



COMPOSITES

TENSION CONTROL

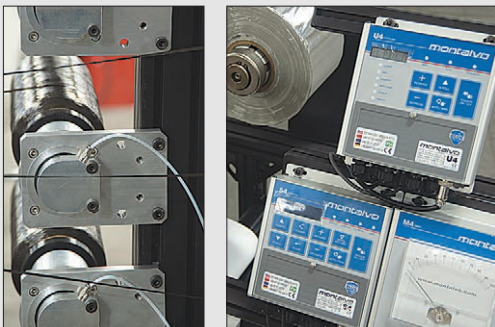
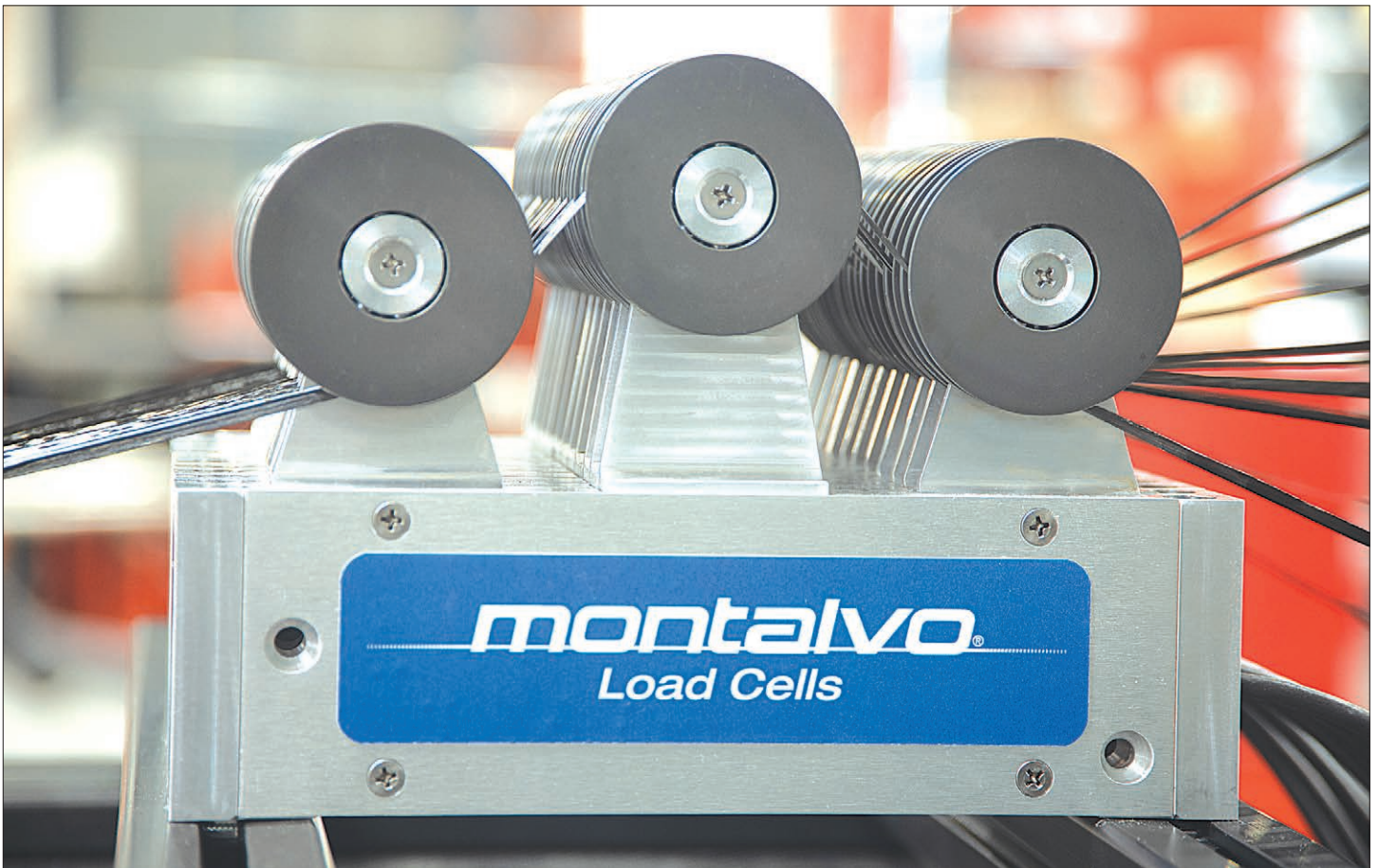
EST. 1947 **montalvo**
Better Web Control

**Tension Control Components, Training, Service
and Support for the Composites Industry**

AUTOMATED, CONTINUOUS PRODUCTION

Since 1947 Montalvo has been a leader in the manufacturing of higher quality, higher performing tension control components that improve the productivity of manufacturing processes for reduced waste and higher quality end product. In addition to industry leading components Montalvo provides the service and training of process personnel to maximize knowledge, efficiency, and effectiveness.

Achieve automated, continuous, consistent, and high-quality production with Montalvo Composites Tension Control.



DROP-IN TENSION CONTROL SOLUTIONS

Easily upgrade the capabilities of your machine.

Montalvo's composite tension control components are designed to be *drop in solutions* for your machine. No need to invest in completely new machinery. Our equipment can fit within existing applications to ADD automated tension control to your application delivering a quick return on investment.

A Critical Component

“Good Enough” is No Longer Good Enough. Achieve More with Tension Control

Tension control is a large and vital component of any high-quality manufacturing process, often being what separates a “good enough” process from one that is a productivity powerhouse of higher quality materials and end product.

Adding an automated tension control system expands both the existing and future capabilities of your process while delivering critical benefits for you, your customers, their customers, and beyond.

- **Reduce or Eliminate the Risk of Catastrophic Failure**
- **Reduce or Eliminate Wrinkling, Weakening, Breaking, Delamination, and More**
- **Reduce Manual/Hands-On Process Dependency**
- **Prevent Web Related In-Plane Wave Defects**
- **Remove Quality and Consistency Concerns**
- **Prevent Twisting, Bird Nesting, Blistering, and Abrasion**
- **Eliminate Misalignment**
- **Eliminate Random Tension Impacts**
- **Decrease Catenary**
- **Improve Kitting Accuracy and Reduce Waste**



THE EXPERIENCE YOU RELY ON

More than just products.

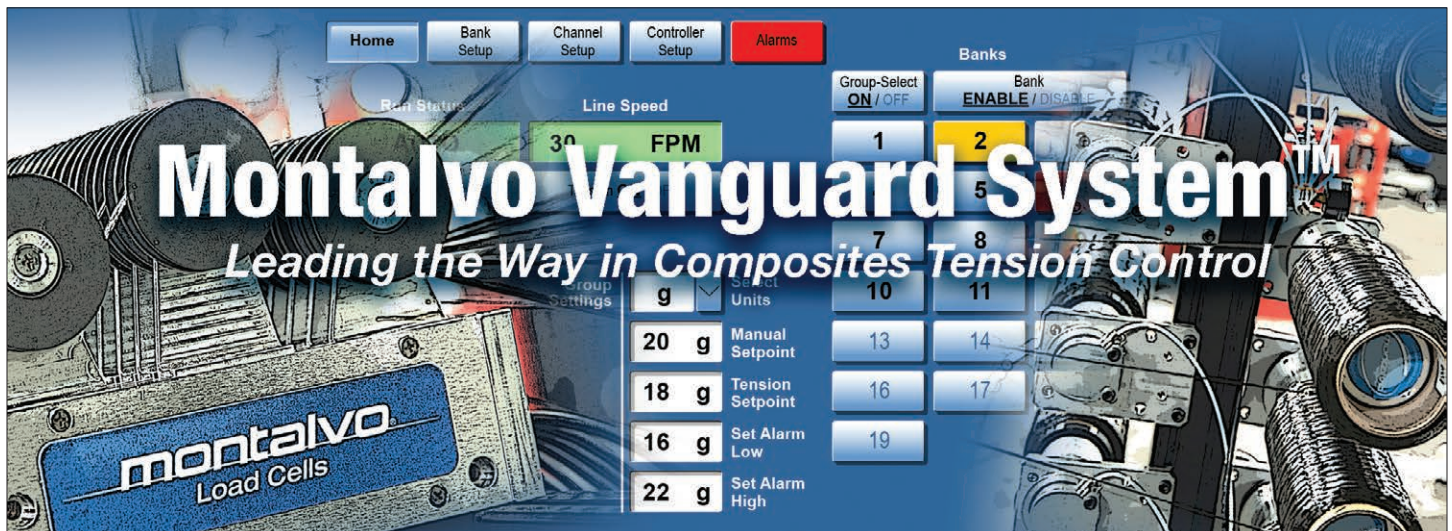
For more than 73 years Montalvo has been providing our customer's not just the products to expand the capabilities of their machines, but the expert tension control knowledge, service and support required for them to Achieve More now and in the future.

We Are Here For You!

TOW TENSION CONTROL

Precise, Consistent, Uniform Tension Control of Every Individual Tow

Inconsistent and non-uniform tension on every tow creates many negative outcomes, from manufacturing scrap to catastrophic failure of end products. Inconsistent tension amongst tows which are meant to work together to form a single product creates weak points across the end material as tension varies. Proper tension control of every tow ensures each tow's effectiveness is maximized, creating stronger, better, higher quality end products.



The Montalvo Vanguard System (MVS)™

PATENTED

The Vanguard System is Montalvo's flagship closed loop tow tension control technology system, leading the way in precise, uniform, consistent, automated tension control.

The MVS automatically controls even the slightest changes to ensure tension is automatically and always, precisely where you set it. Maximize your productivity and profitability!

Tension Control

A single interface for automated control, indication, and data collection of every tow in your process. Montalvo's Vanguard Tension Controller (V-TC) is an easy to setup and operate interface that utilizes the continuous feedback from the load cells to provide minute changes in torque, automatically and precisely maintaining set tension from start to finish.

- Easy to Setup and Operate
- Low/High Tension and Tow Break Alarms
- Pre-Configured for Your Application
- Single Interface for Managing Every Tow in Your Process
- Adjustable and Expandable Tow Counts



Tension Measurement

Continuous, precise tension measurement directly from your tow. The Vanguard Load Cells (V-LC) feature Montalvo's industry leading load cell technology for sensitivity, reliability, and repeatability giving exact, continuous tension measurement of your tows for higher quality tension control.

- Wider Sensing Ranges
- Pre-Calibrated (Just Install & Go)
- Stainless Steel Construction
- High Overload Protection
- Precise Tension Measurement
- Repeatable, Reliable, High Performance

Torque Control

Smooth, consistent, precise torque control for maximum process capability. Montalvo's Vanguard Torque Control offers three different torque control options depending on the requirements of your application.

- Wide Torque Ranges
- Wide Variety of Material and Tensions
- Easy, Hassle Free Installation
- Long Lasting, High Quality Performance
- Compact
- Multiple Torque Device Options



Creel Brake Torque - pneumatically controlled brakes



Creel Motor Torque - driven systems with DC servo motors

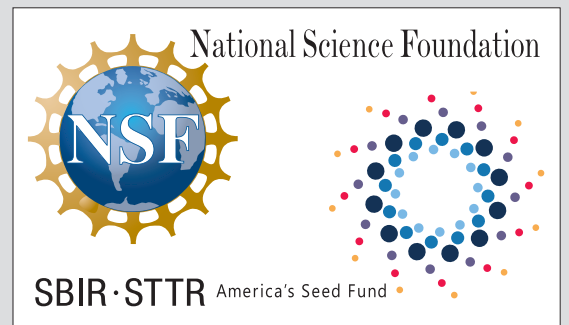
***In-Line Torque** - versatile, drop-in torque control

*coming Q3 2020)

A REVOLUTIONARY TECHNOLOGY

Backed by the National Science Foundation and SBIR Program (Phase I & II)

Reserved for only disruptive technologies that will positively impact industries in essential ways, Montalvo has been awarded multiple grants from the NSF for development of innovative tow tension control technology specifically for composites manufacturing.



WEB TENSION CONTROL

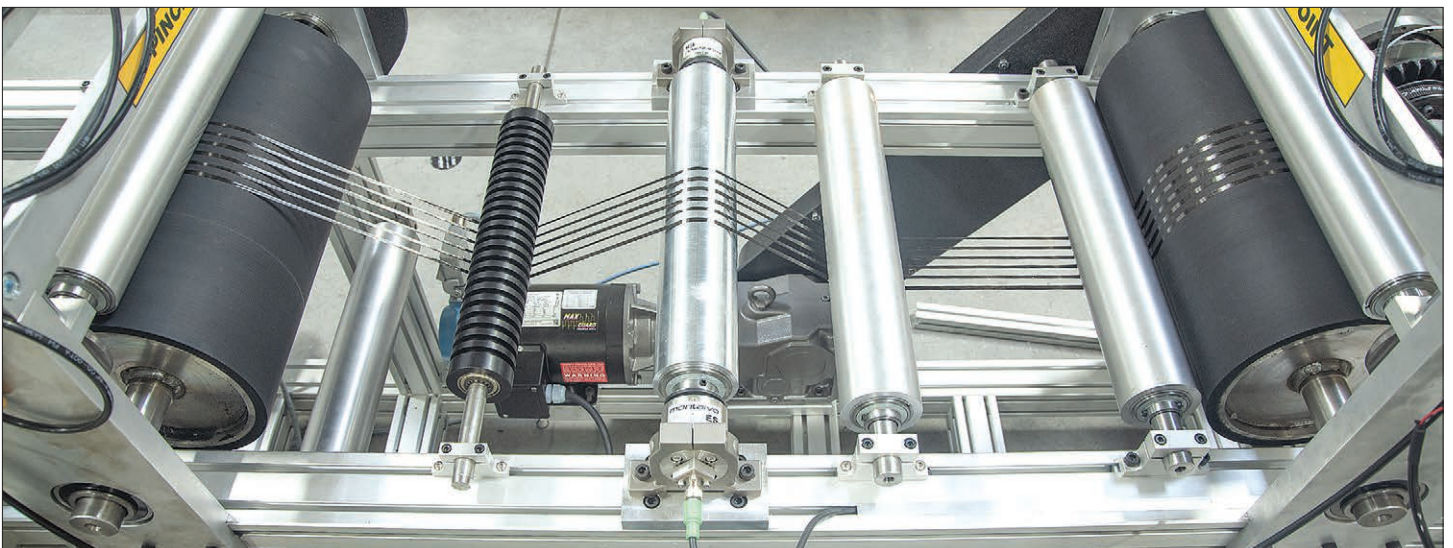
Set It & Forget It Tension Control

Whether it's after the web formation process in prepreg or pultrusion processes, looking to add some continuous processing to a hand lay application, or utilizing converting, roll to roll, laminating, sheeting, or slitting processes, Montalvo manufactures a wide range of tension control products suited to your application requirements.

- Drop-In and Retrofit Solutions
- Specified to Your Process Parameters
- Automated, Repeatable, High Quality Control
- Wider Operating Ranges for Running Various Materials
- High Performance, Longer Service Life Components
- Immediate ROI

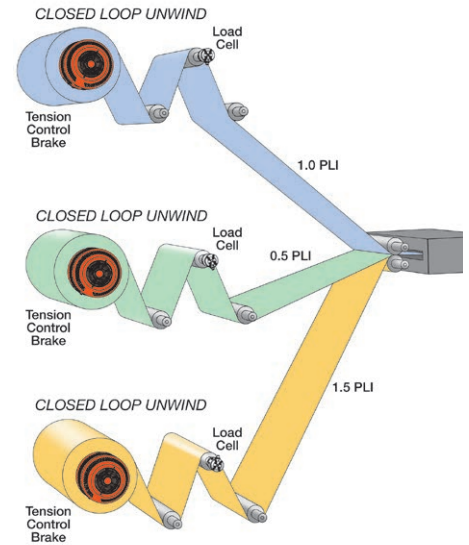
Pultrusion and Prepreg Processes

Web tension control on the formed mat as well as any utilized carrier sheets is critical to high quality processing in pultrusion and prepreg applications. Carrier sheet tension control ensures wrinkles, bagginess, breaks and other defects do not occur, while tension control on the mat itself ensures uniform resin application (if applied to mat) with no necking down/stretching, breaks, or telescoping during additional processing and rewind/take-up.



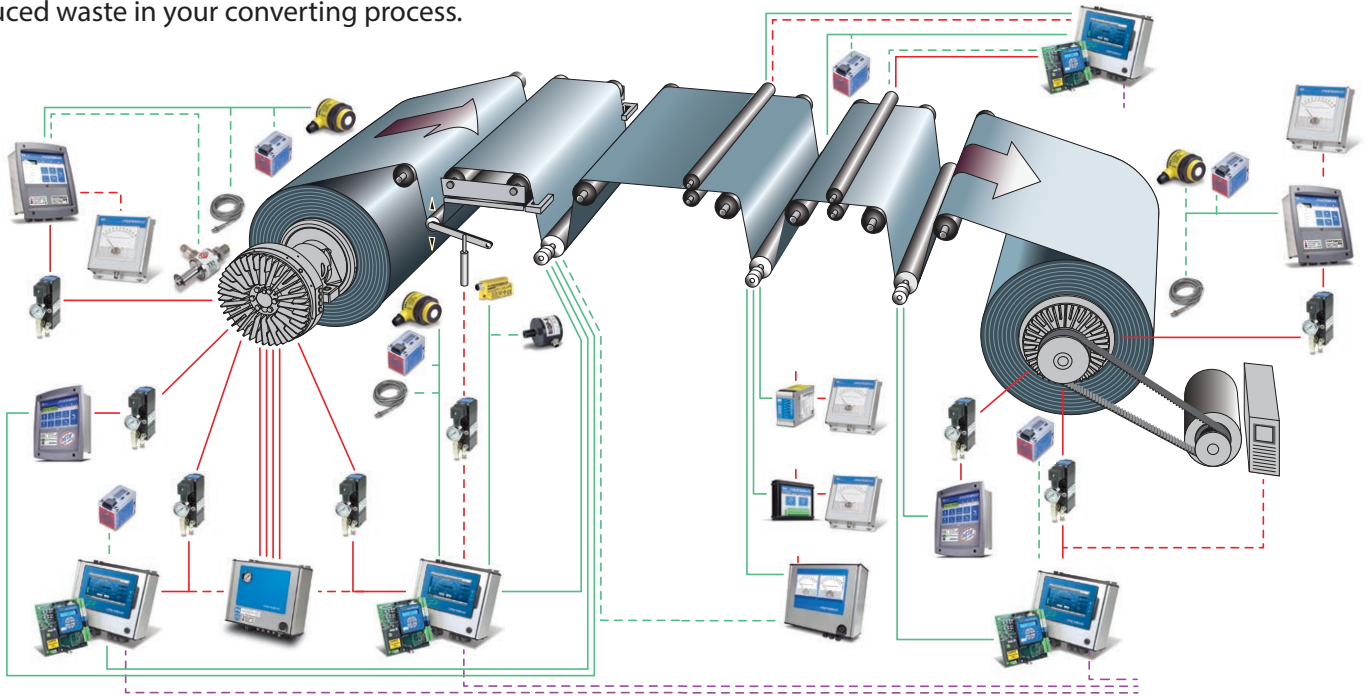
Laminating Processes

As two or more webs come together (general lamination, carrier sheets, surface veil, inter-leaving), each web may have the same or (more often) different characteristics and tension requirements. Ensure every material is at the precise tension required for high quality production with Montalvo Tension Control Components



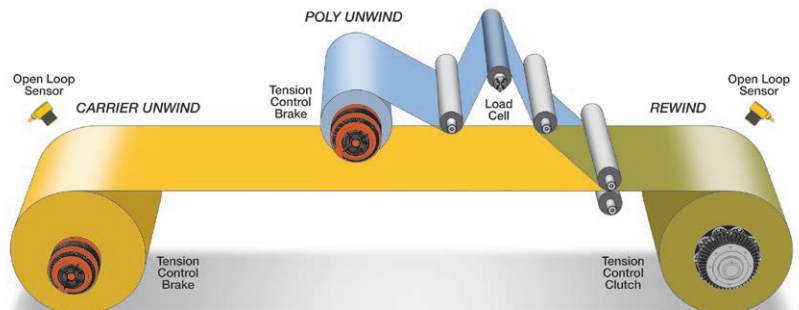
Converting - Slitting/Sheeting/ R2R

All materials have unique processing requirements. Combined with the various processing requirements of the Converting process being employed, a high quality and wide range tension control system to meet every demand is required. Montalvo's tension control components give you the range, the performance, and the repeatability you require for increased productivity and reduced waste in your converting process.



Hand-Lay Processes

Montalvo has provided unique tension control solutions to add continuous production to hand-lay applications improving efficiency and quality. Depending on the nature of the hand-lay application, targeted tension control component additions can add new processing capabilities to hand-lay application you may not have thought possible.

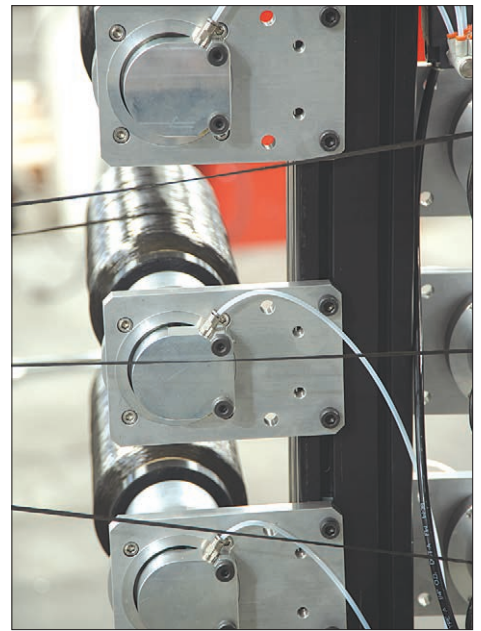
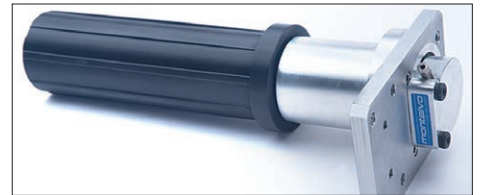
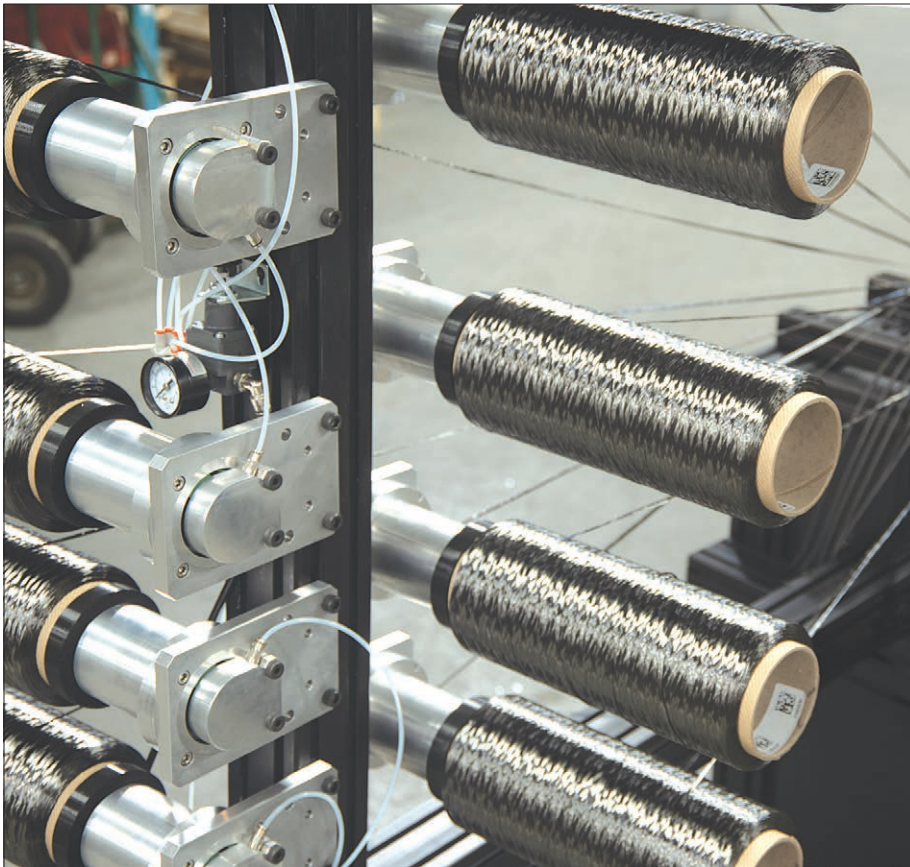


CREEL RACKS

Retrofit or New – We Have the Solution for You

Whether it's retrofitting your existing creel to add a cost effective, automated, closed loop tension control system, or fabricating a new creel rack, Montalvo has the experience and capabilities to deliver.

From small scale to large scale, get the high performing, high quality creel rack you require to "start strong" in your manufacturing process.



CUSTOM SATISFACTION **Custom Problems Need Custom Solutions**

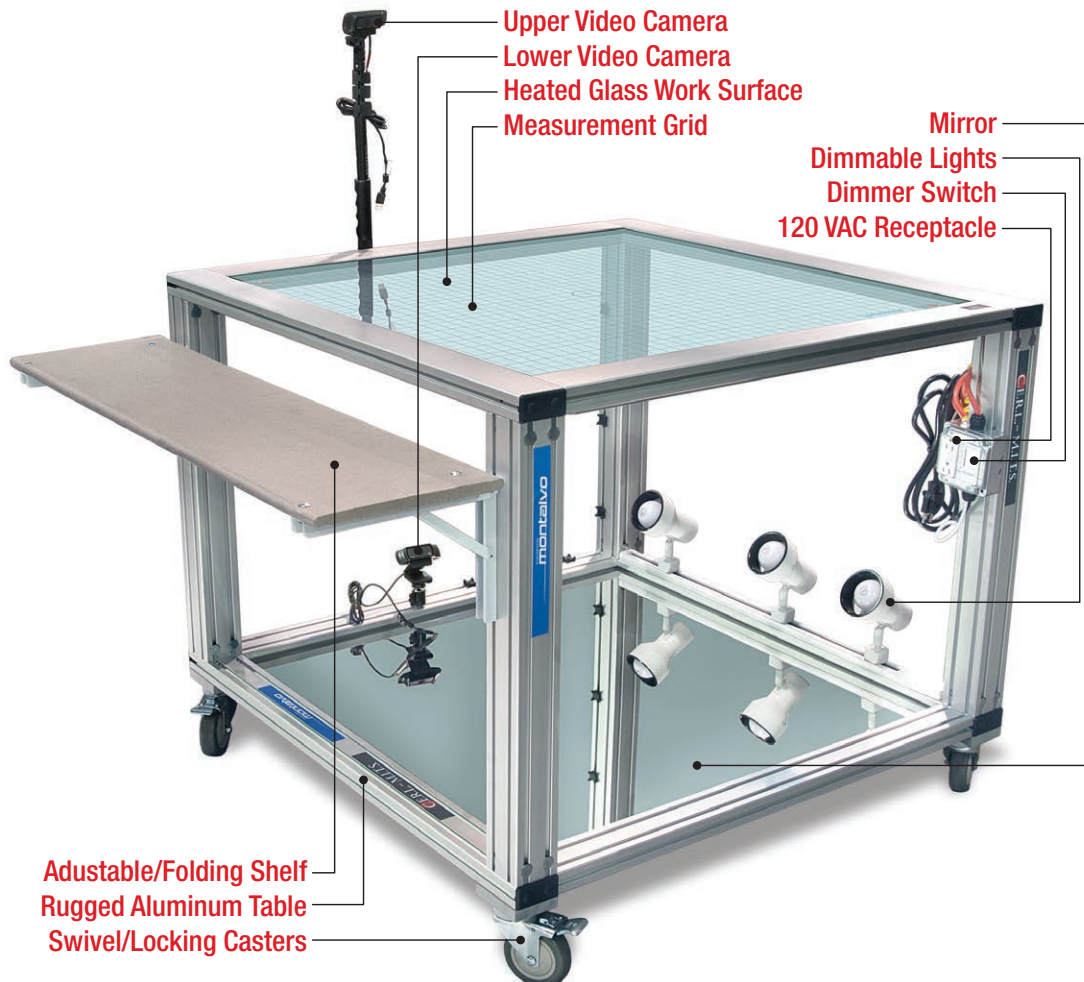
With over 73 years in the business, Montalvo and its engineers, sales team and applications specialists have worked with just about every kind of tension application in use. If you require something special, Montalvo will work with you to engineer a custom solution to meet your tension control needs. Let us consult with you on your next project.

MOBILE INFUSION

Mobile Infusion Technology System (MITS)

Achieve deeper knowledge of your vacuum infusion process.

The Montalvo engineered MITS Table is an analysis tool meant to characterize problems associated with vacuum infusion process (VIP) manufacturing. It does this by providing an environment where variables during the infusion process can be both controlled and clearly observed.



MITS Table Features

- Transparent Glass Surface with Grid Measurement System
- Heated Surface with Range to 85°C Using Standard 110V Outlet
- 2 Digital Cameras for Simultaneous Top and Bottom Surface Video Recording
- Underside Lighting
- Track System for Camera and Hose Placement
- Resin Reservoir Shelf
- Standard Operating Procedure Manual

HERE FOR YOU

On site or in the field, We Are Here for You

Having spoken at numerous industry events, like CAMX, and having technical articles featured in CompositesWorld Magazine and JEC Magazine, Montalvo has established itself as a primary source for tension control knowledge and training for the Composites Industry. We are committed to working with and helping the industry better understand what tension control is, how it can significantly impact a process and the end product, and how to implement tension control solutions into your applications.

Whether it's getting operators up to speed on your tension control equipment, keeping your equipment running at optimal capacity, educating or presenting your team with the latest tension control technology, we offer a variety of services for you.

TENSION CONTROL BASICS

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Tension Gauges T T Measuring Beam
Compression Gauges C C

Montalvo
24-III
Infeed Tension Controller for Load Cell Feedback

TECHNICAL MANUAL

24-LL Unwind (for Load Cell feedback)

Excitation
Signal
Signal
Excitation



COMPLIMENTARY UPGRADE ASSESSMENT

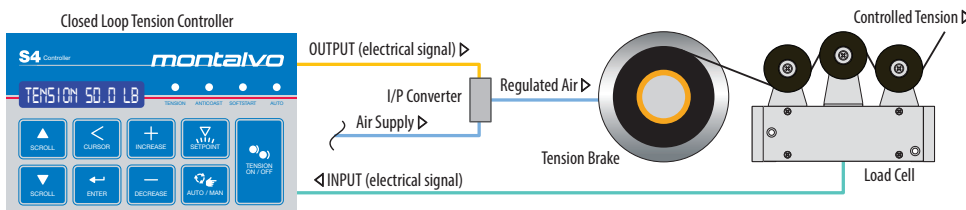
Get expert recommendations on how to achieve process improvements.

Montalvo Applications Specialists are available to assess your application and will let you know what would be involved in completing an upgrade and what type of performance upgrades you can expect to achieve. Contact us today to learn more.

WE SOLVE PROBLEMS

Closed Loop Tension Control

Continuous measurement and torque control to even the slightest changes in tension ensures tension is automatically and always, precisely where you set it. Montalvo Closed Loop Tension Control Systems offer some of the most advanced functions and features while still being the easiest to set-up and operate, so you achieve maximum productivity and profitability every time.

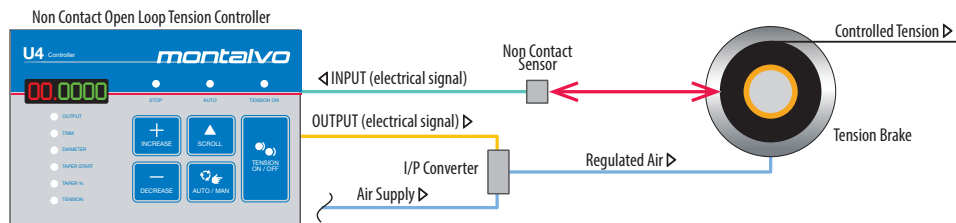


Features

- Superior Signal Sensitivity
- Repeatable, Reliable Measurement
- Tension Indication - Know More About Your Process
- Direct Web Tension Feedback for Highly Precise, Accurate Control
- Smooth, Linear Torque from Full Roll to Core
- Full Range of Functions & Features to Maximize Productivity
- Multiple Styles, Models, and Packages to Meet Your Specific Requirements
- Easy to Install, Set-Up and Operate
- High Quality, High Performance
- Long Service Life Products

Open Loop Tension Control

Processes requiring minimal to no roller contact and/or those that cannot accommodate load cells but still require automatic, precise, and accurate tension control require a Montalvo Open Loop Tension Control System. Montalvo is an industry leader and the premier innovator of open loop tension control solutions.



TAILORED UPGRADE PACKAGES

Designed for the specific requirements and variables of your application.

Whether it's bolt patterns, shaft size, space limitations, etc, Montalvo Composites Upgrade component packages and modular tensioners are tailored for the specific requirements of each type of process, simplifying installation and maximizing performance.

HERE FOR YOU!



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www.xing.com/companies/montalvocorporation

Montalvo USA (Corporate Headquarters)

Gorham, Maine 04038
USA

Tel: 1-800-226-8710

Tel: +1-207-856-2501

info@montalvo.com

Montalvo Europe ApS

DK-8700 Horsens

Denmark

Tel: +45 75 57 27 11

info.eu@montalvo.com

Montalvo Deutschland

30167 Hannover

Germany

Tel: +49 (0)511 760 691 41

info.de@montalvo.com

Montalvo (Shanghai) Trading Co., Ltd.

Shanghai

China 200062

Tel: +86-21-52188010

info.cn@montalvo.com

Your local representative

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