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| CERTIFICATE NUMBER | 22-2330168-3-PDA-DUP |
| EFFECTIVE DATE | 06-Mar-2023 |
| EXPIRY DATE | 05-Jan-2027 |
| ABS TECHNICAL OFFICE | Houston ESD - Electrical |

CERTIFICATE OF

Product Design Assessment

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

BENCHMARK ELECTRONICS (M) SDN BHD

located at

**FREE INDUSTRIAL ZONE, PHASE 1, , BAYAN LEPAS, PENANG,
Malaysia, 11900**

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: Programmable Logic Controller
Model: Rx3i PACSystem & RsTi-EP
Endorsements:
Tier: 5 - Unit Certification Required

This Product Design Assessment (PDA) Certificate remains valid until 05/Jan/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

American Bureau Of Shipping

Soheni Haque

Soheni Haque, 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 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: 5 - Unit Certification Required

Product: Programmable Logic Controller**Model:** Rx3i PACSystem & RsTi-EP**Endorsements:****Intended Service:**

Marine (Propulsion Control, Power Management, Alarm & Monitoring, Auxiliary Machinery Control) for ACC and ACCU Classed Vessels and Offshore and Industrial Controls.

Description:

PACSystems Rx3i consists of the components listed below:

IC695 followed by CHS016*; PSA040CA*, 140*; PSD040*, 140*; PSD180CA**; CPU310*; CPU320*; PBM301; CRU320; CMM002CA**; CMM004CA**; CMX128*; RMX128*; CMU310; ETM001*; PBM300*; PBS301*; LRE001; ALG106CA**; ALG112CA**; ALG306**; ALG312CA**; ALG616CA**; ALG708CA**;
ALG600CA**; ALG608CA**; ALG704CA**; ALG626CA**; ALG728CA**; ALG628CA**; ALG808CA**;
NIU001*; CHS012*; CPE305CA**; CPE310CA**; ACC400CA*; ACC302*; ACC600*; HSC304*; HSC308*;
CHS007CA*; MDL664CA*; MDL765CA*; ALG412CA**; PNC001CA*; CEP001CA*; ALG508CA**;
SPC100*; CPE330CA*; GCG001CA*; ACC402CA*; CPE400CA**;
ACC403CA**;
PNS001CA**;
CPE302CA**;
CPL410CA and PNS101CA.

- Above models maybe followed by '-' and additional letters.

IC694 followed by ACC310; ALG220; ALG221; ALG222; ALG223; ALG232CA*; ALG233CA*; ALG390;
ALG391; ALG392 (Rev A, Rev. B)*; ALG442; ALG542CA*; APU300(Rev. A); BEM331; BEM341; CHS392;
CHS398; DNM200; MDL241; MDL250; MDL260; MDL350; MDL645; MDL646; MDL648; MDL654; MDL655;
MDL660; MDL730; MDL732; MDL740; MDL741; MDL742; MDL748; MDL752; MDL753; MDL754; MDL916;
MDL930; MDL931; MDL940; PWR321; PWR330; PWR331; TBB032*; PSM001CA*; ACC200CA*; CEE001CA*.

- Above models maybe followed by '-' and additional letters.

Notes: Components marked with * have been tested to 70 °C for 2 hours. Components marked with ** have been tested to 70 °C for 16 hours.

The following components of the RSTI-EP are covered by this certificate: EPSCPE100CA, EPSCPE115CA, EPXCPE2xx includes: EPXCPE240, EPXCPE220, EPXCPE215, EPXCPE210, EPXCPE205

Rating:

Power Supply: Analog: 5/ 12/ 24/ 48/ 125 VDC; 120/240 VAC at 0-60°C

Service Restriction:

Unit Certification is not required for this product. If the manufacturer or purchaser request an ABS Certificate for compliance with a specification or standard, the specification or standard, including inspection standards and tolerances, must be clearly defined.

- 1) Tests and approval for hardware only. Each particular application/configuration is to be specifically approved.
- 2) This equipment is not suitable for installation in the outside/exposed to sea atmosphere.
- 3) Modules IC695CPE310CA and IC695PNC001CA must be mounted in last slot with an empty slot to the left when tested to 70°C.

Comments:

- 1) The Manufacturer has provided a declaration about the control of, or the lack of Asbestos in this product.
- 2) Equipment must be installed in a metal enclosure with all cables coming into the enclosure being shielded.
- 3) Tests and approval are for hardware only. Each particular application/configuration is to be specifically approved.

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Tier: 5 - Unit Certification Required

Notes/Drawing/Documentation:

Drawing No. 705-100906, PSD180 Mechanical Outline, Revision: AB, Pages: 1

Drawing No. 705-101411, CIRCUIT DIAGRAM IC695PSD180 MAIN, Revision: AB, Pages: 9

Drawing No. 771-100903, PSD180 ASSY ENCLOSURE DWG, Revision: AE, Pages: -

Drawing No. IC695PSD180CA Block Diagram, Block Diagram IC695PSD180CA, Revision: -, Pages: 2

Drawing No. TDD-20221008-LPK, Marine Certification Test Plan for IC695PSD180, Revision: 1.1, Pages: 26

Drawing No. NW0821-1 Marine Report, Compliance Test Report, Revision: -, Pages: 132

PACSystems Rx3i supporting documentation from previous reviews:

Drawing No. BP-CPE305B-V5, ELECTRICAL LAYOUT, Revision: 5, Pages: 1

Drawing No. BP-CPE305F-V1-BS-LS, ELECTRICAL LAYOUT, Revision: 1, Pages: 1

Drawing No. BP-CPE305U-V2-BS+LS, ELECTRICAL LAYOUT, Revision: 2, Pages: 1

Drawing No. Correspondence, PDA APPLICATION, Revision: -, Pages: -

Drawing No. IC695CPE310, ASSEMBLY DRAWING, Revision: B, Pages: 1

Drawing No. NW0566-2, Combined Marine Report, Revision: 1, Pages: 1

Drawing No. TDD-20220821-LPK-1, 2022 Marine Certificatoin Type Approval CPE310 Test Design Document, Revision: 0.5, Pages: 1

Drawing No. sch-CPE305B-V50, ELECTRICAL DIAGRAM, Revision: 50, Pages: 1

Drawing No. sch-CPE305F-V11, ELECTRICAL DIAGRAM, Revision: 11, Pages: 1

Drawing No. sch-CPE305U-V22, ELECTRICAL DIAGRAM, Revision: 22, Pages: 1

Drawing No. BOM_205, EPXCPE205-V13_2022_02_25

Drawing No. BOM_210_215_220, EPXCPE220-V13_2022_02_25

Drawing No. BOM_240, EPXCPE240-V13_2022_02_25

Drawing No. BOM_CPE302_305, IC695CPE30500_V2x

Drawing No. CPE302_305 documents, CPE302_305 documents

Drawing No. Marine Test Plan, Marine_Cert_TDD-20211021-LPK-1_ver0.4

Drawing No. Test Plan, TDD-20220108-LPK_v1.5

Drawing No. Test report, NV1836-1 Issue 2 Final Report

Drawing No. assembly drawing, mergedPDF_IC695CPE30

Drawing No. schematic, sch-CPU1BP-V11

Drawing No. schematic_board1, sch-CPE305B-V36

Drawing No. schematic_board2, sch-CPE305F-V10

Drawing No. NW0023-2_Issue 2 Final Report

Drawing No. 00813-0100-0101, EPSCPE100/115, Revision: -, Pages: -

Drawing No. 00813-0100-0102, CPL410 IPI, Revision: -, Pages: -

Drawing No. 41G1244-MD01, ALG392 (30Di5B1) Assembly, Revision: 3, Pages: 1

Drawing No. 41G1301-SC01-000-F0, 40BZ0A1, Revision: 1, Pages: 1

Drawing No. 41G1302-SC01-000-F0, 40BZ0B1, Revision: 1, Pages: 1

Drawing No. 41G1485-SC01-000-EO, 30II5A1 AND 30II3A1, Revision: 3, Pages: 1

Drawing No. 41G1491-AD30, 7 slot backplane final assembly, Revision: 0, Pages: 1

Drawing No. 41G1491-SC01-000-H0, 40BZ0C1, Revision: 1, Pages: 1

Drawing No. 41G1905-SC01-000-B2, ETM_PNS_PNC_SOC, Revision: 0, Pages: 1

Drawing No. 41G1905-SC01-000-B3, ETM_PNS_PNC_SOC, Revision: 0, Pages: 1

Drawing No. 41G1905-SC01-000-C1, ETM_PNS_PNC_SOC, Revision: 0, Pages: 1

Drawing No. 41G2202-SA10, ASY- DIN Mount/Clip, Revision: A, Pages: -

Drawing No. 41G2393-SC01-000-C0, CPU1, Revision: 3, Pages: -

Drawing No. 41G2437-SC01-000-A0, 41G2437 Super CAP Daughter Card for CPU1 Carrier, Revision: 0, Pages: 1

Drawing No. 42G9000-0107, Panel - IO Wrap, MFA, Revision: E, Pages: -

Drawing No. 42G9000-0212-A1, Housing - RX3i, Single, Diecast with Screws, Revision: A1, Pages: 1

Drawing No. 42G9000-0212-A3, Housing - RX3i, Single, Diecast with Screws, Revision: 2, Pages: 1

Drawing No. 42G9000-0213-A5, Side Plate - RX3i Single, Diecast, Revision: 1, Pages: 1

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Tier: 5 - Unit Certification Required

Drawing No. 42G9000-0233, Side Panel - Right, Revision: A, Pages: 1
Drawing No. 42G9000-0234, Side Panel - Left, Revision: A, Pages: 1
Drawing No. 42G9000-0392-A2, Side Plate - RX3i Single, Diecast, ETM, Revision: A5, Pages: 1
Drawing No. 44c718374, 12-16 SLOT BACKPLANE FINAL ASSEMBLY, Revision: 3, Pages: 1
Drawing No. EU2105, EMC Final Report, Revision: -, Pages: -
Drawing No. GFK-2222AN, RX3i CPU REference Manual, Revision: -, Pages: -
Drawing No. GFK-2314V, RX3i System Manual, Revision: -, Pages: -
Drawing No. NU2105, ENV Marine Final Report, Revision: -, Pages: -
Drawing No. TDD-20200921, Test Plan, Revision: 1.3, Pages: -
Drawing No. Marine Test Plan, Marine Cert TDD-20211018-LPK-1, Revision: 01, Pages: 1
Drawing No. Test report, 3269ERM.001 EMC, Revision: 01, Pages: 1
Drawing No. Declaration of Conformity, Revision: -, Pages: 1
EMC Certified by MET Laboratories, Inc. MET Report: EMC AND ESL19546-IEC dated 13 June 2006
Drawing No. 2018 IP ABS Declaration of no changes to products, Declaration of Conformance,
Drawing No. ES0421-1 E10 Marine Final Report, E10 Test Report No ES0421-1, dated 20 April 2018,
Drawing No. NS0421-1 Final Report, Test Report No. NS0421-1 dated 18 April 2018,
GFK-3000 Quick Start Guide, Programmable Control Products, PACSystems Energy Pack IC695ACC403;
GFK-3002 Quick Start Guide, Programmable Control Products, PACSystems IC695CPE400;
GFK-2737G User Manual, Automation & Controls Programmable Control Products, PACSystems RX3i PROFINET Scanner (PNS);
ER1753-1, Bureau Veritas/Curtis-Straus LLC Test Report, dated 28/Sep/2017;
NR1753-1, Bureau Veritas/Curtis-Straus LLC Test Report, dated 22/Sep/2017.
Drawing No. 41G1626-SC01-000-H1, 16PA3A1, 16PA3A2, Revision: 1, Pages: -
Drawing No. 41G1627-SC01-000-E0, 16PA3B1, Revision: 0, Pages: -
Drawing No. 41G1798-SC01-000-B0, 40SX0C1, Revision: 0, Pages: -
Drawing No. 41G1813-SC0-000-C0, 40CX0E1, Revision: 1, Pages: -
Drawing No. 41G1826-SC01-000-A1, COM Express Mini Type 10, Revision: A1, Pages: -
Drawing No. EP2585-1, Marine Final Report, Date Issued: 17 February 2016, Revision: -, Pages: 1
Drawing No. GFK-2891B, PACSystems RX3i Genius Communication Gateway, IC695GCG001 Quick Start Guide, Dated August 2014, Revision: -, Pages: 1
Drawing No. GFK-2939, PACSystems RX3i Energy Pack IC695ACC402 Quick Start Guide, Dated March 2015, Revision: -, Pages: 1
Drawing No. GFK2941D, PACSystems RX3i 1GHz 64MB CPU w/ Ethernet IC695CPE330 Quick Start Guide, Dated November 2015, Revision: -, Pages: 1
Drawing No. NP2585-1, Bureau Veritas Test Report no. NP2585-1, Date Issued 06 April 2016, Revision: -, Pages: 1
Drawing No. P1208003, Genius Communication Gateway, Block, MAster, Clock, Revision: -, Pages: -
Drawing No. TDD-20151021-SPY-1, 2015 CPE330/GCG001/ACC402 Marine Certification Test Plan, Revision: -, Pages: 1
Drawing No. EO2963-1 Final Report, EO2963-1 Final Report, Revision: -, Pages: 1
Drawing No. GFK-2738G_IC695PNS001, Description GFK-2738G_IC695PNS001, Revision: -, Pages: 1
Drawing No. GFK2748C_IC694PSM001_ACC200, Description GFK2748C_IC694PSM001 ACC200, Revision: -, Pages: 1
Drawing No. GFK2884A IC695CEP001, Description GFK2884A IC695CEP001, Revision: -, Pages: 1
Drawing No. GFK2885A IC694CEE001, Description GFK2885A IC694CEE001, Revision: -, Pages: 1
Drawing No. NO2963-1 Final ENV Marine Report, Bureau Veritas Test Report, Revision: -, Pages: 1
Drawing No. gfk2501c_IC695ALG508, Description gfk2501c_IC695ALG508, Revision: -, Pages: 1
ECO-00017654, -15682, -16157, -16227, -16265, -17113, -09355, -12022, -12803, -12899, -13205, -13865, -14094, -14243, -15281, -17801, -15476, -14094, -15682, -16261, -16711, -12367, -16138 & -12243
EMC Certified by MET Laboratories, Inc. MET Report: EMC and ESL19546-IEC dated 13 June 2006;
Met Laboratories, Inc. Report: 24735-IACS, dated 1 October 2008;
TDD-20110421-MRO-1 Test Report dated 29 June 2012;
Curtis Straus Test Report EJ1393-1, EJ1320-2, -3;
BV Test Report No EL1393-1 dated 16 July 2012;
BV Test Report No NL1393-1 dated 29 June 2012;

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Tier: 5 - Unit Certification Required

Drawing No. BOM MFR V7768_132000, BOM MFR V7768_132000, Revision: -, Pages: 1

Drawing No. Hardware Reference Packet V7768_7769, Hardware Reference Packet V7768_7769, Revision: -, Pages: 1

Drawing No. Schematic DWGS 141 9301007768 000, Schematic DWGS 141 9301007768 000, Revision: A1, Pages: 1

ECO-00017654, -15682, -16157, -16227, -16265, -17113, -09355, -12022, -12803, -12899, -13205, -13865, -14094, -14243, -15281, -17801, -15476, -14094, -15682, -16261, -16711, -12367, -16138 & -12243;

Terms of Validity:

This Product Design Assessment (PDA) Certificate remains valid until 05/Jan/2027 or until the Rules and/or Standards used in the assessment are revised or until there is a design modification warranting design reassessment (whichever occurs first).

Acceptance of product is limited to the "Intended Service" details prescribed in the certificate and as per applicable Rules and Standards.

This Certificate is valid for installation of the listed product on ABS units which exist or are under contract for construction on or previous to the effective date of the ABS Rules and standards applied at the time of PDA issuance. Use of the Product for non-ABS units is subject to agreement between the manufacturer and intended client.

STANDARDS**ABS Rules:**

Rules for Conditions of Classification, Part 1 - 2023 Marine Vessels: 1-1-4/7.7, 1-1-A3, 1-1-A4, which covers the following:

2023 Marine Vessel Rules: 4-8-3/1.7, 4-8-3/1.11, 4-9-5/17, 4-9-6/23, 4-9-9/1, 7, 13; 4-9-9/Table 1

Rules for Conditions of Classification, Part 1 - 2023 Offshore Units and Structures : 1-1-4/9.7, 1-1-A2, 1-1-A3, which covers the following:

2023 Mobile Offshore Units : 4-3-1/11, 4-3-1/15, 4-3-1/17.1

National:

NA

International:

IEC/EN 60945 (Ed. 4): 2002

IACS-E10: Rev8, 2021

IEC 61000-4-2: 2008

IEC 61000-4-3: 2020

IEC 61000-4-4: 2012

IEC 61000-4-5: 2017

IEC 61000-4-6: 2013

IEC 60068-2-2: 2007

IEC 60068-2-30: 2005

IEC 60068-2-6: 2007

CISPR 16-1-1: 2019

CISPR 16-2-1: 2014

Government:

NA

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Tier: 5 - Unit Certification Required

EUMED:

NA

OTHERS:

NA