

# THE COMPLETE CREEL SYSTEM



**Tension Controllers  
and Creel Equipment**



## Introduction

RJS Corporation has been a supplier to the tire industry for more than fifty years, manufacturing a variety of supporting machinery for the production of tires.

RJS first began manufacturing wire pullout tension controllers in 1962, selling first to the reinforced hose industry. With the advent of the steel cord radial tire in the U.S. around 1972, RJS applied its skills toward producing a practical steel cord tensioning device which is now in use worldwide.

Over the previous decades, RJS has improved and expanded upon its product line and now offers a selection of tension controllers to suit every requirement of the industry. RJS also offers a variety of creel equipment to further improve manufacturing.

## Creel System Description

A row of creel frames hold tension controllers with spools of steel wire mounted thereon. As the steel wire is pulled off of the spool, the controller regulates the tension that the wire is pulled out at.

The front organizing stand positioned at the start of the creel row collects the hundreds of steel cords and organizes them as they leave the creel. RJS Corporation provides varying accessories for the front organizing stand to monitor for broken wires and to improve on production downtime.

The final section of a creel row before the steel wire passes into the calender is the main organizing stand. This stand consists of a large organizing board and a set of guide rollers. This final section of the creel row allows for total control over flow width and flow height before the cords enter the calender room.

## Tension Controller Description

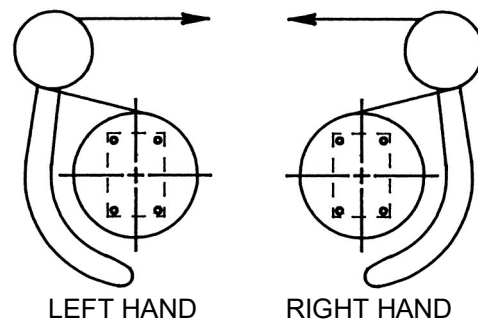
All tension controllers manufactured by RJS Corporation are mechanical devices used for the payout of steel cord at a uniform tension with automatic braking. While braking the control arm roller moves rearward to take up any slack that occurs in the cord and reduce the probability of a cord jumping from its path. The amount of rearward movement of the roller is selectable by the user within the mechanical limits of the model (1/2" minimum to 2" maximum).

The tension is held constant from air pressure supplied to each controller. The air pressure acts upon a low-friction air cylinder manufactured by RJS which delivers a load to the brake arm. The tension is changed by merely adjusting the air pressure to produce the desired wire tension. Unless the tension is being changed, there is no air flow and no air is consumed. Furthermore the rolling-diaphragm cylinder is completely sealed and has zero leakage. The maximum system air pressure required is about 20 psi (1.4 kg/cm<sup>2</sup>).

A creel system using air-loaded controllers with all air cylinders connected to a common source of air pressure has the capability of altering the tension in an entire creel row through one air regulator. Each controller will deliver the same wire tension as long as each receives the same air pressure.

Operation at a tension less than that created by the bearing friction in the spindle and control-arm roller is not possible. Tension will remain constant from full spool to empty by mean inherent in the design.

All RJS Corporation tension controllers are available in left hand and right hand configurations. Typically the configuration is determined by the side of the creel frame the controller is mounted on.



## Operation

The wire tension comes about through the use of a brake drum and friction element and is regulated by a control arm with an idler roller over which the cord passes.

When in operation, a state of balance between the loading of the control arm and the drag of the friction element on the brake drum results in constant tension. The wire tension from this force-balance system is, within limits, independent of the coefficient of friction between the friction element and drum.

Thus, changes in the coefficient of friction of the pads, due to aging or glazing, has little effect on the wire tension. This feature is advantageous when compared with direct pull-off controllers which have no inherent automatic means for adjusting to variations in tension.

Periodic “loping” of wire tension, caused by the eccentricity of the wire spool, is minimized in RJS Controllers by the control arm’s ability to respond to variation. In contrast, any system using direct payout from the spool will show a greater amount of periodic lobe due to eccentricity. This is an inherent weakness of any payout directly from the spool, and is true regardless of whether the means of braking is frictional, electrical or hydraulic.

## Spindles

Most models are offered in a choice of two spindle angles: 0° and 4°, as measured with the horizontal plane. Most frequently 4° is selected. The Model 305 controller is offered in 0° and 6°.

The load rating of the spindle depends upon the model of controller, the spool bore diameter, and the type of spindle required for use with a specific spool. The load ratings for controllers equipped with appropriate spindles to operate with specific spools are in the following table:

SPOOL TYPE	CONTROLLER	MAX. LOAD
B-80/33 and/or B-60/33	121-MK III	132 lb (60kg)
B-80/17 and/or B-40/17	ALL MODELS	100 lb (45kg)

## Drive Type

*Pin Drive*—The standard drive type of a tension controller. A drive pin will lock the spool into place on the controller and cause the spool to rotate at the same rate as the brake drum.

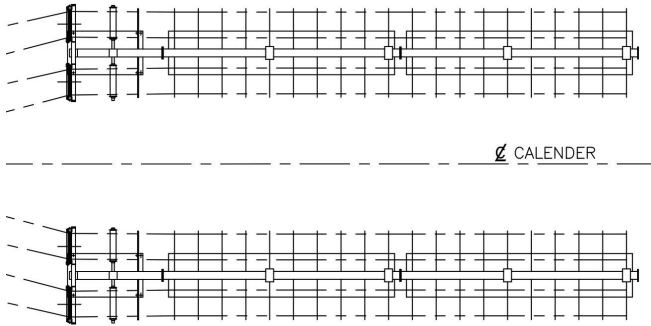
*Magnet Drive*—Greatly reduce creel loading time as creel room personnel no longer need to spend time “finding” the pin to enter the drive hole in the spool. This drive type is offered in plain cup type as well as with a positive flange engagement feature (PFEF) to eliminate spool slippage.

## Spool Type

All tension controller models are made to accept spools of type B-40 and/or B-80/17, or B-60 and/or B-80/33, as selected by the customer. Operation with other spools can be integrated with a special series of controller that RJS has designed. The dimensions of the most common spool types are as follows:

SPOOL TYPE	OUTSIDE DIAMETER	WIDTH	SPINDLE DIAMETER	PREFERRED DRIVE PIN DIAMETER	OFFSET DISTANCE SPINDLE TO DRIVE PIN
B-40	10 in. (255mm)	6-1/2 in. (165mm)	5/8 in. (16mm)	7/16 in. or 10mm	1-1/2 in. (38mm)
B-80/17	10 in. (255mm)	13 in. (330mm)	5/8 in. (16mm)	7/16 in. or 10mm	1-1/2 in. (38mm)
B-60	10 in. (255mm)	6-1/2 in. (165mm)	1-1/4 in. (32mm)	7/16 in. or 10mm	1-11/16 in. (43mm)
B-80/33	10 in. (255mm)	13 in. (330mm)	1-1/4 in. (32mm)	7/16 in. or 10mm	1-11/16 in. (43mm)

# Creel Arrangement



## Fixed Parallel

Ideal for creel rooms with limited floor space, fixed parallel creels occupy a smaller factory footprint than the vee-creel and allow for a greater number of rows within a creel system.

## Fixed Vee

The most common creel configuration, this layout allows for a constant run of steel cord. As one row is in operation, the other row can be reloaded for the next run, minimizing production downtime. The angle between the creel row and centerline cannot exceed 15 degrees.

## Shifting Parallel

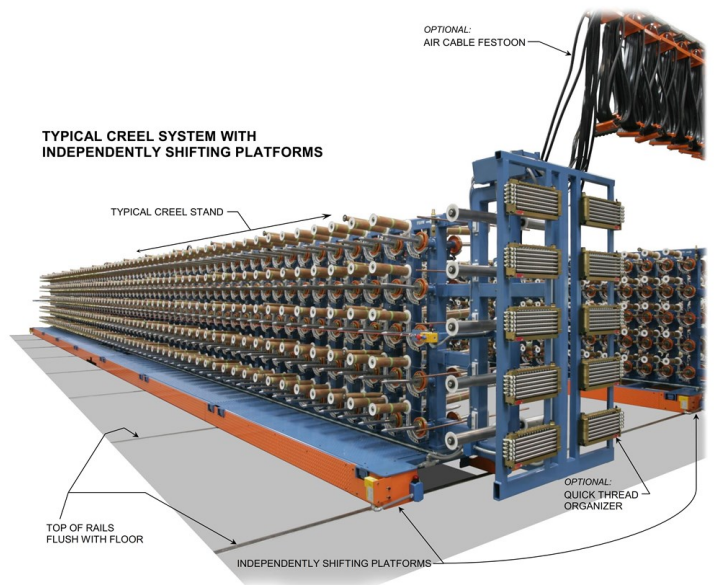
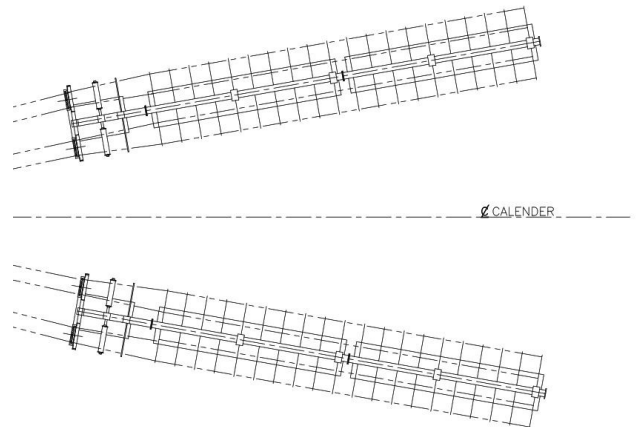
Creel shifting provides the best flow of cords because the active creel row is placed directly in-line with the calender while other creel rows in the system are being reloaded for the next run.

With an RJS creel shifter, rails are positioned in place and embedded in a concrete floor; the creel remains at floor level for spool loading. When employed with two or more separate creel rows, each row is independently movable to suit unique creeling programs.

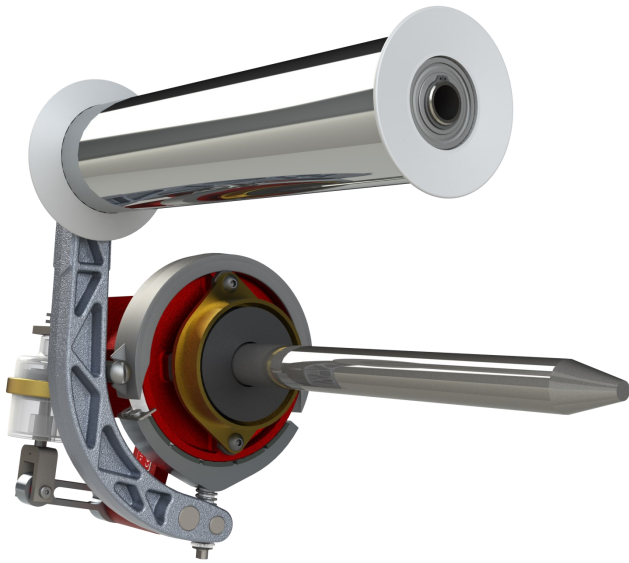
RJS Corporation also offers the newly innovated lightweight motorized creel (LMC) to greatly reduce size, cost and complexity of creel shifting. The LMC is the ideal creel solution for small applications driving up to four frames per creel row.

## Non-Standard Configurations

RJS occasionally designs and manufactures systems to meet the specific needs of a client, whether they require special heights, lengths, zone control, etc. We are prepared to assist you find the best solution to your cord let-off requirements.



# Tension Controllers



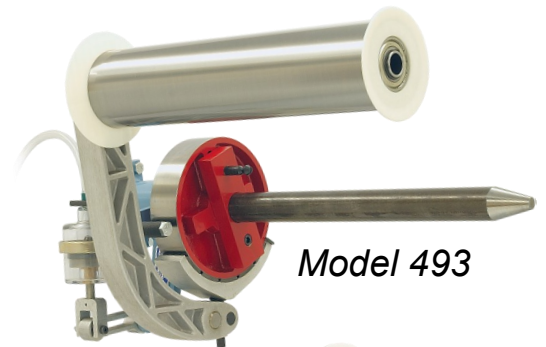
## Model 121 MK III

The Model 121 Mark III tension controller is derived and refined from our first Model 121 controller. The Model 121 is the most widely used controller today. With the same inherent quality built into all RJS controllers, the Model 121 can be counted on to function properly without adjustment. The Mark III may be ordered in any selection of spindle diameter and spindle angle to fit any available spool within its size range.

## Models 493 / 500

The Model 493 has been developed by RJS for operation at tensions as high as 10 lbs and for running OTR and large cords up to 4mm in diameter. This model has a heavy duty brake shoe, brake drum and control arm for premium operation even at high tensions.

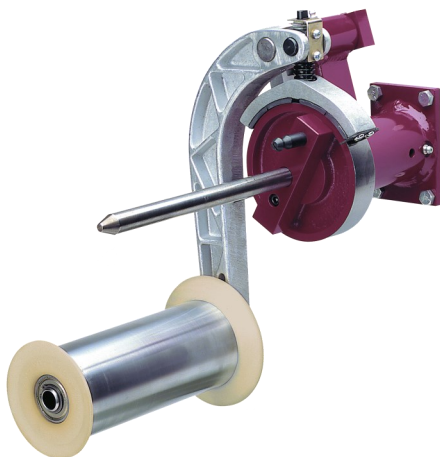
The Model 500 has all the features of the Model 493, but has a larger control arm roller to accommodate larger steel cord diameters up to 5.5mm. This model of controller requires greater mounting space on a creel due to its increased size.



*Model 493*



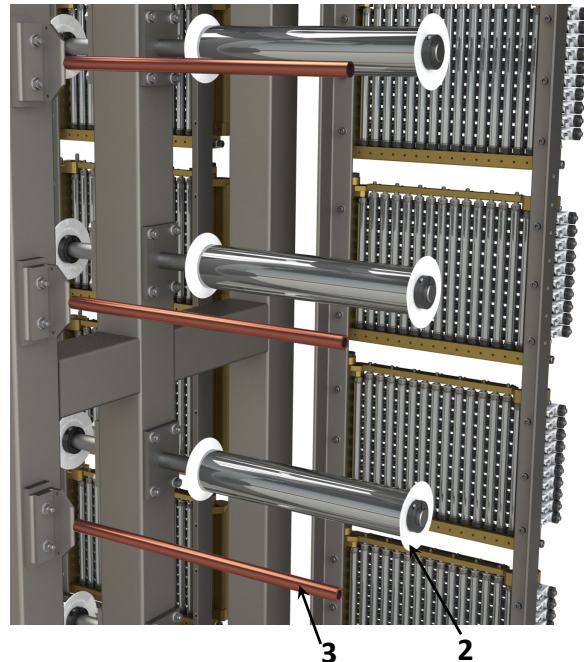
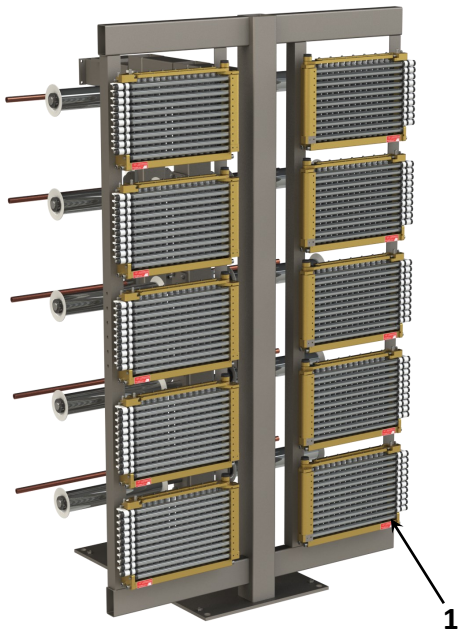
*Model 500*



## Model 305

The Model 305 was developed to offer improved creel operation at low tensions and has been used for creeling both steel and textile cords. The normal operating configuration of the Model 305 is with the control arm and roller in the down position, in order to prevent the weight of the arm and roller affecting the tension. However, the Model 305 also operates in the roller up configuration, typically with a counterweight to negate the weight of the arm and roller.

# Front Organizing

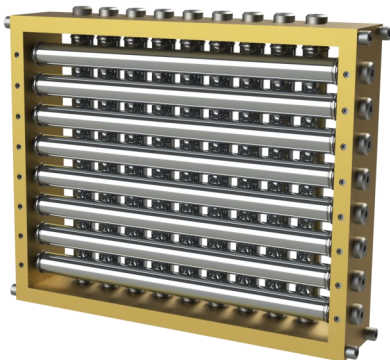
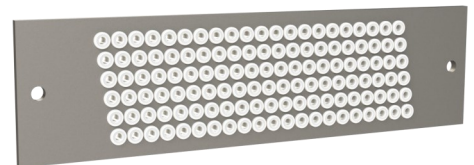


## 1) Front Organizing Boards

Responsible for organizing the steel cord as it travels off of the creel frames, the front organizing boards capture one steel wire in each opening. RJS Corporation offers three different models of organizing boards for both front and main organizing.

### Eyelet

The simplest and most economical solution RJS Corporation offers for wire organization. Eyelet boards can be provided with either ceramic or steel eyelets to extend the useful lifetime of the board. The openings on an eyelet board can accommodate steel cord up to 10mm in diameter.

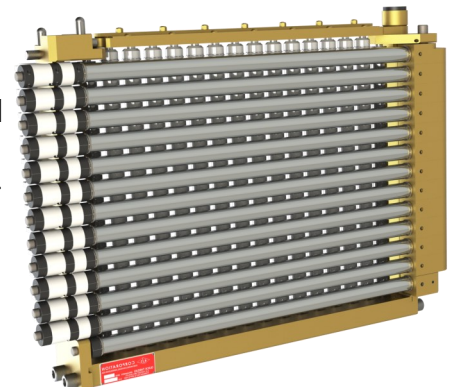


### Fixed Roller

Our most popular model. Fixed roller boards capture one wire in each opening created by vertical and horizontal rollers. This organizing board minimizes friction as each roller rotates with the steel cord on anti-friction bearings. Each roller is made of hardened steel to guarantee the continued quality of performance expected and delivered from RJS equipment.

### Quick Thread

The Quick Thread roller board is the most advanced organizing board on the market and is an RJS Corporation original. The Quick Thread roller board allows a worker to rethread the creel system faster and easier than ever before. Available in both top loading and side loading configurations, one direction of rollers will pivot away from the board to allow the steel cord to be quickly threaded through a larger opening. These rollers are made of the same hardened steel as the fixed roller boards.



# Front Organizing

## 2) Direction Changing Rollers

Vital to the front organizing stand, direction changing rollers redirect the steel cord before it travels into the front organizing boards. The direction changing rollers can be optionally hard chrome plated to extend the useful lifetime of the product.

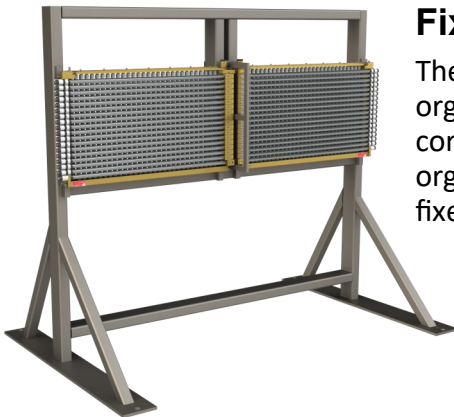
## 3) Loose Wire Detector

Alerting the operator when a wire is broken, the loose wire detector will sound an audible and visual alarm on an electrical control panel to indicate which row in the creel is experiencing an issue. This allows the operator an easy diagnosis how to get the creel back into production.

## Magnetic Hold-Down

Magnetic hold downs minimize the frustration of rethreading a creel system. This item allows a worker to temporarily fix the steel cord to the stand after it is threaded through the board.

# Main Organizing



## Fixed Type

The simplest and most economical solution RJS Corporation offers for a main organizing stand. This stand serves as the final organization before the steel cord passes over the guide rollers and into the calender. The fixed model organizing stand is best fit for single creel row applications. Available for eyelet, fixed roller and Quick Thread organizing boards.

## Model 360

Our most popular model. The Model 360 is available fixed to floor, mounted on rails or with casters for free movement across the factory floor. Having the capability to move grants a factory the ability to use this stand for multiple creel rows. The Model 360 is the only stand offered that combines the main organizing boards with guide rollers. Magnetic retainers can be added after the guide rollers to aid in rethreading. This model can be used with any type of organizing board RJS Corporation offers.



## Model 191

Optimized to limit production downtime between creel runs, the Model 191 organizing stand allows for one organizing board to be in use for a creel run while the other is used to rethread a nearby creel row. This model of the main organizing stand can integrate eyelet boards and fixed roller boards.



# Control Console

## Digi-Creel®

The newest addition to the RJS lineup, the Digi-Creel servo-valve air pressure control system is available for fixed and shifting applications. This system can be used to monitor

- ◆ Loose or broken wires
- ◆ Tension across the flow width leading into the calender
- ◆ Room Temperature
- ◆ Relative Humidity

The Digi-Creel can also be used to control

- ◆ Air pressure supplied to the creel
- ◆ Programable shifting patterns

Each aspect of the creel room conditions can be monitored and controlled on the Digi-Creel, on an external computer via ethernet or WIFI or on a handheld device. This innovation replaces the air pressure control console, loose wire detection box and creel shifting controls.

The Digi-Creel also keeps an event log. All defined alarm states (initial, fix in process, resolved) are recorded and traceable by time, date and personnel verification. The current and historical status of the creel system can be broadcasted in real-time to a remote display monitor.



## Model 173 Air Pressure Control Console

The air pressure control console provides conditioning and regulation of the compressed air supplied to an air-pressure actuated creel. The Model 173 is manually adjustable and complete with pressure gauges, air filter, safety relief valve and blow-off valve. It is available in one or more operating stations, selected at time of purchase, to provide individual air pressure control to multiple creel rows.

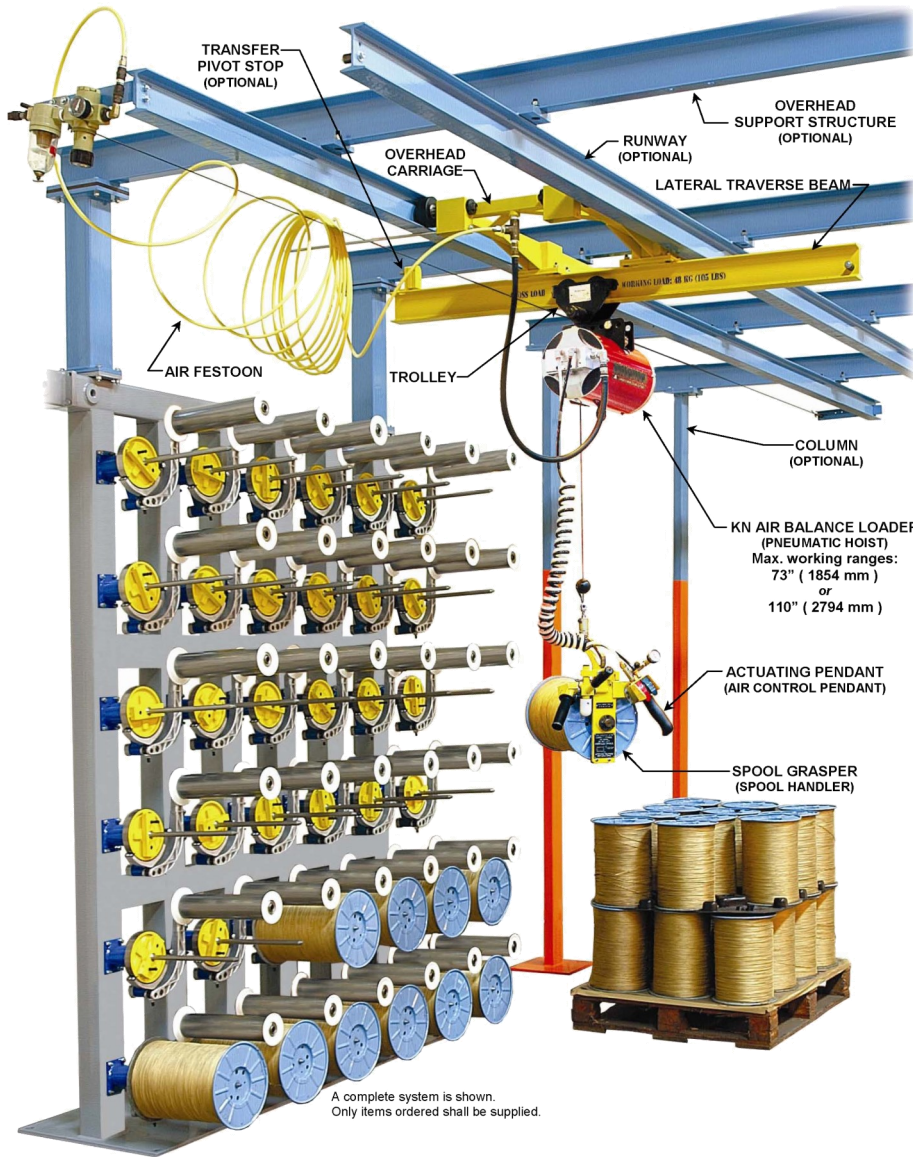
RJS Corporation also offers an air pressure control console that is servo valve controlled with manual overrides. That model allows control of the pressure by user's programmable logic controller.



TWO-STATION CONSOLE



# Creel Loading



## Model 477 Creel Loader

Reloading hundreds or even thousands of spools onto a creel on a daily basis is greatly time consuming and cumbersome.

The Model 477 creel loading system allows an operator to lift a maximum weight of 102kg up to 110" (2794mm) with ease using a pneumatic system.

RJS Corporation offers a complete solution for manually assisted creel loading that includes a supporting overhead structure. The overhead carriage rides between a set of runway beams and is light-weight in design for an effortless response to an operator's movement.

To accommodate the Model 477 creel loading system, the creel room must have a minimum height clearance of 43.75" (1111mm) above the top spindle.



## Model 476 Spool Grasper

A key piece of the Model 477 creel loading system is the Model 476 spool grasper.

This grasper features an interchangeable spindle to fit a wide range of spool sizes, pendant control to easily maneuver the spool up and down and a spring loaded clip on the front of the grasper to lock the spool into place while the grasper is in use. An easy tilt bracket and swivel clevis allow for total control of the spool during loading.

This item can be ordered with the complete creel loading solution or by itself.

# Splice Press



## Model 344 Splice Press

This equipment provides a means to splice the trailing ends of steel cord in a completed creel run to the starting ends of steel cord in a freshly loaded creel. The splice press has pneumatic cylinders to press heated upper and lower platens together. The Model 344 is stationary on the centerline of the calender.

## Model 448 Splice Press

The Model 448 is open on one side and mounted on rails to allow lateral movement of the splice press onto or off of the centerline of the calender while the steel cords are in place. Retracting hooks lock the frame in its position while the press is in operation.



# Scrap Removal



## Model 341 Wire Pull-Out

This scrap removal machine provides a means to pull-out the steel cord remaining on the spools of the creel after a creel run. With this model, the wires are pulled out by a pair of rubber-covered pinch rollers. The Model 341 can be supplied with a variable speed AC motor drive. An integrated bin permits easy removal of the scrap wire that has been collected.

## Model 409 Mk II Scrap Winder

With the Model 409 scrap winder, a rotating wind up drum is employed to bundle the unused wire as it is pulled from the creel. This model has several safety features to safeguard the operator during operation. The Model 409 is driven by an AC induction motor with a variable speed motor controller.



# Sales Bulletins

If you are interested in the products RJS Corporation has to offer and would like to know more information about the equipment, please request any of the following bulletins from a sales representative.

TC-2002	Creel Systems
RJS-493-107	Model 493 Tension Controller
RJS-500-107	Model 500 Tension Controller for OTR
TC-396	Model 305 Tension Controller
SS-1112	Special Series Tension Controllers
RJS-Shifter-434-1013	Typical Creel System with Independently Shifting Platforms
QT-997	Quick-Thread Organizer
QT-501	Large Size Quick Thread Organizer
RJS-DC-2002	Digi-Creel, Creel Room Monitoring and Control
RJS-173-12-111	Model 173 Air Pressure Control Console, Manually Controlled
SCC-3631191_363	Model 363 Air Pressure Control Console, Servo Valve Controlled
RJS-KN476-477-10	Model KN 476/477 Creel Loader
RJS-476-07	Model 476 Spool Grasper
SP-344-309	Model 344 Steel Cord Splice Press
SP-448-10	Model 448 Steel Cord Splice Press, Side opening Style
WPO-341-813	Model 341 Wire Pull-Out Stand
SW-409-2009	Model 409 Mk II Scrap Winder

RJS Corporation also offers...

DG-797	Disciplign® Belt Guide
RJS-70-IV-1502	Model 70 MK IV Tire Plunger / Bead Unseating Tire Test Machine
BCM-147-475	Model 147 Universal Bead Covering Machine

## Ordering Information

To request a quote or place an order for tension controllers from RJS Corporation, the following information is needed:

- A. Tension controller model
- B. Total quantity and configuration
- C. Spool type to be used
- D. Angle of spindle relative to the floor
- E. Drive type
- F. Any additional requirements

If you are interested in a complete creel system, the following information is needed when requesting a quote:

- A. Tension controller detail
- B. Number of creel rows and arrangement
- C. Number of horizontal levels per creel row
- D. Model of cord organizing boards
- E. Control console type
- F. Additional supporting equipment
- G. Shipping destination



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