submersible motors

GUARDIAN AUTO ME - 1E - 2E - 3E

EVOLUTION

ENGLISH

OVERVIEW:

This booklet describes the instructions for use and maintenance of the **GUARDIAN® AUTO** series control panels.
This booklet must be carefully conserved for future references after reading.
Before installing and connecting the panel, read the following instructions carefully.
The Manufacturer declines all responsibility for accidents or damages caused by negligence or failure to observe the instructions provided in this booklet. Installation must be performed in compliance with the directives issued by the local authorities and the regulations in force, as well as with rules of good workmanship and in relation to the particular installation in question.

1.1 SYMBOLS USED IN THE MANUAL:

	
This symbol indicates a potential risk of electrical nature	This symbol indicates a subject of particular importance

2 GENERAL INFORMATION:

The GUARDIAN® AUTO series control panels are available in the following sizes:

GUARDIAN® AUTO ME: single phase rated loads up to a maximum of 18A nominal (230V).

GUARDIAN® AUTO 1E: three phase rated loads up to a maximum of 9A nominal (400V or 230V).
GUARDIAN® AUTO 2E: three phase rated loads up to a maximum of 20A nominal (400V or 230V).
GUARDIAN® AUTO 3E: three phase rated loads up to a maximum of 30A nominal (400V or 230V).

3 DESCRIPTION:

GUARDIAN® AUTO in the standard version is available with the following functions:

- Connection and disconnection directly in line (DOL);
- Overload protection;
- Overvoltage and under voltage crowbar;
- Short-circuit protection;
- Protection against dry running (no water protection);
- Protection against 2 phases operation (three phases).

3.1 OPERATIONS:

The GUARDIAN® AUTO has been designed to operate connected to submerged and surface electric pumps, but it may be used with any asynchronous electric motor.

A wide range of electric pumps may be managed with just one version.
The rated current is calibrated by programming via the keys on the front of the panel.
In the event of phase failure, overload or overvoltage, the system disconnects the motor [OVERLOAD], after a time which simulates the tripping of a thermal overload cut-out.

In the event of current overload, the system runs 3 tests automatically, with progressive pauses between each (10, 20, 40 min.) in order to verify whether the overload current conditions persist, indicating the waiting status with the flashing text OL (OVERLOAD). During one of the tests, if the current falls below the set trip value, the alarm is reset and GUARDIAN® AUTO resumes normal operation.
After 3 tests if the overload condition persists, GUARDIAN® AUTO trips the alarm with the OL indicator permanently lit, and remains blocked until a manual reset is performed (see 3.2.13).

The dry running protection does not require sensors (source of errors and extra costs), but functions by checking the COSφ (power factor) value absorbed by the motor.

In the event of dry operation (no water), the system automatically carries out 4 tests with increasingly longer pauses in between (10, 22, 45, 90 minutes), in order to allow the water level in the well to be restored, and signalling the stand-by state with the indication SB on the display. If the presence of water is detected during one of the tests, the alarm is reset and GUARDIAN® AUTO continues with normal operation.
If there is still no water after 4 tests, GUARDIAN® AUTO gives the alarm with the indication UL (under load) on the display and remains locked until a manual reset is carried out (see 3.2.13).

A capacitor of suitable size has to be inserted and connected in single-phase versions.

The system may be connected to external automated systems such as pressure switches, floats, alarm signals, timers, computers, etc. through an electrically clean (not live) NC contact connected to the SW terminals on the main terminal board.

3.1.1 ATTENTION!: should this possibility not be used, leave the short circuit jumper (2) between the two SW terminals.

3.2 STATE:

GUARDIAN® AUTO indicates the operating state of the system by displaying, through display, the following situations:

Calibration and normal functioning.

- **3.2.1** Self-diagnosis upon start-up (indication of the frequency).
- **3.2.2** Display of automatic calibration (display of text AT).
- **3.2.3** Display of learning phase (display of text CL).
- **3.2.4** Display of manual calibration (display of text MA).
- **3.2.5** Display of current value setting (display of text AA).
- **3.2.6** Display of power factor setting (display of text CP).
- **3.2.7** Normal operation (indication of the absorbed current).

Error condition.

- **3.2.8** Situation of dry operation/low load (display of SB blinking).
- **3.2.9** Stand-by for restoring of level (display of SB, load disconnected).
- **3.2.10** Final lack of water, (display of UL, load disconnected).
- **3.2.11** Overload in progress (display of the absorbed current blinking).
- **3.2.12** Overload alarm (display of the OL blinking, load disconnected).
- **3.2.13** Before restarting GUARDIAN® AUTO, remove any error condition on the control panel by switching it off and then on again (1).

4 HANDLING AND STORAGE:

Make sure that the unit has not undergone any damage during shipment and that is still in its original packaging without penetration of water or humidity.
Store the unit in a dry and aerated place.

5 INSTALLATION:

Check to make sure that the rating place data (power/size and voltage) are correct as ordered and that they are compatible with the load/motor that the GUARDIAN® AUTO must control.
An appropriate **knife switch that guarantees the visual opening/disconnection of the same from the power supply line,** thereby guaranteeing the intervention of the operator on the panel in maximum safety.

GUARDIAN® AUTO should be installed, if possible, in the shade, as near as possible to the motor, in an upright position and making sure that the cable clamps are in the bottom position.
The container is rated IP44, but protection is guaranteed only if installation is correct.

5.1 ELECTRICAL CONNECTIONS:

ATTENTION!: the electrical connection must be made exclusively by **technical personnel.**
ATTENTION!: in the event of an existing system, make sure that the load connection is compatible with the GUARDIAN® AUTO connection.
Make sure that the cable is of a suitable cross section for the motor breakaway starting current and in single-phase installations, that the capacitor is suitable for the motor to be installed.
A reduced cable section could cause dangerous overheating and, apart from dangerous voltage drops, damage to the actual system.
ATTENTION!: with particular types of load , inverted motor rotation can cause elevated absorption that is capable of damaging the machine and the system connected even after a very short time.
ATTENTION!: make sure to make the ground connection carefully using a yellow-green cable of the same section as the cable used for the connection of the phases.
The failure to perform a correct ground connection can create serious risk to the operator.
Perform the electrical power connections as shown in FIG. 4a - 4b (only for 2-wire motors or pumps) - 5, making sure that the motor phases are connected in the correct sequence.

5.2 ADJUSTMENTS:

5.2.1: GUARDIAN® AUTO offers two methods for programming parameters for protection against overload and dry running operation; manual **(MA)** and automatic **(AT)**.

5.2.2 Manual mode (MA):
after GUARDIAN® AUTO is powered up, the initial self-diagnostics phase is followed by display of the software version and mains frequency, and the user can press ▲ to select manual mode **MA** followed by ■ to confirm and enable GUARDIAN® AUTO for operation (the display shows the current motor absorption value).

5.2.2.1: setting the rated current in manual mode (indicates the current value over which the overload protection trips):
after bringing the load to the maximum admissible absorption level in normal operating conditions, use key ▲ to select parameter **AA** and press ■ to confirm. Press ▼ until the current reading starts flashing on display, then press ▲ until the value on display is permanent and press ■ to confirm. The display shows the flashing number **88** to confirm memorisation of the value (if no operation is performed for more than 10 seconds the current value is memorised automatically). Ensure that the measured current value is the rated value stated on the motor dataplate.

5.2.2.2: setting **Cosφ** in manual mode: indicates the **Cosφ** threshold value, below which the dry running alarm trips.
To calibrate, start up the motor (or pump) and bring it to the minimum admissible load in normal operating conditions, then press ▲ to select the parameter **CP** and press ■ to confirm.
Press ▲ until the display starts flashing, then press ▼ until the current value on display is permanent, after which press ■ to confirm. The display shows the flashing number **88** to confirm memorisation of the value (if no operation is performed for more than 10 seconds the current value is memorised automatically).

5.2.3 Automatic mode (AT):
after GUARDIAN® AUTO is powered up, the initial self-diagnostics phase is followed by display of the software version and mains frequency, and the user can press ▲ to select automatic mode **AT** followed by ■ to confirm and enable GUARDIAN® AUTO for operation (the display shows the current motor absorption value).
Ensure that the measured current value is the rated value stated on the motor dataplate.
Press ▲ to start the self-learning process for the current value and **Cosφ.** The display shows the flashing text **CL**, after which press ■ to confirm automatic calibration (if more than 10 seconds pass before pressing ■ to confirm calibration, GUARDIAN® AUTO automatically memorises the current and **Cosφ** values).

5.2.4: to restore GUARDIAN® AUTO factory settings, press the three status keys (▲+■+▼) at the same time until the display shows the flashing number **88.** After that switch off the device and power up it again to start a new calibration phase.
ATTENTION!: this operation doesn't reset any error condition on GUARDIAN® AUTO.

6 TABLE OF IDENTIFICATION OF ERRORS:

TROUBLE	MEANING	POSSIBLE CAUSE	POSSIBLE REMEDY
6.1: the motor does not start and the GUARDIAN® AUTO display the frequency.	Self-diagnosis 3.2.1.	Supply voltage is too low.	Check.
6.2: GUARDIAN® AUTO powers the motor for a fraction of a second.	Self-diagnosis 3.2.1.	High voltage drop at breakaway.	Increase the cross section of the supply cables.
6.3: display of SB blinking.	Operating dry or at low load. Stand-by for restoring of level (10, 22, 45, 90 minutes).	- No water in the well. - Pump unsuitable for the motor. - Reverse rotation of the motor.	Check. ATTENTION: the load should always be considered as live.
6.4: display of UL and the motor is off.	Final lack of water (after at least 4 tests and 167 minutes).	As above.	Solve the problem and reset GUARDIAN® AUTO by switching it off and then power up on again (see 3.2.13).
6.5: display of flashing OL and the motor is off.	Too high absorption of current detected. Pause pending return to level (10, 20, 40 min).	Incorrect adjustment. - Overload. - Pump clogged with sand. - Power supply voltage too high. - Pump unsuitable. - Problems on motor.	Check correct current absorption and current threshold setting (AM). (Arbitrarily increasing the adjustment setting is not a solution). See following points. Solve the problem and reset GUARDIAN® AUTO by switching it off and then on again (see 3.2.13).
6.6: display of permanent OL and the motor is off.	Too high absorption of current detected. Overload alarm.	- The motor does not start. - Overload. - Pump silted up. - Supply voltage too high. - Unsuitable pump. - Problems with the motor.	
6.7: display of OF.	Missing phase.	- Missing phase. - The motor is not connected.	Solve the problem and reset GUARDIAN® AUTO by switching it off and then on again (see 3.2.13).
6.8: the GUARDIAN® AUTO is not activated.		- No jumper on SW contacts. - The external contact is open/disconnected.	

GUARDIAN AUTO ME

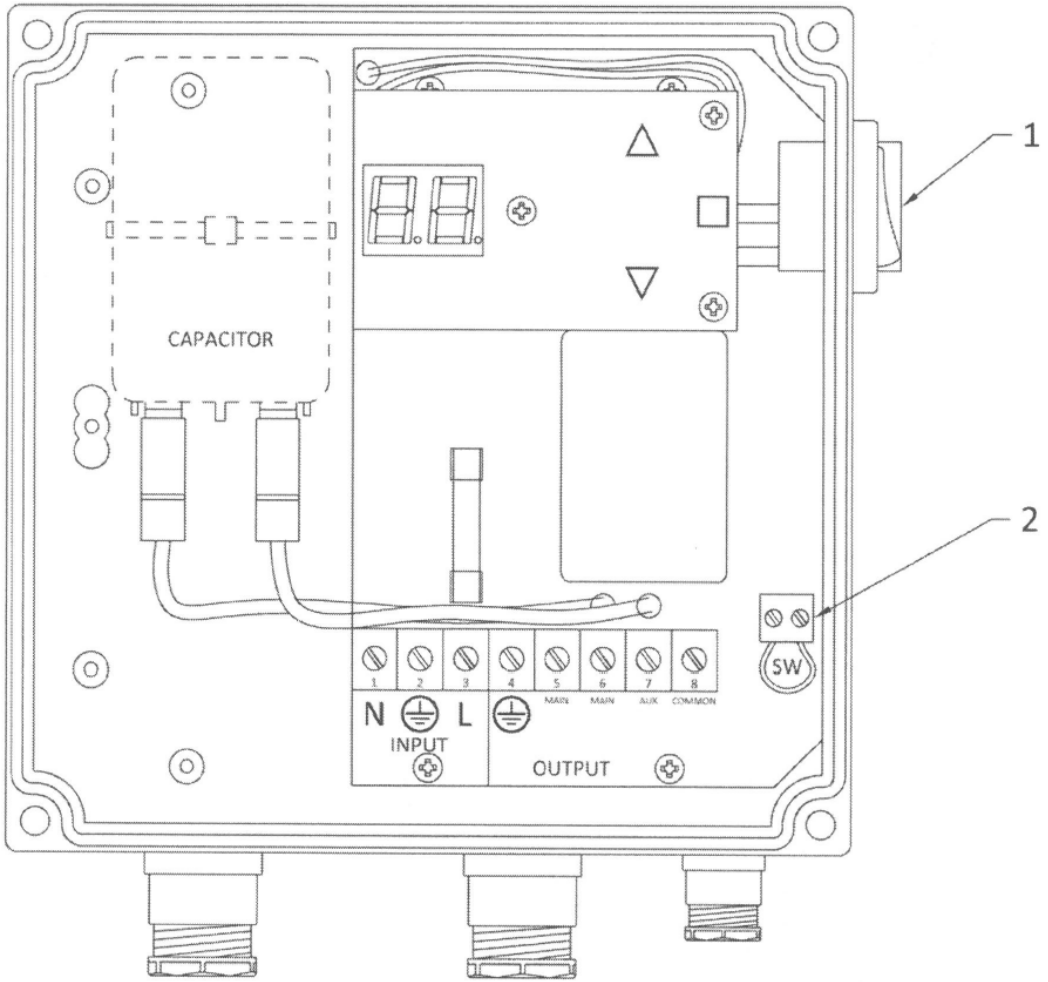


FIG. 4b: 2-WIRE MOTOR/PUMP

GUARDIAN AUTO IE

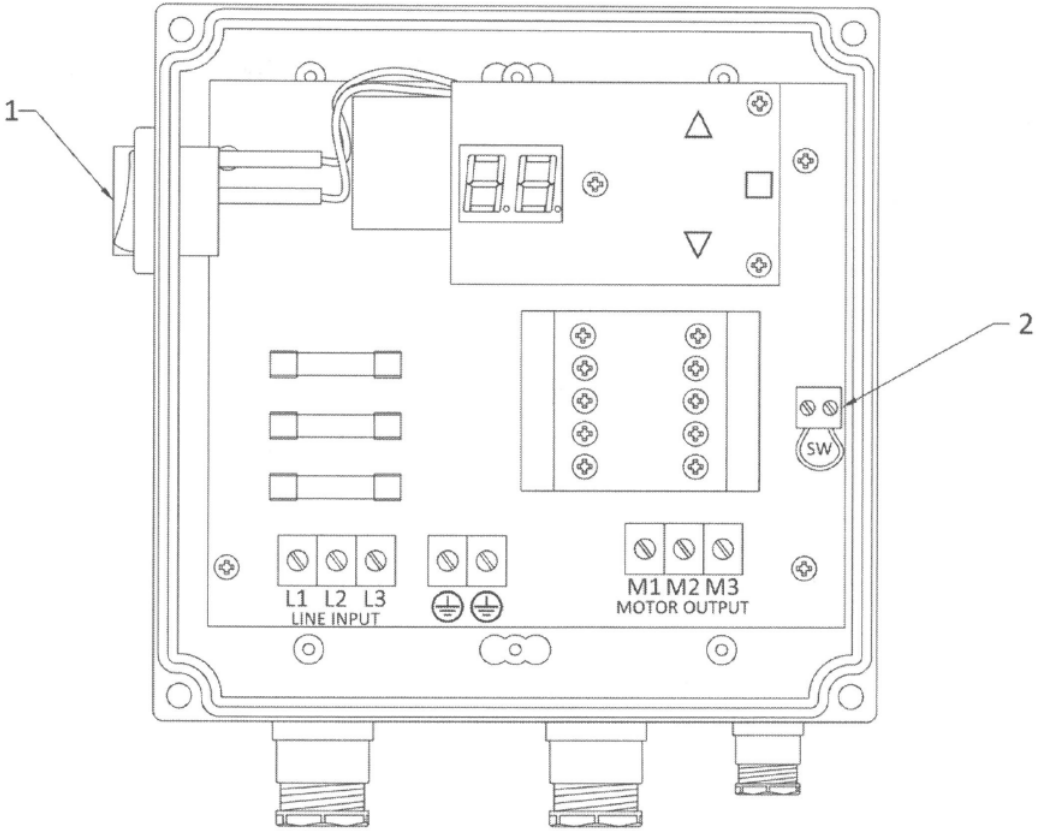
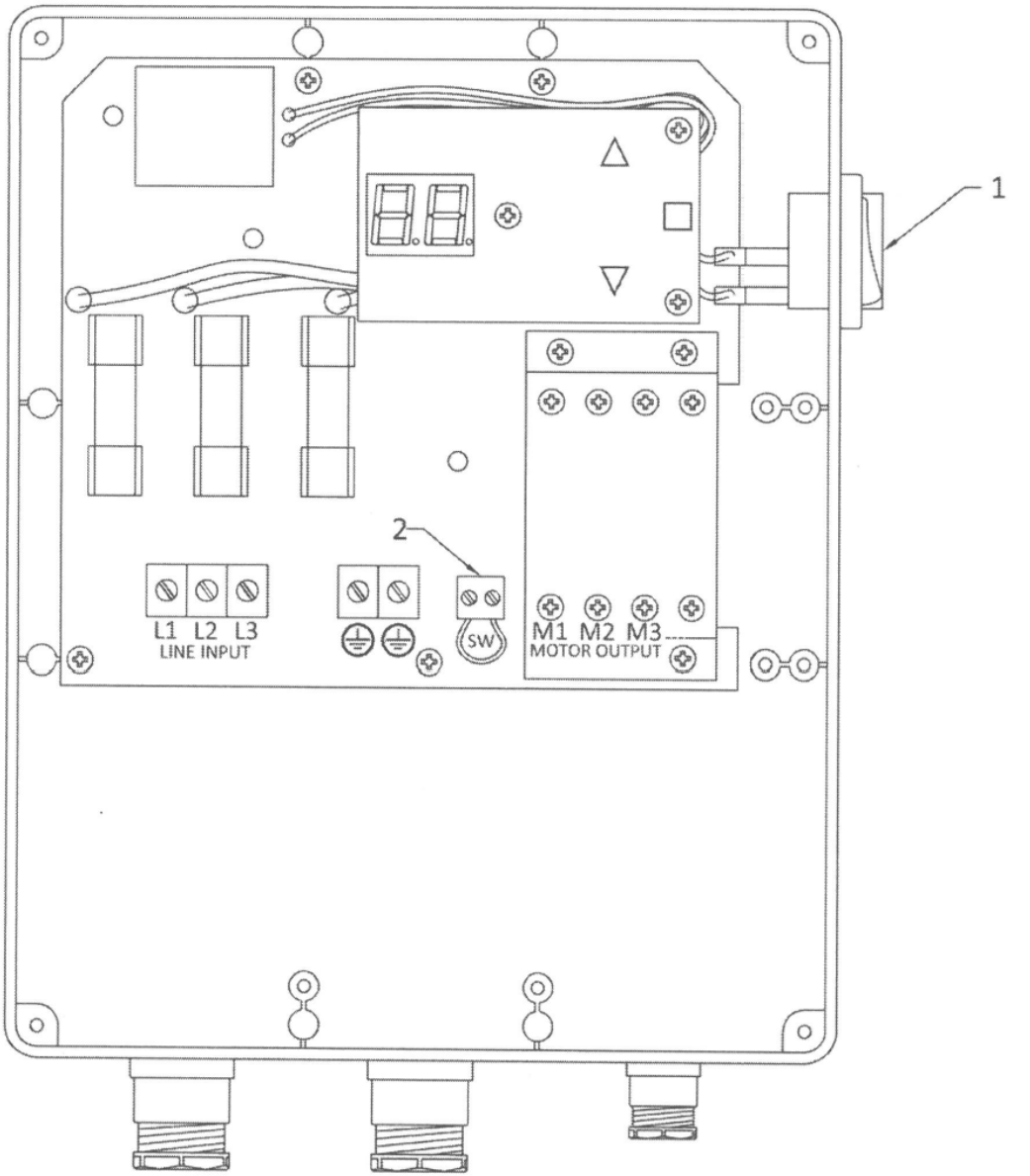
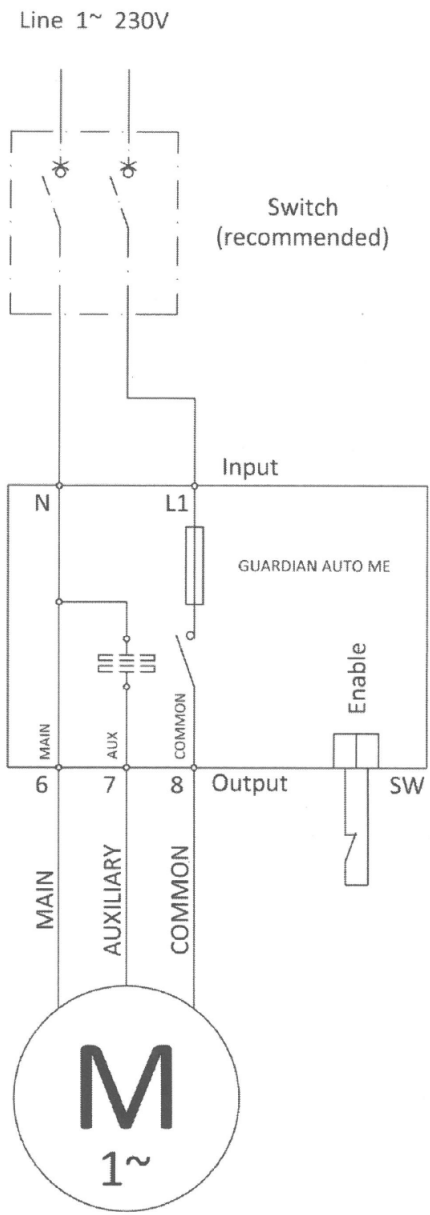


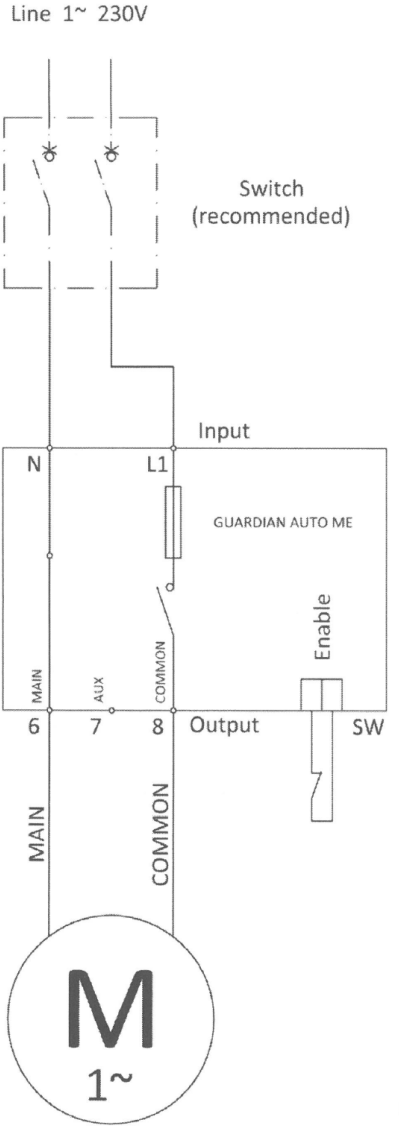
FIG. 2

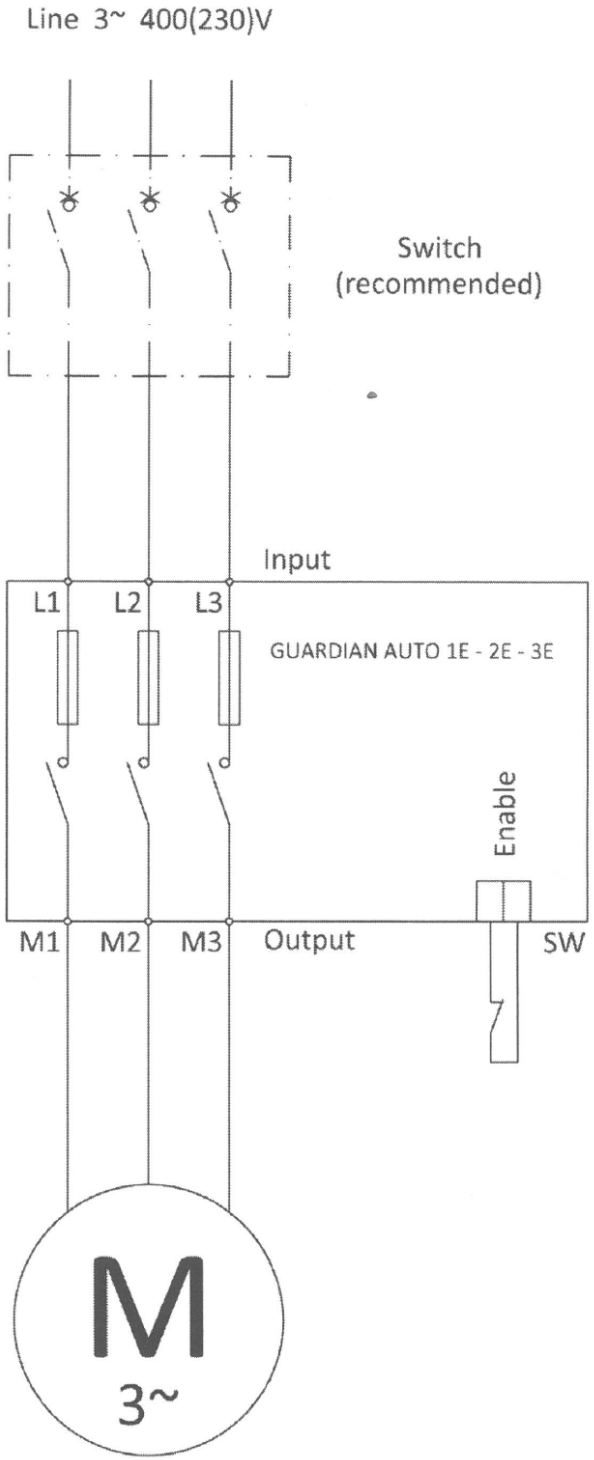
FIG. 4a: PSC MOTOR/PUMP

GUARDIAN AUTO 2E - 3E




Line 1~ 230V
Switch
(recommended)
Input
N
L1
GUARDIAN AUTO ME
Enable
MAIN
AUX
COMMON
6
7
8
Output
SW
MAIN
AUXILIARY
COMMON
M
1~


Line 1~ 230V
Switch
(recommended)
Input
N
L1
GUARDIAN AUTO ME
Enable
MAIN
AUX
COMMON
6
7
8
Output
SW
MAIN
COMMON
M
1~


Line 3~ 400(230)V
Switch
(recommended)
Input
L1
L2
L3
GUARDIAN AUTO 1E - 2E - 3E
Enable
M1
M2
M3
Output
SW
M
3~

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