

RePureX™

Vacuum Oil Purifier

The necessity for regular purification of electrical insulating fluids in electrical apparatus has been recognized for a very long time. Moisture, solids and gaseous contaminants can seriously affect the function of electrical insulating fluids as a coolant and insulator. This specification describes the equipment as supplied by **Enviroflex** for the processing (degassing, dehydration, filtration and de-acidification) of transformer insulating oil. **Enviroflex** purifiers are designed for processing transformer insulation oil in workshops or in the field, in storage tanks, drums or directly in transformers. Purification of oil in transformers can be carried out off-load or on-load, depending on customer's preference. For purification of oil in the field, a mobile type Vacuum Oil Purifier, mounted on a roadworthy trailer and covered by a weatherproof canopy, is recommended.

The Scope of Supply

The scope of supply of this specification shall include the design, fabrication and factory testing of Vacuum Oil Purifier. Equipment will be mounted on a common base (open frame) or in a trailer and supplied in the form of a pre-piped and pre-wired package, and shall provide a fully workable unit in accordance with this specification when received by the purchaser.



Vacuum Chamber for Gas & Water Removal



Rotary Vane Vacuum Pump



Roots Vacuum Pump



The Vacuum Oil Purifier is also called in Asia as:

TRANSFORMER OIL CENTRIFUGING MACHINE

Process Description

Enviroflex process of treatment is based on the available technology:

Heating:

Oil Heating is done by indirect electric heaters with low density electric ceramic heaters (Max. 2 watt/cm²) and exact temperature control.

Filtration:

Insulating oil is drawn in by an Inlet Pump, and is heated up in the Heater and filtered by Fine Filter before it reaches the Processing Vacuum Chamber, where water and gases contained in the oil are thoroughly exposed to vacuum by efficient spreading and removed through a Vacuum Pump. Filtration cartridges constructed of non-migration type glass fiber material featuring a large surface area and dirt holding capacity obvious advantages of cartridge type filters, and no loss of oil or time for back washing etc.

Spreading of Oil, Water & Gas remover:

Oil degassing & water removal is done in the Vacuum Chamber with coalescing filters which installed inside the Vacuum.

Spreading of Oil is vital for easy release of moisture and gaseous contaminants, is accomplished by porous media cartridge, called a coalescer. In this process, heated or unheated oil passes through the layer of bonded fiberglass, where millions of sharp edges shear oil and expose it to the effect of the vacuum in very low pressure range of 0.1 to 3 mbar a. Spreading of oil by passing through porous media is so efficient that oil can be treated at temperatures as low as 20°C.

Vacuum Chamber connected to 1-Stage Vacuum Pump (Rotary Vane or Screw Dry) or 2-Stage included Vacuum Pump and a Booster (Roots Vacuum Pump)

Operation & Maintenance:

Enviroflex Vacuum Oil purifiers (**RePureX**) combine maximum simplicity with high safety standards. A number of sensing devices are built in, continually monitoring all vital parameters.

If any of these parameters deviate from normal operation, Vacuum Oil purifiers (**RePureX**) will shut down, positively preventing inlet or outlet of oil, and a diagnostic light will remain on to inform the operator what corrective action is required.

Duty & Performance

Performance in a single pass or Multi pas through the Vacuum Purifier at a full flow rate shall be as follows:

Water Removal

From 50 ppm down to less than 5 ppm in a single pass and down to 1 ppm after multi passes as measured by the ASTM Method D-1533 with new or Regenerated Oil.

Gas Removal

From fully saturated with air (10% to 12% by volume) down to less than 0.1% by volume as measured by the ASTM Method D-2945 with new Regenerated Oil.

Particulate Matter Removal

98% of particles over 0.5 micrometer, or over 1 or 5 micrometer at customer's preference.

Tan Delta Improvement

Tan Delta value at 90°C can be improved to 0.005. The Tan Delta correction pertains to polishing new/regenerated oil and is not recommended for used/old oil.

Dielectric Strength

Improvement in dielectric strength up to 75 kV with new or regenerated oil.

Main Components

Inlet Strainer

Solid particles over 90 microns are retained in the inlet Strainer, preventing damage to the inlet pump and other components.

Inlet Pump

One positive displacement gear type pump, complete with mechanical seal, direct-driven by electric motor.

In Direct Electric Heater

A low watt density heater (max. 2 watts/cm²) is used to prevent heat degradation of oil. Heater elements are encapsulated in steel tubes, thus comeletely insulated from oil to prevent fire hazard and provide uniform heating of oil. Heaters are Controlled by heavy-duty contactors and a failsafe electronic type temperature controller.

Fine Filter

Solid contaminants are retained by a Cartridge type filter, featuring easy and fast replacement of cartdidges.

Processing Chamber

Shell and all internal parts are made of carbon steel construction, vacuum chamber features heavy-duty Design, suitable for mobile installation.

Vacuum Pump

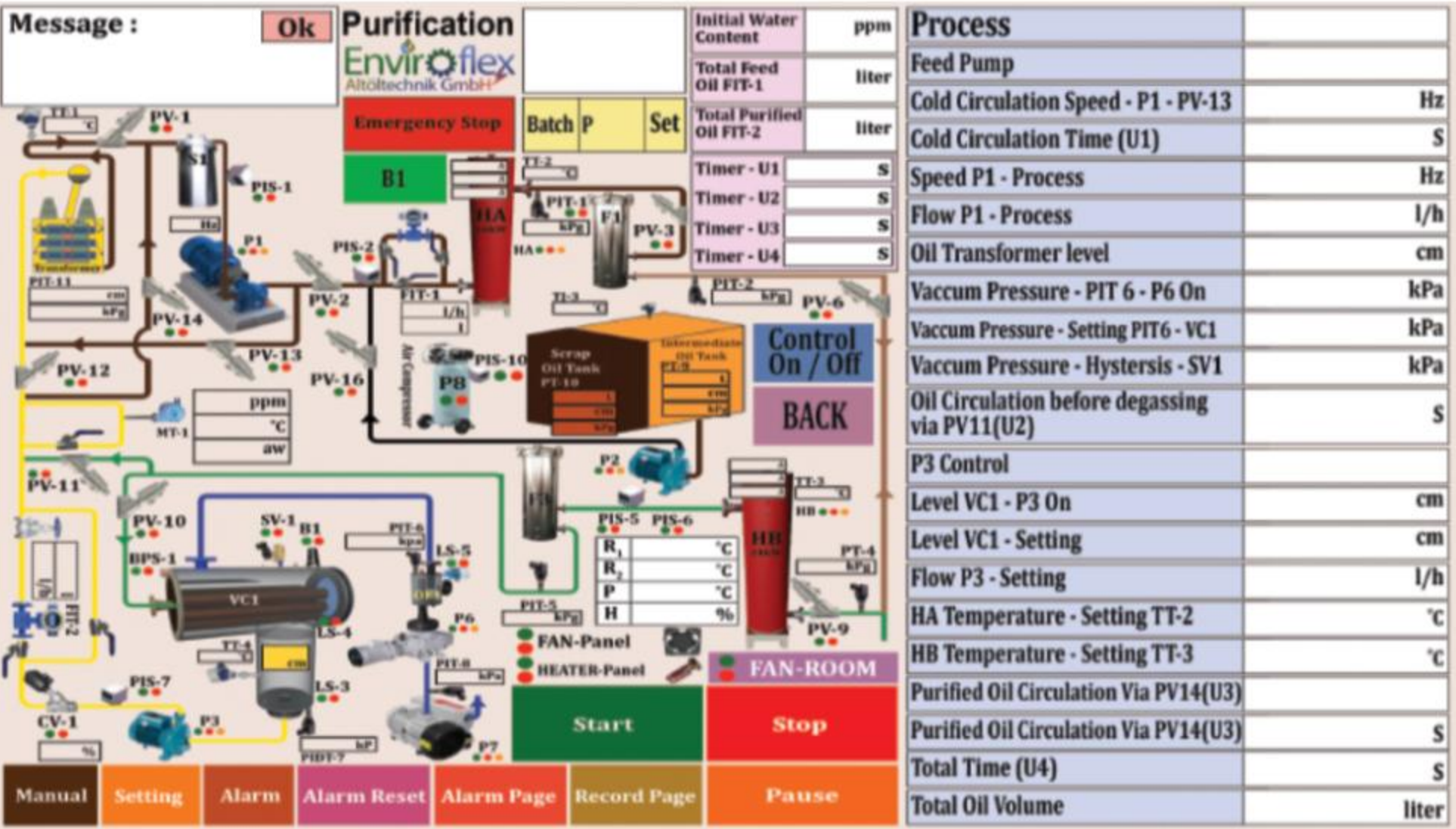
Mechanical Vacuum Pump rotary vane type is air-cooled, direct driven by electric motor and is sized to maintain vacuum of less than 1 mbar in vacuum chamber during last pass.

Vacuum Booster (option)

A Roots Vacuum Pump can be combined to Vacuum Pump for better performance & lower pressure less than 7 mbar a

Oil Discharge Pump

Centrifugal pump featuring high suction capability removes oil from processing chamber and discharges it through a flow meter back into transformer. pump is Direct driven by electric motor mounted on common base.



Control Page - Purification - HMI - Laptop

Instrumentation

Instrumentation and electrical controls are located in a dust proof cabinet. A PLC & HMI or Scada system is provided for the convenience of the operator showing the functions of the main components of the plant by way of pilot lights. Although the Purifier features fully automatic operation, a manual override of various functions is provided as standard. Even with manual override vital plant protection such as oil overflow are still in force. Standard instrumentation and controls comprising of :

- * Temperature Controller
- * Vacuum Indicator
- * Pressure Gauges
- * Vacuum Gauges
- * Flow Meter
- * Level Control
- * Flow Control
- * Foam Control



Capacity

1350 to 18000 liter per hour in different models

Types

Mobile or Stationary

Models

- RePureX-1350
- RePureX-2700
- RePureX-4500
- RePureX-6000
- RePureX-9000
- RePureX-12000
- RePureX-18000

(The numbers after RePureX refer to flow rate in l/h)



Identification Codes

Each models may have different options and Specification that showed as codes in below:

ENF-RePureX-L-n-m-XX-S-W-f

Code Description:

- L:** Flow rate in l/h
- n:** Quantity of coalesce filter Cartridges
- m:** Quantity of Vacuum Chamber
- XX:** VB (Rotary Vane & Booster Vacuum Pumps)
DB (Screw Dry & Booster Vacuum Pumps)
V (Only Rotary Vane Vacuum Pump)
D (Only Screw Dry Vacuum Pump)
- S:** Vacuum Pump or Booster Suction in m³/h
- W:** Total Power of Heaters in kW
- f:** Quantity of Filtrasion Stages



Mobile Vacuum Oil Purifier (RePureX)

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