

# Transformer conditioning system



## TRANSCOND





**DIDEE** GMBH

TRANSFORMER LIFE MANAGEMENT SYSTEMS

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## **On-line Transportable Transformer Conditioning and Preserving System**

### **TRANSCOND**

### **Specification**

#### **1. Use of the system**

The system has been developed for mobile and preferably preventive use on transformers for gas conditioning and long term conservation of the residual life time strength. (Life extension) The application is necessary with more than 2% water content in the cellulose, with particle contamination and excess gas. The quick restoration of safe dielectric conditions also forms part of the concept. The reduced O<sub>2</sub> content together with a homogeneous dielectric condition assures a reliable and secure service, even for heavily aged transformers. The system can be installed regardless of the size and type (only mineral oil filled) of the transformer. The moderate degassing effect must not reduce the gas content to a level, where a DGA is not possible anymore. Therefore a typical gas rest of ca. 20-30% of the natural saturated values must remain in the transformer.

#### **2. System –configuration**

- Combination of moderate vacuum system (No vacuum pumps allowed) with low temperature process (normal transformer temperature) and without regular consumables.
- All oil containing containers hermetically sealed.
- Connection to transformer by high pressure (220 KPa) hydraulic hoses.
- Spring loaded electrical valves with open/close contact, controlled by the PLC for installation procedure and automatic closing in case of failure/power fail at transformer oil circuit side protecting the whole oil circuit.
- Flow control system
- Automatic restart after power fail.
- Inlet rough and fine filter to protect the conditioner.
- Outlet fine filters only for particles. (typical wear: 1-2 years)
- Leakage control for all oil containing compartments. Full control of leakage (Truly unmanned service)
- **Actual international available PLC-system Mitsubishi.**
- **Remote control with analogue Modem or GSM (option) or connection to actual plant bus systems (Option).**
- **System recovery back up included** In order to enable the customer to reinstall the PLC system in case of Soft/Hardware breakdown.

- **Control Program for analyzing the process for understanding and improving the treatment without any back up from the manufacturer. (Option)**
- Going always in secure mode in case of failure.
- Designed for at least 15 years utile life.



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- For tropicalisation the device comes in completely sealed casing of stainless steel with complete separation of ambient atmosphere and internal air circuits by air conditioning system.

### **3. Advantages:**

- Moisture, as well as gas and particles content can be reduced to the level of a new transformer extracting of the ageing accelerators O<sub>2</sub> and water.
- Quick restoration of dielectric strength of oil
- No impact on the insulating oil properties, no over-drying of the transformer
- No disconnection of the transformer under treatment, normally not even during the installation
- Installation and service with minimum manpower and energy
- Direct control of dehydration efficiency by volumetric measurement of the evacuated water
- Remote monitoring & control of the drying process (option by GSM Lan Bus systems)
- No consumables like cartridges or drying agents are required
- No need of regular control or maintenance on site
- Typical unattended time min. 4 weeks
- All processes fool-proof menu controlled
- Stand alone auto secure service for remote and unmanned substations

### **4. Design**

Heavy duty for unattended long term stand-alone use. Tropical design (upon request) with separated sealing of internal and external air flow.

**Professional hydraulic systems.**

### **5. Accessories:**

Complete with all necessary hoses and connection material

### **6. Technical data:**

Power supply voltage 400 V/230 (or on request)

Power supply frequency 50/60 Hz (or on request)

Oil throughput 4- 10 m<sup>3</sup> per day maximum

Outlet water content 10 ppm nominal , 4 ppm minimum

Outlet gas content 1% nominal, 0.3 % minimum

Outlet filtering grade 1 µm

Hydraulical connection 2 x flexible 1/2" hose

Communication: faxmodem, GSM modem (option) or LAN link (option)



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**7. Options:**

GSM connection, Lan connection, Bus systems  
Tropicalisation

**Gas and Water content monitoring of the incoming oil**

**8. General:** The complete design and documentation enables the customer to use the plant without any back up from the manufacturer.

**9. Special features:**

- Modern actual internationally available PLC-system from a international reputed manufacturer (Mitsubishi). Which can updated and used with any actual control system.
- A "bug-free" software
- Any integration in modern control systems, industrial buses etc. is possible.
- A system recovery chip is included in the delivery, in order to enable the customer in case of Hard/Soft-Ware break down to bring the plant back in service without back up from the manufacturer.
- A system analyzer- program (option) enables the customer to understand completely the process and cycles in order to optimize the process.
- A vast and detailed documentation allows the customer to use and understand the system without back up from the manufacturer.
- A complete new rigid design with professional hydraulic components.
- The complete oil circuit is protected against leakages. The connection to the plant is inside the housing and therefore protected against spill and hazards for the environment.
- The complete system is installed in a integrated housing, with options for air conditioning. The overall weight and dimensions are suitable for free application even in low space areas.
- For maintenance the internal parts are full accessible by hinged doors.
- For all possible spare parts, international accessible sources are available.
- The design is specially focused to avoid any repair. Leakage and spills are impossible by none outside oil conducting parts apart of the connecting tubes (Connection to the tubes inside the casing).
- Connecting by professional standard fast coupling system.

## Technical data:



<b>Mains:</b>	400/230V 50 Hz 8 kW 5 wires (others on request)
<b>Oil flow rate:</b>	10 m <sup>3</sup> /24h
<b>Water content in exit:</b>	max. 10ppm, typically 4 ppm
<b>Gas content in exit:</b>	max. 1% typically 0,3%
<b>High grade filtering:</b>	1µm
<b>Weight:</b>	370 kg empty,
<b>Dimensions:</b>	- L: 1700 - W: 670 - H: 1360
<b>Connection oil:</b>	- 1/2 " Hydraulic hoses
<b>Remote control:</b>	Analogue modem

### Typical water separation:

Separation /24h**	• water in oil*	• Break down voltage**
ml/24h	ppm	kV/2,5mm/20°
0	<5	>70****
20	<10	>60
50	<20	>50
100	<30	30-40
120	<40	>30***
130	>40	<30***

Remarks:

\* measured with physical probe, with neutralization  
Nr above 0.1 the Karl Fischer titration is not applicable.

\*\* only oil without particles or fibers.

\*\*\* with separation above 100ml/24h must be controlled,  
if this use is acceptable (Please inform DTC).

\*\*\*\* avoids over drying



## Transformer conditioning system



**TRANSCOND**

### 1. Use:

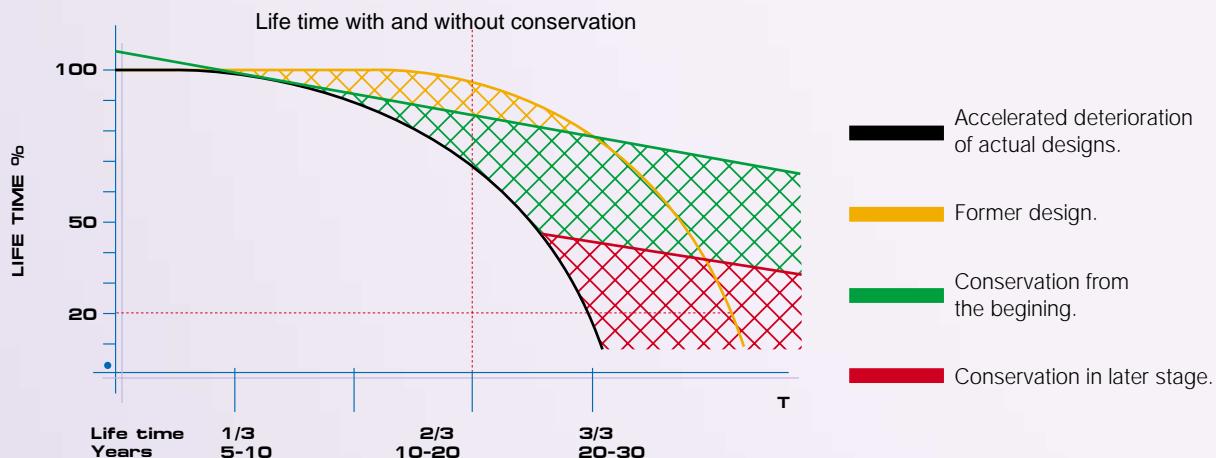
Transformer conditioning systems are needed to keep the actual substantial condition of a transformer in order to extent the life time and/or improve reliability and security of the service.

The system removes the ageing accelerators water and oxygen. Furthermore, it removes the particles using an integrated high grade filtering.

The necessary data of secure service, especially the Break Down Voltage (BDV) will be restored within a short time.

The long term reliability and electric strength will be restored or maintained because of the improved homogeneity in the insulation system and the low oxygen content, the latter measure stops nearly the ageing deterioration.

It is possible to keep even transformers with a remaining life time strength below 50%, which have normally a very limited utile life under 5 years, for 5-15 years longer in service, without jeopardizing the reliability of service and energy supply to the customer.



## 2. Specification:

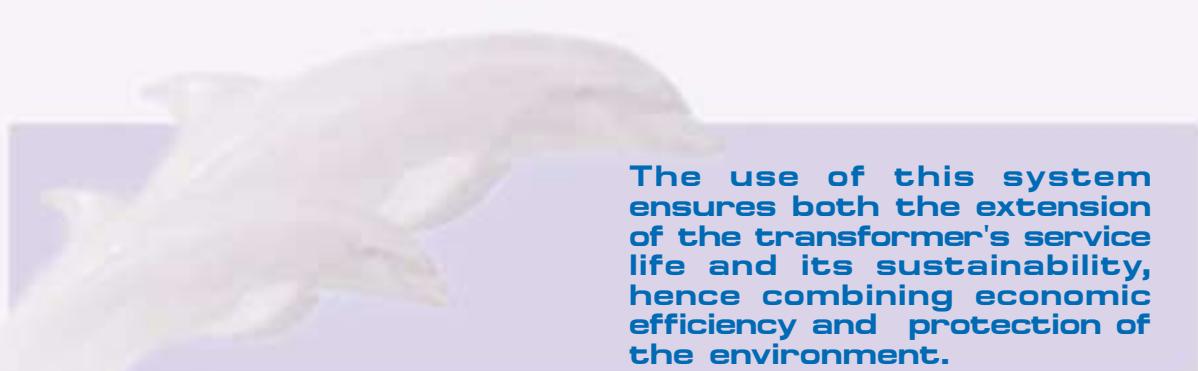
### Application:

Mineral oil filled transformers and similar machines like voltage/current transformers, reactors or all other systems with oil-cellulose insulation.

### Technical features:

**Maintaining the oil integrity:** Moderate vacuum without vacuum pumps combined with a special process to separate oil and water (separation of emulsion). This process works without high temperatures. The complete system avoids therefore the loss of the aromatics (natural inhibitors) and deterioration of the oil by high temperature. The process assures that all oil fractions remain in the original oil.

**Environment:** Since no oil products will be extracted, the exhaust gases are free of any possible hazardous contamination. Therefore there are no limits even for indoor use.



The use of this system ensures both the extension of the transformer's service life and its sustainability, hence combining economic efficiency and protection of the environment.

**Design:** All oil containing vessels are hermetically sealed. There are no rotating joints i.e. pump shafts or similar.

**Control of the process:** The separated water is measured and it can be controlled physically in liters, as well as being used for further analysis. The internal average pressure is transmitted together with the amount of separated water and temperature of incoming oil, via modem for remote control. Therefore the whole process can be duly surveyed. The process allows getting the information about the actual condition of the transformer in means of gas saturation and water content. If a certain drying target (for example 2%) was set, after reaching the preset values the drying process will be stopped.

**Remote control:** All data necessary for the service can be read out by remote control, in case of need, parameters can be changed accordingly.

**Security:** The complete machine is designed for stand-alone use in unmanned substations. All failures of relevance to security (for example spills) will stop the machine and close the oil circuit directly at the transformer via electric spring loaded valves, which close also if the power should fail. The connection to the transformer is made by high pressure hydraulic hoses, which provides therefore an inherent security.

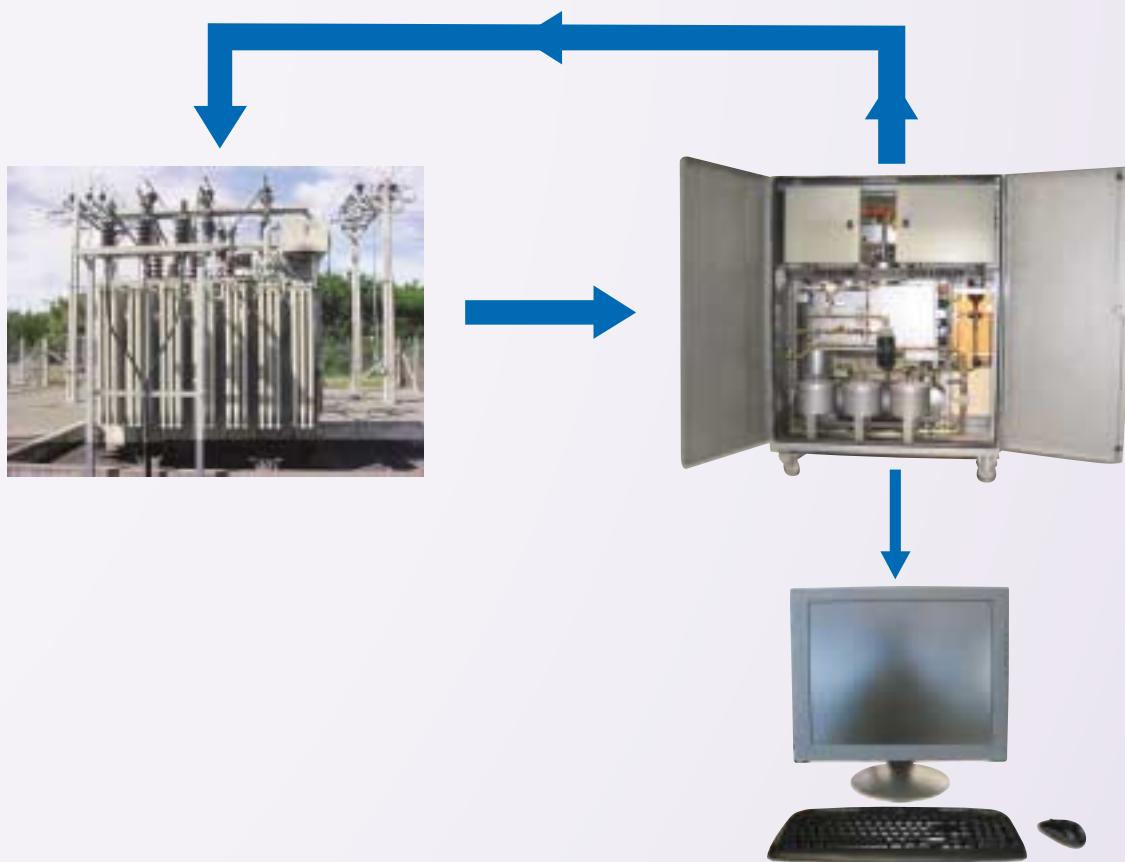
**Start up/shut down:** A PLC menu controlled start up procedure assures that all hoses, as well as the system are duly bleded from air and gases. It is impossible, that air or gases are introduced into the transformer. Therefore the TransCond can be installed anytime under regular working conditions of the transformer.

**Consumable:** There are no consumables that have to be changed regularly. For reasons of security, it is recommended to change the high grade filters in the outlet at least after working 2 years.

**Life expectancy:** The design life based on a continued service is at least 15 years.

**Communication:** The standard communication is via analogue modem. Optionally GSM or LAN Ethernet connection can be provided.

**Options:** For extreme environment conditions it is possible to supply a hermetically sealed version with a separation system between outside and inside atmosphere by an air conditioning system.



# VATTENFALL EUROPE

Date  
26.01.2009

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Your Reference

## **Subject: TransCond Transformer treatment system**

to whom it may concern

Your Message Of

we have purchased from DIDEE GmbH the TransCond Bypass system for On-Line transformer treatment.

The a.m. named system works as given in the specification and the results are successfully in line with the promised data.

DIDEE GmbH has completed all its obligations in commissioning and support in correct use of the device.

We recommend based on this experience the use of the TransCond and the co-operation with DIDEE GmbH

With best regards

i.A. Helmold

i.A. März

(i.A. A. Helmold)

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