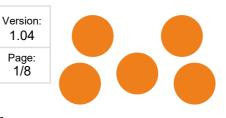


TB-1-2	
UR poly-scope.	



# ToolBase UR programming.

# Quick start manual

# Rename I/O

There are two quick couplings on the tool base. One coupling has a black colored bayonet, the other is light colored (white).

The UR robot TOOL I/O has 2 digital outputs and 2 digital inputs.

The ToolBase uses 1 input and 1 output to control tool.

It is recommended to name TOOL I/O according bayonet colors.

Rename tool_out[0]	to	oWhite
Rename tool_out[1]	to	oBlack
Rename tool_in[0]	to	iWhite
Rename tool_in[1]	to	iBlack

Set tool voltage to 24V



TB-1-2	Version: 1.04		
UR poly-scope.	Page: 2/8		

# URcap

From robot SW Version 3.3 an URcap can be installed to activate the ToolBase in polyscope however it is not recommended as the ToolBase use of IO is generic simple (see renaming of IO)

Download latest version of ToolBase Urcap from <u>www.setuprobotics.com</u> (direct link at toolbase product page) and install into polyscope.

	🛃 Un	iversal Robots	s Graphica	al Programm	ning Envi	ironment			+ ×
To make a program pada proce	<u> R</u> 🗿 File					17:0	04:00	cccc	$\bigcirc$
To make a program node press	Program Installation	Move I/O	Log						
the "ToolBase" button at the	<pre></pre>	Command G	iraphics	Structure	Variables				
URCaps tab.	▼ Robot Program	Program	Struct	ture Edi	itor				
		Set placement	of node Aft	ter selected	•				
		Insert	Basic Ad	dvanced W	lizards	URCaps			
		Ē							
				ToolBase					
		-							
		Edit	We l	Сору		Paste	-	uppress	
		_		сору				abbi 633	
	<b>♀</b> ♠ <b>∢</b> ►	- Mo	ve	Cut		Delete			
	Simulation Real Robot		Speed 🚃	<b></b> 10	00%	-	Previous	Next	•

Select a radio buttons to select activation / deactivation of white or black tool coupling.

4 push buttons provides access for easy testing of connected tools.

Tool status can be read below buttons.

🛃 Ur	niversal Robots Graphical Pr	ogramming Environment		- + ×
<u> R</u> 🔮 File			11:44:52	cccc 🕜
Program Installation	Move I/O Log			
-unnamed	Command Graphics Stru	icture Variables		
▼ Robot Program — ■ TB: Activate White	ToolBase			
	Select ToolBase action for curr	ent node.		
	PolyScope node:			
S	ACTIVATE WHITE			
	DEACTIVATE WHITE			
	ACTIVATE BLACK			
	DEACTIVATE BLACK			
	Click below, to test a tool:			
	Activate Black	Activate White		
			-	
	Deactivate Black	Deactivate White		
	Black Status: Not holding/No			
	White Status: Not holding/No			
♀ ♠ ▶ ◄>				
Simulation	Speed	√100%	<table-cell-rows></table-cell-rows>	Next 🔿
📀 Real Robot 📃 🔼		*		

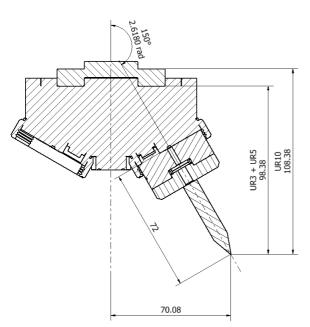


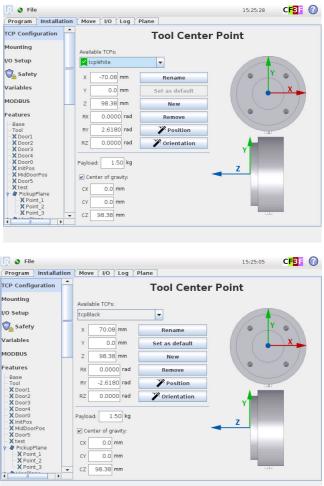
UR poly-scope.		Version: 1.04	TB-1-2
3/8		Page: 3/8	UR poly-scope.

# UR programming.

Programming the robot can be done in many ways. Here an examples on how to position tools mounted in ToolBase to positions in a cartesian coordinate system.

First define TCP's for the digitizer in the white and black tool position. Name them tcpWhite and tcpBlack.



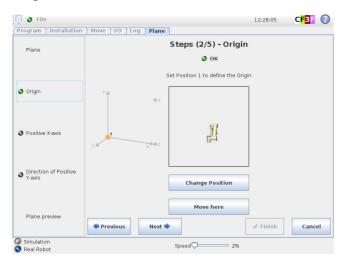


Make a program selecting tcpWhite and run it. (the default selection is not always working)

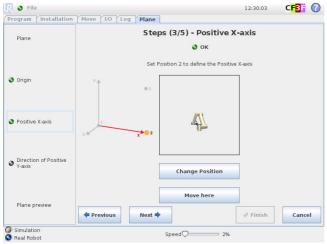
	TB-1-2	Version 1.04
Certified	UR poly-scope.	Page: 4/8
Init Variables ▼ Robot Program → Select tcpWhite · Select the action Select the action Select the action Set Organic Set Set Analog Set <-Output	Traphics     Structure     Variables       n you wish the robot to perform at this point in the program. You can also in the robot's payload.       Dutput <dutput>       Output     <dutput> <dutput< td=""> <an.output></an.output></dutput<></dutput></dutput>	
Set the tota	I payload to 0.00 kg e TCP as center of gravity	

Create feature plane using the digitizer tool. A feature is a coordinate system where the robot can position XYZ and angles. As it is not easy to position the digitizer tip inside many real features a small block is placed at the the desired point to be measured. As demo is used the SetupRobotics Robot stand table RM-TB.

Origon:





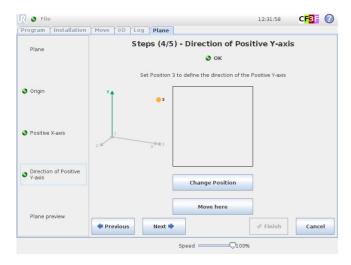


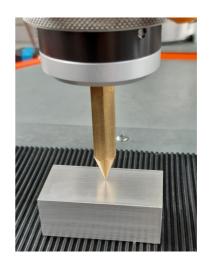






## Plane:





Create variables holding the lengths of: digitizer, block (used when digitizing) length of tools etc. The LANG laser cut digitizer plater is for center digitizing of LANG vices.



Calculate offset as -lenDigitize-lenBlock+lenTool. Calculate angle as (2 x  $\pi$  / 360) x angle.

Now it is possible to position the tools mounted in the ToolBase robot in respect to the defined features. Assign desired position to a variable. Below p1 parameters (meter, radian). Select p1 in the dropdown dialog for a moveL or moveP command.

Move white tool to p1 on feature Table:

	TB-1-2		Version: 1.04	
Certified	UR poly-scope.		Page: 6/8	
File  Installation Move VO Log Plan demo bot Program I=n0]gtttz=72 I=n0]gttz=72 I=n0]gttz=72 I=n0]gttz=72 I=n0[gttz=72 I=n0]gttz=72 I=n0[gttz=74 I=	13:44:37     CFC:     Image: Command [Graphics ] Structure [Variables]       Command [Graphics ] Structure [Variables]       Move       Specify how the robot will move between waypoints.       The values below apply to all child waypoints and depend on	Robot Program       Image: Second	UO Log Plane nd Graphics Structure Va ypoint he robot to a variable position	13:44:59 <b>CF3 (</b> riables
offWhite=i_i=hoDgites-tenBlock-lenToolWhite)1000 angleWhite=i(5.23650)0 offBlock-ienDgites-tenBlock-lenToolBlack)1000 angleBlock(5.23650)0 ol=g0(0150,0.100,offWhite+0.050,0.0,angleWhite) Moret + p1	the selected movement type. Set TCP Tool Speed tcpWhite 250 mm/s Feature Tool Acceleration Table 1200 mm/s <sup>+</sup>		ariable p1 💌	Advanced Onlines
Ð	4dd Waypoint Reset	~	op at this point and with radius mm Add waypoint before	Advanced Options  Time Time Solution Tool Speed Tool Acceleration Solution Solution Tool Acceleration Solution
			Add Haypoint before	



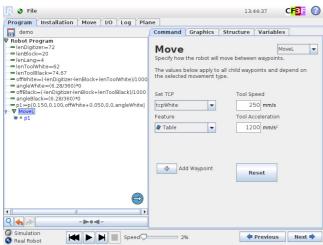
TB-1-2
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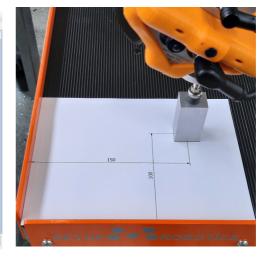
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Version:



### White tool, X150 Y100 Z50 A0:



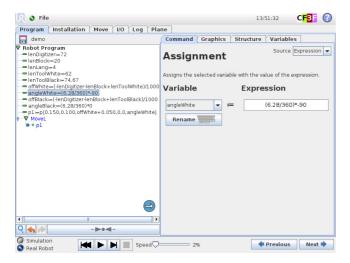


### White tool, X150 Y100 Z50 A90:

🜒 File				13:	46:35	CF3F	0
Program Installation Move I/O Log Pla	ne						
📻 demo	Command	Graphic	s St	ructure	Variables		
▼ Robot Program - ■ lenDigitzer=72 - ■ lenBlock:=20 - ■ lenLang=4	Assign	ment	t		Source E	xpression	
-= lenToolWhite:=62 -= lenToolBlack:=74.67	Assigns the s	elected var	riable w	ith the va	lue of the ex	pression.	
-= offWhite:=(-lenDigitizer-lenBlock+lenToolWhite)/1000 -= angleWhite:=(6.28/360)*90	Variable			Expre	ssion		
	angleWhite Rename	-	:=		(6.28/360)	*90	
<							
Simulation Real Robot Speed Speed Speed	9	%		-	Previous	Next	•

# 

### White tool, X150 Y100 Z50 A-90:

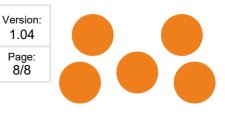




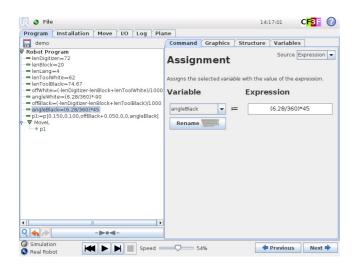


TB-1-2
UR poly-scope.

1.04 Page: 8/8



### Black tool, X150 Y100 Z50 A45:





### Black tool, X150 Y100 Z50 A-45:

