

Factory Automation Systems Business Strategy Briefing

~ Overview of FA Systems Business and Growth Strategy ~

Yoshikazu Miyata
Executive Officer and Group President
Factory Automation Systems

March 27, 2018
Mitsubishi Electric Corporation

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1. Business Overview

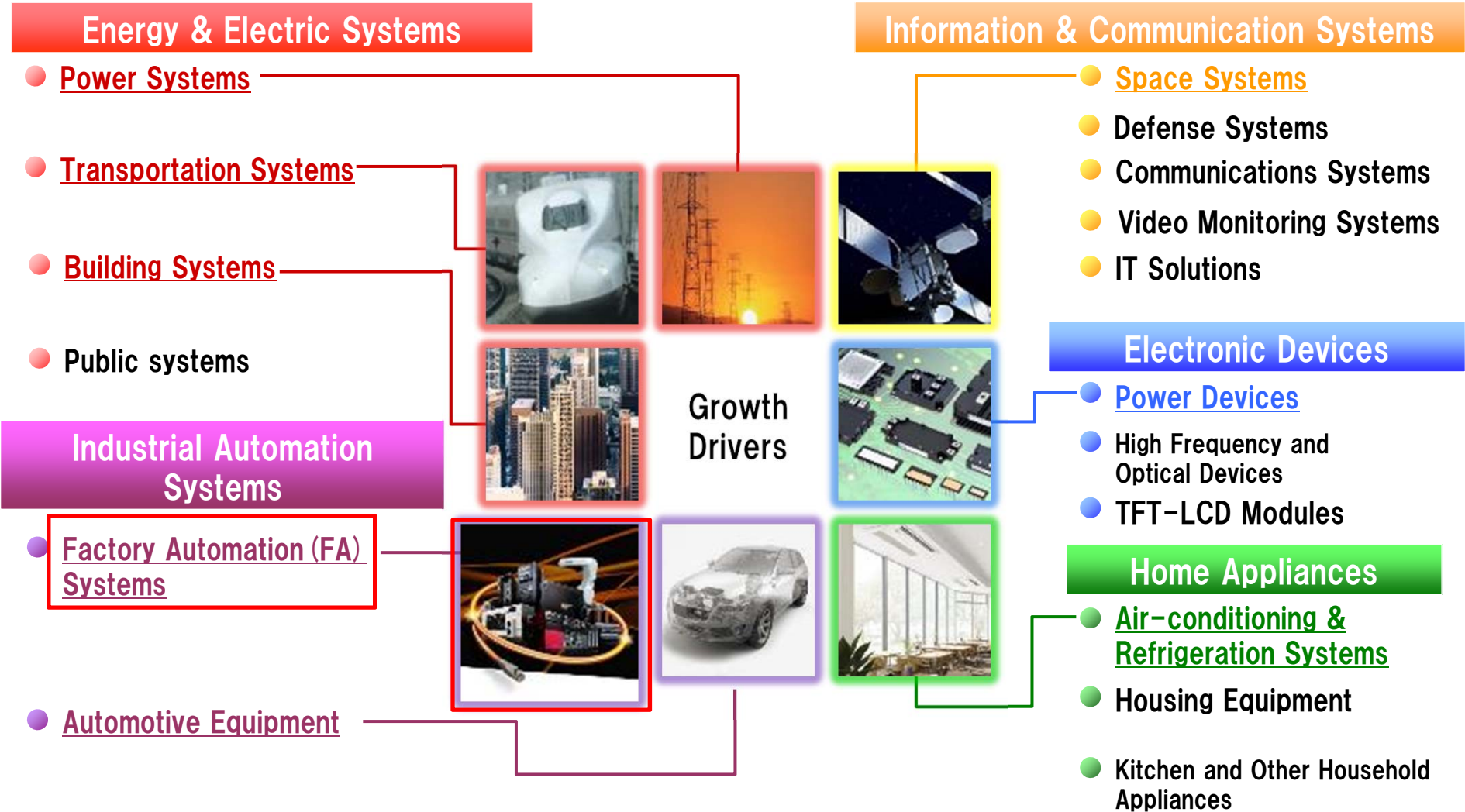
2. Growth Strategy

- e-F@ctory
 - AI Utilization
 - Product Strategy
 - Regional Strategy
-

3. Mid-term Business Target

1. Business Overview: Positioning within the Company

One of the Growth-driving Businesses



1. Business Overview: Product Portfolio

Comprehensive FA Manufacturer Offering a Wide Range of Products, Services and Solutions

Controllers

Programmable Controllers

HMI^s*1



Drive Control Devices

AC Servos

Inverters

CNC^s*2



Mechatronics Products

Electrical-discharge Machines

Laser-processing Machines

Robots



Rotating Devices

Three-phase Motors, Geared Motors,
Industrial Fans



Power Distribution Controllers

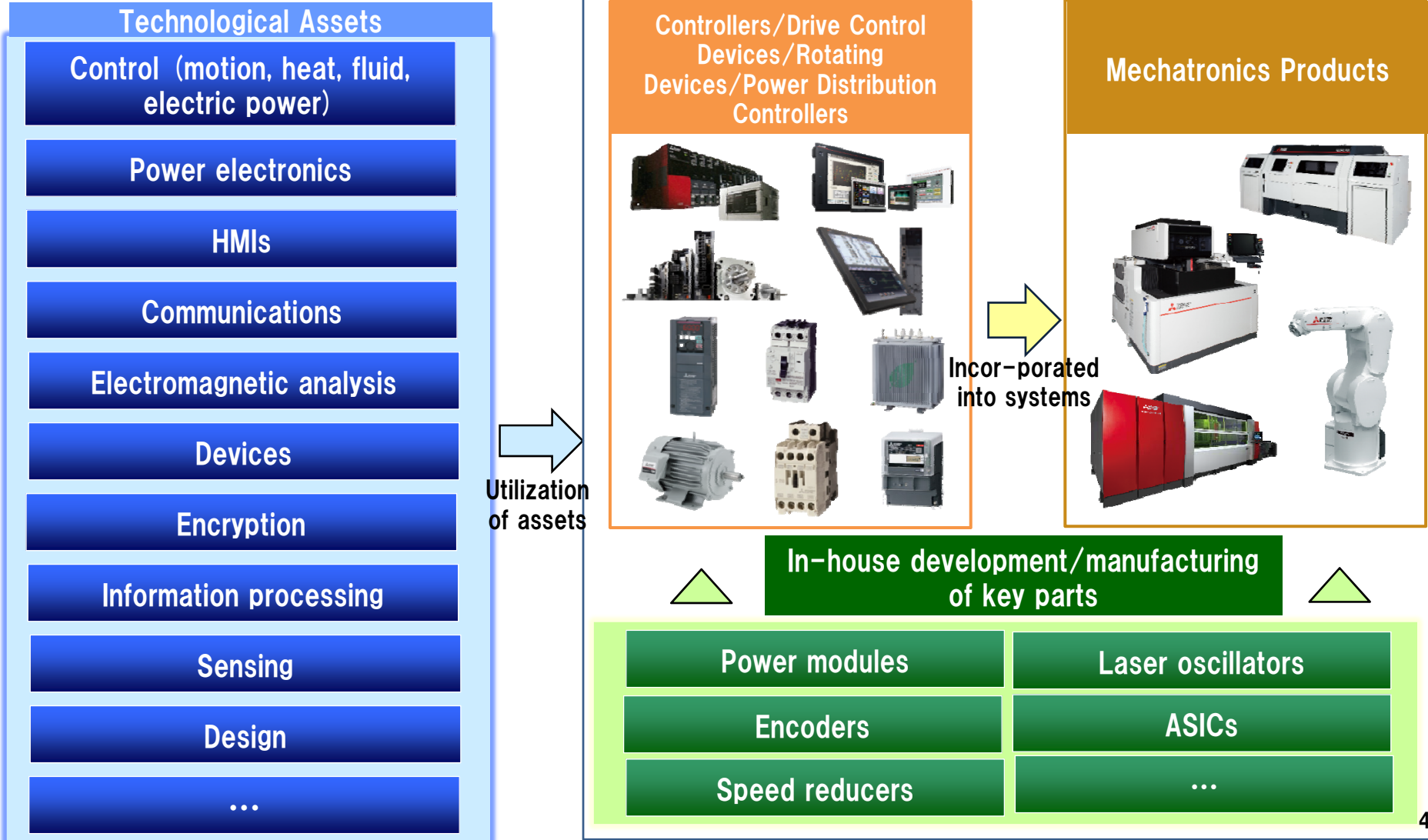
Circuit Breakers, Energy-saving Devices,
Electromagnetic Switchgear, Transformers



*1 HMIs: Human-Machine Interfaces *2 CNCs: Computerized Numerical Controllers

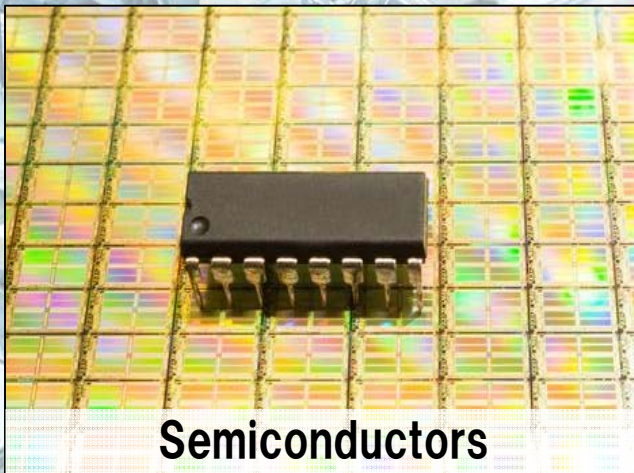
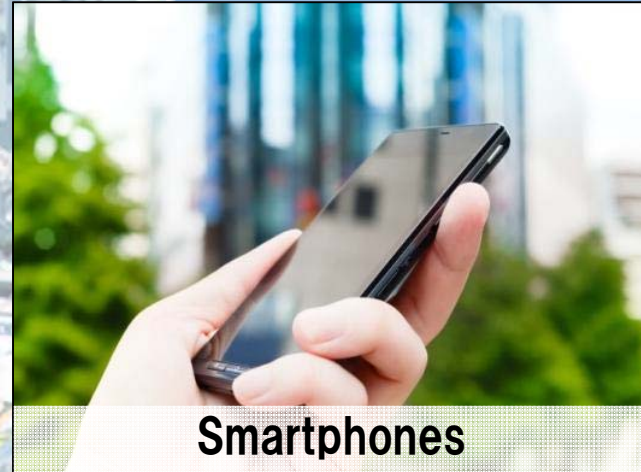
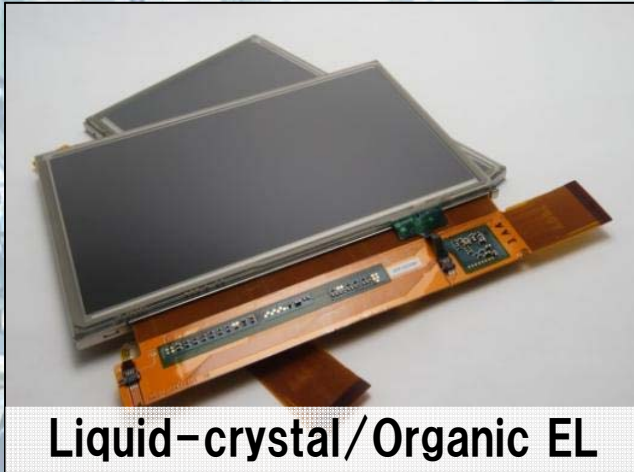
1. Business Overview: Advantages of Products

Creating Value by Utilizing Technological Assets



1. Business Overview: Where Our Products Are Used (1)

Contributing to Improving Customer Product Competitiveness, and Facilitating Automation and Adoption of IoT*¹ at Production Sites



*1 Internet of Things

1. Business Overview: Where Our Products Are Used (2)

Widely Used Outside of Production Sites as Well



Logistics/Transportation



Power Distribution Facilities



Building Air-conditioning



Waste Processing Plants



Tunnel Excavation/
Ventilation



Ports & Harbors/Shipping

<Production Volume of Major Products>



AC Servos

370,000 units/month



Programmable Controllers
(CPUs)

150,000 units/month



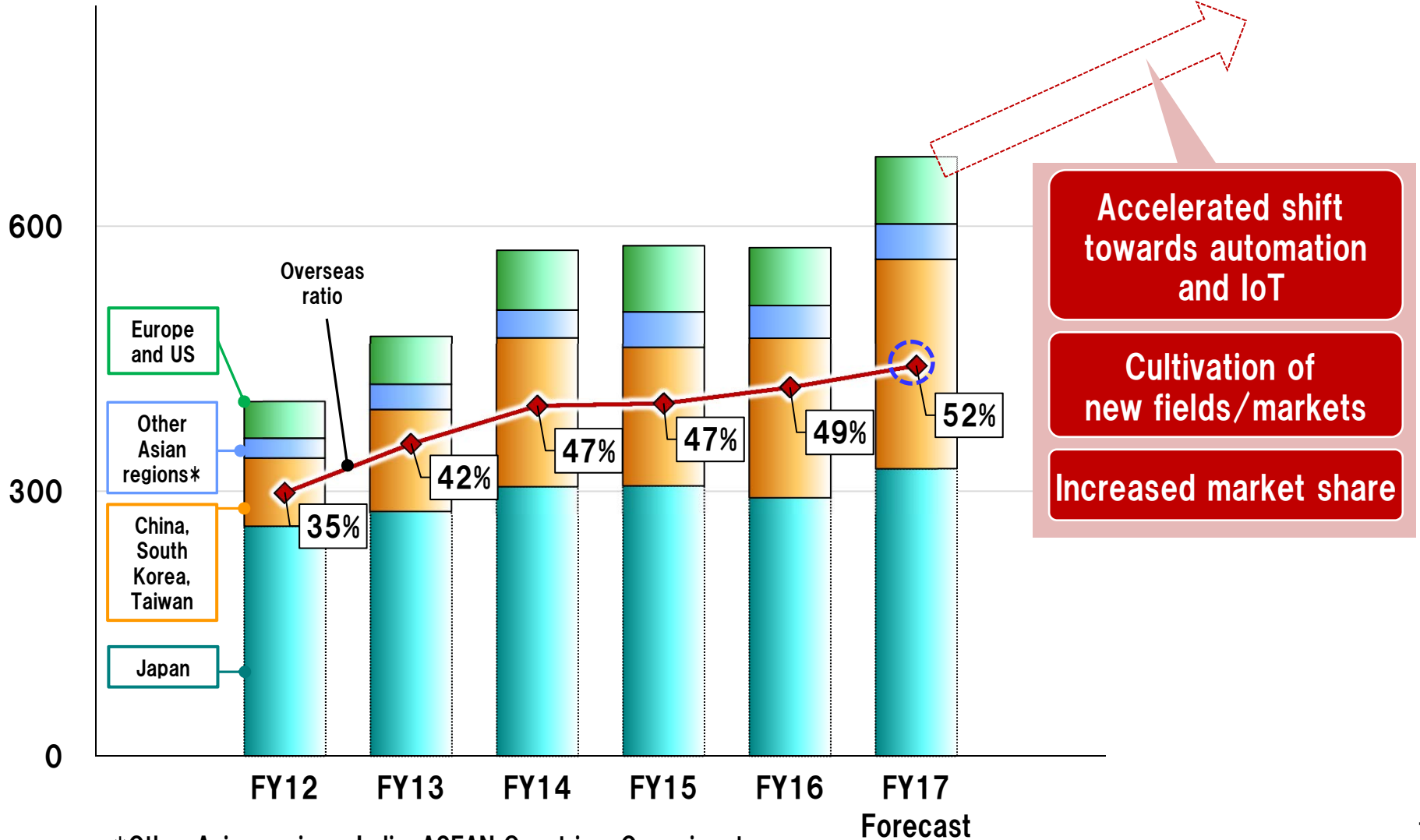
Inverters

200,000 units/month

1. Business Overview: Trend in Consolidated Sales

New Record Sales Expected Thanks to Strong Capex Demand

(JPY Billion)

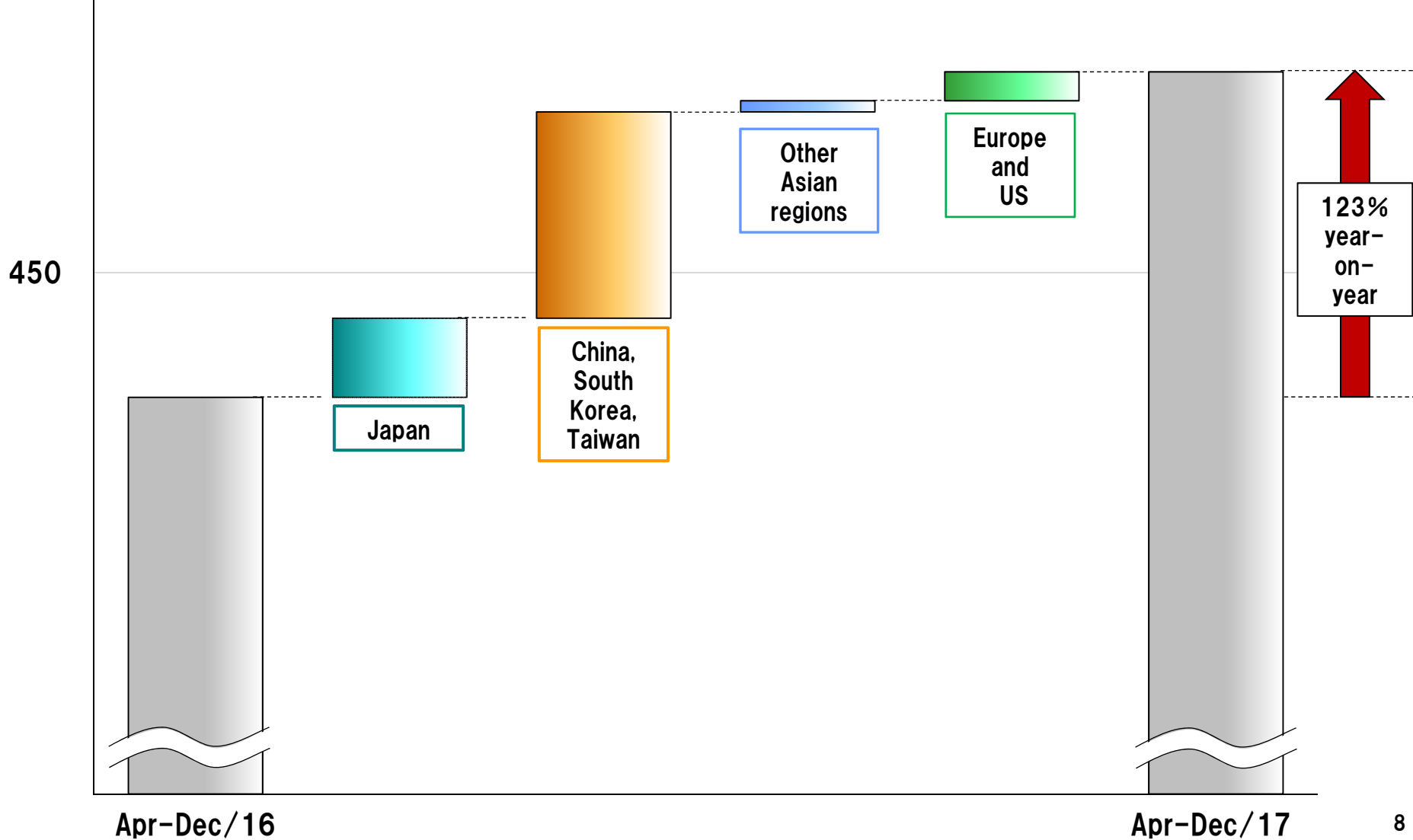


*Other Asian regions: India, ASEAN Countries, Oceania, etc.

1. Business Overview: FY17/Q3 Consolidated Sales

Sales Expanded in All Regions, Driven by China, South Korea and Taiwan

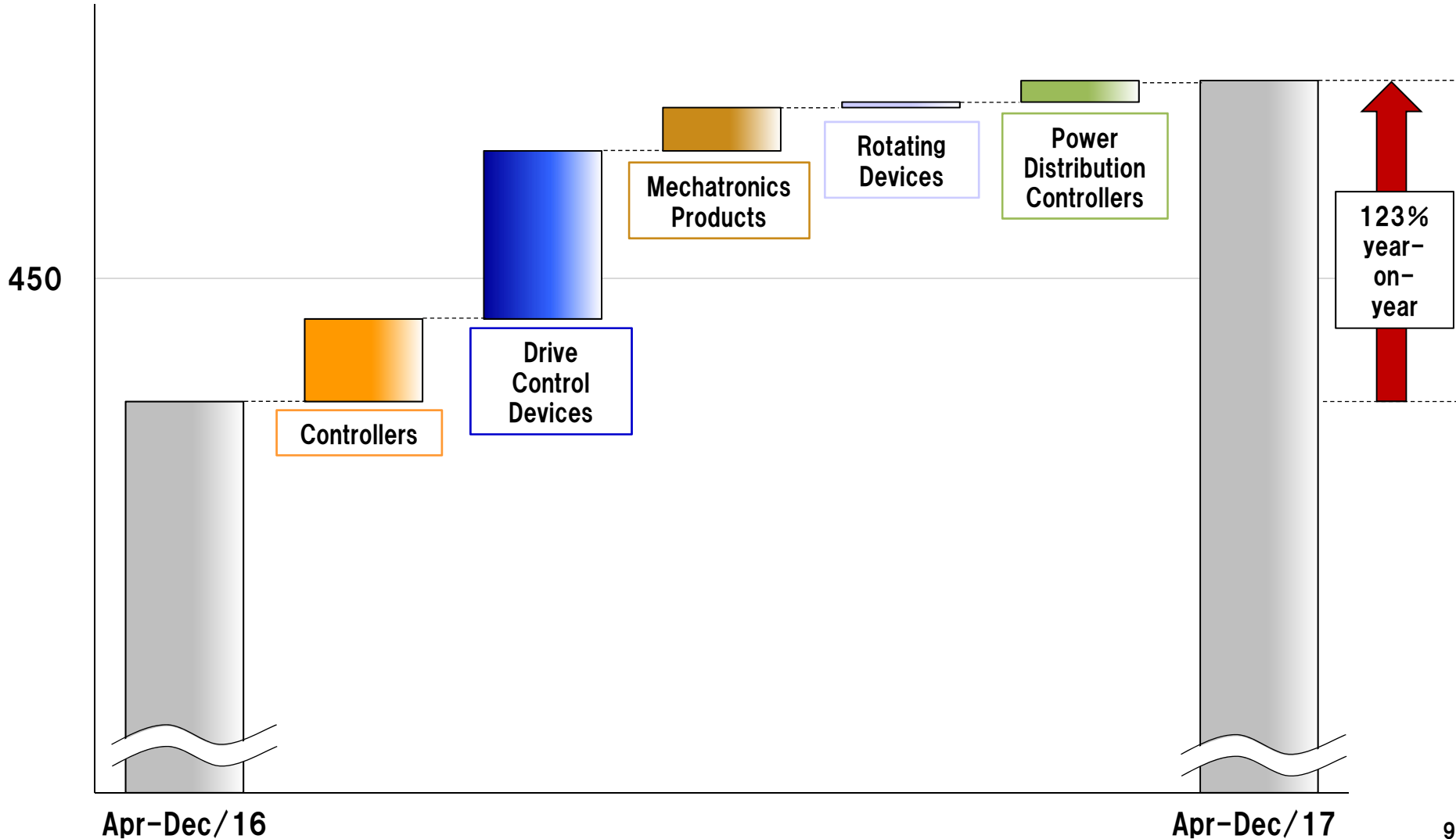
(JPY Billion)



1. Business Overview: FY17/Q3 Consolidated Sales

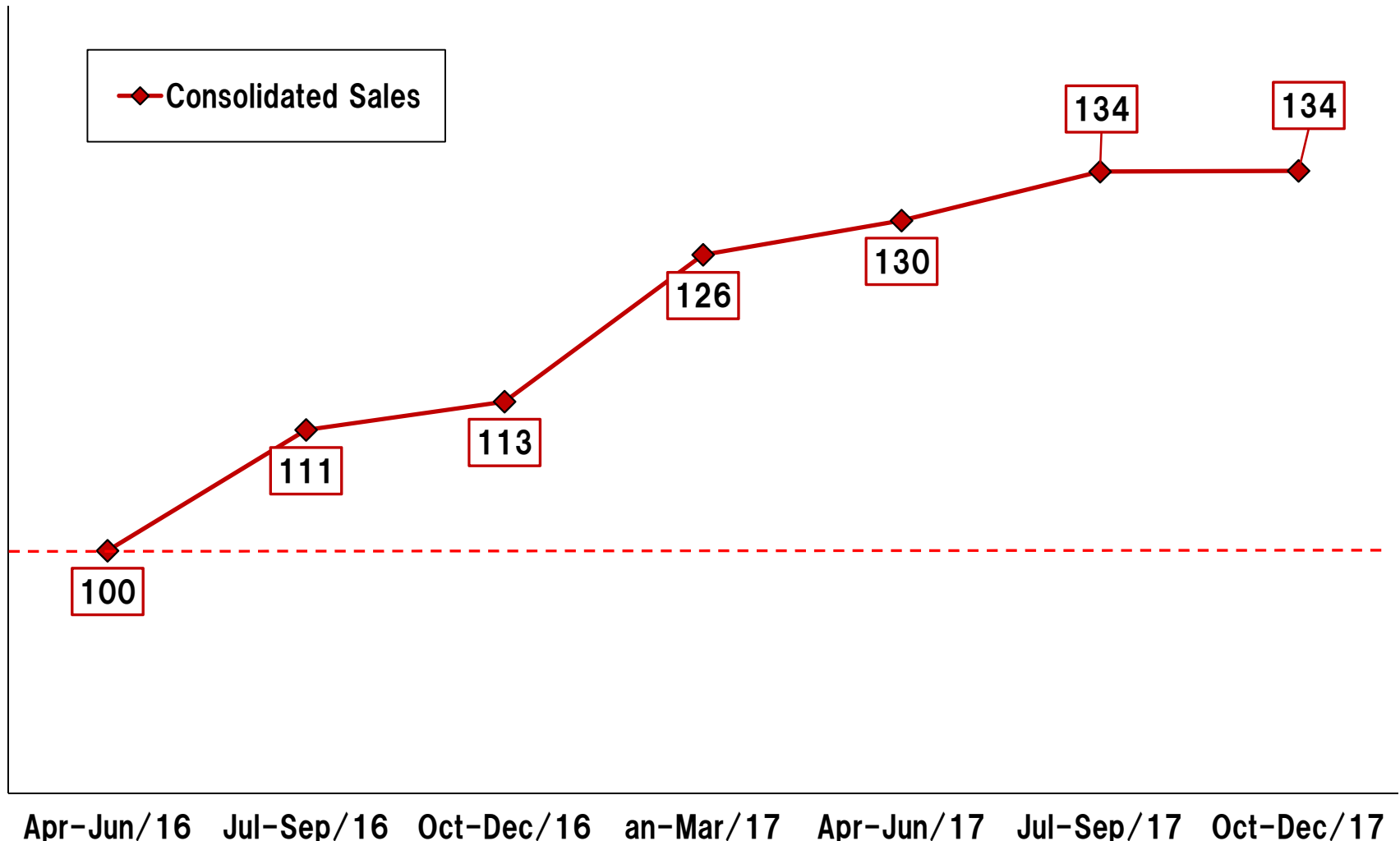
Sales Expanded in All Product Categories, Driven by Drive Control Devices

(JPY Billion)



1. Business Overview: Trend in Quarterly Consolidated Sales

Maintained at High Levels, Mainly for Smartphones, LCDs/OLEDs, Semiconductors and Automotive Components



* Index (Apr-Jun/16 = 100)

1. Business Overview: Production Network

Production in Overseas Consumption Areas Expanded as Well as in Japan



Mitsubishi Electric Low-Voltage Equipment (Xiamen) Co., Ltd.



Mitsubishi Electric Automation Manufacturing (Changshu) Co., Ltd.

Second factory became operational (Mar 17)
Second factory to be expanded (Oct 18)



Mitsubishi Electric Dalian Industrial Products Co., Ltd.



Mitsubishi Electric India Pvt. Ltd.

India (Pune)

China (Changshu)

China (Dalian)

China (Xiamen)

Thailand (Bangkok)

Vietnam (Ho Chi Ming)

Mother Factories



Nagoya Works



Mitsubishi Electric Automation (Thailand) Co., Ltd.



Oriental Electric Industry Co., Vietnam Ltd.



Fukuyama Works

1. Business Overview: R&D Network

Maximizing Comprehensive Strengths and Overseas Hubs

Corporate Research and Development Group's Research Centers



Information Technology R&D Center (Kamakura City)



Industrial Design Center (Kamakura City)



Advanced Technology R&D Center (Amagasaki City)



Mitsubishi Electric Research Laboratories (US)



Mitsubishi Electric R&D Center Europe (France/UK)

Germany (Dusseldorf)



European FA Development Center

India (Pune)



India FA Development Center

China (Changshu)



China FA Development Centers

China (Dalian)



Fukuyama Works



FA Development Center No.2 completed (July 2017)

Nagoya Works

San Jose

Chicago

Boston



North American FA Development Centers

Functions of Overseas Hubs

- US & Europe: R&D of cutting-edge technologies
- China: Improvement in competitiveness of locally made products
- India: Locally-tailored development activities

1. Business Overview: Sales/Service Network

Extensive Sales/Service Network Covering 94 Countries Worldwide

Business Sites Added in FY17

- Mexico Queretaro FA Center (17/5)
- Mexico Monterrey FA Center (17/5)

Overseas Service Functions

- Product training
- Response to technical inquiries
- Supply of parts for repairs and service



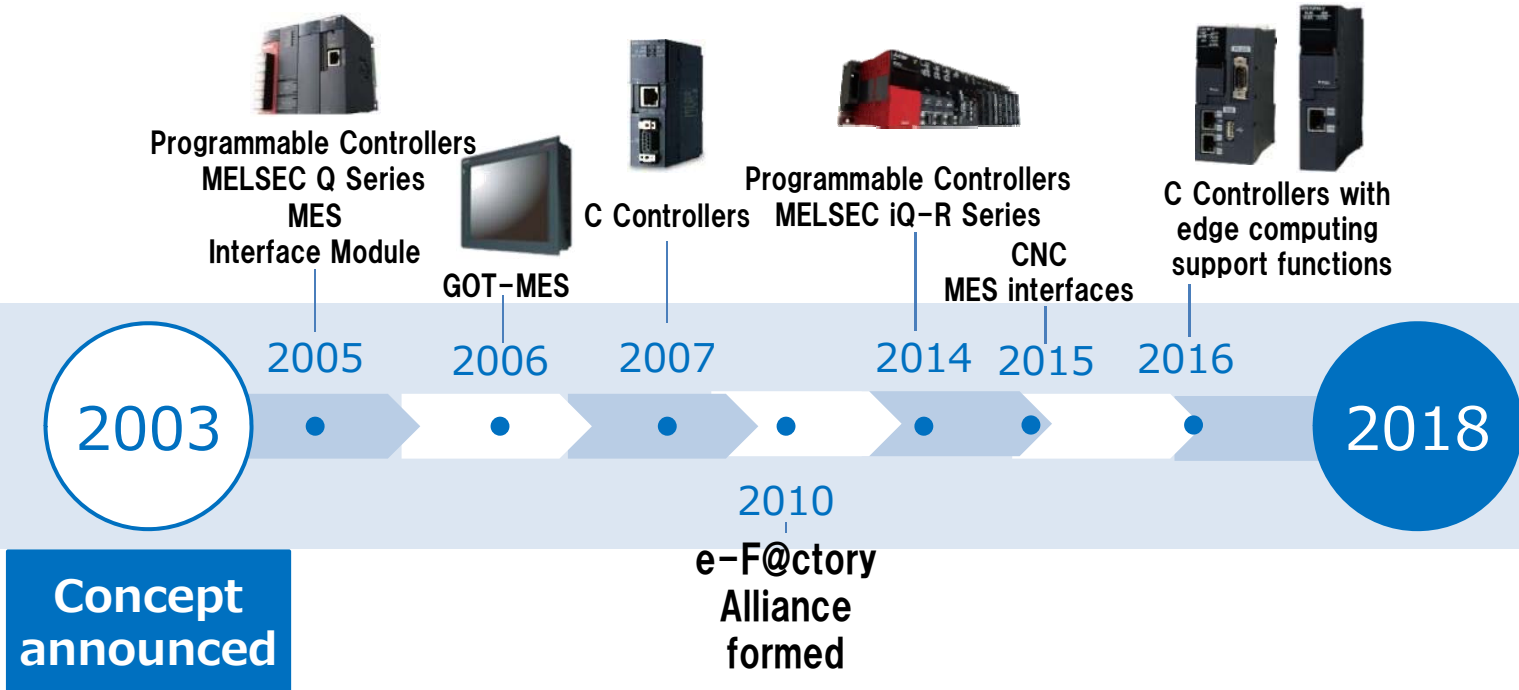
2. Growth Strategy: e-F@ctory

Concept Advocated Since 2003

FA-IT Integrated Solution

e-F@ctory

Proposing solutions for manufacturing that stays one step ahead by reducing total cost of development, production and maintenance through the utilization of FA and IT technologies



2. Growth Strategy: e-F@ctory

**Expertise Accumulated Inside/Outside of the Company,
and Alliances with a Wide Variety of Partners**

Track Record of Introducing to MELCO Production Lines and Customers' Model Lines

Over **7,700** cases



Examples of introducing various applications

Changshu Innovation Center for Green
& Intelligent Manufacturing (China)

2013
Nagoya Works
substrate
mounting line



2017
Mitsubishi Electric
Automation
Manufacturing
(Changshu) Co., Ltd.
servo motor assembly line



Mitsubishi Electric Corporation production lines

2018
Power Distribution
Systems Center
vacuum
interrupters (VI)
and vacuum circuit
breakers (VCB) factory



Wide Variety of Partners



Approx. **610** participating
companies*1

- Software partners (approx. **150**)
- SI partners (approx. **310**)
- Equipment partners (approx. **150**)



Approx. **3,300** participating companies*1

Approx. **1,800** connectable products*1

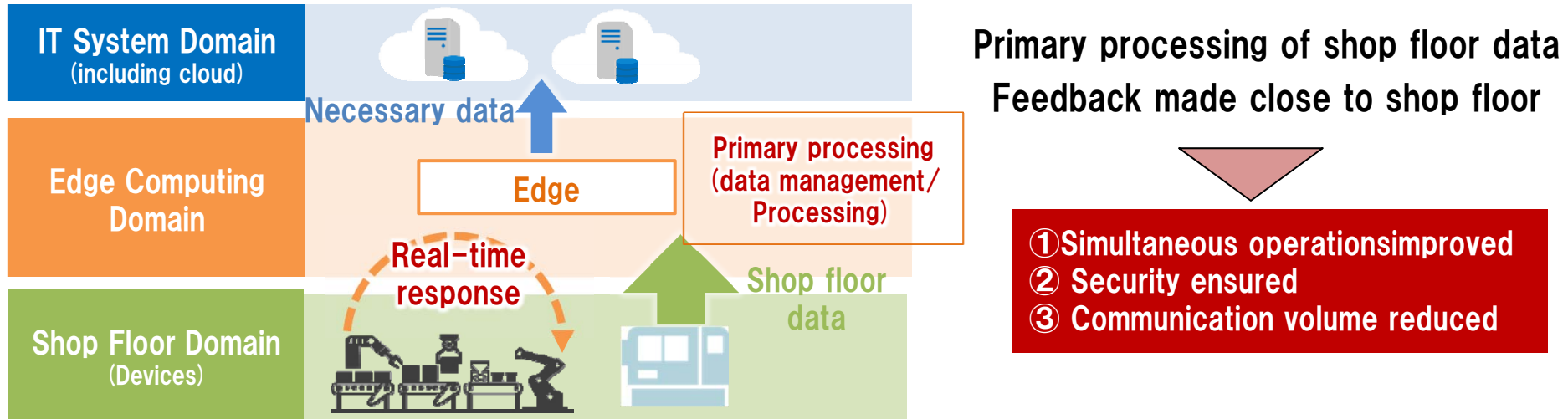
CC-Link Partner
Association*2

*1 No. of partner companies and connectable
products as of March 2018.

*2 Organization promoting industrial network, CC-Link 15

2. Growth Strategy: e-F@ctory

Edge Computing – The Key to Using IoT



Reference: Ministry of Economy, Trade and Industry/Commerce and Information Policy Bureau/Information Economy Subcommittee/Industrial Structure Council's "Working Group on Distribution Strategy (First Session)"

Open Software Platform for Edge Computing Domain



Edgecross is an open software platform for the edge computing domain, which originated in Japan. It was created by Edgecross Consortium members, who interact outside the boundaries of corporations and industries with the aim of achieving FA-IT collaboration.

- Operates on any industrial-use computer regardless of manufacturer
- All data on shop floor collected
- Real-time diagnosis and feedback
- Modeling shop floor
- Seamless connectivity between FA and IT systems
- Utilizing wide variety of applications in the edge computing domain



Source: Edgecross Consortium

2. Growth Strategy: e-F@ctory

Enhance Solution Proposal Capability through Utilization of Edgecross

IT Systems (including cloud)

- Strengthening partnerships through our Information Systems & Network Service Group and partner IT companies

Edge Computing

- Development of Edgecross-equipped industrial-use computers

MELIPC



- Development of application software

Real-time data analyzer

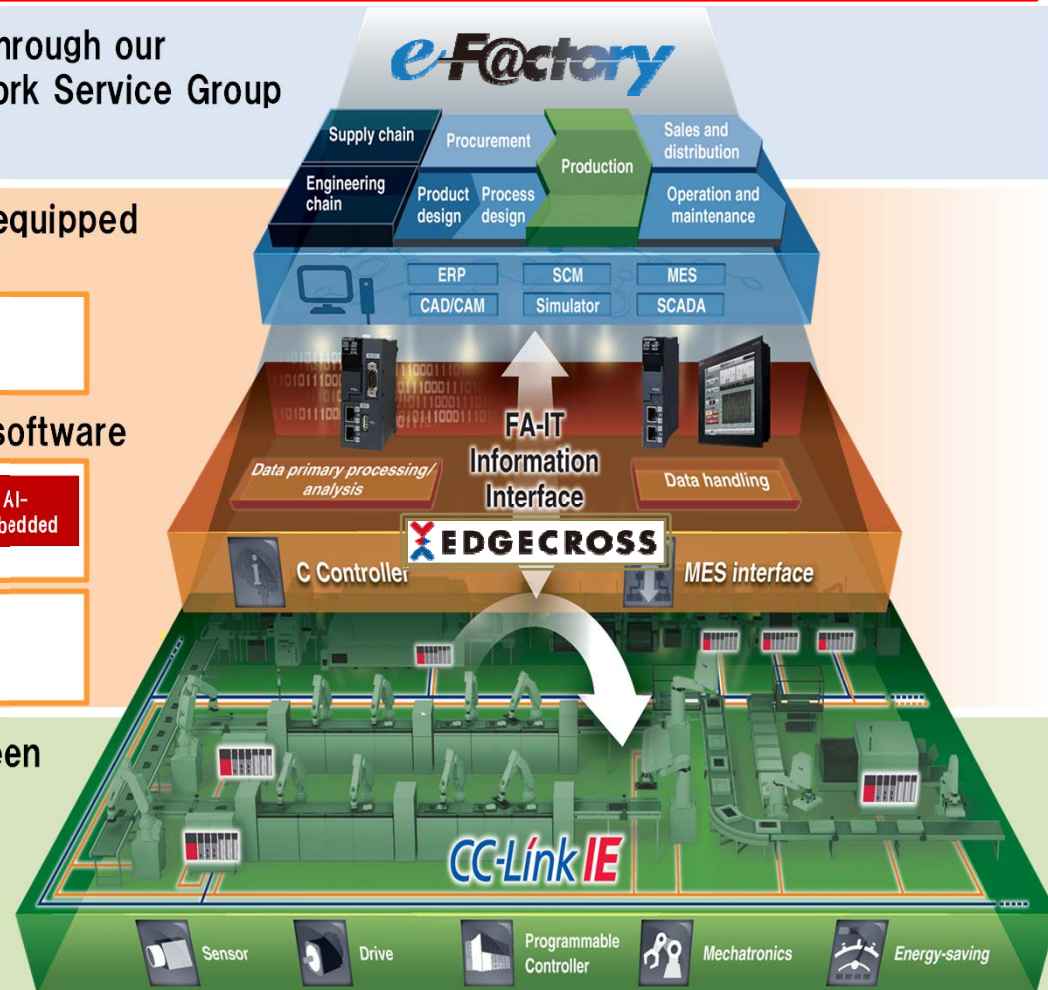


SCADA (MC Works64)



Shop Floor (devices)

- Enhancing connectivity between products
- Improving networks and the iQ Platform
- Improving compatibility among products, MELIPC, MELCO edge-computing applications
- Equipping products with AI



2. Growth Strategy: e-F@ctory

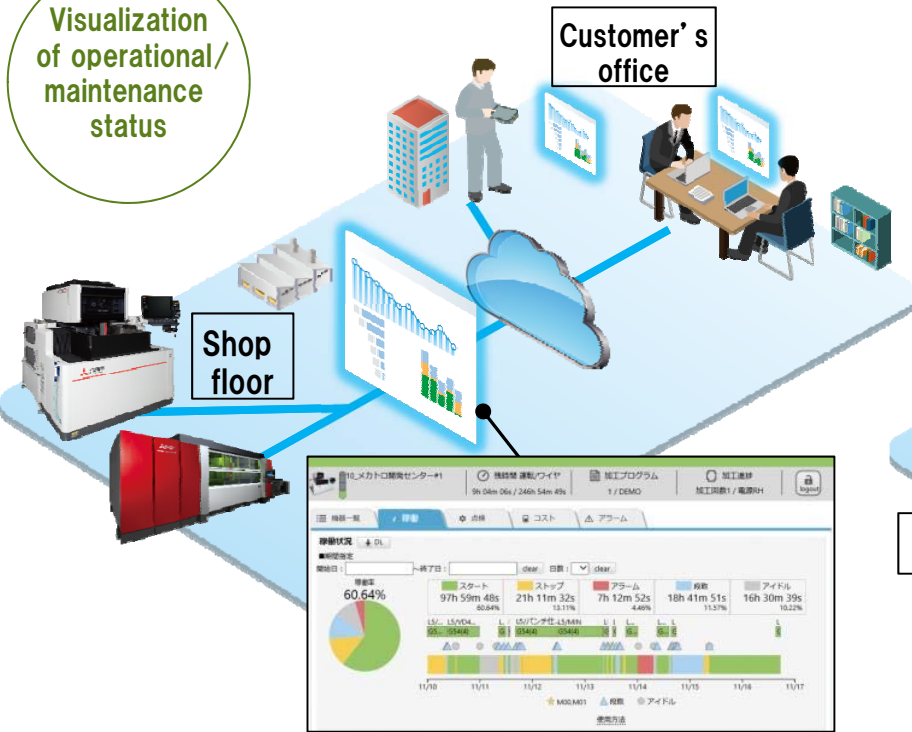
Mitsubishi Electric Service Solution That Takes Advantage of IoT



Production/Maintenance Support Service for Electrical-discharge/Laser Sheet Metal Processing Machines Offered through IoT Utilization

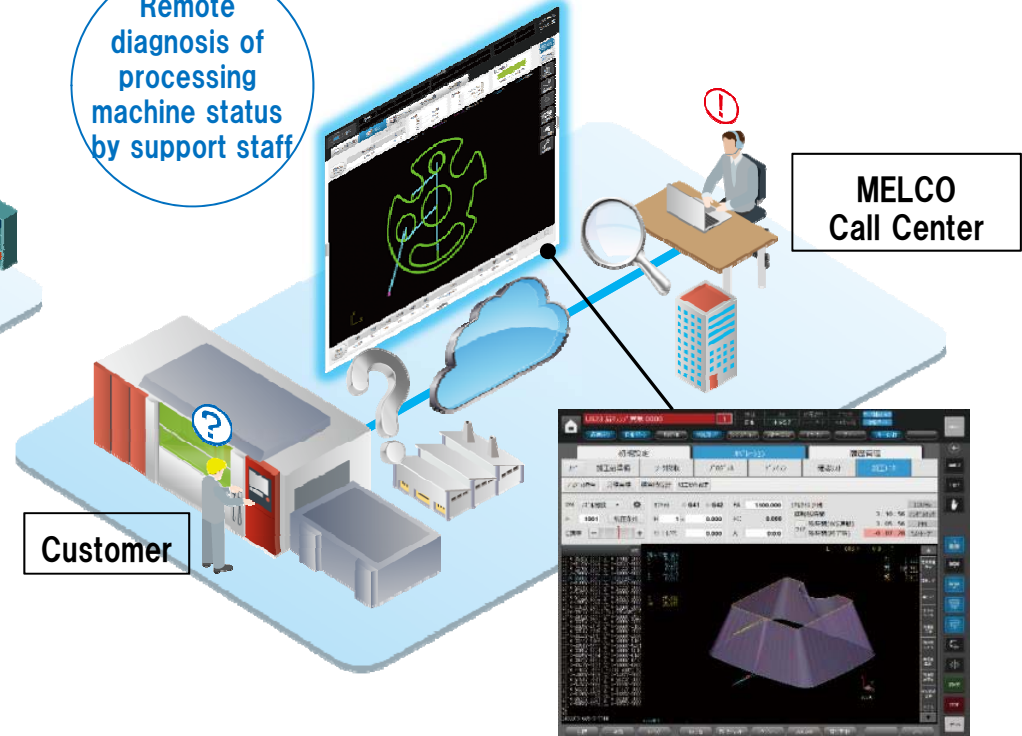
Dashboard Function

Visualization of operational/maintenance status



Remote Diagnostics Function

Remote diagnosis of processing machine status by support staff



Service launched in Japan (April 2016)
Total applicable machines: 600 units



Service to be introduced overseas beginning FY18

2. Growth Strategy: AI Utilization

Create “Smart Factories” Utilizing Mitsubishi Electric AI Technologies and Shop Floor Knowledge

Mitsubishi Electric AI Technologies



Deep Learning

More compact algorithms

Reinforced Learning

More efficient learning through utilization of device domain knowledge

Big Data Analysis

More efficient chronological data analysis through utilization of device domain knowledge

Shop Floor Knowledge

Manufacturing

Production technologies

Service life prediction

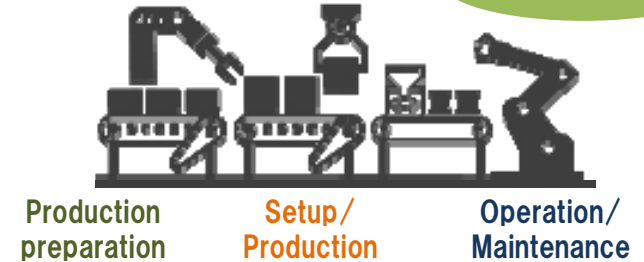
Control

Process -ing

Drive

Machinery mechanisms

...



Applied to 7 models in FY18

◆ Advantages of AI embedded Systems



Quick start-up

Reduces start-up time: Set-up time for facilities and production lines



Lean operations

Improves yields/utilization rates by analyzing test results and operational status



No disruption

Advises optimal maintenance timing by predicting possible equipment breakdown

2. Growth Strategy: Product Strategy

Enhance Product Lineups and Connectivity between Products

Product Development Policies

Controllers

- Enhance lineups of programmable controllers, MELIPC and HMIs
- Improve engineering environment in pursuit of user-friendliness

Drive Control Devices

- AC Servos: Develop next series and improve basic performance
- CNCs: Enhance functions by utilizing cutting-edge technologies and improving operability
- Inverters: Enhance the range of large-capacity products

Mechatronics Products

- Electrical-discharge machines: Enhance product appeal in the area of high-precision processing
- Laser-processing machines: Enhance product appeal in the fiber area
- Robots: Develop robots capable of working with humans in pursuit of user-friendliness

Rotating Devices

- Three-phase motors: Strengthen ability to meet overseas regulations for high-efficiency operation

Power Distribution Controllers

- Circuit breakers/Electromagnetic switchgear: Enhance product lineups for overseas markets
- Transformers: Enhance product appeal through improved efficiency

MELIPC links

Enhanced iQ Platform

Connectivity between products

Enhanced networks

Improved safety functions

Maisart-equipped

...

2. Growth Strategy: Regional Strategy (Japan)

Reinforce Business Networks for the Base-load Market

◆ East Japan FA Solution Center (tentatively named) to be opened (July 2018, Akihabara)

Exhibit products/solutions, Users' school, User application testing

◆ New division dedicated to solution business established (April 2017, approximately 150 staff members)

1. Solutions Business Division
2. Dedicated sales teams (7 locations throughout Japan)

◆ Strengthen partnerships with sales partners/customers

1. Equipment Distributors Association
(celebrating 50th anniversary in FY18)
 - ① Equipment distributors: approx. 200 companies
 - ② Equipment dealers: approx. 400 companies
2. 「RyoBankai」(celebrating 50th anniversary in FY19)
Switchboard/Control panel manufacturers:
approx. 500 companies
3. FATEC Club
User members: approx. 16,000
4. Mitsubishi Electric FA Product Information Site
Registered users: approx. 300,000



<Exterior/User school (illustrative purpose only)>



<Equipment Distributors Association nationwide meeting>

2. Growth Strategy: Regional Strategy (China)

Enhance Resources for Sales, Development, Production and Services in China as the Priority Overseas Market

◆ Establish our position in IoT market using Chinese government's guideline "Made in China 2025" as a spring board

1. Participate in government-sponsored seminars as a lecturer
2. Establish relationships with relevant government sectors



<e-F@ctory seminar>

◆ Expand e-F@ctory usage in government projects
ITEI* Intelligent Production Model Line constructed (November 2017)

*ITEI: Instrumentation Technology and Economy Institute



<ITEI Model Line>



<China International Industry Fair>

◆ Strengthen local network to understand trend towards automation and IoT

1. Substantial increase in number of staff for sales, production, design and service
2. Increase number of e-F@ctory staff at sales companies
3. Reinforce sales bases for focus segments (e.g., government's investment promotion regions)
4. Increase number of models manufactured in the consumption areas and expand locally procured materials

➔ **Approx. 2,600 (up 400 from FY17)**

➔ **Approx. 50 (2x from FY17)**

➔ **FY18: 4 locations (Hefei and others)**

➔ **FY18: Robots**

2. Growth Strategy: Regional Strategy (South Korea, Taiwan/ASEAN)

Korea/Taiwan – Maintain/Expand top-class share by winning projects in key segments

ASEAN – Strengthen business networks in anticipation of local company growth and additional investment by Japanese companies

◆ Expand e-F@ctory partnerships

1. South Korea/Taiwan
e-F@ctory Alliance formed (March 2018)



Partner Target No.
South Korea: 70 companies
Taiwan: 70 companies

2. Taiwan

- ① MOU concluded with Taiwan Ministry of Economic Affairs for promotion of IoT (June 2017)
- ② e-F@ctory demonstration model exhibited at IoT experimental exhibition held in Taichung City

◆ Key segments

Smartphones, LCDs/OLEDs, Semiconductors, Lithium-ion batteries, machine tools

◆ Strengthen business networks

Reinforce business networks utilizing comprehensive sales company, and expand and improve local sales network

◆ Key segments

Automobiles/Automotive components (including local Japanese affiliate companies), food processing and instrumentation



<e-F@ctory Alliance formed>



<MOU concluded with Taiwan Ministry of Economic Affairs>

South Korea/Taiwan

ASEAN

2. Growth Strategy: Regional Strategies (India, Europe and Americas)

India – Strengthen Business Networks in Anticipation of Economic Growth and Sophistication of Manufacturing
Europe and Americas – Improve Position by Gaining Market Share in Key Segments/Regions

◆ Strengthen business networks

1. Expand sales network to north and central regions (e.g., Rajasthan)
2. Examination of setting up of new production base (see p.25)

◆ Key segments

Automobiles, food processing, pharmaceuticals, machine tools, and instrumentation

◆ Contribute to advancements in manufacturing through “Made in India” movement

Active participation in government-sponsored events (e.g., attract foreign investment)

◆ IoT and AI technology R&D

1. European FA Development Center: participate in Industrie4.0-related working group
2. North American FA Development Centers: Utilize new San Jose Center



Collect Industrie4.0-related information and develop relevant technologies

Research technological trends in AI, AR, etc.

◆ Enhance development activities to meet local needs in Europe and US

Europe: Foods, automobiles and instrumentation; Americas: Automobiles, air-conditioning and sanitation

◆ Key regions

Europe: Southern Europe, central and eastern Europe and Turkey; Americas: US Midwest and Mexico



<Mitsubishi Electric booth visited by Prime Minister Narendra Modi>

2. Growth Strategy: Production Strategy

Strengthen Production Network and Establish Stable Supply Network to Achieve Mid-term Business Target

◆ Increase production capacity

1. Increase AC servos production →

March 2018
480,000 units/month
(170% compared to FY16)

2. Increase Programmable Controllers production →

June 2018
190,000 units/month
(160% compared to FY16)

3. Increase robots production →

June 2018
Production started in China (Changshu)

◆ Procurement of parts and materials, and securing the workforce (labor)

1. Strengthen relationships with key suppliers in cooperation with procurement divisions across the company and diversify suppliers of parts and materials
2. Aggressively promote recruitment and improve employee satisfaction (e.g., upgrade welfare facilities)

◆ Reinforce production network to achieve mid-term business targets

Japan

Nagoya Works: Strengthen production network

1. Consider purchasing site for factory in Chubu region (FY18)
2. Construction of new factory building/office block (FY19-)

Overseas

Strengthen production network in consumption areas

1. Expand production bases in Changshu and Dalian areas in China
2. Consider establishing new production base (India)

◆ Establish Stable Supply Network

Improve and extend inventories of key parts and products →

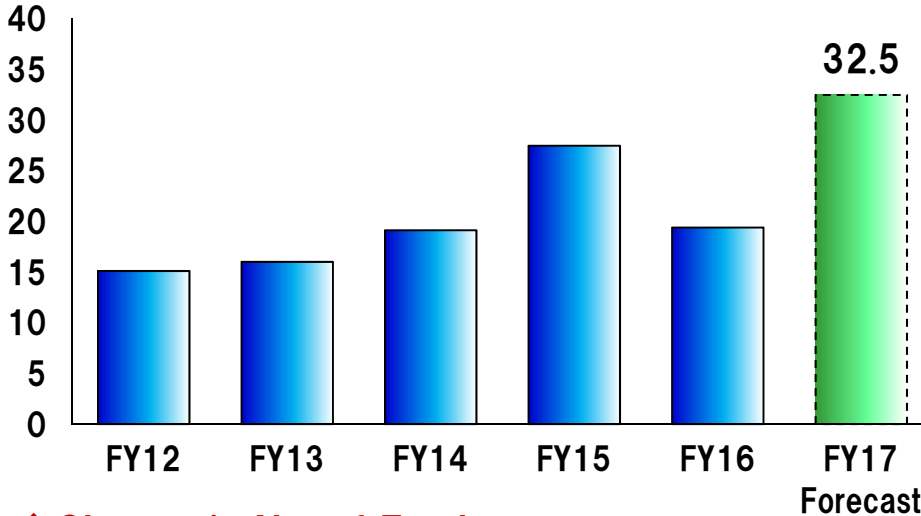
Reinforce BCP measures/Learn to manage sharp fluctuations in demand

2. Growth Strategy: Injection of Resources and Increase Workforce

Continuous Injection of Resources to Enhance Business Competitiveness

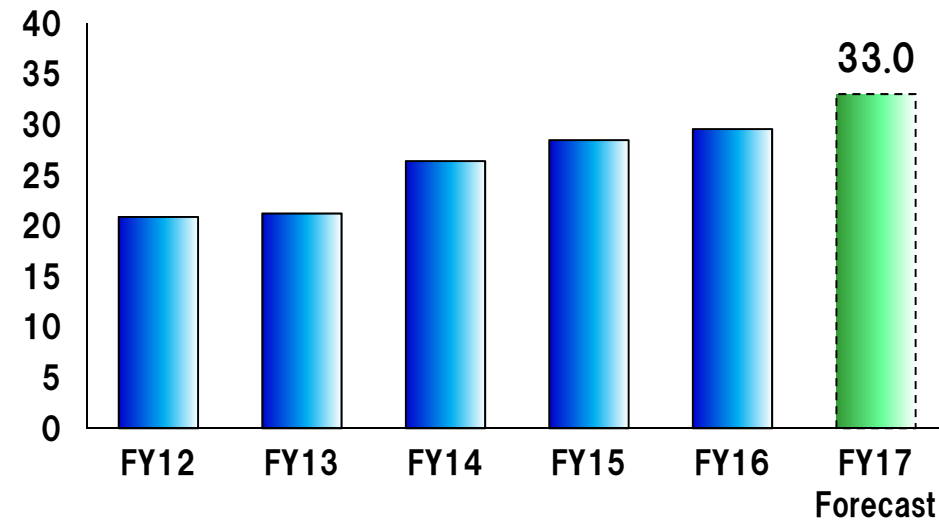
◆ Capital Investment

(JPY Billion)

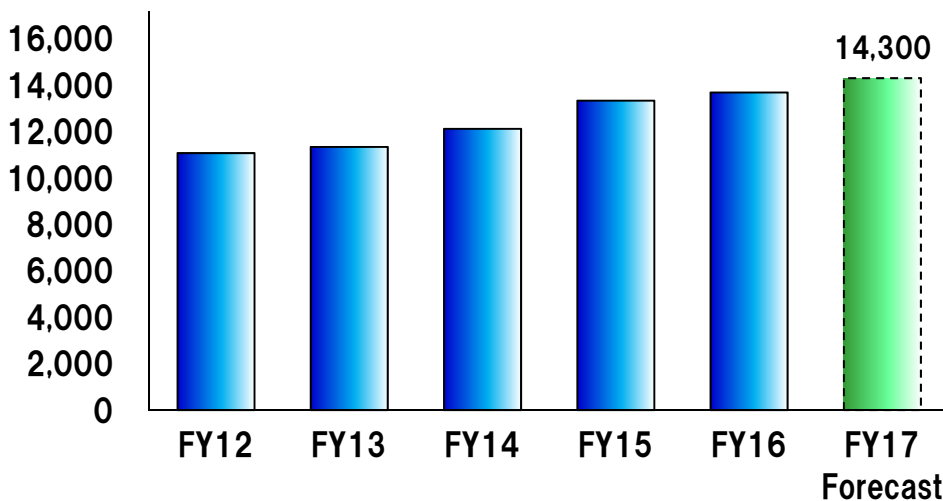


◆ R&D

(JPY Billion)



◆ Change in No. of Employees



Capital investment

Increase production capacity and accelerate updating of factories

R&D

e-F@ctory, edge computing-related products, Networks, next series

Employees

Sales, production, design, quality assurance, and service staff

2. Growth Strategy: M&As

- ① Complement Product Groups, Technological Fields, Etc.
- ② Ensure Sales/Service Networks, and
- ③ Obtain New Clientele

◆ Major M&As carried out in past five years (including joint capital investments)

Strengthening of Technological Prowess		
Country	Case	Aim
Japan	Making AnyWire Corporation a subsidiary	Strengthen sensor network
US	Acquisition of a stake in ICONICS	Expand SCADA product lineup
Germany	Acquisition of KH-Automation	Enhance solution proposal capability
Japan	Acquisition of assets of Dura Systems Corporation	Enhance product development capability in edge computing
Japan	Takeover of part of business of NIPPON DENNO Co., Ltd.	Enhance product development capability in edge computing

Strengthened technical prowess: 11 cases in total

Expansion of Sales Networks		
Country	Case	Aim
India	Acquisition of MESSUNG	Expand sales channels and enhance product development function
Turkey	Acquisition of GTS	Expand Turkish business
Thailand	Acquisition of F.A.TECH	Enhance sales function
Japan/Asia	Making SETSUYO ASTEC Corporation a subsidiary	Enhance sales network and expand business in ASEAN/Taiwanese markets
Russia	Takeover of ETS	Enhance business network

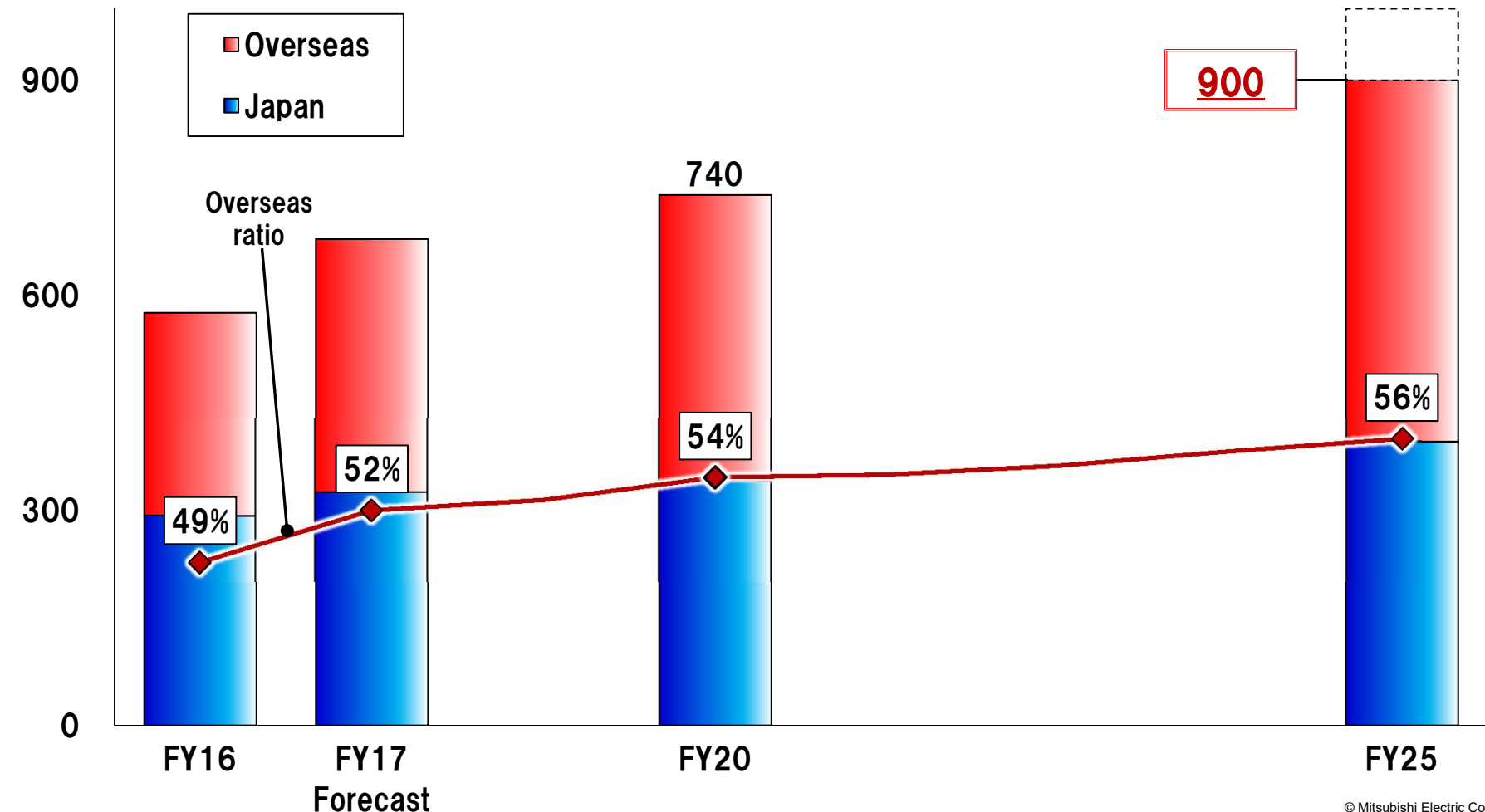
Expanded sales channels: 8 cases in total

3. Mid-term Business Target

FY25 Business Target

Consolidated Sales: ¥900 billion+

(JPY Billion)



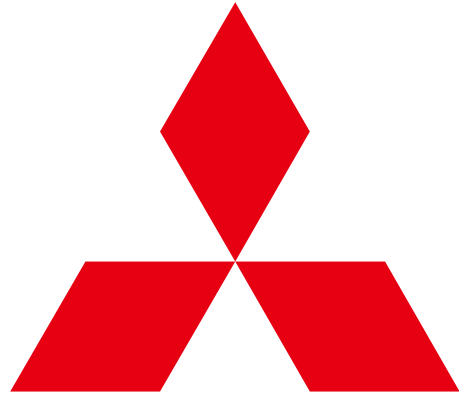
Changes for the Better

Cautionary Statements

The expectation of operating results herein and any associated statement to be made orally with respect to the Company's current plans, estimates, strategies and beliefs, and any other statements that are not historical facts are forward-looking statements. Words such as "expects," "anticipates," "plans," "believes," "scheduled," "estimated," "targeted," along with any variations of these words and similar expressions are intended to identify forward-looking statements that include but are not limited to projections of revenues, earnings, performance and production. While the statements herein are based on certain assumptions and premises that the Company trusts and considers to be reasonable under the circumstances to the date of announcement, you are requested to kindly take note that actual operating results are subject to change due to any of the factors as contemplated hereunder and/or any additional factor unforeseeable as of the date of this announcement.

Such factors materially affecting the expectations expressed herein shall include but are not limited to the following. As such, additional factors may arise at any given time.

1. Any change in worldwide economic and social conditions, as well as laws, regulations, taxation and other legislation
2. Changes in foreign currency exchange rates, especially yen/dollar rates
3. Changes in stock markets, especially in Japan
4. Changes in balance of supply and demand of products that may affect prices and volume, as well as material procurement conditions
5. Changes in the ability to fund raising, especially in Japan
6. Uncertainties relating to patents, licenses and other intellectual property, including disputes involving patent infringement
7. New environmental regulations or the arising of environmental issues
8. Defects in products or services
9. Litigation and legal proceedings brought and contemplated against the Company or its subsidiaries and affiliates that may adversely affect operations or finances
10. Technological change, the development of products using new technology, manufacturing and time-to-market
11. Business restructuring
12. Incidents related to information security
13. Occurrence of large-scale disasters including earthquakes, typhoons, tsunamis, fires and others
14. Social or political upheaval caused by terrorism, war, pandemic by new strains of influenza and other diseases, or other factors



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