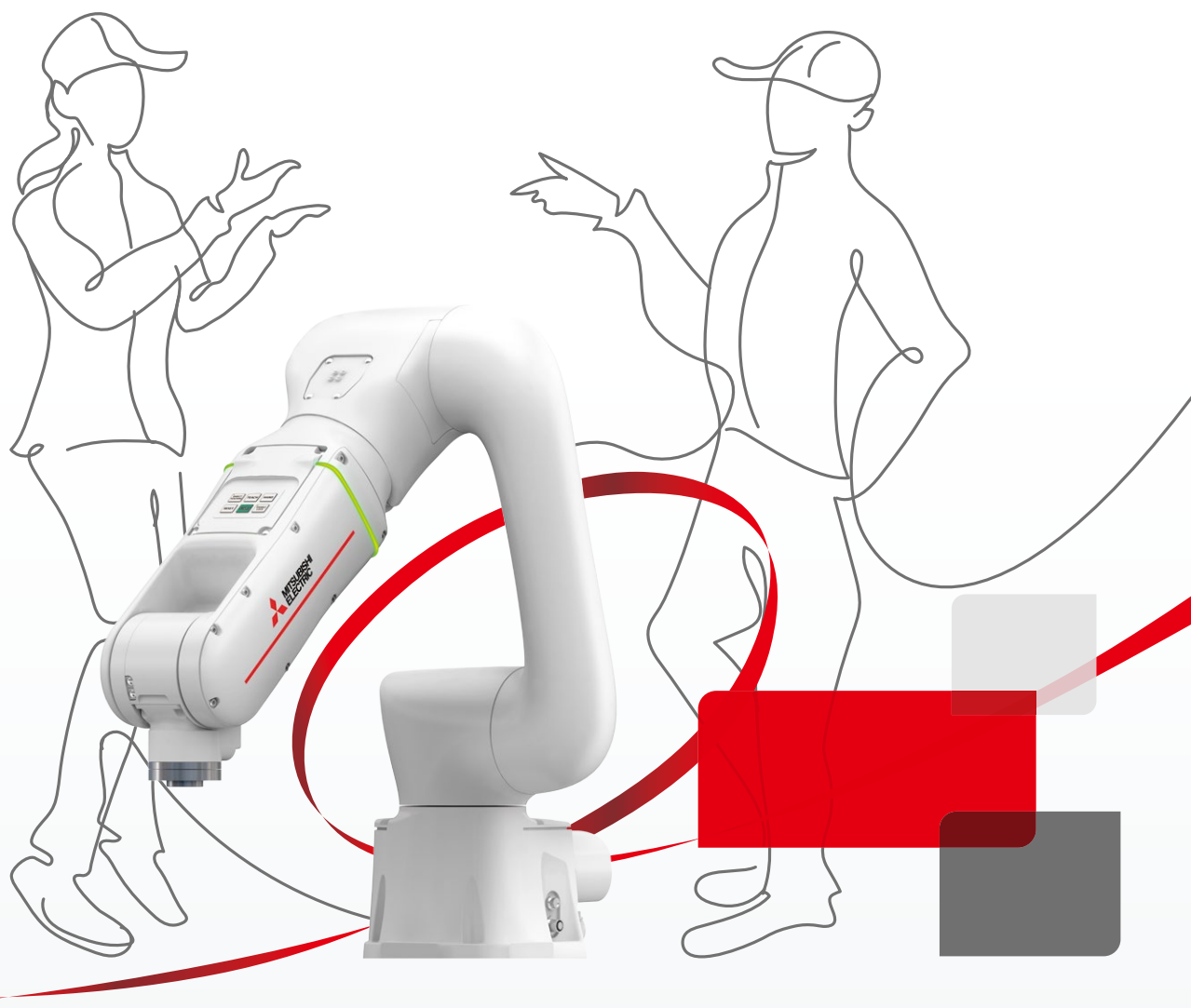


FACTORY AUTOMATION

mitsubishi electric collaborative robot melfa assista



MELFA

as*§*ista



Our Factory Automation business is focused on "Automating the World" to make it a better, more sustainable environment supporting manufacturing and society, celebrating diversity and contributing towards an active and fulfilling role.

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.



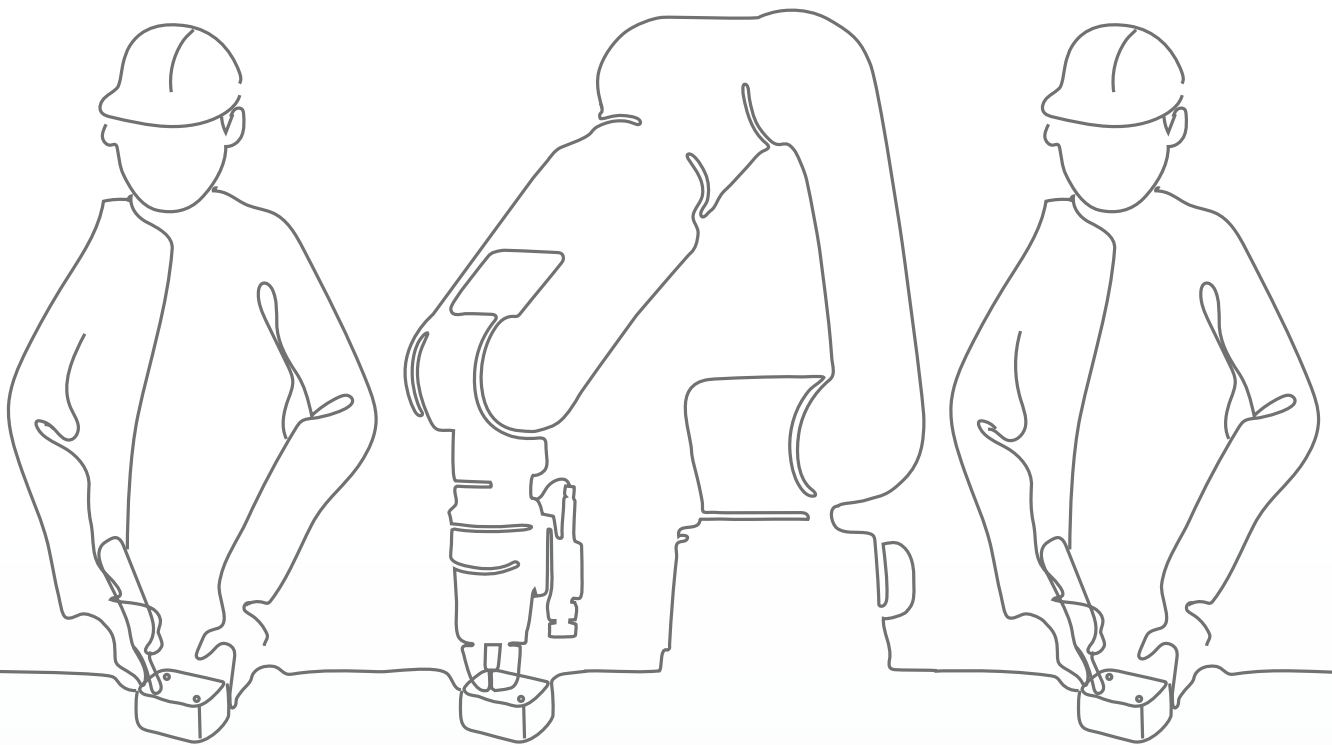
The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

OVERVIEW

Concept	4
Specification	14

► Some functions or options may be available only in specific versions or later.
For details on the compatibility, refer to the instruction manual for each function and option.

Integrate.



Mitsubishi Electric Collaborative Robot - ASSISTA

MELFA

as **Σ** ista

Collaborate.



Simpler and Easier



Mitsubishi Electric Collaborative Robot - MELFA ASSISTA
can share a workspace with humans.
Simpler, Easier and more flexible.
This robot will change your perception of what a "ROBOT" is.

Easy operation with
the Operation button.

Easy Control



No robot programming expertise required.

Easy Programming



MELFA
assist



Easy connectivity with
a wide variety of components.

Easy Connecting

Easy Control

Move Easily with
the Operating Buttons



The operating buttons on the robot arm provide you with easy control for ASSISTA and the teaching pendant for programming and teaching is no longer needed. The LED on the robot arm display the status of the robot.



Easy
Programming

Easy
Control

Easy
Connecting

MITSUBISHI
ELECTRIC

Easy Program

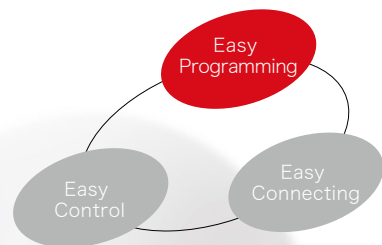
No Expertise
for Robot Required.

You can create programs visually using intuitive operations with RT-Visual-Box. "Visual Programming"

- This software allows operators to simply program this robot with a "train by demonstration" programming interface. This allows them to move the robot arm position and set way-points easily.

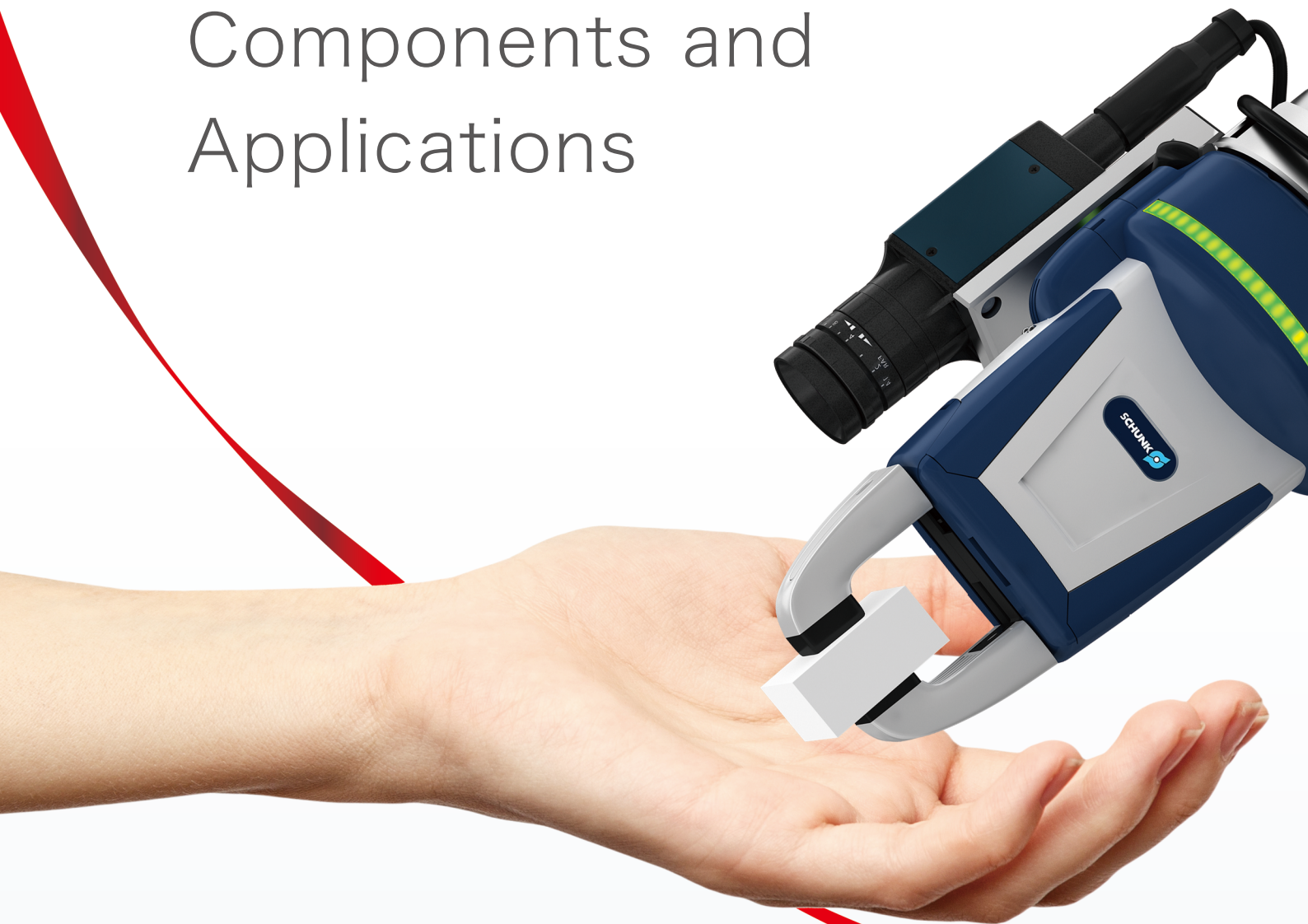


ming



Easy Connect

A Wide Variety of Components and Applications

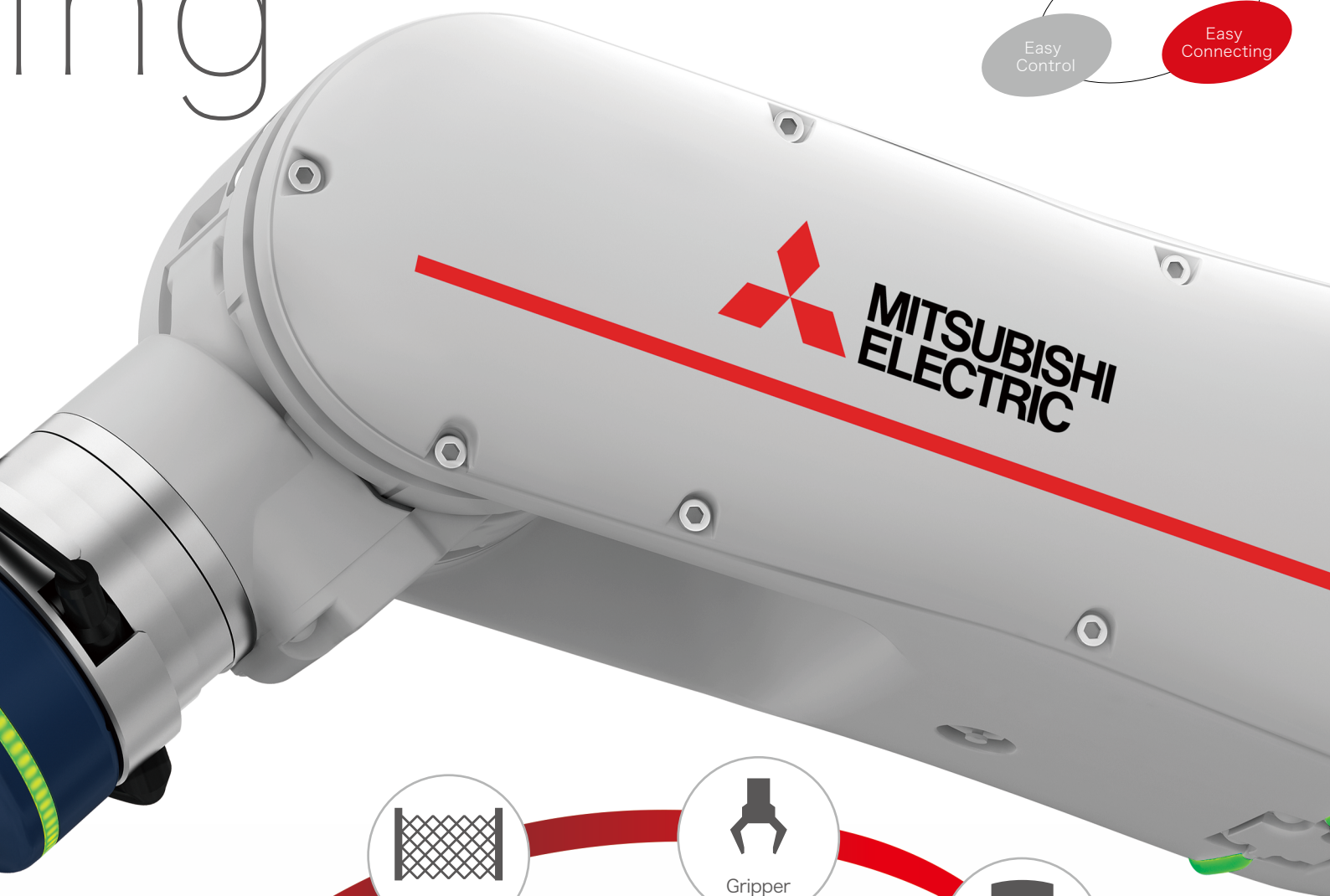
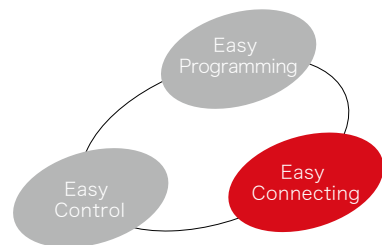


ASSISTA offers a wide variety of components—Grippers, Fingers, Vision and other peripherals—developed by a group of organizations known as MELFA Robot Partners.

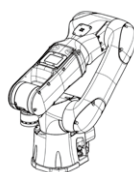
These tools can easily be setup and configured for your application. ASSISTA can also be configured to move freely as part of an AGV/AMR or as a mobile robot.

AGV: Automated Guided Vehicle
AMR: Autonomous Mobile Robot

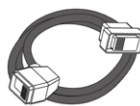
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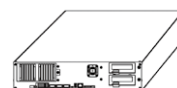
Robot arm



RV-5AS-D



Connect cable



Controller



Safety extension unit

CR800-05VD

Standard specifications of RV-5AS-D robot

Item		Unit	Specifications
IP Rate			IP54
Degree of freedom			6
Installation posture			Floor mounted / ceiling mounted
Structure			Vertical, multiple-joint type
Operating range	Waist (J1)	Degree	± 240
	Shoulder (J2)		± 148
	Elbow (J3)		± 150
	Wrist twist (J4)		± 200
	Wrist pitch (J5)		± 120
	Wrist roll (J6)		± 200
Speed of motion Note 1)	Waist (J1)	Degree/s	124 (59.6)
	Shoulder (J2)		124 (34.0)
	Elbow (J3)		124 (34.0)
	Wrist twist (J4)		297 (142)
	Wrist pitch (J5)		356 (215)
	Wrist roll (J6)		360
Maximum reach radius		mm	910
Maximum resultant velocity Note 2)	High-speed operation mode	mm/sec	1,000
	Collaborative operation mode (Standard operation)		250
	Collaborative operation mode (Low-speed operation)		50
Load	Rating	kg	5
	Maximum Note 3)		5.5
Pose repeatability		mm	± 0.03
Ambient temperature Note 4)		°C	0 to 40
Mass		kg	32
Wiring	Hand I/O	–	Mechanical interface: 2 inputs/4 outputs Forearm: 6 inputs/0 outputs Base: 0 inputs/4 outputs
	Force sensor cable/Spare cable	–	5-conductor (24 V/0.7 A) One of the conductors should be used for the frame ground (FG).
	LAN cable	–	Cat-5e supported
Plumbing	Primary hoses	–	Φ6 × 2
	Secondary hoses	–	Φ4 × 4 From the base of the robot to the elbow.
Supply pressure		MPa	0.54

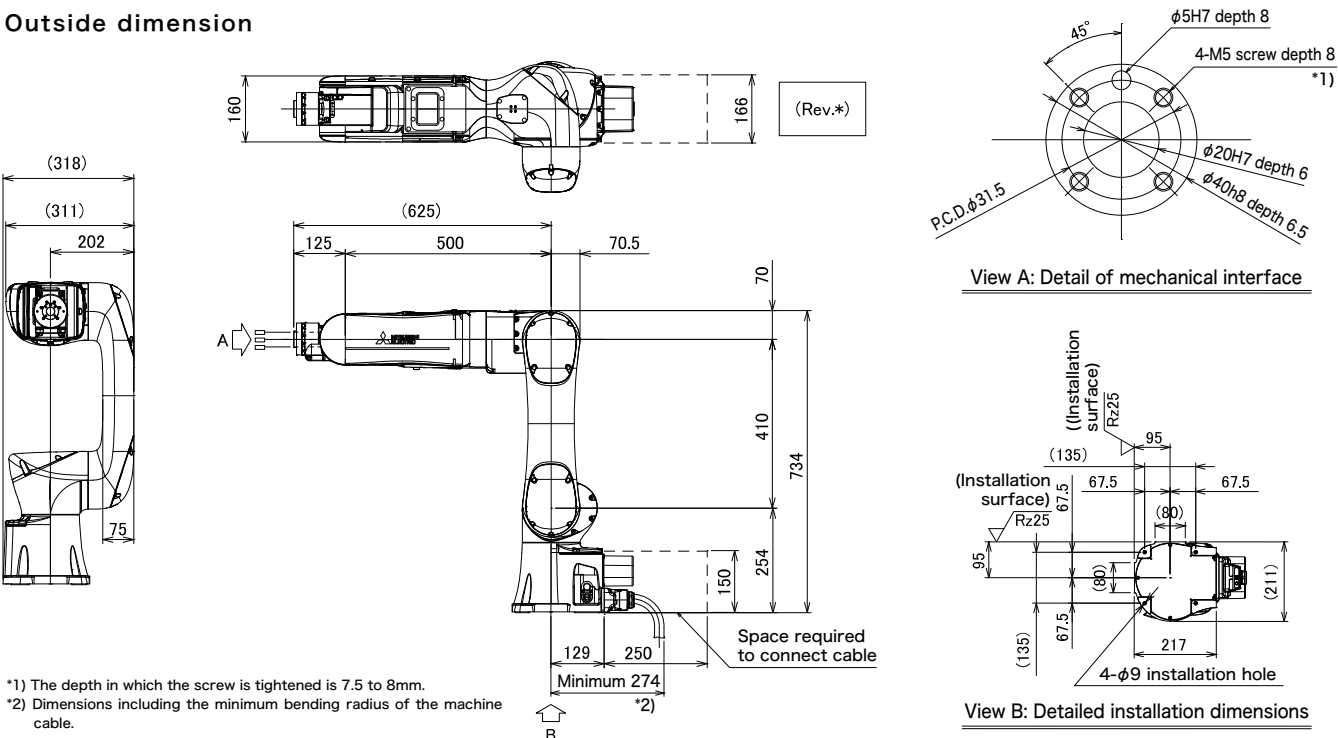
Note1) Values in parentheses indicate the maximum speed when the input voltage is single-phase 100 to 120 VAC.

Note2) These values represent the maximum overall speed of all axes combined. The safety functions limit the robot to the speeds shown in the table. For accurate collision force data when the robot is in Collaborative operation mode, measure collision forces under actual operating conditions.

Note3) Allowable load when the mechanical interface faces downward at an inclination within $\pm 10^\circ$ to the vertical direction.

Note4) Sets the robot's operating environmental temperature as parameter OLTMX. The initial value is 30 (°C). Corresponding to the environment, the continuous control action performance and the overload-protection function are optimized.

Outside dimension

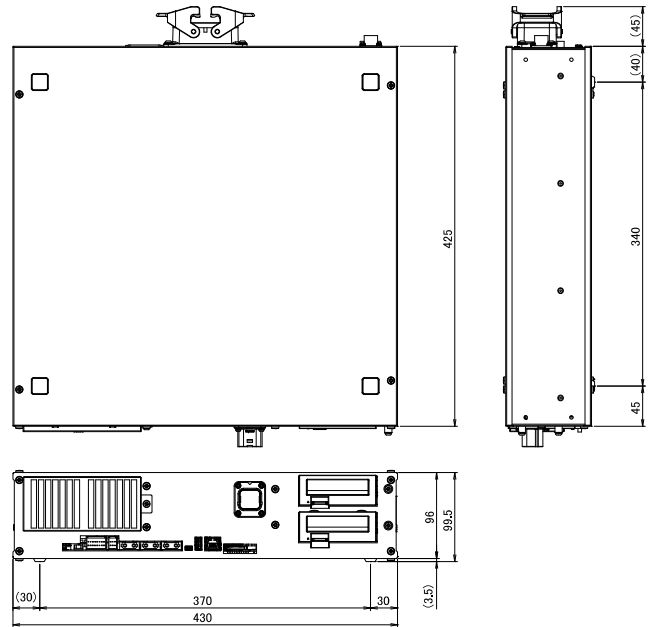


*1) The depth in which the screw is tightened is 7.5 to 8mm.

*2) Dimensions including the minimum bending radius of the machine cable.

CR800-05VD controller specifications of controller

Item	Unit	Specification	Remarks
Number of control axis	–	Simultaneously 6	–
Memory capacity	Programmed positions	point	39,000
	No. of steps	step	78,000
	Number of program	–	512
Robot language	–	MELFA-BASIC VI	–
Teaching method	–	Pose teaching method, MDI method	–
External input and output	Input/output	point	0/0
	Dedicated input/output	–	Assigned with general-purpose input/output
	Emergency stop input ^{Note2)}	point	1 (duplicated)
	Emergency stop output	point	1 (duplicated)
	Mode selector switch input ^{Note3)}	point	1 (duplicated)
	Mode output	point	1 (duplicated)
	Robot error output	point	1 (duplicated)
	Door switch input	point	1 (duplicated)
Safety I/O	Encoder input	Channel	2
		point	8 (duplicated) / 4 (duplicated)
Interface	Force sensor interface	Channel	1
	Remote input/output	Channel	1
	USB	port	1
	Ethernet	port	1
			1
	Option slot	slot	2
	SD memory card slot	slot	1
Power source	RS-422	port	1
	Input voltage rang	V	Single phase AC 100 to 120 Single phase AC 200 to 230
	Power capacity	kVA	1.0
	Power supply frequency	Hz	50/60
Outline dimensions	mm	430(W) x 425(D) x 99.5(H)	Excluding protrusions
Mass	kg	Approx.12.5	–
IP Rate		IP20	–
Ambient temperature	°C	0 to 40	Without freeze
Ambient humidity	%RH	45 to 85	Without dew drops
Grounding	Ω	100 or less	Class D Grounding ^{Note5)}



Note1) The maximum number of usable programs differs depending on the number of types of workpieces that are registered.

Note2) Only the STO function can meet the requirements of Category 4, Performance Level e. At factory settings, the STO function meets the requirements of Category 3, Performance Level d. To make the STO function meet the requirements of Category 4, Performance Level e, change the parameter setting.

Note3) Provide a mode selector switch to change the mode (MANUAL/AUTOMATIC) of the controller.

Note4) The power capacity is the recommended value. The power capacity does not include the rush current when the power is turned ON. The power capacity is a guideline and the actual operation is affected by the input power voltage.

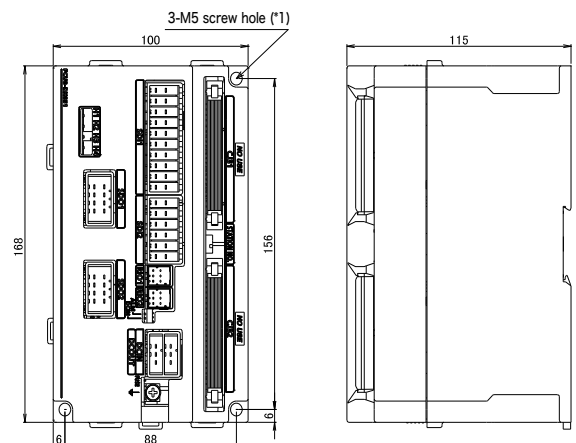
Note5) The robot must be grounded by the customer.

Safety extension unit

Item	Description	Remarks
Safety function	STO function	The function electrically shuts off the driving energy to the motor of the robot arm.
	SS1 function	The function to control and decelerate the motor speeds of the robot. After stopping, the robot transitions to the STO state.
	SS2 function	The function to control and decelerate the motor speeds of the robot. After stopping, the robot transitions to the SOS state.
	SOS function	Without shutting off the driving energy to the motors, this function monitors the robot so that it stays at rest.
	SLS function	This is a function to monitor each part of the robot arm so that their speeds do not exceed monitoring speeds.
	SLP function	The function monitors specified monitoring positions so that they do not go across position monitoring planes.
	STR function	This function ensures that the torque limits of each motor in the robot are not exceeded.
Standard		EN ISO 10218-1: 2011 ISO/TS 15066: 2016 EN ISO 13849-1: 2015 EN 61800-5-1: 2007 EN 61800-5-2: 2017 EN 61000-6-7: 2015 EN 61326-3-1: 2017 IEC 61508-1: 2010 IEC 61508-2: 2010 IEC 61508-3: 2010
		–
Safety performance	Power supply specifications	24 V DC ± 5% Ripple 0.2 V (P-P)
	Maximum consumption current	300 mA
Safety extension unit	IP Rate	IP20
	Weight	0.8kg
	Environment	Operating temperature range
		0 to 40°C
		Relative humidity
		45 to 75%
Input signal		8 routes (duplicated signal)
	Output signal	4 routes (duplicated signal)

Safety functions and safety performance of CR800-05VD controller

Fuction	Item	Performance	Remarks
STO	Safety Level	SIL 3 (IEC 61508:2010) Category 4, PL e (EN ISO 13849-1:2015)	Performance when parameter settings are changed
	Mean time to dangerous failure (MTTFd)	MTTFd ≥ 100 years	
	Diagnostic coverage (DC)	DC = 99%	
	Probability of dangerous failure per hour (PFH)	PFH = 1.40×10^{-8} [1/hour]	Factory setting
	Safety Leve	SIL 2 (IEC 61508:2010) Category 3, PL d (EN ISO 13849-1:2015)	
	Mean time to dangerous failure (MTTFd)	MTTFd ≥ 100 years	
SS1,SS2, SOS,SLs, SLP	Diagnostic coverage (DC)	DC = 90%	
	Probability of dangerous failure per hour (PFH)	PFH = 1.57×10^{-8} [1/hour]	
	Safety Level	SIL 2 (IEC 61508:2010) Category 3, PL d (EN ISO 13849-1:2015)	
	Mean time to dangerous failure (MTTFd)	MTTFd = 24 years	
STR	Diagnostic coverage (DC)	DC = 90%	
	Probability of dangerous failure per hour (PFH)	PFH = 3.42×10^{-7} [1/hour]	
	Safety Level	SIL 2 (IEC 61508:2010) Category 3, PL d (EN ISO 13849-1:2015)	
	Mean time to dangerous failure (MTTFd)	MTTFd = 24 years	
	Diagnostic coverage (DC)	DC = 90%	
	Probability of dangerous failure per hour (PFH)	PFH = 3.62×10^{-7} [1/hour]	



The list of robot option equipment

Item	Type	Description
Machine cable (replacement)	1F-□□UCBL-41	"□□" in type shows the length of the cables as follows. 02=2 m, 10=10 m (Changed from the original length of 5 m)
Solenoid valve set	1F-VD0□□-01(Sink) 1F-VD0□□-01(Source)	Sets with one or two valves are available. $\Phi 4$ diameter output hoses The number that replaces "□□" indicates the number of valves the solenoid has (1 or 2).
2-piece force sensor conversion cable set	1F-ASSISTA-ADCBL	2-piece force sensor conversion cable set (hand cable/base cable) required to connect the force sensor to the robot.
Vision sensor mounting bracket	1F-ASSISTA-2DVSFLG	Bracket required to connect a vision sensor to the hand.

The list of the controller option equipment and special specification

Item	Type	Description
Easy-setup kit	4F-ASSISTASETUP-JP (for Japan/NorthAmerica)	A kit which aids setup that consists of switches, a connector cable, and a 24 V power supply.
	4F-ASSISTASETUP-EU (for Europe/China)	
RT VisualBox	3G-30C-WINE	Windows 11 Supporting English.
RT ToolBox3	3F-14C-WINE	Windows 11 Supporting English. (With the simulation function) Ver.1.70Y or later
RT ToolBox3 mini	3F-15C-WINE	Windows 11 Supporting English. Ver.1.70Y or later
Simple teaching pendant	R32TB/R32TB-15	Cable length 7m, Cable length 15m
Highly efficient teaching pendant	R56TB/R56TB-15	Cable length 7m, Cable length 15m
Parallel I/O Interface	2D-TZ368(Sink type)	DO: 32 point
	2D-TZ378(Source type)	DI: 32 point
External I/O cable (For Parallel I/O Interface)	2D-CBL05	CBL05:5m, CBL15:15m Use to connect the external peripheral device to the parallel input/output interface.
CC-Link interface	*1 2D-TZ576	Only intelligent device station, Local station.
Network base card (CC-Link-IE TSN)	*1 2F-DQ535-TSN	Communication interface for mounting the Anybus CompactCom module manufactured by HMS. The customer needs to prepare CC-Link IE TSN (AB6714-C-106) manufactured by HMS.
Network base card (EtherNet/IP interface)	*1 2F-DQ535-EIP	Communication interface for mounting the Anybus CompactCom module manufactured by HMS. The customer needs to prepare the EtherNet/IP module (AB6704-E-161) manufactured by HMS.
Network base card (PROFINET IO interface)	*1 2F-DQ535-PN	Communication interface for mounting the Anybus CompactCom module manufactured by HMS. The customer needs to prepare the PROFINET IO module (AB6705-E-210) manufactured by HMS.
Network base card (CC-Link IE Field interface)	*1 2F-DQ535	Communication interface for mounting the Anybus CompactCom module manufactured by HMS. The customer needs to prepare the CC-Link IE Field module (AB6709-C-118) manufactured by HMS.
Network base card (EtherCAT interface)	*1 2F-DQ535-EC	Communication interface for mounting the Anybus CompactCom module manufactured by HMS. The customer needs to prepare the EtherCAT module (AB6707-E-224) manufactured by HMS.
SD memory card	*1 2F-2GBSD	Memory card capacity 2GB.

*1 Not supported by RT VisualBox.

The list of function extension device

Item	Type name	Specifications
Force sensor set	*1 4F-FS002H-W200	A set of devices necessary for force sense control function, such as a force sensor, an interface unit, and support software.
MELFA-3D Vision 3.0	*2 3F-53U-WINM	MELFA-3D Vision software

*1 Not supported by RT VisualBox.

*2 The camera head must be prepared by customers. Manufacturer: ENSENSO GmbH (Distributor: IDS Imaging Development Systems GmbH)

ASSISTA Startup Configuration



This image shows a full page of blank, lined paper. It features approximately 28 horizontal blue lines spaced evenly across the page, typical of standard notebook paper. The lines are thin and light blue, set against a plain white background. There are no margins, text, or other markings on the page.

[illegible]

Creating Solutions Together.



Low-voltage Power Distribution Products



Transformers, Med-voltage Distribution Products



Power Monitoring and Energy Saving Products



Power (UPS) and Environmental Products



Compact and Modular Controllers



Servos, Motors and Inverters



Visualization: HMIs



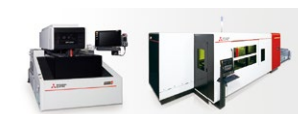
Edge Computing Products



Numerical Control (NC)



Collaborative and Industrial Robots



Processing machines: EDM, Lasers



SCADA, analytics and simulation software

Mitsubishi Electric's product lineup, from various controllers and drives to energy-saving devices and CFRP laser processing machines, all help you to automate your world. They are underpinned by software, innovative data monitoring, and modelling systems supported by advanced industrial networking and Edgecross IT/OT connectivity. Together with a worldwide partner ecosystem, Mitsubishi Electric factory automation (FA) has everything to make IoT and Digital Manufacturing a reality.

With a complete portfolio and comprehensive capabilities that combine synergies with diverse business units, Mitsubishi Electric provides a one-stop approach to how companies can tackle the shift to clean energy and energy conservation, carbon neutrality and sustainability, which are now a universal requirement of factories, buildings, and social infrastructure.

We at Mitsubishi Electric FA are your solution partners waiting to work with you as you take a step toward the realization of sustainable manufacturing and society through the application of automation. Let's automate the world together!

Global Partner. Local Friend

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Product Security
Initiatives.



Mitsubishi Electric's e-F@ctory concept utilizes both FA and IT technologies, to reduce the total cost of development, production and maintenance, with the aim of achieving manufacturing that is a "step ahead of the times". It is supported by the e-F@ctory Alliance Partners covering software, devices, and system integration, creating the optimal e-F@ctory architecture to meet the end users needs and investment plans.



MITSUBISHI ELECTRIC CORPORATION

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