

HYOSUNG GOODSPRINGS

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GLOBAL PUMP SOLUTIONS PROVIDER

HYOSUNG GOODSPRINGS

NEW HYOSUNG

We know that new changes and advances do not come through chance alone.

A process must be in place to gather the small results of countless challenges and failures and harness them to overcome difficulties. We remember the endeavors and sacrifices of those building the energy for our future and successfully bringing about change.

At Hyosung, a company pursuing the path of challenge and exploration

A New Change Begins

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HYOSUNG BUSINESS AREAS

Hyosung has completed its conversion into a holding company system, and restructured its departments into the affiliated companies of Hyosung TNC, Hyosung Heavy Industries, Hyosung Advanced Materials and Hyosung Chemical, which are overseen by Hyosung Corporation. The new system will increase management transparency and reinforce business expertise.

MANAGEMENT SYSTEM



TEXTILE / TRADING · Hyosung TNC Corporation
· Hyosung Transworld Co., Ltd.

POWER & INDUSTRIAL SYSTEMS / CONSTRUCTION · Hyosung Heavy Industries Corporation
· **HYOSUNG GOODSPRINGS Inc.**
· Chinhung International, Inc.

INDUSTRIAL MATERIALS · Hyosung Advanced Materials Corporation
· Global Safety Textiles (GST)

CHEMICALS · Hyosung Chemical Corporation

INFORMATION & COMMUNICATION · Hyosung TNS Inc.
· Hyosung Information Systems Co., Ltd.
· Hyosung ITX Co., Ltd.
· Galaxia Electronics Co., Ltd.
· Galaxia Communications Co., Ltd.
· Galaxia Device Co., Ltd.

OTHER AFFILIATED COMPANIES · Hyosung Capital Co., Ltd.
· The Class Hyosung Corporation
· Hyosung Toyota Corporation
· The Premium Hyosung Co., Ltd.
· Forza Motors Korea Corporation
· Hyosung Premier Motors Corporation
· A-seung Automotive Group Co., Ltd.
· Galaxia Corporation Co., Ltd.
· Shinwha Intertek Corporation

POWER & INDUSTRIAL SYSTEMS / CONSTRUCTION

Hyosung Heavy Industries is in possession of the world's best technology in heavy electric equipment, the core of industrial energy. In addition to electric equipment such as transformers and circuit breakers, electric motors, generators, gears and industrial pumps receive high regard in the industry, and the company is developing the core technologies necessary for establishing future electrical grids such as energy storage system (ESS), STATCOM and smart grids. Furthermore, the company is actively participating in various construction projects such as housing, business and commercial, civil and environmental, and SOC projects based on its rich history and the trust it has gained.

Hyosung Heavy Industries Corporation

- Power Systems PU** Transformers, Switchgears, Intelligent electronic devices, IT solutions, Preventive diagnostic system, Energy storage system, STATCOM, Turn-key solution
- Industrial Machinery PU** Motors, Gear units, Generators, Chemical process equipment, Hydrogen gas filling station
- Wind Energy Business Division** Wind turbine
- Construction PU** Housing, Building, Civil engineering, Industrial

HYOSUNG GOODSPRINGS Inc.

- Pump Business**
- Water Business**

Chinlung International, Inc.

- Civil engineering** Roads and pavement, Subways and railways, Bridges and tunnels, Site development, Security facilities for site organization
- Construction** Buildings for commercial use, Offices, Apartment houses, Education, Welfare facilities, Facilities for special purposes
- Housing** Apartments, Mixed- used development, Villas



HYOSUNG GOODSPRINGS

Global Pump Solutions Provider

HYOSUNG GOODSPRINGS Inc. Korea's largest pump and seawater desalination plant equipment supplier, produces pumps for a wide variety of applications for thermoelectric power plants and combined cycle power plants as well as nuclear plants that put safety first, petrochemical plants that process petroleum, chemicals and gases, shipbuilding, commercial and residential, general, and industrial plants and desalination plants. To develop independent technologies, HYOSUNG GOODSPRINGS Inc. has been concentrating its efforts on developing, producing and supplying large high-pressure pumps for power plants, safety pumps for nuclear power plants, a full series of pumps for petrochemical plants defined by the American Petroleum Institute (API), and high-pressure pumps for seawater desalination plants. Furthermore, the company has verified its quality reliability and safety by acquiring KEPIC certification, which allows pumps with nuclear power plant level safety, for the first time in Korea as well as "N" and "NPT" certifications from ASME, which are only acquired by globally renowned pump companies. In the seawater desalination field, the company has developed a containerized RO system that is exported overseas to plants in countries such as Chile, and it has also been designated as the leading developer in a government-driven recyclable seawater desalination plant supervision company for the development, construction and operation of Korea's first seawater desalination plant for power plants. The company is aggressively expanding in the Korean market as well as overseas markets, and is offering customers reliable, high-quality solutions that offer a full one-stop process covering everything from ordering to designing, producing and A/S. HYOSUNG GOODSPRINGS Inc. will continue to endeavor in innovation and grow to be a leader in pump production and seawater desalination equipment.

Pump Business

Pumps for Oil & Gas Plant

- Refinery, Petrochemical & Chemical Plant
- Fertilizer / Pipeline

Pumps for Power Plant

- Thermal & Combined Cycle Power Plant
- Nuclear Power Plant

Pumps for Water Plant

- Desalination Plant
- Water Transmission Plant

Pumps for Buildings and Houses

Pumps for Industrial Use

Pumps for Shipbuilding Industry

Water Business

- Desalination (RO) System
- UF Membrane System



PUMP BUSINESS

Pumps for Oil & Gas Plant

- Refinery, Petrochemical & Chemical Plant
- Fertilizer / Pipeline

HYOSUNG GOODSPRINGS manufactures full range of API-type pumps accredited by American Petroleum Institute and they are in successful operation in oil & gas plants including petrochemical, oil refinery and fertilizer plants, all of which deal various types of liquids. The wide range of pumps meets stringent requirements, such as high pressure and high temperature up to 450°C. We continue to meet the demands of the flourishing domestic and international oil & gas companies. We have a long-term relationship with global major companies such as SAUDI ARAMCO, SABIC, KNPC, CHEVRON-PHILLIPS, EXXONMOBIL and GAZPROM, by supplying optimized pumps for the customer's specific service conditions and requirements.



Pumps for Power Plant

- Thermal & Combined Cycle Power Plant
- Nuclear Power Plant

HYOSUNG GOODSPRINGS has been recognized as having the best technique to provide boiler feed water pumps, circulating water pumps and condensate pumps for 1,000MW capacity thermal power plants as well as high pressure pump line-ups. Our state-of-the-art technology applied pumps are proven to be reliable and sustainable high efficient with our supply records to SEC, MARAFIQ, PT PLN and other global corporations. Furthermore, HYOSUNG GOODSPRINGS provide wide range of safety-class pumps for nuclear power plants. We have been strictly applying the quality and safety standards for pumps designated for the nuclear power industry based on KEPIC certification.



Pumps for Water Industry

- Desalination Plant
- Water Transmission System

HYOSUNG GOODSPRINGS provides wide range of pumps for water industry including desalination plants and water transmission system. We have full range of high efficiency and compact design pumps for high pressure pumps, ERD booster pumps, intake pumps and process pumps which are required for desalination plants. Furthermore, we are supporting our clients in pumping station industry by offering horizontal axial split casing type pumps and vertical large pumps for their irrigation or water transmission plants. With proven quality control and manufacturing process we were successfully audited from our customers and are prequalified in global companies including ADWEA, FEWA and KAHRAMAA.



Pumps for Industrial Use

The pumps manufactured and supplied by HYOSUNG GOODSPRINGS are high-efficiency and high performance products, enabling stable and efficient operation at various industrial sites. Through the pumps, the company provides its customer with the best services possible.



Pumps for Buildings and Houses

HYOSUNG GOODSPRINGS manufactures and supplies pumps for various uses, such as cold/warm water circulation, water supply, and water-purifying systems, in buildings such as usual family homes, multi-family houses and apartments, large buildings for business use, and cultural facilities. Particularly, the pumps manufactured by HYOSUNG GOODSPRINGS greatly contribute to cost savings for customers, thanks to their high efficiency properties.



BRIEF HISTORY

HYOSUNG GOODSPRINGS has played the role of a locomotive behind the Korean economic growth over the last five decades. The company is now leaping forward as the top-rank global company aimed at global excellence and value management.

1962 ~ 1996

- 1962 Established Hanyoung Industrial Corporation
- 1975 Merged into Hyosung Group
- 1977 Completed the Changwon Plant with Korea's largest test facility
- 1989 **Established Hyosung EBARA Co., Ltd.**
- 1989 Developed the HYDRAULIC PARTS DESIGN PROGRAM
- 1990 Developed the localization of pump for oil refining
- 1991 Received Quality Merit Medal from the Prime Minister
- 1992 Received Industrial Service Medal from the President to celebrate Business Founder's Day
- 1994 Obtained ISO 9001 certification
- 1995 Hyosung Heavy Industries Co., Ltd. acquired and merged the Pump Business Division.
- 1996 Completed Korea's largest test facility for testing BOILER FEED PUMP for 800MW Thermal Power Station and REACTOR FEED PUMP for 1350MW Nuclear Power Station

1997 ~ 2009

- 1997 **Obtained "Nuclear Reactor Facility Production License" (Pumps & Valves)**
- 1998 Received order for Gas Stripper Pumps of Q-Class pumps for Uljin Nuclear Power (1000MW, Units 5&6)
- 1999 Supplied pumps for Yeongkwang Nuclear Power (1000MW, Units 5&6) CWP (Korea's largest capacity)
- 2002 Won a Korea Energy Efficient Product Excellence Award (presented by Korea Management Association)
- 2003 Obtained reliability certification for booster systems from the Korea Institute of Machinery and Materials
- 2006 **Obtained high-efficiency machinery materials certifications enforced by the Korea Energy management Corporation**
- 2008 CE Mark received for OH type (CFP, USP), BB type (KS), HDR, CFPS
- 2009 Obtained nuclear power-related ASME 'N', 'NPT' certifications

2010 ~ 2013

- 2010 Approved by Westinghouse for supply safety class pump in nuclear power plant
- 2010 Hyosung / Ebara Joint Venture Terminated and Changed name to "HYOSUNG GOODSPRINGS"
- 2011 Supplied API pumps 32 sets to TAKREER for UAE Refinery Plant
- 2011 Supplied 104 sets of Q class and Non-Q class related pumps for UAE Nuclear power plant
- 2011 Approved vendor for supplying pumps from major power and petrochemical companies including SWCC, KNPC, KOC
- 2012 Approved vendor for supplying pumps from Marafiq, SEC
- 2012 Approved vendor for supplying pumps from SABIC, SWCC
- 2013 Successful localization of the centrifugal charging pump for the first time in Korea
- 2013 Received order for Bismayah New City Project to NIC, Republic of IRAQ

2014 ~ 2019

- 2014 Completion of the world's largest pump test center and opening ceremony held in HYOSUNG GOODSPRINGS Changwon plant
- 2015 Technical seminar and improvement completion ceremony of boiler feed water pump for 1,000MW
- 2015 Supplied API pumps 21 sets (BB2) to ExxonMobil for Jurong Aromatics Complex Project
- 2015 Supplied API pumps 3 sets (BB5) for Saudi Aramco Project
- 2016 Supplied API pumps 261 sets (BB5, BB2, VS1, VS4, VS6) to KNPC for Clean Fuels Project
- 2017 Test performance demonstration and technical seminar for HPRT (Hydraulic Power Recovery Turbine) & API high pressure pumps
- 2018 Conducted Demonstration of High Pressure Pump for Seawater Desalination (SRO)
- 2018 The opening of HYOSUNG Jakarta branch office

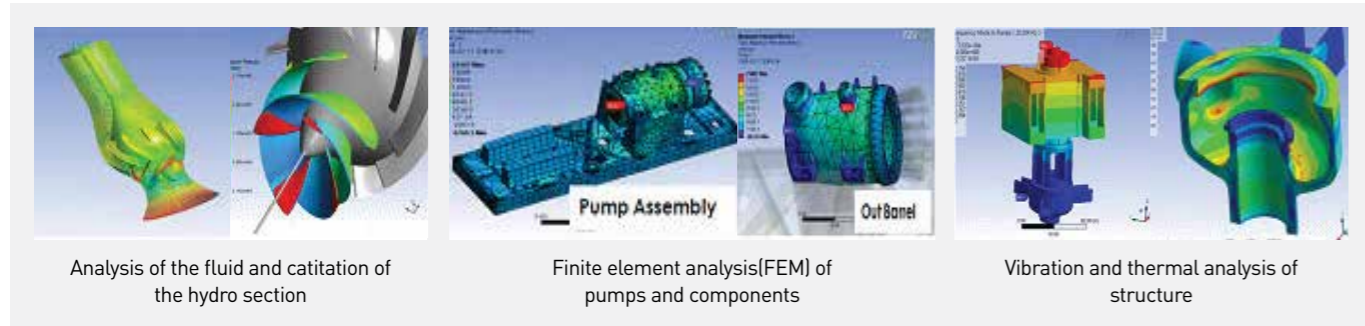


RESEARCH & DEVELOPMENT

HYOSUNG GOODSPRINGS is committed to securing a differentiated competitive edge in the market through the development of a core pump technology, HYDRO, with the establishment of the HYDRO testing facilities solely for research and developmental use. Globally competitive technical competence, experience in and passion for research and development, and an unquenchable thirst for challenges will enable HYOSUNG GOODSPRINGS to open up a new world of technology with the spirit of a pioneer.

Research Field

Hydraulic design means a three-dimensional form of impeller and casing determining pump performance. It is cutting-edge pump technology. In addition, testing the characteristics of HYDRO and assuring testing reliability are required to develop independent new products. HYOSUNG GOODSPRINGS is increasingly spurring the development of its own models with excellent performances and pilot products through research into the characteristics of HYDRO, given the establishment of the HYDRO testing facilities. HYOSUNG GOODSPRINGS uses its HYDRO database, accumulated through many tests and experiences, in designing the basic forms of pumps, and draws the optimal three-dimensional form of the HYDRO through experiment design by adopting various flow analysis programs and HYDRO design programs. In addition, the company contributes to stable operation of pumps and extending pump life by checking whether a vortex occurs or not through Sump Model Test, designing an anti-vortex system, and then applying it to civil engineering structures. Particularly, HYOSUNG GOODSPRINGS conducted many analyses on safety class pumps for nuclear power requiring a high level analysis technique. HYOSUNG GOODSPRINGS holds the technology to conduct rotor system vibration analysis, structure strength analysis, thermal stress analysis, structure vibration analysis, seismic resistance analysis, operability analysis, thermal fluid analysis, thermal fluid-structure interaction analysis, transient analysis, thermal shock test, etc., and secures the safety of products to the maximum through those processes.



Analysis of the fluid and cavitation of the hydro section

Finite element analysis(FEM) of pumps and components

Vibration and thermal analysis of structure

PUMP TEST CENTER

HYOSUNG GOODSPRINGS has completed the world's largest pump test center, upgrading Korea pump industry's competitiveness as well as strengthening its position in the global market. This enables HYOSUNG GOODSPRINGS to earn its product reliability in the global market and provide the best quality products. Also, this paves the way for Korea's companies to more aggressively play in the global market by upgrading Korea pump industry's competitiveness.

HYOSUNG GOODSPRINGS Pump Test Center, one of the largest facilities in the world

	Feature	Specification
Electricity Test Capacity	Max. Volt	13,200 V
	Max. Power	14,000 kW
Large Capacity Pump Test Stand	Max. Flow	130,000 m ³ /h
High Pressure Pump Test Stand	Max. Press	400 barG
	Max. Temp	200 °C



Large Capacity Pump Test Facility



High Pressure Pump Test Facility



High-end Test Control System

QUALITY MANAGEMENT



ISO 9001 (Quality Management Systems)

ISO 9001 certification is performed by third-party certification bodies (i.e. UK's BVsQI, etc.) for companies' quality management systems compliant with the ISO 9000 series of standards published by the International Organization for Standardization (ISO). HYOSUNG GOODSPRINGS obtained certification for the first time on July 22, 1995.

ISO 14001 (Environmental Management Systems)

ISO 14001 is an international standard for environmental management systems set by the International Organization for Standardization (ISO) that sets forth a series of management activities continually improving environmental performances across the whole process of business activities. Beyond the simple observation of environmental laws and standards, ISO 14001 certification is given to a company following its methodology: environmental policy, planning, implementation & operation, checking & corrective action, management review and continual improvement. HYOSUNG GOODSPRINGS not only provides customers with the highest quality products, but also practices environmental protection activities.



OHSAS 18001 (Safety and Health Management System)

OHSAS(Occupational Health and Safety Assessment Series) 18001 is a standard for the requirements in understanding inherent risk factors in business activities and continually managing them in order to ensure safety and health of the employees and prevent industrial accidents. Certification is performed by third-party certification bodies for whether a company's voluntary systems and its implementation are compliant with the standard.



KEPIC

A KEPIC certificate is issued by the Korea Electric Association for a product evaluated as properly maintaining nuclear power quality assurance. HYOSUNG GOODSPRINGS acquired Korea's first KEPIC certification for nuclear power safety class pumps (Class 2) on May 7, 1998.

CE mark

The CE (Conformite European) mark is a key indicator of a product's compliance with EU legislation and enables the free movement of products within the European market without separate inspections or testing. HYOSUNG GOODSPRINGS has the CE mark on its single suction volute pumps for industrial use (CFP) and single suction volute pumps (USP) and double suction volute pumps (HDR) for petrochemical uses.

TR CU(EAC)

The TR CU certificate of conformity signifies that imported products comply with standards of the Customs Union's member countries as well as quality and safety requirements.



ISO 9001



ISO 14001



OHSAS 18001



KEPIC



CE Mark



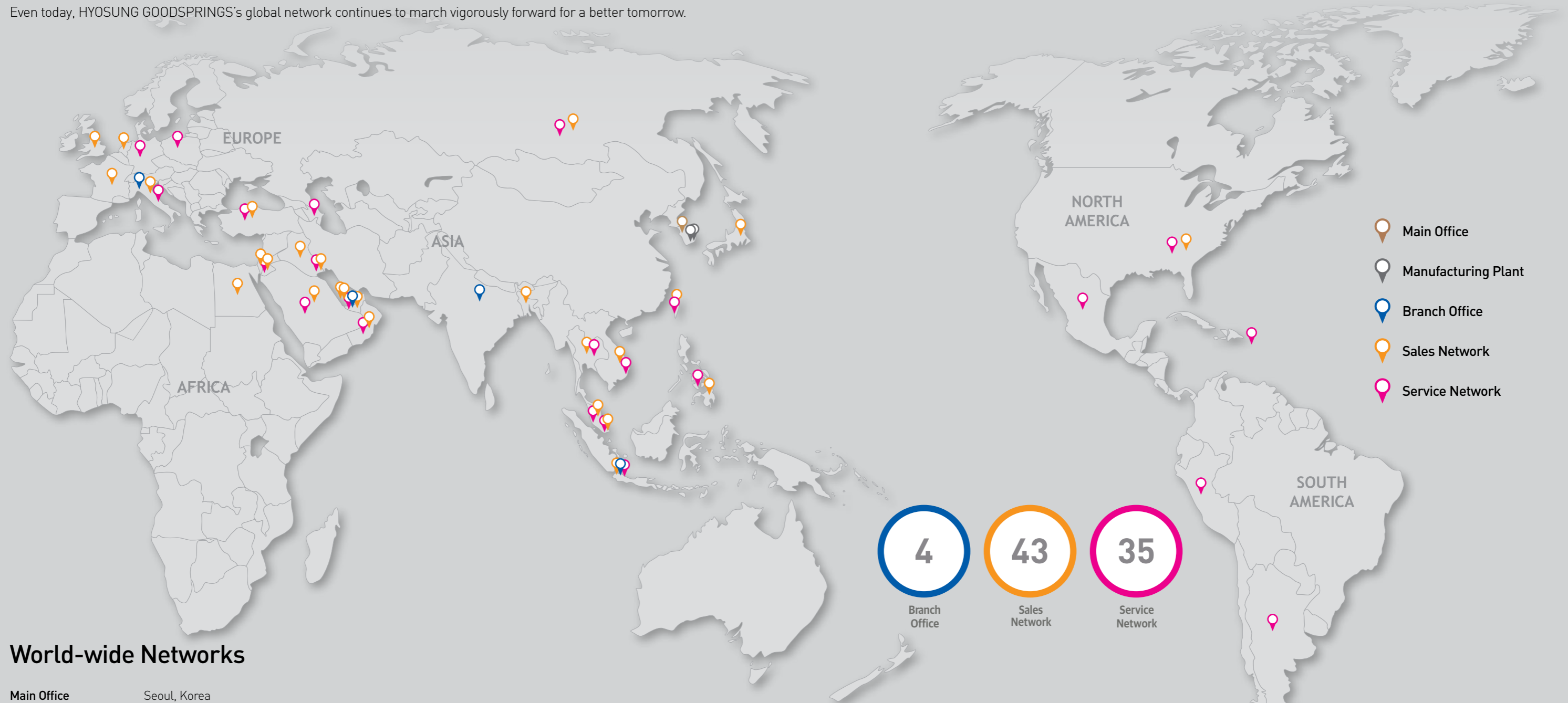
TR CU

GLOBAL NETWORK

HYOSUNG GOODSPRINGS is building a localized strategic global network

The global competitiveness of HYOSUNG GOODSPRINGS has been achieved by a localized strategic global network that allows the high-quality products clients demand to be supplied promptly and stably, along with excellent technologies. Even today, HYOSUNG GOODSPRINGS's global network continues to march vigorously forward for a better tomorrow.

Ready to serve our global customer anytime, anywhere



World-wide Networks

- Main Office** Seoul, Korea
- Manufacturing Plant** Changwon & Gimhae, Korea
- Branch Office** Italy · UAE · India · Indonesia
- Sales Network** USA · Netherlands · Spain · Turkey · Israel · United Kingdom · Italy · Russia · UAE · Saudi Arabia · Kuwait · Jordan · Oman · Egypt · Qatar · Bahrain · Iraq · Thailand · Japan · Indonesia · Singapore · Malaysia · Taiwan · Vietnam · Philippine · Bangladesh
- Service Network** USA · Mexico · Peru · Puerto Rico · Argentina · Russia · Poland · Germany · Turkey · Italy · Azerbaijan · UAE · Saudi Arabia · Kuwait · Oman · Jordan · Singapore · Malaysia · Philippine · Indonesia · Taiwan · Thailand · Vietnam

