Nitrogen Injection Fire Protection Systems

GST : 21GNLPS7947Q1ZU

ACHYUTA Fire Safety

NITROGEN INJECTION AND OIL EVACUATION SYSTEMS

(FIRE PREVENTER FOR ELECTRIC TRANSFORMER)

WHY NIOES (NIFPS)

Transformer is among the most expensive equipment located in power plants and substation etc. They generally contain a large quantity of combustible substance, which can spread re to nearby installations also and caused a power failure and so huge economic losses. Special attention should therefore be paid for their protection. The traditional System like "High Velocity Water Spray System / Co2 Gas Flooding System" provides external protection of the transformers and they come into operation once the Fire got initiated around the transformer for the reason whatsoever or in case transformer already got exploded. Whereas "Nitrogen Injection Explosion prevention & Fire Protection System" is an internal protection of the transformer as it prevents the Transformer from its explosion which generally occurs due to over heating / overloading / winding Short-circuiting or for any earth fault etc.

Please note that this system does not protect the transformer from its external Fire, since Nitrogen is injected inside the body of the transformer, Therefore "Nitrogen Injection Explosion prevention System" is not an alternative for HVWS / Co2 Flooding System but its Installation is recommended in addition to HVWS / Co2 Flooding System.

INCIDENTS OF TRANSFORMER FIRE

Nitrogen Injection Explosion prevention & Fire Protection System" is more advanced Transformer prevention for oil immersed transformers in compare to water spray (HVWS) System and Co2 Flooding System.

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HOW TRANSFORMER EXPLODES AND CATCH FIRE

An Arc is generated due to any internal fault in the Transformer and a high energy flows through transformer which lead to decomposition of insulation/oil at high temperature. Top oil surface attains temperature higher than ignition point. Huge thermal energy is generated thereby emitting combustible gases. Pressure built-up resulting in tank rupture normally at top cover. Hot oil when comes in contact with the oxygen catches fire.

BENEFITS OF NITROGEN INJECTION AND OIL EVACUATION SYSTEM

- ✶ On activation, the system extinguish the Fire within seconds.
- ✶ It prevent the Transformer from explosion.
- ✶ Nitrogen Gas is inert and does not react with transformer oil.
- ✶ It is completely Non-Toxic & Non-hazardous.
- ✶ It provides best cooling effect to the oil inside the Transformer.
- ✶ Forms insulating layer of N2 Blanket on top surface of the oil.
- ✶ Less Cost of Installation & Maintenance.
- ✶ Environment Friendly.
- ✶ Best System for the Areas of water Scarcity.
- ✶ CNF Spray System for External Fire Protection (Optional).

OUR SYSTEM'S USP

- ✶ Auto Dialer Facility - a pre-recorded message will be sent to already registered phone numbers in the system in case of any system activation. (Max 3 numbers)
- ✶ A mechanical interlocking has been provided to ensure that nitrogen injection will not take place into the transformer until the oil drain valve is open.

SYSTEM INSTALLATION

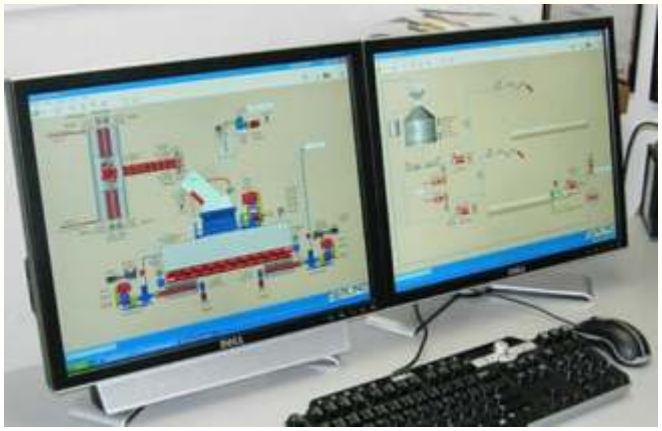
NITROGEN INJECTION AND OIL EVACUATION SYSTEMS

MAJOR COMPONENTS

Control Panel

Fire Extinguishing Cabinet

Control Panel (PLC / SCADA) Optional



Monitoring (Optional)

TCIV

Fire Detector

NITROGEN INJECTION AND OIL EVACUATION SYSTEMS

PRINCIPLE OF EXPLOSION PREVENTION & NITROGEN INJECTION IN THE TRANSFORMER

If the transformer is not working properly, an enormous amount of flammable gases will be created inside the oil tank. As a result, the gas relay closes and the electric breaker switches off. At this moment, the internal pressure of the tank increases due to the thermal inertia.

Once the pressure exceeds and reach at its setting value of the pressure relief valve (PRV), the oil drain valve opens to draw off oil in order to relieve the pressure inside the tank and prevent any explosion and fire by activation the System.

Consequently, Nitrogen Injection system is operated immediately.

PRINCIPLE OF EXTINGUISHING EXTERNAL FIRE OF TRANSFORMER (OPTIONAL)

In case the transformer is on fire externally also in addition to the internal problem as defined above for the principle of explosion prevention & Nitrogen Injection, the fire detector is activated, the Gas Relay/PRV closes, and the electric breaker switches off. As a result, the system is operated to drain the oil drain valve opens to draw off oil.

Then nitrogen gas is continuously injected and the Foam Spray System activate, and in this process the nitrogen gas cools down the transformer INTERNALLY, whereas the Foam Spray extinguishes fire EXTERNALLY over the transformer.

WORKING CONDITIONS

- ✶ Fire detector, drain valve, fire protection cabinet could be located outdoor. Control Panel should be located indoor. Around the site there should be no violent vibration and shock, no corrosive gas.
- ✶ **Ambient Temperature**

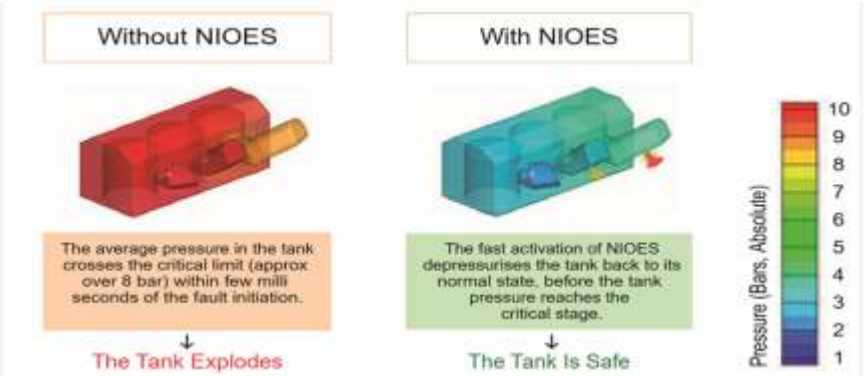
  Outdoor device (Fire Prevention Part): -40℃ ~ 60℃

  Indoor device (Auto Control Panel): 5℃ ~ 30℃
- ✶ **Relative Humidity**

  Outdoor device (Fire Prevention Part): ≤95 (@ 20℃±5℃)

  Indoor device (Auto Control Panel): ≤85 (@ 20℃±5℃)
- ✶ **Power Source Working power source:** AC230V OR DC24/110/220V

EXPLOSION PREVENTION OF TRANSFORMERS



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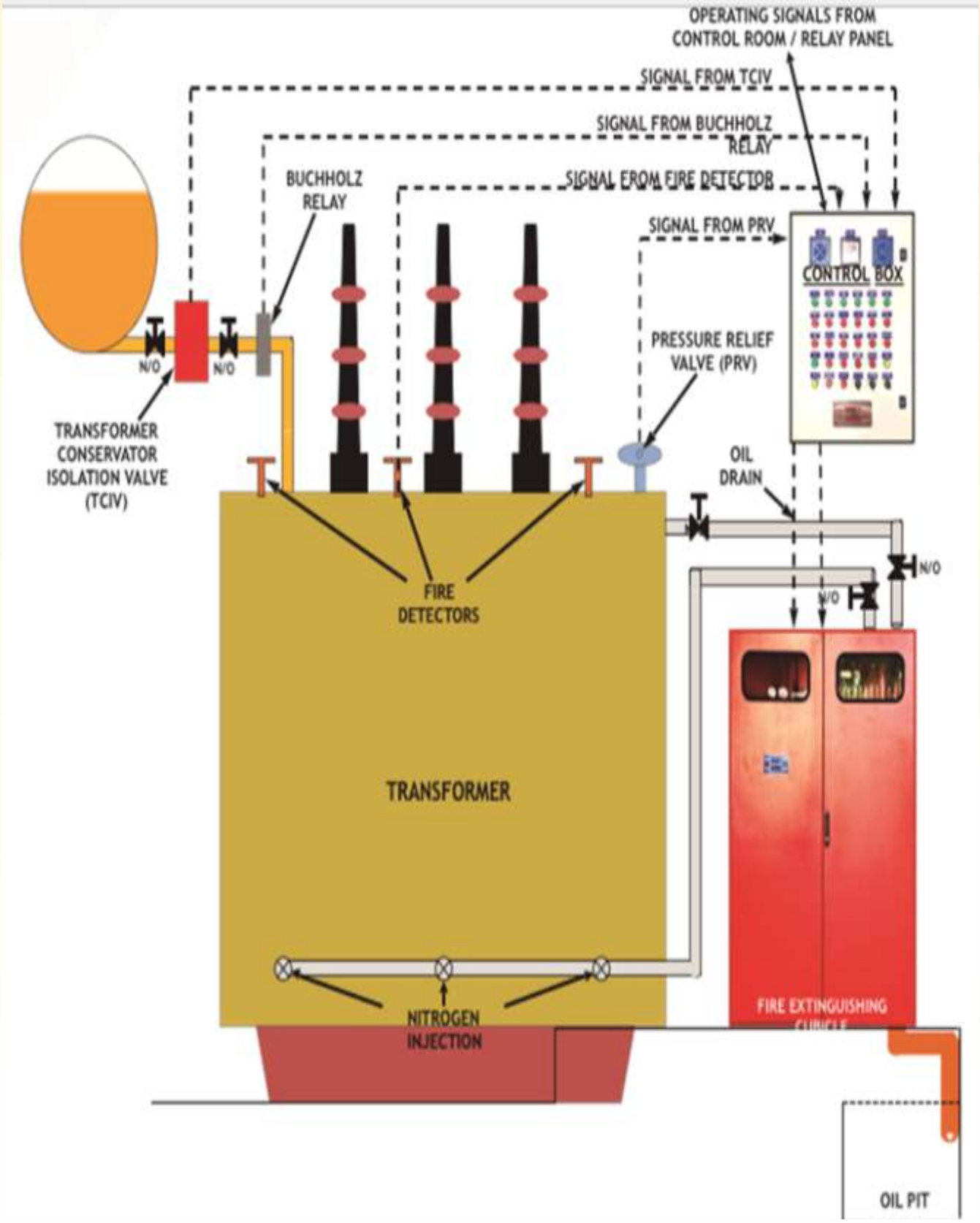
GENERAL ARRANGEMENT OF THE SYSTEM



NITROGEN INJECTION AND OIL EVACUATION SYSTEMS

CHARACTERSTICS OF NITROGEN INJECTION SYSTEM

- **State-of-art concept:** Rapidly drain oil to prevent explosion and inject nitrogen to prevent and extinct fire.
- **Excellent performance:** Utilizing fast valves to drain oil within seconds with the most advanced technique.
- **Fast response:** Once a fault signal is detected from the Transformer. The oil is drained within second after detection in order to release pressure and to avoid explosion. The nitrogen gas is injected after 1 to 20 second in order to mix and cool down the oil, to reduce the concentration of flammable gases, to isolate oxygen gas, and to extinct fire.
- **Reliability:** Utilizing the principle of logic signal to prevent any improper or unnecessary activity to the system and to provide a more flexible system.
- **High efficiency:** Able to inject nitrogen gas continuously for more than 30 minutes to completely cool down the transformer oil as well as prevent and extinguish fire.
- **Reduce pollution:** No Environmental pollution due to the characteristic of nitrogen gas. Extinct fire without water is an advantage to the lack of water area.
- **Feasibility:** Easy to install and maintain for both new or existing transformers with reasonable investment in a minor price compare to other traditional transformer fire extinction systems, such as water spraying systems and CO2 spraying systems.
- **Functions:** Explosion Prevention and Fire Extinguishing system can extinguish the fire immediately with the Nitrogen Gas injected into the Transformer Tank.
- The Nitrogen can be injected continuously for 30 Minutes to stir and cool down the transformer oil, which also isolated the air from the tank.

SCOPE OF APPLICATIONS

Generator Power is unceasingly increasing with the development of technology, there are many transformer explosion happened due to ineffective of current breaker between the Generator and Power Transformer.

Our Nitrogen Injection System is suitable for new or remodeled Power transformer which are located in the high power plant, substations, indoor substations, underground substations, city substations and cold water deficient areas.

NITROGEN INJECTION AND OIL EVACUATION SYSTEMS

WHAT MAKES US YOUR BEST CHOICE-

Quality Assurance- Quality is the main priority given to the customer. Products we deal are all certified according to the respective laws of product quality.

Trained Experts- As life & property safety is first. We have highly technical expertise for the systems and solution we provide on which you can trust

- ✶ Core Values
- ✶ Honesty & Integrity.
- ✶ Gives Incident-free outcomes.
- ✶ Build long-term relationship founded on trust, respect and responsibilities.
- ✶ Quality and Superior Customer Service.

SYSTEM AND SOLUTIONS WE OFFER

Gas based Fire Suppression System (FM – 200/NAF S125/NOVEC – 1230/IG541/ARGONITE/CO2) Quick Detection and Suppression System for kitchens, Industries etc.

Passive fire Protection/ Fire Stopping Solution.

Foam Fire Suppression System .

Nitrogen Injection and Oil Evacuation System.

Medium /High Velocity Water Spray System .

Automatic Hydrant, Sprinkler and Fire Alarm & Detection Systems.

ACHYUTA
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