

# Knowledge is Power

/SAFEGUARDING ASSETS AND PERFORMANCE THROUGH ONLINE MEASUREMENTS



**VAISALA**

# A Small Investment to Generate Measurable Benefits



*Sometimes, solving challenges is surprisingly easy and cost effective. In the power industry, you can achieve it simply by adding knowledge.*

Vaisala offers a comprehensive range of premium measurement technologies and solutions for the power industry. Our transmitters provide real-time online information about the condition of critical high-voltage assets while enabling operators to safely increase equipment performance.

Knowledge is power – literally. Accurate and stable measurements translate to savings through correct, timely decisions for optimized operational efficiency and cost-efficient maintenance.

## Information for the industry's critical needs

Vaisala gives equipment manufacturers, network operators, utilities, integrators and service companies the power to solve both daily and long-term challenges.

Extending the lifetime of critical high-voltage assets, maximizing performance and yield, and minimizing risks cannot be based on guesswork. The only answer is accurate measuring - whether real-time, online or periodic spot-checking. Luckily, it also means that your work becomes easier and less stressful.

## Tried and tested applications

Vaisala measurement transmitters represent decades of advanced technology development. Packaged into easy-to-use, tailored plug-in solutions for different applications providing you online, real-time values of dew point, SF6 density, humidity, pressure, moisture in oil, and temperature.

### Some parameters you can monitor:

- Relative humidity
- Dew point
- Moisture-in-oil
- SF6 density
- Pressure
- Normalized pressure
- Barometric pressure



# Protect Power Transformers

## Monitor Moisture in Oil



### Capital safety - extended lifetime

Transformers are among the most expensive assets in a power network, representing on average close to 60% of substation capital costs. Maintenance breaks are also expensive. Servicing a single transformer can take weeks and cost hundreds of thousands of dollars. Condition based maintenance can extend the operational life of a transformer by years. Accurate real-time moisture data is essential. Moisture in a transformer deteriorates the cellulose insulation, reduces the performance of the oil and accelerates ageing.

*“Transformer age equals cellulose age”,* say industry experts. The traditional periodic checks of water contamination in oil can be insufficient to assess the performance and safe load conditions as temperature variations and other factors can rapidly change moisture levels with potentially serious consequences. A permanent online measurement system protects transformers by enabling timely and cost efficient maintenance.

### Facts & figures

- The moisture in oil technology developed by Vaisala has proven itself – it has been used for over 15 years by leading power industry customers in over 30 countries worldwide
- You can get both relative saturation of oil as water activity value and calculated ppm values
- Measurement is immune to oil contaminants
- Easy and fast measuring - installation in minutes, via ball valve, transformer does not need to be off-loaded
- Longest recommended calibration interval on the market for fixed transmitters – 3 years

### Continuous online measurement - MMT330

The Vaisala HUMICAP® Moisture and Temperature Transmitter Series for Oil MMT330 measures transformer oil moisture online, providing an accurate real-time picture of the transformer's condition.

The MMT330 transmitter monitors moisture levels in all ambient and

operating conditions and is compatible with any insulating oil. Installation is easy and the device can be directly connected to the substation data collection system. The MMT330 has proven itself even in the most demanding conditions and has the longest recommended calibration interval on the market – 3 years.

### Hand-held for spot-checks – MM70

The lightweight Vaisala HUMICAP® MM70 is a specialized hand-held moisture meter for spot-checks and short-term checks, to identify transformers with moisture issues. The probe can be inserted directly into the process through a ball valve so there's no need to drain the oil or shut the transformer down.



MMT330



MM70

#### Products for online moisture-in-oil monitoring

- Configurable transmitter for fixed installations: MMT330
- Compact transmitter with remote probe for fixed installations: MMT310
- Small transmitter ideal for OEM applications: MMT162
- Hand-held meter: MM70

## Ensure Dry Insulation with Dew Point Measurement

### Complete drying

When building a new transformer or overhauling an installed one, the cellulose insulation needs to be dried completely by applying heat and vacuum. After drying, the tank is purged with dry nitrogen or air. Dew point measurement is crucial in ensuring a thorough drying process by

confirming the final dryness after the nitrogen/air purge. But how do you know when dry is really dry?

### Fast verification

Vaisala's fixed and portable dew point instruments offer fast response time, enabling quick and reliable verification of specified moisture levels.

#### Products for dew point monitoring:

- Configurable transmitter for fixed installations: DMT340
- Compact transmitter for very low dew points: DMT152
- Hand-held meter: DM70



DMT340



DMT152



DM70

# Protect SF6 Gas Insulated Equipment

## Monitor SF6 Quality



DPT145

### Ensure safe operations

Sulphur hexafluoride (SF6) is used as an insulating gas in transmission and distribution equipment such as switchgears and circuit breakers. It effectively prevents arcing during switch-offs and protects equipment from failures.

In order to maintain SF6 insulation properties and to reduce the formation of unwanted secondary decomposition products, the amount of water vapor in the gas insulated system (GIS) should be kept to a minimum. Also, the SF6 system needs to be pressure tight for best insulation performance and safe operation of the equipment.

### Industry first - seven parameters with one meter

The new Vaisala Multiparameter Transmitter DPT145 for SF6 Gas is a unique innovation that measures dew point, pressure and temperature with one meter, and calculates four others online, including density. The dew point measurement combined with the pressure measurement provides an excellent assessment of the condition of the SF6 and its performance. The direct normalized pressure value offers fast leakage detection. Online measurement makes it easy for you, by minimizing the time needed for field operations.

### Smart savings

You need only one transmitter to get up to seven parameters. This saves money and time across the board from investment to installation, operation and service. It also means faster, risk free and more accurate and environmentally friendly measuring.

Online monitoring helps minimize on-site visits by detecting sudden and minor leaks. It also removes the need for sampling and ensures that no SF6 gas is released into the atmosphere. The instrument's long calibration interval means practically service-free operation.

### Spot-Check Convenience with the DM70 Hand-Held

When SF6 dew point spot-checks are required, the Vaisala DRYCAP® Hand-Held Dewpoint Meter DM70 is the optimal lightweight, battery-powered instrument for the job. It helps optimize the field technician's work with a fast response time and internal datalogging capability. The unique auto-calibration technology invented by Vaisala ensures accurate dew point measurements and long-term stability.

Vaisala sample cells allow for dew point measurements both at gas pressure and at atmospheric pressure. The cell meets environmental regulations requiring a minimal sample size and enabling SF6 collection and recycling.

### Multiparameter Online Transmitter DPT145

- Only one transmitter to be installed to provide seven parameters online
  - Measured parameters: Dew point, pressure and temperature
  - Calculated parameters: Density, normalized pressure, dew point in atmospheric pressure and ppm
- Saves time and money across the board, from investment and installation to operation and servicing
- Online measurement reduces need for on-site visits
- Fully digitalized measurement technology offers all seven parameters with less cables and need for space
- Less mechanical connections, reduced risk for leaks
- On-site verification of dew point measurement is convenient with the hand-held DM70

## Protect Hydrogen Cooled Generators Monitor humidity and temperature for best yield

### Hydrogen control

Dry hydrogen cools electric generators thanks to its high thermal conductivity and low viscosity, but it requires constant monitoring to avoid major risks. An increase in the hydrogen moisture level may lead to reduced cooling efficiency and insulation capability as well as an increase in corrosion. The worst outcome: total generator breakdown.

### Built for safety

The Vaisala HUMICAP® Humidity and Temperature Transmitter series HMT360 is built to be intrinsically safe and thus ideal for monitoring hydrogen dryer performance. The sensor can be installed directly into a pressurized pipeline to provide accurate moisture measurements of the hydrogen being fed to the generator.



*HMT360*



# Protect Gas Turbines

## Optimized Humidity – Optimized Performance

### Measure inlet air to increase output

Accurate measurement of inlet air humidity is essential for better turbine control and improved performance. Optimally cooling inlet air increases turbine efficiency, as only a 1°C change in temperature can result in a 0.5% difference in electricity production. On the other hand, too cold and humid air can lead to condensation or icing, which may damage turbine blades.

### Safe performance

Vaisala's humidity monitoring helps the utility operator optimize the temperature and compression of the inlet air, maximizing output without risking condensation.

The HMT330 belongs to the Vaisala HUMICAP® Humidity and Temperature Transmitter Series and incorporates Vaisala's 40 years of experience in industrial humidity measurement. The HMT330 uses a Vaisala patented warmed probe, which ensures sensor

stability in even the most extreme and condensing conditions.

### Information – any way you need it

For power industry operators the HMT330 offers reliable, stable and accurate measurements. The versatile HMT330 series gives you many options tailored to different needs: Numerical and graphical displays, multilingual menu, alarms, trends, battery secured data logging, Modbus protocol and WLAN/LAN.

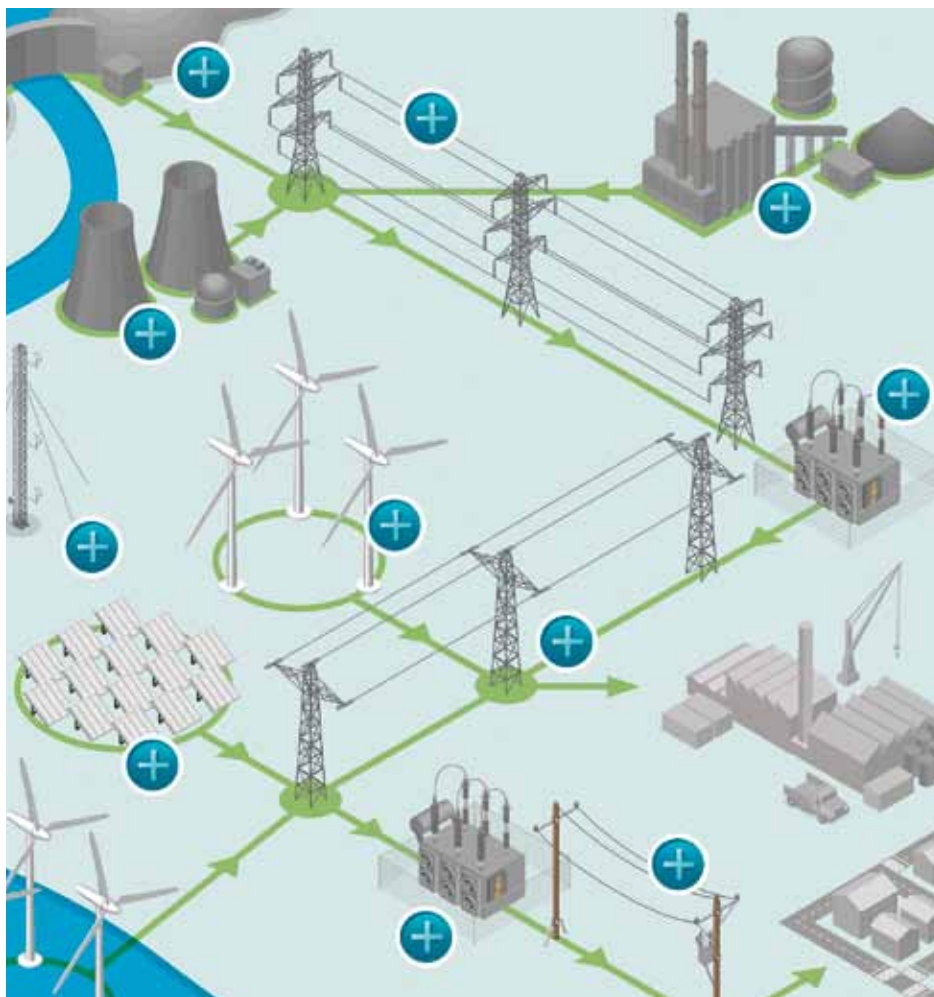
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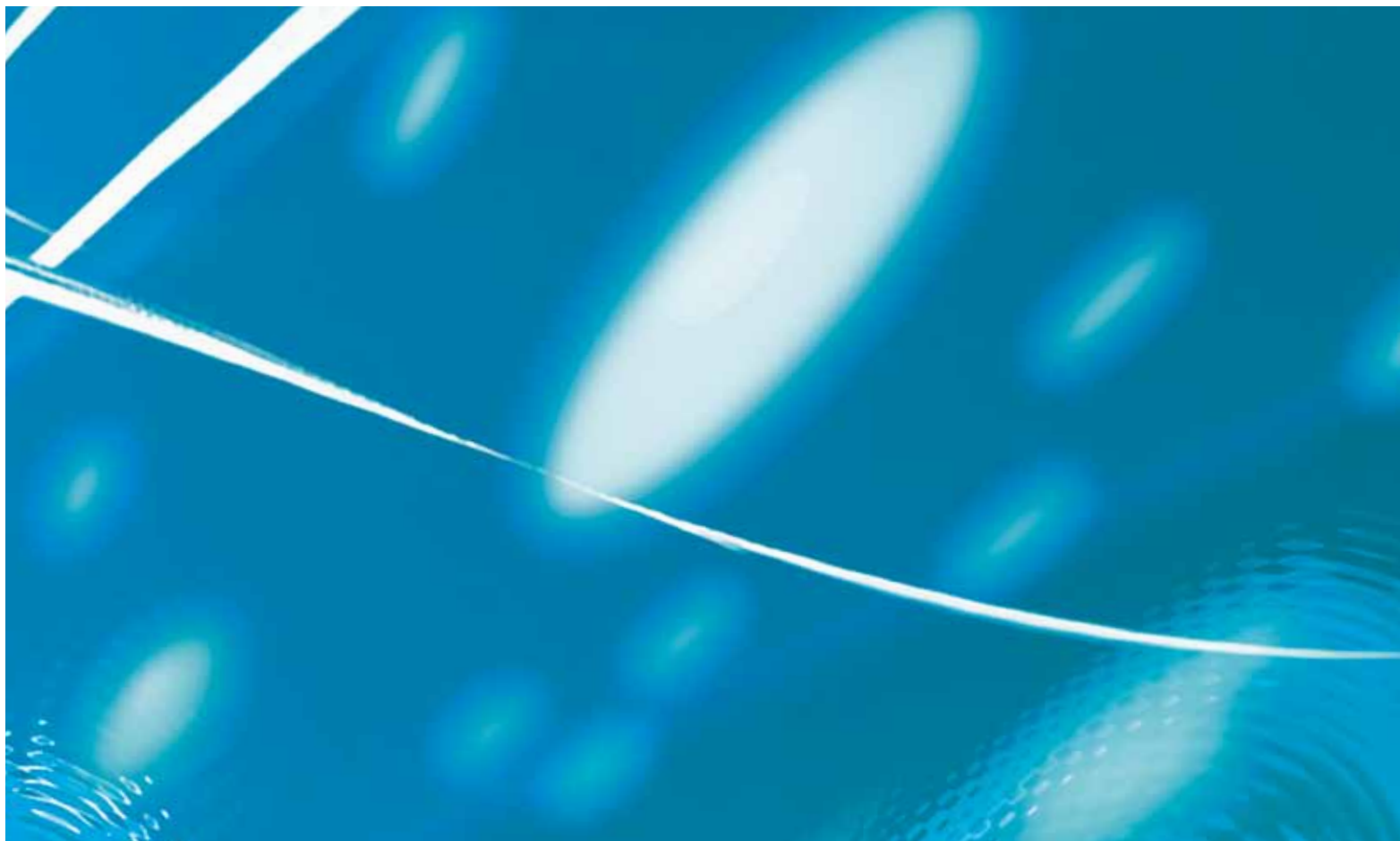
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### Vaisala facts

- A global leader in environmental and industrial measurement, over 75 years of experience
- Customers in over 120 countries, nearly 30 offices worldwide, global distributor network
- Four service centers in China, Japan, the US and Finland
- Experience with humidity measurements in demanding industrial applications for over 40 years
- Developed oil moisture measurement technology, used for over 15 years by leading power industry customers in more than 30 countries worldwide
- Over 10 years of SF6 moisture measurements; proven track record with thousands of dew point measurement installations





For more information, visit  
[www.vaisala.com](http://www.vaisala.com) or contact  
us at [sales@vaisala.com](mailto:sales@vaisala.com)

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