Changes for the Better

MITSUBISHI ELECTRIC

MITSUBISHI ELECTRIC INDUSTRIAL ROBOT

MELFA RH-6SH/12SH/18SH Series

S-series

Nagoya works, Mitsubishi Electric Corporation, has acquired certification for systems of environmental management under ISO 14001, and for quality management systems under ISO 9001.

EC97J1113

Fine Tuning! Improved Performance

Mitsubishi's original robot dedicated motor and dedicated servo amplifier have been newly developed to improve the robot's movement and basic performance. A variety of functions, realized with the 64-bit RISC processor, provide solutions for our customer's high value-added systems.

Speedy — High Speed Operation

Employing a dedicated robot drive motor and decelerator newly developed by Mitsubishi, high speed operation is achieved with the optimum acceleration/deceleration control function.
(RH-12SH: Maximum composite speed is improved by 18% compared to conventional models)

Strong — High payload capacity, highly rigid arm and improved environmental performance

With the implementation of a highly rigid arm design method, the maximum payload that is the top level in class is achieved.
Lineup of seven standard models: payloads of 6kg, 12kg and 18kg, and arm length from 350mm to 850mm.
Environment-resistant specifications - oil mist specification (IP54) and clean room specification (class 10) - are available for all models.
* Robots with environment-resistant specifications are offered as special specifications at factory shipment.

Specialist — Skillful works with diverse functions

With the collision detection function, even if the tip of the ball screw makes contact with a peripheral device during a position teaching operation, the robot can immediately detect the collision, and stops as quickly as possible to prevent damage to the peripheral device and the ball screw. (*)
Also, the maintenance forecast function and position recovery support function added from the S Series make it possible to reduce the maintenance load of the customer.
* The collision detection function will not guarantee to prevent damage to the ball screw, however.

MELFA **RH-S series**

RH-6SH series — RH-12SH/18SH series

CR1B-571 — CR2B-574

Features

Improved Productivity

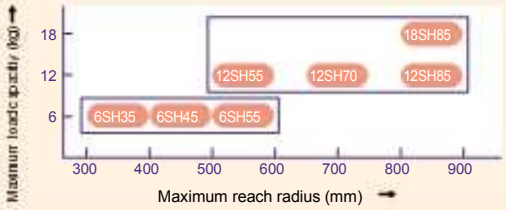
High Speed Operation
In addition to high payload capability, high speed operation is now possible.

Diverse Lineup
As the S Series horizontal multi-joint robots, seven models with varied arm lengths and 6-kg, 12-kg and 18-kg payloads are available.

Compliance with environmental protection
Lineup also includes robots with environment-resistant specifications.
Please select a robot according to the desired environment.

Valve Placement with Consideration for Peripheral Devices
The dedicated valve option for the rear of the No. 2 arm and its installation space are provided. New design is enable to minimize the interference with peripheral devices.

Lineup



Reduction of Maintenance Cost

Installed with the Maintenance Function
The maintenance period is announced beforehand by the maintenance forecast function and position restoration function, allowing timely maintenance and a reduction of total maintenance costs.

Powered and Improved

More Robots with Clean Room Specification
Horizontal multi-joint models with 12-kg or 18-kg payload are now available with clean room specification.
(Special Specification at Factory Shipment)

Improved Actual Operating Speed
A higher speed operation than with the conventional RH-A Series is achieved in the actual movement range, as well as the maximum speed.
The operating speed setting that estimates the lifespan in all movement ranges is also implemented.
The speed is improved by employing the drive module common to the S Series.

Compatiblity

Compatible with the RH-A Series
The mechanical compatibility with the RH-A Series is maintained. The user of the RH-A Series can continue to use the existing robots with this new series.
* To replace RH-A with RH-6SH, correction of the Z position may partially be required.

Model Structure

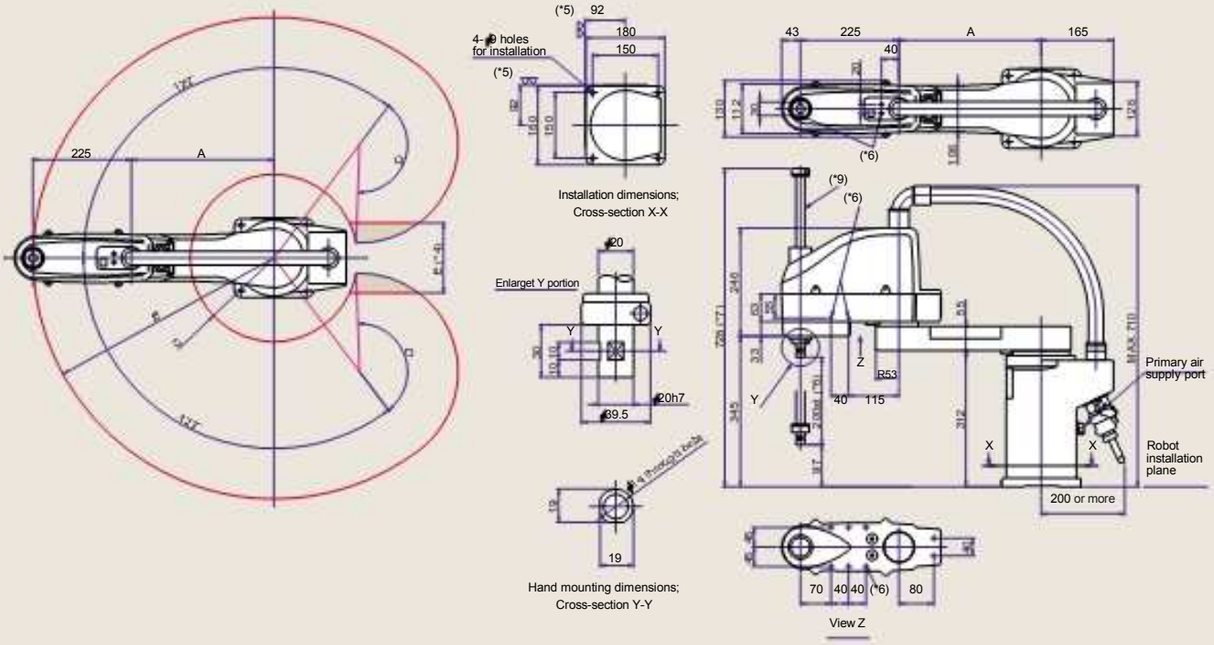
Robot series	Arm length [mm]	Up/down axis movement range [mm] 170	200	300	350	Connection controller
RH-6SH series	350	RH-6SH3517M/C	RH-6SH3520	-	-	CR1B-571
	450	RH-6SH4517M/C	RH-6SH4520	-	-	
	550	RH-6SH5517M/C	RH-6SH5520	-	-	
RH-12SH series	550	-	-	RH-12SH5530M/C	RH-12SH5535	CR2B-574
	700	-	-	RH-12SH7030M/C	RH-12SH7035	
	850	-	-	RH-12SH8530M/C	RH-12SH8535	
RH-18SH series	850	-	-	RH-18SH8530M/C	RH-18SH8535	

*1: Robots with CE marking specification are separately available. The RH-6SH Series uses the CR2B-574 controller. For more information, please contact your nearest dealer or distributor. *2: Please note that the environment-resistant specifications (C: clean room specification, M: oil mist specification) have a narrower up/down axis movement range compared to the robots with the standard specification.
*3: The environment-resistant specifications (clean room specification, oil mist specification) are provided as special specifications at factory shipment. For delivery schedule, please contact your nearest dealer or distributor.

with More Diverse Functions!

Robot Arm Outside Dimension / Movement Range Diagrams

RH-6SH

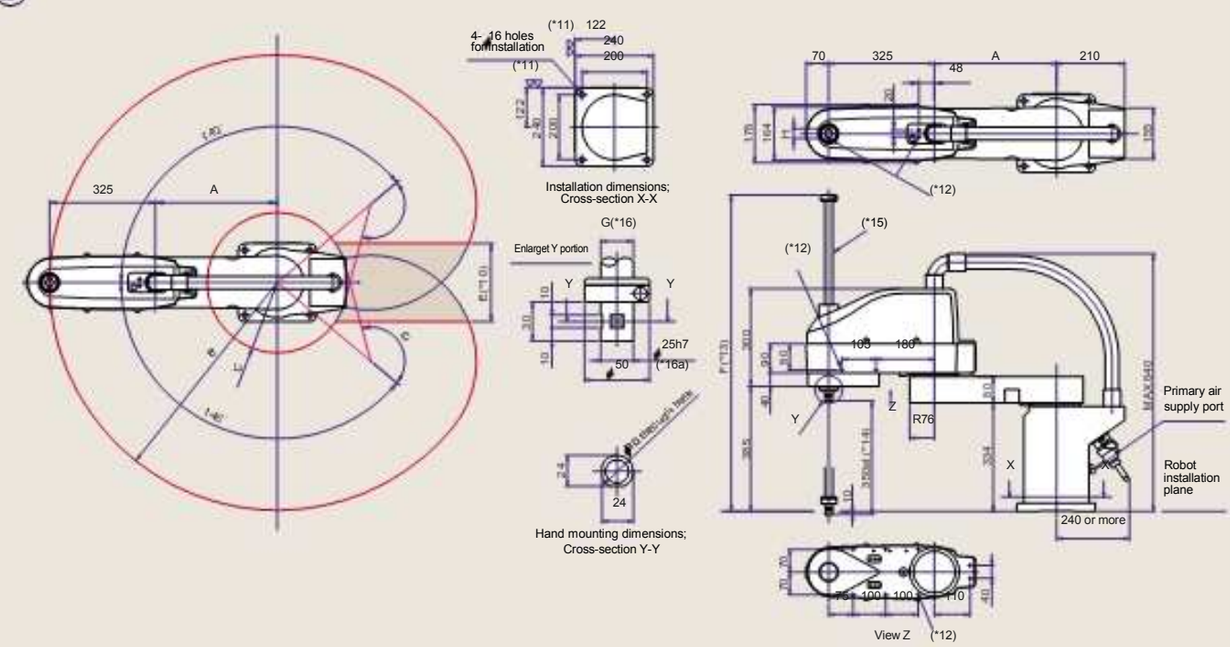


Varied dimensions

Robot series	A	B	C	D	E (*4)
RH-6SH35	125	R350	R159	137°	210
RH-6SH45	225	R450	R136	145°	210
RH-6SH55	325	R550	R191	145°	160

*4: This is the restricted area in the movement range diagram.
*5: This is the reference process surface at installation.
*6: This is the screw hole (M4) for fastening the user wiring and piping.
*7: This is 788 for the clean-room/oil mist specifications.
*8: This is 170st for the clean-room/oil mist specifications.
*9: In the oil mist and clean-room specifications, a bellows is installed in the exposed parts (top and bottom) of the ball screw spline.

RH-12SH/RH-18SH



Varied dimensions

Robot series	A	B	C	D	E (*10)	F (*13)	G	H
RH-12SH55	225	R550	R191	145°	240	972	25	30
RH-12SH70	375	R700	R216	145°	240	972	25	30
RH-12SH85	525	R850	R278	153°	-	972	25	30
RH-18SH85	525	R850	R278	153°	-	967	32	40

*10: This is the restricted area in the movement range diagram.
*11: This is the reference process surface at installation.
*12: This is the screw hole (M4) for fastening the user wiring and piping.
*13: In the oil mist and clean-room specifications, this is 1027 for the RH-12SH Series and 999 for the RH-8SH Series.
*14: This is 300 for the clean-room/oil mist specifications.
*15: In the oil mist and clean-room specifications, a bellows is installed in the exposed parts (top and bottom) of the ball screw spline.
*16: G is 25 for the RH-12SH Series, and 32 for the RH-18SH Series.The shaft outline of the hand mounting flange is common. (*16a)

List of Specifications

Robot Arm

Type		Unit	RH-6SH35zze	RH-6SH45zze	RH-6SH55zze	RH-12SH55zze	RH-12SH70zze	RH-12SH85zze	RH-18SH85zze
Machine class			En (Refer to Table 1)						
Installation			Floor mount						
Degrees of freedom			4						
Structure			Horizontal, maltiple-joint type						
Driving method			AC servomotor						
Position sensing method			Absolute encoder						
Maximum load capacity		kg	6			12			18
Arm length	NO1 arm	mm	125	225	325	225	375	525	
	NO2 arm		225			325			
Maximum reach rasius (NO1 arm+NO2 arm)			350	450	550	550	700	850	
Operating range	J1	deg	254 (±127)			280 (±140)			
	J2		274 (±137)	290 (±145)		290 (±145)		306 (±153)	
	J3(Z)	mm	Z (Refer to Table 1)						
	J4(◐)	deg	720 (±360)						
Maximum speed	J1	deg/sec	375			360		288	
	J2		612			412.5			
	J3(Z)	mm/sec	1,177			1,300			1,200
	J4(◐)	deg/sec	2,411			1,500			
Maximum composite speed *17		mm/sec	6,473 (4,694)	7,128 (5,349)	7,782 (6,003)	10,555 (5,796)	11,498 (6,738)	11,221 (6,612)	
Cycle time *18		sec	0.45	0.46	0.47	0.43	0.44	0.46	0.53
Allowable wrist-moment of inertia (rating)		kg.m²	0.04 (0.01)				0.1 (0.02)		0.2 (0.02)
Position repeatabillity	X-Y composite	mm	±0.02			±0.02	±0.025		
	J3(Z)		±0.01			±0.01			
	J4(◐)	deg	±0.02			±0.03			
Ambient temperature		˚C	0 to 40						
Mass		kg	20		21	41	43	45	47
Tool wiring *19			8 hand input points, 8 output points, 8-wire spare wire						
Tool pneumatic pipes			◐6 x 2 pipes						
Supplied air pressure		MPa	0.5±10%						
Protection class/Clean specifications			Protect (Refer to Table 1)						

*17: The value when J1, J2 and J4 are composed. The value in parentheses is the value when J1 and J2 are composed.
*18: RH-6/12SH shows the value when the payload is 2 kg (RH-18SH shows the value when the payload is 5 kg).
˙The cycle time may increase when the work's positioning accuracy is required, for instance, or depending on the operating position. (The cycle time is a reciprocating operation of up/down 25 mm and horizontal 300 mm.) *19: The air hand interface (optional) is required to use hand output.

Table 1: Relationship Among the Robot Series, Environment Specifications and Up/Down Axis Movement Range (Z Stroke)

Robot series	Up/down axis movement range (Z)	Symbol (model notation: zz)	Protection specifications (En)	Symbol (model notation: e)	Protection class/Clean specifications (Protect)
RH-6SH series	200 (97 to 297)	20	Standard	Blank	IP20
	170 (97 to 267)	17	Oilmist proof	M	IP54
	170 (97 to 267)	17	Clean	C	Class10 (0.3μm)
RH-12/18SH series	350 (-10 to 340)	35	Standard	Blank	IP20
	300 (-10 to 290)	30	Oilmist proof	M	IP54
	300 (-10 to 290)	30	Clean	C	Class10 (0.3μm)

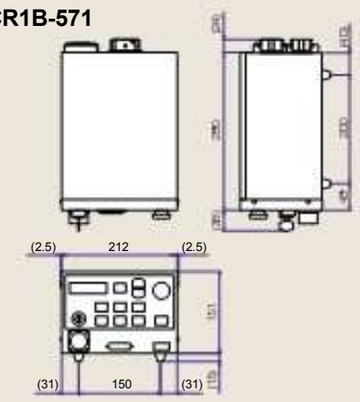
Controller

Type		Unit	CR1B-571	CR2B-574
Path control method			PTP control, CP control	
Number of axes controlled			Up to 6 axes simultaneously	
CPU			64bit RISC/DSP	
Main functions			Joint interpolation, linear interpolation, three-dimensional circular interpolation, palletizing, conditional branching, subroutine, interrupt control, multi-task, optimum acceleration/deceleration control, optimum override control,optimum path connection function, torque limit command, XYZ compliance control, collision detection function, maintenance forecast function, position restoration function	
Robot language			MELFA-BASIC IV	
Position teaching method			Teachig method (direct, remote), MDI method	
Memory capacity	Numbers of teaching points	points	2,500	
	Number of steps	steps	5,000	
	Number of programs	steps	88	
Program creation procedures			Personal computer or teaching pendant	
External I/O	General-purpose	points	16 inputs/16 outputs (up to 240/240 when using the optional, additional I/O unit)	32 inputs/32 outputs (up to 256/256 when using the optional, additional I/O unit)
	Dedicated		Assigned from general-purpose I/O (one point, "STOP," is fixed)	
	Hand open/close	points	8 inputs/0 output (maximum 8-point option) *20	
	Emergency stop input	points	1	
	Emergency stop output	points	1	
	Door switch input	points	1	
Interface	RS-232C	ports	1 (for connecting a personal computer, vision sensor etc.)	
	RS-422	ports	1 (for connecting a teaching pendant)	
	Slot dedicated to hand	slots	1 (for connecting a pneumatic hand interface)	
	Extension slot	slots	0 (When using options: 3) *21	3
	Expantion memory slot	slots	-	1
	Robot I/O link	channels	1 (for connecting a parallel I/O unit)	
Ambient temperature		˚C	0 to 40	
Ambient humidity		%RH	45 to 85	
Power supply	Voltage range	V	Single phase, AC180 to 242	Single phase, AC180 to 242
	Power capacity	kVA	1.0	2.0
Grounding		Ω	100 or less (D-class grounding)	
Structure			Self-contained floor type/closed structure	
External dimensions (Including legs)		mm	212 (W) x 290 (D) x 165 (H) *22	460 (W) x 400 (D) x 200 (H)
Mass		kg	Approx. 8 *22	Approx. 20

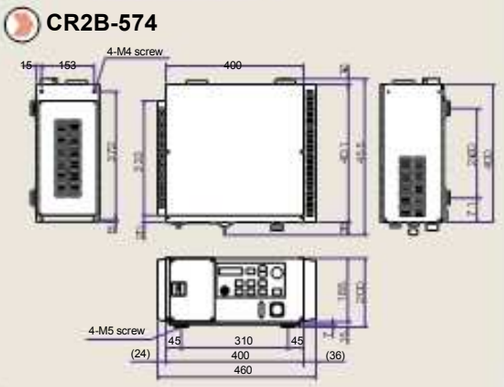
*20: The air hand interface (optional) is required to use hand output. *21:
The expansion box (optional) needs to be mounted.
*22: The size and weight do not include the expansion box for mounting options.

Controller Outside Dimension

CR1B-571



CR2B-574



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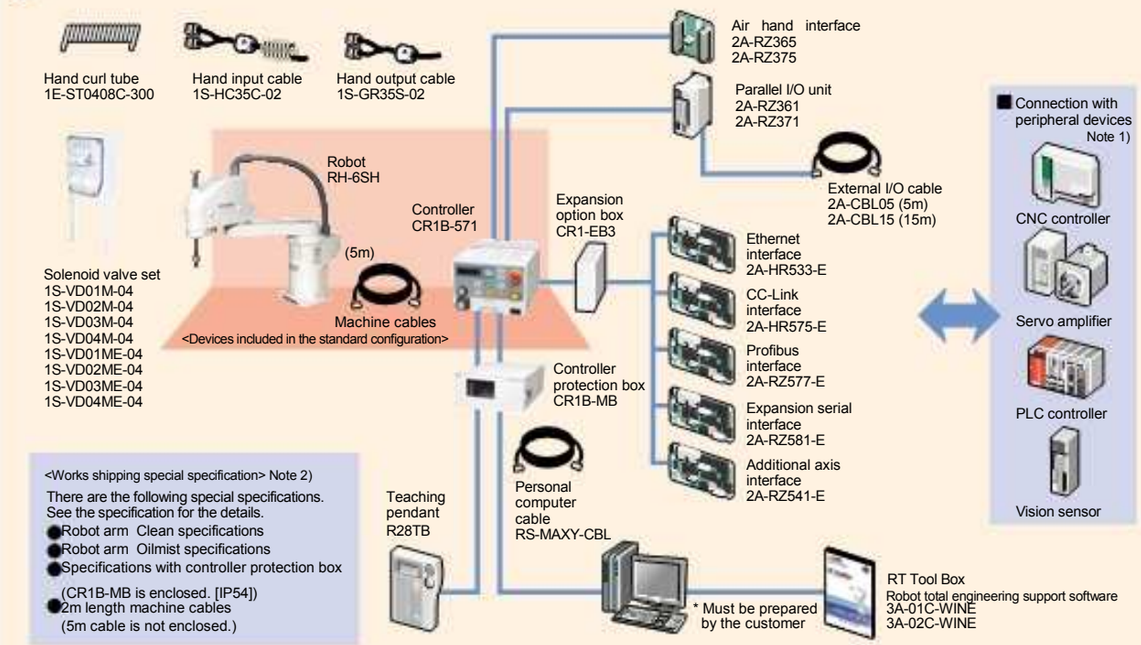
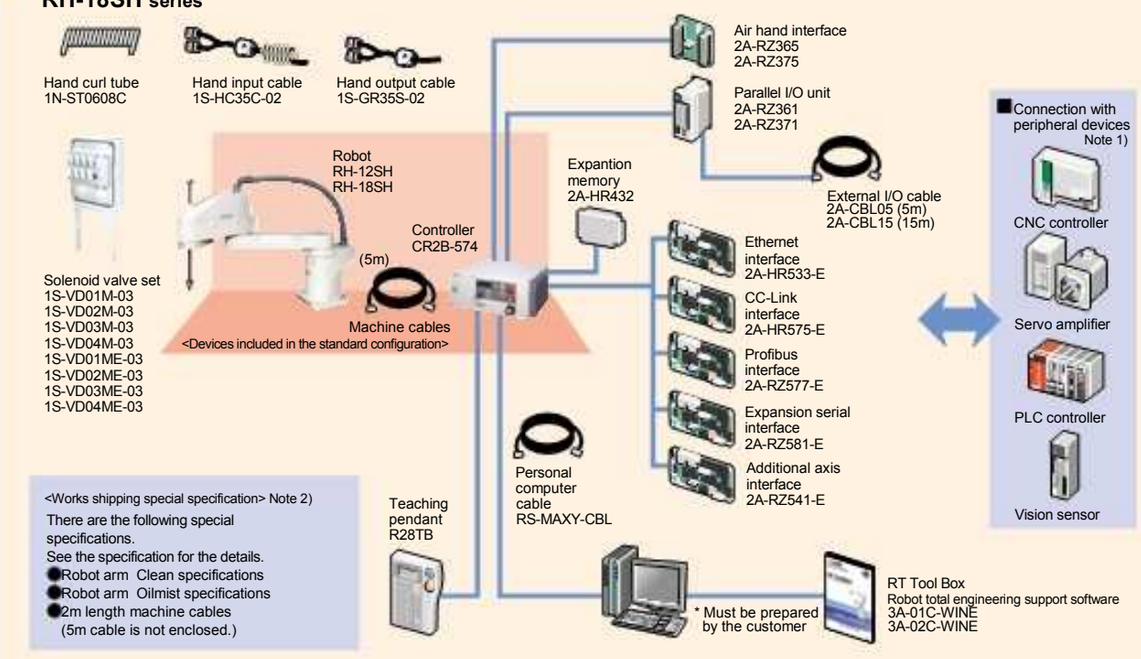
System Configuration

RH-6SH series



RH-12SH series
RH-18SH series



Note 1: Select an appropriate interface according to the I/O on the peripheral device side or network function.

Note 2: The device configuration is specified at shipment. It will be a built-to-order product. Please confirm the delivery date and specification.(Contact the Mitsubishi Sales Dept. for details.)

Configuration Options

	Solenoid valve (Sink)	1S-VD01M-03	1 connection with solenoid valve cable	
		1S-VD02M-03	2 connections with solenoid valve cable	
		1S-VD03M-03	3 connections with solenoid valve cable	
		1S-VD04M-03	4 connections with solenoid valve cable	
		1S-VD01M-04	1 connection with solenoid valve cable	
		1S-VD02M-04	2 connections with solenoid valve cable	
		1S-VD03M-04	3 connections with solenoid valve cable	
		1S-VD04M-04	4 connections with solenoid valve cable	
	Solenoid valve (Source)	1S-VD01ME-03	1 connection with solenoid valve cable	
		1S-VD02ME-03	2 connections with solenoid valve cable	
		1S-VD03ME-03	3 connections with solenoid valve cable	
		1S-VD04ME-03	4 connections with solenoid valve cable	
		1S-VD01ME-04	1 connection with solenoid valve cable	
		1S-VD02ME-04	2 connections with solenoid valve cable	
		1S-VD03ME-04	3 connections with solenoid valve cable	
		1S-VD04ME-04	4 connections with solenoid valve cable	
	Hand output cable	1S-GR35S-02	Terminal end is not processed, supporting 4 connections	
	Hand input cable	1S-HC35C-02	8-points support, with grommet	
	Hand curl tube	1E-ST0408C-300	Support for 4-4	
		1N-ST0608C	Support for 6-4	
	Machine cables extension (Fixed)	1S-05CBL-01	Extension type, amount of extension: 5m	
		1S-10CBL-01	Extension type, amount of extension: 10m	
		1S-15CBL-01	Extension type, amount of extension: 15m	
		1S-05CBL-03	Extension type, amount of extension: 5m	
		1S-10CBL-03	Extension type, amount of extension: 10m	
		1S-15CBL-03	Extension type, amount of extension: 15m	
	Machine cables extension (Flexible)	1S-05LCBL-01	Extension type, amount of extension: 5m	
		1S-10LCBL-01	Extension type, amount of extension: 10m	
		1S-15LCBL-01	Extension type, amount of extension: 15m	
		1S-05LCBL-03	Extension type, amount of extension: 5m	
		1S-10LCBL-03	Extension type, amount of extension: 10m	
		1S-15LCBL-03	Extension type, amount of extension: 15m	
	Teaching pendant	R28TB	IP65, 7m cable length	
		R28TB-15	IP65, 15m cable length	
	Pneumatic hand interface (Sink)	2A-RZ365	DO: 8 (Sink)	
	Pneumatic hand interface (Source)	2A-RZ375	DO: 8 (Source)	
	Parallel I/O unit (Sink)	2A-RZ361	DI: 32 (Sink)/DO: 32 (Sink)	
	Parallel I/O unit (Source)	2A-RZ371	DI: 32 (Source)/DO: 32 (Source)	
	External I/O cable	2A-CBL05	Terminal end not processed 5m length	
		2A-CBL15	Terminal end not processed 15m length	
	Ethernet interface	2A-HR533-E	10 base-T 10Mbps	
	CC-Link interface	2A-HR575-E	CC-Link intelligent remote station (32 points/32 points per station)	
	Profibus interface	2A-RZ577-E	Profibus-DP SLAVE	
	Expansion serial interface	2A-RZ581-E	RS-232C/422 each 1ch	
	Expansion memory	2A-HR432	User program area after expantion: 2MB	
	Additional axis interface	2A-RZ541-E	Control up to 8 axes with SSCNET	
	Expansion option box	CR1-EB3	Required when mounting expansion interface.	Dedicated for CR1, CR1B
	Controller protection box	CR1B-MB	Enclose CR1B-571 for dust-proof measures.	
	Perssonal computer support softwware (Windows)	3A-01C-WINE	Support software on Windows (CD-ROM)	
	Perssonal computer support softwware-mini (Windows)	3A-02C-WINE	Simplified version support software on Windows (CD-ROM)	
	Personal computeer cable	RS-MAXY-CBL	For PC-AT (DOS/V) compatible machines, cable length 3 m, straight type	
		RS-AT-RCBL	For PC-AT (DOS/V) compatible machines, cable length 3 m, right-angled type	
Service part	Backup battery	A6BAT	For internal use in the robot arm In	
		ER6	the controller	

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