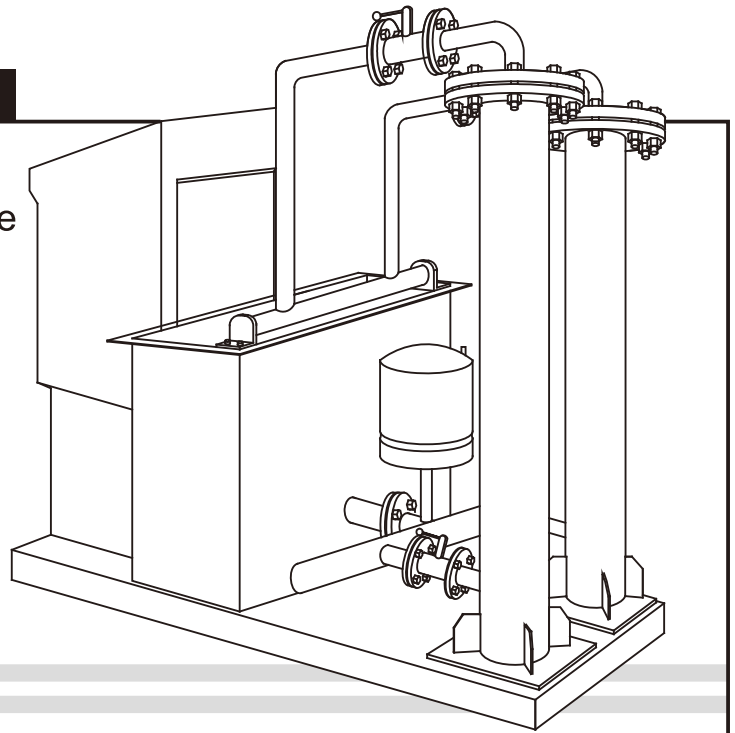


OPERATION INSTRUCTIONS

Variable Frequency Constant Pressure
Inner of Pipe Type Pump Unit
(Vertical/Horizontal)

BG / BGL Series

ENG 



Please check the following points before installation.

- The product is meeting with the specifications ordered.
- Defective or damages, if any.
- All related accessories and tools are ready.
- These instructions contain fundamental information and precautionary notes.
- Please read the manual thoroughly prior to installation of unit for proper operation.
- Keep these instructions near location of operation for easy access.
- Any failure or accidents caused by erroneous installation and/or wrong operation. Non-compliance with the instructions will not be warranted.

General

The pumps have been developed in accordance with state-of-art technology. They are manufactured with utmost care and subject to continuous quality control. These instructions are intended to facilitate familiarity with the pumps and its designated use. The manual contains important information for reliable, proper and efficient operation. Compliance with the operating instruction is of vital important to ensure reliability and a long service life of the pump and to avoid any risks.

Safety

These instructions contain fundamental information, which must be complied with during installation, operation and maintenance. Therefore the manual must be read and understood both by the installing personnel and the responsible trained personnel/operators prior to installation and commissioning, and it must always be kept close to the location of the unit for easy access. Marking of Safety sign in the instructions. The safety instructions contained in this manual non-compliance of which might cause hazards to person are specially marked with the common hazard sign, namely,



(Safety Mark)

Non-compliance with Safety instructions. Non-compliance with safety instructions can jeopardize the safety of personnel, the environment and the machine itself. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claim for damages.

In particular, non-compliance can, for example, result in; Failure of important machine / unit functions,

- Failure of prescribed maintenance and servicing practices,
- Hazard to persons by electrical, mechanical and chemical effects.

Safety awareness

It is imperative to comply with the safety instructions contained in this manual, the relevant national and safety regulations and operator's own internal work, operation and safety regulations.

Safety instructions for maintenance, inspection and installation work

The operator is responsible for ensuring that all maintenance, inspection and installation work be performed by authorized, qualified specialist personnel who are thoroughly familiar with the manual. Working on machine must be carried out only during standstill. The shutdown procedure described in the manual for taking the machine out of service must be adhered to without fail. Pump handling media injurious to health must be decontaminated. Immediately following completion of work, all safety-related and protective devices must be re-installed and/or re-activated.

Unauthorized modification and manufacture of spare parts

Modification or alterations of the machine are only permitted after consulted with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.



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1.1 Main constitutive parts of equipment

BG/BGL Model Equipment is mainly consisted of American U-FLO stainless steel water pump and American FRANKLIN motor or American U-FLO motor.

VMF Model Equipment is the pump package consisted by American U-FLO water pump and imported ABB motor.

FYBG/FYBGL Model Equipment is the direct connecting product for non-negative pressure pipe net, using the American U-FLO water pump and American FRANKLIN motor or American U-FLO motor to form pump packet, with highly control system.

1.2 Advantage to use BG/BGL Model Automatic Constant-voltage Variable-frequency Water Supply Equipment in the secondary urban water supply system

1.2.1 Automatic operation & remote supervision

The equipment will run full automatically, with the following functions, i.e.: manual/automatic shift, pressure adjustment, constant pressure, high/low voltage protection, phase-failure protection, electrical leakage protection, overload protection, overheat protection, water-level & non-pressure protection, leak detection & compensation, stop when water is out of use and instantaneous trip protection. Besides the timed shift for the main and auxiliary pump, LED display, RS485/RS232 bus interface, visual remote adjustment, monitor and maintenance will be provided on the request of customer.

1.2.2 Super-silent, free of pollution and water hammer

This equipment uses the structure to embed pipes inside water pump, so the whole equipment runs steadily and reduces the noise to 30db around (the general equipment may have a noise around 80~100db), thus it overcomes the shortcoming to produce disturbance on residents in the secondary water supply process.

The flow passage components, such as the stainless steel water pump, stainless steel motor, valve and pump, are made of the food-grade stainless steel; the equipment structure forms a closed system, thus it can avoid the water from being polluted secondarily, thence it complies with the international water-involved hygiene standard.

The system uses soft startup, soft stop and other technologies, so the whole system can work very steadily.

The equipment uses soft startup and soft stop, so it reduces the pressure variance rate, eliminates water hammer, and overcomes completely the shortcoming that the pressure of conventional equipment may break through, and avoids the pipe net away from being damaged by water hammer.

1.2.3 No water interruption when power is shut down

FYBG/FYBGL Model Equipment makes the system available water supply still through pressure detection system even though power supply line shuts down, i.e.: the system will be shifted to the public piped water for supply when power shuts down.

1.2.4 Pressure is available to adjust

The equipment is allowed to adjust the pre-setting pressure at discretion on the request of customer in the secondary water supply process. After adjusting the presetting pressure, the equipment can make comparative calculation on the detected value and setting value of the pipe pressure, and then determine the desirous quantity of motor and pump, as well as the output frequency of transducer (for motor and pump, it refers to the rotating speed) to realize constant pressure. Despite of the change of municipal pipe network, the user terminal of the secondary water supply equipment will ensure the pipe network a constant pressure, avoid the user terminal from being fluctuated along with the change of municipal pipe network, and then make user avoid the influence arising from temperature fluctuation of bathing water and increase user satisfaction.

1 General Information

1.2.5 Save investment and reduce operating cost

FYBG/FYBGL Model does not need water storage pool (optional), neither the top floor water tank nor water quality processing instrument, so it saves land space, decreases construction load and reduces investment cost hugely.

The equipment ensures pipe constant pressure and change along with water quantity, and adjust the quantity of equipment and operating speed; when the water quantity is huge, the input power will become less; when the water quantity is less or water is out of use, the system will stop, thus no input power will be consumed; meanwhile the system will run with high efficient, so it will decrease operating cost hugely.

The system is available to run without specially escort; furthermore, since the equipment does not need water storage pool, top floor water tank or other water storage facilities, neither the water quality processing instrument, thus the operating cost will be reduced accordingly.

1.2.6 Convenient installation and easy maintenance

The overall equipment is made of stainless steel, and the motor and pump packet are designed inside the stainless steel, thus it does not need a special pump room, but is allowed to install indoor or outdoor, in horizontal or vertical mode; even though it can be placed in gutter, water pool or hanged on wall or under eaves. Looking from the exterior, the equipment is actually a set of tube stack, thus it is simple, beautiful and practical.

When any pump of water supply equipment goes wrong, it should close the valves at both ends of the pump, and then dismantle accordingly, thus it will never influence other pumps. The bearings inside the pump and motor are the cutting-edge water lubricated bearing nowadays, so no any grease is needed to add. Since the water is circulated inside pipe, it is available the function to cool the housing of motor; the reasonable and perfect design makes the equipment free of manual escorting and upkeep.

2 Installations

2.1 Equipments

2.1.1 Please the whole equipment on the foundation of equipment, and then adjust the levelness of equipment stand with level ruler;

2.1.2 Fix the stand of equipment onto the foundation, and then check the levelness of equipment stand again; afterwards cast in grouting secondarily;

2.1.3 Connect the pipe inside the complete set of equipment; pay attention to the direct of check valve and water flow direction when installing the check valve; afterwards fix the pipe support inside equipment;

2.1.4 Connect the inlet and outlet water pipe of equipment, connect the dirt separator, low-resistance backflow preventer and other fittings on the inlet water pipe in accordance with the local requirement. Design an inlet and outlet water valve inside the water pump, and a DN25 drainage valve on the outfall sewer (for normal debugging purpose).

2.2 Electric control cabinet

2.2.1 Please check if all components are complete and in sound condition before installing the equipment;



2 Installations

2.2.2 Check if component terminals inside the electric control cabinet are loosened or detached in the transport or handling process; if yes, please fasten accordingly;

2.2.3 When installing the electric control cabinet, it should consider the conditions for heat radiation and ventilation; and then determine the installation position;

2.2.4 Place and level the equipment, and then cast in a secondary grouting to fix; the equipment is required to install levelly, free of any additional mechanical stress;

2.2.5 Lead in the power cable from the service entrance at the bottom of cabinet, and then connect with air switch L1, L2, L3 and terminal N and PE;

2.2.6 Connect the power cable of pump's motor from the bottom of cabinet, and then connect with wire in turns as per the sequence number of motor;

2.2.7 Connect the low level signal cable of the steady flow adjusting tank as per the electric wiring diagram; connect the signal cable of inlet and outlet water pressure converter; the signal control cable uses RVVP2X1.0 shielding cable, with the shielding layer to the ground; please pay attention to the wiring number of pressure sensor and avoid misuse, otherwise it will be hard to display correct pressure reading, and then influence normal operation of equipment; the red shielding cable should be connected with the positive electrode of pressure sensor, whereas the red cable inside the electric control cabinet should be connected with the phase numbered 500, and the other cable with its negative electrode.

2.2.8 Adjust the relevant current setting of thermorelay in accordance with the power of motor.

3 Debugging

3.1 Equipments

1. Pressure test of steady flow adjusting tank and protector of municipal pipe network:

Close all valves of equipment, open the inlet valve of tap water and the valve of bypass pipe,

- a) check if the protector of municipal pipe network exhausts normally;
- b) when the steady flow adjusting tank is full, conduct pressure test in a closed condition and check the status of protector of municipal pipe network;
- c) when pressure meter becomes stable after being sealed, check if the pressure meter at the inlet and outlet works normally, observe if the input and output pressure reading displayed by the touch screen of the electric control cabinet is normal;
- d) check if the solenoid valve could be opened and closed normally.

2. Cleaning and pressure test of pipe:

Open the water valve of tap water, valve of bypass pipe and outlet relief valve to rinse; close the water valve of bypass pipe and the outlet relief valve after cleaning.

3. *Cleaning and pressure test of pump, power frequency and positive and reserve rotation of manual water pump:*

Open the inlet valve, outlet valve of all pumps, open air release nozzle and release the air inside water pump; afterwards close the air release nozzle, turn the shaft of water pump manually, and observe if the water pump goes wrong when turning; if yes, please remove the problem immediately; itch the button of water pump separately to check the positive and reverse rotation of water pump, and observe if the outlet check valve and bypass check valve of all pumps are closed completely; if water leaks, it can be proven that the water pump runs reversely and pipe could not retain pressure (the pressure retaining test could be conducted by closing the outlet valve). If any problems are found, please solve immediately.

4. *Positive and reverse rotation with variable frequency of water pump:*

Place the control button of pump onto the "Automatic Mode", observe if the rotation direction is correct when water pump changes frequency; when a): the power frequency and variable-frequency rotating direction of water pump is incorrect, please adjust one phase for the power cable of electric control cabinet; b) when the power frequency rotation direction of all water pumps is correct, but the variable-frequency rotation direction is incorrect, please adjust the phase for inlet and outlet cables of frequency converter.

3.2 Electric control cabinet

1. *Debugging*

- 1.1 Power on the electric control cabinet and close the air switch FC, check if the power source and voltage comply with the technical requirements of equipment (3N~380V/220V 50HZ);
- 1.2 Release the load, and then check if the test components work normally in the manual way (on the status screen); when everything becomes normal, please connect with load accordingly;
- 1.3 Check if the water pump rotates correctly; it can close the outlet valve and then observe if pressure goes up rapidly;
- 1.4 Place the working mode on "Automatic Mode", check if the working current of frequency converter and switching process of water pump is correct;
- 1.5 Set the working parameters as per the demand; till now the equipment can be put into use normally; by using the operation panel, it can set the working pressure value.

4 Operation Description

4.1 Operating process

1. Access to the parameter picture to set the desirous parameters;
2. Access to the control picture of pump and select the available water pump type;
3. Place the automatic/manual button to the automatic shift, the system will run accordingly;
4. Monitor the actual pressure of outlet and the pressure at the inlet and outlet.

4.2 Troubleshooting process

1. Place the automatic/manual button to the Automatic Mode, the system will stop running;
2. Analyze the alarming content as per the failure;



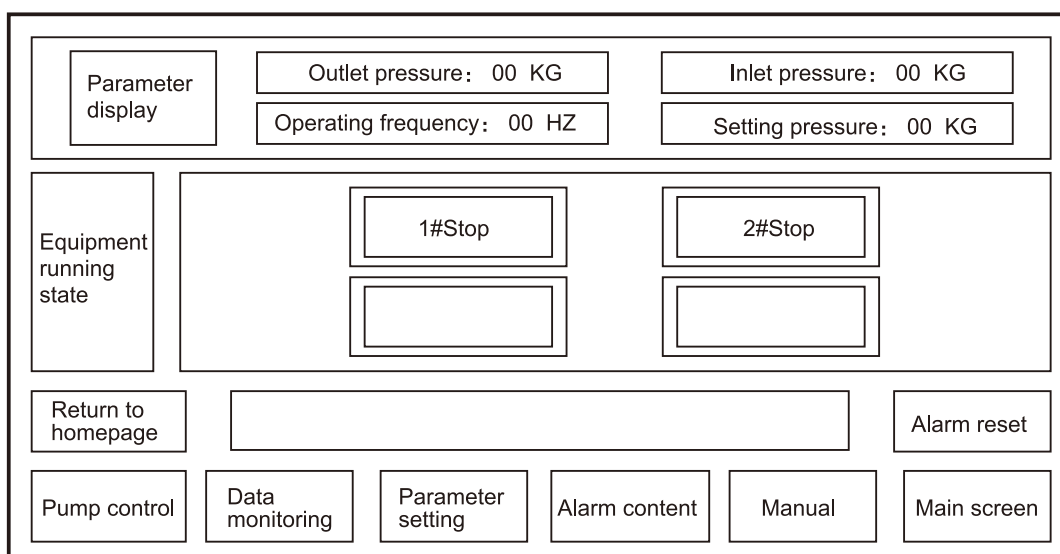
4 Operation Description

3. Shut power supply off and restart as per the basic troubleshooting method;
4. Contact us.

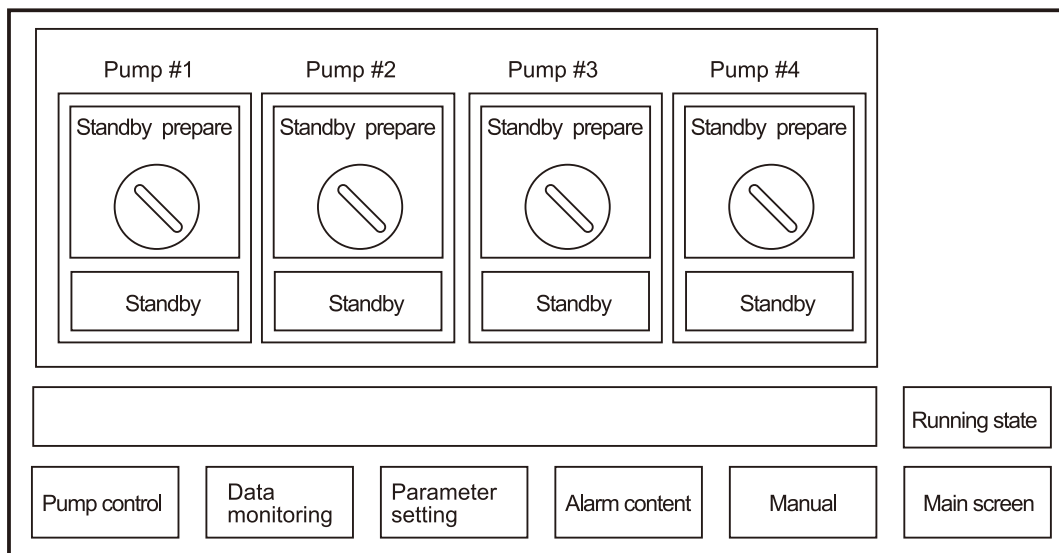
4.3 Basic troubleshooting method

- #1 Motor goes wrong
 - Please check if the thermo-relay of #1 water pump is tripped (FR1), press the Blue button to reset;
- #2 Motor goes wrong
 - Please check if the thermo-relay of #2 water pump is tripped (FR2), press the Blue button to reset;
- Pipe pressure goes wrong
 - The actual pressure exceeds the upper limit; it can enlarge the upper limit pressure by 10kg at most;
- Pressure SENSOR goes wrong
 - Please check if the pressure meter has pressure, afterwards press the reset button
- Idle rotation goes wrong
 - Check if the pressure at the outlet is more than the idle rotation pressure; it can reduce the idle rotation pressure setting to exceed the inlet pressure; and then press the reset button.
- Inlet pressure goes wrong
 - Check if it leaks water, or check if the inlet pressure is less than the setting value.
- Emergency button goes wrong
 - Check if the emergency button is pressed down or if the button is damaged or wire is broken;
- Pipe leaks water
 - If water leaks, please switch power supply off and restart.
- The balance payment is pending
 - Please confirm if you pay the balance payment; if yes, please contact us.

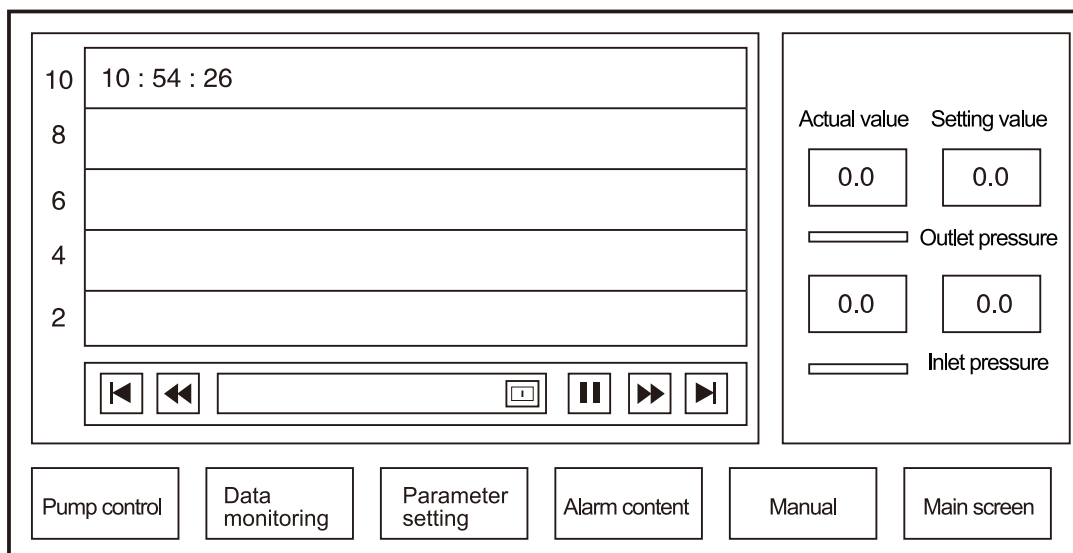
5 Chapter V Picture Explanation



- 5.1.1 To display the current actual pressure, setting pressure and rotating frequency;
- 5.1.2 To display the current status of water pump (stop, variable frequency and power frequency);
- 5.1.3 To press the reset button to reset when the equipment goes wrong.

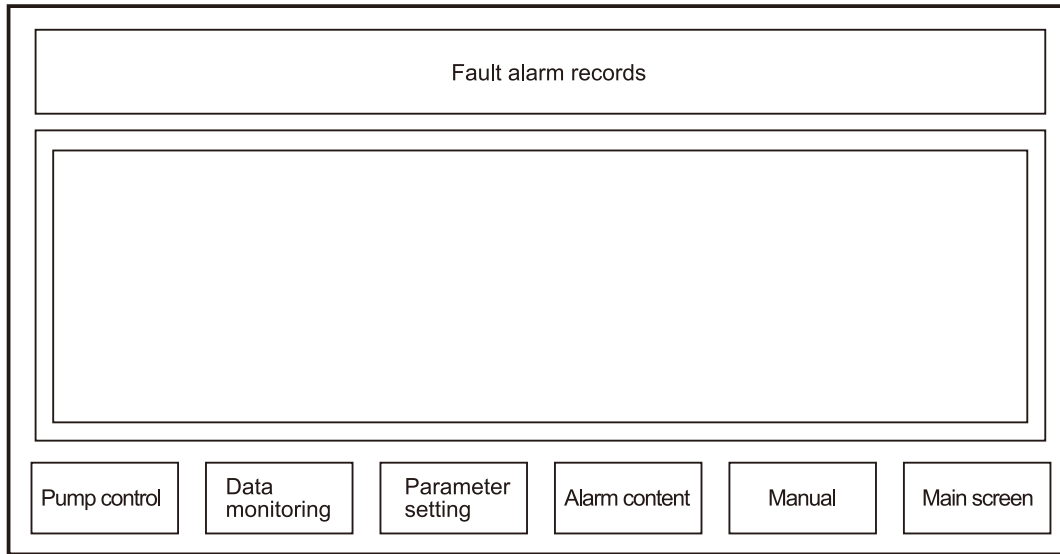


- 5.2.1 Select the water pump that will be used; please make the water pumps that are not started await for orders.



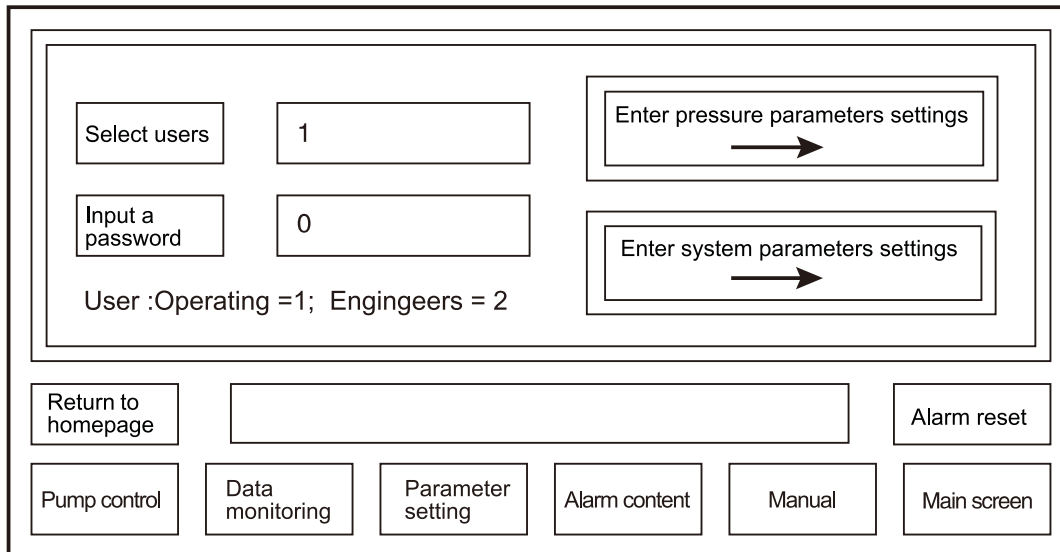
- 5.3.1 To make realtime collection on pressure data; from which it can see the change of pressure at the given time period;
- 5.3.2 On the right of the picture, it displays the setting pressure and the current actual pressure.





5.4.1 Record the alarming content;

5.5.1 Simple instruction and operating instruction of equipment.



5.6.1 Select the corresponding use and make corresponding parameter setting;

5.6.2 For user under the "1", it can only make pressure setting; for user under "2", it can make system parameter setting.

Boosting pump start-up frequency(HZ)	<input type="text" value="0.0"/>	Boosting pump start-up time delay(S)	<input type="text" value="0"/>
Pressure-reducing pump stop frequency(HZ)	<input type="text" value="0.0"/>	Pressure-reducing pump stop time delay(S)	<input type="text" value="0"/>
Predicate dry turn pressure	<input type="text" value="0.0"/>	Stop delay when dry run(S)	<input type="text" value="0"/>
Pipeline pressure limit	<input type="text" value="0.0"/>	Predicate sensor abnormal coefficient	<input type="text" value="0"/>
Pipeline leak detection(S)	<input type="text" value="0"/>	Sensor abnormal delay(S)	<input type="text" value="0.0"/>
Switch time of boosting pump(S)	<input type="text" value="0"/>	Detection function:	<input type="text" value="Protective operation"/>
<input type="button" value="Transducer paramter"/>		<input type="button" value="Return"/>	

- 5.9.1 Set the start frequency of boosting pump, i.e. making the actual frequency larger than the start frequency of boosting pump; it can be realized by delaying for several seconds; the system can be put into use after adding auxiliary pump;
- 5.9.2 Set the start frequency of pressure-reducing pump, i.e. making the actual frequency less than the start frequency of pressure-reducing pump; it can be realized by delaying for several seconds; remove one auxiliary pump from the system;
- 5.9.3 Set the protection pressure for idle rotation, i.e.: making the actual pressure less than the idle rotation pressure; it will be reached by delaying several seconds; if so the system will send alarm and water pump will stop working;
- 5.9.4 Set the upper limit pressure (i.e.: making the actual pressure larger than the upper limit pressure, the system will stop and avoid burst);
- 5.9.5 Select if it triggers the water leakage detection function (i.e.: it can detect if water pipe will break when water pump runs for a long time);
- 5.9.6 Switching period of boosting pump: when starting boosting pump, it can stop system and start two water pumps simultaneously, the time to stop and start is just the switching period.

102: Motor power input	201: Output frequency lower limit
103: Motor voltage input	202: Output frequency upper limit
104: Motor frequency input	440: Process PID scale factor
105: Motor current input	441: Process PID integral time
106: Motor speed setting	442: Process PID rate time
Any unqualified personnel are not allowed to alter the equipment so as to avoid unexpected result !	
<input type="button" value="Return"/>	

- 5.10.1 The code for frequent parameters of frequency converter is mainly used for debugging;
- 5.10.2 Any unqualified personnel are not allowed to alter the equipment so as to avoid unexpected result.

