

1 HV2 Inverter Platform

1.1 HV2 description

The HV2 Three-Phase Electric Motor Inverter is a family of products in different power levels developed from a unique technology platform. The rugged HV2 Inverter is designed to accommodate the demanding features and requirements of auxiliary functions in electrification of modern Commercial Hybrid, Electric or Diesel-Electric vehicles.

1.2 Product Family Features

- The continuous power levels of 10 to 35 kVA, make the products ideally suited for Electric Air Conditioning, Electro-Hydraulic Power Steering, Electro-Hydraulic Hoist systems
- Nominal Voltage 350VDC. Operation from 150 to 450VDC bus voltage
- Liquid (WEG) cooled, 60°C inlet temperature or forced air cooled with high-efficiency finned heatsink
- CAN communication, CANopen like protocol with support for diagnostics and software download
- Three-phase Permanent Magnet motor, Induction motor, Synchronous Reluctance control
- 4 Quadrant, generator and motor operating modes
- Speed, Torque and DC-voltage control modes
- Resolver, Sin/Cos, or Encoder feedback
- Fully automated self-test at start-up / run-time diagnostic
- Automatic protection against overheating
- Internal capacitor discharge functionality
- Active Short Circuit
- HVIL - High Voltage Connection Supervision
- Field proven control platform with multiple years of demonstrated service.
- Total SW configurability for OEM
- Fully isolation between high voltage section and low voltage
- Dual CPU architecture

1.3 HV2 Data & Performance

Rating	HV2 data	Comment
Peak Current	120A	60 sec
Continuous Current	90A	Coolant temp 60°C (140°F) Ambient temp 85°C (185° F)
Peak Power	60KVA	60 sec
Continuous Power	35KVA	
Efficiency	> 97%	Nominal DC voltage Continuous current
Switching frequency	2-8KHz	Automatic switching
Output Frequency Range	0-500Hz	

Operational Voltage

Nominal DC voltage	350V _{DC}
Maximum DC voltage	480V _{DC}
Full torque current available	150V _{DC} to 450V _{DC}
Logic supply voltage	12V or 24V

Functionality

Operational modes	Torque, Speed, DC Voltage control mode	Sensored operation
Motor Control modes	Induction machines Surface Permanent Magnet machines Internal Permanent Magnet machines Synchronous Reluctance machines	Field weakening supported

Liquid Cooling

Max inlet cooling temperature	60°C (140°F)	Higher with de-rating
Nominal cooling flow	6 l/min	

Environmental

Operational Temperature	-40°C → 85°C (-40°F → 185°F)
Storage Temperature	-40°C → 85°C (-40°F → 185°F)
Sealing	IP6K9K
Protection	Withstands cleaning agents and liquids
EMC	E-mark

Physical Outline

Size W x H x L	250mm x 200mm x 87mm	(liquid cooling version)
Mass	4,5kg	

1.4 HV2 Basic Functionalities

The HV2 family is a full four quadrant inverter to be used for both generator and motor operating modes. The following modes of operation are available:

- Current control - e.g. at battery charging
- Torque control – e.g. when a certain pull force is requested in a traction application.
- Voltage control - when the Inverter is supposed to generate a certain output voltage on the DC-Bus, e.g. when a battery is not connected to the DC-Bus and the Inverter will be the energy source
- Speed control - is used when the Inverter is requested to hold a certain number of revolutions per time unit of the motor, e.g. to hold a certain speed of the vehicle in traction mode.

The HV2 product family is configurable for battery charging, super cap control and shunt control.



Finned Heatsink version



Liquid Cooling version





