International Society of Automation
Delhi Section

NEWSLETTER
YEAR 2024-2025 VOL.1

From President's & Secretary's Desk

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Combination Surge Arrestors

ISA INTRODUCES Mimo℠, an AI-powered LLM

From the desk of President …

Greetings!

It is with great pride and enthusiasm that I reach out to each one of you as we embark on another remarkable year filled with opportunities and growth. I am immensely pleased to see our collective dedication towards advancing in the field of automation, and I am confident that 2024 will be a year of significant achievements for the ISA Delhi Section.

This year, we have an exciting lineup of activities that reflect our commitment to addressing the evolving challenges in our industry. Our focus on cybersecurity is imperative as we navigate an increasingly digitalized world. Through comprehensive workshops and seminars, we aim to enhance our proficiency in safeguarding our systems and infrastructure.

We are also committed to fostering continuous learning and knowledge sharing through our monthly technical meetings. These sessions, both virtual and physical, are designed to provide our members with the latest insights, emerging trends, and innovative solutions in automation. Our goal is to create a dynamic space where ideas flourish and skills are honed.

Showcasing new products and new technologies remains a cornerstone of our efforts. We have scheduled numerous exhibitions and product launches, providing a platform for industry leaders and innovators to present their cutting-edge developments. This initiative not only keeps us at the forefront of technological advancements but also inspires us to integrate these innovations into our practices.

I encourage each member to actively participate in these initiatives and be a trailblazer. Your involvement and leadership are critical to achieving our shared goals. Together, let us set new benchmarks and drive excellence within the industry. Your passion and dedication are the catalysts that will propel us forward.

Thank you for your unwavering support and commitment. Let us embrace the opportunities ahead with zeal and determination.

Warm regards,

Sanjeev Sharma
Hon President, ISA Delhi Section

From the desk of Secretary …

It gives me great pleasure to present the 1st Issue of our Quarterly Newsletter for April-June 2024.

This period's highlight was our flagship event, the Petroleum & Power Automation Meet 2024. We successfully brought together end users, consultants, licensors, EPCs, and OEMs from various industry segments. On behalf of our executive committee, I extend my gratitude to all dignitaries, paper presenters, participants, exhibitors, and sponsors for their invaluable contributions to the success of PPA 2024.

We continue to actively engage with our student sections, and this newsletter includes a special segment detailing these activities. The enthusiasm from our student community has been truly inspiring.

We are excited to announce that we are expanding our focus to include cybersecurity, AI/ML, and sustainability industries within ISA Delhi Section. In line with this, our upcoming Two-Day Cybersecurity Conference in September 2024 will concentrate on cutting-edge advancements and challenges in cybersecurity for Indian process and manufacturing industries, featuring thought leaders and experts from around the globe.

The overwhelming support and positive response we have received are incredibly encouraging. We are committed to building on this momentum, continually enhancing our offerings and engaging with a broader audience.

Thank you for your continued support and participation. Together, we can drive innovation and excellence in our industry.

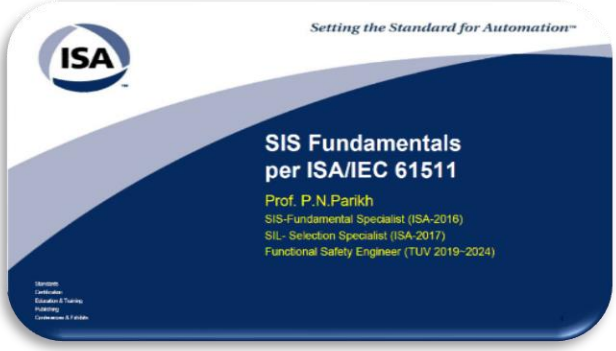
Warm regards,

Some Nath Kundu
Hon. Secretary, ISA Delhi Section

Virtual TechTalk - SIS Fundamentals per ISA/IEC 61511

ISA Delhi Section conducted a Virtual Tech Talk on the topic- SIS Fundamentals per ISA/IEC 61511 on the 4th of July 2024. The speaker for the Tech talk was Prof.P.N.Parikh BE, in Electrical, Mechanical & Instrumentation, SIS- SIL Selection Specialist and a TUV Certified Functional Safety Engineer. Prof. P. N. Parikh is The Only ISA-US qualified /certified Instructor for course on SIS & SIL Fundamentals.

A large number of participants from different industries attended the Virtual Tech Talk. Prof Parikh explained the SIS fundamentals with examples along with Risk Matrix.



Monthly Meet M/s Yokogawa – 26th July 2024.

ISA Delhi Section Monthly Meet was conducted at Mirza Ghalib Chamber, Scope Convention Centre, on 26th July 2024, on the topic **Use of AI in Process Control** by Mr. S Ravindra Kiran.

The session was a true celebration of collaborative learning and growth. The esteemed speakers shared their expertise, using innovative presentation of storytelling with videos of a very popular topic. The presentation sparked thought-provoking conversations that left the audience inspired.

Monthly Meet was followed by Networking Dinner.

Glimpses of the event

ISA DELHI STUDENT CHAPTER EVENTS

JSS MAHAVIDYAPEETHA - JSS ACADEMY OF TECHNICAL EDUCATION, NOIDA

Event: Memory Planner
Date: May 22, 2024.
Number of Students Participated: 20.

Objective: The primary goal for the codebreaker is to determine the exact sequence of colors in the codemaker's secret code within a set number of attempts. The codemaker's objective is to create a code that the codebreaker will find challenging to solve within the allowed attempts.

Memory Planner is a strategic and logic-based game that challenges players to deduce a hidden code through pattern recognition and deductive reasoning. The codebreaker must interpret feedback provided by the codemaker to make increasingly accurate guesses within a limited number of attempts. Success requires analyzing previous feedback to eliminate incorrect possibilities and refine guesses. The game emphasizes critical thinking and problem-solving skills, providing an engaging and mentally stimulating experience for players. Its varying difficulty levels make it accessible and enjoyable for a wide range of ages and skill levels.

Event/ Activity Name: Blind Maze
Date: May 20, 2024.
Number of Students Participated: 30.

Objective: To promote innovation and collaboration among students and to foster communication, trust, Problem-solving, collaboration, and teamwork.

Designed a concept of automated obstacle sensing goggles designed specifically for the visually impaired, is both fascinating and impactful. These innovative devices can significantly enhance the mobility and independence of blind individuals.

Smart Blind Stick (SBS): The Smart Blind Stick (SBS) is a pioneering tool designed to address daily navigation challenges faced by visually impaired individuals.

Ultrasonic Smart Glasses: Another interesting concept is Ultrasonic Smart Glasses designed for the blind. These portable, user-friendly glasses help visually impaired individuals navigate and avoid obstacles effortlessly.

Outdoor Blind Navigation: For outdoor navigation, a reliable state-of-the-art obstacle detection algorithm can be implemented. This algorithm analyzes data from external sonar devices and audibly warns the blind person about nearby obstacles.

Collaborative Innovation: Collaborating with engineers, designers, and the blind community can lead to even more advanced solutions. Consider incorporating features like GPS-based navigation, voice commands, and real-time map integration.

Event/Activity Name: FAULT ANALYZER
Date: May 21,2024.
Number of Students Participated: 30

Objectives: The primary objectives of the Fault Analyzer event were to test participants' abilities to reassemble electronic circuits from given component, identify and correct errors in pre-assembled circuits and to enhance problem-solving skills and practical knowledge in electronics.

The event featured a variety of electronic projects, including but not limited to:

Weather Monitoring Sensors: Participants worked on circuits designed to monitor environmental conditions such as temperature and humidity.

Automatic Door Lock System: Participants analyzed and corrected circuits used in automated security systems.

Other Projects: A range of miscellaneous projects provided a broad spectrum of challenges, ensuring participants encountered a wide array of electronic components and configurations.

ISA DELHI WELCOMES OUR NEWEST MEMBERS

It is with great pleasure that we extend a warm welcome to the newest members of our ISA Delhi Section. Your presence enriches our association, and we are excited to see the unique perspectives and contributions you will bring to our Section.

To help you get started and make the most of your membership, here are a few tips:

1. **Explore Our Resources:** Take some time to browse through ISA Delhi website and familiarize yourself with the various resources available.

2. **Connect with Fellow Members:** Join ISA Connect where you connect with fellow members, engage in discussions, and forge new professional relationships.

3. **Attend Events and Meetings:** Keep an eye on our upcoming events and meetings. These are excellent opportunities to network, learn, and collaborate with other members who share your interests.

4. **Reach Out for Support:** Don't hesitate to contact our ISA Delhi members if you have any questions, need assistance, or have suggestions to share.

Once again, a heartfelt welcome to each of you. We are eager to witness the positive impact you'll make within our association. Together, we can achieve extraordinary things!

New Members for the period April to June 2024

1	Mr Dinesh Kumar Gandhi	18	Mr Vikram Sabharwal
2	Mr Shivam Gaur	19	Mr Kunal Soni
3	Mr Amol Prasher	20	Mr Taridib Hazarika
4	Mr Rahul Kapoor	21	Mr Sreevishnu S
5	Mr Sachin Garg	22	Mr Lalit Gupta
6	Mr Amit Vyas	23	Mr Dinesh Kumar Saini
7	Mr Krunal Kantale	24	Mr Rajat Tikku
8	Mr Samaresh Nandi	25	Mr Anand Vardhan
9	Mr Sandeep Chudasama	26	Mr Ashok Bhat
10	Mr Darshak Manohar Chavda	27	Mr Pranoy Sahu
11	Mr Sunil Kumar Singh	28	Mr Lalit Kumar Jha
12	Mr Puneet Tyagi	29	Mr Nishant Singh
13	Mr Himanshu Taneja	30	Mr P Hanumantha Reddy
14	Mr Jatin Taneja	31	Mr Himanshu Sharma
15	Mr Pradeep Dhankhar	32	Mr Krina Dossani
16	Mr Hitesh Kumar Verma	33	Dr Manju Mam
17	Mr Fayaz Nayyar		

Process Automation for Alkaline Water Electrolyzer Based Green Hydrogen Plant

Mr. Priti Prakash Patnaik
DGM Instrumentation
Avaada GreenH2 Private Limited

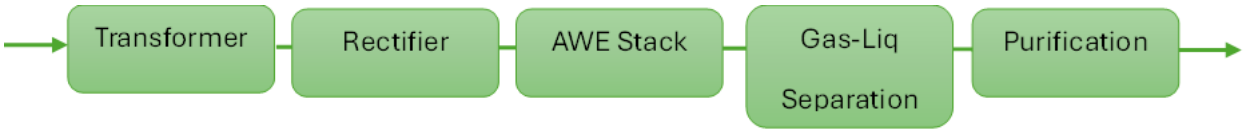
Introduction:

Production of Green Hydrogen and its derivatives at large scale is what is being eyed by various leaders in the energy sector. This Article is intended to provide basic information regarding various process controls and associated instrumentation involved in green hydrogen production. Both electrical and chemical process complexity inherently involved in electrolyzer based green hydrogen production plant needs to be efficiently handled with optimized automation solutions to achieve operational and safety integrity. Alkaline electrolyzer based green hydrogen production requires electrical and process equipment such as Transformer, Rectifier, Gas-liquid separation vessel, moisture separator, Deoxidizer, electrical heaters, dryers etc. For automation of entire hydrogen product process using electrolyzers need critical instrumentation items such as Separator level & Pressure control valve, Vent Valves, H2 in O2 Analyzer, O2 in H2 Analyzer, Sequence operated ball valves, Dew point analyzers, Lye flow meters, H2 flow meters, pH Analyzers.

Electrical Controls & Interlocks:

The rectifier providing DC power supply to electrolyzer stack is mainly controlled from PLC based control system. For varying production capacity of stack 4-20mA analog output to rectifier panel is provided from PLC HMI accordingly lye flow to stack is adjusted. Moisture removal dryers and deoxidizers are provided with electrical heaters to remove moisture and O2 from produced hydrogen. These heaters are operated from sequence logic implemented in PLC based on adsorption and regeneration cycle. On activation of safety system interlocks to stop production of hydrogen, rectifier stop command is generated from safety PLC. Rectifier operating parameters like current, voltage, reference current etc. are configured in main PLC in order to calculate, monitor electrolyzer stack performance parameters such as Power consumption (KWH/NM3), Current density(A/m2) etc.

Process Controls & Interlocks:



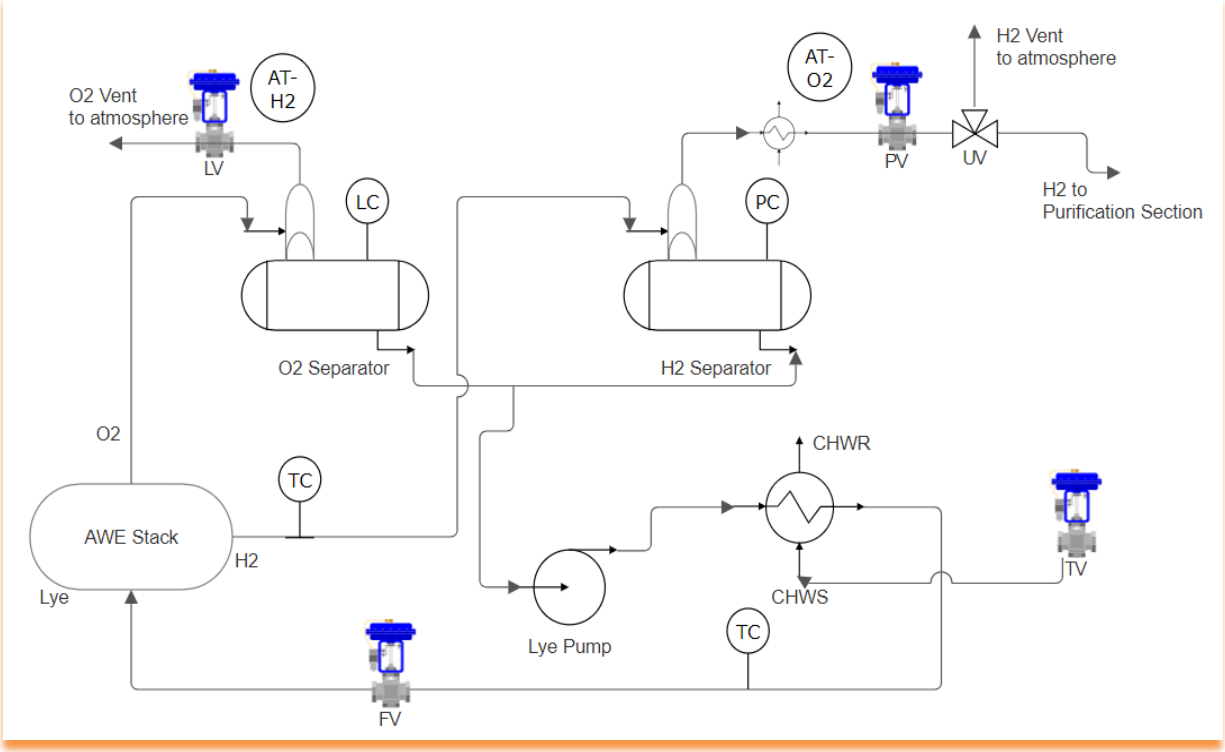
[Block Flow diagram of AWE stack H2 Production Process]

Water electrolyzer stacks have two product outputs (H2 and O2) where in protection interlock is provided for high temperature of hydrogen and oxygen. Produced H2 and O2 shall also contain electrolyte solution (Generally 30% KOH with water). In order to

separate liquid from product gases gas-liquid separation vessels are used. Below are the closed loops which are essential for automatic and safe operation of subject process.

- Separator level controller to control production of H2
- Electrolyte flow control to regulate flow as per electrical load of stack
- Pressure control of separator vessels to maintain H2 Pressure

In gas-liquid separation skid there are protection interlocks like separators high/low level, pressure, electrolyte solution flow to stack, electrolyte solution temperature, H2 concentration in O2 stream, O2 concentration H2 stream. Whenever any of the above interlock demand is generated rectifier operation is stopped and vent valves are opened to bring entire separation skid to a safe state.



[Process flow of Gas-Liquid Separation Skid]

Product hydrogen from separation skid enters purification skid to achieve pure H2 (without H2O, O2 contents). Deoxidizer removes remaining O2 from separation unit and H2 is sent to series of dryers. From dryer's H2O is removed. Dryer sequence operation is critical for removing moisture from H2 where on-off valves are sequential operated (typically once every 12 hours). Electrical heater temperature control, H2 product pressure control loops are crucial closed loops of purification section. O2 concentration in H2 Product, Electric heater temperature protection, H2O in H2 Product, High/Low pressure of H2 Product Interlocks are implemented to ensure process safety. H2 and O2 analyzers are typically based on Galvanic fuel cell/Thermal conductivity measuring principles.

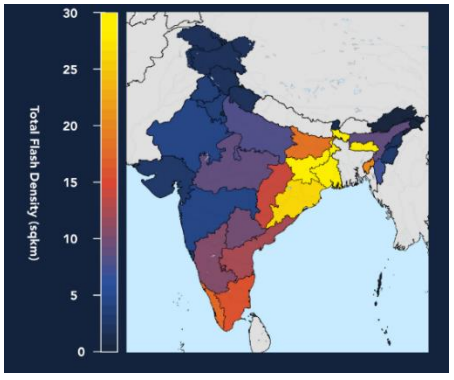
Apart from above mentioned process automation and safety loops there are gas detectors and flame detectors installed across the production facility.

COMBINATION SURGE ARRESTERS – A NEW CONCEPT TO PROTECT YOUR VALUEABLE EQUIPMENT

Dr. Ashish Manchanda

Lightning is a very common phenomenon, happens mostly during Monsoon season in India. With references to the various scientific studies done, it is estimated that over 65% of damage or premature failures and aging that occur in the electronics /electrical equipment like Control Panels, UPS, Drives, Data-Centre, IT Equipment, Electronic Controllers, Indoor and Outdoor LED Lights Drivers, Building Automation System, CCTV, Control Rooms and Power Supply Cards of HVAC Controllers, Fire Protection Panels, Elevator and Lift Panels etc. are attributed to Surges due to lightning and induced over voltages.

The effects of surge over-voltage can appear almost immediately or can have a damaging cumulative effect. The surges originating from Lightning or even switching of various electrical loads i.e. ACs, Pumps, Motors, Transformers, Circuit Breakers, Generators etc within any plant or building premises can be the main reason behind any sudden functional disruptions or even damage of equipment.



The past years' lightning occurrences are given by "EARTH NETWORKS" as 41.5 million + LIGHTNING STRIKES IN INDIA IN 2023. Contrary to popular beliefs that, only the Cloud-to-Ground Strikes are damaging, the fact remains that the In-Cloud Strikes can also create capacitive surges in the existing plants, structures and buildings.

The Lightning Flash Density Chart of India (as per picture below) tells us a story of lightning prone regions in the country and help us evaluate the risks involved. We must have a sensitive eye to use the new generation solutions that are suitable for the Indian conditions.

With the recent innovation in Lightning Protection Technology, as per IEC 61643 standards there are now Type 1+2, Universal Lightning and Surge Protection Device for the Low Voltage Electrical Power Supply of the Plants, Buildings and Panels are now available that do not need two separate products to be installed.

These new generation devices are suitable for Lightning Surges as well as Switching Surges can be installed at any location of any Facility / Building i.e.

- Remote Panels
- UPS
- Control Panels
- Building / Floor Entrance distribution boards
- Critical Equipment Rooms
- Server / IT Rooms / HVAC Controls
- Outdoor Lighting Feeder Panels
- Control rooms
- Elevator Power Supply etc

It provides immediate surge protection for any installation by simply connecting in parallel with the Incoming Circuit Breaker etc. With its parallel connection independent of the load conditions of the power supply, it can also be easily mounted in the existing Junction Boxes or Enclosures. The advantageous part of this uniquely crafted Comprehensive Power Supply Lighting and Surge Protection Solution is - Its Design, drafted while keeping in mind the Indian Power Supply fluctuations and grounding conditions.

Some of the key features that make this Lightning and Surge Protection Device quite universal for Indian installations are:

- Suitable for TT- Ground System of Electrical Wiring which is largely prevalent in Indian scenario.
- Suitable for both Lighting discharge currents (10/350 µs) as well as Switching Surges i.e. Nominal discharge current (8/20 µs).
- Enhanced Maximum Operating voltage level up to 320 VAC to suit INDIAN power supply conditions.
- Status INDICATION for Presence/Healthy/Replacement coupled with the easily pluggable module, envisions no possibilities of mistakes
- High working TEMPERATURE rating of up to 80 Deg C which allows its optimum performance even under extreme outdoor conditions seen in Indian subcontinent.
- Compact Dimensions: 3 Phase AC SPD, equivalent to the size of a 4 Pole MCB

ISA INTRODUCES Mimo℠, an AI-powered LLM

The International Society of Automation (ISA) – the leading professional society for automation – announced a new large-language model (LLM) trained on ISA content. Named Mimo℠, this AI-powered LLM is educated on ISA standards, training, technical reports, white papers, articles and presentations, and can answer user questions about industrial automation and operational technology (OT) cybersecurity.

Mimo is now available at **www.isa.org/mimo**. ISA members have unlimited use of the service and will be provided with links to the ISA source material referenced in Mimo's answer for further reading and research. Non-members may access the service but may only ask a limited number of questions and will receive less detailed answers.

"We are thrilled and proud to launch this exciting, first-of-its-kind service in support of the worldwide community of automation professionals," said Claire Fallon, ISA CEO and executive director. "ISA has a vast wealth of technical information, including the world's leading standards for industrial automation and OT cybersecurity. Mimo provides a novel way for users to engage with that content and deepen their understanding."

Mimo continues to be trained on new ISA content every day, and the service takes user feedback into account, with an opportunity to react to answers and provide commentary. As more users engage with Mimo, the service will continue to grow in its capabilities and offerings.

"Last year, ISA launched Pub Hub, the society's one-stop content portal for members. Mimo uses Pub Hub as a launch point for its learning and refers back to documents hosted there for exclusive use by ISA members. This reliance on ISA technical content makes Mimo a richer and more relevant resource than ChatGPT or similar services," said ISA President Prabhu Soundarrajan. "We are proud to continue to provide many different ways for the automation community to grow in their individual careers and their understanding of important topics in our industry". ISA collaborated with Betty Bot to develop Mimo.

Visit **www.isa.org/mimo** to get started.

Upcoming Event of ISA Delhi Section

Cyber Security Conference – 20th & 21st September 2024, at Scope Complex, New Delhi

All members are cordially invited to the upcoming event and mark the dates in their calendar to make their presence and upskill themselves.

Appeal from ISA Delhi Section

All members, sponsors, technical experts are invited to contribute in making this quarterly newsletter more informative by sharing their technical expertise in the form of technical literature on the latest Technology for the next quarter's newsletter.

Ask the Editor

For Technical queries to be answered by experts and/or any suggestions for improvement, please contact our editorial board comprising: -

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