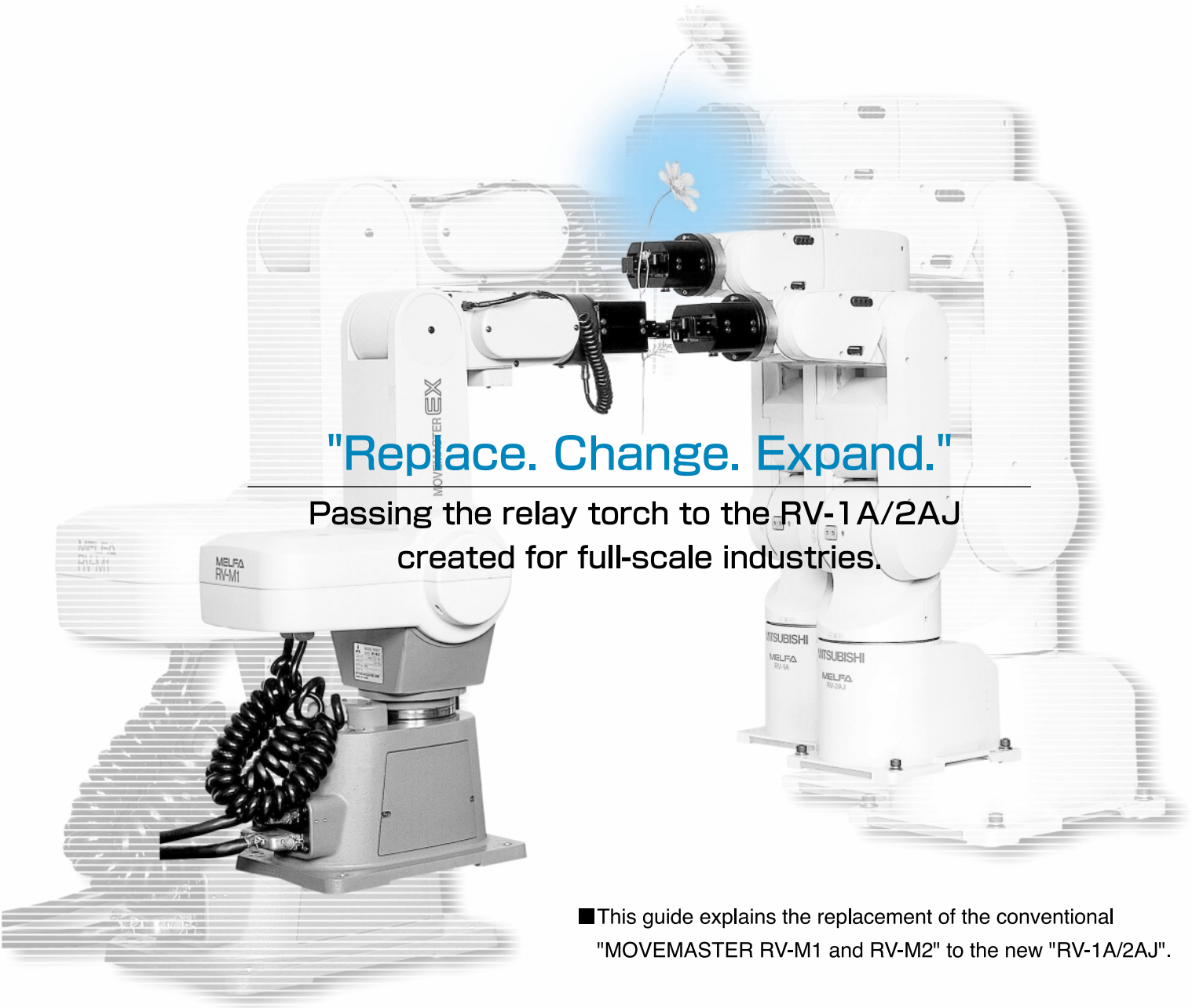
MITSUBISHI

MITSUBISHI INDUSTRIAL ROBOT
RV-1A/2AJ Replacement Guide



"Replace. Change. Expand."

Passing the relay torch to the RV-1A/2AJ
created for full-scale industries.

■This guide explains the replacement of the conventional "MOVEMASTER RV-M1 and RV-M2" to the new "RV-1A/2AJ".

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

ISO 14001 JACO — UKAS ENVIRONMENTAL MANAGEMENT 051

BVQI ISO 9001 — UKAS QUALITY MANAGEMENT 008

Progress

Succession

Changes.

No changes.

The Mitsubishi Electric compact robot "MOVEMASTER" has beenreborn as the "MELFA RV-1A/2AJ" for full-scale industries.

Here's your chance to replace your robots.

1 Compatibility

Increased build Installation surface is the same

	RV-M1 5 axis → RV-2AJ 5 axis		Compatibility	RV-M2 5 axis → RV-2AJ 5 axis		Compatibility	RV-M1 5 axis / RV-M2 5 axis → RV-1A 6 axis			Compatibility
Max. weight capacity	1.2kg	2kg	◎	2kg	Same as left	○	M1	1.2kg	1.5kg	◎
							M2	2kg	1.5kg	△
Same as left	410mm	Same as left	○	635mm	410mm	△	M1	410mm	418mm	○
							M2	635mm	418mm	△
Mechanism installation surface dimensions (screw size)	160×205mm (M8)	Same as left	○	160×205mm (M8)	Same as left	○	M1・M2	160×205mm (M8)	Same as left	○
Hand installation surface (screw size)	PC φ68×4 screws (M3)	PC φ68×4 screws (M3) Adaptor required [*1]	○	PC φ31.5×4 screws (M5) Adaptor not required	Same as left	○	M1	PC φ68×4 screws (M3)	PC φ68×4 screws (M3) Adaptor required [*1]	○
							M2	PC φ31.5×4 screws (M5)	PC φ31.5×4 screws (M5) Adaptor not required	○

[*1] Surface when hand adaptor (1A-HA01) <option> is installed. Surface is PC φ31.5 x 4 (M5) when adaptor is not used.
Compatibility: ◎ Increases. ○ Is the same. △ Is smaller.

2 Compatibility

Programs using MOVEMASTER language can be used

Program	Use possible through personal computer. [*2]
Teaching work	Teaching must be carried out again.
Input/output signals	Wiring on peripheral device side must be changed. [*3]

[*2] Slight changes are required for the speed setting value and assignment of the input/output signals, etc. Refer to the back page for details.
[*3] Changes are required as the pin assignments for the power line and GND (ground) line, etc., are different.

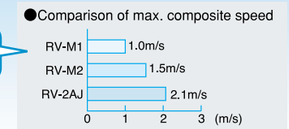
3 Improved robot arm

Performance and serviceability are greatly improved

		RV-M1 5 axis	RV-M2 5 axis	→	RV-1A 6 axis	RV-2AJ 5 axis	
Drive method		DC servomotor			AC servomotor		Brush replacement not required
Position detection method		Incremental encoder			Absolute encoder		Origin setting not required
Incremental encoder		1000mm/s	1500mm/s		2200mm/s	2100mm/s	Improved productivity (reduced tact time)
Position repeatability		±0.3mm	±0.1mm		±0.02mm		Expanded applications to precision work
6-axis specifications		Not available			Available (RV-1A)		Detailed work possible

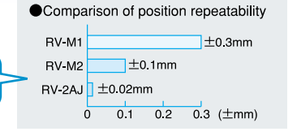
1.4 to 2 times compared to conventional model

●Comparison of max. composite speed



5 to 15 times compared to conventional model

●Comparison of position repeatability

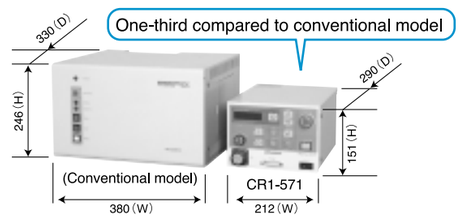


4 Lightweight and compact

Pursuing smaller and lighter robot

Robot arm weight		19kg	28kg	19kg	17kg	Lightweight Portable
Controller	Weight	Approx. 25kg		Approx. 8kg		
	Size	Approx. 380 (W) ×330 (D) ×246 (H) mm		Approx. 212 (W) ×290 (D) ×151 (H) mm		Compact

One-third compared to conventional model



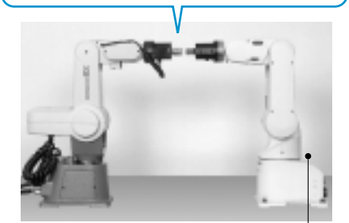
5 Enhanced controller

Powerful open-ended 64-bit CPU

CPU	8bit	16bit	64bit		Improved processing performance
Program language	MOVEMASTER language		MOVEMASTER language or MELFA BASIC IV		Easier to use
Interface	RS232C,RS422		RS-232-C, RS-422, hand expansion slot, expansion slot [*1], robot input/output link		Improved expansion performance and ease of use

[*1] Up to three option cards can be mounted when expansion option box (CR1-EB3) <option> is installed.

RV-M1 and RV-2AJ have same arm length, and cables at shoulder are laid inside.



6 Environment and safety

Contributing to energy conservation Considerate of safety and environment

Motor capacity	Axis maximum	30w	60w	50w		Less than 80w [*2]
	Total capacity	112w	206w	195w	180w	Safe and energy conserving Reduced consumed power during production
Basic motor capacity [*3]		93w/(kg・m/s)	68w/(kg・m/s)	59w/kg・ms	43w/kg・ms	
Deadman safety function		Not available		3-position type [*4]		Importance laid on safety
Arm cable treatment		Some external cables (shoulder section)	Internal	Internal		Safe and guarded

[*2] This does not apply to the "industrial robot" as specified by the Occupational Safety and Sanitation Rules Ordinance 36 Clause 31, but safety measures must be taken before use.
[*3] The basic motor capacity is a reference value calculated as total motor capacity/(max. weight capacity x max. composite speed).
[*4] This is valid when the teaching box (R28TB) <option> is used.

(Note 1) An adaptor (option) is required to switch to this series from the RV-M1.
(Note 2) Note that RV-M2 arm length is 635mm.

Example of program conversion: Replacement of <RV-M1> with <RV-2AJ>

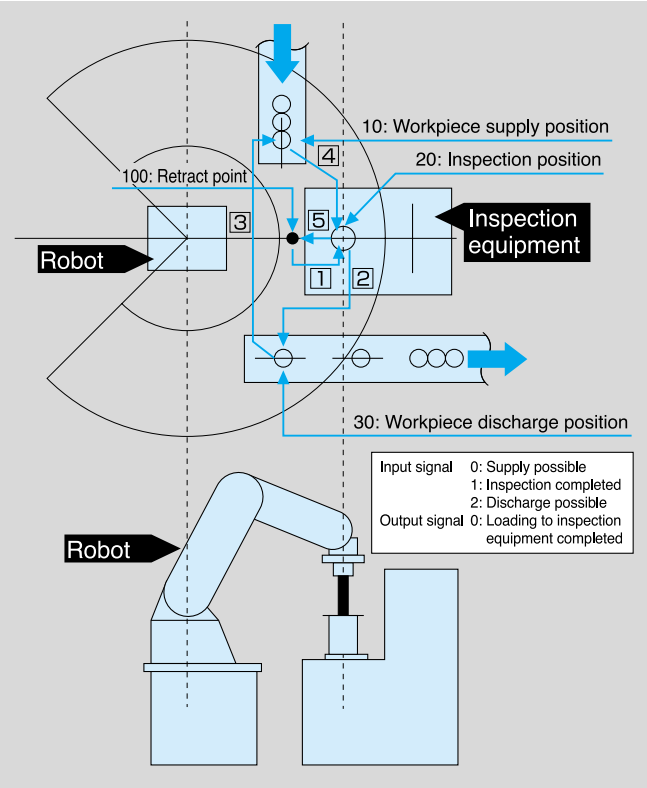
Details of work

Loading and unloading of workpiece from conveyor to inspection equipment.

Movement pattern

1 Move from retract point (100) to inspection equipment (20), and unload inspected workpiece.
2 Carry inspected workpiece to discharge conveyor (30).
3 Move to uninspected workpiece unloading position (10).
4 Unload workpiece, and move to over inspection equipment (20).
5 Set workpiece on inspection equipment (20), and return to retract point (100).
(When inspection complete signal is input, process starts again from step 1.)

Explanatory diagram



Example of program conversion

Before conversion		After conversion
100 MO 100		100 MO 100
110 '		110 '
120 SP 9	1) →	120 SP 25
130 ID		130 ID
140 TB -0,130	2) →	140 TB -3,130
150 MT 10,-50,O		150 MT 10,-50,O
160 MO 10,O		160 MO 10,O
170 GC		170 GC
180 MT 10,-50,C		180 MT 10,-50,C
190 '		190 '
200 MT 20,-50,C		200 MT 20,-50,C
210 HE 25		210 HE 25
220 SP 3	→	220 SP 15
230 MS 20,10,C	3) →	230 MS 20,C
240 GO		240 GO
250 MO 20,O		250 MO 20,O
260 SP 9	→	260 SP 25
270 MO 100,O		270 MO 100,O
280 OB +0		280 OB +0
290 '		290 '
300 ID		300 ID
310 TB -1,300		310 TB -1,300
320 OB -0		320 OB -0
330 MT 20,-50,O		330 MT 20,-50,O
340 MO 20,O		340 MO 20,O
350 GC		350 GC
360 MS 25,10,C	→	360 MS 25,C
370 '		370 '
380 ID		380 ID
390 TB -2,380		390 TB -2,380
400 MT 30,-50,C		400 MT 30,-50,C
410 SP 3	→	410 SP 15
420 MO 30,C		420 MO 30,C
430 GO		430 GO
440 MO 30,O		440 MO 30,O
450 ED		450 ED

Explanation

1) The speed set with the SP command differs according to the model. Change the value set for the SP command.
2) Adjust the input/output signal numbers according to the actual wiring.
With the RV-2AJ, the bit 0 of the input signal is used as the stop input.
If used for other applications, the setting must be changed.
3) If the MS command (linear interpolation) is designated as a No. of divisions, delete the No. of divisions.

<Supplement>
- The input/output commands (IN) that use synchronous signals must be replaced with ID, OD, TB, etc.
- The RV-M1 and RV2AJ have different robot coordinate systems. The position data must be corrected.

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