ETNA®

EHP Constant Speed Water Booster Pump Control Panel Operation and Maintenance Manual

1. Product Information

EHP Panels are pump controllers designed for constant speed pump installations and managed by a control unit featuring a 128x64 graphical screen. The panel cover includes the EHP pump controller, automatic/manual mode selector button, warning lamps, and a switch disconnector. The panel enables up to six pumps to be run via the integrated EHP control unit, together with the included auxiliary equipment such as relays and contacts, and displays their operational status on the screen. The system settings can easily be configured from the settings menu on the graphical screen using the control buttons on the pump controller.

The EHP Pump Controller is a device that provides the desired pressure by activating pumps as necessary following 'run' or “stop” commands from the pressure switches.

There are two versions of EHP constant speed pump controllers.

1- EHP-3P (three pumps, controller with an internal star-delta relay); this version allows up to three pumps to be controlled by the internal star-delta starter relays and specially developed software, without needing to use the external star-delta starter relays in the panel.

2- EHP-6P (six pumps, controller with external star-delta relay); this version allows up to six pumps to be controlled. One external star-delta starter relay for each pump should be used in the electricity panel.

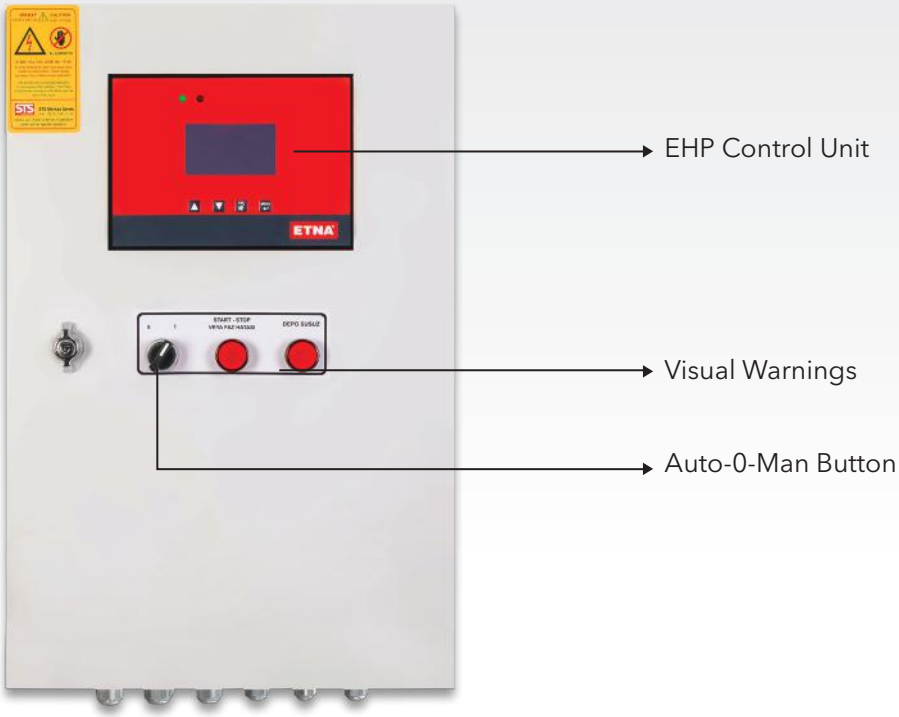


Figure 1: EHP Series Panel Exterior

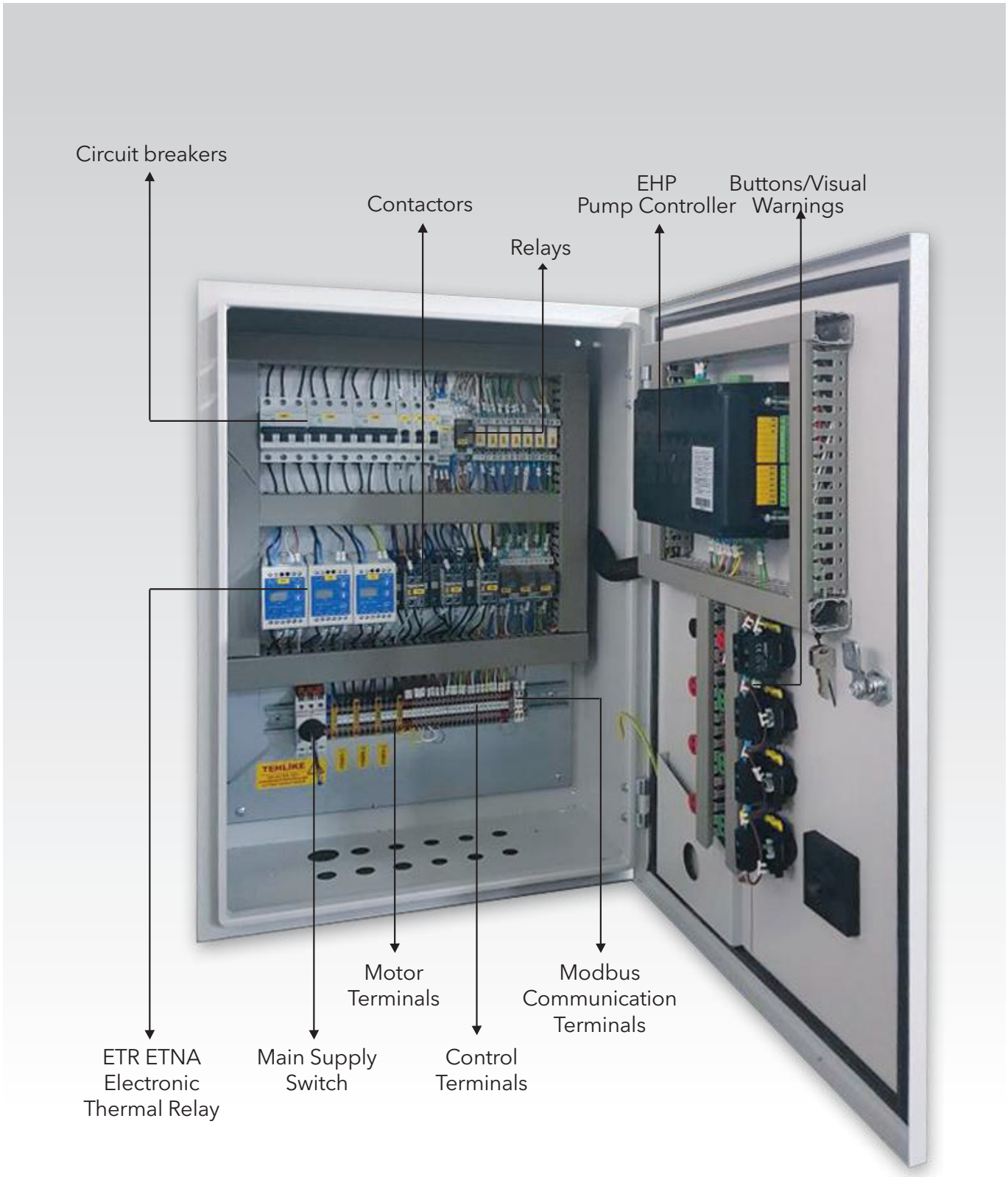


Figure 2: EHP Series Panel Interior

1.1. Panel Specifications

- Epoxy-coated DKP sheet metal panel
- Protection class IP 54
- Isolator lock switch on panel cover
- Automatic/manual mode selector button on panel front cover
- Phase failure, asymmetry, and sequence protection with the phase protection feature
- The ETR ETNA electronic thermal relay protection against under and over current
- The external float switch protection against dry running
- Ability to transfer system operating data to automation system via Modbus using RS 485 communication protocol
- Ability to control up to 6 pumps with specially designed panel featuring a 128x64 graphical screen
- Ability to perform sequential or timed equal aging according to need
- Ability to monitor variables such as pump count, pump operating status, pressure switch status, and the date & time on the main operating screen
- Ability to monitor each pump's total and manual working times and number of total and manual switches
- Reaction at the optimum speed based on the system requirements with adjustable pump activation and deactivation times
- Ability to make pumps active or passive according to need
- Periodic maintenance deadline reminder
- Turkish and English language options
- Can keep 98 past event logs in memory
- Real-time date and time
- Over- and under-voltage protection
- Ability to adjust the maximum number of switches permitted per hour
- Ability to perform automatic weekly test on set date, hour and time
- Displays supply voltage as phase to phase or phase to neutral on main screen
- Manual pump control on the pump controller
- The EHP-3P version lets you set the star duration and star-delta switch delay time for the star-delta starter system
- Ability to select a spare pump
- Ability to configure settings while the system is running
- Password protected menu prevents unauthorized access
- Changeable menu password
- Remote operation through dry-contact
- Ability to send 'running' and 'general fault' information to the Building Monitoring System for each pump individually through dry contacts
- Single phase operation in EHP-6P version

2. Pump Controller

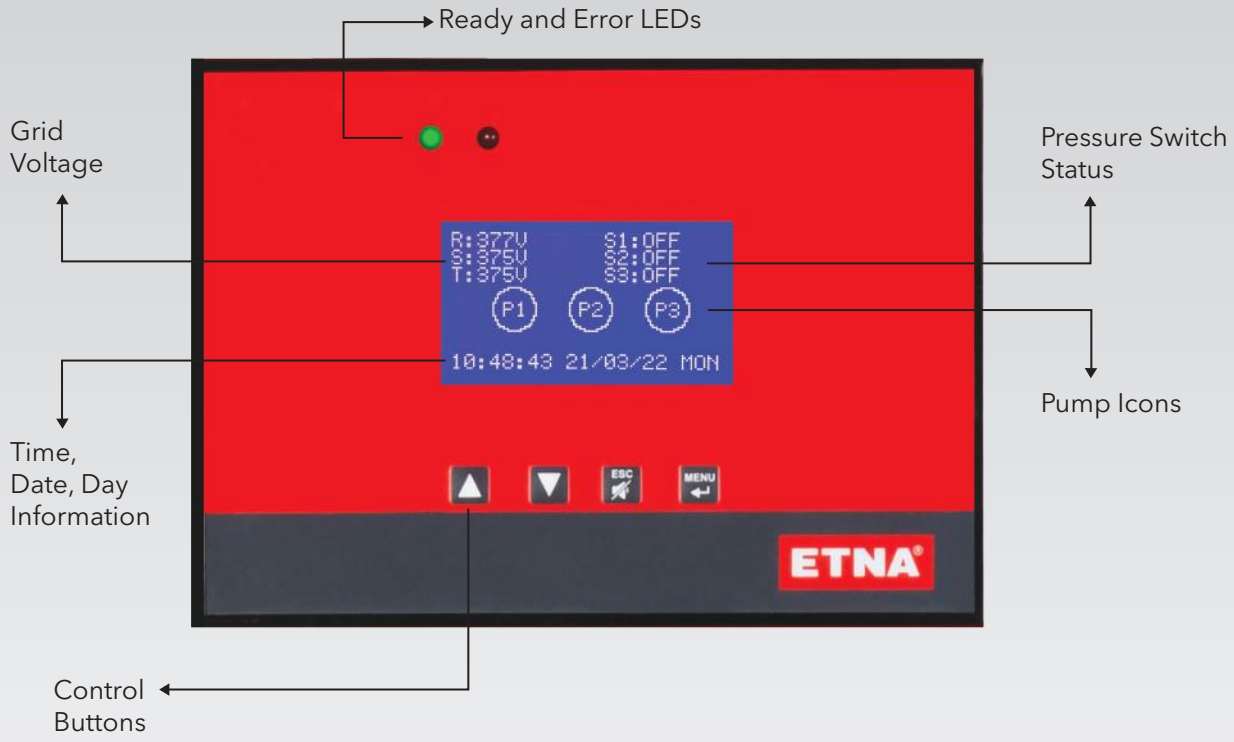


Figure 3: Pump Controller

2.1 Pump Controller Buttons

: Used to navigate within the menu or increase the set value.

: Used to navigate within the menu or decrease the set value.

: Used to silence the audible warning triggered in the event of failure or to return to the previous menu while within a menu.
Press ESC key for 3 seconds to silence the audible warning.

: Used to access the menu or to save the changed parameter. Changes made to parameters will not be saved unless this button is pressed.

2.2 Main Screen Descriptions

2.2.1. Main Screen Icons

: Pump icon (Pump 1)

: Icon showing pump will run after start delay

: Pump is running icon (Display alternates with pump number)

: Icon showing pump will stop after stop delay

: Spare pump icon

: Pump error status icon

: Passive pump icon

2.2.2. Sample Main Screen Description

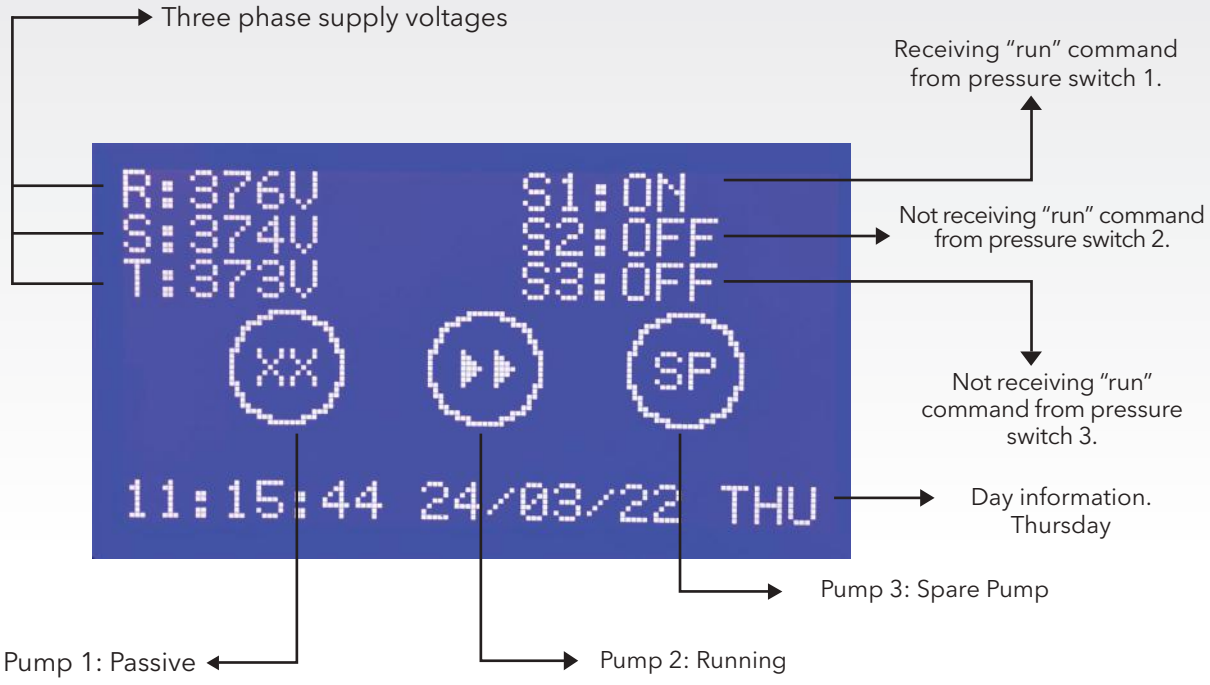


Figure 4: Sample Main Screen Description

3. Menus

3.1 Main Menu

Press MENU on the main operating screen to display the Main Menu Screen shown in Figure 5. In this menu, move the arrow keys to move the cursor up or down to select the desired sub-menu then press MENU again to access the selected menu.

Figure 5: Main Menu Screen

3.1.1 Pump Durations

This menu displays the operating times of the pumps in the system and their switch counts. Each pump's total and manual working times and the number of total and manual switches are shown separately. For example; P1T: pump 1, total operating time in minutes (total operating time from pressure switch in automatic mode and from manual start in manual mode), P1M: pump 1, total manual operating time in minutes (total operating time from manual start in manual mode), S1T: pump 1, total number of switches (total number of switches from pressure switch in automatic mode and from manual start in manual mode), S1M: pump 1, total manual number of switches (number of switches from manual start in manual mode).

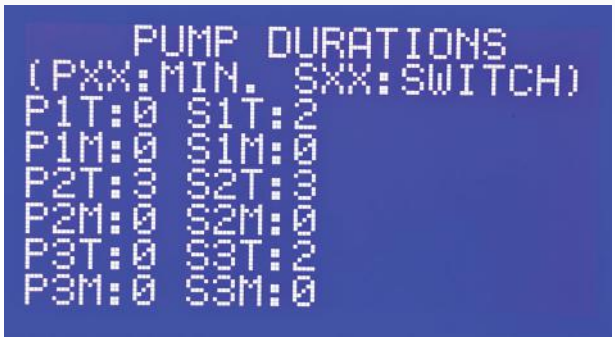


Figure 6: Pump Durations Screen

3.1.2 History Record

Press MENU while the cursor is on the on the history record line on the main menu screen to display the event logs menu shown in Figure 7. The last 98 event logs are listed here, and the latest event is always carried to 1st place. Press MENU on the cursor line again to display the event description screen shown in Figure 8 together with the date and time of the event.

Figure 7. History Records Screen

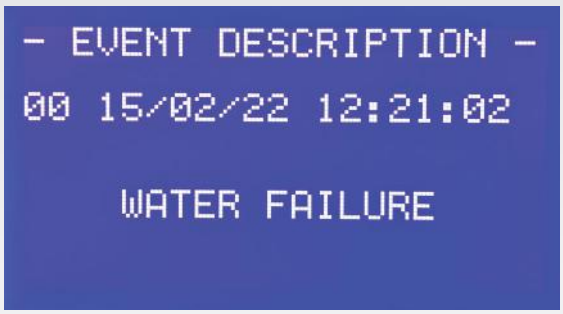


Figure 8. Event Description Screen

3.1.3 Manual Pump Control

Press MENU while the cursor is on the manual pump control line on the main on the main screen to display the manual pump control screen shown in Figure 9.
Use this screen to start the pumps manually when necessary. Select manual mode using the automatic/manual selection button on the panel cover to start the pumps manually.
This means there must be an open circuit between the EHP pump controller's start connection and the com connections.
Move the cursor to the desired pump and press MENU to start the respective pump.
Press MENU again to stop a manually started pump once it is running, or select automatic mode from the automatic/manual selection button on the panel cover.

Manual operation is limited to 10 minutes to prevent possible failures.
A manually started pump will stop automatically after 10 minutes. As a manually started pump runs independent of line pressure, it should be monitored constantly and pumps should not be operated at high pressure for long periods. Failures that occur due to operating for long periods under high pressure with manual start are not covered by warranty.

Figure 9. Manual Pump Control Display

3.1.4 General Settings

3.1.4.1 Password Menu

Press MENU when the cursor is on general settings line, to display the password screen shown in Figure 10. Enter the correct password using the up down and menu buttons to access password protected menus. The initial menu password in the factory settings is "0000."

Figure 10. Password Menu

3.1.4.2 General Settings

a. Language Select: The language options are Turkish and English.

b. Time Date Setting: Using the time and date setting menu, set the time in hours, minutes, and seconds and set the date as day, month, year.

c. Modbus Settings: Use the modbus settings menu to set the Baud Rate, Stop Bit, Parity values, and Device ID. The modbus register table is given below.

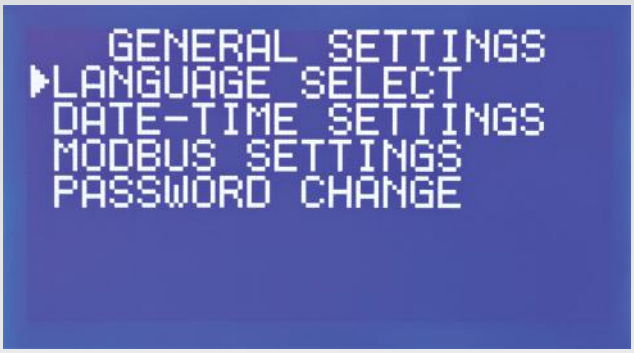


Figure 11. General Settings Screen

EHP Pump Controller Modbus Register Table

MEMORY ADDRESS	DESCRIPTION
40000	Pump 1 total operating time (x6)
40001	Pump 1 total number of switches (x6)
40002	Pump 1 manual operating time (x6)
40003	Pump 1 number of manual switches (x6)
40004	Pump 2 total operating time (x6)
40005	Pump 2 total number of switches (x6)
40006	Pump 2 manual operating time (x6)
40007	Pump 2 number of manual switches (x6)
40008	Pump 3 total operating time (x6)
40009	Pump 3 total number of switches (x6)
40010	Pump 3 manual operating time (x6)
40011	Pump 3 number of manual switches (x6)
40012	Alternate run information (11- Periodical run, 22- Sequential run, 33- Normal run)
40013	Error status (0 - No error, 1- Error)
40014	R phase (Single phase L - N) (0 - Normal, 1 – Undervoltage, 2 – Overvoltage, 3 - Phase loss)
40015	S phase (0 - Normal, 1 – Undervoltage, 2 – Overvoltage, 3 - Phase loss)
40016	T phase (0 - Normal, 1 – Undervoltage, 2 – Overvoltage, 3 - Phase loss)
40017	Phase sequence error (0 - No error, 1 - phase sequence error)
40018	Water level information (0- No water, 1- Water present)
40019	Pressure switch 1 (B1) status (0 - Stop, 1 - Start)
40020	Pressure switch 2 (B2) status (0 - Stop, 1 - Start)
40021	Pressure switch 3 (B3) status (0 - Stop, 1 - Start)
40022	Thermal switch 1 (T1) input status (0 - No error, 1 - Thermal switch error)
40023	Thermal switch 2 (T2) input status (0 - No error, 1 - Thermal switch error)
40024	Thermal switch 3 (T3) input status (0 - No error, 1 - Thermal switch error)
40025	Weekly test program (0 - Disabled, 1 - Active)
40026	Mod information (0 - Manual mode, 1 - Automatic mode)
40027	Pump 1 number of maximum switching error information (0 - No switching error, 1 - Switching error)
40028	Pump 2 number of maximum switching error information (0 - No switching error, 1 - Switching error)
40029	Pump 3 number of maximum switching error information (0 - No switching error, 1 - Switching error)
40030	Service maintenance error (0 - None, 1 - Service maintenance error)
40031	Pump 1 active passive information (0 - Active, 1 - Passive)
40032	Pump 2 active passive information (0 - Active, 1 - Passive)
40033	Pump 3 active passive information (0 - Active, 1 - Passive)
40034	Pump 1 (11- Operating from pressure switch, 22- Stopped, 33- Operating in weekly test, 44- Operating from manual start)
40035	Pump 2 (11- Operating from pressure switch, 22- Stopped, 33- Operating in weekly test, 44- Operating from manual start)
40036	Pump 3 (11- Operating from pressure switch, 22- Stopped, 33- Operating in weekly test, 44- Operating from manual start)
40037	Spare pump information (0- no spare pump, 1- pump 1, 2- pump 2, 3- pump 3, 4- pump 4, 5- pump 5, 6- pump 6)

MEMORY ADDRESS	DESCRIPTION
40038	R phase (Single phase L - N) voltage
40039	S phase voltage
40040	T phase voltage
40041	Number of pumps in system
40042	Solenoid relay status (0 - Not energized 1 - Relay energized)
40043	Maximum permitted number of switches
	The below registers are only valid for EHP-6P pump controller.
40044	Pump 4 total operating time (x6)
40045	Pump 4 total number of switches (x6)
40046	Pump 4 manual operating time (x6)
40047	Pump 4 number of manual switches (x6)
40048	Pump 5 total operating time (x6)
40049	Pump 5 total number of switches (x6)
40050	Pump 5 manual operating time (x6)
40051	Pump 5 number of manual switches (x6)
40052	Pump 6 total operating time (x6)
40053	Pump 6 total number of switches (x6)
40054	Pump 6 manual operating time (x6)
40055	Pump 6 number of manual switches (x6)
40056	Pressure switch 4 (B4) status (0 - Stop, 1 - Start)
40057	Pressure switch 5 (B5) status (0 - Stop, 1 - Start)
40058	Pressure switch 6 (B6) status (0 - Stop, 1 - Start)
40059	Thermal switch 4 (T4) input status (0 - No error, 1 - Thermal switch error)
40060	Thermal switch 5 (T5) input status (0 - No error, 1 - Thermal switch error)
40061	Thermal switch 6 (T6) input status (0 - No error, 1 - Thermal switch error)
40062	Pump 4 number of maximum switching error information (0 - No switching error, 1 - Switching error)
40063	Pump 5 number of maximum switching error information (0 - No switching error, 1 - Switching error)
40064	Pump 6 number of maximum switching error information (0 - No switching error, 1 - Switching error)
40065	Pump 4 active passive information (0 - Active, 1 - Passive)
40066	Pump 5 active passive information (0 - Active, 1 - Passive)
40067	Pump 6 active passive information (0 - Active, 1 - Passive)
40068	Pump 4 (11- Operating from pressure switch, 22- Stopped, 33- Operating in weekly test, 44- Operating from manual start)
40069	Pump 5 (11- Operating from pressure switch, 22- Stopped, 33- Operating in weekly test, 44- Operating from manual start)
40070	Pump 6 (11- Operating from pressure switch, 22- Stopped, 33- Operating in weekly test, 44- Operating from manual start)
40071	Spare pump 2 information (0- no spare pump, 1- pump 1, 2- pump 2, 3- pump 3, 4- pump 4, 5- pump 5, 6- pump 6)

Table 1: EHP Pump Controller Modbus Register Table

d. Password change: Use the password change menu to change the user password.
Move the cursor to the password change line, then press the MENU button to access the password change screen. Enter the new password and press MENU again. Enter the new password again to confirm, then press the MENU button to save it.

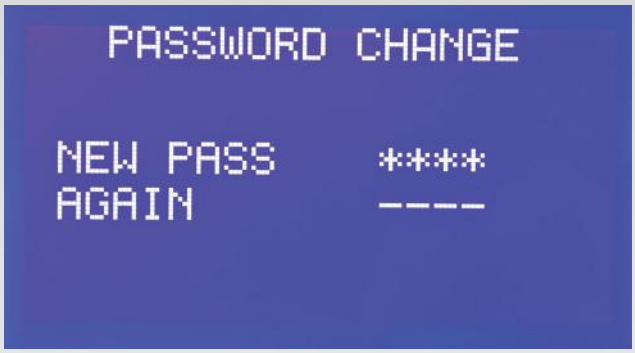


Figure 12. Password Change Menu Screen

3.1.5 Device Settings

Press the MENU button when the cursor is on the device setting screen to display the screen shown in Figure 13. Use the device settings menu to adjust the line settings, pump settings, maintenance period, weekly test settings.

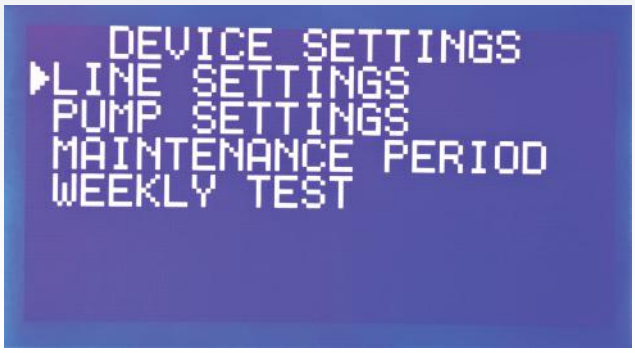


Figure 13. Device Settings Menu

3.1.5.1 Line Settings

Use the line settings menu to voltage calibration, voltage limits, voltage type and supply voltage settings.

Figure 14. Line Settings Menu

3.1.5.1.1. Voltage Calibration

Use the voltage calibration menu to calibrate the R - S - T phase voltage values detected by the EHP pump controller and displayed on the main screen against the mains voltage. Calibrate by measuring with a calibrated voltmeter on the same phase as the mains current. Select the phase - notr option in the LCD supply voltage menu to perform the operation more easily by measuring the voltage value for each phase between the respective phase and neutral. Match the value on the screen with the value on the voltmeter then set the value by pressing the MENU button.
The calibration is made in the factory and changing it is not recommended.

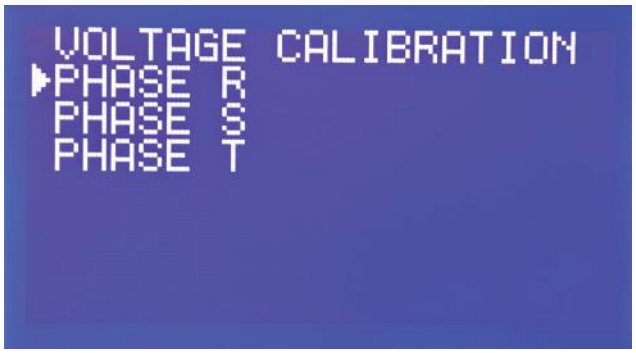


Figure 15. Voltage Calibration Screen

3.1.5.1.2 Voltage Limits

Select the overvoltage and undervoltage cut-off values in the voltage limits menu. Three ranges can be selected -- 10%, 15%, 20%. The factory setting is 10% and changing this is not recommended except for special applications. If the phase voltages measured on the main screen exceed the values set in this menu, an Undervoltage or Overvoltage error is given and the system is protected. The error is automatically removed and the system becomes ready for operation when the voltage levels are restored and the measured value falls between the upper and lower limits.

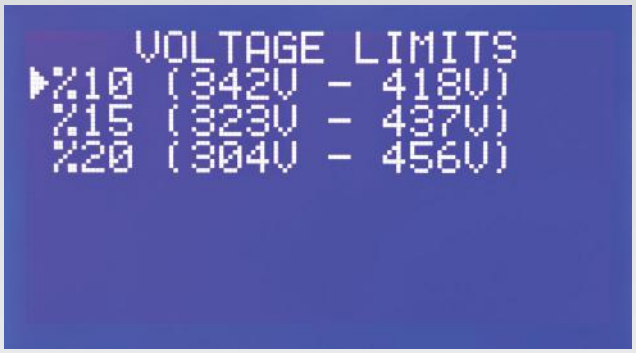


Figure 16. Voltage Limits Setting Screen

3.1.5.1.3 Supply Voltage

Use the supply voltage setting menu to set the voltage values displayed on the EHP pump controller's main display as phase to phase or phase to neutral. When performing a voltage calibration from the voltage calibration menu, select phase to notr as the LCD voltage display to make the calibration process easier

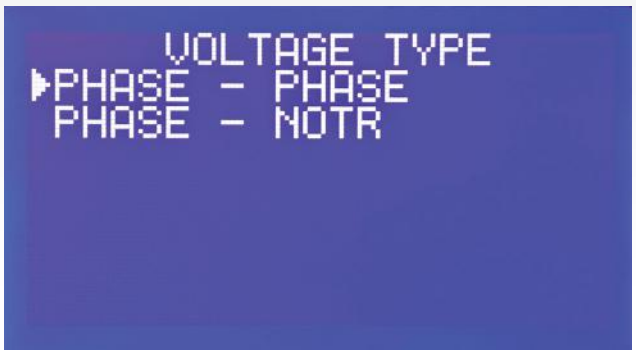


Figure 17. Voltage Type Setting Screen

3.1.5.1.4. Supply Voltage

The supply voltage menu is only available in the EHP-6P version. Input voltage can be set as three phase or single phase according to the system's supply type. Select three phase supply voltage for installations with three phase electric motors and single phase supply voltage for installations with single phase electric motors.

Figure 18. Supply Voltage Setting Screen

3.1.5.2. Pump Settings

Use the pump settings menu to enter settings related to the pump system's operation.

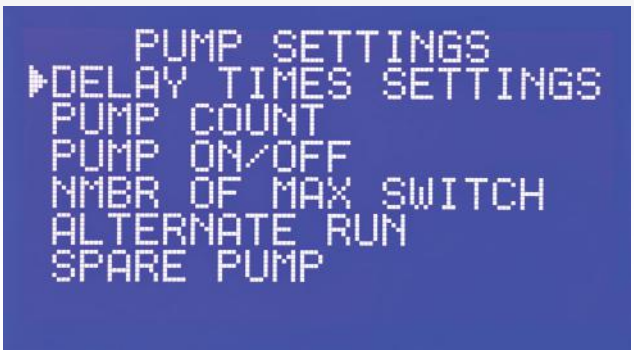


Figure 19. Pump Settings

3.1.5.2.1 Delay Times Settings

Use the delay times settings menu to set the switch on time, switch off time, star time and star-delta transition delay time.

a. Switch On Time: The delay time defined for the pump to start if there is no obstacle to start when a 'run' command is received from the pressure switch for the respective pump. This period is counted down under the respective pump's icon, and the pump starts when the countdown ends.

b. Switch Off Time: The delay time defined for the pump to stop when the 'run' command is no longer received from the pressure switch for the respective pump. This period is counted down under the respective pump's icon, and the pump stops when the countdown ends.

c. Star Time: The period when the star contactor relay will be energized in the star-delta starter system on the EHP-3P pump controller. The factory setting for this period is 5 seconds. The star contactor relay will be energized for the period set in this menu on the EHP-3P pump controller. On the EHP-6P panel, this is used to inform the EHP-6P pump controller controller about the period set at the star-delta starter relay used externally in the panel. Enter the star time set at the star-delta starter relay into the EHP-6P pump controller.

d. StarDelta Transition Delay Time: This is the parameter to set the delay time until the star contactor relay is unenergized and the delta contactor relay is energized in the EHP-3P panel. The factory setting for this period is 0.2 seconds. On the EHP-6P panel, this is used to inform the EHP-6P controller about the period set at the star-delta starter relay used externally in the panel Enter the delay time set at the star-delta starter relay into the EHP-6P pump controller.

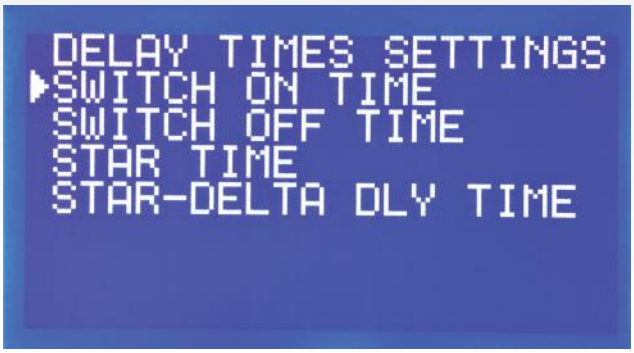


Figure 20. Delay Times Settings

3.1.5.2.2 Pump Count

Use the pump count menu to set the number of pumps in the system connected to the pump controller. The main screen will display as many pump icons and pressure switch status indicators as the number of pumps entered in this menu.

Figure 21. Pump Count

3.1.5.2.3 Pump On / Off

Use the pump on off menu to set the pumps in the system to active or passive. In the present system, use this menu to set to passive any pumps that are not required to start or that are offline due to malfunction or maintenance. Pumps set to active can be started from the pressure switch or manually from the manual pump control menu. Pumps set to passive cannot be started from the pressure switch in automatic mode, as part of weekly automatic test, or manually.

Figure 22. Pump On / Off Menu Screen

3.1.5.2.4. Permitted Number of Maximum Switches

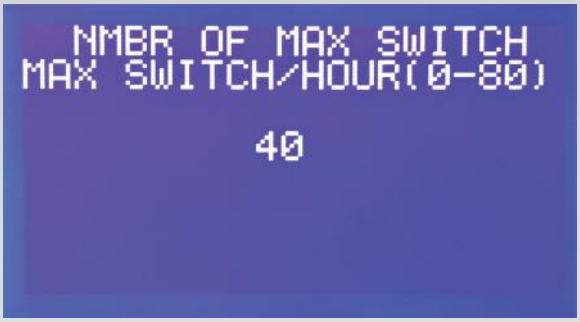


Figure 23. Number of Maximum Switch Screen

Motor power (kW)	0.25 – 3	4 – 7.5	11 – 15	18.5 – 22	30 – 37	45 – 75	90 – 160
Recommended maximum number of switches per hour	60	40	30	24	16	8	4

Use the number of maximum switches menu to set the maximum number of switches permitted in 1 hour. This menu limits the maximum number of times one pump motor can start running in 1 hour, and protects the electric motor. The main display shows a "max switch limit" message when the maximum number of switches is exceeded. After the determined time, the switching error automatically disappears. The time to wait between 2 sequential starts is set by dividing 1 hour (60 minutes) by this set value. E.g., if this program is set as '10', the minimum time between starts will be 6 minutes; therefore, 10 starts per hour is possible. We recommend setting the number of switches limiting program according to the power of the electric motor. A value between 0 and 80 can be set depending on the power of the motor. When set to '00', switch number protection is deactivated.

3.1.5.2.5 Alternate Run

Use the alternate run menu to select sequential aging, periodical run, or normal run. When sequential aging is selected, the pumps will start working one after the other. When periodical run selected is selected, equal aging will occur by running the pumps so as to equalize their operating hours. When normal run is selected is selected, the equal aging scenario is disabled and pump 1 will run according to pressure switch 1, pump 2 to pressure switch 2, and pump 3 to pressure switch 3.

Figure 24. Alternate Run Screen

3.1.5.2.6 Spare Pump

Use the spare pump menu to define the spare pump in the system. From the spare pump menu, use the up and down buttons to reach the desired pump number, then use the menu button to set it as the spare pump.

The EHP-3P version allows 1 spare pump to be selected.

The EHP-6P version allows 2 spare pumps to be selected.

A pump set as spare will only run in place of the faulty pump if one of the main pumps experiences a fault (thermal switch fault). For example, in a system with three pumps, if P3 is set as spare pump, P1 and P2 will start working on receiving the "run" command from all pressure switches. If P1 or P2 stop for thermal switch fault reasons, P3 will run in place of the stopped pump.

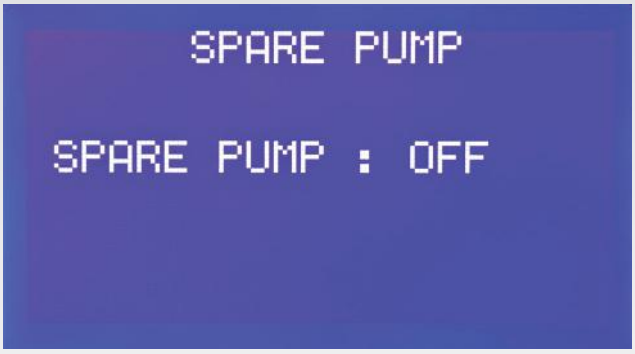


Figure 25. Spare Pump Screen

3.1.5.3 Service and Maintenance Period

This is the menu for setting a maintenance reminder. Maintenance can be set to off or on. Set to on to enter the date and time for maintenance. The pump controller will give a warning when this date and time are reached. Set maintenance status to off to disable the warning. Afterward, set a new date and time for the next maintenance.

Figure 26. Maintenance Time Setting Screen

3.1.5.4 Weekly Automatic Test Program

Use the weekly test menu to adjust the settings related to the weekly automatic test program. The weekly test can be set to on or off. If the weekly test is set to on, set the test time, test date, and test duration in that order. The pumps will run for the set duration automatically at the set date and time every week, and a weekly test will be performed. The pump controller must be in automatic mode for the weekly test to take place. Any pumps in the system set to passive will not run in the weekly test. If there is a solenoid valve in the output collector of the pump system, the solenoid valve relay will activate during the weekly test and engage the solenoid valve, preventing pressurization at the line behind the solenoid valve during the weekly test. The weekly test duration can be set between 60 and 300 seconds. Care should be taken not to operate the pumps at high pressure for long periods because of the weekly test. We recommend running the weekly tests for 60 seconds.

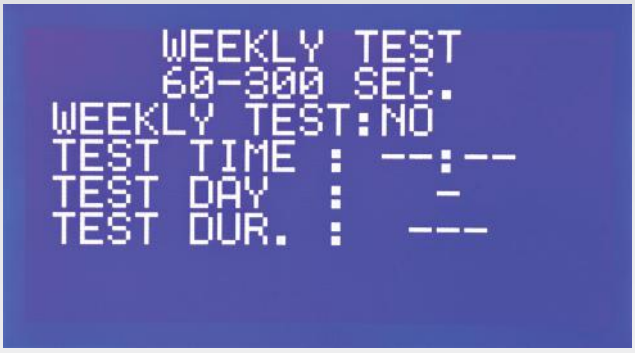


Figure 27. Weekly Test Screen

3.1.6 Factory Settings

From the factory settings menu, enter the user password then select yes to restore the pump controller to factory settings. After restoring the pump controller to factory settings, any set parameters will be reset and the pump controller restored to its initial loading values.

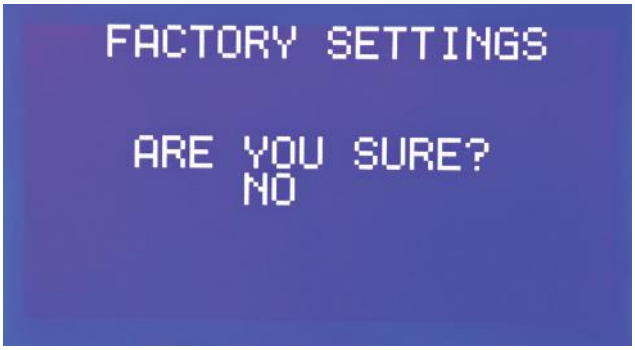


Figure 28. Factory Settings Menu

4. EHP Pump Controller Connection Diagrams

4.1. EHP-3P

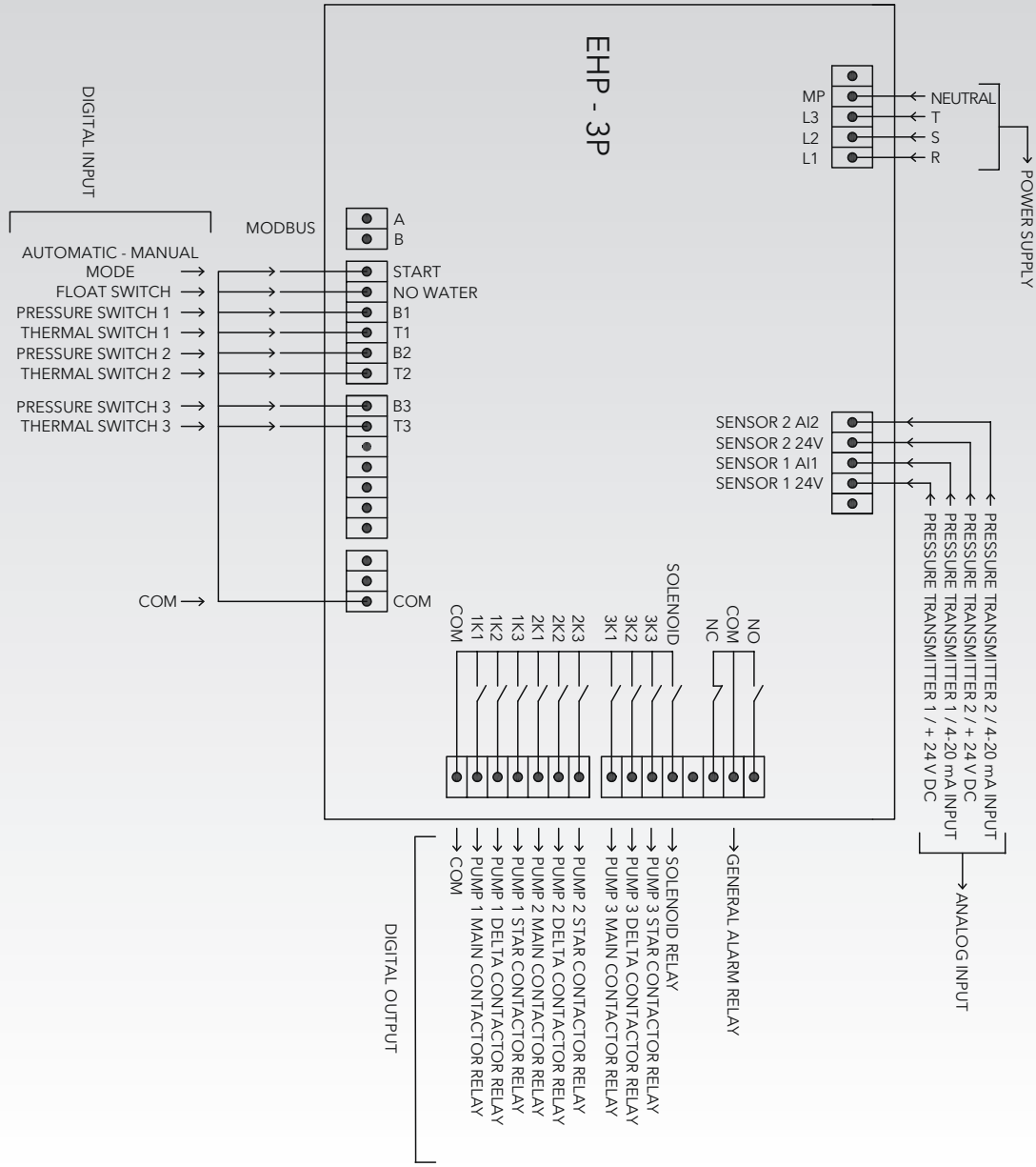


Figure 29. EHP-3P Pump Controller Terminal Descriptions

4.2. EHP-6P

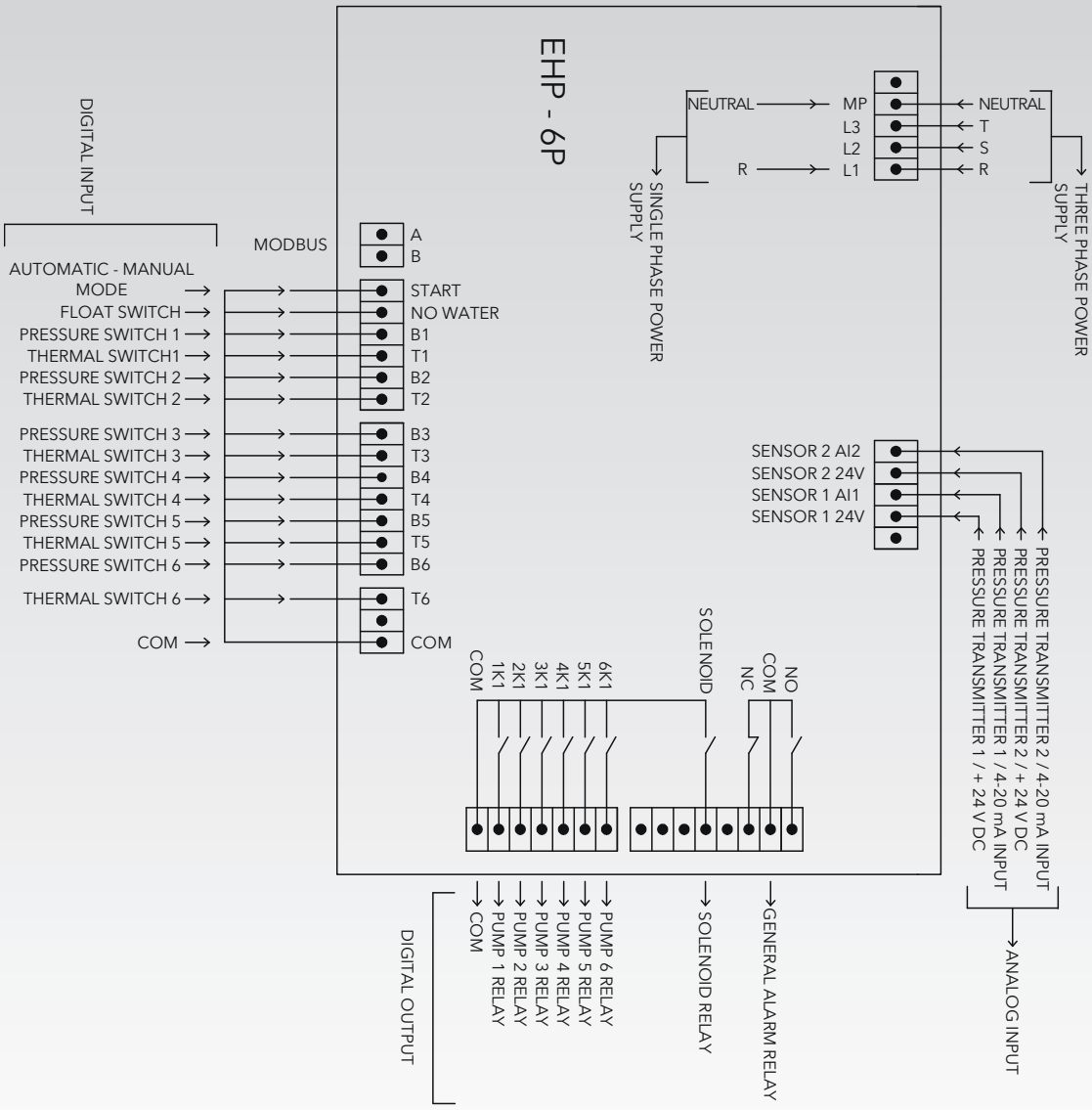
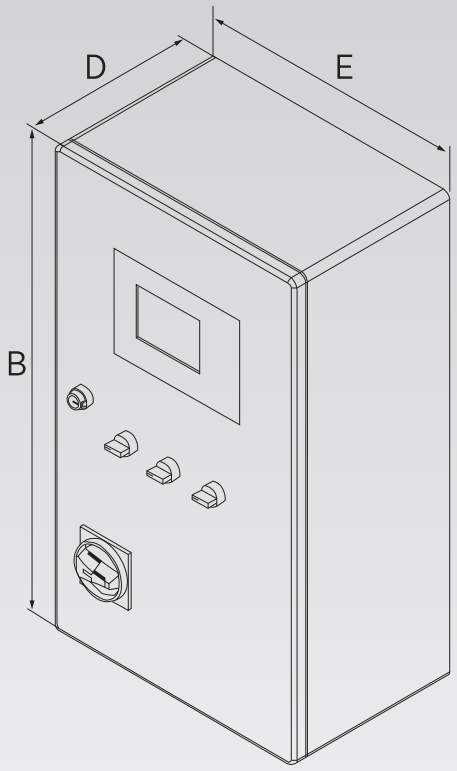


Figure 30. EHP-6P Pump Controller Terminal Descriptions

5. Dimensions



H: Height
W: Width
D: Depth

Figure 31: EHP Series Panel Dimensions

Motor Power		1 Pump			2 Pumps			3 Pumps		
HP	KW	E (mm)	B (mm)	D (mm)	E (mm)	B (mm)	D (mm)	E (mm)	B (mm)	D (mm)
0,5	0,37	400	600	260	400	600	260	400	600	260
0,75	0,55	400	600	260	400	600	260	400	600	260
1	0,75	400	600	260	400	600	260	400	600	260
1,5	1,1	400	600	260	400	600	260	400	600	260
2	1,5	400	600	260	400	600	260	400	600	260
3	2,2	400	600	260	400	600	260	400	600	260
4	3	400	600	260	400	600	260	400	600	260
5,5	4	400	600	260	400	600	260	400	600	260
7,5	5,5	400	600	260	400	600	260	400	600	260
10	7,5	400	600	260	400	600	260	400	600	260
15	11	400	600	260	500	700	260	600	800	260
20	15	400	600	260	500	700	260	600	800	260
25	18,5	400	600	260	500	700	260	600	800	260
30	22	400	600	260	500	700	260	600	800	260

Table 2: EHP Pump Controller Dimensions Table (ask for dimensions for applications with 4 pumps or above)

6. Maintenance and Operation

General Information

Electricity Hazard:

- A fuse must be present in the EHP pump controller power input.
- Disconnect the system from the power supply before any service or maintenance.

Check List:

- Make sure the ambient temperature is within the permitted operating conditions.
- Make sure the device is disconnected from the power supply before doing any work on it
- Always observe the pump and motor control instructions.
- Contact the manufacturer for detailed information.

Check the Error Log:

- Use the error log to display past information about the product.

7. Troubleshooting

WARNING: Make absolutely sure to disconnect the system from the power supply before performing any installation or maintenance. Use suitable equipment and measurement tools for the checks.

Warnings and Errors:

If any alarms or errors appear, consult the table below and make checks accordingly.

NO	ERROR and ALARMS	CAUSE	SOLUTION
1	PHASE LOST	One or more of the phases that should reach the EHP panel's three phase supply are missing.	• Checkthe electrical connections. • Check the mains three phase and neutral voltages. • Check that three phase and neutral reach the panel input terminals.
2	PHASE SEQUENCE FAIL	The phase sequence is inversed.	• Disconnect the power. • Change the phase order. • Energize under control. • Check the electric motor's rotation direction.
3	PHASE LOW - HIGH	The voltage is outside the voltage protection limit values set in the menu.	• Check the mains voltage and the phase to neutral voltages for each phase. • Check the electrical connections. • Check that the current voltage values are within the protection limits set from the menu.
4	LOW WATER LEVEL	There is no COM signal at the EHP pump controller's no water terminal.	• Check the water level in the tank. • Check that the float switch is operating. • Check the electrical connections.
5	MAX SWITCH LIMIT	The maximum number of switches set in the number of switches menu is exceeded.	• Check the expansion tank. • Check the number of switches limit from the menus. • Make sure that the system is operating correctly. • At the end of the duration which depends upon the limit value set from the number of switches menu, the switching error will automatically disappear.
6	THERMIC FAULT	There is no COM signal at the EHP pump controller's thermal (T) terminal.	• Check the electrical connections. • Check the electric motor's thermal protection.
7	AUTO MODE DISABLED	There is no COM signal at the EHP pump controller's start terminal.	• Check that automatic mode is selected on the panel. • Check the electrical connections.
8	SUPPLY VOLTAGE FAULT	The power supply at the EHP pump controller's power input terminals does not match the "supply voltage" selected in the "line settings" menu.	• If single phase input voltage is selected, only L1(R) and MP neutral connections should be made to the power input terminals. • If three phase voltage is detected in the power input terminals when single phase input voltage is selected, this fault is given. • Check the EHP pump controller's power input terminals. • Make sure that single phase input voltage is selected in a single phase system, and three phase input voltage is selected in a three phase system.

Table 3. Error Message Guidance Table

Notes

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