Introducing TSC™... Montalvo’s Open Loop Torque Sensing Control System

For the first time ever in an open loop control system, you get a precise, reliable tension reference that operators can use to ensure consistent, high quality production runs. The TSC™ is a total tension control solution that delivers performance, convenience, and productivity. Simple, compact and easy to install and operate, the TSC is the latest innovation in open loop tension control. Patented technology allows easy integration into existing machines as well as new machine builds.

Automated, Precise, High Quality Tension Control without Load Cells or a Dancer!

Customizable System Packages
Select TSC system components based on the needs of your application to create a unique total tension control solution.

TSC Components
- TS Torque Sensor
- V / CS Series Brake
- U4 Tension Controller
- US4 Ultrasonic Sensor / Proximity Sensors
- M4 Analog Tension Meter
- MPC4 I/P Converter

- Easy Installation, Set Up & Operation
- Reduces Machine Build Cost
- Easily Upgrade Existing Machines
- Smooth, Precise, Repeatable Tension Control from Full Roll to Core
- Compact, Space Saving Tension Control Package
- Performance Driven, High Quality Components
Overview

The Montalvo Torque Sensing Control System (TSC™) is an open-loop based control system, that works on the principle of Tension = Torque / Roll Radius.

Until now, typical open-loop tension control systems relied 100% on roll diameter feedback to control tension. Products such as ultrasonic sensors or proximity sensors are used to measure changes in the roll's diameter and relay this information to the tension controller. The controller monitors and measures the roll diameter as it changes during the unwinding process, and automatically reduces the torque of the brake proportionally. As the T=Tq/R formula dictates, this will maintain constant web tension from full roll to core.

The quality of this system is highly dependent on the quality of the brake, motor, or drive to deliver linear and responsive torque (whether typical open-loop systems or TSC systems). Montalvo’s highly responsive and linear brakes deliver smooth, reliable torque throughout the entire production run and is one of the reasons we have been a sought after source for open-loop systems.

Typically the quality of an open-loop system is also highly dependent on the skill and experience of the operator to ensure that the starting web tension (controller TRIM level/Starting Brake Output level) is correct for the material and process. If you run a variety of materials, and/or have several shifts and have different operators, it can be challenging to obtain the same results consistently.

This is where the benefits of the TSC System become apparent. The (TS) Torque Sensor provides an accurate, calibrated measurement of the torque being delivered by the brake at any given time. Since the formula T=Tq/R is true, and since we now know the brake torque (via the TS) and we know the roll radius, we now know exactly what the web tension is.

Operators can now easily and consistently set and monitor the actual web tension from start to finish.

Combined with the responsive, linear torque delivery of Montalvo Brakes, tension verification, available for the first time ever in open-loop tension control systems via the TS Torque Sensor, creates a highly precise, consistent, and high performance system.

Other system advantages are that the system can be utilized on applications where it is impractical to install a typical closed loop system due to space restrictions, technical complexity or cost considerations. It also allows for an accurate tension reference on systems where it would be impossible to fit traditional load cells, such as on systems where the web enters the process directly from the unwind on processes with multiple web paths off the unwind.

The TSC™ is a total tension control solution that delivers performance, convenience, and productivity. Simple, compact and easy to install and operate, the TSC™ is the latest innovation in open-loop tension control. The TSC™ features patented technology.
The TSC™ is ideal for applications where...

- The machine cannot accommodate load cells or retrofits (space limitations, costs, etc.).
- There are multiple web paths or web is traveling directly from unwind roll into the process.
- The web cannot be contacted after unwind by rollers or requires minimal roller contact (coating, films, foils, etc.).
- Multiple unwind stands that each require cost effective, simple control, and a simple web path (sheeters, laminators).
- Existing open-loop system, but want to improve consistency and quality of your production.
- Utilizing a PLC or similar system and want to control torque with minimal modification and effort.

How the TS Torque Sensor Works... Simple as 1-2-3

1 As a roll unwinds it rotates the shaft and brake disc. When friction pads attached to the spider plate are engaged against the brake disc, this force (torque) tries to rotate the spider plate.

2 This rotation is prevented by the Torque Sensor. The force (torque) being applied to rotate the spider plate is measured by the Torque Sensor.

3 The measured torque is provided to the U4 Tension Controller and, in conjunction with a diameter measurement, calculates tension of the web, which is then displayed on a meter.
Application Diagrams

Ultrasonic Sensor Input

Proximity Switch Input

For more information on the TSC™ contact your local Montalvo Applications Specialist montalvo.com/local-contact, view the TSC™ webpage at montalvo.com or check out the TSC™ demonstration video at YouTube.com/betterwebcontrol.