

AVENTICS™ Control head Series Type 244, Generation 3

For Marex OS and Marex MCS propulsion control systems



Table of Contents

Section 1:	About this Documentation	3
1.1	Validity of the Documentation	3
1.2	Required and Additional Documentations	3
1.3	Presentation of Information.....	3
1.3.1	Safety Instructions	3
	Hazard classes according to ANSI Z535.6-2006.....	3
1.3.2	Symbols	3
1.3.3	Designations	4
1.3.4	Abbreviations	4
Section 2:	Safety Instructions	4
2.1	About this Section.....	4
2.2	Intended Use	4
2.3	Improper Use	4
2.4	Personnel Qualifications.....	4
2.5	General Safety Instructions.....	4
2.6	Product- and Technology-related Safety Messages	5
2.7	Operator's Obligations	5
Section 3:	Scope of Delivery.....	5
Section 4:	About this Product.....	5
4.1	Performance Description.....	5
4.2	Product description	5
4.3	Product versions	6
4.4	Product identification	7
4.5	Control head type 244 Gen. 3.....	7
4.5.1	Product overview.....	7
4.5.2	Keypads for FPP	8
4.5.3	Keys and functions (FPP)	9
4.5.4	LED indicators (FPP)	9
4.5.5	Keypads for CPP	10
4.5.6	Keys and functions (CPP).....	11
4.5.7	LED indicators (CPP).....	11
4.5.8	Keypads for Hybrid Systems	12
4.5.9	Keys and functions (Hybrid Systems).....	12
4.5.10	LED indicators (Hybrid Systems).....	12
4.6	Control head type 244 Gen. 3 for triple engines.....	13
4.6.1	Keypads	13
4.7	Acoustic signals.....	13
4.8	Levers	13
4.8.1	FPP applications.....	13
4.8.2	CPP applications	14
4.9	Keypad LED Brightness Control	14
Section 5:	Transport and storage.....	14
5.1	Product transport	14
5.2	Delivery check	14
5.3	Product storage	14

Section 6:	Assembly	15
	6.1 Installation conditions.....	15
	6.2 Mounting orientation	15
	6.3 Mounting the control head type 244 Gen. 3	15
	6.4 Connecting the control head type 244 Gen. 3	15
	6.4.1 Electrical connections	15
	6.4.2 Grounding	16
	6.4.3 Establishing the electrical connection	16
	6.5 Instructions for commissioning	17
	6.5.1 Registration and configuration of control heads	17
	6.5.2 Key and LED assignment in the Marex Propulsion Controller	17
Section 7:	Maintenance and repair	18
	7.1 Cleaning	18
	7.2 Inspection	18
	7.3 Maintenance.....	18
Section 8:	Disassembly and replacement	18
Section 9:	Disposal	18
Section 10:	Technical Data	19
Section 11:	Accessories.....	19
Section 12:	Appendix	20
	12.1 Installation drawings.....	20

Section 1: About this Documentation

1.1 Validity of the Documentation

These instructions apply to control heads type 244 Gen. 3. At the time of issue of the documentation the product series "control head type 244 Gen. 3" consists of the versions listed in **Table 1** below.

EMERSON reserves the right to expand the product series in order to serve technical progress and customer requirements. These instructions remain valid for all versions of control heads type 244 Gen. 3 until a new edition is published.

- For any questions regarding the validity of these instructions contact EMERSON at: Marineservice.aventics@Emerson.com.

Table 1: Product versions of control head type 244 Gen. 3

R417004000	R417004010	R417004020
R417004001	R417004011	R417004021
R417004002	R417004012	R417004022
R417004004	R417004014	R417004023
R417004005	R417004015	R417004026
R417004006	R417004016	R417004027
R417004008	R417004018	

These instructions are intended for mechanics and service technicians.

Unless otherwise stated, in this documentation, the designation "**control head**" applies for all product versions.

The illustrations in this document are examples and can differ from the appearance of the actual product.

These instructions contain important information for properly and safely installing, starting up, maintaining and dismantling control heads type 244 Gen. 3.

- Read these instructions completely, especially the "Section 2: Safety Instructions" on page 4, before working with the product.

1.2 Required and Additional Documentations

Before powering up the product, make sure to read and understand the necessary documents.

- Observe the instructions for the other system components.
- Observe the ship's operating instructions.

Table 2: Required and additional documentations

Title	Document number	Document type
MAREX OS II/III	R419300579	Operating manual
Marex MCS	R417003866	Service manual
Marex Propulsion Controller	R417003865	Installation and Operation manual

- Contact EMERSON at Marineservice.aventics@Emerson.com for documents on AVENTICS products.

1.3 Presentation of Information

For a quick start and safe operation of the product, consistent symbols, terms and abbreviations are used and safety instructions are given in a consistent manner. For easy understanding, explanations are provided in the following sections.

1.3.1 Safety Instructions

This documentation includes safety instructions placed before a sequence of actions during which there is a risk of damage to persons or property. The precautions described must be observed.

Safety instructions are structured as follows:

⚠ SIGNAL WORD

Type and source of risk

Consequences

- Precautions

- **Warning sign:** Draws attention to the risk
- **Signal word:** Identifies the hazard level
- **Type and source of risk:** Identifies the type and source of the hazard
- **Consequences:** Describes the consequences of non-observance
- **Prevention:** Describes how to avert the danger

Hazard classes according to ANSI Z535.6-2006

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Property damage: The product or the environment may be damaged.

1.3.2 Symbols

The following symbols mark notices which are not relevant to safety but contain useful knowledge for the proper operation of the product.

Table 3: Meaning of symbols

Symbol	Meaning
	If this information is not observed, the optimal use or operation of the product cannot be ensured.
►	Single, independent step
1. 2. 3.	Numbered instructions: The numbers indicate the steps which must be executed in a given order.

1.3.3 Designations

The following designations are used in this documentation:

Table 4: Designations

Designation	Meaning
Marex MCS	Marex Motion Control System
Marex OS	Marex Open System
Trolling	Operating mode in which the clutch is operated with permanent slip
Slip & Grip	Operating mode with continuous transition from slip operation to fully engaged operation and back

1.3.4 Abbreviations

The following abbreviations are used in this documentation:

Table 5: Designations

Abbreviation	Meaning
CAN	Controller Area Network asynchronous, serial bus system which links the control components
COM	Command
CPP	Controllable Pitch Propeller
FPP	Fixed Pitch Propeller
Gen. 3	Generation 3
L_Prop	Low Prop
n. a.	Not applicable
SW	Software
SYN	Synchronization
S&G	Slip & Grip
TRL	Trolling

Section 2: Safety Instructions

2.1 About this Section

The control head type 244 Gen. 3 has been manufactured in strict compliance with the generally accepted rules of technology.

However, this does not exclude the risk of damage to persons or property if the general safety instructions in this section and the safety instructions in this document are not observed.

- ▶ Read these instructions completely and carefully before starting to operate the control head.
- ▶ Keep these instructions in a location where they are accessible to all users at any time.
- ▶ Always include these instructions when passing the control head on to third parties.

2.2 Intended Use

The control head type 244 Gen. 3 is designed for the use on yachts and work boats. It is suitable for in- and outdoor stations

under observance of the specified installation conditions and IP protection class, see also **"Section 10: Technical Data" on page 19**. The control head type 244 Gen. 3 must only be used with diesel engines, electric motors or any combination of these drives, known as **"hybrid"**. It is not suitable for the operation in explosive areas, e.g. in combination with gasoline or gas engines.

The control head type 244 Gen. 3 must only be used in combination with the Marex OS or Marex MCS, under the ambient conditions described in these instructions, in adherence to the interface manuals and only with a separate emergency stop switch provided at all control stations.



There are exceptions in which the operation of the control heads type 244 Gen. 3 as a standalone device is admissible. This application must be explicitly checked and released by Emerson.

Only use the product under the operation conditions and within the performance range provided in the technical data.

Intended use includes having fully read and understood this manual, especially **"Section 2: Safety Instructions" on page 4**.

2.3 Improper Use

Any use other than as described in "Intended use" is improper and thus inadmissible.

If, in applications relevant to safety, inappropriate products are installed or used, unintended operating conditions can be created in the application which may cause damage to persons and/or property. Therefore only apply a product within applications relevant to safety if this kind of use is clearly specified and permitted in the product's documentation as for example within explosive areas or in parts of a control system which are relevant for functional safety.

Unintended use of the product does also include:

- connecting the control head type 244 Gen. 3 to inadmissible supply voltage (see **"Section 10: Technical Data" on page 19**).
- combining the control head type 244 Gen. 3 with further components which are not suitable for that purpose,
- exposing the control head type 244 Gen. 3 to ambient conditions which are not admissible (see **"Section 10: Technical Data" on page 19**).

EMERSON declines any responsibility for damage resulting from improper use. The user of the equipment is fully responsible for any risk arising from improper use of the product.

2.4 Personnel Qualifications

The activities described in these instructions require basic knowledge of electronics and the corresponding terminology. To ensure the safe use of the product, those activities may only be performed by authorized personnel or by instructed persons supervised by authorized personnel.

An authorized person is someone who due to his/her expert training, knowledge and experience including his/her knowledge of the relevant regulations can assess the assigned tasks, recognize possible dangers and take appropriate safety measures. Authorized personnel must comply with the applicable specialist regulations.

The control head type 244 Gen. 3 must only be operated by persons who are familiar with its function and the control system.

2.5 General Safety Instructions

- Observe the valid regulations pertaining to accident prevention and environmental protection.
- Observe the safety instructions and guidelines of the country in which the product is used.

- Only use EMERSON products in technically perfect condition.
- Check the product for obvious defects as for example cracks in the housing or missing screws, caps or sealings.
- You must not modify or convert the control head.
- Persons who install, operate, dismantle or maintain EMERSON products must not be under the influence of alcohol, other drugs or medications which affect the responsiveness.
- Make sure that safety devices belonging to the product are available, properly installed and fully operational. Such safety devices must not be relocated, bypassed or rendered ineffective.
- If safety devices are taken out of operation in order to work on the product you must make sure that no risk arises for persons or property. Observe the additional documentations.
- Warranty applies exclusively for the configuration supplied.
- Incorrect assembly, unintended use or inappropriate handling will invalidate the warranty.
- Under no circumstances the product may be subjected to mechanical load. Never use the product as a handle or step.

Do not place objects on the product.

2.6 Product- and Technology-related Safety Messages

- ▶ Always disconnect the system from the power supply before assembling the control head, connecting or disconnecting plugs. Secure the system against being switched on unintentionally.
- ▶ Lay cables in such a way that they cannot be damaged and nobody can trip over them.
- ▶ Before starting the product make sure that all seals and protective caps on connectors are properly fixed and undamaged in order to prevent that liquids and foreign particles penetrate into the product.
- ▶ **Commissioning:** Make sure that all electric ports are used or covered. Only start up products which are fully installed.
- ▶ **Operation:** Only allow authorized persons to access the helm.
- ▶ **Cybersecurity:** Only allow authorized persons to access components and cables.
- ▶ Use the ship's alarm system to emit acoustic signals with a sound pressure level in accordance with DIN EN ISO 25197.
- ▶ The ABYC marine safety standard requires a neutral holding lock that keeps the control handle in the neutral position to prevent accidental movement. This can be achieved by connecting an appropriate electrical switch to the Marex Marine Propulsion Controller.

2.7 Operator's Obligations

Installation and maintenance work is subject to the country-specific safety regulations and standards of the application. As an operator of a ship which shall be equipped with a control head type 244 Gen. 3 and further components of a ship remote control system, you are responsible that:

- the product is in technically perfect condition,
- the product is used as intended,
- any staff handling the product has read and understood the documentation,
- users of the product are trained and instructed,
- the regulations related to safety, accident prevention and environmental protection are complied.

Section 3: Scope of Delivery

The standard product delivery includes:

- 1 Control head type 244 Gen. 3
- 1 Manual R417003610
- 1 Drilling template
- 4 Nuts
- 4 Washers
- 1 Safety Data sheet

Section 4: About this Product

4.1 Performance Description

The control head type 244 Gen. 3 is an operating device designed to control the engine speed and transmission or propeller pitch of marine diesel propulsions. It may be used also with electric or hybrid applications. In either case, the control head type 244 Gen.3 must only be used with the Marex OS or Marex MCS propulsion control systems.



There are exceptions in which the operation of the control heads type 244 Gen. 3 as a stand-alone device is admissible. This application must be explicitly checked and released by Emerson.



Minimum software requirement:

Only operate the control head type 244, Gen.3 with Marex control systems equipped with the software O2WG, V4.50 or higher, or O2VP or O3WG.

Contact Emerson AVENTICS Marine at: marineservice.aventics@Emerson.com for inquiries about the Marex MCS software.

4.2 Product description

Different versions of the control head type 244 Gen. 3 are available to meet the requirements of fixed and controllable pitch propeller applications.

The control head type 244 Gen. 3 provides up to three levers for single, twin or triple engine applications. Short levers are available as an option.

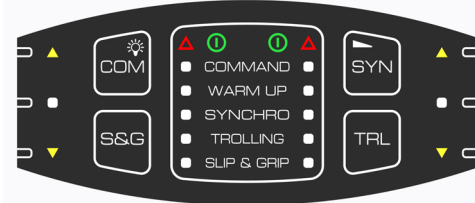
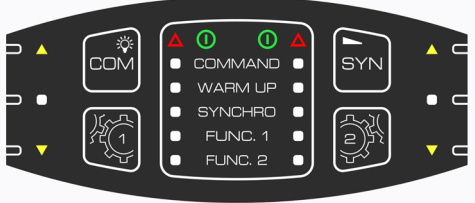
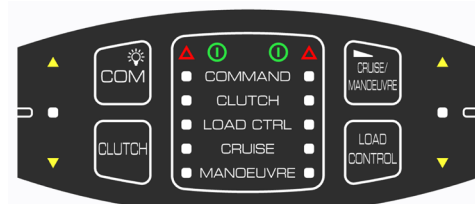
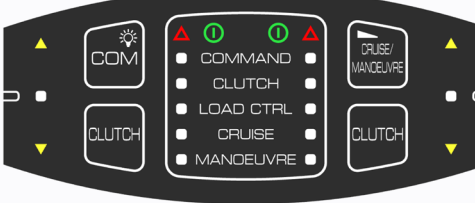
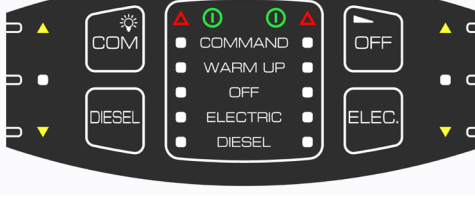
The versions of the control head type 244 Gen. 3 further vary in material and keypad.

The operator controls the speed and direction of movement of the ship by means of the control head levers. The commands are communicated via CAN bus to the Marex MCS controller which actuates engine and transmission or, respectively, pitch controller. Single and twin engine versions use a common microprocessor for all propulsion trains. Control heads for triple engines provide two microprocessors. The power supply and CAN bus connections of every propulsion train are galvanically isolated from each other. Special functions can be selected via the integrated keypad which is available in different designs suiting the requirements of fixed or controllable pitch propeller control. Every keypad version provides colored LEDs for status indication and alarming. The control head type 244 Gen. 3 has an automatic and manual dimming function for controlling the brightness of the indicators and background illumination. CAN bus connectors are provided at the bottom of the control head for integration into the Marex network.

Designed and approved to meet protection class IP66 above and below the control panel, the control head type 244 Gen. 3 is suitable for the operation at in and outdoor stations.

4.3 Product versions

Table 6: Control head type 244 Gen. 3, product versions series type 244

Appl.	Features	Engine	Keypad	Keys	Lever length	Color	Material No.
FPP	Keypad for - Slip & Grip - Trolling - Indication of gear direction - Back light - Synchronization - Dimming	Single		4	Standard	Chrome	R417004000
		Twin			Short	Chrome	R417004001
					Standard	Black	R417004002
					Standard	Chrome	R417004004
					Short	Chrome	R417004005
					Standard	Black	R417004006
Triple	2 Keypads provided		8	Standard	Chrome	R417004008	
FPP	Keypad for - Special functions 1+2 - Synchronization - Dimming - Indication of gear direction - Back light	Single		4	Standard	Chrome	R417004010
		Twin			Short	Chrome	R417004011
					Standard	Black	R417004012
					Standard	Chrome	R417004014
					Short	Chrome	R417004015
					Standard	Black	R417004016
Triple	2 Keypads provided		8	Standard	Chrome	R417004018	
CPP	Keypad for - 2nd maneuvering curve, - clutch operation - disable overload control - Back light - Dimming	Single		4	Standard	Chrome	R417004020
					Short	Chrome	R417004021
	Keypad for - 2nd maneuvering curve, - clutch operation portside + starboard - Back light - Dimming	Twin		4	Standard	Chrome	R417004022
					Short	Chrome	R417004023
FPP	Keypad for - Hybrid drives - Back light - Dimming	Twin		4	Standard	Chrome	R417004026
						Black	R417004027

4.4 Product identification

A product type plate can be found at the bottom of every control head type 244 Gen. 3 and on its packaging. The type plate contains the following information:

Figure 4-1: Type plate of the control head type 244, Gen.3

AVENTICS™
30880 Laatzen, Ulmer Straße 4, Germany
UK Import: Emerson, X XXX XXX XXXXX
XXXX XXXXX, XXXXXXXXXXXX I XXX XXX, UK

7 → MNR:
6 → SN:
5 → FD:
4 → SWV:
Made in Germany

3 → CE
2 → UKCA

1 → Data matrix code*
8 → QR CODE

1	Data matrix code*
2	UKCA*
3	CE label*
4	Software version
5	Manufacturing date
6	Serial number
7	Material number
8	QR Code

***Data matrix code:** includes the material number, serial number, manufacturing date and software version.

***CE mark and UKCA identification:** This product complies with the Electromagnetic Compatibility (EMC) Directive 2014/30/EU and its amendments. The product is labeled with CE and UKCA identification. The declaration of conformity is available on request. Please provide the material number and serial number for the corresponding products.

4.5 Control head type 244 Gen. 3

4.5.1 Product overview

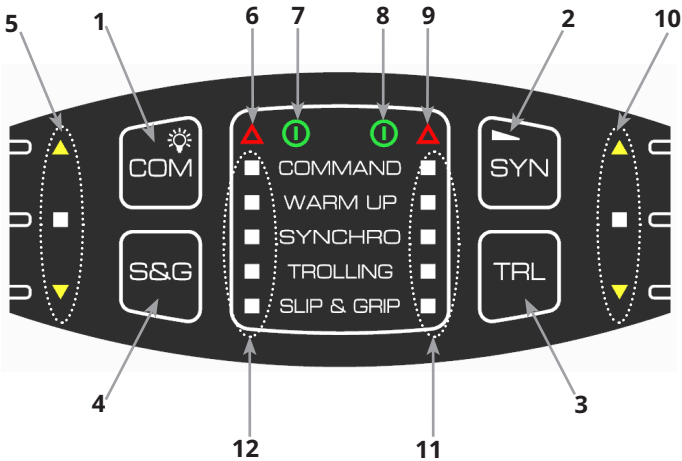
Figure 4-2: Control head type 244 Gen. 3, twin version

1 → Portside lever
2 → Starboard lever
3 → Keypad
4 → CAN bus connectors
5 → Mounting bolts

1	Portside lever
2	Starboard lever
3	Keypad
4	CAN bus connectors
5	Mounting bolts

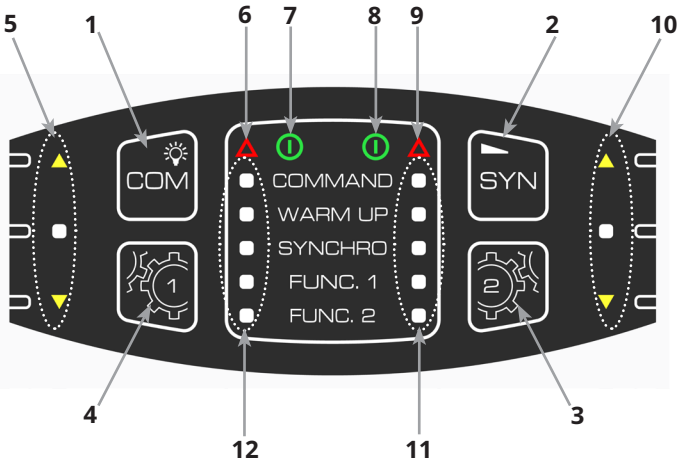
4.5.2 Keypads for FPP

Figure 4-3: Keypad optimized for slip & grip and trolling, single, twin or triple engine version



1	Command key
2	Synchro key
3	Trolling key
4	Slip&Grip key
5	Gear position LED indicators portside (ahead - yellow; neutral white; backward yellow)
6	Alarm red
7	Operational readiness indicator green portside
8	Operational readiness indicator green starboard
9	Alarm red
10	Gear position LED indicators starboard (ahead yellow, neutral white, backward yellow)
11	Status LED indicators white starboard
12	Status LED indicators white portside

Figure 4-4: Keypad optimized for special functions, single, twin or triple engine version



1	Command key
2	Synchro key
3	Special function 2
4	Special function 1
5	Gear position LED indicators portside (ahead - yellow; neutral white; backward yellow)
6	Alarm red
7	Operational readiness indicator green portside
8	Operational readiness indicator green starboard
9	Alarm red
10	Gear position LED indicators starboard (ahead yellow, neutral white, backward yellow)
11	Status LED indicators white starboard
12	Status LED indicators white portside

4.5.3 Keys and functions (FPP)



This document describes the key functions used in standard Marex systems. In customized systems different functions may be assigned to the keys.

- Refer to your system documentation for detailed information about the key functions in your system.

Table 7: Keys and functions (FPP)

Key	Function
	- Request command - Take over command - Warm up engine - Acknowledge alarm
	- Synchronize speeds of twin or triple engines - Adjust brightness (+COM) – see Figure 4-3, position 2
	- Switch the trolling function on or off – see Figure 4-3, position 3
	- Switch the slip and grip function on or off – see Figure 4-3, position 4
	- Switch special function 1 on or off – see Figure 4-4, position 4
	- Switch special function 2 on or off – see Figure 4-4, position 3
+	- Adjust Brightness – see “4.9 Keypad LED Brightness Control” on page 14

4.5.4 LED indicators (FPP)

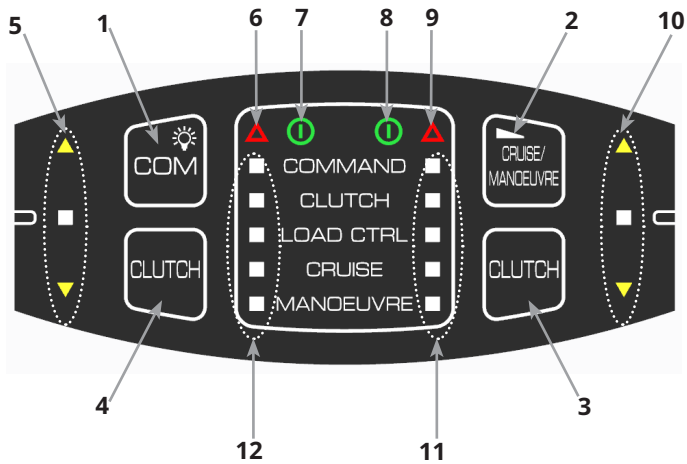
On the keypad of the control head type 244 Gen. 3, LED indicators are provided which are used to display status, functions and alarms (see **Figure 4-3** and **Figure 4-4**).

Table 8: LED indicators for FPP applications

Indicators	Function
Command	■ Slowly flashing: Command requested, conditions for transfer not fulfilled ■ Quickly flashing: Command requested, conditions for transfer fulfilled ■ Permanently illuminated: Control head active
Warm up	■ Permanently illuminated: Warming up active
Synchro	■ Flashing: Engine synchronization in standby, bring levers in the same position ■ Permanently illuminated: Engine synchronization active ■ The side on which the LED lights is the master – see Figure 4-3, position 11 and 12, Synchro LED
Trolling	■ One flash on activation: Conditions not fulfilled, bring levers in neutral position ■ Permanently illuminated: Trolling active – see Figure 4-3, position 11 and 12, Trolling LED
Slip&Grip	■ Permanently illuminated: Slip&Grip function active – see Figure 4-3, position 11 and 12, Slip&Grip LED
Alarm/ Warning (1x portside, 1 x starboard)	■ Permanently illuminated red: Alarm
Operation	■ Permanently illuminated green: Communication established and ready for operation
Gear position	■ Permanently illuminated: The transmission is engaged in the ahead or neutral or astern position ■ Blink slow: waiting for gear feedback
Func 1	■ Permanently illuminated: Special function 1 active – see Figure 4-4, position 11 and 12, function 1 LED
Func 2	■ Permanently illuminated: Special function 2 active – see Figure 4-4, position 11 and 12, function 2 LED

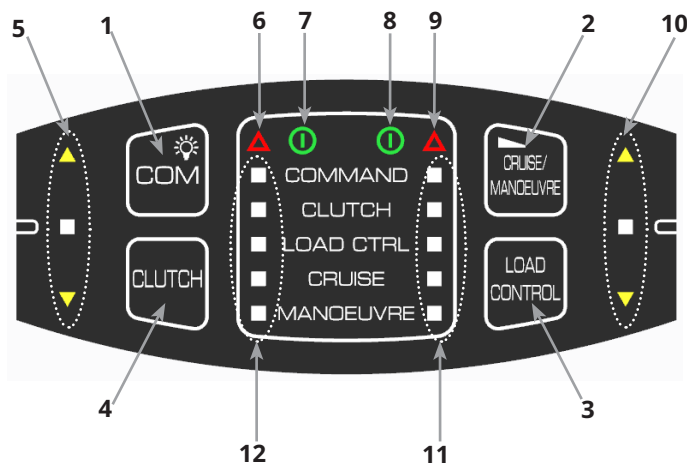
4.5.5 Keypads for CPP

Figure 4-5: Keypad optimized for CPP, twin engines



1	Command key
2	Cruise / Manoeuvre key
3	Clutch key starboard
4	Clutch key portside
5	LED control depending on the project
6	Alarm red
7	Operational readiness indicator green portside
8	Operational readiness indicator green starboard
9	Alarm red
10	LED control depending on the project
11	Status LED indicators white starboard
12	Status LED indicators white portside

Figure 4-6: Keypad optimized for CPP, single engine



1	Command key
2	Cruise / Manoeuvre key
3	Load control key
4	Clutch key
5	LED control depending on the project
6	Alarm red
7	Operational readiness indicator green portside
8	Operational readiness indicator green starboard
9	Alarm red
10	LED control depending on the project
11	Status LED indicators white starboard
12	Status LED indicators white portside

4.5.6 Keys and functions (CPP)



This document describes the key functions used in standard Marex systems. In customized systems different functions may be assigned to the keys.

- Refer to your system documentation for detailed information about the key functions in your system.

Table 9: Keys and functions (CPP)

Key	Function
	- Request command - Take over command - Warm up engine depends on configuration - Acknowledge alarm
	Select or deselect a second speed curve
	- Engage or disengage portside clutch – see Figure 4-5, position 4 and Figure 4-6, position 4
	- Engage or disengage starboard clutch – see Figure 4-5, position 3
	- Overwrite the automatic engine load reduction for 10s (default) – see Figure 4-6, position 3
 + 	- Adjust Brightness – see "4.9 Keypad LED Brightness Control" on page 14

4.5.7 LED indicators (CPP)

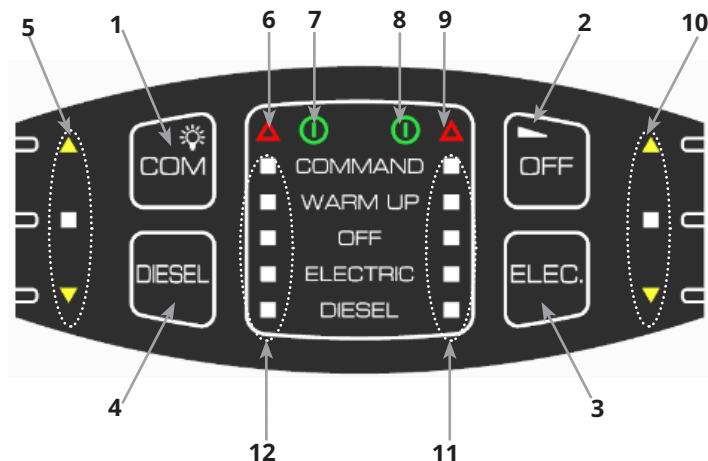
On the keypad of the control head type 244 Gen. 3, LED indicators are provided which are used to display status, functions and alarms (see **Figure 4-5** and **Figure 4-6**).

Table 10: LED indicators for CPP applications

Indicators	Function
Command	Slowly flashing: Command requested, conditions for transfer not fulfilled Quickly flashing: Command requested, conditions for transfer fulfilled Permanently illuminated: Control head active
Clutch	Permanently illuminated: Clutch engaged
Load control	Permanently illuminated: Automatic load reduction active
Cruise	Permanently illuminated: Cruise mode active
Manoeuvre	Permanently illuminated: Manoeuvring mode active
Alarm/ Warning (1x portside, 1 x starboard)	Permanently illuminated red: Alarm
Operation	Permanently illuminated green: Operational readiness

4.5.8 Keypads for Hybrid Systems

Figure 4-7: Keypad optimized hybrid FPP, twin engine



1	Command key
2	Off key
3	Electric control key
4	Diesel key
5	Gear position LED indicators portside (ahead - yellow; neutral white; astern yellow)
6	Alarm red / Warning yellow portside
7	Operational readiness indicator green portside
8	Operational readiness indicator green starboard
9	Alarm red / Warning yellow starboard
10	Gear position LED indicators starboard (ahead yellow, neutral white, astern yellow)
11	Status LED indicators white starboard
12	Status LED indicators white portside

4.5.9 Keys and functions (Hybrid Systems)



This document describes the key functions used in standard Marex systems. In customized systems different functions may be assigned to the keys.

- Refer to your system documentation for detailed information about the key functions in your system.

Table 11: Keys and functions (hybrid)

Key	Function
	- Request command - Take over command - Warm up engine depends on configuration - Acknowledge alarm
	Switch off diesel or electric modes
	Switch the electric mode on
	Switch the diesel mode on
 	- Adjust Brightness - see "4.9 Keypad LED Brightness Control" on page 14

4.5.10 LED indicators (Hybrid Systems)

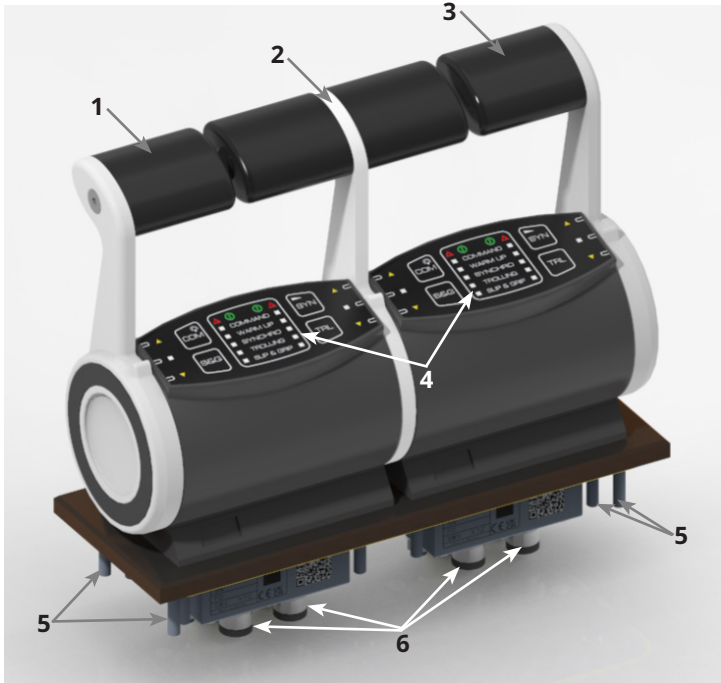
On the keypad of the control head type 244 Gen. 3, LED indicators are provided which are used to display status, functions and alarms (see **Figure 4-7**).

Table 12: LED indicators for Hybrid Systems applications

Indicators	Function
Command	Slowly flashing: Command requested, conditions for transfer not fulfilled Quickly flashing: Command requested, conditions for transfer fulfilled Permanently illuminated: Control head active
Warm up	Permanently illuminated: Warning up active
Off	Permanently illuminated: Drive switched off
Electric	Permanently illuminated: Electric mode switched on
Diesel	Permanently illuminated: Diesel mode switched on
Alarm/ Warning (1x portside, 1 x starboard)	Permanently illuminated red: Alarm
Operation	Permanently green illuminated: Operational readiness
Gear position	Permanently illuminated: The transmission is engaged in the ahead or neutral or astern position

4.6 Control head type 244 Gen. 3 for triple engines

Figure 4-8: Control head type 244 Gen. 3 for triple engines (example)



1	Lever propulsion 1
2	Lever propulsion 2
3	Lever propulsion 3
4	Keypads
5	Mounting bolts
6	CAN bus connectors

4.6.1 Keypads

The control head type 244 Gen. 3 for triple engines provides a double keypad which is available in two layouts:

Keypad version	Reference	Material No.
Slip and Grip/Trolling	Figure 4-3 on page 8	R417004008
Special functions	Figure 4-4 on page 8	R417004018

- Refer to section “4.5.2 Keypads for FPP” on page 8 for information about the keypads.

4.7 Acoustic signals

The control head type 244 Gen. 3 issues warnings and alarm messages via the acoustic signal transmitter. The meaning of the acoustic signals is shown in the following table:

Table 13: Acoustic signals

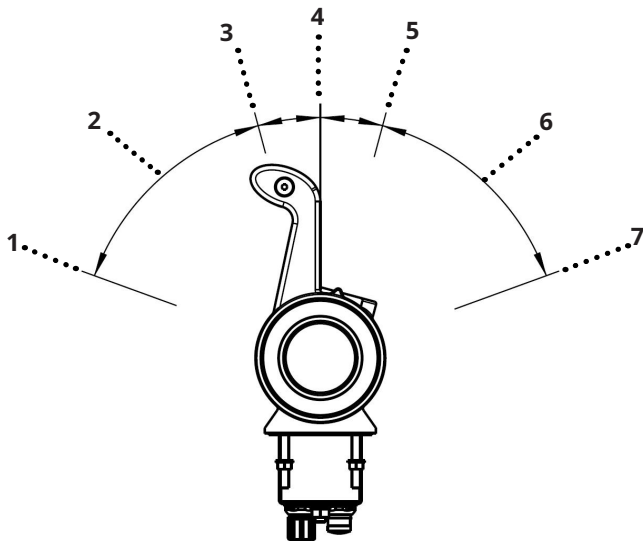
Acoustic signals	Meaning
Short intervals	COM key was pushed and control head is ready to take over command.
Long intervals	- Control system is in initializing state and awaits activation of a control station - COM key was pushed, but conditions for taking over the command are not fulfilled.
Continuous	Unacknowledged alarm signal of control system

4.8 Levers

4.8.1 FPP applications

The control head type 244 Gen. 3 provides one, two or three levers which are used to preset the engine speed and direction of movement. The lever(s) act on engine and transmission of the assigned propulsion.

Figure 4-9: Lever range with FPP application



1	Lever position full speed ahead
2	Ahead speed range
3	Lever detent clutch in ahead
4	Lever detent neutral position
5	Lever detent clutch in astern
6	Astern lever range
7	Lever position full speed astern

Control heads type 244 Gen. 3 for fixed propeller applications provide three detents.

In normal operation the adjustment range for the engine speed is between the lever positions "clutch in ahead", and "full speed ahead", or, respectively, "clutch in astern", and "full speed astern".

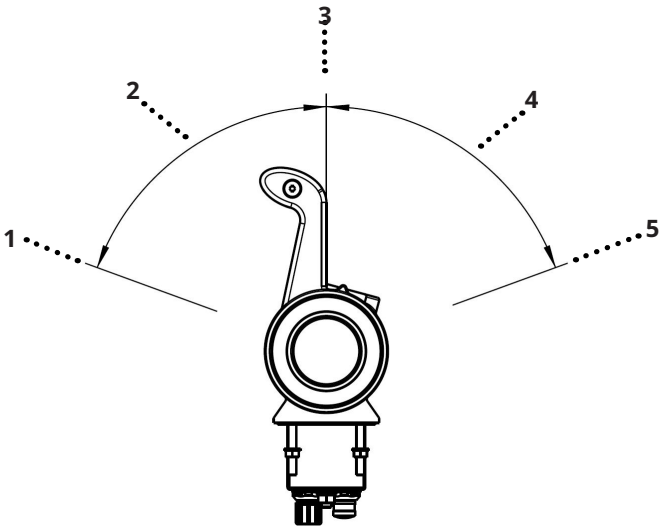


The transmission may react differently if special functions are selected.

4.8.2 CPP applications

With CPP applications the control head levers are used to set the engine speed in relation to a defined propeller pitch of the assigned propulsion (combinator mode). Control heads type 244 Gen. 3 for controllable pitch propeller systems have one detent in the neutral position. The clutch is operated manually via the key "CLUTCH".

Figure 4-10: Lever range with CPP applications



1	Lever position full ahead
2	Ahead range
3	Lever detent neutral position
4	Astern range
5	Lever position full astern

4.9 Keypad LED Brightness Control

The control head has a built-in sensor that automatically adjusts the keypad LED brightness based on the surrounding light.

If needed, you can manually adjust the brightness:



+

press & hold



1. Press and hold COM

2. While holding COM, press and hold the second button.

The second button is always the upper right button with the triangle symbol.

Depending on the keyboard used, this button may be labeled differently.

It may be labeled "SYN," "CRUISE/MANOEUVRE," or "OFF."

The brightness will change as long as both keys are held.

To change the adjustment direction, release **SYN** (keep holding **COM**) and then press and hold **SYN** again.

Your manual adjustment is saved as an offset and will be applied in addition to the automatic brightness control.

Section 5: Transport and storage

5.1 Product transport

NOTICE

Damage due to improper transport

Improper transport can cause substantial material damage.

- ▶ Be careful when unloading the packages on delivery and in case of in-plant transport. Observe the symbols and instructions on the package.
- ▶ Only remove the packaging shortly before the assembly.

5.2 Delivery check

- ▶ Check the supply immediately on receipt for completeness and transport damage.
- ▶ Proceed as follows if any visible damage is discovered during receipt of delivery:
 - Do not accept the delivery or only under reservation.
 - Note the extent of damage on the transportation documents or the delivery note.
 - Submit a claim.

5.3 Product storage

- ▶ Do not destroy the packaging and only remove it shortly before installation.
- ▶ Adhere to the following conditions for storage:
 - Only store the control head type 244 Gen. 3 in its original packaging.
 - Do not store the control head type 244 Gen. 3 outside.
 - Store the packages in a dry and dust-free place.
 - Do not expose the packages to aggressive media.
 - Protect the packages against solar radiation.
 - Observe the admissible storage temperature of 233 to 358 K (-40 °C to 85 °C), see also "Section 10: Technical Data" on page 19.
- ▶ Avoid mechanical impact.
- ▶ Make sure all M12 protective caps are applied.

Section 6: Assembly

⚠ CAUTION
Risk of injury and property damage due to improper installation or mounting work

Improper installation can cause damage to property.

- ▶ The control head type 244 Gen. 3 may only be installed by EMERSON or qualified personnel as specified in **"2.4 Personnel Qualifications"** on page 4.
- ▶ Install or uninstall the control head type 244 Gen. 3 only if the component and the system are powered off.
- ▶ Prepare mounting work carefully.
- ▶ Make sure there is enough space to mount the product professionally.

The control head type 244 Gen. 3 is intended for panel installation. The required panel cutout is shown in **Figure 6-1** and **Figure 6-2**. A drilling template is included in the delivery.

6.1 Installation conditions

The mounting bolts are suitable for a panel thickness between 2 to 20 mm.

The mounting depth for the electric plugs and connections below the console or panel is 85 mm approximately.

- ▶ Install the control head type 244 Gen. 3 in such a way that its moving range is not restricted by other components and all operating and indicating elements are visible and can be easily operated at all times.

A circumferential sealing is provided around the control head type 244 Gen. 3 to seal its edge to the panel surface.

- ▶ Make sure that no bores or gaps in the panel surface are located in the sealing area as otherwise the tightness of the panel cannot be guaranteed.
- ▶ Use an elastic sealant in addition when installing the control head type 244 on panels which are uneven or have a rough, structured surface. This prevents the penetration of water into the panel.

6.2 Mounting orientation

Install the control head type 244 Gen. 3 as follows:

- in forward direction
- with the lever(s) pointing upward.



All Type 244 Generation 3 control heads can also be installed in the opposite direction, for example, on double-ended ferries. The device must be parameterized accordingly in the MPC.

6.3 Mounting the control head type 244 Gen. 3

1. Prepare a panel cutout by using the drilling template which is included in the delivery (see **Figure 6-1** and **Figure 6-2**).
2. For the mounting bolts, drill 4 holes with a diameter of 5.5 mm into the panel.
3. Insert the control head type 244 Gen. 3 into the opening from above.
4. Use the nuts and washers supplied to mount the control head type 244 Gen. 3 and fix the nuts with a maximum torque of 2 Nm.

Figure 6-1: Drilling template single and twin engine control heads

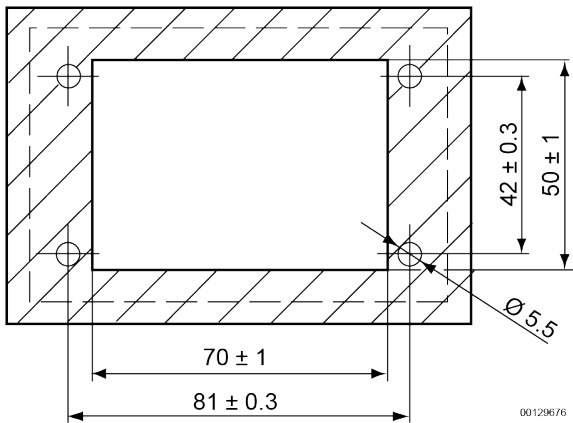
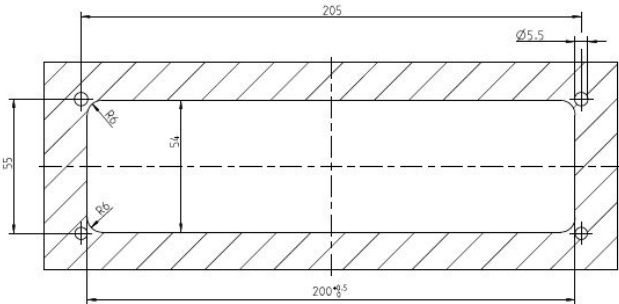


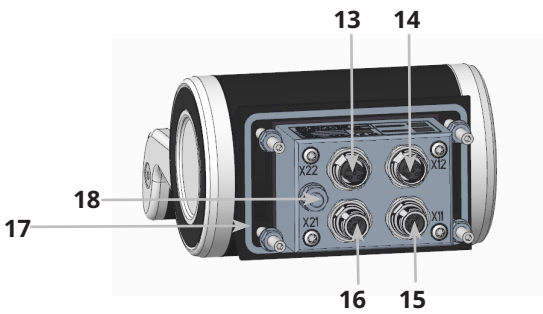
Figure 6-2: Drilling template triple engine control heads



6.4 Connecting the control head type 244 Gen. 3

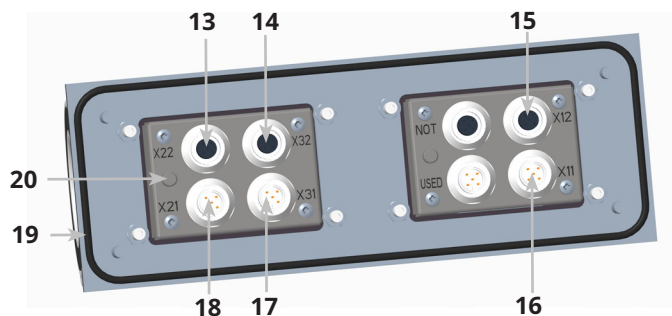
6.4.1 Electrical connections

Figure 6-3: M12 CAN bus connectors at bottom of control head, single and twin engine versions



13	X22, bus connector M12, female (portside)
14	X12, bus connector M12, female (starboard/one engine)
15	X11, bus connector M12, male (starboard/one engine)
16	X21, bus connector M12, male (portside)
17	Circumferential sealing
18	Grounding bolt

Figure 6-4: M12 CAN bus connectors at bottom of control head, triple engine version



13	X22, bus connector M12, female (propulsion 3)
14	X32, bus connector M12, female (propulsion 2)
15	X12, bus connector M12, female (propulsion 1)
16	X11, bus connector M12, male (propulsion 1)
17	X31, bus connector M12, male (propulsion 2)
18	X21, bus connector M12, male (propulsion 3)
19	Circumferential sealing
20	Grounding bolt

6.4.2 Grounding

⚠ CAUTION

Risk of control malfunction due to incorrect or insufficient grounding!

Electromagnetic interference can cause failures in the propulsion control system.

- ▶ Always use grounding screws to ensure sufficient contact between the control head type 244 Gen. 3 and the hull.
- ▶ In particular on plastic ships, make sure that all earth potentials are electrically conductive with a central earth potential, e.g. are connected to the main engine.
- ▶ Always disconnect the earthing system when carrying out welding work on the ship.

Proceed as follows to connect the grounding:

- ▶ Attach the grounding to the grounding bolt of the control head type 244 Gen. 3, see also **Figure 6-3** (single and twin versions) or **Figure 6-4** (triple engine versions).

6.4.3 Establishing the electrical connection

⚠ CAUTION

Risk of control failure due to external power supply at control head

Connecting the control head type 244 Gen. 3 to external power supply can lead to damage and loss of control over the ship's speed.

- ▶ Only use the system's internal power supply via the CAN bus line to supply the control head type 244 Gen. 3 with power.

⚠ CAUTION

Risk of control failure due to missing terminating resistor

The data communication can be disturbed if the CAN bus lines are not terminated by a resistor. In such case the ship's speed can no longer be controlled.

- ▶ Make sure that terminating resistors are always connected to both ends of a CAN bus line.

⚠ CAUTION

Risk of control failure due to water ingress

Liquids and foreign bodies can penetrate the devices and the plug connections and destroy the electronics.

- ▶ Use round plug connections with protection class IP66.
- ▶ Make sure that the seals in the plug are in place and not damaged.
- ▶ Before commissioning, make sure that all plugs are firmly attached.



Always take the permissible limit values into account when you connect the devices to the power supplies and peripheral devices. See also **"Section 10: Technical Data"** on page 19.

The control head type 244 Gen. 3 provides 4 or respectively, 6 M12 CAN bus connectors at the bottom of the device, see also **Figure 6-3** and **Figure 6-4**.

- ▶ Refer to **Table 14** below for the recommended assignment of the M12 connectors to the propulsion trains.

Table 14: Standard assignment of M12 connectors to the propulsion trains

Connector	Type	Number of propulsions			Function of M12 connector
		Single engine	Twin engines	Triple engines	
X11	Male	Propulsion 1	Starboard	Propulsion 1	CAN-BUS
X12	Female	Propulsion 1	Starboard	Propulsion 1	CAN-BUS
X21	Male	n. a.	Portside	Propulsion 3	CAN-BUS
X22	Female	n. a.	Portside	Propulsion 3	CAN-BUS
X31	Male	n. a.	n. a.	Propulsion 2	CAN-BUS
X32	Female	n. a.	n. a.	Propulsion 2	CAN-BUS

Proceed as follows to connect the control head type 244 Gen. 3:

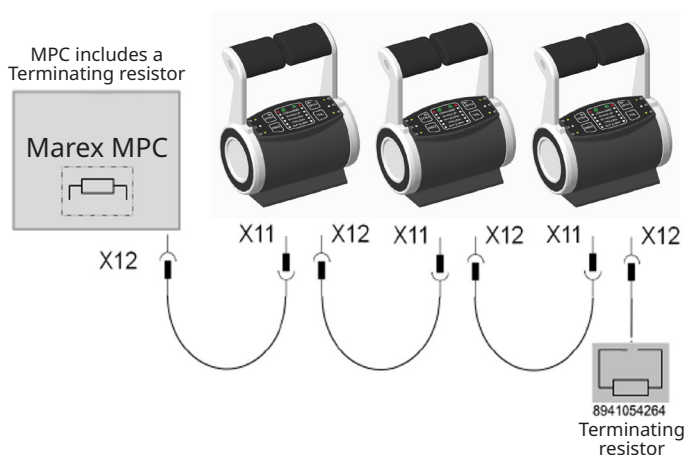
1. Make sure that all components are dead before connecting the control head.
2. Use the connector X12 at the Marex MCS controller MPC to connect a CAN bus cable M12. Route the other end of the cable to the control head type 244 Gen. 3 and connect it to X11 from underneath the control panel.

3. To connect another control head type 244 Gen. 3 apply a CAN bus cable to the connector X12 at the control head. Route the cable to the next control head and connect it to X11. Proceed accordingly to connect more control heads if applicable.
4. Apply a torque of 0.4 Nm to fasten the M12 connectors.
5. If no further control heads are being installed, apply a terminating resistor (EMERSON Aventics material No. 8941054264) to X12 at the last control head type 244 Gen. 3.

i Observe the maximum cable length of 300 m for the CAN bus lines. Apply a terminating resistor to all unused CAN bus connectors at the last control head type 244 Gen. 3.

Figure 6-5: Connecting the CAN bus line

Example:



i Up to 5 command transmitters can be connected to one bus. The project-specific documentation must be observed.

6.5 Instructions for commissioning

6.5.1 Registration and configuration of control heads

To proceed with the commissioning, every control head in the Marex MCS network must be assigned an ID number and a mounting location.

Refer to the manual of the Marine Propulsion controller (see section "Required and Additional Documentation") for instructions how to assign the control head IDs.

6.5.2 Key and LED assignment in the Marex Propulsion Controller

Refer to **Table 15**.

Table 15: Parameterization special functions

Keypad	Special Function	Key	LED Indication
	SYNCHRO	8	8
	Trolling	9	9
	Slip&Grip	10	10
	SYNCHRO	8	8
	Function 1	10	9
	Function 2	9	10
	Cruise/Manoeuvre	8	-
	Cruise	-	9
	Manoeuvre	-	10
	Clutch	10	Auto SL7*)
	Load Control	9	8
	Arrow ahead	-	SL57**)
	Neutral position	-	SL56**)
	Arrow astern	-	SL55**)
	Cruise/Manoeuvre	8	-
	Cruise	-	9
	Manoeuvre	-	10
	Clutch PS	10	AUTO SL7*)
	Clutch SB	9	AUTO SL7*)
	Load Control	-	8
	Arrow ahead	-	SL57**)
	Neutral position	-	SL56**)
	Off	8	8
	Electric	9	9
	Diesel	10	10

- » The 3 LEDs on the left and right side are automatically activated by the control unit via the gear function (ahead, neutral, astern).
- » *) SLx indicates the LED number which is automatically assigned to functions in the control unit. This fixed assignment can be canceled in the control unit via the "Special lamp" parameters and the LED can be used for other purposes.
- » **) Same as *) with the difference that the LED is not automatically controlled by the control unit. The LED can be used via the "Special Lamp" parameters of the control unit.

Section 7: Maintenance and repair

7.1 Cleaning

NOTICE

Product damage due to inappropriate cleaning

Cleaning agents containing solvents may damage the product's surface and cause premature aging.

- ▶ Do only use solvent-free, non-abrasive cleaning agents.
- ▶ Never use pressure washers or steam cleaners to clean the control head type 244 Gen. 3.

Clean the product only by using a slightly moistened, lint-free cloth. Only use water or mild cleaning agents.

NOTICE

Product damage due to excessive exposure to sea water

Continuous and excessive exposure to sea water can cause corrosion at the control head's metal parts.

- ▶ Wipe off water stains regularly by using a lint-free cloth.

7.2 Inspection

Make sure the component is always in technically perfect condition. Check the control head type 244 Gen. 3 regularly for visual damage, especially at the keypad and bellow.

NOTICE! Do not attempt to repair a damaged control head yourself. In case of defects, always replace the complete control head.

7.3 Maintenance

The control head type 244 Gen. 3 does not require maintenance.

Section 8: Disassembly and replacement

⚠ CAUTION

Risk of injury and property damage when servicing components under power

- ▶ If you dismantle or replace the control head type 244 Gen. 3 while Marex MCS is in operation, the ability to steer may be lost. Components may be destroyed if connections are removed under power.
- ▶ Only perform assembly or disassembly work on electrical connections if the Marex MCS system is powered off.

Proceed as follows to dismantle the control head type 244 Gen. 3:

1. Switch the power supply off.
2. Verify if the control head type 244 Gen. 3 is powered off.
3. Remove the electrical connections at connectors X11 and X12 (see "6.4 Connecting the control head type 244 Gen. 3" on page 15).
4. Loosen the mounting nuts. You may now remove the control head type 244 Gen. 3 from the control panel.

Section 9: Disposal

NOTICE

Environmental damage due to improper disposal

Electronic components require special waste treatment and must only be disposed of by approved specialist companies.

- ▶ Dispose of electronic scrap in an environmentally sound way. Consult the responsible local authorities regarding the environmentally sound disposal.

Dispose of the packaging in an environmentally compatible way.

Section 10: Technical Data

Table 16: Technical data

Dimensions (width x height x depth) single and twin versions	125 x 157 (above panel) x 65 mm
Dimensions (width x height x depth) triple versions	235 x 165 (above panel) x 65 mm
Weight (single and twin versions)	1.3 kg
Weight (triple versions)	2.8 kg
Power supply	38 V DC (internal system power supply via Marex MCS)
Admissible ambient temperature	248 to 343 K (-25 °C to 70 °C)
Storage temperature	233 to 358 K (-40 °C to 85° C)
Max. Storage period	2 years from date of manufacture
Protection class above and below panel	IP 66 - EN 60529 (IEC 60529)
Vibration resistance	4 g (IEC 60068-2-6:2007)
Immunity to radiated, radio frequency, electromagnetic fields	30 V/m applied to the whole frequency range
Painting, body	Black with surface structure
Painting, lever	Chrome-plated or black unpolished
Keypad	Black, with 4 keys and colored LED indicators

Section 11: Accessories

Table 17: Accessories

Material No.	Description
8941054264	Terminating resistor, male
8941054274	Terminating resistor, female
8946054792	Bus cable, 0.5 m
8946054802	Bus cable 2 m
8946054812	Bus cable 5 m
8946054822	Bus cable 10 m
8946054832	Bus cable 15 m
8946054842	Bus cable 20 m
8946054852	Bus cable 30 m
8946054862	Bus cable 50 m
8946054872	Bus cable 80 m
8946054882	Bus cable 100 m

Section 12: Appendix
12.1 Installation drawings

Figure 12-1: Dimensional drawing R417004004

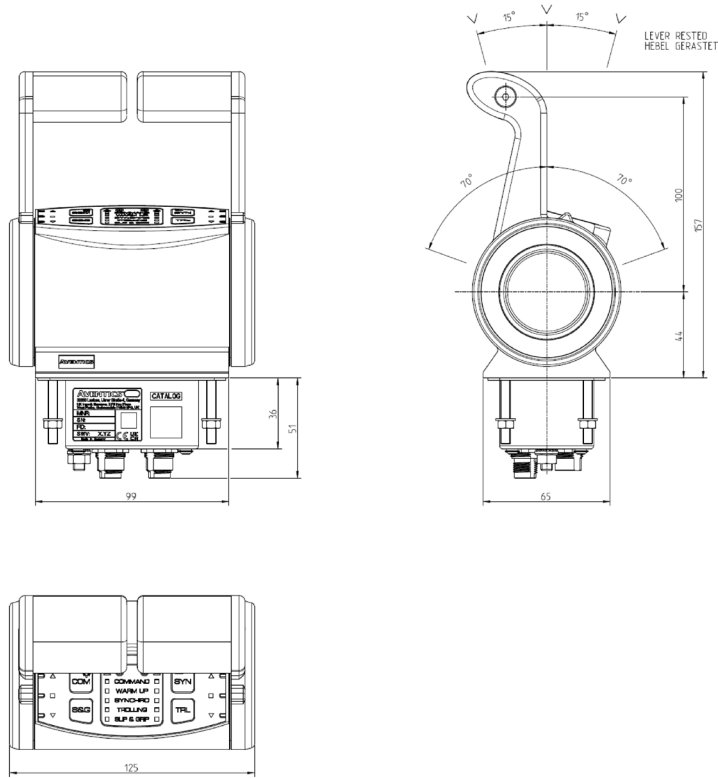
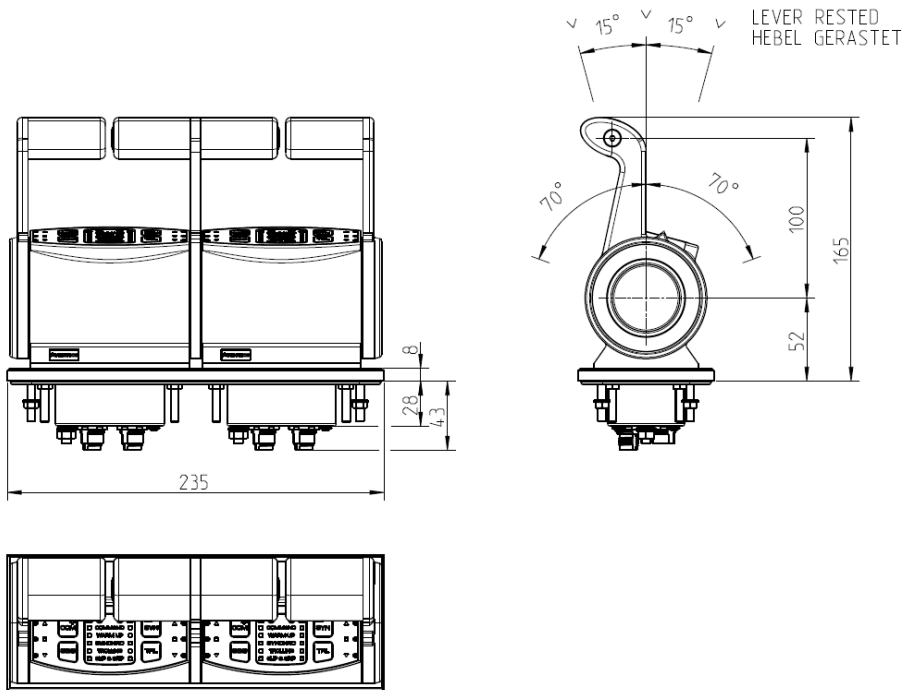


Figure 12-2: Dimensional drawing R417004008





Import into the United Kingdom is
done by:

**Emerson Automation Fluid
Control & Pneumatics UK Ltd**

2 Pit Hey Place, West Pimbo
Skelmersdale | WN8 9PG
United Kingdom

Emerson Automation Solutions

AVENTICS GmbH
Ulmer Straße 4
30880 Laatzen, GERMANY
phone +49 511 2136-0

Further addresses:
www.emerson.com/contactus

The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The given information does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

An example configuration is depicted on the title page. The delivered product may thus vary from that in the illustration.

Translation of the original operating instructions. The original operating instructions were created in the English language.

Subject to modifications. © All rights reserved by AVENTICS GmbH, even and especially in cases of proprietary rights applications. This document may not be reproduced or given to third parties without our consent.

The Emerson logo is a trademark and service mark of Emerson Electric Co. AVENTICS is a mark of one of the Emerson Automation Solutions family of business units. All other marks are property of their respective owners.

