

**KAGA ELECTRONICS  
EMS Business Briefing Material**

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**March 30, 2022  
TSE 1st section 8154**

## Preface

## Business Domains



Sales agent activities for general electronic components and semiconductors for customers in Japan and worldwide

Electronic part  
and  
Semiconductors



EMS

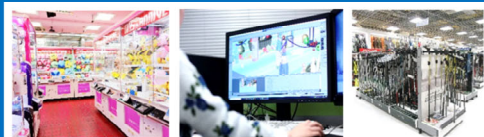
Providing total support for design, development, and manufacture of products ranging from semi-finished to finished products

Supplying PCs and peripherals to domestic and international distribution channels, and serving the network solutions field

Information  
Equipment

Others

Development, manufacture, and sale of amusement-related products and software



Starting with this slide, we can see our four main businesses. We will explain the EMS business, in the upper right-hand corner, which is the main theme of today's presentation.

## Medium-Term Management Plan 2024 : Management Targets

Realize sustainable growth by organic growth and further M&A challenges

### FY2021 Forecasts

Net Sales	JPY 475 bn
Operating Income	JPY 17.5 bn

### FY2024 Management Targets

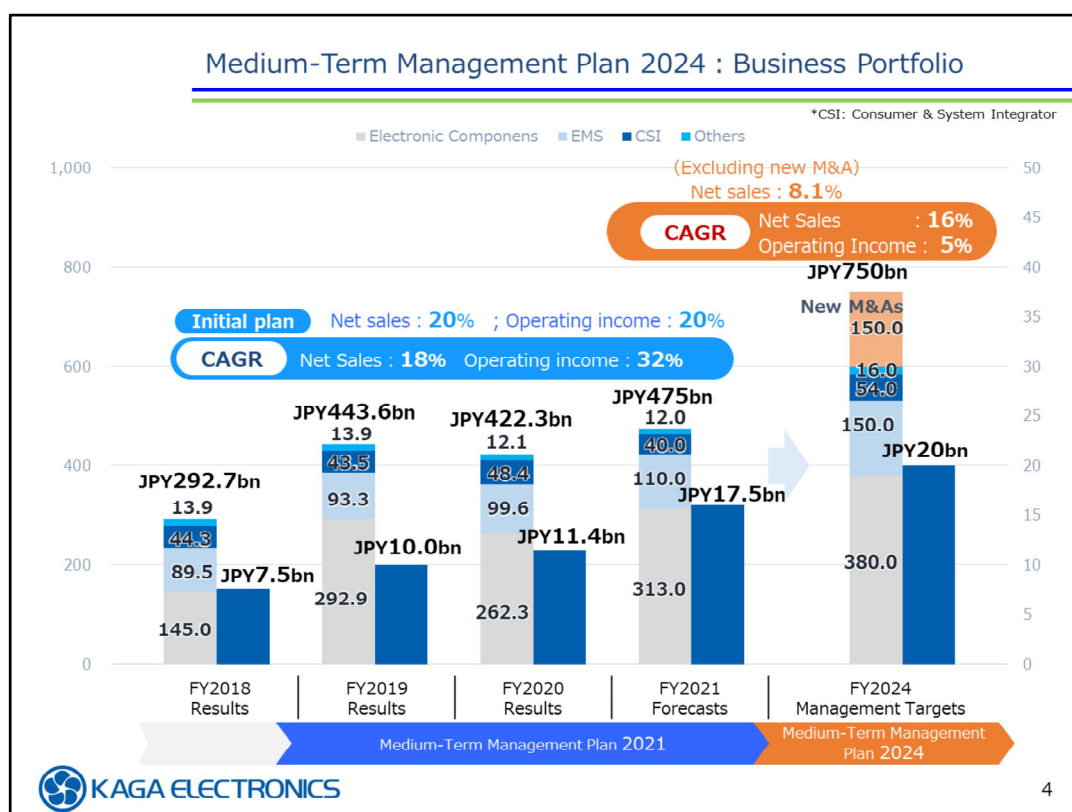
Organic growth	Including new M&As
JPY 600 bn	JPY 750 bn
JPY 20 bn	

With cost of shareholders' equity (7-8%) in mind,

ROE	12.3 %	stable 8.5 % or higher
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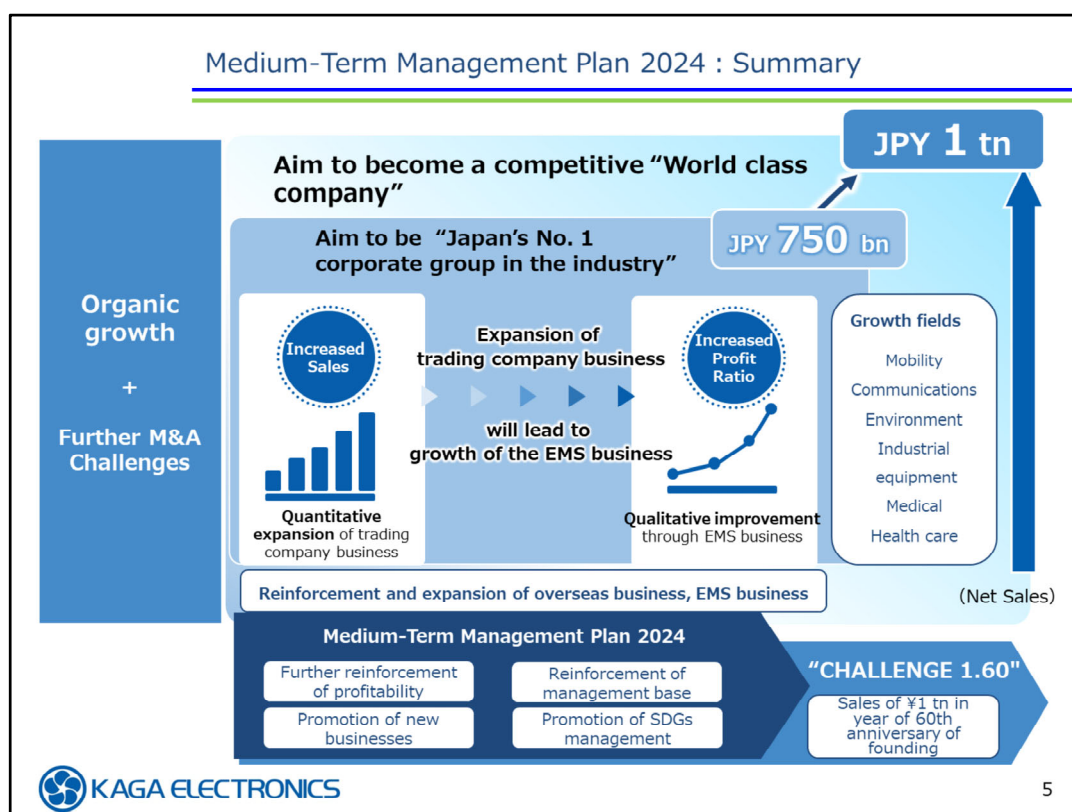
These are our management targets in the new medium-term management plan, announced last November. This three-year plan from FY2022 to FY2024 calls for net sales of 600 billion yen based on organic growth and 750 billion yen when we include M&As, operating income of 20 billion yen, and a stable ROE of 8.5% or more in the final year, which is FY2024.





These are the sales by segment.

In the vertical bars, the EMS business is the second block from the bottom. We believe EMS business sales will land at about 110 billion yen this fiscal year (FY2021). From there, the plan is to increase sales by 40 billion yen to 150 billion yen in FY2024. Therefore, the EMS Business plays a very important role alongside our electronic components side.

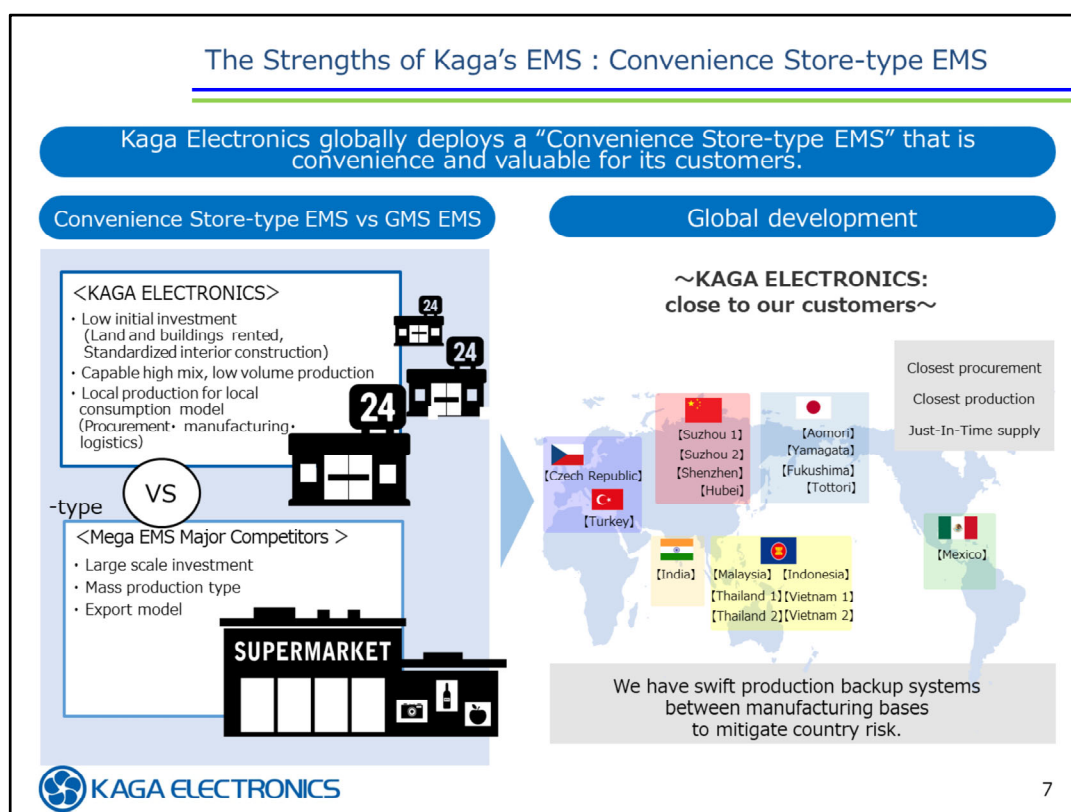


This is a bird's-eye view of our new medium-term management plan. In this plan, our sources of growth will be "organic growth" and "further M&A challenges," which will generate 750 billion yen.

Our growth opportunities come from our overseas business and EMS business. From here, we will focus on growth areas like mobility, communications, environment, and industrial equipment. In these fields, we will aim to be the number one corporate group in the industry here in Japan, with sales of 750 billion yen. These sales will be driven by the dual axis of our electronic component business and the high value-added EMS business.

In the new medium-term plan, we are working to go beyond that, to achieve sales of 1 trillion yen and to realize our vision of becoming a world-class competitive company. Since the 60th anniversary of our founding coincides with the period of the plan after the new medium-term plan, we have established "CHALLENGE 1.60," an expression of our desire to reach 1 trillion yen at our 60th year. Thank you for your attention to this brief introduction. Now, let's move on to the presentation.

## About Kaga' EMS Business



## The Problem-solving Power of Convenience Store-type EMS (A Case Study from an Existing Customer)

### Present problem

The manufacturing industry has suffered directly from dramatic changes in the external environment, including US-China trade friction, the impact of the COVID-19 pandemic, and shortages in the supply of semiconductors.



### Our solution

Develop a system to supply our main customers with bases in Romania from Turkey.



Next, I would like to introduce one of the most recent examples of the problem-solving capability offered by our convenience store-type EMS. The manufacturing industry has been directly impacted by a number of issues amid a dramatically changing external environment: trade friction between the U.S. and China, the impact from the COVID-19 pandemic, and semiconductor supply shortages. In the midst of these impacts, many of our customers in the manufacturing industry are experiencing a number of problems, including longer shipping times, higher logistics costs, financial pressures, reduced flexibility, and increased risk of supply disruptions when handling exports from remote locations.

In response to these emerging problems, we have decided to launch a circuit board mounting business in Turkey in order to meet the growing demand for local production, especially from our customers in Europe as mentioned here. We believe that this system will enable us to shorten transport times, control logistics costs, improve financial health and flexibility, and reduce the risk of supply disruptions. Here, we believe our strength is being able to rapidly progress through launch phases by deploying our expertise as is in convenience store-type projects mentioned on the previous page.

## Construction of a New Plant in Turkey

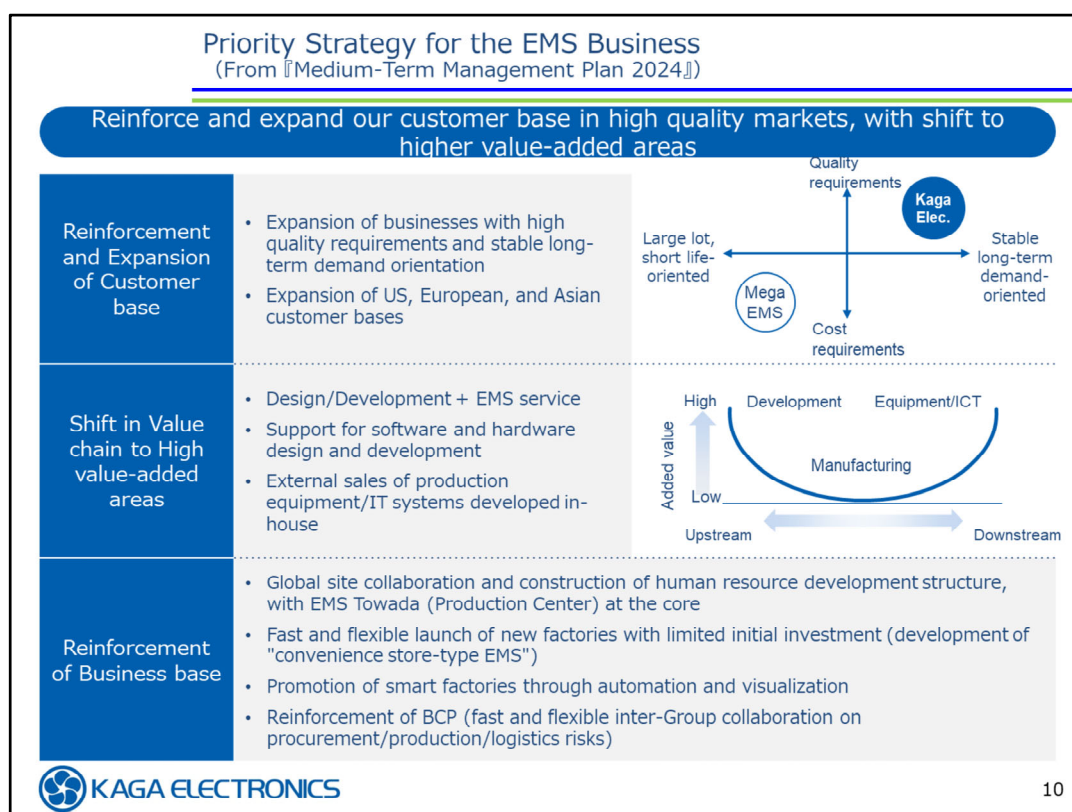
A new base for circuit board mounting in Europe



[Overview of the new plant in Turkey]

- Completion: Planned for November 2022
- Site area: 15,000m<sup>2</sup>
- Floor space: 11,600m<sup>2</sup>
- Production equipment: Manufacturing and inspection equipment associated with circuit board mounting and electrical equipment assembly
- Number of employees: 330
- Planned products:
  - Electrical equipment units for air conditioners
  - Mounted circuit boards for electrical tools
  - Mounted circuit boards for automotive equipment

This is an overview of the new KD TEC Turkey plant, our hub for circuit board mounting in Europe. Construction is scheduled for completion in November 2022, with a site area of 15,000 square meters and a total floor area of 11,600 square meters. The plant's production equipment includes board mounting and manufacturing and inspection equipment associated with the assembly of electrical components. With a planned number of 330 employees, this is to become a main plant in Europe for the production of air-conditioning equipment, which we already produce elsewhere, as well as mounted circuit boards for electrical tools and automotive equipment, which we plan to produce in the future.

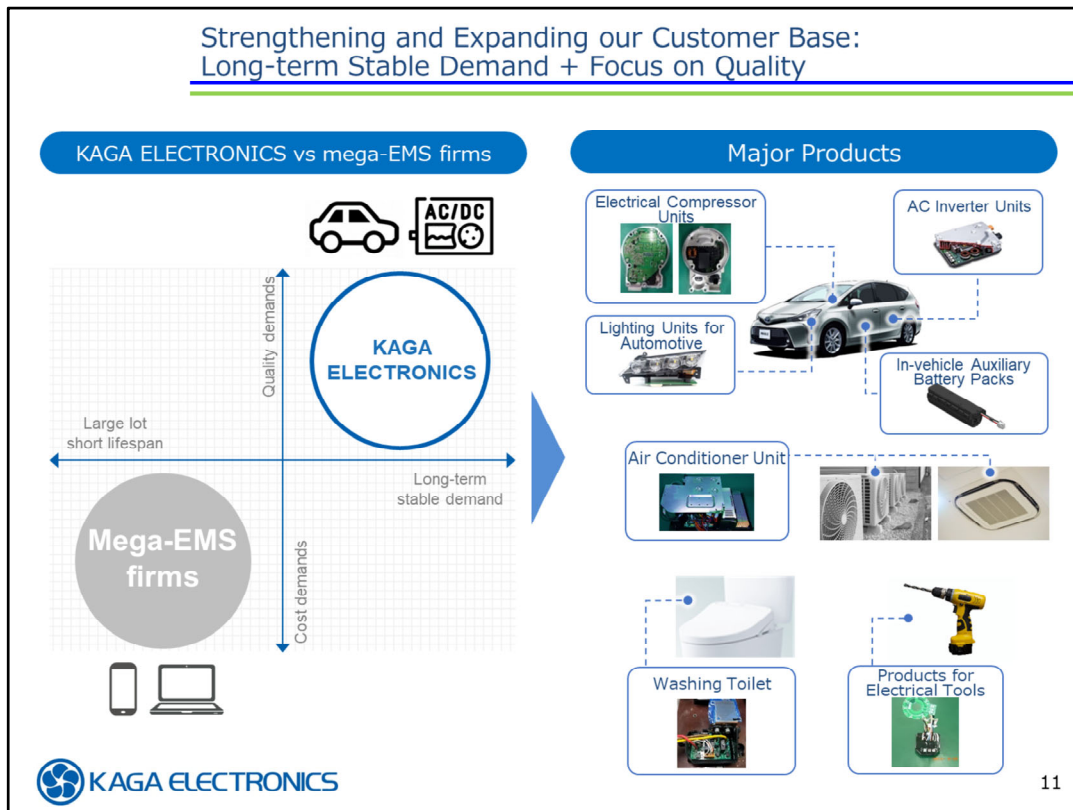


These are the details of our medium-term management plan. While I am sure everyone is aware of this already, I would like to reiterate a few points. The first is that, to strengthen and expand our customer base, we are targeting not only Japanese-affiliated customers, who require quality-oriented product lines with stable long-term demand, but we are also looking to expand to customers based in Europe and the United States.

The second point is that, in our value chain shift to higher value-added areas, we are aiming to expand our business domain to include development, manufacturing, and maintenance. Here, we add to our currently established mass production manufacturing core business by expanding our business domains into development and facilities. The third point, reinforcing our business base, focuses on our Towada Plant and harnesses our production center and mother plant. I will explain these in the second half of the presentation.

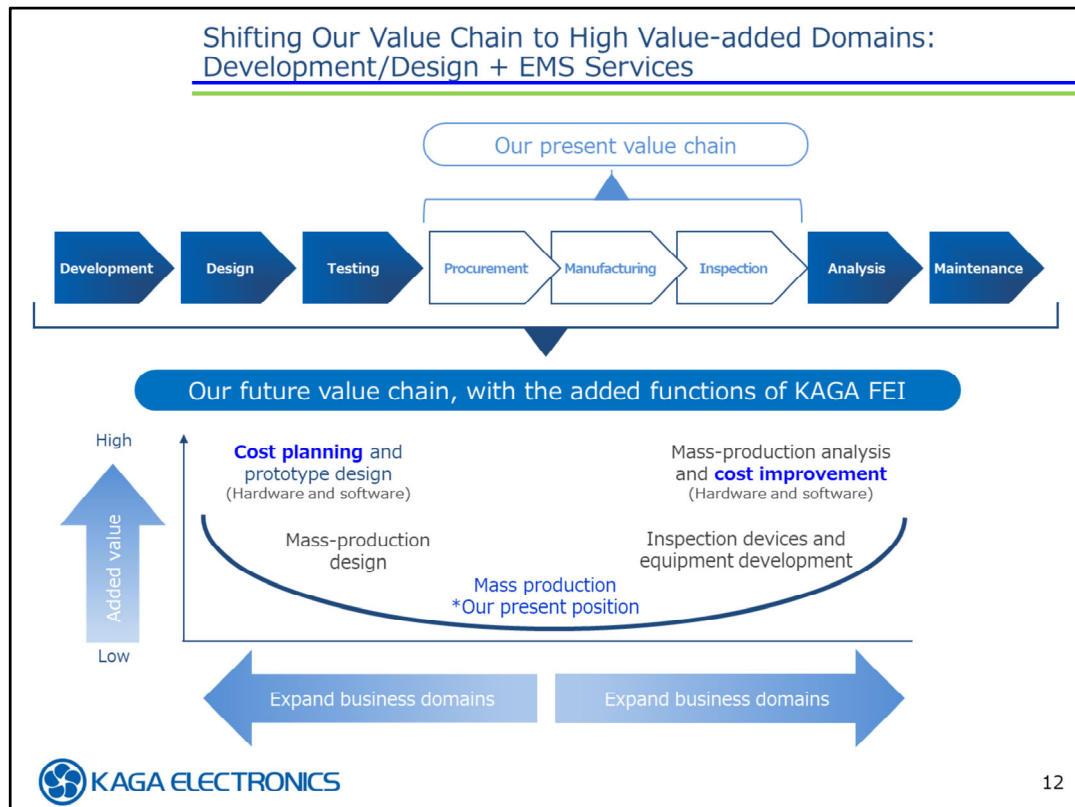


## Strengthening and Expanding our Customer Base: Long-term Stable Demand + Focus on Quality



Let me quickly explain each of our individual areas of business. The upper section to the right is the automotive field, a core product category for us because of high quality requirements and stable long-term demand. Here, we have started producing control units for various internal equipment, such as electric compressors and AC inverters. We also produce lighting equipment for the exterior. We produce LED lighting units as well, which are becoming much more prevalent in automobiles. We also make in-vehicle auxiliary battery packs, as demand for these packs is growing considerably for usage in communications. In the center-right is air conditioner-related equipment, or more specifically electrical components used in outdoor A/C units. Our plants handle everything from board mounting to aluminum sheet assembly. The lower section shows products for washing toilets. Here, we make sanitary ventilation units, control units, and remote control-related units. Next to it is electrical tools. The DIY market here has exploded amid the COVID-19 pandemic, and we, too, are involved by producing primarily control boards for DC motors in electrical tools.

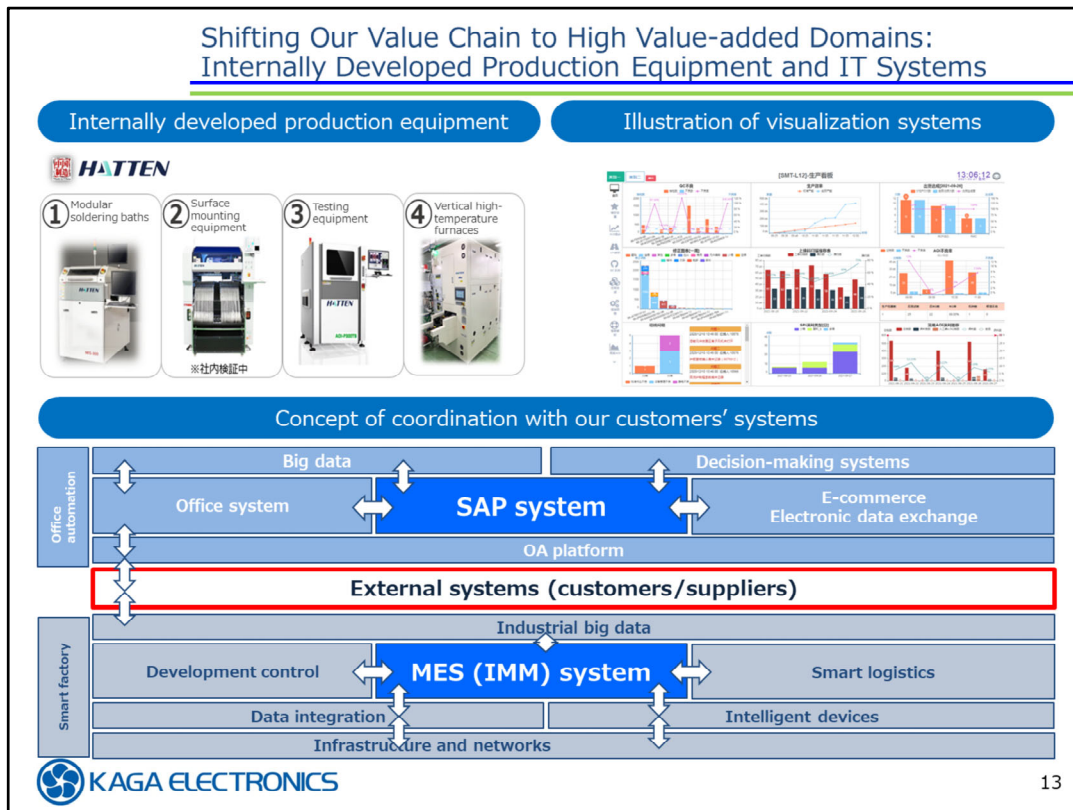




Our business domains to this point have been procurement, manufacturing, and inspection; however, from here, we will extend our value chain to development, design, testing, analysis, and maintenance. This is in order to strengthen the value chain by adding the functions of Fujitsu Electronics (now KAGA FEI), which we acquired three years ago. In the past, we used "mass production" as the entry point for our transactions. However, this new expansion will enable transactions to begin with services, like cost planning and cost improvement, that will build business. This will allow us to expand our business domains from our customers' upstream

into the EMS mass production and manufacturing domains, with added value growing accordingly. This is the sort of business model that we envision.

## Shifting Our Value Chain to High Value-added Domains: Internally Developed Production Equipment and IT Systems



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This is another high value-added value chain, but with internally developed production facilities and IT systems. "HATTEN" in the upper left-hand corner is a registered trademark of our company. Its brand name, Japanese for "development," expresses our desire to do just that.

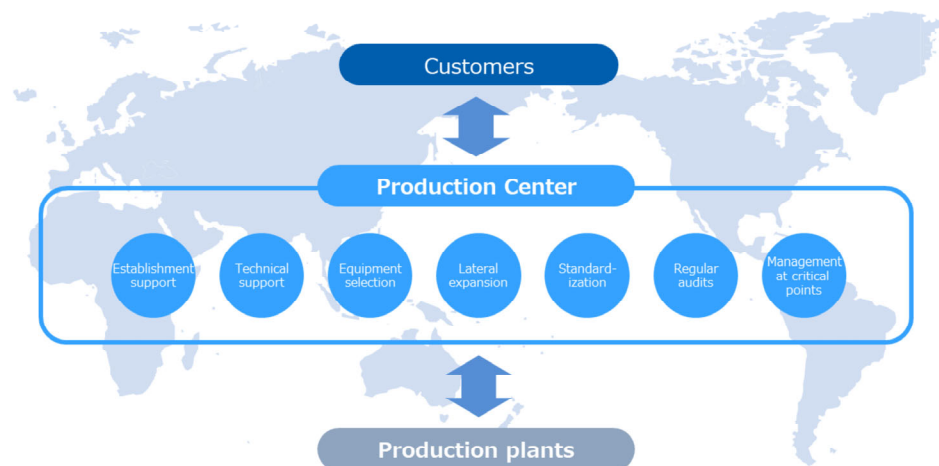
Currently, we are working on four areas here: modular soldering baths, surface mounting equipment, testing equipment, and vertical high-temperature furnaces. We have already achieved #1, #3, and #4 of these. For #2, we are currently conducting proof-of-concept tests. This is an area where we intend to focus on achieving consistently internally developed equipment going forward. This will lead to stronger competitiveness with controlled depreciation, which will allow us to manufacture and process products at prices appealing to our customers. This is an area we intend to refine further going forward.

Next is the "visualization systems" you can see on the right-hand side. This comes amid the "smart factory" trend, in which quality control, production control, and other manufacturing data are collected and linked with business data, like current production status and current inventory levels. This linked data is "visualized" on a real-time basis. Currently, this visualization is only available on dedicated computers, but in the future we would like to change this to a system that can be handled on the cloud, etc., building an environment where data can be viewed anywhere, such as on a smartphone. Below this is our vision of the future system integration with our customers. In the very middle, we see the external systems – our customers and suppliers. By linking business data, including an SAP system as shown in the upper section, and manufacturing data, including an MES system as shown in the section below, both customers and suppliers will be seamlessly connected. This initiative, the adoption of digital technologies, is important because it builds a business that is resilient amid change and can keep pace. This is precisely what we are aiming for, to build a business that can ratchet up its production and manufacturing pace alongside our customers and suppliers amid a rapidly changing business environment. Our concept is to link these two parties through the mechanisms we are building, and to adopt digital technologies in these. The mechanisms we at the Kaga Electronics Group seek to build are, in a word, resilient.

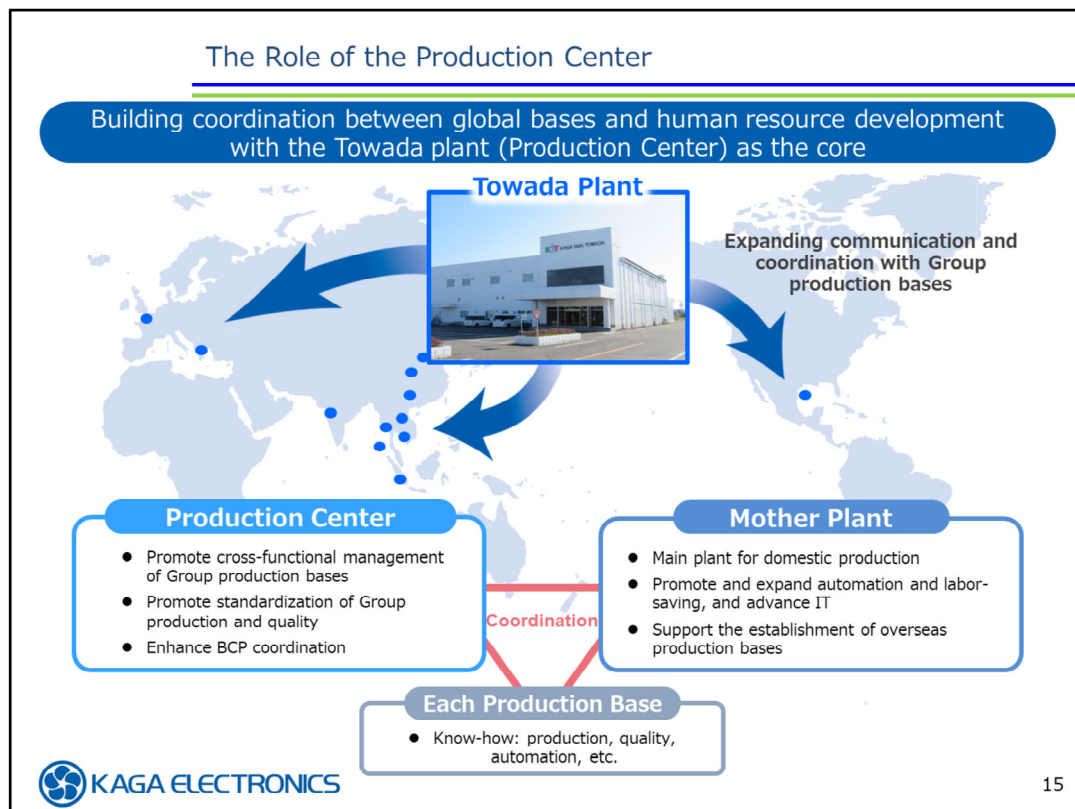
## Strengthening Our Business Base: Production Center

### The role of the Production Center

**Cross-functional management** of information for each EMS plant  
and **standardization** of manufacturing at each EMS plant

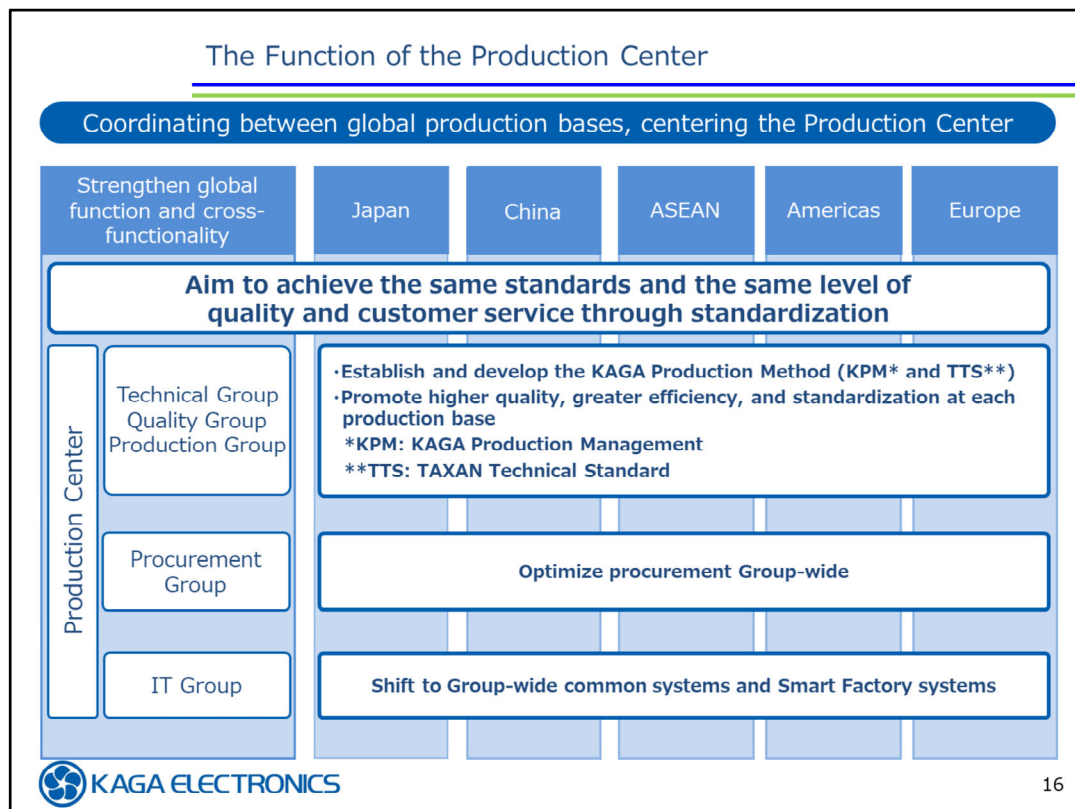


Here, we present the role of the production center. Here, please consider procurement, manufacturing, and inspection as value-added areas. As mentioned earlier in the presentation, the production center becomes the heart of cross-functional management and standardization of 21 factories across 10 countries. It is a section that handles everything from establishment support, technological support, and facility selection and standardizes these in a cross-functional manner while conducting audits and managing milestones, pursuing the answer to the question of how we can provide products to our customers at consistent quality at the most rapid speed possible.



This is the Towada Plant. Here, we see the trend of combining the functions of a production center and a mother plant. In other words, our aim is to achieve global collaboration and development of human resources for production. In addition to the cross-functionality and

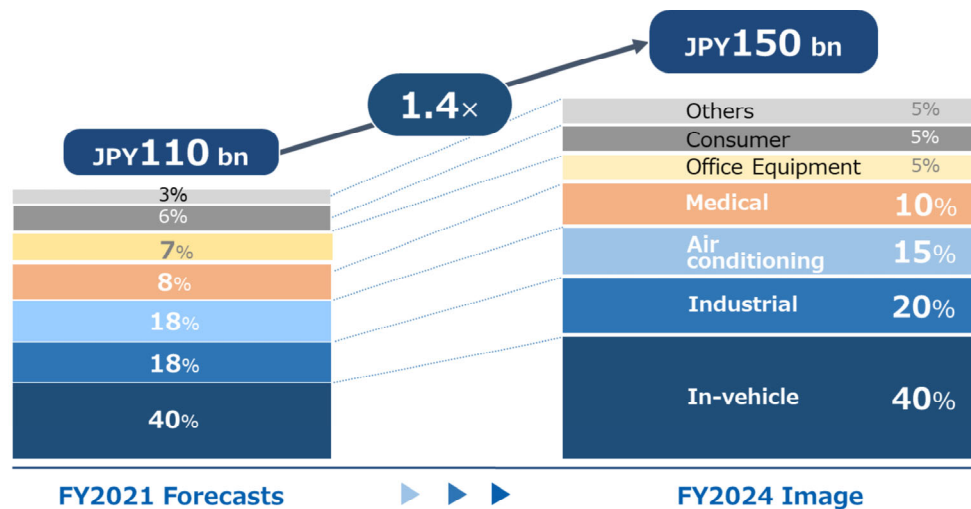
standardization of the production center I mentioned a moment ago, and improving our BCP linkage, the Towada Plant will serve as both a mother plant and core plant. Here, we will promote automation, labor-saving, and adoption of IT technologies, plus support the start-up of plants outside of Japan. Our vision here is to develop a global system like this, consolidating our production, quality, and automation expertise in the Towada Plant for provision to Group plants.



This is an illustration of the cross-functionality of our global functions. As I explained earlier in the presentation, the production center exists to horizontally roll out standardization of the manufacturing expertise we have developed over two decades. For the five major markets of Japan, China, ASEAN, the Americas, and Europe, we will look at our production engineering, quality control, production management, procurement, and IT in a cross-functional way. Through standardization, we strive to be consistent in meeting standards and providing quality levels and services. We have established KPM, our own unique production system, and TTS as our technical standards. We have documented these and rolled them out to each of our plants. I would like you to imagine this as a process for building deeper collaboration among the Kaga Electronics family, ensuring that any of its members, no matter where they are, can have a conversation in the same internal language.

## The EMS Business Portfolio by Industry

Through our key strategies of “strengthening and expanding our customer base,” “shifting our value chain to high value-added domains,” and “strengthening our business base,” we aim to rapidly grow the business scale to 1.4 times the level of fiscal 2021.



This is our portfolio by industry. By implementing the three priority strategies explained so far in this presentation, that is, reinforcing and expanding our customer base, shifting to value chains in high value-added areas, and reinforcing our business base, we will achieve 150 billion yen in sales in FY2024, 1.4 times the 110 billion yen in sales for the current fiscal year. The fields we will be particularly focusing on as we aim to achieve business growth will be the automotive mobility field, the industrial machinery industry, and the medical field.

## The EMS Business and SDGs

### Utilizing renewable energy



As part of our efforts to utilize clean energy, we plan to use electricity generated from solar power at some of our plants from fiscal 2022.



\*The photograph is for illustrative purposes only.

### Initiatives for a work-friendly environment



At our Shenzhen plant (China), we held an event inviting the children of employees to experience the workplace at the plant.



In closing, I would like to present two of our SDGs initiatives. On the left side, we have a picture of solar panels, illustrative of our work to harness renewable energy. We are planning to introduce solar energy at some of our plants starting in FY2022, with the aim of maximum possible use of renewable energy by 2030. As for the other initiative, in FY2021, we invited children of our employees to the Shenzhen Plant to experience the work environment and offer a learning experience about comfortable working environments for our employees and their families. This is one example of our efforts to create a comfortable working environment and part of our outreach work to help deepen understanding of what it is the Kaga Electronics Group does, including our contributions to the local community. We intend to continue actively pursuing these kinds of efforts going forward.

## **An Introduction to KAGA EMS TOWADA**



## Introduction to KAGA EMS TOWADA

### ■ KAGA EMS TOWADA CO., LTD.



Site area	30,564 m <sup>2</sup>
Building area	13,264 m <sup>2</sup>
Number of employees	290
Approval	<ul style="list-style-type: none"><li>• ISO 9001</li><li>• ISO 14001</li><li>• ISO 13485</li><li>• License for manufacturing general medical devices</li><li>• IATF 16949 (to be acquired in FY2022)</li></ul>

I will now introduce and start the virtual factory tour of KAGA EMS TOWADA, which is positioned as the mother factory of KAGA Electronics' EMS business. KAGA EMS TOWADA has the areas and number of employees shown here, and has acquired ISO certification with respect to quality, environment, medical, and on-board automotive. In addition, it has also acquired a license for the general medical device manufacturing business in Japan.

I will mainly explain our key production processes—the mounting process, whereby components are soldered to circuit boards, and the finished product assembly process, whereby circuit boards with mounted components, mechanical parts, and housing are assembled. I will also introduce the features of our company.

## 1. Main Production Items and Production Lines

### Main production items

#### Circuit board mounting and electronic equipment assembly and inspection

**Automotive  
related**

**Medical device  
related**

**Consumer product and industrial  
equipment related, food processing  
equipment related, etc.**

### Main production lines

**① Automated surface mount  
technology (SMT) lines**

5 lines + exclusive use of  
5 lines at partner factory



**② Dual in-line package (DIP)  
lines**

3 lines + exclusive use of 1  
line at partner factory



**③ Finished product assembly lines**

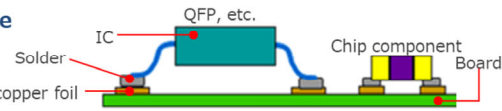
Flow production lines: 4 lines  
Cell production lines: 8 rooms  
(clean room available)



This shows an overview of our factory. The main production items are board mounting, electronic equipment assembly, and inspection. Priority is given to the on-board automotive-related and medical device-related product fields. Our production lines are automated surface mount technology lines and dual in-line package lines, and we also have finished product assembly lines. For finished products, we have lines to flow a wide variety of products in small batches, ranging from conveyor production lines to cell production lines.

## 2. Automated Surface Mount Technology (SMT) Lines

- Process to solder components to board surface  
(densification, IC, fine chip components)



▼ Automated surface mount technology (SMT) lines



▼ Component mounter



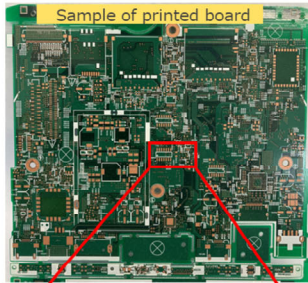
▼ Reflow oven



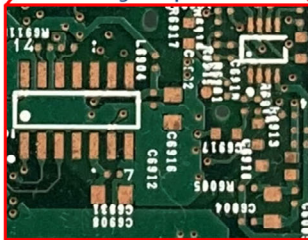
Now I will explain our surface mount technology lines, and you will be given a video tour of the lines. First, let's look at circuit board mounting. There is a process to solder components to the surface of a circuit board. Recently, as the extreme densification and high precision of electronic equipment progress and the components also become increasingly miniaturized and higher precision, surface mount technology is frequently used as a technique to mount high-precision components with high density. Please look at the figure at the top right for a specific example. This board has an electronic circuit wired according to the design with pattern copper foil to solder components on top of it. The technique aligns the terminals of the electronic components with the surface and then solders them to these parts.

### (1) Print solder with a printer

▼ Board with designed circuit wired



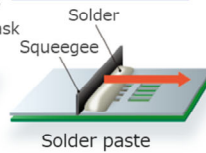
▼ Copper foil pattern for soldering components



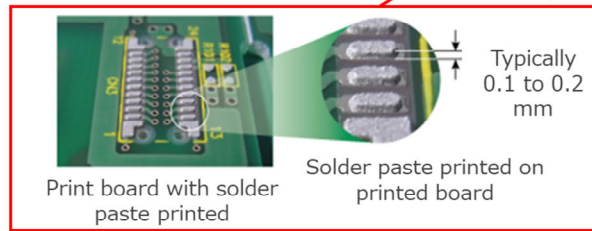
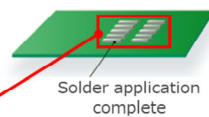
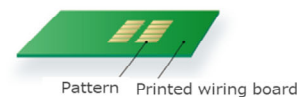
1 Place the metal mask aligned with the pattern



2 Move the squeegee to transfer the solder onto the printed wiring board



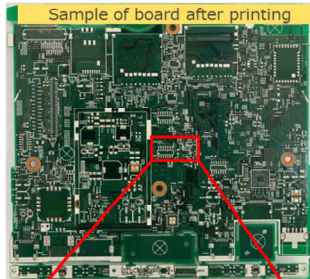
3 Separate the metal mask



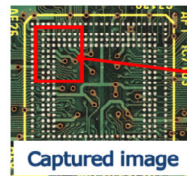
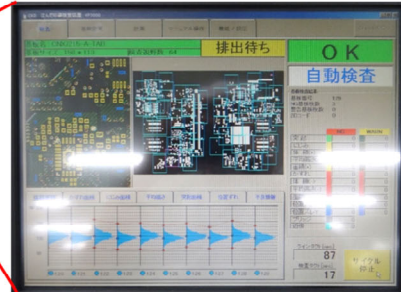
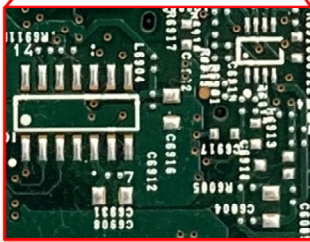
I will explain the specific flow. First, I will give a rough overview of the flow. The photo at the bottom left shows the state with no components mounted to the board. The parts where you can see copper foil here are the parts to solder. The terminals of electronic components are soldered onto this surface. The process involves printing solder paste in a semi-liquid state onto this terminal part. As shown in the top right figure, a metal plate with holes made just where components are to be soldered is aligned on the board and solder paste in a semi-liquid state is printed onto the hole parts of the metal plate. The holes are filled with the solder by scraping from left to right with a blade-shaped piece of metal. The figure at the bottom right shows the finished state. The solder is printed with extreme precision and minute dimensions, as high quality is demanded.

[Basic Flow-(2)]

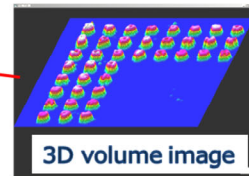
(2) Precisely inspect state of printed solder paste using a printing inspection machine (inspect volume, bleeding, dimness, position deviation, average height, etc. with 3D precision)



▼ State of printed solder



Captured image

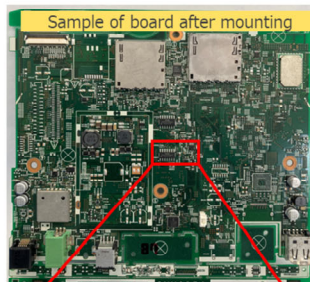


3D volume image

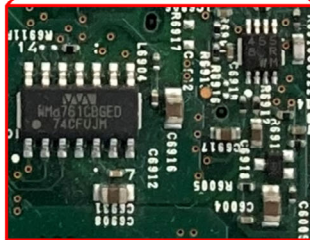
Next, the photo at the bottom left shows the printed board. An inspection machine for high-resolution 3D optical images such as that in the figure at the top right is used to inspect the printed solder state, including the volume, bleeding, dimness, and position deviation. If a problem is found in this inspection, the board does not proceed to the next process. At KAGA, an extremely high level of maintenance and technology ingenuity ensure an extremely high non-defective rate.



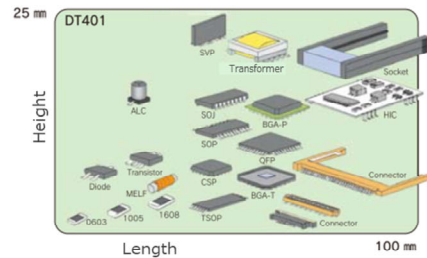
### (3) Mounting: Install the components using a component automatic mouter



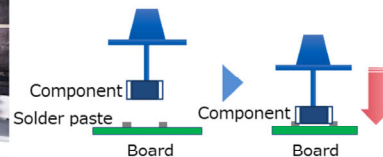
▼ State with components mounted



#### Wide variety of components supported

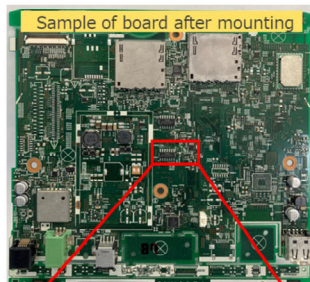


#### Vacuum pickup and placement at specified position on board

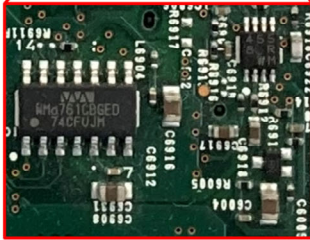


Next is the process to mount components. The bottom left photo shows the state after mounting. The specific mounting method is shown in the bottom right illustration. The electronic components are prepared by inserting them into cassettes in advance, and those cassettes are placed in the automatic mouter. The automatic mouter performs vacuum pickup of the components and moves them to their mounting positions at high speed. The process is implemented by our engineer programming the component mounting positions and conditions to operate the machine. This is a process that also demands a high level of engineering skills.

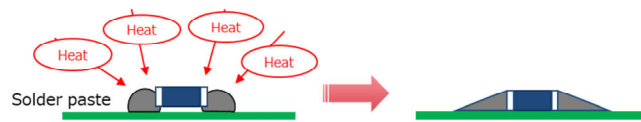
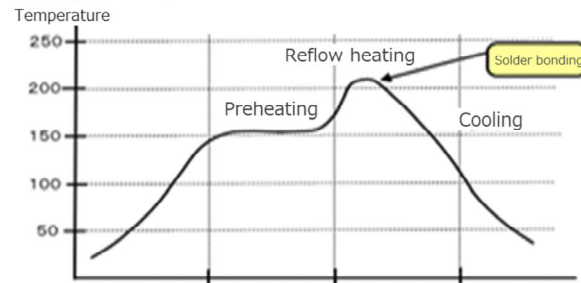
#### (4) Mounting: Melting, cooling, and bonding of solder by reflow (oven)



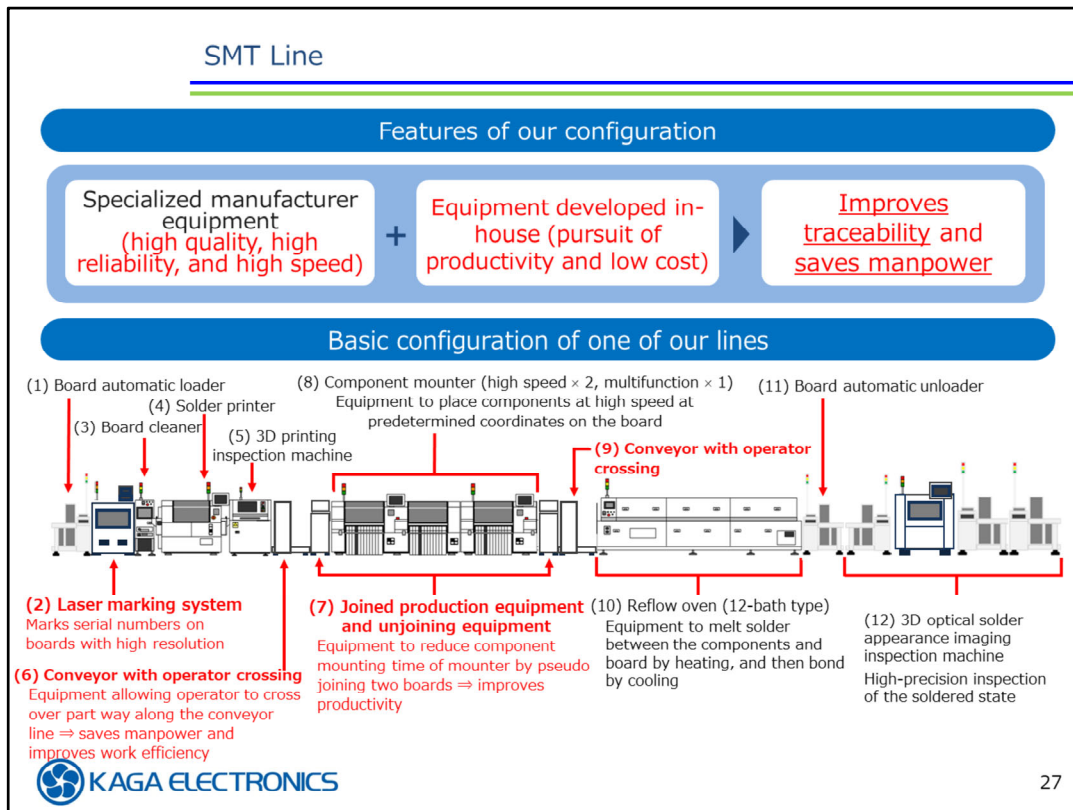
▼ State with components mounted



Board passes through a number of baths of different temperatures along a conveyor



When component mounting is finished, the reflow and oven process begins. In this process, the board is conveyed through a long oven. The solder parts of that board flow while being subjected to temperature differences in the form of preheating, high-temperature heating, and finally cooling. When the flow is finished, solder bonding is achieved and the state is as shown in the bottom left photo.



This explains how the line is configured for the basic flow that I explained. Unlike general lines and other companies' lines, KAGA lines have our unique know-how incorporated at various places. Specifically, (2) the laser marking system and (6) the conveyor with operator crossing indicated in red on this page are equipment aimed at saving manpower, as they allow operation by one operator. In addition, (7) joined production equipment and unjoining equipment are devised so as to increase the speed of board component mounting. We aim to pursue quality and productivity at a level other companies cannot match by incorporating equipment such as this that we have designed in-house.



[Video]

[Laser marking → Board cleaner → Solder printing → 3D printing inspection]

(1 minute 20 seconds)



KAGA ELECTRONICS

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You will now be given a video tour. The first video is about the laser marking described previously. Laser marking is the process whereby each individual board is marked with a serial number.

Other companies do not generally mark a serial number on each individual board, or they do so but employ the old method of using a sticker with a printed barcode. We employ the technique of highly detailed laser marking to achieve a more detailed board and save board area space. On top of that, we clean the board using board cleaner, and perform solder printing and print inspection as described previously. The beginning of this video shows about three lines, but you will notice that there are only two or three workers.

Whereas other companies have two or three workers per line, we have two or three workers for three lines. In other words, you will see that our aim is for one line to be operated by one operator to save manpower.

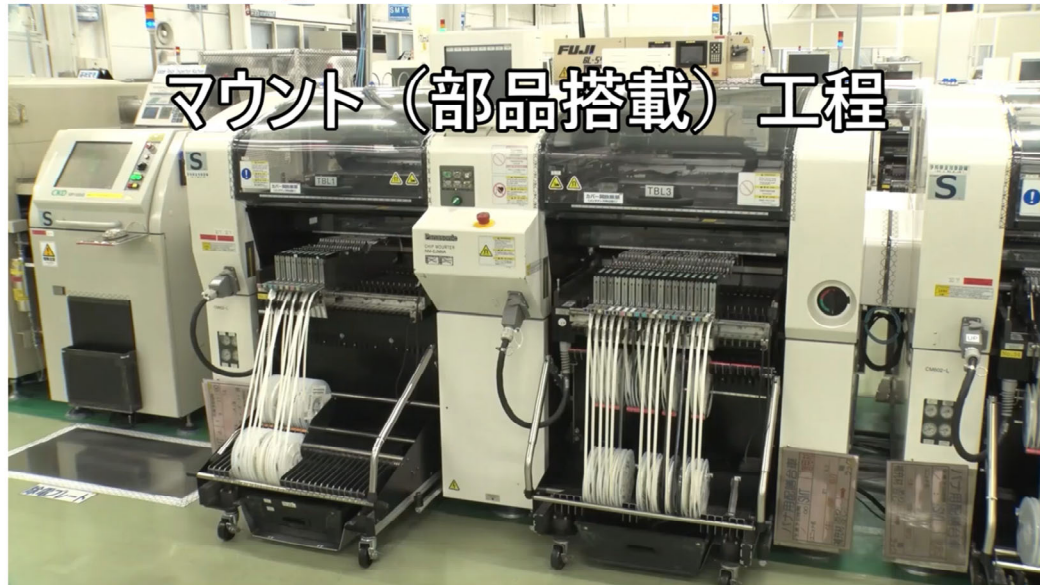
–Video playback– (1 minute 20 seconds)

There are very few workers. You are looking at three lines. This is laser marking. Please look at the right side of this board. A laser beam was just emitted. Again, another laser beam was emitted. At the place pointed to afterwards, a QR barcode is marked where originally there was nothing. Next, the board is cleaned with air. This is solder printing. Please look at the printing movement. When the solder paste is inserted into the parts where holes have been made, it penetrates into the holes. Solder is put on the board in this state, and the machine you see on the right side of the printer at the center of this still image is the printing inspection machine. The inspection image is displayed on the monitor of this inspection machine, and a judgment is made automatically by inspecting this inspection image from various angles.

[Video]

[Component mounting]

(0 minutes 46 seconds)



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–Video playback– (0 minute 46 seconds)

From here onward, the components will be mounted. You can see five machines. The components are loaded at the bottom of this machine. The middle robot performs the process of picking up these components from the near side and opposite side and placing them on the board. This scene shows components being placed at rapid speed.

[Video]

[Reflow (joining by melting and cooling solder) → 3D optical solder appearance inspection]

(0 minutes 36 seconds)



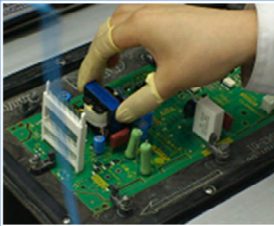
–Video playback– (0 minute 36 seconds)

The board with components placed on it is then put in an oven and preheated. This line then heats and cools the solder to properly bond the board and components together. The board enters the oven from here. Preheating, heating, and cooling take place in this long oven. Afterwards, the cooled board is output. An optical inspection is then performed on it. This is the optical inspection equipment. There is a board in the location that can be seen through this gap, and its image is being inspected precisely by 3D optical inspection. A board judged to be OK in the precision inspection flows to the next process.

### 3. Dual In-line Package (DIP) Lines

- **Process to insert leads of components into copper foil holes in the board and solder them (large components, connectors, coils, transformers, etc.) (higher strength than surface soldering)**

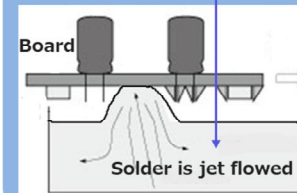
The terminals of components are inserted into the through holes (circuit conduction pattern holes) in the board.



Insertion error imaging inspection machine developed by Kaga Electronics Group (prevents component, missing, polarity, tilt, height, and other human errors)



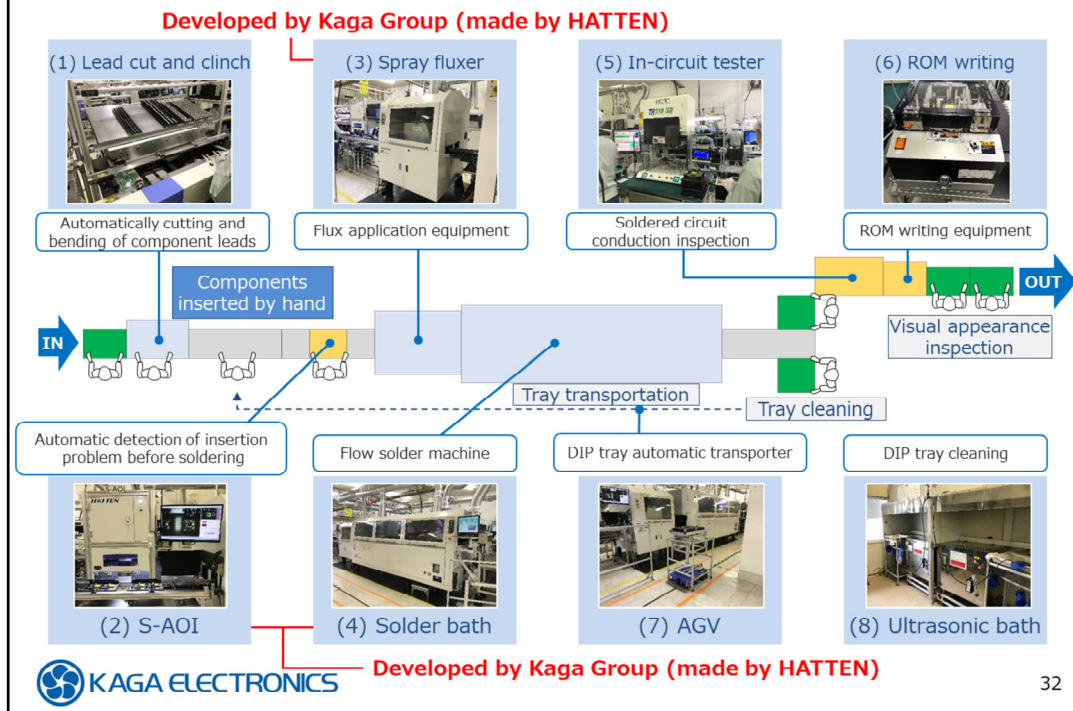
Terminals of a component inserted into the soldering surface of the board are soldered by jet-flowing molten solder at a high temperature



Up to now, I have covered from solder printing to mounting and bonding in the process for surface mounting and surface soldering, followed by image inspection. Next, I will cover large components. This process involves soldering components that are not surface mounted such as large components, connectors, and coils whereby the terminals of the components are inserted into the through holes in the boards that I am sure you are all familiar with and then soldered from the opposite side of the board. The flow is as shown. First, the components are inserted into the board. This is shown in the photo on the left. The board in that photo is then placed in the soldering oven on its right, and soldering is performed by jet-flowing molten solder from the opposite side of the board as shown in the illustration at the bottom right. This is the normal process. We have uniquely incorporated an image inspection machine developed by the KAGA Group to perform inspection during the process from mounting components to soldering in order to ensure quality. Inspection is performed by this image inspection machine to prevent missing components, component mistakes, polarity mistakes, tilting, height, and other human errors. This is also one of our unique initiatives.



## Basic Configuration of Our Dual In-line Package (DIP) Lines



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This is the overall configuration of a dual in-line package line. Starting from (1) at the top left, a reel of components is cut to the specified dimensions. (2) below shows S-AOI which is the image inspection machine I explained previously that was independently developed by the KAGA Group. (3) above shows a spray flux. This applies flux to improve spreading of the solder. (4) below shows a solder bath. This is equipment to jet flow solder. Out of (2) to (4), (2) was independently developed by the KAGA Group. Although (3) and (4) are equipment that other companies also have, we made them in-house in order to achieve productivity and cost improvements. From (5) onwards are the inspection and other processes.

[Video]

[Dual in-line package lines (flow solder)]

(0 minutes 50 seconds)



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–Video playback– (0 minute 50 seconds)

This is our unique image inspection machine on the conveyor line where components are inserted. It accurately inspects for mistakes such as component mounting mistakes, input mistakes, and polarity mistakes by checking images. Only those that are OK are sent to be soldered.

Here you can see a soldering machine called a solder bath, which is made by the Kaga Group. This scene shows the applying of solder. This black box contains boards with components mounted to them. Solder is sprayed from the bottom of the box, which has parts cut out only where soldering is to be performed on the opposite surface of the boards. The process to apply solder to boards has been covered up to this point.

#### 4. Finished Product Assembly Lines

- Module assembly in clean room



- Finished product assembly line



Next, I will introduce the finished product assembly lines. We have various lines for assembly. There is a clean room to assemble modules as well as an area to assemble finished products using a conveyor.

[Video]

[Flow production assembly line]

(0 minutes 34 seconds)



–Video playback– (0 minute 34 seconds)

This is a finished product assembly line for assembling car navigation systems.

The flow from the front is assembly of the module, assembly of the front panel of the car navigation system, then installation in the housing, and finally inspection. After that, the navigation system is sent to the packing line.

Next, I will explain those assembly processes that are not ordinarily used or that incorporate unique methods devised by the KAGA Group.



## Our own developed Production Equipment

Developed and manufactured by KAGA: Automatic pressure feeding screw fastener and automatic horizontal screw fastener

Before

Commercially available screw fastener



Developed by KAGA

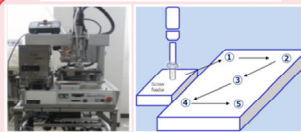
[Basic specs]

Manufacturer: IAI  
3-axis robot  
Reference model

Screw fastening time  
22.9 sec for screws at 13 points

After

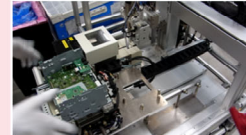
[Speed improved] Pressure feeding screw fastener



– Screw fastening time improvement effect –

22.9 sec → 14.5 sec (8.4 sec shorter)  
Work time shortened by 36.6%

[Versatility improved] Horizontal screw mechanism installed



Developed rotation mechanism → Versatility improved

As a result of providing horizontal screw support  
– Manual screw fastening process –  
4 screws × 500 units/day  
– Automated –  
2,000 screws × 3.6 sec = 120 min/day

Developing an original mechanism improved productivity by shortening the process time and provided a measure against tenosynovitis due to tightening by hand

This page introduces the screw fasteners manufactured by KAGA. While many factories normally use electric screwdrivers as screw fasteners, KAGA aims to automate screw fastening. For screw fastening, KAGA has uniquely designed and developed both a pressure-feeding screw fastener and a horizontal screw fastener. This initiative provides better productivity than normal screw fastening.

[Video]

[Assembly – Developed in-house by KAGA

(automatic pressure feeding screw fastener + automatic horizontal screw fastener)] (0 minutes 50 seconds)



 KAGA ELECTRONICS

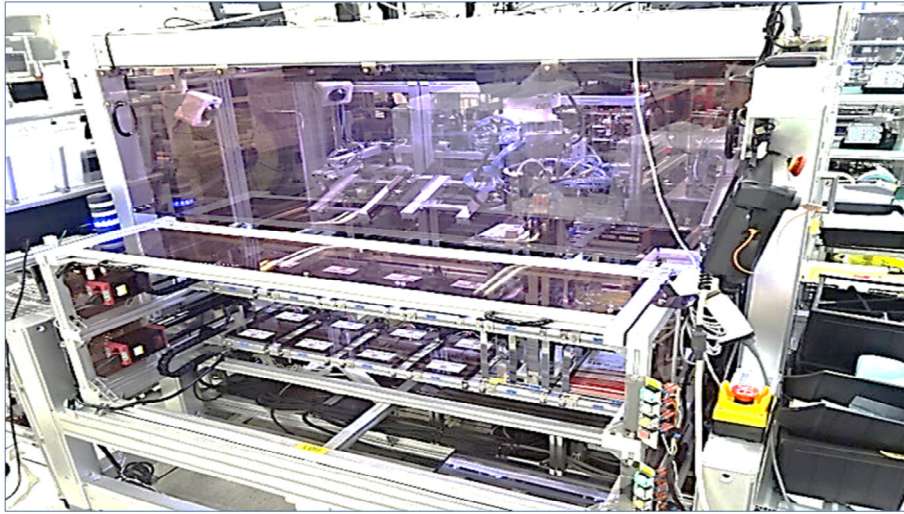
37

–Video playback– (0 minute 50 seconds)

This process fastens a board to the housing with screws. Screws are taken out faster than with a robot. To achieve this purpose, we use a tube and developed our own unique technology to automatically feed water through the tube. Next, the screws are fastened from the side. Whereas normally a worker would turn over or otherwise change the orientation of the product to fasten screws, we aim to automate the process by fastening the screws from the side, rather than above, without changing the orientation. This is another example of significantly contributing to productivity and quality improvements.

### Our own developed Automatic Picking Machine

[Features of our equipment] Developed and manufactured by KAGA:  
Automatic picking machine for instruction manual and other accessories



**Effect: Achieves automation of preparation of accessories (instruction manual, warranty, etc.) and thus prevents mistakes by workers**

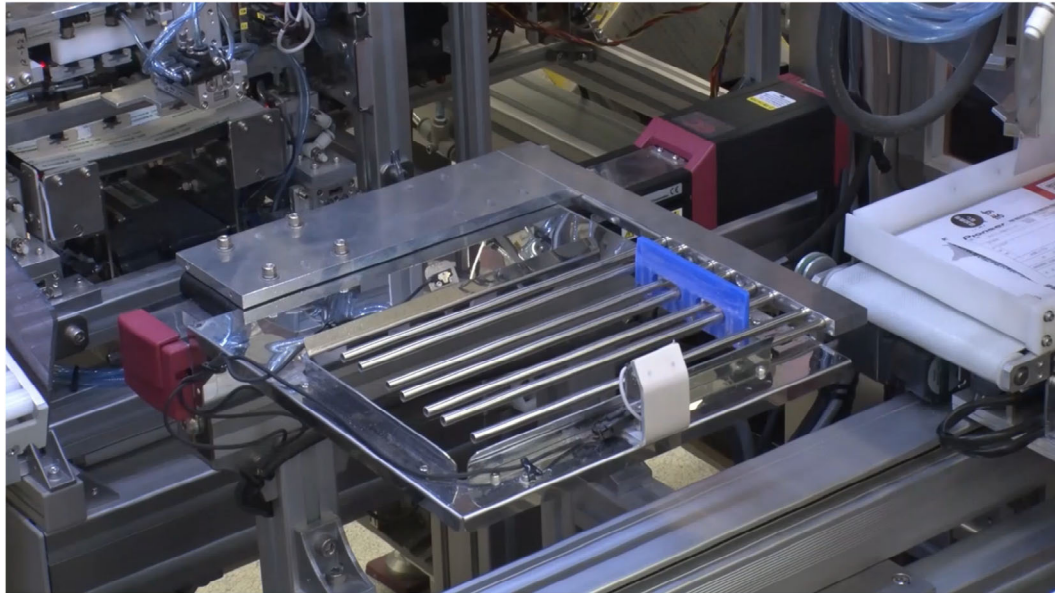


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When a finished product such as a car navigation system is assembled and shipped as a product, a number of accessories such as an instruction manual, warranty, and other accompanying documents are shipped with it. For the process to pick them up to create one set, we have also independently developed a picking machine to prevent missing accessories, mistakes, and other human errors.

[Video]

[Assembly – Developed in-house by KAGA  
(automatic picking machine for instruction manual and other accessories)] (0 minutes 36 seconds)



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–Video playback– (0 minute 36 seconds)

The next set is about to begin. A manual drops down from the back left automatically, another manual drops down from the center, a disclaimer is placed on top of them, and finally an accessory is placed at the very top. This robot that is employed on the line was developed in-house to create individual sets without any missing accessories.



## 5. Strengths of KAGA EMS TOWADA: High-Quality and High-Productivity Initiatives

Mechanisms “not to accept, use, make, or allow flow of defective parts” + “not to stop supply”

### Mechanism not to accept or use defective parts

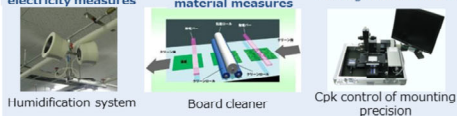
Developing and deploying part control system resulted in zero erroneous part use

Parts registered when entering warehouse Solder traceability system



### Mechanism not to accept or use defective parts

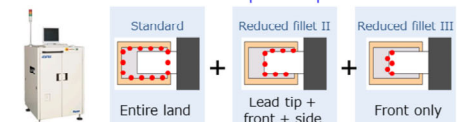
Thorough static electricity measures Thorough foreign material measures Thorough maintenance



Measures using static electricity removal sheet, shoe cleaner, suction sheet, and clean room

### Mechanism not to allow flow of defective parts

Developing and deploying program for appearance inspection machine enabled automatic inspection up to smallest fillet

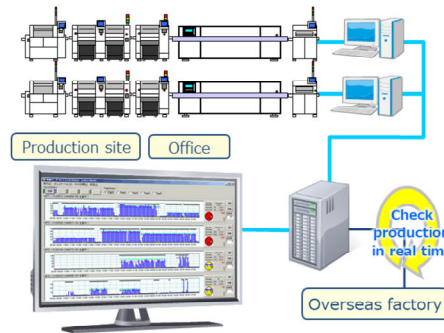


### Monitoring system developed by KAGA

KAGA always monitors, analyzes, and provides feedback on production and quality information acquired from the quality real-time monitoring system developed by KAGA, and takes the optimal measures.

KAGA has built a mechanism in this way to ensure defects are not made and production does not stop.

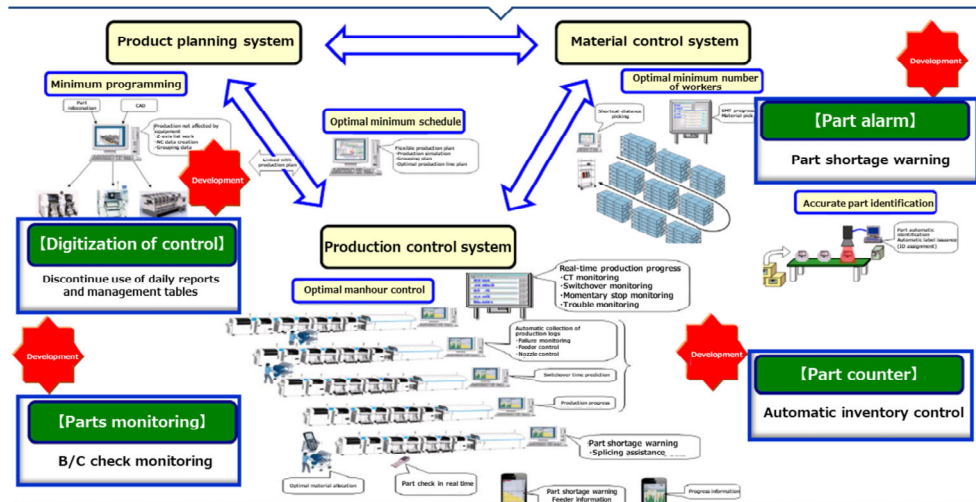
Operation efficiency improvement and manpower saving by real-time visualization and centralized control Grasping momentary stops (time and details) and taking measures



Finally, I would like to introduce our features, KAGA Electronics' EMS business, and the high-quality and high-reliability initiatives of KAGA EMS TOWADA, which is our mother factory. We do not accept, use, make, or allow the flow of defective parts, nor do we stop the supply to customers, and various mechanisms have been implemented to achieve this goal. A traceability machine has been employed in all appropriate places to implement proper traceability from part comparison to completion. Please look at the left middle section. Measures such as static electricity measures and foreign material measures are also implemented at each appropriate place. Next, please look at the right side. To improve the production system, a network-connected monitoring system is deployed to always monitor in real time from the production progress to production planning at the production site, and then control at the office.

## KAGA EMS TOWADA Smart System

System developed by KAGA linked with planning, material, and production control



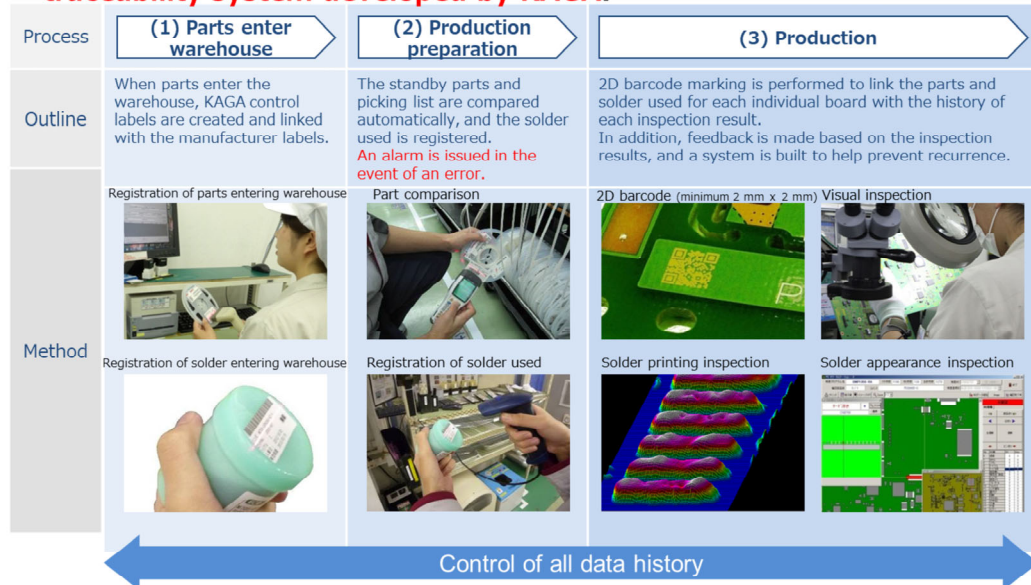
Effect of deploying smart system ➔ **workforce reduction of -12.5%** compared with before deployment

This introduces the smart system. This system connects all of the traceability, part replenishment, and automatic inventory control systems, and performs all line site and office control online.



## KAGA EMS TOWADA Smart System

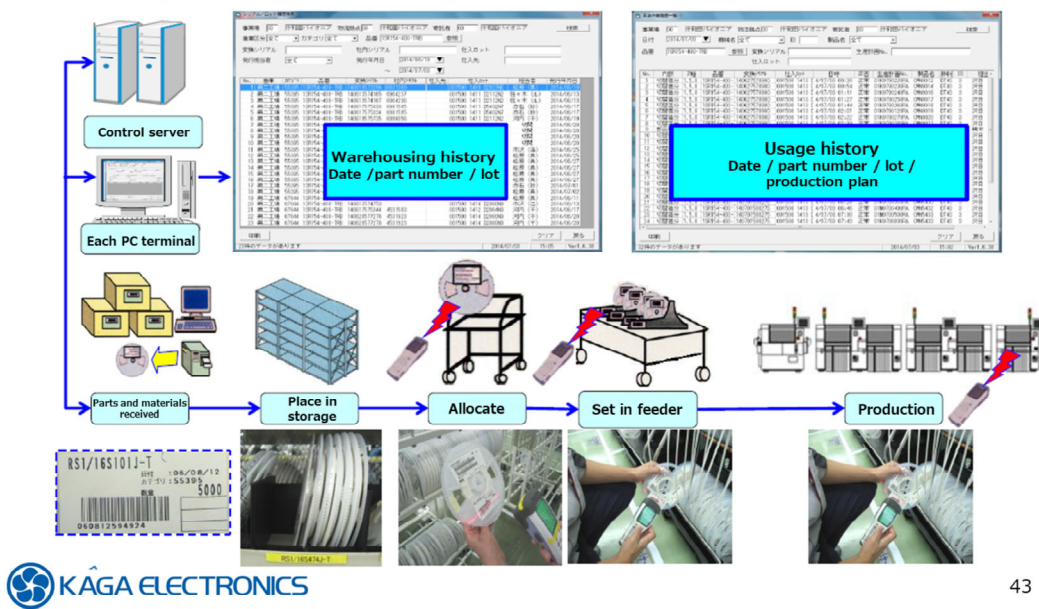
- **Thorough history control and prevention is implemented using traceability system developed by KAGA.**



This introduces part control and the implementation of traceability on an individual part basis. We have deployed a barcode control system.

## KAGA EMS TOWADA Smart System

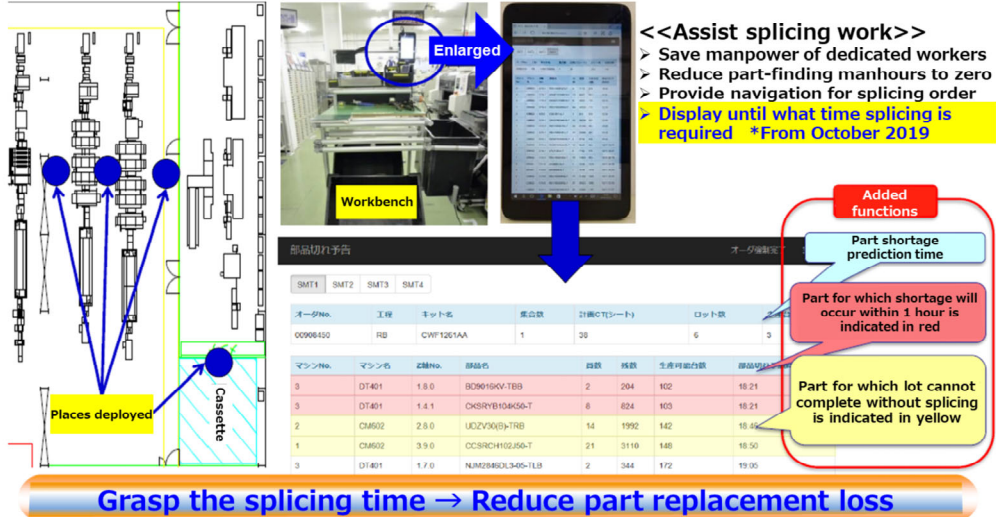
- Method: **Issue control labels** when parts and materials are received and implement B/C check for each work process.  
**Traceability information** can be acquired, as the results are collected in real time.



This introduces our independently developed and deployed system to affix an in-house control label to each part when parts enter the warehouse to properly implement the traceability of parts in all of our processes.

## KAGA EMS TOWADA Smart System

- Part alarm (part shortage warning) developed by KAGA improves productivity by preventing delays due to waiting for parts to be prepared
- Objective: **Avoid machine stops due to part shortages** by developing a part alarm function to display the order that part shortages will occur on a tablet



This shows our part alarm and part shortage warning system that we independently developed to enable one production line to be operated by one operator. With other companies' lines, if a part shortage occurs for an automated machine, a red lamp rotates and the operator pauses the line to replenish the part. On our lines, such a pause does not occur because we have independently developed a program to display a warning on the operator's tablet notifying them which line a parts shortage will occur on and after how many minutes. The operator takes the necessary measure before the line stops.

## Examples of Awards received for Equipment

- The Commendation for Science and Technology and Prize for Creativity by the Minister of Education, Culture, Sports, Science and Technology

Board laser marker



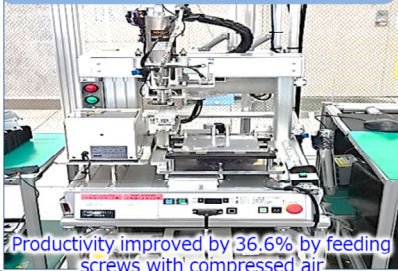
Price reduced by 1/2 or more compared with existing products of equipment manufacturers

Board joint conveyor equipment



Productivity improved by 6.6% by joining boards to mount components

Pressure feeding screw fastener



Productivity improved by 36.6% by feeding screws with compressed air

Automatic picking machine for instruction manual and other accessories



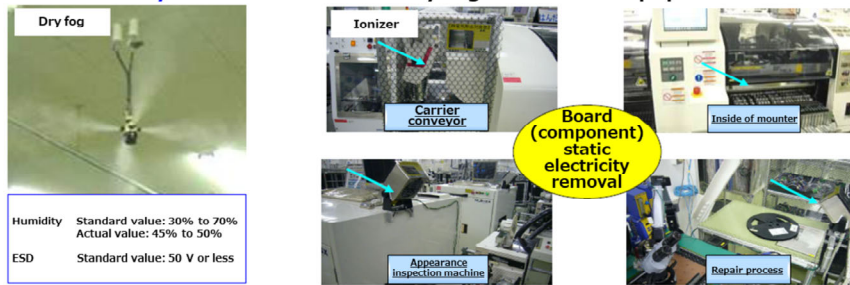
Automation of preparation of accessories (manual, warranty, etc.) achieved



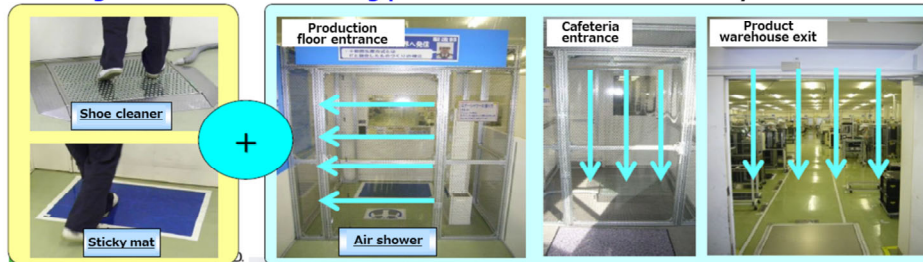
We have received awards for equipment that we independently developed to achieve productivity and quality improvements. The four representative examples that I introduced previously received the Commendation for Science and Technology and Prize for Creativity by the Minister of Education, Culture, Sports, Science and Technology.

## Measures for Static Electricity and Foreign Material

### <<Static electricity and dust control>> Dry fog and ionizer equipment

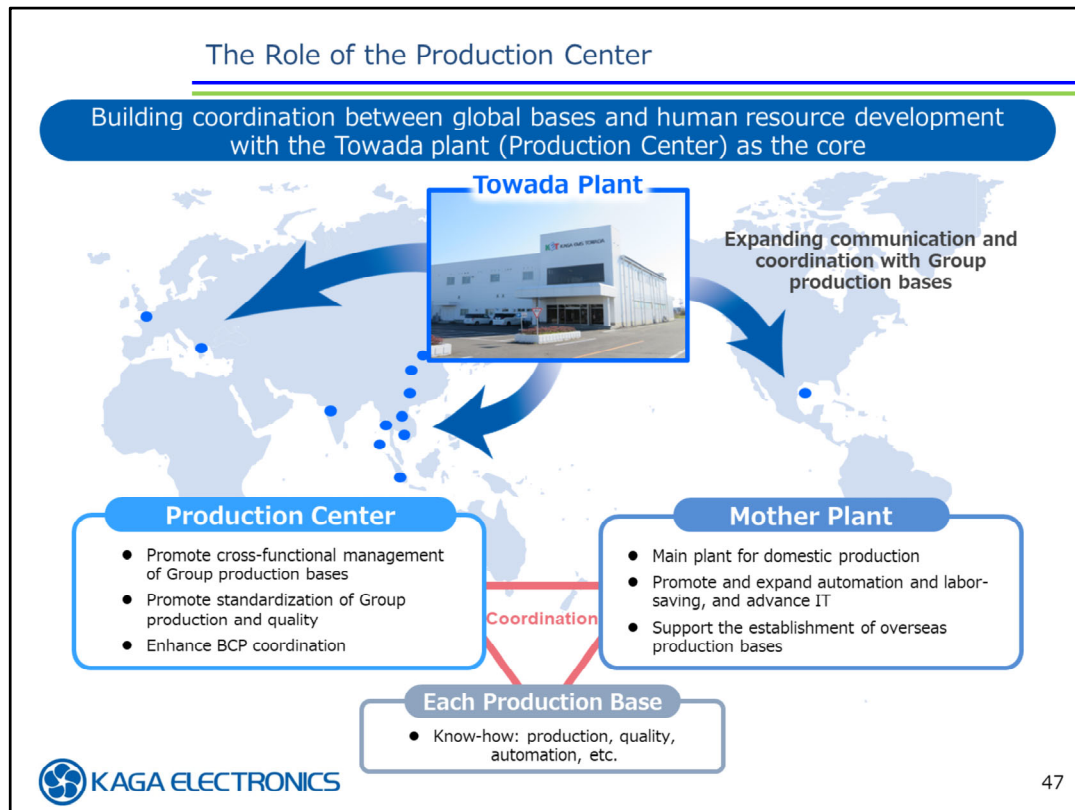


### <<Prevent foreign material from entering production floor>> Install sticky mat and air shower



In addition, we implement static electricity and foreign material removal at each appropriate place in the factory, and implement control properly using measures such as an air shower.





Finally, the TOWADA factory implements productivity improvement, quality improvement, and our own independent development initiatives, and these initiatives and the resulting know-how will be gradually rolled out at other factories of the KAGA Group. The quality and productivity improvements arising from the rollout of such know-how will be further standardized worldwide in order to positively promote the role of our mother factory to ensure customers continue using our products and services with peace of mind.

Thank you for your time.



## Other IR Information

- IR Site

<https://www.taxan.co.jp/en/>



- Integrated Report 2021

[https://www.taxan.co.jp/en/ir/library/library\\_05.html](https://www.taxan.co.jp/en/ir/library/library_05.html)



- Registering for “IR MAIL Distribution Service”

<https://www.taxan.co.jp/en/irmail/index.html>



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# **“Everything we do is for our customers**



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