2ry Distribution Switchgear
Up to 24 kV
IEC standards

Reliable innovation.
Personal solutions.
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I. Introduction

Preface

**ga-gae**630

Fully gas insulated modular (**gae**) and compact RMU (**ga**) switchgear

- Up to 24 kV / 630 A / 20 kA 1-3 s / 50 - 60 Hz. IEC standards

- First **ga** RMU was launched in 1985, **gae** in 2001
- Completely designed in Germany
- +385,000 **ga** in service in +60 countries and +350,000 **gae** in service in +40 countries
- Application: DNS (Distribution Network Solutions for secondary distribution)

Your business and DNS applications

Segments

- **UTILITY**
  - Smart Grid
  - Transmission & Distribution
  - Generation

- **END USERS**
  - Infrastructures
  - Industrial
  - Tertiary

- **RES**
  - Wind
  - Solar
  - Dispatchable RES
II. Main features

Safety
- **Internal arc** tested AFL
- All live components inside a **hermetically sealed gas tank**
- Mechanical and electrical **interlocks** to **prevent unsafe operations**

Reliability
- **Fully insulated** and **sealed** for life
- **100 % routine tested** at factory
- **Screened cable connectors**

Efficiency
- **ga compact design** up to four functions per gas tank
- **gae modular design** suitable to any electrical single line diagram
- **Easy frontal access** to install and to test MV cables and HRC fuses
- **Small size** and **light weight**

Sustainability
- **No SF₆ use during installation**
- **En-of-life** management
- Use of highly **recyclable material**

Continuous innovation
- **Smart-grid** ready system
- Ambient temperature in **-5 / -25°C**
III. Technical details
ga-gae630 range

**ga compact cubicles**

- **1ts1a1**
  - One transformer feeder and one connection
- **1ts1s-b**
  - One transformer feeder and one cable connection with two set of bushings
- **1ts1a2**
  - Three feeders
- **3k**
  - Four feeders
- **4k**
  - Three feeders
- **3k1ts**
  - Two feeders and one transformer feeder
- **2k2ts**
  - Two feeders and two transformer feeders
- **2k1ts**
  - Two feeders and one transformer feeder
- **2k1lsf**
  - Two feeders and one SF₆ CB

**gae modular cubicles**

- **1k**
  - Load-break switch (LBS)
- **1a**
  - Cable connection
- **1ts**
  - Fused LBS
- **1lsf**
  - SF₆ Circuit Breaker
- **1h**
  - Busbar riser
- **1e**
  - Busbar earthing
- **1lsv**
  - Vacuum CB
- **1m**
  - Metering
- **2ts**
  - Two transformer feeders
- **2k1ts**
  - Two feeders and one transformer feeder
- **2k1lsf**
  - Two feeders and one SF₆ CB
- **2k**
  - Two feeders
- **3k**
  - Three feeders

(*) Available versions:
1. 1k, 1kb and 1kg
2. 1lsf and 1lsfg
3. 1h1 and 1h2
4. 1lsv and 1lsvg
5. 1m1, 1m2, 1m4, 1m5, 1m5ü, 1m6
### III. Technical details

#### General ratings

<table>
<thead>
<tr>
<th></th>
<th>ga-gae630</th>
<th>IEC</th>
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<tbody>
<tr>
<td><strong>Rated Voltage</strong></td>
<td>Ur [kV]</td>
<td>7.2</td>
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<tr>
<td><strong>Rated frequency</strong></td>
<td>fr [Hz]</td>
<td>50 / 60</td>
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<tr>
<td><strong>Rated normal current</strong></td>
<td>Ir [A]</td>
<td>630</td>
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<tr>
<td>Busbars and cubicle interconnection</td>
<td>[A]</td>
<td>630</td>
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<tr>
<td>Feeder</td>
<td>[A]</td>
<td>630</td>
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<tr>
<td>Output to transformer</td>
<td>[A]</td>
<td>200</td>
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<td><strong>Rated short-time withstand current</strong></td>
<td>Ip [kA]</td>
<td>20</td>
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<tr>
<td>with tk = 1 s – 3 s</td>
<td></td>
<td>50</td>
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<tr>
<td>Peak value</td>
<td>Ip [kA]</td>
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<tr>
<td><strong>Rated insulation level</strong></td>
<td>Ud [kV]</td>
<td>20</td>
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<td>Rated power-frequency withstand voltage [1 min]</td>
<td>Ud [kV]</td>
<td>20</td>
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<td>Rated lightning impulse withstand voltage</td>
<td>Up [kV]</td>
<td>60</td>
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<td><strong>Internal arc classification according to IEC 62271-200</strong></td>
<td>IAC</td>
<td>AFL</td>
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<td><strong>Degree of protection</strong></td>
<td>IP</td>
<td>IP65 (Gas tank)</td>
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<td><strong>Colour of equipment</strong></td>
<td>RAL</td>
<td>Grey 7035</td>
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<td><strong>Loss of service continuity category</strong></td>
<td>LSC</td>
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<td><strong>Partition class</strong></td>
<td>PM</td>
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IV. Design characteristics

Constructive structure: Modular cubicles

General view

1. Gas tank
2. Busbar
3. Driving mechanism
4. Cable compartment
5. Control box

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<tr>
<th></th>
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<th>1ts</th>
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<th>1lsv</th>
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<td>Width [mm]</td>
<td>350</td>
<td>400</td>
<td>600</td>
<td>500</td>
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<td>Depth [mm]</td>
<td>665</td>
<td>665</td>
<td>665</td>
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<tr>
<td>Height [mm]</td>
<td>1400</td>
<td>1400</td>
<td>2000 / 2300</td>
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<td>Weight [kg]</td>
<td>127</td>
<td>150</td>
<td>225</td>
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IV. Design characteristics

Constructive structure: Compact cubicles

General view

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<th>2k1ts [mm]</th>
<th>2k1lsf [mm]</th>
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<tr>
<td>Width</td>
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<tr>
<td>Depth</td>
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<tr>
<td>Height</td>
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<tr>
<td>Weight</td>
<td>298</td>
<td>355</td>
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</table>
V. References

Project References

**Utility**
- **Germany**: E.on, EnBW, RWE, RheinEnergie, Vattenfall....
- **China**: Southern Grid, State Grid...
- **Australia**: Energy Australia
- **Bulgaria**: B. Power
- **Dominican Republic**: EDESUR, CEPM
- **Malaysia**: Tenaga TNB

**End Users**
- **Germany**:
  - Dresden football stadium
  - DB (German railways) MV network
  - IOF Fraunhofer Institute
  - Zugspitze mountain cable car station
  - Leitz Industrial Park in Wetzlar
- **Malaysia**: Exxon Mobil platform
- **China**: 2008 Olympic games facilities

**RES**
- **Germany**: Wertheim PV plant
- **Italy**: Udine PV plant
- **South Africa**: Kalkbukt PV plant
- **Germany**: Schopfloch wind farm
- **Sweden**: Österlen wind farm
- **China**: Ningxia Hanas Master wind farm

**Main countries with ga-gae630 installed:**
- Germany
- China
- South Africa
- Dominican Rep.
- Czech Rep.
- Slovakia
- Poland
- Romania
- Switzerland
- Hungary
- Bulgaria
- Sweden
- Denmark
- Ukraine
- Turkey
- Egypt
- Thailand
- Indonesia
- Malaysia
- Australia
- Japan
- Vietnam
V. References

Solution Notes

End Users

Dresden football stadium

RheinEnergie headquarters in Stuttgart

Germany

Germany
Thank you!
more information:
www.ormazabal.com
and
social networks

We are launching a new website
Designed for you, letting you know everything about Ormazabal

ga-gae630 downloads:

- Brochure: CA-500
- Flyer: CA-438 / 439
- Manuals: OI_yyyy_GA-x / OI_yyy_GAE-x