General
AVL Universal Inverter as test bed component for powertrain/e-motor test systems. On its DC-side connected to a variable DC power supply unit (source/sink) and on its three-phase AC-side to AC permanent magnet synchronous or induction motors.

State of the art Insulated Gate Bipolar Transistor (IGBT) technology with device features like true 4-quadrant operation without requiring brake resistor, field weakening, wide DC link voltage span, user selectable IGBT switching frequency makes it fit to handle a wide variety of those motors. Incremental encoder and resolver interface for precise control and dynamic operation are on board as well.
Parameters, demand values, measured quantities
The Universal Inverter can easily be parameterized and remote controlled via CAN-bus interface.
No motor maps are required, just basic motor and encoder resp. resolver information.
Parameters like controller parameters, IGBT switching frequency, as well as demand values for torque and current + phase angle/slip control can be set by the operator via the CAN-bus interface.
Quantities measured by the Universal Inverter like speed, current, voltage, temperature can be read in from CAN-bus.

Packaging and Options
The Inverter is installed in an enclosure equipped with a proper DC-link capacitor, digital control unit and CAN-bus interface to test bed automation system. High-voltage protection chopper is available on demand.

Different rotor position sensors/encoders (e.g. AMITEQ, TAMAGAWA, etc.) supported by exchangeable interface hardware add-ons to the universal inverter.
Technical Data

E-Motor types
- 3phase Permanent Magnet Synchronous Motor (PMM)
- 3phase Induction Motor (IM)

4 variants available
(750-1, 750-2, 1000-1, 1000-2)

Flexible DC Inverter supply
50VDC .... 750VDC (1000VDC)

Output voltage max.
520VAC\text{rms} @ 750VDC (690VAC\text{rms} @ 1000VDC)

Nominal output current
up to 760Arms (S1)

Measurement accuracy
- Voltage: < +/-0.5V
- Current: < +/-1A

IGBT switching frequency
- fsw: 4.5kHz .... 15kHz (14kHz)

Output frequency
0Hz .... 1/10 of fsw
(Higher frequency with synchronous pulse pattern possible)

E-Motor Idle voltage
- Back-EMF max.: 1000Vpeak (1500Vpeak)
- Higher idle voltage with optional protection chopper

Control modes
- PM motors: Current and Angle (I_d/I_q)
- Torque … Inverter adapted to UUT via parameterization
- Induction motors: Current and Slip
- Torque … Inverter adapted to UUT via parameterization

Interface to Encoder/Resolver
- Signal conditioning/conversion HW-boxes available on demand

Protection class
- Air-cooled System: IP 23
- Water-cooled System: IP 54

Operation environment condition
3K3
Diagrams

Type 750-1

Type 750-2

Type 1000-1

Type 1000-2