

Tension Controls

Selection Guide

Selecting the Correct Tension Control

Selecting the correct tension control is as important as selecting the proper tension clutch or brake. As the control is the heart of the system which provides the necessary controlling function in the application, selecting the wrong control or inadequate control can be as bad as incorrectly sizing the mechanical portion of the system.

Normally control selection can be very simple if a few simple questions can be answered regarding the application. By doing so, selection can be very easy and painless.

Selection Steps

The following steps outline a simple way of selecting the proper control system for the application.

1. Determine the type of system that is to be used. Will the system be load cell, dancer, or open loop analog control?
2. Next, determine the type of brake or clutch system that the control will be used with. Will this be an electric or pneumatic system?
3. Using the Quick Selection Chart, determine which models may be suitable for the application.

Once the determination of the control/controls has been made for the application, review the specifications for the various controls to determine the characteristics and features that best suit the application and your requirements.

Mechanical Elements

Once the control has been selected, be sure to check that it will work with the brake or clutch previously selected.












This can be determined from the specific technical specification for the control selected. Remember, not all controls will work with all clutches and brakes.

If the control selected will not operate the controlling device selected, i.e., clutch or brake, then a different control must be selected.

Control – Quick Selection Guide

Model Number	Output Voltage	System Type				Air or Electric	Page
		Open Loop		Closed Loop			
		Manual Adjust	Analog Input Adjust	Dancer	Load Cell		
MCS2000	0±10 (2 channel) (0–20mA)	●	●	●	●	Air/Electric	46
*TCS-200	0–24	●	●			Electric	56
TCS-200-1	0–24	●	●			Electric	56
TCS-200-1H	0–24	●	●			Electric	56
MCS-203	0–24				●	Electric	61
MCS-204	0–24	●	●			Electric	57
MCS-207	0–10 (1–50mA)				●	Air	63
MCS-208	0–10 (1–50mA)	●	●			Air	59
TCS-210	0–24 (48)				●	Electric	62
TCS-220	0–24 (48)	●	●			Electric	58
TCS-310	0–24 (48) (2 channel)				●	Electric	64
TCS-320	0–24 (48) (2 channel)	●	●			Electric	60

*For new applications, we recommend the TCS-200-1 or TCS-200-1H.

Control	Description	Page Number
MCS2000 	Fully digital control, PLC compatible, which can operate in both open (analog input follower) or closed (dancer or load cell) mode. Directly controls electric clutches and brakes, and air brakes via an electric/pneumatic transducer. Control has two output channels with fully programmable splice logic. Can also be used as a digital front end to an analog drive.	46
TCS-200 	Inexpensive analog control with manual or remote follower adjust for electric brakes. Also accepts roll follower potentiometer input. Requires 24-30 VAC input. For use with MTB Series electric brakes (page 68).	56
TCS-200-1 TCS-200-1H 	Extremely versatile and economical open loop control for all 24V electric brakes and clutches. Can be used for manual adjust, or will follow an analog (0–10V, 4–20mA) input, such as from an ultrasonic sensor or PLC. For use with MTB, TB and ATTB Series and magnetic particle electric brakes. (page 68)	56
MCS-203 	Closed loop dancer control for 24V electric clutches and brakes. For use with TB Series, ATTC and ATTB Series and Magnetic Particle clutches and brakes (page 68).	61
MCS-204 	Analog control for 24V electric clutches and brakes. Manual control, or analog (0–10V or 4–20mA) signal. For use with TB Series, ATTC and ATTB Series and Magnetic Particle clutches and brakes (page 68).	57
MCS-207 	Economical closed loop dancer control especially configured for air brakes. Provides a 0–10V or 4–20mA output to E/P transducers. For use with Pneumatic brakes (page 68).	63
MCS-208 	Economical open loop analog control especially configured for air brakes. Provides manual control, or accepts analog input (0–10V or 4–20mA). Same output as MCS-207. For use with Pneumatic brakes (page 68).	59
TCS-210 	Economical closed loop dancer control for all 24V brakes and clutches. Has reserve 48V supply for enhanced E-stop torque with certain brakes. For use with MTB Series electric brakes (page 68).	62
TCS-220 	Analog control for 24V electric clutches and brakes. Manual adjust, or follows analog (0–10V or 4–20mA) input. Reserve 48V overexcite for E-stops. For use with MTB Series electric brakes (page 68).	58
TCS-310 	Dancer splicer control (two output channels) for 24V electric brakes. Full splicing logic, and 48V overexcite for E-stops. For use with MTB Series electric brakes (page 68).	64
TCS-320 	Analog splicer control (two output channels) for 24V electric brakes. 48V overexcite for E-stops. For use with MTB Series electric brakes (page 68).	60

Tension Controls

MCS2000 – Modular Control Components

Flexible modular design is the key to trouble-free web tension control!



The MCS2000 Digital Web Tension Controller handles all winding and unwinding applications, either brake or motor operated.

Difficult setups with potentiometer adjustments are no longer a problem. The MCS2000 Web Tension Controller is easily programmed with only four push buttons on a panel-mounted programmer; a handheld programmer; or a Windows driven software package. All programmers employ a simple menu driven format. The unit can also "talk" to a PLC via the RS232 cable.

The power supply AC input auto-ranges from 95 to 264 VAC to avoid any match-up problems. The unit can be used in both open-loop and closed-loop systems. It can also be configured in an "open plus super-imposed/ closed-loop design for very precise tension control applications.

Two types of amplifiers are available for powering electro-magnetic

brakes. The amplifiers have outputs for controlling two high-power brakes at 1.4 or 3 Amps per channel, continuous for each brake.

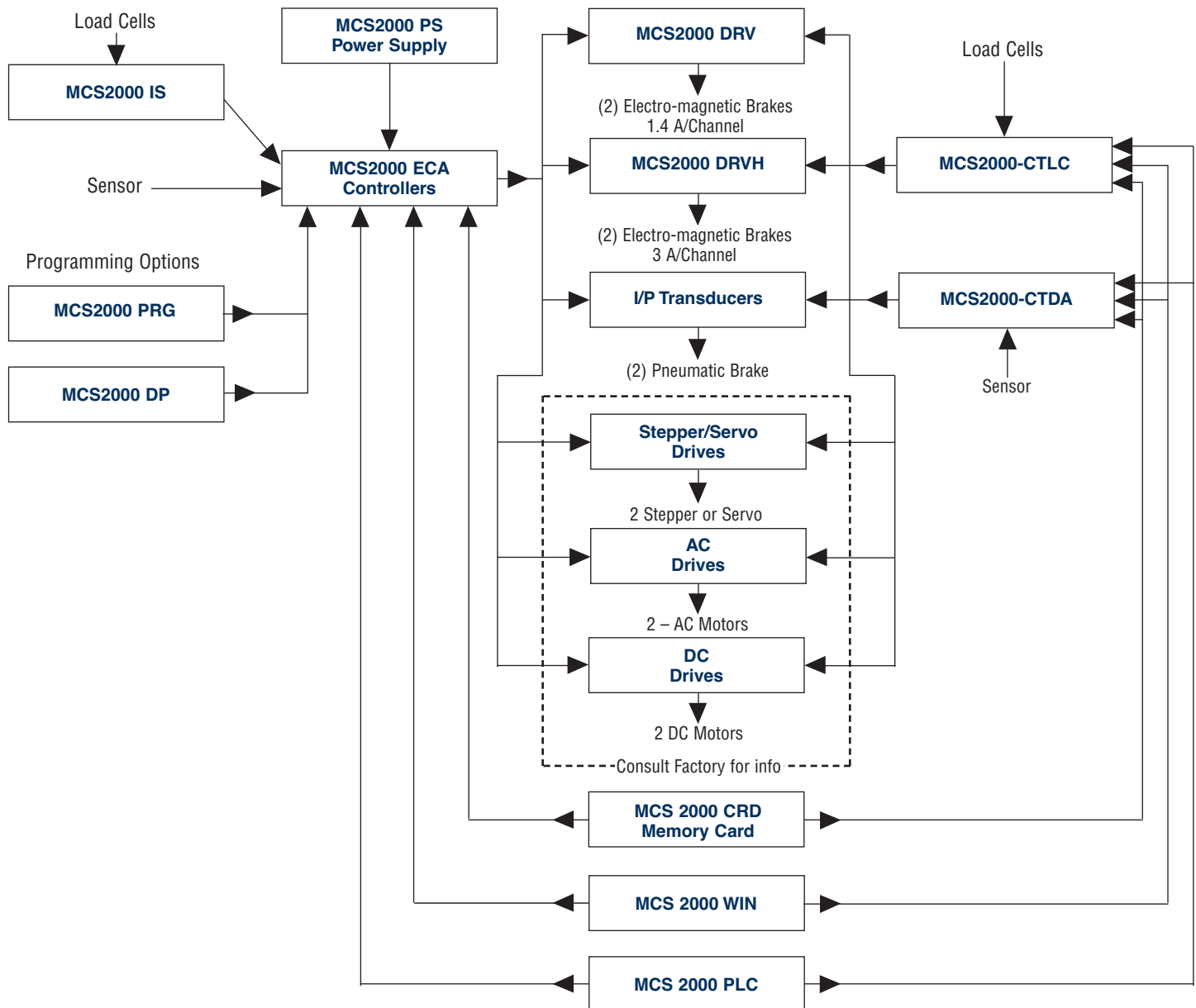
The MCS2000 modules are housed in metal enclosures designed for snap-fit assembly, eliminating screw attachment (patent applied for). All components are on printed circuit boards. Wiring connections are made with quick-disconnect screw terminals.

Features

- Modular system
- Easy to program
- Plug-in memory card for saving parameters
- Programmable in English or French
- PLC compatible
- Optically isolated inputs and outputs
- Dual output in either current or voltage operation mode

- Auto scaling of sensors
- Capable of open-loop operation with an ultrasonic sensor
- Splicing capability
- Windows programming software
- Automatic voltage range of AC input (95-264 VAC)
- Short-circuit protection
- Quick-disconnect wiring terminals
- Capable of controlling dual channel rewind or unwind
- Automatic PID correction - from analog inputs
- 2 x 16 backlit LCD display for programming and parameter readout

Modular Configurations



Ordering Information

Model	Feature	Part Number
MCS2000-CTDA	Closed loop dancer arm controller	6910-448-120
MCS2000-CTLC	Closed loop load cell controller	6910-448-121
MCS2000-ECA	Digital programmable controller	6910-448-096
MCS2000-WIN	Windows software	6910-101-096
MCS2000-PS	24 VDC power supply	6910-448-091
MCS2000-DRV	Dual channel 24 VDC driver	6910-448-092
MCS2000-DRVH	Dual channel 48 VDC driver	6910-448-095
MCS2000-PSDRV	24 VDC Power supply & 24 VDC driver	6910-448-093
MCS2000-PSDRVH	24 VDC Power supply & 48 VDC driver	6910-448-094
MCS2000-PSH	48 VDC Power supply, 6 AMP	6910-448-098
MCS2000-PSHA	48 VDC Power supply, 12 AMP	6910-448-088
MCS2000-IS	Dual load cell amplifier	6910-101-092

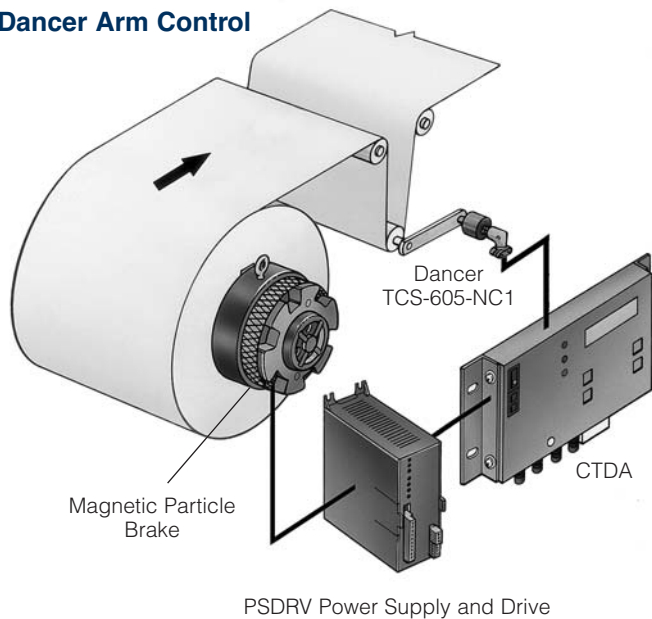
Model	Feature	Part Number
MCS2000-PRG	Handheld programmer	6910-101-090
MCS2000-CRD	Memory card	6910-101-091
MCS2000-DP	Panel mount programmer	6910-101-093
MCS2000-CBL	RS232 cable	6910-101-095
I/P Transducer	0-120 PSI	6910-101-066
Static Switch	Solid state switch	6910-101-007
TCS-605-1	1 turn pivot point sensor (1K)	7330-448-002
TCS-605-5	5 turn pivot point sensor (1K)	7330-448-003
Coupling	Intermittent motion sensor coupling	6910-101-001
Ultrasonic Sensor	4-40" sensing distance	7600-448-001
Ultrasonic Sensor	8-80" sensing distance	7600-448-002

Tension Controls

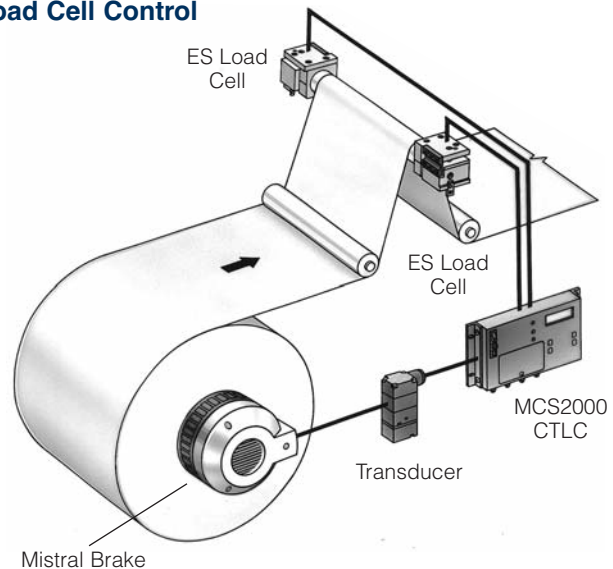
MCS2000 - Modular Control Components

Application Examples

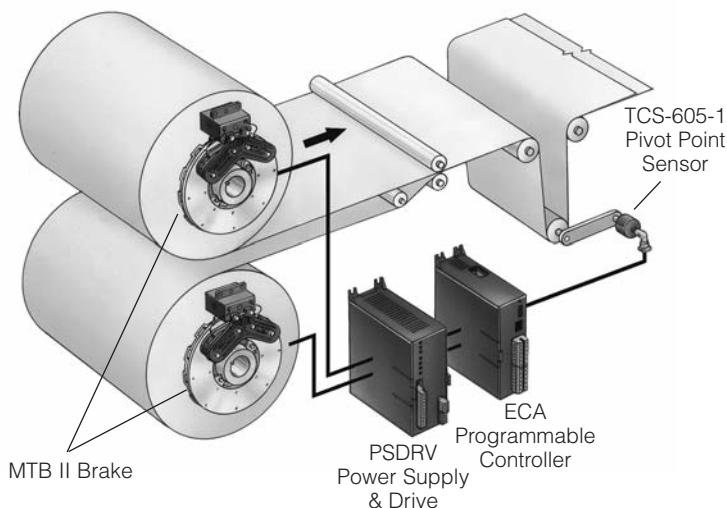
Dancer Arm Control



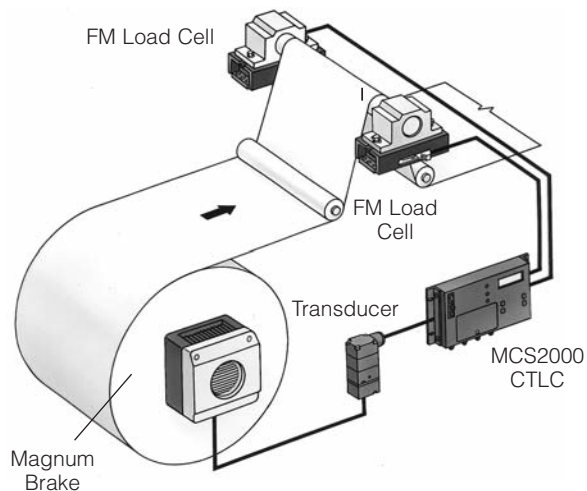
Load Cell Control



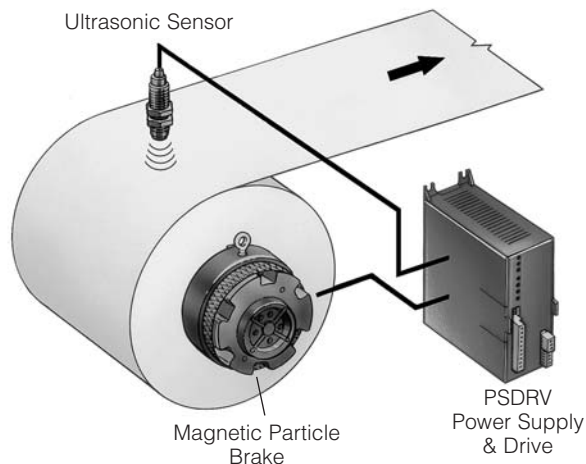
Closed Loop (Dancer Arm) Dual Unwind



Closed Loop (Load Cell) Unwind



Open Loop (Ultrasonic Sensor) Unwind



Closed Loop Control

MCS2000-CTDA

Dancer arm feedback

(P/N 6910-448-120)

MCS2000-CTLC

Load cell feedback

(P/N 6910-448-121)



Both units have especially been designed for user applications. They include all functions for web tension control. The units are equipped with standard power supply, controller front face keyboard and display. The CTLC unit is provided with 2 load cell inputs with selectable sensitivity from 10 mV to 10 V, compatible with most sensors on the market.

Applications

For every web or wire tension control application. Applicable regardless of controlling device (air brake, electric brake or motor).

Common Features

- Scaleable tension readout
- Password protected
- 8 different output options
- Fully digital
- Multi-purpose
- RS232 communications
- Memory card for storing up to 2 full programs
- Windows programming software
- Integral terminal reset
- 2 output channels
- Automatic sensor scaling
- External set point change
- Programmable output configuration
- Output sensor information
- Automatic or imposed PID correction
- Taper Tension Available on other models
- Manual/Auto Operation per front panel pushbutton

Specifications

Input Power/Output Power

Input supply 110-240 VAC, switch selectable
Ref. Output 10 VDC, 10mA max.
Sensor Output ± 15 VDC, 100mA max.

Performance

Analog input/output resolution 12-bit ADC/DAC, 4096 steps

Analog Inputs

2 analog inputs 0–10 VDC, can be increased upon request (consult factory)
 Range: ± 10 VDC, delta min. of 4 VDC

Sensor input

Analog Outputs

2 output channels 0– ± 10 VDC or 0–20mA software adjustable

Brake Power Supply

For use with brake systems, requires power supply/driver module.
 (See page 51)

Open loop signal output

0–10 VDC, 10mA max.

Digital Inputs

(Activated by connecting the input to ground. Inputs are optically isolated if a separate external 24 VDC supply is used.)

Set point adjustment
 Signal multiplier
 Open & closed-loop
 Limit output
 Integral reset
 Synchronize ABC input change
 ABC binary inputs

Digital Outputs

2 binary outputs for sensor error indication

Programming Options

Personal computer or PLC through RS232 cable

Display Options

(Can display 2 parameters on any of the programming options listed.)

Set point Output 1
 Sensor value Output 2
 Analog 1 input Error sensor 1
 Analog 2 input Error sensor 2
 PID adaptation
 IN# for state of digital inputs

Indicator

Green power LED indicator on switch
 Output 1, 2:
 Green: 0 + 10 DC
 Red: 0 - 10 DC
 Out Window Indication
 Green: out of limits

Adjustments

Setpoint +
 Setpoint –
 Auto/Manual

Saving Options

Controller stores one full program. Memory card stores two full programs.

Switching Inputs

Electro-mechanical, rated 24 VDC
 Solid state, rated 40 VDC, minimum

Tension Controls

MCS2000 – Modular Control Components

MCS2000-ECA

(P/N 6910-448-096)



Digital Controller

The MCS2000-ECA is a digital tension controller that can be used in both open-loop and closed-loop systems. It can also be configured as an “open plus superimposed closed-loop” for very precise tension control.

Features

- Programmable output options
- Fully digital
- RS232 communications
- Memory card for storing up to 2 full programs
- Windows programming software
- Integral terminal reset
- 2 output channels
- Automatic sensor scaling
- External set point change
- Digital outputs from sensor input value

Specifications

Input Power/Output Power

Input Supply	24 VDC
Ref. Output	10 VDC, 10mA max.
Sensor Output	±15 VDC, 100mA max.

Performance

Analog input/output resolution	12-bit ADC/DAC, 4096 steps
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Analog Inputs

2 analog inputs	0–10 VDC, can be increased upon request (consult factory)
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Sensor input

Range: ±10 VDC, delta min. of 4 VDC

Analog Outputs

2 output channels	0–±10 VDC or 0–20mA software adjustable
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Open loop signal output

0–10 VDC, 10mA max.

Digital Inputs

(Activated by connecting the input to ground. Inputs are optically isolated if a separate external 24 VDC supply is used.)

Set point adjustment
Signal multiplier
Open & closed-loop
Limit output
Integral reset
Synchronize ABC input change
ABC binary inputs
Inverse sensor polarity

Digital Outputs

2 binary outputs for sensor error indication

Programming Options

Personal computer or PLC through RS232 cable

Display Options

(Can display 2 parameters on any of the programming options listed.)
VIA MCS2000-DP or MCS2000-PRG
Set point
Sensor value
Analog 1 input
Analog 2 input
Output 1
Output 2
IN# for state of digital inputs
Error sensor 1
Error sensor 2
PID adaptation

Indicator

Green power LED indicator

Saving Options

Controller stores one full program.
Memory card stores two full programs.

Switching Inputs

Electro-mechanical, rated 24 VDC
Solid state, rated 40 VDC, minimum

Tension Controls

MCS2000 Series Web Tension Control Systems

MCS2000-DP

(P/N 6910-101-093)



Panel Mounted Programmer

A panel-mounted programming unit for the MCS2000-ECA Programmable Controller. A 6-foot shielded cable (provided with the unit) plugs into the 9-pin connector on top of the MCS2000-ECA.

Features

- 2 x 16 character backlit LCD display
- Powered by MCS2000-ECA Programmable Controller
- Easy-to-use menu-driven programming
- Requires only four push buttons for operation
- Can be used to display two different operating parameters while the system is running.

MCS2000-PRG

(P/N 6910-101-090)



Handheld Programmer

A handheld programming unit for use with the MCS2000-ECA Programmable Controller. A quick-disconnect cable (provided with the unit) plugs into a 4-position jack on the ECA.

Features

- 2 x 16 character backlit display
- Powered by MCS2000-ECA Programmable Controller
- Easy-to-use menu-driven programming
- Requires only four push buttons for operation
- Can be used to display two different operating parameters while the system is running.

MCS2000-CRD

(P/N 6910-101-091)



Memory Card

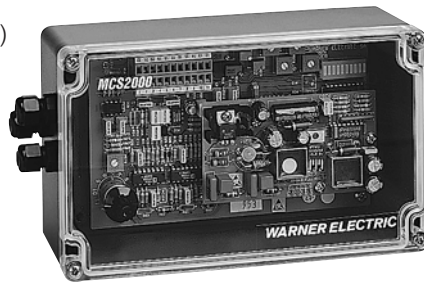
1 9/16" x 9/16" memory card for storing up to two full programs (port A or port B). Plugs into a slot in the MCS2000-ECA Programmable Controller.

Features

- Program memory (port A) can be downloaded off the card simply by cycling power to the MCS2000-ECA Programmable Controller.
- Card memory is protected against inadvertent erasures by a stray magnetic field.

MCS2000-IS

(P/N 6910-101-092)

**Load Cell Interface**

The interface sensor will sum and amplify the input signals from two load cells, and can be used with a number of different load cells. The interface should be positioned close to the load cells to ensure that no noise is injected into the low voltage signal before it is amplified.

Specifications**Input Power/Output Power**

Input supply	+24 VDC, $\pm 10\%$, 300mA
Load cell supply	± 15 VDC or ± 5 VDC, 100mA max.

Analog Inputs

2 load cell inputs	Range: Any voltage between 20 mV and 10 VDC, 5K Ω input impedance
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Ultrasonic input	Range: 0–10 VDC, delta min. of 1 V, 10K Ω input impedance, Maximum gain: 1000
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3 inputs for line speed	Range: 0–10 VDC, 10K Ω impedance
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Analog Outputs (Short circuit protected)

Calibrated load cell/ultrasonic-sensor output	0–10 VDC, 10mA max.
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Power for ultrasonic sensor	+24 VDC
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Voltage reference	10 VDC, 10mA
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Adjustments	Select polarity of ultrasonic sensor output, SW1
	Select polarity of voltage reference, SW2
	Setup min. & max. values for the load cell or ultrasonic input, SW3
	Adjust gain of load cell inputs (p1, p2), 450 min., 1000 max.
	Adjust load cell offset (p3, p4), ± 5 V
	Adjust gain of summed load cell (p5), 1 min., 2 max.
	Adjust gain on line speed (p6), 0–10 V
	Adjust offset for ultrasonic input (p7), 2.5 V max.
	Adjust gain for ultrasonic input (p8), 1 min., 5 max.
	Adjust gain for selected output (p9), 0.2 min., 1.1 max.

Indicators	Green power indicator
	Red 10-digit display indicates W3 setting

Electro-Pneumatic Transducer

(P/N 6910-101-066)



Used for interfacing with pneumatic brakes. Warner Electric offers a convenient package that consists of an air filter with automatic moisture drain, together with one I/P (current-pressure) transducer.

Specifications

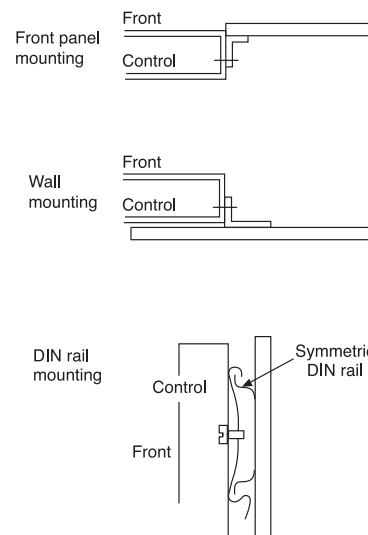
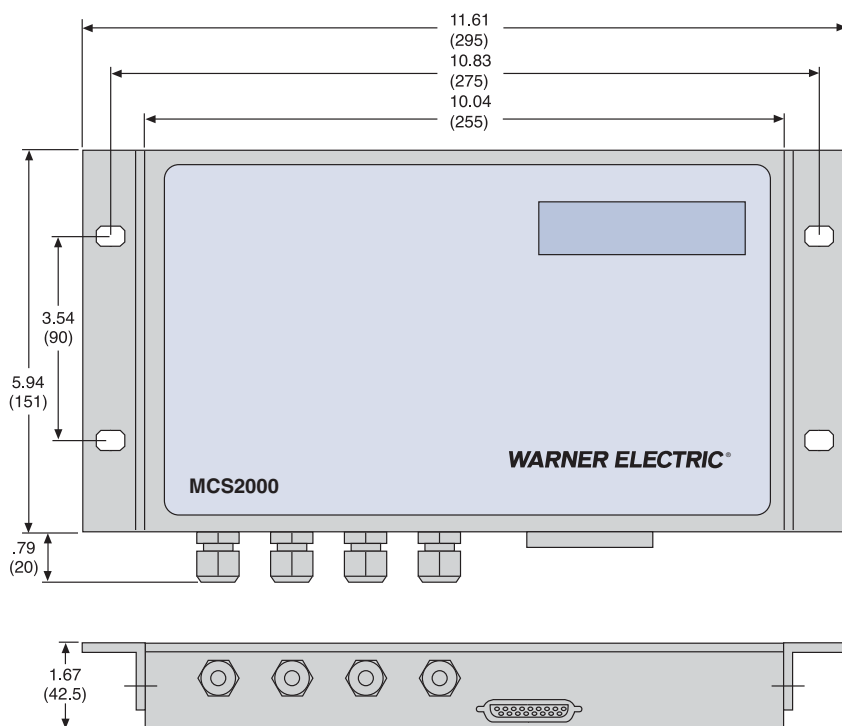
Input signal	4–20mA
Output range	0–120 Psig.
Supply pressure	20–150 Psig. Note: Supply pressure to the transducer must always be at least 5 Psig. above the maximum output pressure required for the brake.
Temperature range	-20°F to 150°F
Minimum air consumption	6.0 (SCFH) at 15 Psig.
Supply pressure effect	1.5 Psig. for 25 Psig. supply change
Pipe size	1/4" NPT (transducer and filter)

Tension Controls

MCS2000 Series Web Tension Control Systems

Dimensions

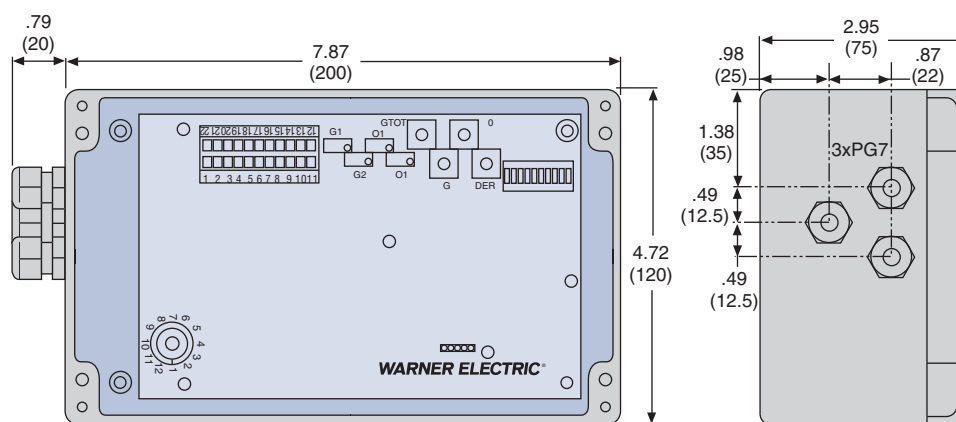
Closed Loop Controls



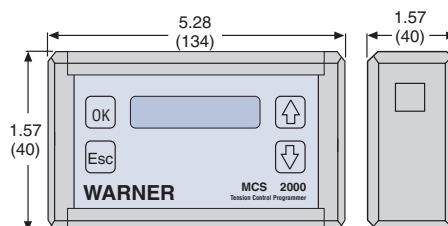
Mounting

-CTDA, -CTLG

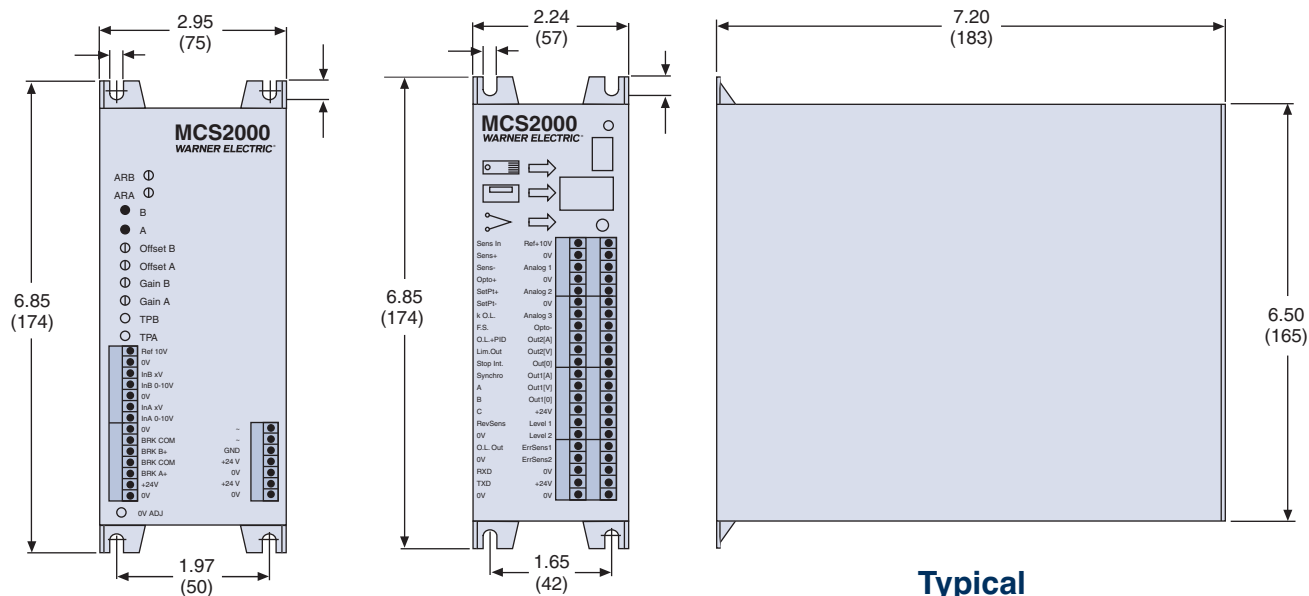
Load Cell Interface



-IS

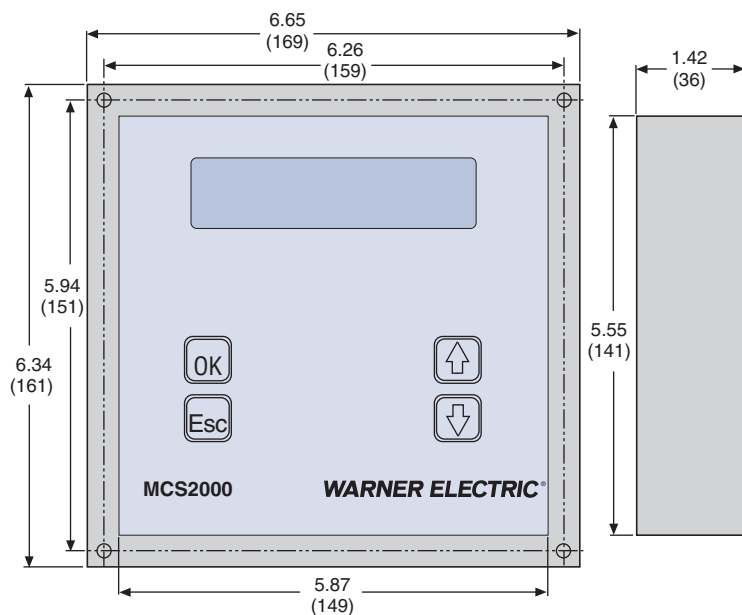


-PRG



- PS
- DRV/DRVH
- PSDRV/PS DRVH

-ECA



-DP

Weight

MCS2000	Lbs.
-ECA	2.00
-PS	2.00
-DRV	2.00
-DRV8	2.00
-DRVH	2.00
-PSDRV	2.00
-PSDRV8	2.00
-PRG	0.50
-DP	1.50
-IS	1.50
-CTDA	4.50
-CTLG	4.50

Tension Controls

Analog/Manual Control for Electric Brake Systems

TCS-200-1

(P/N 6910-448-086)

TCS-200-1H

(P/N 6910-448-087)

TCS-200

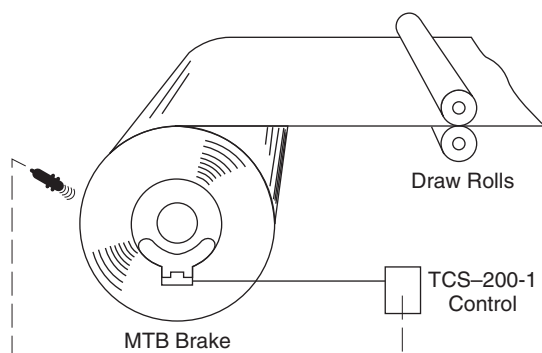
(P/N 6910-448-055)



Analog/Manual Control

The Analog/Manual Control is a basic, low cost, open loop control for manual type operation of Electro Disc tension brakes. A remote torque control function is available that enables the operator to control the desired tension from any convenient location. A roll follower feature provides automatic adjustment of brake torque proportional to roll diameter change. For the TCS-200-1 and TCS-200-1H analog inputs can be followed.

Typical System Configuration



The complete system consists of:

1. Tension brake
2. Analog tension control
3. Control power supply
4. Optional sensor inputs (customer supplied)

The control unit maintains a current output to the tension brake based on an analog input or the manual setting of the control tension adjustment dials. Varying the current from the control creates more or less brake torque for tension adjustability.

Specifications

Input

TCS-200

24–30 VAC, $\pm 10\%$, 56/60 Hz, single phase

TCS-200-1, TCS-200-1H

115/230 VAC, $\pm 10\%$, 50/60 Hz, single phase

Output

TCS-200

PWM full wave rectified, 0–3.24 amps current controlled

TCS-200-1

Adjustable 0–24 VDC, 4.25 amps maximum continuous

TCS-200-1H

Adjustable 0–24 VDC Maximum of 5.8 amps continuous

Can be used with any 24 VDC tension brake. TCS-200 requires sense coil for operation.

Sense Coil – 275-3893

TCS-200-1 and TCS-200-1H can be used with or without sense coil.

Ambient Temperature

TCS-200

–20° to +115°F (–29° to +46°C)

TCS-200-1, TCS-200-1H

–20° to +125°F (–29° to +51°C)

Sensor Inputs

Remote Torque Adjust

TCS-200, TCS-200-1,

TCS-200-1H

1000 ohms

Roll Follower

TCS-200

10K ohms

TCS-200-1, TCS-200-1H

1000 ohms

Analog Voltage Input

TCS-200-1, TCS-200-1H

0–10 VDC (optically isolated when used with an external 15–35 VDC supply)

Analog Current Input

TCS-200-1, TCS-200-1H

4–20 mA (optically isolated when used with an external 15–35 VDC supply)

Auxiliary Inputs

Brake Off (all models)

Removes output current to the brakes. Puts the brake at zero current.

Brake On (all models)

Applies full voltage to the connected brake.

Front Panel Adjust

Tension Adjust

(all models)

Provides current adjust to the brake from 0–100%.

In the remote mode, provides for maximum output level set to the brake.

Brake Mode Switch

(all models)

Allows for full brake on, run, or brake off modes of operation to the brake.

Indicators (all models)

Green LED power indicator showing AC power is applied to the control.

Red LED short circuit indicator showing shorted output condition. Resettable by going to brake off mode with front panel switch.

General (all models)

The control chassis must be considered NEMA 1 and should be kept clear of areas where foreign material, dust, grease, or oil might affect control operation.

Note: When used with other than MTB magnets, inductive load must be supplied – PN 275-3843. Consult factory for details.

MCS-204

(P/N 6910-448-017)

(Shown with Housing)

**Remote/Analog control**

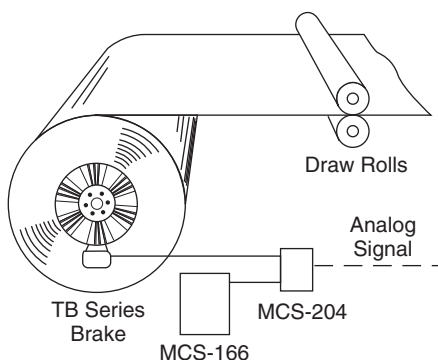
The MCS-204 control, also completely solid state, is designed for manual or analog input control. The MCS-204 can control two 24 VDC tension brakes in parallel. It also has an antiresidual (magnetism) circuit, a brake on and a highly accessible terminal strip for rapid connection. It is designed for use with the MCS-166 power supply.

MCS-166 Power Supply (page 65).

Specifications

Input	24-28 VDC @ 3 Amps (from MCS-166, 1.5 amps for single MCS-166; 3.0 amps from dual MCS-166's) or other power source.
Output	Pulse with modulated 0-24 VDC for 24 volt Warner Electric tension brakes.
Ambient Temperature	-20° to +113°F (-29° to +45°C).
External Inputs	
Torque Adjust	Controls tension by applying the desired amount of current to the brake.
Brake On	Applies full current to tension brake.
Brake Off	Removes brake current and applies antiresidual voltage to eliminate brake drag. Useful when changing rolls.
Operating Modes	
Local Torque Adjust	Knob on front panel.
Remote Torque Adjust	Via remote potentiometer.
Roll Follower	Using external potentiometer.
Current Loop	1-5 mA, 4-20 mA, 10-50 mA. Voltage Input: 0-14.5 VDC.
Mounting	Available for panel mounting with exposed wiring or wall/shelf mounting with conduit entrance. Must be ordered with either wall/shelf or panel enclosures.

Requires enclosure, see page 66.

Typical System Configuration

The complete system consists of:

1. Tension brake
2. Analog tension control
3. Control power supply
4. Analog signal input (customer supplied)

The control unit maintains a current output to the tension brake based on an analog input or the manual setting of the control tension adjustment dials. Varying the current from the control creates more or less brake torque for tension adjustability.

Tension Controls

Analog Control for Electric Brake Systems

TCS-220

(P/N 6910-448-027)

(Shown with Housing)



The remote analog input control is an open loop system designed to allow easy interface with existing or specially designed customer controls to complete a closed loop system. The system also offers complete operator controllability for manual tensioning control.

TCS-167 Power Supply, (page 65).

Note: When used with other than MTB magnets, a resistor, 68 ohms, 25 watts, must be added. Consult factory for details.

Specifications

Input

TCS-220 – 48 VDC @ 1.6 Amps continuous, 48 VDC @ 6 Amps intermittent, 1.6% duty cycle, 30 sec. on time, 8–12 VDC @ 1.5 Amps.

TCS-167 – 120 VAC, 50/60 Hz or 240 VAC, 50/60 Hz (Switch selectable).

Output

TCS-220/TCS-167 – 0–270 mA/magnet (running); 270–500 mA/magnet (stopping).

Ambient Temperature

–20° to +113°F (–29° to +45°C).

External Inputs

Torque Adjust

Controls tension by applying the desired amount of current to the brake.

Emergency Stop

Applies full current to tension brake.

Brake Off

Removes brake current and applies antiresidual current to eliminate brake drag. Useful when changing rolls.

Operating Modes

Local Torque Adjust

Knob on front panel.

Remote Torque Adjust

Via 1K to 10K ohm potentiometer.

Roll Follower

Via 1k to 10k ohm potentiometer.

Current Loop

1–5 mA, 4–20 mA, 10–50 mA current source.

Voltage Input

0–14.5 VDC.

Adjustments

Torque Adjust/Span

Controls output manually in local torque mode. Sets maximum control span in remote torque adjust, roll follower, current loop; or voltage input mode.

Zero adjust

Potentiometer adjustment for setting zero output level. Front panel access.

Brake off input

Terminal strip connection which provides for removal of brake current and applies antiresidual current to eliminate brake drag. Used primarily when changing rolls.

Brake on input

Terminal strip connection applies full current to brake when activated regardless of input control signal. Used for emergency stops.

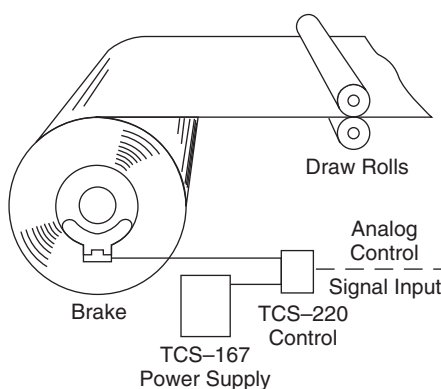
Mounting

TCS-220 – available as panel mounted with exposed wiring, or wall/shelf mounted with conduit entrance.

TCS-167 – Available with open frame or wall/shelf mounted enclosure with conduit

Requires enclosure, see page 66.

Typical System Configuration



The complete system consists of:

1. Tension brake
2. Analog tension control
3. Control power supply
4. Analog signal input (customer supplied)

The control unit maintains a current output to the tension brake based on an analog input or the manual setting of the control tension adjustment dials. Varying the current from the control creates more or less brake torque for tension adjustability.

MCS-208

(P/N 6910-448-067)

(Shown with Housing)



The MCS-208 control, also completely solid state, is designed for manual or analog input control. The MCS-208 features a highly accessible terminal strip for rapid connection, and it is designed for use with the MCS-166 Power Supply.

The remote analog input control is an open loop system designed to allow easy interface with existing or specially designed customer controls to complete a closed loop system. The system also offers complete operator controllability for manual tensioning control.

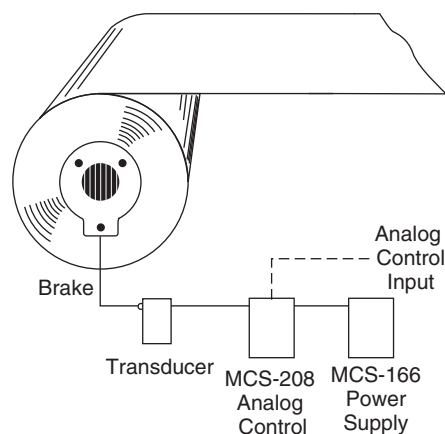
MCS-166 Power Supply, (page 65).

Note: When used with other than MTB magnets, a 68 ohm, 25 watt resistor must be added. Consult factory for details.

Specifications

Input Power	24–28 VDC, 0.5 amps maximum (from MCS-166 power supply or other source)
Outputs	Switch selectable current or voltage Voltage: 0–10 VDC Current: 1–5 mA, 4–20 mA, 10–50 mA Will operate most electric to pneumatic transducers available.
Ambient Temperature	+32° to +120°F (0° to +49°C).
External Inputs	
Brake On	Applies maximum output signal (voltage or current) to the transducer
Brake Off	Removes output from the transducer and applies minimum levels
Adjustments	
Front Panel	Zero Adjust: Provides for adjustment of minimum input to correspond to minimum output levels Torque Adjust/Span: Provides for manual adjust in manual mode, or span adjustment when in other operating modes
Operating Modes	Local torque adjust Remote torque adjust Roll follower Analog voltage input Analog current input
Mounting	Available with panel mounting with exposed wiring or wall/shelf mounting with conduit entrances. Note: Must be ordered with wall/shelf enclosure or with panel mount enclosure.

Requires enclosure, see page 66.

Typical System Configuration

The complete system consists of:

1. Pneumatic tension brake
2. Analog tension control
3. Control power supply
4. Analog signal input (customer supplied)
5. E to P transducer

The control unit maintains a current output to the tension brake based on an analog input or the manual setting of the control tension adjustment dials. Varying the current from the control creates more or less brake torque for tension adjustability.

Tension Controls

Analog Splicer Control for Electric Brake Systems

TCS-320

(P/N 6910-448-043)



The analog splicer control provides dual brake functions with manual operator or analog input control requiring simultaneous brake tensioning and holding.

The system also offers complete operator controllability for manual tensioning control.

TCS-168 Power Supply, (page 65).

Note: When used with other than MTB magnets, a 68 ohm, 25 watt resistor must be added. Consult factory for details.

Specifications

Input

TCS-320 – 48 VDC @ 3.2 Amps continuous, 48 VDC @ 12 Amps intermittent, 1.6% duty cycle, 30 sec. on time, 8–12 VDC @ 3.0 Amps.

TCS-168 – 120 VAC, 50/60 Hz or 240 VAC, 50/60 Hz (Switch selectable).

Output

TCS-320/TCS-168 – 0–270 mA/magnet (running); 270–500 mA/magnet (stopping) on controlled output channel, 0 to 90 mA/magnet (typ.) on holding output channel.

Ambient Temperature –20° to +113°F (–29° to +45°C).

External Inputs

Torque Adjust

Controls tension by applying the desired amount of torque to the brake.

Brake On

Applies full current to tension brake.

Brake Off

Removes brake current and applies antiresidual current to eliminate brake drag. Useful when changing rolls.

Operating Modes

Local Torque Adjust

Knob on front panel.

Remote Torque Adjust

Via 1K to 10K ohm potentiometer.

Roll Follower

Via 1k to 10k ohm potentiometer.

Current Loop

1–5 mA, 4–20 mA, 10–50 mA current source.

Voltage Input

0–14.5 V DC.

Adjustments

Torque Adjust/Span

Controls output manually in local torque mode. Sets maximum control span in remote torque adjust, roll follower, current loop, or voltage input mode.

Zero adjust

Potentiometer adjustment for setting zero output level. Front panel access.

Brake off input

Terminal strip connection which provides for removal of brake current and applies antiresidual current to eliminate brake drag.

Brake on input

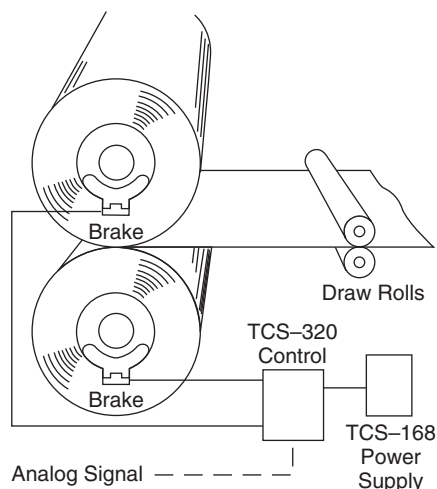
Terminal strip connection applies full current to brake when activated regardless of input control signal. Used for emergency stops.

Mounting

TCS-168 – available with open frame or wall/shelf mounted enclosure with conduit entrance.

TCS-320 – available as open frame or a NEMA 4 enclosure with remote control station.

Typical System Configuration



The complete system consists of:

1. Two tension brakes
2. Analog splicer control
3. Control power supply
4. Analog signal input (customer supplied)

The control unit maintains a current output to the tension brake based on an analog input or the manual setting of the control tension

adjustment dials. Varying the current from the control creates more or less brake torque for tension adjustability.

The TCS-320 can function as a splicer control or a dual brake control. With the use of the jumper board (included), the TCS-320 can control up to 24 magnets.

MCS-203

(P/N 6910-448-014)

(Shown with Housing)



The completely solid state MCS-203 Dancer Control Module is designed for automatic web tensioning through the use of a dancer roll. The MCS-203 can control two 24 VDC tension brakes in parallel. It works on the concept of a P-I-D controller and has internal P, I & D adjustments for optimum performance regardless of brake size.

MCS-166 Power Supply, (page 65).

Specifications**Input**

24–28 VDC @ 3 Amps (from MCS-166, 1.5 amps for single MCS-166; 3.0 amps from dual MCS-166's) or other power source.

Output

Pulse width modulated 0–24 VDC for 24 volt Warner Electric tension brakes.

Ambient Temperature

–20° to +113°F (–29° to +45°C).

External Inputs**Dancer Potentiometer**

Provides the feedback signal of dancer position and movement for input to the control.

Brake On

Applies full current to tension brake.

Brake Off

Removes brake current and applies antiresidual current to eliminate brake drag. Useful when changing rolls.

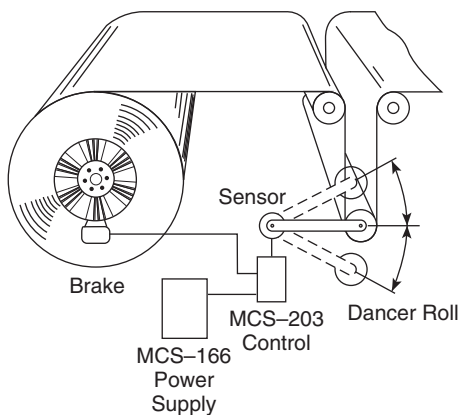
Antidrift Input

Nullifies integrator portion of control for faster brake response. Important for splicing and mid-roll starting.

Mounting

Available for panel mounting with exposed wiring or wall/shelf mounting with conduit entrance. Must be ordered with either wall/shelf or panel enclosures.

Requires enclosure, see page 66.

Typical System Configuration

The complete system consists of:

1. Tension brake
2. Dancer tension control
3. Control power supply
4. Pivot point sensor
5. Dancer roll assembly (customer supplied)

The control unit maintains a current output to the tension brake based on an analog input or the manual setting of the control tension adjustment dials. Varying the current from the control creates more or less brake torque for tension adjustability.

Tension Controls

Dancer Control for Electric Brake Systems

TCS-210

(P/N 6910-448-026)

(Shown with Housing)



This closed loop tension control system automatically controls tension on unwinding materials such as paper, film, foil, cloth and wire.

TCS-167 Power Supply, (page 65).

Note: When used with other than MTB magnets, a 68 ohm, 25 watt resistor must be added. Consult factory for details.

Specifications

Input

TCS-210 – 48 VDC @ 1.6 Amps continuous, 48 VDC @ 6 Amps intermittent, 1.6% duty cycle, 30 sec. on time, 8–12 VDC @ 1.5 Amps.

TCS-167 – 120 VAC, 50/60 Hz or 240 VAC, 50/60 Hz (Switch selectable).

Output

TCS-210/TCS-167 – 0–270 mA/magnet (running); 270–500 mA/magnet (stopping).

Ambient Temperature

–20° to +113°F (–29° to +45°C).

External Inputs

Dancer Potentiometer

Provides the feedback signal of dancer position and movement for input to the control.

Brake On

Applies holding brake voltage.

Anti-Drift Input

Nullifies integrator portion of control for faster brake response. Important at startup and for mid-roll starts.

Brake Off

Removes brake current and applies antiresidual current to eliminate brake drag. Useful when changing rolls.

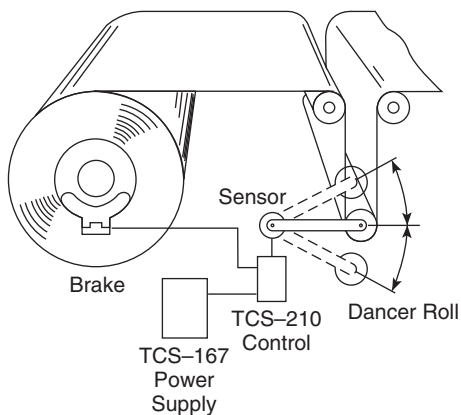
Mounting

TCS-210 – available as panel mounted with exposed wiring, or wall/shelf mounted with conduit entrance.

TCS-167 – available with open frame or wall/shelf mounted enclosure with conduit entrance.

Requires enclosure, see page 66.

Typical System Configuration



The complete system consists of five components:

1. Tension brake
2. Dancer tension control
3. Control power supply
4. Pivot point sensor
5. Dancer roll assembly (customer supplied)

The weight of the dancer roll or loading on the dancer determines the tension on the web and the remainder of the system operates to hold the dancer roll as steady as possible. When the dancer position changes, the Warner Electric pivot point sensor tracks the direction and speed of the change and sends an electric signal to the closed loop control, which, in turn, relays a corrective signal to the Electro Disc tension brake. Increasing current to the Electro Disc

increases braking torque to elevate the dancer to the desired position, while reducing brake current lowers the dancer.

The closed loop dancer control system is completely automatic, limiting the need for operator involvement and the potential for inaccurate tension control. The system offers exceedingly rapid response that, in effect, corrects tension errors before they reach the work area of the processing machine.

MCS-207

(P/N 6910-448-066)

(Shown with Housing)



The dancer control, MCS-207 is designed for automatic web tensioning through the use of a dancer roll. The MCS-207 can control either a voltage to pneumatic or current to pneumatic transducer with an air operated clutch or brake. It works on the concept of a P-I-D controller and has internal adjustments of the P-I-D loops for optimum performance regardless of the brake size.

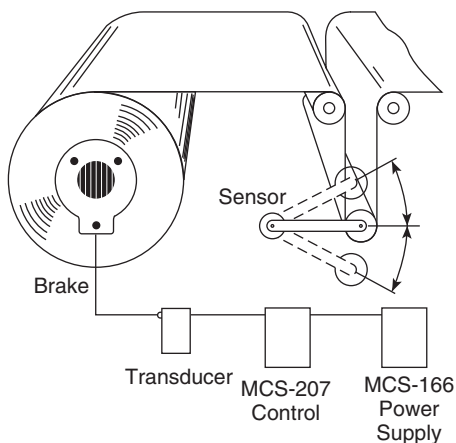
MCS-166 Power Supply, (page 65).

Note: When used with other than MTB magnets, a 68 ohm, 25 watt resistor must be added. Consult factory for details.

Specifications

Input	24–28 VDC, 0.5 amps maximum (from MCS-166 or other power source)
Output	Switch selectable current or voltage Voltage: 0–10 VDC Current: 1–5 mA, 4–20mA, 10–50mA Will operate most electric to pneumatic transducers available.
Ambient Temperature	+32° to +120°F (0° to +49°C).
Control Input	Pivot point sensor, MCS-605-1 or TCS-605-5
External Inputs	
Brake On	Applies maximum output signal (voltage or current) to the transducer
Brake Off	Removes output from the transducer and applies minimum level
Anti-Drift	Provides integrator reset function for mid-roll starting
Adjustments	
Front Panel	Dancer Position: sets dancer operating position Gain: Controls overall system response based on change of dancer input signal
Mounting	Available as panel mounted with exposed wiring, or wall/shelf mounted with conduit entrance. Note: Must be ordered with wall/shelf enclosure or with panel mount enclosure.

Requires enclosure, see page 66.

Typical System Configuration

The complete system consists of:

1. Pneumatic tension brake
2. Dancer tension control
3. Control power supply
4. Pivot point sensor
5. E to P transducer
6. Dancer roll assembly (customer supplied)

The control unit maintains an output to the tension brake based on an analog input or the manual setting of the control tension adjustment dials. Varying the signal from the control creates more or less brake torque for tension adjustability.

Tension Controls

Dancer Splicer Control for Electric Brake Systems

TCS-310

(P/N 6910-448-042)



This closed loop tension control system automatically controls tension on unwinding materials such as paper, film, foil, cloth and wire.

TCS-168 Power Supply, (page 65).

Note: When used with other than MTB magnets, a 68 ohm, 25 watt resistor must be added. Consult factory for details.

Specifications

Input

TCS-310 – 48 VDC @ 3.2 Amps continuous, 48 VDC @ 12 Amps intermittent, 1.6% duty cycle, 30 sec. on time, 8–12 VDC @ 3.0 Amps.

TCS-168 – 120 VAC, 50/60 Hz or 240 VAC, 50/60 Hz (Switch selectable).

Output

TCS-310/TCS-168 – 0–270 mA/magnet (running); 270–500 mA/magnet (stopping) on controlled output channel 0 to 90 mA holding channel.

Ambient Temperature

–20° to +113°F (–29° to +45°C).

External Inputs

Dancer Potentiometer

Provides the feedback signal of dancer position and movement for input to the control.

Brake On

Applies holding brake voltage.

Anti-Drift Input

Nullifies integrator portion of control for faster brake response. Important for start-ups.

Brake Off

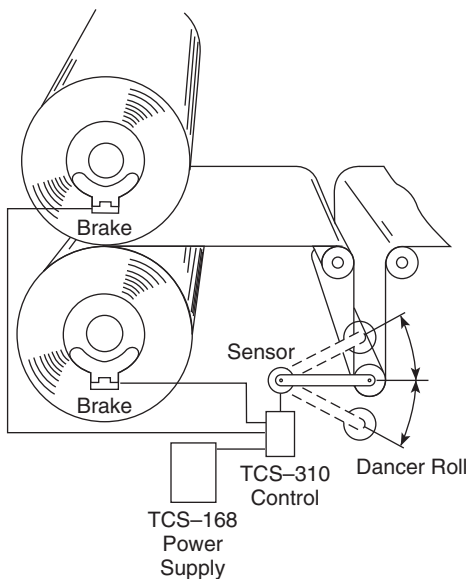
Removes brake current and applies antiresidual current to eliminate brake drag. Useful when changing rolls.

Mounting

TCS-310 – available as open frame or as NEMA 4 enclosure with remote control station.

TCS-168 – available with open frame or wall/shelf mounted enclosure with conduit entrance.

Typical System Configuration



The complete system consists of five components:

1. Two tension brakes
2. Dancer splicer control
3. Control power supply
4. Pivot point sensor
5. Dancer roll assembly (customer supplied)

The weight of the dancer roll or loading on the web determines the tension on the web and the remainder of the system operates to hold the dancer roll as steady as possible. When the dancer position changes, the Warner Electric pivot point sensor tracks the direction and speed of the change and sends an electric signal to the closed loop control, which, in turn, relays a corrective signal to the Electro Disc tension brake. Increasing current to the Electro Disc

increases braking torque to elevate the dancer to the desired position, while reducing brake current lowers the dancer.

The closed loop dancer control system is completely automatic, limiting the need for operator involvement and the potential for inaccurate tension control. The system offers exceedingly rapid response that, in effect, corrects tension errors before they reach the work area of the processing machine.

MCS-166

(P/N 6910-448-013)

(Shown with Housing)



Power Supply for MCS-203, MCS-204, MCS-207, and MCS-208 Controls

Warner Electric's MCS-166 is the companion power supply module to be used with MCS-203 and MCS-204 tension controls. The MCS-166 supplies the 24–28 VDC that these systems require. The MCS-166 is a modular unit designed to couple with its respective control or it can be mounted separately. It is also fused for overload protection, has a voltage indicator light, and is internally protected against 240 VAC input when set for 120 VAC.

Specifications

Input

120 VAC 50/60 Hz or 240 VAC 50/60 Hz (switch selectable).

Output

24–28 VDC (1.5 Amps).

Note: For dual brake application, two MCS-166's are required, 3.0 amps output.

Ambient Temperature

–20° to +113°F (–29° to +45°C).

Mounting

Available for panel mounting with exposed wiring or wall/shelf mounting with conduit entrance. Must be ordered with either wall/shelf or panel enclosures.

Requires enclosure, see page 66.

TCS-167

(P/N 6910-448-025)



The TCS-167 power supply is designed to provide the correct power input to MCS-207, TCS-210, and TCS-220 tension controls. Its switch selectable input allows the user to adapt to 120 or 240 VAC. It has dual voltage circuits to provide low voltage power and anti-residual output as well as power to operate a brake. The TCS-167 is available with an enclosure or open frame for control panel mounting.

Specifications

Input

120 VAC or 220/240 VAC, $\pm 10\%$, 50/60 Hz, 1 phase. (switch selectable)

Output

Unregulated 9–12 VDC @ 1.5 Amps
Unregulated 48 VDC @ 1.6 Amps continuous, 48 VDC @ 6 Amps intermittent, 1.6% duty cycle, 30 seconds on time.

Ambient Temperature

–20°F. to +113°F. (–29°C. to +45°C.)

Mounting

Open frame or enclosed wall/shelf mount with conduit entrance

TCS-168

(P/N 6910-448-032)



The TCS-168 power supply is designed to provide the correct power input to the TCS-310 Dancer Splicer Control and the TCS-320 Analog Splicer Control. Its switch selectable input allows the user to adapt to 120 or 240 VAC. It has dual voltage circuits to provide low voltage power and anti-residual output as well as power to operate two brakes. The TCS-168 is available with an enclosure or open frame for control panel mounting.

Specifications

Input

120 VAC or 220/240 VAC, $\pm 10\%$, 50/60 Hz, 1 phase. (switch selectable)

Output

Unregulated 9–12 VDC @ 3 Amps
Unregulated 48 VDC @ 3.2 Amps continuous, 48 VDC @ 6 Amps intermittent, 1.6% duty cycle, 30 seconds on time.

Ambient Temperature

–20°F. to +113°F. (–29°C. to +45°C.)

Mounting

Open frame or enclosed wall/shelf mount with conduit entrance

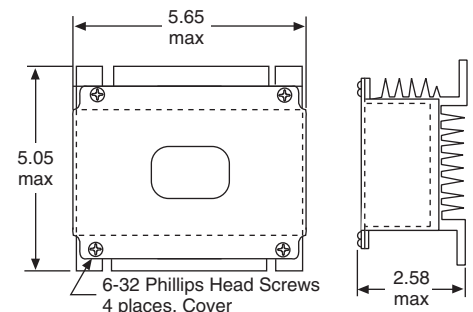
Magnet Selector Static Switch

The magnet selector switch allows magnets to be dynamically or statically added or removed from the tension system to be tailored to the application need. Examples include shedding magnets for narrow, light webs near core or adding magnets for emergency stops.

Each selector switch provides two circuits, each capable of switching up to four magnets.

How to Order

To order, specify Magnet Selector Static Switch 6910-101-007.

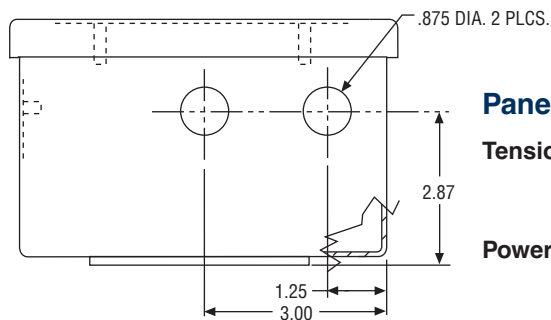
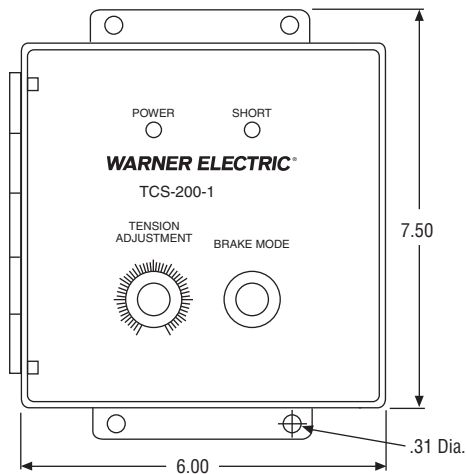


Tension Controls

Dimensions/Enclosures

Dimensions

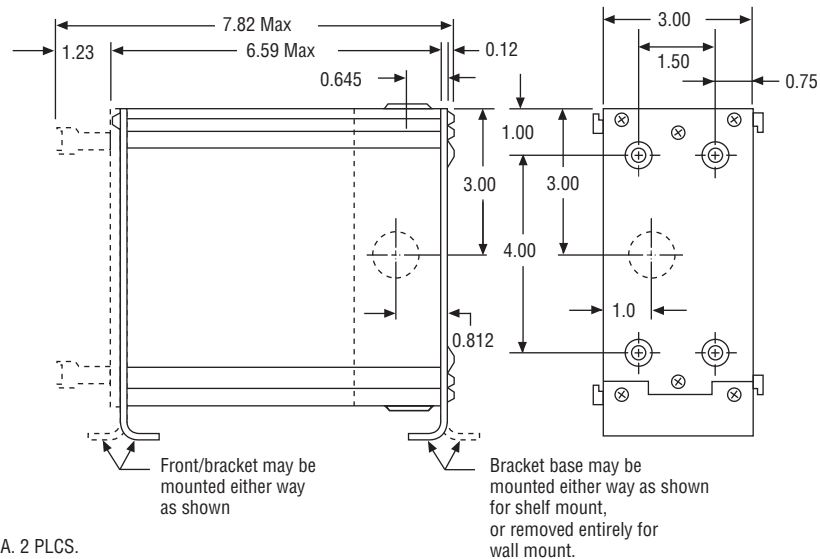
TCS-200-1



Wall/Shelf Mount

Tension Controls – For use with MCS-203, MCS-204, MCS-207 or MCS-208 order part number 6910-448-016.
For use with TCS-210 or 220, order part number 6910-448-029.

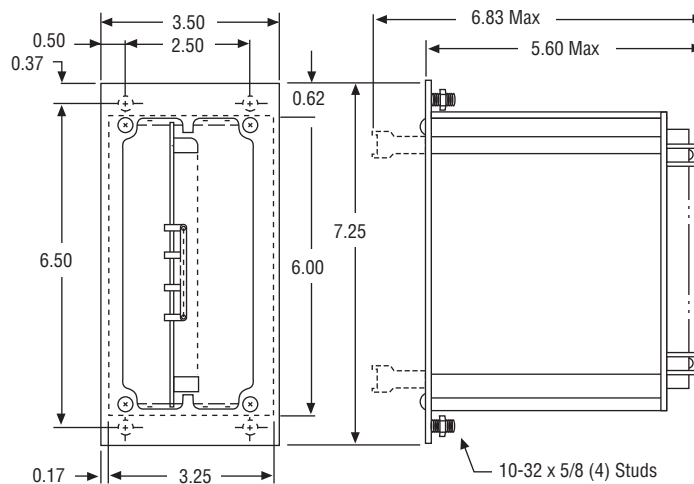
Power Supplies – For use with MCS-166, order part number 6910-448-019.



Panel Mount

Tension Controls – For use with MCS-203, MCS-204, MCS-207 or MCS-208 order part number 6910-448-015.
For use with TCS-210 or 220, order part number 6910-448-028.

Power Supplies – For use with MCS-166, order part number 6910-448-018.

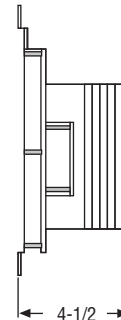
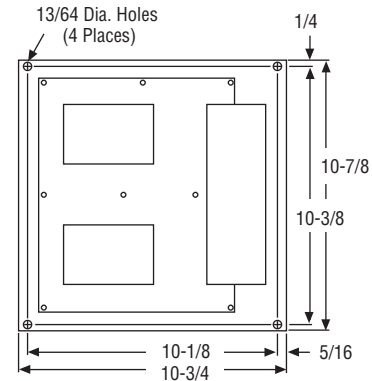
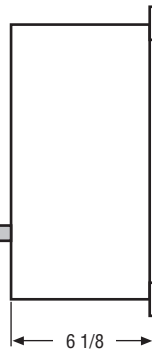
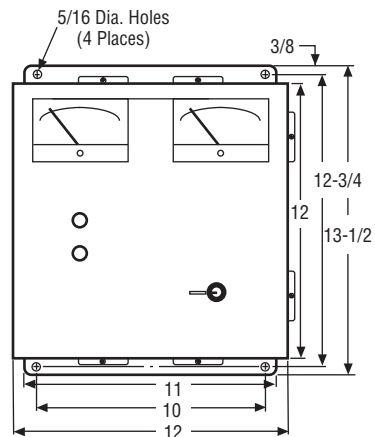


Ribbon Cable

A ribbon cable has been added to the rear terminal board of the MCS-203/204/207/208 and MCS-166 enclosures to improve performance and reliability. The upgrade is fully retrofittable and enclosure part numbers have not changed.

Dual Brake Controls

TCS-310, TCS-320



Power Supplies

TCS-167, TCS-168

(P/N 6910-448-033)

