

Multilevel highspeed inverter 110 1.1

MLI 110 1.1 Preliminary Datasheet REV 001

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 110 ARMS
- Stator frequency up to 2,500 Hz
- PWM switching frequency up to 35kHz

Features

- Compact design
- High power density
- Liquid-cooled, inlet temperature < 60°C (under full load conditions)
- Interface to higher-level control system (CANopen/J1939)
- Field-proven sensorless speed and torque control
- Temperature monitoring interface
- Motor position 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	200		800	V
I_{nom}	I_{rms} nominal - $dV/dt = 10$ lt/min - 50%Glykol/50%H ₂ O - $T_{coolant} = 60^{\circ}C$ - $T_{air} = 60^{\circ}C$ - $V_{CC} = 750V$ - $f_{out} > 100$ Hz - $f_{sw} = 30$ kHz		110	130 (max. 1.5s)	Arms
f_{sw}	Switching frequency	20	30	35	kHz
I_{DC}	DC input current			100	A
C_{DC}	DC-link capacitance		113		μF
C_y	EMI capacitor; DC to enclosure		0.11		μF
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			636	V
Mechanical Data					
m	Weight (without cooling water)		7		kg
L	Length (without connector)		400		mm
W	Width (without connector)		270		mm
H	Height (without connector)		77		mm
M_t	AC / DC terminals (M5) torque			4.5	Nm
M_c	Cover of terminal box (M4) torque			2.4	Nm
M_{gnd}	GND connection (M5) torque			4.5	Nm
M_m	Mounting screws (M6) torque			6.5	Nm
Liquid Cooling					
$T_{coolant}$	Operating range	-30		60	$^{\circ}C$
dV/dt	Flow rate	6	10		lt/min
dp	Pressure drop @10 lt/min		<100		mbar
P	Operating pressure (gauge)			2	Bar

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Symbol	Conditions	Min.	Typ.	Max.	Unit
V _{coolant}	Coolant quantity of integrated cooling circuit		450		cm ³
Inlets	Coolant inlets	for 16mm flexible pipe			
Environmental Data					
T _{air}	Ambient temperature operating range	-30		85	°C
T _{no}	Non-operating temperature range	-40		85	°C
IP	Enclosure protection level (Connector mated)		IP67		
Altitude	V _{DC} = 636V			4000	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	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 @35kHz		1250		mA
t _{por}	Power-on reset completed (gate driver primary & secondary side)			1.5	s
Protection Functions					
V _{DCtrip}	DC-Link voltage trip level (HW) +DC/2 & -DC/2		467.5		V
I _{sstrip_nom}	Nominal phase current trip level		200		A
I _{sstrip_max}	Maximal phase current trip level (HW)		240		A
Motor Temperature 1					
R _{ts}	Measurable range 1 (PT100)	0		199	Ω
	Measurable range 2 (KTY-84)	0		2360	Ω
Motor Temperature 2					
R _{ts}	Measurable range 1 (PT100)	0		199	Ω
	Measurable range 2 (KTY-84)	0		2360	Ω
Motor Position Sensing					
	ABZ encoder interface				

Power Connectors (HV)

Pin	Terminal	Size	Torque	Cable harness
A:01	DC+	M5 (max 16mm ²) Depth of thread 6mm	<3Nm	1 x M32
A:02	DC-	M5 (max 16mm ²) Depth of thread 6mm	<3Nm	
B:01	Phase U	M5 (max 16mm ²) Depth of thread 6mm	<3Nm	1 x M32 or 3 x M20
B:02	Phase V	M5 (max 16mm ²) Depth of thread 6mm	<3Nm	
B:03	Phase W	M5 (max 16mm ²) Depth of thread 6mm	<3Nm	

Signal Connectors (LV)

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

Please check datasheet of the manufacture 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	DO1	Digital Output 1	
C:08	DO2	Digital Output 2	

Sensor Connector

Sensor Connector: Binder Serie 713 M12 (09 3431 700 04)

Please check datasheet of the manufacture for mating cycles.

Pin	Signal	Function	Specification
D:01	MOT_TEMP_A+	Motor Temperature 1	
D:02	MOT_TEMP_A-	Motor Temperature 1	
D:03	MOT_TEMP_B+	Motor Temperature 2	
D:04	MOT_TEMP_B-	Motor Temperature 2	

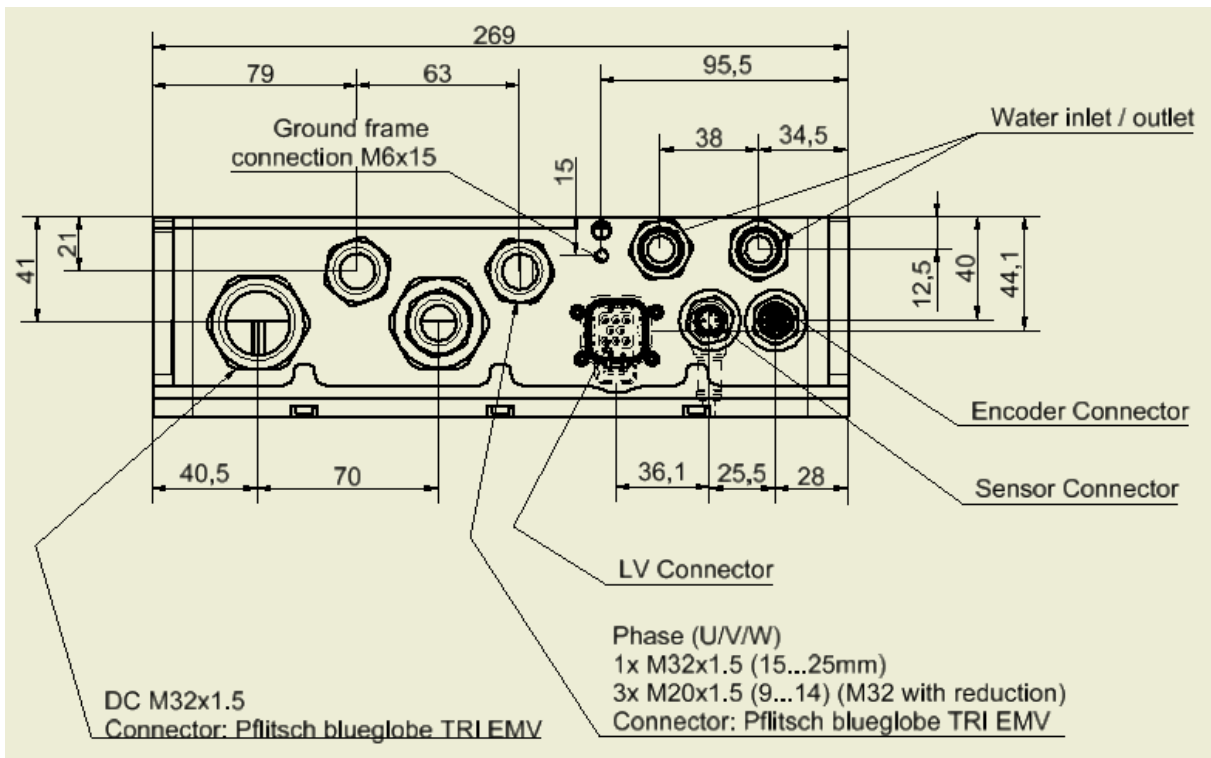
Encoder Connector

Sensor Connector: Binder Serie 713 M12 (09 3482 700 08)

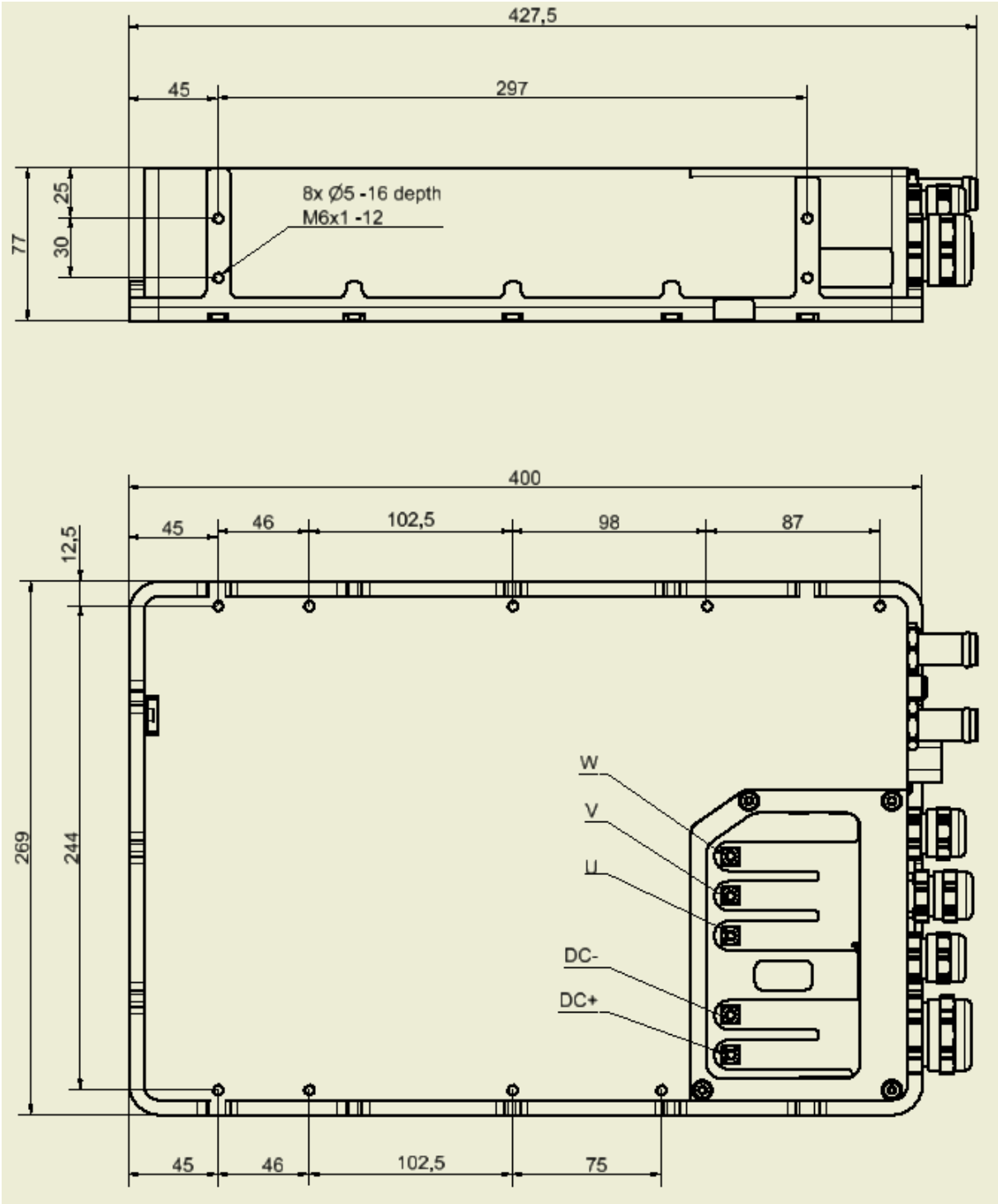
Please check datasheet of the manufacture for mating cycles.

Pin	Signal	Function	Specification
E:01	GND	GND Encoder Supply	0V
E:02	PWR	Encoder Supply	5V +/- 5%
E:03	A+	Track A	RS-422
E:04	A-	Track A	RS-422
E:05	B+	Track B	RS-422
E:06	B-	Track B	RS-422
E:07	Z+	Index	RS-422
E:08	Z-	Index	RS-422

Mechanical Data – Enclosure Mounting Drawing



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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

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