

Intelligent Frequency Conversion Circulation Pump

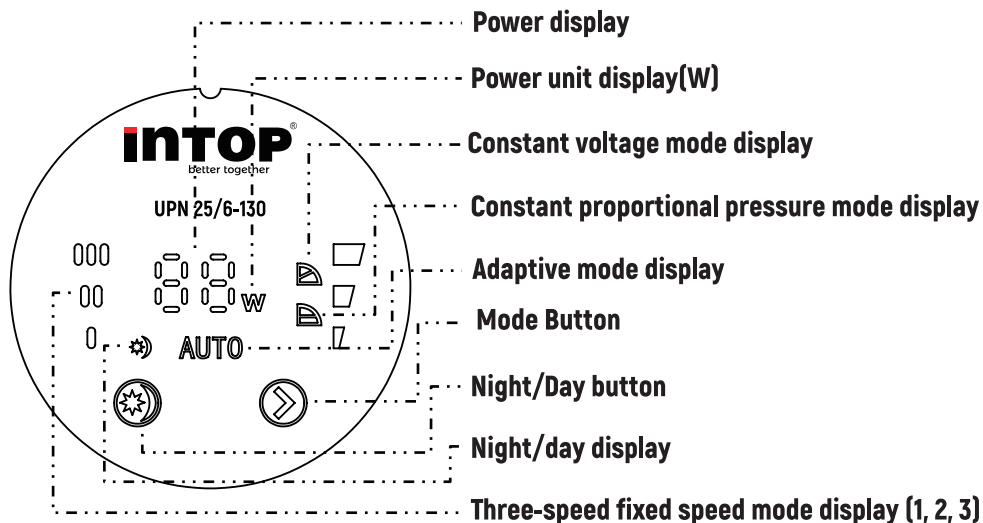
Thank you for choosing our products.
Before using the pump, carefully read the instruction manual.
Save this manual for future reference.



ATTENTION!

- ! Before starting operation, make sure that the pump is properly grounded.
- Don't touch to a running pump.
- Do not operate the pump without water.

1.Panel function display description



2. Buttons and Display

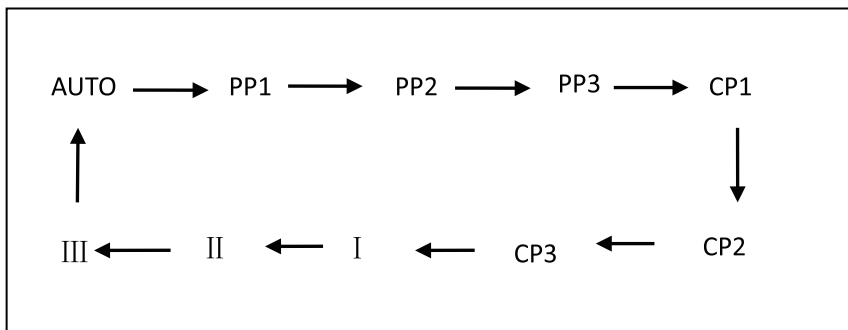
(1) Display panel description

The display panel is shown in FIG. 7

In Figure 7, when there is no fault, the digital tube displays the total power of the controller; when a system fault occurs, the system fault is displayed; the PP3 status light is on, indicating that the system works in the high constant proportional pressure mode; the PP2 status light is on, indicating that the system works in the medium constant proportional pressure mode; the PP1 status light is on, indicating that the system works in the low constant proportional pressure mode; the CP3 status light is on, indicating that the system works in the high constant pressure mode; the CP2 status light is on, indicating that the system works in the medium constant pressure mode; the CP1 status light is on, indicating that the system works in the low constant pressure mode; the III status light is on, indicating that the system works in the fixed speed third gear mode; the II status light is on, indicating that the system works in the fixed speed second gear mode; the I status light is on, indicating that the system works in the fixed speed first gear mode; the AUTO status light is on, indicating that the system works in the adaptive mode.

(2) Button Description

After power-on, each time the mode button is pressed, the modes will cycle through the following order and start running.



3. Adaptive Mode

In the adaptive function, the system can adjust the performance of the pump according to the current customer demand flow, and the pump is also in proportional pressure control mode. It mainly adaptively adjusts the performance of the water pump within a certain area so that it works at a relatively high efficiency.

The shaded part in Figure 2 is the moving range of the proportional pressure curve in the adaptive function. Among them, the minimum proportional pressure line (PPmin), the maximum proportional pressure line (PPmax), and the power limit line can be adjusted according to the specific water pump system.

Specific method: By collecting system operation data over a period of time, and analyzing the current demand of the system through these data, the optimal proportional pressure curve of the system (within the shaded range) is selected.

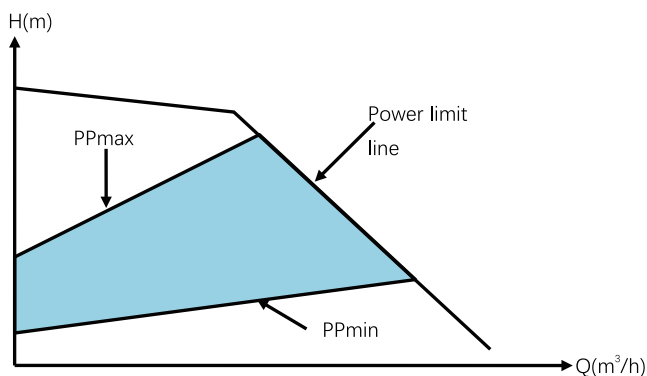


Figure 2 Adaptive working curve

4 . Constant Proportional Pressure Mode

In the constant proportional pressure mode, two proportional pressure curves can be preset according to the specific water pump system, namely PP3 pp2 PP1. The system can move the working point of the pump on the preset proportional pressure curve according to the actual flow demand. Its characteristics are: the system pressure will increase with the increase of flow until it increases to the maximum power.

PP1: is the preset low proportional pressure curve; pp2: is the preset medium proportional pressure curve, PP3: is the preset high proportional pressure curve. The working curve is shown in Figure 3.

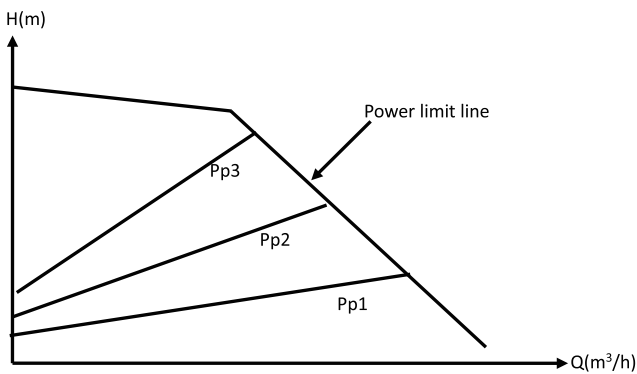


Figure 3 Constant proportional pressure working curve

5. Constant Voltage Mode

In the constant pressure mode, two pressure curves can be preset according to the specific water pump system, namely CP3 CP2 CP1. The system can make the pump's working point move horizontally on the preset pressure curve according to the actual flow demand. Its characteristics are: the system pressure will not change with the change of flow, and always maintain a constant set pressure.

CP1: is the preset low pressure curve; CP2: is the preset medium pressure curve; CP3: is the preset high pressure curve. The working curve is shown in Figure 4.

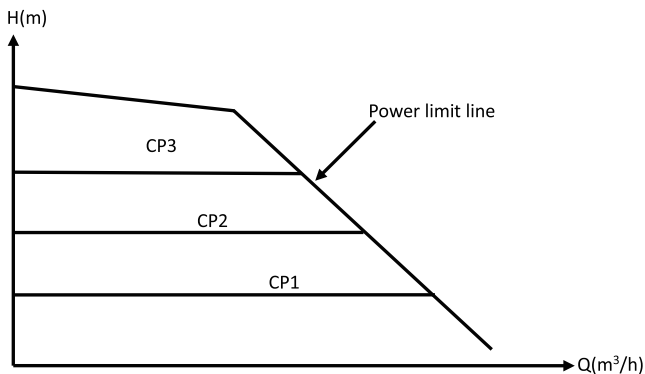


Figure 4 Constant voltage mode working curve

6. Constant Speed Mode

In the constant speed mode, three gears of water pump motor speed can be preset according to the specific water pump system, namely SPD1, SPD2 and SPD3. Its characteristics are: the water pump works on a predetermined constant speed curve.

SPD1: is the preset constant speed 1 gear speed, the specific speed is *Hz; SPD2: is the preset constant speed 2 gear speed, the specific speed is *Hz; SPD3: is the preset constant speed 3 gear speed, the specific speed is *Hz; the working curve is shown in Figure 5.

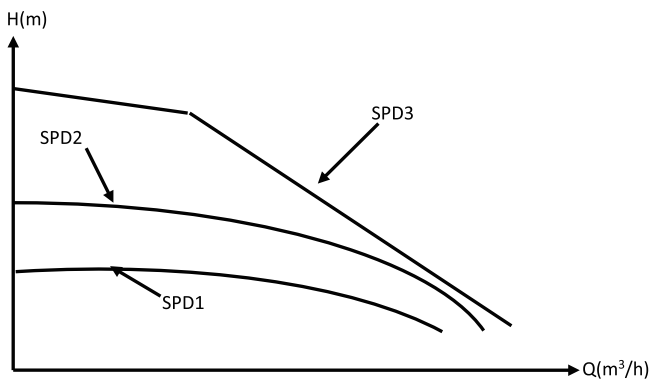


Figure 5 Constant speed mode working curve

6. Night Mode

Night mode can only be enabled and run in adaptive, constant proportional pressure, and constant pressure modes. After the night key is pressed, the night LED lights up, indicating that the night mode has been entered. The operation process is shown in Figure 6.

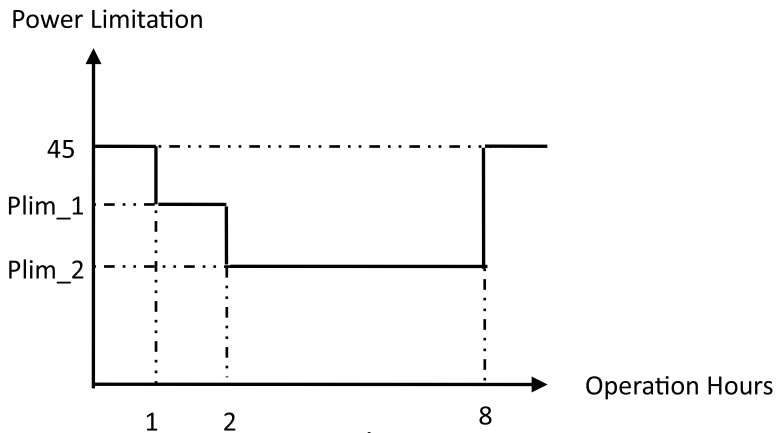


Figure 6

After the night mode is activated, the maximum power limit values in different time periods are different. The maximum power limits Plim_1 and Plim_2 can be set according to different systems.

8. Exhaust Mode

When other substances are mixed in the fluid and enter the pump body, the noise during operation will increase and the pump body will be easily damaged. To solve this problem, this driver adds an intelligent exhaust mode.

(1) Entering the exhaust mode

Click the function key and wait for 5 seconds to automatically enter the automatic exhaust operation mode. After entering the exhaust mode, the display panel flashes to show the current power and setting mode, and the LED flashes continuously during the exhaust process. If you need to stop the program, press and hold the function key until the program stops.

(2) Exhaust mode operation process

In exhaust mode, the entire exhaust process lasts for 10 minutes. The first 2 minutes are operated at the highest speed, and the next 8 minutes are operated with a 10-second cycle (excluding acceleration and deceleration time) to switch between the highest and lowest speeds. When exhausting, the pipeline must be kept unobstructed, and the water pump starts the automatic exhaust procedure, which lasts for 10 minutes.

9. Energy Consumption Monitoring

When the system is powered on and self-checked, the motor starts to start, and when the motor enters the synchronous state, the real-time power is calculated and displayed on the panel in watts.

10. Fault Protection

When a fault occurs during system operation, the pump will stop working immediately, the display panel will flash the fault code, and the pump will restart after 30 seconds. See Table 1 for the fault code.

Table 1

Error Code	Fault Name	Illustrate
P0	Module protection	IPM module failure or system overcurrent protection (excessive load).
P1	Voltage error	The current voltage is too low or too high (the bus voltage is higher than 380V or lower than 120V).
P2	Startup failed	The motor is stuck or mismatched and cannot start normally
P3	Phase loss protection	The motor is not wired.
P6	Stall protection	The motor stalls because the motor cannot run synchronously due to external reasons.
P9	Overcurrent protection	System overcurrent protection (excessive load).
E5	EEPROM Failure	External memory failure.

Note: When the external memory fails, some functions of the controller fail, but the pump keeps running. The fault code flashes for 10 minutes after power-on.

11. Power Frequency Limiting

Power frequency limiting is a universal protection. It is effective in all states, and the protection value depends on the model. When the total power is detected to be greater than the frequency reduction power of the model, the motor enters the frequency reduction state until it recovers to below the frequency reduction power. The power protection thresholds of each model are shown in Table 2.

Model (by head)	Frequency reduction power value
8meters	50w
6meters	40W
5meters	28W
4meters	18W

12. Power-off Memory

When the system is running, the system loses power. The system will store the current operating mode before the power failure. When the system starts again, it reads the model parameters and mode parameters in the EEPROM and continues to run. The EEPROM storage method uses double backup. When the EEPROM is read at power-on, if the data verification of one of the backup areas fails, the second backup area is read. After the reading is successful, it is reviewed in the first backup area. If both data areas are damaged, the water pump automatically selects the 6-meter head model and runs in adaptive mode.

13. Motor Cleaning and Maintenance Reminder

When the system encounters force majeure (impeller blocking, fluid with debris, etc.) or suffers devastating damage, the system will automatically detect and display "E-" on the display panel within 5 minutes, prompting the user to replace the motor or clean the heating system.

14. Model Selection

Model selection can be achieved by changing the data in EEPROM.