

Handling and Operating Manual

CPA-HS & CPA-FS Control Panel



CPA-HS & CPA-FS Infrastructure Submersible Pump Control Panels Handling and Operation Manual

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Figure: 1 (Wall Type)

- 1-Mains Power Switch
- 2-Electric terminals of Motor connection
- 3-Electric terminals of Control connection
- 4-Pump humidity sensor relay
- 5-Auto-manual selector switches
- 6-Current transformers
- 7-Thermal switches
- 8-Contactor
- 9–Isolation transformer thermal power switch
- 10-Isolation transformer
- 11–Phase protection relay
- 12-24 V DC power supply
- 13-PLC & Analog module
- 14-Emergency stop
- 15-Door locks
- 16-Touch screen
- 17-Digital multimeter

" Panel design; The number of pumps may vary depending on the power and selected options "





Figure: 2 (Standing Type)

- 1-Mains Power Switch
- 2-Electric terminals of Motor connection
- 3-Electric terminals of Control connection
- 4- Pump humidity sensor relay
- 5-Auto-manual selector switches
- 6-Current transformers
- 7- Thermal switches
- 8- Star Delta Relay
- 9-Contactor
- 10-Isolation transformer thermal power switch
- 11-Isolation transformer
- 12-Phase protection relays
- 13-24 V DC power supply
- 14-PLC & Analog module
- 15-Emergency stop
- 16- Door lock
- 17- Touch screen
- 18- Digital multimeter

" Panel design; The number of pumps may vary depending on the power and selected options "

1. General

Installation and operating should only be carried out by qualified personnel!

Installation and operating instructions are part of the device. It should be available at the side of the device as a source for reference at any time. Completely observing this manual is essential for proper use of the device and proper operation. The installation and operating manual conforms to the device model and the current safety technical norms at the time of printing.

2. Safety

This user manual contains basic explanations that should be taken into account during installation and operation. For this reason, this manual must be read by the installer and the relevant operator during installation and operation. Not only the general safety instructions under this basic safety title but also the special safety instructions added under the following points must be taken into consideration.

2.1 Symbols related to explanations in the user manual

In this operating guide, the safety rules if not followed that may cause injuries and handicaps are indicated by the following symbol.



The warnings against electric shock are specified by the following symbol.



For the purpose of specifying safety rules that may cause damage to machinery, equipment or systems when not in compliance

ATTENTION!

Symbol is used.

2.2 Staff education

The personnel performing the installation must have been properly trained for these operations.

2.3 Dangerous hazards if the safety rules are not observed

Failure to comply with the safety instructions may result in personal injury and damage to the equipment. Failure to comply with the safety rules will also invalidate compensation claims that may arise due to possible injuries. Failure to comply with the rules in general can lead to the following negative facts:

The important functions of the equipment are disabled,
Personnel injuries resulting from electrical or mechanical reasons.

2.4 Safety rules for operating personnel

The current legislation on the prevention of accidents should be respected. Necessary precautions should be taken against the hazards that may be caused by electricity. Hazardous electrical hazards must be considered and the directives of the local electricity distribution companies must be respected.

2.5 Safety rules for control and installation works

The business manager should ensure that all control and installation work is carried out by authorized and qualified specialist personnel and that they have information at a sufficient level regarding to the details given in the user manual. In principle, the work on the system should only be carried out when the system is in a completely stopped position.

2.6 Unauthorized modification and spare parts use

Changes to the appliance are only possible with the manufacturer's approval. The use of spare parts recommended by the manufacturer ensures that the safety is complete. The use of other parts may invalidate claims for compensation.

2.7 Unacceptable operating types

The operating safety of the supplied equipment is only guaranteed in case of operation in working condition indicated in paragraph 4 of the operating instructions. The operating limit values given in the catalog or brochures should never be exceeded.

3. Shipping and interim storage



The panel is shipped from the factory in boxes or on a pallet, protected against dust and moisture. Receiving the product:

The transport should be checked for damage,
If any transport damage is detected, the transport company must make necessary initiatives.

During transport:

• Always use suitable lifting devices and take the safety nets to prevent parts from falling,



• Secure the product on a flat pallet, use a suitable pallet truck for transportation.

Never stop under suspended loads, use a cage during lifting and secure the product straight into the cage.
Ensure that the panel is stable and stable in storage and transport, and before the installation work in a safe place. The control unit must be protected against nausea and mechanical damage.

ATTENTION! The control unit must be protected against humidity and mechanical damage. Environment between -10 °C and + 50 °C Should not be used except this temperature range

4. Purpose of use

Automatic control of submersible pump system with maximum 4 pump, with 4–20 mA analog level sensoror level float.

5. Product information



5.1 Application

Automatic control of submersible pump system with maximum 4 pump, with 4–20 mA analog level sensor or level float.

5.2 Panel Coding Sample

Sample:	CPA-HS4/2.2 DOL
Sample:	CPA-FS4/2.2 DOL
CPA-HS	Analog level sensor system
CPA-FS	System with level floats
2.2	Nominal power of each pump P2 [kW]
DOL	Direct starter
SD	Star delta starter

5.3 Working Principle

The analog level sensor connected to the CPA-HS Model wastewater well sends the water level information in 4–20 mA to the "PLC" in the control system. Thus, "PLC" reads the water level of the wastewater well. For each pump, Level of value is defined on the screen. The current water height information of the well, minimum and maximum level information is also defined on the screen. "PLC" will gradually start the pumps to keep the water level in the well at the minimum value. The system in CPA-FS model works step by step with the minimum, maximum, and one level floater per pump connected to the waste water well.

5.4 Product Features / Benefits

- · Lockable main switch
- Auto-manual switch
- Phase protection relay
- Auto-Test
- Emergency stop
- External on-off
- General operation / General fault signals
- Individual operation / Individual fault signals
- •Automatic pump change in case of malfunction
- Touch Screen to the display of all values and status
- · Delay times of at the pump-in and pump-out
- Individual operating/recovering hours of pumps
- Reseting the pump operating time(Resetting)
- Automatic pump replacement

- Touch screen to monitoring all values and operating status,
- Through the screen; • System up time
- System up time
- If Panel HS type is selected, the water level of the well can be taken as analog 0..10 V
- 2 different operating modes
- While in Mode "0", All pumps enters the respective circuit inthe set level, all of them are deactivated when the minimumlevel is seen (Emergency Operation Mode). Mode "1" All the pumps enter the respective circuit at the setlevel, each pump is deactivated when the lower level is seenand the last operating pump is deactivated after seeing theminimum level.
- Thanks to Digital multimeter, The system's Voltage, Amps and Hz values can be monitored
- •Water leaks humidity sensor relay

5.4.1 Control and Signal Functions

- Stop operating with external dry contact
- SSM general fault signal
- SBM general operation signal
- Individual error signal to each pump
- Individual operation signal to each pump
- External horn output 24 VDC

5.4.2 Types of Bus

• Modbus (with socket addition)

5.3 Equipment used in clipboard

The structure of the switchboard is designed to be connected to the power of the pumps to be connected.

• **Main switch:** It switches the control device on / off. (Figures 1 and 2, no. 1)

•Current transformer (Fig. 1 and.2, no.6)

- Phase control relay: Alarm to warning in case of phase sequence, phaseloss and phase imbalance.
 (Figure 1- no.11 or Figure 2- No. 12)
- **Touch screen:**It is the operating data(see.''Menus'') and the operating status is indicated by the color change of thebackground lighting. It provides menu selection andparameter entry via the touch screen. (Figure 1 No: 16 Figure 2 No: 17)

•Memory programmable control (PLC):

The network is made up of modular construction. (Figure 1 No: 13 Figure 2 No: 14)

• Power Supply 24V DC power supply (Figure 1 No: 12 Figure 2 No:13)

• **Controller equipment:** Contactors for star/delta transformation (Fig. 1, No. 8 or Fig2 – no 8–9)

•Protective / protection combinations:

There are safeguards for the operation of the pumps: Overcurrent fuse thermal isolator (current rating: 0.58 IN) Time relay and contactors for star-to-delta transformation. (Figure 1 No: 7 Figure 2 No: 7-9)

•Manual-0-automatic switch:

Switch for selection of pump operation types.(Fig 1 no:5 fig 2 – no:5)"Manual" (emergency operation on mains/test operation: motor protection available)"0" (pump off – can not be activated via PLC) "automatic" (pump is released via PLC for automatic operation)

Emergency stop button

The emergency stop button does not interrupt the power supply, only stop the system operating When intervening in the panel or in electrical equipment, cut off the input power supply (Figure 1 No: 14 Figure 2 No: 15)

Technical Specifications	
Mains supply voltage (V)	3~400 V, 50/60 Hz
Nominal current (A)	See. Product plate
Protection type	IP54
Maximum permissible ambient temperature	50 °C
Circuit braker	According to the circuit plan

5.6 Scope of Delivery

- Control panel WILO CPA-HS & CPA-FS
- Electrical Circuit Diagram
- Installation and user manual

5.7 Options / Accessories

CPA-HS & CPA-FS system is can be optionally equipped with the options listed below. These must be ordered exclusively The connection of the pumps must be carried out on the contact site in accordance with the circuit diagram, • Module for connection to various line systems (eg Modbus)

· GSM modem and Web server related modules



6. Electrical connections

The electrical connection must be carried out by trained personnel in accordance with the regulations of the regional electricity distribution company.

Network connection:

Explanations regarding the installation and operating instructions of the whole equipment must be taken into account.



Pump network connections



Take into consideration account the installation and usermanuals of the pump!!

6.1Pressure switch

According to the installation and operating instructions, connect the pressure sensor to the terminals according to the circuit diagram. Use shielded cable, place shield in one-sided circuit box.

CAUTION!

Do not apply external voltage to the terminals!

6.2 External on / off circuit:

In accordance with the circuit plan, A tele (remote) on / off circuit can be connected via a potential-free contact (opener) after the bridge has been removed with the relevant terminals (pre-assembled by the factory.)

External on / off circuit		
Switch off	Open Auto	
Switch on	Auto OFF, reporting on the screen with a symbol.	
Switch loaded	24 VDC / 10 mA	

CAUTION!

Do not apply external voltage to the terminals!

6.4 General operation / General malfunction messages

Potential-free contacts for external messages via respective terminals according to the circuit diagram, maximum contact load 250 V~/2A

6.5 Real water level informationi

PLC control unit with 0 ... 10 V output well water level information can be obtained via the corresponding terminals. Sample : 2 m water level in the well; It gives 10 V at 2 meters and 5 V at 1 meter.

7..Start-up

We recommend that the device be operated by WILO Customer Service. The cables on the side of structure Before the first operating must be checked for correct connection and especially grounding. Individual precautions for operating must be taken from the installation and operating instructions for the complete assembly.



All connection terminals must be tightened before commissioning.

Do not cover the fan input and output filters.

7.1 Factory settings

Preset of the control panel was made in the factory. The factory setting can be recreated by the WILO Service.

8.Maintenance

Before maintenance or repair work, the device must be switched off and secured against unauthorized restart. The control cabinet must be kept clean. The control cabinet and fan should be cleaned when soiled.

From 5,5 kW motor power, check the protection contacts from time to time for burns and replace in case of intense combustion. The charging status of the real time clock buffer battery is determined by the system and notified when necessary. However, it is recommended to change it at 12– month intervals. For this purpose, the battery should be changed according to the description of the following CPU structure set.

CAUTION!

The leakage current protection relay must be installed in the power line where the control panel is connected.

9. Spare parts

Spare parts Is ordered through the services authorized by WILO Pompa Sistemleri A.Ş.. The spare parts list is on the back page of the electricity project.

10. Authorized services

You can find a list of services authorized by WILO Pompa Sistemleri A.Ş. : http://www.wilo.com.tr/anasayfa/servis-destek/yetkili-servisler/

11. Misuse

The control panel cover must be kept closed and locked.
Do not switch off the power supply switch of the control panel except for periodic maintenance (controlled conditions).
Do not intervene in the panel without interrupting the power

Do not intervene in the panel without interrupting the power supply.Do not place any material on or in front of the control panel.

- By inserting an isolated carpet in front of the control panel and
- pressing on the carpet Interfere with the board.
- Do not pull the power supply line out of the control cabinet.

12. Display Images and Explanations

Display image	Descriptions
wilo Pumpen Intelligenz.	9.1 Opening screen saver It is necessary to touch the access the worksheet screen saver.
Main Menu Service Settings Manuel Control Tracking Alarms Türkçe English Lutfen Sifrenizi Giriniz **** Menü **** Menü	Main Menu The Main Menu page can be accessed by pressing the Menu. button on the previous Operation Screen. From this page, It should be entered service password in the window that opens by pressing the Service Settings button.
Clr 0 1 2 3 Ent	
System Options Number of Pumps 1 Operating Mode 1 Sensor Type Floater Sensor Type Sensor I Sensor Type Gater Analog hata varsa sensor değişim ON	 System Options Page After the service password is entered, the System options page opens and the number of pumps in the system and the operating mode of the system are entered from this page. While in Mode "0", All pumps enters the respective circuit in the set level, all of them are deactivated when the minimum level is seen (Emergency Operation Mode).Mode "1" All the pumps enter the respective circuit at the set level, each pump is deactivated when the lower level is seen and the last operating pump is deactivated after seeing the minimum level. The Sensor options page is opened when the sensor type button on this page is pressed.
Sensōr Opsiyonları Sensortipi Analog Analog hata varsa sensor değişim ON	 Sensor Options Page: If the Sensor type; system will read the level information with the analog level sensor, Analog will be selected, and if the level information is to be read with the floater , the floater will be selected. In order to make selection press on the sensor type button When there is an analog error , sensor change feature is set to ON, the system automatically switches to the floater mode when an analog sensor error occurs. To use this feature, In floaters with analogue sensor must be installed in the system. To exit this page, press the second button in the upper left corner.

Display image	Descriptions
Modbus Adresi	Modbus Address Settings Modbus address settings is accessed by pressing the button in the top right corner of the system options page. Modbus address can be changed via this screen in order to control panel access via modbus.
Maximum Seviye Ayarları-1 Maximum Seviye Yuksekliği <u>110 cm</u> Minumum Seviye Yuksekliği <u>25 cm</u>	Level Settings-1 Page: (Sensor operation mode) Level Settings-1 is accessed by pressing the button on the top right corner of the previous Modbus address page.Working with analogue sensor, It is entered from this page with minimum water level and maximum water level values.
Flatör süreleri-1 1.Flator Görmede Gecikme Süresi 2.Flator Görmede Gecikme Süresi 3.Flator Görmede Gecikme Süresi 2 S	Floater Times-1 Page: (Floater operation mode) Floater Times-1 is accessed by pressing the button on the top right corner of the previous Modbus address page. Delay times for seeing floaters are entered from this page.
Seviye Ayarları-2 3.Seviye Yüksekliği <u>85 cm</u> 2.Seviye Yüksekliği <u>70 cm</u> 1.Seviye Yüksekliği <u>40 cm</u>	Level Settings-2 Page: (Sensor operation mode) Level Settings-2 is accessed by pressing the button for the top right corner of the previous Level Settings-1 page.Working with analogue sensor, the number of pumps is entered as Water level knowledge, the pumps are engaged and deactivated according to these levels
Flatōr sūreleri-2 1.Flator Bırakmada Gecikme Suresi <u>2S</u> 2.Flator Bırakmada Gecikme Suresi <u>2S</u> 3.Flator Bırakmada Gecikme Suresi <u>2S</u>	Floater Times-2 Page: (Floater operation mode) Floater Times-2 is accessed by pressing the button for the top right corner of the previous Floater Times-1 page.Delay times for leaving floaters are entered from this page.
Seviye Ayarları-3 Mexcut Suyun Yüksekliği 293 Sensör Tipi-Metre 10 Menü	Level Settings-3 Page: (Sensor operation mode) Level Settings-3 is accessed by pressing the button for the top right corner of the previous Level Settings-2 page. The analog sensor information connected to the working with analogue sensor system is entered in meters in the sensor type-meter section in this page. For example, if 1 meter sensor is used, enter 1 here. If 10 meter sensor is used, 10 here. The current water level can also be monitored from this page.



Display image Descriptions	
Zaman ve Tarih Sanive 0001 0000 Saat-0k 10:57 0K 1057 Ay-Gün 02:16 0216 2016	Time and Date Page This page is accessed by pressing the button on the top right corner of the previous Number of Max.On-Off hours per pump page. From this page, the system time and date settings are made. The system is set to the time and date the values entered on the right side when the "ok" button is pressed.
Ana Menū Servis Ayarları Manual Kontrol İzleme Alarmlar Türkçe English Manuel Kontrol AUTO PP1 P22 P3 P3 P3 P3 P3 P3 P3 P3 P3 P3	Manual Control Page is accessed by pressing the manual control button on the Main menu page. If the pump is in the automatic position, "Auto" appears on the pump image. If it is in the manual position, the hand sign appears on the pump image. In addition, "Start" is displayed if the pump is operating under the manual pump, and "Stop" is displayed if it is not operating.
Pompa Bakım P2 BAKIM BAKIM BAKIM	Pump Maintenance Page Pump Maintenance is accessed by pressing the button on the top right corner of the previous Manual Control page. From this page, The pump is taken to the maintenance mode by pressing on the received pumps. The image showing that the pump is operating in the maintenance mode is displayed.
Alarm list is empty. Reset Tribustion 16/02/2016 11:18:52 AKTIF P2-Kontaktor Ariza AlarmGroup1 1/2 Reset Tribust	Alarm Page Alarm page is accessed by pressing the alarm button on the Main menu page. If there is no alarm in the system, it will write "Alarm list is empty', if there is alarm present, writes the definition of alarm. By pressing the reset button under the page, the alarms are reset and the exit button is pressed to exit the alarms page.

13. Failure causes and possible solutions

Definition of Problem	Possible reasons	Solution recommendation
	Ground is not connected	Connect the grounding cable.
Definition of Problem Pump operates short time and stops Analog sensor / Analog module fault Height of water read on the panel with actual water height is different Triangle mark on screen No text or images on screen There is no fault on the screen, system doesn't work.	The sensor reads incorrectly or interrupts the signal	Check the sensor cable.
	May Sensor value not entered or entered wrong	Enter the sensor type-meter setting from the Level settings-3 page.
	Sensor cable faulty	Change the cable.
Analog sensor / Analog module fault	Sensor may be faulty	Disconnect the sensor cable ends from the panel sensor (2) k ohm resistor is connected instead, if the error is erased the sensor is faulty
	Sensor cable ends are reversed	Replace the sensor cable ends.
Height of water read on the panel with actual water height is different	Sensor values may be misrepresented. The sensor value can be set low or high to allow equal perception	Enter the sensor type-meter setting from the Level settings-3 page.
	PLC analog input faulty	Replace the analog module.
Triangle mark on screen	PLC can not communicate, PLC program may be deleted or there is a problem with communication cables	Check the communication cable, try to reload the program if the problem persists
No text or images on screen	No display power supply.	The power supply should be checked if the display supply does not measure 24VDC.
There is no fault on the screen, system doesn't work.	Pumps left manually	Set pump to automatic position from manual control page
	Motor winding problems	The motor windings are measured.
Earth fault and motor short circuit faults	Short circuit in contactor	The contactor is changed.
	Touching the housing in the cables	A short-circuit check is performed and it is resolved if necessary.
	There may be looseness in the terminals.	Check the terminals.

Notes :	

Notes :	



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