



MARINE DIVISION

Certificate number: 19701/A1 BV

File number: ACE 02/138/07

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

LSIS CO., LTD. (Cheongju Plant)

Cheongju (Chungbuk) - KOREA (REPUBLIC OF)

for the type of product

CIRCUIT BREAKERS (LOW VOLTAGE)

MCCB (Molded Case Circuit Breaker)

Type: TD100-, TD160-, TS160-*, TS250-*, TS400-*#, TS630-*#, TS800-*# (-:E,N,S,H,P,L *:ETS #:ETM)

Requirements:

BV Rules for the Classification of Steel Ships.

IEC 60947-1, IEC 60947-2.

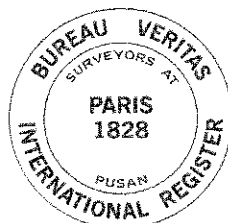
This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 17 Aug 2012

For BUREAU VERITAS,

At BV PUSAN, on 28 Jul 2011,

Keum-Ho Lee



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.

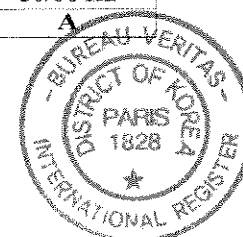
THE SCHEDULE OF APPROVAL

I. PRODUCT DESCRIPTION :

	TD100E ₁₎ TD160E ₁₎	TD100N ₁₎ TD 160N ₁₎	TD100S ₁₎ TD 160S ₁₎	TD100H ₁₎ TD 160H ₁₎	TD100P ₁₎ TD 160P ₁₎	TD100L ₁₎ TD 160L ₁₎
Number of poles	3	3	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750	750	750
Rated current I _{n max} (A) at 45°C	16-100 16-160	16-100 16-160	16-100 16-160	16-100 16-160	16-100 16-160	16-100 16-160
Rated breaking capacity I _{cu} = I _{cs} (kA)						
480/500V(AC)	18	30	42	50	60	65
440/460V(AC)	35	50	65	70	100	130
380/415V(AC)	35	50	65	85	130	150
220/240V(AC)	65	85	85	100	150	200
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A	A	A

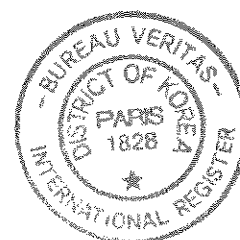
	TS100E ₁₎ TS 100E ₂₎ ETS	TS 100N ₁₎ TS 100N ₂₎ ETS	TS 100S ₁₎ TS 100S ₂₎ ETS	TS 100H ₁₎ TS 100H ₂₎ ETS	TS 100P ₁₎ TS 100P ₂₎ ETS	TS100L ₁₎ TS 100L ₂₎ ETS
Number of poles	3	3	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750	750	750
Rated current I _{n max} (A) at 45°C	40-100 40, 80	40-100 40, 80	40-100 40, 80	40-100 40, 80	40-100 40, 80	40-100 40, 80
Rated breaking capacity I _{cu} = I _{cs} (kA)						
480/500V(AC)	25	42	50	65	70	85
440/460V(AC)	42	50	65	70	100	130
380/415V(AC)	42	50	65	85	130	150
220/240V(AC)	85	100	120	120	150	200
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A	A	A

	TS 160E ₁₎ TS 160E ₂₎ ETS	TS 160N ₁₎ TS 160N ₂₎ ETS	TS 160S ₁₎ TS 160S ₂₎ ETS	TS 160H ₁₎ TS 160H ₂₎ ETS	TS 160P ₁₎ TS 160P ₂₎ ETS	TD160L ₁₎ TS 160L ₂₎ ETS
Number of poles	3	3	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750	750	750
Rated current I _{n max} (A) at 45°C	40-160 40-160	40-160 40-160	40-160 40-160	40-160 40-160	40-160 40-160	40-160 40-160
Rated breaking capacity I _{cu} = I _{cs} (kA)						
480/500V(AC)	25	42	50	65	70	85
440/460V(AC)	42	50	65	70	100	130
380/415V(AC)	42	50	65	85	130	150
220/240V(AC)	85	100	120	120	150	200
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A	A	A



	TS250E ₁₎ TS 250E ₂₎ ETS	TS250N ₁₎ TS 250N ₂₎ ETS	TS 250S ₁₎ TS 250S ₂₎ ETS	TS 250H ₁₎ TS 250H ₂₎ ETS	TS 250P ₁₎ TS 250P ₂₎ ETS	TD250L ₁₎ TS 250L ₂₎ ETS
Number of poles	3	3	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750	750	750
Rated current I _{n max} (A) at 45°C	40-250 40-250	40-250 40-250	40-250 40-250	40-250 40-250	40-250 40-250	40-250 40-250
Rated breaking capacity I _{cu} = I _{cs} (kA)						
480/500V(AC)	25	42	50	65	70	85
440/460V(AC)	42	50	65	70	100	130
380/415V(AC)	42	50	65	85	130	150
220/240V(AC)	85	100	120	120	150	200
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A	A	A

	TS 400E ₁₎ TS 630E ₁₎ TS 400E ₂₎ ETS/ETM TS 630E ₂₎ ETS/ETM	TS 400N ₁₎ TS 630N ₁₎ TS 400N ₂₎ ETS/ETM TS 630N ₂₎ ETS/ETM	TS 400S ₁₎ TS 630S ₁₎ TS 400S ₂₎ ETS/ETM TS 630S ₂₎ ETS/ETM	TS 400H ₁₎ TS 630H ₁₎ TS 400H ₂₎ ETS/ETM TS 630NH ₂₎ ETS/ETM
Number of poles	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750
Rated current I _{n max} (A) at 45°C	300, 400 300-630 160-400 160-630	300, 400 300-630 160-400 160-630	300, 400 300-630 160-400 160-630	300, 400 300-630 160-400 160-630
Rated breaking capacity I _{cu} = I _{cs} (kA)				
480/500V(AC)	35	42	50	65
440/460V(AC)	50	65	70	85
380/415V(AC)	50	65	70	85
220/240V(AC)	85	100	120	120
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A



	TS 400P ¹⁾ TS 630P ¹⁾ TS 400P ²⁾ ETS/ETM TS 630P ²⁾ ETS/ETM	TS 400L ¹⁾ TS 630L ¹⁾ TS 400L ²⁾ ETS/ETM TS 630L ²⁾ ETS/ETM	TS 400S ¹⁾ TS 630S ¹⁾ TS 400S ²⁾ ETS/ETM TS 630S ²⁾ ETS/ETM	TS 800E ¹⁾ TS 800E ²⁾ ETS/ETM	TS 800N ¹⁾ TS 800N ²⁾ ETS/ETM
Number of poles	3	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750	750
Rated current I _{n max} (A) at 45°C	300,400 300-630 160-400 160-630	300,400 300-630 160-400 160-630	300,400 300-630 160-400 160-630	800 630, 800	800 630, 800
Rated breaking capacity I _{cu} = I _{cs} (kA)					
480/500V(AC)	70	85	50	42	50
440/460V(AC)	100	130	70	50	65
380/415V(AC)	130	150	70	50	65
220/240V(AC)	150	200	120	85	100
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A	A

	TS 800S ¹⁾ TS 800S ²⁾ ETS/ETM	TS 800H ¹⁾ TS 800H ²⁾ ETS/ETM	TS 800P ¹⁾ TS 800P ²⁾ ETS/ETM	TS 800L ¹⁾ TS 800L ²⁾ ETS/ETM
Number of poles	3	3	3	3
Max. Rated operating voltage U _e (VAC)	500	500	500	500
Rated Insulation voltage U _i (VAC)	750	750	750	750
Rated current I _{n max} (A) at 45°C	800 630, 800	800 630, 800	800 630, 800	800 630, 800
Rated breaking capacity I _{cu} = I _{cs} (kA)				
480/500V(AC)	65	85	85	100
440/460V(AC)	85	100	120	130
380/415V(AC)	85	100	130	150
220/240V(AC)	120	120	150	200
Rated Frequency	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Utilization Category	A	A	A	A

Notes :

- 1) Thermal Type
2) Electronic type (ETS, ETS/ETM)

2. DOCUMENTS AND DRAWINGS :

2.1 - In accordance with the manufacturer's drawings and documents, at latest and at any subsequent issue endorsed by Bureau Veritas:

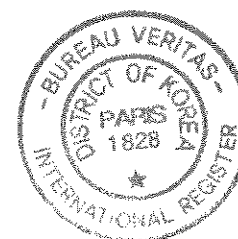
2.1.1 - Installation Instructions BV ref.: 19701/A0.

2.1.2 - 2007 Manufacturer's catalogue.

2.1.3 - Design drawings: 102000100 ~ 0102090000 (2), 7231 1172 002(2), 7231 1172 012(2), 7231 1172 101(2), 7231 1173 001(2), 7231 1173 012(2), 7231 1173 004(2), 7231 1173 014(2), 7231 1174 002(3), 7231 1174 012(2), 7231 1174 004(2), 7231 1174 014(2).

Nb: This above list can be revised to show changes to drawings and documents issue status.

Before changes can be implemented, new drawings and documents must be provided to Bureau Veritas for review and acceptance. The new documents and drawings list will be stamped and endorsed accordingly.



3. TEST REPORTS :

3.1 - Power Testing & Technology Institute test reports:

- N° R36-0770, R36-0771, R36-0072, R36-0773 dated 26/Sep./2006.
- N° R36-0774, R36-0775, R36-0776, R36-0777 dated 11/Aug./2006.

3.2 - Korea Institute of Machinery & Materials, Vibration test report No: 2006320823 dated 13 Sep. 2006.

3.3 - KEMA Test reports N°s: 2086029.50, 2086029.51, 2086029.52, 2086029.53, 2086029.54, 2086029.55, 2086029.56 dated 12/Dec./2005.

3.4 - KEMA EMC Certificates N°s: 2087087-QUA/EMC 05-4961, 2087087-QUA/EMC 05-4964, 2087087-QUA/EMC 05-4966 dated 22/Mar./2006.

4. APPLICATION / LIMITATION :

4.1 - According to BV Rules for the Classification of Steel Ships and IEC 60947 specifications.

4.2 - Approval valid for ships intended to be granted with the following additional class notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**

4.3 - The equipment fulfils the EMC requirements for installation on the Bridge and Deck Zone.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The above products are to be manufactured, examined and tested by **LSIS CO., LTD. (Cheongju Plant) - Korea (Republic of)** 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 **LSIS CO., LTD. (Cheongju Plant) - Korea (Republic of)** has to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.

5.3 - **LSIS CO., LTD. (Cheongju Plant) - Korea (Republic of)** has declared to Bureau Veritas that the type of products described in this certificate are manufactured at the following production site:

LSIS CO., LTD. (Cheongju Plant)
1, Songjung-dong, Heungdeok-gu
Cheongju (Chungbuk)
KOREA (REPUBLIC OF)

6. MARKING OF PRODUCT :

According to IEC 60947 specifications.

7. OTHERS :

7.1 - This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the circuit breakers at any time, and that **LSIS CO., LTD. (Cheongju Plant) - Korea (Republic of)**, will accept the responsibility for informing shipbuilders or their sub-contractors of the proper methods of use and general maintenance of the circuit breakers and of the conditions of this approval.

7.2 - This certificate cancels and replaces the Type Approval Certificate N°19701/A0 BV issued on 17/08/2007 by the Society.

*** END OF CERTIFICATE ***

