

## **GUMMING APPLICATION WITH SERVO CONTROLLER**

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**Abstract:** The aim of this paper is to automate the operation of Gummer using Advance drive rectifying system (IGBT). For highly control dynamic and motion control application, for demanding the highest degree of speed and torque accuracy over a large speed control range and for a group drives. This application enables innovative, customized drive solution, enable quick and easy extension and modification of drive concept, enables customer requirement to be met both flexibly and economically, reduces engineering cost. This is the time for an attempt to design a point to point control technique on AC servo motor position control systems. The object of this Paper is to simplify the machine with great accuracy. Mechanical part incredibly replacing by drives with intelligent positioning control. There are several application of drives control. Basically Gummer is design to operate on mechanical gear and cam follower system which is having large drawback of accuracy in degree and cutting system.

**Keywords:** Gummer machine, AC servo motor, delinting, IGBT

### **I. INTRODUCTION**

The Automatic control is one of today's most significant areas of science and technology. This attributed to the fact that automation is linked with the development of almost every form of technology. Advance drive is one of the automatic controls, where servo motor is term as using a position motion control to interface directly with a system as the control device. The disparity between position control and gear control or supervisory control is that it does not required any additional hardware to implement the controller everything from servo controller (sinamic drive) in term of digital/analog signal can be programmed using PLC. Electronically coordinated individual drives work together to perform drive tasks. Higher-level controllers operate the drives to achieve the required coordinated movement. This requires cyclic data exchange between the controller and the drives. This exchange usually took place via a field bus, which required a great deal of time and effort for installation and configuration. SINAMICS takes a different approach: A central Control Unit controls the drives for all connected axes and also establishes the technological links between the drives and there axes. Since all the required data is stored in the central Control Unit, it does not need to be transferred. Inter-axis connections can be established within a Control Unit and easily configured in the STARTER commissioning tool using a mouse. Simple technological tasks can be carried out automatically by the SINAMICS Control Unit.

### **II. OPERATING PRINCIPLE OF ADVANCE DRIVE SYSTEMS**

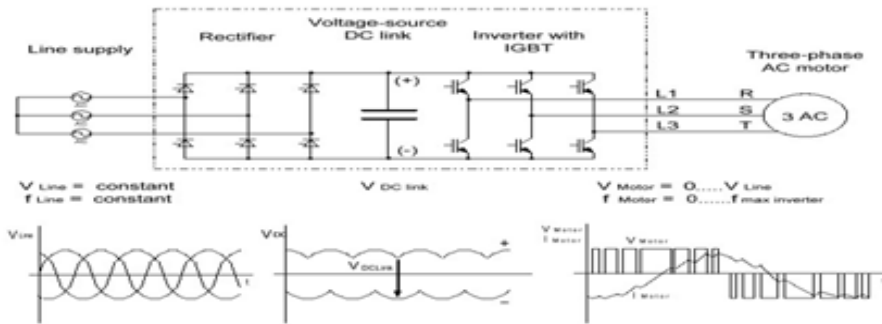
The converters in the product range are PWM converters with a voltage-source DC link. At the input side, the converter consists of a rectifier (shown in the schematic sketch as a thyristor rectifier) which is supplied with a constant voltage  $V_{Line}$  and a constant frequency  $f_{Line}$  from a three-phase supply. The rectifier produces a constant DC voltage  $V_{DCLink}$ , i.e. the DC link voltage, which is smoothed by the DC link capacitors. The IGBT inverter on the output side converts the DC link voltage to a three-phase system with a variable voltage  $[V]$  Motor and variable frequency  $[f]$  Motor.

#### **Block diagram of a PWM converter with voltage-source DC link:**

This process operates according to the principle of pulse width modulation PWM. By varying the voltage and the frequency, it is possible to vary the speed of the connected three-phase motor continuously and virtually without losses.

Pulse modulation method:

The power semiconductors of the IGBT inverter (IGBT = Insulated Gate Bipolar Transistor) are high-speed, electronic switches which connect the converter outputs to the positive or negative pole of the DC link voltage. The duration of the gating signals in the individual inverter phases and the magnitude of the DC link voltage thus clearly determine the output voltage and therefore also the voltage at the connected motor.

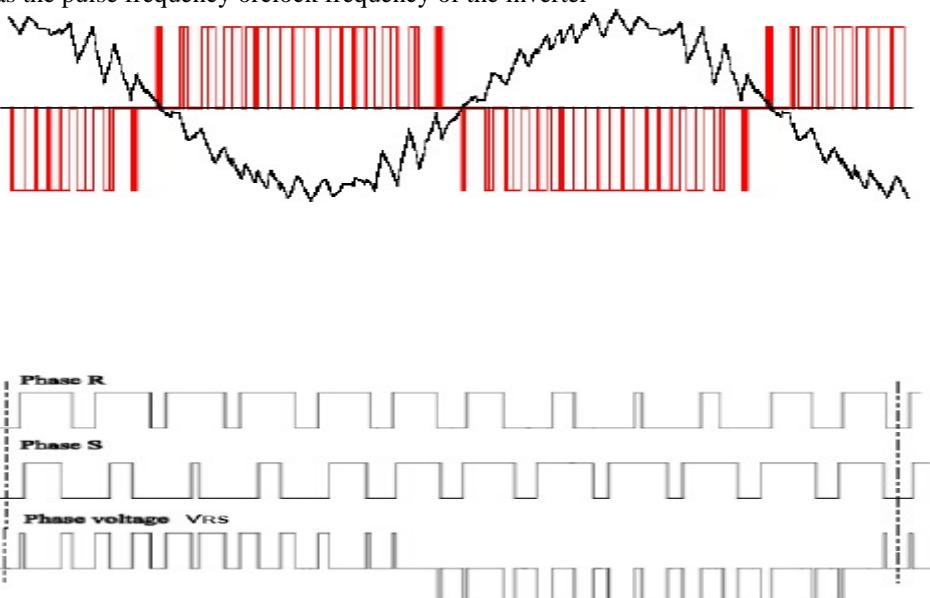


**Block diagram of a PWM converter with voltage-source DC link:**

Generation of a variable voltage by pulse width modulation:

Voltage and frequency must be specified in a suitable way for a certain operating state of the motor, characterized by speed and torque. Ideally, this corresponds to control of the voltage vector  $V(\omega t)$  on a circular path with the speed of rotation  $\omega = 2\pi \cdot f$  and adjusted absolute value. This is achieved through modulation of the actual settable voltage space vectors (pulse width modulation). In this way, the momentary value  $V(\omega t)$  is formed by pulses of the adjacent, actual settable voltage space vectors and the voltage zero. The solid angle is set directly by varying the ratio of the ON durations (pulse width) of adjacent voltage vectors, the desired absolute value by varying the ON duration of the zero voltage vectors. This method of generating gating signals is called space vector modulation SVM. Space vector modulation provides sine-modulated pulse patterns.

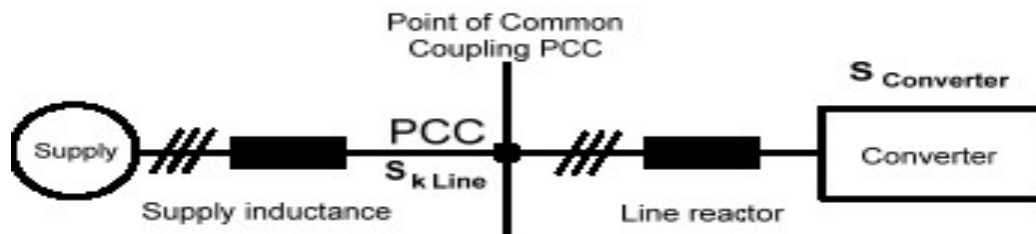
The following diagram illustrates how the voltages in phases L1 (R) and L2 (S) plus output voltage VRS (phase-to-phase voltage) are produced by the method of pulse width modulation and shows their basic time characteristics. The frequency with which the IGBTs in the inverter phases are switched on and off is referred to as the pulse frequency or clock frequency of the inverter



Connection of converters to supply systems with different short-circuit powers

Definition of relative short-circuit power RSC

The relative short-circuit power RSC (Relative Short-Circuit power) at the point of common coupling (Point of Common Coupling) is defined as the ratio between the short-circuit power  $S_k$  line at the PCC and the apparent power  $S_{\text{Converter}}$  of the connected converter(s).



#### **The supply for the auxiliaries with 230 V AC and for the electronics with 24 V DC:**

The supply for the auxiliaries with 230 V AC and for the electronics with 24 V DC is produced in the cabinet units SINAMICS G150, S120 Cabinet Modules and S150 as a standard via built-in transformers internal to the units, which are supplied directly by the power supply voltage. Consequently, the supply voltage dips have an effect directly on the auxiliaries supplied with 230 V. If the supply voltage dips too much and over a too long time period, the auxiliaries (including the internal switch-mode power supply for the 24 V supply for The electronics) will fail. This leads to a fault trip.

Supply of the auxiliaries with 230 V AC and of the electronics with 24 V. Example with a SINAMICS G150 cabinet unit an uninterruptible power supply (UPS). For that two jumpers must be removed inside the cabinet unit and the external 230 V supply must be connected as shown in the following diagram with the example of a G150 cabinet unit. Also the voltage of 24 V can be supplied from a secure, external supply by disconnecting the internal switch-mode power supply and replacing it by a secure, external supply.

### **III. GUMMER MACHINE**

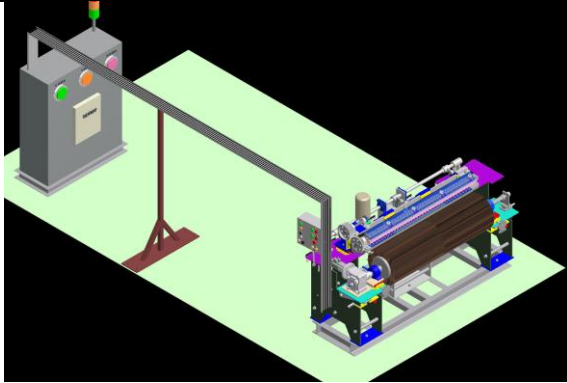
Now in Cotton Processing Machinery, which involves several processes like entry into the shaker room, where the cotton seeds are cleaned, the cleaned cotton is send through the grin sand where linter's are removed from the cotton seed. The seeds obtained from this section are crushed in Expellers for partial recovery of oil. Furthermore, we have been able to garner a huge client across the globe owing to its features like smooth and noiseless operation, durability, reliability and effective performance.

### **IV. INDEXING**

To achieve the teeth formation indexer play major role it's used to index the saw mandrel for 494 or 429 times tooth formation in 360 degree rotation. Teething degree is of 0.729 or 0.837 degree. In indexing the major priority is nothing but accuracy, the Accuracy in 360 degree rotation total accumulative error should not be more than 0.5 min because there is a chance of teeth over cutting or it can Work station assembly Damage the teeth.

To overcome this problem. Following thing are used

- 1) AC Servo motor
- 2) Bonfiglioli Gear Box (Back lash free)
- 3) Spline coupling (Back lash free)
- 4) Output shaft of gear box
- 5) Coupling for shaft and gear box



If the voltage of the auxiliaries (230 V) and the electronics (24 V) should remain in operation even during large and long supply voltage dips, the voltage of 230 V must be supplied from a secure, external supply.

#### **V. PREPARATION OF THE GUMMER FOR CUTTING TEETH ON SAWS**

The thirty-six spindle are carried by a single channel- shaped casting, which in turn is held to a similar stationary casting by a series of five dove-tailed slides. These slides allow the files spindle to shift from saw to saw. At the bottom of each of the dove tailed section is a Jig or wearing that is held in sung position As these Gibs become loose due to wear, the casting holding the spindles will tend to tilt forward but should not be loose, it will become readily noticeable when cutting new teeth on cylinder due to heavy cuts taken. Gibs are also provided on the cylinder Slides that allow the cylinder to be moved into the files. These Gibs must also be checks to be sure they are snug. In adjusting the Gib Screws at any point, care must be taken not to get then to tight as this will lock the dove- tailed surface together or cause unnecessary wear on the Gibs.

#### **VI. ROLE OF AC SERVOMOTOR IN GUMMER MACHINE**

It is used for indexing the saw mandrel which coupled with Bonfiglioli gear box, operated by servo drive and PLC communication which is mechanically coupled with mandrel shaft. With the help of Spline coupling mounted on moveable slide (gear ratio-100:1). For 8.89mm slide assembly another servo motor (0.43 kw) is used, the total accumulative error in the traverse movement is 0.02mm. And is mounted on the worm gear arrangement of lead screw unit. The pitch of 3mm for single rotation of the lead screw. There are two proximity sensor for sensing the forward and reverse end movement of cutter assembly about 16mm of traveling distance, indexing take place by means of sensing the proximity for 0.729 or 0.837 degree count out of 360.the programming is so done that, while starting new indexing the system should be in homed position by homing operation.

#### **VII. CONCLUSION**

This paper represent the advance drive application of position control with high degree of accuracy with easy of flexibly and friendliness system for costumer point of view operation of machine is maintenance free with fully automatic system. advanced features, forming a powerful and advanced platform to support and integrate various subsystems in power automation control and operation management, including SCADA integrated system parallel drive EMS.

#### **VIII. ACKNOWLEDGMENT**

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