

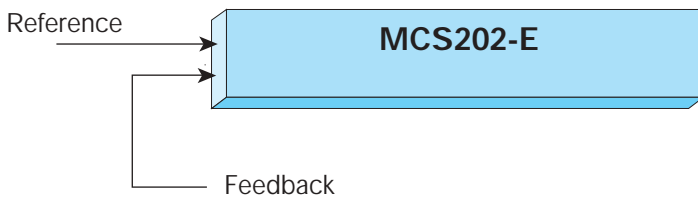
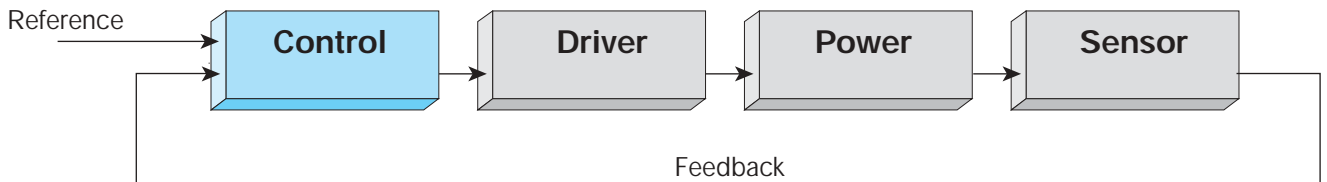


## CONTROLS

# Closed loop control overview

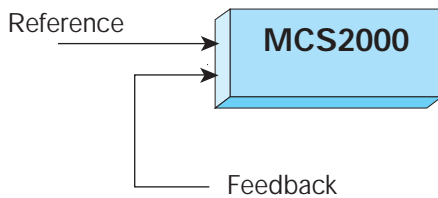
Most tension controls work in closed loop configuration. In this case the **CONTROLLER** is indispensable. This element is the heart of the system. The control is continuously comparing the web tension information coming from the **SENSOR** with the tension reference we give to the controller. As soon as the controller detects a difference between the two values a correction is applied to the power element through the driver.

## WICHITA CONTROL LINE OVERVIEW



Low cost analogue control including driver in 3 versions:

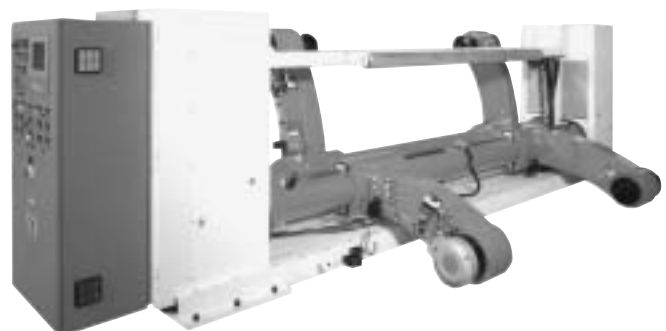
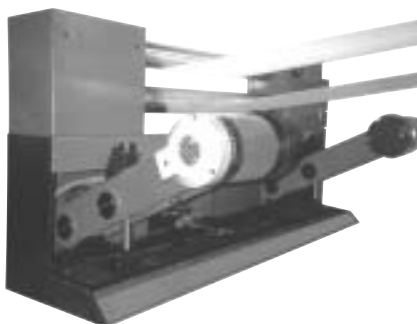
- MCS202-E1      standard version.
- MCS2000-E54    IP54 protected.
- MCS202-EC1     Open frame standard version.



Digital control in 3 versions:

- MCS2000-ECA    OEM version.
- MCS2000-CTDA   user version for dancer application.
- MCS2000-CTLC   user version for load cell application.

## Typical applications



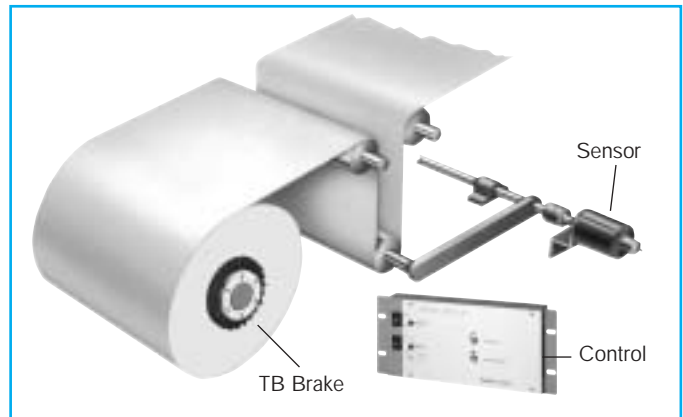
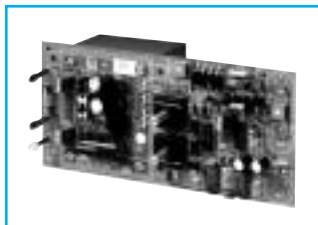


## CONTROLS

# MCS202-E line

The **MCS202-E** is an analogue control. It is dedicated to electromagnetic brakes and accepts only dancer as feedback. The control is not provided with internal logic function for splice. It suits the simple application and is very easy to start up. All connections are made by connector avoiding the wiring error risk. Wichita can supply the sensor and other accessories for easy mounting.

## ANALOGUE CONTROL MCS202-E



- MCS202-E1 Standard execution.
- MCS202-E54 Standard IP54 protected.
- MCS202-EC1 Open frame execution.

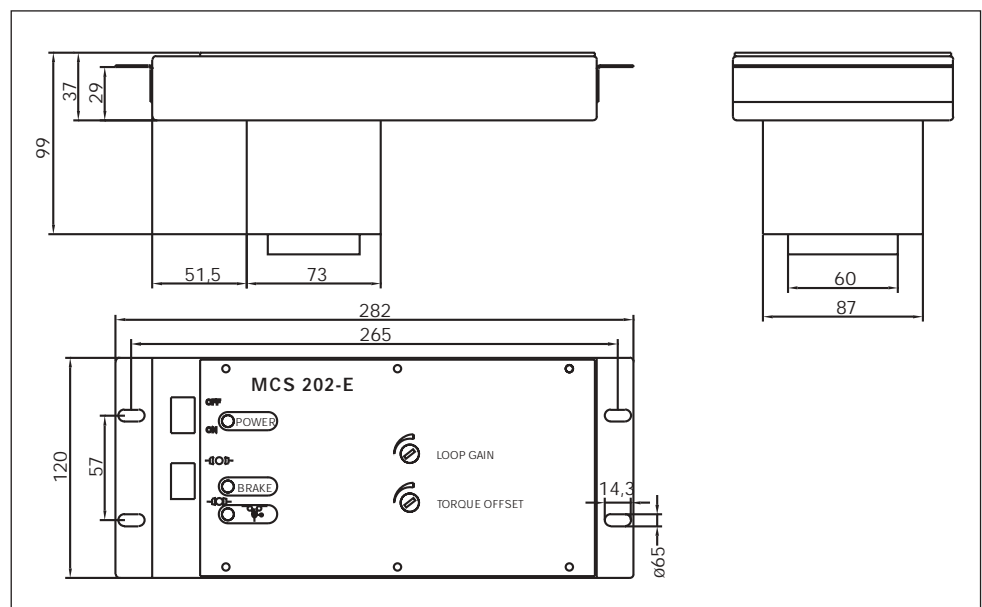
### Technical Characteristics – valid for 3 executions

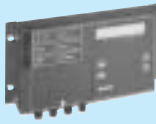
	Range – Values	Comments
Power supply	110-220 VAC selectable	Open front face to access
Output current capability	Max 2, 5 Amps, shortcircuit protected	Able to power 2 TB in parallel
User settings	Loop gain	Front face potentiometer
	Offset torque	Front face potentiometer
Output voltage	0-24 VDC	Compatible all elec. Wichita brakes
Housing	Metal rugged housing	Only MCS202-E1 and -E54
Loop gain	2 adjustable range selection	Can be changed during operation
Accessories	MCS-KIT1, 2, 3, 5 and 6	See details on page 48
Sensor compatible	Dancer arm with MCS605-E	See details on pages 45 and 48

### Technical information

MCS202 control is based on classical and fixed PID terms. The loop gain can be set on front face potentiometer. Due to the fixed PID terms, its use is limited in terms of roll diameter ratio. One input is provided to change the loop gain and has to be used when diameter ratio exceeds 8 to 10. To ensure proper operation it is important to wire the function "Drift Stop". This function releases the Integral term as soon as the machine runs.

### Dimensions





**CONTROLS**

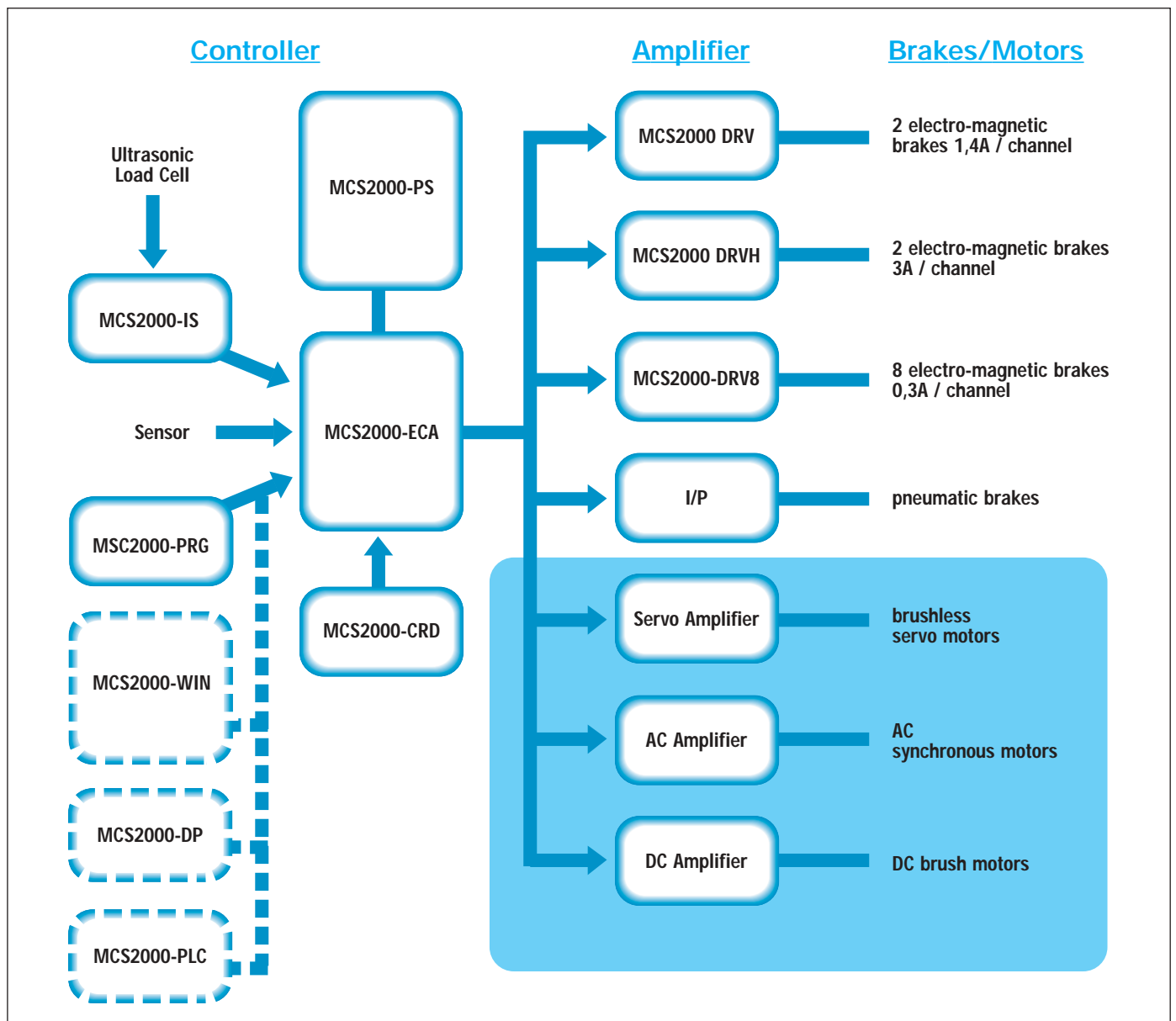
# MCS2000 line configuration

**MCS2000** is a product line developed around the controller **MCS2000-ECA**. **MCS2000-ECA** is the heart of the complete configuration grouping driver, power supply, programming tool, display, interface sensor... The configuration is represented in the diagram below.

## MCS2000 LINE CONFIGURATION



MCS2000-ECA	Digital programmable controller – dual channel output.	36
MCS2000-PS	24 VDC power supply – 100-260 VAC auto-ranging input.	47
MCS2000-DRV	Dual channel brake amplifier with individual “anti-residual” adjustment.	30
MCS2000-DRVH	Dual channel brake amplifier with high output current capability.	30
MCS2000-PSDRV	Dual amplifier MCS2000-DRV and power supply MCS2000-PS in common housing.	30
MCS2000- PRG	Portable programming tool with 2 lines 16 character display.	47
MCS2000- DP	Panel mounted programming keyboard and display.	47
MCS2000-CRD	Pluggable memory card with 2 full programme capacity.	47
MCS2000-IS	Ultrasonic and dual load cell interface.	47
MCS2000-WIN	Window software to interface the control to the PC (3 disks).	47
MCS2000-PLC	Codes list for PLC (terminal mode) – RS232 controller communication.	47








**CONTROLS**

## MCS2000 line – characteristics

Based on the **MCS2000-ECA** controller, Wichita has developed two additional versions as a "User Version". These two versions were obtained by grouping some existing functions in the modular configuration. These two versions make the installation and wiring easier. The programming tool – separate on the ECA version – is fitted as standard. Finally, three digital control units are available in the **WICHITA** range:

MODELS	MAIN CHARACTERISTICS	UTILISATION
<p>MCS2000-ECA</p> 	<p>Open + closed loop control            PID compensation            RS232            Memory card            24V power supply            See details on page 36</p>	<p>Multipurpose OEM</p>
<p>MCS2000-CTDA</p> 	<p>MCS2000-ECA + PS + DP            in same housing.            110-240VAC power supply            See details on page 37</p>	<p>Dedicated dancer</p>
<p>MCS2000-CTLG</p> 	<p>MCS2000-ECA + PS + DP + IS            in same housing.            110-240VAC power supply            See details on page 37</p>	<p>Dedicated load cell</p>
<p>Use the reference below to order with various software :</p>		
<p>MCS2000-ECA</p>	<p>Standard software with RS232</p>	<p>Multipurpose OEM</p>
<p>MCS2000-CTDA-10</p>	<p>Standard software with RS232</p>	<p>Dedicated dancer</p>
<p>MCS2000-CTDA-11</p>	<p>Taper position function            Limited RS232</p>	<p>Dedicated dancer</p>
<p>MCS2000-CTLG-10</p>	<p>Standard software with RS232</p>	<p>Dedicated load cell</p>
<p>MCS2000-CTLG-11</p>	<p>Taper tension function            Limited RS232</p>	<p>Dedicated load cell</p>

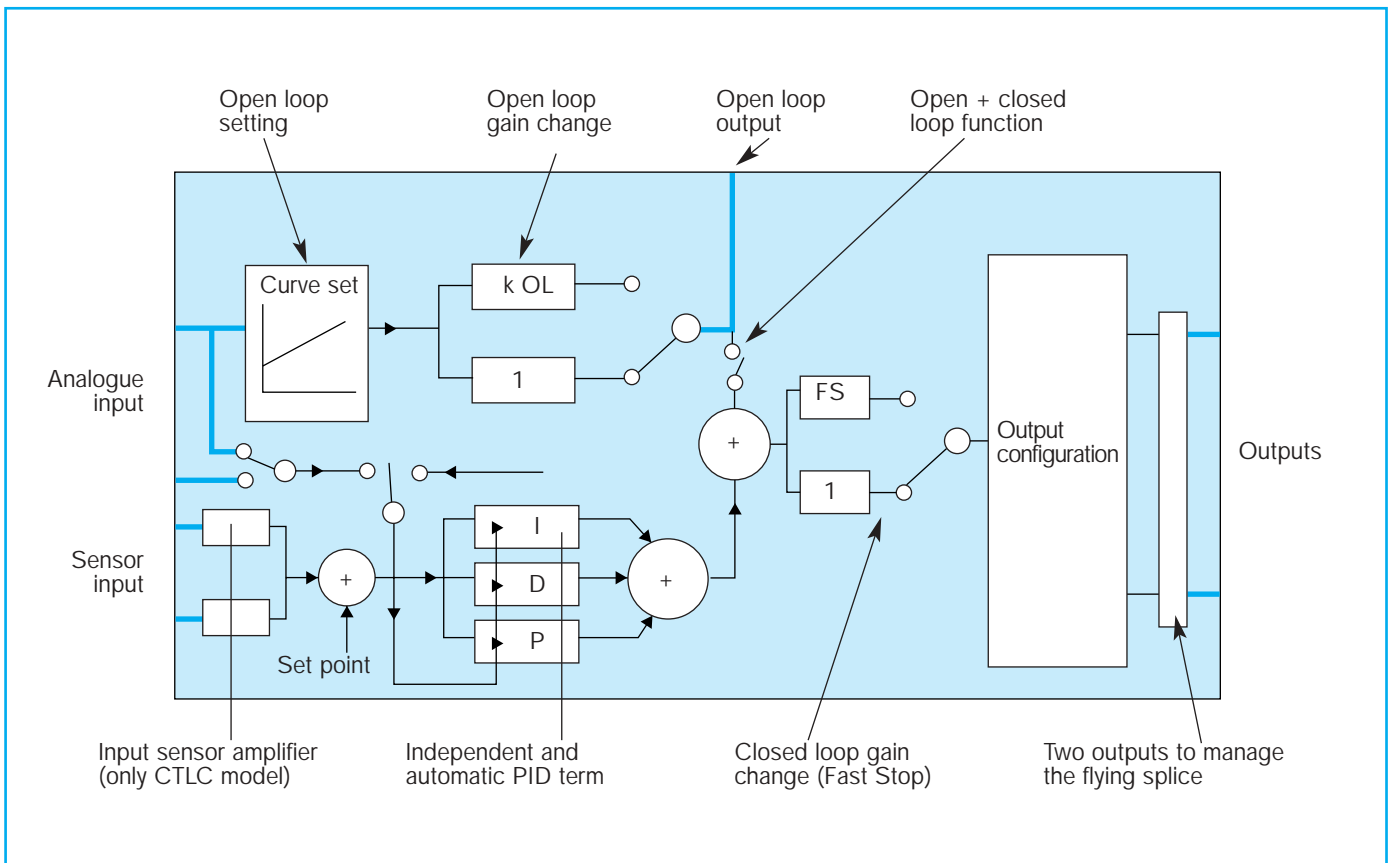


**CONTROLS**

# MCS2000 line – characteristics

The block diagram below shows all important features installed in the MCS2000 control line. It is very important to understand all the possible configurations that the control can provide.

## MCS2000 Block diagram



## MCS2000 Features

Features / compatibility	ECA	CTDA-10	CTLC-10	CTDA-11	CTLC-11
Power supply 110 / 240 VAC		✓	✓	✓	✓
Power supply 24 VDC	✓				
Dancer use, one sensor input	✓	✓		✓	
Load cell use, 2 sensors input			✓		✓
RS232 communication	✓	✓	✓	✓	✓
Window software programming system	✓	✓	✓		
Taper function	✓	✓		✓	✓
Splicing capability	✓	✓	✓	✓	✓
Sensor auto-scaling	✓	✓	✓	✓	✓
Memory card support	✓	✓	✓	✓	✓
PID, individual term setting/online correction	✓	✓	✓	✓	✓
Options, accessories	PRG				
(see details on pages 42 and 47)	DP				
	PS				
	CRD	CRD	CRD	CRD	CRD



**CONTROLS**

# MCS2000-ECA

*MCS2000-ECA is a digital controller that can be used in both open or closed loop. Operation in open and closed loop is also possible. It is mainly destined for OEM application. The programming tool is detachable. Sensor, sensor mounting kit, display are available as options. The unit has to be powered with 24 VDC.*

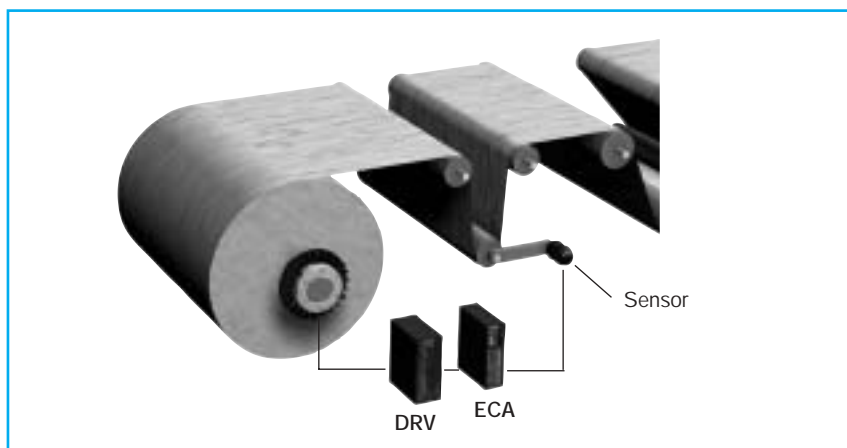


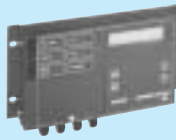
## Specifications

<b>Input power supply</b>	24 VDC ± 5%, 0,2 Amp
<b>Analogue inputs</b> Two analogue inputs Sensor input	0-10 VDC Min 4 VDC delta in ± VDC
<b>Analogue outputs</b> Two controlled channels Open loop signal	± 10 VDC, 0-20 mA 0-10 VDC
<b>Digital inputs</b> Set point change + Set point change – Gain multiplier Open + closed loop activation Output limitation ABC binary combination ABC inputs synchronisation Sensor polarity change Stop integral term	active low active low active low active low active low active low active low active low active low active low
<b>Digital output</b> Sensor level indication	Two binary outputs, active low
<b>Other outputs</b> Power supply sensor Voltage reference	± 15 VDC / 100 mA + 10 VDC /10 mA
<b>Options / accessories</b> Rotary and linear sensors Programming tool Programming tool and display Windows software Terminal mode communication Memory card	see page 42 see page 47 see page 47 see page 47 see page 47 see page 47

## Features

- Fully digital, scrolling menu program.
- Multipurpose application.
- RS232 communication.
- Window programming software.
- Two output channels.
- Automatic sensor scaling.
- Programmable output configuration.
- Output sensor information.
- External set point change.
- Automatic or imposed PID correction.
- All features requested for tension control.
- Pluggable memory card.
- Sensor rescaling without tool.





## CONTROLS

# MCS2000-CTDA / CTLC

**MCS2000-CTDA and CTLC** are packaged versions. Power supply, programming keyboard and display are built in. In the **CTLC** version (load cell), two load cell amplifiers are installed as standard.

For both **MCS2000-CTDA and CTLC** two software versions are available. See specifications below.



## Common specifications

**Input power supply** 110-240 VAC selectable

**Analogue inputs**  
Two analogue inputs 0-10 VDC

**Analogue outputs**  
Two controlled channels  $\pm 10$  VDC, 0-20 mA  
Open loop signal 0-10 VDC

**Digital inputs**  
Set point change + active low  
Set point change - active low  
Set point change  $\pm$  front face switch  
Gain multiplier active low  
Output limitation active low  
ABC binary combination active low  
ABC inputs synchronisation active low  
Stop integral form active low

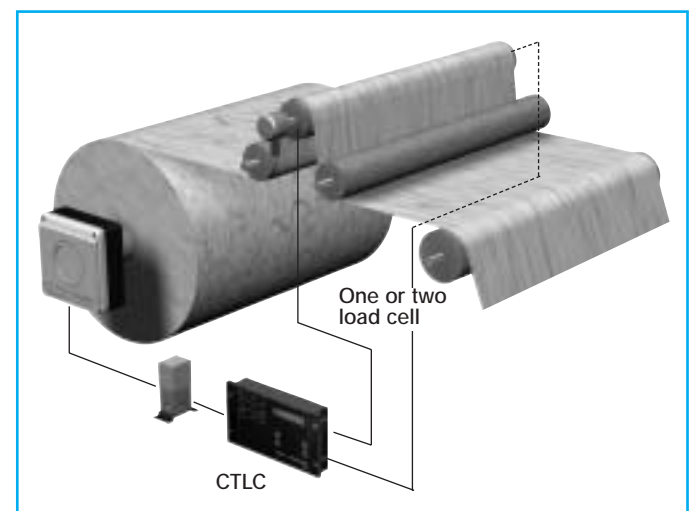
**Digital outputs**  
Sensor level indication Two binary outputs

**Other outputs**  
Power supply sensor  $\pm 15$  VDC / 100 mA  
 $+ 5$  VDC / 100 mA  
Power supply 24 VDC  
Voltage reference  $+ 10$  VDC / 10 mA

**Options /accessories**  
Memory card see page 47  
Windows software see page 47  
Rotary and linear sensor see page 42

## Common features of all versions

- Three mounting possibilities.
- Software password protected.
- Fully digital, scrolling menu program.
- Multipurpose application.
- RS232 communication.
- Two output channels.
- Automatic sensor scaling.
- Programmable output configuration.
- Output sensor information.
- External set point change.
- Automatic or imposed PID correction.
- All features requested for tension control.
- Pluggable memory card.





CONTROLS

# MCS2000-CTDA / CTLC

## Various models definitions – specifications – typical applications

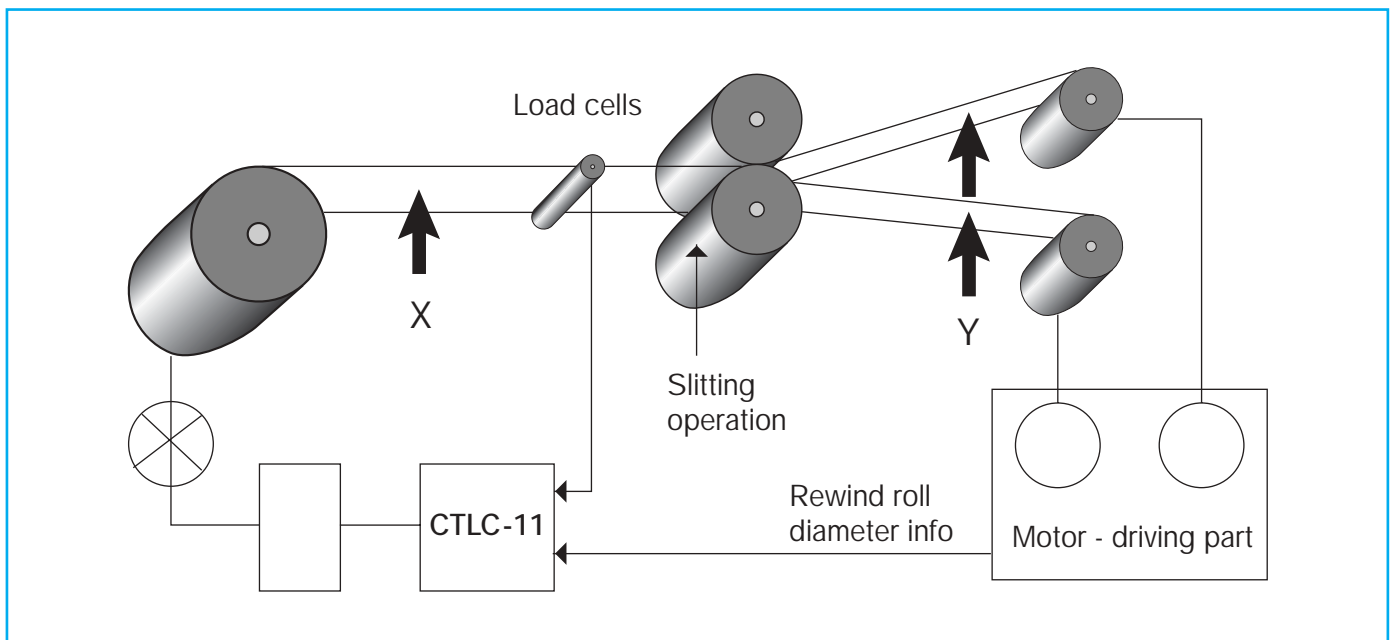
Model	Characteristics	Applications
MCS2000-CTDA-10	RS232 One sensor input	Dancer feedback
MCS2000-CTDA-11	One sensor input Taper function Limited RS232	Dancer feedback
MCS2000-CTLC-10	RS232 Two scalable sensor input	Load cell feedback
MCS2000-CTLC-11	Two scalable sensor input Taper function Limited RS232	Load cell feedback

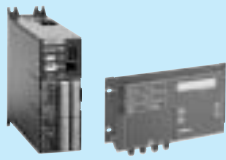
### Taper function

The most usual application requiring taper function is the rewind stand where the initial tension on the core has to be automatically reduced as the diameter increases. Rewind diameter information / feedback is essential. The typical application is slitter where no intermediate driving roll is present. The unwind tension, in this case, is the same as rewind and has to be tapered. The tension is identical in zone X and Y.

The tension reference on the controller MCS2000-CTLC-11 is continuously corrected according to the rewind diameter information coming from the driving system or from an ultrasonic sensor measuring the rewind diameter.

The taper function allows a perfect rewind roll shape (mainly avoiding telescopic effect).



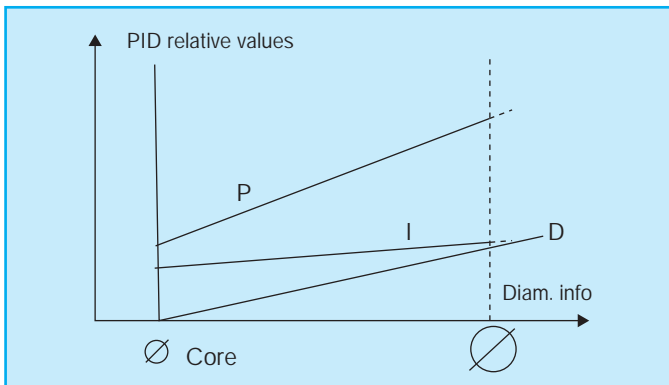


## CONTROLS

# MCS2000 – Important features

**MCS2000** line is provided with very interesting and useful features. Below is a brief description of the most interesting ones.

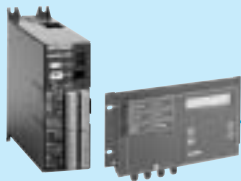
As already stated, the main problem in tension control is the roll inertia change during operation. The PID function is optimal for one inertia value. The MCS2000 line is provided with an important feature – the PID correction. Based on the available diameter information, you can apply a continuous PID correction. When no information is available, an internal PID change can be programmed.



Each parameter P, I and D can be set individually for the smallest (core) and biggest diameter. As soon as the correct parameters are found for the extreme diameter value, they are stored. The diameter information provided will fix the PID values for the present diameter value. This will allow the system to keep an excellent stability during the whole diameter evolution. In the case where the diameter information is not available we can provide this signal by installing a sonic sensor or by working with internal correction. The external diameter information supplied to the controller will ensure a better precision compensation compared to an internal correction.

## WHATEVER YOU NEED MCS2000 CAN REPLY ...

You need the tension control connected to PLC.	Use RS232 communication.
You need an adaptive PID due to big diameter ratio.	Use internal or external PID correction. Use RS232 communication to operate the correction.
You already have your own load cell.	MCS2000-CTLC can accept any signal.
You have flying splice on the machine.	MCS2000 can manage it.
You need to control a brake and a motor.	MCS2000 can control both.
You have a multi-material machine range.	Use memory card to load the correct programme. Use RS232 communication to change the parameters. Use Windows software to load the correct programme.
You need taper function.	Use the right MCS2000 model including this function.
Your feedback is a 0-10 V.	MCS2000 can accept any signal range.
You need to work in open + closed loop.	MCS2000 is provided with both functions.
You finally found a perfect setting.	Save it on a memory card as back-up.
You need to display the tension in Newton, kilo...	MCS2000 can be programmed for any unit.
You have a very special application.	We can assist you in control definition. Ask a Wichita representative, we can propose any customised solution / software.



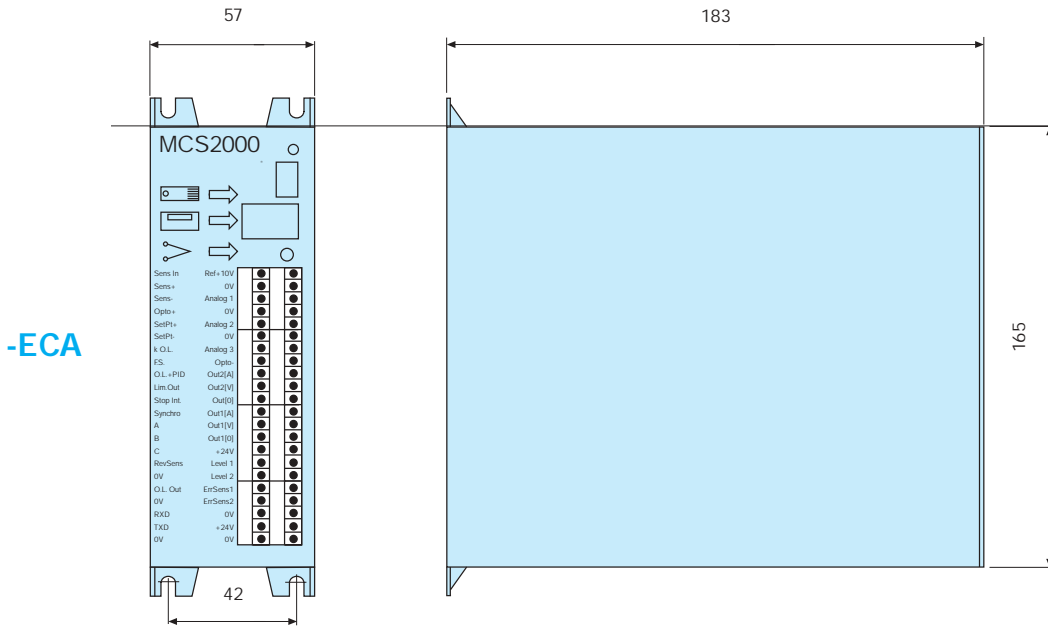
CONTROLS

# MCS2000 control line – Dimensions

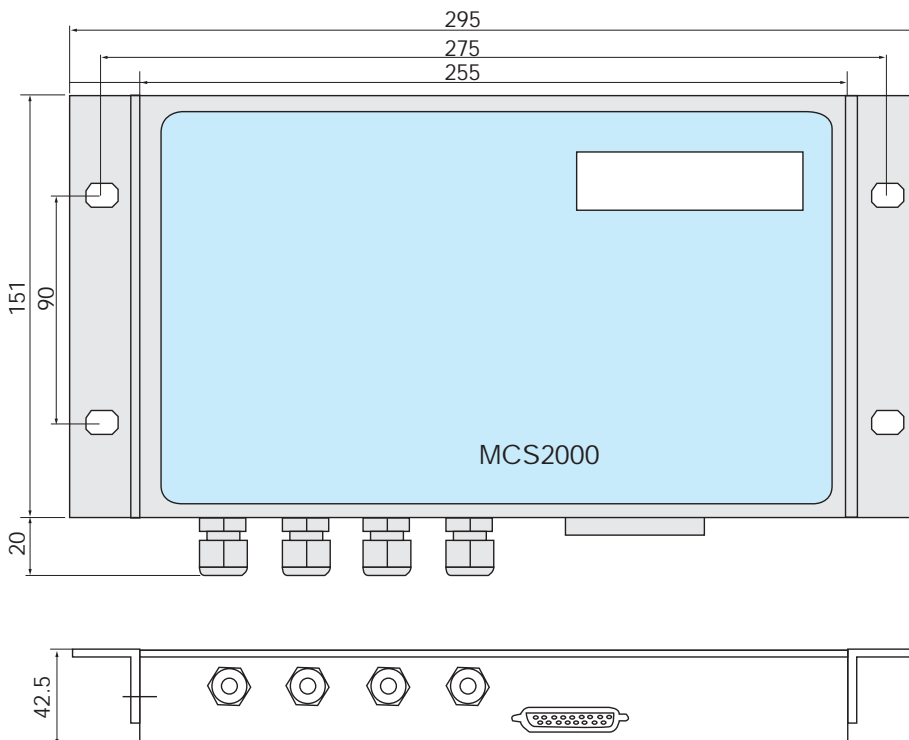
**MCS2000-ECA**  
**MCS2000-CTDA-10 / CTDA-11 / CTLC-10 / CTLC-11**  
*(same physical dimensions)*

## Dimensions [mm]

### MCS2000



### MCS2000-CTDA, MCS2000-CTLC



## MOUNTING

