



## *Hydraulic Press Machine: Definition, Parts, Types, Working Principle, Applications, Advantages, and Disadvantages (With PDF)*

In the 17th century (1795) this machine was developed. The **Hydraulic Press machine was invented by Joseph Bramah**. The location of Joseph Bramah was England.

Joseph Bramah also developed daily life uses stuff which is a flush toilet.

So today we will learn the **parts and types of a hydraulic press machine** and also I tell you the **specifications, applications, advantages, and disadvantages of hydraulic press machines**, so let's jump to the **definition of hydraulic press machine**.

And also at the end of the article, I give you the **PDF downloadable link** of this article.

## *Hydraulic Press Machine*

### *Definition:*

The **Hydraulic press** is a machine press that works is to generate compressive force by the use of a **Hydraulic cylinder**.

The **hydraulic press machine** is a device which is used for lifting the heavyweight by the application of much smaller force.

This is based on **Pascal's law**.



Pascal's law state that the intensity of pressure in a **static fluid** is transmitted equally in all the direction.



## *Hydraulic Press Machine Parts:*

**A hydraulic press machine consists of following parts:**

- Safety Door
- Limit switch
- Manual control valve
- Electrical control box
- Relief valve



- Pressure gauge
- Hydraulic cylinder
- Motor
- Oil tank
- Pressing Plate
- Bailing Compartment

## *Safety Door:*

Safety door is just like the correction gate when any accessories get damage than from this door we can fix this.

## *Limit switch:*

It is a switch that prevents the travel of an object in a mechanism past some predetermined point, mechanically operated by the motion of the object itself.

## *Manual control Valve:*

The operation is controlled manually with the help of the valve.

## *Relief valve:*

When pressure is high exceeds the limit this valve is used to release or control the pressure



### *Pressure gauge:*

It is fixed thereto measure the pressure.

### *Hydraulic cylinder:*

This is a mechanical actuator which is used to give a unidirectional force through a unidirectional stroke

### *Oil tank:*

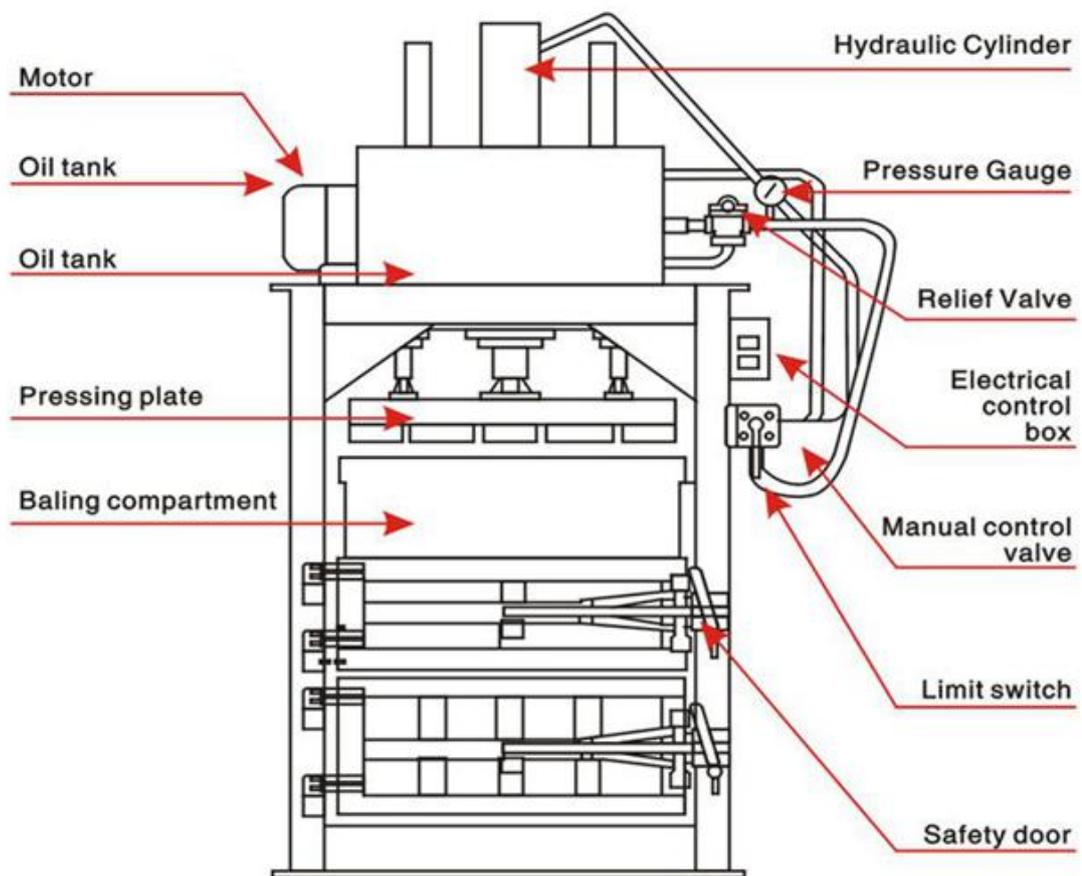
Here hydraulic oil is stored and supply.

### *Pressing Plate:*

The main works of pressing plates are to provide pressure to the object and this plate having high strength.

### *Bailing Compartment:*

Here the workpiece and placed and press according to the required shape and size.



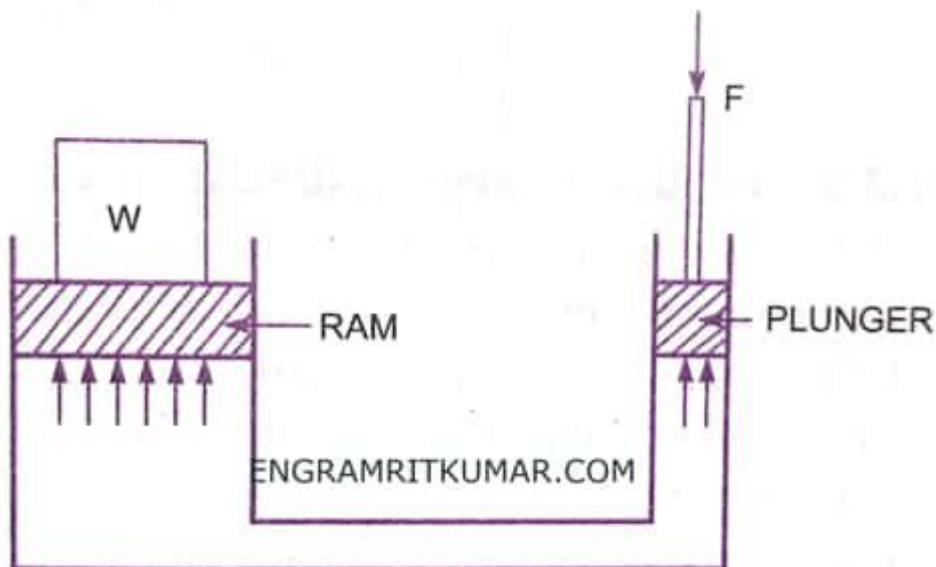
Parts of Hydraulic press Machine

## Hydraulic Press Machine

### Working Principle:

A hydraulic press machine work in the following steps:

1. This is based on Pascal's law, Pascal's law state that the intensity of pressure in a static fluid is transmitted equally in all the direction.
2. The hydraulic press consists of two cylinders of different diameters. One of the cylinders is of large diameter and contains a Ram, while the other cylinder is the small diameter and contains the plunger as shown in the below figure.
3. The two cylinders are connected by a pipe.
4. The cylinders and pipe contain a liquid through which pressure is transmitted.
5. When a small force  $f$  is applied on the plunger in the downward direction, a pressure is produced on the liquid in contact with the plunger.
6. This pressure is transmitted equally in all directions and acts on the RAM in the upward direction as shown in the figure.
7. The heavier weight placed on the ram is then lifted up.



*The hydraulic press.*



## Types of Hydraulic Press Machine:

The hydraulic press machine is categorized into 5-types and those are:

1. Four-column hydraulic press
2. Single column hydraulic press (also known as C-type)
3. Vertical hydraulic Press
4. Horizontal hydraulic press and
5. Universal hydraulic Press

### *Four-column hydraulic press:*

This machine can be used for any kind of material and eligible for various pressing technology like bending, punching, etc.

Source: [Ishaengineering.com](http://Ishaengineering.com)

### *Single column hydraulic press (also known as C-type):*

As the name suggests single column means this machine has only one column and a C-type frame. Here is the picture of the machine.



Source: Indiamart

## *Vertical hydraulic Press:*

This type of hydraulic machine has 2 columns and an overarm connected with the columns. And the pressure applies vertically.



Source: Indiamart

### *Horizontal hydraulic press:*

In a horizontal hydraulic pressing machine, the workpiece remains between the two vertical plates and the pressure applies horizontally or parallel to the axis of the machine.



Source: IndiaMart

## *Universal hydraulic Press:*

This type of pressing machine is used for many types of pressing processes like forging, punching, etc without any external attachment.



Source: IndiaMart

## *Specification of Hydraulic Press Machine:*

**A hydraulic press machine can be specified in terms of these following points:**

- Types of hydraulic press, is it vertical or down stroking?
- The type of frame used in the machine.
- Maximum load of pressing.
- Return capacity of the machine.
- Stroke of the ram.
- The number of the cylinder inside in the machine.
- Type of cylinder, is it single or double-acting?
- The speed of the ram in mm/sec.
- The electrical power consumed by the machine in KW.



- Types of operation need (Automatic or Semi-automatic).

In terms of technical specifications, you can check [this document](#) to get more details on specifications.

## Hydraulic Press Machine

### Advantages:

**The advantages of hydraulic press machine are:**

- High tonnage capacity
- The hydraulic press is quieter because it's having less number of moving parts.
- It generates a high amount of pressure.
- Greater Versatility (Ability to adapt). Here are a few examples of the machine
- And it also works for:
  1. Powered metal forming
  2. Straightening
  3. Bonding
  4. Transfer molding
  5. Shell reductions
  6. Press fits and more
- It takes less floor space or Floor space required is less.
- Here do not worry about overloading or weight damage because at some point the pressure is set and when the pressure gets more the relief valve opens.



- It having low tool cost as compared to mechanical counterparts.
- Smooth Pressing.
- Simple Design.
- A skilled operator not required even semi-skilled operators can work.
- The tool life will be longer.
- Improve the rigidity and strength of the workpiece.

## *Hydraulic Press Machine*

### *Disadvantages:*

**The disadvantages of hydraulic press machine are:**

- The pressure is set for some limit can not exceed more than that.
- Maintenance requires is more.
- There is a carbon footprint.

## *Applications of Hydraulic Press*

### *Machine:*

**These are the following applications of hydraulic press machine:**

- The hydraulic pressing machine is used to convert any metal block to a sheet.

Although hydraulic press machine is used for:



- Forging
- Blanking
- Clinching
- Molding
- Deep drawing
- Metal forming operations and
- Punching,

Some more application of hydraulic press machine are:

- Thermoplastics
- Composites
- RTM (Resin Transfer Molding)
- SMC (Sheet Molded Composites)
- Carbon Fiber Molding, and
- GMT (Glass Mat Transfer)



## Difference between Hydraulic Press Machine and Mechanical Press Machine:

Hydraulic Press	Mechanical Press
The motion is uniform.	The motion is not uniform.
Stroke length is more.	As compared to hydraulic press having less.
Inertial loss is low.	Here it's more.
Range of speed is high.	Speed range is low.
The motor needed is big.	The motor needed here is small.
Used for heavy-duty operation.	Used for light-duty operation.
The flywheel is not there so here a big motor is required.	Flywheel (stored energy) is there.
The max pressure we get here at any point between the stroke.	In mechanical press at the bottom stroke max pressure we get.
A deep drawing operation is possible here.	Not possible here.
High maintenance cost.	Low maintenance cost.



The initial cost is high.

The initial cost is low.

It works on oil pressure system.

Here we use crack gear mechanism.

Less floor space is required.

More floor space is required.

## Conclusion:

Hi, now I want to hear from you, I hope you **learned about the parts and types of a hydraulic press machine also I told you the specifications, applications, advantages, and disadvantages of hydraulic press machine**, remember these things these type of questions you may face anywhere.

In case you wanna read this type of article on the Shaper machine and Lathe machine you can check these articles "[Shaper Machine: Definition, Parts, Types, and Operations](#)" and "[Lathe Machine: Definition, Parts, Types, and Operations](#)"

If you have any queries or doubts about the lathe machine tool, you can ask me in the comment section or we have a dedicated Q&A platform for you where you directly post your question: [Click here to post your question](#), and also you can [join our facebook group](#). I will love to hear from you and glad to help you. Till then enjoy rest your day. Cheers