

MAGNETIC GRIPPERS

Magnetic grippers are most commonly used in a robot as an end effector for grasping the *ferrous* materials. It is another way of handling the work parts other than the mechanical grippers and vacuum grippers.

Types of magnetic grippers:

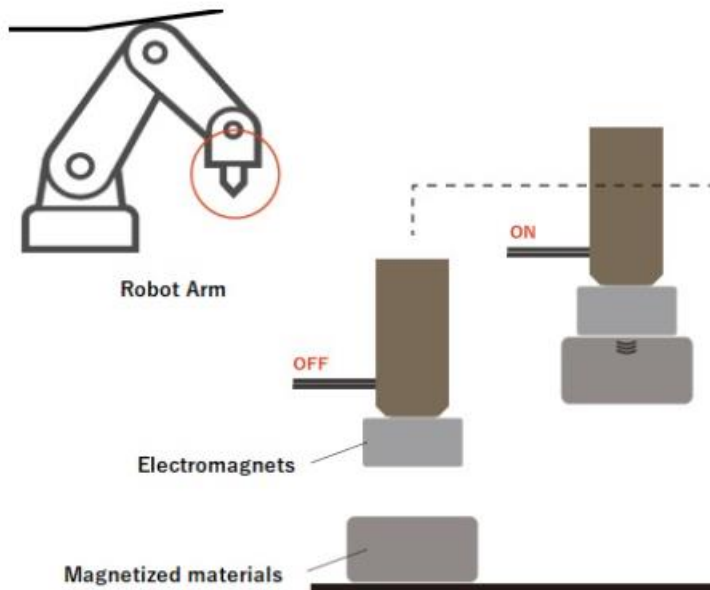
The magnetic grippers can be classified into *two common types*, namely:

- (i) Electromagnetic gripper
- (ii) Permanent magnet gripper

Electromagnets:

Electromagnetic grippers include a *controller unit* and a *DC power* for handling the materials. Use an electric coil to generate magnetic field when current flows.

- Holding force is controllable by adjusting current.
- Requires continuous electrical power to maintain grip.



If the work part gripped is to be released, the controller unit reverses the polarity before the electromagnet is turned off. This process will certainly help in *removing the magnetism* on the work parts. As a result, a best way of releasing the materials is

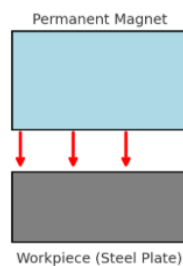
possible in this gripper. This type of grippers is easy to control, and very effective in releasing the part at the end of the operation than the permanent magnets.

Permanent magnets:

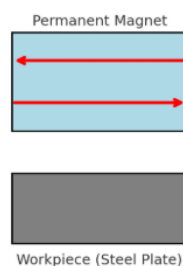
The permanent magnets do not require any sort of external power as like the electromagnets for handling the materials. A **permanent magnet** generates a continuous magnetic field.

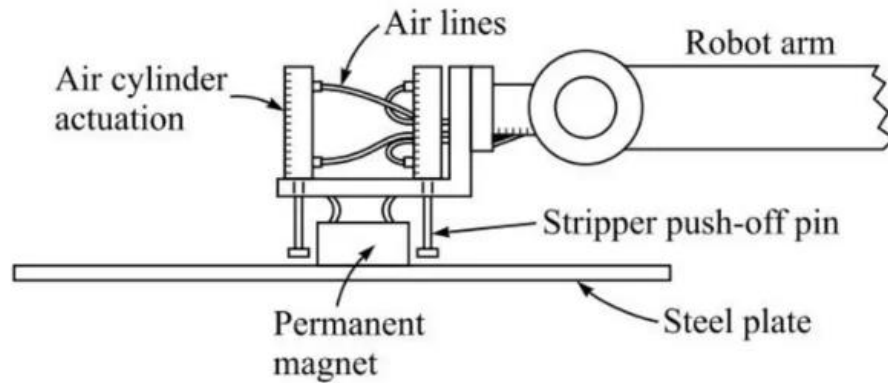
- This field attracts ferromagnetic materials (like iron or steel) and holds them firmly.
- To **release the workpiece**, some means of separating the part from the magnet must be provided. The device which do this task is called a stripper.
- The stripper has a **mechanical mechanism** (like sliding, rotating, or shifting another piece of magnet/iron) that redirects or cancels the magnetic field at the gripping surface.
- *stripper push –off pin* are used to separate the work part from the magnet. This device is incorporated at the sides of the gripper.

HOLD MODE



RELEASE MODE





The advantage of this permanent magnet gripper is that it can be used in hazardous applications like *explosion-proof apparatus* because of no electrical circuit. Moreover, there is no possibility of *spark production* as well.

Benefits:

- This gripper only requires *one surface* to grasp the materials.
- The grasping of materials is done *very quickly*.
- It does not require *separate designs* for handling different size of materials.
- It is capable of grasping materials with *holes*, which is unfeasible in the vacuum grippers.

Drawbacks:

- The gripped work part has the chance of *slipping out* when it is moving quickly.
- Sometimes *oil* in the surface can reduce the strength of the gripper.
- The *machining chips* may stick to the gripper during unloading.