DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-10633
This Certificate consists of 6 pages

This is to certify that the
Circuit Breaker
with type designation(s)
EMAX Series

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)	690
Rated Current (A)	800- 6300
Frequency (Hz)	50-60

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 address of manufacturer

ABB SpA – ABB Sace Division
Frosinone, ITALY

Product description

Type: EMAX

E1B08, E1B12, E2B16, E2B20, E2L12, E2L16, E3L20, E3L25, E1N08, E1N10, E1N12, E1N16, E2N10, E2N12, E2N16, E2N20, E3N25, E3N32, E2S08, E2S10, E2S12, E2S16, E2S20, E3S10, E3S12, E3S16, E3S20, E3S25, E3S32, E4S40, E3H08, E3H10, E3H12, E3H16, E3H20, E3H25, E3H32, E4H32, E4H40, E6H40, E6H50, E6H63, E3V08, E3V12, E3V16, E3V20, E3V25, E3V32, E4V32, E4V40, E6V32, E6V40, E6V50, E6V63.

Air selective/current limiting circuit breakers and PR111, PR112, PR113, PR121, PR122 and PR123 releases.

- PR111-112-113 In min=250A
- PR121-122-123 In min=400A
- E1N only with PR121-122-123
- E1B only with PR111-112-113 up to Iu=1250A

Application/Limitation

Shall be installed and tested according to Veritas' current Rules for steel ships, fixed and mobile offshore units. The manufacturer's instruction to be observed.

Testing results:

Type	**1.** **V**	**2.** **V**	**3.** **A**	**4.** **Hz**	**5.** **Ics 690V**	**6.** **Ics 440V**	**7.** **Icu 690V**	**8.** **Icu 440V**	**9.** **Icm 690V**	**10.** **Icm 440V**	**11** **Utilisa-tion Cat.**	**12** **Icw**
E1B08	1000	690	250-800	50-60	36	36	36	45	75,6	94,5	B	36
E1B12	1000	690	250-1250	50-60	36	36	36	45	75,6	94,5	B	36
E2B16	1000	690	250-1600	50-60	45	45	45	45	94,5	94,5	B	45
E2B20	1000	690	250-2000	50-60	45	45	45	45	94,5	94,5	B	45
E2L12	1000	690	250-2500	50-60	65	110	85	110	187	242	A	10
E2L16	1000	690	250-1600	50-60	65	110	85	110	187	242	A	10
E3L20	1000	690	250-2000	50-60	65	110	85	110	187	242	A	15
E3L25	1000	690	250-2500	50-60	65	110	85	110	187	242	A	15

Type	1. V	2. V	3. A	4. Hz	5. Ics 690V	6. Ics 440V	7. Icu 690V	8. Icu 440V	9. Icm 690V	10. Icm 440V	11 Utilisa-tion Cat.	12 Icw
E1N08	1000	690	400-800	50-60	50	50	50	50	105	105	B	50
E1N10	1000	690	400-1000	50-60	50	50	50	50	105	105	B	50
E1N12	1000	690	400-1000	50-60	50	50	50	50	105	105	B	50
E1N16	1000	690	400-1600	50-60	50	50	50	50	105	105	B	50
E2N10	1000	690	400-1000	50-60	55	65	55	65	121	143	B	55
E2N12	1000	690	250-1250	50-60	55	65	55	65	121	143	B	55
E2N16	1000	690	250-1600	50-60	55	65	55	65	121	143	B	55
E2N20	1000	690	250-2000	50-60	55	65	55	65	121	143	B	55
E3N25	1000	690	250-2500	50-60	65	65	65	65	143	143	B	65
E3N32	1000	690	250-3200	50-60	65	65	65	65	143	143	B	65
E2S08	1000	690	400-800	50-60	65	85	65	85	143	187	B	65
E2S10	1000	690	400-1000	50-60	65	85	65	85	143	187	B	65
E2S12	1000	690	400-1250	50-60	65	85	65	85	143	187	B	65
E2S16	1000	690	400-1600	50-60	65	85	65	85	143	187	B	65
E2S20	1000	690	400-2000	50-60	65	85	65	85	143	187	B	65
E3S10	1000	690	400-1000	50-60	75	85	75	85	165	187	B	75
E3S12	1000	690	250-1250	50-60	75	85	75	85	165	187	B	75
E3S16	1000	690	250-1600	50-60	75	85	75	85	165	187	B	75
E3S20	1000	690	250-2000	50-60	75	85	75	85	165	187	B	75
E3S25	1000	690	250-2500	50-60	75	85	75	85	165	187	B	75
E3S32	1000	690	250-3200	50-60	75	85	75	85	165	187	B	75
E4S40	1000	690	800-4000	50-60	85	85	85	85	187	187	B	85
E3H08	1000	690	400-800	50-60	85	85	85	100	187	220	B	75
E3H10	1000	690	400-1000	50-60	85	85	85	100	187	220	B	75
E3H12	1000	690	250-1250	50-60	85	85	85	100	187	220	B	75
E3H16	1000	690	250-1600	50-60	85	85	85	100	187	220	B	75
E3H20	1000	690	250-2000	50-60	85	85	85	100	187	220	B	75
E3H25	1000	690	250-2500	50-60	85	85	85	100	187	220	B	75

Type	**1.** **V**	**2.** **V**	**3.** **A**	**4.** **Hz**	**5.** **Ics 690V**	**6.** **Ics 440V**	**7.** **Icu 690V**	**8.** **Icu 440V**	**9.** **Icm 690V**	**10.** **Icm 440V**	**11** **Utilisa-tion Cat.**	**12** **Icw**
E3H32	1000	690	250-3200	50-60	85	85	85	100	187	220	B	75
E4H32	1000	690	800-3200	50-60	85	100	85	100	187	220	B	100
E4H40	1000	690	800-4000	50-60	85	100	85	100	187	220	B	100
E6H40	1000	690	800-4000	50-60	100	100	100	100	220	220	B	100
E6H50	1000	690	800-5000	50-60	100	100	100	100	220	220	B	100
E6H63	1000	690	800-6300	50-60	100	100	100	100	220	220	B	100
E3V08	1000	690	400-800	50-60	85	100	100	130	220	286	B	85
E3V12	1000	690	400-1250	50-60	85	100	100	130	220	286	B	85
E3V16	1000	690	400-1600	50-60	85	100	100	130	220	286	B	85
E3V20	1000	690	400-2000	50-60	85	100	100	130	220	286	B	85
E3V25	1000	690	400-2500	50-60	85	100	100	130	220	286	B	85
E3V32	1000	690	400-3200	50-60	85	100	100	130	220	286	B	85
E4V32	1000	690	800-3200	50-60	100	125	100	150	220	330	B	100
E4V40	1000	690	800-4000	50-60	100	125	100	150	220	330	B	100
E6V32	1000	690	800-3200	50-60	100	125	100	150	220	330	B	100
E6V40	1000	690	800-4000	50-60	100	125	100	150	220	330	B	100
E6V50	1000	690	800-5000	50-60	100	125	100	150	220	330	B	100
E6V63	1000	690	800-6300	50-60	100	125	100	150	220	330	B	100

Rated insulation voltage AC (V):		1
Rated operational voltage AC(V):		2
Rated current (A):		3
Rated frequency (Hz):		4
Rated service short Circ. Breaking Capacity (KA/power factor) at resp voltage I_{CS}:	690V:	5
	440V:	6
Rated ultimate short cir. Breaking Capacity (kA) I_{CU}:	690V:	7
	440V:	8
Rated making cap.(kA) at resp. voltage: Icm:	690V:	9
	440V:	10
Utilisation category:		11
Short time withstand current, 1s (kA): Icw:		12

All test results are given according to IEC 60947.1/2

Only the basic unit of PR111, PR112, PR113, PR121, PR122 and PR123 is a part of the type approval. Options are to be approved case by case.

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

Technical info: EMAX technical catalogue 1SDC200006D0202, dated April 05 (relevant parts).

KEMA test reports nos.: 415189-3/4/5 dated 2004-12.

Certificate of conformity for all circuit breakers from Lovag, verifing tests according to IEC 947-2. LOVAG Certificate nos.:

IT 96.033, -034, -40, -041, -042, -043, -044, -045, -046, -047, -055, -056, -057, -058, -059, -60 -61, -62, -063, -064, -065, -066, -067, 077, -078, -079, -080, -082, -083, -084 and -085.

IT 97.001, -002, -003, -004, -011, -026, -027, -029, -030, -031, -032, -033, -034, -035, -036, -037, -05, -055, -056, -059, -060, -061, -062, -063, -064, -065, -066, -067, -068, -069 , -079, -090, and -091.

IT 98.001, -002, -003, -005, -019 and -039.

IT 01.032, IT 04.125, -125 and -126, IT 05. 002, -003, -018, -019, -043, -044, -052, -054,

LOVAG test reports 98346/T01 issued 98-12-03 and 98.018 issued 98-04-02, Environmental test report IA/TTR-97/005 no. 0131 issued 97-05-06, test reports from Marinperman no. 9466 rev.2 and 9467 rev.2 issued 97-08-25, ABB test report no. 200995 issued 00-11-24, test report no. LBRP 5145 issued 01-08-31 and LBRP 5190 issued 02-01-31, Marina Militare – Commissione Permanente (Mariperman) test report no. 9808 issued 01-11-12. Intertek ETL Semco EMC test report nos.: E133S2105G1_06/ 07/ 08 / 09 dated 2005-05-02. ACAE Test report nos.: 05.033 & 05.034 dated 2005-05-18.

Tests carried out

Type tests according to IEC 60947-2 (1989) and Amendments 1 (1992-03) and (1993-12) and 2003 (3rd edition) inclusive Annex H, EMC in accordance with 61000-4 and 60947-2 annex F, Dry heat, Low temperature, Humidity.

Certificate retention survey

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

The main elements of the survey are:

- Inspection of factory samples, selected at random from the production line. Review of production and inspection routines, including test records from product sample tests and control routines.
- Ensuring that components/materials used comply with type approved documents and/or referenced components/materials specifications.
- Review of possible changes in design of components/materials and performance, and make sure that such changes do not affect the type approval given.
- Ensuring traceability between manufacturer's product type marking and the type approval certificate.
- Ensuring that type approved documentation is available.

Survey to be performed at least every second year.

END OF CERTIFICATE