W713TCS Booster Pump System with Remote Monitoring Control User Manual

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V1.0.1

Contents

1. SUMMARY

1.1 Preface

Booster Pump System is a self-developed product with high performance, high quality and multi-functional automatic constant pressure water supply equipment. The system adopts colorful and high brightness touch screen, which can display Chinese and English as well as high-precision control, parameters setting and running state stick out a mile. By the function of internal integrated automatic alternate working of multiple pump application, efficiently balance the service life of each pump. System wide range of applications, simple application, is the first choice for modern water supply equipment.

1.2 System function

- Adopt a colorful and high brightness touch screen to display Parameter setting, running state.
- Control Mode: Constant pressure, constant differential pressure, manual
- Linkage Mode: Synchronize, master-slave, big-small pump combination, one duty one standby
- Multi-Pump Control: Max.6 pumps on-line operation.
- Sleep Function: Automatic sleep down when no water consumption.
- Power on Restart: Auto restart after power restoration.
- Fault Auto Shift: When the master break down, the slave automatically become a new master, make the system supply water without interruption.
- Alternate Running: Balance each pump service time, prolong service life of pumping unit.
- Day-Part Function: 11 independent time section pressure control water supply.
- Variety of water supply Fault Alarm Function: High-Pressure, Low-Pressure, Transducer Error etc.
- Automatically Record the Fault Function: Real-time record the occurrence time of fault, to facilitate the analysis of fault.
- Remote monitoring: Through the Ethernet cable or mobile Sim card can be connected to the remote service platform, real-time monitoring of the pump operation status

1.3 Application Scope

- ◆ Business: such as hotel, office buildings, shopping malls, large sauna etc.
- ◆ Public Field: Such as hospitals, schools, gyms, airports, golf course etc.
- ◆ Manufacturing Industry: such as manufacturing, washing equipment, food industry, workshop etc.
- ◆ Residents Living Water: such as high-rise buildings, residential quarters, villas etc.

1.4 Working Condition

(1) Environment Temperature Range: 0℃～+50℃, and have good ventilation conditions.

(2) Relative Humidity: 20%~90%, no condensation when temperature changes.

(3) Environment cleanliness: No corrosive gas, no large dust.

(4) Altitude: < 1000 m.

(5) Voltage Fluctuation: ±15%.

(6) Frequency Fluctuation: ± 5%.

(7) Voltage Unbalance Factor: ≤ 3%.

(8) Vibration < 2m/s.

(9) Electric control group of body and internal earth terminal must be reliable grounding, and safety grounding resistance is not more than 4Ω.

2. OPERATION GUIDE

2.1 Touch screen wiring

(1) 7 inch touch screen BDF2000T-2-07/DC wiring terminal as shown in Figure 2.1

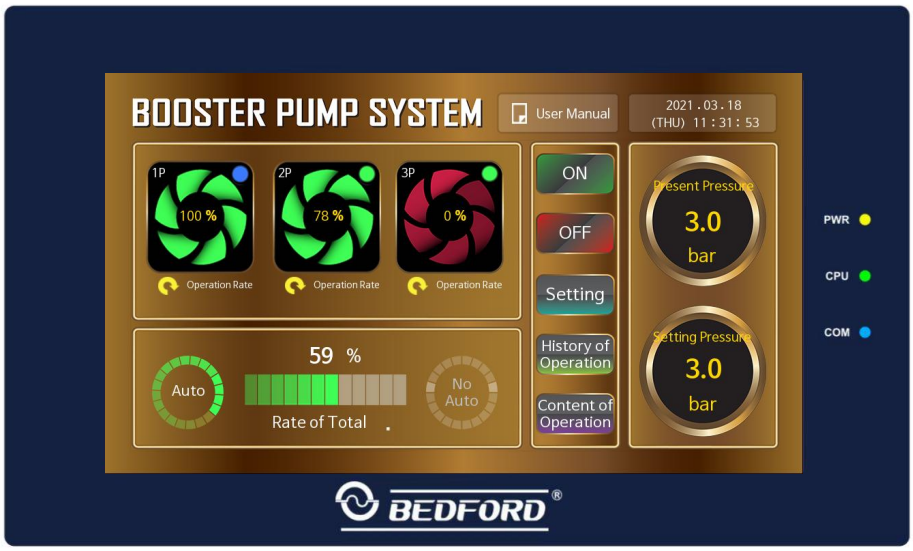


Figure2.1 7 inch touch screen terminal and its introduction

Terminal Name	Terminal application and introduction
DC 24V、FG	The input voltage range of the touch screen is 18 ~ 28V DC and the grounding terminal is FG
Ethernet	Ethernet Port
COM0	Connecting with inverter RS485 communication interface，Pin#1sever as 485-，Pin#6 serve as 485+
COM1	Reserved 485 interface，Pin#1sever as 485-，Pin#6 serve as 485+

（2）10 inch touch screen BDF2000T-2-10/DC-2 wiring terminal as shown in Figure 2.2

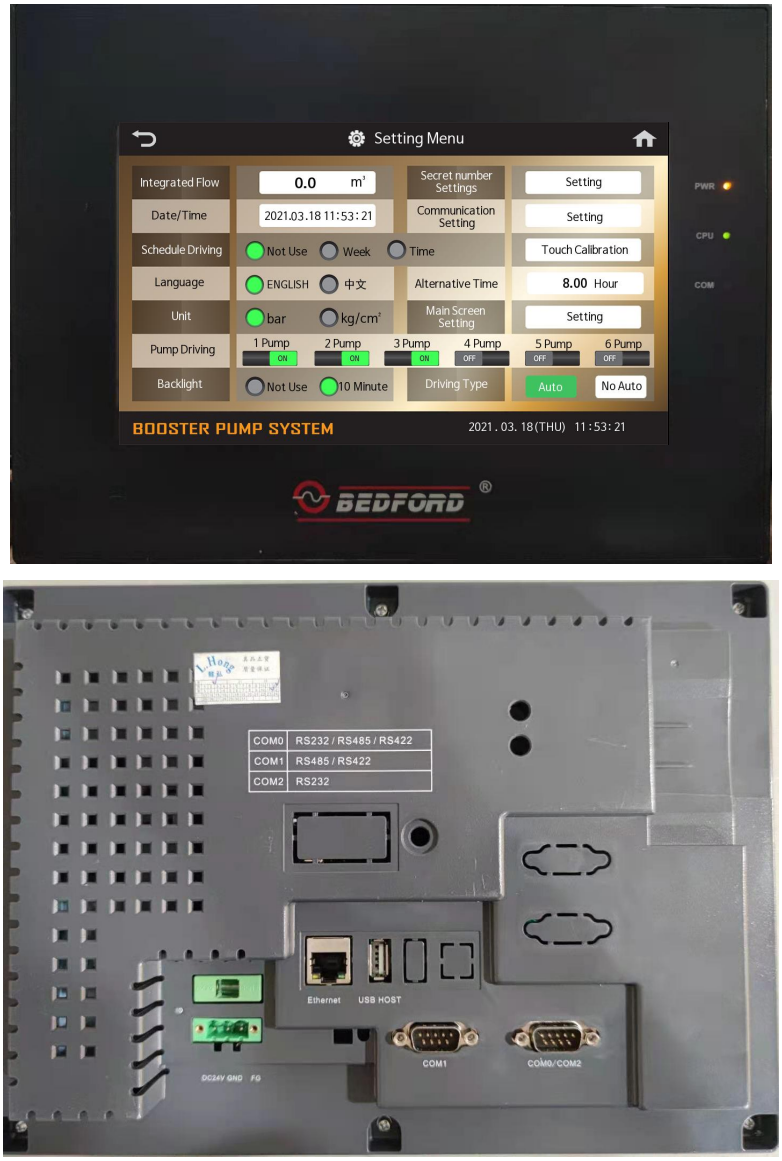


Figure2.2　10inch touch screen terminal and its introduction

Terminal Name	Terminal application and introduction
DC 24V、FG	The input voltage range of the touch screen is 12 ~ 28V DC and the grounding terminal is FG
Ethernet	Ethernet Port
COM1	Connecting with inverter RS485 communication interface，Pin#1sever as 485-，Pin#6 serve as 485+
COM0	Reserved 485 interface，Pin#1sever as 485-，Pin#6 serve as 485+

2.2 Installation size diagram

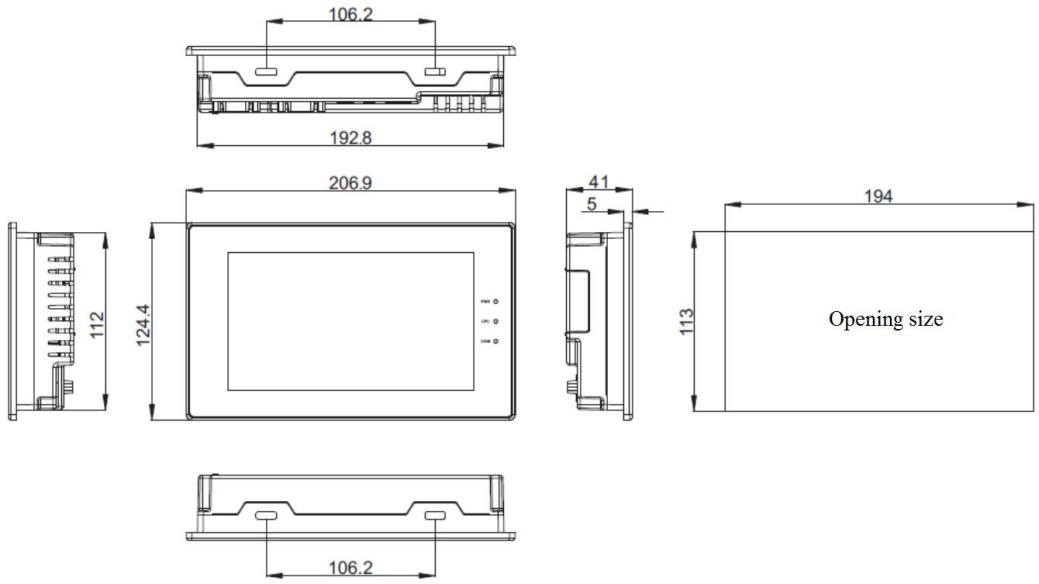


Figure2.3 7 inch screen size

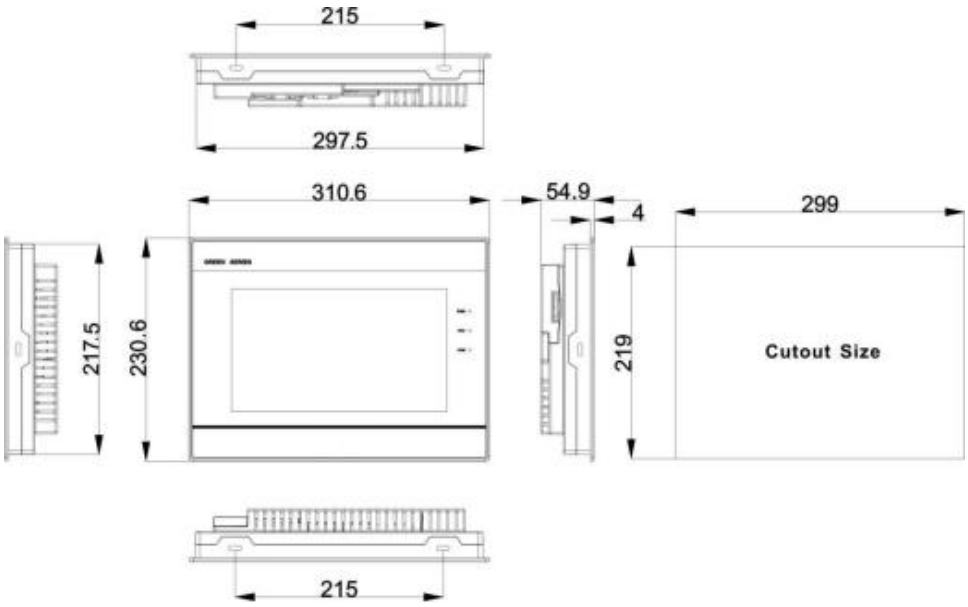


Figure2.4 10 inch screen size

2.3 Pumping Unit Commissioning

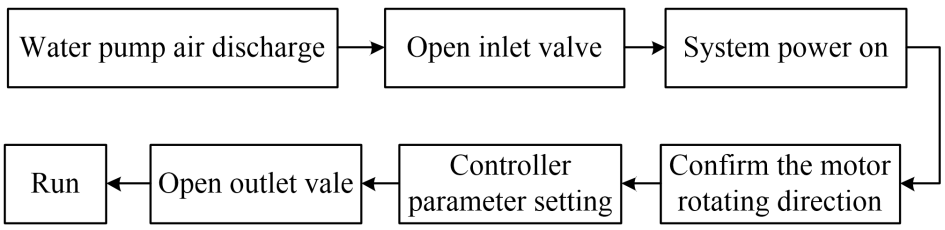


Figure2.5 Commissioning procedures

(1) Open the inlet valves;

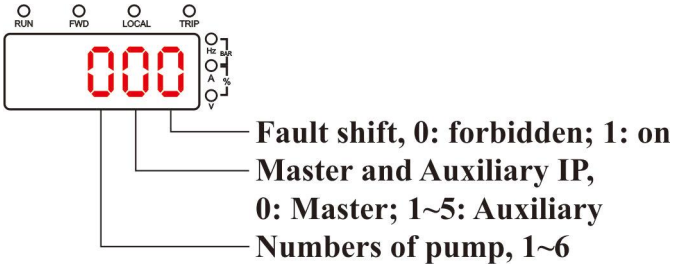
(2) Pump exhaust: Loosen the air vent screw of each water pump, exhaust the air inside the pump;

(3) Open the pump outlet valve;

(4) Power on the inverter after wiring is correct.

(5) Confirm each motor's steering: Press "RUN" on W713 panel to start inverter group, confirm the motors rotating right and then press "STOP" to stop. If the steering error, please modify parameter b00.02 of W713 controller or adjust the motor wiring order.

(6)Inverter W713 parameter setting: Mutil pump system quick setting b00.07 as follows



（7）After the parameters are set, the slave needs to press the "RUN" key to put the controller into standby mode.

Take the 6-pumps system as an example.

Master b00.07=601, No.1 slave b00.07=611, No.2 slave b00.07=620,No.3 slave b00.07=630,No.4 slave b00.07=640,No.5 slave b00.07=650

Note：

(1) When Fault Shift Function is not needed, the parameter "b00.07" of each controller can be set to ××0.

(2) When the master is in failure, if Fault Shift accepted, #2 auxiliary controller will changes into the master ,the previous master will change into #1 auxiliary controller

Only the following fault will cause shift:

- Master power failure suddenly
- Transducer Fault: The one connecting with the master is damaged or in failure.

Remark: Fault shift can be only one-way shift, if #2 auxiliary controller change into new master and break down, can't shift back to #1 controller. After triggering Fault Shift, if the fault of previous master is removed, the system will power on again and automatically recover

the previous operation method of master-auxiliary

(3) Turn on Restart After Power-up Function, indicating when the system is powered off again, the slave pumps automatically enters the standby state.

2.4 Touch Screen Operation Introduction

This system adopts high precision touch screen to display all parameters and running state. As long as the user touch the graphics or text gently with their finger on the screen, can achieve on the system operation control as well as parameter setting and view , thus makes HMI friendly and easily.

The company uses the touch screen system main screen has 8.

(1) Splash Screen

(2) Homepage

(3) Setting Menu

(4) History of Operation

(5) Content of Operation

(6) Scheduled Driving Set

(7) Password Setting

(8) Communication setting

Of course, also can be increased and decreased according to the user's requirements. The following will introduce the function and operation methods of each picture.

2.4.1 Homepage

After system power on, the touch screen is lighten and show you splash screen with company's logo firstly about 2's, then it goes into the homepage. Homepage was shown in the Figure2.6. The number of pump display is adjusted automatically according to the actual quantity of water pump.

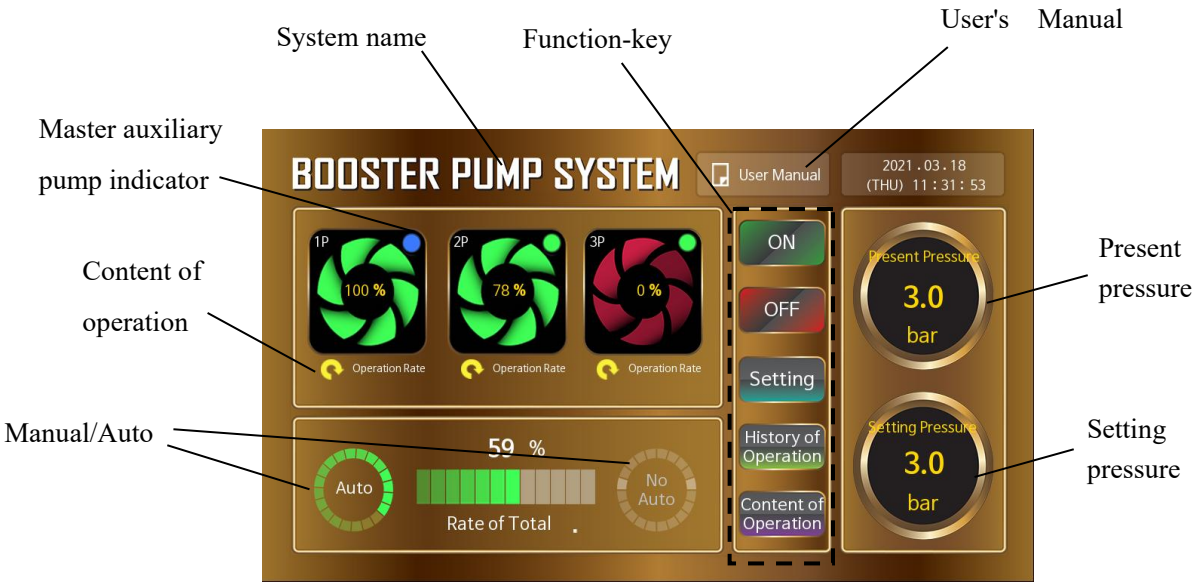


Figure2.6 Homepage

(1) Master Auxiliary Pump Indicator:

Master Auxiliary Disconnected

(2) Content of Operation:

Content of Operation include： Operation Rate, Current, Power, Electricity, Frequency, click it can be recycling shown.

(3) Operation State

Run Stop Disconnected

(4) Function-key introductions as shown in the Table2.2

Table2.2 Function-key Introductions

Key	Name	Function Description
ON	Run Key	Use for Run Manipulation
OFF	Stop Key	Use for Stop Manipulation
Setting	Skip Key	Skip to the “Setting Menu” page
History of Operstion	Skip Key	Skip to the “History of Operation” page
Content of Operation	Skip Key	Skip to the “Content of Operation” page

(5)User's Manual

When there is no fault, the display would be as shown in Figure 2-6 above, click "User's Manual" on the main page, it will enter the operation guide of the touch screen, move left/right to

view the operation guide, as shown in Figure 2-7, when a fault occurs, the "user's manual" will turn to display as "system detection", the "system name" will turn to display as "fault information", click to switch to the corresponding and check the causes of faults and how to fix it. If multiple faults occur at the same time, the display can be cycled; when a fault occurs, click on "system detection" to bring up the reset window, which can reset the corresponding controller, as shown in Figure 2-8.

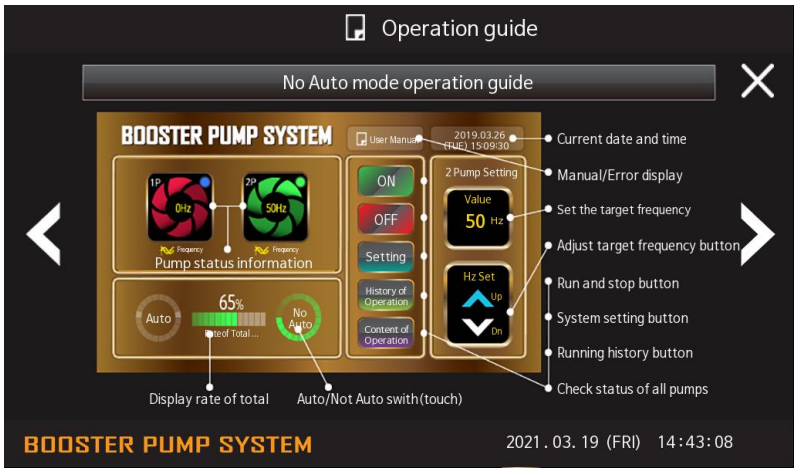


Figure2.7 Operation guide

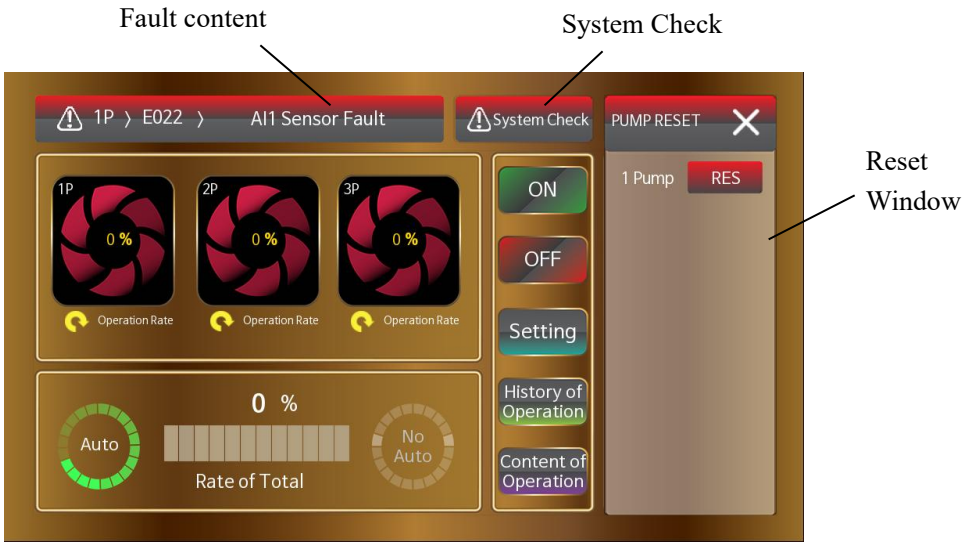


Figure2.8 Homepage Fault Information Display

(6) Operation Rate of Total

Operation Rate of Total reflects the system usage rate, its calculation formula as below:

$$\text{percentum} = \frac{\text{Summary of home page frequency}}{\text{Total home page frequency}} \times 100\%$$

(7) Setting Pressure

Water Supply Pressure is set as per actual requirements, of which the upper and lower limitation is restricted by set value of controller function code b01.00 and b01.01.

（8）Manual/Auto　Switchover

The switch can only be made when the system is stopped. The switch button is located on the main page (as shown in Figure 2-6 above) or on the settings page.

2.4.2 Setting Menu

The Setting Menu Page is used to set the key parameters of the system, as shown in Figure 2.9. Table 2.3 describes the function parameters. If password protection is enabled, enter the correct password.

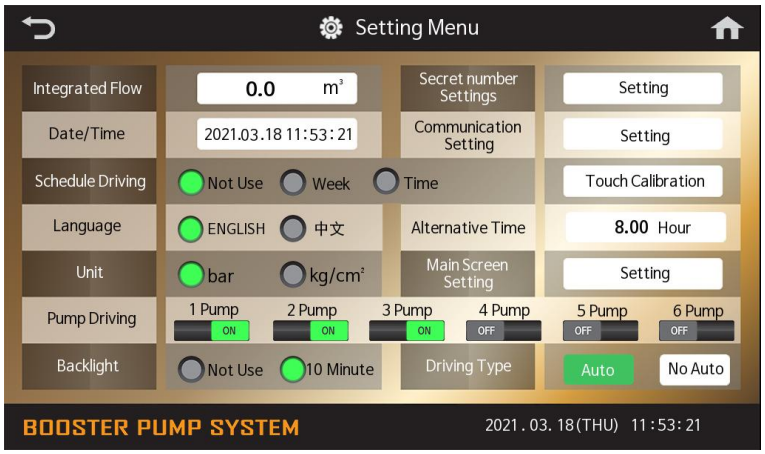


Figure2.9 Setting Menu Page

Table 2.3 Setting Menu Function Parameter Instruction

Function Parameter	Setting Range	Factory Setting	Description
Cumulative flow	——	——	Total system water flow
Date/Time	——	System time	Display system time，Calibrate system time
Scheduled Driving Set	Not use, Week, Time	Not use	If start using, pls refer to Timing Water Supply Page Instructions
Language	English, Chinese	English	Chinese/English switch-over
Unit	bar, kg / cm^2	bar	Pressure Unit
Pump State	ON、OFF	——	Show the connection status of the pump, click the "ON-OFF" button to control the pump's input and exit, except the communication host.
Backlight	Forbidden, 1Min, 5Min, 10Min	10Min.	Backlight time on the state of no-operation

Password Setting	——	——	Setting Password protect specific operation and page, details refer to the introduction of the “Password Setting” page
Communication setting	——	——	Set RS485 and Ethernet communication parameters, more information please refer to the "Communication Settings" page description.
Alternate Time	0~25.5 h	Set by Controller	For balance pump service life, Master -Auxiliary Pump work as per alternate time, Unit serve as Hour, “0.0 hour” mean non-alternate.

2.4.3 History of Operation

History of Operation page includes system operation information statistics and data delete, display picture as shown in the Figure2.10, functional parameter as shown in the Table2.4.

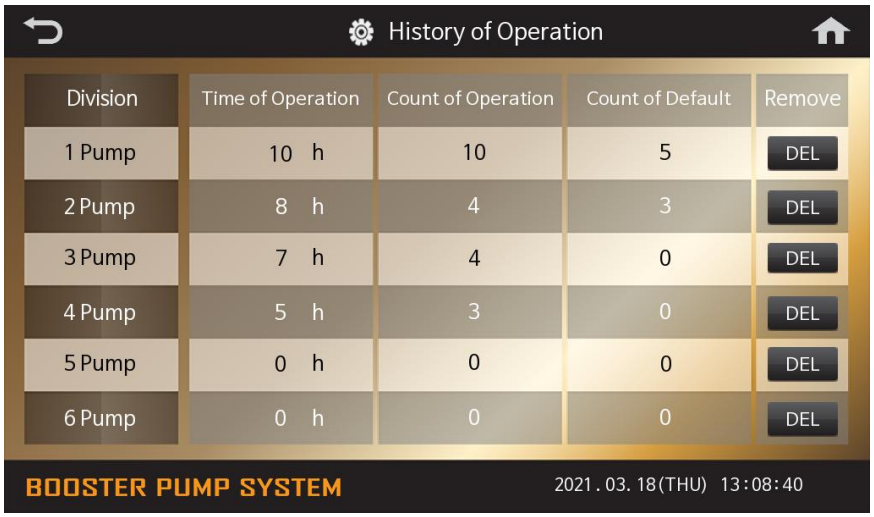


Figure2.10 History of Operation Page

Table2.4 Fault Content Functional Parameter Instruction

Function Parameter	Setting Range	Factory Setting	Description
Time of operation	0~65535 h	0 h	Display each pump time of operation
Count of Operation	0~65535	0	Display each pump count of operation
Count of Fault	0~65535	0	Display each pump count of fault, click may enter Fault Content page and check each pump recently 5 times fault record, as shown in the Figure2.11; Click the fault content to see the cause of the failure and solution, as shown in Figure 2.12.
Delete	——	——	Use for delete Time of Operation, Count of Operation, Count of Fault, if user enabled password protection, need enter password

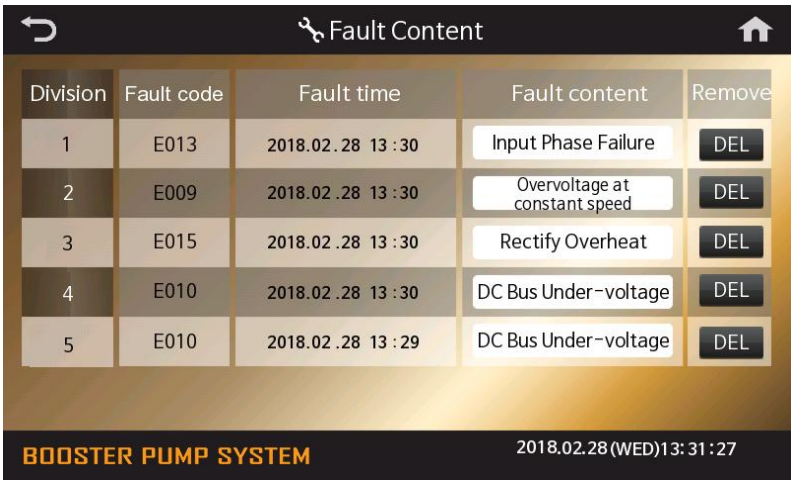


Figure2.11 Fault Content Page

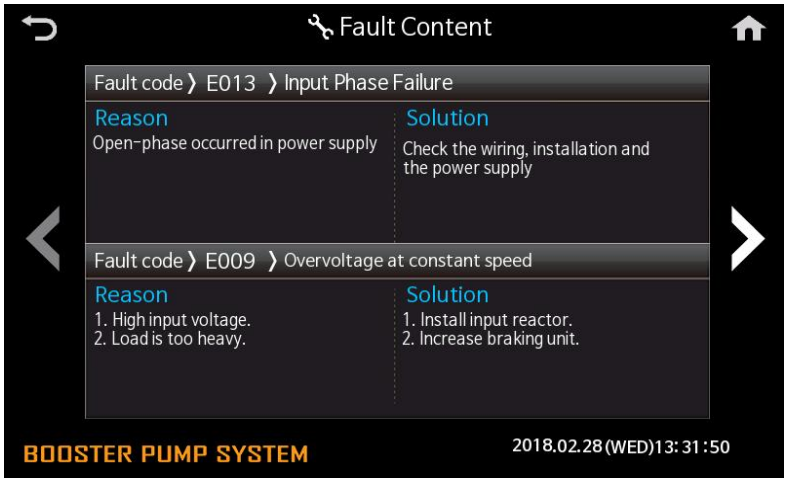


Figure2.12 Fault Content Page

2.4.4 Content of Operation

Content of Operation page is used for real-time display of main parameter of running pump, as shown in the Figure2.13

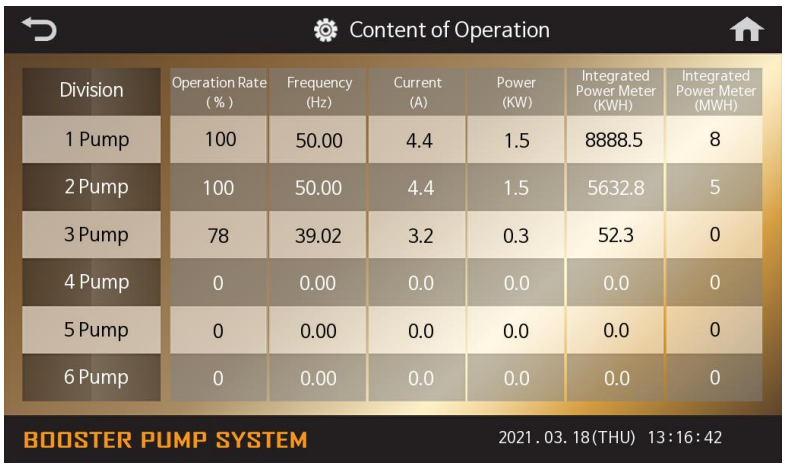


Figure2.13 Content of Operation

2.4.5 Scheduled Driving Set

Touch Screen provide 11 schedule independent pressure water supply control, start using scheduled driving need set relative parameter, its display interface as shown in the Figure2.14 and Figure2.15, parameter instruction as shown in the Table2.5

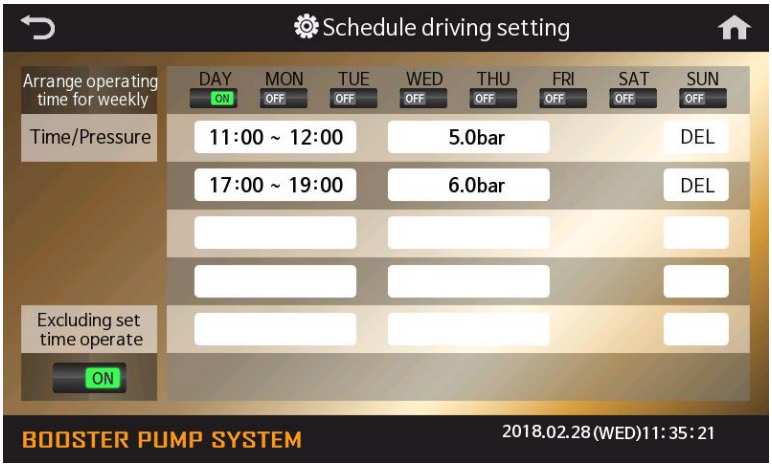


Figure2.14 Scheduled Driving Setting

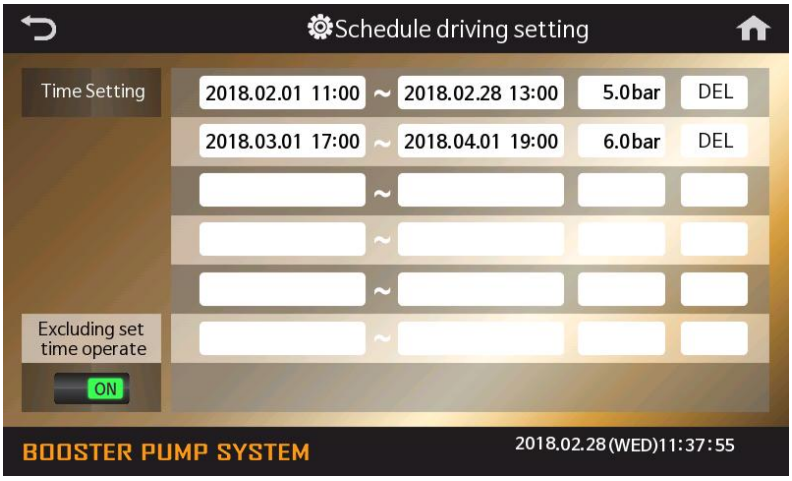


Figure2.15 Scheduled driving Setting

Note：

(1) The Timing Water Supply Function is valid within the set date.

(2) If start time and end time are set to 00:00, or pressure is set to 0, the period setting is invalid.

(3) The timing of water supply is not allowed to overlap.

(4) Enable “Excluding set time operate” means to allow the pump to run at set pressure outside of the set timed water supply; disable, vice versa.

2.4.6 Password Setting

Touch Screen protection password serve as 1~6 digit valid data, setting 0 means invalid, user could set it as per requirement. Start using password protection function, enter password setting page need password. Its display interface as shown in the Figure2.16. **Note: Please must keep in mind of password, if password lost, please contact with the factory.**

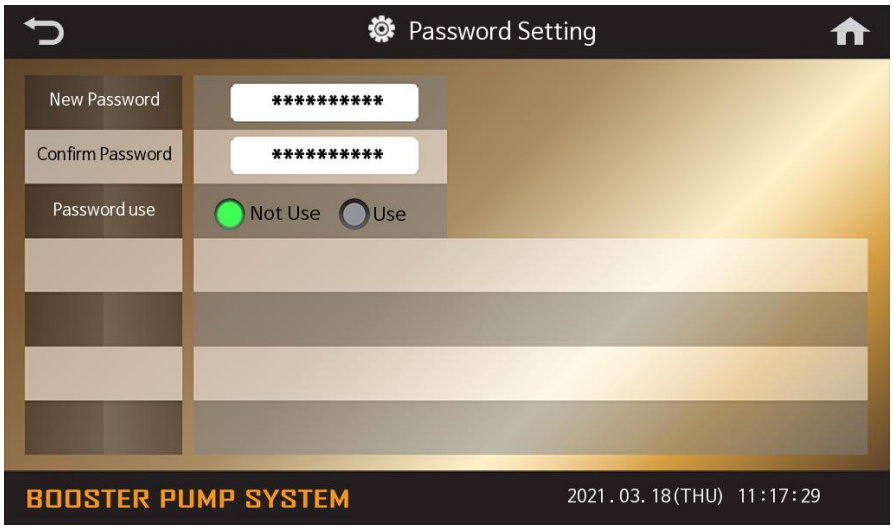


Figure2.16 Password Setting

2.4.7 Communication Setting

This touch-screen supports the RS-485 communication and Ethernet communication. Its display interface is shown as Figure2.17 and the parameter description is shown as table 2-5. **Note: if you change the baud rate or network Settings, you must restart the touch screen.**

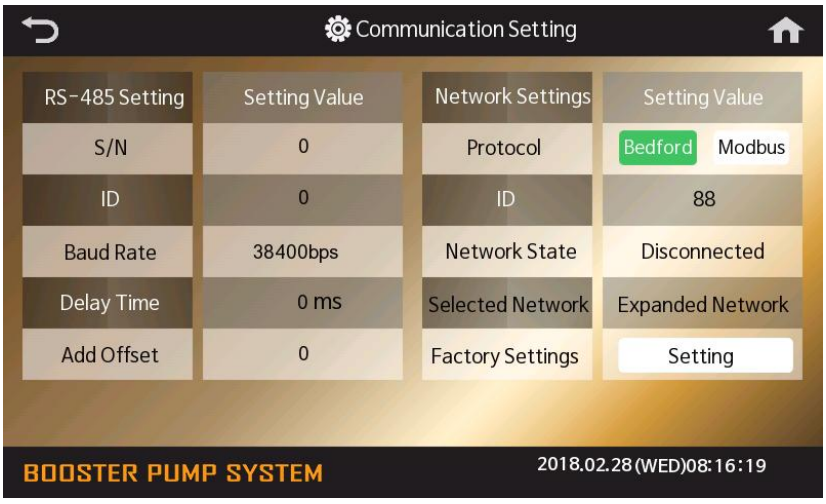


Figure2.17 Communication Setting Page

Table2.5 Communication Setting Function Parameter Instruction

Function Parameter	Setting Range	Factory Setting	Description
S/N	0~99999999	0	S/N of RS485
ID	0~99999999	0	RS485's ID number, its default is 0
Baud Rate	9600bps～38400bps	38400bps	Data of touch-screen and controller comes into the rate. 9600bps 19200bps 38400bps
Delay Time	0～999	0	Communication delay time of RS485
Add Offset	0～999	0	Add Offset of RS485
Protocol	Bedford, Modbus	Factory Setting	Ethernet communication protocol
ID	0～65535	Factory Setting	ID address of touch-screen，which use for Ethernet communication, 0 is invalid address.
Selected Network	Own Network, Expanded Network	Expanded Network	Network module
Network State	Disconnected, Connected	Disconnected	Display network connection state

3. FAULT CONTENT AND TROUBLE SHOOTING

When Touch Screen displays Fault Content, User should check the relevant circuit according to the content. Fault type includes as below:

Table3.1 Touch Screen Fault Information and Solutions

Fault type	Reason	Solutions
Sensor fault	1. Pressure transmitter disconnected; 2. Wrong pressure transmitter wiring; 3. Pressure transmitter short circuit; 4. Pressure transmitter break down	1. Check the cable between pressure transducer and telecommunication controller; 2. Check the pressure transducer 3. Check the parameter b0.08(setting valve too big)
High Water level	1. Water level of pool is too high; 2. Abnormal water level switch;	1. Check the water system 2. Check the situation of the control terminal S1
Low Water level	1. Water level of pool is too low; 2. Abnormal water level switch; 3. Wrong setting of water level switch style parameter	1. Check the water system 2. Check the situation of the control terminal S3 3. Check the parameter b05.00
High water pressure	1. Abnormal sensor; 2. The parameter b01.00 setting value is too small	1. Check the installation of pressure transmitter； 2. Check the parameter b01.00 (setting value too small)

Fault type	Reason	Solutions
Low water pressure	1. Abnormal sensor; 2. Motor rotates in the reverse direction; 3. Insufficient water inflow; 4. There is air inside the pump	1. Check the installation of pressure transmitter; 2. Check the motor's direction of rotation is correct or not; 3. Check the parameter b01.01 (setting value too big); 4. Check the pump whether is vent out the air inside

Table3.2 The pumping unit fault and solutions

Fault type	Reason	Solutions
The pump can't run	1. Motor not running; 2. Debris into the pump body	1. Check motor; 2. Clean the debris;
An abnormal noise of pump	1. Motor bearing bad 2. Pump with air 3. Water vortex generation 4. Pump bearing or movement damage; 5. A gaseous cavitation	1. Replacement of motor bearing; 2. To pump exhaust and to ensure adequate water pressure ; 3. Ensure sufficient water is available for use; 4. Replacement of the pump bearing or damaged parts; 5. If the water is insufficient ,the appropriate close outlet value
The motor can't run	1. Frequency controller fault; 2. Frequency controller and the motor line circuit breaker Air ; 3. switch trip; 4. Power supply fault; 5. Motor fault;	1. Find out the reasons and reset; 2. Find out and to exclude; 3. Check the air switch trip reasons, do not endanger personal safety and equipment conditions, to close the air switch ; 4. To restore the power, check the motor's direction of rotation is correct or not; 5. During the warranty period, immediately inform the manufacture;
The motor running speed is not normal	Motor phase failure or low voltage	Check the motor current and input power supply voltage, and correct, please pass electrical personal check motor before the restart;

4. SAFETY PRECAUTIONS

- When installing Touch Screen, make sure that keep a certain distance from AC power source, relay and other electric interface devices. Please don't use it in the field with direct sunlight, high temperature and high humidity, high corrosiveness and many droplet; please take shielding measures when use it in the field with static, noise and strong electromagnetic.
- Before using, it need to exhaust the vertical pump to prevent anhydrous idling to damage the pump.

- When the equipment shut down for a long term, please drain off the water in the pumps, inlet/outlet pipe and pressure tank in time, in case of equipment frozen to damage in winter.
- Before maintaining controller, please be sure to cut off power source for 10 minutes. During the process of checking and maintenance, the power wires, circuits, flat cables etc. must to be connected rightly; otherwise, it will cause the system abnormal work or damage.

5. MAINTENANCE

⚠WARNING
◆ Maintenance must be performed according to designated maintenance methods; ◆ After turning off the main circuit power, please wait for 10 minutes before maintenance or inspection. ◆ Do not directly touch components or device of PCB board. Otherwise it can be damaged by static electricity. ◆ After maintenance, all screws must be tightened.

In order to protect the controller and Touch Screen from any fault, to keep the system work in high-performance for a long time and prolong the system service life, entire system need daily care and maintenance.

5.1 Touch Screen Maintenance

(1) User should inspect periodically whether the power supply input terminal and the electrical terminals of touch screen well or not, as well as the terminal screws tight enough.

(2) User should clean periodically and roundly the touch screen, keep the panel clean, no moisture and oil stain.

(3) Check touch screen’s display and operation is well or not, if its performance bad please maintain and replace at once.

(4) Keep dry and ventilated on its service environment.

5.2 Controller Maintenance

(1) Confirm operation ambient temperature 0～50℃, humidity 20～90%

(2) Confirm there is no oil mist, dusty and condensate.

(3) Check whether there is any abnormal heat and vibration.

(4) Confirm fans are working in good condition, speed and air flow is normal.

5.3 Pumping Unit Maintenance

(1) Check whether there is any leakage in the confluent pipe welding.

(2) Check whether there is any loosen on pump base and bottom bolt and in the connections of water pump and confluent pipe, in and out of the water pipe connections.

(3) Check all connection seal are in good condition.

(4) Check the ball valve open and close flexibly.

(5) Check water pump work in good condition or not.

(6) Check whether there is any abnormal vibration, heat and abnormal noise on the motor of pumping unit.

Agent: