+ AADvance Safety System Overview

SENSIA
Rockwell Automation + SLB

AADvance Safety System

Scalable Safety Instrumented System (SIS)

AADvance System

The AADvance® system consists of a Controller, I/O modules and field termination assemblies that can easily be assembled and configured. You can build an individual system controller, consisting of one or more processors, a combination of I/O modules, power sources, communications networks and user workstations, to a distributed controller system consisting of multiple individual controllers, I/O module combinations, etc. The system can be used for many different applications based on how you configure it. All of the configurations are readily achieved by combining modules and assemblies without using special cables or interface units.

As a highly scalable and flexible system, the following aspects of the AADvance system are all configurable by you, the user:

+ Scalability – System architectures can be scaled from a standalone single controller, to a distributed architecture consisting of multiple controllers
+ Flexibility – choose between redundancy options for both fail-safe and fault tolerance, across module types
+ Simplicity – The scalable architecture and flexible redundancy comes with no change in the complexity of programming, wiring or maintenance

Benefits

Scalable Architecture

+ Distributed controller architecture
+ Flexible controller redundancy
+ Flexible I/O structure
+ Mixed fail safe & fault tolerant configurations are supported in the same controller architecture
+ Black channel communications

Feature Rich Hardware

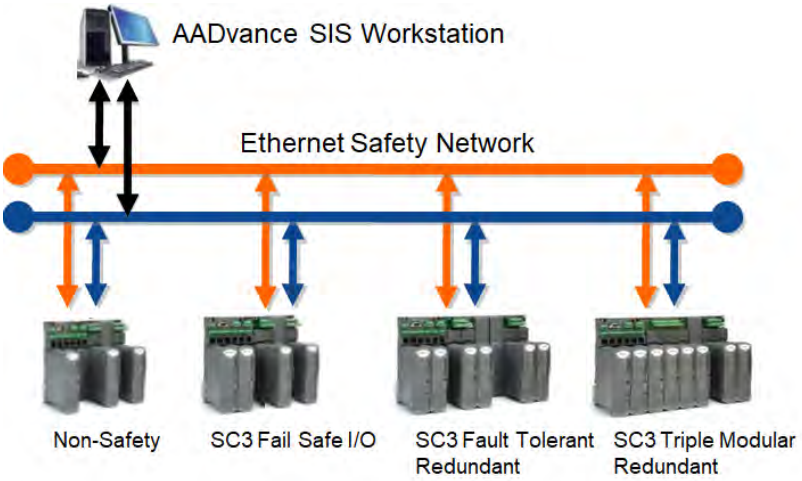
+ Comprehensive diagnostics
+ Integrated HART communications (AI & AO)
+ Conformal coating
+ Channel isolation
+ Electronically protected outputs
+ Online replaceable

Comprehensive Programming Environment

+ Supports the four IEC61131 commonly used languages
+ Online programming changes
+ Online debugging
+ Offline simulation
+ Built in version control
+ T3 compliant online modifications and expansion
+ Single programming environment to manage multiple controllers for distributed safety applications

Communications Options

+ EtherNet/IP™ (with CIP™) communications to ControlLogix® Programmable Rockwell Automation Controllers
+ Modbus TCP/RTU and OPC communications for other BPCS/ SCADA/PLC systems
+ Integrated with Rockwell PlantPAx®
+ Can be deployed standalone



SIS Workstation Configuration Software

AADvance Software is a complete design, configuration and maintenance software environment that enables you to design the complete multi controller safety strategy as a single project, then to target parts of the strategy for each controller.

Supports the four IEC61131 commonly used languages and produces validated code for use in safety applications, regardless of language used.

This leading-edge programming environment is comprised of a powerful set of features:

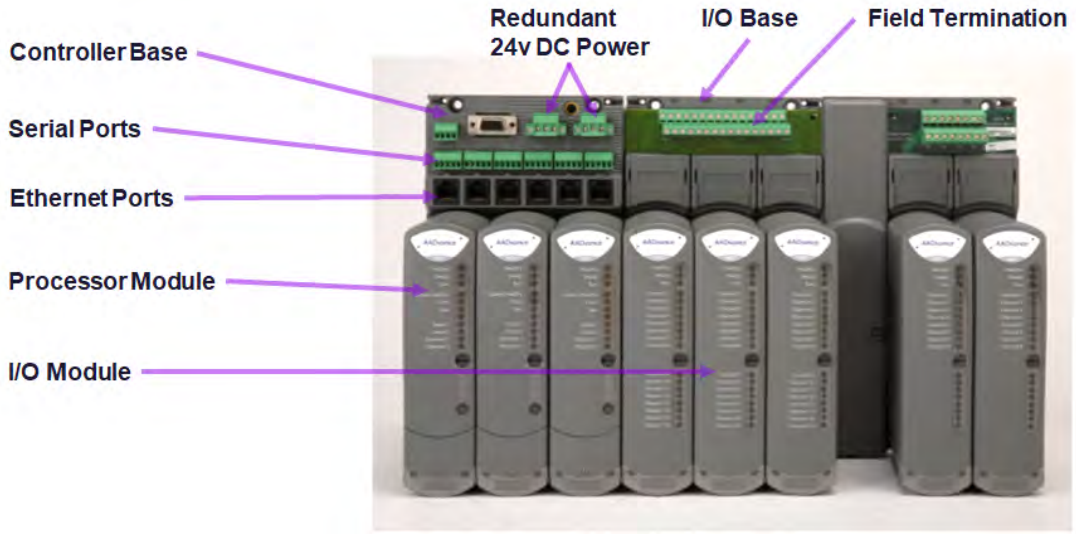
+ Offline simulation of the entire distributed controller environment, including controller to controller communications
+ Centralized repository for archiving of application source, which provides automatic archiving whenever a change is made to a running controller.
+ Collaborative programming environment, allowing controlled multiple user access to a single project.
+ Online monitoring (also a collaborative environment) of applications across multiple controllers.
+ Online updates of changes, including the addition of new controllers into the distributed network.

Typical Applications	SIL Target	Demand
Emergency Shutdown (ESD)	2&3	Low/High
Fire and Gas (F&G)	2	Low
High Integrity Pressure System (HIPPS)	3	Low
Burner Management Systems (BMS)	2	High
Subsea Blowout Prevention (BoP)	2	Low

Performance Characteristics	
Safety Intergrity Level	IEC61508 SC 3
Safety Degradation Modes	Dual 2-1-0, TMR 3-2-1-0
Processor Modules Supported	Three

TÜV Rheinland Certification	
IEC 61508, Part 1-7: 2010	EN 50130-4:2011 + A1:2014
EN 50178:1997	EN 50156-1:2015
IEC 61511-1:2017 + A1:2017	EN 54-2:1997 + AC:1999 + A1:2006
EN 61131-2:2017	NFPA 72:2019
EN 61326-3-1:2017	NFPA 85:2019
EN 61000-6-2:2015	NFPA 86:2019

AADvance Certification	
Electrical Safety	UL508, CSA22.2 (142-M1987), EN 60079
Hazardous Area Location	Class 1 Div II - ANSI/ISA 12.12.01:2010, Class 1 Div II - CSA 22.2 (213-M1987), Zone 2 – ATEX (94/9/EC)



SENSIA
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Contact Us

Sensia LLC
Energy Tower IV
15th Floor
11750 Katy Freeway
Houston, TX 77079

+1-866-7SENSIA (+1-866-773-6742)
hello@sensiaglobal.com

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