

Datasheet

Marine DC-Breaker 1.5kA



Features

- > Stand-alone solution for integration in any type of DC-grid
- > High di/dt-capability with autonomous switch-off
- > Ultra-fast break time in microsecond range
- > Bi-directional functionality
- > Liquid cooling (tap or de-ionized water)
- > Topology optimized for low power loss and maximum lifetime
- > Autonomous current monitoring and switch control
- > Internal self-diagnostic capability
- > Optical and electrical trigger and feedback
- > DNV-GL certified

Configuration

- > IP20 with fan
- > Short interface suitable for busbar connection
- > Balancing switch 1300W
- > Liquid cooling with threaded coupling

1 Introduction

Product Number: AA-21001-110

Product Code: CBM-1.5-1.5-O3-IB-BS13-SC-LN-FL-01

The Marine DC-Breaker is a solid-state circuit breaker especially designed and certified for on-board electrical systems in the maritime industry. In order to protect healthy sections of the system, the breaker has to interrupt a fault current within microseconds. With this response time requirement, local fault protection must be performed autonomously by the breaker control system, without the need for external control or fault detection. In addition to the fast over-current protection, the breaker can be programmed to open according to a time-current profile. It allows the overall system to reconfigure the behavior of the DC-Breaker within certain boundaries which are pre-defined by the factory. The fast opening time of solid-state breaker limits the fault current and reduces the negative impact on the load to a minimum. The current does not reach damaging energy levels and can be interrupted without forming an arc, therefore voltage reversal is not required.

2 Technical Specifications

2.1 Power Supply

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Notes
Input Voltage	V_{IN}	-	18	24	31	V	
Power Consumption	P_{IN}	@ $V_{IN}=24V$	-	35	120	W	
Insulation Voltage	$V_{Insulation}$	-	-	6	-	kV	¹

¹ Peak voltage

Table 1 Power Supply

2.2 Electrical Characteristics

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Notes
DC Link Voltage	$V_{DC\ link}$	-	0.01	1.0	1.5	kV	
DC Link Current	$I_{DC\ link}$	-	-	-	1.50	kA	²
System Loop Inductance	$L_{DC\ link}$	-	-	-	100	μH	
Breaking Time	t_{Break}	-	-	8	10	μs	
Clearance Time	$t_{Clearance}$	typ. @ $L=4\mu H$	-	25	300	μs	²
Voltage Drop	V_{Drop}	-	-	6.1	6.5	V	
Link Length	l_{Link}	-	-	-	30	m	³

¹ For custom specific values ask factory.

² Higher Inductance values available

³ Depends on customer system (inductance, voltage, current)

⁴ See also picture fig. 1

Table 2 Electrical Characteristics

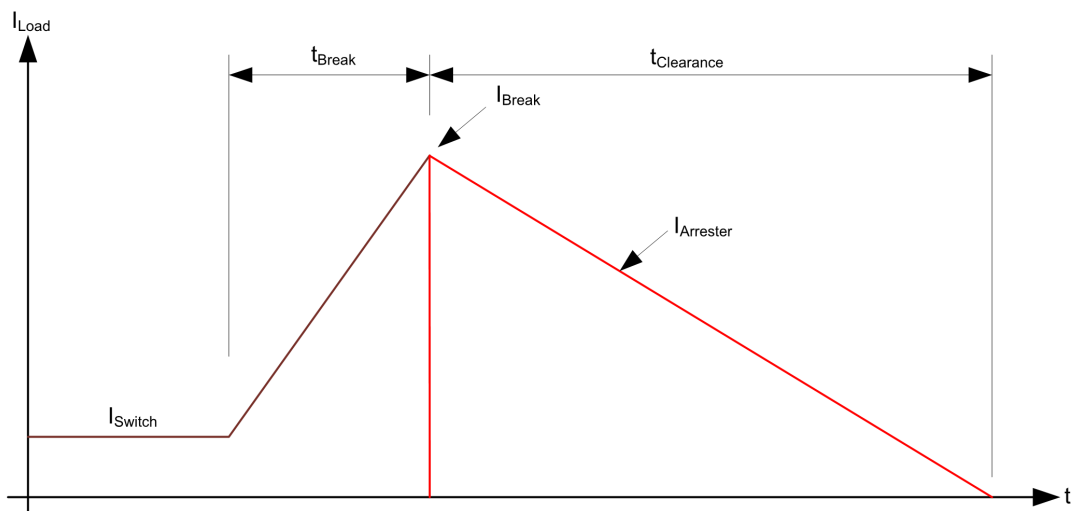


Figure 1 Short Circuit

2.3 Environmental Conditions

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Notes
Operating Temperature	T _{OP}	non condensing	-5	-	+60	°C	¹
Storage Temperature	T _{Store}	non condensing	-40	-	+85	°C	¹
Humidity	Hum	non condensing	5	-	95	%RH	¹
IP Protection			-	IP20	-		²
Altitude	Alt		-	-	1000	MSL	

¹ non condensing

² Optional

Table 3 Environmental Conditions

3 Operation

3.1 Overload and Tripping

The overload and overcurrent tripping characteristics of the DC-Breaker are configurable using a parameter set which defines current limits relative to the maximum continuous current I_{cmax} .

Parameter	Symbol	Description	Min	Max	Unit	Remark
Maximum Continuous Current	I_{cmax}	This current can be conducted continuously without causing an overload error.	50	$I_{dc\ link}$	A	Rated current of the $I_{dc\ link}$ of the DC-Breaker.
Overload Factor	K_{OL}^1	If this current is applied continuously it will cause an error after the time T_{OL} has reached.	-	1.25	-	
Overload Time	T_{OL}	The overload current can be applied continuously for this time without causing an overload error.	1	100	s	-
Peak Current	I_P	Exceeding this current level causes an immediate trip.	I_{cmax}	$1.25 \cdot I_{cmax}$	-	

Table 4 Tripping Characteristic Parameter Set

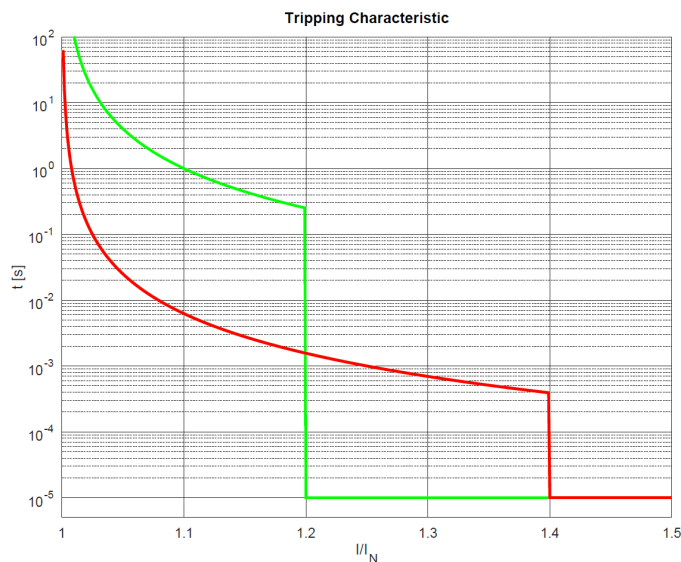


Figure 2 Tripping Characteristics of DC-Breaker

4 Mechanical Interface Description

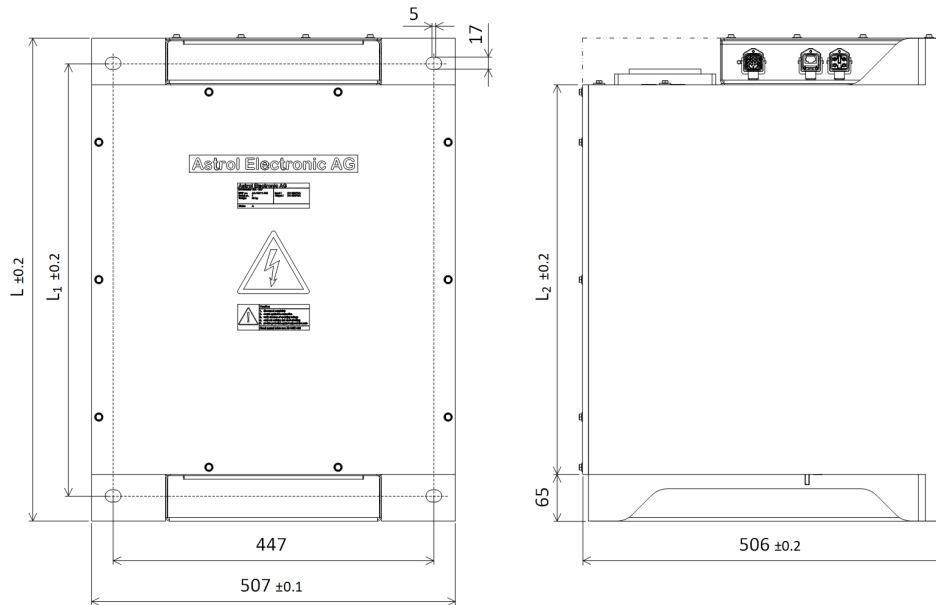


Figure 3 Mechanical Dimensions DC-Breaker

Model	No	L [mm]	L1 [mm]	L2 [mm]	Weigth [kg]	Notes
1.5kA	AA-21001-002	673	603	543	95	1, 2

¹ For more details about mechanical dimensions, refer to the dimensional drawing AD-10811-028

² The weight is calculated with all options.

Table 5 Mechanical Size

Rev.	Changes	Visum	Date
1.0	Initial Release	AST	31.03.2022



Figure 4 Checked



Figure 5 Approved

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