Data types

## speeddata - Speed data

RobotWare - OS

#### 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.

# **Basic examples**

The following example illustrates the data type <code>speeddata:</code>

## Example 1

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

The speed data  ${\tt vmedium}$  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.

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

## Predefined data

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
 5000°/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
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	<u>i</u>	<u>ii</u>	<u>iii</u>	<u>iv</u>

i Max. TCP speed for the used robot type and normal practical TCP values, specified by the system parameter TCP Linear Max  $\textit{Speed (m/s)}. \ \ \textit{The RAPID function} \ \ \textit{MaxRobSpeed returns this value}. \ \ \textit{If extremely large TCP values are used in the tool frame,} \\$  $you\ can\ create\ your\ own\ {\tt speeddata}\ with\ bigger\ TCP\ speed\ than\ returned\ by\ {\tt MaxRobSpeed}\ and\ use\ {\tt VelSet}\ to\ allow\ larger\ than\ larger\ than\$ 

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

Max. reorientation speed for the used robot type, specified by the system parameter TCP Reorient Max Speed (deg/s). The  $\label{problem} \textbf{RAPID function} \ \texttt{MaxRobReorientSpeed returns this value}.$ 

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.

Max. rotational speed for additional axes, specified by the system parameter Ext. Axis Rotational Max Speed (deg/s). The  $\label{prop:prop:condition} \textbf{RAPID function} \ \texttt{MaxExtReorientSpeed} \ \textbf{returns this value}.$ 

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 >

## Related information

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