

3 Data types

3.75 speeddata - Speed data

RobotWare - OS

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Usage

`speeddata` is used to specify the velocity at which both the robot and the external axes move.

Description

Speed data defines the velocity:

- at which the tool center point moves,
- the reorientation speed of the tool,
- at which linear or rotating external axes move.

When several different types of movement are combined, one of the velocities often limits all movements. The velocity of the other movements will be reduced in such a way that all movements will finish executing at the same time.

The velocity is also restricted by the performance of the robot. This differs, depending on the type of robot and the path of movement.

Components

`v_tcp`

velocity tcp

Data type: num

The velocity of the tool center point (TCP) in mm/s.

If a stationary tool or coordinated external axes are used, the velocity is specified relative to the work object.

`v_ori`

velocity orientation

Data type: num

The reorientation velocity of the TCP expressed in degrees/s.

If a stationary tool or coordinated external axes are used, the velocity is specified relative to the work object.

`v_leax`

velocity linear external axes

Data type: num

The velocity of linear external axes in mm/s.

`v_reax`

velocity rotational external axes

Data type: num

The velocity of rotating external axes in degrees/s.

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Basic examples

The following example illustrates the data type speeddata:

Example 1

```
VAR speeddata vmedium := [ 1000, 30, 200, 15 ];
```

The speed data vmedium is defined with the following velocities:

- 1000 mm/s for the TCP.
- 30 degrees/s for reorientation of the tool.
- 200 mm/s for linear external axes.
- 15 degrees/s for rotating external axes.

```
vmedium.v_tcp := 900;
```

The velocity of the TCP is changed to 900 mm/s.

Limitations

At very slow motion each movement should be short enough to give an interpolation time less than 240 seconds.

Predefined data

A number of speed data are already defined in the system.

Predefined speed data to be used for moving the robot and the external axes:

Name	TCP speed	Orientation	Linear ext.axis	Rotating ext.axis
v5	5 mm/s	500°/s	5000 mm/s	1000°/s
v10	10 mm/s	500°/s	5000 mm/s	1000°/s
v20	20 mm/s	500°/s	5000 mm/s	1000°/s
v30	30 mm/s	500°/s	5000 mm/s	1000°/s
v40	40 mm/s	500°/s	5000 mm/s	1000°/s
v50	50 mm/s	500°/s	5000 mm/s	1000°/s
v60	60 mm/s	500°/s	5000 mm/s	1000°/s
v80	80 mm/s	500°/s	5000 mm/s	1000°/s
v100	100 mm/s	500°/s	5000 mm/s	1000°/s
v150	150 mm/s	500°/s	5000 mm/s	1000°/s
v200	200 mm/s	500°/s	5000 mm/s	1000°/s
v300	300 mm/s	500°/s	5000 mm/s	1000°/s
v400	400 mm/s	500°/s	5000 mm/s	1000°/s
v500	500 mm/s	500°/s	5000 mm/s	1000°/s
v600	600 mm/s	500°/s	5000 mm/s	1000°/s
v800	800 mm/s	500°/s	5000 mm/s	1000°/s
v1000	1000 mm/s	500°/s	5000 mm/s	1000°/s
v1500	1500 mm/s	500°/s	5000 mm/s	1000°/s
v2000	2000 mm/s	500°/s	5000 mm/s	1000°/s
v2500	2500 mm/s	500°/s	5000 mm/s	1000°/s

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Name	TCP speed	Orientation	Linear ext.axis	Rotating ext.axis
v3000	3000 mm/s	500°/s	5000 mm/s	1000°/s
v4000	4000 mm/s	500°/s	5000 mm/s	1000°/s
v5000	5000 mm/s	500°/s	5000 mm/s	1000°/s
v6000	6000 mm/s	500°/s	5000 mm/s	1000°/s
v7000	7000 mm/s	500°/s	5000 mm/s	1000°/s
vmax	i	ii	iii	iv

- i Max. TCP speed for the used robot type and normal practical TCP values, specified by the system parameter *TCP Linear Max Speed (m/s)*. The RAPID function `MaxRobSpeed` returns this value. If extremely large TCP values are used in the tool frame, you can create your own speeddata with bigger TCP speed than returned by `MaxRobSpeed` and use `VelSet` to allow larger speed.
- ii Max. reorientation speed for the used robot type, specified by the system parameter *TCP Reorient Max Speed (deg/s)*. The RAPID function `MaxRobReorientSpeed` returns this value.
- iii Max. linear speed for additional axes, specified by the system parameter *Ext. Axis Linear Max Speed (m/s)*. The RAPID function `MaxExtLinearSpeed` returns this value.
- iv Max. rotational speed for additional axes, specified by the system parameter *Ext. Axis Rotational Max Speed (deg/s)*. The RAPID function `MaxExtReorientSpeed` returns this value.

Predefined speeddata to be used for moving rotating external axes with instruction `MoveExtJ`.

Name	TCP speed	Orientation	Linear ext.axis	Rotating ext.axis
vrot1	0 mm/s	0°/s	0 mm/s	1°/s
vrot2	0 mm/s	0°/s	0 mm/s	2°/s
vrot5	0 mm/s	0°/s	0 mm/s	5°/s
vrot10	0 mm/s	0°/s	0 mm/s	10°/s
vrot20	0 mm/s	0°/s	0 mm/s	20°/s
vrot50	0 mm/s	0°/s	0 mm/s	50°/s
vrot100	0 mm/s	0°/s	0 mm/s	100°/s

Predefined speed data to be used for moving linear external axes with instruction `MoveExtJ`.

Name	TCP speed	Orientation	Linear ext.axis	Rotating ext.axis
vlin10	0 mm/s	0°/s	10 mm/s	0°/s
vlin20	0 mm/s	0°/s	20 mm/s	0°/s
vlin50	0 mm/s	0°/s	50 mm/s	0°/s
vlin100	0 mm/s	0°/s	100 mm/s	0°/s
vlin200	0 mm/s	0°/s	200 mm/s	0°/s
vlin500	0 mm/s	0°/s	500 mm/s	0°/s
vlin1000	0 mm/s	0°/s	1000 mm/s	0°/s

Structure

```
< dataobject of speeddata >
  < v_tcp of num >
  < v_ori of num >
  < v_leax of num >
  < v_reax of num >
```

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Related information

For information about	See
Positioning instructions	<i>Technical reference manual - RAPID Overview</i> , section <i>RAPID Summary - Motion</i>
Motion/Speed in general	<i>Technical reference manual - RAPID Overview</i> , section <i>Motion and I/O principles - Positioning during program execution</i>
Defining maximum velocity	<i>VelSet - Changes the programmed velocity on page 974</i>
Max. TCP speed for this robot	<i>MaxRobSpeed - Maximum robot speed on page 1311</i>