



## Delta assists Taiwan High Speed Rail create a new generation passenger information system

### SPECIAL REPORT /

Delta assists Taiwan High Speed Rail create a new generation passenger information system

### IoT SMART SOLUTIONS /

Delta's Equipment Network Integration (ENI) solutions on electronic assembly lines

### PEOPLE & PRODUCT /

Get ready and look forward to the future Delta Taoyuan Plant 5

### BRAND CIRCLE /

8K documentary premiere on NHK and simultaneously debuting at NMNS

# DELTA BRAND NEWS CONTENTS

## FROM THE EDITOR

## SPECIAL REPORT

- 02 Delta assists Taiwan High Speed Rail create a new generation passenger information system

## BRAND PEOPLE

- 05 Building brand value on a solid foundation  
Interview with Mr. Jimmy Yiin, General Manager of the  
Power and System Business Group (PSBG)

## IoT SMART SOLUTIONS

- 09 Delta's Equipment Network Integration (ENI) solutions on electronic assembly lines

## BRAND CIRCLE

- 13 8K documentary premiere on NHK and simultaneously debuting at NMNS  
14 Delta's IoT Solutions unveiled at Hannover Messe 2019  
15 DEF and DET have helped the Chinese education in Northern Thailand for 20 years  
16 Delta UPS and DCIM solutions power new, green data center and data lab for Bytesnet  
16 Delta micro module helps the bank build provincial branch data center  
17 Video walls from Delta ensure the future is always present at Hannover Rück  
17 Expressway Command Center adopts Delta Laser DLP to build command and dispatch platform  
18 Delta Ako Energy Park receives LEED CI Gold Certification  
18 Delta five-axis horizontal articulated robot helps improve shoemaking efficiency  
19 Delta presents Smart Machine Solutions at TIMTOS 2019  
20 Delta enhances smart production line at the CYCU R&D Center for smart manufacturing  
21 Delta showcases total solutions for packaging industry in Sino-Pack 2019  
21 LOYTEC LIOB-585 controller debuts at 2019 ACREX  
22 Delta launches smart factory solution with multi-task integration platform  
22 Delta and Vivitek display solutions showcase together at ISE 2019  
23 2019 DGC Annual Conference and Channel Conference were successfully held  
24 The Digital Projection INSIGHT Laser 8K projector honored with the  
"InAVation Award 2019 - Most Innovative Technology for Large Venue Presentation"  
24 Delta wins LinkedIn's Transformation Award for the second consecutive year  
25 Delta clinches two major awards in "17<sup>th</sup> Annual Industrial Automation  
and Intelligence Awards"  
25 DET listed in CDP for 3<sup>rd</sup> Consecutive Year

## PEOPLE & PRODUCT

- 26 Get ready and look forward to the future Delta Taoyuan Plant 5  
30 Delta introduces PMT2 series of panel mount power supply in low profile design  
31 New power supply with integrated DC-UPS function - PJU series in 2" x 4" footprint  
32 LOYTEC LIOB-585 I/O Controller is multiplexed to reduce the cost of building control  
33 Delta Controls O3 smart sensing enhances comfort of space

## DELTA GREEN LIFE

- 34 Disclose energy consumption information, reduce buildings' energy consumption  
37 Let's be filial to Mother Earth



## FROM THE EDITOR

Delta has been focused on issues of climate change for a long time. It is also committed to energy-saving and carbon emission reduction as its corporate social responsibility. Sponsored by Delta Electronics Foundation, "Water with Life", the first 8K SHV environmental documentary in Taiwan has premiered on Japan NHK channel on March 31st. In collaboration with the National Museum of Natural Science (NMNS), Delta Electronics Foundation invited NMNS volunteers and honored guests to experience the lifelike effect of 8K projection technology at the 3D theater of NMNS together.

Delta Display Solutions have been widely adopted in transportation, security monitoring, large-scale exhibition and performance, sports venues, etc. in Taiwan. It is recently announced that Delta will assist Taiwan's High Speed Rail (THSR) in building a new generation of passenger information system. In this issue of "Special Report", we introduce a Delta innovative application service for THSR passengers using large LED display and frameless LCD screen with low power consumption and high resolution. In "Internet Intelligence", we have technology sharing from Wujiang System Integration Department. By Delta's Equipment Network Integration (ENI) solutions combined with the manufacturing management platform, production data, equipment operation data and quality management data can be visualized to assist enterprises' decision-making.

Delta has accumulated nearly 50 years' of core competence in power electronics. Its products are widely used in industrial equipment, data center, telecom power supply, renewable energy and other fields. We also pay close attention to market demands and develops new applications. In this issue's "Brand People", we have interviewed PSBG General Manager Jimmy Yiin, asking him to share with us the strategic direction of PSBG, as well as the experience from over 25 years' career in Delta.

Delta continuously aims for two mega trends in smart manufacturing and building automation and we will present advanced product technologies at this year's Hannover Messe in Germany, TIMTOS in Taiwan and ACREX in India. A new green data center and data laboratory for Bytesnet in the Netherlands has adopted Delta's modular UPS and data center information management system. To promote Delta's Employer Brand and attract talents to join the team, the HR Department has continued to invest in the operation of social media in recent years and been awarded "Transformation Award" by LinkedIn for two consecutive years. More contents are available in this issue's "Brand Circle".

In "Delta Green Life", we will introduce United State Green Building Council (USGBC)'s use of "Energy Benchmarking Policy", which requests large buildings to disclose energy consumption information to help the government set more adequate energy efficiency standards. In the aspect of "Low-carbon LOHAS", our colleagues will share with you how to create a plastic reducing environment in the daily life so as to leave a clean and beautiful land to the next generations. You will definitely enjoy the contents covered in this issue!

Brand Management Office



# Delta assists Taiwan High Speed Rail create a new generation passenger information system

Text by BABG

The Taiwan High Speed Rail (THSR), Delta Electronics, and the Syscom Group jointly organized the "Meet a New Journey" signing ceremony to announce the revamping of the THSR passenger information system (PIS). As leading partners, Delta and the Syscom Group will jointly implement the THSR's digital transformation with a new generation of PIS. This project is in line with the government's rail industry localization policy, in which the THSR replaces passenger system hardware and software facilities after 10 years of use. Through information re-engineering, the THSR will gradually introduce technical applications such as internet of things, big data, artificial intelligence, and others. For future needs of high-speed rail operation, such as providing passenger information services or visualized station management, video Integration services and software systems are the most important platforms. Delta's excellent terminal display products and capabilities in integration planning, combined with the expertise of the Syscom Group in system integration and software development, will create innovative and comprehensive application services for Taiwan's high-speed rail and passengers. Participating in a signing ceremony on behalf of the three parties were Mr. Jiang Yaozong, Chairman of THSR, Mr. Yancey Hai, Chairman of Delta, and Mr. Liu Ruilong, general manager of the Syscom Group.



Delta Chairman Yancey Hai (third from left), Senior Director Hua Jianhao of Delta's Audio-visual Business Group (right), and the management teams of the THSR and the Syscom Group gave a thumbs up, symbolizing the success of the project

In recent years, Delta's video integration solutions have successfully built integrated applications for baseball stadiums in Taipei, New Taipei, Taoyuan, Kaohsiung and Hualien, as well as integrated applications such as those at Kaohsiung's E-da Outlet Mall and Exhibition Center for the National Chung-Shan Institute of Science and Technology (NCSIST). In the field of transportation, successful projects included monitoring screens for the operation control center of the Taichung MRT. The Syscom Group's solid capabilities also completed the development of large-scale systems for transportation applications such as eTag, Taipei Transit Station, UBus and the Taiwan Railway Authority. For the THSR case, Delta is responsible for the hardware and software facilities of the project using low-energy, high-resolution LED large-scale display screens and borderless LCD screens. The capabilities of the Syscom Group include professional software development and system integration that interconnects and aggregates information for the THSR control center providing information for passengers inside the station and on the platform, and others. At the same time, database management, visual management, authorization for certification, system monitoring, and integration and interconnection of core systems are also carried out. The first and second phases of the contract include the halls of the original eight stations (Taipei, Banqiao, Taoyuan, Hsinchu, Taichung, Chiayi, Tainan, Kaohsiung), ticket booths, passenger guidance signs in public spaces, train information boards on the platforms, and more. The improvement of software and hardware specifications, as well as integration of multiple applications, will result in smarter and friendlier passenger services.

Jiang Yaozong, Chairman of THSR, said, "The THSR company cooperates with the government to assist the rail industry and develop policies for encouraging local technological capabilities through active partnership with outstanding domestic manufacturers. We are very grateful for the cooperation of the three parties. We believe that the combination of innovative offerings in hardware and software from Delta and the Syscom Group will create a more advanced and diversified information system for high speed rail passengers, combining new technologies such as AI, Internet of Things, and big data. In the future, THSR will continue to provide passengers all-round travel information through utilization of innovative technological applications. We are providing thoughtful services to deepen our connection with passengers. By creating better services, THSR aspires to become a platform for leading progress and creating a better life."



Mr. Yancey Hai, Chairman of Delta, said, "We thank the THSR for your recognition of Delta. In addition to our core capabilities in power and energy management solutions, we have worked on integrated audio-visual solutions for a long time. Besides gaining leadership in the industry by being the first to introduce a 25,000 high-lumen projector with a resolution of up to 8K, our integrated solutions for various large-size displays are also widely used for traffic and security monitoring, large-scale exhibitions, sports venues and other areas at home and abroad. Along with Delta's highly regarded power management systems, our audio-visual equipment also features environmental friendliness and energy efficiency. Our many success stories at home and abroad are sufficient to confirm why Delta has been selected as one of Taiwan's top 20 international brands for eight consecutive years and why its brand value has been improving year by year. "



Delta's excellent terminal display products and capabilities in integration planning will create innovative and comprehensive application services for Taiwan's high-speed rail and passengers

Taking advantage of Taiwan's top world position in IT manufacturing, Delta has been long committed to innovative R&D and continued care. Along with the core competence of the Syscom Group's excellence in innovation, Delta incorporates the 4T spirit of the THSR in transportation professionalism, technological innovation, Taiwan's deep local roots, and continuous care. With the new generation passenger information system that creates supply from demand, manufacturers are willing to invest in core rail industry systems. This means greater R&D capabilities for the core systems of the rail industry, making it possible for subsequent joint exports overseas of achievements and creating a win-win situation for all.



Mr. Jimmy Yiin, General Manager of PSBG

### **Building brand value on a solid foundation**

Interview with Mr. Jimmy Yiin, General Manager of  
the Power and System Business Group (PSBG)

Text by Brand Management Office

Delta has rich experience in the field of power management solutions, including a variety of embedded power supply and external power supply, providing products for the field of information, network, commerce, industry, medical power supply and aerospace; Delta pays close attention to market demand and continues to develop new applications. In this issue, we have a special interview with Mr. Jimmy Yiin, General Manager of PSBG, to share with our readers the blueprint of Delta Power Business Group, as well as the experience from serving in Delta for more than 25 years.



### Developing business opportunities in power supply with the core technology by pursuing innovation and change

"PSBG was established at the beginning of last year. It is mainly composed of Embedded Power Supply Business Group (EPSBG) and Mobile Power Supply Business Group (MPBG)." Mr. Yiin talked about the organization that he had just taken over for less than three months, with expectation in affirmation: "PSBG has 10 business units, which can obtain benefits and business opportunities from various market demands; including CNBU (Computer & Networking Power Business Unit) and CDBU (Custom Design Power Business Unit) that are responsible for the server , storage , network communication, and data center; DCBU (Direct Current Power Business Unit) and ADC LOB (Aerospace Line of Business) for precision DC power module; PCBU (Personal Computer Power Business Unit) and NBBU (Notebook Adapter Business Unit) for PC, Notebook , workstation and consumer power ; ABPU for electrical equipment power ; IT LOB (Industrial Line of Business) for power supply and control of Power tool; UPS LOB (Uninterruptible power supply) for single-phase continuous power; and consumer electronic brand Inneer for Delta B2C business."

Before taking over PSBG, Mr. Yiin served as Vice-Chairman of Delta Greentech (China) Co., Ltd. and was responsible for the market development and business promotion of Industrial Automation (IA) in China. In this interview, we can feel that he is ready to apply these valuable experiences to his new position: "Product planning must be 'outside in', meet the market demand clearly, so that business promotion results can be multiplied with half the effort." Delta Greentech (China) Co., Ltd. is rich in resources and has a huge organization, so "work flow" is very important in order to enable Region and BU to work closely and communicate clearly and directly, said Mr. Yiin .Taking Delta NPI (New Product Introduction) process as an example, from competition analysis, target industry, market positioning, application requirements, product planning, technical roadmap, product design, design verification, to Go-To-Market (GTM), members and tasks that need to be involved in each stage are defined and audited in details. In order to speed up the development of markets outside the IT field, Mr. Yiin went back to BG last year and began to explain the specific practices of NPI internally, believing that it will be of great help in developing new markets and new applications.

As for the future business plan of PSBG, Mr. Yiin believes that technological leadership, lean organization, operational efficiency, innovation and change are important elements to lead the team forward and continue to grow. Delta has accumulated core technologies in the field of power and electronics for nearly 50 years. Its products are widely used in industrial equipments , data center, communication power supply, renewable energy and others . How to ensure core advantages and create more value through cross-sectoral cooperation is an important task. In terms of organization, Mr. Yiin said that the integration of BU, factory end and regions will be strengthened in the future, and only by making information transparent and synchronized can we keep up with the fast changing environment, grasp market opportunities and respond to customers' needs immediately. In addition, as far as innovation is concerned, besides existing products, we also begin to pay attention to all kinds of related applications of electrification and digitization. At present, the team is actively integrating the solutions of power, battery management, controller and motor drive, which will be applied to new industries in the future, such as smart home, unmanned aerial vehicle, electric vehicle and even agricultural machinery.



Mr. Jimmy Yiin (left) and Delta executives took a photo at the Shanghai Industrial Expo Media Exchange



### Expanding market share via multi-layouts

development strategies and opportunities in various regions: "PSBG's business mainly distributes across the United States, Japan, Taiwan and China. In recent years, we have also sought new business opportunities in Southeast Asia and Europe." With the vigorous development of IT industry in the United States, whether in cloud computing and personal clients devices , power efficiency and power density continue to increase, which is the main driving force for the growth of PSBG revenue; Japan mainly focuses on the game console market, with the development of next generation video game consoles , hardware with high speed computing needs more stable power supply; Delta has operated in cross-strait markets for many years, not only has it provided high-quality services for brand customers and EMS, but also performed well in power systems in new areas such as UAV, surveillance system and industrial automation in the past two years; on the other hand, it has continued to expand the Southeast Asian and European markets. The current products of integrated power supply and controller have also been more recognized by European customers, so the follow-up development potential deserves attention.

From the perspective of Segment, the demand for power products of Date Center has a growing trend. Mr. Yiin then added, "Take the United States electricity statistics in 2016 as an example, data center power consumption accounts for 6% of the total electricity consumption in the United States." With the popularity of smart phones and Internet multimedia, the more data stored, the greater the power consumption in Data Center. In view of this, PSBG and ICTBG have more close cooperation in business development or technology development, so as to bring into full play the overall and comprehensive effect through a two-pronged strategy. At the same time, in the field of electric motorcycles, PSBG and IABG work together to provide overall solutions for driving, control and power.



### Focusing on quality and improving brand influence

In terms of brand management, Mr. Yiin also shared his views with us: "PSBG is currently divided into two parts: B2B and B2C; B2B is still dominated by ODM and OEM customers, while B2C is mainly Innergie." In terms of ODM and OEM models, Delta brand has been deeply rooted in people's hearts. Maintaining product competitive advantage and providing stable quality is the most effective weapon to enhance brand value. In terms of B2C, Mr. Yiin thinks the technology of Innergie's product has been perfected. Last year, it also won Gold Award for Best Product of Best Choice. Brand promotion needs to be closely integrated with sales model so as to spread brand influence through channel development. He also mentioned that with the introduction and popularization of USB Type C, the fast charging technology of handheld devices is no longer a high threshold. Continuous enhancement of product differences with competitors and continuous improvement of Innergie's brand benefit will be the goal of the team's continuous efforts.



Enterprise delegation of the Manufacturing Summit Forum visited Delta, with a group photo taken with Mr. Jimmy Yiin (left 6th) and Mr. Zhihong Zhou (left 4th), spokesman for Delta



### Sticking to dreams and driving future development with self-experience

Mr. Yiin has been with Delta for 25 years , holding positions in purchasing, director of materials department , general manager of Delta Electronics (Jiangsu) Ltd., vice-chairman of Delta Greentech (China) Co., Ltd. and others. He also shared with us his experience and thoughts from the whole journey: "No matter for an individual or an organization, it is necessary to keep ahead through continuous learning; for an individual, continuous learning and accumulation of experience, grasping opportunities in career life, is the only way to improve oneself; for organizations, in the face of rapidly changing environment, only by constantly learning and exploring to create new markets with technology can they keep ahead all the way." He also encouraged his colleagues to have the courage to dream, because great inventions often stem from inadvertent imagination.

"No matter which position you are in, the only way to success is working smart , observing carefully, dedicating with heart, keeping promise and accomplishing mission." At the end of the interview, Mr. Yiin encouraged his Delta colleagues with this remark.

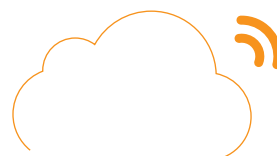


Delta's Equipment Network Integration (ENI) solutions applies on electronic assembly line

### Delta's Equipment Network Integration (ENI) solutions on electronic assembly lines

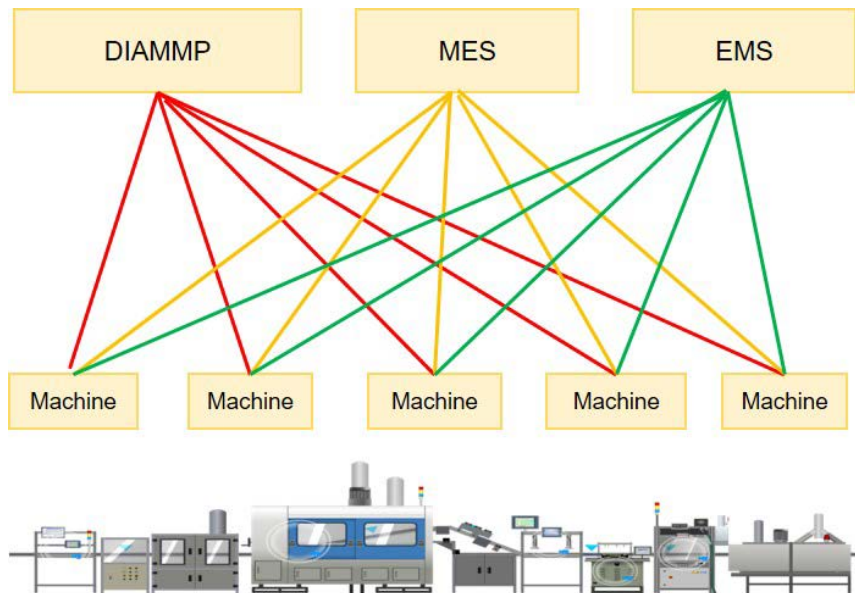
Text by Wujiang System Integration Dept.

The industrial automation systems of the electronics manufacturing industry are normally comprised of soft and hardware such as upper computer monitoring, data capturing devices, controllers, sensor and bus products, and there is often more than one set of upper computer software. Many companies use PLC controllers when setting up a production management visualization system, manufacturing execution system (MES), and energy management system. However, there are various brands of controllers, such as Mitsubishi, Omron, Delta, and Siemens. Different software platforms communicate with production line devices individually to acquire production and device operation information. Such a system framework requires the devices to simultaneously respond to multiple data requests from the upper computer software, which increases the device's load. Without isolation between the device and data layers, there is a significantly increased risk of the network being infected by virus.



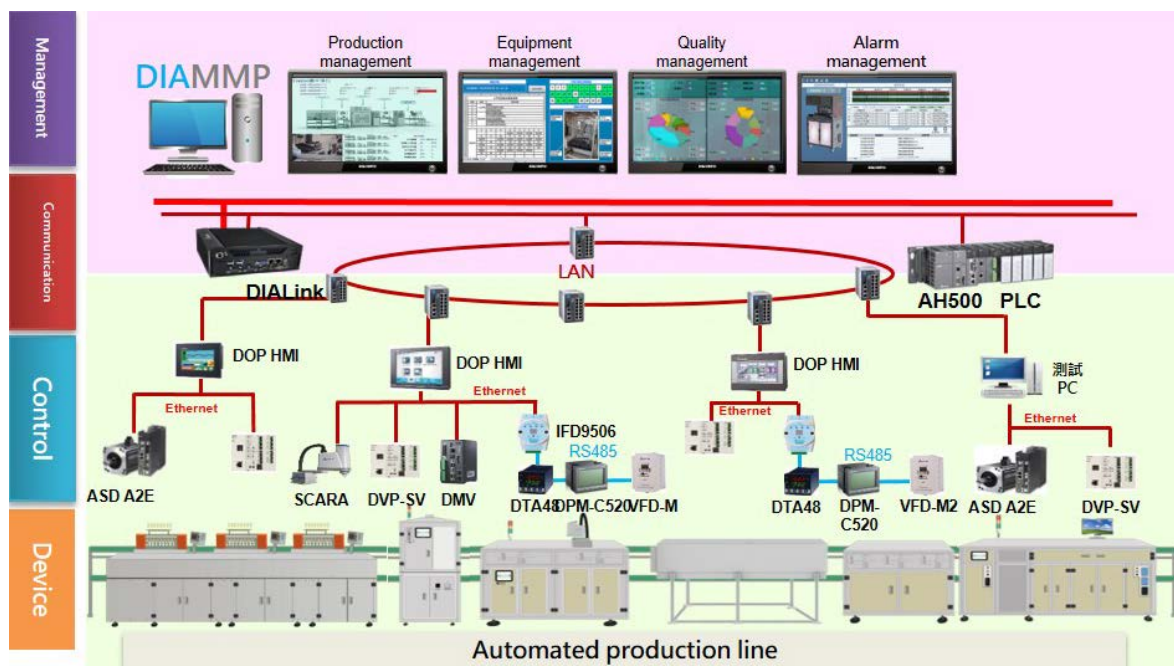


## IoT SMART SOLUTIONS

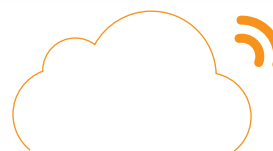


During the upgrade process for automation and informatization, traditional plants introduce many management software platforms at different stages. Due to lack of overall planning, this results in redundant data exchanges with the same device by different software platforms, increasing the load to the device.

The main purpose of an equipment network integration (ENI) system is to capture data for the production equipment status and operation parameters. Device controllers that need communication include PLCs, human machine interfaces (HMI) and numerical control systems. Device data requires seamless connection with several sets of upper computer software (e.g. Production Management & Visualization Platform (DIAMMP), manufacturing execution system (MES), energy management system).



Delta provides a full range of solutions such as automated machines, control layer products, communications layer products and management software, and all of its products comply with uniform communication protocols, achieving seamless connection between the device layer, control layer, communications layer and software platform and ensuring system compatibility and reliability.





The installation location and installed quantity of data capture devices are designed based on the number of production line devices, with consideration of factors such as data capturing parameter quantity and cabling distance. One data capturing device corresponds to multiple units of equipment, capturing the data of the equipment, and temporarily storing it. Edge computing of an ENI system is achieved through the logical operation function of the data capture device, reducing the burden of upper computer software.

ENI enables data capture on every process station with the help of the data capture device. ENI automation integrated technologies help establish a communication interface of uniform specifications and standardized transmission content, realizing inter-device data exchange and machine-to-machine/man overall synergy. In addition, parameter standardization can achieve the standard definition of device parameters. With all equipment following a uniform standard, it reduces the development time for ENI, and improves cross-team development efficiency, achieving rapid duplication of ENI.

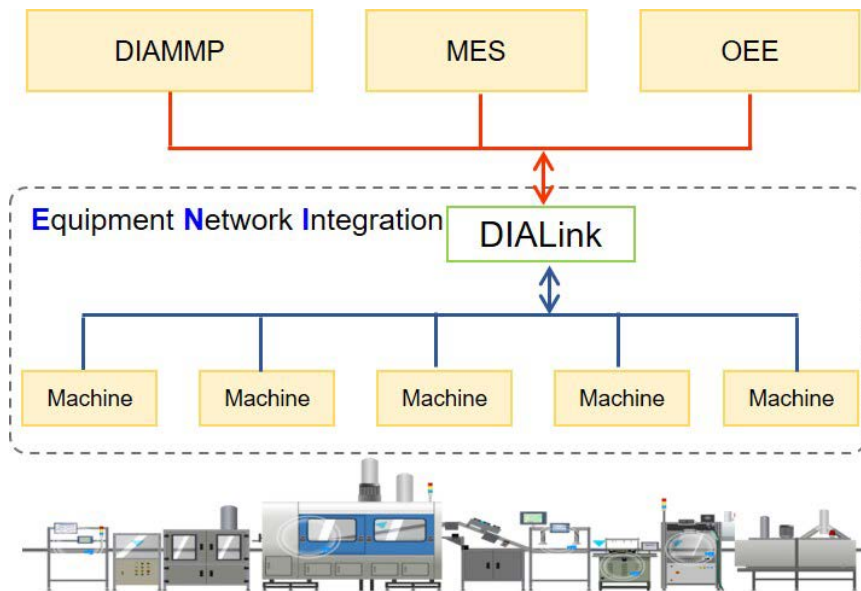
Compared to traditional equipment networked systems, Delta's ENI solutions have the following characteristics:

### (1) Interconnection standardization

Data capture devices communicate with PLC controllers of various brands to collect the data of PLC controllers. With ENI's interconnection standardization, it reorganizes and rearranges the parameters of various devices, which provides a uniform access format for upper computer software, thereby reducing software development cost, and effectively increasing communication efficiency between software and devices.

### (2) High reliability

A data capturing device is equipped with two independent network ports, one connecting to the production equipment, and the other to the upper computer's software, which effectively isolates the device communication layer and software data layer, reducing the risk of the equipment network being infected by a virus. When a virus attack is encountered at the data layer, it will not affect the equipment's normal operation.



ENI focuses on the ability to achieve effective isolation between the device communication layer and software data layer, reducing the risk of the equipment network being infected by a virus and the devices' access load





### (3) Data visualization

With ENI solutions and the powerful DIAMMP, systematic analysis, monitoring and management are carried out on data collected from the production line to the workshop in an orderly manner, achieving real-time and powerful machine network efficiency. Besides reducing manpower and time cost, digitization and visualization of production data management can also make the originally rigid data on the server more intuitive, and provide a basis for establishing company policies by the companies' decision-makers.



With ENI as the foundation, it couples with DIAMMP (This is an example of the Simplified UI) to present the information from production, device operation and quality management in an intuitive and easy-to-understand manner, promoting the data values that were formerly stored in the database and providing a basis for the companies' decision-makers to draw up strategies

Delta's ENI automation integrated technologies are easy to install and debug, which increases a production system's reliability and real-time data processing at the data layer. Delta's ENI automation integrated system, which can be widely used in the electronics manufacturing industry, and by the metal processing industry through smart factory upgrades, will become an indispensable and important part of the integration process of any plant's automation and informatization in the future.





## 8K documentary premiere on NHK and simultaneously debuting at NMNS

Text by Delta Electronics Foundation



Group photo at the "Water with Life" premier: (from right to left) The documentary producer Mr. Kazuhiro Sato, the Director of National Museum of Natural Science, Mr. Wei-Hsin Sun, the founder of Delta, Mr. Bruce Cheng, the Director-General of Water Resources Agency, Dr. Chien-Hsin Lai, the chairman of Delta, Mr. Yancey Hai, the vice chairman of the Delta Electronics Foundation, Ms. Shan-shan Guo, and the spokesman of the Delta, Mr. Jesse Chou

Sponsored by Delta Electronics Foundation (DEF), "Water with Life" is Taiwan's first 8K UHD environmental documentary, and will be broadcasted to the world via Japan's NHK on March 31st. In collaboration with the National Museum of Natural Science (NMNS) at the same time, using 8K projector developed and produced by Delta and featuring the highest brightness in the world, DEF invites NMNS volunteers and honored guests who care about Taiwan's environment to experience the lifelike effect of the 8K projection at the 3D theater of NMNS together.

In recent years, due to the aggravated climate change, issues including extreme rainfall, warm winter and drought, coral bleaching, sea level rise and so on have worsened, which also makes Taiwan's water situation tight almost every year, and affects the amount of crop production. To increase the public's attention to the importance of water resources, Delta Foundation has invited Japan's NHK Enterprises (NEP) to shoot a documentary to faithfully present the various features of Taiwan's waterscape with the world's leading 8K UHD photographic technology.

Bruce Cheng, founder of Delta Group and Chairman of DEF, also attended the premiere in person, seating in front of the near-700-inch screen featuring UHD 8K projection with more than 300 honored guests at the 3D theater of NMNS for the immersive experience. In his opening remark, Mr. Cheng also stressed in particular that only 7/100,000 (0.007%) of the earth's water can be used by mankind, but according to the WWDR recently published by the UN, water use has been increasing worldwide by about 1% per year since the 1980s, and over 2 billion people live in countries experiencing high water stress. We must cherish our water resources.

The film "Water with Life" takes the four seasons as observation points, surveys scenery from Kenting in the south all the way to Hokkaido in the north, and records influences brought by water resources impacted by earth warming, such as the gradually disappearing lichen and moss in Chilan Mountain (Yilan County), ecological restoration of Formosan landlocked salmon in Chijiawan Stream in Taichung, and coral bleaching of Pingtung Kenting. The film hopes to raise the environmental awareness of the public, and let the public "know about water", "protect water" and "cherish water" together with DEF.

After the premiere on March 31st, the 8K film "Water with Life" will be broadcasted at the 3D theater of NMNS in Taichung for public charity cause from April 2nd to 7th. In the future, there will also be plans for touring broadcasts in Taipei, Taichung and Tainan, in an effort to continuing the influence of this documentary.



## Delta's IoT Solutions unveiled at Hannover Messe 2019

Text by Brand Management Office

Delta is demonstrating its enhanced spectrum of solutions for the digitalization, visualization and integration of smart manufacturing at Hannover Messe 2019 from 4/1~5. An impressive 220-inch video wall at Delta's booth features the newly-launched Digital Factory Monitoring Solution, which integrates a series of software platforms developed by Delta to determine in real-time the status of manufacturing processes, equipment and energy consumption. The new DIAStudio integrated engineering software enables an all-in-one platform to select models, program and set up PLCs, HMIs, drives and more, allowing for effective and time-efficient machinery systems development. Delta's new CODESYS-based Motion Control Solution, matched with a Delta SCARA robot, will also be a highlight of our showcase.

To foster the smart manufacturing megatrend, Delta is launching its new Digital Factory Monitoring Solution, an IIoT-based platform in which various Delta software systems converge to facilitate a 360-degree monitoring view of manufacturing and factory operations, such as production equipment data collection (DIAMMP Manufacturing Management Platform), factory facility operation (DIAView SCADA system) and overall factory energy consumption (DIAEnergie). Visitors at Delta's exhibition booth will witness the cutting-edge automation, digitalization and visualization qualities of the Digital Factory Monitoring Solution in a 220-inch video wall.

Delta also exhibits solutions for building automation, surveillance, smart lighting, and infrastructure. For smart building, Delta - together with its subsidiaries LOYTEC and VIVOTEK - is also showing its latest smart building management solutions. These range from surveillance systems to 3D people counting systems, smart LED lighting and control solutions for third party HVAC and sunblind systems. For infrastructure, Delta shows its complete smart charging infrastructure solutions ranging from renewable power generation, Power Conditioning Systems (PCS), Battery Energy Storage Systems to EV charging solutions. The PCS100 is available for outdoor applications and is an ideal fit for peak-shaving and load shifting planning in EV charging stations.



Delta's Industrial Automation Solutions for digitalized, visualized and integrated smart manufacturing unveiled at Hannover Messe 2019



## DEF and DET have helped the Chinese education in Northern Thailand for 20 years

Text by Delta Electronics Foundation

In 1989, Mr. Bruce Cheng, the founder of Delta Group, set up a plant in Thailand. That was the first Delta plant in South East Asia, and it has recently celebrated its 30th anniversary. At that time, there was a batch of Northern Thailand students who were recruited by DET (a company affiliated with Delta) after graduating from Taiwan. Those students contributed significantly to the growth of DET.

Those students eventually became the middle management and executives in DET and suggested to Mr. Cheng regarding their hope to give back to the Chinese schools in Northern Thailand that have nurtured them. As a result, scholarships were awarded in these schools since 2001 under the name of Delta Foundation. On top of the occasional software and hardware subsidy, the type of awards has been increasing. There are scholarships for primary school students, adopted senior high school students as well as students who wish to come to Taiwan for the university. A total of more than 20 million NTD worth of scholarships were awarded to more than 4000 people from 150 schools in Chiang Rai and Chiang Mai regions.

After supporting Chinese education in Northern Thailand for about 20 years, Mr. Bruce Cheng visited Chinese senior high schools in Mae Salong, Ban Hin Taek, Mae Sai and Wa Wee region in March 2019. Although the locals are still deprived of supplies, the situation has improved significantly compared to 20 years ago. Some items that Delta Foundation and DET have donated in the past include emergency power supply, water filtration equipment as well as hygiene-related equipment, and all these allow the students and the teachers to focus on learning and teaching respectively. The LED lights donated are produced by Delta and was supposed to simply improve the lighting in schools. However, these lights allowed many schools to reduce electricity consumption by one third to a half, decreasing the electricity bill significantly.

Mr. Bruce Cheng realized that the local teaching resources are still lacking and hence created Delta Green Classroom in 4 Chinese senior high schools with more students. In addition to donating energy-saving Vivitek laser ultra-short throw projector, interactive whiteboard and LED lights, Mr. Cheng also introduced the DeltaMOOCx course planned by the foundation. This course was senior high school mathematics and science lessons recorded by top teachers in Taiwan over the past 4 years and is definitely beneficial for Chinese students who are working hard in Northern Thailand. The course consists of 2000 videos that are more than 300h long in total and covers subjects such as mathematics, physics, biology, chemistry, earth sciences and electrical and electronics. If the students are interested, they can study the additional 2000 advanced science videos that Automation and Industrial 4.0 has planned.

Delta Foundation and DET will continue to support the Chinese schools in Northern Thailand and hope that the students will pass down the legacy when they have the chance in the future. This will allow Chinese students in Northern Thailand to have the capability to compete with global talents.



Mr. Bruce Cheng (left) and Ms. Liang, Mei Hua (right), the principal of Chian Hua Senior High School



## Delta UPS and DCIM solutions power new, green data center and data lab for Bytesnet

Text by EMEA



Delta UPS and DCIM solutions power new, green data center and data lab for Bytesnet

Delta, a global leader in thermal and power management solutions, announced that its DPH500 modular UPS (uninterruptible power supply) and InfraSuite Manager data center information management system are now in operation at Bytesnet's new d'Root data center at Zernike Campus Groningen in the Netherlands. Bytesnet is a regional colocation and network services provider with two main datacenter locations in Rotterdam and Groningen. In addition to a 2,500 m2 data floor, the 6,500 m2 facility also houses a data lab where research and education take place. As a tier 3+ facility, reliability was an extremely important factor in choosing the power infrastructure.

At the heart of the d'Root data center is a 6-megawatt power system. The three-phase modular DPH500 Delta UPS that Bytesnet has chosen for its new data center was one of the keys to minimizing the facility's environmental footprint. With its exceptionally high power density, Delta's DPH500 UPS requires only 50% as much space as competing solutions. This Delta UPS also offers industry-leading AC-AC efficiency of 96.5%, resulting in considerably lower energy consumption, CO2 emissions, and costs for Bytesnet.

Peter de Jong, CEO of Bytesnet, said, "Here, we really are laying the foundation for the 21<sup>st</sup> century economy. In Delta, we have found a valuable partner that is with us all the way." And the new facility in Groningen is pioneering in more ways than just its advanced power equipment. Bytesnet has partnered on this project with local universities, regional ICT vendors, and the Netherlands Institute for Radio Astronomy, Astron. In the d'Root data lab, students, scientists, professionals, and Bytesnet staff and customers work together on developing the data technologies of the future.

## Delta micro module helps the bank build provincial branch data center

Text by DGC

To ensure the safe and stable operation of the core functions of the data centers of each branch of the bank in the province, recently, Shanxi Province branch of a large state-owned bank has finally selected Delta Smart Series Micromodule Data Center to conduct unified upgrading and reconstruction of its 24 branches in the province, after the planning and model selection of the data center products, overall evaluation of the products and services, and a series of product argumentation, scheme design and manufacturer inspection.

In this bank project, 24 sets of Delta Smart Series Micromodule Data Center solutions were adopted for unified planning and deployment of subordinate branches. The Smart Series is designed for industry users' rapid deployment of stable, reliable and small data rooms with no more than 10 cabinets that cover 50 m2 and smaller area; the capacity from 3KVA to 22KVA can be configured on demand; power supply, distribution, monitoring system, cabinet system and refrigeration system are integrated, making it flexible and easy to build, intelligent and easy to manage. It provides perfect room solutions with high cost-effectiveness and high availability for small data room users.

At the time of installation of Smart Series, clients only need to prepare the power line and data cable, then the series can be quickly installed and ready to run. The Smart Series also supports the possibility of on-demand expansion in response to the possible expansion needs of the bank data center in the future. The three big software functions that it provides, namely power management, user management and environment monitoring, can address users' requirements of reliable monitoring and intelligent management.



Delta Smart Series Micromodule Data Center Solution



## Video walls from Delta ensure the future is always present at Hannover Rück

Text by EMEA

Since it was founded in 1966, Hannover Rück has become the fourth largest reinsurer in the world. With around 3,300 employees and 140 subsidiaries, branches and representative offices, the company is represented worldwide. Its strong market position requires leading-edge and optimally equipped conference and meeting rooms. While on one hand the rooms must offer the highest levels of current technical level excellence, on the other hand, they must also be flexible so that they can easily accommodate future developments.

To be effective, large conference rooms require presentation areas with a lot of space and light, so that the displayed contents are clearly visible even for those seated in the back rows. The two video walls from Delta have a screen size of 137.5 inches, which corresponds to an area of about 3 x 1.71 metres. Roland Fischer, Managing Director of ROFI AV Mediensystemhaus, ordered the Delta LED cabinets "Delta Full HD FE15" from AV specialists, Luxion. In addition, four Delta DC-600 controllers are used to position the content exactly on the video wall. The Fine Pitch Indoor LED modules of the FE series are characterised by excellent image quality and uniformity of illumination and are designed to deliver sharp and bright images, even in rooms with plenty of ambient light. The resolution of the two video walls is Full HD in 16 : 9 format. The pixel pitch, which is the distance between the individual LEDs, is only 1.58 mm, ensuring sharp images from all viewing distances.

Claus Rudolf, Facility Manager at Hannover Rück, expressed his satisfaction with the execution and reliability of the project: "We are proud of our conference room. Delta's two LED walls provide the optimal technical framework for important meetings. The interplay between the furniture and the video wall has succeeded perfectly and corresponds to our branding and corporate house style."



Video walls from Delta ensure the future is always present at Hannover Rück

## Expressway Command Center adopts Delta Laser DLP to build command and dispatch platform

Text by DGC



The laser DLP large-screen display system provided by Delta has won the recognition of users of Miannan Expressway in Sichuan once again

Recently, with the advanced product technology and reliable performance, the laser DLP large-screen display system provided by Delta has won the recognition of users of Miannan Expressway in Sichuan once again. Following the project of Miannan Expressway Construction Command Center, Delta has built a laser DLP large-screen display system for Miannan Expressway (Yanting) Operation and Dispatch Command Center. This project is another successful application of Delta's large-screen display system on the expressway.

Delta has provided a laser DLP large-screen splicing system with a single screen of 67" 4L x 8C to Miannan Expressway (Yanting) Operation and Dispatch Command Center. The core product of the project - Delta fourth-generation light source (laser) DLP display unit, provides ultra-high brightness, high contrast and high uniformity, which surpasses the LED light source considerably, has met or exceeded the super-wide color gamut of Rec. 709 (ITU HDTV color standard), and given true color performance. It has a wider range of brightness control and constant color temperature, and can better guarantee the brightness and color uniformity of the whole screen. The life of the light source can reach 60,000-80,000 hours, saving the high costs of later maintenance. In addition to the above advantages, Delta's stable and reliable industrial grade products also ensure the 7\*24 uninterrupted operations of the Expressway Dispatch and Command System.



## Delta Ako Energy Park receives LEED CI Gold Certification

Text by BABG



The park's multi-function building is Delta's first LEED certified green building in Japan

Delta Building Automation Solutions has created a human-centric multifunction green building in Delta Ako Energy Park, Japan. Using the IoT building control and management platform provided by Delta's subsidiary LOYTEC, it not only offers people a comfortable and safe working environment, but also improves building operation efficiency. The building also achieves average energy savings of up to 33.8%, having received LEED CI Gold Certification with full marks on energy items. The new green building fully demonstrates the capabilities of Delta's smart building solutions.

To meet the building's requirement for an energy saving and humanized design, it adopts the LOYTEC IP-based platform, which supports a variety of communication protocols and integrates multiple subsystems, including a building management and control system, LED smart lighting, electric vehicle charging, indoor air quality solutions, smart meters, energy storage systems, and solar power systems. The systems connect to each other on this single management platform and operate per actual needs to achieve benefits such as reducing energy use and operation costs, improving energy management and monitoring efficiency, and reducing environmental impact.

Besides comfortable lighting, air conditioning is also a key to enhancing user comfort. Delta's UNO Indoor Environment Quality Service Solution integrates IoT and cloud technologies with sensors and modulating air conditioning equipment. Through the LOYTEC Automation Server, the real-time temperature, humidity, PM2.5, CO2, LUX, TVOC and other indoor environment data collected by UNO sense can be display on the L-VIS Touch Panel. Based on the dynamic indoor and outdoor environment and people's behavior, an optimal balance control strategy for indoor environmental quality/comfort/energy savings can be achieved.

## Delta five-axis horizontal articulated robot helps improve shoemaking efficiency

Text by DGC

In recent years, with the aggravation of labor shortage, "machines replace persons" has become the commoner trend of traditional enterprises. For the traditional manufacturing industry of shoemaking with complicated craftsmanship, such a demand is increasingly urgent. Take the shoemaking industry as an example. As people have higher requirements for quality, automatic production will provide more scientific and efficient technical guarantee for the shoemaking industry. In the production of a shoemaking company, Delta SCARA industrial robot was applied to the process of spraying chemical solution on shoe surface significantly improves the quality and efficiency of the products, thus greatly increasing the competitiveness of the said shoemaking company.

In this application, the client required that the spraying accuracy should reach  $\pm 0.5$  mm, accommodating to different types of shoes and distinguishing left and right feet, and automatically correcting the relationship between robot and visual coordinates. Therefore, the four-axis robot seems slightly inadequate; it takes the freedom of one more axis to carry out non-plane gluing and tin soldering, etc., but six-axis freedom is not necessary. Through Delta's integration of standard four-axis horizontal articulated robot with the fifth axis expansion module, multi-angle application can be achieved, and when position correction function is combined, rapid line changing can be done, thus improving the overall project operation.

The advantage of Delta five-axis horizontal articulated robot solution is reflected mainly in its realization of integrated system control. Through the integration of SCARA robot and five-axis module, control is conducted directly with Delta robot controller ASDA-MS series, which saves the operating time and expenses of self-integrating system. Meanwhile, with SCARA robot and five-axis module, simple and flexible multi-angle application can be achieved, thus saving equipment space and additional purchase costs.



Delta five-axis horizontal articulated robot



## Delta presents Smart Machine Solutions at TIMTOS 2019

Text by IABG

From March 4<sup>th</sup> – 9<sup>th</sup>, 2019, Delta participated in the “2019 Taipei International Machine Tool Show” (TIMTOS 2019) with the theme “Delta Smart Machine Solutions for an Upgrading Machine Tool Industry”. Partnering with several machine makers, Delta’s Equipment IoT and Management Platform connected smart machines and a management system with a complete equipment IoT structure. At Delta’s booth, a huge screen wall displayed real-time operation data of the partners’ demo kits at their booths with real smart manufacturing applications. Delta also presented many smart CNC machine tool solutions. The brand new CNC Ultrasonic Machining Solution integrates Delta’s CNC system and the latest ultrasonic generator to enhance machining efficiency and quality of brittle materials (such as ceramics, glass and sapphire). The Grinding Solution adopts CAD/CAM Software for Surface Grinding to showcase Delta’s excellent smart manufacturing integration capabilities.



The Equipment IoT and Management Platform connects live demos at partners’ booths and displays the operation data on the large TV wall in real-time. It showcases real smart manufacturing applications for the machine tool industry, and attracted a large number of visitors

The General Manager of Delta’s Industrial Automation Business Group (IABG), Andy Liu, indicated that Delta is dedicated to developing IA products and software. The CNC solutions featured complete self-developed key components. Combined with IIoT technology and a monitoring visualization platform, Delta provides flexible solutions to meet various market demands. Delta not only supports the upgrades of machine tool customers, but is also developing global machine tool markets with its international business coverage. For example, a simple CNC lathe with touch panels for the local machining requirements in India provides small-volume with large-variety and easy operation. In Turkey, Delta offers complete aluminum and stone machining solutions for construction. With Delta’s global operation and local customer service and maintenance, a Korean CNC machine maker successfully sells its Delta CNC solution integrated equipment to Vietnam.



## Delta enhances smart production line at the CYCU R&D Center for smart manufacturing

Text by IABG



Visitors show great interest in Delta's Electric Servo Press and 3D Machine Vision & Multi-point Robotic Soldering Solutions

Delta's IABG has cooperated with Chung Yuan Christian University (CYCU) and various vendors to set up the CYCU R&D Center for Smart Manufacturing. Delta adopted its own smart factory construction experience to implement the monitoring system, industrial robots, and other IA products on the smart production demo line on the first floor of the new center.

On the automated production line at the first floor of the center, Delta's DIAMMP provides efficient management and monitoring of production equipment. The Delta Articulated Robot DRV60L performs pick-and-place tasks for the electric discharge machine (EDM). At the inauguration ceremony, CYCU demonstrated the Delta Electric Servo Press performing the precision bearing pressing process as an advanced automation application. The 3D Machine Vision & Multi-point Robotic Soldering Solution adopted machine vision algorithms for multi-point soldering inspection. It replaces the traditional labor-intensive soldering process, which attracted the attention of many visitors. CYCU is planning further collaboration to enhance its smart production line efficiency.



### Delta showcases total solutions for packaging industry in Sino-Pack 2019

Text by DGC

Delta exhibits various total solutions for the packaging industry in the 26<sup>th</sup> China International Exhibition on Packaging Machinery & Materials (Sino-Pack 2019), including horizontal flow wrapper solutions, filling machinery solutions, palletizing solutions, professional cartoning solutions, etc., assisting the packaging industry in moving towards a high-speed, high-precision and high-efficiency intelligent direction.

Highlights of Delta's exhibits include:

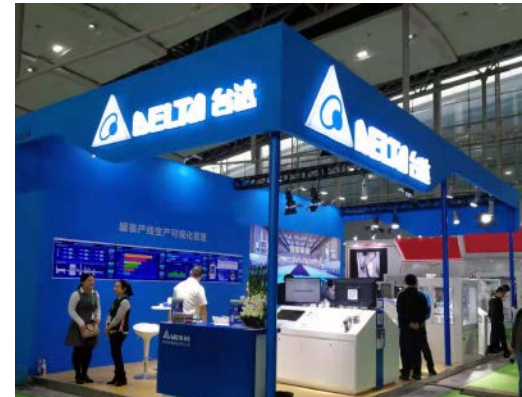
**Filling machinery solutions:** Uses Delta's PLC-Based multi-axis motion controller DVP50MC series as master controller, and built-in electronic cam for precise positioning and synchronous control such as following, stacking and filling, meeting the application requirements in the food packaging industry and so on.

**Palletizing solutions:** Uses PC-Based structure, eliminating the problem of repetitive teaching; scenario guidance design allows process compiling to be faster and more convenient.

**Delta's fully automated cartoning solutions:** Uses Delta's Machine Vision + SCARA industrial robot, replacing former photoelectric positioning, and reducing manual operation.

**DIACloud platform:** Users can monitor the equipment's operations and alarm information at real-time anywhere through mobile APP or website, facilitating remote maintenance, guidance and troubleshooting.

**Delta's suspending SCARA industrial robot DRS60H series:** Robotic products have higher load capacity, high repeatability and precision, and can efficiently utilize installation space to achieve optimal layout and save space.



Delta showcases total solutions for the packaging industry in Sino-Pack Guangzhou 2019

### LOYTEC LIOB-585 controller debuts at 2019 ACREX

Text by BABG

Delta participated in the ACREX India 2019 exhibition held in Mumbai, India from February 28th to March 2nd. The expo focused on building automation and indoor air quality. Delta presented two outstanding building management brands for the first time, LOYTEC and Delta Controls, to provide users with a full range of building solutions.

Mr. Vaibhav Bagu, Sales Director of the Building Automation Solutions Business Unit of Delta India, mentioned that "The HVAC&R market in India will rapidly soar beyond US\$7.5 billion in the next five years, and the open integration platform will be one of the future, winning advantages of building automation manufacturers. The integrated application of constructing cross-object, cross-regional or cross-system will be a prerequisite."

Delta's building automation solutions include upper management software, controllers, sensors, and green building consulting services. Whether it is Delta Controls' full BACnet building management system or a LOYTEC building management system with an IoT integration architecture, Delta helps developers by providing dual-brand BA services, build up an open building management system with horizontal cross-architecture and vertical cross-systems based on demand. The platform supports various communication protocols such as BACnet, LON, Modbus, and others, integrates HVAC, lighting, security and other building subsystems, and uses centralized monitoring and decentralized control mechanisms to maximize the synergy of heterogeneous system integration, and ultimately creates the best energy saving and equipment operation results.

The highlight of the expo was the first appearance of the LIOB-585 controller in India. The LIOB-585 controller with multi-protocol support can bridge between various protocols, and the IoT features enhance the LIOB-585 controller's flexibility, finding application for air conditioning equipment, all types of lighting controls, and integrating access to control hardware devices.



Mr. Vaibhav Bagu (2nd from left), Sales Director of the Building Automation Solutions Business Unit of Delta India, introduced Delta's smart building solutions to the ISHRAE members at ACREX India 2019 exhibition



## Delta launches smart factory solution with multi-task integration platform

Text by BABG



Charlene Lin, Business Development Chief of Delta's Surveillance Automation Solutions Business Division, shares Delta's success stories at the forum

Delta recently participated in the "2019 Forum on Smart Factory x Industrial Safety and Environmental Control" organized by DIGITIMES. The forum attracted nearly 150 professionals in factory operations and property management to attend. Speakers mentioned that smart factories should be built on a smart factory infrastructure, which includes industrial safety and environmental control. Delta shared several success stories on factory buildings and security during the forum, and stressed that under an open architecture a single management platform with multi-task integration can achieve a linked synergy between systems and reduce integration and labor costs by 20%, which prompted audience discussion.

Delta's smart factory solution emphasizes an open architecture, where a single platform and multi-task integration allow different systems to be integrated onto the platform. This solution achieves a linked synergy between the systems, reducing integration and labor costs by 20%, and improving the efficiency of factory management. Most factory management systems work independently and have not been integrated, so they are unable to achieve linked synergies between systems. Charlene Lin, Business

Development Chief of Delta's Surveillance Automation Solutions Business Division points out: "Infrastructure establishment costs cannot be shared, and when unexpected situations occur, only experienced managers can be relied on for their inter-system operation judgment. The high manpower management costs can be difficult to bear. Delta's smart factory solution uses mature technologies to help build smart office and factory environments with high degree of automation, tight security, in-depth intelligence and comprehensive management."

## Delta and Vivitek display solutions showcase together at ISE 2019

Text by EMEA

A stunning, open-plan new stand design, exciting new products shown for the first time and the thrill of winning an industry recognition award on the first day of the show, were just some of the highlights that kicked off Vivitek's and Delta's presence at ISE 2019. Delta Display solutions and Vivitek brand on a shared stand and united under the theme of 'Celebrate Together' marked the presence at ISE 2019.

Among the products being discussed, included a new laser projector that boasts breakthrough brightness levels using single-chip DLP technology. Visitors were wowed by its ability to deliver a brightness performance only previously achievable when using traditional 3-chip technology. Vivitek's new flagship projector DU9821Z uses laser-phosphor illumination to provide durability and colour accuracy. The projector also comes with a choice of optional lenses to provide installation flexibility for any new or existing environment.

Additionally, Vivitek also displayed its full range of wireless collaborative NovoConnect Solutions, and new to ISE 2019 was the industry first all-in-one wireless collaboration laser projector as well as the NovoDisplay range which was previewed to offer signage and collaboration features in a non-touch screen. Vivitek also took this opportunity to demonstrate NovoTouch's new LiveScreen function, a recently added feature that provides the ability to connect up to five screens in different rooms. The NovoConnect range is industry leading in its choice to offer stand alone as well as embedded solutions, boosting convenience and simplifying connectivity in new as well as existing meeting rooms.



Delta and Vivitek display solutions showcase together at ISE 2019



## 2019 DGC Annual Conference and Channel Conference were successfully held

Text by DGC



Dr. Donald Yu, Managing Director of DGC, reviewed and summarized the development of the company and the industry in 2018, while thanking all the colleagues for their efforts and expressing his high expectation for 2019

### 2019 DGC Annual Conference -

#### Joint Operation with Common Ideals, Weaving Dreams and Forging ahead

DGC Annual Conference in 2019 lasted for 2 days, with 186 colleagues from 22 business departments and administrative units having attended the conference. In the report sharing session, Dr. Donald Yu, Managing Director of DGC, said that in 2018, the Sino-US trade conflict brought great uncertainty to the market, and in 2019, the growth rate of China's macro economy is not so optimistic but remains on a steady and forward-looking trend. He called on all the colleagues to overcome all difficulties, create business opportunities, and strengthen cooperation among departments to move toward the goal of US\$1 billion a year.

### 2019 Delta Electromechanical Channel Supplier Conference -

#### Potential Accumulation, Innovation, and Transcendence

The theme of this Channel Supplier Conference was "Potential Accumulation, Innovation and Transcendence", where Dr. Donald Yu, Managing Director of DGC, Mr. Eric Chen, General Manager of DGC Electromechanical Business Department,

Director of Product Development Division, Director of Industry Division, Region Director, responsible persons from relevant functional departments, and representatives from Delta's electromechanical channel suppliers, with more than 130 people in all, gathered in Wujiang, Suzhou, to summarize the channel work in 2018 and discuss the development plan in 2019.

Mr. Eric Chen said that in 2018, Delta continued to strengthen the industrial automation field, with new products coming out frequently, while collaborating with CODESYS for strengthening the software; key industries, new strategies for the EU market, and enhanced channel management are all directly linked with users, thereby coming out with a new innovated ecosystem. In 2019, Delta and its channel partners will continue to provide customers with more valuable solutions through the high-quality products and complete services.

### 2019 Channel Supplier Conference for DGC Key Infrastructure Solutions Business Department -

#### Elites Marching Forward Together, Riding the Wave to Win the Future

This Conference lasted for 3 days, with attendees including Managing Director of DGC Dr. Donald Yu, MCIS Business Department Director of DGC Cai Jie, colleagues from relevant product divisions of Delta CIS BU and DGC MCIS Business Department, and various channel partners.

Cai Jie, MCIS Business Department Director of DGC, said that 2018 was a year of bumper harvest. In the industries such as semiconductor, IDC, and communication, Delta achieved encouraging results with its UPS and data center infrastructure solutions. In 2019, Delta and its channel partners will continue to provide customers with more valuable solutions through its professional competency, high-quality products, and complete services that aim to create win-wins for all.



Core channel partners of MCIS Business Department, as well as leaders and team elites of Delta and DGC from all over the country, gathered in the beautiful Mountain Wuyi to attend 2019 Channel Supplier Conference for DGC Key Infrastructure Solutions Business Department



### The Digital Projection INSIGHT Laser 8K projector honored with the "InAVation Award 2019 – Most Innovative Technology for Large Venue Presentation"

Text by Corporate Communications



Delta's associate company Digital Projection, had its INSIGHT Laser 8K projector recognized as the "Most Innovative Technology for Large Venue Presentation" in the InAVation Awards 2019. This major accolade applauded the unique innovative features of the world's first 8K projector, such as its unparalleled 33 million-pixel (7680x4320) resolution, 25,000-lumen brightness and DLP® technology.

End user and system integrator voters select InAVation Awards winners in a process that has been in place for 12 years now. The Awards are organized by InAVate, a leading magazine for the audiovisual industry in Europe, and are held annually parallel to the world's most prominent display technology tradeshow, Integrated Systems Europe (ISE).

The "InAVation Award 2019 – Most Innovative Technology for Large Venue Presentation" recognized the unique qualities of Digital Projection's INSIGHT 8K

### Delta wins LinkedIn's Transformation Award for the second consecutive year

Text by Human Resource



CHRO Mr. Charles Chen (2nd from the right) received the award on behalf of our company

Delta Electronics has been honored with the 2018 Transformation Award from LinkedIn. Since 2016, the number of followers of Delta Taiwan's LinkedIn official page has grown to 37,305, meaning 337% of increase; followers for Delta Americas reached 20,433 with 308% of increase, and EMEA 23,729, 295% of increase. LinkedIn has gradually become an important recruitment channel for Delta (8% in Taiwan, 40% for Americas and EMEA). Delta outperformed other employers in Taiwan by being awarded this accolade for the second consecutive year. The award recognizes Delta's continuous efforts in pursuing new approaches to attract and engage global talents. The CHRO of Delta, Mr. Charles Chen, participated in the ceremony and received the award on behalf of our company.

Delta's Human Resources team has been engaging more actively in all kinds of social media with fruitful results as it strives to build global talent networks, multiply talent acquisition channels, and promote employer branding. We invite all of you to join us on LinkedIn to attract more outstanding human capital that will contribute to our sustainability goals.



## Delta clinches two major awards in “17<sup>th</sup> Annual Industrial Automation and Intelligence Awards”

Text by DGC



Eric Chen indicates that while manufacturing companies are transforming towards digitization and intelligence, they have to maintain their core business and insist on developing projects according to their advantage, so as to get ready for the future

Delta’s Industrial Automation Business Group (IABG) produced astonishing results in the “17th Annual Industrial Automation and Intelligence Awards” organized by gongkong.com and held in Beijing. General Manager of DGC IABG, Eric Chen, was awarded “Smart Manufacturing Leadership Award”, and Delta’s self-developed high-speed inverter C2000-HS series received the “Breakthrough Award.” Eric Chen was invited to the event, and expounded the topic of responding to “the trend of industrial economy downturn; interconnectivity and integration of industry and network; hold on to one’s own expertise or seek cross-industry breakthrough.”

Eric Chen pointed out that as manufacturers are transforming towards digitization and intelligentization, they have to maintain their core business, insist on developing projects according to their advantage, and work on exploring the industry’s customer requirements and development direction, so as to get ready for the future. They also have to change their mode of thinking, actively expanding, establishing themselves and keeping up with the new industry, in order to get ahead of others in smart manufacturing. Delta has been dedicated to automation for the past 20 years, and has accumulated strong research and development capabilities and rich industrial process experience. By actively enhancing its soft power, Delta is now equipped with the capabilities of providing customers with automation solutions of both width and depth, assisting clients in developing higher-end intelligent applications.

## DET listed in CDP for 3<sup>rd</sup> Consecutive Year

Text by DET

Delta Electronics (Thailand) PCL. (DEI and DET are associate companies) participated in the CDP climate change related questionnaire and public environmental data disclosure of for the 3rd consecutive year. CDP, formerly the Carbon Disclosure Project, is a global disclosure system for companies, cities, states and regions to manage their environmental impacts and for investors or purchasers to access environmental information for use in financial decisions.

In 2018, 3,273 companies from around the world participated in the CDP program. DET was one of 23 companies in Thailand to submit the questionnaire in the CDP disclosure system which helps guide participants to achieve an effective organizational plan in mitigating the impact of climate change. The company participates in global climate initiatives and forums like the UN COP climate summit as part of its efforts to support the 2015 Paris Agreement policies that tackle global warming.

As a global corporate citizen, DET recognizes the tangible business benefits of disclosure and action, as it continues to take meaningful steps to address climate change, deforestation and water security. DET’s ongoing participation in the CDP demonstrates its unwavering commitment to the UN’s sustainable development goals, sustainability and its brand promise: Smarter. Greener. Together.

|  CDP<br>ENVIRONMENTAL DISCLOSURE<br>FOR A SUSTAINABLE ECONOMY |                     |      |             |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------|-------------|----------------|
| Name                                                                                                                                             | Response            | Year | Status      | Score          |
| Boonchai Petroleum Public Co., Ltd.                                                                                                              | Climate Change 2018 | 2018 | No Response | Not applicable |
| Delta Electronics (Thailand) plc                                                                                                                 | Climate Change 2018 | 2018 | Submitted   | B              |
| Energy Management System Company Limited                                                                                                         | Climate Change 2018 | 2018 | No Response | Not applicable |
| East Thailand PCL                                                                                                                                | Climate Change 2018 | 2018 | No Response | Not applicable |

DET 2018 environmental data disclosed in CDP



Delta Taoyuan Plant 5

### PEOPLE

## Get ready and look forward to the future Delta Taoyuan Plant 5

Text by Delta Taoyuan Plant 5



Tib Lin / Chief Engineer, ESDBD

In the blink of an eye, it has been nearly ten years since I joined Delta. In 2009, the company gave me a stage to “apply what I have learned.” At that time, the electric vehicle market just started, AEBU recruited vehicle R&D engineers in earnest. As I just completed my master degree in the Institute of Power Mechanical Engineering, National Tsing Hua University, and my major happened to be heat transfer and computational fluid dynamics, I was lucky enough to join the R&D Team, and began to enthusiastically apply what I had learned.

In the first few years when I worked at AEBU, I was mainly responsible for the design of vehicle battery pack mechanism and the development of thermal dissipation system, which laid a good foundation for turning to the large-scale energy storage system in the future. In 2011, Taoyuan No. 3 R&D Center was established, our department moved from Taoyuan No. 2 Factory to this new green building, and the environment and atmosphere became quite different. At that time, the factory occasionally held foretaste activities, in which employees could have a taste of green vegetables just in season cultivated by the plant factory on the 7th floor. The most novel thing was that the elevators in the factory were not only transparent, but there were also green atriums, creating a good working environment for employees.



## PEOPLE & PRODUCT

Later, as a result of business integration, we began to cooperate with first-line vehicle manufacturers in Europe, and turned to the research and development of vehicle battery junction boxes. This cooperation was a very rare opportunity for me. At that time, I was sent to Germany for two months, where I learned first-class artisan skills and spirit, which helped me accumulate experience in new product development. Looking back at these days in AEBU, I would like to express my gratitude to three supervisors, Bai-Quan Zeng, Yuan-Kun Xiao and Sheng-Nan Cai, for their guidance and nurturing, which made me grow into an independent engineer from a confused new graduate.

At the end of 2014, Delta cooperated with Mitsubishi Heavy Industries of Japan, introduced lithium battery technology and established the ESDBD. Due to some luck and fate, I came to Taoyuan No. 5 Factory. Under the leadership of Mr. James Chen, I began to try applying battery technology on the creation of multiple products. I often think that James is a dream maker who dares to get rid of habitual thinking and bring innovation into play. Just as on my first day in ESDBD, we were told to build an MW class energy storage container system. It was a daunting challenge for a team at its pioneering stage to research and develop such a large-scale system. Nonetheless, we bravely took the first step.

In the past few years, our department has built the system step by step from scratch. The supervisor has always allowed the team to freely make bold attempts, and I have to say that I have truly enjoyed the process of R&D here. Today we have a wide range of transnational and cross-sector cooperation opportunities for our energy storage products, and Delta's energy storage technology is also taking off in the international market.

As a family chef instead of an engineer on weekends, cooking has always been my interest; to some extent, cooking is very much like developing new products that requires creativity and good process management. In addition, I also love travelling very much. I especially appreciate the travel vacation system of Delta, which allows me to travel and explore around the world. My colorful life after work has been painted by making use of vacations for travels, such as going to Indonesia to climb a volcano and searching for vampires in Romania, and there are many other trips full of wonders.



Posing with Delta's energy storage container at the opening ceremony of Chiayi Green Energy Gas Station in 2019



Hiking in Switzerland during a vacation in 2018



## PEOPLE & PRODUCT



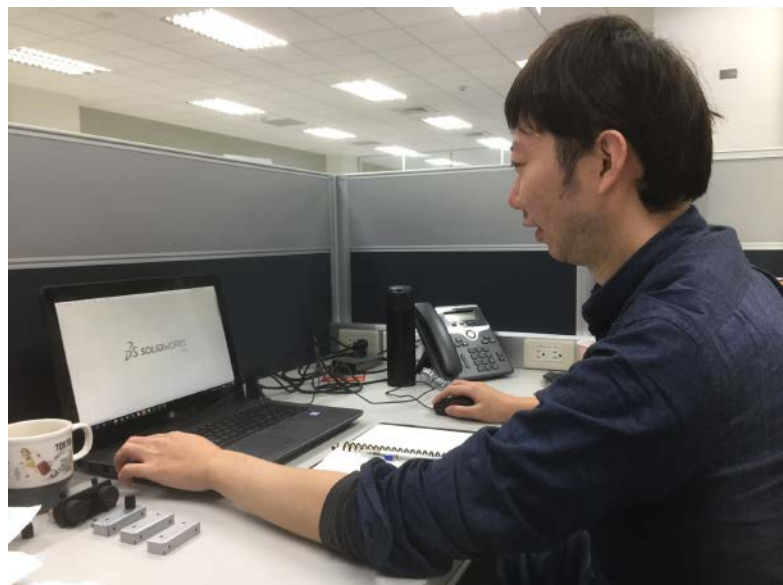
Johnny Li / Senior Engineer, ESDBD

The year 2015 was the busiest year and also the year full of changes. I had had interviews with many companies after I completed my military service, and Delta was the one that impressed me most. When the HR Department phoned to arrange an interview with me, the caller said happily, "We will not work next week during the vacation for travel!" I thought to myself, this was the company which I wanted to join. Later, I was fortunate to join MCIS BU of Delta Tainan Factory for the development of UPS power cabinet. The main product of this department was modular uninterrupted power system, which could integrate expansion and backup in a single cabinet, effectively solving the demand of customers with high power density and high power efficiency, and enabling cloud, 4G/5G and various media data streaming applications to operate in the IT-intensive world. When just joining, everyone was full of motivation and hope for the future. The average age of the department was rather young, and the work atmosphere was harmonious; we got along just like senior and junior students working with each other in the school laboratory. Everyone spent long hours together in the sea of screws, and grew up together when developing cabinets.

A few years later, there was another big decision in life, marriage. After getting married, I agreed with my wife to live and work together in northern Taiwan. I might have to leave Delta, but fortunately Delta's multiple factory sites and close coordination between different departments allowed me to stay with this big family and continue my original experience in Delta. With the assistance of the HR Department, I joined the ESDBD and took charge of the design of the UPS battery cabinet. As this product was just the matching product of my previous department, I was able to continue applying my previous experience and learn new technologies. We developed and produced quite a wide variety of energy storage component products, ranging from lithium battery cell and lithium battery module to energy storage products of cabinet and container capacity levels. And these products have been marketed and sold worldwide. There are also many new things to learn in the work, such as understanding the circuit structure and collocation of new electromechanical materials and parts, which make my work more challenging and learning new knowledge and new technology more fun.

After work, sometimes I go shopping and watch movies with my wife. Sometimes I play ball games with my friends, and talk about stocks to earn some extra bucks. Striking a proper balance between work and play also makes me more motivated at work and more harmonious with others.

I would like to express my gratitude to Delta for allowing me to grow and meet a group of like-minded colleagues, and also to "BRAND" for giving me this opportunity to share my life in Delta.



Work-loving Bo-Sheng, posing in the ESDBD office



## PEOPLE & PRODUCT



Herry Yu / Senior Engineer, ESDBD

I was only 24 years old when I joined the ESDBD of Delta. At that time, there were only a few lights on the pack production line, accompanied by a solitary table and several pieces of old equipment. The huge room seemed empty and the then energy storage industry was in its infancy. It was a bit hard for me to imagine what energy storage was at that time.

No one expected that three years later, we would have such a scale today. Every day we are busily rushing in and out, trying to satisfying the blooming energy storage needs. We have our own professional capability to design and produce energy storage products, including small ones such as lithium battery cell and lithium battery module, and big ones such as those of cabinet and

container capacity levels. Coordinating and integrating with Delta's products from other departments, we are able to provide customers with complete solutions. Our products are also exported to the markets in Europe, America, Japan and Australia, with applications covering smart grid output regulation, renewable energy power storage and UPS backup power supply.

I previously thought that a mechanical engineer would only need to prepare some drawings and fasten screws, but later I found that there were so many things to be learned in ESDBD. You have to understand the circuit, and learn to choose electromechanical materials, and also understand the system. There are a lot of things you have to start from scratch. Whenever I learned new skills, I always felt good, very satisfied! In these past three years in ESDBD, it has been just as I have lived in a box full of surprises. There are always amazing Easter Eggs to look for. As the industry is still a new one, there are always unexpected

challenges and tasks happening, and new knowledge and technologies waiting to be learned.

When I was stressed out by cases, when the design was constantly challenged and faced with numerous voices of doubt, I also wavered and doubted myself. I am a girl, can I do as well as those guys? Fortunately, I have an unyielding personality, and I want to do better than you, just to show you! I also appreciate the warm companionship of many colleagues and partners around me when I encountered setbacks. From them, I have gained a lot of courage and strength to move forward, and I am also grateful to my supervisor for leading me all the way, keeping me from being scolded, and believing me, giving me chances again and again to explore, to try and to broaden my horizon.

I would like to express my gratitude to Delta for my change from once an ordinary person to what I am now with a somewhat not-so-ordinary life. I would also like to thank ESDBD for giving me the opportunity to watch each other mature, and grow stronger, wiser and kinder.



Dear partners, Leo, Johnny, Lynna, myself, Hom Rex, Johnson and Shingfa (from left to right)



Delta PMT2 series

PRODUCT

### Delta introduces PMT2 series of panel mount power supply in low profile design

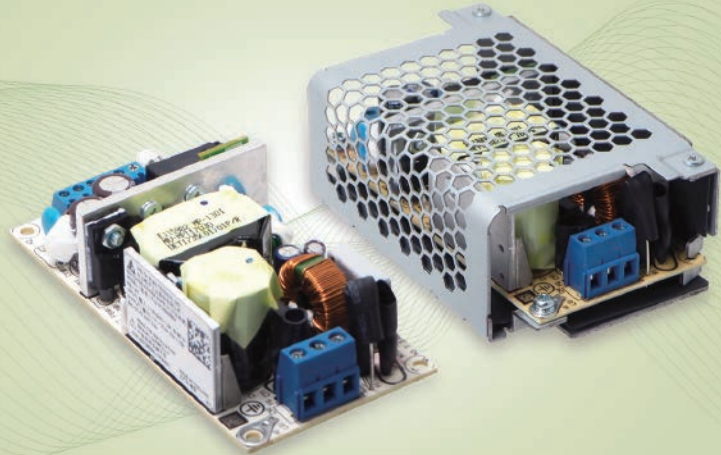
Text by DET

PMT2 series, designed based on a low profile of < 30mm, is the latest series of panel mount power supply from Delta Electronics. This series is currently available in 50W, 100W and 150W output power with 12V and 24V output voltage. They offer a wide operating temperature range from -30°C to +70°C and can withstand shock and vibration requirements (in accordance to IEC 60068-2-27 and IEC 60068-2-6 respectively). The PMT2 series is designed for cost competitive applications without compromising on quality and reliability. The products have an expected life time of 10 years.

In view of IEC/EN 60950-1 standards expiring in December 2020, the PMT2 series will come certified with the new IEC/EN 62368-1 standard, information and communication technology equipment. EMI standard is according to EN 55032, Class B. All Delta industrial power supplies including the PMT2 series are fully compliant with RoHS Directive 2011/65/EU environmental protection.

#### Highlights & Features:

- ▶ Safety approval IEC 60950-1, IEC 60335-1, IEC 61558-1 and IEC 61558-2-16
- ▶ Universal input and selective switch input for 150W
- ▶ No load power consumption < 0.2 for 50W, < 0.3 for 100W and < 0.5 for 150W
- ▶ Low Leakage Current < 0.75mA @ 240VAC / 50Hz
- ▶ Low profile design: < 30 mm height
- ▶ Conforms to harmonic current IEC/EN 61000-3-2, Class A



Delta PJU series

PRODUCT

### New power supply with integrated DC-UPS function - PJU series in 2" x 4" footprint

Text by DET

Delta PJU series, the new open frame power supply comes with integrated DC-UPS function. The PJU-60W, is designed to operate with an external 12Vdc or 24Vdc SLA battery. They will switch over to battery mode operation (batteries not included) seamlessly to prevent system downtime in the event of power disruption or unexpected loss of AC input power. The diagnostic monitoring signals available in this series, for AC OK and Battery Low status can alert the user.

The two PJU models are rated at 13.8V/3.5A (PJU-13V60WCBA) or 27.6V/1.4A (PJU-27V60WCBA). The main output channel and battery channel will operate in CC-CV mode to maintain voltage regulation of main output channel while charging the external battery. This series has high efficiency up to 89% @ 230Vac and wide operating temperature range from -20°C to +70°C with convection cooling design. Metal chassis and cover is available as an option for different installation requirements.

In view of IEC/EN/UL 60950-1 standards expiring in December 2020, the PJU series will come certified with IEC/EN/UL 62368-1 approval. They also meet China safety approval according to GB4943.1 and comply to EMI according to EN 55032 Class B. The series is suitable for security systems, emergency lighting applications and various other applications requiring battery backup.

#### Highlights & Features:

- ▶ Universal AC input voltage range
- ▶ Small Footprint 2" x 4"
- ▶ Zero switch over time from loss of AC to battery operation
- ▶ Protection against reverse polarity battery connection
- ▶ Built-in diagnostic monitoring for AC OK and Battery Low status
- ▶ Overvoltage / Overcurrent / Over Temperature / Short circuit Protections
- ▶ Built-in over current and short circuit protection in Buffering (battery discharging) mode operation



LIOB-585 supports multiple communication protocols, combining multiplex capabilities and reducing construction costs

PRODUCT

### LOYTEC LIOB-585 I/O Controller is multiplexed to reduce the cost of building control

Text by BABG

The use of IP access and IoT integration has become a necessity for realization of smart buildings. In terms of hardware, most users usually need at least two different controller devices to meet their needs for management and control of unitary and terminal devices. This is not a small investment for the users, and reducing the cost of investment is a difficult problem for them.

LOYTEC's new LIOB-585 I/O Controller demonstrates innovative advantages for building automation, maximizing synergy from integration of different systems and creating potential savings on energy as well as operational efficiencies. LIOB-585 is a multiplex controller combining IP architecture and building management. It supports multiple communication protocols and seamlessly integrates wired or wireless building control systems, greatly reducing requirements for the equipment on the control and management layers in the system architecture.

In addition, the compact LIOB-585 goes beyond simple HVAC application, allowing for control of lighting and even acceptance of types of access control hardware for custom applications. Through the Internet of Things interface, you can connect to enterprise systems for scheduling, energy use and management, weather services, or other IoT devices such as projectors and audio-visual systems. Without additional equipment, you can directly use IP networks to connect the control system for the rooms or areas.

The powerful features of the LIOB-585 I/O controller are recognized by the US-based 2018 Control Trends Awards and honored with the award "Building Automation Plant/Equipment Controller of the Year". It is also unanimously expected that this product will achieve new success after the LOYTEC touch panel L-VIS was well-sold in North America.



Delta Controls O3 sensor offers more user-friendly detection on the environment

PRODUCT

### Delta Controls O3 smart sensing enhances comfort of space

Text by BABG

Equipped with 12 sensing devices, Delta Controls O3 Sensor Hub is designed to offer a better user experience. Compared with wall-mounted sensors, the ceiling-installed O3 can more realistically sense the real feeling of the resident with a 3D concept of space and detect the temperature, sound, light levels, light color, etc. to enable a more accurate detection on human, establish monitoring on illumination, or even interact with the users.

Users can download mobile apps from the Google Play Store and Apple App Store, and these intuitively designed apps allow users to interact directly with their space. O3's multi-color LED light ring and speaker enable instant feedback and interaction with the user. When the user makes a change to the space situated in, he/she can know from the light ring that the command has been received and the system has also been operating automatically.

The O3 is also an integrated hub that connects to the system via Wi-Fi, EnOcean and Bluetooth wireless, allowing complete integration of everything in the space ranging from curtains, access control to projectors and TVs. The user simply presses the application and the meeting room automatically switches to presentation mode. The O3 system can dim the lights, pull down the curtains, open the projection screen, and monitor the number of people present to provide a perfectly ventilated environment, truly offering users a brand-new experience.

O3 entered the finalist list in the Innovation Awards held by AHR in 2019, making it apparent that its multi-functional sensing has been appraised by the judges. It features algorithmic calculation and vocalization ability that correspond to the trend of building control with user experience first and deeply attract attention in the market.



According to the latest report by the International Energy Agency (IEA), the energy use of the building sector accounted for 31% of the global energy consumption, higher than that of the industrial and transportation sectors (29% each)

## Disclose energy consumption information, reduce buildings' energy consumption

Text by Yvonne Chan / Senior Program Coordinator of DEF

Since Trump took office, many local and state governments have mobilized against the central government. They not only have different ideas in terms of policy planning, but also propose further climate commitments, advocating climate targets such as carbon neutrality and 100% renewable energy. The building sector, which has the highest energy consumption in the world, is often the number one target for remediation.



### **Disclose energy consumption information, laying the foundation for saving energy**

How can the building sector get rid of the title, “energy-consuming” giant? The U.S. Green Building Council (USGBC) believes that “Energy Benchmarking policy” is the first step that we need to make together, which requires disclosure of energy consumption information by large buildings (e.g. public buildings, commercial buildings, congregate housings) to help the government establish more appropriate statutory energy-efficiency standards, and grasp information on building electricity consumption and energy usage.

Model cities such as Chicago, Seattle and New York, request buildings with floor area exceeding 20,000 - 50,000 square feet (approximately the size of 4-10 standard basketball courts) to report their annual energy consumption, which will then be compiled and published by the city governments.

In order to urge buildings to truthfully report their energy information, the governments adopt the carrot and stick approach. The local power and water companies are engaged to assist building owners in disclosing energy information free of charge and creating the customized energy- and water-saving programs for different buildings. At the same time, the governments also establish a set of punishment measures, which fine offenders based on the degree of non-compliance or incompleteness of data submitted. A few years after implementing the policies, 85-99% of the buildings being managed abide by the rules at present, and the greenhouse gas emission of these three cities has decreased by 4.8-19%, and their energy consumption reduced by 3.7-10%.

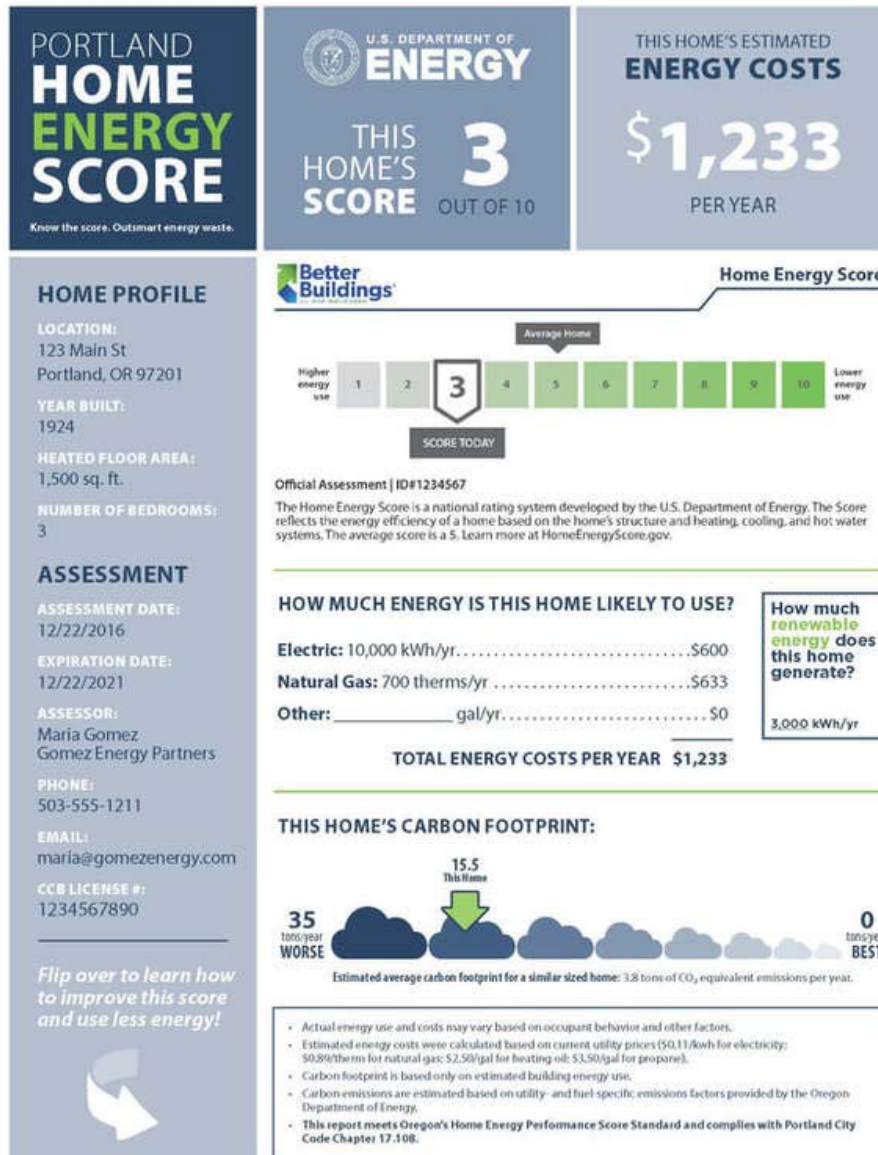


### **Energy conservation relies on disclosure of household electricity consumption**

However, besides commercial buildings, buildings also comprise of general residential buildings. As such, due to the local conditions of different cities, policies such as “bill disclosure”, “housing evaluation”, and “home energy-saving features” are adopted based on local Privacy Act and public acceptance, so that consumers can learn about its energy usage, energy cost and efficiency before making a decision about real estate transaction.

Firstly, as the name suggests, “bill disclosure” is to make public your home electricity bill. Such policies are common in Chicago, Hawaii and New York. “Housing evaluation” is a simple and clear scoring system for comparison of residential energy efficiency, carbon footprint, etc.; while “home energy-saving features” carry out evaluation in terms of house structure and equipment, and identify the building’s energy-efficiency technologies, characteristics and areas for improvement.

For example, Portland specially selected the relatively easy-to-understand “Home Energy Score” to evaluate housing energy efficiency and carbon footprint because the disclosure system is very user-friendly. In just nine months after implementing the policies, up to 7000 residential buildings have made public disclosure. Berkeley, which has also adopted the “Home Energy Score” system, requests households to enclose “home energy-saving features” on top of information disclosure, so that information on energy-saving structure and facilities of the houses can be easily available in the market.



Portland's Home Energy Score template discloses information on energy-efficiency score, carbon footprint, energy consumption, etc

Looking back at the situation of Taiwan, green buildings have become a trend in recent years. Statistics shows that as at end of September 2018, 7375 building projects in Taiwan had applied and obtained the green building label. In a recent international conference hosted by the Ministry of the Interior, an official claimed that Taiwan has the highest density of green buildings in the world at present.

Unfortunately, these green buildings are mostly new buildings. Taiwan still needs to make greater effort to increase energy efficiency for a large number of existing private buildings hidden in the country, increasing the incentives for their owners to carry out energy-saving home improvements, and making the big step in public buildings' energy consumption disclosure.



## Let's be filial to Mother Earth

Text by Yting Wang / Senior Engineer of Software Design, Delta Research Center

In 2013, when the film "Beyond Beauty – Taiwan from Above" was released by Zeppelin, I was very impressed with its narration. The general idea is that our land is like a mother, giving us unlimited tolerance and letting us develop, without being able to voice out any pain. I also like to go outdoors to the nature, where I can always relax and heal myself. So I started pondering that since I took so much from Mother Earth whether I could change something by actually doing it, to give back to this mother who always tolerates us, rather than endlessly consuming her. The simplest and most effective way is to start from reduction of garbage in daily life. So, sometimes I joked that I am a filial daughter of the Mother Earth.



When going out during ordinary days, I usually bring a green folding cup with an eco-friendly straw to reduce use of disposable cups. In the beginning, I used a Mason jar with a holed lid as a normal drinking cup that I can also insert a straw into. However, the Mason jar is not easy to carry, so I usually leave it in the office and use it with the coffee bought nearby. When going out, most of those commonly used silicon-folding cups with a capacity of 800 ml can also hold takeout drinks. The folding function allows me to take it with me at any time, in case of need, and its capacity is also very large. Sometimes I even use it to hold the soup I buy.



Mason jar with a holed cover (left),  
silicone folding eco cup (middle, right)

When buying an eco-cup, be sure to check your drinking and carrying habits, in terms of materials or capacity. Otherwise, with an unsuitable eco-cup bought, it is easy to result in it being abandoned as waste, and it is difficult to develop a habit of using self-brought eco cups. If you are not used to drinking beverages and only drink water, it is a good choice to use a thermos bottle. Though light and cheap, as I have the habit of drinking coffee, the plastic cup is easy to be tainted with the taste of coffee. If it is used again, the taste will be mixed with drinking water. The experience of using it is not good; it is easy to not want to use it again, which in turn used to cause waste. The glass, as mentioned above, is heavier and less portable, but it is easier to clean. At present, the most common silicon folding one is convenient to carry, but it should be cleaned immediately after use, otherwise, it will be easily tainted. By the way, some coffee shops and breakfast shops, even if they choose to eat or drink in their store, they will still give you a take-out cup. At this time, if you tell the store yourself to use the in-store cup, you can reduce the garbage and do something that show some filial piety for the mother earth.



Take your own lunch box and take it out, it looks so delicious

Use the food belt to buy delicious crepes, donuts, and scallion cakes



I eat out most of the time. When I start to live without plastics, I often use a glass lunch box that has a disadvantage of not being easy to carry. After that, I had a food bag. In Taiwan, where road-side snacks are abundantly accessible, which I think it is the most convenient. In fact, I have never felt that I need to buy extra containers to avoid plastics. Later, I found that if I just buy things near my home, the existing iron pans in my home can be directly used to carry the food bought nearby. For example, they are very handy when buying crispy and salty fried chicken and stews nearby.

If you cook by yourself, buying food from the traditional market reduces more plastic bags than shopping from the supermarket. For example, you can buy loosely-packed vegetables, meat, and eggs with your own box and plastic bag. You can then place them directly in the refrigerator when you return home, which makes it very convenient.



Buying loosely-packed eggs, vegetables, and meat



Using the bottom of the PET bottle as the soap tray, you can prevent the soap from getting too mushy (left); unwanted mesh bags can also be used to pack soap to prevent mashing of the soap (right)



The bamboo toothbrush can be naturally decomposed

In order to reduce the bottles and jars in the home, shampoo, shower gel, and dishwashing detergent are replaced by shampoo pies, soaps, and house soaps. Not only are the ingredients natural, the consumption of bottles, cans, and plastic beads that pollute the marine ecology can be avoided. I often buy from handmade soap sellers, even using leaf packaging, which is very environmentally friendly, while washing the body, but not polluting the earth. In addition, in terms of living, toothbrushes can be replaced by bamboo ones, as they are naturally decomposable. For cotton swabs, the ones with paper or the bamboo shaft for the axis can be selected for use, which can reduce the burden on the environment; and do not underestimate the toothbrush and cotton swabs, as they are the top names of marine debris and can also harm marine life.

In addition, I like outdoor sports very much, and during marathons, I will bring a folding water cup on the waist belt to pour water in to drink at the supply station, so that I would not have to take a new paper cup at each depot that end up increasing garbage. When I go to the seaside to play, I will wipe coconut oil or aloe vera cream instead of sunscreen, to avoid the damage to the sea caused by sunscreen. I will also be equipped with a kettle made of glass as a water bottle, because only hot water (for instant noodles) can be drawn from water dispenser at most convenience stores. By placing it in a glass container, bike riding will slowly cool it down, and then pour it into the plastic kettle for the bicycle. With this way, there is no need to buy bottled water, and purchase of bottled water that usually cause garbage from the PET materials can then be reduced.



Bring a folding cup for use during the marathon



Bring a glass kettle with you while traveling by bicycle

In fact, it is really difficult to stop the use of plastics 100% and not to make garbage. However, if you can easily reduce it little by little from small things in daily life and accumulate it little by little, you can leave the environment a space for recovery. As for the journey of the garbage, we can't predict where it will go and whether it is really handled and processed. Even if we recycle it, we don't know if it really can be used again. Only by reducing generation of garbage and choosing materials that cause less damage to the environment could the most effective ways there ever be. Leaving the next generation a clean and beautiful land, I think, is also the most love-giving act for them.

