

# GEMAS RANGER PUMP INSTRUCTION MANUAL



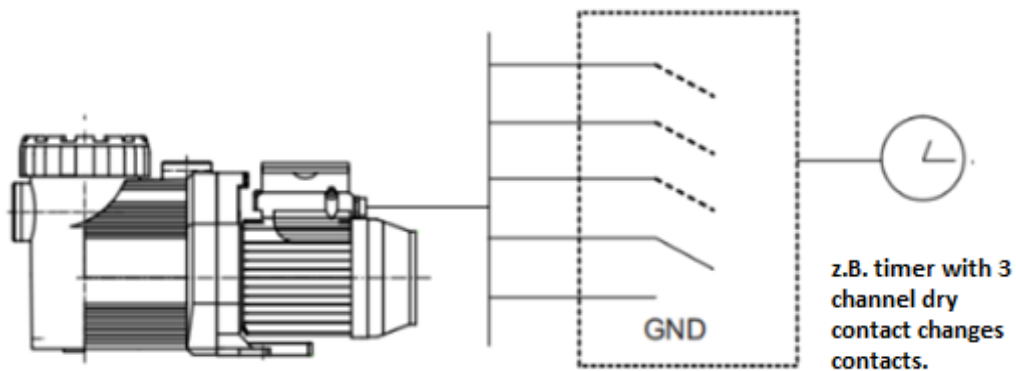
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Pumps are complete with 5 wire cable for connection. Cable colours are shown on below chart with RPM amounts.

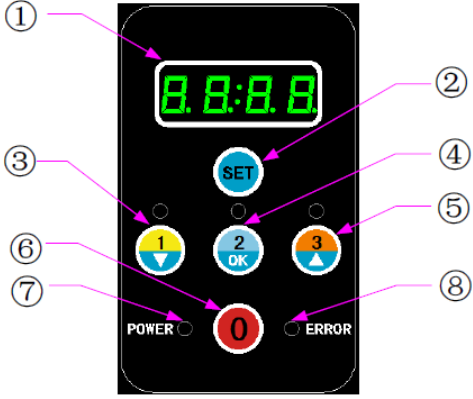


Cables should be connected to dry contact. Contacts must be changed separately. Otherwise speed can not be adjusted.



## PUMP CONTROLLER OPERATION GUIDE Rev.1.2

The pump controller version 1.2 provides two pump operation modes of constant power control and constant speed control with advanced sensorless sine wave vector control method. A four-digits each with 7-segment led displays the motor speed, power percentage, and fault code information

	<p><b>(1) LED window:</b> displays the current speed of the motor, or error code message.</p> <p><b>(2) "SET" button:</b> used to enter the programming mode or to reset the control.</p> <p><b>(3) Button "1/ ▼":</b> used to select the fixed low speed or to decrease in the programming mode.</p> <p><b>(4) Button "2/OK":</b> used to select the fixed medium speed or to confirm/save parameters in the programming mode.</p> <p><b>(5) Button "3/ ▲":</b> used to select the fixed high speed or to increase in the programming mode.</p> <p><b>(6) Button "0":</b> to stop the motor.</p> <p><b>(7) Power light:</b> illumines when power turns on.</p> <p><b>(8) Error light:</b> illumines when there is a fault.</p>
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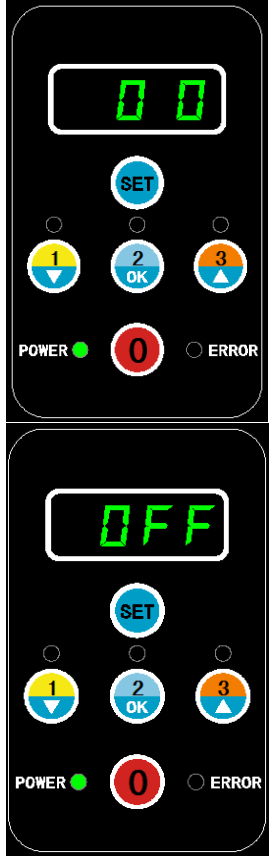
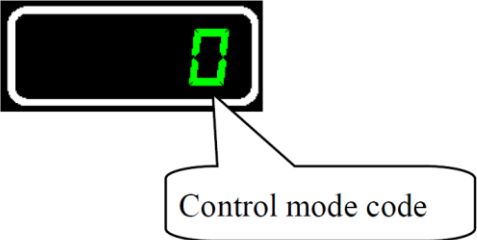
### Default Settings:

Preset control mode	0 = constant power 1 = constant speed
Preset fixed speed	1= 2000 d/d 2= 2400 d/d 3= 2850 d/d
Preset fixed power or flow percentage	1= %60 2= %80 3= %100
Priming speed	2850 rpm
Priming time	5 minutes
Speed which can be set	1000-2850 rpm (in 50 rpm per step)
Priming time which can be set	0 - 10 minutes ( <i>in 1 minute per step</i> )


## Presetting the control mode and control signal source



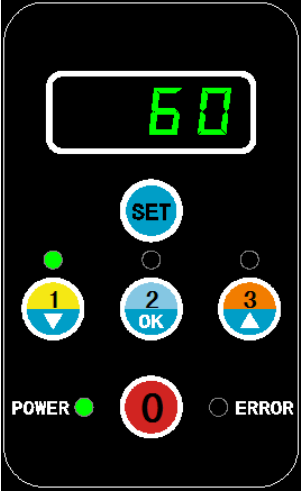
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	<p>Keep the "SET" button be pressed when turning on the ac power supply till the LED display shows "0" . The digit is for control mode setting.</p> <div data-bbox="715 407 1193 645"></div> <p>The digits can be changed with the buttons "▼▲". Press "OK" button to save the settings, and the display shows "OFF".</p> <p>Control mode code 0 = constant power 1 = constant speed</p>
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## Presetting the fixed speed in constant speed operation mode

	<p>In constant speed operation mode, press the button "1", "2" or "3" of the fixed speed which is to be changed and the LED window displays the current speed, then keep the "SET" button pressed for at least three seconds until the speed displayed in the LED window begins to flash. Now the speed can be changed with the buttons "▼▲". Every time the button "▼" or "▲" is pressed, the speed decreases or increases by 50 rpm. The upper limit of the speed is 2850 rpm and the lower limit is 1000 rpm. To save the set speed confirm with "OK" button. To cancel and return to the original speed press the "SET" button.</p> <p>The default setting is as follows:</p> <ul style="list-style-type: none"><li>1 = 2000 rpm</li><li>2 = 2400 rpm</li><li>3 = 2850 rpm</li></ul>
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### Presetting the fixed power in constant power operation mode

 The image shows a control panel with a green LED display showing '60'. Below the display are several buttons: a blue 'SET' button, three buttons labeled '1', '2', and '3' with up/down arrows, a blue 'OK' button, a red '0' button, and an 'ERROR' indicator. There are also three indicator lights: a green 'POWER' light, a red '0' light, and a white 'ERROR' light.	<p>The power or flow is shown in percentage of the maximum power rating or flow rating. In constant power operation mode or constant flow operation mode, press the button "1", "2" or "3" of the fixed value which is to be changed and the LED window displays the current power percentage, then keep the "SET" button pressed for at least three seconds until the speed displayed in the LED window begins to flash. Now the power percentage can be changed with the buttons "▼▲". Every time the button "▼" or "▲" is pressed, the speed decreases or increases by 1%. The upper limit of the speed is 100% and the lower limit is 5%. To save the set power percentage confirm with "OK" button. To cancel and return to the original speed press the "SET" button.</p> <p>The default setting of the power or flow percentage is as below:</p> <ul style="list-style-type: none"><li>1 = 60 %</li><li>2 = 80 %</li><li>3 = 100 %</li></ul>
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### Setting the priming parameters

 The image shows a control panel with a green LED display showing 'OFF'. Below the display are several buttons: a blue 'SET' button, three buttons labeled '1', '2', and '3' with up/down arrows, a blue 'OK' button, a red '0' button, and an 'ERROR' indicator. There are also three indicator lights: a green 'POWER' light, a red '0' light, and a white 'ERROR' light.	<p>The motor has to be stopped ("0" button) to program the priming speed and time. Then press the "SET" button again for at least three seconds until the speed displayed in the LED window begins to flash. Now the speed can be set with which the motor is to start up during the priming time. The speed can be changed with the buttons "▼▲", the upper limit of the priming speed is 2850 rpm and the lower limit is 1000 rpm. Press the button "OK" to save the speed setting and enter the phase for priming time setting, or press "SET" to cancel and return to the previous mode. After the priming speed has been set, the period of the priming time can be specified with regard to a range from 0 to 10 minutes.</p>
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## Stop operation



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1. Button "0" is pressed;
2. stop signal is detected if wire control is selected
3. Fault occurred

If the pump is stopped normally as in the above case 1~3, the "Power" LED flashes and the LED display shows "OFF", while the LED shows an error code if the pump is stopped due to a fault. When the power is turned on and the motor is at the standby state, the LED display also shows "OFF" if there is no error, and the power light flashes.

## Start the pump



### Manual operation

Press button "1", "2" or "3" to select the preset fixed speed or preset fixed power.

If the pump starts from standby state, it starts up in priming mode and subsequently runs with the selected fixed speed or fixed power.

As long as the pump is in the priming phase, the light of the selected speed or power flashes.

During running operation the pump will be accelerated or decelerated to the selected fixed speed or fixed power directly, without priming time.

Preset speed or power can be changed during running operation.

Please refer to "Presetting the fixed speed in constant speed operation mode" for the change operation method.



Recover factory default settings



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The motor can be reset to the state of factory delivery by pressing the "SET" button for at least 15 seconds. The three lights of the fixed speeds and the power light turn on. The motor starts to run by the default preset speed after the "SET" button is released.

Power saving mode



The LED display turns off in three minutes when there is no action detected either from the press buttons or from the external switches.

## Fault alarm



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In case of an error occurs, the Error light turns on and the LED window displays an error code. The message will not be cleared until the fault is disappeared or the power supply is turned off. The controller records the latest 8 errors, and the error history can be viewed one by one in the LED window. When a new error occurs, the oldest error record will be deleted.

To view the error records, press the "0" button first and then soon press the "SET" button within 500msec at standby state. Press the "▲" button to go to the next error code. Press the "▼" button to delete the current error record, and press the "▼" button for at least 3sec to delete all error records. Pressing the "SET" button or doing nothing within 30sec will exit the error code view mode.

The first character "E" denotes "Error", the second digit shows the sequence of the error, and the last two digits are the error code.

## Error codes and possible causes

Error code	Possible cause
01	DC-link over-voltage
02	DC-link under-voltage
03	DC-link voltage is too low
04	IPM over-current software protection
05	IPM over-current hardware protection
07	AC input over-voltage
08	AC input under-voltage
10	Electric-thermally protection for pump over-load
11	Motor over speed
13	IPM over temperature
16	Motor out of step
17	PFC output DC low voltage
20	Earth short circuit
21	Motor Phase short circuit
22	Output phase lack
31	Communication error with master
41	Current sensor circuit error
42	Inrush current preventing relay error
43	Voltage sensor error, AC voltage and DC voltage does not match
51	IPM temperature sensor circuit error
60	Motor rotor lock
61	DSP ROM error
62	DSP RAM error
63	DSP watchdog error
66	Communication error with driver