Application of frequency converter in constant pressure water supply

Constant pressure water supply technology with frequency converter as the core has been widely used in the water supply industry for its advantages of safe use, energy saving and environmental protection, and high water supply quality. Through the built-in PID function of the inverter, the operating frequency of the inverter can be automatically adjusted according to the changes in water consumption pressure, so as to keep the water pressure constant to meet the water demand on site.**This inverter supports adjusting the given water pressure by using the up and down keys on the keyboard.**

There are usually three constant pressure water supply methods according to different signals and control methods: a)

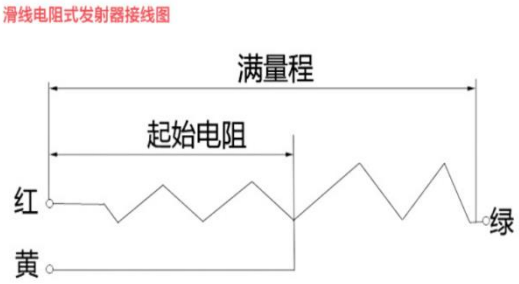
Constant pressure water supply by remote pressure gauge (voltage signal feedback)

b) Constant pressure water supply of pressure transmitter (current signal feedback)

c) Constant pressure water supply controller with frequency converter (constant pressure water supply controller directly sets frequency) **Constant pressure water**

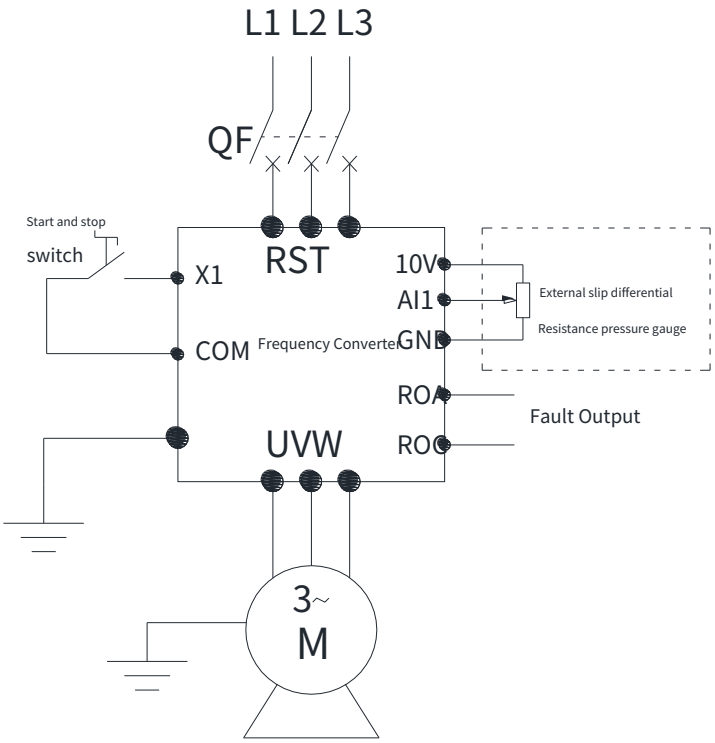
1 **supply mode using remote pressure gauge**

1.1 The slip resistance remote pressure gauge is used for pressure detection on site. Taking the Hongqi YTZ-150 resistance remote pressure gauge as an example, its appearance and parameters are as follows:



Main technical indicators: initial resistance 3~20Ω, full scale 340~400Ω.

1.2 Water supply system wiring diagram



External remote pressure gauge diagram

Wiring Instructions

When selecting a remote pressure gauge, it is best to select the actual pressure used.**1/3 to 2/3 of the entire range**Around, this makes the pressure error small, the water pressure fluctuation small, and the accuracy high;

When connecting an external slip resistor remote pressure gauge, if AI1 is used as the pressure feedback signal, be sure to pay attention to whether the wiring is correct. The middle tap is connected to the AI1 terminal of the inverter, the start resistor terminal is connected to the GND terminal, and the full scale terminal is connected to the 10V terminal; The wiring method of the above remote pressure gauge is:

Red Line Terminals for connecting to the inverter**GND**

Yellow Line Terminals for connecting to the inverter**AI1**

Green Line Terminals for connecting to the inverter**10V**

※：The lead wire colors of different remote pressure gauges may be different, so please be careful to distinguish them.

1.3 Related parameter settings of the inverter

Parameter settings	Parameter Description
P0-01＝2	VF Control
P0-02＝1	Control the start and stop of the inverter through external terminals; if the keyboard is used to start and stop, no setting is required
P0-03＝8	PID setting
P0-14＝25-30Hz	The lower limit frequency should be adjusted according to the heat dissipation of the motor itself; the lower limit frequency of the motor with automatic air cooling cannot be too low.
P0-17＝XX.X	Acceleration time (set according to actual needs)
P0-18＝XX.X	Deceleration time (set according to actual needs)
P4-00＝1（factory default value）	X1 and COM are closed, the inverter runs forward
P3-34=1	Start water supply mode
P3-35=XX	XX is the pressure gauge range (unit: MPa)
P3-36=YY	YY is the required pressure value (unit: MPa)
PA-00=0 (factory default value)	PID setting source is digital setting, the value of P3-36
PA-02=0 (factory default value)	PID feedback channel is AI1 (0～10V)
PA-05=20 (factory default value)	Proportional Gain
PA-06＝2.0（factory default value）	Integration time

If the sleep function is required, the following parameters need to be set:

PA-28=1 (factory default)	PID shutdown also calculates
P3-37＝HH	The sleep frequency is determined according to the on-site conditions. It is recommended to record the frequency AA of the inverter when no water is used on site (to maintain the pipeline pressure), and then add 2 to 3 Hz to it. That is: HH≧AA+2 to 3Hz
P3-38＝30-120S	Sleep delay time, determined according to the site
P3-39＝80% (factory default value)	The wake-up pressure value is a percentage of the set pressure. The smaller the value, the lower the wake-up pressure value.
P3-40＝1S	Wake-up delay time. When the feedback pressure is less than the wake-up pressure P3-39 (target pressure P3-36×P3-37), the inverter will be re-awakened after the P3-40 sleep delay.

AA-Minimum frequency to maintain stable pipeline pressure without water HH-

Sleep frequency

1.4 Give examples;

The customer needs 5 kg (0.5 MPa) of pressure for a water supply. He bought a remote pressure gauge with a range of 1.2 MPa and a motor power of 7.5KW, sleep function required, external terminal control start and stop, measured to maintain pipeline pressure at 35Hz

The wiring method is shown in the figure above, and the parameter settings are as follows:

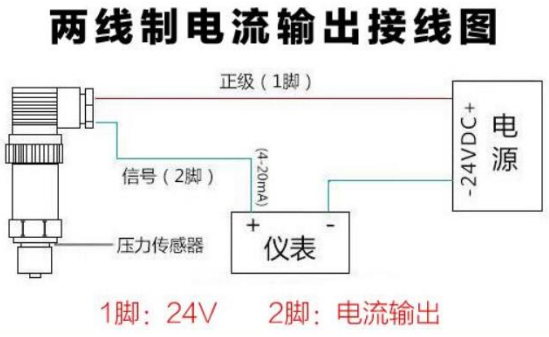
P0-01=2 P0-02=1 P0-03=8 P0-14=25 P0-17=6.00 P0-18=8.00
P3-34=1 P3-35=1.2 MPa P3-36=0.5 P3-37=38 P3-38=60 P3-39=80%
P3-40=1.0

1.5 Common problems and solutions:

Frequently asked questions	Cause	Treatment
The inverter cannot run	Are the operating parameters set incorrectly?	External terminal operation: P0-02=1, P4-00=1 Keyboard operation: P0-02=0
	Is the wiring bad or wrong?	Whether X1 and COM are connected can be checked through parameters. U0-07=H0000 means X1 and COM are not connected. If connected, U0-07=H0401
The inverter always runs at 0.00Hz or 50.00Hz	Remote pressure gauge wiring error, disconnection or damage bad	Measure the DC voltage between AI1 and GND. Normally, it increases with the increase of water pressure.
	Parameter setting error	Recheck the parameters and set
The inverter cannot maintain constant pressure and transmit pressure remotely The pointer fluctuates too much	The remote pressure gauge is too close to the water outlet	Install the remote pressure gauge in another location and add A buffer.
The inverter frequency rises too slowly	Adjust the inverter parameters appropriately	Reduce the acceleration and deceleration time P0-17 and P0-18 (too small will cause the inverter to report overcurrent or overvoltage fault) Increase the proportional gain PA-05 (too large will cause frequency instability It is best not to exceed 60) Reduce the integral time PA-06 (not less than 0.5)
The motor does not produce water or the amount of water is very small	Is the motor direction opposite?	Exchange any two phases of the motor line
The inverter reports an overcurrent or overvoltage fault	Improper inverter selection	Check whether the inverter is small
	Is there any leakage in the check valve of the pipeline?	Re-inspect pipeline
	The motor or water pump is not running well or is stuck. elephant	Re-check the motor and water pump
	Inverter parameter settings are incorrect	Is P0-01 set to 2? Is the acceleration/deceleration time set too short?
	The inverter is restarted before the motor stops completely	Wait until the motor stops completely before restarting.
The inverter drives multiple motors and stops or Fault occurs when switching motors	The inverter parameters need to be set to free stop	P6-10=1

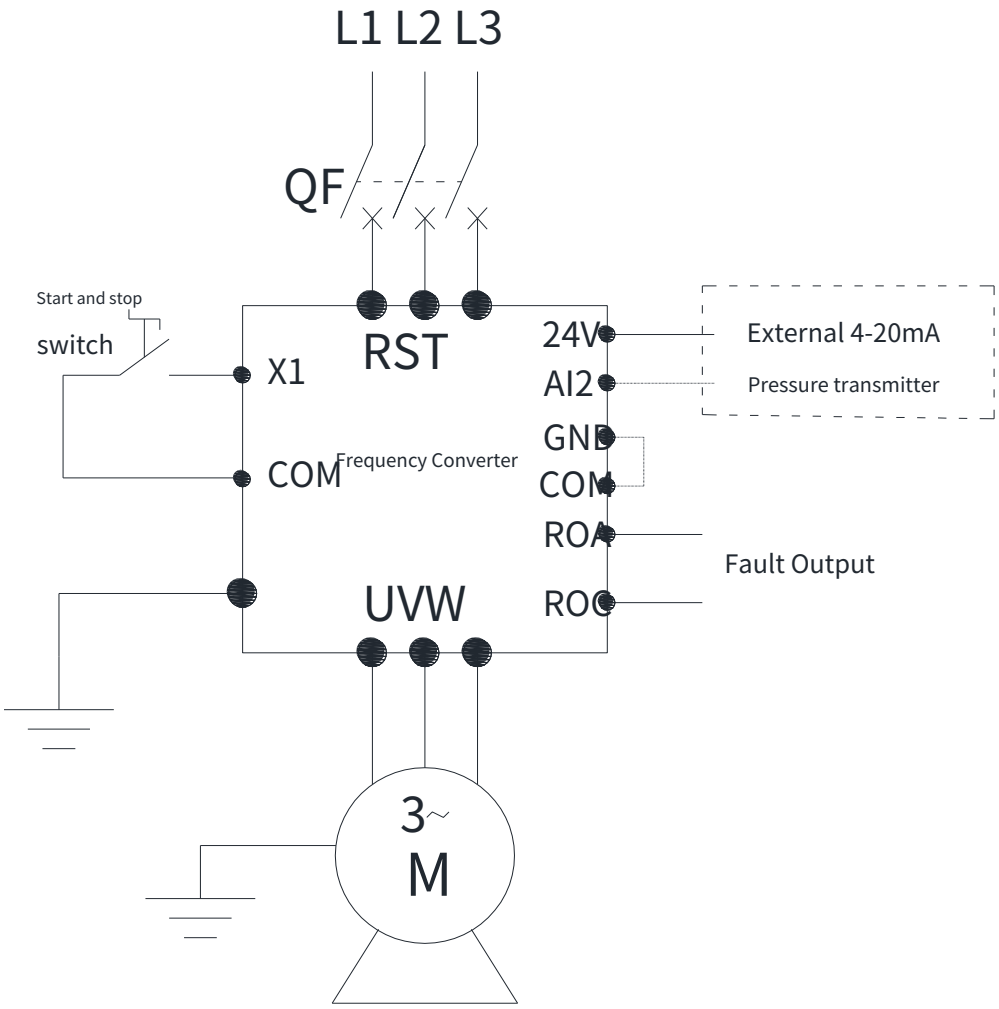
2 Constant pressure water supply mode using pressure transmitter

2.1 The pressure transmitter used on site, taking the pressure transmitter of Rongguang Technology as an example, the appearance, wiring and parameters are as follows:



Main technical indicators: power supply; 12-36VDC, output 4-20mA

2.2 Water supply system wiring diagram



External pressure transmitter diagram

Wiring Instructions

When selecting a pressure gauge, it is best to select a pressure that is actually used at about 1/3 to 2/3 of the entire range, so that the pressure error is small, the water pressure fluctuation is small, and the accuracy is high; because the pressure transmitter outputs a 4-20mA DC signal, only the AI2 terminal of the inverter can be used. At the same time, the J2 jumper of the inverter must be in the AI2 current I position, and the jumper is located on the lower right side of the control panel.

The wiring of the upper pressure transmitter and the frequency converter is as follows:

Red Line Connect to inverter**24V**

Blue Line Connect to inverter**AI2**

Inverter**COM and GND short circuit** The leads of different remote pressure gauges may be different, so please be careful to distinguish them.

2.3 Related parameter settings of the inverter

Parameter settings	Parameter Description
P0-01＝2	VF Control
P0-02＝1	Control the start and stop of the inverter through external terminals; if the keyboard is used to start and stop, no setting is required
P0-03＝8	PID setting
P0-14＝25-30Hz	The lower limit frequency should be adjusted according to the heat dissipation of the motor itself; the lower limit frequency of the motor with automatic air cooling cannot be too low.
P0-17＝XX.X	Acceleration time (set according to actual needs)
P0-18＝XX.X	Deceleration time (set according to actual needs)
P4-00＝1（factory default value）	X1 and COM are closed, the inverter runs forward
P3-34=1	Start water supply mode
P3-35=XX	XX is the pressure gauge range (unit: MPa)
P3-36=YY	YY is the required pressure value (unit: MPa)
P4-18=2.0V	**2.0 V corresponds to 4 mA**
PA-00=0 (factory default value)	PID setting source is digital setting, the value of P3-36
PA-02＝1	**PID feedback channel is AI2 (4-20 mA), jumper required**
PA-05=20 (factory default value)	Proportional Gain
PA-06＝2.0（factory default value）	Integration time

If the sleep function is required, the following parameters need to be set:

PA-28=1 (factory default)	PID shutdown also calculates
P3-37＝HH	The sleep frequency is determined according to the on-site conditions. It is recommended to record the frequency AA of the inverter when no water is used on site (to maintain the pipeline pressure), and then add 2 to 3 Hz to it. That is: HH≧AA+2 to 3Hz
P3-38＝30-120S	Sleep delay time, determined according to the site
P3-39＝80% (factory default value)	The wake-up pressure value is a percentage of the set pressure. The smaller the value, the lower the wake-up pressure value.
P3-40＝1S	Wake-up delay time. When the feedback pressure is less than the wake-up pressure P3-39 (target pressure P3-36×P3-37), the inverter will be re-awakened after the P3-40 sleep delay.

AA-Minimum frequency to maintain stable pipeline pressure without water HH-

Sleep frequency

2.4 Common problems and solutions: Please refer to 1.5 for instructions. **Water supply**

3 mode of constant pressure water supply controller with inverter

The water supply mode of the constant pressure water supply controller (hereinafter referred to as the controller) with a frequency converter is suitable for one frequency converter with two or more water pumps. The operating frequency and working mode of the frequency converter are controlled by the controller. The controller has detailed operating instructions and wiring methods. Here is an explanation of the use of the frequency converter:

3.1 Wiring between inverter and controller

There are several functional connections between the controller and the inverter: inverter start and stop, analog frequency setting (usually 0-10 VDC), and inverter fault alarm.**For wiring diagram, please refer to the controller manual.**.

3.2 The inverter parameter settings are as follows:

Parameter settings	Parameter Description
P0-01＝2	VF Control
P0-02＝1	Control the start and stop of the inverter through external terminals
P0-03＝2	Given by AI1 (voltage signal feedback)
P0-14＝25～30Hz	The lower limit frequency should be adjusted according to the heat dissipation of the motor itself; the lower limit frequency of the motor with automatic air cooling cannot be too low, otherwise there is a risk of burning the motor
P0-17=XX	Acceleration time (set according to actual needs)
P0-18=XX	Deceleration time (set according to actual needs)
P4-00＝1（factory default value）	X1 and COM are closed, the inverter runs forward
P6-10=1	Free parking