

MELFA Technical News

Subject: Precautions of replacement from RH-12SDH to RH-12FRH-D**Applicable to: RH-12SDH
RH-12FRH-D**

Thank you for your continued support of Mitsubishi industrial MELFA series robots. This Technical News explains in detail the precautions for the replacement of **RH-12SDH** horizontal multiple-joint type robots with **RH-12FRH-D** robots.

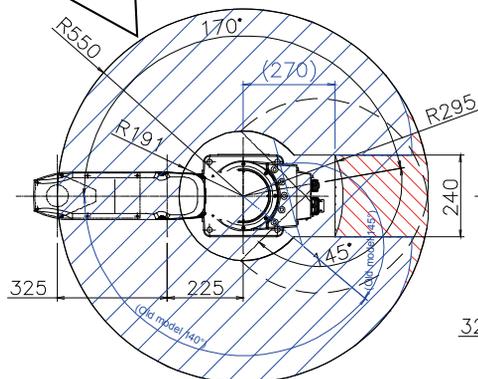
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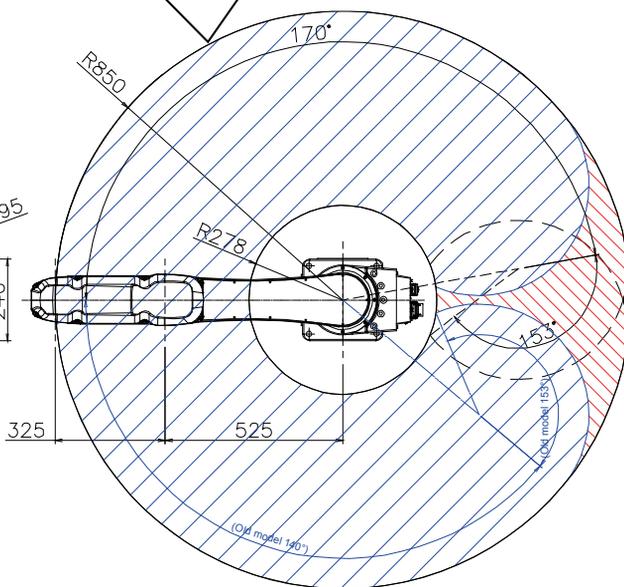
2) Dimensions of the robot arm and diagram of the operating range

For the dimensions of the robot arm and diagram of the operating range, refer to the following.

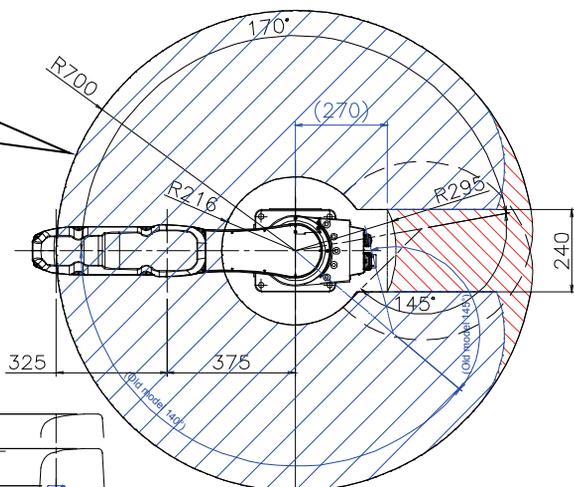
Operating range difference
 RH-12FRH55xx-D:
 (Shaded area with lines upward to the right + shaded area with lines downward to the right)
 RH-12SDH55xx:
 (Shaded area with lines upward to the right)



Operating range difference
 RH-12FRH85xx-D:
 (Shaded area with lines upward to the right + shaded area with lines downward to the right)
 RH-12SDH85xx:
 (Shaded area with lines upward to the right)



Operating range difference
 RH-12FRH70xx-D:
 (Shaded area with lines upward to the right + shaded area with lines downward to the right)
 RH-12SDH70xx:
 (Shaded area with lines upward to the right)



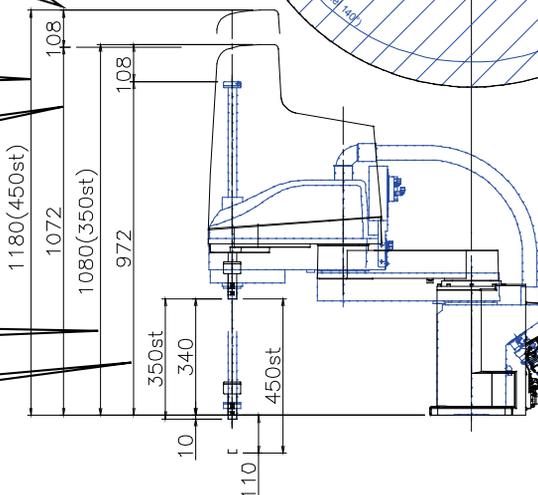
Overall height difference: 108mm	
RH-12FRH7045:	1180mm
RH-12SDH7045:	1072mm
Overall height difference: 108mm	
RH-12FRH7035:	1080mm
RH-12SDH7035:	972mm

RH-12FRH7045-D

RH-12SDH7045

RH-12FRH7035-D

RH-12SDH7035



A duct (φ50 (2m)) is installed.

Clean specification

Note that the height described above is for RH-12FRH70xx. For RH-12FRH55xx/12FRH85xx, the height is the same as the ones described above.

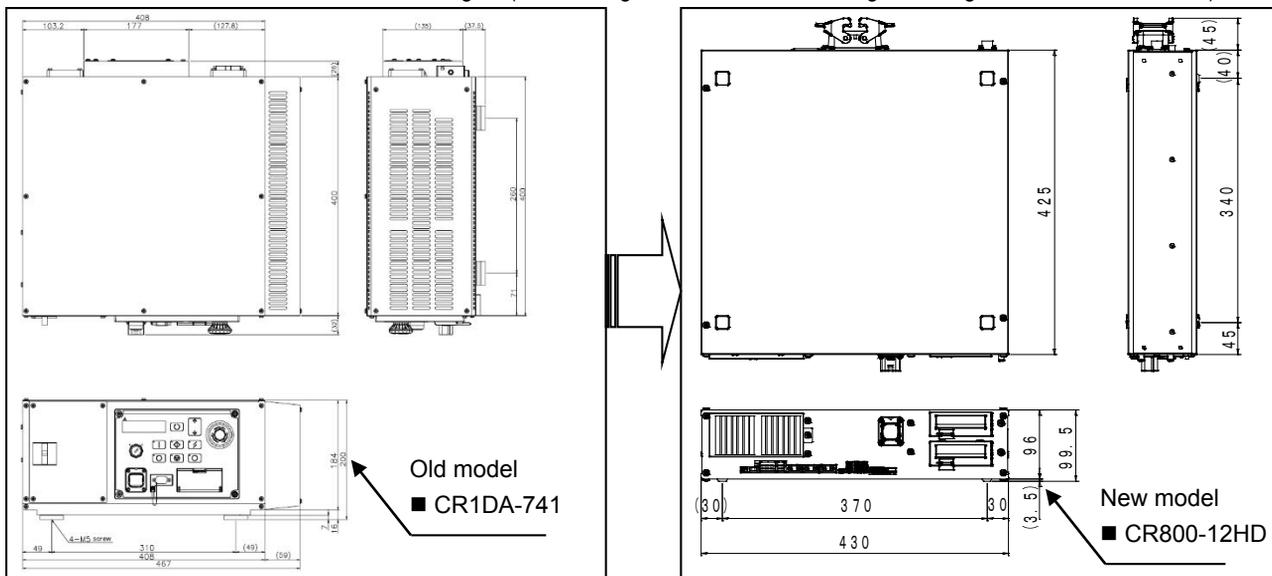
2.3 Specifications of the controller

Please note that the controller model is new, and the dimensions and others have changed. For the details, refer to the following.

Item	Unit	Specifications		
		Old model RH-12SDH CR1DA-741	New model RH-12FRH-D CR800-12HD	
Controller model		CR1DA-741	CR800-12HD	
Routing control method		PTP control, CP control		
Number of control axis		Simultaneously 4		
Programming language		MELFA-BASIC V	MELFA-BASIC VI	
Memory capacity	Programmed positions	point	13,000	
	Number of steps	step	26,000	
	Number of programs		256	
External input/output (standard)	General-purpose input/output	point	Input 0/output 0	
	Dedicated input/output		Assigned to general-purpose input/output	
	Dedicated stop input		1	
	Hand open/close		Input 8/output 0 (when using pneumatic hand interface: 8/8)	
	Emergency stop input		1 (duplication)	
	Door switch input		1 (duplication)	
	Enabling device input		1 (duplication)	
	Emergency stop output		1 (duplication)	
	Mode output		1 (duplication)	
	Robot error output		1 (duplication)	
	Mode selector input		0	
	Additional axis synchronization		1 (duplication)	
	Interface	RS-232	port	1
		RS-422	port	1 (for T/B)
Ethernet		port	1 10BASE-T/100BASE-TX	
USB		port	1 1 (for T/B)/ 1 (for customer) 10BASE-T/100BASE-TX/1000BASE-T	
Memory expansion slot		SLOT	1	
Expansion slot		SLOT	1	
Robot input/output link		ch	1	
Additional axis function		ch	1 (SSCNETIII)	
Input power supply	Voltage range	V	Single phase, 180 to 253 VAC	
	Power capacity	kVA	2	
Outside dimensions	mm	470(W)×400(D)×200(H)	430(W)×425(D)×99.5(H)	
Mass	kg	Approx. 21	Approx. 12.5	
Construction [Protection specification]		Self-contained floor type, open type [IP20]		
Grounding	Ω	100 or less (D class grounding)		

2.4 Outside dimensions of the controller

The controller's outside dimensions have changed. (Left drawing: RH-12SDH controller, right drawing: RH-12FRH-D controller)



2.5 Options

(1) Robot arm options comparison

Item	Specifications			Compatibility
	Old model	New model	Specifications and supplementary explanation	
	RH-12SDH	RH-12FRH-D		
Solenoid valve set	1S-VD0DM-03 (Sink type) 1S-VD0ME-03 (Source type) □: 1 to 4	1S-VD0□-01 (Sink type) 1S-VD0□E-01 (Source type) □: 1 to 4	Solenoid valve set for the pneumatic hand (1 to 4 sets, sink type) Solenoid valve set for the pneumatic hand (1 to 4 sets, source type)	×
Hand output cable	1S-GR35S-02	1F-GR60S-01	The robot side has a connector, and the other side has drip-proof grommet attached output cables for unprocessed solenoid valve connection. (Total length: 1050mm)	×
Hand input cable	1S-HC35C-02	1F-HC35C-02	The robot side has a connector, and the other side has drip-proof grommet attached input cables for unprocessed hand sensor connection. (Total length: 1800mm)	×
Hand curl tube	1N-ST0608C	1N-ST0608C-01	φ6 × 8 pcs, curl pneumatic tube for 4-set solenoid valve connection	×
Internal wiring/piping set for hand	-	1F-HS604S-01 1F-HS604S-02	8 hand inputs, φ6 x 4 tip axis built-in wiring piping set (with fixed plate)	-
User external wiring/piping box	-	1F-UT-BOX-01	Box for hand I/O wiring of 4-set solenoid valves and for external pullout of φ6 (8 pcs) hand pipes	-
J1-axis operating range change	-	1S-DH-02	Stopper part for J1-axis operating range change	-
2m machine cable (replacement type)	1S-02UCBL-01	-	Fixed type (Set of 2 cables for power supply and signals), 2m (Provided as substitute for standard 5m cables.)	-
Machine cable (replacement type) (fixed type)	-	1F-□□UCBL-41 □□: 02, 10, 15, 20	Fixed type: 2m, 10m, 15m, 20m	-
Machine cable (replacement type) (flexed type)	-	1F-□□LUCBL-41 □□: 10, 15, 20	Flexed type: 10m, 15m, 20m	-
Machine cable extension (Fixed type)	1S-□□CBL-01 □□: 05, 10, 15	-	Fixed type (Set of 2 cables for power supply and signals), 5m, 10m, 15m (Used for adding to standard 5m cables.)	-
Machine cable extension (Flexed type)	1S-□□LCBL-01 □□: 05, 10, 15	-	Flexed type (Set of 2 cables for power supply and signals), 5m, 10m, 15m (Used for adding to standard 5m cables.)	-

Meaning of symbols in table:
○: Same product
×: Incompatible
-: Not supported

(2) Robot controller options comparison

Item	Specifications		CR2DA-741 /CR800-D compatibility	Remarks
	Old model	New model		
	CR1DA-741	CR800-12HD		
Pneumatic hand interface	2A-RZ365 (Sink) 2A-RZ375 (Source)	☆	○	
Expansion I/O unit	2A-RZ361 (Sink) 2A-RZ371 (Source)	2A-RZ361 (Sink) 2A-RZ371 (Source)	○	
External I/O cable	2A-CBL□□	2A-CBL□□	○	For expansion I/O unit
Built-in I/O interface	2D-TZ368 (Sink) 2D-TZ378 (Source)	2D-TZ368 (Sink) 2D-TZ378 (Source)	○	
External I/O cable	2D-CBL□□	2D-CBL□□	○	For built-in I/O interface
CC-Link interface	2D-TZ576	2D-TZ576	○	Ver. 2 compatible
Additional axis interface	☆	☆	☆	
Ethernet interface	☆	☆	☆	
Tracking function	☆	☆	☆	
Expansion memory	2D-TZ454	-	-	
Controller protection box	CR1D-MB	CR800-MB	×	
Teaching box	R32TB		○	
High-functionality teaching box	R56TB		○	
RS-232 cable (for PC support)	2D-232CBL03M	-	-	
Force sensor set	-	4F-FS002H-W200/4F-FS002H-W1000	-	
PC support software	3D-1□C-WINJ	3F-14C-WINJ	-	RT ToolBox3 Standard
		3F-15C-WINJ	-	RT ToolBox3min
		3F-16D-WINJ	-	RT ToolBox3Pro
Simulator (MELFA-Works)	3D-21C-WINJ	-	-	

Meaning of symbols in table ○: Compatible, ☆: Standard equipment, ×: Incompatible, -: Not supported

3. Compatibility

The following table provides compatibility between old and new models.

3.1 Compatibility of the robot arm

Category	Item	Specifications		Compatibility	Remarks
		Old model	New model		
		RH-12SDH	RH-12FRH-D		
Outside dimensions	Installation dimensions	Changed		△1	Only the base length (depth) is incompatible.
	Mechanical interface	Changed		○	Compatible, however, note that φ25 screw is long, 42mm.
	Operating range	Changed		○	Compatible (expanded operating area)
Tooling	Hand wiring	Changed		×	
	Hand piping	Changed		×	
	Backup wiring	Changed		○	Built-in LAN cable, also available as backup wiring.
Maintenance	Backup battery	A6BAT	MR-BAT6V1	×	

○: Fully compatible, ×: Incompatible, △1: Only the base length (external depth dimension + 30mm) is incompatible.

3.2 Compatibility of the controller

Category	Item	Specifications		Compatibility	Remarks
		Old model	New model		
		CR1DA-741	CR800-12HD		
Operation	TB	R32TB		○	
	High-functionality TB	R56TB		○	
	I/O map	0 to 9999	0 to 9999	○	
	Programming language	MELFA-BASIC V	MELFA-BASIC VI	×	
	PC support software	RT ToolBox2	RT ToolBox3	×	
Maintenance	Backup battery	Q6BAT	-	×	

○: Fully compatible ×: Incompatible

Precautions of controller specifications

Item	Specifications	
	Old model	FR series
	CR1DA-741	CR800-12HD
Robot language	MELFA-BASIC IV MELFA-BASIC V	MELFA-BASIC IV cannot be used directly. (RT3 converts MELFA-BASIC IV into MELFA-BASIC V or VI.) MELFA-BASIC V MELFA-BASIC VI (upper-compatible of MELFA-BASIC V) * In MELFA-BASIC VI, the description method of program is the same as MELFA-BASIC V unless the Function or Include commands are used.
Serial number of robot	Necessary to input (by using the T/B or RT2)	Not necessary to input (The data has been stored in the robot's internal ROM.)
Origin setting	Necessary to input (by using the T/B or RT2)	Not necessary to input (The data has been stored in the robot's internal ROM.)
Hand type	Sink type (initial value) It is necessary to set a parameter for selecting the source type.	Not set (initial value) It is necessary to select either sink or source type by setting a parameter. (If not set, an error will occur.)
Mode selector input	Provided	Provided (Customer needs to prepare a mode selector switch.) Recommended key switch: HA1K-2C2A-2 (manufactured by IDEC)
Enabling device switch input	Provided	Not provided
Battery	Provided (Q6BAT, 1 pc.)	Not using (Not necessary to replace the battery)
TB dummy connector	Necessary	Not necessary After deadman turns on, the T/B can be removed without stopping the robot even during operation.

3.3 Precautions of the extension function for GOT direct connection

The start addresses of the GOT shared memory (CPU buffer memory) I/O are different between old and new models.

Item	Specifications		Remarks
	Old model	FR series	
	CR1DA-741	CR800-12HD	
GOT output start address (to robot)	U3E0\G10000	U3E0\G0	
Robot input signal start address	10000	10000	
Robot output signal start address	10000	10000	
GOT input start address (from robot)	U3E1\G10000	U3E1\HG0	
Memory configuration	Shared memory among GOTs	CPU buffer memory	