival cell

The survival cell is the main safety and structural component of the car and it has been approved by the FIA, great attention must be paid in checking for structural failure not later than two years after delivery from Tatuus factory, and after each major accident. Chassis must be checked and repaired by a center authorized by Tatuus.

2.1.2 Front Anti-Intrusion panel

A front anti-intrusion panel has been introduced by year 2018, it is intended to be a safety structure acting in combination with the 2018 spec Rear Impact Structure. Careful inspection shall be done after major accidents.

2.1.3 Front impact structure

Front impact structure is a safety and structural component of the car (approved by FIA crash test), great attention must be done in checking for structural failure not later than two years after delivery from Tatuus factory, and after each accident. Front nose must be checked and repaired by a center authorized by Tatuus except for the following specified exceptions:

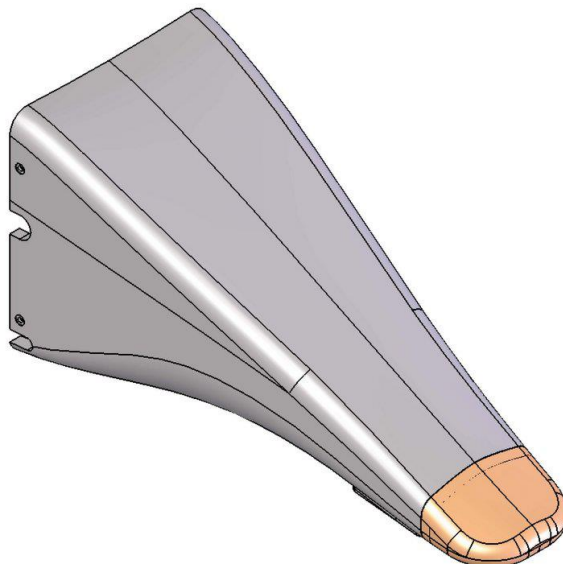
2.1.3.1 Front nose repair specification and procedure

Applicable requirements

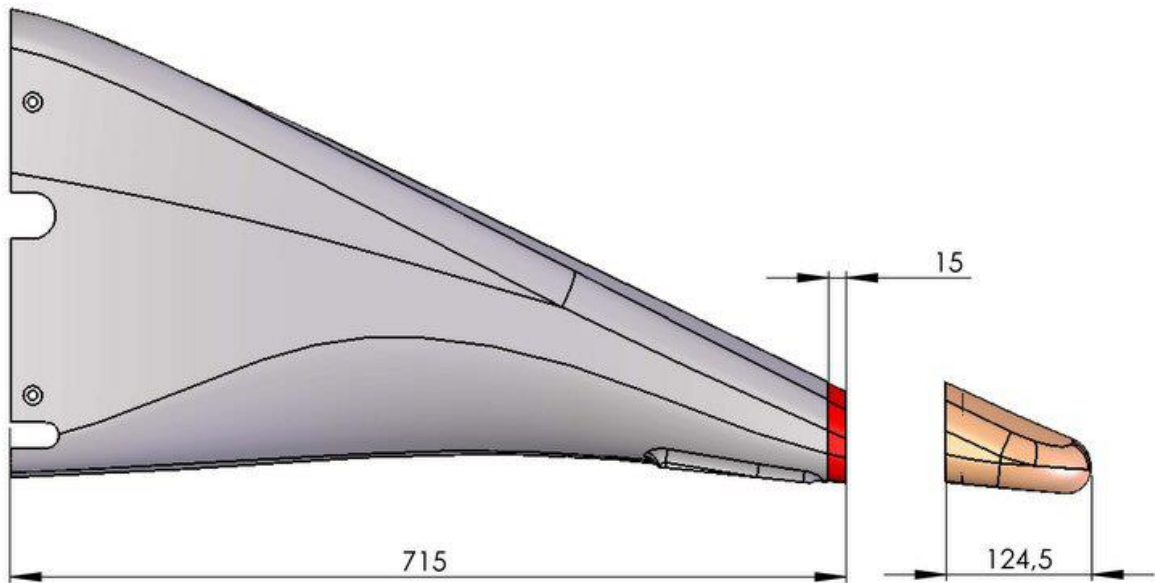
The following procedure is applicable only when the damage is contained in the first 100mm from the nose tip (715mm from the chassis bulkhead), all the other damages must be inspected by the manufacturer.

Replacement procedure

Spare nose tip is available as spare part, the reference code is 16 04 01 003 002



1. Trace a line parallel to the chassis bulkhead 715 mm from the bulkhead, you should find the line 15 mm from the old nose tip junction.
2. Cut off the nose tip forward the traced line.
3. Using sandpaper on the outer surface, reduce the thickness of the crashbox by about 1mm for a length of 15-25 mm (red area).



4. Attention must be paid to sandpaper the outer surface, at the depth of 1 mm you should find the resin between first and second ply.
5. Use sandpaper on the new nose tip inner surface to produce a rough surface that will match the outer surface of the crashbox.
6. Spread specific resin 3M 9323 over the junction surface, carefully respect the percentage between resin and catalyst:
3M 9323 Mixing specification:

	Resin	Catalyst
Weight ratio	100 g	27 g
Volume ratio	100 g	31 g

7. Position the new nose tip cleaning the excess of resin; new nose tip can be hold in position with high temperature tape.
8. Cure the assembly on the oven following the specific temperature cycle for 3M 9323: 2 hours at 60°C.

2.1.4 Rear impact structure

Rear impact structure is a safety and structural component of the car (approved by FIA crash test), great attention must be paid in checking for structural failure not later than two years after delivery from Tatuus factory, and after each accident. Rear impact structure must be checked and repaired by a center authorized by Tatuus.

The Rear Impact Structure has been upgraded by year 2018 (pn. 16 18 04 006), it is mandatory the use of this specification in combination with the 2018 Frontal Anti-Intrusion panel (pn. 16 18 01 029).

2.1.5 Steering column

The steering column has an integrated collapsible section [1] to absorb impact energy. Extreme attention must be paid on this part to avoid any damage or overload.

IMPORTANT: in case of impact the aluminum crashbox must be replaced and column carefully inspected.



2.2 FUEL CELL

Premier FT3-1999

Rubber bladders should be used for no more than 5 years after the date of manufacture, unless inspected and recertified by the manufacturer for a period of up to another 2 years.

2.3 FUEL COUPLING

Staubli SPT08.3655/L/JV
 SPT08.7655/L/JV

2.4 SEAT BELTS

OMP HANS Superleggera 6 points

FIA D-255.T798

FIA 8853-2016 Homologation SH.037.17-T-6

2.5 RAIN LIGHT

Tatuus 12x High intensity LED

A minimum of 85% of the LED's must be operational at any time.

2.6 WHEEL TETHERS

Cortex 6kJ (FIA 8864-2013 standard)

It is recommended to replace wheel tethers if:

- The cable has been on the car for more than 12 months
- Accident
- The cable has been damaged, i.e. the braid or tape have been damaged exposing the fiber
- The cable has been over-tensioned

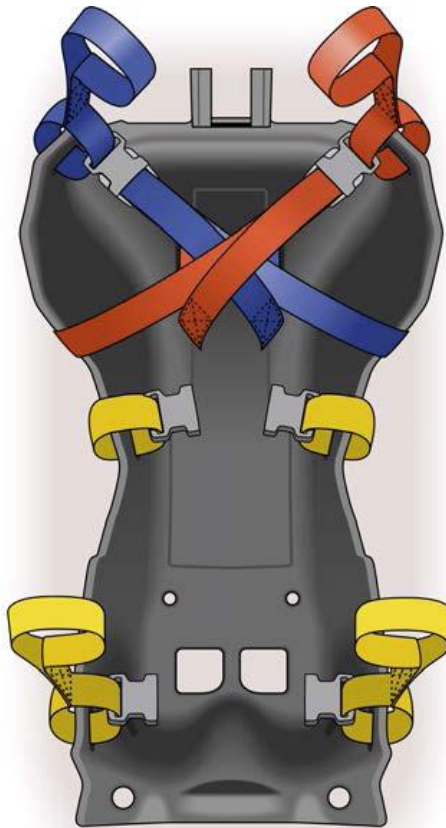
2.7 EXTRACTABLE SEAT

The seat must be removable without the need to cut any of the seat belts or remove the harness buckle.

The shoulder and lap belts must fall away over the seat edges as it is withdrawn and the crotch straps must pass freely through the seat bottom hole or holes, which must be located in front of the driver's crotch.

Any seat liner must have the same holes as the seat shell, identical and perfectly aligned with them in order to prevent the harness straps being trapped.

However, if the lap straps have to pass through holes in the seat, it is necessary to fit the car with a harness having the buckle attached to a shoulder belt, given that the buckle will not pass between the driver's body and the side of the seat.



2.8 FIRE EXTINGUISHER

Information about OMP products is also available at www.ompracing.it and www.ompamerica.com

2.8.1 Precaution for use

The extinguishing liquid is an irritant to the eyes, skin, and respiratory tracts, and is harmful if swallowed. Avoid ingestion, inhalation, contact with the eyes, and prolonged and repeated contact with the skin.

In the event of contact with the eyes, wash thoroughly with water. In the event of accidental contact with the skin, immediately wash the affected body part with plenty of soap and water.

In the event of inhalation, bring the subject to a well-ventilated area. If any signs of illness occur, seek medical assistance. In the event of ingestion, do not induce vomiting, but seek immediate medical assistance. The extinguishing liquid contains ethylene glycol.

Before every race, replace the battery in the electrical control. If the battery is dead, the system will not activate. See section 7 for replacing the battery.

Before every race, make sure that the needle on the bottle gauge is in the green zone. When the bottle gauge needle is outside the green zone, the extinguishing system is drained and must be charged.

If the bottle gauge needle is outside the green zone, contact your OMP authorized dealer to charge the system. An intact tamper-proof seal and gauge needle in the green zone ensure that the system is compliant and indicate that it is ready for use.

2.8.2 Homologation and intended use

Only use original OMP parts and components when installing the system. Using non-original components invalidates the homologation of the system and voids the warranty. CEFAL 3 and CESAL 3 extinguishing systems can extinguish a fire in the type of vehicle for which they are suited under design conditions. Nonetheless, keeping in mind the large number of variables involved in a fire that are difficult to anticipate and control, it cannot be guaranteed that this goal will be achieved under all conditions.

CEFAL 3 and CESAL 3 extinguishing systems are intended to provide protection for the vehicle occupants and not for the vehicle itself.

When the control box lever switch is in the OFF position, the extinguishing system is disabled. Check that the switch is in the ON position before using the vehicle.

The Electrical Control Unit is not water proof. If the Control Unit circuit get wet, unwanted activation of the extinguishing system might occur. Care should be taken to install the Control Unit in an area where it is protected from direct splash of water.

Before connecting the control unit to the bottle, use a multimeter to check that:

when the lever switch on the control unit is in the OFF position, when either of the activation buttons is pressed the potential difference between the ends of the wires is about 7 - 8V with the lever switch on the control unit in the ON position, when either of the activation buttons is pressed the potential difference between the ends of the wires is about 9V when neither of the activation buttons are pressed the potential difference between the ends of the wires is 0V.

(PLEASE NOTE: after pushing either of the activation buttons, potential built up in the system needs to be discharged before it gets back to zero. This can easily be achieved by touching the connectors). Before connecting the cable to the valve, switch the control unit to OFF mode.

With the control unit switch in the OFF position, connect the bottle's explosive capsule. Make sure the connector retention ring is tightly screwed onto the bottle.

If the bottle is connected with the Control Unit switch in the ON position, the system might go on. Always make sure that the bottle connector is tightly screwed before setting the Control Unit Lever Switch to ON.

With the switch still in the OFF position, press one of the two buttons and check that the LED turns on, thus indicating that the system is connected correctly.

The LED verifies the functionality of the system and turns on ONLY when the extinguisher valve is connected to the system. If the LED does not turn on after having connected the system, check the connections and/or try replacing the battery.

If the LED turns and correctly with the lever in the OFF position, your system is ready to be put into operation by moving the switch to the ON position.

2.8.3 Technical specifications

Bottle operating pressure: 16,5 Bar
Minimum pressure: 12 Bar
Maximum pressure: 18 Bar
Battery power: 9V alkaline battery
Electrical valve igniter: 9V non-polarized

Liquid extinguisher:

Name: Sabolite
Usage temperature: - 15°C / + 60°C
Appearance: red liquid
Density at 20° C: 1.07 Kg/dm³
PH: 7 ±1
Boiling point: -100°C
Biodegradability: rapidly biodegradable RO.D. 220'000 mgO₂/l
Chemical Comp. aqueous solution containing hydrocarbon surfactants, fluorosurfactants, and antifreeze agents
Ecotoxicity rapidly biodegradable
Hazardous components ethylene glycol, urea

2.8.4 Maintenance

Before every race:

Check that the pressure gauge needle is inside the green area on the scale. If the needle is not inside the green area, have the system recharged. Check that the tamper-proof seal is whole and intact. If the tamper-proof seal has been compromised, have the system checked and replaced if necessary. Replace the 9V battery that powers the system's electrical control. Put the system's electrical control unit lever switch in the OFF position and make sure that the LED on the control unit turns on, both when you push the system activation button located on the control unit, and when you push the external button located near the bottom of the windshield. If the LED does not turn on when you push either of the control buttons, check the electrical connections and/or replace the control unit battery and repeat this check. If the LED remains off contact technical support.

Before the race, put the lever switch in the ON position.

When the control box lever switch is in the OFF position, the extinguishing system is disabled. Check that the switch is in the ON position before using the vehicle.

Every 2 years:

Have OMP or an OMP licensee perform the compulsory overhaul on the bottle. The date for the first overhaul is shown on the extinguisher label.

Clean the system as follows:

- Disassemble the nozzles from their connectors and the connectors from the hose.
- Blow compressed air through the hose and into the connectors and nozzles.
- Blow the nozzles from the sprayer side toward the connector.
- Visually check that there is no rust on any of the system components. Replace all rusted components.
- Visually check the plastic and rubber on the connectors for wear. Replace any worn components.
- Reassemble the system.

After an accident not involving fire in which the system is not activated:

- check that all the fastening screws in the system are tight, especially those securing the bottle. If any of the screws have come unfastened, replace them with new ones.
- check that the bottle fasteners have not been warped in any way. If there are any deformations replace the fastening brackets.
- visually check the integrity of the hoses and orientation of the nozzles. Replace any damaged components.
- perform all the checks described in the "before every race" section.

After activation of the system when no fire was present:

- have the bottle recharged by OMP or an OMP licensee.
- clean the system as described in the section "in the event the vehicle is flooded".
- perform all checks required in the event of an accident not involving fire and in which the system is not activated.

After activation of the system when fire was present:

- have the bottle recharged by OMP or an OMP licensee
- replace the protective sheathes on the hoses.
- clean the system.
- perform all checks required in the event of an accident not involving fire and in which the system is not activated.

2.8.5 Warranty

OMP extinguishing systems are guaranteed for a period of 24 months from the date of purchase in accordance with EC Directive 99/ 44.

In countries outside the European Union, the warranty period may be different: in this case the period dictated by the law in the country in which the extinguishing system was purchased will apply.

The warranty allows you to request replacement or repair of the extinguishing system free of charge from the dealer from which you purchased the product if during the warranty period manufacturing defects arise that are not attributable to use outside that described in this instruction manual.

Extinguishing systems with a damaged tamper-proof seal will not be serviced under the warranty, as they will be considered to have been tampered with.

The warranty will be voided in the event that the extinguishing system is used incorrectly or in the event of inappropriate maintenance.

Any use of the extinguishing system that deviates from the information provided in this manual voids the warranty and relieves OMP Racing of all responsibility to the user.

Maintenance on the system must be performed by OMP or by an authorized licensee. Maintenance that deviates from the information provided in this manual voids the warranty and relieves OMP Racing of all responsibility to the user.

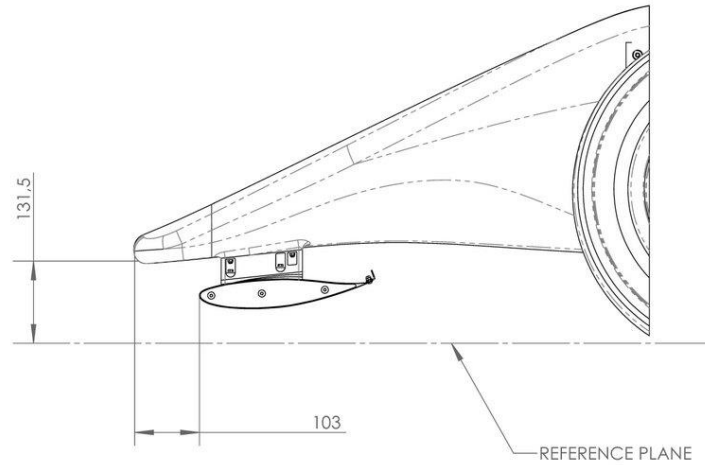
Never modify or alter your OMP extinguishing system. Alterations or modifications to the extinguishing system nullify the warranty and increase the risk of injury.

3 CHASSIS

3.1 WORKSHOP TOOLS

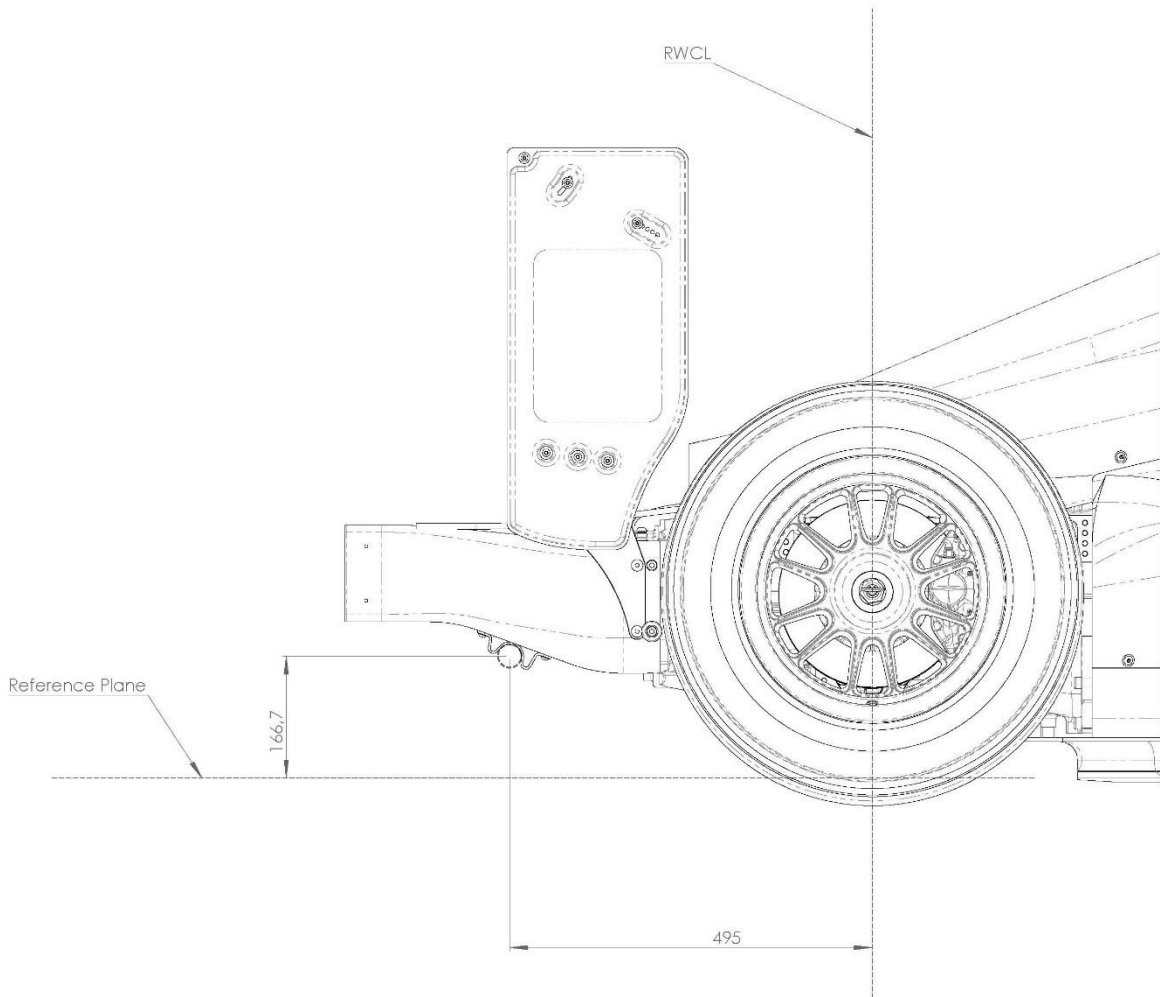
3.1.1 Front Jacking

The highlighted area is suitable to carry the weight of the car, the jack plate should fit as better as possible the underwing surface.



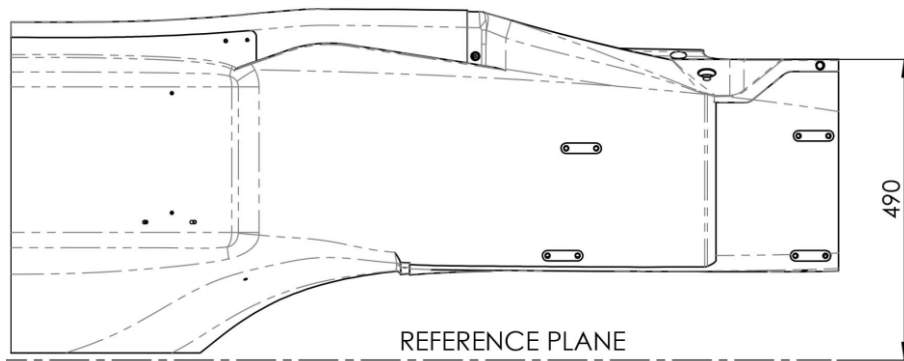
3.1.2 Rear Jacking

The highlighted jacking points are suitable to carry the weight of the car.



3.2 SETUP TOOLS

Here below some views of the main reference points



3.3 STANDARD SET-UP

Standard set-up sheet, refer to specific chapter for adjustment details:

		FRONT	REAR
GEOMETRY	Ride Height [mm]	20	40
	Camber [deg]	-3.5°	-2.5°
	Toe (Total) [deg]	+10' (out)	0'
	Rear Suspension position		BF13
SUSPENSIONS	Springs [lb/in]	600	800
	Spring preload [Turn]	0.5	0.5
	Anti-roll [mm]	11.5	8
	Anti-roll blade		
	Damper bump [0 click: full closed]		
	Damper reb [0 click: full closed]		
AERO	Wing position	3°	
	Gurney [mm]	15	--
BRAKES	Master cylinder [mm]	17,8	20,6
GEAR/DIFF	Diff Ramp on power	--	
	Diff Ramp off power	--	
	Diff plates config	--	
TIRES	Tire pressure (hot) [psi]	21	20

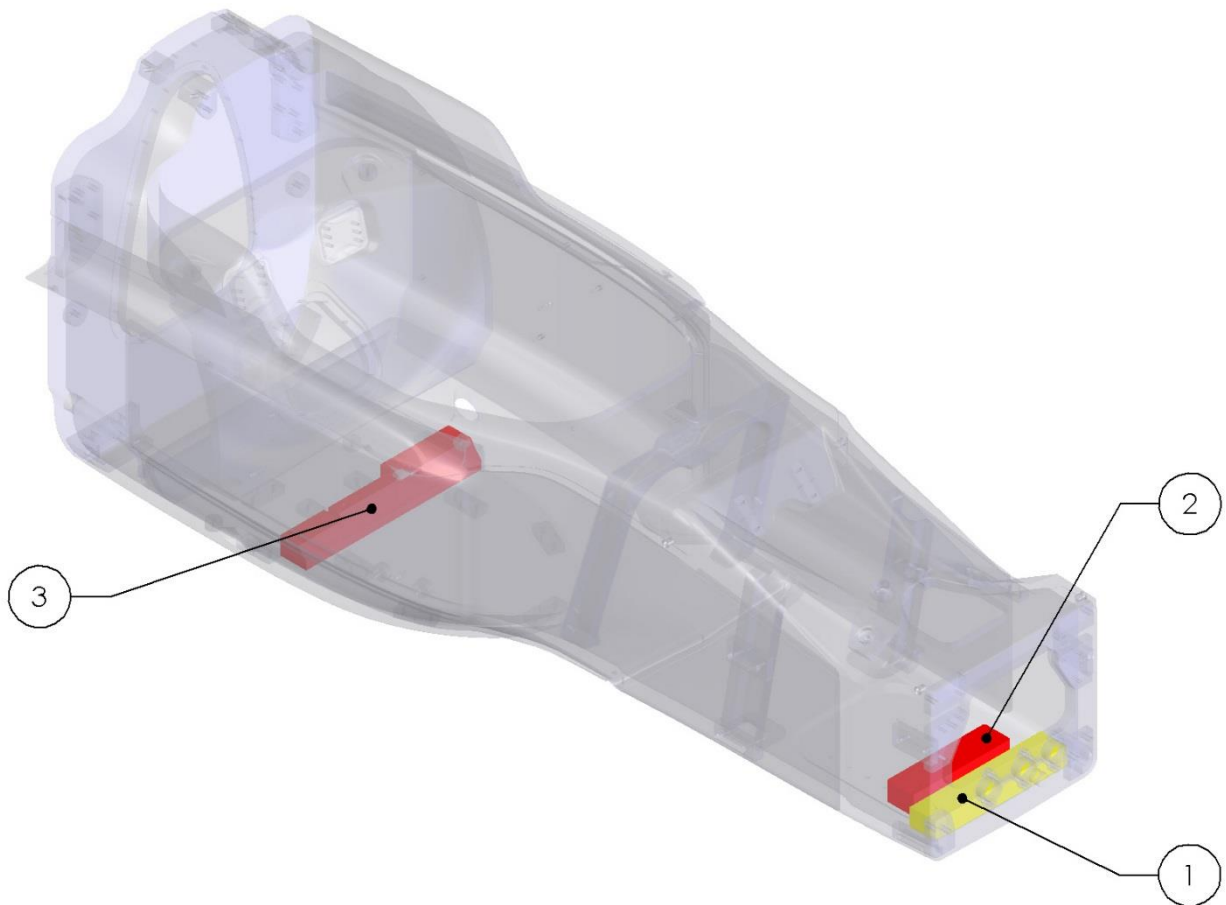
3.4 WEIGHT AND BALLAST

In order to achieve the minimum racing weight of the car it is possible to add ballast, provided it is fitted in the allowed places (see pictures below) and it is fixed in such a way that tools are required for its removal.

Ballast may be constructed from plates or machined from solid. Welding the plates together is permitted.

It is allowed to install ballast in the following prescribed positions:

1. Front ballast
2. Pedal box ballast
3. Driver seat ballast

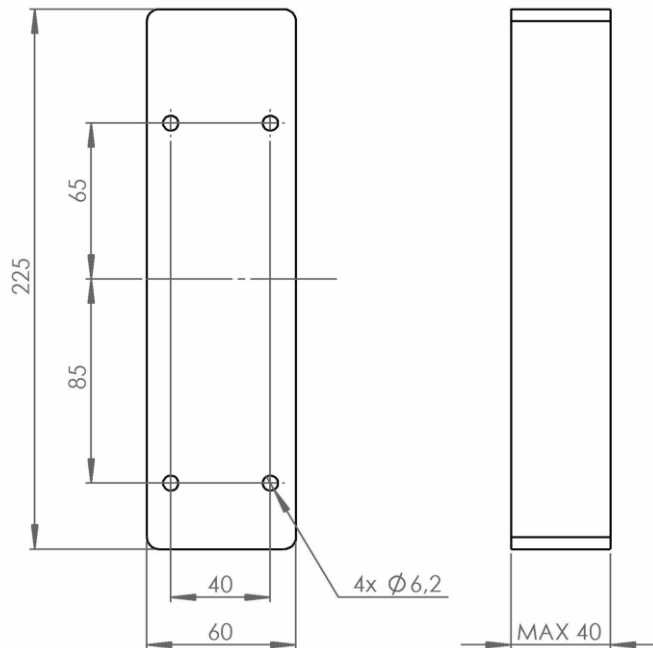
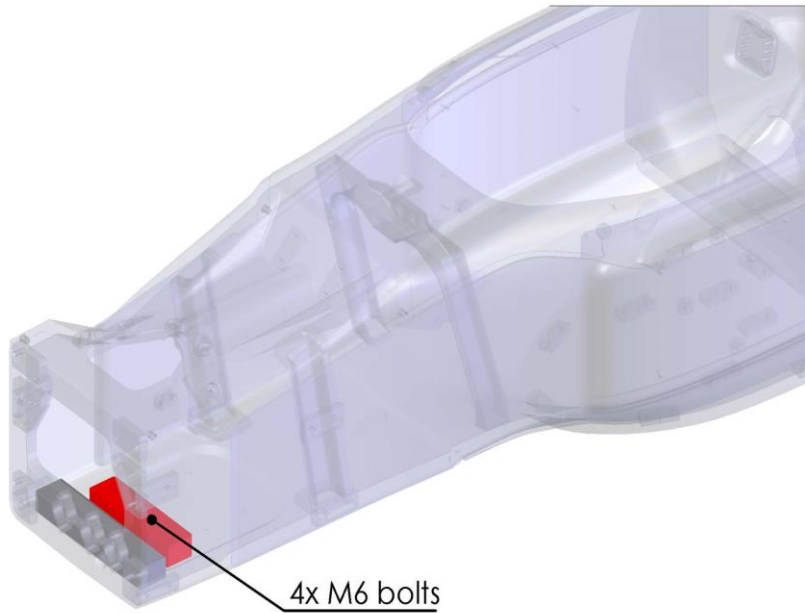


3.4.1 Pedal box ballast

Maximum 5.0 kg, fixings 4x M6 bolts. Emplacement available only for short drivers, two sets of pedal holes must be free.

WARNING: check for any possible interference between ballast and pedals or master cylinder push rods in any functional position, and any pipes and cables or connectors. It is permitted to locally modify the ballast in order to achieve the necessary 10mm min clearance to pedal parts and 5mm to pipes and cables. In the case of a very short driver, and when using the rearmost pedal bracket mounting holes, additional pedal box ballast may be added to the redundant pedal bracket holes. The minimum clearances of 10mm to pedal parts and 5mm to pipes, cables and connectors must be respected.

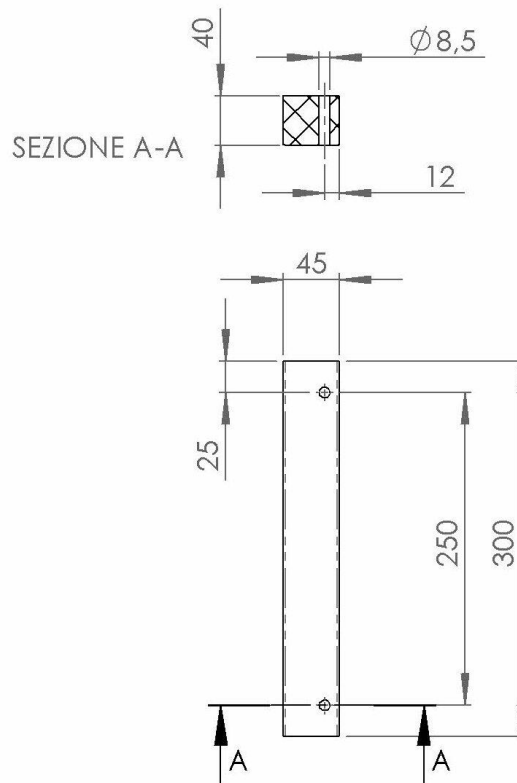
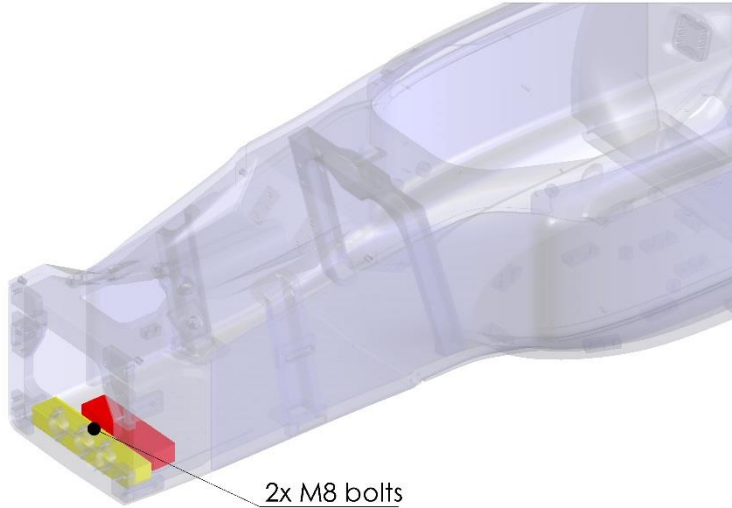
(Guide drawing of overall dimensions shown below)



3.4.2 Front ballast

Maximum 5.0 kg, fixings 2x M8 bolts. **WARNING:** check for any possible interference between ballast and pedals or master cylinder push rods in any functional position, and any pipes and cables or connectors. It is permitted to locally modify the ballast to achieve a necessary 10mm minimum clearance to pedal parts and 5mm minimum to pipes, cables and connectors.

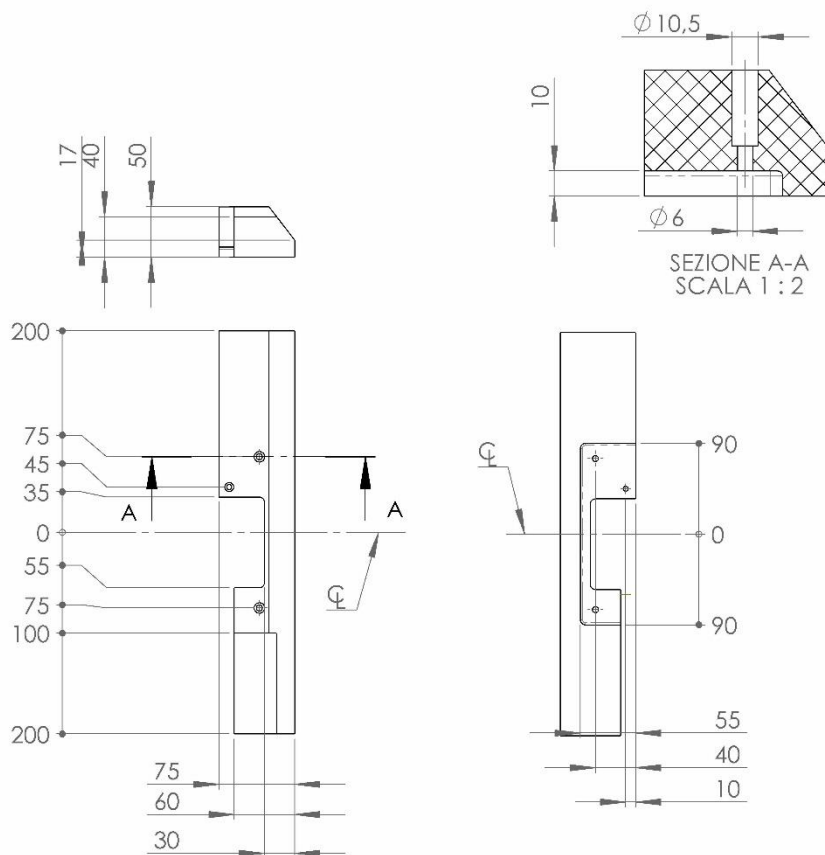
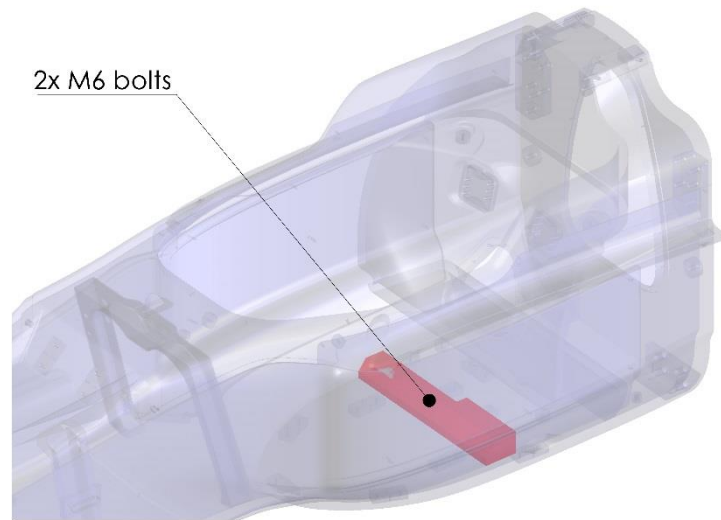
(Guide drawing of overall dimensions for ballast shown below)



3.4.3 Driver seat ballast

Maximum 10.0 kg, fixings 2x M6 bolts.

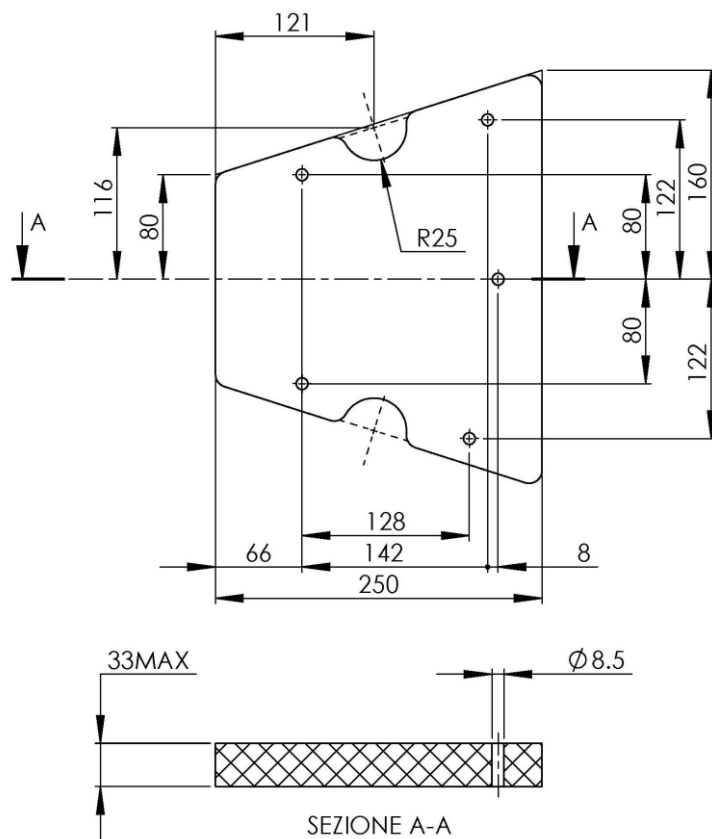
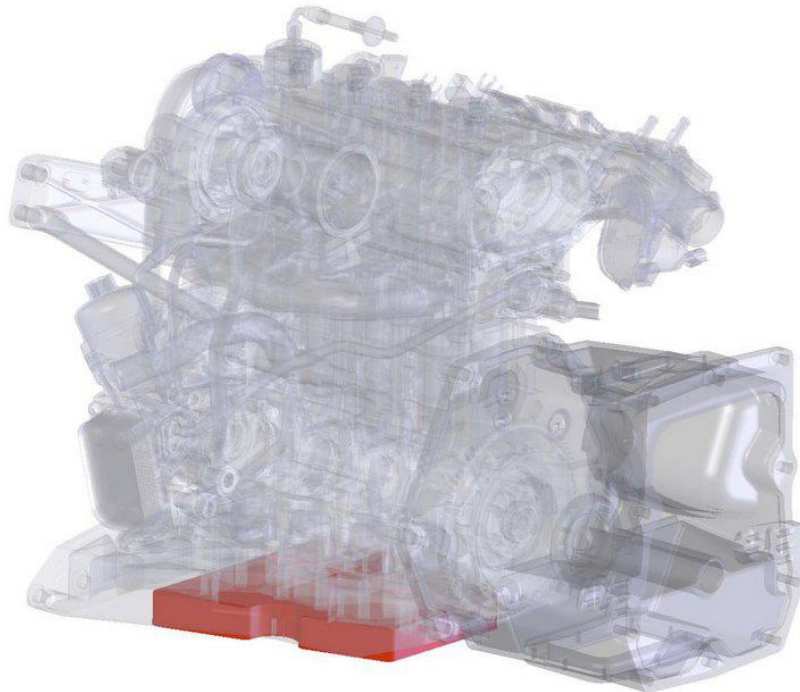
The electronic carrier plate must remain in its original position (sitting on the floor), the ballast must sit on top of this plate. It is permitted to locally modify the ballast to achieve clearance to adjacent cables and connectors. (Guide drawing of overall dimensions for ballast shown below)



3.4.4 Engine ballast

Please refer to the engine manufacturer for further details and prescriptions.

Max 20.0 kg, fixation 4x M10 bolts (Preliminary plan below)



3.5 COCKPIT

3.5.1 Commands and procedures

On the cockpit panels you can find:

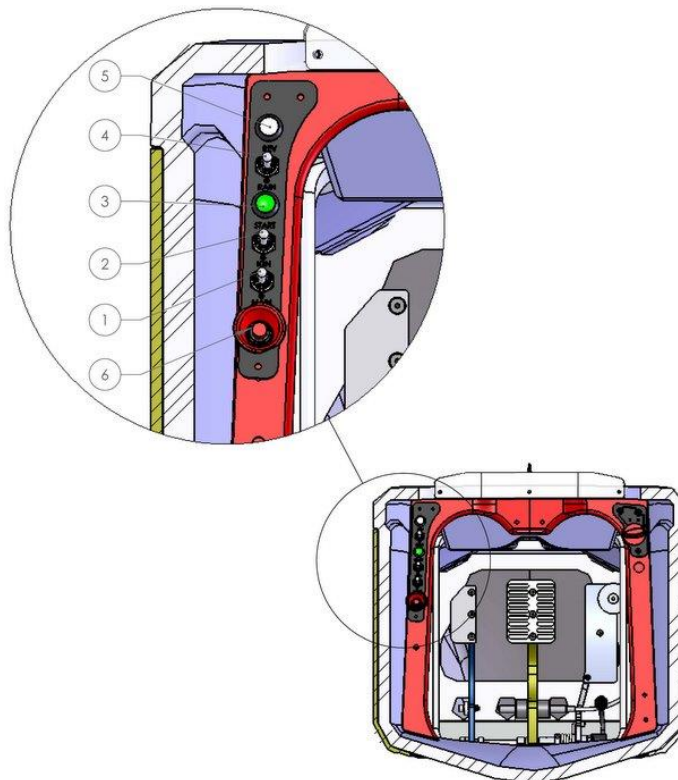
- [1] Main power switch: master switch is ON;
- [2] Ignition switch: ignition coils, injectors and alternator are powered;
- [3] Starter button (GREEN): starter motor is cranking (note that this button will crank the starter in any condition but the engine will fire up only if Ignition is ON);
- [4] Rain Light Switch
- [5] REVERSE button: this button + AKN button on the steering wheel must be operated to engage reverse gear

All the switches are ON when HIGH.

The starter button [3] can be used to crank the engine and raise up the oil pressure only if ignition switch [2] is off.

Before the engine start check to be in neutral gear, then push master switch ON [1], switch ON ignition [2], press starter button [3].

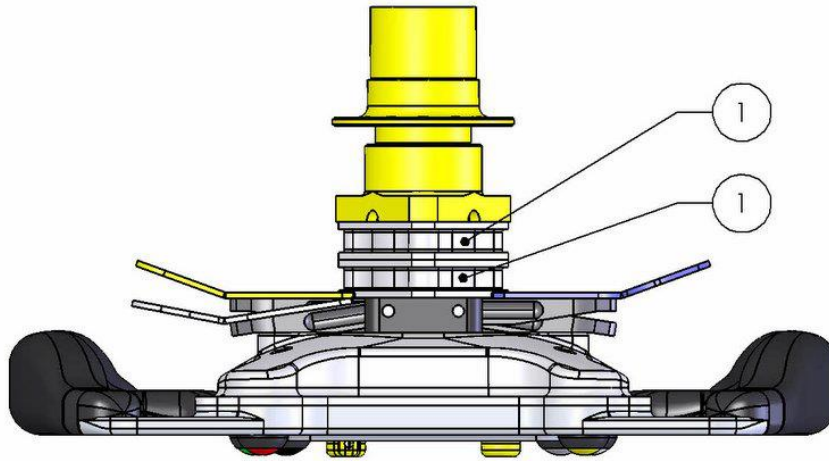
To switch off the engine it is strongly recommended to turn ignition switch OFF [2], this procedure will allow all the systems to complete the shutdown procedure.



3.5.2 Steering Wheel

Installation adjustment:

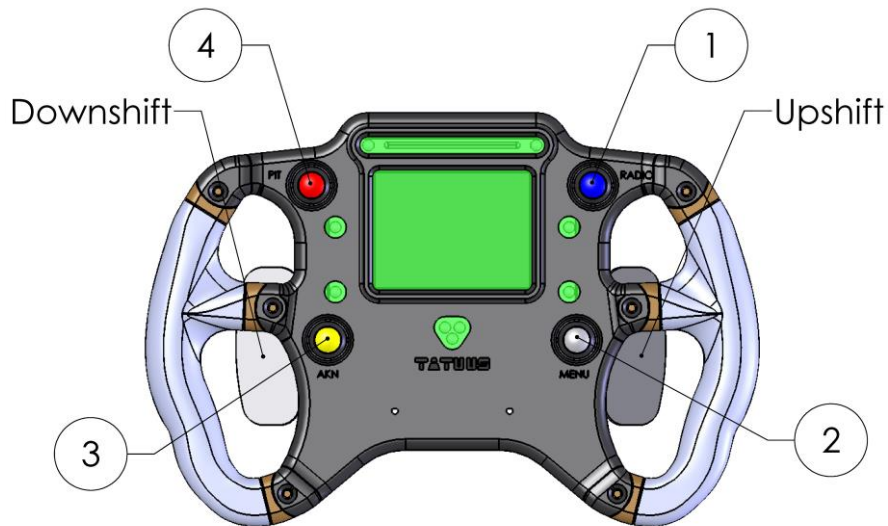
The spacers [1] allow the adjustment of driver position depth, each spacer add 13mm and can be stack up to three.



The steering wheel of the T014 is a control unit, here below input/output signals:

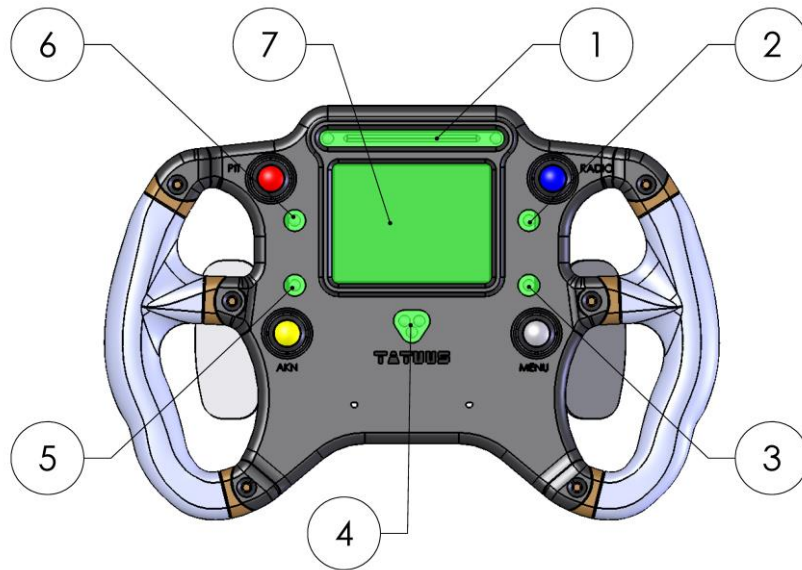
Input:

- Button #1: **Radio PTT**, the button signal is forwarded to the plug located close to the steering bulkhead right hand side (see wiring diagram for pinout).
- Button #2: **Display menu**, pushing the button for longer than 0.5 sec will enable the secondary page of the display (car sensor setting);
- Button #3: **Acknowledge**, when pushed alarm message is turned OFF (critical alarms will persist, non critical alarms will reappear at the next occurrence). This button must be pushed to enable Reverse and First gear shift;
- Button #4: **Pit Limiter**, when pushed the ECU will set engine rev limiter to control pit-line speed below 60 km/h.
- UPSHIFT PADDLE: upshift request (refer to gearshift chapter for strategies detail);
- DOWNSHIFT PADDLE: downshift request (refer to gearshift chapter for strategies detail);



Outputs:

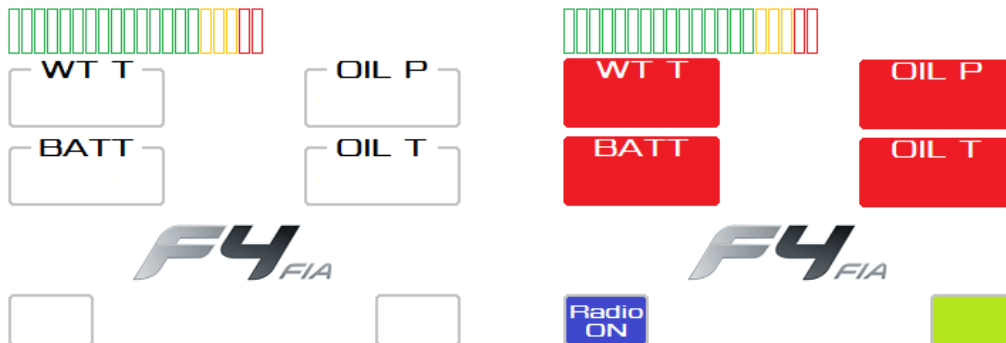
- LED strip #1: Shift lights, LED pattern is programmable only by engine manager (as function of rev and engaged gear)
- LED strip #1b: Blue LED are ON when pit limiter is engaged
- Alarm 2: Red LED are ON when radio button is pressed
- Alarm 3: nd
- Alarm 4: 3x RED LED will blink when a general alarm is on, the display will highlight the relevant value and will show a text message;
- Alarm 5: nd
- Alarm 6: nd



The first page of the display (Race page) shows the following values:

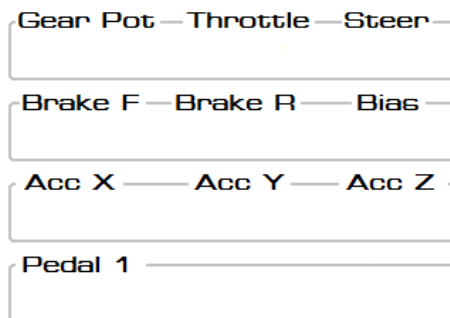
- Water Temperature
- Engine Oil Pressure
- Battery Voltage
- Oil Temperature
- Radio com: left bottom box turns blue
- Switch test: when engine off pushing buttons or pulling paddle will switch on green light on right bottom box

All the value boxes turn red when in alarm range (alarm values are set by engine control), the alarm message can be skipped pushing AKN button.



The second page (mechanic/garage) can be reached scrolling with the menu button, it shows:

- Gear pot: voltage of the gear potentiometer (see gearshift chapter for setting)
- Throttle: percentage of throttle opening
- Steer: steer sensor position in mV, install steer sensor in order to have 2500mV when wheels are straight
- Brake F/Brake R: brake pressure sensor
- Bias: brake bias measured when a pressure is applied
- AccX/AccY/AccZ: accelerometer measurements in mV
- Pedal 1: voltage of the throttle pedal potentiometer (see pedal chapter for setting)

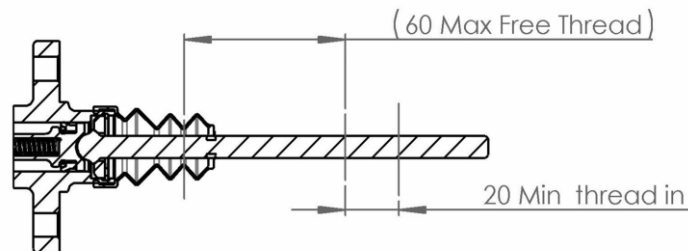
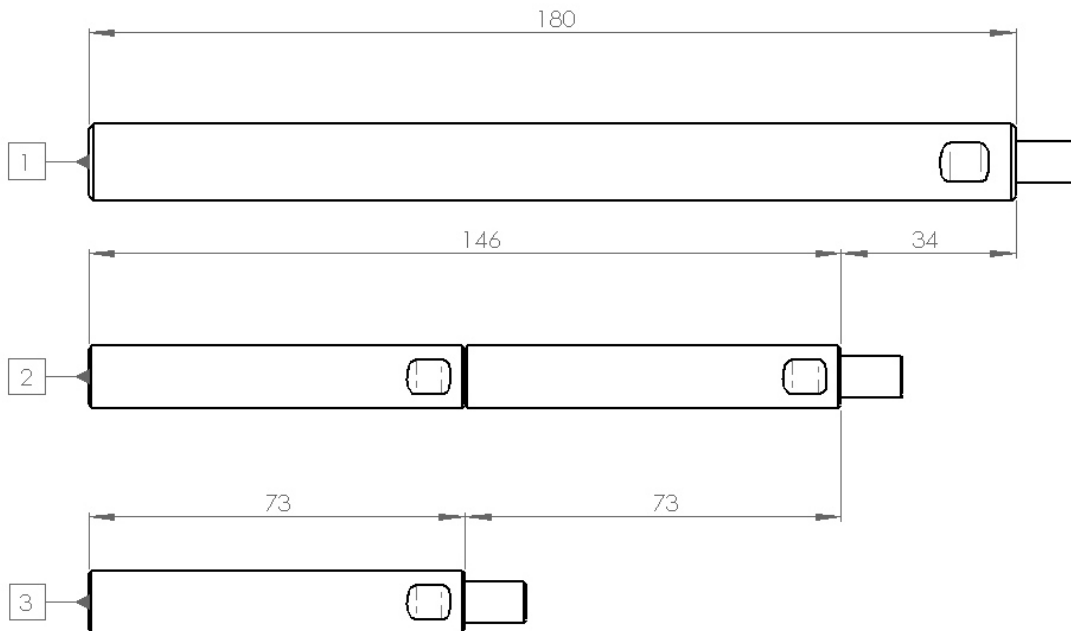


3.5.3 Pedals

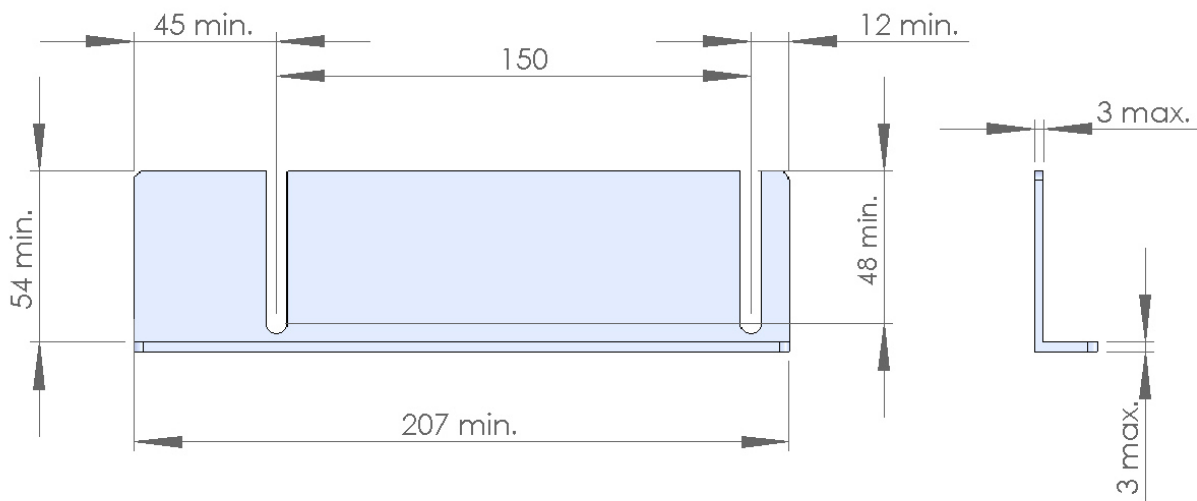
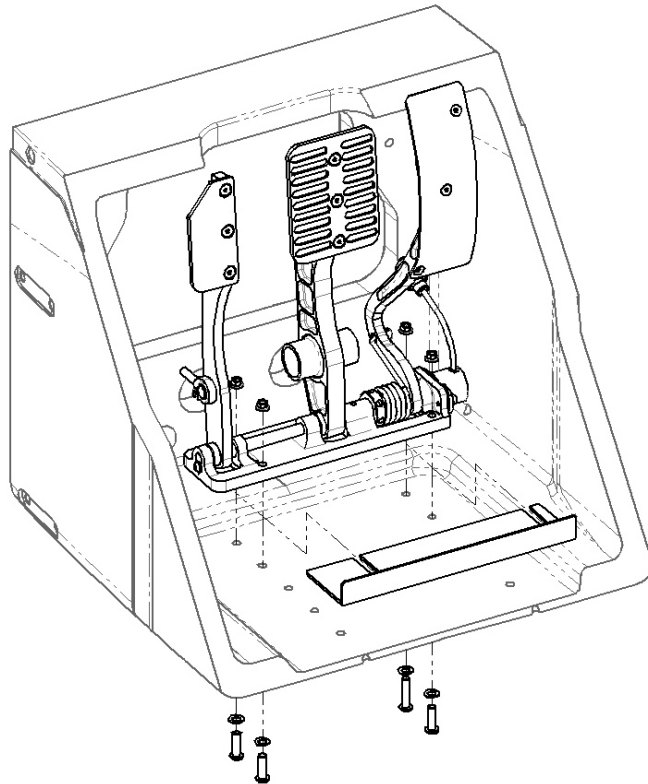
The pedal box can be adjusted in position, five positions are available in the chassis, when pedal box is moved backward the pedal rod have to be adjusted to reach the master cylinders, here below the available options:

1. Long rod (ref. 16-15-16-005): it has to be added to the AP rod, the total length of the rod must be shorter than 330mm. The AP rod must be shorter than 100mm (max 60mm free thread).
2. Medium rod (2x ref. 08-06-16-009) two aluminum rod 08-06016-009 can be stacked (it must be carefully checked the planarity of the connection between the rod surfaces), the assembled rod is then tight over the AP rod, the total length of the rod must be shorter than 280mm. The AP rod must be shorter than 100mm (max 60mm free thread).
3. Short rod (ref. 08-06-16-009) one aluminum rod 08-06016-009 has to be added to the AP rod, the total length of the rod must be shorter than 210mm. The AP rod must be shorter than 100mm (max 60mm free thread).
4. No extension rod: the original AP master cylinder rod can be kept, (overall length AP rod plus bracket about 180mm)

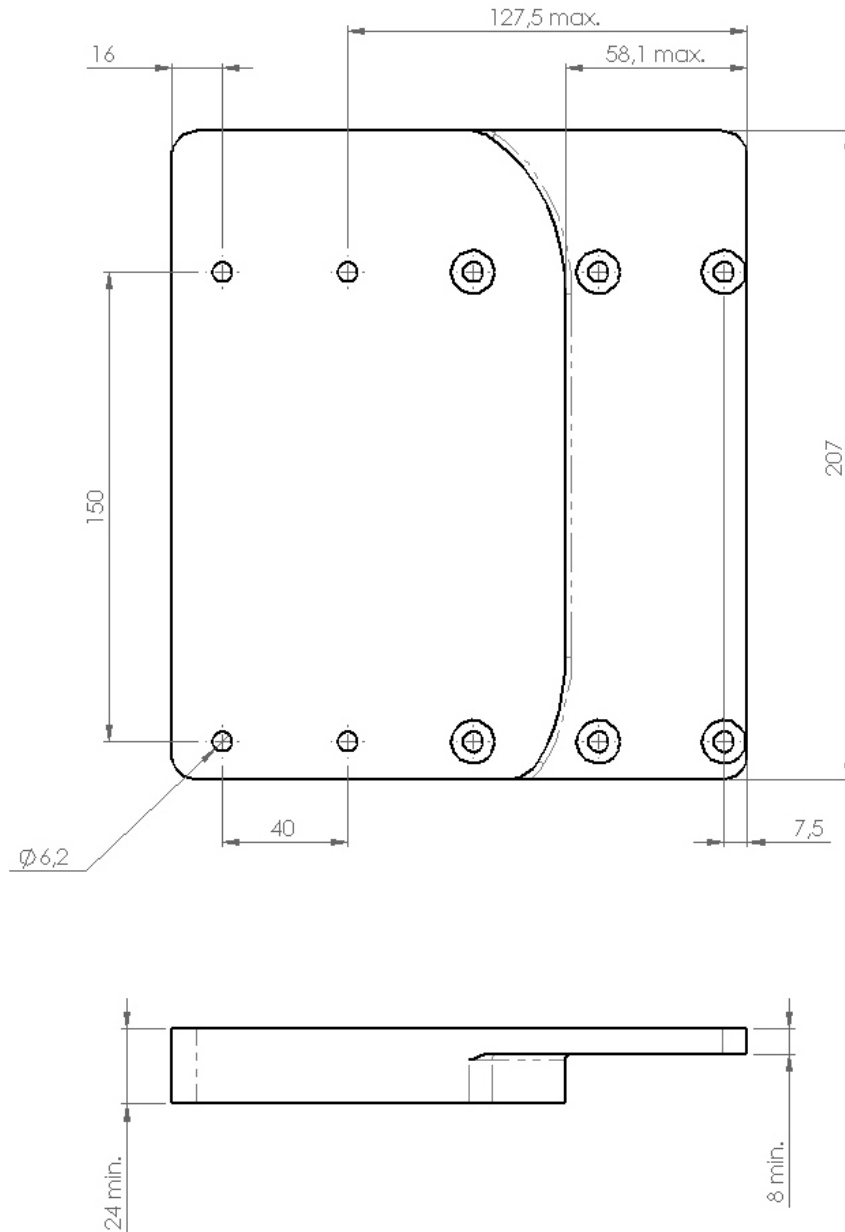
(Replacement AP rods are ref AP 2142-22)



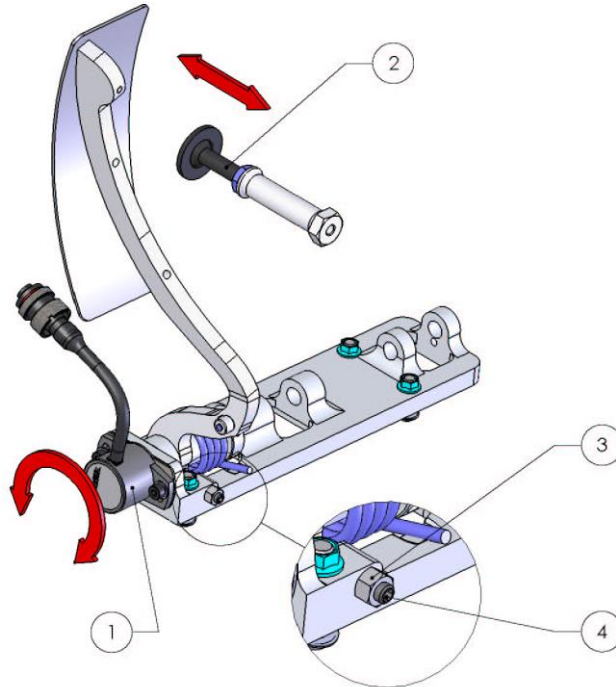
An aluminum heel rest plate can be added, here below a guideline sketch:



For very short driver customers are allowed to manufacture a pedal plate in order to shift backwards the pedal box, here below the guidelines:



The throttle pedal potentiometer has to be set in order that when the pedal is in the idle position the voltage is set according to the following table:

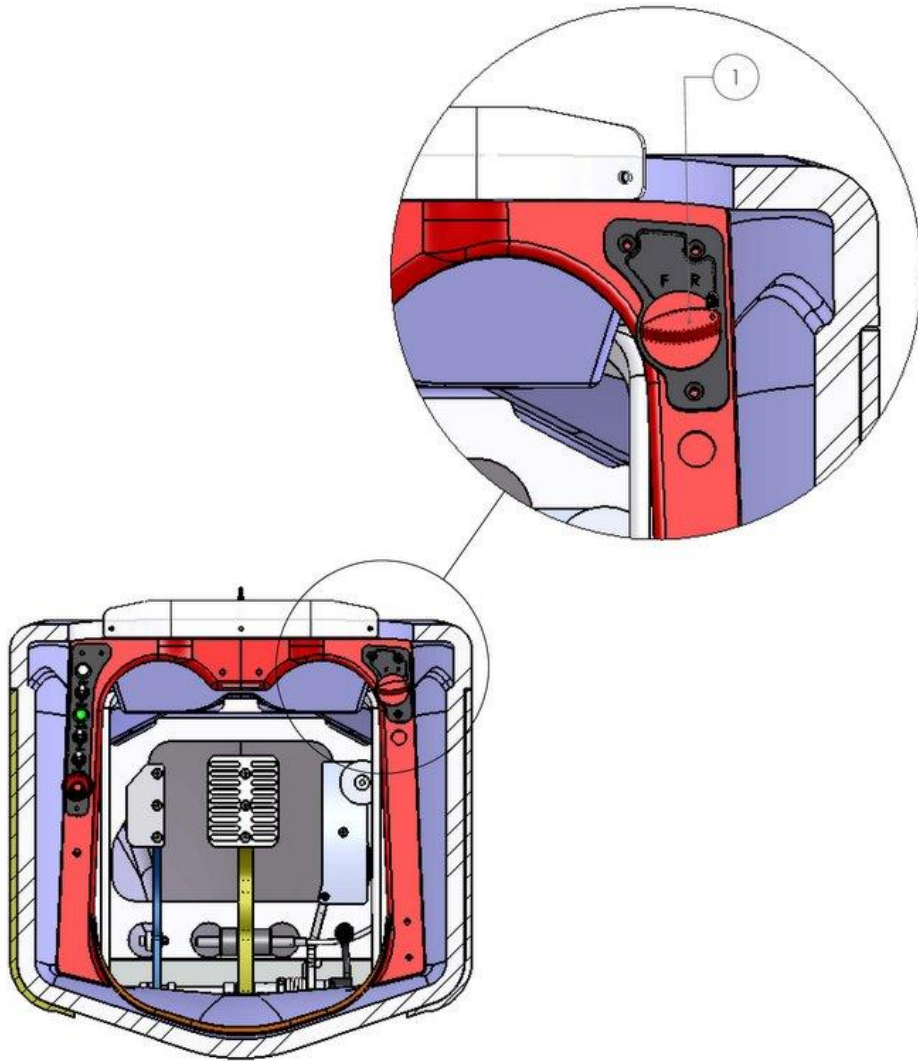


Pedal 1 (ECU_TPS_1) must be less than 1.2 V when throttle pedal is resting and must be more than 2.0 V when throttle pedal is at full stroke.

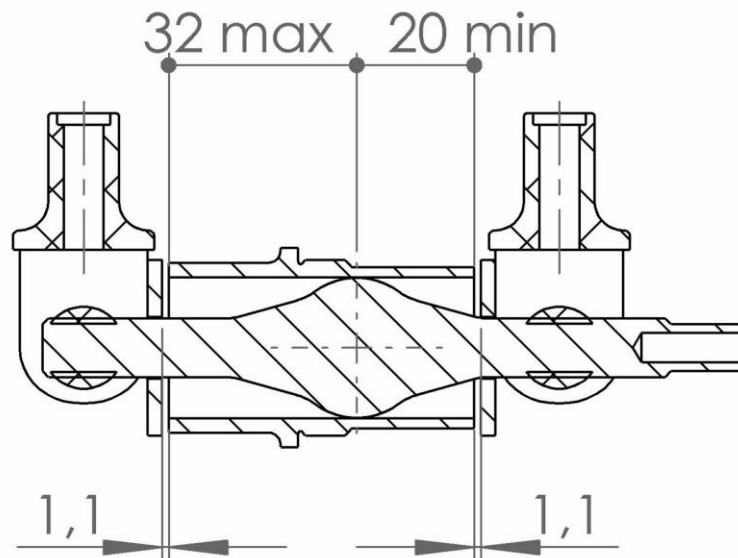
Pedal released	Full stroke
0.6 V < Pedal 1 (ECU_TPS_1) < 1.2 V	2.0 V < Pedal 1 (ECU_TPS_1) < 4.0V

3.5.4 Brake Bias

Brake bias can be adjusted by the knob located on the top right corner of the cockpit, rotating the knob counter-clockwise will shift brake balance toward front.



It is recommended to leave about 2.2mm total free play between pedal bush and master cylinder rod bushes.



An excessive brake balance shift toward one of the axles, or an excessive asymmetry in master cylinder rod, could result in an abnormal wearing of the balance bar, if some groove is appearing on the bar the part must be immediately replaced.

It is recommended to not exceed 4 complete turn of the brake bias knob from centre position (about 8% unbalance), in case of higher unbalance it is recommended to change master cylinder size.

It is recommended to inspect the part every 5000km and replace the balance bar (161815005) every 10.000 km.

4 AERODYNAMIC

4.1 GENERAL NOTES

Drag [SCx]: total drag (including wheels) of the car resolved to the tire contact point.

Downforce [SCz]: total downforce generated by the car, excluding wheel lift.

Front downforce: downforce acting at the front contact patches.

Rear downforce: downforce acting at the rear contact patches.

Balance %F: percentage of the total downforce acting at the front contact patches.

$E = L/D$: vehicle efficiency

All dimensions are full scale

All forces are reported as percentage from the datum point measurements (or its extension, see chapter 5.15.1).

Aerodynamic loading is a function of atmospheric conditions:

- 5°C increase in ambient temperature from ISA conditions result in a 2.7% reduction in aerodynamic forces.
- 10 mbar increase in air pressure from ISA conditions results in a 1% increase in aerodynamic forces.
- 50% increase in humidity from ISA conditions results in a 0.3% reduction in aerodynamic loading.

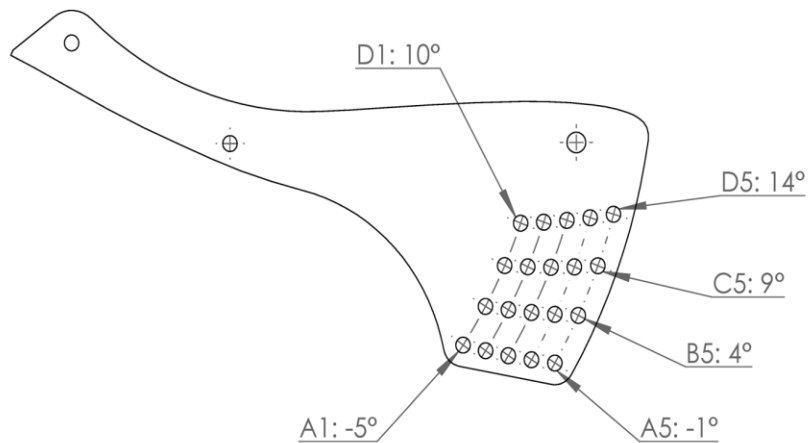
4.2 FRONT WING SETTING

Front flap angle is adjustable with shim:

- 16 14 04 035 FW adjuster 3°
- 16 14 04 015 FW adjuster 5°
- 16 14 04 032 FW adjuster 7°

4.3 REAR WING SETTING

Rear flap angle is adjustable via plates:



	1	2	3	4	5
A	-5°	-4°	-3°	-2°	-1°
B	0°	1°	2°	3°	4°
C	5°	6°	7°	8°	9°
D	10°	11°	12°	13°	14°

4.4 AERODYNAMIC REFERENCE SETUP

Aerodynamic baseline setup (datum):

Front Ride Height: 15 mm
 Rear Ride Height: 20 mm
 Front Wing angle: 3°
 Rear Wing angle: 8° (C4)

At the datum point aerodynamic coefficients will be:

Scz = 100%
 Scx = 100%
 %F = 40%

4.5 RIDE HEIGHT SENSITIVITY

The following table report the percentage changes from the datum point resulting from the change of 5mm in the ride height:

	SCz	SCx	%F
DFRH (-5mm)	+0.40%	-0.30%	+2.90%
DRRH (+5mm)	+1.90%	+0.60%	+0.70%

4.6 FRONT WING SENSITIVITY

The following table report the percentage changes from the datum point resulting from the change of front wing angle:

	SCz	SCx	%F
3°	+0.00%	+0.00%	+0.00%
5°	+1.00%	+1.40%	+6.40%
7°	+2.50%	+2.40%	+10.70%

Adding the front gurney (ref. 16 14 04 023/024) will result in the following changes:

	SCz	SCx	%F
16 14 04 023/024	+10.20%	+0.91%	+13.20%

4.7 REAR WING SENSITIVITY

The following table report the percentage changes from the datum point resulting from the change of rear wing angle:

	SCz	SCx	%F
DRW (1 deg)	+1.10%	+0.70%	-0.64%

5 SUSPENSIONS

5.1 MEASUREMENT STANDARD

REFERENCE PLANE: it is the plane where skid plank (16 14 02 015) and wooden floor (16 14 02 016) are in contact, the skid plank is then the only suspended part of the car sitting below this plane.

RIDE HEIGHT: it is measured at the intersection between the vertical plane passing through the axle and the vehicle center line. Zero when reference plane is coincident with ground, positive change when the car is raised.

TOE: Zero when wheels are parallel, positive change when toe-out.

CAMBER: Zero when wheels are vertical, positive change when the top of the wheel is outward

CASTOR: Zero when steering axis is vertical, positive change when the contact patch is behind the intersection of steering axis and ground.

5.2 SETUP ADJUSTMENTS

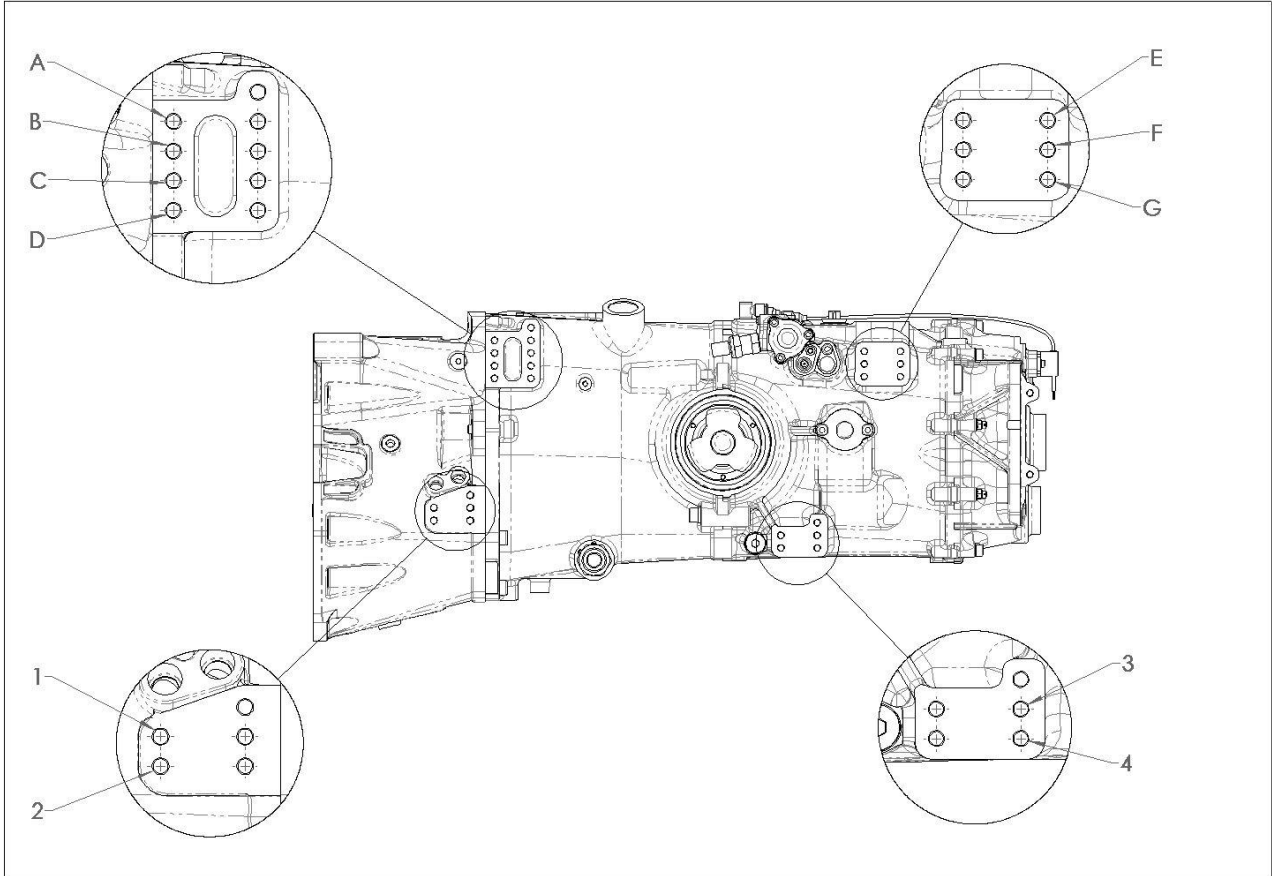
		FRONT	REAR
RIDE HEIGHT +1 turn push rod adjust.	Pushrod	+2.25mm	+2.25mm
	RH	+5.1mm	+6.6mm
CAMBER Shim +1mm		0.31° (3.2 mm/°)	0.25° (4.0 mm/°)
TOE (TOTAL) +1 turn rod adjuster		1.28°	1.64°
Wheel/Damper ratio		1.21	1.31

5.3 FRONT PICK-UP

Pick-up position	RC height [mm] @ 20mm FRH	Camber derivative [°/10mm]	Anti-dive [%]
Standard	15	0.04	27

5.4 REAR PICK-UP

The rear wishbones can be installed on different pick-up points, only the point combinations listed on the table below can be used.



The following table summarizes the anti-effects that can be set changing the rear pickup points, the roll center height is measured from the ground for a static rear ride height of 35mm. Only the combinations listed in this table are allowed.

Pick-up position	RC height [mm] @ 35mm RRH	Camber derivative [°/10mm]	Anti-squat [%]	Anti-lift [%]
AE-13	27	0.09	49	46
AF-13	37	0.13	71	38
BE-13	32	0.11	25	55
BF-13	42	0.16	47	47
BG-13	52	0.2	69	38
CF-13	47	0.18	24	55
CG-13	57	0.23	46	47
DF-13	52	0.2	2	64
DG-13	61	0.25	23	56
AE-14	-3	0.03	64	72
AF-14	8	0.08	86	63
BE-14	2	0.05	40	81
BF-14	13	0.1	62	72
BG-14	23	0.15	84	63
CF-14	18	0.13	39	81
CG-14	27	0.17	60	72
DF-14	23	0.15	17	89
DG-14	33	0.2	39	81

5.5 VERTICAL STIFFNESS

5.5.1 Front vertical stiffness

The table below resumes stiffness options available and relevant stiffness at the wheel:

Spring stiffness [lb/in]	600	800	1000
Ground stiffness [daN/mm]	7.4	9.8	12.2

Springs can be preloaded acting on the damper/spring platform, the pitch of the thread is 2mm.

5.5.2 Rear vertical stiffness

The table below resumes stiffness options available:

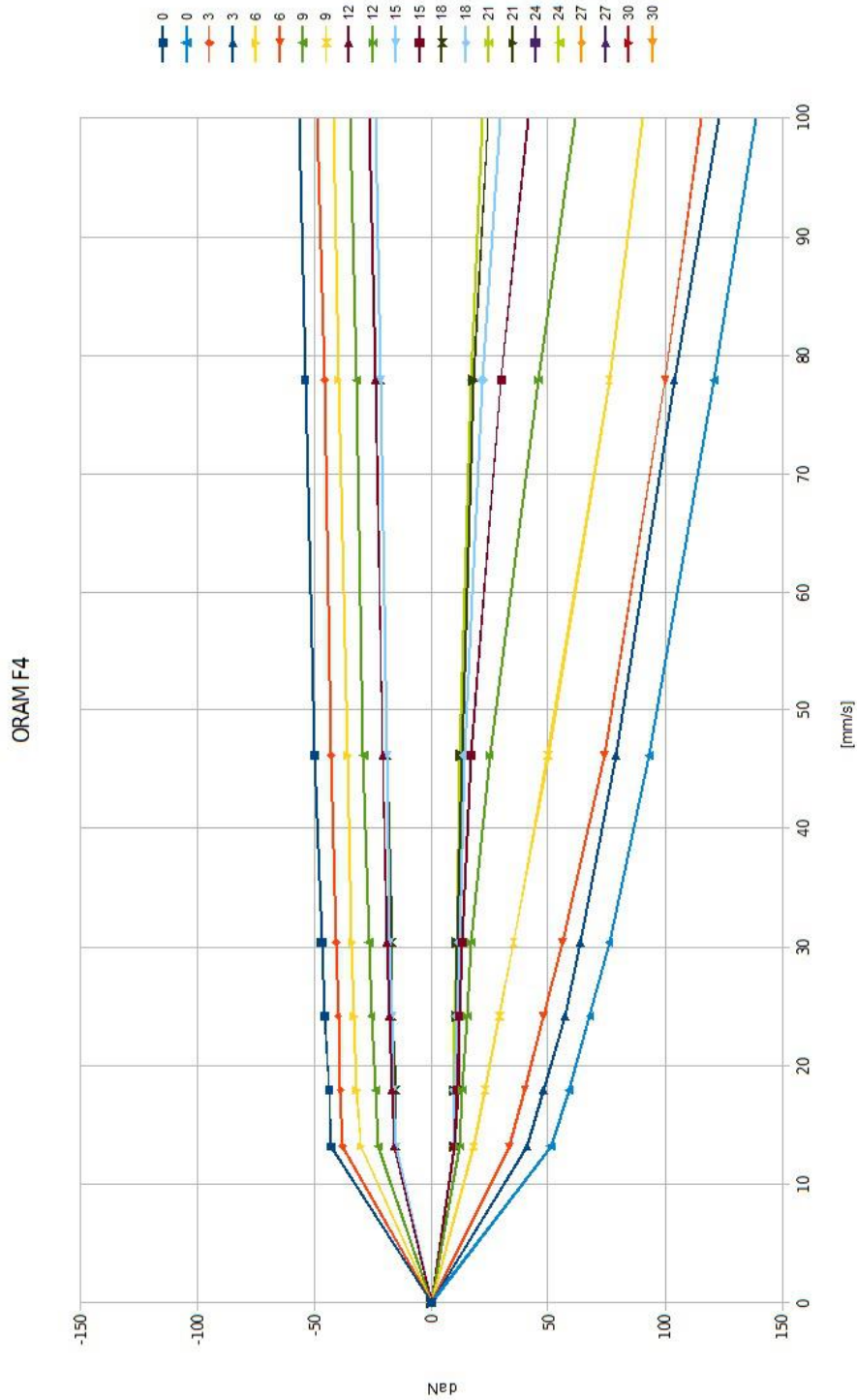
Spring stiffness [lb/in]	600	800	1000
Ground stiffness [daN/mm]	6.3	8.3	10.4

Springs can be preloaded acting on the damper/spring platform, the pitch of the thread is 2mm.

5.6 DAMPERS

The adjustment of front and rear dampers is identical, please note that wheel to damper ratio is different front and rear.

Here below damper graphs (compression negative, extension positive):



5.7 ROLLING STIFFNESS

5.7.1 Front roll stiffness

The motion ratio of the front anti-roll bar is:

$$\phi_{\text{Anti-rollbar}} / \phi_{\text{Chassis}} [^{\circ}/^{\circ}]: 10.9$$

The ratio represents the torsion angle of the antiroll bar resulting from a roll of 1° on the chassis.

The following table summarizes anti-roll bar options available:

Rollbar diameter [mm]	11.5	13.5
ARbar Torsion stiffness [daN*m/°]	1.73	3.29
Roll stiffness (@ ground) [daN*m/deg]	205	389

5.7.2 Rear roll stiffness

The motion ratio of the rear anti-roll bar is:

$$\phi_{\text{Anti-rollbar}} / \phi_{\text{Chassis}} [^{\circ}/^{\circ}]: 9.3$$

The ratio represents the torsion angle of the antiroll bar resulting from a roll of 1° on the chassis.

The following table summarizes anti-roll bar options available:

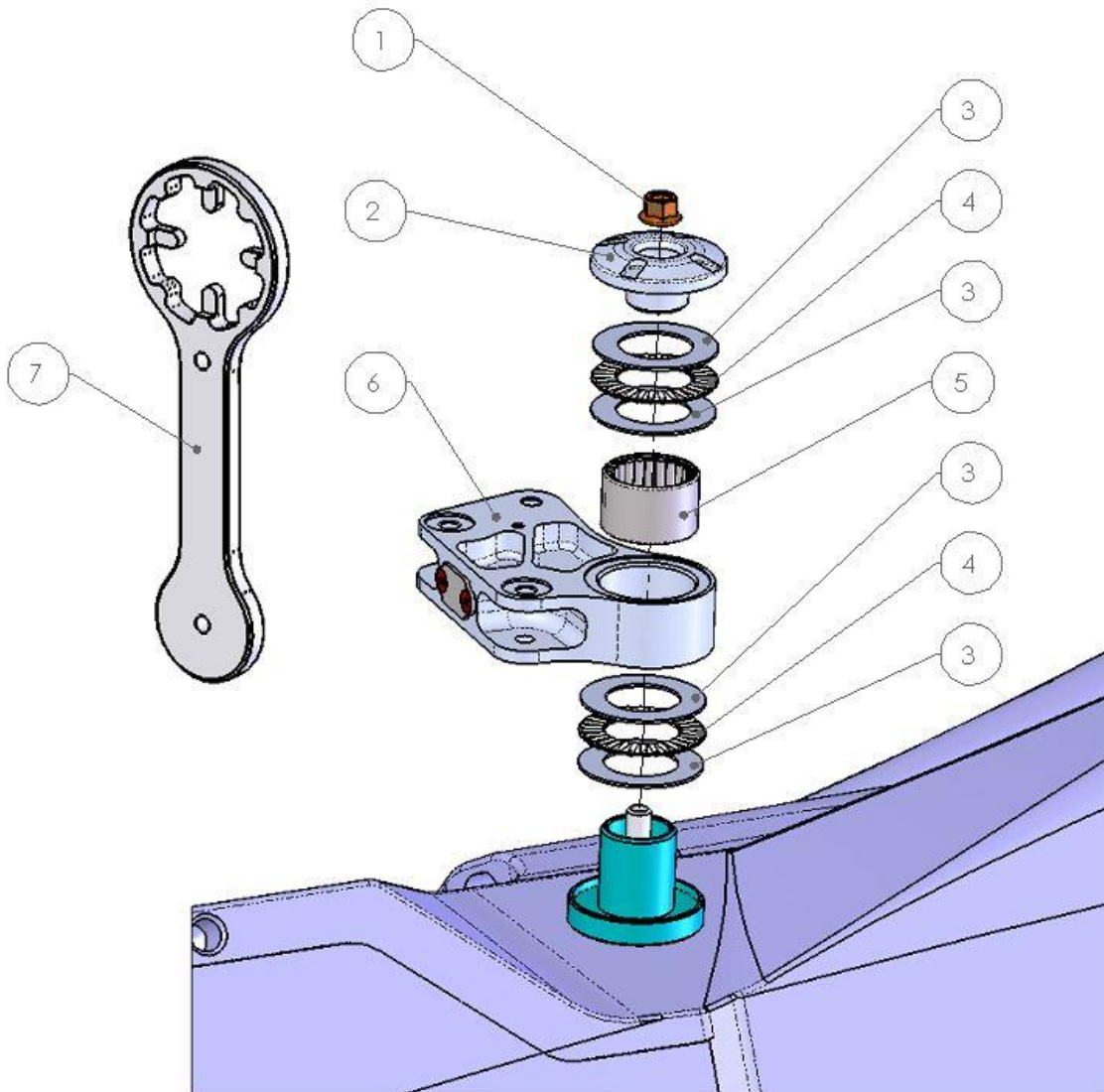
Rollbar diameter [mm]	8	10.5
ARbar Torsion stiffness [daN*m/°]	0.61	1.82
Roll stiffness (@ ground) [daN*m/deg]	53	156

5.8 SUSPENSION MAINTENANCE

5.8.1 Rockers maintenance

Front and rear rockers should be regularly adjusted to reduce play or locking, here below you can see the stacking sequence.

The rocker cap [2] should be tightened up to the disappearance of any free play (special tool 7), the counter nut [1] is then locking the stack.



6 STEERING

6.1 STEERING GEOMETRY

Pinion primitive diameter: 19.0 mm

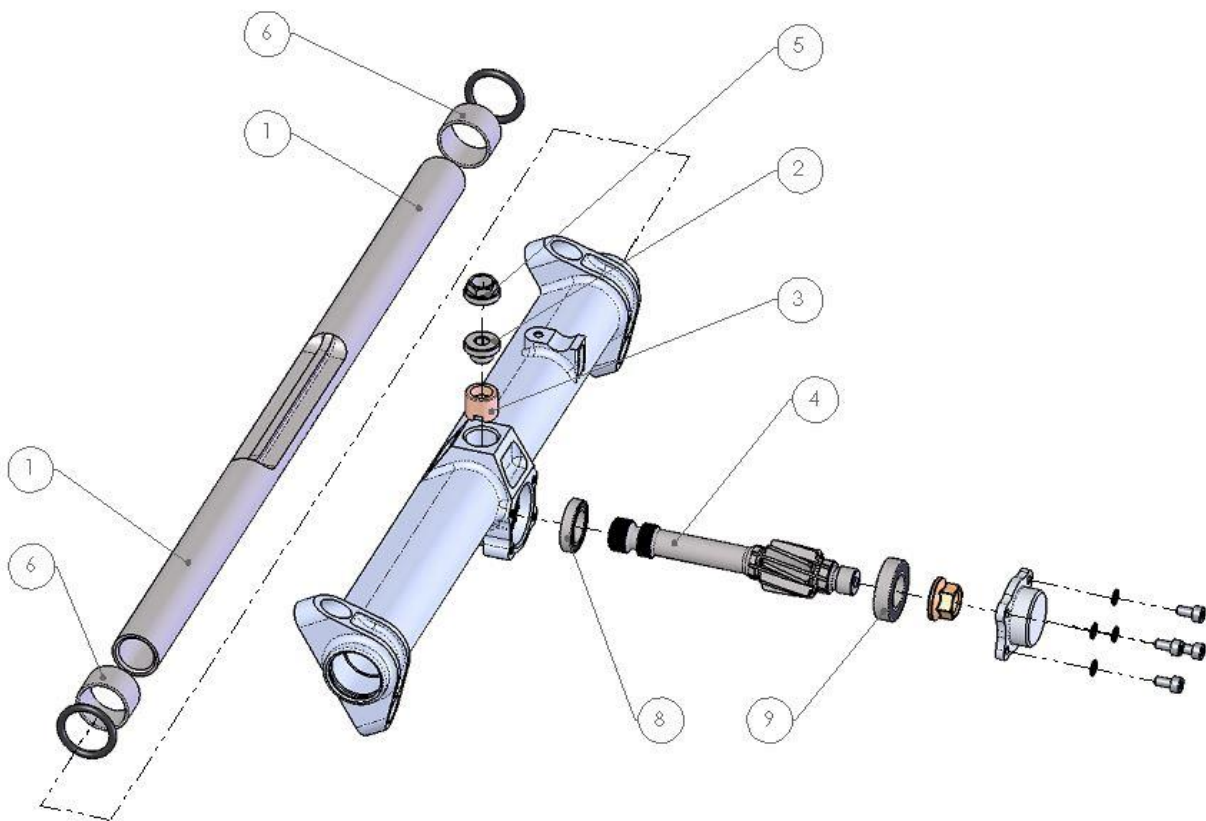
Steering ratio: 10/1 (steering wheel/wheel)

Ackerman: 29%

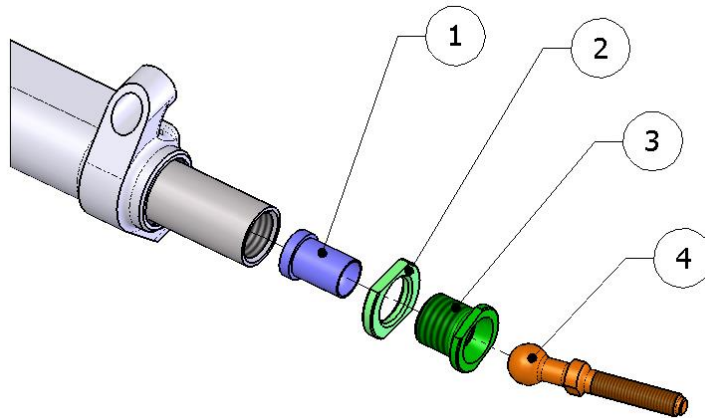
6.2 STEERING MAINTENANCE

The steering rack must be periodically inspected:

- rack pinion play [1]: the preload can be set acting on the bush [2], its position should be regularly inspected to follow system wearing, periodically inspect bush [3];
- pinion [4]: regularly inspect and lubricate;
- bearings [8-9];



Rack end assy [4]: allow some preload [2-3] to avoid any freeplay during the setting up, periodically change the bush [1].



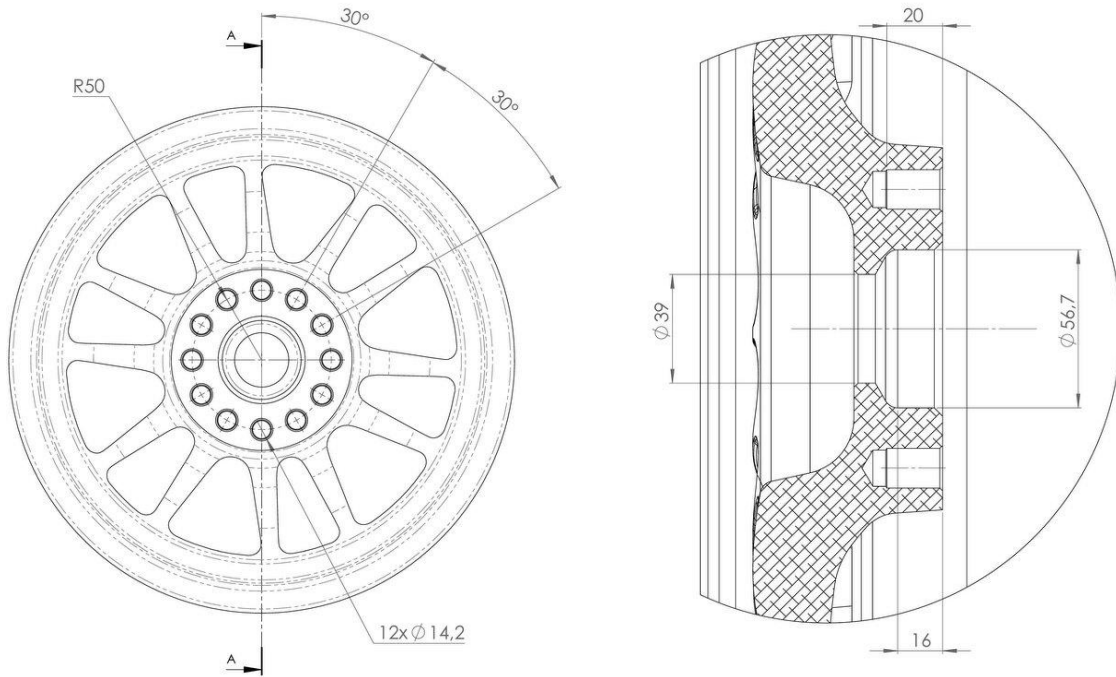
7 WHEELS AND TIRES

7.1 WHEELS

Front wheels: OZ Wheels 8.0 inches

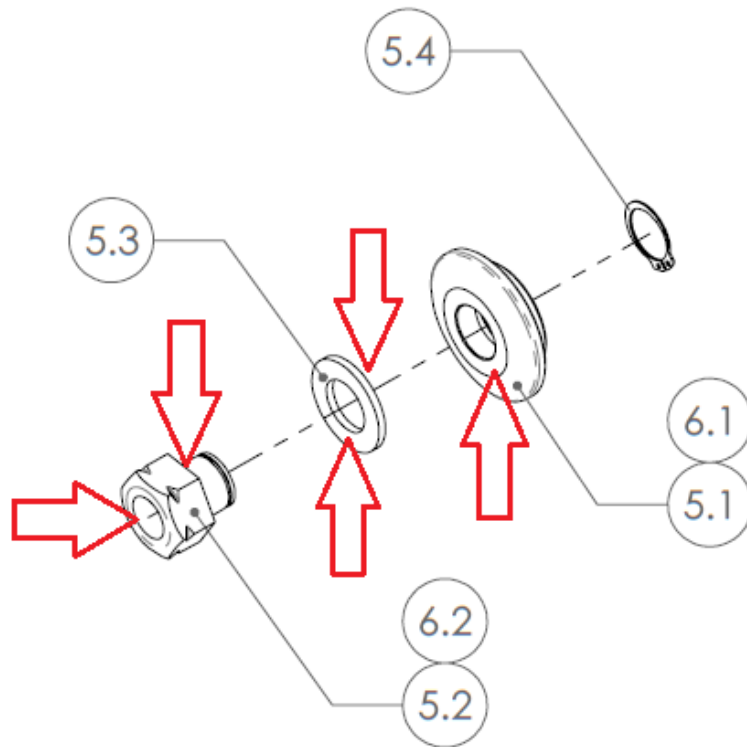
Rear wheels: OZ Wheels 10.0 inches

Here below hub details:



7.1.1 Wheel nut

It is reminded to maintain the highlighted surfaces and the wheel spindle thread cleaned and properly lubricated with Molyslip Copaslip high temperature grease.



It is required to adjust the tightening torque according the following prescriptions:

- cold wheel hub: 130Nm
- hot wheel hub: 150Nm

It is recommended to restrain for any reason the maximum tightening and un-tightening torque below 250Nm (180 ft lbs), impact guns should not be used.

7.2 TIRES

Refer to the documentation provided by the championship tire manufacturer.

8 BRAKE SYSTEM

8.1 CALIPERS

8.2 MASTER CYLINDERS

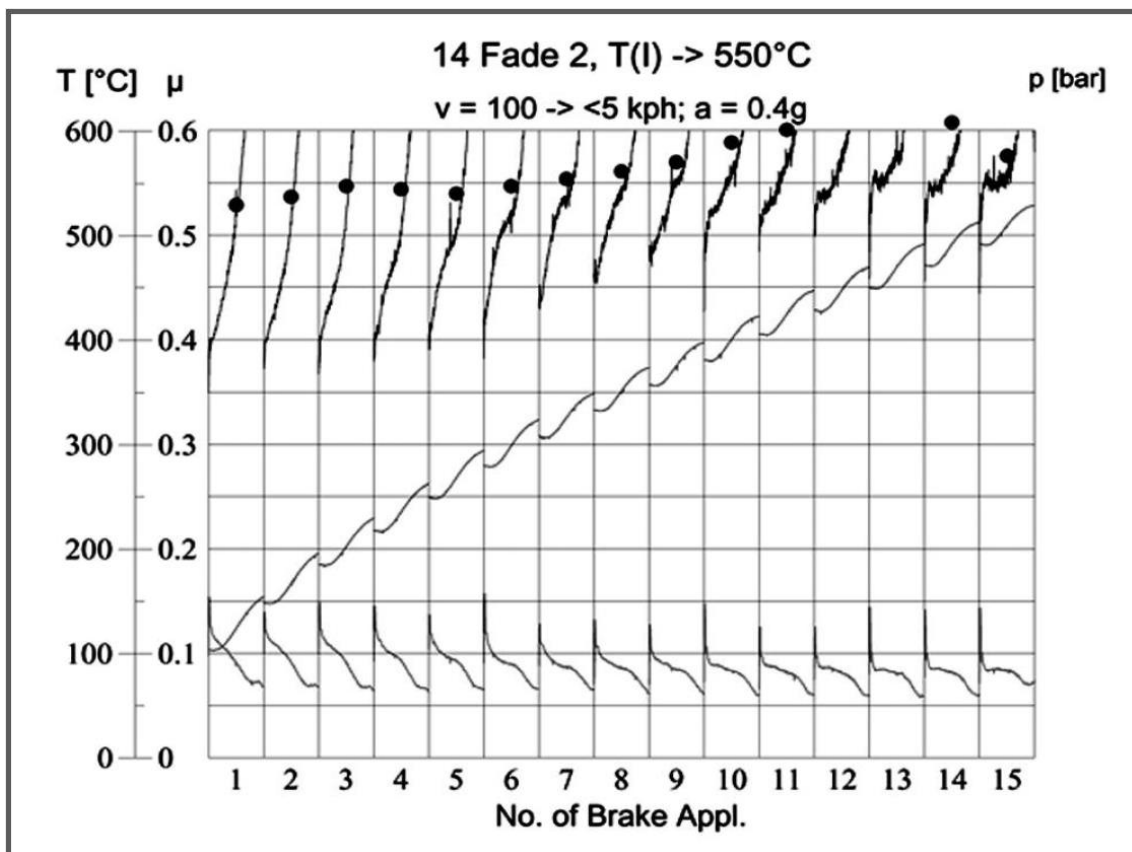
Standard front and rear master cylinders are 0.70 inches.

8.3 DISCS

The minimum thickness of brake disc rotor is 17.0mm.

8.4 PADS

With a μ of 0.55+ DS PF pads deliver a superb performance both hot and cold. Excellent wet recovery properties, great resistance to fade and consistent pedal feel complete all the requirements for a safe, reliable and efficient high performance brake pad.



9 COOLING SYSTEM

Cooling system pressure: 1.2 bar.

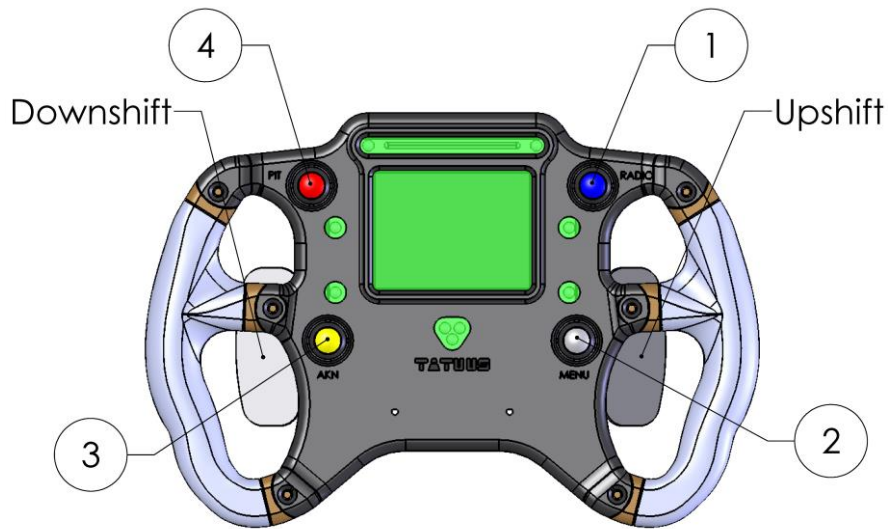
10 FUEL SYSTEM

10.1 OVERVIEW

The fuel system is an open-type circuit, flow is delivered by the high pressure pump through the fuel filter and then out of the bladder. Fuel pressure is regulated by the pressure regulator installed on the main flange of the fuel cell, the bleeding line ends in the fuel pump collector.

10.2 FUEL DRAIN PROCEDURE

Pushing the pit limiter button [#4] for longer than 0.5s with ignition switch OFF will override fuel pump command, opening the quick release line will allow the tank drain.



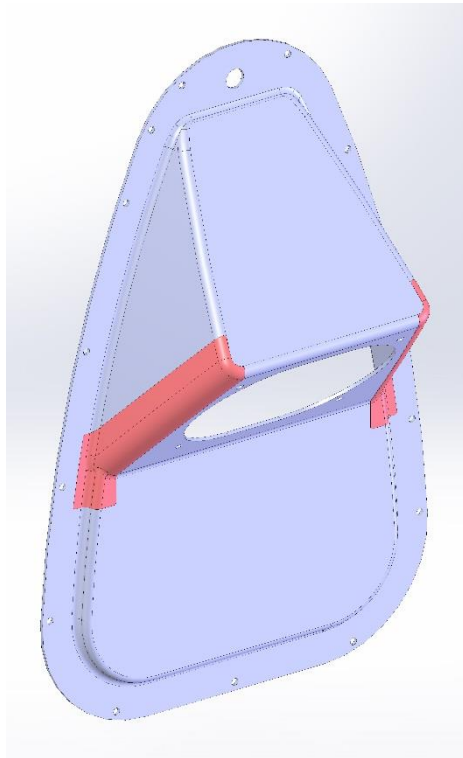
10.3 MAINTENANCE

Regular maintenance has to be done on the following items:

- Fuel filter: check for pollution after every session when the fuel cell is brand new, then check after every meeting for impurity. Fuel filter can be inspected accessing through the cockpit port (behind the driver seat).
- Fuel pump: current consumption can be monitored within data logger.
- Quick coupling: always check that releasing cables are correctly installed and tighten.

It is strongly recommended to drain all the fuel from the fuel cell before transportation to and from any event. Furthermore, Premier has advised that leaving fuel in the tank for prolonged periods of time can shorten the fuel cell's lifespan.

The surfaces inside the fuel cell compartment must be smooth and every edge protected with PVC tape (i.e. Permacel type).

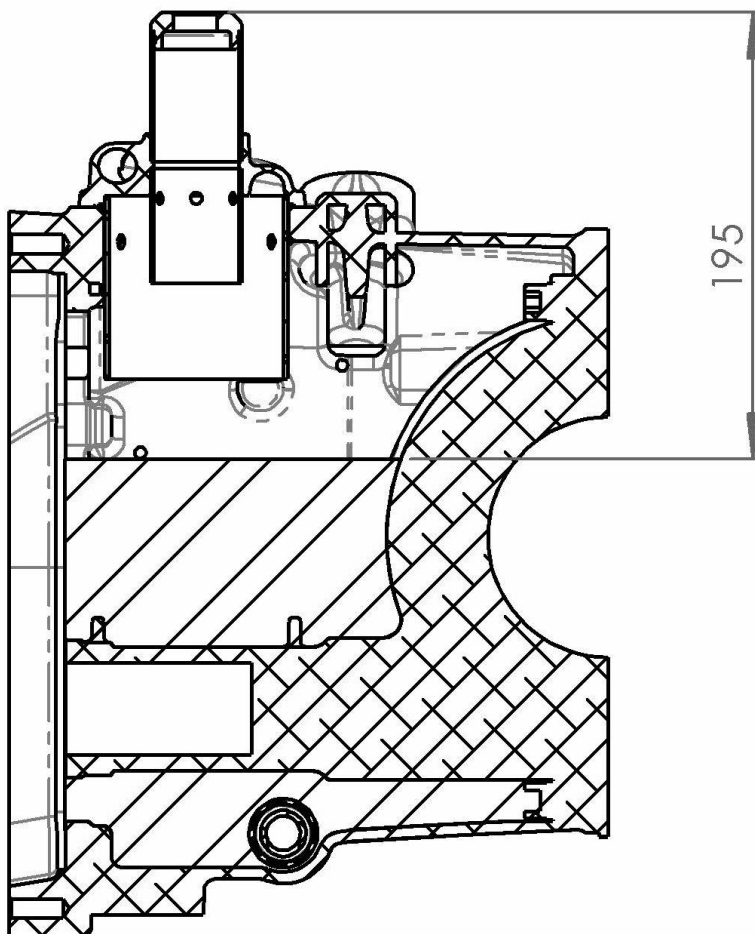


11 OIL SYSTEM

The oil tank is located within the gearbox bellhousing,

It is recommended to respect the following procedure in order to have a consistent level measurement:

- Turn on the engine;
- Warm up temperatures (oil at 80°C);
- Run the engine for 30 second at 3000rpm;
- Turn off the engine;
- Measure the oil level: from the filler plug plate the oil level should be **195mm**.



Volume: 4.0 Lt

12 ELECTRIC SYSTEM

12.1 OVERVIEW

The wiring loom is split in four main parts:

- Chassis harness
- Engine harness
- Gearbox harness
- GCU/EGA harness

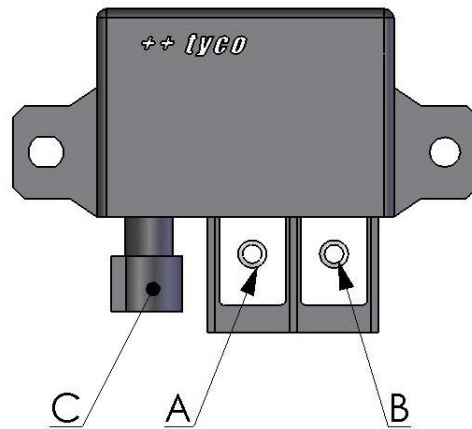
The power system (+12V) includes

- Battery: installed in the cockpit behind driver seat
- Main switch: electrically operated, located on the battery carrier
- Generator: installed on the engine
- Powerbox: current distribution is provided to the vehicle by a 9 line power distribution module
- Starter: direct power connection
- EGA (gear actuator): fused power connection

12.2 MAIN SWITCH

The master switch is actuated by the cockpit panel and emergency switches, connection schematics:

- A: +12V Generator, +12V Chassis loom ring;
- B: +12V Battery, Main switch coil supply;
- C: chassis loom connector.



12.3 BATTERY AND ALTERNATOR

Battery is a crucial component interacting with engine and gearbox management systems always pay attention to its charge level especially if you are running reset procedures.

NOTE: running engine at low revs will not charge battery!

NOTE: if the battery power is low high current consumptions (like a gearshift actuation/recharge) can result in an engine stall, keeping higher revs and generator in charge will fix this occurrence.

12.3.1 Battery installation

It is recommended to apply a minimum of 5mm of padding, below and on the top of the battery case, and a 2mm padding per side in order to protect the battery from excessive vibration.

The padding also protects the battery casing from getting damaged. It is recommended using closed cell neoprene. It is also important that when strapping the battery in place, the padding is not excessively compressed, as this would minimize its effect.

We also recommend that the battery cables are fully supported so they do not add any extra stress onto the battery terminals. If they are too short, the engines movement when revved will be transferred through the cable to the battery. If the cables are too long, they may have weigh enough and move when accelerating, braking or cornering, adding extra stress to the battery terminals.

A battery, which has been damaged due to vibration, will show a good open circuit voltage (12.8v or more), but when loaded, the voltage drops to zero. The battery casing usually also shows signs of wear on the casing.

It is also important that when attaching cables to the battery terminals, that the retaining nut is tightened to 4Nm and no higher.

12.3.2 Jump battery

It is suggested the use of a jump battery during the engine crank, **the jump battery must be plugged in only when the main switch is ON.**

The rear wing pillar has a double thread suitable for the Anderson SB50 plug.

12.4 POWERBOX

The PSD9 powerbox manages the current distribution on the following power lines:

1. (pin 1A) Main Fuel Pump
2. (pin 2A) Rain Light
3. (pin 3A): Electronics (ECU, GCC, Steering wheel)
4. (pin 4A): Engine Valves (Dump Valve, Waste Gate, Cam Sensor, Alternator, Lambda)
5. (pin 5A): Vbatt Aux (Data Logger, Beacon, Timing transponder, Wheel Speed Sensor, Radio, ADR)
6. (pin 6A): Coils, injectors
7. (pin 7A): Coils, injectors (redundant)
8. (pin 8A): Starter
9. (pin 8B): Starter (redundant)

The powerbox can shut-down current supply in case of over-load, the system can be reset with a power cycle but current cut will re-occur if problem persists, here below current limits:

1. Main Fuel Pump: 16 Amp (spike 30Amp)
2. Spare Fuel Pump: 13 Amp (spike 30Amp)
3. Control Units Supply: 13 Amp (spike 30Amp)
4. Engine: 13 Amp (spike 30Amp)
5. Vbatt Aux: 13 Amp (spike 15Amp)
6. Coils, injectors: 13 Amp (spike 15Amp)
7. Coils, injectors: 13 Amp (spike 15Amp)
8. Starter: 16 Amp (spike 15 Amp)
9. Starter: 16 Amp (spike 15 Amp)

User devices connected to customer available connections must not exceed 5A in total and 2A per power supply pin.

WARNING: Do not disconnect the powerbox connection when power is ON!

Diagnostic and functional information are available in the logger system see chapter for details.

12.5 WIRING LOOM

Refer to attached pdf files for electrical schematics.

12.5.1 Vref distribution

Vref_1: Pedal Position A

Vref_2: Pedal Position B

Vref_3: Gearbox Position Sensor

Vref_DAQ (AIM): Brake Pressure Sensors, Steering Position Sensor

13 ENGINE

Refer to the engine Technical Manual.

14 TRANSMISSION

14.1 RATIO CHART

Here below the ratio options:

Final drive Ref.CPLE10X31855	
Secondary shaft	10
Crown wheel	31

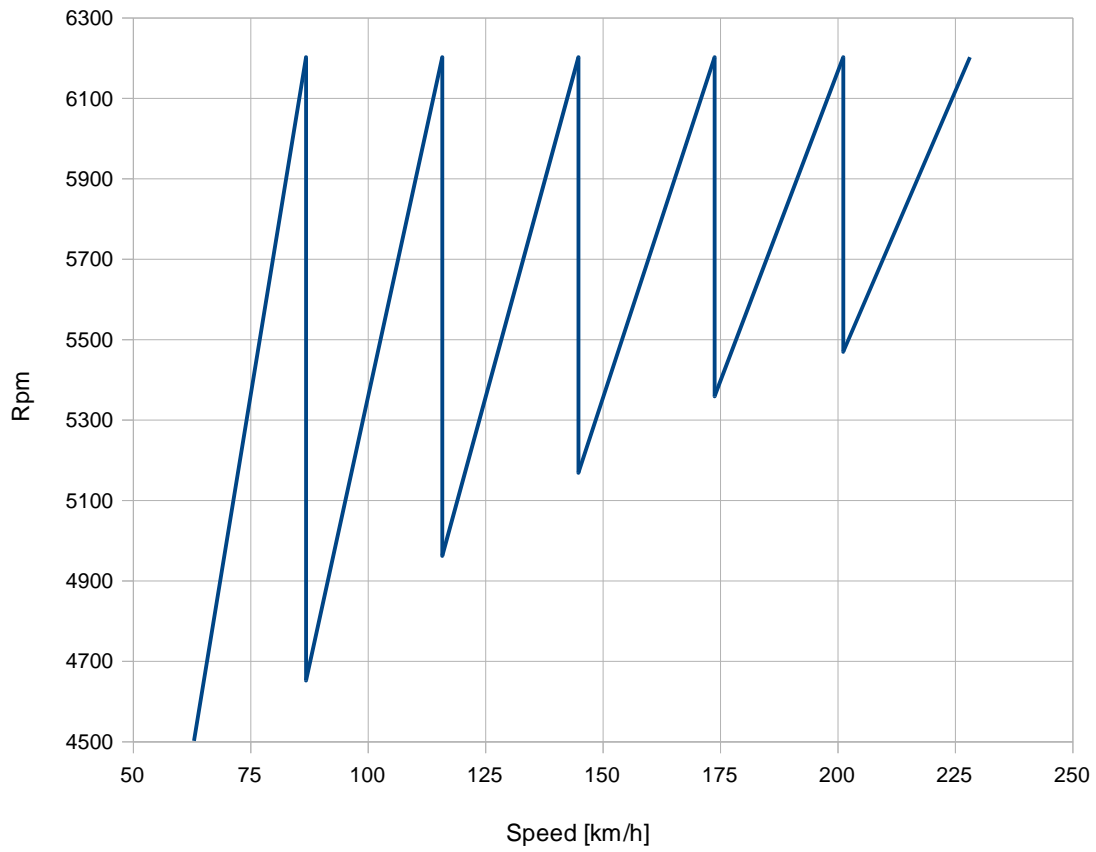
Reverse gear	
Primary shaft	14
Reverse gear	18
Secondary shaft	40

14.1.1 Short gearset

Gear	Ratio
14/35	2.50
16/30	1.88
18/27	1.50
20/25	1.25
25/27	1.08
21/20	0.95

SL75_F4

Short

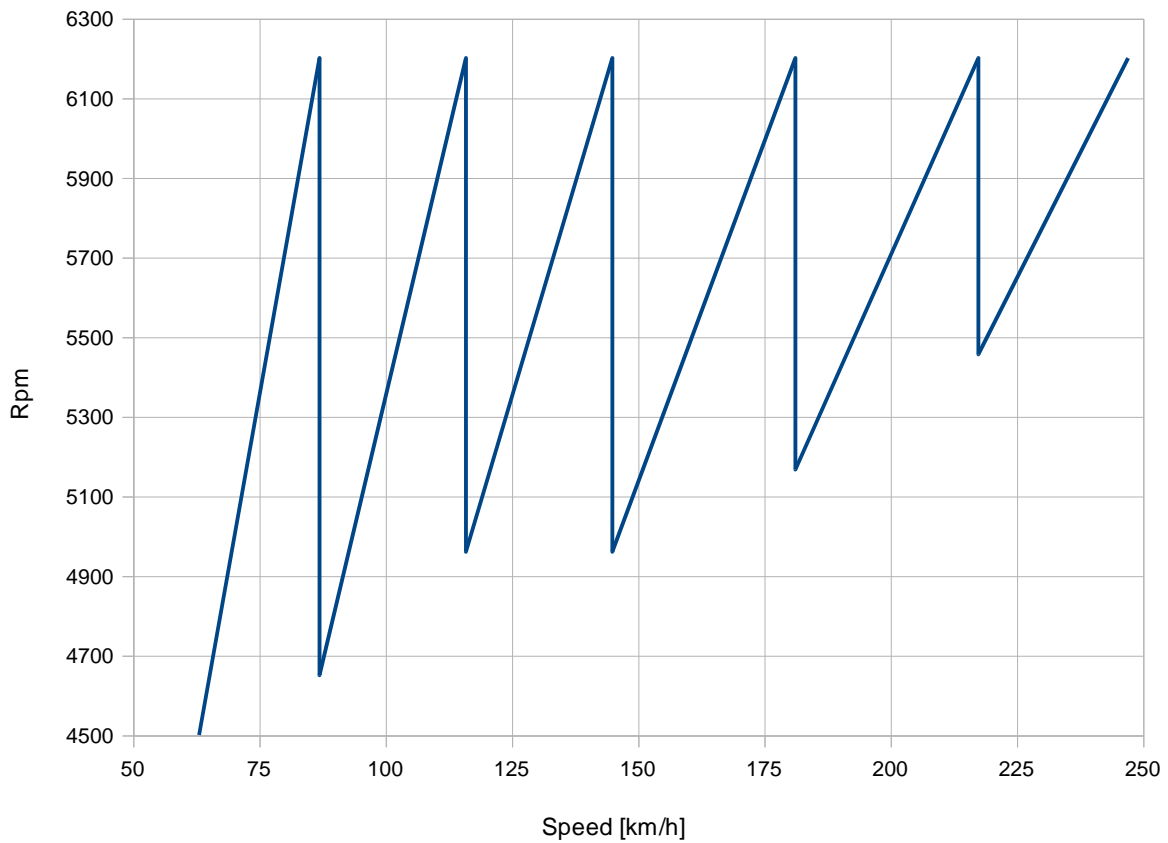


14.1.2 Long gearset

Gear	Ratio
14/35	2.50
16/30	1.88
18/27	1.50
20/24	1.20
26/26	1.00
25/22	0.88

SL75_F4

Long



14.2 DIFFERENTIAL

Free differential

14.3 LUBRICATION

Oil capacity: 1.5 Liters

1rst drain	Drain frequency	Viscosity
After a 50Km running-in	Each meeting	75W140

14.4 PARTICULAR PRECAUTIONS

No additives should be added to the oil. The resulting consequences are not in any circumstances covered by SADEV.

When topping up the rear differential oil, do not mix any other oil with that already in the box.

14.4.1 Storage and use

Be particularly careful with any bottles which are open when used:

Close the bottle again properly after use to prevent the introduction of water or dirt.

Store bottles horizontally, protected from severe weather.

Do not store bottles close to a washing station.

Do not decant the oil into larger containers.

14.4.2 Washing under pressure

When the rear differential is removed, seal all openings correctly to prevent the ingress of water into the rear differential.

14.5 GLUE COMPONENTS

Glue components and tightening torque are shown in the 3D exploded view.

WARNING:

Glue components have been chosen during tests sessions. Only 'Loctite' brand components must be used.

Sadev can't ensure consequences of false glue component choice.

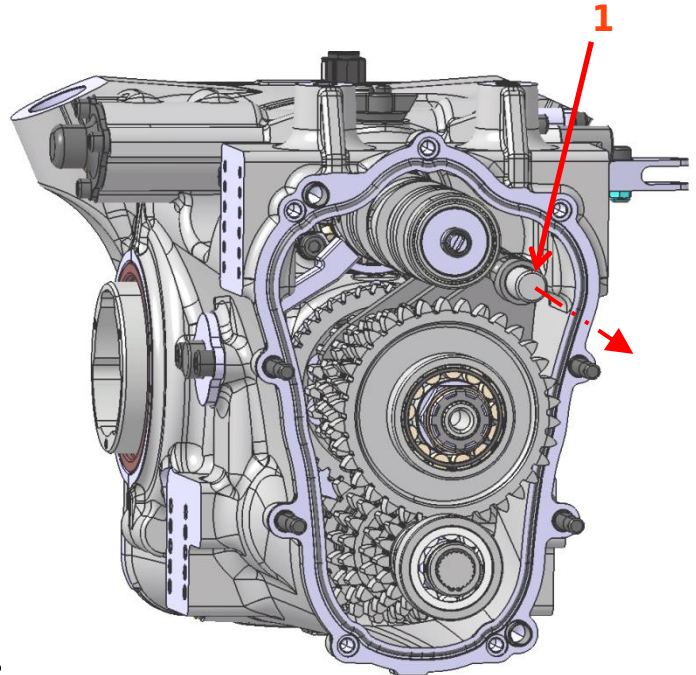
14.6 SPECIAL TOOLS

	Ref. SADEV	FOUT0085001	Locking plate
	Ref. SADEV	FOUT0085004	Play adjuster
	Ref. SADEV	FOUT0085005	Spacer
	Ref. SADEV	FOUT1908001	Primary bolt tool
	Ref. FACOM	U.49D6	Bearing extractor
	Ref. FACOM	U.306G2 U.306M	Inertia extractor

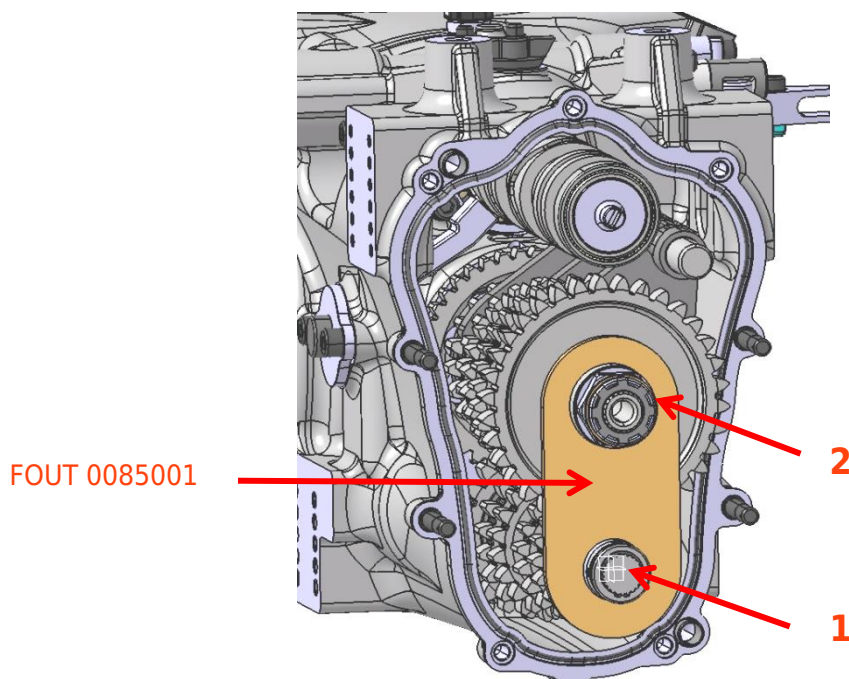
14.7 GEAR MAINTENANCE

Removal:

- Engage reverse gear.
- Drain gearbox through lower drain plug.
- Disconnect potentiometer.
- Remove rear casing.



- Remove fork shaft (1) and swing forks to release.
- Engage 2nd gear.
- Remove the circlips & the splined washers.
- Fit primary and secondary shaft lock plate FOUT 0085001.
- Remove primary shaft bolt (right-hand thread) (1) with tool FOUT 1908001 and secondary shaft bolt (left-hand thread) (2).
- Remove gears one after the other marking installation direction.



Refitting:

Do not invert the gears so as to ensure their initial rotation direction: risk of breaking teeth.

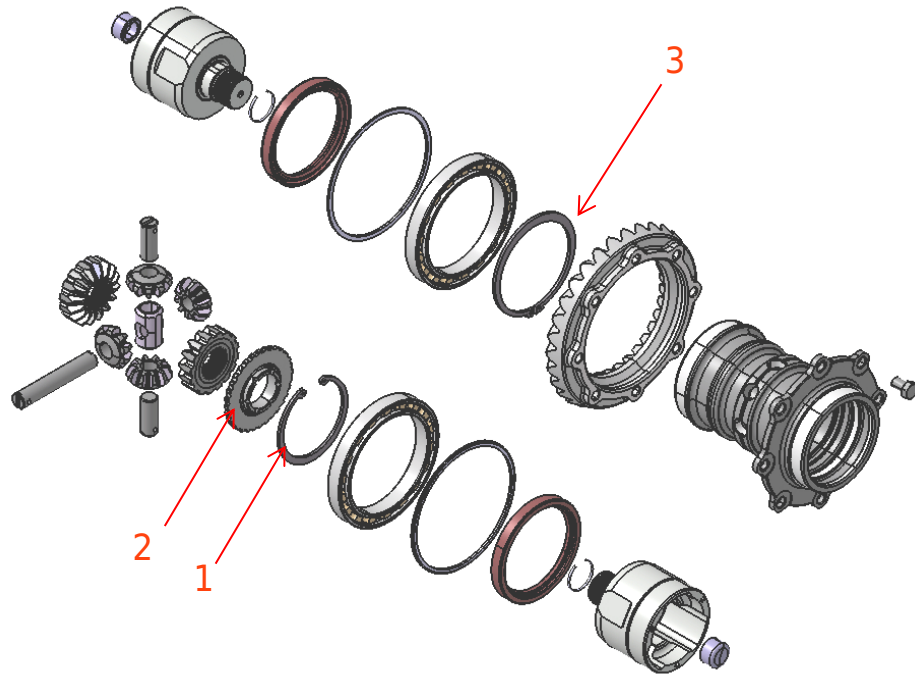
- Clean and check condition of parts.
- If you need to change the secondary shaft or the head bearing, then see chapter 0 to adjust clearances.
- Lightly lubricate the needle roller bearing cages using gearbox oil (*2 in the secondary explode view*).
- Replace gears one after the other in the reverse order from removal.
- Engage 2nd gear to prevent gearbox turning.
- Mount the primary/secondary lock plate *FOUT 0085001*.
- Clean and degrease threads on shafts and bolts.
- Screw primary shaft bolt and secondary shaft nut to torques:
- Primary shaft bolt: 8 daN.
- Secondary shaft nut: 18 daN.m
- Reinstall the splined washers & the circlips.
- Replace forks in initial locations.
- Clean the joint face of the rear casing.
- Refit rear casing.
- Connect potentiometer ensuring that its coupling is still correct.

Note: the gear display must indicate reverse.

14.8 DIFFERENTIAL MAINTENANCE

Removal:

- Drain the box through the lower drain plug.
- Remove differential housing.
- Extract the differential assembly.



Dismantling the differential elements:

- Remove the internal circlip (1).
- Remove the differential cap (2).
- Remove the external circlip (3)
- Remove the planet gear axles and after you can remove all the internal parts.

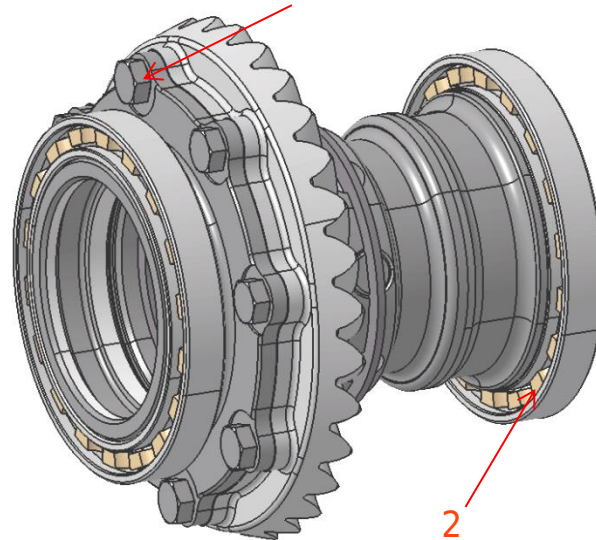
Refitting the differential elements:

- Clean parts.
- Replace parts in the reverse order of installation, lubricating each part with gearbox oil just before installation. Maintain order of parts as noted during dismantling.

Remove the spiral gear crown:

- Remove the right-hand bevel gear bearing.
- Remove right-hand ball bearing (2).
- Remove crown wheel fixing bolts (1).

Note: The bolts are glued and a hot air gun must be used.



Re-assemble the spiral gear crown:

- Using an M10 x 1.00 tap, clean and degrease gearbox and bolt threads.
- Attach the crown wheel to the housing using new bolts coated with a few drops of Loctite blockpress 648. Tighten bolts to 9 daN.m.
- Replace right hand bevel gear bearing.
- Adjust the various clearances: check tothing clearance (see paragraphs 11.10).

Re-fitting:

- Clean joint face on housing.
- Use joint Threebond 1215
- Attach differential housing to gearbox using bolts covered with a few drops of Loctite 243. Tighten bolts to 6 daN.m.
- Change the lip seals.

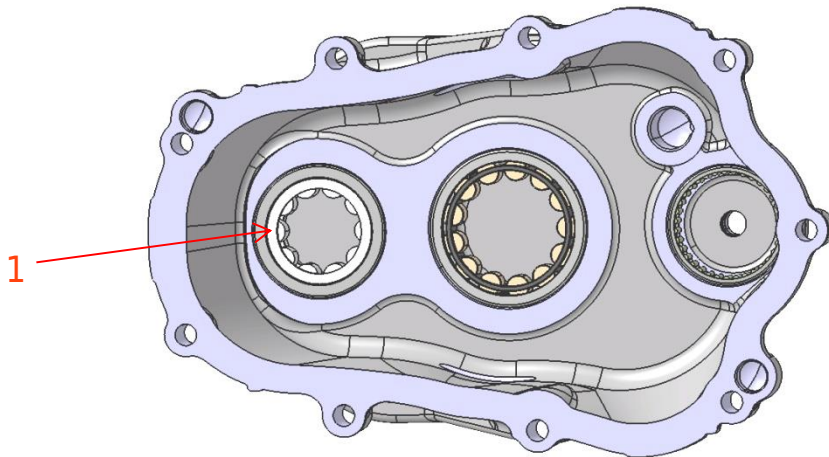
Note: The final drive clearance shim must be mounting in the correct side.

14.9 REPLACEMENT AND ADJUSTMENT OF VARIOUS BEARINGS

14.9.1 Primary shaft bearing

Removing rear casing side:

- Drain oil through the lower drainage plug.
- Disconnect potentiometer and remove assembly from support.
- Remove rear casing.
- Heat rear casing to 120°C (first remove lip seal from potentiometer).
- Fit a FACOM type extractor (ref. U.49D6) on the primary shaft bearing (1) and extract using an inertia extractor.
- Check that the bearing housing has not been damaged on dismantling.



Removing differential side:

- Drain the box through the lower drain plug.
- Disconnect potentiometer and remove assembly from its support.
- Remove rear casing.
- Remove gears (see paragraph 74).
- Remove primary shaft.
- Remove differential assembly (ref paragraph 76).
- Remove bearing by tapping from the inside of the differential casing.
- Check that the bearing housing has not been damaged on dismantling.

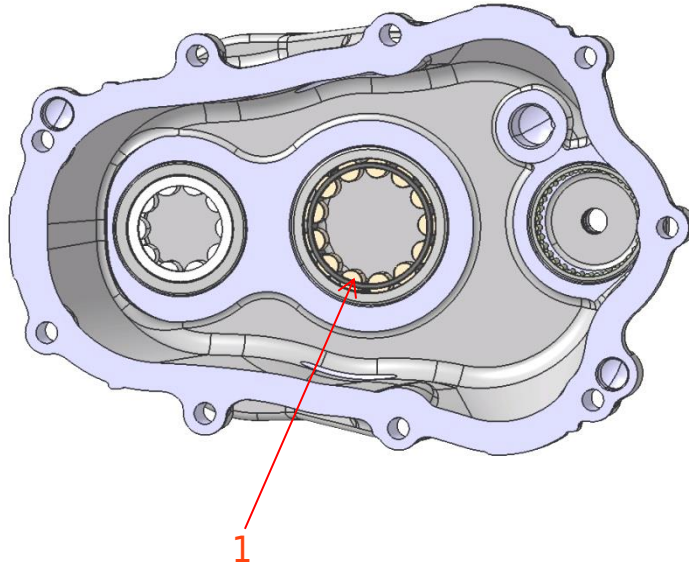
Refitting:

- Apply a small quantity of Loctite "fixing product " 603 on the outer bearing cage.
- Press fit the bearing of the rear casing taking care to seat this well at the bottom of its housing.
- For the other bearing use the same glue but do not press fit.

14.9.2 Secondary shaft bearing

Removing the secondary shaft bearing:

- Heat the rear casing to 120°C (first remove the potentiometer lip seal).
- Turn casing and position on a flat surface, then tap with a mallet on the back of the secondary shaft bearing (1) housing until the bearing is removed from its position.
- Check that the bearing housing have not been damaged on dismantling.



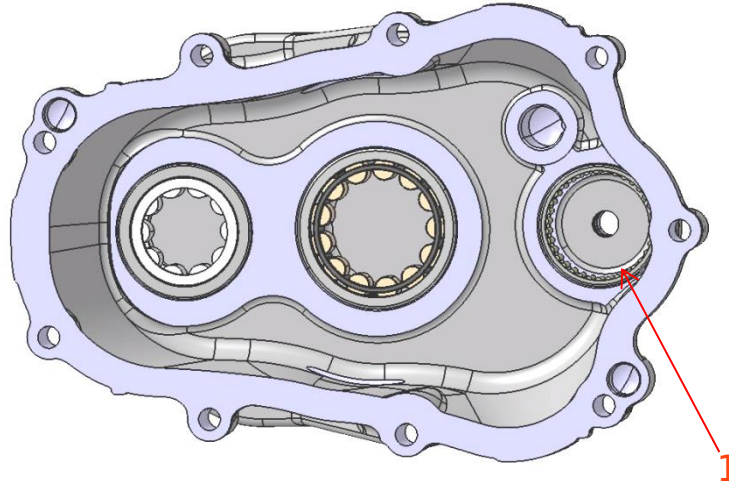
Refitting:

- Apply a small quantity of Loctite "fixing product" 603 on the outer bearing cage.
- Press fit bearing (1) on the rear casing ensuring this is well seated at the bottom of its housing.
- To change the bearings on the differential side see paragraph 0).

14.9.3 Barrel bearing

Removing rear casing side:

- Heat the casing to 120°C (first remove the potentiometer lip seal).
- Position the FACOM extractor ref U.306G2 in the recesses on the housing and extract the bearing (1) using the inertia extractor.
- Check that the bearing housing has not been damaged on dismantling.



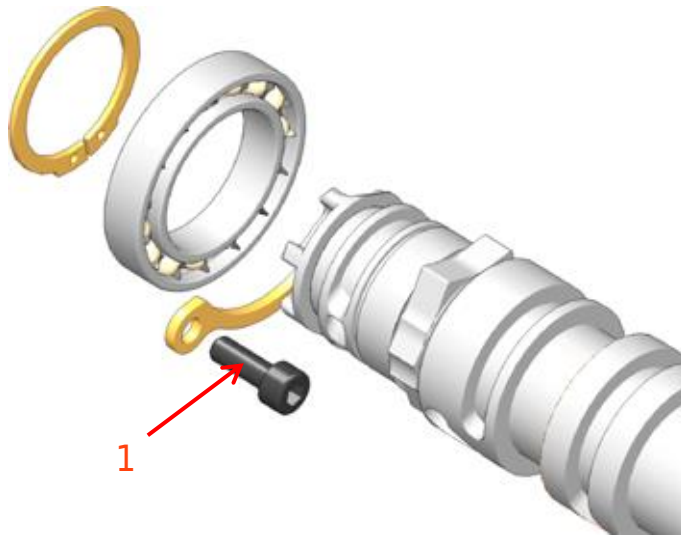
Refitting:

- Apply a small quantity of Loctite "fixing product" 603 on the outer bearing cage.
- Press fit the bearing on the rear casing ensuring this is properly seated at the base of its housing.

After refitting, ensure that the needle roller cage has not been crushed (rotate the needles).

Removing differential side:

- Drain the box through the lower drain plug.
- Disconnect potentiometer and remove from support.
- Remove rear housing.
- Remove gears (see paragraph 14.7).
- Remove reverse rocker (see paragraph 0).
- Remove indexer guide.
- Remove the two bolts (1) on the barrel bearing retainer and extract the barrel.
- Remove barrel circlips.
- Remove press bearing (do not damage barrel).



Check that the bearing housing has not been damaged on dismantling.

Refitting:

- Apply a small quantity of Loctite "fixing product" 603 on the inner bearing cage.
- Press fit the bearing on the barrel & refit circlips.
- Refit barrel (see paragraph 0).

14.9.4 Differential bearing

Removal:

- Extract the differential assembly (see paragraph 14.8).
- Remove left and right bearings.
- Remove secondary shaft (see paragraph 14.11.1).

Refitting:

- Press the ball bearings on the differential casing.
- Refit the differential assembly (see paragraph 14.8).

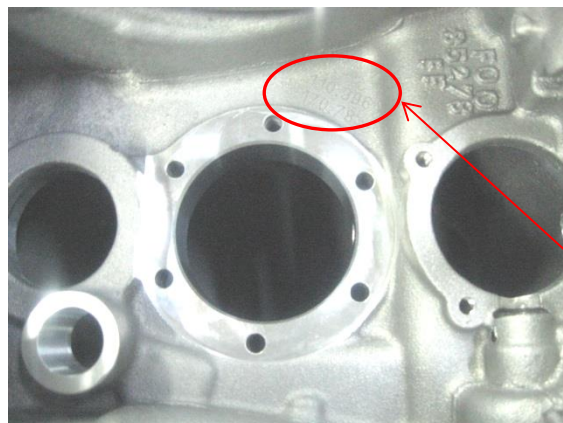
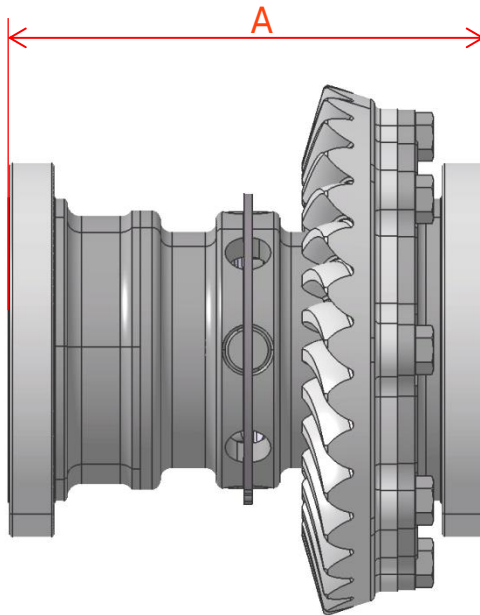
Check preload on differential bearings:

- Measure the distance A between the two bearings.
- Note the value engraved on the bottom inside of the main casing (B) (for example 170,78).
- The thickness of the shims is:

$$C = B - (A + 0.1)$$

$$C = \text{left shim} + \text{right shim}$$

- Refit secondary shaft (see paragraph 0), and adjust the final drive operating clearance (see paragraph 14.10).



14.10 FINAL DRIVE OPERATING CLEARANCE

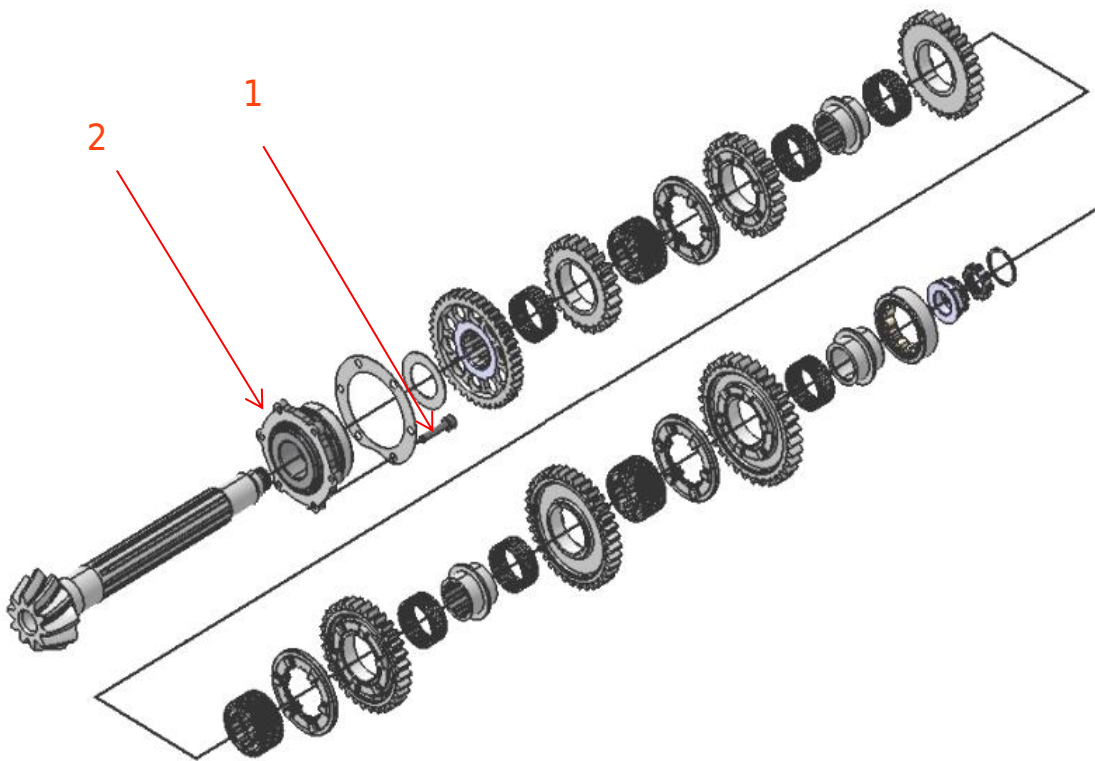
- Drain the box via the lower drain plug.
- Remove gears (see paragraph 14.7).
- Fit tool *FOUT 0085004* and *FOUT 0085005* on the secondary shaft and tighten the secondary shaft nut to 18 daN.m.
- Check the inter-tooth play using a comparator placed on tool *FOUT 0085004* (clearance indicator).
- Check the play for each tooth on the gear (10 teeth) by rocking the secondary shaft from left to right. The play must be between **0.1 mm** and **0.2 mm**.
- If the inter-tooth play is incorrect, remove the differential housing.
- Remove the shims (ref *F1910320*) behind the bearing shells and proceed as follows:
 - If the play is excessive: move the crown wheel closer to the pinion by increasing the thickness of the left-hand shim and reducing the thickness of the right-hand shim accordingly.
 - If the play is insufficient: move the crown wheel away from the pinion by reducing the thickness of the left-hand shim and increasing the thickness of the right-hand shim accordingly.
- Always keep the total thickness of the two shims constant so as not to affect the preload on the bearings.
- Recheck clearance after each operation.
- Once the clearance has been checked, refit the differential (see paragraph 14.8).
- Refit gears (see paragraph 14.7).

14.11 SECONDARY SHAFT

14.11.1 Removal

- Drain the box through the lower drain plug.
- Remove gears (see paragraph 14.7).
- Remove differential (see paragraph 14.8).
- Remove secondary shaft fixing bolts (1).
- Remove secondary shaft by tapping the end with a mallet (do not damage the thread).
- Disassemble the twin head-bearing (2).
- Remove bearing cage by heating the casing uniformly to 120° around the zone concerned.

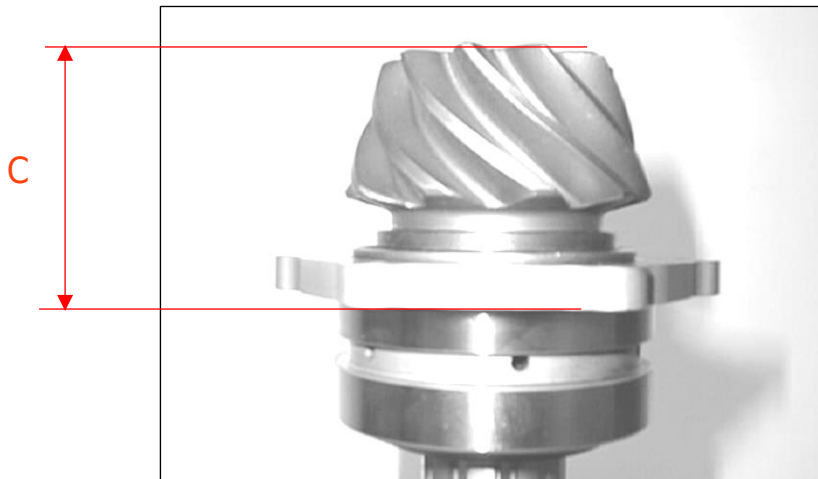
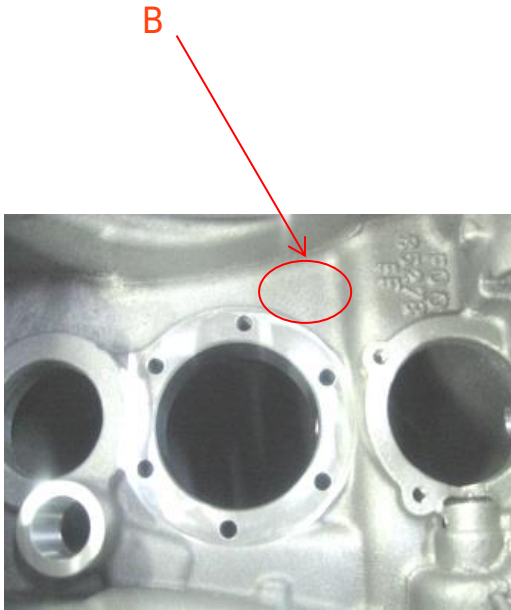
Check that the bearing housing has not been damaged on dismantling.



14.11.2 Operating clearance

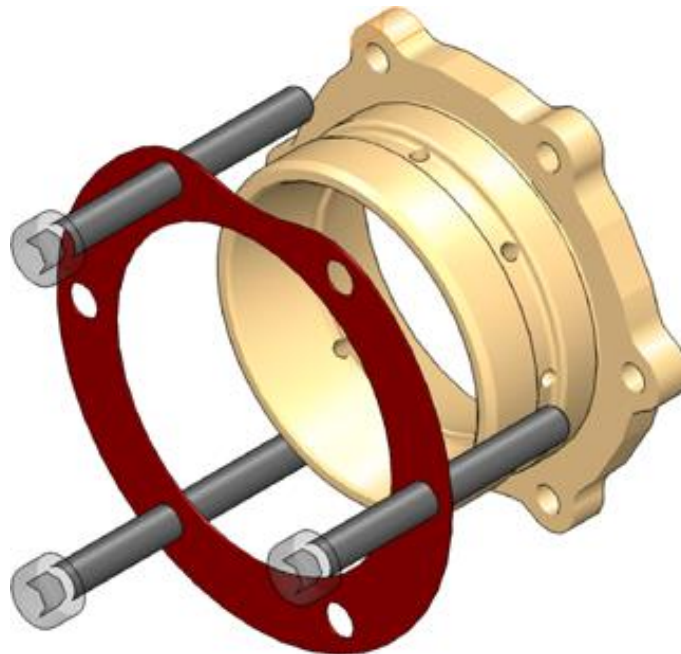
- Press fit the twin head-bearing assembly on the secondary shaft. Fit *FOUT 0085005* and tighten the secondary shaft nut to 18 daN.m.
- Note the value engraved on the top of the secondary shaft pinion (A), and that on the bottom inside of the main casing (B) (for example 110,396).
- Measure dimension (C) between the upper face of the secondary shaft pinion (1) and the lower face of the bearing cage (2).
- Perform the following operation:

$$E = B - (A + C)$$



14.11.3 Secondary shaft refitting

- Using an M7 x 100 tap, clean and degrease the bearing cage threads and bolts.
- Remove cage and bearing from the secondary shaft.
- Heat the gearbox casing until the temperature of the roller cage housing is 120°C.
- Fit shim thickness E (ref F00850121) on the roller cage (see calculation 14.11.2).
- Position the cage on the centering pins so that its bores coincide with those on the shim and casing. (Cut the head of 3 M7x65 bolts and use them as centering pins)
- Refit it using a mallet.
- Fit 3 of secondary shaft fixing bolts so that the casing bores align perfectly opposite the cage threads.
- Hold this fixing until the temperature of the casing returns to normal.
- Remove the 3 of temporary fixing bolts.
- Refit the secondary shaft fixing bolts coated with a few drops of Loctite block press 648 & tightened to 3 daN.m.
- Refit secondary shaft preload brace and bearing on the cage.



Ensure that the two tapered roller bearings are in contact with the cage.

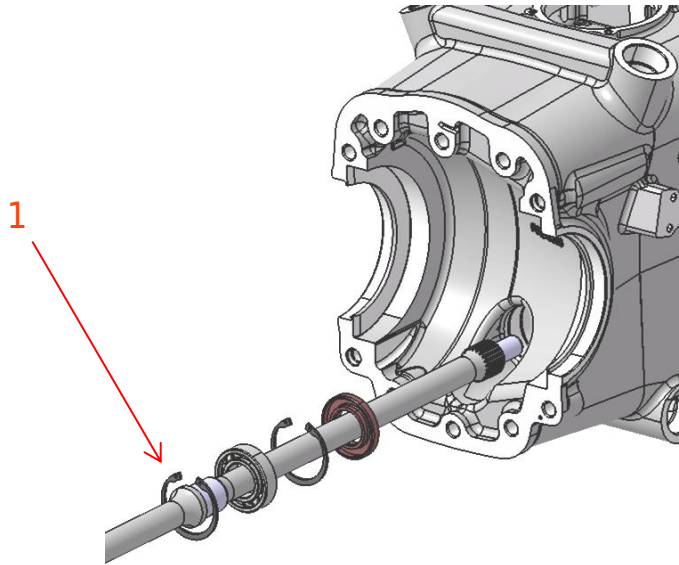
- Refit differential & gears.
- Check the operating play of the conical pair (see paragraph 14.10).
- Top up the gearbox oil to the level.

14.12 INPUT SHAFT

Removing:

- Remove the oil tank housing.
- Remove circlip (1).
- Remove the input shaft with the bearing.
- Remove circlip (2).
- Destroy lip seal (3) to remove.
- Remove circlip (2).
- Remove input shaft bearing.

If the clutch shaft is seized in the primary shaft, remove the rear casing and bolt on the primary shaft, then insert a shaft $\varnothing 10$ inside the primary shaft and tap the clutch shaft to release.



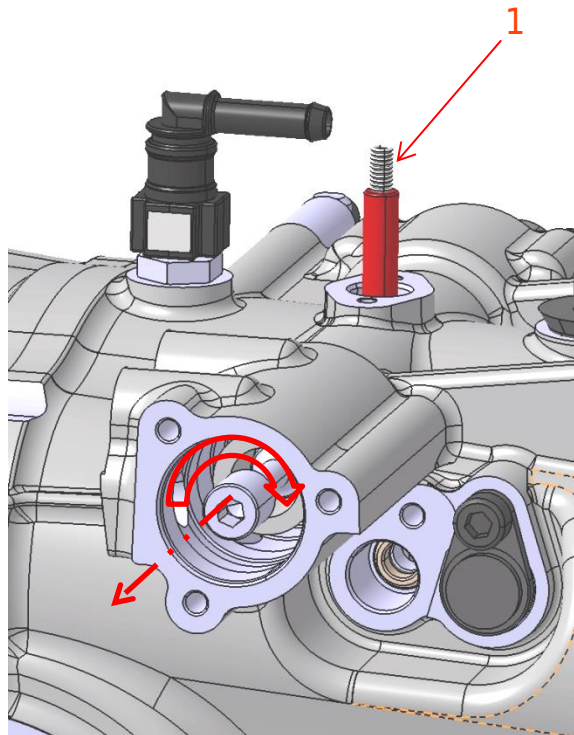
Refitting:

- Clean and check state of shaft (splines and bearing surface) and housing of lip seal.
- Change faulty parts.
- Lubricate the bearing surface and shaft splines.
- Fit the ball bearing on the clutch shaft.
- Fit the new lip seal in place and attach circlip
- Fit the clutch shaft in the oil tank housing and attach circlip.
- Fit the oil tank housing.

14.13 SELECTION

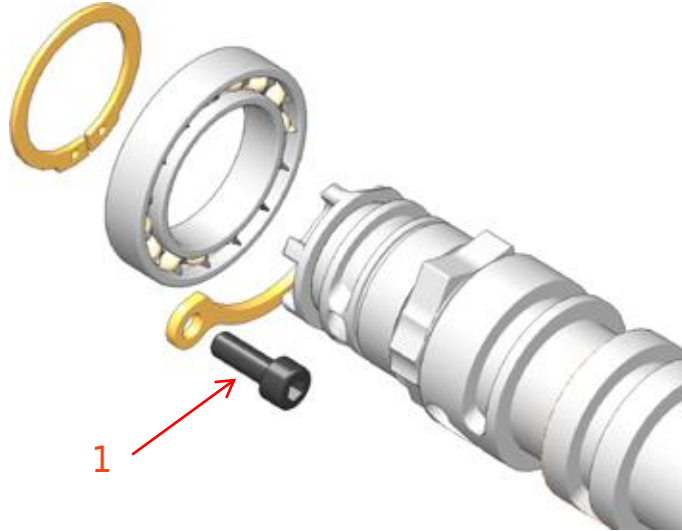
14.13.1 Removing the selector shaft

- Engage reverse gear
- Remove the two fixing bolts of the selector rocker.
- Remove left selector closing block.
- Remove the selector spacer.
- Remove pusher guide.
- Pass a round magnet (1) type FACOM (ref. 827.1) through the opening of the pusher guide and support the double clip.
- While holding the clip raised, pivot the control shaft one-quarter of a turn only and extract from the control closing block side.



14.13.2 Removing the selector barrel

- Remove all gears (see paragraph 14.7).
- Remove reverse gear rocker (see paragraph 0).
- Remove indexer guide.
- Remove the three bolts (1) of the barrel retainer bearing and extract barrel.

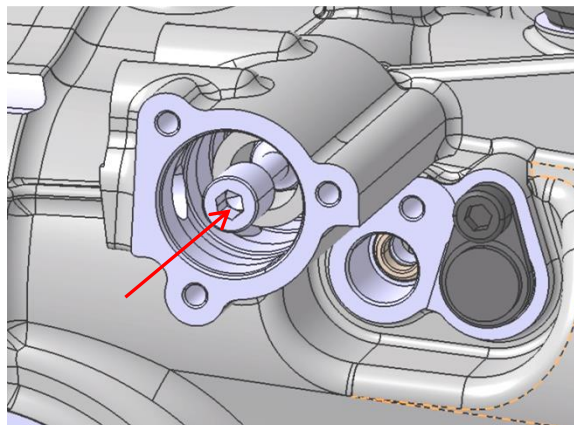
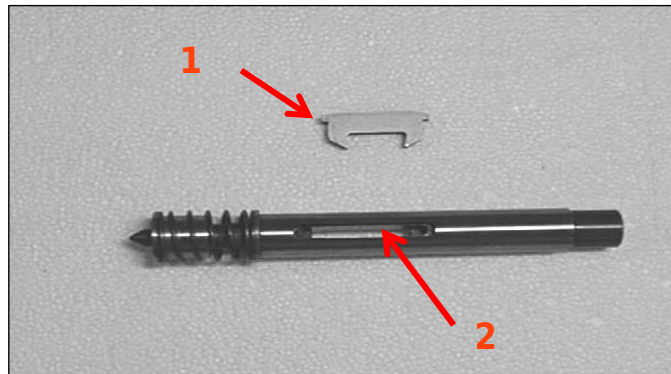


14.13.3 Refit selection barrel

- Proceed in the reverse order from removal.
- Clean and degrease the three fixing bolts of the retainer and the reverse gear rocker bolt.
- Apply a few drops of Loctite normal threadlock 243 on the bearing retainer bolt and Loctite high-strength threadlock 270 on the reverse gear rocker bolt. Tighten as follows:
 - Bearing retainer bolt: 2.2 daN.m
 - Reverse gear rocker bolt: 5.5 daN.m
- Refit indexer guide and tighten bolts to 1.3 daN.m, after coating with a few drops of Loctite low-strength threadlock 222.

14.13.4 Refit control lever

- Clean the joint face of the control closing block.
- Put the barrel in reverse gear position.
- Check the condition of the double clip (1) and control shaft (2).
- Check the good condition of the various O-rings and lip seals.
- Refit the double clip on the control lever.
- Insert control lever in casing having first made a quarter turn anti-clockwise. Once the shaft is in place, turn this back a quarter turn clockwise.
- Using an M5 x 80 tap, clean and degrease the casing threads and bolts on the pusher guide.
- Refit pusher guide. Coat threads with Loctite low-strength threadlock 222 and tighten to 0.6 daN.m.
- Refit the selector spacer and the power shift
- Apply a few drops of Loctite low-strength threadlock 222 on the bolts of the left selector closing block and refit block. Tighten bolts to 0.6 daN.m.
- Refit reverse gear locking cable on gearbox.
- Check proper function of gate on selector lever.
- Apply a few drops of Loctite normal threadlock 243 and tighten the bolts on the external transfer lever to 2.5 daN.m.

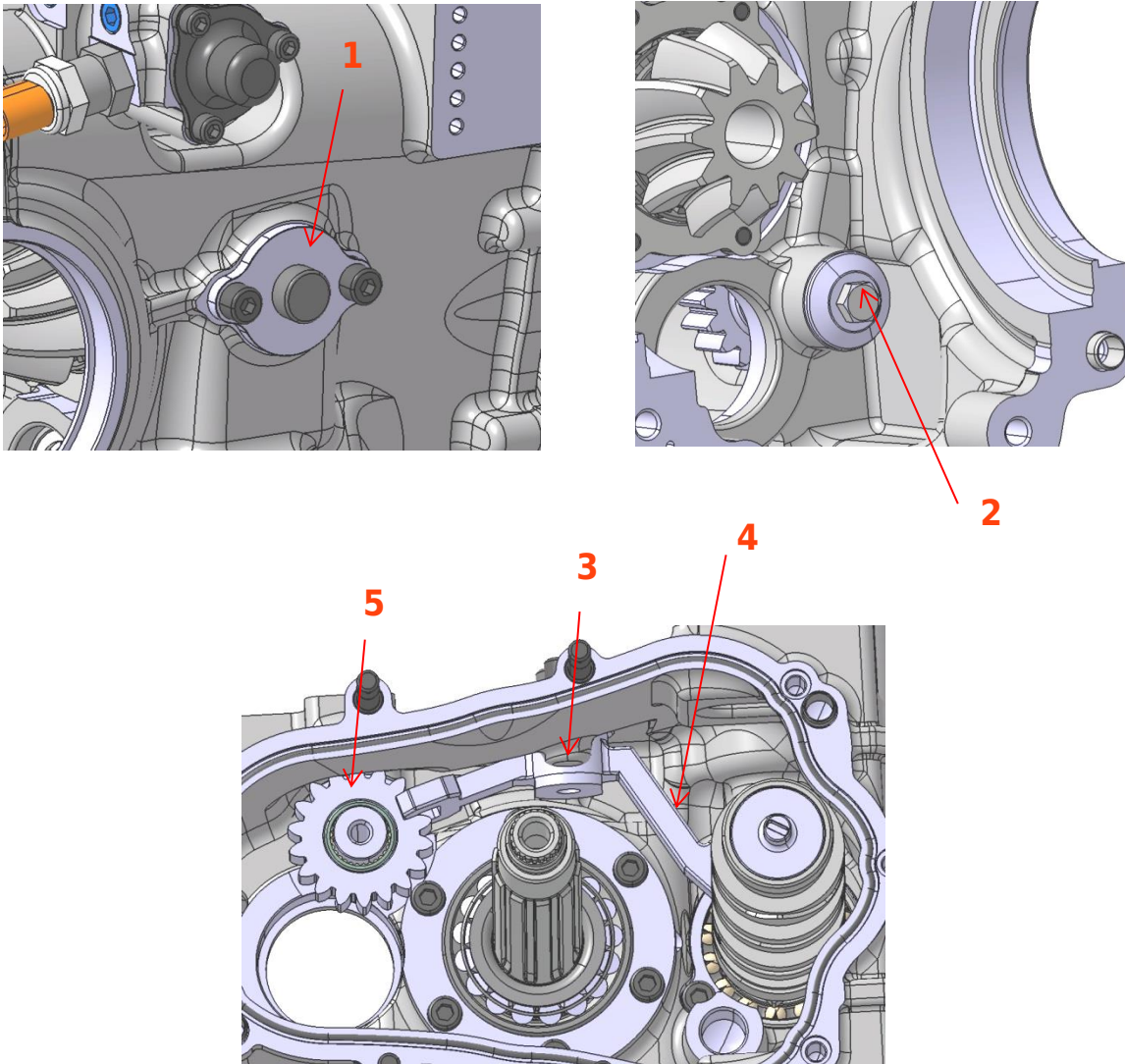


14.14 REVERSE GEAR

Remove

- Remove all gears (see paragraph 14.7).
- Withdraw primary shaft.
- Withdraw cover on rocker bolt (1).
- Using an open-ended wrench, stop the reverse rocker nut turning (3) and release rocker bolt.
- Withdraw rocker (4) and reverse transfer pinion (5).
- Remove differential (see paragraph 14.8).
- Remove the axle bolt (2).
- Heat the casing to 120°C around the reverse axle.
- Remove the axle from the gears housing side by tapping with a mallet.

Check that the bore of the casing has not been damaged



Refit

- Check condition of all parts.
- Heat casing to 120°C around the reverse pin.
- Install the reverse axle.
- Refit shaft by tapping with a mallet in the opposite direction to removal.
- Refit differential assembly.
- Clean and check condition of parts.
- Fit the reverse transfer pinion in the fork of the reverse gear rocker.
- Insert the rocker control finger in the barrel groove.
- Using an M10x150 tap, clean and degrease the reverse gear bolt and nut.
- Change the copper washer after each removal.
- Apply a few drops of Loctite high-strength threadlock 270 to the rocker bolt. Tighten the bolt to 5.5 daN.m while stopping the reverse nut from turning with an open-ended spanner.
- Refit the bolt head cap.

15 SHIFT SYSTEM

15.1 SYSTEM OVERVIEW

The T014 is equipped with a semi-automatic shift system, here below a quick overview:

- GCU (Gear Control Unit): Magneti Marelli SRAE/GCC, this unit manage the engine and the gearshift control
- EGA (Electric Gear Actuator): Magneti Marelli EGA, this unit driven by the GCC (Magneti Marelli) perform the physical shift, EGA is a position control unit, refer to the chapter 15.3 for its setting and maintenance.

15.2 GEARSHIFT CONTROL

The semi-automatic gearshift is controlled by several parameters of the vehicle, critical sensors are:

- paddle sensors
- RPM
- Throttle position
- Barrel position
- AKN button
- REV button

Upshift

- 1st to 6th gear: right paddle
- N to 1st gear: AKN + right paddle
- R to N: right paddle

Downshift

- 6th to 1st gear: left paddle (if over-revs threshold is respected)
- 1st to N: simultaneous left + right paddle
- N to R: (car steady) AKN button + REV button

Recovery strategies are in place in case of button faults:

- if AKN is in fault pulling the upshift paddle longer than 2.5s will engage 1st gear

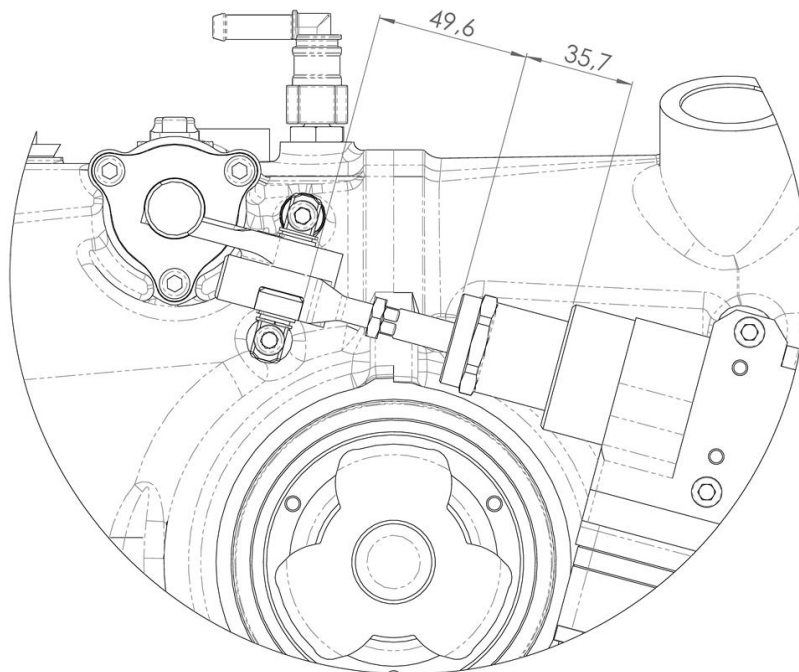
The downshift is allowed only if the lower gear (to be engaged) will not results in an overrevs, if an overrev is expected the shift will be skipped and driver has to repeat the request.

The control system auto-learn gear installed within the gearbox, to improve this calculation during the installation lap it is recommended to maintain every gear for few seconds. The auto-learned gear ration can be reset pulling the DOWNSHIFT pad for longer than 5s with IGN OFF.

15.3 EGA MAINTENANCE

The EGA actuator have to set to a proper “rest” length following this procedure:

- disengage actuator from gear selection rocker
- position the EGA in order that any shaft stroke cannot contact with anything
- require a shift with paddle (either upshift or downshift)
- the shaft will move and will go back to the rest position
- check with the online feature of the data system that ECU_SHAFT=2500 +/- 20mV
- check that the length of the main EGA shaft (see drawing) is 35.7 +/-0.5mm
- set the length of the selection link according to drawing (49.6 +/-0.5mm from the main EGA shaft).
- fit the EGA



In order to check the shaft length, you can inspect the EGA movement: after every actuation, the shift control is forcing the shaft to its mid position for two seconds and then leave the centering to the selection spring, if a further movement can be seen after the release of the electric control the shaft length should be adjusted to compensate it.

16 ELECTRONIC & SOFTWARE

16.1 ELECTRONIC SYSTEM

The T014 electronic system is based on three units:

- Engine Control Unit (ECU): Magneti Marelli SRA-E located on the right-hand sidepod.
- Gearbox Control Unit (GCC): Magneti Marelli unit located on the right-hand sidepod.
- Steering wheel
- Logger unit (DAQ). AIM EVO4S located behind driver seat.

The three units have their communication port:

- SRA-E: access restricted to Abarth
- GCC: access restricted to Abarth/Magneti Marelli
- AIM EVO4S: it is possible to communicate to the unit with the USB port

16.2 SOFTWARE

- Magneti Marelli GCC: no software available for users
- Next Solution PSD9: no software available for users
- Tatuus/Next Solution steering wheel: no software available for users
- Rain light: no software available for users
- Data Logger: <http://www.aim-sportline.com/eng/download/index.htm>

16.3 ECU CONFIGURATION

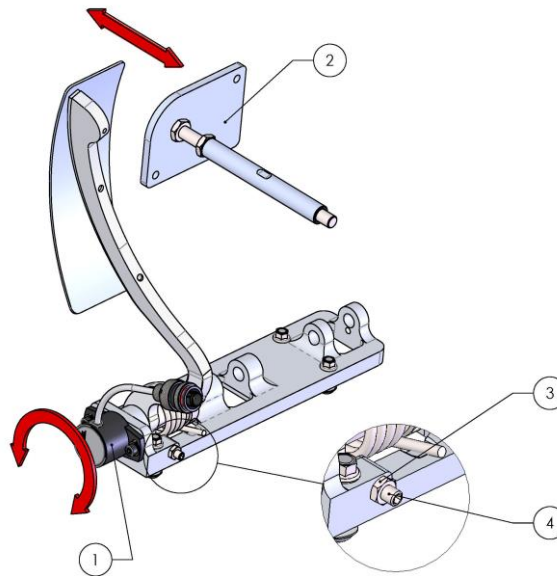
16.3.1 Throttle position reset

This procedure reset pedal and throttle body, some preliminary setting has to be done in order to get a proper learning process.

It is recommended to check and reset pedal and throttle position every day.

Analogue channel 1 is displayed on the dashboard page #2, check that values are within the requested range.

The throttle pedal potentiometer has to be set in order that when pedal is idle or full opened the following range are respected:



Pedal 1 (ECU_TPS_1) must be less than 1.2 V when throttle pedal is resting, and must be more than 2.0 V when throttle pedal is at full stroke.

Pedal released	Full stroke
$0.6\text{ V} < \text{Pedal 1 (ECU_TPS_1)} < 1.2\text{ V}$	$2.0\text{ V} < \text{Pedal 1 (ECU_TPS_1)} < 4.0\text{ V}$

Gear Pot — Throttle — Steer

Brake F — Brake R — Bias

Acc X — Acc Y — Acc Z

Pedal 1

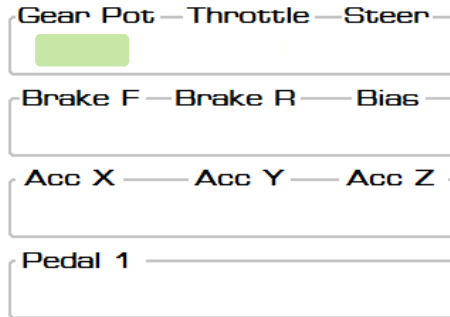
Once the potentiometer is working within the proper range the following procedure must be followed to learn pedal stroke:

1. Switch off main switch
2. Set throttle pedal to full stroke
3. switch ON main switch
4. wait three second (throttle pedal full stroke)
5. release throttle pedal (to idle position)
6. the system activates the throttle body to 100% then to 0%
7. check on dashboard page #2 that throttle reaches 100% (idle value is set according to pre-opening strategies)

16.3.2 Gearbox barrel position reset

The gearbox barrel position sensor needs to be reset when gearbox is opened for any maintenance, the value is shown on page #2 of the steering dashboard.

- Engage 1st gear
- set the barrel potentiometer to have a raw output of GearBarrel_raw=1.18V



The barrel position is auto-learned by the GCU during the run, it is suggested to maintain the gear engaged for few seconds during the installation lap. The barrel position grid can be reset pulling the DOWNSHIFT paddle for a time longer than 5s when IGN is off.

16.4 DATA LOGGER

The T014 features a DAQ port where logger system can be connected.

The standard data logger is the AIM EVO4, the AIM website (http://www.aim-sportline.com/index_eng.htm) provides the firmware to configure the communication with the T014 electronic system.

16.4.1 Standard channel list

Time	Time
Steer_Angle	Steer angle, to be calibrated (see chapter x.xx)
Brake_Front	Front brake pressure, to be calibrated
Brake_Rear	Rear brake pressure, to be calibrated
Channel_4	Free analogue channel
Acc_Verticale	Z acceleration, to be calibrated
Acc_Laterale	Y acceleration, to be calibrated
Acc_Longitudin	X acceleration, to be calibrated
Datalogger_Tem	Logger temperature [°C]
Battery	Logger voltage [V]
ECU_RPM	RPM
ECU_THROTTLE	Throttle position [%]
ECU_WATER_T	Cooling temperature [°C]
ECU_OIL_T	Engine oil temperature [°C]
ECU_OIL_P	Engine oil pressure [bar]
ECU_CAM_REAL	see Abarth documentation
ECU_SYC_LOST	see Abarth documentation
ECU_SYC_STAT	see Abarth documentation
ECU_DIAG_PED	see Abarth documentation
ECU_TPS1_V	TPS position 1 [V]
ECU_TPS2_V	TPS position 2 [V]
ECU_PPS1_V	Pedal position 1 [V]
ECU_PPS2_V	Pedal position 2 [V]
ECU_TPS1_%	TPS position 1 [%]
ECU_TPS2_%	TPS position 2 [%]
ECU_PPS1_%	Pedal position 1 [%]
ECU_PPS2_%	Pedal position 2 [%]
ECU_FUEL_PMP	Current consumption Fuel pump line [Amp]
ECU_RAIN_LGH	Current consumption Rain light line [Amp]
ECU_DAQ_GCC	Current consumption DAQ line [Amp]
ECU_VALVES	Current consumption Engine Valves line [Amp]
ECU_VBAT_AUX	Current consumption AUX line [Amp]
ECU_COIL_IJ	Current consumption Coil + injectors line 1 [Amp]
ECU_COIL_IJ2	Current consumption Coil + injectors line 2 [Amp]
ECU_STARTER1	Current consumption Starter line 1 [Amp]
ECU_STARTER2	Current consumption Starter line 2 [Amp]
ECU_V_BATT	Battery voltage [V]
ECU_PSD_T	Powerbox temperature [°C]
ECU_GEAR	Gear [n]
ECU_GEAR_POT	Barrel position [mV]
ECU_GBOX_TMP	nd
ECU_PAD_STATE	Paddle request status (see diagnostic chapter for details)
ECU_ALARM	Dashboard alarm (see diagnostic chapter for details)

ECU_SHAFT	EGA shaft position
ECU_BATTERY	Battery voltage @ECU [V]
ECU_IGN_LIM	Ignition limiter [RPM]
ECU_INJ_LIM	Injection limiter [RPM]
ECU_SPEED_FL	Front left speed [km/h]
ECU_SPEED_FR	Front right speed [km/h]
ECU_ALM_STAT	Powerbox alarm status (see diagnostic chapter for details)
ECU_IN_STAT	Powerbox input status (see diagnostic chapter for details)
ECU_OUT_STAT	Powerbox output status (see diagnostic chapter for details)
ECU_BUTTON	Steering button status
ECU_PAD_UP	Upshift paddle position [mV]
ECU_PAD_DWN	Downshift paddle position [mV]
GPS_Speed	GPS Speed
GPS_Nsat	GPS satellites
GPS_LatAcc	GPS Y acceleration
GPS_LonAcc	GPS X acceleration
GPS_Slope	
GPS_Heading	
GPS_Gyro	GPS gyroscope
GPS_Altitude	GPS altitude
GPS_PosAccuracy	
Brake_B	
GPS_Latitude	GPS_Latitude
GPS_Longitude	GPS_Longitude
GPS_Altitude	GPS_Altitude

16.4.2 Diagnostic information

16.4.2.1 ECU_PAD_STATE

This channel logs the paddle request status:

- 1: Up
- 2: Down
- 3: Neutral (request pending for time confirmation)
- 4: Reverse
- 8: Neutral confirmed
- 10: AKN

16.4.2.2 ECU_ALARM

This channel logs the alarm shown on the steering dashboard

- 1: Twater alarm
- 2: Poil alarm
- 4: Vbatt alarm
- 8: Toil alarm
- 16: Gearshift fault
- 32: Pit limiter engaged
- 64: Kill switch ON

16.4.2.3 ECU_ALM_STAT

This channel logs the alarm reported by the powerbox, every alarm is caused by an overload of the power line and will result with the current provided by the relevant line being cut (0 Amps)

- 1: Fuel pump current alarm (ECU_FUEL_PMP down to 0 Amps)
- 2: Rain light current alarm (ECU_RAIN_LGH down to 0 Amps)
- 4: Electronic system current alarm (ECU_DAQ_GCC down to 0 Amps)
- 8: Engine valves alarm (ECU_VALVES down to 0 Amps)
- 16: Auxiliary current alarm (ECU_VBAT_AUX down to 0 Amps)
- 32: Engine coils/injectors line 1 current alarm (ECU_COIL_IJ down to 0 Amps)
- 64: Engine coils/injectors line 2 current alarm (ECU_COIL_IJ_2 down to 0 Amps)
- 128: Starter line 1 current alarm (ECU_STARTER1 down to 0 Amps)
- 256: Starter line 2 current alarm (ECU_STARTER2 down to 0 Amps)

16.4.2.4 ECU_IN_STAT

This channel logs the input received by the powerbox:

- 1: Fuel pump ON
- 4: IGN ON
- 16: Starter ON
- 32: Master switch ON
- 64:
- 128: Rain switch ON

16.4.2.5 ECU_OUT_STAT

This channel logs the output active from the powerbox:

- 1: Fuel pump ON
- 2: Rain light ON
- 4: Electronic system ON
- 8: Engine valves ON
- 16: Auxiliary current ON
- 32: Engine coils/injectors line 1 ON
- 64: Engine coils/injectors line 2 ON
- 128: Starter line 1 current alarm ON
- 256: Starter line 2 current alarm ON

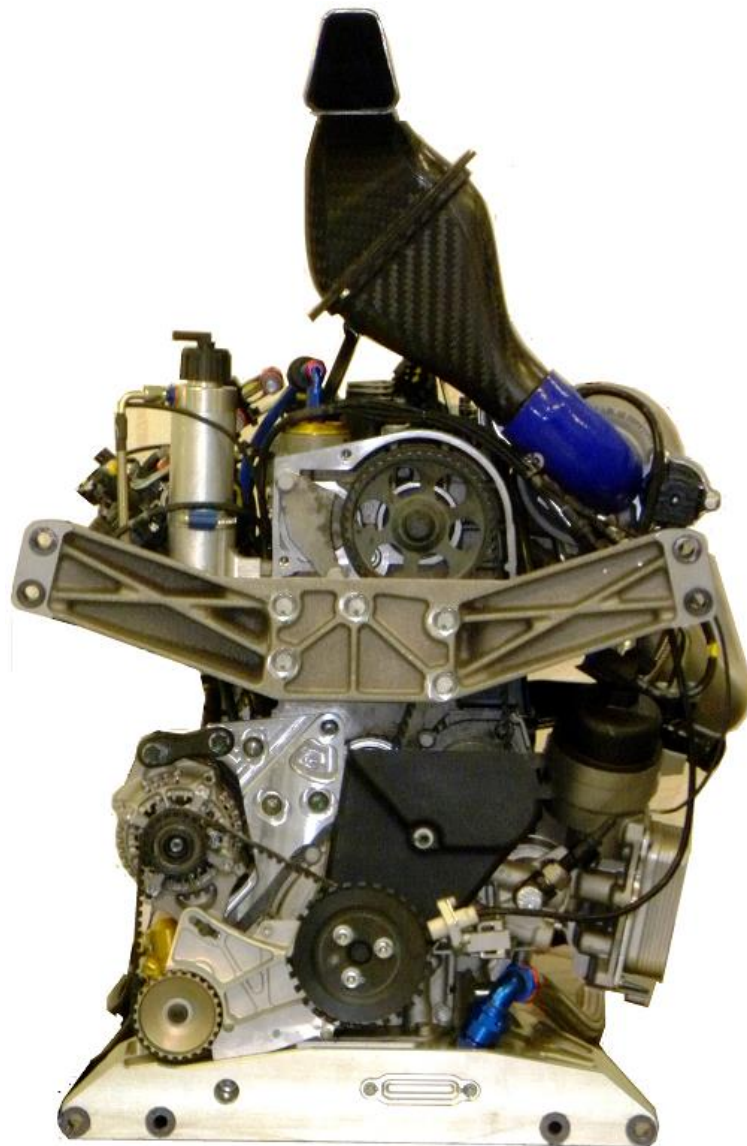
17 ANNEXES

17.1 TIGHTENING TORQUE

Thread [mm]	Pitch [mm]	Torque [Nm]	Torque [Lbs ft]
3	0,5	1,8	1,3
4	0,7	4,0	2,9
5	0,8	8,1	6,0
6	1	13,6	10,0
8	1,25	33,3	24,5
8	1	37,2	27,4
10	1,5	66,2	48,8
10	1,25	72,3	53,3
12	1,75	113,9	84,0
12	1,25	131,4	96,9
14	2	182,7	134,8
14	1,5	206,6	152,3
16	2	290,4	214,2
16	1,5	322,0	237,5

		Grade 5	Grade 8
Thread	Pitch	Torque	Torque
Inch	TPI	Lbs-ft	Lbs-ft
1/4	28	7	10
5/16	24	14	20
3/8	24	25	35
7/16	20	40	55
1/2	20	60	85
9/16	18	85	120
5/8	18	120	170

TECHNICAL MANUAL ENGINE 414-F4

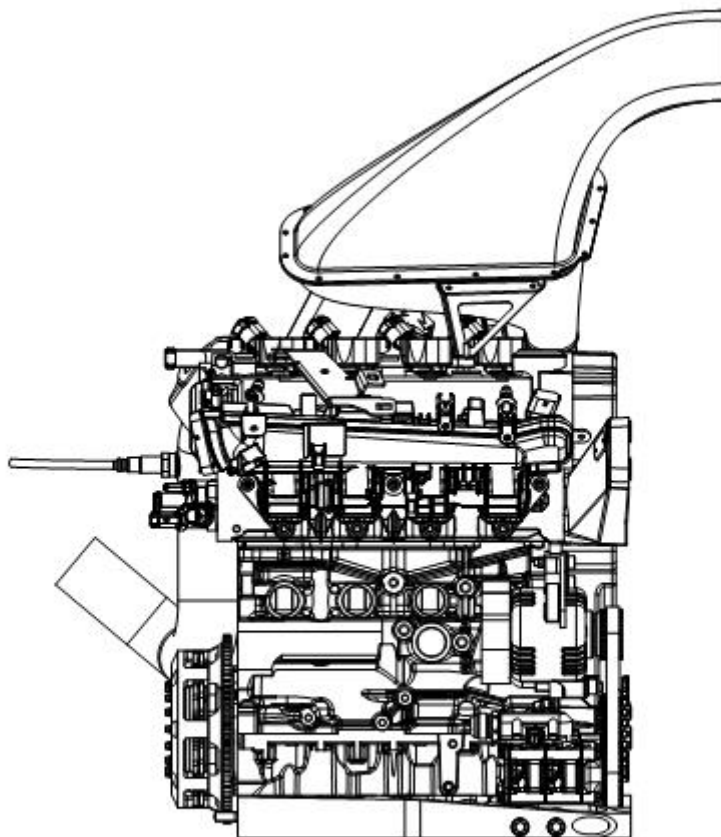


This technical manual contains necessary information for engine use and maintenance. It consists of three sections:

-  **DATASHEET**
-  **USE AND MAINTENANCE INSTRUCTION**
-  **COMPLEMENTARY INFO**

DATASHEET

ENGINE 414-F4



General data

Bore	72	mm
Stroke	84	mm
Capacity	1368	cm ³
Compression ratio (nominal)	9,8:1	
Maximum power DIN	160/118	cv/kW
Maximum torque DIN (3000 rpm)	235	Nm
Fuel required	102	RON

Timing system

	<i>Int</i>	<i>Exh</i>
Port diameter of cylinder head (mm)	22,7	18,8
Valve lift without clearance (mm)	7,5	7
Timing (°)	-2/34	27/-2

Mixture supply system

Throttle body	Bosch DVE5
Injector	Bosch
Fuel pressure (bar)	3,5 + int. manif. Press.
Spark plugs	NGK IKR9F8
Firing order	1-3-4-2
ECU	Magneti Marelli SRA EDL 16

Lubrication system

Oil required	Selenia Racing 10W/60
Operating oil temperature (°C)	100 ÷ 130
Maximum oil temperature (°C)	140
Average oil pressure with normal operating temperature (bar)	4,2 ÷ 5,2
Oil pressure at idle speed with normal operating temperature (bar)	2,5 ÷ 3

Cooling system

Centrifugal pump timing belt drive

Coolant

Water + 10 ÷ 15 % glycol

Optimum operating temperature (°C)

80 ÷ 90

Maximum operating temperature (°C)

100

Opening pressure water tank cap (bar)

1,2

Boost system

Turbocharger

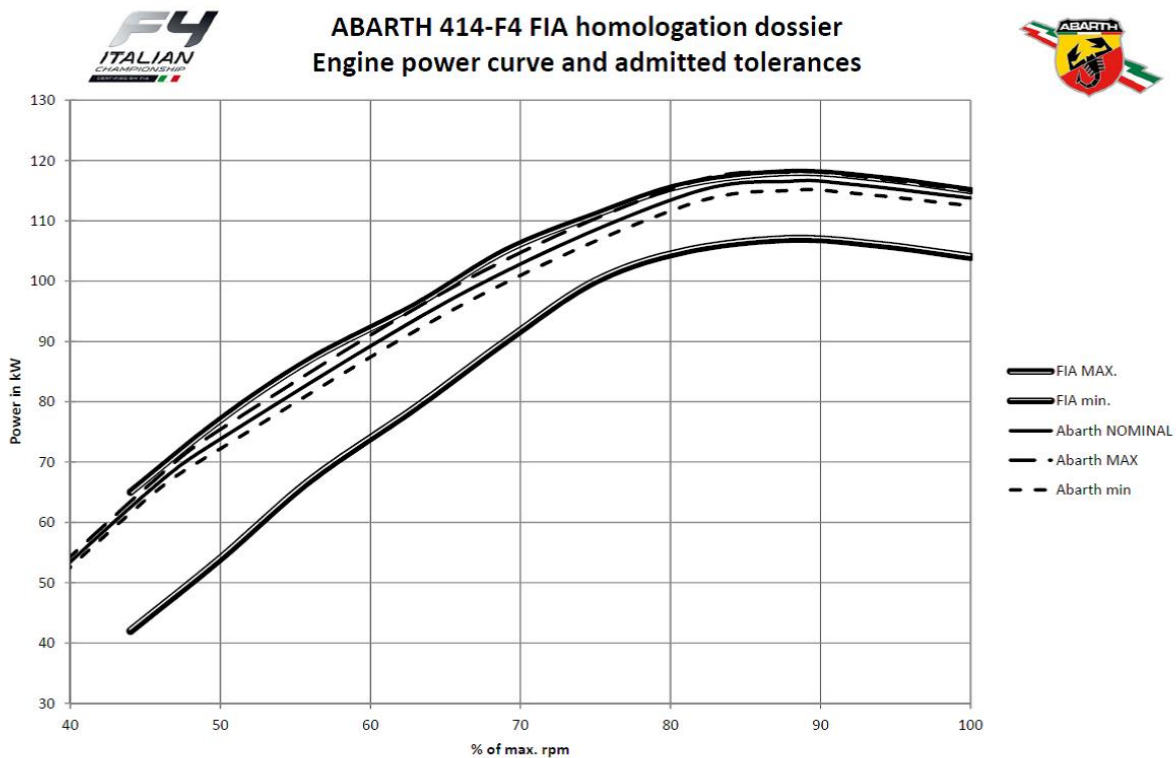
Garrett

Boost pressure (3250 rpm)

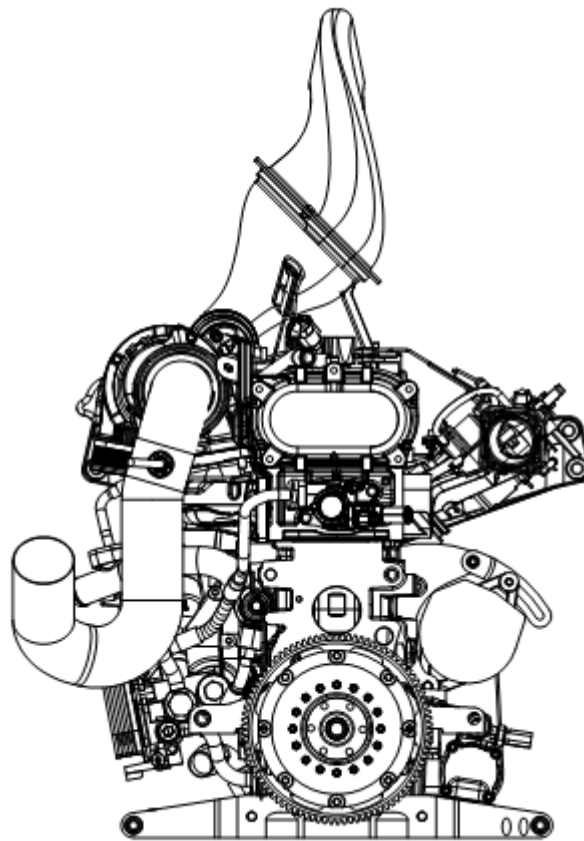
1150

MbarG

Performance



USE AND MAINTENANCE INSTRUCTIONS



Preliminary checks

WARM-UP		NOTES
1	Coolant level check	
2	Oil level check	System capacity about 4,5 liters
3	Accelerator pedal linearization	<p>Pedal linearization</p> <ol style="list-style-type: none"> 1) Switch OFF main switch 2) Set throttle pedal to full stroke 3) Switch ON main switch 4) Wait three second (throttle pedal full stroke) 5) Release throttle pedal (to idle position) 6) The system act the throttle body to 100% then to 0% 7) Check on dashboard page #2 that throttle reach 100% (idle value is set according to pre-opening strategies) <p>When engine is not running, the throttle automatically opens from about 15 to 25% to permit a correct cold starting.</p> <p><u>When pedal linearization is complete, switch OFF main switch</u></p>
4	Switch ON main switch	
5	Set the IGNITION switch to OFF	
6	Oil pressure check	Cold-crank with START button (GREEN) and check if the oil pressure exceeds 1 bar.
7	Set the IGNITION switch to ON	

8	Start with START button	Hot-crank to start engine. <u>During starting, it's necessary to use the secondary battery to avoid problems in the acquisition data.</u>
9	Check coolant circulation	Use the radiators and the turbocharger bleeds to remove gases from the coolant system. When the circulation of coolant starts, close the cap of water tank.
10	Warm up	During engine warm up, keep engine speed between 1500 and 2500 rpm. It's normal if the engine speed automatically begins to oscillate because there's a strategy that moves the throttle to maintain idle speed.
11	Idle speed	During engine warm up it's normal if the idle speed is higher than normal value because there's a strategy that opens the throttle to reduce the warm up time. When the warm up is complete, the correct idle speed is 1300 ± 100 rpm.
12	Turning off with IGNITION switch	The warm up must last until the coolant temperature reaches 75 °C.
13	Oil level check	Please refer to page 11.

General checks

COMPONENT PART		NOTES
1	Timing system	The rpm limiter is set to 6300 rpm (with pre-limiter of 150 rpm). The maximum allowed engine speed is 7000 rpm. Beyond this value, contact Autotecnica technicians.
2	Alternator	Alternator works correctly if beyond 2700 rpm the battery voltage is about 13,5 V.
3	Lubrication system	Replace the oil and the oil filter at the end of each event or ever 500 km. It's forbidden to use different oil from that recommended in this manual.
4	Air filter	At the end of each event check the integrity and the cleanness of the air filter. In the event of a fault, check the baldes of the compressor.
5	Turbocharger	To ensure the integrity of the turbocharger, complete the last lap of each run at low engine load. When the car enters the box don't turn off the engine immediately. Maintain the idle speed for at least 30 seconds (check if the water temperature exceeds 95°C). It's normal to find a small amount of oil in the intake system.
6	Auxiliary belt	At the end of each event check the integrity of the auxiliary belt.

Dashboard alarms

N° alarm	Description	Lower threshold	Upper threshold
1	Oil pressure	2	8
2	Water temperature	60	95
3	Oil temperature	70	140
4	Battery voltage	10,5	15

Flywheel

The tightening torque of M9x1,25 bolts is 65 Nm.

Clutch

The tightening torque of K-Lock M8x1 nuts is 27 Nm.

Auxiliary belt tension

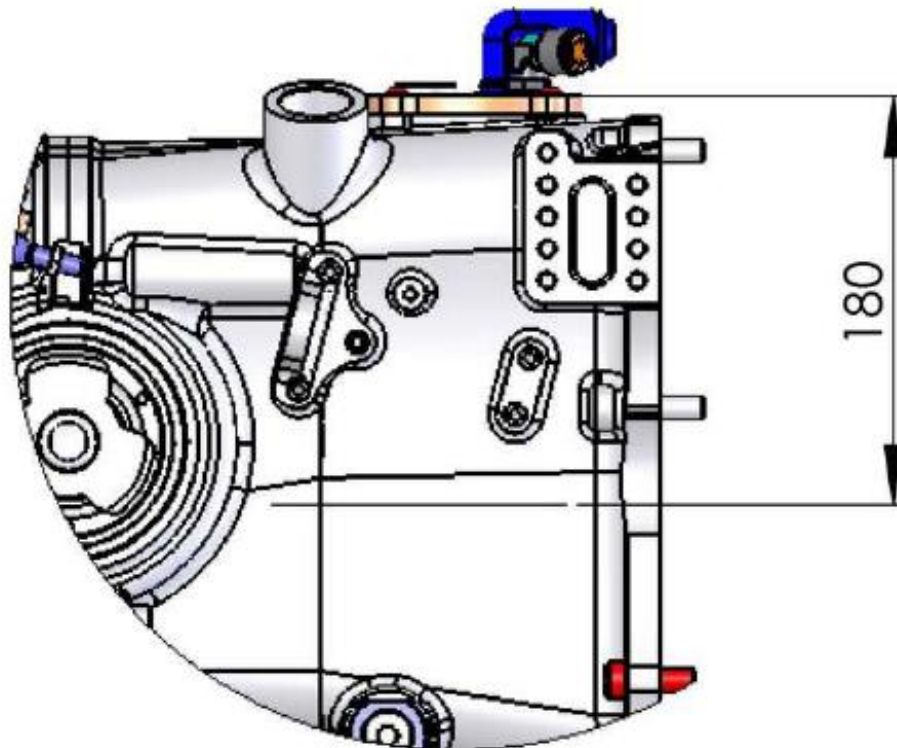
The correct tension of auxiliary belt is 120 Hz in the branch between scavenge pump and alternator.

Engine Oil Level Procedure

The oil tank is located within the gearbox bell housing.

We recommend to respect the following oil level, please refer to the following procedure in order to have a consistent measurement:

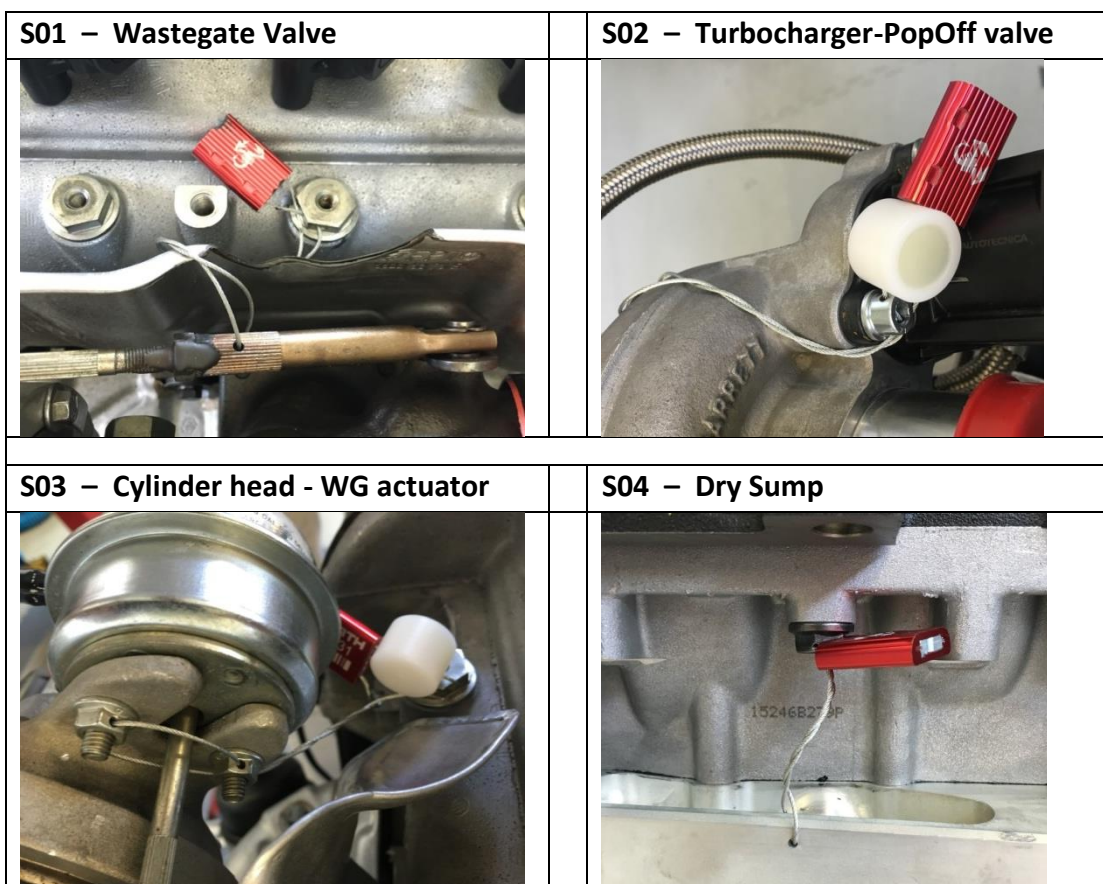
- 1) Turn on the engine;
- 2) Warm up temperatures (oil at 80°C);
- 3) Run the engine for 30 second at 3000 rpm;
- 4) Turn off the engine;
- 5) Measure the oil level: from the filler plug plate the oil level should be 180 mm.





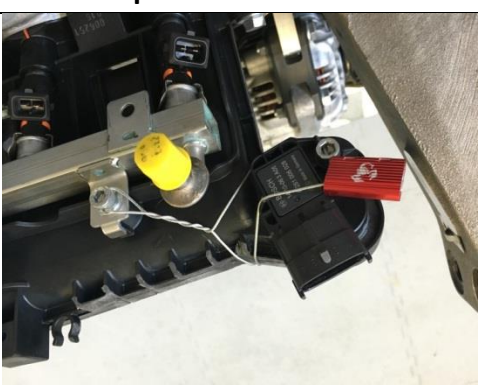




COMPLEMENTARY INFO

	ENGINE SEALS	MECHANICAL	RFID
1	Wastegate Valve	X	
2	Turbocharger - PopOff valve	X	X
3	Cylinder head-WG actuator	X	X
4	Dry sump	X	
5	Engine block	X	
6	Timing cover		X
7	Fuel pressure regulator	X	
8	Fuel pressure sensor	X	
9	Air pressure sensor	X	
10	Timing cover		X
11	SMOT sensor bracket		X

The pictures show the position of the seals



S05 – Engine Block	S06 – Timing cover
	
S07 – Fuel pressure regulator	S08 – Fuel pressure sensor
	
S09 – Air pressure sensor	S10 – Timing cover
	
S11 – SMOT sensor bracket	
	

Contacts

Manufacturer:

ABARTH & C. S.p.a.

Address: Via Plava, 80 – 10135 Turin – Italy

General Information:

Phone: +39 011 0044871

(switchboard)

e-mail: racing.info@abarth.it

Sporting issues:

Ermanno GAGLILOLO

Phone: +39 011 0044980

e-mail: racing.sporting@abarth.it

Technical & Homologation

Andrea BARBIERI

Phone: +39 011 0044855

e-mail: racing.technical@abarth.it

Commercial sales:

Susanna REALI

Phone: +39 011 0044856

e-mail: racing.aftersales@abarth.it

Authorized Service and Aftersales Agent:

AUTOTECNICA MOTORI S.n.c.

Address: Via A. Bernardi, 3 – 26041 Casalmaggiore (Cr) – Italy

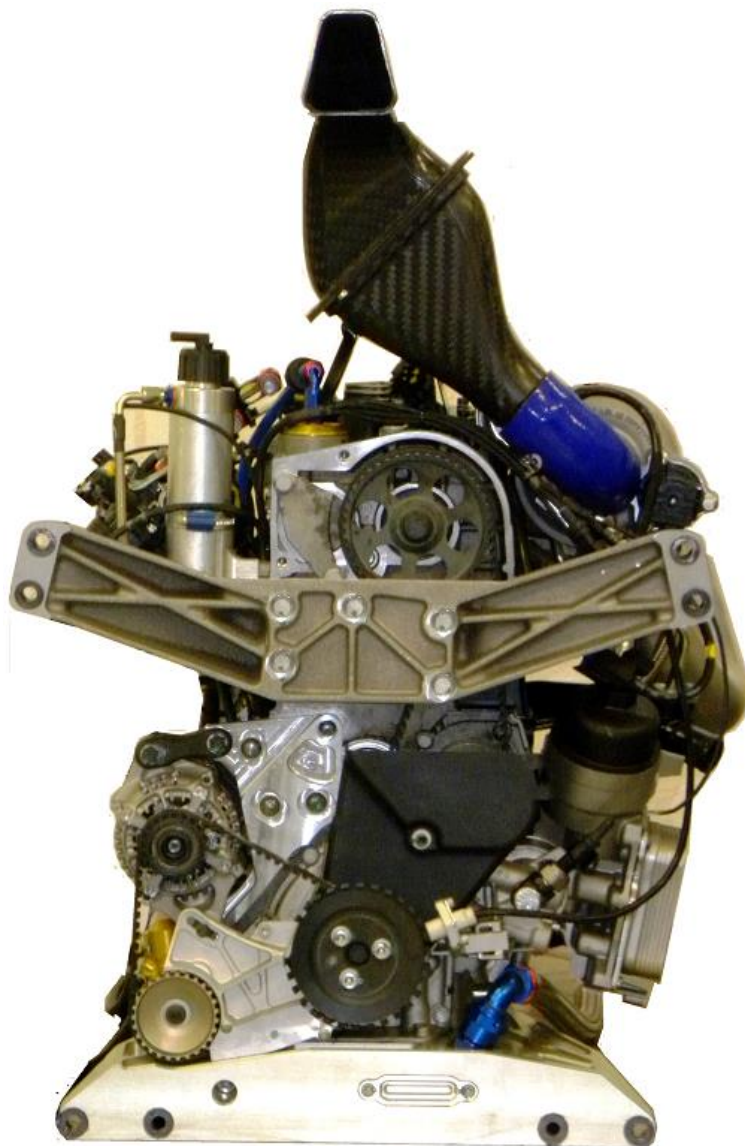
Giovanni DELFINO

Phone: +39 0375 40174

e-mail: giovanni.delfino@autotecnicamotori.it

TECHNICAL MANUAL

ENGINE 414-F4

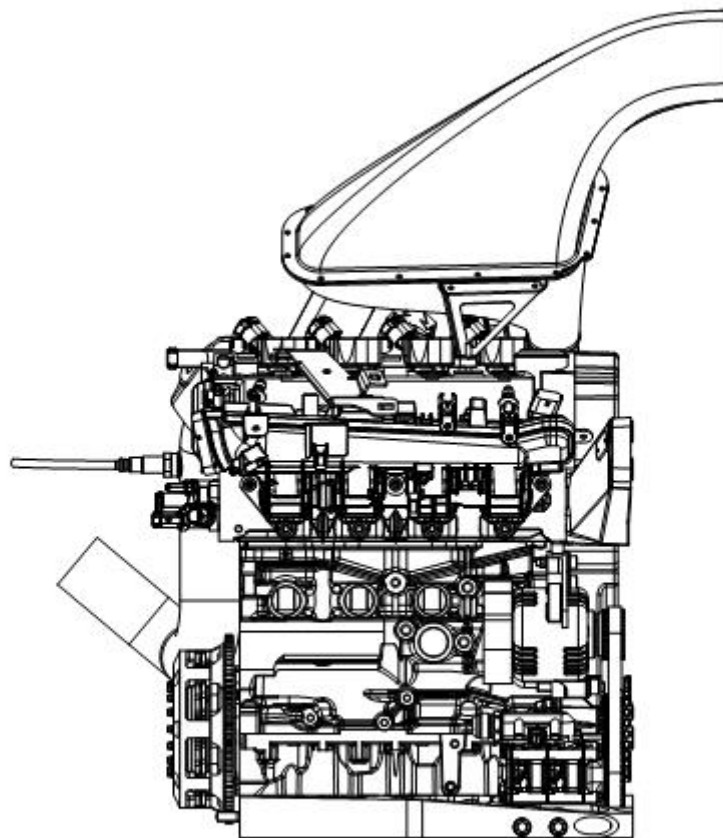


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-  **DATASHEET**
-  **USE AND MAINTENANCE INSTRUCTION**
-  **COMPLEMENTARY INFO**

DATASHEET

ENGINE 414-F4



General data

Bore	72	mm
Stroke	84	mm
Capacity	1368	cm ³
Compression ratio (nominal)	9,8:1	
Maximum power DIN	160/118	cv/kW
Maximum torque DIN (3000 rpm)	235	Nm
Fuel required	102	RON

Timing system

	<i>Int</i>	<i>Exh</i>
Port diameter of cylinder head (mm)	22,7	18,8
Valve lift without clearance (mm)	7,5	7
Timing (°)	-2/34	27/-2

Mixture supply system

Throttle body	Bosch DVE5
Injector	Bosch
Fuel pressure (bar)	3,5 + int. manif. Press.
Spark plugs	NGK IKR9F8
Firing order	1-3-4-2
ECU	Magneti Marelli SRA EDL 16

Lubrication system

Oil required	Selenia Racing 10W/60
Optimum operating oil temperature (°C)	100 ÷ 130
Maximum operating oil temperature (°C)	140
Average oil pressure with normal Operating temperature (bar)	4,2 ÷ 5,2
Oil pressure at idle speed with normal operating temperature (bar)	2,5 ÷ 3,0

Cooling system

Centrifugal pump timing belt drive

Coolant

Water + 10 ÷ 15 % glycol

Optimum operating water temperature (°C)

80 ÷ 85

Maximum operating water temperature (°C)

100

Opening pressure water tank cap (bar)

1,2

Boost system

Turbocharger

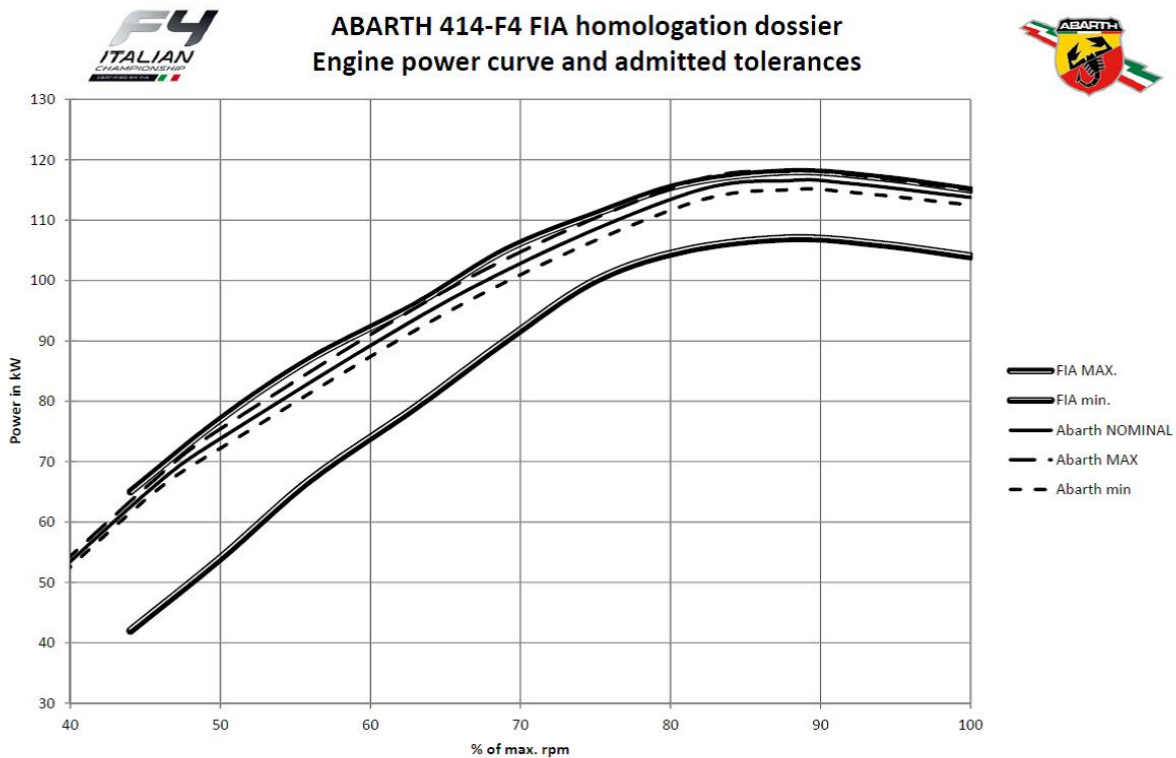
Garrett

Boost pressure (3250 rpm)

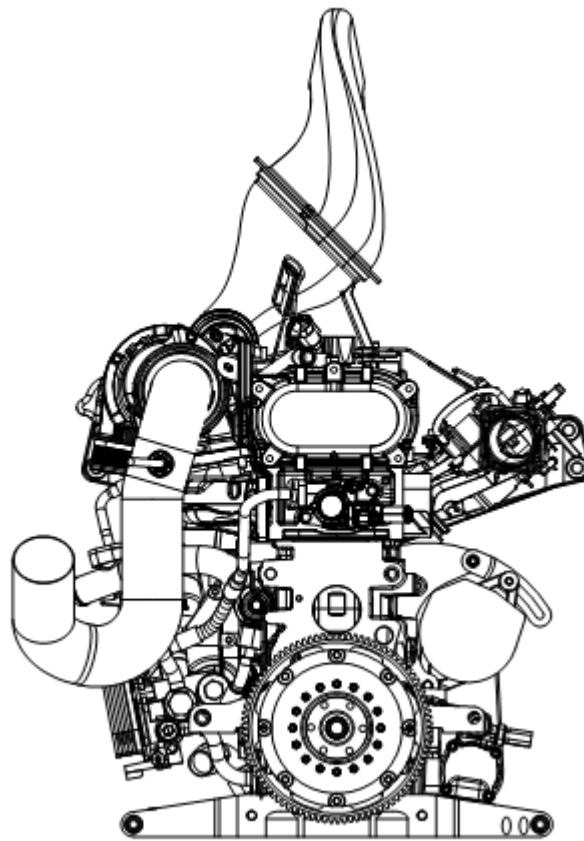
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MbarG

Performance



USE AND MAINTENANCE INSTRUCTIONS



Preliminary checks

WARM-UP		NOTES
1	Coolant level check	
2	Oil level check	System capacity about 4,5 liters
3	Accelerator pedal linearization	<p>Pedal linearization</p> <ol style="list-style-type: none"> 1) Switch OFF main switch 2) Set throttle pedal to full stroke 3) Switch ON main switch 4) Wait three second (throttle pedal full stroke) 5) Release throttle pedal (to idle position) 6) The system act the throttle body to 100% then to 0% 7) Check on dashboard page #2 that throttle reach 100% (idle value is set according to pre-opening strategies) <p>When engine is not running, the throttle automatically opens from about 15 to 25% to permit a correct cold starting.</p> <p><u>When pedal linearization is complete, switch OFF main switch</u></p>
4	Switch ON main switch	
5	Set the IGNITION switch to OFF	
6	Oil pressure check	Cold-crank with START button (GREEN) and check if the oil pressure exceeds 1 bar.
7	Set the IGNITION switch to ON	

8	Start with START button	Hot-crank to start engine. <u>During starting, it's necessary to use the secondary battery to avoid problems in the acquisition data.</u>
9	Check coolant circulation	Use the radiators and the turbocharger bleeds to remove gases from the coolant system. When the circulation of coolant starts, close the cap of water tank.
10	Warm up	During engine warm up, keep engine speed between 1500 and 2500 rpm. It's normal if the engine speed automatically begins to oscillate because there's a strategy that moves the throttle to maintain idle speed.
11	Idle speed	During engine warm up it's normal if the idle speed is higher than normal value because there's a strategy that opens the throttle to reduce the warm up time. When the warm up is complete, the correct idle speed is 1300 ± 100 rpm.
12	Turning off with IGNITION switch	The warm up must last until the coolant temperature reaches 75 °C.
13	Oil level check	Please refer to page 11.

General checks

COMPONENT PART		NOTES
1	Timing system	The rpm limiter is set to 6300 rpm (with pre-limiter of 150 rpm). The maximum allowed engine speed is 7000 rpm. Beyond this value, contact Autotecnica technicians.
2	Alternator	Alternator works correctly if beyond 1700 rpm the battery voltage is about 13,8 V.
3	Lubrication system	Replace the oil and the oil filter at the end of each event or ever 500 km. It's forbidden to use different oil from that recommended in this manual.
4	Air filter	At the end of each event check the integrity and the cleanness of the air filter. In the event of a fault, check the baldes of the compressor.
5	Turbocharger	To ensure the integrity of the turbocharger, complete the last lap of each run at low engine load. When the car enters the box don't turn off the engine immediately. Maintain the idle speed for at least 30 seconds (check if the water temperature exceeds 95°C). It's normal to find a small amount of oil in the intake system.
6	Auxiliary belt	At the end of each event check the integrity of the auxiliary belt.

Dashboard alarms

N° alarm	Description	Lower threshold	Upper threshold
1	Oil pressure	2	---
2	Water temperature	---	110
3	Battery voltage	11	---

Flywheel

The tightening torque of M9x1,25 bolts is 65 Nm.

Clutch

The tightening torque of K-Lock M8x1 nuts is 27 Nm.

Auxiliary belt tension

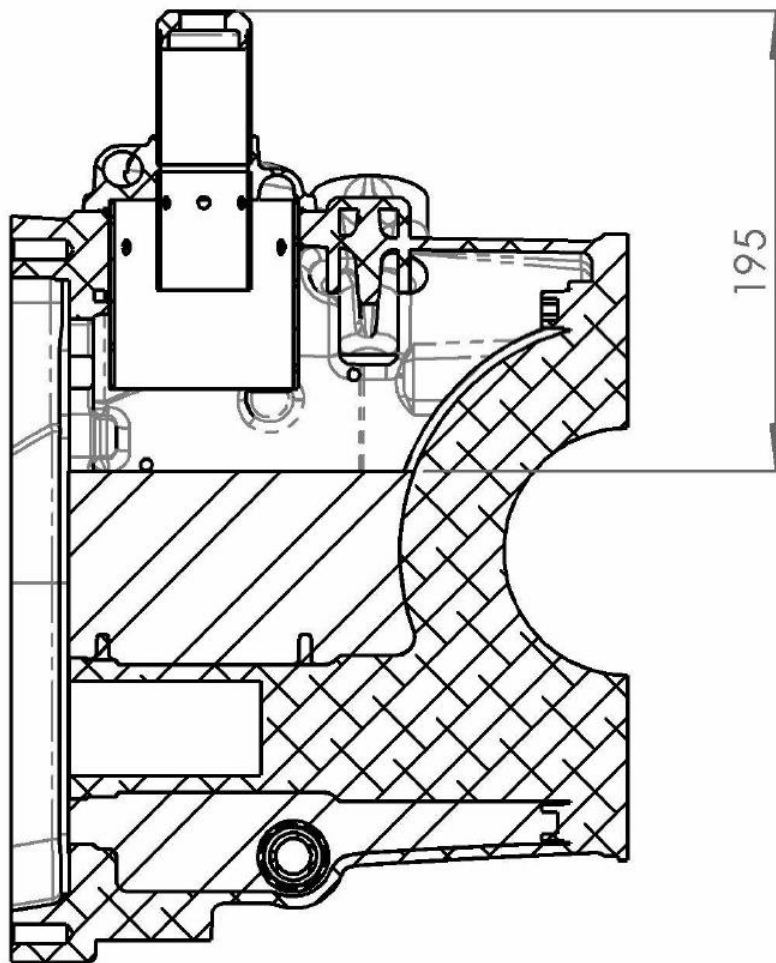
The correct tension of auxiliary belt is 120 Hz in the branch between scavenge pump and alternator.

Engine Oil Level Procedure

The oil tank is located within the gearbox bell housing.

We recommend to respect the following oil level, please refer to the following procedure in order to have a consistent measurement:

- 1) Turn on the engine;
- 2) Warm up temperatures (oil at 80°C);
- 3) Run the engine for 30 second at 3000 rpm;
- 4) Turn off the engine;
- 5) Measure the oil level: from the filler plug plate the oil level should be **195 mm**.

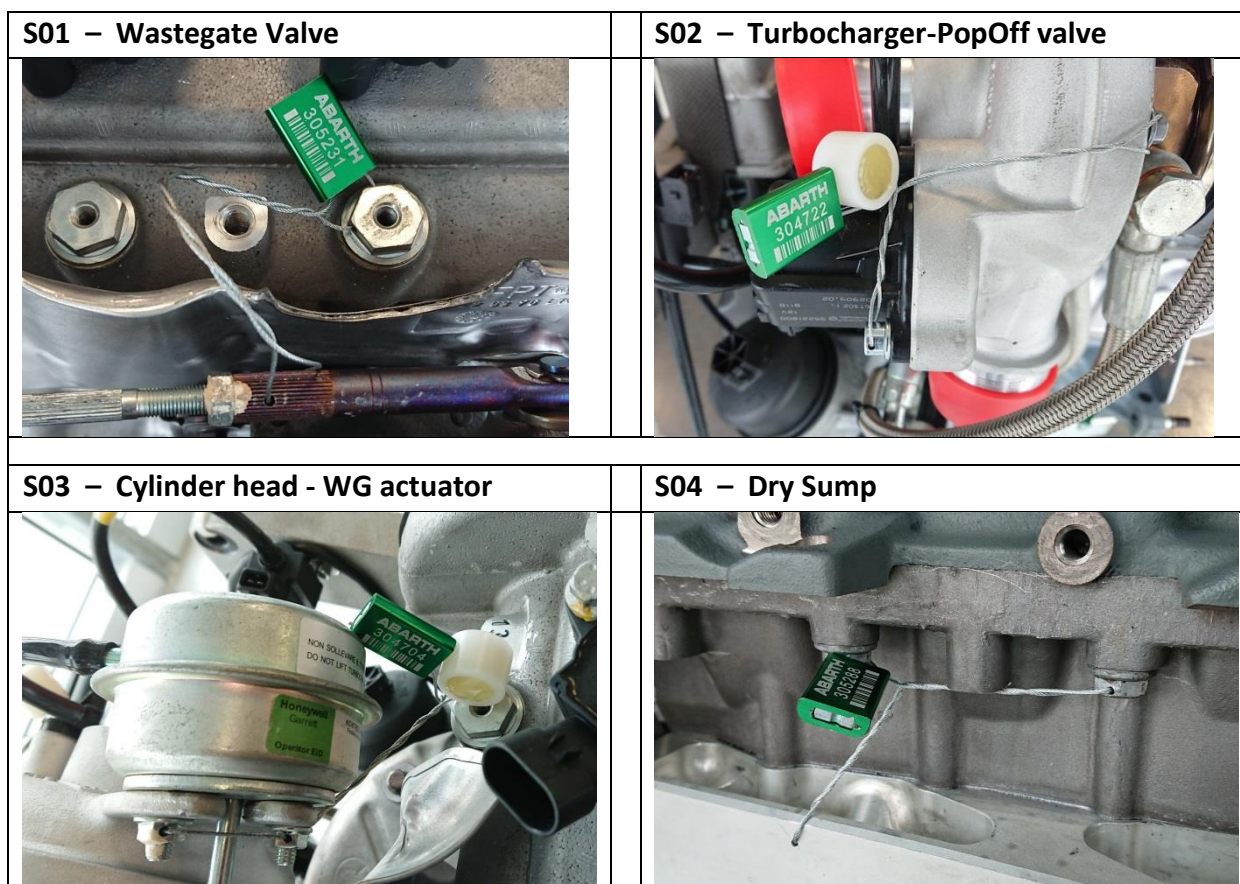


Volume: 4.0 Lt



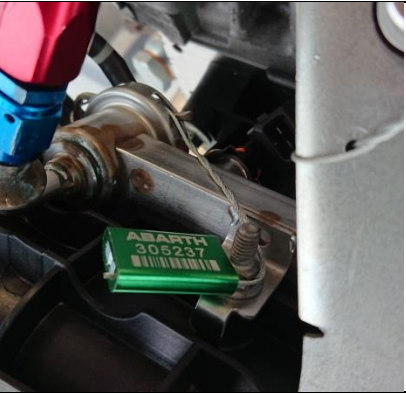
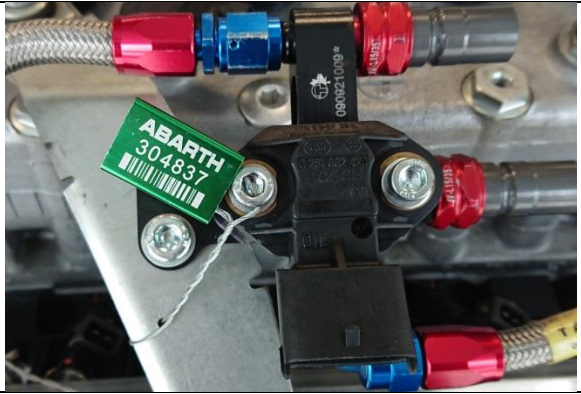

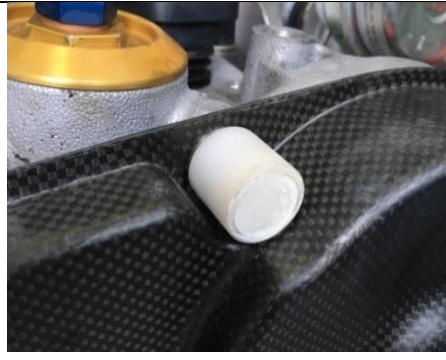
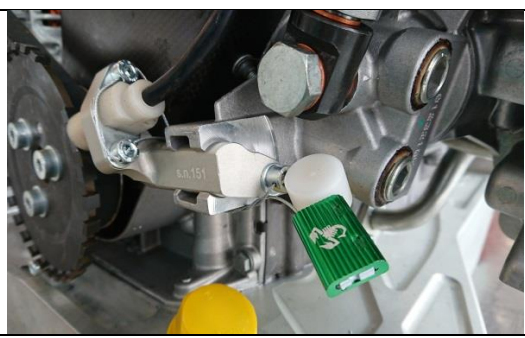
COMPLEMENTARY INFO

	ENGINE SEALS	MECHANICAL	RFID
1	Wastegate Valve	X	
2	Turbocharger - PopOff valve	X	X
3	Cylinder head-WG actuator	X	X
4	Dry sump	X	
5	Engine block	X	
6	Rear cover		X
7	Injectors rail	X	
8	Fuel pressure sensor	X	
9	Air pressure sensor	X	
10	Timing cover		X
11	SMOT sensor bracket	X	X

The pictures show the position of the seals



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<p>S05 – Engine Block</p> 	<p>S06 – Rear cover</p> 
<p>S07 – Fuel pressure regulator</p> 	<p>S08 – Fuel pressure sensor</p> 
<p>S09 – Air pressure sensor</p> 	<p>S10 – Timing cover</p> 
<p>S11 – SMOT sensor bracket</p> 	

Contacts

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(switchboard)

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Technical & Homologation

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Phone: +39 011 0044855

e-mail: racing.technical@abarth.it

Commercial sales:

Susanna REALI

Phone: +39 011 0044856

e-mail: racing.aftersales@abarth.it

Authorized Service and Aftersales Agent:

AUTOTECNICA MOTORI S.n.c.

Address: Via A. Bernardi, 3 – 26041 Casalmaggiore (CR) – Italy

Alberto LONGHINI

Phone: +39 345 2345509

e-mail: alberto.longhini@autotecnicamotori.it

Andrea CANEVELLO

Phone: +39 380 2644400

e-mail: andrea.canevello@autotecnicamotori.it

Fabio VAILATI

Phone: +39 346 5399498

e-mail: fabio.vailati@autotecnicamotori.it

TECHNICAL MANUAL

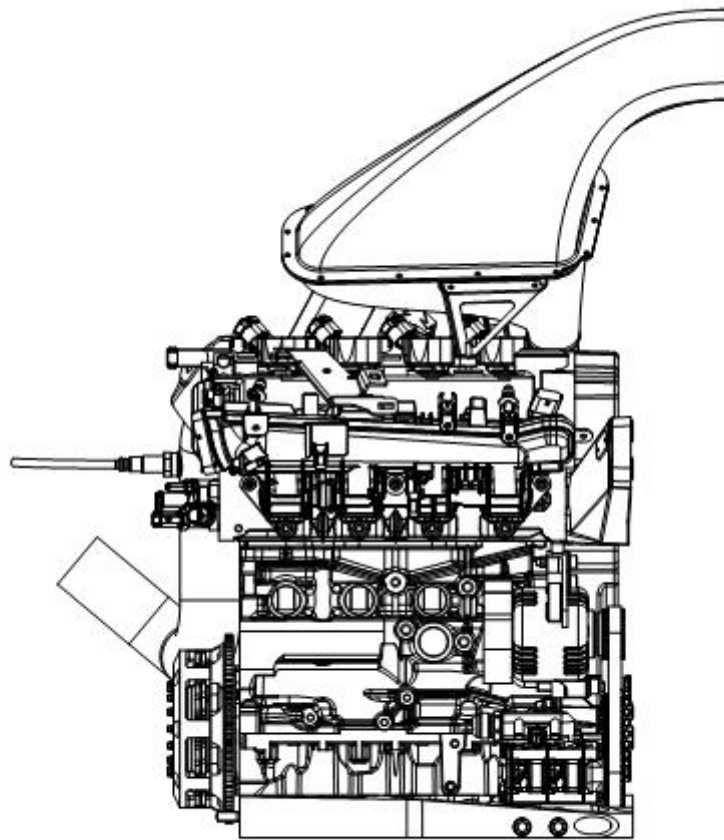
ENGINE 414-F4



This technical manual contains necessary information for engine use and maintenance. It consists of three sections:

-  **DATASHEET**
-  **USE AND MAINTENANCE INSTRUCTION**
-  **COMPLEMENTARY INFO**

DATASHEET ENGINE 414-F4



General data

Bore	72	mm
Stroke	84	mm
Capacity	1368	cm ³
Compression ratio (nominal)	9,8:1	
Maximum power DIN	160/118	cv/kW
Maximum torque DIN (3000 rpm)	235	Nm
Fuel required	102	RON

Timing system

	<i>Int</i>	<i>Exh</i>
Port diameter of cylinder head (mm)	22,7	18,8
Valve lift without clearance (mm)	7,5	7
Timing (°)	-2/34	27/-2

Mixture supply system

Throttle body	Bosch DVE5
Injector	Bosch
Fuel pressure (bar)	3,5 + int. manif. Press.
Spark plugs	NGK IKR9F8
Firing order	1-3-4-2
ECU	Magneti Marelli SRA EDL 16

Lubrication system

Oil required	Selenia Racing 10W/60
Optimum operating oil temperature (°C)	100 ÷ 130
Maximum operating oil temperature (°C)	140
Average oil pressure with normal Operating temperature (bar)	4,2 ÷ 5,2
Oil pressure at idle speed with normal operating temperature (bar)	2,5 ÷ 3,0

Cooling system

Centrifugal pump timing belt drive

Coolant

Water + 10 ÷ 15 % glycol

Optimum operating water temperature (°C)

80 ÷ 85

Maximum operating water temperature (°C)

100

Opening pressure water tank cap (bar)

1,2

Boost system

Turbocharger

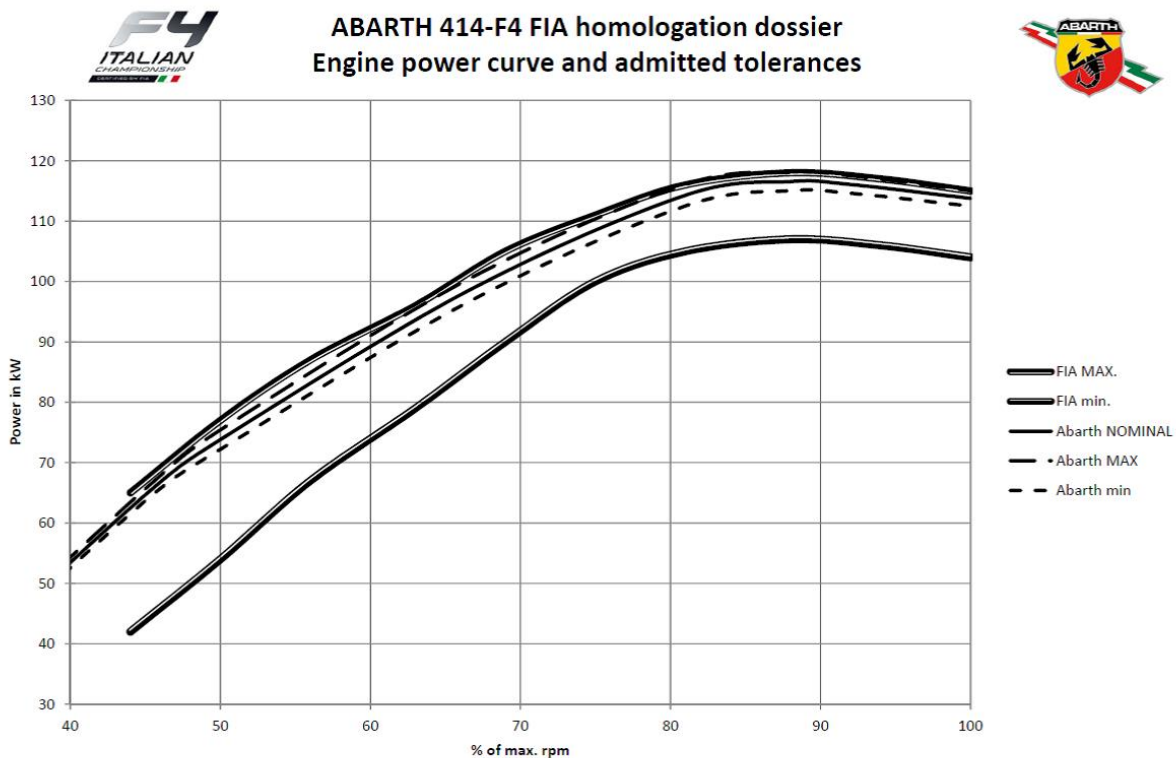
Garrett

Boost pressure (3250 rpm)

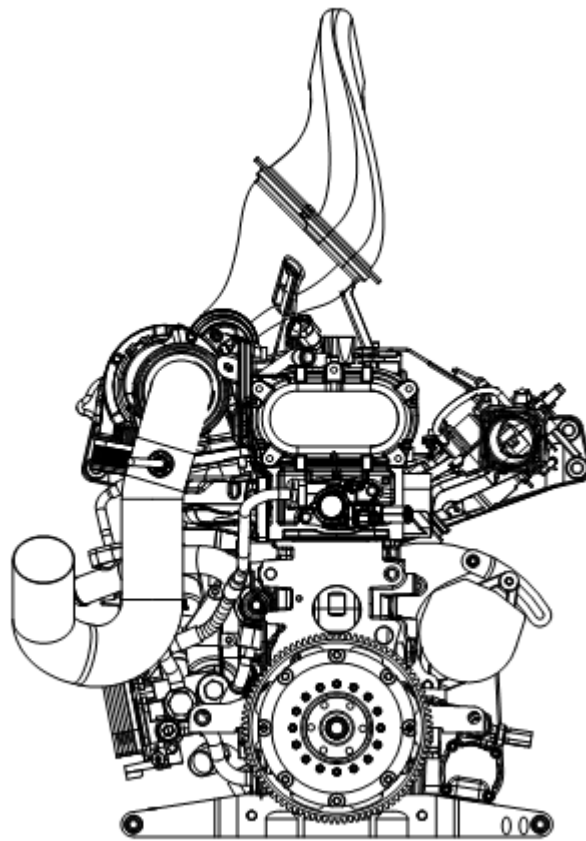
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MbarG

Performance



USE AND MAINTENANCE INSTRUCTIONS



WARM-UP		NOTES
1	Coolant level check	
2	Oil level check	System capacity about 4,5 liters
3	Accelerator pedal linearization	<p>Pedal linearization</p> <ol style="list-style-type: none"> 1) Switch OFF main switch 2) Set throttle pedal to full stroke 3) Switch ON main switch 4) Wait three second (throttle pedal full stroke) 5) Release throttle pedal (to idle position) 6) The system act the throttle body to 100% then to 0% 7) Check on dashboard page #2 that throttle reach 100% (idle value is set according to pre-opening strategies) <p>When engine is not running, the throttle automatically opens from about 15 to 25% to permit a correct cold starting.</p> <p><u>When pedal linearization is complete, switch OFF main switch</u></p>
4	Switch ON main switch	
5	Set the IGNITION switch to OFF	
6	Oil pressure check	Cold-crank with START button (GREEN) and check if the oil pressure exceeds 1 bar.
7	Set the IGNITION switch to ON	

8	Start with START button	Hot-crank to start engine. <u>During starting, it's necessary to use the secondary battery to avoid problems in the acquisition data.</u>
9	Check coolant circulation	Use the radiators and the turbocharger bleeds to remove gases from the coolant system. When the circulation of coolant starts, close the cap of water tank.
10	Warm up	During engine warm up, keep engine speed between 1500 and 2500 rpm. It's normal if the engine speed automatically begins to oscillate because there's a strategy that moves the throttle to maintain idle speed.
11	Idle speed	During engine warm up it's normal if the idle speed is higher than normal value because there's a strategy that opens the throttle to reduce the warm up time. When the warm up is complete, the correct idle speed is 1300 ± 100 rpm.
12	Turning off with IGNITION switch	The warm up must last until the coolant temperature reaches 75 °C.
13	Oil level check	Please refer to page 11.

General checks

COMPONENT PART		NOTES
1	Timing system	The rpm limiter is set to 6300 rpm (with pre-limiter of 150 rpm). The maximum allowed engine speed is 7000 rpm. Beyond this value, contact Autotecnica technicians.
2	Alternator	Alternator works correctly if beyond 1700 rpm the battery voltage is about 13,8 V.
3	Lubrication system	Replace the oil and the oil filter at the end of each event or ever 500 km. It's forbidden to use different oil from that recommended in this manual.
4	Air filter	At the end of each event check the integrity and the cleanness of the air filter. In the event of a fault, check the baldes of the compressor.
5	Turbocharger	To ensure the integrity of the turbocharger, complete the last lap of each run at low engine load. When the car enters the box don't turn off the engine immediately. Maintain the idle speed for at least 30 seconds (check if the water temperature exceeds 95°C). It's normal to find a small amount of oil in the intake system.
6	Auxiliary belt	At the end of each event check the integrity of the auxiliary belt.

Dashboard alarms

N° alarm	Description	Lower threshold	Upper threshold
1	Oil pressure	2	---
2	Water temperature	---	110
3	Battery voltage	11	---

Flywheel

The tightening torque of M9x1,25 bolts is 65 Nm.

Clutch

The tightening torque of K-Lock M8x1 nuts is 27 Nm.

Auxiliary belt tension

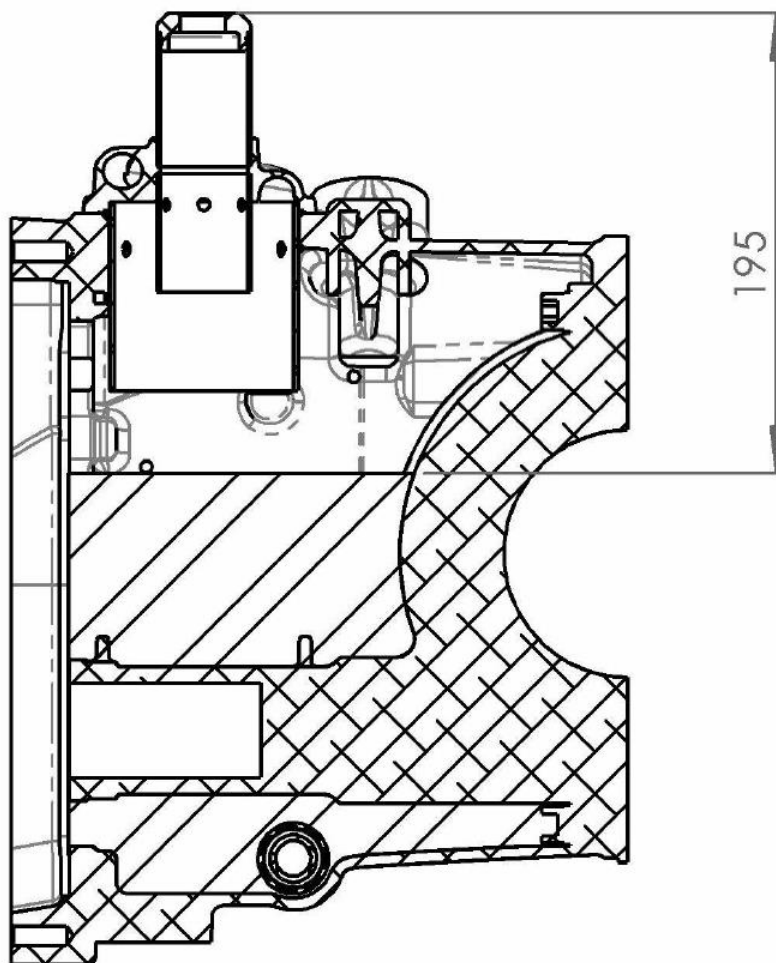
The correct tension of auxiliary belt is 120 Hz in the branch between scavenge pump and alternator.

Engine Oil Level Procedure

The oil tank is located within the gearbox bell housing.

We recommend to respect the following oil level, please refer to the following procedure in order to have a consistent measurement:

- 1) Turn on the engine;
- 2) Warm up temperatures (oil at 80°C);
- 3) Run the engine for 30 second at 3000 rpm;
- 4) Turn off the engine;
- 5) Measure the oil level: from the filler plug plate the oil level should be **195 mm**.

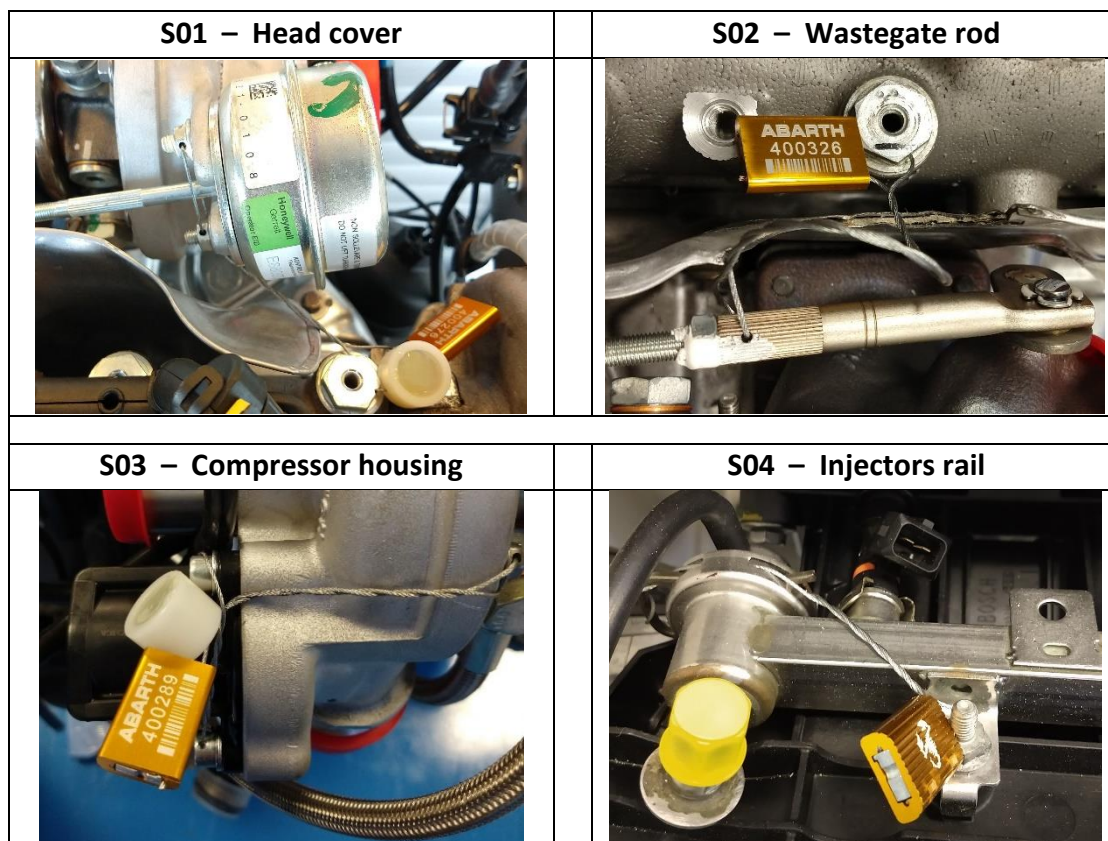


Volume: 4.0 Lt




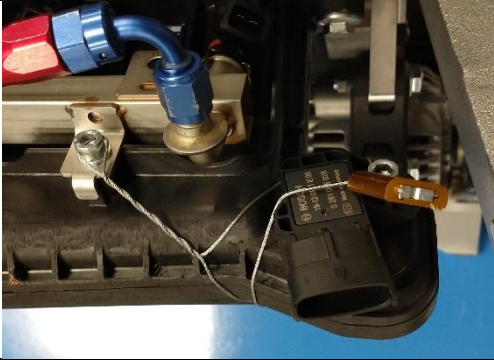



COMPLEMENTARY INFO

	ENGINE SEALS	MECHANICAL	RFID
1	Head cover	X	X
2	Wastegate Rod	X	
3	Compressor housing	X	X
4	Injectors rail	X	
5	Crankcase	X	
6	Dry sump	X	
7	PFuel sensor	X	
8	PAdm sensor	X	
9	SMOT sensor	X	X
10	Timing cover		X
11	Rear cover		X

The pictures show the position of the seals





<p>S05 – Crankcase</p> 	<p>S06 – Dry sump</p> 
<p>S07 – PFuel sensor</p> 	<p>S08 – PAdm sensor</p> 
<p>S09 – SMOT sensor</p> 	<p>S10 – Timing cover</p> 
<p>S11 – Rear Cover</p> 	

Contacts

Manufacturer:

ABARTH & C. S.p.a.

Address: Via Plava, 80 – 10135 Turin – Italy

General Information:

Phone: +39 011 0044871

(switchboard)

e-mail: racing.info@abarth.it

Sporting issues:

Ermanno GAGLILOLO

Phone: +39 011 0044980

e-mail: racing.sporting@abarth.it

Technical & Homologation

Andrea BARBIERI

Phone: +39 011 0044855

e-mail: racing.technical@abarth.it

Commercial sales:

Susanna REALI

Phone: +39 011 0044856

e-mail: racing.aftersales@abarth.it

Authorized Service and Aftersales Agent:

AUTOTECNICA MOTORI S.n.c.

Address: Via A. Bernardi, 3 – 26041 Casalmaggiore (CR) – Italy

Alberto LONGHINI

Phone: +39 345 2345509

e-mail: alberto.longhini@autotecnicamotori.it

Andrea CANEVELLO

Phone: +39 380 2644400

e-mail: andrea.canevello@autotecnicamotori.it

Fabio VAILATI

Phone: +39 346 5399498

e-mail: fabio.vailati@autotecnicamotori.it

TECHNICAL MANUAL

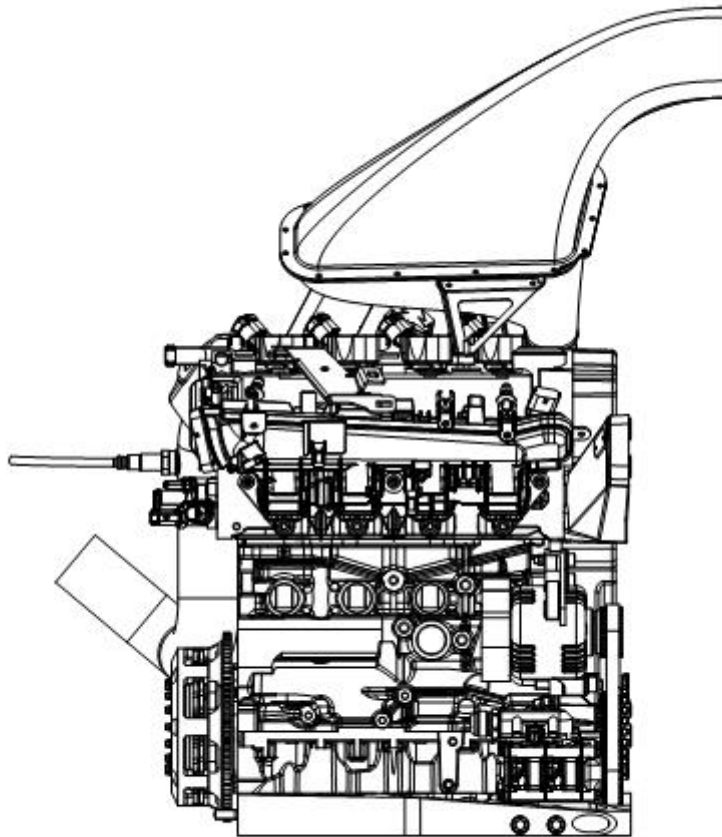
ENGINE 414-F4



This technical manual contains necessary informations for engine use and maintenance. It consists of three sections:

-  **DATASHEET**
-  **USE AND MAINTENANCE INSTRUCTION**
-  **COMPLEMENTARY INFO**

DATASHEET ENGINE 414-F4



General data

Bore	72	mm
Stroke	84	mm
Capacity	1368	cm ³
Compression ratio (nominal)	9,8:1	
Maximum power DIN	160/118	cv/kW
Maximum torque DIN (3000 rpm)	235	Nm
Fuel required	102	RON

Timing system

	<i>Int</i>	<i>Exh</i>
Port diameter of cylinder head (mm)	22,7	18,8
Valve lift without clearance (mm)	7,5	7
Timing (°)	-2/34	27/-2

Mixture supply system

Throttle body	Bosch DVE5
Injector	Bosch
Fuel pressure (bar)	3,5 + int. manif. Press.
Spark plugs	NGK IKR9F8
Firing order	1-3-4-2
ECU	Magneti Marelli SRA EDL 16

Lubrication system

Oil required	Selenia Racing 10W/60
Operating oil temperature (°C)	100 ÷ 130
Maximum oil temperature (°C)	140
Average oil pressure with normal operating temperature (bar)	4,2 ÷ 5,2
Oil pressure at idle speed with normal operating temperature (bar)	2,5 ÷ 3

Cooling system

Centrifugal pump timing belt drive

Coolant

Water + 10 ÷ 15 % glycol

Optimum operating temperature (°C)

80 ÷ 90

Maximum operating temperature (°C)

100

Opening pressure water tank cap (bar)

1,2

Boost system

Turbocharger

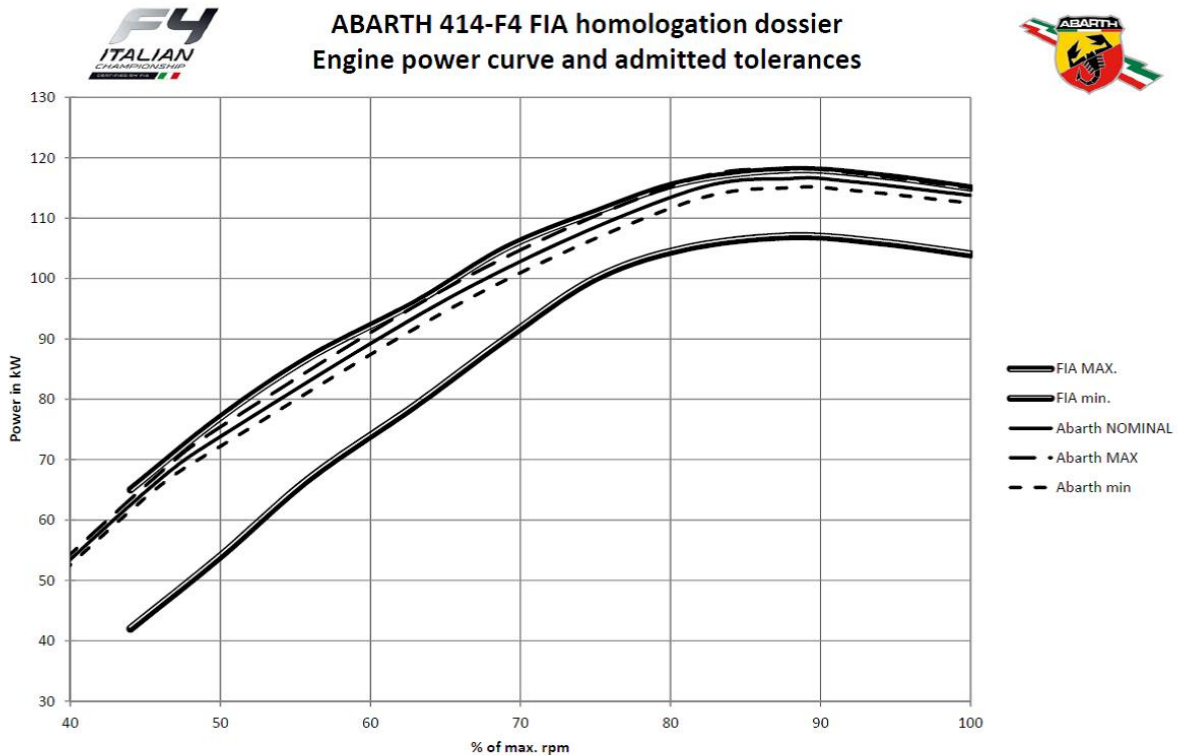
Garrett

Boost pressure (3250 rpm)

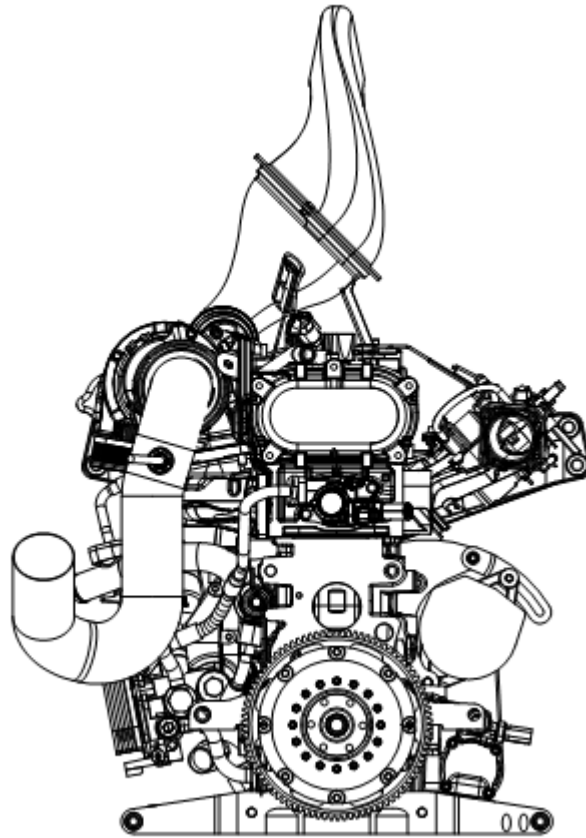
1150

MbarG

Performance



USE AND MAINTENANCE INSTRUCTIONS



Preliminary checks

WARM-UP		NOTES
1	Coolant level check	
2	Oil level check	System capacity about 4,5 liters
3	Accelerator pedal linearization	<p>Pedal linearization</p> <ol style="list-style-type: none"> 1) Switch OFF main switch 2) Set throttle pedal to full stroke 3) Switch ON main switch 4) Wait three second (throttle pedal full stroke) 5) Release throttle pedal (to idle position) 6) The system act the throttle body to 100% then to 0% 7) Check on dashboard page #2 that throttle reach 100% (idle value is set according to pre-opening strategies) <p>When engine is not running, the throttle automatically opens from about 15 to 25% to permit a correct cold starting.</p> <p><u>When pedal linearization is complete, switch OFF main switch</u></p>
4	Switch ON main switch	
5	Set the IGNITION switch to OFF	
6	Oil pressure check	Cold-crank with START button (GREEN) and check if the oil pressure exceeds 1 bar.
7	Set the IGNITION switch to ON	

8	Start with START button	Hot-crank to start engine. <u>During starting, it's necessary to use the secondary battery to avoid problems in the acquisition data.</u>
9	Check coolant circulation	Use the radiators and the turbocharger bleeds to remove gases from the coolant system. When the circulation of coolant starts, close the cap of water tank.
10	Warm up	During engine warm up, keep engine speed between 1500 and 2500 rpm. It's normal if the engine speed automatically begins to oscillate because there's a strategy that moves the throttle to maintain idle speed.
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12	Turning off with IGNITION switch	The warm up must last until the coolant temperature reaches 75 °C.
13	Oil level check	Please refer to page 11.

General checks

COMPONENT PART		NOTES
1	Timing system	The rpm limiter is set to 6300 rpm (with pre-limiter of 150 rpm). The maximum allowed engine speed is 7000 rpm. Beyond this value, contact Autotecnica technicians.
2	Alternator	Alternator works correctly if beyond 2700 rpm the battery voltage is about 13,5 V.
3	Lubrication system	Replace the oil and the oil filter at the end of each event or ever 500 km. It's forbidden to use different oil from that recommended in this manual.
4	Air filter	At the end of each event check the integrity and the cleanness of the air filter. In the event of a fault, check the baldes of the compressor.
5	Turbocharger	To ensure the integrity of the turbocharger, complete the last lap of each run at low engine load. When the car enters the box don't turn off the engine immediately. Maintain the idle speed for at least 30 seconds (check if the water temperature exceeds 95°C). It's normal to find a small amount of oil in the intake system.
6	Auxiliary belt	At the end of each event check the integrity of the auxiliary belt.

Dashboard alarms

N° alarm	Description	Lower threshold	Upper threshold
1	Oil pressure	2	8
2	Water temperature	60	95
3	Oil temperature	70	140
4	Battery voltage	10,5	15

Flywheel

The tightening torque of M9x1,25 bolts is 65 Nm.

Clutch

The tightening torque of K-Lock M8x1 nuts is 19 Nm.

Auxiliary belt tension

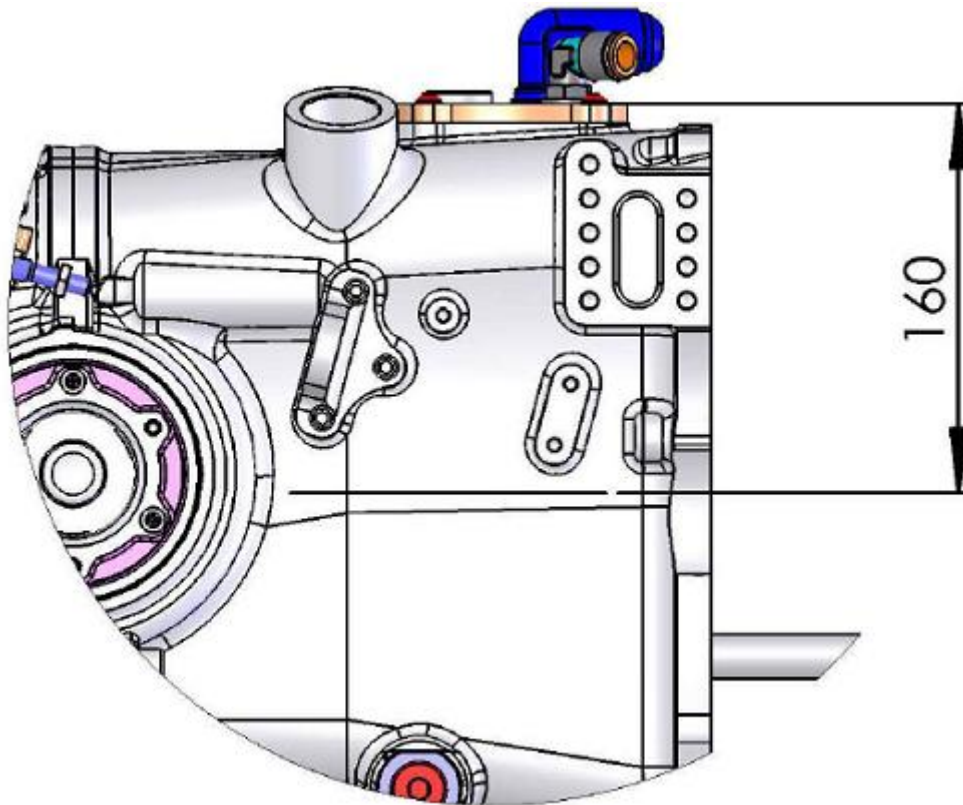
The correct tension of auxiliary belt is 120 Hz in the branch between scavenge pump and alternator.

Engine Oil Level Procedure

The oil tank is located within the gearbox bell housing.

We recommend to respect the following oil level, please refer to the following procedure in order to have a consistent measurement:

- 1) Turn on the engine;
- 2) Warm up temperatures (oil at 80°C);
- 3) Run the engine for 30 second at 3000 rpm;
- 4) Turn off the engine;
- 5) Measure the oil level from the filler plug plate.

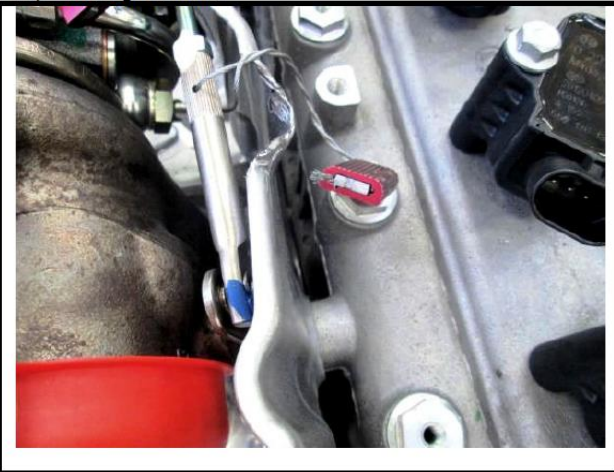


COMPLEMENTARY INFO

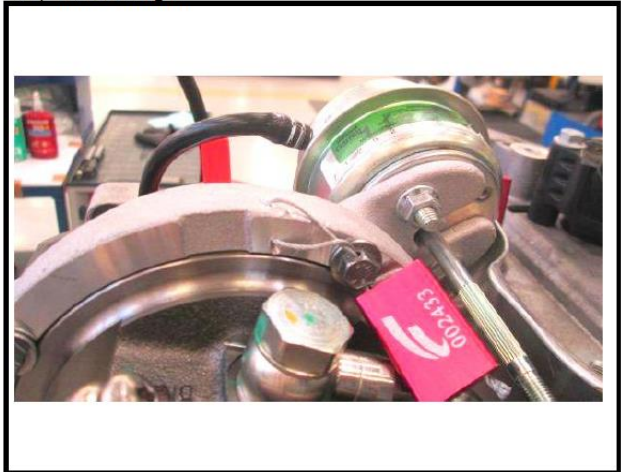
ENGINE SEALS	
1	Wastegate Valve
2	Turbocharger
3	Cylinder head
4	Oil sump
5	Engine block
6	Timing gear cover
7	Fuel pressure regulator
8	Fuel pressure sensor
9	Air pressure sensor

The pictures show the position of the seals.

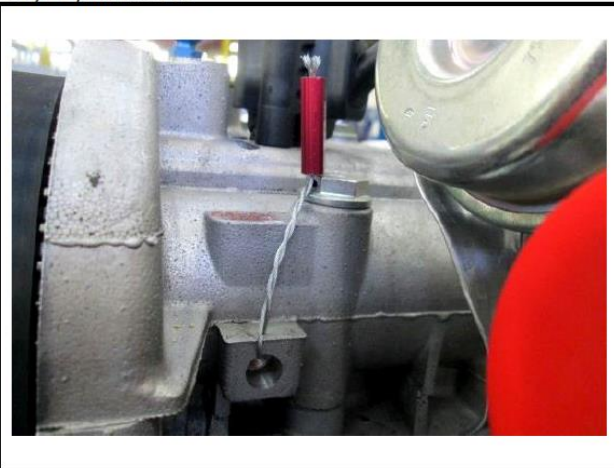
S1) Wastegate valve



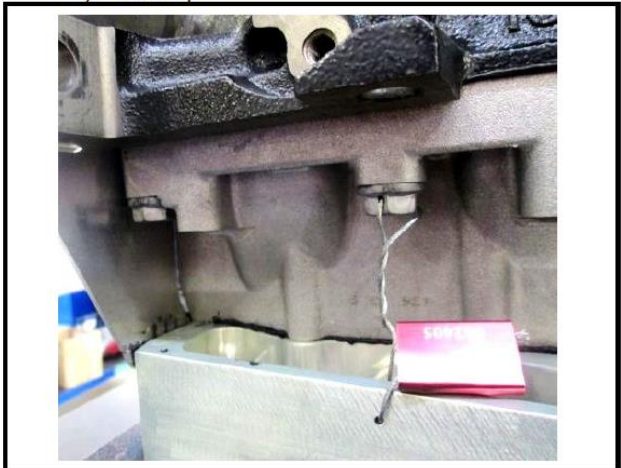
S2) Turbocharger



S3) Cylinder head



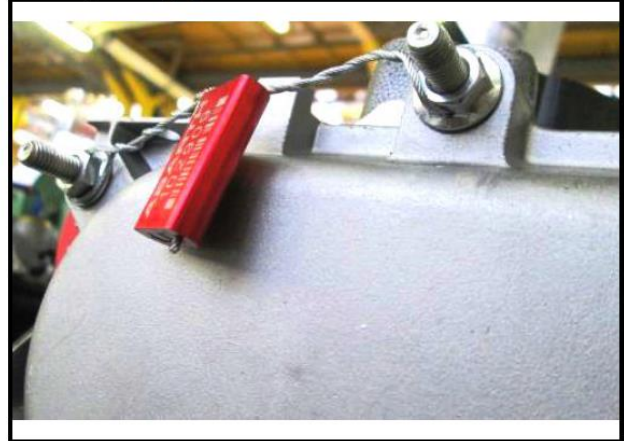
S4) Oil sump



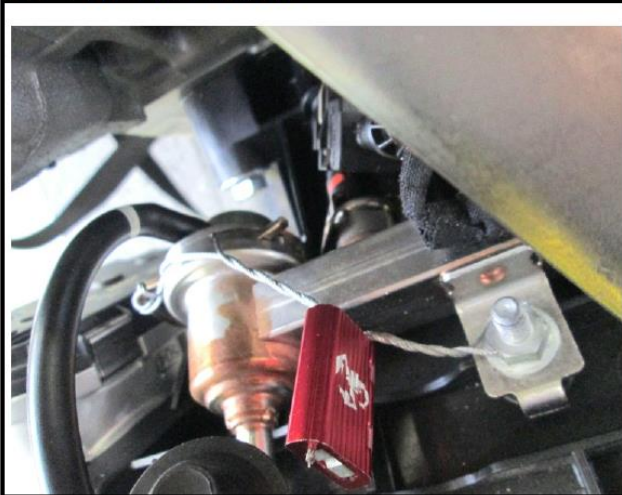
S5) Engine block



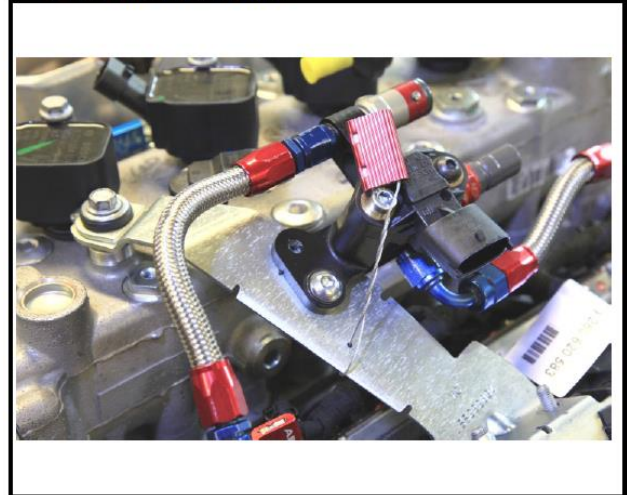
S6) Timing gear cover



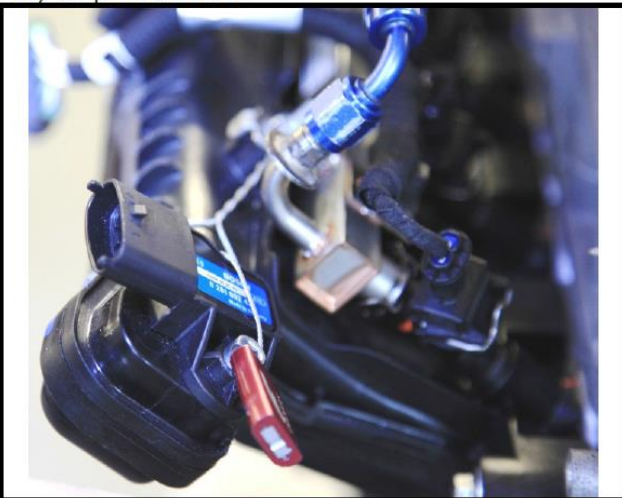
S7) Fuel pressure regulator



S8) Fuel pressure sensor



S9) Air pressure sensor



Contacts

Manufacturer:

ABARTH & C. S.p.a.

Address: Via Plava, 80 – 10135 Turin – Italy

General Information:

Phone: +39 011 0044871

(switchboard)

e-mail: racing.info@abarth.it

Sporting issues:

Ermanno GAGLILOLO

Phone: +39 011 0044980

e-mail: racing.sporting@abarth.it

Technical & Homologation

Andrea BARBIERI

Phone: +39 011 0044855

e-mail: racing.technical@abarth.it

Commercial sales:

Susanna REALI

Phone: +39 011 0044856

e-mail: racing.aftersales@abarth.it

Authorized Service and Aftersales Agent:

AUTOTECNICA MOTORI S.n.c.

Address: Via A. Bernardi, 3 – 26041 Casalmaggiore (Cr) – Italy

Giovanni DELFINO

Phone: +39 0375 40174

e-mail: giovanni.delfino@autotecnicamotori.it

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 001/17

OBJECT: 414-F4 engine, block welding

Since January 1st 2017 block welding will be permitted.

This operation can be done ONLY by Autotecnica Motori personnel in ATM workshop.

It will be allowed to weld the block ONLY in the following three critical positions (see Fig. 1):

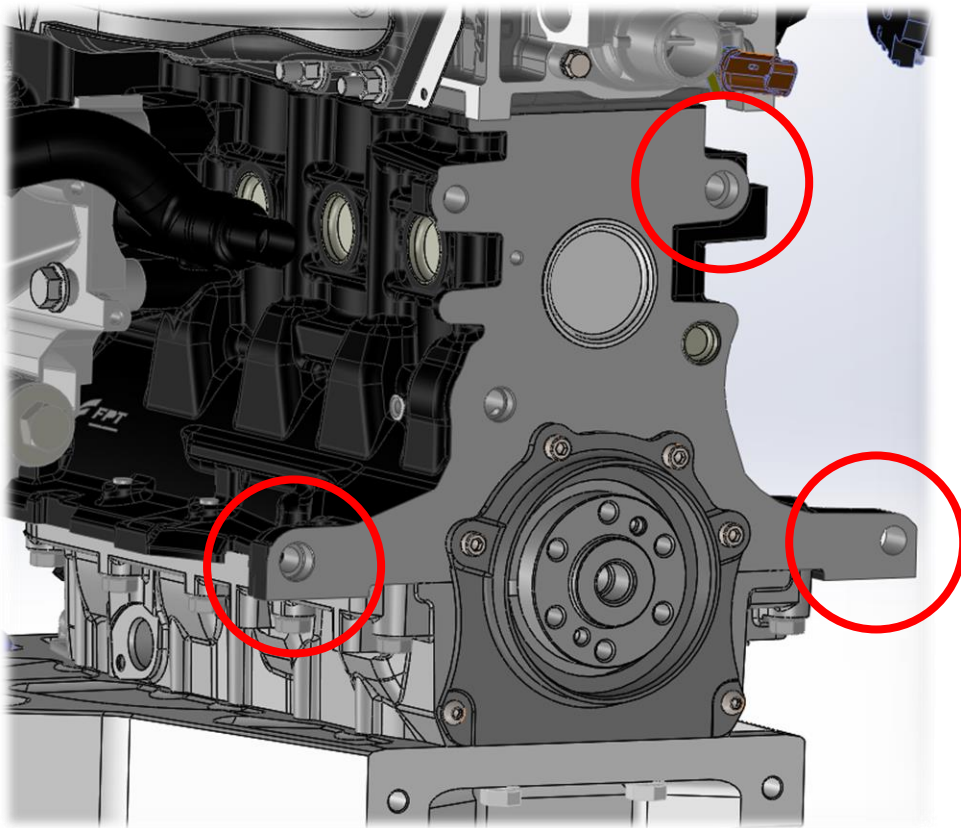


Fig.1: block admitted welding positions

It is necessary to keep and deliver to ATM the broken part to be welded. No reconstruction will be possible. Welding feasibility will be evaluated each time.

All welded blocks will be recognized with a new information written in the R-FID seals (all R-FID seals(5) will be replaced).

All self-welded blocks by Teams in within 31st December 2016 have to be denounced by Teams themselves, and they will be recognized with a different information written in the R-FID seals (all R-FID seals(5) will be replaced). This operation has to be done in Autotecnica Motori workshop NOT LATER than Wednesday 29th March 2017.

All welded blocks without this information in the R-FID will be considered as not compliant.

Casalmaggiore, 12 Gennaio 2017

Campionati FIA Formula 4, Bollettino tecnico no. 001/17

OGGETTO: motore 414-F4, saldabilità basamento

A partire dal 1° Gennaio 2017 sarà consentita la saldatura dei basamenti.

Questa operazione sarà consentita SOLO al personale Autotecnica Motori c/o la sede di ATM.

Sarà consentito saldare i basamenti solo nelle tre seguenti posizioni critiche (Fig.1):

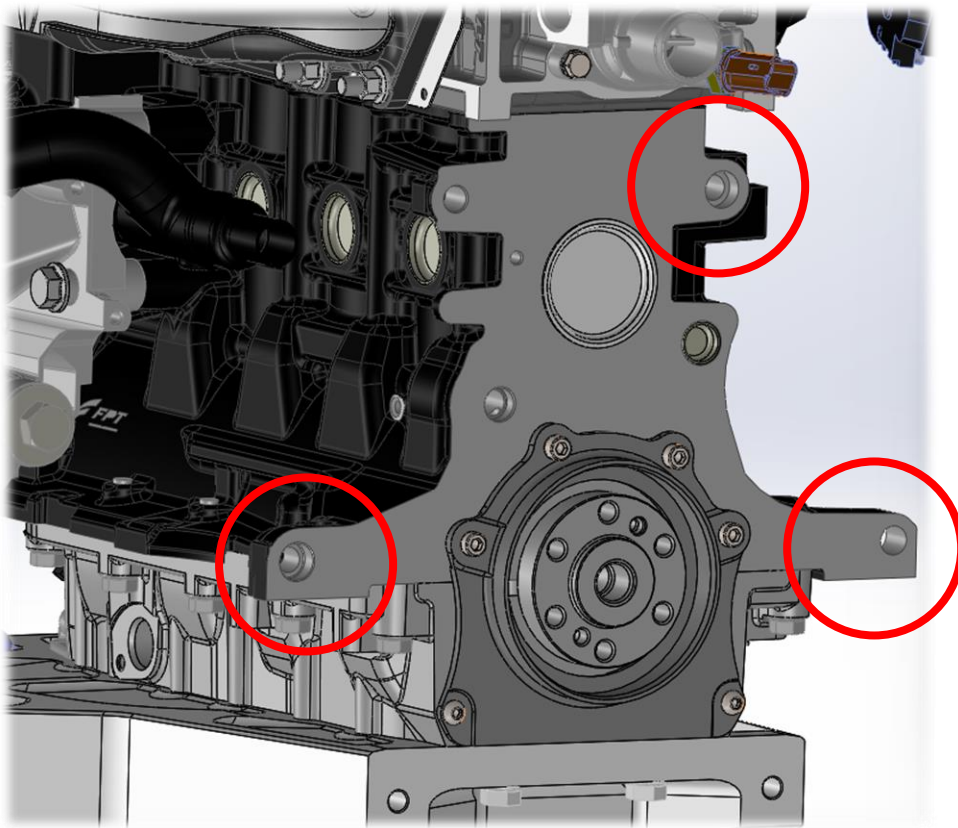


Fig.1: evidenziati I tre punti critici saldabili

E' necessario conservare e consegnare ad ATM la parte rotta da saldare. Nessuna ricostruzione sarà possibile. La saldabilità del basamento verrà comunque valutata volta per volta.

Tutti i basamenti saldati saranno riconosciuti tramite una nuova informazione scritta nei sigilli R-FID (tutti i sigilli R-FID(5) verranno sostituiti).

Tutti i basamenti saldati autonomamente dai Team entro il 31 Dicembre 2016 dovranno essere denunciati dai Team stessi, e saranno riconosciuti con una diversa informazione scritta nei sigilli R-FID (tutti i sigilli R-FID(5) verranno sostituiti). Tale operazione deve essere effettuata presso Autotecnica Motori ENTRO mercoledì 29 Marzo 2017.

Tutti i basamenti saldati senza questa informazione nei sigilli R-FID saranno considerati non conformi.

Casalmaggiore, January 12th 2017

FIA Formula 4 Championships, Technical Bulletin no. 002/17

OBJECT: 414-F4 engine, crankshaft seal

Since January 1st 2017 the crankshaft seal AM000074 (Fig. 1) can be replaced with the one in Fig. 2.



Fig. 1: standard crankshaft seal



Fig. 2: new crankshaft seal

The code to order the new crankshaft seal will be AM500092, price € 98,45 (as reported in Technical Appendix R1.10).

The seal has been tested on the dyno: no performance difference has been recorded.

Both seals are considered compliant to the regulation.

Casalmaggiore, 12 Gennaio 2017

Campionati FIA Formula 4, Bollettino tecnico no. 002/17

OGGETTO: motore 414-F4, paraolio albero motore

A partire dal 1° Gennaio 2017 il paraolio posteriore AM000074 (Fig. 1) può essere sostituito con il paraolio rappresentato in Fig. 2.



Fig. 1: paraolio posteriore standard



Fig. 2: nuovo paraolio posteriore

Il codice con cui ordinare il nuovo paraolio posteriore sarà AM500092, prezzo € 98,45 (come riportato nel Technical Appendix R1.10).

Questo paraolio è stato deliberato in sala prova senza riscontrare alcuna influenza sulle prestazioni.

Entrambi i paraoli sono considerati conformi al regolamento.