ARTC

NEW EQUIPMENT AND SYSTEM APPROVAL CERTIFICATE

Certificate No. NESA-S035   (v1.0)

Approval date	10/02/2020
Approved by	General Manager Technical Standards
Report no.	NESA-S035
Report date	20/12/2019

This certificate is issued to

Supplier	Alstom Transportation

In respect of

Manufacturer	Alstom Transportation Greg Hann Senior Product Manager 2712 South Dillingham Road Grain Valley, MO 64029 United States of America
Product description	ElectrologIXS
Item identification	Computer Based Interlocking
Application	ARTC Network Wide
Relevant Standards	EN50126 Railway applications – the specification and demonstration of reliability, availability, maintainability and safety (RAMS)
	EN50128 Railway applications – communication, signalling and processing systems -Software for railway control and protection systems
	EN50129 Railway applications – communication, signalling and processing systems – safety related electronic systems for signalling
	EN50159 Railway applications – Communication, signalling and processing systems – Safety-related communication in transmission systems
	SCP 17 Computer Based Interlocking Requirements
	SPS 05 Electrical & Components (Ratings & Construction Requirements)
	SPS 02 Environmental Conditions
	EST-20-01 Signals Standards and Equipment Training Courses
	ESC-09-02 Lightning and Surge Protection Requirements

Conditions of Approval		
General		
	1.	Only items on the Approved Items List shall be used in designs for ARTC or installed on the ARTC network.
	2.	Project Engineers and Third-Party Contractors shall inform the supplier Alstom that the equipment is to be used on the ARTC network when placing the order.
	3.	All new systems being commissioned shall use firmware version C35. Project/Third Party Contractors/Users shall inform to ARTC Standards in case a later version is available with release history as a minimum for consideration of the same by Standards. It also applies to all hardware/software versions which are type approved in this certificate.
	4.	Technical manual version update shall be informed to ARTC Standards by Project/Third Party Contractors/Users with gap analysis.
Supplier	5.	All documentation from the supplier supporting this system shall be in English. All diagnostic systems, support systems and tools associated with the Product shall display all information in English.
	6.	The Supplier shall submit to ARTC any updates to the support documents listed in Table 3.
	7.	The supplier grants to ARTC the permission to publish the documents on the ARTC Engineering Extranet so that those signals staff internal and external involved in supporting the system may reference the information.
	8.	The Supplier remains accredited to ISO 9001 specifically for these products. The Supplier advises ARTC on a 12 monthly basis that the ISO 9001 accreditation is current. ARTC reserves the right to conduct its own audit of the manufacture and supply of these components to AS 19011.
	9.	Any subsequent change to the design, materials or manufacturing process of the product is not covered by this approval. The Supplier shall notify ARTC of any modification or changes in order to obtain a valid updated type approval certificate.
	10.	The Supplier will make available training courses for Maintenance of the product for signals technician staff to undertake maintenance, fault finding, installation, set to work and testing.
	11.	The Supplier will make available training courses for design of the product for signals design staff to undertake application design consistent with the ARTC design standards. These shall cover data design and circuit design.
	12.	Training courses shall be documented in accordance with EST-20-01 and submitted to ARTC for endorsement.
	13.	All items shall be fitted with a readily visible label stating the Manufacturer/Supplier, Product group, item name, revision level, serial number, date of manufacturer and manufacturer's identification product number.

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Design Conditions	14.	All design shall be undertaken in accordance with the Application Logic Data Structure. See ESW-05-01. Contractor will supply ALDS documents which is consistent and compliant with existing ARTC standards and practices. The document will be finalized and submitted to ARTC prior to installation on ARTC network.
	15.	Only for use on closed communications systems to category 1 or category 2 EN50159:2010. Not to be used on radio communications systems without further approval.
Signal Designers	16.	Any individual working with or designing a system of the product for the ARTC network shall have completed the respective endorsed training course for designers. The individual shall also have the product on their statement of competency for design with a level 2 or shall work under appropriate mentorship and supervision.
	17.	All designs for application on the ARTC network shall be in accordance with the relevant ARTC engineering and signalling standards.
	18.	All details and settings for the design shall be included in the circuit sheets
	19.	The Logic Station Tool shall be used in the design and verification of data for each and every interlocking.
	20.	For new designs covering situations not clearly identified in the ALDS, then the signal designer shall consider the Safety Related Applications Conditions (SRACs) detailed in Attachment 3 to this report.
Signal Maintenance, Installation & Testing	21.	Any individual working with the product on the ARTC network shall have completed the respective endorsed training course for maintenance. The individual shall also have the product on their statement of competency for maintain and/or install and/or test with a level 2 or shall work under appropriate mentorship and supervision.
	22.	There are no field serviceable components within the units. Any failed units shall be replaced. Units shall only be repaired and overhauled by certified workshops.

A general condition of approval is that the supplier remains accredited to ISO 9001 specifically for these products and ARTC is advised on a 12 monthly basis that accreditation is current. ARTC reserves the right to conduct its own audit of the manufacture and supply of these components to AS 19011.

Any subsequent change to the design, materials or manufacturing process is not covered by this approval. The manufacturer should notify ARTC of any modification or changes in order to obtain a valid certificate.

Note/Comments NIL

Issue date	10/02/2020	**Expiry date**	N/A
Issued by		**Mayank Jain**	
		Manager Signalling Standards ARTC	

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APPROVED ITEMS LIST

Alstom ElectrologIXS computer-based interlocking

All the items below are approved for use in an ElectrologIXS computer-based interlocking. As indicated in the columns some items have been previously approved for use on XP4 predictor level crossing systems or EC5 computer based interlockings. Some signals maintenance regions may prefer that these be used as common spares between all three systems. Noted that some of the items have been approved as part of the Type Approval Certificate S-01-1802-AL227 for the XP4 level crossing predictor.

Table 1 – Processor Modules

Part Number	Product Name	Product Description	XP4	EC5	Hardware Revision	Software Revision
251432-200	VPM-3	Processor Module (LX)	✓		AH1	5.15
*251432-401	VPM-3	Processor Module (VLine)			AA6	5.15
251432-100	VPM-3	Processor Module			AG0	5.15

Note* The CRC information shows up on the units Web GUI for FLA, FLB & FLC software loads

Executive Software

Date	Part Number	Release	Processor	SW Label	Executive Runtime CRC	Executive File CRC
12/14/18	083025-C35	Ver C.35	A	VPM3 ABC Exec Bld 0265	4D8E4A9D	1F7E045F
			B		E0B48063	5AFD3F9E
			C		3A10B2C8	45FF2C00

Table 2

Part Number	Product Name	Product Description	XP4	EC5	Hardware Revision	Software Revision
251134-000	VIO-44S	Vital Input/Output Module	✓	✓	CAO	NA
	VIO-44S	VIO-44S personality module	✓	✓	B01	NA
251379-000	VIO-44R	Redundant Vital Input/Output Module	✓		AB0	NA
251380-000	VIO-86S	Vital Input/Output Module 12 volt	✓		AB0	NA
227537-000	VIO-86S	VIO-86S personality Module	✓		AA3	NA
251380-050	VIO-86S	Vital Input/Output Module 50 volt			AC2	NA

227537-050	VIO50-86S	VIO-86S personality Module 50 Volt			AB1	NA
251380-024	VIO-86S	Vital Input/Output Module 24 volt Cenelec			AB2	NA
227537-024	VIO-86S	VIO-86S personality Module Cenelec 24 Volt			AA2	NA
251125-000	VLD-C6S	Vital Lamp Driver		✓		
251381-000	VLD-R16S 12V	Vital Lamp Driver				
227539-000	VLD-R16S	VLD Personality Module				
	VLD-R8AC	VLD 110Volt AC lamp driver card				

Special Function Modules						
251124-000	CDU-1	Control and Display Unit	✓	NA	CA9	AC0
251333-000	GFD-1	Ground Fault Detector	✓		B03	NA

Communication Modules						
251329-000	CIO-1A	RS232 and Office Comms Interface	✓	NA	B02	NA
251330-000	CIO-2A	RS 232 Comms Interface	✓		B01	NA
251332-000	CIO-MDA	RS422/485 Comms Interface	✓		B02	NA

Power Supply						
251456-000	CPS-3	Central Power Supply	✓		AA0	NA

Chassis						
300752-000	Chassis	9 slot with backplane	✓	NA	BA4	NA
251464-000	Chassis	4 slot with backplane	✓		AB0	NA
251473-000	Chassis	1 slot with backplane	✓		AA2	NA

Application Memory Module						
251495-000	UCI-3	Application Memory Module	✓		AA0:2	NA

Noise Filters and Reactors						
250158-1A	1180B	Battery Reactor	✓		G03	NA

Junction Boxes						
226108-001	TJC	Junction Box	✓		J02	NA
225238-001	385A-3	Terminal Housing Pipe & Mounting Foot 20"	✓		T1	NA
225238-003	385A-3	Terminal Housing Pipe & Mounting Foot 24"	✓		BA1	NA

Note – some items with "✓" have previously been type approved for the XP4 system or the EC5 system and are common to the ElectrologIXS system.

Software
- Application Compiler Editor (ACE) – Version 5.9

Design Tools
- Logic Station Tool version 2.9
- Validator version 5.9

Reference technical manuals.
Table 3 Manuals for ElectroLogIXS XP4#

Identification	Title		Version
100323-010	System Operation and Maintenance	Volume one	B1
100323-010	System Operation and Maintenance	Volume two	B1
100132-001	Application Manual		AD0

- Refer Conditions of Approval Item number 4.

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Alstom ELIXS Engineer Training Course

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Curriculum Outline

Module title & code	ElectroLOGIXS Engineer Training *Insert name and unique identifier for the training course*
Prerequisites	Rail Signalling Engineering background. Previous Rail Signalling Design, Either Relay based or CBI experience is preferred. *Insert details of prerequisite training, qualifications and/or competencies for the trainees.*
Target group	Rail Signalling Design Professionals *Identify the target group for this training course.*
Nominal duration	15 hours spread over 2 consecutive days *Insert the duration of the course in hours and / or days.*
Purpose statement and objective	At the completion of the training the candidate will be able to achieve Level 1 accreditation by ARTC in the design and application of the ElectroLOGIXS application design and validation of designs. *Insert a clear statement of the purpose and objective of the training course.*
Course content – training	Course Overview ElectroLOGIXS system Theory of Operation Review of the manuals Selection of Hardware modules based on requirements from the ALDS Installation of Hardware Modules and their power requirements Installation and Setup of Logic Station Review and use of the Logic Station tools Use of Vital Remotes and Vital Remote Emulator Office controls and indications use and programming. Practical project to write an application from a supplied ALDS using Vital I/O, Signal Lamp drivers and Electrocode Track circuits / or Axle Counters Test the project using the simulator tool kit Validation of the application using validation tool kit Change tracking Load the software into a test rack and validate the software on a hardware platform. Capture and decode logs to validate the testing. Fault finding in the running software. *Insert a comprehensive list of the items covered in the course in the order in which they are delivered.*

Resources required for this module	☒ classroom ☒ data projector & computer ☒ equipment test rig ☒ equipment samples ☒ computer for each student ☒ course workbook & notes for each trainee ☒ test tools ☒ White board or Butchers Paper ☒ Provided USB sticks which contain manuals and tools *Insert details of all items required to deliver the training.*
Learning Outcomes	Design an operating signalling system Write the required code for the designed system Test the design on the simulator Program the hardware with the code Set to work and test the design Fault find as required Down load logs and interpret them *Insert a list of Learning Outcomes including activities that the person has been trained and assessed to do e.g. set to work, maintain, test, fault find etc.*
Delivery strategy	Present by PowerPoint Discussion forum with candidates Demonstrate Candidate interaction *Detail the delivery strategy and major steps.*
Assessment strategy	Observation by the tutor Observation and interaction from other candidates Marking of the written exam paper Demonstration buy the candidate *Detail the Assessment Strategy including all activities of the assessment.*
Relationship to competency standards	 *List how this training relates to ARTC Signals Competency after considering EST-20-05.*
Trainer and assessor qualifications	Cert IV in the train the trainer modules as specified by ARTC 45 years rail signalling experience *List training or qualifications of the Trainers and the Assessors.*

Course Curriculum drafted by (Course Provider):	
Name: Robert Rose	
Title: Senior Technical Manager Signalling	Signature: *RRose*
Organisation: Alstom_Transportation	Date . . . 07/05/2019
Course Curriculum approved by (ARTC):	
Name:	
Title:	Signature:
	Date

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Alstom ELIXS Maintainer Training Course

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Engineering (Signalling) Standard - Form
EST-20-01 Signals Standards & Equipment Training
Form number: EST2001F-01

Curriculum Outline

Module title & code	ElectroLOGIXS Maintainer Training
	Insert name and unique identifier for the training course
Prerequisites	Working as Rail Signalling Maintainer or Signal Technician.
	Insert details of prerequisite training, qualifications and/or competencies for the trainees.
Target group	Rail Signalling Technician / Maintainer
	Trainee Rail Signalling Technician / Maintainer
	Identify the target group for this training course.
Nominal duration	15 hours spread over 2 consecutive days
	Insert the duration of the course in hours and / or days.
Purpose statement and objective	At the completion of the training the candidate will be able to achieve Level 1 accreditation by ARTC in the maintenance of the ElectroLOGIXS product as a wayside signalling product
	Maintain the equipment
	Fault find and repair
	Confirm that the correct software is installed and it matches the documentation
	Insert a clear statement of the purpose and objective of the training course.
Course content – training	Course Overview
	ElectroLOGIXS system Theory of Operation
	Review of the manuals
	Hardware Modules and their functions
	Calculating Electrocode track setup
	Hardware Modules and their power requirements / Surge protection
	Laptop configuration
	Connection to the equipment using the laptop
	Uploading Boot Loader, Executive and Application Software
	Down loading logs
	Logging tools and their use.
	Fault Finding guide
	Fault finding in the running software.
	Review of Fault Tree from the manual
	Changing cards.
	Retest guide
	Use of the Web gui and CDU to review and adjust settings.
	Local presence how it works and what does it do.
	Insert a comprehensive list of the items covered in the course in the order in which they are delivered.

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Resources required for this module	☒ classroom ☒ data projector & computer ☒ equipment test rig ☒ equipment samples ☒ computer for each student ☒ course workbook & notes for each trainee ☒ test tools ☒ White board or Butchers Paper ☒ Provided USB sticks which contain manuals and tools *Insert details of all items required to deliver the training.*
Learning Outcomes	Connect the laptop to the Web Gui. Upload software Review settings and collect logs Use the CDU-1 to review settings Fault finding Down load logs and interpret them *Insert a list of Learning Outcomes including activities that the person has been trained and assessed to do e.g. set to work, maintain, test, fault find etc.*
Delivery strategy	Present by PowerPoint Discussion forum with candidates Demonstrate Candidate interaction *Detail the delivery strategy and major steps.*
Assessment strategy	Observation by the tutor Observation and interaction from other candidates Assisting other candidates Marking of the written exam paper Demonstration buy the candidate *Detail the Assessment Strategy including all activities of the assessment.*
Relationship to competency standards	*List how this training relates to ARTC Signals Competency after considering EST-20-05.*
Trainer and assessor qualifications	Cert IV in the train the trainer modules as specified by ARTC 45 years rail signalling experience *List training or qualifications of the Trainers and the Assessors.*

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Name:	
Title:	Signature:
	Date . . . .