

Application Note

3105 Creekside Village Dr, Unit 801,
Kennesaw, GA 30144

Tel.: 800-879-6171

Email: info@sifamtinsley.com

**Spindle motor safety of Dope Winder in Textile
Industry using Programmable Digital Meter
N30H**



Overview

Textile sector is the largest single industry in India (and amongst the biggest in the world), accounting for about 20% of the total industrial production. This industry consists of manufacturing of various product ranges such as polyester and nylon yarns, woven and printed fabric, etc. An essential element in manufacturing these products is the dope winder machinery. In this note, we will be understanding how the overheating of spindle motors, installed at the dope winder machine is avoided, ensuring safety of operation.

Problem Statement

Whenever the position of the spindle in dope winder is changed, DC voltage is generated via Braking Resistor, which is installed in the AC Drives. This generated voltage value will increase with the continuous operation, and above a certain limit, results in overheating of the drives installed, thus developing a risk of fire hazard.

Solution

In the mentioned case, each dope winder consists of two spindles. These spindles are driven by an AC motor. The controlling of the AC motor is achieved through Variable Frequency drive.

A VFD consists of three basic components- rectifier, DC line, and inverter. The rectifier converts AC input to a DC signal. Depending on the system, an inductor, a capacitor, or combination of these components smooths the DC signal in the DC link part of the VFD. The inverter circuit converts the DC signal into a variable frequency AC voltage to control the speed of the motor.

During the operation of dope winder, the dope or the position of the spindle is changed. The time for this changeover is approx. 10 to 15 seconds. Whenever an overhauling or decelerating load on a motor causes the motor to turn faster than the synchronous speed set by a drive, the spindle motor acts as a generator and transforms mechanical energy from the motor shaft into electrical energy. This AC power from the motor flows backward into the drive and causes the DC bus voltage to increase. This value of DC voltage for the spindle motor, is normally in the range of 200-250V. However, due to continuous operation, this value goes above 250V several times. This results in overheating of the spindle motors installed, thus developing a risk of fire hazard.

N30H meters are installed at every Dope Winder Machine. The generated DC voltage is given as input to the N30H. This generated voltage is not pure DC. However, N30H, being a true RMS meter, considers the ripple content in the signal while measurement. Thus, measuring the DC Voltage, N30H will trip the spindle motor in high voltage condition (above 250V). Whenever the value of DC voltage goes above 250V, the relay output of N30H will trip and thus overheating is avoided.

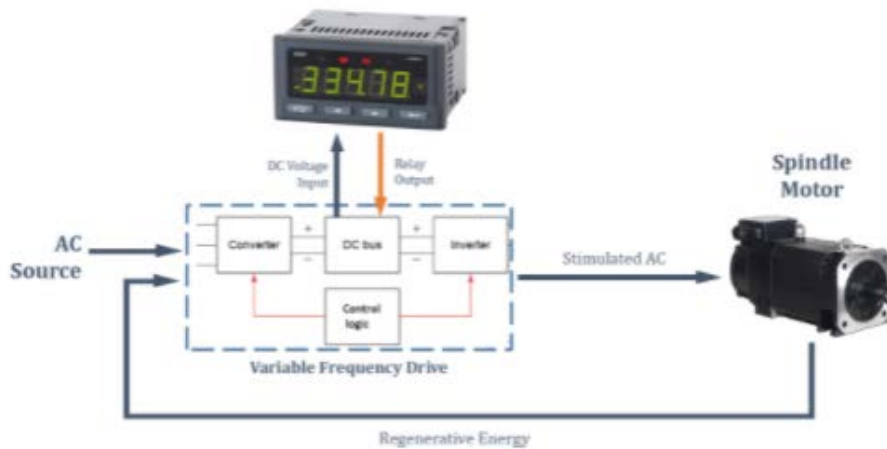


Fig. - Working Block diagram

Other Applications

- Battery Backup System Monitoring

Benefits

- Avoid overheating of spindle motor
- Measurement of DC voltage generated due to position change
- Three color display assigned to indicate the severity of DC voltage value

Featured Product N30H



Available Features

- Measurement: current and DC voltage up to 5A and 600V
- Three-color display (14 mm high), programmed in three intervals of the measured value
- Meter programming from the keyboard or through the RS-485 interface by means of the free delivered e-Con software
- Four alarm outputs with signaling by LED diodes, operating in 6 different modes
- Conversion of any measured value into a 0/4...20 mA, or 0...10 V analog signal
- Storage of minimal and maximal values for all measured quantities
- 21-point individual characteristic for the measured value



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