

Multilevel highspeed inverter

MLI 55 2.0 Datasheet

Control of motors and generators up to 150,000 rpm. Speed safely under control – lower system costs



General Description

High speed kept under control

- DC supply voltage up to 800 VDC
- Nominal phase current up to 55 ARMS
- Stator frequency up to 2,500 Hz
- PWM switching frequency up to 46kHz

Features

- Compact design
- High power density
- Liquid-cooled, inlet temperature < 70°C (under full load conditions)
- Interface to higher-level control system (CANopen/J1939)
- Field-proven sensorless speed and torque control
- Temperature monitoring interface
- Digital Signal Processor with high control performance
- Integrated EMI filter
- DC voltage measurement and supervision
- Three phase current measurements
- Three phase voltage measurements
- IP67 enclosure

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Characteristics

Symbol	Conditions	Min.	Typ.	Max.	Unit
V_{DC}	DC supply voltage	80		800	V
I_{nom}	I_{rms} nominal - $dV/dt = 10$ lt/min - 50%Glykol/50%H ₂ O - $T_{coolant} = 70^{\circ}C$ - $T_{air} = 75^{\circ}C$ - $V_{DC} = 500V$ (for higher voltage max. nominal current 50Arms) - $f_{out} > 100$ Hz - $f_{sw} = 38$ kHz		55	60 (max. 1.5s)	Arms
f_{sw}	Switching frequency	20	38	46	kHz
I_{DC}	DC input current			50	A
C_{DC}	DC-link capacitance		50		μF
C_y	EMI capacitor; DC to enclosure		2x47		nF
R_{BL}	DC+ to DC-		176		k Ω
t_d	Discharge time to $V_{DC} < 60V$			60	Sec
V_{WFRI}	Working Voltage for Reinforced Isolation			800	V
Mechanical Data					
m	Weight (without cooling water)		5.7		kg
L	Length (without connector)		345		mm
W	Width (without connector)		244		mm
H	Height (without connector)		82		mm
M_{gnd}	GND connection (M6) torque			6.5	Nm
Liquid Cooling					
$T_{coolant}$	Operating range	-30		70	$^{\circ}C$
dV/dt	Flow rate	6	10		lt/min
dp	Pressure drop @10 lt/min		<100		mbar
p	Operating pressure (gauge)			2	Bar
Inlets	Coolant inlets	for 16mm flexible pipe			

Symbol	Conditions	Min.	Typ.	Max.	Unit
Environmental Data					
T _{air}	Ambient temperature operating range	-40		85	°C
T _{no}	Non-operating temperature range	-40		85	°C
IP	Enclosure protection level (Connector mated)		IP67		
Altitude				5000	m
Interface					
V _s	Auxiliary supply voltage primary side	8	14	36	V
I _{s_sleep}	Auxiliary supply current primary side in sleep mode		100	680	μA
I _s	Auxiliary supply current primary - V _s = 14V - IGBT inverter standby		850		mA
I _s	Auxiliary supply current primary - V _s = 14V - IGBT inverter switching @38kHz		1250		mA
t _{por}	Power-on reset completed (gate driver primary & secondary side)			1.5	s
Protection Functions					
V _{Dtrip}	DC-Link voltage trip level (HW)		920		V
I _{sstrip_max}	Maximal phase current trip level (HW)		117		A
Temperature Sensor 1 and 2					
T	Measurable temperature range (PT100)	-55		155	°C

Power Connectors (HV)

HV DC Connector: Amphenol PL082X-61-10 (Plug: PL182X-61-10)

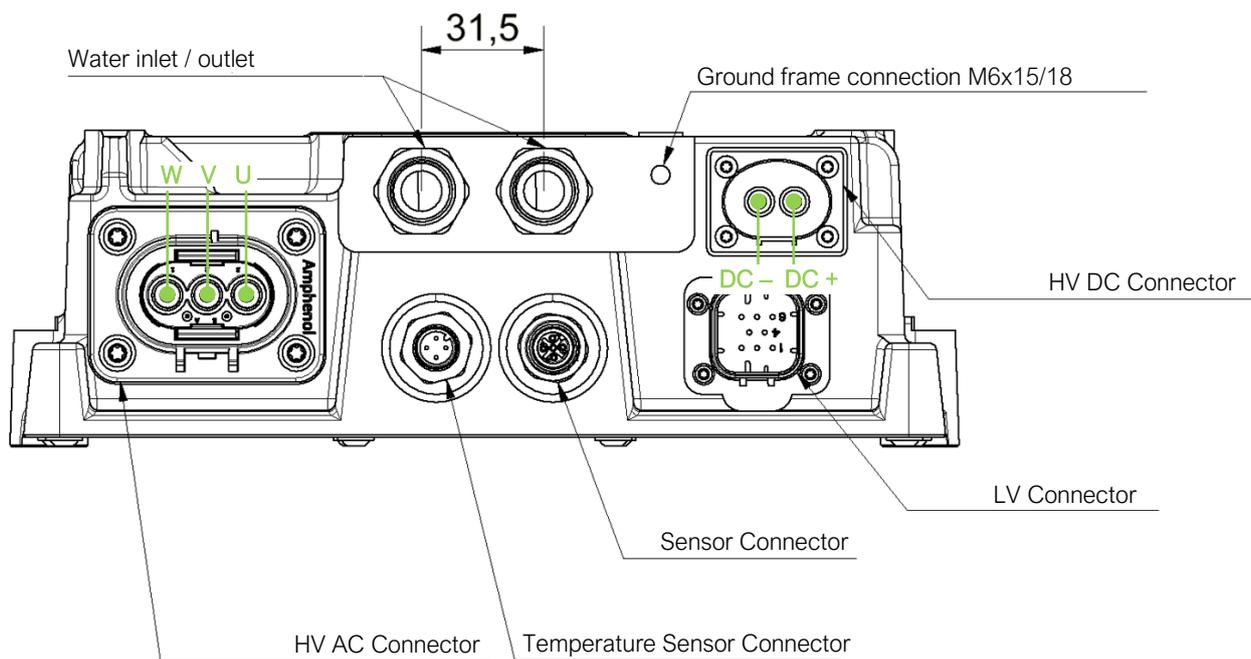
Please check datasheet of the manufacture for mating cycles.

Pin	Signal	Function	Specification
A:01	HV+	HV DC Connector	
A:02	HV-	HV DC Connector	

HV AC Connector: Amphenol ELR03A04 (Plug: ELP03A04)

Please check datasheet of the manufacture for mating cycles.

Pin	Signal	Function	Specification
B:01	HV-AC W	HV AC Connector (Motor)	
B:02	HV-AC V	HV AC Connector (Motor)	
B:03	HV-AC U	HV AC Connector (Motor)	



Signal Connector (LV)

LV Connector: AMPSEAL 776280-1 (Plug 776286-1) (TE Connectivity)

Please check datasheet of the manufacturer for mating cycles.

Pin	Signal	Function	Specification
C:01	KL31	Auxiliary supply voltage negative	
C:02	CAN_L	CAN	
C:03	CAN_H	CAN	
C:04	HVIL_IN	Interlock	
C:05	HVIL_OUT	Interlock	
C:06	KL30	Auxiliary supply voltage positive	
C:07	D_OUT 1	Digital output 1	Output voltage V_s Max. load current 1A per channel Short circuit and overload protected
C:08	D_OUT 2	Digital output 2	Output voltage V_s Max. load current 1A per channel Short circuit and overload protected

Temperature Sensor Connector

Temperature Sensor Connector: M12-A male connector, 4 contacts

Please check datasheet of the manufacturer for mating cycles.

Pin	Signal	Function	Specification
D:01	TEMP_AIN_1+	Temperature Sensor 1	
D:02	TEMP_AIN_1-	Temperature Sensor 1	
D:03	TEMP_AIN_2+	Temperature Sensor 2	
D:04	TEMP_AIN_2-	Temperature Sensor 2	

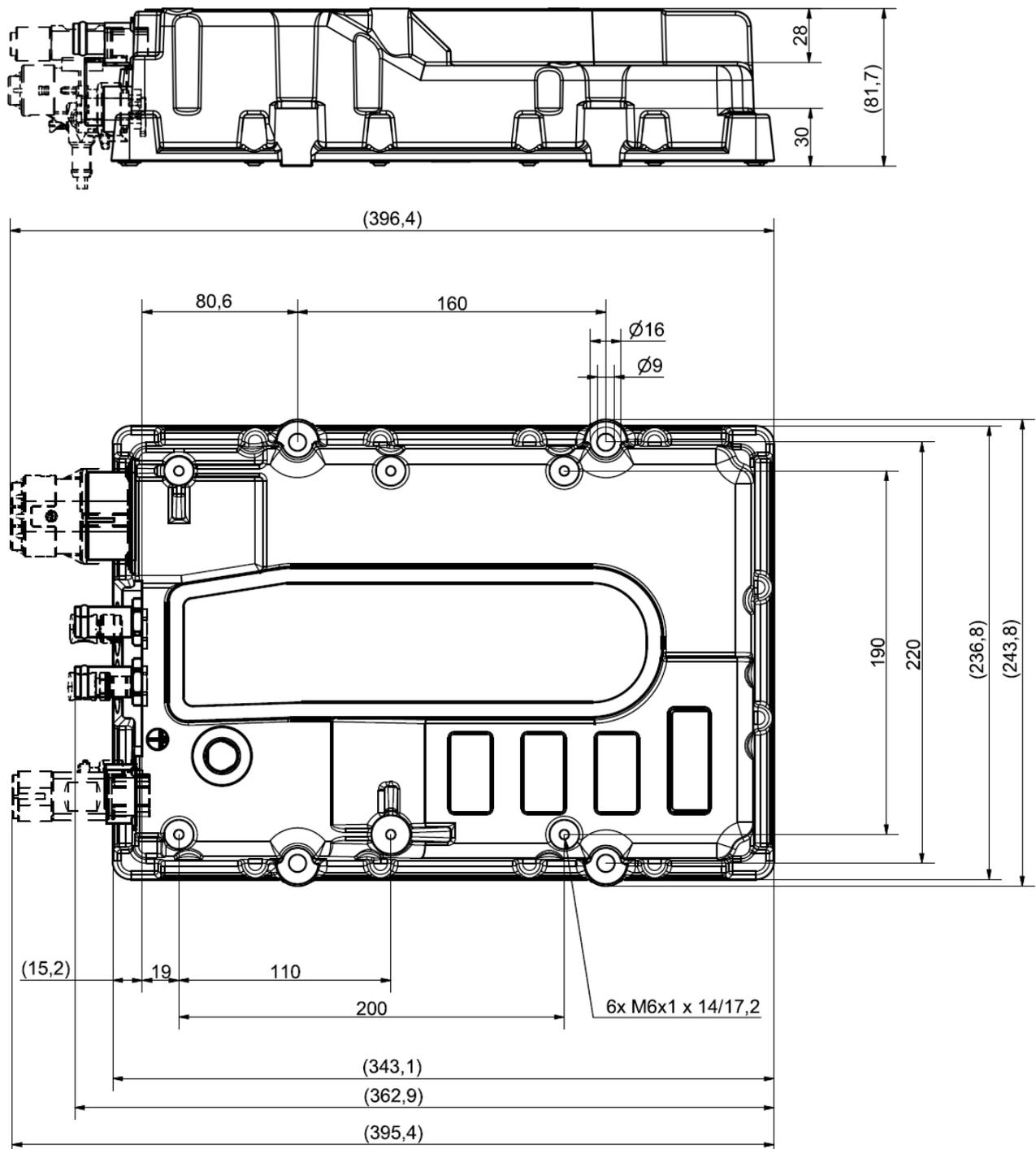
Sensor Connector

Sensor Connector: M12-A female connector, 4 contacts

Please check datasheet of the manufacturer for mating cycles.

Pin	Signal	Function	Specification
E:01	5V_AIN_3	5V +/- 10% Output Maximal current 5 mA	
E:02	VOLT_AIN_3-	GND	
E:03	VOLT_AIN_3+	0.5 V – 4.5 V Analog Input	
E:04	Not connected		

Mechanical Data – Enclosure Mounting Drawing



Company Overview

Specific applications for electric drive technology and power electronics

Our comprehensive systems expertise in electric drive technology and power electronics is based on our specialist knowledge of electrical machines with related inverters/DC-DC converters, including the associated software, along with the courage to change perspective.

We have the expertise to combine single components into individual systems solutions. By pooling our experience, knowledge and technology, we are able to meet your requirements with precision.

System Engineering

- Systems modelling and analysis expertise
- Hardware/software co-simulation

Electrical Machines

- High-performance electric motors and generators
- Outstanding power density and efficiency
- From prototyping to series production

Hardware

- Advanced SiC or IGBT inverters for main and auxiliary drives
- Low-voltage MOSFET inverters
- Grid-tied or island-mode power generation inverters
- Highly efficient and compact DC/DC converters (isolated / non-isolated)
- DSP- and/or FPGA-based control electronics

Software

- Embedded real time applications on DSP and FPGA devices
- Motor control strategies for maximum efficiency
- Software solutions for grid-tied and islanding mode power generation
- QUASAR™ proprietary motor control software for all machine types
- Q-control, proprietary Windows®-based diagnostic and configuration tools

With Drivetek, you get the entire system from one competent partner.

Markets

Our markets are automotive and transportation, industry, aerospace, energy.

For further questions

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Disclaimer

Drivetek reserves the right to change specifications and design without notice.