

ULVAC CRYOGENICS INCORPORATED

www.ulvac-cryo.com



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Kyoto Factory

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CORPORATE INFORMATION

ULVAC CRYOGENICS INCORPORATED



Revolution
in Our Lives

Smart Society
Fundamental Technologies
IoT, AI, Robot
Big Data

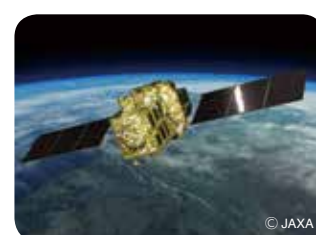


Smarter and Better World with Our Cryogenic Technology

Have you been aware of where cryogenic technology works?

Our cryogenic products play important roles in many different fields ranging from eyeglasses, LED, TV, smartphones advanced medical treatment, cell preservation to space development.

We continue our effort so that our technology make even more positive contributions in the new era of 5G to achieve better lives.



Space, Satellite,
Communication
Cell preservation, Food
Medicine, Health care



Transportation, Logistics
Next Generation Energy



We are Committed to Make Positive Contributions to the Future of Manufacturing



President, ULVAC CRYOGENICS INCORPORATED

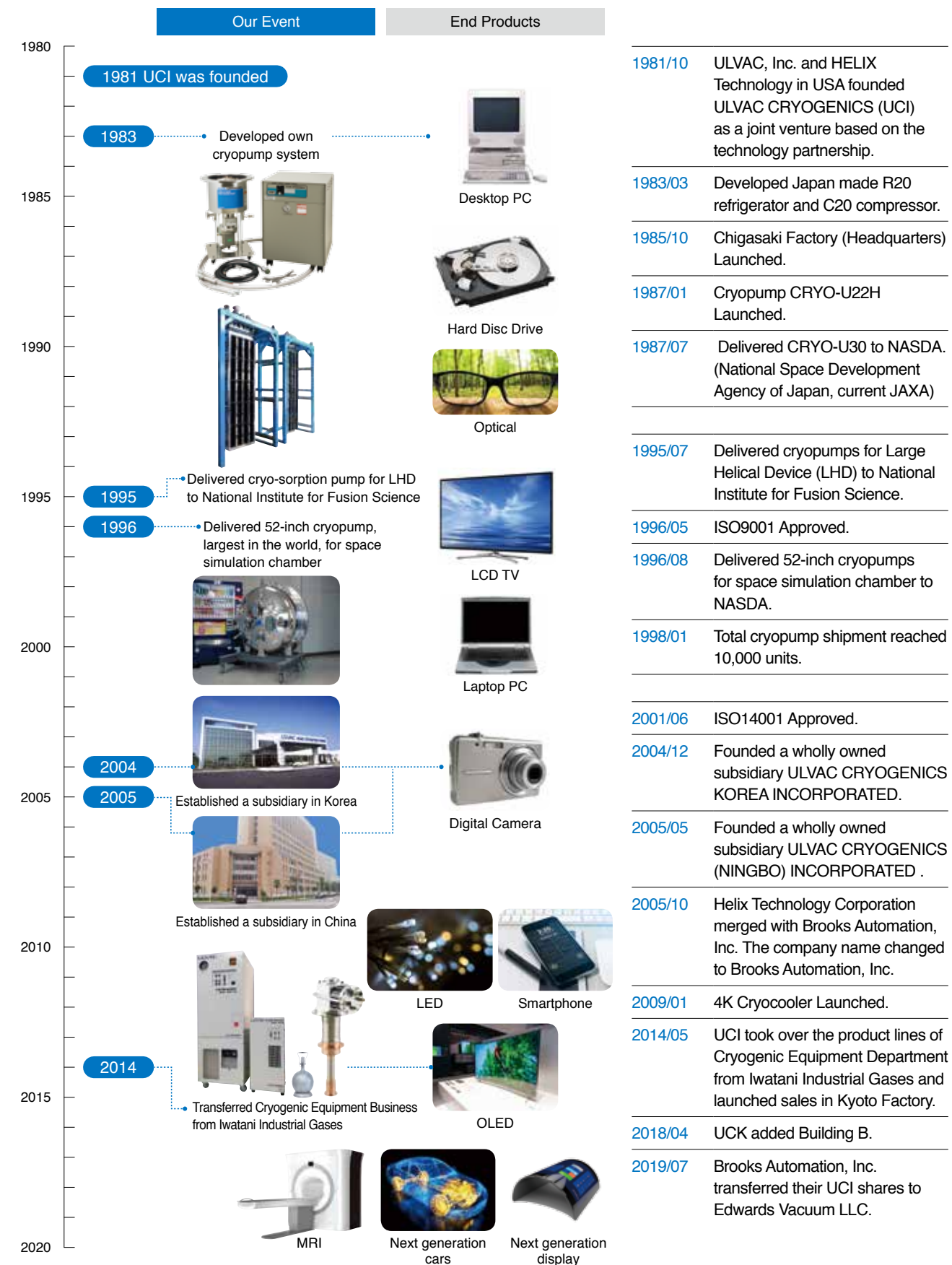
Takeshi Haginouchi

We are doing business in the fields where rapid technological innovations are taking place and excellent quality products are required. We have our production and development base in Korea and China to sense what the customers need on a timely manner and to provide products and services that precisely meet the demand. Based on our Credo, "Technology, Creativity, Passion and Trust", all three Ulvac Cryogenics companies will be working very closely to deliver values for the future that lead to further growth cycle.

Ulvac Cryogenics was founded in 1981 as a joint venture of Japan Vacuum Engineering Co., Ltd. (currently ULVAC, Inc.) and Helix Technology (currently Edwards Vacuum LLC) CTI Cryogenics Department. Our main business at that time was manufacturing and sales of cryopumps that are indispensable to create ultra-high vacuum, and has since steadily expanded the business. Currently, our products are employed in many fields of manufacturing or research facilities such as OLED displays, lighting, semiconductors, power semiconductors, sensors or optical thin films. We keep the number one share in the world's cryopump market for many years. In addition, we are accelerating product development in cryogenic equipment fields where rapid growth is now taking place or expected in future, to name a few,

- (1) Liquid Nitrogen Generator: Liquid nitrogen is indispensable in advanced medical fields such as reproductive medicine or cell cryopreservation. We provide LN₂ Generator, a standalone device that produces liquid nitrogen from the air. Our LN₂ Generators play a very important role for medical treatments when liquid nitrogen is unavailable due to disasters.
- (2) Liquid helium is used in MRI, cutting-edge medical device, to cooldown superconducting magnet. We launched a new cryocooler that prevent liquid helium from evaporating.
- (3) We have been working hard to develop a cryocooler that provides temperature as low as almost absolute zero for quantum computers. Although quantum computers are expected as next generation computers and are actively being developed, their semiconductor devices only work in such low temperature range.
- (4) Analysis of all materials, regardless organic or inorganic, are done in very low temperature. We deliver cryocoolers that provide such low temperatures.

Our products are now needed in increasingly more fields. We are no longer satisfied solely with being the world's number one cryopump maker, but are actively expanding business in cryogenic equipment field for our growth, and for making further contributions to the society.



Cryopumps

We provide cryopumps that respond to the requirements ranging from producing familiar products such as desktop PCs, eyeglasses, TV sets, cameras or automobiles to cutting-edge research facilities.

- 1) Cryopumps for vacuum deposition equipment or sputtering to manufacture eyeglasses, TV sets or smartphones.
- 2) Cryopumps for ion-plating or DLC coating which are used for car components or processing tools.
- 3) Cryopumps for JAXA that support space development with technology or leading-edge research facilities that are working for next generation energy.

Super Trap (cryogenic water-pump)



Single-stage GM Refrigerator



100K
(-173°C)

77K
(-196°C)

Cryopump



Two-stage GM Cryocooler



10K
(-263°C)

4K
(-269°C)



Production site

0K (kelvins) means Absolute zero, at which all molecular motions stop.

0K = -273.15°C (Absolute zero)
0.01K = -273.14°C
4K = -269.15°C
77K = -196°C

<0.01K
(-273.14°C)

Cryogenic Equipment

We have been selling cryogenic equipment products for analytical instruments or R&D so far, and now we are entering into many new fields including;

- 1) LN₂ generator for fertilizing treatment or cell preservations.
- 2) 4K GM cryocooler for producing silicone, semiconductor material, or for MRI, advanced medical device.
- 3) Quantum computers are now drawing attention as the next generation computers. We are also working to develop dilution refrigerators for quantum computers.

Single-stage Solvay Cryocooler



LN₂ Generator



NMR(OEM)*



Two-stage 4K GM Cryocooler



MRI(OEM)*



Cryostat (OEM)



Pulse-tube Refrigerator + Dilution Technology

Dilution Refrigerator



*NMR : Nuclear Magnetic Resonance
*MRI : Magnetic Resonance Imaging

Our cryopumps are employed in a broad range of applications for both industries and academic research of cutting-edge OLED displays, lighting, semiconductors, power devices, sensors or optical films.



Sputtering Equipment
for Semiconductor Production



Display



LED Element



Smart Society

IoT

Internet of Things

5G

5G Mobile Communication
System

AI

Artificial Intelligence

Self Driving System

Data Center

Mobile Communication System



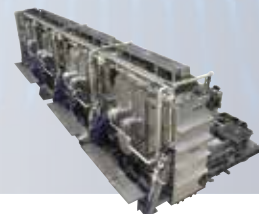
Crypumps



OLED Manufacturing Equipment



Batch Type High Vacuum Deposition
Equipment



LCD Manufacturing Equipment



Crypumps installed on
Manufacturing Equipment



Semiconductor



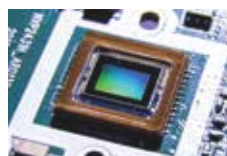
Memory IC



Power Device



Thin Film



CMOS Image Sensor



Smart Speaker



End Product

Trillions of Chips will
Change our Lives
in the Future.

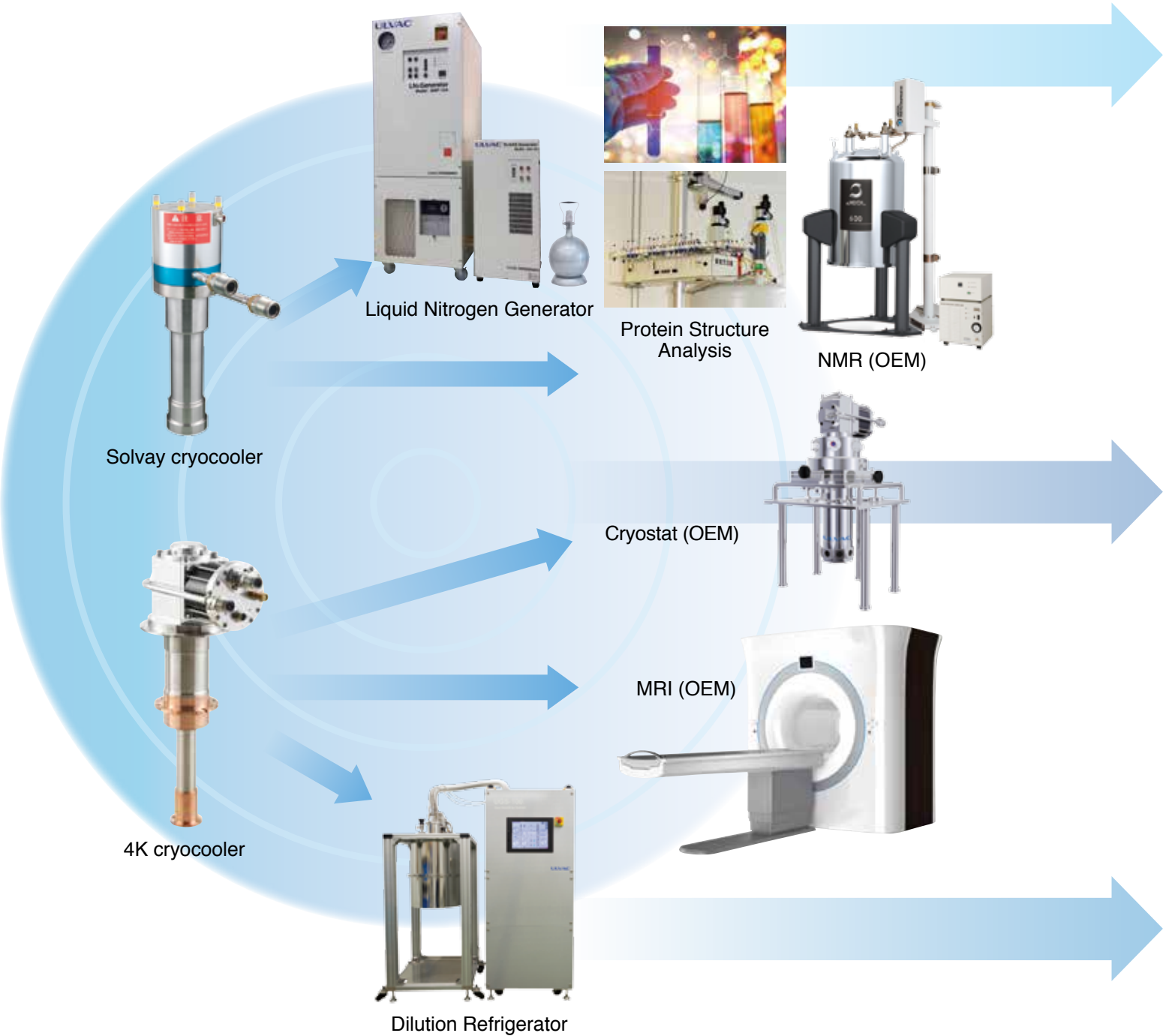
Vacuum Equipment

Displays and
Semiconductors

Society and Lives from Now

Our vacuum technology of cryopumps plays an important role for faster communication, higher energy efficiency, automation in transportation and logistics or more efficient farming by supporting device production.

In such a special condition as ultra-low temperature, many substances show splendid properties that they never show at room temperature. Cryogenic technology is the key for the development in leading-edge technology fields including superconducting, new technology, or new medicine.



Applications

77K (-196°C)



Improve Sensitivity of Analysis Equipment



Reproductive Medicine/ Cell Preservation

Measurement of physical properties at ultra-low temperature

~ 4K (-269°C)



Basic Research
• Electrical Property Measurement
• Optical Quartz

Space Observation, Research

<0.10K (-273.05°C)



Basic Research

Next Generation Computer

<0.01K (-273.14°C)



Quantum Computer

CSR Activities / Our People



Donation to Chengdu Research Base of Giant Panda Breeding in China

— Contribution to Protect Rare or Endangered Animals —

We donated our Liquid Nitrogen Generator that produces liquid nitrogen from the air to Chengdu Research Base of Giant Panda Breeding in China. Besides the use for preserving sperms, eggs or stem cells of pandas, it works for preserving and breeding of other endangered animals.

Liquid nitrogen is indispensable for preserving cells for which higher demand is expected from now. We are pleased that we can make positive contributions to preserve endangered animals in the world with our vacuum and cryogenic technologies.



Donation
Liquid Nitrogen Generator

CSR Activities



Rice Paddy Project



Cleaning Local Beach

Our People



ULVAC CRYOGENICS KOREA / ULVAC CRYOGENICS (NINGBO)



ULVAC CRYOGENICS KOREA (UCK)

Founded on December 2004

UCK Dominates Display Market in Korea with 99% Share

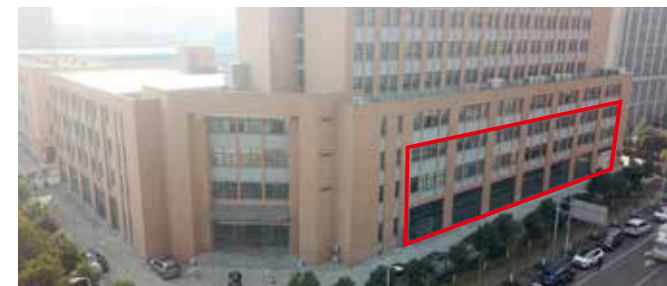


2 hours drive from Incheon Airport or Gimpo Airport

● UCK's operation includes processing parts, manufacturing, sales and servicing of vacuum and cryogenic equipment with strict quality management. Based on technical and manufacturing experience and know-how of Ulvac Cryogenics, UCK delivers highly reliable products to customers. UCK has 99% share in the display market in Korea, and is now expanding into semiconductor or new fields of cryogenic equipment. UCK is working hard to further improve customer satisfaction by strengthening competitiveness and customer services through its new smart factory and by launching RMC (Re-Manufacturing Center).

● Business Area

Manufacturing, assembling, sales and services, import and export of cryopumps and cryogenic equipment.



ULVAC CRYOGENICS (NINGBO) (UCN)

Founded on October 2005

UCN Launched for manufacturing and sales of cryopumps in China



3.5 hours drive from Shanghai Hongqiao International Airport
2.5 hours drive from Hangzhou Xiaoshan International Airport

● UCN serves as an important production base of cryopumps in China that offers production, repair and maintenance service. Along with the expansion of cryopump sales and overhaul, UCN works closely with ULVAC Group's maintenance providers to deliver prompt and precise support services in all over China. UCN also works hard to expand sales in growing semiconductor industry and cryogenic equipment market which is indispensable for basic research.

● Business Area

Manufacturing, assembling, sales, servicing, import and export of cryopumps and cryogenic equipment.

Global Network to Deliver Reliable Customer Services

Ulvac Cryogenics has production and development base in Japan, Korea and China and responds to the customers' requirements in precise and prompt manner in rapidly growing Asian market.

We also work very closely with ULVAC Group companies in the world to provide reliable services with proven technology to the customers around the world.



Kyoto Factory



Osaka Office



● : Service Locations



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■ Osaka Office
3-3-31 Uemura Nissei bldg., Miyahara, Yodogawa-ku, Osaka, 532-0003
Phone: +81-6-6397-0112

EUROPE

■ Germany
ULVAC GmbH

● : Sales and Services Base

Largest production capacity in UCI Group



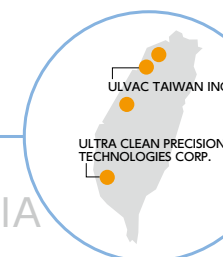
ULVAC CRYOGENICS KOREA INCORPORATED



NORTH AMERICA

■ USA
ULVAC Technologies, Inc.

■ USA
Boston



ULVAC TAIWAN INC.
ULTRA CLEAN PRECISION TECHNOLOGIES CORP.

■ Taiwan

SOUTH AMERICA

■ Brazil
ULVAC Brasil Representative Office

Sao Paulo

Key hub of customer service in China



ULVAC CRYOGENICS (NINGBO) INCORPORATED

ASIA

■ China
ULVAC CRYOGENICS (NINGBO) Inc.
ULVAC (Shanghai) Trading Co., Ltd.
ULVAC (Suzhou) CO., LTD.
Hong Kong ULVAC Co., Ltd.

■ South Korea
ULVAC CRYOGENICS KOREA INCORPORATED
ULVAC KOREA, Ltd.

■ Taiwan
ULVAC TAIWAN INC.
ULTRA CLEAN PRECISION TECHNOLOGIES CORP.

■ Singapore
ULVAC SINGAPORE PTE LTD

■ Philippines
ULVAC SINGAPORE PTE LTD, Philippines Branch

■ Vietnam
ULVAC SINGAPORE PTE LTD, Vietnam Representative Office

■ Indonesia
ULVAC SINGAPORE PTE LTD, Indonesia Representative Office

■ Malaysia
ULVAC MALAYSIA SDN. BHD.

■ Thailand
ULVAC (THAILAND) LTD.

■ India
ULVAC, Inc. India Branch