

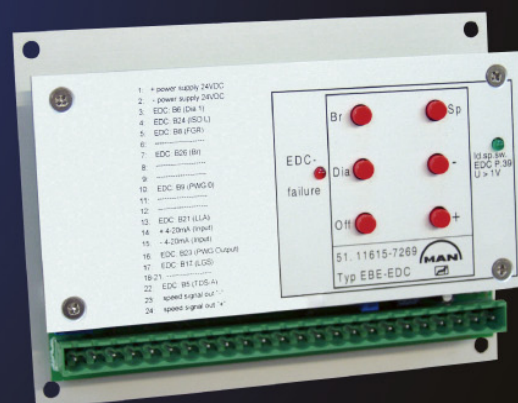
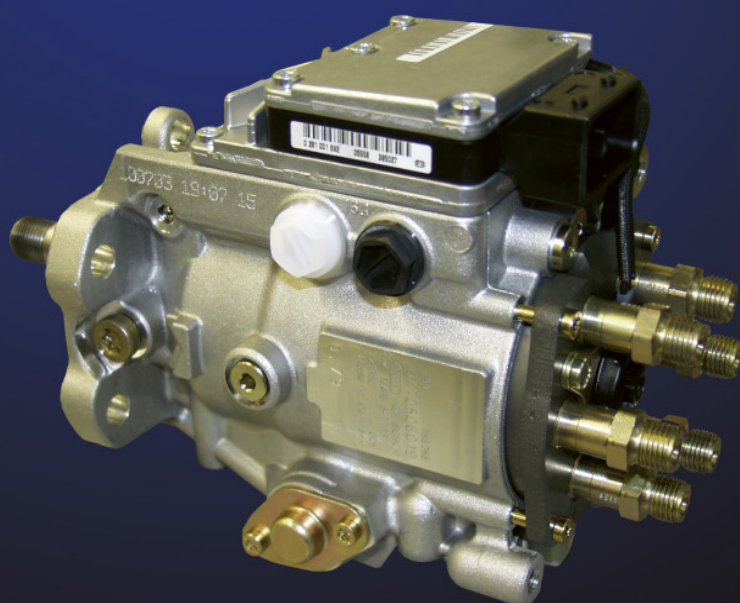
Technical Information

Electronically controlled diesel injection in conjunction with MAN Monitoring Diagnostic System (MMDS)



EDC MS 6.4 - D08 marine engines

*Description, testing, interfaces,
4-20 mA engine triggering system and electric gearbox triggering system*



These instructions are intended to help you to repair the electronic Diesel control system properly.

In writing these instructions, we have assumed that you have the necessary knowledge of control systems for working on and with the electronic diesel control.

Important instructions which concern technical safety and protection of persons are emphasised as shown below.

**Danger:**

This refers to working and operating procedures which must be complied with in order to rule out the risk to persons.

**Caution:**

This refers to working and operating procedures which must be complied with in order to prevent damage to or destruction of material.

**Note:**

Explanations useful for understanding the working or operating procedure to be performed.

Best regards
MAN Nutzfahrzeuge Aktiengesellschaft
Nuremberg Plant

We reserve the right to make technical modifications in the course of further development.

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General

Important safety regulations are summarized in this quick-reference overview and arranged by topic to effectively convey the knowledge necessary to avoid accidents causing injury, damage or environmental hazard.

The engine operating manual contains further information.

Important:

Should an accident occur despite all precautionary measures, particularly one involving contact with corrosive acid, penetration of fuel under the skin, scalding by hot oil, antifreeze splashing into the eyes etc. **you must seek medical assistance immediately.**

1. Instructions for avoiding accidents likely to cause injury

Only authorized and qualified personnel are permitted to carry out inspection, adjustment and repair work

- Secure and chock vehicles to prevent the vehicle rolling.
- Firmly secure units and assemblies on disassembly.
- Only authorized personnel are permitted to start and operate the engine.
- Do not stand too close to rotating parts while the engine is running.
Wear close-fitting working clothes.
- Do not touch a hot engine with bare hands:
Risk of burns.
- Keep area surrounding engine, ladders and stairways free of oil and grease.
Accidents caused by slipping can have serious consequences.
- Only work with tools which are in good condition. Damaged or worn spanners and wrenches can slip off: Risk of injury.
- Persons must not stand under an engine suspended on a crane hook. Keep lifting gear in perfect condition.
- Only open coolant circuit once the engine has cooled down. Follow the instructions given under "Care and Maintenance" in the Operating Manual exactly if it is not possible to avoid opening the coolant circuit with the engine at operating temperature.



- Do not tighten or loosen pipes and hoses that are under pressure (lubricant circuit, coolant circuit and any downstream hydraulic oil circuits): Risk of injury caused by liquids escaping under pressure.
- Do not place hands under the fuel jet when checking injection nozzles. Do not inhale fuel mist.
- Always disconnect battery when working on the electrical system.



- Do not use rapid charger to start the engine. Rapid charging of batteries is only permitted with the positive and negative leads disconnected!
- Disconnect batteries only with the ignition turned off.
- Observe manufacturer's instructions for handling batteries.
Caution:
Battery acid is toxic and corrosive. Battery gasses are explosive.



- Only use suitable measuring instruments to **measure voltages!** The minimum input resistance of a measuring instrument should be 10 MΩ.
- Only disconnect or connect wiring harness connectors on electronic control units with the **ignition turned off!**



Disconnect batteries and connect the positive lead to the negative lead such that they are electrically conductive before carrying out any electric welding work. Earth the welding set as close to the weld as possible. Do not place cables of welding set parallel to electrical lines in the vehicle.

Refer to the "Welders Code of Practice" for further accident prevention measures.

- **When carrying out repaint jobs**, electronic components may be subject to high temperatures (max. 95°C) for only very short periods; a period of up to approx. 2 hours is permissible at a max. temperature of 85°C, disconnect batteries.

Limitation of liability for parts and accessories

In your own interest, we strongly recommend you use only accessories and original MAN parts expressly approved by MAN for your MAN engine. The reliability, safety and suitability of these parts and accessories have been tested specially for MAN engines. Despite us keeping a constant eye on the market, we cannot assess and be held responsible for these properties in other products, even if they bear TÜV (German testing and inspection institute) approval or any other official approval in any particular case.

Laying up or storage

Special measures must be implemented in accordance with MAN Company Standard M 3069 Part 3 if engines are to be laid up or placed into storage for more than 3 months.



Electronic diesel control EDC

General

The demands made by customers and the legislators in respect of fuel consumption, exhaust emission and noise characteristics etc. on diesel engines have increased over the years and will be even more stringent in the future.

The fact that conventional mechanical injection systems have reached their performance limits has made electronically controlled fuel injection systems necessary.

Such systems increase engine efficiency, improve driving comfort and lessen the burden on the environment.

EDC (**E**lectronic **D**iesel **C**ontrol) meets these requirements.

Layout and function

With the implementation of the D 0836 engine, the electronically controlled diesel injection with radial piston distributor injection pump VP 44 is used from the first time in marine engines.

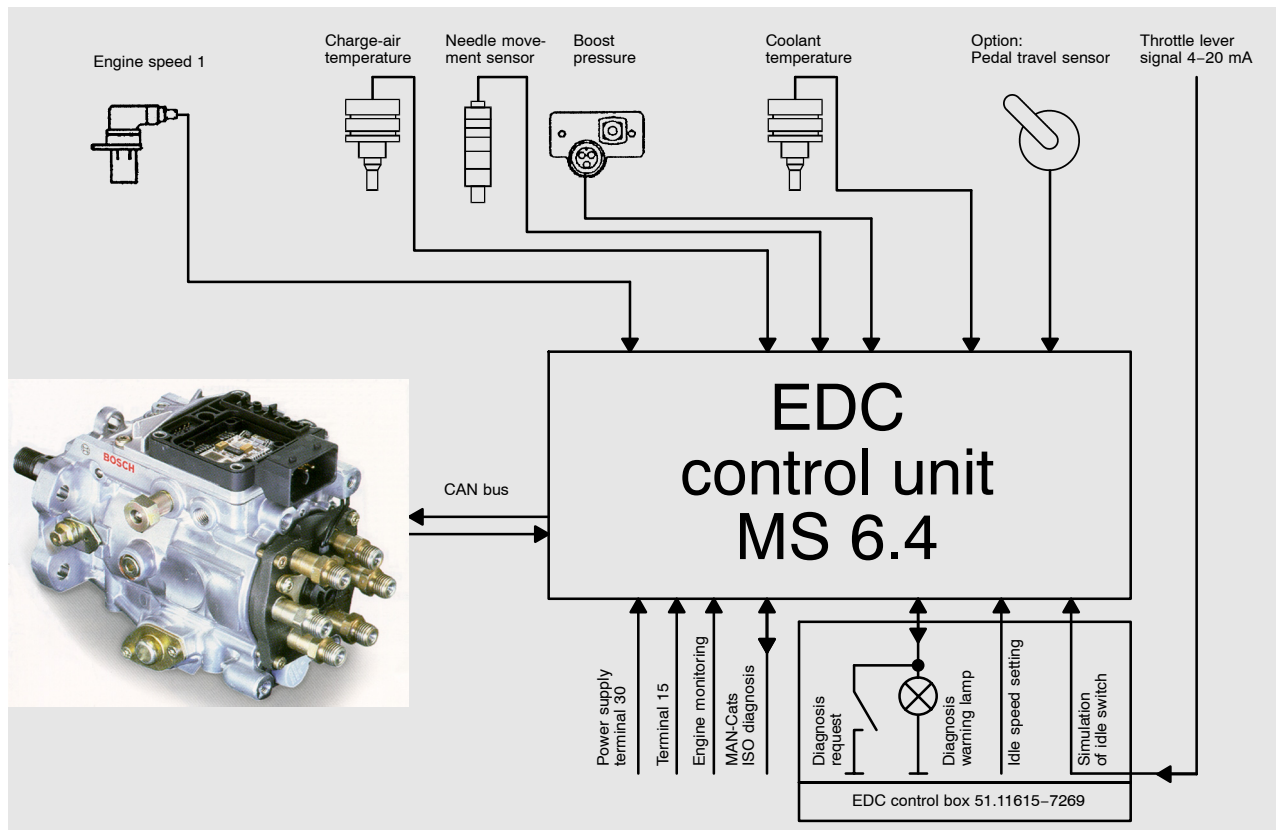
This diesel injection system requires two control unit for electronically diesel control:

- Pump control unit (installation position: part of the injection pump)
- Engine control unit (installation position: control unit in the terminal box)

This arrangement is necessary to prevent overheating of certain electronic components on the one hand and the influence of interference signals that can come from the injection pump on the other.

The pump control unit records the pump-internal sensor signals for engine speed, angle of rotation and fuel temperature and the data supplied by the engine control unit, evaluating them for exact control of the injection volume injection point.

Data interchange between the engine control unit and pump control unit is across the CAN data bus.



The engine can be triggered

- mechanically with the pedal travel sensor or alternatively
- electrically with the 4–20 mA signal.

The intelligent pump control unit contains

- the fuel delivery regulator
- the injection timing mechanism

The pump control unit is activated by the engine control unit.

The engine control unit processes information it receives via

- the CAN data bus from pump control unit
- the pedal travel sensor (throttle lever signal) or from the 4–20 mA throttle lever
- the needle movement sensor
- the boost pressure sensor
- coolant temperature sensor
- the rpm sensor on the flywheel housing



System description

The expanded EDC control box 51.11615–7269 contains the following functions:

- EDC fault diagnosis with LED and flashcode
- Idle speed adjustment
- Conversion of 4–20 mA input signal into a voltage signal
- Galvanic separation of the 4–20 mA input signal from the EDC control unit
- Simulation of the idle switch if the 4–20 mA triggering system is used
- Isolation of the EDC engine speed signal (TDS signal from the EDC control unit)

Communication with the MAN-Cats test and diagnostic program is possible via an ISO interface of the EDC control unit that is also integrated into the terminal box.

To regulate the start of injection, the current injection timing is recorded by the needle movement sensor in the injector holder on cylinder 1.

The start of injection is changed via the hydraulic injection timing mechanism in the VP 44.

To ensure the vessel can reach the nearest workshop in the event of one or several sensors failing, an emergency operation function is integrated in the control unit which, depending on the situation, enables the vessel to continue on its way, albeit with restricted functions.

The idle speed is exactly maintained by means of the idle speed governor as long as the engine output is sufficient for this. The regulated idle speed can be varied within certain limits.

The idle speed is factory set to 600 rpm. However, it can be varied within the range of 600 to 750 rpm by using the EDC control box.

Starting fuel is delivered when a lower start detection speed is exceeded.

The starting fuel volume and cold idle speed are limited as a function of the coolant temperature to avoid impermissible smoke emission and unnecessary revving of the engine after starting.