



GMC-2 (3x400V)

Manual

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1 General

1.1 Introduction

The GMC-2 is a motor control unit for three-phase electric motors. It can control two motors.

Features:

- A limit switch.
- Manual or automatic operation.
- Adjustment of the nominal motor current from 0.4 A ... 6.5 A.
- A lockable mains switch.
- Measurement of the current per motor.

1.2 The Type Plate



Model:	
Type:	
Input:	200-240V~, 50/60Hz, 17.8-14.9A or 208V~, 2~, 60Hz, 17.2A
Output:	200-240V~, 3~, 0-400Hz, 7.5A nom.
Control U:	24Vdc or ac
Max pre-protect:	25A
SN: 00100 15.03.16	IP54  

Fig. 1: Example of a type plate



This type plate is an example. The actual type plate on your product shows the correct information and technical data for that product.

The type plate shows important information and technical data about this product, such as:

- the model (related to the hardware configuration of the product)
- the type (related to the software and/or product settings)
- the technical data, such as the power supply, power consumption or pre-fuse value
- the symbols with regard to certifications and markings
- the serial number
- the date of manufacturing
- the contact information of the manufacturer

2 Safety

2.1 Introduction to Safety

- This manual contains the information required to install, operate and maintain this product. Read the information and instructions thoroughly before use.
- This product is covered by the warranty and liability regulations laid down in documents including the manufacturer's general terms of sale governing the contract concluded for the delivery of this product.

2.2 Description of the Signal Words

This document has safety-related and other important messages. Signal words and safety symbols describe the types of messages.



DANGER!

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

The safety symbol shows the type of hazard.



WARNING!

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

The safety symbol shows the type of hazard.



CAUTION!

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

The safety symbol shows the type of hazard.



NOTICE!

Indicates a hazardous situation which, if not avoided, could cause machine, property or product damage.



Indicates more information, suggestions and recommendations.

2.3 Description of the Safety Symbols

**WARNING!**

General warning.

**WARNING!**

Risk of injury from electrical voltage.

2.4 Personnel Qualification

Installer

Installers are all persons that do these actions with regard to the product:

- Installation
- Maintenance
- Troubleshooting

Installers must be qualified electricians. Each installer must have a profound professional experience and knowledge of:

- Electronic and electrical installations.
- The national and international regulations and legislation on electronic and electrical installations.
- Safety regulations.
- Possible dangers during the installation, maintenance and troubleshooting.
- Commissioning of the product.

Preferably, all installers have passed the product training of the manufacturer.

User

Users are all persons that operate this product. Users are only permitted to operate this product when:

- they have read and understood the instructions in this manual.
- they know the consequences of changes to settings.
- they know the possible dangers of incorrect use of this product.
- they know the possible dangers of the connected systems, especially systems that start automatically.
- during normal operation, they keep the cover of the housing closed, unless the manufacturer or this manual gives other instructions.

2.5 Safety Notes for the Installation

Personnel: ■ Installer

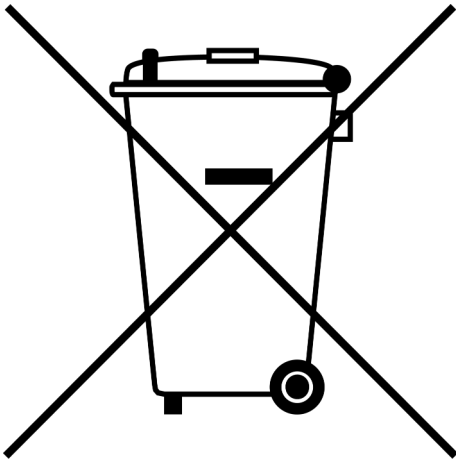
- The installation is an integral part of the product. Only professional installers are permitted to install this product.
- This product is under no circumstance a safety component.
- Install the product according to prevailing standards (BS, ANSI, ISO, DIN, NEN, for example).
- Before the installation, refer to the "Technical Specifications" section(s) in this manual.
- Secure the installation wiring to the product housing or cabinet to prevent short circuits.
- Seal the cable glands with an acid-free sealant.
- Install a lockable disconnect switch near the product. The disconnect switch must have a marking that clearly shows that this switch is the disconnecting device for this product.

2.6 Safety Notes for the Usage

Personnel: ■ User

- Only persons who have read and understood the instructions in this manual are permitted to operate this product.
- Persons who operate or adjust this product must know the possible dangers of the connected systems.
- This product can control different systems. When the product is defective, it is unsafe! De-energize the connected systems until the product is repaired or replaced.
- This product is an electronic device. A malfunction or defect can always occur.
- Always keep the power ON to prevent condensation through cooling, unless the manufacturer or this manual gives other instructions.
- During normal operation, the cover of the housing must stay closed, unless the manufacturer or this manual gives other instructions.
- The system of which this product is part of, has an alarm device. At least once a day, do a check on the correct operation of this alarm device.
- This product can be an integral part of a system with moving parts that start any time automatically. These moving parts could cause injury to persons. The presence of persons near the moving parts is not permitted. At least once a day, do a check on the correct operation of the guards or protective devices.
- When this product controls a moving or rotating system, Machinery Directive 2006/42/EC is applicable.

2.7 End of Life (WEEE)



The crossed-out wheeled bin indicates a product that, at the end of its life cycle, must be collected separately (Directive 2012/19/EU on waste electrical and electronic equipment - WEEE). Separate collection is a precondition to ensure specific treatment and recycling of WEEE to get the chosen level of protection of human health and the environment in the Union. The black bar below the crossed-out wheeled bin indicates that the product was put on the market on or after August 13, 2005.

The European Union has systems in place for the separate collection of waste electrical and electronic products and batteries. Thus, return waste products, batteries and accumulators to the appropriate local authorities, or a local collection point/recycler. When you do not dispose of the product correctly, you may be fined.



Fig. 2: Crossed-out wheeled bin

3 Transport and Storage

- Check the product for transport damage.
- Check if the product is what you ordered.
In case of incorrect delivery or damage, contact the manufacturer.
- Store the product in a dry and clean environment:
 - Temperature: 0 °C ... 40 °C
 - Humidity: 20% ... 80%
- Store the product in such a way that it is protected from:
 - Humidity
 - Dust
 - Dirt
 - Direct sunlight
 - Aggressive, chemical substances
 - Mechanical vibrations

4 Installation

4.1 Technical Specifications

Electrical	
Type of mains supply	Fixed wiring (via a mains switch)
Operating area	Indoor, normal, dry (not suitable for wet areas)
Operating conditions	Continuous operation
Power supply	400 Vac, 3W+E
Frequency	50/60 Hz
Pre-fuse	Max. 16 A
Power consumption	Max. 13.1 A
Insulation	Class 1 (IEC 61140)
Transient over-voltage, mains supply	Category II (IEC 60664-1)
Pollution degree	Category 2 (IEC 61010-1)

Motor connection	
Motor (2x)	3x400 Vac, 50/60 Hz
Contact load per motor	Max. 6.5 A
Thermal protection adjustment range	0.4 A ... 6.5 A

Inputs	
OPEN/CLOSE/COMM	24 Vac/dc, 8 mA
Limit switches <i>open/close</i>	24 Vdc, 20 mA
Limit switches <i>emergency</i>	<ul style="list-style-type: none"> • Relay active: 24 Vdc, 93 mA • Relay inactive: 24 Vdc, 5 mA

Outputs	
Contact load of alarm relay	24 Vac/dc, 0.5 A
Power supply	24 Vdc, total max. 180 mA

Mechanical	
Mobility	Fixed position
Operating temperature range	0 ... 40 °C
Relative humidity	Max. 80%

Mechanical

Installation height	Max. 2000 m above sea level
Housing (H x W x D)	220 mm x 270 mm x 115 mm, IP54, PVC

Compliance

EU Directives	See the Declaration of Conformity for this product
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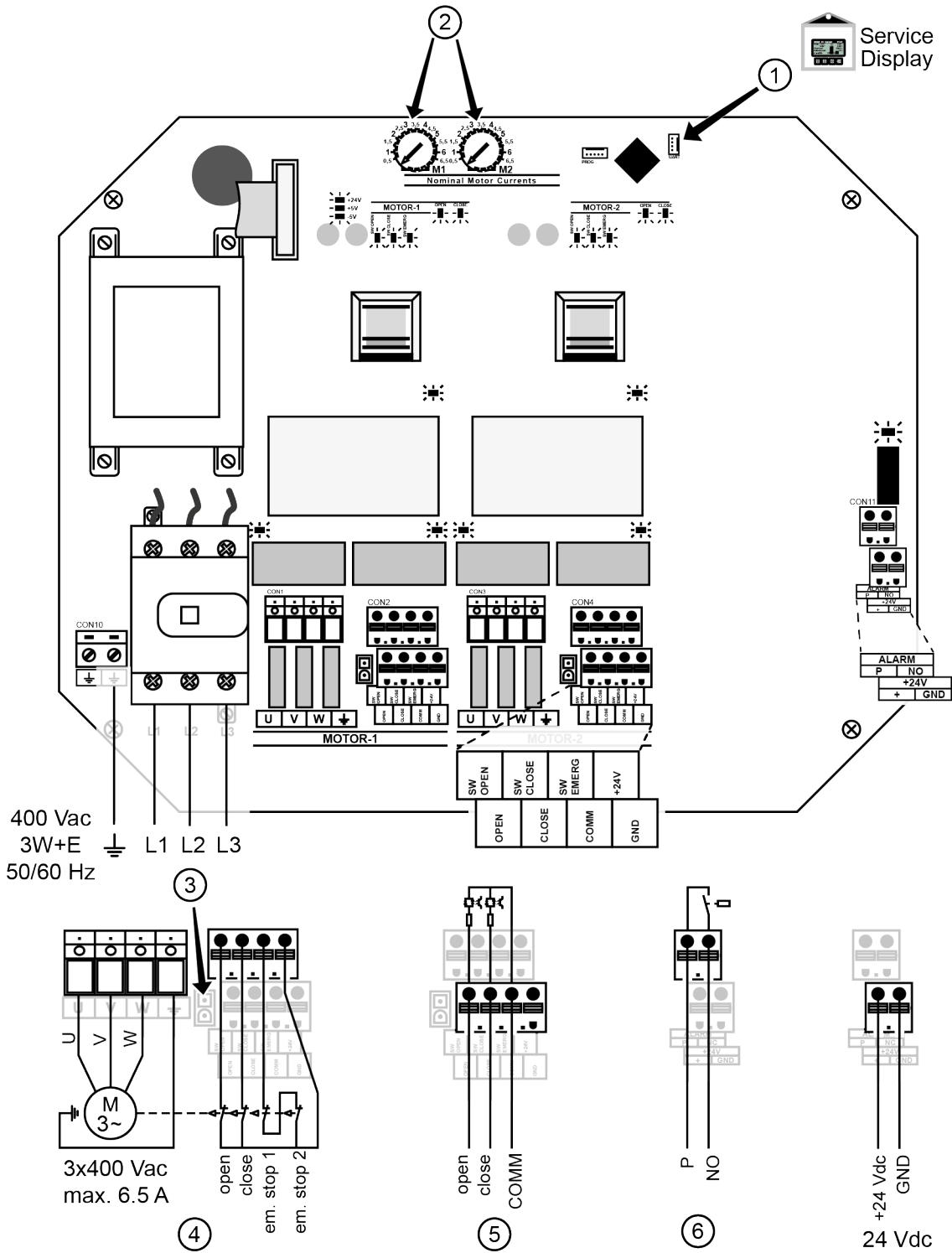
4.2 General Instructions

- Install the GMC-2 on a wall at a dry, vibration-free location.
- For all connections, refer to the wiring diagram.
- Adjust the nominal current for each motor.
- After you finished all connections, seal the glands with an appropriate sealant.
- Close the cover of the GMC-2.




- Make sure that the mains switch is OFF before you open the cover of the GMC-2.
- You can set the current more accurately with the MCSD Service Display.

4.3 Wiring Diagram





- ① Connector for the MCS Service Display
- ② Potentiometer to adjust the nominal current
- ③ Connector for the bypass of the emergency stop
- ④ Motor and limit switches
- ⑤ Computer control
- ⑥ Alarm contact


 During an alarm, the volt-free alarm contact is separated.


4.4 The MCSD Service Display

Introduction

The MCSD Service Display has these functions:

- Show the status of the GMC-2.
 - Adjust the thermal protection more accurately.
1. ➔ Connect the MCSD Service Display to the connector on the printed circuit board.
 - ⇒ The MCSD Service Display starts up.
 2. ➔ Select the motor with the   keys.

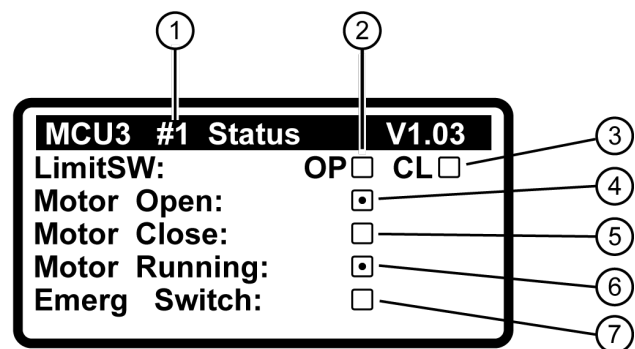
 The software is used for all the available types of GMC. Thus, the MCSD Service Display shows always three motors.

3. ➔ Select the desired information with the  key.

Information screens for each motor:

- Limit switches
- Thermal protection
- Management

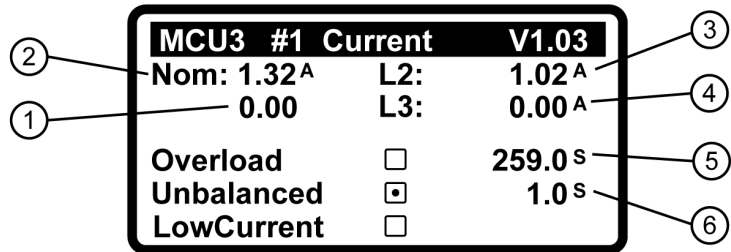
Limit Switches



- ① Motor number
- ② Limit switch *close*
- ③ Limit switch *open*
- ④ Direction *opening*
- ⑤ Direction *closing*
- ⑥ Motor switched on

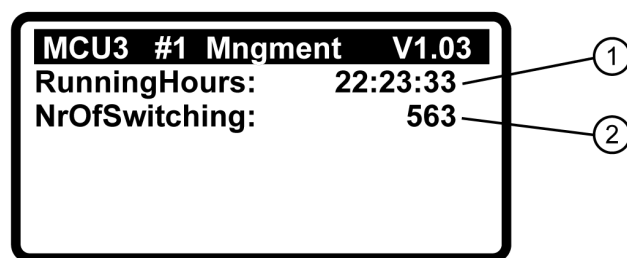
- ⑦ Emergency limit switch
- Disabled
- Enabled

Thermal Protection



- ① Current factor
 - ② Nominal current set
 - ③ Measured current phase 2
 - ④ Measured current phase 3
 - ⑤ Overload + clearing time
 - ⑥ Phases unbalanced
 - Disabled
 - Enabled
- Current factor < 1: Normal operation.
 - Current factor > 1: The measured current is higher than the nominal current. When this takes longer than the *clearing time*, the motor is switched off. The *clearing time* decreases when the *current factor* increases.
 - The motor is switched off immediately when one of the power phases drops out (*Unbalanced*).

Management



- ① Run time of the motor (in hours)
- ② Number of times that the motor was switched on

i The management data are tracked continuously but they are only saved to the permanent memory once every 24 hours. If, in the meanwhile, the power supply is interrupted, the management data can be lost, but only the data that not have been saved.

4.5 Options

Emergency stop bypass: These are additional keys to bypass the circuit of the emergency limit switches when an emergency stop occurs.

**CAUTION!**

Running motors can cause injury.

Only apply the emergency stop bypass when the situation is safe.

**NOTICE!**

Incorrect running directions can damage the product.




When the emergency stop bypass is activated, the running direction is not guarded. The installation can be seriously damaged when you activate the incorrect running direction.

5 Operation

The Mains Switch

You can switch the power supply on and off with the mains switch. When the mains switch is in the OFF position, you can lock it with a pad lock.

The Operating Keys


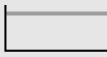
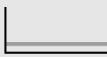
Operating keys per motor		
 open	Manual opening	Only in the manual mode: <ul style="list-style-type: none"> • Press the key short to start the motor. • Press the key short to stop the motor.
 close	Manual closing	
 auto	Operation mode	Press the key to change the operation mode: <ul style="list-style-type: none"> • ON = Automatic mode. • OFF = Manual mode.







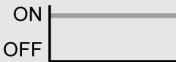
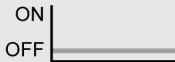
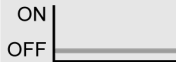
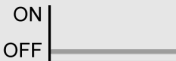
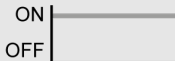
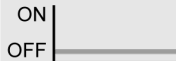

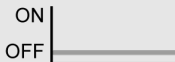
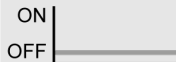
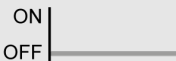

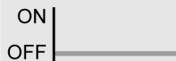
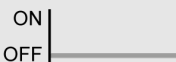
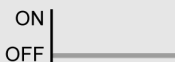
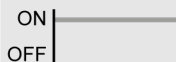
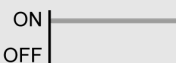
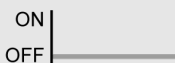

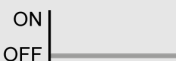
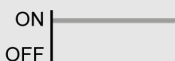
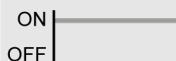

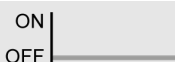






The GMC-2 has an automatic reverse delay.

The Signal LED

Each operating key has a signal LED. The LED shows the operation status of the motor.

Signal	Description
ON  OFF	The signal LED flashes.
ON  OFF	The signal LED is continuously ON.
ON  OFF	The signal LED is continuously OFF.

			Description
			Manual control. The motor does not run.
			Manual opening.
			Manual closing.
			Manual opening. The limit switch is reached.
			Manual closing. The limit switch is reached.
			Automatic control. The motor does not run.
			Automatic opening by the main controller.
			Automatic closing by the main controller.
			Automatic opening by the main controller. The limit switch is reached.
			Automatic closing by the main controller. The limit switch is reached.

6 Maintenance

Personnel: ■ Installer
 ■ User



NOTICE!

When you clean the product incorrectly, you can damage it.

Detergents, solvents and running water can damage the product and the labels on it.

- Only use a soft cloth to clean the product.
- Only dampen the cloth with water.
- Make sure that the cable glands are firmly tightened around the connection cables.
- Keep the GMC-2 switched on to prevent condensation.
- Make sure that direct water jets or high-pressure steam do not damage the GMC-2.

→ Examine the functionality of the GMC-2 when you do maintenance.

7 Troubleshooting




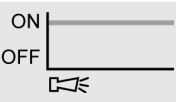
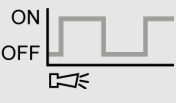
CAUTION!

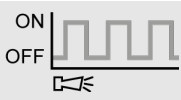
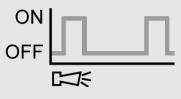
Unexpected starts of the motor can cause injury.

Always do the following procedures safely. Make sure that the motor cannot start unexpectedly when you examine or repair it. If possible, switch off the mains supply before you start.



- The alarm LED  is the LED above the operating keys (red).
- Press one of the keys to reset the GMC-2.
- The GMC-2 goes back to the last saved operating mode. When the failure has occurred during manual operation, the GMC-2 automatically goes back to the *manual off* mode.
- You can analyze the status of the GMC-2 with the MCSD Service Display.
↳ *Chapter 4.4 „The MCSD Service Display“ on page 13*
- When an alarm occurred because there is no current, the motor remains activated. When the current is back, the alarm is automatically reset.

Signal	Problem	Solution
	The emergency limit switch is activated because the motor has run through a limit switch.	<ul style="list-style-type: none"> ● Examine the motor. ● Solve the problem. Release the emergency limit switch for the motor.
	The thermal protection is activated because the motor has an overload, or there is a problem with the power supply.	<ul style="list-style-type: none"> ● Examine the motor. The motor can be blocked, or there is too much resistance. ● Examine the thermal protection setting. The setting can be too tight. ↳ <i>Chapter 4.4 „The MCSD Service Display“ on page 13</i> ● Examine the power supply. Maybe one of the phases has dropped out. The thermal protection trips when one of the phases drops out. ● Examine the power supply. The thermal protection trips when no current is measured while the motor is controlled. ● Wait 5 minutes before you switch on the motor again.

Signal	Problem	Solution
 <p>ON OFF</p>	EEPROM fault because the GMC-2 has lost the previous state.	<ul style="list-style-type: none"> The GMC-2 gives this alarm when it starts up for the first time (empty memory). The EEPROM cannot be read. The GMC-2 goes into the <i>manual off</i> mode after the problem is solved.
 <p>ON OFF</p>	Hardware failure.	Contact your supplier.