

Subject: Report of RT ToolBox2 Version 3.40S release**Applicable to:** F series, SQ series, SD series, S series
(CR750/CRnQ-700/CRnD-700/CRn-500 series robot controller)

Thank you for your continued support of Mitsubishi industrial robot "MELFA".

This Technical news describes the new version 3.40S of the RT ToolBox2. 3D-11C-WINJ(E)/3D-12C-WINJ(E)

In order to use the functions described in this technical news, you need to download the latest version from MITSUBISHI ELECTRIC FA site, and upgrading the RT ToolBox2.

1. Model addition

The following models were added.

< RV-F Load maximum:2Kg / Long arm >
RV-2FL-D/Q

< RV-F Load maximum:2Kg / Long arm / Brake specification >
RV-2FLB-D/Q

<RV-F Load maximum:35Kg/50Kg/70Kg >
RV-35F-D/Q RV-50F-D/Q RV-70F-D/Q

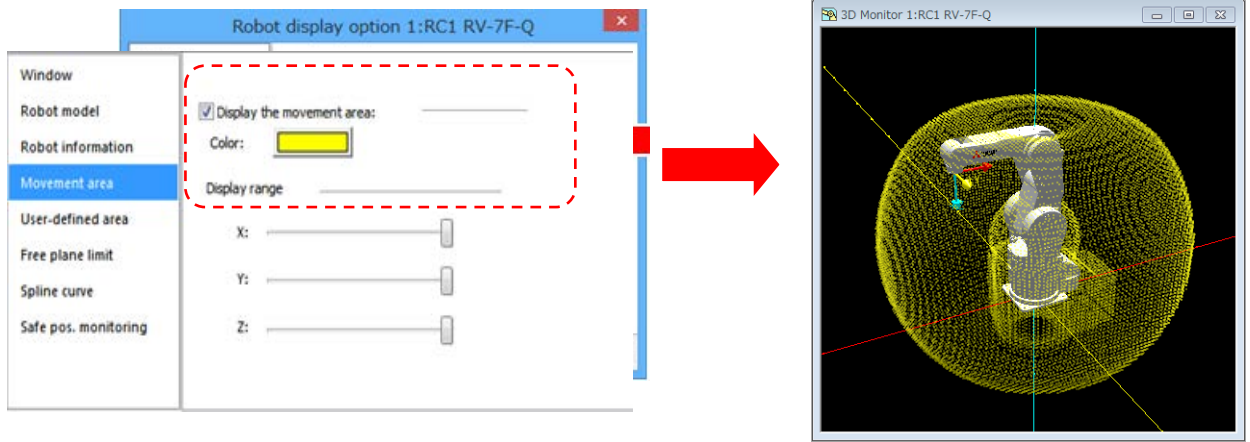
<RV-F Load maximum:35Kg/50Kg/70Kg / Mist specification >
RV-35FM-D/Q RV-50FM-D/Q RV-70FM-D/Q

(Note) Some of the parameters until the robot shipment is changed, it may be different from the simulator.

2. 3D monitor

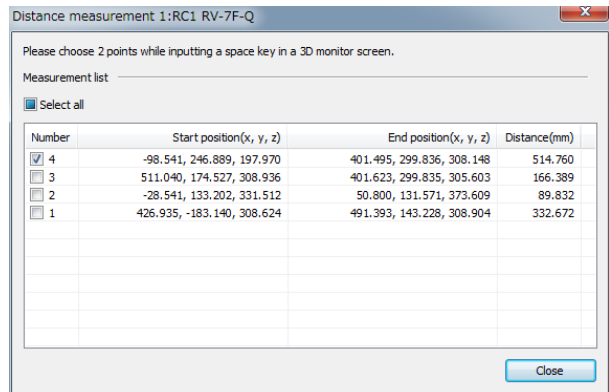
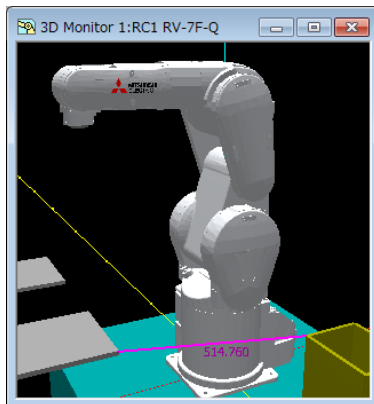
● Added the function of display movement area.

The position where robot can move with the posture of tool center point (TCP) at the time is displayed.



● Added the function of distance measurement.

You can measure the distance between any two points on objects (robots, layouts etc.) displayed in 3D monitor.



- **Added the function of switching view (XY/YZ/ZX plane).**

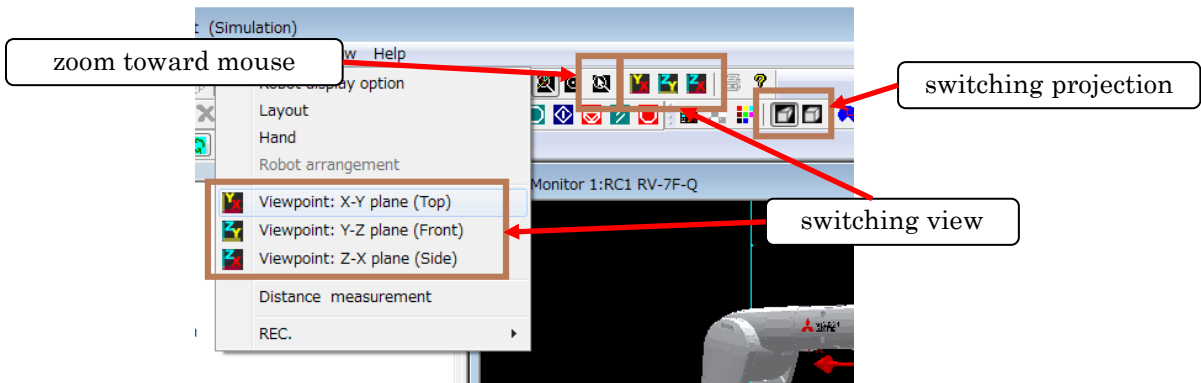
You can select the XY or YZ or ZX plane with buttons of the toolbar.

- **Added the function of switching projection (Perspective/Orthogonal).**

You can change the projection mode with buttons of toolbar.

- **Added the function of zoom toward mouse.**

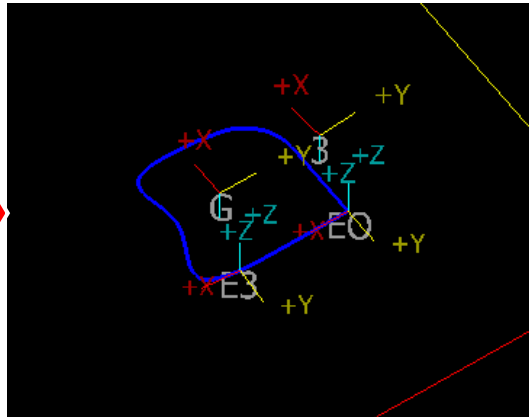
If you select the button, enlargement/reduction toward mouse on the 3D monitor.



- **Added the function of display of curves correspond to the Ex-T-spline.**

If opened a spline file corresponding to the Ex-T spline, spline curve will be displayed in the start position was along the Ex-T coordinate position.

#	X[mm]	Y[mm]	Z[mm]	A(deg)	B(deg)	C(deg)
1	400.000	0.000	0.000	0.000	0.000	0.000
2	400.000	100.000	400.000	180.000	0.000	0.000
3	300.904	191.907	400.000	180.000	0.000	-85.430
4	300.904	191.907	400.000	180.000	0.000	57.000
5	381.964	-116.496	400.000	-180.000	0.000	-56.186
6	413.960	-117.250	400.000	-180.000	0.000	-39.189
7	450.506	-194.873	400.000	-180.000	0.000	-17.285
8	475.204	-84.377	400.000	-180.000	-0.000	1.102
9	486.243	-54.722	400.000	-180.000	-0.000	21.663
10	473.980	-47.377	400.000	-180.000	-0.000	26.936
11	452.148	-31.643	400.000	-180.000	-0.000	23.130
12	421.142	-59.520	400.000	-180.000	-0.000	10.482
13	386.247	-60.613	400.000	-180.000	0.000	-5.266
14	359.840	-56.831	400.000	-180.000	0.000	-13.471
15	348.137	-60.697	400.000	-180.000	0.000	-8.663
16	361.963	-79.177	400.000	-180.000	-0.000	14.030
17	384.009	-88.375	400.000	-180.000	-0.000	33.311
18	409.866	-89.440	400.000	-180.000	-0.000	54.179
19	426.838	-84.013	400.000	-180.000	-0.000	70.812
20	431.229	-78.566	400.000	-180.000	-0.000	81.527
21	412.703	-73.836	400.000	180.000	-0.000	91.828
22	376.678	-76.136	400.000	180.000	-0.000	102.818
23	381.453	-94.577	400.000	180.000	-0.000	139.695

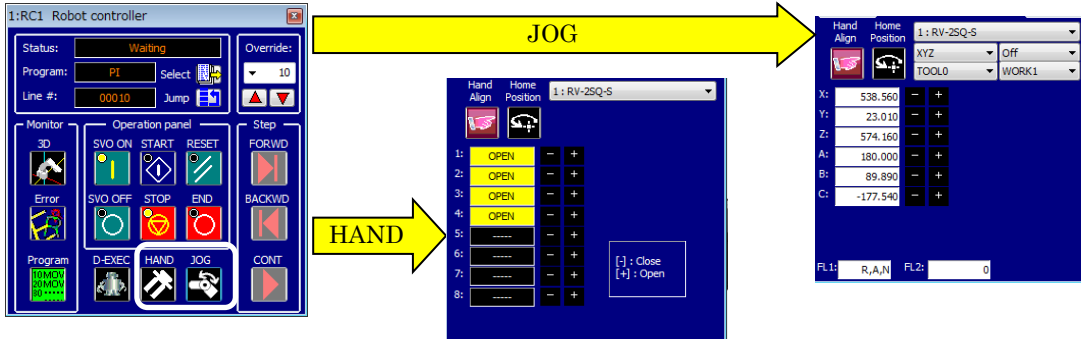


- **Extend the recordable time by compressing when recording in save AVI.**

3. Operation panel

● Added the jog operation of real robot.

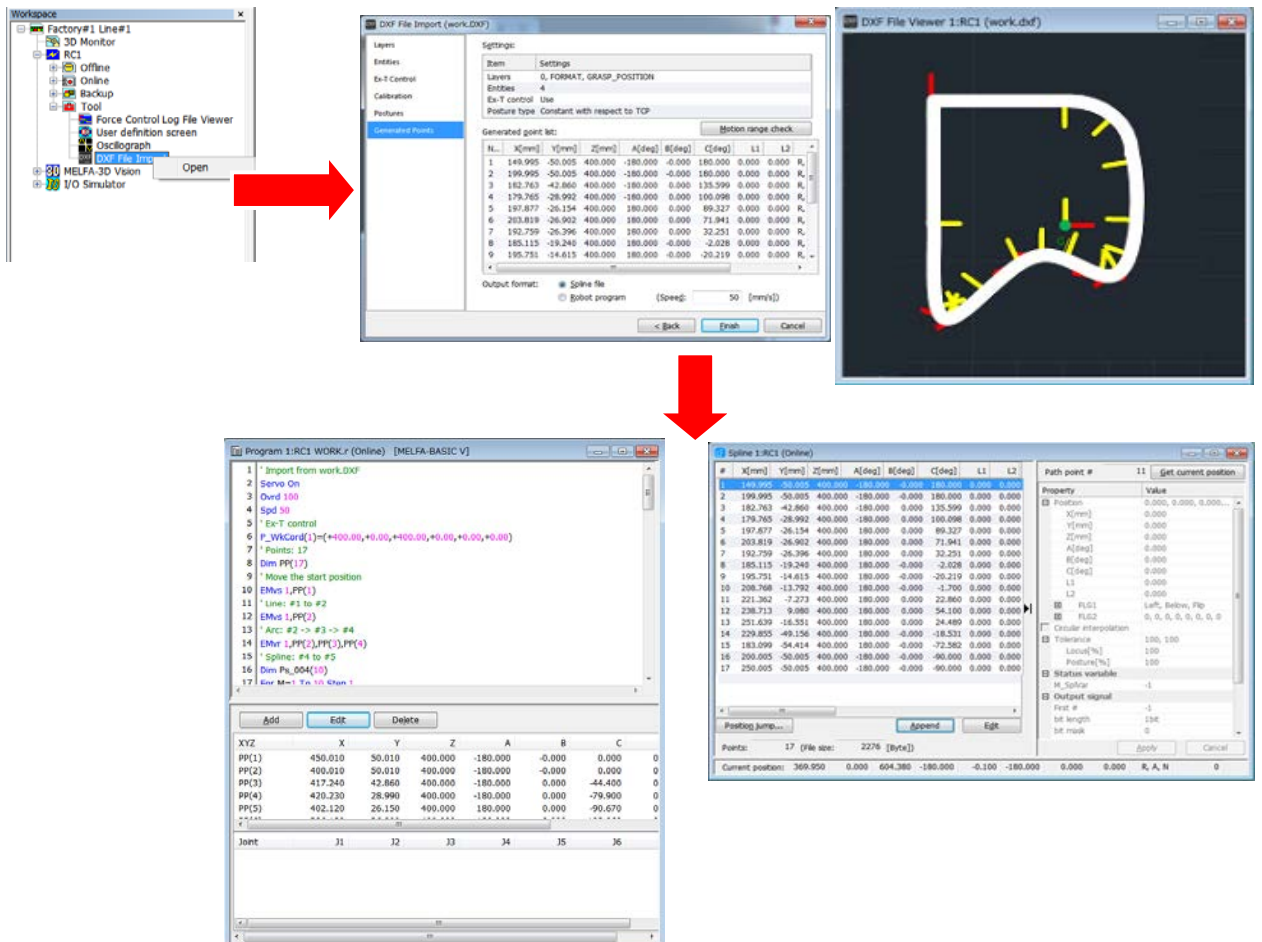
You can open / close each hand, align hand or move the robot to home position to the real robot controller.



4. DXF file import

● Added the function of “DXF File Import”.

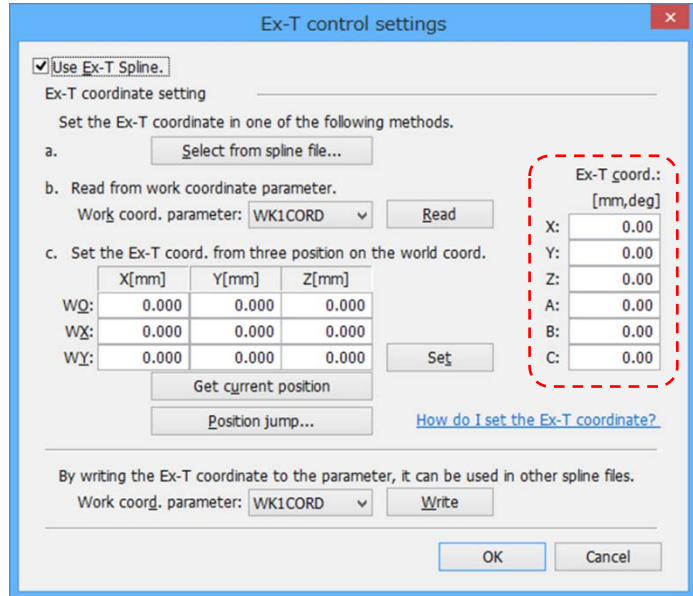
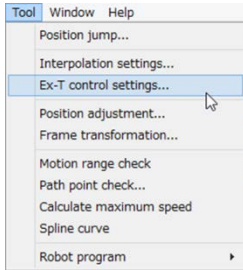
You can convert to the robot program / the spline file from the DXF file.



5. Spline

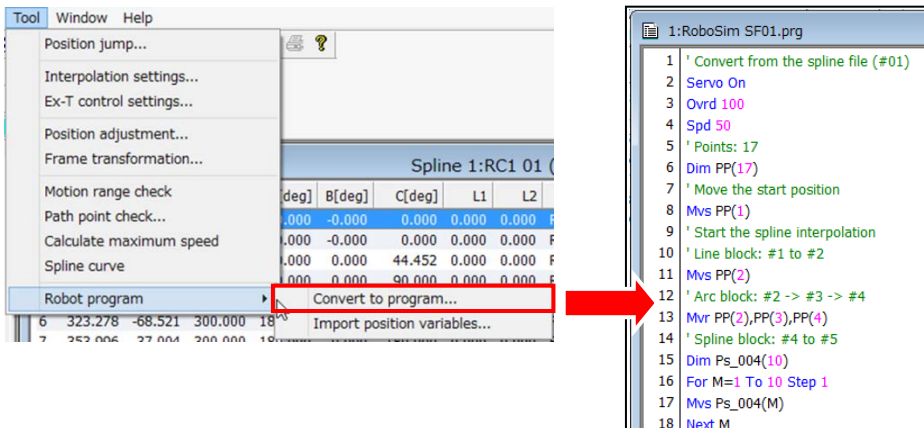
●Corresponded to the Ex-T spline.

You can set the Ex-T coordinates in the spline file for the Ex-T spline interpolation command.



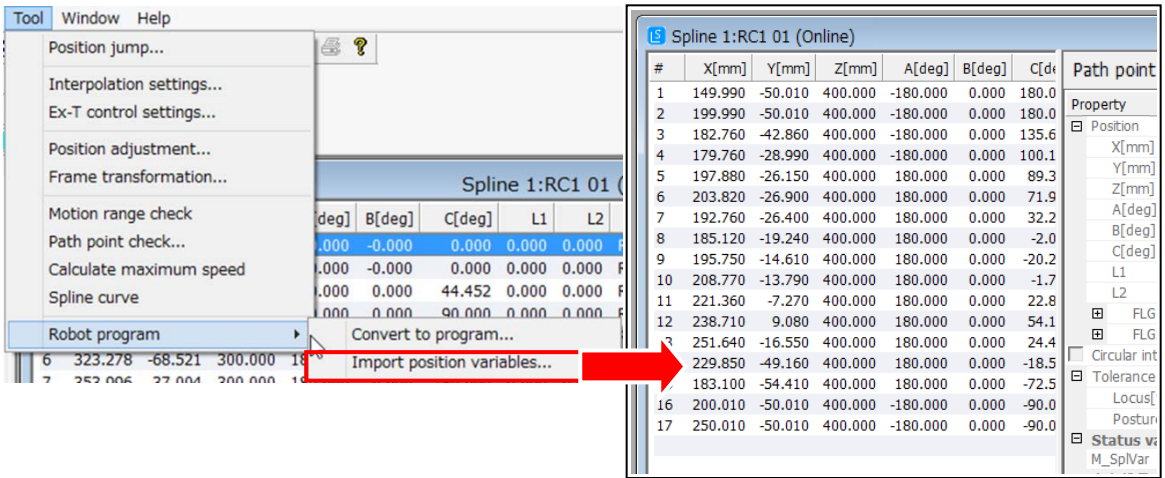
●Added the function of convert the robot program.

You can create the robot program using path points data registered in the spline file.



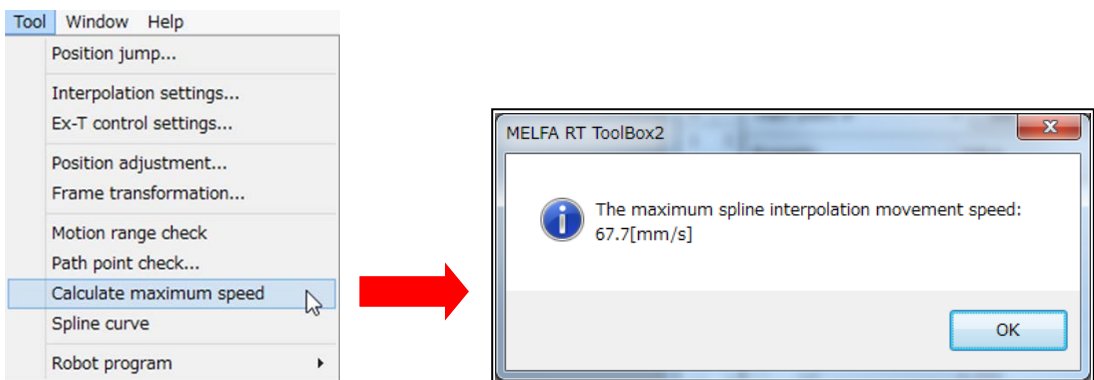
● **Added the function of load the position of the robot program.**

You can import the position data as the path point's data in the spline file.
The position data can be imported is PP(n) or Pn (n: Path point number).



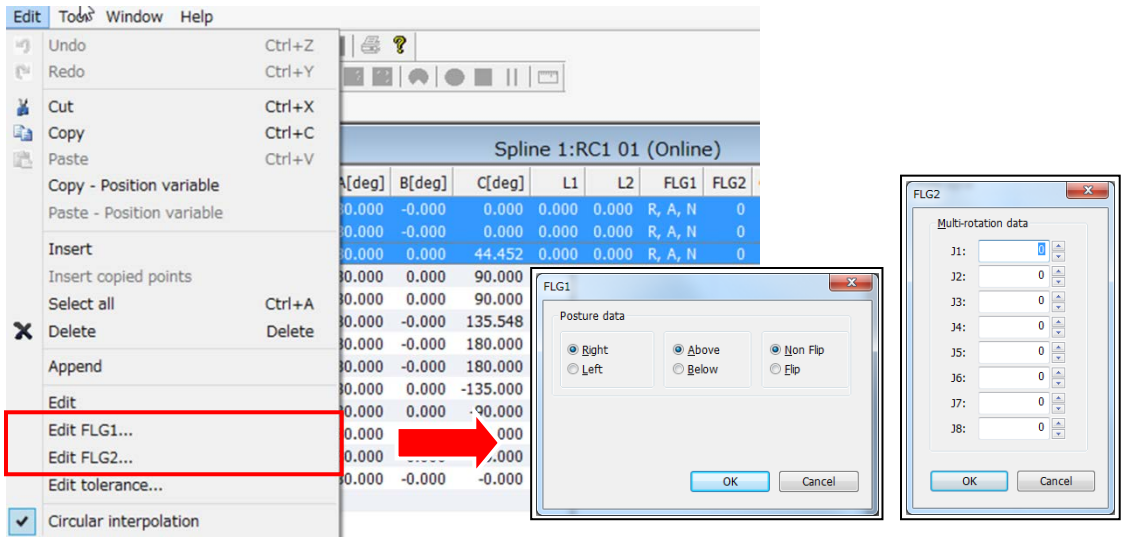
● **Added the function of spline interpolation operating maximum speed calculation.**

The possible execution maximum speed in the spline interpolation command (MvSpl, EMvSpl command) is calculated.



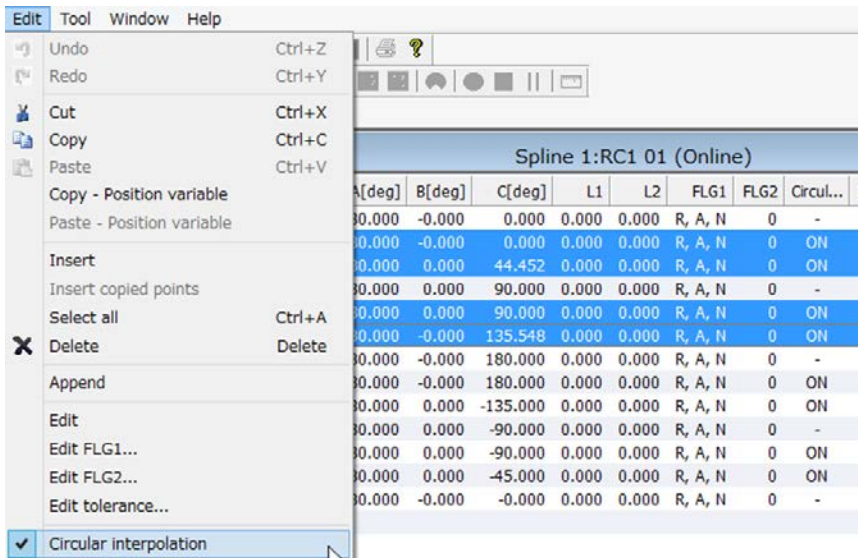
● **Added the function of editing the structure flags.**

You can edit the structure flags (FLG1, FLG2) of selected path points.



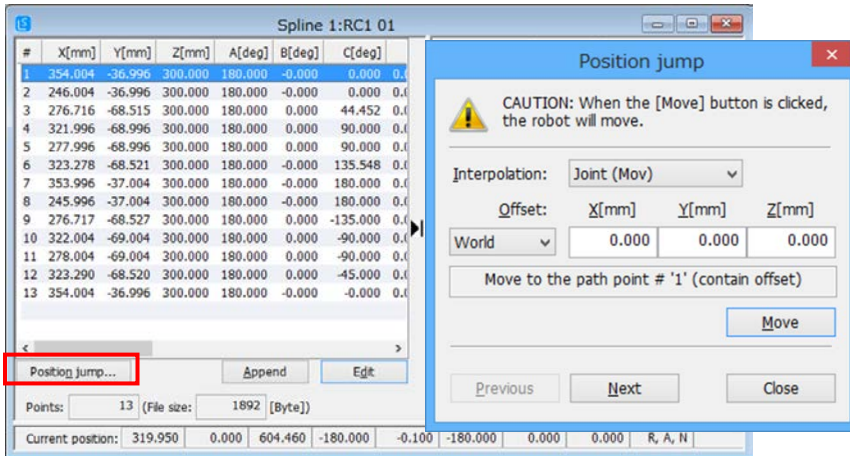
● **Added the function of editing the circular interpolation.**

You can edit the circular interpolation of selected path points.



● **Added the function of position jump.**

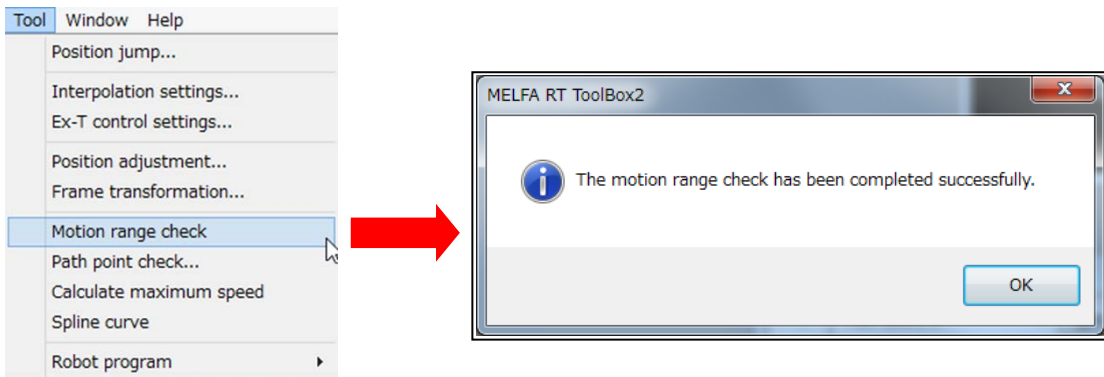
You can move the robot to the selected path point.



● **Added the function of motion range check.**

You can check whether the robot can move in each path points.

This function can be used in the simulation.



6. Oscillograph

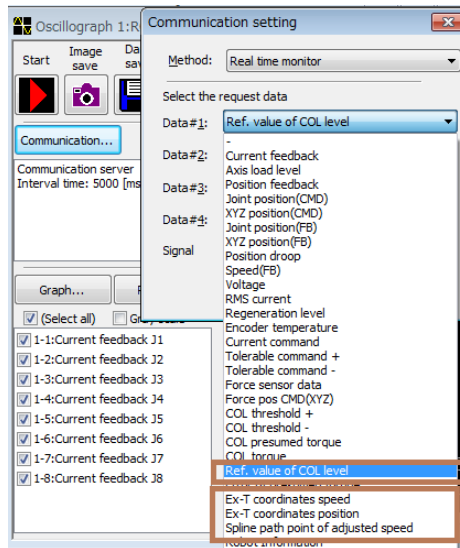
- New four types of data is able to be acquired.

"Ref. value of COL level"

"Ex-T coordinates speed"

"Ex-T coordinates position"

"Spline path point of adjusted speed"

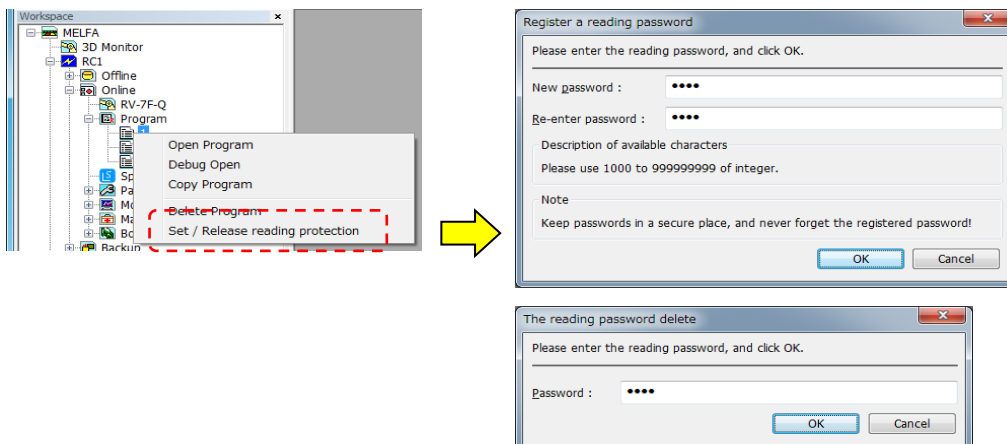


7. Program

- Added the function of “Reading protection of each program”.

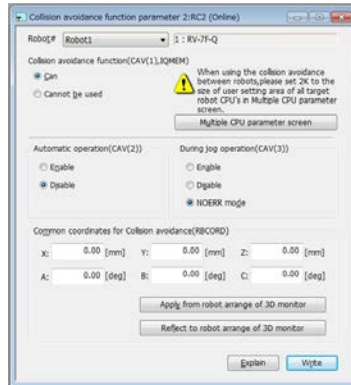
If you set the reading protection to the robot program, you can make sure the third person can't read it easily.

This function can be used with Version R5n/S5n or later of the controller software.



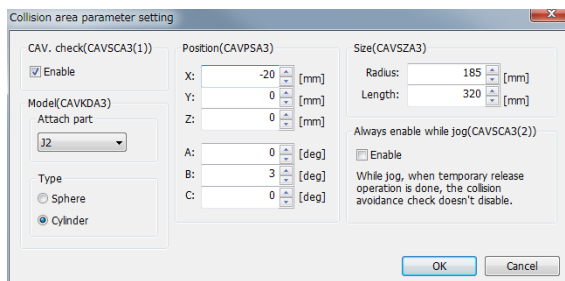
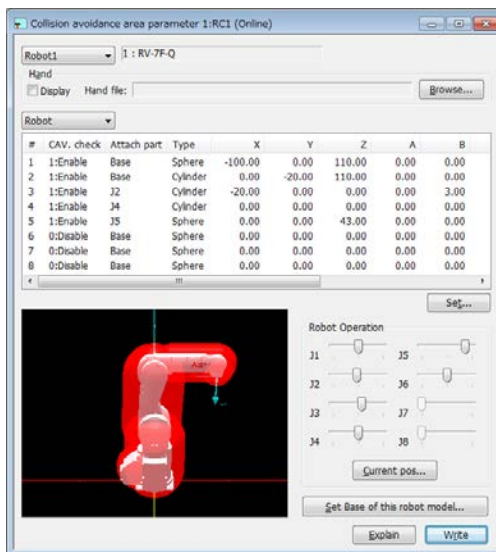
8. Parameter

- Added the function of setting the “Collision avoidance function” parameters.
You can set parameters of collision avoidance in PC and robot controllers.

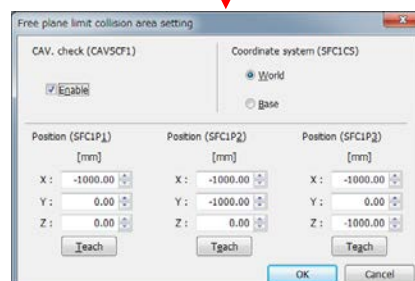


- Modified “Collision avoidance area” parameter screen.

Added the function of “Free plane limit collision avoidance area” to “Collision avoidance area” parameter screen .



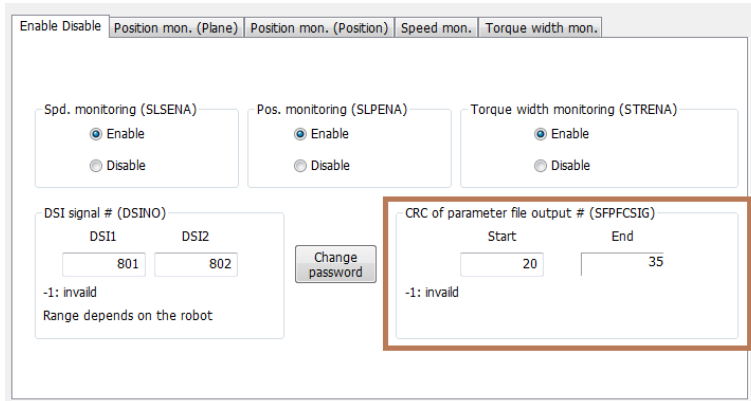
Robot/Hand/Work



Free plane limit

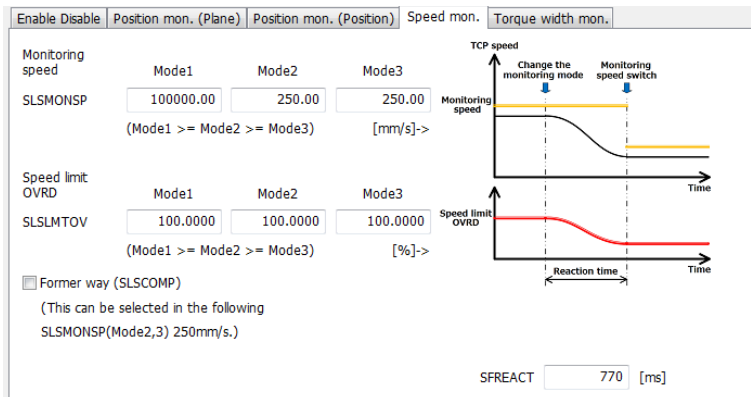
● **Modified “Safety” parameter screen “Enable Disable”.**

Added the setting item [CRC of parameter file output #].

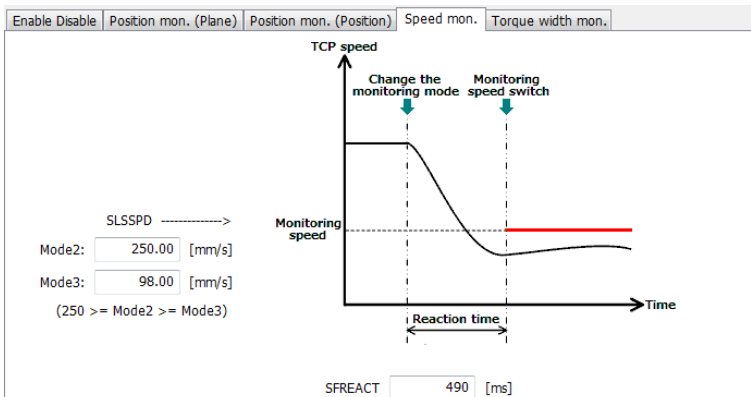


● **Modified “Safety” parameter screen “Speed mon.”.**

If you use with Version R6b/S6b or later of the controller software, the A screen is displayed. In other cases, the B screen is displayed.



Safety parameter (Speed mon.) A



Safety parameter (Speed mon.) B

9. Monitor

- Added the change function decimal notation of the signal value in General signal monitor.

The right end of the column, will appear in notation that you selected, the signal value of the line in the “Display format”. (Hex/Unsigned decimal/Signed decimal)

General Purpose signal 1:RC1

Display format : Hex

Input signal:

Signal#	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	Hex
15- 0	0	1	0	1	0	0	1	0	0	1	0	0	1	1	0	0	524C
31- 16	1	0	0	1	1	0	1	0	0	0	0	1	0	0	0	1	9A22
47- 32	1	0	1	0	0	0	0	1	1	0	0	0	1	1	0	0	A18C
63- 48	0	1	0	1	1	1	1	1	0	1	0	0	1	0	0	0	5F48
79- 64	0	1	1	1	1	1	0	0	1	1	0	1	0	0	0	1	7CD1
95- 80	1	0	1	1	0	0	0	1	0	1	0	0	1	1	1	1	B14F
111- 96	0	0	0	1	1	0	1	0	1	1	0	1	0	1	0	0	1AD4
127- 112	1	0	0	0	0	1	0	0	0	1	0	1	0	0	1	1	8453

Output signal:

Signal#	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0	Hex
15- 0	1	0	1	0	0	1	0	0	1	0	1	0	0	1	0	0	A4D2
31- 16	0	0	1	0	0	1	0	0	1	0	1	1	0	1	0	1	2485
47- 32	0	0	0	0	1	1	0	0	0	0	0	1	0	1	0	1	0C2A
63- 48	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	1	501B
79- 64	0	1	0	0	0	0	1	0	0	1	1	0	0	1	1	0	4266
95- 80	1	0	1	0	0	0	1	0	0	0	1	1	0	1	0	1	A235
111- 96	0	1	0	1	0	1	0	0	1	0	1	0	1	1	0	0	54AC
127- 112	0	1	1	0	0	1	1	0	0	0	0	1	0	1	0	1	6615

Pseudo Input

Monitor setting

Forced Output

10. Simulator

- The operating speed of the simulator has become equal to the real robot.

In the PC machine power is insufficient, please view the robot model in the simple mode.

When the detailed model display, it is recommended personal computer equipped with a Core i7 or more of the CPU.