

*Operating manual
and
installation instructions*

Vetus[®]

ENGLISH

***Electronic engine
remote control***



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1 Introduction

Read this manual carefully before installing the electronic engine remote control.

This engine remote control has the following characteristics:

- The engine remote control is intended for high speed ships' diesel engines fitted with a gearbox and a fixed propeller.
- Suitable for power plants with 1 or 2 engines.
- Maximum 6 operating positions.
- Simulated synchronised running standard with 2 engines.
- Automatic synchronised running operation optional with 2 engines.
- Operation of both engine and gearbox by means of pull-push cables or by means of electric signals:
 - revolutions control 4 - 20 mA
 - gearbox 12 / 24 V
- In order to synchronise the remote control with the engine and gearbox in the best possible way the following settings can be made:
 - increased stationary revolutions before engaging the engine,
 - a delay before engaging to allow the engine to reach the increased stationary revolutions,
 - a delay before giving power after engaging (for slow reacting hydraulic gearboxes),
 - a delay before changing from forward to reverse or vice versa.
- The Vetus engine remote control is intended to operate diesel engines. If you wish to use the system for operating gas or petrol engines then all parts of the system must be situated outside those areas with increased explosion risk. Take note here of the valid regulations for areas with increased explosion risk.

2 General conditions of use

(according to the official regulations)

Indication of the actual sailing command *)

The actual sailing command (revolutions, position of the gearbox) must be visible at every steering position.

Indication of the active steering position *)

At every steering position it must be visible from which position the sailing commands are being given.

If it is possible to see all other steering positions from each steering position then no indication of the actual sailing command and the active steering position is required (e.g. on small yachts).

Independent steering possibility *)

There must be a second steering mechanism available which can control the gearbox and the engine revolutions as well as the remote control system.

Emergency stop button *)

There must be a separate emergency engine stop button, which works independently of the remote control system, at every steering position.

*) These facilities are not delivered with the installation.



Keep body parts away from the servo motor when this is in operation in order to reduce the risk of injury.

We recommend that the electronic engine remote control is installed by a professional installer.

3 Operating

3.1 General

In this explanation of how to operate the electronic engine remote control it is assumed that the installation has been installed completely and that it has been taken into service.

The position of the handle determines both the revolutions and the setting of the gearbox (forward, neutral, reverse).

The following operating elements are available:

Push button

- Change steering position
- Cancel alarm buzzer
- Switch on special function

Command lamps

- Indication as to whether the steering position is active

Alarm lamps

- Indication of fault reports

Synchronisation lamp

- Indication as to whether the synchronisation is active

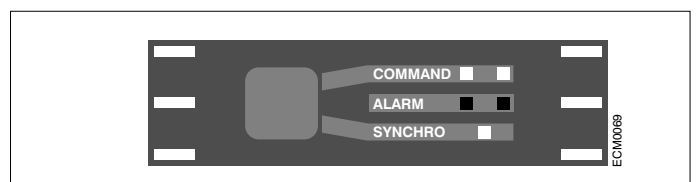
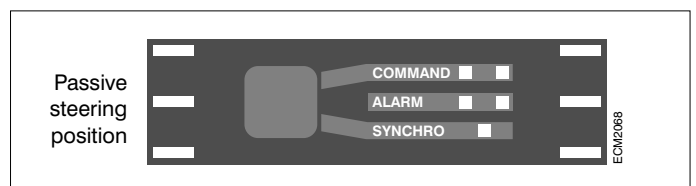
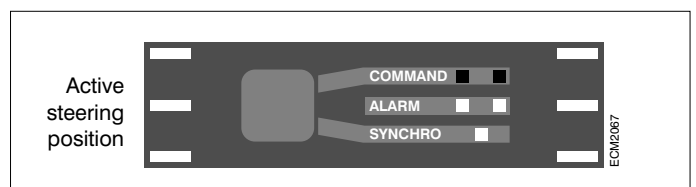
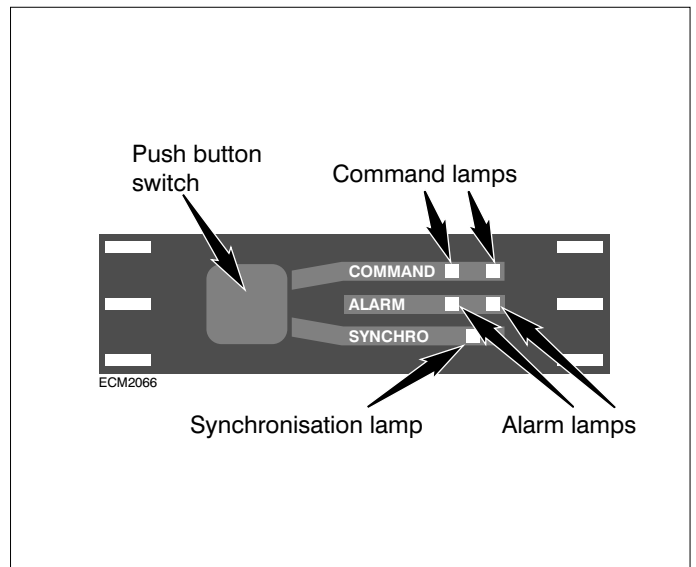
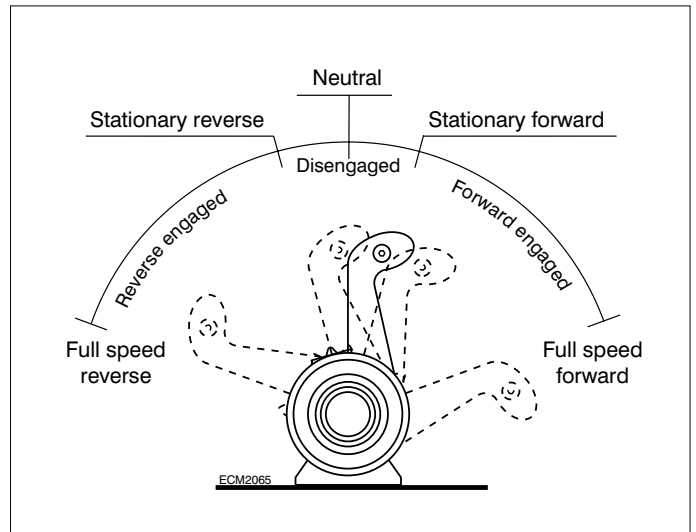
Where there is double engine control both systems have their own LEDs for Command and Alarm.

Where there is more than one steering position a distinction must be made between an active and a passive steering position. Only the active position can give sailing commands. If you wish to give sailing commands from a passive steering position this must first be made active (see section 3.3).

Both Command lamps are lit up at the active steering position and are out at a passive position:

An external switch can be used to block changing the steering position (see section 13.4).

If changing the steering position is blocked then the Alarm lamps are lit up at the passive position.



3.2 Switching on and selection of steering position ALARM

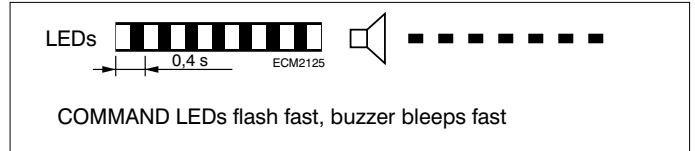
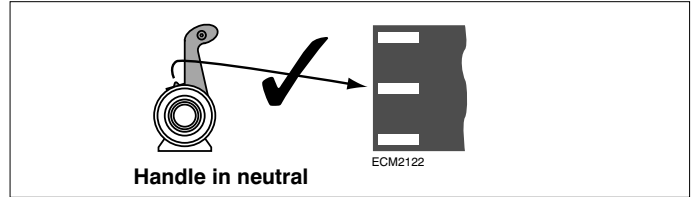
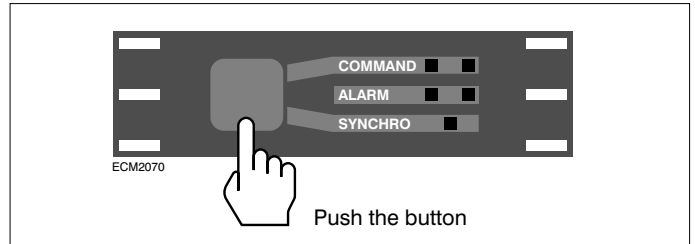
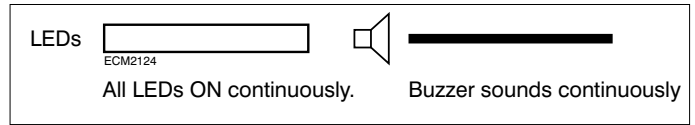
After switching on the power supply all correct functioning engine controls activate lamp tests (all lamps and the buzzer are switched on).

Activate a steering position by pushing the button once.

Pushing the button for one of the engine controls ends the lamp test for all connected engine controls.

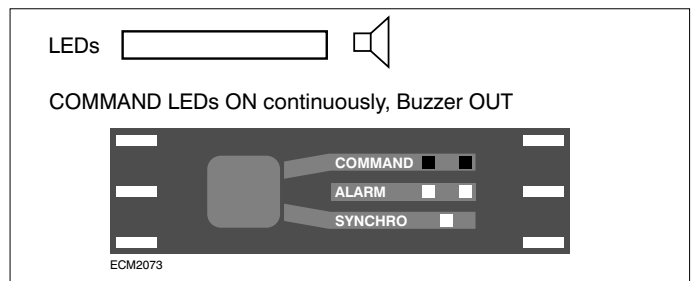
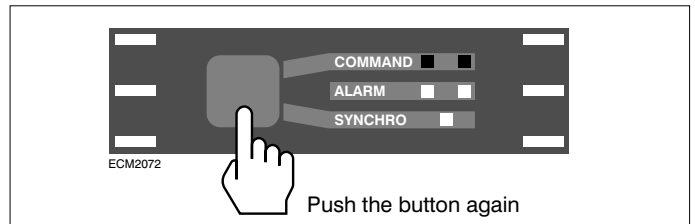
Make sure that the operating handles are set to **NEUTRAL**.

The Command lamps flash fast and the buzzer beeps fast at the steering position where you have pushed the button.



If the operating handles are **NOT** set to **NEUTRAL** then the Command lamps will flash slowly and the buzzer will beep slowly at the steering position where you have pushed the button.
This indicates that you must first set the handles to neutral.

Push the button again to activate the steering position.
Once a steering position has been chosen the gearbox is set to neutral and the idle speed are reached. You can then give sailing commands from the active steering position (see section 3.1).



Instruction for the engine control where two engines are fitted:

In that case you must set both handles to neutral. Each handle has its own set of Command lamps (port, starboard).

Fault report:

Engine controls whereby the Command lamps do not light up after switching on have not been able to make contact with the control module. Check the wiring and the ID setting (see 4.3). Where necessary carry out the registration procedure for the

engine controls again (see 'Setting procedure' in chapters 5 to 12).

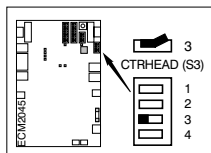
If no correct functioning engine controls are found then the alarm relay is activated.

3.3 Changing the steering position

Changing the steering position can be done in 2 different ways. Which method is used depends on the setting of CTRHEAD (S3) switch 3 (see section 14.3, Position and setting comparison).

Position comparison

CTRHEAD(S3) switch 3 is in the 'OPEN' position.

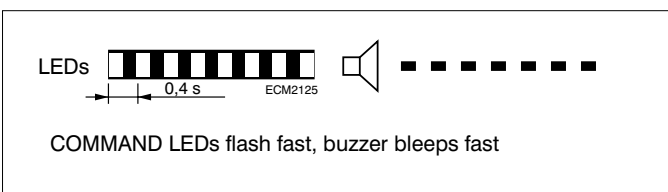
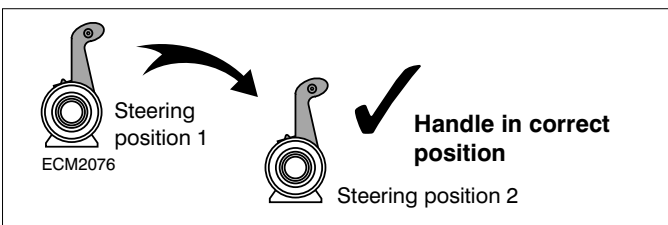
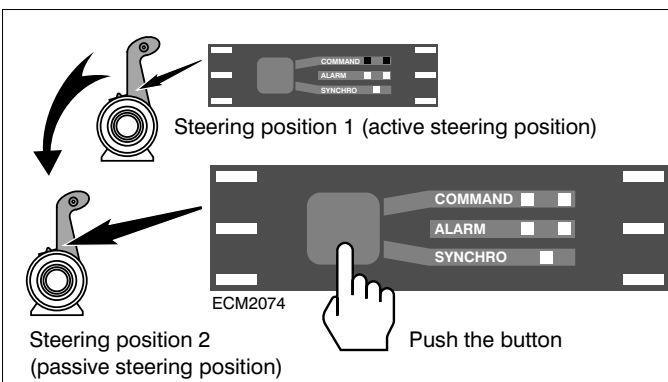


Push the button on the passive steering position in order to change position.

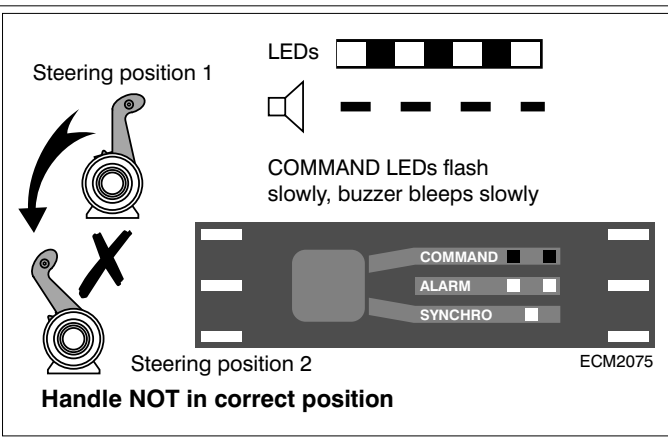
The passive steering position handle is in the **correct position** (e.g. in forward or neutral while the active one is in forward, or in reverse or neutral).

The Command lamps flash fast and the buzzer bleeps fast.

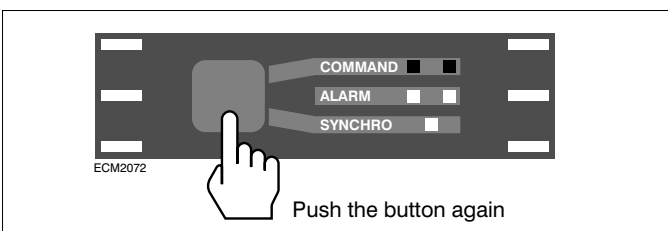
Taking over is always possible!
 With the handle (1 engine, or handles for 2 engines) in the same direction or position taking over will be carried out. Immediately afterwards a new command can be given e.g. full reverse.



If the handle of the passive steering position is **NOT in the correct position** (e.g. in reverse while the active one is in forward or neutral, or in forward while the active one is in reverse or neutral), then the buzzer bleeps slowly and the Command lamps flash slowly. This shows that you must first put the handles to the correct position.



You can take over the command by pushing the button again when the passive handles are in the correct position.

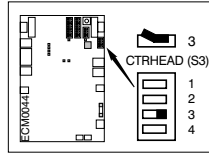


Instruction for **two engines**:

Where there are two engine control handles both of these must be in the correct position before the steering position can be changed. Each handle has its own set of Command lamps. The buzzer will only bleep fast when both handles are in the correct position.

Setting comparison

CTRHEAD(S3) switch 3 is in the 'CLOSE' position.



The handle setting of the passive steering position may only differ by 30% from that of the active position when the setting is compared. As well as this the setting (forward, neutral, reverse) must also agree before the steering position can be changed. The button does not have to be pushed a second time. The change is made as soon as the handle settings are correct. In this way, after the first push on the button, the user can move the handle until the correct setting is found, after which the change of position will be made automatically. If the correct handle setting is not found within 30 seconds the procedure will be terminated.

Push the button on the passive steering position in order to change steering position.

The handle of the passive steering position is **not at the correct setting**.

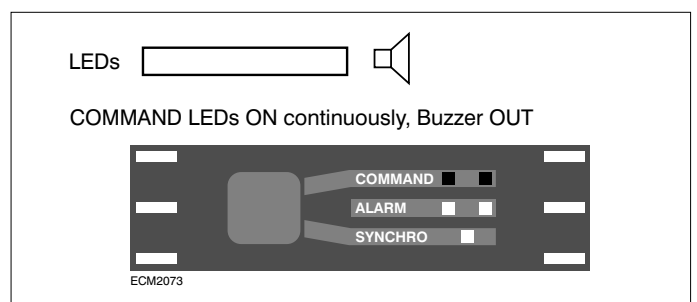
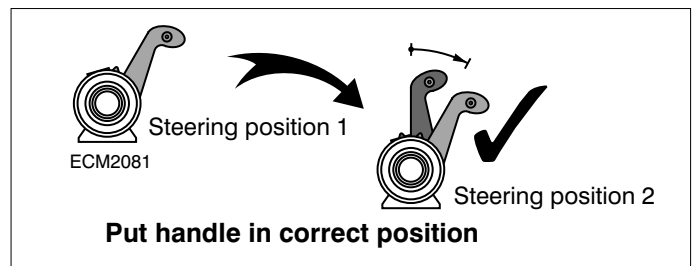
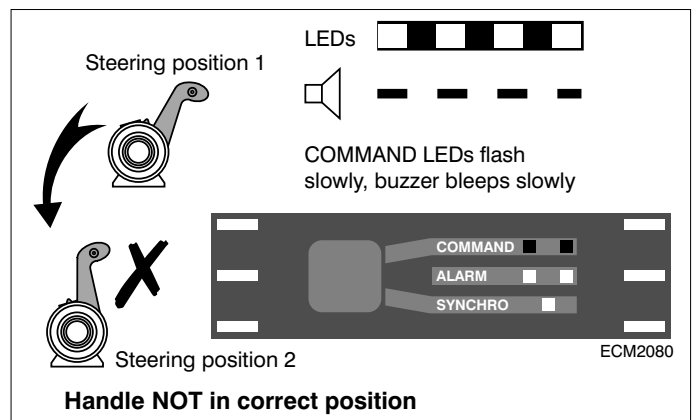
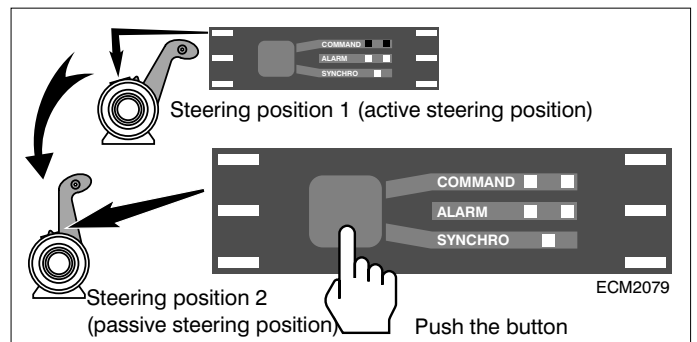
The Command lamps flash slowly and the buzzer beeps slowly.

Put the handles in the correct setting in order to take over command.



According to the official regulations the actual sailing command may not change when the steering position is changed. It therefore depends on the ship's class as to whether you can make use of setting comparison or not.

Instruction for two engines: Where there are two engine control handles both of these must be at the correct setting before the steering position can be changed. Each handle has its own set of Command lamps. The buzzer will only beep fast when both handles are at the correct setting.

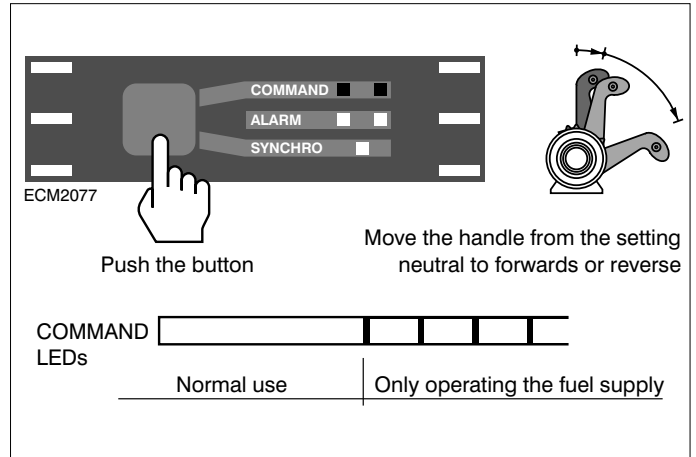


3.4 Operating throttle only 'Warming Up'

The special function 'Warming Up' allows you to set a number of revolutions without engaging the gearbox. This function is to allow the engines to warm up.

Make sure that the operating handle is set to Neutral. Switch on the function 'Warming Up' by pushing the button of the active steering position at the same time as putting the handle to forward or reverse. Then release the button. The function is cancelled by putting the handle back to setting neutral. Do not push the button then.

The Command lamps flash when 'Warming Up' is switched on.



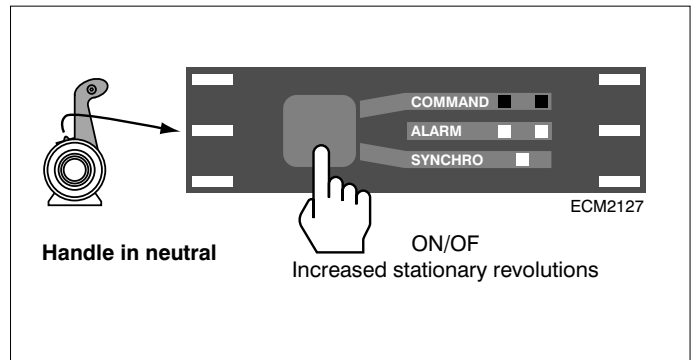
Instruction for two engines: The 'Warming Up' function can be switched on and off separately per side. Each handle has its own command lamp.

3.5 Increased idle speed

You can use the special function 'increased idle speed' to choose for a higher idle speed. Use this function if the engine also has to drive a hydropump for a bow and/or stern propeller and if the normal idle speed is too low for this.

Switch this function on and off using the button on the active steering position.

Switching on this function is only possible with the operating handle in neutral position. Switching off this function is always possible.



You can only use 'increased idle speed' if you have set this function (see 'Setting procedure' in chapters 5 to 12).

If you have chosen to use this function then you can no longer switch off the 'Synchronisation'.

3.6 Synchronisation

If the difference between the forward settings of the handles for the port and starboard engines at the active steering position is less than 10% then the same instruction is automatically given to both engines (that of the port handle).

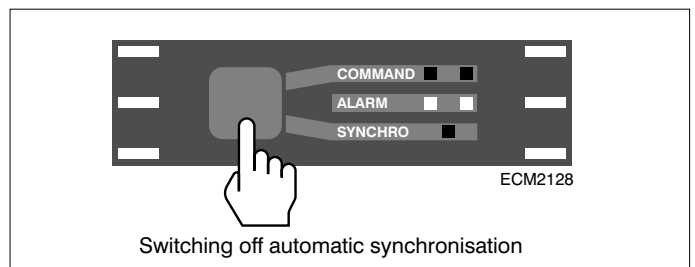
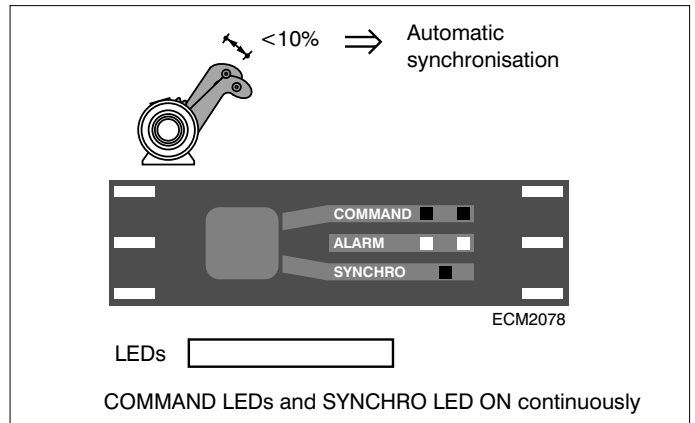
The Synchro lamp shows whether the 'Synchronisation function' is switched on or not.

Switch this function off using the button on the active steering position. The function will be switched on again if the handles in another setting are less than 10% different from each other again.

Instruction for 'increased idle speed': You cannot switch off the function 'Synchronisation' when you are using the function 'increased idle speed'.



You can only use 'Synchronisation' if you have set this function (see section 14.4, Synchronisation).



4 Installation

4.1 Introduction

The composition of the engine remote control is dependent on the way in which the engine (throttle) and the gearbox are operated.

This can be mechanical (pull-push cables) or electrical.

2 engines can also be operated in 1 combined system.

Use the tables to check whether all the necessary articles are present.

Connection cables are needed as well as the articles given in the tables.

- Data cable	LIYCY	4 x 1 mm ²
- Power cable	Ölflex 100	2 x 2.5 mm ²
- Revolutions cable only for electrical throttle	LIYCY	2 x 0.75 mm ²
- Gearbox cable only for electrically controlled gearboxes	LIYCY	7 x 1 mm ²
- Alarm cable only if an alarm system is connected	LIYCY	2 x 0.75 mm ²
- Start blocking cable only if start blocking is connected	LIYCY	2 x 0.75 mm ²
- Idle cable only if idle control is connected	LIYCY	2 x 0.75 mm ²

Pull-push cable(s) Vetus type 33

only for mechanical operation of throttle and/or gearbox.

Supplied in lengths from 0.5 m increasing by 0.5 m.

The relevant chapters with the descriptions of the minimum necessary installation and setting actions required for each separate system are shown in the tables.

The codes (such as 1MM or 2 ME) are repeated on each page and shown by the relevant options.

A number of options are available both for the installation and the settings. These options are described separately. Although it is not necessary it is recommended that the minimum installation with the appropriate settings is completed and tested first, after which the options can be installed and tests carried out again.

4.2 Summary of installation procedure

1 Refer to the chapter of the system as shown in the tables.

2 Carry out the installation steps given there:

- Install System box.
- Install servo motor(s) and/or I/O extension cards.
- Connect operating handles.
- Connect power cables.

N.B. Instructions valid for all systems for installing the operating handles are given in section 4.3.

3 Carry out the setting procedures:

- Register engine controls.
- Set revolutions (idle, increased (idle) and maximum revolutions).
- Gearbox forward/reverse (only by mechanical operation).

4 Install the required options.

- Start blocking (see section 13.1).
- Idle relay (see section 13.2).
- Alarm relay (see section 13.3).
- Blocking switch for changing the steering position (see section 13.4).


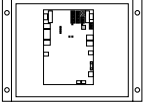


5 Set the required settings options:


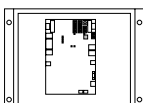
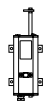

- Delay when engaging the gearbox (see section 14.1).
- Buzzer to show neutral (see section 14.2).
- Comparison of position or setting (see section 14.3).
- Synchronisation (see section 14.4).
- Power supply alarm (see section 14.5).

6 Sea trial.
Check the reversing time of the gearbox if set.

If the system does not work as it should consult chapter 15 to find the fault.

Article code for screened cable LIYCY			
Length	2 x 0,75 mm ²	4 x 1 mm ²	7 x 1 mm ²
5 m	REC27505	–	–
10 m	REC27510	REC4110	REC7110
15 m	–	REC4115	REC7115

1 engine					
		Operating gearbox			
		Mechanical		Electrical	
		Operating throttle		Operating throttle	
		Mechanical	Electrical	Mechanical	Electrical
Single lever control handle for 1 engine (RECO1) *		X *)	X *)	X *)	X *)
System box (RECOBOX)		1	1	1	1
Servo motor for mechanical operation of throttle (fuel pump) or a gearbox (RECOACT)		2	1	1	–
Interface print card for electrical operation of throttle (fuel pump) or a gearbox (RECOPCB)		1	1	1	
For installations and setting procedure see sections: Check the code:		5 1 M M	6 1 E M	7 1 M E	8 1 E E

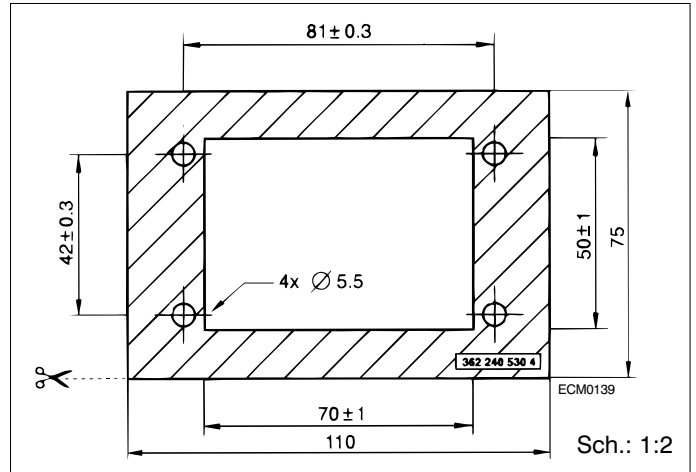
2 engines					
		Operating gearbox			
		Mechanical		Electrical	
		Operating throttle		Operating throttle	
		Mechanical	Electrical	Mechanical	Electrical
Single lever control handle for two engines (RECO2) *		X *)	X *)	X *)	X *)
System box (RECOBOX)		2	1	1	1
Servo motor for mechanical operation of throttle (fuel pump) or a gearbox (RECOACT)		4	2	2	–
Interface print card for electrical operation of throttle (fuel pump) or a gearbox (RECOPCB)		2	2	2	
Optional: Interface card for auto-synchronised running of two engines (RECOSYNC)		1	1	1	1
For installations and setting procedure see sections. Check the code:		9 2 M M	10 2 E M	11 2 M E	12 2 E E

*) One single handle control is required for each steering position, maximum 6 per installation.

4.3 Operating handles

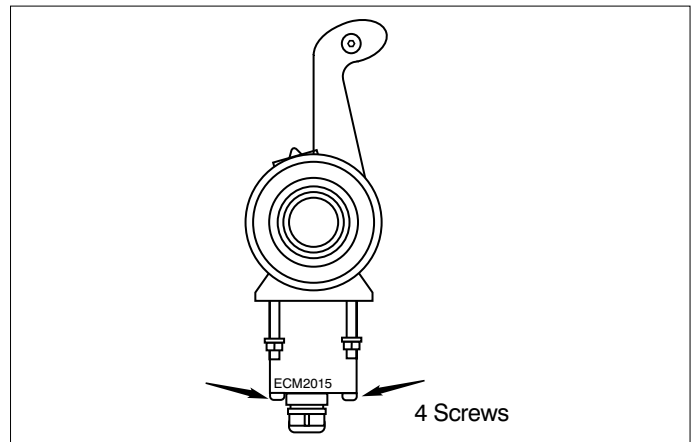
General

Use the drilling template to drill holes for fixing the handles at the desired points on the dashboard.



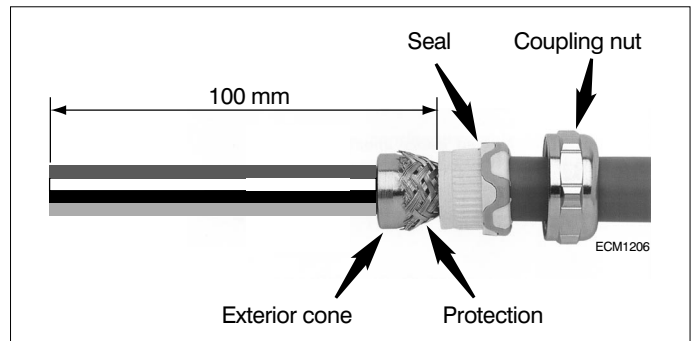
Instructions for fitting the connecting cable

Loosen the 4 screws and remove the lid in order to connect the cable.



Prepare the data cable according to the illustration shown opposite.

Fit the wiring (see the next pages) and make sure that when fitting the cable is not pinched. The seal must be correctly positioned in order to guarantee the protection level IP65.



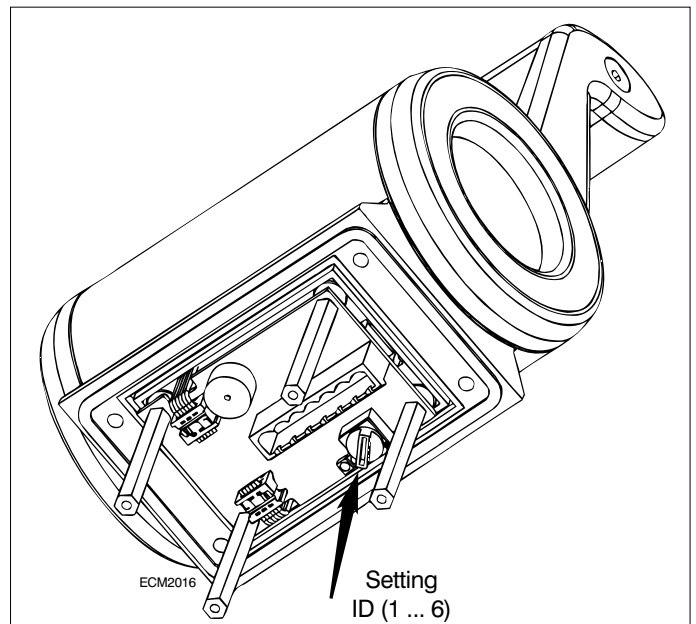
Setting the identification (ID) number



The control module recognises all motor controls according to a unique ID number that must be pre-set (e.g. ID 1 for the controls at the interior steering position and ID 2 for those at the exterior position).

ID 0 must never be used

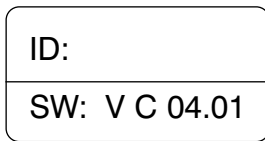
The lid must be taken off in order to set the ID number.





Give every engine control a different ID number.

ID 0 may not be used.



Note the ID number on the label.

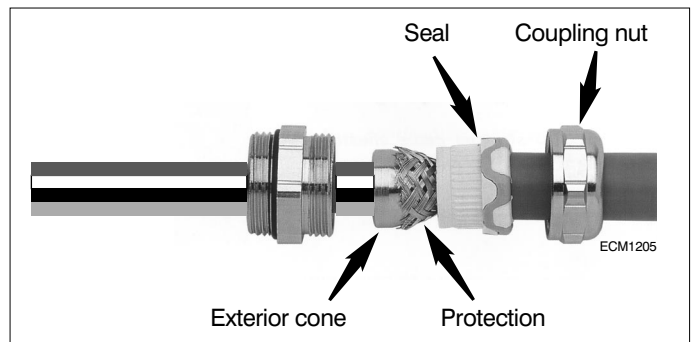
Connections operating handle

Clamp	Description	Colour
1	0 V	white
2	+8 V	brown
3	CAN -	yellow
4	CAN +	green
5	CAN terminator	
6	Switch -	
7	Switch +	

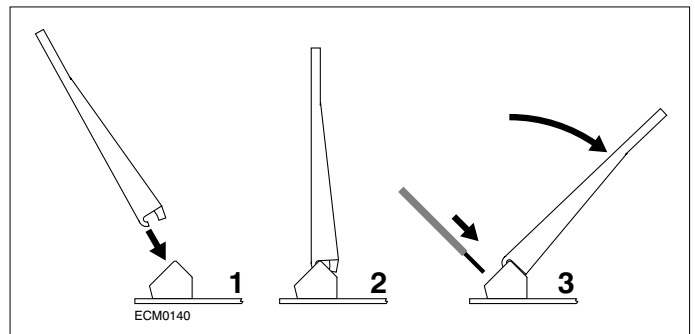
How the operating handles are to be connected to the System box is given separately for each system.

4.4 Fitting instructions

Connect the cables to the System box with the metal coupling nuts supplied. Fit these threaded connections as shown.

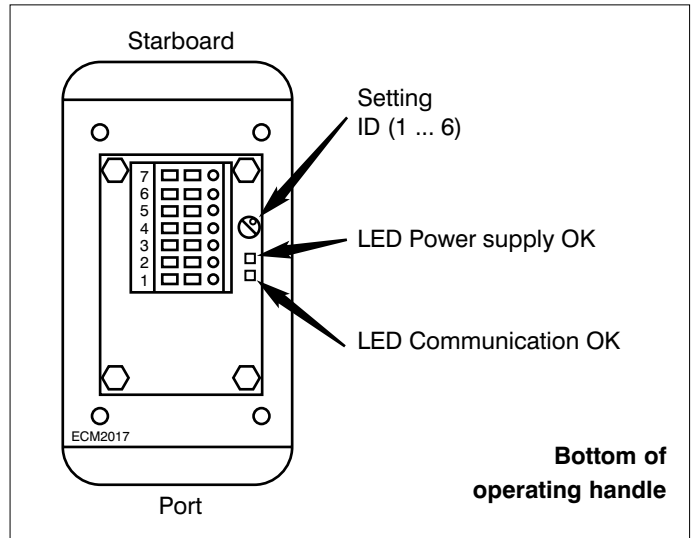


A plastic tool has been supplied to help in connecting wires to the print card connector. See the drawing for how to use this.



Always disconnect the power before commencing installation work. Make sure that the power cannot be reconnected by accident.

Only trained personnel may carry out installation work and take the system into service as shown in the manual.



4.5 Fitting pull-push cables

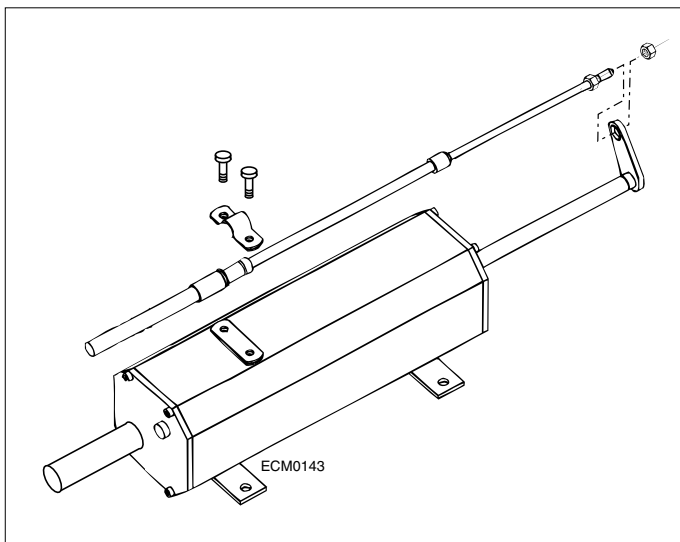
Servo motors are required for mechanical control of the revolutions (fuel) and/or the gearbox. The connection of a servo motor to a fuel or gearbox lever must be by means of Vetus pull-push cables type 33.

Fitting the cables must be done in two stages.

The first step, connection to the servo motor, can be carried out before the electrical connections are made and the setting procedure has been carried out.

The second step, connection to the engine, must be carried out after the electrical connections have been made and the setting procedure has been carried out.

Fitting the pull-push cables to the servo motor



Connect the pull-push cable to the servo motor as shown in the drawing.

Fix the inner cable ends with the locknuts.

Fitting the pull-push cables to the engine

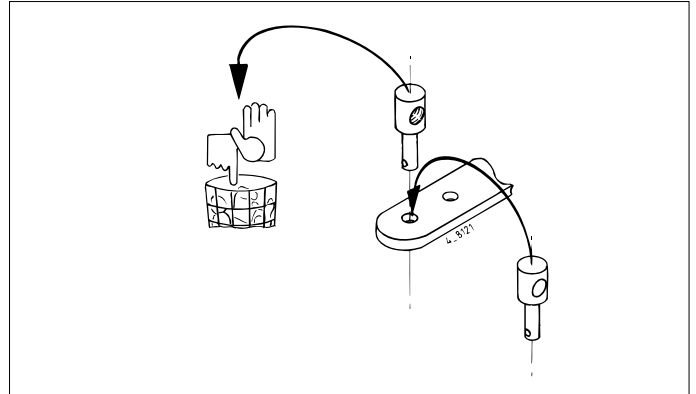


Do not fit the pull-push cables to the engine before the electrical connections have been made and the setting procedure has been carried out.

Throttle

Most engines are so designed that the engine revolutions will rise when the fuel cable is pulled ('pull to throttle').

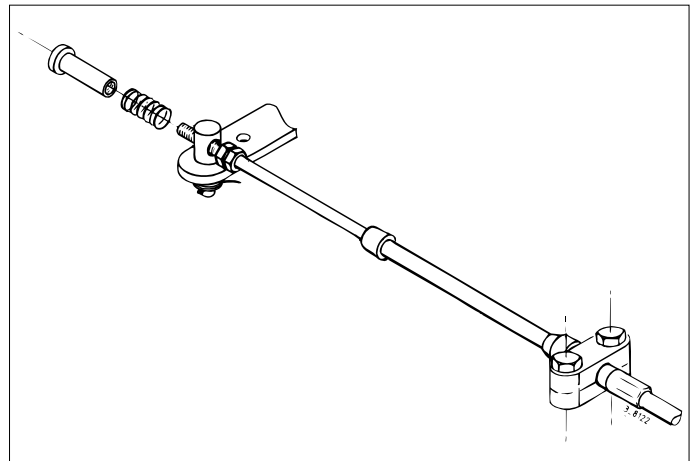
Carry out the following in order to prevent overloading of the motor and/or the pull-push cable:



Remove the existing brass cable nipple from the engine fuel lever and replace this with the cable nipple together with spring and collar supplied.

Measure the distance moved by the fuel lever between the positions idle and full power and choose a hole in the lever such that this distance is between 65 and 69 mm.

If the lever is too short fit an extension piece to increase the distance to 67 mm. See also 'Gearbox'.



Connect the free end of the fuel pull-push cable to the cable nipple on the fuel lever; use two locknuts tightened on the threaded end of the inner cable.

Check that the smooth part of the collar can move freely in the cable nipple and that the fuel lever spring is capable of pushing the lever back to the idle position when no power is given.

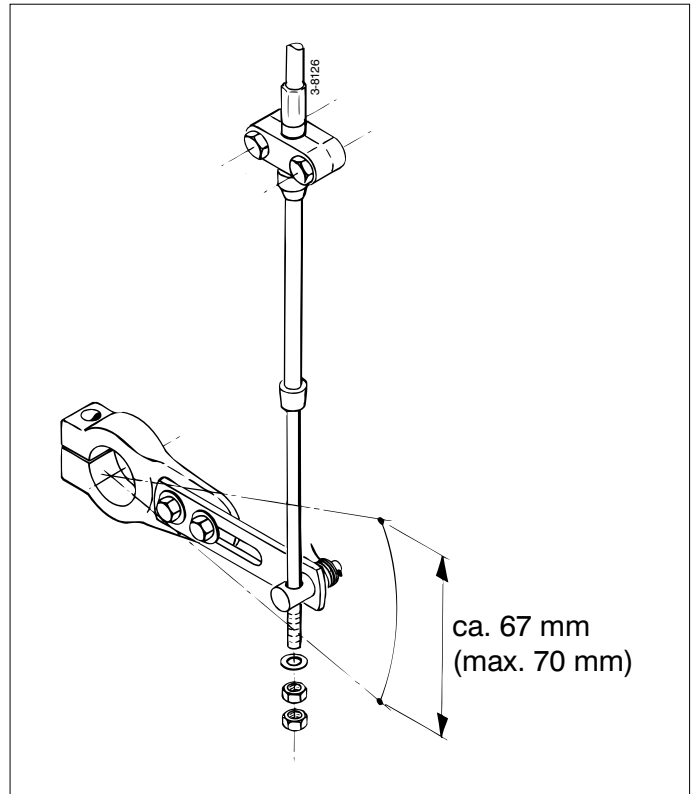
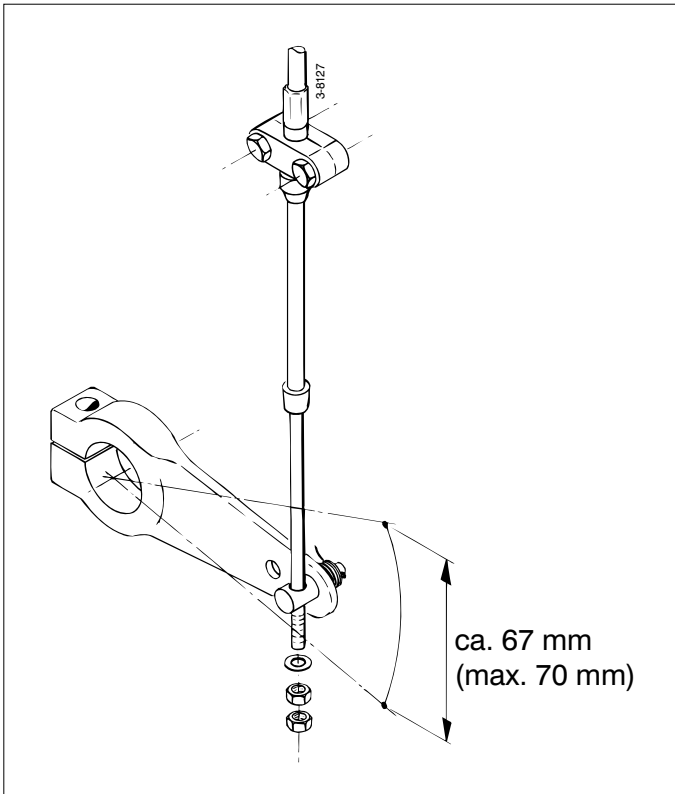
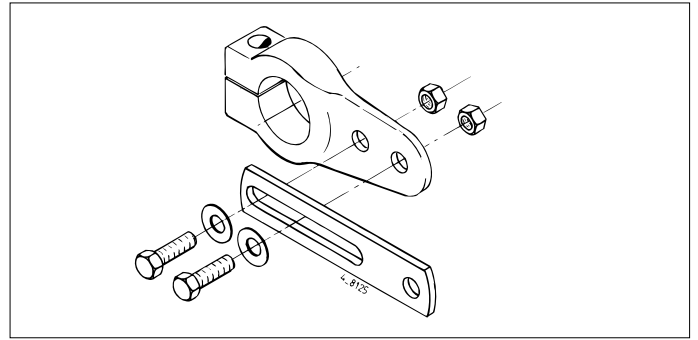
Consult Vetus if a spring loaded pull-push cable connection is required for 'push to gas'.

Gearbox

Measure the distance moved by the gearbox lever between the positions forward and reverse and choose a hole in the lever such that this distance is between 65 and 69 mm.

If the lever is too short fit an extension piece to increase the distance to 67 mm.

If the lever is too short there is a danger that the power required to operate the clutch is greater than the maximum that the servo motor can supply.



Remove the brass cable nipple from the lever and fix this to the pull-push cable. Use the M5 locknut supplied to fix this. Put the cable nipple back onto the gearbox lever.

Consult Vetus if a spring loaded pull-push cable connection is required for the gearbox.

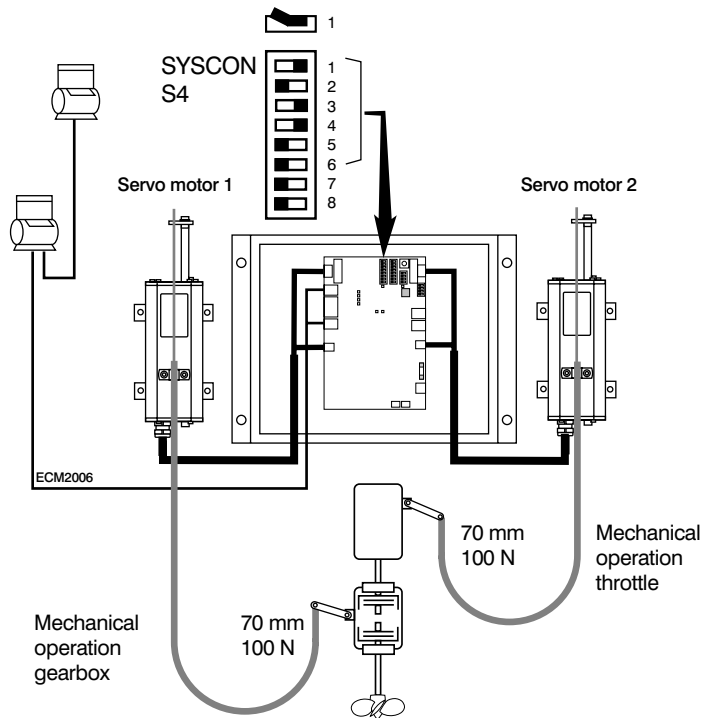


Important

Select the stroke of the lever not too big.
Don't let the actuator travel up to the limit positions.

5 Installation with one engine - mechanical throttle, - mechanical operation of the gearbox

Complete installation



5.1 System box

Choose an easily accessible place near the engine for the system box with the control module.
Do not fit the system box to the engine.

Set the DIP switches of S4 'SYSCON' as shown



Never change the positions of the SYSCON switches when the power is connected.

5.2 Servo motors

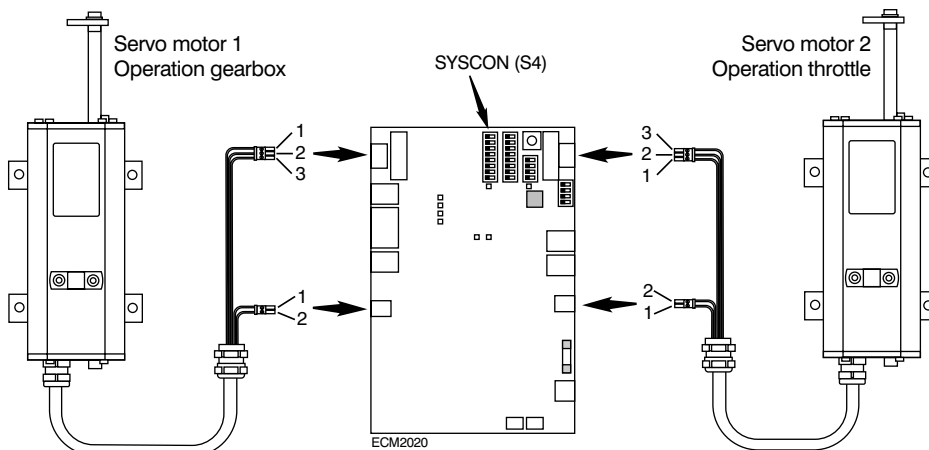
Position the servo motors directly next to or under the system box.

The servo motors must be connected to the fuel (throttle) and gearbox levers by means of Vetus pull-push cables type 33, see section 4.5.

The servo motor electrical connection cables may not be extended.

Connect the servo motor electrical connecting cables to the control module.

Connection of servo motors



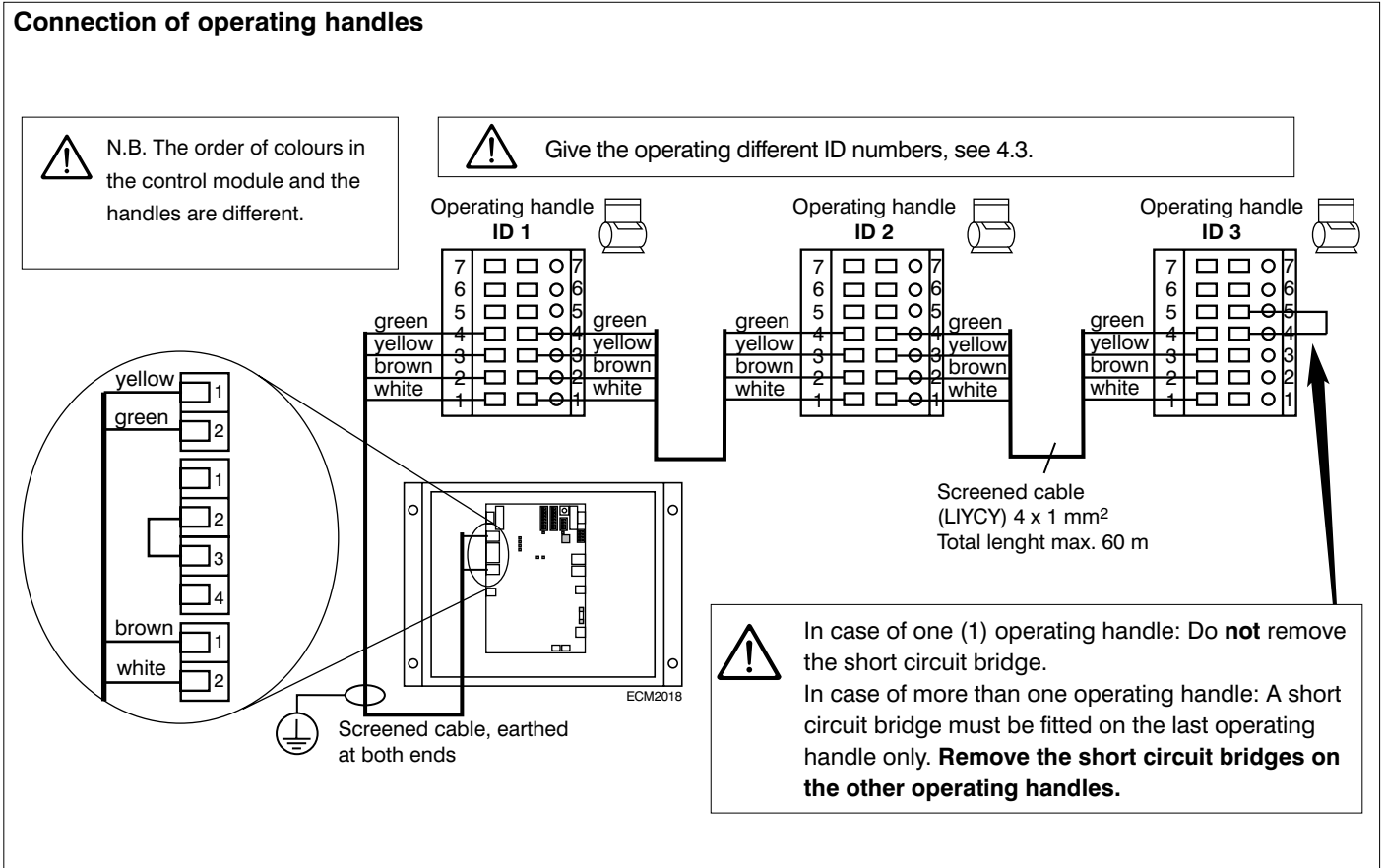
5.3 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use screened cable, LIYCY, 4 x 1mm² for this.

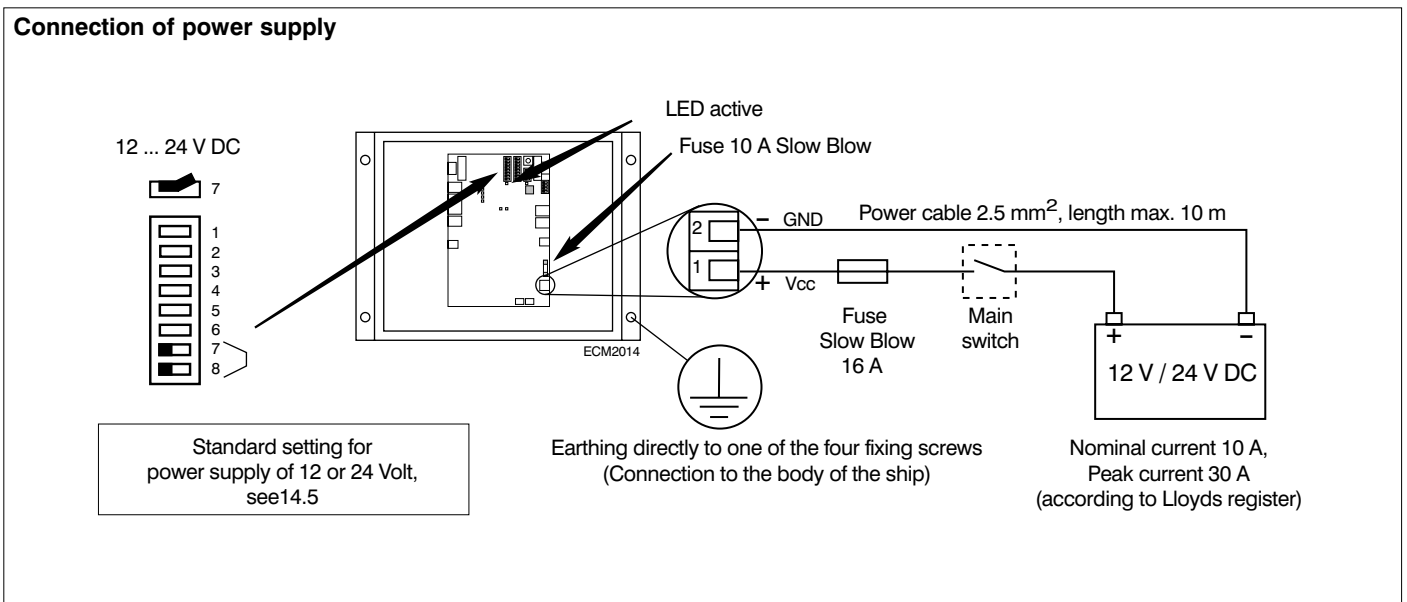
Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.



5.4 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current.
Use connecting cable with 2.5 mm² cross-section.

Connect the power supply to the control module as shown in the plan.
See section 14.5 for more information regarding the power supply.



5.5 Setting procedure

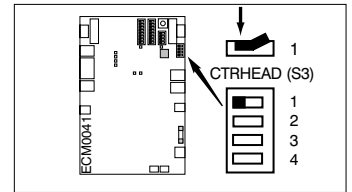
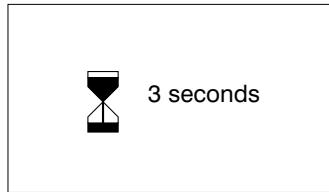
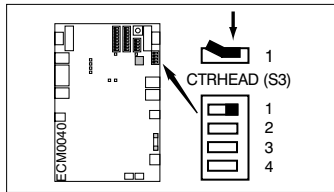
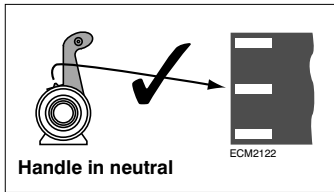
After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

5.5.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered. The procedure is as follows:

- 1 Check that all operating handles are set to the neutral position.
- 2 Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3 Wait 3 seconds.
- 4 Switch CTRHEAD (S3) switch 1 back to 'open'.

N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation

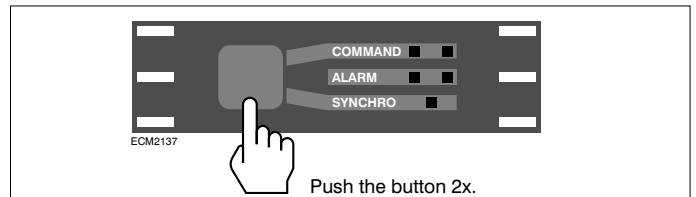


5.5.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1 Activate a steering position by pushing the button **twice while the handle is set to neutral**.

After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



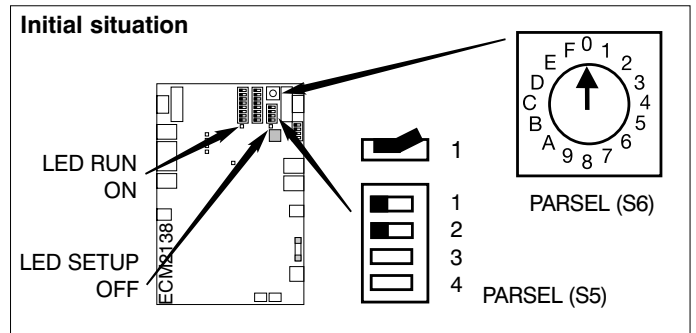
- 2 The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

***) For increased idle speed, see 3.5.

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or
Increased*)	Position A	Idle forward or
Increased idle **)	Position B	Idle reverse
Maximum	Position 2	Neutral or Full power forward or Full power reverse.

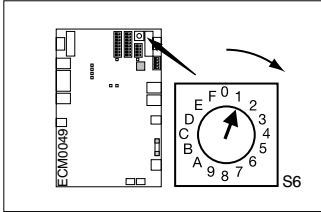
- 3 The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



4 Choose a number of revolutions to set.

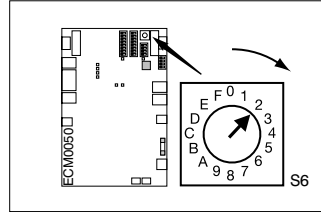
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



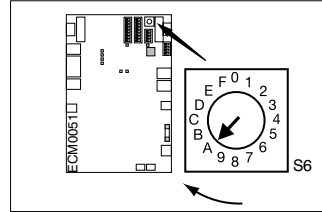
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



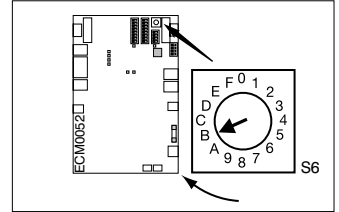
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle revolutions.

Set the PARSEL selector switch (S6) to position B.

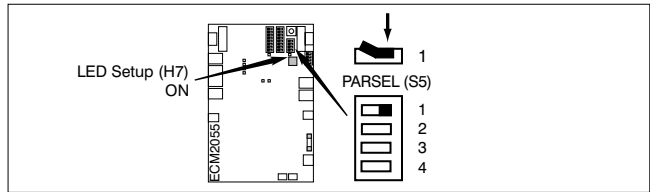


! When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP.

Switch PARSEL (S5) over to do this.

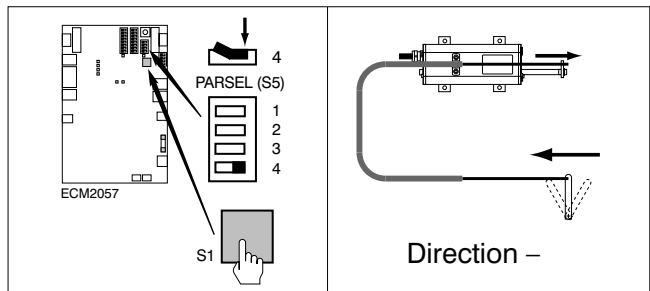
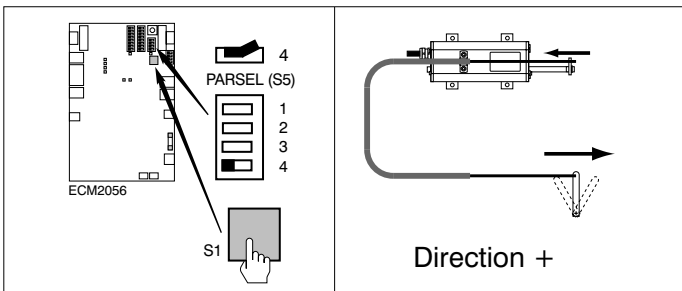
The servo motor will be moved to the last position set and Setup LED (H7) lights up.



! After switching PARSEL (S5) over an automatic revolutions change can occur.

6 Set the servo motor for the correct position for the required revolutions.

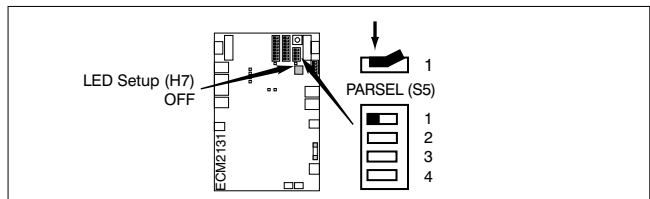
The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



7 Store the parameters by changing to RUN.

To do this put PARSEL switch (S5) back to the 'OPEN' position.

Setup LED goes out.

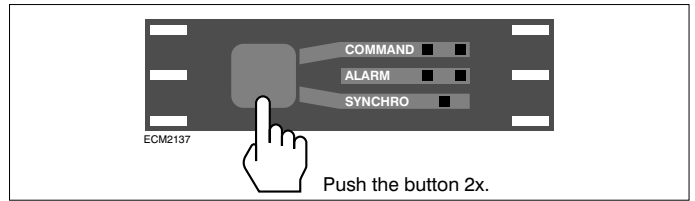


Set another number of revolutions.

5.5.3 Installation of the gearbox

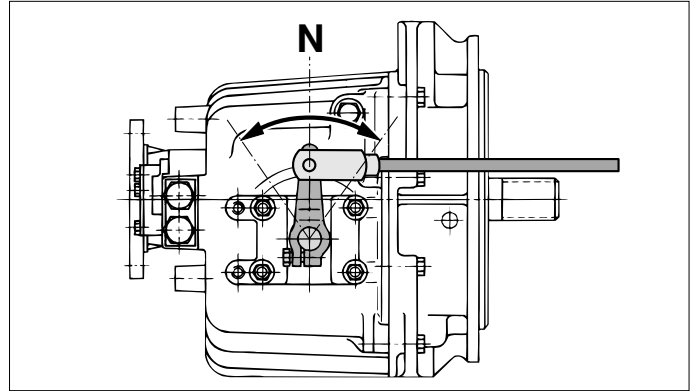
First activate a steering position if one is not already active.

- 1 Activate a steering position by pushing the button **twice while the operating handle is set to neutral**. After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



- 2 **Neutral cannot be set electronically and must be set mechanically.**

Therefore set the pull-push cable on the side of the servo motor and on the side of the gearbox such that when the handle of the active steering position is set to neutral the gearbox is also in neutral.



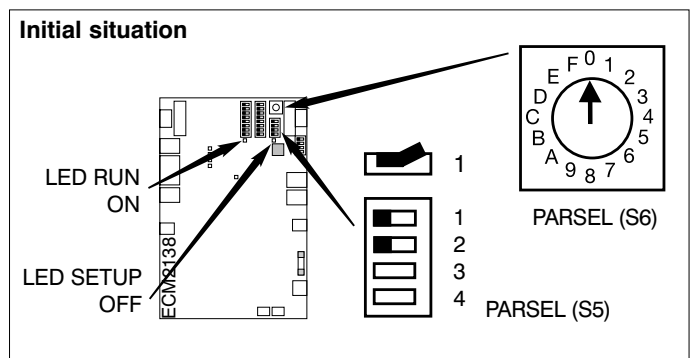
- 3 'Forward' and 'Reverse' settings can be made in random order once the engine remote control is switched on and a steering position has been activated.



Only change these settings with the engine switched off.

Gearbox position	PARSEL selector switch (S6)	Operating handle set to:
Forward	Position 4	Neutral or Forward
Reverse	Position 6	Neutral or Reverse

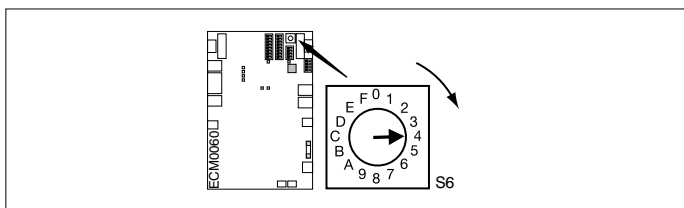
- 4 The PARSEL selector switch (S6) is used to determine which position is set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



5 Select a position to be set.

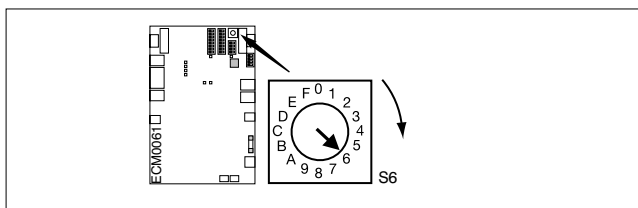
Setting position 'Forward'

Set PARSEL selector switch (S6) to position 4.



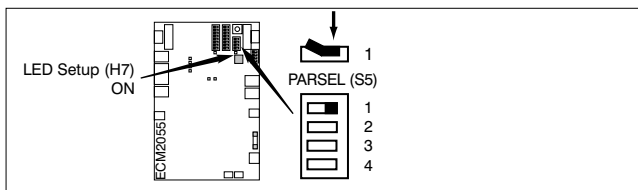
Setting position 'Reverse'

Set PARSEL selector switch to position 6.



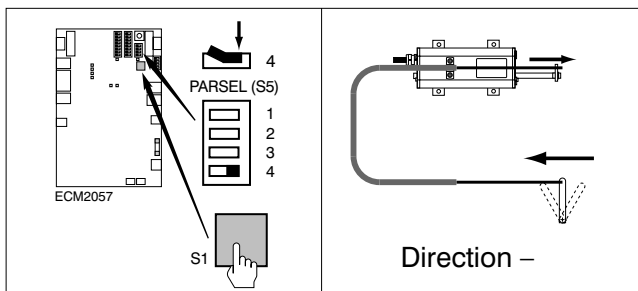
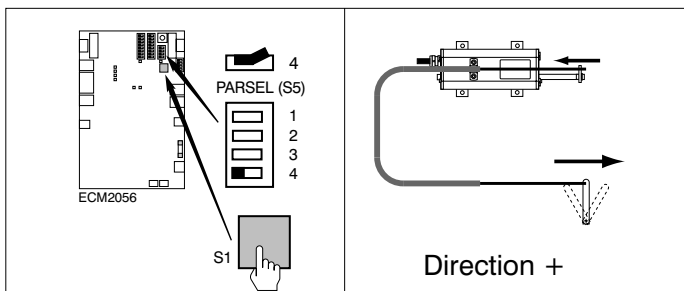
**6 Change from RUN to SETUP.
Use PARSEL (S5) to do this.**

The servo motor will be moved to the last position set and Setup LED (H7) lights up.

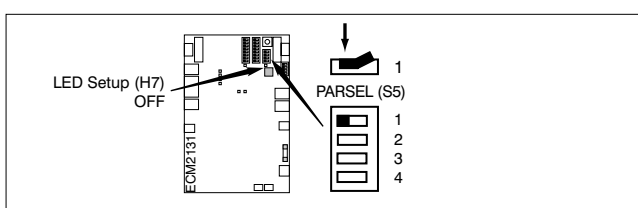


During step 6 the setting of the gearbox can be changed automatically. Therefore the engine must be switched off.

7 Set the servo motor correctly for forward or reverse.
The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



**8 Store the parameters by changing to RUN.
To do this change PARSEL (S5) switch back to position 'OPEN'.
Setup LED goes out.**

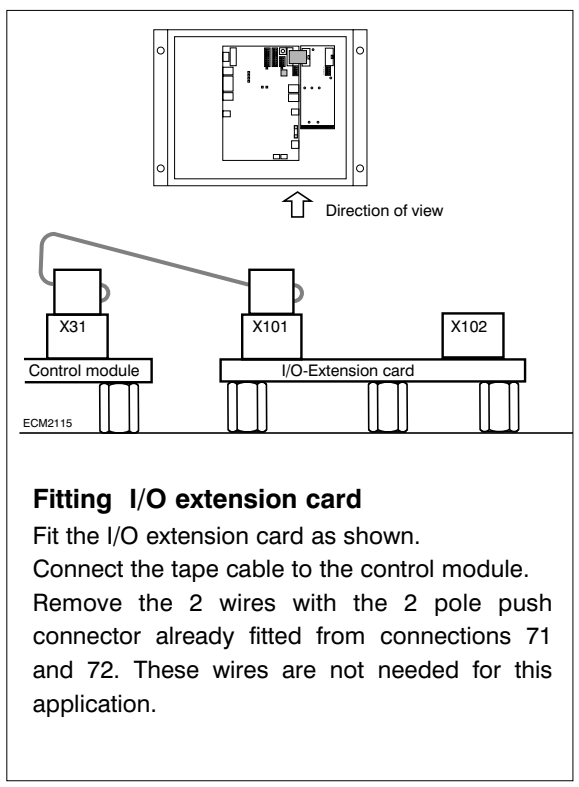
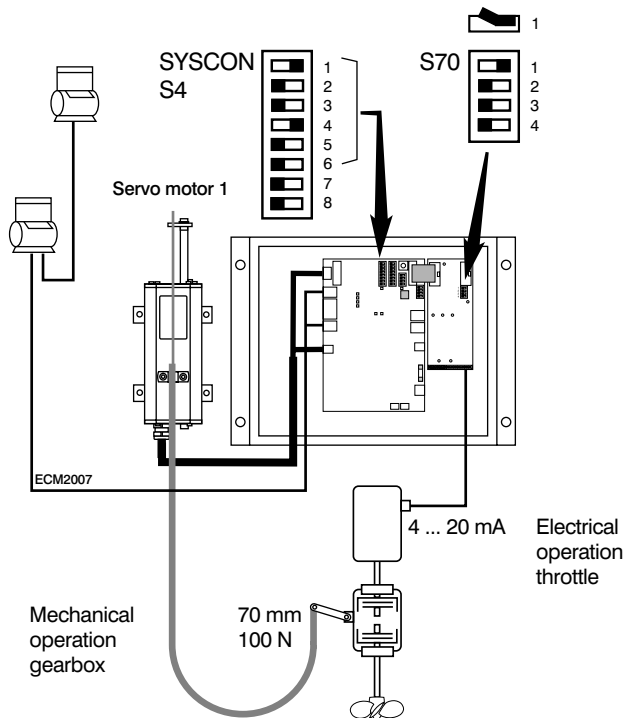


Set the other gearbox position.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional Settings'.

6 Installation with one engine - electrical throttle (4 ... 20 mA), - mechanical operation of the gearbox Complete

installation



6.1 System box

Choose an easily accessible position for the system box, with the control module, near the engine.
Do not fit the system box on the engine.

Set the DIP switches of S4 'SYSCON' as shown.
Set the DIP switches of S70 on the I/O extension card as shown.



Never change the SYSCON switch positions when the power is connected.

6.2 Servo motor

Position the servo motor directly next to or under the system box.

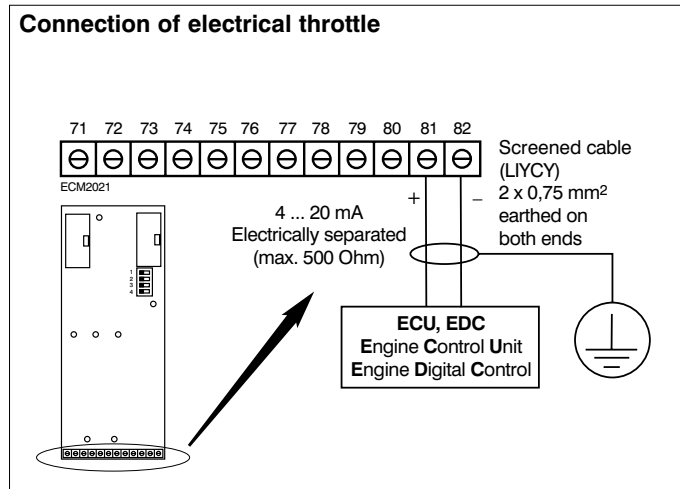
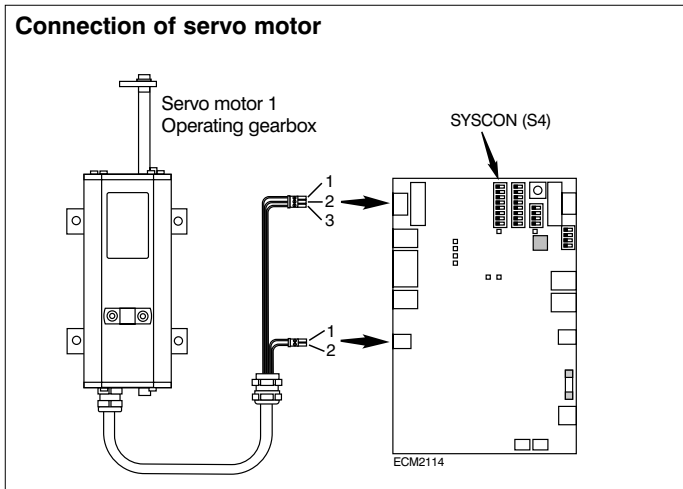
Connect the servo motor electrical connecting cable to the control module.

The servo motor electrical connecting cable may not be extended.

The servo motor must be connected to the gearbox lever using Vetus pull-push cables type 33, see 4.5.

6.3 Electrical throttle

Connect the motor to the system box using a screened connecting cable, LIYCY, 2 x 0.75 mm². Connect as shown in the plan.



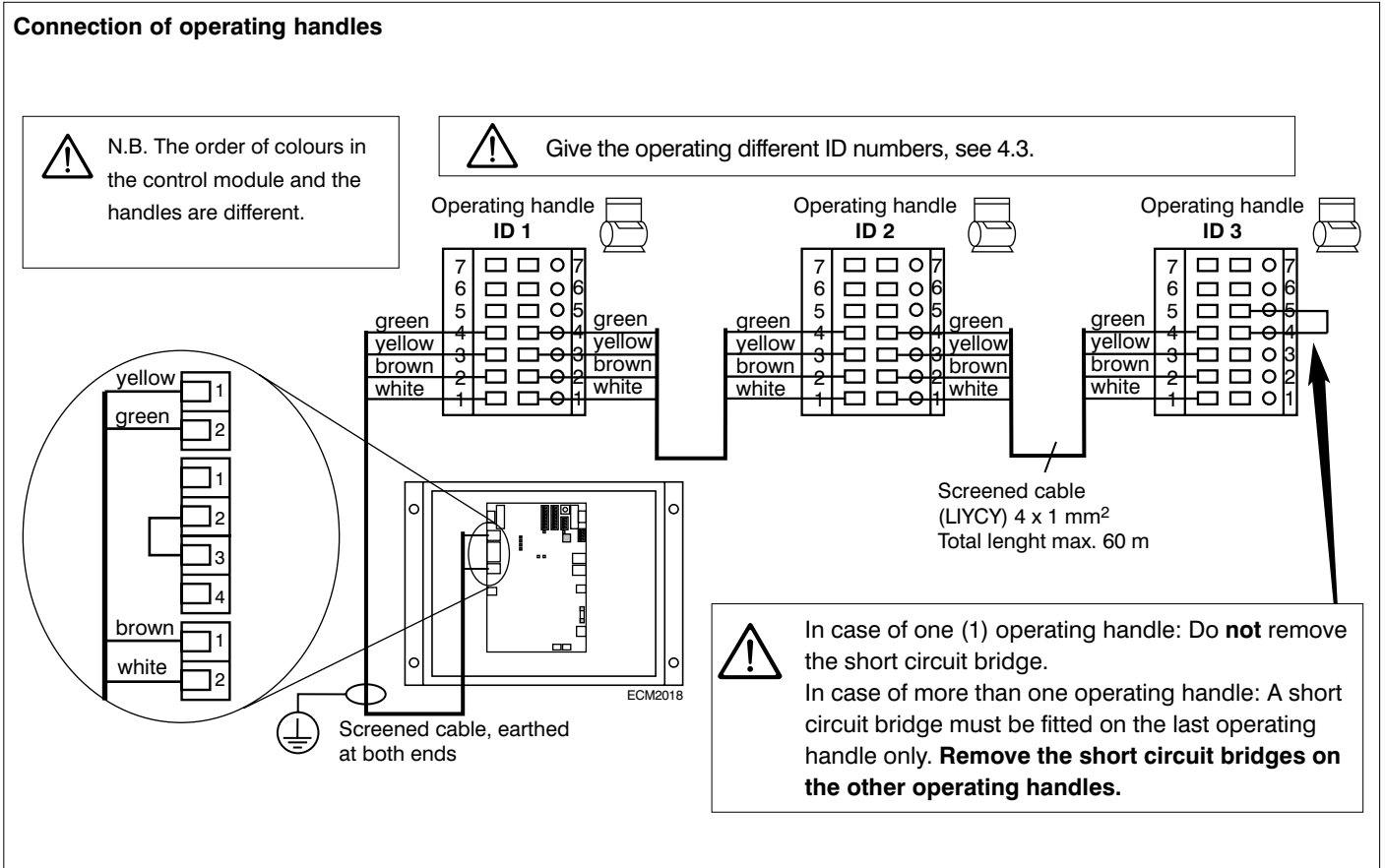
6.4 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.

Use screened cable, LIYCY, 4 x 1mm² for this.

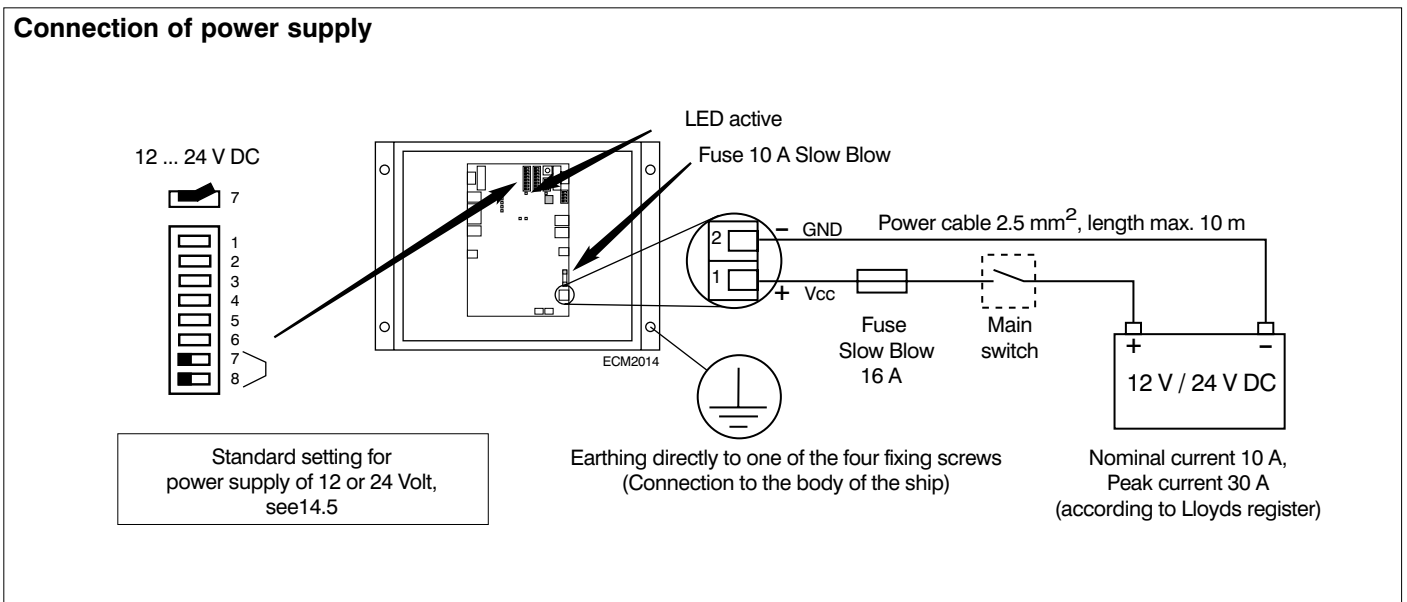


6.5 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current. Use connecting cable with 2.5 mm² cross-section.

Connect the power supply to the control module as shown in the plan.

See section 14.5 for more information regarding the power supply.



6.6 Setting procedure

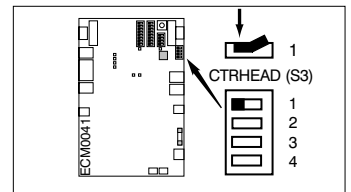
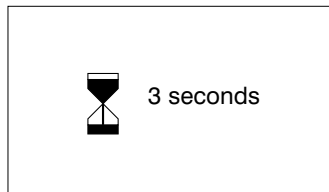
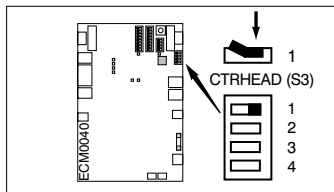
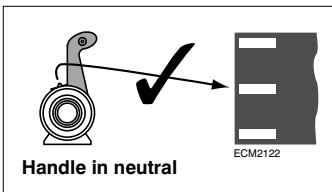
After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

6.6.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered. The procedure is as follows:

N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.

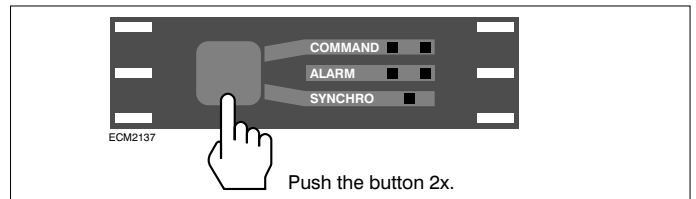
- 1** Check that all operating handles are set to the neutral position.
- 2** Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3** Wait 3 seconds.
- 4** Switch CTRHEAD (S3) switch 1 back to 'open'.



6.6.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1** Activate a steering position by pushing the button **twice while the handle is set to neutral.**
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



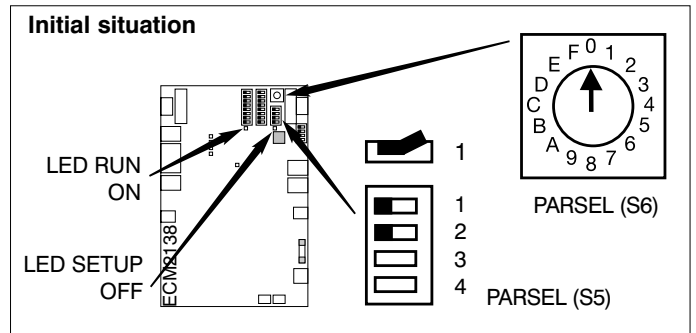
- 2** The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

***) For increased idle speed, see 3.5.

Revolutions	PARSEL selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or Idle forward or Idle reverse
Increased *)	Position A	Neutral or Full power forward or Full power reverse.
Increased idle **)	Position B	
Maximum	Position 2	

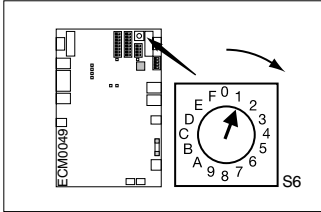
- 3** The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



4 Choose a number of revolutions to set.

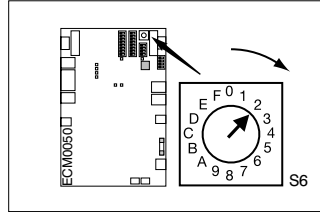
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



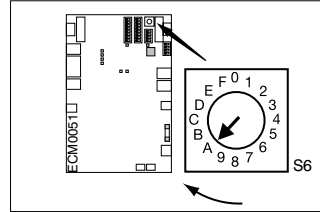
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



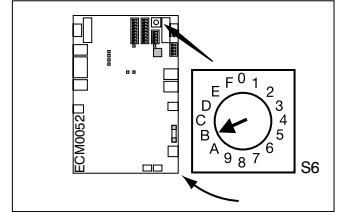
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle revolutions.

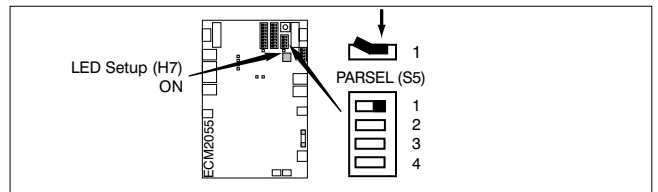
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP. Use PARSEL (S5) to do this.

The 4 to 20 mA signal will be set to the last entered value and Setup LED (H7) lights up.

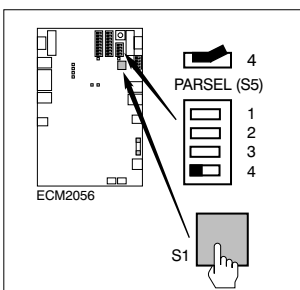


6 Set the 4 – 20 mA signal for the correct value for the required revolutions.

The setting changes as long as you hold the button pushed in or until the limit value is reached. Changing the setting is very slow, running through the total range can take about 28 sec.

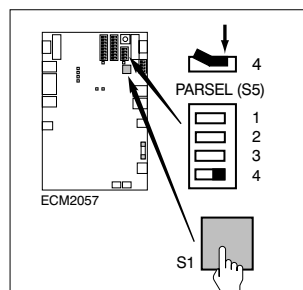


After switching PARSEL (S5) over an automatic revolutions change can occur.



4 ⇒ 20 mA

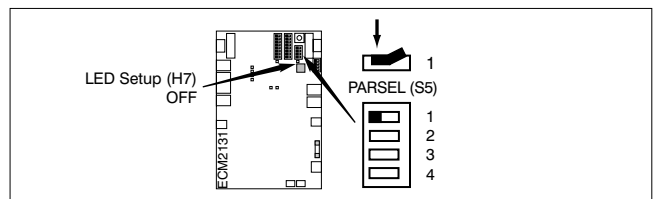
Direction +



20 ⇒ 4 mA

Direction -

7 Store the parameters by changing to RUN. To do this put PARSEL switch (S5) back to the 'OPEN' position. Setup LED goes out.

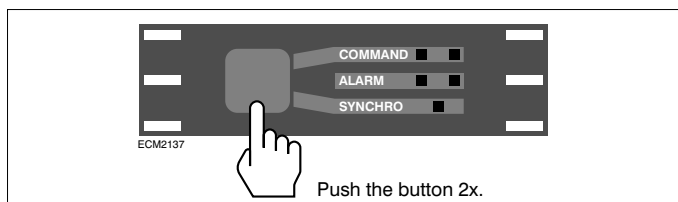


Set another number of revolutions.

6.6.3 Installation of the gearbox

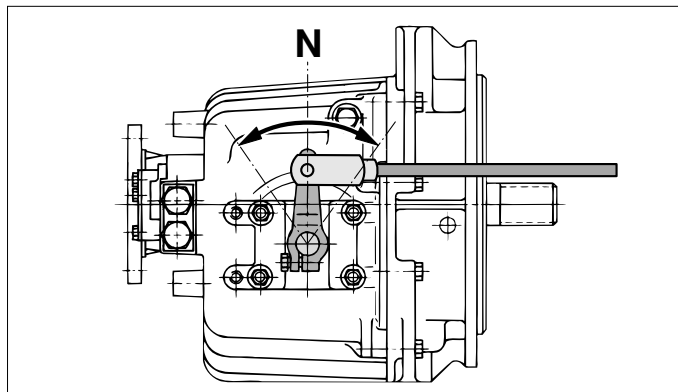
First activate a steering position if one is not already active.

- 1 Activate a steering position by pushing the button **twice while the operating handle is set to neutral.**
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



- 2 **Neutral cannot be set electronically and must be set mechanically.**

Therefore set the pull-push cable on the side of the servo motor and on the side of the gearbox such that when the handle of the active steering position is set to neutral the gearbox is also in neutral.



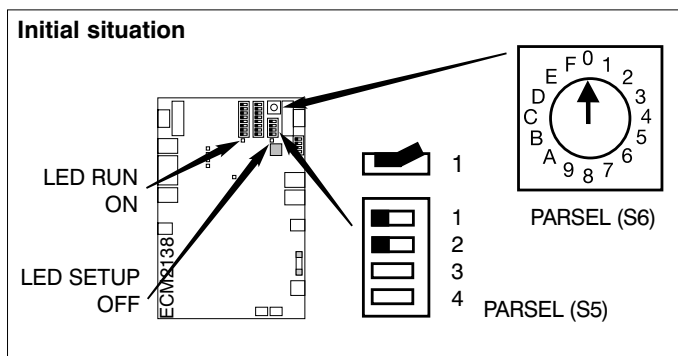
- 3 'Forward' and 'Reverse' settings can be made in random order once the engine remote control is switched on and a steering position has been activated.



Only change these settings with the engine switched off.

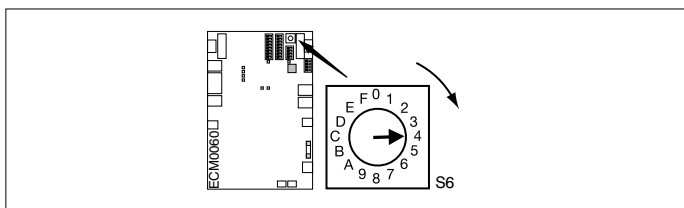
Gearbox position	PARSEL selector switch (S6)	Operating handle set to:
Forward	Position 4	Neutral or Forward
Reverse	Position 6	Neutral or Reverse

- 4 The PARSEL selector switch (S6) is used to determine which position is set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.

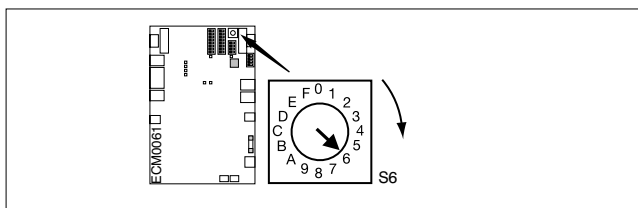


5 Select a position to be set.

Setting position 'Forward'
Set PARSEL selector switch (S6) to position 4.

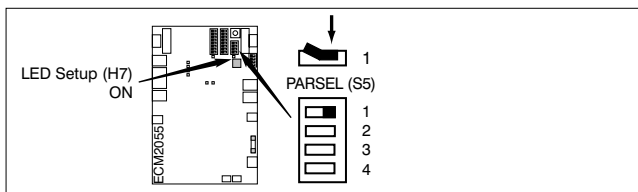


Setting position 'Reverse'
Set PARSEL selector switch to position 6.



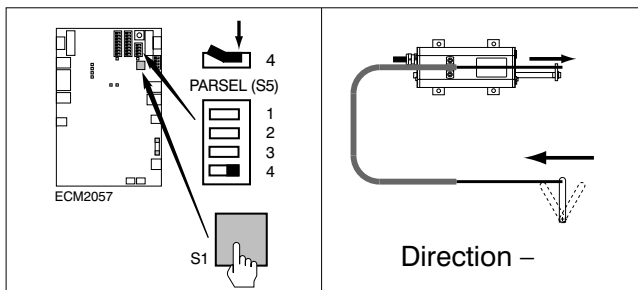
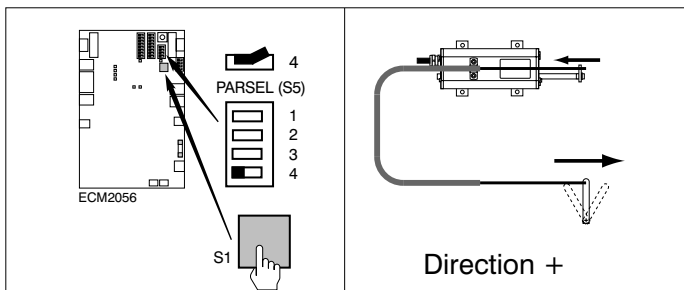
6 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The servo motor will be moved to the last position set and Setup LED (H7) lights up.

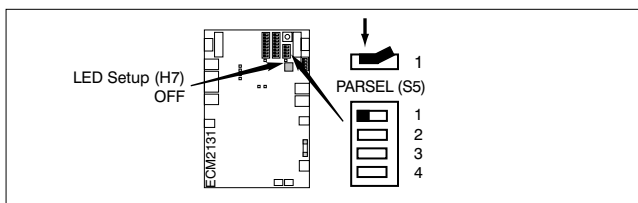


⚠ During step 6 the setting of the gearbox can be changed automatically. Therefore the engine must be switched off.

7 Set the servo motor correctly for forward or reverse.
The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



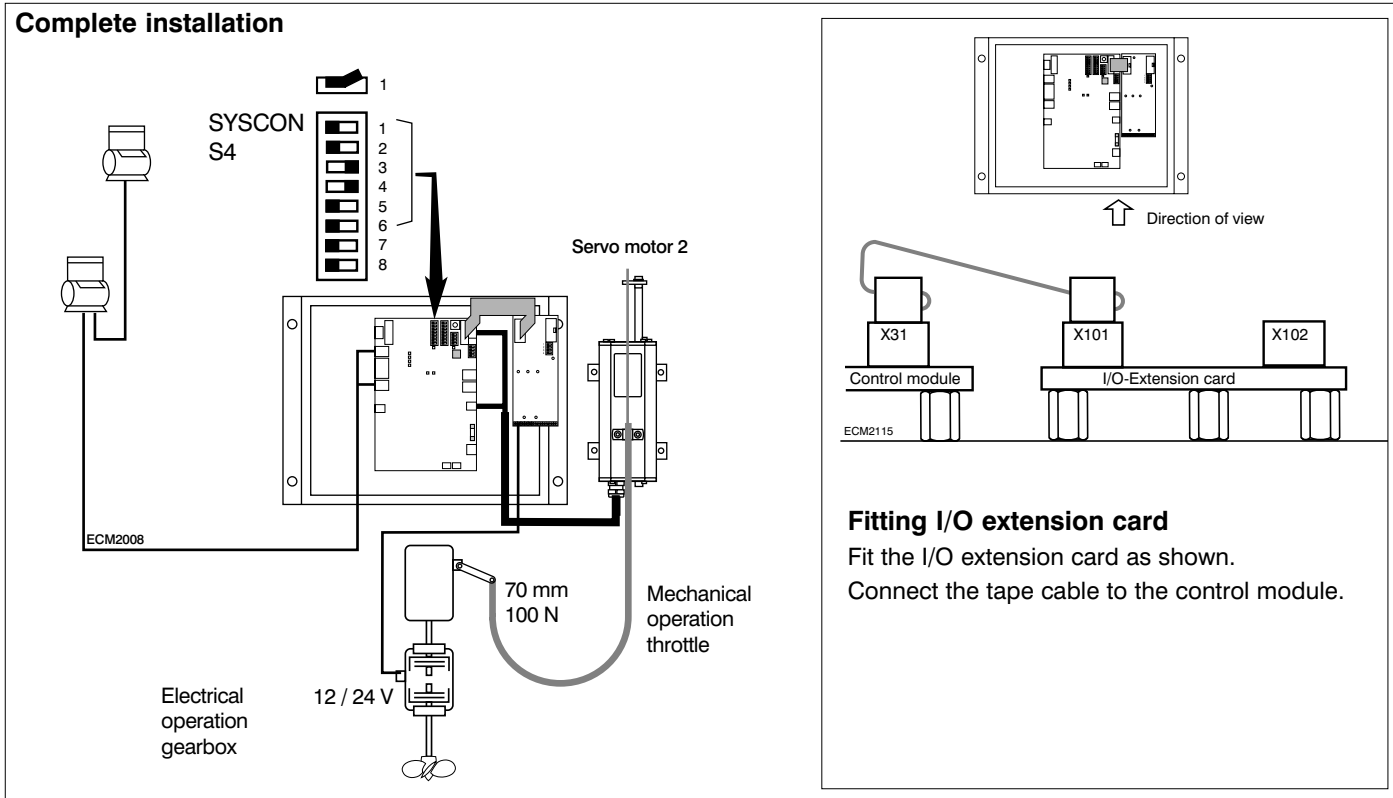
8 Store the parameters by changing to RUN.
To do this change PARSEL (S5) switch back to position 'OPEN'.
Setup LED goes out.



Set the other gearbox position.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional Settings'.

7 Installation with one engine– mechanical throttle, – electrical operation of the gearbox



7.1 System box

Choose an easily accessible position for the system box, with the control module, near the engine.
Do not fit the system box on the engine.

Set the DIP switches of S4 'SYSICON' as shown.



Never change the SYSICON switch positions when the power is connected.

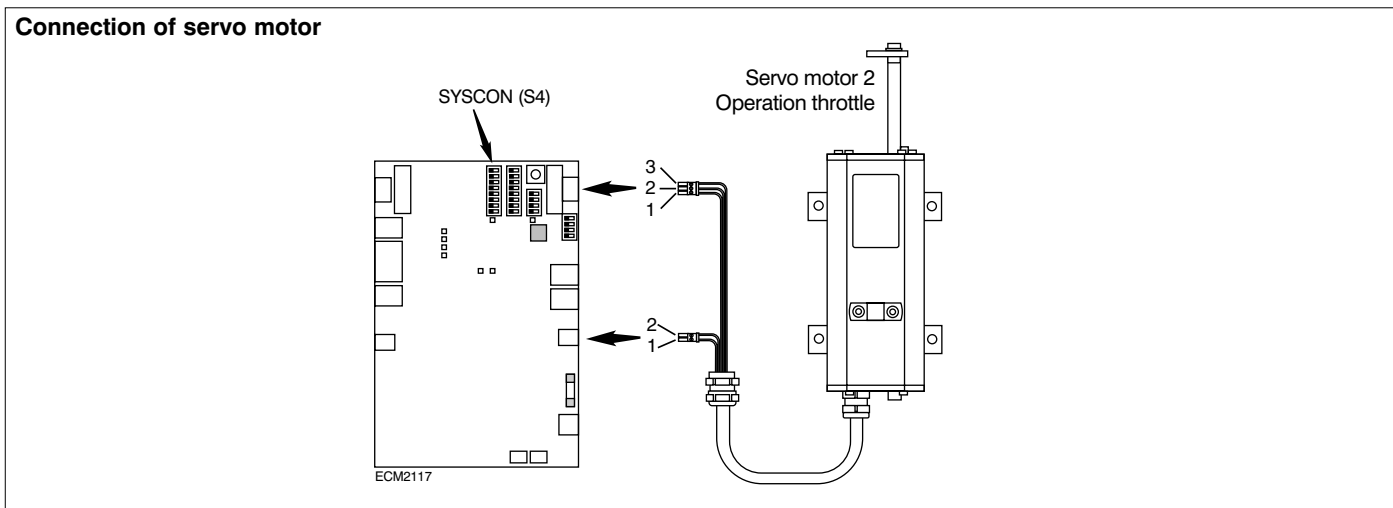
7.2 Servo motor

Position the servo motor directly next to or under the system box.

The servo motor must be connected to the fuel lever (throttle) using Vetus pull-push cables type 33, see 4.5.

The servo motor electrical connecting cable may not be extended.

Connect the servo motor electrical connecting cable to the control module.



7.3 Electrically operated gearbox

Connect a connecting cable from the system box to the gearbox. Use screened cable, LIYCY, 7 x 0.75 mm². Connect as shown in the plans.

In the first plan, without report back of the position reached by the gearbox, the engine remote control does not check whether the clutch has been engaged or not.

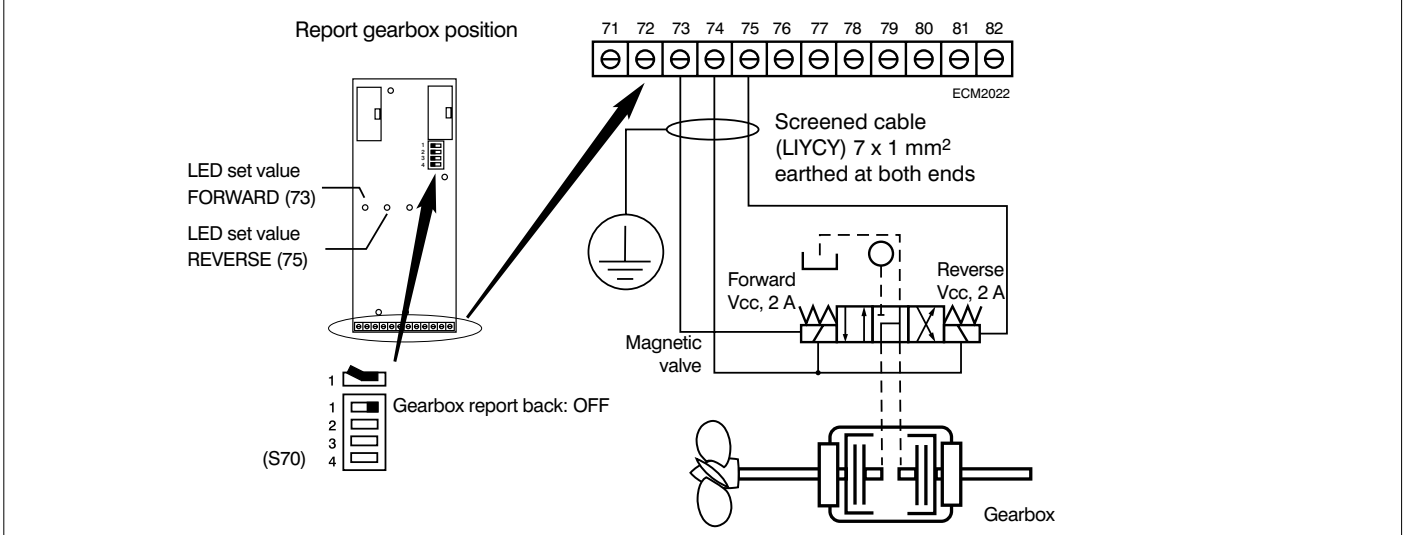
In the other plans there is a check by the engine remote control as to whether the clutch has been engaged or not. The engine

revolutions are then only raised after the clutch has been engaged.

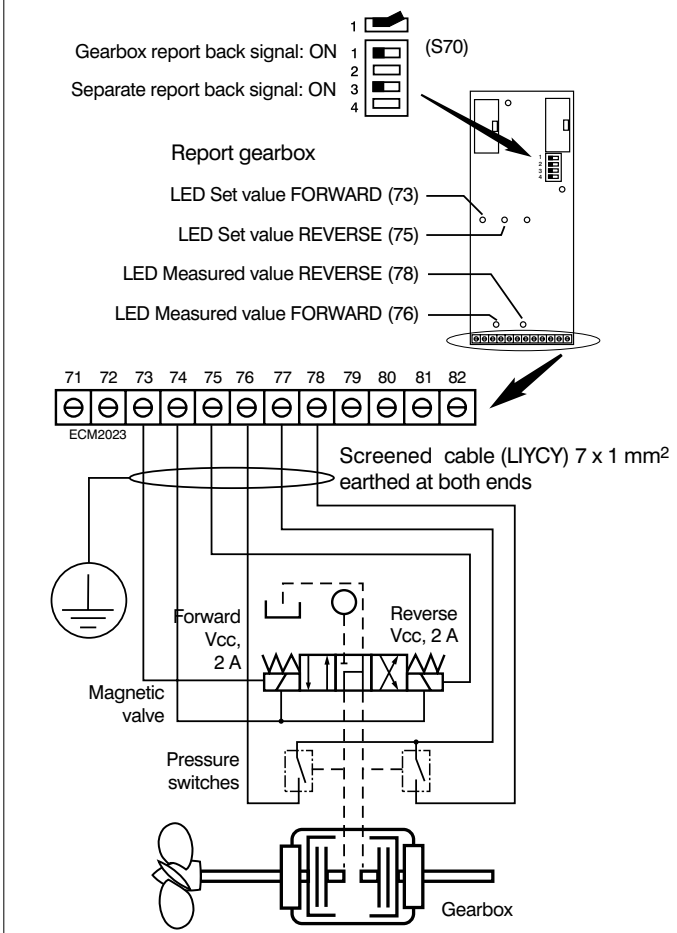
The gearbox must then be fitted with pressure switches which signal whether the desired position has been achieved. Signalling can be separate for forward and reverse or combined.

Set the DIP switch of S70 on the I/O extension card as shown.

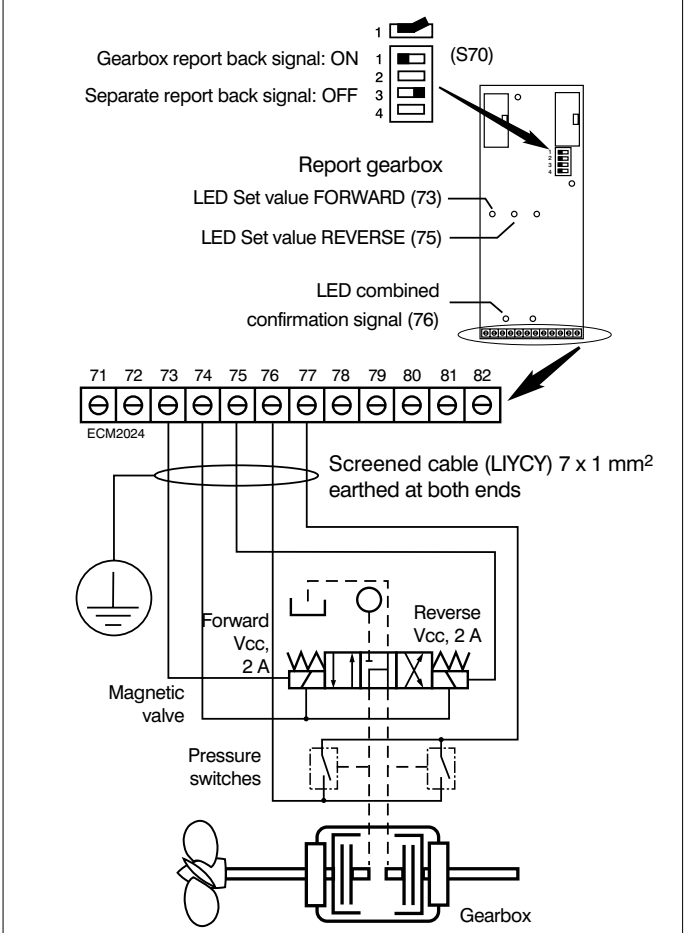
Connections electrically operated gearbox without report back signal



Connections electrically operated gearbox with separate report back signal



Connections electrically operated gearbox with combined report back signal



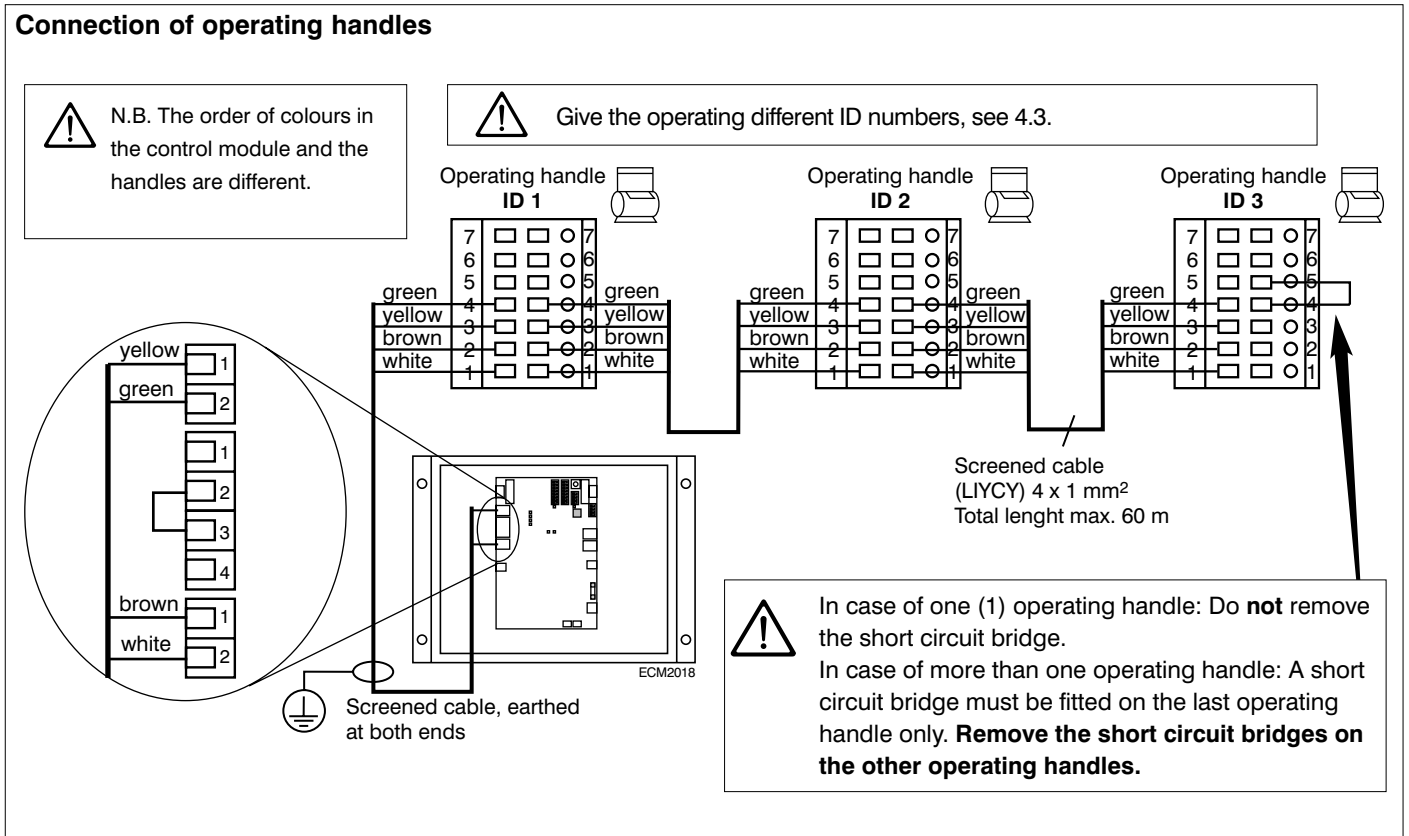
7.4 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use screened cable, LIYCY, 4 x 1 mm² for this.

Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.



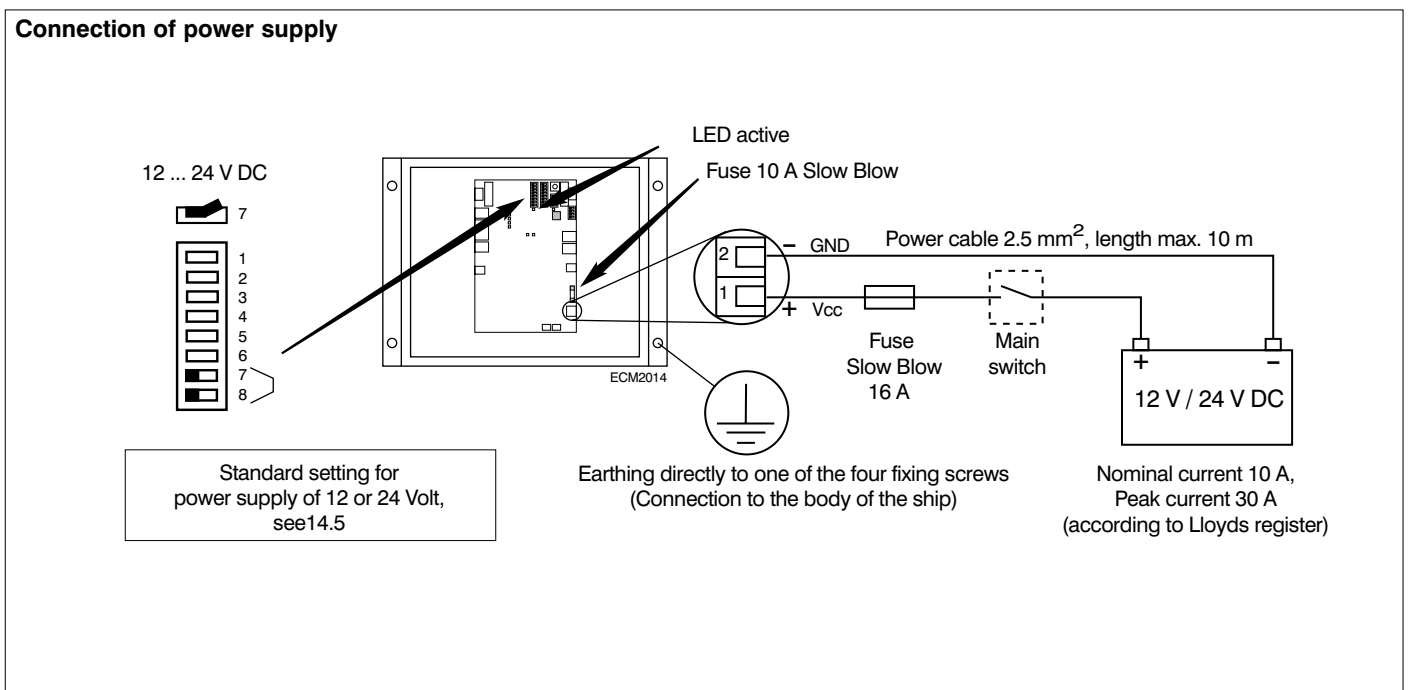
7.5 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current.

Use connecting cable with 2.5 mm² cross-section.

Connect the power supply to the control module as shown in the plan.

See section 14.5 for more information regarding the power supply.



7.6 Power supply for the electrical operation of the gearbox

The control module can supply the power for the electrical operation of the gearbox:



The fuse (F) on the control module does not protect the electrical operation of the gearbox.

A fuse **must** be included in the power cable from the control module.

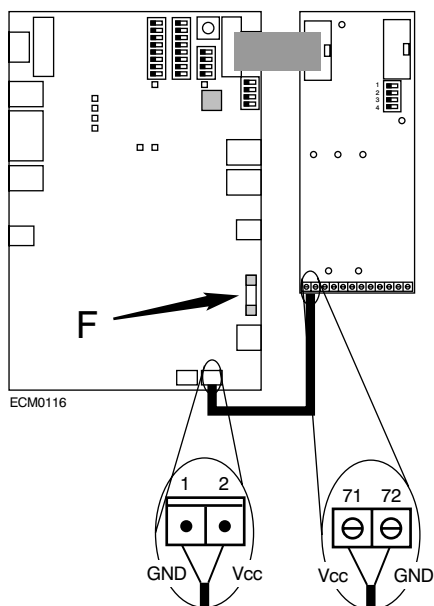
The regulations for the installation can include the requirement that the power supply for the electrical operation of the gearbox must be via a separate direct power supply on the I/O card.

Connect the I/O card as follows:

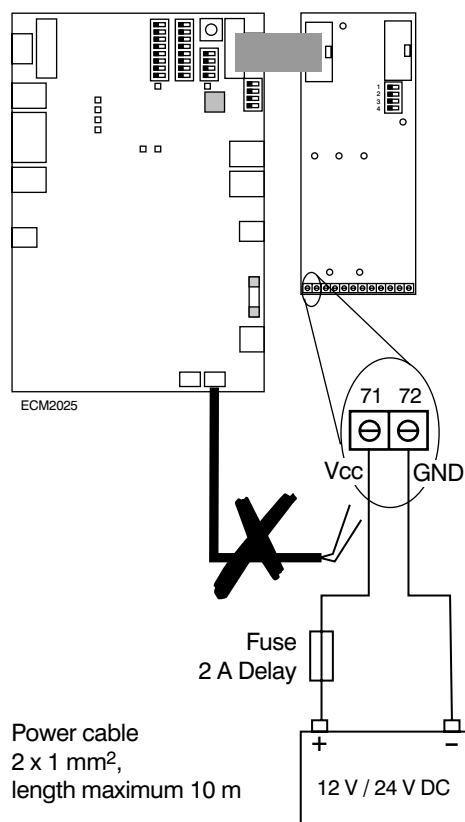


Never connect both connections 71 and 72 at the same time on to the control module too.

Connection of power supply for electrical operation of the gearbox via the control module



Connection of the power supply for the electrical operation of the gearbox by separate supply



7.7 Setting procedure

After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

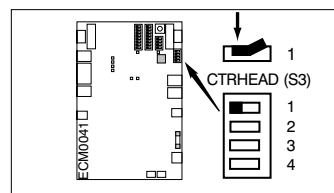
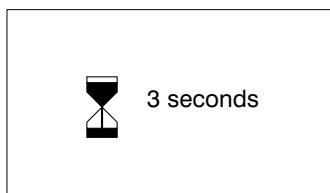
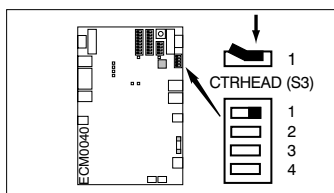
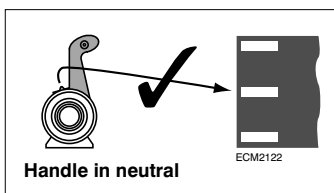
7.7.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered.

The procedure is as follows:

- 1 Check that all operating handles are set to the neutral position.
- 2 Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3 Wait 3 seconds.
- 4 Switch CTRHEAD (S3) switch 1 back to 'open'.

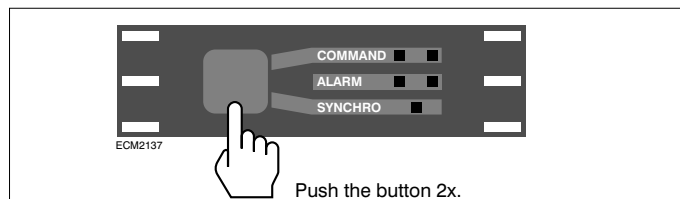
N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.



7.7.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1 Activate a steering position by pushing the button **twice while the handle is set to neutral**.
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



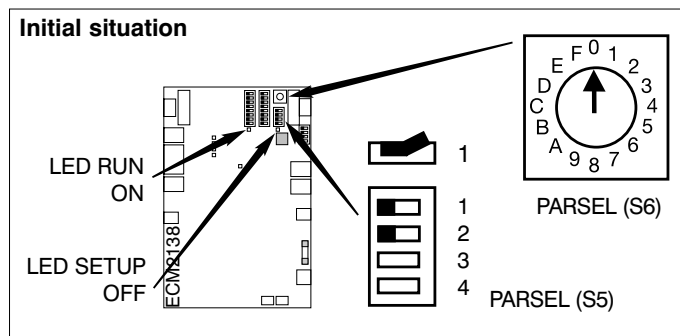
- 2 The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

***) For increased idle speed, see 3.5.

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or
Increased*)	Position A	Idle forward or
Increased idle **)	Position B	Idle reverse
Maximum	Position 2	Neutral or Full power forward or Full power reverse

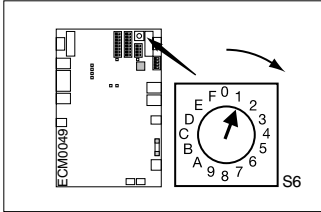
- 3 The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



4 Choose a number of revolutions to set.

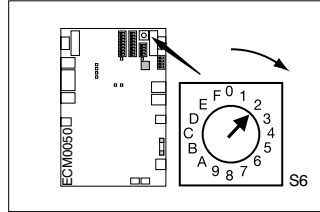
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



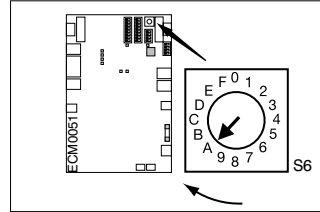
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



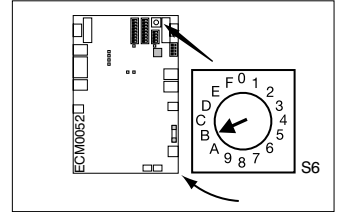
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle speed.

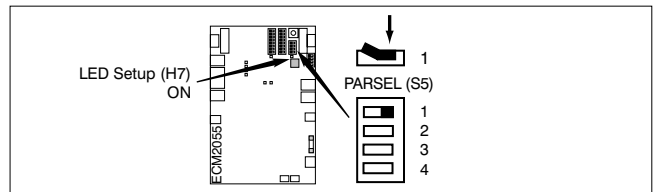
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The servo motor will be moved to the last position set and Setup LED (H7) lights up.

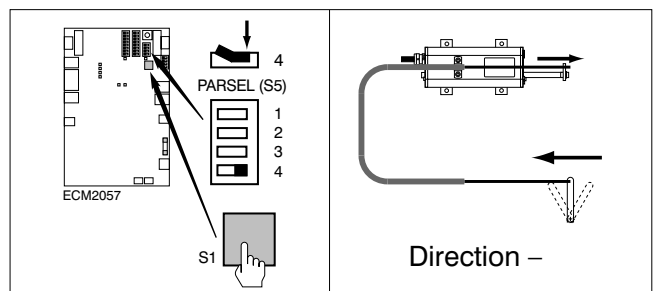
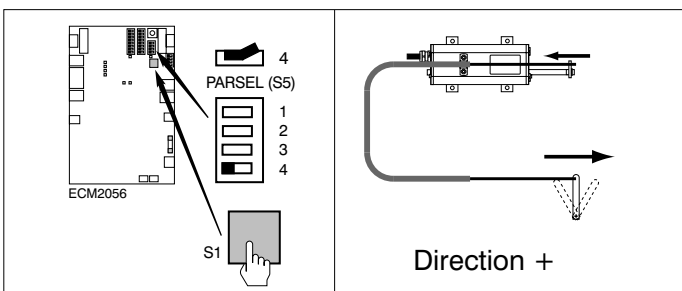


6 Set the servo motor in the right position for the required revolutions.

The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.

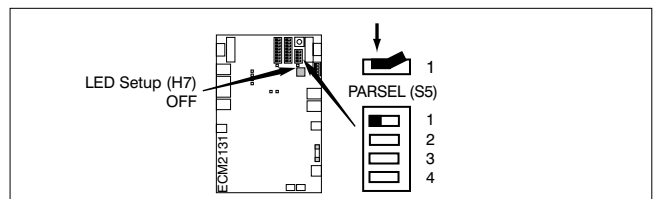


After switching PARSEL (S5) over an automatic revolutions change can occur.



7 Store the parameters by changing to RUN.
To do this put PARSEL switch (S5) back to the 'OPEN' position.
Setup LED goes out.

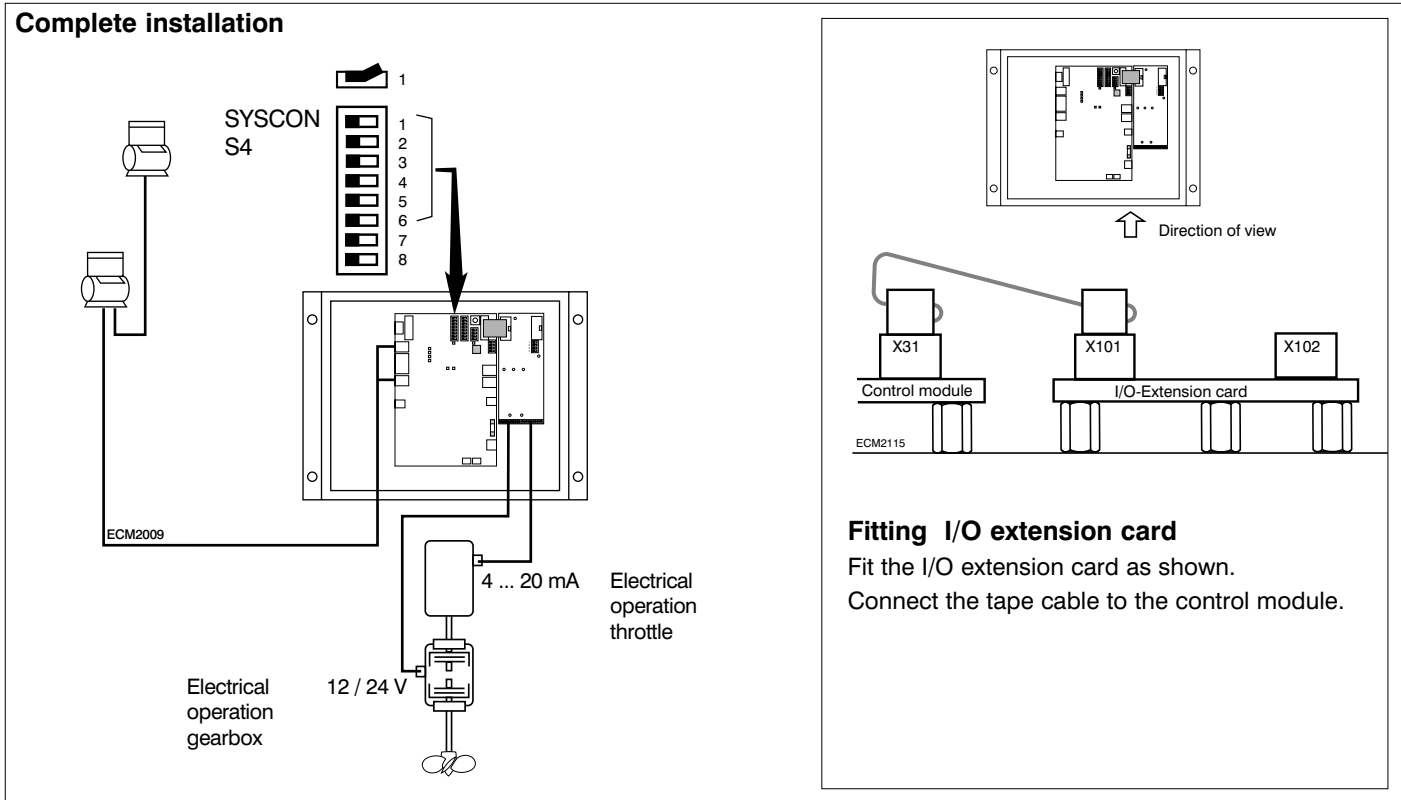
Set another number of revolutions.



'Forward' and 'Reverse' do not have to be set for the electrically operated gearbox.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional settings'.

8 Installation with one engine - electrical throttle (4 ... 20 mA), - electrical operation of the gearbox



8.1 System box

Choose an easily accessible position for the system box, with the control module, near the engine.
Do not fit the system box on the engine.

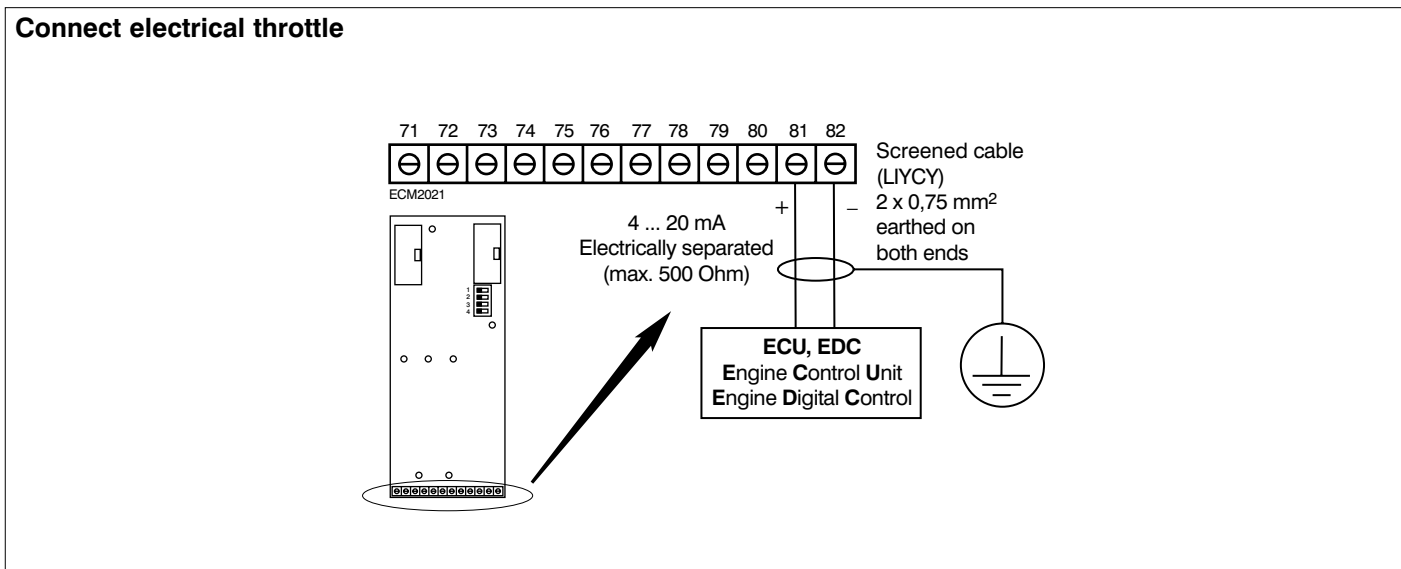
Set the DIP switches of S4 'SYSCON' as shown.



Never change the SYSCON switch positions when the power is connected.

8.2 Electrical throttle

Connect the engine to the system box using a connection cable, LIYCY, 2 x 0.75 mm². Connect as shown in the plan.



8.3 Electrically operated gearbox

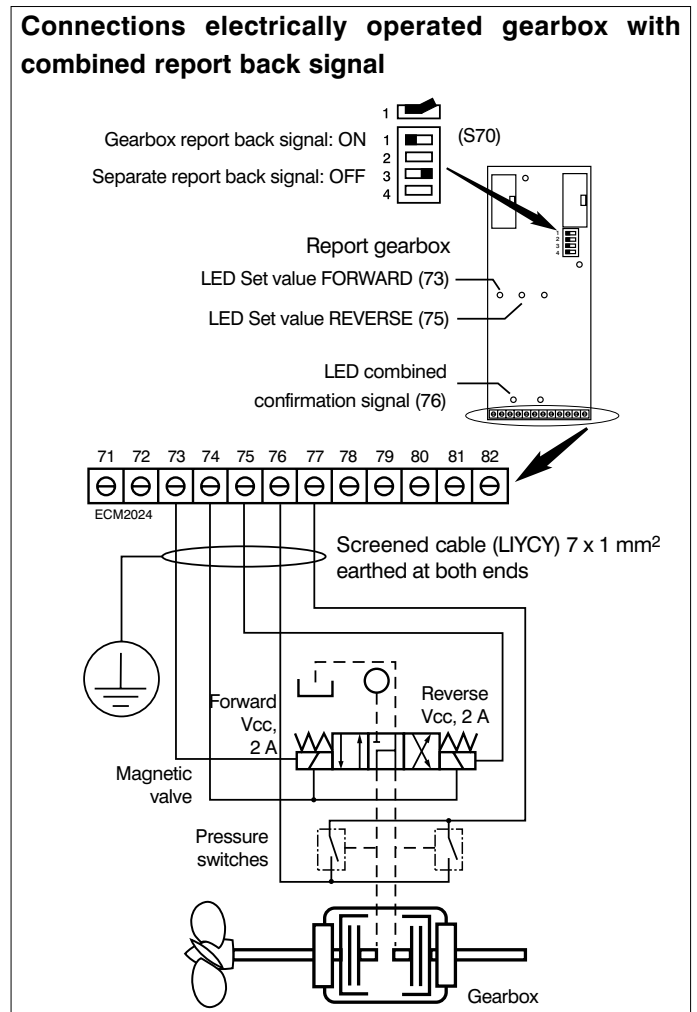
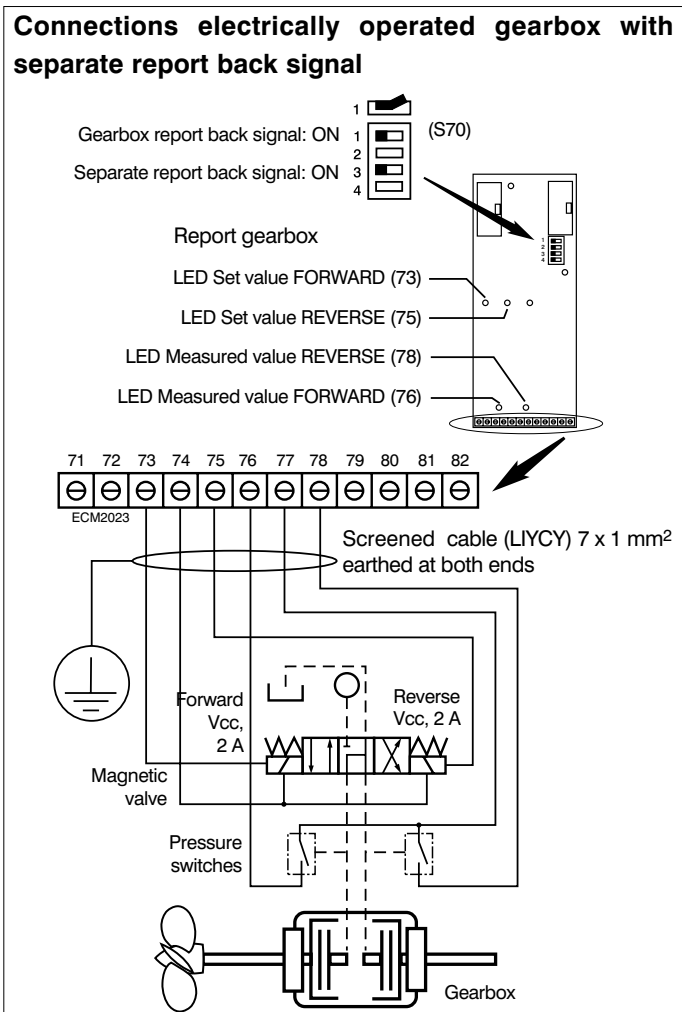
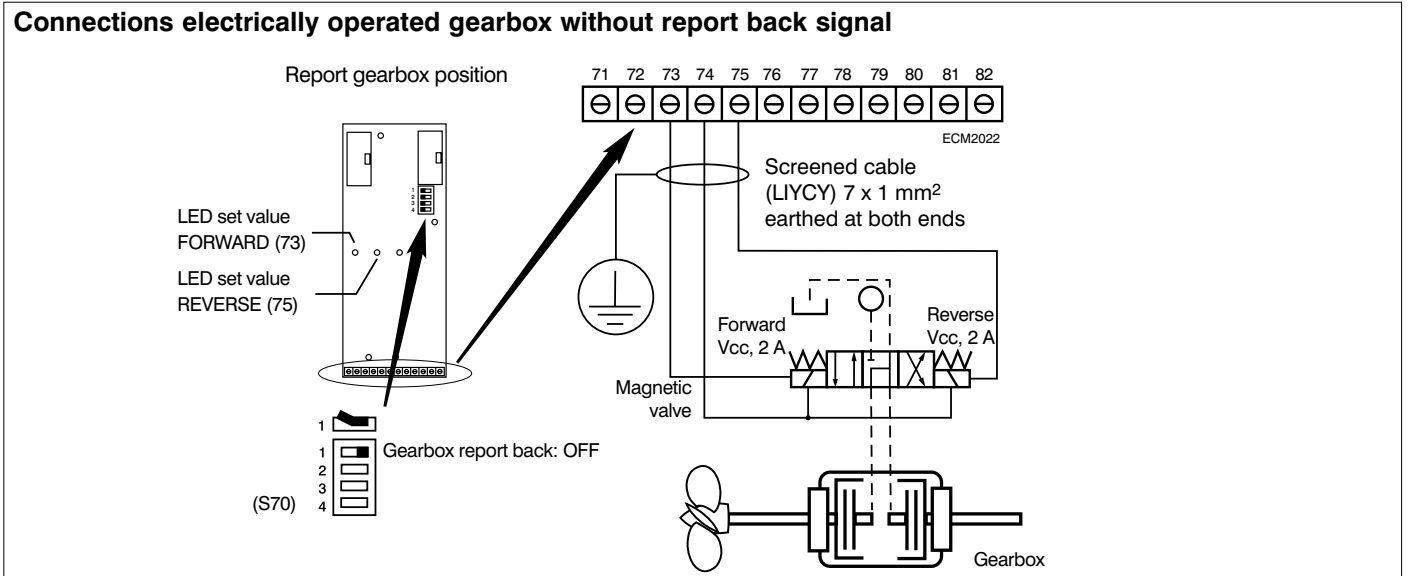
Connect a connecting cable from the system box to the gearbox. Use screened cable, LIYCY, 7 x 0.75 mm². Connect as shown in the plans.

In the first plan, without report back of the position reached by the gearbox, the engine remote control does not check whether the clutch has been engaged or not.

In the other plans there is a check by the engine remote control as to whether the clutch has been engaged or not. The engine

revolutions are then only raised after the clutch has been engaged. The gearbox must then be fitted with pressure switches which signal whether the desired position has been achieved. Signalling can be separate for forward and reverse or combined.

Set the DIP switch of S70 on the I/O extension card as shown.



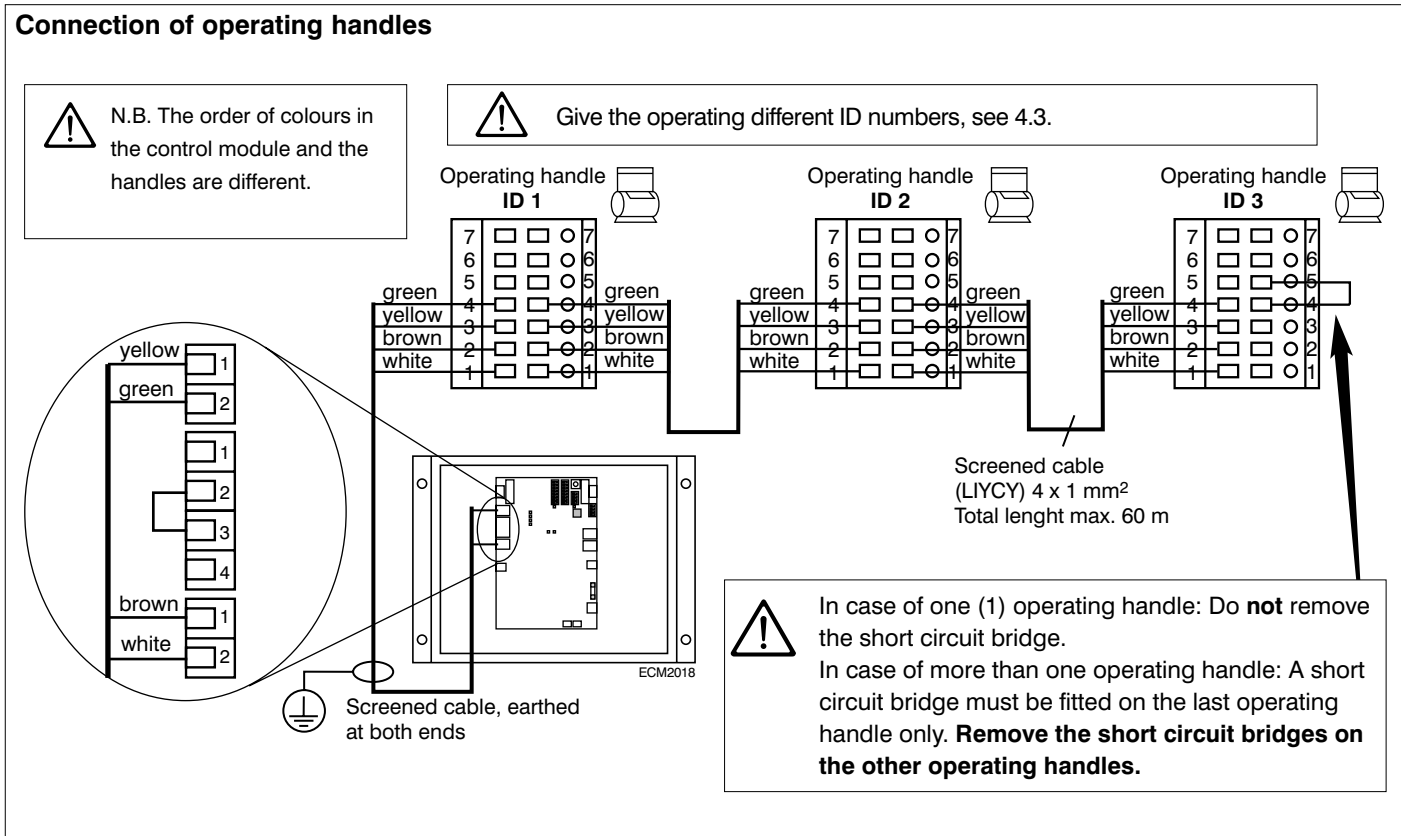
8.4 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use screened cable, LIYCY, 4 x 1 mm² for this.

Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.



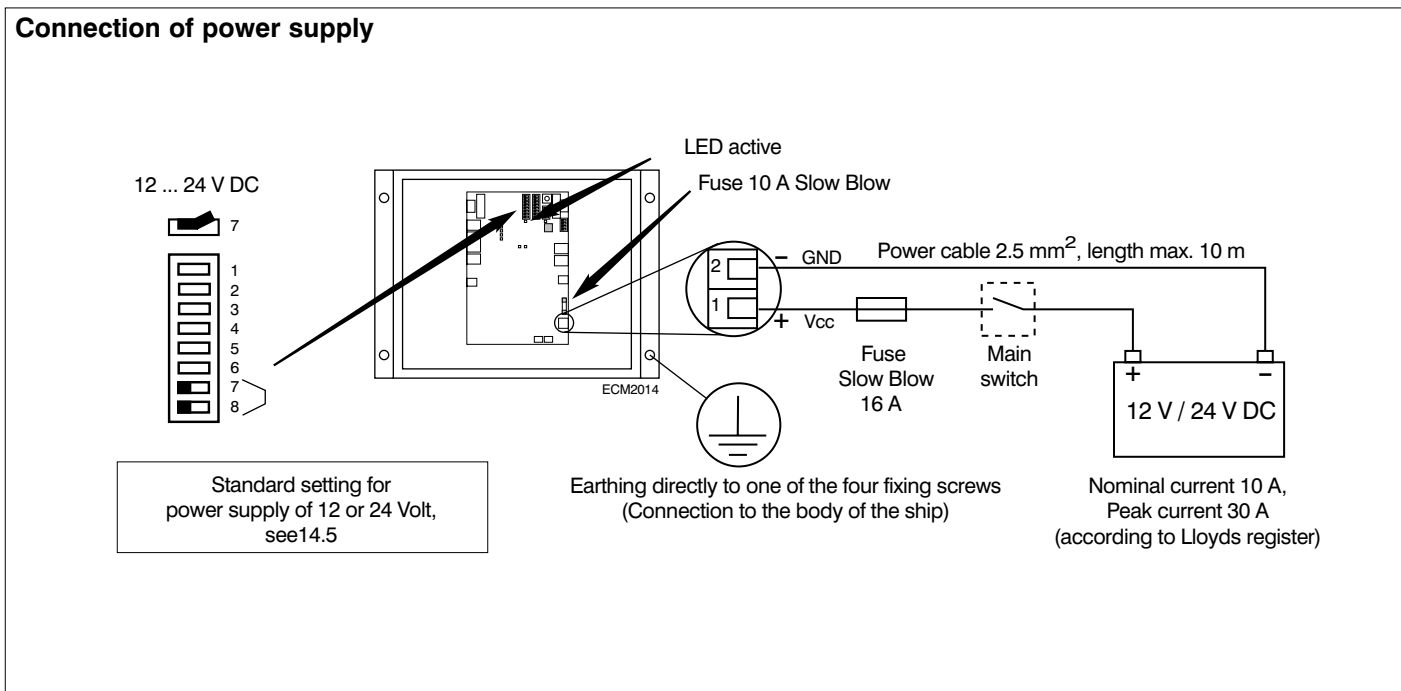
8.5 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current.

Connect the power supply to the control module as shown in the plan.

Use connecting cable with 2.5 mm² cross-section.

See section 14.5 for more information regarding the power supply.



8.6 Power supply for the electrical operation of the gearbox

The control module can supply the power for the electrical operation of the gearbox:



The fuse (F) on the control module does not protect the electrical operation of the gearbox.

A fuse **must** be included in the power cable from the control module.

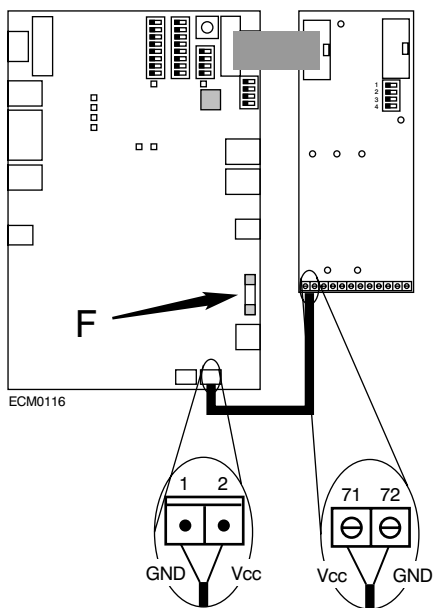
The regulations for the installation can include the requirement that the power supply for the electrical operation of the gearbox must be via a separate direct power supply on the I/O card.

Connect the I/O card as follows:

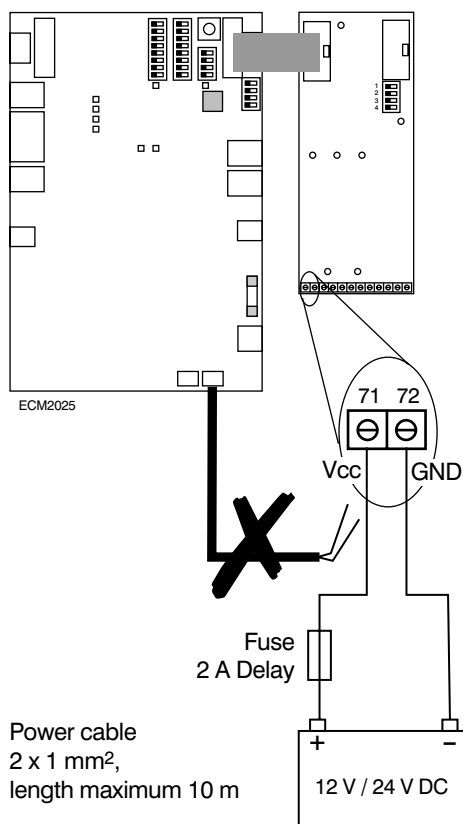


Never connect both connections 71 and 72 at the same time on to the control module too.

Connection of power supply for electrical operation of the gearbox via the control module



Connection of the power supply for the electrical operation of the gearbox by separate supply



8.7 Setting procedure

After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

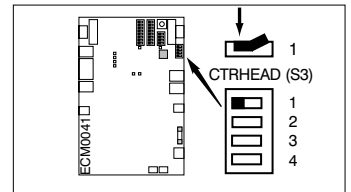
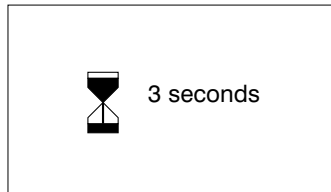
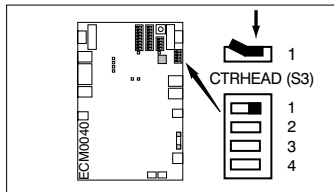
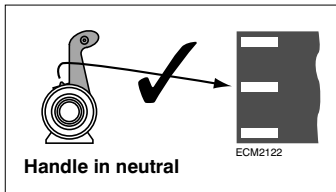
8.7.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered.

The procedure is as follows:

N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.

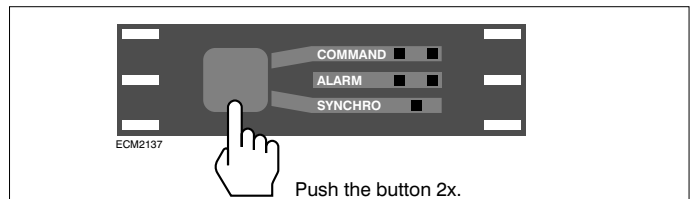
- 1** Check that all operating handles are set to the neutral position.
- 2** Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3** Wait 3 seconds
- 4** Switch CTRHEAD (S3) switch 1 back to 'open'.



8.7.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1** Activate a steering position by pushing the button **twice while the handle is set to neutral.**
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



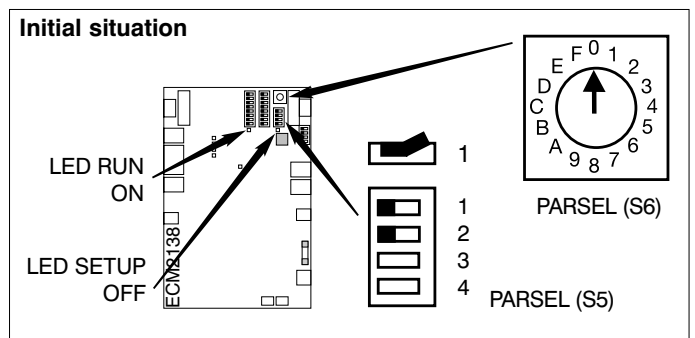
- 2** The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

***) For increased idle speed, see 3.5.

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or
Increased*)	Position A	Idle forward or
Increased idle **)	Position B	Idle reverse
Maximum	Position 2	Neutral or Full power forward or Full power reverse

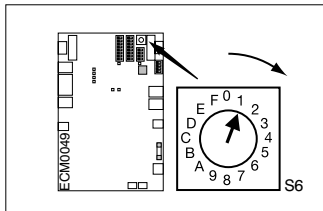
- 3** The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



4 Choose a number of revolutions to set.

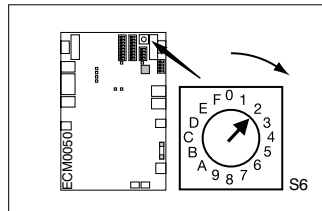
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



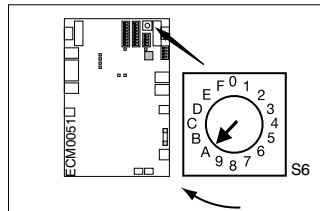
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



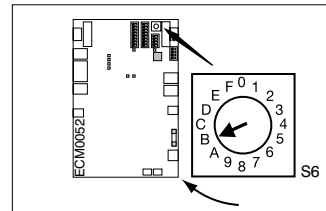
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle speed.

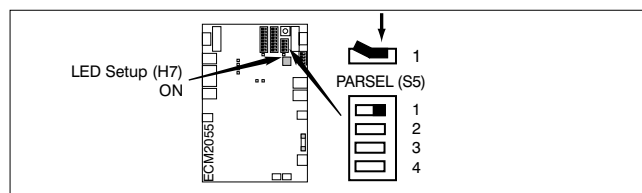
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The 4 to 20 mA signal will be set to the last entered value and Setup LED (H7) lights up.

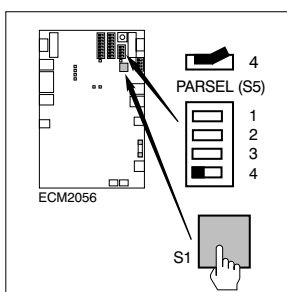


6 Set the 4 – 20 mA signal to the correct value for the required revolutions.

The setting changes as long as you hold the button pushed in or until the limit value is reached. The change is very slow, moving through the total range takes about 28 sec.

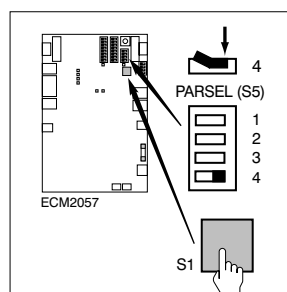


After switching PARSEL (S5) over an automatic revolutions change can occur.



4 ⇒ 20 mA

Direction +

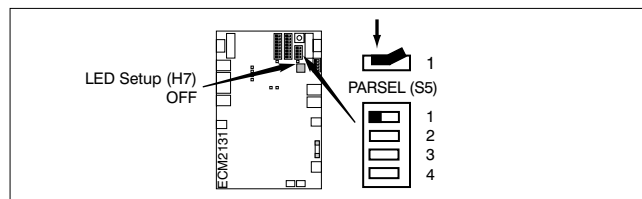


20 ⇒ 4 mA

Direction -

7 Store the parameters by changing to RUN.
To do this put PARSEL switch (S5) back to the 'OPEN' position.
Setup LED goes out.

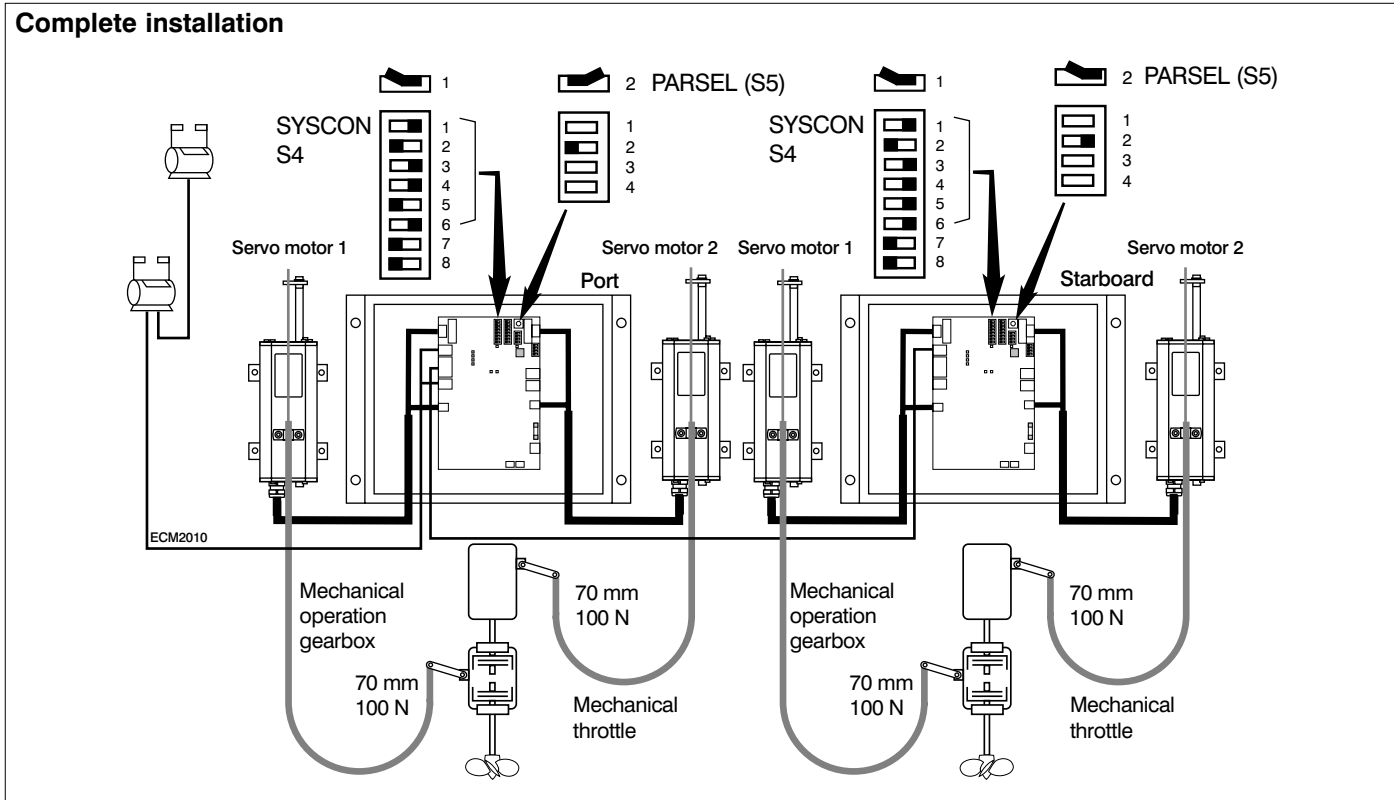
Set another number of revolutions.



'Forward' and 'Reverse' do not have to be set for the electrically operated gearbox.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional settings'.

9 Installation with 2 engines – mechanical throttle, – mechanical operation of the gearbox



9.1 System boxes

Choose an easily accessible position for the system boxes, with the control modules, near the engine.

Set the DIP switches of S4 'SYSCON' in both system boxes as shown.

Do not fit the system boxes on the engine.



Never change the SYSCON switch positions when the power is connected.

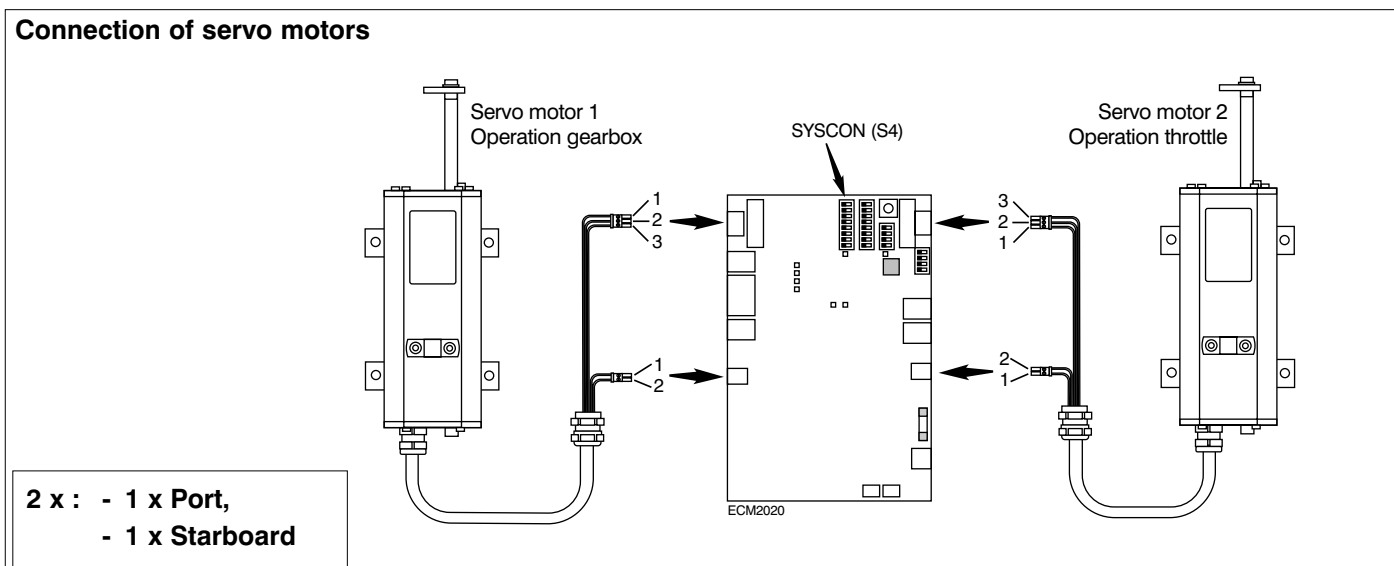
9.2 Servo motors

Position the servo motors directly next to or under the system boxes.

The servo motors must be connected to the fuel lever (throttle) using Vetus pull-push cables type 33, see 4.5.

The servo motor electrical connecting cables may not be extended.

Connect the servo motor electrical connecting cables to the control modules.



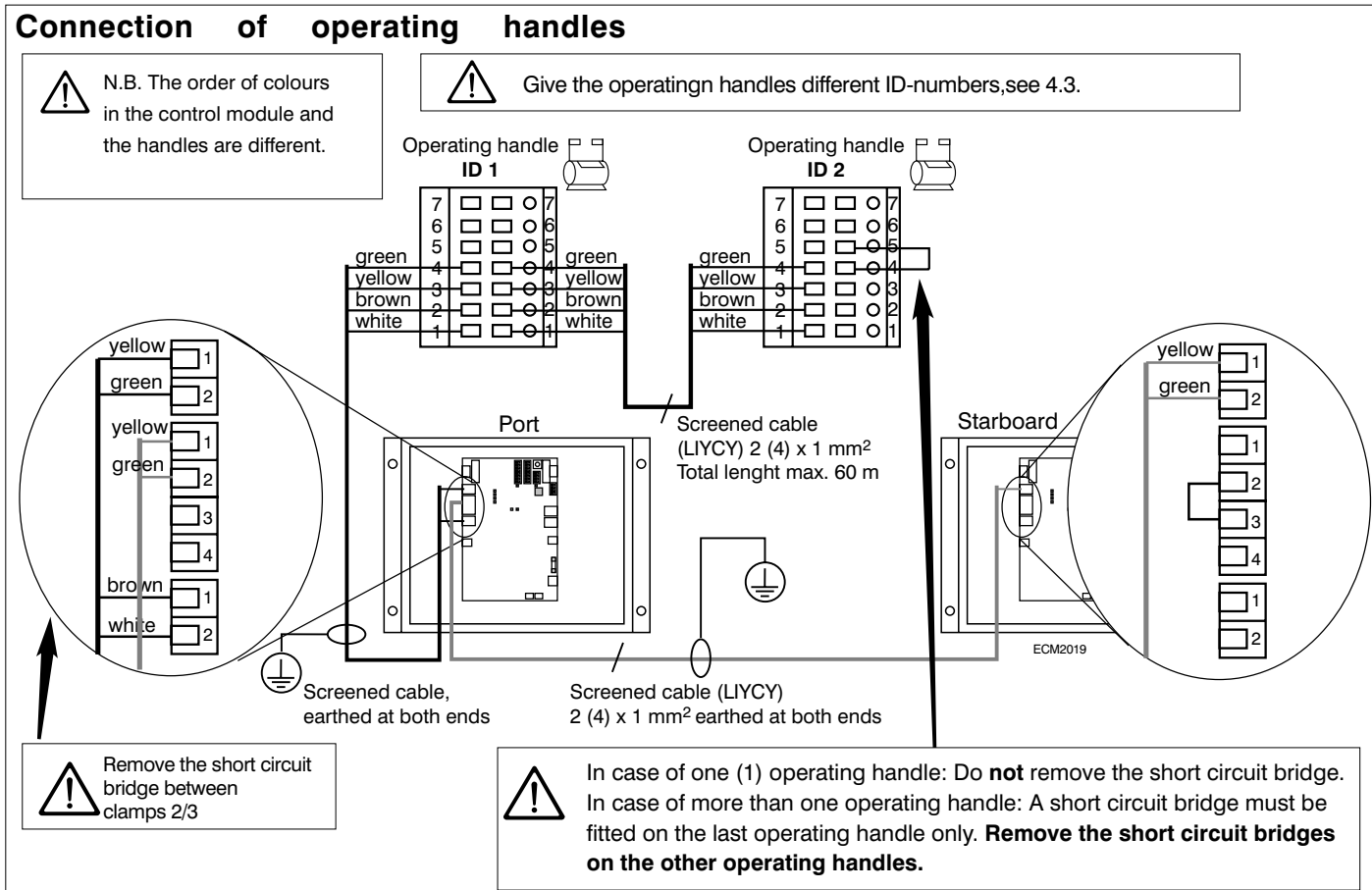
9.3 Operating handles

Connect a cable from the **port** system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on. Also connect a cable between the port and starboard system boxes.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.

Use screened cable, LIYCY, 4 x 1 mm² for this.

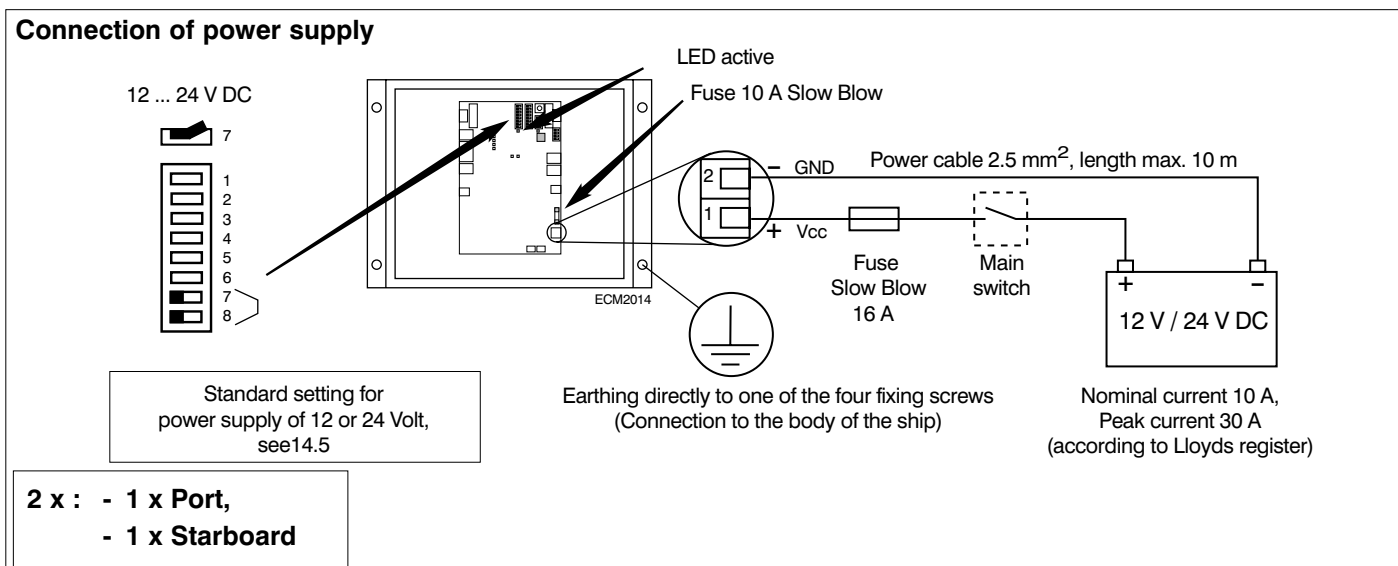


9.4 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current. Use connecting cable with 2.5 mm² cross-section.

Connect the power supply to the control module as shown in the plan.

See section 14.5 for more information regarding the power supply.



9.5 Setting procedure

After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

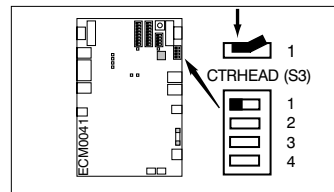
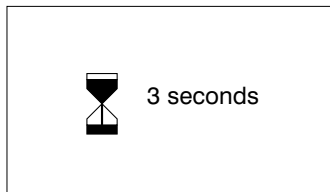
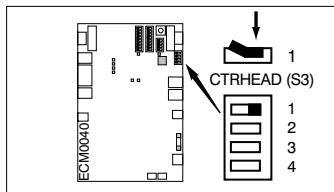
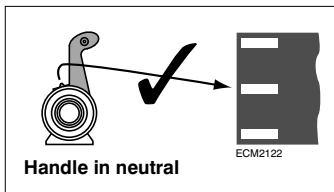
N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.

9.5.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered.

The procedure for both system boxes (port and starboard) is as follows:

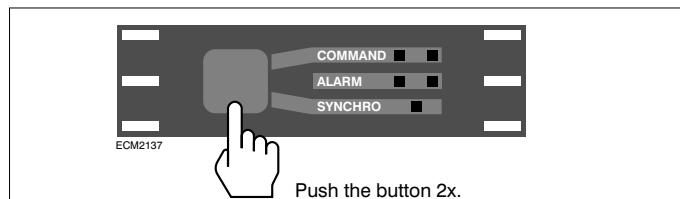
- 1** Check that all operating handles are set to the neutral position.
- 2** Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3** Wait 3 seconds
- 4** Switch CTRHEAD (S3) switch 1 back to 'open'.



9.5.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1** Activate a steering position by pushing the button **twice while the handle is set to neutral**.
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



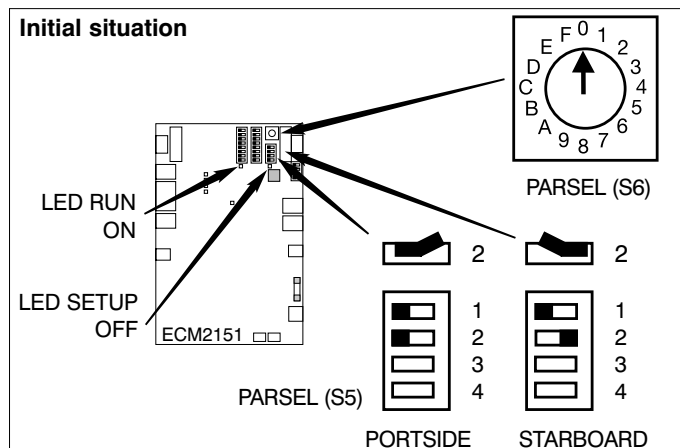
- 2** The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

***) For increased idle speed, see 3.5.

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or
Increased*)	Position A	Idle forward or
Increased idle **)	Position B	Idle reverse
Maximum	Position 2	Neutral or Full power forward or Full power reverse

- 3** The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the correct position in both cabinets.

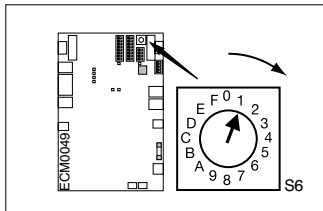


Carry out steps 4 to 7 in both system boxes for the port and starboard engines respectively.

4 Select a position to be set.

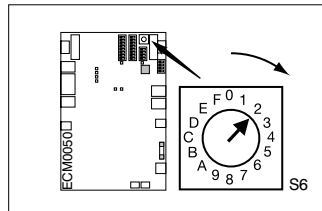
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



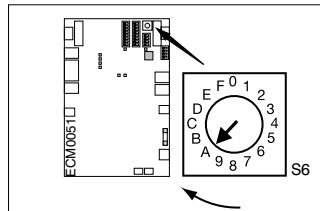
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



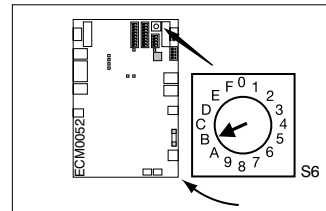
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle speed.

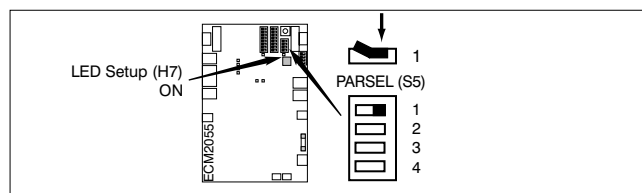
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The servo motor will be moved to the last position set and Setup LED (H7) lights up.

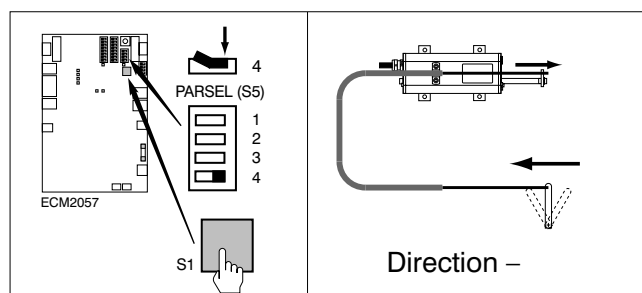
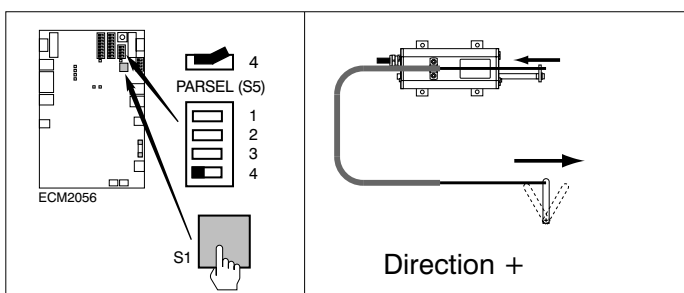


6 Set the servo motor in the right position for the required revolutions.

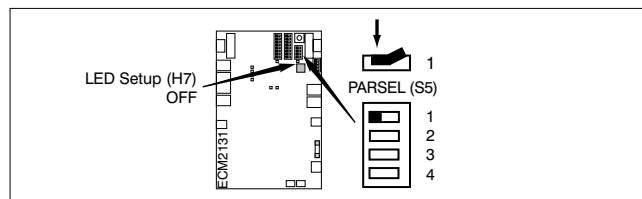
The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



After switching PARSEL (S5) over an automatic revolutions change can occur.



7 Store the parameters by changing to RUN.
To do this put PARSEL switch (S5) back to the 'OPEN' position.
Setup LED goes out.

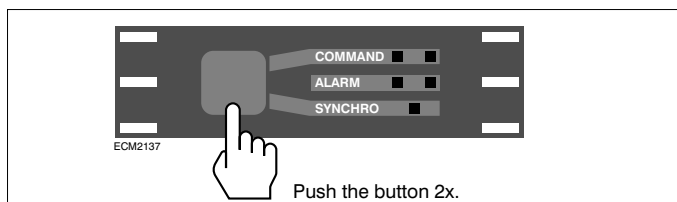


Set another number of revolutions.

9.5.3 Setting the gearbox

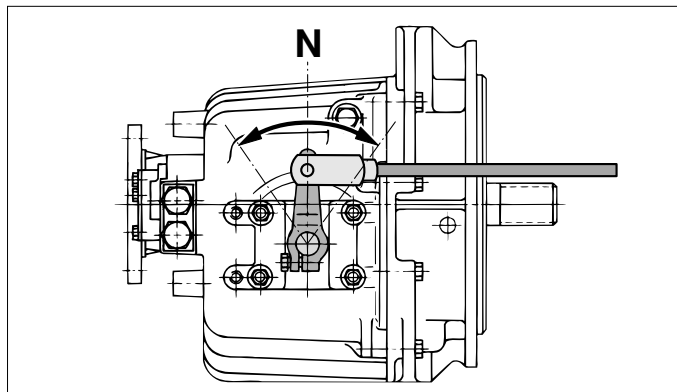
First activate a steering position if one is not already active.

- 1 Activate a steering position by pushing the button **twice while the operating handle is set to neutral**. After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



- 2 **Neutral cannot be set electronically and must be set mechanically.**

Therefore set the pull-push cable on the side of the servo motor and on the side of the gearbox such that when the handle of the active steering position is set to neutral the gearbox is also in neutral.



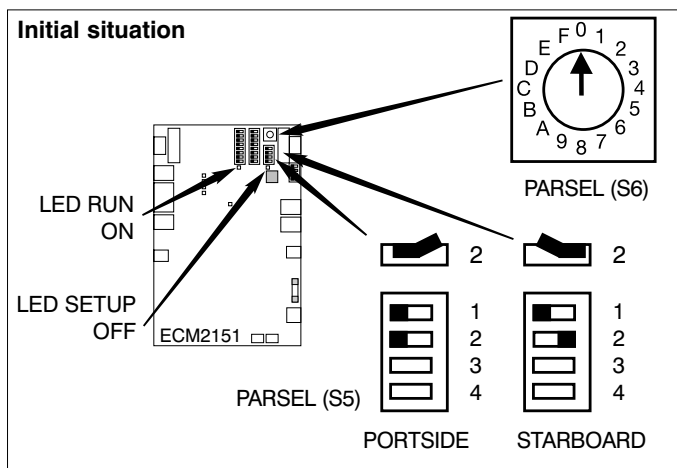
- 3 'Forward' and 'Reverse' settings can be made in random order once the engine remote control is switched on and a steering position has been activated.



Only change these settings with the engine switched off.

Gearbox position	PARSEL selector switch (S6)	Operating handle set to:
Forward	Position 4	Neutral or Forward
Reverse	Position 6	Neutral or Reverse

- 4 The PARSEL selector switch (S6) is used to determine which position is set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.

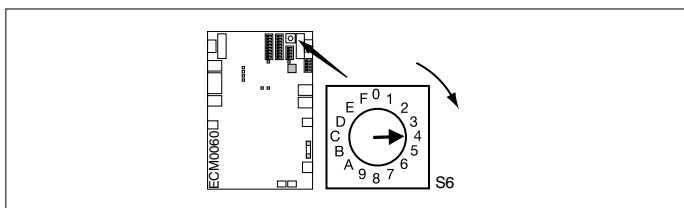


Carry out steps 5 to 8 in both system boxes for the port and starboard engines respectively.

5 Select a position to be set.

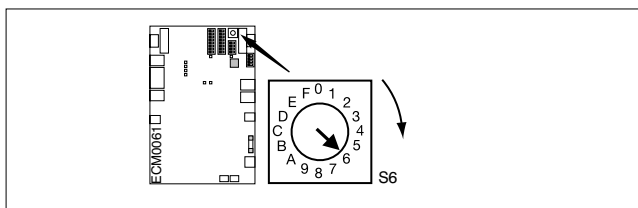
Setting position 'Forward'

Set PARSEL selector switch (S6) to position 4.



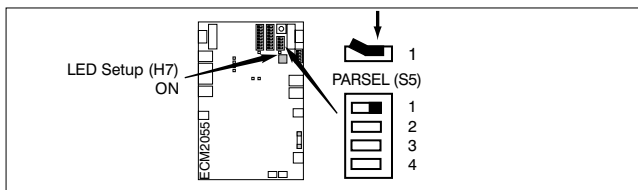
Setting position 'Reverse'

Set PARSEL selector switch to position 6.



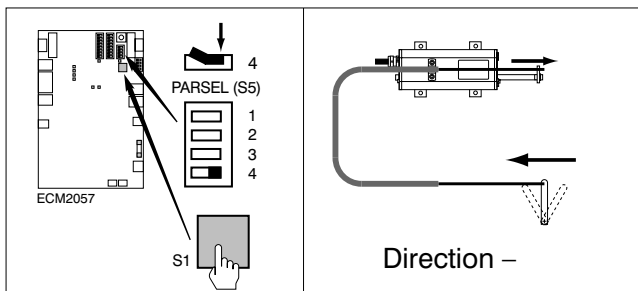
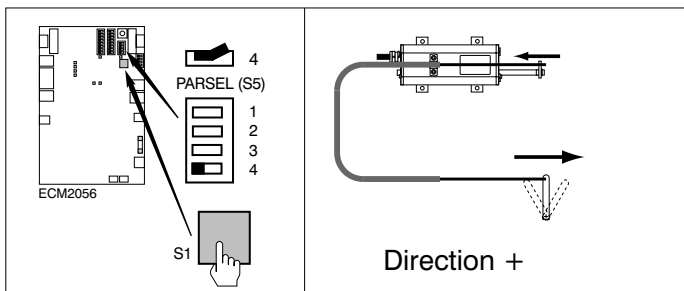
6 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The servo motor will be moved to the last position set and Setup LED (H7) lights up.

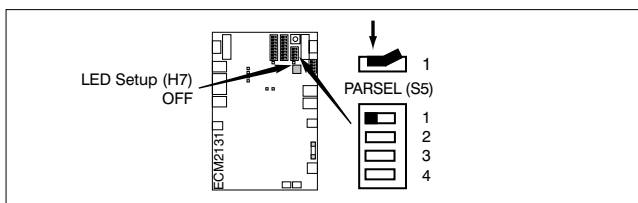


During step 6 the setting of the gearbox can be changed automatically. Therefore the engine must be switched off.

7 Set the servo motor correctly for forward or reverse.
The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



8 Store the parameters by changing to RUN.
To do this change PARSEL (S5) switch back to position 'OPEN'.
Setup LED goes out.

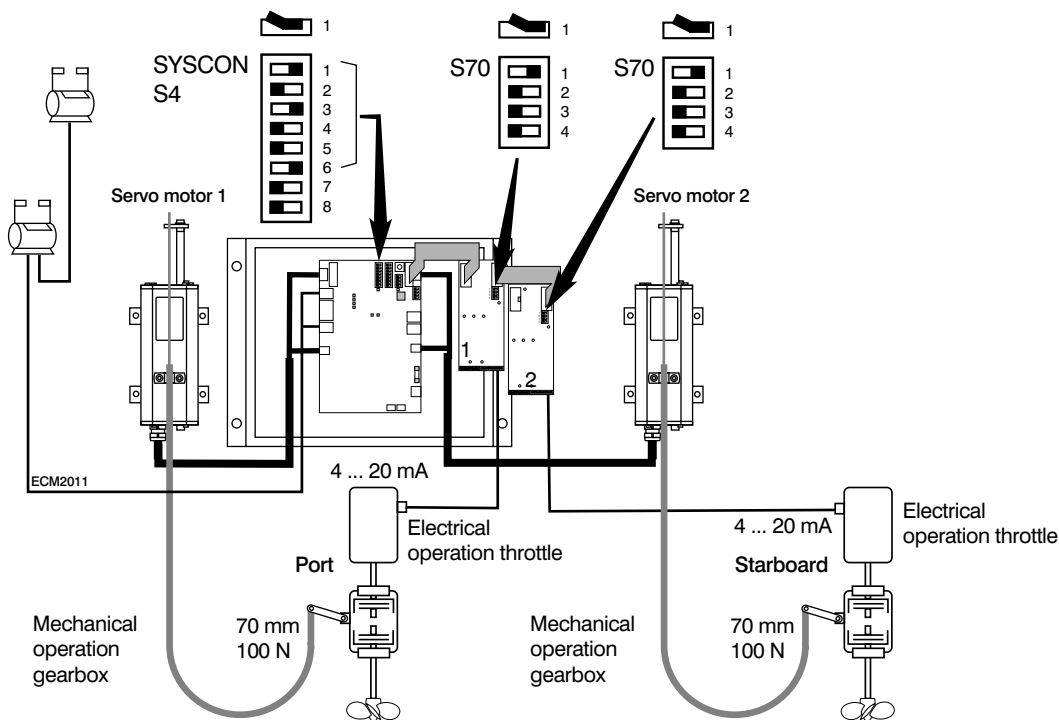


Set the other gearbox position.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional settings'.

10 Installation with 2 engines – electrical throttle (4 ... 20 mA), mechanical operation of the gearbox

Complete installation



I/O extension cards

Fit the I/O extension cards as shown.

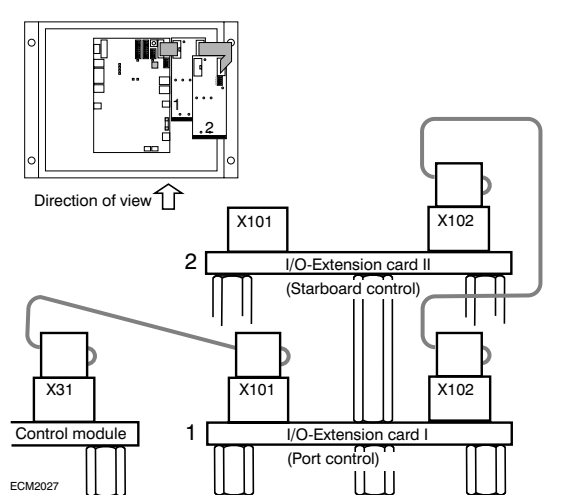
Connect the tape cable from I/O extension card 1 to the control module.

Connect the tape cable from I/O extension card 2 on to I/O extension card 1.

Remove the 2 wires with the 2 pole push connector already fitted from connections 71 and 72 on both I/O extension cards. These wires are not needed for this application.

Set the DIP switches of S70 as shown.

Fitting the I/O extension cards



10.1 System box

Choose an easily accessible position for the system box, with the control module, near the engine.

Do not fit the system box on the engine.

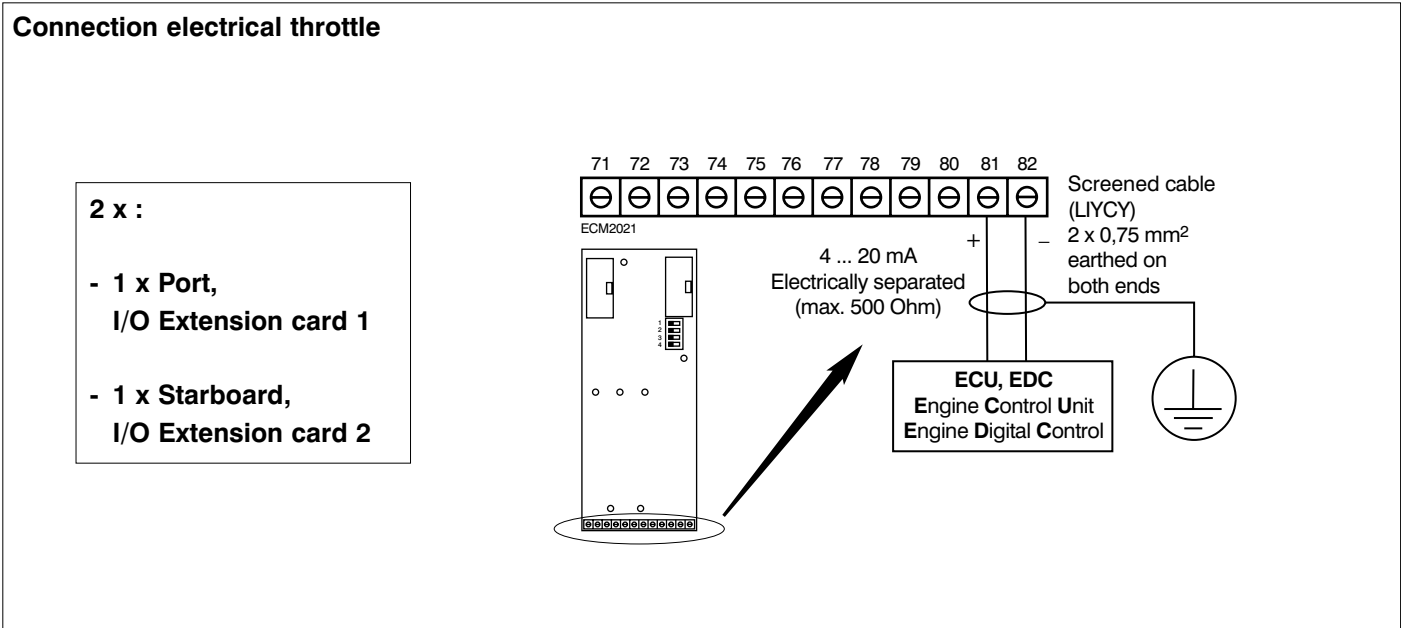
Set the DIP switches of S4 'SYSCON' as shown.



Never change the SYSCON switch positions when the power is connected.

10.2 Electrical throttle

Connect the engines to the system box using connection cables, LIYCY, 2 x 0.75 mm². Connect as shown in the plan.



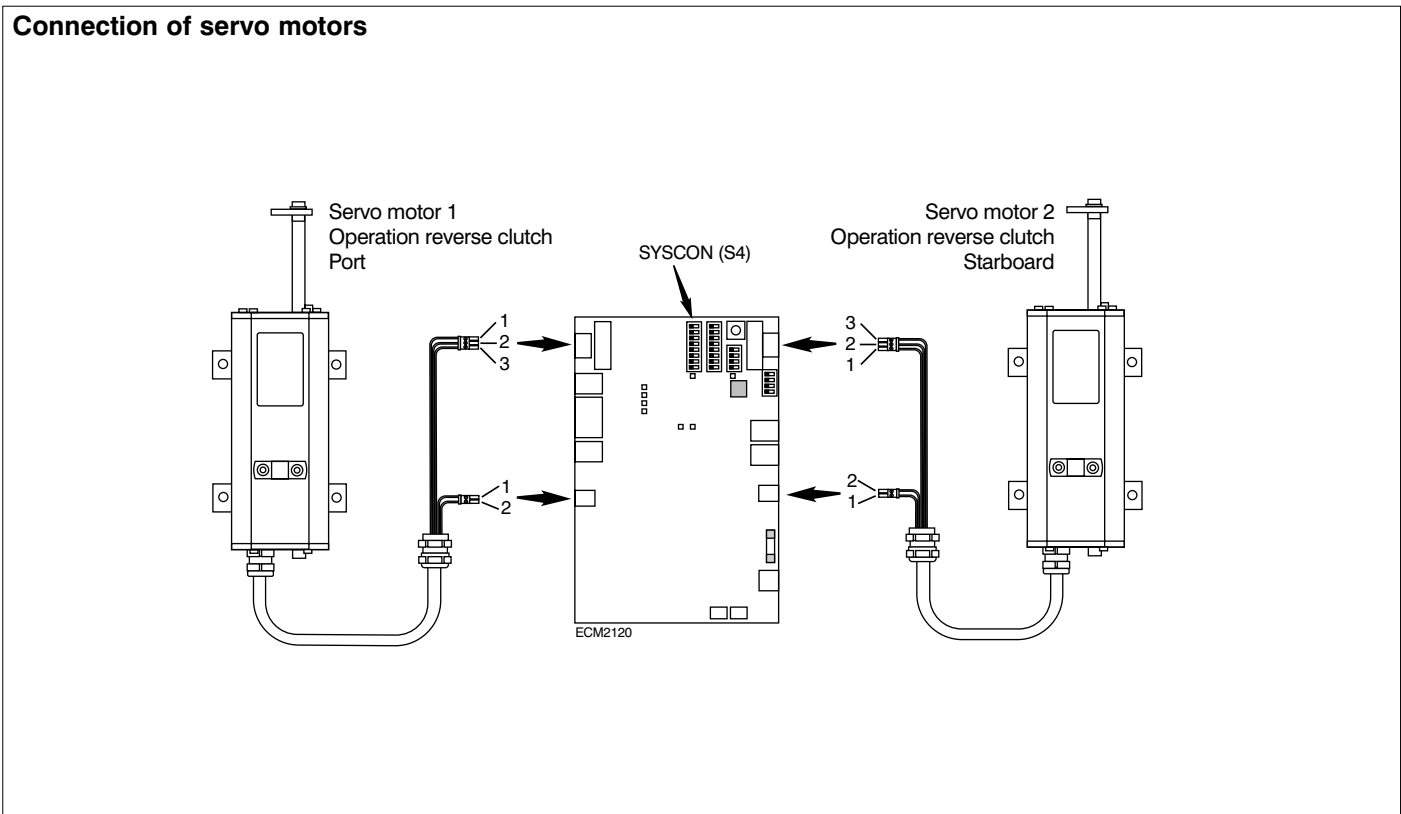
10.3 Servo motors

Position the servo motors directly next to or under the system boxes.

The servo motors must be connected to the fuel lever (throttle) using Vetus pull-push cables type 33, see 4.5.

The servo motor electrical connecting cables may not be extended.

Connect the servo motor electrical connecting cables to the control module.



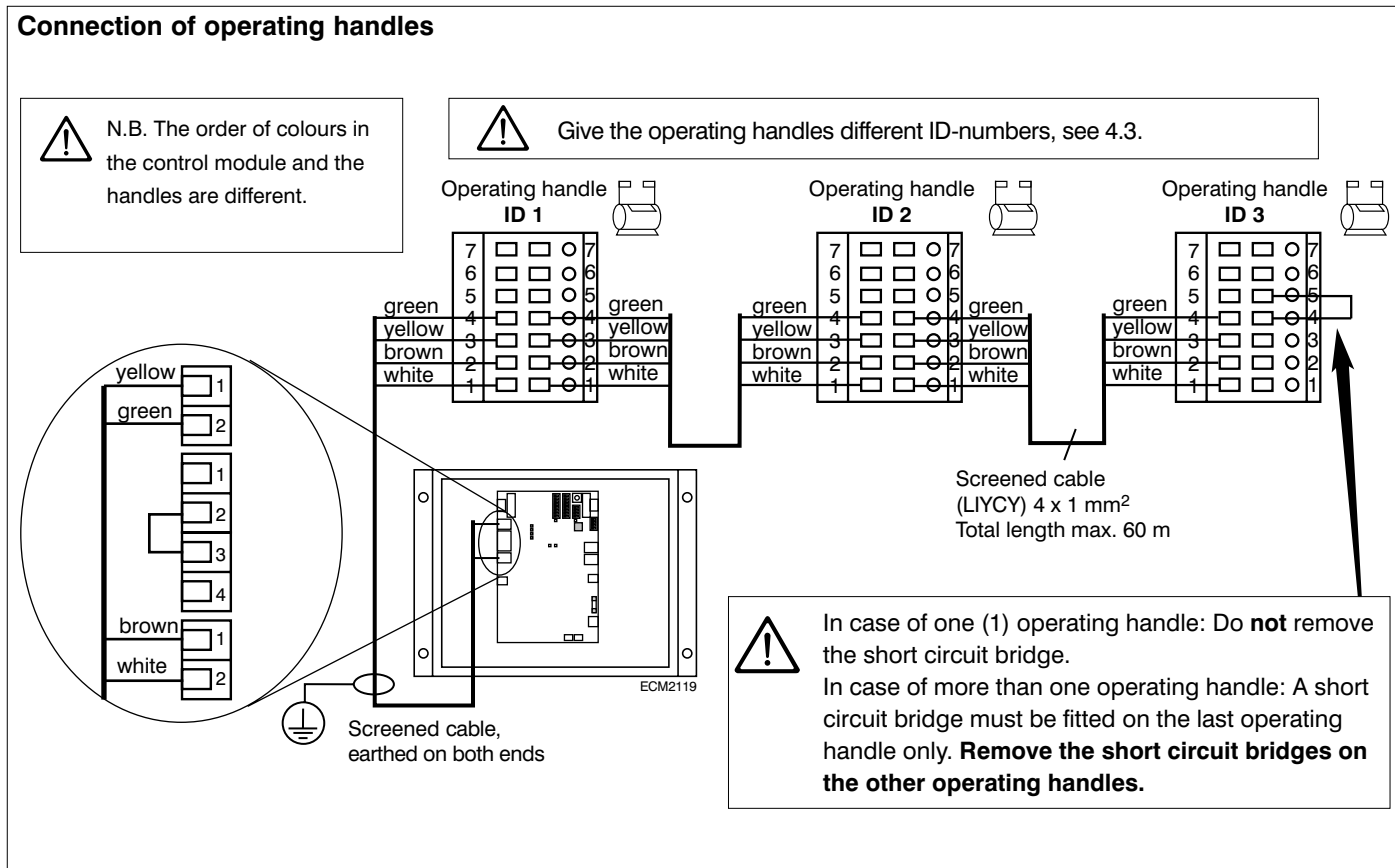
10.4 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use screened cable, LIYCY, 4 x 1 mm² for this.

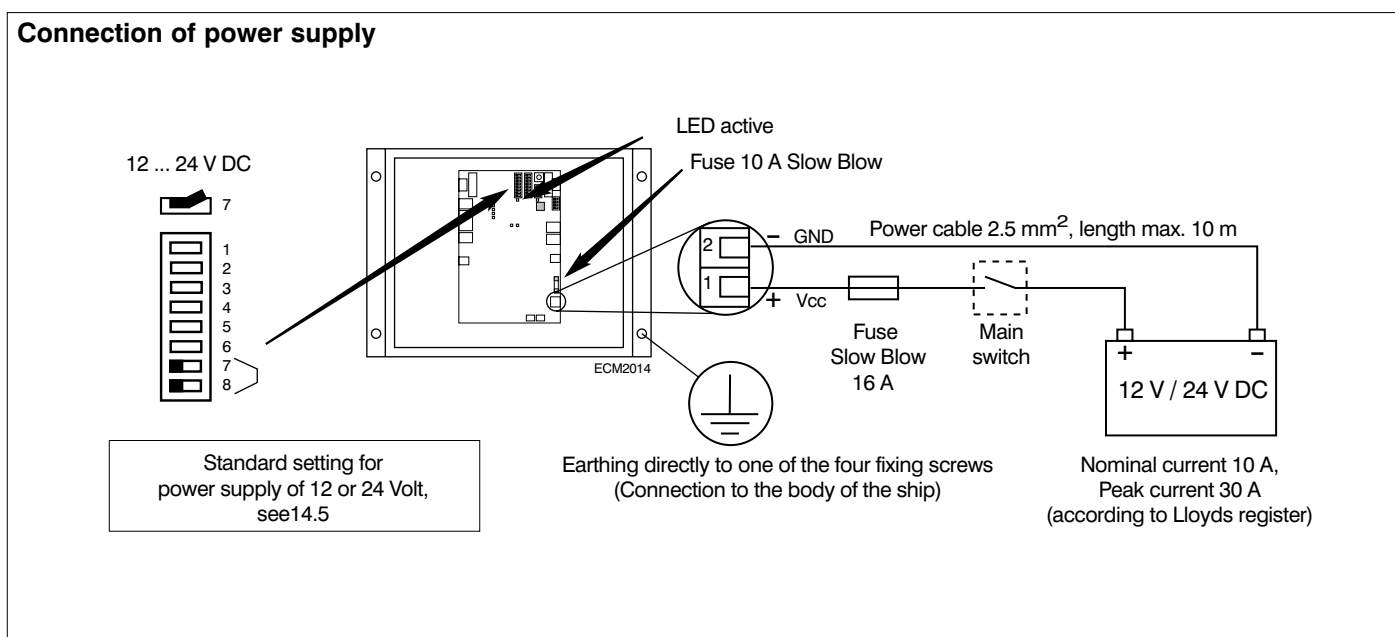
Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.



10.5 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current.
Use connecting cable with 2.5 mm² cross-section.

Connect the power supply to the control module as shown in the plan.
See section 14.5 for more information regarding the power supply.



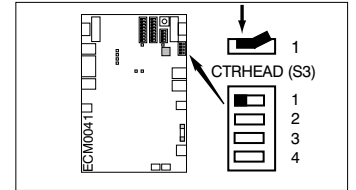
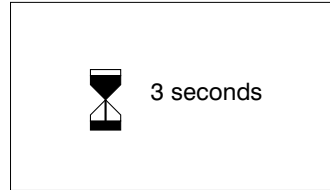
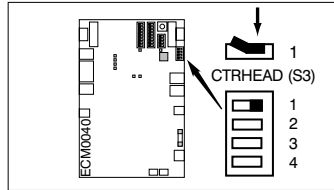
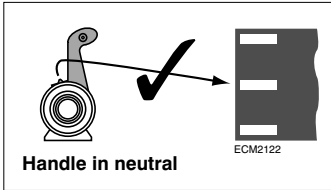
10.6 Setting procedure

After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

10.6.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered. The procedure is as follows:

- 1** Check that all operating handles are set to the neutral position.
- 2** Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3** Wait 3 seconds
- 4** Switch CTRHEAD (S3) switch 1 back to 'open'.



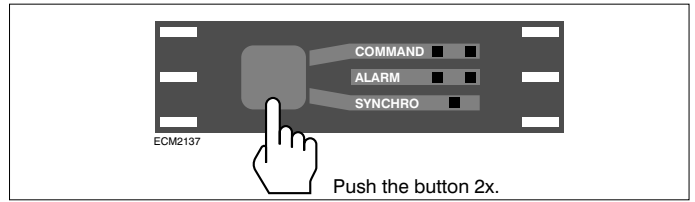
N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.

The setting procedure is continued on the following page.

10.6.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1 Activate a steering position by pushing the button **twice while the handle is set to neutral**.
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



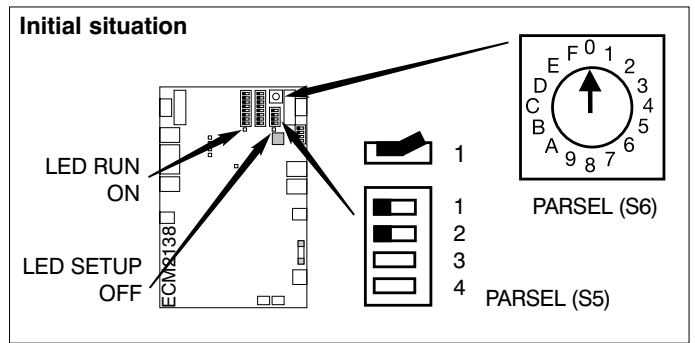
- 2 The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or Idle forward or Idle reverse
Increased*)	Position A	
Increased idle **)	Position B	
Maximum	Position 2	Neutral or Full power forward or Full power reverse

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

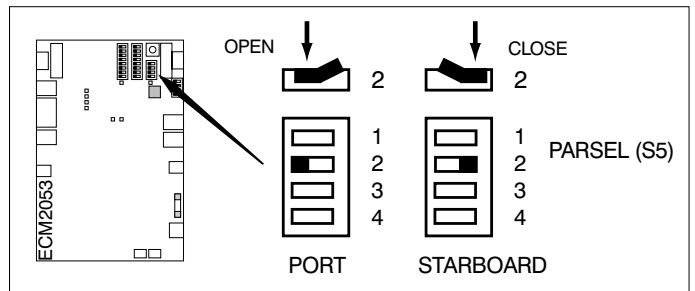
***) For increased idle speed, see 3.5.

- 3 The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



Carry out steps 4 to 7 for the port engine with PARSEL (S5) switch 2 in the 'OPEN' position.

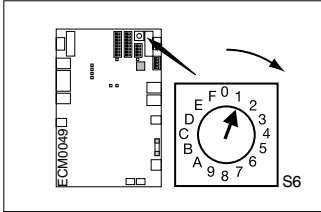
Repeat steps 4 to 7 for the starboard engine with PARSEL (S5) switch 2 in the 'CLOSE' position.



4 Choose a number of revolutions to set.

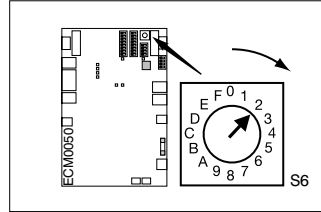
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



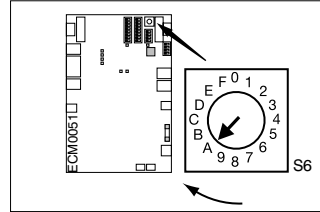
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



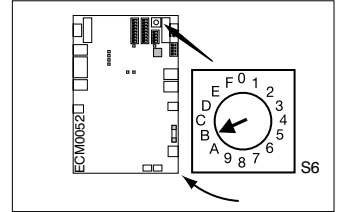
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle speed.

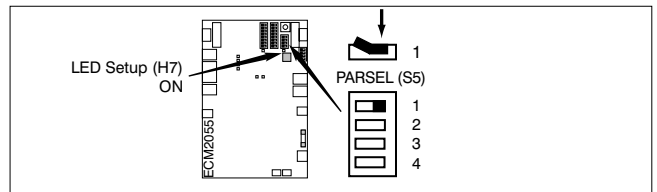
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The 4 to 20 mA signal will be set to the last entered value and Setup LED (H7) lights up.



6 Set the 4 – 20 mA signal to the correct value for the required revolutions.

The setting changes as long as you hold the button pushed in or until the limit value is reached. The change is very slow, moving through the total range takes about 28 sec.



After switching PARSEL (S5) over an automatic revolutions change can occur.

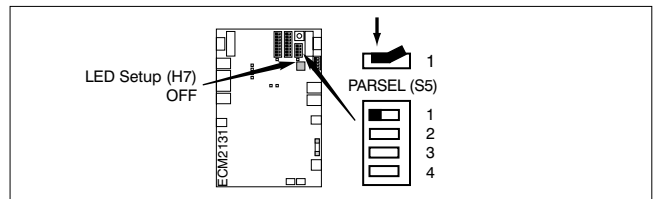
4 ⇒ 20 mA

Direction +

20 ⇒ 4 mA

Direction -

7 Store the parameters by changing to RUN.
To do this put PARSEL switch (S5) back to the 'OPEN' position.
Setup LED goes out.

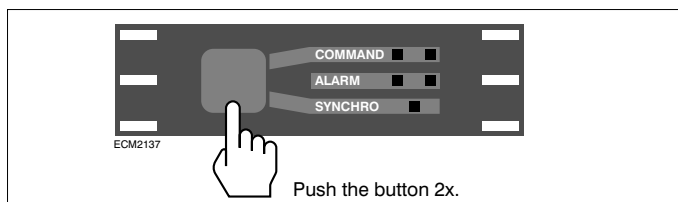


Set another number of revolutions.

10.6.3 Setting the gearbox

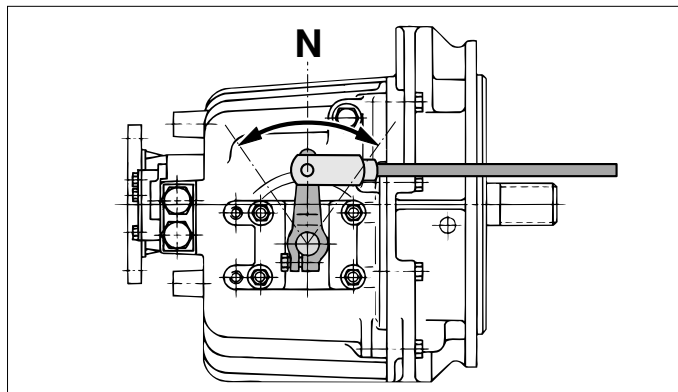
First activate a steering position if one is not already active.

- 1 Activate a steering position by pushing the button **twice while the operating handle is set to neutral**.
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



- 2 **Neutral cannot be set electronically and must be set mechanically.**

Therefore set the pull-push cable on the side of the servo motor and on the side of the gearbox such that when the handle of the active steering position is set to neutral the gearbox is also in neutral.



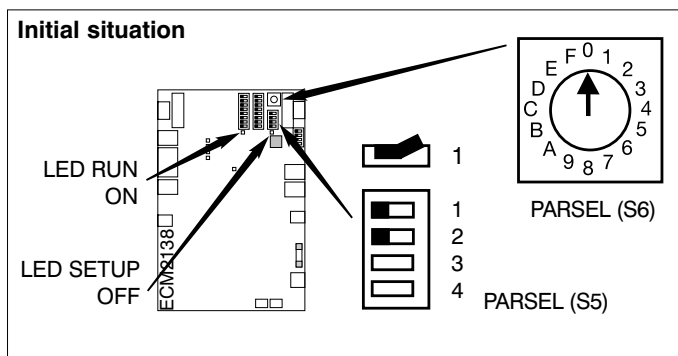
- 3 'Forward' and 'Reverse' settings can be made in random order once the engine remote control is switched on and a steering position has been activated.



Only change these settings with the engine switched off.

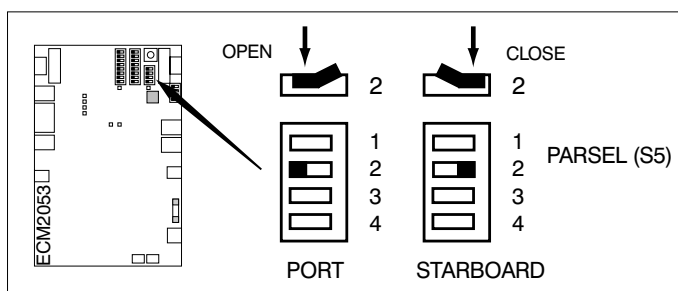
Gearbox position	PARSEL selector switch (S6)	Operating handle set to:
Forward	Position 4	Neutral or Forward
Reverse	Position 6	Neutral or Reverse

- 4 The PARSEL selector switch (S6) is used to determine which position is set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



Carry out steps 5 to 8 for the port engine with PARSEL (S5) switch 2 in the 'OPEN' position.

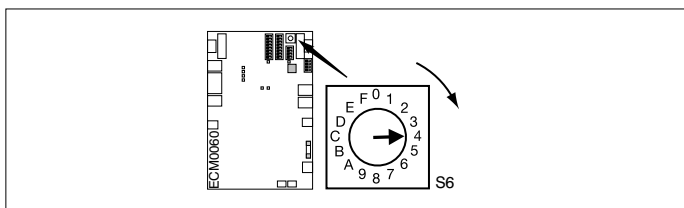
Repeat steps 5 to 8 for the starboard engine with PARSEL (S5) switch in the 'CLOSE' position.



5 Select a position to be set.

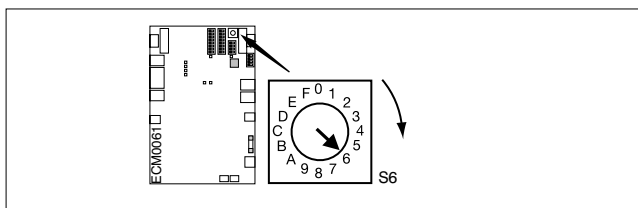
Setting position 'Forward'

Set PARSEL selector switch (S6) to position 4.



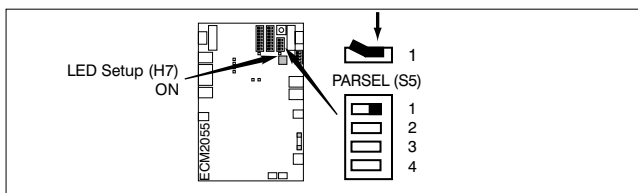
Setting position 'Reverse'

Set PARSEL selector switch to position 6.



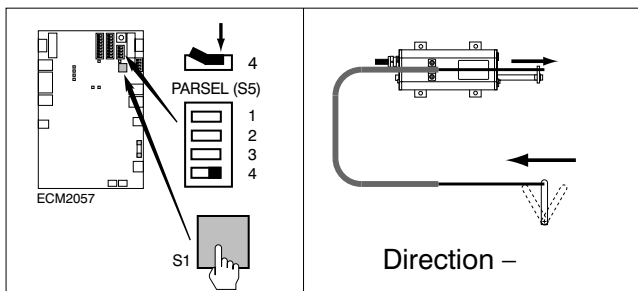
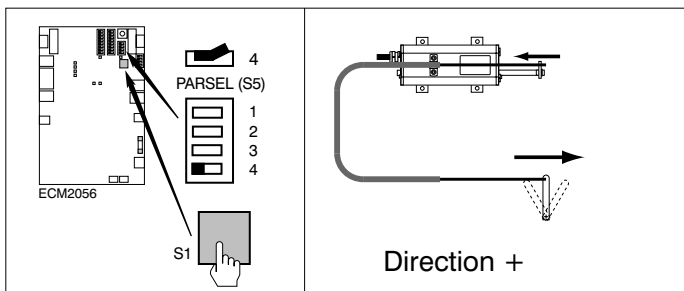
6 Change from RUN to SETUP.
Use PARSEL (S5) to do this.

The servo motor will be moved to the last position set and Setup LED (H7) lights up.

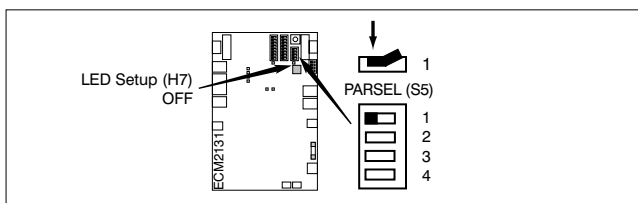


During step 6 the setting of the gearbox can be changed automatically. Therefore the engine must be switched off.

7 Set the servo motor correctly for forward or reverse.
The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



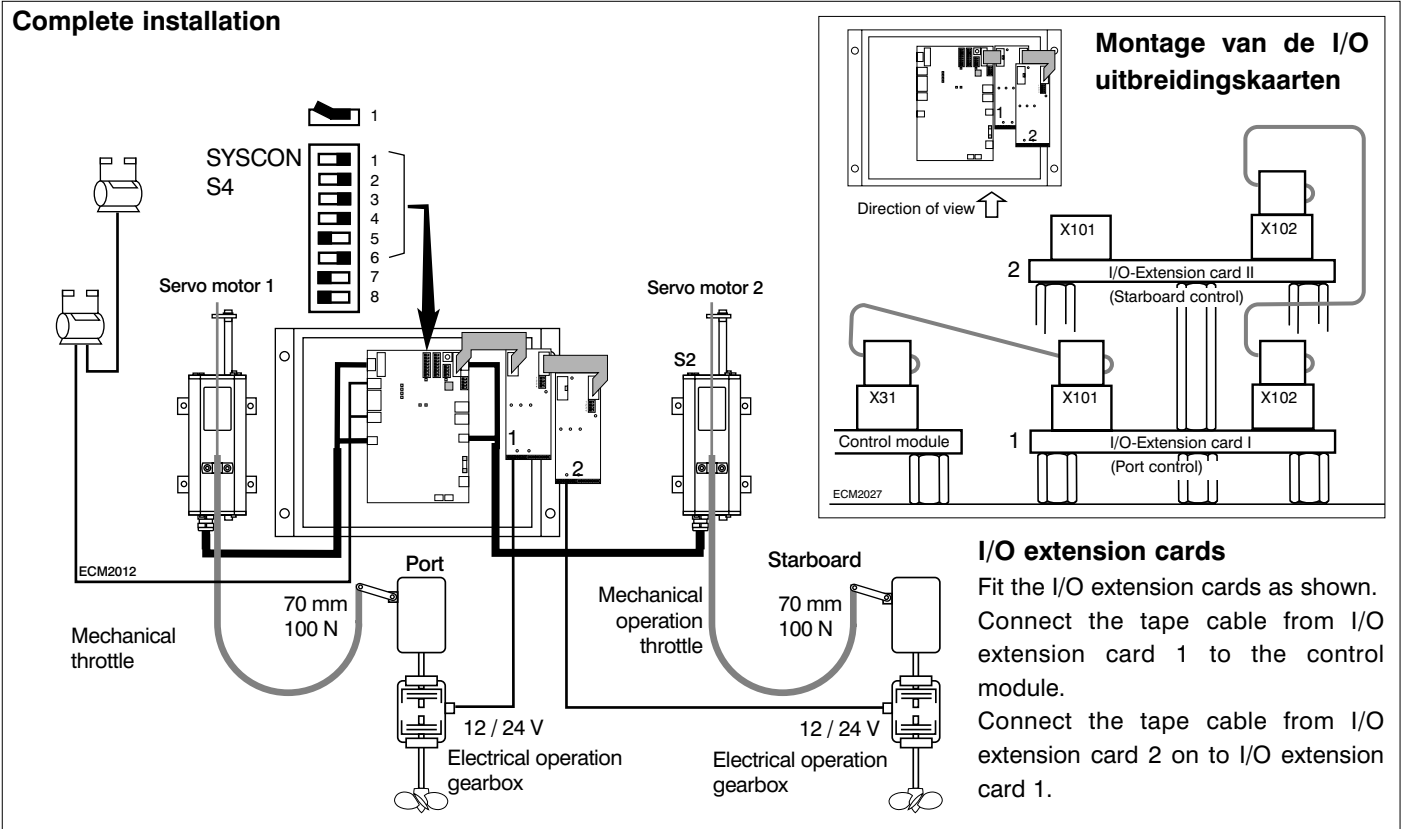
8 Store the parameters by changing to RUN.
To do this change PARSEL (S5) switch back to position 'OPEN'.
Setup LED goes out.



Set the other gearbox position.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional settings'.

11 Installation with 2 engines – mechanical throttle, – electrical operation of the gearbox



11.1 System boxes

Choose an easily accessible position for the system boxes, with the control modules, near the engine.

Set the DIP switches of S4 'SYSCON' in both system boxes as shown.

Do not fit the system boxes on the engine.

Never change the SYSCON switch positions when the power is connected.

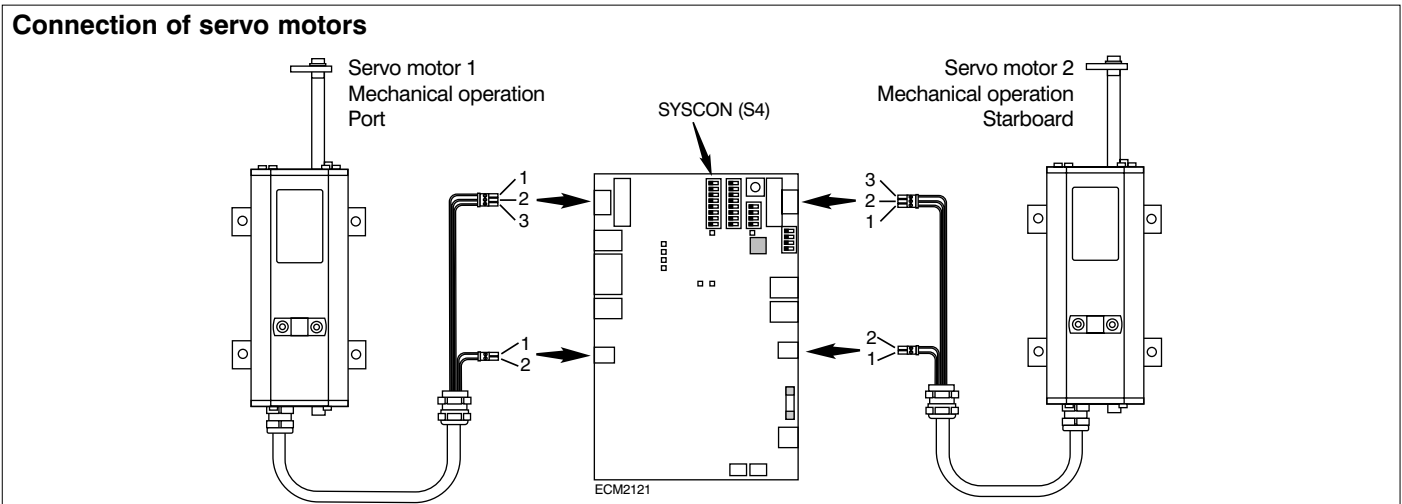
11.2 Servo motors

Position the servo motors directly next to or under the system boxes.

The servo motors must be connected to the fuel lever (throttle) using Vetus pull-push cables type 33, see 4.5.

⚠ The servo motor electrical connecting cables may not be extended.

Connect the servo motor electrical connecting cables to the control modules.



11.3 Electrically operated gearbox

Connect a connecting cable from the system box to the gearbox. Use screened cable, LIYCY, 7 x 0.75 mm². Connect as shown in the plans.

In the first plan, without report back of the position reached by the gearbox, the engine remote control does not check whether the clutch has been engaged or not.

In the other plans there is a check by the engine remote control as to whether the clutch has been engaged or not. The engine

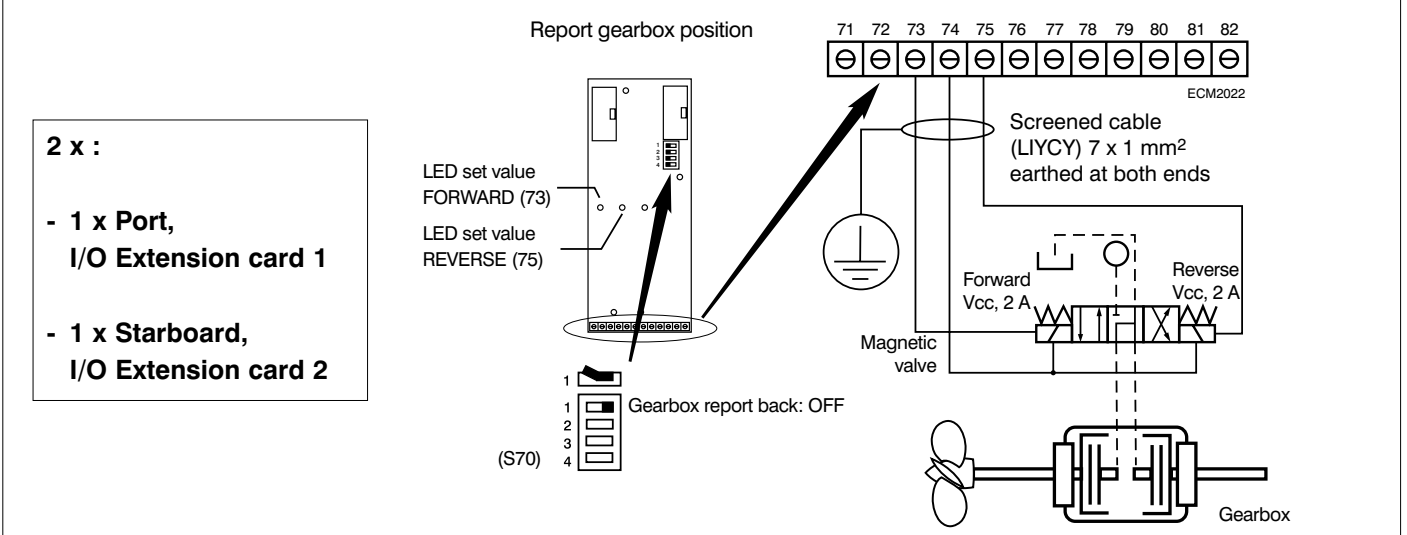
revolutions are then only raised after the clutch has been engaged.

The gearbox must then be fitted with pressure switches which signal whether the desired position has been achieved.

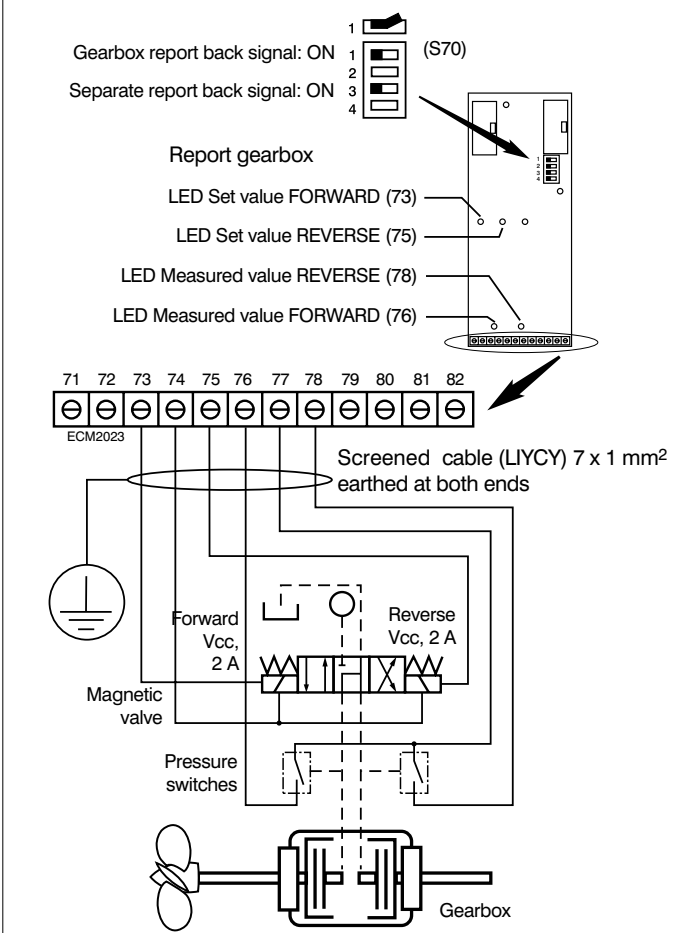
Signalling can be separate for forward and reverse or combined.

Set the DIP switch of S70 on the I/O extension card as shown.

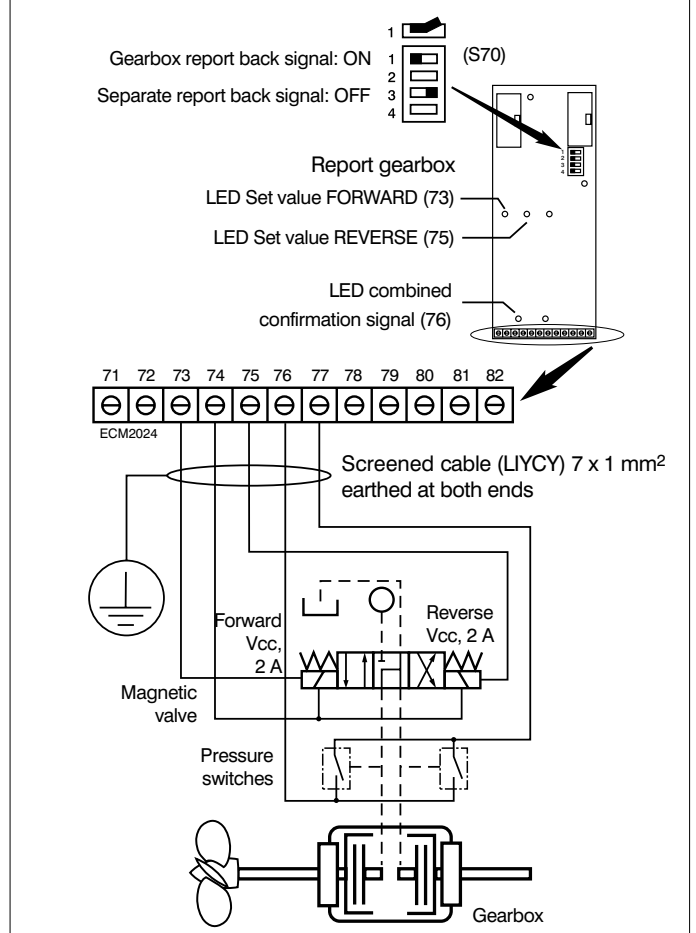
Connections electrically operated gearbox without report back signal



Connections electrically operated gearbox with separate report back signal



Connections electrically operated gearbox with combined report back signal



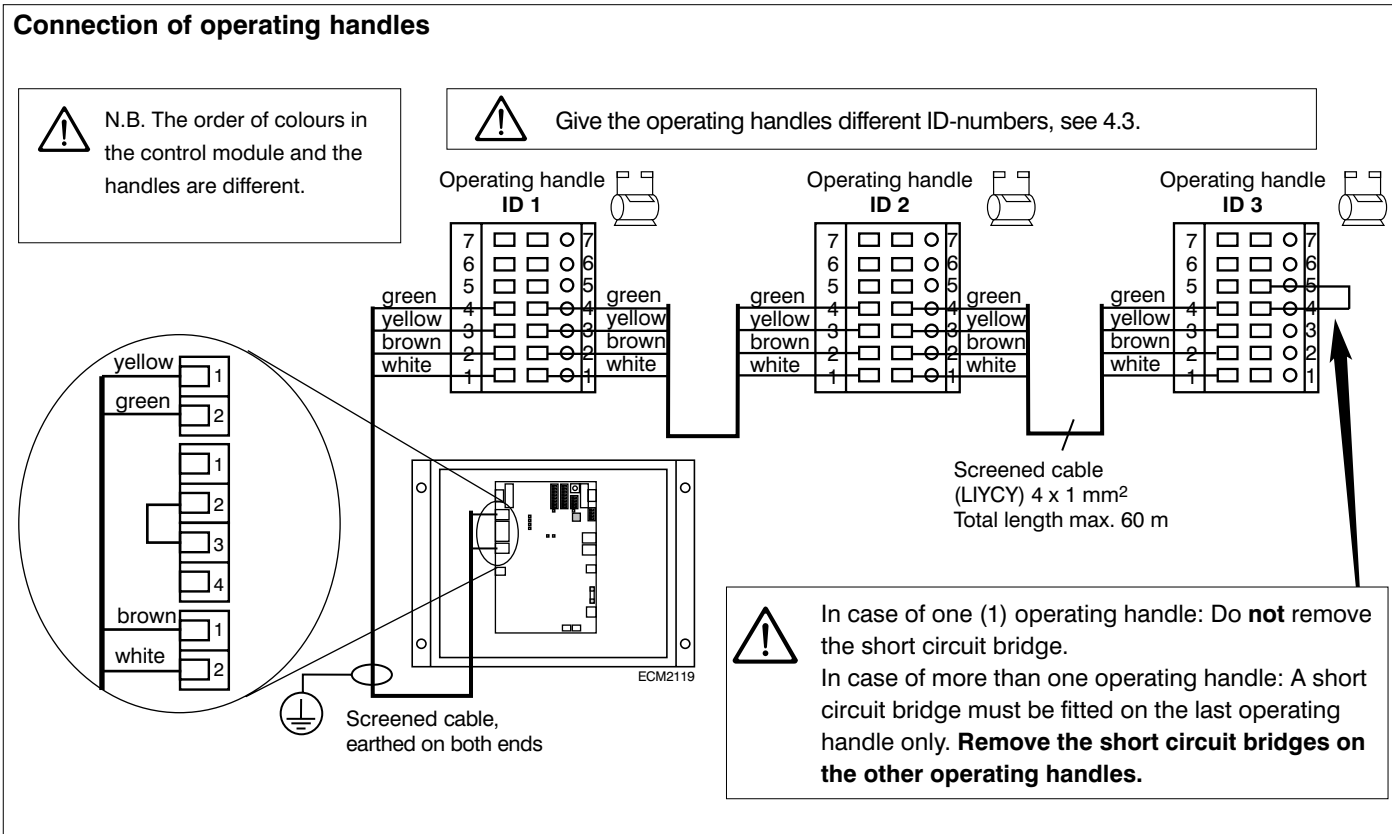
11.4 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use screened cable, LIYCY, 4 x 1 mm² for this.

Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.



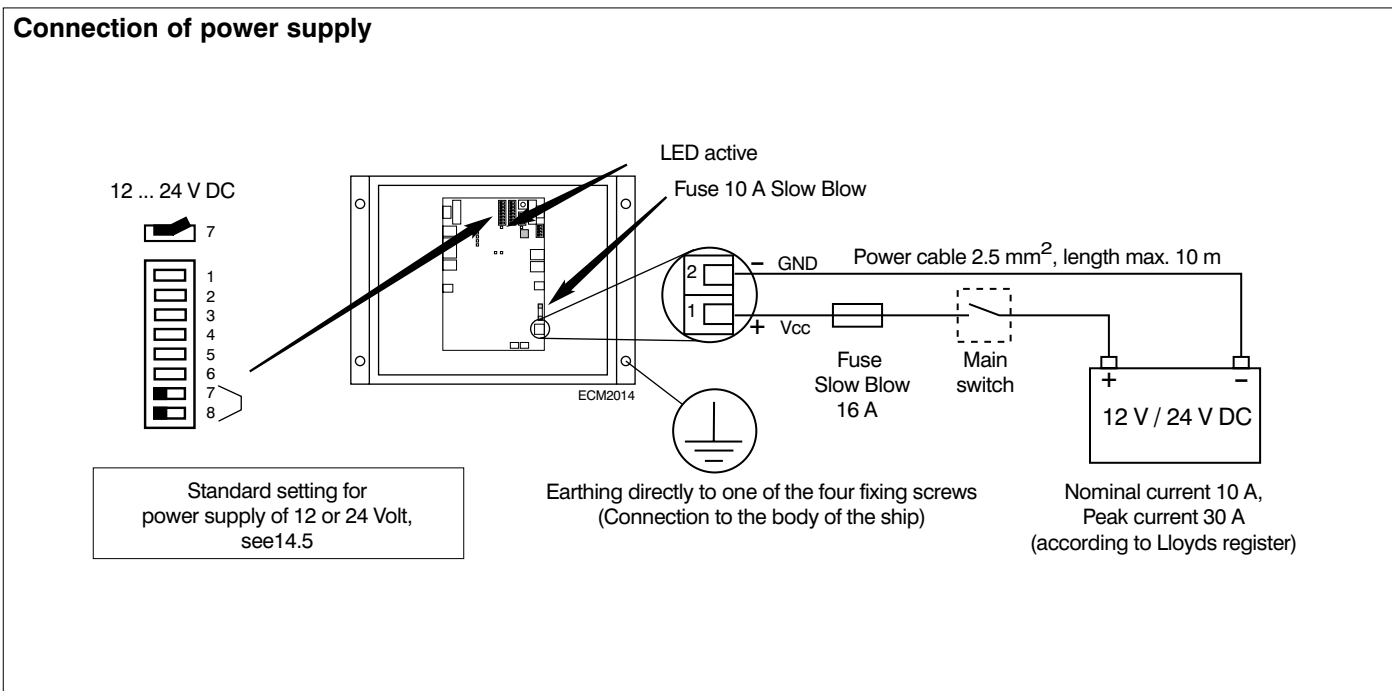
11.5 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current.

Connect the power supply to the control module as shown in the plan.


Use connecting cable with 2.5 mm² cross-section.

See section 14.5 for more information regarding the power supply.




11.6 Power supply for the electrical operation of the gearboxes

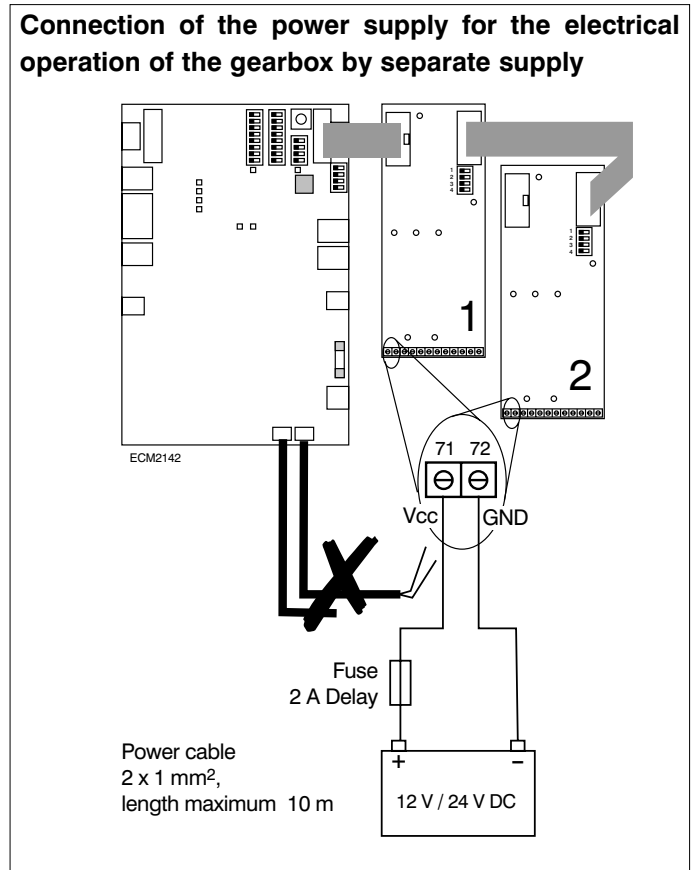
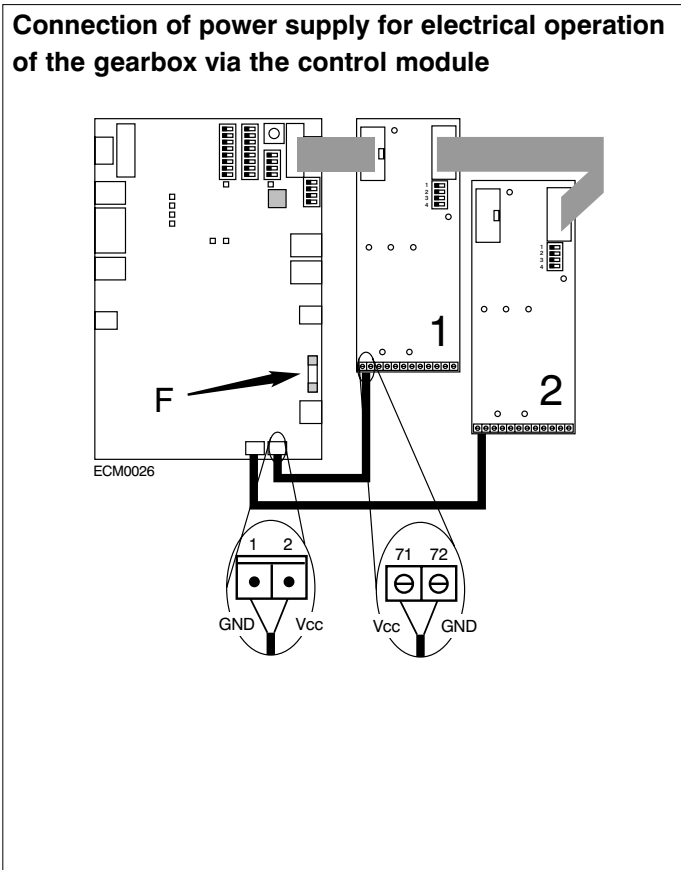
The control module can supply the power for the electrical operation of the gearbox:

 **The fuse (F) on the control module does not protect the electrical operation of the gearbox.** A fuse **must** be included in the power cable from the control module.

The regulations for the installation can include the requirement that the power supply for the electrical operation of the gearbox must be via a separate direct power supply on the I/O card.

Connect the I/O card as follows:

 Never connect both connections 71 and 72 at the same time on to the control module too.



11.7 Setting procedure

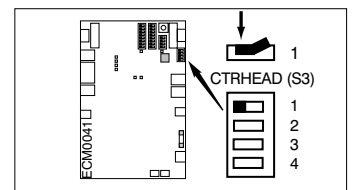
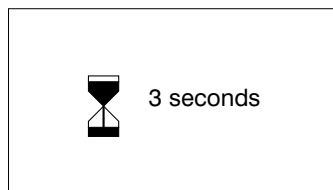
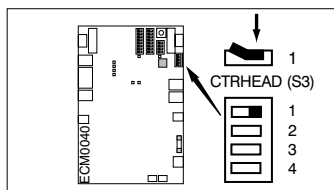
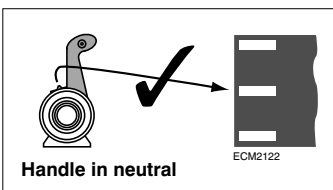
After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

11.7.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered. The procedure is as follows:

- 1 Check that all operating handles are set to the neutral position.
- 2 Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3 Wait 3 seconds.
- 4 Switch CTRHEAD (S3) switch 1 back to 'open'.

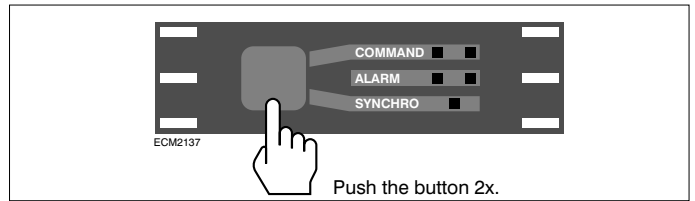
N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.



11.7.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1 Activate a steering position by pushing the button **twice while the handle is set to neutral**.
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



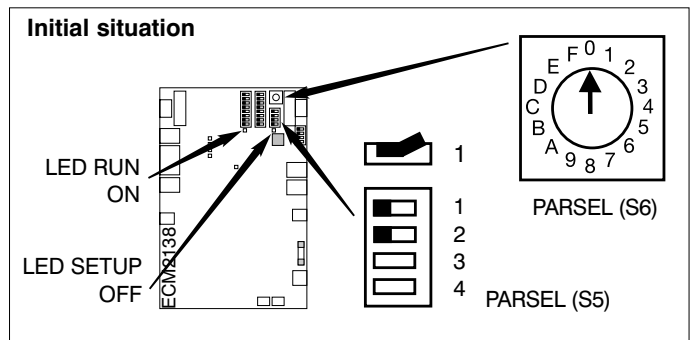
- 2 The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or Idle forward or Idle reverse
Increased*)	Position A	
Increased idle **)	Position B	
Maximum	Position 2	Neutral or Full power forward or Full power reverse

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

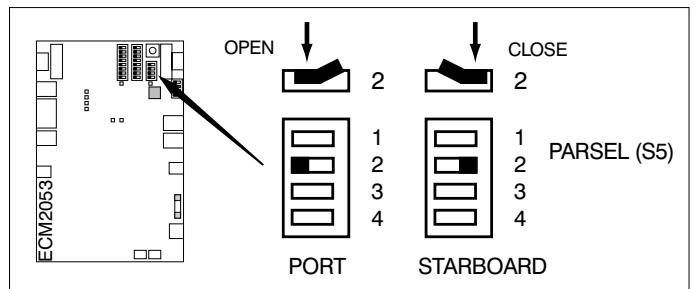
***) For increased idle speed, see 3.5.

- 3 The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



Carry out steps 4 to 7 for the port engine with PARSEL (S5) switch 2 in the 'OPEN' position.

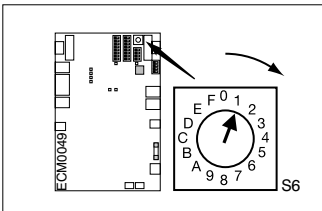
Repeat steps 4 to 7 for the starboard engine with PARSEL (S5) switch 2 in the 'CLOSE' position.



4 Choose a number of revolutions to set.

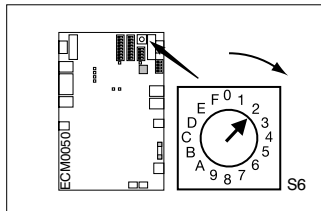
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



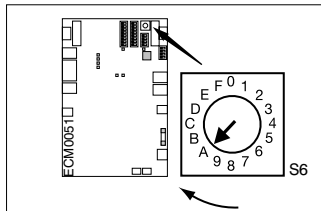
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



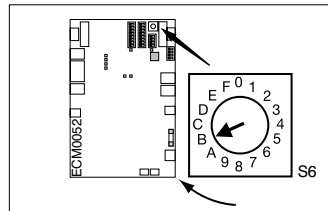
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle speed.

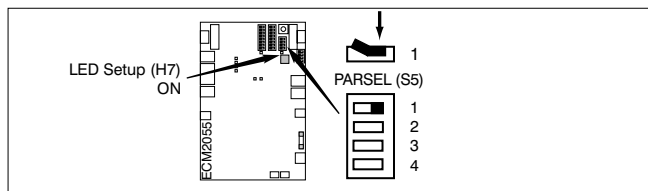
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP. Use PARSEL (S5) to do this.

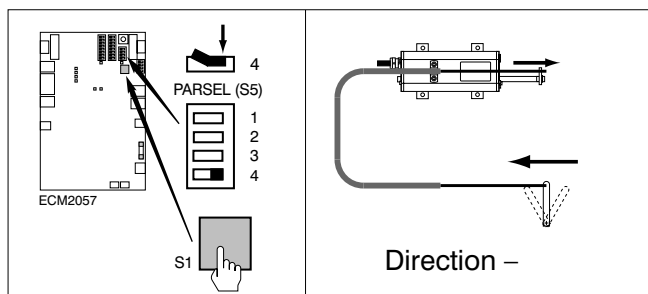
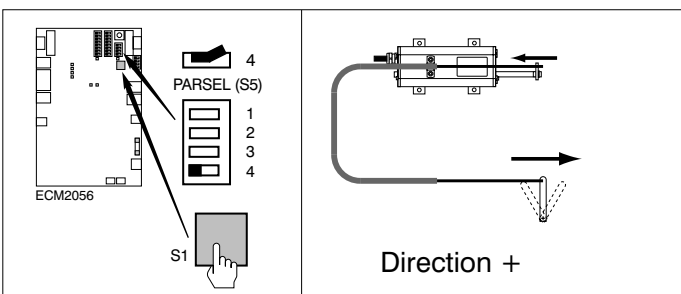
The servo motor will be moved to the last position set and Setup LED (H7) lights up.



After switching PARSEL (S5) over an automatic revolutions change can occur.

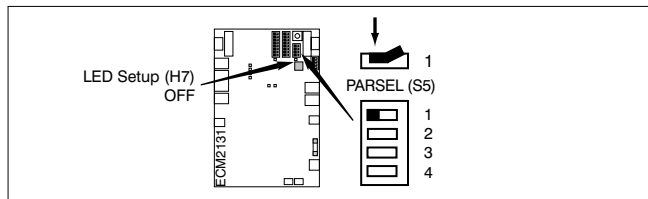
6 Set the servo motor in the right position for the required revolutions.

The setting of the servo motor changes as long as you hold the button pushed in or until the end position is reached. The movement is very slow, about 2.5 mm / sec.



7 Store the parameters by changing to RUN. To do this put PARSEL switch (S5) back to the 'OPEN' position. Setup LED goes out.

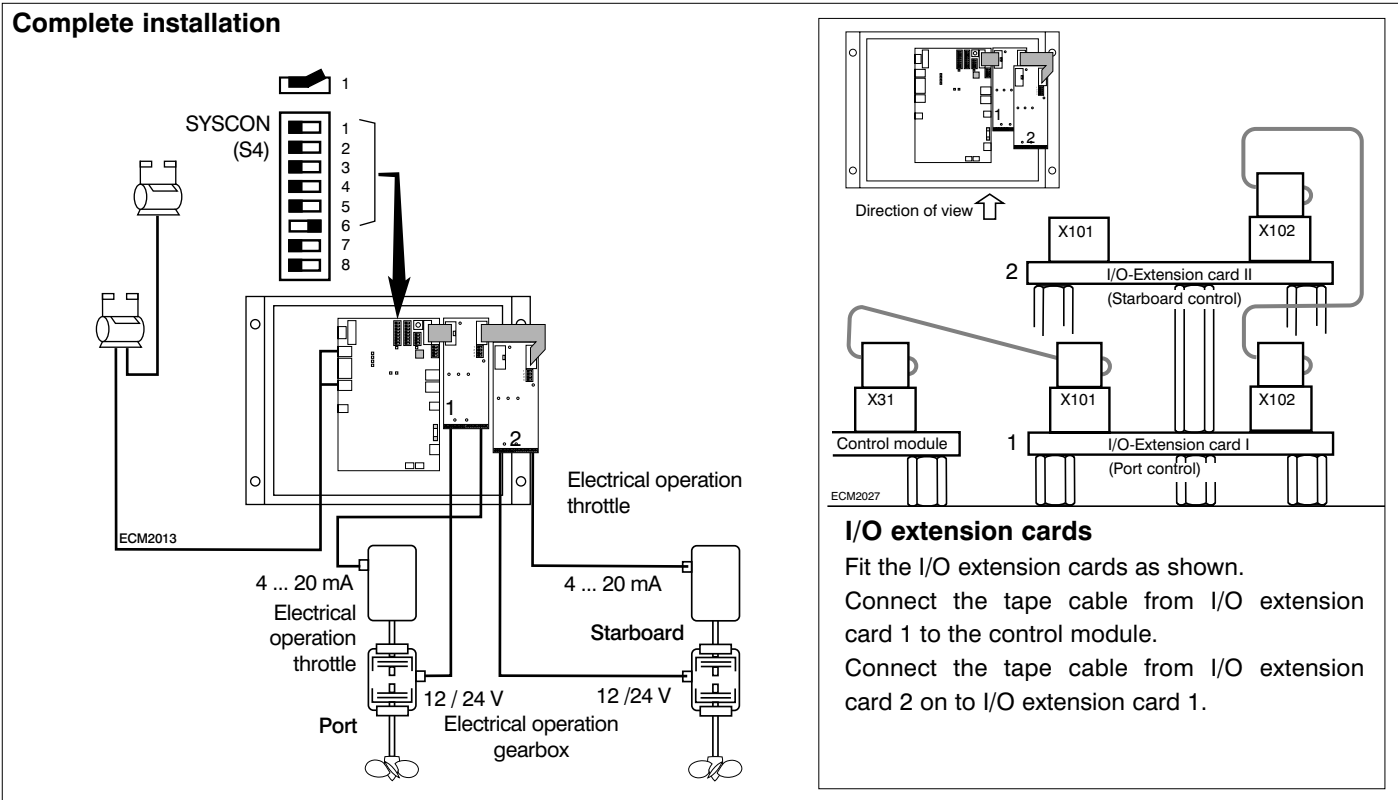
Set another number of revolutions.



'Forward' and 'Reverse' do not have to be set for the electrically operated gearbox.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional settings'.

12 Installation with 2 engines - electrical throttle (4 ... 20 mA), - electrical operation of the gearbox



12.1 System box

Choose an easily accessible position for the system box, with the control module, near the engine. Set the DIP switches of S4 'SYSCON' as shown.

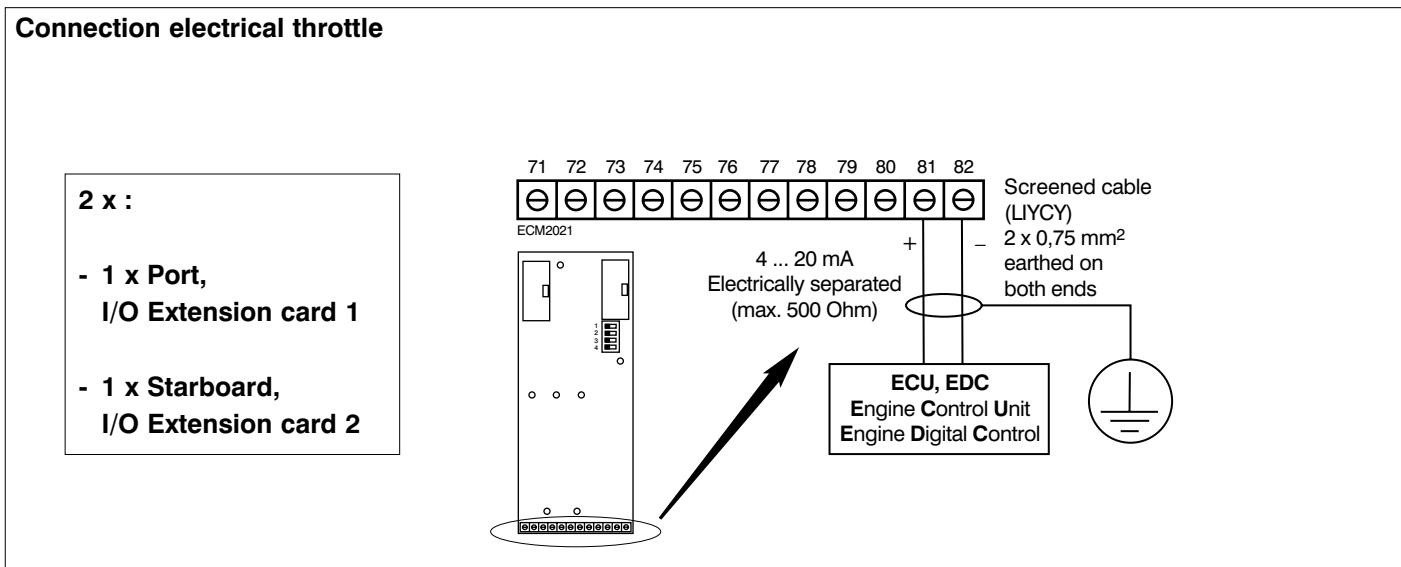
Do not fit the system box on the engine.



Never change the SYSCON switch positions when the power is connected.

12.2 Electrical throttle

Connect the engines to the system box using connection cables, LIYCY, 2 x 0.75 mm². Connect as shown in the plan.



12.3 Electrically operated gearboxes

Connect connecting cables from the system box to the gearboxes. Use screened cable, LIYCY, 7 x 0.75 mm². Connect as shown in the plans.

In the first plan, without report back of the position reached by the gearbox, the engine remote control does not check whether the clutch has been engaged or not.

In the other plans there is a check by the engine remote control as to whether the clutch has been engaged or not. The engine

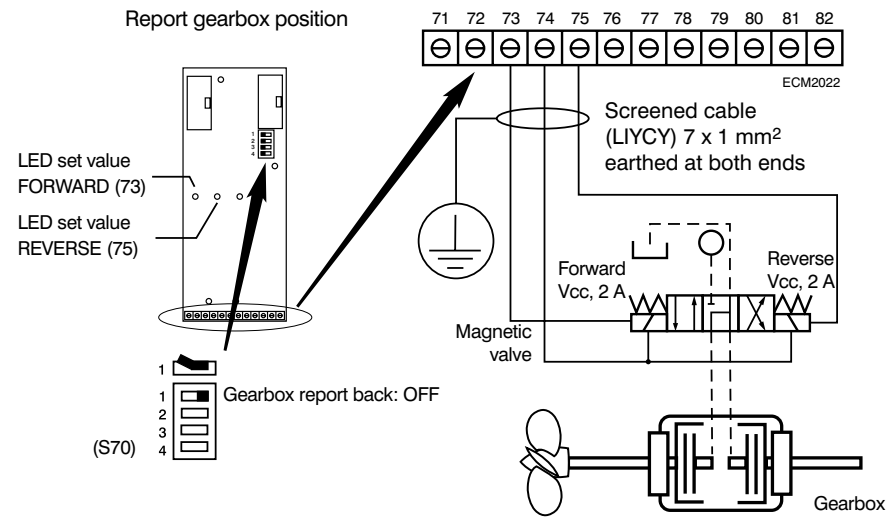
revolutions are then only raised after the clutch has been engaged.

The gearbox must then be fitted with pressure switches which signal whether the desired position has been achieved. Signalling can be separate for forward and reverse or combined.

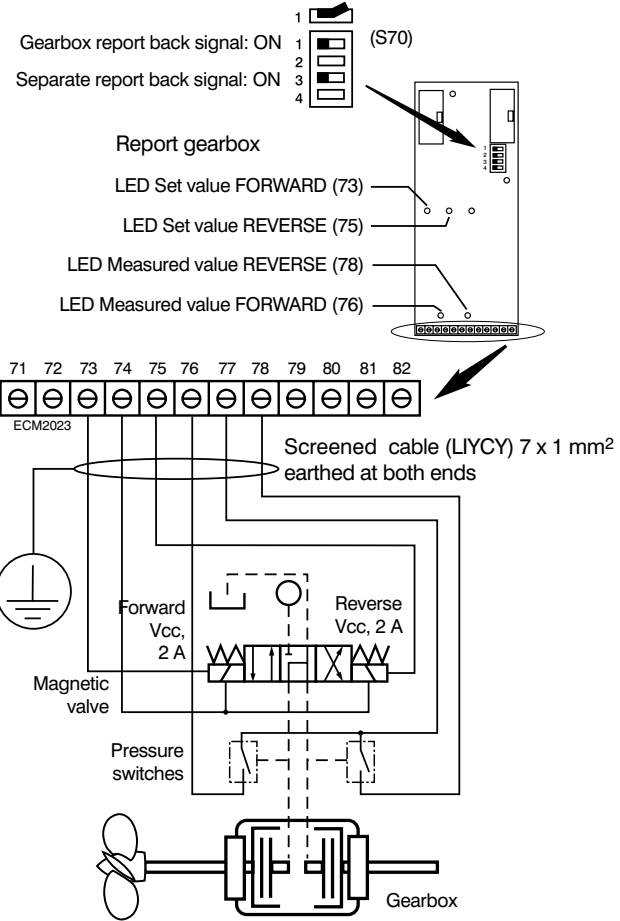
Set the DIP switch of S70 on the I/O extension card as shown.

Connections electrically operated gearbox without report back signal

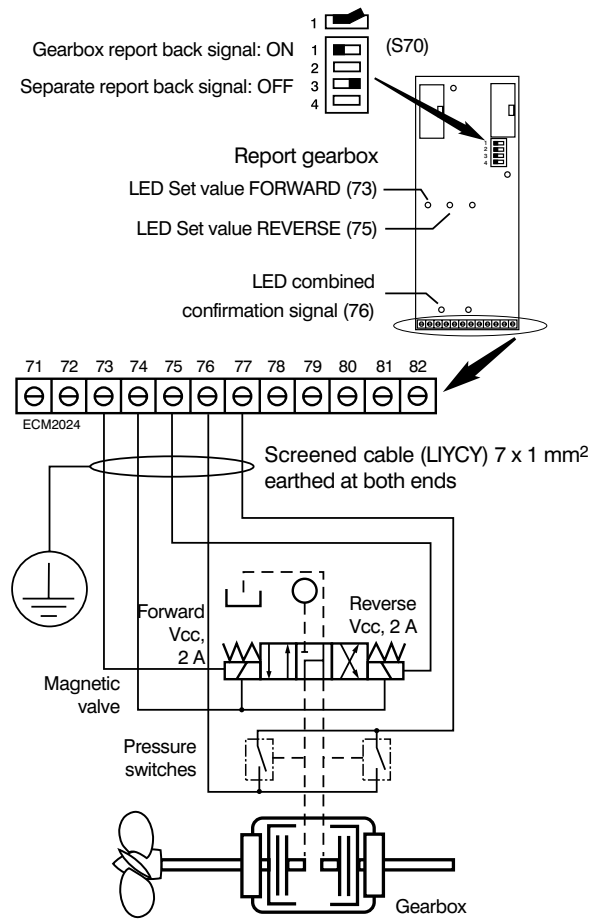
- 2 x :
- 1 x Port, I/O Extension card 1
 - 1 x Starboard, I/O Extension card 2



Connections electrically operated gearbox with separate report back signal



Connections electrically operated gearbox with combined report back signal



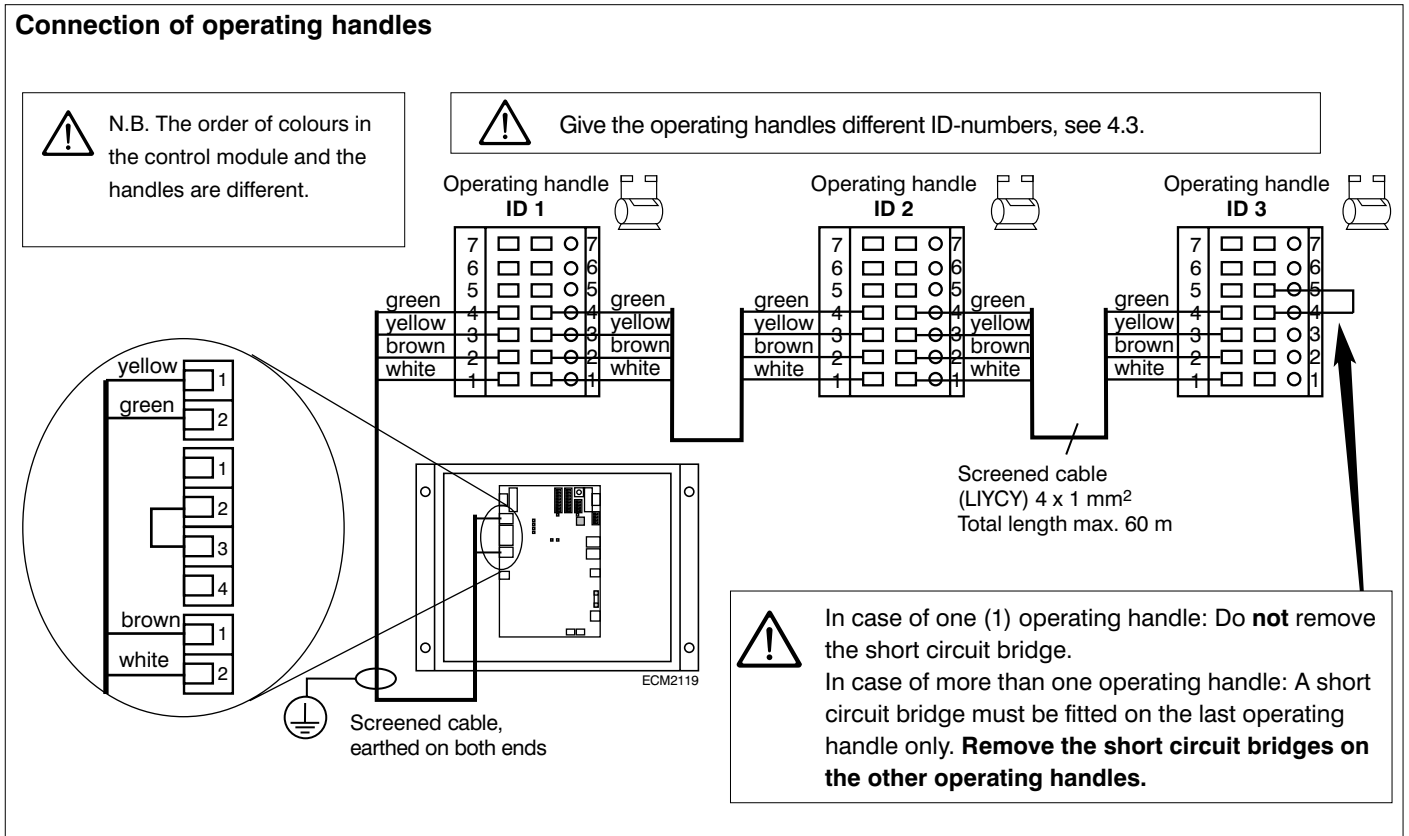
12.4 Operating handles

Connect a cable from the system box to the nearest operating handle. Follow this with a cable from the first handle to the next and so on.

Give each handle a unique ID number (i.e. each handle a different number, 1 to 6) see section 4.3.

Use screened cable, LIYCY, 4 x 1 mm² for this.

Use a drilling template to drill holes for fixing the handles in the desired positions on the dashboard. Also see section 4.3.



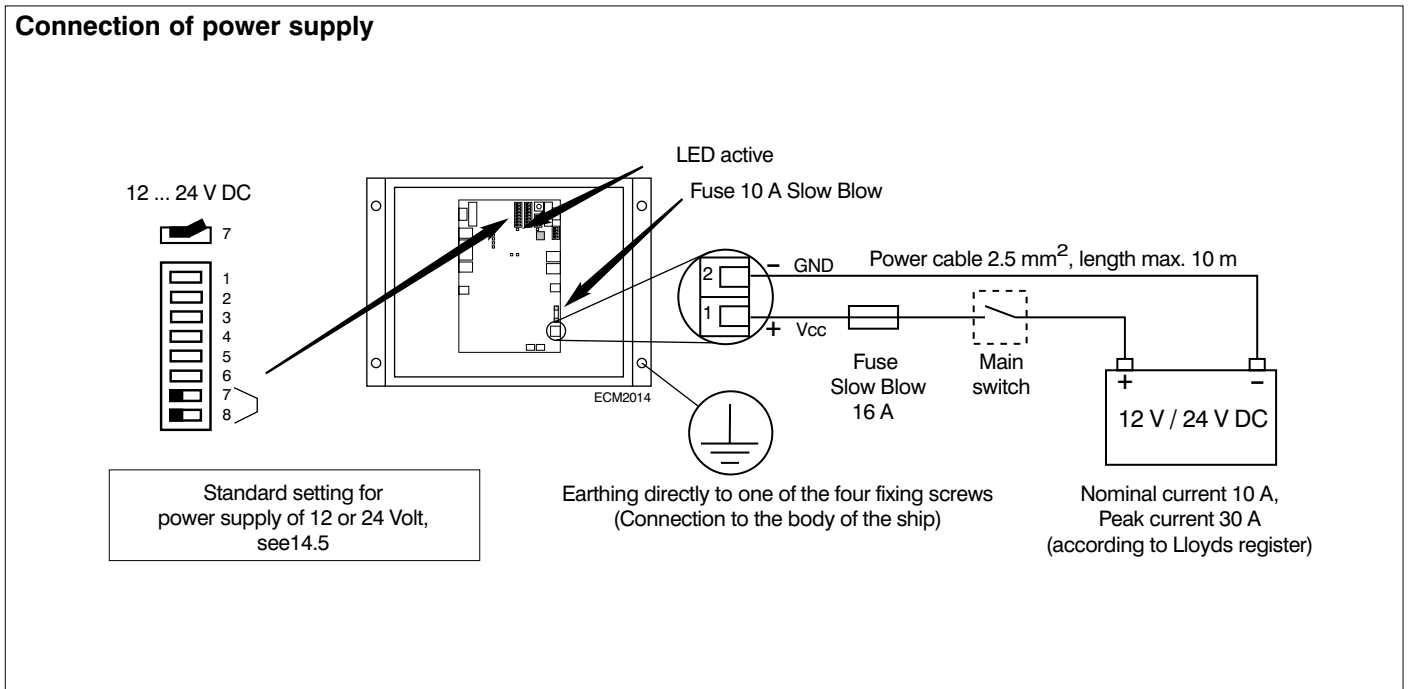
12.5 Power supply

The electronic engine remote control is suitable for both 12 and 24 V direct current.

Connect the power supply to the control module as shown in the plan.

Use connecting cable with 2.5 mm² cross-section.

See section 14.5 for more information regarding the power supply.



12.6 Power supply for the electrical operation of the gearboxes

The control module can supply the power for the electrical operation of the gearbox:



The fuse (F) on the control module does not protect the electrical operation of the gearbox.

A fuse **must** be included in the power cable from the control module.

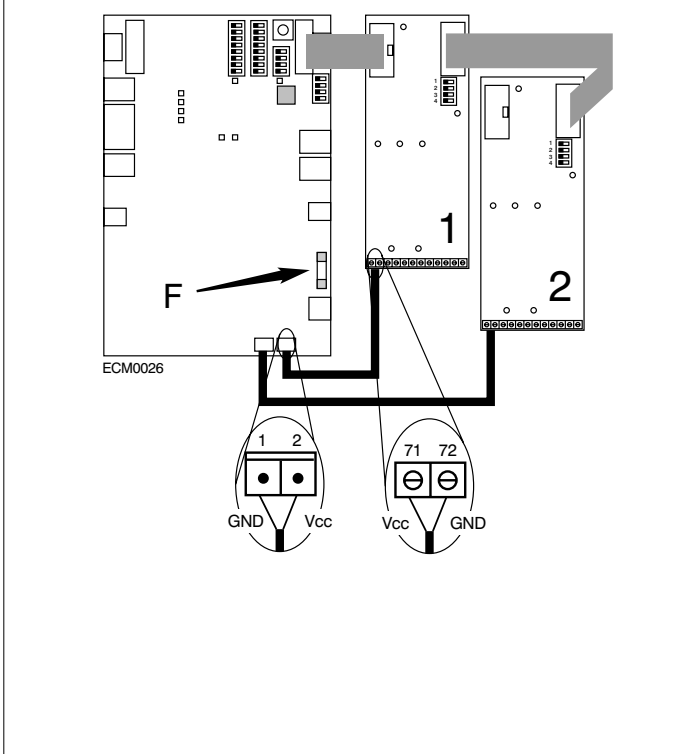
The regulations for the installation can include the requirement that the power supply for the electrical operation of the gearbox must be via a separate direct power supply on the I/O card.

Connect the I/O card as follows:

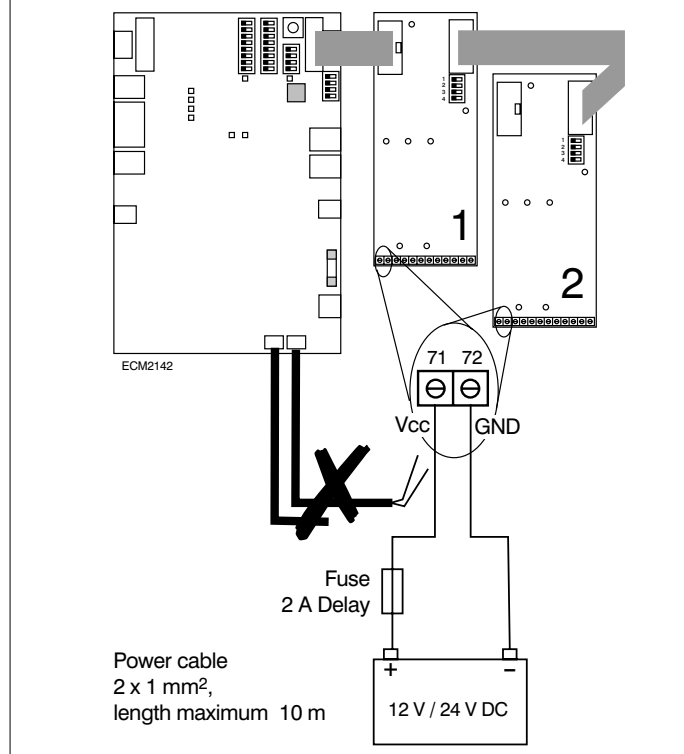


Never connect both connections 71 and 72 at the same time on to the control module too.

Connection of power supply for electrical operation of the gearbox via the control module



Connection of the power supply for the electrical operation of the gearbox by separate supply



12.7 Setting procedure

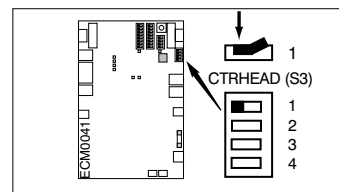
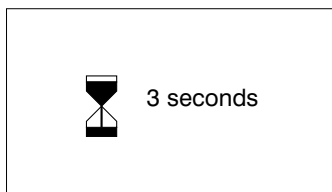
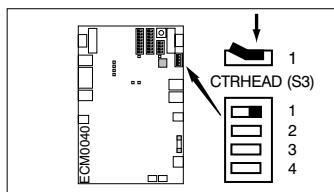
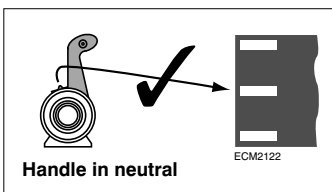
After all parts have been connected to each other and the SYSCON switches have been set correctly the setting procedure must be carried out.

12.7.1 Registration of operating handles

The control system knows how many operating handles are connected after these have been registered. The procedure is as follows:

- 1 Check that all operating handles are set to the neutral position.
- 2 Switch on the power. Switch CTRHEAD (S3) switch 1 to position 'close'.
- 3 Wait 3 seconds.
- 4 Switch CTRHEAD (S3) switch 1 back to 'open'.

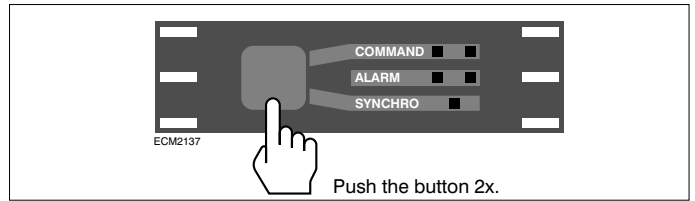
N.B. The registration of the operating handles is only necessary during the first time the system is taken into operation or after a repair or replacement of parts of the installation.



12.7.2 Setting the number of revolutions

First activate one steering position if no positions are active.

- 1** Activate a steering position by pushing the button **twice while the handle is set to neutral**.
After pushing the button on one of the engine controls for the first time the lamp test of all the engine controls is ended.



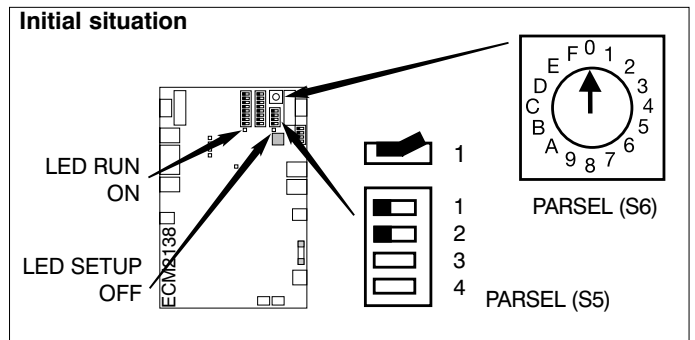
- 2** The following revolutions settings can be made in random order once the engine remote control is switched on and a steering position has been activated:

Revolutions	PARSEL-selector switch (S6)	Operating handle set to:
Idle	Position 1	Neutral or Idle forward or Idle reverse
Increased*)	Position A	
Increased idle **)	Position B	
Maximum	Position 2	Neutral or Full power forward or Full power reverse

*) Increased revolutions before the gearbox is engaged in forward or reverse from neutral.

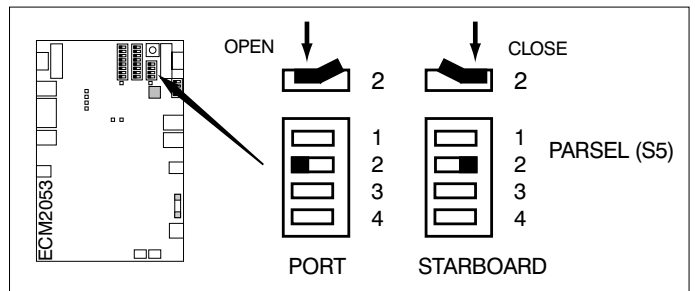
***) For increased idle speed, see 3.5.

- 3** The PARSEL selector switch (S6) is used to determine which revolutions are set. PARSEL (S5) switch 1 is used to choose between RUN and SETUP mode. Check that PARSEL (S5) switch 2 is in the 'OPEN' position.



Carry out steps 4 to 7 for the port engine with PARSEL (S5) switch 2 in the 'OPEN' position.

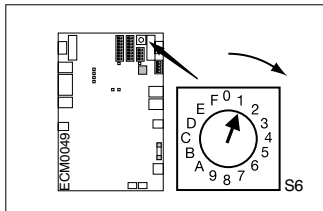
Repeat steps 4 to 7 for the starboard engine with PARSEL (S5) switch 2 in the 'CLOSE' position.



4 Choose a number of revolutions to set.

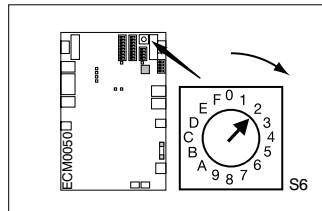
Set idle speed.

Set the PARSEL selector switch (S6) to position 1.



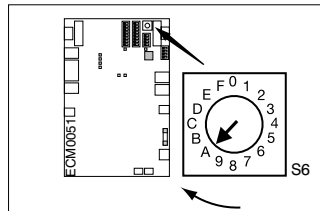
Set maximum revolutions.

Set the PARSEL selector switch (S6) to position 2.



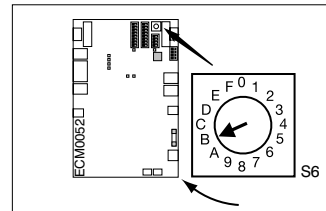
Set increased revolutions.

Set the PARSEL selector switch (S6) to position A.



Set increased idle speed.

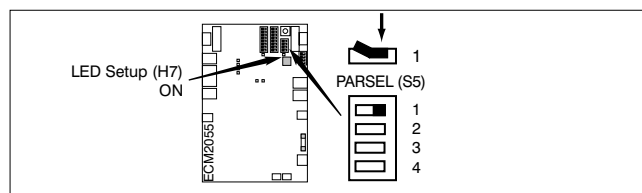
Set the PARSEL selector switch (S6) to position B.



When setting increased revolutions check the maximum allowed revolutions for engaging the gearbox (see the specifications supplied by the manufacturer of the gearbox).

5 Change from RUN to SETUP. Use PARSEL (S5) to do this.

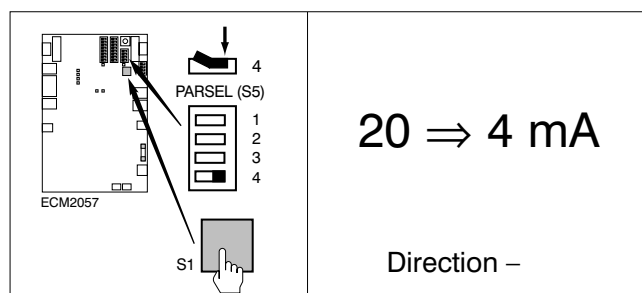
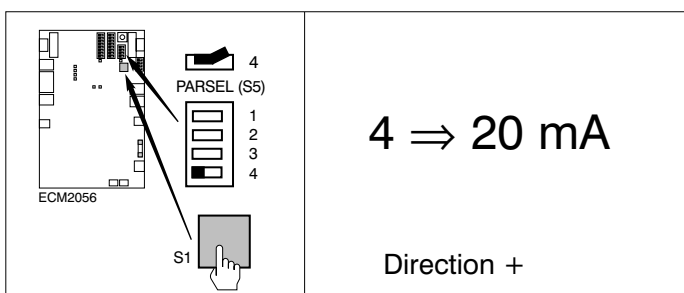
The 4 to 20 mA signal will be set to the last entered value and Setup LED (H7) lights up.



After switching PARSEL (S5) over an automatic revolutions change can occur.

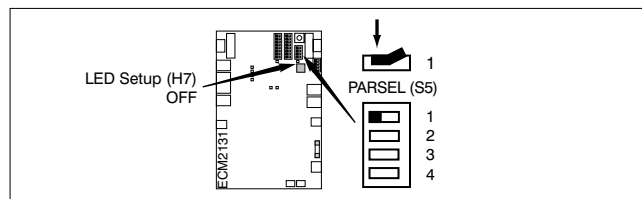
6 Set the 4 – 20 mA signal to the correct value for the required revolutions.

The setting changes as long as you hold the button pushed in or until the limit value is reached. The change is very slow, moving through the total range takes about 28 sec.



7 Store the parameters by changing to RUN. To do this put PARSEL switch (S5) back to the 'OPEN' position. Setup LED goes out.

Set another number of revolutions.



'Forward' and 'Reverse' do not have to be set for the electrically operated gearbox.

Installation and setting procedures are now completed. See chapter 13 for 'Options' and chapter 14 for 'Optional settings'.

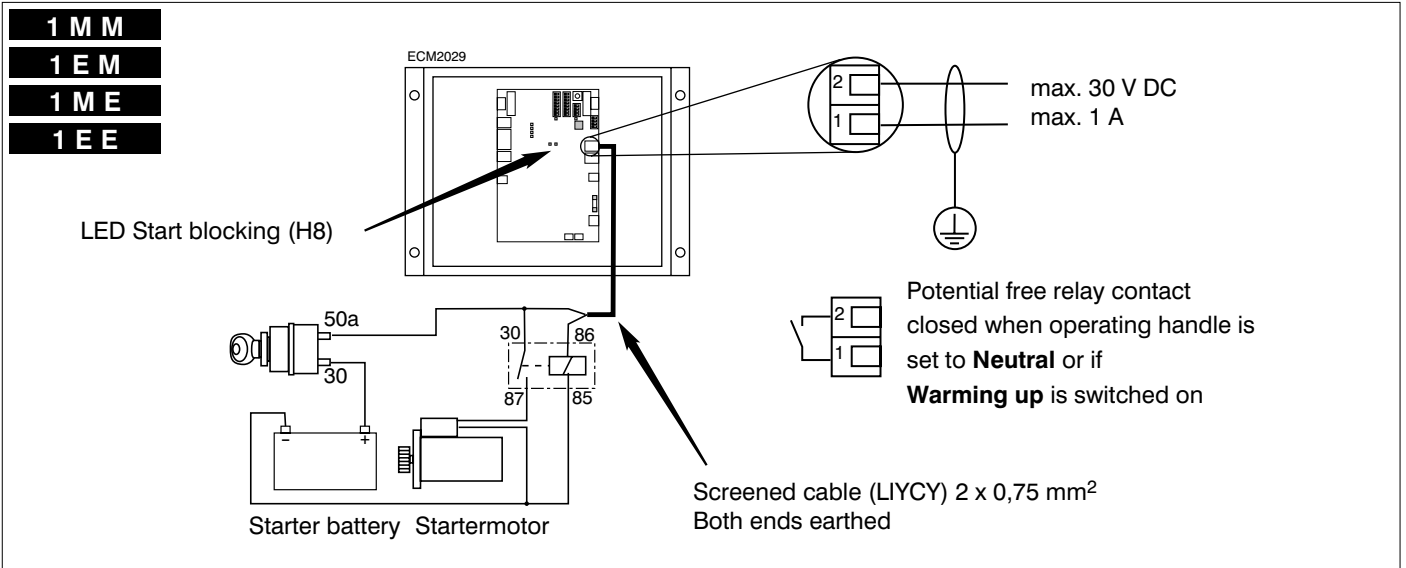
13 Options

13.1 Start blocking

Start blocking prevents the engine from being started when the gearbox is (still) engaged.

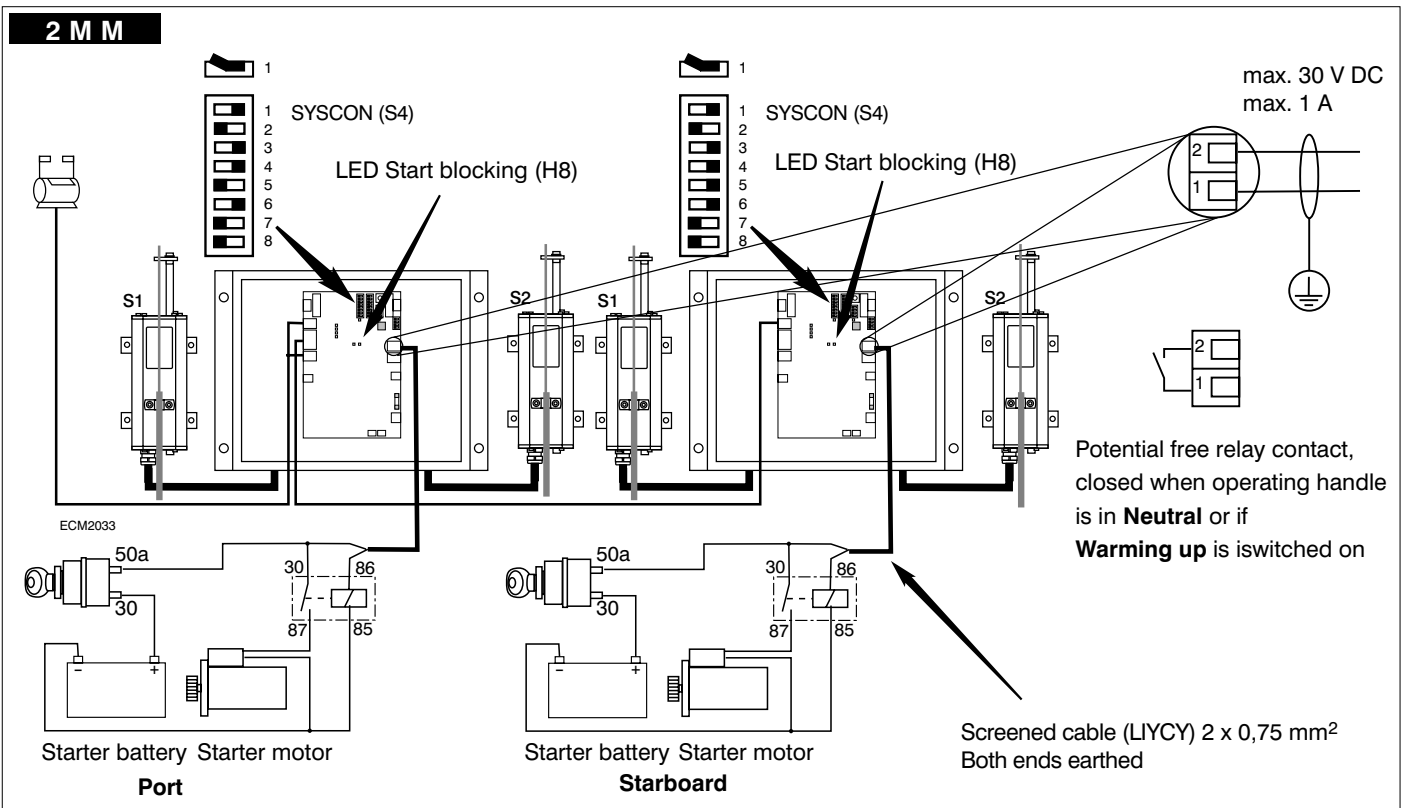
The potential free start blocking relay is closed when the handle of the active steering position is set to 'Neutral' or if 'Warming Up' (see 3.4 Warming Up) is switched on.

13.1.1 Connection start blocking relay with 1 engine

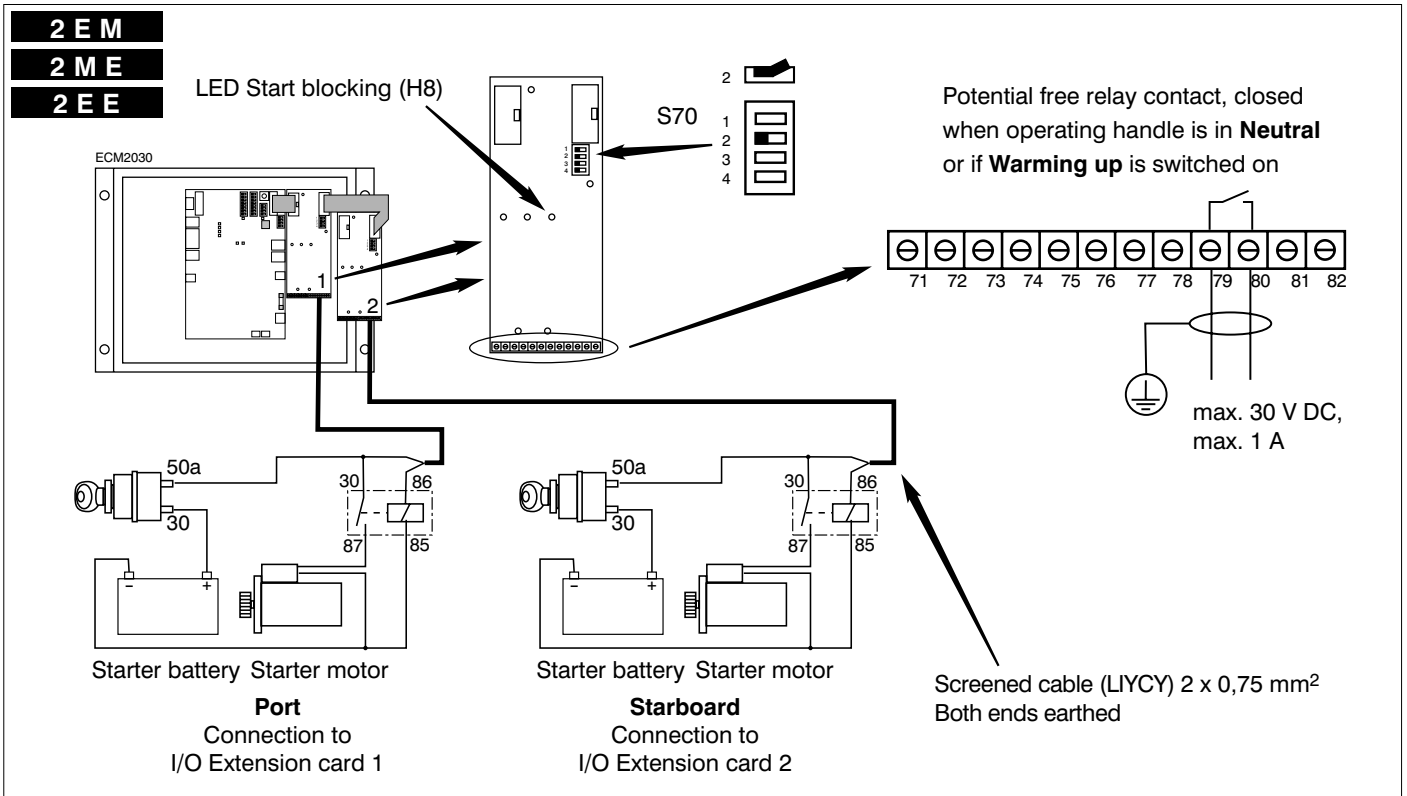


13.1.2 Connection start blocking relay with 2 engines

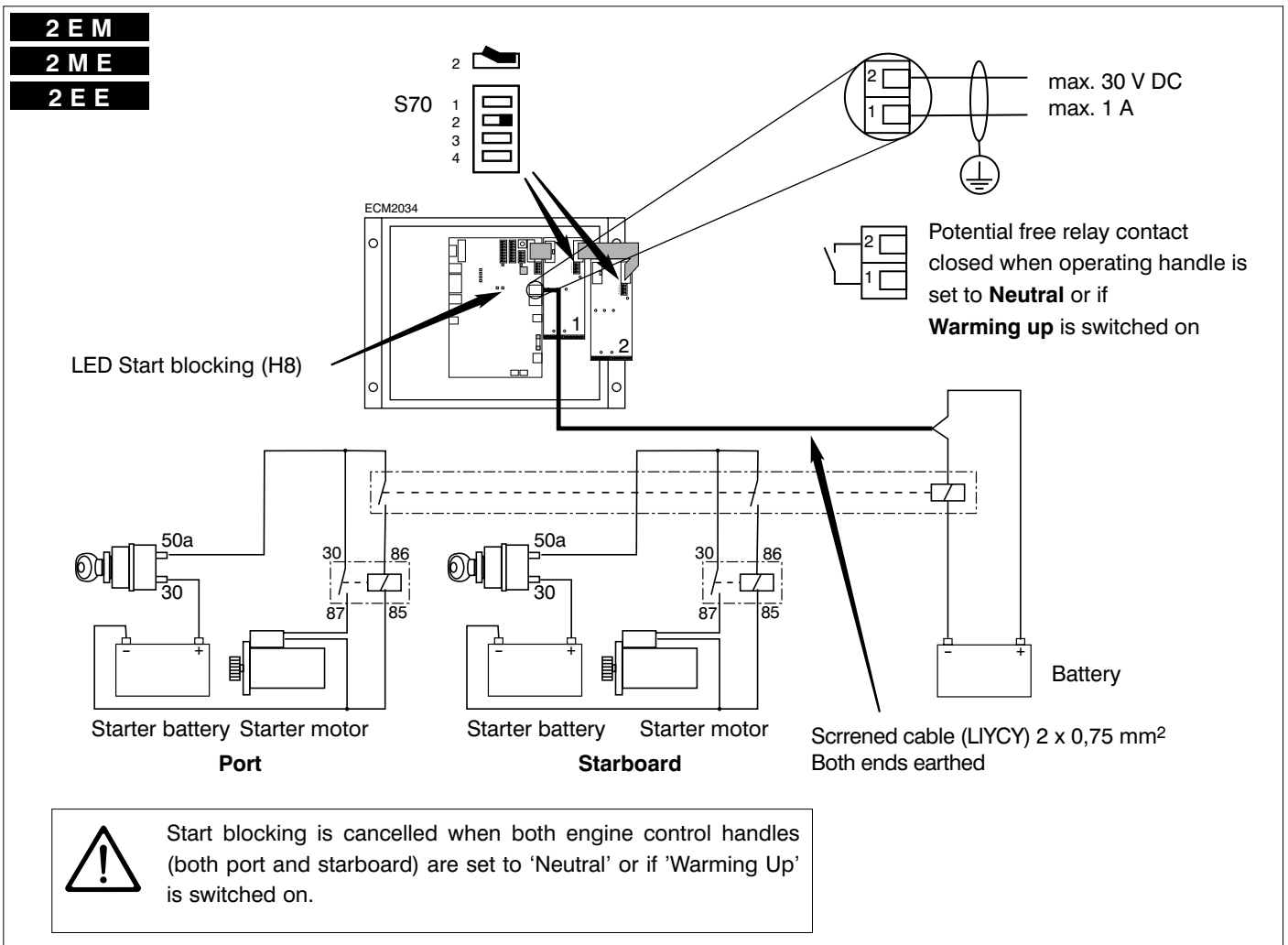
- Engines with mechanical throttle and mechanical operation of the gearbox



- Engines with electrical throttle and/or electrical operation of the gearbox
Without making use of the idle relay



- Engines with electrical throttle and/or electrical operation of the gearbox
Where use is also made of the idle relay



13.2 'Idle' relay

The potential free contact of the relay on the I/O extension card can also be used as 'idle' relay.



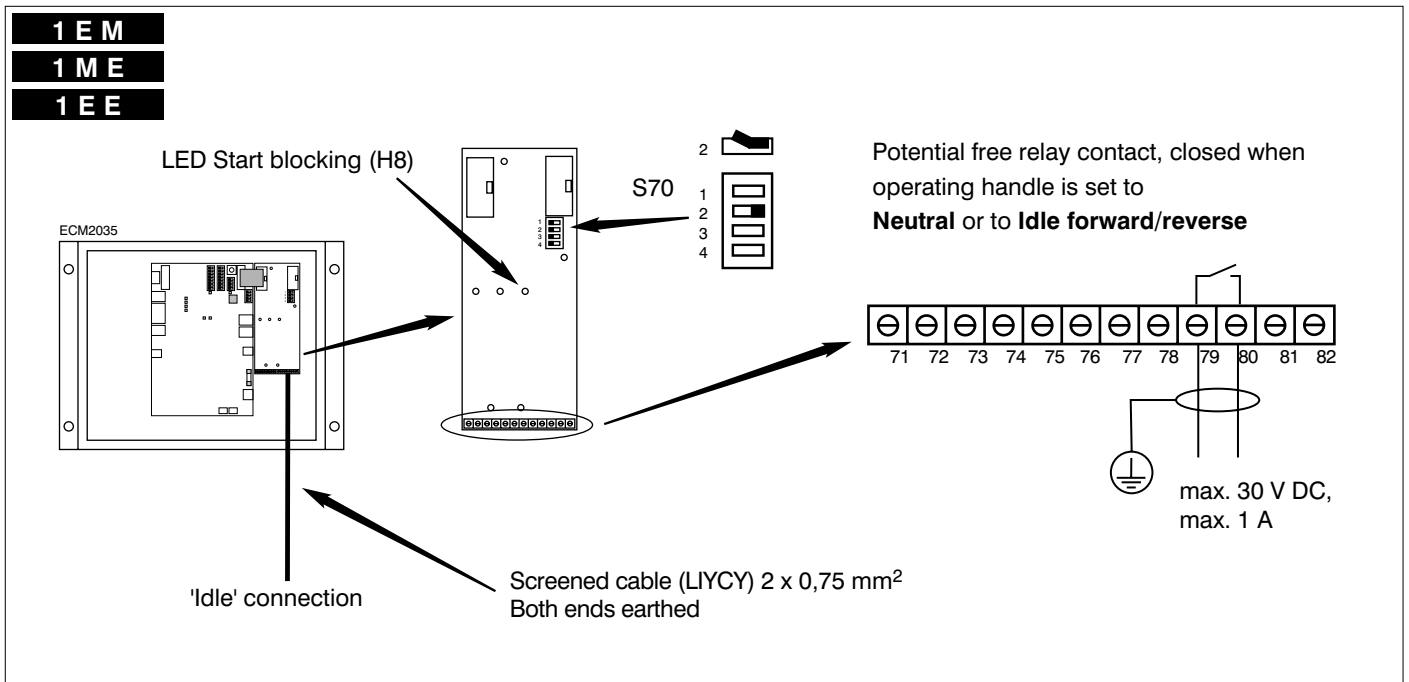
If no I/O extension card has been installed in installations with both a mechanically operated throttle and a mechanically operated gearbox then it is not possible to use the function 'idle' relay.

The 'idle' relay is closed when the handle of the active steering position is set to 'neutral' or to idle forward or reverse.

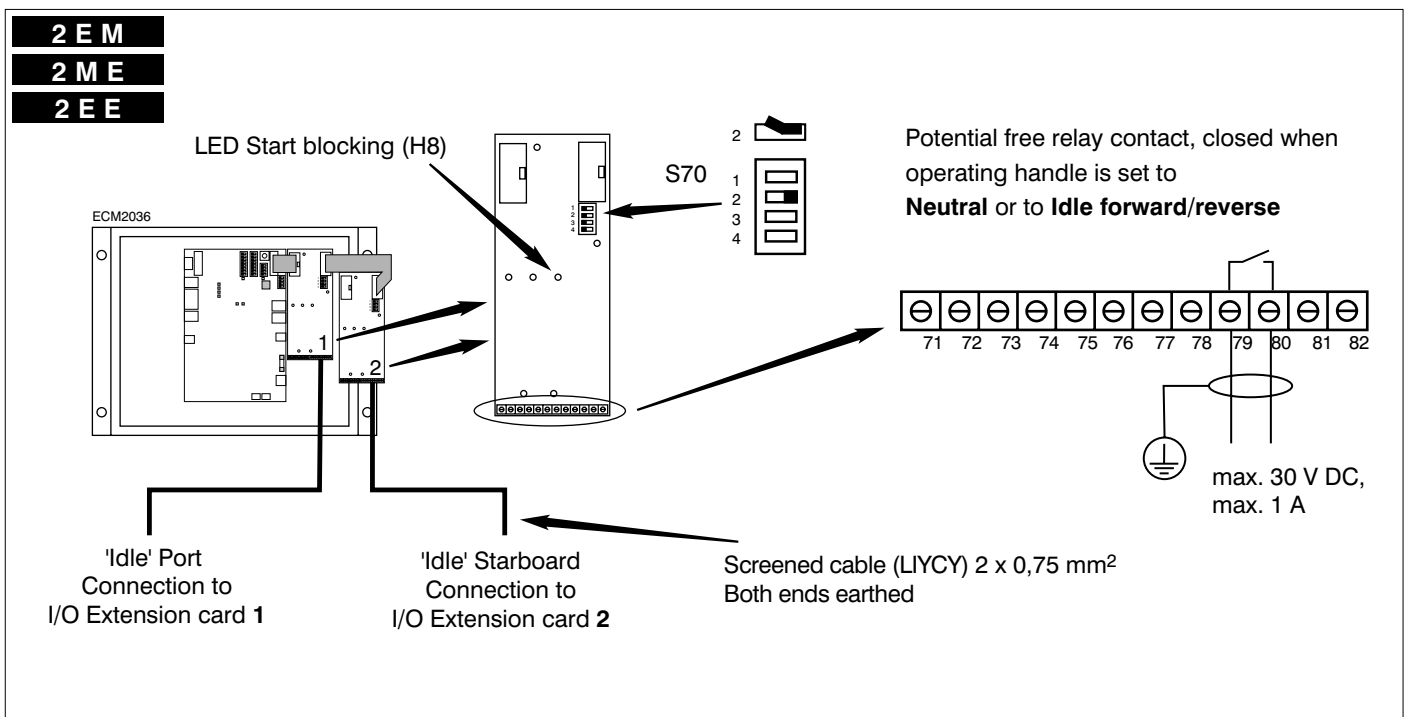


If you make use of the idle function then you cannot use the relay on the I/O extension card for start blocking, see 13.1.

13.2.1 Connection 'idle' relay for 1 engine



13.2.2 Connection 'idle' relay for 2 engines

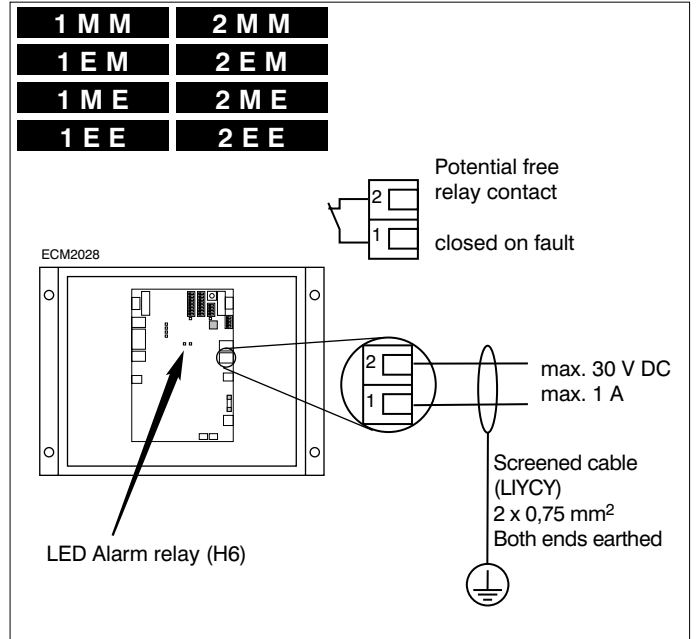


13.3 Alarm relay

If a fault develops the potential free relay contact of the alarm relay is closed on the control module, see chapter 15 'Fault finding'.

This contact can be used to operate a warning lamp or a buzzer.

For installation **2 M M** connect the relay contacts at both control units .

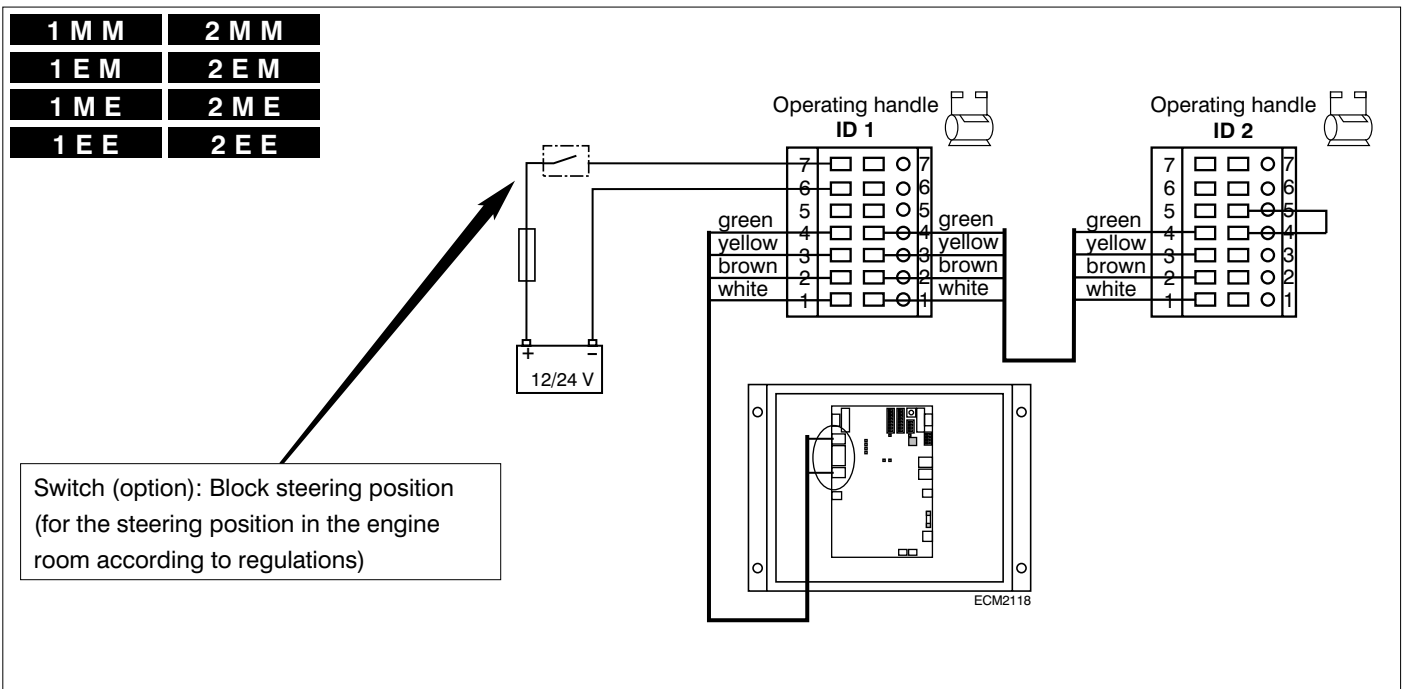


13.4 Changing steering position blocking switch

It is possible to block changing to a new steering position by means of an extra switch.

For example, the steering position in the engine room may be restricted according to regulations.

Connect the switch with the necessary power supply, 12 or 24 V, to the operating handle as shown.



14 Optional settings

14.1 Delay when engaging the gearbox

14.1.1 Delay before engaging (A)

Set the delay before engaging such that the set number of revolutions (see 'setting revolutions' chapters 5 to 12) will always be reached.

14.1.2 Delay after engaging (B)

Set the delay after engaging such that the gearbox will have ample time to engage (this is important if the gearbox does not signal whether or not the change has been made).

If the gearbox does signal that the change has been made then the 'delay after engaging' only begins after the appropriate signal has been received.

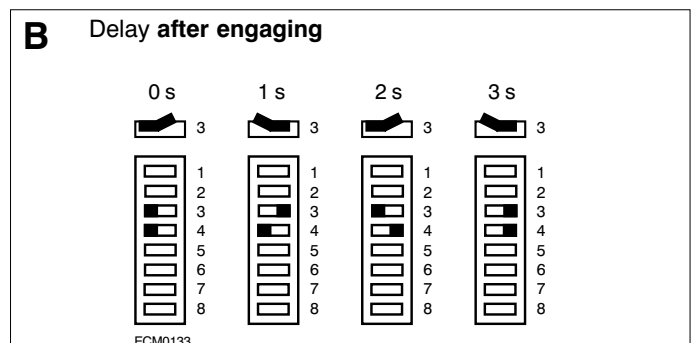
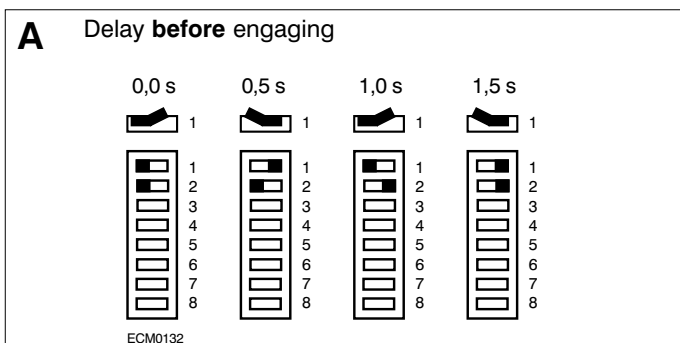
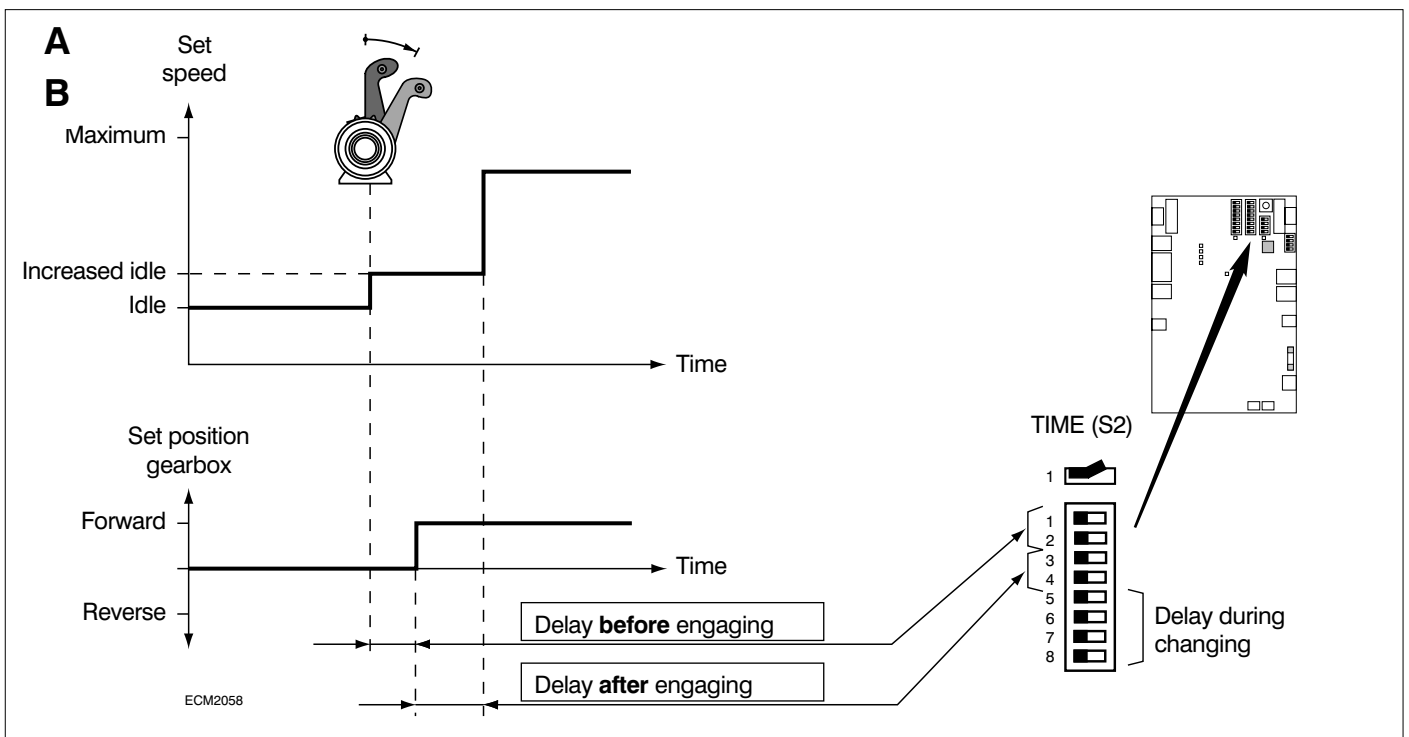
14.1.3 Delay when changing from forward to reverse (C)

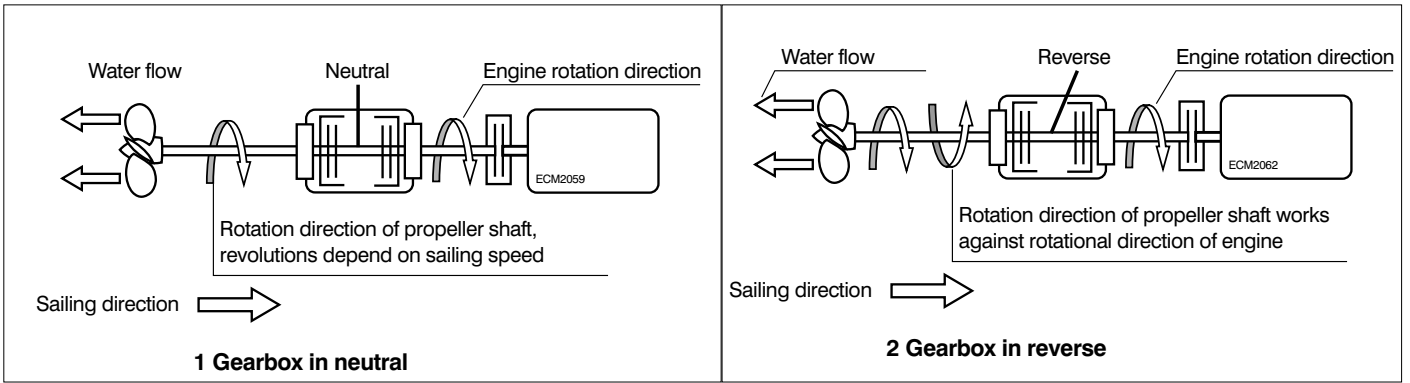
When changing from forward to reverse the gearbox is first put into neutral with the shaft uncoupled from the engine (1). Because the ship still has forward momentum the propeller acts like a windmill driven by the water streaming past, so that the propeller shaft still turns.

If reverse is engaged then the engine has to brake the shaft which is still turning. In unfavourable situations the engine could stall.

In order to prevent this a delay can be introduced (reverse delay) before the change is made. The built-up delay is dependent on the actual setting of the engine control handle and on the time that the handle was in that setting.

The time as set applies only in case of the maximum setting of the handle during a very long time.





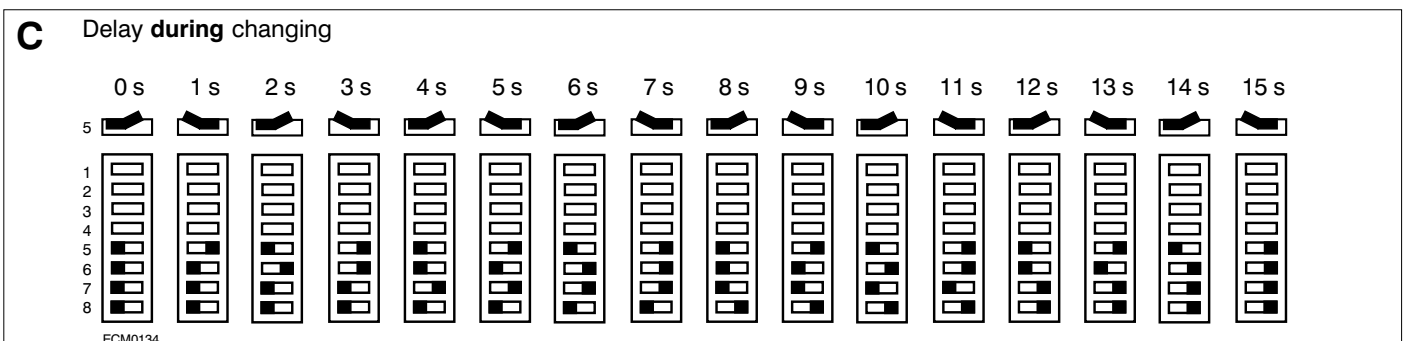
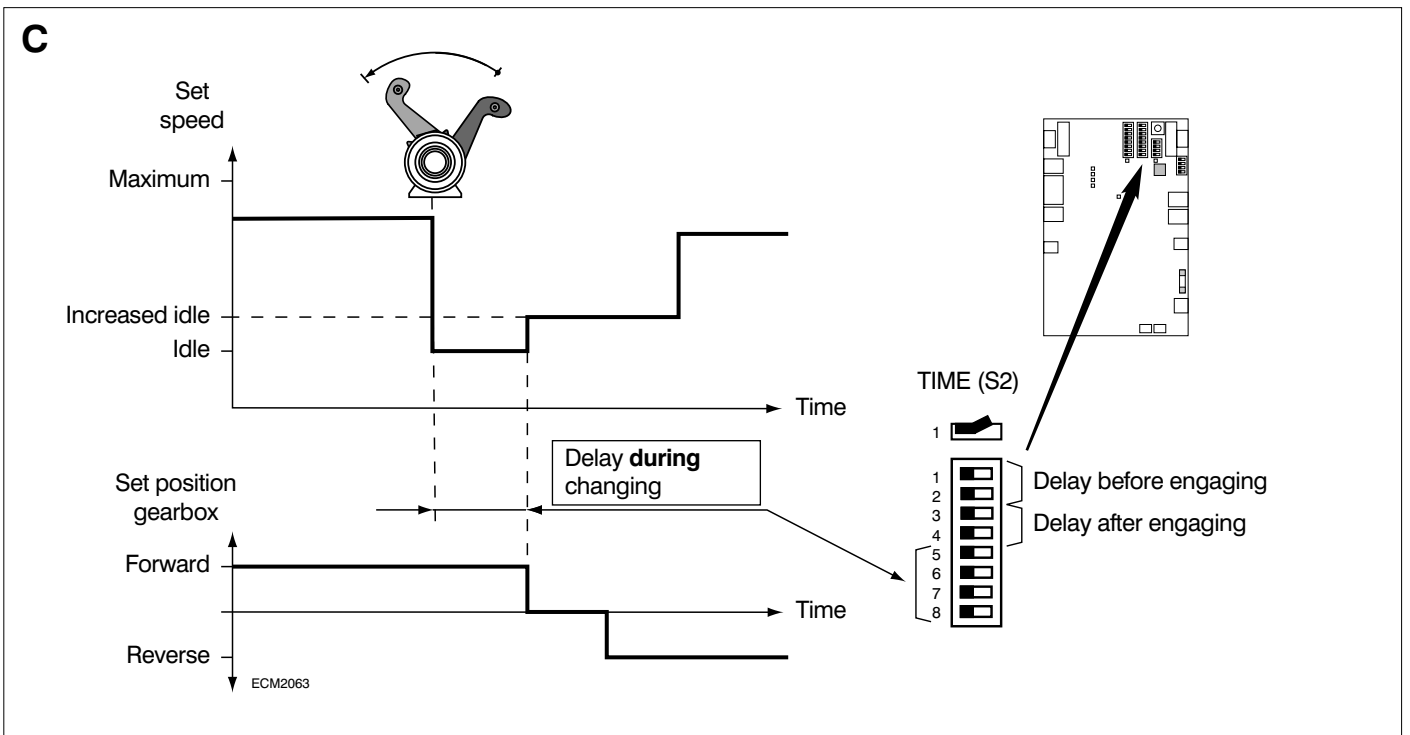
Determine the change delay time by experiment during a test sail. Accelerate the ship from idle forward to full power forward.

The time that the ship requires to reach 2/3 of its maximum speed is the change delay time. Then carry out change manoeuvres at all numbers of revolutions.



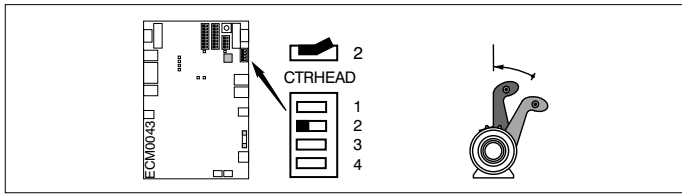
Begin by the lowest number of revolutions and gradually raise these. Adjust the change delay time as required (increase it if the engine revolutions drop too strongly or shorten it if the revolutions do not change appreciably).

Too short a change delay time can damage the clutches, the gearbox and the engine; too long a delay can have a disadvantageous effect on the manoeuvrability of the ship.

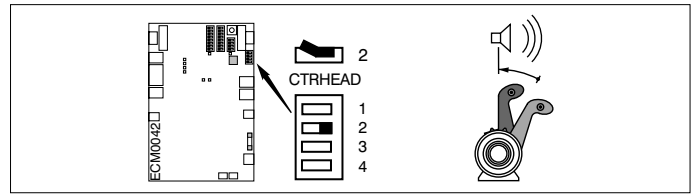


14.2 Buzzer to show neutral

It is possible to let a short bleep be given when the handle of the active steering position has been set to neutral.

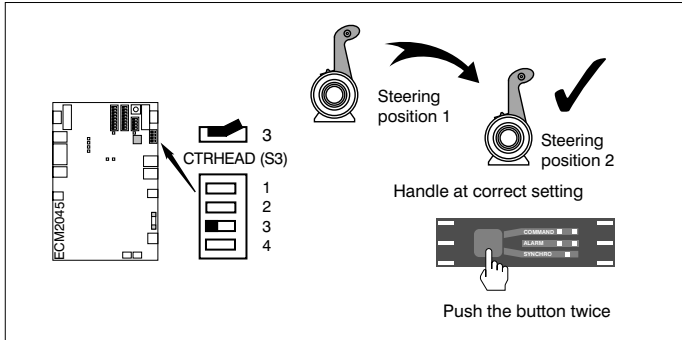


No bleep (standard setting)



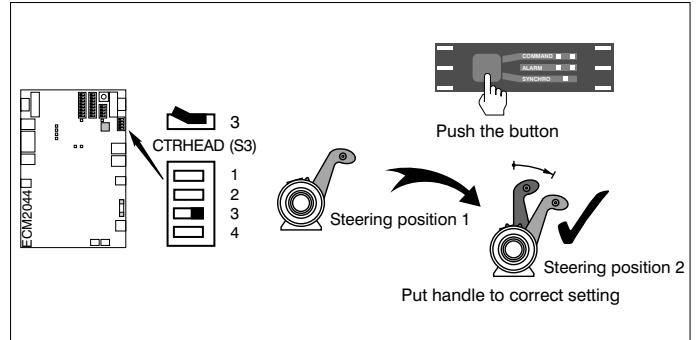
Short bleep when handle set to neutral

Comparison of position and setting



14.3 Position comparison

You can only change steering position if the handle of the new steering position is set the same as the active one (forward, neutral, reverse) or is set to neutral.

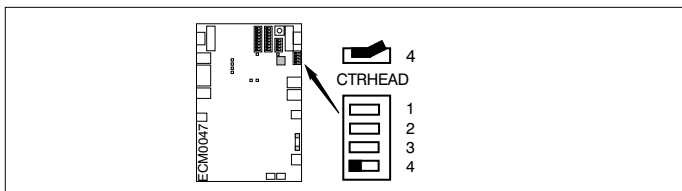


Setting comparison

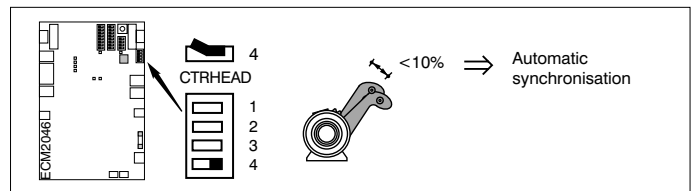
You can only change steering position if the handle of the new steering position is set the same as the active one (forward, neutral, reverse) and at approximately the same position (maximum 30 % difference).

This setting is dependent on the requirements that are valid for your installation.

14.4 Synchronisation



No synchronisation (standard setting).



Synchronisation switched on

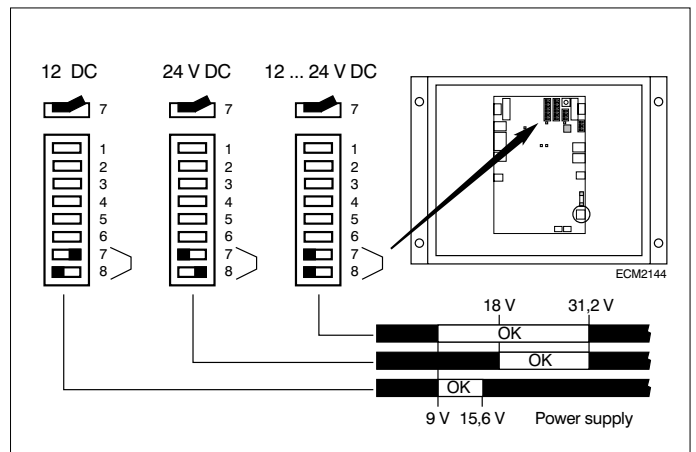
If the difference between the settings of the handles of the port and starboard engines is less than 10 % then the same value is automatically used for both.

14.5 Power supply alarm

The engine remote control works correctly on a voltage between 9 and 31.2 Volt.

Switches 7 and 8 of the SYSCON (S4) switch can be used to choose what voltage will generate a fault alarm.

An alarm will be given when the voltage is outside that which is judged as 'OK'.



14.6 Resetting the default settings



If you reset the standard settings the revolutions and gearbox settings are restored to the values originally supplied.

You cannot revoke this afterwards. The correct values will have to be entered again as described in chapters 5 to 12!

You may only reset the standard values when the engine is switched off. Where there is mechanical control the pull-push cables must be disconnected first.

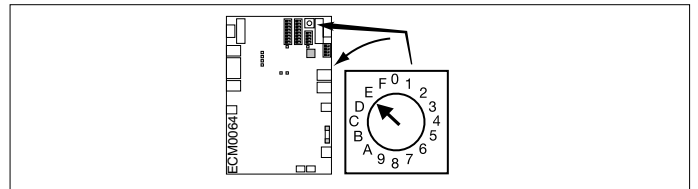
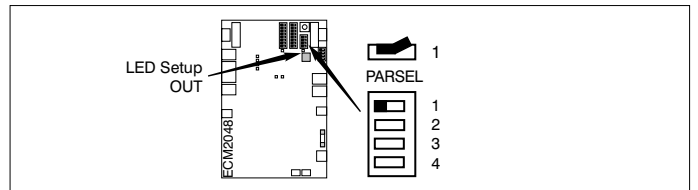
1 Initial situation

The standard settings can be reset when the engine remote control is switched on and a steering position is active and the handle (or handles if two engines) is/are set to neutral.

2 Choose standard settings

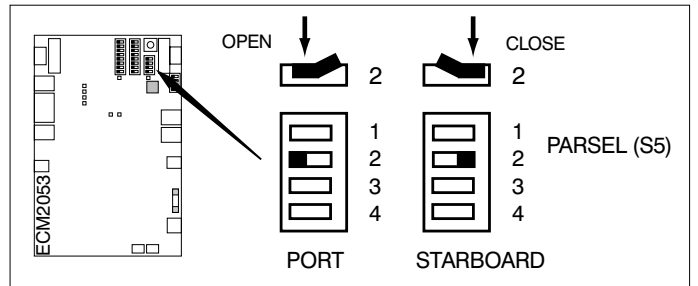
Set the **PARSEL (S6)** selector switch to position E.

Use PARSEL (S5) switch 1 to choose between RUN and SETUP mode.



Carry out steps 3 and 4 for the port engine with PARSEL (S5) switch 2 in the 'OPEN' position.

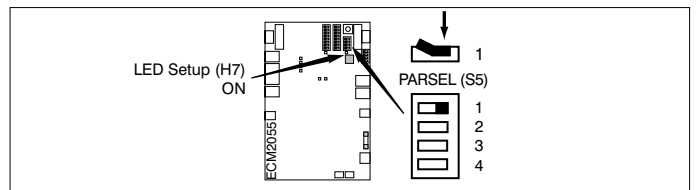
Repeat steps 3 and 4 for the starboard engine with PARSEL (S5) switch 2 in the 'CLOSE' position.



3 Change from RUN to SETUP.

Change PARSEL (S5) switch 1 to do this.

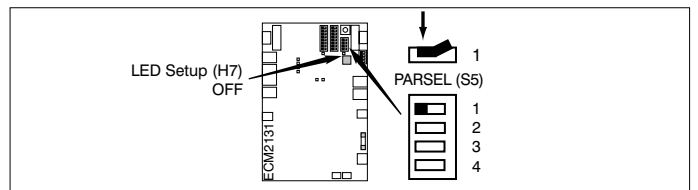
The standard settings become active.
Setup LED lights up.



4 Store the standard settings.

Set PARSEL (S5) switch 1 back to position 'OPEN' in order to switch back to RUN.

Setup LED goes out.



15 Fault finding

15.1 Fault warning at the steering position

There are two different sorts of faults:

15.1.1 Alarm

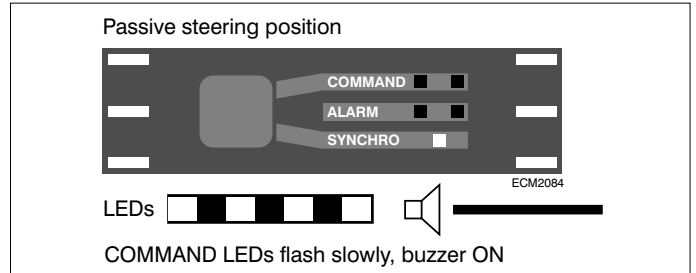
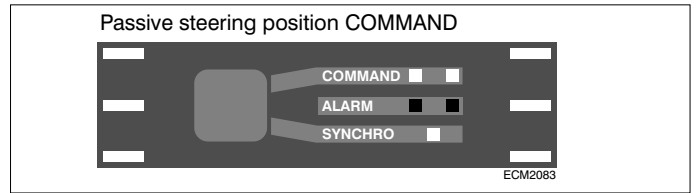
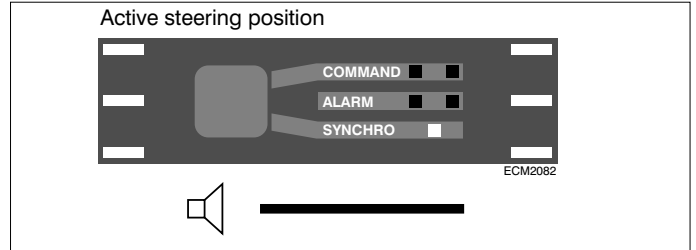
When an alarm is given it is no longer possible to give sailing commands (throttle or operation of the gearbox). The red alarm lamp on the active steering position lights up and the buzzer sounds. You can cancel the buzzer by pushing the button.

The Command lamps show whether the engine controls are active or passive, i.e. whether commands can be given from that steering position or not.

When there is an alarm the alarm relay is activated. As well as this, if the remaining functionality of the control system is sufficient to allow it, the system switches to idle speed and sets the gearbox to neutral.

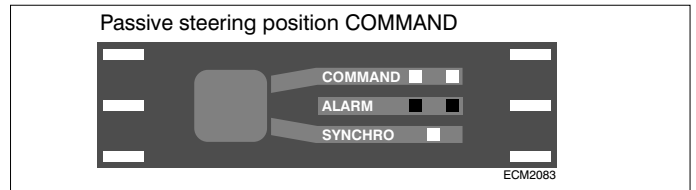
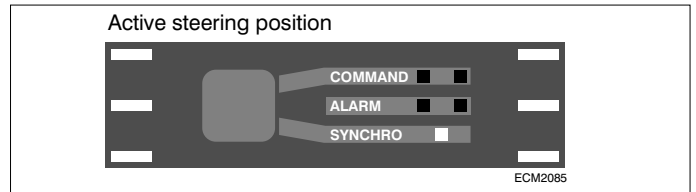
Exception:

If the active steering position is faulty then the passive positions activate their buzzers and switch to "Choose steering position".



15.1.2 Warning

Where there is a warning sailing commands can still be given. The red lamp lights up but the buzzer does not sound.



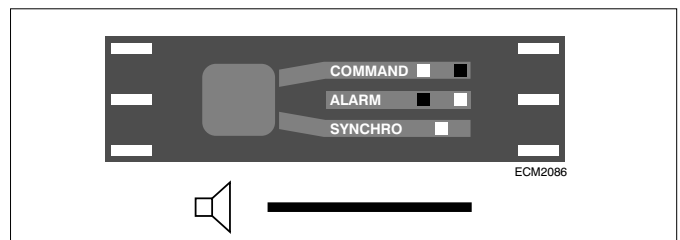
Two engines

Where there are two engines both have their own Alarm and Command lamps, so that combinations of the above situations can occur. The buzzer will sound as soon as either the port or starboard side gives an alarm.

Example for two engines:

Alarm on port side, no fault on starboard side

The starboard side has no faults and this is the active steering position. Port gives an alarm and no more sailing commands can be given from this steering position to the port engine.

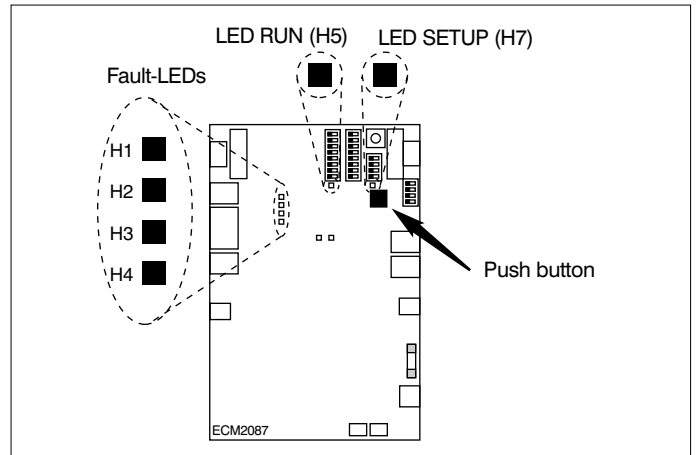


15.2 Fault warning from the control module

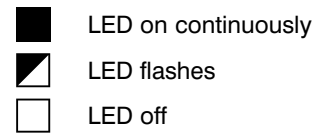
There are four LEDs which can signal faults. The top LED is red in order to recognise the order of the LEDs quickly.

Two other LEDs (RUN, SETUP) show the working of the control module.

By pushing the button other fault warnings can be shown in cases where more than one fault occurs at the same time.



Explanation of the LED symbols:



15.2.1 Summary of fault reports:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
LED H1	■	■	■	■	■	■	■	■	▣	▣	▣	▣	▣	▣	▣	▣	□	□	□	□	□	□	□	□	□
H2	□	■	□	■	□	■	□	■	□	■	□	■	□	■	□	■	■	□	■	□	■	□	■	■	□
H3	□	□	■	■	□	□	■	■	□	□	■	■	□	□	■	■	□	■	□	■	■	□	□	■	■
H4	□	□	□	□	■	■	■	■	□	□	□	□	■	■	■	■	□	□	□	□	□	■	■	■	■
RUN H5	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	■	■	■	■	■	■	□	□	□
SET UP H7	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	■	■	□	□	□	□	■	■	■
ECM2129	See 15.2.2							See 15.2.3							See 15.2.4			See 15.2.5							

The fault reports can be grouped as follows:

- The red LED (H1) is on continuously, see 15.2.2
- Red LED (H1) flashes, see 15.2.3
- Initialisation position (LEDs for RUN and SETUP on), see 15.2.4
- RUN- or SETUP position (LED for RUN on or LED for SETUP on), see 15.2.5

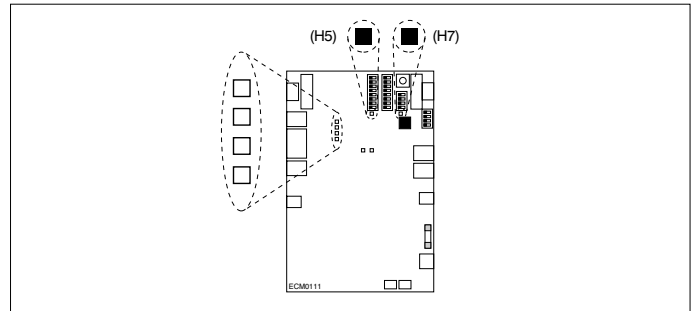
15.2.2 De rode LED (H1) licht continu op

Fault report and type	Description	Solution
1 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> HARDWARE 3 <input type="checkbox"/> 4 <input type="checkbox"/>	Hardware fault in the control module print plate.	Replace the print plate.
2 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> PARAMETER 3 <input type="checkbox"/> 4 <input type="checkbox"/>	The control module parameter memory is faulty.	Reset the parameters to the standard settings (see section 14.6). If the fault persists replace the print plate.
3 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> SOFTWARE 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/>	The control module software is faulty (e.g. EPROM is loose). The print plate must be replaced.	Switch off the control module and then switch it on again. If necessary replace the print plate.
4 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> CAN 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/>	The CAN controller reports a fault. .	Check the wiring to the operating handles. Check the short circuit bridges (see sections 4.3 and chapters 5 to 12). There may be a short circuit in the cables.
5 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> ACTUATOR 1 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/>	The configuration is such that servo motor 1 operates a mechanical gearbox or throttle. The control module however detects a fault in the control of the servo motor.	<p>Check that the servo motor 1 plug is correctly connected to the control module print plate (see chapters 5, 6, 7, 9, 10 and 11).</p> <p>Check where necessary the connection of servo motor 1 to the connection of servo motor 2 to the control module. If the servo motor is working faultlessly then the control module print plate is faulty and must be replaced. Otherwise replace the servo motor.</p>
6 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> ACTUATOR 2 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/>	The configuration is such that servo motor 2 operates a mechanical gearbox or throttle. The control module however detects a fault in the control of the servo motor.	<p>Check that the servo motor 2 plug is correctly connected to the control module print plate (see chapters 5, 6, 7, 9, 10 and 11).</p> <p>Check where necessary the connection of servo motor 2 to the connection of servo motor 1 to the control module. If the servo motor is working faultlessly then the control module print plate is faulty and must be replaced. Otherwise replace the servo motor.</p>
7 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> I/O-CARD 1 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/>	The configuration is set such that the I/O extension card 1 operates an electrically controlled gearbox or throttle. The control module however detects a fault in the control of the I/O extension card 1.	<p>Check the connecting cable between the I/O extension card 1 and the control module (see chapters 6, 7, 8, 10, 11 and 12).</p> <p>If necessary replace the connecting cables and/or the I/O extension card.</p>
8 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> I/O-CARD 2 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/>	The configuration is set such that the I/O extension card 2 operates an electrically controlled gearbox or throttle. The control module however detects a fault in the control of the I/O extension card 2.	<p>Check the connecting cable between the I/O extension card 2 and I/O extension card 1 and that between I/O extension card 1 and the control module (see chapters 6, 7, 8, 10, 11 and 12).</p> <p>If necessary replace the connecting cables and/or the I/O extension card.</p>

15.2.3 Red LED (H1) flashes

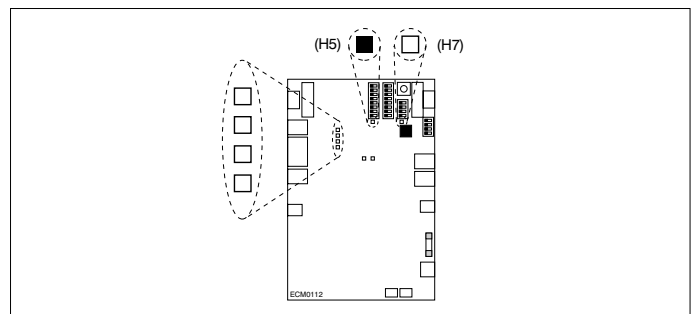
Fault report and type	Description	Solution
9 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> SYN-CARD (only a warning)	The synchronisation extension card is missing.	Check the connecting cable between the synchronisation card and the control module print plate (see the synchronisation card documentation). If necessary replace the synchronisation card.
10 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> SYN-SIG (only a warning)	The synchronisation card cannot measure the revolutions	Check the connecting cable leading to the revolutions sensor (see the synchronisation card documentation). If necessary replace the revolutions sensor or the synchronisation card.
11 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> ACT-CTR	The control module reports that the active steering position is completely out.	Check the connecting cable leading to the engine controls. Check that the necessary short circuit bridges are in place. Check the power cable to the engine controls LED. Check the ID setting. If necessary replace the engine control. (See section 4.3 and chapters 5 to 12).
12 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/> ACT-CTR-HW	The hardware of the earlier active operating handle reports a fault (e.g. a defective potentiometer).	Replace the operating handle.
13 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> POWER	The voltage lies outside the allowed range (see 14.5) (for 24 V: 18 ... 31,2 V, for 12 V: 9 ... 15,6 V, if no voltage range has been set 9 ... 31,2 V)	Charge the power battery.
14 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/> TEMPERATURE	The temperature is outside the allowed range (-25 ... +70°C)	The control module may only be used within the allowed temperature range.
15 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> TWIN	The configuration is set as in chapter 9 for 2 engines – with mechanical operation of the gearbox and throttle. The communication between port and starboard is not working.	Check the connecting cables between the controls and check whether the necessary short circuit bridges are in place (see chapter 9). Check the power cables of both controls (LED status, see chapter 9). If necessary replace the synchronisation card.
16 1 <input checked="" type="checkbox"/> 2 <input checked="" type="checkbox"/> 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/> SYSCON (only a warning)	One of the SYSCON switches for configuring the installation has been reversed while running. This is not allowed. The SYSCON switches may only be changed when no power is connected. Or the SYSCON switches are in an incorrect position.	If a SYSCON switch has been changed by accident then reset the correct position as described in chapters 5 to 12. If the switch has been deliberately changed switch the control off and on in order to register the change.

Warnings can also be given. The red fault LED 1 does not light up by warnings. In the case of warnings you must also check the actual operating situation.



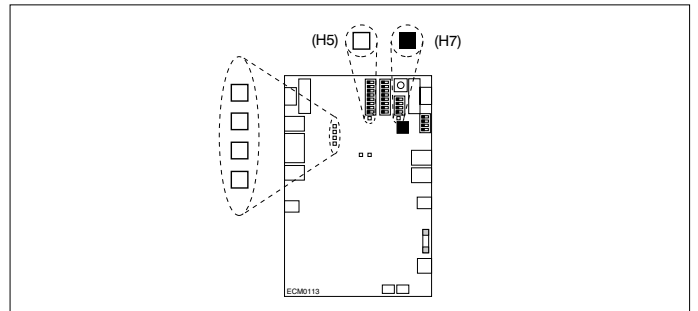
15.2.4 Initialisation position (LEDs for RUN (H5) and SETUP (H7) on)

Fault report and type	Description	Solution
17 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> TWIN-MASTER 3 <input type="checkbox"/> 4 <input type="checkbox"/>	The SYSCON switch on the starboard side has been set wrongly for two engines with mechanical operation.	Set the SYSCON switch on the starboard side correctly for two engines with mechanical operation (see chapter 9).
18 1 <input type="checkbox"/> 2 <input type="checkbox"/> TWIN-SLAVE 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/>	The SYSCON switch on the port side has been set wrongly for two engines with mechanical operation.	Set the SYSCON switch on the port side correctly for two engines with mechanical operation (see chapter 9).



15.2.5 RUN-position or SETUP-position (LED for RUN (H5) on or LED for SETUP (H7) on)

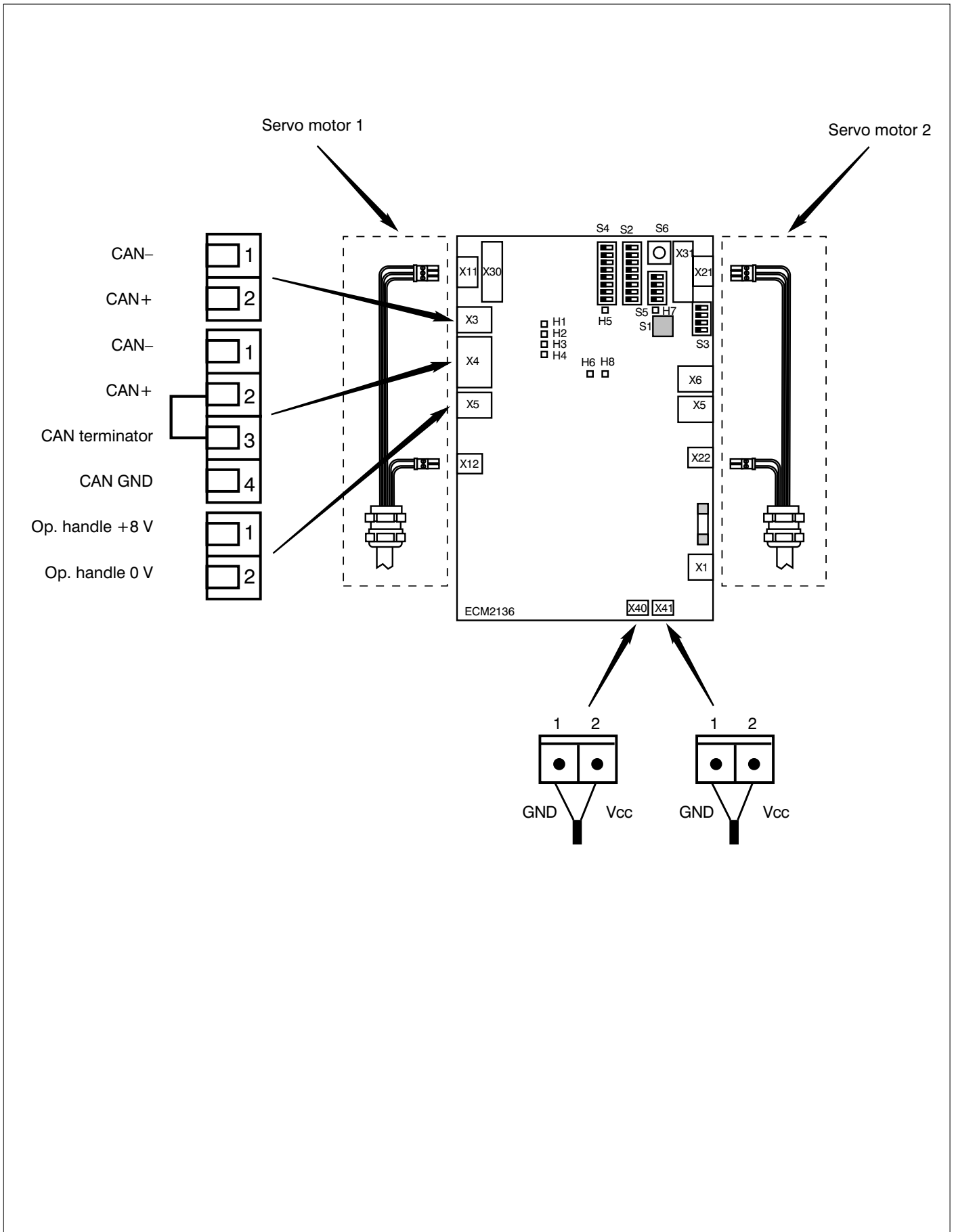
Fault report and type	Description	Solution
19 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> GEAR MASTER 3 <input type="checkbox"/> 4 <input type="checkbox"/>	Report back signal for the operation of the gearbox has been set on the I/O extension card (see chapters 7, 8, 11 and 12). This report back (by two engines on the port side) does not give any signals. The control works without receiving a signal from the gearbox.	Check the pressure sensor in the gearbox. Check the LEDs on the I/O extension card (the reporting LED shows forward or reverse, or a combined report back signal). Check the wiring.
20 1 <input type="checkbox"/> 2 <input type="checkbox"/> PAS-CTRL 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/>	The control module reports that a passive operating handle is completely out.	Check the wiring (see section 4.3 and chapters 5 to 12). Check the LED power signal of the defective passive operating handle. If necessary replace the operating handle.
21 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> PAS-CTRL-HW 3 <input checked="" type="checkbox"/> 4 <input type="checkbox"/>	The hardware of a passive operating handle is defective (e.g. a defective potentiometer).	Replace the defective operating handle.
22 1 <input type="checkbox"/> 2 <input type="checkbox"/> GEAR SLAVE 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/>	Report back signal for the operation of the gearbox has been set on the I/O extension card (see chapters 7, 8, 11 and 12). This report back (by two engines on the starboard side) does not give any signals. The control works without receiving a signal from the gearbox.	Check the pressure sensor in the gearbox. Check the LEDs on the I/O extension card (the reporting LED shows forward or reverse, or a combined report back signal). Check the wiring.



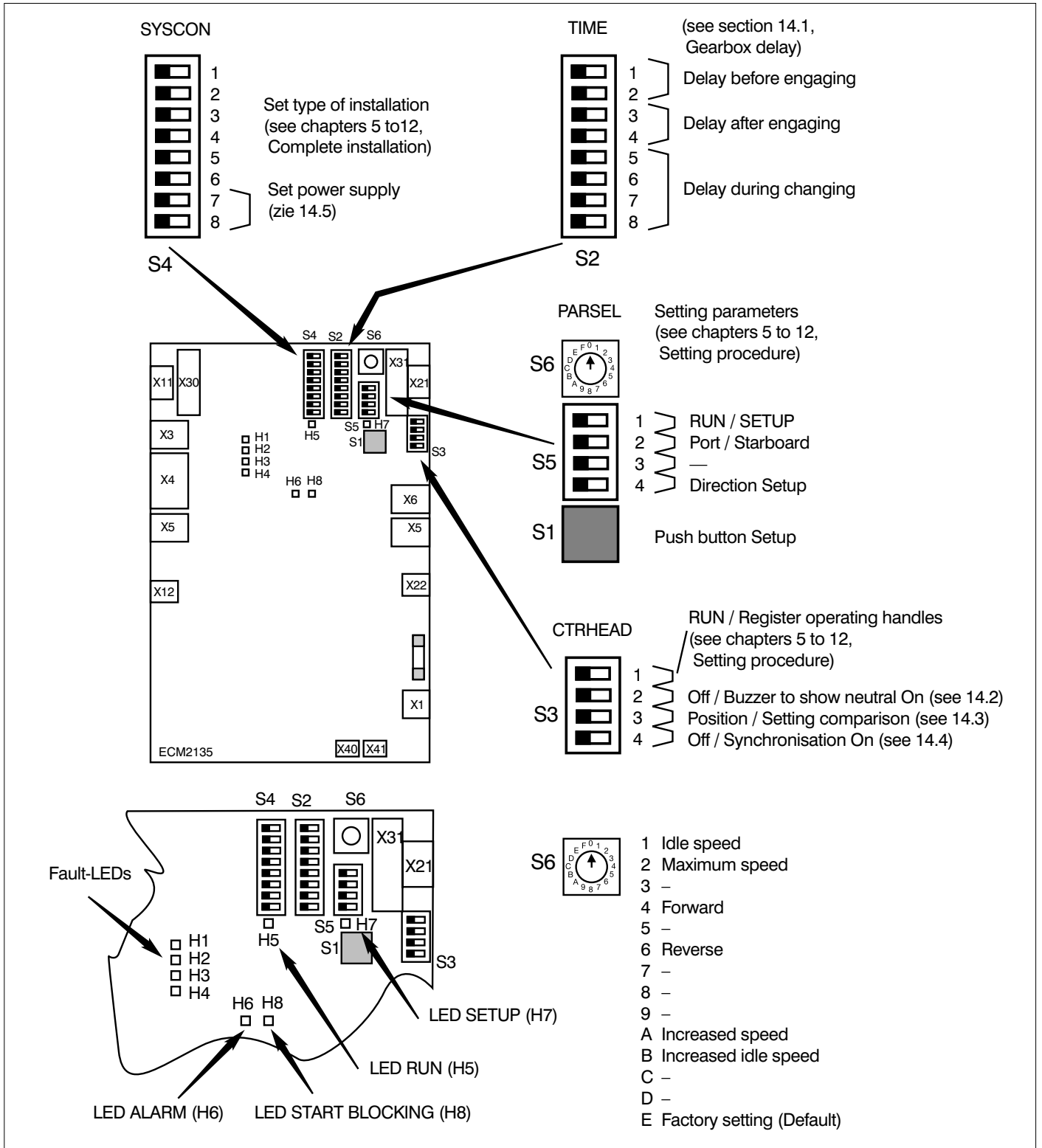
Fault report and type	Description	Solution
23 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> CTRL-POS 3 <input type="checkbox"/> 4 <input checked="" type="checkbox"/>	In order to set the parameters for the number of revolutions and the gearbox the active operating handle must be set correctly (see chapters 5 to 12). This particular setting of the handle does not allow the parameters to be set.	Change to RUN (setting procedure in chapters 5 to 12). Set the handle correctly and reset the parameters.
24 1 <input type="checkbox"/> 2 <input checked="" type="checkbox"/> PROCEDURE 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/>	You are not setting the parameters in the correct order (e.g. you have turned the PARSEL switch during Setup mode).	Switch to RUN (setting procedure in chapters 5 to 12). Set the handle correctly and reset the parameters.
25 1 <input type="checkbox"/> 2 <input type="checkbox"/> ADJUST 3 <input checked="" type="checkbox"/> 4 <input checked="" type="checkbox"/>	During the setting of the parameters you are attempting to set a parameter which according to the configuration does not exist (e.g. revolutions on starboard side when there is only one engine). Or you have set the rotating PARSEL switch to an invalid value.	Set the switches and the rotating PARSEL switch correctly.

16 Appendices

16.1 Control module - connections



16.2 Control module – input and output



Control module setting possibilities

The settings of the SYSCON switches (system configuration) must be in agreement with the type of system used. The settings are shown on the installation drawings (Complete installation) in chapters 5 to 12.

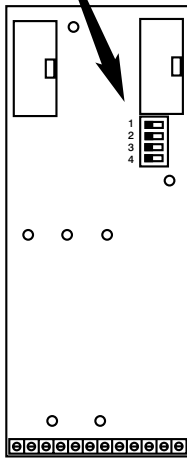
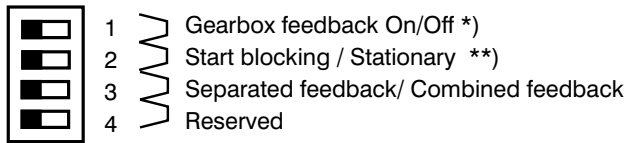
The **TIME** switches determine the delays when engaging the gearbox. This is described in Section 14.1, Gearbox.

The **PARSEL** switches (parameter selection) can be used to set parameters, such as the idle and nominal revolutions by mechanical throttle and the gearbox position for forward and reverse by mechanical operation of the gearbox, as well as parameters for special functions (see chapters 5 to 12, Setting procedure).

The **CTRHEAD** switches (control head) determine the working of the engine controls (as described in chapter 14).

16.3 I/O Extension card

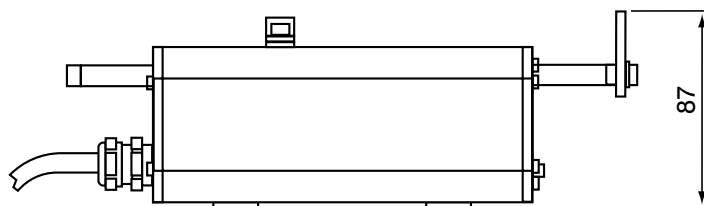
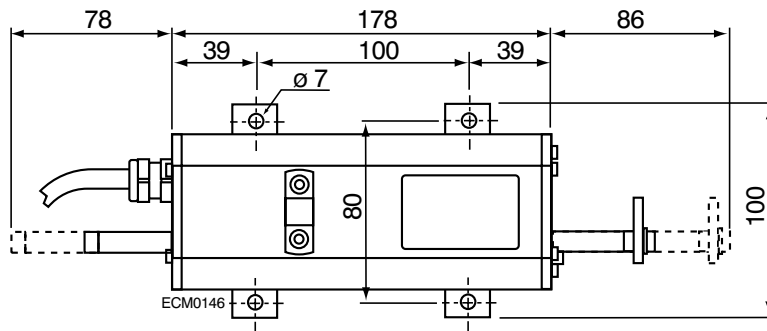
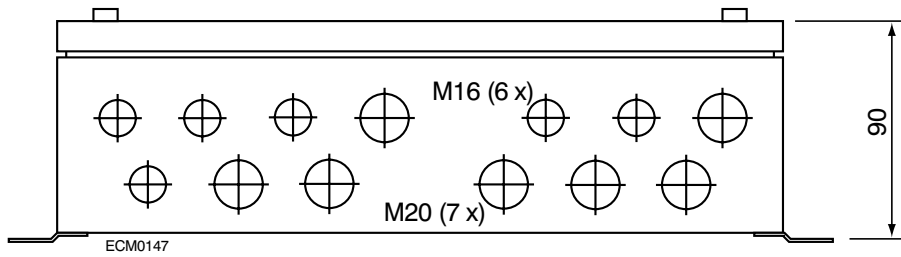
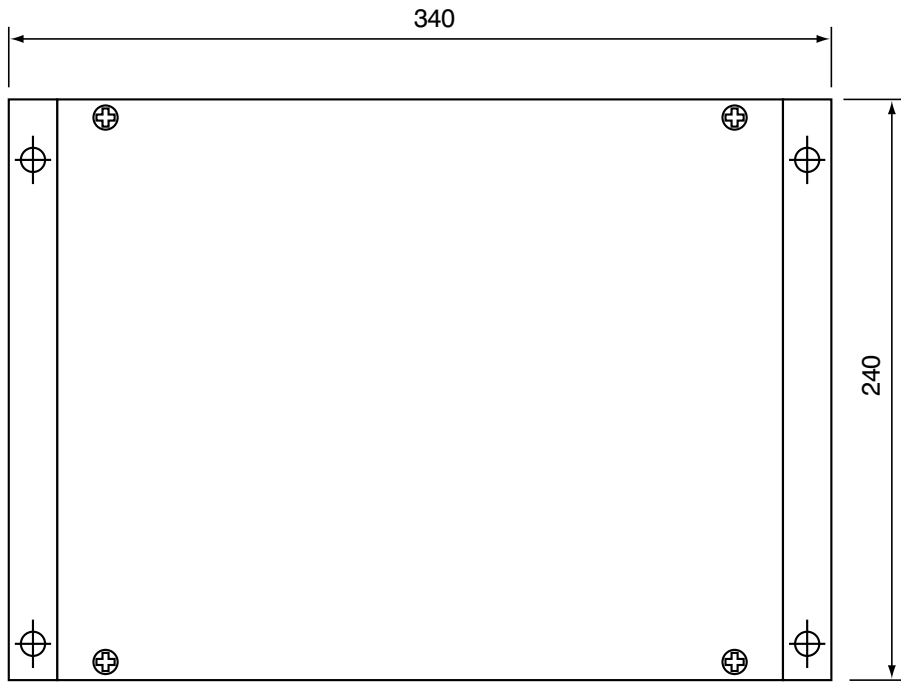
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The I.O. extension card only works correctly if switch 4 is in the position shown above.

- *) see chapters 7, 8, 11 and 12, Connections electrically operated gearbox
- ***) see section 13.1

17 Main dimensions



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FOKKERSTRAAT 571 - 3125 BD SCHIEDAM - HOLLAND - TEL.: +31 10 4377700
TELEX: 23470 - TELEFAX: +31 10 4152634 - 4153249 - 4372673 - 4621286

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