M&D GROUP

Technical and product information

OVERVIEW

NEWS
Automation
to improve efficiency

FOCUS
Still looking to the future
with diesel engines

A/C SYSTEM
Resistors and regulators for good
system operation

FOCUS
Cabin switches for maximum
control

M&D GROUP

40.000
refs. available

150
product lines

CERTIFIED TecDoc® DATA SUPPLIER

LinkedIn
M&D Group

meat-doria.com
hoffer-products.com

expertise by your side

MEAT & DORIA SPECIAL PARTS SINCE 1945

HOFFER® PRODUCTS SINCE 1999

TABLE OF CONTENTS

NEWS
Automation to improve efficiency ____ 4

FOCUS
Still looking to the future with diesel engines ____ 8

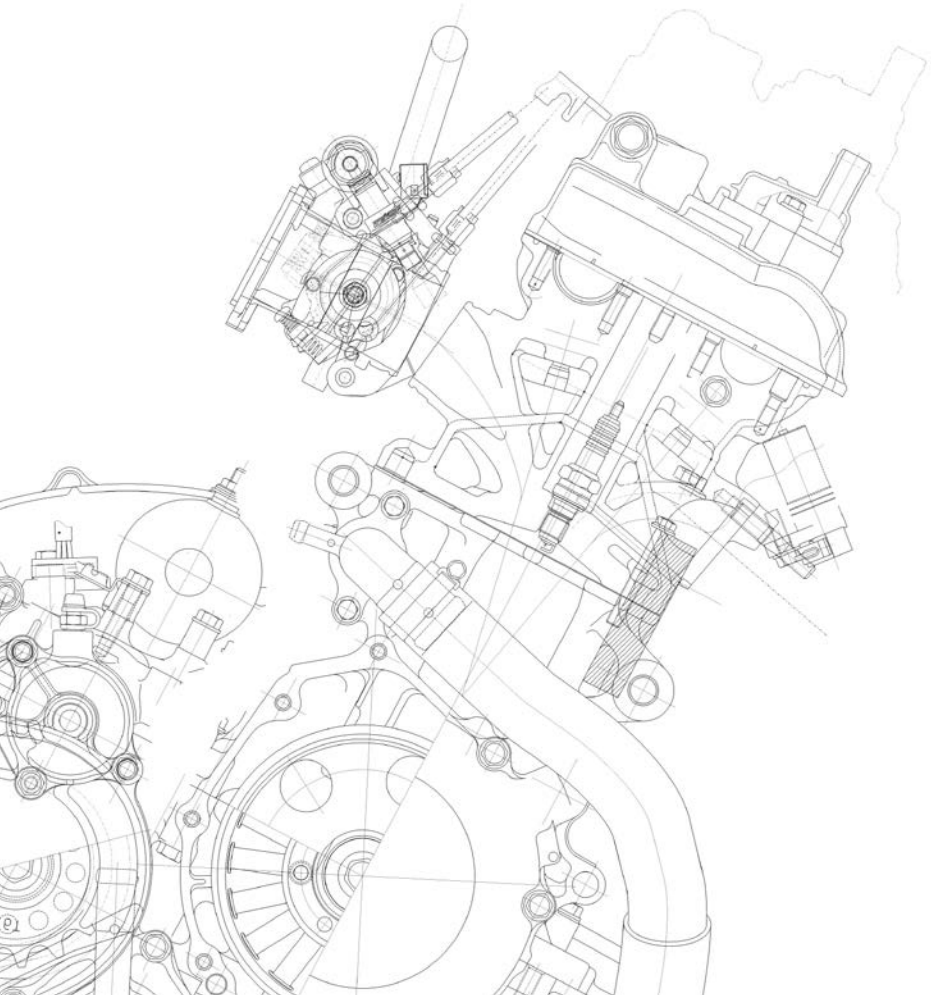
MARKET
SCR systems: greener diesel is possible ____ 12

A/C SYSTEM
Resistors and regulators for good system operation ____ 14

FOCUS
Cabin switches for maximum control ____ 16

NEWS
Expansion tank for keeping the engine at the right temperature ____ 20

PARTS
Our range ____ 22



OVERVIEW

Editorial office and graphics:
M&D Group

Layout and printing:
Stamperia Artistica Nazionale S.p.A.

For more information:
marketing@meat-doria.com

Image credits: Swisslog

NEWS

Automation to improve efficiency

> The handling of goods in the factory and all the processes that characterise the company's day-to-day activities are more efficient, faster and more accurate.

gories and the wide variety of item sizes being managed present **new challenges in optimising materials storage space**, making it increasingly difficult to provide standardised storage locations. With this in mind, M&D Group approached Simco Consulting, an international company specialising in logistics and supply chain consultancy, in September 2021, to commission a project with a twofold objective: **to make storage**

For some time, the M&D Group has been exploring how to meet the new challenges of responsiveness in an industry where logistics is becoming more and more critical to business operations due to the increasing need to respond quickly to unscheduled orders.

In particular, we asked ourselves:

- How can the customer's waiting time for an order be reduced to the minimum?
- How can stocks be optimised to make efficient use of available storage locations?
- How can internal flows be optimised to boost productivity?

The ever-increasing number of product cate-

more efficient and to optimise all material handling flows in plants. Various solutions capable of meeting both requirements were identified and studied. In the end, the most advanced automated system was selected to best meet the Group's business needs: **AutoStore™**.

AutoStore™ is an automated storage system, consisting of an external structure enclosed by four walls, inside which is an aluminium grid on which robots – guided by a computer – handle thousands of bins. The system is modular and can be expanded at any time leaving scope for future scalability requirements.

The bins are stacked one on top of the other and

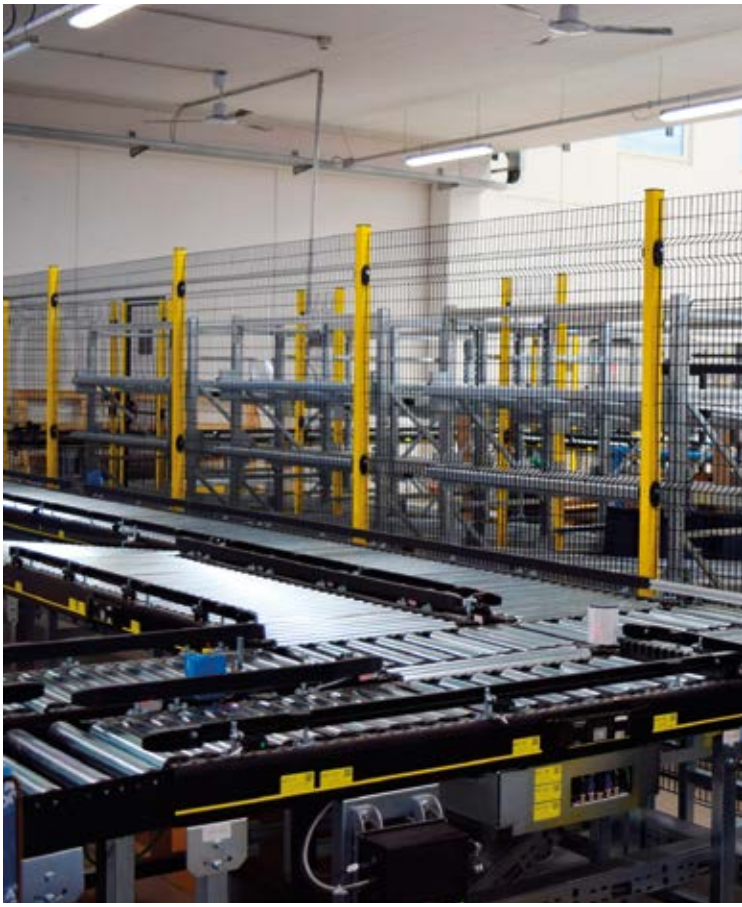
each bin can hold several products. Space efficiency is extremely high.
The system operates on a *goods-to-person* logic. The robots bring the products to the operator in the picking bay. This means that the operators do not have to go and pick the items themselves.
AutoStore™ is an intelligent system that analyses the most frequently handled items and automatically places them at the top of the grid. This makes them easier and quicker to access, and the robots do not have to reach the bottom of the grid when they need to pick them for the operator.

M&D Group's AutoStore™ system in figures:

- 16,000 storage bins
- Storage capacity of 128,000 different items
- 25 robots working simultaneously
- Four picking bays, with provision for two more bays for future expansion
- Four goods filling bays
- I/O performance of more than 500 bins per hour.

The advantages of M&D Group's AutoStore™ system:

- **High productivity**: the robots work around the clock, regardless of the presence of human operators, following a continuous computer-controlled optimisation logic. They run on rechargeable batteries. Each robot independently goes to one of the charging stations when its battery is flat and is replaced by one that has completed the charging cycle.
- **High energy efficiency and low environmental impact**: an AutoStore™ robot consumes significantly less electricity than a standard robot or a directly powered system.
- **Maximum redundancy and virtually zero lulls**: in the event of a robot malfunction, the others take over and automatically compensate for workloads.
- **Reduced downtime for the picking operator**: the advantage of such a large number of robots working on the grid allows an almost unlimited picking buffer and fewer operator trips because all the goods are taken to a picking bay.



M&D Group's logistics implementation does not stop there. With the introduction of AutoStore™, an **automated conveyor line** with roller convey-

Oct 2021	Jun-Jul 2022	Feb 2023	Apr 2023
Appointment to Simco **Feasibility Study**	**Order for AutoStore™** sent to Swisslog and order for **electromechanical line sent** to Incas SSI Schäfer	Completed **warehouse areas** preparation	Opening of construction site and **installation of AutoStore™**

ors was installed to automatically move goods from the AutoStore™ and the traditional warehouse to the packing and shipment areas.
The line is a complex **mechatronic system on rollers, equipped with several control and processing stations**. It had to adapt to a specific layout and machining cycles and for this reason, several state-of-the-art solutions were implemented, such as:

- **Motorised roller conveyors** with individually controlled sections for facilitated, faster conveying of goods.
- **Elevator**, which conveys goods at a height allowing vehicles and personnel to pass smoothly and safely underneath.
- **Cartesian robot**, which groups and optimises orders for processing cycles according to a precise logic;
- **Gravity roller conveyors**, for fast and accurate feeding of bins and cartons by operators at several points along the line.
- The ***pick-to-light*** **and** ***put-to-light*** systems make it easier and faster for operators to extract and position goods.

These implementations have made the handling of goods in the factory and all the processes that characterise the company's day-to-day activities **more efficient, faster and more accurate**.

May 2023	Jun 2023	Jul 2023	Aug 2023
Electromechanical line installation Incas SSI Schäfer	**Closing of construction site** and start of HW/SW **testing**	**Plant tests** and assessments **Industry 4.0**	**GO-LIVE!**

FOCUS

> By bringing together different skills, the Group has created a new industrial division entirely dedicated to rebuilding diesel components.

After years of success and affirmation, diesel cycle engines began to be the subject of concern and controversy, sparked by the VAG Group Dieselgate scandal, which exposed misrepresentations about diesel engine emissions. Since then, the perception of pollution and the actual performance of this technology have changed significantly. In addition, the increasing focus on pollution and environmental protection has helped to reinforce the change, gradually leading to the adoption of restrictive policies on the use of diesel engines, such as traffic restrictions in city centres and government incentives for scrapping diesel cars.

More recently, the European Union announced

the **Fit for 55** plan, which introduces the highly controversial measure of banning cars and vans with internal combustion engines from the market starting from 2035.

Still looking to the future with diesel engines

Despite this bold stance by the institutions, most car manufacturers, including Hyundai, Kia, BMW, Land Rover, Mercedes, Audi, Ford and others, are communicating a different message. They believe that the diesel engine is not destined to disappear in the near future, but is the expression of **a mature technological platform on which it is still possible to work and develop new implementations**.
The major car makers continue to invest heavily in diesel engines, aiming for **performance improvements** with a focus on **fuel efficiency** and – above all – **emission reduction**. If in the past these engines were characterised by modest power output and high fuel consumption, today we are experiencing a phase of maximum technological development, making it possible to travel up to 30 kilometres on just one litre of diesel fuel, with drastically lower emissions.
These advances have been made possible by the state-of-the-art technologies developed and introduced over the last two decades. The most important are the EGR exhaust gas recirculation system, ultra-high-pressure piezoelectric common rail technology with pump injectors, exhaust gas filtration via particulate filter (FAP and DPF) and reductive catalytic selection, which significantly contributes to lowering emissions by means of post-injections into the exhaust.
M&D Group has always focused on future implementations and transitions while maintaining a centre of attention on existing technologies that evolve and improve over time. This includes the latest generation of diesel engines, in which the market is continuing to invest capital and energy, convinced that they will retain a solid market share for a long time to come. In this segment, too, **the Group stands out** with unwavering confidence in these technologies, encouraging the growth of product families and stimulating the distribution chain to follow the trend.

The diesel range currently offered by M&D is one of the most comprehensive on the market. For many years it has included thousands of components that are readily available for repairs and rebuilds.

These include:

- Injection pump repair kits
- Common rail pressure sensors
- Common rail pressure regulators
- Injector recovery kits
- Copper holder sealing rings for injectors, available singularly and in kits
- Cable harness kit for injectors
- Hand primer pumps
- Check valves
- Fuel recovery pipes and hoses
- CR system pressure relief valves
- Water-in-fuel sensors
- Solenoid valves
- Additional modules
- Heaters
- Plastic oil recovery fittings
- Filter supports

More recently, the focus has been on the two key system components - the **injection pump** and the **common rail injectors** - to complete the diesel injection range.
In particular, **the Group decided to enter the remanufactured products market**, which requires in-depth knowledge of the sector, rebuild processes and components. M&D has gained this *expertise* through years of experience and the wide availability of the most popular items. **The Group has chosen to capitalise on its key differentiators – meticulous product identification and selection, high technical value creation and supply chain management –** to enter a segment predominantly associated with specialists and to present itself as a *premium partner*. With this in mind **the Group created a new industrial division, entirely devoted to the rebuilding of diesel components** combining its knowledge and strengths with those of a strategic manufacturer, a specialised and authorised centre since 1965. The project springs from the blending of different know-how and the rebuilding expertise is complemented by the experience of M&D's quality control engineers and technicians. From the outset, this partnership and the substantial initial investment ensured large-scale production to meet the huge demand for these components.

DIESEL INJECTOR

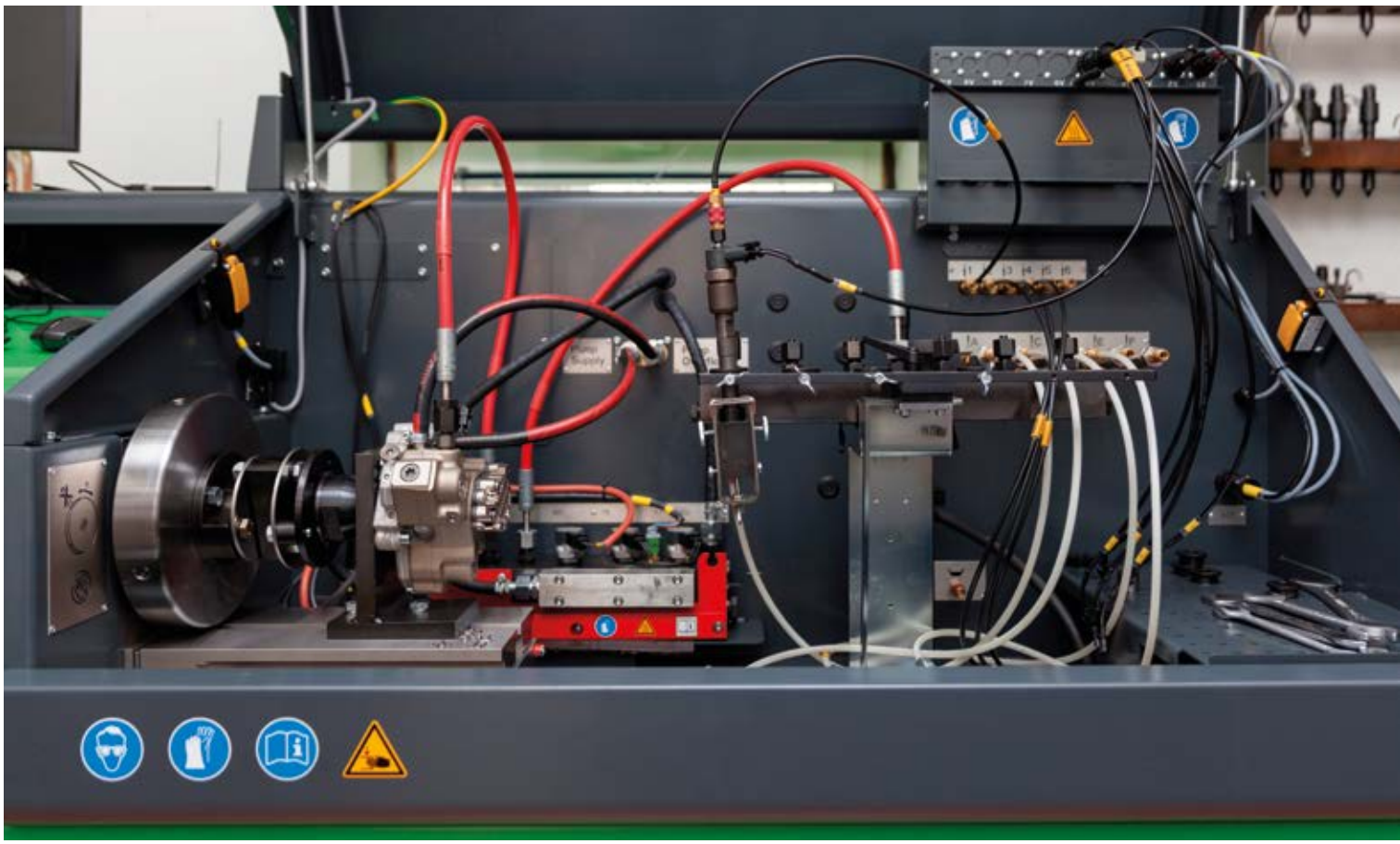
DIESEL PUMP

What are the main peculiarities of this project?

- Rebuilding of injection pumps and common rail injectors using modern and efficient processes and components made in Italy.
- A continuous search for the best coverage of vehicles on the road, for the most popular codes and for niche products alike, achieved through the introduction of new products on a precise monthly schedule and the training of our distribution chain.
- Rebuilt product sales through traditional channels, without the need to return the casing because a large stock of these components is guaranteed.
- Technologically advanced equipment.
- Testing of each individual item by means of specific machines and testers, with the production of detailed reports – a key point for product traceability and warranty management.

As the project progressed, **new component ranges for injection pumps and common rail injectors were developed** to bring it to fruition.
For injection pumps, the main components available immediately in stock are:

- Pump shafts
- Fuel pressure sensor washers
- Pump oil seals
- Diesel inlet and outlet connections
- Tappets



- Inlet fittings
- Adjustment screws
- Overflow valves
- Sealing plugs

The range of spare parts already available for common rail injectors is even more comprehensive and consists of:

- Injector nozzle nuts
- Injector control valves
- Sealing rings
- Cleaning kits
- Seals
- Nozzles
- Fixing kits
- Repair kits
- Nuts
- Copper sealing rings
- Locking clips
- Bushings
- Double washers
- Injector nozzle screws
- Injector holder sealing rings
- Piezoelectric valves
- Nozzle protection caps
- Positioning tongs
- Steel balls

All these components are always in stock. They are made in Italy using the most precise production processes and are fully compatible with original spare parts from major manufacturers.

NOZZLE

SCR systems: *greener* diesel is possible

> Nitrogen oxides, mainly generated by diesel engines, can be reduced by up to 80% by using a specific additive.

An additive fluid used to reduce the harmful effects of nitrogen oxides (NO_X) in SCR (Selective Catalytic Reduction) systems, which became mandatory with the introduction of the Euro 6 standard.
Nitrogen oxides, which are mainly produced by diesel engines due to the high operating temperatures that cause nitrogen and oxygen to react chemically, can be **reduced by up to 80%** through the use of a specific additive.

The first car manufacturers to introduce cars equipped with SCR technology were:

- the **Volkswagen Group** on 2.0 and 3.0 TDI engines.
- **BMW** on 2-litre and 3-litre diesel engines.
- the **Stellantis Group** (FCA and PSA), on HDi and Multijet engines of various displacements (1.4, 1.6, 2.0).
- **Ford** on diesel engines of different displacements.
- **Hyundai** and **Kia**, on CRDi engines of various displacements.
- **Maserati** on the Ghibli, Levante and Quattroporte with the 3.0 Diesel engine.
- **Mercedes-Benz** on diesel engines from 1.5 CDI to 3.0.
- **Jaguar/Land Rover** on the latest Ingenium and Diesel engines.
- **Renault/Dacia** on Blue dCi engines.
- **Toyota** and **Mazda** on the latest generation diesel range.

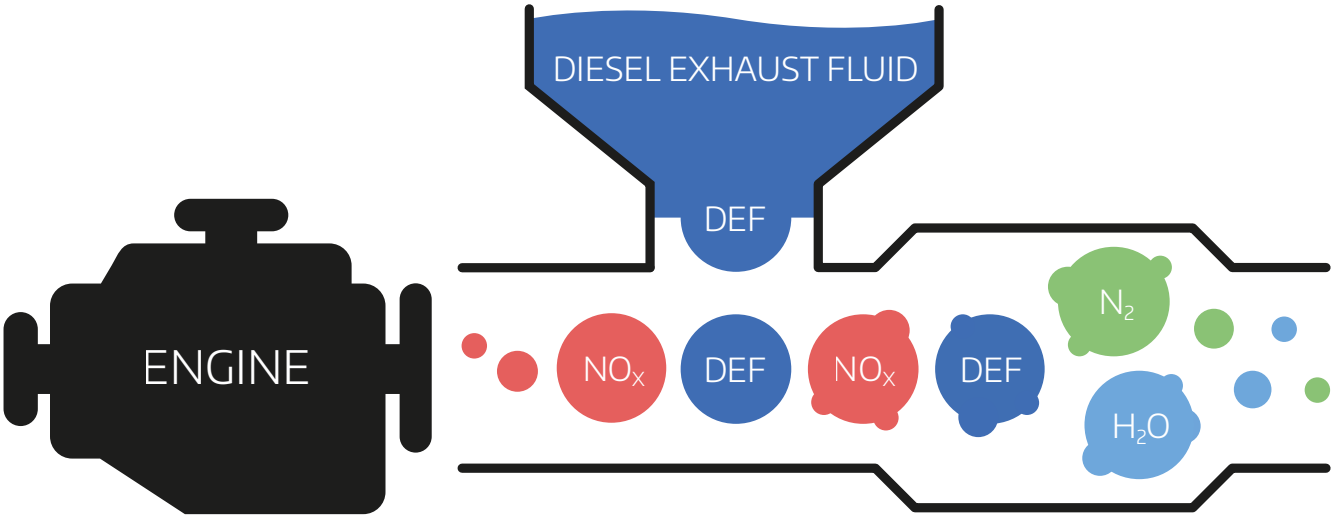
The SCR is a complex system and its various power and sensor components must work in perfect synergy with each other. Failure of any one of these components could jeopardise the operation of the entire system. The most common causes of malfunctions include:

- **Depletion of diesel exhaust fluid in the tank**: the vehicle will stop running and a specific warning light will appear on the instrument cluster.
- **Malfunction of diesel exhaust fluid** level reading system.
- **Fault concerning the urea** pump, requiring the part to be replaced. Error code P20E8 indicating low additive pressure may appear. So, the DEF pump is the first component to be checked in the workshop.
- **Fouled or – worse – leaky DEF lines.**

Topping up the urea fluid is sufficient in the first case, but a trip to the workshop will be needed for more accurate troubleshooting and possible repair in all the other ones.

The following components are present in an SCR system:

- The **urea pump** is positioned above the urea tank, with an integrated pressure and temperature sensor. It provides the flow of urea to the injector. It is an electrical component and can fail prematurely.
- The **urea heater**, using a resistor, regulates the



temperature of the diesel exhaust fluid. The freezing point of the urea fluid is not very low, so it is necessary to prevent it from freezing inside the tank.

- The **DEF** injector, positioned upstream of the catalytic converter and controlled by the appropriate control unit, injects diesel exhaust fluid fluid under pressure when activated. The latter is pushed together with the exhaust gases into the catalytic converter, causing a chemical reaction which transforms the nitrogen oxides into less harmful gases. The injector can be easily clogged up by layers of solid urea residue after only a few kilometres and may need to be replaced.
- The **diesel injector** positioned upstream of the catalytic converter optimises the exhaust gases by means of micro-injections of fuel, instead of diesel exhaust fluid, after the catalytic converter. This raises the temperature and facilitates the transformation of nitrogen oxides into harmless gases. Its operation is strategically managed by the control unit in case of forced regeneration or when the temperature in the exhaust pipe is too low. This component suffers from the most typical and known problems, such as the accumulation of dirt, which can limit its efficiency and cause it to malfunction over time.
- The **NO_X** probe, located downstream of the catalytic converter, detects the residual amount of nitrogen oxides and communicates the reading to the engine control unit. This will adjust the amount of diesel exhaust fluid to be injected accordingly.

The M&D Group is actively involved in the development of these recently introduced ranges, which are destined to play an increasingly important role in the automotive sector.
As far as SCR systems are concerned, the Group is currently present in the market with the following products, for which strong growth is expected:

- **Urea pumps**: more than 20 different references available in stock.
- **Specific injectors**: over 10 different references available in stock.
- **Additive pumps**: 5 different references available in stock.
- **Tank heating units**: over 20 different references available in stock.

INJECTOR

Meat&Doria: 73016
Hoffer: 7503016

INJECTOR

Meat&Doria: 73033
Hoffer: 7503033

DEF PUMP

Meat&Doria: 73076
Hoffer: 7503076

ADDITIVE PUMP

Meat&Doria: 73041
Hoffer: 7503041

HEATING TANK UNIT

Meat&Doria: 73040
Hoffer: 7503040

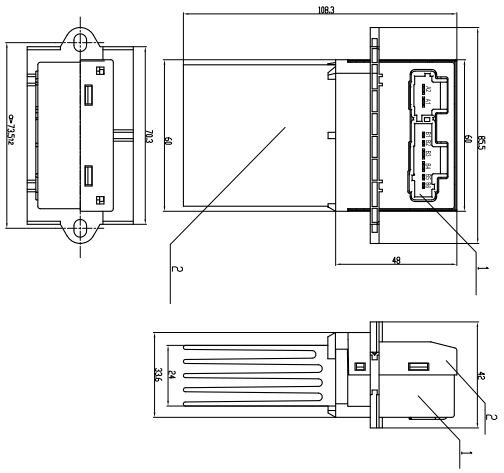
A/C SYSTEM

Resistors and regulators
for good system operation

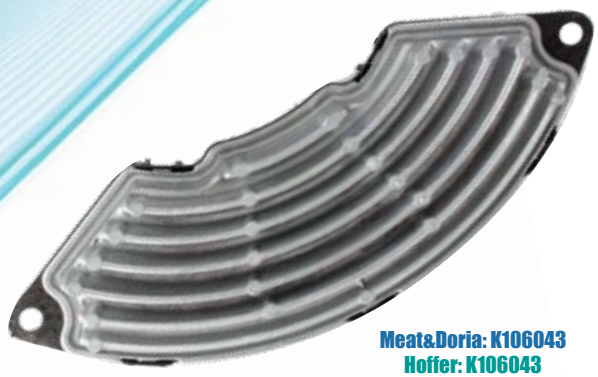
The speed of the cabin fan on vehicles can be controlled by using resistors or, alternatively, dedicated electronic controllers. These components are directly connected to the cabin fan and play a vital role in its correct operation. In some cases, they also affect the radiator air ducts.
The resistor is responsible for transforming excess electrical energy into heat, diverting the other part into the electrical circuit. This regulates the motor speed by reducing the voltage available to the fan. Since the resistors are activated every time the fan is used, they are subject to wear and tear and can be damaged by voltage spikes or overheating. For this reason, they are positioned close to the fan so that air can blow over them and cool them down.
Consequently, diagnosing and detecting problems with this component is relatively easy.

The fan controller, also known as the HVAC control module, is an electronic component that operates via pulse width modulation (PWM) and comprises an electronic circuit board. Some variants may include small capacitors or transistors. The controller features a finned aluminium heat sink, designed to ensure the correct operation of the electronic part. Located close to the fan, it is connected to the latter via a dedicated wiring harness.

Meat&Doria: K106024
Hoffer: K106024



REGULATOR DESIGN



Meat&Doria: K106043
Hoffer: K106043

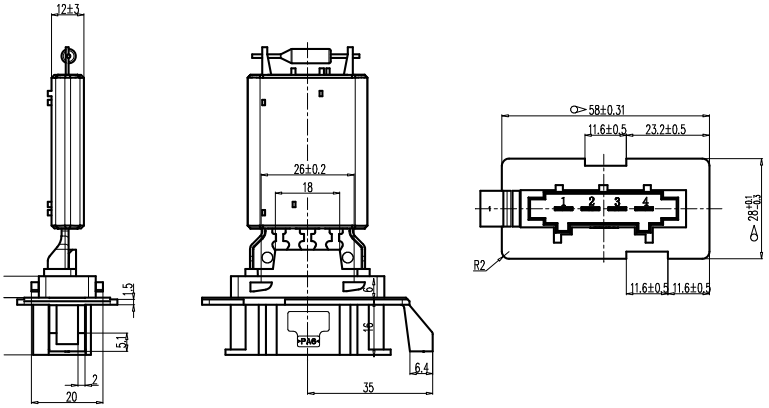
ATTENTION TO QUALITY

Quality cannot be neglected in the case of electronic components that are subject to continuous stress, such as those mentioned above. M&D Group only guarantees components that ensure constant reliability over time.

The resistors and regulators are integrated directly into the cabin fan on some models. Therefore, the entire component must be replaced in the event of a failure. These components are usually located near the footwell behind the dashboard cover, although their location may vary depending on the car model. Often, they are located on the passenger side, near the glove compartment. The disassembly procedure is generally simple and does not require many hours of work. Resistors and regulators are commonly fixed on a plastic holder and can be removed easily. When replacing these components, it is essential to check the condition of the wiring harness, as only original quality wiring will guarantee the correct replacement of these sensitive components. M&D Group provides repair technicians with all the necessary tools to carry out professional and high-quality repairs.

Finally, we recommend that you always change the cabin filter and clean the air intake at the correct intervals. Failure of resistors and regulators can also be caused by a lack of routine maintenance.

M&D Group's range includes 130 regulators, 198 resistors, covering over 90% of the vehicles on the road in **continuous expansion**!



RESISTOR DESIGN

Meat&Doria: K109001
Hoffer: K109001

FOCUS

Cabin switches for maximum control

As comfort, control and infotainment technologies increase, the number of switches in the cabin is growing. These new systems and driving assistance devices are controlled by traditional buttons, potentiometers and switches when not controlled by touchscreens or voice commands.

The M&D Group is constantly developing new product categories and improving existing ones, **offering a range of over 120 items** that is constantly growing to meet the most interesting and sought-after applications.

Power window switches

They are used to raise and lower the car windows. The raising and lowering function can be automated and the rear windows can be electric or manual (with a traditional crank handle).

Meat&Doria: 26569
Hoffer: 2106569

Mirror switches

This switch is used to precision-adjust the rear-view mirror angle along the vertical and horizontal axes. On cars equipped with power seats, they self-adjust according to the selected profile (and thus to the driver). This way, if the car is driven by more than one person, everyone can have their rear-view mirror adjustment saved to recall as needed.

Meat&Doria: 206025
Hoffer: H206025

Headlight switches

They are used to switch the headlights on and off. The high beam function – either adaptive or conventional – is controlled using the steering column stalk. Other functions include automatic headlight switching using a dusk sensor, manual switching of the fog lights and headlight lighting distance collimation.

Meat&Doria: 23902
Hoffer: H23902

Fuel tank release switches

They allow the tank door to be opened, either mechanically or electronically.

Meat&Doria: 206035
Hoffer: H206035

Hazard light switches

They switch on the emergency lights.
This is an intelligent device fitted to vehicles manufactured in the last decade that can switch on the hazard lights in the event of sudden braking.

Meat&Doria: 23672
Hoffer: 2103672

Trunk lock switches

They unlock the boot by means of an electrical impulse. The switches on cars equipped with power liftgates communicate with the appropriate control unit to determine the correct opening timing.

Meat&Doria: 206183
Hoffer: H206183

Heated seat switches

They manage the option of heating driver, passenger and rear seats, where present.

Meat&Doria: 206120
Hoffer: H206120

Combi switches

They have the peculiarity of combining several buttons with different functions. The advantage of this is that it allows several buttons to be installed neatly on the dashboard, giving a more pleasing and ergonomic result.

Meat&Doria: 206134
Hoffer: H206134

Central door lock switches

They lock and unlock the four doors. The switch is also smart and locks the doors automatically when the vehicle moves off.

Meat&Doria: 206060
Hoffer: H206060

Sunroof opening and closing switches

In advanced or high-end cars, they work in conjunction with other sensors (such as rain and sun sensors) to automatically close the roof and, if fitted, the electric blinds under certain conditions (to prevent rain from entering the cabin or to reduce overheating caused by direct sunlight).

Meat&Doria: 206119
Hoffer: H206119

Headlight collimation adjustment controls

They are responsible for setting the depth of the headlights to adjust the beam that illuminates the road. They can be dedicated switches or integrated into the actuation controls of the headlights.

Meat&Doria: 206074
Hoffer: H206074

Airbag activation and deactivation switches

This switch is only present for the front passenger airbag allowing it to be deactivated when it could be dangerous: for example, when a child restraint system is installed on the front seat.

Meat&Doria: 206149
Hoffer: H206149

Power seat adjustment switches

With or without lumbar support, memory function and massage function, these switches, like the mirror switches, work in synergy with the comfort control unit. For memory seats, they can recall the various seat configurations according to the person driving.

Meat&Doria: 206234
Hoffer: H206234

NEWS

Expansion tank for keeping the engine at the right temperature

> The consequence of a damaged expansion tank is that the coolant will not be able to perform its function.

EXPANSION TANK

Meat&Doria: 2035061
Hoffer: 2035061

The expansion tank is located in the engine compartment. It contains coolant to maintain the correct engine temperature. The term "expansion" refers to the fact that the coolant expands when the engine is hot and flows into the tank. When the engine is cold, the fluid flows back into the circuit. Therefore, it performs a compensating action: it collects the coolant as it expands and equalises the circuit pressure.

For functional reasons, it is located in the upper part of the engine. This is important because there must be no air inside the circuit. For the same reason, the return pipe is always positioned higher than the supply pipe. A cap is provided on the top of the tank to top up the coolant and vent the system at a specific pressure specified by the manufacturer to compensate for the pressure increase.

Coolant is essential for the correct engine operation and so some tanks also have a level sensor to monitor the correct amount of fluid.

The main causes of a faulty expansion tank can be:

- ageing plastic;
- a faulty cap that does not vent;
- a leakage caused by temperature variations and engine vibrations.

Expansion tank faults are easy to spot if there is coolant under the car or in the engine compartment, if you can smell the anti-freeze, or if you need to top up frequently. The consequence of a damaged expansion tank is that the coolant will not be able to perform its function. The lack of coolant will be signalled by an indicator on the instrument panel and

Test procedures

Our Quality Department performs the following tests.

Leak test: the expansion tank must not show any kind of failure or leakage.

Pressure tightness and cap venting test: the pressure increases as the temperature of the coolant increases; the tank must hold correctly up to the cap venting point.

Thermal stress test: there must be no deformation as a result of sudden changes in temperature.

Meat&Doria: 2036028
Hoffer: 2036028

could cause **serious damage to the engine** if action is not taken fast.
However, the problem may not be reported correctly if the **level sensor** is not working properly. The sensor may no longer measure correctly and may need to be replaced.

To provide prompt answers to market demands, M&D Group has developed a complete range of expansion tanks with the following **main advantages**:

- High-quality materials.
- Entirely compliant with the manufacturer's specifications.
- Made to the highest quality standards, with precise checks carried out at all steps of the process to ensure the tightness and quality of each component.

M&D Group has added two important complementary products following the inclusion of the expansion tanks in the range:

- **Expansion tank caps**: as described above, they play a very important role because they are provided with a vent with a specific calibration for each type. **Over 50 models in the range**.
- **Coolant level sensors**: this is another key component for measuring the residual amount of coolant if the expansion tank is provided with one. **Over 10 models in the range**.

Meat&Doria: 72406
Hoffer: 7532406

COOLANT LEVEL SENSOR

PARTS

Over 40,000 refs.

Our range

ENGINE MANAGEMENT

Over 2100 refs.

- Idle speed controls
- Relays and components
- Injectors
- Electronic control units
- Throttle bodies
- Cohline
- LPG/CNG
- Pressure regulators
- Electrical small parts
- Mechanical parts and kits
- Air intake manifold modules
- Cable harness kits

EMISSION CONTROL

Over 1800 refs.

- EGR valves
- Mass airflow meters (and inserts)
- Air pumps and valves
- Electrovalves
- Fuel vapour valves

IGNITION COILS

Over 600 refs.

- Ignition coils
- Ignition modules

LIGHTING AND COMFORT

Over 3700 refs.

- Steering column switches
- Brake light, reverse light, hazard light switches
- Power window switches
- Level sensors
- Xenon light control units
- Headlight switches
- Wiper motors
- Window wiper systems
- Wiper arms
- Door lockers
- Airbag control modules and clock springs
- Steering locks

FUEL PUMPS

Over 2100 refs.

- Fuel supply units
- Fuel pumps
- Mechanical fuel pumps
- High pressure pumps
- Fuel level sensors
- Fuel pump accessories

TURBOCHARGERS

Over 2000 refs.

- Turbochargers
- Core assemblies
- Variable geometries
- Oil pipes
- Air hoses
- Recirculating air valves
- Gaskets
- Wastegates

VACUUM PUMPS

Over 200 refs.

- Vacuum pumps
- Vacuum pump repair kits

STARTER SYSTEM

Over 2100 refs.

- Alternators
- Starters
- Pulleys
- Starter drives
- Electromagnets
- Voltage regulators
- Rectifiers
- Brushes

MEAT & DORIA SPECIAL PARTS SINCE 1945

HOFFER PRODUCTS SINCE 1999

MECHANICAL PARTS AND ENGINE COOLING

Over **500** refs.

- Oil coolers
- Oil valves
- Camshaft phaser solenoid valves
- Steering pump repair kits

COOLING SYSTEM

Over **900** refs.

- Thermostats
- Thermal systems
- Water flanges and pipes
- Water hoses
- Oil hoses
- Electric water pumps

SENSORS

Over **5000** refs.

- Knock sensors
- Throttle position sensors
- Accelerator pedal sensors
- Camshaft and crankshaft sensors
- Torque sensors
- Pressure sensors
- Parking sensors
- Oil level sensors
- Temperature sensors
- Exhaust gas pressure sensors
- Exhaust gas temperature sensors
- ABS sensors and control units
- Fuel pressure sensors
- Oil pressure switches
- Brake pad wear sensors
- Brake booster pressure sensors
- NO_x sensors
- Pedal stroke sensors
- TPMS sensors

OXYGEN SENSORS

Over **750** refs.

- Oxygen sensors
- Universal oxygen sensors

DIESEL PARTS

Over **1000** refs.

- Common rail pressure sensors
- Common rail pressure regulators
- Hand primer pumps
- Heating elements
- Injectors
- Electrovalves
- Injector repair kits
- Pump repair kits
- Nozzles
- Shaft pumps
- Oil seals
- Gaskets
- Fittings
- Other

AIR CONDITIONING SYSTEM

Over **3150** refs.

- Compressors
- Control valves
- Viscous fan drives
- Viscous clutches
- Expansion valves
- Dryer filters
- Pressure switches
- Cabin fans
- Resistors and regulators
- Wastegates

FILTERS

Over **2100** refs.

CARBURETTOR KITS

430 refs.

NEWS

Automation to improve efficiency

A/C SYSTEM

Resistors and regulators
for good system operation

FOCUS

Still looking to the future with
diesel engines

FOCUS

Cabin switches
for maximum control

Technical and product information

OVERVIEW

www.meat-doria.com
www.hoffer-products.com