

# Repair Manual



MAN-Monitoring Diagnostic System (MMDS)  
Marine Diesel Engines Common Rail

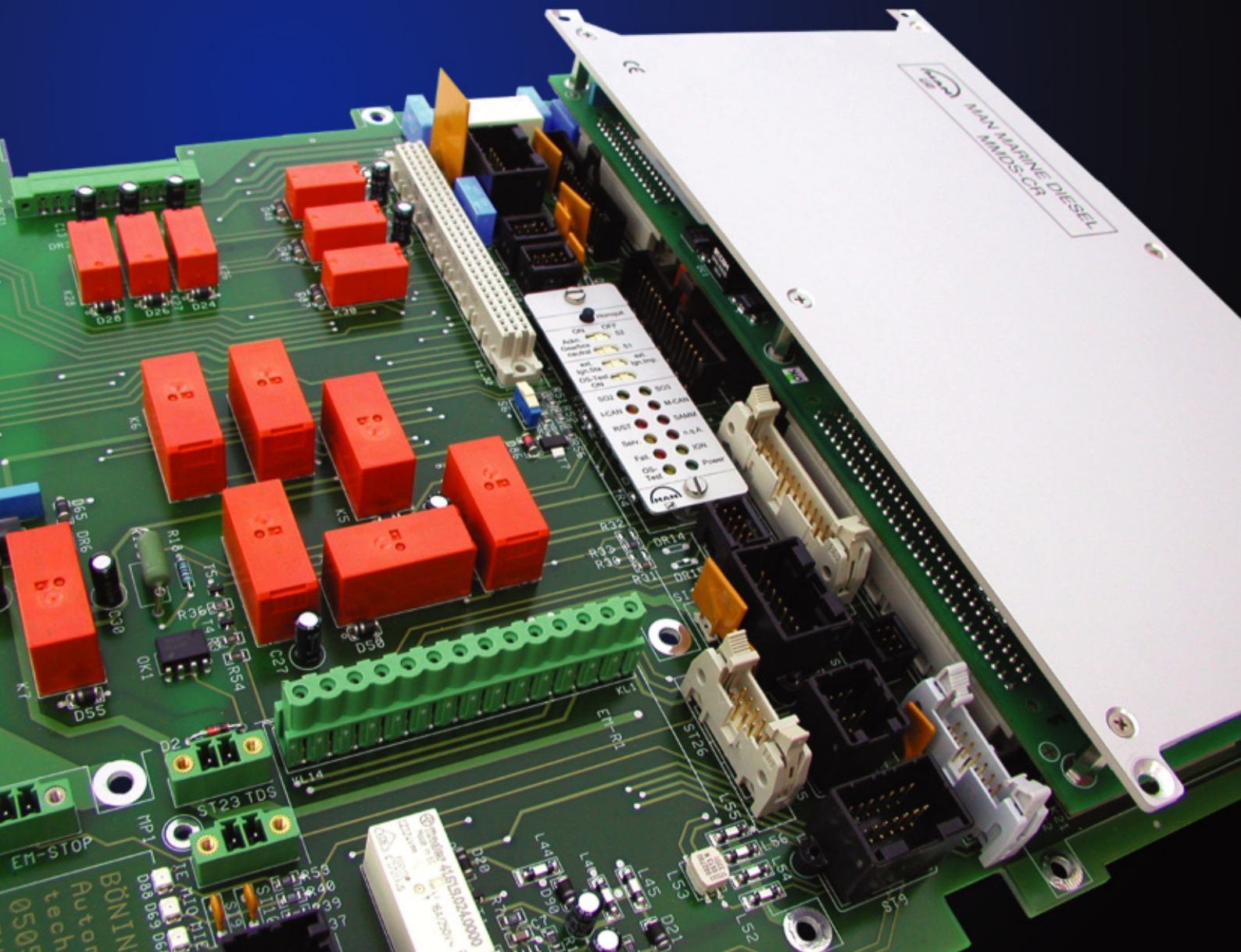
R 6

V 8

V10

V12

Description, checking, interfaces





### Dear Customer,

These instructions are intended to help you:

- Get to know the components of the MAN Monitoring Diagnosis System (MMDS for short)
- Recognise the combined effects of the individual components of the MMDS
- to install the system in the ship in line with accepted technical principles
- to rectify malfunctions

These instructions are to be viewed in the context of the printed material 51.99598–8127 “Common Rail fuel injection system in conjunction with MAN Monitoring Diagnosis System (MMDS)”.

This Publication was devised under the assumption that its readers will have the necessary basic knowledge of handling and working with marine engines and their electrical systems.

Yours faithfully  
MAN Nutzfahrzeuge Aktiengesellschaft  
Nuremberg Plant

We reserve the right to make changes of a technical nature for reasons related to development.

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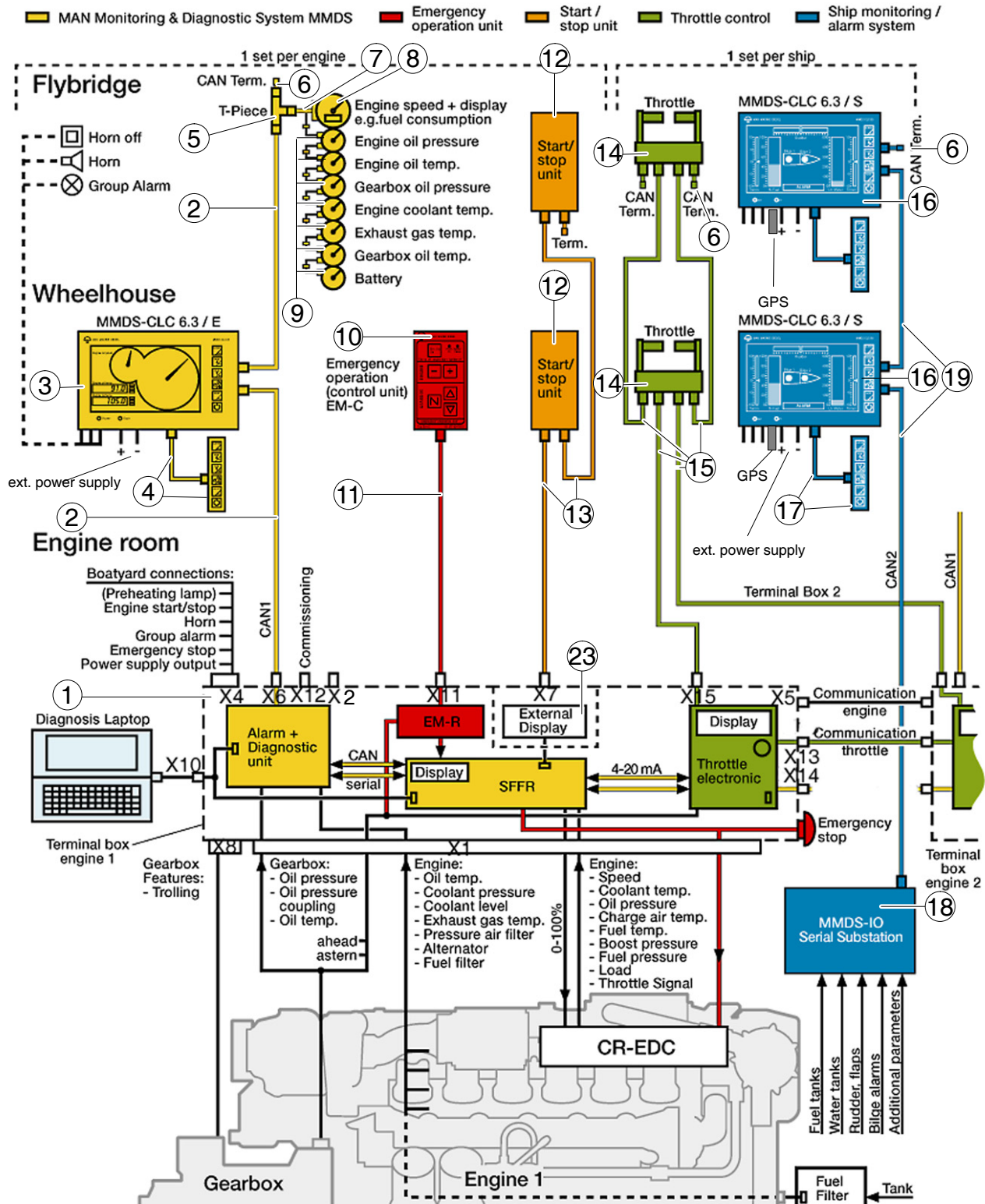


## D28-CR: MMDS for CR engines with EDC 7 (CAN bus system) / CLC display, step 1 (on bridge)

- Throttle lever system MPC
- Ship alarm system (step 1)
- Emergency running unit

Explanation of step 1:

CLC display with a CAN interface  
(1x input, 1x output)



The D28-CR CAN bus system consists of the following components:

- ① Terminal box with
  - SFFR 51.25805–700X
  - Motherboard 51.25430–200X
  - Diagnostic and monitoring unit
  - Receiver unit for emergency running unit (Em-R) 51.27720–7013, optional
  - MPC throttle lever control (51.11610–6033)
- ② CAN bus cable 51.25411–0025 / –0026 / –0015 / –0016 / –0017
- ③ CLC 6.3 display engine (CAN / step 1) (51.27721–7043)
- ④ Connection lead 51.25449–0022 with key block 51.27720–7025
- ⑤ T-piece for separating the CAN line 51.25433–0023
- ⑥ CAN termination resistor 51.25435–0174
- ⑦ Adapter CAN master 51.25411–6014
- ⑧ CAN master tachometer with display for engine parameters (51.27102–7002)
- ⑨ CAN slave instruments
- ⑩ Emergency running unit (Em-C) control box (51.27720–7035), optional
- ⑪ Connection cable for terminal box (15 m, 20 m) – emergency running unit Em-R (51.24449–0047 / –0048)
- ⑫ Start-stop unit \*
- ⑬ Connection cable \*
- ⑭ CAN throttle lever 51.11605–6050 (long) / –6051 (short)
- ⑮ Connecting cable 51.25449–0052 / –0053 / –0054 / –0055
- ⑯ MMDS-CLC display, ship
- ⑰ Connection lead 51.25449–0022 with key block 51.27720–7025
- ⑱ Serial substation IO12 (In / Out12), order-based
- ⑲ CAN bus cable 51.25411–0025 / –0026 / –0015 / –0016 / –0017
- ⑳ Engine room panel (optional) as of 11.2005
  - LC display in the terminal box cover
  - SFFR without display
  - Button for ignition ① “ON / OFF” / engine ② “START / STOP” integrated in the terminal box cover



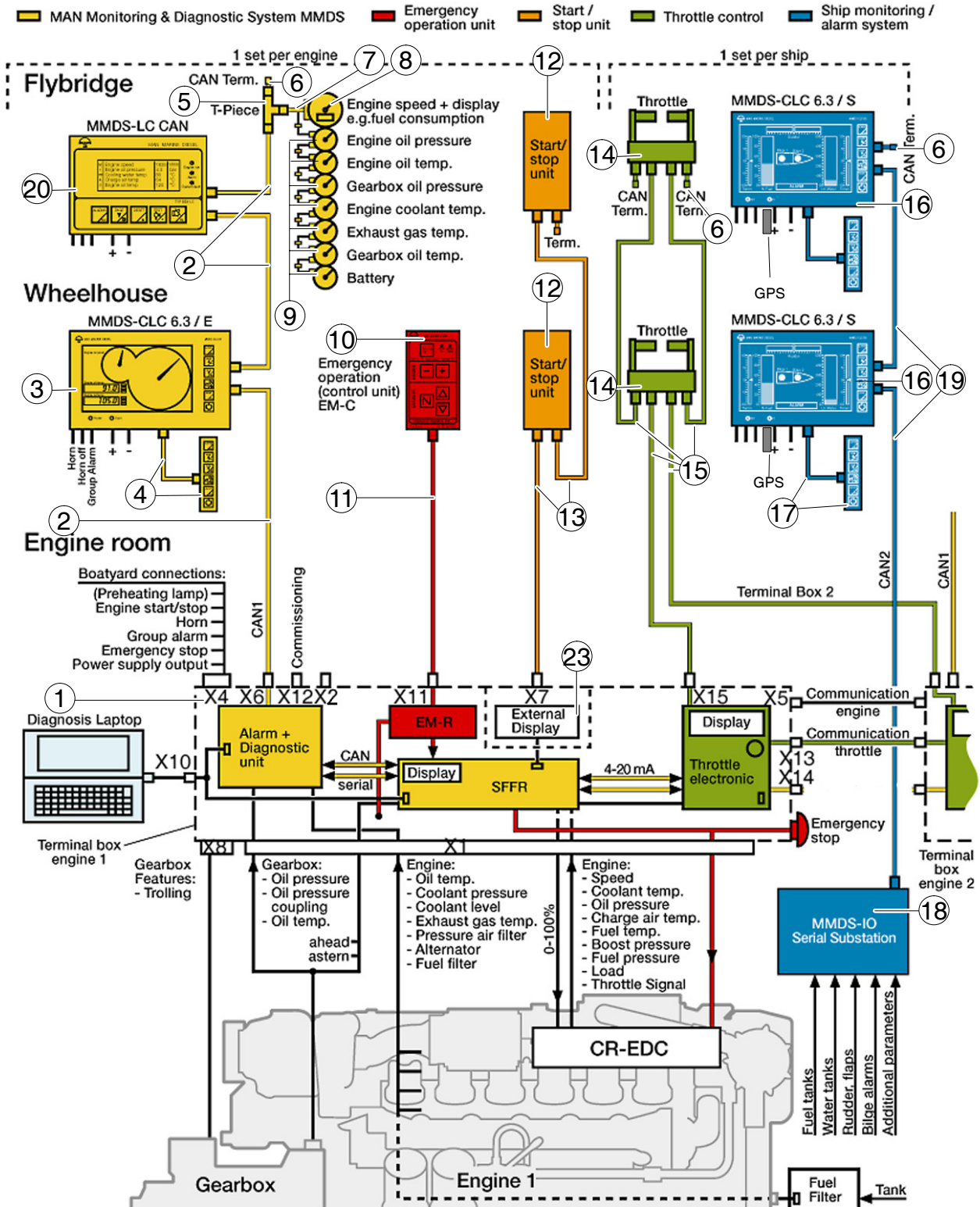
\* in planning

NB: The validity of the item numbers refers to the issue date of these instructions.

## D28-CR: MMDS for CR engines with EDC 7 (CAN bus system) /

### LC-CAN on flybridge

- Throttle lever system MPC
- Ship alarm system (step 1)
- Emergency running unit



The D28-CR CAN bus system consists of the following components:

- ① Terminal box with
  - SFFR 51.25805–700X
  - Motherboard 51.25430–200X
  - Diagnostic and monitoring unit
  - Receiver unit for emergency running unit (Em-R) 51.27720–7013, optional
  - MPC throttle lever control (51.11610–6033)
- ② CAN bus cable 51.25411–0025 / –0026 / –0015 / –0016 / –0017
- ③ CLC 6.3 display engine (CAN / step 1) (51.27721–7043)
- ④ Connection lead 51.25449–0022 with key block 51.27720–7025
- ⑤ T-piece for separating the CAN line 51.25433–0023
- ⑥ CAN termination resistor 51.25435–0174
- ⑦ Adapter CAN master 51.25411–6014
- ⑧ CAN master tachometer with display for engine parameters (51.27102–7002)
- ⑨ CAN slave instruments
- ⑩ Emergency running unit (Em-C), control box 51.27720–7035, optional
- ⑪ Connection cable for terminal box (15 m, 20 m) – emergency running unit Em-R (51.24449–0047 / –0048)
- ⑫ Start-stop unit \*
- ⑬ Connection cable \*
- ⑭ CAN throttle lever 51.11605–6050 (long) / –6051 (short)
- ⑮ Connecting cable 51.25449–0052 / –0053 / –0054 / –0055
- ⑯ MMDS-CLC display, ship
- ⑰ Connection lead 51.25449–0022
- ⑱ Serial substation IO12 (In / Out12), order-based
- ⑲ CAN bus cable 51.25411–0025 / –0026 / –0015 / –0016 / –0017
- ⑳ LC-CAN display (51.27721–7064)
- ㉑ Engine room panel (optional)
  - LC display in the terminal box cover
  - SFFR without display
  - Button for ignition ① “ON / OFF” / engine ② “START / STOP” integrated in the terminal box cover



\* in planning

NB: The validity of the item numbers refers to the issue date of these instructions.



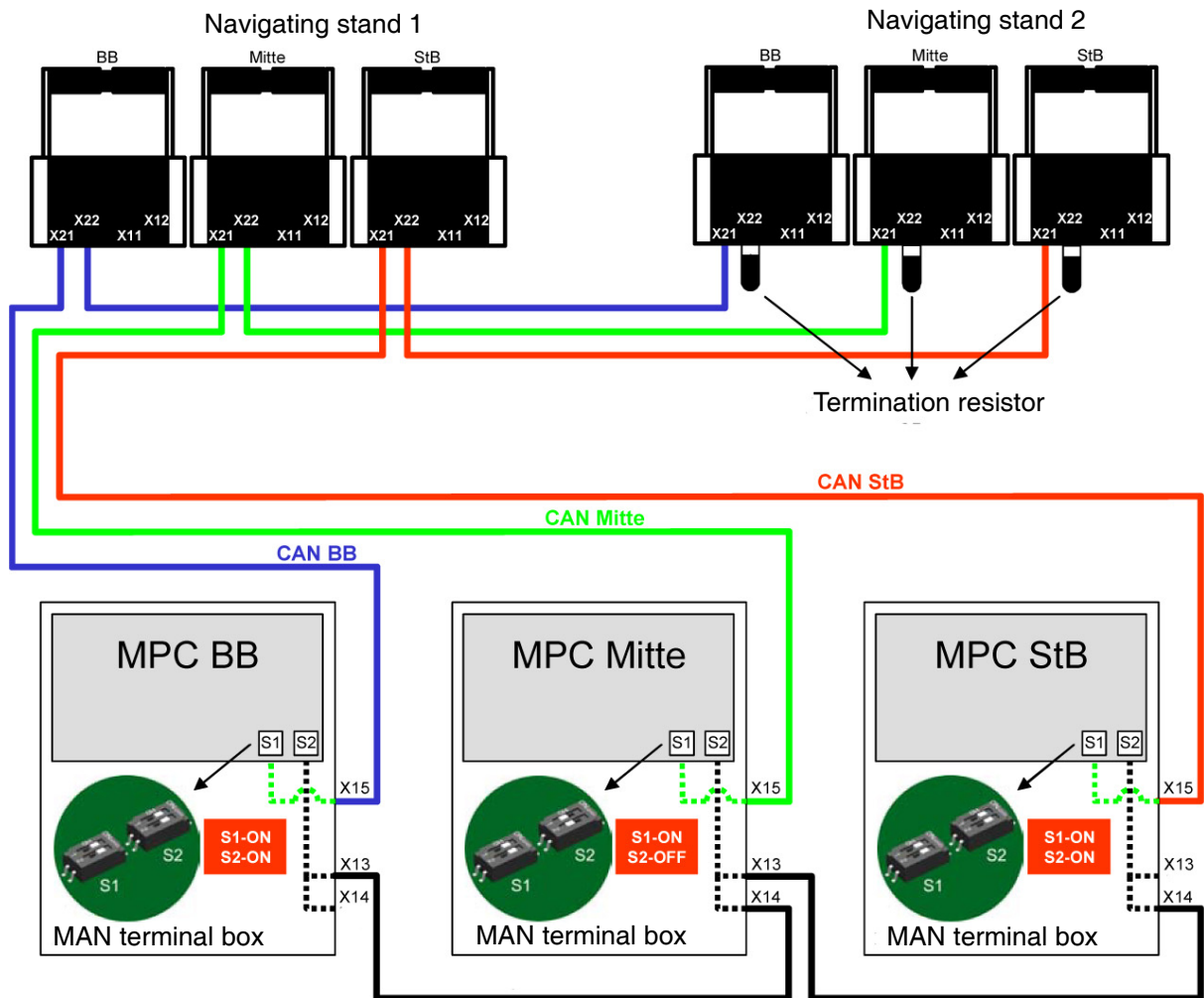
## MPC throttle lever control

Example of CAN bus wiring with 3 engines and 2 navigating stands

Here, the cross-communication interconnects 3 MPCs.

In the case of the middle engine, S2 is to be set to OFF (S2.1 = OFF; S2.2 = OFF).

The CAN data line for cross-communication is the same as that leading to the throttle levers.



S1: termination throttle lever CAN bus  
S2: termination cross-communication

Cross-communication

Cross-communication

## Trolling gearbox activation

### Connector X8

In order to enable improved slow travel on powerful drive systems with power shift gears, various manufacturers offer trolling gearboxes. In order to be able to use the trolling function on the gearboxes, various inputs and outputs are made available via connector X8. These can be parameterised in the MPC for a wide variety of signal types.

#### Output: 4–20 mA / 0–10 V

On activation of the upstream electronics, the following signal types are available for the outputs: 4–20 mA, 0–20 mA, 2–10 V, 0–10 V and PWM signal: **Connector X8: pin 6 (+), pin 7 (–).**

With this output, the trolling speed is sent to the gearbox electronics.

**For setting, refer to the MPC manual!**

#### Proportional valve output:

The MPC analog output provides the possibility to activate proportional valves directly. This output can drive a maximum of 3 A: **Connector X8: pin 1(–), pin 2 (+).**

**For setting, refer to the MPC manual!**

#### Digital output for trolling:

Some gearboxes additionally require a digital signal to switch between power shift gear and trolling mode. It is often the case here that a valve is activated directly, but electronic inputs also have to be activated.

**Connector X8: pin 4, pin 5 (contact without voltage, max. 2 A).**

**For setting, refer to the MPC manual!**

#### Digital inputs for monitoring mech. override switches on the gearbox:

Some trolling gearboxes have mechanical override switches in addition to the standard solenoid valves for power shift gears. These switches are required to engage and disengage the gearbox mechanically in the event of defective electronics. To monitor the position of this switch, the start enable can be interrupted via the input “Gearbox acknowledgement stop”. This function can be connected via **connector X4 pin 14, pin 15.**

## Connection assignment of the trolling connector X8 at the terminal box / motherboard –2005 / –2006

Plug X8			
Pin 1:	Proportional valve A / B	earth → valve –	
Pin 2:	Proportional valve A +	Trolling → valve+	
Pin 3:	Proportional valve B +	Reserve	
Pin 4:	Digital output	Trolling on / off, contact without voltage	
Pin 5:	Digital output	Trolling on / off, contact without voltage	
Pin 6:	Analog output	Trolling target value +	
Pin 7:	Analog output	Trolling target value –	
Pin 8:	Digital input	Gearbox acknowledgement forwards +	
Pin 9:	Digital input	Gearbox acknowledgement reverse +	
Pin 10:	Digital input	Gearbox acknowledgement stop +	
Pin 11:	Digital input	Gearbox acknowledgement earth	
Pin 12:	Digital output	Express / docking mode	
Pin 13:	Digital output	Express / docking mode	
Pin 14:	Terminal 15 U <sub>Batt</sub>	Power supply for trolling electronics	
Pin 15:	Terminal 31 earth – (max. 3 A)	Power supply for trolling electronics	
Pin 16:	Terminal 30 U <sub>Batt</sub> (max. 1 A)	Power supply for trolling electronics	

**1st step**  
Select the “Gearbox parameters” tab

**2nd step**  
Activation of monitoring type for temperature (oil temperature switch or analog sensor / both active).  
At least one monitoring type must be active (mutually locked).

**3rd step**  
Setting of the alarm limit values for temperature. Only with analog sensor active! Set current values on the basis of enclosed list (alarm values for gearbox).

**4th step**  
Enable or disable slowdown for the set monitoring type.

**5th step**  
Press the button (F7) to transfer the temperature values.

**6th step**  
Setting for pressure – exact same procedure as for temperature. Transfer values for pressure with (F8).

After each transfer, the current state in the MMDS is displayed.

**7th step**  
Additional information for diagnosis software

## Default values:

If no gearbox alarms are set on commissioning, default limit values are stored in the MMDS.

Default value for oil temp.: Pre-alarm VA: 90°C / 194°F  
Master alarm HA: 95°C / 203°F

Default value for oil pressure: Pre-alarm VA: 11 bar / 160 psi  
Master alarm HA: 10 bar / 145 psi

The alarms are parameterised without slowdown. Gearbox switch recording is inactive.

These values are not suitable for safe gearbox monitoring. The most important are the permitted values for oil pressure and oil temperature as specified by the gearbox manufacturer, see page 48.

## Restore default values (F9):

(F9) “Restore MMDS standard configuration” can be used to restore the source state.

## Save / load the gearbox configuration (F2 / F1):

(F2): The data for an existing gearbox can be saved on the laptop hard drive

(F1): The saved data for an existing gearbox can be taken from the hard drive, displayed and programmed into the MMDS using F7 or F8.

### V engine

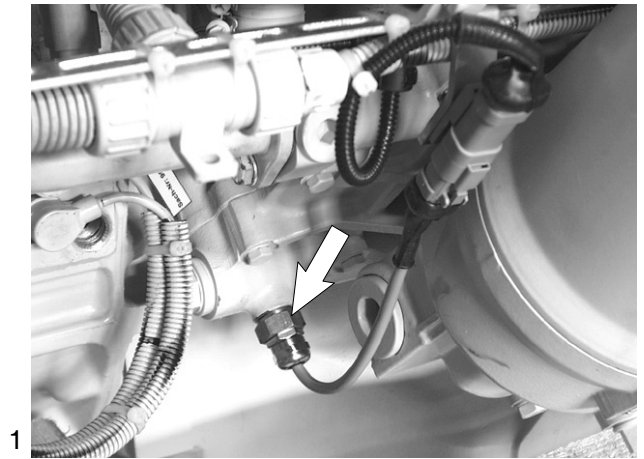
#### Oil temperature sensor

Fig. 1

Item no. 51.27421-0225

Signal: resistance measurement PT1000

Location: right-hand side of engine, on the oil cooler



### R engine

#### Oil temperature sensor

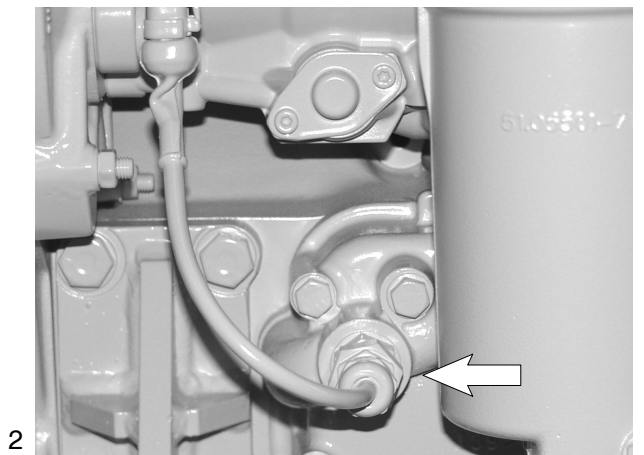
Fig. 2

D 0836 LE423

Item no. 51.27421-0225

Signal: resistance measurement PT1000

Location: right-hand side of engine, on oil filter



#### Oil temperature sensor

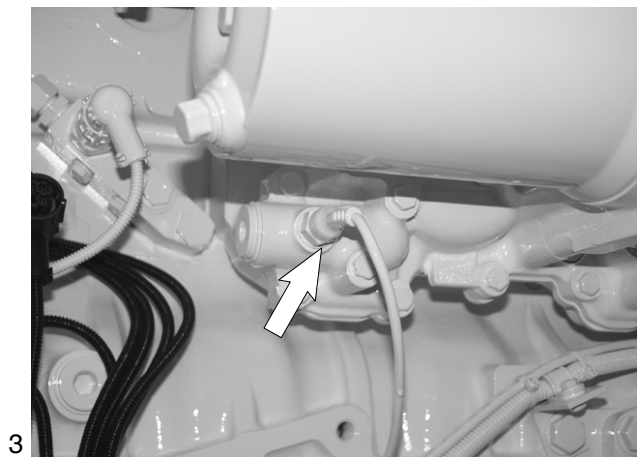
Fig. 3

D 2876 LE 423

Item no. 51.27421-0225

Signal: resistance measurement PT1000

Location: right-hand side of engine, rear oil filter





## V engine

### Fuel pressure sensor

Fig. 1

### Fuel return zero-delivery throttle

Item no. 51.27421-0125

Signal: 4-20 mA at 0-2.5 bar

Location: top flywheel side

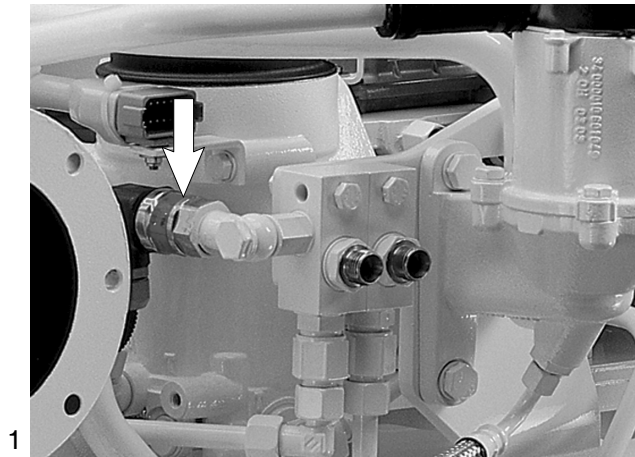


Fig. 2

### Fuel return up to 05.2005

Item no. 51.27421-0125

Signal: 4-20 mA at 0-2.5 bar

Location: top flywheel side

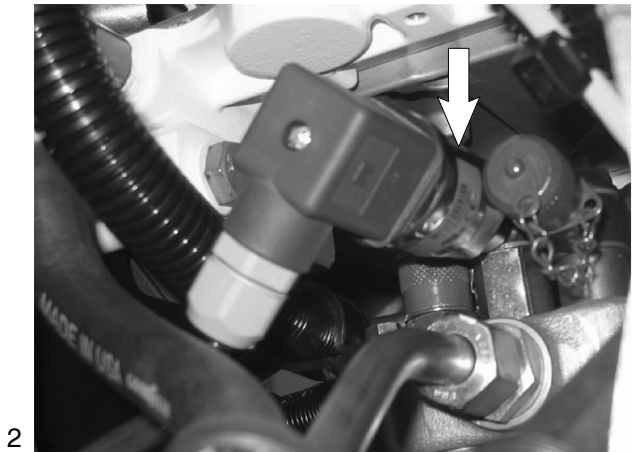


Fig. 3

### Fuel return as of 05.2005

Fuel return zero-delivery throttle ①

Fuel return ②

Item no. 51.27421-0125

Signal: 4-20 mA at 0-2.5 bar

Location: top flywheel side

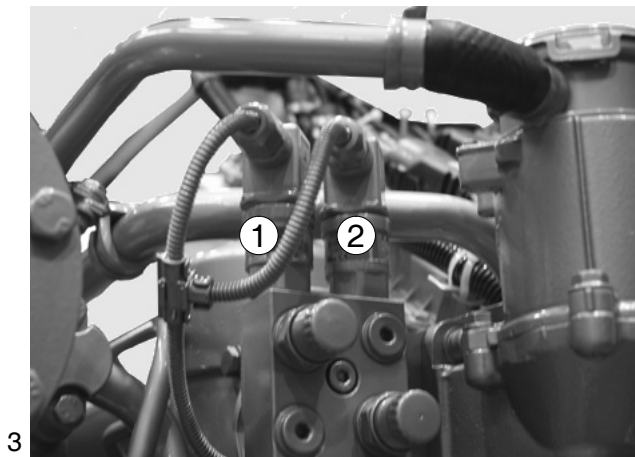


Fig. 4

### Level sensor fuel pre-filter Water level MANN + HUMMEL filter

Item no. 51.12501-7278

① Level probe

② Connector

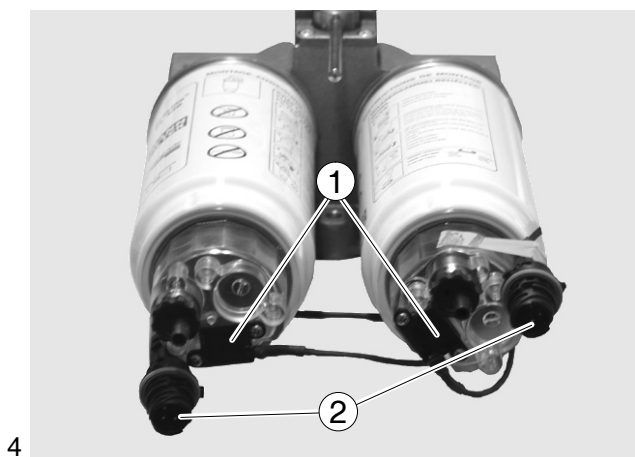


Fig. 5

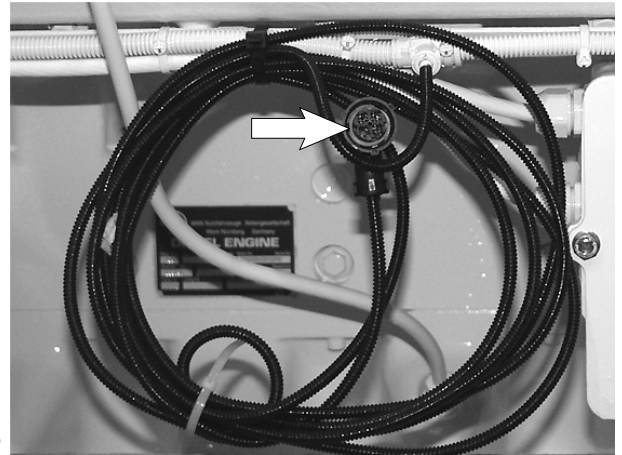
## Connection cable for level probe of the fuel pre-filter MANN + HUMMEL

Location: right-hand side of engine



### Note:

In the case of a dual fuel pre-filter, an adapter cable (51.25411-6030) is necessary for connection at the engine.

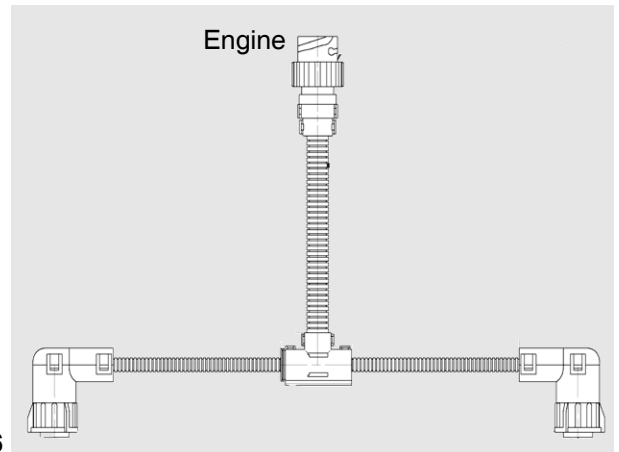


5

Fig. 6

## Adapter cable for connection of a dual fuel pre-filter

Item no. 51.25411-6030



6