

# Hydro Pneumatic Riveting Machine

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**Abstract:**— The hydro pneumatic riveting machine is used to covers the inner surface of material slowly on every type of shoe by rivet and derive. To get the excellent qualities of energy, force, rigidness and inflexibility heavy duty steel structure is used in the machine . Thus, by combined pneumatic and hydraulic acting system become an high working force using a low quantity of air under pressure greater than that of the atmosphere in which its is treated by taking a gas ,vapor or air at some limited pressure and rescue the air at a high pressure.

**Keyword:**-- Siemens logo plc, ladder logic, rivet, hydro pneumatic press, pneumatic cylinder, connector, flow control value, IR Sensor, Proximity Sensor

## I. INTRODUCTION

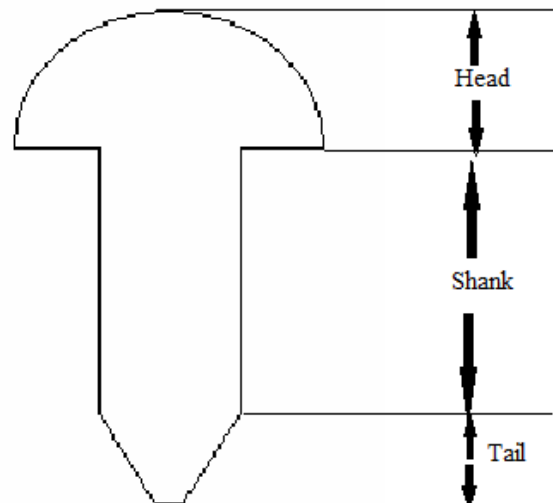
**Need:** In today's practical and cost awareness world, riveting machine parts have already developed by using a microcontroller, AVR etc but the cost is more so to minimized this problem we have developed a special type of machine called as Hydro pneumatic riveting machine. In this machine work by hydro pneumatic press which is usually apply pressure to make riveting faster. Rivet is a special kind of metal bolt or pin that is used to hold pieces of metal together

Hydraulic systems use a force that produces or tends to produce rotation or twisting force multiplication in an simple way, not-dependent on the distance between the input and output, and not including the need for mechanical apparatus or jimmy and the fact about pneumatic system is capable of being compressed, so equipment is less subject to shock damage. For punching the letter or rivet metal riveting machine tool is used by applying the mechanical force by pressure. There are varied types of pressure used punching which are used according to requirement . We are gains to used hydro-pneumatic .Pneumatic is a system which operate a supply of compressed air at suitable pressure according to capacity of the system . Hydraulic is used for moving high load and it's also provide high force . And it required little maintenance.

**Elements:** For making a large machine part, a small machine component are joined tighter. The important component of machine is design of joint because designed machine part may spoil the joint work within a short period. Joint is divided into two classes non permanent joint and permanent joint. Non permanent joint can be gather and act without harming the component example: keys and coupling, screw joint. Permanent joints cannot be act

without harming component. This joints is depend on type of force example : riveting joint.

A Rivet is a low-lying cylindrical rod having a tapered tail and head. The central part of the rivet is called blade(shank).Corresponding to Indian standard specifications rivet heads are of different types. Rivets heads for overall intention are mention by Indian standards IS:1928-1978 (below 11 mm diameter) and IS: 255-1982(from 11mm to 48 mm diameter).



**Fig 1.Rivet**

The riveting process can be of two types: (a)hot riveting: before applying force rivets are initially heated.(b)cold riveting: in this riveting is done by ambient temperature. Literature Review Survey on Hydraulics: A hydraulic system spread the equal fluid constantly from a certain stock that is part of the primary mover, The liquid is

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almost non-compressible fluid, so the actuator it drives can be controlled to very correct speed, force and position. Hydraulic systems usually have a dedicated power unit for each machine. Survey on pneumatic: Most pneumatic circuits run at low power -- usually around 2 to 3 horsepower. Two main benefit of air-operated circuits are their design simplicity and low initial cost. Because air systems operate at the building block, somewhat low pressure and can be made of relatively inexpensive material.

**Survey on different type of rivets:**

**Table 1: Type of Rivets**

Round head rivet	Round head rivets are one of the older and most secure type of attach, it is a solid rivets , the most commonly used for solid rivets can be found in part of aircraft structural
Semi-tubular rivets	semi-tubular rivets are similar to solid rivets but not including the biased hole at the tip. The ambition to introduce this hole is to break the amount of force needed for usage by round the tubular portion outward.
Flush rivet	: A flush rivet is used initially on foreign metal materialize where good aspect and the removing of inessential aerodynamic brag.
Drive rivet	This is frequent used to rivet wood round-robin into place as long as the hole does not need to be drilled badly through the round-robin
Friction-lock rivet	Friction-lock rivets are acquirable in two head styles, 100 degree countersunk and universal .

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**4. Drive rivet:** This is frequent used to rivet wood round-robin into place as long as the hole does not need to be drilled badly through the round-robin

**5. Friction-lock rivet:** Friction-lock rivets are acquirable in two head styles, 100 degree countersunk and universal .

**Survey on different type of sensor:**

**Table 2: Type Of SENSOR**

Type	Working	Application
Temperature	This device contain data about temperature from a origin and convert into that form which is understand by other device.	Temperature sensing
IR sensor	This device give out or determined infrared radiation to sensation a point phase in the surrounding. The essential concept is to make use of IR LED to send the infrared waves to the object.	Obstacle detection shit encode, fixed frequency detection.
UV Sensor	These sensor scale the intensity or hold the circumstance ultraviolet radiation.	Automobile, robotic
Touch sensor	A touch sensor acts as a changeable resistor as per the point where it is touched.	Oven, washing machine /dryers

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Proximity sensor	A proximity sensor determine the sight of intention that are closely placed without any point of contact.	Used in automation engineering
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**5. Proximity Sensor:** A proximity sensor determine the sight of intention that are closely placed without any point of contact.

**Survey on different type of plc: 1.ABB PLC:**

ABB's automation device deliver solution with high reading and adaptable to be achieving deployed within different industries and usage including water, building infrastructure, machinery automation and many more. 2.Siemens plc. Siemens automation solution is scalable and flexible. They are powerful in term of their interpretation and are qualify with integrated IOS, inter-grated PROFINET interface for programming, HMI connections, distributed IOS and distributed drive architecture.

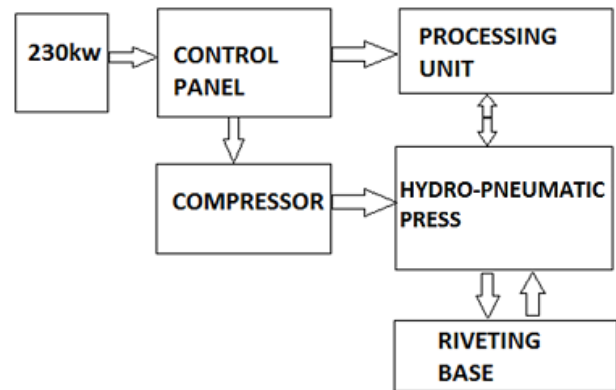
**Table (c) Type of PLC**

Company name	PLC MODEL Number	INPUT /OUTPUT	SOFTWARE Understanding	COST (INDIAN RS)
ABB	07KR51	8/6	HARD	5000/-
ALLEN - BRANDLY	Micro820	8/6	HARD	16500/-
MIT-SUBISHI	FXIS-14MR-ES/UL	8/6	HARD	8/6
SIEMEN CE	S7-200	8/6	EASY	52209/-

**II. IMPLEMENTATION:**

**Block diagram:**

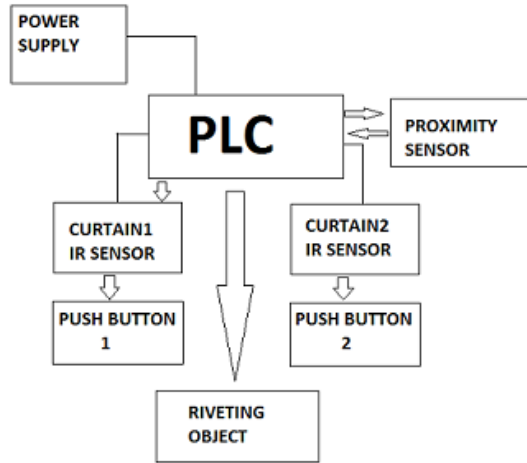
A hydro-pneumatic press is a machine give higher outlet hydraulic pressure with lower inlet pneumatic pressure utilizing both air and oil in its operation.



**Fig2. Block diagram**

Hydro pneumatic system consists of 2 to 6 high pressure multistage centrifugal pump is given for moving away from a centre, the act or process for removing the air, water etc suction is used from a space in order to draw something into that space to stick to a surface the force with which the air, water etc i-base frame and suitable control pane. Compressed air from a machine that compresses air or gas is used to press the work by express of the piston and piston rod, cylinder through a lever. The high pressurized air striking against the piston tends to push it upwards. This force is convey to a punch by denote of a jimmy by its mechanical help. The punch forced downward penetrated the work material.

**Internal architecture:** We are using hydro pneumatic in this machine pneumatic is using for air pressure to move or work and for fast pressure and hydraulic is operated by the pressure of a fluid. When a power supply is on sensor sense the pressure applies to the hydro pneumatic cylinder. When a curtain are in NC (normally closed) position if two push button are in NC position and both condition are satisfied then hydro pneumatic will work ,if any one condition are in false condition then hydro pneumatic does not work.



**Fig3. Internal Architecture diagram**

Pneumatic system work on a supply of air under pressure greater than that of the surrounding, which must be made accessible in enough quantity, so the pressure proceeding the capacity of the systems. a compressor is a machine that takes in air, gas or vapor at any certain pressure and deliver the air at a high pressure.

**III. RESULT AND DISCUSSION:**



**Fig.4(a)**



**Fig.4(b)**



**Fig.4(c)**



**Fig.4(d)**

**IV. CONCLUSION & FUTURE SCOPE:**

Our basic aim was to design an application that work on pressure and make easy and quick work done. Hydro pneumatic riveting machine work by using plc has overcome the drawback of the microcontroller, AVR. In microcontroller, AVR the programming is difficult and handling the machine is also difficult so we are using plc. In plc programming is easy and its require less maintenance and handle easily. Hydro-Pneumatic riveting machine we are able to do fast and different types of riveting in small period of time as compare to any other systems, productivity is increased by using this machine and operation is totally secured . By analyzing all the process we are satisfy by using hydro pneumatic because by using hydraulics it is capable of moving higher load and it also provide high forces and by using pneumatic system generally have long operating lives and require litter maintenance.



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