

Mitsubishi Electric Trendy v robotizaci a automatizaci 27.1.2016, Brno



Petr Brynda – Key Account Coordinator Automotive, Industrial Solutions Team

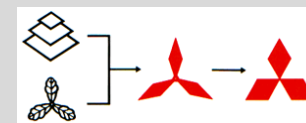
- O společnosti Mitsubishi
- Přehled produktů Mitsubishi Electric
- Robotická řešení Mitsubishi Electric
- iQ platforma
- Příslušenství k robotů Mitsubishi

About “Mitsubishi” — Origin

- 1870** ▶ Tsukumo Shokai, which was the origin of Mitsubishi, was established.
- 1886** ▶ Mitsubishi Sha was established. It promoted its business diversification and grew as a modern corporation.
- 1917** ▶ Spinning-off of the business departments started. Mitsubishi Goshi Kaisha became a holding company.
- 1921** ▶ Mitsubishi Electric Corporation was established.
- 1946** ▶ Mitsubishi Headquarters was dissolved.
Each Mitsubishi company started as a new independent entity.



The founder, Yataro Iwasaki



Origin of the Three-Diamond Mark

Photo courtesy of The Mitsubishi Archives



Mitsubishi Electric Corporation is an independent company like other Mitsubishi companies, and is separately owned, managed, and operated.

With the exception of other companies in the Mitsubishi Electric Group, it bears no legal affiliation with other companies that have the word "Mitsubishi" in their names.

- **Mitsubishi companies share a founding management philosophy:**
 - **Corporate Responsibility to Society**
 - **Integrity and Fairness**
 - **Global Understanding through Business**
- **40 member companies of the Mitsubishi Public Affairs Committee support a variety of philanthropic activities together**



The Three Principles

Mitsubishi Electric Corporation <hr/> Electric & Electronics	Mitsubishi Heavy Industries, Ltd. <hr/> Ships, Aircraft, Steel Structures, Power Generation	Mitsubishi Motors Corporation <hr/> Automobiles	Mitsubishi Corporation <hr/> Trading
The Bank of Tokyo-Mitsubishi UFJ, Ltd. <hr/> Banking	Nikon Corporation <hr/> Cameras, Optical Equipment	Tokyo Marine & Nichido Fire Insurance Co., Ltd. <hr/> Insurance	Kirin Holdings Co., Ltd. <hr/> Food
Mitsubishi Estate Co., Ltd. <hr/> Construction, Real Estate, Hotels	Asahi Glass Co., Ltd. <hr/> Chemicals, Ceramics & Glass	Mitsubishi Research Institute, Inc. <hr/> Consulting & Research	JX Holdings, Inc. <hr/> Resources & Energy, Nonferrous Metals

The companies shown above represent some of the 40 member companies of the Mitsubishi Public Affairs Committee.

Corporate Mission

The Mitsubishi Electric Group will continually improve its technologies and services by applying creativity to all aspects of its business. By doing so, we enhance the quality of life in our society. To this end, all members of the Group will pursue the following Seven Guiding Principles.

Seven Guiding Principles

Trust, Quality, Technology, Citizenship,
Ethics and Compliance, Environment, and Growth

Corporate Statement

Our corporate statement, "Changes for the Better," signifies the goal and stance of the Mitsubishi Electric Group to continually innovate for the better.

Changes for the Better



Building Systems



Factory Automation Systems



Information/
Communication Systems



Air Conditioning Systems



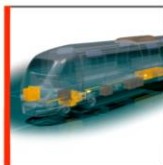
Semiconductors/Devices



Visual Information Systems



Space Systems



Transportation Systems



Public Systems



Energy Systems



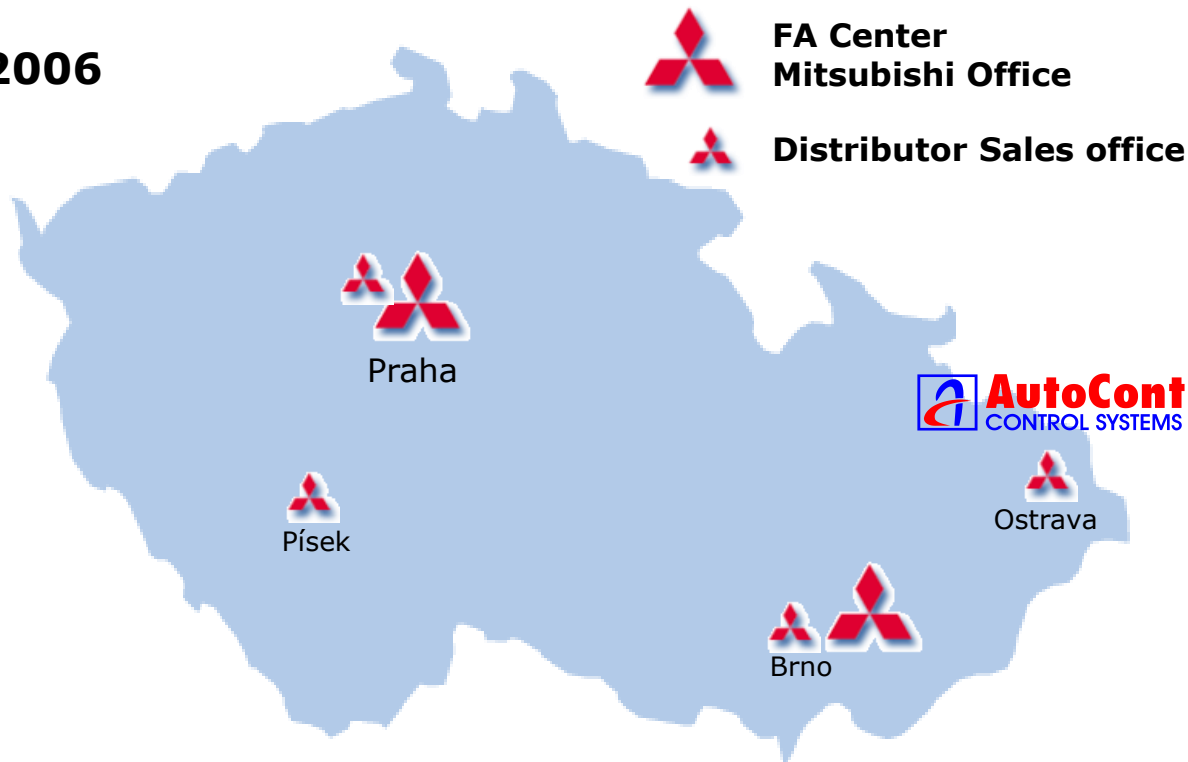
Automotive Equipment



Home Products

- FA Center in Prague since 2006
- Brno Office 10/2015
- MEU-CZ total 20 people

- Local technical support
- Product seminars
- Training / work-shops
- Simulation
- Demo product lending



Factory
Automatization

PLC
HMI
Software
Networks

Drives

Servomotors
Inverters
Motion Controllers

Power Distribution

Low-voltage circuit
breakers
Magnetic contactors

Control equipment

Thermal relays
Energy measuring units

Mechatronics

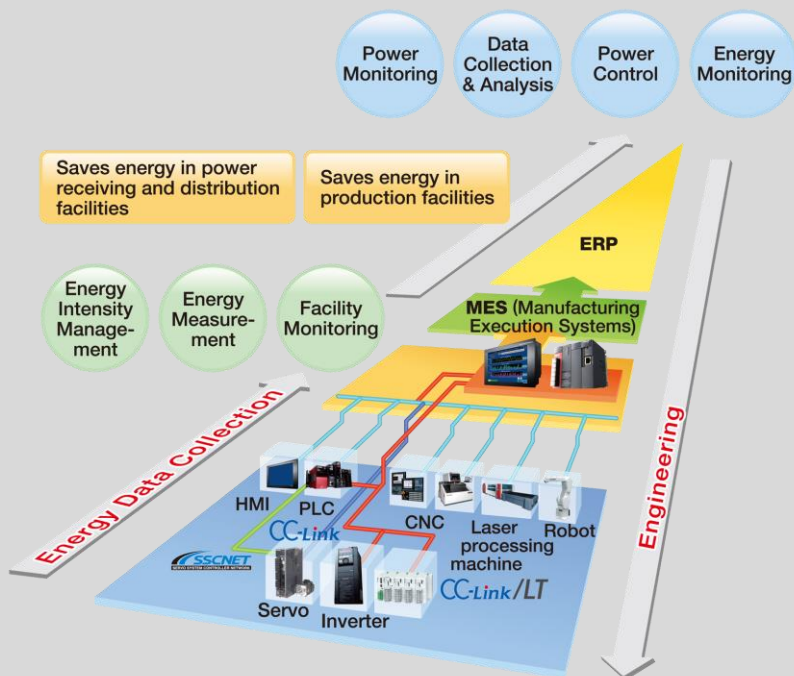
Robots
CNC
EDM
Laser cutting machines



Providing quality automation equipment and systems to major manufacturers **for more than 75 years.**

e-F@ctory

Factory Network



e-F@ctory

Successful in increasing productivity and reducing production costs

- Reduces data processing and response times
- Optimizes production line scheduling
- Allows more efficient management of site equipment and resources
- Enables remote diagnostics for faster maintenance
- Efficiently integrates various equipment and systems
- Visualizes energy consumption on factory floors with full coordination between energy measuring equipment, PLC, and MES

- **Mitsubishi Motors**
- **MAN**
- **Honda**
- **Saab**
- **NedCar**
- **Toyota**
- **Chevrolet**
- **Hyundai**
- **Volvo**
- **Nissan**
- **Renault**
- **TPCA**
- **Chrysler**
- **FIAT**



- **Continental**
- **Delphi**
- **Daenso**
- **Koito**
- **Hella**
- **Kostal**
- **Valeo**
- **Magna**
- **TRW**
- **Faurecia**
- **Magnetti Marelli**
- **Grupo Antolin**
- **LEAR**
- **TI Automotive**
- **Docter Optics**

- **IBM**
- **Bosch**
- **Alcatel**
- **Eisenmann**
- **Singulus**
- **Unaxis**
- **Sharp**
- **JVC**
- **Foxconn**
- **3COM**
- **Apple**



- **Yorkshire Water**
- **Blue Circle**
- **Werner & Pfleiderer**
- **Krones**
- **Ankele**
- **Eurostar**
- **Elopak**
- **KBA**
- **Leistritz**
- **Davis Standard**
- **Virgin**



- Robot solutions to **improve productivity**
- Helping **reduce operational costs** and improve profitability
- **Experience you can rely on to create the perfect solution for your application**
- Fastest operating performance in its class for improved productivity
- High-performance motors and unique driver control technology developed by Mitsubishi Electric.
- RH-6FH needs 0.29s and RV-7F need s 0.32s for the standard 12" cycle test.



Key features



Compact
footprint



Improved
productivity



Flexibility

A safer
environment



Connectivity



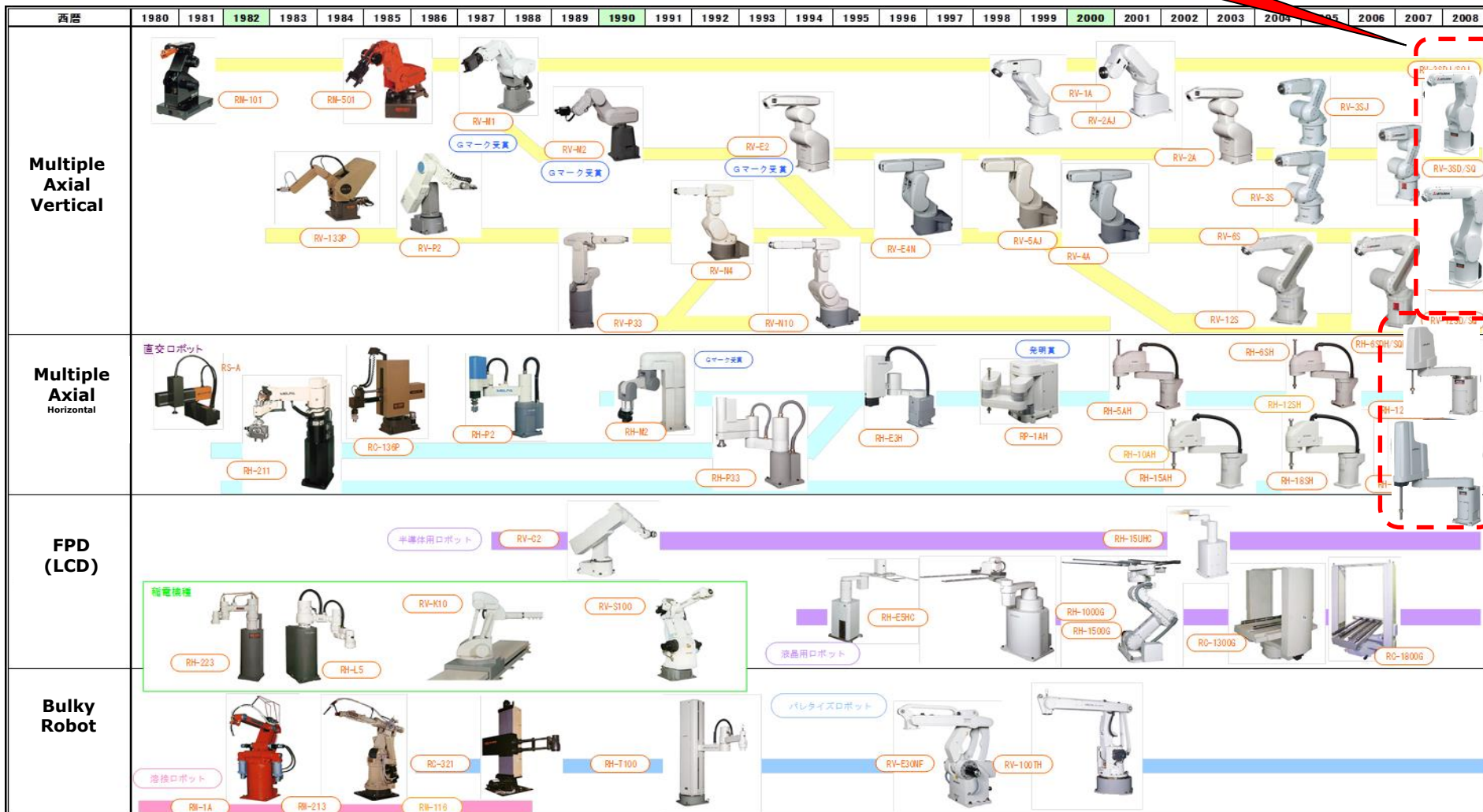
Optimum
reliability



Since 1980 ~

F series

In 2013



Horizontal type - SCARA


- **The fastest high-speed operation in its class**
- **Improved speed for vertical movements**
- **Improved continuous operability**
- **Enhanced wrist axis**
- **Internal routing of cables results in simplified cable management**
- **Compatibility with internal Ethernet cable tools**
- **Full use of installation space**



Horizontal type - SCARA

Horizontal, multiple-joint type (RH)



Type		RH-3FH35	RH-3FH45	RH-3FH55	RH-6FH35	RH-6FH45	RH-6FH55
Maximum load capacity (kg)		3	3	3	6	6	6
Maximum reach radius (mm)		350	450	550	350	450	550
Environmental specifications	Standard	○ (IP20)			○ (IP20)		
	Oil mist	—			○ (IP65)		
	Clean	○ (ISOclass3)			○ (ISOclass3)		
	Medical, food	—			○ (IP65)		
Controller		<div></div> <div>CR750</div>					

Horizontal type - SCARA



RH-12FH55	RH-12FH70	RH-12FH85	RH-20FH85	RH-20FH100	RH-3FHR
12	12	12	20	20	3
550	700	850	850	1000	350
○ (IP20)			○ (IP20)		○ (IP20)
○ (IP65)			○ (IP65)		Water proof: ○ (IP65)
○ (ISOclass3)			○ (ISOclass3)		○ (ISOclass5)
○ (IP65)			○ (IP65)		—



CR751



Controllers with protective specifications
(Equipped with controller protection boxes)

Horizontal type - SCARA



Horizontal type - SCARA



Vertical type

- **The fastest high-speed operation in its class**
- **Contributes to improved productivity with high-frequency operations**
- **Compatibility with internal Ethernet cable tools**
- **Expanded J4 axis operating range**
- **Compact installation with operation performed near the robot base**
- **Changes in operating posture made even more quickly**
- **Full use of installation space**



Vertical, multiple-joint type (RV)



Type		RV-2F	RV-2FL	RV-4F	RV-4FL	RV-7F	RV-7FL
Maximum load capacity (kg)		3		4		7	
Maximum reach radius (mm)		504	649	515	649	713	908
Environmental specifications	Standard	○ (IP30)		○ (IP40)		○ (IP40)	
	Oil mist	—		○ (IP67)		○ (IP67)	
	Clean	—		○ (ISOclass3)		○ (ISOclass3)	
	Medical, food	—		○ (IP65)		○ (IP65)	

Controller



CR750



CR751

Vertical type



RV-7FLL	RV-13F	RV-13FL	RV-20F	RV-35F	RV-50F	RV-70F
7	13		20	35	50	70
1503	1094	1388	1094	2050		
○ (IP40)	○ (IP40)		○ (IP40)	○ (J1 to J4:IP40, J5 to J6:IP67)		
○ (IP67)	○ (IP67)		○ (IP67)	○ (IP67)		
○ (ISOclass3)	○ (ISOclass3)		○ (ISOclass3)	—		
○ (IP65)	○ (IP65)		○ (IP65)	—		



Controllers with protective specifications
(Equipped with controller protection boxes)

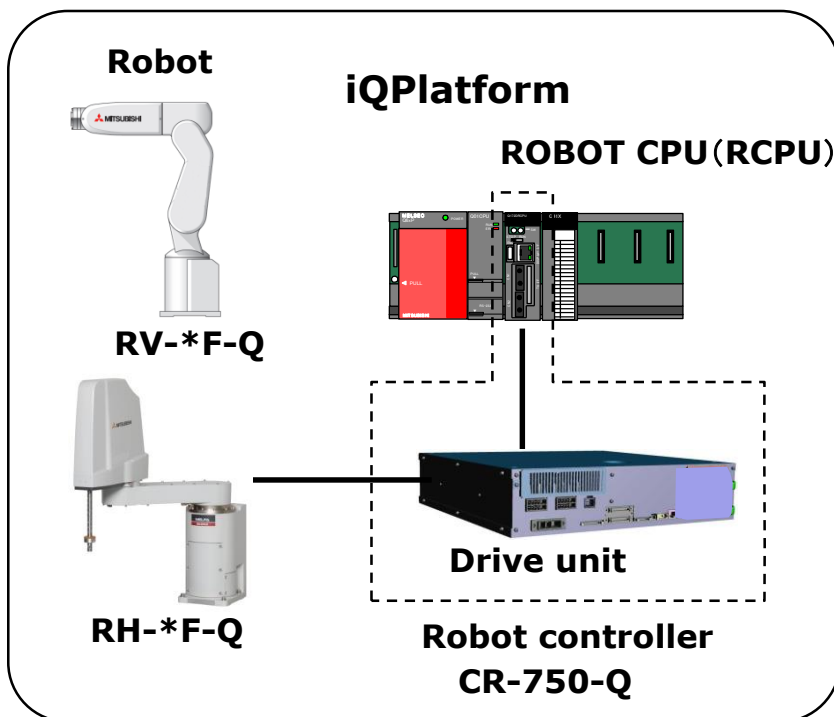


CR760-D/Q

Vertical type

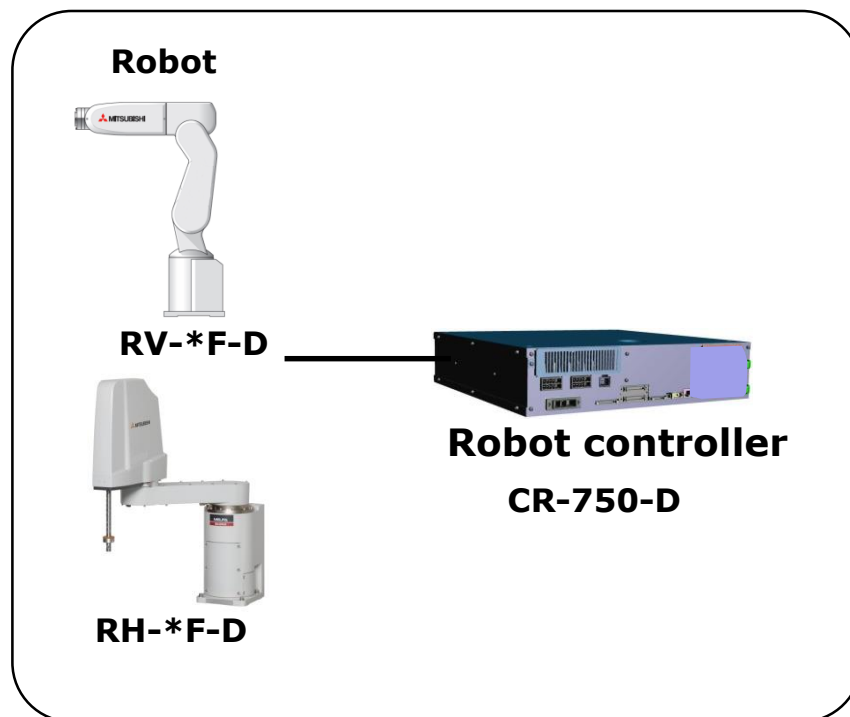


iQ-Platform



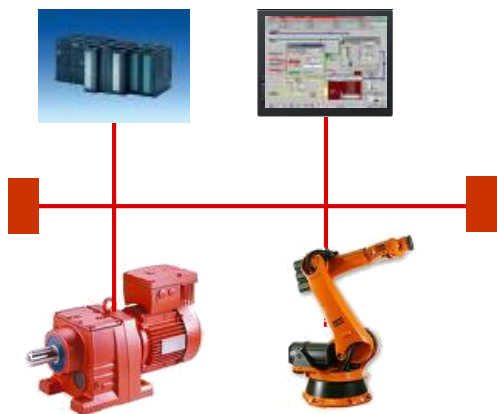
- Capable of building large cell
- Fine system control is possible by high-speed communication with common memory and various PLC units

Stand alone type



- Capable of building simple cell
- Variety interfaces are available as standard
- Additional axis, Ethernet, CC-Link, Encoder input

System configuration



Competitor & D type:

- Network
- Add software tools
- Standard speed
- Errors



All in one iQ – platform:

- Internal exchange
- High speed
- Only configuration
- Error minimalization
- MES solution !!!

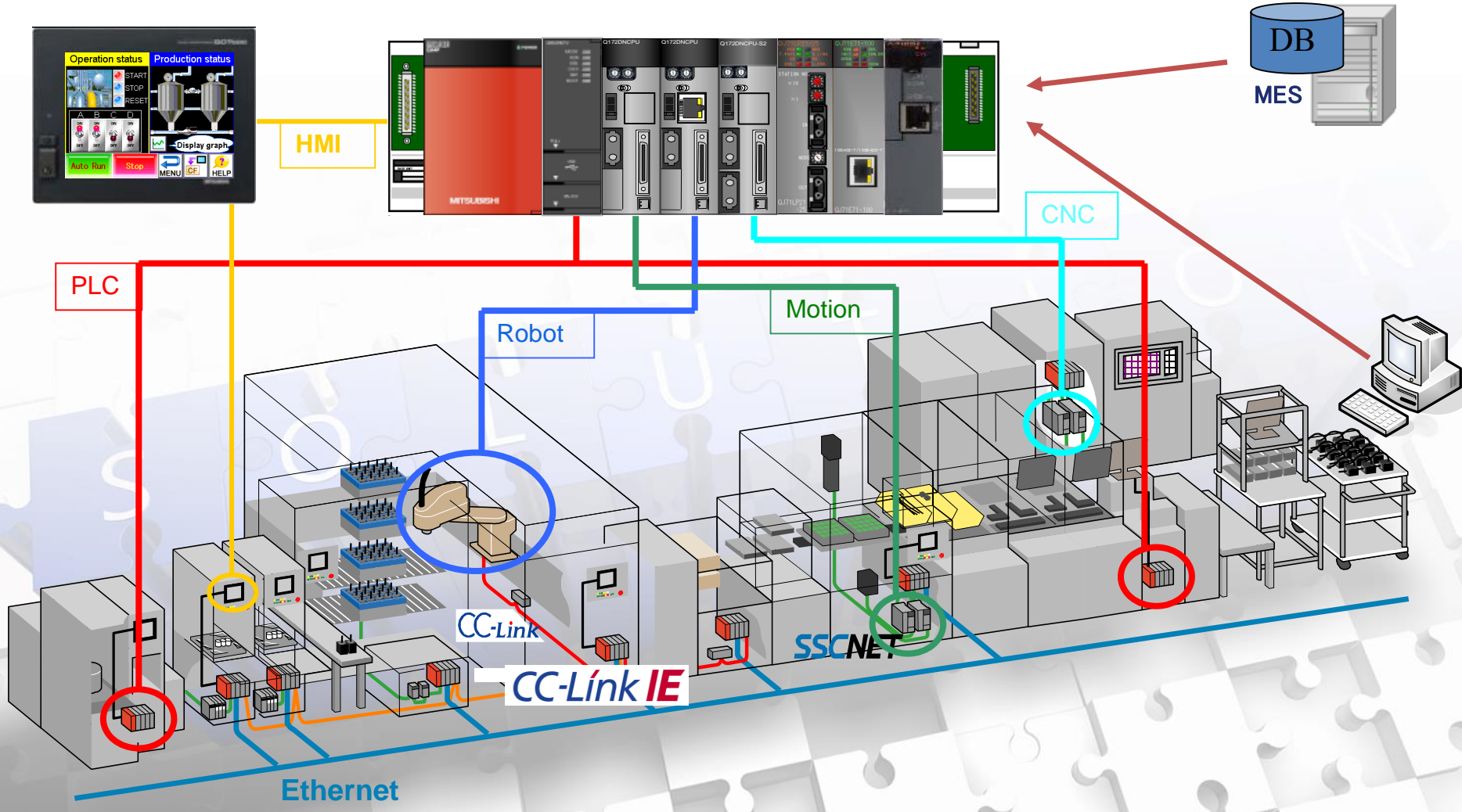


Fast data exchange & easy access to shared memory

iQ Platform robot controllers

The iQ Platform incorporates many different CPU types to integrate multiple control disciplines including sequence, process, servo motion, robot, information handling, process and more.





Additional servo axes control

Up to 8 additional axes can be controlled by the controller. Additional axes and user machines can be operated from the robot program and teaching pendant without any additional motion control hardware. The robot controller has plug-and-play compatibility with the MELSERVO (MR-J3-BS, MR-J4-B) servos.



All operations can be integrated in GOT

Enables the robot to be controlled from the GOT even without a teaching box. Current robot position data, error information, and other items can be displayed easily on the GOT.

- Internal robot information
- Errors
- program information
- Robot status
- Maintenance information
- Servo data



Assembly cell

- Robotic cell manufacturing
- Handling unit for tester

Life science

Pharmaceutical

- Pick and Place
- Tracking
- Test Automation

Automotive

- Covering the complete production chain
- Complete robotic integration
- Robotic vision solutions
- Force sensor QC stations

Food & Beverages

CPG

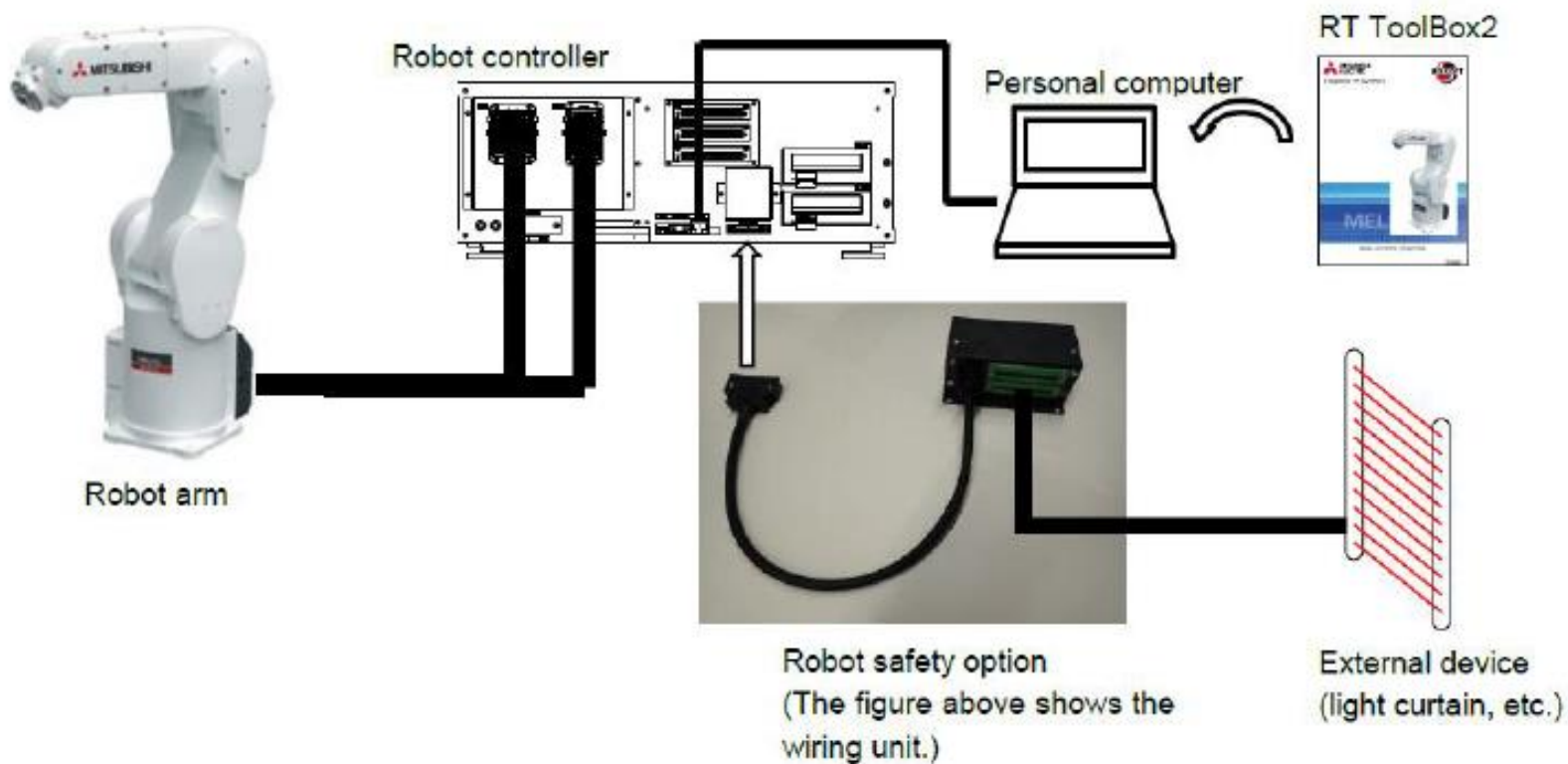
- Packaging
- Palletizing
- Decorating
- Capping



- **Improved productivity**
- **Reduced operation costs**
- **Solutions to suit most applications**
- **Small footprint range with high payload capability**
- **Floor and ceiling mounted models**
- **Meeting IP54 / IP67 standards**
- **Integrated safety functions**



■ System configuration

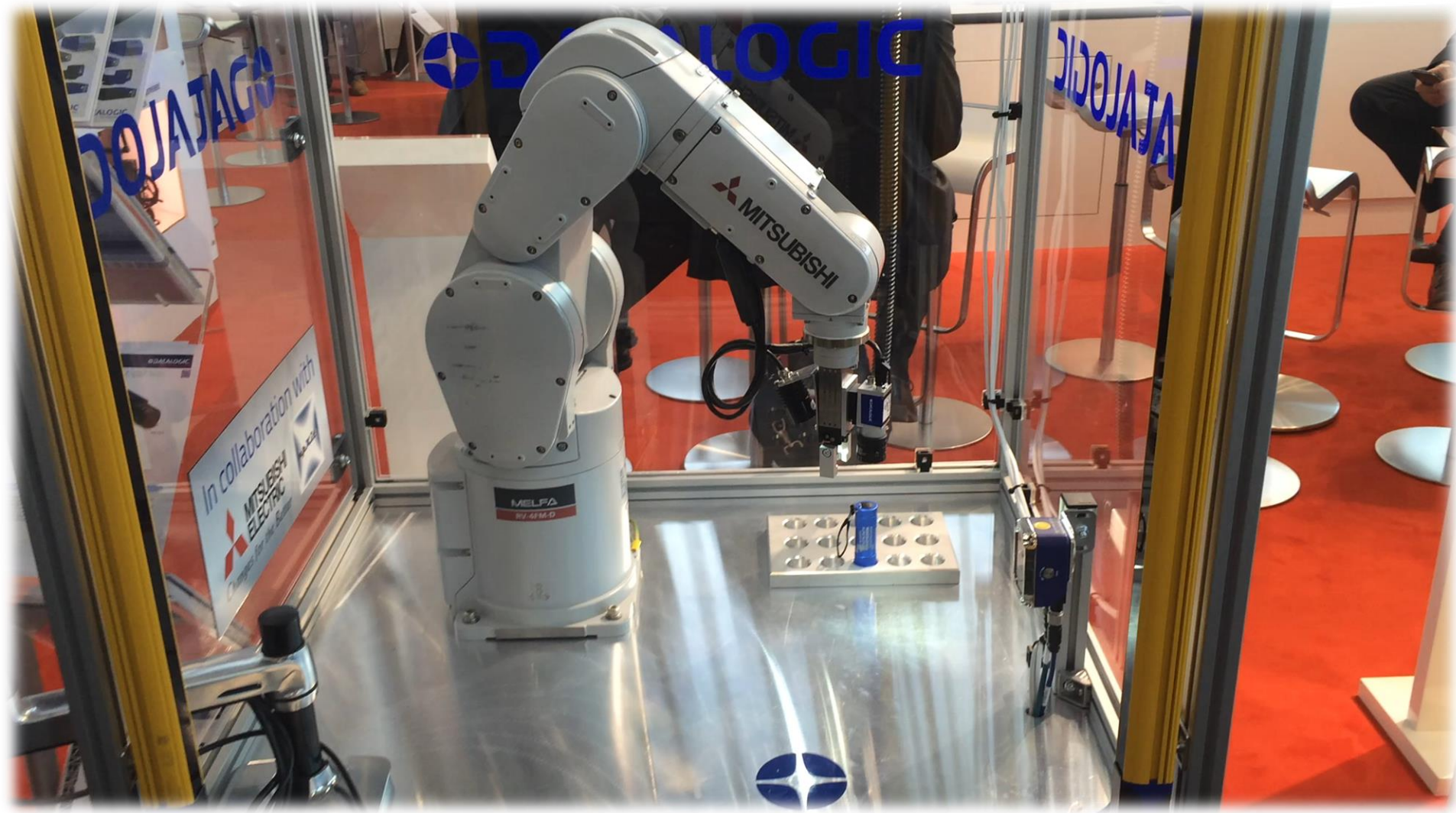


"MELFA SafePlus"

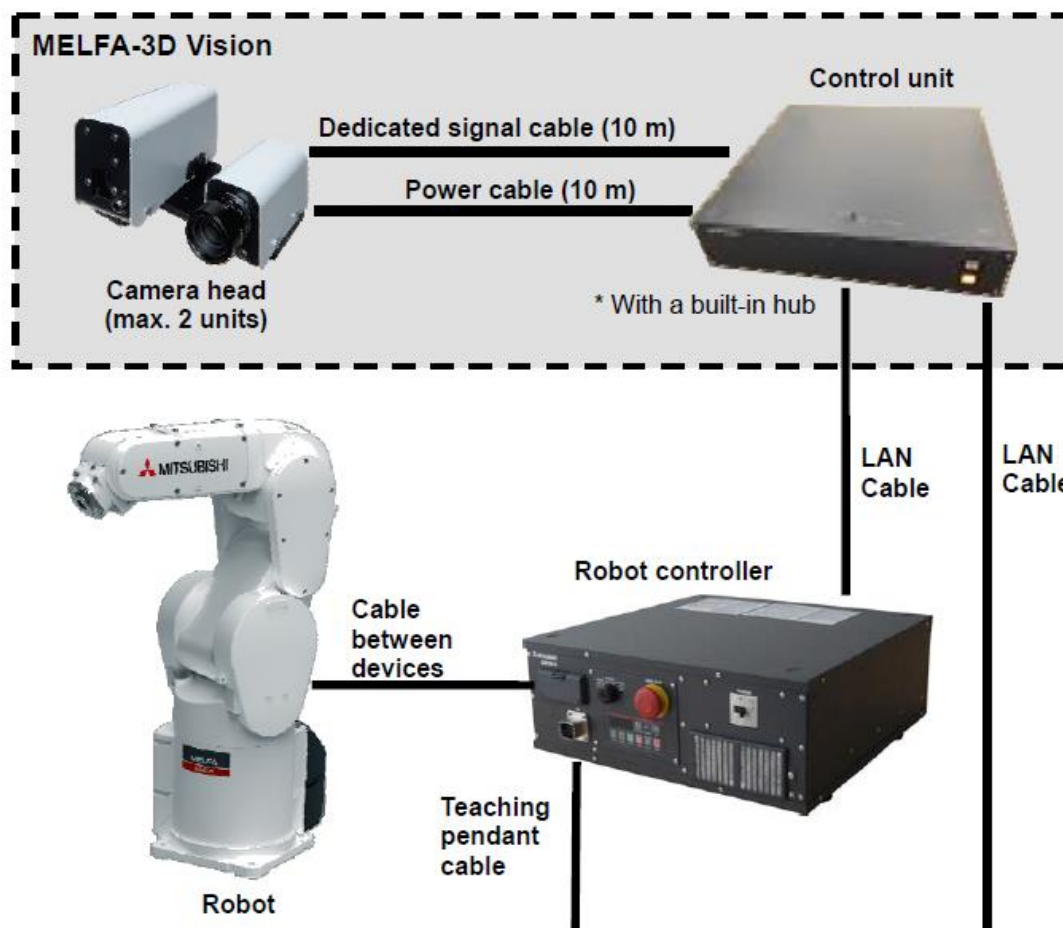
Features

Safety Function	Description	Related Standard
Reduced Speed Control	Function to control the robot speed with less than 250mm/s when signaled via safety input signals. Two different zones with different limited speed can be activated. Operator can be interactive while the robot is running in automatic mode, but with safe low speed.	SLS
Limited Range Control (Free plane limit function)	Function to control the robot movement range and to ensure that the robot does not exceed the set limit activated by the safety input signal. This function monitors four particular points of the robot arm. If one of them exceeds any set plane, the robot will stop immediately.	SLP
Torque Monitoring (Collision detection function)	The allowable torque range is set by parameter and the estimated torque is calculated with the robot movement. Actual torque (feedback) is monitored and if that value exceeds the allowable torque range, the robot immediately stops as STR error. This function is necessary for the detection of collision between humans and the robot/equipment.	STR
Safety Inputs (Dual channel)	Safety input function for activating the three different safety modes. Also an easy and safe connection to a Safety PLC is possible.	ISO13849-1
Safe Torque Off Safe Stop 1	Function that shuts off the motor power and stops the robot when some error occurs.	STO SS1

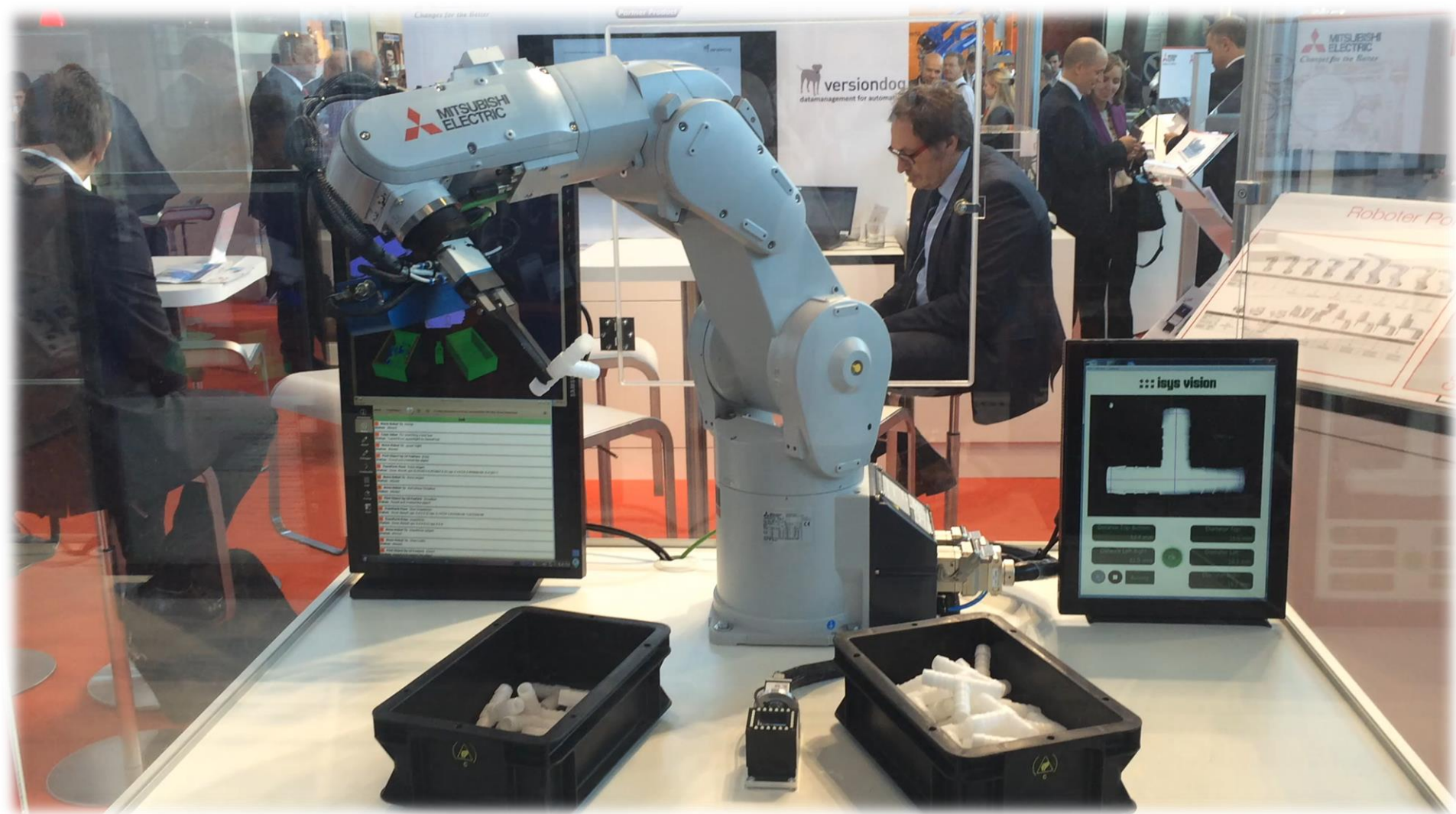
"MELFA SafePlus"



MELFA-3D Vision

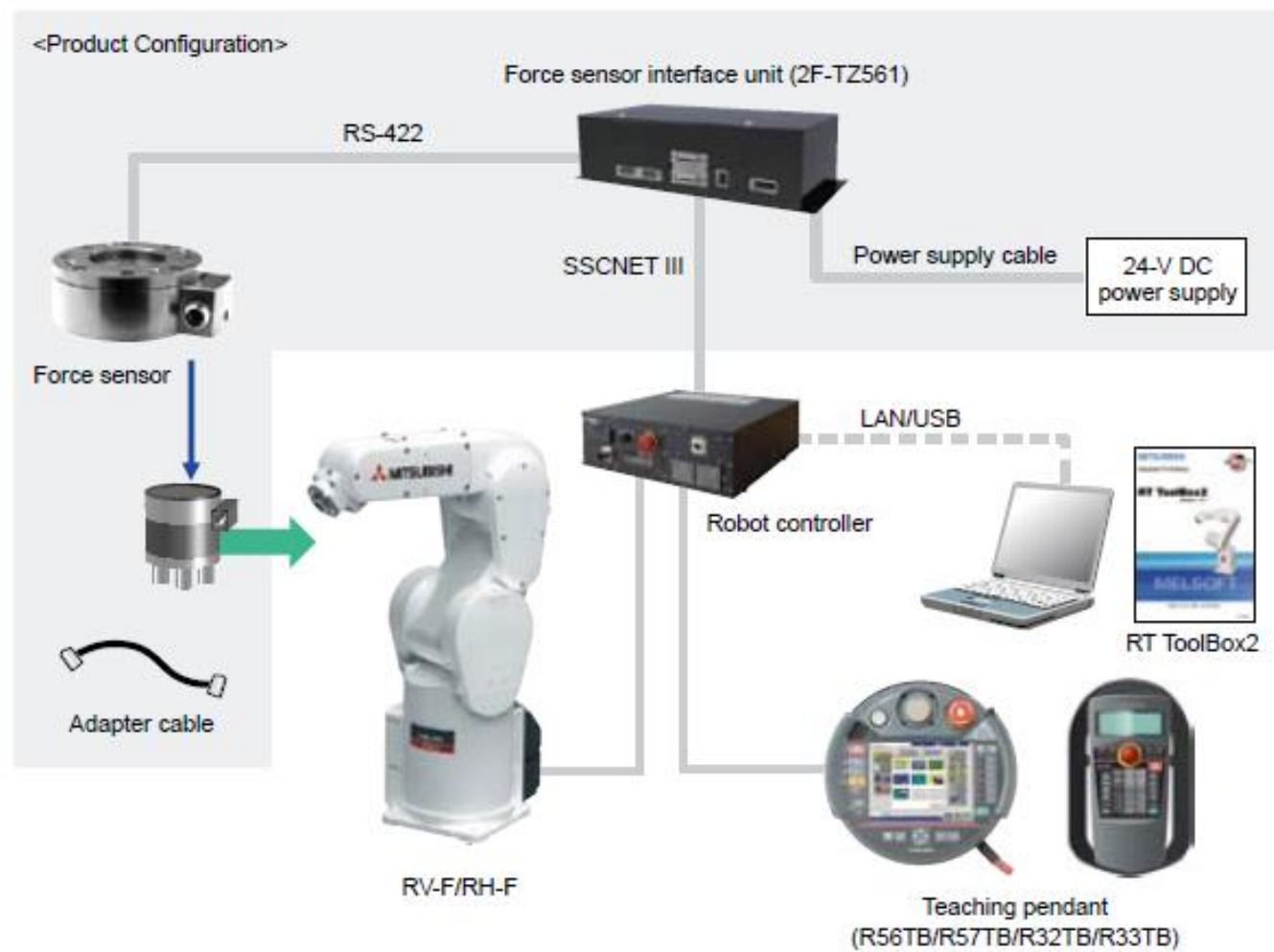


MELFA-3D Vision



Force sensor

System Configuration



✓ Stiffness control



Position compensation



Fixed position control

✓ Pressing force control

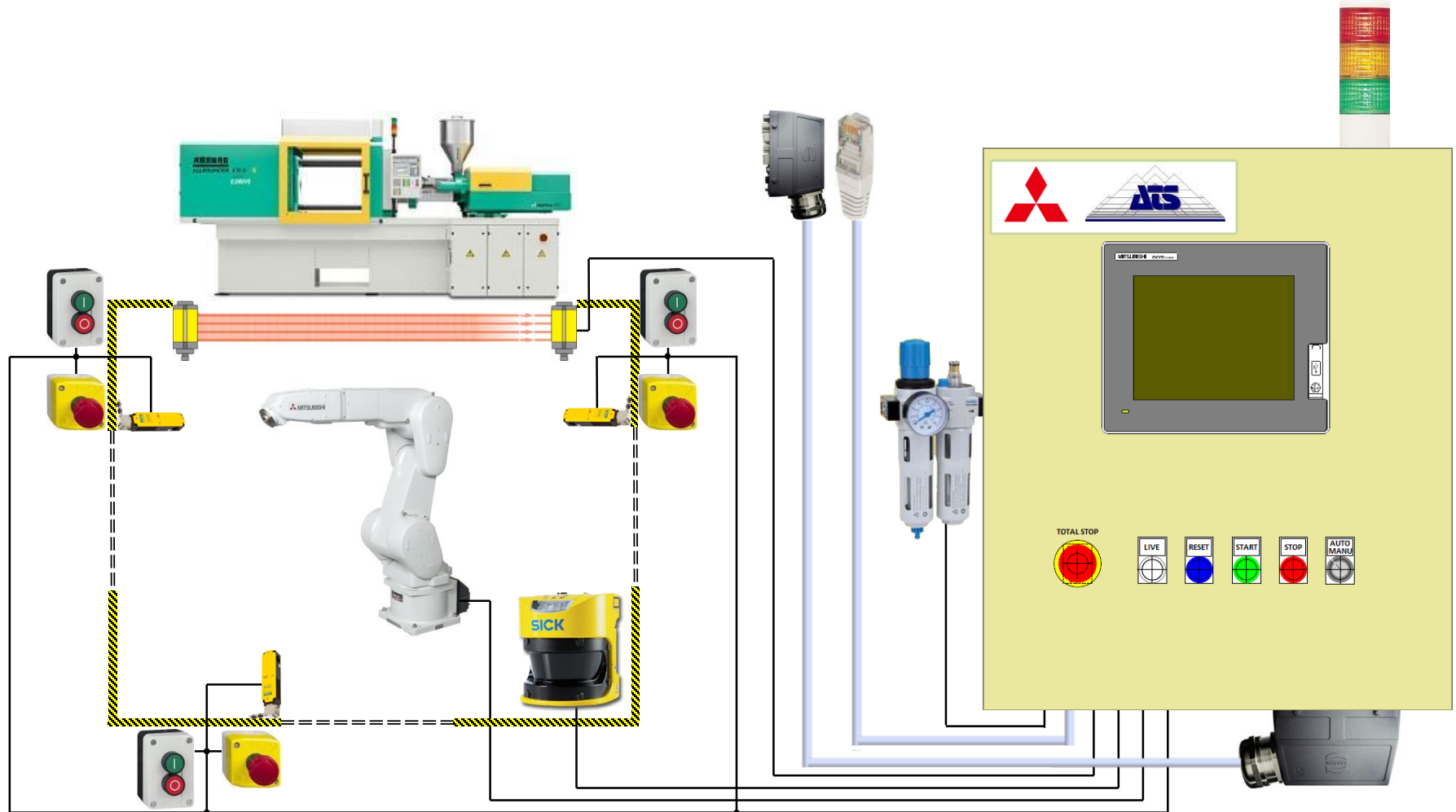


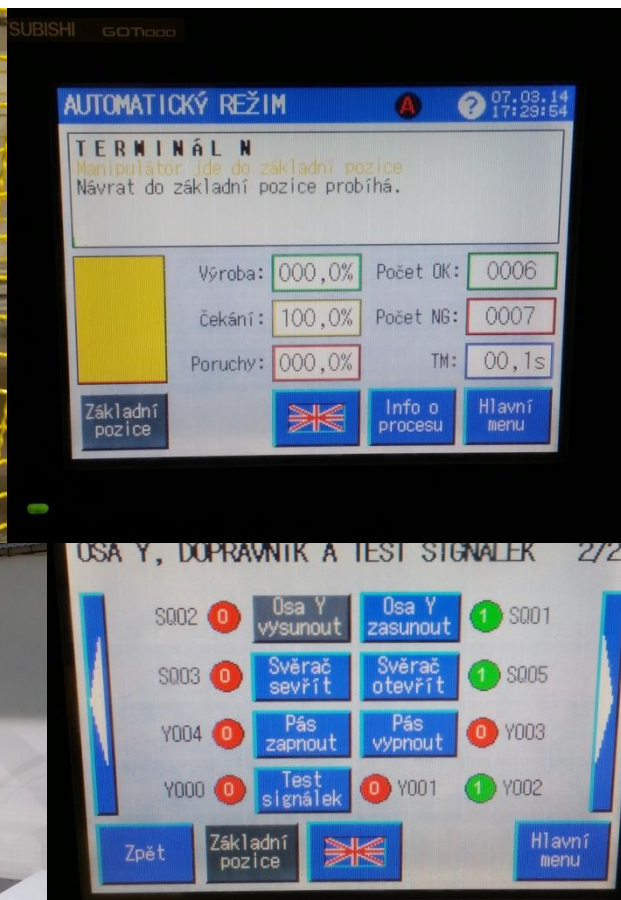
Copying surface

✓ Force detection



Pressing force control





- **Konzultace řešení (výběr robota, umístění, atd.)**
- **3D Simulace**
- **Simulace pracovního cyklu**
- **Reálné simulace**
- **Studie**
- **Školení**
- **Aplikační podpora**
- **Servis**

Připravujeme:

- **Hot-line support**
- **Projekt management**



A white Mitsubishi industrial robot arm is shown in the background, positioned vertically. The arm has the Mitsubishi logo and the word "MITSUBISHI" on its upper section. The base of the arm is labeled "MELFA RV-4FL-D". The background is a solid blue color with faint, stylized white lines and shapes, including a large gear-like pattern on the left side.

Thank you for your attention