

# ROBOT PROGRAMMING

Visual Components Essentials 4.0



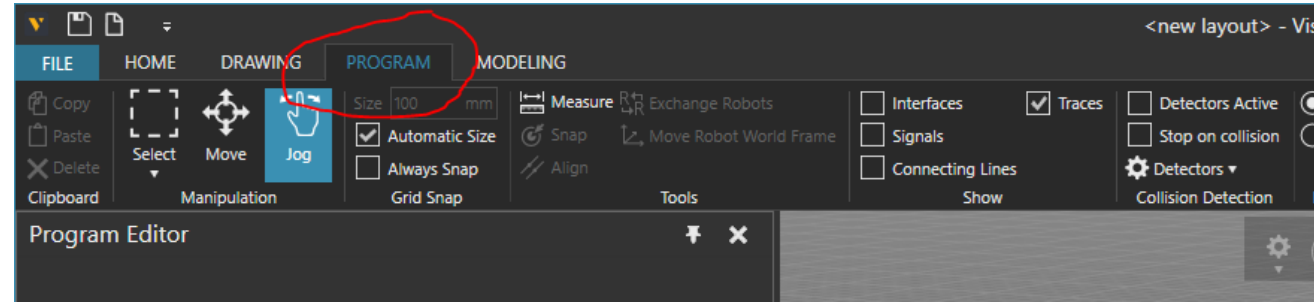
# COMMENTS AND QUESTION

- Comments and questions are welcome in the webinar chat.
- Continue discussion on the **[forum.visualcomponents.com](https://forum.visualcomponents.com)**

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# AGENDA

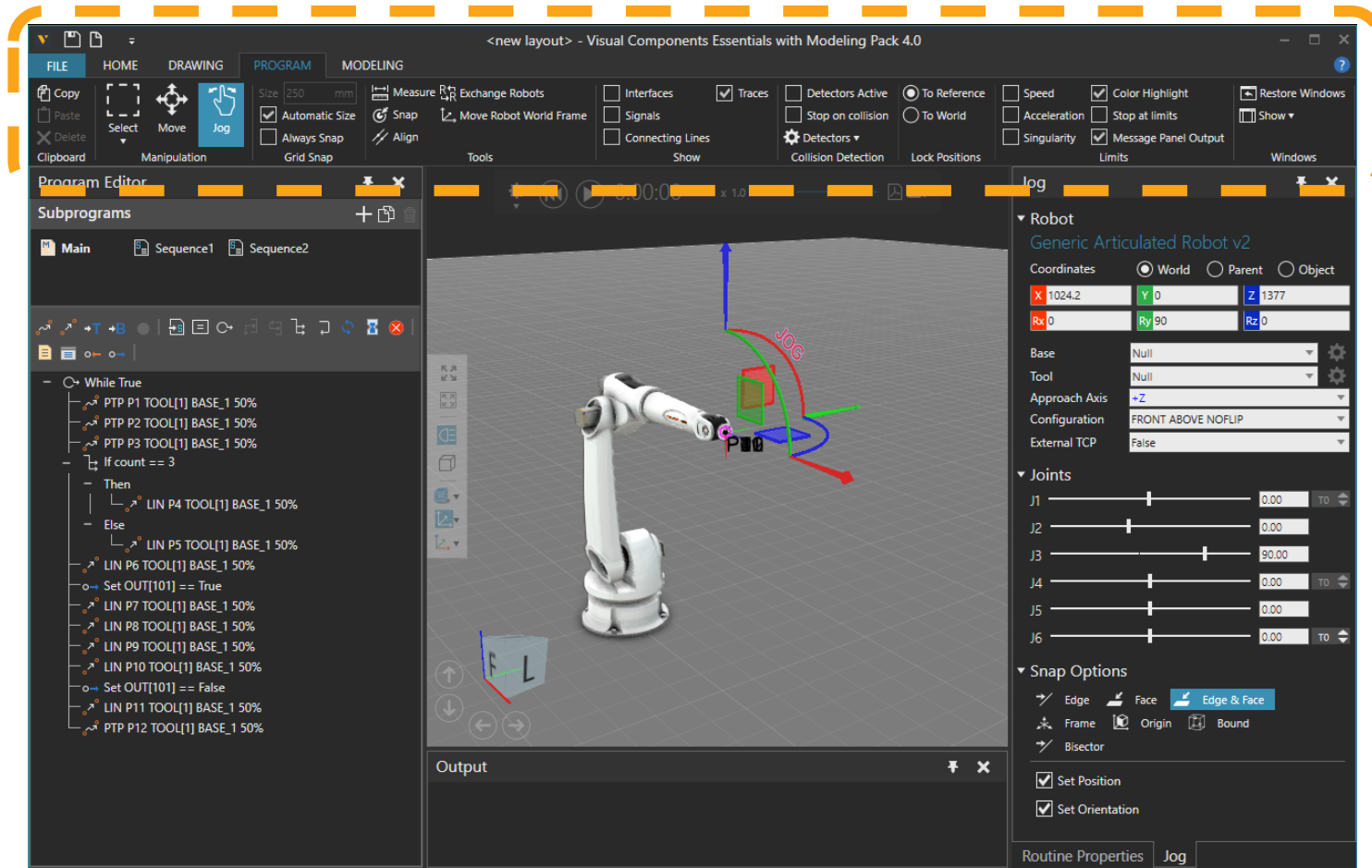


- Program tab GUI overview
- Teaching Motion points
- Move vs. Jog manipulation mode
- Configuring and Connecting IOs
- Configuring Tools<sub>(tcp)</sub> and Bases<sub>(coordinate system)</sub>
- External Axis

 VISUAL  
COMPONENTS

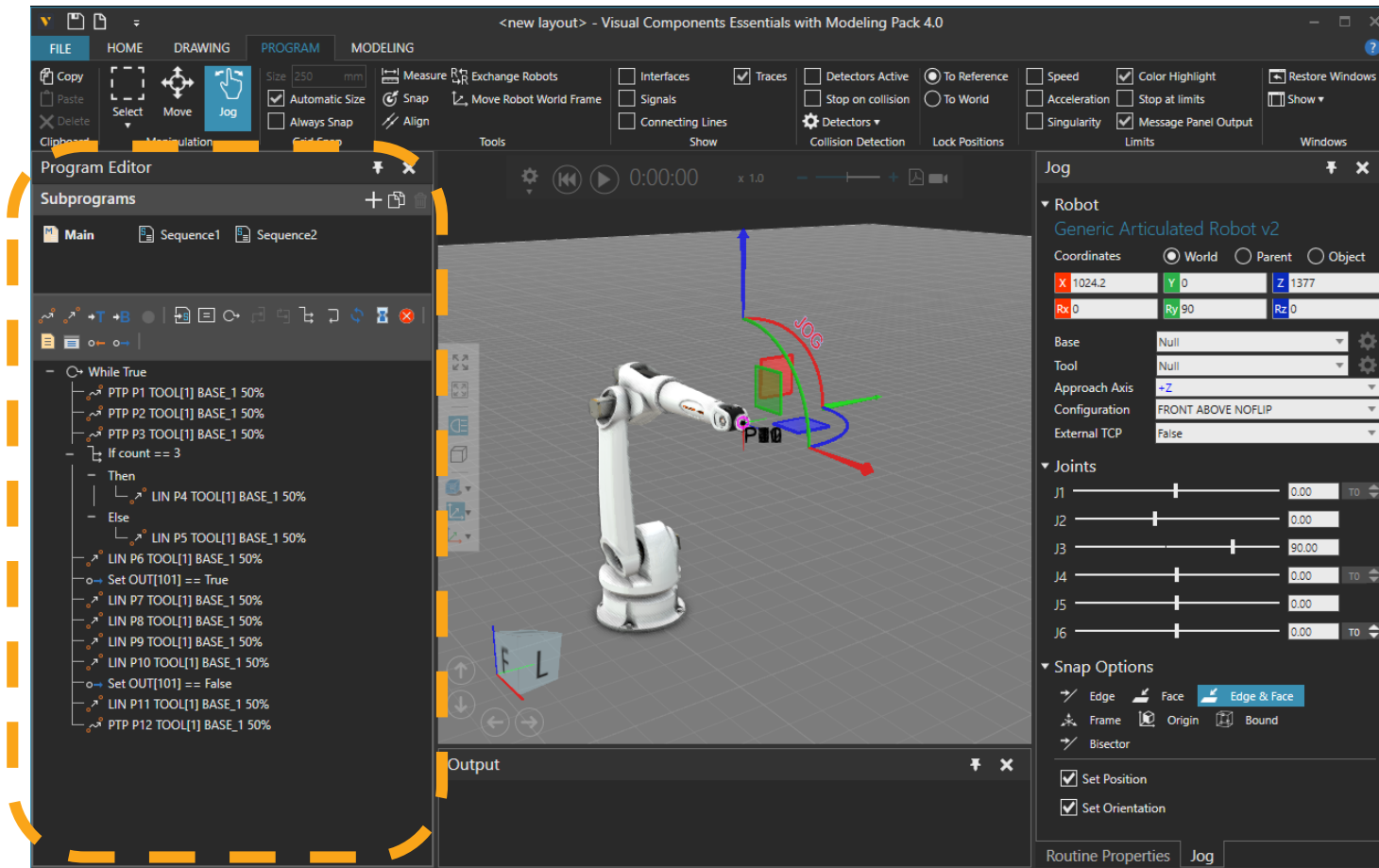


# PROGRAM TAB



Program Ribbon

# PROGRAM TAB



Program editor



# PROGRAM TAB

The screenshot displays the 'PROGRAM' tab in a CAD application. The interface is divided into several sections:

- Top Bar:** Shows the current layout as '<new layout> - Visual Components Essentials with Modeling Pack 4.0'. The 'PROGRAM' tab is active, with sub-tabs for 'DRAWING' and 'MODELING'.
- Toolbar:** Includes 'Copy', 'Paste', 'Delete', 'Select', 'Move', and 'Jog' (highlighted in blue). Other tools include 'Automatic Size', 'Snap', 'Align', 'Measure', 'Exchange Robots', 'Move Robot World Frame', 'Interfaces', 'Traces', 'Detectors Active', 'To Reference', 'Speed', 'Color Highlight', 'Restore Windows', 'Always Snap', 'Grid Snap', 'Signals', 'Stop on collision', 'To World', 'Acceleration', 'Stop at limits', 'Singularly', 'Message Panel Output', 'Limits', and 'Windows'.
- Program Editor:** Located on the left, it shows a tree of subprograms: 'Main', 'Sequence1', and 'Sequence2'. The 'Main' routine is expanded, showing a sequence of operations: 'While True' containing 'PTP P1 TOOL[1] BASE\_1 50%', 'PTP P2 TOOL[1] BASE\_1 50%', 'PTP P3 TOOL[1] BASE\_1 50%', an 'If count == 3' block with 'Then' (LIN P4 TOOL[1] BASE\_1 50%) and 'Else' (LIN P5 TOOL[1] BASE\_1 50%) branches, followed by 'LIN P6 TOOL[1] BASE\_1 50%', 'Set OUT[101] == True', 'LIN P7 TOOL[1] BASE\_1 50%', 'LIN P8 TOOL[1] BASE\_1 50%', 'LIN P9 TOOL[1] BASE\_1 50%', 'LIN P10 TOOL[1] BASE\_1 50%', 'Set OUT[101] == False', 'LIN P11 TOOL[1] BASE\_1 50%', and 'PTP P12 TOOL[1] BASE\_1 50%'.
- 3D View:** The central area shows a white robotic arm in a 3D environment. A 'JOG' control panel is overlaid on the view, showing coordinate axes (X, Y, Z) and rotation axes (Rx, Ry, Rz). The current coordinates are X: 1024.2, Y: 0, Z: 1377. Rotation values are Rx: 0, Ry: 90, Rz: 0. The 'Jog' panel also includes 'Robot' settings (Generic Articulated Robot v2), 'Coordinates' (World, Parent, Object), 'Base', 'Tool', 'Approach Axis' (+Z), 'Configuration' (FRONT ABOVE NOFLIP), and 'External TCP' (False). Below these are 'Joints' (J1-J6) with sliders and 'Snap Options' (Edge, Face, Edge & Face, Frame, Origin, Bound, Bisector).
- Output:** A panel at the bottom right for displaying program execution output.

Routines: Main routine and subroutines

# PROGRAM TAB

The screenshot displays the 'PROGRAM' tab in a software interface. The top menu bar includes FILE, HOME, DRAWING, PROGRAM, and MODELING. The 'PROGRAM' tab is active, showing a toolbar with icons for Copy, Paste, Delete, Select, Move, and Jog. The main workspace shows a 3D model of a robot arm with a 'JOG' label and a coordinate system. The left pane, titled 'Program Editor', shows a tree view of subprograms (Main, Sequence1, Sequence2) and a list of program statements. The right pane, titled 'Jog', shows robot properties such as coordinates (X: 1024.2, Y: 0, Z: 1377), base, tool, and joints (J1 to J6).

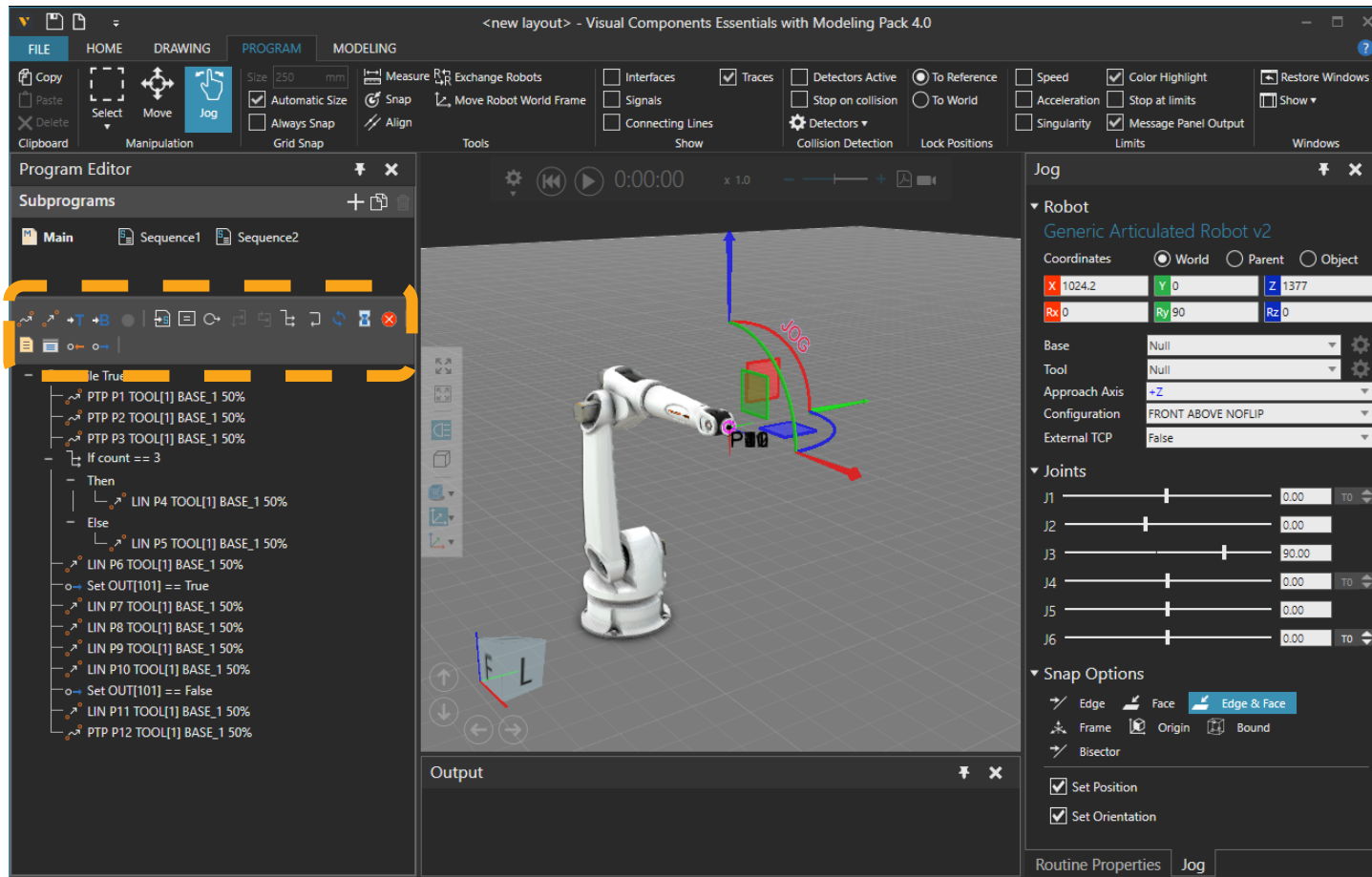
Program Editor Subprograms: Main, Sequence1, Sequence2

Program Statements:

- While True
  - PTP P1 TOOL[1] BASE\_1 50%
  - PTP P2 TOOL[1] BASE\_1 50%
  - PTP P3 TOOL[1] BASE\_1 50%
  - If count == 3
    - Then
      - LIN P4 TOOL[1] BASE\_1 50%
    - Else
      - LIN P5 TOOL[1] BASE\_1 50%
  - LIN P6 TOOL[1] BASE\_1 50%
  - Set OUT[101] == True
    - LIN P7 TOOL[1] BASE\_1 50%
    - LIN P8 TOOL[1] BASE\_1 50%
    - LIN P9 TOOL[1] BASE\_1 50%
    - LIN P10 TOOL[1] BASE\_1 50%
    - Set OUT[101] == False
      - LIN P11 TOOL[1] BASE\_1 50%
  - PTP P12 TOOL[1] BASE\_1 50%

Program Statements for the selected routine

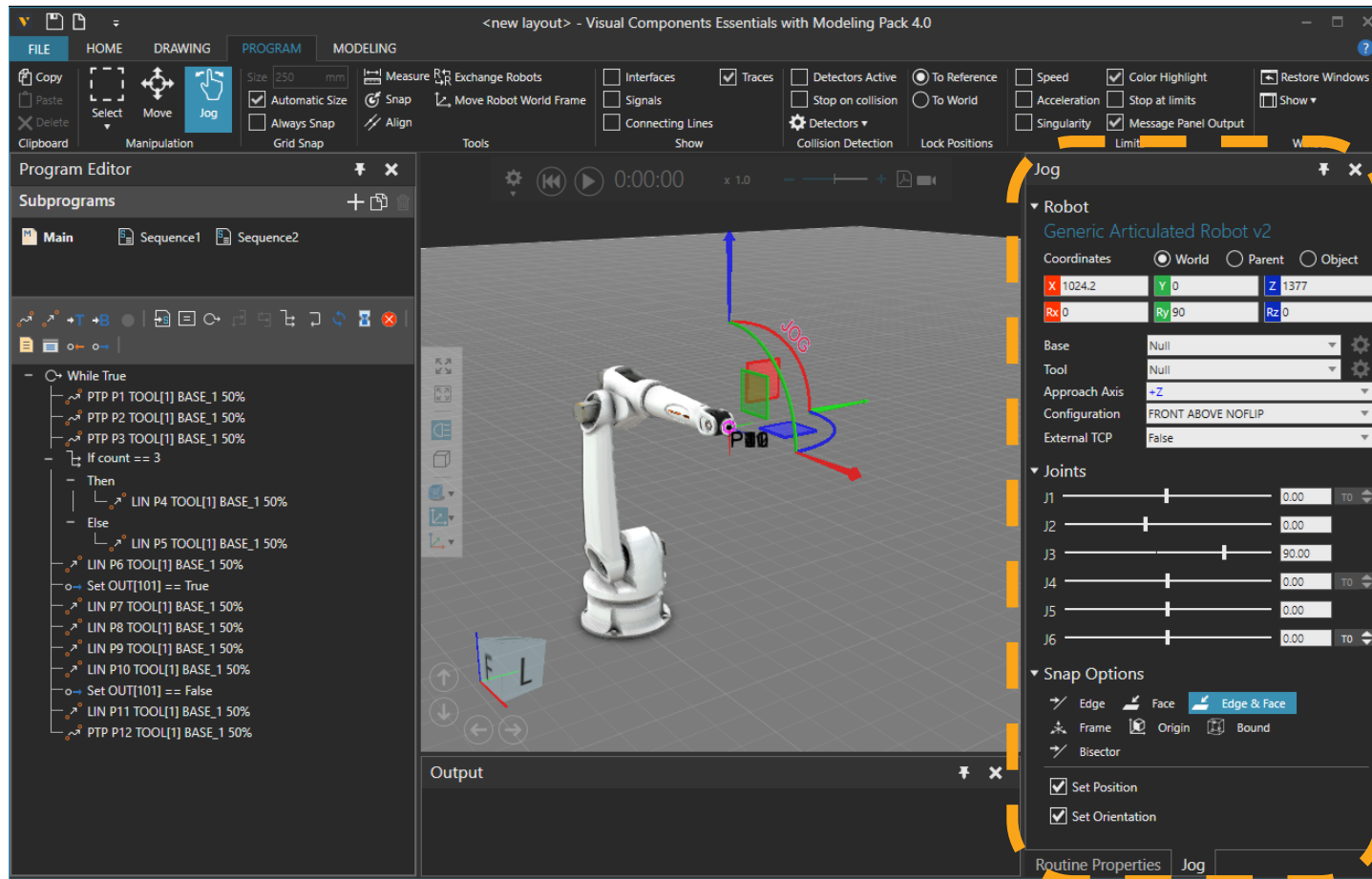
# PROGRAM TAB



Create new statements



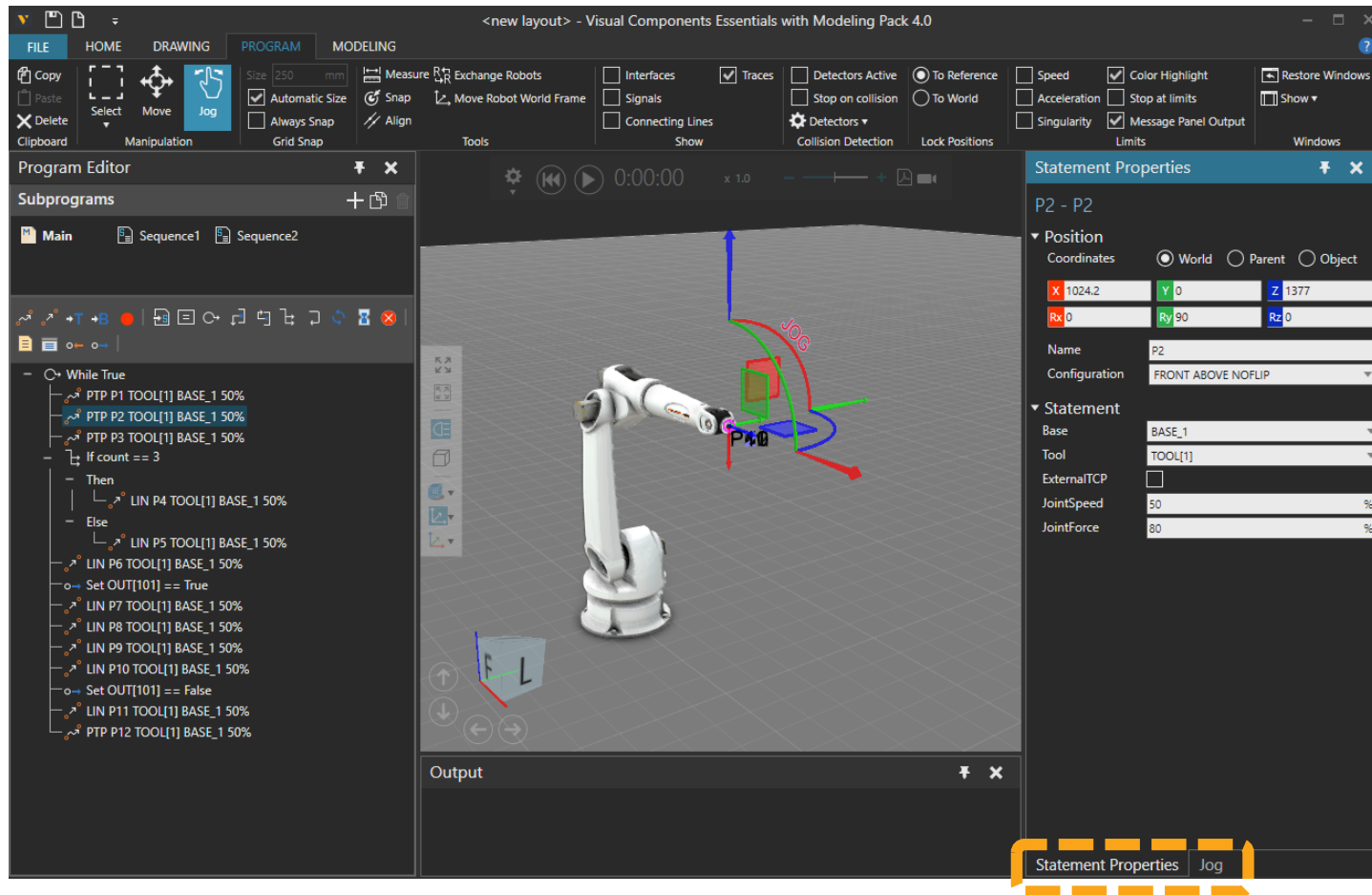
# PROGRAM TAB



Jog panel: robot's current state and config base/tool



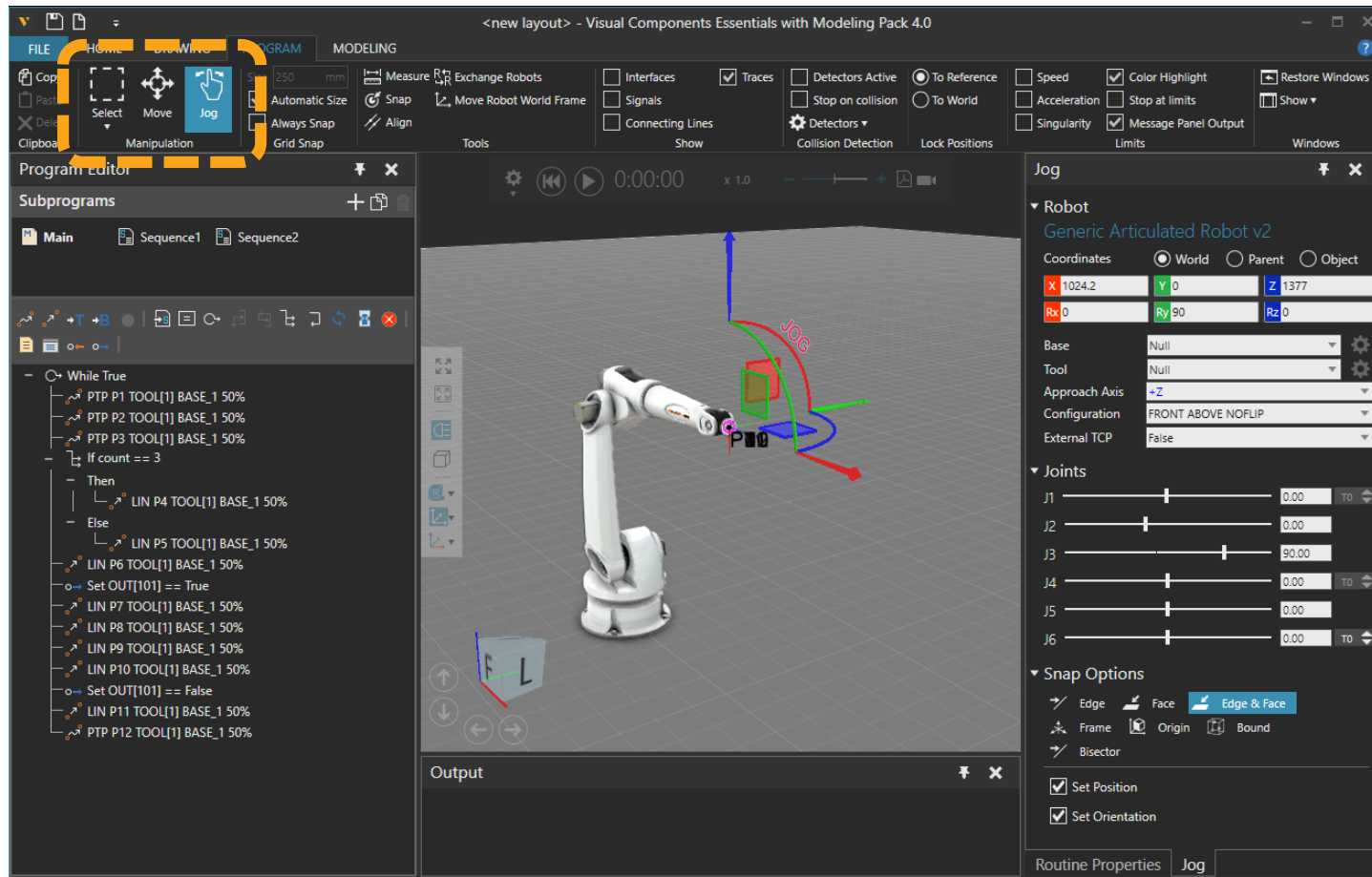
# PROGRAM TAB



Properties Panel / Jog Panel



# PROGRAM TAB



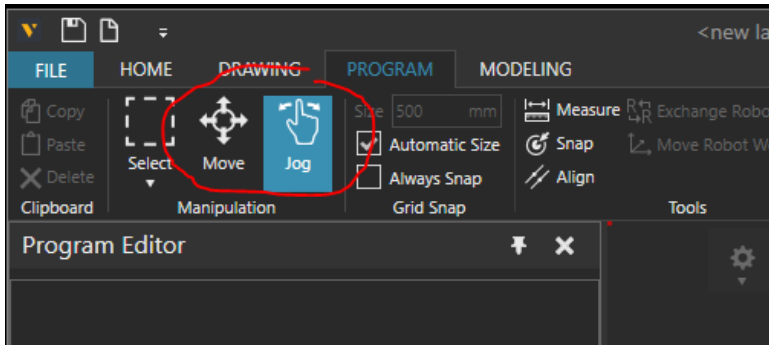
Select / Move / Jog -modes

# TEACHING PROGRAM POINTS

- Jog robot to a posture
  - Use snap and align commands if needed
- Add a motion statement
  - Point To Point (PTP) or Linear motion type
  - See statement properties for speeds, acc, etc.
- Select multiple points and edit properties for group of points



# MOVE VS. JOG



**Jog**

- Manipulate robot and other devices
- 3d handle shown at the active TCP
- Touch up required to update program points

**Move**

Move selected item(s)  
Point, Component, Base, Tool  
Moving a program point edits the point immediately



# CONFIGURING AND CONNECTING I/O:S

- Robot inputs and outputs
- Default outputs

Output #	Action On True	Action On False
1...16	Grasp	Release
17...32	Trace Tool On	Trace Tool Off
33...48	Mount Tool	Unmount Tool
49...80	Trace External Tool On	Trace External Tool Off



# CONFIGURING AND CONNECTING I/O:S

The screenshot displays the SolidWorks software interface for configuring and connecting I/O. The main window shows a 3D model of a robot arm and a conveyor belt. The 'Interfaces' and 'Signals' options in the ribbon are highlighted with a red dashed box. The 'Component Properties' panel is also highlighted, showing settings for a 'Generic Articulated Robot v2'. The 'Actions Configuration' panel is highlighted, showing settings for 'Signal Actions', 'Grasp', and 'Release'.

**Component Properties**

BOM	<input checked="" type="checkbox"/>
BOMName	Generic Articulated Robot v3
BOMdescription	Generic and parametric Visual Componer
Category	Robots
Simulation Level	Detailed
Backface Mode	Feature
J1	0
J2	0
J3	90
J4	0
J5	0
J6	0
DefineRobotSize	ByReach
Reach	1.8 m
L2	861 mm
L3	861 mm
scale	1.2

**Actions Configuration**

**Signal Actions**

Output	1
On True	Grasp
On False	Release

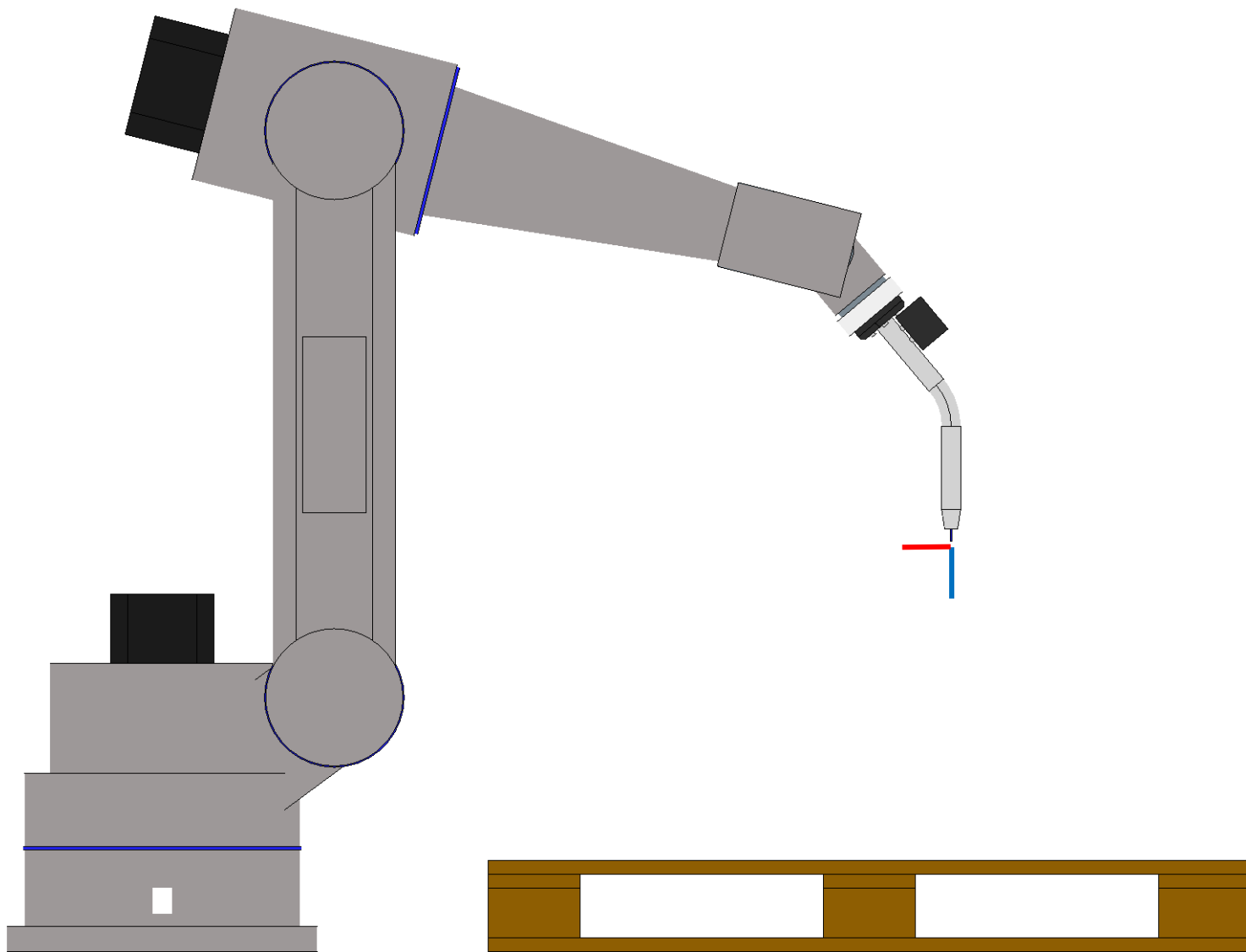
**Grasp**

DetectionVolu...	X 50 Y 50 Z 50
UsingTool	TOOL[1]

**Release**

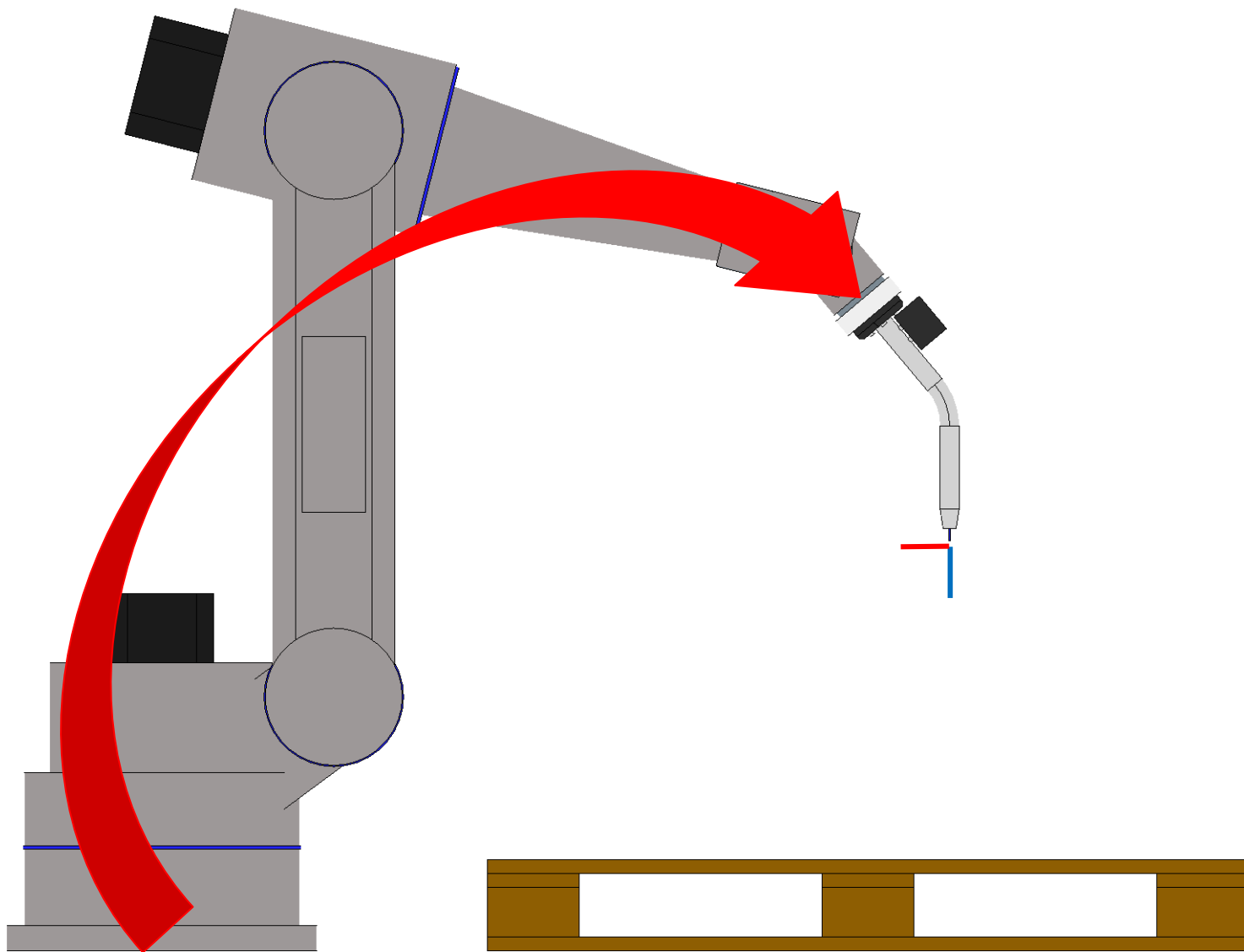
GravityDirection	25
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# BASES AND TOOLS

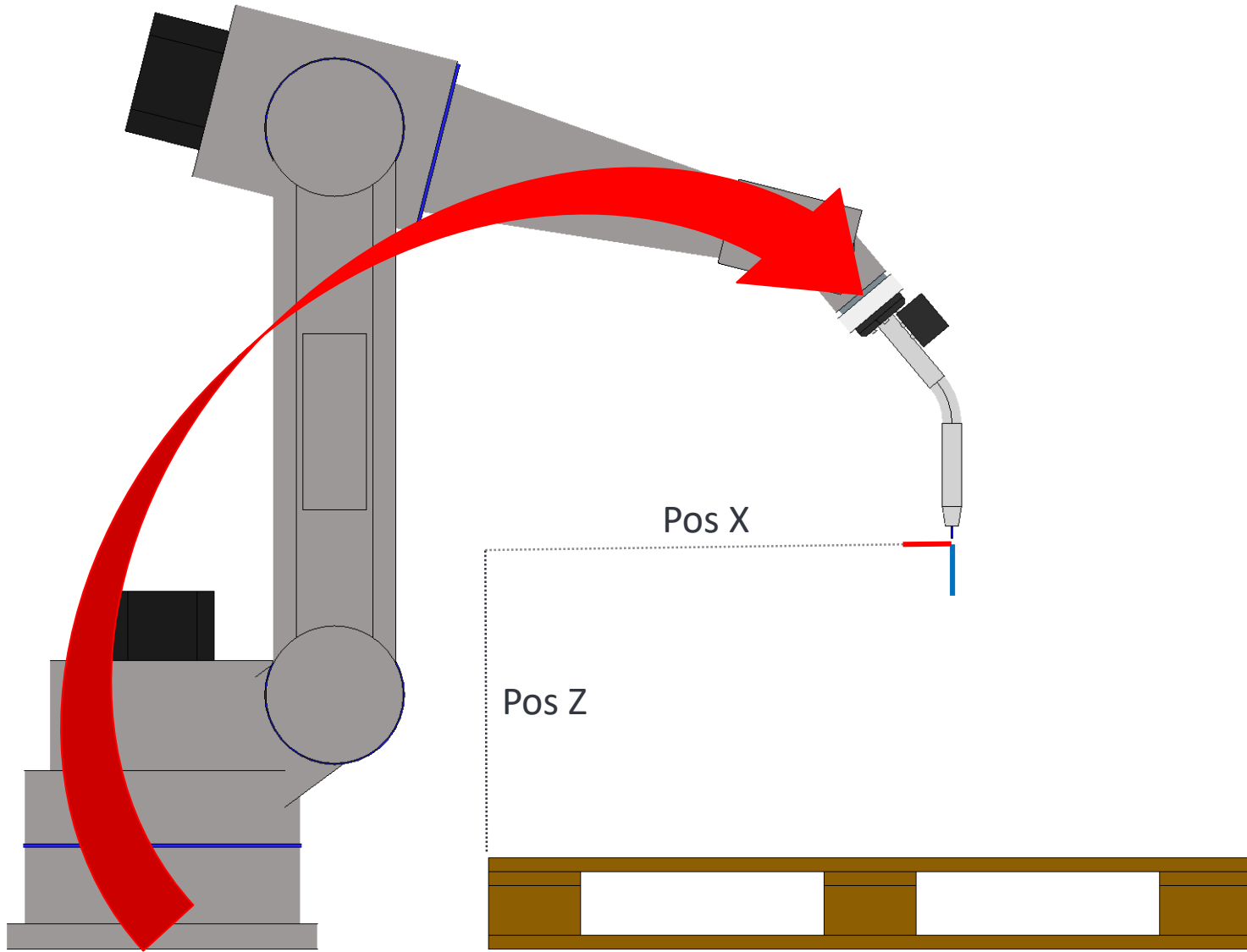




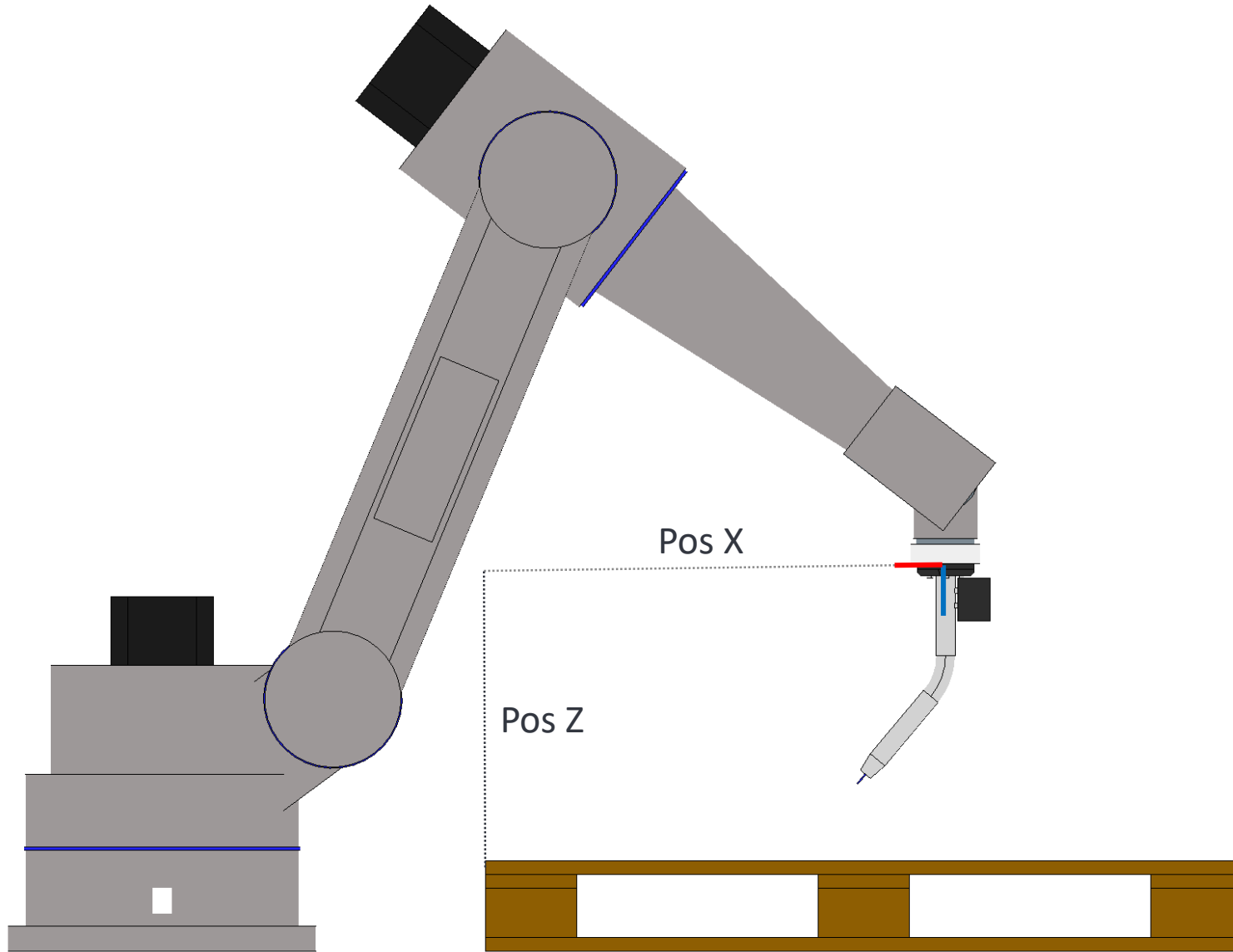
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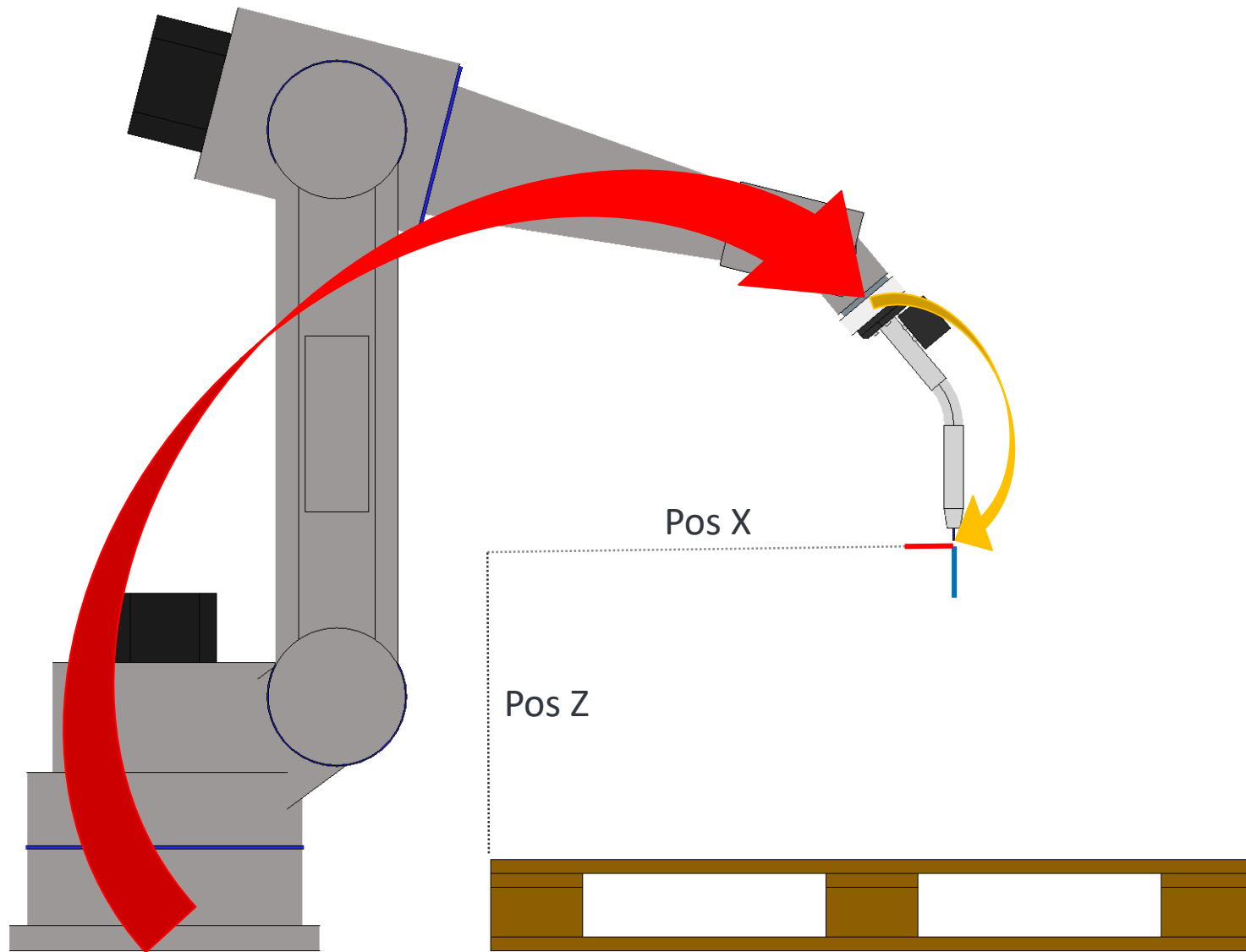
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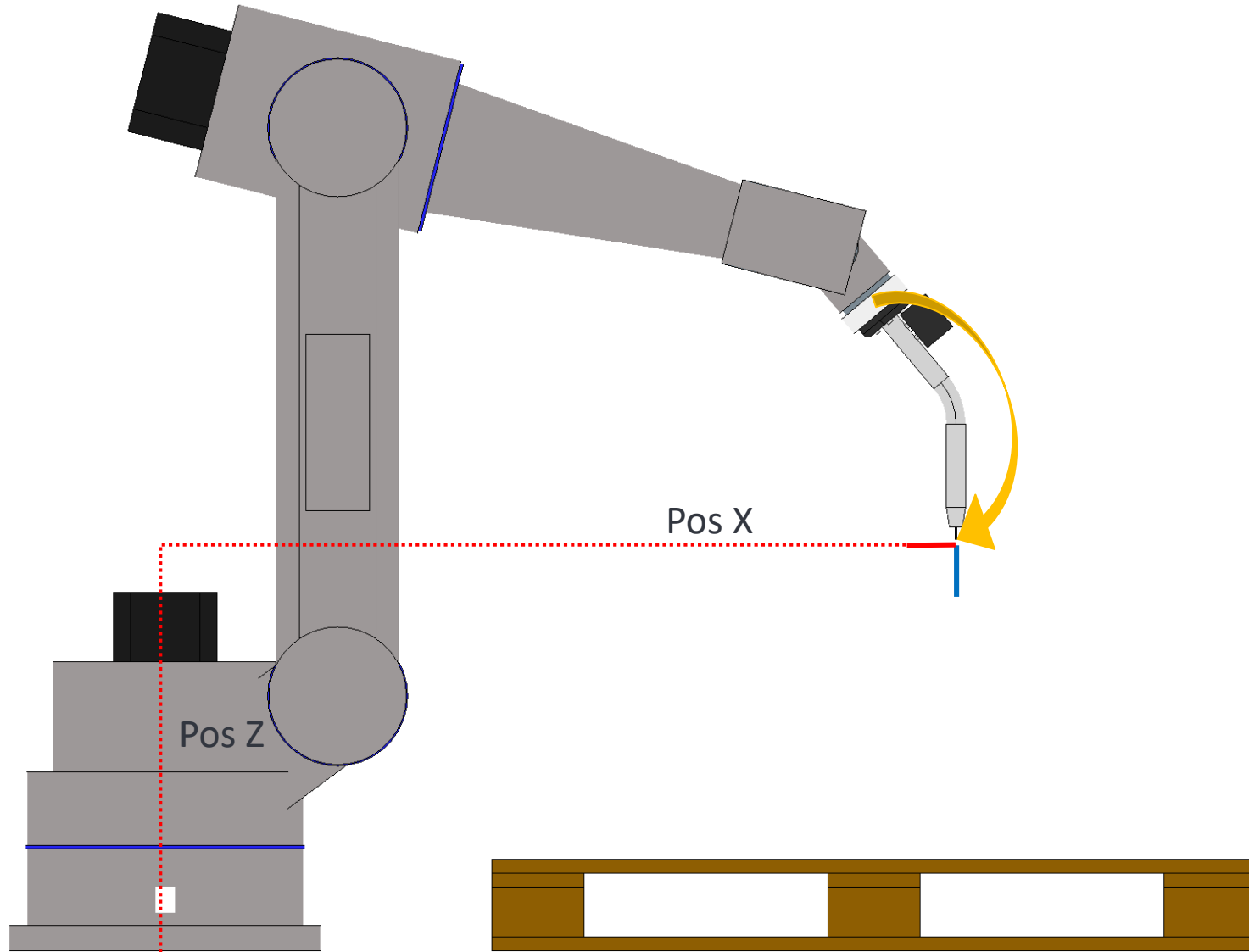
# BASES AND TOOLS



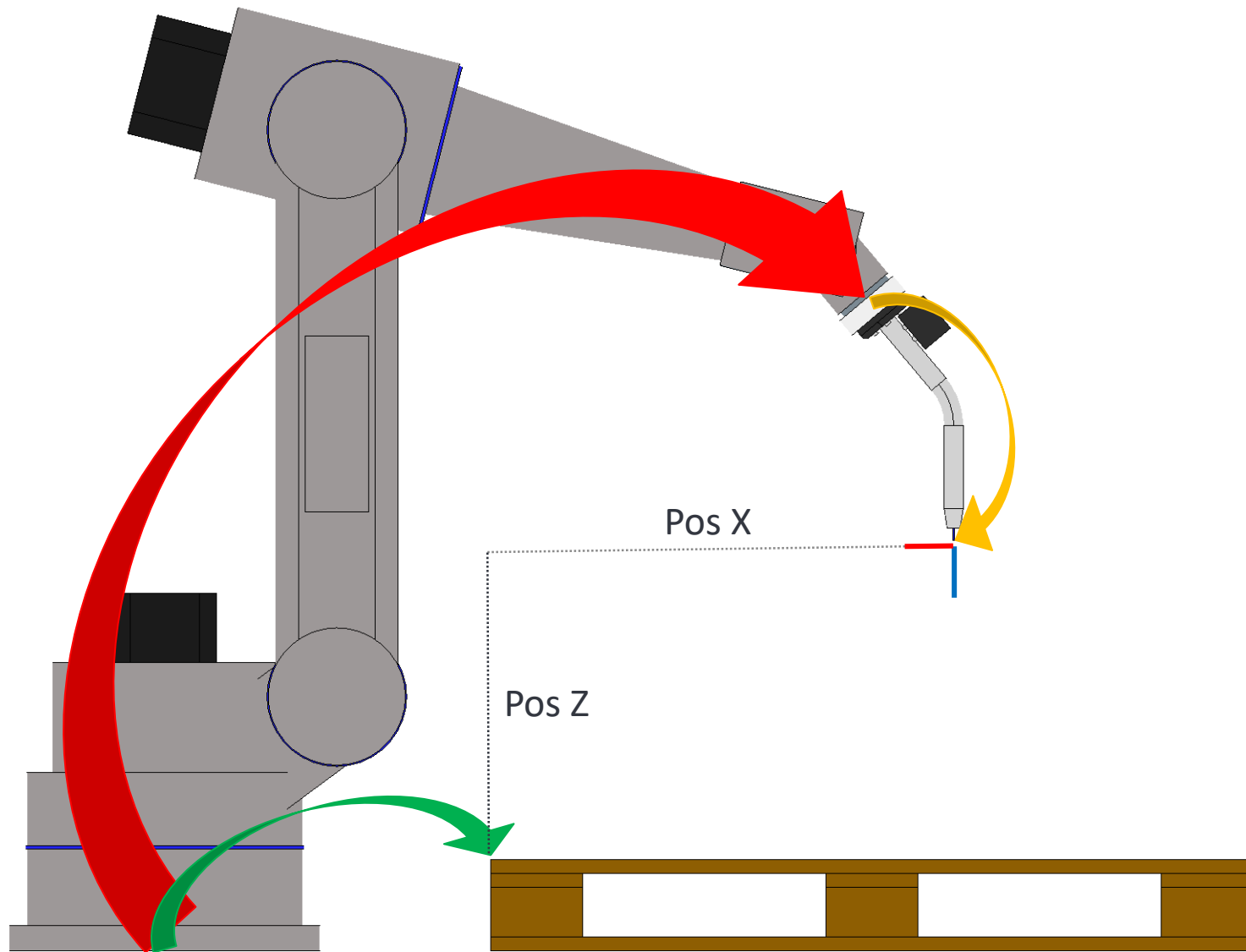
# BASES AND TOOLS



# BASES AND TOOLS



# BASES AND TOOLS



# EXTERNAL AXIS

- Connecting External Axis
- Programming with External Axis

