

Changes for the Better



MITSUBISHI INDUSTRIAL ROBOT

MELFA RV-12SD/12SDL Series



RV-12SDL



RV-12SD

MELFA
RV-SD series

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001 (standards for quality assurance management systems)



The Ultimate Series of Powerful Mitsubishi Robots

- A new high performance controller design offers faster speed and greater accuracy.
- Enhanced compatibility with the Mitsubishi's family of automation products improves versatility.
- Compact but rigid arm designs are durable and flexible for applications in all industries.
- Dedicated Mitsubishi servo technology has been designed for each model to optimize overall performance.

MELFA RV-SD series

Applicable models



RV-12SD



RV-12SDL



CR3D-701M

Features

1 Improved Productivity

- **Fastest operation speed in class**
[Maximum composite speed: 9.6 m/s (RV-12SD)]
Multiple complex tasks are handled by a single controller.
- **Shorter takt time**
With a new, high-performance controller, I/O's and programs can be processed at high speed. This allows the takt time to be reduced by as much as 15%.
- **High operation accuracy [High-rigidity arm, active gain control]**
The robot posture and load are monitored to adjust the servo gain and filter in real time. This achieves higher accuracy.
- **Environmental resistance [Arm: IP65 / Torso: IP54]**
The hollow structure adopted by the S series now comes with fully sealed rotational joints. This means that you can use the RV-SD series in wide-ranging applications regardless of the installation environment.
- **Direct connection to the GOT**
The robot controller can be connected directly to our GOT-1000-series display via Ethernet. This achieves sequencer-free operation and ultimately reduces cost.
- **All models come standard with advanced functions**
Control of additional axes, tracking function and Ethernet, which were all provided as options with the S series, are now standard features. You can save on the costs of options to reduce the overall system cost.

2 Improved Operability

- Adoption of a new HMI (Human Machine Interface) results in significant improvement of operability.
- **New function wizards**
Wizards for special functions such as additional axes, tracking and collision detection are included in the PC tools. These wizards reduce the time needed for startup, adjustment and maintenance.
 - **New teaching pendant with graphical interface**
The new teaching pendant [R56TB] offers significantly improved operability through its GUI reduces the time needed for startup, adjustment and maintenance.

3 Safety

- **Compliance with ISO-10218 (2006)**
The RV-SD series helps your equipment as a whole comply with the safety standards.  
- **Compliance with various standards**
The RV-SD series complies with the European Machinery Directive (CE) and UL Standard. (UL-compatible models are limited to custom specifications.)

4 Backward Compatibility

- **Fully compatible with S-series robot systems**
Robot programs and I/O maps for S-series robots can be used 100%.

Model Structure

Type	RV-12SD	RV-12SDL	RV-12SDC	RV-12SDLC
Maximum load capacity	12kg			
Reach	1086mm	1385mm	1086mm	1385mm
Environment specification	IP65 (J4 to J6), IP54 (J1 to J3)		Cleanliness class 10 (0.3μm)	
Installation posture	Floor type, ceiling type (wall-mounted type *1)		Floor type	
Standard type classification	Standard type		Custom specification type	
Connected controller	CD3D-701M (self-supported floor type, sealed structure (IP54))		CD3D-701 (self-supported floor type, open structure (IP20))	

*1: The wall-mounted specification is a custom specification where the operating range of the J1-axis is limited.

Offering New Functionality and Performance

Functions

1 New teaching pendant (optional)

Improved display performance and operability

- Simple teaching pendant [R32TB]
Five times greater display performance (vs. R28TB)
- Ergonomic design improves operability.
- IP65 Protection



2 New high-functional teaching pendant (optional)

No need to bring a PC to the site

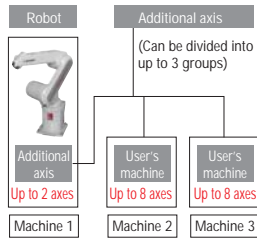
- High-functional teaching pendant [R56TB]
[VGA (640 x 480) touch panel] adopted
- Can utilize HMI tools equivalent to the RT-Tool Box on the teaching pendant.
- Can utilize USB memory to back up controller data.
- IP65 Protection



3 Additional axis function

No need for dedicated control device. Additional axes can be controlled with robot programs. This helps keep the system cost low.

- Controlling the robot's traveling axes and turntable.
- Up to 8 axes can be controlled in addition to the robot.
- Standard function
- Utilizes Mitsubishi MR-J3□B servos for additional axes.



4 Synchronized outputs from additional axes

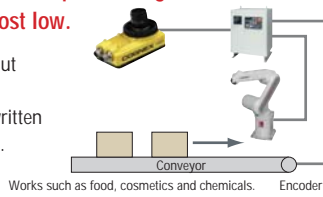
Improved safety of the entire system

- A signal is output from the auxiliary contacts for the main circuit contactor in the robot controller. The auxiliary contacts allow the servo amplifier contactor of each additional axis to synchronize with the robot servo status.
- This contact signal is output redundantly, which improves the safety of your equipment and makes it easy for the entire equipment to comply with the safety standards.

5 Tracking function

Improved process takt. No need for positioning device. This helps keep the system cost low.

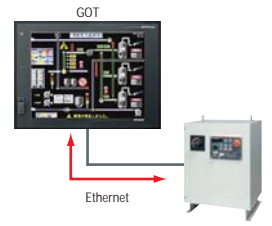
- The robot can be operated without stopping the conveyor.
- Robot programs can be easily written using MELFA-BASIC-V language.
- Standard function



6 GOT connection

No need for GOT connection ladder

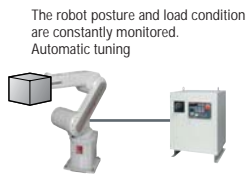
- The robot can be controlled directly from the GOT1000. (A dedicated robot screen must be created.)



7 Active gain control

Improved tracking accuracy and vibration-damping performance

- The motor is tuned for optimal control automatically based on the operating position, posture and load condition of the robot.



8 Ensuring of safety based on operation by two persons

[Enabling-device input function]

- Allows for connection of 3-position enabling devices to protect the robot system and multiple persons from danger.
- Since multiple operators must always be coordinated, safety improves.
- Redundant devices



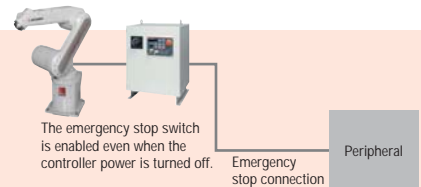
9 New emergency-stop I/O function

[Emergency-stop output function]

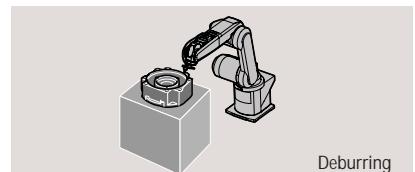
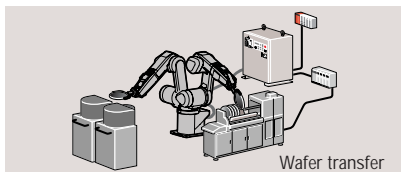
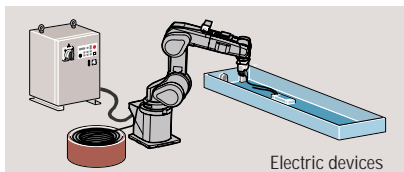
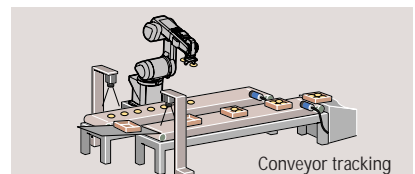
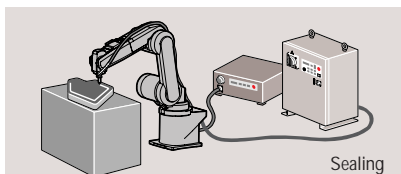
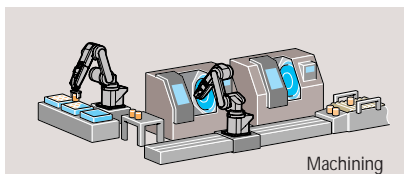
- Even when the robot controller power is cut off, you can still stop the peripherals by pressing the emergency stop switch on the panel or teaching pendant.
- These I/Os are all provided redundantly.

[Robot error output]

- If the robot generates an error, a safety contact signal is output in addition to an applicable I/O signal output on conventional models.



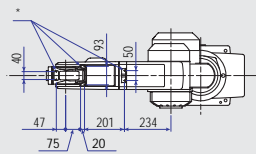
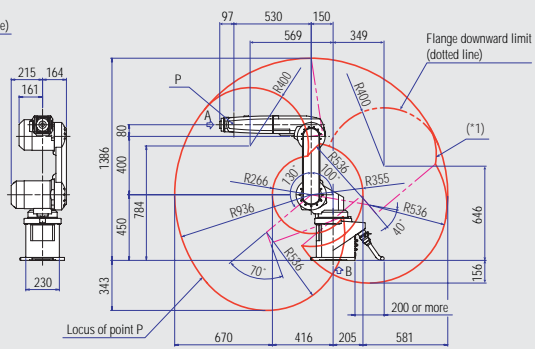
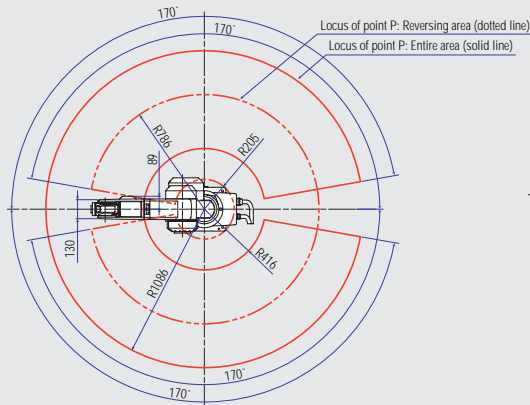
Applications



Offering New Functionality and Performance

Robot Arm Outside Dimension/Movement Range Diagrams

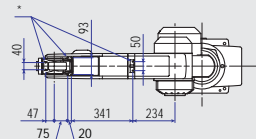
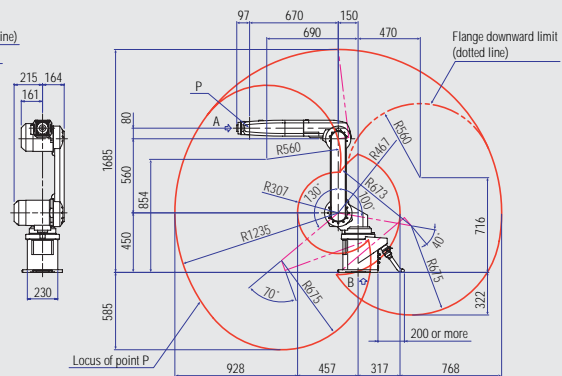
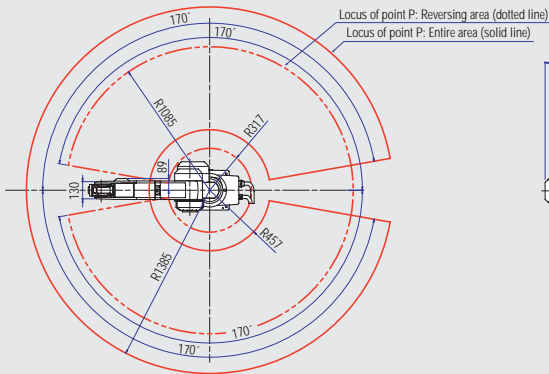
RV-12SD



Posture at $J1 = J2 = J4 = J5 = J6 = 0^\circ$, $J3 = 90^\circ$
Wide-angle limit at front
When $J1 \leq 60^\circ$, $J2 \leq -95^\circ$; $J3 \geq 50^\circ$ (*1)

* indicates a service screw hole for tooling (M4 x 6 locations).

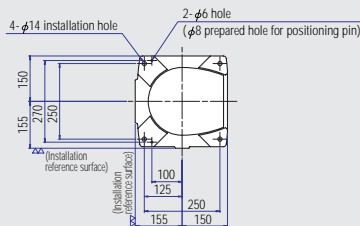
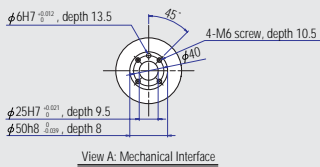
RV-12SDL



Posture at $J1 = J2 = J4 = J5 = J6 = 0^\circ$, $J3 = 90^\circ$

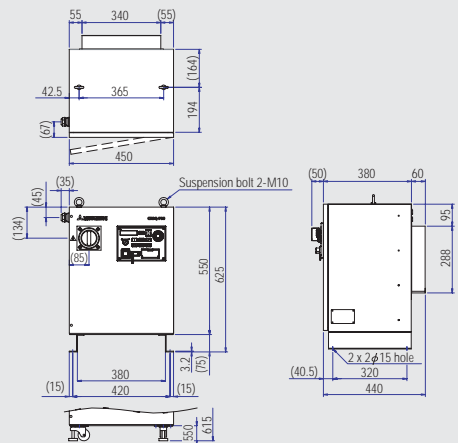
* indicates a service screw hole for tooling (M4 x 6 locations).

Common parts



Controller – External Dimensions

CR3D-700M series



Dimensions of caster specification (factory-set custom specification)

Specification

Robot Arm

Type		Unit	RV-12SD/12SDC	RV-12SDL/12SDLC
Structure			Vertical articulated type	
Degrees of freedom			6	
Drive system			AC servo motor (with brake on all axes)	
Position detection method			Absolute encoder	
Maximum load capacity (rating) *2		kg	12(10)	
Arm length		mm	400+530	560+670
Maximum reach radius		mm	1086	1385
Operating range	Waist J1	deg	340 (± 170); May be limited after shipment (in units of 45 degrees).	
	Shoulder J2		230 (-100 to +130)	
	Elbow J3		290 (+160 to -130)	
	Wrist twist J4		320 (±160)	
	Wrist pitch J5		240 (±120)	
	Wrist roll J6		720 (±360)	
Maximum speed	Waist J1	deg/sec	276	230
	Shoulder J2		230	172
	Elbo J3		267	200
	Wrist twist J4		352	
	Wrist pitch J5		375	
	Wrist roll J6		660	
Maximum composite speed *3		mm/sec	Approx. 9600	Approx. 9500
Cycle time *4		sec	0.66	0.74
Position repeatability		mm	±0.05	
Ambient temperature			0 to 40	
Mass		kg	Approx. 93	Approx. 98
Allowable moment	J4	N·m	19.3	
	J5		19.3	
	J6		11	
Allowable inertia	J4	kg·m ²	0.4	
	J5		0.4	
	J6		0.14	
Tool wiring *5			Hand: 8 input points / 8 output points (forearm) 8 spare lines: AWG#27 (0.1mm ²)	
Tool pneumatic pipes			Primary: φ6 x 2 / Secondary: φ6 x 8	
Machine cable			7m (connector on both ends)	

*2: The maximum load capacity indicates the maximum payload when the wrist flange is facing downward.

*3: At the hand flange surface when all axes are composited.

*4: The cycle time is based on back-and-forth movement over a vertical distance of 25 mm and horizontal distance of 300 mm.

*5: When the tool (hand) output is used, the pneumatic hand interface (optional) is required.

Controller

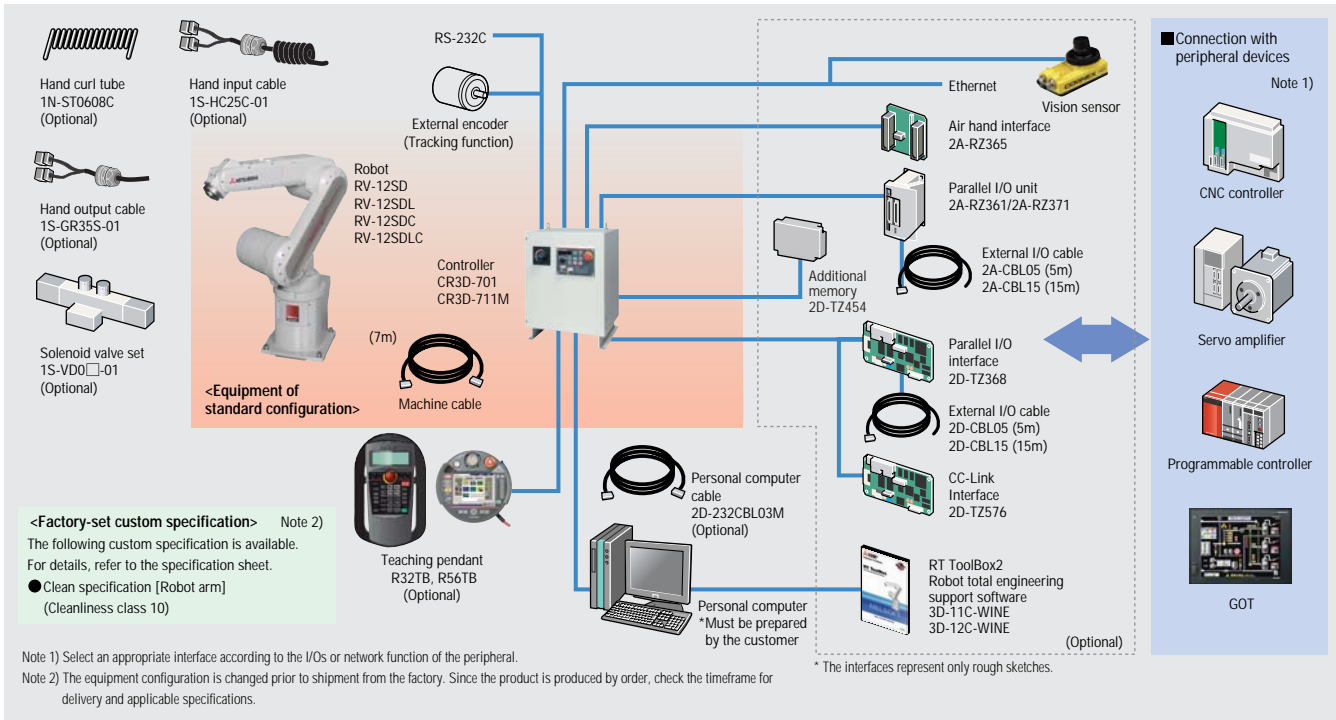
Type		Unit	CR3D-701M	CR3D-701
Path control method			PTP control and CP control	
Number of axes controlled			Up to 6 axes simultaneously Up to 8 axes additional can be controlled in addition to the above.	
Robot language			MELFA-BASIC V	
Position teaching method			Teaching method, MDI method	
Memory capacity	Number of teaching points	points	13,000	
	Number of steps	steps	26,000	
	Number of programs	Unit	256	
External input/output	General-purpose I/O	points	0 input/0 output (Up to 256/256 when options are used)	
	Dedicated I/O	points	Assigned according to general-purpose I/O	
	Hand I/O	points	8 inputs/0 output (8/8 when the pneumatic hand interface is used)	
	Emergency stop input	points	1 (2 contacts are supported)	
	Door switch input	points	1 (2 contacts are supported)	
	Enabling device input	points	1 (2 contacts are supported)	
	Emergency stop output	points	1 (2 contacts are supported)	
	Mode output	points	1 (2 contacts are supported)	
	Robot error output	points	1 (2 contacts are supported)	
Interface	Synchronization of additional axes	points	1 (2 contacts are supported)	
	RS-232C	ports	1 (for the connection of a personal computer, vision sensor, etc.)	
	Ethernet	ports	1 (dedicated teaching pendant port), 1 (for customer) 10BASE-T/100BASE-T	
	USB	Slots	1 (Version 1.1 device functions only)	
Additional-axis interface		channels	1(SSCNET III)	
Operating temperature range			0 to 40	
Relative humidity		°C	45 to 85	
Power supply	Input voltage range	%RH	3-phase, AC 180 to 253	
	Power capacity *6	V	3.0 (not including rush current)	
External dimensions		KVA	450(W) x 440(D) x 625(H) *8	450(W) x 380(D) x 625(H) *8
Weight		mm	Approx.60	
Structure [protection function]		kg	Self-contained floor type/sealed structure [IP54]	Self-contained floor type/open structure [IP20]
Grounding *7			100 or less (class D grounding)	

*6: The power capacity represents the rating for normal operation. Take note that the power capacity does not include the current being input when the power is turned on. The power capacity is only a guideline and whether or not operation can be guaranteed is affected by the input power-supply voltage.

*7: Grounding works are the customer's responsibility.

*8: 615 (H) for the caster specification.

System Configuration



Configurations Options

Classification	Name	Type	Compatibility (*)	Specification overview
Robot arm	Solenoid valve set	1S-VD0□-02	○	1 to 4 valves connected: With solenoid valve cable
	Hand output cable	1S-GR35S-01	○	4 valves connected type with one end not treated
	Hand input cable	1S-HC25C-01	○	8-point type with splash-proof grommet
	Hand curl tube	1N-ST0608C	○	φ6-4 valves connected type
	Stopper for changing J1-axis operating range	1S-DH-01	○	Stopper part (Installation is the customer's responsibility)
	Machine cable, for extension/fixed	1S-□□CBL-02	○	Extension type / Extended length: 5m, 10m, 15m
Controller	Machine cable, for extension/flexible	1S-□□LCBL-02	○	Extension type / Extended length: 5m, 10m, 15m
	Simple teaching pendant (7m, 15m)	R32TB(-**)	New	7m: Standard / 15m: Custom ("-15" is specified in the model name)
	High-function teaching pendant (7m, 15m)	R56TB(-**)	New	7m: Standard / 15m: Custom ("-15" is specified in the model name)
	Pneumatic hand interface (sink/source)	2A-RZ365/2A-RZ375	○	8 output points, used exclusively for hand
	Parallel I/O unit (sink/source)	2A-RZ361/2A-RZ371	○	32 output points / 32 input points
	External I/O cable (5m, 15m)	2A-CBL**	○	CBL05: 5m CBL15: 15m One end not treated, for 2A-RZ361/2A-RZ371
	Parallel I/O interface (sink)	2D-TZ368	New	32 output points / 32 input points
	External I/O cable (5m, 15m)	2D-CBL**	New	CBL05: 5m CBL15: 15m One end not treated, for 2D-TZ368
	CC-Link interface	2D-TZ576	New	CC-Link intelligent device station, Version 2.0, 1 to 4 stations
	Additional memory	2D-TZ454	New	User program area with additional memory: 2MB
	RT ToolBox2	3D-11C-WINE	New	With simulation function (CD-ROM)
RT ToolBox2 mini	3D-12C-WINE	New	Simple version (CD-ROM)	
Service part	Personal computer cable	2D-232CBL03M	New	For PC-AT compatible machine, 3m
	Backup battery	A6BAT Q6BAT	○ New	Installed in the robot arm (Quantity: 5pcs) Installed in the controller (Quantity: 1pc)

(*) <Compatibility with conventional models> New: New option / ○: Option for conventional models can be used



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