



**Wilo-SiBooster EXCEL**  
**High Efficiency, Electronically Commutated Motor-Driven,**  
**Pressure Boosting Systems**

**Installation and operating instructions**

# Installation and commissioning by qualified personnel only!

## 1 About this document

These installation and operating instructions are an integral part of the product. They must be kept readily available at the place where the product is installed. Strict adherence to these instructions is a precondition for the proper use and correct operation of the product.

These installation and operating instructions correspond to the relevant version of the product and the underlying safety standards valid at the time of publication.

## 2 Safety

These operating instructions contain basic information concerning the installation and commissioning of the system and should be read by the service technician and responsible operator prior to proceeding. Observe the special safety instructions and understand the danger symbols throughout this document.

### 2.1 Indication of instructions

Symbols:



General danger symbol



Danger due to electrical voltage



Danger due to explosion risk



Information on handling the product or draw attention to possible problems.

Signal Words:

#### **DANGER!**

Acutely dangerous situation. Non-observance could result in death or the most serious of injuries.

#### **WARNING!**

The user can suffer (serious) injuries. 'Warning' implies that (serious) injury to persons is probable if this information is disregarded.

#### **CAUTION!**

There is a risk of damaging the pump/unit. 'Caution' implies that damage to the product is likely if this information is disregarded.

### 2.2 Personnel qualifications

The installation personnel must have the appropriate qualifications for this work.

### 2.3 Danger in the event of non-observance of the safety instructions

Non-observance of the safety instructions can result in risk of injury to persons and damage to pump/unit. Non-observance of the safety instructions can result in the loss of any claims to damages. In detail, non-observance can, for example, result in the following risks:

- Failure of important pump/unit functions
- Failure of required maintenance and repair procedures
- Danger to persons from electrical, mechanical and bacteriological influences
- Property damage

### 2.4 Safety instructions for the operator

The existing directives for accident prevention must be observed. Danger from electrical current must be eliminated. Local directives [e.g. NEC, etc.] and local power supply directives must be followed.

### 2.5 Safety instructions for inspection and installation work

The operator must ensure that all inspection and installation work is carried out by authorized and qualified personnel, who are sufficiently informed from their own detailed study of the operating instructions. Work on the pump/unit should only be carried out when the unit is powered down, and lock-out/tag-out procedures are followed.

### 2.6 Unauthorized modification and manufacture of spare parts

Modifications to the pump/unit are only permissible after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of unauthorized parts violates warranty and absolves the manufacturer of responsibility for consequences stemming from their use.

### 2.7 Improper use

The operating safety of the supplied pump/unit is only guaranteed for conventional use in accordance with Section 4 of the operating instructions. The limit values must never fall below or exceed those specified.



#### **CAUTION!**

**If placing the unit outside, a NEMA 3R panel and a enclosure hood for the EC motors must be used in order to avoid defaulting on the factory warranty.**

## 3 Transport and interim storage

The Wilo-SiBooster EXCEL is supplied on a pallet, on transport boards or in a crate and is film-wrapped to protect it against moisture and dust. Transport and storage instructions marked on the packing must be observed. The transport dimensions, weights and necessary passageways or transport space of the unit are given in the attached installation plan or other documentation.



## CAUTION!

### Risk of damage!

The equipment must be transported by means of authorized load carriers. Stability of the load must be ensured, since the pumps have been constructed in a way that shifts their center of gravity to the top. Transport straps or ropes must be secured to the existing transport lugs or placed around the base frame. The pipes are not designed to withstand loads and should not be used to secure loads in transit.



## CAUTION!

**Risk of damage! The system must be protected against moisture, frost and heat and also mechanical damage by means of suitable measures!**

Unpack. Carefully inspect the Wilo-SiBooster EXCEL booster or the accessory parts for possible damage and notify the delivery company (forwarder) or Wilo after-sales service. After removing the packing, store or install the unit according to the installation conditions described (see section entitled Installation). Concealed damage will not be revealed until after start-up, at which time notify Wilo after-sales service.



## DANGER!

**Risk of bodily harm or death! A storage tank, if used, must be vented to atmosphere and unpressurized! Over-pressurizing a storage tank can cause an explosion!**

## 4 Product Information

### 4.1 Applications

Pressure boosting systems are designed for boosting and maintaining the pressure of water supply systems. They are used as:

- Potable water supply systems
- High-rise apartments
- Hospitals
- Offices
- Industrial buildings

The pressure boosting system's structure, function and requirements comply with the following guidelines and directives:

- Drinking Water Ordinance – UL Listed for NSF 372 and NSF-61
- DOE 2020 regulations concerning pump efficiency

The Wilo-SiBooster EXCEL pressure boosting system must be connected directly to a water main, or indirectly to a storage tank. These storage tanks are open to atmospheric pressure and should never be pressurized.

### 4.2 Type Key (description)

Example: Wilo-SiBooster 2 EXCEL V270-02/2-1/2/5/VCE	
Wilo	Brand Name
SiBooster	Product Family: High Efficiency, EC Motor-Driven, Pressure Boosting System
2	Number of Pumps
EXCEL	Electronically Commutated Motor Driven Multistage Pump
V	Pump Design (Vertical Multistage)
270	Nominal Flow Rate in US Gallons per Minute
-02	Number of Stages (Impellers in Series)
/2	Number of Trimmed Impellers (if any)
-1	304 Stainless Steel Wetted Parts
5	Horsepower
VCE	Vision Controller

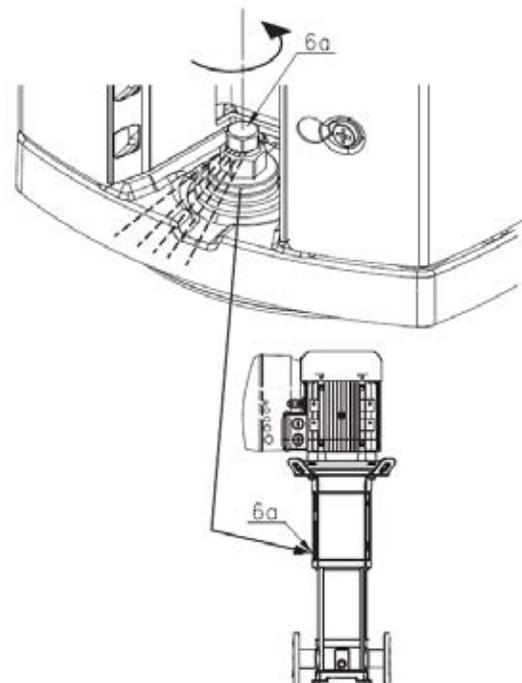
## 5 Description of the product and accessories

### 5.1 General description

The Wilo-SiBooster EXCEL booster is a compact system that is supplied completely piped and ready to connect. The only connections that have to be made are for the inlet and pressure pipes and the main power connection. It may also be necessary to install accessories ordered separately but included in the delivery.

The Wilo-SiBooster EXCEL booster is supplied with 2-4 non-self-priming, High-Efficiency, EC Motor-Driven, pumps that can be connected indirectly (non-pressurized water storage tank) or directly to the water supply main from the city. **Vent** any air out of the Helix EXCEL pumps before start-up to prevent seal failure or unexpected high pressure thrusts that can damage system components (See Fig. 5a).

Figure 5a



The systems must be operated and maintained in accordance with the relevant regulations so that the operational security of the water supply is permanently ensured and neither the public water supply nor other consumption installations are disrupted.

Mechanical and hydraulic system components (Figure 5b)	
1	Base frame with vibration damper
2	2 to 4 High-Efficiency, EC Motor-Driven, EXCEL Pumps
3	Suction manifold pipe
4	Discharge manifold pipe
5	Check valve
6	Isolation valves
7	Vision Control Panel (VCE)

Mechanical and hydraulic system components (Figure 5c)	
8	Hex Nut (Grade 5)
9	6" Threaded Rod (Grade 5)
10	Spool Piece
11	300 Class NSF-61 Gasket
12	Flat Washer
13	7" Threaded Rod (Grade 5)
14	Pressure Transducer
15	1/4" Stainless Steel Shut-Off Valve
16	Pressure Gauge
17	3/4" Stainless Steel Shut-Off Valve
18	3/4" Stainless Steel Plug
19	Pipe Support Assembly
20	Grooved Coupler (if Grooved connection)
21	Stainless Steel Grooved Cap (if Grooved connection otherwise 300# ANSI Flanged or NPT Threaded system connection)

Figure 5b

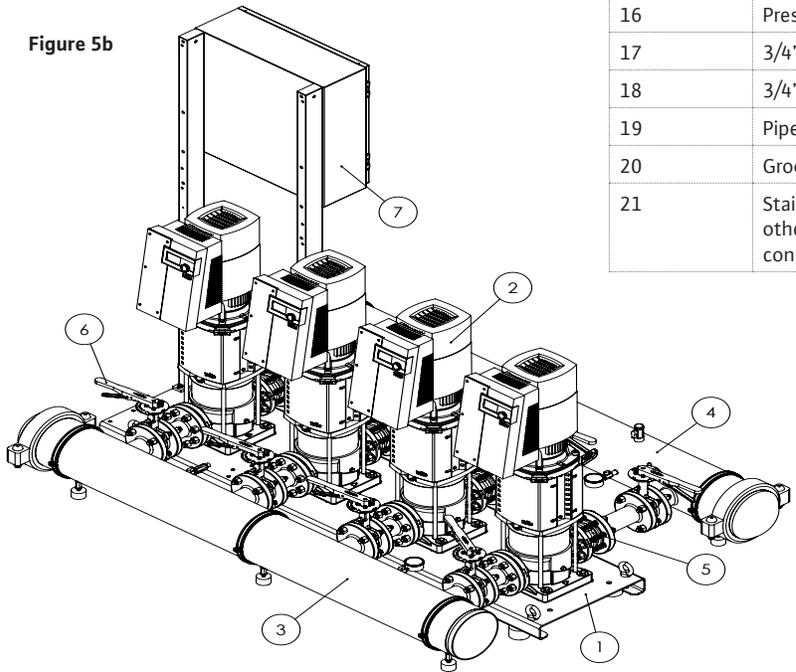
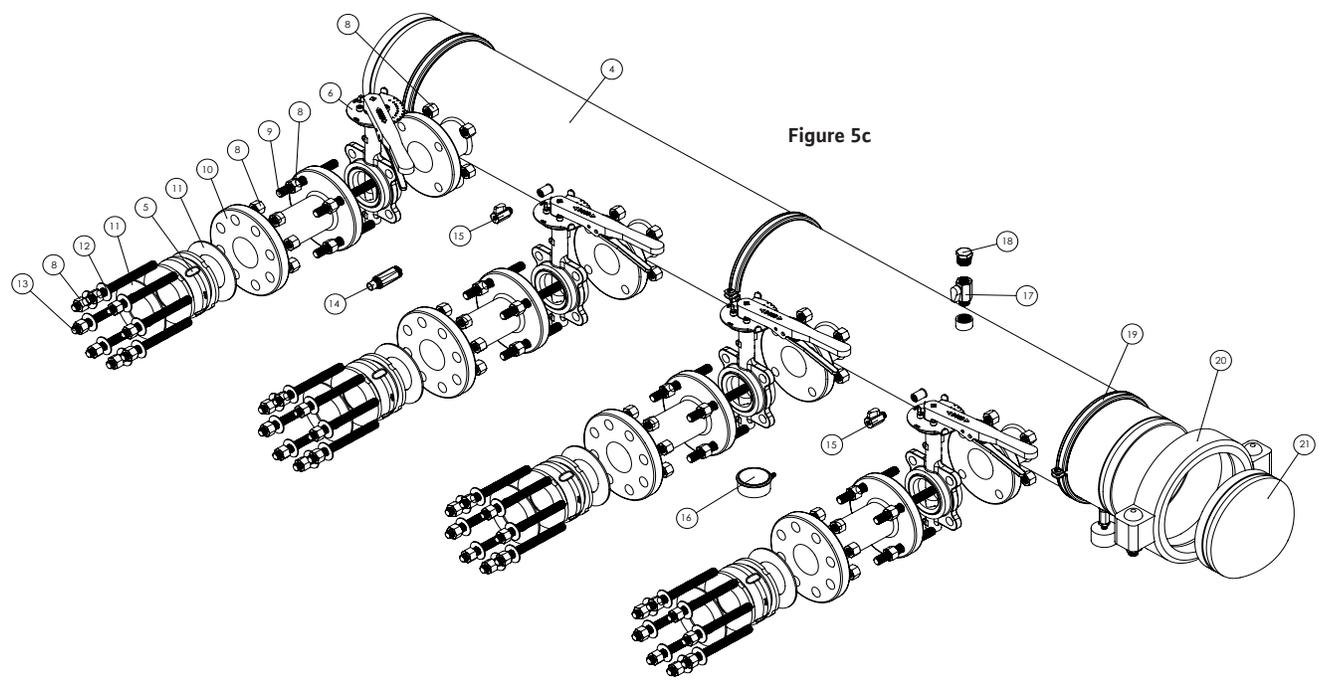


Figure 5c



Optional Hydropneumatic Tank instructions for safe removal

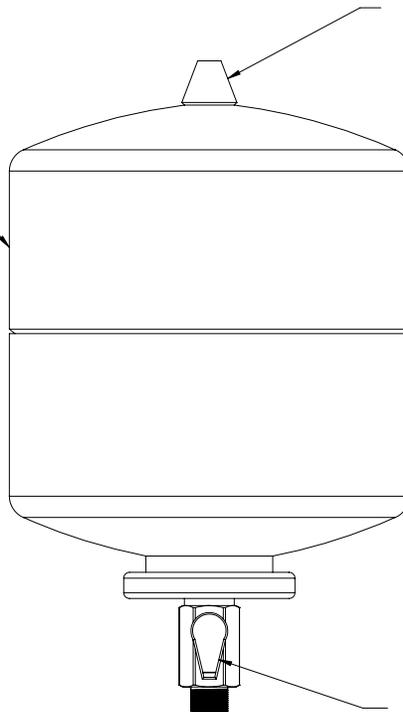
SPECIAL NOTE: MAKE SURE SiBooster EXCEL IS COMPLETELY TURNED OFF PRIOR TO PERFORMING THE BELOW PROCEDURE!

**Warning:**

To safely uninstall the diaphragm tank,  
please follow these steps

Step #3: Rotate the tank  
counter clockwise

Step #2: Depressurize the diaphragm  
tank to atmospheric pressure



Step #1: Shut off the valve to  
isolate from the system

Figure 5d



**WARNING!**

**Risk of damage or bodily injury!**

**Please follow the above instructions (figure 5d) in order to safely remove the Optional hydropneumatic tank from the discharge manifold for service! Note: The bladder may be ruptured; please proceed with caution!**

**5.3 Function of Wilo-SiBooster EXCEL pressure boosting system**

Wilo-SiBooster EXCEL pressure boosting systems are equipped with non-self-priming, high-pressure, high Efficiency, EC motor-driven, multistage centrifugal pumps as standard. These are supplied with water via the suction manifold pipe. The pumps increase the pressure and pump the water to the consumer via the discharge manifold pipe. To do this, they are switched on, off, or speed-controlled depending on the demand of the system. Depending on demand, the control unit switches the pumps on or off, or changes the speed of the pumps, until the set control parameters are reached. (A more precise description of the control mode and the control process is given later in this document).

The total delivery volume of the system is distributed over several pumps (cascading). The system output is adapted very precisely to the actual demand and the pumps are operated in the most favorable power range in each case. This design delivers a high level of efficiency and an economical energy consumption for the system. The first pump that starts up is called the base load pump. The remaining pumps needed to reach the system operating point are called peak load pumps. If the system is configured to supply potable water, one pump can be designated as a standby pump. To ensure that all the pumps are used equally, the control unit exchanges the pumps continuously based on least amount of hours used (e.g. the order of switching on and off the base load/peak load or duty-standby pump functions change regularly).

An optional hydropneumatic pressure vessel performs a buffer function for the pressure sensor and prevents unnecessary control system oscillation of on/off starts. It also mitigates and reduces the frequency of starts and switching of the base load pump as a result of minor pressure drops in the consumer's piping system. **A Hydroneumatic tank is strongly recommended for the booster set** – tanks are available for purchase from Wilo USA.



**CAUTION!**

**To protect the axial face seal or slide bearing, do not allow the pumps to run dry. Dry run may cause the pump seal to fail and leak!**

Protection against low water level/suction pressure is monitored by a suction pressure transducer mounted on the side of the suction manifold. The suction transducer monitors the supply pressure that is being provided from the water main. Its analog signal is processed by the PLC to make sure it does not fall below the suction pressure set point. In the case of an indirect connection (system separation through non-pressurized storage tank), the suction transducer should be sufficient for the application. If low pressure issues occur (not common), a level-dependent switch can be used in lieu of the supplied pressure transducer (provided by others). It should be inserted in the storage tank as a dry run protection device and wired to the control panel accordingly (please refer to the wiring diagram located in the panel door). In addition, a change from the PLC input will have to take place in order to change the analog input to digital.



**WARNING!**

**Use only materials approved for use in potable water systems!**

**5.4 Noise**

The Wilo-SiBooster EXCEL Booster is supplied with different stages of pumps and a variable number of pumps. Consequently, the overall noise level variants cannot be listed here. However, it is possible to approximate the overall noise level using the noise value for an individual pump of the type supplied. To do this, use the individual pump noise value from the Installation and Operating Instructions for the pumps.

Calculation		
Individual pump =	...	dB(A)
2 pumps, total	+3	dB(A)
3 pumps, total	+4.5	dB(A)
4 pumps, total	+6	dB(A)

**5.5 Scope of delivery**

- Wilo-SiBooster EXCEL Pressure boosting system.
- Installation and operating instructions of the Wilo CO-Helix booster.
- Electrical circuit diagram as required.
- Additional sheet with the frequency converter factory settings as required.

## 5.6 Optional Accessories

Accessories must be ordered separately if needed. The optional accessories included in the Wilo range are:

- Optional, 2.1 gallon, non-ASME, 232 PSI WP tank.
- Larger diaphragm pressure vessels available (both non-ASME rated and ASME rated).

Control panel options must be ordered separately if needed and placed at the time of the initial order. The control panel options included in the Wilo range are:

- Dome light – Red (Failure)
- Dome light – Green (Running)/Red (Failure)
- Dome light – Green (Running)/Amber (Yellow)/Red (Failure)
- Dome light – Green (Running)/Amber (Yellow)/Red (Failure)/White (Running)
- Run/Fault lights
- 3 Phase surge protection – 208v-230v 3 phase, Delta, 3-wire with ground
- 3 Phase surge protection – 460v 3 phase, Delta, 3-wire with ground
- 3 Phase surge protection – 208v-230v, 3 phase, Wye, 3-wire with ground
- 3 Phase surge protection – 277v-480v, 3 phase, Wye, 3-wire with ground
- 3 Phase surge protection – 347v –600v, 3 phase, Wye, 3-wire with ground
- BACnet gateway (MS/TP and IP)
- LONworks gateway
- CANopen gateway Card
- Interior panel light
- NEMA 3R adder in lieu of NEMA 12 panel

575VAC to 460VAC Transformers, Type 1:

- Aluminum Coiled Transformers
  - 15 kVA vented transformer – 3 phase – 600v delta – 480Y/277 150C RISE
  - 30 kVA vented transformer – 3 phase – 480v delta – 480Y /277 150C RISE
  - 45 kVA vented transformer – 3 phase – 600v delta – 480Y /277 150C RISE
- Copper Coiled Transformers
  - 15 vented transformer – 3 phase – 600v delta – 480Y/277 150C RISE
  - 30 vented transformer – 3 phase – 600v delta – 480Y/277, 150C RISE
  - 45 vented transformer – 3 phase – 600v delta – 480Y/277 150C RISE
- 3R weather shield for transformers

## 6 Installation

### 6.1 Installation location

- Adequately dimensioned floor drainage must be provided in the installation room.
- Location must be free from harmful or combustible vapors.
- Adequate space must be provided for maintenance work and the installation should be freely accessible from at least two sides.
- The installation surface must be horizontal and flat.
- The system is designed for an ambient temperature range of 32°F to 104°F with a relative atmospheric humidity of 50%.
- Installation and operation should be in a secure space, away from living and sleeping quarters

### 6.2 Foundation/bearing surface

The Wilo-SiBooster EXCEL booster is constructed for installation on flat concrete floors. The base frame is mounted on height-adjustable vibration dampers to prevent structure-borne noise.



#### NOTE!

The vibration dampers will not be fitted when the equipment is delivered for transport reasons. Before installing the Wilo-SiBooster EXCEL booster, check whether all the vibration dampers are fitted and locked by the threaded nut. If additional onsite adjustment is required, measures must be taken to avoid structure-borne noise.

#### 6.2.2 Hydraulic connection and pipes

- When connecting to the public potable water main, the requirements of the local water supply company must be met.
- Perform all the welding or soldering work and then flush the system. If necessary, disinfect the piping system and the boosting system before connecting the system.
- The system pipework must be free of pipe strain. Flexible connector lines are recommended to avoid stress on the pipe connections and to minimize the transmission of system vibration to the building installation. In order to prevent the transmission of structure-borne noise to the building, do not secure the pipe clamps to the Wilo-SiBooster EXCEL manifolds.
- The connection is made either on the right or left of the system, depending on the site conditions. It may be necessary to move blind flanges or thread caps that are already fitted.
- The flow resistance of the suction pipe must be minimized through ample diameter and straight, short, pipe runs, in order to prevent low suction pressure faults during high-volume pumping. **Observe NPSH requirements of the system.**

#### 6.2.3 Hygiene

When used for potable water applications, the complete potable water supply system has to be transferred to the operator in a perfectly hygienic condition, flushing if necessary and also disinfecting under some circumstances.



## WARNING!

**Contaminated potable water is a health hazard! Flushing the pipes and the system reduces the risk of adversely affecting the potable water quality. The water must be completely replaced after a long period of system standstill.**



## DANGER!

**The Wilo-SiBooster EXCEL must be de-energized during the flushing process!**

For the simple flushing of the system prior to start-up, Wilo recommends removing the 3/4" NPT plug on the top of the discharge manifold of the Wilo-SiBooster EXCEL (if no diaphragm pressure vessel on the discharge side is present) and connecting a garden hose connection (3/4" MNPT x 3/4" male garden hose adaptor), to drain the water to the nearest floor drain or waste water system during the flushing process. If an optional, diaphragm pressure vessel is present on the discharge manifold, you will have to follow the procedure noted in diagram 6a and proceed with attaching the hose adaptor and hose prior to opening the 3/4" shutoff valve.



## NOTE!

Isolation of the discharge manifold from the downstream piping system will be needed in order to properly flush the Wilo-SiBooster EXCEL correctly before start-up for potable water applications. Wilo recommends that either a ball valve or butterfly valve (depending on manifold connection size) be placed directly between the discharge manifold and upstream piping system.

### 6.2.4 Dry-running protection system and protection against low water

- Every Wilo-SiBooster EXCEL system is supplied with a suction transducer that has a .4% accuracy across its full span (0-150 PSI) which equates to a +/- 0.6 PSI deviation.
- To fit an alternate, dry-running, switch protection system (**not common** and provided by others):
  - It is very rare for a problem to arise using the Wilo-SiBooster EXCEL supplied suction transducer when a storage tank is used. Regardless of this rarity, issues with low water conditions when utilizing a storage tank can occur and a digital switch can be used in lieu of the transducer in the form of a tank float or low water probe.
  - Please refer to the PLC operation, described later in this document for detailed instructions to use a digital switch in lieu of the Wilo-supplied suction transducer.

### 6.2.5 Diaphragm pressure vessel (optional accessory)

For transport reasons, if Hydropneumatic tank has been purchased as an accessory for the Wilo-SiBooster EXCEL, it will not be attached upon delivery; it will be separately packed. Before commissioning, this must be mounted on the 3/4" NPT shutoff valve (see Fig. 6c) and charged to the appropriate pressure at the jobsite with nitrogen (See below – 7.2.5.1)

### 6.2.5.1 Diaphragm pressure vessel recommended charge

The diaphragm pressure vessel should be installed on the discharge manifold, adjacent to the pressure transducer, and it should be charged with pressure to equal 70% of the system constant pressure setpoint. For example, if the constant pressure setpoint is 80 PSI, the tank should be charged to 56 PSI (80 x 70%).

## 6.3 Electrical connection



## DANGER!

**Risk of fatal injury! The electrical connection must be made in accordance with the local and national electrical code regulations by a qualified electrician!**

The Wilo-SiBooster EXCEL can be equipped with different variances of current at 460V~3. A transformer can be purchased separately to accommodate other voltages. To make the electrical connection, the corresponding installation and operating instructions and attached electrical circuit diagrams must be observed. General points to be considered are listed below:

- Every Wilo-SiBooster EXCEL control panel is supplied with a current overload sized for each pump motor amperage (circuit breakers).
- The type of current and voltage of the main connection must comply with the details on the wiring diagram of the control panel.
- The electrical connection line must be adequately sized according to the total power of the Wilo-SiBooster EXCEL.
- External protection must be provided according to local and national electrical codes.
- As a protective measure, the Wilo-SiBooster EXCEL must be wired to ground in accordance to local and national electrical codes. The connections intended for this purpose are identified accordingly (see wiring diagram).
- Further measures are referenced in the wiring diagram of the control panel.

## 7 Commissioning/decommissioning

We recommend that Wilo's after-sales service commission the system. Contact your dealer, the nearest Wilo representative or our service department directly for details.

### 7.1 General preparations and checking



## WARNING!

**Make sure the system is de-energized and wait 5 minutes to allow any capacitance voltage to discharge.**

Before energizing the system for the first time:

- Check that onsite wiring and grounding of the electrical panel is correct.
- Check that the pipe joints are stress-free.
- Fill the system and check visually for leakage.
- Open the pump vent screws and slowly fill the pumps with water so that the air can escape.



## CAUTION!

**Risk of damage! Do not allow the pump to run dry. Dry-running destroys the axial face seal of the Helix EXCEL.**

In suction mode (e.g. negative level difference between storage tank and pumps), the pump and the suction line must be filled via the opening in the vent screw (use a funnel as required).

## 7.2 Electrical layout and start-up procedure



## DANGER!

**Risk of fatal injury! Always refer to the wiring diagram of the onsite Wilo-SiBooster EXCEL ONLY! References and examples of wiring diagrams in this document are not official wiring diagrams for the onsite unit!**

### 7.2.1 Electrical layout – panel overview

Every Wilo-SiBooster EXCEL panel shall meet the requirements of UL508A standards for Industrial Control equipment. Standard panel shall be rated as a NEMA 12 enclosure and the Helix EXCEL Power-Head shall be programmed to the Wilo-SiBooster EXCEL needed parameters prior to shipment. The Power-Head shall utilize the MODbus protocol to report faults and energy usage in kWh to the programmable logic controller. The Power-h shall provide visual indication that requires no external control devices. The panel shall have labeled wires and terminal block for easy reference to the wiring diagram. The panel shall contain motor protector circuits, for each pump supplied, sized for motor amperage. Through-the-door-disconnect with selector handle and lockout will be provided with the panel. The panel will also be provided with alarm with silencing button.

Optional panel items include

- NEMA 3R panel suitable for outdoor applications.
- Run/fault lights per pump
- Surge protection
- Interior panel light
- Transformer
- NEMA 3R transformer cover
- BACnet gateway
- LONworks gateway
- CANopen gateway card

**EXAMPLE** of CO-Helix triplex electrical layout and wiring diagram:

WILO USA 10/12/2018 9:15 AM SI BOOST LAYOUT.dwg

PANEL NAME PLATE INCLUDES:

System Voltage, Motor Amp Range, Max Panel Amps, Phase & HZ, and Enclosure Type

Installer to Supply an appropriate Power Supply and Branch Circuit Protection to Panel; in Accordance with Article 504 of the National Electric Code and Local Codes.

Fuses (LP-J or Equivalent) for Branch Circuit Protection: 1.25 X Full Load Amps of Motors; Plus 6 Amp for Control Power.

Dotted Lines (— · — · — ·) Represent Field Connections. Wire Colors: Black=Power, Blue=D.C Volts, Yellow=Isolated Contacts, Wht/Yellow= D.C. Volt Common. Wires are individually Numbered. Pumps should rotate in direction of arrow on Pump case. Change rotation of pumps at the Control Panel; External OFF switch is optional. Remove jumper to use.

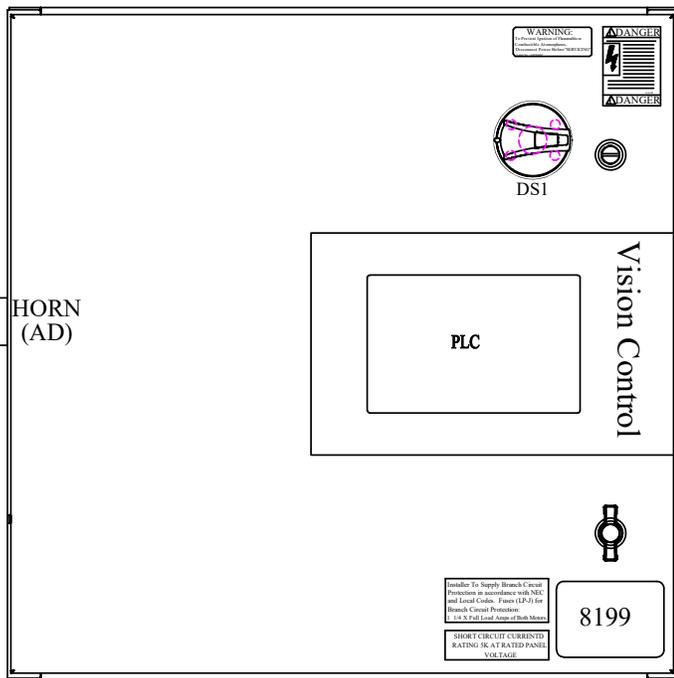
VFD = Variable Frequency Drive, PLC = Programmable Logic Controller

MP1 & MP2=Motor Protectors, AD = Alarm Horn, PS = Power Supply

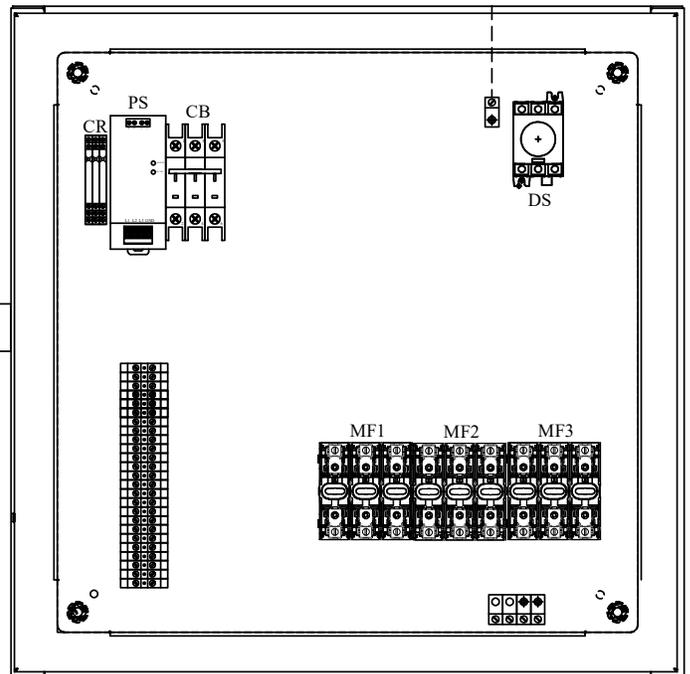
○ =Number on Compnents, ⊕ =Component Coil, □ =Number on Terminal Block,

| | =Normally Open Contact, and | | =Normally Closed Contact. Caution: Connection of any Other Devices to the Control Panel will cause improper operation and will void any or all Warranties.

SYSTEM  
POWER { L1 -  
          L2 -  
SUPPLY { L3 -  
3 PHASE { Grd -



FRONT VIEW



INSIDE VIEW

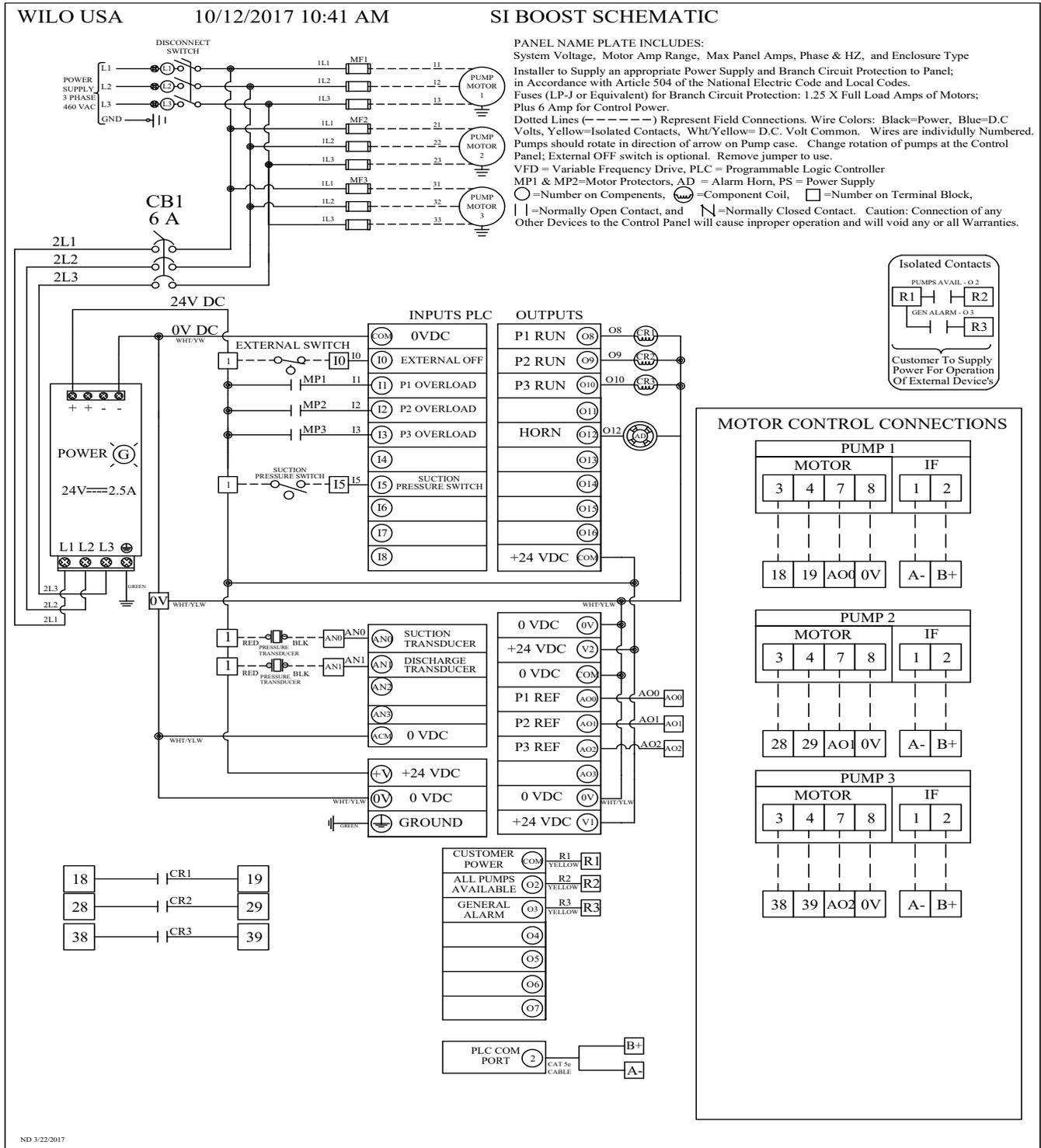
7.2.2 Electrical layout – programmable logic controller (PLC)



**DANGER!**

Risk of fatal injury! Always refer to the wiring diagram of the onsite Wilo-SiBooster EXCEL! References and examples of wiring diagrams in this document are not official wiring diagrams for the onsite unit!

**EXAMPLE** of a wiring diagram for Wilo-SiBooster EXCEL triplex unit:



**The Wilo-SiBooster EXCEL boosting system technology is the current state of the art functionality and factory-checked to ensure it performs at start-up.** The programmable logic controller shall have the following attributes:

- 7" LED color touchscreen with a display resolution of 800 x 480 pixels.
- The PLC shall indicate on the display, per the pump icon, the individual pump status in real-time. (green=running, red=faulted, no color=off).
- The PLC shall be factory set for either base load/peak load or duty/standby operation.
- The PLC shall provide off/hand/auto function. Hand operation shall be password protected.
- The PLC shall display pump hours, suction PSI, discharge PSI, pump frequencies, total kWh for system, and current kWh per pump.
- The PLC shall be able to modify the discharge pressure setting through password protected screen.
- The PLC shall have a low pressure cut out function.
- The PLC shall have pipe burst protection.
- The PLC shall be able to be able to flash the PLC program by means of a Micro-SD card via Micro-SD port or remotely flashed by the factory (note: internet access need in order to be flashed remotely).
- The PLC shall have a RJ45 Ethernet port capable of transmitting data 10/100Mbps using a Cat 5 cable.
- The PLC shall have a 2.0 USB port available for communication.
- The PLC shall have onboard Modbus Protocol. Two serial ports available: one for communication to the VFD and one open for the building management system.
- The PLC shall have the following I/O:
  - Number of digital inputs: 18
  - Number of digital outputs: 17
  - Number of analog inputs: 4
  - Number of analog outputs: 4

### 7.3 SI-BOOSTER PLC levels of access

The PLC includes three levels of control access: monitoring, operator settings and advanced settings. These levels of access prevent unauthorized individuals from accessing parameters that are critical to proper function of the Wilo-SiBooster EXCEL. If the "Operator Settings" or "Advanced Settings" buttons are pressed from the main screen a keyboard will appear to allow a password to be entered for the requested level of access.

#### 7.3.1 Monitoring

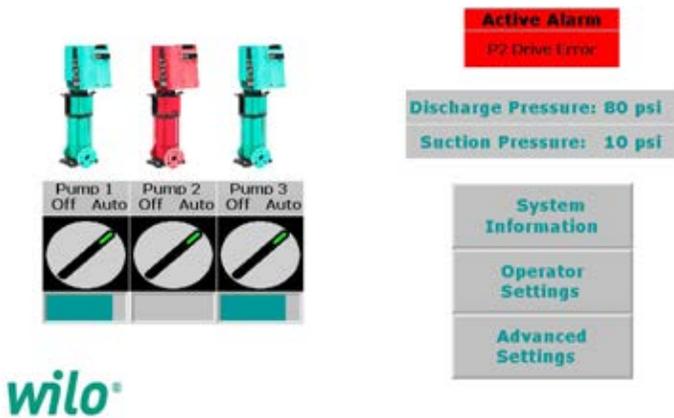
Monitoring access is the lowest level of access. Monitoring is the only level of access that is not password protected and allows access to three areas of the PLC:

##### **Main screen**

Displays pump off/auto toggle switches, pump state, current discharge and suction reading in PSI, alarm status with ability to silence alarm, frequency bar, and access to system information.

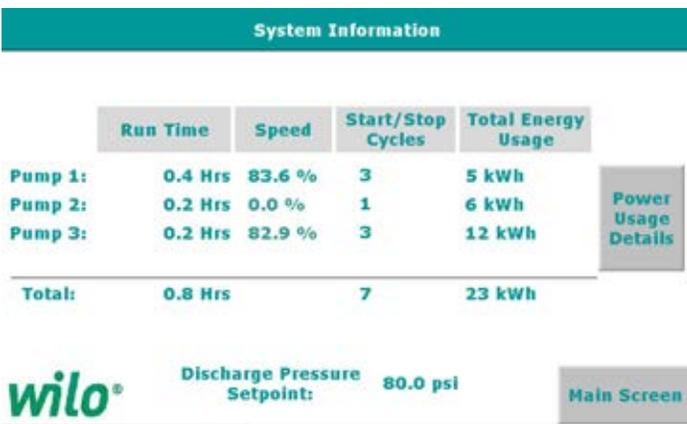


If an alarm has been triggered, the alarm horn will sound and have to be silenced. However, acknowledgement of a critical alarm can only be executed by an operator. Refer to section, "View Alarm History" later in this document for further details.



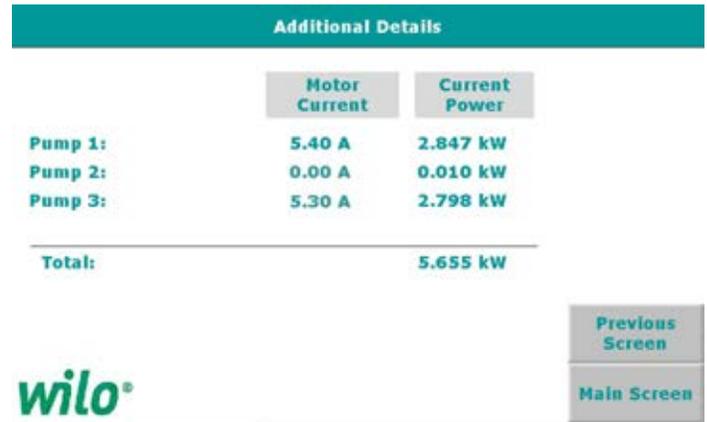
### System information screen

Displays pump run time in hours of operation, real-time frequency status, start/stop cycles, and total energy usage in kWh per pump. It also displays the totals for each pump and the entire unit as well as the discharge pressure setpoint.



### Additional details screen

Displays real-time, pump motor voltage, motor current, current power per pump. It also displays the real-time totals in kW for the entire unit.

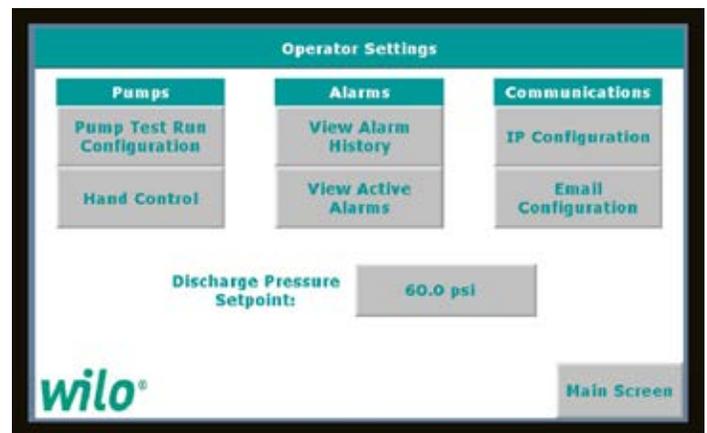


### 7.3.2 Operator settings

Operator access is a password-protected level of access for the on-site operator of the SiBooster EXCEL. Operator access allows permission to critical areas of the PLC. Default password for this level is "1111". In addition to the monitoring access screens, it also includes access to:

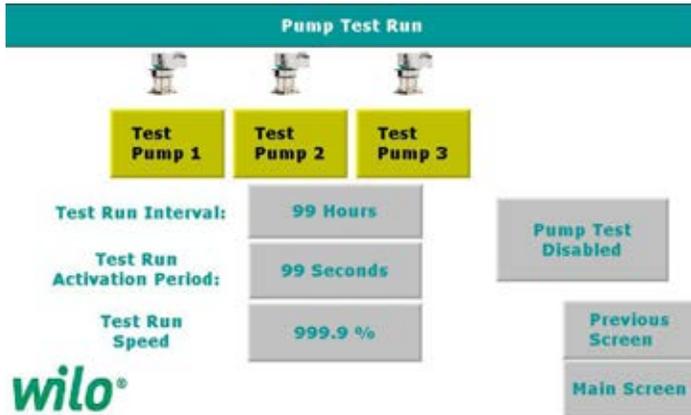
#### Operator settings screen

Displays the hub of the access points for the operator. It allows access to the pump test run configuration, hand control operation, alarm history screen, active alarm screen, IP configuration screen, and E-mail configuration screen. Most importantly, it allows the discharge pressure setpoint to be set to the system's demand.



### Pump test run configuration

Displays the pump test run configuration settings. In this mode, you are able to test every pump manually by pressing each of the pump's "Test Buttons". This "Test Button" function will only operate when the pumps are off. The pump test run screen has set-up options for a test run interval timer which forces the pump to operate if it has not run for a specified period of time. These parameters can be set for the down-time of the pump and also dictate at what frequency the pump should be run during the timed test. This function can also be disabled from this screen (not recommended).



### Hand control

Displays the current pump status in auto control and indicates the operating frequency that they are operating at along with the real-time discharge pressure. In order to put the pumps in hand control, you must press the "Automatic Control" button to shut the pumps off for hand control operation.



Once the pumps are switched from "Automatic Control" to "Hand Control", the screen will change; most noticeably, the green, "Automatic Control" button will now read "Hand Control On".



This mode allows the pumps to be turned on at a set frequency for manual control of the pump. Once you change a pump from off to on, a warning sign will pop-up on the display that informs you that if the frequency is set too high, damage can occur to either the pump or the components of the system. You can press the "override alarms for hand control" in order to bypass this warning.



### CAUTION!

Risk of damage! Do not allow the pump to over pressurize the system! Damage to pump or system components will occur!

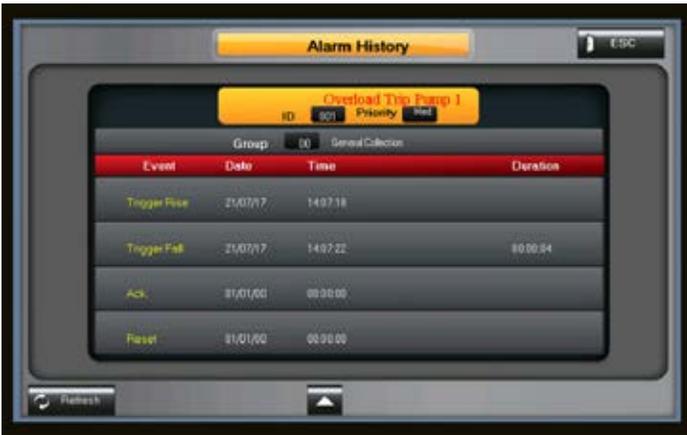


### IMPORTANT NOTE!

Before exiting the "Hand Pump Control" screen, make sure you have pressed the yellow "Hand Control ON" button so that it turns back to green reading, "Automatic Control"! Otherwise, the system will not return to automatic control operation!

### View alarm history

Displays the last 20 alarms that have been logged. Includes information on length of alarm, when alarm occurred, and when alarm cleared.



**View active alarms**  
Displays current active alarms.



Press ESC again and it will revert to the group alarm screen.



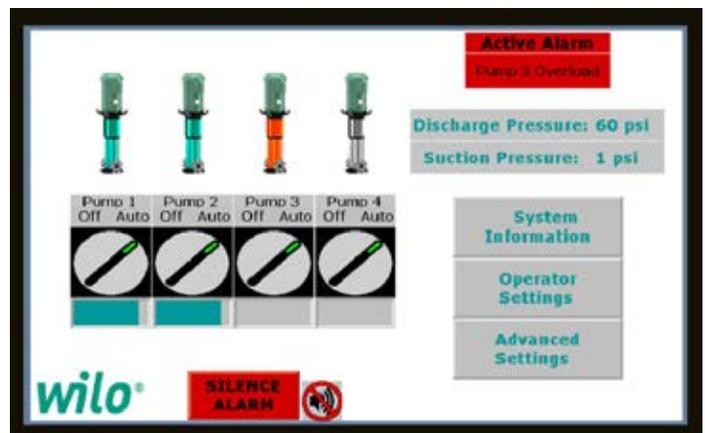
The check mark indicates that the alarm is acknowledged. The red light indicates the alarm is currently active, and the grey light means that the alarm has cleared, but has not yet been acknowledged. Default value is that alarms do not require acknowledgement to reset, except for the pipe burst alarm.



Press ESC, once again, will return you to the main screen to silence the alarm.



When an alarm is triggered, you will see this screen appear and the alarm horn will sound. You will want to silence the alarm first! To silence the alarm, press the escape key (ESC) which will bring up the alarm log screen.



Once on the main screen, press the "ALARM SILENCE" button to stop the audible alarm (if you have not already pushed the "Push-To-Silence" button on the front of the panel).

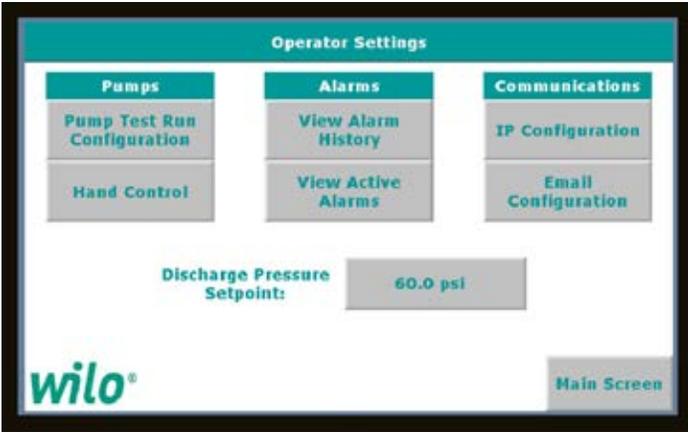
Now that the alarm is silenced you can observe the alarm status in the right hand corner. Press the "Operator Settings" button that will prompt a password.



Once the password has been accepted, proceed to the "View Active Alarms" category on the Operator Setting screen.



To acknowledge the alarm, click on the magnifying glass symbol to prompt the access password again.



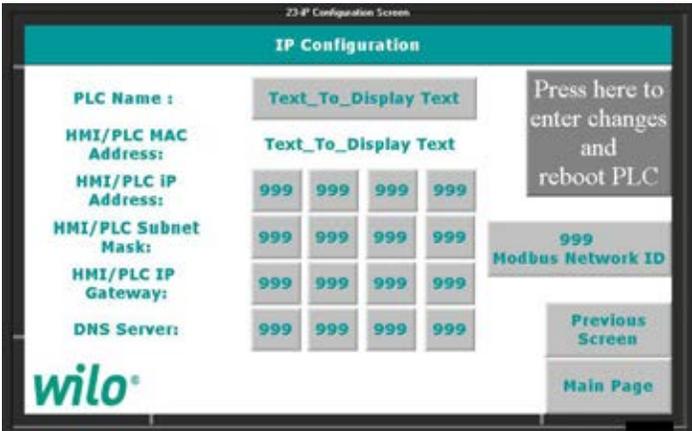
On the operator screen, you can now view the active alarms.



Once the password is accepted, the alarm will now be acknowledged.



Hit the ESC button three times to return to the main screen.



**IP configuration screen**  
 From the Operator Settings screen, press the "IP Configuration" button. Once there, settings to the IP address can be tailored for communication purposes for remote monitoring. Once internet access has been securely set up, you will be able to utilize the Wilo Communicator app (available for both Android and Apple devices).

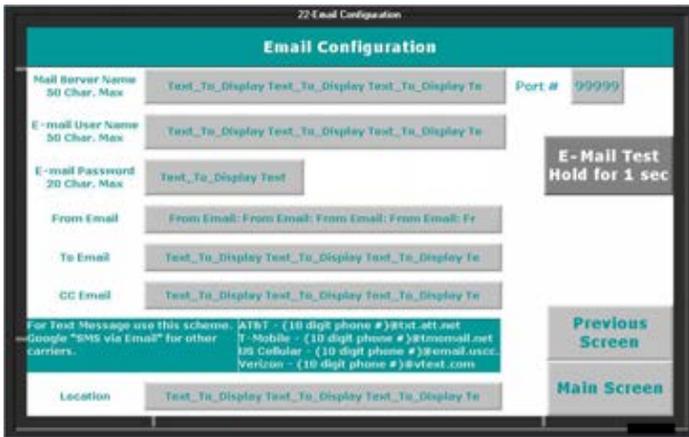
The Wilo Communicator app allows the operator to access the panel directly from any location and interface the PLC as if he/she were in front of the panel with the same functionality.

**Email configuration**

In addition to the Wilo Communicator app, you may also (or in lieu of) choose to have automatically generated e-mails sent to your smartphone. To enable this feature, press the “Email Configuration” button in order to enter the necessary information. This function will send e-mails to the operator when an alarm has occurred. Also, it will allow the user to receive an e-mail stating the alarm has been acknowledged.

FAULT	CAUSE	REMEDIES
Pump(s) do not start	No mains voltage	Inspect fusts, cables and connections
	Main switch “OFF”	Switch on main switch
	Water level in break tank too low, i.e. low-water level reached	Check break tank inlet valve/inlet pipe
	Low-water level switch has triggered	Check intake pressure
	Low-water level switch defective	Check, if necessary replace the lowwater level switch
	Electrodes incorrectly connected or supply pressure switch incorrectly set	Check installation or setting and correct
	Intake pressure exceeds start-up pressure	Check settings and correct if necessary
	Check valve closed at pressure sensor	Inspect, open check valve if necessary
	Start-up pressure set too high	Check setting and correct if necessary
	Fuse defective	Check fuses and replace if necessary
	Motor protection has triggered	Check set values against the pump or motor data, measure current values and correct setting if necessary. Check motor for defects and replace if necessary
	Contactors defective	Check and replace if necessary
	Turn-to-turn fault in motor	Check, if necessary replace motor or have repaired
Pump does (pumps do) not switch off	Intake pressure fluctuates severely	Check intake pressure, if necessary take measures to stabilise supply pressure (e.g. pressure reducer)
	Intake pipe blocked or shut off	Check inlet pipe, if necessary remove blockage or open check valve
	Nominal diameter of inlet pipe too small	Check the inlet pipe, increase the crosssection for the inlet pipe if necessary
	Inlet pipe incorrectly installed	Check inlet pipe, if necessary change pipe guide
	Air in inlet	Check, if necessary seal pipe. Vent pumps
	Impellers blocked	Check pump, if necessary replace or have repaired
	Non-return valve leaking	Check, if necessary replace seal or replace non-return valve
	Non-return valve blocked	Check, if necessary remove blockage or replace non-return valve
	Gate valve in system closed or not sufficiently open	Check, open the check valve completely if necessary
	Volume flow too large	Check pump data and default values and correct if necessary
	Check valve closed at pressure sensor	Inspect, open check valve if necessary
	Switch-off pressure set too high	Check setting and correct if necessary
	Direction of motor rotation false	Check the direction of rotation and correct by changing over the phases if necessary
FAULT	CAUSE	REMEDIES

Switching frequency too high or fluttering	Intake pressure fluctuates severely	Check intake pressure, if necessary take measures to stabilise supply pressure (e.g. pressure reducer)
	Intake pipe blocked or shut off	Check inlet pipe, if necessary remove blockage or open check valve
	Nominal diameter of inlet pipe too small	Check the inlet pipe, increase the crosssection for the inlet pipe if necessary
	Inlet pipe incorrectly installed	Check inlet pipe, if necessary change pipe guide
	Check valve closed at pressure sensor	Inspect, open check valve if necessary
	No diaphragm pressure vessel present (optional or accessory)	Retrofit a diaphragm pressure vessel
	Supply pressure at existing diaphragm pressure vessel incorrect	Check supply pressure and correct if necessary
	Valve on existing diaphragm pressure vessel closed	Check valve and open if necessary
	Existing diaphragm pressure vessel defective	Check the diaphragm pressure vessel and replace if necessary
	Set switching difference too small	Check setting and correct if necessary
Pump(s) produces no or too little pressure	Major fluctuations in Intake pressure	Check intake pressure, if necessary take measures to stabilise supply pressure (e.g. pressure reducer)
	Intake pipe blocked or shut off	Check inlet pipe, if necessary remove blockage or open check valve
	Nominal diameter of inlet pipe too small	Check the inlet pipe, increase the crosssection for the inlet pipe if necessary
	Inlet pipe incorrectly installed	Check inlet pipe, if necessary change pipe routing
	Air in inlet	Check, if necessary seal pipe. Vent pumps
	Impellers blocked	Check pump, if necessary replace or have repaired
	Non-return valve leaking	Check, if necessary replace seal or replace non-return valve
	Non-return valve blocked	Check, if necessary remove blockage or replace non-return valve
	Gate valve in system closed or not sufficiently open	Check, open the check valve completely if necessary
	Low-water level switch has triggered	Check intake pressure
	Direction of motor rotation false	Check direction of rotation and correct by changing over phases if necessary
Turn-to-turn fault in motor	Check, if necessary replace motor or have repaired	
Dry-running protection system switches off, although water is present	Major fluctuations in Intake pressure	Check intake pressure, if necessary take measures to stabilise supply pressure (e.g. pressure reducer)
	Nominal diameter of inlet pipe too small	Check the inlet pipe, increase the crosssection for the inlet pipe if necessary
	Inlet pipe incorrectly installed	Check inlet pipe, if necessary change pipe guide
	Volume flow too large	Check pump data and default values and correct if necessary
	Electrodes incorrectly connected or supply pressure switch incorrectly set	Check installation or setting and correct
	Low-water level switch defective	Check, if necessary replace the lowwater level switch
Dry-running protection does not switch off, although water low	Electrodes incorrectly connected or supply pressure switch incorrectly set	Check installation or setting and correct
	Low-water level switch defective	Check, if necessary replace the lowwater level switch



#### 7.3.4 Advanced settings

Advanced settings are only able to be accessed by a Wilo USA after-sales service technician. Please contact Wilo USA Service at +1 888-945-6872 for further assistance.

#### 7.4 SiBooster EXCEL PLC commissioning

We recommend that Wilo USA's after-sales service commissions the system. Contact your dealer, nearest Wilo USA representative, or the Wilo USA service department directly.

### 8 Commissioning/decommissioning

To guarantee maximum operational reliability at the lowest possible operating cost, we recommend inspecting and maintaining the Wilo-SiBooster EXCEL regularly. It is advisable to have a maintenance agreement with a specialist company or with our after-sales service department. The following inspections should be made regularly:

- Check that the Wilo-SiBooster EXCEL is ready to operate.
- Check the mechanical seal of the pump. The mechanical seal needs water for lubrication and small quantities of it can leak out of the seal. If the volume increases, change the mechanical seal.

Check the **Hydropneumatic tank** (every 3 months is recommended) to make sure that the **supply pressure** is set correctly, please refer to the hydropneumatic tank recommended charge section in this document for guidance (Section 7.2.5.1).



#### **CAUTION! Risk of damage!**

**The function of the diaphragm vessel is compromised and can lead to system faults.**

Set the tank pressure to the correct level. Isolate (see step 1 of figure 5d) the pumps and system from the discharge side and upstream piping of the manifold. Drain the water from the discharge manifold. Check the gas pressure at the valve (see step 2 figure 5d) of the diaphragm pressure vessel. Use an air pressure gauge and correct the pressure as required.

To assure proper air flow to the control panel, inlet and outlet air filters for the panel fan must be cleaned periodically. If the system is out of service for a long period drain all the pumps by opening the drainage plug on the bottom of the pump base.

### 9 Faults, causes and remedies

Faults, particularly those affecting the pumps or control system, should only be remedied by Wilo USA's after-sales service or a specialist company.



#### **NOTE!**

The general safety instructions must be observed when doing any maintenance or repair work. Also reference the Installation and Operating Instructions for the Wilo Helix pumps.

### 10 Spare parts

Spare parts or repairs may be ordered from local service technicians or the Wilo USA aftersales service department. To avoid incorrect orders, all data on the name plate should be submitted with each order.

Subject to change without prior notice!

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