

## Reduction in Hydraulic Press Pump Energy Consumption by 13% for Minimizing Recirculation of Hydraulic Oil

### **Background of Unit:**

An automobile industry involves stamping operation to manufacture designer door panel for 4 wheelers. The stamping normally involves blanking, drawing, piercing, forming, notching, trimming, hemming, etc where hydraulic press is used to carry out these operations. The process involves 10-15 strokes per minute of hydraulic cylinder.



### **Baseline parameters & diagnosis:**

The study of operation of hydraulic press pump revealed that during the pressing operation, hydraulic oil is supplied to piston cylinder assembly and during the idle time, hydraulic fluid is re-circulated back to the oil tank with bypass valve open. Irrespective of press operation, the hydraulic pump operates at constant speed to continuously deliver hydraulic oil.



After the detailed study of the system, the variable frequency drive (VFD) was recommended & installed on hydraulic pump to control the motor speed which in turn controls the hydraulic oil flow rate to prevent the re-circulation of oil during idle operation of machine. VFD senses the set point pressure to adjust the pump speed which regulates the oil flow instead of employing the recirculation valve.

Installation of VFD on hydraulic press pump has given following benefits:

- **Reduction in electrical energy consumption by 13 %.**
- **Smooth load/unload operation**
- **Reduction in wear & tear in machine**
- **Reduction on noise level, better working environment**
- **Better motor efficiency**

### ***Life cycle of technology / equipment:***

VFD has an operating life of more than 15 years. Actual capacity and suitable location are two important points must be considered before installation of VFD

### ***Overall Impact after Implementation:***

- Reduction in power consumption
- Increased life of equipment.

### ***Skills Requirements:***

Few hours training provided on various function of VFD, operating mechanism etc to the operator.

### ***Technical specifications of EE Technology:***

A variable frequency drive is an electronic controller that adjusts the speed of an electric motor by regulating the power being delivered. Variable-frequency drives provide continuous control, matching motor speed to the specific demands of the work being performed. Variable frequency drives are an excellent choice for adjustable-speed drive users because they allow operators to fine-tune processes while reducing costs for energy and equipment maintenance.

The specification of Variable frequency drive:

- VFD - Three Phase Drive (I/P 400 V 3 phase, O/P 400 V 3 phase)
- Flux Vector Control with In-Built Brake Unit 150% O/L for 60 sec. & 200% O/L for 0.5 sec.
- Protection class of VFD:IP20
- Sensor less vector control
- **Mains Input:** T4 (3-phase 400V) : 380-480V -15%+10%
- **Overload capacity :** Heavy load (G) : 150% of rated output current for 60s, 200% of rated output current for 2S, 220% instantaneous
- **Frequency command source:** Analog input, Keyboard, Serial communication, Terminal UP/DOWN motor potentiometer
- **Control mode:** V/F control for constant torque, V/F control for quadratic load , Vector control without PG, Energy saving with Vector control

### ***Equipment Delivery/Installation lead time***

Process down time required for installation of VFD on hydraulic press will be of 1 day.

### **About the Project**

*The World Bank (WB), with support from the Global Environmental Facility (GEF), is executing a project titled "FINANCING ENERGY EFFICIENCY AT MSMEs". The project aims to identify, design & implement Energy Efficiency (EE) solutions in 500 MSMEs in 5 clusters with potential of EE investment of more than Rs. 100 crore and reduction in GHG emissions equivalent to 1.2 million tonne CO2. Majority of the MSME units completing implementation have reported significant energy and cost savings. This project is being co-implemented by Small Industries Development Bank of India (SIDBI) and Bureau of Energy Efficiency (BEE)*

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### **Disclaimer:**

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