Changes for the Better

MITSUBISHI ELECTRIC

MITSUBISHI INDUSTRIAL ROBOT

MELFA RV-2SDB/RV-2SQB Series

RV-2SDB/RV-2SQB

MELSOFT iQ Platform

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ISO 14001 JACO EC97J1113 — UKAS ENVIRONMENTAL MANAGEMENT 051

ISO 9001 BUREAU VERITAS Certification — UKAS QUALITY MANAGEMENT 008

MELFA RV-2SDB / RV-2SQB Series Vertically Articulated Robot. A New Design that is Streamlined, Compact, High-Speed, with High Functionality and 2kg Payload

A compact 6 axis robot ideally suited for assembly, material handling, inspection, and a wide variety of other tasks.

Features

Reduced profile while maintaining a large operating range

- The length and shape of the arm are designed for optimum performance and maximum reach while providing the ability to reach positions close to the robot base.
- A greater range of motion is insured in applications requiring ceiling or wall mount.
- J1 operation range is expanded to 480° (±240°). This eliminates any rear side dead zone.

Advanced servo control provides high-speed and high-accuracy operation

- Maximum composite speed is 4,400 mm/s. Additionally, the speeds of axes J4-J6 have been optimized to satisfy high-speed assembly applications.
- Positioning repeatability of ±0.02mm combined with active-gain control and highly rigid arm design provide for high accuracy positioning at high speed.

Unique arm design allows greater range of motion and accessibility

- Offset arm design greatly reduces the robots minimum operating radius allowing work close to the robot base.
- Reduced elbow protrusion lessens rear interference points.
- A compact wrist design enables the robot to reach into smaller spaces at many angles.

RV-2SDB/RV-2SQB

CR1DA-771 CR1QA-771

Multiple interfaces assure convenience and flexibility in integration

- The robot comes standard with additional axis control, Ethernet and encoder (for line tracking) interfaces. Profibus and DeviceNet are available options.
  * SQ needs manual pulser input unit (Q173DPX) for line tracking.
- Direct communication to GOT is available without the use of a programmable controller.

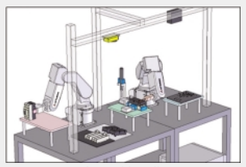
Software tools are powerful and user-friendly allowing simplified design, programming, monitoring and diagnostics

- RT ToolBox2 : Windows based software for robot programming, debugging, parameters, simulation and diagnostics.
- MELFA-Vision: Machine vision software configuration tool for Cognex In-sight vision sensors.
- MELFA-Works: Advanced 3-D simulation and design software that works as an add-on to SolidWorks.

Robot Arm

Quicker posture changes- ideal for assembly applications

Assembly work typically requires many postures compared to pick and place work.



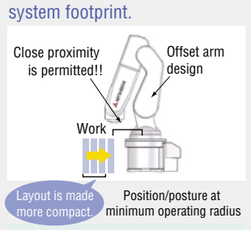
Assembly cell

Increasing the speed of posture change has a significant affect on overall cycle time. By optimizing the performance of axes J4-J6, posture change time is improved.

The speed of J4, J5, and J6 have improved by 10% compared to RV-3SD/SQ.

Ability to layout the work cell with points near the robot base

Range of motion is now closer to the base of the robot. This allows more flexibility and smaller system footprint.

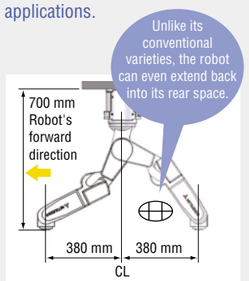


The minimum radius becomes smaller by the offset arm design (139 mm compared to 319 for RV-3SD) However the overall operating range (R max-R min) is greater than RV-3SD at 365 mm vs.323 mm.

Increase space efficiency and the compact layout is possible.

Large work area can be reached without rotating the arm

Extended back reaching access is effective for ceiling mount applications.

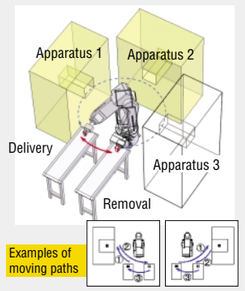


Expanded J2 operation range for extended back reach.

- Wide work area can be secured without turning around the arm.
- Decrease extra motion, reduce the cycle time.

The J1 operation range designed +/- 240 degree

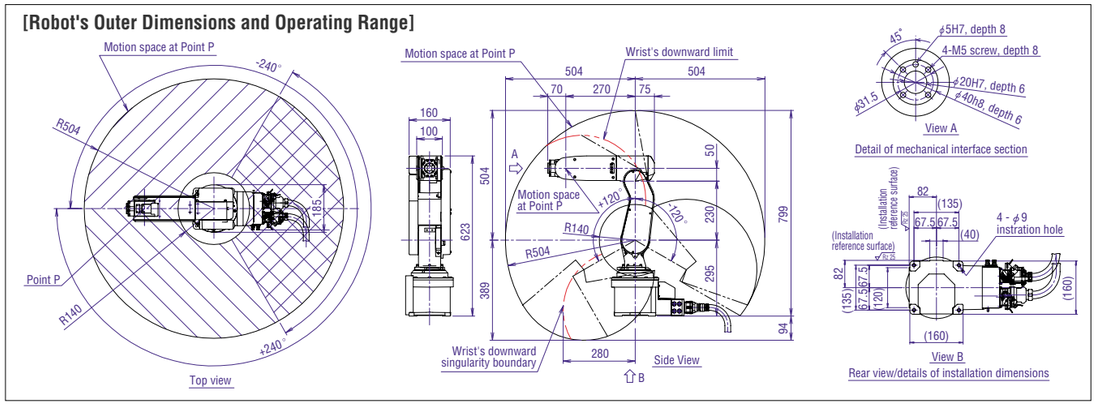
Cycle time can be short if it is possible to take a short cut path.



J1 operation range expanded to 480°(±240°).

- Minimize path, Minimize cycle time.
- Increase flexibility of machine layout.

[Robot's Outer Dimensions and Operating Range]



Specifications

Robot Arm

Item		Unit	Specification
Type			RV-2SDB / RV-2SQB
Protection class			IP30
Installation			Floorstanding, ceiling-hung, and wall-mounted *1
Structure			Vertical articulated arm robot
Degrees of freedom			6
Arm length		mm	230+270
Maximum reach radius		mm	504
Operating range	J1	deg	480 (-240 to +240)
	J2		240 (-120 to +120)
	J3		160 (0 to +160)
	J4		400 (-200 to +200)
	J5		240 (-120 to +120)
	J6		720 (-360 to +360)
Maximum speed	J1	deg/s	225
	J2		150
	J3		275
	J4		412
	J5		450
	J6		720
Maximum composite speed		mm/s	4400
Cycle time *3		s	0.68
Load Capacity	Rated	kg	2.0
	Maximum	kg	3.0 (wrist, downward)
Position repeatability		mm	±0.02
Mass		kg	19

*1 There are limits to J1 motion when wall-mounted.
*2 All axes are equipped with a brake.
*3 Value at a load of 1kg when the robot reciprocates 25mm vertically and 300mm horizontally.

Controller

Item		Unit	Specification		Remark
Type designation			CR1DA-771 (RV-2SDB)	CR1QA-771 (RV-2SQB)	
Robot language			MELFA-BASIC V		
Position teaching method			Teaching method, MDI method		
External input/output	Input/output	Point	0 input / 0 output (maximum 256/256, available as option)	8192 / 8192 (between sequencer and robot)	
	Dedicated input/output	Point	Assigned according to general-purpose I/O.		
	Input for shutdown purpose only	Point	1		
	Hand open/close input/output	Point	4 inputs / 0 output		4 additional outputs are available as option.
	External emergency shutdown input	Point	1		Double-redundant
	Door switch input	Point	1		Double-redundant
	Enabling device input	Point	1		Double-redundant
	Synchronization of additional axes	Point	1		Double-redundant
	Mode output	Point	1		Double-redundant
	Error output	Point	1		Double-redundant
Interface	RS-232	ports	1	–	Extensions for computer, vision sensor, etc.
	RS-422	ports	1		I/F dedicated to TB
	Ethernet	ports	1	1 (dual-use, user and TB)	10BASE-T / 100BASE-TX
	USB	ports	1	–	Device function only, mini-B terminal
	Additional-axis I/F	channels	1		SSCNET III
	Tracking I/F	channels	1	–	For connecting encoder cable
	Slot for hand	slots	1		Slot dedicated to air hand I/F
	Extension slot	slots	1	–	For installing optional I/F
Power supply	Input voltage range	V	Single phase, AC200 to 230±10% (180 to 253)		
	Power capacity	KVA	0.5		Not including in-rush current
	Frequency	Hz	50 / 60		
External dimensions		mm	240(W) x 290(D) x 200(H)		Protrusions excluded
Weight		kg	Approx. 9		
Structure			Self-contained floor type / open structure (IP20)		
CPU	Type designation		–	Q172DRCPU	iQ Platform-compliant

SQ Series Controller - New Capabilities

iQ platform compatibility-High speed communication and ease of integration

With the robot CPU mounted in an iQ system, communications between the sequencer or other available CPU's are much faster and at greater volumes. Total machine integration is simplified and performance is enhanced.

GOT interface provides easy access to robot data and status

Shared memory across the iQ platform allows multiple sets of machine data to be easily accessed and displayed via GOT. This serves as a user-friendly system interface at a single point.

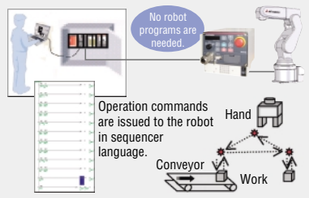
Robot can be directly controlled from the sequence program

RV-2SQB programming flexibility comes with the ability to command the robot directly from the sequencer program. This method allows complete machine control with a single language. Traditional programming via MELFA-Basic V is also available.

Direct sequencer control is possible

Not necessary to program in dedicated robot language

Programming can be accomplished directly within the sequencer language. No need to use a second language/ program to control the robot.



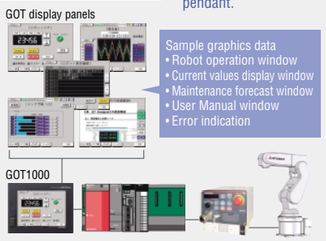
The ability to command the robot directly from the sequencer program.

Programming time can be reduced and integration can be simplified by using a sequencer language that you are already familiar with.

Robot data can be easily accessed and displayed on GOT

Convenient monitoring and retrieval of information from robot and other machine components at a single point

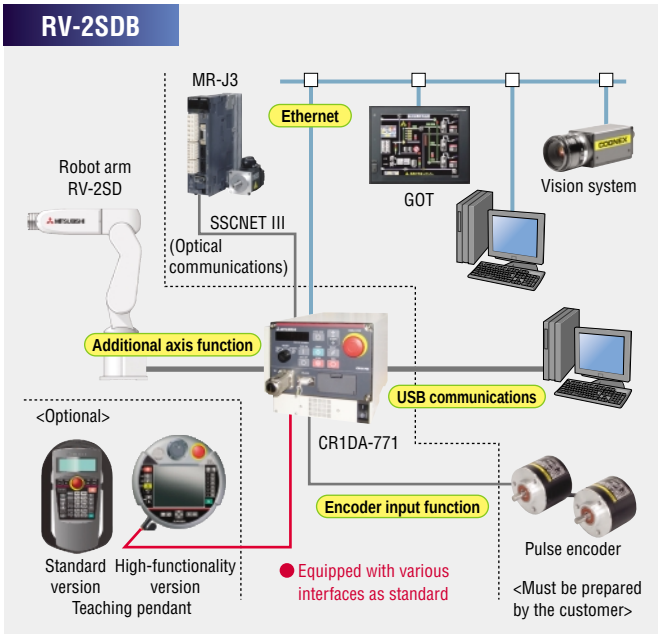
Essential data from the robot can be displayed without referring to the robot program, editing software, or teach pendant.



Various data is stored in a memory shared by sequencer multi-CPUs.

Sample GOT programs are available.

Product Configuration



Configurations Options

Classification	Name	Type	Specification overview	RV-2SDB	RV-2SQB
Robot arm	Solenoid valve set	1E-VD01/VD01E	Solenoid valve (with an output cable, 1 valve) (sink/source)	○	○
		1E-VD02/VD02E	Solenoid valve (with an output cable, 2 valves) (sink/source)	○	○
	Hand output cable	1E-GR35S	With a robot-side connector, not terminated at another end	○	○
	Hand input cable	1S-HC30C-11	With a robot-side connector, not terminated at another end	○	○
	Hand curl tube	1E-ST0402C	ϕ4 tube, number of sets - 2	○	○
		1E-ST0404C	ϕ4 tube, number of sets - 4	○	○
	Stopper for changing operating range	1S-DH-11J1	For limiting J1 axis rotation (±210 deg., ±150 deg., ±90 deg.)	○	○
		1S-DH-11J2	For limiting J2 axis rotation (±30 deg.)	○	○
		1S-DH-11J3	For limiting J3 axis rotation (+70 deg.)	○	○
	Machine cable, for extension/fixed	1S-05CBL-03	Extension type: 5 m	○	○
		1S-10CBL-03	Extension type: 10 m	○	○
		1S-15CBL-03	Extension type: 15 m	○	○
	Machine cable, for extension/flexible	1S-05LCBL-03	Extension type: 5 m	○	○
		1S-10LCBL-03	Extension type: 10 m	○	○
		1S-15LCBL-03	Extension type: 15 m	○	○
Controller	Teaching pendant, standard version	R32TB	7 m: Standard / 15 m: Custom	○	○
	High-function teaching pendant	R56TB	7 m: Standard / 15 m: Custom	○	○
	Air hand interface	2A-RZ365/375	8 output points, used exclusively for hand (sink/source)	○	○
	Parallel I/O unit (remote)	2A-RZ361/371	32 output points / 32 input points (sink/source)	○	×
	External I/O cable	2A-CBL05/2A-CBL15	Cable length: 5 m / 15 m, not terminated at one end (for 2A-RZ361/371)	○	×
	Parallel I/O interface (on-board)	2D-TZ368/378	32 output points / 32 input points (sink/source)	○	×
	External I/O cable	2D-CBL05/2D-CBL15	Cable length: 5 m / 15 m, not terminated at one end (for 2D-TZ368/378)	○	×
	CC-Link interface	2D-TZ576	CC-Link intelligent device station, Version 2.0, 1 to 4 stations	○	×
	PROFIBUS interface	2A-RZ577	Slave station, combined total number of input and output data: 192 words	○	×
	DeviceNet Slave interface	2D-TZ571	Slave station, Release 2.0 is supported	○	×
	Additional memory	2D-TZ454	User program area with additional memory: 2MB	○	×
	Personal computer support softwware	RT-Toolbox2	With simulation function (CD-ROM)	○	○
	Personal computer support softwware-mini	RT-Toolbox2 Lt	Lite Version (CD-ROM)	○	○
	Personal computer cable	2D-232CBL03M	For PC-AT compatible machine, 3 m	○	×
	MELFA-Vision	MELFA-Vision	COGNEX Vision System-compliant	○	○
	3D simulator (MELFA-Works)	MELFA-Works	Add-in to Solidworks software	○	○
Service part	Backup battery	ER6	Installed in the robot arm (Quantity: 4pcs)	○	○
		Q6BAT	Installed in the controller (Quantity: 1pc)	○	○

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