



MARINE DIVISION

Certificate number: 20125/A0 BV

File number: ACE 02/010/20

Product code: 2633H

*This certificate is not valid when presented without the full attached schedule composed of 7 sections*

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## TYPE APPROVAL CERTIFICATE

*This certificate is issued to*

**ABB SACE S.p.A.**  
Bergamo - ITALY

*for the type of product*

### CIRCUIT BREAKERS (LOW VOLTAGE)

Low voltage moulded-case circuit-breakers Tmax type T1, T2, T3, T4, T5, T6, T7

**Requirements:**

BV Rules for the Classification of Steel Ships.  
IEC 60947-1, IEC 60947-2.

*This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.*

**This certificate will expire on: 02 Jul 2014**

**For BUREAU VERITAS,**

At BV GENOA, on 02 Jul 2009,

Carlo Bozzetti



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

## THE SCHEDULE OF APPROVAL

### 1. PRODUCT DESCRIPTION :

Technical data of low voltage moulded case circuit-breakers Tmax type: T1, T2, T3, T4, T5, T6, T7.

- Rated insulation voltage, **Ui**: 1000V
- Rated impulse withstand voltage, **Uimp**: 8 kV
- Rated frequency: 50 - 60 Hz
- Poles: 3/4

<b>Tmax T1</b>				
		<b>B</b>	<b>C</b>	<b>N</b>
Rated uninterrupted current , <b>Iu</b>	(A)	160	160	160
Rated service voltage, <b>Ue</b> (AC)	(V)	690	690	690
	(DC) (V)	500	500	500
<b>Rated ultimate short-circuit breaking capacity, Icu</b>				
220/230 V AC	(kA)	25	40	50
380/415 V AC	(kA)	16	25	36
440 V AC	(kA)	10	15	22
500 V AC	(kA)	8	10	15
690 V AC	(kA)	3	4	6
<b>Rated service short-circuit breaking capacity, Ics</b>				
220/230 V AC	(% Icu)	100%	75%	75%
380/415 V AC	(% Icu)	100%	100%	75%
440 V AC	(% Icu)	100%	75%	50%
500 V AC	(% Icu)	100%	75%	50%
690 V AC	(% Icu)	100%	75%	50%
Utilization category		A	A	A
<b>Rated short-circuit making capacity, Icm</b>				
220/230 V AC	(kA)	52,5	84	105
380/415 V AC	(kA)	32	52,5	75,6
440 V AC	(kA)	17	30	46,2
500 V AC	(kA)	13,6	17	30
690 V AC	(kA)	4,3	5,9	9,2
Version		F	F	F

<b>Tmax T2</b>					
		<b>N</b>	<b>S</b>	<b>H</b>	<b>L</b>
Rated uninterrupted current , <b>Iu</b>	(A)	160	160	160	160
Rated service voltage, <b>Ue</b> (AC)	(V)	690	690	690	690
	(DC) (V)	500	500	500	500
<b>Rated ultimate short-circuit breaking capacity, Icu</b>					
220/230 V AC	(kA)	65	85	100	120
380/415 V AC	(kA)	36	50	70	85
440 V AC	(kA)	30	45	55	75
500 V AC	(kA)	25	30	36	50
690 V AC	(kA)	6	7	8	10
<b>Rated service short-circuit breaking capacity, Ics</b>					
220/230 V AC	(% Icu)	100%	100%	100%	100%
380/415 V AC	(% Icu)	100%	100%	100%	75% (70 kA)
440 V AC	(% Icu)	100%	100%	100%	75%
500 V AC	(% Icu)	100%	100%	100%	75%
690 V AC	(% Icu)	100%	100%	100%	75%
Utilization category		A	A	A	A
<b>Rated short-circuit making capacity, Icm</b>					
220/230 V AC	(kA)	143	187	220	264
380/415 V AC	(kA)	75,6	105	154	187
440 V AC	(kA)	63	94,5	121	165
500 V AC	(kA)	52,5	63	75,6	105
690 V AC	(kA)	9,2	11,9	13,6	17
Version		F-P	F-P	F-P	F-P

<b>Tmax T3</b>		
	<b>N</b>	<b>S</b>
Rated uninterrupted current , <b>Iu</b> (A)	250	250
Rated service voltage, <b>Ue</b> (AC) (V)	690	690
(DC) (V)	500	500
Rated ultimate short-circuit breaking capacity, <b>Icu</b>		
220/230 V AC (kA)	50	85
380/415 V AC (kA)	36	50
440 V AC (kA)	25	40
500 V AC (kA)	20	30
690 V AC (kA)	5	8
Rated service short-circuit breaking capacity, <b>Ics</b>		
220/230 V AC (%Icu)	75%	50%
380/415 V AC (%Icu)	75%	50% (27kA)
440 V AC (%Icu)	75%	50%
500 V AC (%Icu)	75%	50%
690 V AC (%Icu)	75%	50%
Utilization category	A	A
Rated short-circuit making capacity, <b>Icm</b>		
220/230 V AC (kA)	105	187
380/415 V AC (kA)	75,6	105
440 V AC (kA)	52,5	84
500 V AC (kA)	40	63
690 V AC (kA)	7,7	13,6
Version	F-P	F-P

<b>Tmax T4</b>					
	<b>N</b>	<b>S</b>	<b>H</b>	<b>L</b>	<b>V</b>
Rated uninterrupted current , <b>Iu</b> (A)	250/320	250/320	250/320	250/320	250/320
Rated service voltage, <b>Ue</b> (AC) (V)	690	690	690	690	690
(DC) (V)	750	750	750	750	750
Rated ultimate short-circuit breaking capacity, <b>Icu</b>					
220/230 V AC (kA)	70	85	100	200	200
380/415 V AC (kA)	36	50	70	120	200
440 V AC (kA)	30	40	65	100	180
500 V AC (kA)	25	30	50	85	150
690 V AC (kA)	20	25	40	70	80
Rated service short-circuit breaking capacity, <b>Ics</b>					
220/230 V AC (%Icu)	100%	100%	100%	100%	100%
380/415 V AC (%Icu)	100%	100%	100%	100%	100%
440 V AC (%Icu)	100%	100%	100%	100%	100%
500 V AC (%Icu)	100%	100%	100%	100%	100%
Utilization category	A	A	A	A	A
Rated short-circuit making capacity, <b>Icm</b>					
220/230 V AC (kA)	154	187	220	440	660
380/415 V AC (kA)	75,6	105	154	264	440
440 V AC (kA)	63	84	143	220	396
500 V AC (kA)	52,5	63	105	187	330
690 V AC (kA)	40	52,5	84	154	176
Version	F-P-W	F-P-W	F-P-W	F-P-W	F-P-W

<b>Tmax T5</b>					
	<b>N</b>	<b>S</b>	<b>H</b>	<b>L</b>	<b>V</b>
Rated uninterrupted current, <b>Iu</b> (A)	400/630	400/630	400/630	400/630	400/630
Rated service voltage, <b>Ue</b> (AC) (V)	690	690	690	690	690
(DC) (V)	750	750	750	750	750
Rated ultimate short-circuit breaking capacity, <b>Icu</b>					
220/230 V AC (kA)	70	85	100	200	200
380/415 V AC (kA)	36	50	70	120	200
440 V AC (kA)	30	40	65	100	180
500 V AC (kA)	25	30	50	85	150
690 V AC (kA)	20	25	40	70	80
Rated service short-circuit breaking capacity, <b>Ics</b>					
220/230 V AC (%Icu)	100%	100%	100%	100%	100%
380/415 V AC (%Icu)	100%	100%	100%	100%	100%
440 V AC (%Icu)	100%	100%	100%	100%	100%
500 V AC (%Icu)	100%	100%	100%	100%	100%
690 V AC (%Icu)	100%	100%	100%	100%	100%
Utilization category *)	B(400A) -A(630A)	B(400A) -A(630A)	B(400A) -A(630A)	B(400A) -A(630A)	B(400A) -A(630A)
Rated short-circuit making capacity, <b>Icm</b>					
220/230 V AC (kA)	154	187	220	440	660
380/415 V AC (kA)	75,6	105	154	264	440
440 V AC (kA)	63	84	143	220	396
500 V AC (kA)	52,5	63	106	187	330
690 V AC (kA)	40	52,5	84	154	176
Version	F-P-W	F-P-W	F-P-W	F-P-W	F-P-W

<b>Tmax T6</b>				
	<b>N</b>	<b>S</b>	<b>H</b>	<b>L</b>
Rated current, <b>Iu</b> (A)	630/800/1000	630/800/1000	630/800/1000	630/800/1000
Rated service voltage, <b>Ue</b> (AC) (V)	690	690	690	690
(DC) (V)	750	750	750	750
Rated ultimate short-circuit breaking capacity, <b>Icu</b>				
220/230 V AC (kA)	70	85	100	200
380/415 V AC (kA)	36	50	70	100
440 V AC (kA)	30	45	50	80
500 V AC (kA)	25	35	50	65
690 V AC (kA)	20	22	25	30
Rated service short-circuit breaking capacity, <b>Ics</b>				
220/230 V AC (%Icu)	100%	100%	100%	75%
380/415 V AC (%Icu)	100%	100%	100%	75%
440 V AC (%Icu)	100%	100%	100%	75%
500 V AC (%Icu)	100%	100%	100%	75%
690 V AC (%Icu)	75%	75%	75%	75%
Utilization category **)	B(630A-800A) -A(1000A)	B(630A-800A) -A(1000A)	B(630A-800A) -A(1000A)	B(630A-800A) -A(1000A)
Rated short-circuit making capacity, <b>Icm</b>				
220/230 V AC (kA)	154	187	220	440
380/415 V AC (kA)	75,6	105	154	220
440 V AC (kA)	63	94,5	105	176
500 V AC (kA)	52,5	73,5	105	143
690 V AC (kA)	40	46	52,5	63
Version	F-W	F-W	F-W	F-W

<b>Tmax T7</b>				
	<b>S</b>	<b>H</b>	<b>L</b>	<b>V (7)</b>
Rated current, <b>Iu</b> (A)	800/1000/ 1250/1600	800/1000/ 1250/1600	800/1000/ 1250/1600	800/1000/ 1250/1600
Rated service voltage, <b>Ue</b> (AC) (V) (DC) (V)	690 -	690 -	690 -	690 -
Rated ultimate short-circuit breaking capacity, <b>Icu</b>				
220/230 V AC (kA)	85	100	200	200
380/415 V AC (kA)	50	70	120	150
440 V AC (kA)	50	65	100	130
500 V AC (kA)	40	50	85	100
690 V AC (kA)	30	42	50	60
Rated service short-circuit breaking capacity, <b>Ics</b>				
220/230 V AC (%Icu)	100%	100%	100%	100%
380/415 V AC (%Icu)	100%	100%	100%	100%
440 V AC (%Icu)	100%	100%	100%	100%
500 V AC (%Icu)	100%	100%	75%	100%
690 V AC (%Icu)	100%	75%	75%	75%
Utilization category (***)	B	B	B	B
Rated short-circuit making capacity, <b>Icm</b>				
220/230 V AC (kA)	187	220	440	440
380/415 V AC (kA)	105	154	264	330
440 V AC (kA)	105	143	220	286
500 V AC (kA)	84	105	187	220
690 V AC (kA)	63	88,2	105	132
Version	F-W	F-W	F-W	F-W

\*) I<sub>cw</sub> = 5 kA,\*\*) I<sub>cw</sub> = 7,6 kA (630 A) - 10 kA (800 A),\*\*\*) I<sub>cw</sub> = 20 kA (S, H, L version) - 15 kA (V version).

F = Front,

P = Plug-in circuit-breakers,

W = Withdrawable circuit-breakers.

<b>Trip units:</b>	T1	T2	T3	T4	T5	T6	T7
<b>Thermomagnetic:</b>							
T adjustable, M fixed TMD	X	X	X	X(2)	-	-	-
T adjustable, M adjustable (5..10 x In) TMA	-	-	-	X(3)	X(4)	X(6)	-
T adjustable, M fixed (3..5 x In) TMG	-	X	X	-	-	-	-
T adjustable, M adjustable (2,5..5 x In) TMG	-	-	-	-	X(5)	-	-
Magnetic only	-	X(1)	X	X	-	-	-
<b>Electronic:</b>							
PR221DS	-	X	-	X	X	X	-
PR222DS	-	-	-	X	X	X	-
PR223DS	-	-	-	X	X	X	-
PR231/P	-	-	-	-	-	-	X
PR232/P	-	-	-	-	-	-	X
PR331/P	-	-	-	-	-	-	X
PR332/P	-	-	-	-	-	-	X

(1) - MF up to In 12,5 A,

(2) - up to 50 A,

(3) - up to 250 A,

(4) - up to 500 A,

(5) - up to 500 A,

(6) - up to 800 A (W version is not available on T6 1000 A),

(7) - only for T7 800/1000/1250 A.

**2. DOCUMENTS AND DRAWINGS :**

As per Manufacturer's technical catalogue N° 1SDC210015D0202.

**3. TEST REPORTS :**

ABB SACE test reports Nos LBRP 8013/00 issued on 08.09.2008 and LBRP 7876/01 issued on 20.12.2007.  
Intertek test reports Nos E 133S220765\_25a, E 133S220765\_25aR, E 133S220765\_25b and E 133S220765\_25bR issued on 28.06.2007.  
CESI test report No A7027438 issued on 26.02.2008.  
LOVAG Certificates of Conformity Nos: IT 07.001 to IT 07.014, IT 07.040 ; IT 07.062, IT 07.075 to IT 07.078, IT 08.009, IT 08.010, IT 08.018 to IT 08.020, IT 08.051 to IT 08.054, IT 08.074, IT 08.075, IT 08.078 and IT 08.079 including performance test reports.

**4. APPLICATION / LIMITATION :**

4.1 - Approval also valid for ships to be granted with the notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**  
4.2 - According to BV Rules for the Classification of Steel Ships and IEC 60947-2.

**5. PRODUCTION SURVEY REQUIREMENTS :**

5.1 - The above circuit breakers are to be manufactured, examined and tested by **ABB SACE S.p.A.**, in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.  
5.2 - Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end **ABB SACE S.p.A.** have to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.  
5.3 - **ABB SACE S.p.A.** have declared to Bureau Veritas that the type of products described in this certificate are manufactured at the following production site:

**ABB SACE S.p.A.**  
**Via Baloni 35**  
**I-24123 Bergamo, Italy**

**6. MARKING OF PRODUCT :**

According to IEC 60947-2 specifications.

**7. OTHERS :**

This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that **ABB SACE S.p.A. - Bergamo - Italy** will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the units and the conditions of this approval.

\*\*\* END OF CERTIFICATE \*\*\*