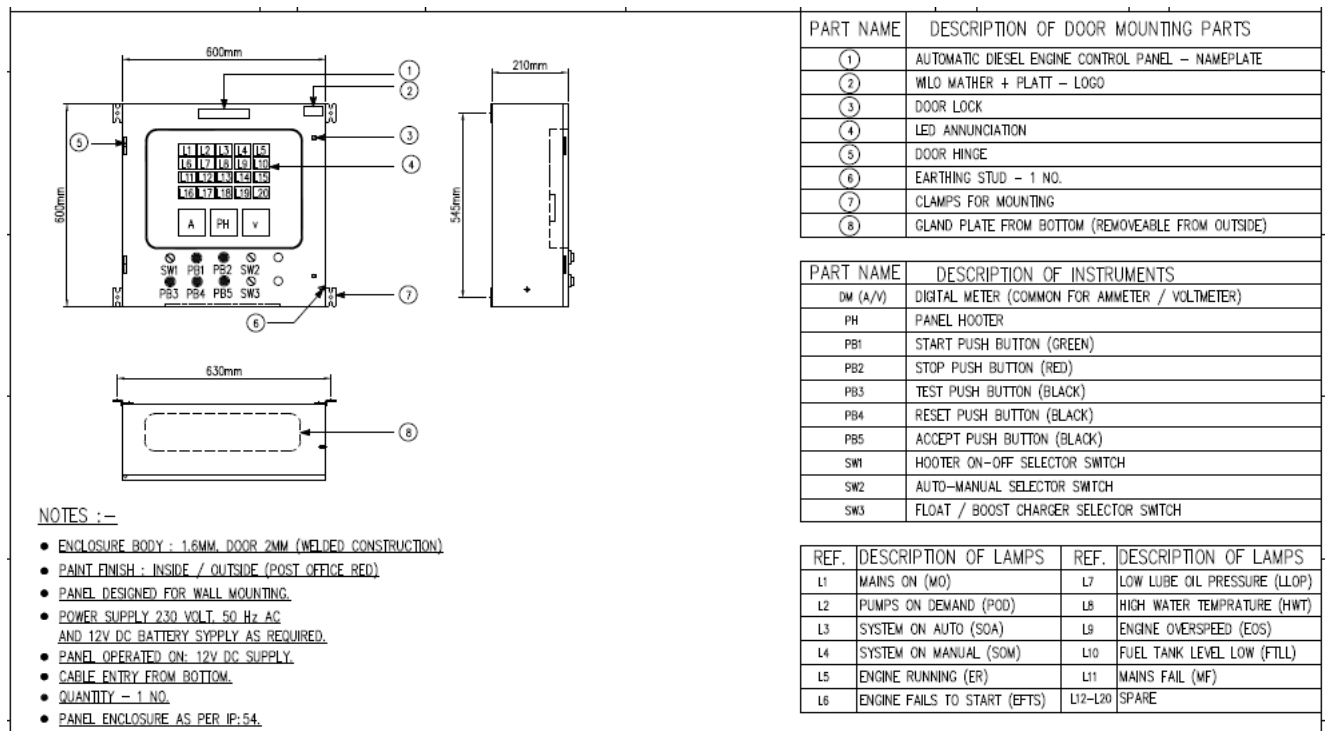


**MANUAL FOR  
AUTOMATIC DIESEL ENGINE  
CONTROL PANEL**

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**Fig 1**



## 1. General.

### Installation and commissioning by qualified and trained persons only.

#### 1.1 About this document.

These installation and operating instructions are an integral part of the unit. They must be kept readily available at the place where the unit is installed. Strict adherence to these instructions is a precondition for the proper use and correct operation of the unit. These installation and operating instructions correspond to the relevant version of the unit and the underlying safety standards valid at the time of going to print.

## 2. Safety.

Read these instructions carefully before installing and starting up. Pay special attention to the points regarding safety of the equipment for the intermediate or final user.

### 2.1. Symbols in the instructions.



Safety instruction: If not followed, could cause injury for person.



Electrical safety instructions. If not followed could cause injury to the person.

**ATTENTION!**

Safety instruction: If not followed could cause damages for the equipment and its operating.

### 2.2 Staff Training.

The Personnel installing the panel must have the appropriate qualifications for this work.

### 2.3 Risks incurred by failure to comply with the safety precautions.

Failure to comply with the safety precautions could result in personal injury or damage to the pump or installation. Failure to comply with the safety precautions could also invalidate any claims for

damages. Lack of care may lead to problems such as failure of important pump or machinery functions, danger to persons from electrical, mechanical and bacteriological influences, material damage.

### 2.4 Safety Precautions for the operator.

Regulations for the prevention of accidents must be followed. Directives issued by the local Electricity supply companies are to be observed.

### 2.5 Installation and commissioning of system.

If system is going to be commissioned after six months from the date of dispatch, revalidation of the system is required. Revalidation to be done through Wilo authorized service personnel before commissioning system.

## 3. Transport and storage.

**3.1** When the equipment is delivered, check that it has not been damaged in transit. If any defects are found, please inform supplier.



The equipment must be transported by means of authorized load carriers. Stability of the load must be ensured. Transport straps or ropes must be secured to the existing transport lugs or taken round the base frame. The pipes will not withstand loads and should not be used to secure loads in transit.

**ATTENTION!**

### Loading of the pipes in transit can result in leaks.

**If the delivered equipment is to be installed later, store it in a dry place and protect it from impacts and all outside effects (moisture, frost, etc....).**

If Transit damage is observed to the system inform to the delivery company (forwarding agent) or our customer service department, even if you did not find any damage initially. After removing the packing, the installation must be stored or installed according to the installation conditions described above.

## 4. Installation.

### 4.1. Room

The controller must be installed in a shelter or in a room that is easy to reach, normally ventilated and protected from frost.

### 4.2. Electrical connections.



The electrical connections and checking must be done by a qualified electrician in accordance with the local standards.

Refer Motor data plate for the electrical characteristic (Frequency, Voltage, nominal current)

Check if the motor complies with the mains supply used. Provide isolator switch to protect the power supply.



**DO NOT FORGET CONNECTING TO EARTH (Green-yellow conductor).**

### 5. Operating Principle.

The Control panel is used to automatically control of firefighting engine. It is used in residential high-rise buildings, hotels, and hospitals, administrative and industrial buildings.

## 6. Product Information

### 6.1 Type Key Fire Fighting

This is fix speed system panel. Description details given in below table

e.g.: ENGINE CONTROL PANEL (STD)-12V MFG	
ENGINE PANEL (STD)	FIRE FIGHTING System Panel Standard. Options: PLC, CB
12V	OPERATING DC VOLTAGE. Option : 24V
MFG / CB	MANUFACTURING / CONTACTOR BLOCK (in case of standby battery)

### 6.2 Technical Data

Mains supply voltage [V]	1~230V,50Hz
ENGINE VOLTAGE (Vdc):	See name plate
Protection class:	IP 42
Max. Ambient temp.	40°C
Main side protection	In accordance with wiring diagram

## 7. Description of the product and the accessories.

### 7.1 Description of product and its accessories. Function description.

The engine control system is provided with engine Aligned with pump on a skid, batteries, battery Cables and control panel.

The engine control system is designed to offer a combination of manual and fully automatic control in starting of diesel engine – driven firewater-pumping sets. Batteries will be always kept fully charged by the control panel. The control panel keeps constant watch on engine conditions & gives visual indications.

Note: You will find information on the pump type used in the attached Installation and operating instructions for the pump.

Regulations of the competent fire protection authorities must be included where appropriate. Local conditions (e.g., a hydrant pressure is too high or fluctuates considerably and which might require the installation of a pressure relief valve).

### 7.2 Quick Start Guide.

The complete installation can be completed with following steps;

S.N.	Action
1	Ensure that Our Engine Panel is mounted properly
2	Engine starter motor to Battery cable connection should be proper
3	Engine and Panel Earthing should be connected properly
4	Our Engine Panel to Engine Panel Cable should be routed and connected properly as per drawing,
5	Check Water Present in Source Tank
6	Check Pump Alignment with Engine
7	Check Suction Line and Delivery Line connected properly
8	Check Engine and Pump are coupled properly
9	Check Lubrication Oil, Coolant, Charged Battery, Diesel Line/Filter etc.
10	Charge Panel with 230Vac supply
11	Check indications and hooter working ok by using Test button. Follow Jumper Link Sheet as per voltages coming from engine. Preferably crosscheck LLOP sensor is with NO contact or NC contact. And it gives us negative signal or positive signal.
12	Start / Stop engine properly through engine panel
13	If engine function properly as per S.N.-12 above, then connect engine wires to our panel. Start/Stop engine from our control panel in Manual Mode and check for 'Engine Running Feedback'
14	If hydrant line is pressurized, crosscheck it's feedback at our panel
15	If 'hydrant line pressure feedback' & 'engine running feedbacks' are Ok; put our panel in 'Auto Mode'

### **Function of the fire fighting system**

The Automatic Starting of the Diesel Engine is done by means of a Pressure Switch mounted on the delivery end of the Fire Water Pump provided its Hand Switch (SW2) is kept in A/M Mode. The 'NO' contact (under low pressure) of the pressure switch is wired to the Control Panel to ensure a fail-safe operation.

On drop of pressure, the 'NC' contact of the pressure switch opens thereby command goes to PCB 314A Control card. This causes contact of Relay to close and 12/24 VDC supply is applied through relay to the starter motor of the Diesel Engine.

In case of Pressure drop and Auto-Manual Selector Switch (SW2) is being in Auto Position the PCB 314A gives starting command to the Starter Motor mounted on the Diesel Engine. Further direct Battery Terminals are connected to the solenoid of Starter motor through batteries ensuring 12/24 VDC Supply with required current to Diesel Engine. Simultaneously fuel oil solenoid gets '12/24 VDC' supply, which will energize the fuel oil solenoid meant for supplying fuel to the Diesel Engine on starting of motor and energization of fuel solenoid, lubricating oil pressure will increase which acts as feedback for cranking operation as described. This feedback is taken from "Lube Oil Pressure Switch" mounted on the Diesel Engine. Under diesel engine running condition, the 'NO' contact of Lube Oil Pressure Switch get closed and in turn energizes fuel solenoid which will supply the fuel to the engine for running.

### **7.3 Scope of supply**

- Switch Box microcontroller Based.
- Electrical circuit diagram.
- Operation and installation Manual.

### **7.4 Accessories**

Accessories must be ordered separately if needed.

## 8. Installation/mounting.

### 8.1 Installation at Site.

The system is installed in the room or in a dry, well ventilated and frost-proof, separate room that can be locked. Adequately dimensioned floor drainage (sewer connection or similar) must be provided in the installation room. No harmful gases must penetrate the room or be present there. Adequate space must be provided for maintenance work. The main dimensions are given on the attached installation plan. The installation should be freely accessible from at least two sides. The installation surface must be horizontal and flat. The system is designed for a maximum ambient temperature of +0 °C to 40 °C with a relative atmospheric humidity of 50%. Installation and operation in the vicinity of living rooms and bedrooms is not recommended. To avoid the transmission of structure-borne noise and to ensure a stress-free connection to upstream and downstream pipes, compensators with extension limiters or flexible connecting pipes should be used!

### 8.2 Foundation/substrate:

The construction of the firefighting allows it to be set up on a level concrete floor. The base frame is mounted on this floor, suitable measures must be taken to avoid structure-borne noise.

### 8.2.1 Hydraulic connection and pipes.

The installation must not be connected until all the welding and soldering work and the necessary flushing and, if necessary, disinfecting of the pipe system and the booster installation has been done.

The customer's pipes must be installed free from stresses. Compensators with length limiters or flexible connecting pipes are recommended for this purpose to avoid stresses on the pipe connections and minimize the transmission of installation vibrations to the building installation.

Pipe connection can be made either on the right or left of the installation, depending on the site conditions. It may be necessary to change blind flanges or thread caps already fitted. In the case of booster installations with horizontal pumps, the pipes on the suction side must be supported so that the tilting moments that can be generated through a shift in the installation's center of gravity are safely absorbed. The flow resistance of the intake pipe must be kept as small as possible (i.e., short pipe, few elbows, adequately large shut-off valves), otherwise the low-water protection device may respond with high volume flows through high pressure losses. (Note

NPSH of the pump, avoid pressure losses and cavitation).

### 8.2.2 Flushing the pipes and the system reduces the risk of adversely affecting the water quality. The water must be completely replaced after a longer period of system standstill.

For simple flushing of the installation, we recommend the installation of a T-piece on the end pressure side of the system, upstream of the next shut-off device. Its branch, provided with a shut-off device, drains into the wastewater system during the flushing process and must be suitably dimensioned according to the maximum volume flow of an individual pump.

### 8.2.3 Dry-running protection system and protection Against low water level (accessory)

Suitable dry run protection device must be used to protect pumps running dry.

### 8.2.4 Safety valve (accessory)

A component-tested safety valve must be installed on the discharge to limit or protect the installation against excess pressure.

## 9. Description and Function of Fire Fighting system:

The fix speed-based system is specially designed for automatic control of diesel engine to maintain provide volume flow at the time of any major incidence.



### 9.1 Construction of the Control Panel:

It consists of following main components.

The Panel consists of one set of SMPS based Battery Charger. Battery Charger is capable of charging two numbers of 12/24 VDC batteries to their fullest capacity. The charger is short circuit protected.

When command for engine 'start' is given, the starter motor gets power directly from the 12/24 VDC battery which draw heavy current.

Ammeter and voltmeter are provided to indicate charging current and charging voltage respectively.

Through Battery Charger Selector Switch (SW4), one can select which Battery should gets charged. (in case of double battery only)

Through (SW3) float/boost selector switch we can charge the battery in boost mode, earlier than standard time. The voltage observed at the time of boost is 13.3/25.8 Volt.

The charger goes in boost mode automatically in case of battery voltage is very low.

At the bottom, two terminals are provided which gives 12/24 VDC Supply to system for control and operation. Diodes "AND" ing is done so that two sets of Batteries do not get discharge into each other as well they do not start back charging the Charger. Separate MCBs are provided for protection.

Relay RLM (Coil 12/24V DC – mounted in Control Card) is used to have "Mains ON" Indication.

Auto-Manual Selector Switch (SW2) - When this switch is in Auto-Manual Position the Engine can be started in Auto as well as Manual Mode of operation through Start Push Button PB1.

Start Push Button (PB1 ) is provided to start the Diesel Engine Manually. Manual start of the engine / pump is possible in both positions of the 'Operation Mode Selector Switch'. When

PB1 is pressed, the contact closes & PCB 314A will gives command to start the engine.

Another facility is provided if the switch is in Manual Position, no one can start Diesel Engine Automatically – as it is assumed that some maintenance work is going on and, hence pressure is reduced. But after completion of the work, it is necessary to bring back the switch in "Auto-Manual" Position.

Stop Push Button (PB2) is provided to stop the Diesel Engine, when this Push button is pressed it cuts off 12/24 VDC Supply provided to Fuel Solenoid mounted on the Diesel Engine, PCB 314A gives stop command.

### **Common functions in All Operation Modes.**

12/24 Vdc voltage goes to fuel oil solenoid to stop the engine through stop push button whenever required.

When engine takes pick up 30 to 40 %, feedback goes through contact of Lub Oil Pressure switch to PCB 314A, it means engine is running.

As soon as Diesel Engine crosses the pre-set speed, PCB 314A receives feedback through Over Speed Switch. "Engine Over Speed", annunciation is then provided on the fascia of the panel.

PCB 314A is our logic control card. It gives signal to electronic hooter which gives out Audio Alarm. It can be silenced by pressing "ACCEPT" Push Button. TEST (PB3 ), ACCEPT ( PB5 ) AND RESET ( PB4 ) Push Buttons are provided .

PCB 314A is used for generating Visual Annunciation and give pulse for generating Visual Alarm. The Alarm is reset only after field conditions are set normal and RESET Push Button is pressed.

### **CONTACTOR BLOCK – (In case of Double battery):**

This is a separate unit consists of two numbers of contactors, 'X' and 'Y' for the Automatic & Manual Starting of the Diesel Engine. Depending upon the logic selected either contactor "X" or "Y" is get energize for giving starting crank to Diesel engine.

Since the battery cables will be connecting the contactor block to starter motor it is essential that the starter motor (engine), batteries and contactor block are located near each other. Since the Control Panel controls only the two contactor coils 'X' and 'Y', it is possible to locate the Control Panel at a slight distance away for easy operating for personnel. (Detail wiring diagram shown in sheet 5 of 5)

## 10.0 Installation /Fitting.

### Installation.

**Wall mounting:** The panels for firefighting systems are mounted directly on wall.

**Floor mounting:** Floor mounted version is to be erected on a plane area. It is supplied with 100 mm height plinth. Others than this size is optional.



### 10.1 Electrical connections.

Electrical connection must be carried out by an Electrical installer authorized by the local power Supply Company in accordance with the applicable local regulations.

**ATTENTION!**

The engine terminal box is connected to the terminal blocks in accordance with the wiring diagram. PE must be connected to the earth bus.

Pressure switches / level sensor need to connect to the terminals in accordance with the installation and operating instructions.

## 11. Commissioning.

We recommend starting the unit into operation by the Wilo customer service personnel. The customer's wiring is to be checked to make sure it is correct, especially the earthing, before switching the unit on for the first time.

Priming to the pumps and pipework must be done before system put into operation for the first time.

All steps for Installation, commissioning and operation are described in the booster-system's manual.

### 11.1 Factory setting.

The controller is pre-set at factory preset value.

### 11.2 Testing of engine:

After taking care of pump starting, start engine from Local starter supplied by engine manufacturer. Note feedback signal polarities, type of fuel solenoid.

### 11.3 Setting in our panel as per site and observations As per point 11.2:

Check for Factory settings.

If it is as per field requirement, it's well and good.

Otherwise change settings as required. Setting guide Is provided with Panel.

Now start the panel in simulation mode. If operation Is correct then connect to engine junction box.

First take trial in manual mode and then if satisfied

Then put in Auto mode.

## 12 Faults:

### 12.1 Fault displaying and acknowledgement

PCB 314A is our logic control card. It gives signal to electronic hooter which gives out Audio Alarm. It can be silenced by pressing "ACCEPT" Push Button.

TEST ( PB3 ), ACCEPT ( PB5 ) AND RESET ( PB4 ) Push Buttons are provided .

### 12.2 Following Faults are displayed:

In the event of fault appears the fault will be displayed on LED Fascia.

1. Mains On.
2. Pump On Demand
3. System on Auto
4. System on Manual
5. Engine Running
6. Engine Fails to Start
7. Low Lube Oil Pressure
8. High Engine Water Temp.
9. Engine Over Speed
10. Fuel tank Level Low
11. Mains Fail
12. Spare
13. Spare
14. Spare
15. Spare

**If the fault cannot rectify, please contact your nearest Wilo customer service point or Representative.**



### 13 DO's and DON'Ts

Sr.No.	Do's	Don'ts
1	Initially battery should be charged	Don't put our control panel in Auto mode before confirming 'Engine Run feedback ' in Manual mode
2	Ensure Engine working from engine Panel before connecting our control panel,	Engine Battery to Starter Motor Cable length should not be more than five meters
3	Ensure tightness of power cable connections before Cranking Engine	Our Control Panel to Engine Cable length should not be more than ten meters

**Further Information:**

For Further information please email to us on following ID: -

[service.in@wilo.com](mailto:service.in@wilo.com)

Technical Specifications are subjected to change.