

*Be the* **ONE**<sup>\*</sup>

*Outstanding People, Best-in-Class Product, Winning Partnership*

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Outstanding People, Best-in-Class Product, Winning Partnership

**LS** Mtron

# Outstanding Company

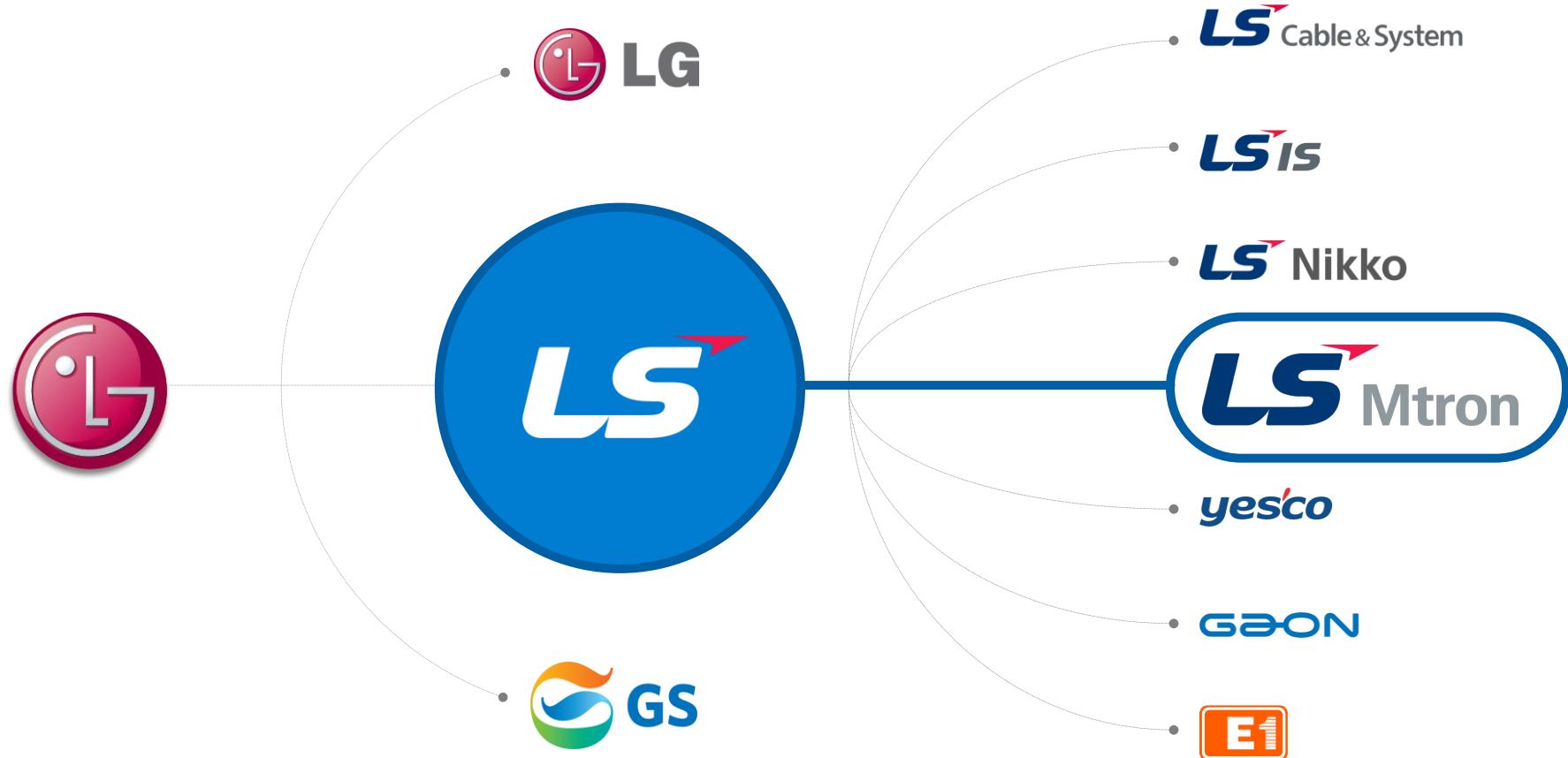


# LS GROUP



| Spun off from LG Group in 2003

| A leading company in the areas of industrial electricity and electronics, materials, machinery, components, and energy



The 15th largest corporation in South Korea and a leader in many major industries

## Management Philosophy

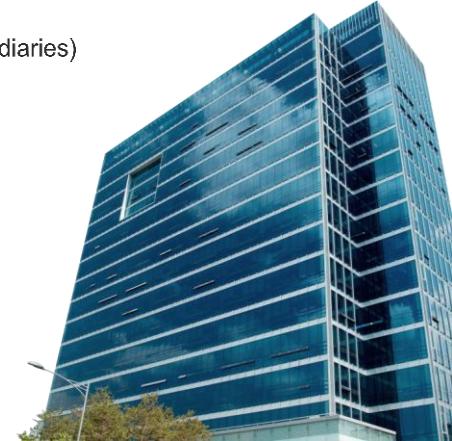


LS is a devoted and **reliable business partner**.  
Collaboration with LS leads to **greater success**.

## Management Status

	<b>No. of employees</b>	13,000
	<b>No. of affiliates</b>	45
	<b>Sales</b>	USD 18.3 Billion
	<b>Operating profit</b>	USD 631 Million
	<b>Total assets</b>	USD 18.2 Billion

(As of 2016, excluding overseas subsidiaries)



Established to enhance global competitiveness and expertise in the industrial machinery and cutting-edge component businesses

## Vision



## Management Status



Date of establishment

July 1<sup>st</sup> 2008



No. of employees

6,280



Sales

USD 2.89 Billion



No. of overseas locations

16

(As of 2016, consolidated)

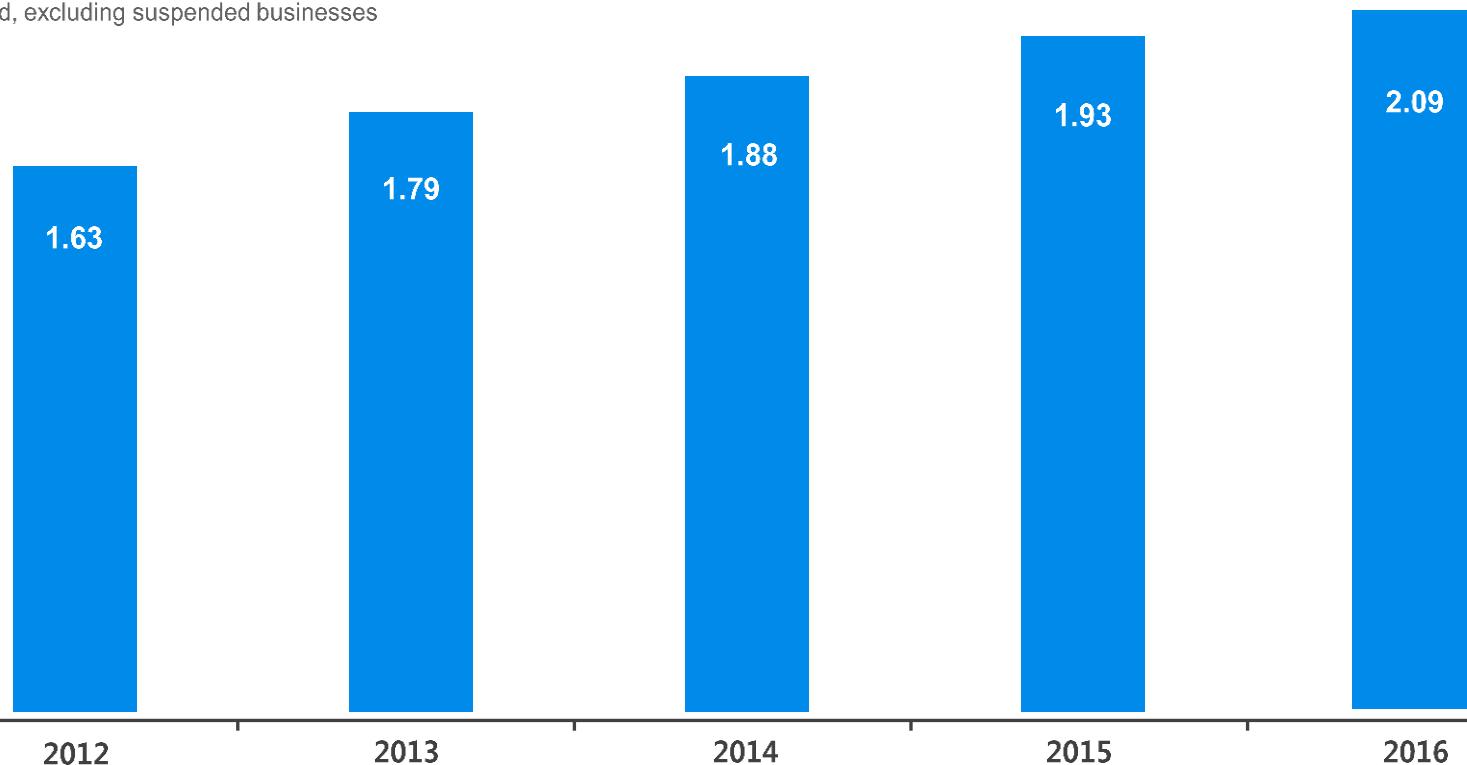


## Sales

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 Sales (Unit: USD in Billion)

Consolidated, excluding suspended businesses



# History



Founding and Establishment of Growth Foundations	Growth	Innovation	Going Global
<p><b>1962~1994</b></p> 	<p><b>1995~2002</b></p> 	<p><b>2003~2007</b></p> 	<p><b>2008~</b></p> 
<ul style="list-style-type: none"><li>May 1962 <b>Established as Korea Cable Industry Co., Ltd.</b></li><li>June 1969 <b>Launched plastic injection molding systems</b></li><li>October 1983 <b>Acquired Gunpo plant from Korea Heavy Industry</b></li><li>May 1986 <b>Entered the connector business</b></li></ul>	<ul style="list-style-type: none"><li>February 1995 <b>Renamed as LG Cable Co., Ltd.</b></li><li>April 1998 <b>Launched an automotive rubber hose business</b></li><li>September 1998 <b>Secured a USD 100 million contract to supply tractors to the U.S.</b></li><li>August 2000 <b>Launched the copper foil business</b></li></ul>	<ul style="list-style-type: none"><li>November 2003 <b>Spun off from LG Group</b></li><li>May 2004 <b>Established an injection molding machine subsidiary in Wuxi, China</b></li><li>March 2005 <b>Declared CI of LS Group</b></li><li>March 2005 <b>Relocated the Gunpo plant to Jeonju</b></li><li>April 2005 <b>Launched the ultracapacitor business</b></li><li>March 2007 <b>Established an electronic components subsidiary in Qingdao, China</b></li><li>October 2007 <b>Launched the FCCL business</b></li></ul>	<ul style="list-style-type: none"><li>July 2008 <b>Launched LS Mtron</b></li><li>November 2008 <b>Established the Qingdao tractor subsidiary in China</b></li><li>November 2008 <b>Acquired LS Automotive Co., Ltd.</b></li><li>January 2009 <b>Established a tractor subsidiary in the U.S.</b></li><li>April 2013 <b>Completed the Hi-Tech Center</b></li><li>October 2013 <b>Completed a tractor plant in Brazil</b></li><li>February 2014 <b>Established an electronic components subsidiary in Vietnam</b></li><li>June 2014 <b>Completed a tractor engine plant</b></li><li>July 2015 <b>Declared the company Vision</b></li></ul>

# Domestic Business Locations



## LS TOWER, Hi-Tech Center

(Head office, Electronic Components, Ultracapacitors, Sales)



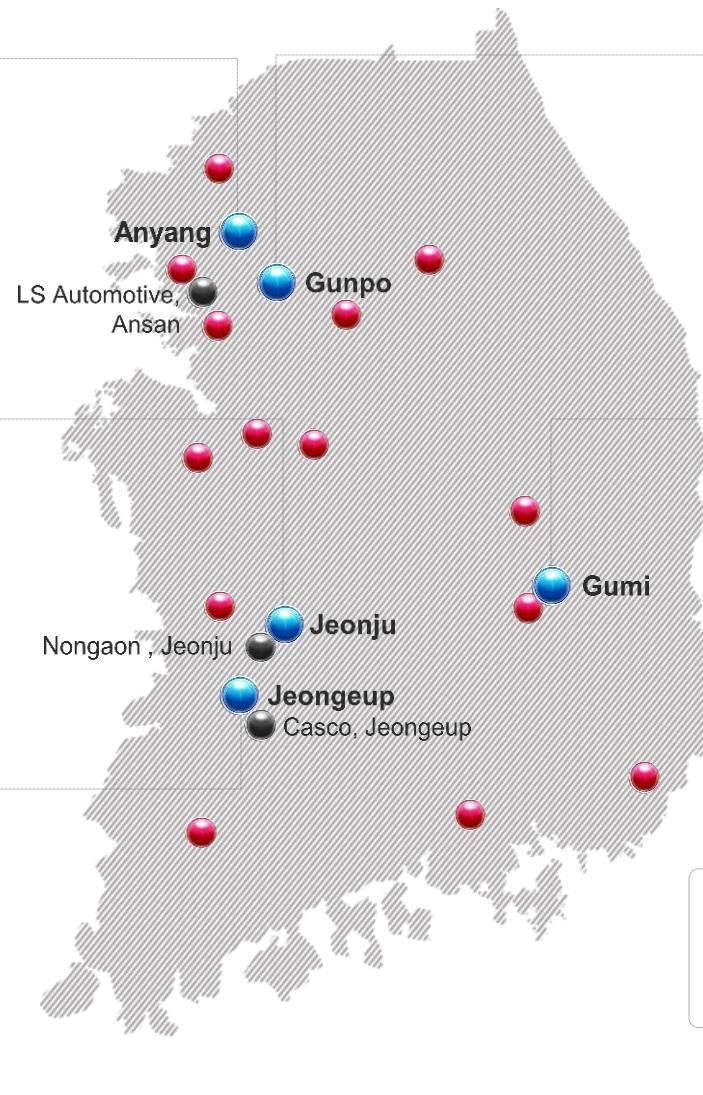
## Jeonju Plant, Engine Plant

(Tractors, Injection Molding Systems, Track Shoes, Tractor Engine)



## Jeongeup Plant

(CF, FCCL)



## LS Mtron R&D Center



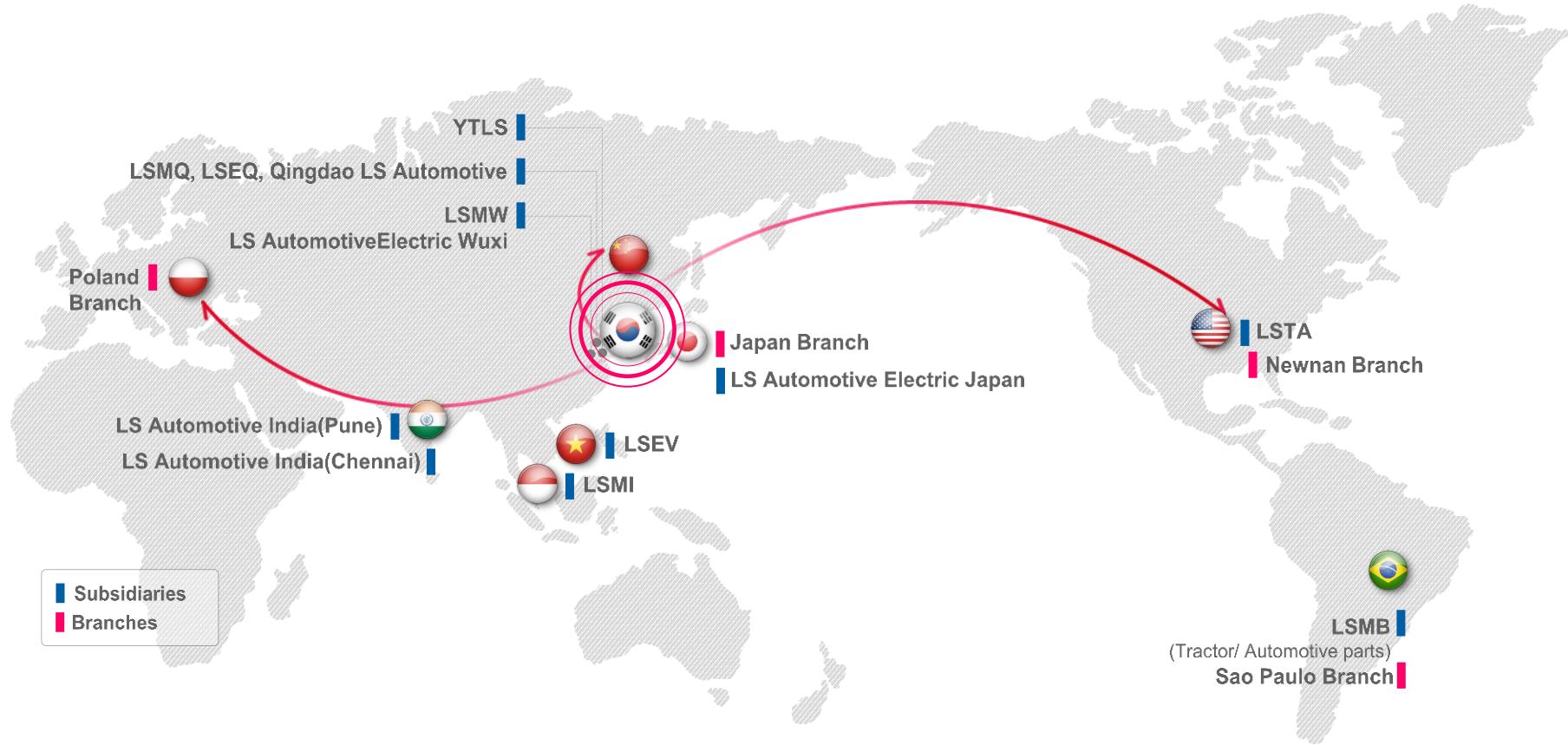
## Indong Plant

(Automotive Components)



- Head Office and Business Locations
- Sales Offices
- Subsidiaries

# International Business Locations



I Growth of international subsidiaries and foothold

2008

3



2017  
17

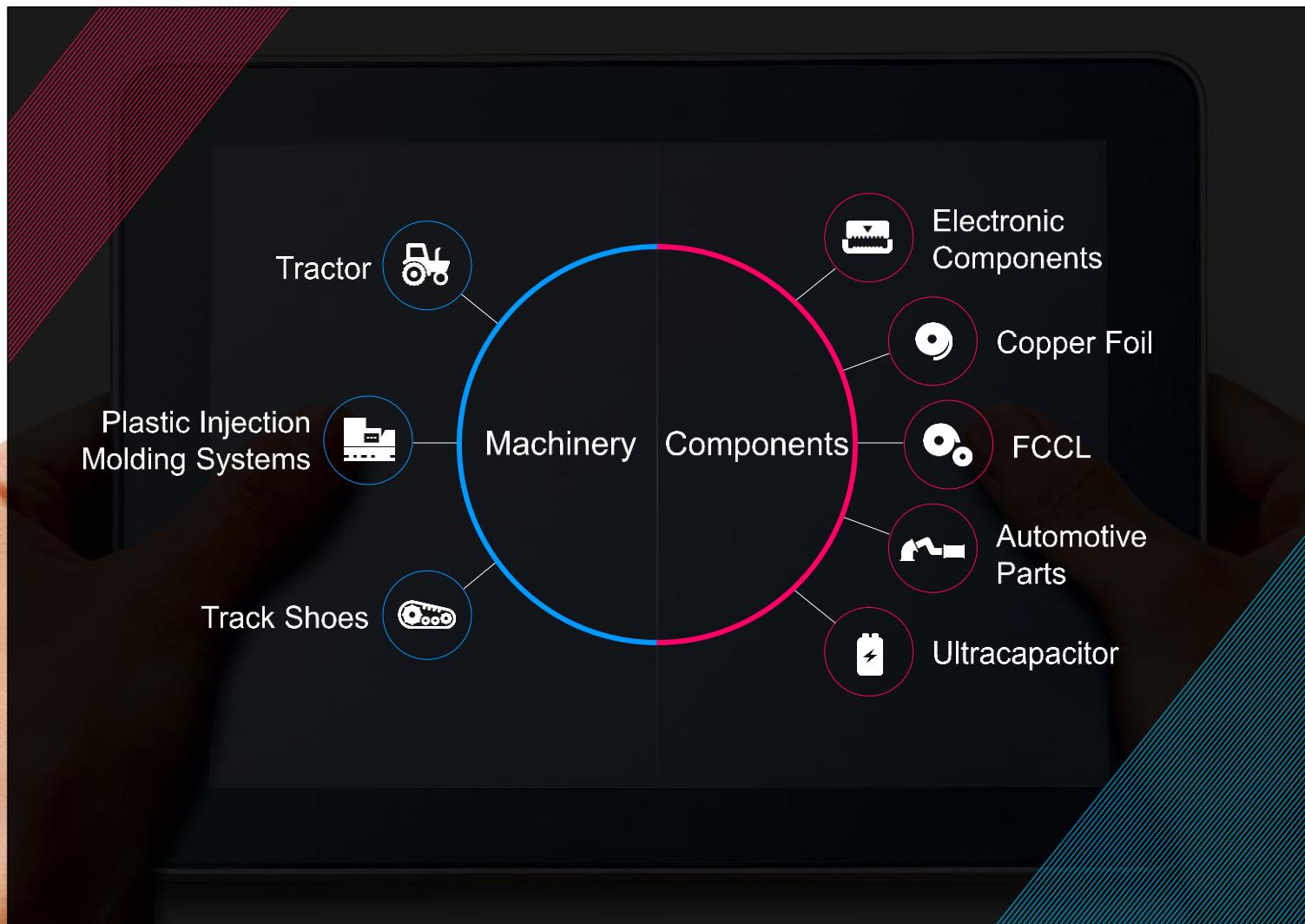
**Secured 17 overseas bases**

including China, Brazil, USA, and Vietnam

A close-up photograph of a high-speed serial connector, likely a PCIe or similar, mounted on a printed circuit board. The connector has a gold-plated metal housing and a black plastic retainer. The PCB features a dense pattern of blue and gold vias and traces. The background is dark, with bright highlights reflecting off the metal and the PCB surface.

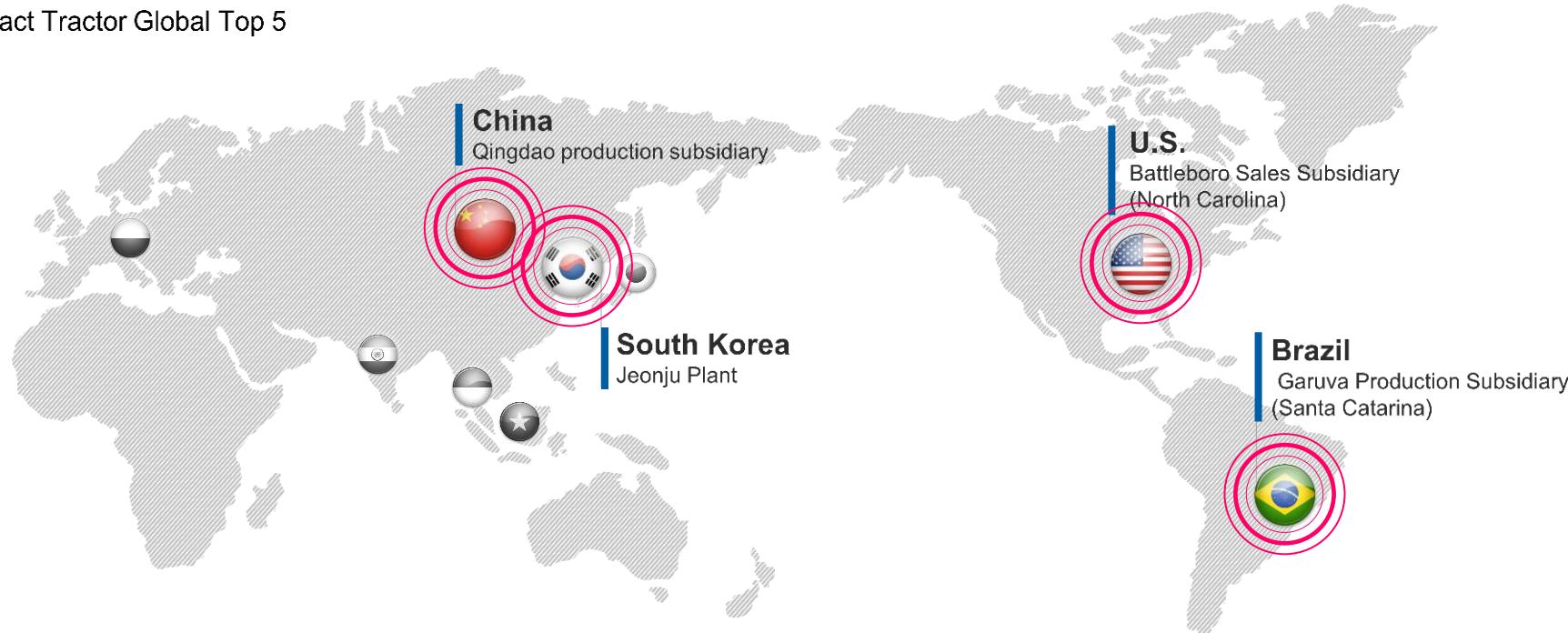
Best-in-Class  
Product

# Major Businesses



# Tractors

## Compact Tractor Global Top 5



Performance



Major Plans

- #1 market leader in South Korea
- Supplied to over 40 countries around the world
- Annual production capacity of 50,000 units from plants in South Korea, China, and Brazil
- Enhance global competitiveness of models from all plants including in China and Brazil
- Secure growth potential through global partnerships
- Bolster product lineups, including tractor implements, combines, and heavy construction equipment



# Tractors



## Key Products

### XP Series (84~101Hp)



Comfortable interior and  
good fuel efficiency

Convenient user-oriented  
features and economy

### MT5 Series (63~73Hp)



Clear & wide view  
with 4-pillar cabin

Superior performance and  
comforts with fully  
functioned cabin

### MT1 Series (22~25Hp)



Stylish and  
easy to operate

Sub compact tractor with  
high performance and  
superb agility

## Product Line-up

### Sub Compact Tractor

- LS MINI(18Hp)
- MT1 Series(22~25Hp)
- J Series(23~27Hp)
- XJ Series(25Hp)

### Compact Tractor

- I Series(28~38Hp)
- G Series(33~38Hp)
- XG Series(32~37Hp)
- R Series(41~56Hp)
- XR Series(32~56Hp)

### Utility Tractor

- U Series(50~60Hp)
- XU Series(45~68Hp)
- MT5 Series(63~73Hp)
- V Series(70~80Hp)
- PLUS Series(70~95Hp)
- XP Series(84~101Hp)

### Row-Crop Tractor

- H Series(110~140Hp)

### Others

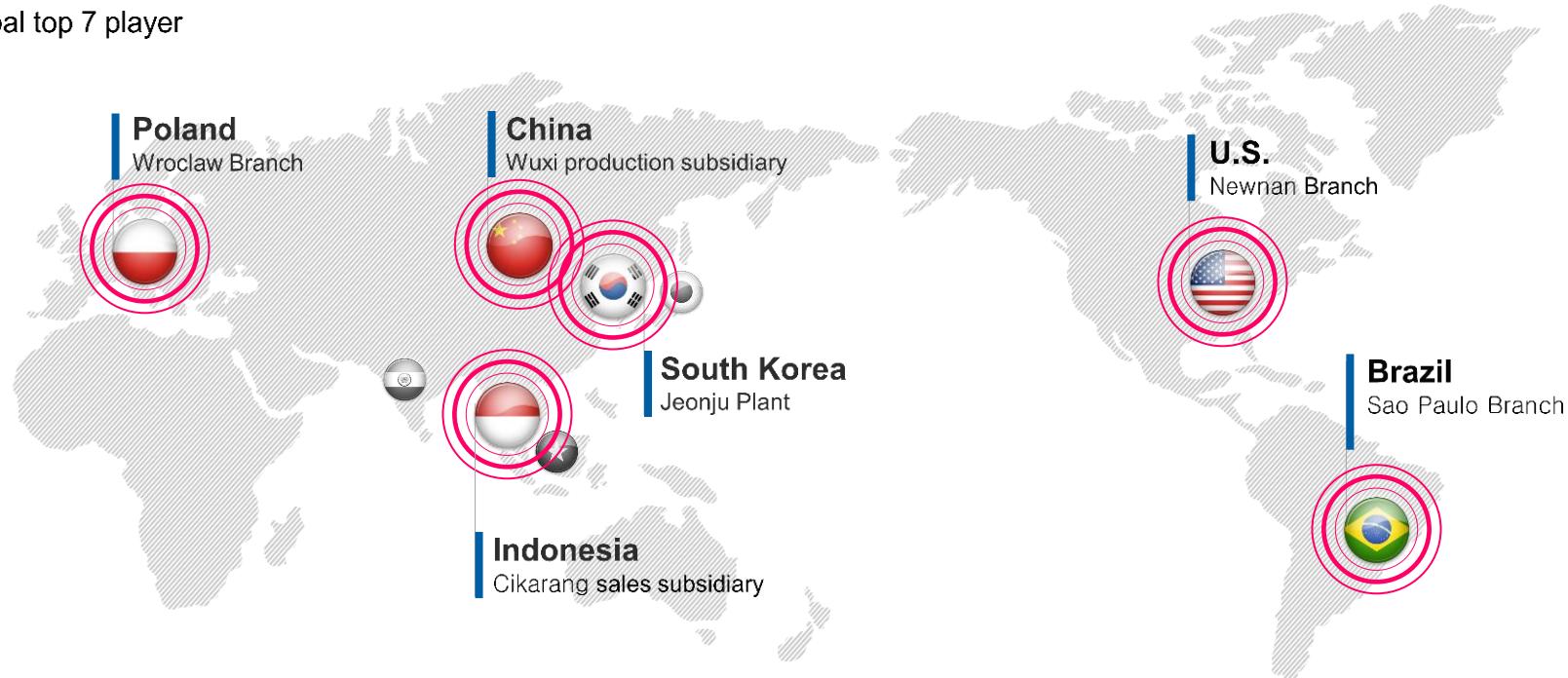
- Combine harvesters
- Rice transplanters
- Cultivator
- Implements



# Injection Molding Systems



A global top 7 player



Performance



Major Plans

- **No.1 market leader of injection molding machine industry in South Korea**
- **A comprehensive injection molding machine maker**
- **Exported 60% of production to over 50 countries around the world**

- **Strengthen the capabilities of international operations, including Indonesia, Brazil, and Poland**
- **Develop new products**

- New brand launching of premium injection molding machine with the ONE\* series.
- Line up electric machines with Global specifications.
- Develop large-electric injection molding machine (650ton & 850ton) )

# Injection Molding Systems



## Key Products

### Electric (18-850 tons)



#### Clean molding

Extremely responsive,  
high-speed injection  
molding

### Hydraulic (80-4,500 tons)



#### Maximum productivity

High efficiency,  
low operating costs

### Toggle-type (90 tons-380 tons)



#### Excellent reproducibility

Outstanding  
power-saving efficiency

## Application

Injection molding of various parts for smart phones,  
automobiles, air conditioners, washing machines, and TVs

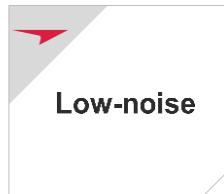
## Strengths



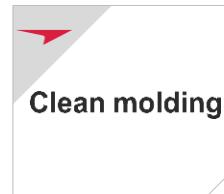
High-speed  
injection



Energy saving



Low-noise



Clean molding

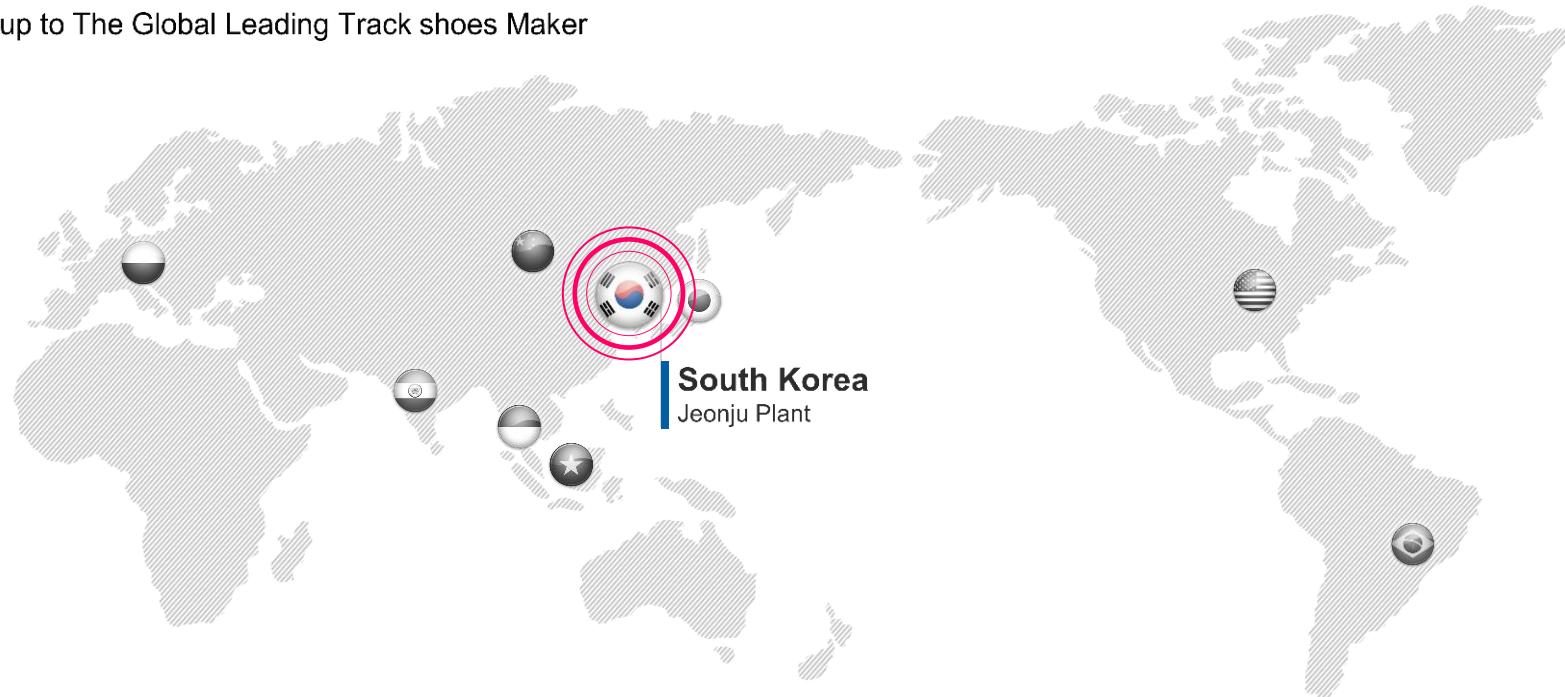
## Customers

Samsung Electronics, LG Electronics, Hyundai Motors,  
Hyundai MOBIS, Seoyon E-Hwa, PT.YASUNLI



# Track Shoes

Jump up to The Global Leading Track shoes Maker



Performance

- The only tank-track shoes manufacturer in South Korea
- Supplied to the ROK Army for over 40 years
- Selected as Excellent Defense Contractor in 2013



Major Plans

- Begin full-fledged mass production of track shoes for the next-generation South Korean Main Battle Tank (MBT), K2 Black Panther
- Develop track shoes for the Turkish MBT, Altay
- Secure future leading technologies (high durability, lightweight)



# Track Shoes

## Key Products

### K1A1 Track Shoes

#### Enhanced stability of Strengths by component

- Sharply improved durability
- Outstanding economy



### K9 Track Shoes

#### Low-vibration driving surface

- Manufactured specifically for Korean topography and operational characteristics
- Guaranteed durable wear life of stable tank-track shoes and pads



### K21 Track Shoes

#### Lightweight and high durability

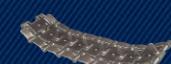
- Designed for heavy loads
- Upgraded high-speed capability
- Optimized for water-surface operability



### K200(M113) Track Shoes(export)

#### Contributing to foreign currency savings by replacing imports

- A leading model that is applicable to all series vehicles
- Excellent economic feasibility and quality



## Application

### Track shoes :

Play a vital role for the movement, rotation, and braking of the major lower components of combat and other types of vehicles

## Strengths

Tank-track shoes designs in various grades

Cuts Costs

Built with a stable quality system

Secured facilities for all work processes

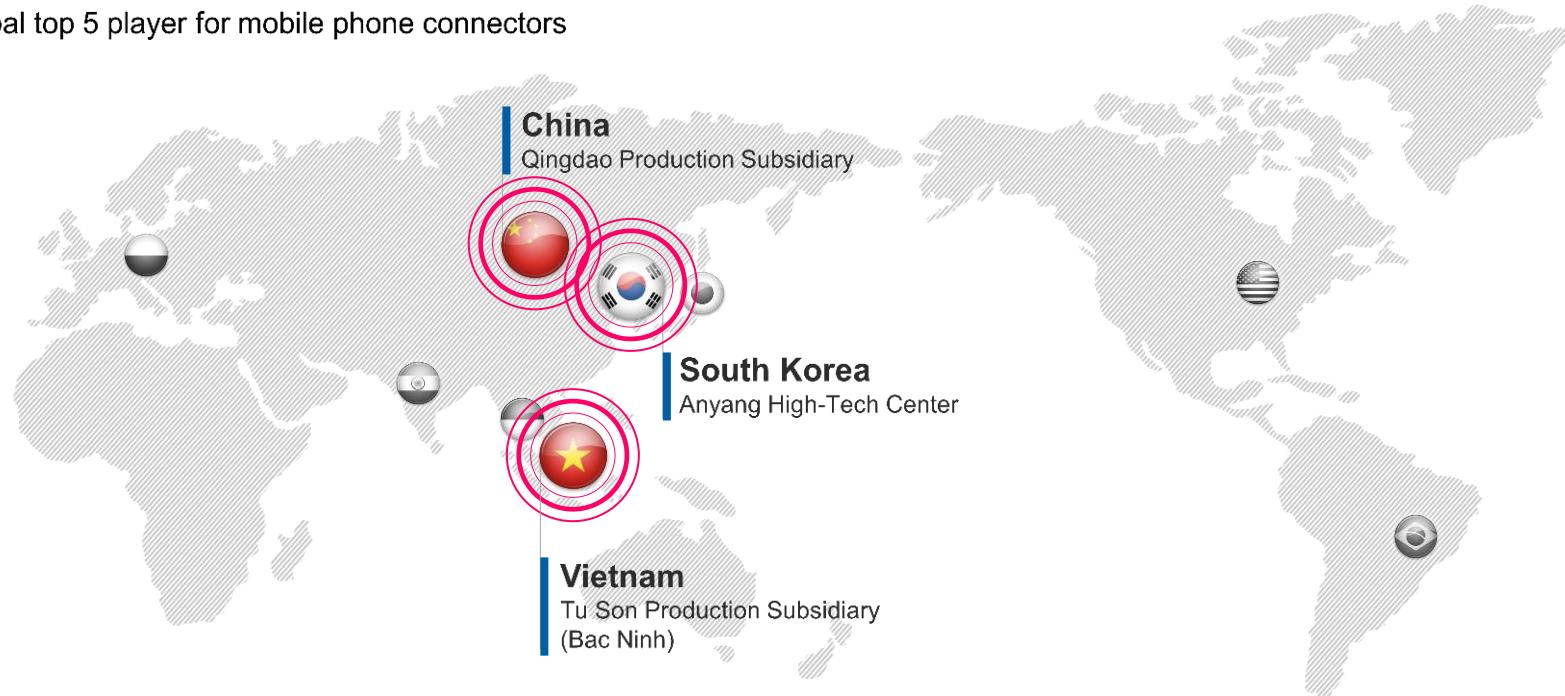
## Customers

Defense Acquisition Program Administration, Hyundai Rotem, Hanwha Techwin, Hanwha Defense, overseas defense companies



# Electronic Components

A global top 5 player for mobile phone connectors



Performance



Major Plans

- Supplying customized electronic components for flagship models of the major customers such as Samsung Electronics and LG Electronics
- Increase the pool of customers Chinese and worldwide
- Lay global business foundations by establishing a Vietnamese subsidiary
- Maximizing the domestic market share and expanding performances in the global market
- Developing market-leading products and securing core-technologies of manufacturing process
- Taking opportunities of growth through discovering and developing new growth engines



# Electronic Components

## Key Products

### B2B connector for cell phones

Minimize its chief area/  
Enhancement  
Excellent fastening workability



### I/O connector

For mobile phones M-USB/  
Type-C connector

micro USB/Type-C  
Waterproof/Multi Pin /Slimization



### Connector for FPDs

Applied high-speed  
transmission technology  
Excellent contact reliability



### Antenna for cell phones

Antenna integrated with case  
Slim multi-band antennas



## Application

Smart phones, tablet PCs, digital cameras, smart TVs,  
OLED/LCD TVs, monitors, notebooks, wearable devices

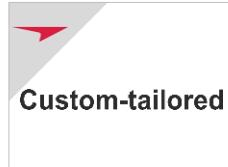
## Strengths



Ultra compact



High Speed



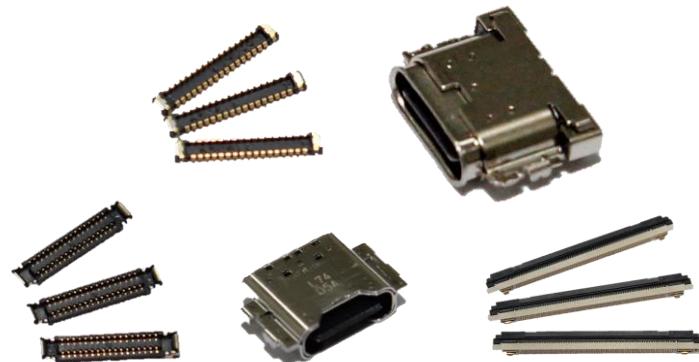
Custom-tailored



High Quality

## Customers

LG Electronics, LG Display, LG Innotek, Samsung Electronics,  
Samsung Display, Samsung Electro-Mechanics, ZTE, Lenovo,  
BOE, HTC, Sharp, Nikon, LAVA

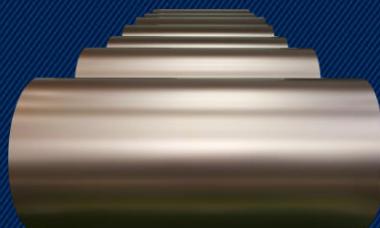


# Copper Foil

A global leader in copper foil manufacturing technology



South Korea  
Jeongeup Plant



Performance



Major Plans

- **A top supplier of copper foils to global IT/EV battery makers**
- **Established new copper foil product development and mass production system**
  - : First in the world to mass-produce 6 $\mu\text{m}$  copper foils, and high-strength, high-elongation copper foils for high-capacity batteries
- **Secured the world's first wide-width, long-winding and anticorrosion technologies**
- **Developed ultra-thin, low light level products for Fine Pitch FCCLs**
- **Develop cutting-edge copper foils for high-capacity batteries**
  - : including ultra-high strength 4 $\mu\text{m}$  copper foils and high-adhesion copper foils
- **Develop ultra-thin copper foils, including 6 $\mu\text{m}$  copper foils for FCCLs**

# Copper Foil



## Key Products

### LSB-STN

#### Standard copper foil used in batteries

- Standard copper foil for cathode
- current collectors used in lithium ion batteries

Tensile Strength (High Temperature) : 28~33kgf/mm<sup>2</sup>  
Elongation (High Temperature) : 4~8%



### LSE-HEN

#### High-elongation copper foil used in batteries

- High strength at room temperature, high elongation at higher temperatures
- high reliability

Tensile Strength (High Temperature) : 55~60kgf/mm<sup>2</sup>  
Elongation (High Temperature) : 18~22%



### LSS-HSN

#### High-strength copper foil used in batteries

- Copper foil for high-capacity
- Metal-based cathode current collectors due to its high strength

Tensile Strength (High Temperature) : 55~65kgf/mm<sup>2</sup>  
Elongation (High Temperature) : 3~5%



### LSU-FXR/LSB-FXC/LSE-FXN

#### Copper foil for FCCLs

- Built copper foil lineup for three types of FCCLs, suitable for customer processes
- Excellent traversability and flexibility

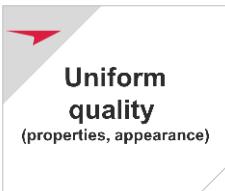
Normal Treatment,  
Reverse Treatment,  
Fine Nodule Treatment



## Application

- For batteries: Mobile phones, cathode current collectors of secondary batteries for electric vehicles
- For FCCLs : Flexible PCBs used in portable devices

## Strengths



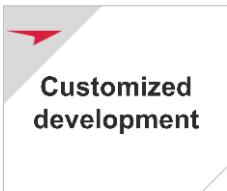
Uniform quality  
(properties, appearance)



Stable supply  
(wide width, long length)



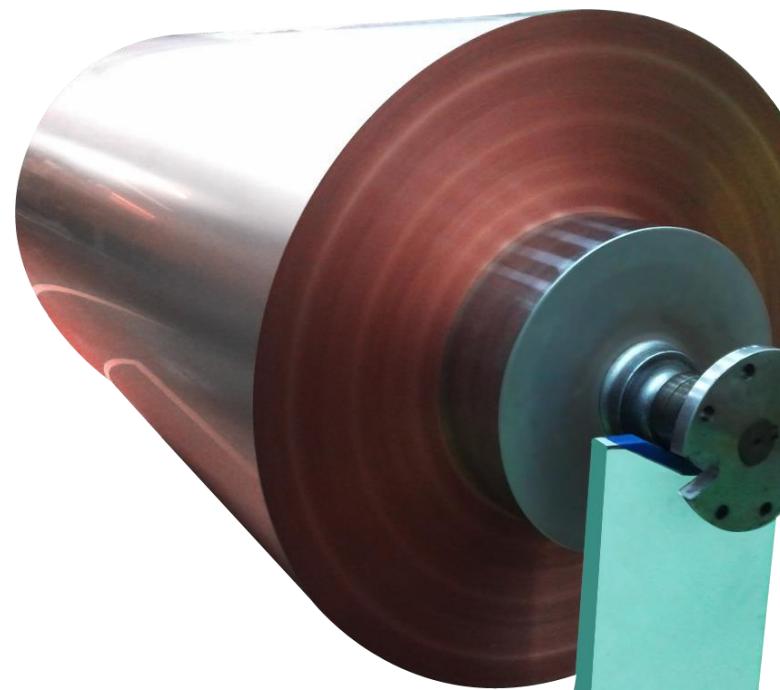
High reliability  
(anticorrosion, chemical resistance)



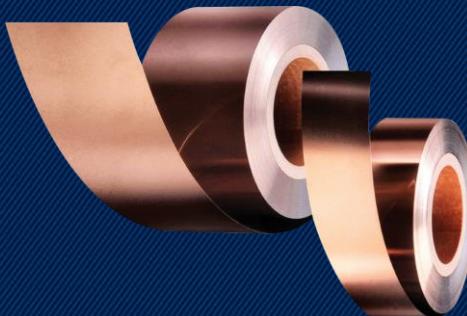
Customized development

## Customers

LG Chem, Samsung SDI, Panasonic, Sony, ATL, BYD, Coslight, LG Innotech, Doosan Corporation Electro-Materials, Daeduck GDS, Innox, SK Innovation



A leading global player in FCCLs



Performance

- Ranked second in the world market share
- Secured the nation's sole independent technologies
- Secured the world's highest productivity



Major Plans

- Secure over 30% of the global market share
- Develop new products for displays
- Achieve the world's highest productivity
- Grow to rank first in market shares



## Key Products

### FCCL for display products (Chip On Film)



#### Materials for high-definition image connection

- Materials for high-definition signal and image connection, including TVs, notebooks, and monitors

### FCCL for FPCs



#### Materials for slim circuits

- Fine and slim circuits in smart phones and medical devices

### Metal materials for TSPs



#### Materials for small- and medium-sized touch screen films

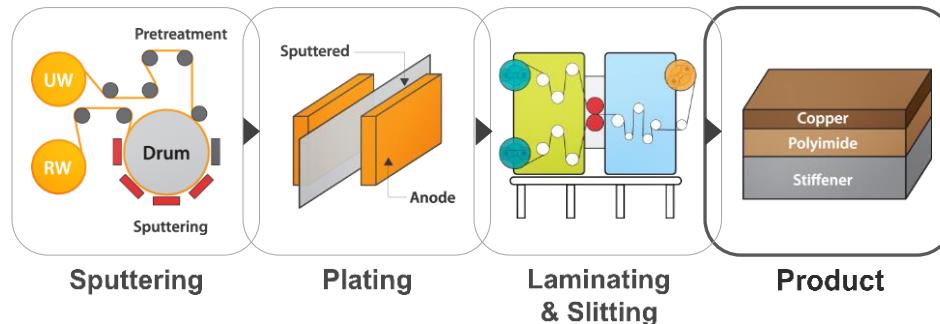
## Application

COF for LCDs, COF for mobile phones, Optical Pickup, FPCB for HDDs, FPCB for medical devices (including ultrasonic detectors)

## Customers

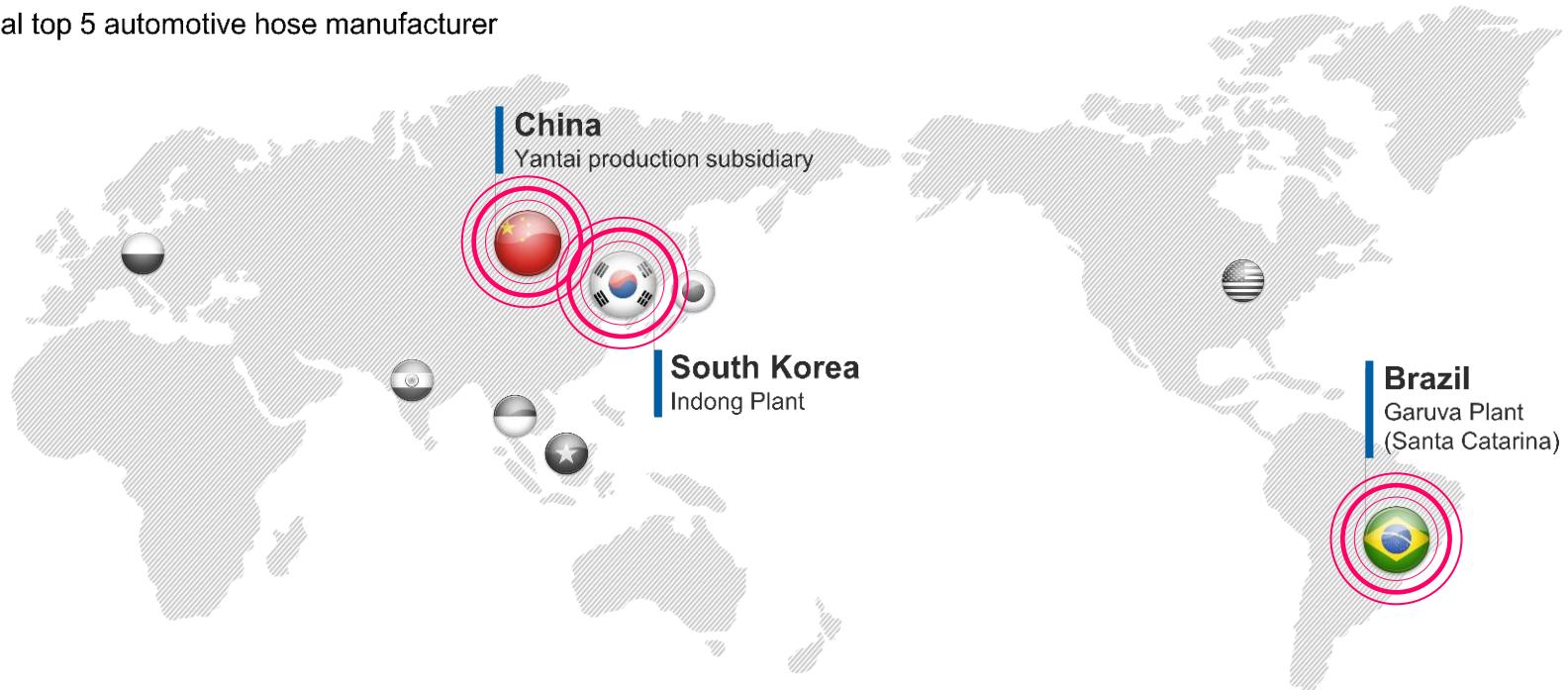
LG Innotek, STEMCO (a Samsung affiliate)

## Manufacturing Process



# Automotive Components

A global top 5 automotive hose manufacturer



Performance



Major Plans

- Built a brake hose assembly
- Secured global price competitiveness
- Expanded eco-friendly CAC hose line
- Develop overseas production bases in full scale
- Build an automated brake hose assembly line
- Enter the 3D Blow molding plastic duct business model market



# Automotive Components



## Key Products

### CAC hose

**Enhances fuel efficiency and engine output**

- A core component that reduces exhaust gas emissions



### Brake hose

**A product with the highest-grade security**

- Meets the needs of customers



### 3D Blow molding plastic duct

**For lightweight vehicles**

- Reduced noise



### Power steering hose

**Developed as a custom-tailored product**

- Maximizes driving convenience



## Application

- Used in braking and steering systems
- Enables drivers to change vehicle direction with ease

## Strengths

 **Excellent heat resistance**

 **Verified stability**

 **Customized product development**

## Customers

GM, Hyundai/Kia Motor, Renault-Nissan, Chrysler, Avtovaz



# Ultracapacitor



A global top player for Ultracapacitors



**South Korea**  
Anyang High-tech Center



Performance



Major Plans

- Entered mass production for global industrial AGV
- Increased cylindrical large-cell automated production capacity
- Secured new electrode coating technology and specialized module design technology
- Carried out joint product development with global companies
- Target 12% of the global market share for mid- to large-sized UCs
- Increase shares in key global markets and open new markets
- Develop high-voltage, ultra-low resistance products, and new technology-applied modules



# Ultracapacitor



## Key Products

### LSUC



#### Easy module composition for various purposes including voltage and capacity

-Usable for a variety of applications due to its strong durability

### LSUM



#### Standard and customized modules

-Standard module lineup with various forms and features  
-Offers optimal solutions through customized modules

## Application

Hybrid buses, Automobiles, UPS, AGV, Wind power, Railways and trams, Heavy equipment

## Strengths

High output

High efficiency

Low resistance

Strong durability

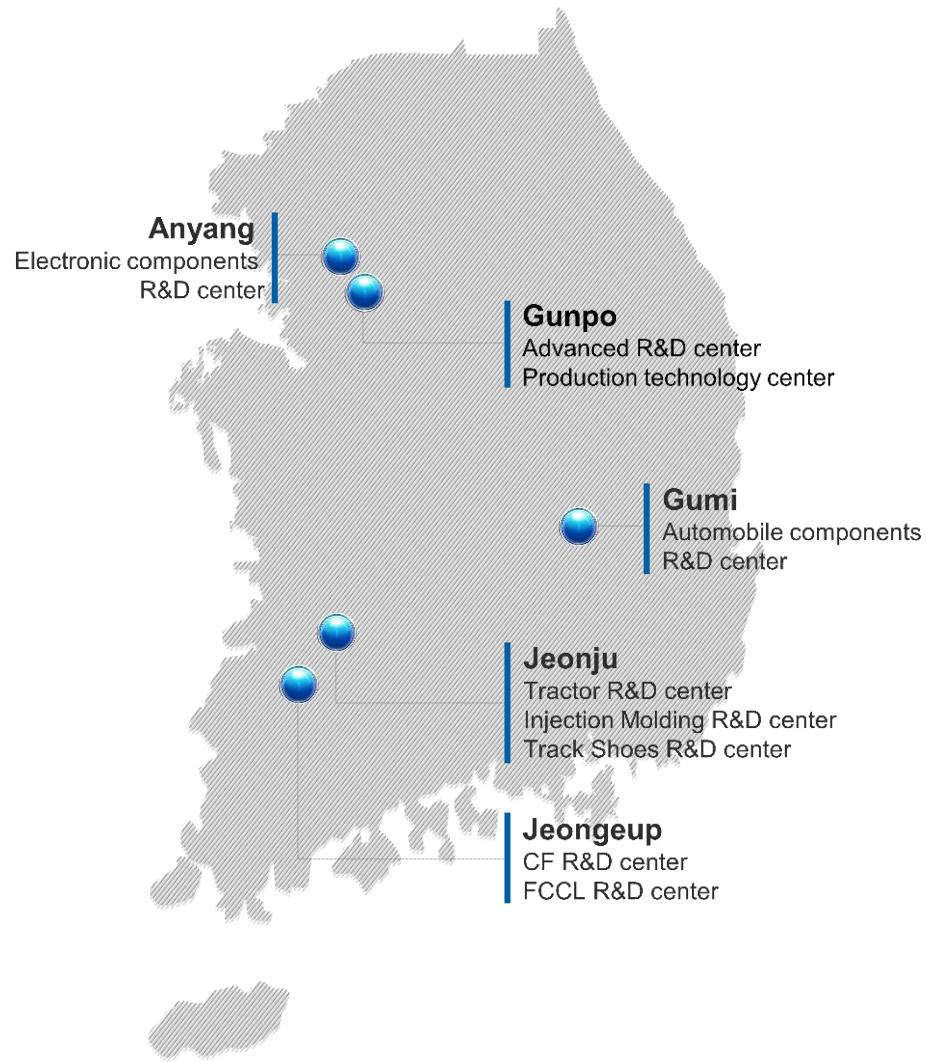
## Customers

ABB, Siemens, Eaton, Wind World, Daifuku, CRRC



# R&D

Be the one in “Digital transformation” R&D



- **Advanced R&D center:**  
Pursued an omni-directional R&D that aligns with the roles of the research centers at business divisions



Performance

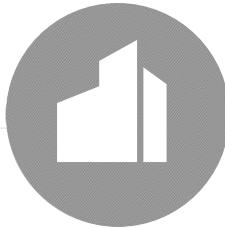
- **Established R&D process and advanced project management system**
- **Built production technology center**  
(for companywide technology support)



Major Plans

- **Develop industry-leading products**
- **Enhance open innovation**
- **Upgrade a product lifecycle management system for efficient R&D activities**

Committed to improving products and services through the highest-level technology development



## R&D Institute

### Advanced R&D Center



#### Tractors

- Development of automatic transmissions
- Development of Automated
- Operating & Convenience function
- Development of Autonomous Driving Technology



#### CF

- Development of copper foils for batteries
- Development of additive and plating recipes



#### Injection Molding

- Precision control and molding technology
- New mechanism
- Software Platform Development



#### Automotive Components

- CAC structure, vibration analysis
- Design of resonators



#### Electronic Components

- High-speed connectivity technology
- 5G antenna & RF technology



#### FCCL

- Development of next-generation double-sided products for mobile

### Production Technology Center



#### Companywide Technology Support

- Support CAE technology for the stages of development and mass production
- Innovate productivity through the development of automation and testing technologies
- Polymer product design and process technology development



#### Development of new processes and engineering methods

- Digital manufacturing
- Virtual durability test



#### Enhancement of Reliability System

- Develop precision analysis and test and evaluation methods
- Establish reliability process management

# Winning Partnership

# Sustainability Management



| Shaping the future with diverse stakeholders

Corporate Vision

2015 Goal

Strategies

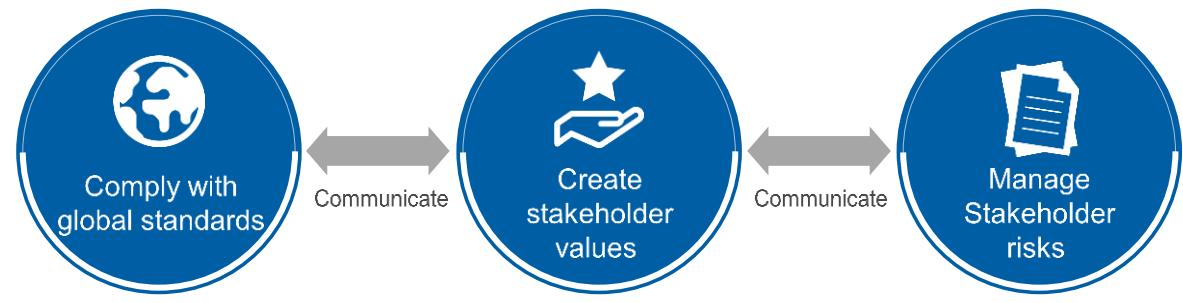
Activity areas

Basis of practice



*Outstanding People, Best-in-Class Product, Winning Partnership*

The growth toward respected global company through enhancing trusts from stakeholders



Initiatives in innovation

Quality and customer satisfaction

Shared growth

Social contribution

Green management

Competitive edge in technology

Enhanced employee value

Ethics Management

Creating Greater Value Together!



# Ethics Management

A standard for all directions and decision-making in sustainable management



# Win-Win Partnership

■ Growing together by working together

## M-Partner

Excellent business partner certification system



## Support for strengthened capabilities

Support to upgrade quality and productivity, while ensuring safety



## Six major activities for shared growth

## Financial assistance programs for business partners

Create win-win funds



## Improvement of supply chain transparency and the environment

Bolster fair trade relationships and practice green carbon partnerships



## Enhancement of R&D competitiveness

Support the projects of business partners that are related to technology development



## Increased communications

Develop together with business partners through consistent communications and feedback



# Green Management



A leading global green company in industrial machinery and components



## Targeting zero environmental and safety negligent accidents

- Building a system to better cope with environmental and safety negligent
- Strengthening the prevention accidents with precautionary system construction through assess the risk of environmental safety



## Leading green management in South Korea

- Received Global Green Management Excellence Award in 2014
- Seeking shared growth with our parent company and business partners through green partnership activities



## Leading by addressing global issues and climate change

- To actively respond to climate change through building management systems of greenhouse gas/energy and sustained reduction efforts
- Acquired Carbon Footprint Label Certification for Mtron tractors



# Social Contributions

Reaching out through employee volunteers around the world



## We Love Farming Village volunteer Group

- LS Mtron's representative social contribution program
- Volunteer work includes improvement of the residential environment, tractor inspection, taking photographs for the elderly, hairdressing services
- Help to solve low-income and aging issues in the rural regions



## Employee volunteer clubs

- Employees run volunteer clubs in local communities that are located near their business locations
- An open volunteer system joined by employees, their families, and business partners

# Social Contributions (international)

Reaching out through employee volunteers around the world

## Employee volunteer Group and Talent Development

- Carry out outreach activities by employee volunteer groups
- Activities include school construction and educational services (art, music, sports, etc.)
- Volunteer labor, education in hygiene, village and environmental improvement campaigns
- Support for scholarships and school supplies



# Employee Value Enhancement



| Fostering high-caliber, dedicated LS Mtron members by imparting a sense of ownership and strengthened expertise

## Jump programs for new recruits

Introductory training  
→ Overseas training  
→ Work smart  
→ Future Camp



## Mentorship program

Establishment of mentor-mentee relationships for new recruits,  
3-month activities, Helpers for organizational adaptation,  
Sharing experience and knowledge



## Professional job training

A variety of training programs including R&D, sales, and support



## Talent nurturing programs

LS MBA, master's degree programs, overseas doctoral degree programs in R&D, foreign language training



# A Great Workplace

Received the Great Work Place in Korea Award for three consecutive years

"It is not like a company  
but a university."

## [Club activities]

Support club activities including baseball, soccer, fishing, photography, leisure sports, and volunteer opportunities



"Families are avid  
fans of our company."

## [Employee family events]

Carry out a variety of family events for employees, including children sketch contests and parties for parents



"Enjoy holidays in  
a variety of creative ways"

## [Vacation programs]

Operate programs to refresh members twice a year, aside from summer vacation



"The best facilities  
in South Korea."

## [Convenient facilities and welfare]

Complete with all kinds of facilities such as swimming pools, fitness clubs, driving



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