AHAR Catalog

AUG 2024







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History

Ahar Company started its activations on a small scale with the designing and producing of electronic card projects in 1997. Over the past two decades, it has managed to become one of the most well-known knowledge-based companies in the Islamic Republic of Iran country in the field of electronics and control systems with a remarkable growth rate. Ahar's development across the domains of knowledge, economics, human capital, and product portfolio is exceptional. A summary of Ahar's projects over the past 25 years is presented below:

- **1997** Production of the first power plant electronic card.
- **1999** Expansion Diversification of power plant electronic card production.
- **2001** Design and installation of monitoring systems in various industries.
- Design and manufacture of the first series of electronic generator excitation cards.
- 2003 Commencement of specialized design of electronic gas turbine control cards.
- **2006** Membership in Khorasan Science and Technology Park.
- **2008** Initiation of gas turbine control system design.
- Update and installation of the first gas turbine control system with a capacity of 25 MW GE F5 model in Iran.
- **2011** Design and manufacture of digital control system for steam turbine governor same as Woodward 505.
- 2013 Design and manufacture of Yokogawa-based DCS input and output modules.
 - Acquisition of Knowledge-Based Company license.
- **2014** Design and installation of the first 25 MW gas turbine generator excitation control system in Iran.
- **2015** Update of more than 1000 MW of turbine control system of Iran's electricity grid.
- **2016** Design and installation of the Siemens SGT100, twin shaft gas turbo-pump control system in the oil and gas industry of Iran.
- **2018** Upgrade and installation of the turbine control system for a 130 MW Mitsubishi gas turbine unit at a major Iranian power plant.
 - Upgrade and installation of the generator excitation control system for a 320 MW steam turbine unit at a major Iranian power plant.
- 2019 Design and manufacture of the first synchronous motor start-up



system (SFC) with a capacity of 3 MW in Iran.

- Update of more than 5000 MW of turbine control and generator excitation system of Iran's electricity grid.
- Design and manufacture of the first overspeed protection system for rotating machines with SIL3 standard in Iran.
- **2022** Upgrade of over 7,300 MW of turbine control and generator excitation system in Iran's power grid.
- **2023** Design and manufacture of all Yokogawa DCS system (software upgradation to VP R6, Hart I/O, non Hart I/O, communication, power supply, backplane).



Ahar at a Glance

Ahar Company embarked on its activities in the realm of industrial automation and electronic card design in 1999. This endeavor commenced with the reengineering and manufacturing of power plant electronic cards and automation projects. Over time, it evolved into designing advanced control systems essential for the energy industries.

In 2011, Ahar introduced its own turbine control system, named Ramiyar, which gained widespread acclaim. As the company progressed and expanded its knowledge endeavors, the generator excitation and protection system under the brand name Sanyar, synchronous motor drivers (SFC) under the brand name Rastar, the indigenous DCS system under the brand name Ramona, and many more were produced. These systems found extensive applications and utilization within the energy industries. Presently, over 7000 MW of Iran's power plants, along with numerous refineries, petrochemical complexes, oil transmission lines, and other facilities, have been modernized utilizing the indigenous products of the knowledge-based Ahar Company.

Ahar Company, a knowledge-based enterprise, stands out as a pioneer in designing, manufacturing, and implementing advanced control and protection systems for a wide range of industries.

Fields and areas of activity

Ahar company, expertise encompasses various domains, including:

- Turbine Control and Protection Systems
- Generator and Synchronous Motor Excitation and Protection Systems
- Synchronous Motor Drives
- DCS system
- Protection, Speed Control, Vibration Monitoring, and Condition Monitoring Systems
- Fire and Gas Protection System
- Electro-Pneumatic Positioners

The company's activities can be pointed out in sensitive industries such as: power plants, refineries, petrochemical plants, steel industries, copper, and etc.



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Knowledge-Base

One of the key values of Ahar Company is solving fundamental industrial problems and challenges with a scientific approach. From its very first days of operation, the company has emphasized scientific methods as the cornerstone of its work. This has enabled it to reach a considerable depth of knowledge in its specialized fields. It is worth noting that this approach predates the definition and emergence of knowledge-based companies. As a result, when the definition of knowledge-based companies was established in 2014, Ahar Company was among the first to be evaluated and approved. The company currently holds a technology license (the highest level of license for knowledge-based companies).

Being problem-oriented and ready to undertake highly complex projects has led Ahar Company to hold the record for the highest number of first-time contracts, kinds of contracts in Iran, among knowledge-based companies in Iran.

Currently, 100% of the company's sales consist of knowledge-based products.

Ramyar: Gas/Steam Turbine control system

Sanyar: Generator excitation control and protection system

Rastar: Drive system for synchronous motors

Rayan: Speed and vibration protection system for rotating equipment with SIL3,2 certification

Ramona: DCS control system compatible with Yokogawa Centum Manyar: Fire and gas detection and suppression system (F&G)

Ahar Company, relying on its high technology products, has successfully undertaken the following projects with first-of-a-kind contracts in Iran:

- Design, construction, and commissioning of the boiler burner management system (BMS) for steam turbines at the Bandar Abbas power plant
- Upgrading the control and hydraulic governor system of 320 MW steam turbines at the Shazand DEH power plant
- Localization of the hardware and software of the control system for Hitachi gas turbine generators at the Abadan refinery
- Modernization of the excitation system of units 11 and 12 at the Abadan Refinery power plant No. 2
- AVR system for the South Pars Phase 1 refinery
- Manufacturing Yokogawa modules for the Imam Khomeini (RA) Refinery in Shazand
- Localization of Yokogawa DCS cards for the South Pars Gas refinery

Over 15 industrial projects have been defined between the company, universities, and scientific centers:

- Cooperation agreement for the production of positioners with
- the Vice Presidency for Science and Technology
- Research contract to evaluate the performance of embedded operating systems with Ferdowsi University
- Research contract to develop a tool for microcontroller programming with Ferdowsi University
- Design, simulation, and construction of an antenna with Shahrood University of Technology
- Research contract to investigate and familiarize oneself with the communication protocol with Ferdowsi University
- Research contract entitled "Implementation and
- commissioning of communication under a specific industrial protocol" with Ferdowsi University
- Design of a power meter card with the Growth Center of Ferdowsi University of Technology, Mashhad
- Research contract entitled "Implementation and evaluation of the synchronization protocol" with Ferdowsi University
- Memorandum of understanding to conduct a study opportunity
- for a number of professors with Ferdowsi University
- Agreement to carry out a student internship project with Ferdowsi University
- Conducting a feasibility study and prototyping to acquire the know-how of producing piezoelectric components on a laboratory scale
- Design and construction of three high-power communication amplifiers with Ferdowsi University
- Design, construction, and upgrading of a flow computer with Ferdowsi University of Mashhad
- Conducting specialized student courses in the summer
- Holding competitions at universities to introduce industrial challenges and familiarize students







Depth of Knowledge

Ahar Company began its activations by designing and manufacturing power plant cards and subsequently expanded into the refining and petrochemical sectors. From a knowledge perspective, we can identify several distinct phases in Ahar's evolution: the era of electronic card manufacturing, the period of system study and complete replacement, and the era of designing new systems.

Manufacturing Electronic Cards

Initially, cards were designed and manufactured as spare parts to replace well-known global brands. The distinguishing feature of Ahar's manufactured cards was that they were thoroughly studied, modeled, and analyzed for performance. Depending on the technology level and the card's lifespan, the design was either improved or redesigned. In some cases, the technology level and design structure of the card were completely changed. Although the primary goal was to design and manufacture replacement cards for original samples, in reality, all cards were analyzed, and by carefully studying the function and operating method of the card, the design team became familiar with the technology, design points, and the so-called problem-solving theory of well-known global brands. By implementing a comprehensive reporting system, all this information was effectively transformed into embedded knowledge within the company.

During this period, due to the increasing demand for various types of cards from different brands, a valuable opportunity was created for Ahar to acquire knowledge in various fields, such as: various controllers for gas and steam turbines (temperature, speed, acceleration control, etc.), the operating methods of various servo valves, various power supplies and power sources in different capacities and operating classes, generator excitation systems and their components, various vibration, speed, power, current protections, etc., drives for various proportional valves and rulers and LVDTs, electronic breaker drives, power circuits and drives for servo and stepper motors, information processing and monitoring systems, multi-axis simultaneous controllers, and more.

It's worth noting that the card design team was formed from the beginning of Ahar and continues to operate today with over two decades of experience. In this phase, approximately 600 different types of electronic cards were manufactured for various power plants and refineries.

Studying Systems and Complete Replacement

After about a decade of activity in card manufacturing and studying different parts of systems, the knowledge created in the company provided Ahar with the opportunity to move towards the localization and complete replacement of systems. In this phase, the models of individual system components were brought together to create the overall structure of a comprehensive system. In this phase, Ahar moved from being a designer and manufacturer of electronic cards to manufacturing and replacing entire large systems such as turbine control systems, generator excitation, and mega drives. Two features were significant in this era: Firstly, each component had been studied and modeled in the previous phase, and in addition to that, it had been practically tested by manufacturing the card. Therefore, trial and error was avoided when assembling the system. Secondly, with a comprehensive understanding and modeling of the system, as well as studying articles and the latest technologies, the way was open for upgrading systems and updating them, and this path continues

Designing New Systems

After about three decades of activity, the depth of knowledge created in Ahar Company is now sufficient to propose solutions for the main needs and problems of the energy industry and perform fundamental design. Due to nearly three decades of activity and experience, as well as the documentation and focus on recording technical documents, the technical team of Ahar Company has been able to achieve special features, including:

- 25 years of exclusive design in upstream industries related to energy, including power plants, refineries, and petrochemical plants
 Design of over 600 different types of electronic cards with various functions and performances
- Familiarity of the technical team with the mechanical and systemic processes of the target industry and the ability to study and learn new systems
- Ability to work interdisciplinary and combine various engineering specialties together, such as: mechanics, electrical, electronics, computer, materials, control, etc. (for example, the ability to simultaneously design electronic circuits and also the ability to model and understand mechanical parts allows Ahar to enter large-scale projects and so-called total solutions).



 A powerful knowledge management structure, exclusive to Ahar; given the importance of recording and developing knowledge in knowledge-based organizations, Ahar Company has created a dedicated environment for recording and managing knowledge within the company. In this system, the knowledge map, the strengths and weaknesses of the company, and all experiences, etc., are in the knowledge domain can be monitored.

- Study and formulation of about 100 widely used industrial standards and the ability to implement them in related projects
- Ability to calculate the overall lifespan of all company cards and designs, as well as calculate the reliability for cards and systems
- Ability to model industrial systems, especially those related to the energy sector, and the ability to optimize controllers and control algorithms

Turbine Control

Turbine Control & Protection System RAMYAR

Ramyar is a control and protection system designed for various turbomachinery, including power plant turbo generators, turbopumps, and turbocompressors. As a PLC-based system, Ramyar oversees all turbine processes, such as control, protection, monitoring, and operator command execution.

Key Features

- Versatility: Adaptable to various turbine structures.
- Modern Technology: Incorporates the latest control system and instrumentation equipment.
- Customization: Customizable features and equipment.
- Redundancy: Redundancy at the processor, input/output, and communication network levels.
- Safety: Safety implementation based on the IEC61508 standard.
- Robust Monitoring: Powerful monitoring system.
- Data Archiving: Dedicated archiving and reporting system.
- Diagnostics: Hardware and software diagnostics capabilities.
- Cybersecurity: High network and cybersecurity.
- Intelligent Algorithms: Intelligent fuel switching algorithms without load changes.
- Intelligent Temperature Calculation: Intelligent algorithm for calculating turbine temperature based on exhaust temperature.

Standards

The design and manufacturing standards for the Ramyar system include:

IEC611312	 IEC61355
IEC61508	 IEC60947
• IEC61511	

Ahar Company's Custom Equipment and Capabilities

• High-Speed I/O Module: For communication with governor signals (ExpressIO).



- Compatibility with Existing Equipment: Ability to interface with old and non-standard equipment and signals using custom-designed cards, such as:
- Servos Flow meters Spark plugs And more

Flame detectors







Generator Excitation

Synchronous Generator Excitation and Protection System

SANYAR

Sanyar is a comprehensive excitation and protection system designed for synchronous generators. It can be applied to various dynamic and static systems without limitations on excitation current. Sanyar can be installed in all types of gas, steam, and hydroelectric power plants and is designed based on the latest excitation system standards (such as IEEE421).

The design of the Sanyar excitation system allows for adaptability to various systems and is produced and commissioned based on the user's needs and the existing excitation system. The technology used in this system results in increased stability, reliability, and generator performance at the highest possible level.



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• Key Features

- Control Modes: AVR, FCR, VAR, and PF control modes.
- Seamless Mode Transition: Smooth transitions between control modes.
- Soft Start: Soft start for generator voltage.
- Compensation: Droop compensation for line and reactive power. • Limiters: OEL, UEL, SCL, V/F limiters.
- Field Current Limits: Minimum and maximum field current limits.
- Precision: Generator voltage control accuracy of less than 0.1%.
- Speed: Controller response speed less than 2 milliseconds.
- Stability: Power system stabilizer (PSS1B) according to IEEE421 standard.
- Redundancy: Ability to design redundancy in control, power, and cooling systems.
- High Current and Voltage: Capable of handling up to 6000A current and 1200V voltage.
- Protections: Overvoltage, semiconductor switch protection with fast fuses, overcurrent, overload, phase loss, thyristor/IGBT non-conduction, power bridge temperature, generator PT monitoring, rotor temperature monitoring, excitation current measurement sensor monitoring, rotating diode monitoring.
- High-Speed Processing: 50 microsecond processing speed using high-speed processors.
- PLL Technology: PLL technology for zero-crossing detection and power bridge drive.
- Fault Recorder: Automatic fault recording at a rate of 250 microseconds for 3 seconds with pre-trigger capability.
- Online Maintenance: Ability to perform online maintenance of power converters in redundant systems.

Other Equipment

High-speed AVR loop control module. (Sanyar401)



Processor for upstream control loops. (Raden)







Standards

The design and manufacturing standards for the Sanyar excitation system include:

- IEEE Std 421.1
- IEEE Std 421.2
- IEEE Std 421.3
- IEEE Std 421.4
- IEEE Std 421.5
- IEEE Std 421.6
- IEC 61000-4-2

- IEC 61000-4-3
- IEC 61000-4-4
- IEC 61000-4-5
- IEC 61000-4-8
- IEC 60068-2-1
- IEC 60068-2-2
- IEC 60068-2-30



Startup & Motor Drive

Synchronous Motor Drive

RASTAR

Rastar is a specialized drive system designed for various synchronous machines in industries such as power generation, refining, and mining. This system provides precise control of motor speed, position, and torque across a wide power range. It can also be installed on various power plant generators to use the generator as a motor for turbine

Key Features

 Multiple Starting Modes: Supports various starting modes such as normal start, washing, turning, purging, black start, condenser, and brake.

- Modularity: Can be implemented as a 6-pulse or 12-pulse system.
- Operation Modes: Capable of driving synchronous motors in starting or continuous duty modes.
- High-Speed Control: Control loops operate at a speed of 10 microseconds.
- Sensorless Start: Initial startup without the need for a rotor position sensor.
- Real-Time Monitoring: Continuous online monitoring of all power switches, including thyristors.
- Fiber Optic Technology: Utilizes fiber optic technology for thyristor drives.
- Cooling: Supports both air-cooled and water-cooled systems.
- Sensor Monitoring: Monitors current measurement sensors (CT/Sensor Wire Break).
- Protections: Overvoltage, overcurrent, overload, phase loss protections. • PLL Technology: Utilizes PLL technology with variable frequency and
- amplitude for zero-crossing detection and power bridge drive.
- Data Recording: Ability to store and display 200 signals with a sampling rate of 125 µs for 10 minutes.
- Health Monitoring: Continuously checks the health of hardware and software.
- Online Maintenance: Allows for online maintenance of power converters in redundant systems.

Ahar Equipment

- RASTAR401: High-speed inverter loop control module.
- RASTAR402: High-speed rectifier loop control module.
- Raden: Processor for upstream control loops.
- Raden HMI: HMI system for monitoring and command execution.



Standards

The design and manufacturing standards for the Rastar drive system include:

■ IEC60146-1-1	■IEC 61000-4-4
• IEC 61000-4-2	• IEC 61000-4-5
IEC 61000-4-3	IEC 61000-4-8





• IEC 60068-2-1 • IEC 60068-2-2 • IEC 60068-2-30

Overspeed Protection

Overspeed Protection System



Rayan P-10

generators, blowers, and expanders.

Key Features

- Safety Compliance: Adheres to the stringent IEC61508/SIL3 safety standard.
- Modularity: Features 3 independent speed measurement and protection modules, expandable to 6 per rack. Redundancy: Supports various redundancy configurations (2003, 1002, or 4006) to ensure high reliability. • Dual Machine Protection: Capable of safeguarding two independent rotating machines simultaneously.
- Sensor Compatibility: Compatible with a wide range of frequency measurement sensors, including pickups, proximity sensors, and Hall effect sensors.

- Customization: Can be configured using dedicated software.
- integration with other systems.

Standards and Certifications

- IEC61508/SIL3 Certified
- System Type: B
- HFT: 1
- Architecture: 2003
- Service Time: 5 Years
- PFD avg: 7.13 × 10−5

Comparison with Competitors

P-10 with these other brands.

Protection system	SIL	PFD	Proof Test Interval
Braun - E16×356	SIL3	8.41×10^{-6}	20 years
Rayan - P10	SIL3	7.13×10^{-5}	5 years
Braun - E16×352	SIL3	7.71×10^{-5}	20 years
Woodward	SIL3	7.5×10^{-5}	1 year

Rayan P-10 is a specialized system designed to safeguard rotating machinery from exceeding safe operating speeds. It is primarily used for critical equipment such as gas and steam turbines, compressors,

- Rapid Trip: Triggers a trip within 15 milliseconds for swift response.
- High Precision: Offers a frequency measurement accuracy of 1Hz.
- Self-Diagnostics: Includes an automated system for testing modules during operation.
- Safety-Rated Relays: Employs force-guided relays compliant with safety standards.
- Hot-Swapping: Allows for online replacement of modules without system shutdown.
- Connectivity: Supports various communication protocols like Profibus, Modbus, Ethernet, and USB for

Self-Diagnosis: Automatically detects and diagnoses internal circuit and external communication faults.

- Designed based on API670 standard
- IEC61000 certified for noise immunity
- IEC60068 certified for environmental conditions

Rayan P-10 can effectively replace well-known international brands such as Braun, Woodward, Bently Nevada, CEMB, Emerson, Jaquet, and Meggitt. The provided table compares the reliability of Rayan



Vibration Protection Rayan P-20

Vibration Protection System

Rayan P-20 is a specialized system designed to monitor and protect rotating machinery from excessive vibrations. It is primarily used for critical equipment such as gas and steam turbines, compressors, generators, blowers, and expanders. The Rayan P-20 system monitors temperature and vibration parameters. It detects early signs of equipment failure and issues warnings to the operator before the situation becomes critical. The system can also initiate equipment shutdown commands. Beyond its features as a vibration protection system (MPS) compliant with API670 standards, the Rayan P-20 also serves as a standard sampler for condition monitoring (CMS).

Standards and Certifications

- Meets the IEC61508 safety standard.
- Vibration protection features fully comply with API670 standards.
- Complies with ISO/IEC 27001-2022 cybersecurity standards.
- Meets IEC61000 electromagnetic compatibility requirements.
- IEC60068 certified for environmental conditions

Key Features

- Safety Compliance: Adheres to the stringent IEC61508/SIL2 safety standard and can be upgraded to SIL2.
- Cybersecurity: Complies with ISO/IEC 27001-2022 cybersecurity standards.
- Rapid Trip: Triggers a trip within 100 milliseconds for swift response.
- Sensor Compatibility: Compatible with a wide range of voltage and current two-wire and three-wire proximity, velocity, and acceleration sensors.
- Specialized Modules: Features dedicated modules for process, temperature, key phasor, and tachometer measurements.
- Force Guided Relays: Ensures feedback accuracy.
- Hot-Swapping: Allows for online replacement of modules without system shutdown.
- Multi-Channel Processing: Can simultaneously process up to 22 vibration channels.
- Customization: Offers customizable hardware, communication settings, online monitoring, and logic programming.
- Connectivity: Supports various communication protocols like TCP/IP, Modbus RTU, and Profibus for integration with other systems.
- Self-Diagnosis: Automatically detects and diagnoses internal circuit and external communication faults.
- Comprehensive Vibration Analysis: Capable of analyzing various vibration types including:
- Radial (X or Y or X-Y Relative vibration, Smax, MAX(X,Y), Eccentricity, Orbit, ...)
- Axial (Thrust position, Expansion, ...)
- Rod drop (Average Mode & Trigger Mode)
- Casing Vibration (Acceleration or Velocity)

Comparison with Competitors

Rayan P-20 can effectively replace and compete with well-known international brands such as Bently Nevada, B&K, Meggitt, Emerson, and CEMB.

DCS System

Distributed Control System

RAMONA

RAMONA is a Distributed Control System (DCS) which is designed to provide integrated control and monitoring of industrial processes in facilities such as power plants, refineries, and factories. It consists of various components including inputand output modules, CPU, network switches, power supply, and etc.

Given the widespread use of Yokogawa systems globally, RAMONA has been specifically designed to be compatible with Yokogawa systems.



Key Features

- Offers customized licenses tailored to customer needs.
- Provides an easy-to-use and unified graphical user interface.
- Delivers high reliability and fast response times.
- Allows for process updates without requiring system downtime.
- Seamlessly integrates with Yokogawa Centum systems.
- RAMONA modules can operate alongside Yokogawa modules, even in redundant configurations.
- Offers rapid and affordable support compared to foreign systems.
- Provides higher security against cyberattacks and meets cybersecurity standards.
- Offers a Windows-based engineering interface for process implementation and modification.
- Provides an interface for connecting to systems from other manufacturers.
- Features a unified alarm and message management system (UACS).
- Supports Fieldbus, HART, PROFINET, PROFIBUS, and EtherNet/IP.
- Offers customized licensing options.

Advantages over Yokogawa Systems

 Provides solutions for addressing shortcomings in existing systems.

- Enables upgrades to existing systems.
- Offers more competitive pricing.
- Simplifies procurement and technical support.
- Provides quick and affordable maintenance.
- Meets cybersecurity requirements due to domestic design and manufacturing.

RAMONA offers a range of digital and analog input/output modules, network cards, and other components as outlined in the provided table.

No.	Module Name	Compatible with	Number of Channels	Module Type
1	ADV2551-P50	ADV551-P50	32	Digital out (Voltage)
2	ADV2151-P50	ADV151-P50	32	Digital In (Voltage)
3	ADV2559-P00	ADV559-P00	32	Digital out (Voltage)
4	ADV2159-P00	ADV159-P00	32	Digital In (Voltage)
5	AAI2135-S50	AAI135-S50	8	Analog In (Current)
6	AAI2835-S50	AAI835-S50	8	Analog In/Out (Current)
7	AAI2841-S50	AAI841-S50	16	Analog In/Out (Current)
8	AAI2141-S50	AAI141-S50	16	Analog In (Current)
9	AAI2143-S50	AAI143-S50	16	Analog In (Current)
10	AAI2543-S50	AAI543-S50	16	Analog Out (Current)
11	AAI2835-H50	AAI835-H50	8	Analog Input/ Output - Hart
12	AAI2143-H50	AAI143-H50	16	Analog Input - Hart
13	AAI2543-H50	AAI543-H50	16	Analog Output - Hart
14	EC2401-51	EC401-51	-	ESB bus copler module
15	SB2401-51	SB401-51	-	ESB bus interface slave module
16	PW2482-51	PW482-51	-	220- 240VAC 50/ 60 Hz 1.3A
17	PW2481-51	PW481-51	-	100- 120VAC 50/ 60 Hz 2.5A
18	AFV2010D	AFV10D	-	Centum 3000 Rack
19	AFV2030D	AFV30D	-	Centum VP Rack
20	ANB2010D	ANB10D	-	Centum 3000 Extend Rack
21	AEA2004D	AEA4D	-	Analog Terminal board
22	AED2005D	AED5D	-	Digital Terminal board
23	VI2702	VI702	-	Vnet/IP Interface Card
24	CP2461	CP461	-	Centum VP CPU Module



- The first Iranian fire detection and suppression system with SIL3 safety
- Offers various configurations to achieve desired reliability and availability.
- Designed to meet EN54, EN12094, and NFPA72 standards.
- Features redundancy at all levels, including CPU, I/O modules, and
- Highly modular design for easy expansion.
- Supports up to 120 input/output modules.
- Can handle up to 64 suppression zones in a single configuration.
- Supports a wide range of conventional and addressable detectors and
- Includes analog input modules for gas detection sensors.
- Allows for online replacement of modules and CPU.
- Features redundant power supply, battery, and battery charger compliant
- Uses safe and high-speed fiber optic communication protocols.
- Offers automatic configuration capabilities.
- Supports various communication protocols like TCP/IP, Modbus, and Profibus for integration with PLCs, DCSs, and SCADA systems.
- Provides software for hardware configuration, communication setup, and zone logic programming.
- Offers 4 types of panels to suit different environments and applications.

Standards

- Meets IEC61508/SIL3 functional safety requirements.
- Complies with EN54 standards.
- Designed and implemented according to EN12094-1.
- Designed and implemented according to NFPA72 .
- Adheres to ISO/IEC 27001-2022 cybersecurity standards.
- Meets IEC61000 electromagnetic compatibility requirements.
- Complies with IEC60068 environmental conditions.

Components

- Central Processing Unit (CPU) module
- Various specialized input and output modules (see table)

Module	Туре	Function	Redundancy
Input Module	Conventional	8 line input	Yes
Input Module	Analog	3 types: 4 channels 8 channels 4 channels with Hart	Yes
Input/ Output Module	Addressable	2 channels/127 Devices	
Single Input	Convert Conventional Line to Addressable Loop		
Single Output	Convert Conventional Line to Addressable Loop		
Digital Output		8 channels/0.5A 4 channels/2 A	Yes
Reverse Output		8 channels/Reverse	
Multi In/Out	Convert Conventional Line to Addressable Loop or versa	5 Conventional Line input 5 output contact 1 Addressable Loop	
CM-MBRTU	Communication Module	Convert FGS Bus to Modbus RTU	Yes
CM-MBTCP	Communication Module	Convert FGS Bus to Modbus TCP	Yes
CM-PB	Communication Module	Convert FGS Bus to Profibus	Yes
CM-TCP	Communication Module	Convert FGS Bus to TCP/IP	Yes
CM-SafeBus	Communication Module	Convert FGS Bus to Safe Bus	Yes

CERTIFICATE AHAR Registration Certificate Ahar PowerStation Services (AHAR) With AHAR CERTIFICATE TERNATIONAL Limited O 9001:2015 💥 xefracert Registration Certificate Ahar PowerStation Services (AHAR) [1] FUNCTIONAL SAFETY CONFORMITY [2] E/E/PE Electrical / Electronic / Programmable Electroni [3] Num XEF 23 SIL 0028 Issue Number: 0 TUV-INTERNATIONAL Limited [4] Equips AYAN-P10 Rotating Machine Ov EnergyKontrol Co ISO 45001:2018 [5] Manu [7] Safety architecture 200 Type B Subsystem Registration Certificate Ahar PowerStation Services [9] e with applied Stan (AHAR) the following Ad IEC 61508 (Part 1 to 7) ed.2.0 Mith t TUV-INTERNATIONAL Limited ISO 14001:2015 [12] This safet ler Control Safety Integrity Level SIL3 Low Demand Mode of Operatio RCBH 10.08.2026 Expiry date Energy&Power Industries Laboration TUV-INTER Page 1 of IMS Management Systems EPIL TEST REPORT Vo.2, Boujari Seht Dead-End, Comer of Fariman St., Bozorgnehr St., Vali-A Postal Code: 5148654523 Tel: 021-61871 Fax: 021-66174283 Lab: Kewah Reasench City, Supa Blod, 9th rev of Kang-Darvin Freeway, Ira Tel: 026-34766700-14 Fax: 026-34766715

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Management Systems at Ahar Company

Business systems and processes play a pivotal role in organizational value creation. The effective utilization of these systems, their implementation on suitable software platforms, and their integration with other management tools are crucial for enhancing a company's capabilities. In line with this, Ahar Power Services Company has been designing and implementing these systems for years, with key examples including customer relationship management, project management, production management, supply chain management, quality management, performance management, human resources management, financial management, knowledge management, and information technology management. A detailed introduction to these systems, their underlying software platforms, and complementary tools is provided below:

Quality Management System \checkmark

The Quality Management System is a cornerstone of Ahar Company, playing a pivotal role in quality control and quality assurance of products. It ensures the proper execution of other organizational systems, manages processes and organizational documents, and contributes significantly to overall operational effectiveness. Ahar holds international certifications such as ISO 9001, 14001, and 45001, demonstrating its commitment to quality and environmental standards.

Customer Relationship Management System

This system is central to Ahar's customer-centric approach, managing interactions from initial contact to post-project support. Customer satisfaction is a core value at Ahar, and this system ensures that it remains a priority.

:.0 **Project Management System**

Ahar employs a combined agile and waterfall methodology for its project management, which includes EPC and product-focused R&D projects. The system is integrated with business intelligence tools to optimize project oversight and control.

5 **Production Management System**

Given Ahar's focus on designing and producing knowledge-based products, the production management system is crucial. It ensures high-quality production at optimal costs and timelines.

Financial Management System 101

The financial management system supports budgeting, financial planning, and decision-making at both operational and strategic levels.

Procurement Management System

In project-based companies, especially those operating in primary and infrastructure industries, ensuring the adequate supply of

equipment is a critical concern. Ahar Company has been paying close attention to its supply chain management system for years. The implemented processes and reports, which are supported by software platforms, assist the organization in managing daily operations and making managerial decisions.

Performance Management System

This system has been established to create a platform for continuous feedback and communication between managers and employees and to achieve the organization's strategic goals. This system helps to identify employees' capacities, competencies, and growth areas, and provides a basis for making sound decisions regarding promotions and appointments to suitable job positions. Moreover, the data obtained from the performance management system plays a crucial role in identifying employees' training needs and succession planning.

Human Resources Management System

The HRMS streamlines HR processes such as recruitment, onboarding, and time and attendance, ensuring efficient HR operations.

99 **Knowledge Management System**

This system has created a unified approach to identifying, accessing, retrieving, evaluating, and sharing all knowledge resources within Ahar Company.

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Information Technology Management System

This system facilitates the flow of information and provides employees with appropriate access to the necessary information, while ensuring information security as a critical matter in knowledge-based companies operating in the country's upstream industries.

~ Business Intelligence (BI)

Given the inevitable trend of digital transformation and increasing organizational intelligence as we transition from the Third Industrial Revolution to the Fourth, leveraging Business Intelligence tools is of paramount importance. These tools aim to integrate information resources and facilitate timely, high-quality, and informed decision-making. Ahar Company, aligned with this objective, has implemented Microsoft's Power BI to consolidate organizational data from various sources, such as ERP systems. By generating comprehensive, integrated, and intelligent reports based on the company's designed and implemented systems and processes, Ahar is harnessing the capabilities of BI. Key benefits include:

- Utilization of advanced tools
- Regular calibration of equipment"



Customers in Iran







Ghaen Gas Power Plant

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Zahedan Power Plant

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Achievements

- Awarded as the top research and development unit in Khorasan Razavi province Iran by the Ministry of Industry, Mine, and Trade in 2022
- Awarded as a top development center in the country by the Ministry of Industry, Mine, and Trade in 2022
- Ranked first nationally in the Science and Practice Festival in 2012
- Selected as the top company at the knowledge-based companies exhibition presented to the Supreme Leader in 2019

- The company's product, the Rastar Frequency Starter (SFC), was selected as the best product at the first specialized electricity industry festival and technology market in Iran
- Awarded as a top technologist in the country by the Ministry of Science in 2019
- Selected as a technology company for the 2023 festival celebrating research and technology in Mashhad
- Selected as a top entrepreneur at the first festival of entrepreneurship for technical and vocational universities in 2020





Ramyar & Sanyar Projects

Turbine Control & Protection System and Generator Excitation & Protection System



Generator Excitation & Protection System

Turbine Control & Protection System



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