LS Industrial Systems is leading the industries from the electric control to the most advanced ubiquitous solution to create comfortable and productive industrial society.

Established in 1974, LS Industrial Systems is becoming the global leader in the industrial Electrics & Automation fields. LS Industrial Systems will lead the comfortable and productive industrial Electrics & Automation fields by offering Total Solution, the core of 21C industrial competitive power.
Company History

1974 ~ 1993
LG Industrial Systems (Currently LS Industrial Systems) went public after overcoming challenges of growth period
Soon after LG Industrial Systems was established in 1974, we had produced one million WHM units by 1975. We were the first to obtain the ISO9001 certificate in the Korean electric power industry in 1993, and have secured our position as a leading electric power supplier through diversification of business fields encompassing low to high voltage equipments. LG Industrial Systems was the pioneer in the Korean automation industry, as the company had developed PLC in 1984, inverter in 1986 and DCS in 1989. LG Industrial Systems went public in 1993 with initial challenges overcome and growth ensured.

1994 ~ 1998
LG Industrial Systems became a leading supplier of industrial power and automation systems through rapid progress and innovation
LG Industrial Systems merged Goldstar Instrument & Electric Co., Ltd and Goldstar Electric Machinery Co., Ltd in 1995, and obtained the ISO9001 certificate for PLC in 1994 and inverters in 1996. And the company had proceeded to break the 100 million unit mark in the accumulated production of low voltage equipment in 1998. LG Industrial Systems became the largest supplier in the Korean industrial power and automation market by reinforcing its internal capacity through these achievements coupled with business activation and management reforms.

1999 ~ 2004
Towards becoming the world’s best through selection and concentration
LG Industrial Systems has reformed its business organization in order to secure an international level of competitive power through specializing its business scope, while successfully operating the local corporations for production and sales in Dalian and Wuxi, China and Hanoi, Vietnam. In June 2001, we proclaimed ourselves the ‘Leader in Industrial Power and Automation by offering Total Solution’ as the new vision, and have grown to be the enterprise with excellent quality and product development power through selection and concentration.

2005 ~
New name, new start, new advance
Renamed ‘LS’ along with LG Cables group in March 14, 2005, we set up the management philosophy as ‘Always with our customers’, and the mid and long term management goal as ‘Excellent quality and product development power’. We plan to be the Korea’s first enterprise, the World’s first enterprise, and future-leading enterprise through Total Solution system industry based on IT technology growing out of simple device manufacture.

(LG Group was divided into LG Group focusing on electronics and chemistry, GS Group focusing on oil refining and construction, and LS Group focusing on cables and industrial systems.)
Business Principle 4
Business Field 6
Total Solution Provider 8
Research & Development 10
Quality & Service 12
Electric Equipment & Systems 14
Automation Equipment & Systems 26
Processed Metals 38
New Business/RFID 40
Global Network 42
LS group is advancing into a Leading Solution provider for customers, contributor to the society, and ground for employees to achieve their dreams. With the management philosophy of "Always with our customers", every member of LS will endeavor until LS gets recognition for the most reliable brand by the customers all over the world.

The new CI of LS means that LS will offer Total Solution, growing out of device industry. The arrow of wordmark represents the strong will of company stepping toward the future and the infinite competitive power as the new paradigm maker and the red color represents the challenging and the enterprising spirit of LS. The feature taking shape of smooth curve symbolizes the LS spirit for the customers, and the blue color symbolizes LS transparent management and sincerity.
LG Group was divided into LG Group focusing on electronics and chemistry, GS Group focusing on oil refining and construction, and LS Group focusing on industrial systems and cables.
Providing top quality products in industrial electric controls and automation fields, LS Industrial Systems set the long term goal as “Superiority over quality and product development.” LS Industrial Systems will drive the industry into the future through system business, providing Total Solution based on IT technology.
Unlike the general components, power semiconductor module has high added value from high technology and clean equipments. The related project will be regularized after the development of module integration and packaging technology in the national policy project by 2008.

PCU (Power Conditioning Unit) development for transforming the power generated from decentralized power system into AC power for certain load or system is underway.

LS Industrial Systems is continually discovering the new industry for the future and industrializing it.
LS Industrial Systems has been leading the industrial electric controls and automation field in Korea with the advanced technology for decades. To set the standard of digitalization which will drive the future of the industry, LS Industrial Systems provides Total Solution found on abundant industrial knowledge and technology in electric control, automation, tube & pipe and the new business area.

### Electric Power Industry

LS Industrial Systems electric equipment and systems ranging from low to high voltage not only acquired ISO9001 and 14001, but also the KEMA, TÜV, CESI, ASTA, KERI and other certificates for efficient design and excellent quality. The outstanding quality of our products is recognized for being manufactured with international standards such as IEC, UL, ANSI, CCC, JIS and KS. We also provide the Total Solution that encompasses rational design and engineering, efficient production and installation, as well as highly accurate testing and analysis of power equipment.

<table>
<thead>
<tr>
<th>Plant</th>
<th>Product</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheonju Plant #1, Korea (ISO9001, 14001)</td>
<td>Low Voltage, Medium Voltage Metering, Protection &amp; Measurement</td>
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</tr>
<tr>
<td>Cheongju Plant #2, Korea (ISO9001, 14001)</td>
<td>High Voltage Equipment &amp; Systems, Low &amp; Medium Voltage Switchgear, Transformer, Power Equipment Diagnosis &amp; Preventive &amp; Maintenance</td>
<td></td>
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<tr>
<td>Dalian Plant, China (ISO9001)</td>
<td>Power transmission &amp; Distribution, VCB, SF6 Contactors</td>
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<tr>
<td>Wuxi Plant, China</td>
<td>Low Voltage</td>
<td></td>
</tr>
<tr>
<td>Hanoi Plant, Vietnam (ISO9001)</td>
<td>Switchgear</td>
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</table>
We prepared the manufacture lines producing 100,000 reader units annually and 100 million tag production equipment to offer the advanced technology optimized for customer's need for RFID industry, which will be the leading part of transportation revolution. The test production line is equipped and operated for the power semiconductor, the core of power electronics. Moreover, we are constantly discovering new industries such as eco-friendly energy-saving hybrid car ESA, power transforming equipment, etc.

### Automation Industry
#### Automation Equipment, Industrial IT
LS Industrial Systems has opened domestic automation industry by developing the country’s first PLC, Inverter, and DCS. It is offering Total-Solution through the application of various products by providing high-tech control devices and control systems from abundant experiences on the industrial equipment.

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<tbody>
<tr>
<td>Chonan Plant, Korea (ISO 9001, 14001)</td>
<td>PLC, Inverters, Monitoring Units, Process Control Systems, ITS (Intelligent Transport Systems), Railway Systems</td>
</tr>
<tr>
<td>Cheongju Plant, Korea (ISO 9001, 14001)</td>
<td>Photovoltaic Systems, Power IT Systems and Solution</td>
</tr>
<tr>
<td>Wuxi Plant, China</td>
<td>PLC, Inverters</td>
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</table>

### Processed Metals
We manufacture copper pipes with 99.99% pure electrical copper for the basic industrial material of electronic and heavy chemical industry, and stainless steel pipes used for heavy industry piping, construction piping, and machines.

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<tbody>
<tr>
<td>Janghang Plant, Korea (ISO 9001, 14001)</td>
<td>Copper Tubes &amp; STS Pipes</td>
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### New Business
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<td>Chonan Plant, Korea (ISO 9001, 14001)</td>
<td>RFID, Power Semiconductor, Hybrid Car ESA, PCU</td>
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LS Industrial Systems is allocating its R&D resources on electric controls, automation equipment and system to meet global standard. In order to develop outstanding products in the fields of industrial electric, automation, RFID/USN, Electric Car Sub Assembly, Power Semiconductor Module, LS R&D activities are directed in 3 ways, “Acquiring core technology”, “Business cohesive R&D” and “Establishing basis for new business.”

Central R&D Center

With the goal of developing the best industrial electric power and automation products, LS Industrial Systems is concentrating all its R&D activities to embody core and common capacities centering on the wired and wireless network technology, SoC, embedded systems and power electronics technology. LS Industrial Systems also strives to introduce new products like PLC, Inverter, smart rail systems and process control systems, with which to unfold new businesses.

- Technology Research
  - Wired and Wireless Network Technology
    The Center Researches wired network technology for industrial electric field, and wireless network technology based on RFID systems and USN platform.
  - System LSI
    The center leads the design of ASIC, SoC and Mixed ASIC that are applied to embedded systems and various products.
  - Power Electronics
    The center researches power conversion combining decentralized power technologies and power quality improvement technologies.
  - Component Software
    The center conducts research on the industrial control solution platform in the fields of PA (Process Automation), FA and driving systems, while developing web-based communication and monitoring technology and component software for control systems.

- Product Development
  - Inverters (Variable Speed Drives)
    The center researches industrial inverters based on power electronics technologies, and induction motor control algorithms.
  - Automation Equipments
    The center develops PLC and HMI systems and relevant technologies those include advanced digital, analog, position, networking technologies and also comprise graphic & compile technologies for programming tools.
  - Power IT Research
    The latest power IT solution development and research on the overall power system including generation, transmission, transformation, distribution, and customer.
  - Process Control
    The center establishes process monitoring control systems through efficient decentralized control networks forth optimal operations enironment of large factories, while researching optimal operations systems and process application technology using high-performance control methods.
  - Railway Control Research
    Establishing the integrated railway signaling system solutions to national railways, high-speed railways, subways and light rail transits and developing the state-of-the-art communication-based train control systems for safe train control and optimal operation management.
  - New Business
    The center develops various products in the fields of RFID/USN, power semiconductor and hybrid electric vehicle ESBs for new enterprise deployment.
With the advanced technology of electrical industry and continuously excavating dynamic engine on the future-growth, Electro Technology R&D Center moves toward to realize the safe and high-tech industrial society.

- **Eco-Friendly Material Research**
  - Eco-friendly product & core components development
  - Diagnostic sensors & system development

- **Advanced Technology Research**
  - Next generation products with preceding new & future technology research Global leading technology with researching core technology

- **Power information Research**
  - High precision electricity measuring technology research & development of e-WHM & AMR system & DAU
  - Digitalization of low & high voltage device

- **Convergence Research**
  - Convergence of power technology & automatic technology
  - Research of digital/intelligent protection/control technology in power system
  - Development of new IED
  - Research of power system analysis & modeling

PT&T is a KOLAS-qualified (Korea Laboratory Accreditation Scheme) accredited testing laboratory and provides worldwide testing service with its 1,600MVA-capacity high power laboratory, high voltage laboratory and reliability testing laboratory. PT&T is also fully recognized by foreign testing and certification bodies of high reputation as CESI of Italy, KEMA of Netherlands, UL of America, and CE (Certificate of European Union) for its low voltage testings.

- **Tests**
  - Short-circuit Test / Switching Test / High-voltage Test / Characteristic Test / EMC Test / Durability Test / Environmental Test

- **Testing Capacity**
  - **Short-circuit Generator**
    - 2-pole, 3 w., 198(kVY)
    - Rated Capacity : 85(MVA)
    - Rated Short-circuit Capacity : 1603MVA at t=0
    - Frequency : 50Hz / 60Hz
    - RPM : 3000rpm / 3600rpm
  - **LV Short-Circuit Testing Capacity**
    - 230kA at 250V ~ 866V
  - **HV Short-circuit Testing Capacity**
    - 63kA at 7.2kV
    - 25kA at 25.8kV
    - 16kA at 38kV

- **High Voltage Test**
- **Impulse Test**
- **Characteristics Test**
- **VCB Characteristics Test**
- **Short-Circuit Test**
- **ACB Breaker Test**
- **Environmental Test**
- **Non-Stop High-Temperature Test**
Propelling high-tech field, RFID, Electric Car Sub Assembly, Power Semiconductor Module, and other leading future industries, LS Industrial Systems is striving for realizing LS Innovation motto- Absolute Perfection in 3P (Product, Process, Personnel) with a variety of progressive activities. This inner movement is a phase for realizing a goal to Zero-Defect Products.

Customer service is available anywhere in the world.

LS Industrial Systems offers web-based customer services anywhere in the world. We provide technical information, prompt Q&A service through our web service. We have established the Supply Chain Management System that embodies the integrated management of purchase, production and sales, and we are now leading e-business in the areas of industrial electric power and automation.
Awarded the 1st prize in the 32nd Korea Management Quality Awards

We were awarded the Korea Management Quality Awards, the biggest and the most authorized industry award in the year 2006. Quality Management System in LS is continuously developing. LS Industrial Systems provides top class products worldwide, complies with formal management system enhancing product quality, and improves job efficiency by cultivating human resource. LS Industrial Systems positions customers’ satisfaction top priority and will ever endeavor to grow for a Greatest Company.

Quality is the core of customer satisfaction!

The training center for learning the most advanced technologies

The LS Industrial Systems Training Center is conducting customer technology training of the industrial system in Korea for the first time. The technical training center is currently giving lessons in the fields of factory automation, industrial electric power and electronics with real practice equipment.
LS Industrial Systems offers various equipment and systems ranging from low to high voltage designed to supply stable electric power in industrial, commercial and residential facilities.

In the field of low voltage equipment, we produce molded case circuit breakers, earth leakage circuit breakers, magnetic contactors, relays and electricity meters. And in order to keep pace with the global developmental trends, we also concentrate on developing high-performance, small-sized, modules and digitalized products to stand at the same level with other global products.

As for the medium voltage equipment, we supply vacuum circuit breakers that adopt LS Industrial Systems vacuum interrupters, which internationally recognized for their technological capacity. We also manufacture RMU and ALTS (Automatic Load Transfer Switches) as well as various types of other cast resin transformers that are favorably recognized both at home and abroad.

In particular, the outstanding quality of our low and medium voltage equipment is guaranteed since all our products undergo the most meticulous tests at PT&T, an official testing institute that is internationally recognized and approved by KOLAS (Korea Laboratory Accreditation Scheme per ISO17025).

LS Industrial Systems uses various insulation media (Epoxy, Oil, SF6 Gas) and applies the new material, laser core, to the transformer produced in package operation system to nuclear power plant, underground railway, international airport, etc. LS Industrial Systems developed condensor-less type GIS (Gas Insulation Switch) as well as GCB (Gas Circuit Breaker) for the first time in the country.

High protection and reliability of distribution panel are secured by safe structure, compact size, various insulation media (Air, SF6 Gas, solid), and digital data link. We also offer PQ (Power Quality) equipment for high quality power supply to customers. Through the accidental prediction by analyzing potential factors, we provide you with Total Solution in the construction and engineering field by diagnosis and maintenance of the electrical facility, which makes users operate electrical equipment under the safety.
Various Industrial Electric Power Technologies Deliver a Stable Power Supply and Maximized Energy Efficiency
# Electric Equipment

## Low Voltage

### Susol series Circuit Breakers (up to 800A)
- Suitable for Super Solution
- Simplified four (4) frame size (160, 250, 630, 800AF)
- Improved quality: Uimp 785V, Ue 690V
- High breaking capacity (60, 80, 100, 150kA at 415VAC, Ics=100%Icu)
- Optimized protection and accurate measurement
- Communication capable circuit breakers via Modbus, RS485
- Interchangeable trip units & add-on module system
- Ensuring discrimination and cascading
- Plug-in versions for fast removal or insertion of the circuit breaker without exposure to live parts
- Easy installation and various connection, mounting
- Compliance with international standard IEC60947-2 and RoHS Directive
- Approved by shipping registries
- CE, KEMA, SEMKO, CQC, UL1077 / CCC, SABS, SASO, GOST
- Protection of the environment by avoiding use of hazardous substance

### Molded Case Circuit Breakers (AB-Type) Earth Leakage Circuit Breakers
- Easy panel manufacture by unification of main values
- Handle cutting value: 24" x 52mm
- Height: unified as 60mm
- High breaking capacity: 35kA at 460V(high breaking type)
- Identical size of MCCB/ELCB
- New and old products are replaceable
- Easy attachment of accessories
- 4 pole type ELCB
- CE, KEMA, KR, LR certificate

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### Susol Series Contactors & Overload Relays (up to 80A)
- Compact & cutting-edge design
- Three (3) frames (32, 63, 95AF)
- Superior quality and long lifespan
- Ideal solution where space is limited through perfect combination with Motor Starters
- Eco-friendly products (Eliminate hazardous substances : lead, cadmium, and hexavalent chromium)
- CE marked, KEMA CB approval, UL listed
- Compliance with international standard IEC60947-4 and RoHS Directive

### Magnetic Contactors / Thermal Overload Relays (From 9A to 85A)
- Compact size (3 Frame size)
- Offering complete ranges (3Pole & 4Pole contactors)
- Easy to mount & separate on DIN-rail
- Various kinds of accessories are available
- Auxiliary contact block (Front, Side)
- Mechanical interlock, Mechanical latch unit
- Direct mounting structure without additional brackets
- Delay opening device Lug terminals
- CE, UL, KEMA, KR, LR certificate

### Adjustable Molded Case Circuit Breakers (GB-Type)
- Suitable for protection against Overload & Short Circuit
- Overload & Short Circuit (BKN, BKN-b, BKH, BKP, BF Series)
- Ground fault (RKN)
- 35mm DIN rail mounting & Plug-in types
- Rated voltage 230/400V
- Characteristics: B, C, D according to IEC 60948 for MCB
- Accessories : auxiliary switch (AX & AL for BKN, AX for BKN-b)
- CE, KEMA, SEMKO, CCC, UL1077 / CCCS, SABS, SASO, GOST

### Electronic Motor Protection Relay for Ground Fault (GMP60-3TN, TZ)
- Final fault cause recording function
- Overcurrent, phase fault, inverse phase, arresting, ground fault protection
- Rated current : adjustable current range due to DIP SW setting
- 1 model applies to 0.5~60A
- Ground fault detection
- zero phase current detection type (0.1~2.5A), residual current detection type (0.5~6A)
- Penetration type, Screw type
- Operation power : 110~220V free voltage
PLUG-IN Molded Case Circuit Breakers
- Easy replacement and maintenance
- Meta-MEC MCCB 30~800AF applied to all series
- Connection type: general, panel 1 row, 2 rows, exclusive to source side
- Terminals for accessories such as AL, AX, SHT, UVT, etc.
- High reliability of tulip connection
- Certificate acquired

UL489 Certified MCCB Molded Case Circuit Breakers
- Rating: 100~600AF
- Poles: 2, 3
- Accessories: AX, AL, SHT, UVT
- UL489 standard applied

Earth Leakage Circuit Breakers Fb Series
- Rating: 30~100 A
- High breaking capacity (5kA at AC 220V)
- Leakage indicator button
- Various and shared accessories
- AX, AL, insulation barrier, terminal cover

Mini Contactor & Thermal Overload Relay
- Rating: 6~16A
- Direct connection with MMS
- Ultra-miniature size (1 frame size)
- Variation of terminal structure
- Screw clamps, Fast-on, Cage clamps, Solder pins
- Accessories:
  - Surge unit, sub contact, surge-up server, electronic timer
  - CE, UL, KEMA, CCC, GOST, safety certificate

Manual Motor Starters (MMS)
- Rating: 32, 63, 100 A
- Direct connection with Susol MC 9~95A and Mini MC 6~16A
- Breaking current: Max. 100kA 415Vac, Icu=100% Ics
- Rated current adjustable
- Motor protection Overload, short circuit, phase fault protection
- Accessories: AX, AL, SHT, UVT, PB, MMS+MT
- CE, UL, KEMA, CCC, GOST, safety certificate

Air Circuit Breaker
- Rating: 630~5000 A
- High breaking current
- Compact & simplified size
- Approved the type test by KEMA according to IEC60947-2
- High capacity OCR
- Power quality 63th harmonics (THD) : SP type
- Last fault record: SP type
- Accessories:
  - ON/OFF button lock
  - Key lock/Pad lock
  - False insertion preventer etc.
  - High capacity auxiliary contacts
  - Mechanical interlock
  - Door interlock
- CE, UL, KEMA, CCC, GOST, Safety certificate

Susol ACB (Air Circuit Breaker)
- High breaking current 150KA at AC500V
- Compact & simplified size
- Approved the type test by KEMA according to IEC60947-2
- High capacity OCR
- Power quality 63th harmonics (THD) : SP type
- Last fault record: SP type
- Accessories:
  - ON/OFF button lock
  - Key lock/Pad lock
  - Door interlock
  - Mechanical interlock etc

Electronic Motor Protection Relay (EMPR)
- Panel cost reduction (Small size)
- Electronic contactor combination type, independent type, penetration type
- High reliability against noise
- Inverse and definite time delay trip characteristic for motor protection
- Various series
- Overcurrent, shorting, phase fault, inverse phase, unbalance protection (3CT)
- CE, UL, KEMA, CCC, safety certificate

Digital Motor Protection Relay (Digital EMPR)
- Overall digital motor protection relay using microprocessor control
- Diversified protections Overcurrent, phase fault, inverse phase, unbalance, undercurrent, arresting, ground fault, instantaneous short circuit
- 3 phase digital ammeter: detachable display section
- Fault cause and value indication/overload operation time
- Inverse/definite time delay characteristic
- Terminal connection type and penetration type
- CE, UL, TUV, safety certificate
## Electric Equipment

### Medium Voltage

#### Home Distribution Panel Board
- European style & luxurious design
- Diversified colors associated with room interior
- Strong breaking capacity due to ultra-mini branch switch
- Easy wiring and maintenance by DIN-rail
- KS-certified components

#### Auto Section Switch
- Rating: 25.8kV 200A
  - Air arc extinguishing type
  - Rated short time current (Asym/sym): 15/10kA (1s)
  - Minimum distance between phases (215mm, Metal to metal)
  - Overcurrent and ground fault protection, and short circuit current lock
  - Bending knife structure
  - Accessories: switching counter, sub switch (2a2b)
  - Applied standard: KEMC 1126
    (Korea Electrical Manufacturers Cooperative)

#### Load Break Switch
- Rating: 24kV 630A
  - Rated short time current: 20kA/1s (52kA peak)
  - Performance up-grade by new standard
  - Metal screen test
  - Miniature type design
  - 3 phase package operation and combination type fuse
  - Bending knife structure
  - Accessories: switching counter, sub switch (2a2b)
  - Applied standard: IEC 62271-105, IEC 60265-1

#### Vacuum Contactor
- Rating: 3.6/7.2kV 200/400 A
  - Rated short time current: 6.3kA/1s (16.4kA peak)
  - Perfect compatibility with the existing products
  - Diversified customer-oriented safety equipments
  - Detachable type, metal shutter installed
  - Applied standard: IEC 60470, IEC 60282-1

#### Ring Main Unit
- Rating: 15/24kV 630 A/200 A
  - Function: (2LBS+1PF, 1LBS, 1PF)
  - Operating power: DC 24V
  - 3 positions (ON, OFF, Earth)
  - For sectionalizing and branch
  - Protection of customer load and transformer
  - Applied standard: IEC 60265-1, 60129, 60298, 60694, 60056

#### Gas Insulated Load Break Switches for 25.8kV Underground Line
- 24/25.8kV 600A
  - Circuits and switches: 3W3S, 4W4S
  - 3 positions (ON, OFF, Earth)
  - For line sectionalizing and branch
  - Applied standard: ES151-143~145

#### Electronic Polyphase Electricity Meter (LGRW)
- 3 phase 3 wires, class 0.5, 110V, 5(2.5)A
- 3 phase 4 wires, class 0.5/1.0, 110/190V, 5(2.5)A
- 4 channels, maximum demand power, power factor, reactive power, apparent power
- Saving load profile data of 90days
- Saving 6 month data
- Compatible with AMR (Automatic Meter Reading)
- Adopted by KERI
- RoHS-applied eco-friendly product

#### Electronic Electricity Meter
- Reading reliability secured by authentic CPU
- Non-volatile memory for protecting data in power failure
- Improved accuracy against the existing induction model (class 2.0 →1.0)
- Easy reading due to large LCD
- Diversified models general type, pulse type, remote reading type
- RoHS-applied eco-friendly product
- Safety cover to prevent accident on the connection part
- Diversified communication method

#### Demand Controller (WDC-3000)
- High efficiency energy device certificate
- Electricity fare reduction by maximum demand control
- Load management by time
- Synchronous to KEPCO watt hour meter
- Diversified measurements
- Automated calculation of electricity fare
- Various value settings due to large LCD
- Diversified communication method

#### Home Distribution Panel Board
- European style & luxurious design
- Diversified colors associated with room interior
- Strong breaking capacity due to ultra-mini branch switch
- Easy wiring and maintenance by DIN-rail
- KS-certified components
### Power Fuse
- **Rating:** 3.6/7.2/24kV
- Unification of connection size by DIN 43625 for easy replacement and maintenance
- Viewing verification due to the improvement of operation distance and weight of striker
- Electrical signal and mechanical interlock by striker
- Applied standard: KSC 4612, DIN 43625, IEC 60282-1

### Vacuum Circuit Breaker
- **Rating:** 7.2/12/17.5/25kV
- Rated breaking time: 3cycles
- Rated short-time withstand current: kA/3sec
- Dual connection of main body and cradle (Clip, Tulip)
- Diversification of accessories
- Switching durability mechanical: 20,000 times, electrical: 20,000times
- Passed development tests of KERI, KEMA
- Applied standard: new standard IEC 62271-100 [M2, E2(List1), Class C2]

### Automatic Load Transfer Switch
- **Rating:** 25.8kV/630A
- Air insulation method
- Rated short time current: 16kA/1s
- High speed transfer time: 10cycles, 167ms or less
- Monitoring of the phase fault of main power
- Saving events (20EA max.)
- Various output contacts
- Small, light-weighted
- Motor spring charge method
- Applied standard: IEC 60265-1, PS 151-05

## Metering

### Vacuum Interrupter
- 3.6/7.2/12/15/17.5/24/25.8kV
- 600-3, 1500 4-40kA
- High safety and reliability
- High vacuum
- Excellent mechanical solidity and degassing
- High speed breaking and short arcing time

### Electronic Electricity Meter (Single, three phase)
- Pulse, exclusive line, communication (option)
- Large LCD
- Remote reading
- Small size and easy wiring
- Penetration structure wiring
- RoHS-applied eco-friendly product
- Wiring regardless of source or load

### Electronic Electricity Meter (Single phase) (LGRW)
- 1P2W 220V 40(10)A, 80(20)A, 120(30)A
- Accuracy: class 1.0
- Remote reading system (exclusive line)
- Detachable communication model
- Conforming to KS, IEC standard
- ROHS-applied eco-friendly product

### Inductive Watt Hour Meter
- Single and three-phase digital and transformer electricity meters
- Aluminum Die Casting Frame
- Phenol Resin, Polycarbonate Case
- 200%-400%
- IEC and KS Mark Standard

### Electronic Electricity Meter
- 1P2W 220V 40A/120A/5(2.5)A
- 3P4W 220V 40A/120A/5(2.5)A
- 3P4W 110/190V 5(2.5)A class 0.5/1.0
- 3P3W 110V 5(2.5)A class 0.5
- Active/Reactive/Maximum demand power/power factor
- Measure by time
- Saving data of 99days
- IEC62056 DLMS authorization certificate
- New IEC standard
- Satisfies ROHS

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**LS Industrial Systems Co., Ltd.**
Electric Equipment

Protection & Measurement

- Event & Fault Recording
  - Event Recording: Max.1000events - Fault Recording: Max.200faults
  - Event Recording: Fault Wave Recording: 512cycle/phase
  - SOE & SBO Functions
  - MIMIC Diagram & Graphic LCD
  - Programmable I/O (with PLC program): DI 20, Do 19 point
  - Communication: RS-485/Optic, DNP3.0, Modbus / I-NET

Digital Integrated Protection & Monitoring Equipment (GIPAM-2200)
- Event & Fault Recording
  - Event Recording: Max. 800events
  - Fault Recording: Max. 200 faults
  - Fault Wave Recording: 512 cycle/phase
  - SOE & SBO Functions
  - Programmable I/O: DI 6, Do 10, AI 4 point
  - Communication: RS-485/Optic, DNP3.0, Modbus / I-NET

Power Quality Meter (GIMAC-PQ)
- Diversified measuring factors and class 0.2%
  - Voltage, current, power, energy 0.2%
- Sag, Swell, Interruption, Undervoltage, Overvoltage
- Measuring voltage/current harmonics, THD, TDD and k-Factor
- Saving PQ Event/Fault Recording and Fault waveform
- Data statistic process: calculating and saving Max / Min / Average values

Digital Integrated Metering & Control Device (GIMAC-IV)
- Automatic Power Factor Controller / Demand Controller
  - Diversified measuring factors
  - Harmonic analysis and indication
  - 0.3% high accuracy measurement by 128 samplings per cycle
  - Maximum 8 capacitor/load control
  - Event Recording (Max. 300EA)
  - Communication: Modbus / RS-485, I-NET
  - Optimal power factor control by automatic/manual control, circulation control, combination control (GIMAC-415AP)
  - Efficient power management by automatic/manual control, priority control (GIMAC-415DC)

Transformer

The transformer transforms the primary voltage to the secondary voltage for customer's necessity, and we produce and sell mold transformer, low noise high efficiency transformer, and oil transformer.

Electronic Time Switch
- 1P2W 220V 30(10)A
- Automated transfer for late night equipments
- Load switching 24 hours/day
- Present time, switch-on time, breaking time
- Automatic load breaking in overload
- Built-in battery for failure compensation

Micro Remote Terminal Unit (micro RTU-II)
- Features local control on circuit breakers and
- Status monitoring on contact points
- Electricity meters analog value
- I-NET communication method

Protocol Converter (GMPC-III)
- Communication relay to link the company exclusive terminals using I-NET communication and the superior computer system
- I-NET Frame
- I-NET Protocol
- RS-232, RS-485 Frame
- MODBUS Protocol
- Offering RS-232, RS-485, RS-422 port
- SOE function and viewing synchronization
- 20 terminal devices linked to 1 protocol converter

The transformer transforms the primary voltage to the secondary voltage for customer's necessity, and we produce and sell mold transformer, low noise high efficiency transformer, and oil transformer.
Digital Protective Relay (DPR-1000)
- High voltage protection (HVP)
- EVENT&FAULT Recording
- Fault Waveform Recording
- SCE (Sequence of Event) function
- SBO (Select Before Operate) function
- Programmable I/O
- Analog Input (4-20mA): TPR
- CANBUS/Modbus/RS-485

Digital Integrated Protection &
Monitoring Device (GIPAM-115)
- Diversified measurement/indication (GIPAM) V, A, W, Wh, Var, Varh, PF, F, Vo
- Diversified protections OCR, OCGR, SGR, OVR, UV FR, CVGR, COP
- Breaker ON/OFF control, local/remote selection
- Slim distribution panel
- Operation state input/output
- Data communication (MODBUS, I-NET)

Digital Protective Relay (DPR)
- Various functions of protection
- Independently programmable settings for each measuring element and timer
- Fault Recording, Sequence of Event
- Back-Lit LCD display
- Self-diagnostic
- User friendly interface
- Data communication
- KEMC1120, IEC225, IEC1000-4

Digital Integrated Metering &
Control Device (GIMAC-II)
- Measurement functions V, A, Wh, Var, F
- Control functions
- Circuit Breaker output signal
- Alarm LED and LCD etc.
- User friendly interface
- Fault indicating
- Data communication (I-NET)

Intelligent Motor Controller (IMC-III)
- Overcurrent, phase failure, inverse phase, unbalance, undervoltage, stall, locked rotor, ground fault protection
- Direct on-line, Y-D, reversing, reactor, inverter with 1 model
- Motor control at LOP, MCC, Auto, Water Level, Remote 0.125-65A with 1 model
- Temporary power failure compensation and automatic restart
- Interlocked operation between motors and built-in timer
- Applicable to complex water processing facility or chemical plant
- Data communication (Modbus/RS-485)
- Fault cause and value recording
- Recording and setting overall operation time

Protocol Converter (GMPC-V)
- Communication relay to link the company exclusive terminals using I-NET communication and the superior computer system
- Communication method RS-232, RS-485, RS-422, Ethernet
- Supporting protocols : Modbus, DNP3.0, Glofa PLC
- Dual communication lines (Option)
- 20 terminal devices linked to 1 protocol converter (max. 80EA connected in case of module addition)

Cast Resin Transformer
- Compact size, high efficiency, easy maintenance
- Excellent shortage mechanical strength, water proof characteristic, and non flammability. Appropriate for severe load change such as subway power supply.
- Rating : 3P 3.3-22.9kV / HV-LV 50-15,000kVA

Cast Resin Transformer
- Laser core is applied as core material and wire winding process is improved to optimize the overall loss.
- Noise reduced 7-11dB or more against KS standard
- Rating : 3P 3.3-22.9kV / HV-LV 50-15,000kVA

Oil Immersed Transformer
- Volume is reduced by 30% by corrugate radiation pin instead of panel radiation plate for lowering temperature.
- Rating : 3P 3.3-22.9kV / HV-LV 50-20,000kVA
Gas Insulated Switchgear

In order to guarantee the more reliable and stable operations of electric equipments for indoor or outdoor substations, GIS acts as an integrated switchgear that monitors, controls, protects and measures the power systems with protection & control relay panels by safely opening or closing the power lines under the conditions of normal and abnormal operations.

<table>
<thead>
<tr>
<th>25.8kV GIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Compact size: 2,500(H) x 600(W) x 2,620(D) for 2DS + 1CB</td>
</tr>
<tr>
<td>● Motor spring charged operating mechanism</td>
</tr>
<tr>
<td>● Vacuum interrupting and gas insulation</td>
</tr>
<tr>
<td>● Highly reliable and safe operations</td>
</tr>
<tr>
<td>● Lightweight aluminum casing</td>
</tr>
<tr>
<td>● Rating: 25.8kV 25kA / 3sec, 600~2,000A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>36~72.5kV GIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Competitive price and compact size by applying three-phase encapsulated GIS enclosure</td>
</tr>
<tr>
<td>● Hydraulic (CB), Motor(DS) operating mechanism</td>
</tr>
<tr>
<td>● Improved reliability by removing exposed connection rods</td>
</tr>
<tr>
<td>● Rating: 72.5kV 20kA 600~2,000A</td>
</tr>
</tbody>
</table>

Low & Medium Voltage Switchgear

From 600V to 24kV rating voltage, LS LV & MV switchgears (LS LV & MV SWGR) are applied with the standard of IEC, JEM, ANSI etc. The LS LV&MV SWGR are generally utilized in the field of Power Facility, Industrial Plant, Building etc.

<table>
<thead>
<tr>
<th>24kV MCSG</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Internal arc proof construction</td>
</tr>
<tr>
<td>● CESI certificate</td>
</tr>
<tr>
<td>● Withdrawable circuit breaker with interlocks</td>
</tr>
<tr>
<td>● Pressure relief device is available</td>
</tr>
<tr>
<td>● Rating: 24kV, 25kA / 3sec, 630~2,000A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>17.5kV MCSG</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Separation of CB room, bus room, cable room, LV room to prevent accident spread</td>
</tr>
<tr>
<td>● Internal arc test performed</td>
</tr>
<tr>
<td>● Door interlock</td>
</tr>
<tr>
<td>● Rating: 17.5kV 40kA / 3sec 3,150/2,000/1,250A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>25.8kV C-GIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Safety first considered</td>
</tr>
<tr>
<td>● Compact structure</td>
</tr>
<tr>
<td>● Excellent economical efficiency</td>
</tr>
<tr>
<td>● Stainless pressurized instrument</td>
</tr>
<tr>
<td>● Mechanical interlock between breaker and disconnecting switch</td>
</tr>
<tr>
<td>● Rating: 25.8kV 25kA / 3sec 1,250A, 630A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DC Switchgear</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Metal-clad panel with built-in detachable HSCB for DC distribution panel</td>
</tr>
<tr>
<td>● Easy operation and analysis of control and protection section at the front</td>
</tr>
<tr>
<td>● DC protection relay of integrated protection and control system installed for control and monitoring of the remote control system</td>
</tr>
<tr>
<td>● Rating: DC1,500V, 750V 50kA 4,000/3,000/2,000A</td>
</tr>
</tbody>
</table>
Up to 145kV GIS
- Combined arc extinguishing method allows low power mechanism to safely switch the abnormal condition.
- 3-phase package operation method
- Rating : 145kV 40kA 3,150A

170kV GIS
- Excellent Performance & Highly reliability
- Hydraulic Operating Mechanism
- Easy Installation & Maintenance
- 3-phase encapsulated enclosure
- Minimum Space requirement
- Rating : Up to 170kV 50kA 1,200~4,000A

245~362kV GIS
- Easy installation and extension through compact size
- Rating : 245kV 50kA 3,150A
362kV 40kA 4,000A
362kV 50kA 4,000A
362kV 63kA 4,000~8,000A

12kV MCSG
- Incoming panel and main circuit PT panel are integrated in 1 cubicle
- 1,250A or less width 650mm (3,150A : 850mm)
- Breaker transfer operation between Run
- Test operat be performed when door is closed
- Rating : 12kV 25kA /3sec 2,000/1,250/300A
  12kV 40kA /3sec 3,150/2,000/1,250A

7.2kV MCSG
- Exterior body reduced by 18%
- Safety structure strengthened by door lock and earthing s/w
- Rating : 7.2kV 40kA 3,150A

Intelligent LV panel
- Reduced by 40% against the existing distribution panel
- Integrated management system with built-in operational information indicator and alarm
- Rating : 600V 85kA 5,000A

Motor Control Center
- Passed ASTA authorization as the first in the country
- 1, 2, 3, 4th withdrawable structure(Line, Load, Control Circuit, Aux. Circuit)
- Arc shielding plate is installed at the vertical bus to prevent accident spread
- Basic unit 13 layers, 100A MCCB unit 26 layers by flat type basis
- Characteristics : 600V 80kA 1,000 ~4,000A
- Rating : 600V 100kA 5,000A

Subway Substation (Silicon Rectifier)
- This silicon rectifier with automatic air-cooling system converts the alternating current into a direct current for subway trains
- Features natural cooling system
- Compact size
- High-efficiency and low-maintenance rectifier
- Large-capacity rectifier(DC 1500V, 4000kW)

Compact Type Switchgear
- Install space 80% reduce because Compact size
- Combination structure 1set 6panel necessary
- Build Up Earthing function and Situation checking strength
- Easy operation, installation and transportation
Substation Monitoring and Diagnosis System

Substation monitoring and diagnosis system is a web-based on-line diagnosis system which examines/forecasts the cause of failure by monitoring and diagnosing the operation of substation power facilities to improve the reliability of power supply.

- Improves the stability and reliability of power supply
- Efficient and reliable equipment operation
- Prevention of accident and minimization of regular maintenance
- Mid and long term data trend management of equipment

It is fully suited for plants, research labs, hotels, officetels, department stores which have highly automated equipment, high electricity demand, and large scale equipment.

PQ Equipment

PQ equipment prevent the harmful factors for electricity quality from electrical system. DVR compensates temporary voltage sag and swell, SVC compensates reactive power and stabilize voltage, and APF compensates harmonic current for example.

Bus Duct System
### Dynamic Voltage Restorer
DVR is inserted in series in distribution system to compensate low quality power such as voltage sag and swell to supply high quality power.
- Rating: Capacity-100, 200, 300, 500Kva/1,000, 2,000Kva
- Voltage - 200, 380, 440V/6.6kV, 22.9kV

### Static Var Compensator
SVC compensates voltage fluctuation as well as reactive power on line using power semiconductor element to improve the quality of power supply.
- Compensates lagging and leading reactive power and voltage
- Improving power factor, and saving energy
- Flicker compensation
- Voltage stability improvement by high speed reaction
  (Electrical furnace, high speed railroad)
- Rating: 3P3W 380V, 440V, 6.6kV, 22.9kV 500kVA~100MVA

### Active Power Filter
APF pours the current which has the same value and contrary polarity with the generated harmonic current by non-linear load into the line to eliminate the harmonic of source current and improve electricity quality.
- It removes the harmonics from non-linear load such as rectifier using power transfer equipment.
- Rating: 3P3W, 3P4W 100 ~400kVA

### GIS Maintenance Solution
- Insulation diagnosis by UHF PD technology
- Life forecasting by GCB contact wear
- Maintenance by GCB operation characteristic

### Power Tr Diagnosis Solution
- Deterioration diagnosis by DGA technology
- Maintenance strategy support

### LA Diagnosis Solution
- Deterioration diagnosis by harmonic analysis

### Plug-in Bus Duct
- Adoptable to factories, buildings and automated facilities requiring large-scale facility maintenance
- Down-sized and lightweight by utilizing a vacuum duct / Features include reduced facility space and vibration-free transmissions
- Adopts one-touch-joint method / Features easy, bolt-less installation and maintenance / Possible to conduct inspections on joints even during operation
- Description: 600V 600~5,500A

### NSPB(Non-Segregated Phase Bus Duct)
- Adoptable to power transmission for substations and the mainline systems of industrial and construction facilities
- Features high insulation resistance and easy installation, maintenance and extension
- Description: 600~2kV 600~5,000A

### IPB
(Isolated Phase Bus Bar, Detachable Busduct)
- Detachable structure prevents short-circuit interface hazards
- Constant supply of dry air preserves exsiccated interior, and interior pressure of bus bar is maintained at desirable level
- Equipped with an efficient heat emission system
- Classified by phases one and two, and each phase uses natural and artificial cooling air
- Description:
  41.6~24kV 31.5kA 5,000A~20,000A (Self cooling)
  41.6~24kV 31.5kA 20,000A~50,000A (Forced cooling)
LS Industrial Systems provides the most up-to-date controllers and systems based on the accumulated experience in the field of electric & electronic technology and automation system installation.

Ever since we started manufacturing PLC (Programmable Logic Controller) and Inverter for the first time in Korea, our LS Industrial Systems automation equipment division has been leading the Korean automation industry. We provide the optimal automation environment with various machine modules and large-scale process controls. Furthermore, we have obtained a range of international quality standard certificates such as CE and UL.

In the area of process control, we have independently developed Korea's first DCS (Distributed Control System). It plays a pivotal role in process automation by integrating control and monitoring systems of various industrial sites. We supply high-tech process control systems that are verified through outstanding sales records.

LS Industrial Systems produces SCADA system to realize efficient and reasonable operation of power system, which is recently getting more and more important according to the large scale industrial equipment and its complexity. We also develop and provide the eco-friendly and unexhaustive future alternative energy, and solar generation system.

As for the field of road/railway, we also provide (based on our most up-to-date IT development and experience of having supplied the most number of systems in Korea) ITS/Railway system with reinforced safety and reliability for people to travel safely and pleasantly.

### Project Records

<details>
<summary>2006</summary>
- Turkey Railway Project: PLC, HMI(Turkey)
- BANDAR EMAM PETROCHEMICAL: GLOFA PLC(IRAN)
- Hyundai motors, Kia motors / Body equipment: XGK PLC(Korea)
- Daedeon sewage processing system: GMR PLC(Korea)
- Jeonnamdo environmental basic equipment integrated management system: GLOFA PLC(Korea)
- Yeongdong thermal plant: High voltage inverter(Korea)
- Kia motors, Hwasung plant: Inverter panel(Korea)
- Incheon International Airport 2nd step transforming facility: SCADA system(Korea)
- Korea water resources corporation: Metropolitan wide area water resources integrated management system(Korea)
- Isian combined cycle power plant: Main control system(Korea)
- Incheon international airport 2nd stage SCADA system(Korea)
- Busan subway line 2 extension: Signalling system(In process)
- Seoul bellevue corporation: freeway traffic management system(FTMS) and toll collection system(TCS)
- Uijeongbu LRT: CMS(In process)
- Korea railroad network authority: HSR Phase 2 TCS (In process)
- Korea railroad: ATC/ATS On-board equipment

<summary>2005</summary>
- RAZI PETROCHEMICAL: Inverter system(IRAN)
- State railway: Signalling & communication System(ST1) (Thailand)
- 10 railway stations: Signal equipment system(Bangladesh)
- Hyundai motors, Namyang-myun plant / body line: XGT PLC system(Korea)
- LG Philips LCD / module facility: XGT PLC system(Korea)
- LG Electronics / PDP A3 Pjt.: GLOFA PLC system(Korea)
- KEPCO Honam thermal plant: PDF, high voltage inverter(Korea)
- Kia motors Hwasung plant / ESCO Pjt.: High efficiency Inverter(Korea)
- Daedeon subway line 1: High efficiency Inverter(Korea)
- Technoplan: 154kV power facility SCADA system(Korea)
- New Daegu-busan expressway: Toll collection system(Korea)
- Korea highway corporation: Toll collection system(TCS)
- Korea railroad: Maintenance train ATP
- Samcheonpo power plant: Photovoltaic system 100kW(Korea)
- Jeonnam provincial office: Photovoltaic system 100kW(Korea)
- Kumho Tire Nongpyeong plant: GLOFA PLC(China)
- POSCO CAL Line: Inverter system(China)
- KALAYE PETROCHEMICAL: Inverter system(IRAN)
- LG Electronics / PDP plant: GLOFA PLC system(Korea)
- Ssangyong motors / body assembly line: GLOFA PLC(Korea)
- Korea Tyre: GLOFA View(Korea)
- Pohang synchrotron radiation research lab: SCADA system (Korea)
</details>
2004
- KEPCO: SCADA system for Regional Control Center (23 RCCs, 1995~2004)
- KEPCO: RTU for Substation Control Center (29 Substations, 2002~2005)
- Jejudo: Energy Management System (Korea)
- Deoksan water treatment plant: DCS (Korea)
- Ilan water treatment plant: DCS (Korea)
- Korea pyeongtaek thermal plant: #1, #2, #3, #4: Main control system (DCS)
- Daegu: Busan express way: Toll collection equipment (TCS) (Korea)
- Korea Railroad: ATC/ATS Onboard Equipment
- Gwangju subway: Line 1 phase 1 Communication management system (CMS) (Korea)
- Korea railroad: Homann line CTC, HSR CTC

2003
- Hyundai Motors, Alabama plant: Inverter (USA)
- Hyundai Motors, Beijing plant: Smart VO (China)
- Korea East West Power Hoonam thermal plant: #1, #2: Main control system (DCS)
- Korea Highway Corporation: Toll collection system (TCS)
- Korea railroad network authority: HSR ATC/CTC system
- Korea railroad: Busan CTC

2002
- Ssangyong Motors / body line: GLOFA PLC (Korea)
- Chosun University: Photovoltaic system 53kW (Korea)
- Cheonan Nonsan Highway: Intelligent traffic system (Korea)
- Busan subway line 2: Signalling system (Korea)

2001
- Daewoo Motors Gunsan plant / Nubira assembly process: GLOFA PLC system (Korea)
- Mail center mail classification process: GLOFA PLC system (Korea)
- Incheon International Airport passenger terminal, traffic control center: SCADA system (Korea)
- Gwangyang steel energy center: Main control system (DCS) (Korea)
- Korea Highway Corporation: Image vehicle detecting system

2000
- Seoul subway line 1, 2: Ventilation system (Korea)
- Incheon International Airport: refueling system, Passenger building: Inverter system
- LG Philips LCD / line P4: GLOFA PLC system (Korea)
- Milyang dam wide area water treatment system (DCS) (Korea)
- Jejudo wide area water treatment system (DCS) (Korea)
- KEPRI: Photovoltaic system 50kW (Korea)
- Seoul subway line 6: Signalling system & TCS (Korea)

1999
- North Jeju Terminal Plant: ECMS system (Korea)
- Seoul subway line 6: SCADA system (Korea)
- Korea water resources corporation: Metropolitan wide area water service 5th stage water resources integrated management system and DCS
- Seoul subway line 7, 8: TCS (Korea)

1998
- Incheon subway line 1: SCADA system (Korea)
- Korea highway corporation: Freeway traffic management system
- Busan: Advanced traffic management system (Korea)
- Busan: Gwangju TBS: Traffic & road Information system (Korea)

1997
- Daegu subway line 1: SCADA system (Korea)
- POSCO, steelmaking division: Main control system (DCS) (Korea)
- Seoul: Advanced traffic management system (Korea)
- Seoul: POSCO, steelmaking division: Main control system (DCS) (Korea)
### Programmable Logic Controller

#### XGT Series
- One of Korea's 10 new technologies
- The fastest CPU process among the same class: 28ns/Step (XGK-CPUH)
- The system solution based on open network

**XGK**
- Computation speed 28ns/Step
- High speed backplane (base) transfer
- Compact size (Module size 27x98x90)
- The system solution based on open network
- Setup and operation of each special modules without additional complicated user program

**XGB**
- Computation speed 160ns/Step
- The smallest size among the same class (Basic unit: 30x90x60)
- Extension to as many as 7 layers, controlling as many as 480 points
- Best suited for medium and small system
- Maximum 5 channel communication available using built-in and extension communication modules

#### MASTER-K Series
- Windows-based software support
- Open network support
- Optimized Control with various MASTER-K series

**GLOFA-GM7(U)**
- Processing Speed: 0.5 µs/step
- Max. I/O points: 80
- Program Capacity: 68k byte
- Built-in function: PID, Cnet, etc.

**MASTER-K300S**
- Processing Speed: 0.2 µs/step
- Max. I/O points: 1,024
- Program Capacity: 15 k byte
- Max. number of extension base: 3

#### SMART I/O Series
- Open protocol Profibus-DP, DeviceNet
- Suited for medium and large scale network system
- Small size

**Block type SMART I/O**
- Compatible with Modbus, Profinet DP, DeviceNet, etc.
- S suited for medium and small scale network system
- Small size

**Extension type SMART I/O**
- Open protocol Profibus-DP, DeviceNet
- Suited for medium and large scale system
- Maximum 512 points
- 100% compatible with XGB I/O module

#### PMU Series
- Compatible with Modbus, Profibus DP, DeviceNet, etc.
- Suited for medium and small scale network system
- Small size

**PMU-830**
- Screen size: 12.1 inch
- Display resolution: 800X600
- Display color: 256 colors
- Screen memory: 6M
GLOFA Series

- IEC61131-3 Standard Language Support
- High-speed processing by LS Industrial Systems microprocessor
- System control from simple mechanical control module to complicated redundant systems
- Open network support

**GLOFA-GM4**
- Processing Speed: 0.12 ~ 0.2μs/step
- Max. I/O points: 2,048
- Program Capacity: 512kbyte
- Max. number of extension base: 3
- Real number calculation support

**GLOFA-GM6**
- Processing Speed: 0.5μs/step
- Max. I/O points: 384
- Program Capacity: 68kbyte

**MASTER-K200S**
- Processing Speed: 0.5μs/step
- Max. I/O points: 384
- Program Capacity: 7k step

**MASTER-K120S**
- Processing Speed: 0.1μs/step
- Max. I/O points: 120
- Program Capacity: 10k step
- Built-in function: PID, Cnet, Positioning, HSC

**MASTER-K80S**
- Processing Speed: 0.5μs/step
- Max. I/O points: 80
- Program Capacity: 7k step
- Built-in function: PID, Cnet, etc.

**PMU-730**
- Screen size: 10.4 inch
- Display resolution: 800X600
- Display color: 256 colors
- Screen memory: 6M

**PMU-530**
- Screen size: 8.4 inch
- Display resolution: 800X600
- Display color: 256 colors
- Screen memory: 4M

**PMU-330**
- Screen size: 5.7 inch
- Display resolution: 320X240
- Display color: 256 colors
- Screen memory: 2M
Programmable Logic Controller

Network System

Open network system conforming to the international standard (suitable for CIM), available to connect with multi-vendor devices.
Inverter / Process Automation

Inverter

Starvert-IE5
Micro & compact drive
1 phase 0.1 - 0.4kW, 200~230V
3 phase 0.1 - 0.4kW, 200~230V
- 0.01 - 200Hz frequency output
- V/F control method
- 1-10kHz carrier frequency
- 4 programmable step operation
- IP00 enclosure
- Built-in RS485 / Modbus interface
- Self-cooling
- DC reactor (Optional)
- PI control
- Low THD and torque ripple by space vector control algorithm
- 0.01 - 400Hz frequency output
- 1 - 10kHz carrier frequency
- 4 programmable step operation
- IP20 enclosure
- Built-in RS485/Modbus interface
- Quick scroll programming structure
- PID control
- Stall prevention
- Automatic restart after instantaneous power failure

Starvert-iC5
User friendly general purpose compact inverter
1 phase 0.4 - 2.2kW, 200~230V
- Low THD and torque ripple by space vector control algorithm
- 0.01 - 400Hz frequency output
- 1 - 10kHz carrier frequency
- 4 programmable step operation
- IP20 enclosure
- Built-in RS485/Modbus interface
- Quick scroll programming structure
- PID control
- Stall prevention
- Automatic restart after instantaneous power failure

Starvert-IG5
Small & Powerful purpose inverter
1 phase 0.4 - 1.5kW, 200~230V
3 phase 0.4 - 4kW, 200~230 / 380~480V
- User friendly general purpose compact inverter
- Low THD and torque ripple by space vector control algorithm
- 0.01 - 400Hz frequency output
- 1 - 10kHz carrier frequency
- IP30 enclosure
- Built-in RS485 / Modbus interface
- Selectable manual / automatic torque boost
- Remote control using cable connector and mounting fixture
- Built-in braking chopper
- PID control
- Stall prevention

Starvert-IGA
Powerful & compact sensorless vector control inverter
1 phase 0.4 - 2.2kW, 200~230V / 380~480V
- Selective v/f, sensorless vector control
- Motor parameter auto-tuning
- 0.01 - 400Hz frequency output
- 1 - 15kHz carrier frequency
- Ground fault protection during operation
- Selectable PNP/PNP signal input
- -10 - +10V v/f analog input
- Built-in braking chopper
- Enhanced process PID control
- Stall prevention, Up / Down, 3-wire operations
- Built-in RS485/Modbus-RTU communication
- Cooling fan on / off noise control
- Remote control using external keypad "RA5S" cable

Starvert-IS5
Precise vector control standard inverter
3 phase 0.75 - 7.5kW, 200~230V / 380~480V
- Selective v/f, sensorless, sensored vector control
- Motor parameter auto-tuning
- Powerful torque at overall speed range
- 0.01 - 400Hz frequency output
- 1 - 15kHz carrier frequency
- IP20 enclosure up to 7.5kW
- Remote control using external keypad
- Built-in RS485
- Built-in braking chopper up to 7.5kW

Process Solution

Water Treatment
Water treatment includes the treatment and management of all water resources including water treatment for making clean water, sewage water treatment and industrial wastewater treatment. In order to automate such water treatment systems, we not only design and install control systems but also provide a total solution encompassing equipment manufacturing and tests as well as application software, testing, education and after-sales services.

Power & Incineration
Power plant control systems are said to be the core of operating power facilities since they shorten daily and weekly boiler start-up times while securing reliability and safety as well as efficient operation by improving load follow-ups and operation utilities maintenance. LG Industrial Systems provides solutions for establishing main control systems and power plants' integration control systems required for efficient management and accident analysis.

Steel & Iron
Steel and iron making process is basically the work of batch or repetitious processing. LG Industrial Systems provides the control solutions for all steel and iron making processes based on extensive business records and experience that we have applied to Korean steel industry sites on an international scale.

Chemical
In the field of petrochemicals, LG Industrial Systems has experience in supplying and installing process control systems such as ABS, PS, PVC/MASS and PMMA, and provides optimal chemical process control solutions in accordance with the customer demands.

Industrial Integration Solution

Water Treatment Production Planning Solution
Water treatment production planning solution consists of water demand forecasting system, water pumping and supplying system, facility information management system, pipe-line network analysis system, status monitoring system, and web monitoring. It forecasts each local water demand, establishes supply plan, and monitors operating status.

Water resources Integrated Management Solution
The water resources integrated management center performs the remote control and monitoring of each local station to support creation of synergy in operating each local station.

Sewage Integrated Management Solution
The solution consists of sewage pipe-line maintenance and management monitoring system, sewage treatment process diagnosis system, facility information management system, sewage operation information system, and sewage pipe-line network monitoring system to monitor and control from sewage treatment to sewage pipe-line management.

Energy Integrated Management Solution
The solution maximizes recovery rate of exhaust energy(gas, vapor, etc.) from manufacturing process and provide it to the user for stable supply of iron & steel plant demand energy and energy saving.

Manufacturing Execution System
The system provides the information to optimize the production activity until an order makes final product. It orders, counter plans, reports with accurate real-time data.
Starvert-iPSA
Fan & Pump specialized inverter
3 phase 5.5 - 450kW, 200 - 230V / 380 - 480V
- Selective v / f, sensorless vector control
- 0.01 - 120Hz frequency output
- 0.7 - 15kHz carrier frequency up to 22kW
- 15% - +10% input voltage margin
- Selectable PNP / NPN signal input
- Plug-in type control terminals
- Built-in multi-pump control
- Built-in RS485/Modbus RTU communication
- IP20 enclosure up to 11kW
- Advanced PID control incl.
- Pro-PID, Dual PID cascade, Output inverse, etc.
- Cooling fan on / off control
- Sleep & wake up, flying start, motor preheating functions
- Regeneration & safely stop function

Starvert-iH
Robust dual rated high power inverter
3 phase 30 - 280kW, 200 - 230V / 380 - 480V
- Constant torque / Variable torque dual rating
- Low THD and torque ripple by space vector control algorithm
- 1.01 - 60Hz frequency output
- 2 - 18kHz carrier frequency
- 2 - 20mA Analog output
- 2 line 32 characters LCD display
- Built-in Process PI control
- 150% starting torque
- Various v / f pattern
- Slip compensation
- Recovery from momentary power failure (Flying start)
- Up / down operation
- 3 wire operation

Starvert-iS7
Ambidextrous configuration inverter
3 phase 0.75 - 75kW, 220 / 400V
- Constant torque / Variable torque dual rating
- Selective v / f, sensorless vector, full flux vector control
- Integrated RFI filter and / or DC reactor
- Built-in Modbus-RTU communication
- PLC alike optional user sequence program
- 6 Multiple languages
- 128 x 64 pixel graphic LCD interface
- -15% - +10% input voltage margin
- -10 - +10 volt analog input
- 0 - 20mA analog output
- Plug-in type control terminals
- Optional fieldbus cards : PrpfiBus, DeviceNet, Lonwork, BACnet

Starvert-iV5
High duty full flux vector control inverter
3 phase 5.5 - 220kW, 220 / 400V
- Field-oriented flux vector control
- Static motor parameter auto-tuning without disconnecting motor coupling
- Operating with encoder, line drive/open collector type
- High torque at zero speed
- Position control by encoder feedback
- 0.01% speed control accuracy
- 250% instantaneous torque
- Process PI, Draw, Drop control
- Smooth elevator JERK control
- Elevator operation macro & optional I / O board
- Built-in braking chopper up to 22kW
- Plug-in type control terminals
- Optional communication boards : RS485, Modbus-RTU, Profibus-DP, DeviceNet

Telemeter Telecontrol System

MASTER-RTU SYSTEM
The RTU(Remote Terminal Unit) collects data from field instruments & sensors and transmits them to the SCADA (Supervisory Control and Data Acquisition) system installed in a central control room through wire/wireless communication systems and lines, and receives control commands from the telemeter telecontrol system to conduct on-line controls in real-time.

DCS(Distributed Control System)

MASTER P-3000
This is an automatic control system that enables the main center to conduct overall monitoring and control while minimizing risks by distributing other control computers with built-in automatic control programs according to their functions. The system is a core facility used in monitoring and controlling various industrial processes including water treatment, power generation, boiler, steel and petrochemical.

MASTER P-3000NT / MASTER P-3000AT
MASTER P-3000NT is a type of operating system that uses Windows-NT and international standard hardware, system bus and communication network. The system is a future-oriented distributed control system that embodies a completely open system.

MASTER P-2000
MASTER P-2000 is a high-reliability control system designed to suit the industrial standards used in industrial environments where a high level of reliability is required.
Railway System / ITS

Railway System

Traffic Management System
As an advanced railway signalling system applicable to main lines, metros, and LRTs, the Traffic Management System (TMS) of LS Industrial Systems provides total solutions to realize an automatic train control & monitoring and train operation management with automated and computerized systems.

Audio Frequency Track Circuit
- Determines optimized train speed for the best safety and speed by calculating automatically the preceding train’s location without driver’s operation
- Adjusts train interval and transmits emergency brake data to trains through rails
- Receives and interprets driving orders, and automatically regulates train speed without driver’s operation

Freeway Traffic Management System
Freeway traffic management system monitors traffic and collects information with car detector, computer, etc. to improve the freeway efficiency and capacity for freeway users.
Electronic Interlocking System (LS-EIS 620)
The LS-EIS 620 controls signal, rail switch, railway crossing, etc. without relays by selecting whole electronic module to control the system safely and smoothly.

Electronic Interlocking System (LS-EIS 520)
The LS-EIS520 enables safe train operation by establishing software with database of interlocking conditions such as track circuits, point machines, signals and block systems, and analyzing, controlling and displaying them with a microcomputer.

Automatic Train Control
The ATC satisfies requirements of various customer such as main lines, metros, and LRTs with its enhanced safety and reliability based on safe train control and advanced electric/electronic & information processing technology.

Communication Management System
- Digital Transmission System: Transmitting information of various equipments (Communication, Signalling, AFC, Electric-Power and Administration)
- Train Radio Telephone System: Wireless communication system among train drivers and dispatchers
- Dispatch Telephone System: Providing dispatch telephone lines between each control room (Operation, Electric-Power, Signalling, Communication, Accident-Prevention) and main line or relevant departments
- Video Transmission System: Enabling operator or staff to monitor the safety of the passengers

Passenger Information System
The PIS receives and processes train operation information, transmits it to the host equipment of each control room, and then accordingly informs the passengers on platforms.

Automatic Fare Collection
By computerizing, AFC enables efficient management of data processing, equipment monitoring, and collecting financial and statistical data of ticketing, issuing, supplementing, fare adjustment and entrance controlling at each station.

Wide Area Traffic Control System
Wide area traffic control system collects and manages the various traffic data around downtown to improve the efficiency of road and to offer comfortable traffic environment to the road users.

Automatic Traffic Enforcement System
Automatic traffic enforcement system monitors traffic violations such as speeding, signal violation, bus exclusive line violation, etc. real-time, and carries out administrative process automatically.

Toll Collection System/Electronic Toll Collection System
ETCS system consists of a vehicle identifier, a wireless communication system and OBU, automatically collects tollgate fees and enables drivers to pay toll fee without stopping. LS Industrial Systems provides not only a mechanical toll system using magnetic ticket but also an up-to-date electronic toll system.
Power IT / Power Photovoltaic System

Power IT Solution

We provide a dynamic customer-oriented Power IT Solution that will transform the conventional electric industry into the newest information industry by applying integrated digital networking and new trend information technology throughout the entire field, from generation and transmission to the power distribution.

Energy Management System

The Energy Management System (EMS) ensures optimal control of the operation of the power generation facilities with the linkage system through the normal information collection and load frequency monitoring of the overall power supply system. With the efficient management of the power system, this large-scale power control system facilitates economic energy management.

Distribution Automation System

The Distribution Automation System (DAS) performs prompt recovery of the distribution line automatically with a function which separates the shutdown section and recovers the normal distribution line in the event of a breakdown of the distribution line. The DAS controls the Pad-mounted or overhead switchgear and monitors its status at distance by communicating with the FRTU installed in the switchgear based on computer and communication technology. It is composed of the central system, DAU, communication device (cable / wireless), FRTU, and Pad-mounted or overhead switchgear.

Power Monitoring System

The PMS (Power Monitoring System) has been designed for remote monitoring and control using power equipment with digital relay or RTU for power facilities in factories, plants, buildings, and others. This monitoring and control system is equipped for application and integrated operation in various fields including lighting, remote meter reading, air conditioning and water treatment facilities, in addition to the power equipment.

Power Quality Monitoring System

PQMS (Power Quality Monitoring System) analyzes the primary causes of power quality decline and suggests solutions for this problem by gathering power quality information from the PQ meter installed in major power facilities and analyzing the information in real time. In particular, this is a useful system for production facility systems requiring a high quality of power.

Power Photovoltaic System

Sunlight is the infinite energy source without exhaustion. It is the clean energy that doesn’t bring environmental pollution, noise, and radioactive leakage to substitute the existing energy in the future.

On-Gird Photovoltaic System

On-Gird Photovoltaic System transforms DC power generated from solar cell module into AC power to connect to the network, without battery. When a monitoring system is constructed, the photovoltaic generation amount can be monitored real-time at a distance.

Stand-Alone Photovoltaic System

Stand-Alone photovoltaic system provides power to the areas the power network cannot reach, consist of photovoltaic module, charging regulator, inverter, storage battery and generator.
Electrical Equipment Control and Monitoring System

The ECMS (Electrical Equipment Control & Monitoring System) carries out generator operation, management and control by applying multi-functional integrated digital relay to the power-generating facilities and the power equipment within the power plants. In particular, multi-functional integrated digital relay has been applied to this monitoring and control system to enable the simplification and effective functioning capacity of the system.

Substation Automation System

The Substation Automation Systems provide remote control and monitoring functions in real time, promptly acquiring the information of facilities for all kinds of unmanned substations ranging from distribution to extra high voltage substations, which may be applied to Intelligent Electronic Devices (IEDs) for protection and control and to the facility security devices of the unmanned substation. The SAS supports all of the higher-level remote functions such as advanced power system management and the monitoring of the condition of the equipment through the automatic operation program.

Supervisory Control and Data Acquisition System

SCADA (Supervisory Control and Data Acquisition System) fulfills the role of monitoring and controlling the power facility located on the distance site in on-line, which is based on the information about circuit breaker status, analog and digital data collected by the RTU (Remote Terminal Unit) and transmitted to the central computer through the line or wireless communication network.

Automatic Meter Reading System

The AMR (Automatic Meter Reading System) meters power consumption in the remote user through wire or wireless communication and issues a bill of the power consumption automatically, and enables various system configurations of RF, CDMA, PLC, Handy Terminal method and others depending on the site situation. In addition, through the automation of the meter works, the metering cost saving, the improve-ment of reliability for measured value and the transparent meter working are all supported. It may also be used with the data to establish an energy saving plan by analyzing consumer trends.

Power Equipment Diagnosis and Preventive System

The PDPS (Power Equipment Diagnosis and Preventive System) monitors the functions and capabilities of major power facilities to prevent breakdown and accident in advance and supports efficient power facility manage-ment through equipment records and DB management. This system consists of a sensor, DAU/CCU, and PDPS server. The sensor is applied to the power equipment to acquire the data, the DAU/CCU acquires the data from the field equipment and transmits it to the upper server, and the PDPS server supports the efficient management and accident prevention of the equipment on the basis of acquired information.

Load Management System

When the second stage of the power supply is required for securing reserve power during the summer loading period, the load that can be cut off is actually disconnected for a certain time. This is stipulated with the users in order to provide them with an incentive for subsidy by providing the load. The government secures the stability of power supply in this demand management program.

Photovoltaic Module

The Photovoltaic module as the semiconductor element which directly transforms light energy into electrical energy by photoelectric effect, is connected in parallel or in series to generate constant output power.

Photovoltaic Inverter

Photovoltaic inverter transforms DC power into AC power

Battery

Battery supplies power when the power generated from solar cells is too small or at night

Electric Power Converter

Power transformer supplies the load or storage battery with the power generated from solar cell plate.
Basic materials for the electronic and heavy chemical industries - LS Copper Tubes and STS Pipes

LS Industrial Systems supplies basic and industrial materials for the electronic and heavy chemical industries, while manufacturing copper tubes and STS pipes for the steel processing industry.

LS copper tubes and STS pipe have the perfect quality and a variety of products to satisfy customers, and are certified by the register of shipping of England, Norway, Japan, France, Germany, Italy, and Korea besides KS, JIS, ISO 9001, 14001 certificates.

Copper tubes

LS copper pipe is produced with the high-tech method, horizontal continuous cast & rolling, by Outokumpu, Finland. The high quality pipe is widely used for facilities closely related to our life such as refrigerator and thermal devices as well as water supply, hot water supply, house heating, etc.

Made using 99.9% copper cathode as raw material, LS copper tubes have excellent workability and corrosion resistance. We will continue to make the best efforts to develop and provide high quality wrought copper products available to meet market and customer demands.

STS pipes

LS STS pipe is produced with automated continuous pipe manufacture technology. LS Industrial Systems is manufacturing various pipes for heavy industry, construction, heat exchanger, ondol piping, sanitary use, ship, machine, etc.

We produce the country's largest diameter(56") and 20mm thick tube, and certified by JIS of Japan and worldwide registers of shipping, providing products of satisfaction with variety and reliability.
The Power that Drives Industrial Field
The Force to Lead the Industrial Development

Product Standards
LS Industrial Systems produces pipes of various standards ranging from general 304 types to special industrial 316L. Since we are the only pipe manufacturer in Korea that has the production capability for large-diameter STS pipes, we have product competitiveness that can satisfy any customer demands.

Level Wound Coil
This coil is produced at a length suitable for non-stop operation of automated production lines. It contributes greatly in shortening processing time and increasing productivity.

Product Specifications
- Outside diameter: 5.00~22.00mm
- Thickness: 0.25~1.14mm
- Material: soft material (Type: O), semi-soft material (Type: OL), hard material (Type: H)

Other Products
Hard Tubes: Multi-purpose tubes for piping, regenerators and spiral tubes
Soft Tubes: Industrial copper tubes for equipment with high circulation such as air conditioners and regenerators
Pan Cake Coil: Lightweight, easy to carry/handle. Used in facilities requiring 30M or shorter pipes

Product Specifications
- Outside diameter: 6.35~28.58mm
- Thickness: 0.5~1.85mm

Inner Grooved Tube
This copper tube is produced in technical liaison with Hitachi. Its inner grooves are processed consecutively to widen the surface for heat relay. The Inner grooved tubes are used in air conditioners to save energy and reduce equipment size.

Usage
Besides piping materials for general construction, high quality LS STS pipes are supplied to industrial sites where a high level of precision is demanded. Piping work for heavy chemical plants like petrochemical and pulp manufacturing facilities, as well as special vessels like oil tankers and LNG ships require our products.

Product Certification
LS Industrial Systems has been supplying LS STS pipes for various gas plant projects, LNG ships from major Korean shipbuilders and other major projects in Korea and overseas. The excellence of LS STS pipes is well recognized in all industrial fields.

- KS group: Spec 21.7~660.4mm Thickness 1.05~12mm, specific size available
- A 358: Spec 219.08~1,320.8mm Thickness 2.77~19.05mm, specific size available
- Thick tube: Spec 355.6~1,422.4mm Thickness ~20.0mm, specific size available
LS Industrial Systems offers the optimal RFID solution based on accumulated technology in industrial device field and various developed components.

LS Industrial Systems constructed the country's biggest production line by establishing the country's first reader mass production line and completion of tag mass production line in May, 2006, providing diversified RFID products conforming to the customers' needs.

Our RFID QC center is simulating the customer's installation environment to test the performance to offer verified products passing various recognition tests.

**Security & Access Control**
Today, due to increased number of crimes and temors, the need for security & access control is ever increasing. With its convenient usage and high level of security protection, RFID has widespread usage. LS Industrial Systems supplies new concept security solutions with web based solution and RFID technologies.

**Logistics / Distribution (Transport / Warehousing)**
RFID-based supply chain management systems provide effective and accurate ways of managing whole SCM from parts supply, production planning, and checking delivery to tracking inventory. Selective application of RFID systems is possible. By tagging container, pallet, case, item label, etc. to the characteristics of working conditions, you can achieve visualization of supply chain. LS Industrial Systems holds exclusive RFID manufacturing line for logistics and distribution industry.

**Asset Management**
RFID technology gains attention in asset management. Customers can match tangible assets with balance sheet records so that customers can manage fixed asset systematically. RFID technology is the best way to construct total asset management system. As a professional RFID company, LS Industrial Systems can provide customized systems from tags to tag printers applicable to various asset management needs.

**Production Process Management**
RFID is applicable to various production processes. Since each customer has different installation conditions and different purposes of usage, Customers must consider various factors such as reading distance, frequency range, tag packaging and attachment method etc. With its excellent experience in introducing RFID in this field, LS Industrial Systems can provide solutions to overcome such difficulties.
LS Industrial Systems Makes Ubiquitous World with the Technology for Our Comfortable Life.

900MHz Handheld Reader
Neo Handheld RFID Reader
- Certified by the Ministry of Information and Communication of Korea
- Supports Multiple Protocol
- Camcorder type design to meet customer’s convenience
- Equipped with Wireless LAN
- CDMA (Basic), Barcode Reader (Optional)

900MHz Stationary Reader & Antenna
Neo UHF Band RFID Stationary Reader & Antenna
- Certified by the Ministry of Information and Communication of Korea
- Supports Multiple Protocol
- Easy to set up and well-designed to be durable enough

13.56MHz Long Range Reader & Antenna
- Certified by the Ministry of Information and Communication of Korea
- Easy to install, excellent heat-resistance
- Diversified communication interfaces
- Compatible with ISO 15693
- Various applications due to the default I/O port

13.56MHz Label Tag
- ICODE IC based on ISO 15693
- High quality and lowest price due to the exclusive mass production line

13.56MHz Middle Range Reader & Antenna
- Certified by the Ministry of Information and Communication of Korea
- Supports Multiple Protocol
- Design to fit in logistic industry working conditions.

900MHz Label Tag
- EPC, ISO tag manufacture
- Inlay size and design flexible according to customer’s use
Global Network

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Provides the best-quality products and service

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