eco Changes for a greener tomorrow

MITSUBISHI
ELECTRIC
Changes for the Better

FACTORY AUTOMATION

INVERTER
FR-D700

Global standard

700 series

- Pursuing the easy operation
- Long life and simple maintenance
- Compact and space-saving
- Supporting various applications

GLOBAL IMPACT OF MITSUBISHI ELECTRIC

Through Mitsubishi Electric's vision, "Changes for the Better" are possible for a brighter future.

Changes for the Better

We bring together the best minds to create the best technologies. At Mitsubishi Electric, we understand that technology is the driving force of change in our lives. By bringing greater comfort to daily life, maximizing the efficiency of businesses and keeping things running across society, we integrate technology and innovation to bring changes for the better.

Mitsubishi Electric is involved in many areas including the following

Energy and Electric Systems
A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

Contents

GLOBAL STANDARD

1 New standard of inverter

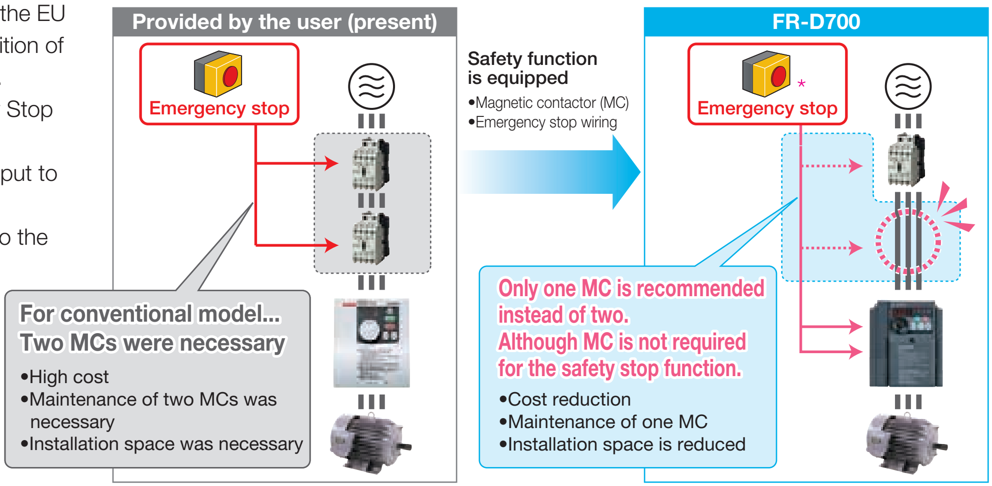
Highly reliable inverter!

(1) Safety stop function

The FR-D700 series is compliant to the EU Machinery Directive without the addition of previously required external devices.
Operation of an external Emergency Stop device results in a highly reliable immediate shutoff of the D700's output to the motor.
This safety stop function conforms to the following standards.

EN ISO 13849-1 Category 3 / PLd

EN62061 / IEC61508 SIL2



For conventional model...
Two MCs were necessary

- High cost
- Maintenance of two MCs was necessary
- Installation space was necessary

Safety function is equipped

- Magnetic contactor (MC)
- Emergency stop wiring

Only one MC is recommended instead of two.
Although MC is not required for the safety stop function.

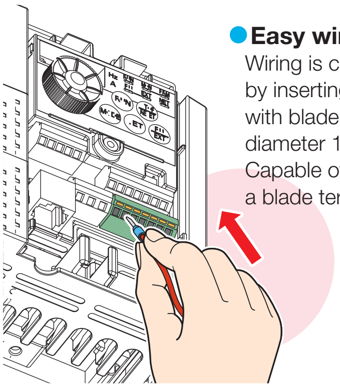
- Cost reduction
- Maintenance of one MC
- Installation space is reduced

*: Approved safety relay unit

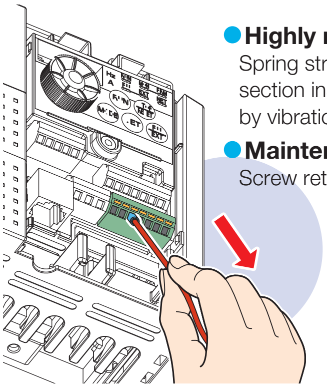
(2) Spring clamp terminal (control circuit terminal)

With spring clamp terminals*, the wiring became easier and more secure.

*: Main circuit terminal is screw terminal.

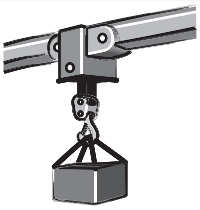


Easy wiring
Wiring is completed only by inserting wires treated with blade terminal (max. diameter 1.5mm)
Capable of wiring without a blade terminal.

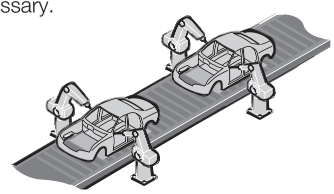


Highly reliable
Spring structure in terminal contact section inside prevents contact fault by vibration.

Maintenance is unnecessary
Screw retightening is unnecessary.



(example: hoist)



(example: automobile production line)

(3) Long-life design

- The design life of the cooling fan has been extended to 10 years[*1]. The life of the fan can be further extended utilizing the it's ON/OFF control.
- The design life of the capacitors has been extended to 10 years[*1*2] by adopting a capacitor that endures about 5000 hours at 105°C surrounding air temperature.

*1: Surrounding air temperature : annual average 40℃ (free from corrosive gas, flammable gas, oil mist, dust and dirt) Since the design life is a calculated value, it is not a guaranteed value.
*2: Output current : 80% of the inverter rated current

- Estimated service lifespan of the long-life parts

Components	Estimated lifespan of the FR-D700	Guideline of JEMA[*3]
Cooling fan	10 years	2 to 3 years
Main circuit smoothing capacitor	10 years	5 years
Printed board smoothing capacitor	10 years	5 years

*3: Excerpts from "Periodic check of the transistorized inverter" of JEMA (Japan Electrical Manufacture's Association)

(4) Leading life check function

- Degrees of deterioration of main circuit capacitor, control circuit capacitor, and inrush current limit circuit can be monitored.
- Trouble can be avoided with the self-diagnostic alarm[*4] that is output when the life span is near.

*4: If any one of main circuit capacitor, control circuit capacitor, inrush current restriction circuit or cooling fan reaches the output level, an alarm is output. Capacity of the main circuit capacitor can be measured by setting parameter at a stop and turning the power from off to on. Measuring the capacity enables alarm to be output.
The cooling fan outputs alarm by using fan speed detection.

(5) Password function

Registering a 4-digit password can limit parameter read/write.
It is effective for parameter setting protection.

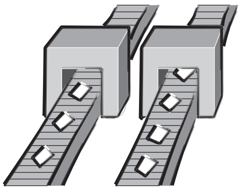
2 Mitsubishi's new standard (As of April 2008)

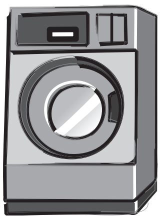
Compact yet equipped with highest level of function/performance!!

(1) 150%/1Hz high starting torque by General-purpose magnetic flux vector control

General-purpose magnetic flux vector control and auto tuning function are available.
It ensures operation that requires high starting torque, such as transfer machine including conveyer, hoist, lift, etc., washing machine, and agitators.

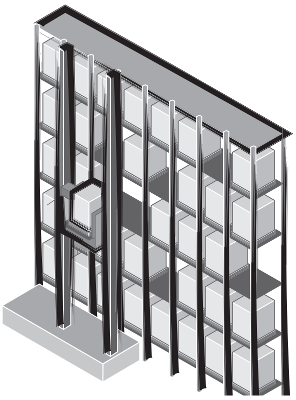
- High torque of 150%/1Hz and 200%/3Hz (3.7K or less) is realized (when the slip compensation function is valid).
- Auto tuning
  Many kinds of motors can be optimally controlled with Mitsubishi original "non-rotation" auto tuning function. (R1 constants tuning)


(example: conveyer)


(example: industrial washing machine)

(2) Brake resistor can be connected

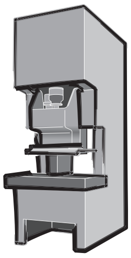
A brake transistor is built-in to the 0.4K or more.
Connecting an optional brake resistor increases regeneration capability.
It is useful for deceleration time reduction of a machine with a large inertia, such as fan, and operation of lift, etc.


(example: automated storage)

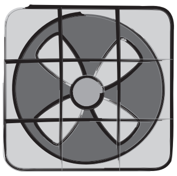
(3) Enhanced function

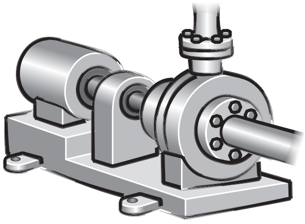
New functions and useful functions from superior models support all sorts of applications.

- **Regeneration avoidance function**
  For a pressing machine and fan rotated faster than the set speed due to the effect of another fan, a trip is less likely to occur by automatically increasing frequency at regeneration.

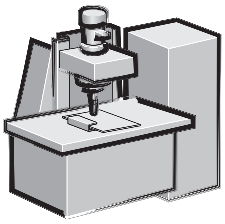

(example: pressing machine)

- **Optimum excitation control**
  This control enables the motor efficiency to its optimum. More energy saving is possible in applications with variable load torque characteristic such as fan and pump.

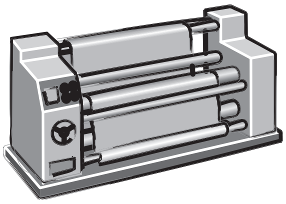

(example: air-conditioning fan)

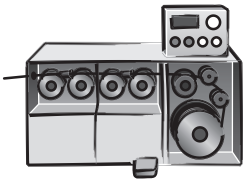

(example: pump)

- **Power failure-time deceleration-to-stop function**
  The motor can be decelerated to a stop when a power failure or undervoltage occur to prevent the motor from coasting.
  For fail-safe of machine tool, etc., it is effective to stop the motor when a power failure occurs.


(example: spindle)

- **Dancer control**
  Entering position detection signal of dancer roll to use PID control enables tension control by dancer roll.
- **Traverse function**
  Traverse function for wind-up drum of spinning machine and wiredrawing machine prevents unevenness and deformation at thread winding.


(example: textile machine)


(example: wiredrawing machine)

●Features
●Standard specifications
●Outline dimension drawings
●Terminal connection diagram
●Terminal specification explanation
●Operation panel
●Parameter unit
●Parameter list
●Protective functions
●Option and peripheral devices
●Precautions for operation/selection
●Precautions for peripheral device selection
●FR-D700 Series Specification Difference List
●Warranty
●International FA Center

3 Easy use and time saving built-in as standard

(1) Quick setup with the setting dial

Setting dial is the feature of Mitsubishi inverters.

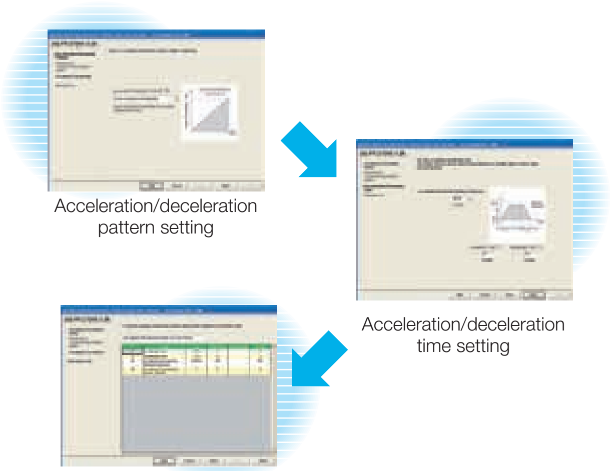
- Displayed numbers can be jumped by turning the setting dial quickly, and numbers can be changed one by one by turning it slowly, enabling speedy parameter setting.
- The nonslip setting dial is easier to turn.

(2) Easy setting from a personal computer using the FR Configurator (option)

Connecting a personal computer and the inverter via RS-485 communication enables setting with wizard (interactive) function of the FR Configurator (inverter setup software).
In addition, a parameter setting can be converted from the FR-S500 series to the FD-D700 series by "Convert" function.
"Graph" function displays monitor data in waveform.

MELSOFT

Setting wizard function (example: acceleration/deceleration time setting)



Acceleration/deceleration pattern setting

Acceleration/deceleration time setting

Parameter list display

(3) Enclosure surface operation panel FR-PA07 (option)

Optional enclosure surface operation panel (FR-PA07) can be connected. In addition, an operation panel for the FR-E500 series can be connected.

The operation panel of the inverter can not be removed.
A parameter unit connection cable (FR-CB20□) is separately necessary.

(4) Parameter unit FR-PU07 (option)

An optional parameter unit (FR-PU07) can be connected as well.

A parameter unit connection cable (FR-CB20□) is separately necessary.

- Setting such as direct input method with a numeric keypad, operation status indication, and help function are usable.
  Eight languages can be displayed.
- Parameter setting values of maximum of three inverters can be stored.

(5) Enhanced communication function

- **Mitsubishi inverter protocol and MODBUS®RTU**
  Communication speed of RS-485 has been improved
  (communication at 38.4kbps is available)
  "Multi command mode" has been added to Mitsubishi inverter protocol
  (data processing time of the inverter has been reduced to 1/4)
  Supports MODBUS®RTU

4 Compact and space saving

(1) Easily replaceable compact body

Installation size is the same as that of the FR-S500 series which is the smallest model of the Mitsubishi inverter.

FR-D740-0.4K FR-S540E-0.4K

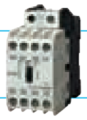
(2) Side by side installation saves space

Space can be saved by side by side no clearance installation*.

*: Use the inverter at the surrounding air temperature of 40°C or less.

Introducing the Mitsubishi magnetic contactor

- Offers a selection of small frames
- Offers a line-up of safety contactors
- Supports small loads (auxiliary contact)
- Supports many international regulations as standard



☞ Refer to page 28 for the selection.

5 Easy maintenance

(1) Easy replacement of cooling fan

A cooling fan is provided on top of the inverter of all capacities requiring a cooling fan (1.5K or more).
A cooling fan can be easily replaced without disconnecting main circuit wires.

(2) Combed shaped wiring cover

Since a cover can be fitted after wiring, wiring work is easily done.

6 Environment consciousness in global standard

(1) EU RoHS Directive compliant

Human and environment-friendly inverter in compliant with RoHS Directive.

RoHS Directive requires member nations to guarantee that new electrical and electronic equipment sold in the market after July 1, 2006 do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.
<G> mark indicating RoHS Directive compliance is printed on the package.

(2) Filterpack FR-BFP2 (option)

Power factor improving DC reactor, zero phase reactor, and capacitative filter (radio noise filter), are frequently-used units for an air conditioning application. The filterpack combines those three units are available as an option.

(3) EMC Directive compliant noise filter

Compliance to the EMC Directive of European Norm is easier.

- Noise filter option which is compatible with EMC Directive (EN61800-3 2nd Environment Category C3) is available.

(4) Compliance with a variety of standards

Complies with UL, cUL, and EC Directives (CE marking), and the Radio Waves Act (South Korea) (KC marking). It is also certified as compliant with the Eurasian Conformity (EAC).

c UL us LISTED CE KC EAC

The single-phase 100V power input model is not compliant with the EMC Directive.

7 Lineup

The lineup of three phase 200V/400V class goes to 15K.

- For a use in harsh environment, special unit with board coating is also available. Please contact our sales representative.
- For the FR-D700 series, North American (NA), EU (EC), and Chinese (CHT) specifications also are supported.

*: This catalog explains based on the Japanese specifications.
Consult our sales office for specifications of each country.

FR-D740□-0.4K

Symbol	Voltage
1	100V class
2	200V class
4	400V class

Symbol	Number of Power Phases
None	Three-phase input
S	Single-phase input
W	Single-phase input (double voltage output)

Symbol	Inverter Capacity
0.1K to 15K	Indicate capacity "kW".

Power Supply	Inverter Model	0.1	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15
Three phase 200V	FR-D720-□K	●	●	●	●	●	●	●	●	●	●	●
Three phase 400V	FR-D740-□K	—	—	●	●	●	●	●	●	●	●	●
Single phase 200V *	FR-D720S-□K	●	●	●	●	●	●	—	—	—	—	—
Single phase 100V *	FR-D710W-□K	●	●	●	●	—	—	—	—	—	—	—

*: Output of the single-phase 200V and single-phase 100V input models is three-phase 200V.

●:Available models —:Not available

We visualize our customers' factories to solve problems and troubles.

"Visualization" of production and energy achieves future factories that advance one step forward.

The integrated solution, e-F@ctory, is based on our consolidated know-how, which has been developed through our own experiences as a user of FA products. Our e-F@ctory provides total cost reduction ranging from development to production and maintenance to achieve optimized production. This solution makes it possible to save energy and to optimize production by "visualization" that links upstream information systems and production site information, thus solving various problems on production sites.

Sharing information across production systems

MES Interface

Information sharing is easy and inexpensive because communication gateways, such as personal computers, are not necessary to connect factory equipment to the Manufacturing Execution System (MES).

Optimizing production from a TCO* stand point

iQ Platform

Factory automation components such as controllers, human-machine interfaces, engineering environments, and networks are all seamlessly integrated to reduce TCO across different stages, from development to production and maintenance.

* TCO: Total Cost of Ownership

Visualization of energy consumption

e&eco-F@ctory

It is indispensable for today’s factory to be energy conscious and efficient. The e-F@ctory solution enables management of specific energy consumption, which provides the visibility needed to improve productivity. Additionally, this solution takes the total life cycle into account, including factors such as “measurement and diagnosis”, “countermeasures”, and “operation and management”. Backed by several successes and achievements, our know-how will support your energy saving efforts.

Network

CC-Link Family, the open field network of the world standard, and SSCNET III/H, the servo network for achieving high-speed processing and enhancement of instruction synchronization, flexibly expanding the connectivity among equipment and devices in the e-F@ctory environment.

iQ Platform-compatible equipment

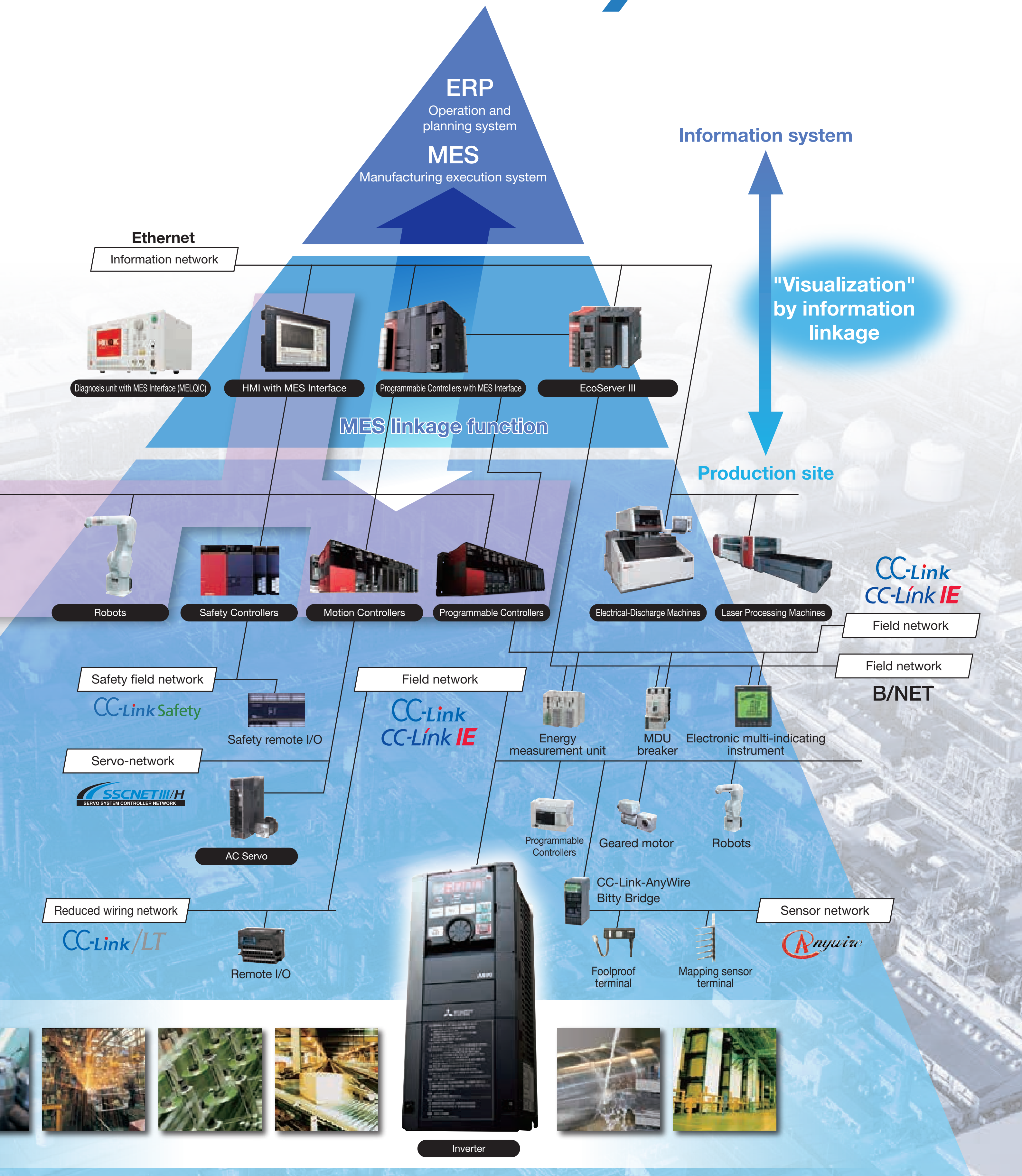
The inter-multi-CPU high-speed base unit provides slots for arbitrarily connecting programmable controllers, motion controllers, on-line CNCs, and robot controllers. Data communication speed among devices is enhanced, and their compatibility is extremely improved.

iQ Platform-compatible engineering environments

Design information is integrated and shared at stages from system design to programming, tests and startup, and operation and maintenance. In addition, programming software programs for programmable controllers, motion controllers, on-line CNCs, robots, inverters, and GOTs, which are separately provided in a conventional environment, can be integrated.

e-F@ctory

Products for achieving e-F@ctory



ERP

Operation and planning system

MES

Manufacturing execution system

Information system

Ethernet

Information network

"Visualization" by information linkage

Diagnosis unit with MES Interface (MELQIC)

HMI with MES Interface

Programmable Controllers with MES Interface

EcoServer III

MES linkage function

Production site

Robots

Safety Controllers

Motion Controllers

Programmable Controllers

Electrical-Discharge Machines

Laser Processing Machines

CC-Link

CC-Link IE

Field network

Field network

B/NET

Safety field network

CC-Link Safety

Safety remote I/O

Field network

CC-Link

CC-Link IE

Energy measurement unit

MDU breaker

Electronic multi-indicating instrument

Servo-network

SSCNETIII/H

SERVO SYSTEM CONTROLLER NETWORK

AC Servo

Programmable Controllers

Geared motor

Robots

CC-Link-AnyWire Bitty Bridge

Reduced wiring network

CC-Link/LT

Remote I/O

Sensor network

AnyWire

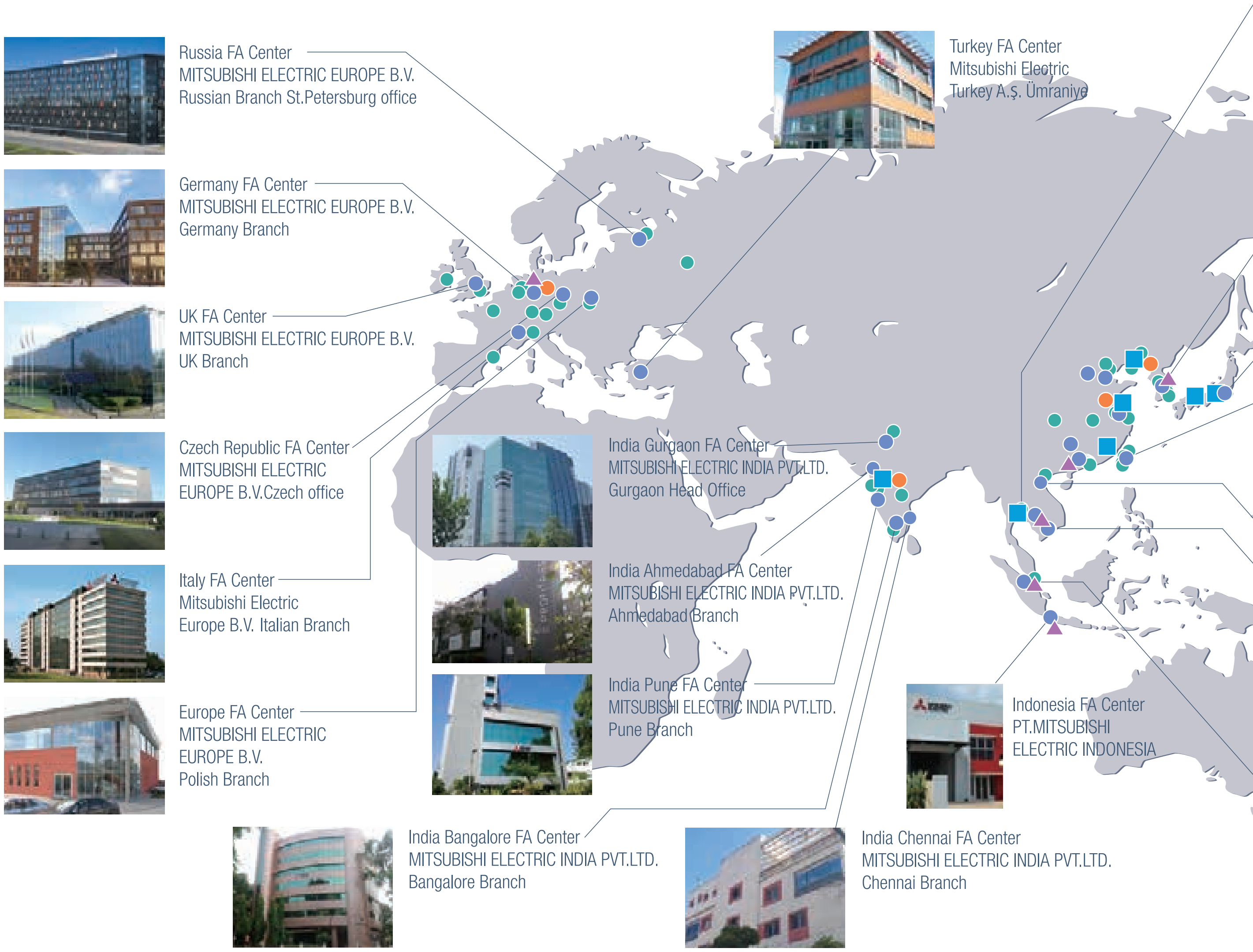
Foolproof terminal

Mapping sensor terminal

Inverter

Mitsubishi Electric's global FA network delivers reliable technologies and security around the world.

🟦 Production base 🟠 Development center 🔵 Global FA Center ▲ Mechatronics showroom 🟢 Mitsubishi Electric sales office



Russia FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
Russian Branch St.Petersburg office

Germany FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
Germany Branch

UK FA Center
MITSUBISHI ELECTRIC EUROPE B.V.
UK Branch

Czech Republic FA Center
MITSUBISHI ELECTRIC
EUROPE B.V.Czech office

Italy FA Center
Mitsubishi Electric
Europe B.V. Italian Branch

Europe FA Center
MITSUBISHI ELECTRIC
EUROPE B.V.
Polish Branch

Turkey FA Center
Mitsubishi Electric
Turkey A.Ş. Ümraniye

India Gurgaon FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Gurgaon Head Office

India Ahmedabad FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Ahmedabad Branch

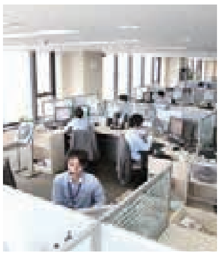
India Pune FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Pune Branch

Indonesia FA Center
PT.MITSUBISHI
ELECTRIC INDONESIA

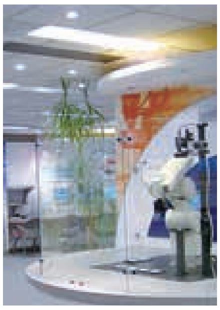
India Bangalore FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Bangalore Branch

India Chennai FA Center
MITSUBISHI ELECTRIC INDIA PVT.LTD.
Chennai Branch

Available services



Technical consultation (engineering)
Our Japanese and/or local staff offer technical advice, and can also propose the best products and systems for a customer's specific application needs.



Showrooms
The latest automation technologies, including programmable controllers, HMIs, inverters, servo systems, and industrial automation machinery such as electrical-discharge machines, laser processing machines, CNCs, and industrial robots can be seen at Mitsubishi Electric showrooms.

Training
From basic operations to applied programming, our training schools offer regular courses that use actual machines. We also offer customized training programs and onsite training sessions.

Technical support
Our FA centers and service shops work together to provide repairs, onsite engineering support, and spare parts.

Repairs
Handle repairs of our FA products.

Service bases are established around the world to provide the same services as in Japan globally. Overseas bases are opening one after another to support our customers' business expansion.

Area	Our overseas	FA centers
EMEA	26	7
China	17	4
Asia	31	13
Americas	15	6
Others	1	0
Total	90	30

·As of July 2017

Thailand FA Center
MITSUBISHI ELECTRIC FACTORY AUTOMATION (THAILAND) CO.,LTD

Korea FA Center
MITSUBISHI ELECTRIC AUTOMATION KOREA CO.,LTD.

MITSUBISHI ELECTRIC CORPORATION
Factory Automation Systems Group

Taichung FA Center
MITSUBISHI ELECTRIC TAIWAN CO.,LTD

Taipei FA Center
SETSUYO ENTERPRISE CO.,LTD

Ho Chi Minh FA Center
MITSUBISHI ELECTRIC VIETNAM COMPANY LIMITED

Hanoi FA center
Mitsubishi Electric Vietnam Company Limited Hanoi Branch

ASEAN FA Center
MITSUBISHI ELECTRIC ASIA PTE.LTD.

North America FA Center
MITSUBISHI ELECTRIC AUTOMATION,INC.

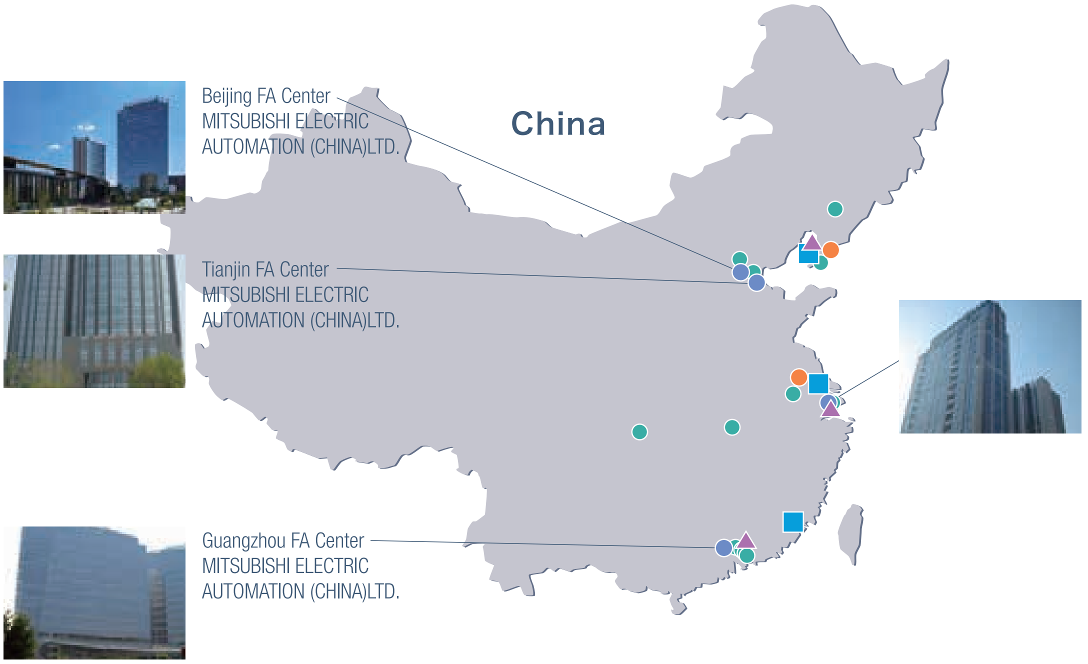
Mexico Monterrey FA Center
Monterrey Office, Mitsubishi Electric Automation, Inc.

Mexico FA Center
Querétaro Office, Mitsubishi Electric Automation, Inc.

Mexico City FA Center
Mexico FA Center
Mexico Branch, Mitsubishi Electric Automation, Inc.

Brazil FA Center
Mitsubishi Electric do Brasil Comércio e Serviços Ltda.

Brazil Votorantim FA Center
MELCO CNC do Brasil Comércio e Serviços S.A.



Beijing FA Center
MITSUBISHI ELECTRIC AUTOMATION (CHINA)LTD.

Tianjin FA Center
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MEMO

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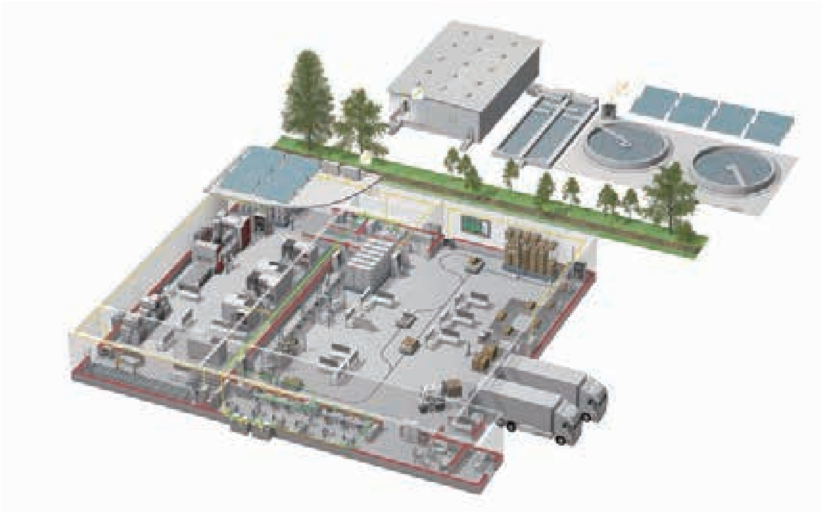
Ethernet is a registered trademark of Fuji Xerox Corporation in Japan.
Windows and Windows Vista are registered trademarks of Microsoft Corporation in the United States and other countries.
Other company and product names herein are the trademarks and registered trademarks of their respective owners.

⚠Safety Warning

To ensure proper use of the products listed in this catalog, please be sure to read the instruction manual prior to use.

YOUR SOLUTION PARTNER



Mitsubishi Electric offers a wide range of automation equipment from PLCs and HMIs to CNC and EDM machines.

A NAME TO TRUST

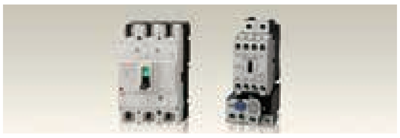
Since its beginnings in 1870, some 45 companies use the Mitsubishi name, covering a spectrum of finance, commerce and industry.

The Mitsubishi brand name is recognized around the world as a symbol of premium quality.

Mitsubishi Electric Corporation is active in space development, transportation, semi-conductors, energy systems, communications and information processing, audio visual equipment and home electronics, building and energy management and automation systems, and has 237 factories and laboratories worldwide in over 121 countries.

This is why you can rely on Mitsubishi Electric automation solution - because we know first hand about the need for reliable, efficient, easy-to-use automation and control in our own factories.

As one of the world's leading companies with a global turnover of over 4 trillion Yen (over $40 billion), employing over 100,000 people, Mitsubishi Electric has the resource and the commitment to deliver the ultimate in service and support as well as the best products.



Low voltage: MCCB, MCB, ACB

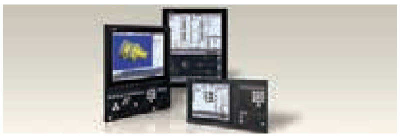
Medium voltage: VCB, VCC

Power monitoring, energy management

Compact and Modular Controllers

Inverters, Servos and Motors

Visualisation: HMIs



Numerical Control (NC)

Robots: SCARA, Articulated arm

Processing machines: EDM, Lasers, IDS

Transformers, Air conditioning, Photovoltaic systems

* Not all products are available in all countries.

Mitsubishi Electric Corporation Nagoya Works
is a factory certified for ISO 14001
(standards for environmental management
systems).

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