Changes for the Better

MITSUBISHI ELECTRIC

MITSUBISHI ELECTRIC INDUSTRIAL ROBOT

MELFA RV-3S/3SJ Series

RV-3S

RV-3SJ

MELFA RV-S series

Nagoya works, Mitsubishi Electric Corporation, has acquired certifi-cation for systems of environmental management under ISO 14001, and for quality management systems under ISO 9001.

ISO 14001 JACO EC97J1113 UKAS ENVIRONMENTAL MANAGEMENT 051

Certified ISO 9001 by BVQI UKAS QUALITY MANAGEMENT 008

BREAKTHROUGH INNOVATION

Introducing the RV-3S Series - the ultimate compac

Mitsubishi's original robot dedicated motor and dedicated servo amplifier have been newly developed to improve the robot's movement and basic performance. A variety of functions, realized with the 64-bit RISC processor, provide solutions for our customer's high value-added systems.

MELFA RV-S series

Speedy
Fastest in the class

Tact times can be reduced with the class's fastest high-speed movement (*1).
*1 Maximum composite speed 5.5m/s (RV-3S: 57% Up compared to conventional RV-2A)

Strong
High payload capacity, highly rigid arm and improved environment withstand performance

Work using complicated hands can be carried out with the maximum 3.5kg payload capacity (downward).

Specialist
Handle intrinsic work with diverse functions

Diverse functions allow compliance with various applications, efficient teaching work, reduced tact time, and reduced system costs and maintenance costs.
●Orthogonal compliance function ●Multi-task function ●Impact detection function
●Position restoration function ●Maintenance forecast function
●Specific point passage function ⇒New function

RV-3S
<6-axis Robot>

RV-3SJ
<5-axis Robot>

CR1B-571

Features

Improved Productivity

●Class's fastest speed
The device's tact time can be greatly reduced with the maximum composite speed of 5.5m/sec.

●Diverse lineup configuration
The 3kg payload robot has been newly added to the S Series to enhance the Mitsubishi Electric vertical articulated robot lineup.
Standard models can be suspended from the ceiling. Wall-hanging installation is possible with special specifications at shipment.
*The J1 axis movement range is limited with the wall hanging type

●Compliance with environment withstanding specifications
All axes (arm section, body section) comply with IP65 with the standard specifications. Clean room specifications are available with special specifications.

●Improved position repeatability
A position repeatability of ±0.02mm is realized.
(Conventional model: ±0.04mm)

●Arm shape designed to accommodate peripheral devices
The degree of layout freedom in the device has been improved by reducing the elbow arm protrusion, and reducing the steering axis interference range. This new series realizes a compact device and helps to save space.

Reduction of Maintenance Cost

●Additional maintenance functions
The maintenance period is announced beforehand by the maintenance forecast function and position restoration function, allowing timely maintenance and a reduction of total maintenance costs.

Powerful and improved level

●Increased number of hand input/output points: 8/8 points
*Hand output interface (when option is mounted)
*Conventional RV-2A: 4/4 points
The tact time can be improved by increasing the number of secondary air pipes and enhancing the response.

●New functions
The specific point passage point function allows a freer peripheral layout.
The specific point eliminates the need to halt work, and allows teaching work to be completed easily.
Teaching, step operation and automatic operation can be handled in the same manner, thereby improving workability.

Compatible

●Compatible with RV-2A/3AJ
[Compatible installation and end effector shape]
The conventional model can easily be changed to this new series. The device's performance can also be improved by replacing the models.

Model Structure

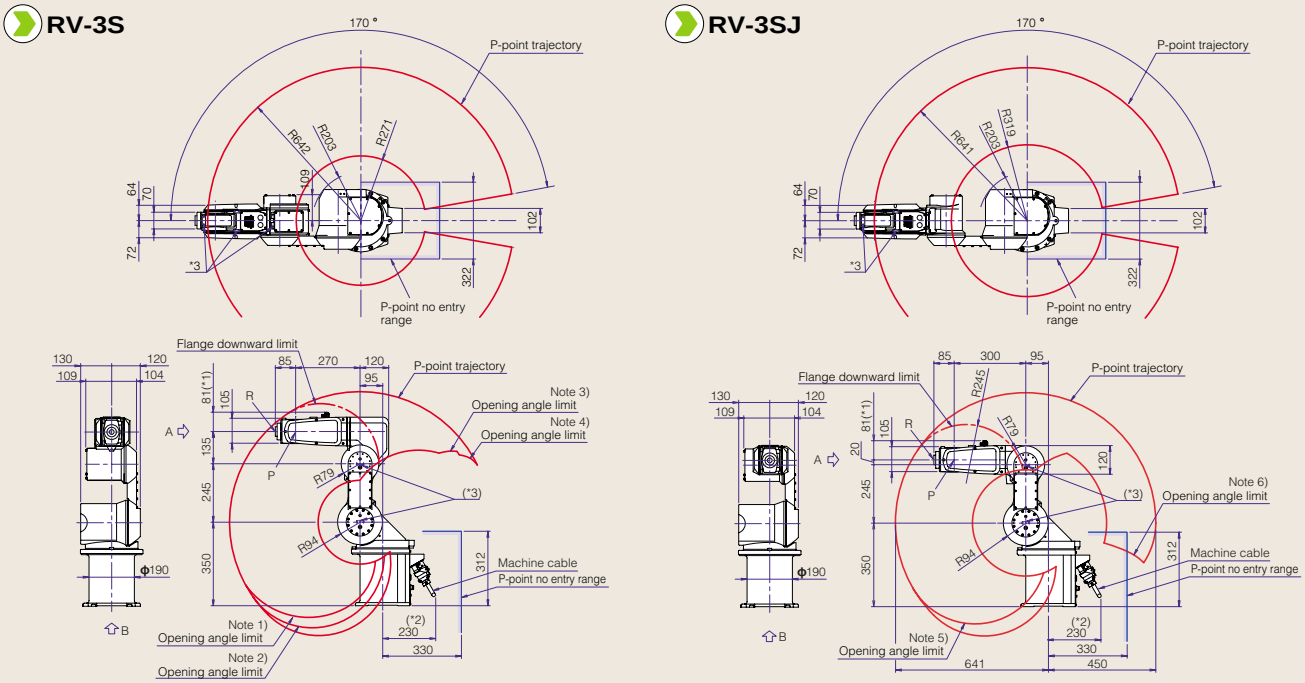
Robot type		RV-3S	RV-3SC	RV-3SJ	RV-3SJC	RV-3S-SM	RV-3SJ-SM
Mechanism body (*3)	Number of axes	6 axis		5 axis		6 axis	5 axis
	Oil mist specifications (IP65)	○	–	○	–	○	○
	Clean specifications (Class 10)	–	○	–	○	–	–
Controller	Open type (IP20)	○	○	○	○	–	–
	Oil mist specifications (IP54)	–	–	–	–	○ (*2)	○ (*2)

*2: The controller protection box is enclosed as a standard with the SM specifications. CR1B-MB (protection box) is enclosed with CR1B-571 (IP20).
*3: The 6-axis model does not have brakes on the J4 axis or J6 axis. The 5-axis model does not have brakes on the J6 axis.

t robot with powerful and outstanding performance!

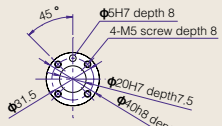
Robot Arm External Dimension/Movement Range Diagrams

RV-3S



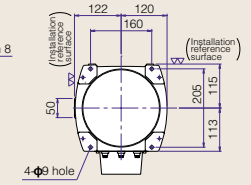
<Front wide-angle narrow-angle limit>
Note1: When the J1 axis angle is within the range of 170deg≧J1>125deg, the J2 axis movement range is limited to 125deg>J2≧-90deg.
Note2: When the J1 axis angle is within the range of -125deg>J1≧-170deg, the J2 axis movement range is limited to 1130deg>J2≧-90deg.

<Rear wide-angle narrow-angle limit>
Note3: When the J2 axis angle is within the range of -30deg>J2>-60deg, the J3 axis movement range is limited to the range that satisfies 4*J2+3*J3>-180 and satisfies 171deg≧J3>-20deg.
Note4: When the J2 axis angle is within the range of -60deg>J2≧-90deg, the J3 axis movement range is limited to the range that satisfies 2.7*J2+J3>-142 and satisfies 171deg≧J3>-20deg.



View A: Details of hand mounting flange section

(J6=0 ↑
(ISO 9409-1 compatible)



View B Rear Surface Diagram; Installation Dimension Detail

RV-3SJ

<Front wide-angle narrow-angle limit>
Note5: When the J1 axis angle is within the range of 170deg≧ | J1 | >125deg, the J2 axis movement range is limited to 120deg>J2≧-90deg.

<Rear wide-angle narrow-angle limit>
Note6: When the J2 axis angle is within the range of -30deg>J2>-90deg, the J3 axis movement range is limited to the range that satisfies 14*J2+9*J3>-1530 and satisfies 137deg>J3>-100deg.

Note
(*1) Indicates the dimensions when the solenoid valve (option) is mounted.
(*2) Indicates the space required for the device cable connection.
(*3) Indicates the screw hole (M4) for fixing the user's wiring and piping.

Specification

●Robot Body

Type		Unit	RV-3S/3SC	RV-3SJ/3SJC
Machine class			Standard (oil mist)/Clean	
Installation posture			Installation on floor, hanging (hanging on wall *4)	
Protection class/Clean specifications			IP65/class 10 *5	
Degrees of freedom *6			6	5
Controller			CR1B-571	
Operating range	J1	deg	340	340
	J2		225	225
	J3		191	237
	J4		320	–
	J5		240	
	J6		720	
Maximum speed *7	J1	deg/s	250	250
	J2		187	187
	J3		250	250
	J4		412	–
	J5		412	
	J6		660	
Maximum composite speed (R point) *7		mm/sec	5,500	5,300
Payload capacity	Rated	kg	3	
	Maximum	kg	3.5	
Position repeatability (At rated load)		mm	±0.02	
Mass		kg	37	33
Tolerable moment	J4	Nm	5.83	–
	J5		5.84	
	J6		3.9	
Tolerable inertia *8	J4	kg•m²	0.137	–
	J5		0.137	
	J6		0.047	
Tool wiring			8 hand input points, 8 output points, 8-wire spare wire (with AWG#24 [0.2mm²] shield)	
Tool pneumatic pipes	Primary		ϕ6×2	
	Secondary		ϕ4×8 (option)	

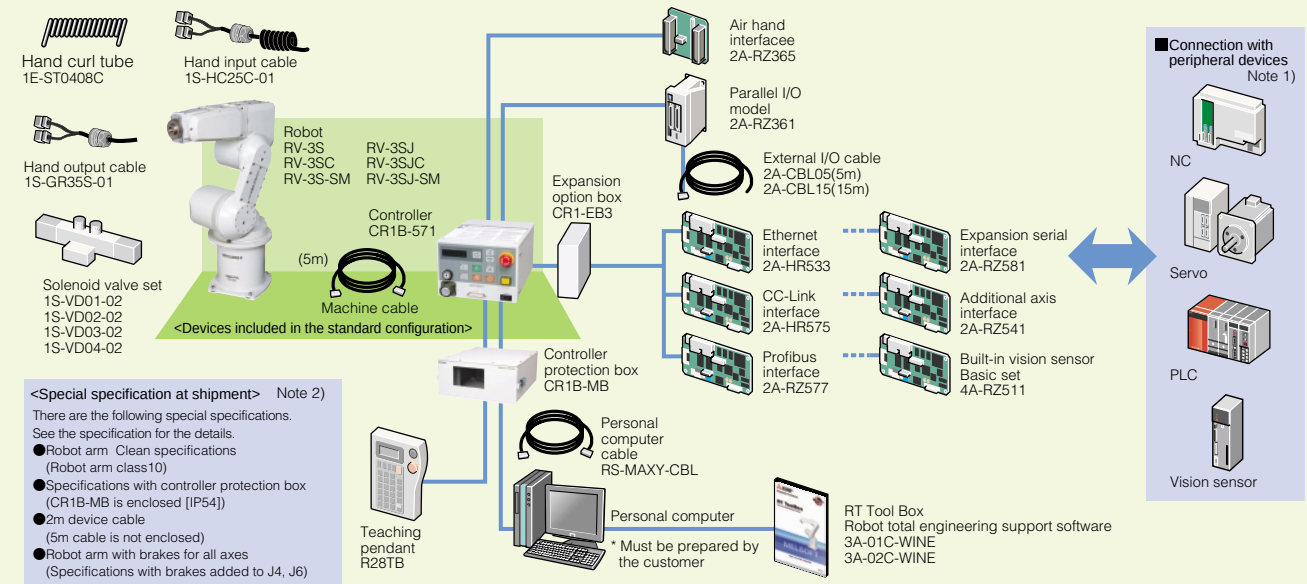
*4: The movement range of the J1 axis is limited in the special specification that allows the robot to hang on a wall.
*5: Air suction from inside is required for the Cleanliness Class 10.
*6: The 6-axis model does not have brakes on the J4 axis or J6 axis. The 5-axis model does not have brakes on the J6 axis.
*7: The maximum speed is the value when the optimum acceleration/deceleration mode is valid. (Flange surface)
*8: When the optimum acceleration/deceleration mode is valid, a value up to double the indicated specification value can be set.
Note: The flange must be fixed in the downward direction to use the maximum payload capacity.

●Controller

Type		Unit	CR1B-571
Path control method			PTP control, CP control
Number of axes controlled			Up to 6 axes simultaneously
CPU			64bit RISC/DSP
Main functions			Palletizing, multi-task Optimum acceleration/deceleration control, optimum override control, optimum path connection function, torque limit command, XYZ compliance control, impact detection function, maintenance forecast function, position restoration function
Robot language			MELFA-BASIC IV/MOVEMASTER language
Position teaching method		points	Teaching method, MDI method
Memory capacity	Numbers of teaching points	steps	2,500
	Number of steps	steps	5,000
	Number of programs		88
Program creation procedures		points	Personal computer or teaching pendant
External I/O	General-purpose I/O		16 inputs/16 outputs (up to 240/240 when using the optional, additional I/O unit)
	Dedicated I/O	points	Assigned from general-purpose I/O (one point, "STOP," is fixed)
	Hand open/close	points	8 inputs/0 output (maximum 8-point option) *9
	Emergency stop input	points	1
	Emergency stop output	points	1
	Door switch input	ports	1
Interface	RS-232C	ports	1 (for connecting a personal computer, vision sensor etc.)
	RS-422	slots	1 (for connecting a teaching pendant)
	Slot dedicated to hand	slots	1 (for connecting a pneumatic hand interface)
	Extension slot	channels	0 (When using options: 3) (For expansion options)
	Robot I/O link	˚C	1 (for connecting a parallel I/O unit)
Ambient temperature		%RH	0 to 40
Ambient humidity		V	45 to 85
Power supply	Voltage range	KVA	Single phase, AC180 to 242 *10
	Power capacity	mm	1.0
External dimensions *11 (Including legs)		kg	212 (W)×290 (D)×165 (H)
Mass *11			Approx. 8
Structure		Ω	Self-contained floor type/closed structure
Grounding			100 or less (D-class grounding)

*9 The air-hand interface (option) is required to use the 8point hand output.
*10. The power voltage fluctuation rate is within 10%.
*11. The size and weight do not include the expansion box for mounting options.

System Configuration



Note 1: Select an appropriate interface according to the I/O on the peripheral device side or network function.
Note 3: The device configuration is specified at shipment. It will be a built-to-order product. Please confirm the delivery date and specification.(Contact the Mitsubishi Sales Dept. for details.)

Configuration Options

Classification	Name	Type	Specifications	Model compatibility				Remark
				RV-3S	RV-6S	RV-12S	RV-2A/3AJ	
Robot arm	Solenoid valve	1S-VD01-02	1 connection with solenoid valve cable	○	○	×	×	
		1S-VD02-02	2 connections with solenoid valve cable	○	○	×	×	
		1S-VD03-02	3 connections with solenoid valve cable	○	○	×	×	
		1S-VD04-02	4 connections with solenoid valve cable	○	○	×	×	
	Hand output cable	1S-GR35S-01	One end not processed, supporting 4 connections	○	○	○	×	
	Hand input cable	1S-HC25C-01	8-points support, with drip-proof grommet	○	○	○	×	
	Hand curl tube	1E-ST0408C	Support for ϕ4-4 connection	○	○	×	○	
	Machine cable extension (Fixing)	1S-05CBL-02	Extension type, amount of extension: 5m	○	×	×	×	
		1S-10CBL-02	Extension type, amount of extension: 10m	○	×	×	×	
		1S-15CBL-02	Extension type, amount of extension: 15m	○	×	×	×	
	Machine cable extension (Flexing)	1S-05LCBL-02	Extension type, amount of extension: 5m	○	×	×	×	
		1S-10LCBL-02	Extension type, amount of extension: 10m	○	×	×	×	
		1S-15LCBL-02	Extension type, amount of extension: 15m	○	×	×	×	
	Movement range of axis J1	1S-DH-03	Stopper for changing (Changeable to ±30, 60, 90, 120) Changed by the user	○	×	×	–	
Controller	Perssonal computer support softwware (Windows)	3A-01C-WINE	Windows compatible support software (CD-ROM)	○	○	○	○	
	Perssonal computer support softwware-mini (Windows)	3A-02C-WINE	Simplified version Windows compatible support software (CD-ROM)	○	○	○	○	
	Personal computeer cable	RS-MAXY-CBL	For PC-AT (DOS/V) compatible machines, 3m	○	○	○	○	
		RS-AT-RCBL	For PC-AT (DOS/V) compatible machines, 3m L-type	○	○	○	○	
	Teaching pendant	R28TB	IP65, 7m cable length	○	○	○	○	
		R28TB-15	IP65, 15m cable length	○	○	○	○	
	Pneumatic hand interface (Sink)	2A-RZ365	DO: 8 (Sink)	○	○	○	○	
	Pneumatic hand interface (Source)	2A-RZ375	DO: 8 (Source)	○	○	○	○	
	Parallel I/O unit (Sink)	2A-RZ361	DI: 32 (Sink)/DO: 32 (Sink)	○	○	○	○	
	Parallel I/O unit (Source)	2A-RZ371	DI: 32 (Source)/DO: 32 (Source)	○	○	○	○	
	External I/O cable	2A-CBL05	One end not processed 5m	○	○	○	○	
		2A-CBL15	One end not processed 15m	○	○	○	○	
	Ethernet interface	2A-HR533	10 base-T 10Mbps	○	○	○	○	
	CC-Link interface	2A-HR575	CC-Link intelligent remote station (32 points/32 points per station)	○	○	○	○	
	Profibus interface	2A-RZ577	Profibus-DP SLAVE	○	○	○	○	
	Built-in vision sensor Basic set *12	4A-RZ511	Basic set for one camera	○	○	Δ	○	
	Expansion serial interface	2A-RZ581	RS-232C/422 each 1ch	○	○	○	○	
	Additional axis interface	2A-RZ541	Control up to 8 axes with SSCNET	○	○	○	○	
	Expansion option box	CR1-EB3	Required when mounting expansion interface.	○	×	×	○	Dedicated for CR1, CR1B
	Controller protection box	CR1B-MB	Enclose CR1B-571 for dust-proof measures.	○	×	×	○	

*12: The basic set contains the options required to use one camera. Select from the independent options if the basic set does not satisfy the user's specifications. Δ : Available soon

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: MITSUBISHI DENKI BLDG., 2-2-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

Governmental export permits are required for the export of products used for strategic materials and service.

L(NA)-09016ENG-* 0502(MEE)

Date of issue:Feb. 2005