



The RG2 gripper is a flexible electric gripper specially designed for robots from Universal Robots. The long stroke allows the gripper to handle a variety of object sizes. Adjusting the gripping force allows the gripper to handle both delicate and heavy object. The standard fingers can be used with many different object. It is also possible to fit custom fingers. The installation complexity is minimal as the cable attaches directly onto any robot from Universal Robots. All configurations of the gripper is controlled from the Universal Robots software.

## Features

- **Simple installation**  
Runs directly from the robot.
- **Integrated control board**  
No need for wiring or external programming.
- **Flexible**  
handles many different object.  
Easily reconfigured.
- **Supports two grippers**  
Two grippers can be operated without any extra wiring.
- **Adjustable force**  
Is set in the Universal Robots software.
- **Wide work range**  
Allows handling of multiple sized objects.
- **Quick finger change**
- **Plug n' play**  
Mount, connect, run script - Automate
- **Simple programming**  
As simple as setting variables.
- **Failsafe operation**  
In case of power loss the gripping force is maintained.
- **Force and Width detection**  
Uses I/O's to give feedback on reached force or Width.
- **Analog width feedback**  
One of the analog input on the robot is always corresponding to the present finger position.
- **Tool output extension**  
The robot tool connector is extended to the gripper connector

## Technical specifications

<i>Technical data</i>	<i>Min</i>	<i>Typical</i>	<i>Max</i>	<i>Units</i>
Total stroke (adjustable)	0	-	110	[mm]
Finger position resolution	-	0,1	-	[mm]
Repetition accuracy	-	0,1	0,2	[mm]
Reversing backlash	0,2	0,4	0,6	[mm]
Gripping force (adjustable)	3	-	40	[N]
Gripping force accuracy	±0,05	±1	±2	[N]
Gripping speed*	55	110	184	[mm/s]
Gripping time**	0,04	0,07	0,11	[s]
Operating voltage***	10	24	26	[V DC]
Power consumption	1,9	-	14,4	[W]
Maximum Current	25	-	600	[mA]
Ambient operating temperature	5	-	50	[°C]
Storage temperature	0	-	60	[°C]
Product weight	-	0,65	-	[kg]

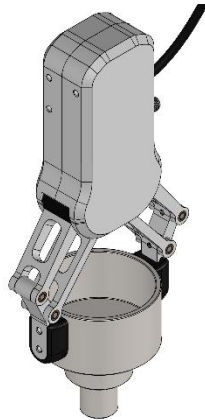
\* see speed table

\*\* based on 8mm total movement between fingers, see speed table

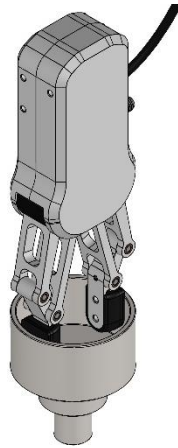
\*\*\*At 12V the gripper runs at approximately half the normal speed

Gripper work range

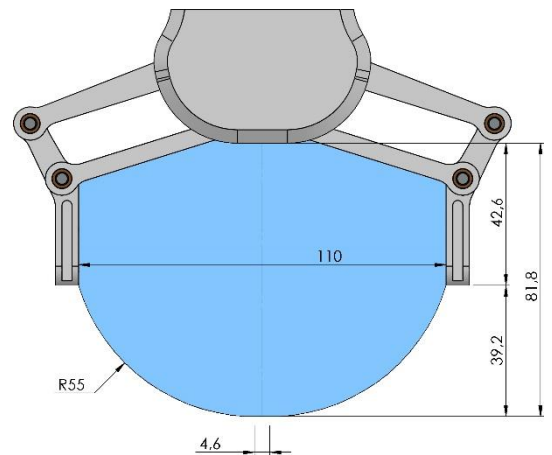
External Grip



Internal Grip

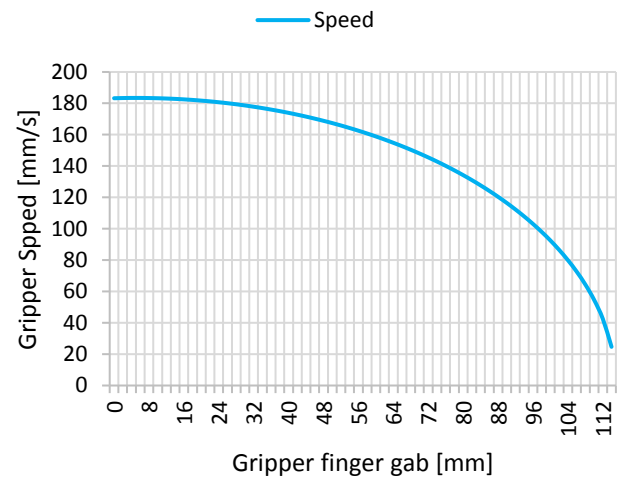


Fingers are rotated.



Gripping speed

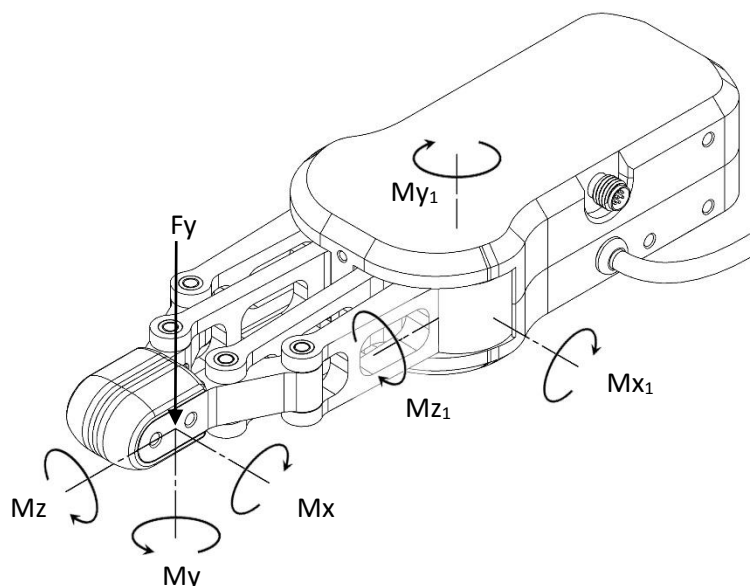
The Speed table are illustrating the difference in speed relative to the gripper finger position.



Load capacity

Parameter	Static	Unit
<b>Fy</b>	<b>362</b>	[N]
<b>Mx</b>	<b>7,55</b>	[Nm]
<b>My</b>	<b>4,1</b>	[Nm]
<b>Mz</b>	<b>6,92</b>	[Nm]
<b>Mx<sub>1</sub></b>	<b>22</b>	[Nm]
<b>My<sub>1</sub></b>	<b>11</b>	[Nm]
<b>Mz<sub>1</sub></b>	<b>22</b>	[Nm]

The parameters in the finger tips are calculated at the shown closed position and will change in relation to the finger positions.

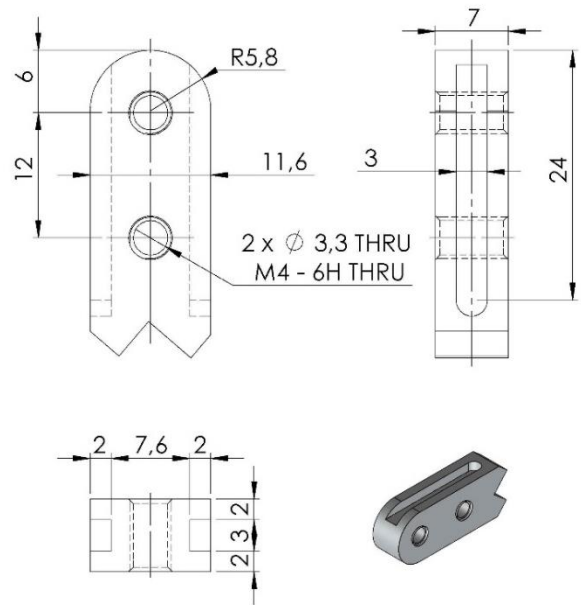


## Fingers

The Standard fingers can be used for many different workpieces. If custom fingers are required, they can be made to fit the gripper finger tips.

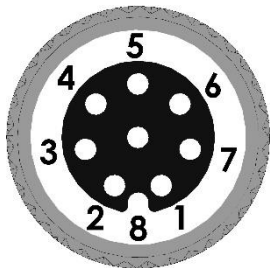
### Standard fingers

For a variety of workpieces



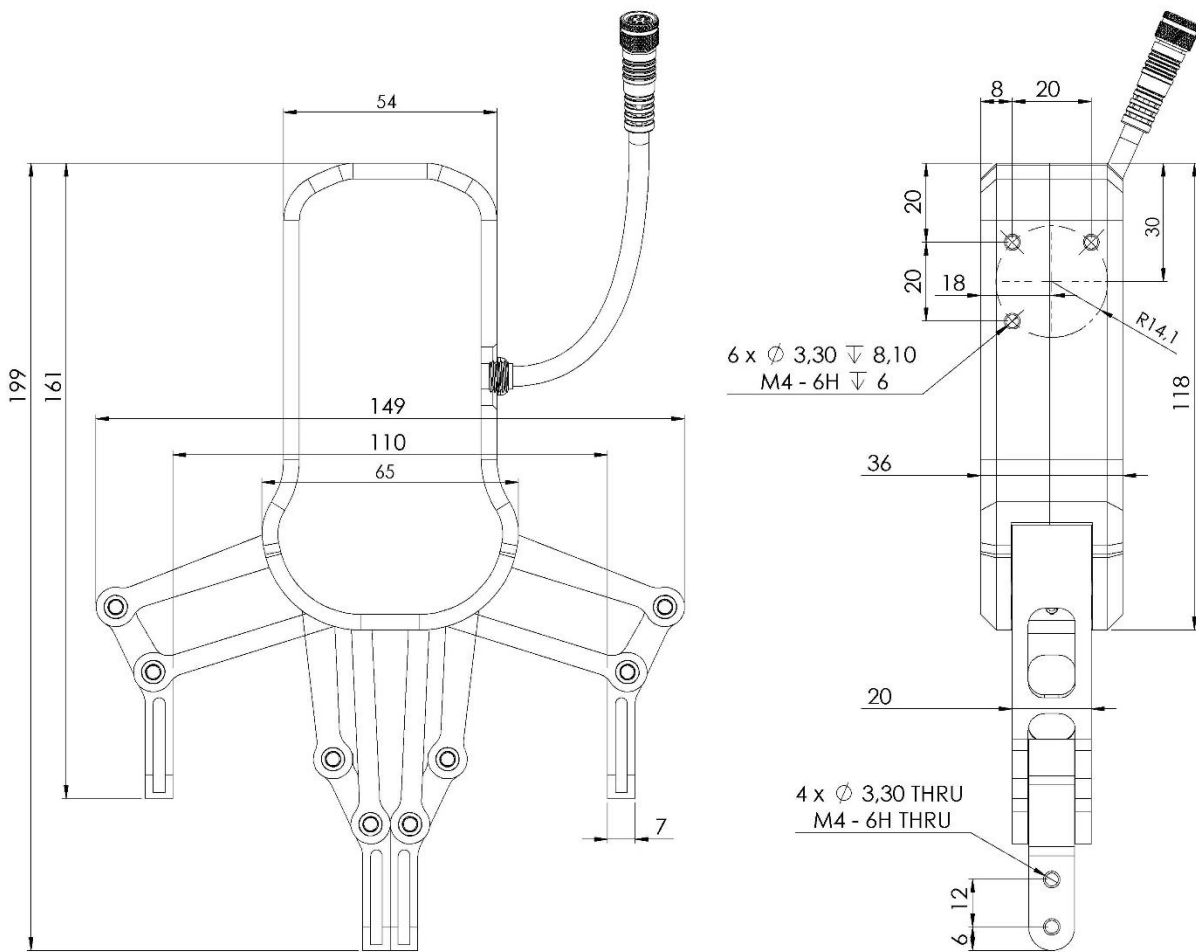
Dimensions of the gripper aluminum finger tips

## Tool connector pinout

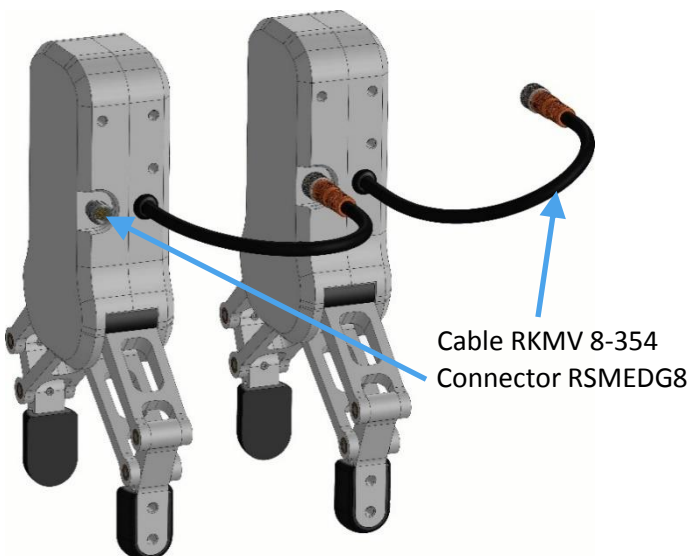


<i>pin</i>	<i>wire</i>	<i>UR I/O</i>	<i>UR I/O V3</i>
1	White	AI2	Tool analog input 2
2	Brown	AI3	Tool analog input 3
3	Green	DI9	Tool input 1
4	Yellow	DI8	Tool input 0
5	Gray	Power	24V DC
6	Pink	DO9	Tool output 1
7	Blue	DO8	Tool output 0
8	Red	GND	0V DC

Mechanical dimensions



Gripper output connector



When one gripper is connected to another via the gripper output connector. The first gripper in the chain (from the robot) becomes master and the second slave. This makes it possible to use both grippers individually using only to digital outputs from the robot.

## Programming the gripper via the UR-interface

### Teach Mode

When the robot is turned on, you can use the gripper without programming it first. Use the tool output I/O's. The table to the right shows the preset configuration.

- 1) Go to the I/O screen on the teach pendant
- 2) Turn on 24V in the tool section
- 3) Use DO8(0) to move the gripper
- 4) And DO9(1) to select High or Low Force

<i>Teach Mode</i>	<i>Tool Outputs</i>	
	<b>0</b>	<b>1</b>
UR Version 3	<b>0</b>	<b>1</b>
UR Version 1 & 2	<b>DO8</b>	<b>DO9</b>
Open Gripper (110mm)	Off	-
Close Gripper (0mm)	On	-
High Force (40N)	-	Off
Low Force (5N)	-	On

### Controlling the gripper

In the **SubProg\_2Pos\_2Force.urp** program you have two options for setting Width and two for Force. Set the variables to the desired forces and widths.

The table shows how to use it.

<i>Control Gripper</i>	<i>Tool Outputs</i>	
	<b>0</b>	<b>1</b>
UR Version 3	<b>0</b>	<b>1</b>
UR Version 1 & 2	<b>DO8</b>	<b>DO9</b>
Width_DO8_Off	Off	-
Width_DO8_On	On	-
Force_DO9_Off	-	Off
Force_DO9_On	-	On

### I/O Feedback

The gripper uses DI8, DI9 and AI3 to give feedback on its status and finger position.

Use DI8 to detect if the gripper grabbed a workpiece or stopped at a given position.

DI9 will go LO (Busy) when the gripper is programmed, moving or changing force.

<i>Digital status Feedback</i>	<i>Tool Inputs</i>	
	<b>0</b>	<b>1</b>
UR Version 3	<b>0</b>	<b>1</b>
UR Version 1 & 2	<b>DI8</b>	<b>DI9</b>
Position Reached	LO	-
Force Reached	HI	-
Gripper Busy	-	LO
Gripper Ready	-	HI

## Analog feedback

AI2 outputs a voltage corresponding to the gripper width.

<b>Analog Feedback</b>			
	<b>UR Input</b>	<b>Voltage</b>	<b>Width</b>
Actual Width @ 0V:5V	AI2	0...3.7V*	0...110mm
Actual Width @ 0V:10V	AI2	0...3.0V*	0...110mm

\* Due to the gripper analog output resistance (10kΩ), the analog feedback voltage will be affected by the robot input resistance. For the robots from Universal Robots, the input resistance is 29kΩ @ 0V:5V and 15kΩ @ 0V:10V, that result in a maximum input voltage of  $5V \cdot \frac{29k\Omega}{10k\Omega+29k\Omega} = 3.7V @ 0V: 5V$  and  $5V \cdot \frac{15k\Omega}{10k\Omega+15k\Omega} = 3.0V @ 0V: 10V$  which correspond to the maximum width of 110mm.

The actual width can be calculated by  $\frac{\text{voltage}}{\text{maximum input voltage}} \cdot 110\text{mm}$ .

## Controlling two grippers

In the **SubProg\_Duo\_2Pos\_1Force.urp** program, each gripper have two positions they can shift between. They share one Force. Set the variables to the desired force and widths in the program tree.

<b>Control Grippers</b>	<b>Tool Outputs</b>	
UR Version 3	<b>0</b>	<b>1</b>
UR Version 1 & 2	<b>DO8</b>	<b>DO9</b>
Master_DO8_Off	Off	-
Master_DO8_On	On	-
Slave_DO9_Off	-	Off
Slave_DO9_On	-	On