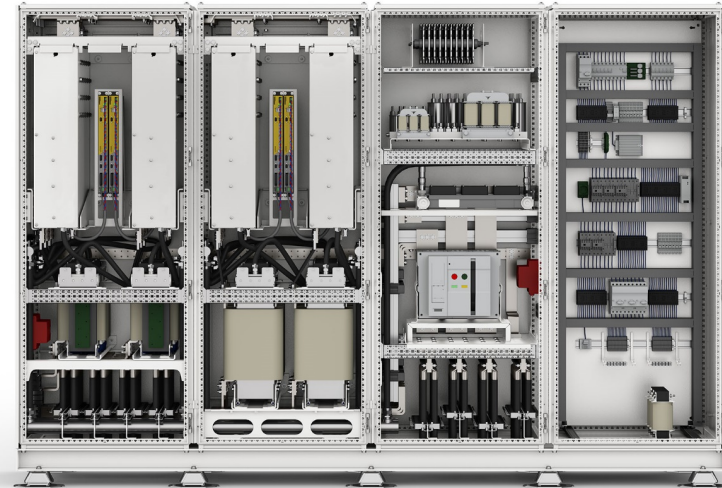




i2MOTION
ARCHITECTS IN MOTION

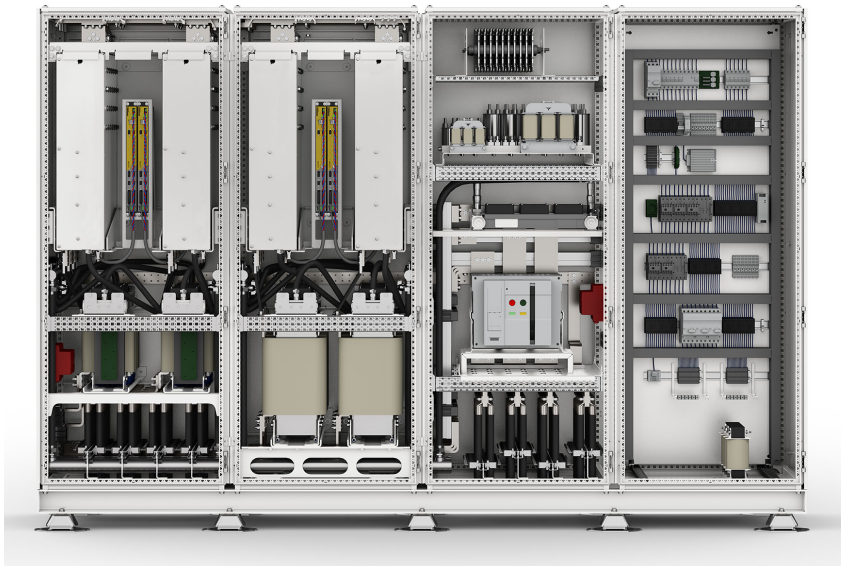


i2Motion, water cooled solutions



i2Motion, water cooled solutions

Advantages & Benefits



- High efficiency
- High power density and small foot print
- Fully enclosed cabinets
- Liquid cooling for individual components
- Identical modules over entire power range
- Easy front access for all components
- Simple cable / rail connections
- Fast protection functions
- Internal Brake Chopper
- Different mechanical arrangements (B2B, in Line)

i2Motion, water cooled solutions

Active Rectifier Unit

- Power electronic modules
- Control module
- Fast Protection System
- Air/water heat exchanger
- Line filter choke

Control Module

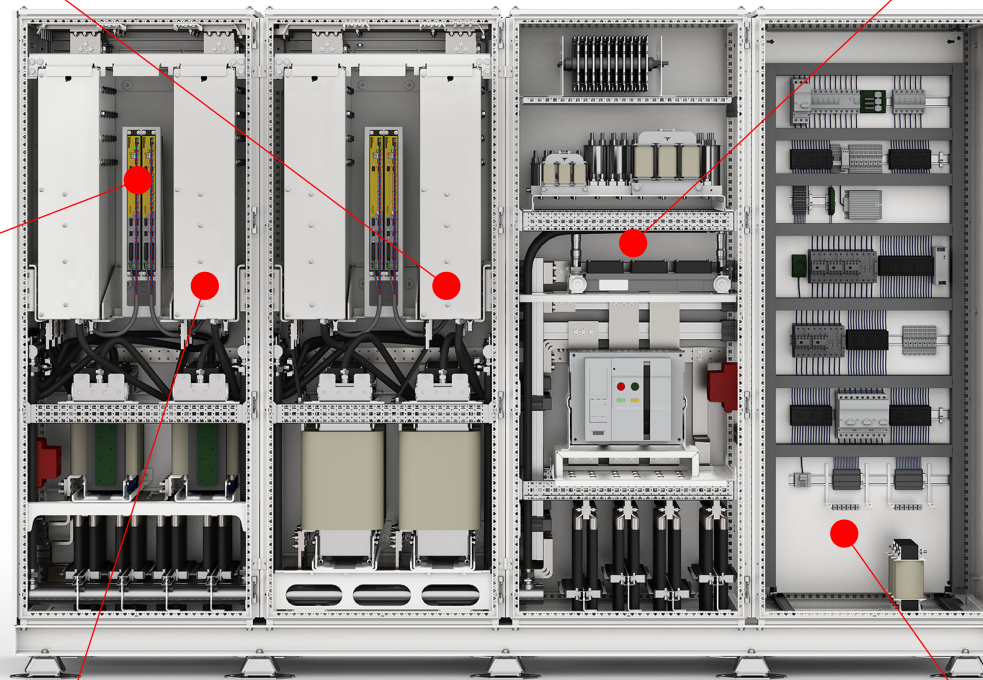
- Fast & accurate control
- Reliable safety functions
- **Will be integrated in power unit Q1-2021**

Converter Unit

- Power electronic modules
- Control module
- Air/water heat exchanger
- dv/dt filter
- Cable connection terminal

Power Supply Infeed Unit

- Braking resistor
- Harmonic filter unit
- Main circuit breakers
- Cable connection terminal



Control

- Auxiliary power supply
- Communicating
- Optional control units

i2Motion, water cooled solutions



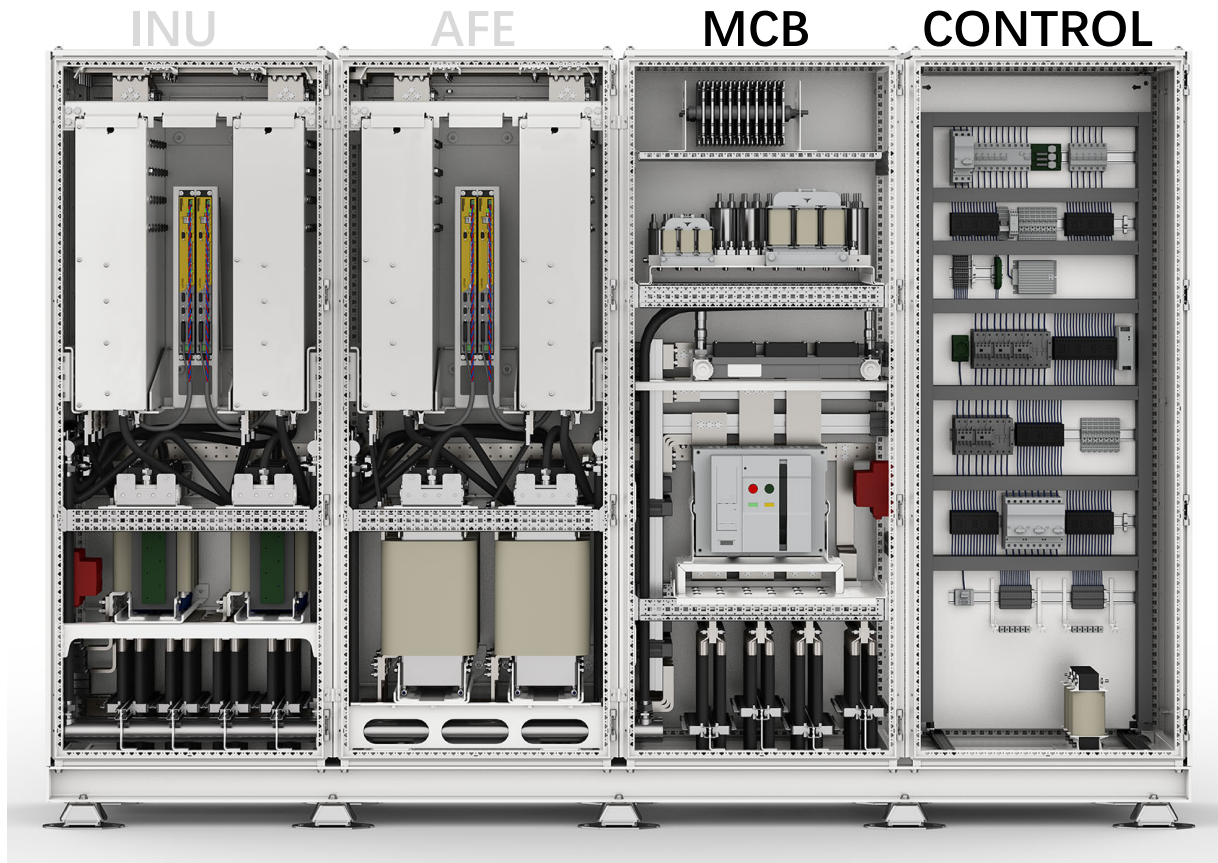
Power Module 1:
Voltage category: 380 / 500 / 690 V
Switching: DC/AC
Power: 110 - 1,000 kW
Cooling: Liquid-cooled
Temperature range: -40 to 50 °C
IP rating: IP21
Weight: 61 kg
Dimensions (H/W/D): 800 / 215 / 445 mm
Also available in: AFE



Power Module 2:
Voltage category: 380 / 500 / 690 V
Switching: DC/AC
Power: 1,000 - 2,000 kW
Cooling: Liquid-cooled
Temperature range: -40 to 50 °C
IP rating: IP21
Weight: 104 kg
Dimensions (H/W/D): 890 / 215 / 580 mm
Also available in: AFE

i2Motion, water cooled solutions

System features

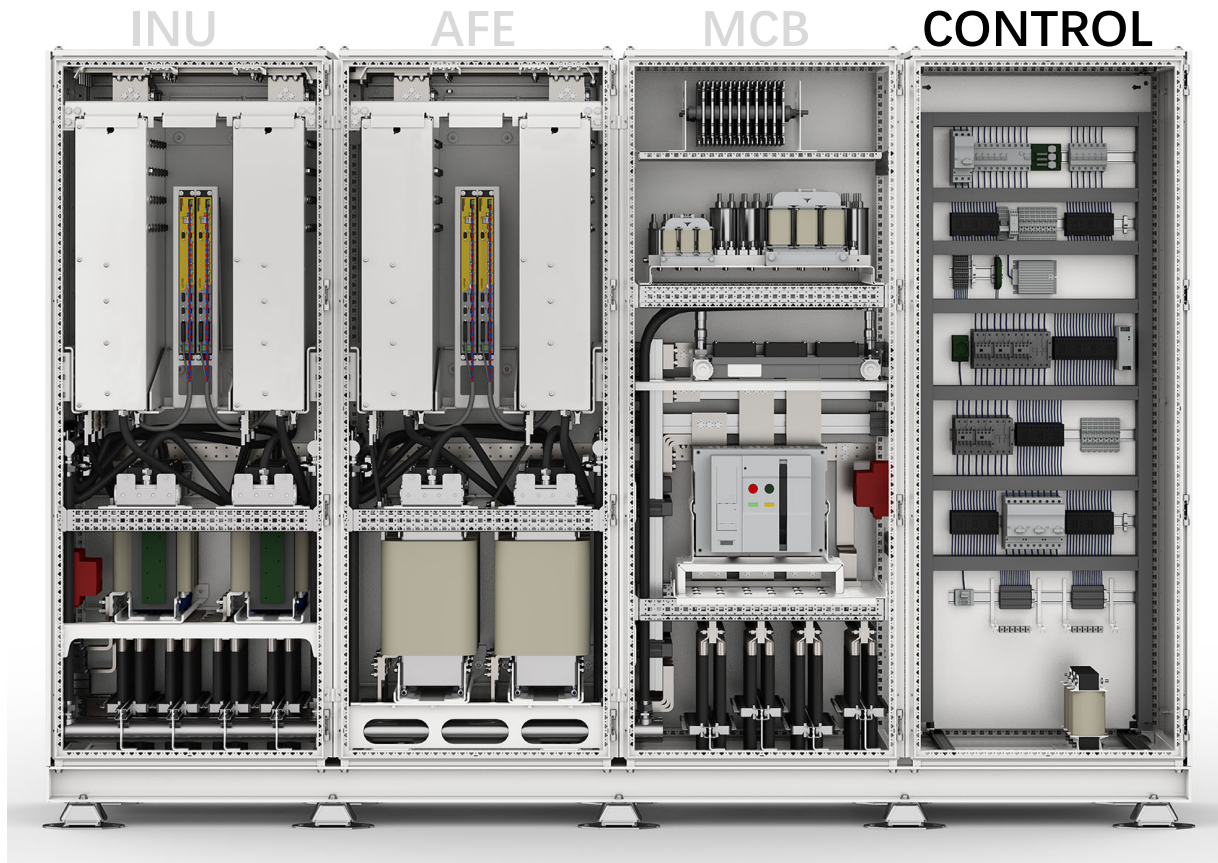


INU = Inverter Unit AFE= Active Front End Unit

- **MCB**
 - Chopper resistor 4MWs
 - Tuned grid filter (BDEW)
 - Internal heat exchanger
 - High reliable circuit breaker
 - Surge arrestors
 - Cable terminals
- **Control**
 - Auxiliary power supply
 - Field bus interface
 - Cooling unit control
 - UPS power supply (DSK)

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System features

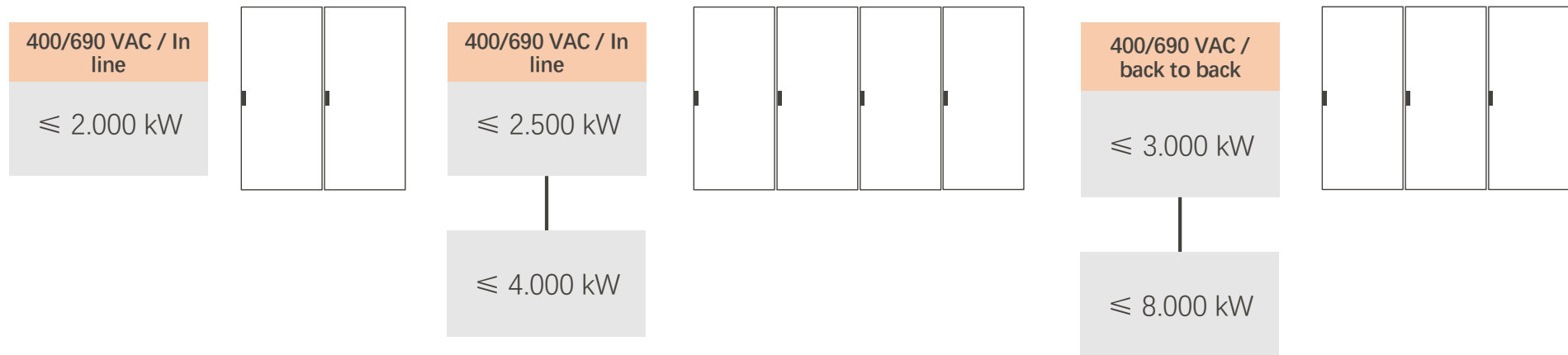


INU = Inverter Unit AFE= Active Front End Unit

- **Control**
 - Exact rotor positioning with encoder
 - Grid synchronisation (inrush free transformer switching)
 - Grid voltage control grid by reactive power supply
 - Fault Ride Through (FRT) control for different grid codes
 - Fast Protection System for extended safety

i2Motion, water cooled solutions

Product line



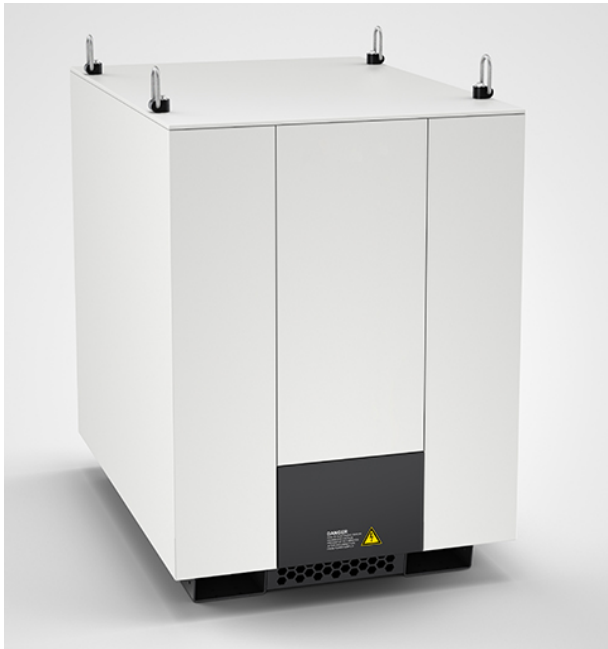
Dimensions (WxHxD): 1600x2000x600

Dimensions (WxHxD): 3200x2000x600

Dimensions (WxHxD): 2800x2000x1200

i2Motion, energy storage unit

Product



[LES 200-1500](#)

- Storage medium: Double-layer UltraCap (DLC)
- Energy content: 1.5 MJ
- Power output: 100 kW (15 seconds)
- Input voltage range: 530 ... 850 V DC
- Storage management: Active balancing
- Communication: CAN open, Profinet
- Dimensions (HxWxD): 1100 x 750 x 1120 mm
- Weight: 500 kg
- Protection class: IP 65
- Cooling: Liquid cooling (external)
- Operating temperature range: -30 °C ... +45 °C

Cabinet integrated energy storage unit available Q4-2020

i2Motion, energy storage unit

Technical data: characteristics

- Independent of (variable) DC link voltage by DC / DC controller
- Use of the entire energy content by DC / DC controllers
- Increased device protection through controlled current flow
- Higher life due to 3-phase DC / DC controller to reduce the current ripple on the DC link and the capacitor cells
- Support of a power management system
- Unlimited repetition rate of maximum load cycle through efficient cooling
- Compared to battery-type accumulators, energy storage units based on double layer capacitors offer a high number of charging and discharging cycles, in which high load peaks temporarily occur and long service life is essential.

Battery/Ultra-Cap hybrid under development

i2Motion, energy storage unit

System properties

Reduced planning cost

- External: Lower coordination → All function units bundled in the Liduro energy storage unit
- Internal: No cost for purchasing, electrical and mechanical design and the production of multiple single components

Simplified and therefore faster integration in machinery and plant

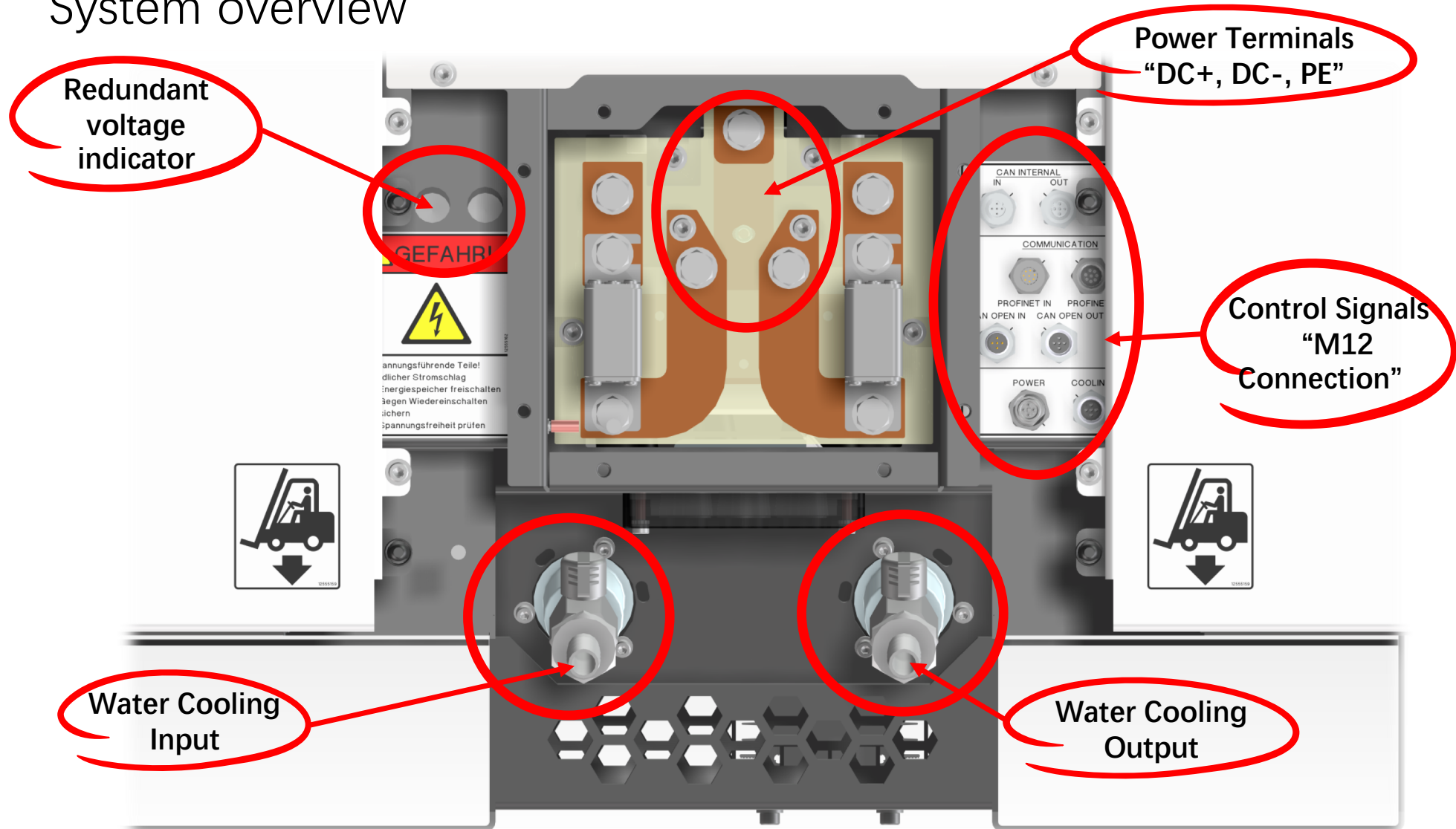
- "2-pole" electrical design
- Less installation work and "connect & use" commissioning
- Small space requirement with very high-power density

Easy to retrofit to existing plants

- Connection to DC networks (for example interim converter circuit)
- Connection to existing cooling water systems or single cooling unit

i2Motion, energy storage unit

System overview



i2Motion, energy storage unit

System overview



CAN intern

- Parallel Operation
- Storage units communicate with each other

Profinet

- Communication with higher-level control (e.g. PLC)

CAN open

- Communication with higher-level control (e.g. PLC)

Supply

- 24V auxiliary supply
- 24V control release signal (Hardware-Enable)

Cooling

- Status and monitoring of the external cooling unit (e.g. level of the cooling)

i2Motion, energy storage unit

System overview



USB-Interface

- Parametrisation

Error-Interface

- Relay contact
- Connection for customer (e.g. operation without field bus)



Thanks for your attention