

Lantech™

Product Guide



Pioneering Industrial and IP Networks

Contents

About Lantech	1
Applications	2
Transportation	2
Power and Utilities	4
Maritime / Ship / Offshore Platform	6
Oil and Gas	8
Surveillance	10
Building Automation and Security	12
Process / Manufacturing Automation	14
Mining	16
EN50155	18
Technology	20
Pro-Ring System	20
Lantech-View	21
Industrial Ethernet Switches	22
Industrial Entry Switches	22
Industrial Smart-Ring Switches	23
Industrial Managed Switches	24
Industrial DNV Type Switches	26
Industrial IEC 61850 Switches	27
Industrial EN50155 Switches	28
Industrial Converters Series	29
Industrial PoE Series	30
Industrial Device Server	31
Business Ethernet Switches	32
Managed Switches	32
Smart Switches	33
Converters	34
PoE Series	35
Mini-GBIC/GBIC Series	36
Accessories	37
Product Matrix Selection	38

About Lantech

With a long background in IP Ethernet products, Lantech brings the best network solutions for Industrial and IP networks to the marketplace. The Lantech group is devoted to providing feature rich, high-quality networking solutions with outstanding service and support to our world-wide partners. Lantech's core competency is centered around our network software and hardware, which allows for the seamless delivery of a variety of applications and services in diverse network environments.

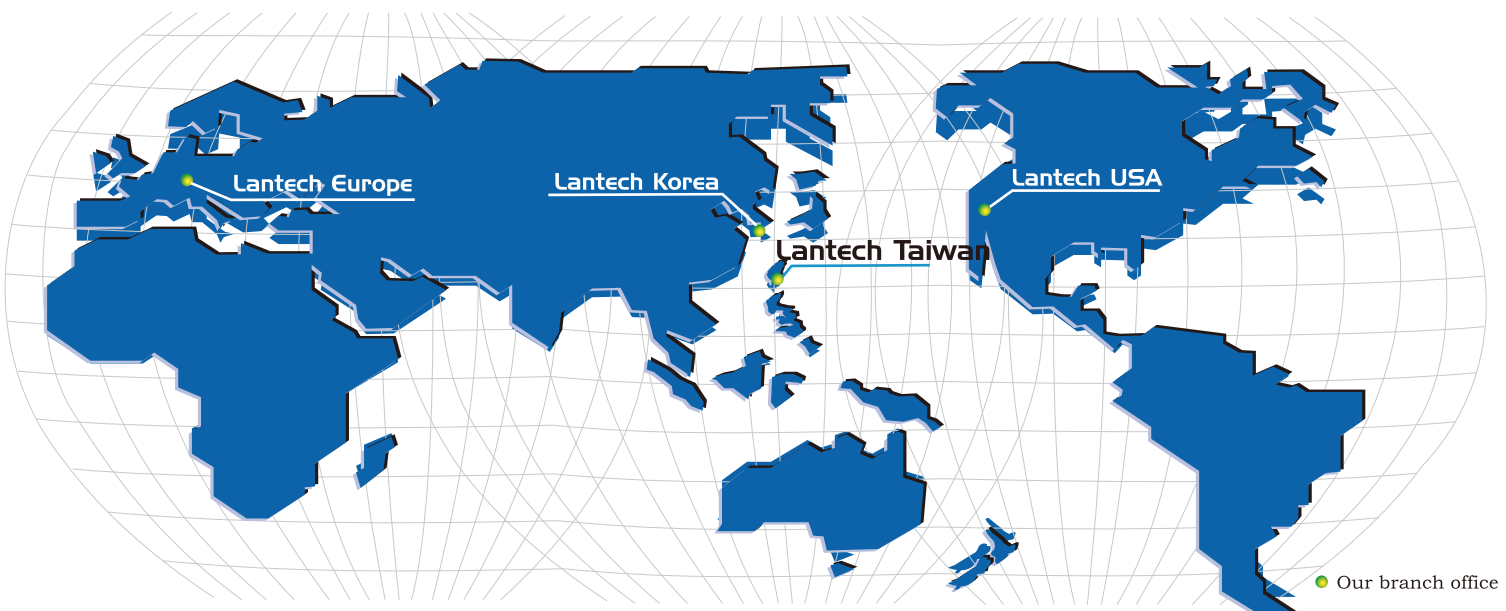
Lantech products are integrated with Pro-Ring, our proprietary auto network recovery protocol, and Lantech-View, a Windows utility for monitoring and configuring multiple switches at one time. Lantech is committed to providing our partners with the products, service and support necessary to help promote our brand in the marketplace.

Lantech offers a complete family of commercial and industrial grade networking products in support of the global transition to all Ethernet services. Lantech products and solutions provide for the delivery of universal Ethernet services across various markets and applications including:

- Transportation
- Power and Utilities
- Maritime / Ship / Offshore Platform
- Oil and Gas
- Telecom and ISP / WISP
- Surveillance
- Building Automation and Security
- Process / Manufacturing Automation
- Mining
- Rail Train EN50155
- Others

Lantech products are distributed worldwide. We provide high quality products with customer-centered services from our sales offices located in Taiwan, United States, Germany, and Korea. By combining our outstanding products and services with knowledgeable and respected channel partners, Lantech is able to provide a significant price-performance value to any Industrial or IP network.

Lantech products are successfully transporting Ethernet services around the globe, including networks at The Taiwan Post Office, In-store Broadcasting Networks, Stanford University, CNN, Universität Würzburg (The University of Wurzburg), Korea U-city FTTX, Korea's Subway System, Thailand's Subway System, Japan's High-speed Railway and Israel's wireless backhaul network.



Transportation



To become a modern country, countries worldwide are constantly developing and improving their transportation systems. Transportation systems commute people and goods within city and between cities as basic country infrastructure to prosper economic growth. Therefore, devices in a transportation network need to be durable for different operating environments and have immediate reaction responding to control center.

Lantech products are able to apply in transportation applications for trains, buses, MRTs, trams, cars, and highways, providing total network solutions, including surveillance, traffic status control, electronic digital display, and train monitoring or controlling.



Surveillance

The metro public transport systems such as MRTs, Light Rail Transport, and Trams, which produce less pollution and commute large amounts of people, is one of the most irreplaceable solution to relieve the heavy pressure of traffic in big cities. However, as public places with a large number of flowing, highly concentrated people, particularly in the peak period, there might be a lot of insecurity issues in which criminals have opportunity in these environments, thus, manpower alone is not enough to maintain the train safety. With a highly integrated network system, the video surveillance device inside the train is able to record the multi-angle and real-time train status and then transfer video stream to control room in the train or the remote control center.

Traffic Status Control and Electronic Display

In daily traffic status monitoring applications such as traffic on highway, or in tunnel is always integrated with electronic display system to inform the drivers of real-time traffic. To collect, analyze, and transfer traffic information fast and accurately, a reliable and powerful network system is necessary in which the network switches need to be sustainable to operate in such a harsh outdoor environment as well.



Train Monitor and Control

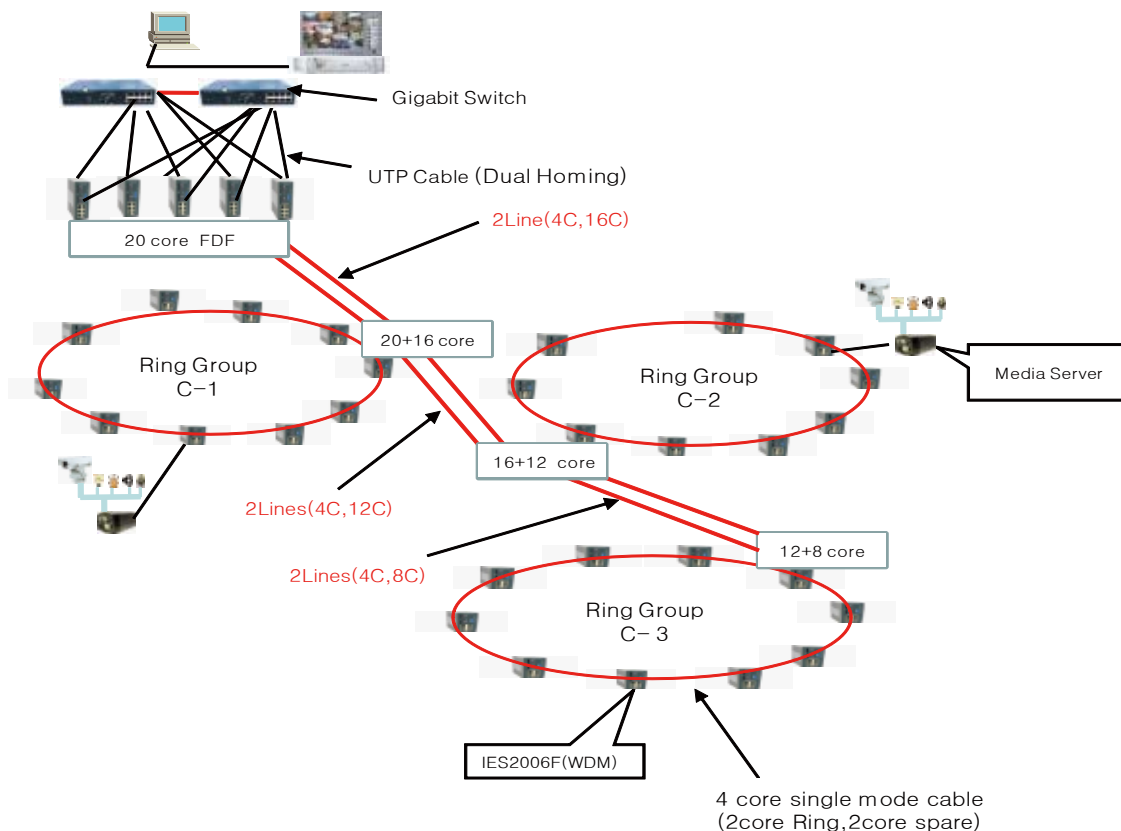
The train control system not only adjusts the speed of trains, but also provides information of the whole railway system, including each vehicle's status such as the anti-skid system status, hotbox, brake cylinder condition, the train pipe pressure, smoke alarm, power supply, lighting, chargers, leakage protection, electrical safety record, air-conditioning unit operating conditions, temperature, and the inside door status. The status are transferred via network and displayed in digital data, LED light and digital meter, providing each system's status more visually.



Lantech industrial switches are designed to meet with transportation environments. To ensure long term reliability in critical industrial environments, each of Lantech products are housed in a robust IP30 metal case and has been tested extensively to meet with Industrial EMI and EMC standards. Rigorous mechanical testing has also been undertaken to comply with free fall, shock and vibration stability test requirements. The -E model can be used in extreme environments with an operating temperature range of -40°C to 75°C.

Any network crash is not allowable in a transportation system since this could cause huge damage on properties or even threaten the safety of people. Thus, the network should have the shortest recovery time in case of system interruption. Featured with Pro-Ring system, Lantech products provides a recovery time of less than 10ms for a ring of up to 250 switches. Lantech PoE industrial switches also provide a flexible, cost-efficient, and less time-consuming solution for transportation network devices with traffic camera units.

Lantech Industrial Switches have been adopted and proved as rugged solution for transportation solutions in Korea's Subway System, Thailand's MRT System, and Japan's High-speed Railway.



Power and Utilities



The current power grid technology has been using for over 100 years in which it has very low efficiency accounts 67% power lost in total power generation resulting big economic lost. In order to fulfill the “Copenhagen Climate Summit” goal reducing 20% to 40% of green house gas by 2020, smart grid network by two way digital technology has become essential to deliver, store, allocate for resilience energy integrating from solar and wind power.

Advantages of Smart Grid

A basic power grid consists of several parts. A power plant generates power and increases the voltage by a transmission substation to improve the efficiency of transmission. The transmission substation also allows it to connect from long distance, high voltage transmission to local, lower voltage distribution. At the local power substation, transformers reduce the voltage to a lower level for distribution to commercial and residential users. It can also provide power to Industrial users which often require a higher voltage and perhaps also have special security of supply considerations.



Since environmental issues are extremely important and major energy resources are non-renewable, how to produce, allocate and manage power effectively has become an inevitable issue nowadays. The smart grid system, which integrates power generation, transmission, distribution, advanced metering infrastructure, power storage, data control and analysis software, and home area network, provides the best solution to address this problem.

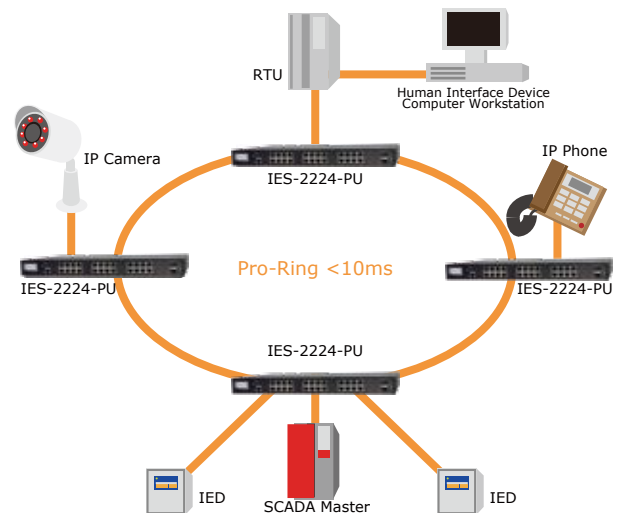
The Ethernet network is one of the most significant infrastructure components used to construct the smart grid and the quality of network is the key factor that affects the operating performance. Lantech products help to build up a highly integrated and reliable network system for smart grid. Another benefit of an Ethernet-based smart grid network is convenient installation and maintenance which results in both cost and time efficiency.

Take a power substation for example - via an Ethernet network constructed by Lantech products, Intelligent Electronic Devices (IEDs) are able to connect with a Remote Terminal Unit (RTU) and satisfy all management needs. The RTU collects and sends data to a central control room, which may be located a long way from the substations which make up the Transmission/Distribution system.



Network Managers have complete control of remote IEDs and are alerted to changing system conditions. When an incident occurs, the nature of the problem can be quickly determined via a Human Machine Interface (HMI) and appropriate corrective action is able to be taken, without having to send personnel to the remote substation. Often corrective action is taken automatically without human intervention.

Data for monitoring the status of the operating environment, such as temperature, humidity, pressure, communication, operating efficiency, access control system, smoke detection, and other unexpected accidents is easily collected and analyzed.



IEC 61850 & Other Features

Equipment in a power utility substation must operate reliably in the vicinity of strong electro magnetic fields (EMI) and may be exposed to voltage surge and ground potential rise during line fault conditions. This harsh environment demands specially hardened reliable network infrastructure to support the IED's. Lantech provides managed switches that comply with the latest IEC 61850 & IEEE 1613 standards which define specifications for operation in the substation environment covering EMI/RFI e.g. from inductive load switching, lightning, electrostatic discharge, interference from portable radio handsets, ground potential rise resulting from high current fault conditions within the substation, and a variety of other EMI phenomena commonly encountered in the substation environment.

One of the most important features of IEC 61850 is the ability to transfer events immediately with Security and Dependability - Generic Object Oriented Substation Events (GOOSE) is a control model defined by IEC 61850 to transport critical events such as intertripping, over substation networks. Based on VLAN and priority tagging, GOOSE group messages are securely accessed within VLAN groups and being priority serviced in the network with a as the GOOSE messages demand to be transmitted with a maximum delay of 3ms.

To ensure long term reliability in critical industrial environments, each of the Lantech products has been tested extensively to comply with free fall, shock and vibration stability requirements. The IP30 metal housing also provides a robust protection for the products. The IEC 61850 series models are designed for extreme environments with an operating temperature range of -40°C to 85°C.

Ease of management is another top priority for power and public utilities applications. Lantech products provide several management choices, including web-browser, telnet, CLI, and our own Windows-based utility Lantech-View.

To prevent network failure the Lantech Pro-Ring system providing minimum network recovery time. With all the above features, Lantech products provide the best options for applications, not only in power generation, but also for use in other public utility facilities such as desalination plants, fresh water and wastewater treatment plants. Lantech hardened switches provide the ideal cost effective and secure network solution especially for diverse widely distributed networks such as wind farms and solar generation.

Regardless of the energy source, be it coal, gas, hydro, nuclear, wind, or solar, Lantech products provide a total network solution, integrating data transmission, line protection, status control, and surveillance.



Maritime / Ship / Offshore Platform



Challenges of Maritime Application

Marine network applications are divided into two categories – One is On-shore, the other is Off-shore. On-shore applications include Lighthouse surveillance, Wind turbine controlling and monitoring systems, Tide Power controlling and monitoring systems and surveillance. Off-shore applications include IP networking for Oil platforms, Battleships, Yachts, and Cruise Liners.

The challenges of marine network applications include coping with harsh environmental conditions. These conditions include extreme operating temperatures, heavy moisture, erosion, extensive shock and vibration. Also, extensive EMI can prevent some of the equipment used in the ship, especially the compass and navigation systems, from operating properly.

Harsh Environment

Problems caused by erosion, heavy moisture and extreme working temperatures are common in marine applications. Lantech's "Marine" Series Industrial Switches are designed to cope with those problems. Given the diversity of locations that switches may be used, Industrial Switches are needed for the various types of approvals under DNV classification.

DNV (Det Norske Veritas) Maritime Certification specifies the test criteria for all equipment used in Ships, High Speed and Light Water Craft as well as Off-shore oil platforms. The DNV Organization originated in Norway. Initially, DNV was to provide consulting services for managing the risk and quality control systems onboard ships. Today, DNV Maritime is recognized by 80 national maritime authorities in managing their risk for the "Tough" maritime environmental conditions. DNV Tests Directives

DNV maritime test directives are defined through the relevant EU-Directives, which include:

- The Marine Equipment Directive (MED)
- The Low Voltage Directive (LVD)
- The Electromagnetic Compatibility Directive (EMC)

Test Categories	Test Categories
Temperature Range	Performance Test
Humidity	Power Supply Test
Vibration with Frequency Range	Inclination Test
EMC	Insulation Resistance Test
Enclosure	High Voltage Test
Compass Safe Distance Test	Salt Mist Test
Acoustic noise and Alarm signal levels	Additional Tests

Marine Ships- Tough Conditions

Challenge I Vibration

When a ship starts its engine, the vibration can cause equipment to fail. For battleships, the vibration caused by firing missiles is so intense, that it can cripple electronic equipment on-board ships. The vibration strain test that DNV carries out takes from 90 to 120 minutes and operates three perpendicular plans (different frequency / amplitude) to reveal the most possible ways to damage EUT tested devices. Through vibration tests, equipment can be assured to function normally during and after intense vibration.

Challenge II High Voltage

Typically at the bottom of a ship, all ships have a high voltage room for distributing electricity to the ship. Under some circumstances, like when a missile is fired, the high voltage will be applied for a short period of time. DNV tests up to 1000V to the EUT for a period of one minute to ensure that the product is able to survive during a period of high voltage.

Challenge III Conducted Radio Frequency Immunity and Emission

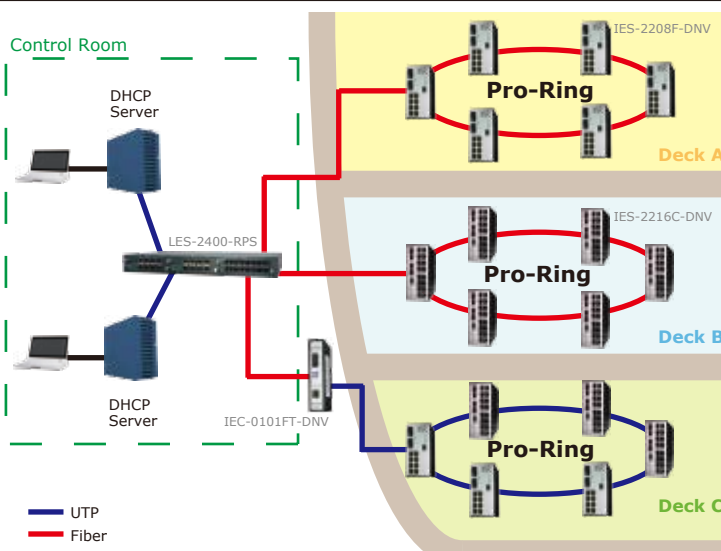
Generators on the ship supply power to all the equipment. However, a generator is constantly creating noise through the line, so it is important to discharge the electromagnetic disturbance to the earth. If not, the conducted emissions on the power supply port will exceed the limits. The DNV test carries out the frequency range as per CISPR 16-1,16-2 which is 200Hz – 9K Hz (Conducted Emission Test) and 9K Hz to 120K Hz (Radiated Emission Test).

Lantech’s “Marine” Series of Industrial Ethernet Switch

Control Room Switch / Media Converter		
Product Name	Description	Features
LES-2400-RPS*	3 slot Modular 100M SNMP Switch + 2 Gigabit uplink switch with redundant power supply	Pro-Ring (Fast recovery within 10ms) with Lantech Industrial Switch
Device-end / Edge Industrial Switches and Media Converters		
IES-2208F-DNV*	8 port 10/100TX + 2 100M FX SNMP Switch	Pro-Ring 10ms; Advanced SNMP with Lantech-View utility
IES-2216C-DNV	16 10/100TX + 2 Giga/100M SNMP Switch	Pro-Ring 10ms; Advanced SNMP with Lantech-View utility
IES-0008T-DNV	8 port 10/100TX Switch	Plug-and-Play
IES-0005T-DNV	5 port 10/100TX Switch	Plug-and-Play
IEC-0101FT-DNV	1 port 10/100TX to 1 port 100FX Converter	LLF, LEP function
		*Pending

What extra benefits can Lantech deliver to marine ship applications ?

Besides the hardware elements to meet with strict marine ship / DNV certifications, Lantech brings a complete line of Ethernet solutions from the control room to the edge of the network. All switches include our Pro-Ring protocol (self healing, recovery in less than 10ms). In a harsh network environment, the risk of network disconnection is much higher than in an office network. Lantech’s marine solution is designed to reduce network downtime, and provides for fast, automatic recovery in the event of a loss of connectivity.

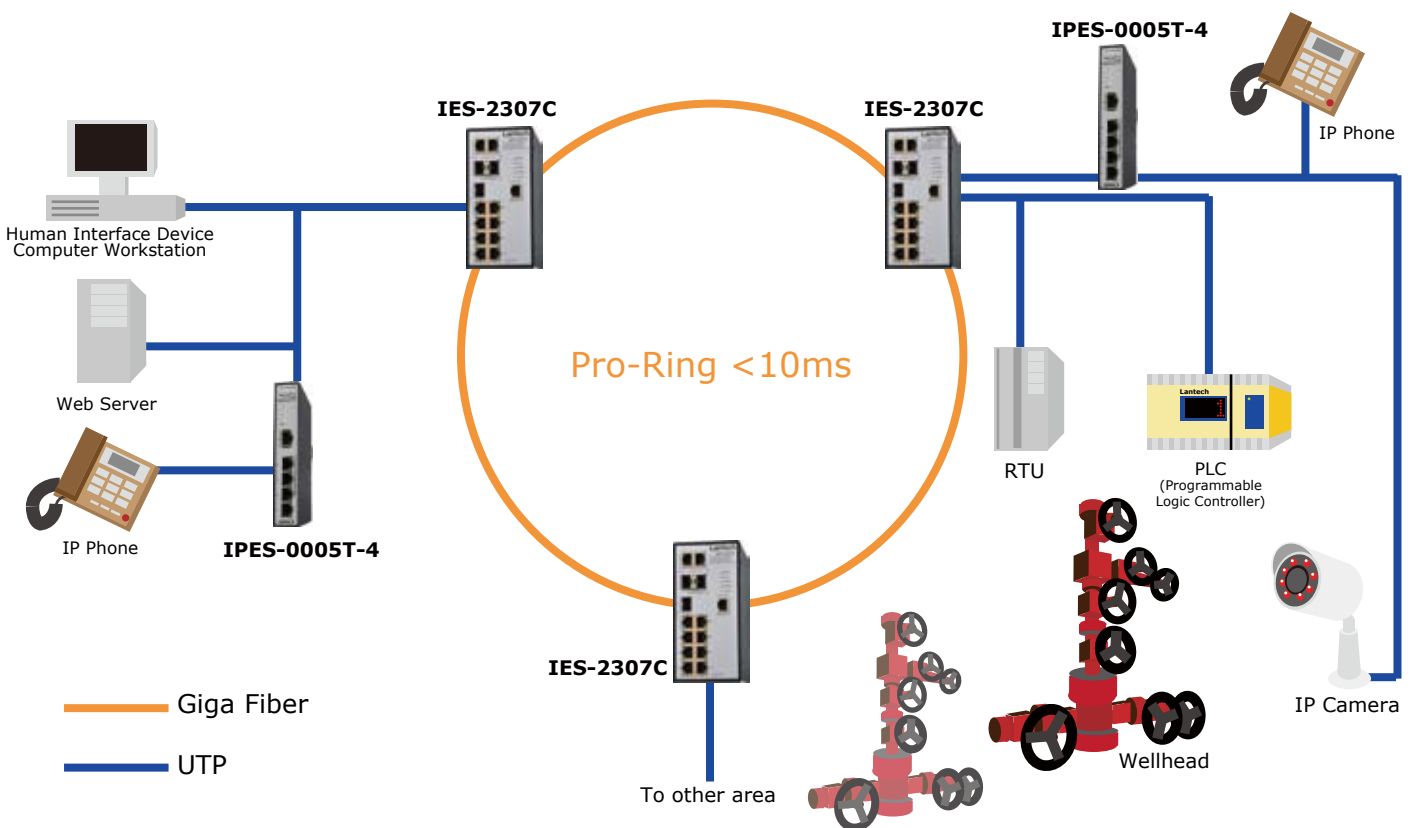


Oil and Gas



The whole oil and gas industrial system starts from wellhead, which may be divided into on-shore and off-shore, and ends with the refine system. Between wellhead and refine factory is the distributed system such as pump station and pipeline. Operating environments of oil and gas industry are full of explode-able materials which may cause tremendous damages, no matter at which part of production processes.

Automated oil tank monitoring system, for example, is one of the most important elements in oil wellhead process. This system combines with data transferring, video recording, and voice, which requires huge bandwidth, real-time reaction, and reliable durability. A well-functioned monitor and control system is able to manage remotely, reducing the needs of human visits for maintenance. Oil fields are wildly distributed around the world. Since the oil field may be located in the desert, under the sea, or in the polar zone, the industrial network must cover wide operating temperature to work properly in these harsh environments. The -E models of Lantech products can be used in extreme environments with an operating temperature range of -40°C to 75°C.



Oil and gas are transmitted via pipelines and pump stations. In order to ensure high and uniform flow of oil, pump stations are needed at regular intervals and pipelines must be under control. For example, to keep the pressure in the pipeline at 50 bar pressure, managers must monitor the status continuously. The reliable Ethernet network allows manager monitor the pressure and flow constantly, making it possible to detect and locate leaks of the pipeline. The entire station data is collected from the individual pump stations, via the extensive Ethernet networks, to a central control room. When there's a malfunction, the operators must be able to identify the exact location of potential leaks quickly and assess unexpected reduction in performance.



As to oil refining process, the last step of oil production, it requires a stable, reliable, and powerful Ethernet network to cover the non-stop and heavy-loading refining process. It is consist of several complicated and a large variety of equipments/devices and need to be deployed by distributed control system (DCS). DCS systems allow the entire system of controllers to be connected by networks for communication and monitoring. Lantech products can construct an efficient Ethernet network to support DCS systems.

Lantech products are featured with Pro-Ring system to avoid network failure, which may cause huge disasters. It covers X-Ring, Central Ring, Dual Ring, Couple Ring and Dual Homing, providing the shortest recovery time for power and utilities. X-Ring is a self-recovery ring protocol operating in less than 10ms for up to 250 switches. Dual Ring and Couple Ring ensure network recovery protection between two X-Ring groups while Dual homing is to back up the X-Ring groups when connect to upper layer or the core switch.

Since oil and gas are flammable and easily to explode, network devices must have different standards to meet with this kind of hazardous condition. The Lantech products have passed UL Class I Division II for Group A, B, C and D hazardous location, which is a safety certification especially suitable for oil and gas industries. With UL Class I Division II approval, the Lantech products can be implemented in hazardous or explosive condition without accelerating the damage.

For oil and gas applications, a powerful and reliable Ethernet network is the basis of the entire control and monitoring functions. It enables future expansion through modern technology, providing flexibilities without large costs. Lantech products ensure long term reliability in critical Ethernet network of oil and gas applications.



Surveillance



With the increasing demand of surveillance on transportation applications, the need to use hardened switch for surveillance network is ramping up. To monitor traffic, community, factory line, warehouse, pharmaceutical process, airport and many other places in order to improve the efficiency or prevent from intruders or record the crime sciences are the best applications for CCTV, IP CAM together with Industrial Switches.

However, to cope with gigantic image files flowing in the network not causing network jam is an important task in such applications. IGMP protocol could reduce network traffic dramatically by handling multicast packets effectively.

Please picture the surveillance network where implements 20-30 or maybe hundreds of IP-CAMs or analog CAM to send all the MPEG or H.264 real time image frames back to the central PC servers or DVRs, you of course don't want to flood all the high resolution images all over the network which could easily crash the network and lost the important images that really need to be restored. On the contrast, you also want to retrieve the important images remotely from the central upon request. The network technology you could use to utilize such surveillance network well is IGMP v2 or v3. IGMP v2 or v3 are the schemes to send the requested video streams to the target destination in the IP network.

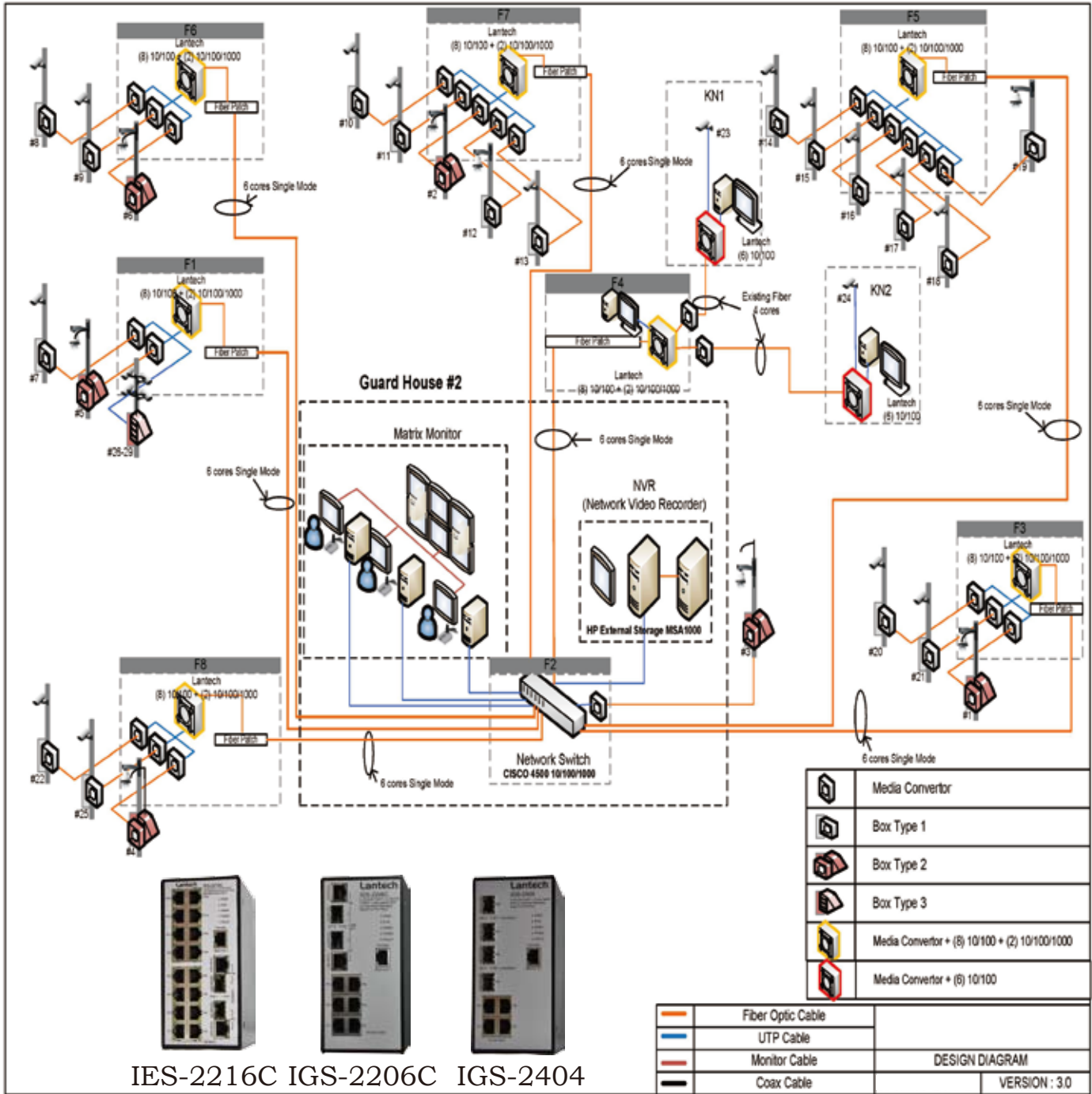
IGMP is Internet Group Mutlicast Protocal that is good for One to Many video frame transmission in network.



IGMP v1 is defined by RFC1122, v2 by RFC2236 and v3 by RFC3376. The difference between v1,v2 and v3 is listed in the following table.

	RFC definition	Main difference
IGMP v1	1122	No Leave, use time out up to 5 minutes
IGMP v2	2236	Leave to notify Query
IGMP v3	3376	Multicast source filering capacity to IP multicast routing; Allows for specific Join and Leave to join specific source

IP Multicast is an application where needs IGMP Query and IGMP Snooping. In IP Multicasting network, a Query mode must be enabled first otherwise the switch would not know that group members exist. Query mode is usually built in a L3 router. Lantech Industrial Switch is built-in with IGMP Query and Snooping mode to fill specific needs, so they are the best to be used in Transportation, Factory Automation, Warehouse, Traffic Control, Community Surveillance applications.



Building Automation and Security

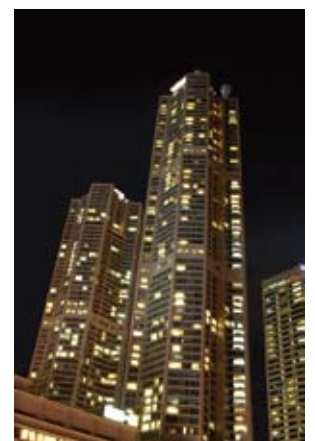


Building Management Systems (BMS)

Most modern buildings today have some sort of Heating and Ventilation system which may also include Air Conditioning (abbreviated to HVAC). In general, BMS is the term used to describe the system which controls the performance of the HVAC system. Historically, building owners in the market for a new BMS system have been forced to choose between one of several proprietary equipment manufacturers. Upon the purchase of a proprietary system the building owner is locked in to one product for a considerable amount of time or has to change the whole system which is costly in terms of time and money.

As in many other markets there has been commercial pressure on Vendors from Users to offer interoperability between different Vendor's equipment to increase the choice, competition and to drive innovation in the BMS market. Key to this interoperability is the use of open standards and in particular the Communication protocols used between devices in the BMS system. Over the last few years there has been a move away from Manufacturers proprietary communication protocols towards more open protocols such as TCP/IP and BACnet®/IP. The use of TCP/IP for BMS System communications has brought about increased choice in selecting products from different Vendors in the same BMS system and reducing the associated cabling and network hardware costs.

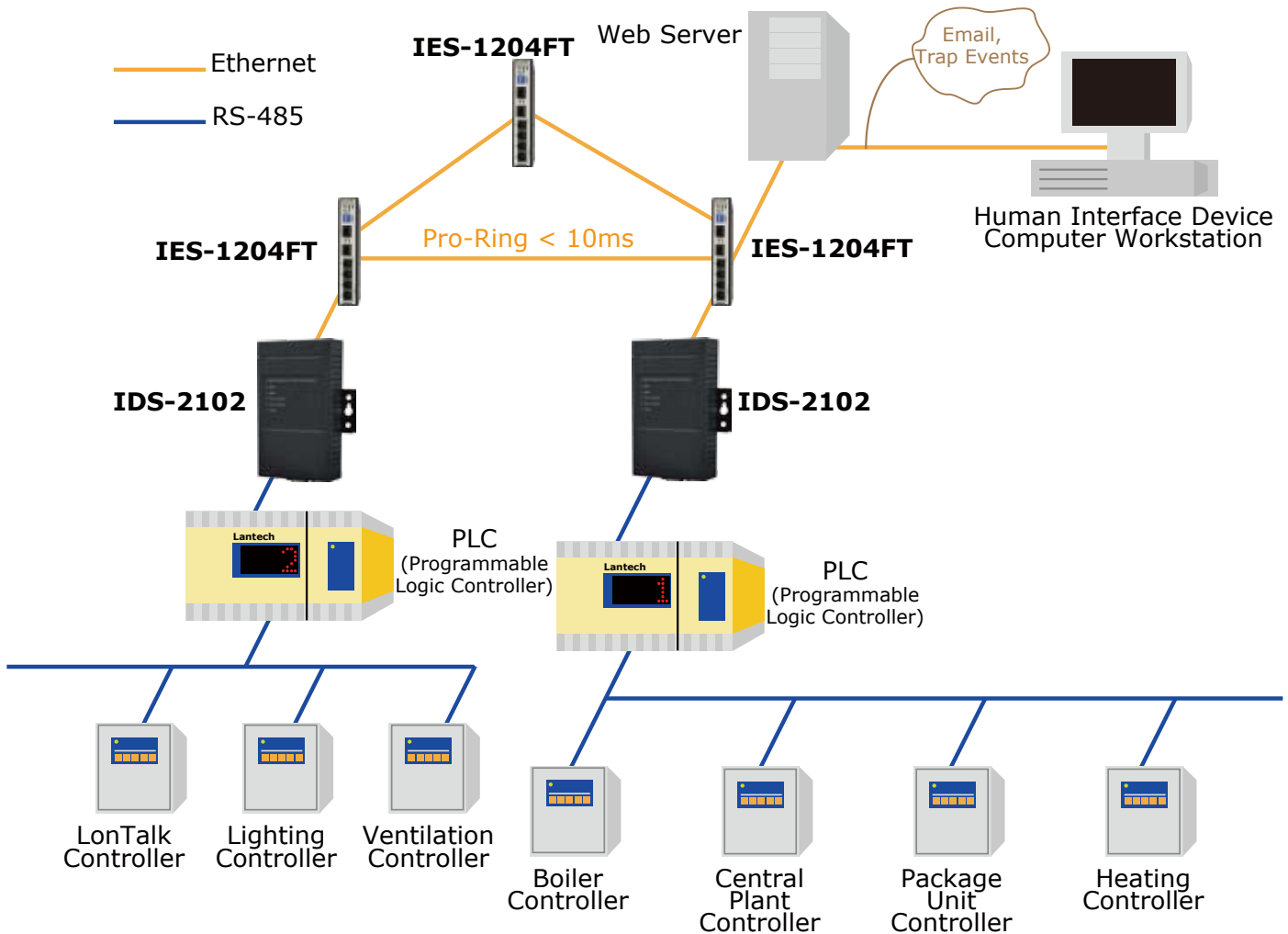
For any Building network it is important to use switches with an appropriate technical specification to ensure high level network reliability and to meet necessary installation requirements. Normally BMS equipment is fitted in compact wall mounted Control cabinets that are distributed around the building, with most devices being DIN Rail mounted and typically requiring a low voltage power feed of 24VAC or 24VDC (varies by Country). For cable runs which exceed the 100 metre limitation of Cat5e or for links between different buildings, a fiber optic link is the ideal solution.



For small installations of a few nodes, a network comprising Unmanaged Industrial grade switches is normally implemented. For larger installations (typically over 10 nodes or with fiber cable runs) it is advisable to use Managed Industrial grade switches which have the added features of Network Diagnostics and Network Management capability. These features are particularly useful when installing large amounts of cabling and commissioning the BMS system.



For more critical applications such as Data Centres or large multi-storey Buildings, it is recommended that Managed Industrial grade switches be used which have a redundant ring capability to enable a fault-tolerant resilient network topology. It is also recommended that Network Management software be used to monitor the network and that this is incorporated into the BMS system.



Process / Manufacturing Automation



In process / manufacturing automation applications, the most common structure consists of PLC, DCS, and SCADA. With PLC and DCS, managers are able to control equipments such as robotic arms and conveyors and transmit data to SCADA, where connects with database and then generate statistic data for monitoring the operating status but also for a better productivity. The network between these devices and software must be reliable and accurate.

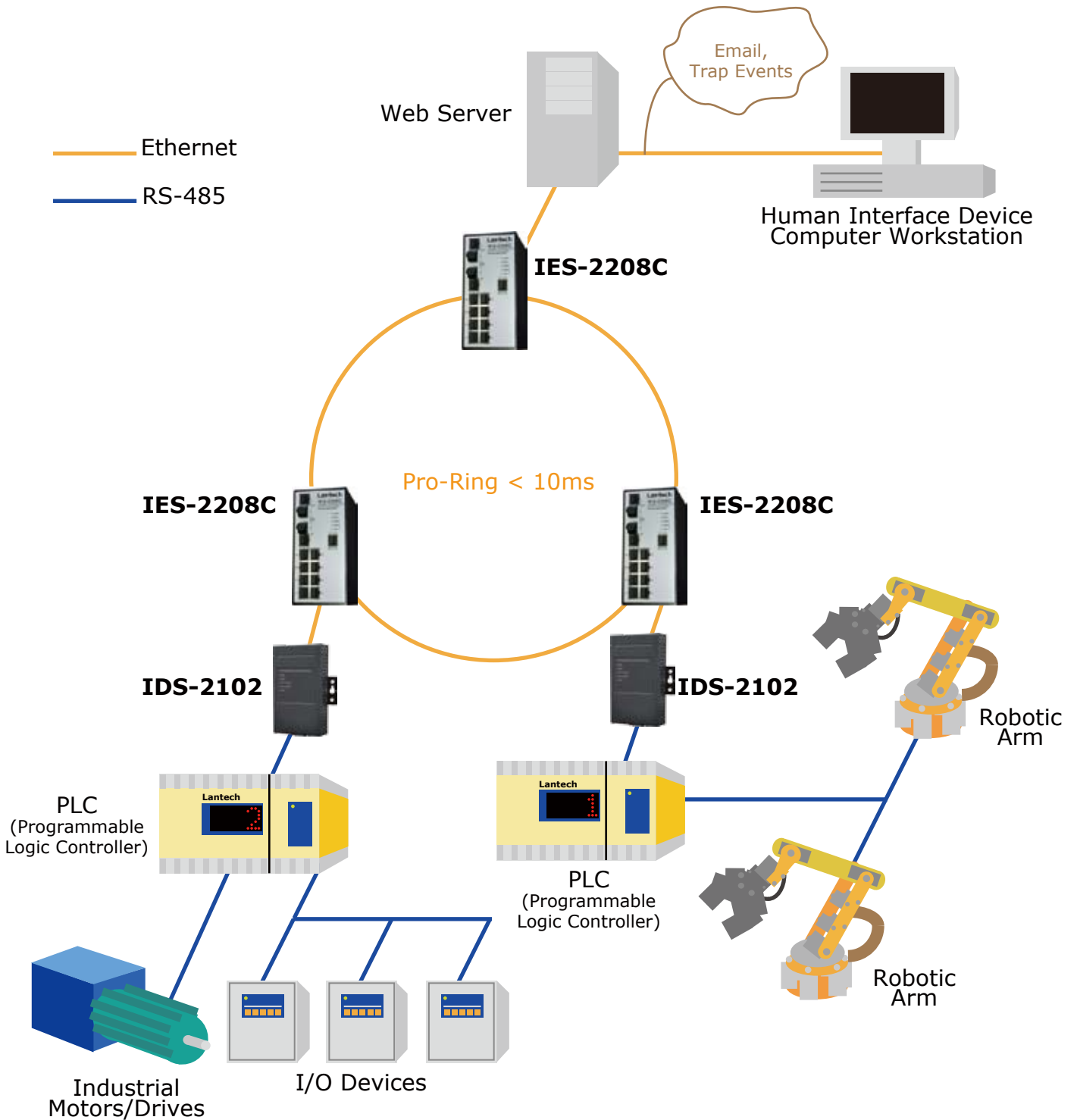


No matter in which kind of industry, Industrial automation nowadays needs to be absolutely accurate because any interruption or delay may result in a huge amount of lost. For example, the assemble line of an automobile factory consist of many precise robotic arms, a few seconds interruption may result in a line of defective products. Thus, in process / manufacturing automation applications, there is a huge need for Real Time protocols, which include ProfiNet by Siemens, EthernetIP by Rockwell, and ModBUS by Schneider. The Real Time protocols were developed by the need of PLC's connecting with robotic arms, conveyor belts and other automation devices for process / manufacturing automation. However, with increasing demand of Ethernet in automation field, most of PLC are now equipped with Enthernet port to collocate with Ethernet switches, managers are able to monitor the status, detect the failure, and solve the problem immediately.

On the other hand, to satisfy the rapid changing industry environment, manufacturing process must have higher flexibility than before, which means a simpler and more convenient control system. Lantech industrial switches not only provide the Pro-Ring feature, which lower the recovery time of less than 10ms, but also support a variety of management functions such as web-browser, CLI, telnet, SNMP, and Lantech-View, a Windows based utility software to eaily configure and manage all Lantech switches.



To ensure long term reliability in critical industrial environments of process / manufacturing applications, each of the Lantech products has been tested extensively to meet Industrial EMI and EMC standards and undertaken to comply with free fall, shock and vibration stability test requirements. The IP30 metal housing also provides a robust protection to our products.



Mining



Since nature resources are limited and rarer than before, it is necessary for traditional mining industry to adopt high-tech IP network to increase the efficiency of exploitation as to monitor the rate of progress and to storage a large amount of row data. Furthermore, the mining cells are usually scattered widely, so it is very important to operate with a stable network system with a large bandwidth, and strong management capabilities.

Whether in the past or modern, mining environment, is undoubtedly one of the most dangerous work environments. In the system of aluminum, for example, there are high-temperature boilers combined with constant vibration of the conveyor belt and mining machinery. Most of mining operating environments are underground or in a cave, where is dusty and poorly ventilated. The producing process may be filled with toxic, acid etching, or flammable substances, such as a caustic soda. A serious mine disaster not only makes the company suffered loss of property, but also result in sacrifice precious lives of many people. Therefore, the IP network for mining industry, in addition to general requirements of management functionality, also needs to overcome these challenges.

Lantech industrial-grade Ethernet switches are designed to satisfy the requirements of the mining industry. With original IP-30 metal-enclosure, Lantech products are able to prevent the certain degree of dust generated from the machine during mining operation. However, Lantech also offers IP-67 grade, absolute-protection enclosure for dust-proof and water-resistant. As the latent temperature inside the smelting plants can be 55°C, this operating environment would quickly destroy most electronic devices or render them non functional, but Lantech -E models can be reliably operated at wide operating temperature range from -40°C to 75°C, maintaining network quality even in the extreme low/high temperature. At the same time, Lantech industrial-grade Ethernet switch products have passed a variety of testing and certification, including the three kinds of stability test (free-fall, vibration, shock), with a certain degree of resistance to shock, vibration-resistant properties. These tests and certifications ensure the normal functioning under mining environments. The, UL, FCC, CE, WEEE, and RoHS certification also provides a certain degree of environmental protection and quality assurance.

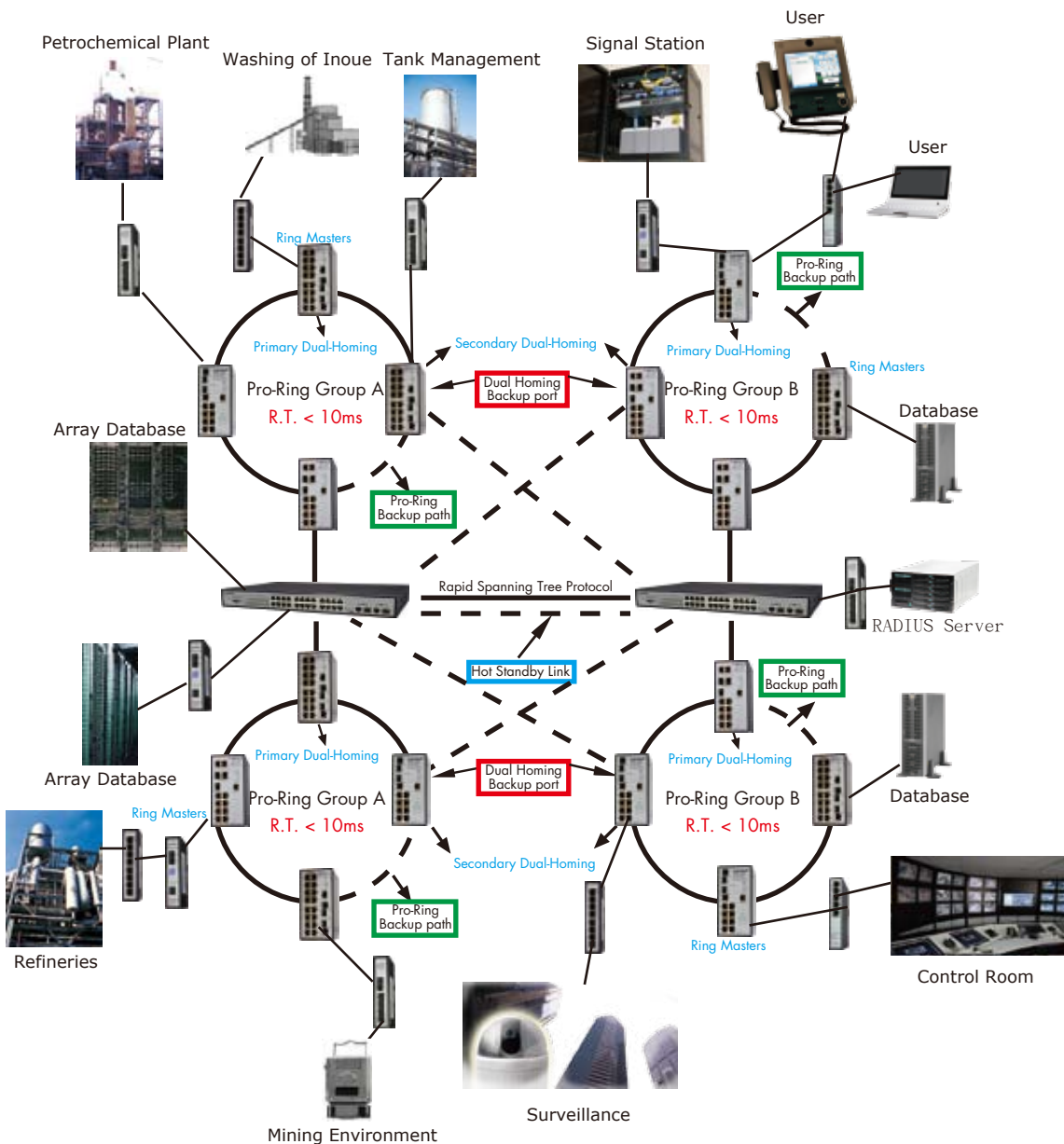
Operating environments of mining industry are dangerous since there may be full of explode-able or flammable materials. Network devices must have different standards to meet with this kind of hazardous condition. UL Class I Division II for Group A, B, C and D hazardous location, which is a safety certification especially suitable for mining industries, provides our clients another guarantee of safety. With UL Class I Division II approval, the Lantech products can be implemented in hazardous or explosive condition without accelerating the damage.

Besides redundant power supplies, Lantech products also are featured with Pro-Ring system, which is able to avoid network failure. Lantech Pro-Ring system providing the fast recovery time for the Ethernet network system. With this protocols for ensuring the network quality, Lantech Industrial Ethernet switches provide a high degree of reliability network system required for mining applications.

A powerful management capability of network systems is also necessary for the mining industry. To face the rapid change that may occur from time to time, network systems must be able to respond quickly to real-time adjustments.

The monitoring system in the pit is increasingly important and it can collect the latest information within the operating environment to avoid major accidents. Lantech's Power over Ethernet (PoE) series of products, directly via the Ethernet cable to transmit electricity to provide IP cameras, warning lights and other facilities required for electric power, without the need for additional construction of a power system. The PoE system significantly reduces the cost and maintenance time and the reduction of wires also lower the potential of risk.

Lantech Industrial Ethernet Switches series meets and exceeds the environmental and technical performance requirements for process controlling and monitoring in mining industry.



Rail Train EN50155



Challenges of current TCN

The current conventional train communication networks (TCN) are facing several challenges to improve the service including the limitation of bandwidth and the limitation of integration. To provide both high quality entertainment video and IP surveillance video, there will be a huge requirement of bandwidth, which is the main restriction for conventional train communication networks. Conventional networks adopt different technologies with proprietary which result in unnecessary costs to integrate with each other.

To construct a railway network with Ethernet infrastructures is the leading trend because it has several advantages. Because all the devices are connected with Ethernet, it is easier to integrate new systems and new applications. Another advantage is the ability of high-bandwidth. Ethernet backbones are able to provide a reliable network environment for implement of applications such as passenger entertainment systems and high-quality video surveillance applications. Connected with Ethernet cables, the installation and maintenance is much easier with less cost.

Harsh Environment

Different to the comfortable environment for passengers, the Ethernet devices in railway applications often operate in a narrow and harsh environment with unique requirements. Devices in rail train must be able to suffer under wide range temperature and humidity. Furthermore, severe air pollution, vibration, shock and EMC are commonly seen. That's why Industrial Switches are needed to be certified by EN50155 standard.

The EN50155 standard is "Railways Applications Electronic Equipment Used on Rolling Stock", which is commonly adopted by many countries and electronics manufacturers. Electronic equipment shall be designed and manufactured to meet the full performance specification requirement for the selected categories such as:

- Ambient temperature

According to diverse severe environments, there are four grades of operating temperature requirements defined by the EN50155 standard and are stated in the following table:

Class	Ambient temperature outside vehicle	Internal cabinet temperature	Internal cubicle over-temperature during 10 min	Air temperature surrounding the printed board assembly
T1	-25°C to 40°C	-25°C to 55°C	70°C	-25°C to 70°C
T2	-40°C to 35°C	-40°C to 55°C	70°C	-40°C to 70°C
T3	-25°C to 45°C	-25°C to 70°C	85°C	-25°C to 85°C
TX	-40°C to 50°C	-40°C to 70°C	85°C	-40°C to 85°C

- Shock and vibration

EN50155 adopts testing methods and limitation according to EN 61373 - Railway applications - Rolling stock equipment - Shock and vibration tests. The standard ensures the equipment to be able to withstand vibrations and shocks and provides the specified useful life under service conditions. To satisfy the requirements, the equipment should be specifically designed with anti-vibration mounts and installed the electronic units completely.

- Relative humidity

EN50155 defines the relative humidity standard that equipment should follow: The equipment should be able to withstand 75 % of the average yearly relative humidity and 30 consecutive days with 95 % relative humidity in the year. IP67 enclosure is one of the best solutions, which provides rugged and waterproof protection to against moisture environments that may cause any malfunction or failure.

- Atmospheric pollutants

The equipment may be exposed in different locations where various pollutants are available, including oil mist, salt spray, conductive dust, sulphur dioxide. To ensure the durability, the equipment should have IP-rated enclosure to against the negative effects from these pollutants.

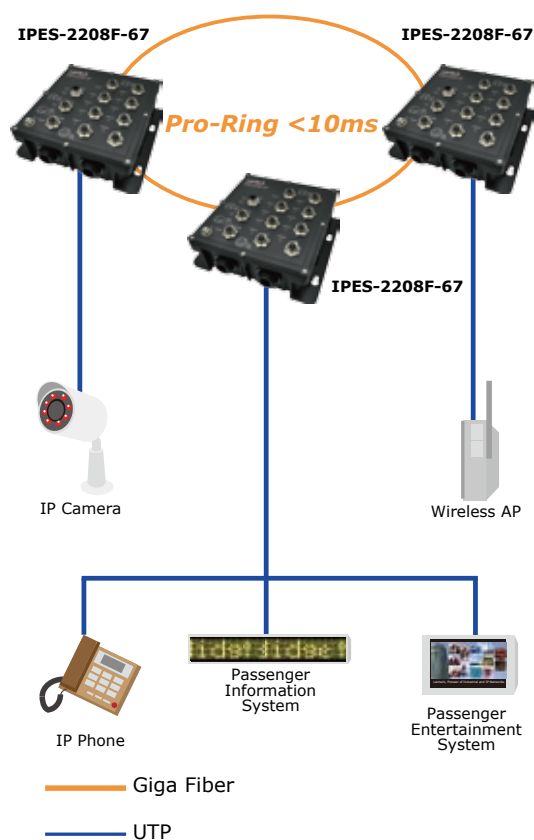
- Electrical service conditions

To overcome the severity and provide the stable services in railway applications, EN50155 also defines several standards for electrical service conditions such as input voltage range, input voltage ripple, and input surges. Each category follows clear requirement. For example, the requirements of input voltage are listed below:

Input Voltage Requirements			
Nominal Input	Permanent input voltage range	Brownout 100ms (0.6xVnom)	Transient 1s (1.4xVnom)
24VDC	16.8-30.0V	14.4V	33.6V
37.5VDC	26.2-47.0V	22.5V	52.5V
48VDC	33.6-60.0V	28.8V	67.2V
72VDC	50.4-90.0V	43.2V	100.8V
96VDC	67.2-120.0V	57.6V	134.4V
110VDC	77.0-137.5V	66.0V	154.0V

Electromagnetic compatibility (EMC) is another main category of EN50155 standard. The equipment should be protected in order not to be negatively affected by conducted or radiated interference, which is referred to EN 50121-3-2 and should not emit radio frequency interference (RFI) that excess the level defined in EN 50121-3-2.

Lantech EN50155 series models provide IP-67 protection and M12 connectors with wide operating temperature from -40°C to 75°C for harsh operating environment in railway applications. The rugged and durable switches have long MTBF that ensure the network quality of video entertainment service and high quality video surveillance at the same time with Giga fiber ports. Besides hardware specifications, the powerful software features also ensure the management convenience.



Pro-Ring System

For Ethernet, network redundancy means a network hardware link down or disconnection cable will not interrupt communications. Also, to achieve network redundancy, one must use a managed switch, since advanced traffic management is required to prevent "looping" of data packets.

Where an interruption of a few seconds is acceptable in the office, it's an eternity for most manufacturing environments. A communication gap of a few seconds or more could cause loss of critical data or worse yet -- system shutdown.

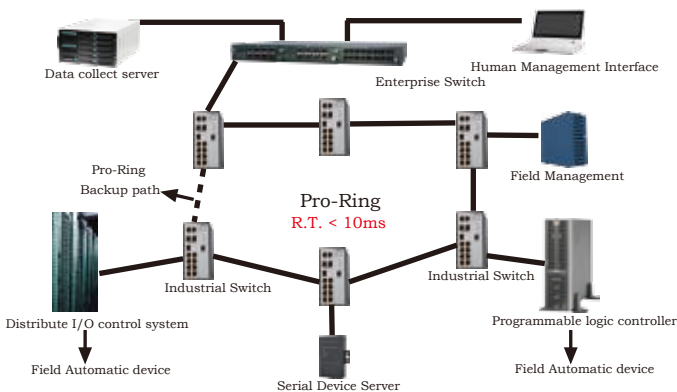
Common enterprise technologies like Rapid Spanning Tree Protocol (RSTP) generally take between 2 to 10 seconds to recover after a fault, and older technologies like Spanning Tree Protocol (STP) take even longer -- 30 to 60 seconds.

Pro-Ring system is a proprietary protocol, for applications where a ring architecture is desired (most manufacturing projects) that uses a pulling scheme to detect whenever a cable break or link fault occurs, it will automatically find a backup path in under 10 milliseconds for networks of up to 250 Lantech switches.

As a result, Pro-Ring system is very important in applications where downtime is expensive.

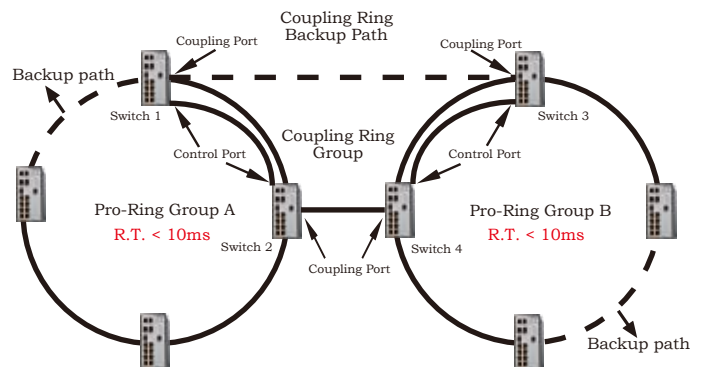
■ X-Ring Application

This is the most basic Pro-Ring system named X-Ring.



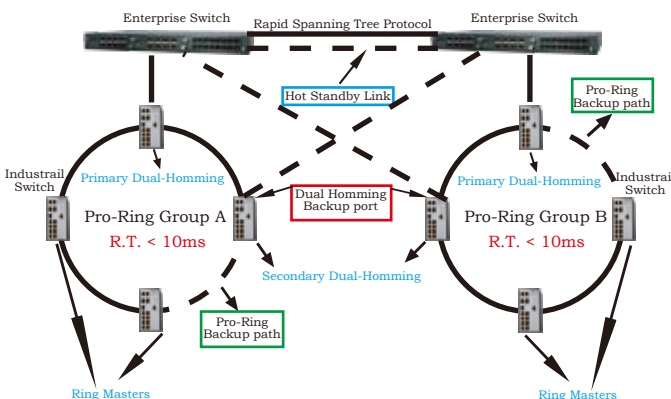
■ Coupling Ring Application

This is the Couple Ring, which is designed for the Network redundancy between two Smart Rings.



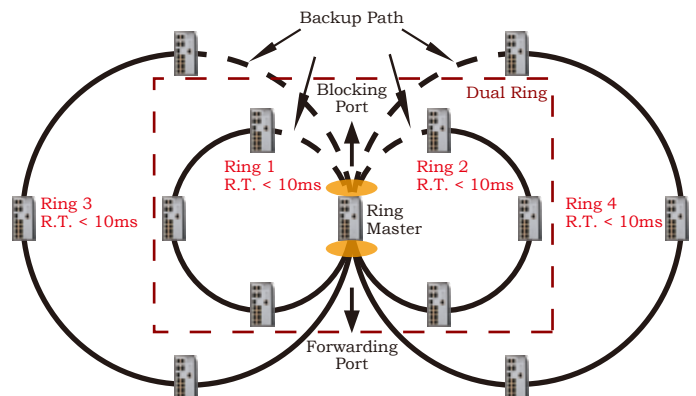
■ Dual Homing Application

This is the Dual Homing. If the users want to add another managed switches from other companies, they can use this function. However, the switched from other companies have to support RSTP.



■ Central / Dual Ring Application

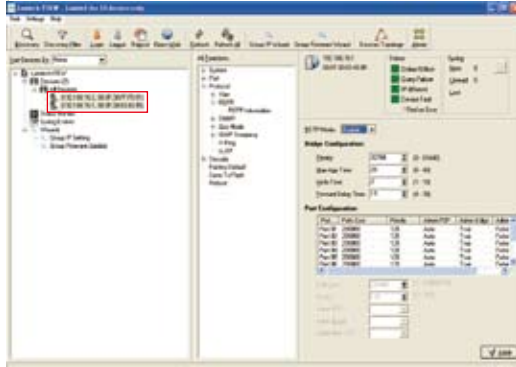
This is the Central Ring. One managed switch can be the ring master of 4 rings. And Dual Ring is one managed switch can be the ring master of 2 rings.



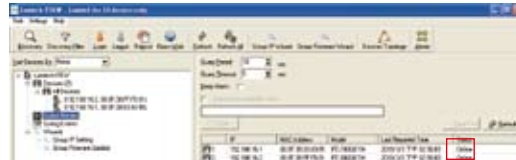
Lantech-View



▲ Auto discovery device



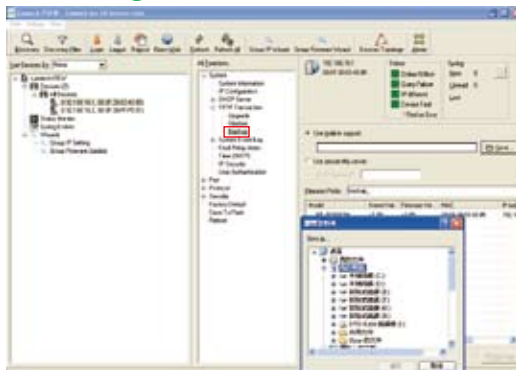
▲ Multiple switches setting function



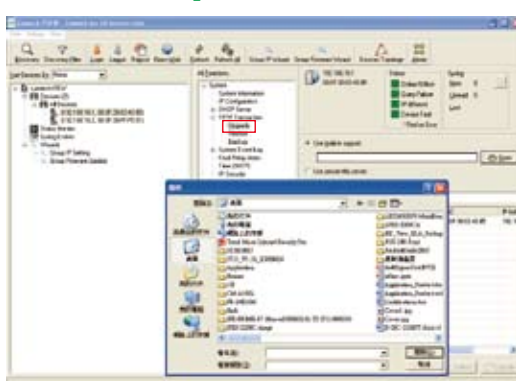
▲ Device status monitoring



▲ Warning: device is abnormal



▲ TFTP Backup

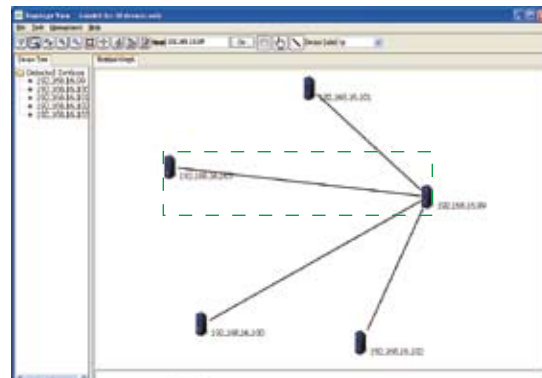


▲ TFTP Upgrade

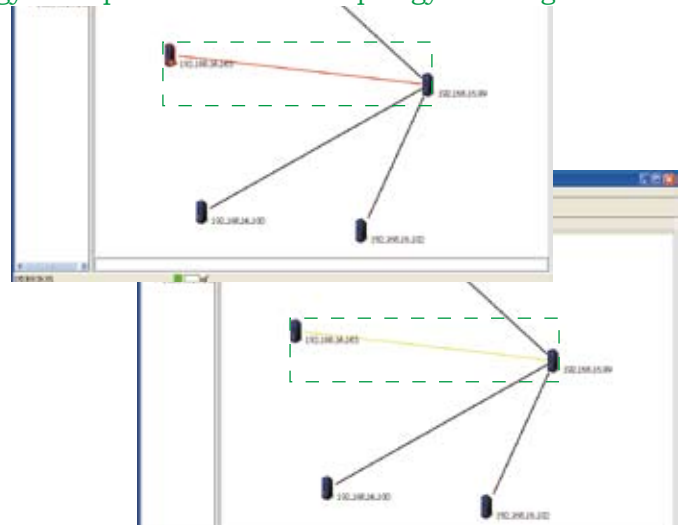
Lantech View is the Windows-based powerful network management software. With its friendly and powerful interface, you can easily configure multiple Lantech switches at the same time, and monitor switches' status.

Lantech View is a smart tool, which can auto discovery devices connected to a network. With its powerful functions for switch configuration, our customers can configure multiple switches concurrently. It can monitor multiple switches status easily, providing a more convenient management solution. As a useful tool to maintain switches firmware and configuration, Lantech View is able to upgrade firmware and backup configure file for multiple switches at one time.

Lantech provides free bundle version for our SNMP Industrial Switch series, in which it can monitor, auto-topology-drawing and configures up to 10 Lantech Industrial switches. The optional Lantech-View Pro can map up to 50 nodes with auto-layout, configuration and discovery.



▲ Topology View provides an auto-topology-drawing function*.



▲ The live status monitor function will detect connection status automatically*.

*Please notice that these functions only works for LLDP (Link Layer Discovery Protocol) supported switches.

Industrial Entry Switches

Lantech Industrial Entry Switches are unmanaged models which are designed to meet the demands of industrial network for Plug-and-Play usage. Each model is in a robust IP 30 housing and has been tested extensively to meet with Industrial EMI and EMC standards.



IES-0005T
5 10/100TX Slim Type
Industrial Switch

- DNV Type Approval
IES-0005T-DNV
- UL Class I Division II Certified



IES-0008T
8 10/100TX Slim Type
Industrial Switch

- DNV Type Approval
IES-0008T-DNV
- UL Class I Division II Certified



IES-0104FT
4 10/100TX + 1 100FX
Industrial Switch

- UL Class I Division II Certified



IES-0204FT
4 10/100TX + 2 100FX
Industrial Switch

- UL Class I Division II Certified



IES-0216C
16 10/100TX + 2
10/100/1000T/Giga or
100M SFP Combo
Industrial Switch

- Dual Speed SFP



IPES-0005T-4
5 10/100TX with 4 PoE
Injector Industrial Switch

- IEEE802.3af PoE Standard
- Power input range: 45~56 VDC



IPES-0104FT
4 10/100TX + 1 100FX w/
4 PoE Injector Industrial
Switch

- IEEE802.3af PoE Standard
- Power input range: 45~56 VDC

FEATURES HIGHLIGHT

- Store and forward switching architecture
- Wide range redundant power design: 24VDC (9~56VDC), 18VAC (12~36VAC) except PoE switches 48VDC (45~56VDC)
- Power polarity reverse function to work under wrong polarity power connection expect PoE switches for polarity protection
- Relay alarm output for system events
- Din rail and wall mount design
- Provides EFT surge protection 3000 VDC for power line
- Supports 6000 VDC Ethernet ESD protection
- Standard operating temperature: -20°C~60°C/-4°F~140°F
- Wide operating temperature: -40°C~75°C/-40°F~167°F (E-model)
- 5 year warranty

Technology Highlights:

What is ESD ?

Electrostatic discharge (ESD) is the sudden and momentary electric current that flows between two objects at different electrical potentials caused by direct contact or induced by an electrostatic field. The term is usually used in the electronics and other industries to describe momentary unwanted currents that may cause damage to electronic equipment.



Industrial Smart-Ring Switches

Lantech Smart-Ring series provides the redundant ring protocol by enabled DIP switch or through Web GUI, which support Pro-Ring system with the most reliable protection for auto-fail recovery. Each model also provides smart and easy functions including Port based VLANs, RSTP/STP, E-mail alert, SNMP Trap, DHCP, DNS client to satisfy the basic management requirements.



IES-1005T
5 10/100TX Smart
Industrial Ethernet Switch
w/Pro-Ring



IES-1204FT
4 10/100TX + 2 100SFP
Smart Industrial Ethernet
Switch w/Pro-Ring

DIP-Switch Setting	
P.F.	When power fault enable relay warning system (On : Enable, Off : Disable function)
R.E.	Enable/Disable Ring function (On : Enable, Off : Disable)
R.M.	Enable/Disable Ring Master Mode (On : Enable, Off : Disable)
R.S.	Ring redundant port select (On : ring port set to port-1 and port-5, Off : ring port set to port-1 and port-2)

FEATURES HIGHLIGHT

- Pro-Ring covers X-Ring, Dual Homing, and Couple Ring Topology
- X-Ring provides Ring recovery time of less than 10ms for up to 250 switches in one Ring
- Lantech-View 10-node, free bundle
- SNTP and SMTP supported up to 4 e-mail alert
- DHCP and DNS client support
- Store and forward switching architecture
- Wide range redundant power design (9~56 VDC)
- Power polarity reverse function to work under wrong polarity power connection
- Relay alarm output for system events
- Din rail and wall mount design
- Provides EFT surge protection 3000 VDC for power line
- Supports 8000 VDC Ethernet ESD protection
- Standard operating temperature: -20°C~60°C/-4°F~140°F
- Wide operating temperature: -40°C~75°C/-40°F~167°F (E-model)
- 5 year warranty

Technology Highlights:

What is HiPOT isolation?

The products are required to pass the High Power 1200-1500 VAC Port to Port Isolation Protection(Ethernet to power, Ethernet to chassis, Ethernet port to port) to protect operators from electrical shock. HiPOT is an abbreviation for high potential. A HiPOT test (also called as Dielectric Withstand test) verifies that the insulation of a product or a component (also referred to as the dielectric) is capable to protect operators from electrical shock.



Industrial Managed Switches

Lantech SNMP managed switches offer advanced functions to cover most of the network requirements. Each model also supports Pro-Ring system for less than 10ms auto-recovery network protection. Free bundled with Lantech-View 10-node, users are able to monitor the entire network more easily.



IES-2208GF
8 10/100TX + 2 1000FX
Managed Industrial Switch



IES-2008A
8 10/100TX Managed
Industrial Switch



IES-2206F-II
6 10/100TX + 2 100FX
Industrial Managed Switch



IES-2208C/E
8 10/100TX + 2
10/100/1000T/Dual
Speed SFP Combo
Industrial Switch

- Dual Speed SFP



IES-2216C/E
16 10/100TX + 2
10/100/1000T/Dual
Speed SFP Combo
Industrial Switch

- Dual Speed SFP
- DNV Type Approval
IES-2216C-DNV
- UL Class I Division II Certified



IES-2307C
7 10/100TX + 3
10/100/1000T with
100/1000M SFP Combo
Industrial Managed Switch
with additional DIDO

- Dual Speed SFP
- UL Class I Division II Certified



IGS-2206C
6 10/100/1000T + 2
10/100/1000T/Dual
Speed SFP Combo
Industrial Switch

- Dual Speed SFP



IGS-2404
4 10/100/1000T + 4
10/100/1000T/SFP
Industrial Switch

- Dual Speed SFP

FEATURES HIGHLIGHT

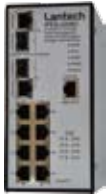
- Pro-Ring system covers X-Ring, Dual Homing, Couple Ring, and Dual Ring topology
- Lantech-View 10-node free bundle
- X-Ring provides Ring recovery time of less than 10ms for up to 250 switches in one Ring
- Supports SNMP v1/v2c/v3, RSTP, QoS, IGMP v2c Query and snooping supported for surveillance L2 network, LLDP, STMP and SMTP with 6 e-mail accounts alert, RMON & 802.1Q VLAN Network Management, DHCP server/client and DNS client
- Relay alarm output system events
- IP-30 metal housing with DIN rail and wall mount design
- Standard operating temperature: -20°C~60°C/-4°F~140°F
- Wide operating temperature range from -40°C to 75°C/-40°F~167°F(E-model)
- Provides EFT surge protection 3000 VDC for power line
- Supports 6000 VDC Ethernet ESD protection
- Wide range redundant power design: 24VDC (9~56VDC), 18VAC (12~36VAC)
- 5 year warranty

Technology Highlights:

What is the SNMP?

Simple Network Management Protocol. SNMP is the protocol governing network management and the monitoring of network device and their functions. There are 3rd party SNMP softwares available in the market to centralize the network management, including HP open view, SNMPC etc.





IPES-2208C
 8 10/100TX + 2
 10/100/1000T/Dual
 Speed SFP Combo w/
 8-PoE-Injector Managed
 Industrial Switch

- Dual Speed SFP
- IEEE802.3af PoE Standard
- Power input range: 45-56 VDC



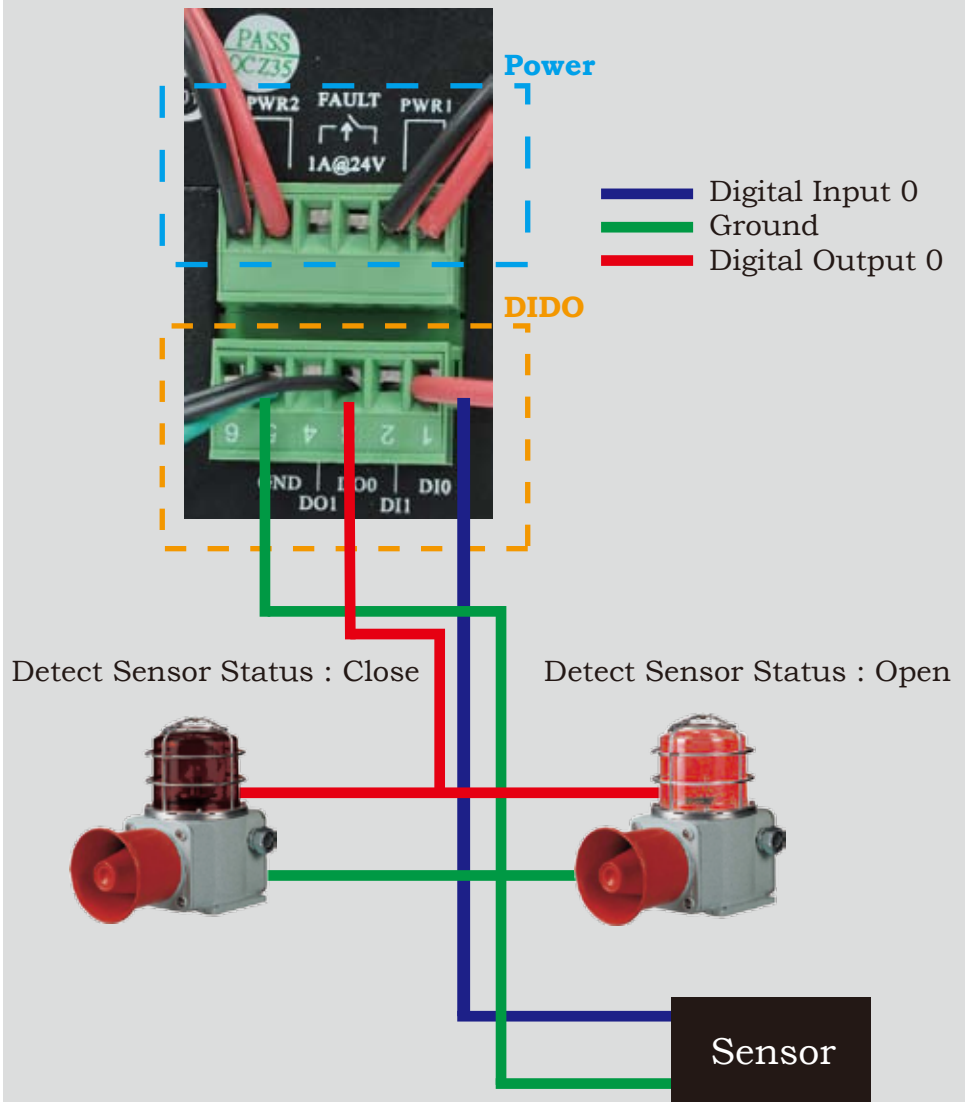
IPES-2224C-24
 24 10/100TX + 2
 100/1000T/SFP combo
 with 24 PoE Injectors
 Industrial Managed Switch

- Dual Speed SFP
- IEEE802.3af PoE Standard
- Power input range: 45-56 VDC

IES-2307C with Digital Input/Output

The IES-2307C Industrial Switch contains additionally two digital outputs and two digital inputs. Outputs are open-collector transistor switches that may be controlled by the host computer. They provide messages, which can be applied to heaters, pumps, and other electrical equipment. The digital inputs may be read by the host computer and used to sense the state of a remote digital signal.

- When First/Second Digital Input/Output function is enabled, First Digital Input/Output and Second Digital Input/Output will then be available respectively.
- Digital Input: Choose the transition type to trigger DI0/DI1.
- Low -> High: Having focused this radio button, DI0/DI1 will only report the status when the external device's voltage changes from low to high.
- High -> Low: Having focused this radio button, DI0/DI1 will only report the status when the external device's voltage changes from high to low.
- Event description: Please fill in the description for the event.
- Action: Click the check boxes to decide whether or not to send the events via Syslog, SMTP e-mails, or SNMP Trap.



Industrial DNV Type Switches



Meet with the most critical test criteria in DNV Type test, Lantech DNV type approval switches ensure the switches sustaining the harsh on-board environments often founded in Ships, Crafts and Offshore platforms. The wide product line provides the most flexibility for maritime applications.



IES-0005T-DNV
5 10/100TX Slim Type
Industrial Switch

- DNV Type Approval
- UL Class I Division II Certified
- 5 year warranty



IES-0008T-DNV
8 10/100TX Slim Type
Industrial Switch

- DNV Type Approval
- UL Class I Division II Certified
- 5 year warranty



IEC-0101FT-DNV
1 10/100TX to 100M-FX
Slim Type Converter

- DNV Type Approval
- UL Class I Division II Certified
- 5 year warranty



IES-2216C-DNV
16 10/100TX + 2
10/100/1000T/Dual
Speed SFP Combo
w/Pro-Ring Managed
Industrial Switch

- Dual Speed SFP
- DNV Type Approval
- UL Class I Division II Certified
- 5 year warranty



LES-2400-RPS
3 slots 10/100M
Modularized + 2 x Gigabit
Combo L2 Plus Managed
Switch w/Redundant
Power Supply Type
Industrial Switch

- DNV Type Approval (pending)
- Operating Temperature :
-20°C~60°C
- 2 year warranty



IES-2208F
8 10/100TX + 2 100FX
Managed Industrial Switch
w/Pro-Ring

- DNV Type Approval (pending)
- 5 year warranty

Technology Highlights: What is UL Class I Div 2 type approval?

The definition of Class I,II,III and Division II locations is as follows:

Class I locations are areas where flammable gases may be present in sufficient quantities to produce explosive or flammable mixtures. Class II locations can be described as hazardous because of the presence of combustible dust. Class III locations contain easily ignitable fibers and flyings. Division 1 designates an environment where flammable gases, vapors, liquids, combustible dusts or ignitable fibers and flyings are likely to exist under normal operating conditions. On the other hand, Division 2 is an environment where flammable gases, vapors, liquids, combustible dusts or ignitable fibers and flyings are not likely to exist under normal operating conditions. Hazardous atmospheres are further defined by "groups." These include:

- Group A: Atmospheres containing acetylene.
- Group B: Atmospheres containing hydrogen, gases or vapors of equivalent hazard such as manufactured gas.
- Group C: Atmospheres containing ethyl-ether vapors, ethylene, or cyclo-propane.
- Group D: Atmospheres containing gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas.

FEATURES HIGHLIGHT

- DNV Type Approval for Ships, Craft and Off-shore Platforms
- UL Class I Division II for Group A,B,C and D hazardous location
- Wide range redundant power design: 24VDC (9~56VDC), 18VAC (12~36VAC)
- Power polarity reverse function to work under wrong polarity power connection
- Provides EFT surge & ESD protection
- Wide operating temperature range from -40°C to 75°C (-E model)
- 5 year warranty

Industrial IEC 61850 Switches

Lantech IEC 61850 series features high reliability and robustness. Each model is ready to comply with IEC 61850 & IEEE 1613 standards for sustaining the high interference EMI environment in substations. Widely operational temperature capacity and GOOSE compliance ensure the switch runtime among the harsh environment of power utilities.



IES-2224-PU

24 10/100TX + 2 1000
SFP Industrial Power
Station L2 Plus Managed
Switch



IES-22812F-PU

12 100FX + 8 10/100TX +
2 1000 SFP Industrial
Power Station L2 Plus
Managed Switch

IEC 61850 features include:

- Data Modeling -- Primary process objects as well as protection and control functionality in the substation is modelled into different standard logical nodes which can be grouped under different logical devices. There are logical nodes for data/functions related to the logical device (LLNO) and physical device (LPHD).
- Reporting Schemes -- There are various reporting schemes (BRCB & URCB) for reporting data from server through a server-client relationship which can be triggered based on pre-defined trigger conditions.
- Fast Transfer of events -- Generic Substation Event (GSE) are defined for fast transfer of event data for a peer-to-peer communication mode. This is again subdivided into GOOSE & GSSE.
- Setting Groups -- The setting group control Blocks (SGCB) are defined to handle the setting groups so that user can switch to any active group according to the requirement.
- Sampled Data Transfer -- Schemes are also defined to handle transfer of sampled values using Sampled Value Control blocks (SVCB)
- Commands -- Various command types are also supported by IEC 61850 which include direct & select before operate (SBO) commands with normal and enhanced securities.
- Data Storage-- SCL(Substation Configuration Language) is defined for complete storage of configured data of the substation in a specific format.

FEATURES HIGHLIGHT

- High-density Ethernet hardened switch for power utility
- System Interface/Performance: IEC-61850 & IEEE1613 Ready/ 8K MAC Address Table/Redundant Power Supply Design for AC or DC
- VLAN: Port Based VLAN/Support 802.1 Q Tag VLAN/ GVRP
- Port Trunk with LACP
- QoS (Quality of Service): Supports IEEE 802.1p Class of Service, Per port provides 4 priority queues/ Port-base,Tag-base and TOS Priority
- Security: Port Security: MAC address entries/filter./ IP Security: IP address security management to prevent unauthorized intruder./ Login Security: IEEE 802.1X/ RADIUS
- IGMP with Query mode for Multi Media Application
- Provides EFT protection 3000 VDC for power line
- Supports 6000 VDC Ethernet ESD protection
- Pro-Ring: Covers X-Ring, Dual Homing and Couple Ring
- Ring Topology: Provides redundant backup feature and the recovery time below 10ms for up to 250 switches in a ring
- Supports up to 256 Policy base ACL
- Bandwidth Control: Ingress Packet Filter and Egress Rate Limit/ Broadcast/Multicast Packet Filter Control
- Wide operating temperature range from -40°C to 85°C
- Power Supply 2 X VAC/VDC 100V~240V Redundancy
- 5 year warranty

Technology Highlights:

What is IEC-61850?

IEC 61850 is a standard for the design of electrical substation automation. IEC 61850 is a part of the International Electrotechnical Commission's (IEC) Technical Committee 57 (TC57) reference architecture for electric power systems. The abstract data models defined in IEC 61850 can be mapped to a number of protocols. Current mappings in the standard are to MMS (Manufacturing Message Specification), GOOSE, SMV, and soon to Web Services. These protocols can run over TCP/IP networks and/or substation LANs using high speed switched Ethernet to obtain the necessary response times of < 4 ms for protective relaying.

Industrial EN50155 Switches

Designed for railway applications, the Lantech EN50155 series provides IP67/IP54 protection to against dust and water jet or immersion. The M12 connectors ensure strength connection with cable. The series also supports fully managed function with Lantech Pro-Ring redundant system.



IES-2008-67
8 10/100TX M12 / IP-67
Managed Industrial Switch



IES-2208F-67
8 10/100TX + 2 100FX
M12 / IP-67 Managed
Industrial Switch



IPES-2208F-67
8 10/100TX + 2 100FX
IP-67 Managed Industrial
Switch w/8 PoE Injectors

- IEEE802.3af PoE Standard
- Power input range: 45-56 VDC



L-Key
Configuration Backup and
Restoration Tool for
Managed Switches

- Auto Backup and Restoration via PnP System
- Requires No Power Supply
- Compact, Easy, Convenient, and Reliable
- Two Models Provide RJ-45 or M12 Connection

Defination of IP houing protection

First digit: Protection of hazardous parts and the ingress of solid foreign objects.		
Level	Object size protected against	Effective against
0	Not protected	No protection against contact and ingress of objects
1	>50 mm	Any large surface of the body, but no protection against deliberate contact with a body part
2	>12.5 mm	Fingers or similar objects
3	>2.5 mm	Tools, thick wires, etc.
4	>1 mm	Most wires, screws, etc.
5	Dust protected	Ingress of dust is not entirely prevented.
6	Dust tight	No ingress of dust; complete protection against contact
Second digit: Protection of harmful ingress of water.		
Level	Protected against	Details
0	Not protected	No protection against contact and ingress of objects
1	Dripping water	Dripping water (vertically falling drops) shall have no harmful effect.
2	Dripping water when tilted up to 15°	Vertically dripping water shall have no harmful effect when the enclosure is tilted at an angle up to 15° from its normal position.
3	Spraying water	Water falling as a spray at any angle up to 60° from the vertical shall have no harmful effect.
4	Splashing water	Water splashing against the enclosure from any direction shall have no harmful effect.
5	Water jets	Water projected by a nozzle against enclosure from any direction shall have no harmful effects.
6	Powerful water jets	Water projected in powerful jets against the enclosure from any direction shall have no harmful effects.
7	Immersion up to 1 m	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time.
8	Immersion beyond 1 m	The equipment is suitable for continuous immersion in water under conditions which shall be specified by the manufacturer.

FEATURES HIGHLIGHT

- Pro-Ring covers X-ring, Dual Homing, and Couple Ring Topology
- Provides M12 connector with IP-67 rated protection
- Support with L-Key(M12) for easy maintenance
- Wide Operating Temperature from -40°C to 75°C
- Power Supply DC 9-56V, Redundant power with M12 5-pole A-coded connector, expect PoE Switches for DC 45~56V
- 5 year warranty

Technology Highlights: What is IP Code?

The IP Code (or International Protection Rating, sometimes also interpreted as Ingress Protection Rating) consists of the letters IP followed by two digits and an optional letter. As defined in international standard IEC 60529, it classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact, and water in electrical enclosures. The standard aims to provide users more detailed information than vague marketing terms such as waterproof.



Industrial Converters Series

Featured with the unique DIP switch for LLF and duplex mode, Lantech Industrial Converters provide the most convenient choice with reliability. Each model is designed to meet the demands of harsh industrial environments with robust IP 30 housing. The series has also been tested extensively to meet with EMI and EMC standards.



IEC-0101FT
1 10/100TX to 100M-FX
Slim Type Converter

- DNV Type Approval
- UL Class I Division II Certified



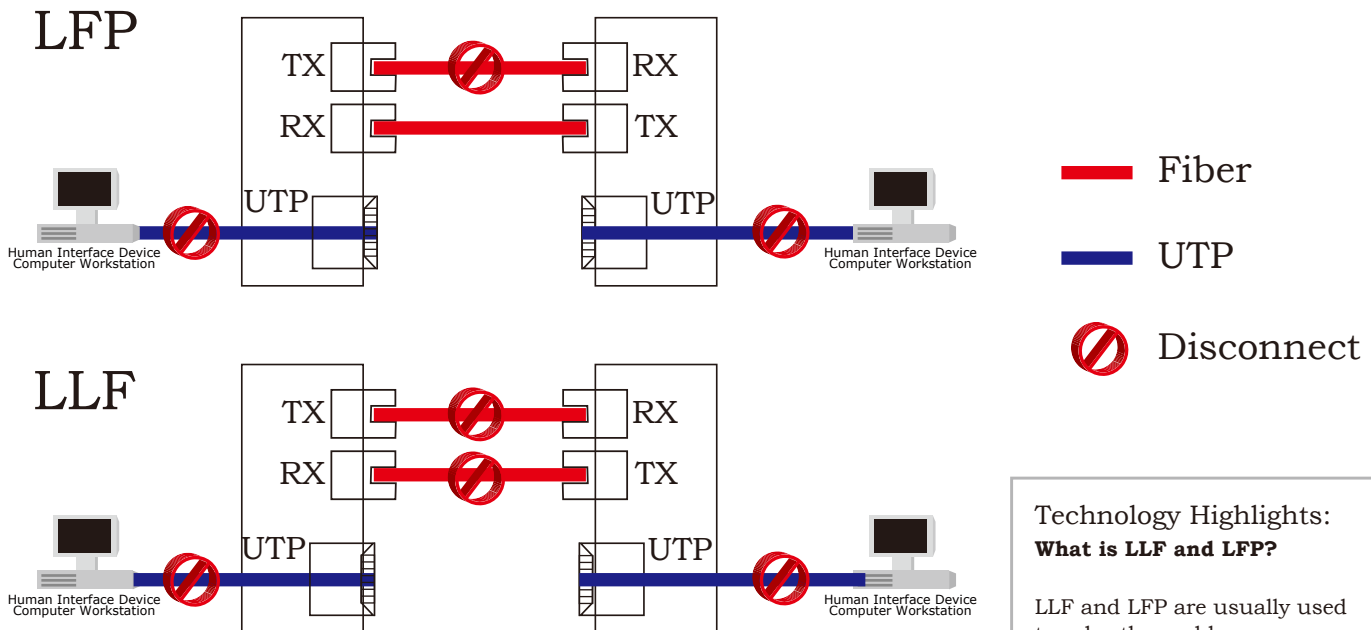
IGC-0101GB
10/100/1000T to
Mini-GBIC Industrial
Switch Converter

- UL Class I Division II Certified



IPEC-0101FT
1 10/100TX to 100M-FX
Slim Type Media Converter
w/PoE injector

- IEEE802.3af PoE Standard
- Power input range: 45-56 VDC



FEATURES HIGHLIGHT

- Unique DIP switches to set LLF and the operation mode
- Provides EFT surge protection 3000 VDC for power line
- Supports 6000 VDC Ethernet ESD protection
- Power with polarity reverse protection
- Wide range redundant power design: 24VDC (9~56VDC), 18VAC (12~36VAC) except PoE switches (45VDC~56VDC)
- Wide operating temperature range from -40°C to 75°C (-E model)

Technology Highlights: What is LLF and LFP?

LLF and LFP are usually used to solve the problem encountered when operating media converters. The problem is when one side of the link fails, the other side still continues to transmit packets, and waits for a response that will never arrive. With the Link Loss Forwarding activated, any detected broken link on the RJ-45 Ethernet port will force the fiber port to cut down, and the fiber uplink port will stop transmitting then cut off as soon as the remote link is down. With the Link Fault Pass technology, the following actions will implement automatically: 1. When the broken link on the RJ-45 Ethernet port occurs, all fiber and UTP connections will stop transmitting. 2. When the broken link on a fiber port occurs, the other fiber port will be forced to stop transmitting and cut down all UTP connection as well.

Industrial PoE Series

Fully comply with IEEE 802.3af PoE standard, Lantech Industrial PoE Switches provide comprehensive PoE solution with durability and reliability. It can adjust power output at each port for 12.9w(15.4w) or 16.5w(22.6w).



IPEC-0101FT
1 10/100TX to 100M-FX
Slim Type Media Converter
w/PoE injector

- Built-in LFP & LLF technology
- Wall and DIN rail mountable



IPES-0005T-4
5 10/100TX w/4 PoE
Injector Industrial Switch

- Wall and DIN rail mountable



IPES-0104FT
4 10/100TX + 1 100FX w/
4 PoE Injector Industrial
Switch

- Wall and DIN rail mountable



IPES-2208C
8 10/100TX + 2
10/100/1000T/Dual
Speed SFP Combo w/ 8
PoE Injector Pro-Ring
Industrial Managed Switch

- Pro-Ring system : X-ring 10ms,
Dual Homing, Couple Ring and
Dual Ring Topology
- Wall and DIN rail mountable
- Dual Speed SFP



IPES-2224C-24
24 10/100TX + 2
100/1000T/SFP combo w/
24 PoE Injector Pro-Ring
Industrial Managed Switch

- Pro-Ring system : X-ring 10ms,
Dual Homing, Couple Ring,
Dual Ring, Central Ring Topology
- Dual Speed SFP

This segment shows the PoE function.

- Maximum Power Available
- Actual Power Consumption
- System Power Limit
- Main Supply Voltage
- Port Knockoff Disabled
- Capacitive Detection
- Legacy
- Priority
- Current (mA), Voltage (V), Power (mW)
- Determined Class

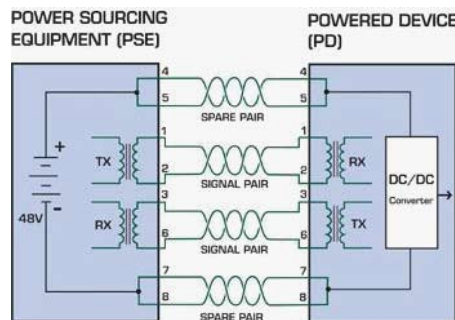
PoE Status Monitor

Power over Ethernet

Maximum Power Available: 200 W Actual Power Consumption: 0 W
System Power Limit: 200 W Main Supply Voltage: 480 dV

Firmware Version: 2.04
Port Knockoff Disabled:
AC Disconnect:
Capacitive Detection:
Start:

Port	Enable state	Power Limit From Classification	Legacy	Priority	Power Limit (<22680) (mW)	Mode	Current (mA)	Voltage (V)	Power (mW)	Determined Class
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
6	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
7	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W
8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Low	22600	Detecting	0	0.0	0	0 15.4W



FEATURES HIGHLIGHT

- Provides 3K VDC EFT and 6K VDC ESD protection
- Complies with IEEE802.3af PoE standard
- Wide range redundant power design: 45~56 VDC
- Redundant power supply with overload current protection
- Relay contact to connect with alarm system
- Wide operating temperature range from -40°C to 75°C (-E model)
- 5 year warranty

Technology Highlights: What is PoE?

It's a system to safely pass electrical power, along with data, on Ethernet cabling. Standard versions of PoE specify CAT. 5 cable or higher. Power can come from a power supply within a PoE-enabled networking device such as an Ethernet switch or from a device built for "injecting" power onto the Ethernet cabling.

The IEEE 802.3af PoE standard (ratified June, 2003) provides up to 15.4 W of DC power (minimum 44 V DC and 350 mA) to each device.

Industrial Device Server

The Lantech device server, which is able to convert one RS232/422/485 port to Ethernet connection, enables user to remotely manage and configure device servers via Internet. Two DC input power can backup power for device server from breakouts.

The Lantech device server is designed with redundant host devices (Virtual COM) up to 5 PC securely protects the data. Featured with HTTPS and SSH function, it can ensure the access security from intruder, providing the flexibility for device management as well. Unique Windows utility “DS-Tool” is able to discover, configure, and manage single or multiple devices.

Lantech device server supports SNMP and SMTP simultaneously, which can automatically send alert events to predefined email addresses. The versatile serial operation modes such as Virtual Com, TCP Host and Client, UDP Host/Client are applicable in POS, Card Reader, Medial Instrument, Power Utility and PLC Automation applications



IDS-2101F

1 RS-232/422/485 port to
1 100FX Ethernet Device
Server

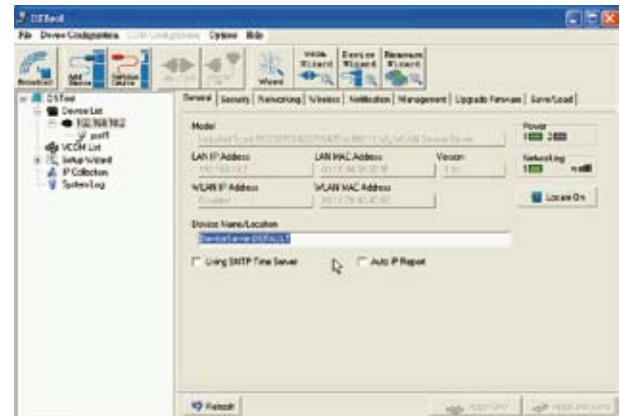
- Maximum Series Speed up to 460.8Kbps
- Maximum Fiber Distance 2KM or 30KM



IDS-2102

1 RS-232/422/485 port to
2 10/100TX Ethernet
Device Server

DS-Tool



- Broadcast discovery device
- Device server status monitoring
- VCOM management
- Multi-Wizard function
- Device setting function

FEATURES HIGHLIGHT

- DS-tool Windows utility for Auto device discovery, device setting and monitoring
- Maximum series speed up to 460.8Kbps
- Versatile serial operation options: Virtual Com, Serial tunnel, TCP Server, TCP Client, UDP
- One port simultaneous Virtual COM, TCP Server, TCP Client connections
- Configuration by Windows, Web-browser, Telnet
- Security: HTTPS and SSH
- Event warning by Syslog, E-mail, SNMP Trap, and Beeper
- Fixed TTY driver for Linux
- Dual power Inputs by 12~48VDC Terminal Block and DC jack
- Built-in 1.5KV magnetic isolation protection
- Serial Line Protection: 15KV ESD for all signal
- IP-30 case protection, DIN Rail & Wall Mountable
- Power input 1: 12~48VDC (3-pin Terminal Block)
- Power input 2(redundant power) : 12~48VDC(DC-jack)
- Power line protection:1KV Burst(EFT),EN 61000-4-4;0.5KV surge, EN 61000-4-5
- Operation temperature: -20°C to 60°C
- Storage temperature : -40°C to 85°C
- 5 year warranty

Technology Highlights:

What is DS-Tool?

DS-Tool is Windows-base powerful device server management software. With its friendly and powerful interface, you can easily configure multiple device server at the same time, and monitor status.

DS-Tool contain the following ability:

1. Device discovery
2. Auto IP report
3. Device setting(run-time change, no rebooting)
4. Access control list
5. Group setting
6. Device monitoring
7. Serial port monitoring
8. Log info
9. Group Firmware update batch

Managed Switches

Lantech business grade managed switches provide fully management functions with Pro-Ring system, which ensures the highest network redundancy. The modular fiber high density switches provide fiber aggregation points with flexible configuration.



LGS-2300-RPS
3-Gigabit-Modular-Slots
Chassis L2 + Managed
Switch with 12-48V DC
Redundant Power Supply
socket



LGS-2424C
24 10/100/1000T with 4
1000SFP shared cage
SNMP managed Switch



LES-2400-RPS
3 slots 10/100M
Modularized + 2 x Gigabit
Combo L2 Plus Managed
Switch w/Redundant
Power Supply



LES-2224C-SFP
24 x 100M SFP SNMP
Switch +2 x 1000T with
shared 1000SFP cage

- DNV Type Approval
- Pro-Ring 10ms



LGS-2207C
7 10/100/1000T + 2
10/100/1000T/Mini-GBIC
Combo Managed Switch

- Pro-Ring 10ms



LGS-2404
4 10/100/1000TX + 4
Mini-GBIC Managed
Switch

- Pro-Ring 10ms



LES-2208
8 10/100TX + 1 Gigabit
copper & mini GBIC
managed switch

FEATURES HIGHLIGHT

- Support Pro-Ring system for most Lantech managed switches correspond with Industrial switch
- Support CLI, Web, Telnet management interface
- Support IGMP v1, v2 Query and Snooping
- Support IEEE802.1d Spanning Tree & IEEE802.1w RSTP
- Support TFTP Firmware Update and System Configure Restore and Backup
- 2 year warranty

Technology Highlights: What is IGMP?

The Internet Group Management Protocol (IGMP) is a communications protocol used to manage the membership of Internet Protocol multicast groups. IGMP is used by IP hosts and adjacent multicast routers to establish multicast group memberships.

IGMP is only needed for IPv4 networks, as multicast is handled differently in IPv6 networks.

IP Multicast is an application where needs IGMP Query and IGMP Snooping. In IP Multicast network, a Query mode must be enabled first otherwise the switch would not know that group members exist. Query mode is usually built in a L3 router.

Lantech Industrial Switch is built-in with IGMP Query and Snooping mode to fill specific needs, so they are the best to be used in Transportation, Factory Automation, Warehouse, Traffic Control, Community Surveillance applications.

Smart Switches

Lantech smart series Web Management switches with 4, 8, 24 10/100/1000T ports specially designed for the small office or department where has high bandwidth requirement. With the Web UI, user are able to manage smart series, which supports port based VLAN, VLAN Tag and port trunk features. They also support CoS to improve the security and performance of the network.

Lantech Smart series is the best solution for the user in aspect of easy management and budget concern.



LGS-1424C
24 10/100/1000T with 4
1000SFP shared cage Web
managed Switch



LGS-1108C
8 10/100/1000T with 1
1000SFP shared cage Web
managed Switch



LGS-1104
4 10/100/1000T + 1mini
GBIC Web Managed
Switch

FEATURES HIGHLIGHT

- Conforms to IEEE 802.3, 802.3u, 802.3ab, 802.3x and 802.1x
- Web Management
- DHCP client
- Auto-MDIX on all ports
- N-Way Auto-Negotiation
- Port Based VLAN, Tag VLAN
- Port Trunk
- Firmware update via Web UI
- 8K MAC address table
- Back pressure half duplex
- Flow control full duplex
- Store-and-Forward switching architecture
- True non-blocking switching
- Class of Service
- 8K Jumbo Frame support
- Spanning Tree and Rapid Spanning Tree
- 2 year warranty

Technology Highlights: What is RSTP?

In 1998, the IEEE with document 802.1w introduced an evolution of the Spanning Tree Protocol: Rapid Spanning Tree Protocol (RSTP), which provides for faster spanning tree convergence after a topology change. Standard IEEE 802.1D-2004 now incorporates RSTP and obsoletes STP. While STP can take 30 to 50 seconds to respond to a topology change, RSTP is typically able to respond to changes within 3*Hello (default is 6 seconds).

System Priority	32768
Hello Time (1~10)	2
Max Age (6~40)	20
Forward Delay (4~30)	15
Force version	Normal

Converters

Lantech fiber converter series extends not only the transmitting distance, but also equips with practical features. For example, Auto-MDI/MDIX feature avoids the problem of cabling. 4 DIP switches are able to adjust transmitting mode and Link Loss Forwarding (LLF) feature. Lantech provides various modules to satisfy the demand of users include WDM/SC/ST/SC single mode (20/30/60km) interfaces. Furthermore, Lantech converter series can be plugged in Lantech Converter Chassis 10-Slots for power redundancy and rack-mounting purpose.



CM-011 Fiber
With SC connector
Multi-mode



CM-011 Fiber
With ST connector
Multi-mode



CM-011 Fiber
With WDM connector
Single-mode



CM-021-GB-II
10/100/1000BaseT to
Gigabit Fiber Media
Converter

- DIP Switch
- 1: LLF(Link Loss Forwarding)
Disable/Enable
- 2: Switch Converter/Pure
Converter mode
- 3: n/a



**Multi-Converter
Chassis**
10 slots Converter Chassis

- Hot swap for Chassis
- Redundant power design for
Chassis



CM-011 Fiber
With SC connector
Single-mode

CM-011 Fiber Converter Series

10/100TX to 100FX Media
Converter

- DIP Switch
- 1: UTP Auto-Nego / 100Mbps Full
Duplex mode
- 2: Fiber Full/Half Duplex
- 3: LLF (Link Loss Forwarding)
Disable/Enable
- 4: Switch Converter / Pure
converter mode

FEATURES HIGHLIGHT

- Built in LFP and Enabled LLF Technology
- Standalone and Chassis design
- Redundant power design for Chassis
- Auto Negotiation Speed, Half/Full Duplex
- 9KB Jumbo frame support for CM-021-GB-II

Power budget = Output power - Sensitivity

Attenuation :
1310nm : 0.4dB -0.45dB / km
1550nm : 0.2dB -0.25dB / km

Item	MMF	SMF
Core Diameter	50 or 62.5 um	9 um
Bandwidth	10G	Un-limited
Distance	100M	2km
	1 Gbps	500m (50 um) 275m (62.5 um)
CWDM / DWDM	N/A	YES
Laser	FP Laser	FP(<30km) or DFB Laser (40km to 120km)

Technology Highlights:

What is fiber attenuation?

Attenuation in fiber optics, also known as transmission loss, is the reduction in intensity of the light beam (or signal) with respect to distance travelled through a transmission medium. Attenuation coefficients in fiber optics usually use units of dB/km through the medium due to the relatively high quality of transparency of modern optical transmission media. The medium is typically a fiber of silica glass that confines the incident light beam to the inside. Attenuation is an important factor limiting the transmission of a digital signal across large distances. Thus, much research has gone into both limiting the attenuation and maximizing the amplification of the optical signal.

PoE Series

Lantech PoE series includes fully-managed switches, splitters and injectors, providing a total PoE solution for our customers. Fully complies with IEEE802.3af PoE standard, Lantech PoE series is integrating “Pro-Ring” to double secure the network, and equipped with IGMP Query and snooping function for IGMP applications where can release the video network burden immediately.



LPES-2224C

24 10/100TX + 2
1000T/SFP combo with 24
PoE Injector Managed
Switch

- Embedded 24 ports PoE inject function
- Power budget: 200W



LPES-2208CA

8 10/100TX + 2 100/1000
Dual SFP Combo Managed
Switch w/ 8 PoE Injectors

- Pro-Ring 10ms
- Power Budget: 96W
- Dual Speed SFP
- Fanless



POA-100A

Single Port POE Power
Source Injector with
Internal Power

- Input power: AC 100~240V,
50~60Hz,0.3A
- 15.4W 48VDC, 0.32A
- Fanless
- Compact Size



POS-100

Adjustable output Power
Over Ethernet Splitter

- 5v, 7.5v, 9v, 12v output
adjustable
- Plug and play
- Compact Size
- Two output power cable suitable
for most PD
- Wall mountable

FEATURES HIGHLIGHT

- Support IEEE802.3af Power over Ethernet
- Hardware:
 1. Over voltage protection
 2. Overload protection
 3. Output short protection
- Operating environment 0°C~45°C
- 2 year warranty

Technology Highlights:

What is injector and splitter?

Injector is designed with 802.3af PoE compliant chip in which it will send impedance to handshake the correspondent PD in prior to deliver 48V power and prevent from burn down any non-POE devices.

Splitter is splits data and power signal over same Ethernet UTP cable and transfer input 48V (PoE standard) to 4 kinds voltages to meet with each PD needs. The inside PoE chip can correspond to PoE impedance signal sent by PoE injector or PSE (Power Source) to handshake with PoE standard first and then to deliver 48V power to drive PD, in which it prevents the risk of burning down the PD.

Mini-GBIC

Specifically designed for the high performance integrated data link, Lantech miniGBIC series provides a variety of Small Form Factor Pluggable (SFP) transceiver modules. The series covers 1.25Gbps/ 125Mbps for the distance from 100m to 120km with long MTBF, which ensures the durability.



Model	Description
8330-168	MINI GBIC 1000T (100m) Transceiver
8330-162	MINI GBIC 1000SX (LC/0.5km) Transceiver
8330-163	MINI GBIC 1000SX2 (LC/2km) Transceiver
8330-165	MINI GBIC 1000LX (LC/10km) Transceiver
8330-166	MINI GBIC 1000LHX (LC/40km) Transceiver
8330-169	MINI GBIC 1000XD (LC/60km) Transceiver
8330-167	MINI GBIC 1000ZX (LC/80km) Transceiver
8330-170	MINI GBIC 1000EZX (120km) Transceiver
8330-060	100Base FX 2KM, Multi-mode, LC Transceiver
8330-061	100Base LX 30KM, Single-mode, LC Transceiver
8330-188	LTSFP-1000BX-10KM Transceiver (WDM 1310)
8330-189	LTSFP-1000BX-10KM Transceiver (WDM 1550)
8330-186	LTSFP-1000BX-20KM Transceiver (WDM 1310)
8330-187	LTSFP-1000BX-20KM Transceiver (WDM 1550)
8330-180	LTSFP-1000BX-40KM Transceiver (WDM 1310)
8330-182	LTSFP-1000BX-40KM Transceiver (WDM 1550)
8330-181	LTSFP-1000BX-60KM Transceiver (WDM 1310)
8330-183	LTSFP-1000BX-60KM Transceiver (WDM 1550)
8330-184	LTSFP-1000BX-80KM Transceiver (WDM 1490)
8330-185	LTSFP-1000BX-80KM Transceiver (WDM 1550)

FEATURES HIGHLIGHT

- SFP 125Mbps
 - Distance: 2km, 30km
 - Standard Operating Temperature: -10°C ~ 70°C
 - Wide Operating Temperature: -40°C ~ 85°C for -E series
 - DDM series for diagnostic mode
- SFP 1.25Gbps
 - Distance: 0.5km, 2km, 10km, 40km, 60km, 80km, 120km
 - Standard Operating Temperature: -10°C ~ 70°C
 - Wide Operating Temperature: -40°C ~ 85°C for -E series
 - DDM series for diagnostic mode
- SFP 1000T
 - Distance: 100m
 - Standard Operating Temperature: -10°C ~ 70°C
 - Wide Operating Temperature: -40°C ~ 85°C for -E series
 - DDM series for diagnostic mode
- BiDi SFP 1.25Gbps/125Mbps
 - Distance: 10km, 20km, 40km, 60km, 80km
 - Standard Operating Temperature: -10°C ~ 70°C
 - Wide Operating Temperature: -40°C ~ 85°C for -E series
 - DDM series for diagnostic mode

Technology Highlights:

What is DDM?

DDM(Digital Diagnostic Monitoring) MSA function are provided with voltage, temperature, TX power, RX power and laser bias current over the network.

DDM function enables central site to remote monitor each fiber link quality with ease.

Accessories

Lantech power with DIN Rail series is rigid and compact for space saving and industrial applications. It supports power ready signal and ring diode circuit for redundant application as well as over-voltage, over-load and short circuit protection. The series provides various models which cover different output voltages and currents.



AD1024F
24Watts, Single Output
Power with DIN Rail

- Output Voltage: 24, 48VDC



AD1048FS
48Watts, Single Output
Power with DIN Rail

- Output Voltage: 24, 48VDC



AD1120F
120Watts, Dual Output
Power with DIN Rail

- Output Voltage: 24, 48VDC



AD1240S
240Watts, Dual Output
Power with DIN Rail

- Output Voltage: 24, 48VDC
- Fan cooled

Model	O/P voltage Adjustment	Loading (A)			Ripple Noise	Line Reg.	Load Reg.	Efficiency	Overvoltage Protection
		Min.	Rated	Max.					
AD1024-24F	+24VDC±10%	0A	1A	1A	150mVp-p	±1%	±1%	83%	40VDC Max
AD1024-24F-E	+24VDC±10%	0A	1A	1A	150mVp-p	±1%	±1%	83%	40VDC Max
AD1024-48F	+48VDC±10%	0A	0.5A	0.5A	250mVp-p	±1%	±1%	83%	60VDC Max
AD1048-24FS	+24VDC±10%	0A	2A	2A	150mVp-p	±1%	±1%	83%	40VDC Max
AD1048-48FS	+48VDC±10%	0A	1A	1A	250mVp-p	±1%	±1%	83%	60VDC Max
AD1120-24F	+24VDC±10%	0A	5A	5A	150mVp-p	±1%	±1%	81%	27~30VDC Max
AD1120-48F	+48VDC±10%	0A	2.5A	2.5A	550mVp-p	±1%	±1%	83%	52~56VDC Max
AD1120-48F-E	+48VDC±10%	0A	2.5A	2.5A	550mVp-p	±1%	±1%	83%	52~56VDC Max
AD1240-24S	+24VDC±10%	0A	10A	10A	150mVp-p	±1%	±1%	83%	27~30VDC Max
AD1240-48S	+48VDC±10%	0A	5A	5A	250mVp-p	±1%	±1%	84%	52~56VDC Max

FEATURES HIGHLIGHT

- Input Voltage 110~240VAC
- Input Frequency 47~63Hz
- Input Inrush Current 22A/115VAC, 44A/230VAC (Cold start)
- Operating Temperature -20°C ~ 50°C (-4°F ~ 122°F), (-E model) -40°C* ~ 50°C (-40°F ~ 122°F), ambient, derating each output at 2.5% per degree from 50°C ~ 70°C
- Output Overvoltage Protection
- Output Overload Protection
- Output Short Circuit Protection
- UL, TUV, CE certified
- 2 year warranty

Technology Highlights:

What is Short-Circuit protection?

Short-circuit protection is a separate discipline dedicated to the study, analysis, application, and design of protective apparatus that are intended to minimize the effect of unintentional short circuits in power supply systems. For these analyses the short circuit is an important limiting (worst) case, and is used to compute the coordination of fuses, circuit reclosers, circuit breakers, and other devices designed to recognize and isolate short circuits. The short circuit is also an important parameter in the specification of these protective devices, which must have adequate capability for interrupting the high short-circuit current.

Product Matrix Selection

Industrial Entry Switches

Industrial Smart-Ring Switches

IES-0005T



IES-0008T



IES-0104FT



IES-0204FT



IES-0216C



IES-1005T



IES-1204FT



HARDWARE FEATURES

Port	IES-0005T	IES-0008T	IES-0104FT	IES-0204FT	IES-0216C	IES-1005T	IES-1204FT
10/100TX	5	8	4	4	16	5	4
100FX	-	-	1 (SC)	2 (SC)	-	-	-
1000FX	-	-	-	-	-	-	-
10/100/1000T	-	-	-	-	-	-	-
100M SFP	-	-	-	-	-	-	2
1000M SFP	-	-	-	-	-	-	-
10/100/1000T/Dual Speed SFP Combo	-	-	-	-	2	-	-
RS232 connector	-	-	-	-	-	-	-
PoE Injector	-	-	-	-	-	-	-

Switching Fabric	1.0Gbps	1.6Gbps	1.0Gbps	1.2Gbps	7.2Gbps	1.0Gbps	1.2Gbps
Packet Buffer	448Kbits	448Kbits	448Kbits	448Kbits	1Mbits	1Mbits	1Mbits
Jumbo Frame	-	-	-	-	-	-	-
Mac Address	2K	2K	2K	2K	8K	2K	2K
Flash ROM	-	-	-	-	-	-	-
DRAM	-	-	-	-	-	-	-

Power Supply	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)
Redundant Power	●	●	●	●	●	●	●
Power Consumption	2.93 Watts	4.71 Watts	4.44 Watts	6.41 Watts	9 Watts	3 Watts	7 Watts
Overload Current Protection	●	●	●	●	●	●	●
Polarity Reverse Protection	●	●	●	●	●	●	●
Relay Contact with Alarm System	●	●	●	●	●	●	●
DIDO (Digital Input/ Digital Output)	-	-	-	-	-	-	-

Standard Operating Temperature -20°C~60°C / -4°F~140°F	●	●	●	●	●	●	●
Wide Operating Temperature -40°C~75°C / -40°F~167°F	●	●	●	●	●	●	●
Storage Temperature -40°C~85°C / -40°F~185°F	●	●	●	●	●	●	●
Operating Humidity 5% to 95% (Non-condensing)	●	●	●	●	●	●	●
Case Dimension W x D x H (unit=mm)	30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	72 x 105 x 152	26.1 x 95 x 144.3	26.1 x 95 x 144.3
Case Protection	IP30	IP30	IP30	IP30	IP30	IP30	IP30
Weight	430g	480g	800g	810g	1300g	395g	395g
DIN Rail Installation	●	●	●	●	●	●	●
Wall Mount Installation	●	●	●	●	●	●	●
19-inch Rack Mount	-	-	-	-	-	-	-

CE/ FCC/ UL	●	●	●	●	●	CE/ FCC	CE/ FCC
RoHS/ WEEE	●	●	●	●	●	-	-
UL Class I Division II Certification	●	●	●	●	-	-	-
DNV Type Approved	●	●	-	-	-	-	-
EN50155	-	-	-	-	-	-	-
IEC 61850	-	-	-	-	-	-	-
Stability Testing (Free fall/ Shock/ Vibration)	●	●	●	●	●	●	●
MTBF	412,590 hours	388,566 hours	380,717 hours	347,014 hours	243,301 hours	390,800 hours	383,478 hours
Warranty	5 years	5 years	5 years	5 years	5 years	5 years	5 years

SOFTWARE FEATURES

Management	IES-0005T	IES-0008T	IES-0104FT	IES-0204FT	IES-0216C	IES-1005T	IES-1204FT
SNMP v1 v2c v3	-	-	-	-	-	●	●
Web Browser	-	-	-	-	-	●	●
Telnet	-	-	-	-	-	-	-
CLI	-	-	-	-	-	-	-
Lantech-View	-	-	-	-	-	●	●
Menu Driven	-	-	-	-	-	-	-

IGMP snooping v1 v2/IGMP query	-	-	-	-	-	-	-
VLAN	-	-	-	-	-	●	●
Port Trunk with LACP	-	-	-	-	-	-	-
LLDP	-	-	-	-	-	●	●
Port Security	-	-	-	-	-	●	●
IP Security	-	-	-	-	-	-	-
Login Security (RADIUS)	-	-	-	-	-	-	-
SNTP	-	-	-	-	-	●	●
SMTP	-	-	-	-	-	●	●
Bandwidth Control	-	-	-	-	-	4 e-mail accounts	4 e-mail accounts
Flow Control	-	-	-	-	-	●	●
Pro-Ring System	-	-	-	-	-	-	-
X-Ring	-	-	-	-	-	●	●
Dual Homing	-	-	-	-	-	●	●
Couple Ring	-	-	-	-	-	●	●
Central Ring	-	-	-	-	-	-	-
Dual Ring	-	-	-	-	-	-	-

Spanning Tree/ RSTP	-	-	-	-	-	●	●
Port Mirror	-	-	-	-	-	-	-
Quality of Service	-	-	-	-	-	-	-
Class of Service	-	-	-	-	-	-	-
System Log	-	-	-	-	-	●	●
Relay Alarm	-	-	-	-	-	●	●
SNMP Trap	-	-	-	-	-	●	●
DHCP	-	-	-	-	-	●	●
DNS Client/ Server	-	-	-	-	-	●	●
TFTP Firmware Update/ Backup/ Resotre	-	-	-	-	-	●	●
Configuration upload and download	-	-	-	-	-	-	-
ifAlias	-	-	-	-	-	-	-

IEC-0101FT

IGC-0101GB

IPEC-0101FT

IPES-0005T-4

IPES-0104FT

IPES-2208C

IPES-2224C-24



Specifications

HARDWARE FEATURES

							Port
1	-	1	5	4	8	24	10/100TX
1 (SC)	-	1 (SC)	-	1 (SC)	-	-	100FX
-	-	-	-	-	-	-	1000FX
-	1	-	-	-	-	-	10/100/1000T
-	-	-	-	-	-	-	100M SFP
-	1	-	-	-	-	-	1000M SFP
-	-	-	-	-	2	2 (1000M SFP only)	10/100/1000T/Dual Speed SFP Combo
-	-	-	-	-	RJ-45	-	DB-9 Female
-	-	1	4	4	8	24	RS232 connector
-	-	-	-	-	-	-	PoE Injector

-	-	-	1.0Gbps	1.0Gbps	5.6Gbps	8.8Gbps	Switching Fabric
-	-	-	448Kbits	448Kbits	1Mbits	-	Packet Buffer
-	9Kbytes	-	-	-	-	-	Jumbo Frame
2K	2K	2K	2K	2K	8K	8K	Mac Address
-	-	-	-	-	4Mbytes	4Mbytes	Flash ROM
-	-	-	-	-	32Mbytes	32Mbytes	DRAM

24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	48VDC (45~56VDC)	48VDC (45~56VDC)	48VDC (45~56VDC)	48VDC (45~56VDC)	48VDC (45~56VDC)	Power Supply
●	●	●	●	●	●	●	Redundant Power
2.74 Watts	5.3 Watts	3.3 Watts	5.4 Watts	6.6 Watts	13.5 W	15.76 Watts	Power Consumption
●	●	●	●	●	●	●	Overload Current Protection
●	●	Polarity Protection	Polarity Protection	Polarity Protection	Polarity Protection	Polarity Protection	Polarity Reverse Protection
●	●	●	●	●	●	●	Relay Contact with Alarm System
-	-	-	-	-	-	-	DIDO (Digital Input/ Digital Output)

●	●	●	●	●	●	-	Standard Operating Temperature -20°C~60°C / -4°F~140°F
●	●	●	●	-	●	●	Wide Operating Temperature -40°C~75°C / -40°F~167°F
●	●	●	●	●	●	●	Storage Temperature -40°C~85°C / -40°F~185°F
●	●	●	●	●	●	●	Operating Humidity 5% to 95% (Non-condensing)
30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	30 x 95 x 140	72 x 105 x 152	440 x 280 x 44	Case Dimension W x D x H (unit=mm)
IP30	IP30	IP30	IP30	IP30	IP30	IP30	Case Protection
600g	600g	600g	648g	824g	1418g	3700g	Weight
●	●	●	●	●	●	-	DIN Rail Installation
●	●	●	●	●	●	-	Wall Mount Installation
-	-	-	-	-	-	●	19-inch Rack Mount

●	●	●	●	●	●	●	CE/ FCC/ UL
●	●	●	●	●	●	●	RoHS/ WEEE
●	●	-	-	-	-	-	UL Class I Division II Certification
●	-	-	-	-	-	-	DNV Type Approved
-	-	-	-	-	-	-	EN50155
-	-	-	-	-	-	-	IEC 61850
●	●	●	●	●	●	●	Stability Testing (Free fall/ Shock/ Vibration)
405,486 hours	525,424 hours	391,515 hours	443,153 hours	259,356 hours	190288 hours	133,495 hours	MTBF
5 years	5 years	5 years	5 years	5 years	5 years	5 years	Warranty

SOFTWARE FEATURES

							Management
					●	●	SNMP v1 v2c v3
					●	●	Web Browser
					●	●	Telnet
					●	●	CLI
					●	●	Lantech-View
					-	-	Menu Driven

					●	●	IGMP snooping v1 v2/ IGMP query
					●	●	VLAN
					●	●	Port Trunk with LACP
					●	●	LLDP
					●	●	Port Security
					●	●	IP Security
					●	●	Login Security (RADIUS)
					●	●	SNTP
					6 e-mail accounts	6 e-mail accounts	SMTP
					●	●	Bandwidth Control
					●	●	Flow Control
							Pro-Ring System
					●	●	X-Ring
					●	●	Dual Homing
					●	●	Couple Ring
					-	●	Central Ring
					●	-	Dual Ring

					●	●	Spanning Tree/ RSTP
					●	●	Port Mirror
					●	●	Quality of Service
					●	●	Class of Service
					●	●	System Log
					●	●	Relay Alarm
					●	●	SNMP Trap
					●	●	DHCP
					●	●	DNS Client/ Server
					●	●	TFTP Firmware Update/ Backup /Resotre
					●	●	Configuration upload and download
					●	●	iAlias

Product Matrix Selection

Industrial Managed Switches

IES-2008A



IES-2206F-II



IES-2208C



IES-2208F



IES-2208GF



IES-2216C



IES-2307C



HARDWARE FEATURES

Port	IES-2008A	IES-2206F-II	IES-2208C	IES-2208F	IES-2208GF	IES-2216C	IES-2307C
10/100TX	8	6	8	8	8	16	7
100FX	-	2 (SC)	-	2 (SC)	-	-	-
1000FX	-	-	-	-	2 (SC)	-	-
10/100/1000T	-	-	-	-	-	-	-
100M SFP	-	-	-	-	-	-	-
1000M SFP	-	-	-	-	-	-	-
10/100/1000T/Dual Speed SFP Combo	-	-	2	-	-	2	3
RS232 connector	RJ-45	RJ-45	RJ-45	RJ-45	RJ-45	RJ-45	RJ-45
PoE Injector	-	-	-	-	-	-	-

Switching Fabric	5.6Gbps	1.6Gbps	5.6Gbps	1.6Gbps	5.6Gbps	7.2Gbps	7.4Gbps
Packet Buffer	1Mbits	1Mbits	1Mbits	1Mbits	1Mbits	1Mbits	1Mbits
Jumbo Frame	-	-	-	-	-	-	-
Mac Address	8K	8K	8K	8K	8K	8K	8K
Flash ROM	4Mbytes	4Mbytes	4Mbytes	4Mbytes	4Mbytes	4Mbytes	4Mbytes
DRAM	32Mbytes	32Mbytes	32Mbytes	32Mbytes	32Mbytes	32Mbytes	32Mbytes

Power Supply	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)
Redundant Power	●	●	●	●	●	●	●
Power Consumption	8.8 Watts	9 Watts	9.5 Watts	9 Watts	8.8 Watts	10 Watts	10.2 Watts
Overload Current Protection	-	●	●	●	-	●	●
Polarity Reverse Protection	●	●	●	●	●	●	●
Relay Contact with Alarm System	●	●	●	●	●	●	●
DIDO (Digital Input/ Digital Output)	-	-	-	-	-	-	2/2

Standard Operating Temperature -20°C~60°C / -4°F~140°F	●	●	●	●	●	●	●
Wide Operating Temperature -40°C~75°C / -40°F~167°F	●	●	●	●	●	●	●
Storage Temperature -40°C~85°C / -40°F~185°F	●	●	●	●	●	●	●
Operating Humidity 5% to 95% (Non-condensing)	●	●	●	●	●	●	●
Case Dimension W x D x H (unit=mm)	72 x 105 x 152	52 x 106 x 144	72 x 105 x 152	52 x 106 x 144	72 x 105 x 152	72 x 105 x 152	72 x 105 x 152
Case Protection	IP30	IP30	IP30	IP30	IP30	IP30	IP30
Weight	1302g	735g	1302g	735g	1302g	1049g	1300g
DIN Rail Installation	●	●	●	●	●	●	●
Wall Mount Installation	●	●	●	●	●	●	●
19-inch Rack Mount	-	-	-	-	-	-	-

CE/FCC/UL	●	CE/FCC	●	●	●	●	●
RoHS/WEEE	●	●	●	●	●	●	●
UL Class I Division II Certification	-	-	-	-	-	●	●
DNV Type Approved	-	-	-	●	-	●	-
EN50155	-	-	-	-	-	-	-
IEC 61850	-	-	-	-	-	-	-
Stability Testing (Free fall/ Shock/ Vibration)	●	●	●	●	●	●	●
MTBF	272,761 hours	232,194 hours	272,761 hours	232,194 hours	272,761 hours	220,111 hours	260,818 hours
Warranty	5 years	5 years	5 years	5 years	5 years	5 years	5 years

SOFTWARE FEATURES

Management	IES-2008A	IES-2206F-II	IES-2208C	IES-2208F	IES-2208GF	IES-2216C	IES-2307C
SNMP v1 v2c v3	●	●	●	●	●	●	●
Web Browser	●	●	●	●	●	●	●
Telnet	●	●	●	●	●	●	●
CLI	●	●	●	●	●	●	●
Lantech-View	●	●	●	●	●	●	●
Menu Driven	-	-	-	-	-	-	-

IGMP snooping v1 v2/IGMP query	●	●	●	●	●	v1 v2 v3	●
VLAN	●	●	●	●	●	●	●
Port Trunk with LACP	●	●	●	●	●	●	●
LLDP	●	●	●	●	●	●	●
Port Security	●	●	●	●	●	●	●
IP Security	●	●	●	●	●	●	●
Login Security (RADIUS)	●	●	●	●	●	●	●
SNTP	●	●	●	●	●	●	●
SMTP	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts
Bandwidth Control	●	●	●	●	●	●	●
Flow Control	●	●	●	●	●	●	●
Pro-Ring System							
X-Ring	●	●	●	●	●	●	●
Dual Homing	●	●	●	●	●	●	●
Couple Ring	●	●	●	●	●	●	●
Central Ring	-	-	-	-	-	-	-
Dual Ring	●	-	●	-	●	-	●

Spanning Tree/RSTP	●	STP/RSTP/MSTP	●	●	●	●	●
Port Mirror	●	●	●	●	●	●	●
Quality of Service	●	●	●	●	●	●	●
Class of Service	●	●	●	●	●	●	●
System Log	●	●	●	●	●	●	●
Relay Alarm	●	●	●	●	●	●	●
SNMP Trap	●	●	●	●	●	●	●
DHCP	●	●	●	●	●	●	●
DNS Client/ Server	●	●	●	●	●	●	●
TFTP Firmware Update/ Backup /Resotre	●	●	●	●	●	●	●
Configuration upload and download	●	●	●	●	●	●	●
ifAlias	●	●	●	●	●	●	●

IGS-2206C		IGS-2404		Industrial IEC 61850 Switches		Industrial EN50155 Switches		Model Name					
IGS-2206C		IGS-2404		IES-2224C-PU		IES-22812F-PU		IES-2008-67		IES-2208F-67		IPES-2208F-67	

Specifications

HARDWARE FEATURES							Port
-	-	24	8	8 (M12)	8 (M12)	8 (M12)	10/100TX
-	-	-	12 (SC)	-	2(LC)	2(LC)	100FX
-	-	-	-	-	-	-	1000FX
6	4	-	-	-	-	-	10/100/1000T
-	4 (Dual Speed)	-	-	-	-	-	100M SFP
-	-	2	2	-	-	-	1000M SFP
2	-	-	-	-	-	-	10/100/1000T/Dual Speed SFP Combo
RJ-45	RJ-45	RJ-45	RJ-45	M12	M12	M12	RS232 connector
-	-	-	-	-	-	-	PoE Injector

16Gbps	1.6Gbps	8.8Gbps	8.0Gbps	5.6Gbps	5.6Gbps	5.6Gbps	Switching Fabric
1Mbits	1Mbits	4Mbits	4Mbits	1Mbits	1Mbits	1Mbits	Packet Buffer
-	9 (for Gigabit Ports)	9K (for Gigabit Ports)	9K (for Gigabit Ports)	-	-	-	Jumbo Frame
8K	8K	8K	1K	8K	8K	8K	Mac Address
4Mbytes	4Mbytes	4Mbytes	4Mbytes	4Mbytes	4Mbytes	4Mbytes	Flash ROM
32Mbytes	32Mbytes	32Mbytes	32Mbytes	32Mbytes	32Mbytes	32Mbytes	DRAM

24VDC (9~56VDC) 18VAC (12~36VAC)	24VDC (9~56VDC) 18VAC (12~36VAC)	2 X VAC/VDC 100V~240V	2 X VAC/VDC 100V~240V	9~56VDC (M12 connector)	9~56VDC (M12 connector)	48VDC (45~56VDC) (M12 connector)	Power Supply
●	●	●	●	●	●	●	Redundant Power
18 Watts	17 Watts	17.5 Watts@VDC 21.5 Watts@VAC	23 Watts@VDC 27 Watts@VAC	14 Watts	14 Watts	14 Watts	Power Consumption
-	-	●	●	●	●	●	Overload Current Protection
●	●	●	●	●	●	●	Polarity Protection
●	●	●	●	●	●	●	Polarity Reverse Protection
-	-	-	-	-	-	-	Relay Contact with Alarm System
-	-	-	-	-	-	-	DIDO (Digital Input/ Digital Output)

●	●	-	-	●	●	●	Standard Operating Temperature -20°C~60°C / -4°F~140°F
●	-	-40°C~85°C -40°F~185°F	-40°C~85°C -40°F~185°F	●	●	●	Wide Operating Temperature -40°C~75°C / -40°F~167°F
●	●	●	●	●	●	●	Storage Temperature -40°C~85°C / -40°F~185°F
●	●	●	●	●	●	●	Operating Humidity 5% to 95% (Non-condensing)
72 x 105 x 152	72 x 105 x 152	440 x 280 x 44	440 x 280 x 44	193 x 62.5 x 176	193 x 62.5 x 176	193 x 62.5 x 176	Case Dimension W x D x H (unit= mm)
IP30	IP30	IP30	IP30	IP67	IP67	IP67	Case Protection
1418g	1250g	3000g	4900g	1630g	1630g	1730g	Weight
●	●	-	-	-	-	-	DIN Rail Installation
●	●	-	-	●	●	●	Wall Mount Installation
-	-	●	●	-	-	-	19-inch Rack Mount

●	●	●	●	●	●	●	CE/ FCC/ UL
●	●	●	●	●	●	●	RoHS/ WEEE
-	-	-	-	-	-	-	UL Class I Division II Certification
-	-	-	-	-	-	-	DNV Type Approved
-	-	-	-	Pending	Pending	Pending	EN50155
-	-	Pending	Pending	-	-	-	IEC 61850
-	●	●	●	●	●	●	Stability Testing (Free fall/ Shock/ Vibration)
248,507 hours 5 years	286,945 hours 5 years	109,064 hours 5 years	89,370 hrs 5 years	388,201 hours 5 years	320,420 hours 5 years	-	MTBF
-	-	-	-	-	-	-	Warranty

SOFTWARE FEATURES








Management							
●	●	●	●	●	●	●	SNMP v1 v2c v3
●	●	●	●	●	●	●	Web Browser
●	●	●	●	●	●	●	Telnet
●	●	●	●	●	●	●	CLI
●	●	●	●	●	●	●	Lantech-View
Optional	-	-	-	-	-	-	Menu Driven

●	●	●	●	●	●	●	IGMP snooping v1 v2/IGMP query
●	●	●	●	●	●	●	VLAN
●	●	●	●	●	●	●	Port Trunk with LACP
●	●	●	●	●	●	●	LLDP
●	●	●	●	●	●	●	Port Security
●	●	●	●	●	●	●	IP Security
●	●	●	●	●	●	●	Login Security (RADIUS)
●	●	●	●	●	●	●	SNTP
6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	6 e-mail accounts	SMTP
●	●	●	●	●	●	●	Bandwidth Control
●	●	●	●	●	●	●	Flow Control
●	●	●	●	●	●	●	Pro-Ring System
●	●	●	●	●	●	●	X-Ring
●	●	●	●	●	●	●	Dual Homing
-	-	-	-	-	-	-	Couple Ring
-	-	-	-	-	-	-	Central Ring
-	-	-	-	-	-	-	Dual Ring

●	●	●	●	●	●	●	Spanning Tree/ RSTP
●	●	●	●	●	●	●	Port Mirror
●	●	●	●	●	●	●	Quality of Service
●	●	●	●	●	●	●	Class of Service
●	●	●	●	●	●	●	System Log
●	●	●	●	●	●	●	Relay Alarm
●	●	●	●	●	●	●	SNMP Trap
●	●	●	●	●	●	●	DHCP
●	●	●	●	●	●	●	DNS Client/ Server
●	●	●	●	●	●	●	TFTP Firmware Update/ Backup /Resotre
●	●	●	●	●	●	●	Configuration upload and download
-	-	-	-	-	-	-	iAlias

Product Matrix Selection

Managed Switches

	LES-2208	LES-2224C-SFP	LES-2400-RPS	LGS-2207C	LGS-2300-RPS	LGS-2404	LGS-2424C
							

HARDWARE FEATURES

Port	LES-2208	LES-2224C-SFP	LES-2400-RPS	LGS-2207C	LGS-2300-RPS	LGS-2404	LGS-2424C
10/100TX	8	-	Max 24	-	-	-	-
100FX	-	-	Max 24	-	-	-	-
1000FX	-	-	-	-	-	-	-
10/100/1000T	1	-	-	7	Max 24	4	20
100M SFP	-	24	Max 24	-	-	-	-
1000M SFP	1	-	-	-	Max 24	4	-
10/100/1000T/1000M SFP Combo	-	2	-	2	-	-	4
RS232 connector	DB-9 Female	DB-9 Female	DB-9 Female	DB-9 Female	DB-9 Female	DB-9 Female	DB-9 Female
PoE Injector	-	-	-	-	-	-	-

Switching Fabric	5.6Gbps	8.8Gbps	8.8Gbps	18Gbps	48Gbps	16Gbps	48Gbps
Packet Buffer	1Mbits	256Kbytes	4Mbits	1Mbits	6Mbits	1Mbits	500Kbytes
Jumbo Frame	-	-	9K (for Gigabit Ports)	-	10KB	-	10K
Mac Address	8K	8K	8K	8K	16K	8K	8K
Flash ROM	2Mbytes	2Mbytes	-	4Mbytes	8Mbytes	4Mbytes	ROM: 512Kbytes x 2
DRAM	32Mbytes	-	-	32Mbytes	-	32Mbytes	RAM: 128Kbytes
System Memory	8Mbytes	-	-	-	32Mbytes	-	-

Power Supply	90~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz
Redundant Power	-	-	12~48VDC	-	12~48VDC	-	-
Power Consumption	10 Watts	25Watts	18 Watts	20.2 Watts	35 Watts	10 Watts	17.9 Watts
Overload Current Protection	-	-	-	-	-	-	-
Polarity Reverse Protection	-	-	-	-	-	-	-
Relay Contact with Alarm System	-	-	-	-	-	-	-
DIDO (Digital Input/ Digital Output)	-	-	-	-	-	-	-

Operating Temperature	0°C~45°C 32°F~113°F	0°C to 45°C 32°F to 113°F	-20°C~60°C -4°F~140°F	0°C to 60°C 32°F to 140°F	0°C~45°C 32°F~113°F	0°C to 45°C 32°F to 113°F	0°C~45°C 32°F~113°F
Storage Temperature	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F
Operating Humidity (Non-condensing)	5%~95%	10%~90%	5%~95%	5%~95%	5%~95%	5%~90%	10%~95%
Case Dimension W x D x H (unit=mm)	217 x 140 x 43	440 x 240 x 45	440 x 200 x 44	217 x 140 x 43	440 x 280 x 44	217 x 140 x 43	440 x 161 x 44
Case Protection	-	-	-	-	-	-	-
Weight	1105g	2500g	5000g	1500g	4900g	1620g	3200g
DIN Rail Installation	-	-	-	-	-	-	-
Wall Mount Installation	-	-	-	-	-	-	-
19-inch Rack Mount	10-inch Rack	●	●	10-inch Rack	●	10-inch Rack	●

CE/FCC/UL	●	CE/FCC	●	●	●	●	●
RoHS/WEEE	●	●	●	●	●	●	●
UL Class I Division II Certification	-	-	-	-	-	-	-
DNV Type Approved	-	-	●	-	-	-	-
EN50155	-	-	-	-	-	-	-
IEC 61850	-	-	-	-	-	-	-
Stability Testing (Free fall/ Shock/ Vibration)	-	-	-	-	-	-	-
MTBF	183,538 hours	48,459 hours	75,900 hours	126,130 hours	85,203 hours	122,506 hours	143,964 hours
Warranty	2 years	2 years	2 years	2 years	2 years	2 years	2 years

SOFTWARE FEATURES

Management	LES-2208	LES-2224C-SFP	LES-2400-RPS	LGS-2207C	LGS-2300-RPS	LGS-2404	LGS-2424C
SNMP v1 v2c v3	●	v1; partial v2c	●	●	v1 v2c	●	v1
Web Browser	●	●	●	●	●	●	●
Telnet	●	●	●	●	●	●	●
CLI	●	●	●	●	●	●	●
Lantech-View	-	-	-	-	-	-	-
Menu Driven	-	-	-	Optional	-	Optional	-

IGMP snooping v1 v2/IGMP query	●	●	●	●	v3 (Optional)	●	●
VLAN	●	●	●	●	●	●	●
Port Trunk with LACP	●	●	●	●	●	●	●
LLDP	-	-	●	-	●	-	-
Port Security	●	-	●	●	●	●	-
IP Security	●	●	●	●	●	●	●
Login Security (RADIUS)	●	-	●	●	●	●	●
SNTP	●	NTP	●	●	●	●	-
SMTP	6 e-mail accounts	8 e-mail accounts	6 e-mail accounts	6 e-mail accounts	5 e-mail accounts	6 e-mail accounts	-
Bandwidth Control	●	●	●	●	●	●	●
Flow Control	●	●	●	●	●	●	●

Pro-Ring System

X-Ring	●	-	●	●	-	●	-
Dual Homing	●	-	●	●	-	●	-
Couple Ring	●	-	●	●	-	●	-
Central Ring	-	-	-	-	-	-	-
Dual Ring	-	-	-	-	-	-	-

Spanning Tree/ RSTP	●	STP	STP/ RSTP/ MSTP (Optional)	●	STP/ RSTP/ MSTP (Optional)	●	●
Port Mirror	●	●	●	●	●	●	●
Quality of Service	●	●	●	●	●	●	●
Class of Service	●	●	●	●	●	●	●
System Log	●	●	●	●	●	●	●
Relay Alarm	-	-	-	-	-	-	-
SNMP Trap	●	●	●	●	●	●	●
DHCP	●	●	●	●	●	●	●
DNS Client/ Server	●	-	●	●	●	●	-
TFTP Firmware Update/ Backup /Resotre	●	●	●	●	●	●	●
Configuration upload and download	●	●	●	●	●	●	●
ifAlias	-	-	-	-	-	-	-

Smart Switches			PoE Switches		Converters		Model Name
LGS-1104	LGS-1108C	LGS-1424C	LPES-2208CA	LPES-2224C	CM-011 Fiber Converter Series	CM-021-GB-II	

HARDWARE FEATURES

							Port
-	-	-	8	24	1	-	10/100TX
-	-	-	-	-	1 (SC/ST/WDM)	-	100FX
-	-	-	-	-	-	-	1000FX
4	7	20	-	-	-	1	10/100/1000T
-	-	-	-	-	-	-	100M SFP
1	-	-	-	-	-	1	1000M SFP
-	1	4	2 (Dual Speed SFP)	2	-	-	10/100/1000T/1000M SFP Combo
-	-	-	DB-9 Female	DB-9 Female	-	-	RS232 connector
-	-	-	8	24	-	-	PoE Injector

10Gbps	16Gbps	48Gbps	5.6Gbps	8.8Gbps	-	-	Switching Fabric
112Kbytes	144Kbytes	500Kbytes	1Mbits	3Mbits	-	-	Packet Buffer
8Kbytes	9Kbytes	10Kbytes	-	-	-	9Kbytes	Jumbo Frame
8K	8K	8K	8K	8K	-	-	Mac Address
ROM: 512Kbytes	-	ROM: 512Kbytes	-	512Kbytes x 2	-	-	Flash ROM
RAM: 32Kbytes	-	RAM: 32Kbytes	-	-	-	-	DRAM
-	-	-	-	8Mbytes	-	-	DRAM

100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	100~240VAC, 50/60Hz	DC9V / 0.7A	DC9V / 0.7A	Power Supply
-	-	-	-	-	-	-	Redundant Power
5.1 Watts	3.75 Watts	19 Watts (max)	10 Watts	20 Watts	3.1 Watts	3.8 Watts	Power Consumption
-	-	-	-	-	-	-	Overload Current Protection
-	-	-	-	-	-	-	Polarity Reverse Protection
-	-	-	-	-	-	-	Relay Contact with Alarm System
-	-	-	-	-	-	-	DIDO (Digital Input/ Digital Output)

0°C to 45°C 32°F to 113°F	0°C~45°C 32°F~113°F	0°C to 45°C 32°F to 113°F	0°C~45°C 32°F~113°F	0°C to 45°C 32°F to 113°F	0°C~45°C 32°F~113°F	0°C to 45°C 32°F to 113°F	Operating Temperature
-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	-40°C~70°C -40°F~158°F	Storage Temperature
10%~90%	10%~90%	10%~90%	5%~95%	10%~95%	10%~95%	10%~95%	Operating Humidity (Non-condensing)
165 x 100 x 32.5	250 x 133 x 37	440 x 161 x 44	217 x 140 x 43	440 x 280 x 44	119 x 85 x 26	119 x 85 x 26	Case Dimension W x D x H (unit=mm)
-	-	-	-	-	-	-	Case Protection
900g	1060g	2700g	1632g	3810g	740g	754g	Weight
-	-	-	-	-	-	-	DIN Rail Installation
-	-	-	●	-	-	-	Wall Mount Installation
-	10-inch Rack	●	10-inch Rack	●	● with Chassis	● with Chassis	19-inch Rack Mount

●	●	●	●	●	●	●	CE/FCC/UL
●	●	●	●	●	●	●	RoHS/WEEE
-	-	-	-	-	-	-	UL Class I Division II Certification
-	-	-	-	-	-	-	DNV Type Approved
-	-	-	-	-	-	-	EN50155
-	-	-	-	-	-	-	IEC 61850
-	-	-	-	-	-	-	Stability Testing (Free fall/ Shock/ Vibration)
304,057 hours 2 years	126,420 hours 2 years	143,965 hours 2 years	175,813 hours 2 years	57,586 hours 2 years	111,076 hours 2 years	443,282 hours 2 years	MTBF
-	-	-	-	-	-	-	Warranty

SOFTWARE FEATURES

							Management
-	-	-	●	●	-	-	SNMP v1 v2c v3
●	●	●	●	●	-	-	Web Browser
-	-	-	●	●	-	-	Telnet
-	-	-	●	●	-	-	CLI
-	-	-	●	●	-	-	Lantech-View
-	-	-	-	-	-	-	Menu Driven

-	-	●	●	●	-	-	IGMP snooping v1 v2/IGMP query
●	●	●	●	●	-	-	VLAN
●	●	●	●	●	-	-	Port Trunk with LACP
-	-	-	●	●	-	-	LLDP
-	-	-	●	●	-	-	Port Security
●	●	-	●	●	-	-	IP Security
-	-	-	●	●	-	-	Login Security (RADIUS)
-	-	-	●	●	-	-	SNTP
-	-	-	6 e-mail accounts	-	-	-	SMTP
●	●	●	●	●	-	-	Bandwidth Control
-	-	-	●	●	-	-	Flow Control

							Pro-Ring System
-	-	-	●	-	-	-	X-Ring
-	-	-	●	-	-	-	Dual Homing
-	-	-	●	-	-	-	Couple Ring
-	-	-	-	-	-	-	Central Ring
-	-	-	-	-	-	-	Dual Ring

●	●	●	●	●	-	-	Spanning Tree/ RSTP
-	-	●	●	●	-	-	Port Mirror
-	-	●	●	●	-	-	Quality of Service
●	●	●	●	●	-	-	Class of Service
-	-	-	●	●	-	-	System Log
-	-	-	●	●	-	-	Relay Alarm
-	-	-	●	●	-	-	SNMP Trap
●	●	●	●	●	-	-	DHCP
-	-	-	●	●	-	-	DNS Client/ Server
web UI	web UI	●	●	●	-	-	TFTP Firmware Update/ Backup /Resotre
●	●	●	●	●	-	-	Configuration upload and download
-	-	-	-	-	-	-	ifAlias

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