

# Multilevel highspeed inverter

## MLI 55 2.0 Datasheet

Control of motors and generators up to 180,000 rpm. Speed safely under control – lower system costs



### General Description

#### High speed kept under control

- DC supply voltage up to 850 VDC
- Nominal phase current up to 55 ARMS
- Stator frequency up to 3,000 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 on request)
- 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
- IP6K9K enclosure

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## Characteristics

Symbol	Conditions	Min.	Typ.	Max.	Unit
$V_{DC}$	DC supply voltage	80		850	V
$I_{nom}$	$I_{rms}$ nominal - $dV/dt = 10$ lt/min - 50%Glykol/50%H <sub>2</sub> O - $T_{coolant} = 70^{\circ}C$ - $T_{air} = 75^{\circ}C$ - $V_{DC} = 800V$ - $f_{out} > 100$ Hz - $f_{sw} = 38$ kHz		55	60 (max. 1.5s)	Arms
$f_{sw}$	Switching frequency	20	38	46	kHz
$I_{DC}$	DC input current			60	A
$C_{DC}$	DC-link capacitance		40		$\mu F$
$C_y$	EMI capacitor; DC to enclosure		2x47		nF
$R_{BL}$	DC+ to DC-		176		k $\Omega$
$t_d$	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
V	Cooling liquid volume		0.25		lt
Inlets	Coolant inlets	for 16mm flexible pipe			

Symbol	Conditions	Min.	Typ.	Max.	Unit
Environmental Data					
T <sub>air</sub>	Ambient temperature operating range	-40		85	°C
T <sub>no</sub>	Non-operating temperature range	-40		85	°C
IP	Enclosure protection level (Connector mated)		IP67 / IP6K9K		
Altitude				5000	m
Interface					
V <sub>s</sub>	Auxiliary supply voltage primary side	8	14	36	V
I <sub>s_sleep</sub>	Auxiliary supply current primary side in sleep mode		100		μA
I <sub>s</sub>	Auxiliary supply current primary - V <sub>s</sub> = 14V - IGBT inverter standby		850		mA
I <sub>s</sub>	Auxiliary supply current primary - V <sub>s</sub> = 14V - IGBT inverter switching @38kHz		1250		mA
t <sub>por</sub>	Power-on reset completed (gate driver primary & secondary side)			1.5	s
Protection Functions					
V <sub>DCtrip</sub>	DC-Link voltage trip level (HW)		920		V
I <sub>sctrip_max</sub>	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)

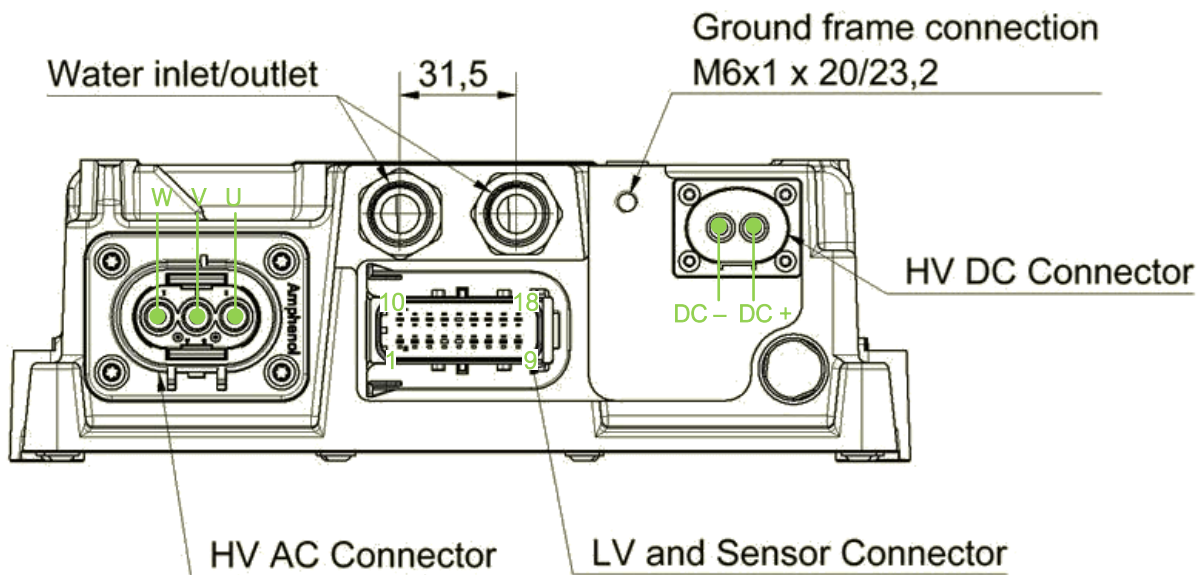
Please check datasheet of the manufacture for mating cycles.

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)	



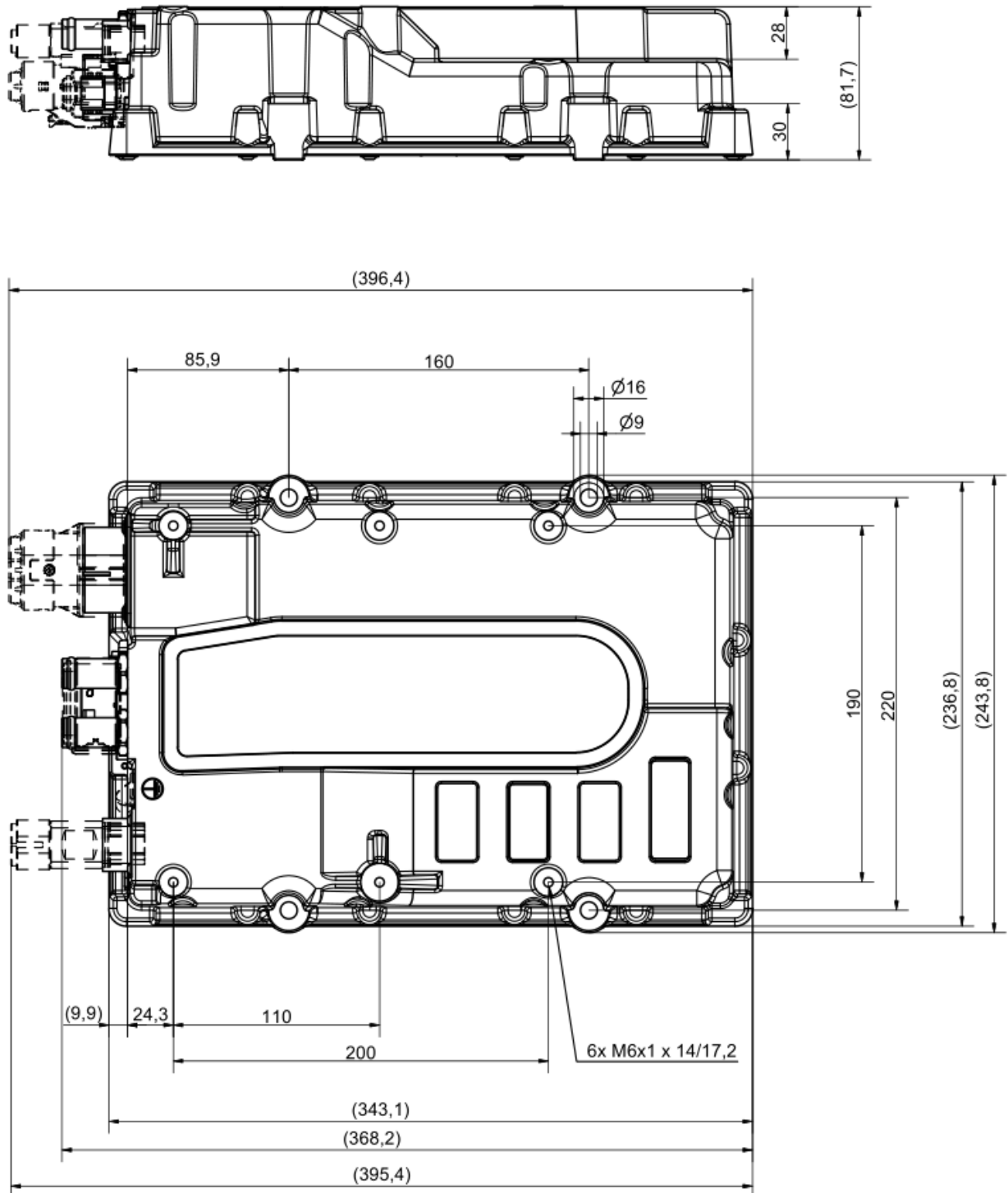
## LV and Sensor Connector (LV)

LV Connector: HDSC 1-1564526-1, Plug 1-1563759-1 (TE Connectivity)

Please check datasheet of the manufacturer for mating cycles.

Pin	Signal	Function	Specification
C:01	TEMP_AIN_1+	Temperature Sensor 1	
C:02	TEMP_AIN_1-	Temperature Sensor 1	
C:03	TEMP_AIN_2+	Temperature Sensor 2	
C:04	TEMP_AIN_2-	Temperature Sensor 2	
C:05	n.c.		
C:06	HVIL_OUT	Interlock	
C:07	HVIL_IN	Interlock	
C:08	D_OUT	Digital output	Function available on request
C:09	D_IN	Digital input	Function available on request
C:10	5V_AIN_3	5V +/- 10% Output	Maximal current : 5 mA
C:11	VOLT_AIN_3+	0.5 V – 4.5 V Analog Input	
C:12	VOLT_AIN_3-	GND	
C:13	n.c.		
C:14	n.c.		
C:15	KL31	Auxiliary supply voltage negative	
C:16	CAN_H	CAN	
C:17	CAN_L	CAN	
C:18	KL30	Auxiliary supply voltage positive	

### 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.