

Program Template EXPLAINED

Dual Gripper Setup and Programming



ROBOTIQ
eLearning

PROGRAM TEMPLATE USING Dual Gripper

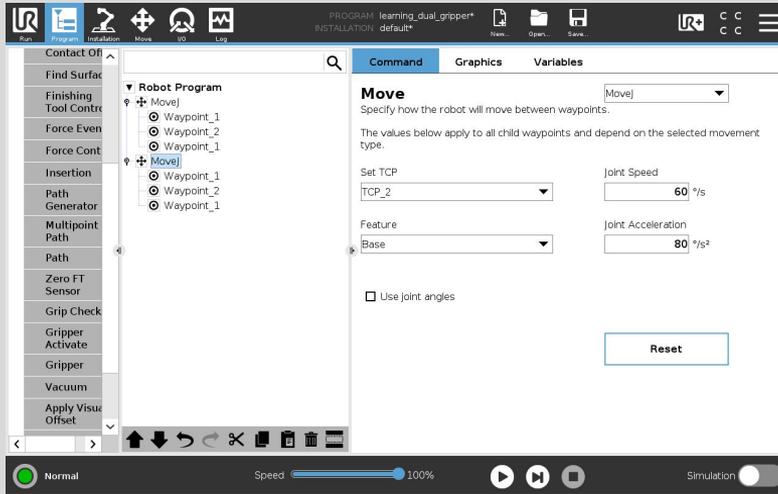




Description

Use this document to help you program your application using the template for the **Dual Gripper**. You can learn more about the steps on how to program your first Dual Gripper application such as CNC Machine Tending application using the available video for this course.

Visit elearning.robotiq.com for more details.



What you will need

- Robotiq Dual Gripper
- Latest URcap - Gripper URcap
- Universal Robot UR3e, UR5e, UR10e or UR16e
- Program Template: **Template_Dual_Gripper.urp**



Setting the Payload

The screenshot shows the software interface for setting the payload and center of gravity. The 'Tool Center Point' section includes a dropdown menu for 'TCP_1', position fields for X (0.0 mm), Y (0.0 mm), and Z (0.0 mm), and orientation fields for RX (-0.0648 rad), RY (0.8235 rad), and RZ (0.0813 rad). The 'Payload and Center of Gravity' section includes a 'Payload' field set to 0.00 kg, a checked 'Center of gravity' checkbox, and position fields for CX (0.0 mm), CY (0.0 mm), and CZ (0.0 mm). A callout '1' points to the 'Center of gravity' checkbox. The right side of the interface shows a 3D model of the gripper with coordinate axes (X, Y, Z) and a callout '1' pointing to the center of gravity point on the gripper.

1 Wizard
Click on the **wizard** to set the **Payload** and **Center of Gravity**. A table with the specific values can also be used. This table can be found in the Instruction Manual.



PROGRAM learning_dual_gripper*
INSTALLATION default*

Run Program Installation Move I/O Log

Next... Open... Save...

LR+ C C C C

Payload Estimation

Overview

- Position #1
- Position #2
- Position #3
- Position #4

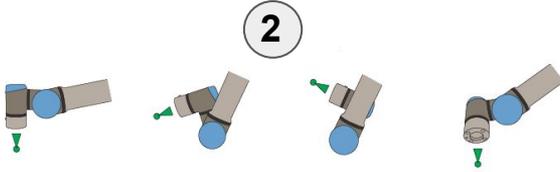
Finalise

Steps (1/6) - Overview

The robot can estimate the payload and Center of Gravity with 4 different TCP positions.

When the four positions are set, the robot performs the calculations. You must vary TCP positions to avoid repositioning.

The four illustrations below is only for inspiration to create 4 different robot positions.



← Previous Next → ● Finish Cancel

Normal Speed 100% Simulation

2 Set 4 different positions
In order to setup the payload and center of gravity, 4 different positions need to be set. Follow the steps to complete the process.



PROGRAM learning_dual_gripper*
INSTALLATION default*

Run Program Installation Move I/O Log

Next... Open... Save...

UR+ C C C C

Payload Estimation

Overview

- Position #1
- Position #2
- Position #3
- Position #4

Finalise

Steps (2/6) - Position #1

● More points are needed

Place the robot in the first position
When you press Next the position will be saved

?

Set Position

Move here

3

i Tip: Use move arrows for more precise estimation.

← Previous Next → ● Finish Cancel

Normal Speed 100% Simulation

3 Set Position
Set the all 4 positions by clicking on the **Set Position** button.



PROGRAM learning_dual_gripper*
INSTALLATION default*

Run Program Installation Move I/O Log

Hex... Open... Save...

UR+ C C C C

Payload Estimation

Overview

- Position #1
- Position #2
- Position #3
- Position #4

Finalise

Steps (6/6) - Finalise

OK

The measurements have been completed.
Verify that these values are reasonable.

When you press 'Finish' the payload and center of gravity will be set.

Payload
2.42 kg

Center of Gravity

CX 1.0 mm
CY 0.0 mm
CZ 59.0 mm

Previous Next 4 Finish Cancel

Normal Speed 100% Simulation

- 4 Finish**
The Payload and the Center of Gravity is display. Click **Finish** to close the wizard.



Setting the Tool Center Point (TCP)

6

PROGRAM learning_dual_gripper*
INSTALLATION default*

Run Program Installation Move I/O Log

Next... Open... Save...

General

TCP

Mounting

I/O Setup

Variables

Startup

Smooth Transition

Home

Tool IO

Conveyor Tracking

Screwdriving

Safety

Features

Fieldbus

URCaps

Tool Center Point

TCP_1

Position

X 0.0 mm

Y 0.0 mm

Z 0.0 mm

Orientation

RX -0.0648 rad

RY 0.8235 rad

RZ 0.0813 rad

Payload and Center of Gravity

Payload: 2.65 kg

Center of gravity:

CX 1.0 mm

CY 1.0 mm

CZ 72.0 mm

Speed 100%

Simulation

5 Position (X,Y,Z)
Using the table at the end of each instruction manual, enter the Tool Center Point position for each axis or use the wizard with a fixed point to obtain an estimated position of the TCP.

6 Adding a Tool Center Point
On a Dual Gripper, a second Tool Center Point needs to be added using the + button. Step 5 needs to be done a second time to enter the three values of the second TCP.



Setting the Tool Center Point Orientation

PROGRAM learning_dual_gripper*
INSTALLATION default_1*

Run Program Installation Move I/O Log

Next... Open... Save...

UR+ C C C C

General

Tool Center Point

TCP:

Position

X: mm

Y: mm

Z: mm

Orientation

RX: rad

RY: rad

RZ: rad

Payload and Center of Gravity

Payload: kg

Center of gravity:

CX: mm

CY: mm

CZ: mm

Teach TCP Orientation

No reference point has been set

Choose a feature and set a point with the tool pointing in the direction of the Z axis of the selected feature.

Base

Set point

Set Cancel

Normal Speed 100% Simulation

7 Orientation of TCP1
Orient the gripper corresponding to your first TCP so it will be oriented upward. Click on the **wizard** to define the TCP orientation.

8 Set Point
Using the wizard, teach the TCP Orientation relatively to the robot base.



Setting the Tool Center Point Orientation

The screenshot displays the Robotiq software interface for setting the Tool Center Point (TCP) orientation. The interface is divided into several sections:

- TCP Position:** Features directional arrows for Z+ (up), Z- (down), X- (left), X+ (right), Y- (left), and Y+ (right).
- TCP Orientation:** Features directional arrows for RZ+ (left), RZ- (right), RX+ (left), RX- (right), RY- (up), and RY+ (down).
- Robot:** Shows the active TCP as 'TCP1' and a 3D model of the robot arm with a red dot indicating the TCP location. Below the model are 'OK' (green checkmark) and 'Cancel' (red X) buttons.
- Tool Position:** A section highlighted with a circled '9', containing input fields for X, Y, Z (in mm) and RX, RY, RZ (in rad).

Axis	Value	Unit
X	-125.81	mm
Y	-480.99	mm
Z	524.19	mm
RX	0.141	rad
RY	5.474	rad
RZ	-0.059	rad
- Joint Position:** A section containing sliders for Base, Shoulder, Elbow, Wrist 1, Wrist 2, and Wrist 3, with their respective angle values in degrees.

At the bottom of the interface, there are buttons for 'Home', 'Freedrive', and 'Zero Position', along with a 'Normal' status indicator, a 'Speed' slider set to 100%, and a 'Simulation' toggle switch.

9 Tool Position
Enter the Tool Position section to set the values of RX, RY and RZ.



Setting the Tool Center Point Orientation

The screenshot shows the RobotStudio software interface. The main window displays a 3D model of a robotic arm. To the right of the model is a control panel with the following sections:

- Feature:** Base
- TCP1:**
 - X: -125.81 mm
 - Y: -481.01 mm
 - Z: 524.16 mm
- RPY [°]:**
 - RX: 0
 - RY: -45
 - RZ: 0
- Joint Positions:**
 - Base: -81.96 °
 - Shoulder: -110.78 °
 - Elbow: -125.55 °
 - Wrist 1: -25.71 °
 - Wrist 2: -45.56 °
 - Wrist 3: -11.29 °

At the bottom of the control panel, there are two buttons: a green checkmark labeled "OK" and a red X labeled "Cancel". A large blue circle with the number "10" is overlaid on the RY field.

10 Tool Position
Set the values of RX, RY and RZ with the following values:
RX = 0, RY = +/- 45 and RZ = 0. Those values are for RPY(°)



The screenshot shows the Robotiq software interface. On the left is a navigation menu with options like TCP, Mounting, I/O Setup, Variables, Startup, Smooth Transition, Home, Tool IO, Conveyor Tracking, Screwdriving, Safety, Features, Fieldbus, and URCaps. The main window is divided into several sections:

- Tool Center Point:** Shows a dropdown menu set to 'TCP2'. Below it are input fields for Position (X: -154.0 mm, Y: 0.0 mm, Z: 138.0 mm) and Orientation (RX: 0.0000 rad, RY: 0.0000 rad, RZ: 0.0000 rad). A circled '11' is placed over the Orientation section.
- Teach TCP Orientation:** A dialog box with the title 'Teach TCP Orientation'. It contains the text: 'No reference point has been set. Choose a feature and set a point with the tool pointing in the direction of the Z axis of the selected feature.' Below this is a dropdown menu set to 'Base' and a 'Set point' button.
- Payload and Center of Gravity:** Shows a 'Payload' field set to 2.00 kg. Below it is a checked checkbox for 'Center of gravity:' followed by input fields for CX (1.0 mm), CY (0.0 mm), and CZ (80.0 mm).

At the bottom of the interface, there is a status bar with a 'Normal' indicator, a 'Speed' slider set to 100%, and a 'Simulation' toggle switch.

11 Orientation of TCP2
Use the **Wizard** to teach the second TCP orientation.



The screenshot shows the Robotiq software interface. The top menu bar includes options like Run, Program, Installation, Move, I/O, and Log. The main area displays a 3D model of a robotic arm. To the right, there is a control panel with the following sections:

- Feature:** View (dropdown)
- TCP_1:** X: -276.84 mm, Y: -523.92 mm, Z: 76.1 mm (each with +/- buttons)
- RPY [°]:** RX: 0, RY: 0, RZ: 4.42 (each with +/- buttons)
- Joint Positions:** Base: -104.07°, Shoulder: -119.62°, Elbow: -112.64°, Wrist 1: -50.88°, Wrist 2: -46.56°, Wrist 3: 18.74° (each with +/- buttons)

At the bottom of the control panel, there are OK (green checkmark) and Cancel (red X) buttons. A large '12' is overlaid on the Cancel button. The bottom status bar shows 'Normal' mode, a speed slider at 100%, and simulation controls.

12 Set the values
Modify the value of the wrist 3 by adding or removing 180° to the value. In this example, the new value will be 198.74°.



Tool Center Point		Tool Center Point	
	TCP_1		TCP2
Position		Position	
X	154.0 mm	X	-154.0 mm
Y	0.0 mm	Y	0.0 mm
Z	138.0 mm	Z	138.0 mm
Orientation		Orientation	
RX	0.0000 rad	RX	1.2023 rad
RY	0.7854 rad	RY	0.0001 rad
RZ	0.0000 rad	RZ	-2.9024 rad

13

14

13 Example of Orientation Values for TCP1

14 Example of Orientation Values for TCP2



Programming Dual Pick

The screenshot shows the RobotStudio software interface. On the left, a sidebar contains a 'Basic' tab with a list of actions: Move, Waypoint, Direction, Wait, Set, Popup, Halt, Comment, and Folder. Below this are 'Advanced', 'Templates', and 'URCaps' sections. The main workspace is divided into three panes: 'Robot Program', 'Command', and 'Variables'. The 'Robot Program' pane shows a tree structure with a 'Move' node circled in blue and labeled '15'. Below it are three waypoints: 'Waypoint_1', 'Waypoint_2', and 'Waypoint_1'. The 'Command' pane shows the 'Move' command selected, with a dropdown menu set to 'MoveJ'. Below this, the 'Set TCP' dropdown is set to 'TCP_1' and circled in blue and labeled '16'. Other parameters include 'Joint Speed' set to 60 %/s, 'Joint Acceleration' set to 80 %/s², and 'Feature' set to 'Base'. There is an unchecked checkbox for 'Use joint angles' and a 'Reset' button at the bottom. The bottom status bar shows 'Normal' mode, a speed slider at 100%, and a 'Simulation' toggle.

15 First Move J
Set the TCP of the first move J with the TCP_1. Add 3 waypoints (Approach, Pick, Retract).
The waypoints Approach and Retract should be linked together since they will be the same position.

16 Second Move J
Set the TCP of the second move J with the TCP_2 and use the exact same waypoints of the first move J



More Templates Available!



ROBOTIQ
eLearning

elearning.robotiq.com



LEAN
ROBOTICS



Share with your Peers!



D o F

Join the DoF Room to discuss about this learning Module, ask questions and get answers from the Pros!

[Join Here!](#)

Robotiq's community where industrial **Automation Pros** share their **know-how** and **get answers**.

[Ask your Questions !](#)