

MCS2000-DRV2 Dual Voltage/ Dual Channel Driver

Service & Installation Instructions

P-2010-6
819-0524



For 24 VDC or
48 VDC Operation



An Altra Industrial Motion Company

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⚠ WARNING Failure to follow these instructions may result in product damage, equipment damage, and serious fatal injury to personnel.

Introduction

The MCS2000-DRV2 Dual Channel/Dual Voltage drive is a replacement for the MCS2000-DRV and MCS2000-DRVH Drivers in one unit. The unit is designed so that it can operate from either 24 volts DC input or 48 volts DC input and provide output voltage and current for operation of any of the 24 volt DC tension brakes available from Warner Electric.

The universal design replaces two separate drivers in one package and provides for dual brake operation, for either single brake when only one brake is required or dual brake operation on splicer systems where two brakes are required.

The driver can be controlled by any of the MCS2000 controllers offered as either a single channel system or dual channel system. The MCS2000-ECA, MCS2000-CTDA, or MCS2000-CTLIC controllers can provide the operating signals.

The MCS2000-DRV2 has reduced input terminals on the front of the unit that are pluggable which will make installation and wiring much easier than the previous versions. By using a pluggable terminal block, if replacement is required then only the controller has to be disconnected and removed and a new controller installed without having to rewire the entire system.

Footprint for the DRV2 is identical to that of the MCS2000-DRV and MCS2000-DRVH drivers. The MCS2000-DRV and MCS2000-DRVH can be replaced with the MCS2000-DRV2 without having to make any mechanical changes in the mounting footprint.

Additionally, LED indicators on the face of the control make troubleshooting and monitoring operation much simpler than previous versions. A combination red and green LED for each channel determines operation during normal run conditions as well as during faults.

Each driver channel has its own individual anti-residual adjustment to make brake adjustment in the “off” state optimum. Anti-residual provides a reverse current to the brakes in the off state to minimize residual magnetism build-up. This allows for reducing the drag torque in the brake during initial start-up.

Specifications

Model: MCS2000-DRV2 Dual Channel/Dual Voltage Driver

Part Number: 6910-448-109

Input Voltage: 24 Volts DC or 48 Volts DC, + / - 10%

Output Voltage: 24 VDC or 48 VDC depending on power supply input voltage.
In Overvoltage mode, output voltage is limited to 48 volts DC for 30 seconds before reducing back to 24 VDC.

Output Current: Maximum of 4.5 amps DC per channel. Overload capacity to 6 amps maximum per channel for 30 seconds, to be followed by maximum 3 amps for a period of minimum 120 seconds.

Anti-Residual Output: 10% of input power supply voltage. Adjustable for each channel.
-2.4 volts DC with 24 VDC power supply input
-4.8 volts DC with 48 VDC power supply input

Analog Input Voltage: 0 to 10 Volts DC on Input A or Input B. When operating with 48 volt DC power, input of 0 to 5 volts corresponds to 24 Volt DC output, and from 5 to 10 volts input overvoltage mode from 24 to 48 volts DC with timed limitation.

Status and Diagnostic Indicators: 2 LED's on each channel indicate normal operation and fault conditions during operation. One Green and one Red LED.

Protection:

Input: Polarity protected to prevent damage in the event of inversion of DC power supply voltages.

Output: Short circuit protected during operation and power up. Output is also protected from overload conditions. Once short circuit is detected, drive locks out for 10 msec and resets. After 4 cycles, drive trips out and requires reset.

Reset Mode: Requires power off and then power on to reset driver.

Wiring: Via 10 position pluggable terminal block.

Operating Temperature: + 104 ° F (40 ° C)

Storage Temperature: -13 ° F to + 131° F
(-25° C to + 55° C)

Enclosure: NEMA 1 (IP 20)



Certifications: CE

Installation

Mounting

Select a location that will allow for sufficient air movement around the control.

Overall Dimensions: 6.85 x 2.95 x 7.28 inches
(174 x 75 x 185 mm)

Note: Unit must be mounted vertically to have best possible cooling effect.

- 1. Using the dimensional data from Figure 1, drill and tap 4 mounting holes for either 4.5 mm screws or #10 screws on the panel or mounting surface the drive will be mounted to.
- 2. Using either 4.5 mm or #10 screws, mount the unit to the panel or mounting surface. Tighten screws sufficiently so that unit will not come loose during normal machine operation or vibration.

Note: 0 Volt terminals in control are tied to control housing. A good ground is required between the control and the panel or mounting surface.

- 3. After unit is mounted and secured, make sure that spacing is sufficient around the housing and that at least a clearance of at least 2.00 inches (50.8 mm) for the front panel wiring plug to facilitate wiring unit and plugging connector to control.
- 4. Double check all mounting before proceeding to the wiring section.

Driver Outline and Mounting Dimensions

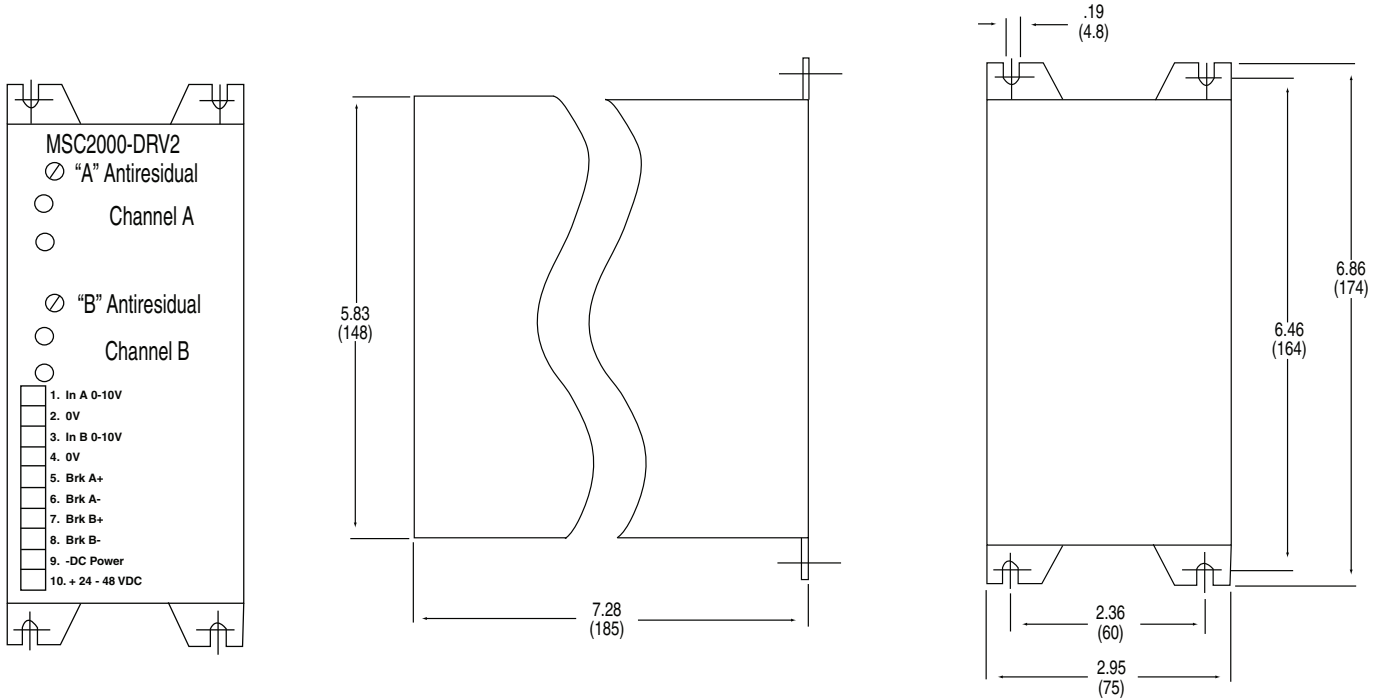


Figure 1
Mounting Dimensions

System Wiring

Controllers

The MCS2000-DRV2 will operate with any of the MCS2000 series Controllers. It will provide interface between the brakes and the MCS2000-ECA, MCS2000-CTDA or MCS2000-CTLCT Tension Controls.

Wiring between the various controls will vary somewhat, but for all practical purposes are pretty similar.

The MCS2000-DRV2 will operate with any of the 24 volt Warner Electric Tension Brakes or Clutches as long as the maximum current rating per channel is not exceeded.

Wiring to the MCS2000-ECA Control

Refer to Figure 2 for wiring hook-ups.

▲CAUTION It is recommended that shielded cable or twisted wire pairs be used to minimize the possibility of noise affecting either the controller or driver circuitry. Additionally, lead lengths should be kept as short as possible.

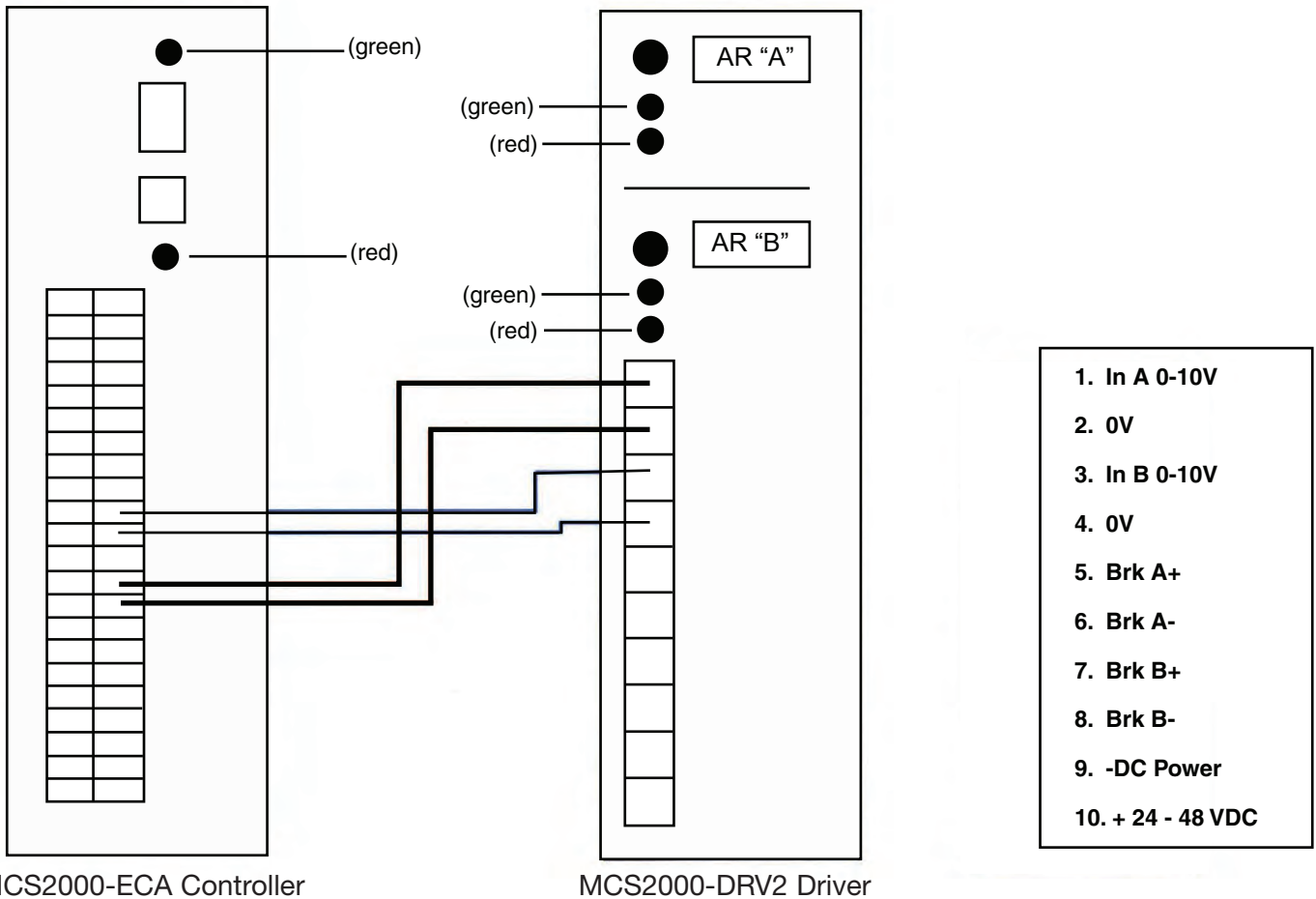
Note: Also refer to MCS2000-ECA Manual for exact terminal strip locations and designations.

- 1. Connect a wire from terminal Out 1 (V) on the MCS2000-ECA to terminal number 1 InA 0-10 V on the MCS2000-DRV2. Insure that both terminals are tightened securely.
- 2. Connect a wire from terminal Out 1 (0V) on the MCS2000-ECA to terminal number 2 0V on the MCS2000-DRV2. Insure that both terminals are tightened securely.

If a dual brake system is to be used, then proceed to step 3.

If only a single brake is to be used on the MCS2000-DRV2, then skip to either the 24 volt brake wiring section, page 8 or the 48 volt brake wiring section, page 10.

- 3. Connect a wire from terminal Out 2 (V) on the MCS2000-ECA to terminal number 3 InB 0-10 V on the MCS2000-DRV2. Insure that both terminals are tightened securely.
- 4. Connect a wire from terminal Out 1 (0V) on the MCS2000-ECA to terminal number 4 0V on the MCS2000-DRV2. Insure that both terminals are tightened securely.
- 5. This completes the wiring between the MCS2000-ECA and the MCS2000-DRV2. Double check all wiring before proceeding to the next section.
- 6. Proceed to either the 24 volt brake wiring section, page 8 or the 48 volt brake wiring section, page 10 of the manual.



Note: Wiring is shown for both channels. If only one channel is required, then follow wiring shown for channel "A" only.

Figure 2
MCS2000-ECA to MCS2000-DRV2

Wiring to the MCS2000-CTDA or MCS2000-CTLIC Controllers

Note: Since the MCS2000-CTDA and MCS2000-CTLIC controllers have 25 pin DB connectors with cables, wiring is made via the cable.

CAUTION Care must be taken to insure the correct wires are connected and none of the other wires contact or short out. It is recommended that unused wires be cut off and taped so that shorting and grounding out does not occur.

Note: Refer to the MCS2000-CTDA or MCS2000-CTLIC Manual for exact wire functions and designations.

Refer to Figure 3 for wiring hook-ups.

- 1. Connect the brown wire [Channel 1 Out (V)] from the connector cable on the MCS2000-CT controller to terminal number 1 In A 0 – 10 V on the MCS2000-DRV2. Insure that the terminal on the MCS2000-DRV2 is tightened securely.
- 2. Connect the green wire [Channel 1 Out (0V)] from the connector cable on the MCS2000-CT controller to terminal number 2, 0 V on the MCS2000-DRV2. Insure that the terminal on the MCS2000-DRV2 is tightened securely.
- 3. Connect the red wire [Channel 2 Out (V)] from the connector cable on the MCS2000-CT controller to terminal number 3 In V 0-10 V on the MCS2000-DRV2. Insure that the terminal on the MCS2000-DRV2 is tightened securely.
- 4. Connect the black wire [Channel 2 Out (0V)] from the connector cable on the MCS2000-CT Connector controller to terminal number 4 on the MCS2000-DRV2. Insure that the terminal on the MCS2000-DRV2 is tightened securely.
- 5. This completes the wiring between the MCS2000-ECA and the MCS2000-DRV2. Double check all wiring before proceeding to the next section.
- 6. Proceed to either the 24 volt brake wiring section, page 8 or the 48 volt brake wiring section, page 10 of the manual.

If a dual brake system is to be used, then proceed to step 3.

If only a single brake is to be used on the MCS2000-DRV2, then skip to either the 24 volt brake wiring section, page 8 or the 48 volt brake wiring section, page 10.

Note: Wiring is shown for both channels. If only one channel is required, then follow wiring using only the brown and green wires as shown.

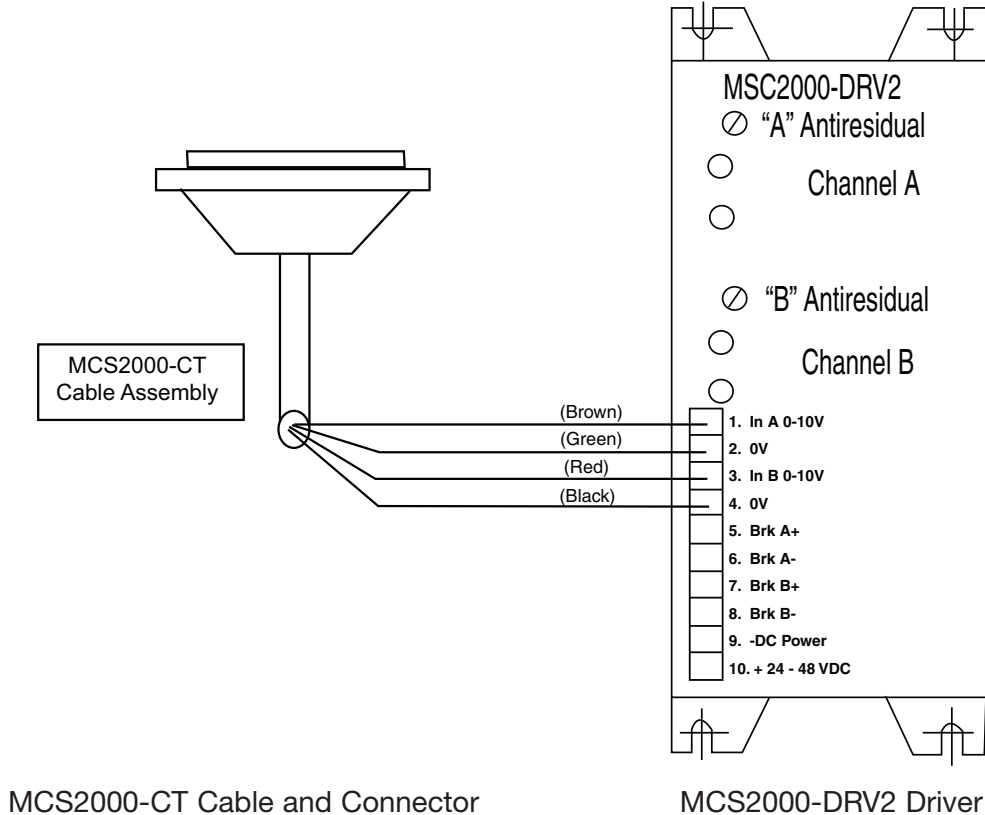


Figure 3
MCS2000-CTDA or MSC2000-CTLC to MSC2000-DRV2

Power and Brake Wiring

24 Volt Systems

- 1. Wire the positive (+) side of the 24 volt DC power supply to terminal 10 of the MCS2000-DRV2. Make sure that the terminal is securely tightened on the MCS2000-DRV2.
- 2. Wire the negative side (-) or DC common of the 24 volt DC power supply to terminal 9 of the MCS2000-DRV2. Make sure the terminal is securely tightened on the MCS2000-DRV2.

NOTE: Make sure the current capacity is sufficient to handle the brake load and driver circuitry. If any other external power requirements are required, then the power supply capacity must be sized to handle these currents as well.

- 3. Wire the brake for Channel “A” on terminals 5 and 6 of the MCS2000-DRV2. Make sure the terminals are securely tightened.
- 4. If a brake is to be used on Channel “B” wire the brake to the Channel “B” terminals 7 and 8 on the MCS2000-DRV2. Make sure the terminals are securely tightened.

Note: Warner Electric Tension brakes are not polarity sensitive, so wiring between terminals on the MCS2000-DRV2 and brake are not sensitive to the + and - designations.

The following 24 volt tension brakes can be used with the MCS2000-DRV2 Driver for 24 volt operation.:

TB Series	ATT Series	MTB Series	Magnetic Particle
TB-170	ATTB/ATTC-25	All MTB's up to 12 magnets	MPB/MPC2
TB-260	ATTB/ATTC-55		MPB/MPC15
TB-425	ATTB/ATTC-115	*Up to 16 magnets if outputs paralleled and inputs paralleled	MPB/MPC70
TB-500			MPB/MPC120
TB-825			MPB240
TB-1000			POB/POC-0.3 TO 20'S
TB-1225			PRB-H'S 1.2 TO 20'S
TB-1525			PTB'S 2.5 TO 20'S
			PMC-A'S 10 TO 40'S
			PHC-R 0.6 TO 40'S
			*POB/POC-40 & 80 if output and inputs paralleled

* When 16 magnet MTB Brakes and POB/POC-40 and 80 Magnetic Particle Brakes are used, inputs and outputs must be wired parallel to obtain sufficient output current for proper brake operation.

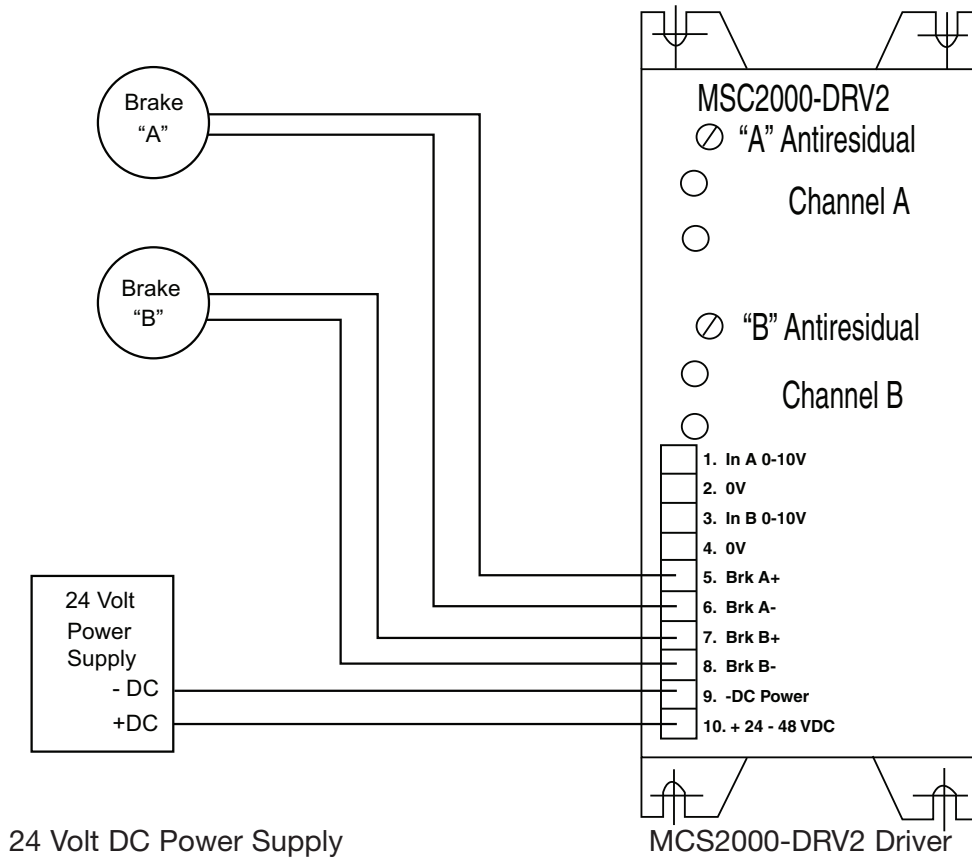


Figure 4
24 Volt System Power Supply and Brake Wiring

If MCS2000-PS is used, maximum current available is 3.1 amps. If higher current is required, then either dual MCS2000-PS power supplies are required or an external 24 VDC source is required.

NOTE: Make sure the current capacity is sufficient to handle the brake load and driver circuitry. If any other external power requirements are required, then the power supply capacity must be sized to handle these currents as well.

48 Volt Systems

- 1. Wire the positive (+) side of the 48 volt DC power supply to terminal 10 of the MCS2000-DRV2. Make sure that the terminal is securely tightened on the MCS2000-DRV2.
- 2. Wire the negative side (-) or DC common of the 48 volt DC power supply to terminal 9 of the MCS2000-DRV2. Make sure the terminal is securely tightened on the MCS2000-DRV2.
- 3. Wire the brake for Channel "A" on terminals 5 and 6 of the MCS2000-DRV2. Make sure the terminals are securely tightened.
- 4. If a brake is to be used on Channel "B", wire the brake to the Channel "B" terminals 7 and 8 on the MCS2000-DRV2. Make sure the terminals are securely tightened.

Note: Warner Electric Tension brakes are not polarity sensitive, so wiring between terminals on the MCS2000-DRV2 and brake are not sensitive to the + and - designations.

The following 24 volt tension brakes can be used with the MCS2000-DRV2 Driver for 48 volt operation with overcurrent feature.

ATT Series	MTB Series	Magnetic Particle
ATTB/ATTC-25 ATTB/ATTC-55 ATTB/ATTC-115	All MTB's up to 12 magnets *Up to 16 magnets if outputs paralleled and inputs paralleled	MPB/MPC2 MPB/MPC15 MPB/MPC70 MPB/MPC120 MPB240 POB/POC-0.3 TO 20'S PRB-H'S 1.2 TO 20'S PTB'S 2.5 TO 20'S PMC-A'S 10 TO 40'S PHC-R 0.6 TO 40'S *POB/POC-40 & 80 if output and inputs paralleled

* When 16 magnet MTB Brakes and POB/POC-40 and 80 Magnetic Particle Brakes are used, inputs and outputs must be wired parallel to obtain sufficient out put current for proper brake operation.

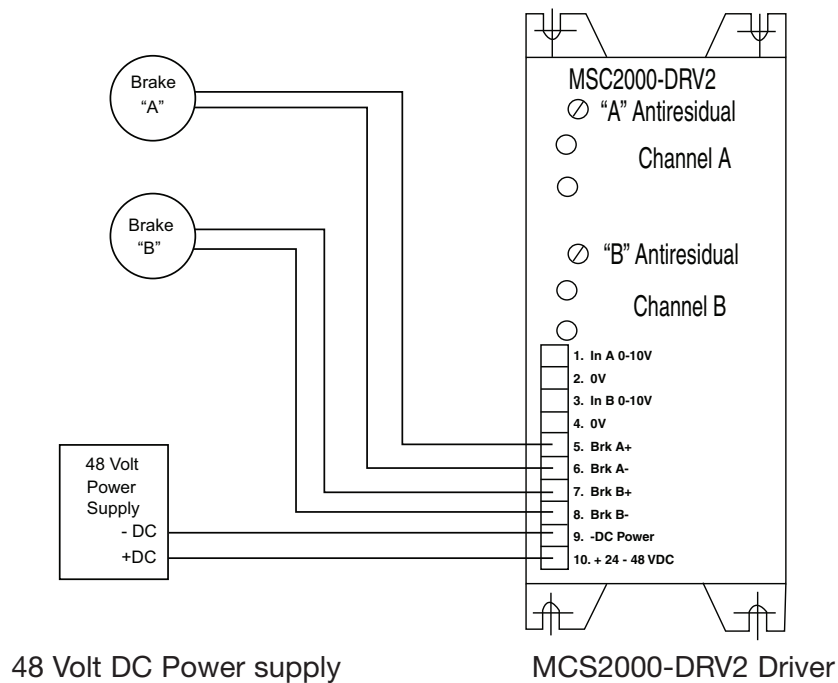
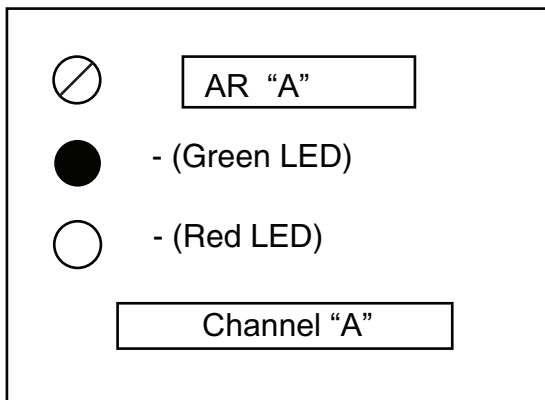


Figure 5
48 Volt System Power Supply and Brake Wiring

System Start-Up

24 Volt System

- 1. Prior to applying power, double check all wiring between Tension Control and Driver, Driver and Brake or Brakes, and 24 Volt Power Source and Driver.
- 2. Once connections are checked and confirmed that all wiring is correct, turn power on to the Power Supply and Controller and observe "RED" and "GREEN" LED Indicators on the Driver.
- 3. If everything is normal, then the "GREEN" LED will be on and "RED" LED's will be off. Any other indication of the "RED" and "GREEN" LED's, refer to the troubleshooting section, page 17 of the manual for troubleshooting and diagnostics.
- 4. If drive is functional and no problems are noted, then the anti-residual output to the brake or brakes needs to be adjusted accordingly. Adjust the anti-residual output for Channel "A" as follows:
 - 4a. Using a digital DC Voltmeter, connect the positive lead to terminal 1 and the negative lead to terminal 2 of the MCS2000-DRV2 for Channel "A" input.
 - 4b. Adjust the Tension controller being used to give a 0 VDC reading on the Channel "A" input.



- 4c. Using a small screwdriver, rotate the anti-residual potentiometer "A" fully counter-clockwise so the output voltage to the brake is zero level. Voltage can be measured to the Channel "A" brake on terminals 5 and 6 of the MCS2000-DRV2. Terminal 5 is positive, and terminal 6 is negative. Note that the "GREEN" LED for Channel "A" is flashing at this time.
- 4d. Now slowly adjust the anti-residual potentiometer "A" clockwise while feeling the reaction on the brake. When the optimum anti-residual output is obtained, the brake will be very free to rotate or the armatures in the case of the TB's will feel like they are floating away from the magnet assembly.

Note: Using a meter across the brake "A" terminals 5 and 6 as noted in 4c above, the voltage observed should be negative at this time.

- 4e. Once this point is found, do not adjust this potentiometer further or the brake can re-engage.
- 4f. If a second brake is used on Channel "B", then proceed to step 5 otherwise this completes the anti-residual adjustment for the "A" Channel. Continue to step 6.

The following LED indications will be present when anti-residual current is applied to the brake.

The Channel "A" is operating in the anti-residual mode with the following indication.

- (Green) Flashing "ON" 1.5 sec, "OFF" 0.5 sec
- RED LED is "OFF"

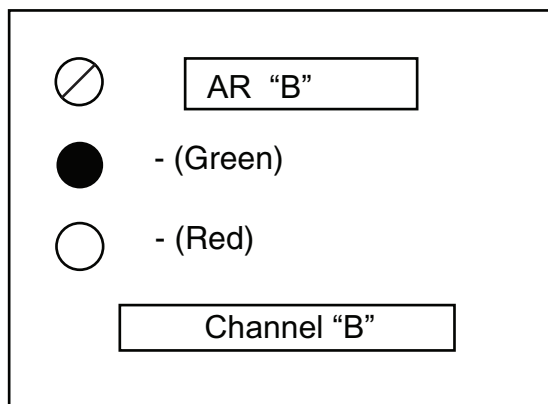
- 5. Adjust the anti-residual output for Channel "B" as follows if a brake is used on this output. If no brake is used, then disregard this portion of the start-up. Proceed to step 6.
- 5a. Using a digital DC Voltmeter, connect the positive lead to terminal 3 and the negative lead to terminal 4 of the MCS2000-DRV2 for Channel "B" input.
- 5b. Adjust the Tension controller being used to give a 0 VDC reading on the Channel "B" input.
- 5c. Using a small screwdriver, rotate the anti-residual potentiometer "B" fully counter-clockwise so the output voltage to the brake is zero level. Voltage can be measured to the Channel "B" brake on terminals 7 and 8 of the MCS2000-DRV2. Terminal 7 is positive, and terminal 8 is negative. Note that the "GREEN" LED for Channel "B" is flashing at this time.

- 5d. Now slowly adjust the anti-residual potentiometer "B" clockwise while feeling the reaction on the brake. When the optimum anti-residual output is obtained, the brake will be very free to rotate or the armatures in the case of the TB's will feel like they are floating away from the magnet assembly.

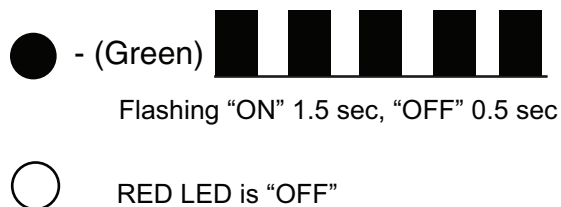
Note: Using a meter across the brake "B" terminals 7 and 8 as noted in 5c above, the voltage observed should be negative at this time.

- 5e. Once this point is found, do not adjust this potentiometer further or the brake can re-engage.
- 5f. This completes the adjustment for the Channel "B" anti-residual. Proceed to step 6.

The following LED indications will be present when anti-residual current is applied to the brake.



The Channel "B" is operating in the anti-residual mode with the following indication.



- 6. Adjust the input voltage from the tension controller to the Channel “A” input observing the “RED” and “GREEN” LED’s. If a 24 volt system is being commissioned, then only the “GREEN” LED should be functional unless there is a problem with the controller, brake, or wiring.
- 7. If no other indications are present on the LED’s then the system is functioning properly. The intensity of the “GREEN” LED does not change with the amount of output current being supplied to the brake.
- 8. If other LED indications are present, proceed to the troubleshooting section on page 17 to determine cause and appropriate action to take.
- 9. Adjust the input voltage from the tension controller to the Channel “B” input if a brake is connected to the Channel “B” output observing the “RED” and “GREEN” LED’s. If a 24 volt system is being commissioned, then only the “GREEN” LED should be functional unless there is a problem with the controller, brake, or wiring.
- 10. If no other indications are present on the LED’s then the system is functioning properly. The intensity of the “GREEN” LED will not change with the amount of output current being supplied to the brake.
- 11. If other LED indications are present, proceed to the troubleshooting section on page 17 to determine cause and appropriate action to take.

48 Volt System

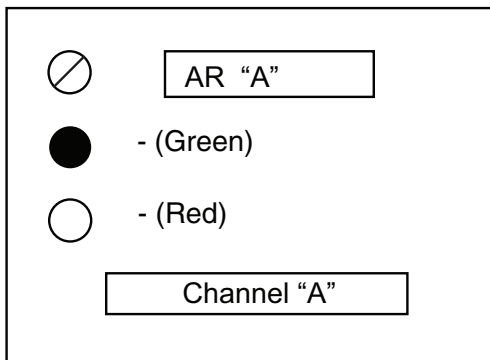
- 1. Prior to applying power, double check all wiring between Tension Control and Driver, Driver and Brake or Brakes, and 48 Volt Power Source and Driver.
- 2. Once connections are checked and confirmed that all wiring is correct, turn power on to the Power Supply and Controller and observe “RED” and “GREEN” LED Indicators on the Driver.
- 3. If everything is normal, then the “GREEN” LED will be on and “RED” LED’s will be off. Any other indication of the “RED” and “GREEN” LED’s, refer to the troubleshooting section, page 17 of the manual for troubleshooting and diagnostics.
- 4. If drive is functional and no problems are noted, then the anti-residual output to the brake or brakes needs to be adjusted accordingly. Adjust the anti-residual output for Channel “A” as follows:
 - 4a. Using a digital DC Voltmeter, connect the positive lead to terminal 1 and the negative lead to terminal 2 of the MCS2000-DRV2 for Channel “A” input.
 - 4b. Adjust the Tension controller being used to give a 0 VDC reading on the Channel “A” input.
 - 4c. Using a small screwdriver, rotate the anti-residual potentiometer “A” fully counter-clockwise so the output voltage to the brake is zero level. Voltage can be measured to the Channel “A” brake on terminals 5 and 6 of the MCS2000-DRV2. Terminal 5 is positive, and terminal 6 is negative. Note that the “GREEN” LED for Channel “A” is flashing at this time.

- 4d. Now slowly adjust the anti-residual potentiometer “A” clockwise while feeling the reaction on the brake. When the optimum anti-residual output is obtained, the brake will be very free to rotate without much resistance. This is best if done at core diameter.

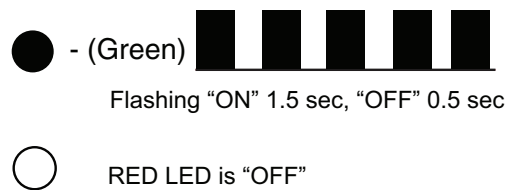
Note: Using a meter across the brake “A” terminals 5 and 6 as noted in 4c above, the voltage observed should be negative at this time.

- 4e. Once this point is found, do not adjust this potentiometer further or the brake can re-engage.
- 4f. If a second brake is used on Channel “B”, then proceed to step 5 otherwise this completes the anti-residual adjustment for the “A” Channel. Continue to step 6.

The following LED indications will be present when anti-residual current is applied to the brake.



The Channel “A” is operating in the anti-residual mode with the following indication.



Flashing “ON” 1.5 sec, “OFF” 0.5 sec

This is anti-residual mode only.

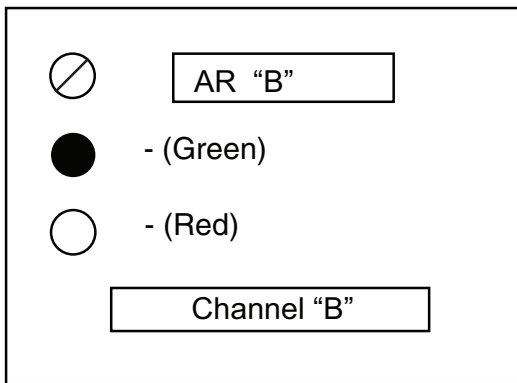
- 5. Adjust the anti-residual output for Channel “B” as follows if a brake is used on this output. If no brake is used, then disregard this portion of the start-up. Proceed to step 6.
 - 5a. Using a digital DC Voltmeter, connect the positive lead to terminal 3 and the negative lead to terminal 4 of the MCS2000-DRV2 for Channel “B” input.
 - 5b. Adjust the Tension controller being used to give a 0 VDC reading on the Channel “B” input.

- 5c. Using a small screwdriver, rotate the anti-residual potentiometer “B” fully counter-clockwise so the output voltage to the brake is zero level. Voltage can be measured to the Channel “B” brake on terminals 7 and 8 of the MCS2000-DRV2. Terminal 7 is positive, and terminal 8 is negative. Note that the “GREEN” LED for Channel “B” is flashing at this time.
- 5d. Now slowly adjust the anti-residual potentiometer “B” clockwise while feeling the reaction on the brake. When the optimum anti-residual output is obtained, the brake will be very free to rotate without much resistance. This is best if done at core diameter.

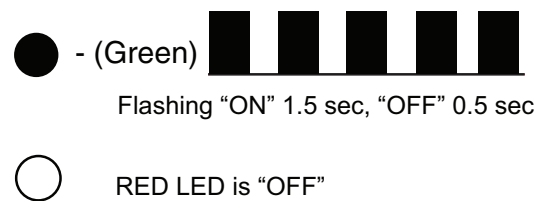
Note: Using a meter across the brake “B” terminals 7 and 8 as noted in 5c above, the voltage observed should be negative at this time.

- 5e. Once this point is found, do not adjust this potentiometer further or the brake can re-engage.
- 5f. This completes the adjustment for the Channel “B” anti-residual. Proceed to step 6.

The following LED indications will be present with anti-residual current is applied to the brake.



The Channel “B” is operating in the anti-residual mode with the following indication.



This is anti-residual mode only.

- 6. Adjust the input voltage from the tension controller to the Channel “A” input observing the “RED” and “GREEN” LED’s. If a 48 volt system is being commissioned, then only the “GREEN” LED should be functional with the input voltage between the 0 to 5 volt level, unless there is a problem with the controller, brake, or wiring.
- 6a. Adjust the input voltage from the tension controller to the Channel “A” input above 5 volts while observing the “GREEN” and “RED” LED’s. The “GREEN” LED should be on steady and the “RED” LED should be flashing at a rate of approximately 30 hertz frequency with the LED on for typically 0.5 second and off for 1.5 seconds. This indicates the brake is operating in the overcurrent mode and will be limited to 60 seconds.
- 6b. Allow the control to operate in this mode for 60 seconds or more and observe the LED’s. After the overexcitation circuit times out, the “RED” LED will be flashing at a frequency of approximately 30 Hertz with the LED being “ON” approximately 1

second and “OFF” approximately 1 second. Measuring the output to the brake on Terminals 5 and 6 should indicate the brake is at 24 volts DC.

- 6c. Reduce the input on terminals 1 and 2 to less than 5 volts DC and observe the LED’s at this time. The “GREEN” LED will be “ON”, and the “RED” LED will be flashing at a frequency of approximately 20 hertz, with the “ON” time of approximately 0.5 second and the “OFF” time of approximately 2.5 seconds. The control output to the brake can operate in the 0 to 24 volt range, but the overexcitation level from 24 volts to 48 volts is not available as the circuit has not reset as yet.
- 6d. Once the overexcitation has reset, the “GREEN” LED will be “ON” and the “RED” LED will be flashing as in step 6a above when the input voltage goes above 5 volts again at terminals 1 and 2 of the MCS2000-DRV2.

- 7. If no other indications are present on the LED's then the system is functioning properly. The intensity of the "GREEN" LED does not change with the amount of output current being supplied to the brake. This completes the checkout of the "A" Channel. Proceed to step 9.
- 8. If LED indications are present other than those described above, proceed to the troubleshooting section on page 17 to determine cause and appropriate action to take.
- 9. Adjust the input voltage from the tension controller to the Channel "B" input observing the "RED" and "GREEN" LED's. If a 48 volt system is being commissioned, then only the "GREEN" LED should be functional with the input voltage between the 0 to 5 volt level, unless there is a problem with the controller, brake, or wiring.
 - 9a. Adjust the input voltage from the tension controller to the Channel "B" input above 5 volts while observing the "GREEN" and "RED" LED's. The "GREEN" LED should be on steady and the "RED" LED should be flashing at a rate of approximately 30 hertz frequency with the LED on for typically 0.5 second and off for 1.5 seconds. This indicates the brake is operating in the overcurrent mode and will be limited to 60 seconds.
 - 9b. Allow the control to operate in this mode for 60 seconds or more and observe the LED's. After the overexcitation circuit times out, the "RED" LED will be flashing at a frequency of approximately 30 hertz with the LED being "ON" approximately 1 second and "OFF" approximately 1 second. Measuring the output to the brake on terminals 5 and 6 should indicate the brake is at 24 volts DC.
 - 9c. Reduce the input on terminals 3 and 4 to less than 5 volts DC and observe the LED's at this time. The "GREEN" LED will be "ON", and the "RED" LED will be flashing at a frequency of approximately 20 hertz, with the "ON" time of approximately 0.5 second and the "OFF" time of approximately 2.5 seconds. The control output to the brake can operate in the 0 to 24 volt range, but the overexcitation level from 24 volts to 48 volts is not available as the circuit has not reset as yet.
 - 9d. Once the overexcitation has reset, the "GREEN" LED will be "ON" and the "RED" LED will be flashing as in step 6a above when the input voltage goes above 5 volts again at terminals 3 and 4 of the MCS2000-DRV2.
- 10. If no other indications are present on the LED's then the system is functioning properly. The intensity of the "GREEN" LED does not change with the amount of output current being supplied to the brake. This completes the checkout of the "B" Channel. The system is now ready for set-up of the controller. Proceed to the controller manual to set up the controller properly.
- 11. If LED indications are present other than those described above, proceed to the troubleshooting section on page 17 to determine cause and appropriate action to take.
- 12. This completes the set-up of the MCS2000-DRV2 Driver.

LED's		LED Operation		Functional Description
Green	Red	Green	Red	
		OFF	OFF	MCS2000-DRV2 is Powered Off
		ON	OFF	MCS2000-DRV2 is "ON" and ready
		 1.5 Sec ON/0.5 Sec OFF	OFF	MCS2000-DRV2 is in anti-residual mode
		ON	 0.5 Sec ON/1.5 Sec OFF	MCS2000-DRV2 Overcurrent enabled Limited to 60 sec maximum at full output.
		ON	 1 Sec ON/1 Sec OFF	MCS2000-DRV2 Overcurrent limited and has gone past 60 sec. Output has reduced back to 24 volts.
		ON	 0.5 Sec ON/2.5 sec OFF	MCS2000-DRV2 Normal operation but overcurrent is not available as it is still in limit mode and will reset on time out.

Figure 6
LED Indicator Operations and Descriptions - Normal Conditions

Note: Each Channel "A" and "B" can be operated independently, so one channel can have one set of indications while the second channel can have a completely different set of indications. This will be dependent on how controller is set to operate the MCS2000-DRV2 Driver.

System Troubleshooting

Troubleshooting the MCS2000-DRV2 Dual Channel/Dual Voltage Driver is fairly straight forward. There are certain basic checks that can be made using a digital DC meter. All readings taken on the MCS2000-DRV2 will be either DC voltages or DC currents. A meter sufficient to measure up to 100 VDC and 10 Amps DC will be suitable for taking any of the measurements deemed necessary.

Additionally, the MCS2000-DRV2 offers a certain amount of diagnostics built into the unit via the "GREEN" and "RED" LED's for troubleshooting purposes.

As with any electronic device, care should be taken when installing, wiring and commissioning the unit. Failure to do so may damage or destroy the driver and void the warranty.

The following diagnostic indications are possible with the two indicator LED's on the face of the controller.

LED's		LED Operation		Functional Description
Green	Red	Green	Red	
		OFF	ON	Internal installation error at power up. Fault Error. Output locked "OFF", Driver has tripped. Return MCS2000-DRV2 for Repair.
		OFF		Short Circuit or Overload on Output at Power Up. Output Locked "OFF", Driver has tripped. Reset by Power Off and then Power On.
		ON	ON	Short Circuit or Overload during normal operation. Output Locked "OFF". Driver has tripped. Reset by Power Off and then Power On.
				Internal auxiliary power supply out of tolerance. Output Locked "OFF". Auto Reset when condition clears. OR Internal auxiliary power supply failure or drive power supply greater than 48 VDC, +10%. Output Locked "OFF". Auto Reset when condition clears.

Figure 7
LED Indicator Operations and Descriptions - Fault Conditions

Other Potential Faults

Symptom	Possible Solution
No Output to Brake	<p>Check LED's for various conditions</p> <p>Check Incoming DC Power to MCS2000-DRV2 either 24 VDC or 48 VDC. Check that power is applied.</p> <p>If unit has power, check that input signals to Input "A" and Input "B" vary between 0 and 10 VDC.</p> <p>Check that brake coil is not open by doing a resistance check on the magnet coil. Refer to the Tension Catalog for proper resistance.</p> <p>Check that brake is wired to the MCS2000-DRV2.</p>
Brake does not produce sufficient torque	<p>Verify that the brake is the proper size for the application. Contact Warner Electric for assistance.</p> <p>Check that maximum voltage is being applied to the brake. Also, check that brake coil is drawing rated current at maximum voltage by placing a digital current meter in series with one of the brake leads.</p> <p>Check the Driver LED's to insure that the control has not gone into a fault condition.</p> <p>Check mechanically that the brake armature or magnets are free and not binding and can engage properly.</p> <p>Check that the input signal to the Channel "A" and Channel "B" inputs goes to full 10 volts on the control inputs. If inputs do not go to 10 volts maximum, check the controller for proper operation and set up. Refer to the particular control manual for proper adjustments.</p>
Brake seems to drag when off	<p>Check that the anti-residual output is set properly. Too little output and the brake will drag due to possibly high residual.</p> <p>Check that the anti-residual output is not adjusted too high. Adjusting the anti-residual too high can result in the brake re-engaging.</p> <p>Refer to the Anti-Residual Adjustment section of this manual for proper adjustment and readjust as necessary.</p> <p>The following chart, on page 20, shows a comparison of the MCS2000-DRV, MCS2000-DRVH and the MCS2000-DRV2 terminal connections.</p>
The MCS2000-DRV2 is different from my old driver	<p>The MCS2000-DRV2 is a universal driver designed as a replacement for the previous MCS2000-DRV and MCS2000-DRVH in one version.</p> <p>Terminal block connections are slightly different on the MCS2000-DRV2 since the previous drivers had additional inputs that typically were not used.</p> <p>If the application used some of the previous terminals, then consult the factory for assistance in making the MCS2000-DRV2 compatible for the application.</p> <p>If problems arise that are not covered in the above troubleshooting section, then either the local Warner Electric Representative or Warner Electric Distributor should be contacted for additional assistance.</p> <p>This completes the installation of the MCS2000-DRV2 Driver. This manual covers only the Driver and does not cover the controller part of the system.</p> <p>Refer to the appropriate manual for set-up and operation of the controller. Failure to do so could result in damage to the controller and/or driver and possibly void the warranty.</p>

The following chart shows a comparison of the MCS2000-DRV, MCS2000-DRVH, and the MCS2000-DRV2 terminal connections.

MCS2000-DRV	MCS2000-PSDRV2	MCS2000-DRVH	MCS2000-PSDRV2
REF 10 V	Not Available	Ref 10 V	Not Available
0 V	Not Available	0 V	Not Available
In BxV	Not Available	In BxV	Not Available
In B 0 – 10 V	Terminal #3	In B 0 – 10 V	Terminal #3
0 V	Terminal #4	In B 0 – 20 ma	Not Available
In AxV	Not Available	Out BxV	Not Available
In A 0 – 10 V	Terminal #1	0 V	Terminal #4
0 V	Terminal #2	In AxV	Not Available
BRK COM	Terminal #8	In A 0 – 10 V	Terminal #1
BRK B +	Terminal #7	In A 0 – 20 ma	Not Available
BRK COM	Terminal #6	Out AxV	Not Available
BRK A +	Terminal #5	0 V	Terminal #2
+ 24 V	Terminal #10	BRK B +	Terminal #7
0 V	Terminal #9	BRK COM	Terminal #8
		BRK A +	Terminal #5
		BRK COM	Terminal #6
		+ 48 V	Terminal #10
		0 V	Terminal #9

If a problem arises that is not covered in the above troubleshooting section, then either the local Warner Electric Representative or Warner Electric Distributor should be contacted for additional assistance.

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Notes:

Warranty

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