

FR Series Robots

Vertically Articulated (RV)



Model Number	RV2FR	RV2FRL	RV4FR	RV4FRL	RV7FR	RV7FRL	RV7FRL	RV13FR	RV13FRL	RV20FR
Maximum Load Capacity (kg)	2	2	4	4	7	7	7	13	13	20
Maximum Reach Radius (mm)	504	649	515	649	713	908	1,503	1,094	1,388	1,094
Environmental Specifications	Standard	IP30		IP40						
	Oil Mist	-		IP67						
	Cleanroom	-		ISO class3						
Controller	CR800-R, CR800-D									

Horizontally Articulated SCARA (RH)



Model Number	RH1FRHR	RH3FRHR	RH3FRH35	RH3FRH45	RH3FRH55	RH6FRH35	RH6FRH45	RH6FRH55
Maximum Load Capacity (kg)	1	3	3	3	3	6	6	6
Maximum Reach Radius (mm)	550	350	350	450	550	350	450	550
Environmental Specifications	Standard	IP20/IP67		IP20				
	Oil Mist	-		IP65			IP65	
	Cleanroom	-		ISOclass5		ISOclass3		
Controller	CR800-R, CR800-D							



Model Number	RH12FRH55	RH12RFH70	RH12FRH85	RH20FRH85	RH20FRH100
Maximum Load Capacity (kg)	12	12	12	20	20
Maximum Reach Radius (mm)	550	700	850	850	1000
Environmental Specifications	Standard	IP20			
	Oil Mist	IP65			
	Cleanroom	ISOclass3			
Controller	CR800-R, CR800-D				

Through Wrist Wiring/Piping Options (RVFR Series)

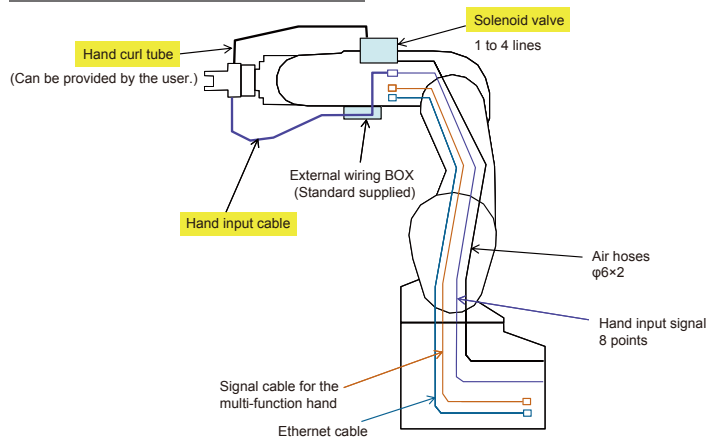
Tooling Device Configuration (4kg – 20kg)

Hand Configuration	Wiring Format	Robot Specifications	Required Device		Remarks
			External Wiring Set for the Forearm	External Wiring Set for the Base	
Air-Hand + Hand Input Signal	Interior equipment	SHxx01	- (*1)	-	Air hoses: Up to 2 systems (4 mm diameter x 4 mm); 8 input signals
	Exterior equipment	Standard	- (*2)	-	Air hoses: Up to 4 systems (4 mm diameter x 8 mm) are possible
Hand Input Signal + Ethernet + Force Sensor OR Electric Hand (*3, *4)	Interior equipment	-SHxx02	- (*1)	1F-HA01S-01 (Included)	
	Exterior equipment	Standard	1F-HB01S-01 (*2)	1F-HA01S-01	Air hoses: Up to 4 systems (4 mm diameter x 8 mm) are possible
Electric Hand + Ethernet + Force Sensor	Interior equipment	-SHxx03	- (*1)	1F-HA02S-01 (Included)	
	Exterior equipment	Standard	1F-HB02S-01	1F-HA02S-01	
Air-Hand + Hand Input Signal + Force Sensor	Interior equipment	-SHxx04	- (*1)	1F-HA01S-01 (Included)	Air hoses: Up to 1 system (4 mm diameter x 2 mm); 8 input signals
	Exterior equipment	Standard	1F-HB01S-01 (*2)	1F-HA01S-01	Air hoses: Up to 4 systems (4 mm diameter x 8 mm) are possible
Air-Hand + Hand Input Signal + Ethernet	Interior equipment	-SHxx05	- (*1)	1F-HA01S-01 (Included)	Air hoses: Up to 1 system (4 mm diameter x 2 mm); 8 input signals
	Exterior equipment	Standard	1F-HB01S-01 (*2)	1F-HA01S-01	Air hoses: Up to 4 systems (4 mm diameter x 8 mm) are possible

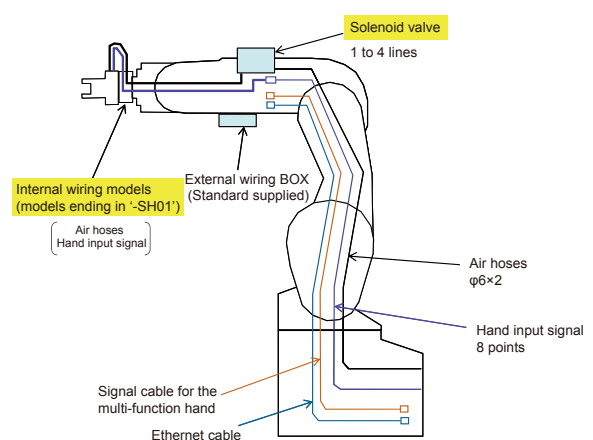
Notes:

1. For internal routing. (Pneumatics sold separately)
2. For external routing. (Hoses, input cables and solenoid valves sold separately)
3. For SHxx02 configuration, the Air hand and Electric hand cannot be used simultaneously.
4. For SHxx02 configuration, the Force sensor and Electric hand cannot be used simultaneously.

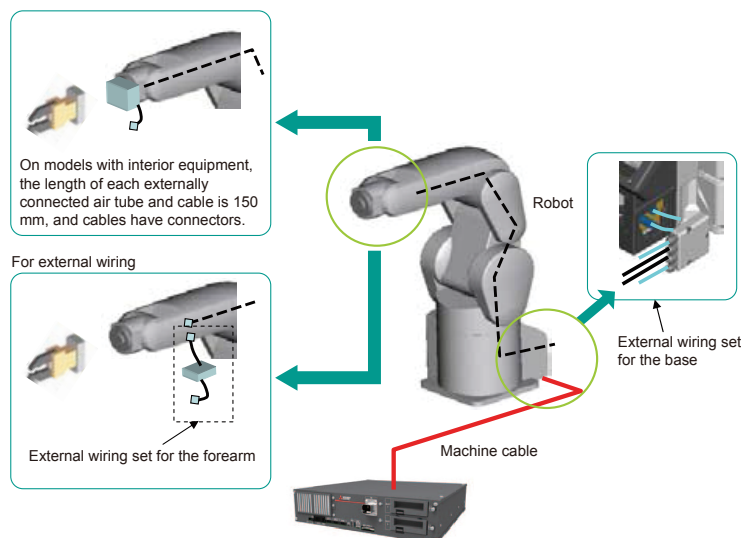
RV series tooling (air-hand): External wiring



RV series tooling (air-hand): Internal wiring



For models with internal wiring and hoses



RVFR Series

Part Number Configuration

RV 1 FR 2 3 4 D 5

Must select items 1–4.

1 Max Load Capacity

Symbol	Maximum Load Capacity
2	2kg
4	4kg
7	7kg
13	13kg
20	20kg

2 Arm Length

Symbol	Arm Length
Blank	Standard specifications
L	Long arm (excludes RV20)
L L	Extended long arm: RV7 only

3 Brake

Symbol	Brake Specification
Blank	All axis with brakes (Excludes RV2)
B	All axis with brakes (RV2 only)

4 Environment

Symbol	Environment Protection
Blank	Standard specification
M	Oil mist specification (Excludes RV2)
C	Cleanroom specification (Excludes RV2)

5 Options Select one from table below:

Symbol	RV Tooling Config (*1)	Internal Wiring Specification
SH_ _	01, 02, 03, 04, or 05	Optional (Excludes RV2)

Note 1: See RV Tooling Device Configurations table for definitions

RV2FR • RV2FRL

Model Number	RV2FR(B)	RV2FRL(B)	
Environmental Specifications	Standard		
Protection Degree	IP30		
Installation	Floor type, ceiling type, (wall-mounted type) (*2)		
Structure	Vertical, multiple-joint type		
Degrees of Freedom	6		
Drive System (*1)	AC servo motor (J2, J3 and J5: with brake)		
Position Detection Method	Absolute encoder		
Maximum Load Capacity (Rating) kg	Maximum 3 (Rated 2) (*5)		
Arm Length (mm)	230 + 270	310 + 335	
Maximum Reach Radius (mm)	504	649	
Operating Range (deg)	J1	480 (±240)	
	J2	240 (±120)	237 (-117 to +120)
	J3	160 (-0 to +160)	
	J4	400 (±200)	
	J5	240 (±120)	
	J6	720 (±360)	
Maximum Speed (deg/sec)	J1	300	225
	J2	150	105
	J3	300	165
	J4	450	412
	J5	450	
	J6	720	
Maximum Composite Speed (mm/sec) (*3)	4955	4200	
Cycle Time (sec) (*4)	0.6	0.7	
Position Repeatability (mm)	±0.02		
Ambient Temperature (°C)	0 to 40		
Weight (kg)	19	21	
Tolerable Moment (Nm)	J4	4.17	
	J5	4.17	
	J6	2.45	
Tolerable Amount of Inertia (kgm ²)	J4	0.18	
	J5	0.18	
	J6	0.04	
Tool Wiring	Gripper: 4 input points/4 output points; Signal cable for the multi-function gripper		
Tool Pneumatic Pipes	ø4 x 4 (Base to forearm section)		
Machine Cable	5m (connector on both ends)		
Connected Controller	CR800-D (iQ-R functionality supported via optional 4F-R16RTCPU and software setting change)		

Notes:

- The standard model does not have a brake on the J1, J4, or J6 axis. There are models available with brakes included for all axes.
- The wall-mounted specification is a custom specification where the operating range of the J1-axis is limited.
- This is the value at the surface of the mechanical interface when all axes are composited.
- The cycle time is based on back-and-forth movement over a vertical distance of 25 mm and horizontal distance of 300 mm when the load is 1 kg.
- The maximum load capacity indicates the maximum payload when the mechanical interface is facing downward (±10° to the perpendicular).

RV4FR • RV4FRL

Model Number		RV4FRM/C	RV4FRLM/C
Environmental Specifications		Standard / Oil Mist / Cleanroom	
Protection Degree		IP40 (standard) / IP67 (oil mist) (*1) / ISOclass3 (*6)	
Installation		Floor type, ceiling type, (wall-mounted type) (*2)	
Structure		Vertical, multiple-joint type	
Degrees of Freedom		6 (*8)	
Drive System (*1)		AC servo motor	
Position Detection Method		Absolute encoder	
Maximum Load Capacity (Rating) kg		Maximum 4 (Rated 4) (*7)	
Arm Length (mm)		235+275	310+335
Maximum Reach Radius (mm)		515	649
Operating Range (deg)	J1	480 (±240)	
	J2	240 (±120)	
	J3	161 (-0 to +161)	164 (-0 to +164)
	J4	400 (±200)	
	J5	240 (±120)	
	J6	720 (±360)	
Maximum Speed (deg/sec)	J1	450	420
	J2	450	336
	J3	300	250
	J4	540	540
	J5	623	623
	J6	720	720
Maximum Composite Speed (mm/sec) (*3)		9027	9048
Cycle Time (sec) (*4)		0.36	0.36
Position Repeatability (mm)		±0.02	
Ambient Temperature (°C)		0 to 40	
Weight (kg)		39	41
Tolerable Moment (Nm)	J4	6.66	
	J5	6.66	
	J6	3.96	
Tolerable Amount of Inertia (kgm ²)	J4	0.2	
	J5	0.2	
	J6	0.1	
Tool Wiring		Gripper: 8 input points/8 output points; Signal cable for the multi-function gripper and sensors; LAN × 1 <100 BASE-TX> (*5)	
Tool Pneumatic Pipes		Primary: ø6 × 2 Secondary: ø4 × 8, ø4 × 4 (from base portion to forearm)	
Machine Cable		5m (connector on both ends)	
Connected Controller		CR800-D (iQ-R functionality supported via optional 4F-R16RTCPU and software setting change)	

Notes:

1. Please contact a Mitsubishi Electric dealer since the environmental resistance may not be secured depending on the characteristics of oil you use. Air will need to be purged from the lines. For details, refer to the specifications sheet.
2. The wall-mounted specification is a custom specification where the operating range of the J1-axis is limited.
3. This is the value at the surface of the mechanical interface 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 when the load is 1 kg.
5. Can also be used as a spare line (0.13 sq. mm, 4-pair cable) for conventional models.
6. Preservation of cleanliness levels depends on conditions of a downstream flow of 0.3 m/s in the cleanroom and internal robot suctioning. A ø8-mm coupler for suctioning is provided at the back of the base.
7. The maximum load capacity indicates the maximum payload when the mechanical interface is facing downward (±10° to the perpendicular).
8. Please contact our sales offices if you request a five axes long arm model.

RV7FR • RV7FRL • RV7FRL

Model Number	RV7FRM/C	RV7FRLM/C	RV7FRLLM/C
Environmental Specifications	Standard / Oil Mist / Cleanroom		
Protection Degree	IP40 (standard) / IP67 (oil mist) (*1) / ISO class3 (*6)		
Installation	Floor type, ceiling type, (wall-mounted type) (*2)		
Structure	Vertical, multiple-joint type		
Degrees of Freedom	6		
Drive System (*1)	AC servo motor		
Position Detection Method	Absolute encoder		
Maximum Load Capacity (Rating) kg	Maximum 7 (Rated 7) (*7)		
Arm Length (NO1 am)	340 + 370	435+470	565+805
Maximum Reach Radius (mm)	713	908	1503
Operating Range (deg)	J1	480 (±240)	380 (±190)
	J2	240 (-115 to +125)	240 (-110 to +130)
	J3	156 (-0 to +156)	162 (-0 to +162)
	J4	400 (±200)	240 (-90 to +150)
	J5	240 (±120)	167.5 (-10 to +157.5)
	J6	720 (±360)	
Maximum Speed (deg/sec)	J1	360	288
	J2	401	321
	J3	450	360
	J4	337	337
	J5	450	450
	J6	720	720
Maximum Composite Speed (mm/sec) (*3)	11064	10977	15,300
Cycle Time (sec) (*4)	0.32	0.35	0.63
Position Repeatability (mm)	±0.02		±0.06
Ambient Temperature (°C)	0 to 40		
Weight (kg)	65	67	130
Tolerable Moment (Nm)	J4	16.2	
	J5	16.2	
	J6	6.86	
Tolerable Amount of Inertia (kgm ²)	J4	0.45	
	J5	0.45	
	J6	0.10	
Tool Wiring	Gripper: 8 input points, Signal cable for the multi-function gripper, LAN × 1 <100 BASE-TX> (*5)		
Tool Pneumatic Pipes	Primary: ø6 × 2 Secondary: ø4 × 8, ø4 × 4 (from base portion to forearm)		Primary: ø6 × 2 Secondary: ø6 × 8, ø4 × 4 (from base portion to forearm)
Machine Cable	5m (connector on both ends)		
Connected Controller	CR800-D (iQ-R functionality supported via optional 4F-R16RTCPU and software setting change)		

Notes

1. Please contact Mitsubishi Electric dealer since the environmental resistance may not be secured depending on the characteristics of oil you use.
2. The wall-mounted specification is a custom specification where the operating range of the J1-axis is limited.
3. This is the value at the surface of the mechanical interface 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 when the load is 1 kg.
5. Can also be used as a spare line (0.13 sq. mm, 4-pair cable) for conventional models.
6. Preservation of cleanliness levels depends on conditions of a downstream flow of 0.3 m/s in the cleanroom and internal robot suctioning. A ø8-mm coupler for suctioning is provided at the back of the base.
7. The maximum load capacity indicates the maximum payload when the mechanical interface is facing downward (±10° to the perpendicular).

RV13FR • RV13FRL

Model Number		RV13FRM/C	RV13FRLM/C	RV20FRM/C
Environment		Standard / Oil Mist / Cleanroom		
Protection Degree		IP40 (standard), IP67 (oil mist) (*1), ISO Class 3 (*6)		
Mounting Position		Floor type, ceiling type, (wall-mounted type) (*2)		
Structure		Vertical, multiple-joint type		
Degree of Freedom		6 axis		
Drive System		AC servo motor		
Position Detection Method		Absolute encoder		
Maximum Payload (Rated) kg		Maximum 13 (Rated 12) (*7)		Maximum 20 (Rated 15)
Arm Length (mm)		410 + 550	565 + 690	410 + 550
Maximum Reach Radius (mm)		1,094	1,388	1,094
Operating Range (deg)	J1	380 (±190)		
	J2	240 (-90 to +150)		
	J3	167.5 (-10 to +157.5)		
	J4	400 (±200)		
	J5	240 (±120)		
	J6	720 (±360)		
Maximum Speed (deg/sec)	J1	290	234	110
	J2	234	164	110
	J3	312	219	110
	J4	375	375	124
	J5	375	375	125
	J6	720	720	360
Synthetic Maximum Speed (mm/sec) (*3)		10,450	9,700	4200
Cycle Time (sec) (*4)		0.53	0.68	0.70
Position Repeatability (mm)		±0.05		
Ambient Temperature (°C)		0 to 40		
Weight (kg)		120	130	120
Allowable Movement (Nm)	J4	19.3		49.0
	J5	19.3		49.0
	J6	11		11
Allowable Inertia (KGM ²)	J4	0.47		1.40
	J5	0.47		1.40
	J6	0.14		0.14
Tool Wiring		Gripper: 8 input points/8 output points; Signal cable for the multi-function gripper; LAN × 1 <100 BASE-TX> (*5)		
Tool Pneumatic Pipes		Primary: ø6 × 2 Secondary: ø6 × 8, ø4 × 4 (from base portion to forearm)		
Machine Cable		5m (connector on both ends)		
Connection Controller		CR800-D (iQ-R functionality supported via optional 4F-R16RTCPU and software setting change)		

Notes:

1. Please contact Mitsubishi Electric dealer since the environmental resistance may not be secured depending on the characteristics of oil you use.
2. The wall-mounted specification is a custom specification where the operating range of the J1-axis is limited.
3. This is the value at the surface of the mechanical interface 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 when the load is 5 kg.
5. Can also be used as a spare line (0.13 sq. mm, 4-pair cable) for conventional models. Provided up to the inside of the forearm.
6. Preservation of cleanliness levels depends on conditions of a downstream flow of 0.3 m/s in the cleanroom and internal robot suctioning. A ø8-mm coupler for suctioning is provided at the back of the base.
7. The maximum load capacity indicates the maximum payload when the mechanical interface is facing downward (±10° to the perpendicular).