カワる、
サキへ。
Changing forward

Kawasaki Robotics
Carbon neutrality Report 2023

Kawasaki Heavy Industries, Ltd.
Robot Business Division
Precision Machinery & Robot Company

Kawasaki
Powering your potential

Contents

3 Editorial Policy

4 Overview of Business

KHI Group Environmental Policy & Environmental Vision/Carbon Neutrality Strategies

6 KHI Group's Approach to the Environment

7 KHI Group Environmental Charter

8 Robot Business Division Environmental Policy

9 Kawasaki Global Environmental Vision 2050

10 KHI Group Carbon Neutrality Targets & Initiatives

Environmental Management by the Robot Business Division

12 Message from the General Manager of the Robot Business Division

13 Progress of Environmental Initiatives

14 Environmental Management

Policies for Achieving Carbon Neutrality

16 Kawasaki Robotics Carbon Neutrality 2050

17 Environmental Technologies Provided by Kawasaki Robotics to Customers

18 Technology Development for Reducing Power Consumption

Measures for Reducing CO_2 Emissions

20 Measures for Reducing CO_2 Emissions

22 Measures Undertaken in Collaboration with Suppliers

24 CO_2 Emissions from Production Activities (Scope 1 & 2)

25 Measures for Reducing Scope 1 & 2 CO_2 Emissions

27 Measures for Reducing CO_2 Emissions from Transportation

29 CO_2 Emissions During Product Use (Scope 3 Category 11)

30 Measures for Reducing Power Consumption

31 Products Selected for the Kawasaki Ecological Frontiers System

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Editorial Policy

Editorial Policy

This Robot Business Division Carbon Neutrality Report (this "Report") conveys the Robot Business Division's fundamental approach to achieving carbon neutrality, management systems, the results of measures, and other information to a broad range of stakeholders.
This report has been issued with the approval of the General Manager of the Robot Business Division.

Referenced Guidelines, Etc.

Ministry of the Environment and Ministry of Economy, Trade and Industry, "Basic Guidelines Accounting for Greenhouse Gas Emissions Throughout the Supply Chain (Ver. 2.4)";
"Emissions Unit Value Database for Accounting of Greenhouse Gas Emissions, etc., by Organizations Throughout the Supply Chain (Ver. 3.2)"

Scope of This Report

In principle, this Report covers the Robot Business Division. Some of the information includes the Kawasaki Heavy Industries, Ltd.; in these cases, the scope is expressly stated.

Contact Information

Robot Business Planning & Administration Department, Planning & Control Division, Precision Machinery & Robot Company, Kawasaki Heavy Industries, Ltd.

Contact Information QR Code

Reporting Period

This report covers primarily activities undertaken during fiscal 2022 (April 1, 2022–March 31, 2023), but some information pertains to activities undertaken prior to that period or after April 1, 2023 and to measures planned for the future.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

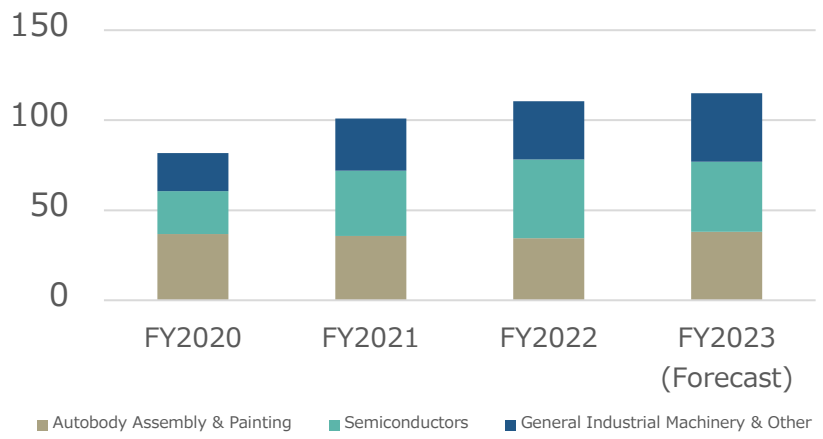
Overview of Business

Overview of the Division

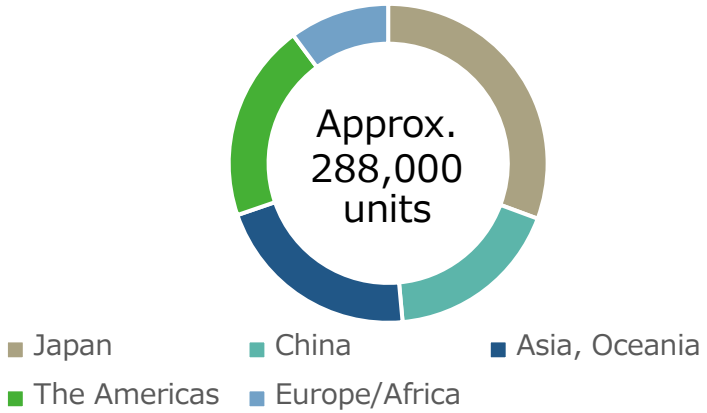
As of March 31, 2023

Organization Name	Robot Business Division Precision Machinery & Robot Company Kawasaki Heavy Industries, Ltd.
Established	1969 Office for Promoting Domestic Production of Industrial Robots (IR), Kawasaki Aircraft
Number of Employees	967 (Non-consolidated), 2,587 (Consolidated)
Business	Development, manufacture, and sale of industrial robots
Main Production Sites	Akashi Works — Akashi City, Hyogo Prefecture Nishi-Kobe Works — Kobe City, Hyogo Prefecture Kawasaki Robotics (Kunshan) Co., Ltd. — Jiangsu Province, China
Main Overseas Sites	U.S.A. (Kawasaki Robotics (U.S.A.), Inc.) Germany (Kawasaki Robotics GmbH) China (Kawasaki Robotics (Tianjin) Co., Ltd.) U.K., South Korea, Thailand, Singapore, India, etc.

Net Sales (billion yen)



Delivery Regions & Units Delivered (Cumulative)
As of June 30, 2023



© Kawasaki Heavy Industries, Ltd. All Rights Reserved

KHI Group Environmental Policy & Environmental Vision/Carbon Neutrality Strategies

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

KHI Group’s Approach to the Environment

The Kawasaki Group has instituted an Environmental Charter to promote environmental management activities. This contains its Environmental Philosophy and Conduct Guidelines, which indicate the common values, principles of environmental management activities, and daily codes of conduct required of all individuals at the Group.

Fundamental Approach

KHI Group Environmental Charter
(established 1999)

KHI Group
Environmental Philosophy

KHI Group
Conduct Guidelines

Robot Business Division
Environmental Policy

Policy on Current Priority Issues

KHI Group
Kawasaki Global Environmental Vision 2050
(established 2017)

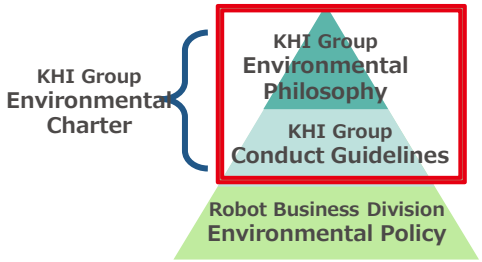
Waste FREE CO_2 FREE Harm FREE

2050 Kawasaki Challenge!

In addition, the KHI Group selected three future environmental issues as current priority issues and established the Kawasaki Global Environmental Vision 2050 as a statement of the Group’s policies on measures to be undertaken in collaboration to achieve a sustainable society in the future.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

KHI Group Environmental Charter (Environmental Philosophy and Conduct Guidelines)



KHI Group Environmental Philosophy

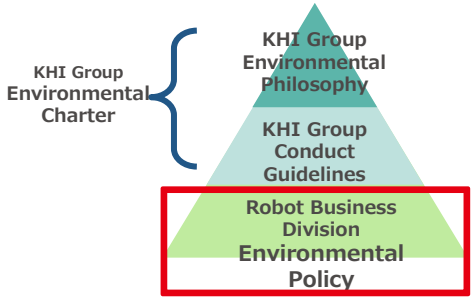
The Kawasaki Group pursues business activities globally in key industries related to land, sea, and air, guided by the desire to contribute to the development of society through *monozukuri* manufacturing. In this effort, as a group, we emphasize the "realization of a carbon-free society," "realization of a recycling-oriented society," and "realization of a society coexisting with nature" to help solve global environmental issues, and we strive to help build a sustainable society through environmentally harmonious business activities and environmentally conscious Kawasaki-brand products and services.

KHI Group Conduct Guidelines

1. Global environmental problems are serious issues shared by people around the world and, making it a management priority to ensure that business activities are conducted in harmony with the environment, we will strive willingly and vigorously toward this goal.
2. We will endeavor to conserve resources, save energy, recycle, and reduce industrial waste in production stages, and we will promote efforts to limit the impact of our operations on the environment.
3. We will carefully consider environmental impact during product planning, R&D and design stages to limit as much as possible any environmental impact caused during procurement, production, distribution, utilization and disposal stages of the products we make and market.
4. We will strive to minimize the impact our business activities have on ecosystems and engage proactively in efforts to protect these ecosystems.
5. In seeking solutions to global environmental issues, we will develop and provide new technologies and new products that effectively contribute to environmental protection and reduced consumption of energy and natural resources.
6. Going beyond environment-related laws, regulations, conventions, and self-established action plans in related industries, we will implement our own environmental control standards, as appropriate, and strive to improve environmental management.
7. Through environmental training and public relations activities, we will strive to elicit greater awareness of global environmental issues among all employees and will encourage employees to perform a self-improvement review and participate in social contribution activities.
8. We will implement an environmental management system for environmental protection activities, hold regular conferences on environmental protection activities, undertake reviews, and strive to achieve continual improvement in our environmental protection activities.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Robot Business Division Environmental Policy



Robot Business Division Environmental Policy

The Robot Division will conduct its business activities in accordance with the following environmental policy.

1. Engage in activities that help save energy and reduce CO_2 emissions.
2. Strive to reduce waste.
3. Promote activities that consider the product life cycle.
4. Establish emergency measures and endeavor to prevent environmental pollution.
5. Continuously work to improve our environmental management system.
6. Comply with environmental laws and regulations.
7. Ensure that all employees are aware of our environmental policy.

In compliance with the environmental policy, we will provide comprehensive solutions that satisfy customers' needs in automobile, semiconductor, and other manufacturing sectors, human-robot coexistence and collaborative sectors, and medical sectors, while driving our evolution from an industrial robotic manufacturer to an all-round robotic manufacturer.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Kawasaki Global Environmental Vision 2050

In light of the Paris Agreement enacted to restrict global warming and the Sustainable Development Goals (SDGs) adopted by the United Nations, the Kawasaki Group has announced that it will collaborate toward the realization of a sustainable society in the future, and formulated the "Kawasaki Global Environmental Vision 2050."

We carry out environmental management based on three visions—**CO_2 FREE**, **Waste FREE**, and **Harm FREE**—and will contribute to mitigating global warming, promoting a recycling-oriented society, and protecting biodiversity in the period up to 2050.

CO_2 FREE

- Pursue zero CO_2 emissions from business activities
- Provide products and services that substantially curb CO_2 emissions

Waste FREE

- Pursue zero waste in business activities
- Implement rigorous preservation and recycling of water resources

Harm FREE

- Pursue zero release of harmful chemical substances in business activities
- Conduct business with respect for biodiversity

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

KHI Group Carbon Neutrality Targets & Initiatives

In addition to adopting hydrogen power generation, we will take further action to save energy, expand the use of renewable energy, and expand and enhance power generation from waste with the aim of achieving carbon neutrality in Japan by 2030. We will also provide decarbonization solutions to society, business partners, and customers, contributing to the early achievement of carbon neutrality in society.

2023 — 2030 — 2040 — 2050

Scope1,2

CO_2 emissions from in-housel fuel and electric power use

- Focus on hydrogen power generation to achieve zero-emission plants in company
- Cut emissions by about 65% by using hydrogen power generation

Net Zero
Scope: Domestic Group companies

Scope3

Category 1

CO_2 emissions from suppliers of materials, parts, etc.

- Cut CO_2 emissions by providing CO_2-free solutions to suppliers and taking other measures
- Achieve an 80% reduction* in CO_2 emissions early by 2040 * Compared to FY2021

Category 11

CO_2 emissions during customer use of products

- Provide decarbonization solutions (products) comprising (1) a shift to hydrogen, (2) CCUS and alterative fuels, and (3) electrification and green power grids
- Transition all solutions (products) to be CO_2-free by 2050

Zero-Carbon Ready
Scope: Kawasaki Heavy Industries, Kawasaki Railcar, Kawasaki Motors

Net Zero
Scope: Entire Group (consolidated)

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Environmental Management by the Robot Business Division

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Message from the General Manager of the Robot Business Division

We are working with stakeholders to solve wide-ranging social problems in tireless pursuit of an “enriching future” through the use of robots.

Kenji Bando

General Manager of the Robot Business Division
Executive Officer

Today, the world in which we all live is at a crucial juncture for protecting the global environment into the future, and responding to climate change has become an urgent matter. As we conduct business in accordance with the Company’s Environmental Philosophy, the Robot Business Division is undertaking various measures to achieve zero CO_2 emissions through product recycling.

Going forward, in addition to these measures, we also hope to make significant contributions to achieving carbon neutrality throughout society as a whole by providing to society new robots that will lead to the carbon neutrality of customers by reducing the electric power consumption of customer plants through means such as saving space, decreasing processes, and reducing time.

KHI is a comprehensive heavy industries manufacturer that conducts business in a wide range of fields including rolling stock, aircraft, energy and environmental products, industrial equipment, and motorcycles. In the past, we achieved challenging targets by generating synergies among different businesses. We are now focusing our efforts on hydrogen-related business, a field with high expectations as a clean energy. Not only will we develop technologies to manufacture, transport, and store clean energy, we will also contribute to the development of a clean society by advancing technologies for the use of clean energy in products such as ships and motorcycles. It is precisely because KHI will play a variety of roles in addressing the social issues of carbon neutrality that I am confident we can generate substantial synergy effects.

In the more than 50 years since the Robot Business Division was established in 1969, we have solved social problems through the use of robots and sought to achieve a better society. Robot products are one means of solving various social problems including the elimination of labor shortages, raising quality, and the elimination of “3D” (dirty, dangerous, and difficult) work, and I believe that the fields in which we are active will expand even further in the future. Going forward, the Robot Business Division will continue to conduct business with “Unlocking Human Ingenuity to Create Robotics that Enrich the Future” as our purpose. I ask for the continued support of all our stakeholders including customers, business partners, employees, shareholders, and local communities.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Progress of Environmental Initiatives

1970～

1981
Delivers the first LNG carrier built in Japan

Through the development and social implementation of LNG carriers, we achieved stable energy supplies in Japan and reduced CO_2 by replacing existing fuels with LNG

1978
Delivers combustion test facilities for hydrogen rocket engine

More than 30 years of experience with hydrogen

2010

1998
Robot Business Division obtains ISO 14001 certification

2010
Focus on hydrogen business announced in Medium-Term Business Plan 2010

Proposed by hydrogen supply chain concept of "Producing, Transporting, and Using" hydrogen

2017

2017
CO_2FREE declaration

In light of the Paris Agreement enacted to restrict global warming and the Sustainable Development Goals (SDGs) adopted by the United Nations, the Kawasaki Group has announced that it will collaborate toward the realization of a sustainable society in the future, and formulated the "Kawasaki Global Environmental Vision 2050."

2021

2021
Declaration to achieve carbon neutrality at domestic business sites by 2030

Declaration of achieving carbon neutrality independently centered on hydrogen power generation
(Scope 1 & 2 only)

2022

2022
Zero-Carbon Ready declaration (Scope 3) to maximize feasible countermeasures by 2040

- Category 1: 80% reduction (versus FY2021)
- Category 11: Promote CO_2 reduction in the world

Robot Business Division established the Carbon Neutrality Committee

The Robot Business Division established the Carbon Neutrality Committee as an internal body to respond rapidly to requests from stakeholders including customers in parallel with KHI companywide initiatives. The Division is accelerating various initiatives in cooperation with other departments with the aim of achieving zero CO_2 emissions throughout the product life cycle.

2023

2023
Recognized as CDP Climate Change 2022 A List Company

KHI's corporate sustainability initiatives were recognized in the Climate Change 2022 Questionnaire conducted by CDP and KHI was certified as an **A List Company**, the highest rating.

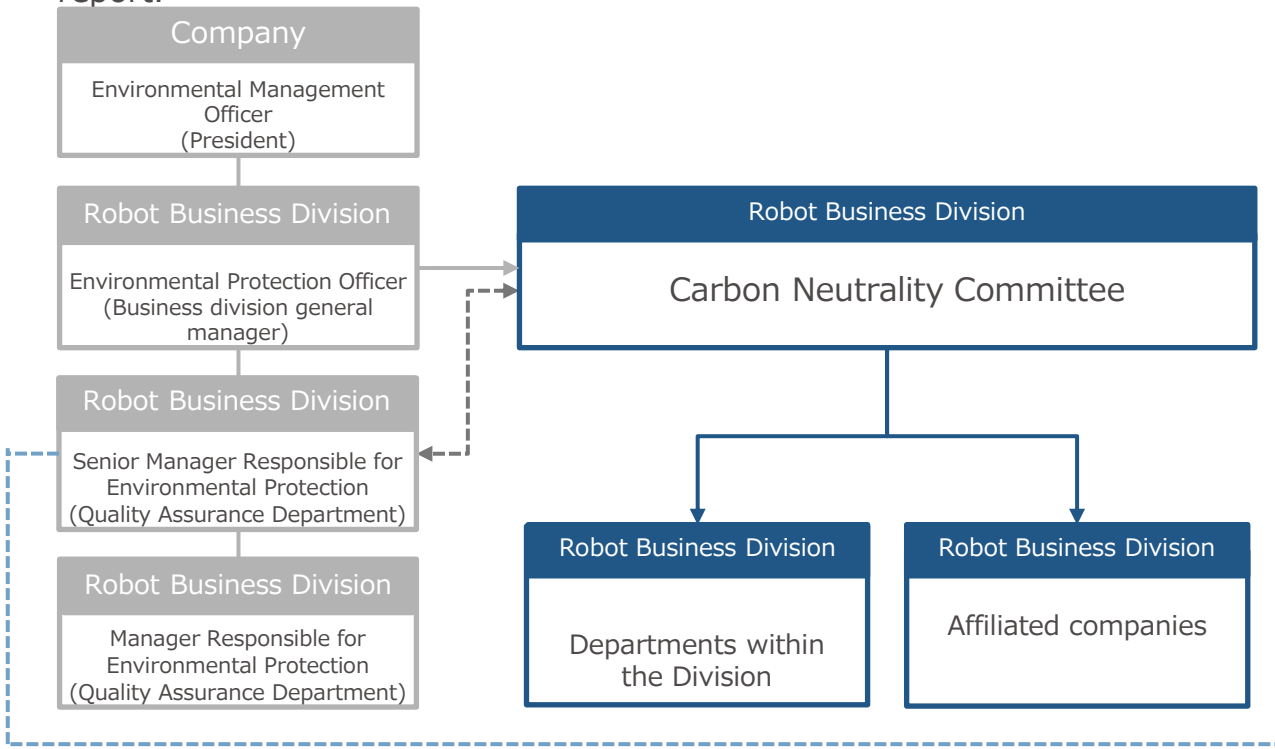
Robot Business Division issues Carbon Neutrality Report

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Environmental Management

Carbon Neutrality Implementation Structure

The Robot Business Division undertakes environmental measures in line with company-wide environmental management implementation structures. Environmental measures intended to achieve carbon neutrality are carried out mainly by the Carbon Neutrality Committee, the issuing body of this report.



Status of ISO 14001 Certification Acquisition

The Robot Business Division creates and operates an environmental management system compliance with ISO 14001.

Percentage of employees in Japan who work at business sites that have obtained ISO 14001 certification (August 2023)

Sites with certification: Akashi Works & Nishi-Kobe Works

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Policies for Achieving Carbon Neutrality

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

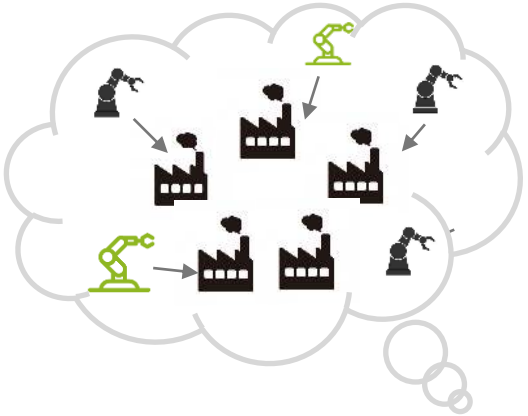
Kawasaki Robotics Carbon Neutrality 2050

Technology Development	Raw Materials Procurement	Manufacturing	Distribution & Packaging
We are developing robots with low environmental impact by adopting energy-saving and other functions. We are also developing robots that will contribute to the carbon neutrality not just of the robots themselves, but of customer plants as a whole.	We are working with suppliers in an effort to reduce CO_2 throughout the supply chain.	We are pursuing carbon neutral production plants by using electric power generated from hydrogen produced by the company, CCUS, and other sources and by saving energy in plants and offices, shifting to renewable energy, and taking other measures.	We are switching to transportation methods, packing materials, and so on with less environmental impact.

We will combine KHI technologies to eliminate all CO_2 emissions from robots throughout their life cycle to zero by 2050 and create a society where humans and robots can co-exist amidst a rich environment

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

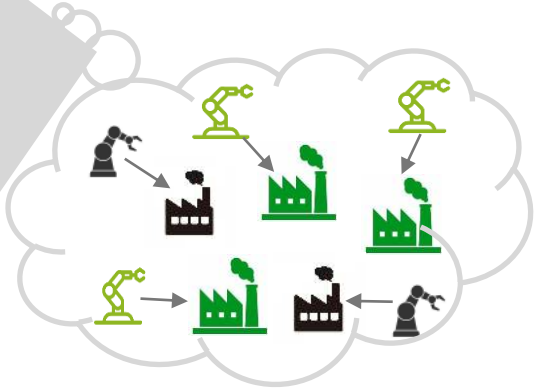
Environmental Technologies Provided by Kawasaki Robotics to Customers



Reduce CO_2 emissions from individual robots

Carbon neutral solutions

Toward society-wide carbon neutrality



Reduce robot power consumption

Weight reduction	・Make cast parts lighter ・Optimize shapes
Arms	High-efficiency operating programs
Drive	Power recovery functions
Service	Make power consumption visible

Carbon neutrality at customer plants

High-density layout Airless painting	Reduce paint use and make painting booths smaller (reduce costs, environmentally hazardous substances, CO_2, etc.)
Optimal operation route generation	Reduce semiconductor manufacturing time and cost (reduce materials, water, electricity (CO_2), waste, etc.)
⋮	

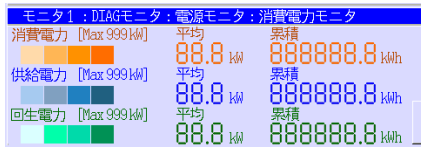
We will conduct business with the objective of achieving carbon neutrality from individual robots to entire solutions

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Technology Development for Reducing Power Consumption

Power Consumption Monitoring Function

The teach pendant has a function to display the robot's power consumption including average and cumulative consumption. The provides quantitative information on the robot's power use status.



Power Recovery Function

This function returns power to the primary power source when the robot decelerates. For example, during palletizing operations, power consumption by a large robot can be reduced by 20%–30% compared to the resistance recovery method. Kawasaki was among the first to focus on power recovery functions, and robots have been equipped with this function since the E-controller (released in 2015; limited to certain models).

Weight Reduction

Reducing weight is effective at reducing power consumption, and accordingly, we are actively working to reduce the weight of robot bodies.
Example: Payload: 200–210 kg
Reach: 2,600 mm class robot
BX200L (launched in 2011) Body weight: 890 kg
BXP210L (launched in 2021): 870 kg

Optimal Operating Programs

By using K-ROSET, operating programs can be optimized offline. Verifying programs offline minimizes online verification, which can reduce energy usage before operating the robot on the actual production line.

High-Density Layouts

By placing robots in high-density layouts, the amount of work per process can be increased, making it possible to shorten production lines made up of multiple processes. As a result, capital investment, facility operating costs, and energy usage can be reduced throughout the facility. Kawasaki Robot creates lightweight, compact designs with an awareness of high-density layouts.

Remote Maintenance

TREND Manager is a function for monitoring robot equipment status via the internet. Robot operating information can be confirmed from a remote location in real time, and high-precision maintenance plans can be proposed despite the remote location. This reduces movement of people and contributes to eliminating robot equipment down time.

Automatic Servo Shutoff

When the robot is not operating or in standby, this function cuts off the power to the motors and holds the robot's position using mechanical brakes. The longer the robot is in standby, power consumption can be curbed. We are also working to reduce standby power consumption by controlling cooling fans and liquid crystal backlights and other means.

Remote Control

The Successor system enables control of robot operations from a remote location, reducing the movement of people and energy consumption for maintaining the operating environment.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions

Raw Materials (Components)

Scope 3 Category 1

Measures undertaken in collaboration with suppliers

Transportation (to KHI)

Scope 3 Category 4

Measures undertaken in collaboration with suppliers

Production Activities

Scope 1/2

- Use of green energy
- Energy-saving measures

Transportation (to Customers)

Scope 3 Category 4

- Changes in transportation methods
- Higher efficiency in transportation
- Improvement and re-use of packaging materials

Product Use

Scope 3 Category 11

Development of technology for reducing power consumption

The Robot Business Division is taking action to reduce CO_2 emissions throughout the product life cycle.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions: Raw Materials and Transportation to KHI

Raw Materials (Components)

Scope 3
Category 1

Measures undertaken in collaboration with suppliers

Transportation (to KHI)

Scope 3
Category 4

Measures undertaken in collaboration with suppliers

Production Activities

Scope1/2

- Use of green energy
- Energy-saving measures

Transportation (to Customers)

Scope3
Category 4

- Changes in transportation methods
- Higher efficiency in transportation
- Improvement and re-use of packaging materials

Product Use

Scope3
Category 11

Development of technology for reducing power consumption

The Robot Business Division is taking action to reduce CO_2 emissions throughout the product life cycle.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures Undertaken in Collaboration with Suppliers

Basic Stance of the KHI Group

It is essential that our procurement activities are conducted in line with our stance on sustainability, which includes consideration for compliance, human rights, labor, occupational safety and health, and the global environment. We will respond to the demands of our customers and society by undertaking sustainability activities with suppliers so that we can actively promotion sustainability throughout the supply chain.

Kawasaki Group Sustainable Procurement Guidelines

The Kawasaki Group CSR Procurement Guidelines (initially established in 2012) were re-established in 2020 as a statement of detailed rules on the KHI Group's stance on sustainable procurement and requests to suppliers. In fiscal 2022, the title was changed to the Kawasaki Group Sustainable Procurement Guidelines and the content was revised in light of the heightened social demands concerning sustainability initiatives in supply chains, clarifying our policy of increasing sustainability throughout the supply chain.

Study session for suppliers

Measures for Calculating Carbon Footprint

To calculate CO_2 emissions (carbon footprint) during the entire product life cycle including parts procurement, we introduced a CO_2 emissions calculation systems in fiscal 2023. In the future, we will use this system to calculate the carbon footprints of our products. We will also cooperate with the calculation of carbon footprints by suppliers.

Measures to Educate Suppliers on Caron Neutrality

Since fiscal 2022, we have been holding carbon neutrality briefings and study sessions for suppliers to encourage suppliers to determine the CO_2 emissions and take action to reduce emissions. In the future, we will create structures for even greater cooperation so that suppliers can enhance the accuracy of their CO_2 emissions data collection and implement full-scale measures for emissions reduction.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions: Production Activities

Raw Materials (Components)

Scope 3 Category 1

Measures undertaken in collaboration with suppliers

Transportation (to KHI)

Scope 3 Category 4

Measures undertaken in collaboration with suppliers

Production Activities

Scope 1/2

- Use of green energy
- Energy-saving measures

Transportation (to Customers)

Scope 3 Category 4

- Changes in transportation methods
- Higher efficiency in transportation
- Improvement and re-use of packaging materials

Product Use

Scope 3 Category 11

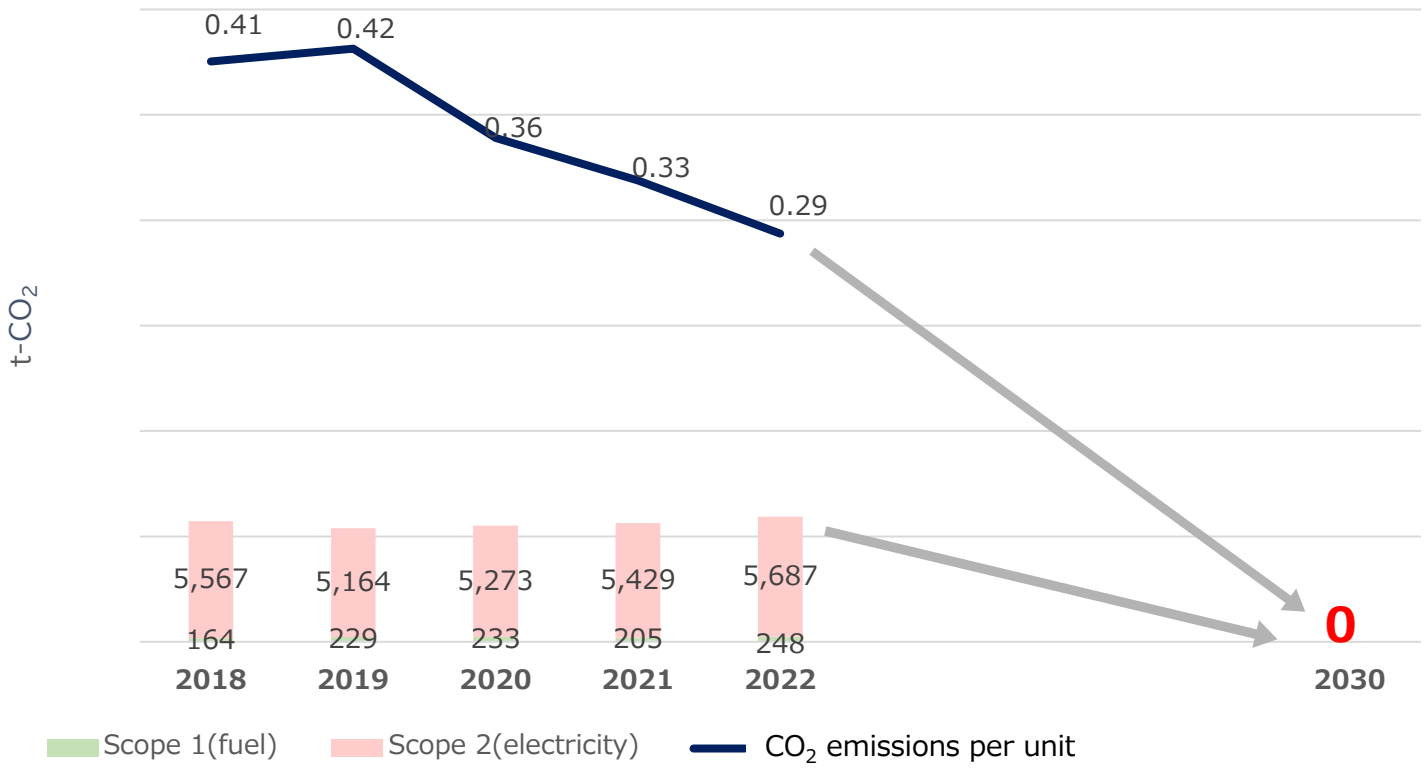
Development of technology for reducing power consumption

The Robot Business Division is taking action to reduce CO_2 emissions throughout the product life cycle.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

CO_2 Emissions from Production Activities (Scope 1 & 2)

Changes in the Robot Business Division's Scope 1 & 2 CO_2 Emissions



* Emissions at the main domestic sites (Akashi Works and Nishi-Kobe Works) only are included.
* The CO_2 emissions coefficients used for fuel and heat are the values released by the Agency for Natural Resources and Energy.
* The CO_2 emissions coefficients used for electricity are the values released by the Ministry of the Environment for each electric power company and each fiscal year.

CO_2 emissions from the Robot Business Division's production activities are shown in the figure to the left. The division has reduced CO_2 emissions per unit produced through measures including energy-saving activities and partially switching to renewable energy.

To achieve the KHI Group's target of zero Scope 1 & 2 CO_2 emissions in Japan by 2030, we will continue to undertake energy-saving and other measures.

We will also use the latest technologies including hydrogen power generation and CCUS, which are proprietary technologies of the KHI Group.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing Scope 1 & 2 CO_2 Emissions

To reduce Scope 1 and 2 CO_2 emissions, the entire KHI Group and the Robot Business Division are working in concert to implement a variety of measures.

Measures by KHI

The KHI Head Office is taking the lead in measures such as implementing measures to use clean energy. As a result of these measures, we expect that Scope 1 and 2 CO_2 emissions will decrease in the future at the Akashi Works and the Nishi-Kobe Works, the main sites of the Robot Business Division.

- Power generation from hydrogen: 100 MW-class power generation under consideration
- Solar power generation: Power generation facilities installed at the Seishin Works
- Power consignment: Trial completed for power consignment from the Akashi Works to the Harima Works
- Development of CO_2 separation and recovery technology

Measures by the Robot Business Division

The Robot Business Division is taking the lead to save energy, mainly at plants and offices.

- Partial switch to renewable energy
- Conversion of lighting to LEDs
- Introduction of power monitoring systems
- Installation of double-glazed windows (improves air conditioning efficiency)
- Implementation of improvements through innovative methods (*karakuri kaizen**)
- Switch to sheet shutter interlocking

Example of *karakuri kaizen*: Non-powered transportation of heavy parts
When a part is introduced from the right side of the photo, the part is transported to the left side under its own weight and the empty pallet is returned to the right side.

* ***Karakuri kaizen***
Improvements for implementing automation using only natural energy or mechanical devices without the use of power such as electricity and air. This reduces environmental impact, and is also a means of curbing costs while improving workplace safety, quality, and workability. The Robot Business Division actively implement such measures.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions: Transportation to Customers

Raw Materials (Components)

Scope 3 Category 1

Measures undertaken in collaboration with suppliers

Transportation (to KHI)

Scope 3 Category 4

Measures undertaken in collaboration with suppliers

Production Activities

Scope 1/2

- Use of green energy
- Energy-saving measures

Transportation (to Customers)

Scope 3 Category 4

- Changes in transportation methods
- Higher efficiency in transportation
- Improvement and re-use of packaging materials

Product Use

Scope 3 Category 11

Development of technology for reducing power consumption

The Robot Business Division is taking action to reduce CO_2 emissions throughout the product life cycle.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions from Transportation

The Robot Business Division has taken a variety of measures until now to reduce CO_2 emissions during transportation of products. In the future, we will investigate the following measures to achieve further reductions.

Shift to transportation methods with low environmental impact

Until now, we have actively selected transportation methods with low environmental impact from among the various options including **truck**, **railway**, and **maritime transportation**. In the future, we will strengthen these measures to achieve transportation optimally suited for the division's products.

Increasing transportation efficiency

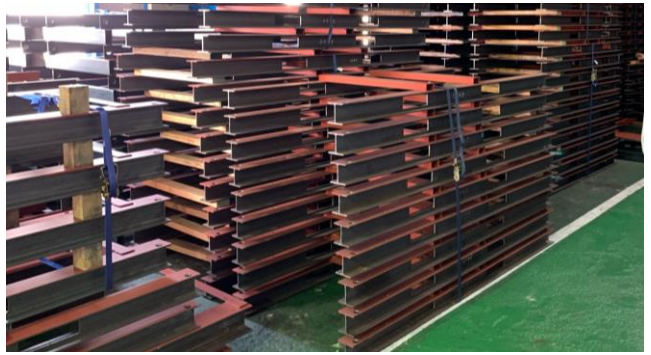
We started cooperative transportation with the Precision Machinery Business Division in 2022, reducing the number of trucks used. Going forward, we will achieve transportation with the highest loading efficiency by **expanding cooperative transportation within the KHI Group, using mixed transportation, and adopting multi-stage loading at the time of transportation**.

Improving and reusing packaging materials

We started using returnable shipping racks in 2022 and are currently shifting away from products that use the most steel over the course of a year. In the future, we will achieve optimal packaging throughout the life cycles of shipping and packaging materials including **increasing the use of returnable shipping racks** and **transitioning to packaging materials with low environmental impact**.

Examples of Current Initiatives

Cooperative transportation by the Robot Business Division and Precision Machinery Business Division



Reusable shipping racks

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing CO_2 Emissions: Product Use

Raw Materials (Components)

Scope 3 Category 1

Measures undertaken in collaboration with suppliers

Transportation (to KHI)

Scope 3 Category 4

Measures undertaken in collaboration with suppliers

Production Activities

Scope 1/2

- Use of green energy
- Energy-saving measures

Transportation (to Customers)

Scope 3 Category 4

- Changes in transportation methods
- Higher efficiency in transportation
- Improvement and re-use of packaging materials

Product Use

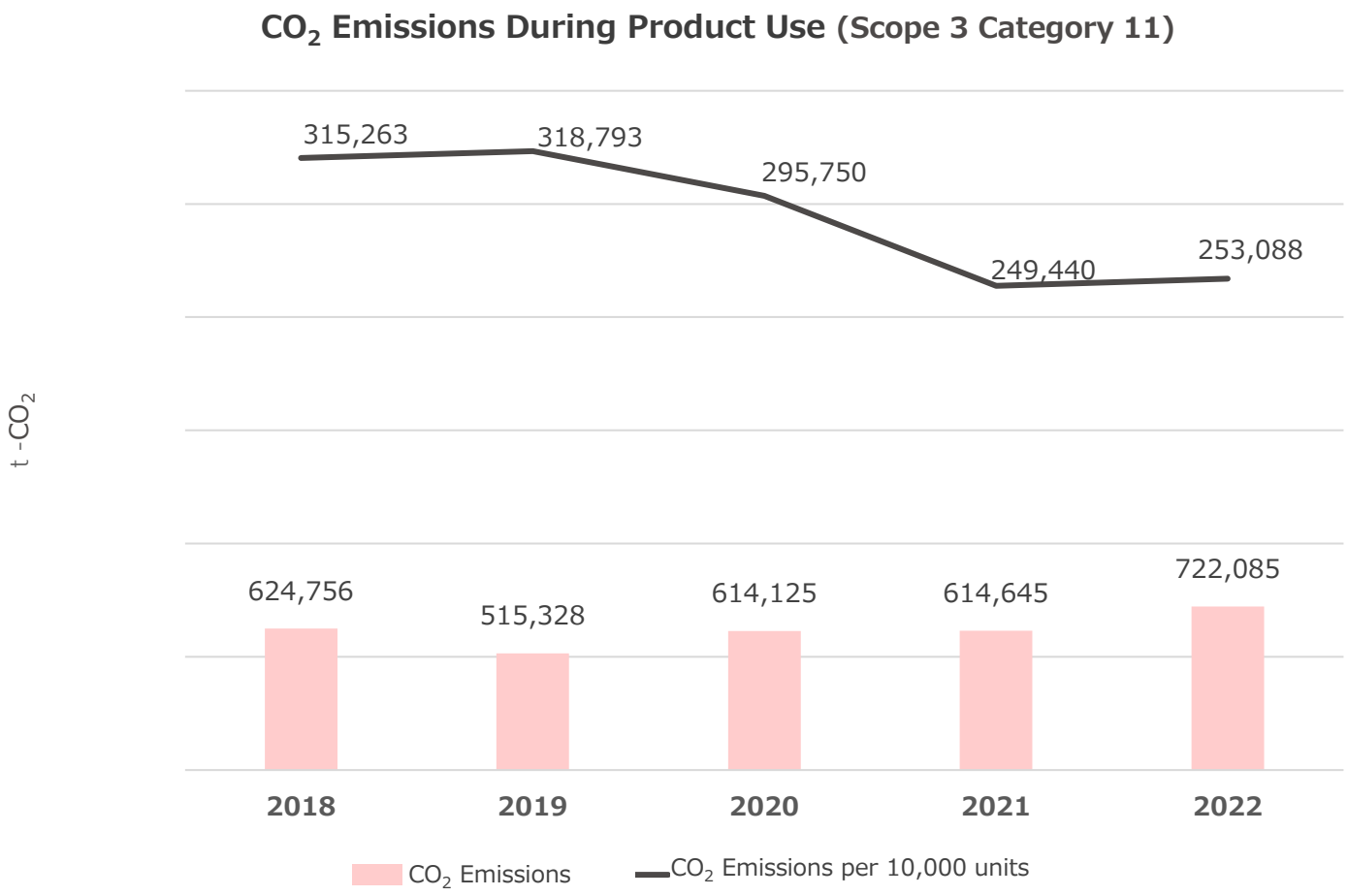
Scope 3 Category 11

Development of technology for reducing power consumption

The Robot Business Division is taking action to reduce CO_2 emissions throughout the product life cycle.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

CO_2 Emissions During Product Use (Scope 3 Category 11)



*Calculated according to the methods specified by KHI.

CO_2 emissions during product use (Scope 3 Category 11) are calculated based on robot power consumption.

The Robot Business Division has developed technologies for reducing power consumption, and as a result, has successfully reduced CO_2 emissions per unit produced.

In the future, we will reduce CO_2 emissions from robot power consumption even further by developing additional technologies, increasing the percentage of energy-saving products among products sold, and taking other measures.

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Measures for Reducing Power Consumption

Until now, the Robot Business Division has worked to develop environmentally-friendly products. The division's products have received numerous certifications under the Kawasaki Ecological Frontiers system, an internal certification program for environmentally-conscious products of the KHI Group.

Kawasaki Ecological Frontiers System (environmentally-conscious products)

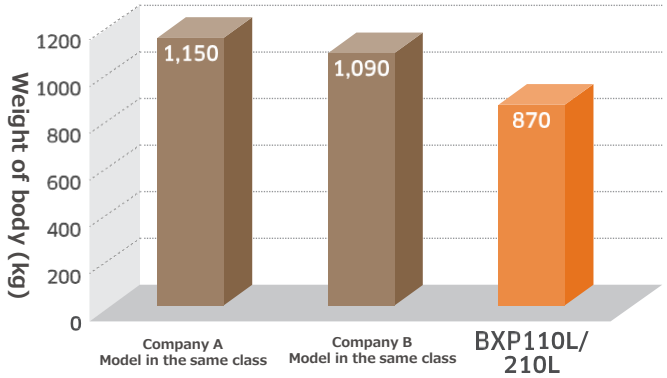
The KHI Group has operated the Kawasaki Ecological Frontiers system (formerly known as the Kawasaki-brand Green Products System), a certification program for environmentally-conscious products, since 2014 with the aim of reducing environmental impact throughout the product and service life cycle.

This program evaluates products in terms of improvement of the environmental performance of products themselves and reduction of environmental impact during the manufacturing process from three perspectives: reducing CO_2, reducing industrial waste, and reducing release of harmful chemical substances, and particularly excellent products are certified and registered.

Certified in 2022

Spot Welding Robot BXP110L/210L

Achieves class-leading weight reduction



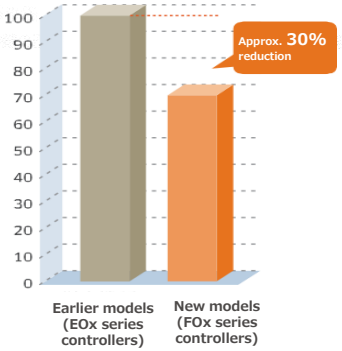
This is a large spot welding robot with a hollow structure. The necessary cables and hoses are incorporated inside the robot in an effort to enhance performance and quality while pursuing ease-of-use and spot welding applications.

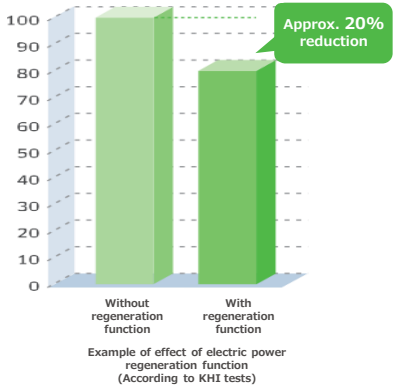
https://www.khi.co.jp/sustainability/earth/green/pdf/green_2022_005.pdf

Certified in 2023

F0x Series Controller

Energy-saving robot controller achieves industry-leading compact size and lightweight





By optimizing the housing structure using the latest thermal design technology, adopting the latest electronic components, and reducing the number of parts, power consumption by the controller itself is approximately 30% less than earlier models. A power regeneration function is available as an option, which reduces power consumption by approximately 20% (depending on the model and operating patterns).

https://www.khi.co.jp/sustainability/earth/green/pdf/green_2023_003.pdf

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Products Selected for the Kawasaki Ecological Frontiers System

The Robot Business Division has received certification for the following products (only products with certification still in effect as of 2023).

Ecological Frontiers Products	Points of Emphasis as Ecological Frontiers Products	Year of Reg.
Large painting robot KJ264/315	• Lightest in its class, slim, compact • High-density layouts for smaller painting booths	2015
General purpose cleanroom robot NT420	• Lightweight arm that can reach up to 4 foups without a travel axis • Travel-less operation reduces robot power consumption	2015
Dual-arm SCARA robot “duAro”	• Arm with excellent drive system efficiency • Contributes to resource conservation in systemization • Arm controller structure reduces volume	2016
Ultra-large MG series robots	• Class-leading low weight achieved with unique mechanism (in the class with 1.5 t transportation capability)	2017
F60 controller	• Class-leading compact size and low weight • Conserves energy by increasing the regenerative power use rate	2018
Compact handling RS007 series robots	• Compact size improves the power rate and achieves both high-speed operations and low power consumption	2019
Kawasaki Robot ANSHIN Lifecycle Support K-COMMIT®	• Remote maintenance reduces travel by service personnel • High-precision maintenance extends robot life span	2020
Compact painting robot KJ155	• Lightest robot in the class with a 1500 mm reach • Has a slim appearance and contributes to making nearby equipment more compact	2021
Spot welding robot BXP110L/210L	• Class-leading low weight • Compact size and internal cable enable high-density layout	2022
F0x series controllers	• Industry’s smallest and lightest energy-saving robot controller • Power regeneration function also available	2023

© Kawasaki Heavy Industries, Ltd. All Rights Reserved

Kawasaki

Powering your potential