



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-11817

This is to certify that the
Circuit Breaker

with type designation(s)
AS, AH,

Manufactured by
LSIS Co., Ltd. (Cheongju Factory)
CHEONG JU, Republic of Korea

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

Application

Type	Rated Voltage (V)	Rated Current (A)	Frequency (Hz)
AS, AH	600/690 (see specification)	630 - 6300	50 - 60

Busan, 2012-07-10
for Det Norske Veritas AS

This Certificate is valid until
2016-06-30

Michael Jost Auf der Stroth
Head of Section



DNV local office:
Seoul

Byoung So Lee
Surveyor

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.
If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



DNV

Certificate No.: E-11817
File No.: 823.10
Job Id.: 262.1-004778-3

Product description

l) Air circuit breaker with the following data: AS-Type

	AS06D	AS08D	AS10D	AS13D	AS16D	AS20D
Rated insulation voltage AC (V)	1000	1000	1000	1000	1000	1000
Rated operational voltage AC(V)	690/500	690/500	690/500	690/500	690/500	690/500
Rated Current, at 45°C (A)	630	800	1000	1250	1600	2000
Rated Frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60
Rated Breaking Capacity I _{cs} = 100% I _{cu} (kA)	65/70	65/70	65/70	65/70	65/70	65/70
Rated making Capacity (kA)	143/154	143/154	143/154	143/154	143/154	143/154
Rated short time Capacity I _{cw} (kA) 1 s	65	65	65	65	65	65
Utilization category	B	B	B	B	B	B

	AS20E	AS25E	AS32E	AS40E	AS40F	AS50F
Rated insulation voltage AC (V)	1000	1000	1000	1000	1000	1000
Rated operational voltage AC(V)	690/500	690/500	690/500	690/500	690/500	690/500
Rated Current, at 45°C (A)	2000	2500	3200	4000	4000	5000
Rated Frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60
Rated Breaking Capacity I _{cs} = 100% I _{cu} (kA)	85/85	85/85	85/85	85/85	85/100	85/100
Rated making Capacity (kA)	187/187	187/187	187/187	187/187	187/220	187/220
Rated short time Capacity I _{cw} (kA) 1 s	85	85	85	85	85	85
Utilization category	B	B	B	B	B	B

	AS40G	AS50G	AS63G
Rated insulation voltage AC (V)	1000	1000	1000
Rated operational voltage AC(V)	690/500	690/500	690/500
Rated Current, at 45°C (A)	4000	5000	6300
Rated Frequency Hz	50/60	50/60	50/60
Rated Breaking Capacity I _{cs} = 100% I _{cu} (kA)	100/120	100/120	100/120
Rated making Capacity (kA)	220/264	220/264	220/264
Rated short time Capacity I _{cw} (kA) 1 s	100	100	100
Utilization category	B	B	B



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II) Air circuit breaker with the following data: AH-Type

	AH06D	AH08D	AH10D	AH13D	AH16D	AH20D
Rated insulation voltage AC (V)	1000	1000	1000	1000	1000	1000
Rated operational voltage AC(V)	690/500	690/500	690/500	690/500	690/500	690/500
Rated Current, at 45°C (A)	630	800	1000	1250	1600	2000
Rated Frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60
Rated Breaking Capacity Ics = 100% Icu (kA)	65/85	65/85	65/85	65/85	65/85	65/85
Rated making Capacity (kA)	143/187	143/187	143/187	143/187	143/187	143/187
Rated short time Capacity Icw (kA) 1 s	65	65	65	65	65	65
Utilization category	B	B	B	B	B	B

	AH06E	AH08E	AH10E	AH13E	AH16E	AH20E
Rated insulation voltage AC (V)	1000	1000	1000	1000	1000	1000
Rated operational voltage AC(V)	690/500	690/500	690/500	690/500	690/500	690/500
Rated Current, at 45°C (A)	630	800	1000	1250	1600	2000
Rated Frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60
Rated Breaking Capacity Ics = 100% Icu (kA)	85/100	85/100	85/100	85/100	85/100	85/100
Rated making Capacity (kA)	187/220	187/220	187/220	187/220	187/220	187/220
Rated short time Capacity Icw (kA) 1 s	85	85	85	85	85	85
Utilization category	B	B	B	B	B	B

	AH25E	AH32E	AH40E	AH40G	AH50G	AH63G
Rated insulation voltage AC (V)	1000	1000	1000	1000	1000	1000
Rated operational voltage AC(V)	690/500	690/500	690/500	690/500	690/500	690/500
Rated Current, at 45°C (A)	2500	3200	4000	4000	5000	6300
Rated Frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60
Rated Breaking Capacity Ics = 100% Icu (kA)	85/100	85/100	85/100	100/150	100/150	100/150
Rated making Capacity (kA)	187/220	187/220	187/220	220/330	220/330	220/330
Rated short time Capacity Icw (kA) 1 s	85	85	85	100	100	100
Utilization category	B	B	B	B	B	B

Application/Limitation

Shall be installed and tested according to Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards.
 The manufacturer's instructions to be observed.

Suitable for use in an IT system with a capacity of 1.2 times the maximum trip current at 500 V AC for types 2000 AF and 5000 AF and up 690 V for other models.



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Type Approval documentation

Technical info:

Summary of rating, part 1.2 and Catalogue general (2007) part 2 of LS "Air Circuit breaker – Metasol ACB & Susol ACB Type approval test" dated 2008-01.

Drawings:

Name Plate: No. 7961 3460 001. General outline: Nos. 8908 0323 160 (2000AF), 8908 0343 320 (4000AF), 8908 0353 500 (5000AF), 8908 0363 500 (6300AF).

Test reports:

KEMA test reports nos.: 2106131.50, 2106131.51, 2106131.52 & 2106131.53, issued 2007-10-29.

PT&T test reports nos. R48-0007 & R48-0162 issued 2008-01-25, R48-0033 issued 2008-01-28, R48-0231, R48-0232 & R48-0233 issued 2008-02-13, R48-0234 issued 2008-01-15, R48-0235 issued 2008-03-25.

KIMM test no. 2008048340 issued 2008-03-05.

ONETECH test no. E083R-028 issued 2008-03-11

Retention survey report dated 2012-06-15.

Tests carried out

IEC 60947-2, sequence 1 and 2 and Annex H. Inclination-, vibration -, dry heat-, damp heat & EMC immunity-test.

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 to be dealt with:

- Ensure that type approved documentation is available.
- Ensure that materials used comply with type approved documents and/or referenced material specifications.
- Review design, materials, performance and production process with respect to possible changes, in order to ensure compliance with the type approved documentation and/or referenced material specifications.
- Ensure traceability between manufacturer's product marking and the DNV Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE