CORPORATE PROFILE

Fighting Disease with Electronics

NIHON KOHDEN

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NIHON KOHDEN CORPORATION
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Fighting Disease with Electronics

The intersection of medicine and engineering

ME (Medical Electronics or Medical Engineering) is the union of medicine and engineering. ME is a common abbreviation in recent years but the founders of Nihon Kohden began working in medical electronics around 1945, long before this phrase was born.
The neuromuscular tissue of a small bird was the impetus behind the founding of Nihon Kohden. The late Dr. Yoshio Ogino, founder of Nihon Kohden, was doing research in electrical engineering when one day he happened to see an experiment involving stimulation of the neuromuscular tissue of a small bird. He was struck by the wonder of biology and remarked that “to measure part of a living body requires several hundred times the sensitivity and at least two decimal places more than the equipment developed by the leading electrical engineering experts in Japan.”
He wondered if it might be possible to apply a higher level of engineering to the subtleties of biology and study the human body. And furthermore, if this union of medicine and engineering could be used for saving human life. With this powerful inspiration, he studied medicine and in August 1951 founded Nihon Kohden.
With the unshakable conviction that “curing disease is something that transcends politics and national borders, and we will never have any regret putting all our energy into this goal,” Nihon Kohden produced a number of state of the art medical electronic instruments. As medicine evolved, Nihon Kohden’s products branched out into many areas. However, the original vision did not change and it still inspires the Company’s engineers. Nihon Kohden will continue growing as a company that contributes to the world with advanced technology based on over 60 years of experience in medical engineering.

President and CEO

TRANSFORM 2020

Transforming our operations to achieve a highly profitable structure

The Company’s fundamental business philosophy is that we contribute to the world by fighting disease and improving health with advanced technology, and create a fulfilling life for our employees. To realize our philosophy, we keep challenging to the healthcare with our technology development by the thought rooted in medical front, and providing high quality safety to the customers. In order to achieve this, the Company has set a long-term goal for 2020 for the continuous growth of the Nihon Kohden Group and increasing the value of the company.

Future Vision

- Lead the world in the development of revolutionary breakthrough technology
- Achieve the highest level of quality in the world
- Attain top share in applicable global markets

In order to achieve these, the Company has set 6 key strategies, call mid-term business plan TRANSFORM 2020, for FY2017 to 2019.

Basic policies

Create high customer value
Improve productivity within the organization

Key strategies

1. Strengthen business expansion by region
2. Achieve further growth in core businesses
3. Develop new businesses
4. Strengthen technological development capabilities
5. Pursue the highest level of quality in the world
6. Consolidate corporate fundamentals

Nihon Kohden's Expa nding Global Network

Becoming a global leader of medical solutions

Every year Nihon Kohden is expanding its global network, from research and development to manufacturing, sales, and service, in order to fulfill its mission to save lives with the most advanced medical technology.

Nihon Kohden began its overseas expansion with Nihon Kohden America in 1979. The Company now has the sales subsidiaries in the US, Mexico, Colombia, Brazil, Germany, France, Spain, Italy, the UK, China, Singapore, Thailand, Malaysia, India, UAE, and Korea. A network of distributors cover the countries where Nihon Kohden does not have a direct sales system. Nihon Kohden products are exported worldwide.

Nihon Kohden products are used in more than 120 countries

Since its founding in 1951, Nihon Kohden has continued to provide a wide range of medical electronic equipment including EEG, EMG/EP measuring systems, electrocardiographs, bedside monitors, defibrillators and hematology analyzers. In particular Nihon Kohden has a high market share in EEG. Demand for medical equipment varies by country and region so the Company makes the most appropriate strategy for each region.

Europe

Nihon Kohden Europe, GmbH
Nihon Kohden Deutschland GmbH [Sales]

Nihon Kohden France Sarl
[Sales]

Nihon Kohden Iberica S.L.
[Sales]

Nihon Kohden Italia S.r.l.
[Sales]

Nihon Kohden UK Ltd.
[Sales]

Nihon Kohden Firenze S.r.l.
[Production, Sales]

Asia

Shanghai Kohden Medical Electronics Instrument Corp.
[Production]

Shanghai Kohden Medical Electronics Instrument Corp.
[R&D, Sales]

Nihon Kohden Singapore Pte Ltd
[Sales]

NKS Bangkok Co., Ltd.
[Sales]

Nihon Kohden Malaysia Sdn. Bhd.
[Sales]

Nihon Kohden India Pvt. Ltd.
[Sales]

Nihon Kohden India Pvt. Ltd.
[Production]

Nihon Kohden Middle East FZE
[Sales]

Nihon Kohden Korea, Inc.
[Sales]

Americas

Nihon Kohden America, Inc.
[Sales]

Nihon Kohden Mexico S.A. de C.V.
[Sales]

Nihon Kohden Latin America S.A.S.
[Sales]

Nihon Kohden Do Brasil Ldta.
[Sales]

Defibtech, LLC
[R&D, Production, Sales]

Neurotronics, Inc.
[R&D]

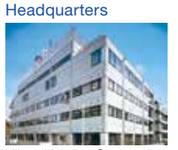
NKUS lab
[R&D]

Nihon Kohden Innovation Center, Inc.
[R&D]

OrangeMed, Inc.
[R&D, Sales]

Japan

Headquarters



Nihon Kohden Corporation

Nihon Kohden Corporation, Tokorozawa Office

Advanced Technology Center
[R&D]

Nihon Kohden Tomioka Corporation
[Production]

Nippon Bio-Test Laboratories Inc.
[Production]

Network in Japan

Sales

11 sales companies and 123 offices in Japan

Service

11 after-sales service depots and
69 service centers / service stations in Japan

Care cycle solution

Supporting the community by medical treatment

Nihon Kohden's mission is to utilize its leading edge technology and products to support medical treatment in all clinical areas from emergency response to testing, diagnosis, treatment and rehabilitation. In addition to clinical treatment, Nihon Kohden products play an active role outside the hospital, such as in health improvement and home medical care and nursing as well as basic medical research.

Physiological measurement equipment

By drawing upon its core technical strength of sensor technology, Nihon Kohden continues to provide excellent biomedical instruments which can detect the faint signals produced by the human body. The Company's main products include electroencephalographs, electrocardiographs, evoked potential/EMG measuring instruments, and polygraphs for cath-labs. In particular, we have a high global market share in electroencephalographs. Electroencephalographs are indispensable in the treatment of epilepsy, brain tumors, sleep disorders and other conditions.

Electroencephalograph Electrocardiograph

Patient monitors

Patient monitors are used in the emergency room, operating room, intensive care, general ward and other areas to measure the patient's vital signs such as ECG, SpO_2, NIBP and other physiological parameters. Nihon Kohden offers a wide range of patient monitoring products for different medical needs. Our patient monitors also incorporate advanced technologies such as esCCO and iNIBP to improve healthcare.

Bedside monitors

Treatment equipment

The defibrillator is used in resuscitation. It delivers an electrical shock to a heart which has gone into life-threatening cardiac arrhythmia such as ventricular fibrillation in order to restore a normal heart rhythm. In recent years, the AED (automated external defibrillator) has become widely available in public places. Nihon Kohden is the only company in Japan that develops and manufactures biphasic AEDs and defibrillators for hospital and ambulance use.

Automated external defibrillators

In-vitro diagnostic equipment

In order to provide better medical solutions for various medical fields, Nihon Kohden is actively developing blood cell counters and reagents for over 40 years. Our cutting-edge laboratory products provide the best solutions for all users and patients worldwide.

Automated hematology analyzer

Clinical chemistry analyzer

Human-Machine Interface Technology

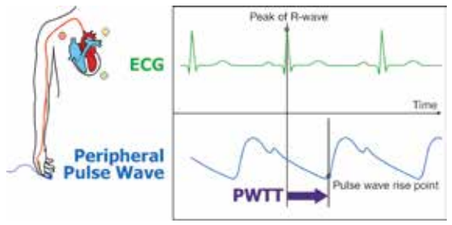
For over half a century, Nihon Kohden is supporting the patient care cycle with leading edge technology such as unique sensing and algorithms. In order to provide better medical solutions for various medical fields, Nihon Kohden gives top priority to patients and is actively developing innovative medical electronic equipment. Our unique methods eliminate patient discomfort and improve quality of patient care.

esCCO

Redefining Quality of Care

Volumetric information for all care levels

Estimated continuous cardiac output (esCCO) determines the cardiac output using Pulse Wave Transmit Time (PWTT) obtained from each cycle of the ECG signals and peripheral pulse wave. esCCO provides real-time continuous and non-invasive cardiac output measurement alongside the familiar vital sign parameters of ECG and SpO_2.



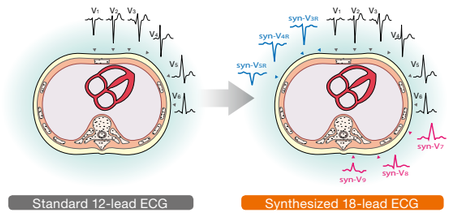
Pulse Wave Transit Time derivered from ECG and pulse oximetry signal

synECi 18
Synthesized Electrocardiogram

Identify Invisible Ischemia

For more informative ECG exam

Synthesized 18-lead ECG uses the 12-lead ECG waveforms to mathematically derive the waveforms of the right chest leads (V3R, V4R, V5R) and back (V7, V8, V9). The measurement procedure is the same as the standard 12-lead ECG but more information can be obtained. 18-lead synthesized ECG is expected to be useful in detecting right side and posterior infarction.



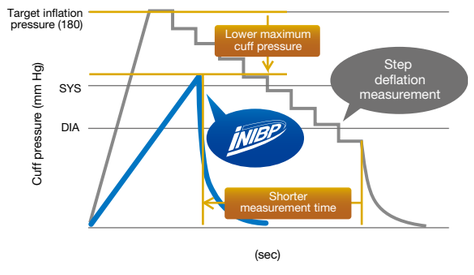
Synthesized right side leads (V3R–V5R) and synthesized back leads (V7 – V9) are added

iNIBP Linear Inflation Technology

Be Impressed, Free from Stress

Non-invasive blood pressure monitoring with speed, gentleness, and reliability

iNIBP is a non-invasive blood pressure measurement algorithm using linear inflation technology that completes the measurement while inflating the cuff. When compared to the conventional method, the iNIBP measurement time is shorter and target inflation pressure is lower. iNIBP eases the burden on patients and medical staff and provides stress-free non-invasive blood pressure measurement.

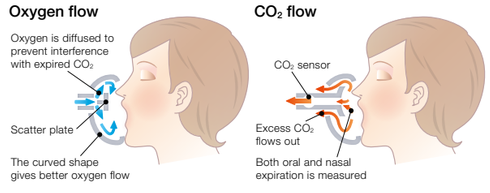


cap-ONE ORAL NASAL EXPIRATION

Safety airway management

cap-ONE is Nihon Kohden's unique mainstream CO_2 sensor for both intubated and non-intubated patients.

Ultra compact sensor and unique adapter provides you accurate measurement and less burden to the patients. cap-ONE mask is originally designed open face oxygen mask for patients who are receiving supplemental oxygen.



Fast, Accurate, Reliable, and Empathetic Service

To ensure that our customers are always happy and satisfied with Nihon Kohden products and service, we continue improving our support system, and providing fast response and top quality service.

Highest customer satisfaction in the US

For 10 years in a row, Nihon Kohden America has achieved the No. 1 customer satisfaction ranking for patient monitoring systems in MD Buyline's quarterly survey of medical engineers and clinicians in hospitals and labs in the US. Nihon Kohden's patient monitoring systems earned especially good marks in specifications, prompt service, and training. MD Buyline is a healthcare market research company in the US and is trusted by many hospitals to provide evidence-based unbiased reviews and guidance.

Extensive training for customers and distributors

Nihon Kohden provides various training for customers and distributors in how to operate, service and repair the products.

Call center responds to your inquiry 24/7

Our call centers in the US and Japan operate 24 hours a day, 7 days a week to address any question or issue across care area.

Extensive service network in Japan

Customers in Japan are supported by 11 service subsidiaries and 69 service offices. Customers receive seamless support from purchase to after sales service.

Global coverage

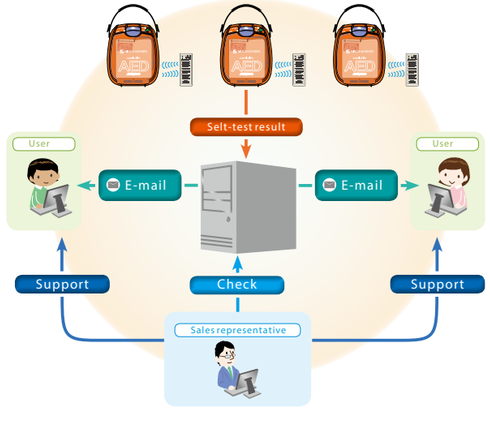
A worldwide network of 14 subsidiaries plus distributors in most countries, together with well-trained service staff, provides installation, user training, maintenance, and on-site repair.

Maintenance and testing tools ensure reliability

Nihon Kohden provides testing tools to check the safety and performance of medical equipment. Accurate checking ensures the reliability of Nihon Kohden's medical equipment.

AED status assured by remote monitoring

To ensure that AEDs are always in top operating condition and ready for life support at any moment, Nihon Kohden's AED Linkage remote monitoring system constantly monitors the status of all AEDs so service staff can keep them in continuous operating condition.



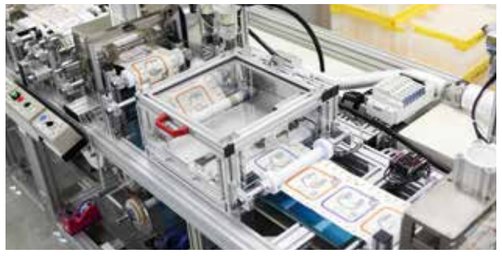
Commitment to High Quality and Reliability

In the manufacture of medical equipment which affects human life, we allow no compromise. All products have guaranteed safety and quality after passing the strictest inspections.

Manufacturing in Japan

Nihon Kohden's major products are manufactured at its main factory, the Tomioka Production Center in Tomioka, Japan. The open design of the factory incorporates the latest production technology for the manufacture of printed circuit boards and medical equipment assembly.

Electrodes and sensors are manufactured at our factory in Kawamoto, Japan. Nihon Kohden's wide range of disposable electrodes are designed to be gentle on the patient and support accurate monitoring. To implement an efficient and superior system of production, Nihon Kohden builds its own automated manufacturing machines.



Automated manufacturing machine for Dispo-pads

Manufacturing Internationally

Nihon Kohden has four international manufacturing base outside of Japan. Shanghai Kohden Medical Electronic Instruments manufactures basic model electrocardiographs, patient monitors, IVD measuring instruments and reagents. Nihon Kohden Malaysia Sdn Bhd manufactures basic model patient monitors. Nihon Kohden Firenze S.r.l. and Nihon Kohden India Pvt. Ltd. manufacture reagents to ensure stables supply of highly reliable Nihon Kohden reagents to our customers.

Nihon Kohden Firenze S.r.l.

Tomioka Production Center

Quality, Reliability, and Innovation

Printed circuit boards — the foundation of product quality

Printed circuit boards (PCB) control the electronic circuits which are critical to the quality and function of the medical device. We produces PCBs in-house to ensure the highest quality. One PCB can have up to 3,000 components. The combination of modern automated production technology and skilled workmanship leads to low defect rate and high quality.

5 production lines turn out high quality printed circuit boards.

Inspecting solder quality on a 3D imaging system.

The soaring lobby welcomes visitors.

AED burn-in period inspection.

Strict quality inspection ensures the highest patient safety

Five inspection gates are used to ensure a defect free product. If a defect is discovered during production, the product is returned to the previous production stage and the process is improved to prevent the recurrence of future defects.

Incoming Inspection

All product parts receive an incoming inspection for safety, function and performance.

PCB Assembly Inspection

PCB soldering and performance inspection includes an expert visual inspection plus 3D imaging and jig testing.

In-process Inspection

The operation of the assembled product with the PCB is checked. The product software and language data are installed and the product is inspected on a test jig.

Aging Inspection

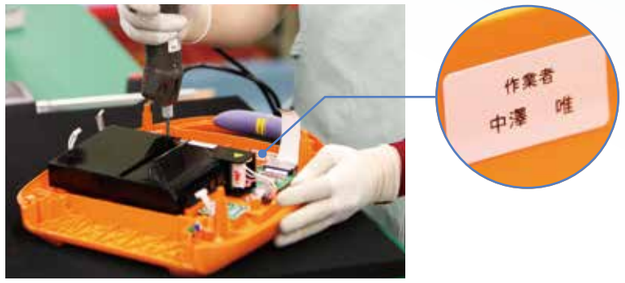
Malfunction in electrical products is most likely to occur at the initial use. By applying a fixed period burn-in test, initial defects are eliminated.

Finished Product Inspection

Finished product inspection includes a complete quality, performance and electrical safety check.

Fostering Personal Pride in Each Product

Each worker attaches a lable with his or her name inside each product. This fosters a sense of pride and quality so that every worker can feel a connection with the product after it leaves the factory and is used by doctors and nurses in hospitals around the world.



Each assembler proudly attaches his or her name label.

Corporate social resp onsibility

Nihon Kohden's CSR initiatives are planned and implemented with the harmony of all its stakeholders in mind including customers, shareholders, business partners, local communities and employees. We bolster our efforts to be a trusted member of society by incorporating opinions and requests from stakeholders in our future business activities, social contribution activities, and information disclosure policies.

Enhancement of corporate governance

Our fundamental policies are aimed at developing Nihon Kohden as a highly regarded company by customers, shareholders, business partners and society in every aspect — product quality and safety, service, technology, financial strength, human resources, as well as establishing confidence in the Company by all stakeholders.
One of our important business challenges is to build a management structure based on prudent management and efficiency. Nihon Kohden adopts the audit and supervisory committee system, and chooses independent outside directors and auditors for the purpose of strengthening the supervisory function in the board of directors.

Compliance implementation

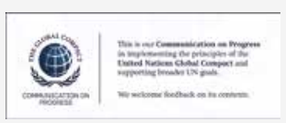
Nihon Kohden Charter of Conduct, Nihon Kohden Code of Ethics and Compliance Promotion Rules form the Company's fundamental approach to compliance. Nihon Kohden is fully aware that the sound ethics and rigorous legal compliance of all employees in accordance with this approach is paramount to the continuity of the company.

Environment policy

Taking care of environmental issues is an important duty for all companies. Nihon Kohden's approach to environmental activities is defined in the Company environmental philosophy and implemented in the business activities and the actions of its employees. Nihon Kohden works toward conservation and qualitative improvement of the global environment so that all people can enjoy a healthy environment.
Based on this philosophy, Nihon Kohden implements a wide variety of environmental activities such as reducing waste and reducing CO_2 emissions, developing eco-friendly products, and creating an environment-friendly production system. We obtained ISO 14001 environmental management certification and we continue to implement our environmental activities.

United Nations Global Compact

In July 2015, Nihon Kohden signed on to the United Nations Global Compact. By engaging in corporate activities that adhere to the Ten Principles of the United Nations Global Compact in the areas of human rights, labor, environment and anti-corruption, Nihon Kohden seeks the trust of society and to contribute to a sustainable society.



Ten Principles of the United Nations Global Compact

Human Rights	Principle 1 : Support and respect the protection of human rights Principle 2 : Avoid being complicit in human rights abuses
Labor	Principle 3 : Freedom of association and effective recognition of the right to collective bargaining Principle 4 : Eliminate forced and compulsory labor Principle 5 : Effective abolition of child labor Principle 6 : Elimination of discrimination in respect of employment and occupation
Environment	Principle 7 : Support a precautionary approach to environmental challenges Principle 8 : Undertake initiatives to promote environmental responsibility Principle 9 : Encourage the development and diffusion of environmentally friendly technologies
Anti-corruption	Principle 10: Work against corruption in all its forms, including extortion and bribery

Community involvement

In 2004 Japan authorized operation of automated external defibrillators (AED) by the general public. Following this, Nihon Kohden began offering cardiopulmonary resuscitation (CPR) and AED training to the public throughout the world. These seminars have helped to educate the public in CPR and AED which have been increasingly used in saving lives.
Public use of AEDs was also authorized by Korea in 2008 and Taiwan in 2013. The life saving benefits of AEDs are becoming recognized and the number of installed AEDs has been increasing especially in Asia. In several countries, Nihon Kohden has collaborated with local training institutions to provide AED education in order to increase the rate of saving lives.
Nihon Kohden is also an official sponsor of the Tokyo Marathon in Japan and the Chuncheon Marathon in Korea. We also provide AED and other support at these events.
We are also actively involved in social contribution activities such as the Great East Japan Earthquake on March 11, 2011 reconstruction activity which we supported by allowing employees leave to volunteer in the reconstruction work. We believe this contribution is valuable for society as well as the individual employees.

Nihon Kohden's CSR philosophy and logo

Our CSR motto "Nihon Kohden – for precious life – " expresses our mission as a medical device manufacturer not only to save human life, but also to contribute to all forms of life on earth through its business actions and citizenship activities.

NIHON KOHDEN
- for precious life -

Nihon Kohden CSR logo uses green to express the earth and blue the sky, while the seedling and wavy line at the center represents a heartbeat on an electrocardiogram to express Nihon Kohden's commitment to coexist with the environment. The uninterrupted white line also symbolizes the concept of sustainability.

©Tokyo Marathon Foundation

Leading the evolution of medical engineering

For over half a century, Nihon Kohden has been developing leading edge medical electronic equipment. The Company will continue its original challenge of using advanced technology to fight disease and improve health.

1951

Nihon Kohden develops the world's first 8-channel all AC-powered direct-writing electroencephalograph, the ME-1D. In the same year, the Company introduced the MC-1B dual AC/DC photographic electrocardiograph.Nihon Kohden is aiming for a level of quality whereby all customers shall continue to be satisfied with the product from the time of purchase and for as long as they own the product.

In the following year, Nihon Kohden introduced a number of groundbreaking products: MOB-1, the world's first electrical opthalmodynamometer, MAW-1 White Noise Audiometer, the world's first audiometer, and MC-2D, Japan's first all AC-powered direct-writing electrocardiograph. The ophthalmodynamometer was the Company's first patent.

ME-1D - the world's first all AC-powered direct writing electroencephalograph

MC-1B AC/battery photographic electrocardiograph

1960

Nihon Kohden develops Japan's first multi-purpose monitoring recorder (polygraph), the RM-150. This became one of the Company's longest selling products.

1972

With the MEK-1100 automatic blood cell counter, Nihon Kohden enters the hematology market. Today the Company has an excellent reputation in compact hematology analyzers.

MEK-1100
blood cell counter

1973

Nihon Kohden successfully tests an ECG telephone transmission and analysis system at the University of the Ryukyu Graduate School of Medicine.

ECG remote analysis system

1975

Nihon Kohden develops the world's first ear oximeter, the OLV-5100. It was based on the principle of pulse oximetry which was invented by Nihon Kohden researcher Takuo Aoyagi. This was a revolutionary technology that allowed the measurement of arterial blood oxygen (SpO_2) with just a sensor placed on the fingertip.

OLV-5100 oximeter

1980

Nihon Kohden develops Japan's first radiolucent disposable electrodes.

1982

Nihon Kohden develops the world's first arrhythmia analysis Scope 10 OEC-5501.

OEC-5501 heart monitor

1985

Nihon Kohden develops the world's first combined respiration monitor, the OMR-7101. The following year, this instrument received development award in the new technology from the Japanese Society of Medical Electronics and Biological Engineering.

1990

Nihon Kohden develops Japan's first digital ECG telemetry system, WEP-8430/8440.

1991

Nihon Kohden develops the world's first digital multi-parameter telemetry bedside monitor, the Life Scope 12 BSM-8502.

BSM-8502 monitor

2000

Nihon Kohden introduces the PYL-1100 Pylori Urease Measurement System. This system detects helicobacter pylori, a bacteria in the stomach which causes gastric and duodenal ulcers. Nihon Kohden received a patent for its helicobacter pylori detection method.

In the same year, Nihon Kohden developed the ISS-1100 Stylet Scope. This is an esophageal tube which allows easier and smoother intubation for difficult intubation patients.

ISS-1100
stylet scope

2002

Nihon Kohden incorporates flow cytometry to develop an automated hematology analyzer with WBC 5-part differential, the MEK-7222.

MEK-7222
hematology analyzer

2010

Nihon Kohden released bedside monitor PVM-2701 which has an onscreen operation guide to support users.

PVM-2701 monitor

2012

Nihon Kohden introduced bedside monitors with esCCO, and electrocardiograph with synthesized 18-lead ECG.

2013

Nihon Kohden released bedside monitor BSM-1700 which realizes true seamless monitoring before, during and after patient transport.

BSM-1700 monitor

1950

1954

Nihon Kohden introduces the MM-20 electromyograph. After that, evoked potential and EMG equipment became one of the Company's major product lines, gaining top market share in Japan and becoming well known as the Neuropack series.

1956

Nihon Kohden develops Japan's first electromagnetic blood flowmeter, the MF-1.

MF-1 flowmeter

1957

Nihon Kohden introduces the MC-2H portable heat stylus recording single-channel electrocardiograph.

1958

Nihon Kohden produces a general-use hearing aid that was released under the Sony brand.

1960

1965

Nihon Kohden develops Japan's first battery powered defibrillator, the MDV-1.

1967

Japan's first intensive care monitor, Nihon Kohden's ICU-80, is installed at the Tohoku University School of Medicine.

ICU-80 - Japan's first intensive care monitor

1970

1976

Nihon Kohden develops the world's first telemetry patient monitoring system, the ICU/CCU-6000 series. Being freed from cables was a great contribution to reducing the burden of patients as well as medical staff.

1979

Nihon Kohden develops an infrared telemetry system and other devices for life science experiments under contract by NASDA (National Space Development Agency of Japan) and contributes to Japan's first experiments onboard the US space shuttle.

Japan's first astronaut Mamoru Mori wearing electrodes developed by Nihon Kohden

1980

1986

Nihon Kohden performs Japan's first trial ECG transmission in an ambulance in Matsudo City.

1987

Nihon Kohden develops the world's first electrocardiograph with an LCD display, the ECG-8210. This revolutionary development allowed checking of the ECG before starting recording.

ECG-8210
electrocardiograph

1988

Nihon Kohden develops Japan's first veterinary use hematology analyzer, MEK-4150.

1990

1998

Nihon Kohden's Pocket CO_2 Monitor receives the new technology development award from Japan's Science News. This monitor was the world's first successful production incorporating medical-use ISFET transistors.

DDG-2001
pulse dye densitometer

1999

Nihon Kohden develops the world's first low-invasive blood volume monitor, the DDG-2001 Pulse Dye Densitometer. This received the new technology development award from Japan's Science News.

2000

2003

Nihon Kohden develops the world's first mainstream method compact CO_2 sensor which could be used for non-intubated patients. This sensor opened a new era in CO_2 monitoring.

2004

Nihon Kohden introduces the world's first wireless monitoring of ECG, respiration, SpO_2 and NIBP with its ZS-940P transmitter.

ZS-940P
transmitter

2007

Nihon Kohden introduces the MEE-1200 intraoperative neurological monitoring system.

2009

Nihon Kohden develops Japan's first automated external defibrillator, the AED-2100. It received the Good Design Award the same year.

2010

2014

Nihon Kohden released a new generation of patient monitor, the CSM-1901 which enables faster intervention and contributing to enhanced quality of medical care.

2015

Nihon Kohden's Dr. Takuo Aoyagi received 2015 IEEE* Medal for Innovations in Healthcare Technology for his invention of pulse oximetry. *Institute of Electrical and Electronics Engineers

Dr. Aoyagi

2016

Nihon Kohden released EEG head set, AE-120A for simple and quick EEG measurement especially for resuscitation use.

AE-120A EEG head set