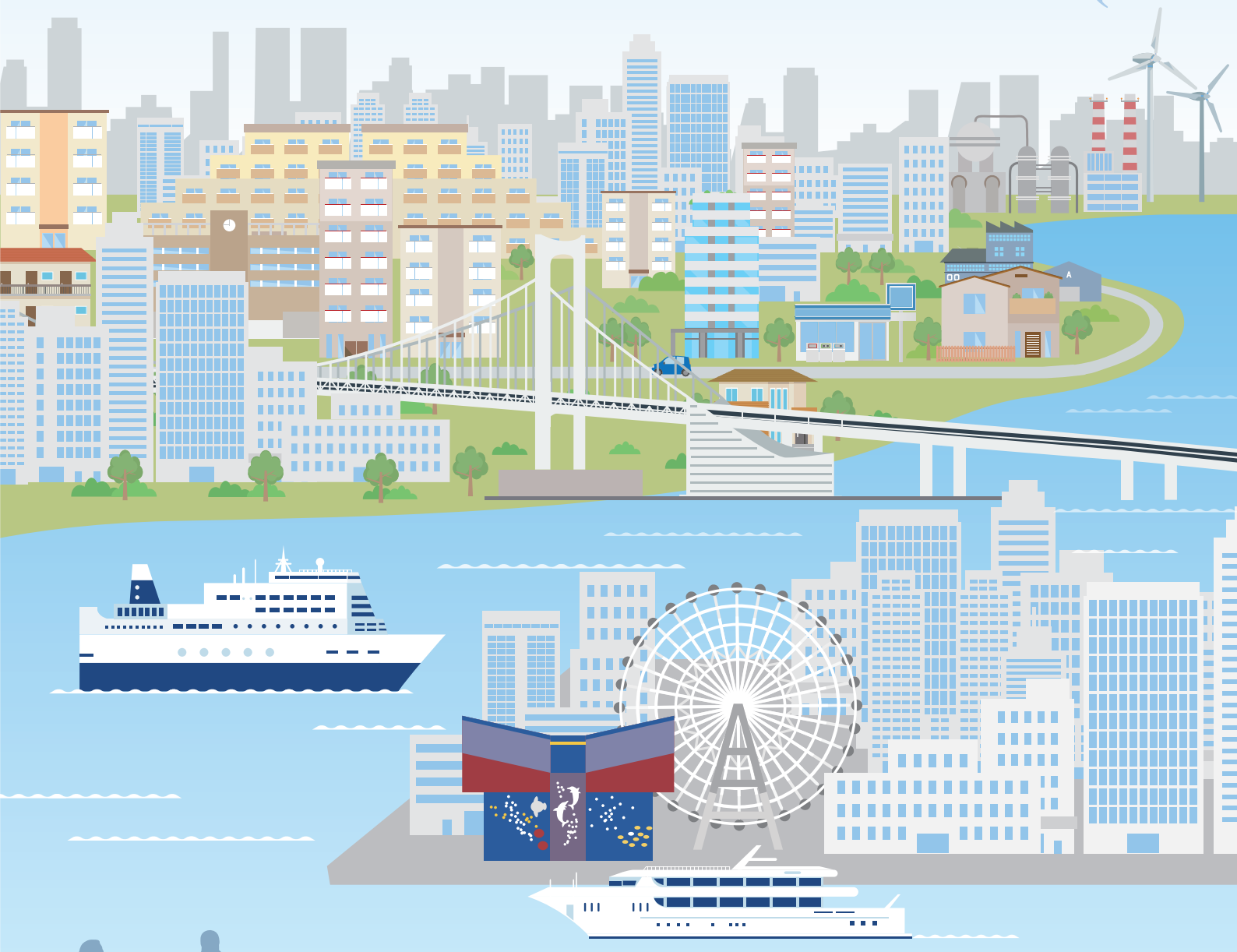
Bringing you a better future

Corporate Social Responsibility Report 2018

DAIHEN Group

Working in Harmony with Society



DAIHEN Corporation

Corporate data

Company name	**DAIHEN Corporation**
Date established	December 1919
Capital	¥10,596 million
Business	Manufacture, sale, and repair of dispersed power systems; welding machines; industrial robots; RF generators, clean transfer robots and PV inverter.
Head office location	2-1-11 Tagawa, Yodogawa-ku, Osaka 532-8512 Japan Tel: +81-6-6301-1212
Business offices and plants	Juso Plant (Osaka), Rokko Plant (Kobe), Mie Plant (Takigun, Mie), Kanehira Plant (Osaka), Chitose Plant (Chitose, Hokkaido)
Regional offices	Hokkaido Regional Office, Tohoku Regional Office, Tokyo Regional Office, Chubu Regional Office, Chugoku Regional Office, Kyushu Regional Office
Website	www.daihen.co.jp

Main subsidiaries and affiliates

In Japan

- SHIHEN TECHNICAL Corporation
- KYUHEN Co., Inc.
- The Chugoku Electric Manufacturing Company, Incorporated
- DAIHEN Industrial Machinery Corporation
- DAIHEN System Corporation
- DAIHEN Techno Support Corporation (*Established in July 2018)
- DAIHEN Stud Co., Ltd.
- DAIHEN Electric Machine Co., Ltd.
- DAIHEN Fuse Corporation
- Minami Electric Co., Ltd.
- DAIHEN Technology Institute Co., Ltd.
- Hanshin Yosetsu Kizai Co., Ltd.
- DAIHOKU Industry Co., Ltd.
- DAIHEN Business Service Co., Ltd.
- DAIHEN Logistics Co., Ltd.
- Daiki Corporation
- DAIHEN Engineering Co., Ltd.
- DAIHEN Welfare Enterprise Co., Ltd.
- Daiichi Seiko Co., Ltd.

International

- DAIHEN, Inc. (U.S.A.)
- OTC DAIHEN Europe GmbH (Germany)
- OTC DAIHEN Asia Co., Ltd. (Thailand)
- DAIHEN Electric Co., Ltd. (Thailand)
- OTC DAIHEN Bangkok Co., Ltd. (Thailand)
- DAIHEN Advanced Component, Inc. (U.S.A.)
- Mudanjiang OTC Welding Machines Co., Ltd. (China)
- OTC (Taiwan) Co., Ltd. (Taiwan)
- OTC Industrial (Shanghai) Co., Ltd. (China)
- DAIHEN Korea Co., Ltd. (Korea)
- OTC Industrial (Qingdao) Co., Ltd. (China)
- DAIHEN OTC (Beijing) Co., Ltd. (China)
- DAIHEN Advanced Machinery (Changshu) Co., Ltd. (China)
- OTC DAIHEN India Pvt. Ltd. (India)
- PT. OTC DAIHEN Indonesia (Indonesia)
- DAIHEN VARSTROJ welding cutting and robotics d.d. (Slovenia)
- DAIHEN MEXICO S.A. de C.V. (Mexico)

Executive officers

Directors and operating officers

President and Chief Executive Officer	Tetsuya Tajiri
Senior Executive Vice President and Member of the Board	Shigekazu Koshino
Executive Vice President and Member of the Board	Naoki Urai
Executive Vice President and Member of the Board	Kazuo Kamo
Senior Vice President and Member of the Board	Keiki Morimoto
Senior Vice President and Member of the Board	Shoichiro Minomo
Member of the Board	Kusuo Sanjo
Member of the Board	Shigenobu Aikyo

Auditors

Standing Auditor	Yuzo Morino
Standing Auditor	Kanji Iwasa
Auditor	Haruo Urata
Auditor	Masayuki Furusawa
Auditor	Masashi Yoshida

Operating officers

Senior Vice President	Yoshio Kondo	Vice President	Kohei Funada
Senior Vice President	Hajime Furuichi	Vice President	Yasuhiro Ohnishi
Senior Vice President	Shingo Wada	Vice President	Yuji Yoshizako
Senior Vice President	Kentaro Kaneko	Vice President	Tomoyuki Ueyama
Vice President	Masanobu Uchida	Vice President	Hiroaki Oichi
Vice President	Ichiro Yamano	Vice President	Ryohei Tanaka
Vice President	Yasuhiro Nishimori		

Editorial policy

We published this report with the goals of contributing to our stakeholders' broader understanding of our approach and initiatives, fulfilling important aspects of our social responsibility, and establishing a relationship of greater mutual trust. Moreover, in order to ensure a broader understanding of this report, we sought to enhance its readability and ease of understanding.

Reporting period

This report covers fiscal year 2017 (April 1, 2017, to March 31, 2018). This report also contains some information from before and after fiscal 2017.

Scope of organizations covered

In principle, this report spans the initiatives of the DAIHEN Group, which comprises DAIHEN Corporation and its consolidated subsidiaries. The environmental report contained herein presents the environmental initiatives of our Group plants — in Tottori, Oita, Matsudo, Eniwa, Hirosaki, Kagawa, and Izumiotsu — that are participating in the environmental management system of DAIHEN Corporation.

Reference guidelines

- *Guidelines 2013* of the Global Reporting Initiative (GRI)
- *Environmental Reporting Guidelines* (Fiscal 2012 Version), Ministry of the Environment, Japan
- *Environmental Accounting Guidelines* (Fiscal 2005 Version), Ministry of the Environment, Japan
- *JIS Z 26000*, Japanese Standards Association

Next issue

The next issue of this report is scheduled for summer 2019.

Disclaimer

This report includes our plans and prospects as of the date of publication; projections based on management plans and management policies; and past and current data on the DAIHEN Group. The reader is advised that these projections are assumptions or judgments based on the best information available at the time, and the possibility exists that future business performance may differ due to changes in various conditions, unforeseen results, and changes to forecast business activities.

Contents

In FY2018, the Daihen Group launched DAIHEN Value 2020 as a 3-year medium-term business plan. We look at the plan as the follow-up and final phase of the DAIHEN Value plan under which we have focused on “developing unique products” and “cutting losses” over the prior six years.

Our objective has always been to make all of our stakeholders happy at the same time. That means our customers, employees and their families, shareholders, suppliers and the people of the local communities that host our business. To do that, we have been creating values only to be expected from Daihen on the understanding that we are a manufacturer and, by virtue thereof, are in the business of making products of values that the customer can appreciate. This is what we mean by “developing unique products” and have been undertaking as a top priority for so long.

Much to our pleasure, this long persistent push has steadfast produced results in the form of numerous products that have expanded our scope of business with world/industry-first features, like our “synchronized feed welding systems” that offer unrivaled welding quality and applicability to multiple materials, high-efficiency “D-Arc” welding systems that turn upside-down the accepted limitations of thick-plate welding, and AI transfer robots and wireless charging systems for AGV that contribute to factory automation. Let me add to that list as well the world’s first 11 kW wireless charging system for EV and our autonomous decentralized cooperative technology for building VPPs (Virtual Power Plants) without a central monitoring unit, known as “Synergy Link”.

Via our Loss-Cutting Initiative, we have sought to internally generate the capital needed to strengthen development by thoroughly eliminating the “hidden losses” in our business processes. And, our efforts have paid off, as manufacturing costs have been reduced by employing our own robots and peripherals to automate our production lines and standardizing parts, and manual tasks have been replaced by visualizing back-office operations and using information systems.

To cut losses further, we are pursuing automation in production via new design concepts and in back-office operations using RPA (Robotic Process Automation).

Over the course of the two prior medium-term business plans, we made it an established practice to invest the capital generated by our Loss-Cutting Initiative in product development and create unique products and technologies, as we set out to do under our DAIHEN Value plan.

Under this newest medium-term business plan, we want to accelerate what we are already doing and go beyond our current product categories to create unique products for new domains that promise future growth potential. At the same time, we want to transition business from making standalone products to offering system solutions by establishing ourselves as a “development-driven company” that continuously creates new values for customers.

I ask for your continued support.

田尻 哲也

Tetsuya Tajiri

President and Chief Executive Officer

DAIHEN Corporation

The DAIHEN Group is committed to achieving simultaneous "contentment for all."

The DAIHEN Group's objective is the simultaneous achievement of contentment for all involved with our Group, including our customers, employees and their families, shareholders, suppliers, and local communities.

To achieve this, all Group employees have agreed to adopt "The DAIHEN Way" as an indicator of our core values while also following the action guidelines setting forth the respective roles of our employees as well as our work practices.

The DAIHEN Group is dedicated to contributing to the sound development of society by taking steps to support the achievement of simultaneous contentment for all.

Corporate Objective

Achieving Simultaneous Contentment for All* (then president Keijiro Kobayashi, 1985)

* Including our customers, employees and their families, shareholders, suppliers, and local communities

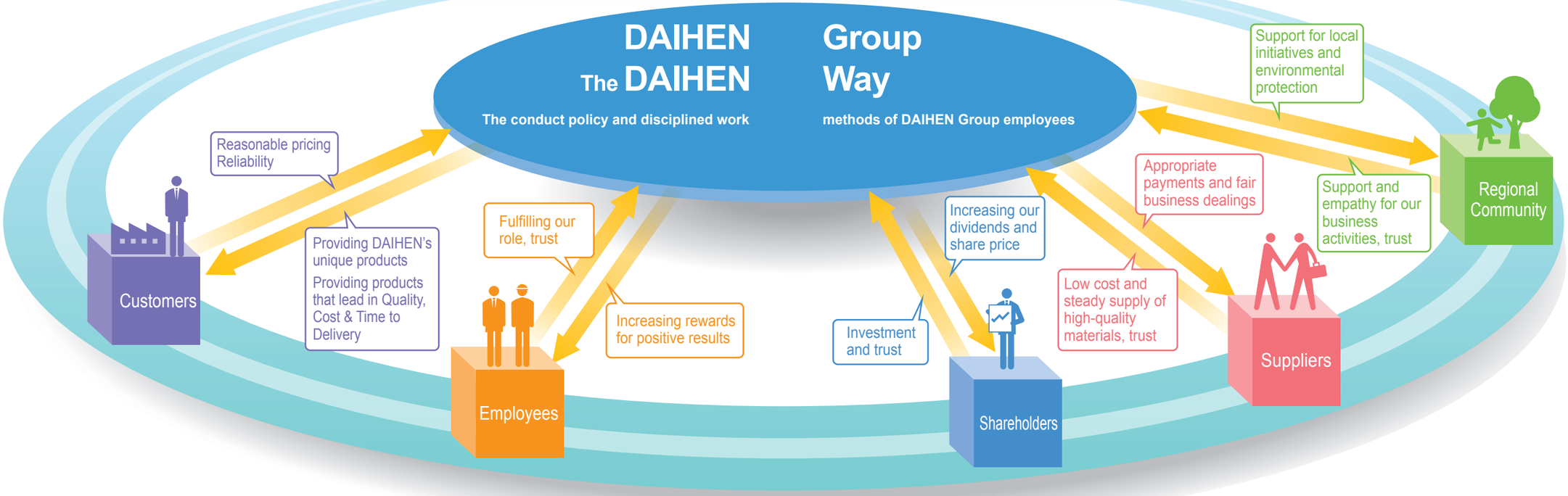
Corporate philosophy

Reliability & Creativity

DAIHEN aims to achieve healthy growth and contribute to society by creating value while upholding the relationship of trust we have established with our stakeholders.

Building on our founding spirit

Superior quality, reasonable price, and on-time delivery



DAIHEN's Action Charter

For the market

- We shall provide safe, high-quality products that meet customer needs and satisfy our customers with timely services and a straightforward response. In this way, we shall win the confidence of our customers through our business activities.
- We shall remain sensitive to change and enthusiastically create new products and technologies while developing new markets.

With our fellow workers

- We shall nurture an environment in which our employees are highly motivated to maximize their abilities and we shall properly evaluate the performance of our employees.
- We shall voice our frank opinions and shall jointly develop a vision for the future as well as an innovation plan. With a strong will, we shall prevail against our competitors.

To win the confidence of shareholders

- We shall continuously develop a stable business so that we can earn profits and increase our corporate value. In addition, we shall publicly disclose accurate information as necessary.

For all our suppliers

- We shall conduct honest trade with our suppliers so that they receive appropriate payment for the products and services they provide.

As members of society

- When we do business, we shall observe the laws and regulations of the corresponding country or region and shall respect their cultural norms and customs. In addition, we shall strive to protect the environment so that we can maintain good relations with society.
- We shall respect human rights and shall treat all people equally. We shall not intrude on personal privacy and shall act sensibly as a member of society.

To please our customers and contribute to the world, we remain focused on developing DAIHEN products that offer unique added value.

Business performance for fiscal 2017

The business environment in fiscal 2017 was bullish on the whole as investment in semiconductors and factory automation increased.

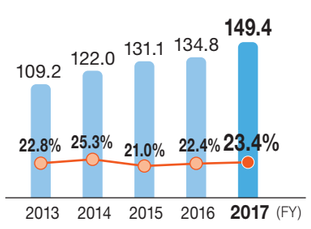
Under these favorable conditions, we developed and launched unique products with world/industry-first features and capabilities in line with our DAIHEN Value 2017 medium-term business plan. As a result, orders increased by 4.0% year-on-year to 151,642 million yen and sales increased by 10.8% year-on-year to 149,448 million yen.

On the income front, the increased sales added to the benefits of process automation, reduced back-office operations and other ongoing efforts to reduce costs via our Loss-Cutting Initiative, resulting in increases from the previous year in operating income of 1,349 million yen to 10,054 million yen, ordinary income of 1,365 million yen to 10,244 million yen and profit attributable to the owners of the parent of 578 million yen to 6,831 million yen.

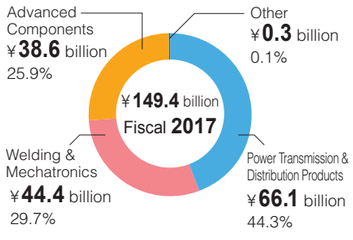
Sales

(¥ billions)

Share of consolidated international sales

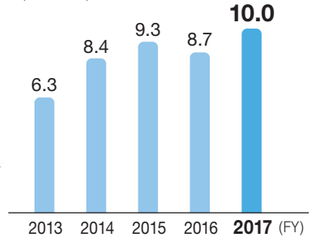


Sales by segment



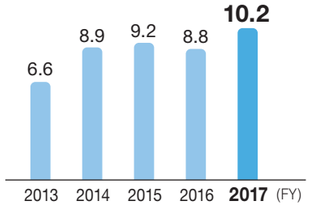
Operating income

(¥ billions)



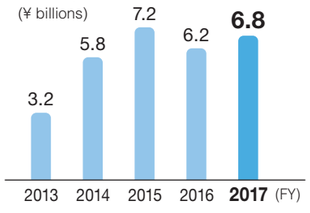
Ordinary income

(¥ billions)



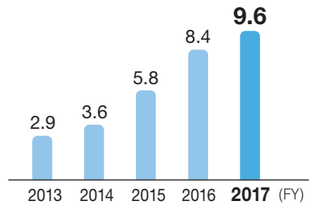
Net income attributable to owners of the parent

(¥ billions)



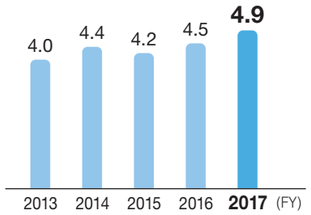
Capital investment

(¥ billions)



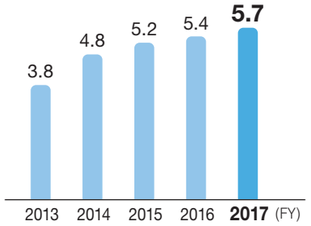
Depreciation

(¥ billions)

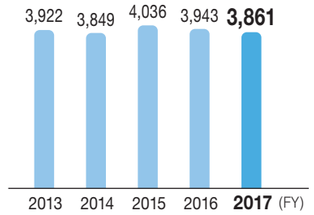


Research & development cost

(¥ billions)



Number of employees



Fiscal 2017 results

Strengthening our unique approach to product development

Under our DAIHEN Value 2017 medium-term business plan, we focused efforts on strengthening our development operations and creating unique products with world/industry-first features and capabilities, in order to please customers and serve society.

In fiscal 2017, we increased our capital investment in research and development by 300 million yen over the previous year to 5,700 million yen, released numerous new products, and increased product sales by 13,400 million yen over the previous year to 48,700 million yen.

Officially got into the charging system business for electric vehicles (EV)

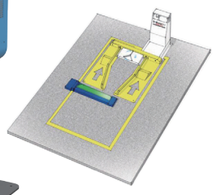
The rapid spread of electric vehicles (EV) has spawned demand for longer cruising ranges. To meet those needs, we built a lineup of vehicle chargers, featuring quick plug-in chargers for charging stands, wireless charging systems for convenient stores and other commercial facilities, and charging systems for super-compact EVs used by car-sharing services in sightseeing areas and elsewhere.

By carefully tuning the charging style to the various conditions of use, we are helping to spread the EV and improve the convenience of driving one.

Quick plug-in charger

Wireless charging system

D-Broad EV

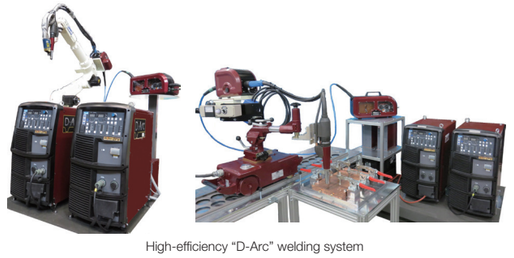


Wireless charging dock

D-Broad EV WIRELESS CHARGING DOCK

High-efficiency “D-Arc” welding system

Our D-Arc welding systems effectively shorten welding work by making it possible to weld 19 mm-thick steel plates in a single pass. They also quicken pre- and post-processing, saving users as much as 85% of their production costs. This gives users the tools they need to enhance both efficiency and quality when welding building frameworks and other large structures, construction machinery, ships and more.



High-efficiency “D-Arc” welding system

Our Loss-Cutting Initiative

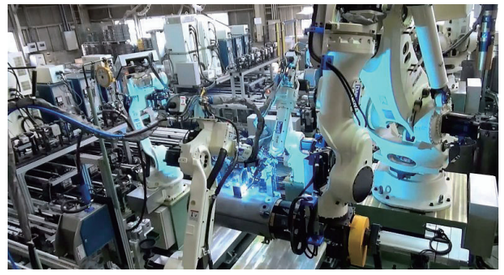
To internally generate capital for funding R&D operations, we automated production, reduced back-office operations and took other steps to strengthen activities within our Loss-Cutting Initiative.

In our efforts to automate production, we are not focusing on individual units but entire lines including pre- and post-processes.

As a result, we achieved a saving of 12.7 billion yen (up 3.6 billion yen from the previous year), significantly exceeding cost increases in R&D.

Fully automated production of pole-mounted transformer cases

At our subsidiary Minami Electric Co., Ltd., we completely automated production of pole-mounted transformer cases. Because we developed the handling tools, parts feeders and other equipment ourselves, parts of all sorts of shapes are accurately handled and welded. The upgrades have greatly improved both productivity and quality.



Hard work behind pioneering new markets

Our Thai subsidiary DAIHEN Electric Co., Ltd. received an order for seven 500,000 V transformers from the state-run power utility EGAT, the first order ever placed with a local manufacturer for this class of extra-high voltage transformer. The order shows EGAT’s approval of DAIHEN’s products and quality control system, which it knows all too well from the 200,000 V transformers that DAIHEN Electric has delivered over the past 30 years. We will take what we have learned and gained from this deal to expand business to neighboring countries in Southeast Asia, the Middle East, Africa and elsewhere.

DAIHEN Electric Co., Ltd.

500,000 V extra-high voltage transformer

Kicking off our DAIHEN Value 2020 medium-term business plan

Summary of our previous medium-term business plans

- Over the 6 years from fiscal 2012 to 2018, we focused on creating unique products that would please customers and serve society under our DAIHEN Value 2014 and 2017 medium-term business plans.
- On the development front, we came out with many new products that allowed us to expand our scope of business, such as RF generator systems equipped high-speed matching capabilities required for finer pattern semiconductors, “synchronized feed welding systems” that users have highly appreciated for the unrivaled welding quality and applicability to multiple materials, “Synergy Link” whose proprietary algorithm builds VPPs without a central monitoring unit, and wireless charging systems for AGV and EV.
- With our Loss-Cutting Initiative that we undertook in order to internally generate the investment capital needed to strengthen development operations, we not only sought to reduce costs in every way but also shorten the time required to do simple tasks by using our own robots to automate production, and visualizing and analyzing back-office operations to eliminate waste and systematize information.
- Though our efforts to create unique products and reduce losses grew sales 1.6-fold without increasing our workforce, brought 2.7 times more operating income (compared to fiscal 2011), and helped us to set an all-time high 10,000 million yen in income, we did not attain the numerical targets of our medium-term business plans.

	FY2011 [1]	FY2017		Change [2]/[1]
		MBP target	[2]	
Sales	92,900 mn yen	150,000 mn yen	149,400 mn yen	1.6x
Operating income	3,700 mn yen	—	1,0000 mn yen	2.7x
Operating income growth	4.0%	8%	6.7%	+2.7 pts
ROE	4.5%	10%	9.3%	+4.8 pts
Employees	3,878	—	3,861	No increase

Basic thinking behind our 2020 medium-term business plan

- Looking at the bigger picture of our new medium-term business plan (FY2018 – 2020) as a DAIHEN Value Plan, we want to establish ourselves as a “development-driven company” that continues to create new values for customers. To do that, we will go beyond the framework of our current forté product lines of transformers and welders to promote development in new domains * where the future growth potential is good, and parallel to that convert business from standalone products to system solutions.

  * See” New domains and directions in development” on page 10.
- With our Loss-Cutting Initiative, our objective is to eliminate the simple jobs by pursuing automated production based on the new design concepts and by using RPA (Robotic Process Automation) to automate back-office operations. Moreover, in order to expand on the results of these efforts, we will reexamine the roles played by our business sites and optimize costs group wide.
- On the support front, we will “strengthen our sales engineering” as an integrated business service between our sales and servicing arms, with sights set on establishing original “D-Servicing” practices across the entire business process from pre-purchase coordination to aftercare servicing. This should spur customers to recognize the product value we offer, encourage them to choose DAIHEN products and ensure that they use our products safely.
- With regards to giving back to our stakeholders, we will be clearer with our “hosting community” targets as they have been vague in the past and will establish scenarios that enable the “simultaneous contentment of all*” espoused in 1985 by former company president Keijiro Kobayashi. We additionally believe that clarifying our corporate goodwill will motivate our workforce to take greater responsibility for achieving targets and will make them proud to be a part of DAIHEN.

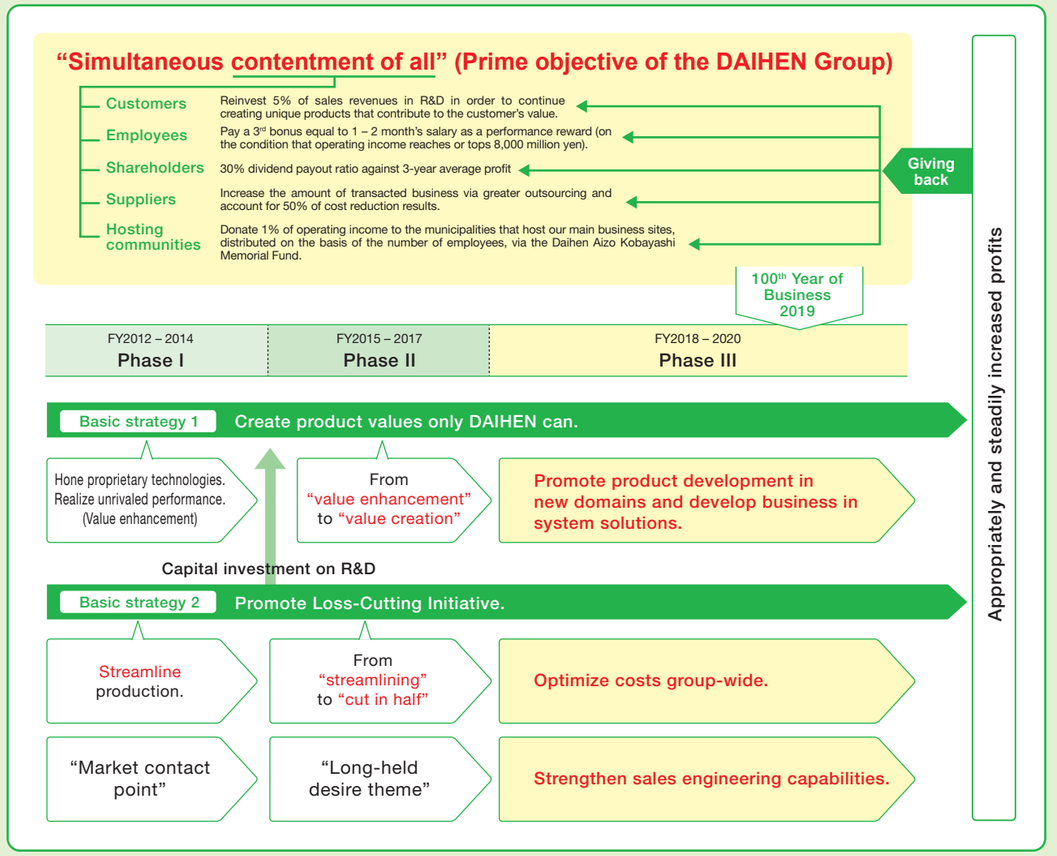
  * Customers, employees and their families, shareholders, suppliers and hosting communities

Basic strategy

1. **Promote product development in new domains and develop business in system solutions.**
2. **Optimize costs group-wide.**
3. **Strengthen sales engineering capabilities.**

Basic targets

	FY2020 target	FY2017 results
Sales	180,000 million yen	(149,400 million yen)
Operating income to sales	8%	(6.7%)
ROE	10%	(9.3%)
Percentage of sales reinvested in R&D	5%	(4.9%)
Dividend payout ratio (3-year average profit)	30%	(27.9%)



New domains and directions in development

Smart energy management field

- Develop and supply systems and units for controlling and managing a diversity of decentralized power sources, e.g., smart communities, renewable energies, storage batteries, etc., and develop technologies that elevate the diversifying means of power grid management to new heights and contribute to new uses of electric power, e.g., EV, etc.

Smart factory automation field

- Automate entire factories so that all operations flow smoothly, by developing our proprietary high-precision, articulate robots using technologies honed with the welding and clean transfer robots we market, and by supplying easy-to-install, flexible systems composed of sensors, monitoring and control software, and peripheral units designed and built with our proprietary technologies.

Material fine-processing field

- Supply new processes needed to innovate manufacturing — e.g., bonding, cutting, film deposition, surfacing, shaping or other precision treatment of metals, semiconductors, insulating materials, resins, etc. — by controlling energy sources such as plasma, lasers, ultrasonic waves, and frictional heat to a high degree of precision.

Special Feature 2

Pursuing DAIHEN Value: **What DAIHEN is doing with wireless charging systems**

Verification testing of wireless charging systems for personal mobility vehicle Helping to put more EVs on the road by making charging infrastructure

Social debate

Automotive manufacturers around the world are engaged in research and development aimed at putting more electric vehicles (EV) on the road as their contribution to a much-wanted low-carbon society, but a number of issues are in the way of the EV spreading, e.g., the shorter cruising range than gasoline-powered vehicles, the need for more supporting infrastructure such as charging stations, and improved user benefits like lower prices.

Moreover, practical applications of automated driving technologies have spurred demand for wireless charging in addition to manual plug-in charging systems.

Products and technologies for solving the social debate

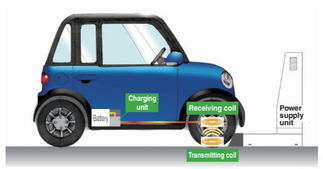
Given the circumstances, we focused our attention on personal mobility vehicles that are expected to spread through society more quickly than others and released the “D-Broad Charging Dock” for vehicles equipped with onboard charging capabilities in May 2018.

The system applied wireless charging technology that we had developed and honed for industrial infrastructure. It works by magnetic resonance, which tolerates considerable misalignment and has proven to be the most efficient charging method in the industry.

Our system assuredly and efficiently charges the vehicle even when the transmitting and receiving coils are not perfectly lined up. There is no plugging in or unplugging the vehicle; it charges just by parking over the transmitting coil.

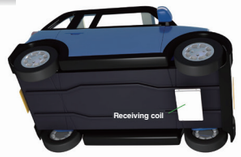
D-Broad EV — World’s first! Wireless charging system for personal mobility vehicle

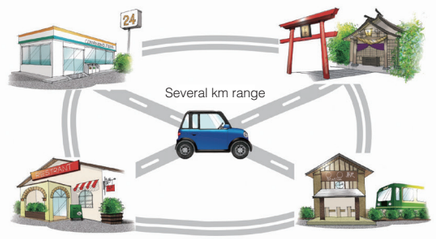
Simply stop the D-Broad EV over the charging dock!



- Noncontact charging starts automatically when the vehicle is parked in the specified location where the transmitting and receiving coils face each other.
- Works by magnetic resonance, which remains effective even when the coils do not line up perfectly.
- Applicable with rental vehicles and car-sharing services.

Charging dock in the administrative parking lot of Osaka Castle Park





Charging docks are installed at frequently visited locations so that vehicles can charge the battery as needed.

The driver simply stops the vehicle in the specified location. The battery is charged without dirtying hands or clothes.

Selected for the first proving tests at Osaka Castle Park

Wanting to promote industry and create new business in Osaka, Osaka City, Osaka Prefecture and the Osaka Chamber of Commerce and Industry launched a project team to provide support for verification testing of cutting-edge technologies.

Our “wireless charging system for personal mobility vehicle” was selected for the first proving tests at Osaka Castle Park.

Proving test overview

For the proving test, the wireless charging system was installed in the administrative parking lot of Osaka Castle Park and used by park personnel to charge a personal mobility vehicle that served for park patrols and facility maintenance from 12/10/2018 to 01/31/2019.

Data on traveled routes, power consumption, charging frequency, charging time, battery residual charge and other performances was collected online by way of a remote monitoring system mounted on the vehicle, and analyzed.

The acquired data was helpful towards understanding battery capacity optimization, how charging systems would be best deployed, and other matters critical to commercialization.

Vehicle detection and charging status can be checked on an LED panel.

After being out on park patrols and facility maintenance, the vehicle was returned to the charging spot and charged to make up just the power that had been consumed each time.

Future plans

Plans are to use the test results to increase both vehicles and charging points, and explore the best possible deployment for road trials and eventually the launch of actual services. We will continue to extract issues and look for effective solutions along the way.

Our goal is to have a practical application ready and in place as a “proving ground for future society”, at the 2025 World Expo.

At DAIHEN, we can help put more EVs on the road by developing “next-generation charging solutions” that solve the cruising range issue by increasing charging frequency, reduce costs, and motivate users to use them because of the contribution they make to lessening environmental loads.

Told from the frontline

It was a big deal for us that a personal mobility vehicle mounted with our wireless charging system was going to be used in verification tests at Osaka Castle Park. The system originally had tire guides to ensure the transmitting and receiving coils would line up right, but we replaced the guides with tape markings because the magnetic resonance technology we used tolerated misalignment and reduced costs.

A number of people charged the vehicle during the test period, but there was not even a single case of the system not working as planned, which spoke again to how the effective magnetic resonance technology was despite misalignment between the coils.

There are still a lot of issues to resolve before mass-producing the system for market, such as to develop means to detect obstructions and reduce costs, but we will knock them out one by one until we have a product that is highly reliable and affordable.

Akira Uchino
Section of High Frequency Technology Development
Department of Communication Technology Development
Research and Development Division

We are focused on developing our businesses globally on the three pillars of power transmission & distribution products, advanced components, and welding & mechatronics.

DAIHEN Corporation began manufacturing pole-mounted transformers in 1919 by instituting a dedicated mass production system. Since then, the company has been developing a series of products that respond to the needs of society. These products include high-performance welding machines incorporating electronic technology that grew out of transformer manufacturing as well as various industrial robots and components for semiconductor manufacturing systems, all of which are fueling the growing trend toward automation.

Today, the DAIHEN Group comprises 36 companies and is actively working to develop its global business while applying its energy conversion and control technologies to the telecommunications and environmental markets.

Corporate history

1919 The Company is established in Nakatsucho, Osaka prefecture.

- July 1930 The plant is relocated to its current location in Juso.
- March 1934 Production of electric welding machines begins.
- July 1961 A welding machinery plant is completed in Settsu.
- October 1961 The company's shares are listed on the Tokyo Stock Exchange.
- December 1967 The Chitose Plant is completed.
- November 1973 The Mie Plant is completed and begins full-scale production of high-capacity, extra-high-voltage transformers.
- May 1980 Production of arc welding robots begins.
- November 1982 The Settsu Robot Plant is completed.
- December 1985 Osaka Transformer Co., Ltd. is renamed DAIHEN Corporation.
- November 1987 The company begins production of RF plasma generators for semiconductor manufacturing.
- November 1987 The company is awarded the Deming Application Prize.
- December 1995 Certification of ISO 9001 registration
- June 2001 The company system and vice-president system are introduced.
- October 2003 Certification of ISO 14001 registration
- October 2007 The Rokko Plant is completed with the relocation of the Settsu Plant.
- December 2009 DAIHEN Advanced Machinery (Changshu) Co., Ltd. is established.
- November 2010 MECS (wafer transfer robot) business is acquired.
- June 2011 OTC DAIHEN India Pvt. Ltd. is established.
- July 2012 PT. OTC DAIHEN Indonesia is established.
- February 2014 Varstroj d.d. acquired.
- July 2015 Chugoku Electric Manufacturing Co., Inc. is made a consolidated subsidiary.
- March 2016 Sales of wireless charging systems are launched.
- October 2016 DAIHEN MEXICO S.A. de C.V. is established.

Product development history

Transformers

- Pole-mounted transformer
- AC arc welding machine
- Oil-immersed power transformer
- Cast resin transformer
- High-capacity extra-high-voltage transformer
- Pad-mounted transformer
- Pole-mounted amorphous core transformer

Power receiving and distribution systems

- Step voltage regulator
- Pole-mounted automatic vacuum section switch

Switches

Automated distribution systems

Power monitoring, control and communication equipment

RF generators/matching units

- RF generator for plasma applications
- Microwave supply system for plasma application

Robots for vacuum environment

Clean transfer robots

- Wafer transfer robot for atmospheric environment
- Vertical multi-articulated arc welding robot

Arc welding robots

- Multipurpose handling robot (40kg carrying capacity)
- Inverter controlled super plasma cutting machine
- THOR-T Cartesian-coordinate arc welding robot

Welding machines

- Submerged arc welding machine (Auto melting)

Power receiving and distribution equipment

Switch terminal unit

Pad-mounted multi-circuit vacuum switch

Microwave generators/Tuners

- Wafer transfer robot for vacuum environment

Clean transfer systems

Handling robots

Air plasma cutting machine

Spot welding machines

- Fuzzy control inverter MIG welding machine

- RF automatic matching unit
- 30 kW high power RF generator
- Power conditioner for solar power generation (PV inverter)
- Saltproof pole-mounted transformer (Applicable to Zn/Al thermal spraying)

Large robots for vacuum environment

- Large glass panel transfer robot for vacuum environment
- Wafer transfer robot for vacuum environment
- LCD panel transfer robot

Factory automation systems

- Multipurpose handling robot (200kg carrying capacity)
- Inverter-controlled compact air plasma cutting machine
- AC/DC pulsed MIG welding machine

- Power center
- Substation device
- Remote monitoring and control equipment
- Switch terminal unit (with sensor)
- Pole-mounted automatic vacuum switch (with sensor)
- Remote monitored and controlled step voltage regulator
- Pole-mounted transformer with auto tap changer
- Top-runner transformer
- Substation package for solar power generation
- RF generator
- High-power microwave supply system
- Wireless power transfer system
- 6-axis vertical multi-articulated arc welding robot
- Inverter-controlled DC spot welding machine
- Welbee Inverter welding machine

Power Products Business Segment

- Power receiving & distribution
- Control & telecommunications
- Power distribution
- Dispersed power products

Semiconductor & FPD related Business Segment

- Power supply products for plasma generation
- Clean transfer products

Welding & Mechatronics Business Segment

- In-plant automatic transfer
- Mechatronics
- Metalworking

Principal subsidiaries and affiliates

19 companies in Japan

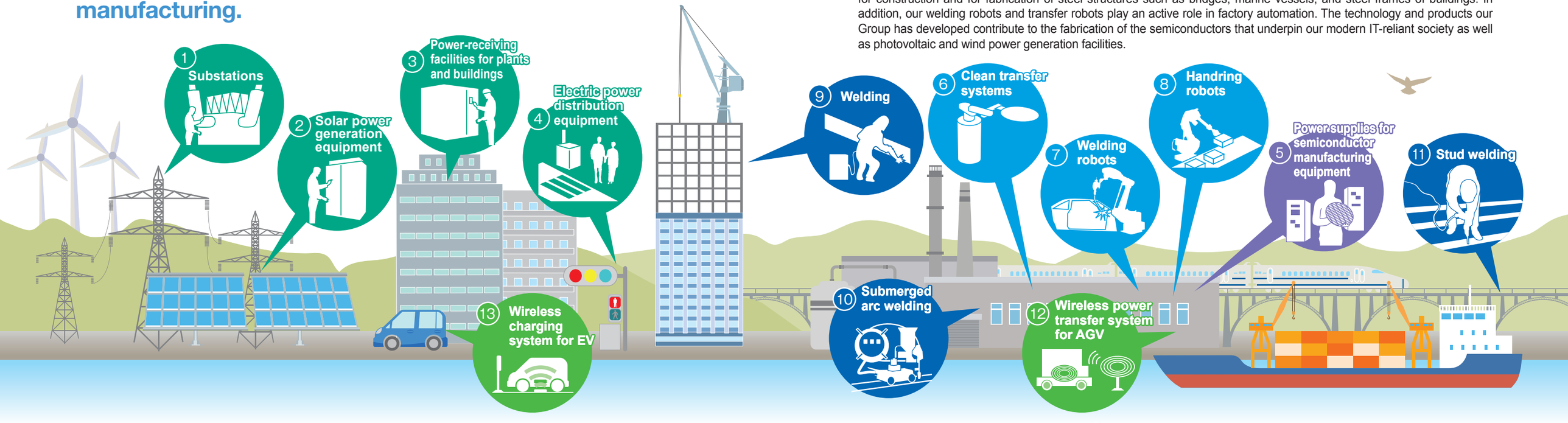
- SHIHEN TECHNICAL Corporation
- KYUHEN Co., Inc.
- The Chugoku Electric Manufacturing Co., Inc.
- DAIHEN Industrial Machinery Corporation
- DAIHEN System Corporation
- DAIHEN Techno Support Corporation (*Since July 2018)
- DAIHEN Stud Co., Ltd.
- DAIHEN Electric Machine Co., Ltd.
- DAIHEN Fuse Corporation
- Minami Electric Co., Ltd.
- DAIHEN Technology Institute Co., Ltd.
- Hanshin Yosetsu Kizai Co., Ltd.
- DAIHOKU Industry Co., Ltd.
- DAIHEN Business Service Co., Ltd.
- DAIHEN Logistics Co., Ltd.
- Daiki Corporation
- DAIHEN Engineering Co., Ltd.
- DAIHEN Welfare Enterprise Co., Ltd.
- Daiichi Seiko Co., Ltd.

17 companies outside Japan

- DAIHEN, Inc. (U.S.A.)
- OTC DAIHEN Europe GmbH (Germany)
- OTC DAIHEN Asia Co., Ltd. (Thailand)
- DAIHEN Electric Co., Ltd. (Thailand)
- OTC DAIHEN Bangkok Co., Ltd. (Thailand)
- DAIHEN Advanced Component, Inc. (U.S.A.)
- Mudanjiang OTC Welding Machines Co., Ltd. (China)
- OTC (Taiwan) Co., Ltd. (Taiwan)
- OTC Industrial (Shanghai) Co., Ltd. (China)
- DAIHEN Korea Co., Ltd. (Korea)
- OTC Industrial (Qingdao) Co., Ltd. (China)
- DAIHEN OTC (Beijing) Co., Ltd. (China)
- DAIHEN Advanced Machinery (Changshu) Co., Ltd. (China)
- OTC DAIHEN India Pvt. Ltd. (India)
- PT. OTC DAIHEN Indonesia (Indonesia)
- DAIHEN VARSTROJ welding cutting and robotics d.d. (Slovenia)
- DAIHEN MEXICO S.A. de C.V. (Mexico)

The DAIHEN Group is dedicated to the emergence of a sustainable society of the future through innovative manufacturing.

The products and technologies developed by the DAIHEN Group are ubiquitous and contribute to our daily lives in innumerable ways. Our electric power transmission and distribution products, such as transformers, provide electricity to factories, buildings, and households from power stations and transformer substations. Welding machines are indispensable for construction and for fabrication of steel structures such as bridges, marine vessels, and steel frames of buildings. In addition, our welding robots and transfer robots play an active role in factory automation. The technology and products our Group has developed contribute to the fabrication of the semiconductors that underpin our modern IT-reliant society as well as photovoltaic and wind power generation facilities.



Power transmission & distribution products

1 Power transformers

Our reliable, high-quality transformers contribute to the stable supply of power, providing a long service life, low loss, low noise and compact design.

2 3 Solar power generation package with built-in storage batteries

Integrates a solar power generation system and storage system for private consumption. The package helps factories and buildings reduce their electricity bills.

3 Top Runner transformer

Top Runner transformers are noted for their low energy loss. Their high efficiency contributes to reduced CO_2 emissions.

4 Step voltage regulator

These units support a stable supply of power through optimal voltage control in order to overcome voltage fluctuations on the transmission lines, such as those resulting from interconnection with dispersed power sources.

4 Pad-mounted transformer

Supports effective underground power distribution as well as landscape conservation in urban areas while preventing disasters and securing space for roads.

4 Pole-mounted transformer

Transforms the high-voltage power flowing through distribution lines, contributing to reliable power for day-to-day use in society.

RF generator for plasma applications

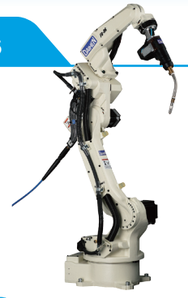
5 RF generator 5 Microwave supply system for plasma application

This RF generator produces the stable, high-quality plasma essential to microfabrication in the semiconductor device manufacturing process.

Industrial robots

6 Wafer transfer robot

Contributes to higher productivity by ensuring high-speed, high-precision transfer of silicon wafers in a clean environment where absolutely no dust is permitted.



7 Arc welding robot

This high-performance welding robot offers advanced operation and contributes greatly to improved quality and productivity on automobile production lines.

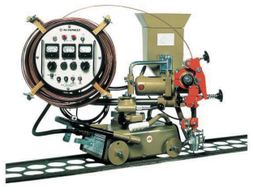
8 Handling robot

Handling robots transport materials quickly and accurately on various production lines and help to improve the factory working environment.

Welding machines

9 Digital Inverter welding machine

The Welbee incorporating digital welding control is a state-of-the-art welder designed with environmental protection in mind.



10 Submerged arc welding machine

Our submerged arc welders offering stable and highly efficient high-current welding have proved indispensable to the shipbuilding industry.

11 Stud welding

Studs are welded to steel beams, etc. to tightly wedge floor slabs to the beams. They are widely used with buildings and bridges to join steel and concrete.

Wireless charging

12 Wireless power transfer system for AGV (Automated Guided Vehicle)

Charges AGVs with the same efficiency as a wired system even if the AGV stops slightly out of position. The system is integral to completely automating factories.

13 Wireless charging system for EV

Capable of rapidly charging up to a max. 11 kW, the system is helping to put for EVs on the road because of the improved convenience.

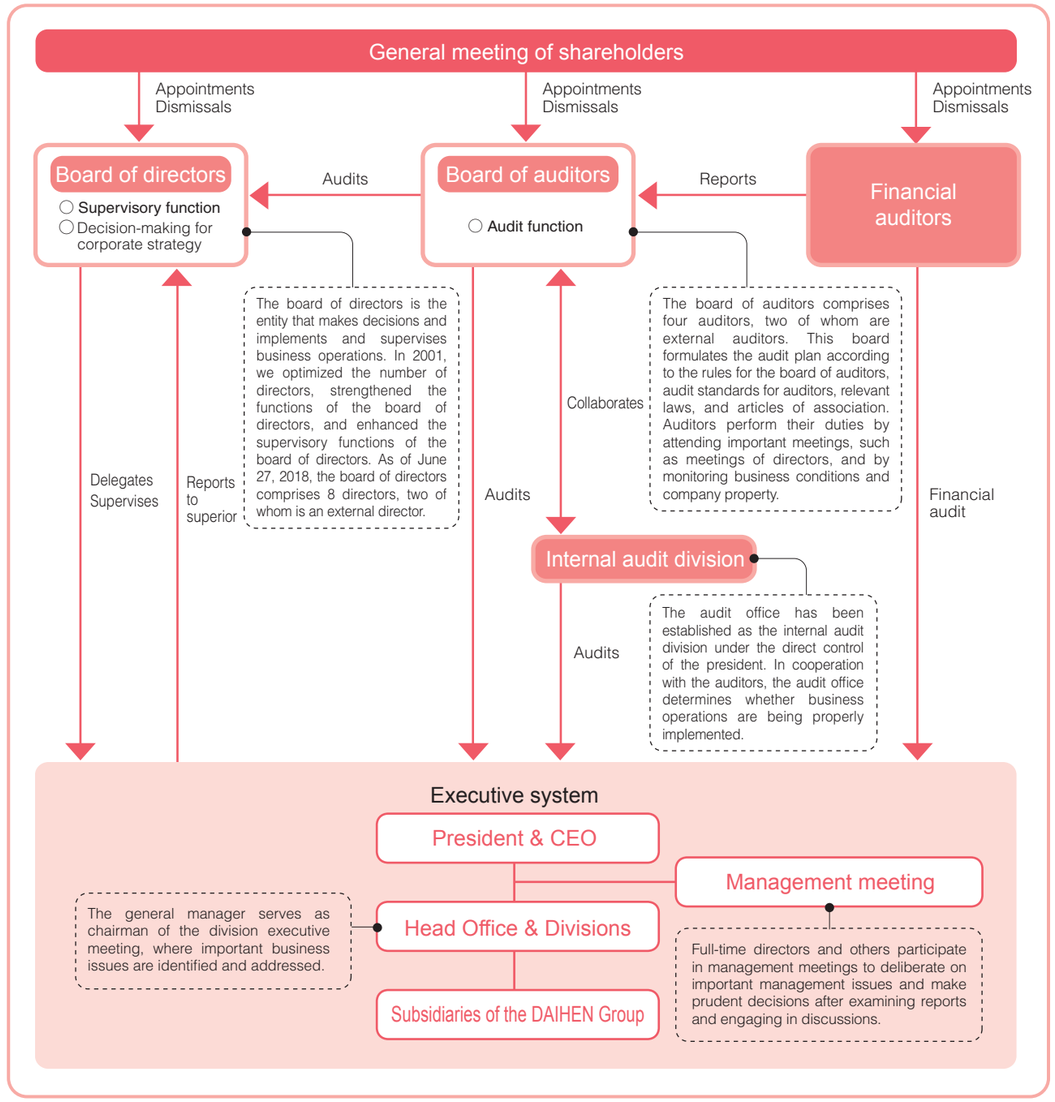
Corporate governance

An underlying principle of all our operations is to win the trust of our customers and all elements of society. The DAIHEN Group is striving to enrich its corporate governance in order to improve the transparency of management and ensure full compliance.

Ensuring management transparency and thorough compliance

The DAIHEN Group maintains a board of auditors that monitors the business undertaken by the board of directors. In June 2001, we adopted an executive officer system and enhanced the decision-making and supervisory functions of the board of directors to ensure the efficient operation of our business.

Corporate governance system



Compliance and Risk Management Initiatives

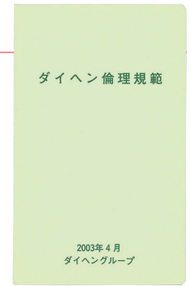
In addition to fulfilling our corporate social responsibility, we continue to seek ways to improve compliance awareness among all our employees. We are addressing this issue by implementing various initiatives intended to ensure that we do not betray the trust of the public.

In the area of risk management, we streamlined our manuals and regulations and instituted training in preparation for natural disasters and accidents; moreover, we are promoting the development of a system to serve as a framework for ensuring compliance in relation to risks associated with misconduct and legal violations.

As for risks related to rapidly developing information systems and the intellectual property field, we are addressing risk management through workshops, enacting various rules and regulations, and keeping employees informed throughout the company.

The DAIHEN Code of Ethics

As the basis for our internal regulations, this manual includes the rules with which we must comply as a corporation as well as all relevant laws and regulations. We have adopted the DAIHEN Code of Ethics, which specifies methods of compliance. It also indicates how we are to operate our business according to the key concepts of our corporate philosophy, “Reliability & Creativity.”



DAIHEN Code of Ethics

A pocket-size version of this publication has been distributed to all Group employees to support appropriate behavior and decision-making according to the highest ethical standards.

Guide to Compliance with Laws and Regulations

As a means of preventing legal violations resulting from a lack of recognition or ignorance of the law, we have developed a compliance guide that summarizes the laws and regulations that all employees must follow. It also presents specific incidents involving violations of the law. This guide can be viewed or printed from any computer on the corporate network.

Click on the right icon to view the DAIHEN Code of Ethics, DAIHEN’s Action Charter, Guide to Compliance with Laws and Regulations, and other documents.

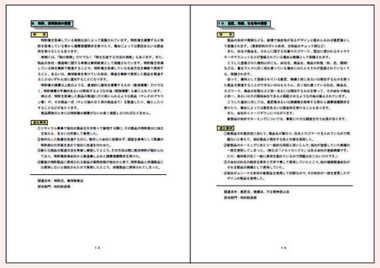
Training for compliance with laws and regulations

To ensure consistency of compliance and to increase the profile of corporate ethics and the law, we provide in-house training focused on compliance and the DAIHEN Code of Ethics. This training is provided to recent hires, mid-career employees, and employees in management positions at various levels.

By extracting laws and rules from our Guide to Compliance with Laws and Regulations, if those are considered deeply linked to specific job categories, we provide regulatory compliance training workshops — including supplemental commentary and case studies — for specific occupations. Training workshops are also held with a focus on how to conclude contracts and on specific laws and regulations.

These training workshops on compliance have been expanded in scope to encompass the entire Group, and we are raising awareness among all employees who must comply not only with laws, but also with internal regulations and corporate ethics.

Regulatory compliance training workshop

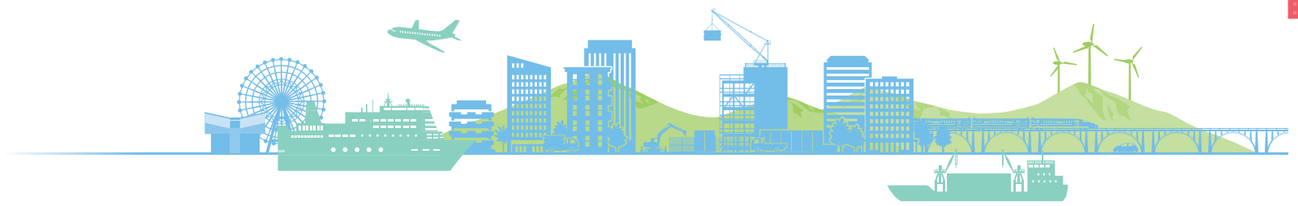


Guide to Compliance with Laws and Regulations

Establishment of a counselor’s office for the Compliance Helpline

We have established a counselor’s office for the Compliance Helpline to prevent and detect illegal actions at an early stage. This helpline will maintain the confidentiality of all employees, and DAIHEN will not prejudice any employee who engages in consultation with the counselor.

In addition, the Regulation for Protecting Whistleblowers provides our whistleblower protection rules.



Strengthening information security

In light of the growing importance of information security, the entire DAIHEN Group has adopted a variety of initiatives to enhance our information security system.

Main initiatives currently in force

Creation of an Information Security Committee

Our Information Security Committee (ISC) improves the information security policy for maintaining and managing information security from a single unified perspective. The ISC also promotes awareness activities such as required security training and education, in order to make the DAIHEN workforce conscious of the importance of information security, and introduces tools for preventing leaks and illegal access to confidential information, etc.

Compliance with our information security policy

We establish “Information Security Policies,” “Rules on Information Security Measures” and “Rules on the Protection of Personal Information,” and organize them to facilitate compliance. In order to verify that the information security measures are working properly, we conduct internal audits every year and, if inadequacies are detected, improvement plans are crafted and implemented.

Promotion of information security awareness activities

Information security measures are explained to the workforce in an educational session, in order to raise employee awareness. Specifically, awareness activities such as training and education are conducted to alert employees to targeted email attacks aimed at businesses and organizations.

To promote compliance at our overseas business sites as well, we explain our policies, rules and measures through educational sessions similar to Japan and provide guidance for the use of information security tools.

Strengthening our information security infrastructure

To avert the risk of information being leaked due to the theft, loss, unauthorized access or other misfortune to befall PCs and external storage devices, we scrupulously encrypt PC hard disks, log operating histories and manage external storage devices. Moreover, we have introduced various systems to strengthen our information security infrastructure such as an automatic system for generating passwords for email attachments and a thin client system that prevents files from being saved to PC disks.

Main activities for fiscal 2018

We will strengthen information security across the entire Group by improving awareness and establishing measures.

- Review IoT security checks and rules at manufacturing sites.
- Establish practices to carefully check and manage the IT environments on a departmental basis.
- Comply with security laws overseas.

Initiatives to protect our intellectual property

In the area of intellectual property, we are implementing a variety of initiatives to support risk management and legal compliance. For example, we comply with applicable laws and regulations relating to intellectual property rights before we undertake to develop, manufacture, or sell a product; in addition, we always confirm that we are not infringing the intellectual property of another company (to prevent the risk of infringement). This approach ensures that our customers can use our products in full confidence.

Risk management

In order to prevent infringement of the intellectual property of other companies, we periodically check publications on patents and the like obtained by other companies. When developing or improving the design of a product, we always seek patent clearances and design reviews (DR) to confirm that we are not infringing on the intellectual property rights of other enterprises.

At the same time, with regard to our own proprietary technology, we have established a patent protection network. The purpose of this network is to ensure our products remain superior to those of other companies, stabilize our business operations, and improve our corporate advantage using our fair rights to intellectual property.

We are also upgrading training and education in intellectual properties in order to achieve these goals. In an effort to keep our workforce knowledgeable and competent, we promote a mixture of purpose-based internal programs scaled according to the employee’s years of experience and outside learning opportunities offered by the Japan Intellectual Property Association.

Legal compliance

At DAIHEN, we periodically provide opportunities to learn about legal affairs and intellectual properties, in order to elevate awareness of compliance and ensure it underscores business operations. These programs are vital in this day and age of open innovation where the growing need to cooperate with other companies makes the contracting of confidentiality obligations, joint research and development, and the handling of results therefrom increasingly more important. One such program is an internal workshop on contracting we offer. The sessions are taught by attorneys and present case examples that help employees to understand and properly draft matters determined in cohort with counterparties into contracts. The workshop is proving useful towards enhancing employee awareness of compliance and ensuring compliance is an integral component of business practices at DAIHEN.

Company-wide workshop on contracts

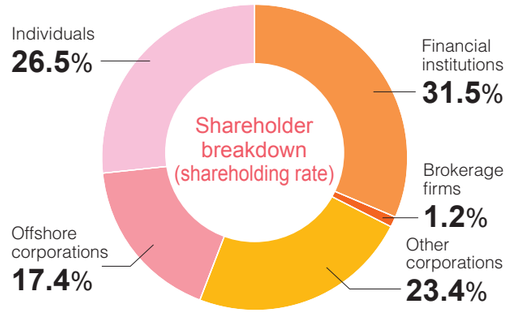
To win the confidence and meet the demands of shareholders

In order to meet the expectations of shareholders and investors and justify their confidence in us, we remain committed to the sound and transparent management of our business. Moreover, we are dedicated to business development and are engaged in dissemination of accurate and pertinent information.

Basic policy

The policy of the DAIHEN Group is to implement the corporate philosophy characterized by the keywords “Reliability & Creativity.” We are upholding this policy by faithfully and honestly providing safe, high-quality products and services that meet the needs of our customers while continuing to demonstrate reliability through our business operations. Moreover, while remaining dedicated to creating value and developing markets with new products and innovative technologies, we are diligently contributing to social development.

In addition, by implementing comprehensive investor-relations initiatives to provide information on our Group’s business and financial circumstances as required for sound investment decisions, we intend to earn the ever deeper confidence of shareholders and investors.



As of March 31, 2018

Increasing our corporate value

Today, we cannot differentiate ourselves in the market merely by focusing on quality, cost, and delivery (QCD). Instead, we believe that we can further augment our corporate value by leveraging intangible assets such as our personnel, technical expertise, sales routes, intellectual property, and environmental preservation initiatives. Through this approach, we can establish a foundation of sustainable development that will enable us to maintain our competitive edge well into the future.

In order to increase the value of these intangible assets, we will take steps to strengthen the organizational capability of our entire Group while developing our human resources, formulating a patent network for our core technology, and further enhancing relations with shareholders, business partners, customers, and other stakeholders.

Paying good dividends

DAIHEN has adopted the important policy of continually paying a good dividend to our shareholders. We are committed to maintaining this policy of returning profits to shareholders subject to our profitability, financial circumstances, and the future development of our business.

○ Five-year record of dividend payments

Fiscal year	2013	2014	2015	2016	2017
Dividend (in yen)	7	8	12	12	15
Payout ratio (%)	27.3	17.6	21.2	24.2	27.6

* We set a payout ratio of 30% against the 3-year average profit as a target in our 2020 medium-term business plan.
Our payout ratio against the 3-year average profit in FY2017 was 27.9%.

○ Stock data

As of March 31, 2018

Number of shareholders	10,577
Shares outstanding	135,516,455

* After implementing a reverse stock split of 5 shares into 1 on October 1, 2018, the total number of issued shares is 27,103,291.

Information disclosure

We disclose all information required by legal disclosure standards. In addition, if we determine that it is necessary to disclose additional information to increase shareholder understanding of our company, we will disclose such information immediately and accurately through various media, even if disclosure of such information is not required by any laws or regulations.

Moreover, we will continue to proactively release information about investor relations activities through our corporate website (www.daihen.co.jp) and IR conferences for institutional investors, etc.

Earning the confidence of our customers by providing high-quality goods and services

In accordance with our quality policy, the DAIHEN Group remains committed to winning the confidence of customers by providing good products, systems, and services. In addition, we are dedicated to enhancing customer satisfaction.

Earning the confidence of our customers

Quality policy

As reflected in our corporate philosophy "Reliability & Creativity" and our founding spirit of "High Quality, Low Price, and Prompt Delivery," DAIHEN has been striving since its establishment to provide customers with reliable products and services. Our strong emphasis on quality has clearly won us the great confidence of our customers.

In order to retain this confidence, DAIHEN has adopted a quality policy and is now taking steps to heighten quality in cooperation with our contractors.

Quality policy

In accordance with our founding spirit and corporate philosophy, we are winning the confidence of our customers by providing outstanding products.

Each division is addressing "customer satisfaction" as an indicator of customer trust. We intend to further increase our efforts in this regard.

Told from the frontline

Improve quality to the point of zero defects

Hiroshi Nakagiri
General Manager,
Quality Control Dept.
FA Robot Division

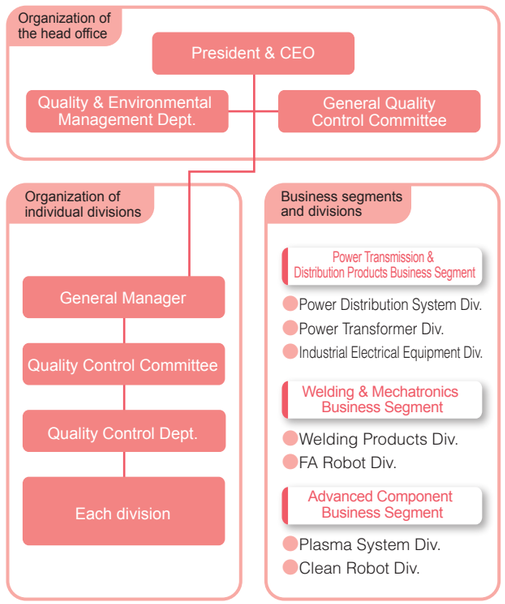
The FA Robot Division supplies industrial robots to automotive plants, shipyards, steel mills and all sorts of other production sites around the world. With businesses everywhere automating production in recent years, demands for robots have headed in all directions and systems become increasingly more complicated, but the quality assurance requirements have not changed.

Under our slogan of "Absolute Quality", we conduct scrupulous checks in every step of manufacturing from development and design to manufacture, inspections and aftercare servicing. Within that, we look at development and design as work processes where high quality is particularly imperative and go to great lengths to eradicate defects that originate in designs, with four separate stages of controls of design drawings and even validation results. As a division, we are united in the effort to further improve quality to the point of zero defects.

Quality assurance system

At DAIHEN, each of our business segments maintains a quality management system. Under their guidance, the respective Quality Control Committees established in each division and each product group discuss quality issues and report on any that arise. We have also established the General Quality Control Committee to provide oversight throughout all divisions. This committee examines problems common to all divisions, receives reports on significant quality problems from each division, examines the reports received on significant quality problems, implements countermeasures for these significant quality problems following their examination, and feeds back the results to all divisions.

○ Quality assurance system



Response system for significant quality problems

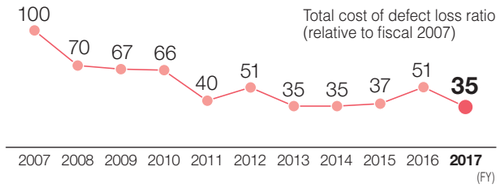
The DAIHEN Group has established a system whereby, if one of our products causes or develops the potential to cause a fire, an accident resulting in death or injury, or damage to customer property, or if a minor product issue causes the loss of many customers, we regard such a case as a "significant quality problem." Our problem-solving team then takes immediate countermeasures against the problem while disclosing the problem company-wide and takes steps to prevent a recurrence.

No one has ever filed a suit against our company for products that do not conform to the Product Liability Act. Nevertheless, it is very important that we root out any significant quality problems to win the confidence of our customers. The entire company, therefore, is now making efforts to discover and correct significant quality problems.

Enhancing customer satisfaction

The DAIHEN Group implemented an Absolute Quality Initiative between fiscal 2006 and fiscal 2008. During the three-year period beginning in fiscal 2009, we promoted further quality improvements through our Quality Initiative (Q Initiative). During the three-year period beginning in fiscal 2012, we promoted our new Quality Initiative with an emphasis on minimizing risks to quality. In fiscal 2013, we went back to basics and circulated PDCA activities to address individual quality problems and risks. We are steadily incorporating corrective actions and preventive measures. As a result, we have gradually improved our sales ratio to total cost of defect loss. Treating fiscal 2007 as 100, our score for fiscal 2017 was 35. We are very confident that these activities will both gain greater trust from customers and greatly contribute to customer satisfaction.

○ Trend in total cost of defect loss ratio



Certification of ISO 9001 registration

Since 1995, a succession of divisions of the DAIHEN Group have obtained certification of registration with ISO 9001, the international standard for quality management systems. Today, all divisions and international production plants, except for new divisions, have acquired certification of ISO 9001.

Acquiring certification of ISO 9001 registration expands our foundation for doing more than just meeting customer requirements; it testifies to our company-wide commitment to comply with the original purpose of the ISO 9001 standard, which is to continuously improve our structure in order to ensure customer satisfaction.

○ ISO 9001-registered divisions and companies

Fiscal year	Divisions, company name
1995	Welding Products Division
1996	Power Transformer Division
1997	Power Distribution Products Division
1998	Mechatronics Division
1999	Power & Control System Division
	DAIHEN Electric Co., Ltd.
	APS Division, ACT Division
2001	Semiconductor Devices Division
	Mudanjiang OTC Welding Machines Co., Ltd.
2004	OTC DAIHEN Asia Co., Ltd.
	OTC Industrial (Qingdao) Co., Ltd.
2009	DAIHEN OTC (Beijing) Co., Ltd. (China)
2016	DAIHEN Stud Co., Ltd.

Quality control exclusive training initiative

In order to maintain and improve quality across the DAIHEN Group, all Group companies are putting a lot of time and effort into human resource training. As a part of that, educational activities focused specifically on quality management are being developed inside and outside Japan.

The training curriculum is devised to primarily apply and practice quality control techniques, bolster our prevention initiatives and strengthen our ability to logically think our way through problems. It additionally covers FMEA and FTA, failure analysis, design review, reviewer training, our own "Why-Why Analysis" training, and human error analysis and countermeasures.

Moreover, we continue to implement training in statistical analysis, which serves in analyzing data in relation to product design, development and manufacture, as well as the basics of product safety in order to ensure users greater safety when using our products.

Report presentation in "Why-Why Analysis" training

Lesson in statistical analysis

Group exercise in FMEA and FTA

Small group movement

In the DAIHEN Group, business operations are directed toward attaining policy objectives based on every individual employee having a proper understanding of what our Group policy is. Within that, we are conducting small group activities from a top-down approach with which we aim to find better ways to look at and execute work, make improvements and efforts, and maintain and improve the quality of our products and services by putting together and condensing that attainment process with a logical and scientific train of thought.

In support of these activities, we train each employee in the fundamentals: QC perspectives and approaches, seven QC tools, seven new QC tools, problem-solving procedures, target-attainment procedures, and report-writing and the like. In this way, we are upgrading our job control and improvement capabilities while improving quality awareness. We can provide a visualization of the progress of our small group activities through our intranet while keeping everyone informed of the results of our initiatives.

Establishing an active workplace and improving our personnel system by providing rewarding work

We are establishing an active workplace and improving our personnel system by providing rewarding work. Moreover, we are supporting our employees' choice of varied working styles.

A personnel system dedicated to enhancing employee motivation

DAIHEN has established a personnel system designed to support and motivate our employees and provide them with rewarding work. For example, we reassign employees to accommodate the personality, work attitude, and abilities of each individual. In addition, we train our employees to develop a spirit to take on challenges; clarify our evaluation standards; and treat all the employees fairly and appropriately. In this way, our personnel system is supporting all our employees.

We believe that supporting and motivating our employees and providing them with fulfilling jobs will allow each employee to maximize his/her abilities and to develop a satisfying career. As a result, workplaces become active and our business develops at the same time. And, as DAIHEN develops, we improve the working conditions of our employees. These improvements are further contributing to employee motivation by making work more rewarding. In other words, we are aiming at a self-sustaining "personnel cycle" that can keep business going indefinitely.

In order to establish this "personnel cycle" and keep it self-sustaining, our performance evaluation system sets clear targets that the individual employee should strive to achieve and, by motivating the individual to produce results from their efforts, aims to help him/her develop his/her abilities in the process. It is a simple and easy-to-grasp system that serves to both manage targets and develop human resources.

A training system that supports employee development

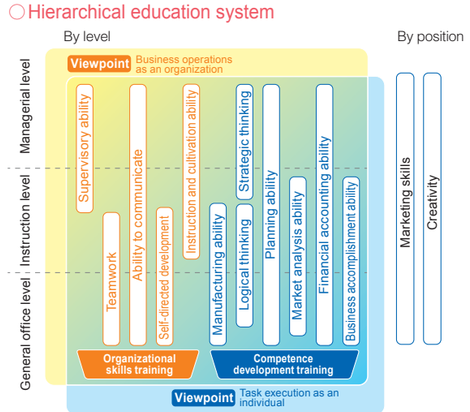
Human resource development at DAIHEN is done through daily on-the-job training, off-the-job training such as our hierarchical education programs, and incentive-driven correspondence courses that individuals can fit into their own schedules.

Our hierarchical education system is designed to improve employee skills and enhance our organizational strengths through position-specific training programs on the one hand, while, on the other, to maximize results as a united workplace by tailoring training content to the weight that "business operations as an organization" and "task execution as an individual" have at each position and level. It helps members of the same workplace not just improve their own skills but also build complementary relations with their colleagues based on the roles they play.

Moreover, to develop the skills required in each engineering, manufacturing and sales, efforts are being made to enhance creativity and marketing skills.

Going forward, we will continue to explore program content and timing in order to make our training efforts more effective.

○Hierarchical education system



Career self-discovery and plotting program

Because of social changes and newly accepted work patterns, corporate development going forward is underscored by the thinking that an organization grows only as much as the people it employs grow. At DAIHEN, we have long believed that our employees are and should be in charge of their own personal growth and, with a forward-looking attitude about what learning and experiences that requires and by liking one's job and going about it enthusiastically, their growth will lead to better results. This is why we put so much effort into our human resource development programs.

Those programs begin with a career self-discovery and plotting program for new recruits. This program is the basis for making all of the human resource development activities employees partake in, including the previously mentioned OJT and Off-OJT, and interviews on target management, more effective.

The purpose is not to have employees acquire knowledge or develop a certain mindset that goes with their position and duties like in hierarchical training. Instead, the program aims to get each individual to look down the road and think about why he/she is working, what he/she wants to achieve and become, and what is important to him/her, and then translate what he/she has discovered through this process of introspection into everyday action.

Nevertheless, in the first three years an employee is with the company, the daily instructions and training in intermediate activities they receive from their superiors are more hands-on.

Going forward, we will continue to develop our organizational strengths and pursue our prime objective as a corporate group of realizing contentment for all, by fortifying the links between our mentoring program and career plotting program, and shaping our new recruits and the younger employees of our workforce as a workplace activity.



Activities in our career self-discovery and plotting program

Developing new recruits as a workplace activity

A "mentoring program" has been introduced in order to systematically guide new recruits in the right direction and get them up to speed in their assigned workplaces as quickly as possible. Rather than managers or supervisors, mentors are someone who can steer the new recruits through daily tasks and counsel them on life issues from a common ground approach.

The primary purpose of the program is to help the new recruits settle into their jobs as soon as possible and promote their growth so that they can execute their work smoothly. To make the program more effective, mentors and new recruits go through training together and do work that helps them to understand one another better. Moreover, not only is one mentor assigned to each new recruit but also the entire workplace is tasked with aiding the new recruits. In other words, developing human resources is a workplace activity.

This idea of an entire workplace developing its new recruits is intended to create a constructive atmosphere in which everyone instinctively assists the new recruits in the same way they themselves received help and guidance when they were new. It is also meant to encourage young employees to set their sights on serving as mentors and growing into workplace leaders.


Mentors following up on new recruits

Creating an environment that facilitates work

We are now creating an environment to facilitate work so that all employees can maximize their abilities.

Support for balancing work with childcare and nursing care responsibilities

Support systems aimed at helping employees balance work with childcare and nursing care responsibilities have been improved so that employees strapped with personal issues of the sort can keep working. We have made changes that offer our workforce greater leeway than statutory requirements, such as by extending the applicable period of paid child nursing leave (5 days) and exemptions from overtime work for childcare reasons through the sixth grade of elementary school, and by introducing a 4-day workweek for employees that have to care for family members. Moreover, knowing that nothing is ever perfect, labor and management discuss work-life balance support based on actual employee needs whenever necessary.

Going forward, we will collect and analyze issues that weigh on employees in order to provide working conditions that allow our people to work in a fresh and lively manner.

DAIHEN Group Heart Festival

The DAIHEN Group Heart Festival is a big field day event that brings together upwards of 1,700 group employees, their families and people from cooperating companies from across Japan.

Held every year since 2007, it was planned and created as a place and opportunity for brewing a sense of belonging and satisfaction as a member of the DAIHEN Group through competitive events between divisions, a special drum performance by new recruits and other contests where teamwork channels the participants' energy toward a shared goal. Moreover, through the process of forming teams, practicing and actually competing with employees from cooperating companies as well as their families, the festival aims to improve communications beyond organizational boundaries.

Because of the energy and enthusiasm the Heart Festival brings out in people, we will continue to shape and stage the event so that everyone connected to the DAIHEN Group will feel more attached and happier to be a part of the Group.

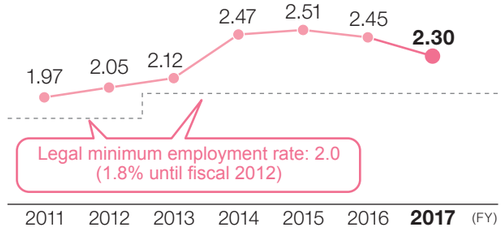



DAIHEN Group Heart Festival

Promoting employment of persons with disabilities

Daiki Corporation became a special subsidiary of DAIHEN in 1983. Daiki is now promoting employment of persons with physical and mental disabilities while improving the working environment for these individuals. As a result, DAIHEN's employment rate for persons with disabilities in Japan is now 2.45%, which is above the legal minimum employment rate of 2.0% (1.8% until fiscal 2012).

○Trend in the employment rate for persons with disabilities



Corporate Action Plan under the Act on Promotion of Women's Participation and Advancement in the Workplace

We established an exploratory committee of labor and management representatives to find ways for women to demonstrate their skills and play more active roles in the workplace. In June 2016, they formulated and submitted the below "Corporate Action Plan" to the Equal Employment Office of the Osaka Labor Bureau.

1. Period
   June 1, 2016 – May 31, 2019 (3 years)
2. Situation at DAIHEN
   In our recruiting practices every year, we look primarily for engineering graduates, however about 90% of the applications for technical positions come from men, because women represent only about 10% of that category. Moreover, about 70% of the applications we receive for office positions come from men. As a result, women account for a small percentage of our workforce.
3. Target
   Raise the percentage of women amongst new recruits (graduates and midcareer transfers) to 18% or higher.
4. Activities and timeline for recruiting and hiring more women
   June 2016 Explore policies and targets for hiring more women.
   October 2016 Explore ways to hire more women.
   December 2016 Explore proposals on deploying women in cohort with divisions/departments.
   January 2017 Formulate recruiting plans for the next year with higher numbers of women.
   March 2017 Implement measures to hire more women.
   August 2017 Assess efforts and explore ways to solve outstanding issues.

Our health and safety initiatives

Group Policies

Across the DAIHEN Group, health and safety initiatives are viewed as the basis of our corporate objective of “simultaneous contentment for all” and underpinned by our philosophy of “health and safety first.”

To promote these initiatives, managers and supervisors use self-directed efforts to enhance health and safety awareness and take steps to prevent accidents in the workplace. We facilitate comprehensive health and safety initiatives with the participation of all employees so that they themselves come to understand the need to protect their own health and safety. DAIHEN continues to follow a policy of promoting a safe, healthful, and comfortable workplace for all.

Highlighted activities

Expert diagnoses to improve workplace safety and health

We invited the Japan Industrial Safety and Health Association to audit and diagnose work safety and health at DAIHEN, for the purpose of double-checking the results of three years of “No-Tolerance Safety Patrols” conducted up through last year by an outside consultant and key safety personnel within the company, and further raising the bar of our work safety and health practices.

Audits were conducted by highly knowledgeable and experienced experts at 12 production sites of ours and affiliates and 2 construction sites in Japan. Problems were pointed out and environmental improvements were made at each of the audited sites based on the advice they gave us. The experts also cited numerous good examples, which confirmed that workplace safety and health at DAIHEN are steadily improving.

Workplace safety and health patrol

Keeping a ledger to manage and mitigate serious risks

One important activity last year that had to do with workplace safety and health was to keep a ledger of Level III and higher risks (risks that may result in serious accidents) extracted from workplaces during risk assessments, and use it in planned activities intended to manage and mitigate those risks.

We also had an industrial safety and health consultant assess the operations registered in the ledger and the countermeasures we took for them, as to whether our risk estimates (especially our risk assessments after measures were taken) and countermeasures were implemented properly or not, and received guidance on those matters.

Going forward, we will apply the results of these audits to raising the level of our own risk assessments and mitigating serous risks in the workplace.

On-site risk assessment verification

Guidance presentation after site audit

Heads-up meetings before starting work

Before starting regular and irregular jobs, a heads-up meeting is held not only to call attention to potential dangers but also to communicate matters like job content and scope, assignments, the state of everyone’s health, etc. At DAIHEN, we believe that communicating is an important component of work safety.

Stronger messaging of the 6 S’s

We continue to practice and improve the 6 S’s (*seiri* [sort], *seiton* [keep orderly], *seiso* [clean], *seiketsu* [standardize the 3 foregoing practices], *shitsuke* [sustain the practices], *seibi* [service]) defined by the DAIHEN Group as the basis of work safety and health activities, by incorporating the practices into group annual plans.

Thorough measures against heat exhaustion

During the grueling heat of summer, we audited the workplace environment and heat exhaustion preventative measures of all of our business sites, to make sure proper measures were being taken, e.g., dressing in air-cooled clothing, carrying an emergency kit and warning meter, providing salt tablets, isotonic drinks, etc. In addition to that, managers and supervisors were instructed to provide guidance to subordinates in managing one’s own health and the workplace environment.

Salt tablets, warning meters and advisories used at all business sites

Drink dispenser offering isotonic drinks

New “Safety Check Day” started

Beginning in 2018, December 15 was set as “Safety Check Day” in the DAIHEN Group. Planned as an annual event, the purpose is to have each and every employee on the group workforce to “check” their own safety awareness and the safety of their actions, by taking part in activities to prevent work related accidents. In this first year, managers and supervisors at each business site conducted safety patrols and every employee checked him/herself by filling out a check sheet, the result being that employees across the group workforce reaffirmed the importance of safety.

“Safety Check Day” announcement. Activities were pushed up to 12/14 because 12/15 was a holiday.

Meeting prior to patrolling the whole business site

As a partner to our customers, we seek to achieve mutual prosperity and outstanding customer satisfaction.

To provide our customers with excellent products, we are promoting green procurement to ensure fair and equitable trade with our suppliers in the interests of mutual development.

Basic policy regarding material procurement

To meet customer demand by providing valuable products and services to our customers, we depend on the cooperation of suppliers offering excellent products and technologies. The DAIHEN Group believes that one of the most important elements of manufacturing competitive products is the procurement of high-quality materials. Therefore, on our website, we always list the items we seek to procure. In addition, we have adopted a basic policy for material procurement so that we can maintain and develop partnerships with our suppliers.

– Basic policy regarding material procurement –

Offering openness and fairness of opportunities

We openly provide opportunities for all our suppliers to participate in trade, regardless of nationality, region, business scale, or business experience.

Fair evaluation

We adhere to principles of competition as the basis on which we select suppliers. We generally take management reliability and technical development capability into consideration and make a fair evaluation in addition to evaluating quality, price, and delivery date.

Mutual development

We maintain sound trade relations based on mutual trust with suppliers and strive to support reciprocal corporate development.

Compliance with the law

We faithfully meet our contractual obligations with our suppliers, negotiate according to laws and regulations, and maintain healthy business practices.

Our policy is not to use conflict minerals that serve as a source of funds for warlords who violate human rights.

Communication with our suppliers

To promote mutual understanding with our suppliers, we hold an annual Briefing Session on Procurement Policy at which we explain our material procurement policy to our suppliers and engage in related discussions.

In addition, we perform a fair evaluation of a supplier's business status and accomplishments. We invite suppliers to our annual Briefing Session on Procurement Policy and honor outstanding suppliers. In this way, we are enhancing our relationships with our suppliers.

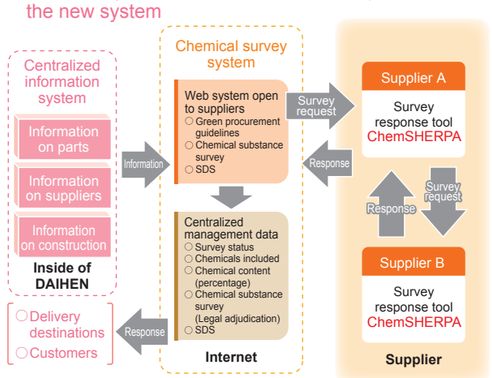
Policy briefing session for suppliers

Green procurement initiatives

The DAIHEN Group establishes a new survey system for chemical substances.

Spurred by international trends in chemical substance management and standardization efforts in Japan, we revised the "Green Procurement Guidelines" of the DAIHEN Group for a 7th time to comply with the new chemSHERPA scheme. Moreover, in order to promote green procurement, we brought our chemical survey system in line with this new scheme as well, making it possible to exchange and share environmental data across our global supply chains. The new system has made the environmental survey process faster and easier, which allows us to focus more on making environment-friendly products.

○ Outline of green procurement and surveys taken with the new system

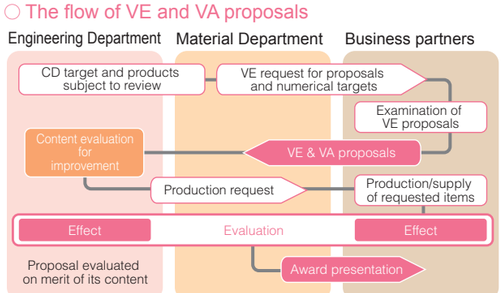


Working together with our suppliers to raise productivity

The DAIHEN Group aims to ensure quality and improve market competitiveness while streamlining our manufacturing processes and enhancing ease-of-manufacturing by actively implementing cost reductions focused on Value Engineering/Value Analysis (VE/VA) proposal initiatives.

Through these activities, we jointly participate in improvement proposals together with those who place and receive orders, and we share the results with both parties. We believe this is a desirable way to operate our business while earning reasonable profits.

○ The flow of VE and VA proposals



Seeking symbiosis with the local community and cooperation with society

As a member of the local community, each plant is deepening its interchange and establishing a positive relationship with community residents while fulfilling its corporate social responsibility through various support initiatives.

Communication with the local community

Keeping the community in focus

Every August, DAIHEN Industrial Machinery in Tottori opens up a part of their site to the general public for their annual summer festival. The festival includes various events, kiosks manned by employees, and a drawing for prizes while offering opportunities for local residents and DAIHEN Group employees and their families to mingle.

Moreover, Daihoku Industry Co., Ltd. in Eniwa, Hokkaido contributes to local events and collaborates on Eniwa Candle Night.

Summer festival hosted by DAIHEN Industrial Machinery

Eniwa Candle Night

Neighborhood schools participate in plant tours

Our Rokko Plant in Kobe and DAIHEN Industrial Machinery offer plant tours to neighborhood elementary schools, day-care centers, and technical colleges. It also provides junior high school students with internships in order to gain work experience. In this way, the manufacturing sites of our Group are imparting in young people an understanding of the significance and appeal of work.

Gaining work experience at the Rokko Plant

Tottori Plant Tour

Comments by participants

Comments from participants in the Rokko internship

- The exposure to such a technical job will serve me as reference when exploring future career paths.
- I saw machinery you don't normally see.
- The workplace had a positive vibe and things were explained politely and made very easy to understand.

Supporting social welfare, education, and cultural initiatives

Support for social welfare

The Hakuaisha, a social welfare service corporation that carries out social welfare activities in Yodogawa-ku, Osaka, holds a regular event known as the Hakuaisha Carnival. Every year, employees wishing to make donations provide numerous items for the fundraising bazaar.

Support for art and culture

We participated in initiatives in support of the Osaka Philharmonic Orchestra, the Kansai Philharmonic Orchestra, Kobe Luminarie, and Nagashibina Maranic (marathon and picnic) event in Mochigase (Tottori City).

Support for scientific education

We dispatch company employees as part-time university lecturers to provide support and help students improve their abilities. This effort includes providing students with an introduction to leading-edge robotic and welding technologies.

We stand together with everyone, and we won't forget that our Group has the support of many people.

Cleanup activity surrounding our offices and plants

Each location of the DAIHEN Group is proactively engaged in cleanup campaigns and is contributing to regional beautification initiatives. Going forward, we intend to participate in future regional beautification and vitalization efforts such as these.


Juso


Rokko


Kanehira


Oita


Hirosaki


Izumiotsu


Matsudo


Mie


Eniwa


Chitose

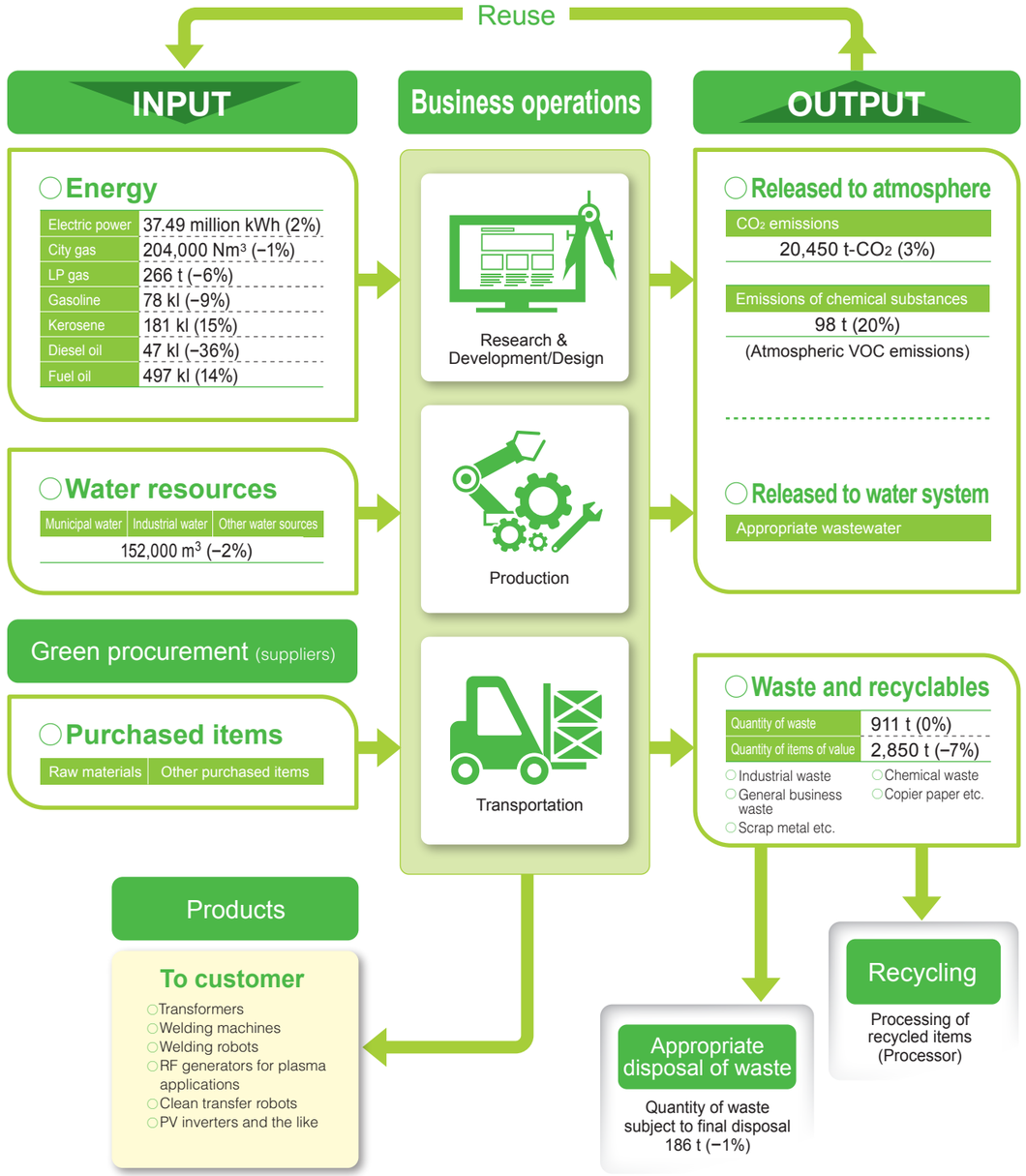

Tottori


Kagawa

The environmental impact of our business activities

In addition to determining the environmental impact of our business activities, the DAIHEN Group is working hard to reduce its overall environmental impact from every angle by remaining constantly aware of all phases from product planning and development through to production.

Relation between the DAIHEN Group's environmental impact and business operations



Notes:

- Scope of data: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, and Kanehira Plant) and Group production bases (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant, and Izumiotsu Plant), OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.
- Figures apply to fiscal 2016. Figures in parentheses are relative to fiscal 2015.

Environmental management at the DAIHEN Group

The DAIHEN Group aims to develop as a company that becomes the first choice of society at large. We consider environmental preservation to be one of our most important issues, and we are thus committed to environmental management in order to establish a better relationship with stakeholders through our environmental preservation initiatives. We are promoting environmental conservation through the implementation of environmental safeguards and are contributing to the emergence of a sustainable society by instituting environmental management that focuses on the environmental impact of our business operations.

Contributing to the emergence of a sustainable society is the social responsibility of the DAIHEN Group, and environmental management represents an important primary factor when evaluating a company's sustainability.

In constructing and operating its Environmental Management System (EMS), the DAIHEN Group is seeking to increase its own sustainability by contributing to the emergence of a sustainable society through the environmental considerations of its business operations, the environmental contribution of its products, the environmental aspects of its social contribution, and so on as shown in the illustration below.

Above all, the environmental contribution of both of our eco-friendly products during and after application is increasingly important to our Group manufacturing businesses. By achieving this, we intend to meet our responsibilities as an enterprise.

Contributing to the emergence of a sustainable society

Implementation of environmental management at the DAIHEN Group

1 Eco-friendly business operations

We are monitoring the environmental impact of the business operations of the DAIHEN Group and are implementing various initiatives to reduce this impact at the product manufacturing stage. In addition, we are expanding such activities to our international production hubs in China, Thailand, and elsewhere and addressing the construction of a global environmental management system.

2 Contributing to the environment through our products

The environmental contribution of our eco-friendly products both during and after application is the most significant mission of our Group manufacturing businesses. We will fulfill our responsibilities as an enterprise by producing numerous eco-friendly products and by contributing to the emergence of a recycling-centered society.

3 Contributing to society through environmental initiatives

While building a better relationship in the future with our customers, local residents, shareholders, and all other stakeholders through the DAIHEN Group's various environmental activities, we are promoting activities to increase the sustainability of the DAIHEN Group. For this reason, we believe it is important that each employee in the Group implement voluntary and concrete actions as a member of society.

Environmental Management System (Basis of activities)

○Compliance ○Risk management ○Communication ○Training and education

Environmental preservation initiatives: policies and systems

The DAIHEN Group has established its own Environmental Policy based on both its Basic Philosophy and Conduct Policy. The Group has established an environmental management system and is promoting environmental conservation through a variety of means.

The DAIHEN Group environmental policy

Basic Philosophy

The DAIHEN Group responds to the trust of society by developing technologies and providing products that place a value on people and resources under the DAIHEN corporate philosophy "Reliability & Creativity." The DAIHEN Group seeks to contribute to an abundant future and a healthy environment as a corporate group that fills a role as the popular choice of society.

Conduct Policy

In an effort to implement its basic philosophy, the DAIHEN Group will voluntarily adopt proactive global environmental conservation initiatives according to the following guidelines in all our business operations including power transmission and distribution products, welding machines, FA products, semiconductor equipment, dispersed power systems, and other products in the energy and power electronics field.

1 Reduce environmental impacts resulting from business operations.

We shall address the following initiatives by considering all steps encompassing product design, development, procurement, manufacturing, and distribution as well as product use and disposal.

1. Promote energy-efficiency initiatives and take steps to help mitigate the risk of global warming.
2. Promote resource conservation, waste reduction, and recycling.
3. Reduce the environmental impact of the use of chemical substances.
4. Offer green products.
5. Promote green procurement.

2 Comply with laws and other requirements.

We shall comply with the relevant legal and environmental requirements and other requirements that we decide to adopt. We shall also adopt and administer voluntary management standards and implement pollution controls to prevent any occurrence of environmental pollution.

3 Establish environmental objectives and targets and periodically review them.

Each division of the DAIHEN Group shall establish environmental targets and promote environmental preservation initiatives.
Moreover, each division shall periodically review its targets, and continually seek to improve its environmental management system in ways that ultimately enhance its environmental performance.

4 Raising environmental awareness

We shall enrich environmental education and deepen understanding of environmental policy among all who are working for or within organizations and seek to increase environmental awareness through initiatives intended to contribute to society.

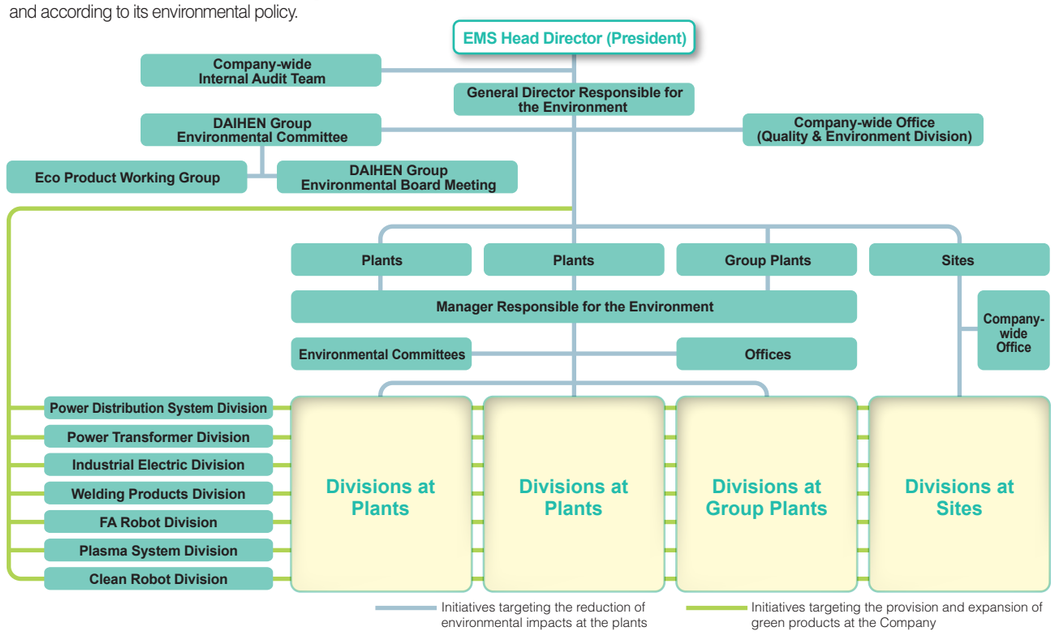
5 Enhancing environmental public relations

We shall provide stakeholders with timely environmental information, collect a broad range of environmental data, review our environmental preservation initiatives, and transmit information in a clear manner.

Environmental Management System

The DAIHEN Group has established and implemented the DAIHEN Group Environmental Management System under the President & CEO of DAIHEN Corporation as the EMS Head Director and the Environmental Officer as the General Director Responsible for the Environment. The DAIHEN Group promotes a variety of environmental conservation initiatives through its business operations and according to its environmental policy.

The DAIHEN Group has established a system that supports environmental protection initiatives from two directions; each office and plant implements environmental conservation related to its business operations, and each division develops plans for eco-friendly products and services. The Eco Product Working Group and the DAIHEN Group Environmental Board Meeting, organizations under the auspices of the DAIHEN Group Environmental Committee, have been established in an effort to promote Group-wide initiatives.



Environmental management system

The DAIHEN Group has proactively established an effective environmental management system and continuously improves it in order to strengthen environmental management groupwide. We intend to continue promoting environmental preservation initiatives in the future.

Certification of ISO 14001 Registration

We have established and implemented a Group-wide environmental management system compatible with the ISO 14001 international standard as part of our environmental preservation initiative under our Environmental Policy. Moreover, because we are committed to continually reducing the impact of our business operations and products on the environment, we transitioned our environmental management system to ISO14001:2015 in fiscal 2017.

○ Group Company sites that have acquired certification of ISO 14001 registration

Companies in Japan

Company name	Site
DAIHEN Corporation DAIHEN Electric Machine Corporation DAIHEN System Corporation DAIHEN Logistics Co., Ltd. DAIHEN Engineering Co., Ltd. DAIHEN Technos Support Corporation	Head Office / Juso Plant Rokko Plant Mie Plant Chitose Plant Kanehira Plant
DAIHEN Industrial Machinery Corporation	Tottori Plant
DAIHEN Technology Institute	Oita Plant
DAIHEN Stud Co., Ltd.	Matsudo Plant
Daihoku Industry Co., Ltd.	Eniwa Plant
Minami Electric Co., Ltd.	Kagawa Plant
DAIHEN Fuse Corporation	Izumiotsu Plant
DAIHEN Aomori Corporation	Hirosaki Plant

Companies outside Japan

Company name	Country
OTC DAIHEN Asia Co., Ltd.	Thailand
DAIHEN Electric Co., Ltd.	Thailand
Mudanjiang OTC Welding Machines Co., Ltd.	China
OTC Industrial (Qingdao) Co., Ltd.	China
DAIHEN OTC (Beijing) Co., Ltd.	China

Environment-related incidents and complaints

In fiscal 2017, there was one environmental accident involving a paint spill, but fortunately it did not impact the environment. As for complains being lodged against us, we received the two below complaints and completed corrective measures including steps to prevent reoccurrence.

○ Environment-related complaints in fiscal 2017

Detail of complaint	Originating workplace	Response
After trimming and spraying the Himalayan cedars in front of the headquarters for insects, hairy caterpillars crossed the fence into neighboring yards.	Juso Plant	Apologies were made and it was explained to residents that trees would be sprayed periodically going forward to prevent the hairy caterpillars from proliferating to begin with.
The canopy of the Himalayan cedars was blocking the lights, making the area dark.		After trimming back the trees, more lights pointing outward from the site were added.

Environmental training and internal awareness initiatives

We provide wide-ranging environmental training in an effort to improve the environmental awareness of all employees, enable them to recognize their responsibilities, and translate their duties into action.

Expansion of environmental training opportunities

We provide three levels of environmental training targeted at specific groups: all DAIHEN Group employees; various employee segments, such as new hires; and employees requiring specific expertise such as personnel undergoing internal audit training and personnel assigned environmental protection duties. Training materials and the relevant data used for various training courses are published internally on the Web and are used for training within division and for improvement of knowledge.

Publication of Eco News

Currently the periodic house journal Eco News is published on the company intranet in order to train all employees as part of their in-house training. It is also intended to raise the environmental awareness of all employees.

Environmental cards distributed

We distributed a pocket card to all our Group employees and temporary workers that contains the text of “My Environmental Declaration” and lists our environmental policies and targets.

Internal environmental audits

In fiscal 2017, we conducted internal environmental audits of all 99 divisions of the DAIHEN Group.

These audits placed emphasis on whether or not, in fiscal 2017, priority environmental targets were considered and appropriately applied in setting division targets, whether or not environmental and compliance risks and opportunities were identified, and whether or not environmental assessments and management were implemented on a product lifecycle basis.

Internal audit under ISO14001 in fiscal 2017

Results of internal audit for fiscal 2017:
12 items identified (all corrective measures completed)

DAIHEN Group environmental accounting in fiscal 2017

As a group of manufacturers, the DAIHEN Group engages in an extensive range of environmental initiatives. We adopted environmental accounting because we believe that cost-benefit analysis supports effective and appropriate initiatives. In the future, we will allot sufficient funds where needed and will engage in additional environmental initiatives by expanding the scope of application of environmental accounting.

Elements of environmental accounting

Accounting period: Fiscal 2017 (April 1, 2017 to March 31, 2018)

Reporting workplaces:
Juso Plant (including the head office), Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant of DAIHEN Corporation, DAIHEN Group production sites (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant and Izumiotsu Plant)

Note: This report has been compiled according to the DAIHEN Group Environmental Accounting Guidelines. These guidelines are in conformity with the Environmental Reporting Guidelines published by the Ministry of the Environment, Japan.

○ Costs of environmental initiatives

- ○ Costs are calculated by separating investment expenditures and expenses.
- ○ Expenses include labor costs, but do not include depreciation.
- ○ Costs including objectives (combined costs) excluding environmental costs are calculated proportionally by our criteria.

(Millions of yen)

Classification		Major initiatives	Investment	Cost
Business area costs			157	166
Breakdown	1. Pollution control	Maintenance and management of facilities to prevent air, water, soil, noise or other pollution.	1	98
Breakdown	2. Global environmental preservation	Introduction, maintenance, and management of energy-efficient equipment; introduction of energy conservation initiatives, etc.	134	20
Breakdown	3. Resource recycling	Waste reduction, recycling, externally consigned disposal, resource-conservation initiatives, etc.	22	48
Upstream and downstream costs		Green procurement promotion activities etc.	0	1
Management activities		Management of environmental preservation organizations, environmental education, information disclosure, construction and maintenance of environmental management systems, etc.	4	70
R&D		Promotion of green products R&D etc.	193	529
Community activities		Community environmental preservation initiatives, donations to environmental organizations, etc.	0	1
Environmental remediation		Environmental remediation cost	0	3
Miscellaneous		Participation in industry groups, information exchange meetings with affiliated companies, etc.	0	6
Total			354	776

○ Benefits of environmental initiatives

Classification	Item (unit)	FY2016	FY2017	Difference
Resource inputs	Total energy input (kL in crude oil equivalent)	8,140	8,338	−198
Global warming prevention	Greenhouse gas emissions (t-CO_2)	14,431	14,259	172
Waste reduction	Total waste and other emissions (t)	724	722	2
	Waste final disposal amount (t)	8	4	4
Air pollution control	Atmospheric emissions of VOCs (kg)	24,477	23,226	1,251

Economic benefits of environmental initiatives

○ Monetary benefits

(Millions of yen)

Item	Details of effects	Amount
Income	Business income by sale of valuables resulted from business activities	31

○ Estimated effects

(Millinos of yen)

Item	Details of effects	Amount
Sales of green products	Power Transmission & Distribution products Top Runner transformers, transformers for power companies, PV inverters, and other products	12,131
	Welding & Mechatronics products Energy-efficient, gas-saving, low-spatter welding machines, welding robots, and other products	3,382
	Advanced Component products RF/Microwave generators and matching boxes, Wafer/glass substrate transfer clean robots and other products	4,770

Note: The above were calculated using the environmental preservation objectives ratio.

○ Estimated major (individual) effects

(Thousands of yen)

Item	Details of effects	
Energy conservation	Reduced paper documents by introducing a paperless system.	29,865
	Reduced work steps by introducing digital X-ray sensors.	6,075
	Reduced power consumption by introducing automated equipment for producing stud bolts.	3,250
	Reduced power consumption by introducing replacing HID lighting with LED lighting.	755
	Reduced running time (days of operation) by automating welding, sleeve crimping and silicon coating processes.	460
Weste reduction	Reduced wood waste by using returnable shipping containers.	162

Note: Estimated benefits from the current year’s investment and initiatives are appropriated as a five-year benefit because the benefits are longer term.

International environmental accounting

Accounting period: Fiscal 2017 (April 1, 2017 to March 31, 2018)

Reporting workplaces:
OTC DAIHEN Asia Co., Ltd. (Thailand); DAIHEN Electric Co., Ltd. (Thailand); Mudanjiang OTC Welding Machines Co., Ltd. (China); OTC Industrial (Qingdao) Co., Ltd. (China)

○ Costs of environmental initiatives

Investment	¥14 million
Costs	¥31 million

Note: Figures exclude payroll and depreciation.

Environmental initiatives: plans and results

Under our Voluntary Environmental Action Plans, the DAIHEN Group has adopted medium-to-long-term environmental objectives and targets, and we are thus closely focused on environmental preservation. In the DAIHEN Group's 5th Voluntary Environmental Action Plan, which was initiated in fiscal 2016, we pursued three initiatives: prevention of global warming, waste reduction, and air pollution control. These were adopted as common initiatives at our 18 plants, including the offshore production plants of the DAIHEN Group.

Because of the positive results posted in fiscal 2016, we raised our targets in fiscal 2017 and spiritedly promoted environmental activities in all divisions, business sites and plants in a challenge to attain those targets. And, with the exception of reducing environmental risks (zero environmental accidents) and air pollution control (reducing VOC emissions), we achieved those targets.

On the management side of our environmental efforts, we completed the transition to ISO14001:2015 and steadily promoted environmental contributions with our suppliers. With regards to reducing environmental risks (zero environmental accidents), there was one accident in the first half of the year, but fortunately it did not impact the environment and we used the experience to strengthen our environmental management system by horizontally expanding preventative measures to all business sites and plants.

Regarding products, we helped customers to significantly reduce their CO_2 emissions by creating and selling environment-conscious products.

As for our own CO_2 emissions, our business sites and plants implemented a variety of activities to reduce their energy consumption, which enabled us to attain our target despite the uphill challenges presented by extended plant operating hours that were needed to meet demand driven by the mild recovery in industrially advanced nations and strong equipment investment in Japan and elsewhere.

In the realm of waste reduction, we promoted recycling and efforts to convert waste into valuable resources, and expanded the use of returnable steel shipping containers to overseas business sites, and, as a result, achieved our target.

In regards to air pollution control, we did not attain our target, but we are investigating alternative ways to reduce emissions such as to switch to VOC-free paint.

In fiscal 2018, we will set our targets higher still and continue to promote environmental protection activities to attain them. This will include aligning our business activities with the requirements of ISO14001:2015, addressing risks and seizing the opportunities they present, and adapting and improving our environmental management system in response to changes in a timely manner.

The DAIHEN Group's 5th Voluntary Environmental Action Plan and Results of Initiatives

Stage	Corporate objective	Medium-term plan	Policy	Target for Fiscal 2016		Results of Initiatives in Fiscal 2017	Initiatives in Fiscal 2017	Evaluated by DAIHEN
Management	Simultaneous contentment for all	—	Promoting environmental management	Transition to ISO14001:2015.		Certified under 2015 version	・Internal audit: May 29 – July 29 ・Surveillance audit: August 23 – October 5 ・2015 version registration: December 14	○
			Green procurement	Promote green procurement with suppliers to broaden our environmental contribution. (Basic business agreement concluded with 75% or more of all suppliers)		Contracts concluded with 80% of all suppliers	・Requested 17 suppliers not amongst the 76 officially certified companies to implement environmental activities. (Contracts concluded with 93 of 117 suppliers = 80%)	○
			Reducing environmental risk	0 environmental accidents* (* An accident that causes environmental damage [soil, water quality, etc.] to DAIHEN or third parties, or seriously impacts the natural environment)		1 environmental accident	・Paint spill at Kagawa Plant. (Paint was harmless and did not impact the environment.) - Checked equipment at all plants and business sites. - Checked preparations against large disasters, e.g., earthquakes, etc.	△
Products		Create value with products unique to DAIHEN	Developing green products	Percentage of new products certified as "green" 90% or more		90.9% of new products "green" certified	・Certified products … Power Distribution: 7, Power Transformer: 3, Industrial Electric Equipment: 3, Welding Product: 3, FA Robot: 5, Plasma System: 3, Clean Robot: 6 ・Percentage of green products amongst new products: 90.9% (30 of 33 products)	○
			Promoting sales of green products	Percentage of all sales accounted for by green products 55% or more		58.1% of all sales accounted for by green products	・[Total green products] Super Eco Products: 16, Eco Products: 238 Sales of green products 67,208 million yen/ Sales of all products 115,636 million yen = 58.1%	○
			Creating values that customers themselves recognize	Reduce CO_2 emissions by 40,000 tons/year via green (energy-saving) products.		48,300 tons	Expansion of qualifying energy-saving products ・Contribution to CO_2 reduction 48,312 tons	○
Processes		Promote our Loss-Cutting Initiative	Preventing global warming	Reduce CO_2 emissions intensity of plants and in distribution by 35% from fiscal 2010 levels.		Reduced by 40.4%	● Updated to LED lighting and power-saving equipment. ● Automated production. ● Efficiently operated drying ovens and annealing furnaces. CO_2 emissions intensity result: 0.14 t-CO_2/million yen FY2017 target: 0.15 t-CO_2/million yen → Compared to FY2010: 40.4% reduction Referenc: Total CO_2 emissions: 20,450 t-CO_2	○
			Preservation of biodiversity	○ Reduce water consumption intensity by 33% from fiscal 2010 levels. ○ Promote efforts to preserve biodiversity at each business site.		Reduced by 42.3%	● Introduced viscosity reducing agent for spilled paint. ● Introduced paint run-off recovery system. ● Participated in community-organized river cleanup. Water consumption intensity result: 1.02 m^3/million yen FY2017 target: 1.18 m^3/million yen → Compared to FY2010: 42.3% reduction	○
			Waste reduction	Percentage of waste disposed of by landfill 0.25%		0.133% disposed of by landfill	● Increased and enforced waste sorting. ● Reduced wood waste. ● Promoted conversion of waste into valuable resources. Percentage of waste from plants disposed of by landfill → 0.133% Reference: Total waste discharged excluding valuable resources: 911.3 t	○
			Air pollution control	Reduce VOC emissions intensity by 50% from fiscal 2010 levels.		Reduced by 44.9%	● Revised paint standards. ● Switched to PRTR-free paint and thinner. VOC emissions intensity: 0.66 kg/million yen FY2017 target: 0.58 kg/million yen → Compared to FY2010: 44.9% reduction Reference: Total VOC emissions: 81,544 kg	△

The DAIHEN Group's 5th Voluntary Environmental Action Plan (fiscal 2018)

Under our 5th Voluntary Environmental Action Plan, we have set medium-term action targets (fiscal 2016 – 2018) for each of the "Management," "Products" and "Process" stages.

In the "Management" stage, we are adapting the environmental management systems we have been using from before to the revised ISO requirements, rebuilding them as a platform integrated with our business activities and rounding them out into more effective tools.

In the "Products" stage, we are continuing the push to create and supply green products with a strong emphasis on the values of our customers and, as energy-saving (high efficiency) products, simultaneously contribute to society by first and foremost helping the fight against climate change.

Also, as a new effort, we added the conversion of waste to valuable resources this fiscal year.

In the "Process" stage, we are expanding the activities that plants in Japan are implementing to protect the environment and preserve biodiversity to our production sites outside Japan, and sharing the results they have posted from those efforts, in order to address environmental protection from a global perspective.

We will further accelerate activities within the DAIHEN Group in order to contribute to society through our efforts to protect the global environment and bring "simultaneous contentment for all."

Stage	Corporate objective	Medium-term plan	Policy	Target for Fiscal 2018
Management	Simultaneous contentment for all	—	Promoting environmental management	Maintain and improve ISO14001:2015-compliant EMS.
			Green procurement	Promote green procurement with suppliers to broaden our environmental contribution. (100% of the suppliers who have concluded basic business agreement with DAIHEN)
			Reducing environmental risk	0 environmental accidents Environmental accident: Accidents that cause environmental (soil, water quality, etc.) damage to us or third parties or that seriously impact the natural environment)
Products		Create value with products unique to DAIHEN	Developing green products	Percentage of new products certified as "green" 90% or more
			Promoting sales of green products	Percentage of all sales accounted for by green products 60% or more
			Creating values that customers themselves recognize	Reduce CO_2 emissions by ~~45,000 tons/year~~→ 50,000 tons/year via green (energy-saving) products.
			Conversion of waste to valuable resources	Identify and set target for convertible percentage of resources in new products (100% of developed products).
Processes		Promote our Loss-Cutting Initiative	Preventing global warming	Reduce CO_2 emissions intensity from fiscal 2010 levels. ~~37%~~→43%
			Preservation of biodiversity	Reduce water consumption intensity from fiscal 2010 levels. ~~35%~~→43% Promote efforts to preserve biodiversity.
			Waste reduction	Percentage of waste disposed of by landfill ~~0.25%~~→0.13%
			Air pollution control	Reduce VOC emissions intensity from fiscal 2010 levels. 50%

→ ** indicates targets that were upward-revised after recording fiscal 2017 results.

Prevention of global warming

Controlling CO_2 emissions

Plan

DAIHEN Group (18 plants)

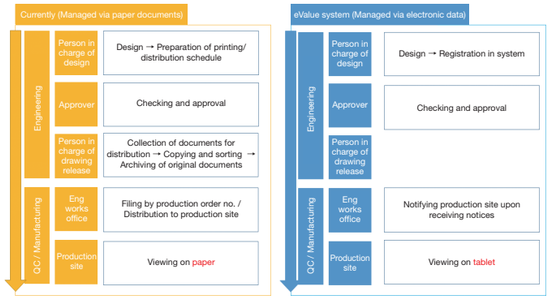
Reduce CO_2 emissions intensity **by 35%** from FY2010 levels.

Do

We have been committed to reducing CO_2 emissions at the 18 plants of the DAIHEN Group, including six plants at production sites outside of Japan. Some of those actions are listed below.

Introduction to initiatives of our plants

- Replacing equipment with energy-saving products (LED lighting, air conditioning, compressors)
- Automation of production lines, efficient operation of equipment
- Shorter inspections and testing
- Management and energy-saving of air conditioning
- Introduction of paperless systems



Stud production line

Coil air conditioning

Check & Act

We attained CO_2 emissions targets within the DAIHEN Group by taking a plethora of actions such as by introducing energy-saving equipment and making efficiency improvements to production lines.

In fiscal 2018, we will continue to implement and manage our energy-efficiency measures and climate change initiatives by adopting target values and assessing our performance.

DAIHEN Group (18 plants)

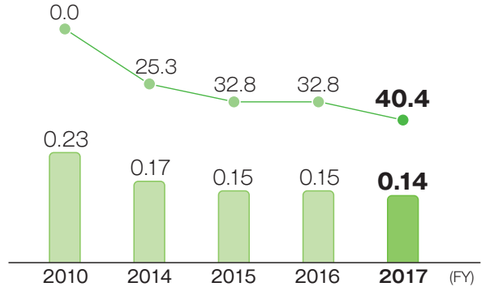
CO_2 emissions intensity relative to fiscal 2010 levels

Reduced CO_2 **by 40.4%**

(Fiscal 2017 result: 0.14 t-CO_2/million yen)

Scope of calculation: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant) and production sites of affiliated companies (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant, and Izumiotsu Plant), and production sites outside Japan [Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.]

CO_2 emissions intensity and reduction of the DAIHEN Group by fiscal year



Waste reduction

Efficient use of resources

Plan

DAIHEN Group (12 plants in Japan)

Percentage of waste disposed of by landfill **0.25%**

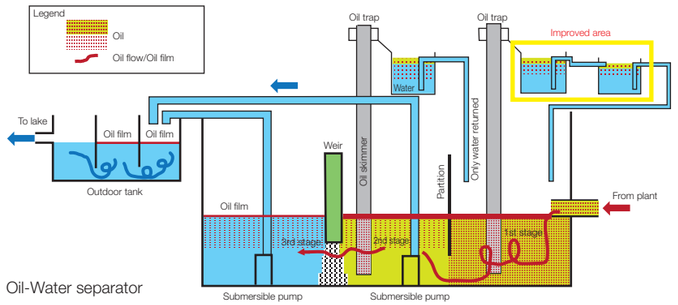
Do

We have been committed to reducing waste to effectively use resources at the 18 plants of the DAIHEN Group, including six plants at production sites outside of Japan. Some of those efforts are listed below.

Introduction to initiatives of our plants

- Sorting of waste by material
- Waste reduction by improving work efficiency and work standardization (Painting work improvement, equipment tuning, outsourcing, etc.)
- Use of steel cases, improvements in packaging methods, introduction of returnable packaging materials
- Introduction of wastewater recovery system
- Improvements to oil-water separator

Wastewater recovery system



Oil-Water separator

Check & Act

We attained waste reduction targets within the DAIHEN Group because each of our plants meticulously manages waste via sorting.

In fiscal 2018, we will continue implementing and managing our waste reduction efforts by adopting target values and assessing our performance.

DAIHEN Group (12 plants in Japan)

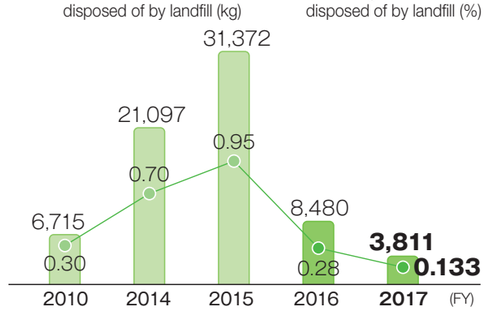
Percentage of waste disposed of by landfill

0.133%

(Amount of waste disposed of by landfill in fiscal 2017: 3,811 kg)

Scope of calculation: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant) and production sites of affiliated companies (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant and Izumiotsu Plant)

Amount of waste disposed of by landfill and percentage thereof amongst all waste in the DAIHEN Group by fiscal year



Air pollution control

Management of chemical substances and control of emissions

Plan

DAIHEN Group (18 plants)

Reduce the intensity of atmospheric emissions of VOCs **by 50%** from fiscal 2010 levels.

Do

We have been committed to reducing VOC (Volatile Organic Compounds) emissions at DAIHEN Group, including plants at production sites outside of Japan. Some of those actions are listed below.

Introduction to initiatives of our plants

- Reduced consumption through quality improvements
- Change of painting method
- Change of priming thinner
- Improvements to exhaust treatment system

Exhaust treatment system

Check & Act

Though quality improvements were made and work method was changed to reduce emissions, we did not attain our target as a group.

Therefore, in fiscal 2018, we will restake our challenge of reducing VOC (Volatile Organic Chemical) emission by 50%.

The DAIHEN Group will continue to promote green procurement in order to control the use of chemical substances in our purchased parts and materials before we incorporate them in our products.
For details, see “Green procurement initiatives” on page 27.

DAIHEN Group (18 plants)

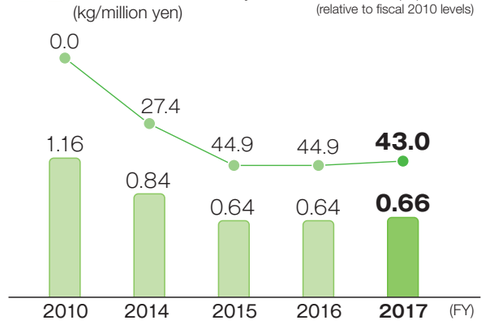
VOC emissions intensity from fiscal 2010 levels

Reduced by 43.0%

(VOC emissions intensity in fiscal 2017: 0.66 kg/million yen)

Scope of calculation: DAIHEN Corporation (Juso Plant, Rokko Plant, Mie Plant, Chitose Plant, Kanehira Plant) and production sites of affiliated companies (Tottori Plant, Oita Plant, Matsudo Plant, Eniwa Plant, Hirosaki Plant, Kagawa Plant, and Izumiotsu Plant), and production sites outside Japan [Mudanjiang OTC Welding Machines Co., Ltd., OTC Industrial (Qingdao) Co., Ltd., OTC DAIHEN Asia Co., Ltd., DAIHEN Electric Co., Ltd., DAIHEN OTC (Beijing) Co., Ltd., DAIHEN Advanced Machinery (Changshu) Co., Ltd.]

VOC emissions and reduction of the DAIHEN Group by fiscal year



Our eco-friendly product development brings results

In order to contribute to the emergence of a low-carbon society committed to recycling as we engage in product manufacturing, the DAIHEN Group is promoting product development intended to reduce environmental impacts during the product usage stage.

Oil-immersed transformer for lighting/motor loads (2014 top-runner transformer)

17% smaller footprint, 14% shorter than our previous model

Small retail stores like convenient stores have a high voltage power supply coming in and diverse loads that require 3-phase and single-phase currents that they have to feed with it. Space is often limited, so a compact transformer that can fit in a small cubicle is needed.

[1] Less no-load (power standby) loss

Because our transformer uses a 3-phase core for both single-phase and 3-phase transformations, no-load loss is reduced compared to using separate single-phase and 3-phase transformers.

[2] Power flexibility

Power can be used flexibly meaning that, when single-phase load is low, more 3-phase load is available, and vice-versa. Therefore, loads can be freely selected between lights and motors as long as the shared amount of power is within the load curve.

[3] Space-saving design with 1/3-phase circuits in a single unit

Since all of the circuitry and capabilities of both single-phase and 3-phase transformers are consolidated into a single unit, this new transformer of ours requires less space and money to install.

Comment from the developer

Takashi Morimoto
Transformer Section
Engineering Dept.
Industrial Electric Division

Q What was the theme or background to the development of this product?

Because a single unit can handle both motor and lighting loads, this type of oil-immersed transformer is a space-saving product widely used by small stores as an in-coming power panel. A customer of ours who makes power panels wanted something compact and ready to deliver, so we came out with a line-up of mass-producible standard products.

Q During product development, what challenges did you encounter?

Saddled with numerous restrictions on things like installation space, we had to discuss specifications in meticulous detail with the customer and reflect all of that in products in order to speedily transition development and design into mass-production and sales.

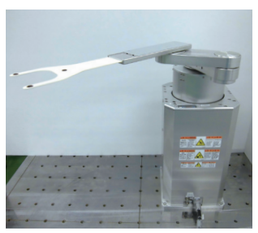
Moreover, we tested prototypes and fed back findings to design multiple times in an effort to slash waste and minimize material costs and installation man-hours to the utmost.

UT-AFX3000NM 3-axis wafer transfer robot with power line communication technology

Boosted robot reliability by replacing harnesses with HD-PLC

We developed a wafer transfer robot with fewer harnesses by incorporating high-definition power line communication (HD-PLC) technologies that have drawn a lot of attention in recent years because of their use with transformers. With fewer harnesses for moving parts, there is less risk of a disconnection, which means greater reliability from the robot.

The robot also requires less frequent maintenance and servicing, so the new design reduces downtime, which translates into longer equipment availability for the customer. From an environmental perspective, there are less parts that need servicing, therefore less waste is generated.

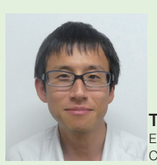


Shorter production lead time via HD-PLC and modular design

Before, each robot had to be singularly assembled to specifications, but reducing the harnesses with HD-PLC technology enabled modularization and, because the robot can be divided into units and those units prefabricated, different combinations are possible.

As a result, a robot is completed by assembling the prefabricated units to customer specifications, which allows us to deliver the robots to customers more quickly.

Comment from the developer



Takaya Yamada
Engineering Dept.
Clean Robot Division

Q What was the theme or background to the development of this product?

By eliminating complicated wiring work, HD-PLC technology has greatly simplified the assembly process of compact robots.

Because this reduces the manufacturing man-hours, the product we developed meets the quick delivery demands we get from many customers.

Q During product development, what challenges did you encounter?

We went through great pains to incorporate the HD-PLC module inside a conventionally sized robot. Taking up too much space detracted from robot performance, therefore we had to balance the two in our design work. In the end, we got the module in there without sacrificing the expected performance.

Operating Eco Product Accreditation System

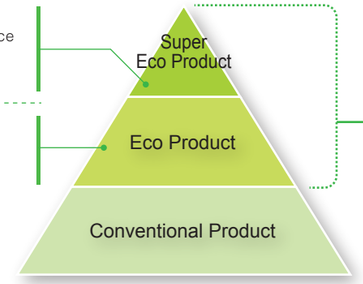
The DAIHEN Group has introduced its own environmental impact assessment standard for products. Since then, we have been promoting green product development.

We introduced the Eco Product Accreditation (Green Labeling) System, launching full-scale operation in fiscal 2008. This innovation helps us to clearly convey to customers the environmental benefits of our products and technologies and thus differentiate our offerings. It also enables our customers to readily select products with a reduced environmental impact.

We have established two product tiers for our certified Eco Products: Eco Products and Super Eco Products.

- Unique industry-leading environmental performance
- Eco product assessment points total at least 300

- Eco product assessment points total at least 225



○DAIHEN Group Green Labeling

Super Eco Product　Eco Product

Note: Among the various green labeling schemes, the DAIHEN Group has chosen Type Ⅱ, the self-defined type. The International Organization for Standardization (ISO) has specified that this type of green label indicates that the labeled item is an eco-friendly product manufactured according to the manufacturer's own standards.

○Examples of product eco-evaluation criteria

Energy efficiency	● Low power consumption ● Increased energy efficiency in production processes
Resource conservation	● Compact design and reduced weight ● Rationalized packing
Recycling	● Use of recycled materials ● Improved ease of sorting and disassembly
Long service life	● Improved durability ● Improved ease of maintenance
Controlled use of chemical substances	● Reduced use of hazardous chemical substances
Information disclosure	● Proactive disclosure of environmental information

The DAIHEN Group adopted a target sales ratio for certified green products and focused on expanding our selection and sales promotion of certified products. Our net sales ratio for certified green products in fiscal 2017 was 58% overall.

○Green-label-certified products added in fiscal 2017

Super Eco Product			
Division	Product Name	Model	Major Environmental Performance Criteria
Welding Products Division	Welbee digital controlled inverter CO_2/MAG welding machine (High-productivity D-Arc welding system)	WB-DPS	● High-efficiency arc welding ● Reduced environmental impact during use (energy-efficient), compact design ● Elimination or reduced use of hazardous substances to less than regulatory levels*

Eco Product			
Division	Product Name	Model	Major Environmental Performance Criteria
Power Distribution System Division	50 + 125 kVA pad-mounted transformer (Air breaker type)	RUV257 RUV313	● Reduced environmental impact during use (energy-efficient by way of reduced loss) ● Improved operability
	SVR2G control unit	SSVR2G3-H01S SSVR2G5-H01S	● Improved sorting and disassembly ● Diffusion of decentralized power sources
	Reverse load flow support for automatic voltage regulator	QST051VI	● Improved operability
	Switch branch station	VMT1-TRO, VMT7-TRO	● Reduced environmental impact during use (improved work efficiency)
Power Transformer Division	30/60 Mvar shunt reactor for power utility	Some models	● Reduced environmental impact during use (energy-efficient by way of reduced loss)
	45 MVA, 100 MVA transformers for power utility	Some models	● Reduced environmental impact during use (energy-efficient by way of reduced loss)
Industrial Electric Division	3-phase, 50/60 Hz, 60 kVA oil-immersed transformer for lighting/motor loads	–	● Qualified for secondary top-runner criteria under the Energy-Saving Law ● Reduced environmental impact during use (reduced weight, resource-saving)
	250 kW air-compressor-less power conditioner	B250JHL2-A01 P250JHL2-A01	● Promotion of adoption of renewable energies ● Elimination or reduced use of hazardous substances to less than regulatory levels*
Welding Products Division	Welbee automatic AC/DC pulse TIG welding machine with digital inverter control	WB-A350P WB-A500P	● Improved operability ● Elimination or reduced use of hazardous substances to less than regulatory levels*
FA Robot Division	Robot manipulator	FD-V8, FD-V8L FD-B6L, FD-V25	● Reduced environmental impact during use (energy-efficient) ● Elimination or reduced use of hazardous substances to less than regulatory levels*
	2D vision sensor	L-23520	● Improved work efficiency ● Compact design, reduced weight ● Elimination or reduced use of hazardous substances to less than regulatory levels*
Plasma System Division	High-frequency power supply unit, microwave power supply unit and automatic matching unit for plasma generation	Some models	● Reduced environmental impact during use (energy-efficient, compact design, reduced weight)
Clean Robot Division	3-axis wafer transfer robot for atmospheric environment	UT-AFX3000NM	● Elimination or reduced use of hazardous substances to less than regulatory levels* ● Reduced environmental impact during use (energy-efficient)
	4-axis FPD transfer robot for vacuum environment	SPR-8568, SPR-8571 SPR-8572, SPR-8573 SPR-8574	● Elimination or reduced use of hazardous substances to less than regulatory levels*

*Compliant with the RoHS Directive.

Please visit the following website for all Eco Product Accredited (Green Labeling) products of the DAIHEN Group, including our green products certified before fiscal 2016.　www.daihen.co.jp/csr/eco/

Environmental impact data for fiscal 2017

Juso Plant

Location: 2-11-1 Tagawa, Yodogawa-ku, Osaka 532-8512 Japan

Principal business: Planning, development, and production of small and medium-size transformers, power supplies for plasma generators used in semiconductor manufacturing, clean robots, and other products

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.4	6.6	7.33	20
BOD	600	170	<1	20.4	20

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	27	<1	4.25	20
Oil	Mineral oil: 5, animal & veg. oil: 30	17	<1	1.35	20

Numerical data on discharge of animal and vegetable oils (limited to 30) applies to the Juso Plant.

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	150	10.9	—	53.1	86
	80	Xylene	582.6	423.3	—	159.3	—
	186	Dichloromethane	180	180	—	—	—
	265	Tetrahydromethylphthalic anhydride	14994	—	—	644.5	14349.7
	296	1,2,4-trimethylbenzene	60.4	60.4	—	—	—
	297	1,3,5-trimethylbenzene	41	27.6	—	—	13.4
	300	Toluene	1114.8	215.2	—	159.3	740.3
	349	Phenol	35.8	35.8	—	—	—
	384	1-Bromopropane	651	65.1	—	—	585.9
Specified as Class 1	400	Benzene	34	0.3	—	—	33.7
	411	Formaldehyde	4.5	4.5	—	—	—

In the Transformer Section, we mainly design top-runner oil-immersed transformers and molded transformer for private businesses. As an environmental protection project in fiscal 2017, we developed and designed an oil-immersed transformer for lighting/motor loads compliant with 2014 top-runner requirements that could be housed in a power cubicle (in-coming power panel) for installation at convenient stores. After showing consideration for various environmental conditions, the finished product required less resources and energy to make than comparable products.

One remaining issue is how to reduce waste discharge from the product, so we are looking into replacing the wooden crates used to transport the product with recyclable paper pallets, in order to reduce wood waste.

Going forward, we will continue to develop and design products that require less resources and energy to make, as our contribution to protecting the global environment and preventing climate change. We will also continue with constructive efforts that lower the environmental load of our products and business operations, and activities that effectively protect the environment.

Shinya Yamada
Transformer Section
Engineering Dept.
Industrial Electric Division

Rokko Plant

Location: 4-1 Koyo-cho-nishi, Higashinada-ku, Kobe-shi, Hyogo 658-0033 Japan

Principal business: Planning, development, and production of various arc welders, resistance welders, welding torches, welding robots, and automatic welding systems

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.8	6.2	7.7	6
BOD	600	430	200	283.15	6

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	374	108	222.35	6
Oil	Mineral oil: 5, animal & veg. oil: 30	20	7.3	9.3	6

Numerical data on discharge of animal and vegetable oils (limited to 30) applies to the Rokko Plant.

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	362.8	308.4	—	54.4	—
	80	Xylene	403.1	342.7	—	60.4	—
	185	Dichloropentafluoropropane	3564	3564	—	—	—
	300	Toluene	39.3	33.4	—	5.9	—

In the Clean Robot Group, we mainly produce robots for transferring large LCD panels, but because parts keep getting larger, we were generating a very large amount of waste from the packaging materials, wooden pallets and wooden crates we used to ship our products. Moreover, the measures we had in place for dealing with wood waste were limited to just our workplace, so we launched a bigger project that got our primary suppliers involved as well.

We started out by surveying our top 30 suppliers in terms of the number of deliveries and selected 10 from which we could expect cooperation and results. Of the various measures we explored, we chose to replace the wooden pallets used to transport small parts with resin cases and pallets, and, for large parts that could not fit on a pallet, we introduced wooden returnable shipping containers. As a result, we greatly reduced the amount of waste we generated in fiscal 2017.

In fiscal 2018, we will be enlarging our clean rooms, which will predictably increase our use of air-conditioning. Therefore, all of our members will be looking for ways to reduce our power consumption.

Kazuhiro Okumura
Robot Section (Clean Robot Group)
Manufacturing Dept.
FA Robot Division

Mie Plant

Location: 800 Higashiikebe, Taki-cho, Taki-gun, Mie 519-2155 Japan

Principal business: Planning, development, design, production, and servicing of power transformers and regulators

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.8	7.5	7.65	2
BOD	600	3	1	2	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	<1	<0.5	<0.5	2
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	<1	<1	2

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	136	136	—	—	—
	80	Xylene	735.6	735.6	—	—	—
	83	Cumene	19.6	19.6	—	—	—
	296	1,2,4-trimethylbenzene	190.7	190.7	—	—	—
	297	1,3,5-trimethylbenzene	62.3	62.3	—	—	—
	300	Toluene	1480	1480	—	—	—
	349	Phenol	0.2	—	—	—	0.2

In fiscal 2017, at the Mie Plant, we raised the reduction in CO_2 emissions as a target for aiding the push against climate change and, to attain this target, reduced our electricity consumption by replacing plant lighting with LEDs, shortening electrical testing under elevated temperatures and other ways.

Also, with turnout increasing year after year, we looked to reduce plastic parts and waste generated from packaging, by simplifying packaging used for shipping, reusing spacers and cushioning, and introducing returnable shipping containers for standard products. We additionally began sorting waste returned from work sites for recycling and conversion to useable resources. As a result of these efforts, we achieved our annual target.

However, much of our business information is still handled on paper, therefore, in fiscal 2018, we want to quickly go paperless with our design drawings, assembly drawings and like by transitioning to electronic data, monitors and tablets, as a waste reduction measure. Moreover, since I'm in charge of shipping, we will be looking for other ways to reduce waste.

Masaki Ito
Manufacturing Dept.
Power Transformer Division

Chitose Plant

Location: 770-7 Kitashinano, Chitose-shi, Hokkaido 066-0075 Japan

Principal business: Production, repair and servicing of transformers for power distribution

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.3	7.2	7.075	2
BOD	600	410	2.7	136.65	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	11	<1	5.25	2
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	<1	<1	2

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	1.25	1.25	—	—	—
	80	Xylene	2.66	2.66	—	—	—
	132	Cobalt and its compounds	1.05	—	—	—	1.05
	186	Dichloromethane	119.28	119.28	—	—	—
	297	1,3,5-trimethylbenzene	5.95	5.95	—	—	—
	300	Toluene	13.18	13.18	—	—	—
	349	Phenol	33	33	—	—	—
	354	Di-n-butyl phthalate	1.14	1.14	—	—	—
	413	Phthalic anhydride	0.084	0.084	—	—	—

At the Chitose Plant, we service pole-mounted transformers, in addition to making them along with SVR, PMT and other transformers for power distribution. As a part of that, the Quality Control Department undertook the job of reducing CO_2 emissions and waste.

To reduce CO_2, we cut back on our power consumption by increasing test lots from 5 to 10 products like our auto tap changers and lumping wrapping tests, withstand voltage tests and characteristic tests into one, thus shortening test time and cycles. Moreover, given the landscape of Hokkaido and the bitter cold of winter, we got all of the plant employees seriously committed to managing the temperature and meticulously turning the power to heaters on and off, in order to reduce CO_2 emission by conserving energy.

With regard to waste reduction, we reviewed the need for printed matter and scaled back the number of copies. Going forward, we will undertake environmental activities, such as to go paperless with our books, in cooperation with the related departments.

Koji Abe
Chitose Plant, Quality Control Dept.,
Power Distribution System Division

Kanehira Plant

Location: 6-2-10 Noda, Fukushima-ku, Osaka 553-0005 Japan

Principal business: Maintenance and repair of pole-mounted transformers for power distribution

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.4	6.7	7.1	48
BOD	600	330	1	29.75	12

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	4	1	1.585	12
Oil	Mineral oil: 5, animal & veg. oil: 30	5	<1	1.07	72

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	526.8	375.2	—	151.6	—
	80	Xylene	2780.6	1978.7	—	801.9	—
	300	Toluene	60.9	40.8	—	20.1	—
	349	Phenol	13.6	13.6	—	—	—

At the Kanehira Plant, we service pole-mounted transformers at the request of power companies. Put differently, we are a transformer refurbishing plant.

In fiscal 2016, we outsourced cover maintenance and, in the ensuing year, maintenance work for primary and secondary bushings, to reduce the amount of waste we release from the plant, and produced big results in the form of a 2,016 kg (16%) reduction from 12,429 kg in fiscal 2016 to 10,413 kg in fiscal 2017.

Moreover, this fiscal year, in order to use the check sheets from Chubu Electric Power in electronic format, we chose a tablet and specifications, and trained staff from our plant and subcontractors in how to use it. The customer gave us their approval in May and we have been paperless since June. This effort is expected to reduce waste by about 4,800 sheets (20 kg) a year.

Next, we want to start using electronic formats for the work and equipment check sheets for Kansai Electric Power, daily work reports and other documents. We want to go paperless because it enhances work efficiency and reduces waste, and, in the end, we want to generate no waste as a plant.

Kakeru Nakano
Kanehira Plant, Quality Control Dept.,
Power Distribution System Division

Tottori Plant (DAIHEN Industrial Machinery Corporation)

Location: 1041 Azo, Mochigase-cho, Tottori-shi, Tottori 689-1227 Japan

Principal business: Production of welding machines, control system equipment, power supplies for semiconductor manufacturing, and PV inverters

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	6.9	6.6	6.725	4
BOD	600	26	1.2	7.65	4

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	31	1	9.175	4
Oil	Mineral oil: 5, animal & veg. oil: 30	<0.5	<0.5	<0.5	<0.5

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	53	Ethylbenzene	18.2	18.2	—	—	—
	80	Xylene	20.2	20.2	—	—	—
	82	Silver and its water-soluble compounds	23.4	—	—	23.4	—
	87	Chromium and chromic compounds	0.2	—	—	—	0.2
	151	1,3-dioxolane	4.2	4.2	—	—	—
	296	1,2,4-trimethylbenzene	66.5	66.5	—	—	—
	297	1,3,5-trimethylbenzene	15.4	15.4	—	—	—
	300	Toluene	161.3	161.3	—	—	—
	302	Naphthalene	46.5	46.5	—	—	—
	392	n-hexane	2.5	2.5	—	—	—
Specified as Class 1	305	Lead compounds	814.9	—	—	325.8	489.1

At DAIHEN Industrial Machinery, we once again addressed our CO_2 emissions. In addition to continuing measures we started last year, this year we:

- Did preliminary investigations for replacing lighting in each workplace with LEDs;
- Reduced energy consumption by updating equipment and improving operating efficiency;
- Reduced energy consumption by lowering air-conditioning loads in each of our factories, and;
- Reduced energy consumption by shortening work time, etc.

We were worried about making our target because we increased turnout of semiconductor equipment products, which was already up from the year before, and added night shifts to keep lines running. Nevertheless, by introducing LED lighting in places we had yet to do so, shutting down one generator, coating the roof and outside walls of the Kunugiwara Factory with heat-shielding paint and scaling back work by 15 minutes, we achieved our target.

On the business side of things, there were some big changes during this fiscal year in that the semiconductor equipment business skyrocketed, welding product operations were moved to China, and production of power conditioners was cut back. Going forward, we will need to be conscious of changes like these in order to tie them into energy reduction efforts and continue an environment-friendly tack at our plant.

Kuninobu Kusakari
Operation Dept.

Environmental impact data for fiscal 2017

Oita Plant (DAIHEN Technology Institute)

Location: 1660-7 Mizoi, Kitsuki-shi, Oita 873-0025 Japan

Principal business: Development, production and repair of semiconductor ACT clean transfer robots; development of software for arc welding robots

○ Quality measurements of drainage water

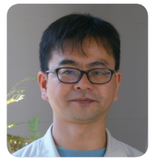
(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	5.8	5.7	5.45	6
BOD	600	3.1	2.6	3	6
SS	600	4.6	2.8	3.3	6
Oil	Mineral oil: 5, animal & veg. oil: 30	No measured result for fiscal 2017			

Oita Plant did not handle any substances subject to the PRTR Law.

At the DAIHEN Technology Institute, we reused packaging materials, reduced our power consumption by introducing LED lighting into our factory and conserved energy by improving work efficiency, in order to reduce waste and CO_2 emissions. In the Planning Department as well, we sought to reduce CO_2 emissions by speeding up development and enhancing the efficiency of prototyping and testing so that operations required less time.

As specific examples, we established and applied practices for preventing miscommunications and work from being duplicated in parallel development operations at multiple sites, introduced software to manage repeated evaluation tests without requiring human intervention, and fabricated a lifting tool for checking wear. All of that together improved the efficiency of our development work.



Also, during our morning announcements every day, detailed progress reports are given to improve communications and examples of energy-saving efforts and other small improvements are mentioned to keep the momentum of our environment activities going. We will continue to reduce our energy consumption by making improvements every day.

Ryuji Tomomatsu
Planning Dept.
Technology Development Headquarters

Matsudo Plant (DAIHEN Stud Co., Ltd.)

Location: 6-8-12 Minoridai, Matsudo-shi, Chiba 270-2231 Japan

Principal business: Stud welding and the design, manufacture, and sales of studs

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.05	6.25	6.65	2
BOD	600	27.8	26.9	27.35	2
SS	600	21.5	3	12.25	2
Oil	Mineral oil: 5, animal & veg. oil: 30	<1	<1	<1	2

Matsudo Plant did not handle any substances subject to the PRTR Law.

Hello, readers. I am Hiroshi Otsuki from the Manufacturing Department at Daihen's plant in Matsudo. We make stud bolts here in Matsudo but bear in mind to improve quality, honor delivery schedules and reduce costs every day as a regular part of work.

One particular environmental activity we put a lot of time and effort into in fiscal 2017 was to "eliminate process-borne defects by introducing automated equipment for making headed stud bolts". What we did was to review the process used to drill holes in the stud bolts and changed how processing was done. As a result, we reduced the rate of process-borne defects from the 0.29% of fiscal 2016 to 0.014%. Moreover, this project helped us to reduce material purchases by 9.5 t/year, reduce waste by 9.5 t/year and reduce power consumption by 540 kWh/year.

In fiscal 2018, we will continue our efforts to bring process-borne defects as close as possible to 0% and to make further improvements that will push our turnout of headed stud bolts to 1.2x that of fiscal 2017.

Hiroshi Otsuki
Manufacturing Dept.

Eniwa Plant (Daihoku Industry Co., Ltd.)

Location: 347-11 Toiso, Eniwa-shi, Hokkaido 061-1405 Japan

Principal business: Manufacture of transformer case cans, sheet-metal processing, application of coatings, and surface treatments

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.1	6.4	6.65	3
BOD	600	120	16	68.25	3

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	12	4	8.5	3
Oil	Mineral oil: 5, animal & veg. oil: 30	4.8	2	3.55	3

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	1	Water-soluble zinc compounds	561.6	—	—	561.6	—
	7	N-butyl acrylate	5.8	5.8	—	—	—
	30	Linear alkylbenzene sulfonic acid	9.3	—	—	9.3	—
	53	Ethylbenzene	248.4	248.4	—	—	—
	71	Ferric chloride	4717.5	—	—	4717.5	—
	80	Xylene	1220.7	1220.7	—	—	—
	132	Cobalt and its compounds	2.3	—	—	—	2.3
	186	Dichloromethane	18	18	—	—	—
	239	Organic tin compounds	218	—	—	43.6	174.4
	240	Styrene	10.3	10.3	—	—	—
	275	Sodium dodecyl sulfate	1.2	—	—	1.2	—
	296	1,2,4-trimethylbenzene	2.4	2.4	—	—	—
	297	1,3,5-trimethylbenzene	145.8	145.8	—	—	—
	300	Toluene	329	329	—	—	—
	302	Naphthalene	8.1	8.1	—	—	—
	349	Phenol	1.1	1.1	—	—	—
	354	Di-n-butyl phthalate	5.8	5.8	—	—	—
	405	Boron compounds	70.2	—	—	70.2	—
	407	Poly(oxyethylene) alkyl ether (alkyl C=12-15)	77.3	—	—	77.3	—
	409	Sodium poly(oxyethylene) dodecyl ether sulfate	4.9	—	—	4.9	—
	412	Manganese and its compounds	140.6	—	—	140.6	—
	420	Methyl methacrylate	5.8	5.8	—	—	—
Specified as Class 1	309	Nickel compounds	70.2	—	—	70.2	—
	411	Formaldehyde	27.6	27.6	—	—	—

Here in Eniwa, our chief job is to manufacture and paint the casings of pole-mounted transformers. So, we set targets on reducing CO_2 and VOC emissions, which result considerably from this work, and set out to achieve them.

With regards to CO_2 emissions, we introduced "clean diesel-powered forklifts" and "suitable capacity motors for UF booster pumps" from a perspective of prioritizing energy-saving equipment in our new equipment purchases, and "reduced boiler running time by automating temperature control of the primer tank" as an automation initiative. As a result, by reducing our power consumption, we were able to attain our target.

As for VOC emissions, we focused on improving work efficiency and reduced the amount of paint we use by "changing to a spray process to paint case markings" and "improving the accuracy of painting robot programs", achieving our target in the end. As we move forward, we will set the bar even higher when looking for ways to protect the environment.

Naoto Iwasuji
Operation Section

Hirosaki Plant (DAIHEN Aomori Corporation)

Location: 1-5-1 Iwaka, Hirosaki-shi, Aomori 036-8073 Japan

Principal business: Manufacture of various fuses and production of power distribution parts

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	8.0	7.3	7.65	2
BOD	600	64	8	36	2

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	21	15	18	2
Oil	Mineral oil: 5, animal & veg. oil: 30	1.8	<0.5	1.1	4

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	80	Xylene	0.14	0.14	—	—	—
	134	Vinyl acetate	1.42	1.42	—	—	—
	186	Dichloromethane	99	99	—	—	—
	300	Toluene	197.7	197.7	—	—	—
	405	Boron compounds	768.2	—	—	2.3	765.89

At DAIHEN Aomori, we continued in the same direction as last year with climate change measures (reducing CO_2 emissions) centered on automating manufacturing processes. This included a switch to unmanned operations by introducing and linking automatic units for coating silicon, welding and crimping sleeves, and replacing heating and cooling equipment on the south side of the work area (cooling-only air conditioner + kerosene heaters → heating-cooling system).

By introducing and linking automatic equipment, we greatly reduced man-hours and resultantly overtime work. Moreover, by upgrading our heating-cooling system and testing, verifying and running it at suitable temperatures, we achieved our climate change (CO_2 emission reduction) target.

In fiscal 2018, we plan to automate more processes and replace the heating-cooling system on the north side of the work area. We will additionally look for ways to further enhance work efficiency as a way to reduce CO_2 emissions.

Megumi Miura
Administration Group
Hirosaki Plant

Kagawa Plant (Minami Electric Co., Ltd.)

Location: 15 Nishi-minatomachi, Tadotsu-cho, Nakatado-gun, Kagawa 764-0017 Japan

Principal business: Manufacture of transformer case cans, sheet-metal processing, application of coatings, and surface treatments

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.7	6.6	7.1	12
BOD	600	501	34.9	138.75	12

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	197	10.1	60.7	12
Oil	Mineral oil: 5, animal & veg. oil: 30	4.5	<1	1.85	12

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	1	Water-soluble zinc compounds	519.5	—	—	—	519.5
	53	Ethylbenzene	3011.7	3011.7	—	—	—
	80	Xylene	3536.3	3536.3	—	—	—
	235	Water-soluble salts of bromic acid	72	—	—	72	—
	296	1,2,4-trimethylbenzene	717.4	717.4	—	—	—
	297	1,3,5-trimethylbenzene	128	128	—	—	—
	300	Toluene	2444	2444	—	—	—
	302	Naphthalene	212	212	—	—	—
	333	Hydrazine	5.4	—	—	—	5.4
	354	Di-n-butyl phthalate	0.6	0.6	—	—	—
	392	N-hexane	3.3	—	—	3.3	—
	405	Boron compounds	45	45	—	—	—
	407	Poly(oxyethylene) alkyl ether (alkyl C=12-15)	176.8	176.8	—	—	—
	412	Manganese and its compounds	13.5	—	—	—	13.5
Specified as Class 1	88	Hexavalent chromium compounds	0.9	—	—	—	0.9
	305	Lead compounds	4.1	—	—	—	4.1
	309	Nickel compounds	31.4	—	—	—	31.4
	411	Formaldehyde	2	2	—	—	—

At our Kagawa Plant, we manufacture and paint transformer casings for power utilities and private businesses. For our environmental efforts in fiscal 2017, we continued activities to reduce CO_2 emissions, VOC emissions and waste from the year before. As a part of that, I oversaw equipment upgrades to energy-saving models, power demand management, and air leak checks and repairs as the head of the energy and noise management committee. And, thanks to these constructive efforts, we attained our CO_2 emission reduction target as a plant. Moreover, I supervised environmental preservation as the person responsible for noise and water pollution control.

Moving forward, we plan to update buildings and aged equipment. With our buildings, we want to improve the work environment and reduce CO_2 emissions with thermal insulation, while with regards to equipment upgrades, we want to further reduce CO_2 emissions by introducing energy-efficient models. Moreover, we will similarly continue our efforts to reduce VOC emissions and waste.

Syogo Itamoto
Manufacturing Dept.

Izumiotsu Plant (DAIHEN Fuse Corporation)

Location: 2-39 Shikinai-cho, Izumiotsu-shi, Osaka 595-0035 Japan

Principal business: Manufacture of various fuses and production of power distribution parts

○ Quality measurements of drainage water

(mg/L except pH)

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
pH	5–9	7.6	7.1	7.4	6
BOD	600	31	10	18.7	6

Item	Plant's regulated compliance value	Track record			
		Max	Min	Average	No. of meas.
SS	600	2	1	1.15	6
Oil	Mineral oil: 5, animal & veg. oil: 30	1	<1	0.5	2

○ Amounts of substances subject to the PRTR Law handled, released or transferred

(kg/year)

Category	Substance number	Substance for inspection	Amount handled	Amount released	Amount transferred		
				Into atmosphere	Into sewage system	As refuse	Used in products etc.
Class 1	134	Vinyl acetate	0.14	0.14	—	—	—
	186	Dichloromethane	79.2	79.2	—	—	—
	281	Trichloroethylene	725	725	—	—	—
	300	Toluene	40.8	40.8	—	—	—

At DAIHEN Fuse, our primary environmental activity was directed at climate change. One highlight from that in fiscal 2017 was that we reduced our annual CO_2 emissions by 3.5 t by replacing fluorescent lights with LEDs in 173 locations of the site in two waves. Given the effectiveness, we already have plans to continue this activity next year and beyond. Moreover, because we carried the activity over from the year before, we obtained a CO_2 emission reduction effect that was more than 10% higher than our fiscal 2017 target, so we easily attained our target.

We also achieved the targets we set for protecting biodiversity, reducing waste and controlling air pollution and raised employee awareness by introducing water-saving valves, recycling used labeling tape, providing education on waste sorting, eliminating the use of methanol, and more. (Biodiversity 6%, waste reduction 54%, emissions reduction 17%)

Going forward, all of us at DAIHEN Fuse will make a united front in our efforts to preserve and protect the environment.

Kenichi Umehara
Quality Assurance Dept.

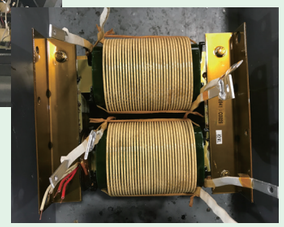
Initiatives in fiscal 2017

Mudanjiang OTC Welding Machines Co., Ltd.

Location: No.18 Xingye Road, Yangming, Mudanjiang, Heilongjiang 157013, China

Principal business: Manufacture of welding machines and parts, etc.

Varnish impregnating machine



Welding machine transformer

In recent years, environmental protection has become an important theme of businesses in China. For us at Mudanjiang OTC Welding Machines, it has as well, which is why we tested, evaluated and began using in early 2017 a new insulating varnish for welding machine transformers that offered environmental improvements on top of insulation performance.

Compared to the previously used 9161 "solvent-free unsaturated polyester ammonia varnish", the new BC-346-A "clear dry varnish" releases far less harmful substances. As a result, we used 243 kg of styrene and released 110 kg into the atmosphere in fiscal 2017, which was about half of the 467 kg we used and 209 kg we released in fiscal 2016, and despite an increase in turnout and consequent increased use of varnish.

Because we reduced emissions of harmful substances without affecting product quality, we both responded to public call for environmental protection and improved our image as a company. Knowing how successful we can be, we will continue to look for ways to reduce our environmental load going forward.

Tan Wujun
Production Engineering Dept.
Mudanjiang OTC Welding Machines Co., Ltd.

OTC Industrial (Qingdao) Co., Ltd.

Location: 588 Sanjiang Road Economic & Technical Development Area, Qingdao 266555, China

Principal business: Manufacture of welding machines and parts, high-frequency power supply units, etc.

Wastewater recovery system

Despite being a coastal city, Qingdao suffers from an acute water shortage and has to draw water from the Yangtze and Yellow Rivers to make up the shortfalls. In fact, ever since the severe drought of 2015, the government has stepped up its water conservation push. Parallel to that, regulations on wastewater release have been stiffened for environmental reasons. Given the situation, we turned our attention to washwater run-off from our sheet metal coating process that accounts for 60% of our water consumption at OTC Industrial Qingdao, and examined ways to recover and reuse it.

In July 2017, we introduced a wastewater recovery system that treats our wash water run-off and feeds it to a purification system, allowing us to save 6,000 m^3 of water a year. On top of that, because we have to treat less wastewater, we reduced our consumption of lime, activated charcoal, $FeCl_3$, heavy metal precipitant and other chemicals by 1.08 t a year and save about 3,800 kWh of power a year.

After introducing the wastewater recovery system, the environmental authorities highly praised the company's attitude and efforts with regard to environmental protection. Going forward, we want to do even more to reduce our load on the environment.

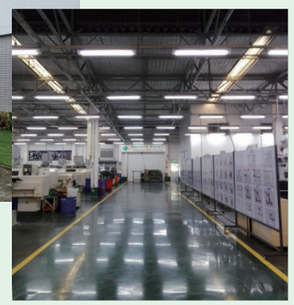
Liu Songyan
Manufacturing Dept.
OTC Industrial (Qingdao) Co., Ltd.

OTC DAIHEN Asia Co., Ltd.

Location: Tambol Klongnueng Amphur Klongluang, Pathumthani 12120, Thailand

Principal business: Manufacture and sales of welding machines, cutting machines and parts in Southeast Asia, Oceania and India

Plant seen from the outside



LED lighting

Our company is located about 50 km north of the Thai capital of Bangkok and produces everything from parts to products for welding/plasma cutting torches, wire feeders, robot peripherals and more.

As a 2017 effort to reduce CO_2 emissions, we continued an activity started in 2014 to replace fluorescent lighting at our plant with LEDs. Because, in 2016, we replaced a total of 1,140 lights, we received a 20% grant from the Thai government and upgraded 322 more fixtures to LEDs in 2017. Doing so, we save about 30,000 kWh a year, which is a big contribution to our energy conservation efforts.

Going forward, OTC DAIHEN Asia will take steps to raise environmental awareness in all departments in line with the environmental policy of the DAIHEN Group, and will promote more activities in order to further reduce our power consumption and waste.

JAKARIN DUANGSANG
Project Department
OTC DAIHEN Asia Co.,Ltd.

DAIHEN Electric Co., Ltd.

Location: Thamboon Thasa-an, Bangpakong Chachoengsao, 24130 Thailand

Principal business: Manufacture and sales of large transformers in Thailand

LED lighting

Industrial-grade LED lighting fixture

Sawadee khrup! We are the first company in Thailand to make transformers for power utilities. Our plant is located about 50 km southeast of Bangkok and ships products to customers in Thailand and around the world. I would like to introduce what we did to reduce our power consumption as an activity in 2017 intended to lower the burden we place on the environment.

The ceilings at our factory are 20 m high, so to illuminate the work area, we had installed mercury vapor lights, which require a lot of power. We replaced them in 2017 with LED lighting of the same luminosity and reduced our power consumption without hindering the workplace environment. Together with other energy-saving measures, the effect we produced was equal to reducing CO_2 emissions by about 25% against our 2010 level.

Our ongoing environmental activities have been officially recognized as well, with a "Green Factory" certification and grant from the Ministry of Industry this year. Looking ahead, we will continue to come up with ideas of how to reduce our environmental load in the hope of acquiring an even higher certification.

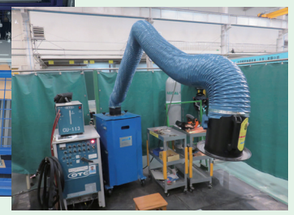
Manop Charoensook
Manufacturing Department
Transformer Manufacturing Division
DAIHEN Electric Co., Ltd.

DAIHEN OTC (Beijing) Co., Ltd.

Location: No. 5, Leyuan South Znd Road, Yangi Economic Development Zone, Beijing 101407, China

Principal business: Manufacture and sales of pad-mounted transformers in China

Returnable shipping containers



Welding fume cleaner

In China, two directions in environmental protection measures are a multilateral legal system encompassing air, water, soil and all other imaginable environmental vulnerabilities that is being built and a variety of other programs for realizing eco-friendly green development that are being offered.

Against that backdrop, Daihen Beijing is promoting environmental activities in line with the group's environmental policy. For example, we reduced our power consumption by cutting back on the number of power distribution transformers at our plant and we conserved water resources by improving the steam system used for winter heating and reducing our use of hot water.

Moreover, we prevented air pollution by installing a fumes cleaner in the welding process of core assembly, put waste to reuse by selling scrap copper to a copper buyer, and reduced use of conventional packaging materials by newly fabricating and using returnable shipping containers to ship JIS transformers for business use.

We are looking forward to continuing these activities and doing more for the environment.

Zhu Zi Wen
Human Resources General Affairs Section
DAIHEN OTC (Beijing) Co., Ltd.

DAIHEN Advanced Machinery (Changshu) Co., Ltd.

Location: No.17 Maqio Factory Area, Riverside Industrial Park, Jiangsu Changshu Economic Development Zone, Changshu City, Jiangsu 215513, China

Principal business: Manufacture, sales, and service of production machinery for semiconductors, LCDs and photovoltaic cells as well as welding robots

Load before improvement
(8 containers x
2 levels =
16 containers)

Load after improvement
(5 containers x 2 rows x 2 levels =
20 containers)

Changshu is on the Changjiang River northwest of Shanghai and is about 2 hours by car from Shanghai Pudong Airport. That is where we build, sell and service clean robots and make FA robots.

In 2017, we took steps to reduce CO_2 emissions and waste by meticulously managing air conditioning temperature, reusing packaging materials and improving packing method.

Moreover, for the FA robots we make, our FA Robot Division teamed up with Daihen Logistics to downsize by 14% and optimize our steel shipping containers. The new container enabled us to load 25% more onto trucks than before and, thereby, reduce the number of truck shipments by 20%. Furthermore, the lesser number of shipments also contributed indirectly to reducing CO_2 emissions.

With environmental awareness growing in China, we will continue to make improvements and rack up small achievements through activities for reducing our load on the environment.

Wen Shuang
FA Section
Manufacturing Dept.
DAIHEN Advanced Machinery (Changshu) Co., Ltd.

DAIHEN Corporation
Head Office / Juso Plant
2-1-11 Tagawa, Yodogawa-ku, Osaka 532-8512 Japan
Tel: +81-6-6301-1212
Website: www.daihen.co.jp
Published March 2019
● Please direct all inquiries concerning this report to the General & Judicial Affairs Department.