DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-10632
This Certificate consists of 5 pages

This is to certify that the

Circuit Breaker

with type designation(s)

Tmax T1C, T1N, T2N, T2S, T2H, T2L, T3N andT3S

Holder of certificate

ABB S.P.A. - ABB Sace Division

Bergamo BG, Italy

is found to comply with

Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards
IEC 60947-2 (2009-05)

Application

Rated Voltage (V)	500 (DC) - 690 (AC)
Rated Current (A)	160 - 250
Frequency (Hz)	50-60 or DC

Place and date
Høvik, 2010-12-22
for DET NORSKE VERITAS AS

This Certificate is valid until
2014-06-30

Marit Laumann
Head of Section

Local Office
Milan

Nicolay Horn
Surveyor

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Name and place of manufacturer

ABB SpA – ABB Sace Division
Frosinone, ITALY

Product description

Type: Tmax

Low voltage moulded case circuit breaker for protection, insulation and switching of circuits. Delivered with different types of releases and accessories.

Technical data:

	Tmax T1 C	**Tmax T1 N**	**Tmax T2 N**	**Tmax T2 S**
Rated insulation voltage **Ui** (V)	800	800	800	800
Rated impulse withstand voltage **Uimp** (kV)	8	8	8	8
Rated current **Iu** (A) at 40 ^{O}C	160	160	160	160
Rated voltage **Ue** (V)	690 AC 500 DC	690 AC 500 DC	690 AC 500 DC	690 AC 500 DC
Rated frequency AC (Hz)	50-60	50-60	50-60	50-60
Breaking current (kA) $\mathbf{I_{CU}}$, 230 V AC	40	50	65	85
Breaking current (kA) $\mathbf{I_{CU}}$, 380/400/415 V AC	25	36	36	50
Breaking current (kA) $\mathbf{I_{CU}}$, 440 V AC	15	22	30	45
Breaking current (kA) $\mathbf{I_{CU}}$, 500 V AC	10	15	25	30
Breaking current (kA) $\mathbf{I_{CU}}$, 690 V AC	4	6	6	7
Breaking current (kA) $\mathbf{I_{CU}}$, 250 V DC 2 poles in series	25	36	36	50
Breaking current (kA) $\mathbf{I_{CU}}$, 250 V DC 3 poles in series	30	40	40	55
Breaking current (kA) $\mathbf{I_{CU}}$, 500 V DC 3 poles in series	25	36	36	50
Breaking current (% I_{CU}) $\mathbf{I_{CS}}$	75[2]	50[1]	100	100
Utilisation category	A	A	A	A
Rated Short-circuit making capacity **Icm,** 230 V AC (kA)	84	105	143	187
Rated Short-circuit making capacity **Icm,** 380/415 V AC (kA)	52.5	75.6	75.6	105
Rated Short-circuit making capacity **Icm ,**440 V AC (kA)	30	46.2	63	94.5
Rated Short-circuit making capacity **Icm,** 500 V AC (kA)	17	30	52.5	63
Rated Short-circuit making capacity **Icm,** 690 V AC (kA)	5.9	9.2	9.2	11.9

1): 75 % for 230 V and 380/400/415 V
2): 100% for 380/400/415 V

	Tmax T2 H	Tmax T2 L	Tmax T3 N	Tmax T3 S
Rated insulation voltage **Ui** (V)	800	800	800	800
Rated impulse withstand voltage **Uimp** (kV)	8	8	8	8
Rated current **Iu** (A) at 40 ^{O}C	160	160	250	250
Rated voltage **Ue** (V)	690 AC 500 DC	690 AC 500 DC	690 AC 500 DC	690 AC 500 DC
Rated frequency (Hz)	50-60	50-60	50-60	50-60
Breaking current (kA) $\mathbf{I_{CU}}$, 230 V AC	100	120	50	85
Breaking current (kA) $\mathbf{I_{CU}}$, 380/400/415 V AC	70	85	36	50
Breaking current (kA) $\mathbf{I_{CU}}$, 440 V AC	55	75	25	40
Breaking current (kA) $\mathbf{I_{CU}}$, 500 V AC	36	50	20	30
Breaking current (kA) $\mathbf{I_{CU}}$, 690 V AC	8	10	5	8
Breaking current (kA) $\mathbf{I_{CU}}$, 250 V DC 2 poles in series	70	85	36	50
Breaking current (kA) $\mathbf{I_{CU}}$, 250 V DC 3 poles in series	85	100	40	55
Breaking current (kA) $\mathbf{I_{CU}}$, 500 V DC 3 poles in series	70	85	36	50
Breaking current (% I_{CU}) $\mathbf{I_{CS}}$	100	75[1]	75	50
Utilisation category	A	A	A	A
Rated Short-circuit making capacity **Icm** 230 V AC (kA)	220	264	105	187
Rated Short-circuit making capacity **Icm** 380/415 V AC (kA)	154	187	75.6	105
Rated Short-circuit making capacity **Icm** 440 V AC (kA)	121	165	52.5	84
Rated Short-circuit making capacity **Icm** 500 V AC (kA)	75.6	105	40	63
Rated Short-circuit making capacity **Icm** 690 V AC (kA)	13.6	17	7.7	13.6

1): 100 % for 230 V

Application/Limitation

Release data is given for 40 ^{0}C. For ship application thermal magnetic releases to be derated in accordance with following table (electronic releases need no deration):

T1	11=1xln	T2	11=1xln	T3	11=1xln
40 ^{o}C	45 ^{o}C	40 ^{o}C	45 ^{o}C	40 ^{o}C	45 ^{o}C
In max	In max	In max	In max	In max	In max
16	15	1.6	1.5	63	6
20	19	2.0	1.9	80	77
25	24	2.5	2.4	100	97
32	31	3.2	3.1	125	121
40	39	4.0	3.9	160	155
50	48	5.0	4.8	200	194
63	61	6.3	6.1	250	242
80	77	8.0	7.7	-	-
100	97	10	9.7	-	-
125	121	12.5	12.1	-	-
160	154	16	15.5	-	-
-	-	to		-	-
-	-	160*	156	-	-

* For data between 16 and 160, see data for T1

For more details regarding derating, see ABB SACE catalogue 1SDC210015D0202

Suitable for use in an IT system with a capacity of 1.2 times the maximum trip current at 690 V AC.

Type Approval documentation

The approval data is based on the following documentation:

Electrical data: Technical catalogue "Tmax Low voltage moulded-case circuit breakers up to 250 A" Preliminary – 604080/012 en.

Test Reports: LOVAG test report no. 00288 / T 01 and 00303 / T 01 with certificate no. IT 00.046 and IT 00.052. dated 2000-12-06, LOVAG test reports no. 00350 / T 01, 00352 / T 01, 00354 / T 01 and 00356 / T 01 with certificate no. IT 00.034, IT 00.035 IT 00.036 and IT 00.037 dated 2000-10-20, LOVAG test report no. 00288 / T 01 with certificate no. IT 00.046 dated 2000-12-06, LOVAG test report no. 00288 / T 01 with certificate no. IT 00.046 dated 2000-12-06, LOVAG test reports no. 01.002, 01.005, 01.007,01.009 and 01.010 with certificate no. IT 01.038, IT 01.040, IT 01.041, IT 01.042 and IT 01.043 dated 2000-06-14, LOVAG test reports no. 00465 / T 01, 00467 / T 01, 00469 / T 01 and 00471 / T 01 with certificate no. IT 00.053, IT 00.055 IT 00.057 and IT 00.059 dated 2000-12-12, LOVAG test reports no. 01.003 with certificate no.. IT 01.039, ABB SACE Test report no. 20994 dated 2000-11-17, ABB SACE Test report no. 21081 dated 2001.10.24, ABB SACE Test report no. 21085 dated 2001-10-25, ABB SACE Test report nos. LBRP 5157 dated 2001-10-18, LBRP 7409 & 7411 dated 2006-11-27, Mariperman test reports nos. 9797, 9798, 9799, 9800,9801, 9802, 9803 and 9806 dated 2001-11-08 and 2001-11-12.

Tests carried out

Type tests according to IEC 60947-2 sequence I, II, III. Vibration, inclination, EMC, dry heat, damp heat and low temperature test.

Marking of product

ABB SACE – Type designation – Electrical data

Certificate retention survey

The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE