

S4 Controller

OPERATOR'S HANDBOOK



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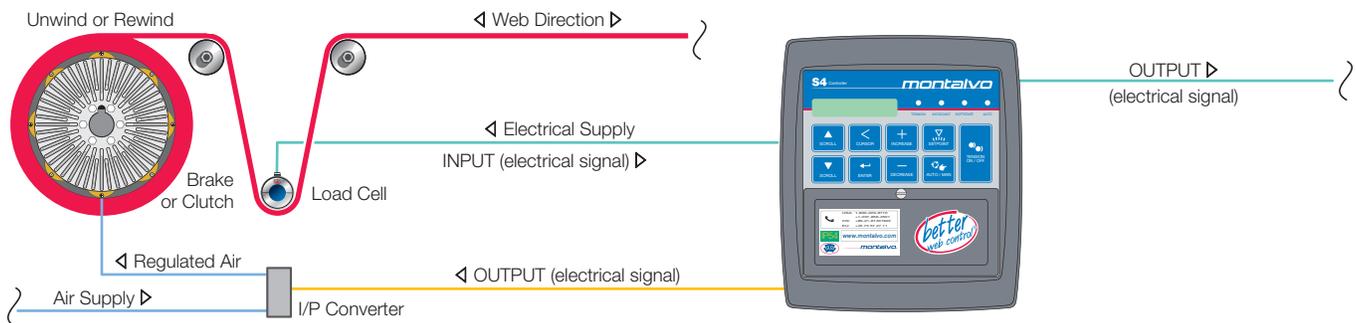
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1 General Description

The Montalvo S4 digital controller provides precise automatic control of web tension. It's used in a closed loop, of which the load cell roll and brake are a part. Please refer to the diagram of a typical pneumatic system below.



Load Cell Function

Two load cells (or transducers) are normally used. The signals from the load cells are summed together to give the total web tension across the entire web.

Converter Function

The I/P converts the 4 to 20 mA regulator output to a proportional 0 to 75 PSI (0 to 6 bar) to control the brake.

Brake Function

One or more brakes may be controlled, converting the pneumatic output pressure from the I/P into torque. This torque in turn changes the web tension.

Auto Mode Function (closed loop)

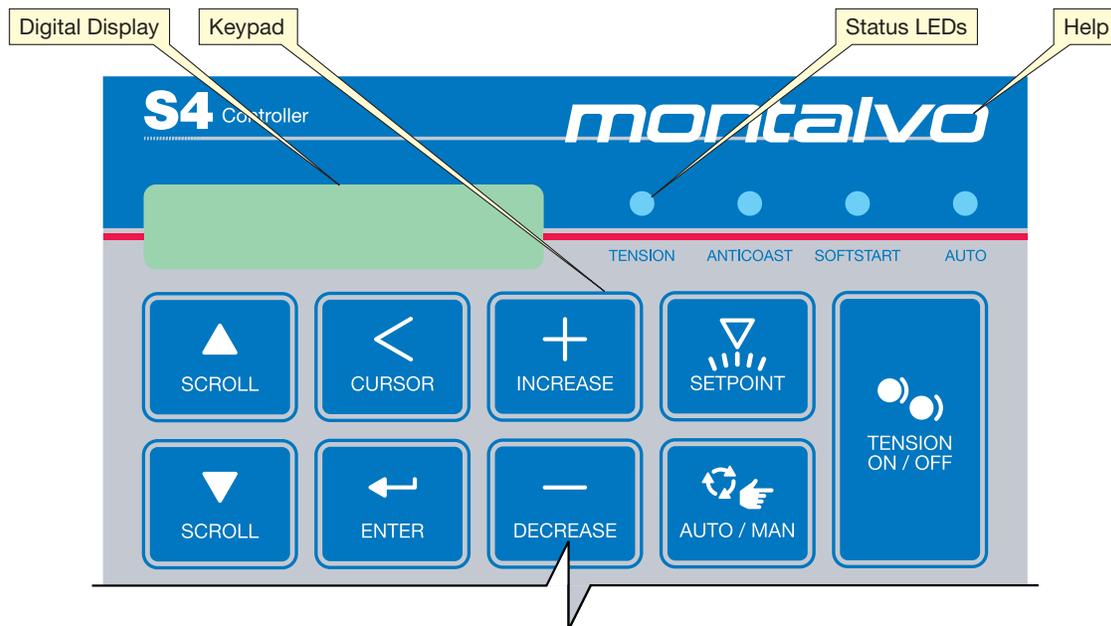
The operator sets the desired tension with the keypad and the digital display. The feedback from the load cells is calibrated to display the actual web tension on both the digital display and the analog meter. This signal is compared with the desired tension (setpoint) and the microprocessor automatically adjusts the output to make the actual tension the same as the desired tension. Because the web itself is part of the feedback loop, the controller can quickly compensate for speed and diameter changes as well as other factors that may affect tension.

Manual Mode Function (open loop)

The operator sets the desired brake pressure with the keypad and digital display. The web tension is still measured and displayed on the web tension meter and the digital display, but no automatic regulation is done in this mode. The operator must make constant adjustments to maintain tension.

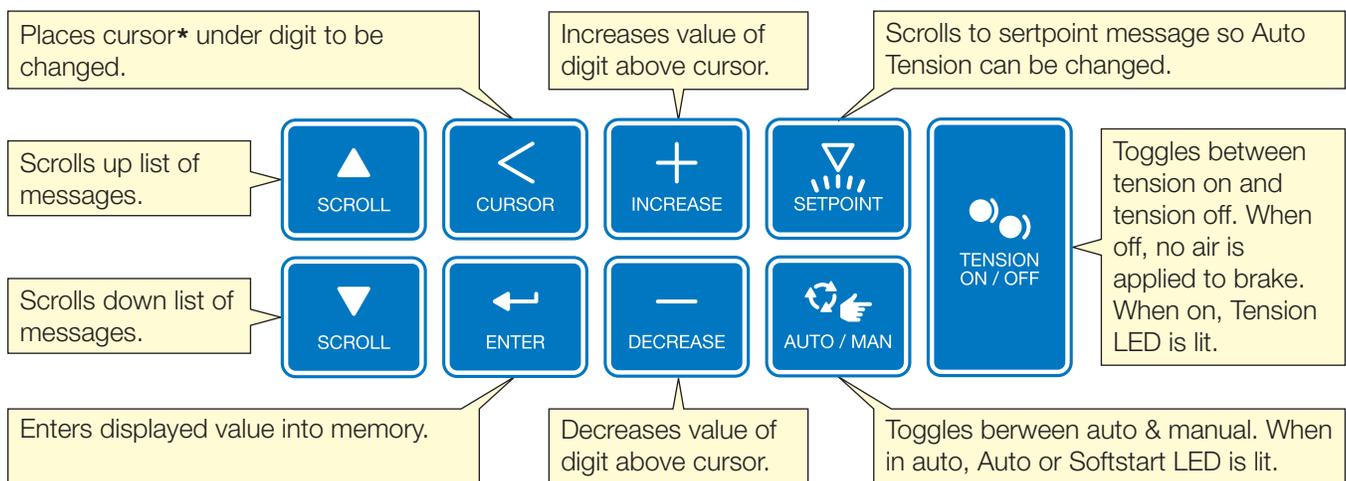
2 Front Panel

2.1 Description of Front Panel and Keyboard



Keypad

The following diagram shows the keypad with a brief explanation of the function of the keys:



*The cursor is a line underneath a digit in the display, marking position of the character that can be edited or entered. If the cursor appears, each time the cursor key is pressed, the cursor moves one position to the left. When it has gone as far left as possible for the particular message, it will return to the least significant digit. If the cursor is not showing on a message that can be edited, pressing the cursor key will make it appear.

Help Key

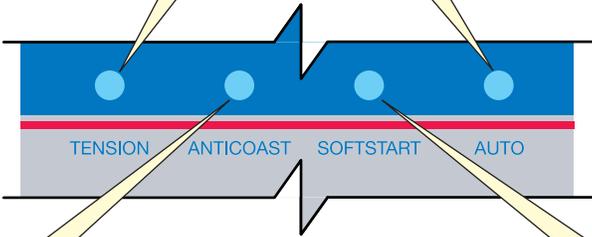
Pressing this key causes a brief help message to scroll across the display. This feature is especially helpful for describing messages that have been abbreviated to fit in the 16 character display. (Refer to keypad diagram.)



2.2 Status Indicator Lights

TENSION ON/OFF - Indicates that an output is being applied to brake. If only tension light is on, the controller is in manual mode. In manual mode, a change in output changes tension. Pressing Tension On/Off key turns tension on and off.

AUTO - Indicates that controller is in automatic mode. Controller will adjust output as needed to maintain setpoint value. To change tension in auto mode, change setpoint. The auto light should only be on when the machine is running.

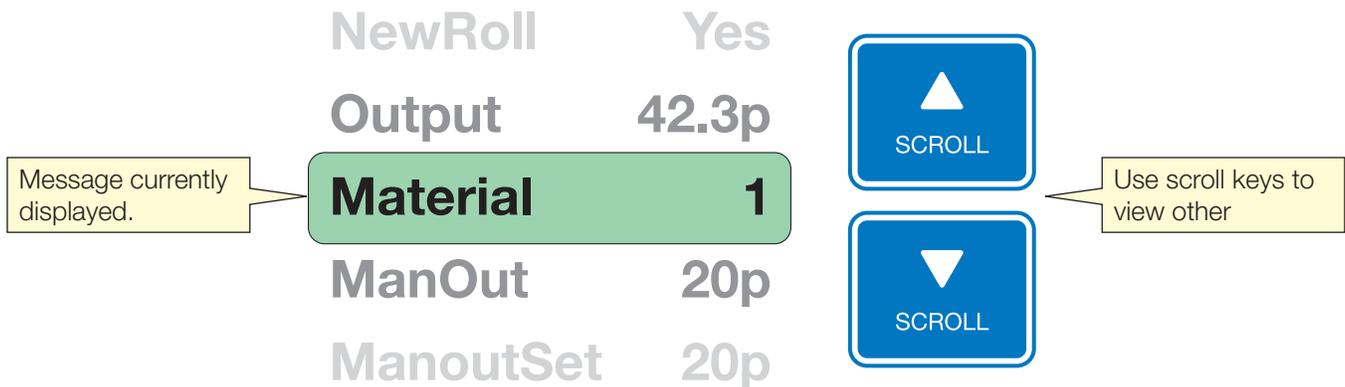


ANTICOAST - Indicates that controller is in the anticoast mode. Should only light up when stop button on machine is pushed and should remain on until machine has come to a complete stop.

SOFTSTART - Indicates that controller is in softstart mode. Should only be on when machine has stopped. When run button on machine is pushed, this light will blink for a set time, then go out, and auto light will come on.

2.3 Digital Display

A limited number of messages appear on the digital display. Most of them are “read only” messages, which cannot be changed. To view the messages, use the scroll up and down keys. Some messages are only available in certain operating modes. For the scrolling principle, see the diagram below:



3 Operation

3.1 Manual Mode

From the ManOut message, the output can be set to any value in its operating range. The output in manual can be previewed and preset from the ManOutSet message.

- Use the CURSOR key to position the cursor under the digit you wish to change.
- Use the INCREASE or DECREASE key to change the digit to the desired value.
- Press ENTER to store the value.
- To activate the manual mode, press the TENSION ON / OFF key.

The tension LED will come on and the message will change to ManOut. Once in manual, the output can be changed using the same procedure. Since no automatic regulation is done in manual, the operator must make constant adjustments to maintain tension.

3.2 Auto Mode

If the start/stop contact has been wired in and Soft Start or Inertia Comp Start has been selected, the S4 provides “set it and forget” operation. At machine start, tension will automatically be turned on and the controller will cycle through Soft Start /Inertia and switch into automatic. At machine stop, depending on application, the controller will either switch into Anticoast/Inertia Comp Stop mode, or remain in automatic until the line has stopped. For unwinds, it will then switch into Hold mode until the line is restarted. For rewind applications, it will remain in auto. If the start/stop contact is not used, the controller can be switched into closed loop automatic regulation by pressing the AUTO/MANUAL key once tension is on. In automatic, the actual web tension is compared with the desired tension (setpoint) and the output is adjusted to maintain that setpoint. The output changes proportionally with roll diameter and other factors which may affect web tension. To change the Setpoint, SCROLL to SetPoint or press the SETPOINT key. Change the appropriate digits and press ENTER to save the new value.

3.3 Auto/Manual Switching

When switching from manual to auto, the controller starts at the manual output, then regulates to the output required for automatic control. When switching from auto to manual, the controller changes the manual set value to the level it was in auto, so that there is a smooth transfer in either direction.

3.4 Changing the Auto Tension Setpoint

This procedure for changing the setpoint also serves as a short exercise in editing and changing displayed messages. Recommended: practice the following procedure a few times to learn how to use the keypad.

- Press  key if Setpoint xx.x# is not displayed.
- Press  key to position cursor under digit to be changed.
- Press  or  key to change digit to desired value.
- Press  key to store desired value in permanent memory.

3.5 New Roll

If Soft Start, Inertia Compensation or Taper are programmed, this message appears automatically each time tension is turned off. It is necessary to reset the diameter calculation whenever the roll is changed. The default message for unwind applications is NewRoll? Yes, so if the roll is being changed, these functions are automatically reset. If tension is turned off without changing the roll, press ENTER to change to NewRoll? No. For rewinds, the default is NewRoll? No. If the roll is changed, press ENTER to change to NewRoll? Yes.

3.6 Installing new roll

Press  to turn tension OFF. Display reads: **NewRoll** **Yes**

Install new roll.

Press  Tension LED lights. Display reads: **ManOut** **xx.xp**

Press  SoftStart or Auto LED is lit. Display reads: **Output** **xx.xp**

3.7 Help

For a short explanation of a displayed message, press the Help key, and a brief description will scroll across the display. This feature is especially helpful in describing messages abbreviated to fit the 16 character display.



3.8 Operator's Messages

Below is a list of standard messages that are available to the operator and the modes in which they will be displayed. Note: some messages are for information (read only) and cannot be changed. Other messages may appear in the operator's list if certain options are activated (for example Taper, Multiple Calibrations, Tension Per Unit Width).

MESSAGE / MODE	TENSION OFF (No LED's lit)	TENSION ON (manual) (Tension LED lit)	AUTO (Tension and Auto or Soft Start LED lit)
ManOutSet 22.0p	Output that will be applied when tension is turned on (can be changed)	Not displayed in this mode	Not displayed in this mode
ManOut 22.0p	Not displayed in this mode	Output that is being applied (can be changed)	Not displayed in this mode
Output 0.0p	Displays 0.0 as a reminder that tension is turned off	Not displayed in this mode	Output that is being applied (display only)
Setpoint 75.0#	Displays the current desired automatic tension (can be changed)		
Tension 02.0#	Displays total tension applied to web (cannot be changed). Should agree with analog meter reading if M4 is used.		
Material 3	Displays Selected Material (can be changed by operator). See - Note 2		
NewRoll? Yes	See - Note 1	Not displayed in this mode	Not displayed in this mode

Note 1 This message will only be displayed if **Soft Start** or **Taper** is selected by supervisor. When changing from **Tension ON** to **Tension Off** mode, display asks **NewRoll?** because the S4 must know if tension was turned off in order to install a new roll. Press **ENTER** to change.

Note 2 Can only be changed if more than one material has been saved by supervisor during set-up.

4 Troubleshooting

Before you call... check this list of common problems often attributed to tension control. Many, however, are not caused by a controller malfunction and may just require a slightly different operating procedure.

Instability (indicated by a remote analog tension meter if being used)

- Small variation are quite common (3 to 5 divisions on the A4 meter scale).
- Switch into the manual mode by pressing Auto/Manual key.
- If meter continues to indicate large fluctuations, fluctuation is not caused by controller.
- Look for mechanical problems such as egg shaped rolls, slipping or worn chucks or air shafts, surging NIP drives, etc.

Cannot adjust tension (setpoint)

- Tension cannot be adjusted above current meter scale reading. See supervisor.

Web break or stretching on start-up

- Make sure S4 is in Soft Start mode when starting. Soft Start usually works off the machine start button.
- If start button is pressed with speed potentiometer turned all the way down, the Soft Start will time out and the S4 will go into Auto mode.
- If S4 goes into Auto mode before web starts moving, air pressure on the brake will start to increase (see section on Soft Start).

Roll coasting when stopping

- If Anticoast is used, coasting should not occur. **Note: Anticoast is activated by the stop button.**
- If speed is adjusted downward by turning the pot quickly to zero, coasting can occur.
- If coasting still occurs after the stop button has been pressed, check that anticoast LED remains on until the machine comes to a stop.
- If machine does not come to a complete stop, supervisor must increase the time that unit stays in anticoast.
- If the LED remains lit after the machine stops and coasting still occurs, supervisor should contact Montalvo customer service representatives.

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