DNV·GL

Certificate No:
TAA00001AA

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Programmable Electronic System

with type designation(s)
PACSystems Rx3i and Rx7i, Series 90-30, VersaMax, Genius Remote I/O and QuickPanel View/Control

Issued to
GE Intelligent Platforms, Inc.
Charlottesville VA, United States

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Temperature	**B**
Humidity	**B**
Vibration	**A**
EMC	**A/B* (*EMC Class B applies only to Versamax products)**
Enclosure	**Required protection according to DNV Rules shall be provided upon installation on board**

Issued at **Hamburg** on **2017-08-21**
This Certificate is valid until **2022-08-20**.
DNV GL local station: **New York**

for **DNV GL**

Approval Engineer: **Andrea Grün**

Joannis Papanuskas
Head of Section

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.

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Product description

GE Intelligent Platforms PACSystems Rx3i and Rx7i, Series 90-30, VersaMax, Genius Remote I/O and QuickPanel View/Control consisting of the following catalog numbers:

Series 90-30 Catalog No	Module Description
IC690PWR124	24V DC Power Supply
IC693CHS391	10-slot Backplane
IC693CHS397	5-slot Backplane
IC693PWR321	120V AC Power Supply
IC693PWR331	24V DC Power Supply
IC693NIU004	Ethernet NIU
IC693CPU372	CPU with Ethernet
IC693CPU374	CPU with Ethernet
IC693CPU366	CPU with Profibus Master
IC693CPU367	CPU with Profibus Slave
IC693PBM200	Profibus Master
IC693PBS201	Profibus Slave
IC693MDL648	16 Circuit Input 48V DC Positive / Negative Logic
IC693MDL660	32 Point 24V DC Input
IC693MDL748	8 Circuit Output 48V DC 0.5 A Positive
IC693MDL754	32 Point 24V DC Output
IC693MDL260	32 Point 120V AC Grouped Input
IC693MDL250	16 Point 120V AC Isolated Input Module
IC693MDL350	16 Point 120V AC Isolated Output Module
IC693MDL916	16 Point Relay Output Module
IC693BEM331	Genius Bus Controller
IC693DNM200	DeviceNET Master
IC693CPU370	CPU 370 Module (240K Bytes configurable user memory, 4K I/O, 8 Racks)
IC693CPU363	CPU 363 Module (240K Bytes configurable user memory)
IC693ACC302	High capacity battery pack
IC693MDL753	12/24 VDC Output, Pos Logic (32 Pts)
IC693ALG222CA	Analog Input; 16/8 channel, voltage
IC693ALG223CA	Analog Input; 16 Ch current
IC693ALG442CA	Mixed analog module; (4) inputs / (2) outputs; current/voltage

PACSystems Rx7i Catalog No	Module Description
IC698CHS017	Rear Mount Rack
IC698CHS117	Front Mount Rack
IC698PSA350	120V AC Power Supply
IC698PSD300	24V DC Power Supply
IC698CPE020	700Mhz CPU, Pentium
IC698CRE020	700Mhz CPU, Pentium with Redundancy Support
IC698CPE030	Rx7i CPU, Pentium
IC698CRE030	Rx7i CPU, Pentium with Redundancy Support
IC698ETM001	Ethernet
IC698CMX016	Communications Memory Exchange
IC698RMX016	Redundancy Memory Exchange
IC697ACC721	120V AC Fan Assembly
IC697ACC744	24V DC Fan Assembly
IC697BEM731	Genius Bus Controller

PACSystems Rx3i Catalog No	Module Description
IC695CHS012	12-slot backplane
IC695CHS016	16-slot backplane
IC695PSA140	120V AC Power Supply
IC695PSD140	24V DC Power Supply
IC695CPE305	CPU
IC695CPE310	CPU
IC695CPU310	CPU
IC695CMU310	CPU Redundant
IC695NIU001	Ethernet NIU
IC695ETM001	Ethernet
IC695PBM300	Profibus Master
IC695PBS301	Profibus Slave
IC694MDL916	16 Point Relay Output Module
IC695ALG600	Universal Analog Input
IC695ALG608	8 Channel Non-Isolated Analog Input
IC695ALG616	16 Channel Non-Isolated Analog Input
IC695ALG704	4 Channel Non-Isolated Analog Output
IC695ALG708	8 Channel Non-Isolated Analog Output
IC695ALG628	8 Channel Non-Isolated Analog Input with HART
IC695ALG626	16 Channel Non-Isolated Analog Input with HART
IC695ALG728	8 Channel Non-Isolated Analog Output with HART
IC695LRE001	Serial Bus Transmitter
IC694DNM200	DeviceNET Master
IC694BEM331	Genius Bus Controller
IC694MDL648	16 Circuit Input 48V DC Positive / Negative Logic
IC694MDL660	32 Point 24V DC Input
IC694MDL748	8 Circuit Output 48V DC 0.5 A Positive
IC694MDL754	32 Point 24V DC Output
IC694MDL260	32 Point 120V AC Grouped Input
IC694MDL250	16 Point 120V AC Isolated Input Module
IC694MDL350	16 Point 120V AC Isolated Output Module
IC694MDL916	16 Point Relay Output Module
IC694ACC310	Rx3i Filler Module
IC694ALG392	8 Circuit Analog Output Module
IC694MDL740	16 Circuit 12/24V Output Module
IC694MDL645	16 Circuit 24V Input Module
IC695CPU320	M class CPU with 64M of memory & 2 serial ports
IC695CRU320	Redundant controller with 64M of memory & 2 serial ports
IC695CMM002	Rx3i serial communications module
IC695CMM004	Rx3i serial communications module with 4 ports
IC695CMX128	Control Memory eXchange reflective memory module with 128M
IC695RMX128	Redundant Memory eXchange reflective memory module with 128M
IC694MDL753	Output module, 12/24VDC POS logic, 32 points
IC694TBB032	Terminal Block
IC694ALG221	Analog Input / Output Module
IC694ALG222CA	Analog Input; 16/8 channel, voltage
IC694ALG223	Analog Input / Output Module
IC694ALG223CA	Analog Input; 16 channels, current
IC694ALG442CA	Mixed analog module; (4) inputs / (2) outputs; current/voltage
IC694ALG232CA	Analog Input; 16/8 channel, voltage
IC694ALG233CA	Analog Input; 16 channel, current
IC694ALG390	Analog Input / Output Module
IC694ALG542CA	Mixed analog module; (4) inputs / (2) outputs; current/voltage

IC695ACC400	Energy Pack
IC695ACC302CA	Smart external battery **(Place of manufacture: Universal Scientific)**
IC695CHS007CA	Rx3i 7-slot universal backplane
IC695CHS007	Backplane
IC695CPE305CA	Rx3i CPE305, 1 serial, 1 Ethernet port
IC695CPE310CA	Rx3i CPE310, 2 serial, 1 Ethernet port
IC695MDL765CA	24V/125VDC O/P with diagnostics
IC695MDL664CA	24VDC Input with diagnostics
IC695NIU001CA	Ethernet network interface unit w/ 2 serial ports
IC695ALG412CA	High speed thermocouple **(Place of manufacture: Spectrum Controls Inc.)**
IC695PNC001CA	PROFINET controller module
IC695ALG508CA	8 Channel Isolated RTD - Conformal Coat
IC695ALG708CA	8 Channel Analog Output - Conformal Coat
IC695CEP001CA	FLEXPAC Carrier
IC695MDL664CA	24VDC INPUT W/ DIAGNOSTICS - Conformal Coat
IC695PNS001CA	Profinet Scanner
IC695PSA140CA	Redundant PWR SUPPLY 120/240VAC, 125 VDC
IC694ACC200CA	POWER SYNC TERMINAL ASSEMBLY
IC694CEE001CA	EXPANSION CARRIER
IC694MDL646CA	INPUT 24 VDC 16PT POS/NEG FAST - Conformal Coat
IC694MDL660CA	32pt. 24 VDC Input (32 Points) - Conformal Coat
IC694MDL742CA	OUTPUT 12/24 VDC 1A 16PT POS ESCP - Conformal Coat
IC694MDL754CA	24VDC W/ESCP, 32PT OUTPUT REQ HIG DEN TB
IC694PSM001CA	POWER SYNC MEASUREMENT MODULE
IC694PWR331	Power Supply
IC695GCG001CA	Genius Communications Gateway
IC695ACC402CA	Energy Pack
IC695CPE330CA	1GHz 64MB CPU w/Ethernet

VersaMax Catalog No	**Module Description**
IC200CPU001	CPU 12k user prog 1.80msec/k boolean
IC200CPU002	CPU 20k user prog 1.80msec/k boolean
IC200CPU005	CPU with configurable user memory 0.8 msec/k boolean
IC200CPUE05	CPU with configurable user memory 0.8 msec/k boolean
IC200PWR102	Power supply with expanded 3.3VDC 120/240VAC input
IC200PWR002 *	Power supply with expanded 3.3VDC 24VDC input
IC200ETM001	Expansion transmitter
IC200ERM001	Expansion receiver isolated
IC200CHS002	Backplane
IC200CHS022	Compact I/O carrier box style (screw style terminals)
IC200CHS025	Compact I/O carrier spring style
IC200CHS006	Communications carrier
IC200GBI001	Remote I/O Genius network interface unit
IC200EBI001	Remote I/O Ethernet network interface unit
IC200PBI001	Remote I/O Profibus DP network interface unit
IC200BEM002	PLC network communications Profibus-DP slave
IC200MDL640	Input 24VDC pos/neg logic (2 group of 8) 16pt
IC200MDL650	Input 24VDC pos/neg logic (4 groups of 8) 32pt
IC200MDL740	Output 24VDC pos logic 0.5a per pt (1 group of 16) 16pt
IC200MDL750	Output 24VDC pos logic 0.5a per pt (2 groups of 16) 32pt
IC200MDL940	Output relay 2.0A per pt isolated form a 16pt
IC200MDD841	Mixed 24VDC pos log input group 20 point / output 24VDC output 12 point.

IC200MDD844	Mixed 24VDC POS LOG input group 16 point / 24 VDC output 16 point.
IC200ALG230	Analog input 12 bit voltage/current 4 channel
IC200ALG240	Analog input 16 bit voltage/current 8 isolated channels
IC200ALG260	Analog input 12 bit voltage/current 8ch
IC200ALG264	Analog input 15 bit current 15ch
IC200ALG320	Analog output 12 bit current 4ch
IC200ALG328	Analog I/O Module
IC200ALG620	Analog I/O Module
(Place of manufacture : Jabil Circuit (Guangzhou) Ltd.)	
IC200MDD840CA	Mixed 24VDC input/output relay 20pt
IC200PNS001CA	VersaMax PROFINET scanner with two 10/100 Mbps copper interfaces
IC200PNS002CA	VersaMax PROFINET scanner with two 100Mbps multi-mode fiber(MMF) ports
IC200PWR011CA	Power supply 24VDC input, isolated
IC200PWR012CA	Power supply with expanded 3.3VDC 24VDC input, isolated

* IC200PWR002 is a non-isolated power supply that requires an isolated DC-DC converter for installation in marine applications.

Genius Remote I/O Catalog No	**Module Description**
IC660BBA026	Block 24/48V DC Analog Current Source 6 Inputs
IC660BBD120	Block High Speed Counter
IC660BSM021	Bus Switching Module

QuickPanel Model Number	**Module Description**
ES0622	6” Color TFT, Loaded QuickPanel
ES0602	6” Monochrome, Basic QuickPanel

Application/Limitation

The Type Approval covers hardware listed under Product description including those conformally coated. When the hardware is used in applications to be classed by DNV GL, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV GL Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

Product certificate

Each delivery of the application system is to be certified according to Pt.4 Ch.9 Sec.1. The certification test is to be performed at the manufacturer of the application system according to an approved test program before the system is shipped to the yard. After the certification the clause for application software control will be put into force.

Clause for application software control

All changes in software are to be recorded as long as the system is in use on board. The records of all changes are to be forwarded to DNV GL for evaluation and approval. Major changes in the software are to be approved before being installed in the computer.

This Type Approval does not cover applications requiring battery back-up or applications powered by battery.
Equipment covered by this Type Approval shall be powered by 120V AC directly or via one of the AC to DC converters covered by this Type Approval.
Equipment covered by this Type Approval shall be mounted inside an RF-tight EMC-shielded cabinet.
Corcom DC line filter, part # 15DCB6F (or equivalent) **and** Panasonic surge absorber, part # ERZV20D680 (or equivalent) shall be applied to the DC line inputs as specified by manufacturer.
I/O cables shall be shielded and grounded on both ends as specified by manufacturer.
For RX3i installations inside consoles/housing together with other equipment with temperature rise $\geq$ 5°C, RX3i modules IC695CPE310 and IC695PNC001 must be mounted in the last slot with an empty slot to the left. All other RX3i modules may be installed in any slot. This limitation is required to meet Temperature Class B.
For Versamax installations, all Versamax products with exception of IC200PWR102 are additionally approved for Bridge and Deck installations when IC200PWR011, IC200PWR012, and IC200PWR002 DC power supplies are used in conjunction with an Corcom DC line filter #15DCB6F or equivalent. This limitation is required to meet EMC Class B.
For modules added in 2015, the following application/limitation applies:

- During conducted RF immunity test IC694MDL660CA input cable requires three turns around ferrite, "Fair-rite, PN: 0461178281" or equivalent.
- During conducted RF immunity test IC695ALG708CA analog accuracy may be degraded by + 20% of full scale.

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.
The main elements of the assessment are:

- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE