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22,800 SF₆ AirPlus < 1

Medium voltage switchgears

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Next to air insulated switchgears, gas insulated switchgears (GIS) with Sulphur Hexafluoride (SF₆) are globally established. Since SF₆ has 3 x better insulation capacity than air, it enables a much more compact design. In addition, all power parts are incorporated within a closed gas tank. This protects against unwanted environmental matter, like dust, humidity or animals, and makes gas insulated switchgears more reliable and almost maintenance free over the lifetime of >30 years.

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As environmentalism gathers pace, so too does criticism of SF₆ – with a GWP of 22,800 it is one of the most potent greenhouse gases. Even though ABB has continuously minimised these SF₆ losses – actual switchgears incorporate losses of less than 0.1% a year – an alternative insulation gas can further minimise greenhouse gas impact.

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The eco efficient ZX2 AirPlus –
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The new ZX2 with AirPlus insulation gas is the world’s first eco-efficient gas insulated switchgear (GIS) based on the new gas mixture. It features all advantages of the established ZX2 switchgears and retains the same compact dimensions – with a simultaneous reduction in GWP to <1.

Future-proof – with ZX2 ‘Ready-for-AirPlus’

All AirPlus GIS from ABB are backwards compatible with SF\textsubscript{6}. Customers who are not prepared to switch to AirPlus immediately, are still well prepared for the future when ordering a ZX2 ‘Ready-for-AirPlus’ switchgear. In this case, the switchgear will be factory-filled with SF\textsubscript{6} but can be refilled to AirPlus later.

Availability of ZX2 AirPlus

The ZX2 is the first member of the ZX family available with AirPlus technology. For the market launch, ZX2 AirPlus is available up to 36kV, 2000A and 31.5kA according to IEC specifications. The AirPlus portfolio is not a replacement for SF\textsubscript{6} but supplements the existing product portfolio. The AirPlus portfolio will be expanded on a continuous basis.

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Less regulations – now and in the future

In some countries GIS is already subject to regulatory obligations and demands for SF\textsubscript{6} monitoring, which increases the administration efforts and operating costs. These regulations are not applicable to AirPlus with a GWP<1.

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The AirPlus technology will be initially available for the 24kV SafeRing product line. For the market launch, SafeRing AirPlus is available up to 24kV, 630A and 16kA according to IEC specifications. The AirPlus portfolio is not a replacement for SF\textsubscript{6}, but supplements the existing product portfolio. The AirPlus portfolio will be expanded on a continuous basis.

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While AirPlus insulation gas is new, the switchgears which use this medium have been on the market for many years. The proven design has been retained and only the inside of the switchgear has been adapted for AirPlus. Naturally AirPlus switchgears fulfill the latest standards and are completely type tested.

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3M™ Novec™ 5110 Insulating Gas: a fluoroketone

The key ‘ingredient’ inside the new AirPlus insulation gas is Novec 5110 insulating gas is Novec 5110 insulating gas – with a new fluoroketone molecule developed by 3M. This medium combines good electrical insulation properties with a negligible GWP of <1. The pure Novec 5110 gas outperforms SF\textsubscript{6} in terms of electrical insulation performance.

The AirPlus gas mixture

To extend the usable temperature range of AirPlus, the Novec insulating gas is not used in pure form, instead it is mixed with a background gas. For medium voltage switchgears, the AirPlus insulation gas contains more than 80% dry air. This enables typical temperature demands of indoor switchgears to be achieved. The insulation performance of this gas mixture is close to SF\textsubscript{6}.

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Composition of AirPlus

<table>
<thead>
<tr>
<th>Novec 5110 molecule</th>
<th>Dry Air</th>
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<tbody>
<tr>
<td>&gt;80%</td>
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Reduction in global warming potential using SF₆ alternative

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