



Fire Fighting Diesel Motor Pump Control Panel Instruction and User Manual

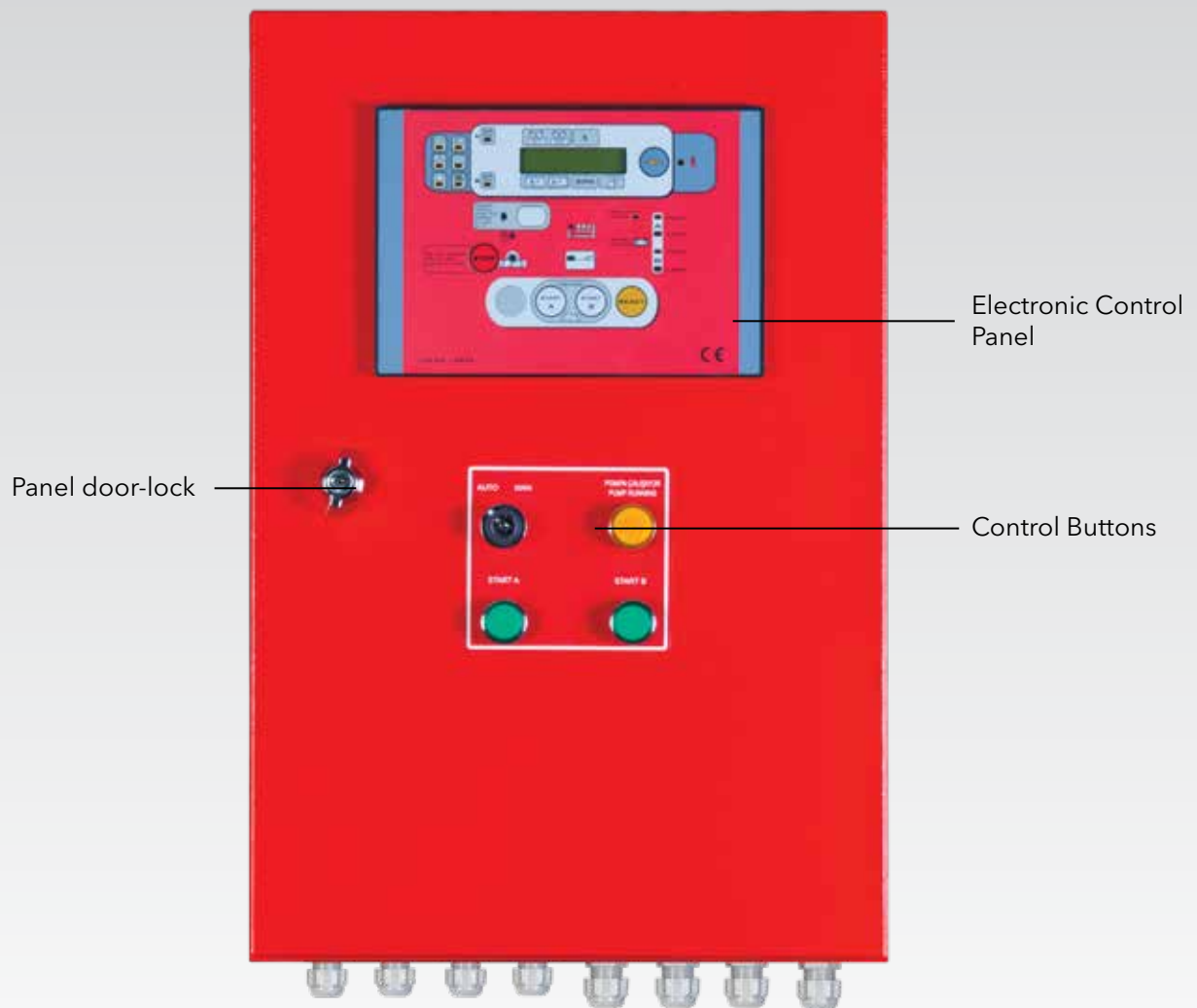


Figure 1. Diesel Control Panel - External View

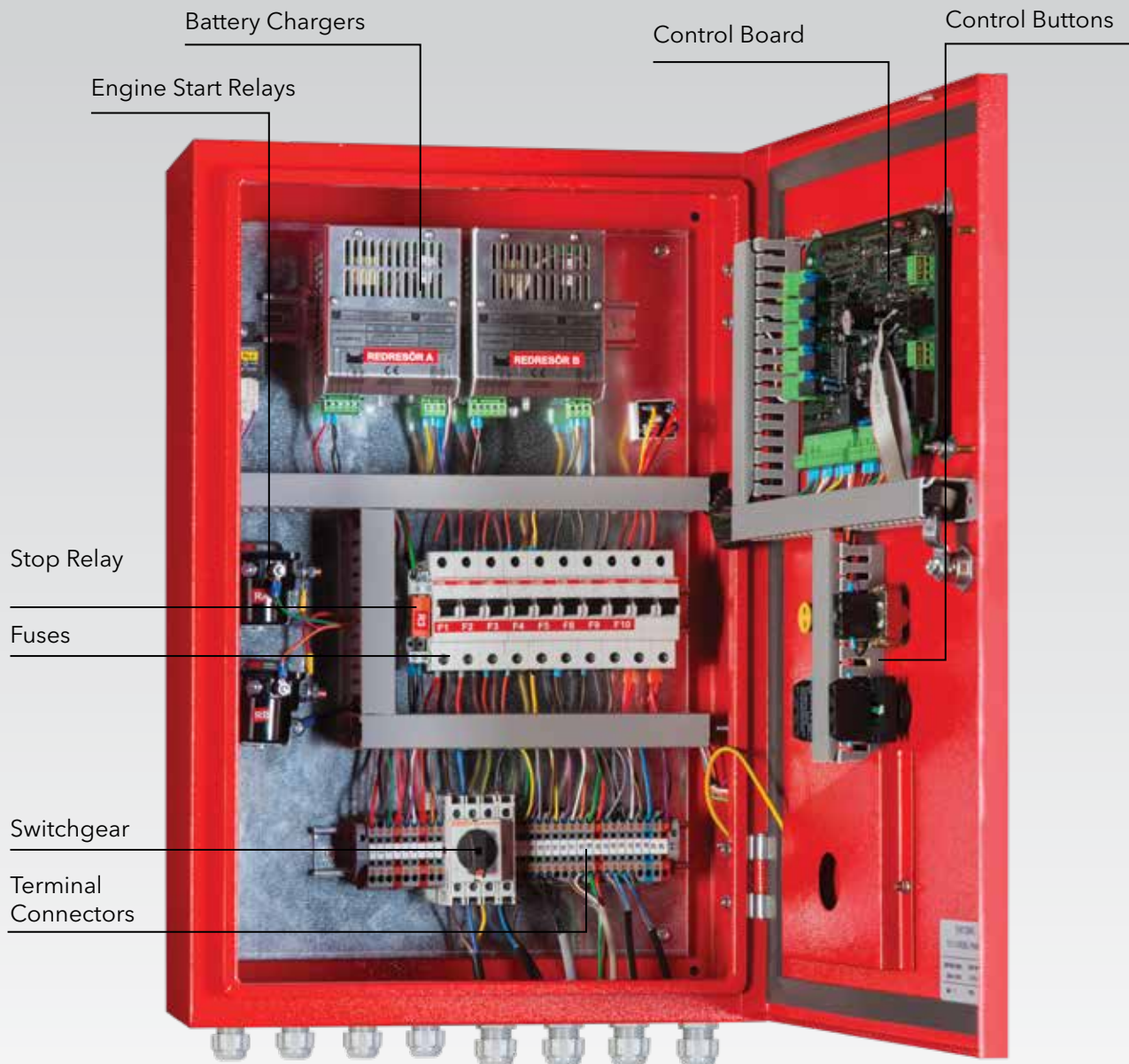


Figure 2. Diesel Control Panel Internal View

Specifications

- 2 pcs of battery ammeters & voltmeters
- Partial&total operating time display
- Tachometer
- Thermometers for oil&water
- Oil level sensor
- Fuel level sensor
- Automatic start with 6 impulses alternated on the two batteries
- Manual start-up buttons
- Test button
- Button for in-site test for machine putting into the service
- Manual stop button
- Battery efficiency check
- Engine automatic fault surveillance
- History events

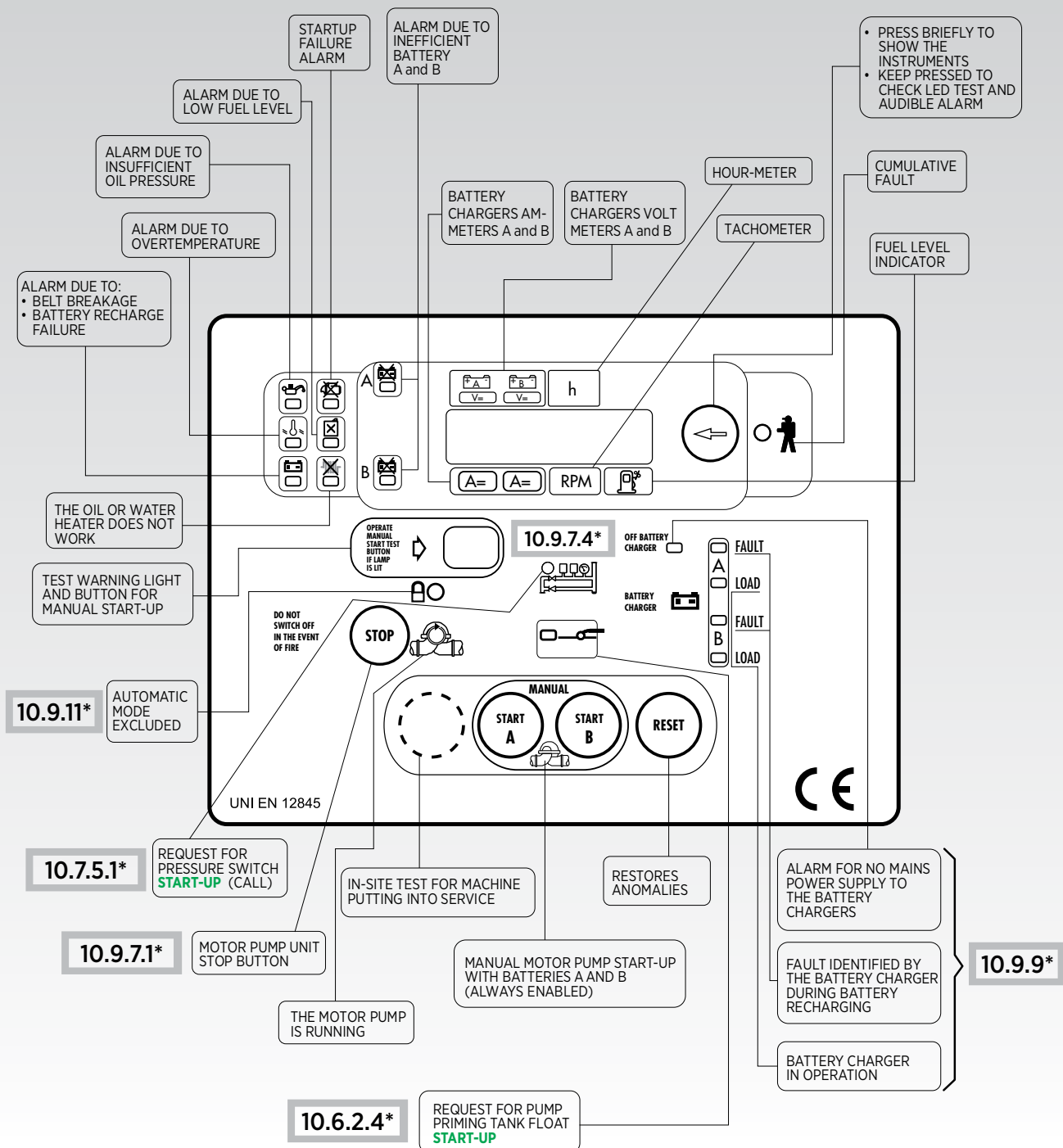



Figure 3. Control Panel Buttons and Indicators

Technical Specifications

2 pcs battery, supply voltage	12VDC or 24 VDC
Supply Voltage	8/32 VDC
System load during Motor OFF	70 mA-12VDC , 40 mA-24 VDC
Maximum load	130 mA-12VDC , 70 mA-24 VDC
Contact capacity 5-7-11-13	Max. 5A 25 VAC 60 VDC
Contact capacity 17-19	Max. 3A 25 VAC 60 VDC
Contact capacity from 71 to 85	Max. 5A AC1 250 VAC
Control Panel Protection Class	IP 54
Operating Temperature	-10 / +50 C
Time display	4 digit
Tachometer	4000 \pm 15 d/d
Battery Charger Voltmeter	38 V \pm %5
Battery Charger Ammeter	99 A \pm %5
Oil level, fuel level, oil&water thermometer precision	%2
MODBUS Serial communication	9600 baud, 8 bit data, 1 bit stop, EVEN parity

Operation

Operation Preparation For Automatic


Active with the switch (externally connected) AUTOMATIC START-UP ENGAGED (from this position, it is possible to remove the key). Setting the switch to excluded, the automatic start is blocked. This exclusion is signalled by the flashing  warning light and by the following message displayed on the screen; AUTOMATIC STARTING EXCLUDED


Automatic

When the equipment detects the closure of the "starting call" contact (pressure switch), the pump set begins to start up. The control unit checks (without commanding the stopping of the pump unit) for possible engine faults, during its operation.

Automatic-Manual Starting


This can be done in three ways :


- Through the emergency start push buttons
- Through push buttons START A or START B
- Through the test push button with consent of the associated warning light 

The test push button receives the consent after the engine automatic start-up (activated by the call pressure switches), followed by the turning of or after start failure. In both conditions the relative warning light  turns on. The circuit used to this end automatically becomes non-operative and the warning light turns off, when the test button is pressed and motor is found running

Automatic

This takes place when the CALL pressure switch contacts are opened, which is shown by a fixed light coming on.

After the pressure switches have closed, the indicator starts flashing. 

Automatic starting also happens when the pump priming contact is closed, which is shown by a fixed light coming on. When the contact opens, the indicator starts flashing. 

Flashing lights stay on for the whole time the motor is running.

In order to facilitate the start-up, a specific circuit makes a sequence of 6 impulses automatically alternating on batteries A and B with 15 seconds (5 secs. Startup, 10 secs. Pause, both adjustable)

Engine starting is interrupted if the starter motor pinion does not succeed in engaging with the crown gear.

Detection Of Diesel Engine Operation

The motor pump On mode is monitored through a magnetic sender (pick-up TM30...) and it disconnects starter motor.


Stopping Of The Engine

The Engine Can Only Be Turned Off Manually

It is not possible to stop it when the call from the pressure switches is present and automatic start up engaged.



- With call from the pressure switches present; Pressing the stop pushbutton, the following message is displayed on the screen: DON'T SWITCH OFF IN EVENT OF FIRE - STOP EXCLUDED.
- With call from the pressure switches absent; Pressing the stop pushbutton, the following message is displayed on the screen: DON'T SWITCH OFF IN EVENT OF FIRE.
- In automatic mode, engine runs after the command from pressure switch. At the end of the time set with the signal that there is pressure from the pressure switch, engine stops with delay. If this status delay time (Wait Stop Time) is activated valid.

Partial Hourmeter

Press  to select (PARTIAL HOUR METER) the operating hours and minutes of the last run of the motor pump.

Battery Charging

Automatic charging; fast charging is controlled in current, intermediate and maintenance charging voltage. The anomalies;

- Battery A and/or FU1 blown
- Battery B and/or FU2 blown
- Short circuit of A and B battery cables
- Mains failure battery charges A and B are signalled by the warning lights ,  FAULT icons are displayed.









Battery Check

A special circuit checks the efficiency of the batteries in particular DURING THE STARTING PHASE.


Alarms

The alarms are indicated on the display by the relative led and by flashing cumulative led.

They are divided into 4 groups;



- STORED: inefficiency of batteries A and B.  
- NOT STORED AND ALWAYS ENABLED. Minimum fuel level , mains power failure to the battery chargers **A and B** , PICK-UP interrupted, oil or water heater failure  and battery chargers A&B fault.
- CHECKED 10 SECONDS AFTER DETECTING ENGINE RUNNING AND STORED: insufficient oil pressure , charging alternator failure , and PICK-UP fault.
- CHECKED WITH ENGINE RUNNING AND STORED IMMEDIATELY: engine overtemperature .

Operating Fault

It locks the starting cycle, if the engine has not started after the sixth attempt . The starting cycles are released using the reset button or the next time motor is found to be running.

Remote Auxiliary Functions

With switching without voltage contacts



- Automatic start-up disabled (automatic startup switch disabled  EXCLUDED  AUTOMATIC MODE DISABLED).
- Startup failure
- Pump operation
- Switchboard fault: occurred engine alarms (excluded minimum fuel level) not powered control unit, battery charger fault: mains failure, FLAT CABLE not connected and blown fuses (the battery charger fuses are signalled as: CHARGER BATTERY FAULT and INEFFICIENT BATTERY.
- Minimum fuel level.


Reset

The memorized protections are reactivated, by pressing the RESET button.


Test

In-Site Commissioning Test

Programming; move the DIP Switch 9 to ON. Press the  button (the screen displays COMMISSIONING TEST) isolating the fuel supply (move the relative lever towards motor stop by hand or hold down the stop button), keep pressed (about 3 secs)  button until the starter motor starts, a circuit produces 6 alternate impulses on the batteries A and B with 30 second cycles (15 secs startup and 15 secs pause).


(WARNING DO NOT use the stop button with electro-stop running intermittently, usually these electromagnets can not be excited for more than 40-50 seconds at a time. After completion of 6 cycles , startup failure is activated and the relative warning light turns on. Restore the fuel supply, startup failure is activated and the relative warning light turns on. Restore the fuel supply (release the lever or the motor stop button) and press the manual startup test pushbutton  . Move the DIP switch back to OFF.

LED Test

In order to check if all warning leds working properly, keep pressed  for 8-10 seconds.

Fuel Tank

Fuel level in the tank can be seen as a percentage on fuel pump icon.

Besides, on the left hand side of the control panel led warning  fuel tank level is displayed as follows;

FUEL LEVEL	FACTORY SETTING	WARNING LED
MAX. FUEL LEVEL	% 95	OFF
MINIMUM FUEL LEVEL	% 25	BLINKS
CRITICAL LEVEL	% 10	FLASHING
NO FUEL	% 1	FLASHING

WARNING

Please be sure to follow the recommendations below;

- All the maintenance and control procedures must be performed when the engine stops and No.50 terminals of start motor is disassembled.
- The installed location must be able to discharge the heat occurred during operation.
- The device must be located away from heat generating/dissipating devices.
- Please throw away the cut cable copper parts and / or any other waste material from the panel.
- The fuses must be exchanged with the ones having exactly the same specifications.
- Do not disassemble the battery terminals in any condition while engine running.

This Device Is Not Convenient To Operate Under Following Conditions

- Ambient temperature is out of the range (+4 / +40 °C).
- Extreme weather pressure and temperature changes causing high condensing.
- In places with contamination caused by high level dust, water vapor salt and corrosive or radioactive effect.
- Where there is a high level of solar radiation or similar heat radiation.
- Where mold and small animals can be affected.
- Extremely pulsed and vibrated places where the control panel will be exposed.

Maintenance

Following controls must be checked every week:

- Automatic start
- Warnings functionality control
- Battery check.
- Check cable connection tightness and terminal conditions.
- Check the fuel level.

Following controls must be checked every month:

- Check the radiator water level.
- Check the engine oil level.

Following controls must be checked every year:

- Change the engine oil.
- Change the oil filter.
- Change the air filter.
- Antifreeze should be added to the radiator water.

Electromagnetic Compatibility

This device works properly in locations in compatible with CE standards and

This device fully in compatible with the EN 50082-2 regulation.

These facts must be taken into the consideration during installation.

Setting Clock

It is suggested to set clock in order to get report.

- Press arrow button in order to display time screen
- Keep pressed reset button for 2 seconds until cursor blinks on screen;
- Set Day-Month-Year-Hour and Minute values by changing the cursor with arrow icon.
- STOP button increases, DOTTED CIRCLE BUTTON decreases the number.



Increases



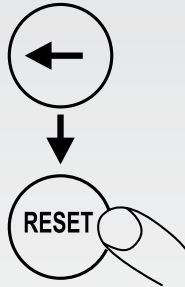
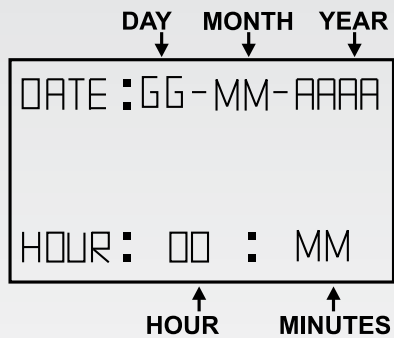
Decreases



Shifts the
cursor

In case mains failure, time must be set again.

SETTING



1.1 User's Programme of Inspection and Checking

The installer shall provide the user with a documented inspection and checking procedure for the system. The programme shall include instruction on the action to be taken in respect of faults, operation of the system, with particular mention of the procedure for emergency manual starting of pumps, and details of the weekly routine of 1.2.

1.2 Weekly routine

1.2.1 General

Each part of the weekly routine shall be carried out at intervals of no more than 7 days.

1.2.2 Checks

The following shall be checked and recorded:

- a)** all water and air pressure gauge readings on installations, trunk mains and pressure tanks; The pressure in the pipework in dry, alternate and pre-action installations should not fall at a rate of more than 1,0 bar per week.
- b)** all water levels in elevated private reservoirs, rivers, canals, lakes, water storage tanks (including pump priming water tanks and pressure tanks);
- a)** the correct position of all main stop valves.

1.2.3 Water motor alarm test

Each water motor alarm shall be sounded for no less than 30 s.

1.2.4 Automatic pump starting test

Tests on automatic pumps shall include the following;

- a)** fuel and engine lubricating oil levels in diesel engines shall be checked;
- b)** water pressure on the starting device shall be reduced, thus simulating the condition of automatic starting;
- c)** when the pump starts, the starting pressure shall be checked and recorded;
- d)** the oil pressure on diesel pumps shall be checked, as well as the flow of cooling water through open circuit cooling systems.

1.2.5. Diesel engine restarting test

Immediately after the pump start test of 4, diesel engines shall be tested as follows:

- a)** the engine shall be run for 20 min, or for the time recommended by the supplier. The engine shall then be stopped and immediately restarted using the manual start test button;

- b)** the water level in the primary circuit of closed circuit cooling systems shall be checked.

Oil pressure (where gauges are fitted), engine temperatures and coolant flow shall be monitored throughout the test. Oil hoses shall be checked and a general inspection made for leakage of fuel, coolant or exhaust fumes.

1.2.5.6 Trace heating and localized heating systems

Heating systems to prevent freezing in the sprinkler system shall be checked for correct function.

1.3 Monthly routine

The electrolyte level and density of all lead acid cells (including diesel engine starter batteries and those for control panel power supplies) shall be checked. If the density is low the battery charger shall be checked and, if this is working normally, the battery or batteries affected shall be replaced.

2) Service, testing and maintenance schedule

2.1 General

2.1.1 Procedures

In addition to the schedule given in this clause any procedures recommended by component suppliers shall be carried out.

2.1.2 Records A signed, dated report of the inspection shall be provided to the user and shall include advice of any rectification carried out or needed, and details of any external factors, e.g. weather conditions, which could have affected the results.

2.2 Quarterly routine

2.2.1 General

The following checks and inspections shall be made at intervals of no more than 13 weeks.

2.2.2 Review of hazard

The effect of any changes of structure, occupancy, storage configuration, heating, lighting or equipment etc. of a building on hazard classification or installation design shall be identified in order that the appropriate modifications might be carried out.

2.2.3 Sprinklers, multiple controls and sprayers

Sprinklers, multiple controls and sprayers affected by deposits (other than paint) shall be carefully cleaned. Painted or distorted sprinkler heads, multiple controls or sprayers shall be replaced.

Any petroleum jelly coatings shall be checked. Where necessary the existing coatings shall be removed and the sprinklers, multiple controls or sprayers shall be coated twice with petroleum jelly (in the case of glass bulb sprinklers to the sprinkler body and yoke only).

Particular attention shall be paid to sprinklers in spray booths, where more frequent cleaning and/or protective measures might be necessary.

2.2.4 Pipework and pipe supports

Pipework and hangers shall be checked for corrosion and painted as necessary. Bitumen-based paint on pipework, including the threaded ends of galvanized pipework and hangers, shall be renewed as necessary.

NOTE: Bitumen-based paint might need renewal at intervals varying from 1 year to 5 years according to the severity of the conditions.

Tape wrapping on pipes shall be repaired as necessary. The pipework shall be checked for electrical earthing connections. Sprinkler pipework shall not be used for earthing electrical equipment and any earthing connections from electrical equipment shall be removed and alternative arrangements made.

2.2.5 Water supplies and their alarms

Each water supply shall be tested with each control valve set in the system. The pump(s), if fitted, in the supply shall start automatically and the supply pressure at the appropriate flow rate shall be no less than the appropriate value in accordance with Clause 10, recognizing any changes required by

2.2.6 Electrical supplies

Any secondary electrical supplies from diesel generators shall be checked for satisfactory operation.

2.2.7 Stop valves

All stop valves controlling the flow of water to sprinklers shall be operated to ensure that they are in working order, and securely refastened in the correct mode. This shall include the stop valves on all water supplies, at the alarm valve(s) and all zone or other subsidiary stop valves.

2.2.8 Flow Alarms

Flow alarms (flow switches or/and pressure switches) shall be checked for correct function.

2.2.9 Replacement

The number and condition of replacement parts held as spare shall be checked.

3 Half-yearly routine

3.1 General

The following checks and inspections shall be made at intervals of no more than 6 months.

3.2 Dry alarm valves

The moving parts of dry alarm valves, and any accelerators and exhausters, in dry pipe installations and subsidiary extensions shall be exercised in accordance with the supplier's instructions.

NOTE: Alternate installations need not be tested in this way since they are exercised twice a year as a result of the changeover from wet to dry operation and back.

3.3 Fire brigade and remote central station alarm

The electrical installation shall be checked.

3.4 Yearly routine

3.4.1 General

The following checks and inspection shall be made at intervals of no more than 12 months.

3.4.2 Flow test

3.4.2.1 Automatic pump flow test

Each water supply pump in the installation shall be tested at the full load condition (by means of the test line connection coupled to the pump delivery branch downstream of the pump outlet non-return valve) and shall give the pressure/flow values stated on the nameplate.

Appropriate allowances shall be made for pressure losses in the supply pipe and valves between the source and each control valve set.

3.4.2.2 Flow test where no pump is install

Each water supply in the installation shall be tested at the full load condition by means of the test line connection coupled to the water supply upstream of the control valve set and shall meet the required flow/pressure values.

Appropriate allowances shall be made for pressure losses in the supply pipe and valves between the water supply and each control valve set.

3.4.2.3 Diesel engine failed-to-start test

The failed-to-start alarm shall be tested to be in accordance with

Immediately after this test the engine shall be started using the manual starting system.

3.4.2.4 Float valves on water storage tanks Float valves on water storage tanks shall be checked to ensure they function correctly.

3.5 Pump suction chambers and strainers

Pump suction strainers and settling chamber and their screens shall be inspected at least annually and cleaned as necessary.

3.5 Yearly routine

3.5.1 General

The following checks and inspections shall be ~~text delete~~ of no more than 3 years.

3.5.2 Storage and pressure tanks

With the exception of tanks designed not to need maintenance within 10 years (See 9.6.2 b), all tanks shall be internally inspected and if necessary drained and cleaned. They shall be examined for corrosion based on the manufacturer's recommendations and all tanks shall be repainted and/or have the corrosion protection refurbished, as necessary.

3.5.3 Water supply stop valves, alarm and non-return valves

All water supply stop valves, alarm and non-return valves shall be examined and replaced or overhauled as necessary.

3.6 10 yearly routine

At no more than 10 year intervals, all storage tanks shall be cleaned and examined internally and the fabric attended to as necessary.

NOTE: Cleaning of tanks usually requires them to be drained, but alternative solutions might be acceptable to save water.

Engine Assembly Plan

Attention!

Proper lifting equipment must be used
Personal protective equipment must be used
Engine must not be operated alone

There must be enough space for assembly, disassembly and periodic maintenance operations when engine and components are operated in a closed and limited space such as a container.

Cylinder Gates
Circulation pumps
Casing
Adjusting Gear Box
Starter Motor and Alternator Flexible Connections
Parts related to periodic maintenance
Oil Filters
Air Filters
Fuel Filters
Block Air Conditioning
Oil Dipstick
Radiator Filler Cap and Enough Distance For Filling

Assembly Instructions;

1. Plastic and improper material including galvanized parts must not be used on fuel pipes and connections.
2. Fuel pipes must be kept away from exhausting system as much as possible.
3. A proper thermal insulation must be implemented after exhaust system and this part must be located away from any wooden material if available. Ps. Thermal insulation must not be implemented on turbocharge and exhaust manifold system.
4. A fire extinguisher must be located in diesel engine room.
5. Batteries must be placed in another area where there is a dedicated air-conditioning system and enough space for maintenance. Battery cable lengths must be as short as possible.
6. A proper mechanism must be placed for oil discharging and a collection funnel must be placed under the casing.
7. There must be enough area around the engine in order to provide easy intervention.
8. Room must have enough lighting and power socket
9. It is suggested to assemble a lifting beam on the ceiling in order to provide easy maintenance
10. Preliminary preparation must be done for cooling water discharge
11. In order to provide safety operation all moving parts must be covered.

Please take into consideration when engine room is designed

1. Room must have enough dimensions and floor must be robust enough against engine weight
2. Air conditioning system must be proper for cooling and suction air inlet.
3. Cooling liquid and fuel supply must be considered
4. Exhausting air must be discharged to atmosphere within permissible exhaust back pressure values
5. Locating air filter and exhaust silencer outside the room may cause performance loss on engine. This must be taken into consideration during room design and room must have enough space to host these components.
6. Construction Works for window blinds must not affect Building constructional tensions in case an existing room will be used for engine hosting.
7. For engines which will work close to residential buildings, noise decreasing precautions must be implemented.

Air-conditioning of Engine Room

The basic principle of the air conditioning is to evacuate the hot air from the room and take the outside environment temperature air in the room. The best location of the diesel engine within the room walls described in Figure 4. The main goal of this positioning to absorb the air from low level as much as possible and to discharge via radiator cooling matrix to outside the building.

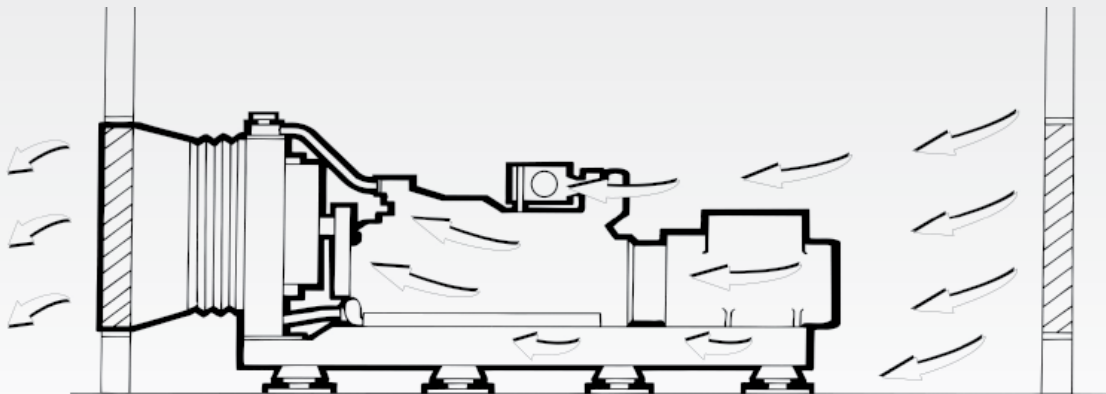


Figure 4

Locating the radiator to air discharging wall will not be enough because in this case the leaked air from between radiator and Wall will come back to fan again. This would cause insufficient cooling and engine temperature increase.

The air discharge window placed on the Wall must be the same rectangular shape of radiator matrix and have %25 bigger size. In the same way, air input window dimensions must be same rectangular shape of radiator matrix and have %25 bigger size. For example; if radiator matrix area is $1,44 \text{ m}^2$, air input-discharge windows will be $1,80 \text{ m}^2$. If there is grate available on windows, this area must be %25 bigger which means $2,25 \text{ m}^2$. Please check Figure 5 and Figure 6.

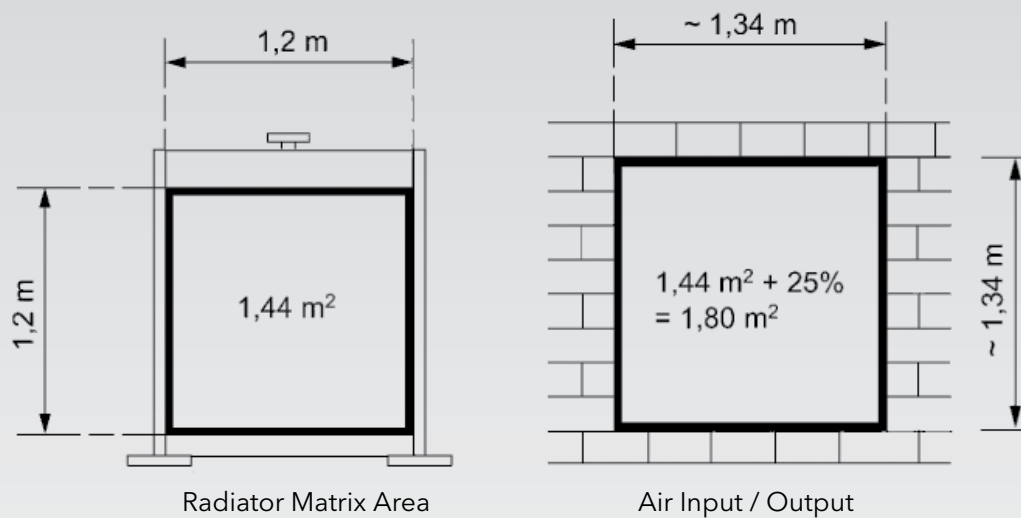


Figure 5

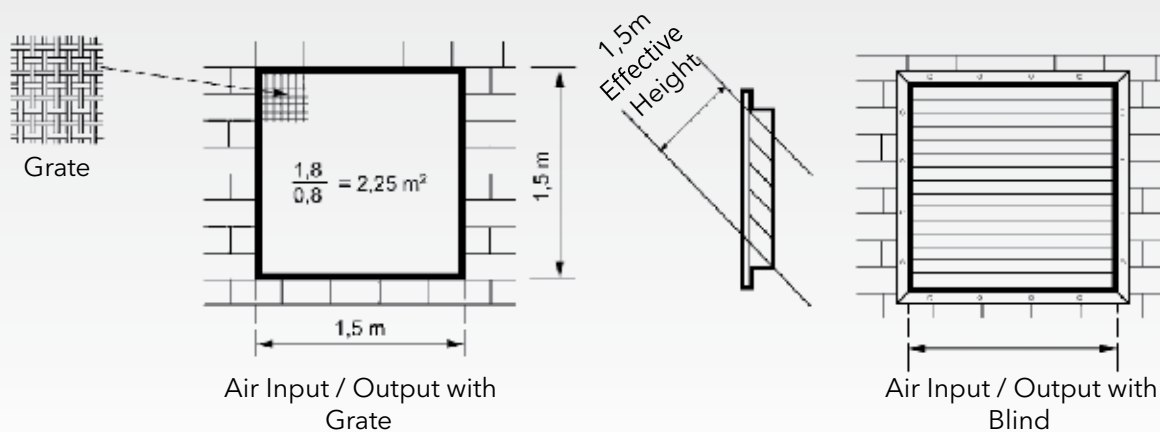


Figure 6

There must be no blockage in front of the radiator

In some cases, air suction must be located on upper side of the wall, a hood must be used in order to direct air downside. This hood also helps to prevent hot air inside flow. Figure 7.

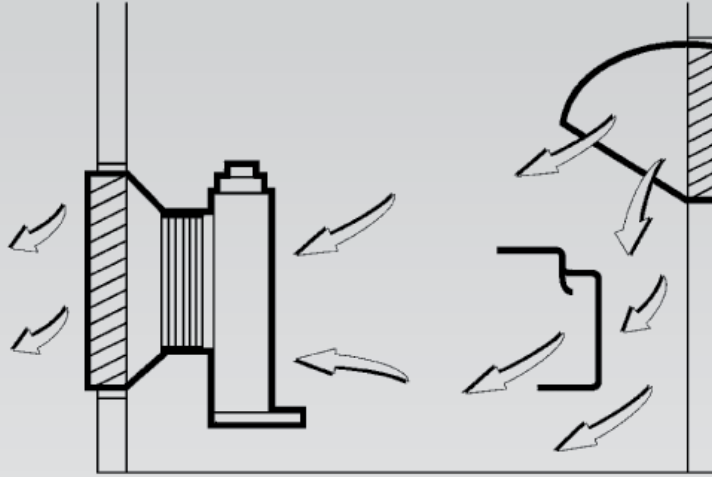


Figure 7

Air Discharge Hood

Air intensity and direction must be taken into consideration during design of hood, the wind coming to blind may cause decrease of cooling air flow. Below listed methods can be implemented on such cases;

1. Hood can be located 90 degrees as seen on Figure 8. In this case, air discharge blinds will be mounted on hood output. In this method, additional precautions may be implemented according to rain or any other climate conditions.
2. Air directing panels can be used as seen on Figure 9.

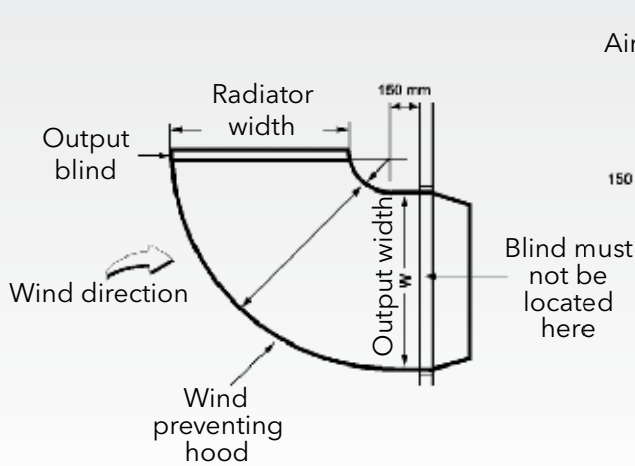


Figure 8

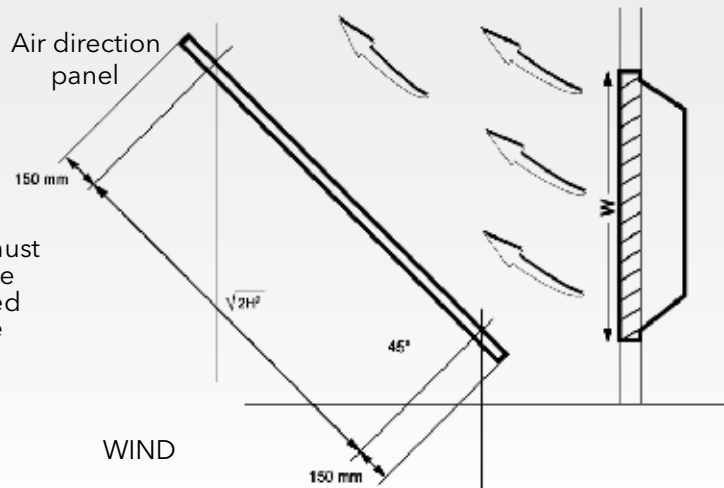


Figure 9

Exhausting System

In case a long exhasuting piping needed, every 5 m. Pipe diameter should be increased 1" and if total length of piping exceeds 30 m. A proper ventilator should be located at the end of the line.

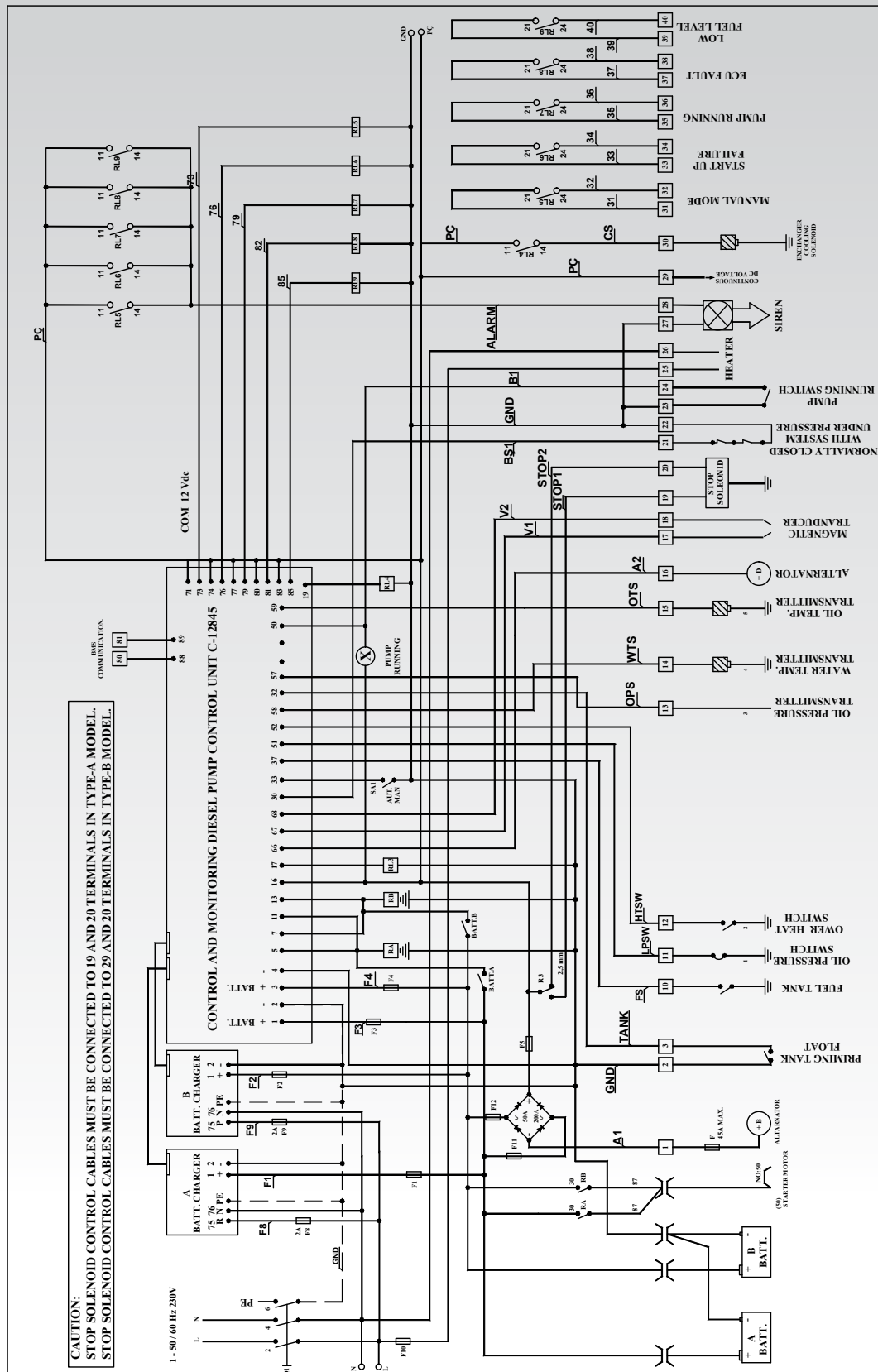


Figure 7. NFPA 20 Diesel Engine Control Panel Electrical Schema

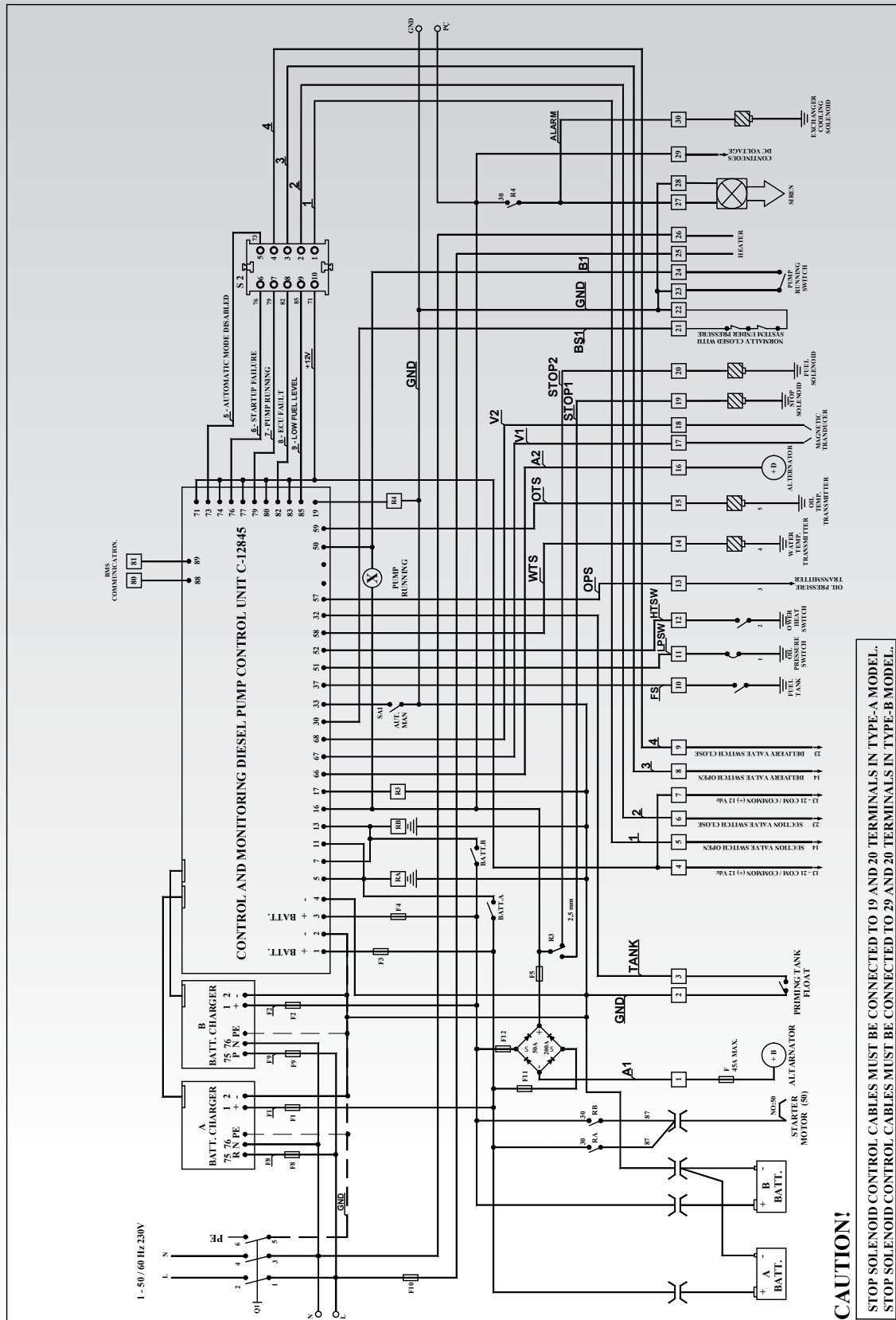


Figure 8. EN 12845 Diesel Engine Control Panel Electrical Schema 21

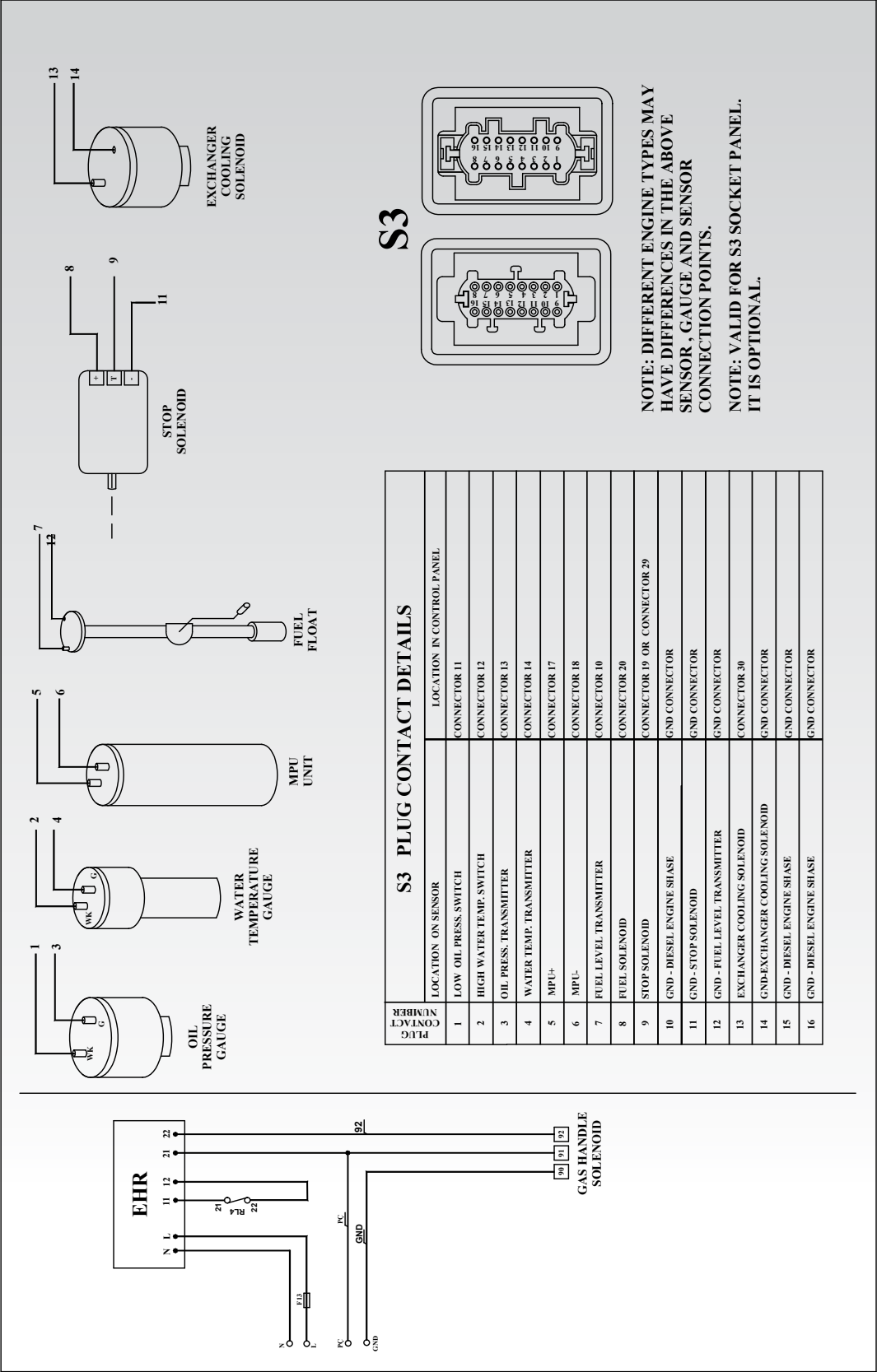


Figure 9. Diesel Control Panel S3 Plug and EHR Relay Detail

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