



UNITED TRAFOTECH PVT. LTD

aiming for a brighter tomorrow...

## SAVE TRANSFORMERS FROM A DEADLY KILLER



United Trafotech Pvt. Ltd.

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**Trafotech SEALED BREATHING SYSTEM- the easiest way to get rid of frequent maintenance of Silica-gel Breathers and keep transformers dry**

**RANGE**

**Series A: For transformers 16 KVA to 400 KVA** /// **Series M: For transformers 500 KVA to 500 MVA**

*Normally, transformers are provided with Silica-gel breathers to protect them from atmospheric moisture. In fact, Silica-gel breathers, in their best form also, are in-capable to fully protect transformers from moisture. This is called Free-breathing system, which does not fully protect transformer from outside moisture. And unfortunately, breathers generally do not remain in their best form due to lack of frequent maintenance they require, thereby further de-grading their performance as a moisture protector device. This creates a huge revenue loss happening due to ingress of moisture to transformer solid insulation and oil, reducing their life to half or even lesser. Presence of moisture in solid insulation accelerates its ageing process and pre-mature end of transformer takes place.*

**IMPORTANT: Life of liquid insulation is reversible, but life of solid insulation is irreversible. Generally, life of transformer  $\leq$  life of insulation.**

*The pre-mature death of a transformer not only causes loss of equipment but the outage generally creates more production loss than the cost of transformer.*

*Many complicated breathing systems have been tried but none succeeded 100%. Some of them failed due to technical inferiority and others, due to high cost.*

**Salient features of Sealed Breathing Systems invented by Trafotech**

- a. *Efficiently protect the transformers from moisture & keep transformers dry  
Provide 100% isolation level to transformer from atmospheric moisture*
- b. *Economical in long run*
- c. *No operating cost*
- d. *No maintenance cost*
- e. *Actually extend the life of transformers which were originally designed for operation with conventional Silica-gel breathers*
- f. *All Trafotech transformers are equipped with in-built Sealed Breathing Device.*

*The system can be installed on any working transformer in the field, without altering the original design of transformer.*

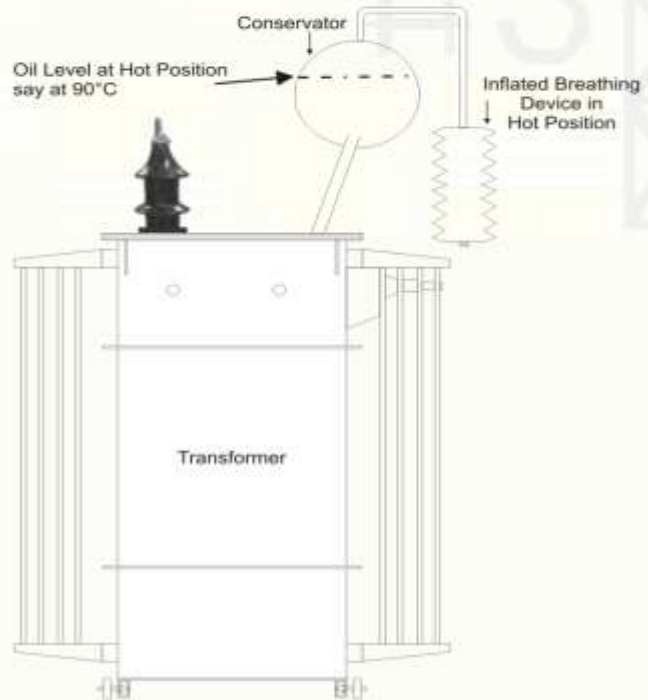
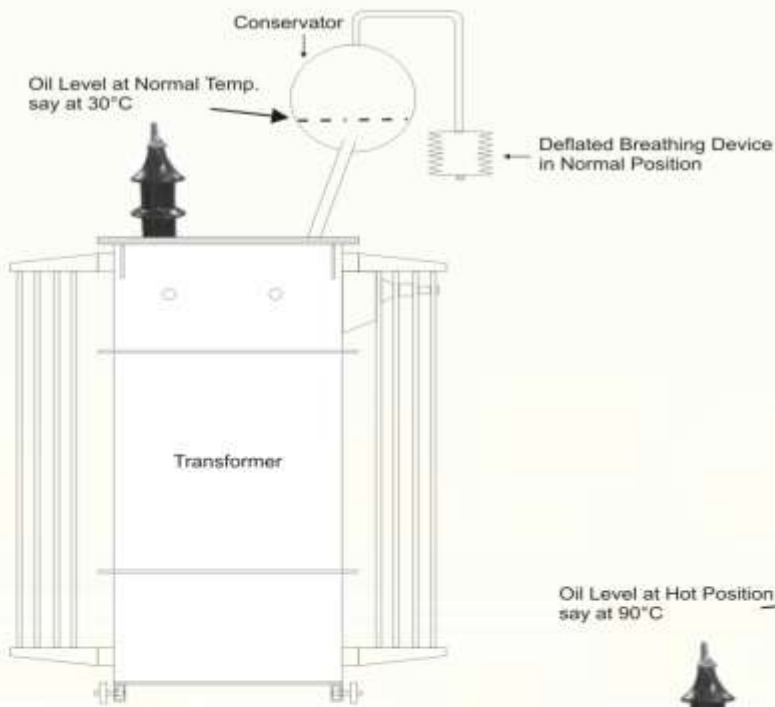
*Experience shows that life of transformer extends by >10 yrs if it is operated dry i.e. at an overall moisture level of < 0.7% by DWOI.*

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## Series "A" Sealed Breathing System

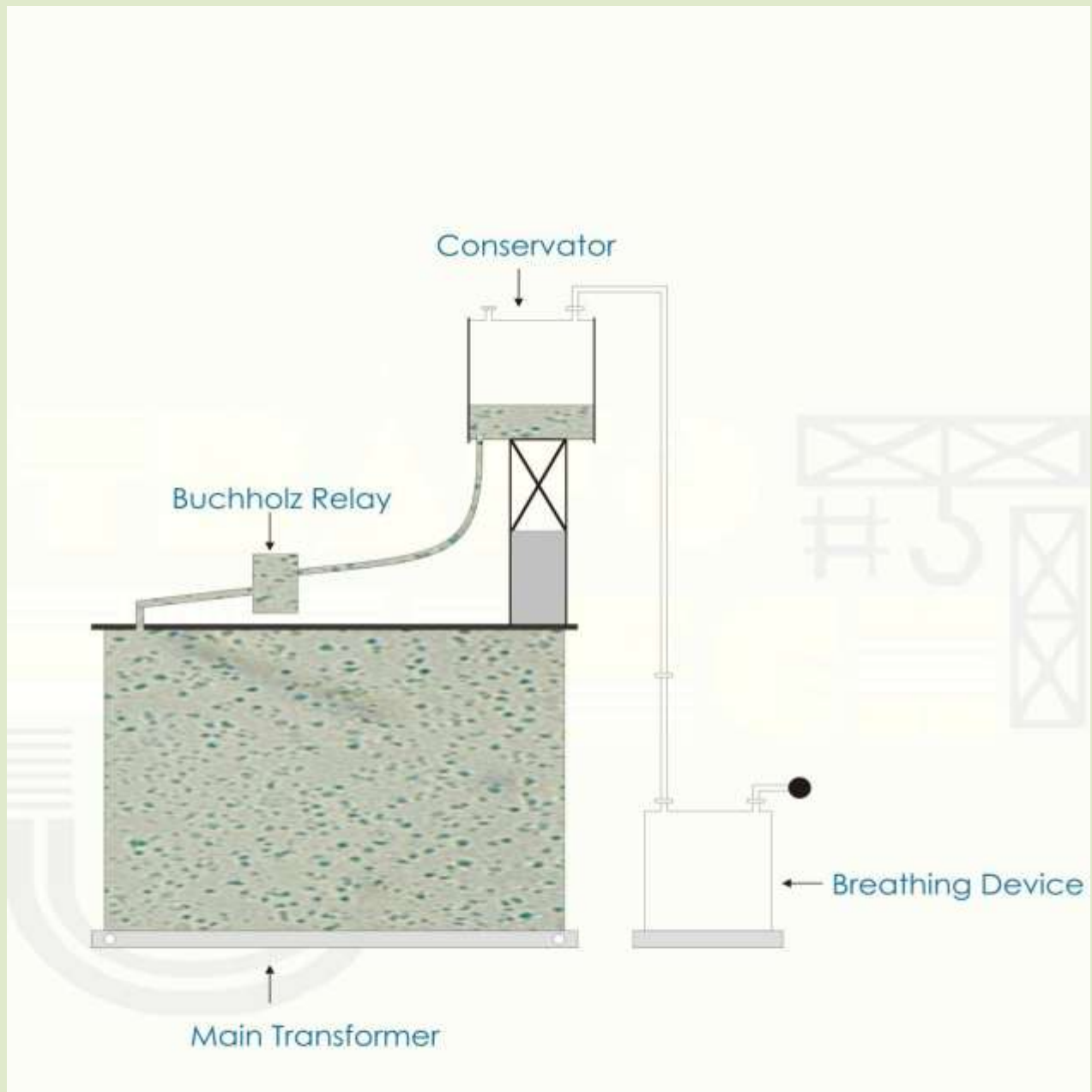
### Series "A" Sealed Breathing System

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## Series "M" Sealed Breathing System

### Series "M" Sealed Breathing System

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# Trafotech On-Line Oil Purifier System

**There are 2 sources of moisture, External and Internal.**

Entry of external moisture is protected by "Sealed Breathing System". Moisture generation takes place inside the transformer tank also due to the presence of Hydrogen/ oxygen.

**On-line oil purifier** extracts the moisture from transformer while transformer is in service and keeps the transformer dry.

The system fulfills the basic requirement of keeping the liquid and solid insulation dry. This basic requirement is not fulfilled by stream-line filter machines due to following reasons:

1. Oil can absorb/ store moisture to a certain level say 200 PPM, after which it releases moisture/ water due to its incapability to store moisture beyond that limit. This moisture finds its way to solid insulation.

2. Solid insulation has capacity to store moisture app. 300 times than oil, so, major moisture lies with solid insulation, not with oil.

3. **MORE MOISTURE IS STORED IN SOLID INSULATION THAN OIL** Transformers oil is filtered generally when the transformer is under shut down. **Problem starts here!!** When the transformer is de-energized, the moisture in oil migrates to solid insulation and vice versa. That means we can extract say 1 part of moisture from oil; Rest say 299 parts are well stored in solid insulation, which again migrates to oil after the transformer is energized and put on load.

4. Streamline filter machines can-not make a wet transformer dry. The basic requirement, that windings should be hotter than oil to extract moisture from solid insulation, is not fulfilled by filter machines. Conventional Filter machines can filter the oil but can-not dehydrate a transformer. They allow major part of moisture to remain in solid insulation.

So, it is equally important to have dry solid insulation, not only dry liquid insulation. In fact, liquid insulation can-not remain dry, unless solid insulation is dry.

**Life of transformer  $\leq$  Life of insulation.**

**Liquid insulation ageing is reversible. Solid insulation age is non-reversible.**

Once the DP value of paper falls, say from 1200 to 200, it can-not be reversed, whereas wet transformer oil can be dried by filter process.

**Trafotech** On-line oil-purifier over-rides the above deficiencies and keep both the liquid & solid insulation dry and make a wet transformer dry while the transformer is in service.

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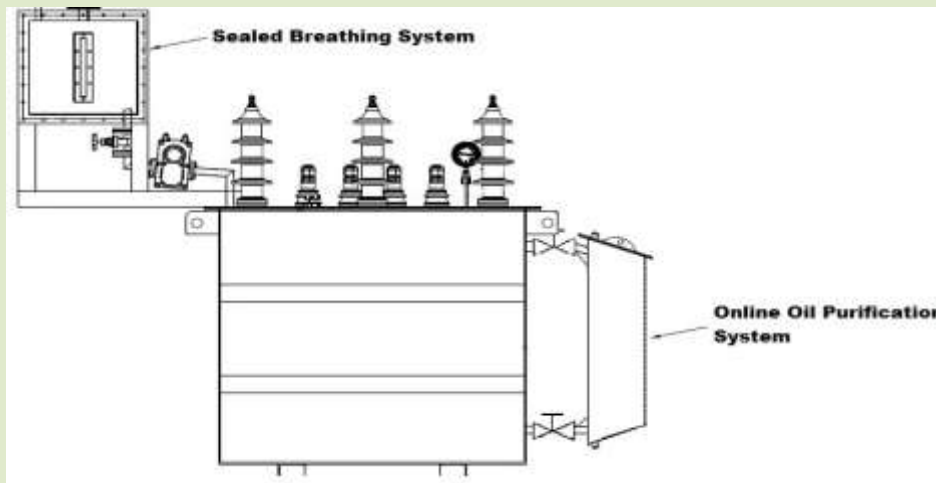
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## Benefits of On-line oil purifier system

- a. It performs without taking shut-down on transformer.
- b. It performs without consuming any **electric power**.
- c. It can bring down moisture level of a wet transformer to **below 15 PPM**.
- d. It can extract moisture from liquid (Oil) and solid insulation both.
- e. In addition to moisture, it improves the **specific resistance & Acidity** value in oil.
- f. It is provided with a micro-filter to remove solid impurities and a drain sump for removal of sludge periodically.
- g. It is provided with **anti-oxidant injection** system.
- h. It can easily be installed on old transformers of any make operating at site with-in 2 hours without any design changes.
- i. The moisture level in oil (in ppm) can be read on instrument installed on transformer.

**ALL TRAFOTECH TRANSFORMERS ARE PROVIDED WITH THIS SYSTEM AS IN-BUILT FEATURE.**



*Basic system shown for a small size transformer (symbolic)*

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## Sealed Breathing System- Type and size

<b>Series A</b>	<b>Suitable for transformer</b>
Type A1	16 KVA to 50 KVA
Type A2	>50 KVA to 200 KVA
Type A3	>200 KVA to 400 KVA
Suitable for new <b>Trafotech</b> transformers and for transformers of any make already in operation at site	

<b>Series M</b>	<b>Suitable for transformer 500 KVA to 500 MVA</b>
The breathing systems are manufactured depending on quantity of oil available in the transformer and not based on KVA rating.	
Type M1	➤ 400 to 600 lts
Type M2	➤ 600 to 1000 lts
Type M3	➤ 1000 to 1500 lts
Type M4	➤ 1500 to 2500 lts
Type M5	➤ 2500 to 4000 lts
Type M6	➤ 4000 to 6000 lts
Type M7	➤ 6000 to 9000 lts
Type M8	➤ 9000 to 12500 lts
Type M9	➤ 12500 to 16000 lts
Type M10	➤ 16000 to 20000 lts
Sizes above 20000 lts are tailor-made against order	

The system requires some space on ground level near the transformer. No special foundations are required.

The system is connected to breather pipe of transformer.

Some quantity of transformer oil is required to install the system which remains in Client's scope of supply.

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## On-line oil purification system- Type and size

Type F1	Up-to 250 KVA transformer. We manufacture sealed type transformers up-to 250 KVA size in which filter-bed is placed inside the transformer
Type F2	➤ 400 to 600 lts
Type F3	➤ 600 to 1000 lts
Type F4	➤ 1000 to 1500 lts
Type F5	➤ 1500 to 2500 lts
Type F6	➤ 2500 to 4000 lts
Type F7	➤ 4000 to 6000 lts
Type F8	➤ 6000 to 9000 lts
Type F9	➤ 9000 to 12500 lts
Type F10	➤ 12500 to 16000 lts
Type F11	➤ 16000 to 20000 lts
	Sizes above 20000 lts are tailor-made against order

The system requires some space on ground level near the transformer. No special foundations are required.

The system is connected to existing top and bottom filter valves of transformer.

Some quantity of transformer oil is required to install the system which remains in Client's scope of supply.

The oil purification system comprises of a micro-filter/ an adsorbent and acidity correction substance / a desiccant/ an anti-oxidant.

The anti-oxidant requires to be added in the transformer every 2 years. This is supplied by us at a nominal cost and can be added by user at site. The cartridges require replacement after 6 years in a normal transformer. The cartridge can be re-activated also. The cost is nominal and replacement can easily be carried-out by site-staff without taking shut-down.

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