
# POWER CONVERTERS FOR TRACTION APPLICATION

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# TYPICAL TRACTION APPLICATIONS

1. MAIN POWER SUPPLY CONVERTERS

2. AUXILIARY POWER SUPPLY CONVERTERS

3. TRACTION CONVERTERS

# TRAIN HEATING CONVERTER **POV**

## Technical data:

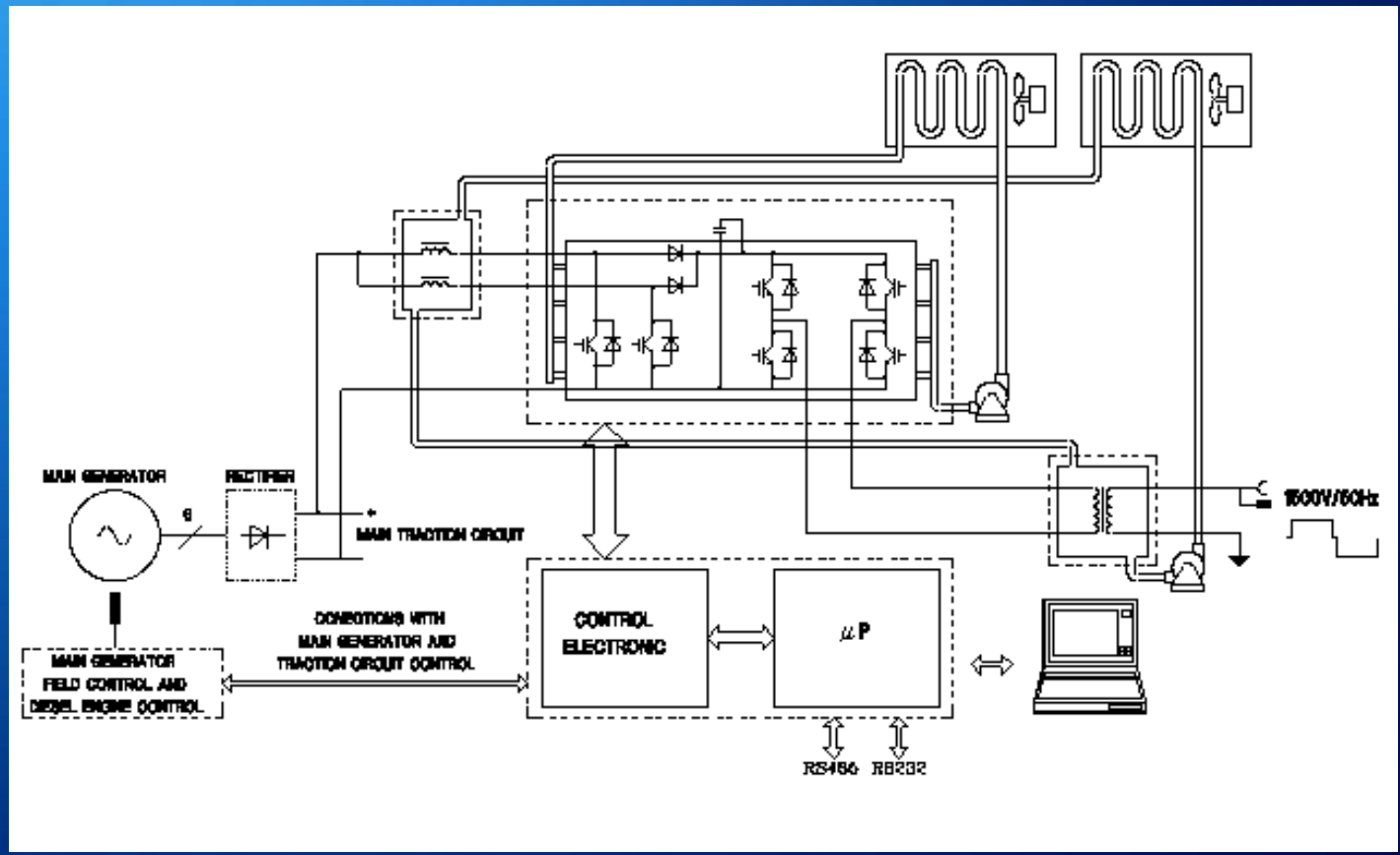
- Nominal rating: 300 kW
- Input: 370–800 V, DC (from 217 to 370 V with reduced power)
- Output: 750 V, 50 Hz, single phase

  (1500 V, 50 Hz on the secondary side of the transformer)

- Short circuit protection on the output
- Type of cooling: water cooling
- Location: machine compartment

# TRAIN HEATING CONVERTER **POV**

## Block diagram of the system with train heating converter



# TRAIN HEATING CONVERTER **POV**

Train heating converter

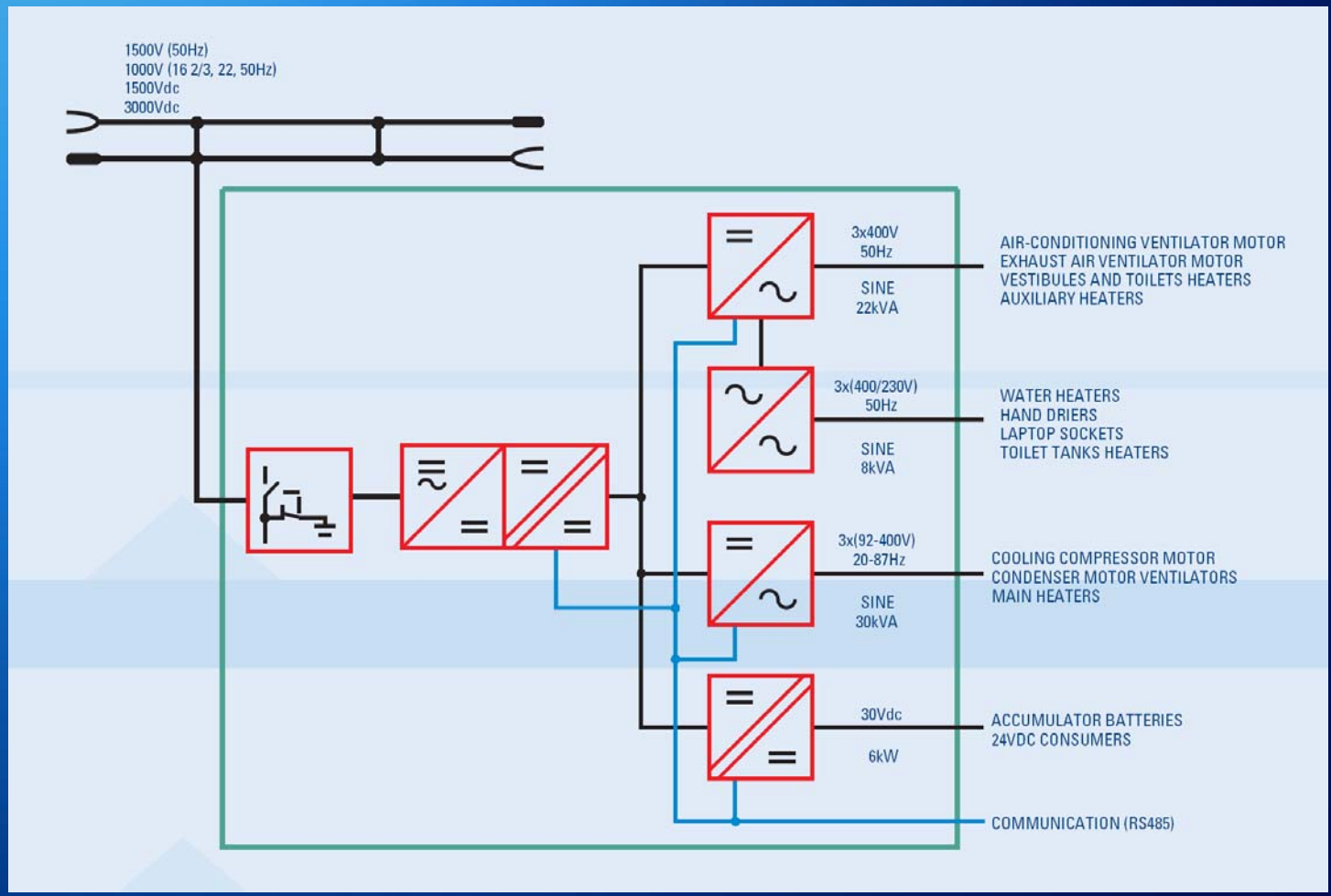
Control electronic unit

# MULTISYSTEM STATIC CONVERTER **VIS 50-1**

## Technical data:

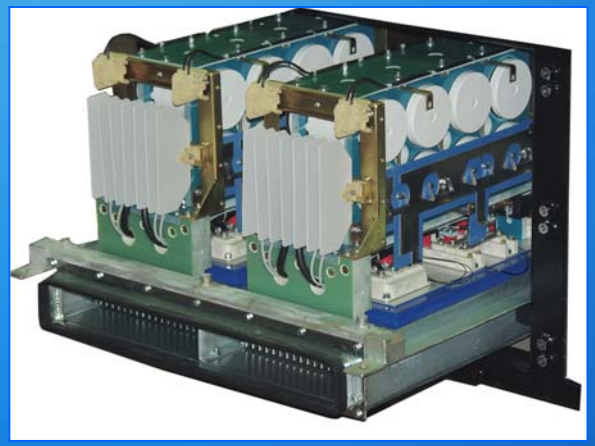
- Rated power: 50 kVA
- Input voltages: 1000 V, (16 2/3, 22, 50) Hz
  1500 V, 50 Hz
  1500 V, DC
  3000 V, DC
- Output voltages: 3 x 400 V, 50 Hz; 22 kVA, sinus
  3 x 400/230 V, 50 Hz; 8 kVA, sinus
  3 x (90-400) V, (20-87) Hz; 30 kVA, sinus
  30 V, DC; 6 kW
- Total power factor: 0, 95
- Efficiency: approx. 97 %
- Temperature range: -25 C to +40 C
- Weight: 1600 kg
- Dimensions: 2750 x 2090 x 605 mm
- International standards: complies with UIC, IEC and RIC

# MULTISYSTEM STATIC CONVERTER **VIS 50-1**



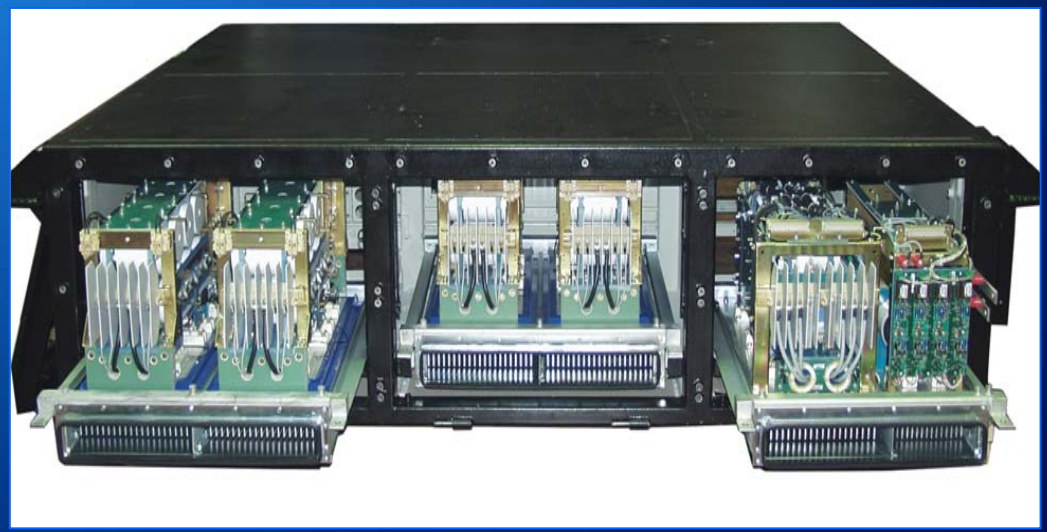

## Simplified schematic diagram

# MULTISYSTEM STATIC CONVERTER **VIS 50-1**



High voltage module

Inverters and battery charger



Static converter VIS 50-1

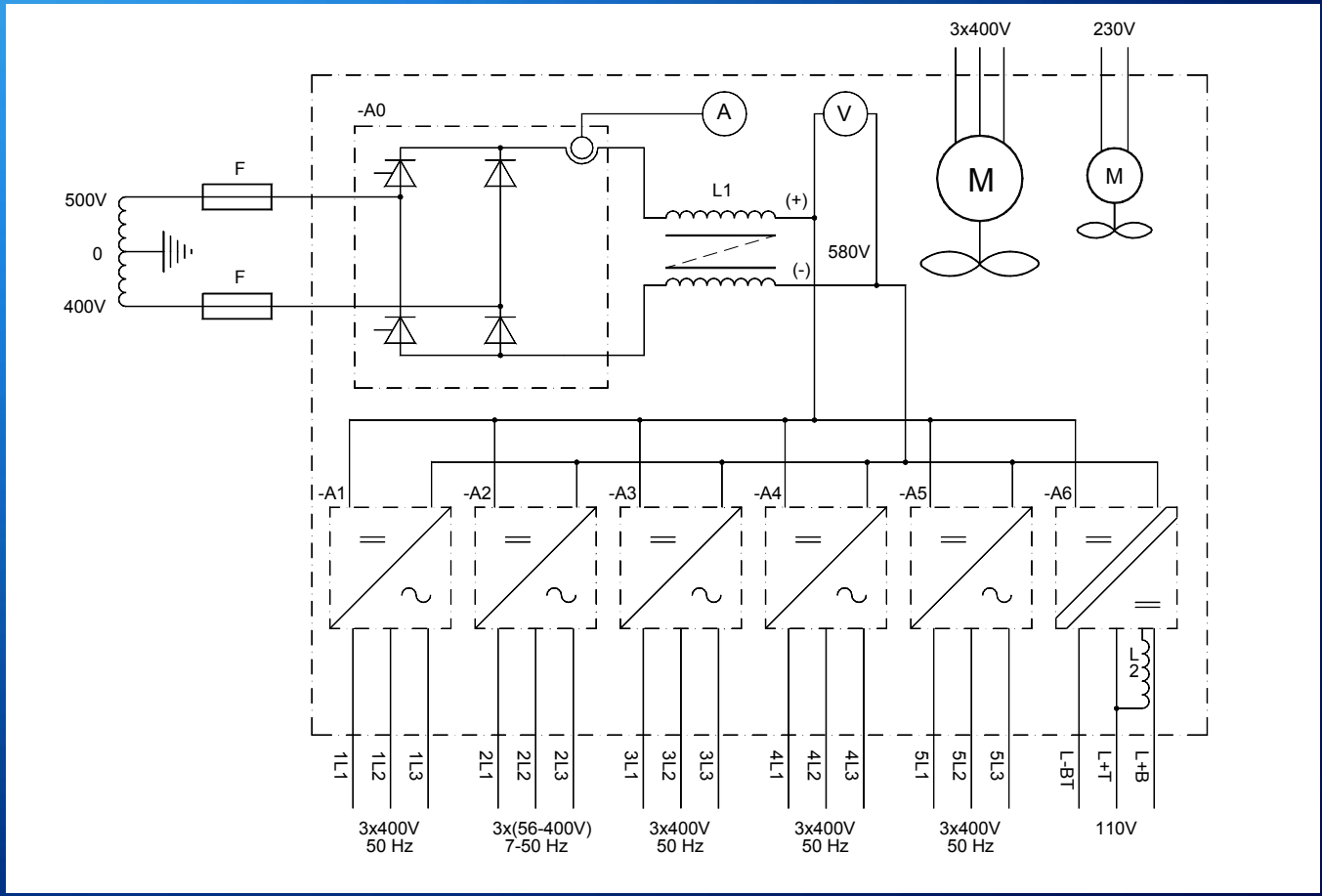
# MULTIOUTPUT AUXILIARY POWER SUPPLY CONVERTER FOR ELECTRIC LOCOMOTIVES **PJUT-2**

## Technical data:

- Nominal rating: (4-5) x 52 kVA + 6,8 kW
- Input: 900 V, AC single-phase, 50 Hz
- AC Outputs: (4-5) x (56-400 V), (7-50) Hz, PWM
- DC Output: 135 V (72 V), 50 A
- Location: machine compartment
- Type of cooling: forced air-cooling
- Dimensions (L x W x H): 900 mm x 1360 mm x 1675 mm
- Weight: 1450 kg

# MULTIOUTPUT AUXILIARY POWER SUPPLY CONVERTER FOR ELECTRIC LOCOMOTIVES **PJUT-2**

## Block diagram



# MULTIOUTPUT AUXILIARY POWER SUPPLY CONVERTER FOR ELECTRIC LOCOMOTIVES **PJUT-2**

Converter with 5 output inverters plus battery charges

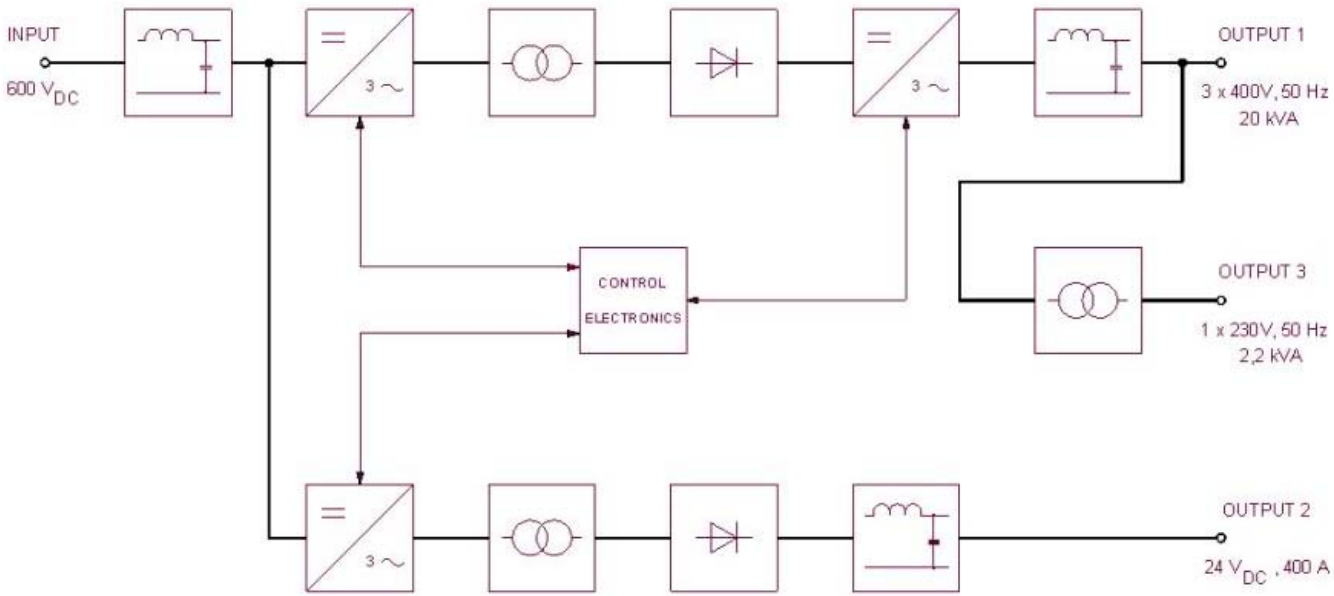
Converter modules

Converter with 4 output inverters

# AUXILIARY POWER SUPPLY CONVERTER **PPB35**

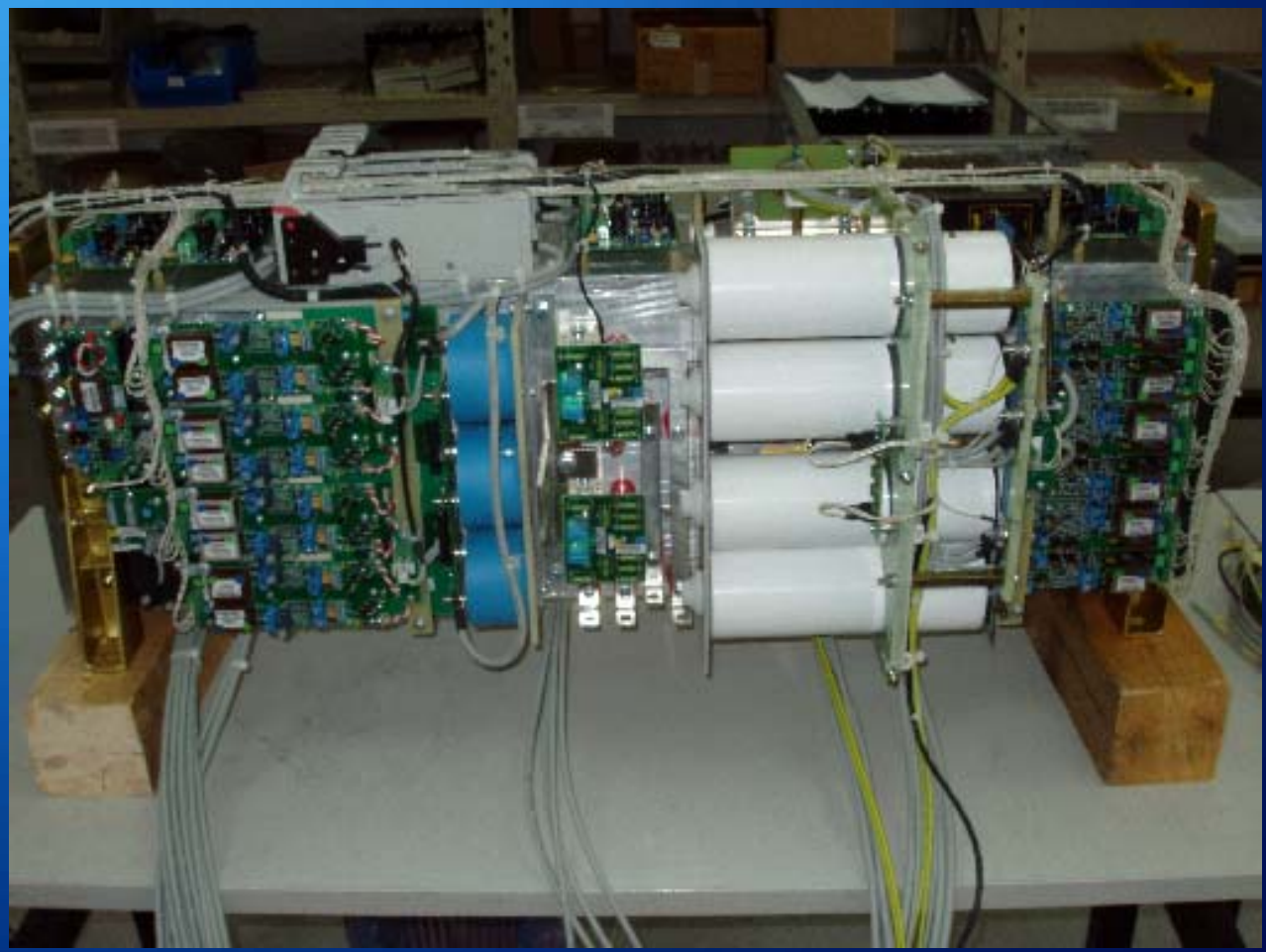
- **Rated input voltage:** 600 VDC, +20% / -30%
- **Three-phase output:** 3x400 V, 50 Hz, 20 kVA
- **Single-phase output:** 1x230 V, 50 Hz, 2,2 kVA
- **DC output:** 24 V, 400 A
- **Protection class:** IP 54
- **Ambient temperature:** -25 °C to +40°C
- **Cooling:** forced, with integrated fan
- **Size (L x W x H):** 1800 x 1000 x 556 mm
- **Weight:** 430 kg

# AUXILIARY POWER SUPPLY CONVERTER **PPB35**




# AUXILIARY POWER SUPPLY CONVERTER: THE FIRST STAGE OF ASSEMBLYNG

# AUXILIARY POWER SUPPLY CONVERTER: POWER PART ASSEMLYNG



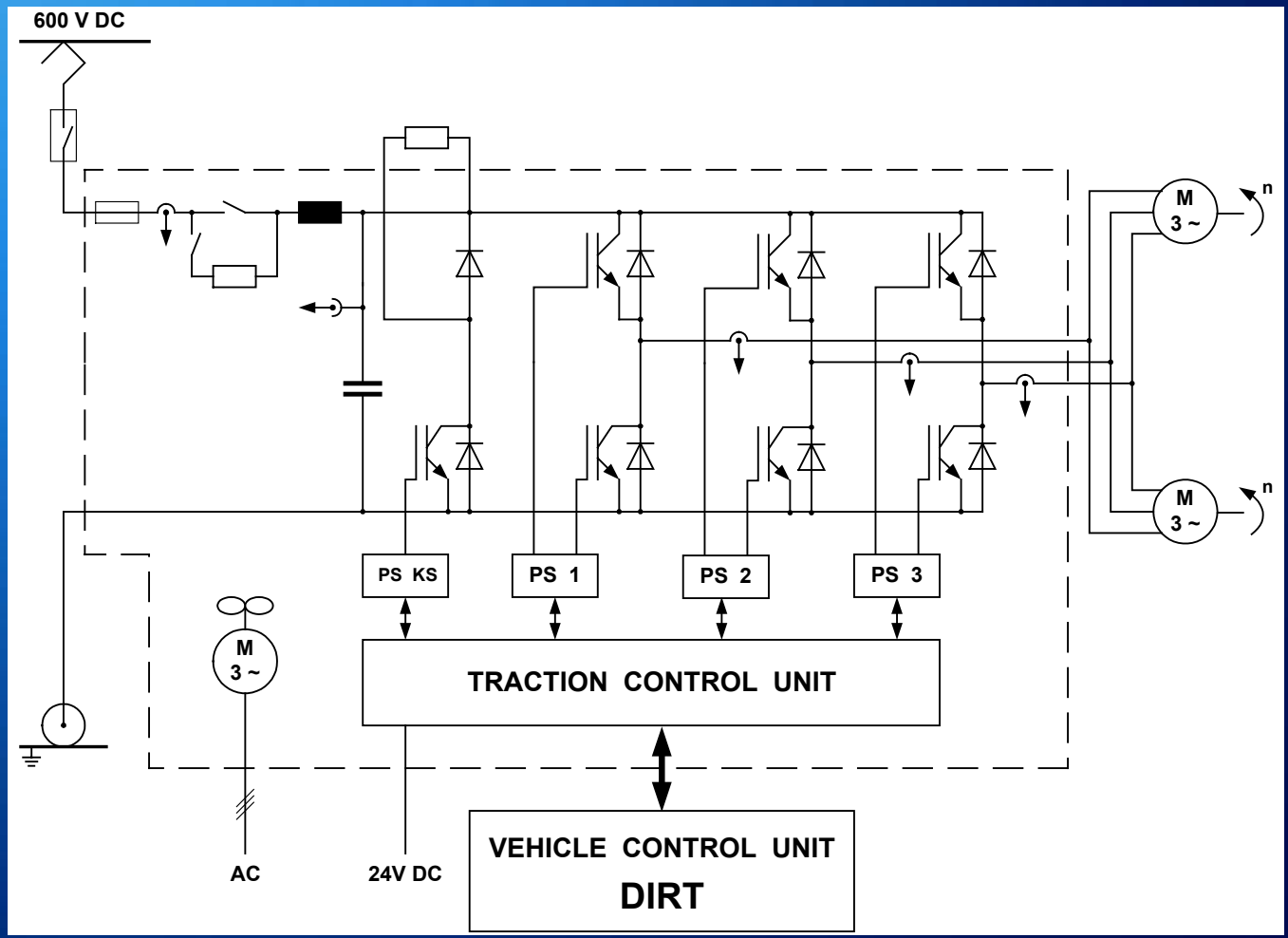
# MAIN DRIVE CONVERTER **PGP**

## Pulse width modulated three-phase voltage source IGBT inverter

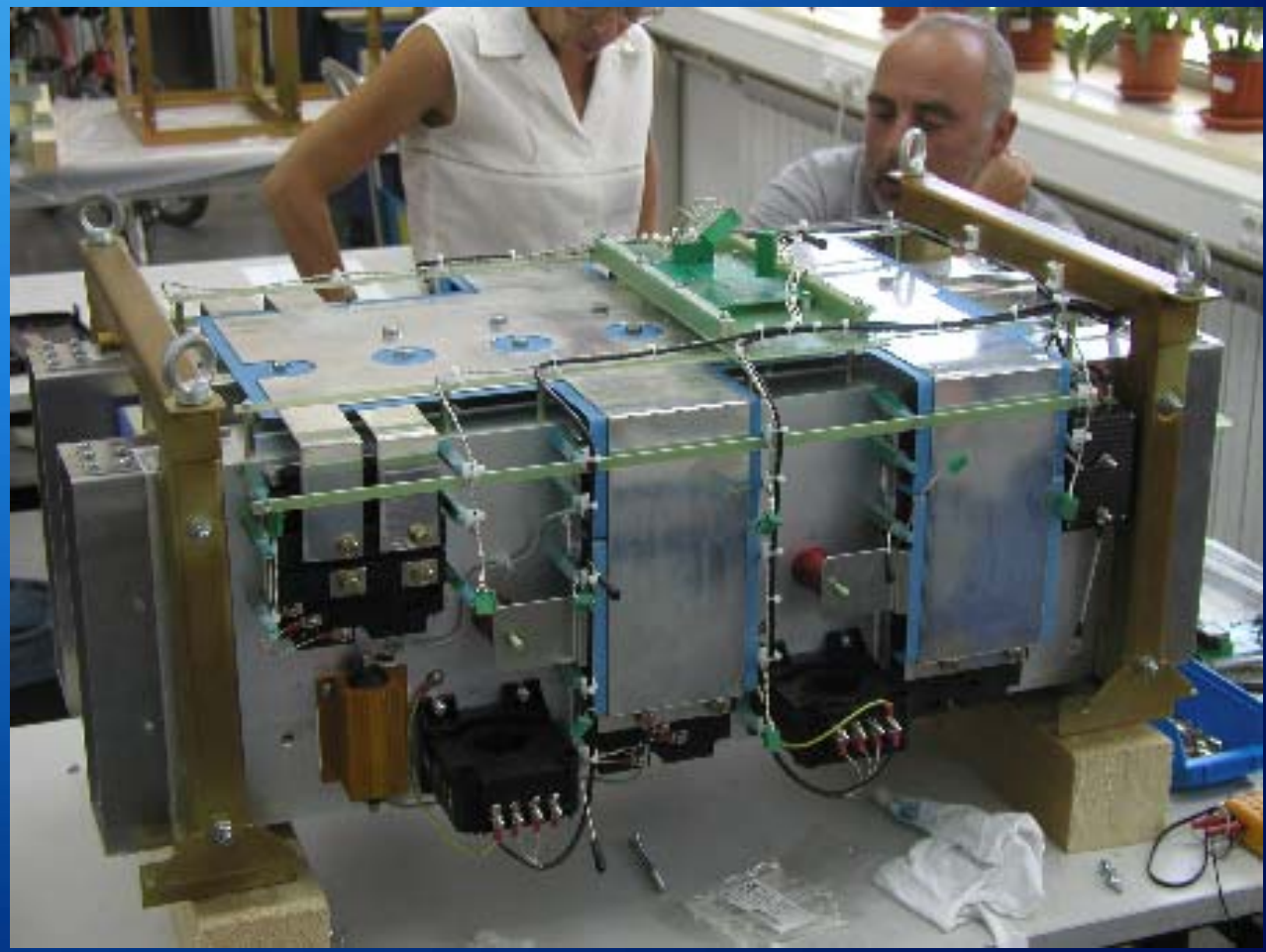
- Rated input voltage: 600 VDC, +20% / -30%
- Rated output current: 3 x 320 Arms
- Maximum output current: 3 x 670 Arms
- Output frequency: 0…143 Hz
- Ambient temperature: - 25 °C to +40°C
- Cooling: forced, with integrated fan
- Size (L x W x H): 1800 x 1000 x 556 mm
- Weight: 420 kg

# MAIN DRIVE CONVERTER PGP

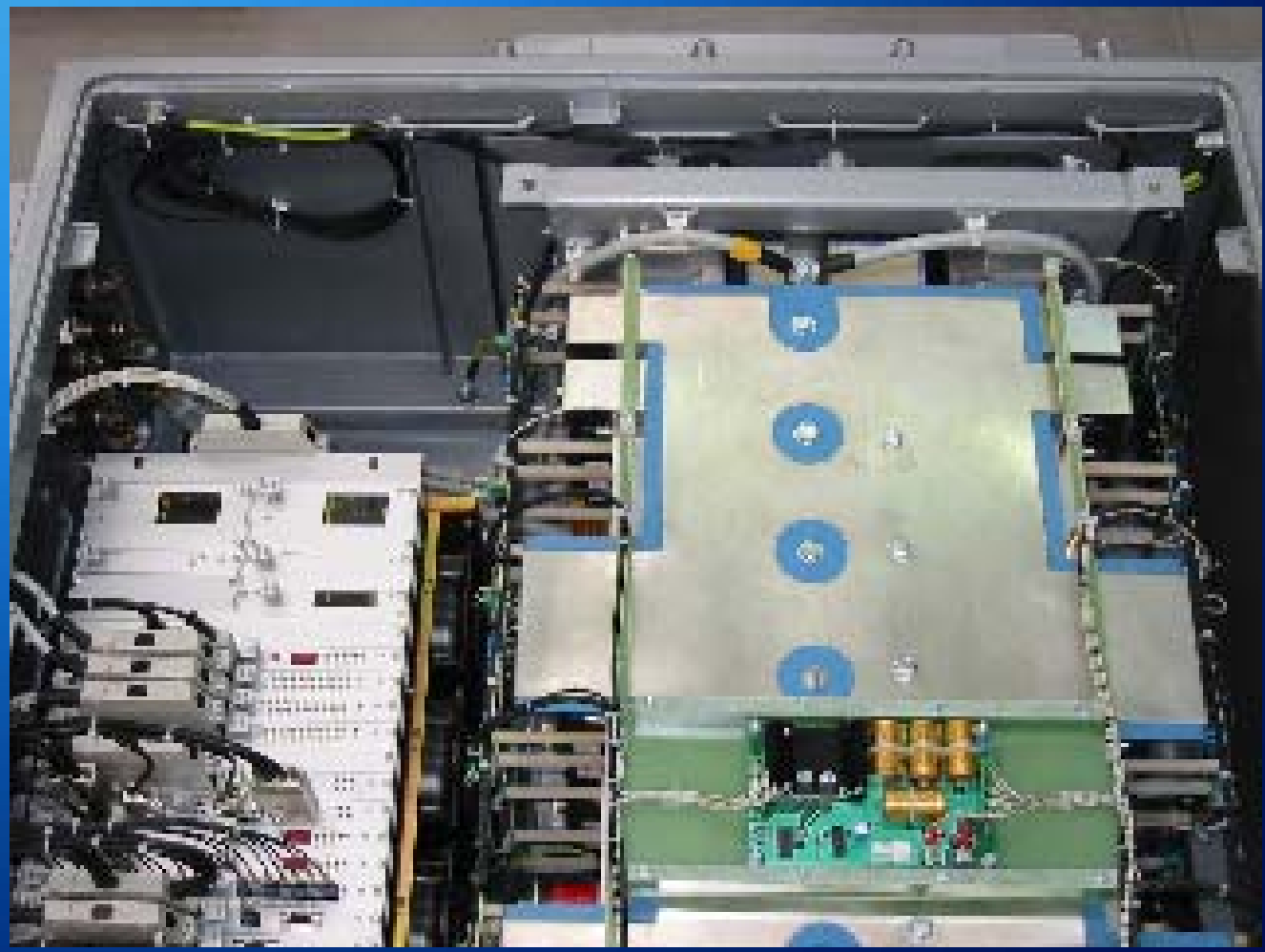
## Block diagram




# MAIN DRIVE CONVERTER: POWER PART ASSEMBLYNG



# MAIN DRIVE CONVERTER



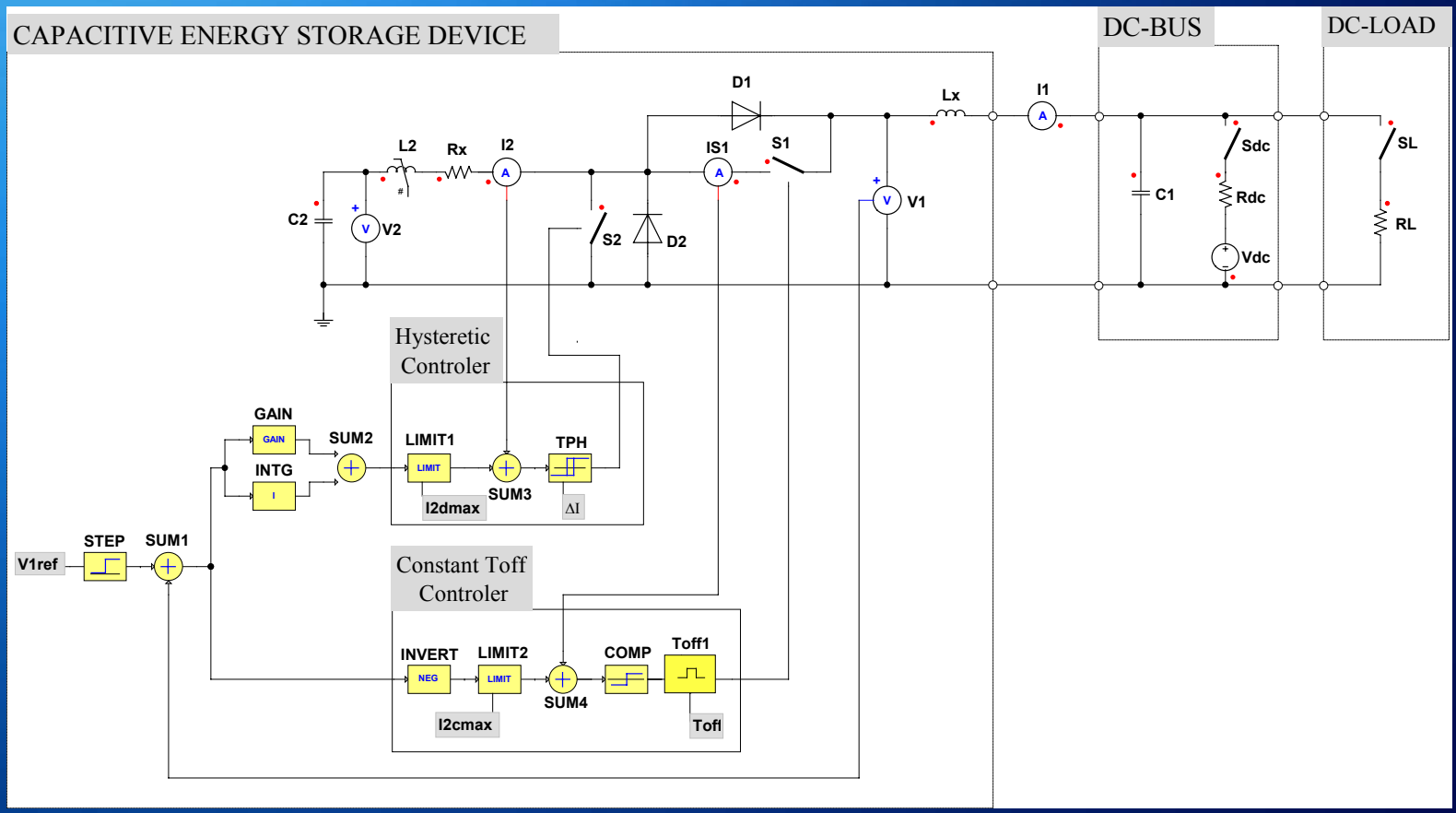
# CHEKS AND TESTS IN ALL MANUFACTURING PHASES

- Converters should undergo extensive routine and type tests in all important phases of the manufacturing process

- Tests are performed according to the specifications of the customer and international standards

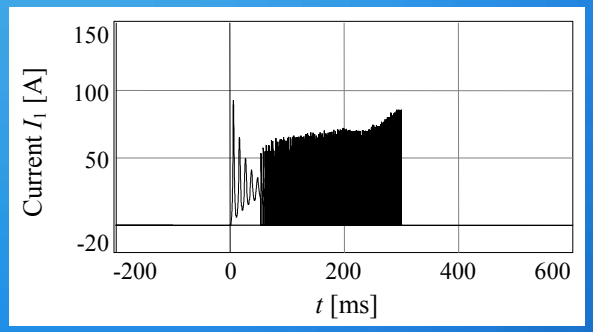
- Comprehensive tests make sure that customers high demands for quality and reliability are fully met

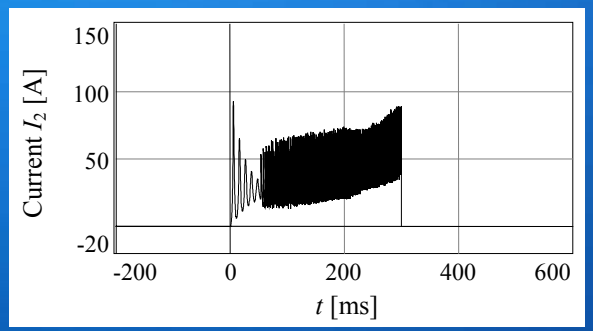
# TOOLS: SIMPLORER

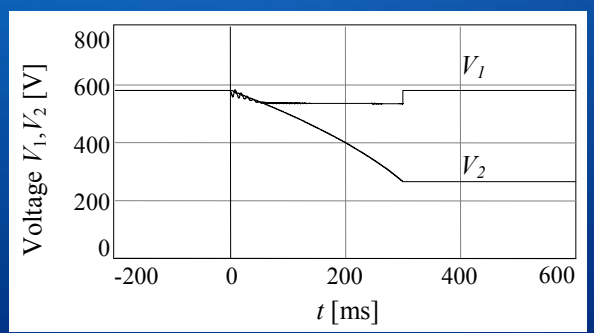


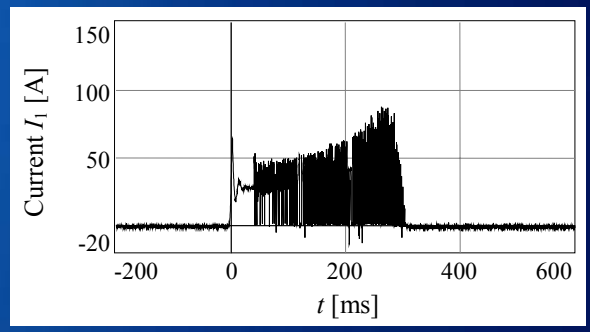

## Schematic used for the simulation

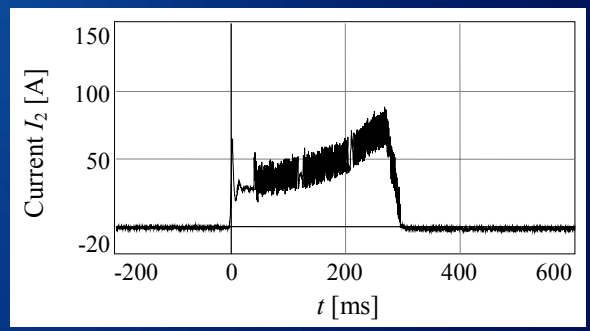
# TOOLS: SIMPLORER

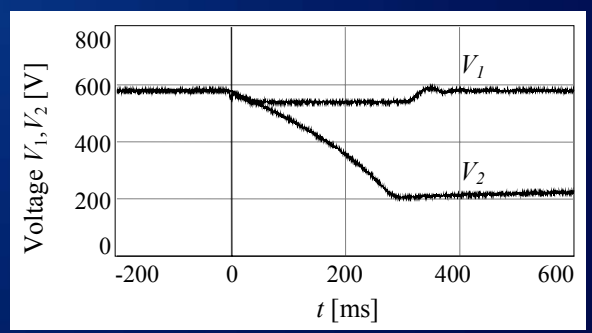



**Simulation results**

**Experimental results**