**UR10e gripper datasheet**

**Gripper mass:**

**Gripper dimensions:**

**Distance between fingers when opened:**

**Actuator stroke:** (two limit positions – once when limit is reached the actuator shuts down – operated with 12 V with digital signals 0 and 1)

**Distance between fingers when closed:**

**Extension spring parameters**

A screenshot of a computer

Description automatically generated

**Important note:** the spring length at F\_1 (see image above) should not exceed 190 mm (if so, the spring would be permanently deformed). Therefore, the maximum grasping width for objects is calculated as follows:

where – is the maximum travel distance of the extension spring calculated as:

The maximum grasping width is:

For the maximum grasping width, the achieved grasping force (**also maximum and distributed on both fingers**) is:

Grasping force depends only on grasping width with the following relationship:

where is grasping width, i.e. the width of an object being grasped, which cannot be smaller than . If which is the theoretical minimum grasping width of an object, the achieved grasping force is

**and depend on the gripper design requirements and can be modified when needed!** In this case 🡪 and

However, the grasp could be achieved by shape or by friction.

A drawing of a scale

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**ACHIEVING GRASP BY FRICTION**

For achieving a grasp by friction, the mass of an object being grasped is (**when neglecting all the friction losses in bearing of the mechanism with robot arm approach vector is parallel to gravity**):

where – is the coefficient of friction between a hand and an object. When achieving grasp by friction, by combining equations (1) and (2), the mass of an object depends on two parameters – and , i.e.:

Where , and the limits of and are:

3D graph that represents the grasping force in relation with and

A diagram of a graph

Description automatically generated

A graph of contour maps

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**NOTE:** **the light gray region on the contour maps** represents the safe zone region where the gripper will hold mass0 () of 1, 2, 3…6 kg for any chosen parameters of width or **friction**

The theoretical maximum mass of an object ( and 🡪

The theoretical maximum end effector gross mass:

A screenshot of a computer

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Figure 1. UR10e datasheet

**ACHIEVING GRASP BY SHAPE** (only for when the approach vector is parallel to the gravity! 🡪 otherwise, the friction component is present)

* achieved by addition of tentacles to the hand

A drawing of a mechanical arm

Description automatically generated

Maximum object height for achieving grasp by shape 🡪

Minimum object height for achieving grasp by shape 🡪

For achieving grasp by shape, the maximum object height should be: