GlobeCore

ISO 9001:2008 certified company

DIESEL FUEL REGENERATION PLANT

Model

CMM-6RL

Production capacity 0,45 m^3/hour (120 GPH)

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1. Introduction

Many Oil Refineries, Fuel storage facilities are dealing with an issue that is caused by fuel aging after the long term storage.

The storage life of any fuel is dependent on the conditions. The military has an obvious interest in fuel storage, given what they do, so they've studied storage life of fuels pretty closely over the years. The key is keeping the fuel cool and keeping the fuel dry. Under ideal conditions, diesel fuel can be stored between six and twelve months. To extend the life past twelve months, even under the best conditions, it needs to be treated with fuel stabilizers and biocides. If the fuel can't be kept cool, below 21 degrees C consistently, twelve months is the longest reasonable estimate for storage.

Small oil refineries in most cases technically cannot produce a high quality fuels. The CMM-R unit with Fuller's Earth is capable to clean fuels from aging products as well as from sulphur and mercaptans, improve fuel color (bleach the product). After treatment on CMM-R unit the fuel is fully comply to EN and ASTM standards, basically the unit can clean the fuels to the "like new" condition.

The process of restoration involves removal of fuel decomposition products and acidic compounds of the fuel, which increases its oxidation stability and reduces gas solubility.

The unique feature of the CMM-R unit is the capability to regenerate insulation fuel directly in a fuel storage tank. Processing fuel allows removal of sediment its extraction by sorbent.

Another feature of the regeneration unit is the Fuller's earth sorbent with multiple reactivation capability. This allows continuous fuel processing without the need to stop and change or replenish the sorbent load.

The technology has proven to be very efficient and effective.

The process of fuel regeneration involves passing the fuel through the micro porous sorbent for "molecular filtration", removing harmful substances and fuel degradation products and trapping them in sorbent granules.

When the sorbent is saturated, the unit switches to sorbent reactivation mode. This process clears the pores of the sorbent, removing all contaminants into a special collection tank and a charcoal filter.

The sorbent can be reactivated approximately 500-600 times, in terms of lifecycle this means 3 – 5 years of continuous operation.

When the sorbent is completely exhausted, it poses no environmental hazard and can be disposed of in a regular manner.

Fuel regeneration has shown good results of fuel processing.

2. Scope of application.

Mobile oil station CMM-6.0L (CMM-6RL unit) is designed for regeneration of diesel fuel.

The unit can be used to regenerate other types of mineral oils / fuels.

2.1. *Technical information*

Table 1

№	Parameter	Value	In US parameters
1	Capacity	0.45* m^3/hour	120 GPH
2	Sorbent reactivation time, max	19 hours	
3	Nominal power requirement, kW	10	
4	Three phase 50Hz, 60Hz AC voltage, V	380	480
5	Dimensions, max - length - width - height	mm 2820 1570 1520	In 111 62 60
6	Weight, max	2100 kg	4629 lbs

* Processing rate and the amount of processed oil depends on incoming fuel quality.

2.2. *Scope of supply*

Table 2

No	Item		Amount
1	***Mobile oil station CMM-6.0L assembled:***		***1***
2	***Documentation:***		
		- unit manual	***1***
		- component manuals	***1 kit***

3. UNIT DESCRIPTION

3.1. *The unit consists of the following components:*

1. Welded frame. All other components are mounted on the frame.

2. Buffer tank. An oil tank used for adding oil and collection of waste.

3. Control cabinet. Temperature parameters are displayed on the control cabinet. The cabinet is equipped with pump control buttons.

4. Charcoal filter. The filter purifies the exhaust during sorbent reactivation.

5. Input pump. The pump draws the fluid into the unit.

6. Transfer pump. This pump outputs the fluid and waste during sorbent reactivation.

7. Filter. Oil is purified passing through the filter.

8. Columns. Transformer oil is regenerated passing through the columns.

9. Vacuum pump. Creates vacuum in the system for sorbent reactivation.

10. Drain pot. When the oil is regenerated, air bubbles are separated in this vessel. Condensate formed during reactivation is collected and extracted from this tank.

11. Demister. Condenses moisture and heavy oil fractions during sorbent reactivation.

12. Control column. Oil is regenerated in this column.

The unit can be mounted on trailer.

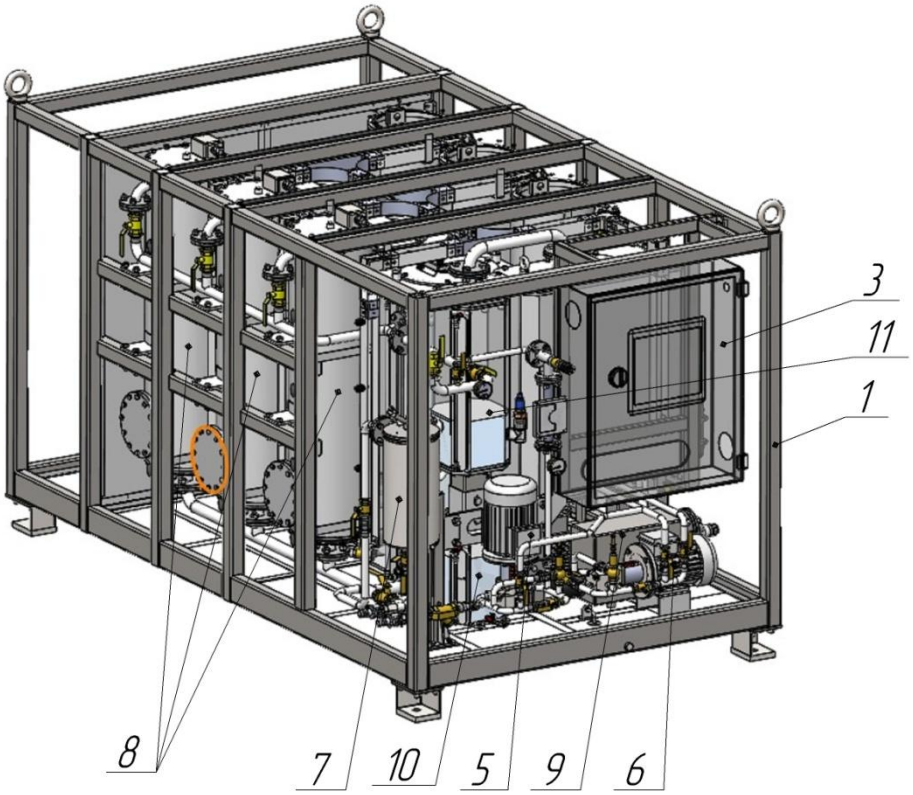

Figure 1. General view

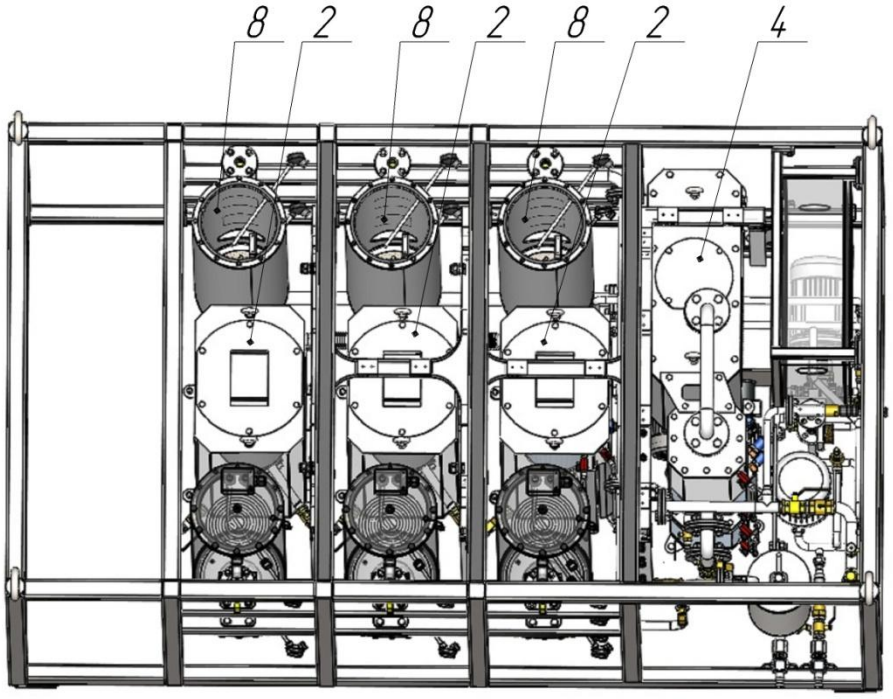

Figure 2. General view

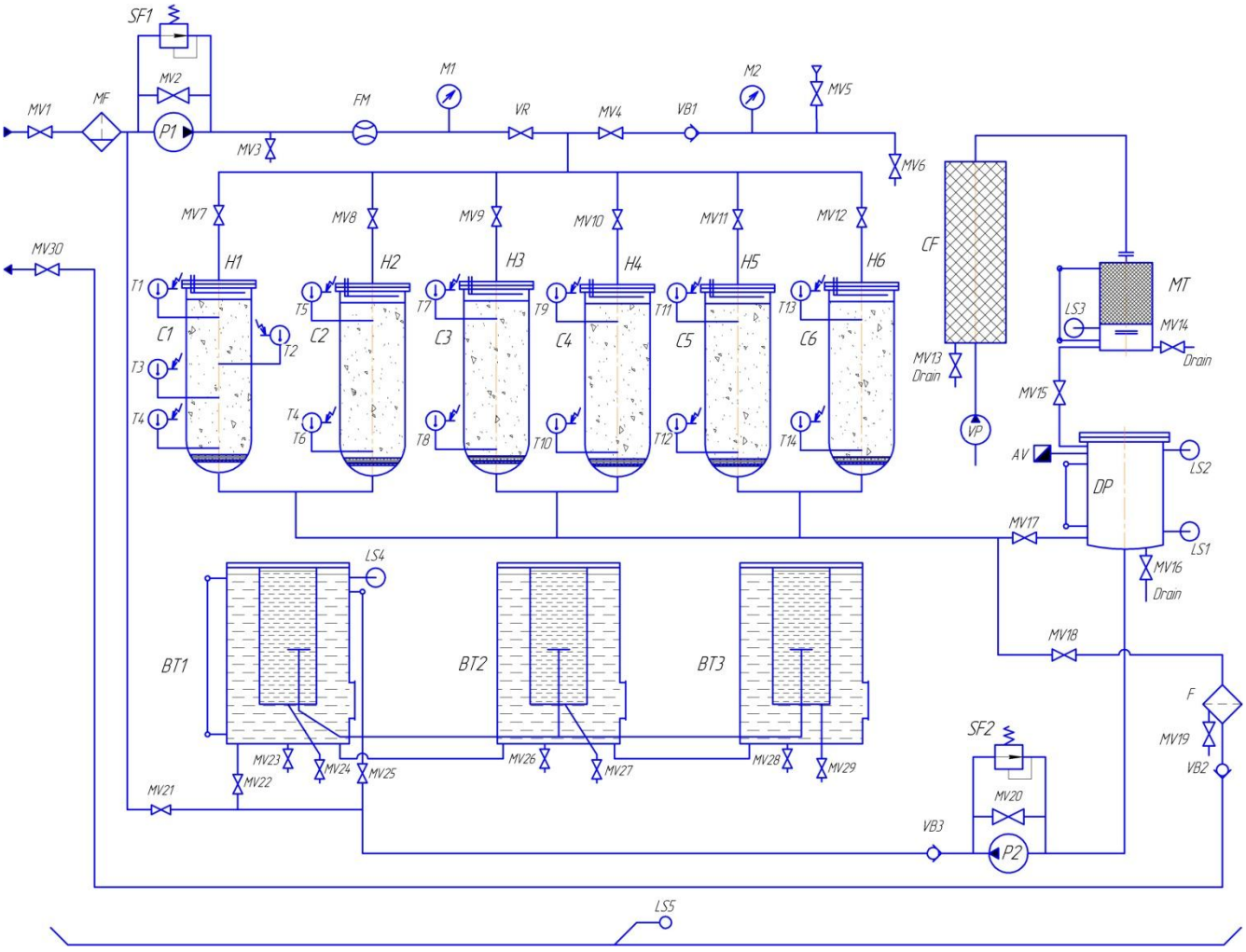

Figure 3. Flow diagram.

Flow diagram components

The unit is controlled from the control cabinet panel; the cabinet contains connections, controls and measuring equipment. Controls are shown and described in Figure 4.

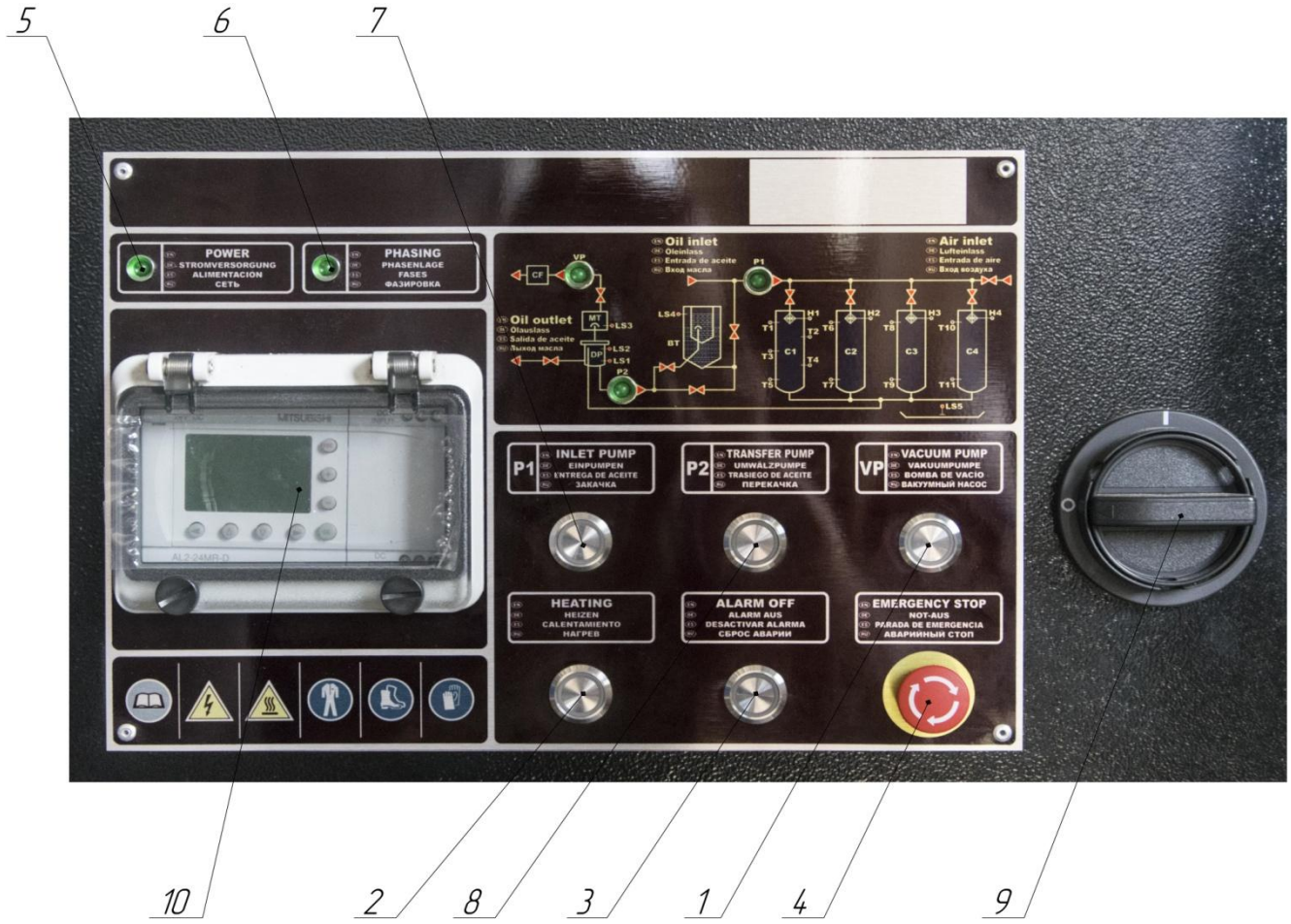

Figure 4. Control panel

1 – Vacuum pump Start/Stop button; **2** - heating; **3** – Alarm off; **4** – Emergency Stop; **5** – Power supply LED; **6** – Correct phase sequence LED; **7** – Input pump Start/Stop button; **8** – Transfer pump Start/Stop button; 9 – power switch; 10 –Alpha 2 controller.

3.2. Electrical system description

The control system is based on the Mitsubishi Alpha 2 controller, which manages operation logic and the logic of main components.

Before commencing operation, connect the three phases (A, B and C) to Q1 input switch. Pump drives are connected at the factory, so for correct operation the phases must be connected in such sequence that the greed LED on the U1 phase control relay is on. If the U1 relay shows red light, swap connections of phases to the input switch, for instance, A and B and make sure the phases are sequenced correctly.

When phases are connected correctly, power is supplied to the control circuit, which consists of:

- breaker F1, which protects the control circuit from current surges;

- step-down transformer T1. The inputs of the transformer are connected to two phases with 480V, the outputs provide 220V.
- operation hours counter V1, a mechanical relay starts counting when the power is on.
- static power supply unit V2. Converts 220V AC to 24V DC to power sensors and the controller.
- Emergency stop button S1, located on the front panel of the control cabinet connected so that when pressed, one contact breaks the component power supply, and the other contact sends a signal to the controller.
- Greed LED HA1, located on the front panel of the control cabinet, indicates power is on the control cabinet.
- Greed LED HA2, located on the front panel of the control cabinet, indicates correct phase connection.

Each pump drive is protected by an automatic breaker with motor heat protection Q2-Q4.

Heaters in sorbent columns are protected by two-pole automatic breakers F2-F3. Starters are managed by the controller. For instance, input pump is controlled by KM1 starter based on the operation logic programmed in the controller U2 via output Q1.

Signals from thermal converters T1 – T11 go directly to analogue inputs I1 – I7 of the controller for further processing and output on screen.

Level sensors LS1 – LS4 are powered from power unit V2 and send the corresponding signals to the inputs of controller U2.

The control panel is equipped with oil and vacuum pump start buttons, heater buttons, fault message reset button and the emergency stop button. Signals from these buttons go to the controller.

Photos of the ready units

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