



# RV Motor Starting Relay and Capacitor

## INSTRUCTION MANUAL

DESCRIPTION	ITEM NUMBER
RV Motor Starting Relay	A07199041
RV Motor Capacitor	E21917006
Motor starting relay kit (Europe/USA)	A07108732
Motor starting relay kit (Japan)	A07108733

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We accept no liability for loss of profit, loss of market or any other indirect or consequential loss whatsoever.

Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

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# 1. Safety and compliance

## 1.1 Definition of Warnings and Cautions

### NOTICE:



For safe operation from the start, read these instructions carefully before you install or commission the equipment and keep them safe for future use.

Read all the safety instructions in this section and the rest of this manual carefully and make sure that you obey these instructions. The equipment must only be operated and maintained by trained personnel in the proper condition and as described in this instruction manual.

Obey local and state requirements and regulations. If you have any questions about safety, operation or maintenance of the device, please contact our nearest subsidiary.

Important safety information is highlighted as warning and caution instructions. Obey these instructions.



### WARNING:

If you do not obey a warning, there is a risk of injury or death. Different symbols are used according to the type of hazard.



### CAUTION:

If you do not obey a caution, there is a risk of minor injury, damage to equipment, related equipment or process.



### NOTICE:

Information about properties or instructions for an action which, if ignored, will cause damage to the pump or the system.

We reserve the right to change the design and the stated data. The illustrations are not binding.

Keep the instructions for future use.

## 1.2 Trained personnel







“Trained personnel” for the operation of this equipment are

- skilled workers with knowledge in the fields of mechanics, electrical engineering, pollution abatement and vacuum technology and
- personnel specially trained for the operation of vacuum pumps.

### 1.3 Safety symbols

The safety symbols on the products show the areas where care and attention is necessary.

The safety symbols that follow are used on the product or in the product documentation.

	Warning/Caution An appropriate safety instruction must be followed or caution to a potential hazard exists.
	Warning - Heavy object Identifies a possible hazard from a heavy object.
	Warning - Dangerous voltage Identifies possible hazards from dangerous voltages.
	Warning - Hot surfaces Identifies a potential hazard from a hot surface.
	Warning - Use protective equipment Use appropriate protective equipment for the task.
	Warning - Risk of explosion There is a risk of explosion when you do the task.

## 2. Important safety information

- Vacuum pumps are potentially dangerous if incorrectly used, repaired or maintained. Be cautious when you do the repair or maintenance work.
- Any incorrectly fitted spare parts could damage your pump and could be potentially dangerous.
- Never allow unqualified personnel to attempt to remove or replace any part of the pump.
- If you have any doubts about the servicing procedures or product capabilities, contact us.
- Always conform to service schedules unless more frequent servicing is required due to adverse conditions.
- Report any defect before an accident or consequential damage can occur.
- Observe all local and national regulations, norms and guidelines.
- Never allow anyone to remove large or heavy components without adequate lifting equipment.
- Before you start the maintenance work, make sure that the pump is switched off and isolated from the mains power supply.
- The pump may have been exposed to processes that use hazardous substances or produces by-products that are dangerous to human health and safety, for example, chemically active, biologically active or radioactive substances.
- Before working on a pump, make sure that the correct personal protective equipment is available and being used. Always wear safety goggles. Wear a breather mask with positive air pressure and take other precautions if you believe the pump may be contaminated with hazardous substances and dust.
- When applying sealants and lubricants, prevent contact with the skin by wearing suitable gloves.
- Seals may contain fluoroelastomer, which when properly handled is not dangerous but which may produce a toxic and corrosive residue (hydrogen fluoride or hydrofluoric acid) in the event of excessive heat or fire depending on the circumstances of degradation and other materials involved.
- On completion of maintenance, check the pump functions correctly and that all guards and protection devices are fitted and working correctly and that the pump is electrically safe.
- If the pump is used for handling hazardous substances check the pump for leak-tightness before use.
- Dispose of waste oil and any process by-products in accordance with local and national safety and environmental requirements. It is usually illegal to dispose of waste oil into drains or watercourses or to bury it.

### 3. Introduction

This manual provides Installation instruction for RV motor starting relay and RV motor capacitor fitted to the 1-phase RV pumps fitted with a plastic terminal box or an aluminium terminal box.

Refer to [Replace the motor starting relay and capacitor](#) on page 9 for the RV pump fitted with a plastic terminal box manufactured before January 2010 and the RV pump fitted with an aluminium terminal box manufactured after January 2010.



## 4. Replace the motor starting relay and capacitor

### 4.1 Fitted with plastic terminal box

1. Switch off the pump and isolate it from the electrical supply. Allow the pump to cool to a safe temperature.
2. Refer to [Figure: Remove/fit the motor starting relay](#). Unscrew the four screws which secure the cover to the top of the pump-motor and remove the cover.
3. Partly lift the old Motor Starting Relay from its retaining slot to access the relay terminal connections.
4. Use a suitable screwdriver to remove the terminal connections off of the relay.
5. Dispose of the old relay safely in accordance with all local and national safety and environmental requirements.
6. Check the code on the motor starting relay to make sure that you have the new relay (the code should be '4771xxxxUBx', where x is any character).
7. Hold the new motor starting relay with terminals 1 and 4 at the top (that is, nearest the motor cover) and fit the terminal connections to the terminals on the relay as described in [Table: Motor starting relay terminal connections](#).
8. Slide the motor starting relay into the retaining slot. Make sure that you do not trap any of the relay wires when you fit the relay.

#### Note

*You may have to cut the cable ties which secure the relay terminal wires to allow you to easily fit the relay. On some older pump-motors, you may have to rotate the relay with pins 2 and 3 at the top to fit the cover properly.*

9. Partly lift the old motor capacitor to access the terminal connections.
10. Use a suitable tool to remove the terminal connections from the capacitor.
11. Remove the old capacitor and safely dispose of it in accordance with all local and national safety and environmental requirements.
12. Check the marking on the capacitor to make sure that the new capacitor is new (the capacitor should be 160 mf, code 'KP8174').
13. Hold the new capacitor as shown in detail C and fit the terminal connections to the terminals on the capacitor as described in [Table: Capacitor terminal connections](#).
14. Slide the new capacitor into the pump-motor enclosure. Make sure that you do not trap any of the wires.
15. Make sure that the voltage shown on the voltage indicator corresponds with your electrical supply voltage. If it does not, reconfigure the pump-motor. Refer to the RV pump instruction manual.
16. Use the four screws removed in Step 1 to secure the cover to the top of the pump-motor. Make sure that you do not trap any of the wires when you fit the cover.
17. Reconnect the pump to the electrical supply.

**Table 1** Motor starting relay terminal connections

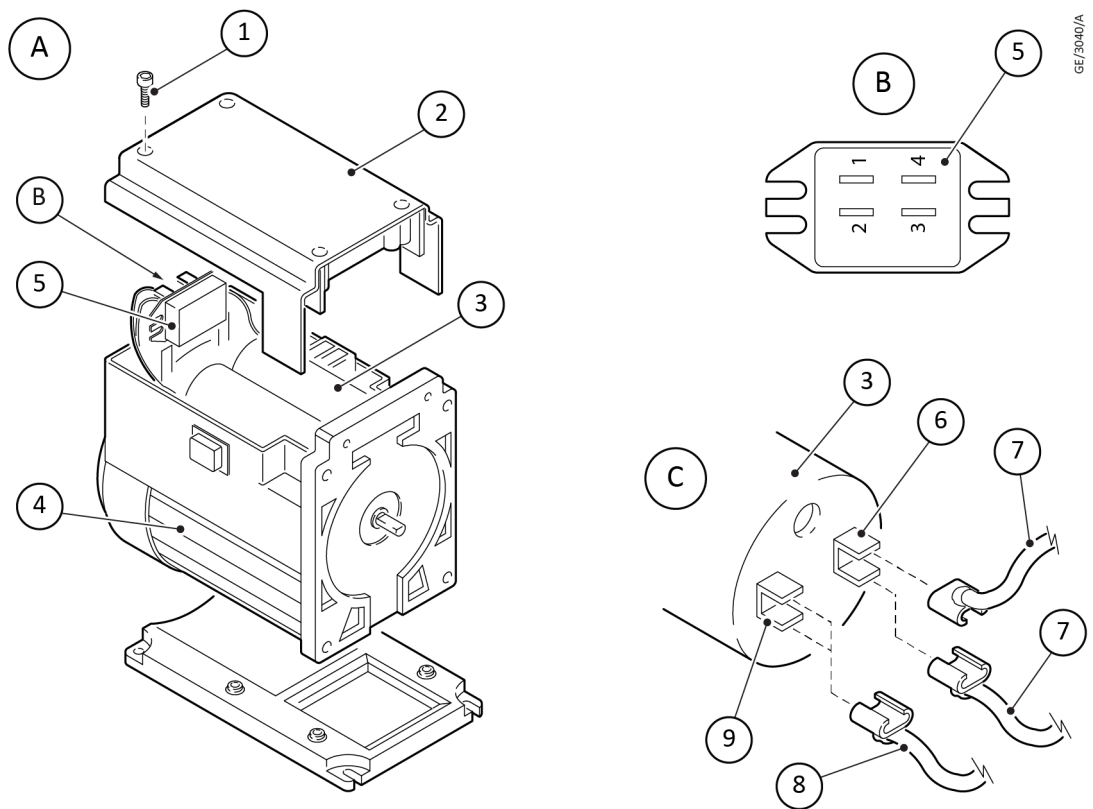
Terminal connection wire colour	Relay terminal
---------------------------------	----------------

Blue	1
Black	2
Purple	3
Yellow	4

**Table 2 Capacitor terminal connections**

Terminal connection wire colour	Capacitor terminal
Purple (8)	Left terminal (9)
Yellow (7)	Right terminal (6)
Yellow (7)	Right terminal (6)

**Figure 1** Remove/fit the motor starting relay

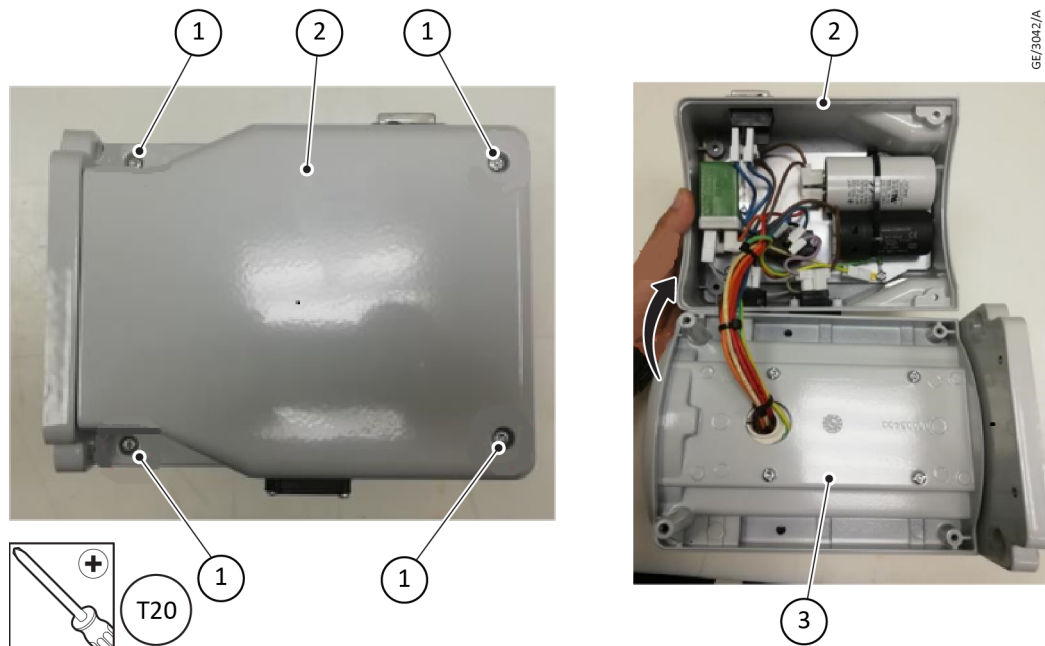


- 1. Screw
- 3. Capacitor
- 5. Motor starting relay
- 7. Yellow wire
- 9. Terminal

- 2. Top cover
- 4. Pump-motor
- 6. Terminal
- 8. Blue wire

## 4.2 Fitted with aluminium terminal box

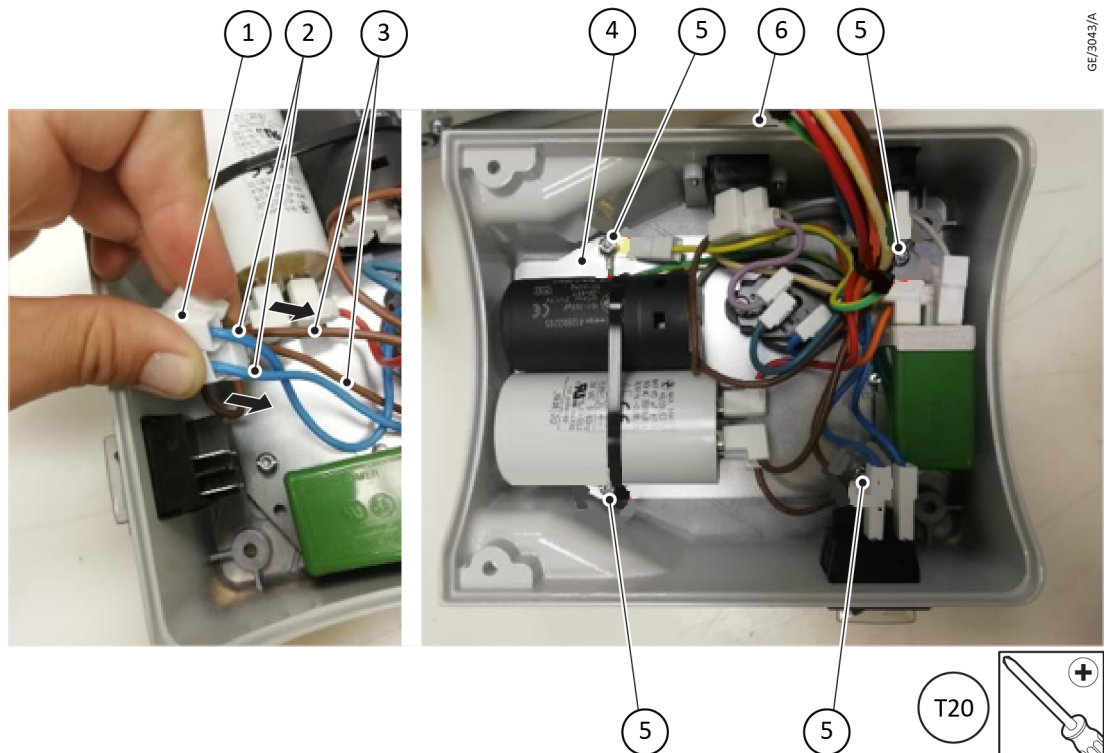
1. Remove four bolts from the top lid of the motor using the Torx screwdriver size T20.



1. Bolts
3. Motor

2. Top lid

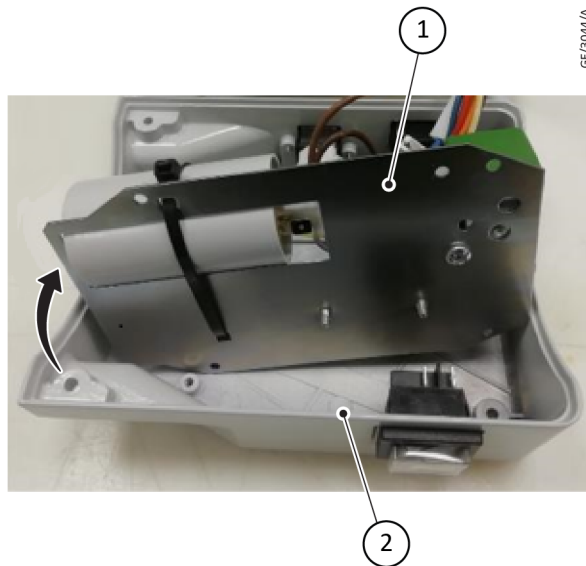
2. Remove the two blue and brown cables from the main supply switch.
3. Loosen four screws which are fixing the board on the top lid using Torx screwdriver size T20.



## A50574840\_D - Replace the motor starting relay and capacitor

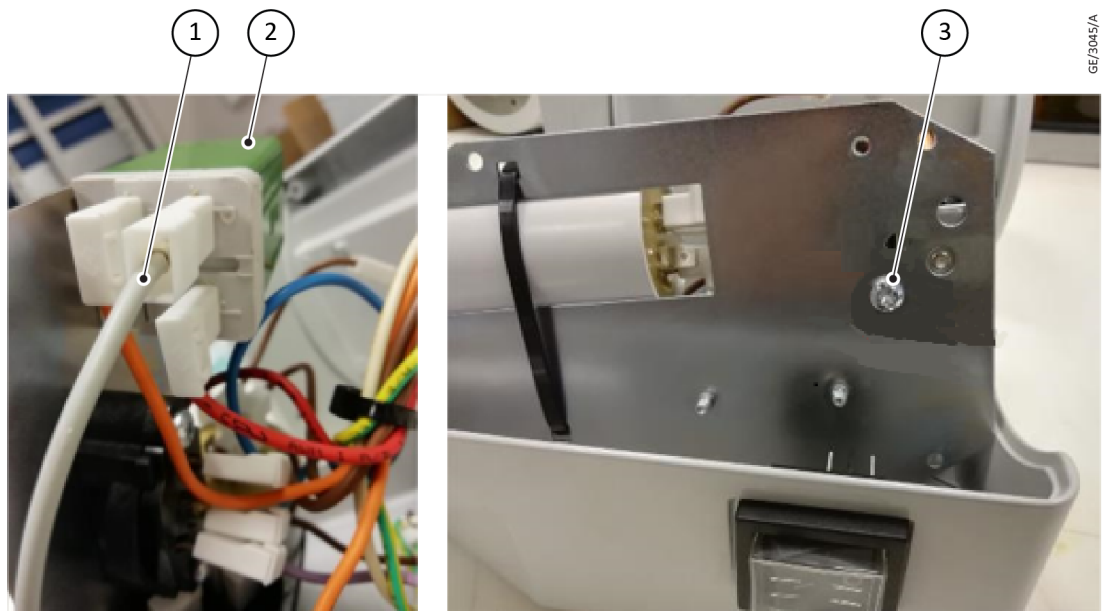
1. *Main supply switch*
2. *Blue cables*
3. *Brown cables*
4. *Board*
5. *Screws*
6. *Top lid*

4. Release the board from the top lid and turn it around.

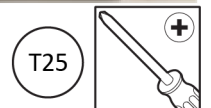


1. *Board*
2. *Top lid*

5. Remove the cables from the relay socket.
6. Loosen the bolt fixing the relay to the board using Torx screwdriver size T25.



1. *Cable*
2. *Relay socket*
3. *Fixing bolt*



A50574840\_D - Replace the motor starting relay and capacitor

7. Replace the relay with the new one depending on the motor type. Refer to [Table: Relay selection](#).



A. MA 000 1RO 115 V 50 60 Hz

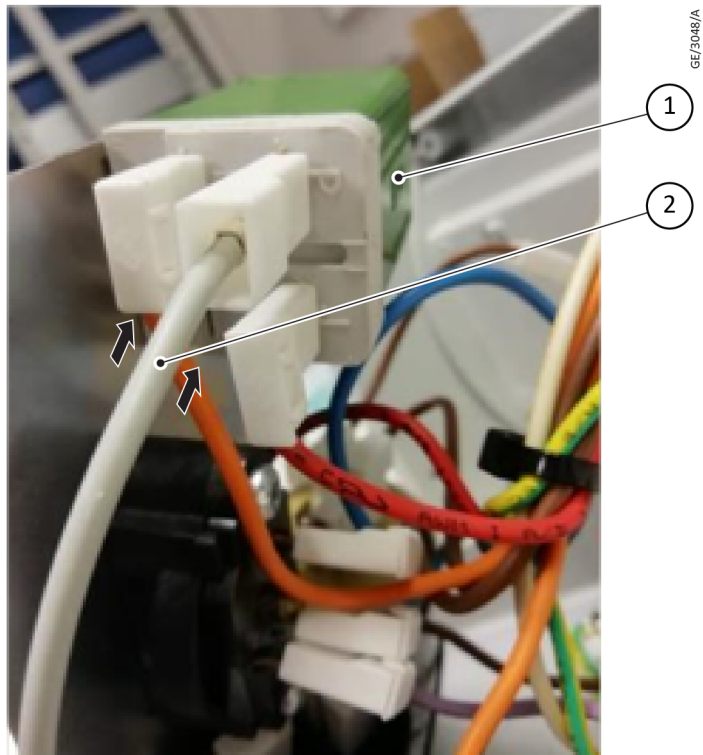
B. MA 000 5RO 100 V 50 60 Hz

8. Tighten the relay by  $3 \pm 1$  Nm to the board using Torx screwdriver size T25.



1. Relay

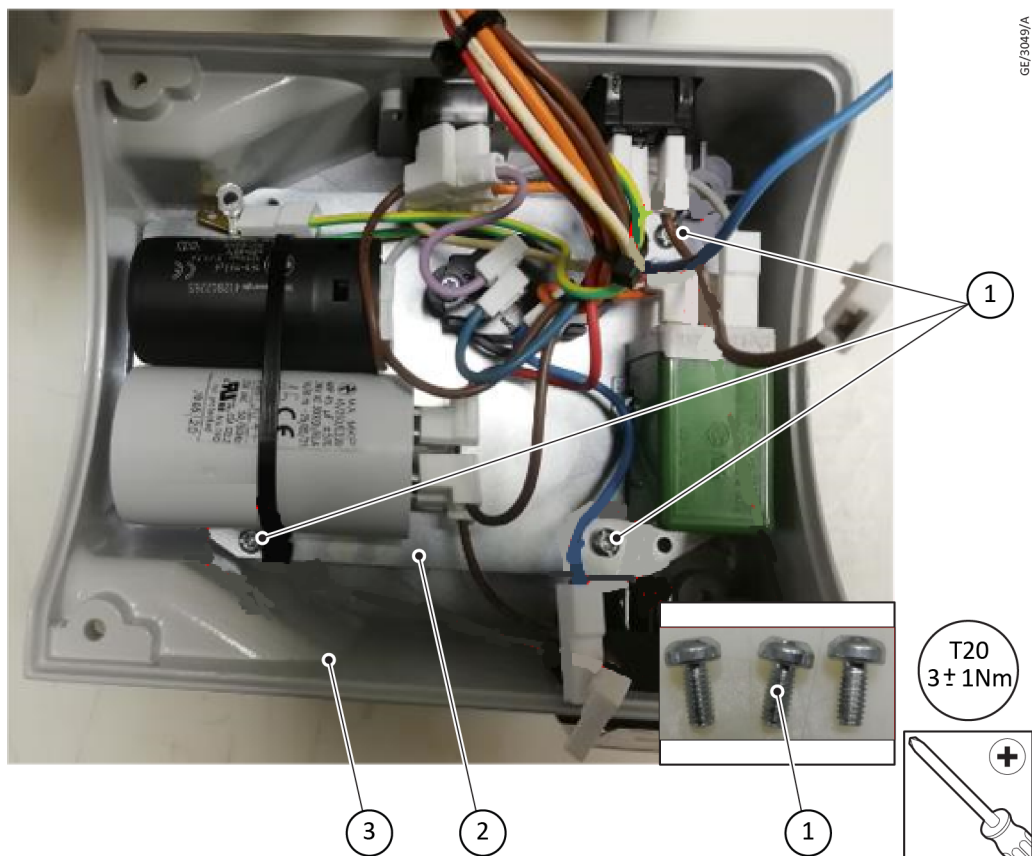
9. Re-connect the cables to the relay (P – grey, J – red, B – orange).



1. Relay

2. Cable

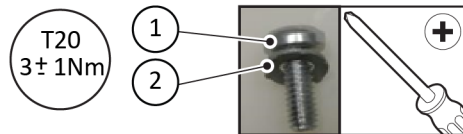
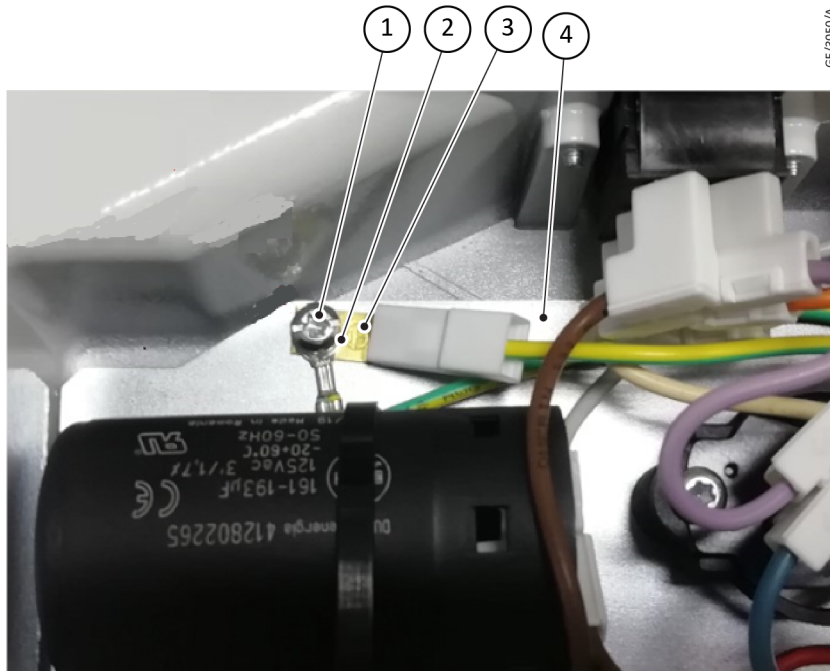
10. Place the board on the top lid. Tighten the three short bolts by  $3 \pm 1$  Nm to fix the board using Torx screwdriver size T20.



## A50574840\_D - Replace the motor starting relay and capacitor

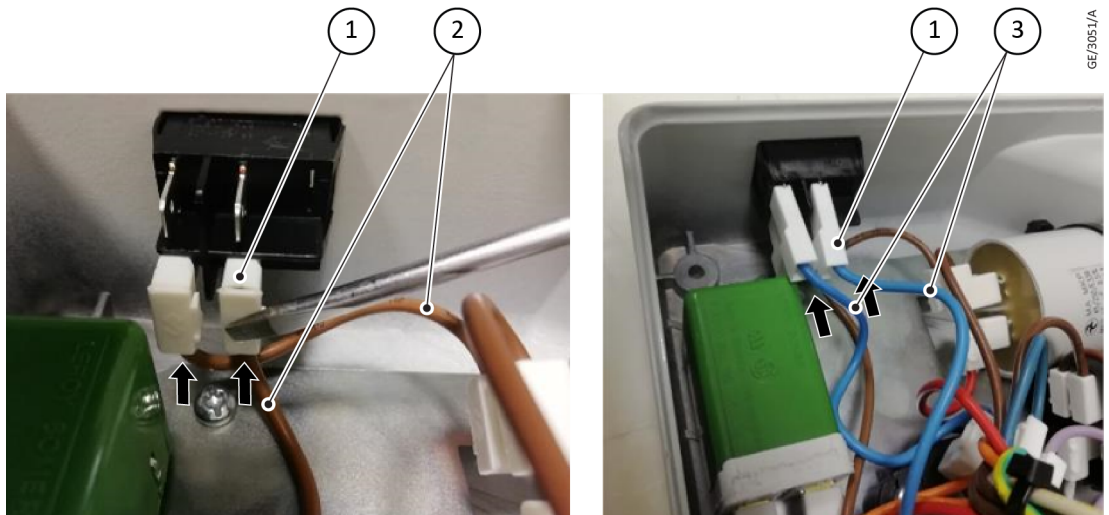
1. Short bolts
2. Board
3. Top lid

11. Use the longer screw with a washer to fix the earth cables to the lid. Tighten the bolt by  $3 \pm 1 \text{ Nm}$  to fix the board using Torx screwdriver size T20.



1. Long screw
2. Washer
3. Earth cable
4. Lid

12. Connect the two brown and blue cables to the mains supply switch.



1. Main supply switch
2. Brown cables
3. Blue cables

- Place the top lid back to the motor. Tighten four bolts by  $3 \pm 1$  Nm to fix the lid using Torx screwdriver size T20.

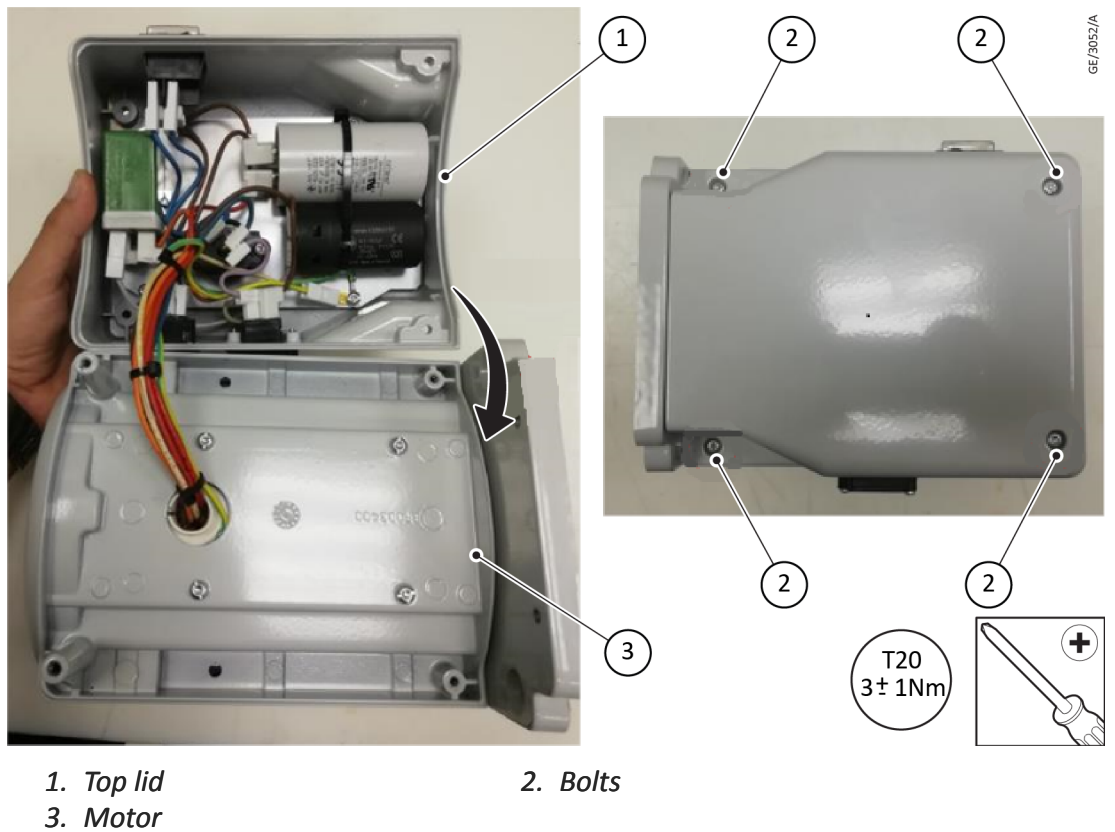


Figure 2 Motor wiring diagram

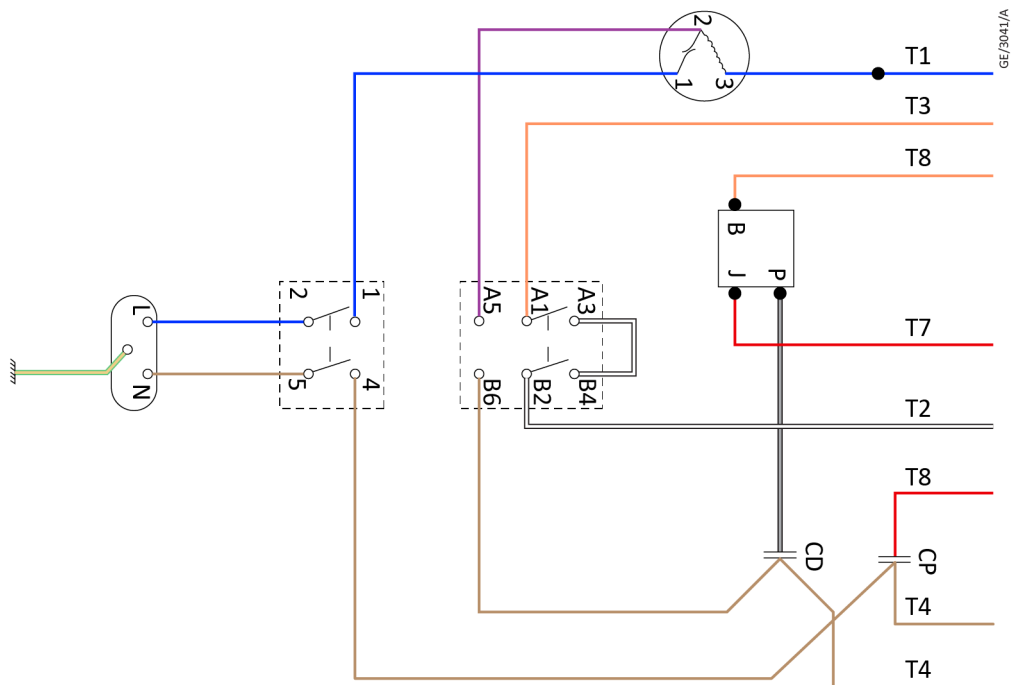


Table 3 Relay selection

Relay kit P/N	A07108732	A07108733
Relay marking	MA 000 1RO 115 V 50 60 Hz	MA 000 5RO 100 V 50 60 Hz



A50574840\_D - Replace the motor starting relay and capacitor

Colour	Green	Black
Motor P/N	A07108030	A07108031
Variant	EUR/USA	JAPAN

