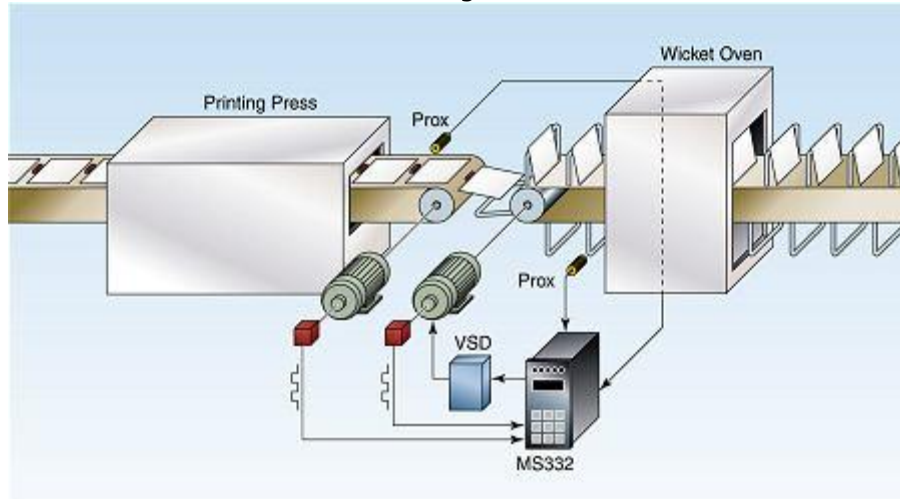


# Motion Control Solutions

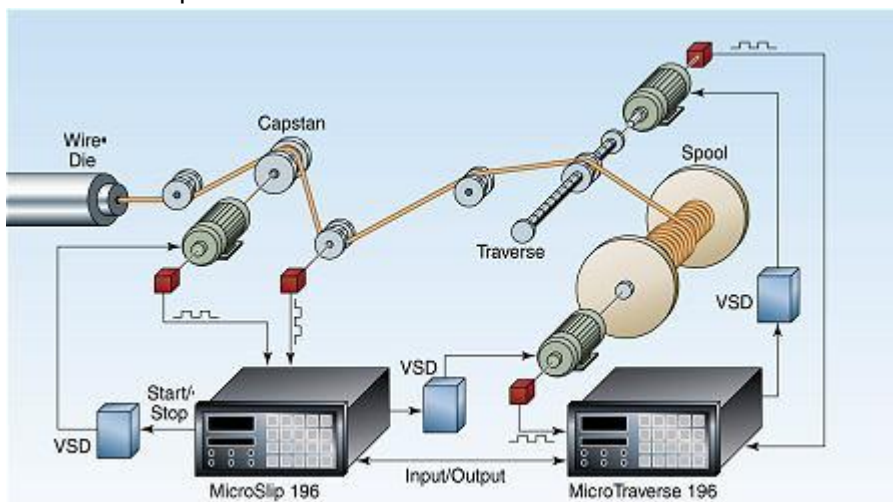
## Wicket Oven Synchronization

The MS332 controls the wicket conveyor to follow the printing press, providing one empty wicket for each sheet off the press. The MS332 receives sensor input from each wicket on the oven and each Feed Dog on the press. The unit is easily programmed to handle a wide range of sheet sizes.



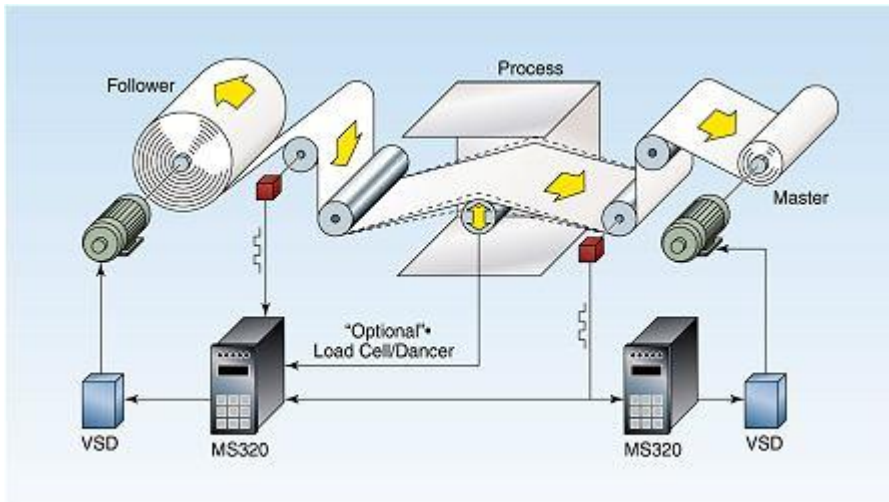
## Wire Slip Draw Control

The MicroSlip 196™ and MicroTraverse 196™ pulls wire through a wire drawing machine and winds it evenly on a spool without kinking or breaking. A capstan drive leads the slip controller that regulates spooler speed. As the spool fills, the slip controller constantly adjusts spool speed without the aid of a dancer. The traverse unit ensures a level wind, even at the spool ends.



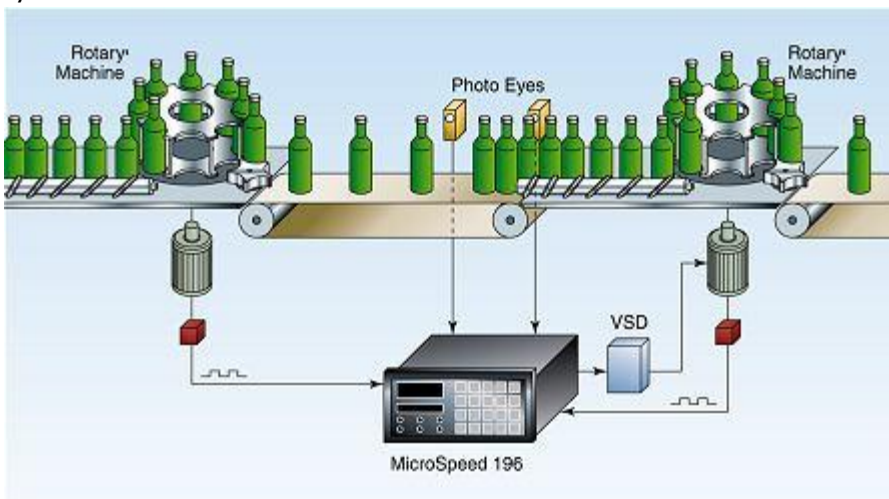
## Tension Unwind/Rewind

The MS320 Closed Loop Motor Speed Controller maintains preset speed and tension at the rewind roll (master) by controlling the unwind roll (follower) and monitoring a Load Cell or Dancer input through the follower. The MS320 is the most economical way to precisely control speed and tension.



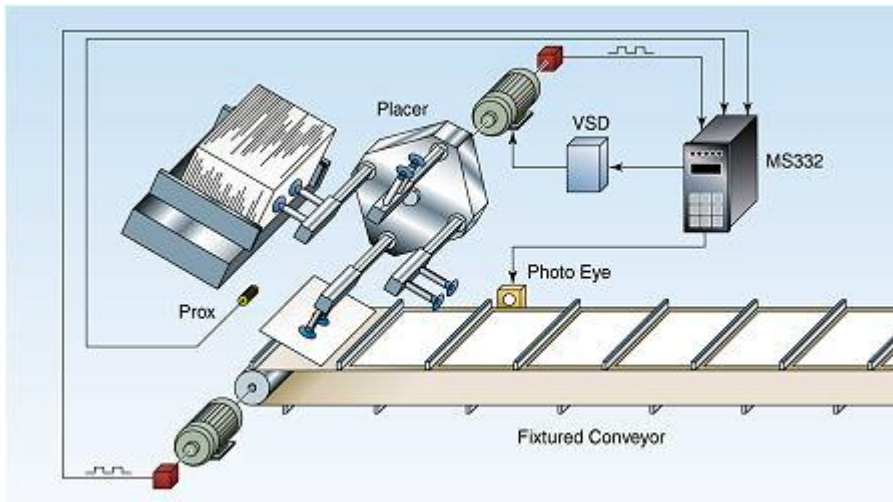
## Backlog Control

The MicroSpeed 196™ precisely controls a machine's velocity relative to upstream conditions so that the critical infeed backlog level is maintained. With information from photoeyes monitoring the infeed backlog level and product spacing, the MicroSpeed 196 makes short speed adjustments which seek and maintain your desired backlog level. This method prevents the oscillation typically associated with high speed/low speed systems.



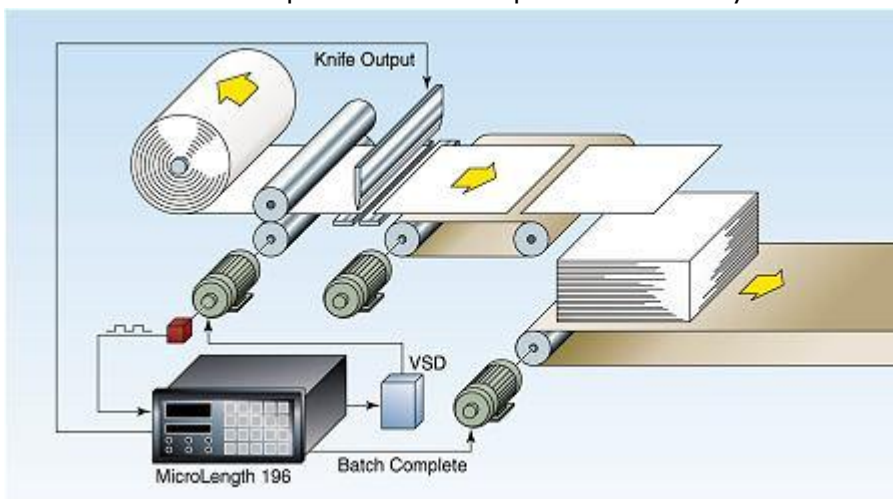
## Synchronized Feeding

The MS332 provides synchronization between an independently-driven rotary plaser and a fixtured conveyor. Event sensors located on the conveyor and plaser confirm timing of one machine to the other. The MS332 features auto-phasing that allows quick product pitch changeover.



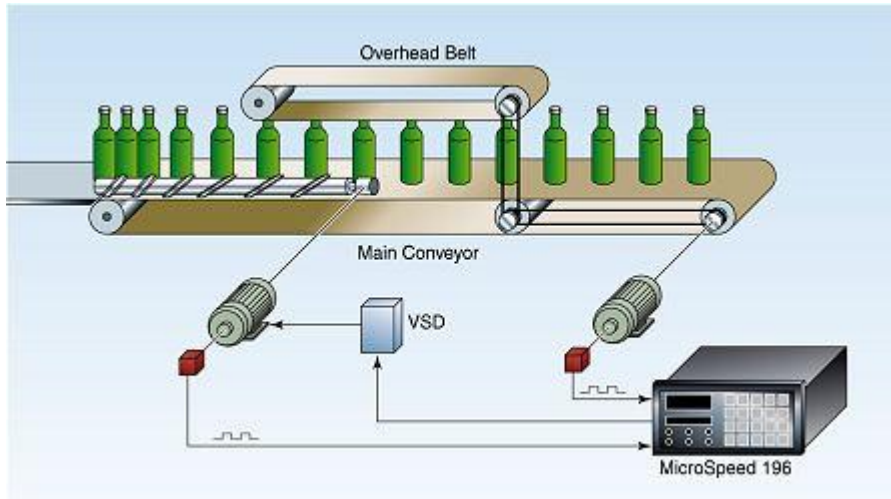
## Batch Cut-To-Length

The MicroLength 196™ controls variable speed AC and DC drives with +/- one pulse accuracy for indexed cut-to-length applications. Features self-adjusting setup, that quickly calibrates the feedback pulses to a given length. This motion controller is an excellent choice to replace inaccurate preset counter systems.



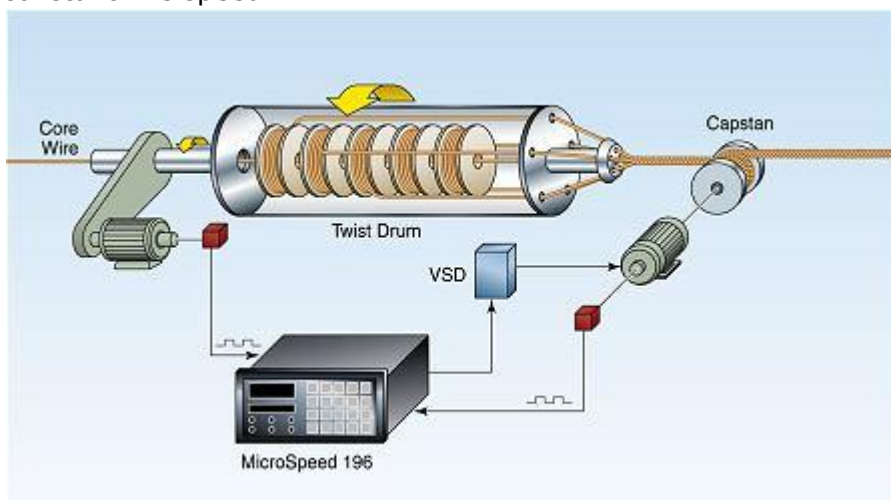
## Electronic Gearing For Multi-Pitch Screws

The Microspeed 196 is used to control the speed of the feed screw relative to the speed of the main conveyor and overhead belt. It is important in this application that the product velocity exiting the screw precisely matches the conveyor velocity. Machines may now be designed to handle a wider range of product sizes and production rates. When a product change over requires a product pitch (product spacing) change, the operator simply changes the timing screw for the new product and selects the new ratio set point on the Microspeed 196. Historically a time consuming pulley or gear change over had to be performed.



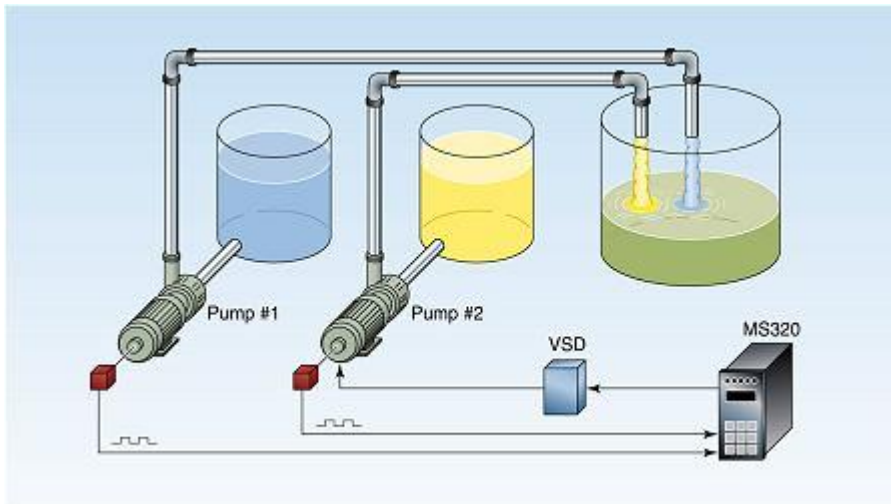
## Cable Twisting

To make multiconductor communication cables, two or more insulated conductors are grouped together and then twisted. The operator adjusts the master "twisting drum" speed and enters the desired setpoint in Lay inches into the Microspeed 196 which has been programmed with the parameters to establish the speed of the capstan. In some applications an additional Microspeed 196 is used on the rewind stand to maintain constant line speed.



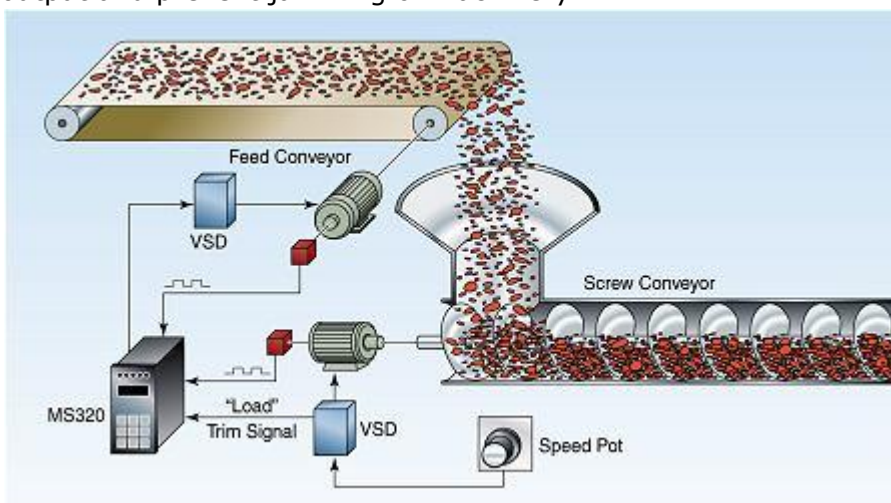
## Ratio Pump Control

Two positive displacement pumps are used to make a controlled solution mixture. Pump 1 is considered the lead and pump 2 the follower. The MS320 is used to control pump 2 at a ratio of pump 1. Utilizing the user unity ratio variable in the MS320, the ratio set point may be entered in user units. For example, if pump 1 always delivers 100 liters/min. and the application calls for the addition of between 5 and 20 liters/min of pump 2 solution. A ratio set point of 5.0 would equal 5 liters/100 liters and a ratio set point of 20.0 would equal 20 liters/100 liters.



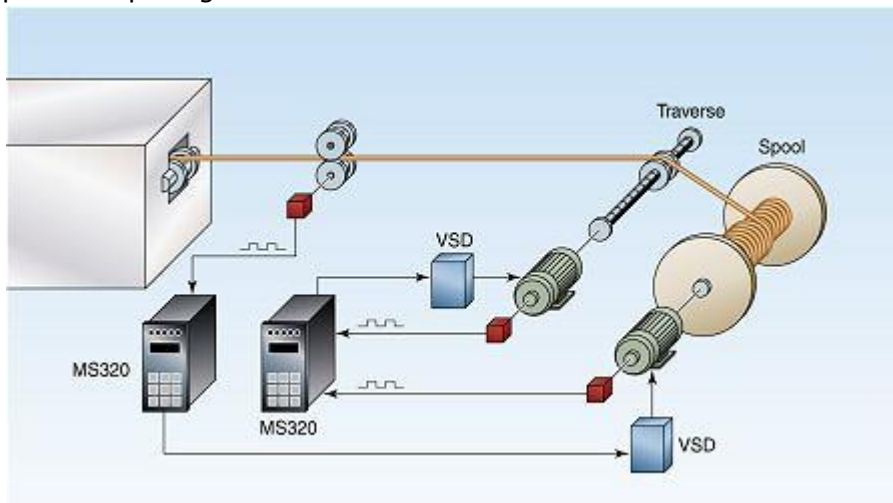
## Motor Load Follower

The MS320 controls the feed conveyor motor to follow the screw conveyor motor at a programmed ratio setpoint. The MS320 also monitors an analog or digital load signal from the screw conveyor VSD and trims the feed conveyor speed to maintain consistent output and prevent jamming of machinery.



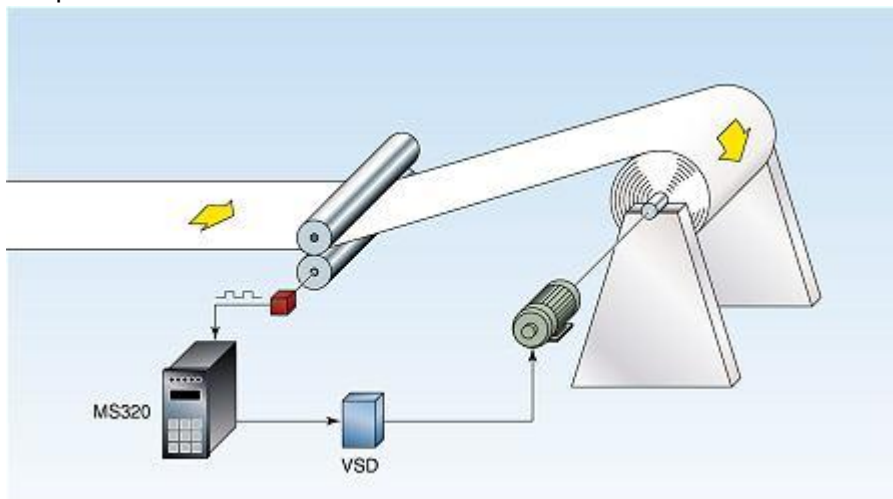
## Traverse Winding At Constant Line Speed

A MS320 controls the master reel to a constant surface speed setpoint by slowing the motor down as the core builds. A second MS320 in the follower mode controls the traverse drive to maintain a consistent product spacing "Lay inches". This control scheme provides the operator with a quick and easy method of adjusting line speed and product spacing.



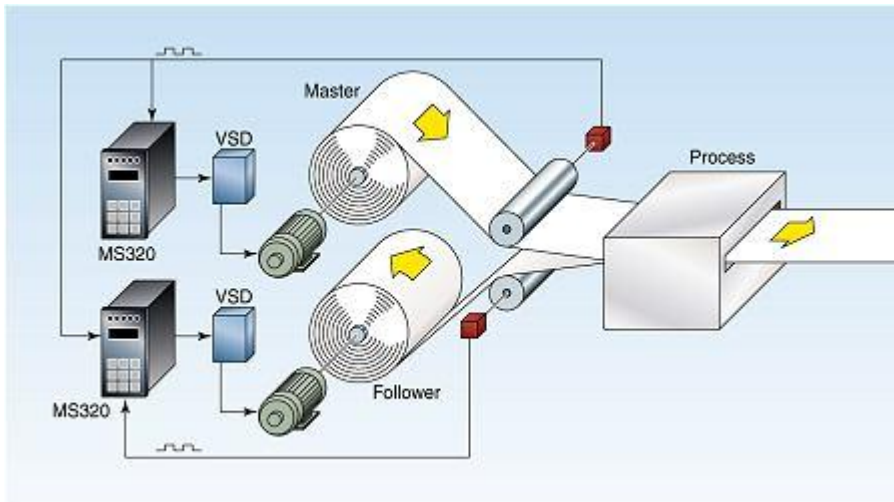
## Unwind/Rewind Stands

Many unwind and rewind stands require a constant surface payoff speed (i.e. FPM). The MS320 operating in the master mode and inter-faced with a line speed pulse generator such as our traction wheel encoder assembly, or a pulse generator mounted on a nip or idle roller will provide .02% accuracy. During operation the motor speed is constantly adjusted as the core diameter changes to maintain the setpoint. This ensures a consistent material flow from empty core to full spool "rewind" and from full spool to empty core "unwind." A load cell or dancer input can be used if tension should influence the process.



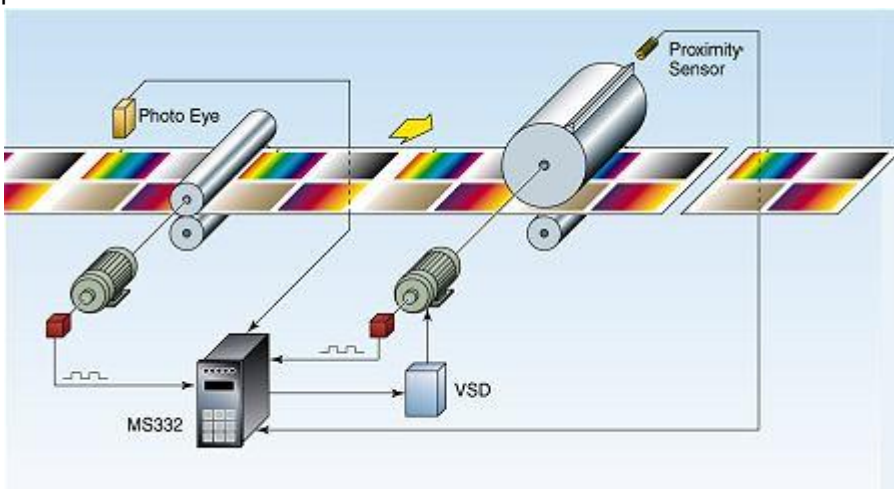
## Laminating Process

Many laminating processes require the coordination of two or more powered unwind stands thru an oven or adhesive process. In this example a MS320 is used in the master mode to set the line speed, i.e., FPM. The follower section is controlled by another MS320 typically set to run at a 1:1 ratio, enabling a smooth mating at the two materials. Both controllers will automatically increase the motor speed as the diameter of the rolls decreases to maintain the set line speed and ratio.



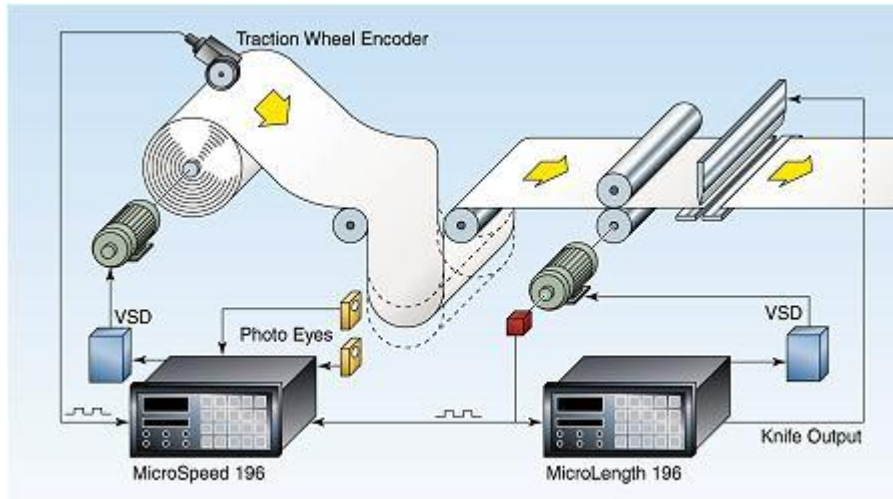
## Rotary Knife

In a continuous motion rotary cutting application a MS332 controls the rotary knife velocity for cutting preset material lengths. Length set points may be entered in easy to understand user units. When making a cut relative to a registration mark is required, the MS332 compares the registration mark input to the knife position input to maintain the preset cut location on the material.



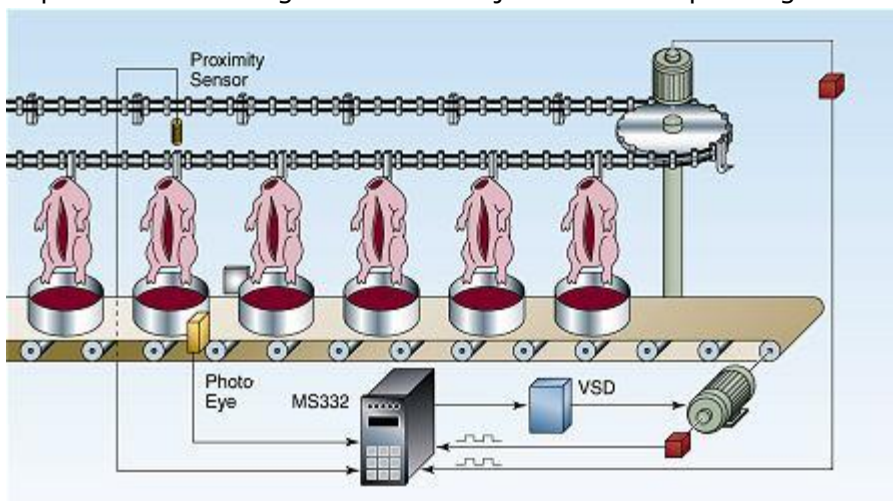
## Stress Free Unwind/ Cut-To-Length

MicroSpeed 196 is used to power unwind the product roll while following the velocity profile created by the MicroLength 196. The MicroSpeed 196 has the responsibility of controlling the power unwind of the product roll as well as maintaining the proper loose loop length. The product is fed through a loose loop so that the product tension is minimized. Photo eyes looking at the loop, signal the MicroSpeed 196 to select between 3 preset ratios. This ratio selection keeps the loop within the proper window. The MicroLength 196 indexes preset lengths of material with accuracies of  $\pm$  one pulse, and cycle rates to 100/minute.



## Food Processing

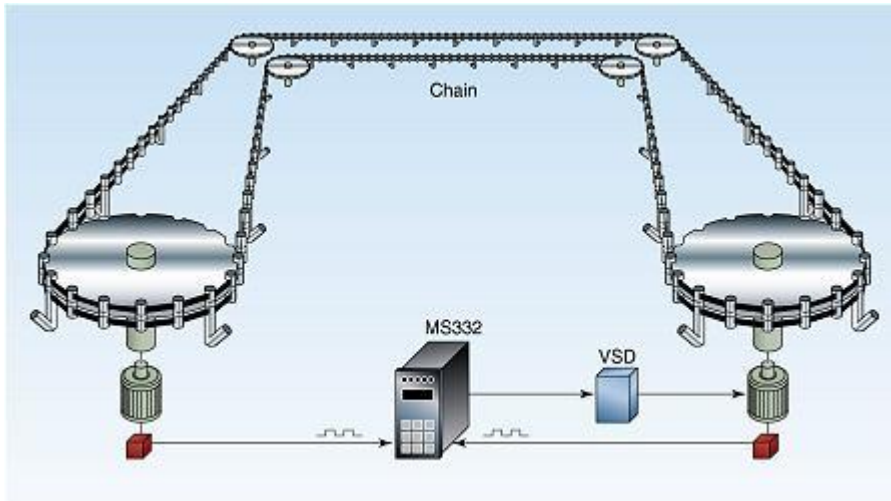
Electro-Sensors has historically been involved in the meat processing industry. Many different conveyor configurations, in harsh environments, around the USA are using ESI synchronizers. This application uses a MS332 to maintain the entrails conveyor in position with the carcass conveyor. Synchronization is required so that government inspectors monitoring entrails can reject the corresponding carcass if necessary.





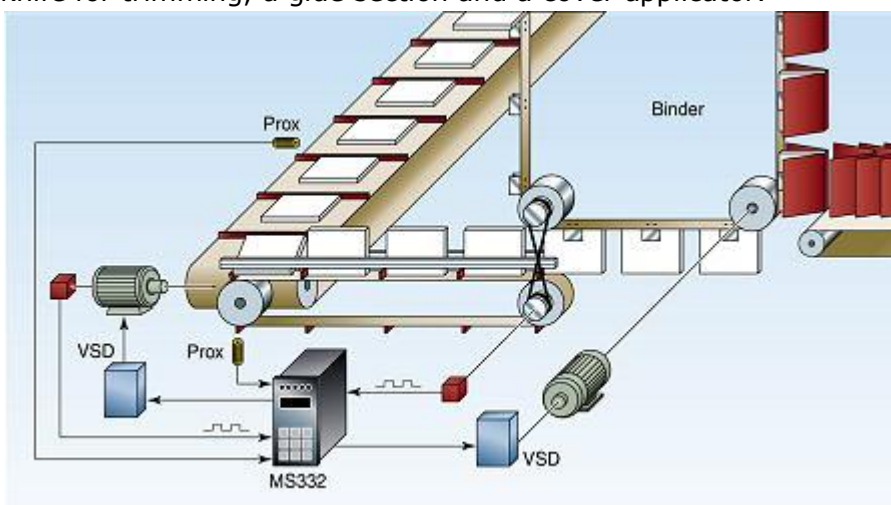
## Load Share Chain Conveyor

Systems where long chains or conveyors are used it may be helpful or necessary to use more than one drive system to "share" the load over the long distance. The MS332 controlling the follower drive is used in the "pulse locked" follower mode to insure there is no gain or loss between drives. This way the conveyor runs smoothly without any buckling regardless of the load.



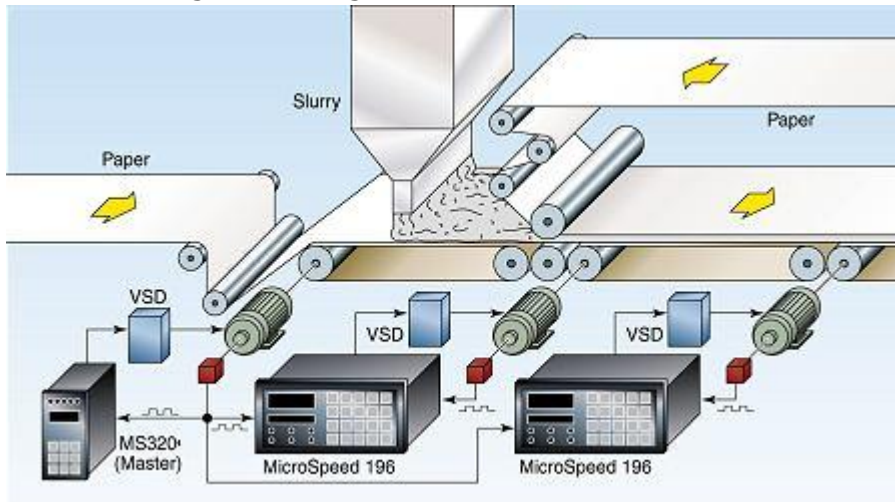
## Book Binding Process

Book binding processes require the precise positioning of folded multi-page sections "booklets" from a fixtured conveyor in a gatherer section thru an intermediate pocket conveyor and then into a binding section. A MS332 is used to control the positioning of the fixtured conveyor to the infeed conveyor. The gatherer conveyor deposits the booklets vertically into the infeed conveyor which then hands the booklet off to a spring loaded pocket in the binder. Then, the binder carousel carries the booklets to a rotary knife for trimming, a glue section and a cover applicator.



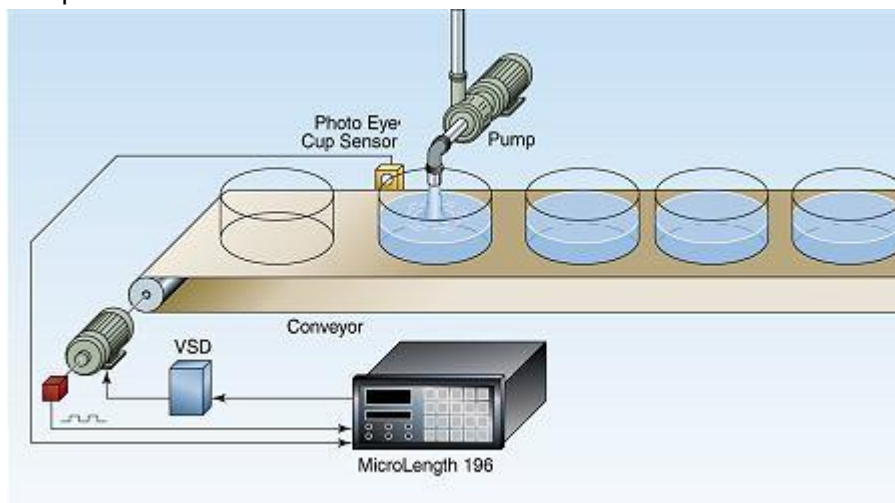
## Continuous Web

A MS 320 is used as a master controller to establish and maintain the product velocity. Several MicroSpeed 196 controllers connected in parallel are used as followers. The pulse lock theory used in the MicroSpeed 196 makes it a very precise follower. It is important in this application that the string of conveyors maintain a matched speed. This insures that the wet web of material is smoothly transferred from one conveyor to the next without tearing or buckling the material.



## Registered Index

Applications requiring a registered index like the conveyor shown in the illustration can be controlled by a MicroLength 196 coupled with an I-mark or event sensor. In this demonstration the randomly spaced product containers must be indexed into position beneath the pump nozzle. Utilizing the event sensor signal, the Micro-Length 196 completes each index by accurately positioning the container a programmed distance from the sensor. Which in this case locates the container beneath the pump nozzle. With this system there is no accumulation error and the accuracy of each index stays within  $\pm$  one pulse.



## Programmable Volume Controller

The MicroLength 196 controls a positive displacement pump to accurately dispense a pre-set product volume. Calibrating the MicroLength 196 for this function is quick and easy. A short run of product is dispensed and measured. The MicroLength 196 provides the number of motor rotation pulses counted relative to this dispense. The pulse and volume values are logged into the controller and it's ready to go. With  $\pm$  one pulse indexing, the MicroLength 196 controls the pump for an accurate dispense each cycle.

