CERTIFICATE NUMBER
16-LD1499493-1-PDA

DATE
31 Aug 2016

ABS TECHNICAL OFFICE
London Engineering Department

CERTIFICATE OF DESIGN ASSESSMENT

This is to certify that a representative of this Bureau did, at the request of

GAI-TRONICS

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate.

Product: **Public Address and General Alarm**

Model: **Elemec3**

This Product Design Assessment (PDA) Certificate 16-LD1499493-1-PDA, dated 31/Aug/2016 remains valid until 30/Aug/2021 or until the Rules or specifications used in the assessment are revised (whichever occurs first).

This PDA is intended for a product to be installed on an ABS classed vessel, MODU or facility which is in existence or under contract for construction on the date of the ABS Rules or specifications used to evaluate the Product.

Use of the Product on an ABS classed vessel, MODU or facility which is contracted after the validity date of the ABS Rules and specifications used to evaluate the Product, will require re-evaluation of the PDA.

Use of the Product for non ABS classed vessels, MODUs or facilities is to be to an agreement between the manufacturer and intended client.

AMERICAN BUREAU OF SHIPPING

Theodoros Chatzigkaidas
Engineer/Consultant

NOTE: This certificate evidences compliance with one or more of the Rules, Guides, standards or other criteria of ABS or a statutory, industrial or manufacturer's standards. It is issued solely for the use of ABS, its committees, its clients or other authorized entities. Any significant changes to the aforementioned product without approval from ABS will result in this certificate becoming null and void. This certificate is governed by the terms and conditions as contained in ABS Rules 1-1-A3/5.9 Terms and Conditions of the Request for Product Type Approval and Agreement (2010).

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Tier: 2 - PDA Issued TC

Product: **Public Address and General Alarm**
Model: **Elemec3**
Intended Service:
ABS Classed Vessels and Offshore Installations in accordance with the listed ABS Rules and International Standards.

Description:
The E3 PAGA System can be configured in 3 basic formats, as described below

1. Single System
2. Duplicated System
3. N+ 1 System

Single Systems consist of a single Controller and a single group of Power Amplifiers. Access Panels only have a single Connection. Duplicated Systems consist of two systems each identical. Each system consists of a single Controller and a single group of Power Amplifiers. Access Panels have a dual output, one output connected to each system 'A' & 'B'. N+ 1 Systems consist of two Controllers and single group of Power Amplifiers. Access Panels have a dual output, one output connected to each Controller. Each controller will have duplicated Modules attached.

Rating:
Power: 47.5kW (max)
Voltage: 48Vdc / 120Vac / 230 Vac

Service Restriction:
Unit Certification is required for this product. Fault simulation and factory acceptance tests, as detailed in 4-9-3/Table 2, 3.6 and 3.7 of the ABS Rules for Building and Classing Steel Vessels (2016), are to be witnessed by an ABS Surveyor. On-board complete system and integration testing as detailed in 4-9-3/Table 2, 4.1 and 4.2 of the ABS Rules for Building and Classing Steel Vessels (2016), are to be witnessed by an ABS Surveyor.

Comments:
The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.

i) Each vessel installation is to be specifically approved in accordance with the applicable Rules. Where a single system serves for both public address and general alarm emergency functions, the major system components are to be duplicated as required by 4-8-2/11.5.4.(v) of the ABS Rules for Building and Classing Steel Vessel Rules 2015. The system may be used on passenger vessels provided that two segregated amplifiers and independent loudspeaker circuits are installed as required by 5/13.15.ii. of the ABS Guide for Building and Classing Passenger Vessels 2001; update 2010.

ii) Where the installation forms a combined PAGA System it is a Computer Based Category II System as detailed in 4-9-3/7.1 and 4-9-3/Table 1 of the Steel Vessel Rules (2016) and IACS Unified Requirement E22 Rev1:Sep 2010. The documentation detailed in 4-9-3/Table 2 of the Steel Vessel Rules (2016) for System Category II is to be maintained and made available to ABS upon request.

iii) Electrical equipment intended for installation in hazardous areas is to be of a certified safe type based on the class of the hazardous area at its location of installation as detailed in 4-8-3/13.1 of the ABS Rules for Building and Classing Steel Vessels (2016). Certificates in this regard are to be presented to the ABS Surveyor for verification on a case by case basis.

iv) Equipment to be installed in an exterior location on an Offshore Installation, Floating Production Installation,

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Mobile Offshore Drilling Unit or similar that is capable of operation after an Emergency Shut-down is to be suitable for installation in a Hazardous Area Zone 2 location as detailed in 3-8-5/13.vi) of the Rules for Building and Classing Facilities on Offshore Installations 2015, 7-2-4/7.15 of the Rules for Building and Classing Floating Production Installations 2015 and 4-3-5/7.1.2 of the Rules for Building and Classing Mobile Offshore Drilling Units (2016).

Notes/Drawing/Documentation:
Drawing No. 333-00-0592-101, General assembly PA-GA system front view, Revision: 1, Pages: 1
Drawing No. 333-00-0592-102, General arrangement safe area desktop access unit, Revision: 1, Pages: 1
Drawing No. 333-00-0592-103, General assembly PA-GA system engineers test panel, Revision: 1, Pages: 1
Drawing No. 333-00-0592-201, General assembly PA/GA system equipment cabinet fron view , Revision: 1, Pages: 1
Drawing No. 333-00-0592-202, Test system G/A desktop access unit panel no1 AP100DT, Revision: 1, Pages: 1
Drawing No. 333-00-0592-203, Test system G/A bulkhead indoor access unit panel no.2 AP100IP, Revision: 1, Pages: 1
Drawing No. 333-00-0592-204, Test system G/A weatherproof bulkhead access unit panel no.3 AP1000B, Revision: 1, Pages: 1
Drawing No. 333-00-0592-205, Test system G/A 19" ENGINEERS TEST PANEL no.4 AP100BGM, Revision: 1, Pages: 1
Drawing No. 333-00-0592-206, Test system G/A I.S. BULKHEAD access unit panel no.5 AP100ex-grp, Revision: 1, Pages: 1
Drawing No. 333-00-0592-302, Termination diagram PA/GA system equipment cabinet, Revision: 1, Pages: 1
Drawing No. 333-00-0592-401, Internal wiring diagram PA/GA system equipment cabinet (engineers test panel), Revision: 1, Pages: 1
Drawing No. 333-00-0592-402, Internal wiring diagram PA/GA system equipment cabinet (power distribution), Revision: 1, Pages: 1
Drawing No. ATEx certificate, ATEx certificate, Revision: 1, Pages: 1
Drawing No. E3 TECHNICAL MANUAL, E3 TECHNICAL MANUAL, Revision: 1, Pages: 1
Drawing No. ELEMEC 3 NETWORKED PUBLIC ADDRESS AND GENERAL ALARM SYSTEM (PA/GA), ELEMEC 3 NETWORKED PUBLIC ADDRESS AND GENERAL ALARM SYSTEM (PA/GA), Revision: -, Pages: 1
Drawing No. Elemec CTRL 0095 EMC Rep IACS_E10 EN60945 TL14060, Elemec CTRL 0095 EMC Rep IACS_E10 EN60945 TL14060 - 08/12/2015, Revision: -, Pages: 1
Drawing No. Elemec CTRL 0095 Envir Rep IACS_E10 EN60945 TL14060, Elemec CTRL 0095 Envir Rep IACS - 08/12/2015, Revision: -, Pages: 1
Drawing No. IECEx certificate, IECEx certificate, Revision: 1, Pages: 1
Drawing No. Parts list, Parts list, Revision: 1, Pages: 1

Terms of Validity:
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manufacturer and intended client.

STANDARDS

ABS Rules:
Steel Vessel Rules (2016): 1-1-4/7.7, 1-1-A3&A4, 4-8-2/11.5.4, 4-8-2/11.7.1, 4-9-3/11.9, 4-9-8/13, 4-9-8/13 Table 1 & Table 2
Steel Vessels Under 90 Meters (295 Feet) in Length (2016): 1-1-4/7.7, 1-1-A3&A4, 4-6-2/15.9, 4-6-2/17.1, 4-7-4/3.9;
Facilities on Offshore Installations (2016): 1-1-4/9.7, 1-1-A2&A3, 1-1, 3-8/7.11;
Offshore Support Vessels (2016): 1-1-4/7.7, 1-1-A3&A4, 4-6-2/15.9, 4-6-2/17.1, 4-9-8/7, 4-9-8/13, 4-9-8/13 Table 1 & Table 2;
Mobile Offshore Drilling Units Rules (2016): 1-1-4/9.7, 1-1-A2&A3, 4-3-2/15.9, 4-3-2/17.1, 6-6-1/9, 6-1-1/13;
Steel Vessels for Service on Rivers and Intracoastal Waterways (2016): 1-1-4/7.7, 1-1-A3&A4;
Bulk Carriers for Service on the Great Lakes (1978, Up-dated 2008): 1-1-4/7.7, 1-1-A3&A4;
High-Speed Craft (2016) 1-1-4/11.9, 1-1-A2&A3;
Steel Barge Rules (2016) 1-1-4/7.7, 1-1-A3&A4;

National:
NA

International:
IACS UR E10, Rev.6:2014, IMO A.1021(26) Code on alerts and indicators (2009), Life Saving Appliances (LSA) Code (2010) VII 7.2, IMO MSC Circ. 808:1997, IMO Res. A.813(19):1995

Government:
NA

EUMED:
NA

TC

OTHERS:
NA