“Medium-Term Management Plan 2026” (Mechatronics Segment)

2024/4/24

Sumitomo Heavy Industries, Ltd.

Taiji Tsuchiya
General Manager, Mechatronics Segment

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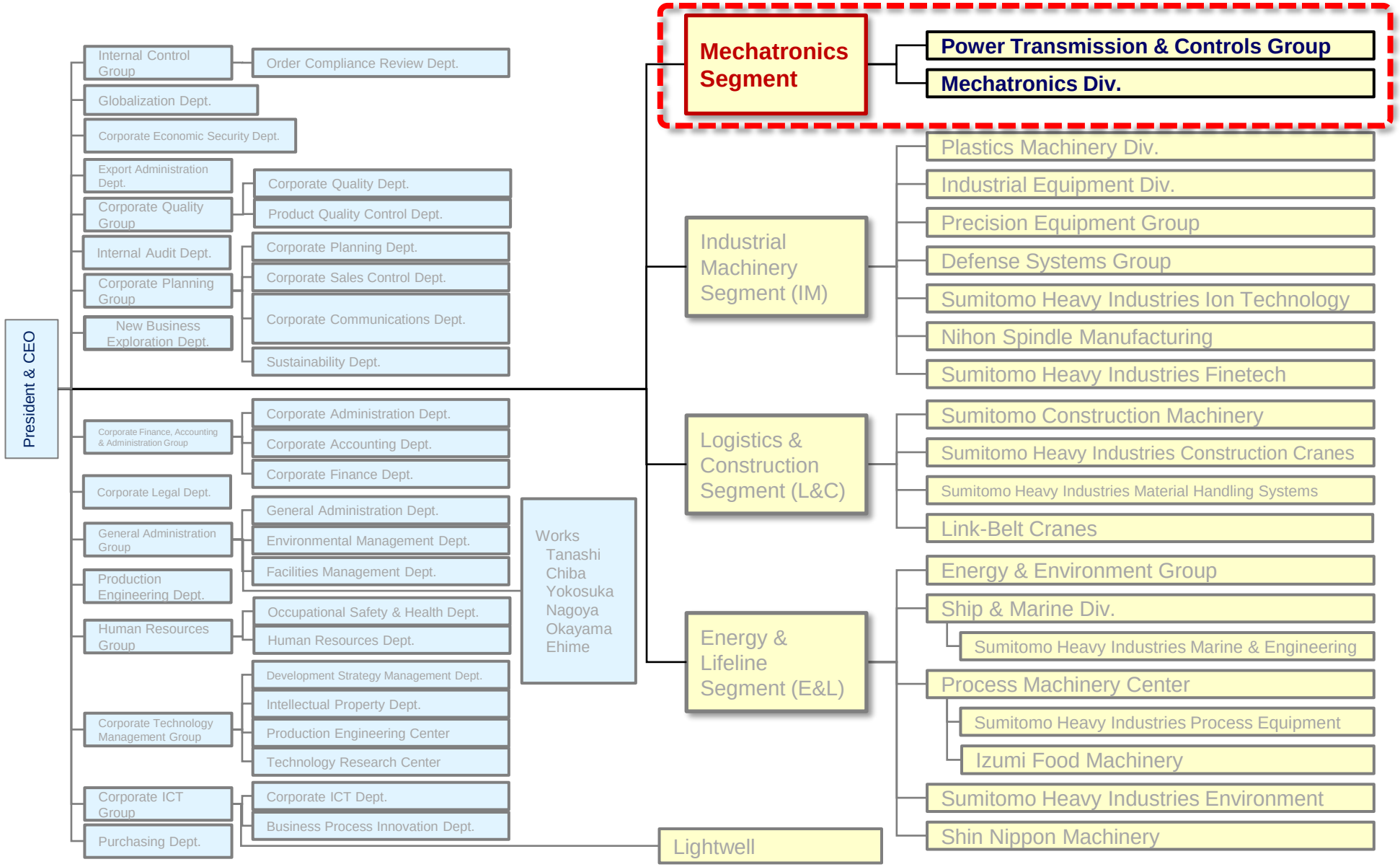
01 Outline of Mechatronics Segment

1-1. Mechatronics Segment



1-2. PTC Division Products

Business area	Product group	Main products	Manufacturing site
Gearmotor (GM)	Small- and medium-size gear reducer	Cyclo BBB	- Japan (Nagoya) - China (Tianjin, Shanghai) - Vietnam - Germany, US
		Altax Hyponic	
Gear box (GB)	Large-size gear reducer	Paramax	- Japan (Okayama, Osaka) - China (Tangshan) - Brazil - Belgium
		Hansen P4	
		Hedcon Planetary gear reducer, high-speed gear	
Electric module with electrical control	Lafert (motor) Invertek (inverter)	IE5 motor P2 inverter	- Italy - Slovenia - China - UK - Germany
	Electric module	smartris TUAKA series	
MCD robotics	Motion Control Drives (MCD) AMR	IB series F series	- Japan (Nagoya) - China (Shanghai) - Germany


Cyclo


BBB


Altax


Hyponic


Paramax


Hansen P4


Hedcon


Planetary gear reducer


High-speed gear


IE5 motor


P2 inverter


Inverter-mounted motor


TUAKA

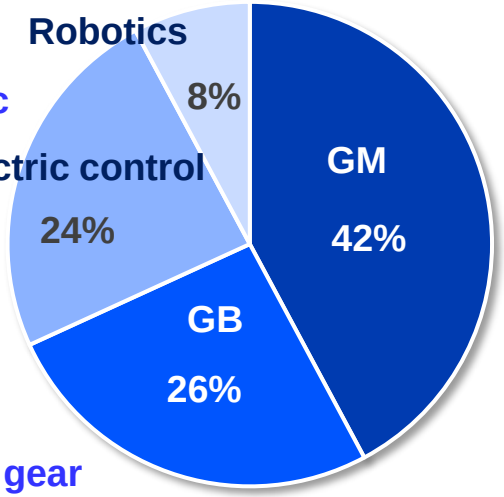

smartris


IB series


F series


KeiganALI

Sales composition: Actual results in 2023



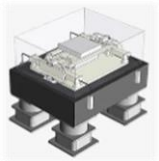
1-3. Mechatronics Division Products

Business area	Product group	Main products
Semiconductor manufacturing equipment	Laser systems	Laser annealing equipment Laser oscillator Laser processing system
	Precision positioning equipment	High-precision XY stage Vacuum stage
Electric control	Control systems	Roll-to-Roll conveyance control system High-precision air dancer unit Smart drive control system
	Motion components	Motion controller Servo driver Linear motor Air actuator
Robotics	Robots	Collaborative robot (Sawyer) AI 3D appearance inspection system (KITOV)

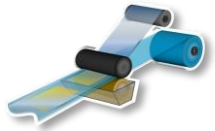
Laser annealing equipment

Laser oscillator

Laser processing system



XY stage



Roll-to-Roll conveyance control system

Smart drive control system

Servo driver

Motion controller

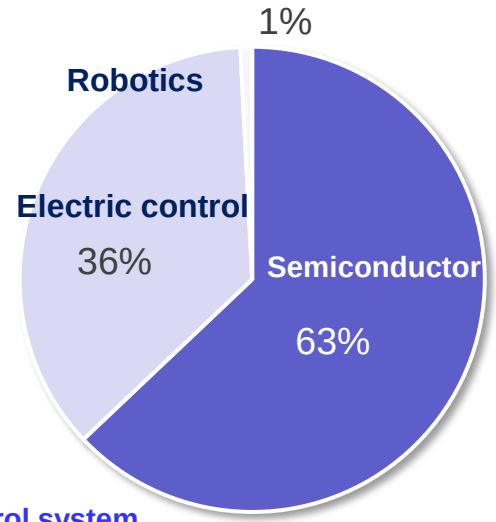
Linear motor

Air actuator

Sawyer

KITOV

Sales composition: Actual results in 2023

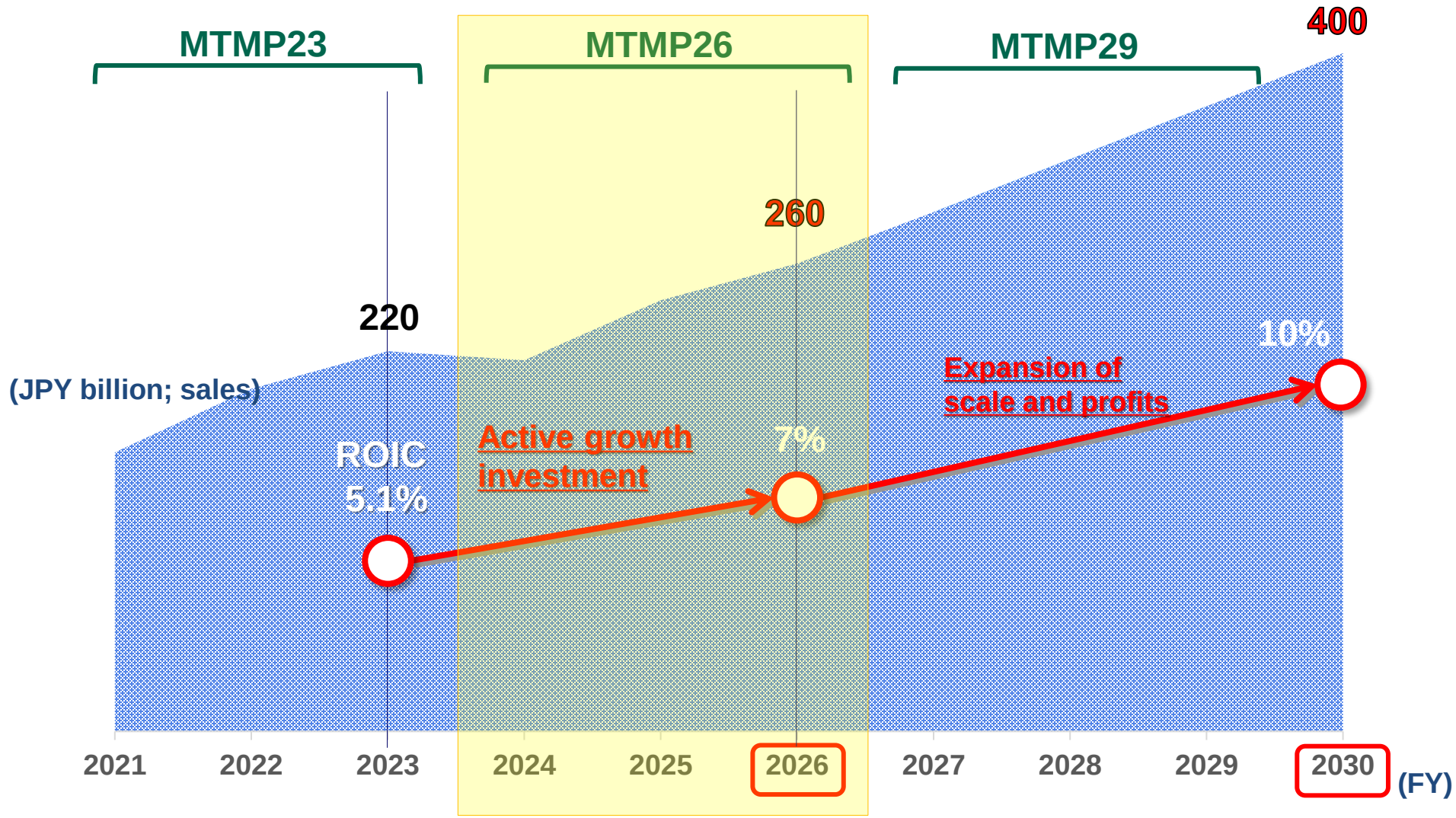


02 Ideal State, Target Portfolio Medium-Term Management Plan 2026 (MTMP26)

2-1. 2030 Business Targets

“Help society and customers solve problems through mechatronic innovation and drive solutions”

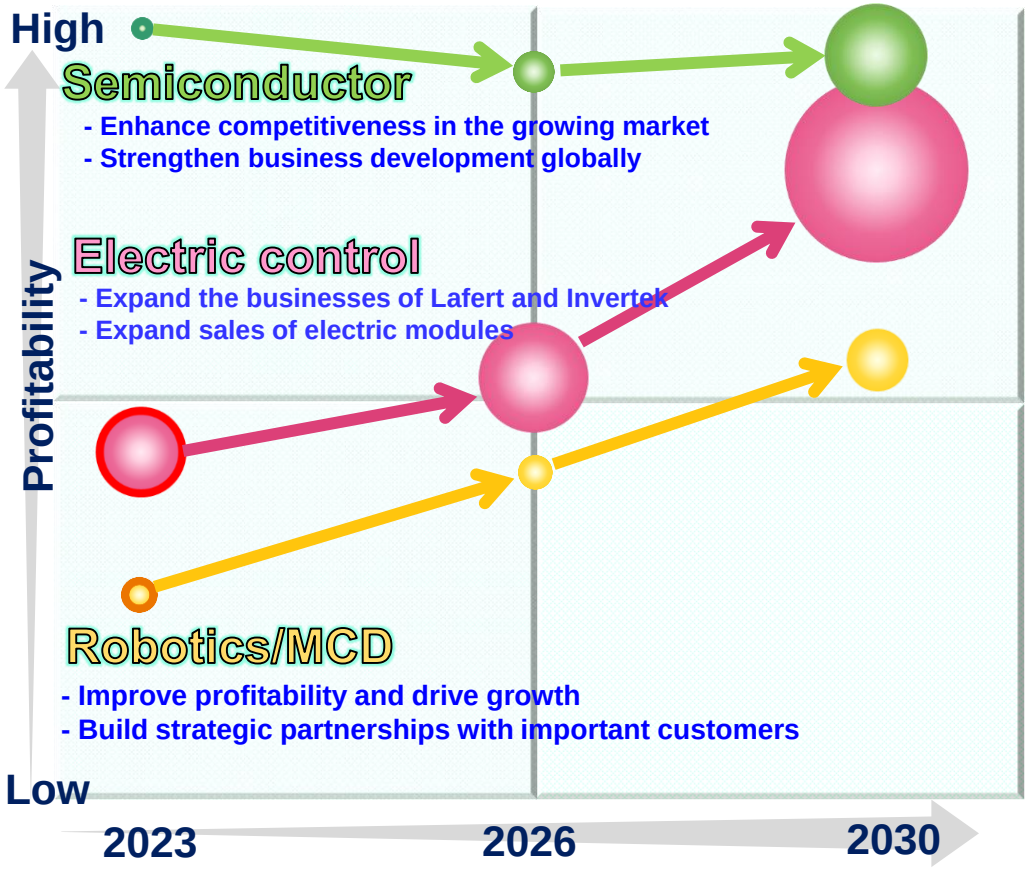
✓ Aim to reach a JPY400 billion revenue by 2030　✓ Achieve high profitability through revenue structure reform



A plan to achieve the objectives of MTMP26 (target ROIC: 7%) and 2030 (target ROIC: 10%)

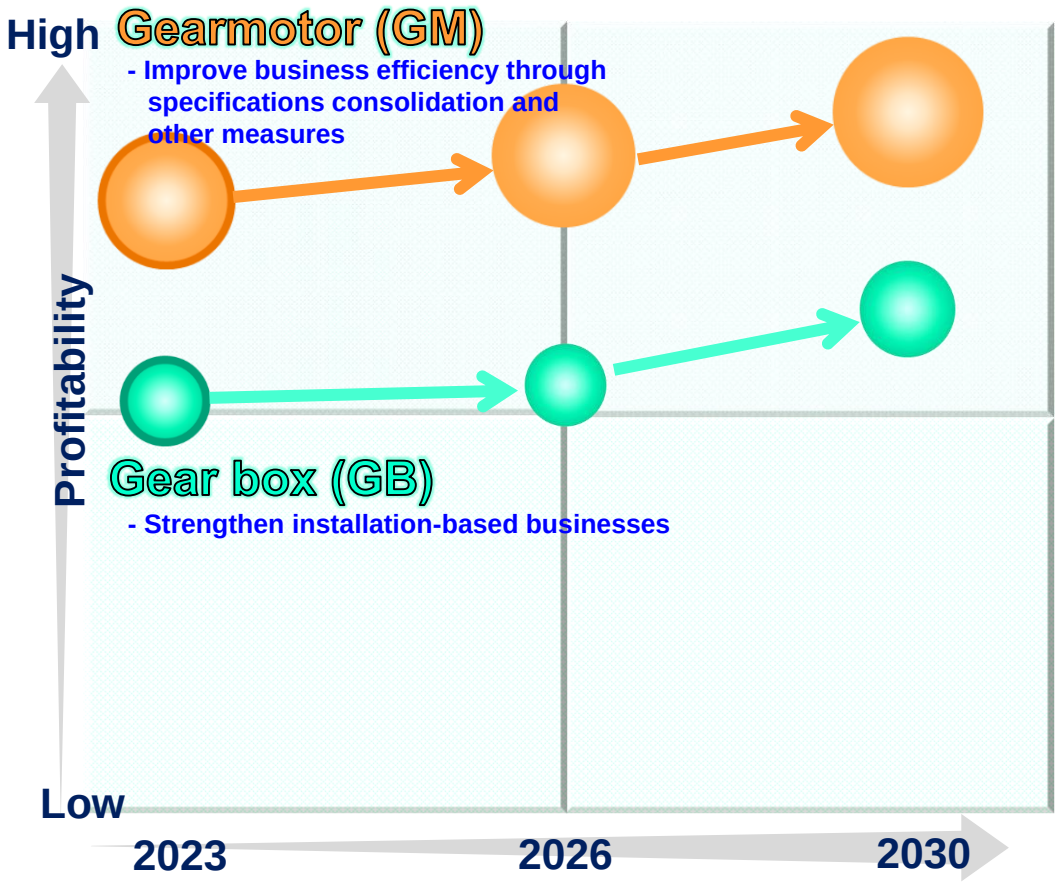
✓ **Key point: Expand businesses and enhance profitability in priority areas** (electric control, semiconductor and robotics) **and boost profitability of the gear business**

Priority areas



Note) The sizes of circles visualize sales volumes

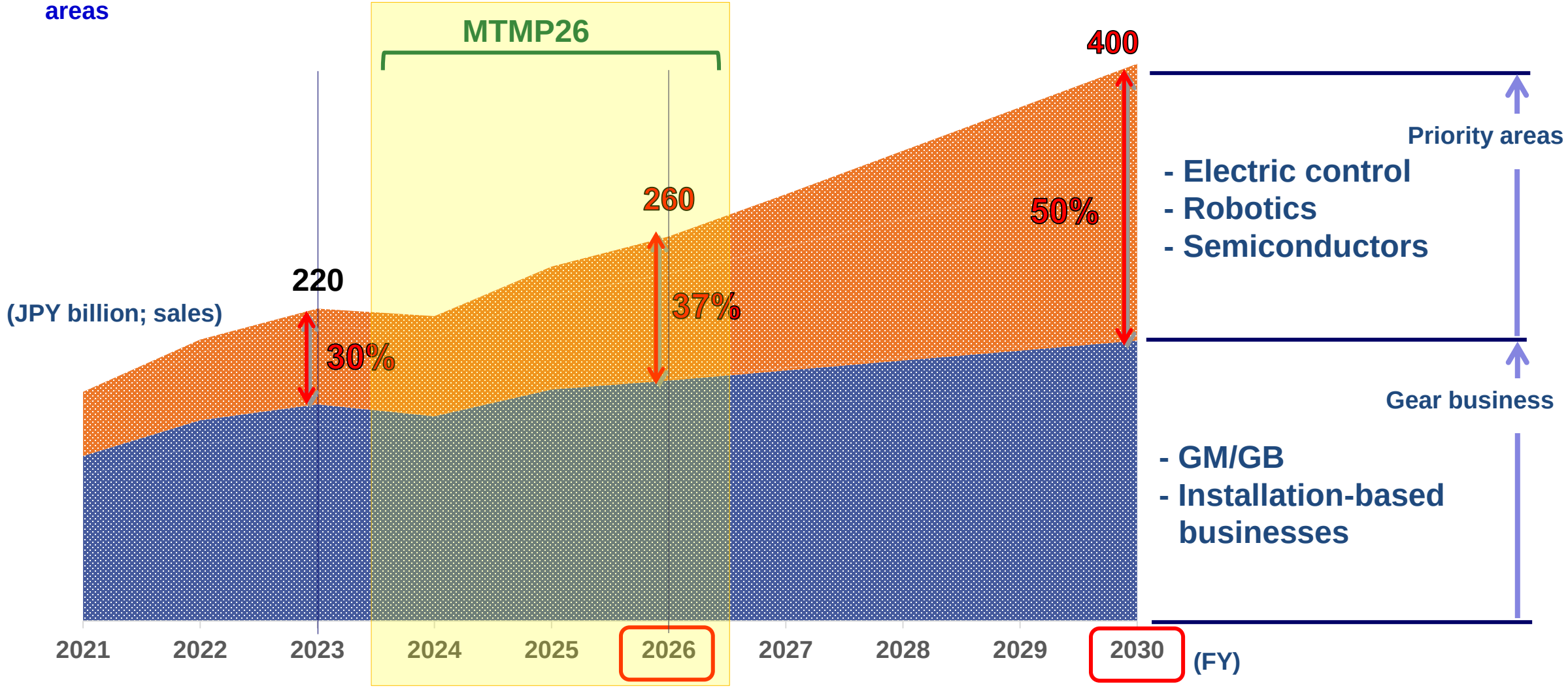
Gear business



2-3. Growth in Priority Areas

Actively invest in priority areas with a view to 2030 and promote the reform of revenue structures as well as the growth of businesses

- ✓ Increase the sales ratio in priority areas in line with growth (30% → 50%)
- ✓ Simultaneously, enhance profitability in priority areas

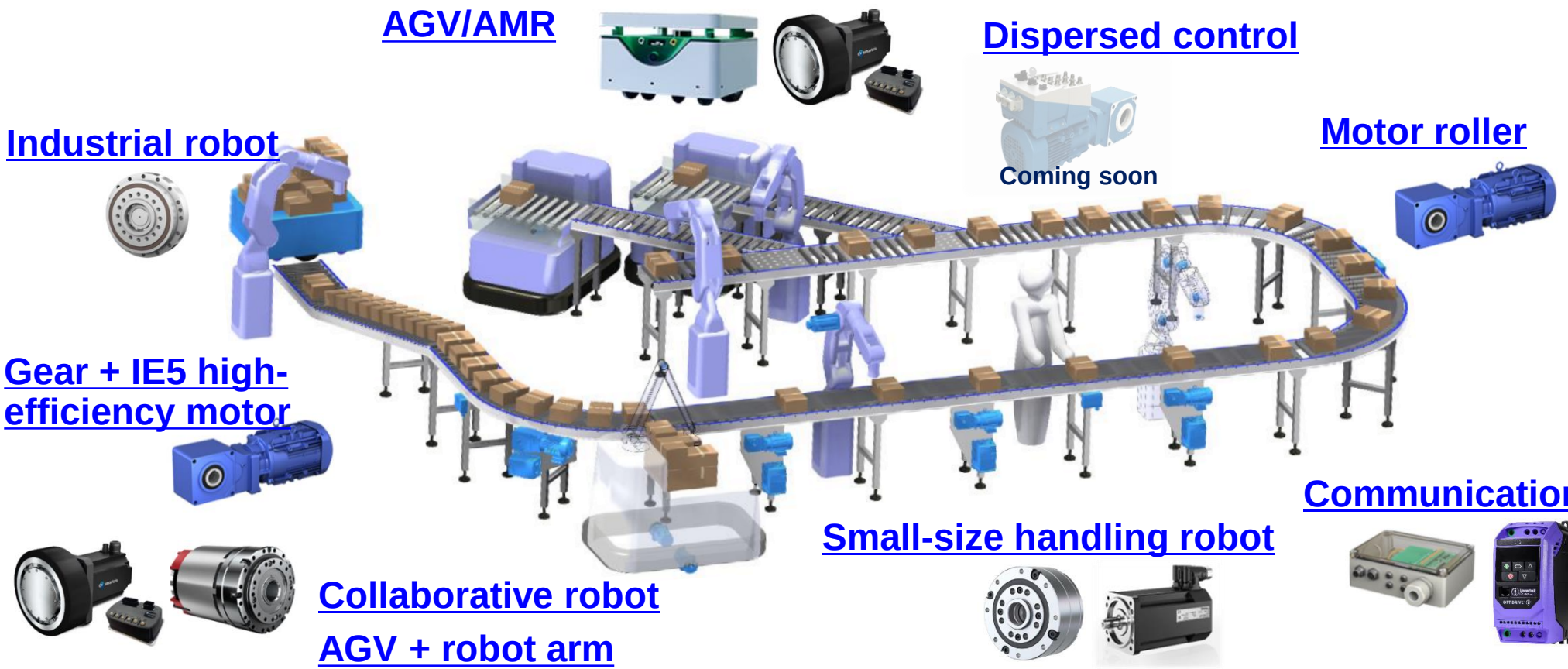


2-4. Market Changes and Responses in the Drive Solutions Business

Trends in the material handling market: Automation and systematization are needed due to increased freight volumes and manpower shortages

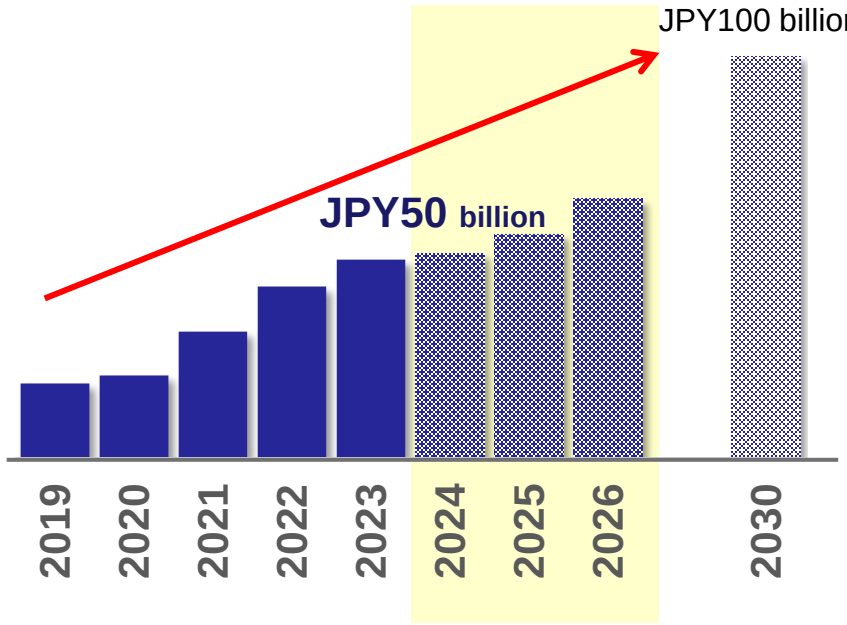
– We are facing a major turning point –

- AGV/AMR material handling
- Introduction of dispersed control
- Introduction of motor rollers
- Introduction of gears + IE5 high-efficiency motors
- Introduction of AGV + robot handling



2-5. Electric Control/Expansion of Lafert and Invertek

Trends in net sales of Lafert and Invertek



Invertek (inverter)

Offers a wide range of solutions to address energy conservation, environmental regulations and other issues

- Expanded an application center and a factory and will construct a new development center.
  → Promote sales mainly in the HVAC* field *HVAC: Heating, Ventilation, and Air Conditioning
- Dispatching engineers from the Mechatronics Division and the Technology Research Center, and conducting collaborative work for new development projects

High-efficiency inverter

Lafert (motor)

Strengthens relationships by offering solutions, including modules, to specific customers

- Construction of a dedicated factory for high-efficiency motors, expansion of shaft processing facilities, increase in production volumes and broadening of operations
  → Development and sales promotion of inverter-mounted gear motors and smartris and other electric modules

High-efficiency motor

smartris

Growth and expansion of electric modules

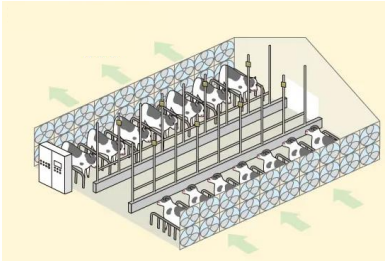
– Responding to the demand for electrification driven by environmental regulations and the need for energy conservation –

Planned establishment of “development site in Europe” – Accelerating technology research and development for “electrification” –

2-6. Electric Control/Development of Stand-alone Products

Invertek (inverter)

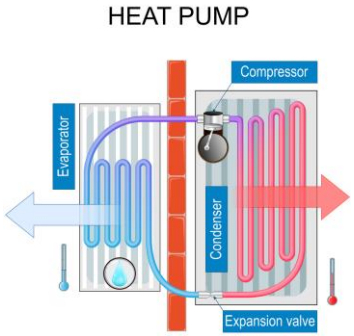
Applying to ventilation fans for livestock stables



Source: https://www.kantomilk.jp/jirei/page-1022/

Proposing optimal ventilation systems with high waterproof and dustproof performance

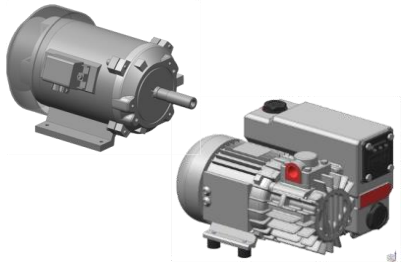
Applying to compressors for cryocoolers

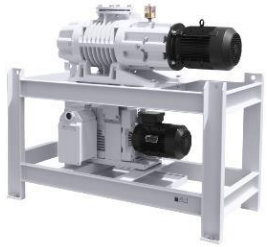


Proposing inverter control optimization and energy conservation in accordance with European fluorine regulations

Lafert (motor)

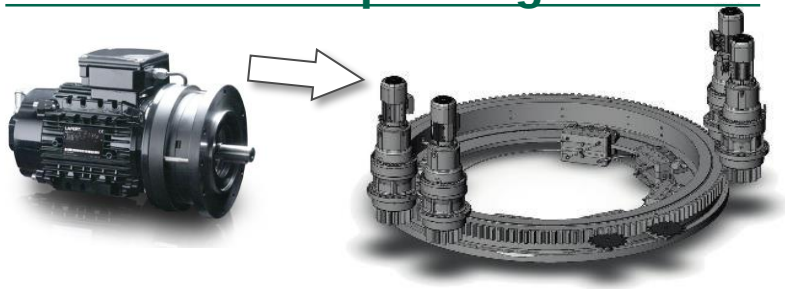
Applying to vacuum pump systems

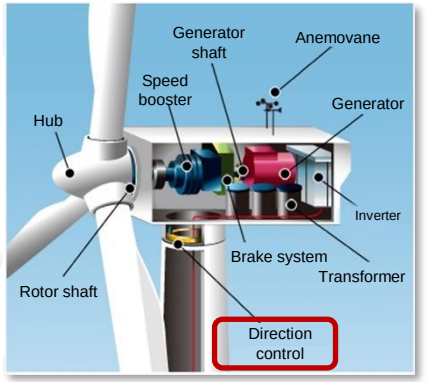




Utilizing high-efficiency motors to save energy and improve production efficiency

Applying to direction control shafts for wind power generation





Source: NEDO "Constituent Elements and Overview of Wind Turbines in Wind Power Generation Plants"

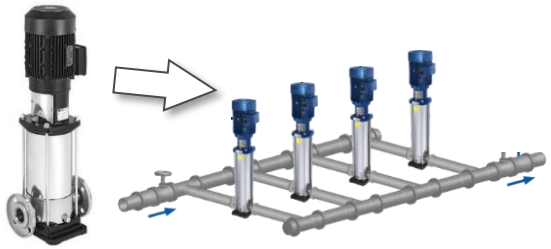
System design and rust prevention structure tailored to customer specifications

2-7. Electric Control/Development of Module Products

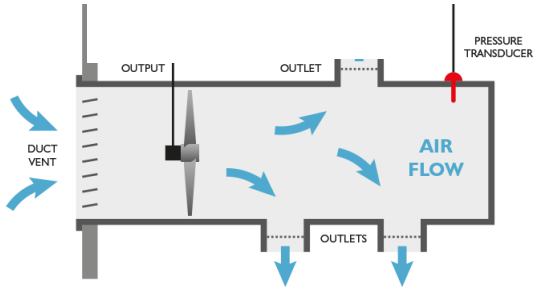
Energy-saving modules: Inverter-mounted type

Inverter-mounted high-efficiency motor

Applying to vertical water supply and drainage pumps



Applying to building ventilation and air-conditioning systems



Roll-out to the HVAC field

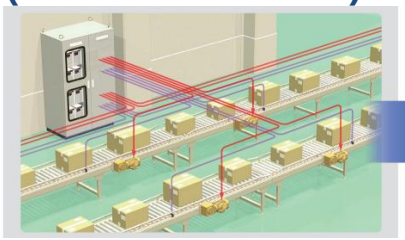
*Heating, Ventilation, and Air Conditioning

Transition from centralized to dispersed control

Coming soon

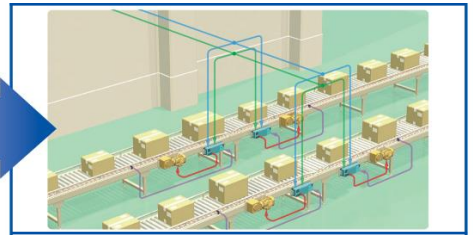
Dispersed control Inverter-mounted gear motor

Conventional control (centralized control)



- Control panel installation space
- Complicated production line layout
- Long wiring

Dispersed control



- Space-saving
- Modularization is possible
- Wire-saving

Electric modules for AGV/AMR: Gear-, motor- and driver-integrated type

smartris for AGV/AMR

Consists of a gear, servo motor and driver

- Compact design: in-wheel structure
- Supports a wide range of load capacities: Sizes/reduction ratios
- High controllability: servo control
- Highly safe: Shock resistant with STO compatibility

Motion Control Drives (MCD)

– Revenue improvement and growth –
- Strategic partnerships with important customers
- Aggressive development
- Enhancing the development of various elements
- Improving convenience and added value by modularization

Product lineup

A series
Compact type

C series
Large-diameter hollow high-speed shaft type

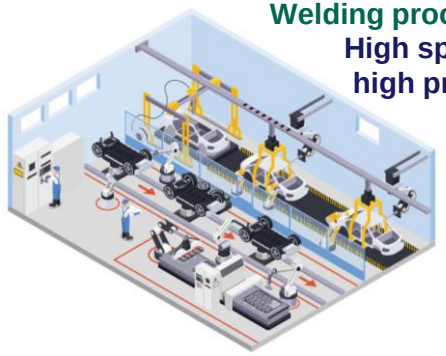
DA series
High-performance compact type

UA series
High reduction ratio compact type

ECY series
For small-size precision control

Main applications

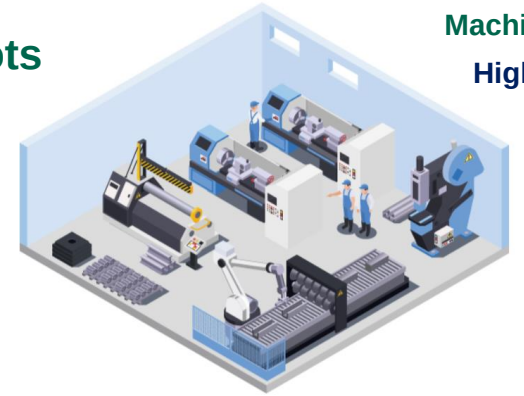
Welding process
High speed and high precision



Material handling
Automation and streamlining

Robots

Machine tools
High load and high precision



2-9. Robotics/Development of Component and Module Products

Electric modules for robots: Gear-, motor- and driver-integrated type

TUAKA for robot actuation

"Application market launch time has been reduced!!"
Received an award at HERMES AWARD 2022

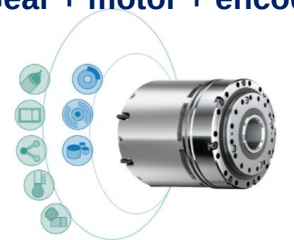
- Integration of functions necessary for joint actuation in robots
- Designing a robot can be easily accomplished by simply selecting the necessary components

TUAKA ACTIVE
Gear + motor

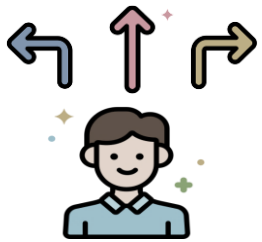
Tailor-made "Kit type"

Customization allows for further downsizing of the entire system

TUAKA SERVO
Gear + motor + encoder



Ultra-compact "Standard servo"



Customer

TUAKA DRIVE
Gear + motor + encoder + driver + safety function

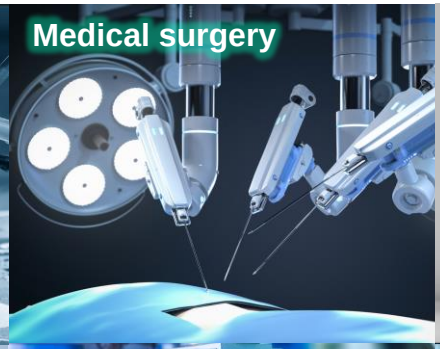
Best in class actuator "All-in"

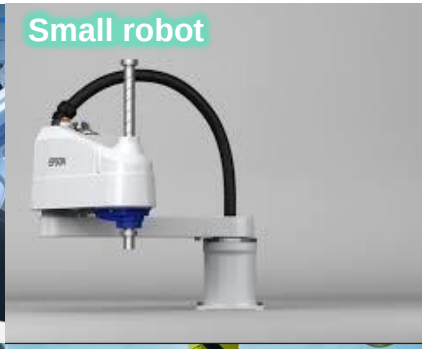
Possible to make the entire system more powerful and simpler

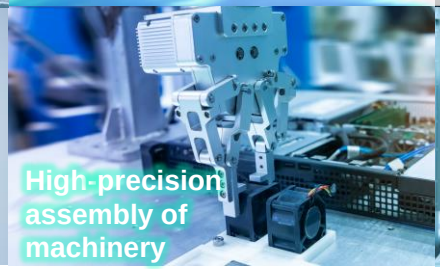
HERMES AWARD 2022 (Hannover Messe)

The product received high praise for its meticulous downsizing to the millimeter, efficient material use, the integration of a torque sensor that opened up new applications, and its easy-to-select options.

Applications







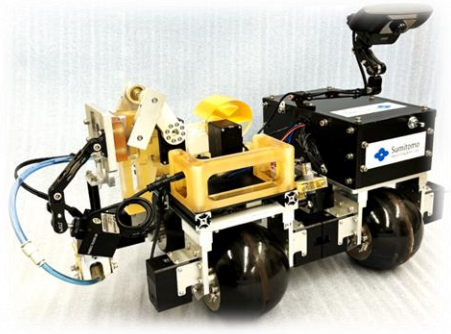
AMR "Keigan ALI"

"Easily configurable and simple to introduce"
Self-driving robot that facilitates the automation of diverse worksites

AMR
"KeiganALI"

- Self-driving
- Simple operation
- Small start
- High versatility and flexibility

Wall-climbing robot



Social trends in infrastructure and plant maintenance

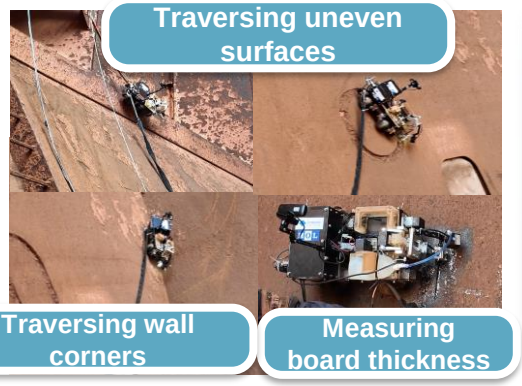
- ✓ Issues related to maintaining aging facilities
- ✓ Highly-efficient operation through DX predictive maintenance
- ✓ Demand for automation due to manpower shortages
- ✓ Freed from dangerous work and arduous tasks

- "Excellent traveling performance" by leveraging our unique wheel technology
- "Able to reach places that are difficult" for drones or conventional robots

Obtained an Innovation Endorsement Certificate from Nippon Kaiji Kyokai

The news was released on April 2, 2024 and televised on TV TOKYO's "World Business Satellite" on April 18

ClassNK Innovation Endorsement



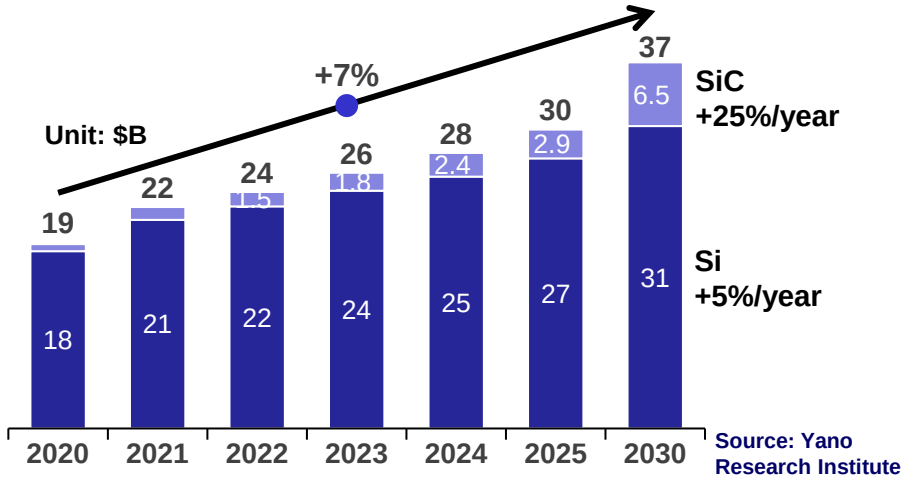
- Received the certificate in collaboration with Mitsui O.S.K. Lines and earned high acclaim for our innovative efforts leveraging outstanding technology
  → Reducing vessel crew's labor, risks associated with high-place work and docking costs

2-11. Semiconductors/Market Changes and Opportunities (Laser Annealing Equipment)

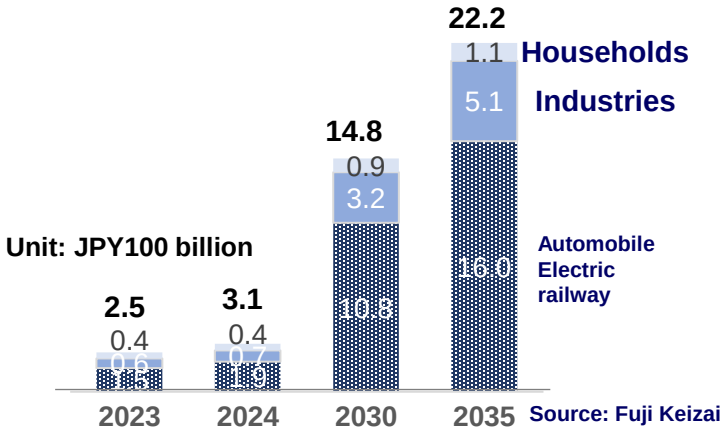
Growth of power semiconductors, driven by the introduction of EVs:

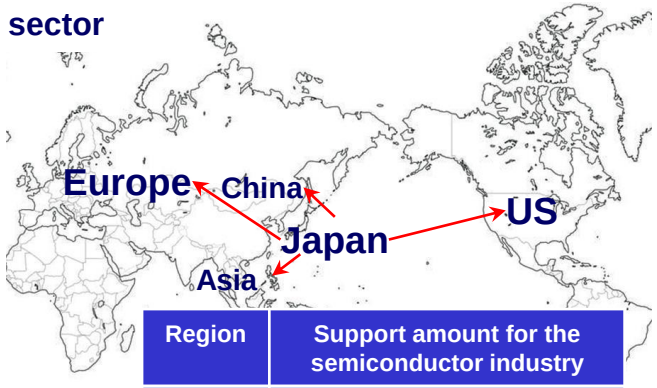
Expansion of demand for high-efficiency laser annealing equipment (Spreading Japanese technology globally)

Forecast of changes in the power semiconductor market size



Forecasts of changes in the SiC device market by sector





Region	Support amount for the semiconductor industry
Japan	JPY2 trillion (2 years)
US	JPY7 trillion (5 years)
Europe	JPY6.5 trillion (by 2030)

Source: Nikkei

Laser annealing*) equipment for SiC power semiconductors

*) Heat treatment process after ion implantation

– Developed new laser processing techniques in collaboration with a Japanese manufacturer and promoted sales –

- Developed in early 2000, ahead of competitors from overseas
- Wafer thinning can be achieved through localized laser heating
  → Resulting in improved electrical characteristics
- Received orders for more than 100 units

Laser annealing equipment for SiC power semiconductors

– Pioneered the development of laser processing techniques in Japan and now promoting sales in Asia and rolling out globally –

- Started sales mainly in Japan and Asia around 2015
- Enjoying strong sales, driven by increased demand for SiC due to introduction of EVs
- Responding to growing global demand

Reference) Roles of Laser Annealing Equipment

Process for enhancing the quality of materials (wafers): Adding dopants to initiate re-crystallization

Ion implantation - Create a non-crystalline structure through the implantation of ions like boron and phosphorus, which serve as dopants to enable semiconductor functionality

Laser annealing - Realigning and restoring the crystalline structure (dopant activation)

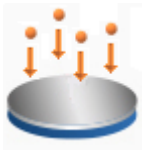
Rear side Grinding ≦120um

Rear side grinding (thinning)

Rear side Ion implantation

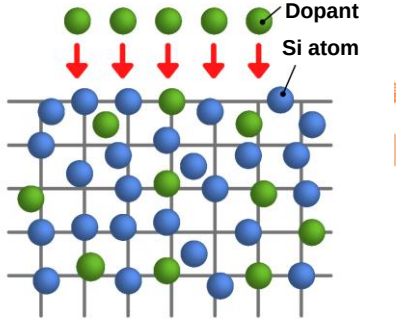
Rear side Heat treatment

Rear side Electrode formation



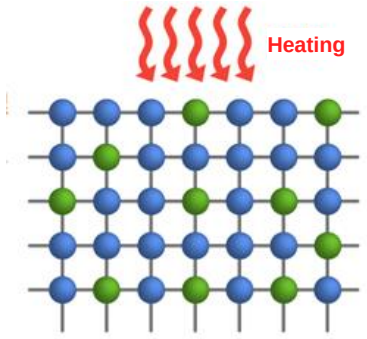
Ion (dopant) implantation:

Dopant implantation disrupts the crystalline structure



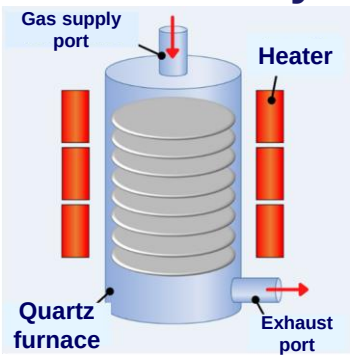
Dopant activation:

Realigning and restoring the crystalline structure by laser heating



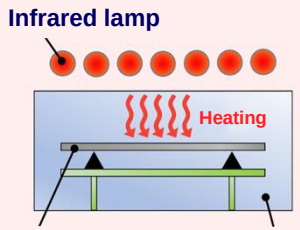
Semiconductor heat treatment process

Batch style



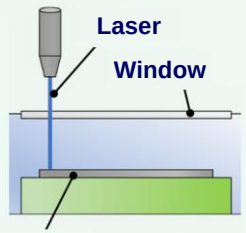
Heating wafers entirely using a heater

RTA



Heating a wafer rapidly through lamp illumination

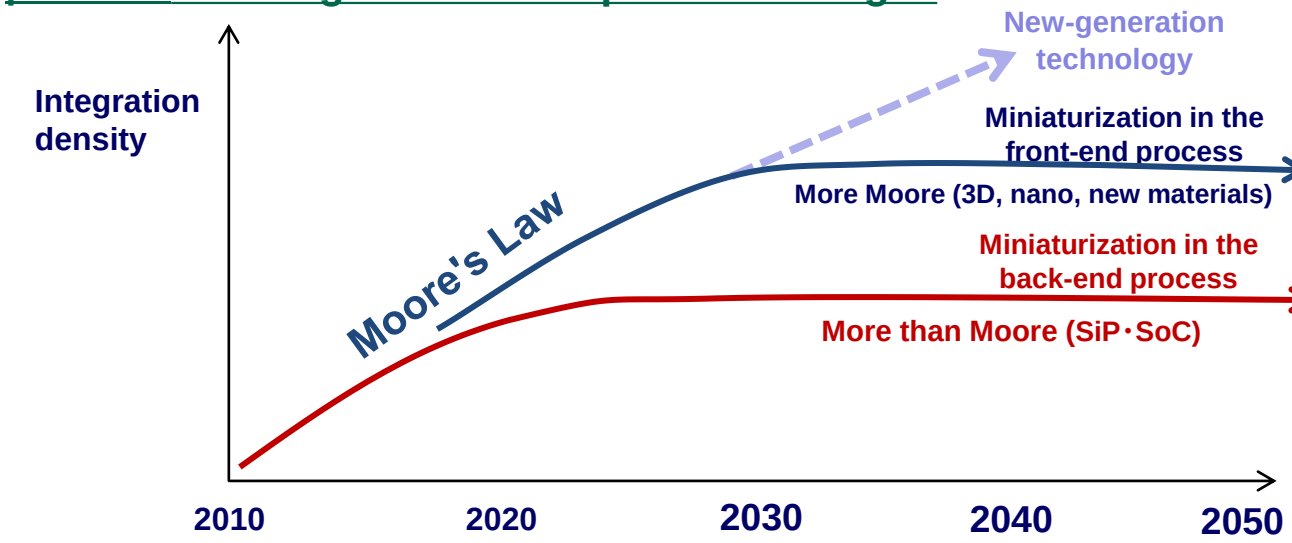
Laser annealing



Heating and melting the outermost surface of a wafer by laser

2-12. Semiconductors/Market Changes and Opportunities (XY Stage)

Transition from miniaturization (More Moore) in the front-end process to miniaturization (More than Moore) in the back-end process: Growing demand for precision stages



Electron beam lithography, EUV mask inspection, etc. ----- Vacuum precision stage — Expansion of the existing market

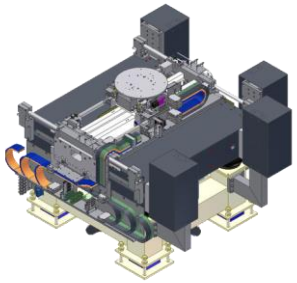
Hybrid bonding, etc. ----- Precision stage — Growing demand from a new market

Source: Prepared by modifying data created by Mitsubishi Research Institute

Precision stage for wafer inspection and bonding

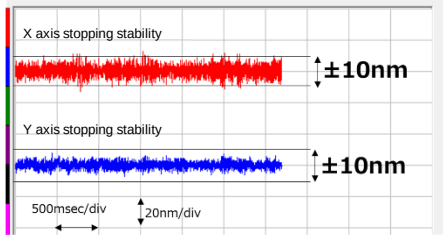
– Rolling out globally, planning for development site in the US –

"Offering optimal precision stages that meet customer needs"



- High-rigidity stage mechanism
- Optimization controller driver, linear motor

Stopping stability

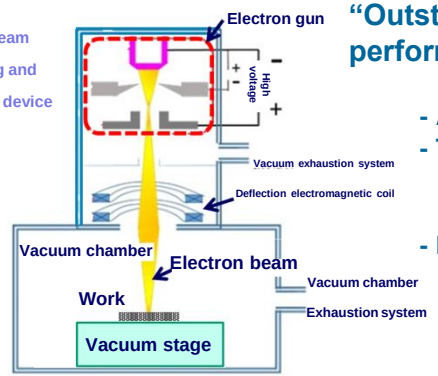


Maximum speed/acceleration: 1.5m/s・1.8G for X axis, 1m/s・1G for Y axis

Precision vacuum air servo stage for electron beam lithography and inspection

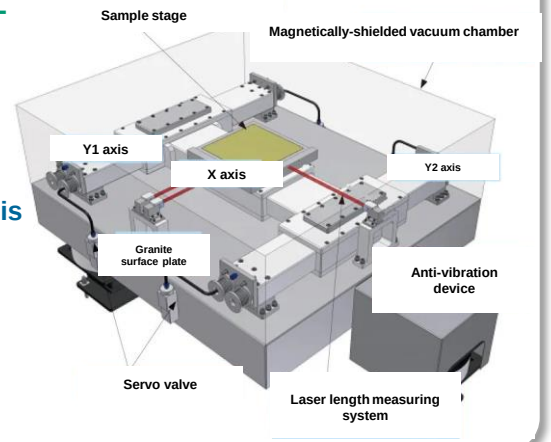
– High-precision stage moving within a vacuum chamber –

Electron beam processing and inspection device



"Outstanding scanning performance"

- Air bearing
- The drive mechanism is air-based and non-magnetic
- Fast response speed



2-13. Gear Business/Installation-based Business Development

Growth and expansion of installation-based businesses

Service → **Repair/inspection** → **Replacement / Legacy / Retrofitting / Drop-in**

- By providing solutions to on-site issues that include replacing both our products and those of other companies, we aim to capture the demand for customization

Types of installation-based businesses

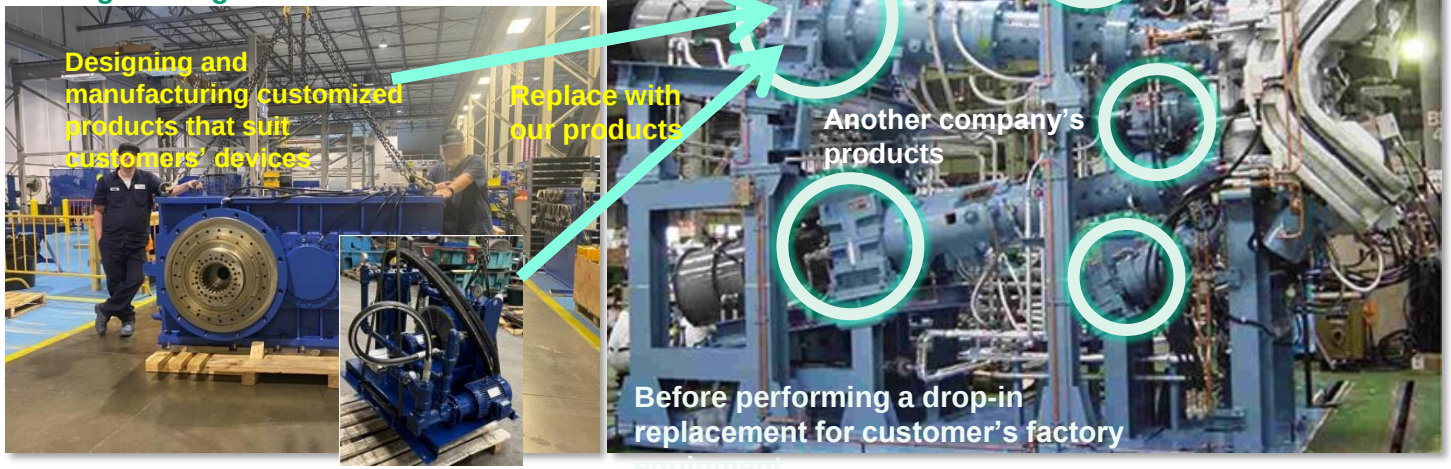
- **Status monitoring system:** Predictive equipment malfunction detection
- **Replacement:** Replacing products
- **Legacy:** Replacing products whose production has been discontinued
- **Retrofitting:** Minor customization and dimension alignment
- **Drop-in:** Customizing by adjusting the leg connections and aligning the output shaft; ensuring significant torque capacity

Example of drop-in replacement: Extruder in a tire factory; Another company's machine was replaced with ours

LUFTEX

Acquired US-based Luftex in 2020

Insights and connections with end users, and engineering skills



Service roll-out map for customers' global sites

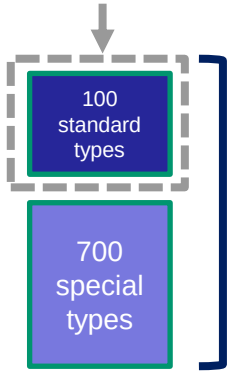
2-14. Gear Business/Standardization and Specifications Consolidation

Standardization: Use a production selection tool to steer customers towards choosing standard specifications (Reduction from 800 types to 100 types)
Specifications consolidation: Consolidate similar specifications through negotiation with customers (Reduction of special specifications by 10%)

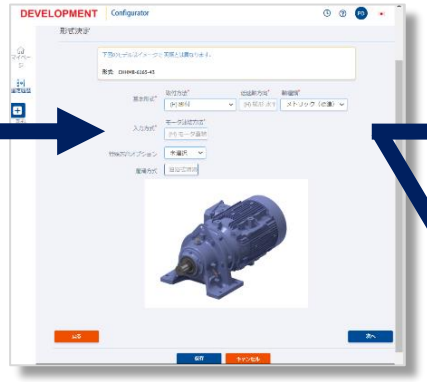
Example of standardization activities: Development of a product selection tool

Customer

Choosing from 100 types

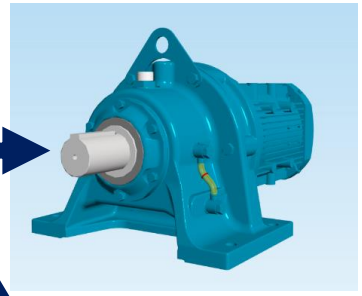


Choosing with a selection tool

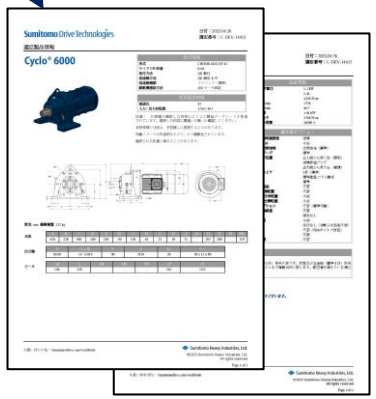


A quick, 5-minute process allows customers to easily obtain drawings and specification sheets whenever they're needed.

3DCAD



Specification sheets



Benefits from standardization and specifications consolidation

Customer

- ✓ Reduced selection time, simplified work
- ✓ Inventory consolidation, global standardization
- ✓ Reduced lead times, simplified supply chain

Our company

- ✓ Reduced inventories
- ✓ Simplified arrangement work, reduced management costs
- ✓ Improved production efficiency

Sumitomo Heavy Industries, Ltd.

All forward-looking statements regarding the company's future performance are based on information currently available to Sumitomo Heavy Industries and determined subjectively. Future performance is not guaranteed and all information related to future performance contained herein is subject to changes in business environments.