



Medium Voltage Products

Portfolio & Applications

Hauke Wetzel, Sales Medium Voltage Components

VAR Partner Day 2022 | September 12 -14 | Zagreb, Croatia

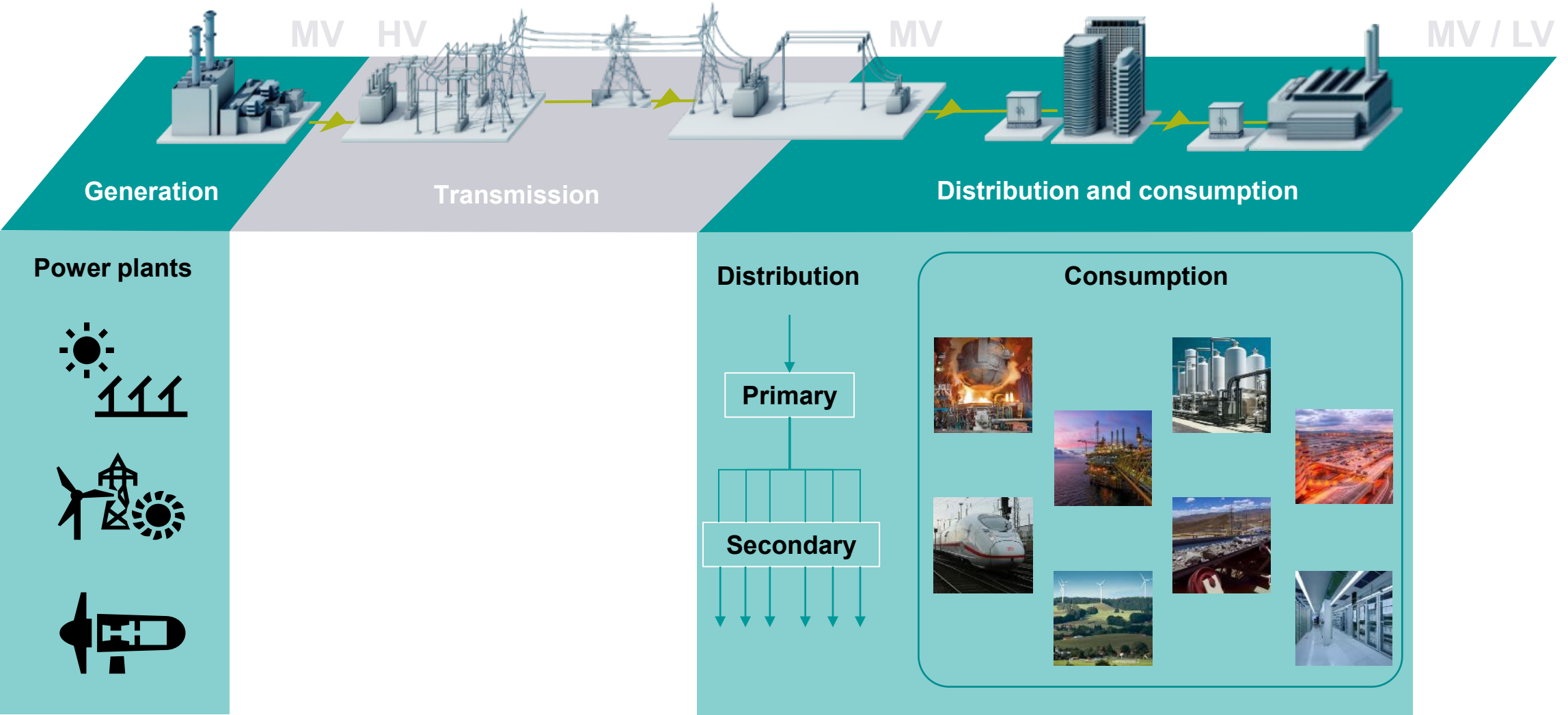
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Medium Voltage Products

The Energy Chain – Focus of Siemens Medium Voltage Products



Medium Voltage Products

Smart power distribution from medium-voltage to low-voltage

Medium-voltage Components, Systems & Solutions

Components



Primary Air-insulated Switchgear



Gas-insulated Switchgear Prim / Sec



SF6-free blue GIS Prim / Sec



Generator Circuit Breaker Switchgear



Photovoltaic (PV inverter systems)

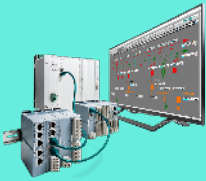


Automation, Protection & Communication for high- and medium-voltage Systems

Protection



Automation



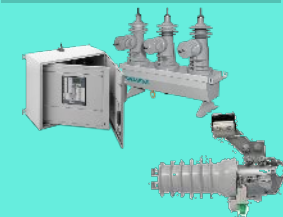
Power Quality



Smart Communication



Outdoor Distribution Systems



Solution Business (E-House systems)



Low-voltage Systems

Power Distribution Boards & Motor Control Centers



Busbar trunking systems



Services

Medium Voltage Products

Overview Portfolio

Vacuum circuit-breaker for standard applications



SION 3AE



3AH3



3AK

Vacuum circuit-breaker for high numbers of operating cycles



3AH4

Vacuum contactor- & fuse-combination



**3TL,
3TM**

Vacuum circuit-breaker for generator switching applications



(3AH5)



3AE2

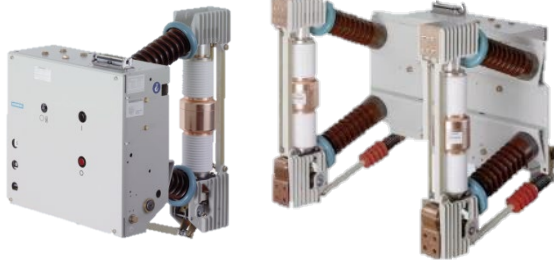


3AK



3AH36/37/38

Vacuum circuit-breaker for railway applications



3AH47

Single-components: Vacuum-interrupter, Surge arrester and auxiliary switch



Medium Voltage Products

SION 3AE family

SION 3AE5 for PRIMARY energy distribution



Product range (IEC)		
7.2 up to 17.5 kV	up to 40 kA	up to 4000 A
24 kV	up to 25 kA	up to 2500 A
 (3AH5, 3AE5 soon)	up to 25 kA	up to 2000 A
36 kV		

Retrofit solutions
replacement of old circuit breakers in existing plants



Medium-voltage switchgears
Primary and secondary distribution into MV panels



Transformer stations
Industrial power distribution, workshops, service sector



Capacitor banks and filters
Reactive power compensation, capacitor banks, voltage stabilization



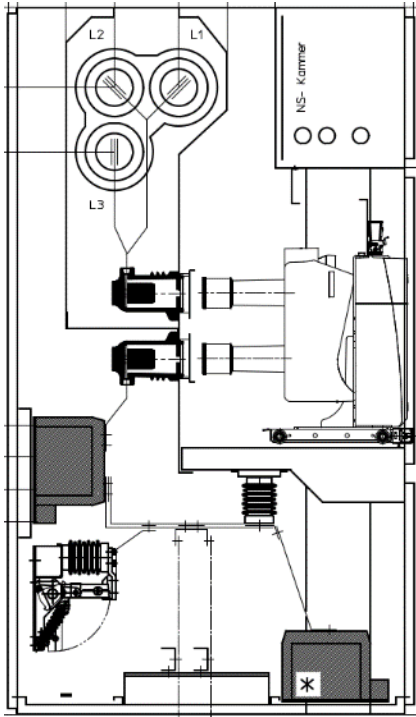
Verticals
Industry (Steel, Automotive industry, Chemicals, Data centers, Distributed energy (Micro-Grid etc.))



30,000 switching operations - new modular platform of SION 3AE5 - easy to integrate - fixed mounted or withdrawable
Regional approvals, e.g. GB / DL (China), GOST (Russia), IEEE / UL (USA)

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Panel builder's package



▶ **Pole-center distance**

▶ **Vertical distance between terminals**

▶ **Withdrawable element**
different designs, motorized option, in L-frame

▶ **Contact arms, contacts**
Siemens design, third party design

▶ **Secondary equipment**
e. g. number of solenoids, voltages, housing ...



Various options for the best possible adaptation to customer-specific panel designs

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SION L 3AE6 – lateral VCB

SION 3AE6 for SECONDARY energy distribution



Ring Main Units
Secondary distribution system



Retrofit Solutions
Retrofit of MV panels (utilities, industry)



Verticals
Wind power, Photovoltaic



Product range			
12 kV	up to 25 kA	up to 1250 A	
24 kV	up to 25 kA	up to 1250 A	

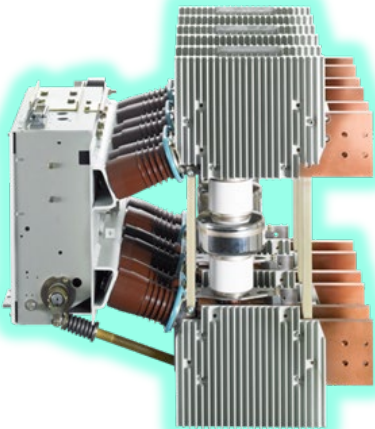


10,000 switching operations - very slim design with small dimensions - left and right mounted drive is possible

Medium Voltage Products

Circuit Breaker for Special Applications

Applications with demand on higher Ratings or Special Requirement



- **Higher primary ratings** (e.g. voltage, current, frequency)
- **Higher number of operations** (above 30.000 operating cycles)
- **Application-oriented design** (e. g. breaker with one or two poles)
- **Special standards** e.g.
 - Generator appl.: IEC/IEEE 62271-c37-013
 - Rail appl.: EN 50152-1
 - or applications without direct reference to standards



Chemicals



Renewables



Rail



Metals



Mining



Oil and Gas



Power generation

Medium Voltage Products

High performance – 3AH family

3AH3 & 3AH4 for power supply & heavy industry



Product range		
7.2 up to 17.5 kV	Up to 63 kA	Up to 4000 A
24 kV	Up to 50 kA	Up to 4000 A
36 kV / 40,5 kV	Up to 40 kA	Up to 4000 A

Switchgear panels
Primary distribution



High Current application
heavy industry, oil industry (e. g. oil rigs)
retrofit and extensions of old switchgears



Rail application
electrical power supply with different frequencies
(16,7 Hz / 25 Hz / 50 Hz / 60 Hz)



Arc furnace Application (Steel industry)
high switching application - up to 120 000 OCO (> 100 cycl. daily)

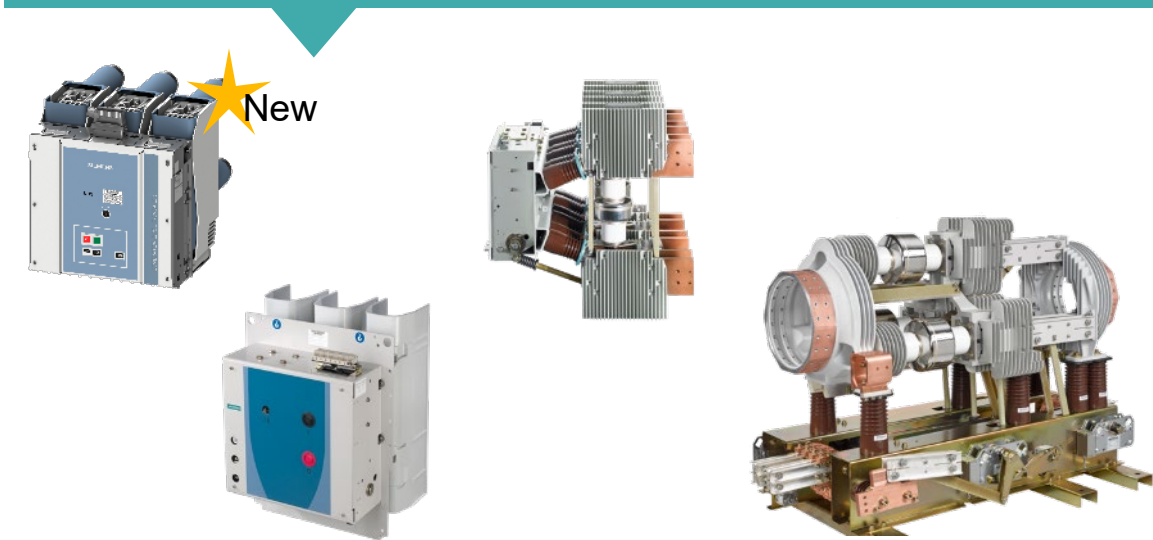


products for the highest demands – up to 250 kV_{BIL} – up to 120 000 operation cycles – 63 kA fault current

Medium Voltage Products

High performance – 3AH family

3AH36/37/38, 3AK & 3AE2 for power generator switching



Product range		
7.2 up to 24 kV (classic design)	31,5 ... 72 kA	up to 8 000 A
17.5 kV (phase segregated design)	up to 110 kA	up to 14 000 A
24 kV (phase segregated design)	up to 100 kA	up to 14 000 A



worldwide first 110 kA vacuum circuit breaker

Generator Switchgear panels

Primary distribution



Fossil Power plants

coal-fired power plant, oil-fired power plant, ...



Renewable Energy

Hydro power plants, biomass power plants



Smart Grid – Down sizing

decentral power plants, e. g. as backup for renewables



Medium Voltage Products

Generator Circuit breaker (IEC/IEEE 62271-37-013)

Applicable standard for distribution circuit breakers is **IEC 62271-100**

**High-voltage switchgear and controlgear –
Part 100: Alternating-current circuit-breakers**

§

Clause 1.1:
"Generator circuit breakers...are not
within the scope of this standard"

The special demands on generator circuit breakers are specified
in the **IEC/IEEE 62271-37-013** standard.

**Standard for AC high-voltage generator circuit breakers
rated on a symmetrical current basis**

Generator circuit breakers must be type-tested acc. to IEC/IEEE 62271-37-013



Medium Voltage Products

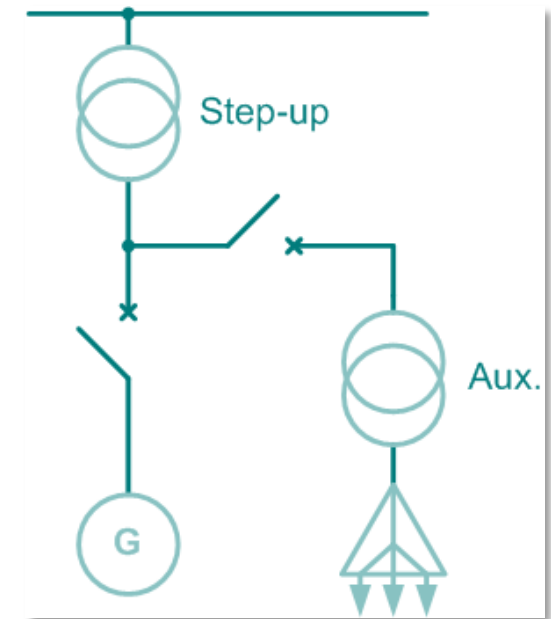
Short-circuit current calculation – Basic support by Siemens

Analysis and evaluation of all electrical components

What are required therefore?

- Data sheets of:
 - Generator
 - Generator step-up transformer (GSUT)
 - Auxiliary and excitation feeder, if applicable
- Single-line diagram (SLD)
- Relevant information regarding
 - Power plant operation mode
 - Multiplex generator systems
 - Interconnection details (busbars, cables, ...)

Highly recommended!
(free of charge)



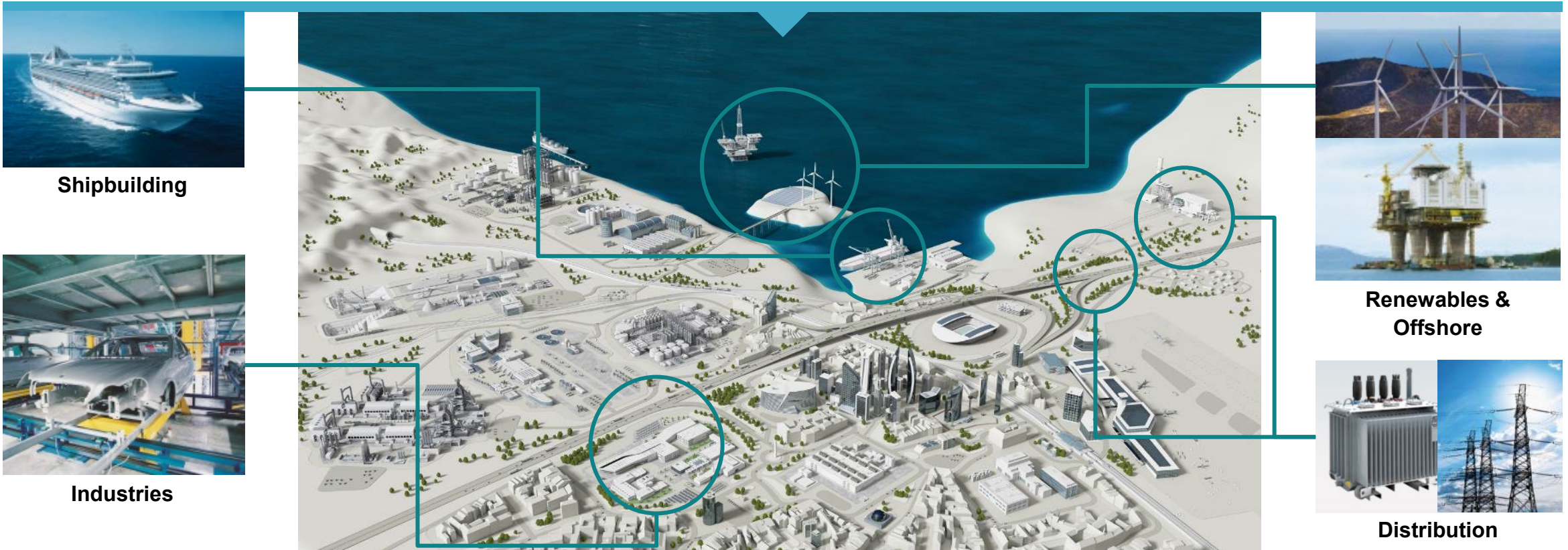
Objective:

1. Simulation of short-circuit current
2. Selection of correct generator vacuum circuit breaker

Medium Voltage Products

Vacuum contactors: Fields of application

Vacuum contactors are **load breaking devices** with a **limited short-circuit making and breaking capacity** for applications with **high switching rates** up to 1 million operating cycles



Medium Voltage Products

Vacuum contactors: Portfolio



3TM



Contactor-Fuse Combination



Product range 3TM

7.2 & 12 kV

up to 5 kA

450 A

3TL7



Product range 3TL71

24 kV

7 kA

800 A



up to 1,000,000 switching operations - maintenance free - robust - variable design - altitudes up to 5,000 m

Motor switching / Soft Starter

Elevator systems, Pumping stations,
Air conditioning systems



Transformer switching & Reactor switching

Ring-main units,
Industrial distribution systems



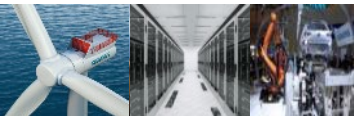
Capacitor bank & filter

Reactive power compensation



Verticals

Wind power, Photovoltaic,
Data center, Industry, Laboratory



Earthing systems

Resistor Grounding - NER / NGR

Medium Voltage Products

How to choose the appropriate order code

1. Catalogue



2. Configurator / Industry mall



3. Questionnaire

Technical data				Other values
Rated voltage	☐ 7.2 kV ☐ 24 kV	☐ 12 kV	☐ 17.5 kV	☐ ____ kV
Rated lightning impulse voltage	☐ 60 kV ☐ 125 kV	☐ 75 kV	☐ 95 kV	☐ ____ kV
Rated short-duration power-frequency withstand voltage	☐ 20 kV ☐ 42 kV	☐ 28 kV ☐ 50 kV	☐ 38 kV ☐ 55 kV	☐ ____ kV
Rated short-circuit breaking current	☐ 12.5 kA ☐ 25 kA	☐ 16 kA ☐ 31.5 kA	☐ 20 kA ☐ 40 kA	☐ ____ kA
Rated operating current	☐ 800 A ☐ 2500 A	☐ 1250 A ☐ 3150 A	☐ 2000 A	☐ ____ A
Pole-centre distance	☐ 150 mm	☐ 160 mm	☐ 210 mm	☐ 275 mm
Vertical distance between terminals	☐ 205 mm	☐ 275 mm	☐ 310 mm	

Secondary equipment		
For possible combinations, see pages 26 to 32		
Circuit breaker installation equipment	☐ Fixed mounting	☐ Withdrawable element, contact arms ☐ Withdrawable element, contact arms, bushings
Drive motor	☐ DC ____ V	☐ AC ____ V, ____ Hz
Closing solenoid	☐ DC ____ V	☐ AC ____ V, ____ Hz
1st shunt release	☐ DC ____ V	☐ AC ____ V, ____ Hz
2nd shunt release	☐ DC ____ V	☐ AC ____ V, ____ Hz
C.T.-operated release	☐	
Undervoltage release	☐ DC ____ V	☐ AC ____ V, ____ Hz
Auxiliary switch	☐ 6 NO + 6 NC	☐ 12 NO + 12 NC
Low-voltage terminal	☐ 20-pole plug strip or 27-pole terminal strip	☐ 64-pole plug
☐ Electrical closing lock-out		
Operating instructions	☐ German	☐ English ☐ French ☐ Spanish

Medium Voltage Products

Online configurator

SIEMENS

3AE2 Configurator

3AE2655-6.....-Z F30+W80

Rated Voltage

Rated voltage (Ur)

17.5 kV

Rated insulation level (Ud, Up)

38 kV / 95 kV

Rated short-circuit breaking current

Rated short-circuit breaking current

31.5 kA

Rated continues current

Rated continuous current

2500 A

Pole Center Distance / Vertical distance between terminals

Pole-center distance (PMA)

275 mm

Vertical distance between terminals

310 mm

Installation options

Configuration is not yet complete

Please insert 3AE2 Ordernumber

Rated Voltage

Rated short-circuit breaking current

Rated continues current

Pole Center Distance / Vertical distance between terminals

Installation options

Insulation features

Shunt release combination/Opening functions

Closing functions

Motor

Secondary equipment

Environmental features

Accessories

Documents, labels and warranty

3D Model

2D Drawing

Technical Data

Accessories

Documents

Warranty

Log In for Price >

Cancel

Reset

Load / Save

CAx Files

Documents

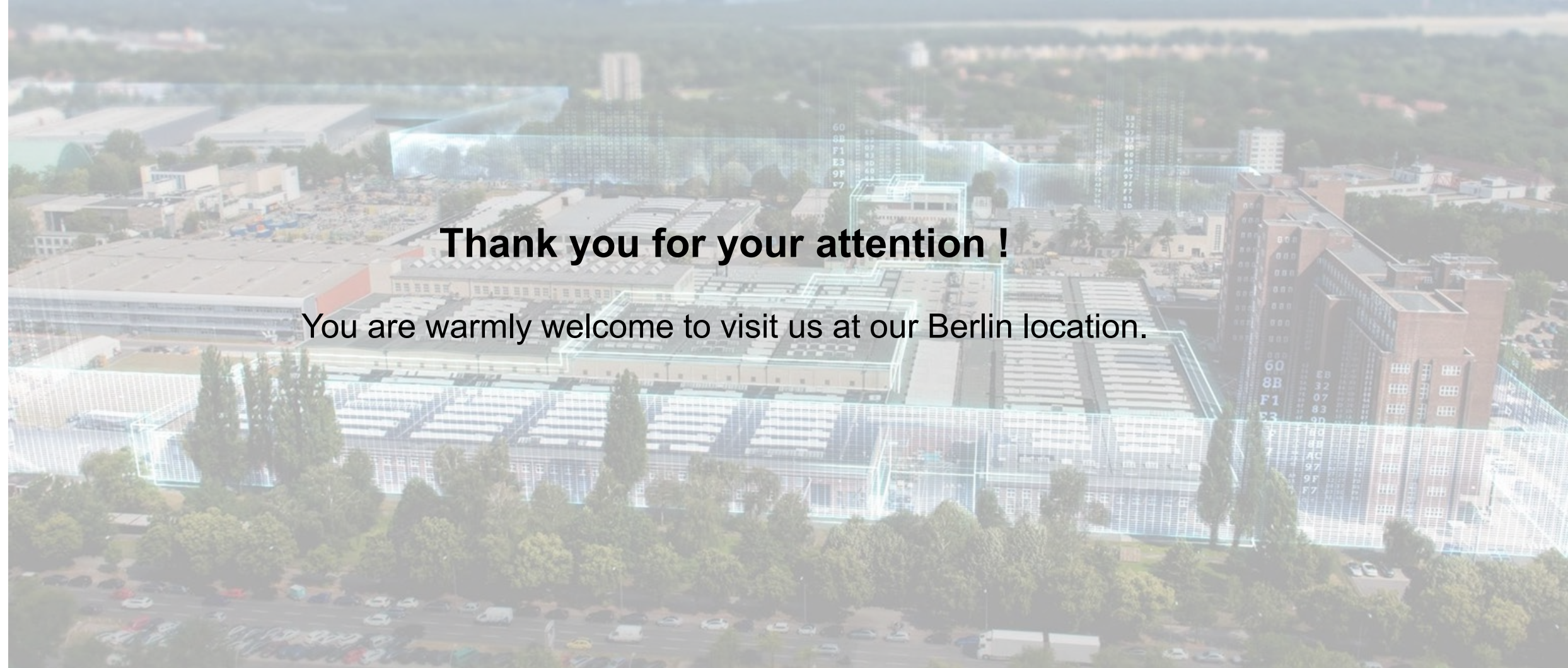
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Medium Voltage Products

Global Business with local Factories



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| Contact

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Hauke Wetzel

Medium Voltage Primary Components
Siemens AG / HQ / SI EA S CP PL PCS
Nonnendammallee 104
13629 Berlin
Germany

Mobile +49 (173) 6076498

E-mail hauke.wetzel@siemens.com

www.siemens.at/var