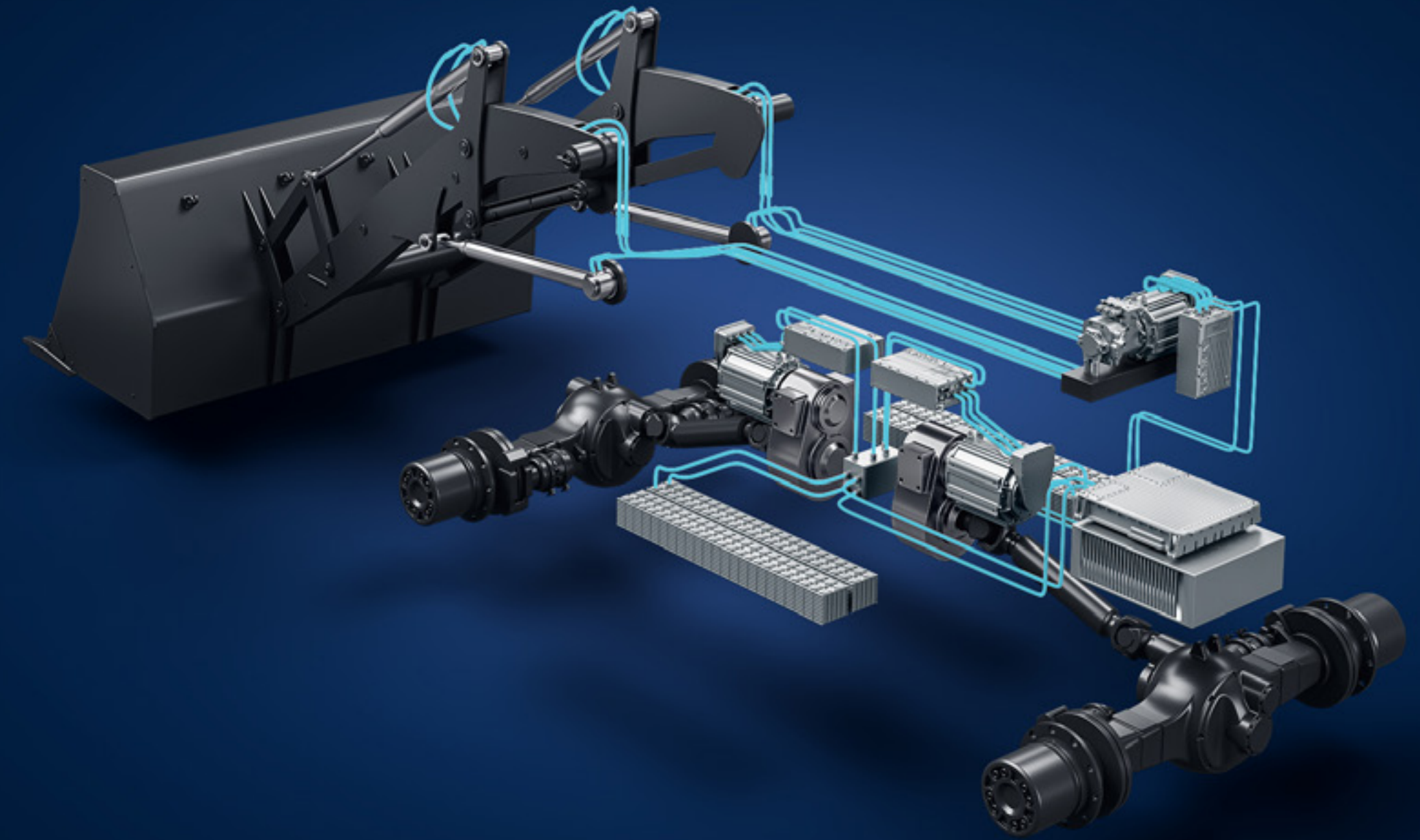


# ARADEX portfolio and subsystems

We drive new energy for a greener future



# / Content

I

## **INVERTERS AND MOTORS**

Hardware for propulsion  
and functional drives

II

## **MULTI-ENERGY-CONCEPT**

Battery, fuel cell, diesel-hybrids:  
Starting now and future proof

III

## **EXAMPLES**

Components and subsystems:  
Our market approach

IV

## **ENGINEERING SUPPORT**

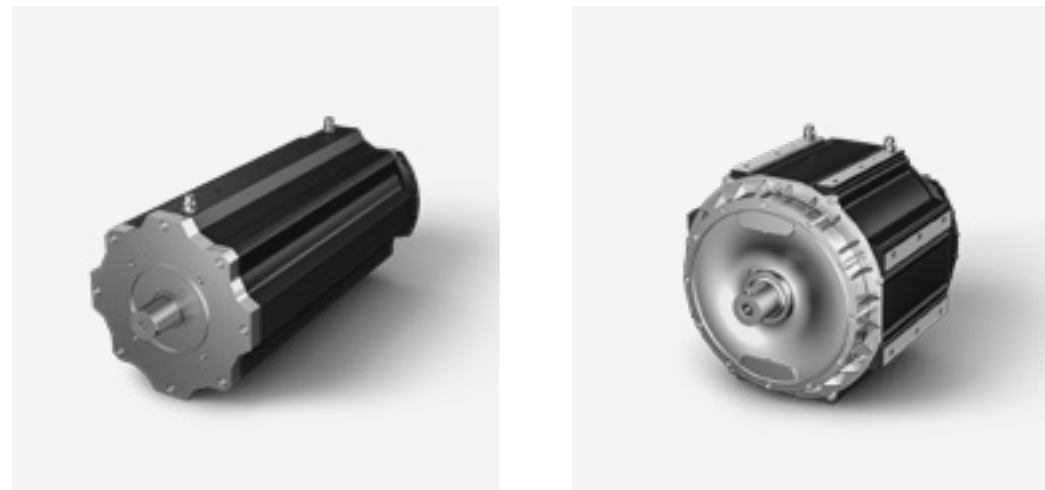
Training, commissioning  
and more

# I INVERTERS AND MOTORS

Hardware for propulsion  
and functional drives

# / Overview

## TRACTION MOTORS



**& MORE  
AVAILABLE  
PRODUCTS**



- AC-induction
- PM-reluctance
- Motor + gearbox

## AUXILIARY MOTORS



**& MORE  
AVAILABLE  
PRODUCTS**



- PM

## MOBILE INVERTERS



**& MORE  
AVAILABLE  
PRODUCTS**



- Double
- Single

# / Motors & inverters combination

VECTOPOWER can operate up to 4 synchronized motors for up to 1200kW continuous power



**Voltage range**  
300-840 VDC



**Continuous power**  
30-300 kW



**Peak torque**  
360-4000 Nm

Our VECTOPOWER inverters support different motor topologies:

- AC-induction
- PM
- PM-reluctance



# / Traction motors

## PM-reluctance type



### High efficiency

VECTOPOWER inverter allows optimum use of reluctance based torque contribution



### Compact design

Comparatively small space requirement in the vehicle as well as lower weight



### High dynamics

Useful for fast synchronization during operation with switchable gearboxes

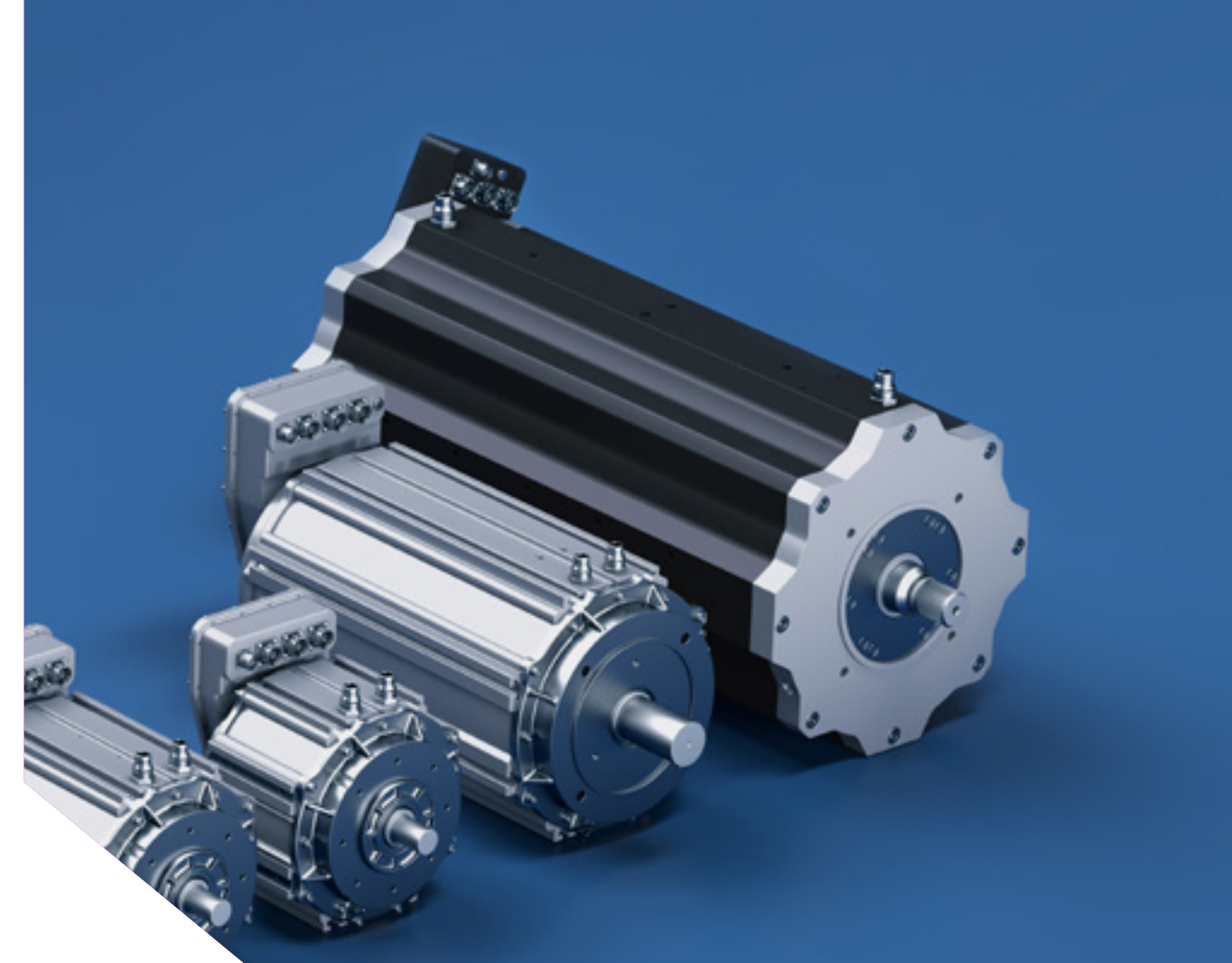


### Suitable inverters

ARADEX offers perfect matching inverters and control software for pm-reluctance motors

# / Traction motors

## AC induction type



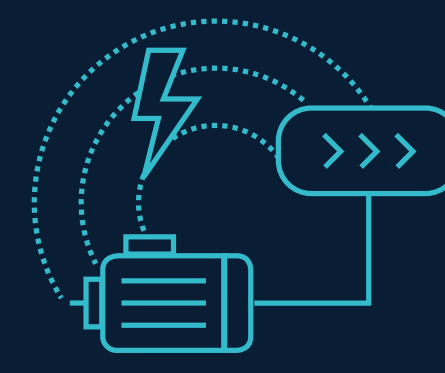
### Maintenance-friendly

Maintenance work does not have to be carried out in a specialized workshop



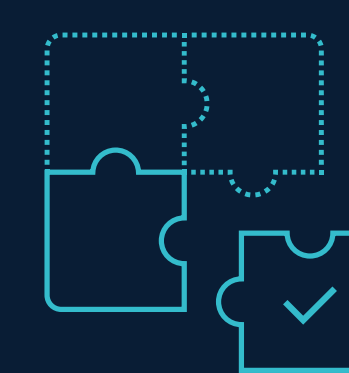
### Easy integration

No torque and no generated voltage in towing operation



### Direct drive solutions

ARADEX offers solutions for propulsion with and without gearboxes



### Suitable inverters

ARADEX offers perfect matching inverters and control software for asynchronous motors

# / Traction motors

## Motor + gearbox combination



### **Integrated solution**

Inverter + motor + gearbox as subsystem. Options: additional differential, shiftability.



### **Various models**

Optimized to traction application we offer several models with various power.



### **High efficiency**

System efficiency from DC-input of inverter to shaft output of gearbox up to 94,5%



### **PM & AC-induction**

We offer very compact solutions with PMSM motor and as well magnet-free ac-induction motors.



# / Traction motors

## Product overview



**VM616-18W0040**  
PM-reluctance



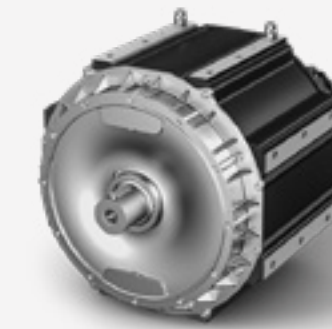
**VM600M-18W0073**  
PM-reluctance



**VM616-18W0120**  
PM-reluctance



**VM622-18W0300**  
PM-reluctance



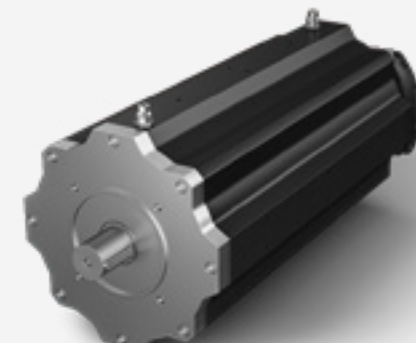
**VM600M-28W0350**  
PM-reluctance



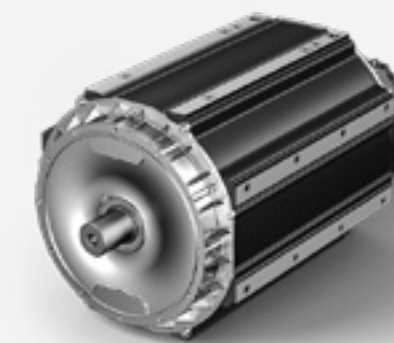
**VM616-18W0044**  
AC-induction



**VM620-18W0134**  
AC-induction



**VM625-18W0270**  
AC-induction



**VM630-28W0380**  
AC-induction

# / Traction motors & inverters

## Product data

Motor Name	Combined Inverter	Motor Topology	Peak Torque [Nm]	Cont. Torque [Nm]	Nom. Speed [rpm]	Max. Speed [rpm]	Main Applications, Remarks	Continuous Power Motor + Inverter [kW]
VM616-18W0040	VP600-18W340, VP600-28W344	PM-reluctance	360	175//110	3580//6000	7200//7200	High speed PM	65//69
VM616-18W0044	VP600-18W340, VP600-28W344	AC-induction	440	179	2510//--	5800//--	High speed AC	47//--
VM600M-18W0073	VP600-18W360	PM-reluctance	800	488//473	2265//3800	6500//6500	Direct cardan/gearbox	110//180
VM600M-18W0073	VP600-28W344	PM-reluctance	669	433//433	2265//3800	6500//6500	Direct cardan/gearbox	100//164
VM600M-18W0073	VP600-18W340	PM-reluctance	780	354//354	2265//3800	6500//6500	Direct cardan/gearbox	82//135
VM616-18W0120	VP600-18W360	PM-reluctance	1100	775//750	1175//2100	5500//6000	Direct cardan	100//163
VM616-18W0120	VP600-28W344	PM-reluctance	1100	725//725	1175//2100	5500//6000	Direct cardan	93//157

Values for **400 VDC** // **670 VDC**

Please contact our sales team for detailed information and data sheets

# / Traction motors & inverters

## Product data

Motor Name	Combined Inverter	Motor Topology	Peak Torque [Nm]	Cont. Torque [Nm]	Nom. Speed [rpm]	Max. Speed [rpm]	Main Applications, Remarks	Continuous Power Motor + Inverter [kW]
VM616M-18W0120	VP600-18W340	PM-reluctance	1100	594//594	1175//2100	5500//6000	Direct cardan	76//129
VM622-18W0300	VP600-18W360	PM-reluctance	2190	1125	--//1230	--//3000	Direct cardan	--//145
VM622-18W0300	VP600-28WA77	PM-reluctance	2470	1192	--//1230	--//3000	Direct cardan	--//153
VM600M-28W0350	VP600-18W368	PM-reluctance	3800	1660	--//1210	--//3600	Direct cardan	--//210

Values for **400 VDC** // **670 VDC**

Please contact our sales team for detailed information and data sheets

# / Traction motors & inverters

## Product data

Motor Name	Combined Inverter	Motor Topology	Peak Torque [Nm]	Cont. Torque [Nm]	Nom. Speed [rpm]	Max. Speed [rpm]	Main Applications, Remarks	Continuous Power Motor + Inverter [kW]
VM620-18W0134	VP600-18W360	AC-induction	1340	600//600	1200//1950	4800//4800	Direct cardan	75//122
VM620-18W0134	VP600-28W344	AC-induction	1257	600//600	1200//1950	4800//4800	Direct cardan	75//122
VM620-18W0134	VP600-18W340	AC-induction	1257	502//502	1200//1950	4800//4800	Direct cardan	62//102
VM625-18W0270	VP600-18W368	AC-induction	2700	804	--//2380	--//4800	Direct cardan	--//200
VM630-28W0380	VP600-18W368	AC-induction	4050	1650	--//1385	--//3600	Direct cardan	--//239

Values for **400 VDC** // **670 VDC**

Please contact our sales team for detailed information and data sheets



# / Auxiliary motors

## Permanent magnet type



### High peak-torques

High peak-torques for best overload-capability



### Convection cooling

2 motors with natural convection cooling, easy to integrate



### High continuous power

2 motors with higher continuous power by liquid cooling

# / Auxiliary motors

## Product overview



# / Auxiliary motors & inverters

## Product data

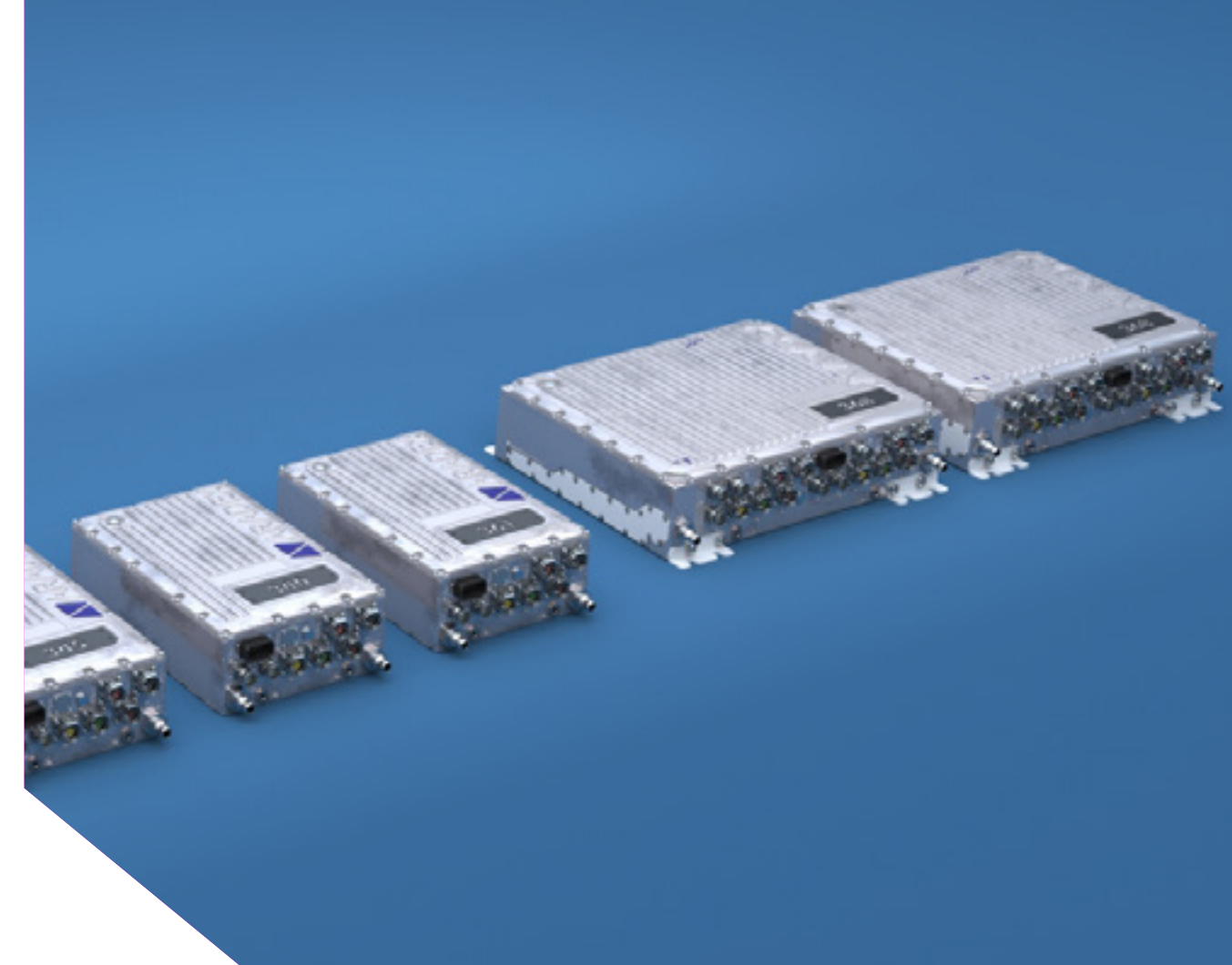
Motor Name	Combined Inverter	Motor Topology	Peak Torque [Nm]	Cont. Torque [Nm]	Nom. Speed [rpm]	Max. Speed [rpm]	Main Applications, Remarks	Continuous Power Motor + Inverter [kW]
VM600M-18W0018	VP600-18W340, VP600-28W344	PM	221	72	2140//3000	2850//4000	Auxiliary, liquid + convection	16//22,6
VM600M-18Z0012	VP600-18W340, VP600-28W344	PM	221	32	2140//3000	2850//4000	Auxiliary, convection cooled	7//10
VM600M-18Z0027	VP600-18W340, VP600-28W344	PM	328	52	2140//3000	2850//4000	Auxiliary, convection cooled	11,6//6,3
VM600M-18W0027	VP600-18W340, VP600-28W344	PM	328	100	2140//3000	2850//4000	Auxiliary, liquid + convection	22,4//31,4

Values for **650 VDC** // **670 VDC**

Please contact our sales team for detailed information and data sheets

## / Mobile inverters

Reliable and robust inverters for mobile applications:  
Single and double versions, up to 900Arms peak.



### **Robust and reliable**

For optimum performance and long working life even with demanding cyclic loads



### **Functional safety**

Series 3 integrates STO as per DIN EN 61800-5-2:2017, EN ISO 13849-1:2015, EN 62061:2005/A2:2015



### **MCU runtime integrated**

Free programming with VECTOSTUDIO or use of ready-made function modules



### **Usability**

Comes with ready-made operating modes, diagnostic and protective functions



# / Mobile single inverters

## Product overview

**Series 3 - single inverters**  
3 phases

- VP600-18W340
- VP600-18W360
- VP600-18W361

**Series 3 - single inverters**  
3/6 phases

- VP600-18W368
- VP600-18W369

**EVO Series - single inverter**  
3 phases

- VP600-18WA78

**WE - single inverter**  
3 phases

- WE600+VM600M-18W0073  
(inverter + motor package)

# / Mobile double inverters

## Product overview



- VP600-28W344
- VP600-28W345



- VP600-28WA44
- VP600-28WA77

# / Mobile single inverters

## Product data

Inverter Name	Single / Double	Cont. current	10-min current	60-s current	10-s current	Max PWM	Max electrical frequency
VP600-18W340	Single	180 Arms	300 Arms	400 Arms	450 Arms	8 kHz	599 Hz
VP600-18W360	Single	250 Arms	400 Arms	488 Arms	525 Arms	8 kHz	599 Hz
VP600-18W361	Single	250 Arms	400 Arms	488 Arms	525 Arms	16 kHz	1999 Hz
VP600-18W368	Single	440 Arms	640 Arms	838 Arms	900 Arms	8 kHz	599 Hz
VP600-18W369	Single	440 Arms	640 Arms	838 Arms	900 Arms	16 kHz	1999 Hz
VP600-18WA78	Single	550 Arms	-	940 Arms	1000 Arms	8 kHz	1000 Hz

Please contact our sales team for detailed information and data sheets

# / Mobile double inverters

## Product data

Inverter Name	Single / Double	Cont. current	10-min current	60-s current	10-s current	Max PWM	Max electrical frequency
VP600-28W344	Double	2 * 220 Arms	2 * 300 Arms	2 * 400 Arms	2 * 450 Arms	8 kHz	599 Hz
VP600-28W345	Double	2 * 220 Arms	2 * 300 Arms	2 * 400 Arms	2 * 450 Arms	16 kHz	1999 Hz
VP600-28WA44	Double	2 * 160 Arms	-	2 * 320 Arms	3 * 320 Arms	8 kHz	1000 Hz
VP600-28WA77	Double	2 * 300 Arms	-	2 * 550 Arms	2 * 600 Arms	8 kHz	1000 Hz

Please contact our sales team for detailed information and data sheets

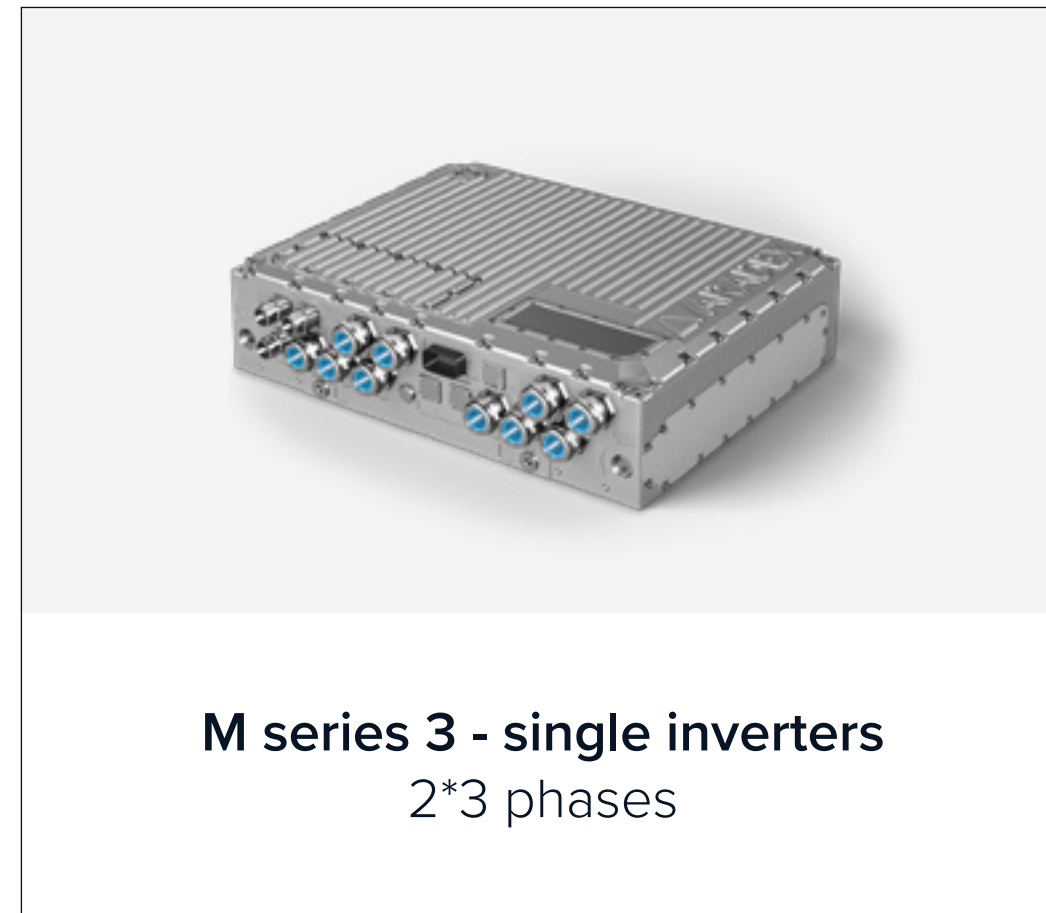


# / Mobile maritime inverters

## Product overview



- M-VP600-18W361
- M-VP600-18W340
- M-VP600-18W330



- M-VP600-18W369



- M-VP600-18W345

# / Mobile maritime inverters

## Product data

Inverter Name	Single / Double	Cont. current	10-min current	60-s current	Max PWM	Max electrical frequency
M-VP600-18W330	Single	95 Arms	105 Arms	120 Arms	8 kHz	599 Hz
M-VP600-18W340	Single	250 Arms	300 Arms	400 Arms	8 kHz	599 Hz
M-VP600-18W361	Single	300 Arms	400 Arms	488 Arms	16 kHz	599 Hz
M-VP600-18W369	Single	550 Arms	640 Arms	838 Arms	16 kHz	599 Hz
M-VP600-18W345	Double	2 * 220 Arms	2 * 300 Arms	2 * 400 Arms	16 kHz	599 Hz

Please contact our sales team for detailed information and data sheets

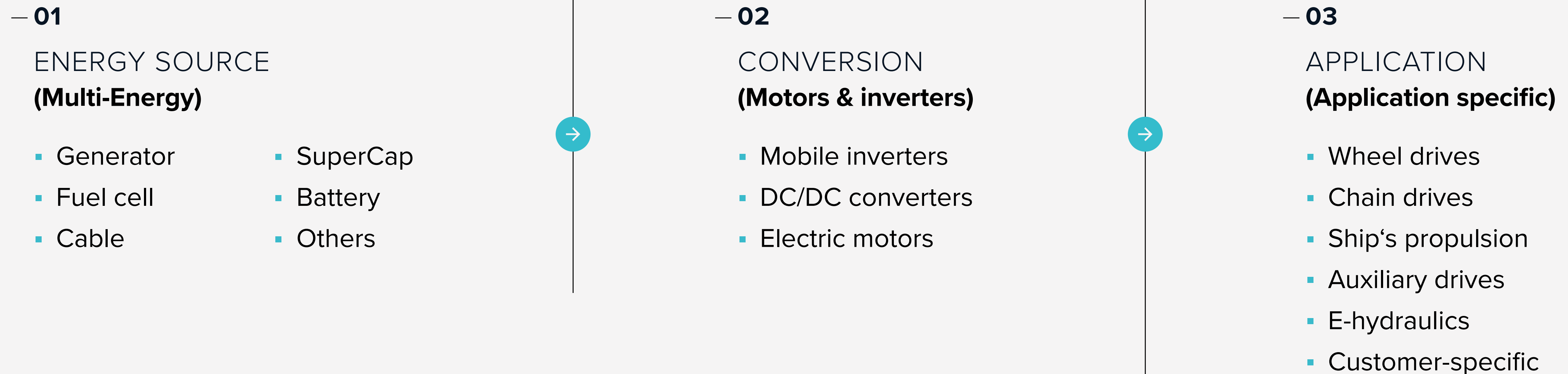


# MULTI-ENERGY-CONCEPT

Battery, fuel cell, diesel-hybrids:  
Starting now and future proof

# / Future Proof Solution

## Modular and flexible HV system

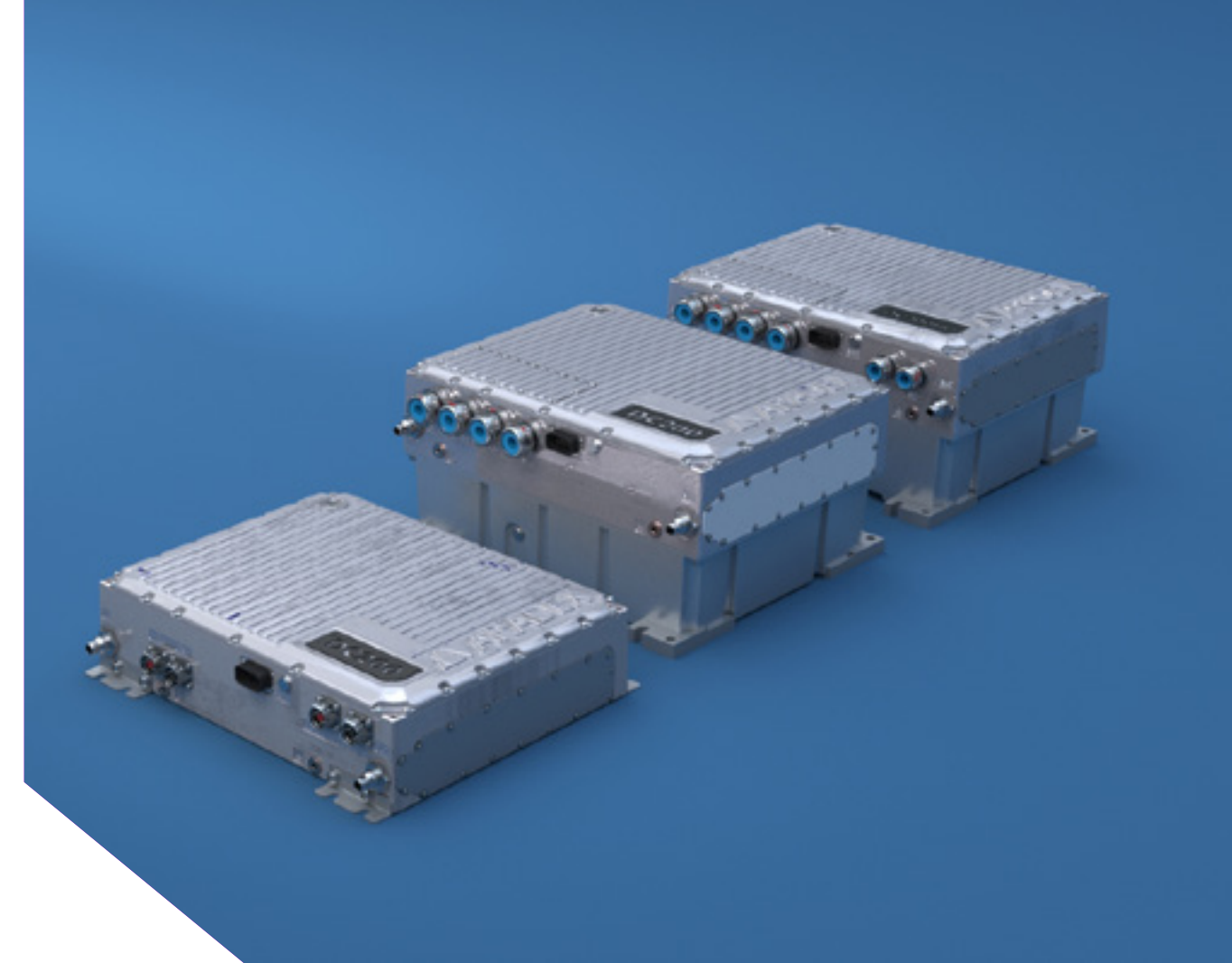


(Power management in real-time directly by our inverters and DC/DCs)



# / DC/DC converters

The VP5000 high-voltage DC/DC converters couple two different DC voltages bidirectionally with a high efficiency.



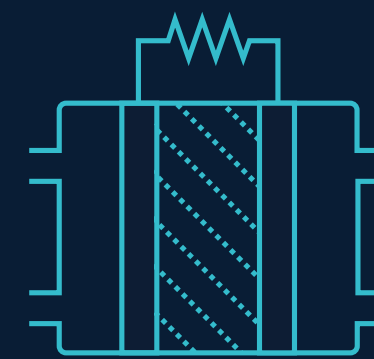
## High efficiency

Highly efficiency-optimized, up to 99% depending on the point of of operating



## Wide voltage range

Current up to 400 A, voltage up to 770 VDC (higher on demand)



## For fuel cells / batteries

Optimized for coupling batteries or fuel cells to existing HV systems

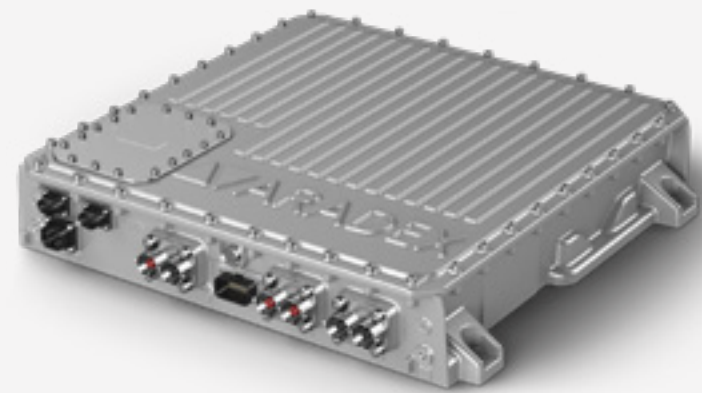


## More safety for fuel cells

Reliable protection against voltage ripple, operation always at the optimum operating point

# / DC/DC converters

## Product overview



**VP5000-FCDC500**  
e.g. for fuel cells

- Max DC-voltage: 800 V
- Voltage on LV side: 100-600 VDC
- Cont. current LV side: 500 ADC
- Max. continuous power: 180 kW
- Unidirectional energy flow
- Efficiency under typical condition: 98,7%



**VP5000-DCDC200**  
e.g. for fuel cells

- Max DC-voltage: 770 V
- Cont. current LV side: 400 ADC
- Max. continuous power: 200 kW
- Bidirectional energy flow



**VP5000-DCDC200-HL**  
e.g. for fuel cells

- Max DC-voltage: 770 V
- Cont. current LV side: 400 ADC
- Max. continuous power: 200 kW
- Bidirectional energy flow
- Integrated brake chopper with max 200 ADC

# / Local & public grids

## Inverter + filter + transformer

To connect to public grids & for creating local grids: Transformer + filters - water cooled housing.

- Similar housing for grid connection and for local grid
- Shown in diagram: 44 kVA solution
- Integrated components are dependent on voltage and function.
- The Inverter is connected externally.



### Dimensions 44 kVA:

1000 mm \* 800 mm \* 460 mm

### Dimensions 86 kVA:

1200 mm \* 800 mm \* 460 mm

### Dimensions 22 kVA:

800 mm \* 800 mm \* 360 mm

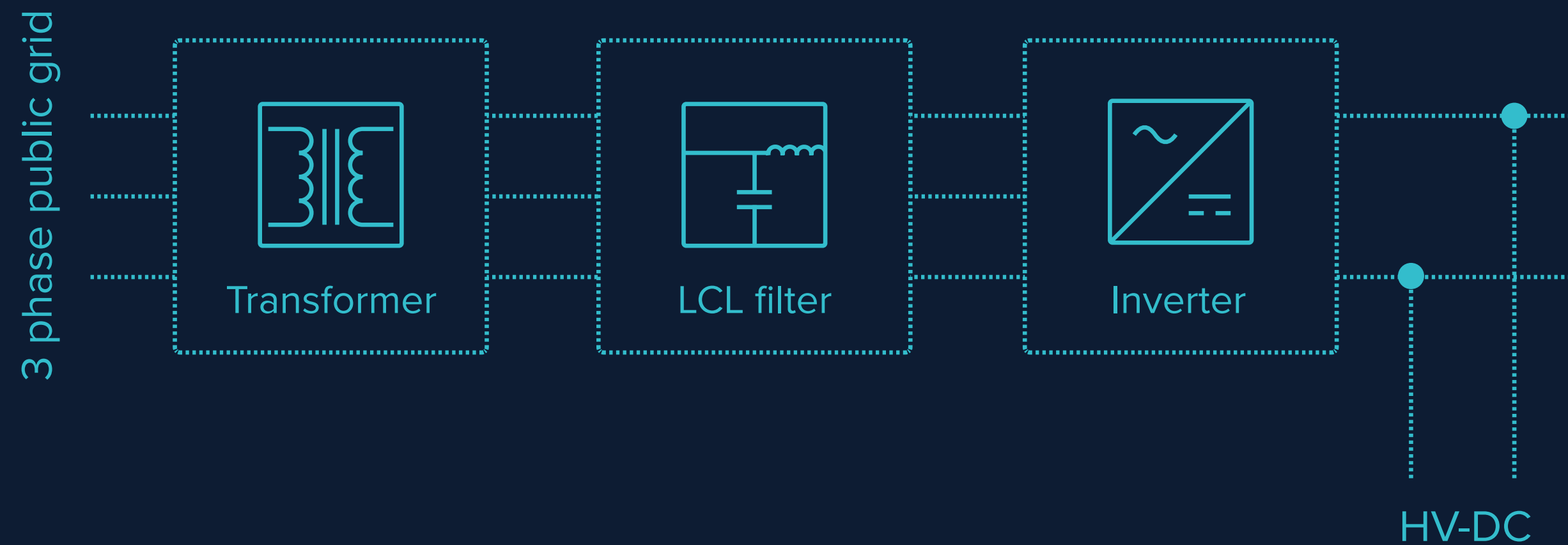
### Filter & transformer:

Steel housing IP55



# / To connect to public grids

## Cable supplied mobile machines



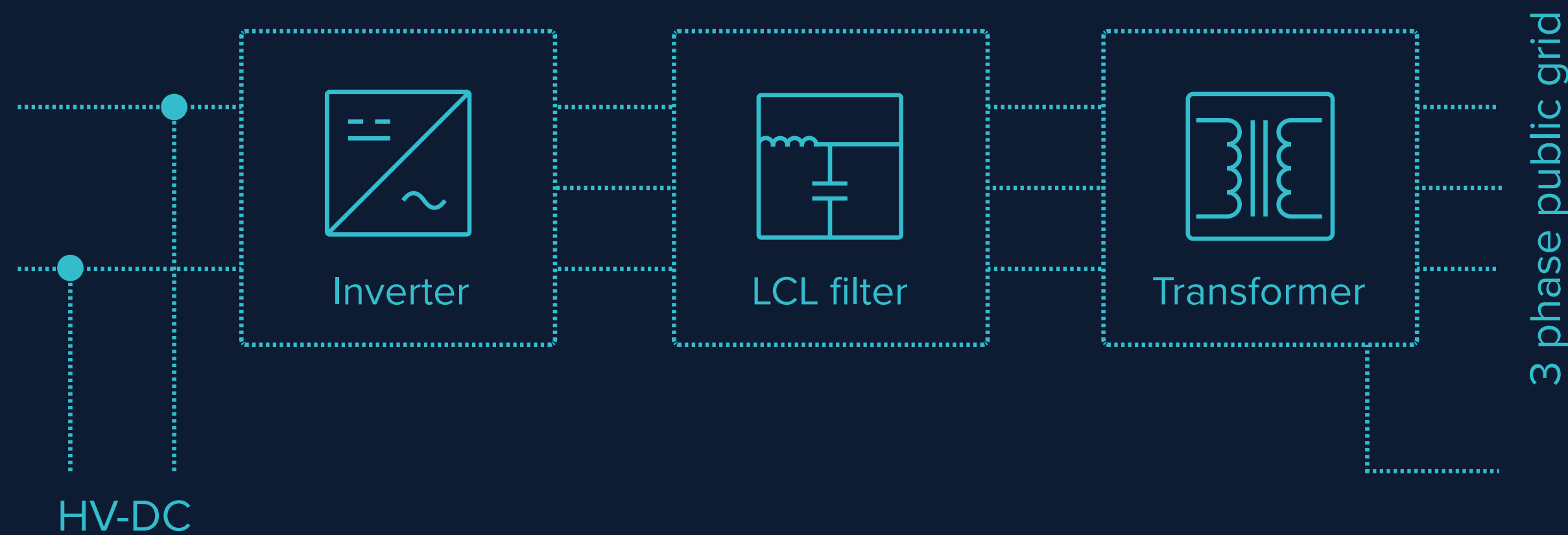
We couple a HV system to a public grid by a transformer and a filter as a package + inverter. Both watercooled and for mobile usage.

- For cable supplied machines or high-power charging.
- Available power versions 11, 22, 44, 86 kVA.
- Higher power by paralleled operation.
- Versions to adapt to HV systems 350 - 840VDC.
- Complete subsystem, including inverter-software.



## / Create local grid

For ships, mobile machines, stationary usage



From a HV system we create a local grid by a transformer and a filter as a package + inverter. Both watercooled and for mobile usage.

- Local grid is capable for asymmetric load.
- Available power versions 11, 22, 44, 86 kVA.
- Higher power by paralleled operation.
- Versions to adapt to HV systems 350 - 840 VDC.
- Complete subsystem, including inverter-software.

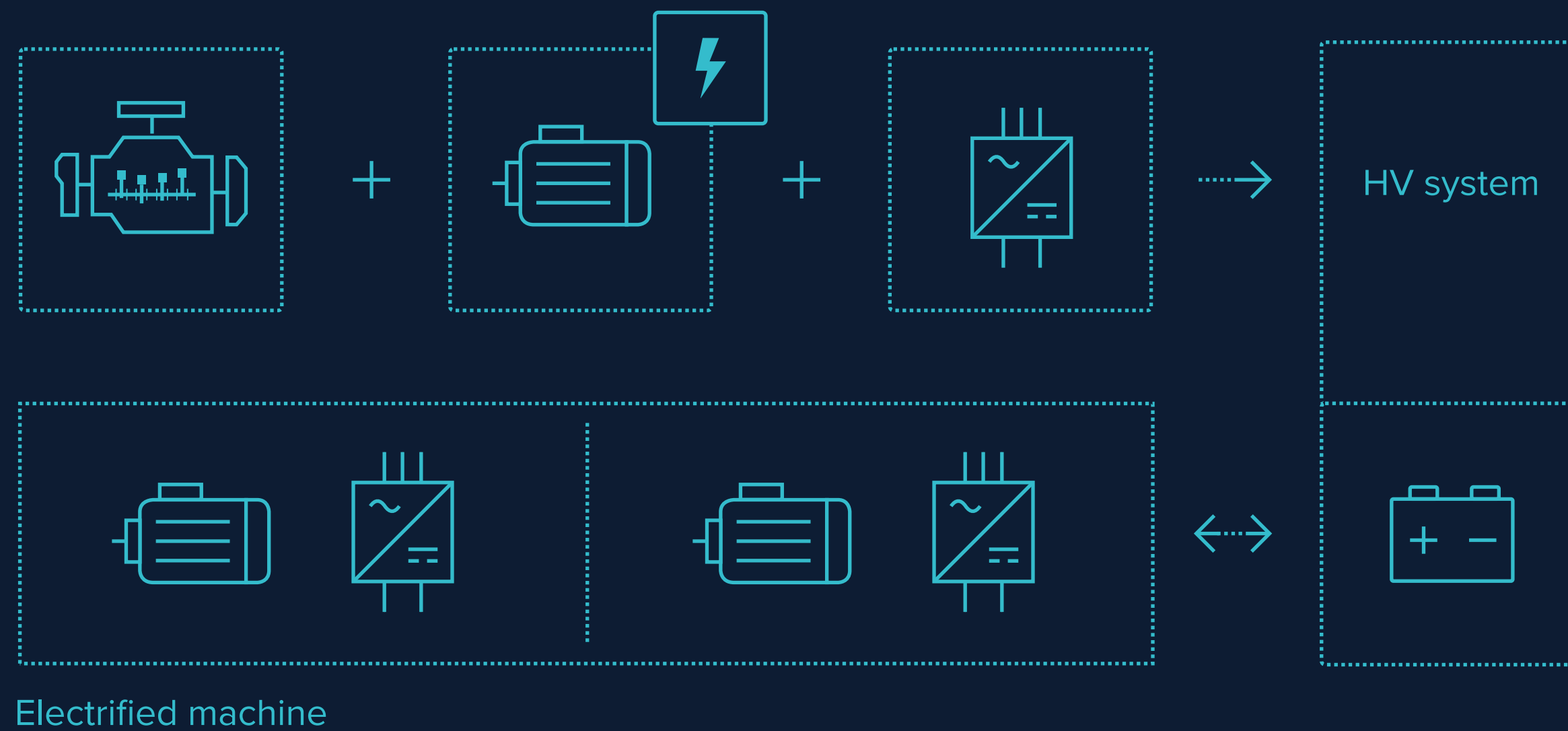




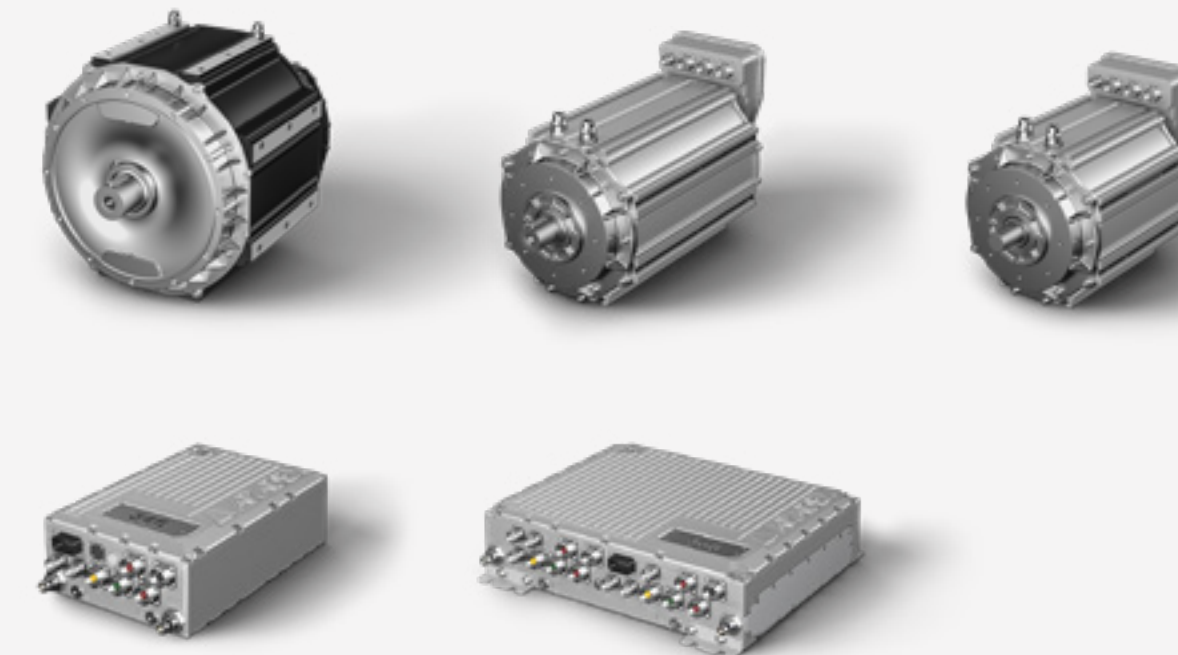
# EXAMPLES

Components and subsystems:  
Our market approach

# / Serial hybrid “RangeExtender”



Products available from ARADEX:



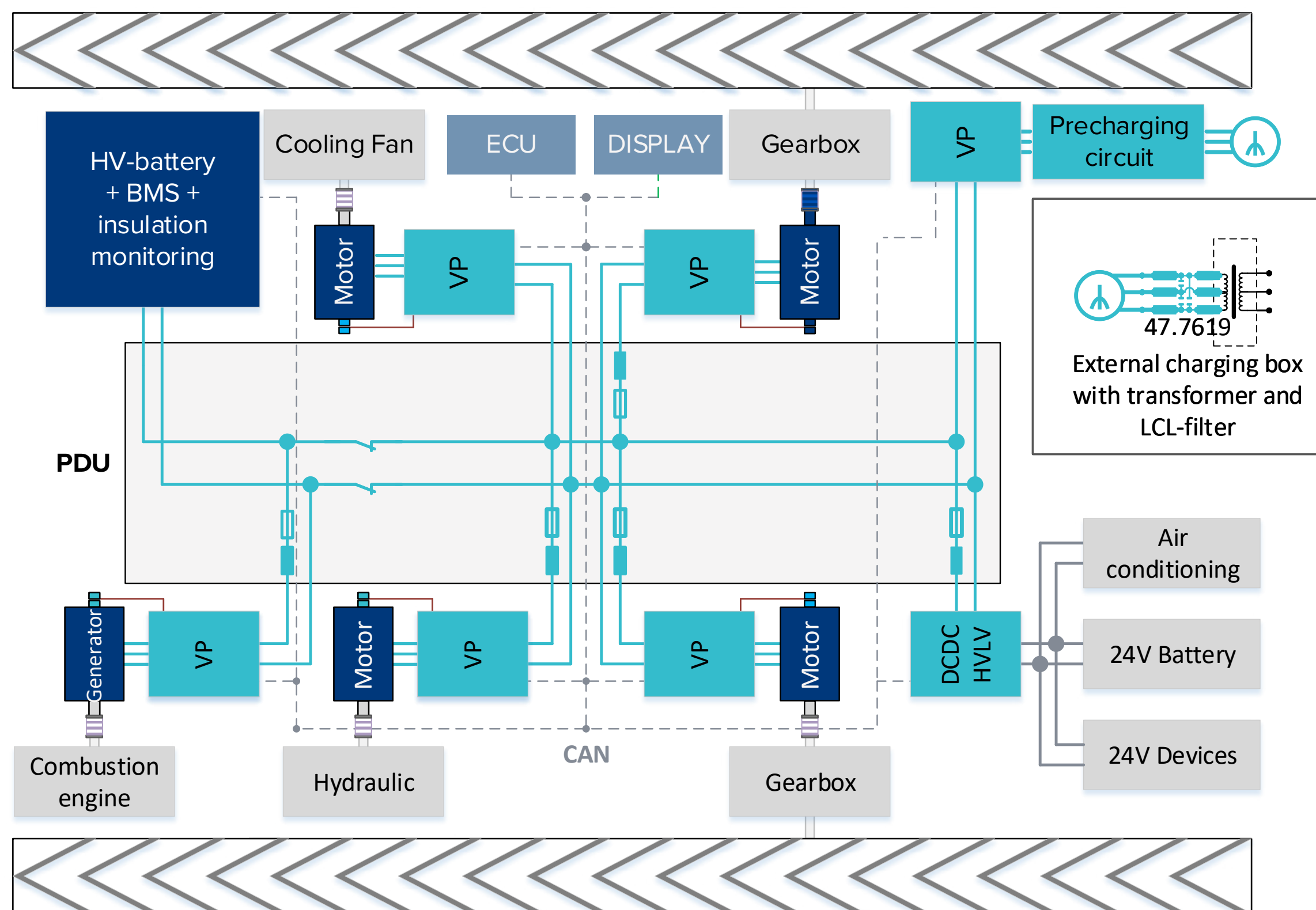
# / Serial hybrid

## Electro-mechanical propulsion



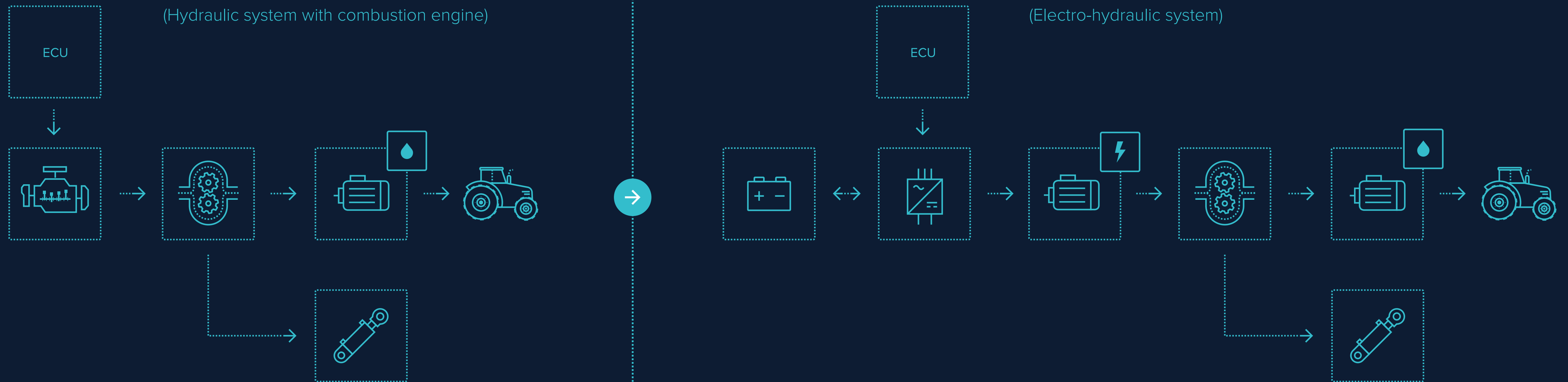
Functional block diagram of an electrified dozer with electromechanical chain propulsion

- Significant increased efficiency
- Improved driveability
- Fuel cell ready

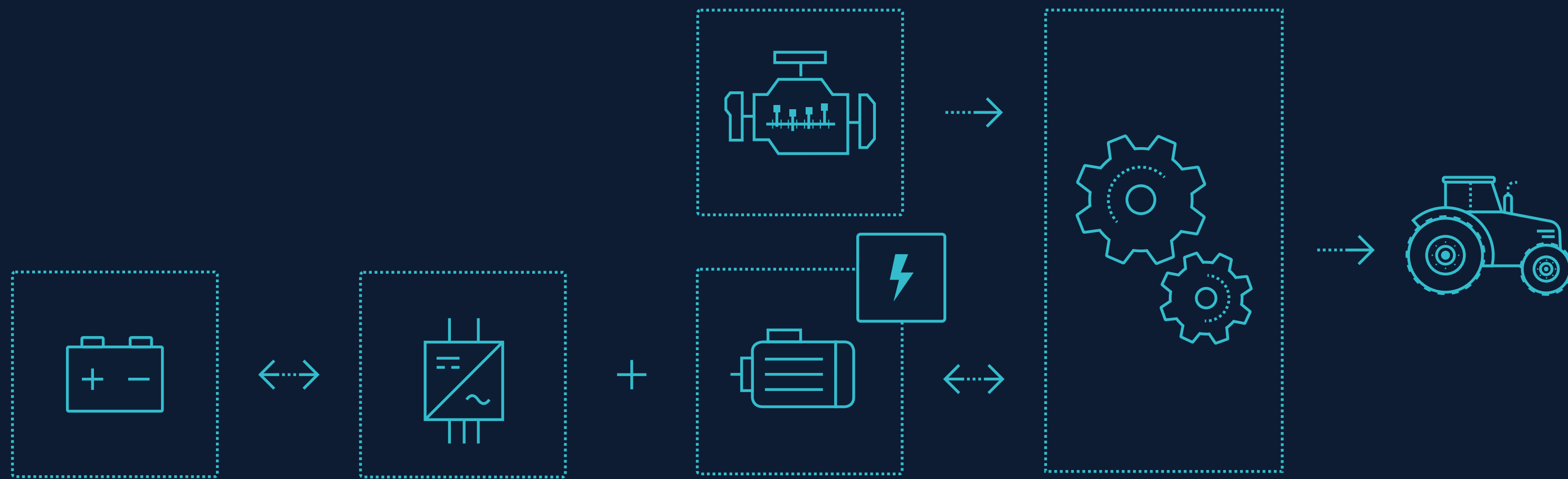


# / Serial hybrid

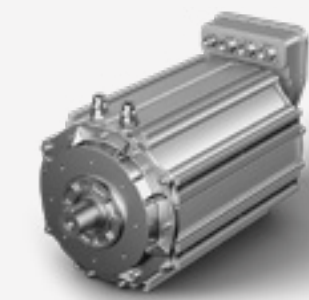
## Electro-hydraulic propulsion



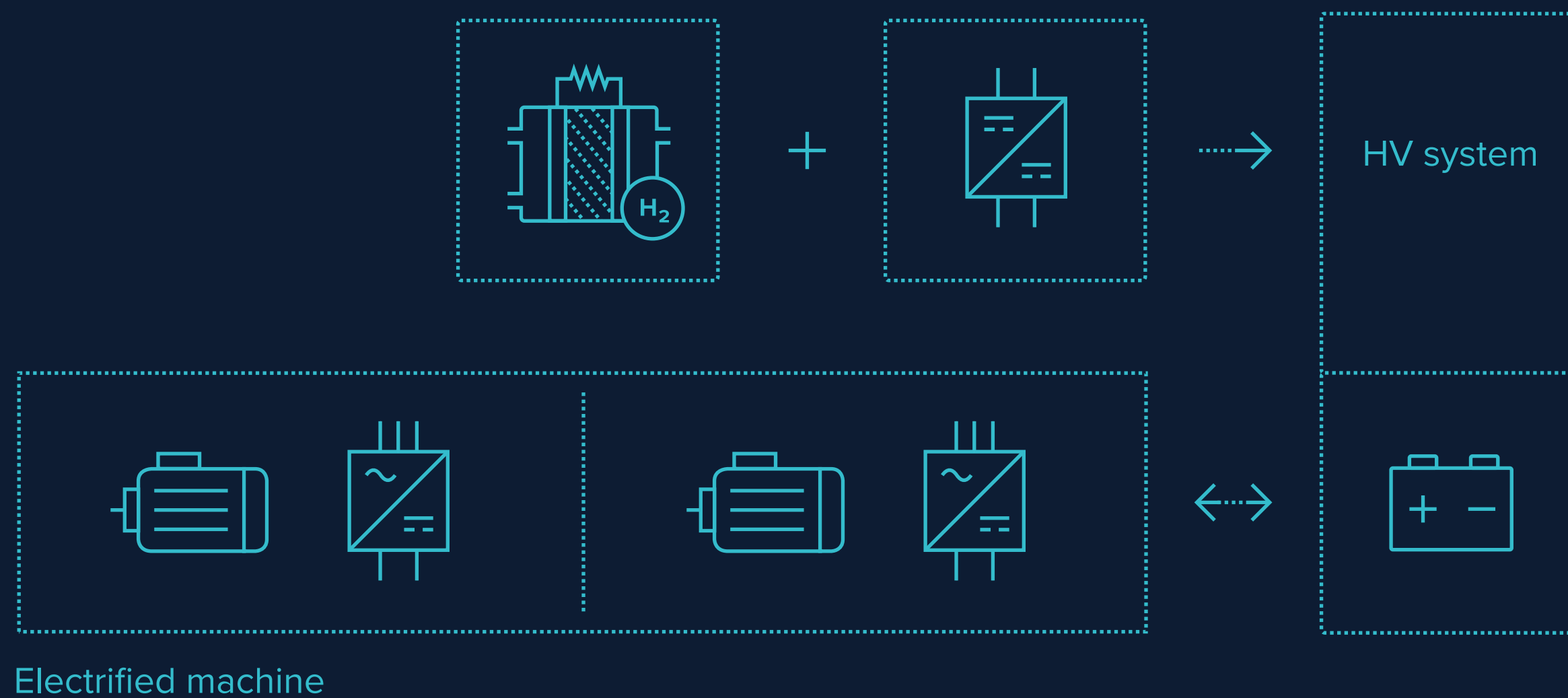
# / Parallel hybrid “E-boost”



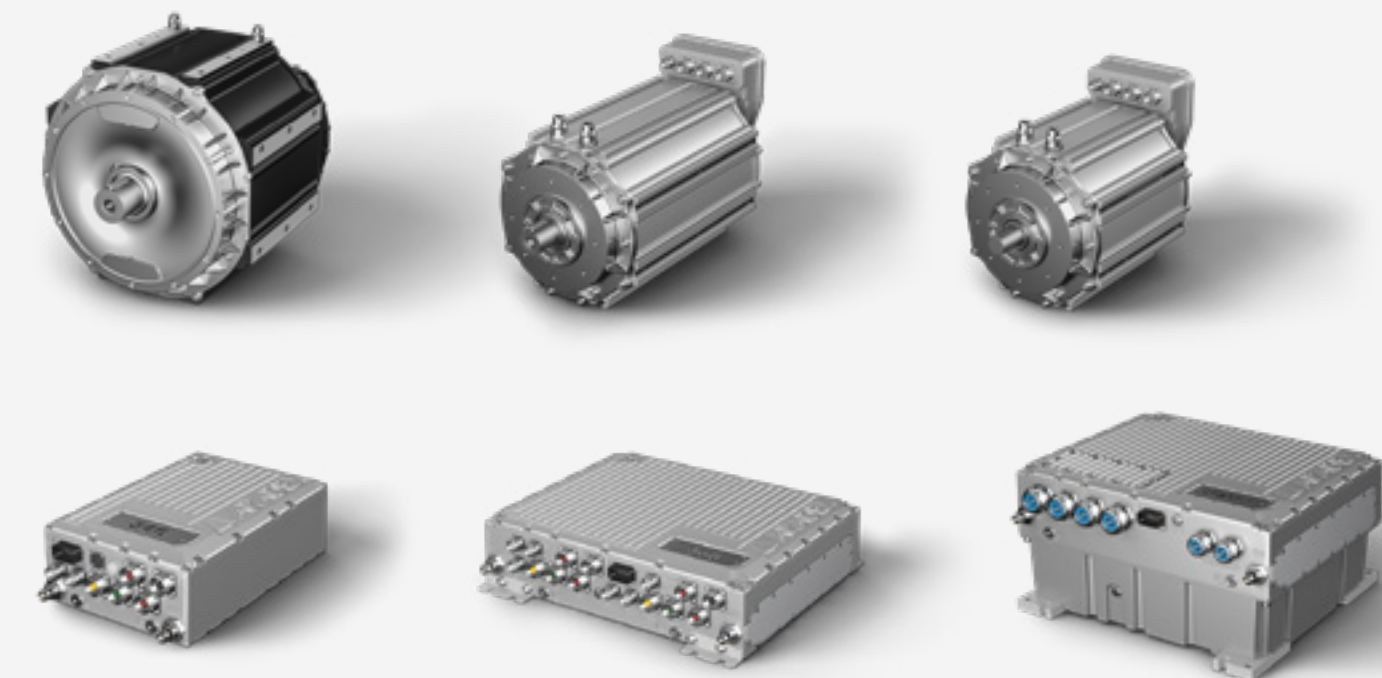
Products available from ARADEX:



# / Hydrogen-based Fuel cell as “RangeExtender”



Products available from ARADEX:





## IV

# ENGINEERING SUPPORT

Training, commissioning  
and more



# / Our claim: Make things work!

Supporting you is our DNA. We create the perfect conditions to provide you comprehensive support in all project phases.



## Our services

- + Support in dimensioning, components selection and feasible complete high-voltage solutions.
- + Training for products, programming, commissioning, diagnostics and dimensioning.
- + Creation of customer-specific software and technology modules.
- + Commissioning support both on site and digital, all over the world. Comprehensive diagnostic tools also for your teams.
- + Our after-sales offers service, maintenance and diagnostics, on site and digital.



# / Challenge us

## Review of your application

**Challenge us with your application, your demands and your ideas!**


- + Our engineers can work out or support the project planning for your application.
- + You receive the result as an electronic document: cornerstones of your project regarding electrification or hybridization including dimensioning done by our experienced project engineers.
- + Contact our sales team for more information.




Thanks for your attention!

# Optimized usability and performance for the best e-mobility



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