PUMP CONTROL BOX WITHOUT PROBE Type GUARDIAN

User's manual

This symbol indicates a potential risk of electrical nature

This symbol indicates a subject of particular importance

1.0 OVERVIEW

This booklet describes the instructions for the use and maintenance of the GUARDIAN Series cor panels.
This booklet must be carefully conserved for future reference 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.

2.0 GENERAL INFORMATION

The GUARDIAN® E series control panels are produced in the following sizes :

GUARDIAN® M. E per single phase rated loads up to a maximum of 18A nominal (230V)
GUARDIAN® 1.E per three phase rated loads up to a maximum of 9A nominal (400V or 230V)
GUARDIAN® 2.E per three phase rated loads up to a maximum of 20A nominal (400V or 230V)
GUARDIAN® 3.E per three phase rated loads up to a maximum of 32A nominal (400V or 230V)

3.0 DESCRIPTION

GUARDIAN® in the standard version comes supplied with the following functions
- Connection and disconnection directly in line (DOL)
- Overload protection Overvoltage and undervoltage crowbar
- Short-circuit protection
- Protection against operating dry (no water protection)
- Protection against 2 phases operation (three phases)

3.1 OPERATIONS:

GUARDIAN® has been designed to operate connected to submerged and surface electric pumps, but may be used with any asynchronous electric motor.
A vast range of electric pumps may be managed with just one version.
The rated current is calibrated inside the switchboard through a suitable potentiometer with graduated scale.
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.
The system to protect against operating dry does not require sensors (source of errors and extra costs), but functions by checking the COS(φ) (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 min.), 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® continues with normal operation. If there is still no water after 4 tests, GUARDIAN® gives the alarm with the indication UL (under load) on the display and remains locked until a manual reset is carried out (see 4.2.8).
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 between the two SW terminals.

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

3.2.1 Self-diagnosis upon start-up (indication of the frequency).
3.2.2 Normal operation (indication of the absorbed current).
3.2.3 Situation of dry operation/low load (display of SB blinking).
3.2.4 Stand-by for restoring of level (display of SB, load disconnected).
3.2.5 Final lack of water, (display of UL , load disconnected)
Overload in progress (display of the absorbed current blinking).
3.2.7 Overload alarm (display of the OL blinking, load disconnected).
3.2.8 After having eliminated any anomalies, GUARDIAN® may be reset by putting the on/off switch to off and then on again (3).

4.0 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

5.0 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® must control. An appropriate kni**fe switch that guarantees the visual opening /disconnection of the same from the power supply line**, thereby guaranteeing the intervention of the operator on A the panel in maximum safety.
GUARDIAN® 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

Caution ! : The electrical connection must be made exclusively by **specialised technical personnel**.
Caution ! : In the event of an existing system, make sure that the load connection is compatible with the GUARDIAN® connection.
In particular, 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.
Caution ! : 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.
Caution ! : 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 5 below , making sure that the motor phases are connected in the correct sequence.

5.2 ADJUSTMENTS

5.2.1 Rated current : GUARDIAN® normally only requires calibration of the overload protection trigger current.
To do this, turn on the motor till it reaches the full load working condition in normal condition then turn the potentiometer 1 in anti-clockwise direction till the display start blinking . Turn therefore the potentiometer in the opposite direction till the light will be switched off. Check with an hook-on type ammeter (or the indicative scale printed on the card) that the setting value is the nominal ones of the motor as shown on the motor data label.

5.2.2 Cos(φ) (Power factor): factory calibration is normally suitable for almost all applications, but in particular cases it may be necessary to adjust the Cosy (power factor) threshold value, below which the dry operation alarm is given.
To make this adjustment, start the motor or the pump and put it in the condition of minimum possible load in normal operation; adjust the potentiometer 2 so that display starts blinking in this condition and then turn it slowly counter-clockwise until its displayed the absorbed current.

6.0 TROUBLE SHOOTING

Trouble	Meaning	Possible cause	Possible remedy
6.1 The motor does not start and the G display the frequency	Self-diagnosis 3.2.1	Supply voltage is too low	Check
6.2 GUARDIAN® 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 min)	- 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	Resolve the problem and reset G see 3.3.8
6.5 display of OL	Too high absorption of current detected	Incorrect adjustment	Check correct absorption by the motor and adjustment of the potentiometer. (arbitrarily increasing the adjustment setting is not a solution) See following points
6.6 display of 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	Resolve the problem and reset G see 3.3.8
6.7 display of OF	Missing phase	- missing phase - the motor is not connected	Resolve the problem and reset G see 3.3.8
6.8 the G is not activated		- GUARDIAN® not powered - No jumper on SW contacts - The external contact is open/disconnected	

6.0 DIMENSIONS

GUARDIAN® ME, 1E : 175 x 175 x 75 mm
GUARDIAN® 2E, 3E : 250 x 175 x 105 mm