

-Liquid-cooled frequency converter switchgear

# VEO knows your needs

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We deliver automation and electrification solutions for energy production, distribution and consumption in close collaboration with our customers worldwide.

VEO's field of expertise is energy. We provide customised automation and electrification solutions for customers in the power generation, distribution and process industries.

Our services range from partial deliveries to turnkey projects, including preengineering, equipment deliveries, project management, installations, commissioning and user training. Our know-how also extends to plant modernisations, maintenance and system updates.

### Independent - in the best interests of customers

We want to be an available, attentive and responsible partner, able to flexibly accommodate our customers' needs. Cooperation with all leading equipment suppliers in the field ensures that the solutions provided to our customers will always be the most suitable and the most advanced available.

## Know-how throughout the energy chain

Our extensive experience is visible in all major fields of the energy sector. Our know-how is cultivated and passed on to the next generation through the VEO Academy, whose expert seminars and training are also available to our customers. Our operations are based on the ISO9001:2000 quality management system, which is audited annually by both DNV and SGS-Fimko Ltd. We also have ISO14001:2004 environmental certification.

VEO manufactures its core products inhouse. The tailor-made solutions offered to our customers are based on these core products combined with other well known suppliers' components in order to provide the best available solution for each project. In addition to control, protection and automation systems for power production, we deliver substations and medium voltage switchgears for distribution systems as well as low voltage switchgear, drives and automation systems for the process industry.



#### Energy-efficient and silent space saver

VELC is a space-saving frequency converter switchgear solution with liquid-cooled main components. Liquid cooling enhances the cooling effect and reduces equipment noise. The VELC solution is particularly suitable for installations with limitations on the available cooling air or installation space. Typical users include ships, the offshore industry, mines and manufacturers of equipment and machinery. Compared with similar air-cooled equipment, significant savings of space are achieved.

Thanks to liquid cooling, large air conditioning equipment or channels are not required as the coolant removes about 95% of the excess heat produced by the main components. This drastically reduces the cooling air requirements. This, in turn, means savings both in capital expenditure and operating costs. Furthermore, the absence of large cooling fans means that the noise level produced by the liquid-cooled frequency converter switchgear is low.

Ordinary drinking water or a mixture of water and glycol can be used as coolant. The use of an inhibitor additive is recommended to avoid electrochemical corrosion.

VELC is available in protection class IP23 and IP54 versions. Either a 6-pulse or a 12-pulse mains connection is available.

#### VELC -Liquid-cooled frequency converter switchgear

- environmentally friendly
- energy-efficient
- space-saving
- silent operation
- reliable
- savings in capital expenditure
- savings in operating costs

# VELC-Liquid-cooled freque



#### VELC 12-pulse version

Mains connection 2. Breakers (optional) 3. Earthing switches (optional) 4. Bus bars 5. Fuses 6. Liquid-cooled mains choke 7. Liquid-cooled frequency converter 8. Liquid-cooled Du/dt -filter (optional) 9. Motor connections
Control and auxiliary section 11. Liquid-air -heat exchanger (optional) 12. Coolant distribution pipelines

# ency converter switchgear

VELC is a compact and welltested switchgear that utilises liquid-cooled components. VELC is designed to be flexible, sturdy, compact, as well as easy to install and maintain. It is a safe choice for all demanding applications.

#### User friendly

The control unit of the frequency converter is in a dedicated space where the auxiliary equipment is also located.

The extensive range of available options allows the switchgear to be equipped to match the customer's needs.

The cable inlets and clamps for mains cable and motor cables are included in the standard scope of supply.

## For demanding environments

The temperatures of the liquidcooled components used in the switchgear remain low and steady, prolonging the service life even in the most demanding operating environments. The excellent EMC (Electromagnetic compatibility) properties of the switchgear also ensure trouble-free operation.

#### Maintenance friendly

The components are designed and placed to make them easily accessible from the front side of the switchgear for maintenance and replacement.

## For small installation spaces

Liquid cooling has significantly reduced the physical size of main components, leading to a compact switchgear design. Liquid cooling is an ideal solution for switchgear that is to be installed in places where space is limited.

#### Silent operation

The absence of large cooling fans means that the noise level produced by the VELC switchgear is low.

# Environmentally friendly and energy-efficient

Thanks to advanced frequency converter technology, the VELC switchgear has top-class energy efficiency. The excess heat absorbed in the coolant can be utilised by the customer through a heat exchanger. The basic solution has a 6-pulse circuit, but the total harmonic distortion (THD) in the mains can be limited using a 12-pulse circuit if required.



# VELC-Technical data and options

#### **VELC technical data**

- Rated nominal voltage  $\bullet \leq 690$  VAC, 50/60 Hz
- Short-circuit withstand strength

Examples of space needed:

• I<sub>cw</sub> (1 s) 50 kA

#### Power range

- Basic solution 630-1400 kW
- Expandable to  $\leq$  4800 kW

#### Degrees of protection

- IP 23
- IP 54

#### Standard colour

• RAL 7035

6-pulse version, IP 23, IP 54				
Power	Height, mm	Width, mm	Depth, mm	Weight, kg
630-1400 kW	2010	1710	820	n. 1450
12-pulse version, IP 23, IP 54				
Power	Height, mm	Width, mm	Depth, mm	Weight, kg
630-1250 kW	2010	1900	820	n. 1600

#### **VELC** options

#### Mains device

- Moulded case circuit breaker
- Air circuit breaker
- Earthing switch

#### Cabling

- Mains cabling from top
- Motor cabling from top

#### Motor output filter

- dU/dt -filter
- Common mode ferrite rings

#### Liquid-liquid heat exchanger

- 40 kW
- 120 kW

#### Marine/Offshore

- Vibration damping
- Top support
- Grip rail
- Door stay at 90° open

#### Enclosure

- IP 23 -> IP 54
- Base plinth
- Additional empty section
- Lifting brackets

#### Auxiliary equipment

- Control cabling to the terminal block
- Emergency stop function using a separate relay
- Isolation level monitoring relay
- Pilot devices mounted on the door
- Auxiliary voltage distribution
- Control of motor cooling fan
- Motor heater feeder
- Control of motor brake
- Cabinet light
- Cabinet heater





We promote the success and sustainable growth of our customers through our decades of experience and diversified energy know-how.



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