

# **Investor's Guide Business Part**

## **Notes:**

- This material is composed mainly of basic contents to promote understanding of Yaskawa for analysts and investors.
- Figures in this document are rounded off and may differ from those in other documents such as financial results.
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**YASKAWA ELECTRIC CORPORATION  
(TSE6506)**

## **1. Motion Control**

**1-1. AC servo & controller**

**1-2. Drives**

## **2. Robotics**

## **3. System Engineering**

## 1. Motion Control

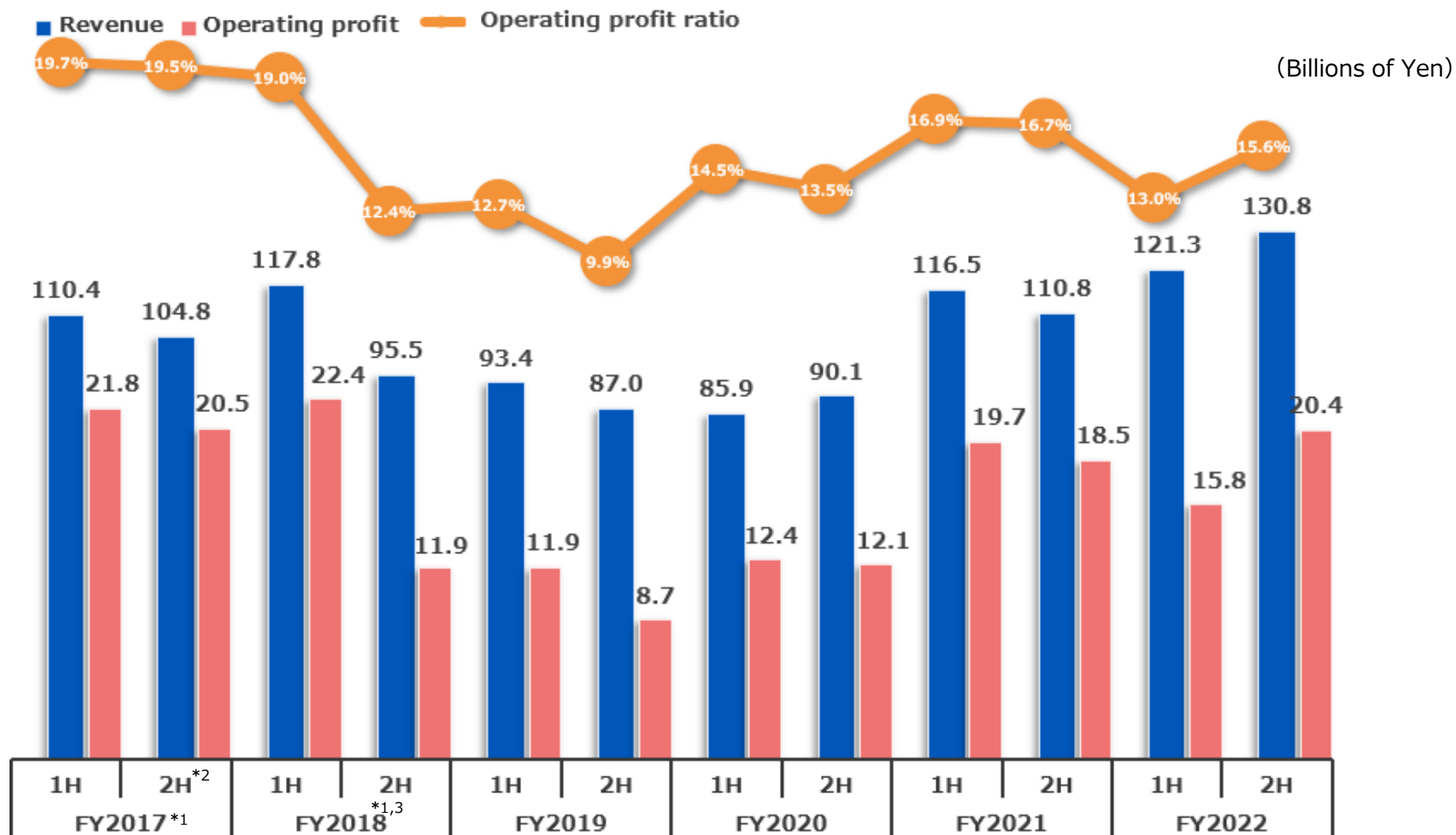


# Product Basics

- Motion control product includes “AC servo & controller” and “AC drive”.
- Main difference is subjects and types of control.

|                    | AC servo & controller                                                                                                                                                                                                                                                                                                                       | AC drive                                                                                                                                                                                                                                                                                                              |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject of control | <b>Position and speed</b> of motor-driven machines                                                                                                                                                                                                        | <b>Rotational speed</b> of motors                                                                                                                                                                                                  |
| Features           | <ul style="list-style-type: none"> <li>• <b>Move exactly and steadily</b> to the commanded position and speed</li> </ul>                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>• Provide <b>smooth and stable movement</b> by freely changing the speed of rotation</li> <li>• <b>Contribute to energy saving</b> by adjusting the speed of rotation and <b>reducing wasted power consumption</b></li> </ul>                                                  |
| Range of use       | <b>Narrow</b> : Field where high speed and precision are required                                                                                                                                                                                                                                                                           | <b>Wide</b> : Life related, industrial equipment, etc.                                                                                                                                                                                                                                                                |
| Application        |    <div> Machine tool Semiconductor production equipment Industrial robots </div> |    <div> Elevator Air conditioning fan Conveyor </div> |

# Revenue / Operating Profit (Motion Control)



\*1 Data up to FY2018 are based on Japanese GAAP (After FY2019, IFRS was applied) \*2 The data for FY2017 are made on a reference basis. (September 21, 2017 – March 20, 2018)

\*3 Reflects the impact of the reclassification of segments in FY 2019

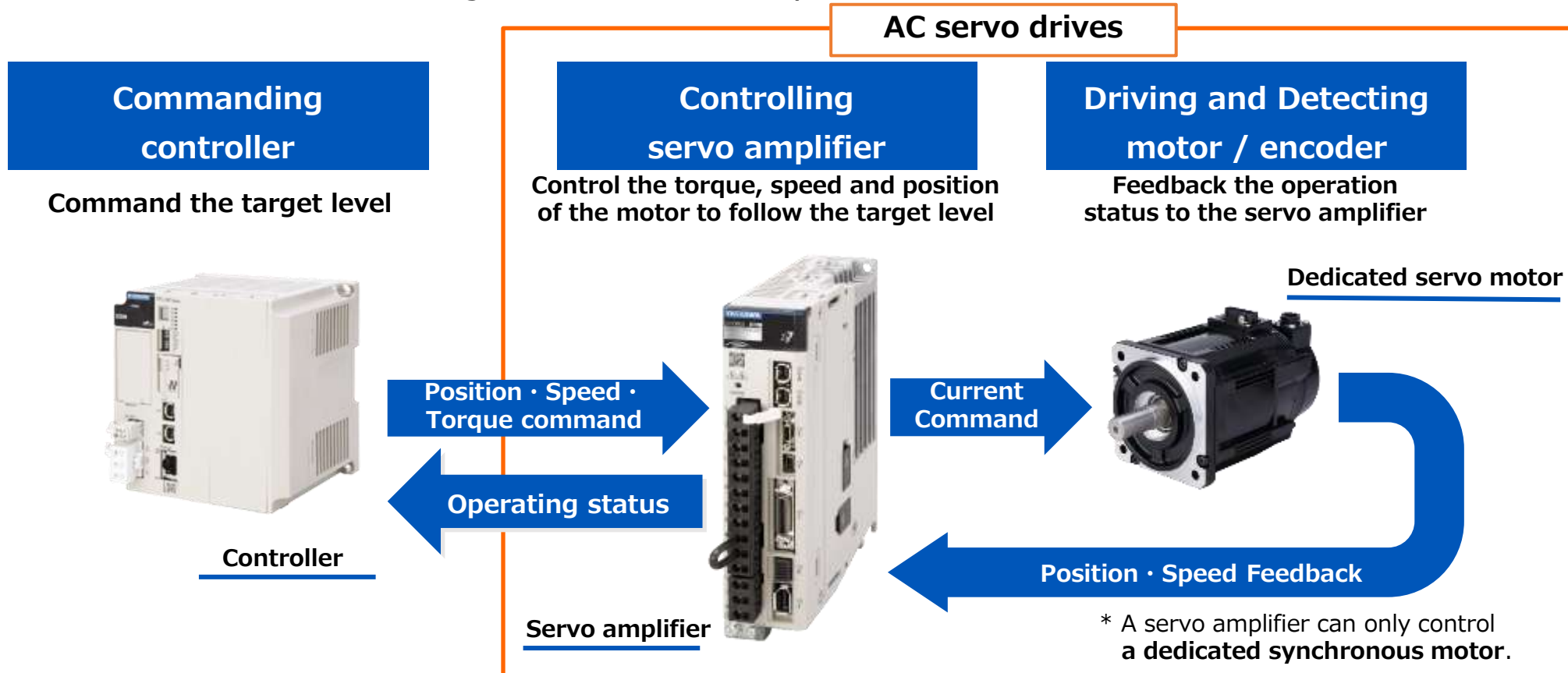
## 1-1. AC servo & controller



# Product Basics (1/3)

## What is an AC servo drive ?

An automatic controller consisting of a servo amplifier and a servo motor that follows the target level indicated by the controller



**The purpose is to improve equipment performance and stabilize quality through highly accurate position, speed and torque control.**

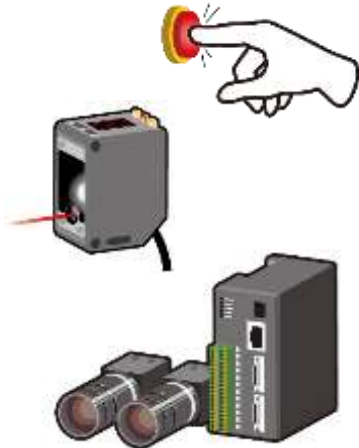
## Product Basics (2/3)

### What is a controller?

A control equipment that controls AC servo drives, AC drives, and robots, etc.

#### Input

Push buttons, sensors, cameras, etc.



#### Processing program

Input information and control output



Controller (MP Series)

#### Output

AC servo drives, AC drives, robots etc.

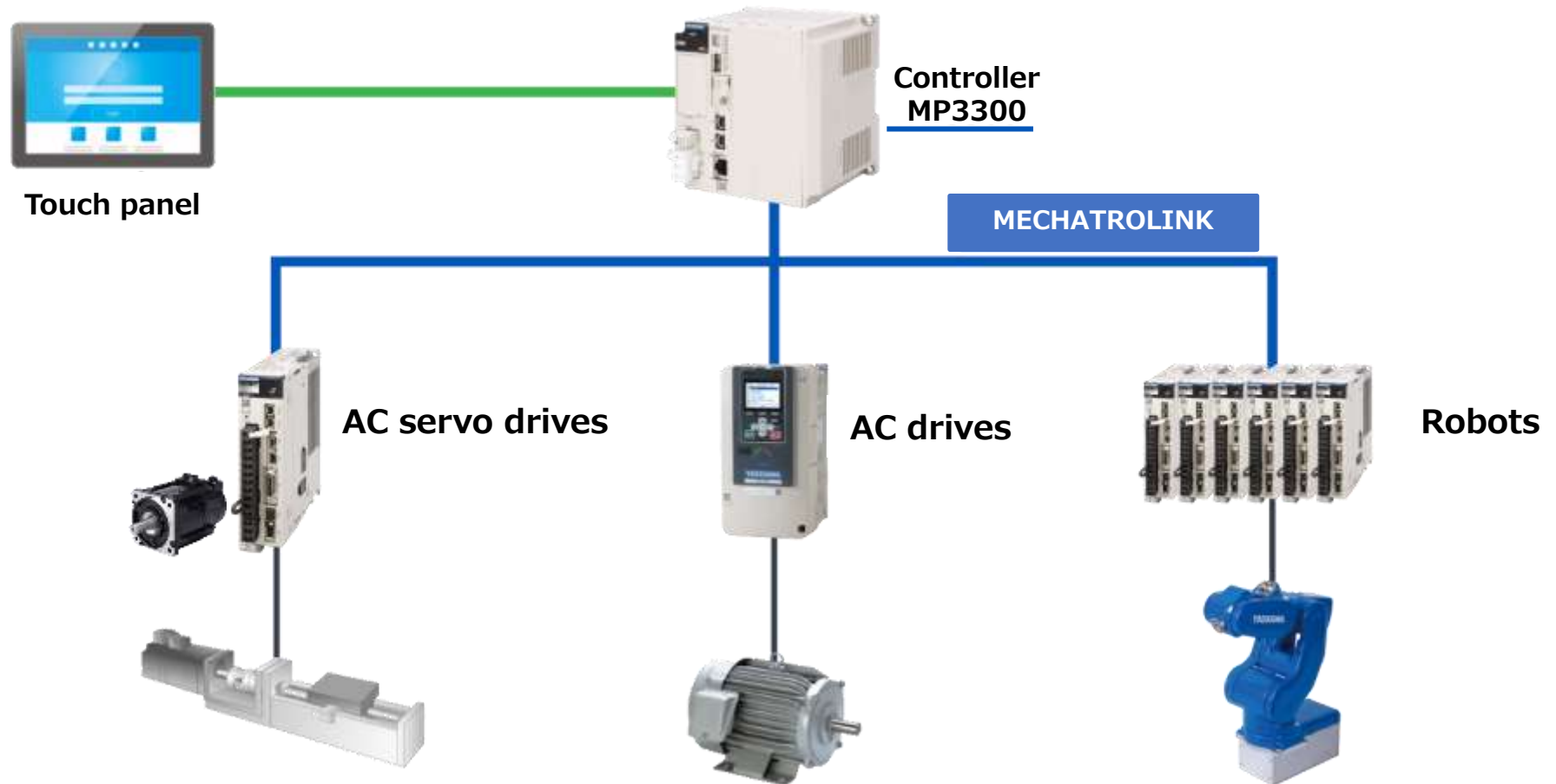


**The purpose is to improve productivity through highly accurate control**

## Product Basics (3/3)

### Flowchart of controller (MP Series)

Receive signals from touch panels to control AC servo drives, AC drives, and robots, etc.



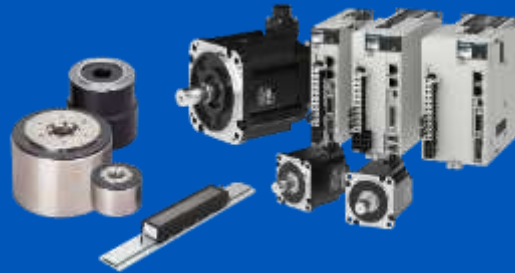
# Applications and Market

## Machines for semiconductor, LCD & electronic component

- Semiconductor manufacturing Equipment
- LCD manufacturing equipment
- Electronic component processing and assembly equipment



## AC servo motor



**Supports motion control for various applications**

## General industrial machines

- Metal processing machine
- Wood processing machine
- Resin molding machine
- Food processing machine
- Packaging and filling machine
- Logistics and transportation equipment
- Printing machine
- Textile machine
- Papermaking



## Machine tools

- NC lathe
- Machining center
- Milling machine
- Grinder



## Robots

- Industrial robot
- Clean transfer robot
- Vacuum transfer robot



# Product Lineup

**Wide lineup** to accommodate to various applications

## Controller



**YRM-X**  
YRM controller



**MP3200**  
Integrated machine  
controller top model



**MP3300**  
Modular machine controller Board type



**MP3100**



**MP2000シリーズ**  
Board type / Modular type  
All-in-one type



**MYVIS YV260**  
Machine vision system

## Network



**MECHATROLINK** (MECHATROLINK-II, MECHATROLINK-III, MECHATROLINK-4) , other Field Network

## AC Servo Drives

**$\Sigma$ -X Series**



**SERVOPACKs**

**$\Sigma$ -XS model**  
Single-axis  
AC200V  
50W to 7.5kW

**$\Sigma$ -XW model**  
Two-axis  
AC200V  
200W to 1.0kW

**$\Sigma$ -XT model**  
Three-axis  
AC200V  
200kW to 400kW



**Rotary Servomotors**

**SGMXA model**  
Low inertia,  
high-speed  
50W to 1.0kW

**SGMXJ model**  
Medium inertia,  
high-speed  
50W to 750W

**SGMXP model**  
Medium inertia,  
flat type  
100kW to 1.5kW

**SGMXG model**  
Medium inertia,  
high torque  
300W to 15kW



**$\Sigma$ -7 Series**



**SERVOPACKs**

**$\Sigma$ -7S model**  
Single-axis  
AC100V/200V  
11W to 15kW

**$\Sigma$ -7W model**  
Two-axis  
AC200V  
200W to 1.0kW



**Rotary Servomotors**

**SGM7M model**  
Low inertia,  
ultra-small capacity  
3.3W to 33W

**SGM7J model**  
Medium inertia,  
high-speed  
50W to 750W

**SGM7A model**  
Low inertia, high-speed  
50 to 7.0kW

**SGM7P model**  
Medium inertia, flat type  
100W to 1.5kW

**SGM7G model**  
Medium inertia, large torque  
300W to 15kW



**Direct Drive Servomotors**

**SGM7E model**  
Coreless,  
Inner Rotor  
2N·m to 35N·m

**SGM7F model**  
With Core,  
Inner Rotor  
Small capacity  
2N·m to 35N·m  
Medium capacity  
45N·m to 200N·m

**SGM7D model**  
With Core,  
Outer Rotor  
1.3N·m to 240N·m

Large-capacity  
 **$\Sigma$ -V Series**

**Linear Servomotors**

**SGLG model**  
Coreless  
12.5N to 750N

**SGLFW2 model**  
With core F  
45N to 2520N

**SGLTW model**  
With core T  
130N to 2000N



**SERVOPACKs**

**SGDV model**  
22kW to 55kW

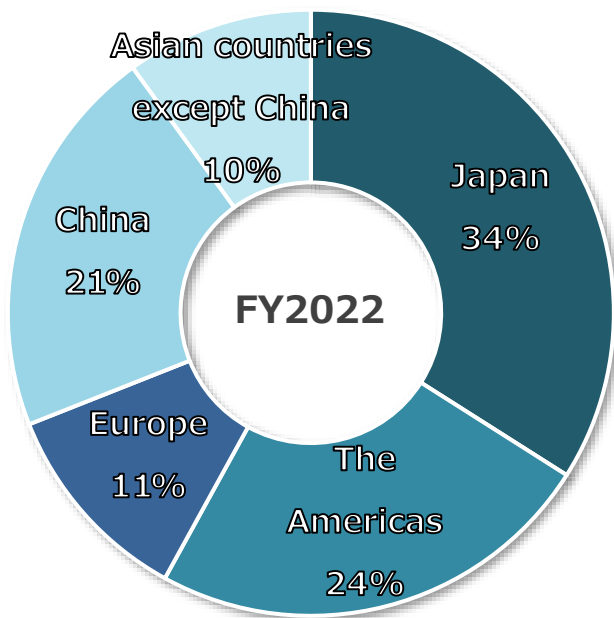
**Rotary Servomotors**

**SGM7V model**  
Large capacity,  
Low inertia  
22kW to 55kW

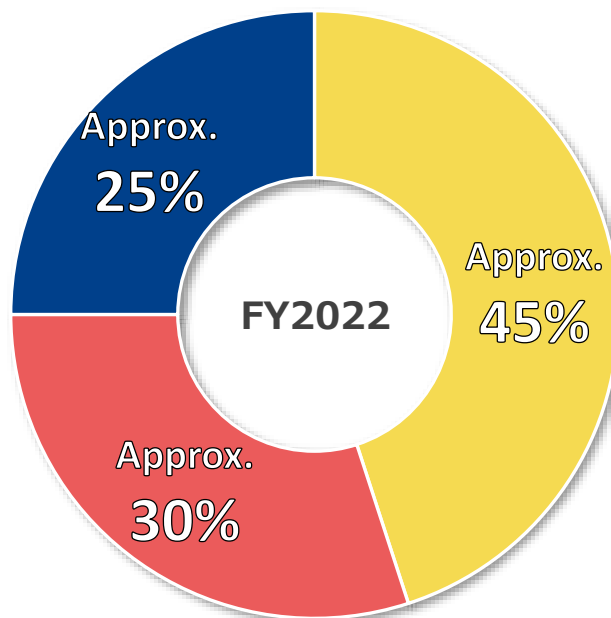


# Revenue Breakdown by Region and Application, Market Share

Breakdown of revenue by region

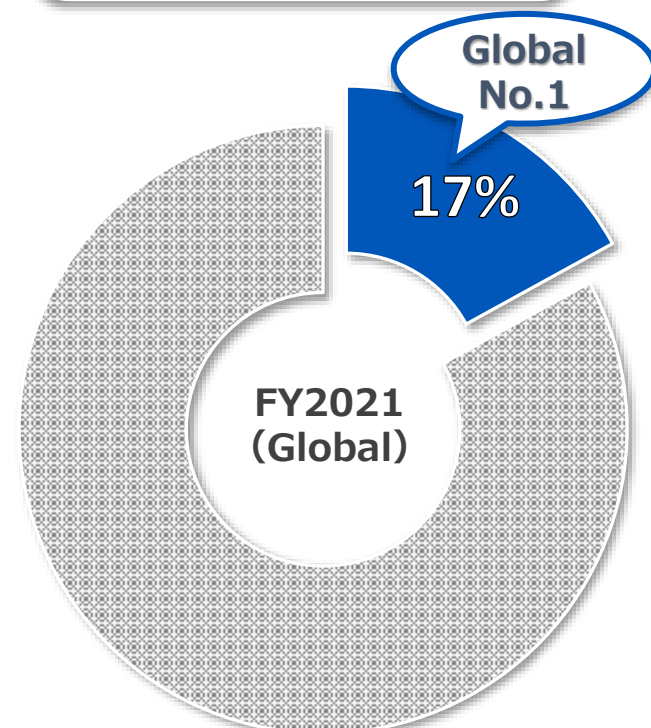


Revenue breakdown by application



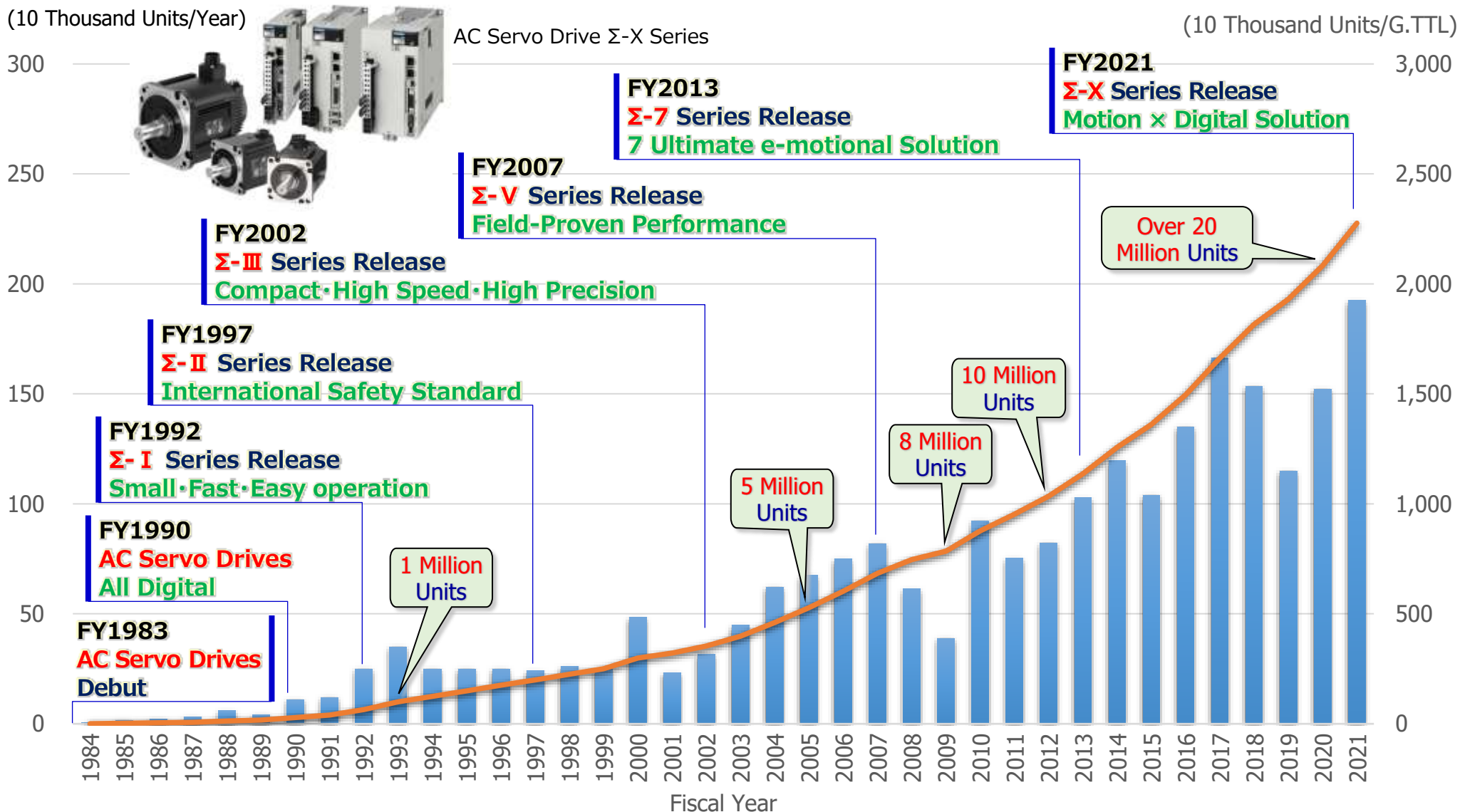
- Electronics-related industries including semiconductor, FPD and electronic components
- Machinery-related industries including machine tool, metal processing, press machine and robots
- Other (Packaging, textile, injection molding, etc.)

Market share



[Note] Company estimate

# Total Shipment



# New Product Features (1/3)

## Features of $\Sigma$ -X Series – Improvement of motion performance

### Maximum motor rotation speed

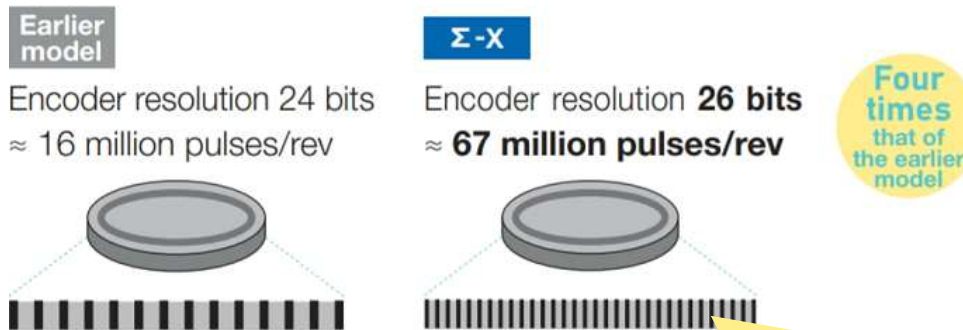
The maximum rotation speed of the motor has increased from the earlier value of  $6,000 \text{ min}^{-1}$  to  $7,000 \text{ min}^{-1}$ .



Applicable models:  
All SGMXJ and SGMXA models

### Equipped with a high-resolution 26-bit encoder

The resolution\* of the encoder has been increased to 26 bits, four times that of the earlier model. 24 bits of encoder resolution is position precision resolving 1 revolution of a motor to 67 million pulses



Increased position resolution/stop precision  
→ Precise stops

\*Ability to measure how finely a motor rotation can be split

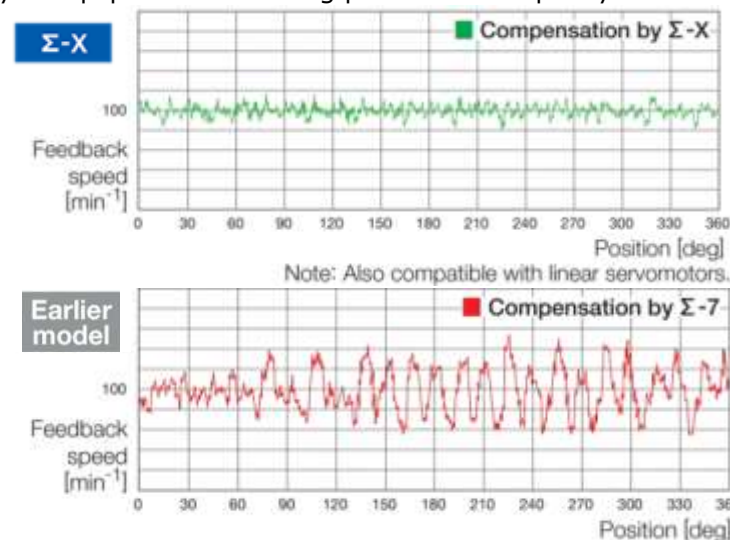
### Speed frequency response

Speed frequency response has changed from 3.1 kHz for the earlier model to 3.5 kHz. Maximizing the following performance for the speed reference improves equipment productivity.



### Improved control precision and smoothness

Smoother drive is possible from a more effective speed ripple compensation algorithm for cogging compensation. This helps reduce inconsistency in equipment machining precision and quality.



# New Product Features (2/3)

## Features of $\Sigma$ -X Series –Sensing and use of data

**The servomotor acts as a sensor and collects various data.  
It can be used for preventive maintenance of equipment.**

$\Sigma$ -X uses the servomotor as a sensor to sense and monitor the parts used by the servo and the servo's installation environment. This can be useful for accurately determining maintenance periods and for preventing sudden failures.

### ■ Sensing Items

Encoder Power-on Time  
Encoder Supply Voltage  
Encoder Battery Voltage  
Motor Rotation Count  
Maintenance Prediction Monitor: Bearing  
Maintenance Prediction Monitor: Oil Seal  
Acceleration Sensor Monitor

New



Estimated External Disturbance Torque  
Number of Serial Encoder Communications Errors  
Settling Time  
Amount of Overshoot  
Residual Vibration Frequency  
Estimated Vibration  
Maximum Value of Accumulated Load Ratio  
Number of MECHATROLINK Communications Errors  
Margin until Overload  
Temperature Margin until Servomotor Overheats



- Both installation environment information and the service life of parts used by the servo can be monitored.



# New Product Features (3/3)

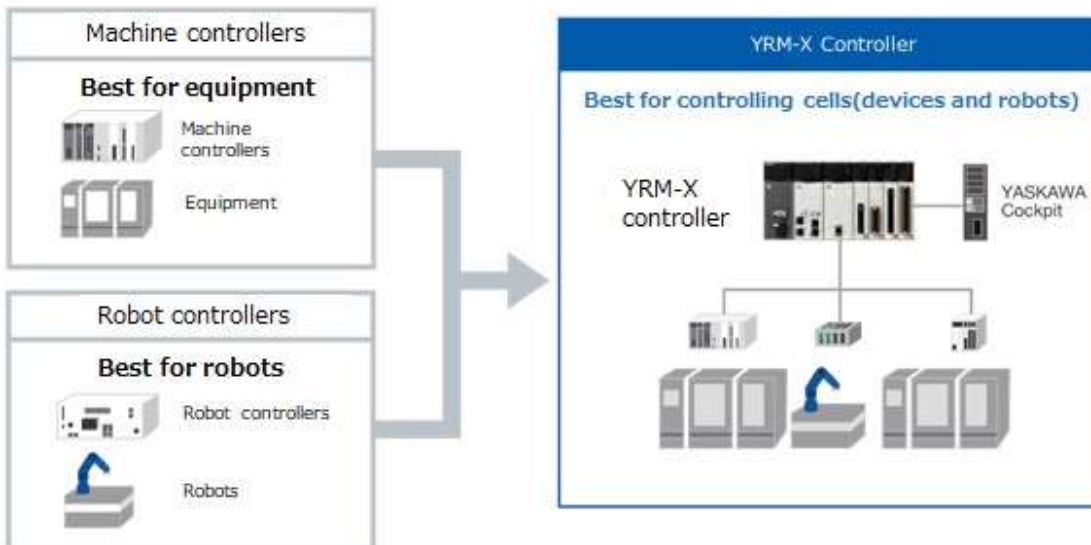
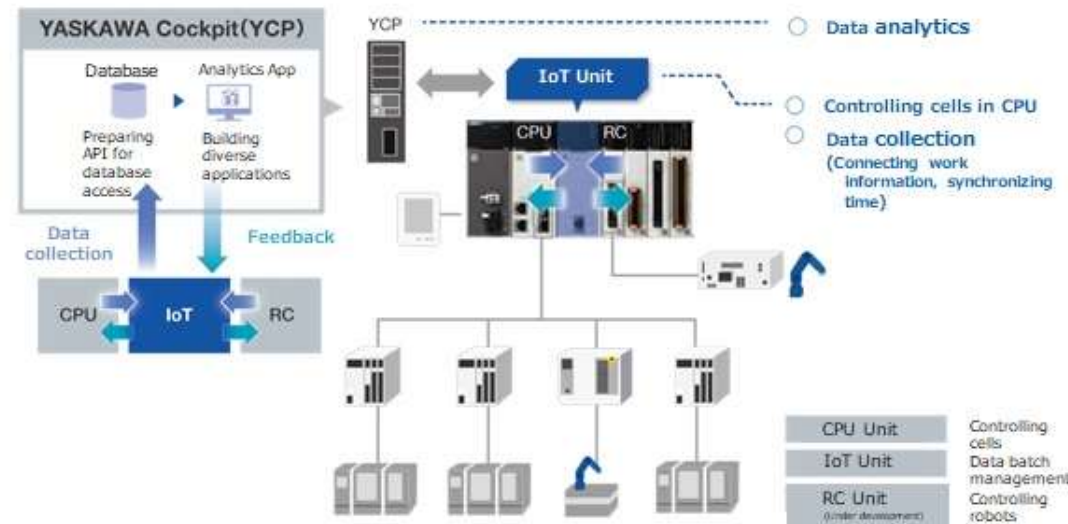
## Features of YRM-X controller



YRM-X controller

### ① Controller controlling cells

Cells : A connected equipment where data relatedness exists  
e.g.) Facilities composing devices or/and industrial robots etc. and working on common tasks



### ② A controller that enables to integrate equipment, robots, and data and turn data into movement

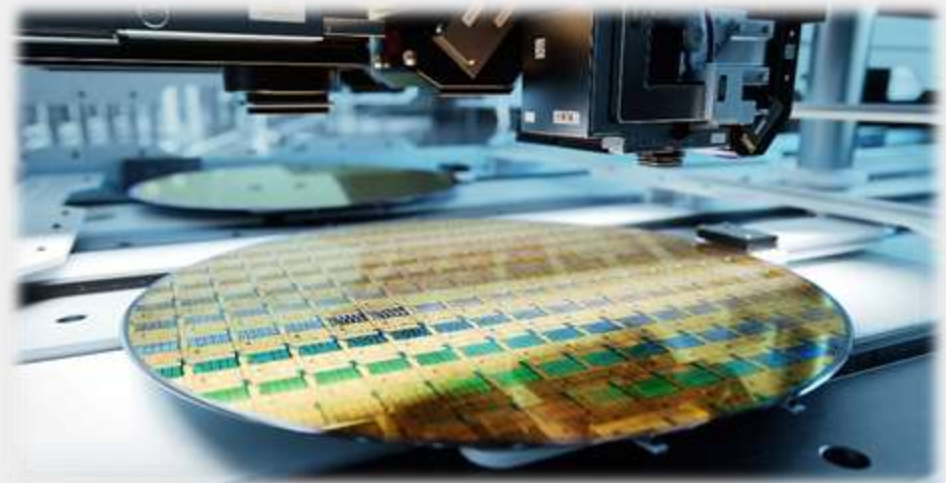
- Real-time understanding of the status of an entire cell by acquiring synchronized data of equipment and robots is possible. The results of analysis of the acquired data are fed back to the entire cell as "data" and "motion" to realize automation of manufacturing (stable operation, stable quality, and process improvement).

(Reference)

## Application of AC servo & controller

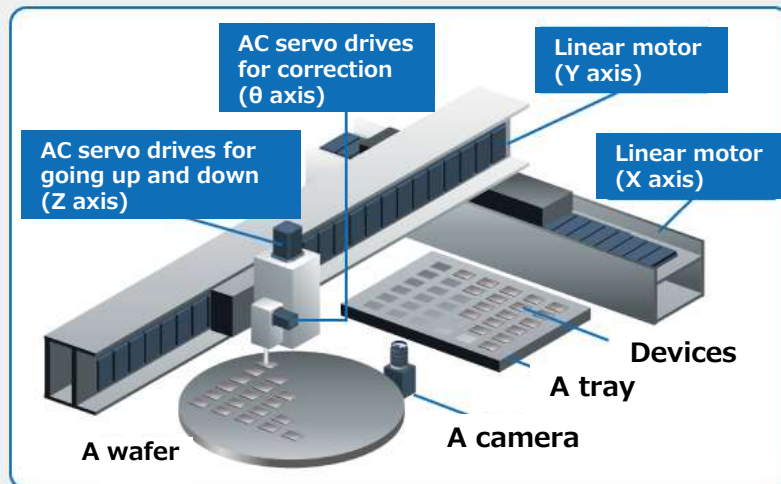


Electronic component



Semiconductor production equipment

Structure of die bonder



Metal processing machine



Injection molding machine

## 1-2. Drives



# Product Basics (1/3)

## What is an AC drive?

Device for controlling rotation speed by changing voltage and frequency supplied to motor

### Commanding controller

Direct operation command or operation command via controller



Controller

### Controlling AC drive

Convert voltage and frequency set internally and externally and output to the motor



AC drive

### Driving and Detecting motor / encoder



General induction motor  
Synchronous motor

Forward/Reverse

Operation command

Power signal

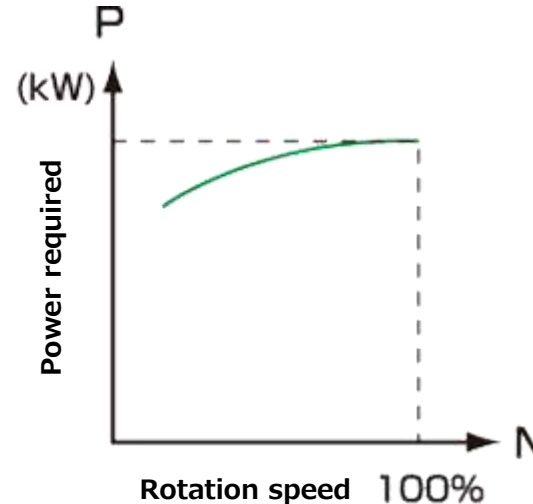
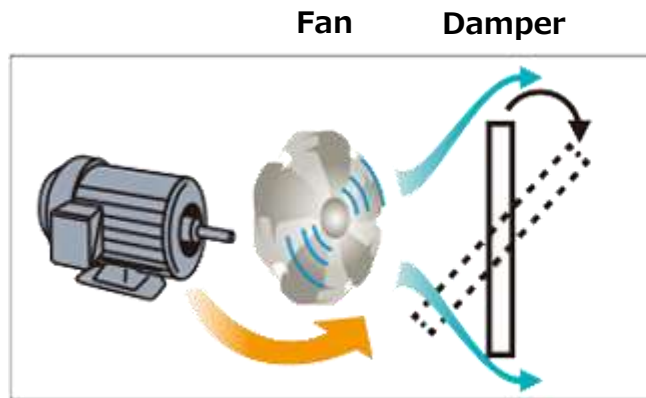
Encoder feedback

※AC drives can control motors from **other companies**

## Product Basics (2/3)

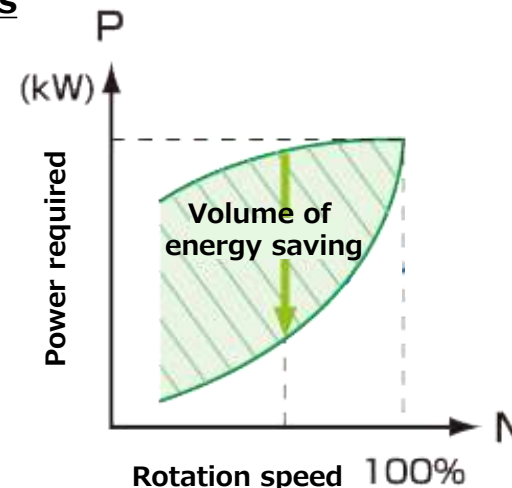
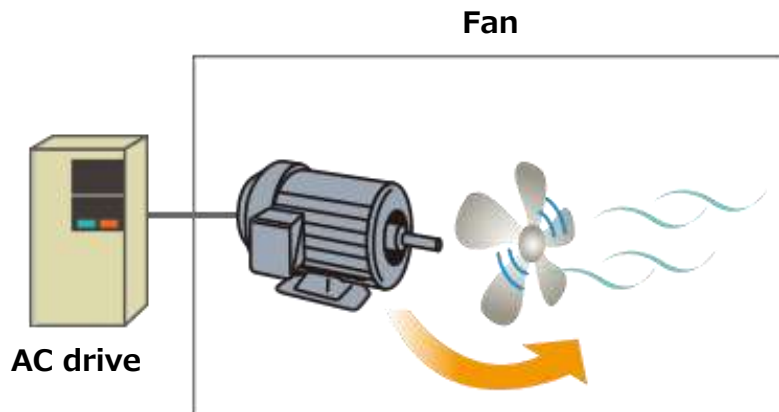
### What are energy conservation benefits of AC drives?

#### ◆ Conventionally, motors had constant speed + damper



Without AC drives, the rotational speed of the motor cannot be changed, so the air volume is adjusted with a damper (on-off valve).

#### ◆ Variable speed motor control by AC drives

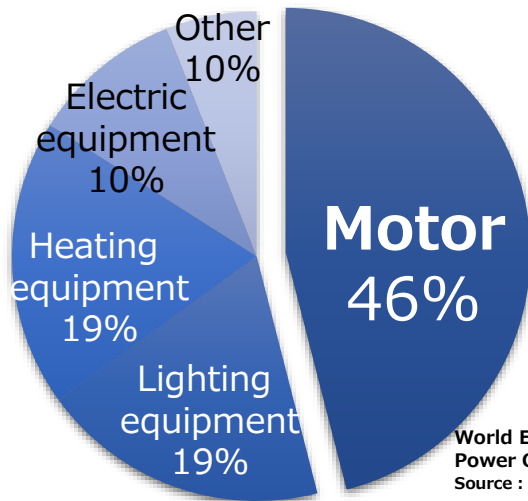


AC drives can adjust the motor speed according to the required air quantity, resulting in saving a lot of energy.

# Product Basics (3/3)

## The reason AC drives are needed

- ◆ Motor takes about half of the world's electric power consumption



- ◆ Global regulations have accelerated the high efficiency-oriented needs towards motors

| Country (Region) | High efficiency laws and regulations enforcement schedule        |      |      |      |      |                           |      |      |      |      |
|------------------|------------------------------------------------------------------|------|------|------|------|---------------------------|------|------|------|------|
|                  | 2011                                                             | 2012 | 2013 | 2014 | 2015 | 2016                      | 2017 | 2018 | 2019 | 2020 |
| JPN              | IE1                                                              |      |      |      |      | Top Runner Regulation IE3 |      |      |      |      |
| USA              | IE3 (such as the leg mounting, conventional IE2 regulated goods) |      |      |      |      | IE3                       |      |      |      |      |
|                  | IE2 (such as flange type)                                        |      |      |      |      |                           |      |      |      |      |
| CHN              | IE2                                                              |      |      |      |      | IE3                       |      |      |      |      |
| EU               | IE2                                                              |      |      |      |      | IE3 or IE2+AC Drive       |      |      |      |      |
| KOR              | IE2                                                              |      |      |      |      | IE3                       |      |      |      |      |

Bibliography : JEMA(July,2018)

- ◆ High efficiency motors require AC drives

### Efficiency Classified

High  
↑  
Efficiency  
↓  
Low

|                                         |
|-----------------------------------------|
| IE5 Ultra Premium High Efficiency Motor |
| IE4 Super Premium High Efficiency Motor |
| IE3 Premium High Efficiency Motor       |
| IE2 High Efficiency Motor               |
| IE1 Standard Motor                      |

### Motor Type

|                                                                           |   |                          |
|---------------------------------------------------------------------------|---|--------------------------|
| Permanent magnet motors,<br>Magnet-assisted Synchronous reluctance motors | } | AC drives required       |
| Permanent magnet motors,<br>Magnet-assisted Synchronous reluctance motors |   |                          |
| Permanent magnet motors,<br>Synchronous reluctance motors                 |   |                          |
| Induction motors                                                          | ← | AC drives required in EU |
| Induction motors                                                          |   |                          |

# Applications and Market

## Fluid machinery

- Air conditioning system
- Fan/pump
- Compressor
- Vacuum pump



## AC drive/PM motor



**Supports motion control  
for broad applications**

## General industrial machine

- Metal processing machine
- Wood processing machine
- Resin molding machine
- Papermaking and printing machines
- Packaging and filling machines
- Environment-related machine
- Life-related machine
- Food machine
- Textile machine
- Chemical machine



## Conveyance machine

- Conveyor
- Crane
- Hoisting machine
- Multistory parking garage



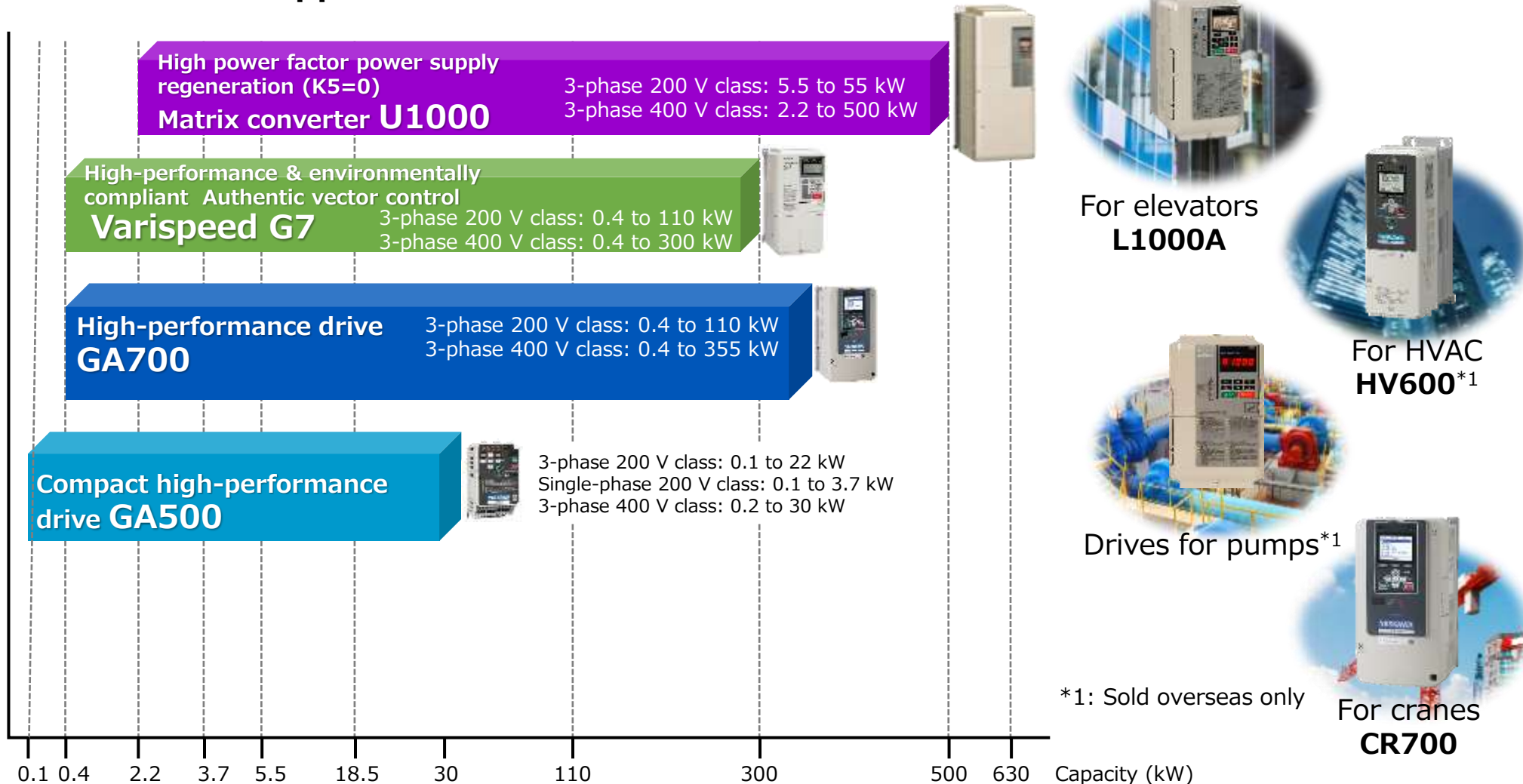
## Lift

- Elevator
- Escalator
- Light lift
- Automated warehouse



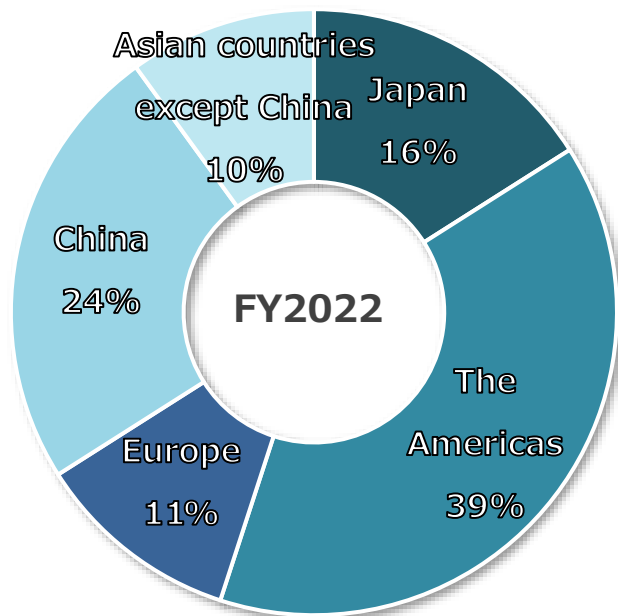
# Product Lineup

Develop lineup for application-specific products, including power supply regeneration and vibration suppression functions

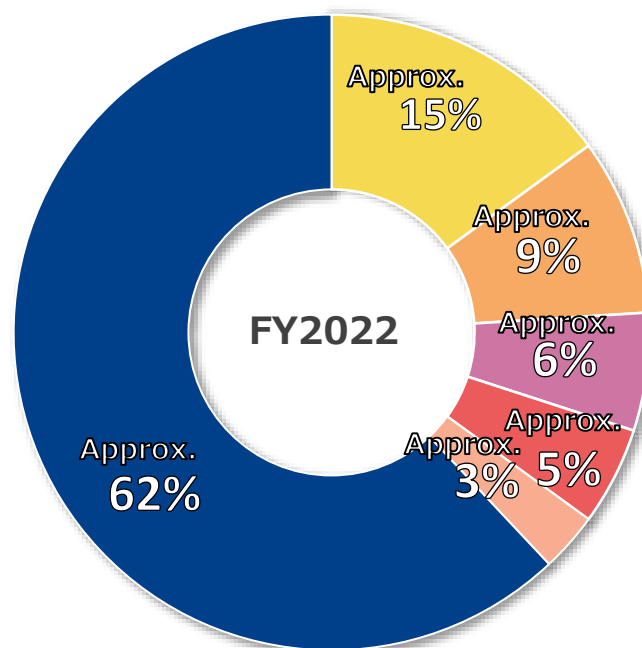


# Revenue Breakdown by Region and Application, Market Share

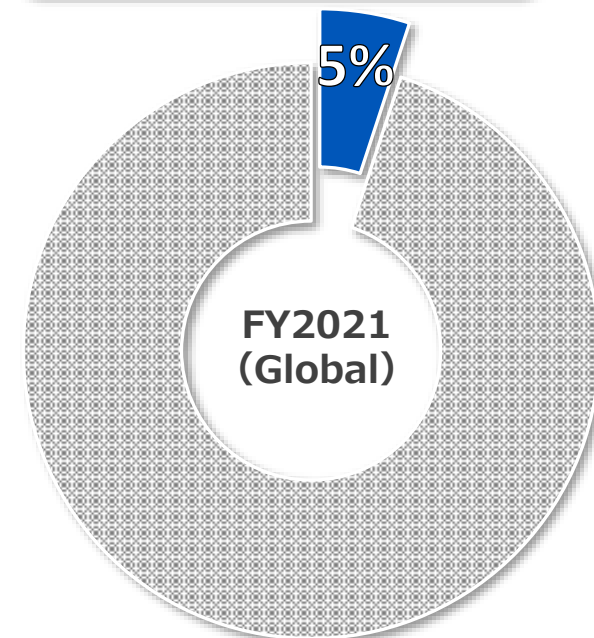
Breakdown of revenue by region



Revenue breakdown by application

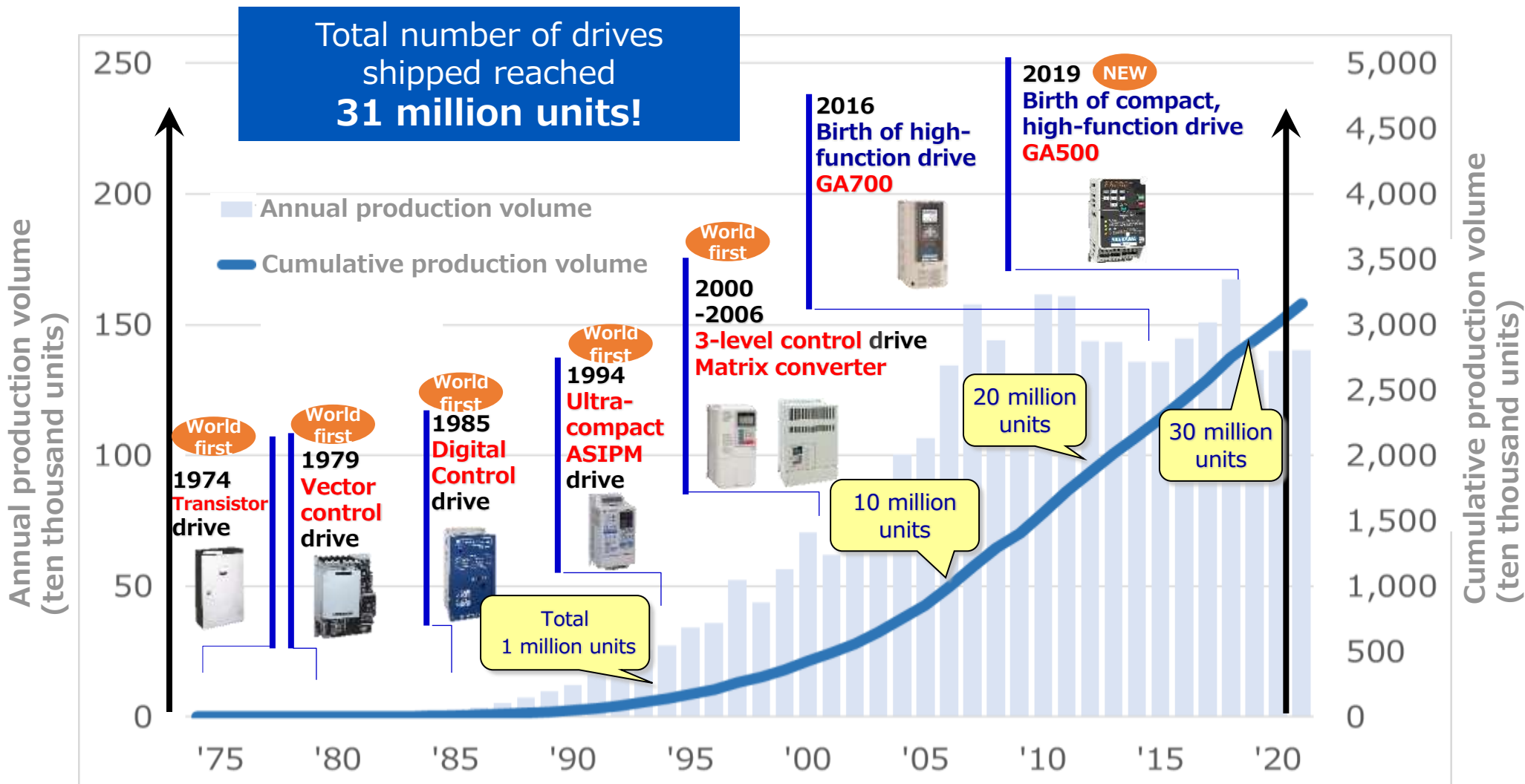


Market share



[Note] Company estimate

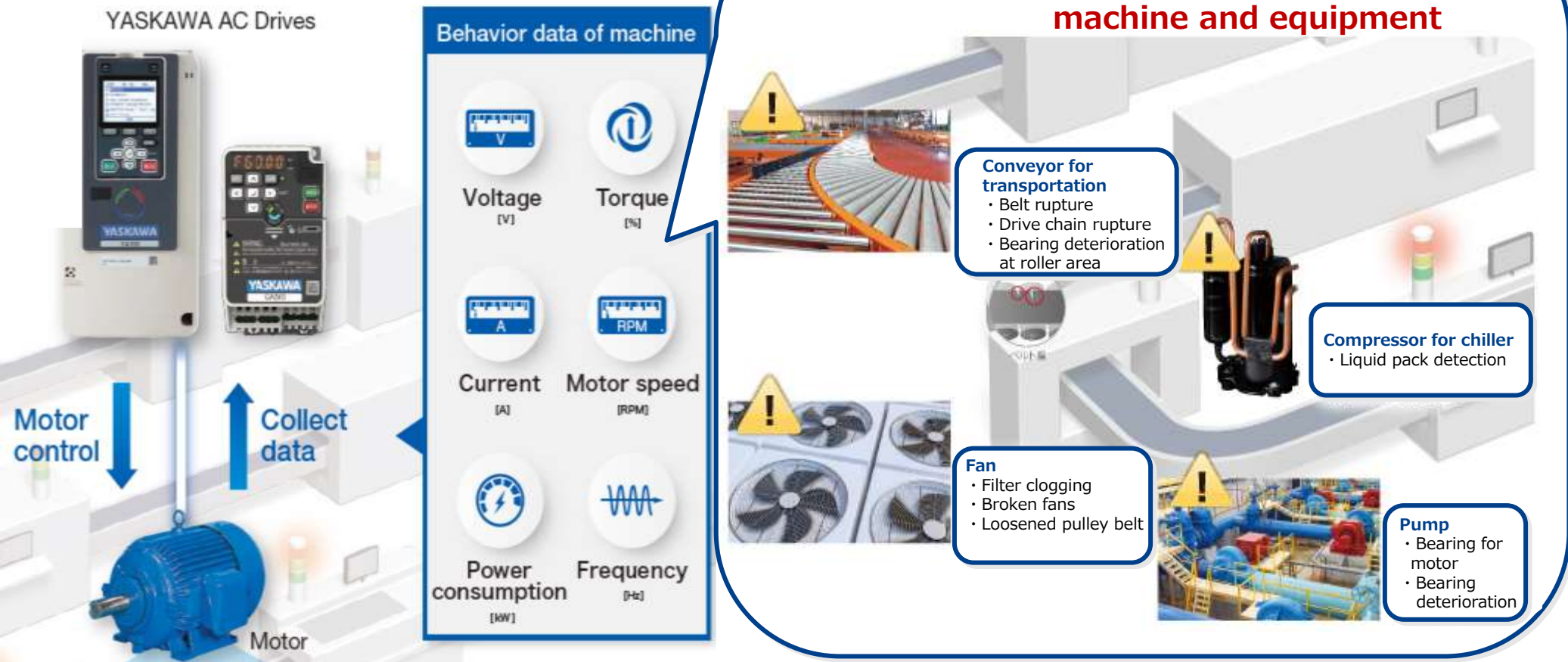
# Total Shipment



# Features of Yaskawa's products (1/2)

## Unique detecting function

Monitoring machine behavior data through AC drives and preventing serious troubles by detecting machine changes in detail



# Features of Yaskawa's products (2/2)

## Energy-saving initiatives

Selling **PM motor** achieving high-efficiency, energy-saving operation when used in combination with AC drives

## Lineup



### Eco PM motor flat type

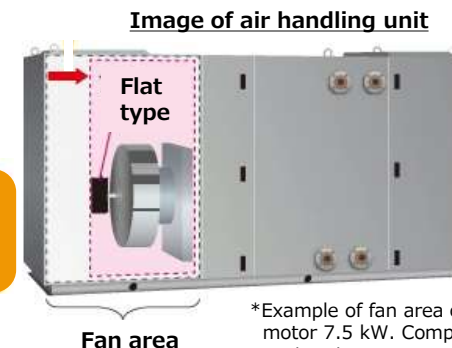
- Achieving the highest (IE5) efficiency of the five efficiency classes
- Contributing to space-saving, resource-saving, and energy-saving by significant reduction of motor length
- Decreasing noise level by reduction of fans



### IPM motor SS7

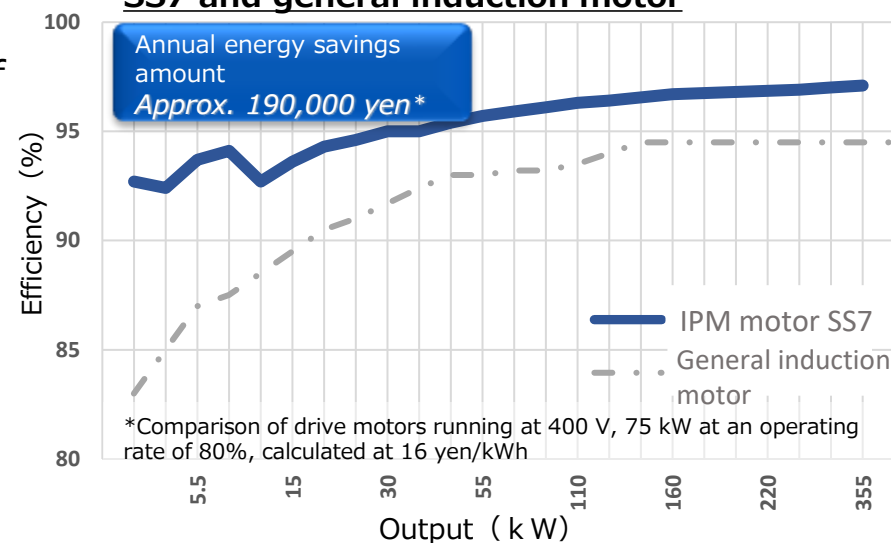
- Realizing the high efficiency which is nearly the second highest (IE4) of the five efficiency classes
- Compact and lightweight, contributing to resource conservation

Installation area  
**25%\*reduction**



\*Example of fan area of motor 7.5 kW. Comparison with induction motor.

## Comparison of efficiency between IPM motor SS7 and general induction motor



(Reference)

## Application of AC drives



Cranes



Fans



Pumps



Conveyors



Automated  
warehouse

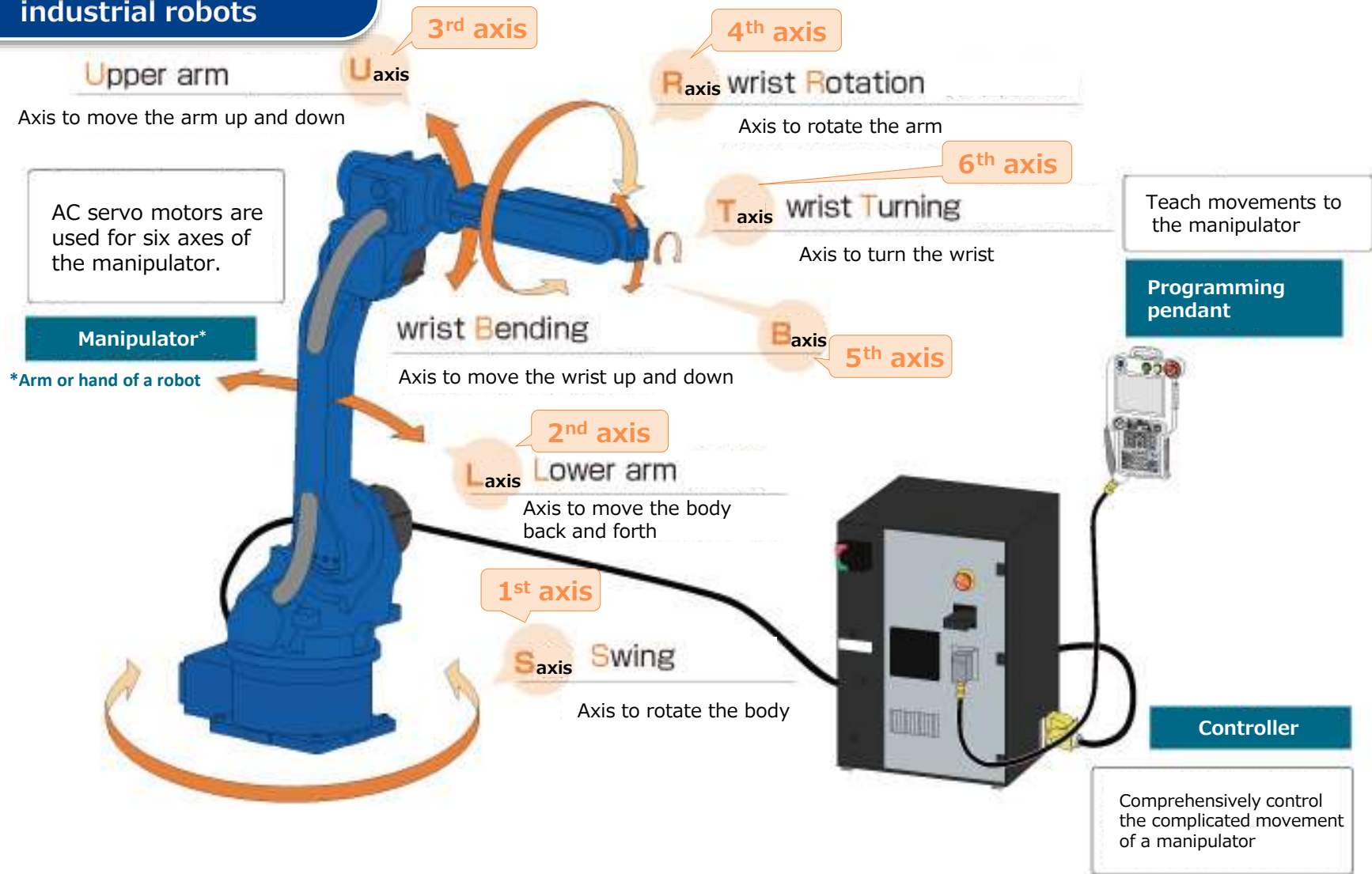
# YASKAWA

## 2. Robotics



# Product Basics (1/2)

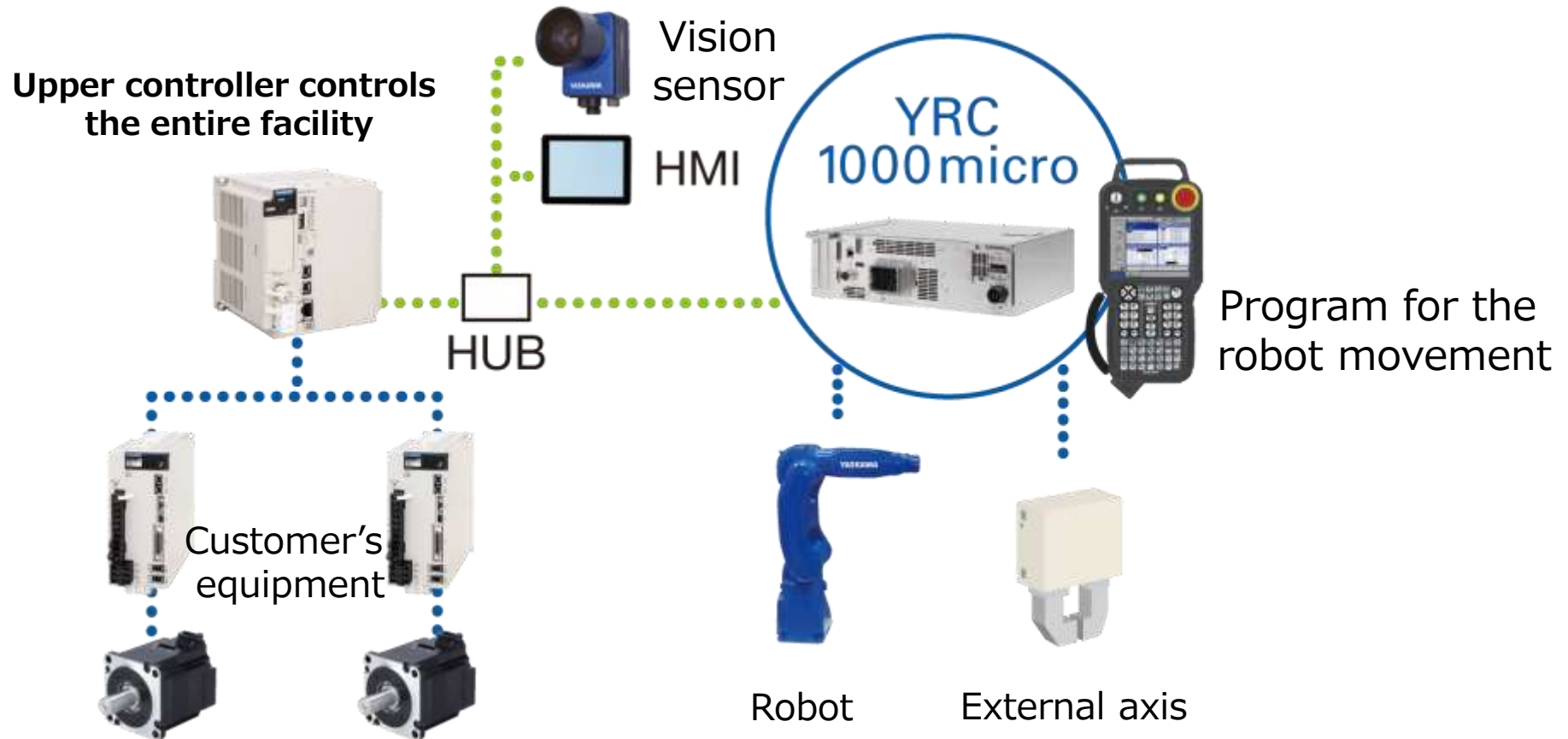
## Basic configuration of industrial robots



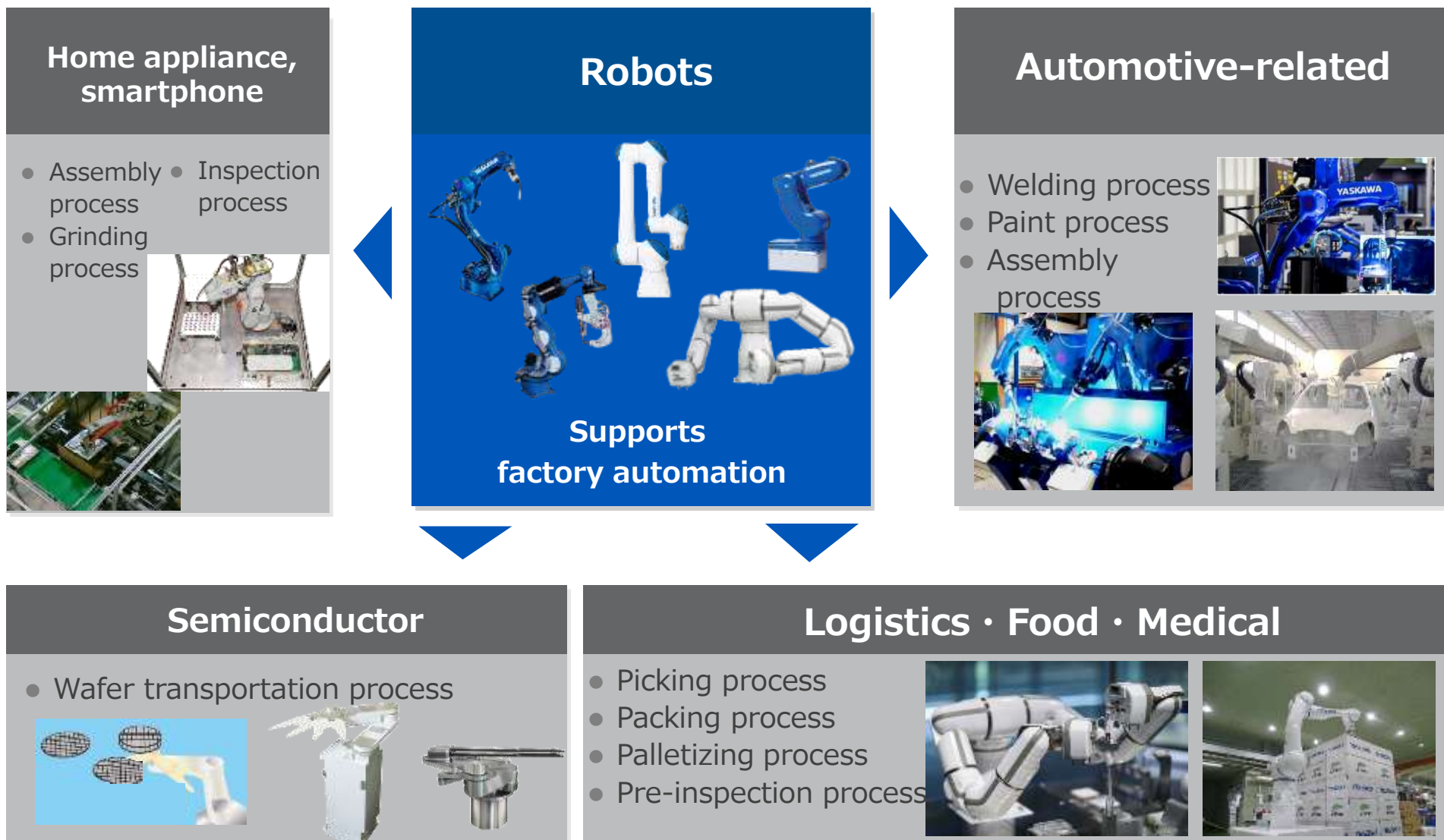
## Product Basics (2/2)

### Image of robot control

- A robot motion program is created in the dedicated robot controller (e.g.: YRC 1000 micro) with a teach pendant.
- The upper controller such as MP controller controls the entire facility including starting the operation program and collecting operation status data.



# Applications



# Product Lineup

## Industrial robots for automotive and other markets

### Arc Welding



### Spot Welding



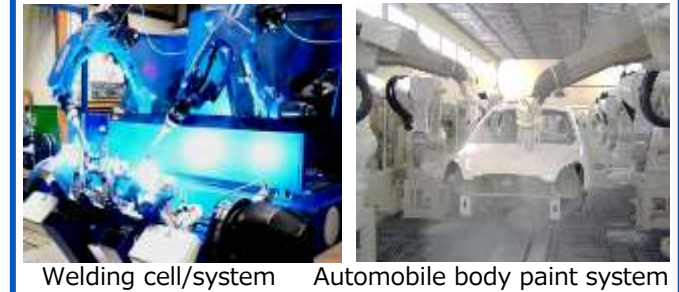
### Paint



### Picking, Packing, Palletizing



### Handling



## Clean room robots (Semiconductor & FPD)

### Semicon. Wafer Transfer



GEKKO MD124D

### Panel Transfer Large Size Vacuum Robot



VD95D

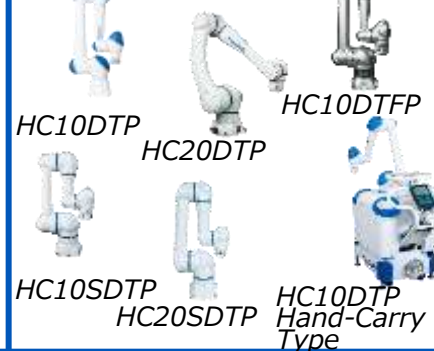
### FPD, Solar Cell Transfer



MFL2400D

## Collaborative

### Collaborative



## Dual Arm

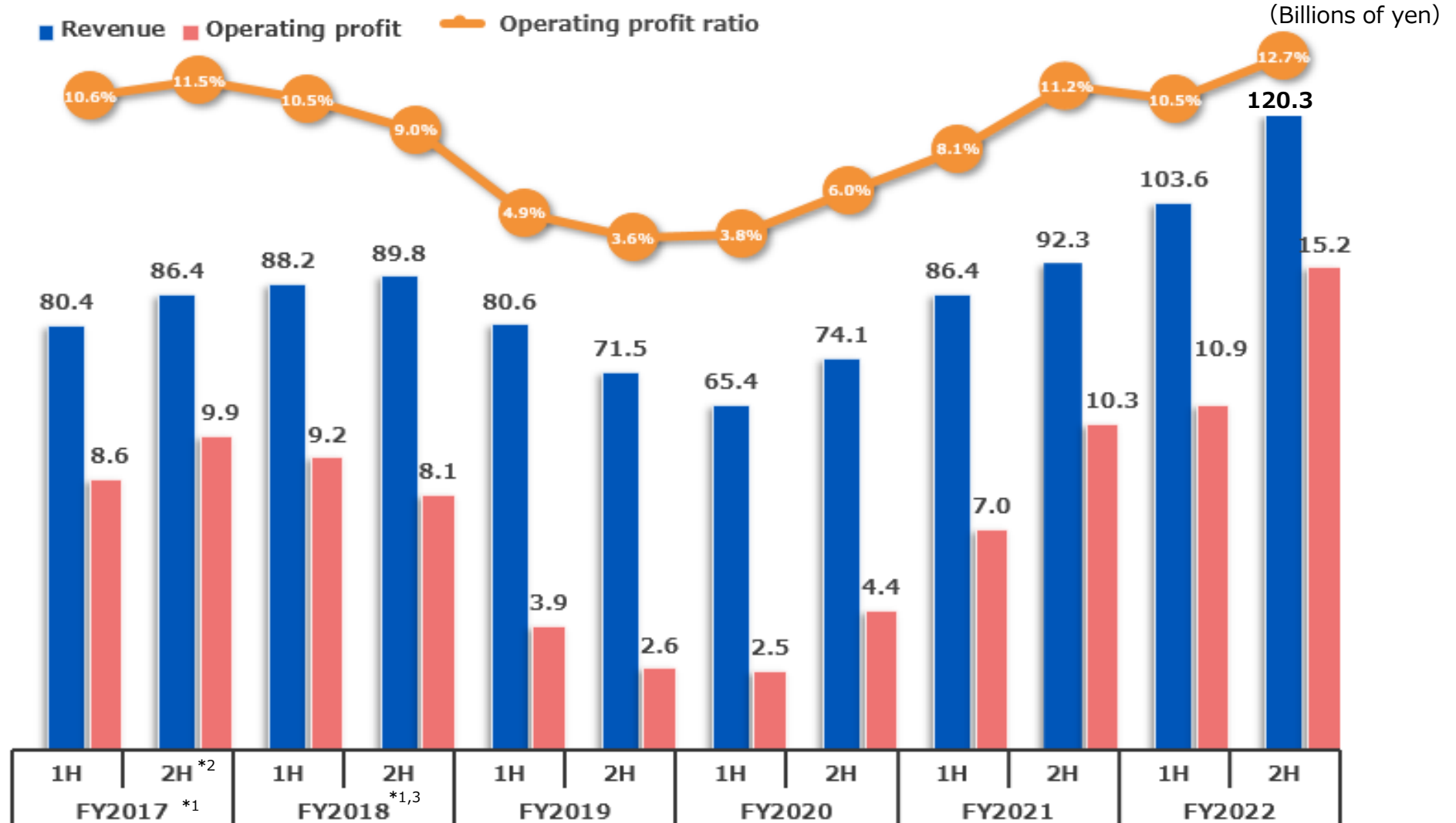
### Transfer, assembly



### Biomedical



# Revenue / Operating Profit (Robotics)

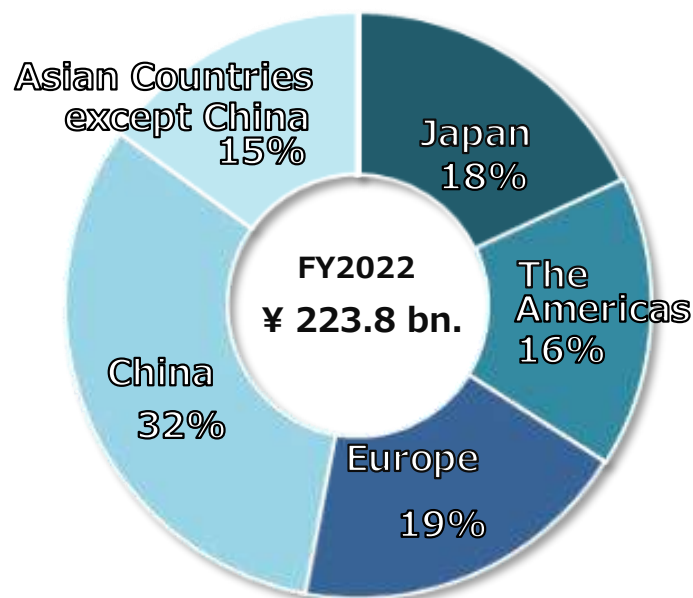


\*1 Data up to FY2018 are based on Japanese GAAP (After FY2019, IFRS was applied ) \*2 The data for FY2017 are made on a reference basis. (September 21, 2017 – March 20, 2018)

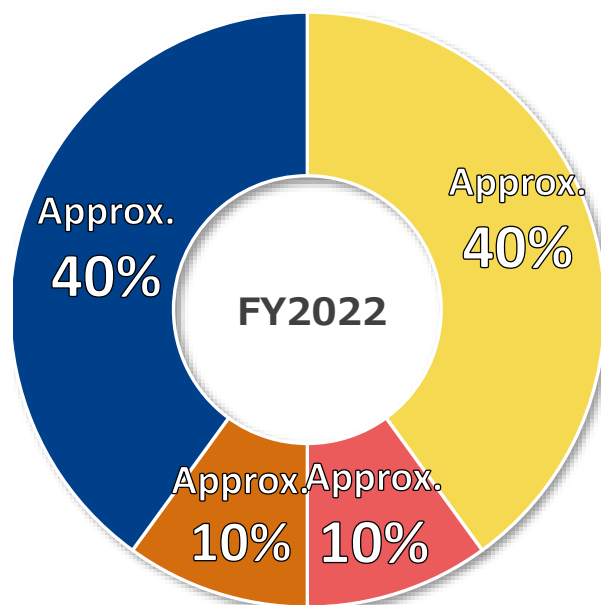
\*3 Reflects the impact of the reclassification of segments in FY 2019

# Revenue Breakdown by Region and Application, Market Share

Breakdown of revenue by region

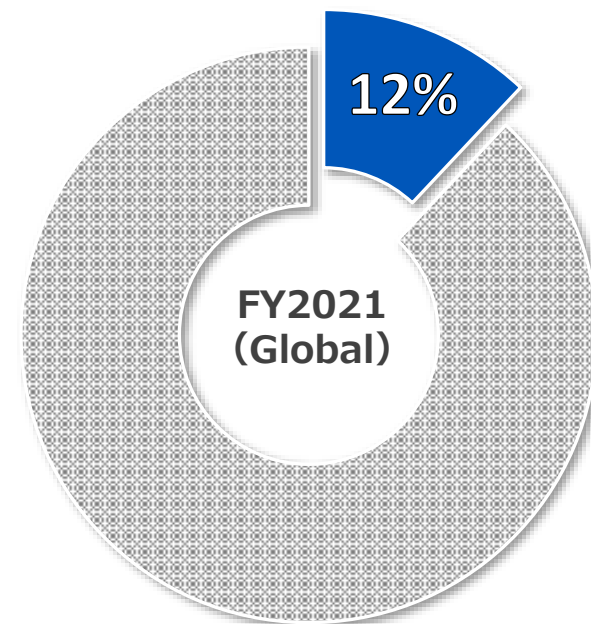


Revenue breakdown by application



- Automotive-related applications (Arc welding, spot welding, painting, etc.)
- Semiconductor and LCD related applications
- 3C (Home appliance, smartphone, etc.)
- General / Other (Handling, etc.)

Market share



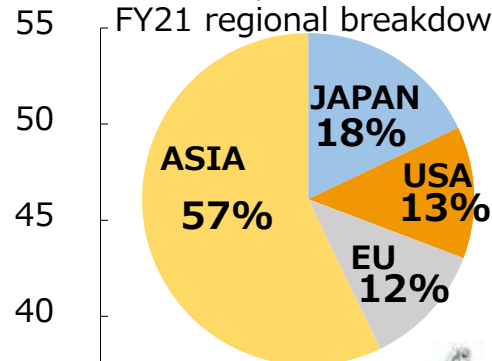
[Note] Company estimate

# Total Shipment

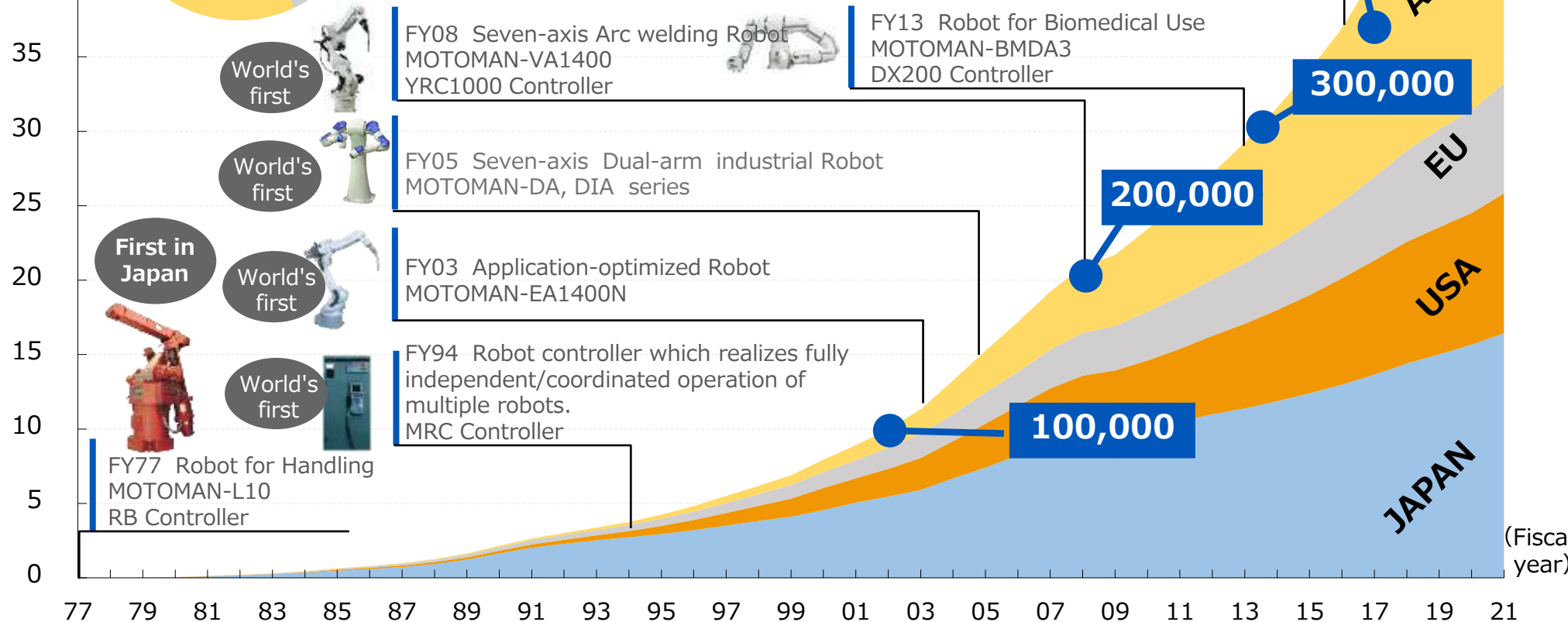
Over  
540,000 Units

(Ten thousand units)

FY21 regional breakdown



Approx. 80%  
shipped abroad



## Arc Welding

Contributed to the automation of parts processing in various industries, including the automotive industry requiring high welding quality and productivity.

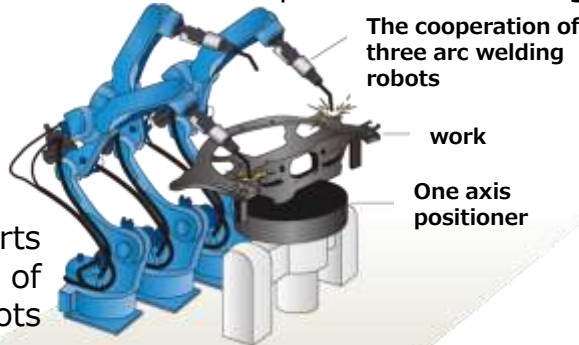


**AR1440**

Arc welding of auto parts with the cooperation of three robots



The work point of arc welding



## Spot Welding

A welding method in which two steel plates are crimped together, a large electric current is passed through them, and make them high temperature. It is used in automobile body joining



**SP225H**

Hollow arm is designed for spot rigging.

Car production line  
Spot welding system



**SP100B**

7-axis structure enables to install in high density



## Handling

Provide wide variation of robots (payload: 0.5 - 600kg) to contribute automation of customers' production line



**MotoMINI**  
(Payload 0.5kg)

**GP4**  
(Payload 4kg)

**GP8**  
(Food specification)

**GP12**  
(Payload 12kg)

**NIKKEI 2017  
Best Product/  
Service award**



Handling of tomatoes with small robots MotoMINI

## Collaborative

**MOTOMAN-HC series is designed to collaborate with human**

**Realize the cost reduction**

- 1) Elimination of the safety fences by the safe structure and function.
- 2) Saving spaces because of elimination of safety fences.

**Smart functionality**

- 1) Robot teaching can be simplified by the direct teaching function and Smart Pendant.

**Expansion of the applicable area by extensive product lineup**

- 1) Dust & Drip-Proof Specifications
- 2) Food Specifications
- 3) High payload type
- 4) Hand-carry type



**HC10SDTP**  
(Dust & Drip-Proof Specifications)



**HC20DTP**  
(Dust & Drip-Proof Specifications)



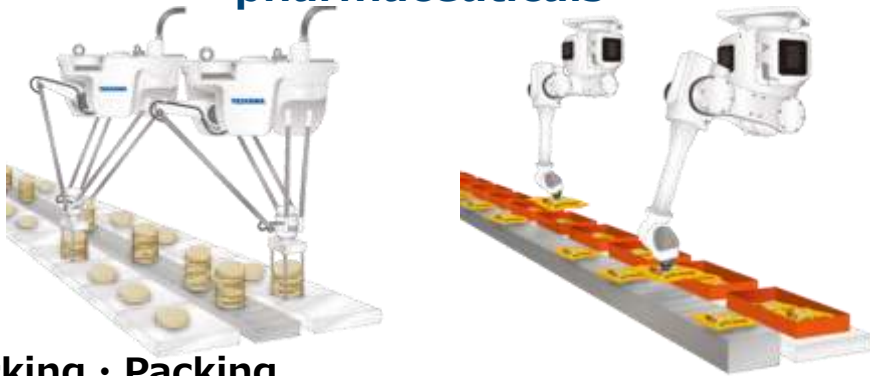
**HC10DTP**  
(Food Specifications)



**HC10DTP**  
(Hand-carry type)

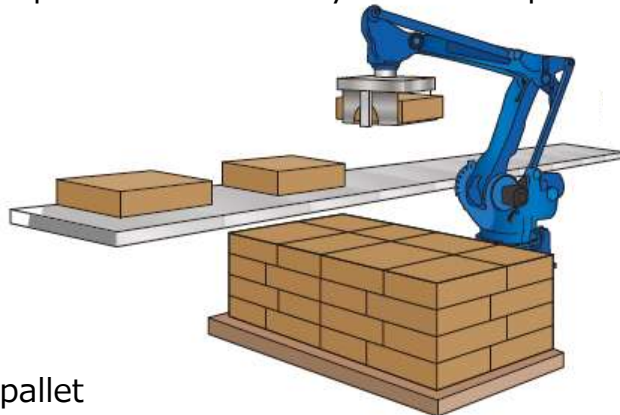
## Picking • Packing • Palletizing

Contributing to automated conveyor system for food, cosmetics and pharmaceuticals



### Picking • Packing

Grabbing and lining up items on a conveyor belt and packing them in boxes



### Palletizing

Placing boxes on a pallet

## Painting

- Installing a paint gun and painting cars and small parts
- Explosion-proof for work in an environment with flammable gases



Automobile Industry  
(Painting Car Body)

**MPX2600**

General Industry  
( For medium-size  
work piece )

**MPX1950**

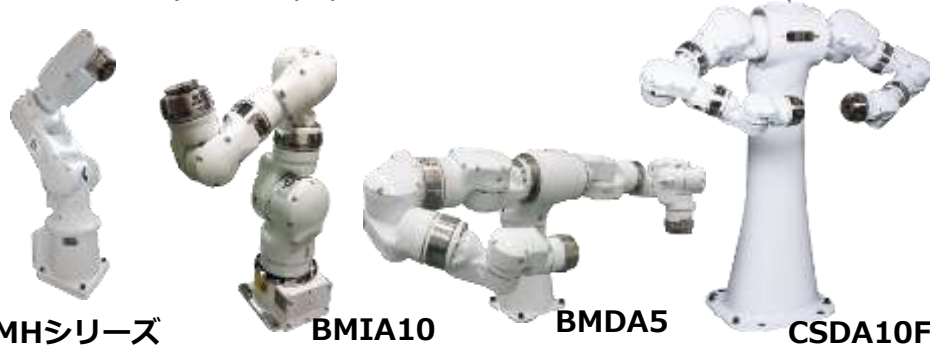
Car painting by  
painting robot and  
door opener robot



## Bio Medical

### Best for automation in Bio-Medical field which requires hygiene control

- Resolve challenges such as manual variations and errors, risk of exposure to powerful drugs, and long routine work
- Use of analytical equipment and containers used by humans



#### Application Examples

- Bio analysis
- Drug development
- Preparation of anticancer



## Clean Robot

### A wide range of products to meet diverse needs, including the transport of semiconductor wafers and glass for liquid crystal and solar panels

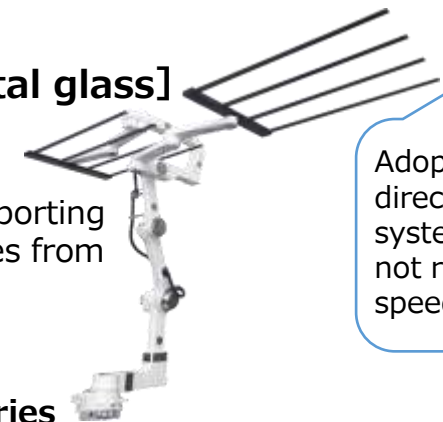
[For semiconductor wafers]



M112  
[For liquid crystal glass]

Removing and transporting large glass substrates from cassettes

MFL•MFS series



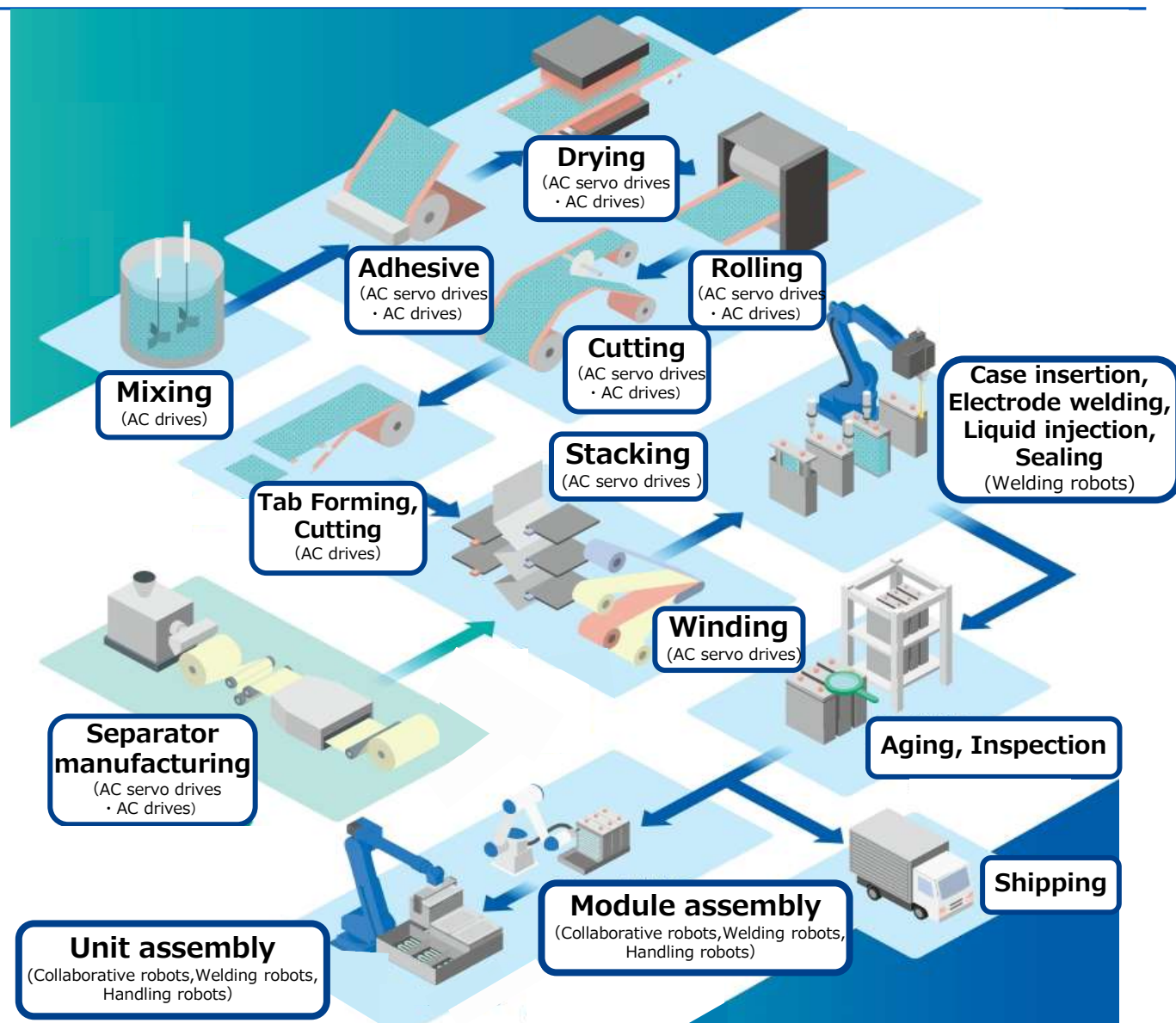
Adopting a direct-drive system that does not require a speed reducer

(Reference)

## Use of Yaskawa products in the manufacturing process of lithium-ion batteries

The lithium-ion battery market is expected to grow about **1,000 times** \* (compared to 2021) in 2040 as the adoption of EVs accelerates.

Yaskawa products are used in many of the manufacturing processes, contributing to higher efficiency and performance.



\*Nov. 2022, Fuji Keizai Co., Ltd.

## 3. System Engineering



# System Engineering Business

**Environmental  
energy  
business**

**Social system  
business**

**To People,  
Communities, and  
the Future**

**Various solutions supporting  
society and industry**

Photovoltaic power generation

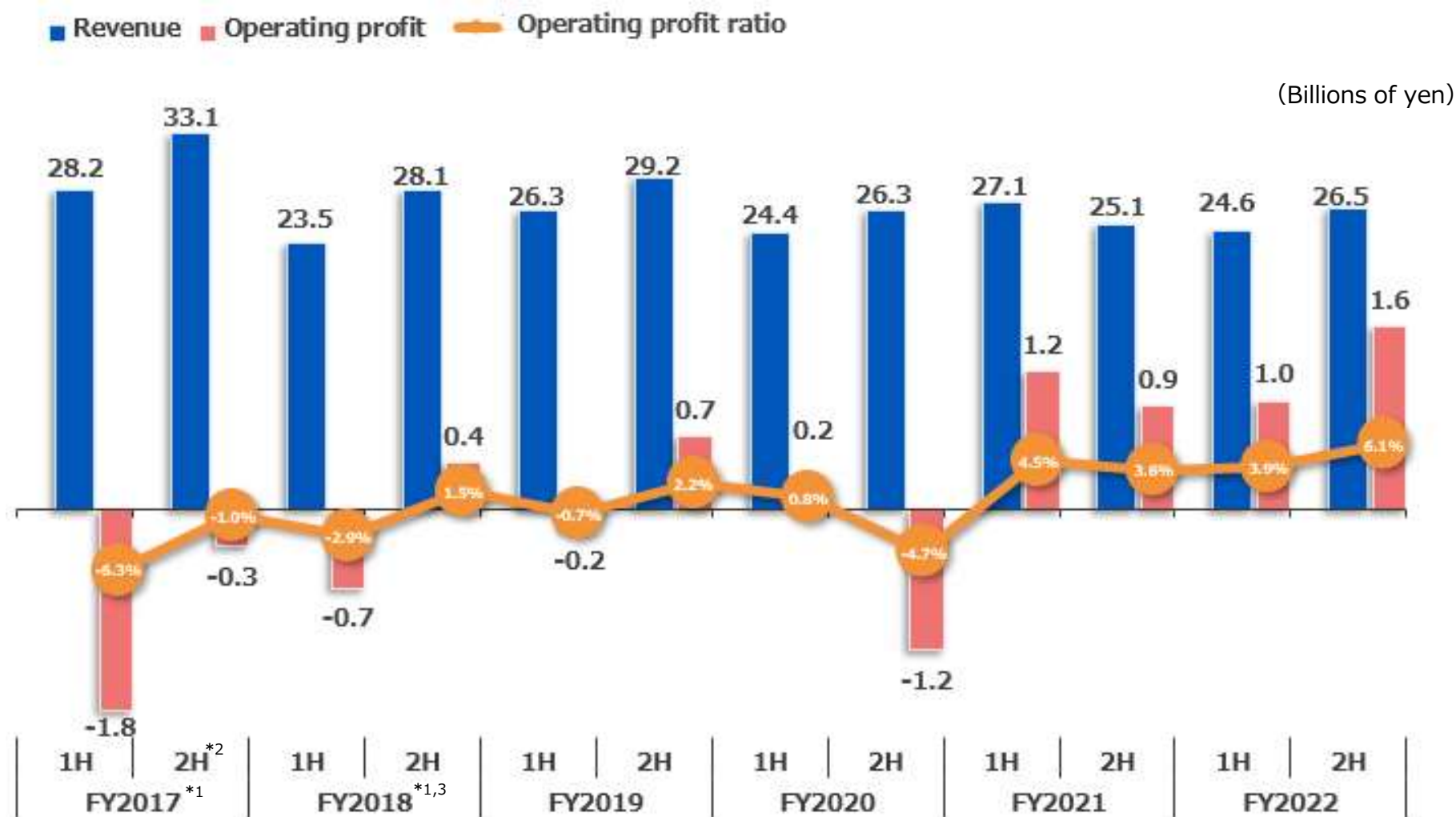
Wind power generation

Drinking water treatment facility

Steel Plant

Sewage treatment plant

# Revenue / Operating Profit (System Engineering)

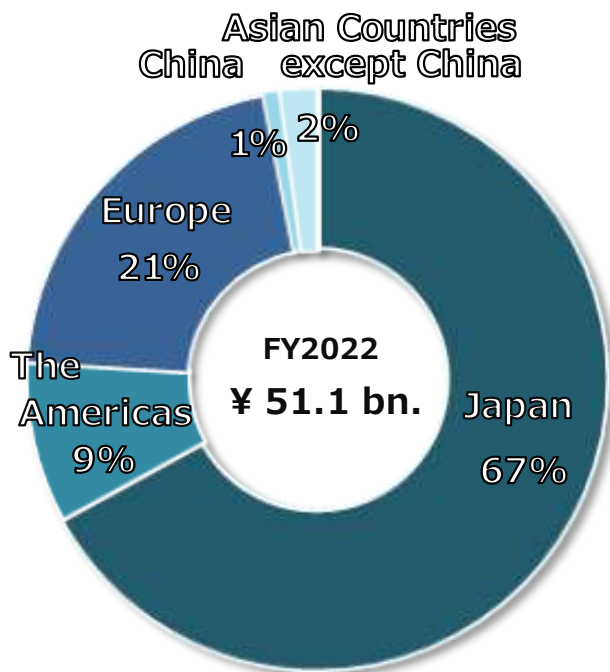


<sup>\*1</sup> Data up to FY2018 are based on Japanese GAAP (After FY2019, IFRS was applied) <sup>\*2</sup> The data for FY2017 are made on a reference basis. (September 21, 2017 – March 20, 2018)

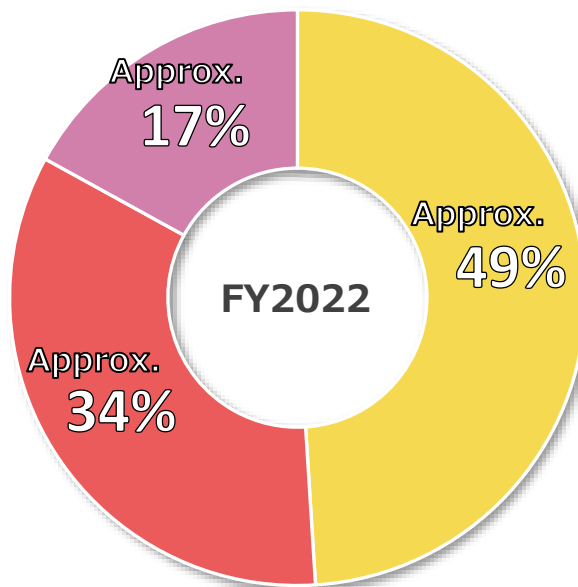
<sup>\*3</sup> Reflects the impact of the reclassification of segments in FY 2019

# Revenue Breakdown by Region and Application, Market Share

## Breakdown of revenue by region



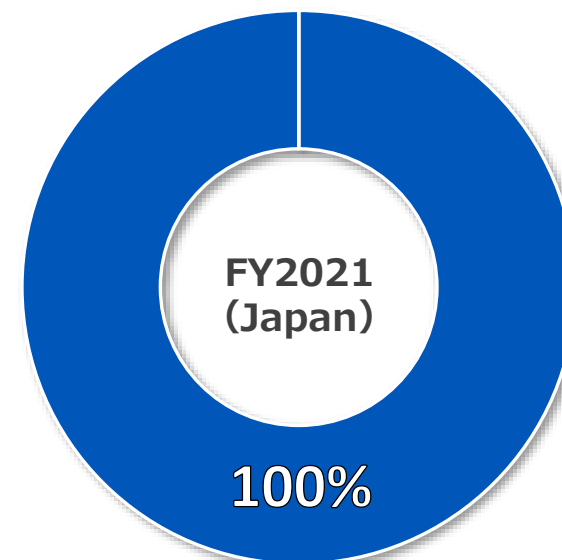
## Revenue breakdown by application



- Industrial automation drive (Steel, industrial electric, crane)
- Environmental energy
- Social system

## Market share

Steel plant systems (Blast furnace)



[Note] Company estimate

# Product Lineup (Environmental Energy Business\_ Large-Scale Wind Turbine)

**With the proven power conversion technology, realize the maximum electricity output from wind power**

Convert energy from wind turbines to **high-efficiency and high-quality power** with our PMGs\* and full-power converters.

\*Permanent magnet synchronous generator



Stored in nacelle

## Product Lineup

### Permanent magnet synchronous generator



Low-speed type



Medium-speed type



High-speed type

### • Output

**1.1~9.5MW**

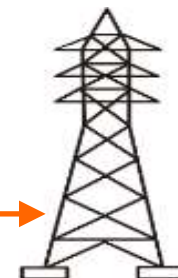
- High efficiency and high reliability are achieved by signature shape and magnet position

## Full-power converter



Power conversion efficiency **97%**

Switchgear



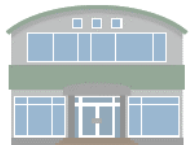
Power grid

# Product Lineup (Environmental Energy Business\_Solar Power Generation)

## We sell PV inverter for solar power generation

Supporting a wide range systems, from self-use and low-voltage grid connection less than 50kW to mega solar.

### For industry low voltage (10~50kW)



public facility



Low voltage solar power

9.9kW 200V class 3-phase isolated type

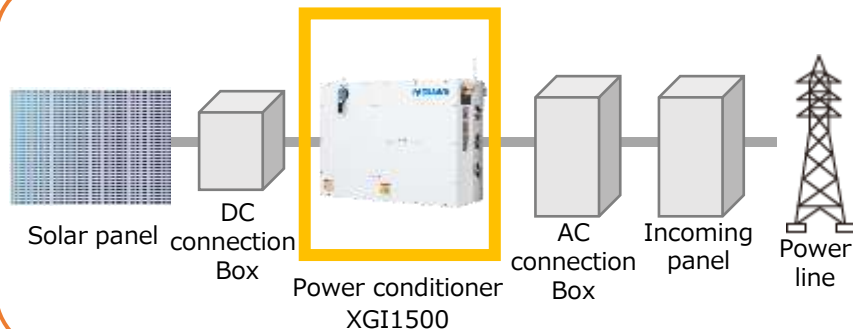
**Enewell-SOL P2H**

Build-in isolate transformer in power conditioner!

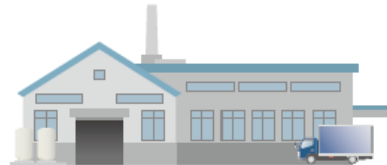


Best for  
self-consumption

### System configuration



### Middiam Voltage / High voltage



Factory



Mega Solar

The large system scale reduce the cost by increasing the voltage.

25kW 200V class 3-phase

**Enewell-SOL P3A**

Achieved 25 kW which is the largest outputs in the 200 V class

Best for  
self-consumption



65kW 400V class 3-phase

**XGI1000**

Contributes to total cost reduction



150kW 500V class 3-phase

**XGI1500**

Specialized to utility scale by maximum output in class



# Product Lineup (Social System Business\_Water Treatment Plant)

**Yaskawa supports the advanced operating management and maintenance management of social infrastructure including water treatment plant.**

Main target facilities

Waterworks Facility



Sewerage Facility



Centralized Monitoring & Control Facility



Centralized Monitoring & Control Facility



Electric products for water supply and sewerage

Monitoring control



Human Machine Interface  
**CP-540**

Power receiving and distribution  
electricity self-generation



Medium-voltage  
Enclosed  
Switchboard

System Controller  
**CP-3550**



# Product Lineup (Social System Business \_ Steel Plant)

Contributing to stable continuous operation with high reliability by providing dedicated control systems and electrical equipment that meet the needs of various facilities in steel plants

## Key process

## Features of the equipment

## Application features/Yaskawa strengths

### Blast furnace



Blast furnace



Control room

- The process of making hot metal from iron ore
- Stable operation and long-term continuous operation under adverse environment are required.

- ① **100% share of raw material charging control in Japan**
- ② **Stable production** of consistent quality pig iron in response to changes in the operating environment
- ③ High-reliability products and system redundancy enable **long-term continuous operation**

### Continuous casting



Continuous casting equipment

- Step of solidifying molten iron from a blast furnace
- Stable operation is essential because equipment shutdowns have a major impact on operations.

- ① **Domestic market share: 50% or more**
- ② System redundancy and reliability design for **stable operation**
- ③ Implement **backup control** to prevent internal coagulation in case of trouble.

### Process / cold rolling



Process line equipment



Cold rolling mill

- Final process of steel manufacturing process
- Continuously process connected steel plates (Surface processing, heat treatment processing, etc.)

- ① **High-precision and high-function line control** that makes the most of years of accumulated control technology
- ② High-precision control of steel plate speed, tension, slack, etc. by drive system
- ③ Large number of products delivered in Japan and overseas

# **YASKAWA**