Technical training.
Product information.

F87 M2 CS Complete Vehicle

BMW Service

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General information

Symbols used

The following symbol is used in this document to facilitate better comprehension or to draw attention to very important information:

Contains important safety information and information that needs to be observed strictly in order to guarantee the smooth operation of the system.

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BMW Group vehicles meet the requirements of the highest safety and quality standards. Changes in requirements for environmental protection, customer benefits and design render necessary continuous development of systems and components. Consequently, there may be discrepancies between the contents of this document and the vehicles available in the training course.

The information contained in the training course materials is solely intended for participants in this training course conducted by BMW Group Technical Training Centers, or BMW Group Contract Training Facilities.

This training manual or any attached publication is not intended to be a complete and all inclusive source for repair and maintenance data. It is only part of a training information system designed to assure that uniform procedures and information are presented to all participants.

For changes/additions to the technical data, repair procedures, please refer to the current information issued by BMW of North America, LLC, Technical Service Department.

This information is available by accessing TIS at www.dealerspeed.net.

Additional sources of information

Further information on the individual topics can be found in the following:

- Owner's Handbook
- Integrated Service Technical Application
- Aftersales Information Research (AIR)

F87 M2 CS Complete Vehicle

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F87 M2 CS Complete Vehicle

1. Introduction

With the new BMW M2 CS, BMW M GmbH extends its range of exclusive and limited special models with a sporty appearance for the first time in the premium compact class. The exclusive BMW M2 CS is positioned as a high-performance vehicle above the BMW M2 Competition. At the same time, it serves as a powerful basis for the BMW M2 CS Racing, the new entry-level model of BMW M Sport for popular sport and the new Clubsport segment available from the 2020 season.

The BMW M2 CS refines the appearance of the BMW M2 Competition and combines excellent performance on the racetrack with unlimited everyday suitability for a fascinating four-seater sports car. When it comes to acceleration figures, driving dynamics, precision and agility, the BMW M2 CS sets new standards in its segment. It is therefore the perfect choice for fans of high-quality, high-performance vehicles and is a new, highly emotional entry-level model to the product range of BMW M GmbH – also for a younger target group.

The BMW M2 Clubsport is offered in a US version. The vehicles will be built at the Leipzig plant. The market introduction of the BMW M2 CS takes place in March 2020 and is limited to approximately 2,000 vehicles.

1.1. Vehicle profile F87 CS/BMW M2 CS

F87 CS, BMW M2 CS

F87 M2 CS Complete Vehicle

1. Introduction

- **Design and aerodynamics:** 2-door high-performance Clubsport Coupe. M-specific characteristics in front, side and rear area. Clever aerodynamic design in front, side and rear area and vehicle underbody. The additional model designation on the rear with the "M2 CS" model inscription ultimately distinguishes the external appearance of the CS model from the BMW M2 Competition.
- **Exterior:** Optimization of the aerodynamics with a specific BMW M2 CS front end. Independent hood and roof made from carbon. A rear spoiler made from carbon completes the BMW M2 CS at the rear.
- **Engine/Transmission:** 3-liter 6-cylinder engine, TVDI engine. Efficient, with even more powerful and more spontaneous linear power development with 444 HP and 3 selectable engine dynamics control programs. M Double-clutch Transmission with Drivelogic as an option. Electronically controlled M rear-axle differential lock is standard.
- **Engine sound:** Sporting character in the lower and upper engine speed and power range. Active Sound Design (ASD), which makes the engine sound in the vehicle interior a desirable overall experience in combination with the original sound.
- **Steering:** Direct and precise variable M Servotronic (EPS) with selectable Servotronic support (in 3 stages). M steering wheel including M shift paddle.
- **Chassis and suspension/Chassis and suspension dynamics design:** Optimal driving precision and adapted interplay of steering, Cup 2 tires and a M-specific coordination in conjunction with the adaptive M suspension. Dynamic Stability Control DSC with M dynamic mode setup.
- **Seating comfort:** By adopting the BMW M4 CS seats with M-specific contrast stitching, the interior of the BMW M2 also becomes the Clubsport.
- **Ergonomics, interior equipment:** Instrument cluster with red needles and white dials, BMW M2 CS specific decorative strips, M footrest, BMW M2 CS entry sills and a carbon center console.
- **BMW ConnectedDrive:** Assistance systems and mobility services from the BMW ConnectedDrive scope, Speed Limit Info, rearview camera and Navigation System Professional.

F87 M2 CS Complete Vehicle

2. Technical Data

Designation	Unit	F87	F87 Competition	F87 CS
Engine range		N55B30T0	S55B30T0	S55B30T0
Engine control		MEVD 17.2.G	MEVD 17.2.G	MEVD 17.2.G
Transmission type designation		K transmission	K transmission	K transmission
Length	[mm/inches]	4468/175	4476/175.6	4476/175.6
Width, US	[mm/inches]	1856/73.7	1856/73.7	1856/73.7
Height	[mm/inches]	1410/55.5	1410/55.5	1414/55.7
Number of seats		4	4	4
Luggage compartment volume	[l]	390	390	390
Maximum speed	[mph]	155*/168**	155*/174**	155*/174**
Acceleration 0-60 mph	[s]	4.3	4.2 *** 4.0 ****	4.0 *** 3.8 ****
Nominal engine power at engine speed	hp [rpm]	365 6500	405 5230-7000	444 6250
Torque at speed	[Nm/lb-ft]	465/343	550/406	550/406
Aerodynamics				
c_x (drag coefficient)		0.35	0.36	0.36-0.37
A (area)	[m^2]	2.21	2.21	2.21
c_x x A (drag)	[m^2]	0.77	0.80	0.80
Vehicle curb weight				
US weight	[lbs]	3505 *** 3450 ****	3600 *** 3655 ****	3545 *** 3600 ****
Rear axle load section, empty (DIN)	[%]	48.6	47.5	47.5
Payload	[lbs]	840	720	750
Permissible total weight	[lbs]	4430	4430	4430
Approx. fuel tank capacity	[gal]	13.7	13.7	13.7
Emission rating		Euro 6	EURO 6d-TEMP	EURO 6d-TEMP

* Electronically controlled

** Electronically limited in conjunction with M Drivers Package SA 7ME

*** Manual transmission

**** DKG Transmission

F87 M2 CS Complete Vehicle

2. Technical Data

2.1. BMW EfficientDynamics measures

- TwinPower Turbo technology
- Direct fuel injection with Valvetronic
- Automatic engine start-stop function
- 7-speed M double-clutch transmission with Drivelogic as optional equipment SA/efficient 6-speed manual transmission
- M Servotronic (EPS)
- Shift point indicator
- Map-controlled oil pump
- Brake energy regeneration.

F87 M2 CS Complete Vehicle

3. Body

3.1. Exterior

3.1.1. Front view

Bumper, front

A specific BMW M2 CS bumper cover is used at the front, which has been adapted to the installation of the carbon front splitter. It is painted in the vehicle color. Due to the necessary air inlets no fog lights are offered. The ornamental grills at the bottom and on the left and right are fitted as separate parts and have a black, grained finish. The frame and the double-rib kidney grill bars of the BMW M radiator grill are finished in high-gloss black as standard for the BMW M2 CS and feature the BMW M2 CS model designation.

F87 CS, front view

In order to optimize the air flow and downforce adaptation corresponding to demands, the BMW M2 CS is equipped with a motor sports-oriented front splitter to increase the contact pressure in the front area of the vehicle. The front splitter is made from carbon in an exposed carbon look to reduce the weight and is screwed to the bumper cover.

F87 M2 CS Complete Vehicle

3. Body

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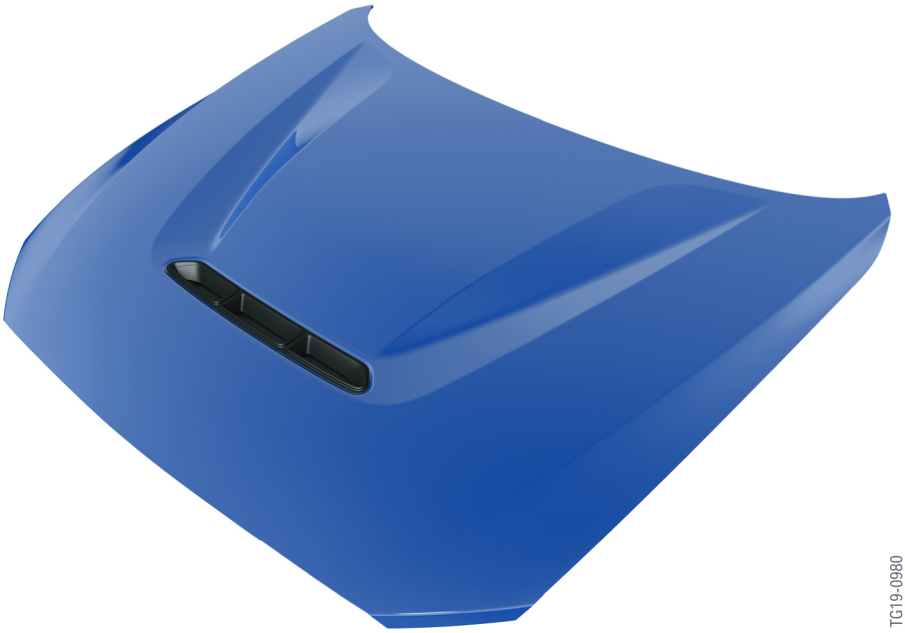
F87 CS, front splitter

Engine compartment lid

A hood made from carbon is used in the BMW M2 CS.



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F87 CS, carbon hood

This hood structure makes it possible to achieve strength properties that are normally only possible with a steel design. The hood in the BMW M2 CS made from carbon weighs 50 % less than the aluminum hood in the F87. The CFRP hood contributes to the lightweight construction design of the new BMW M2 CS.

The hood also performs engine cooling tasks with its BMW M2 CS-specific openings and its aerodynamic form additionally supports the downforce at the front end.

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3. Body

3.1.2. Side view

F87 CS, side view

Exterior mirror and sill

The exterior mirrors are adopted from the BMW M2 Competition, but have carbon mirror covers. They are heated as standard and are optionally electrochromically dimmable with integrated side repeaters. They feature memory and fold-in functions and the passenger side mirror has an automatic parking function.

F87 CS, exterior mirror

Roof

The roof for the BMW M2 CS is made from a carbon fiber and is connected to the body by bonding. The roofline has an aerodynamic outline in the middle section, thus highlighting the sporting character of the new BMW M2 CS.

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3. Body

The CFRP roof construction is manufactured using a wet pressing technique and is sealed with a layer of clear coat. In comparison to the standard steel roof, this CFRP roof saves approximately 11 lbs in weight in the BMW M2 Competition.

The CFRP roof structure thus also contributes to the lightweight construction design of the new BMW M2 CS.

F87 CS, CFRP roof

The new roof increases the rigidity of the body and looks as if it was made from a single cast, as no trims are required and as a result there are no joints. In addition, the acoustics in and outside the vehicle are improved and the weight is reduced with the absence of a roof brace and insulation. The lower weight of the roof makes for a lower center of gravity of the vehicle and provides increased driving dynamics.

Rim design

Forged 19" M light-alloy wheels are used as standard at the front and rear. Mixed tires with the sizes 245/35 ZR 19 at the front and 265/35 ZR 19 at the rear are used. For more information please see the chapter "Wheels/Tires".

F87 M2 CS Complete Vehicle

3. Body

F87 CS, wheel rim design

Index	Explanation
1	19" M Light Alloy Gold Matt Y-Spoke Wheels Style 763M (optional)

3.1.3. Rear view

A model designation on the rear with the "BMW M2 CS" model inscription ultimately distinguishes the external appearance of the CS model from the BMW M2 Competition.

F87 CS, rear view

In order to optimize the air flow and permit downforce adaptation corresponding to demands, the BMW M2 CS is equipped with a rear spoiler, as well as a diffuser at the rear.

F87 M2 CS Complete Vehicle

3. Body

Diffuser

The diffuser is made of carbon-fiber-reinforced plastic and its aerodynamic design helps to reduce the lift and increases the downforce at the rear end of the vehicle.

F87 CS, diffuser

Rear spoiler

A spoiler is an aerodynamic component and functions as a tear-off edge. The spoiler reduces the lift at the rear axle and contributes to the optimization of the driving dynamics.

F87 CS, rear spoiler

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3. Body

3.1.4. Cooling air conduits

Cooling air routing

The following cooling air routing was newly adapted for the BMW M2 CS:

- Cooling air routing via the specific openings of the hood, to support engine cooling.

3.1.5. Exterior colors

The BMW M2 CS is offered in 4 different exterior colors:

- Misano Blue metallic
- Black Sapphire metallic
- Alpine White
- Hockenheim Silver metallic.

3.2. Interior equipment

3.2.1. Driving area and steering wheel

M driving area

F87 CS, dashboard

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3. Body

A lightweight center console made from carbon is used in the BMW M2 CS. Compared to the standard console of the BMW M2 Competition, the center console in the BMW M2 CS is approximately 30 % lighter.

Decorative strips

In the BMW M2 CS specific decorative strips are installed at the following interior components:

- Instrument panel strip in Alcantara with CS model inscription
- Accent strips adopted from the BMW M2 Competition model
- Entry sills with BMW M2 CS lettering.
- Panels of the door handles in high-gloss carbon.

F87 CS, entry sills

M leather steering wheel

The M steering wheel in Alcantara with multifunction capability is designed with a magnesium skeleton and is based on the steering wheel of the F82/F83. In vehicles with double-clutch transmission (DKG) above the thumb rests are the M shift paddles with M switching logic: downshift on left, upshift on right. A marking was provided at the top center to highlight the 12 o'clock position of the steering wheel. This makes it easier to recognize the center position of the steering wheel when performing rapid steering wheel movements.

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3. Body

F87 CS, M steering wheel

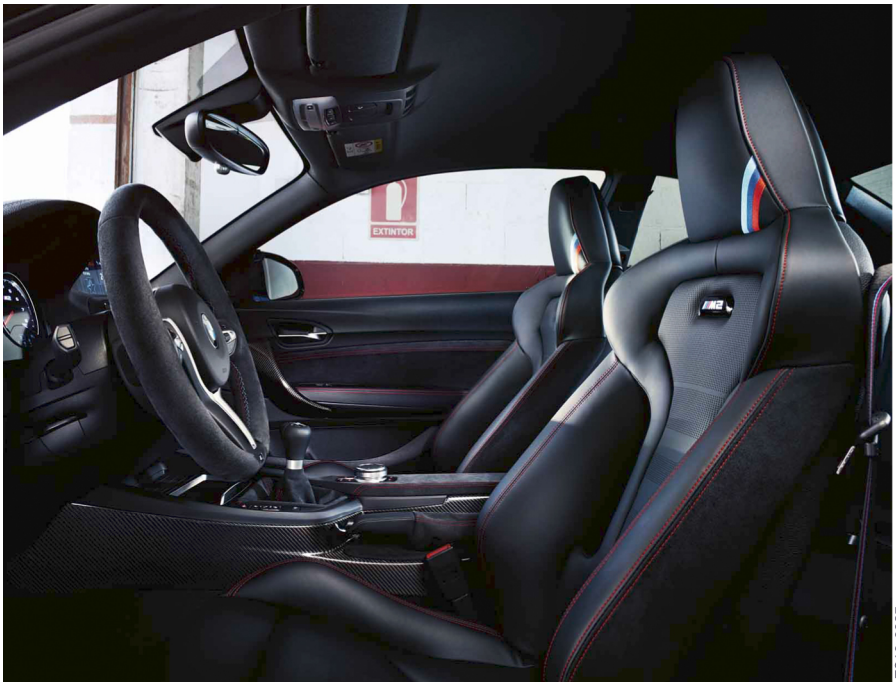
3.2.2. Seats

M CS sport seats

The driver and front passenger sit in the special lightweight M sport seats, which are also installed in the BMW M4 with Competition package. They are covered with leather Merino and Alcantara and also guarantee perfect side support on the racetrack. They also offer excellent long-distance comfort. BMW M stripes are included in the front safety belts.

F87 M2 CS Complete Vehicle

3. Body



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F87 CS, seats

An illuminated "M2" logo is integrated in the backrests of the M sport seats.

TG19-1580

F87 CS, "M2" logo

F87 M2 CS Complete Vehicle

4. Drive

4.1. S55B30T0 engine

The engine known from the F82/F83 BMW M4 Competition is used (S55B30T0 engine). The power was able to be increased to 444 hp and the torque was raised to 550 Nm/406 lb-ft. It was possible to adopt the S55 engine-specific technology, such as the crankcase in closed-deck design, LDS-coated cylinder walls, Valvetronic and twin turbocharging based on the mono-scroll concept with electric wastegate control, from the S55B30T0 engine.

F87 CS, S55 engine

Further information on the S55 engine can be found in the product information ST1404 "S55 Engine".

4.1.1. Engine mechanics

A modified bedplate is used in the S55 Competition. The bedplate from the competition package has a higher rigidity in order to meet the demands of the higher torque curve of the S55 competition engine.

4.1.2. Service information

Like on the F87, the engine oil is currently replaced at the 1200 mile break-in service. After this, the running-in check must be deactivated with the BMW workshop system Integrated Service Technical Application, ISTA.

The current information and specifications in the Integrated Service Technical Application (ISTA) must be observed.

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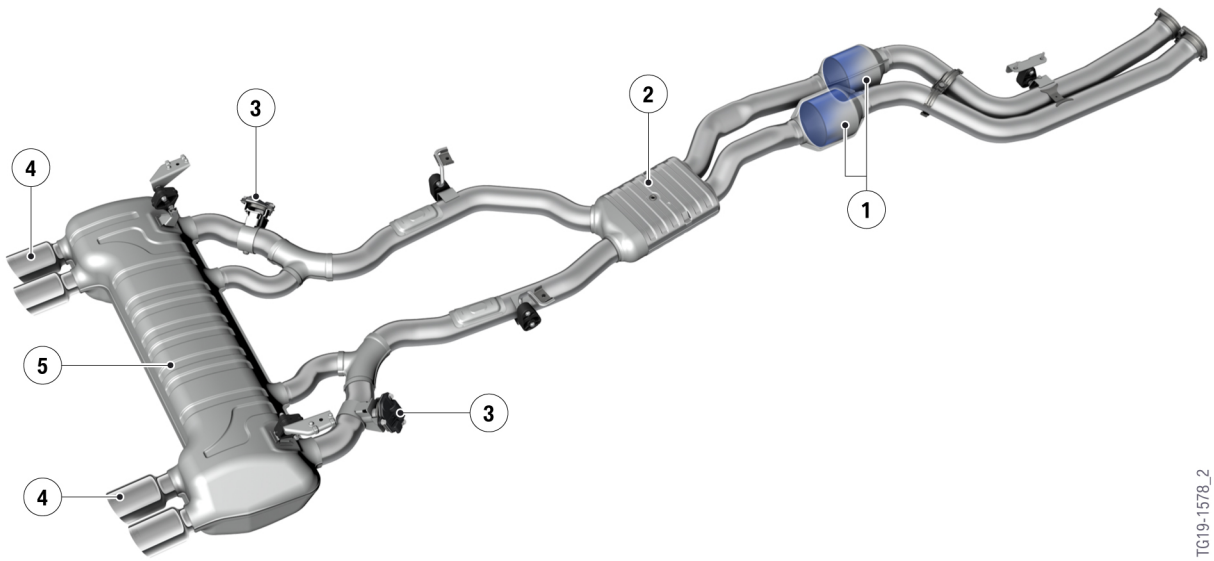
4. Drive

4.2. Exhaust system

In the new BMW M2 CS a twin-pipe flap exhaust system with 4 exhaust tailpipes is installed. It has the lowest possible exhaust gas pressure corresponding to the power development of the S55 engine and is controlled via a flap system. The flaps directly in front of the rear silencers are controlled electrically, thus ensuring optimal feedback about the load condition of the engine across the entire engine speed range and also the typical M sound.



F87 CS, exhaust system

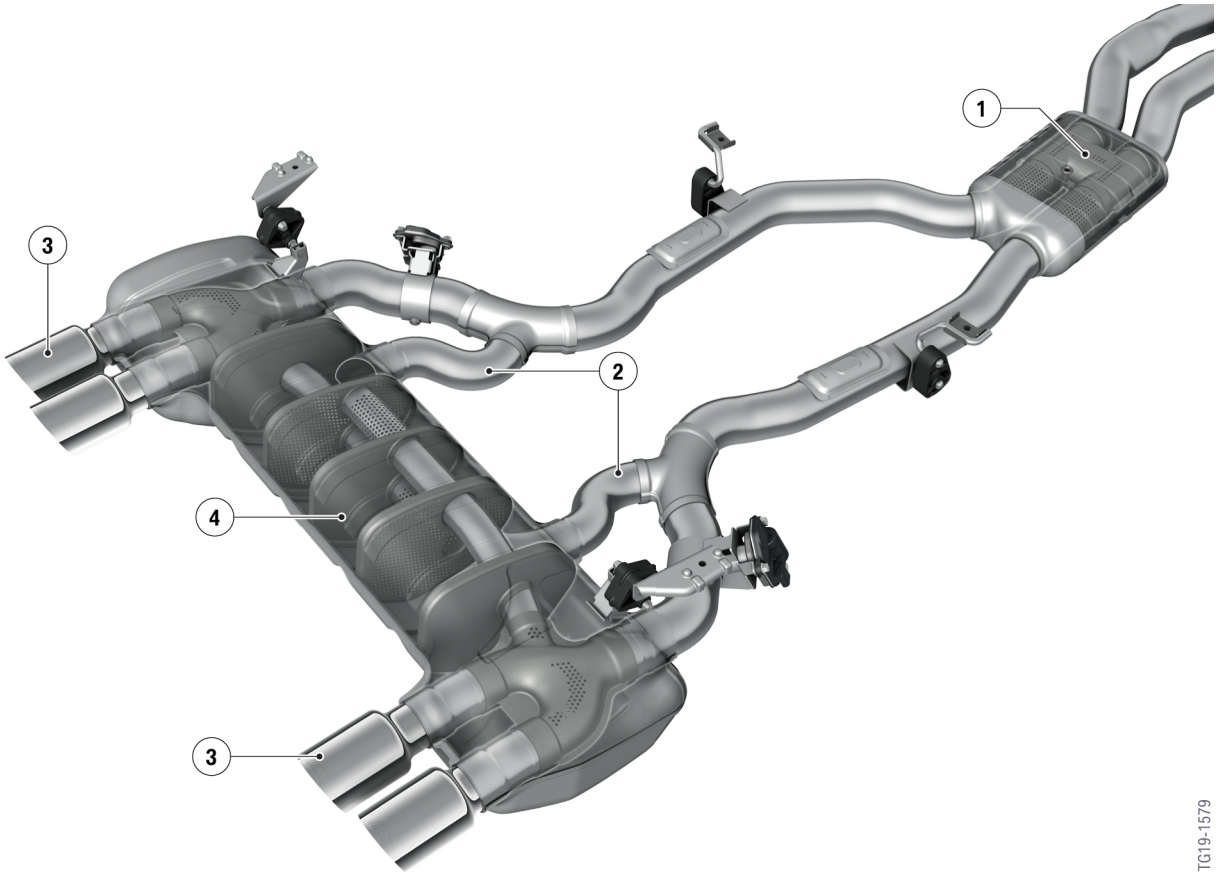
Index	Explanation
1	Underfloor catalytic converter
2	Center silencer
3	Electrical exhaust flaps controller
4	Twin tailpipe
5	Rear silencer

In order to influence the outlet noise, particularly upon a cold start, the two exhaust pipes of the exhaust system between the underfloor catalytic converters and the rear silencers are connected by pressure compensation. In the BMW M2 CS this "crossover area" is integrated in the center silencer.

With controlled opening and closing of the exhaust flaps via the electrical exhaust flap controller, the exhaust gas can be guided either directly via the exhaust tailpipes or via the bypass pipes to the rear silencer.

F87 M2 CS Complete Vehicle

4. Drive



F87 CS, absorption silencer

Index	Explanation
1	Crossover point
2	Bypass pipes
3	Twin tailpipe
4	Absorption silencer

A silencer according to the absorption principle is used as a rear silencer in the BMW M2 CS. This type of silencing generates low exhaust gas pressure and is therefore used in the BMW M2 CS as a silencer.

The stainless steel exhaust tailpipes have the M model inscription.

4.3. Transmission

4.3.1. Manual gearbox

In the BMW M2 CS a manual transmission is used as standard. It is an adapted K-transmission, which is known from the production vehicles of BMW AG. The transmission is known from the F82/F83 and has been adapted to the higher power requirements. The following components were adapted:

- Weight advantage in comparison to the predecessor transmission from the E9x M3 approximately 26 lbs
- Smaller size and thus lower weight
- Improvement of the shifting comfort thanks to use of new type of carbon friction lining at the synchronization units
- Reduction of noise level
- Increase in efficiency with dry sump lubrication ("splashes" in the oil deleted, targeted oil duct); as a result the heat development could be reduced to the extent that external cooling like for the predecessor transmission in the E9x M3 could be eliminated.

4.3.2. Clutch

A double-disc clutch is used for the manual gearbox. The operating principle of the clutch is identical to the double-disc clutch systems already used.

4.3.3. M double-clutch transmission (M DKG) with Drivelogic

The GS7D36BG M DKG with Drivelogic is used as optional equipment.

The double-clutch transmission in the new BMW M2 CS has similar technical features to the double-clutch transmission in other M vehicles.

4.3.4. Emergency gearbox release

The transmission emergency release is not available like in other models with M DKG. For towing please observed the information in the Owner's Manual of the vehicle.

4.3.5. Service information

Transmission oil circuit

For work required at the oil circuit of the DKG - regardless if it is the M DKG or AG DKG - , for example after an accident, or if the oil circuit has to be opened owing to a repair, there must be maximum cleanliness. They include:

- Optimal cleaning of the outer oil circuit areas before disassembly of the components or opening the oil circuit.
- Immediate closure of openings and lines after disassembly without delay and using clean original plugs. Do not use unsealed components or replacement parts of the oil circuit without checking for cleanliness and where possible competent repair.
- The workbay at which a M DKG is opened must be extremely clean and protected against contamination, including during work interruptions, e.g. by means of an adequate, clean and lint-free cover.

Lifetime oil filling

Similar to other vehicles with M DKG Drivelogic, **no** transmission oil change is currently planned at the 1200 mile break-in service or every third engine oil change.

Repair/Part exchange

Depending on the type of repair, the data status of the M DKG must be read out beforehand and read in again after the component has been replaced (e.g. replacement of mechatronics module).

Depending on the type of repair (e.g. dual clutch change), the "Neutral" gear selection position must be selected before the engine is stopped.

The current information and specifications in the documents in the Integrated Service Technical Application (ISTA) must be observed in each case.

4.4. Rear axle final drive

4.4.1. Active M Differential

This electronically/electromechanically controlled rear axle differential lock was developed especially for the F10 M5 and is also used in the F06/F12/F13 M6, F80/F82/F83 and now in the F87 CS.

The M rear axle differential, size HAG 220 (crown wheel Ø 220 mm), is used with a M rear axle differential lock. The system designation for this is "regulated rear axle differential lock", the control unit designation is GHAS (**G**eregelte **H**inter **A**chsgetriebe **S**perre (regulated rear axle differential lock).

4.4.2. Service information

- For a replacement of the GHAS control unit an encoding (activation of vehicle-related characteristic curve) and then an initial calibration are necessary and then the fault memory must be deleted.
- After the replacement of the entire M rear axle differential a calibration must be performed and then the fault memory must be deleted.
- If the electric motor, the electric motor and intermediate gearing or the oil temperature sensor is replaced, deleting the fault memory is all that is required.

The final drive oil is currently replaced at the 1200 mile service and at every third engine oil change.

The current information and specifications in the Integrated Service Technical Application (ISTA) must be observed.

F87 M2 CS Complete Vehicle

5. Chassis and Suspension

5.1. Suspension systems

5.1.1. Front axle

The front axle is the M two-joint spring strut front axle of the F82/F83, like it is also used in the F87 Competition. The fine tuning of the front axle is achieved in the F87 CS via the anti-roll bar and the supplementary spring compared to the F87 Competition.

Further information about the front axle can be found in the product information ST1402 "F80/F82 Complete Vehicle".

5.1.2. Steering

In the F87 CS, like in the F82/F83, a rack and pinion steering with electrical steering wheel support "M Servotronic" based on EPS is used.

For power assistance during steering an electric motor is housed parallel to the rack at the steering gear housing, the power transmission is accomplished via a ball screw.

Further information about the steering can be found in the product information ST1402 "F80/F82 Complete Vehicle".

5.1.3. Rear axle

The rear axle is the five-link rear axle of the F82/F83, like it is also used in the F87 Competition. The fine tuning of the rear axle is achieved in the F87 CS via the anti-roll bar and the supplementary spring compared to the F87 Competition.

Further information about the rear axle can be found in the product information ST1402 "F80/F82 Complete Vehicle".

5.2. Brakes and wheels/tires

5.2.1. Brakes

M Sport brake

The M Sport braking system is used as standard in the F87 CS. It is a large internally ventilated Compound brake disc combined with a 6-piston aluminum fixed caliper at the front. The rear brake caliper is a 4-piston aluminum fixed caliper combined with internally ventilated Compound brake discs.

All brake calipers are red with a colored M logo irrespective of the exterior vehicle color chosen.

M carbon ceramic brakes

The M Carbon ceramic brake is available from the series launch of the F87 CS. It can be ordered as optional equipment.

The M Carbon ceramic brake system is also called the C/SiC brake system.

Depending on the situation, this offers a further increase in active safety as compared to the M Compound brake. In a direct comparison it also offers:

- Even more direct/spontaneous use of brake force
- Maximum heat resistance even with continuous sporty operation
- Higher fading stability
- Significantly reduced wear
- 15 lbs weight reduction of rotating wheel masses
- Increased suitability for winter driving conditions thanks to corrosion resistance.

As a visible distinguishing feature to the M Compound brake system the brake calipers are painted in matt gold with a colored M logo.

The brake discs are manufactured by Brembo SGL Carbon Ceramic Brakes GmbH.

Further information about the M Carbon ceramic brake can be found in the product information ST1302 "M Carbon Ceramic Brake System".

Before racetrack

Remove the covers of the brake ventilation duct in vehicles with M Carbon ceramic brake. They are located inside in each of the front wheel arches.

After racetrack

Both covers must be reinstalled before driving on public roads.

Brake noise

- Humming of the BMW M compound brake disc at high speeds
- Squeaking brakes shortly before coming to a stop
- Hooting in the event of wet, cold BMW M carbon ceramic brakes
- Cracking noises from the area of the BMW M compound brake discs when hot.

Explain to the customer at this point that such noises occurring temporarily or in specific situations are inherent in the design and do not represent a quality problem. They are a consequence of the special performance of the brakes and do not pose any danger or risk of damage.

Point out that the customer can use his/her braking technique to help prevent the noises occurring or ensure they quickly disappear again. For example, after washing the vehicle it is important to dry the brakes out by braking (braking a few times from 31 mph to 0 is sufficient). Or that the brakes can have a tendency to squeak if they go through long periods when they are only exposed to light braking, which is why braking hard a few times can help out (= higher brake temperature). After driving the vehicle very hard and subjecting the braking system to high loads (high brake disc temperatures) the driver should try to make sure that the brakes are able to cool down while the vehicle is moving and not

to keep the brakes on the first time the vehicle comes to a stop. As a result of the increased material transfer from the brake pads to the disc after very hard driving, a humming noise can occur which disappears again after a short time.

Brake dust

Is an effect of a high-performance braking system. The BMW M models are high-performance vehicles which are designed for fast and dynamic driving and embody a racing pedigree. The specially designed brakes make possible the high braking performance required by the vehicle and in so doing generate larger amounts of dust due to the greater levels of friction. The brake dust tells the customer that his/her BMW M vehicle has been driven in an appropriate manner. What is important is to ensure that it is regularly removed by washing the vehicle, as otherwise it will eat into the surface of the wheel.

For necessary service work the current information and specifications in the documents in the Integrated Service Technical Application (ISTA) must be observed in each case.

Dynamic Stability Control (DSC)

The MK 100 from Continental is used as a Dynamic Stability Control (DSC) system. The characteristic maps of the DSC are M-specific and are adapted to the respective M Sport braking system or M Carbon ceramic brake.

5.3. Wheels and tires

Optimum transmission of both acceleration and braking torques is guaranteed by the 245/35 tires on 19-inch forged Jet Black M Style 763M at the front and 265/35 tires on 19-inch forged Jet Black M Style 763M at the rear in a new, unique design.

For the BMW M2 CS mixed performance tires are standard, the Michelin Pilot Sport Cup 2 tires are offered as optional equipment.

Michelin Pilot Sport Cup 2 tires are P1 only, customer will have to sign a waiver for this option.

Designation	F87 Competition	F87 CS
Light alloy EH2+ wheel rims at front (forged jet black)	19x9	19x9
Light alloy EH2+ wheel rims, at rear (forged jet black)	19x10	19x10
Front tires	Michelin Pilot Super Sport 245/35 R19	Michelin Pilot Sport Cup 2 245/35 ZR19
Rear tire	Michelin Pilot Super Sport 265/35 ZR19	Michelin Pilot Sport Cup 2 265/35 ZR19

F87 M2 CS Complete Vehicle

5. Chassis and Suspension

5.3.1. Wheels

As standard, 19” forged Jet Black M Style 763M wheels are used at the front and at the rear.

5.3.2. Cup tires

Michelin Pilot Sport Cup 2 tires are tires designed for the race track which also meet the legal regulations for use on public roads. These tires were optimized specifically for use on the race track in dry conditions. On wet roads or race tracks with a risk of aquaplaning, it is necessary to drive at an appropriate speed and with activated driving dynamics systems.

The Michelin Pilot Sport Cup 2 tires are similar to a pure sport tire in terms of design, structure and rubber compound, but have a dominant influence on the excellent drivability of the BMW M2 CS thanks to their very heat-resistant rubber compound.

TF19-0989

F87 CS, Cup 2 tire thread

The Michelin Pilot Sport Cup 2 tires are designed for maximum dry performance and offer significantly more potential for longitudinal and lateral acceleration and for steering precision than comparable standard tires. They have an asymmetrical tread pattern with a high positive pattern share (large contact surface = few recesses). Their wet performance is correspondingly reduced. The customer must be informed about this by an additional sheet as an appendix to the purchase contract when purchasing the F87 CS. The Michelin Pilot Sport Cup 2 tires have the following properties and thus advantages:

- **High tread depth:** Improved wet grip and thus later aquaplaning tendency. This means greater safety on wet roads.
- **Two-component technology:** Two different rubber compounds on the outer side and inside of the tire tread surface. The tire outer side consists of highly linked elastomers which offer optimum grip and abrasion protection in particularly tight corners. The tire inner side comprises hard elastomers which improve steering precision and offer optimum grip on wet road surfaces.

The following must be observed before intensive race track use:

- Always check the condition of the tires for wear and possible damage.
- Warm up the tires by driving moderately for a few laps.

- The optimum tire pressure of the Michelin Pilot Sport Cup 2 is between 33 psi and 39 psi at the front and rear.
- Never drive with a tire pressure of less than 28 psi.

Observe the following after race track use and before driving on public roads:

- Adjust the tire pressure recommended by the vehicle manufacturer on the cold tire.
- Allow the tire to cool down before making corresponding tire pressure adjustments.
- Always check the condition of your tires to make sure that they comply with the legal regulations for use on public roads.
- If the driving dynamics systems were deactivated, activate these again.

TIRE PRESSURE RECOMMENDATIONS

The correct tire pressures for approved tire sizes can be found on the door post of the driver's door. Further information about tire pressures is described in the Owner's Handbook. The pressure specifications apply for tires at ambient temperature.

ATTENTION

- If the Michelin Pilot Sport Cup 2 tires are not used for an extended period, it is recommended to remove the wheels from the vehicle and to reduce the tire pressure to half the usual value.
- The tires should be stored in a clean, dry and dark location in accordance with the recommendations from Michelin and at temperatures above 32 °F.
- The use, storage or handling of Michelin Pilot Sport Cup 2 tires at ambient temperatures below 14 °F should be avoided. Elements of the rubber compound may be damaged under these conditions. This will impair the performance characteristics of the tire and may even cause cracks or breaks in the tire tread which make further use of the tire impossible.
- Never use a tire that has cracks, breaks or other damage on the tire tread or sidewalls. In case of doubt, the customer should consult BMW Service.
- In the case of intensive race track use, the tires or tire casing may become damaged after extended driving and frequent driving over the curbs.
- The tires must be checked carefully if they have been frequently driven over curbs or the vehicle has left the track. In such a case, it is necessary to remove the tire from the wheel in order to inspect both the outer and inner sides of the tire.
- A visual check of the tires must be performed after every “run” and before returning to the track.

5.4. Driving dynamics systems

The M-specific coordination of the driving dynamics (longitudinal, transverse and vertical) was achieved on the Nürburgring Nordschleife. The main criteria were handling and the lap times.

F87 M2 CS Complete Vehicle
5. Chassis and Suspension

5.4.1. Vertical Dynamics Management

In the BMW M2 CS the adaptive M suspension with the Dynamic Damping Control (EDC) is used. Here four continuously adjustable shock absorbers with coupled rebound/compression stage adjustment produce damping forces according to requirements.

The EDC function integrated in the M Vertical Dynamics Management control unit (M VDM) controls the adjustable dampers.

The drivability can be developed in the driving dynamics direction via the adaptive M suspension (EDC) button in the driving dynamics button panel at the center console. The program selection can also be preconfigured in the MDrive menu and selected via the corresponding M button on the steering wheel.

System function

The Electronic Damper Control (EDC) is a variable, electronically controlled shock absorber adjustment system that controls the vertical dynamics. The front axle damper and rear axle damper can be controlled independent of each other. The EDC adapts the damping forces of the shock absorber more or less instantly to the changing road or driving conditions.

The Dynamic Damper Control (EDC) comes with the standard equipment SA 2VF "Adaptive M suspension".

The EDC consists of the following components:

- 4 continuously adjustable shock absorbers with coupled rebound/compression stage adjustment
- VDM control unit
- 2 wheel acceleration sensors on the front axle to determine the wheel movement
- 2 wheel acceleration sensors on the rear axle to determine the wheel movement
- 1 sensor cluster integrated in the ICM control unit which determines the body movements (pitch, vertical, roll).

The sensors in the vehicle measure the following:

- Body and wheel acceleration
- Current lateral/longitudinal acceleration
- Vehicle speed
- Steering wheel position.

Based on this measured data, the VDM control unit calculates the control commands to be sent to the electromagnetic valves in the shock absorbers for each individual wheel according to the road profile and driving situation. This means that the damping forces will always be applied according to requirements.

This improves ride comfort and also increases driving dynamics.

This can be seen as follows:

- Suitability for long-distance driving
- Enhanced body stability and agility
- Improves driving safety by minimizing wheel load fluctuations and reducing the stopping distance.

M sports suspension (EDC) button option

In the BMW M2 CS Dynamic Damping Control there are the options "Comfort", "Sport" and "Sport+". All 3 programs have dynamic control in the F87 CS.

Program description

- In the BMW M2 CS, "Comfort" should minimize annoying accelerations which have an effect on the driver in order to meet the comfort requirement of a BMW M2 CS customer. The control of the damping forces is comfortable and based on everyday life.
- "Sport" supports a dynamic and sporty driving style. This program is optimized for the Nordschleife of the Nürburgring and similar route profiles.
- In the BMW M2 CS, "Sport+" means that the control of the damping forces is optimized for fast times on flat racetracks, e.g. Hockenheimring. For very uneven routes this program may not be optimal.

Further information about the adaptive M suspension can be found in the product information ST1402 "F80/F82 Complete Vehicle".