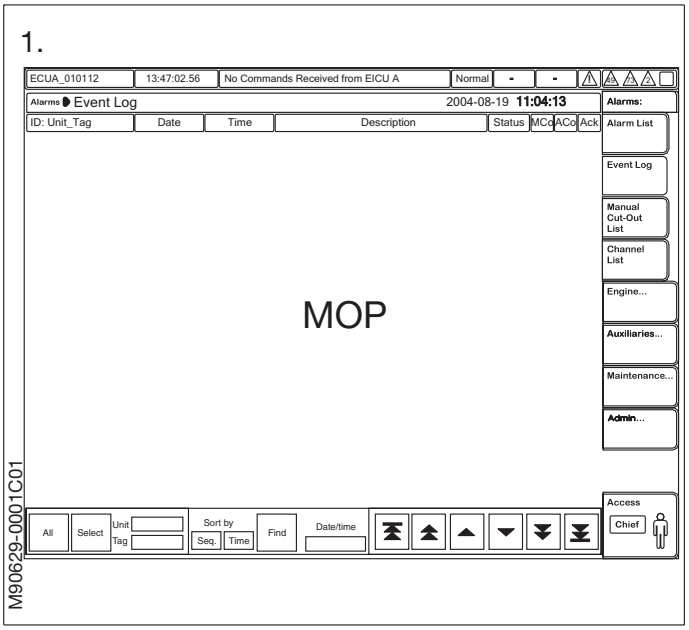
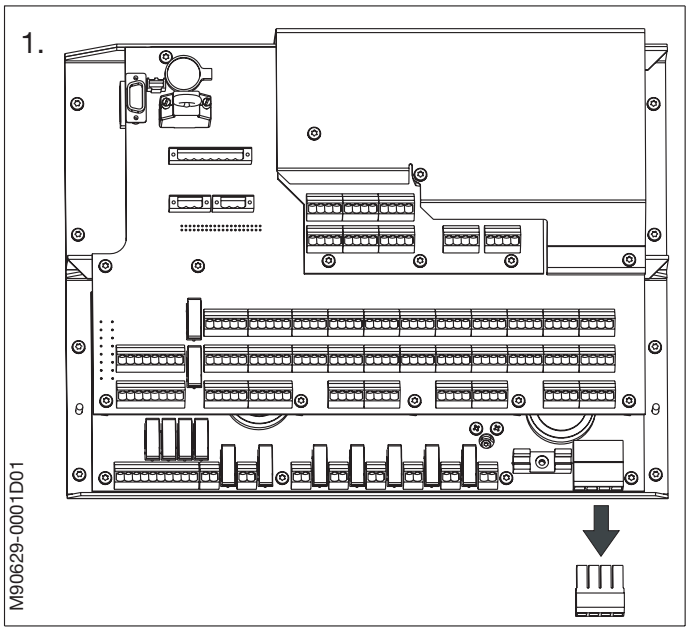
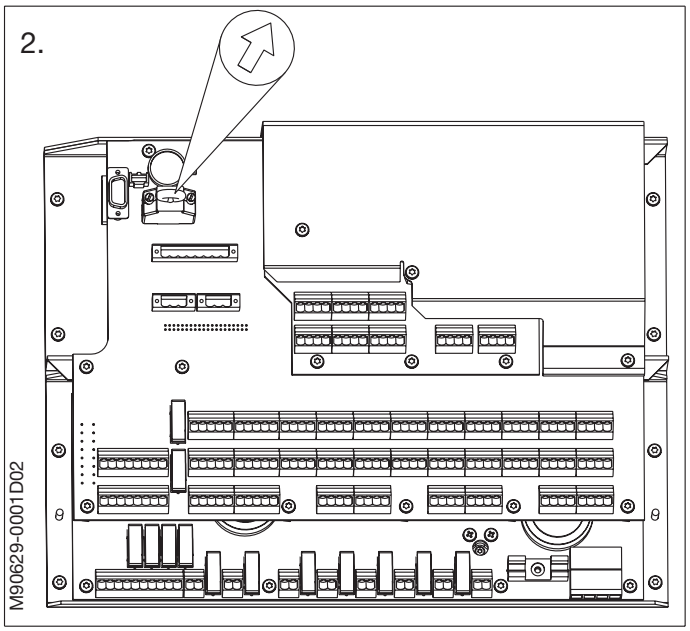
1. Multi Purpose Controllers are used in CCU, ACU, ECU and EICU panels. Checking of the MPC is continuously performed by the MOP units.

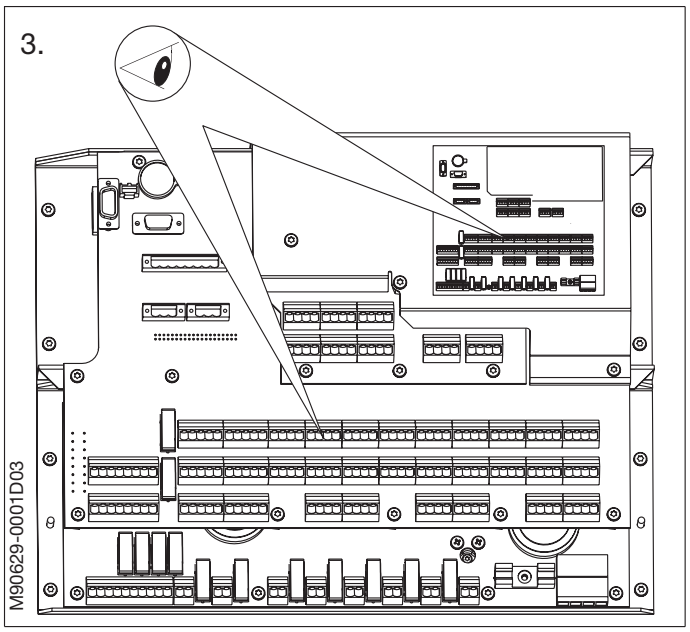
   See Volume I, Chapter 703 for a detailed view of the MOP panel screens.

1.









Dismantling of MPC board

1. Disconnect the power connector.

2. Disconnect the ID-key.

3. Check placement of connectors according to the table shown on the metal plate on the MPC board. If necessary, note down connector placement.

4. Disconnect all connectors on the MPC board.

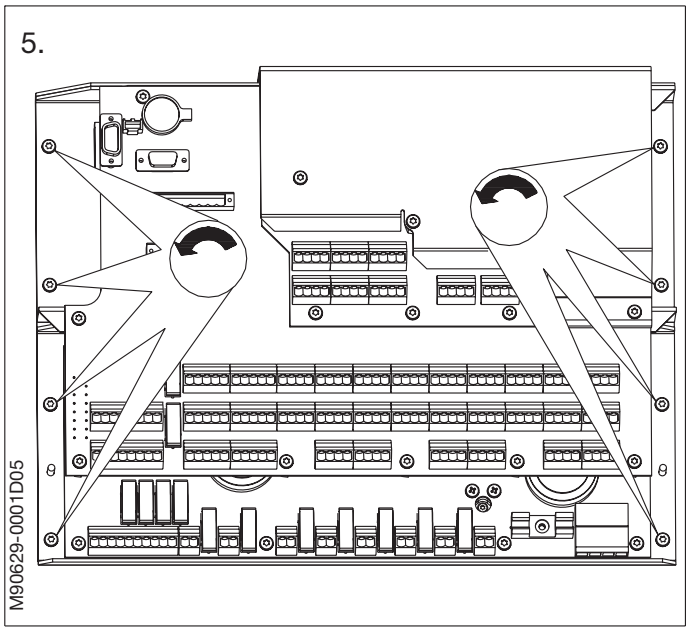
5. Dismount the screws retaining the MPC board and remove it from the panel.

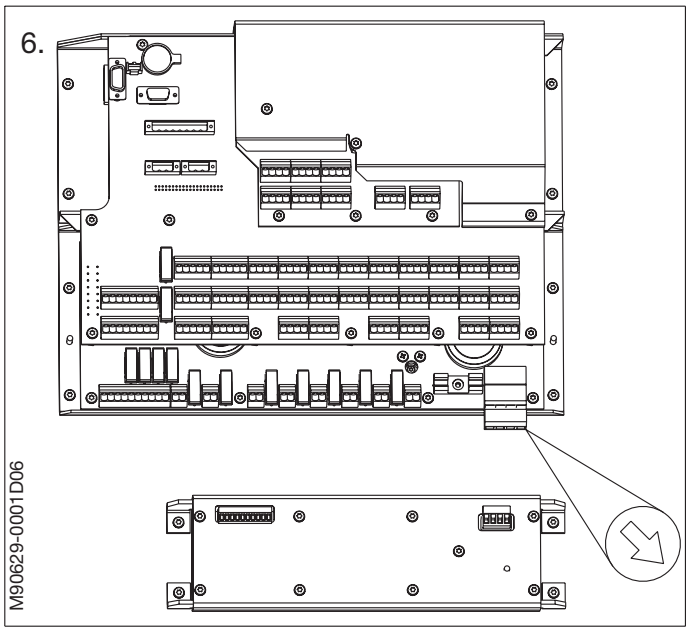
Dismantling of Amplifier

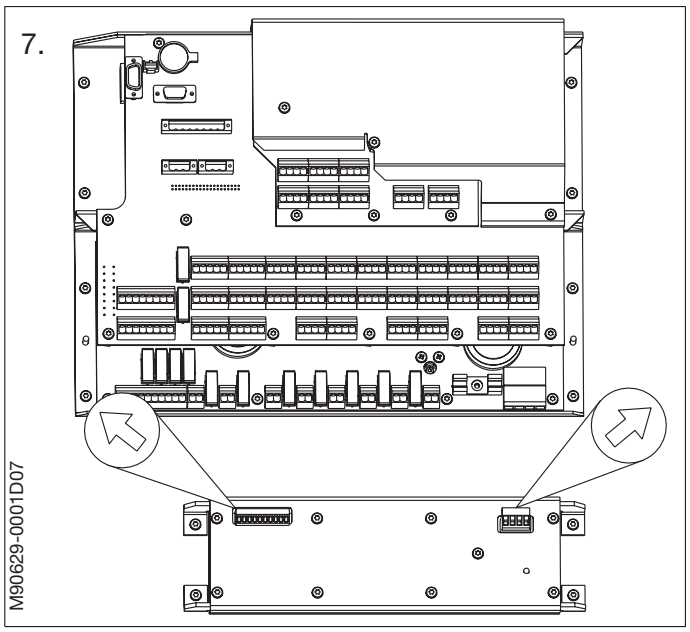
In the CCU and ACU panels amplifiers are mounted below the MPC board.

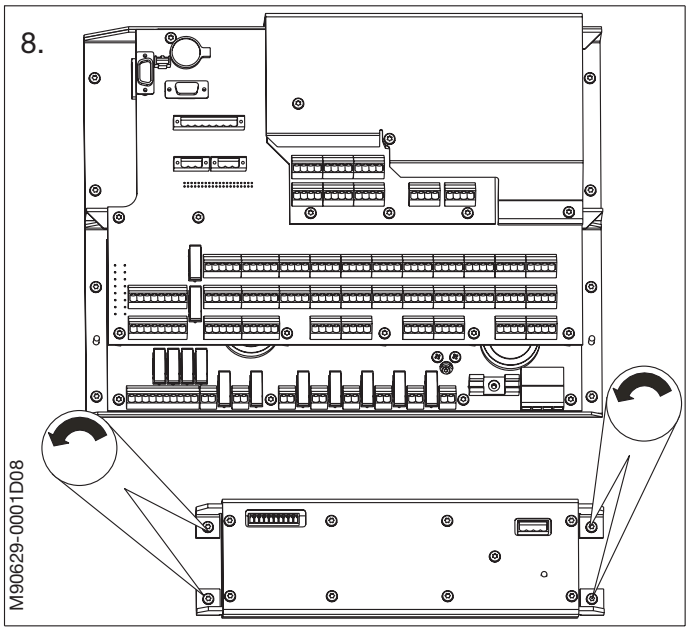
6. Unplug the power connector from the bottom of the MPC board.

7. Unplug the two connectors on the amplifier.









8. Dismount the screws retaining the amplifier and remove it from the panel.

Mounting the MPC board

1.

Warning!

If a spare MPC board has been used previously on another engine it is necessary to force the MPC to update software from the MOP panel.
This is done in the following way:
Set the yellow dip switch No. 4 on the side of the replacement MPC to OFF.
Mount the MPC as described.
Power on the MPC and let the MPC finish downloading.
When the MPC LED flashes 2 red and 3 green (APPLOAD_DIP see appendix), set the yellow dip switch No. 4 to ON.

Note!

Do not mount an MPC board unless the backup battery is installed.

Warning!

Changing the battery of the Multi-Purpose Controller (MPC) may cause a reset and restart of the MPC.

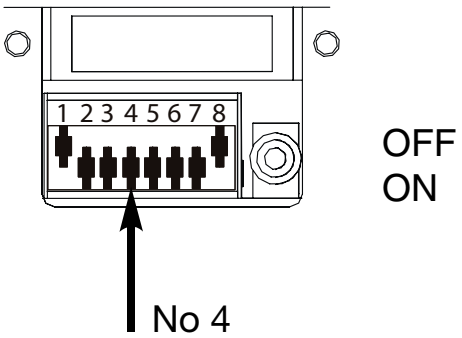
Therefore, only change the battery while:

- the ship is in harbour with engine stopped, or
- when sailing in unrestricted areas, where a restart of an MPC does not imply any risk for the ship or the engine.

The battery only serves as back-up supply for the built-in clock of the MPC, and a low battery level for several days until entering port is of no consequence to the safe operation of the engine.

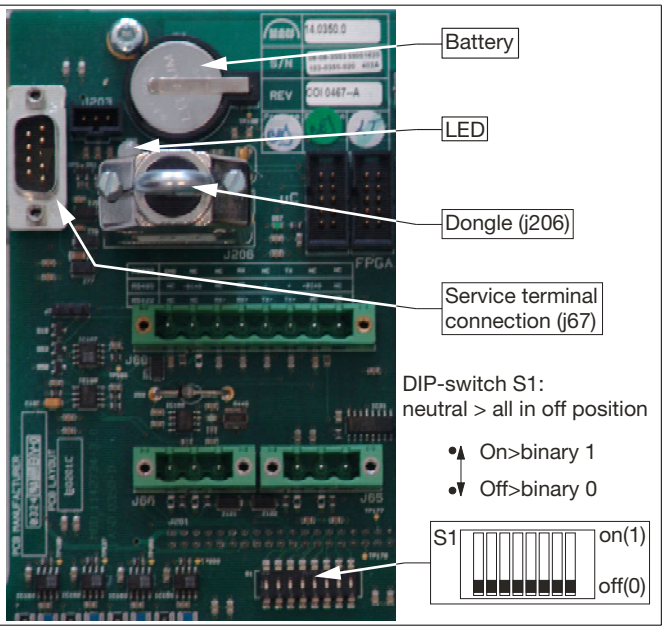
2. Check that the back-up battery is mounted and that the DIP switch S1 is in neutral position. This means all switches are in the »off« position. This is also known as binary »0«.

1.



M90629-0202M02

2.



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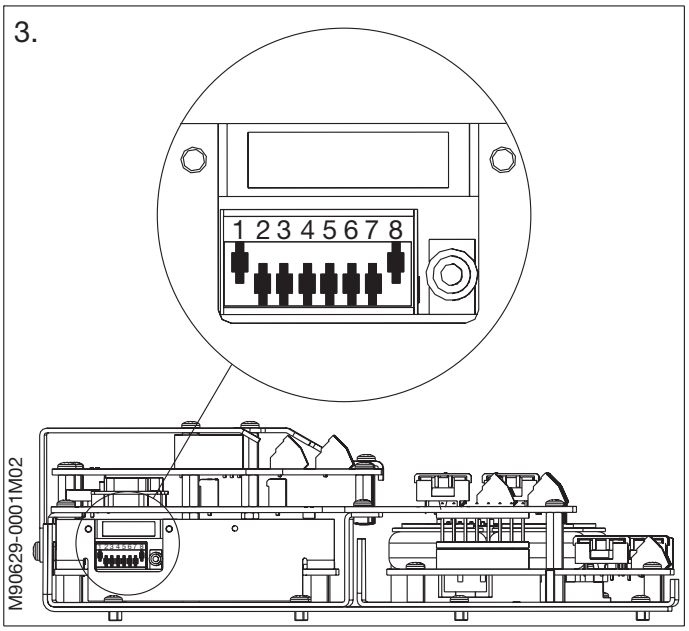
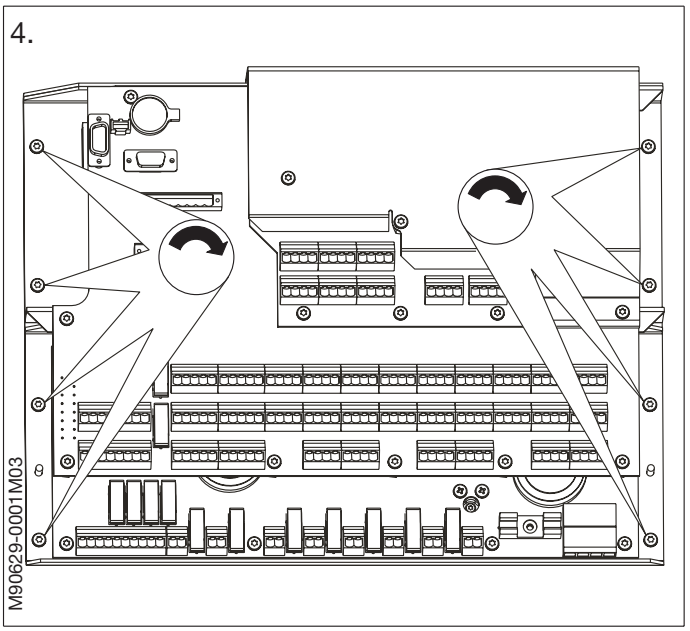
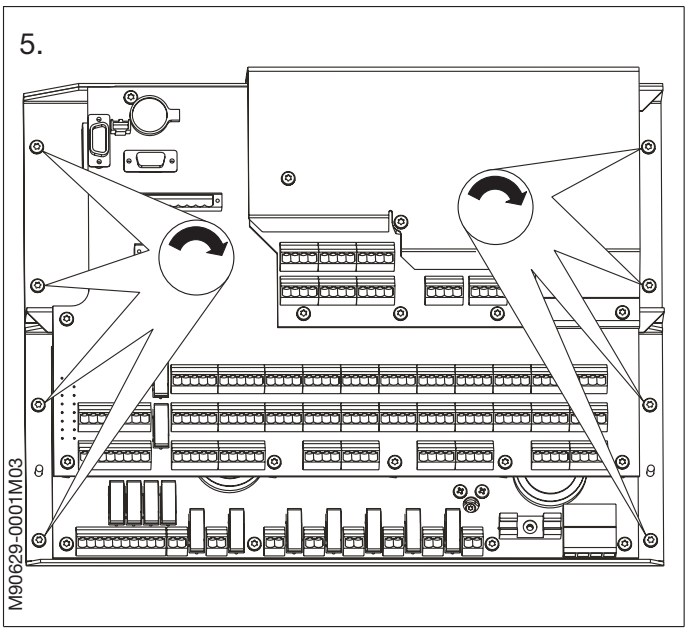






3. Check that the coloured DIP switches 1 and 8 on the side of the MPC board are set to the »off« position.

4. Mount the MPC board in the panel.

5. Mount the connectors according to the table shown on the metal plate on the MPC board.

6. Mount the ID-key.

7. Mount the power connector.

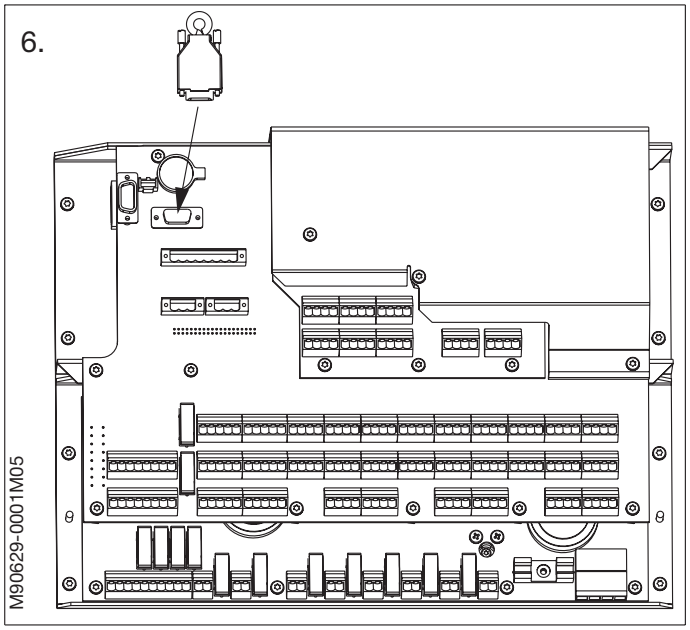
8. During the start-up process, the LED will flash and the MPC board will reboot several times.

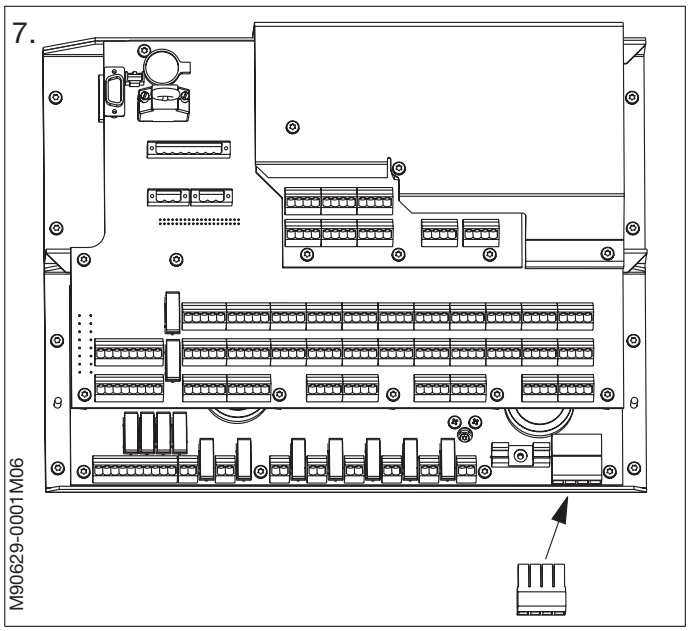
   During start-up, the MPC verifies if the ID-key is connected. It reads the ID number and checks if the key ID is in the correct format and has a valid range, it reads the DIP-switch S1 value and verifies if it is 0 (Off). A new MPC board will download software and settings from the MOP panel during this process.

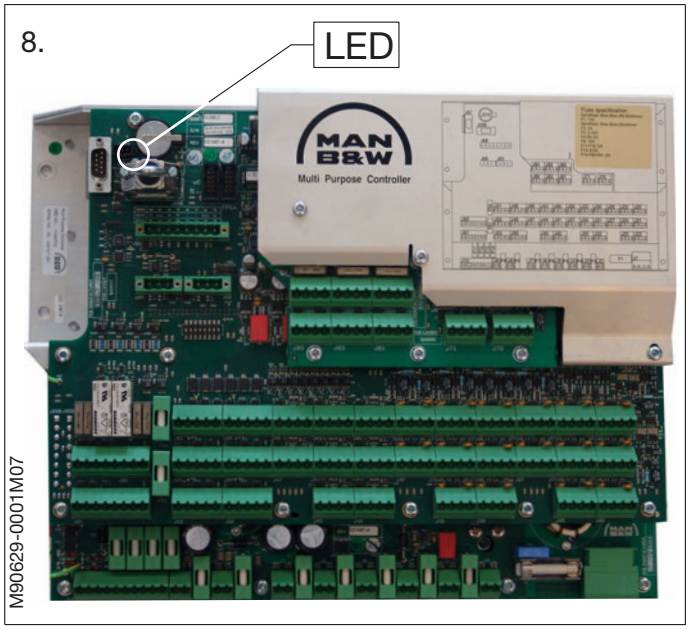
   The program completes the ID-key verification and is now ready to continue the boot sequence. Any deviations will send an error message via the LED. The start-up time of a new MPC board may vary but will take about 15 minutes.

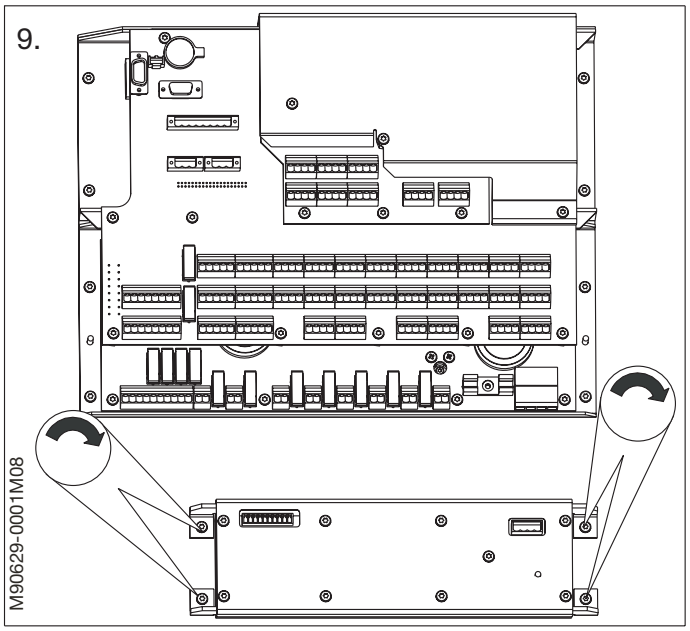
   When the LED shows green, the MPC board is running normally.

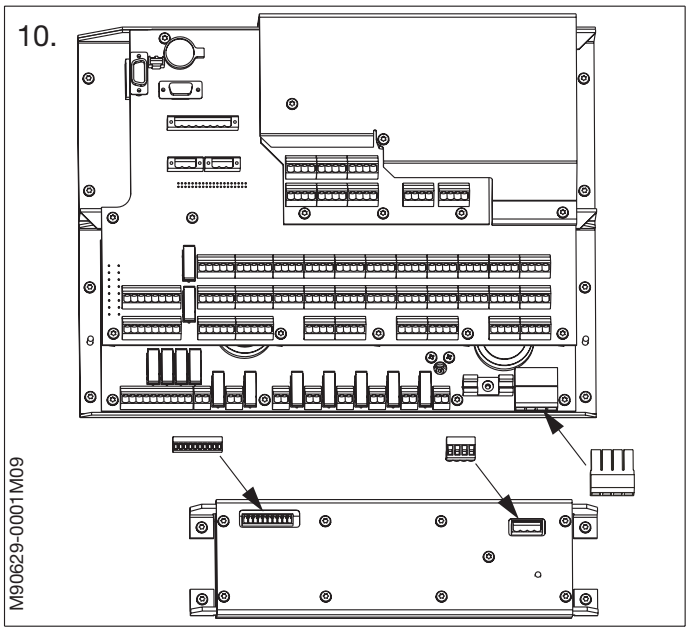
   The MPC LED indications are shown on the appendix in this procedure.











9. Mounting of amplifier.

   Mount the amplifier using the two screws.

10. Connect the two connectors on the amplifier and the power connector on the MPC board.

The MPC LED flashes different sequences according to the process performed.

Some of these indications are for normal use and some are for service personnel use.

All of the LED indication sequences are shown in the diagram below.

This is to facilitate communication with MAN Diesel A/S service personnel if needed.

MPC LED Indication

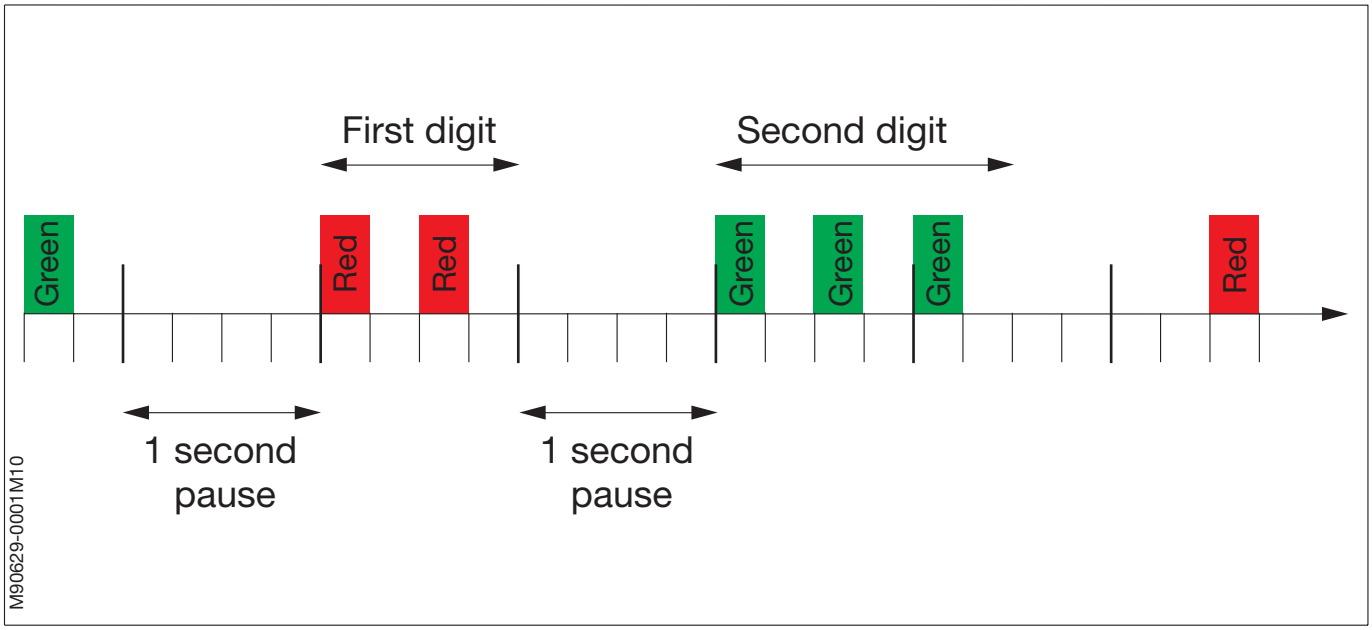
Description

The first part of the document describes the syntax of the LED indication and assigns a short description to each of the used indications. The second part presents a more detailed description of the different indications.

Syntax

The MPC LED may be issuing indications by either emitting constant light or by flashing. The LED indications are uniquely identified by the colour that the MPC LED emits.

A flashing LED indication consists of two pulse trains separated in time by a 1-second pause. Each of these pulse trains represents an integer. All pulses are set against a yellow background. The first pulse train will alternate between the yellow background and a red foreground, while the second will use green as foreground.



For identification of the indication the user must therefore note the number of red and green pulses. The first digit is the number of red pulses and the second digit is the number of green pulses. In the illustration above, the indication code would thus be (2,3).

Indications

Constant

Colour	Short name	Short description
Red	ERROR	Either early initialisation or fatal error
Orange	INIT	Initialisation, no parameters available or non-normal node mode
Green	NORMAL	Application up and running

Flashing

Digits		Short name	Short description
Red	Green		
1	1	CTRL_PRG	Onboard control programming in progress
2	1	APPLOAD_SCAN	Application download in progress – scanning for server
2	2	APPLOAD_DOWNLOAD	Application download in progress – downloading program
2	3	APPLOAD_DIP	Application download completed – reset yellow DIP set to ON
3	1	BOOTLOAD_SCAN	Bootloader download in progress – scanning for server
3	2	BOOTLOAD_DOWNLOAD	Bootloader download in progress – downloading program
4	1	DONGLE_VERIFY	Checking node ID-key
4	2	DONGLE_ERROR	ID-key error – missing, broken or not programmed
4	3	DONGLE_DIP	Node ID DIP switch not correctly reset – reset it to 0x00

Detailed description of LED indications

ERROR (Red)

This code is used primarily for indicating if the MPC has experienced a fatal error. However, the MPC will also use this indication during early initialisation. Therefore, the user should only take this code as an indication of error if it persists more than 10 seconds.

INIT (Orange)

Generally, this code is used for indicating initialisation, but the MPC may also use this indication to signal one of the following conditions:

No parameters: No valid parameters are available to the application software.
Configuration or test mode: The MPC is in a non-normal node mode.
Generally, if the INIT code is shown longer than 10 seconds this would indicate one of the latter conditions.

NORMAL (Green)

Application is up and running.

CTRL_PGM (1,1)

One of the on-board micro controllers is being programmed. This is a part of the MPC initialization process.

APPLOAD_SCAN (2,1)

The application software download program (bootloader) is trying to find a server from which it can download its application program. If this code persists it indicates either that no application program server is connected to the network or the network is broken.

APPLOAD_DOWNLOAD (2,2)

An application program is being downloaded.

APPLOAD_DIP (2,3)

The yellow DIP-switch on the MPC CPU board can be used for forcing download of new application software. To avoid looping it is therefore required that the yellow DIP-switch be reset on completion of such a forced download. Reset it to ON/down.

BOOTLOAD_SCAN (3,1)

This indication is analogous to the APPLOAD_SCAN indication except that this code indicates that there is not server available from which the MPC can download a new bootloader. This code should only be indicated if attempts are being made to update the bootloader using the special update program.

BOOTLOAD_DOWNLOAD (3,2)

A new bootloader program is being downloaded and programmed.

DONGLE_VERIFY (4,1)

The ID-key is being checked. This should only take a couple of seconds.

DONGLE_ERROR (4,2)

A ID-key error has been identified. Either the ID-key is missing, broken or holds an invalid value. Try to reprogram it.

DONGLE_DIP (4,3)

The DIP-switch mounted on the CMI/O board is used for programming the ID-key. The programming process requires that this DIP-switch be reset before completing. This code is used for indicating this to the user. Reset the CMI/O board DIP switches to OFF/down.