



## Customized Lettuce SoftGripper

Hygienic Food Handling  
Packed and Unpacked Food  
High Speed Pick and Place  
Lettuce, Cabbage, Onions

Gripper Type	Customized 4 Finger Centric
Gripper Size	22,2 cm x 17,0 cm
Gripper Weight	0,3 kg
Hygienic Design	yes
Picking Rate	up to 40 picks/min
Gripping Object Size	12 cm - 20 cm
Gripping Object Weight	up to 0,8 kg

 SoftGripping

**PROJX**  
AUTOMATION LTD

## Automation in food processing industry

Many tasks in food processing and packaging industry are still done by humans due to the complex nature of products and processes: Sensitive, compliant products with various size, shape and weight have to be handled very fast under hygienic conditions. Rising cost pressure and increasing demands on process quality reinforce the desire for automation of these tasks. Together with a PROJX from the food automation industry, SoftGripping designed a special gripper to pick packed and unpacked lettuce from a conveyer belt with special space and weight restrictions.

### Hygienic Gripper Design

A major factor for robots in the food and agricultural sector is hygienic design. A gripper must be easily cleaned. This asks for surfaces that are sloped to make sure water can drip off all elements. In addition, screws and seals must be hygienic for the soft gripper to be used in lettuce head handling. The material of the gripping finger itself and the gripper base has to fulfill all international hygienic standards. Gripping lettuce can be very challenging due to the nature of the object. Freshly cut lettuce must be handled with care as every leaf can break and deteriorate the quality of the produce. Lettuce leaves are not very tightly packed as it is the case with cabbage. The gripping apparatus must comply with the soft nature of the object and adjust the gripping force accordingly. Softgripper can theoretically solve both problems though the size of the lettuce does not fit in the standard application field.

To fit the shape of the lettuce head SoftGripping developed a custom gripper design that fits a whole lettuce and lets the gripper pick it from beneath ensuring no pressure marks while being able to pick lettuces of various size and shape.

Moreover, the application required us to adapt the gripper to two types of applications: Packaged and unpacked lettuce. Packaged meaning, that the head lettuce comes pre-packed in plastic bags from a previous conveyer belt station.

### High-speed Lettuce Picking

For the task to be economic, the cycle times must be low. Two types of robots are usually used for this type of application: Delta robots or scara robots. The delta robot set-up resembles what our customer is using in field tests and handling their lettuce. In our tests, up to 40 picks per minute were possible without leaving gripping marks or singling out lettuce leaves. A good gripper for high-speed handling must be fast and light. The weight of the gripper must be as low as possible to achieve maximum productivity, because of a couple of key aspects: faster acceleration and deceleration; less overall energy consumption, a robot model for lighter applications. The last aspect being crucial. How to decrease costs of delta robots? Have them use smaller motors and therefore be cheaper to manufacture! So, in lightweight end of arm tooling design, there are key advantages that should not be overlooked in process design.

### More applications ahead

As you might think this is not the only application for this new type of gripper. SoftGrippers can be adjusted to many other applications to achieve the optimal, safe and hygienic grip. A quick glance at the supermarket shelves reveals a plethora of products that can be handled in a similar fashion. In the video we present a couple of applications: leek packed in two or three pieces and loosely packed red oak leaf lettuce. But chicory and other packed vegetables can be dealt with in a similar manner bringing the agricultural technology forward.

