



Marine & Offshore

Certificate number: 58420/A0 BV

File number: AP4863

Product code: 2658H

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

LEROY SOMER DEI (Les Agriers)
ANGOULEME - FRANCE

for the type of product

GENERATOR CONTROL AND PROTECTION UNITS
Digital voltage regulator D550

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships, Offshor Units, Naval Ships and Yachts

EC Code: 33

This certificate is issued to attest that Bureau Veritas Marine & Offshore 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: 25 Oct 2024

For Bureau Veritas Marine & Offshore,

At BV BORDEAUX, on 25 Oct 2019,

Gabriel ZIMMER



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 Marine & Offshore. 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 & Offshore 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 Marine & Offshore 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:

D550 is a digital automatic voltage regulator for alternators with Shunt, AREP or PMG Excitation.

1.1 - Product's datas:

Description	Minimum Value	Maximum Value
AC Supply Input (Vac)	50	277
Auxiliary Supply (Vdc)	8	35
Voltage sensing range (Vac)	0	230 or 530
Generator current measurement (A)	0	1 or 5
Field excitation current (A)	0	7
Field forcing current (10s max) at 70°C (A)		15
Frequency range (Hz)	30	400
Voltage adjustment range (% rated V)	0	150
Quadrature droop adjustment range (%)	-20	20
Ambient Temp (°C)	-40	70
Programmable digital I/O		8
Programmable analog I/O		4

1.2 - Software & Firmware:

Software version	Firmware version
EasyReg Advanced	1.1.X

2. DOCUMENTS AND DRAWINGS:

LEROY SOMER :

- D550 Datasheet, Ref. 5723a_en, dated January 2019.
- D550 Installation and Maintenance, Ref. 5744a_en, dated February 2019.
- D550 Safety Instructions, Ref. 5779a_fr/en, dated February 2019.
- Connection Diagram, No. 3462 AC 0918 b, dated 18-02-2019, No. 3713 AC 0619 a, dated 26-06-2019.
- Architecture logiciel D550, Ref. CJ180612 01 RDE MC, dated 29-03-2019

3. TEST REPORTS:

GERAC:

- EMC Test Report, Ref. 18T319-RE-01, dated 06-12-2018.

LEROY SOMER:

- Ref. CR-181121-01 RDE LR rev A, IEC 60068-2-1 - Tenue au froid, dated 21-11-2018.
- Ref. CR-181129-01 RDE LR rev A, IEC 60068-2-2 - Tenue a la chaleur seche, dated 29-11-2018.
- Ref. CR-190204-01 RDE LR rev A, IEC 60068-2-30 - Tenue a la chaleur humide dated 04-02-2019.
- Ref. CR-190221-01 RDE LR rev A, Variation de tension DC, dated 21-02-2019.
- Ref. CR-190227-01 RDE LR rev A, D550-Defaillance des alimentations AC et DC, dated 27-02-2019.
- Ref. CR-190410-01 RDE LR rev A, Essai a la flamme IEC 60695-11-5, dated 10-04-2019.
- Ref. CR190301 01 RDE RD A, Variation de la tension DC, dated 01-03-2019
- Ref. CR030419 01 RDE SG A, Conducted Immunity test, dated 03-04-2019.
- Ref. CR090419 01 RDE SG A, Surge Immunity test, dated 09-04-2019.
- Ref. CR171218 01 RDE SG A, Conducted Emissions test, dated 17-12-2018.
- Ref. CR171218 02 RDE SG A, Power frequency magnetic field Immunity test, dated 17-12-2018.
- Ref. CR171218 03 RDE SG A, Electrical Fast Transient / Burst Immunity test, dated 17-12-2018.
- Ref. CR260319 01 RDE SG A, Electrostatic discharge immunity test, dated 26-03-19.
- Ref. CR290319 01 RDE SG A, Conducted Low Frequency Immunity test, dated 29-03-19.
- Ref. CR180426 01 RDE BG A, Test de regulation courant d'excitation, dated 26-04-2018.
- Ref. CR180503 01 RDE BG A, Test de défaut de sous-vitesse, dated 03-05-2018.
- Ref. CR180522 01 RDE BG A, Test d'ajustement consigne courant d'excitation, dated 22-05-2018.
- Ref. CR180523 01 RDE BG A, Test des limites du courant d'excitation, dated 23-05-2018.
- Ref. CR180523 02 RDE BG A, Test d'ajustement consigne de tension, dated 23-05-2018.
- Ref. CR180523 03 RDE BG A, Test des limites de tension, dated 23-05-2018.
- Ref. CR180530 01 RDE BG A, Test de défaut de sous-tension, dated 30-05-2018.
- Ref. CR180530 02 RDE BG A, Test de défaut de surtension, dated 30-05-2018.
- Ref. CR180530 03 RDE BG A, Test de défaut de survitesse, dated 30-05-2018.
- Ref. CR180606 01 RDE BG A, Test de démarrage en rampe, dated 06-06-2018.

3. TEST REPORTS(continued):

- Ref. CR180607 01 RDE BG A, Test de compension de chute en ligne, dated 07-06-2018.
- Ref. CR180607 02 RDE BG A, Test de coude et maintien U/F, dated 07-06-2018.
- Ref. CR180607 03 RDE BG A, Test de demarrage sur seuil, dated 07-06-2018.
- Ref. CR180607 04 RDE BG A, Test du load Acceptance module, dated 07-06-2018.
- Ref. CR180607 05 RDE BG A, Test surcharge du pont de puissance, dated 07-06-2018.
- Ref. CR180608 01 RDE BG A, Test d'ajustement consigne PF generateur, dated 08-06-2018.
- Ref. CR180608 03 RDE BG A, Test de regulation en facteur de puissance generateur, dated 08-06-2018.
- Ref. CR180629 01 RDE BG A, Compteur de temps de fonctionnement test, dated 29-06-2018.
- Ref. CR180704 01 RDE BG A, Inversion puissance active et reactive test, dated 04-07-2018.
- Ref. CR180709 01 RDE BG A, Communication CAN test, dated 09-07-2018.
- Ref. CR180717 01 RDE BG A, Test alimentation USB et batterie et defaut de sous-tension batterie test, dated 17-07-2018.
- Ref. CR180718 01 RDE BG A, Entrees/sorties logiques test, dated 18-07-2018.
- Ref. CR180719 01 RDE BG A, Gestion des TIs test, dated 19-07-2018.
- Ref. CR180730 01 RDE BG A, Limites de surexcitation test, dated 30-07-2018.
- Ref. CR180730 02 RDE BG A, Limitaton courant stator test, dated 30-07-2018.
- Ref. CR181024 01 RDE FJ B, Auxiliary regulation test, dated 20-06-2019.
- Ref. CR181024 01 RDE FJ B, Setpoint variation test, dated 20-06-2019.
- Ref. CR181029 01 RDE FJ B, Pole slipping test, dated 20-06-2019.
- Ref. CR181029 02 RDE FJ B, Switch regulation test, dated 20-06-2019.
- Ref. CR181029 03 RDE FJ B, Maximum stator current recording test, dated 20-06-2019.
- Ref. CR181029 04 RDE FJ B, FRT test, dated 20-06-2019.
- Ref. CR181122 01 RDE RD A, Essais machine 400Hz test, dated 22-11-2018.
- Ref. CR190621 01 RDE RF A, Dielectrique test, dated 21-06-2019.

EMITECH:

- Mechanical Tests Report, Ref. R240-INN-18-105477-1/A (00), dated 12-12-2018.

Nidec:

- Test Report of D550-Marin certification B, dated 19-09-2019.

4. APPLICATION / LIMITATION:

- 4.1 - BUREAU VERITAS Rules and Regulations for the Classification of Steel Ships/Offshore Units/Naval Ships/Yachts.
- 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 - BUREAU VERITAS Environmental Category, **EC Code : 33**.
- 4.4 - The equipment fulfils the EMC requirements for installation in the general power distribution zone .
- 4.5 - The equipment, once installed on board ship, is to be tested in accordance with the above referred Regulations under the supervision of a Society's Surveyor.
- 4.6 - Only Hardware and Firmware / Software successfully tested together in compliance with the regulations as referred to in page one, according to the declaration of the manufacturer are covered by this certificate.
- 4.7 - The equipment is to be mounted in an electric control panel or in a terminal box.
- 4.8 - The product D550 complies with requirements of IACS UR E10 Rev 7.

5. PRODUCTION SURVEY REQUIREMENTS:

- 5.1 - The above products are to be supplied by **LEROY SOMER DEI (Les Agriers)** in compliance with the type described in this certificate.
- 5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.
- 5.3 - **LEROY SOMER DEI (Les Agriers)** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.
- 5.4 - For information, **LEROY SOMER DEI (Les Agriers)** has declared to Bureau Veritas the following production site(s):

LEROY SOMER DEI (Les Agriers)
Zi Agriers
1600 ANGOULEME
FRANCE

6. MARKING OF PRODUCT:

- Maker's name or trade mark.
- Serial number of the units.
- Equipment type number or model identification under which it was type-tested.

7. OTHERS:

7.1 - It is **LEROY SOMER DEI (Les Agriers)**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

*** END OF CERTIFICATE ***