

Environment Technique Human



entechworld

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 **entechworld**

Company Info

Entechworld has provided the-state-of-the-art solutions in the fields of power plant, electric railroad system, transmission/substation facility, heavy electrical equipment, based on engineering expertise in electricity, electronics, control, IT, signal, and optical sensor.

Relying on such solutions, the company annexed technology research institute with the core corporate capabilities undertakes some national projects on electricity and IT as one of the next generation driving forces, in addition to the development of new products.

Especially, Entechworld entertains, as the corporate values of existence, fostering competent talent of globalization and developing latest high-tech solution and new eco friendly materials. We promise to provide you, customers with the distinctive value while focusing on the differentiation and cost saving policies.

“Safer World of the Future
Dreamed by Entechworld
Respecting Both Technology and Nature”



Company History

2010's

- 11 | AddWin Partners with Vietnam national Ho Chi Minh University of Economics established [AddWin Vietnam Economic Research]
- 10 | Law Finance Accounting M&A Real-Estate-Development and Business Management approved the Total Consulting Company in Vietnam [AddWin Partners]
- 09 | Patent Registration [Injector for Bag Filter of Dust Collector]
- 09 | [Relay Chattering Counter System] is registered at develop select item
- 08 | IBK(Industrial Bank of Korea) CORPORATE FAMILY
- 07 | Registered the 'Items of choice' [Korea Western Power]
- 07 | Completed a development of [Measure the exact level of derivative-based control system for optimal]
- 07 | Completed a development of [Injector for Bag Filter of Dust Collector]
- 05 | Patent pending [Deterioration Diagnosis System of Power Utilites Connector]
- 05 | Patent pending [The Intelligent Circuit Breaker]
- 05 | Patent Registration [The Refrigerant Turbine Generator]
- 03 | Patent pending [Apparatus for Expelling Bird]
- 02 | Patent Registration [ONE-BODY TYPE CURRENT/VOLTAGE MEASURING DEVICE]
- 02 | Acquisition [Vietnam Korean resident newspaper company]
- 01 | [Relay Chattering Counter System] developed

2009's

- 12 | Contracted with LAM GIANG REAL ESTATE JOINT STOCK COMPANY about develop 120,000㎡ (APT units 2,796) at Nha Be District, Ho Chi Minh City in Vietnam.
- 11 | Patent Registration [GIS Local Digital System]
- 11 | [Gas turbine fire detecting system] is registered at develop select item by Korea Midland Power Co.
- 09 | Patent pending [The Refrigerant Turbine Generator]
- 07 | Patent pending [Injector for bag Filter of Dust Collector]
- 04 | Patent pending [GIS Local Digital System]
- 04 | Patent Registration [DIGITALIZED-LCP]
- 04 | Certificated maintenance qualified company by Korea Western Power Co.
- 04 | Patent Registration [Elevator]
- 04 | Patent Registration [The integrated operation apparatus with fire detection system and sensor driver system for Air Preheater]
- 03 | Completed a development of Fire Detecting System in combined Cycle Power plant
- 03 | Completed a development of [The integrated operation apparatus with fire detection system and sensor driver system for Air Preheater] in thermal power plant

2008's

- 09 | Acquired 'Certificate of INNO-BIZ'
- 06 | Acquired 'Certificate of Manufacture and Servicing' [Korea Midland Power]
- 05 | Acquired 'Certificate of Manufacture and Servicing' [Korea East West Power]
- 05 | Registered the 'Items of choice' [Korea Midland Power]
- 03 | Joined 'Korea Electrical Contractors Association'
- 02 | Registered the 'Items of choice' [Korea East West Power]

2007's

- 12 | Contract of 'Technology transfer of industrial property rights' [Korea East West Power]
- 12 | Contract of 'Technology transfer of intellectual property rights and commercialization support' [Korea Midland Power]
- 12 | Acquired 'Certificate of Excellent Enterprise for mutual growth and cooperation' [Korea Midland Power]
- 10 | Acquired 'Business certificate for electrical installation'
- 09 | Won the Official Commendation of the Prime Minister [Men of national merit for railroad transport]
- 09 | Patent pending [Elevator]
- 09 | Joined 'Korea Electrical Manufactures' Cooperative'
- 09 | Registered as a qualified partnership of supplies for [Korea Electric Power Corporation]
- 08 | Patent registered [Leading Management System]
- 07 | Gas Leakage Surveillance System for gas turbine Development.
- 06 | Resolved the trouble of ST/RE communication and developed its HMI.
- 03 | Development of NCIS.
- 03 | Independent production system confirmed by [Small and Medium Business Administration]

2006's

- 06 | Patent pending [Digitalized GIS Field Control System]
- 06 | Patent pending [Guidance Management System]
- 06 | Development of GIS LCP Digital System.
- 06 | Registered as a venture firm.
- 06 | 'Competitive Bidding Eligibility for Public Procurement Service' registered.
- 05 | LNG Gas Leakage Detection Equipment Development.
- 05 | Registered the utility patent right. [Secondary-side of CT Open Detector]

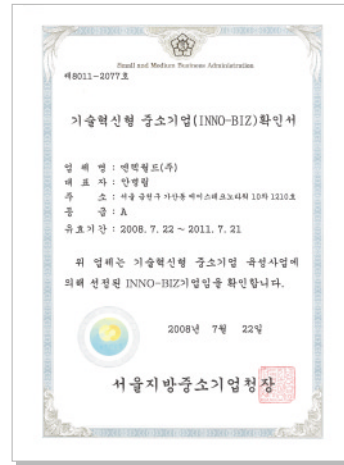
2005's

- 12 | Development of Optical CTs, VTs
- 11 | Registered 'Business certificate for information and communication installation'
- 08 | Joined 'Korea Industrial Technology Association'
- 08 | Joined 'Korea Automatic Control Ind. Cooperative.'
- 07 | Opend the covmpany annexed research institute.
- 07 | Registered the factory [Manufacturing industry for Distribution and Electric Automatic Control Panel]
- 07 | Acquired 'ISO 14001 Environment Management System Certificate'
- 07 | Acquired 'ISO 9001 Quality Management System Certificate'
- 06 | 'Entechworld, inc.' established. [Automatic Control System Field and Production of Distributing Board]

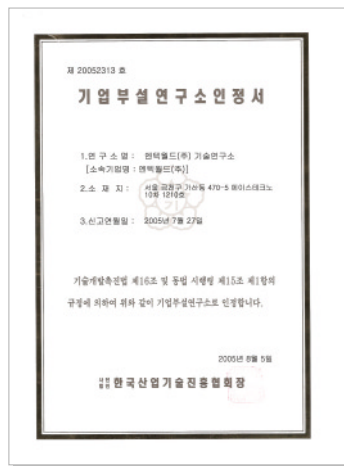
Certificate



Certificate of Environment Management System



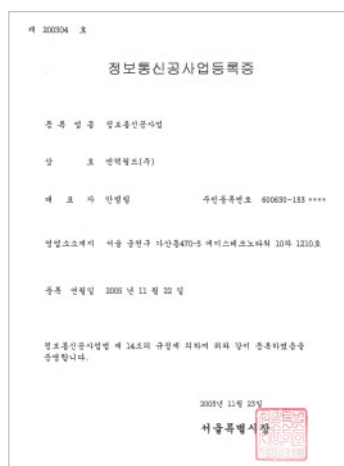
Certificate of INNO-Biz



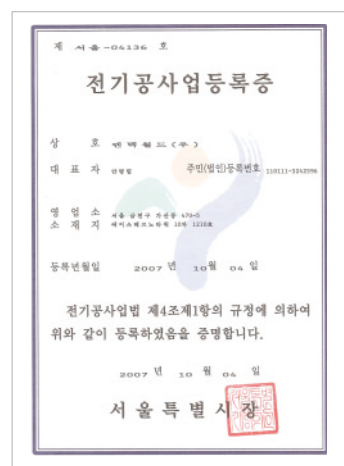
Certificate of Company Annexed Research Institute



Certificate of Excellent Enterprise for Mutual Growth and Cooperation (Korea Midland Power)



Business Resgister Certificate for Telecommunication Installation



Business Certificate for Electrical Installation

Business Fields

Development Business

Entechworld Co.,Ltd generally manages projects, on behalf of the contractors, from planning and designing constructions such as hydroelectric, thermoelectric and atomic power plants, new renewable energy plants and new town developments to the order, construction and maintenance. That is, while suggesting the optimized development directions of a project, based on the results of the project appropriateness review in planning stage, we provide distinctive services up to design, sales and construction. Therefore, Entechworld manages all of business parties including expert technical organization, designer(engineer), construction bodies to participate in every level, contributing to saving construction cost, shortening construction period and improving quality in order that contractors could maximize profits with the highest quality within the budget.

Manufacturing Business

Entechworld Co.,Ltd also participates in power facility, SI business, electrical/telecommunication work construction and special coating. For power facility, we have developed protective relay system, power analysis system and other systems so that electric power could be stably while regarding SI business, we have developed and supplied gas leakage detection system, feeding system and SCADA system to monitor and control any unexpected accidents in order to prevent power failure accidents in power plants and substations. Besides, we actively participate in electric, communication construction and special coating business.

Recently, the range reaches not just the domestic markets even up to Southeast Asian market where industries have been rapidly grown up and the company expects overseas construction projects in the future.

Technology Research Institute

Entechworld Co.,Ltd undertakes research projects, for instance, participating in electric power research and development projects and power plant research and development projects. The company annexed technology research institute and production head office have already completed the perfect preparations such as experimental equipments, research facilities and production facilities, developing new technology and new products in the field of new concept electric power IT field, which are new driving force of the national economy.

In addition, as Kyoto Protocol was effective, eco friendly products are urged to be developed while in consideration of the foresaid statement, the company are also concentrating on new electric products and bio energy products, reducing global warming.

Construction Business

I New Town Development I

New towns are plentifully constructed mainly around Seoul Metropolitan Area in consideration of high density of city population and stable housing supply. New town development requires the increase of electric supply and therefore, it requires power plant facilities and power transmission facilities.

Power facilities are not well matched with neighboring buildings with electromagnetic waves disadvantageously generated and even regarded as an unwanted facility.

Therefore, such facilities including power transmission facility and substations are constructed underground. That is, the tendency that power facilities are constructed underground means cost facilities, expanding the power facility market.

For this, Entechworld Co.,Ltd actively corresponds to the power facility market according to new town development.



Pan-gyo New Town



Pa-ju Gyoha New Town



A-san New Town

I Apartment Construction I

EntechWorld has contracted with LAM GIANG REAL ESTATE JOINT STOCK COMPANY(Vietnam Company) about develop 120,000 m² at Nha Be District, Ho Chi Minh City in Vietnam

*Project Summary

- Total Site Area : 124,573 m²
- Building Footprint Area : 56,123 m²
- Total Building Area : 401,234 m²
- Building Coverage Ratio : 45.05 %
- Floor Area Ratio : 322.09 %
- Parking Lots : Car 567, motorbike 3,000
- Total APT Units : 2,796



BIRD'S EYES VIEW



MASTER PLAN



TYPES OF UNITS

Power Plant Business

I Hydroelectric Power Plant I

Hydroelectric power plant is the mechanism generating electric power in which water high placed in river or reservoir is allowed to lower place through water pressure pipes, rotating water mills, from which motive power, in turn, rotates generators directly connected to water mills, finally generating electricity.

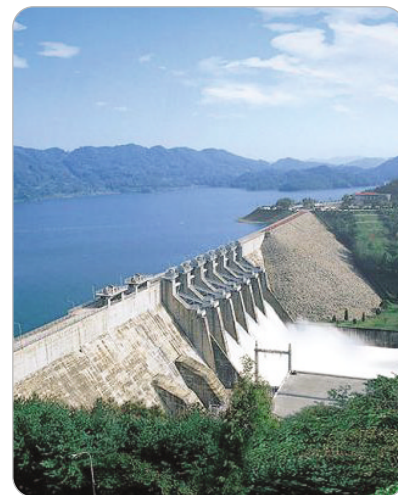
Maritime energy such as tidal power, water-power, ocean current power and seawater temperature difference are distributed in specific areas, so several maritime powers actively develop the related technology. Recently, as hydroelectric power is more demanded in consideration of eco friendly advantages, the related facilities are favorably noticed and needed more. Entechworld is participated in the design and construction of electric and machinery fields to improve the facility performance, increase the capacity and be applied in the fields.



Dae-gok Dam Hydroelectric Power Plant



Chung-ju Dam Hydroelectric Power Plant



Dae-cheong Dam Hydroelectric Power Plant

I Thermoelectric Power Plant I

Thermoelectric Power Plant is the facility generating electric energy by operating a generator with the steam that is created when a large conversion mechanism converting chemical energy of fuel into electric energy, boils water and it actually generates electricity when the steam emitted from nozzles rotates turbines. Recently, as a complex Thermoelectric power plant with high thermal efficiency is constructed, combined heat & power generation system is also under construction.

Entechworld is also focusing on opening new fields such as internal combustion generation used while the thermal energy of thermal power is converted to mechanical energy and gas turbine power generation.



Dang-jin Thermoelectric Power Plant



Yeong-heung Thermoelectric Power Plant



Seoul Complex Thermoelectric Power Plant

I Atomic Power Plant I

It generates the electricity by the mechanism in which steam is generated by the heat from huge nuclear energy created when a nuclear reactor makes nuclear fission continuously. Than any other power generation mechanisms, it does not generate any carbon dioxide, so its rate is increasing.

In addition, as the domestic power facilities were outworn and the international oil price is rapidly increased, the investment in atomic power facility is increased, facilitating the demand for the facilities.



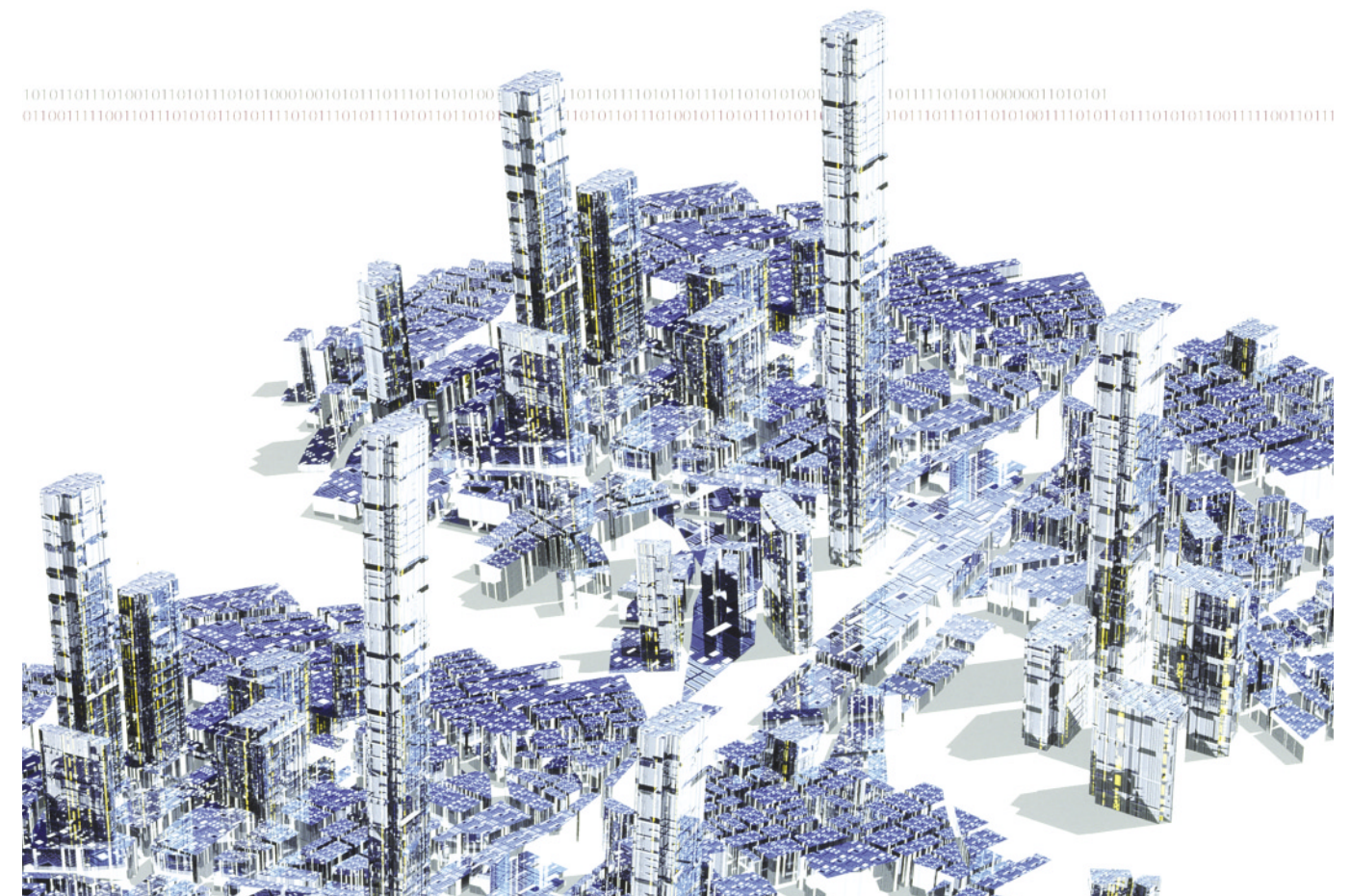
Ul-jin Atomic Power Plant



Generator Turbine



Generator Turbine Construction



Electricity Business

I Power Analysis System I

As the non-linear load has increased with the development and supply of power control system, reactive power and high frequency power are generated to the related power system which resulted in distortion in alternating voltage.

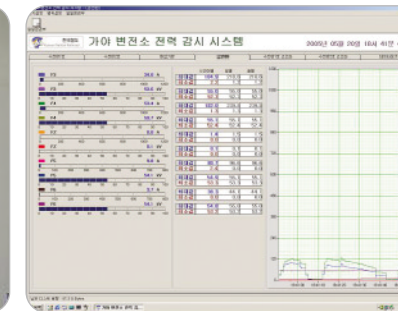
To prevent any damage to the power system, we use active power filter for which we use power analysis equipment to test the compensation performance of the active power filter.

The power analysis equipment is to record and analyze the operation of quality of power in the general users and transformer substation at high speed all the time. It enables to measure the quality of power such as voltage, current, and harmonics.

It can be synchronized with GPS to measure and monitor the data on real time basis. The measured data will be stored in flash memory and the can be transmitted through communication port well.



Power Analysis System Installed



Display of Power Analysis System



Inside View of Power Analysis System

I Cabinet Panel I

The high-voltage Cabinet Panel is the optimized system used for generator, transformer devices, plants, general industrial facility, building, public facilities to monitor and power system.

We produce high quality products aiming at total solution of power IT system including general Cabinet Panel.

The Cabinet Panel refers to the power distribution device to supply electrical energy to the load devices in providing power to the electrical load device of factory or household.

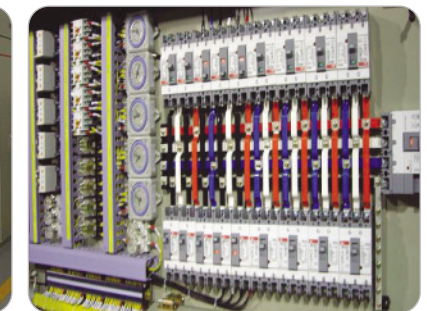
We produce and provide easy Cabinet Panel which is electrical device which provides small amount of current appropriate for uses and capacity by splitting the large volume of current.



Inside View of Cabinet Panel



Cabinet Panel Installed



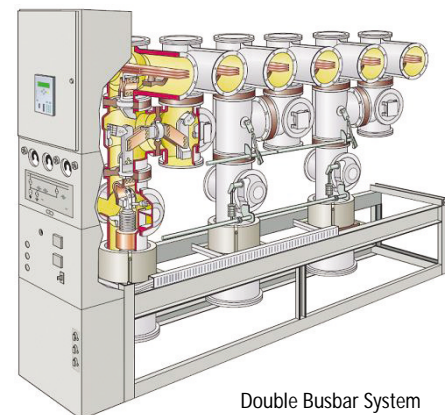
Cabinet Panel

I GIS I

GIS(SF₆ Gas Insulated Switchgear) supports the entire charging assembly for the most affirmative performance, actual system application and highest performance single phase separation ground type metallic pressure container and is a kind of insulating the main circuit with odorless, colorless, tasteless and harmless insulation gas, SF₆.

■ Distinctive feature

- Standardized aluminum alloy sheath
- Capsulized conductor by phases
- Integrated control panel
- Unique and strong VCB structure
- Rated voltage 12kV ~ 36kV supported
- Simple and reliable mechanical indicator
- Safe grounding system
- Compact design - efficiently utilizing the existing switching device



Double Busbar System

■ 25.8kV GIS Rating

- Rated voltage(max. circuit voltage) 25.8 kV, 3 Phase
- Nominal voltage: 22.9 kV, 3 Phase
- Rated frequency: 60 Hz
- Commercial frequency withstanding voltage: 70 / 1 kV/min
- Impulse withstanding voltage: 125 / 1.2 x 50 kV/ μ sec
- Rated short-time current R.M.S. 25 / 1 kA/sec
- Rated current: 2,000A
- Rated SF₆ Gas Pressure: 1.0 bar · G at 200°



GIS

I Load Breaker Switch I

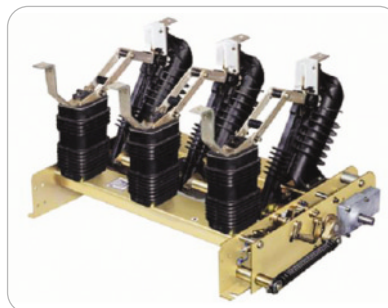
The Load Breaker Switch is open/close disconnecting switch for load current which is possible to open through three-phase interlock. The operation concept is different from the disconnecting switch operates at no-load condition. This is currently installed and utilized for high-speed railroad.

■ Specifications of Load Breaker Switch

- Pole Mounting Type
- Number of pole : 1 or 2
- Rated Voltage : 27.5 kV
- Rated Current : 1250A
- Control Voltage : DC 110V or AC220V



Load Breaker Switch



Open/Close Switch



Open/Close Switch Installed

Power Transmission/Distribution Business

I Power Transmission Line I

As the line such as support, insulator and ground used to send the electric power generated by a power plant to a substation, the ground power transmission line where electric energy is supplied to inner city, based on multi-loop power transmission system, is stably operated by installing monitoring control system.

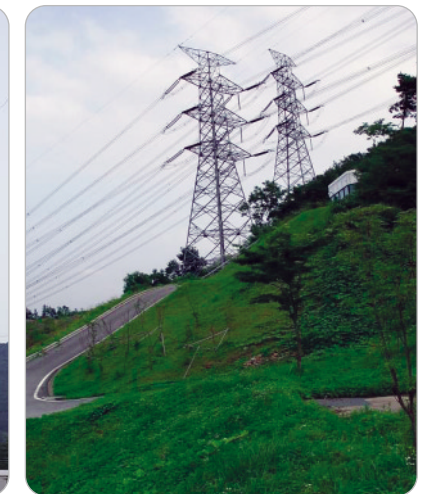
Entechworld Co.,Ltd is also participating in the construction of steel tower and substation.



345kV Substation



345kV Transmission Line



154kV Power Transmission Tower

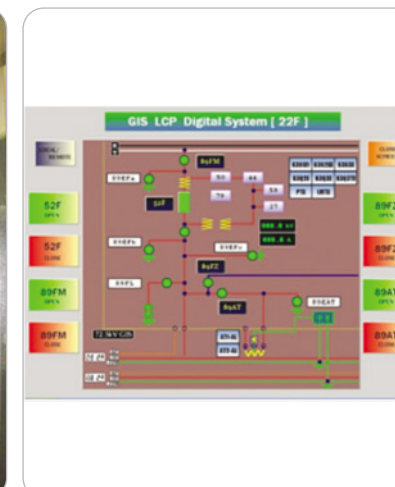
SI business

I Development of GIS LCP Digital System I

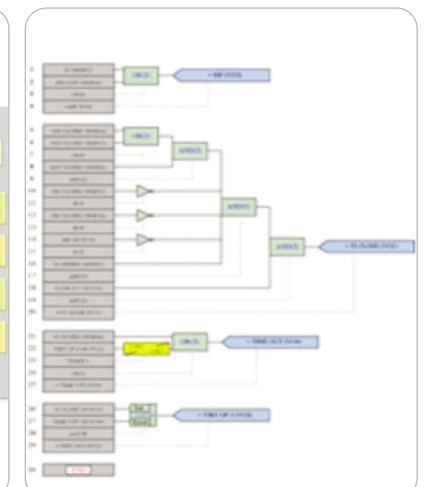
- Power control facility for construction, reduce maintenance cost and effective management of power system.
- Wide area and remote control system using Ethernet and optical communication system for automation of transformer substation. Indispensable facility prior to power market opening to overseas companies.



GIS LCP Digital System



MMI Block Diagram



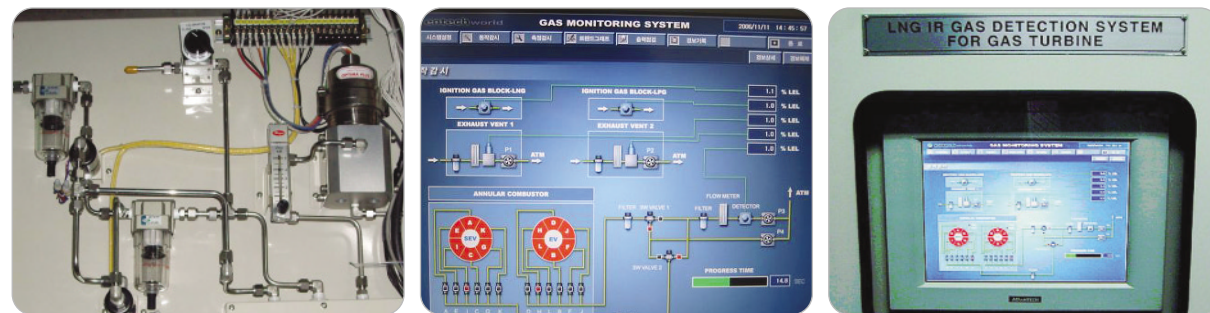
GIS LCP Logic

I Gas Leakage Monitoring Device I

The Gas Leakage Monitoring Device is the system to prevent any accidental explosion or fire caused by gas leakage to detect immediately leakage of LNG or LPG which is used as raw material in the gas turbine generation plant.

The system detects amount of gas in the air with IR sensor by flowing in the exhausted air at the important parts of turbine. The concentration of gas can be measured at different locations.

It is installed at a power plant and its applications are expanded more and more.



Detection Part of Monitoring Device

Monitoring of Gas Leakage Monitoring Device

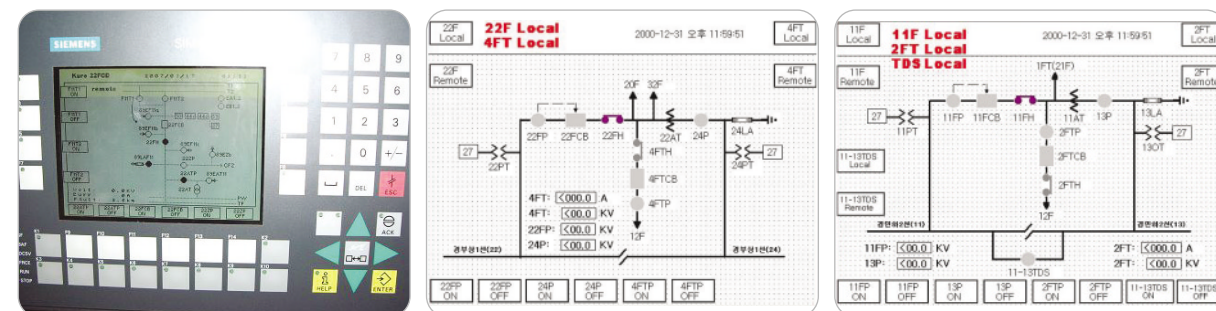
Gas Leakage Monitoring Device

I Power Supply System I

The Power Supply System refers to the system which provide electric power transmitted from a generation plant by transforming it at the transformer plant to the catenary.

The way of supplying power of alternating current is divided into booster transformer method and auto-transformer method.

The system is monitoring a protective power supply utilizing bay controller and protection relay, and the system is easily configured to enable interface with existing power supply utilizing bay controller and protection relay, and the system is easily configured to enable interface with existing power monitoring system and to monitor and control easily by normal users.



Bay controller

Control Display 1

Control Display 2

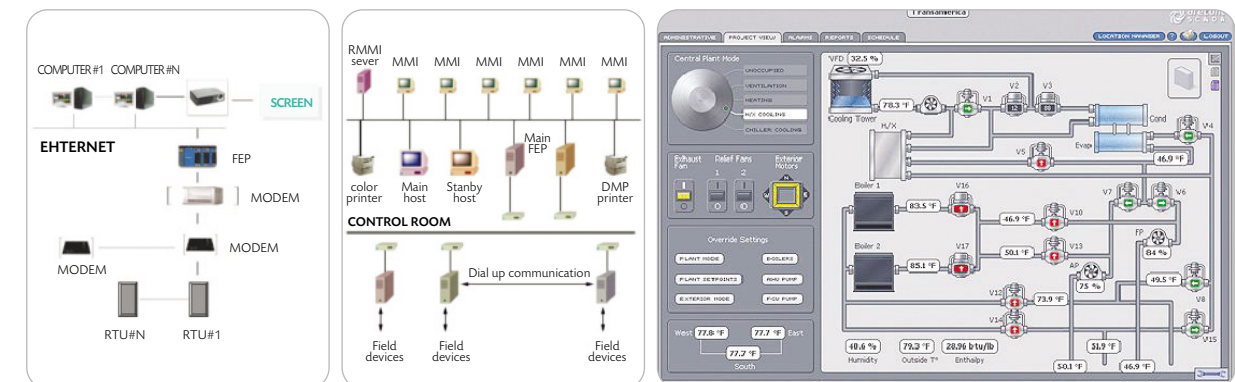
I SCADA System I

SCADA(Supervisory Control and Data Acquisition) is a remote control and monitoring system for a remote monitoring and control room through wire/wireless communication.

SCADA can be used to monitor and control the gas supply base, power generation system, power supply system, water supply system and sewerage treatment plant, and pump plant.

The electrical SCADA facility which is applied to the power supply system to collect and analyze the information of power system, and control remotely by centralizing the electrical facility at the central control room which is complicated and high-power demanding trend in the industrial facility.

The raw cost analysis and integrated management will contribute to reduce cost, to minimize accidents owing to real-time monitoring of electrical facility and to take speedy action.



System Configuration 1

System Configuration 2

System Configuration 3

I FINE VIEW(HMI) I

FINE VIEW can be functionally assembled and customized, especially for developers and users, as a commercial HMI Software Package providing the functions of monitoring, controlling, analyzing and reporting data in various industrial fields.

The standard open interface supported enables developers of applications to share and use all FINE VIEW resources on real-time basis and supports multi-project function in which one single computer can simultaneously process several projects, advantageously allowing the real integrated system.



Fine View V3.0

Manual & CD

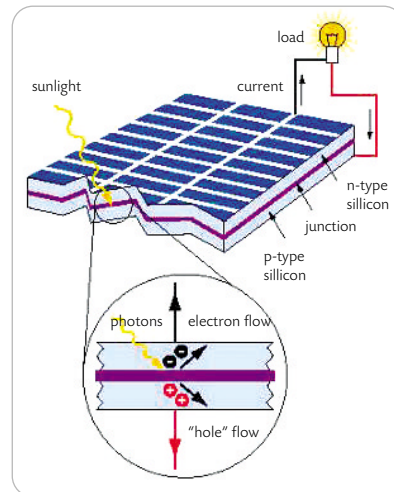
Catalog

New Renewable Energy Business

I Solar Energy I

The Solar Energy utilizes the principle of power generation of the solar energy(light element) which generates current with the movement of electrons which occurs when the solar energy is saturated into the photovoltaic cell made of semiconductor. Each solar cell sizes about $10 \times 10\text{cm}^2$ which generates 0.6V with 1.5W of capacity from the solar energy.

Recently, the solar energy system is widely distributed owing to high energy efficiency and the aid from the government. We, Entechworld are doing our best to supply the high efficient solar power system.



Principle of Solar Energy System



Solar Cell



Solar Cell Installed

I Wind Power Energy I

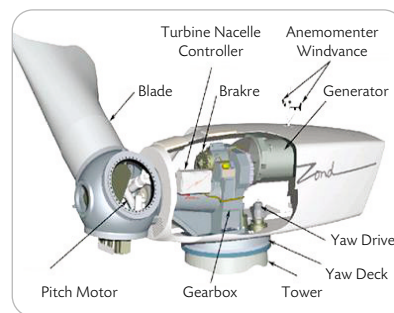
The Wind Power Energy System refers to the power generation mechanism in which the natural wind turns the windmill which will be, in turn, accelerated with gearing tool to run and speed up the generator.

Recently, the system is practically utilized in the isolated areas such as islands where power line is hardly supplied, and its power generation facility is being distributed increasingly owing to its advantages as an environment friendly power generation.

There are two types of wind power generation; direct type and battery type.

The direct type uses indirect wind power generator to the electrical system directly. Since it is inconvenient because it is directly affected by change of wind power, the control devices are attached in cases to change the tilting angle of blade as the wind velocity changes, which helps to rotate the windmill at constant speed regardless of wind velocity.

In America and UK(United Kingdom), the windmill power system is actually used, providing 100MW~ 1000MW of power.



Wind Power Generation System



Wind power Generation Area in Dae-kwan-ryung



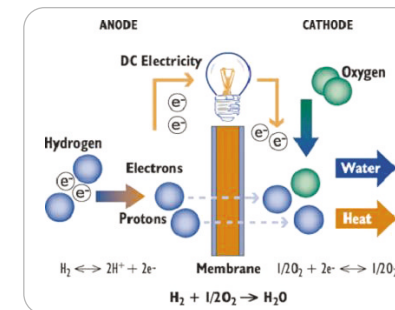
Wind power Generation Area in Je-ju Island

I Fuel Cell I

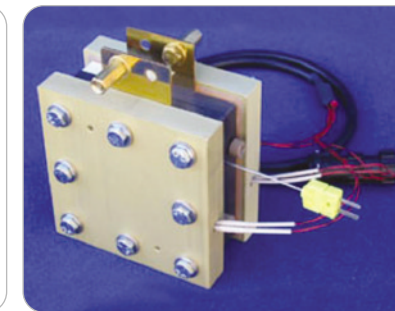
The Fuel Cell generates direct current as the chemical energy of fuel (hydrogen) is converted into electrical energy directly.

At the moment, hydrogen passes through positive pole while oxygen passes through negative pole, during which hydrogen reacts to oxygen electrically and chemically producing water and simultaneously generating current at the poles; electrons generate the direct current passing through the electrolytes.

Fuel cell is expected to increase as the production cost will decrease.



Principle of Fuel Cell



Small-Size Fuel Cell

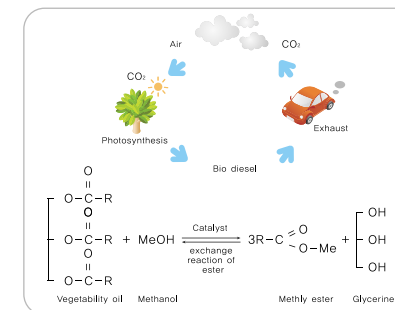


Vehicle with Fuel Cell

I Bio Energy I

Bio Energy refers to the energy source from organic materials(mainly plant) produced by photosynthesis and the energy produced by all living organisms as they are eating and digesting the organisms.

The Bio Energy is obtained by converting the animal and living organisms into different kinds of gas, fluid, or solid fuel; or by burning these to produce the heat, vapor, or electricity.



Bio Energy Principles



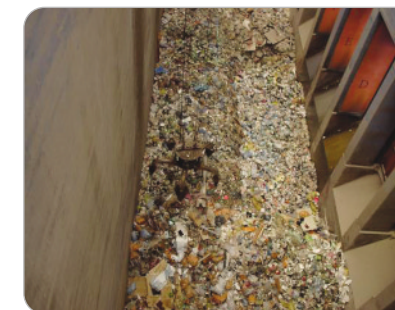
Bio Energy Raw Materials



Bio Energy and Production

I Wastes Energy I

The Renewable Energy shall include the solid fuel, fluid fuel, gas fuel and waste heat, which are produced by oil making technology, in which incombustible wastes with high energy content are pyrolyzed, making combustible gas technology relying on converting into gas, heat recovery technology by burning the wastes which contain high degree of energy out of combustible wastes from industrial areas and household, to use them for the industrial areas and household, to use them for the industrial production purposes.



Wastes Prior Renewal



Wastes Incinerator



Sorting out Renewable Materials

Power Generation Facility and Plant

I Electrical Work I

We are exerting to accomplish the best installation works through accurate installation, complete technical service, complete test and inspection, based on our continued research and education to meet the advanced complete technical service, complete test and inspection, based on our continued research and education to meet the advanced complete technical service, complete test and inspection, based on our continued research and education to meet the advanced technologies in a fast manner in the areas of construction, installation, assembly, precise inspection at site, repair and maintenance.



Cabling Work



Safety Training for Electrical Work



Cabling Work

I Telecommunication Work I

We have installation technology and equipment of communication facility for control of power facility of high-speed railroads and of safety facility of power plant. We continue to make efforts to provide the highest quality of installation from start, commissioning and to A/S sales service.



RTU Installation work



RTU Communication Cabling Work



Communication Cabling Work

I Oil Humidity Sensor I

Free humidity contained in the oil or oily humidity are major factors to accelerate the oxidation of lubricant up to 10 times faster than without the humidity, which results in 75% increase of wearing out of bearing. To prevent this in advance, the humidity could be monitored on real-time basis to have humidity monitoring system installed with humidity detector as well. It can be also utilized to fine out the source of humidity flowing into.



Oil Humidity Sensor



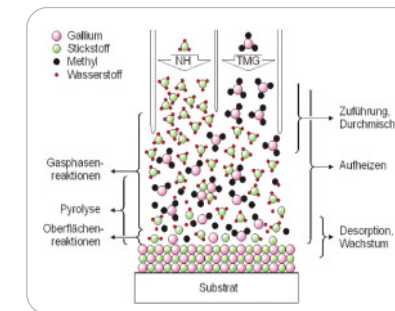
Oil Humidity Sensor Installed



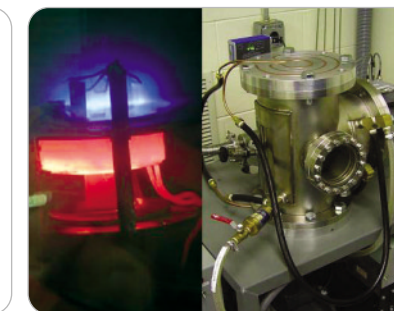
Display of Oil Humidity Sensor

I CVD I

The Chemical Vapor Deposition is surface processing technique of making thin film or microparticle of solid matter which is widely applied to the material field of semiconductor and national defense industry. It does not have size change thanks to low temperature processing, yielding excellent close adhesion and secures good adhesion with complicated material of hole and slit, dense and even finish, which gives higher degree solidity than the processing of Hi-Cr method, nitrification, stellite coating. The CVD coating is high level of technology which is difficult to optimize the coating condition, however the application area is getting expanded.



Principle of CVD Coating



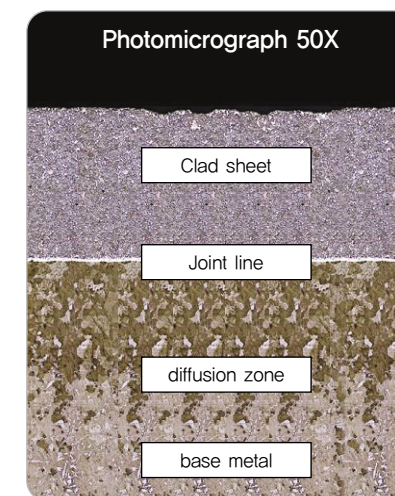
CVD Chamber



Example of CVD Application

I Special Coating I

The coating provides durability against wearing, corrosion, and erosion by making coating film of 2mm thickness on the textile formed coating materials of over 70% of tungsten carbide and processed with heat. With its excellent durability against erosion and corrosion, the clad steel is applicable to the complicated and geometrical parts of power plant, fan blade of power plant and the evaporator tube of boiler power plant. Most of metals can be coated with it.



Coating Section of Clad Steel



Corrosion Comparison of Clad Steel



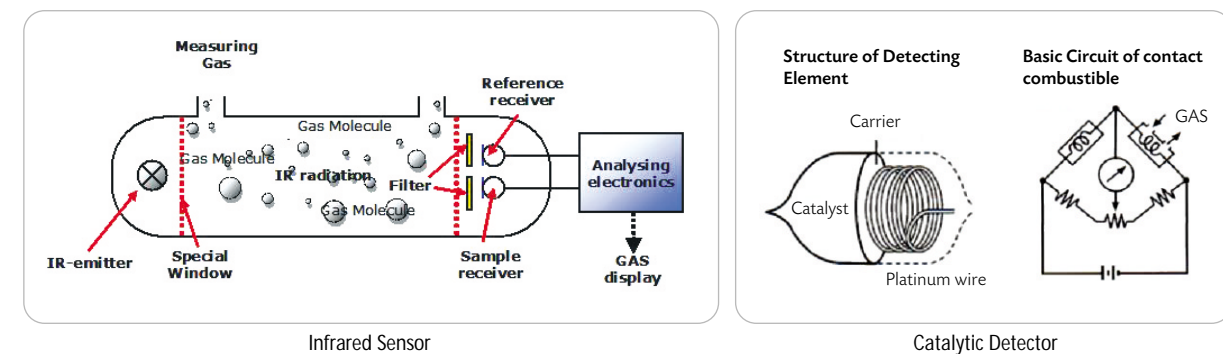
Application of Clad Steel(Burner Tip)

Development of Gas Leakage Detector System

• What is Gas Turbine LNG Leakage Detector System?

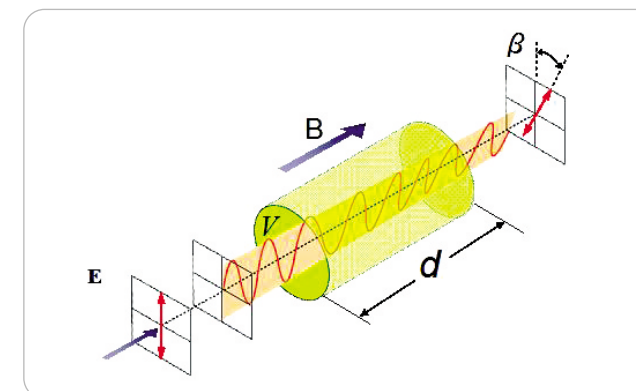
The system detects and manages the leakage of gas could be occurred at the gas turbine at the complex fire power plant using LNG as raw fuel.

< The Structure of Sensor >



Development of Optical CTS, VTS

• Principle of Faraday Effect



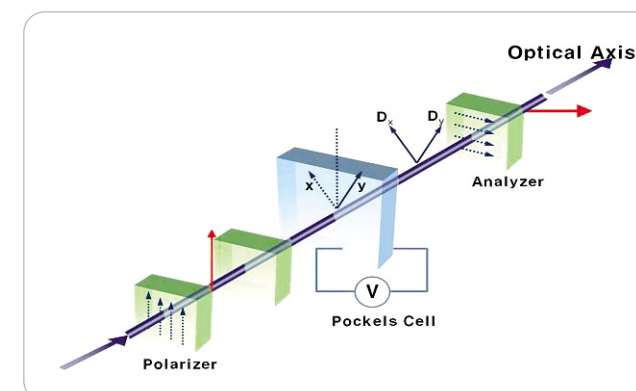
• Optical Current Transformer

- Optical current measuring system using magneto-optic effect.
- Utilize Faraday effect of optical element of which plane of polarization is rotating with magnetic field during faster shooting.

• Benefits of Optical CTS

- Reduced isolation cost compared to iron pole type CT.
- There is no found problems relative to magnetic field saturation.
- Higher stability against outside magnetic field.

• Principle of Pockels Effect



• Optical Voltage Transformer

- Optical voltage measuring system using electro-optic effect.
- Use Pockels effects which change the refractive index in linear pattern depending on the intensity of electricity field when outside electricity field is provided to the optical anisotropic crystal.

• Benefits of Optical VTS

- Enables to measure the voltage with high input impedance and to solve electrical isolation problems.
- Excellent reproduction with the high voltage wave form.

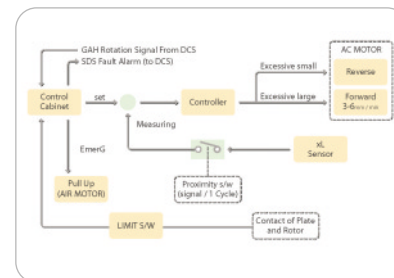
Development of FDS & SDS Combination System for Air Preheater

What is FDS(Fire Detector System) & SDS(Sensor Drive System) Combination System?

The system improving the function of air heater with combined operation for SDS, which can control with automatic measurement of Rotor's Seal to minimize the air leakage of air heater and for FDS, which senses the fire in the air preheater and take the standard temperature.

Specification of FDS & SDS Combination System

- Control Method : Interrupt Computing, Cycle Computing, Repeat Computing
- Input/Output Control Method : Scan Synchronization Batch Processing System
- Program Language : LD(Ladder Diagram), IL(Instruction List), SFC(Sequential Function Chart)
- Computing Capacity: 0.12 μ s/order, 0.12 μ s/step
- Storage Capacity of Program Memory : 512k byte(GMR-CPUA), 2 MB (GMR-CPCU)



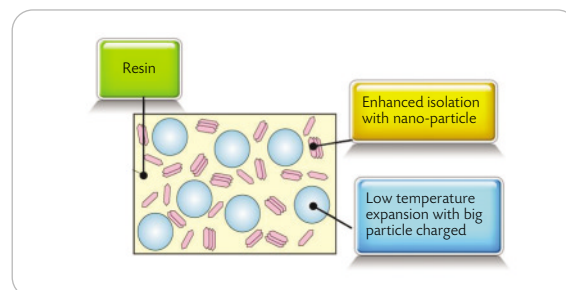
Block Diagram of SDS

Development of NCIS

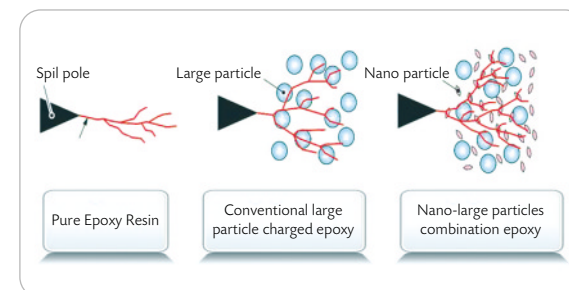
What is NCIS(Nano Composite Insulated Switchgear)?

NCIS standing for nano composite insulated switchgear that improves heat-insulation, heat resistance and mechanical properties by using nano filler composite technology features compact size, simple structure and little maintenance than the existing gas insulation materials.

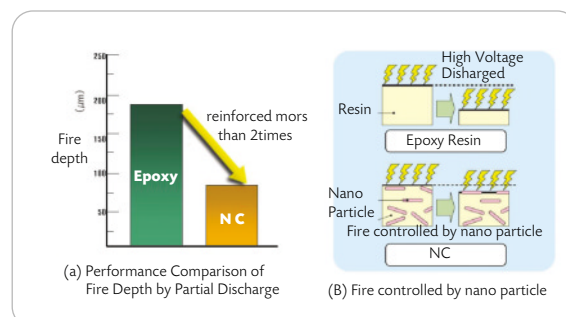
High voltage Electrical Isolation Material



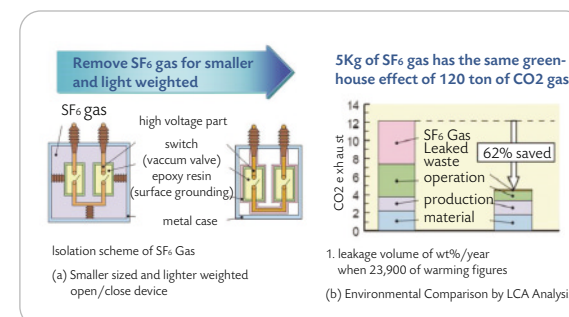
3-D Drawing of High Charged Material



3D Drawing to Control the Heating Route by Nano-Particles



Heat Resistance Performance in Case of High Voltage Discharge



To Transform into Gas Out of SF₆ of Power System of NC Isolation

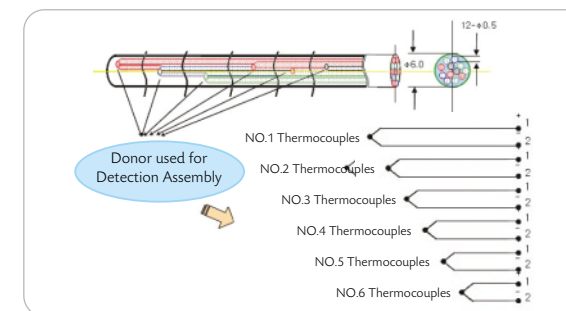
Development of Fire Detection System

What is Gas Turbine Fire Detection System?

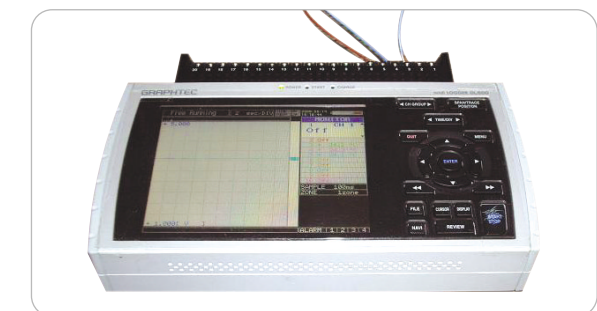
It functionally detects and warns fire that may break out or around gas turbine combustion chamber of complex thermal power plants using LNG as its fuel.

Structure of the Facility

- **Sensor**
 - Donner, fume detector, flame detector, fixed temp.(heat) detector.
- **Receiver**
 - Monitoring a whole system and controlling fire detection.
- **Relay**
 - Transmitting the signals from detector/transmitter connected to a system to a receiver through common signal line.
- **Kinds of Devices**
 - Sound device, strobe light, indication lamp of fire extinguishing chemical discharge, fire extinguishing chemical control box and its stop button.



Structure of Donor used for Detection Assembly



Data Logger

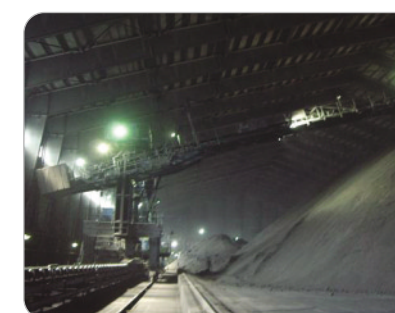
Development of Coal-Supply Control System

Coal-Supply Control System?

It is the facility used to load and unload coal to supply to thermal power plant. In the facility, reclaimer/stacker should be controlled which requires PLC programming.

Necessity of Control Facility Development

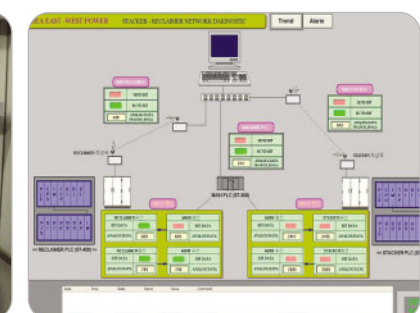
- The above control system requires reinforced facility and advanced programming function as it may have frequent troubles and hardly secure spare parts if it is intended to use for a long term.
- Normally, PLC system is old-fashioned, so most systems simply structured does not have event logging function, causing any accident from unexpected troubles to be delayed for maintenance service.
- By adding HMI function, it is possible to trace and manage records of operation and maintenance, so it is necessary to develop easy maintenance and manageable system.



Coal-Supply Control System



PLC Installed



Control Display