

CBC-200 Series & CBC-200C Series Single Channel Adjust Clutch/Brake Controls

Installation & Operating Instructions

P-269

819-0407



An Altra Industrial Motion Company

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

Introduction

Warner Electric's CBC-200 series Constant Current Clutch Brake Controls are solid-state electronic power supplies designed to operate any of the Warner Electric 90 Volt clutches and brakes, including fail safe designs. They can operate a single clutch or brake, two clutches, two brakes, a combination clutch and brake, or a combination clutch and fail safe brake, depending on the switching arrangement used and the application requirements.

The CBC-200 series controls operate from 120 VAC single-phase input power. They provide constant current output as set by the torque adjustment potentiometers on the front panel or remote potentiometer. Additionally, on some versions a level adjust can be used to set the operating level with the torque adjustment setting the maximum current level. On the CBC-200 series Channel 2 is a fixed output level and an adjustable output on Channel 1. Output current ranges are selectable for the adjustable output channels in one of five ranges by the DIP switches located on the control's printed circuit board.

Several versions of the CBC-200 are provided to handle a wide range of applications. These include both enclosed and chassis mount versions for mounting in an external enclosure

or control panel. The standard version is offered the same as before, but with the chassis version added. The CBC-200-1 and CBC-200-C1 version is being offered where an external limit adjustment potentiometer is required. The CBC-200-2 and CBC-200-C2 version maintains the limit adjust potentiometer on the PC board but allows for an external potentiometer for level adjustment of the output. This allows the output to be controlled from zero to maximum level on both the current adjust channel and steady state output channel. The CBC-200-3 and CBC-200-C3 allow for both the current limit and level adjustment potentiometers to be mounted remotely.

Operations of all units are identical except for the method of the control potentiometer mounting. All units that have external potentiometer options have terminal blocks mounted on the PC boards for connection of the potentiometers.

The potentiometers used can be supplied either as optional accessory items or be obtained from a local electronic supply house.

A short circuit protection scheme is integral which trips on occurrence of line to line shorts on the output. No protection is provided for line to ground shorts because the unit is not isolated.

Two LED indicators are provided on the front panel of the control for "POWER" and "SHORT" indications. The green indicator marked "POWER" is illuminated whenever the AC input power is applied to the control. A red indicator marked "SHORT" is illuminated whenever a short circuit condition occurs in either of the outputs. To reset, power must be removed, the shorted condition cleared, and the AC input power reapplied to the control.

The enclosed version may be used with or without the cover. Removal of the plastic cover when the control is used in an enclosure will increase the operating temperature range of the control.

The chassis mount version does not have a cover and must be mounted in an enclosure or control panel.

Specifications

Input Power: 120 VAC, +10%, -15%, 50/60 Hz, single phase, 215 VA maximum.

Output: Pulse-width modulated full wave rectified DC. Constant current, switch selectable ranges, for one channel and fixed 90VDC second channel, designed for 90 volt DC clutches and brakes.

Ambient Temperature: -32° F to + 113°F (0°C to + 45°) with plastic cover installed. -32°F to +150°F (0°C to +66°C) with plastic cover removed, or board assembly only.

Circuit Protection: Internal short circuit protection on outputs, but no circuit protection for AC ground faults. Optional customer supplied fusing on AC line, 1.5 amps, 250 VAC Fast-Acting type fuse recommended.

Control Adjust: CBC-200 and CBC-200-C via front panel potentiometer for current adjustment. CBC-200-1 and CBC-200-C1 via external mounted potentiometer for current adjustment.

CBC-200-2 and CBC-200-C2 current adjustment via front panel potentiometer and output level adjust via external potentiometer.

CBC-200-3 and CBC-200-C3 both current adjust and limit adjustment are via external potentiometers.

Status Indicators: “POWER” – green LED indicating AC power is applied to the control.

“SHORT” – red LED indicating that a short circuit condition exists on one or both of the outputs.

Internal Adjustments: Current Range Selection via DIP switch, SW1

Current Ranges:

Switch Setting	1	2	3	4	5
Max Output, ma	60	175	245	305	533

External Switching: Mechanical or electromechanical
Electromechanical
 Customer supplied; 1 amp, 125 V minimum rating.

Solid-state NPN isolated transistor
 Customer supplied; 2 amp, 250V minimum rating. Maximum off state leakage current < 1 ma.

External Pots:

Remote current adjust pot
 customer supplied; 10,000 ohm, 2 watt, linear, maximum distance from control to potentiometer not to exceed 10 feet.

Optional Accessory Pot Kit;
 part number, 6011-101-002

Remote Level adjust pot
 Customer supplied; 5,000 ohm, 2 watt, linear, maximum distance from control to potentiometer not to exceed 10 feet.

Optional Accessory Pot Kit;
 part number, 6011-101-001.

Wiring Entrance: Two 7/8” diameter entrance holes located on the bottom of the control chassis on enclosed units. No conduit entrances are on chassis mount versions.

Enclosure: Rated NEMA 1 only – Control must be kept clear of foreign materials, dust, grease and oil which might affect its operation.

Part Numbers:

Enclosed Versions

CBC-200	6011-448-001
CBC-200-1	6011-448-002
CBC-200-2	6011-448-003
CBC-200-3	6011-448-004

Chassis Versions

CBC-200-C	6011-448-005
CBC-200-C1	6011-448-006
CBC-200-C2	6011-448-007
CBC-200-C3	6011-448-008

Mounting

Enclosed Units

Any vertical, horizontal, or angled surface is suitable for mounting the CBC-200, CBC-200-1, CBC-200-2, CBC-200-3 control.

Follow these procedures to mount your control.

- ❑ 1. Remove the front cover by removing the top and bottom retaining screws.
- ❑ 2. Set the control on the mounting surface and mark for the three mounting holes in accordance with "Dimensions." (See Figure 1)
- ❑ 3. Install the top two mounting bolts or screws until they are nearly flush, set the control over the larger top mounting holes and pull down to position the control.
- ❑ 4. Tighten the top bolts or screws and install the bottom bolt or screw and tighten.

This completes the mounting of the control. The control is now ready for final wiring. Refer to the wiring section for final wiring.

If the CBC-200-1, CBC-200-2, or the CBC-200-3 control is used, the following additional procedure must be followed.

- ❑ 1. For the CBC-200-2 remove the knob from the control.
- ❑ 2. On the CBC-200-1, CBC-200-2 or CBC-200-3 remove the four screws that hold the faceplate bracket and PC board to the chassis plate.
- ❑ 3. Bring the external potentiometer wires through the conduit entrance hole and wire the potentiometers to the appropriate terminals blocks as shown in (Figure 5) CBC-200-2, (Figure 6) CBC-200-1, or (Figure 7) CBC-200-3.

- ❑ 4. After wiring the external potentiometers, mount the PC board assembly and faceplate assembly to the chassis with the four screws previously removed. Replace the knob if the CBC-200-2 was installed.

This completes the preliminary wiring of the remote potentiometers. The control is now ready for final wiring. Refer to the wiring section for final wiring.

Note: Be careful not to pinch or crimp the pot wiring to prevent shorting to the housing or components.

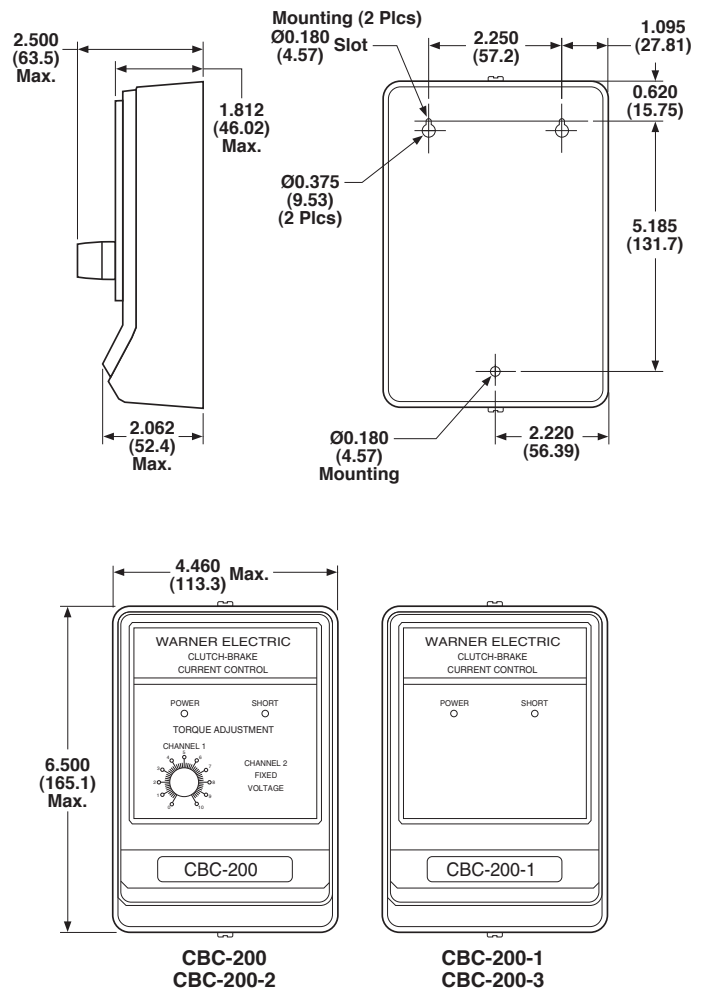


Figure 1

Chassis Mount PC Board Assemblies

Any vertical, horizontal, or angled surface is suitable for mounting the CBC-200-C, CBC-200-C1, CBC-200-C2, or CBC-200-C3 control.

Follow these procedures to mount your control:

- ❑ 1. Determine the mounting location where the control will be placed.
- ❑ 2. Layout the mounting hole dimensions and drill holes and taps using a 4-40 tap. (Figure 2)
- ❑ 3. If the CBC-200-C1, CBC-200-C2 or CBC-200-C3 controls are used, wire the external potentiometers to the appropriate terminal blocks. (See Figure 2)
- ❑ 4. Place the faceplate over the PC board assembly aligning the holes on the faceplate with the holes on the PC board.

- ❑ 5. Using the 4-40 screws supplied, mount the PC board and faceplate assembly to the panel. Insure that the faceplate aligns correctly and does not contact any of the components on the PC board.
- ❑ 6. Tighten all four mounting screws securely.
- ❑ 7. If the CBC-200-C or CBC-200-C2 was used, insert the knob on the internal potentiometer shaft.
- ❑ 8. Attach the switch setting label next to the control as a reference for switch set up.

Note: Be careful not to pinch or crimp the potentiometer wiring to prevent shorting to the chassis or control components.

This completes the mounting of the control. The unit is now ready for final wiring. Refer to the wiring section for final wiring.

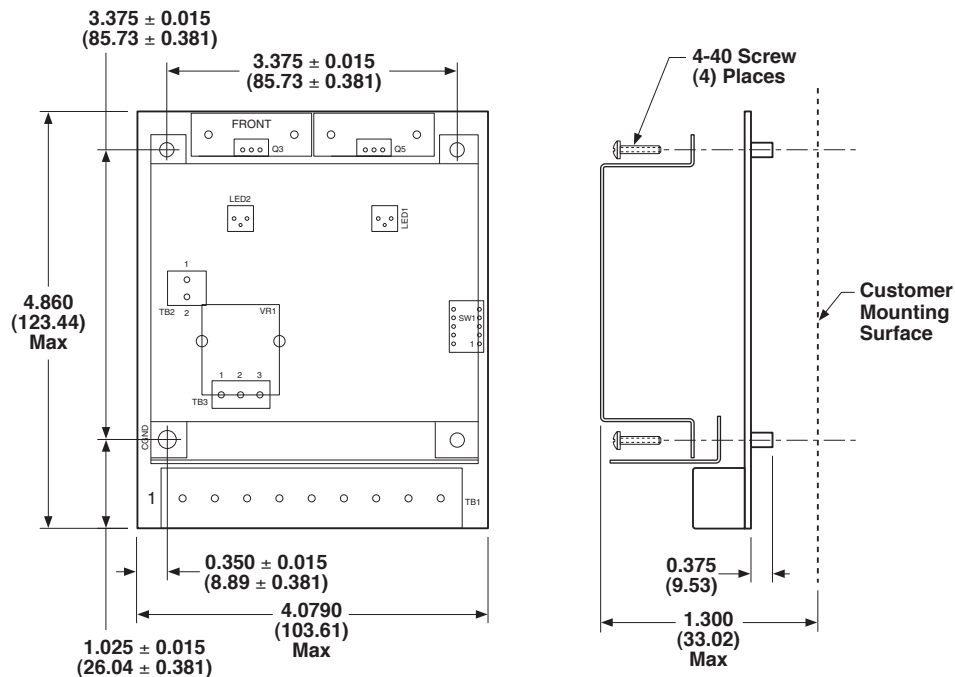


Figure 2

Electrical Connections

⚠ WARNING All electrical current must be off when making electrical connections to prevent injury or death which can result from contact with live wires.

Normal Clutch/Brake Wiring (Power applied clutches or brakes)

AC Input Power Connections

- ❑ 1. Connect Earth Ground wire to Terminal 1 and tighten securely.
- ❑ 2. Connect the Hot side of the 120 VAC line to Terminal 2 and tighten securely.

Note: Customer supplied fuse is desirable. See diagram for connection and sizing.

- ❑ 3. Connect the neutral side of the 120 VAC line to Terminal 3 and tighten securely.
- ❑ 4. For power applied clutch/brake arrangement proceed to the wiring diagram and section below.

Clutch/Brake and Switch Wiring

- ❑ 1. Connect either the clutch or brake magnet to Terminals 4 and 5. Tighten Terminal 4 securely.
- ❑ 2. Connect the other magnet, either brake or clutch to Terminals 7 and 8. Tighten Terminal 7 securely.
- ❑ 3. Connect switching for Channel 1 to Terminals 5 and 6. Tighten both terminals securely.
- ❑ 4. Connect switching for Channel 2 to Terminals 8 and 9. Tighten both terminals securely.
- ❑ 5. Set DIP Switch, SW1 for proper current setting before applying power to the control.

See INTERNAL SWITCH SETTINGS CHART for proper DIP Switch settings

- ❑ 6. If external potentiometers are being used, then proceed to the external potentiometer wiring section. If they are not used, this completes the wiring of the control.
- ❑ 7. Double check all connections before applying power.

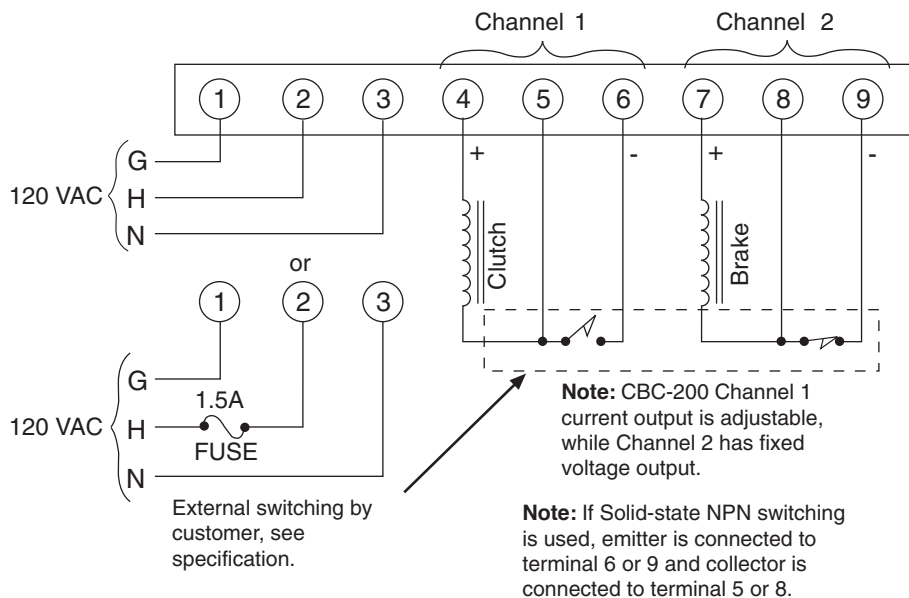


Figure 3

Clutch – Electrically Released Brake Wiring (Power on clutch/power off brake)

⚠ WARNING All electrical current must be off when making electrical connections to prevent injury or death which can result from contact with live wires.

AC Input Power Connections

- ❑ 1. Connect Earth Ground wire to Terminal 1 and tighten securely.
- ❑ 2. Connect the Hot side of the 120 VAC line to Terminal 2 and tighten securely.

Note: Customer supplied fuse is desirable. See diagram for connection and sizing.

- ❑ 3. Connect the neutral side of the 120 VAC line to Terminal 3 and tighten securely
- ❑ 4. For electrically released brake-clutch arrangement proceed to the wiring section below.

Clutch/Brake and Switch Wiring

- ❑ 1. Connect the Brake to Terminals 4 and 5. Observe the polarity when making connections. Tighten Terminal 4 securely.
- ❑ 2. Connect the Clutch to Terminals 7 and 8. Tighten Terminal 7 securely.
- ❑ 3. Connect the switching for Channel 1 to Terminals 5 and 6. Tighten terminals securely.
- ❑ 4. Connect the switching for Channel 2 to Terminals 8 and 9. Tighten terminals securely.
- ❑ 5. Set DIP Switch, SW1 for proper current setting before applying power to the control

See INTERNAL SWITCH SETTINGS CHART for proper DIP Switch settings.

- ❑ 6. If external potentiometers are being used, then proceed to the external potentiometer wiring section. If external potentiometers are not used, this completes the wiring of the control.
- ❑ 7. Double check all connections before applying power.

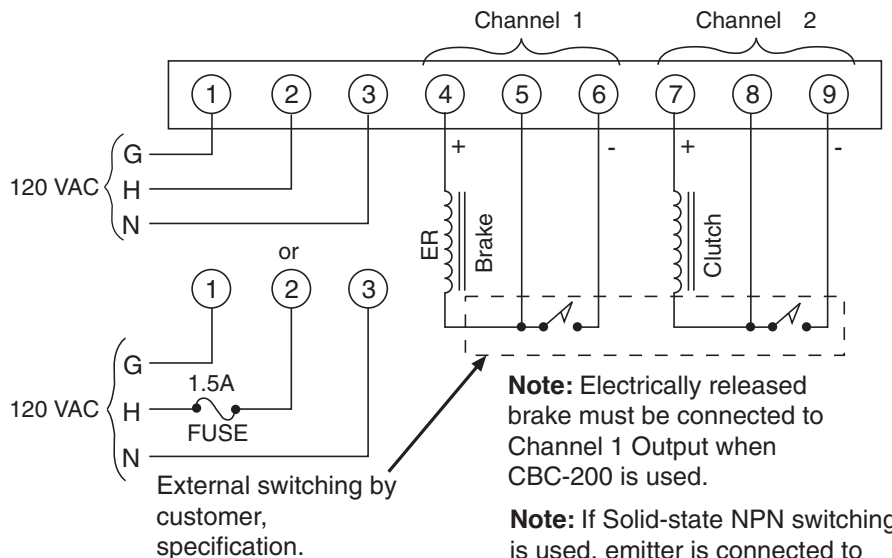


Figure 4

External Potentiometer wiring for CBC-200 Series Controls

Enclosed Models

CBC-200-1

CBC-200-2

CBC-200-3

Depending on which control is being used, options for external potentiometer are available via terminal blocks on the PC board of the unit.

- ❑ 1. For CBC-200-2 only, remove the internal torque adjust knob.
- ❑ 2. Remove the four screws that hold the bracket assembly and PC Board to the chassis. This step applies to all versions of the enclosed models.
- ❑ 3. Based on which model used, route the pot cable through one of the conduit entrance holes on the bottom of the unit and wire to the appropriate terminal block on the PC board. Refer to the wiring diagrams on this page for the proper connections.

CBC-200-1 External Current Limit Adjustment

- ❑ 1. Wire the external current limit potentiometer to Terminal Block TB-3 for Channel 1 as shown in the diagram. (See Figure 6)
- ❑ 2. If the accessory pot kit is used, then wire per the colors as shown in the diagram.
- ❑ 3. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.

CBC-200-2, CBC- 200-C2

TB-2

External Level Adjust w/Internal Current Limit Adjust

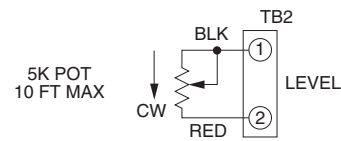


Figure 5

CBC-200-1, CBC-200-C1

TB-3

External Current Limit Adjust

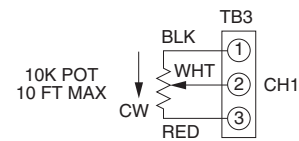
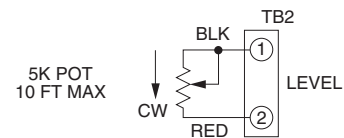


Figure 6

CBC-200-3, CBC-200-C3

TB-2

External Level Adjust w/Internal Current Limit Adjust



TB-3

External Current Limit Adjust

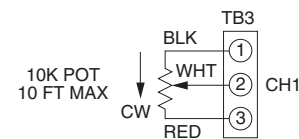


Figure 7

CBC-200-2

External Level Adjust with Internal Current Limit Adjust

- 1. Wire the external level adjust potentiometer on Terminal Block TB-2 as shown in the diagram. (See Figure 5)
- 2. If the accessory pot kit is used, wire according to the colors as shown in the diagram.
- 3. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.

Note: The level adjustment controls both the current adjustable output, channel 1 as well as the steady state output, channel 2.

- 4. After the pot(s) has been wired to the appropriate terminal block, mount the PCB and bracket assembly and reattach to the chassis with the four screws removed in step 2 above.
- 5. For the CBC-200-2 reattach the internal potentiometer knob.
- 6. Double check all wiring for both the potentiometer and the main terminal block to insure proper connections.

CBC-200-3

External Current Limit and Level Adjust

- 1. Wire the external current limit adjust potentiometer to Terminal Block TB-3 for Channel 1 as shown in the diagram. (See Figure 7)
- 2. If the accessory pot kit is used, wire per the color codes as shown.
- 3. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.
- 4. Wire the external level adjust potentiometer to Terminal Block TB-2 as shown in the diagram. (See Figure 7)
- 5. If the accessory pot kit is used, wire per the color codes as shown.
- 6. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.

Note: The level adjustment controls both the current adjustable output, channel 1 as well as the steady state output, channel 2.

Chassis Mount Models

CBC-200-C1

CBC-200-C2

CBC-200-C3

- 1. The CBC-200-C series chassis mount version controls are shipped with the face plate bracket assembly loose.
- 2. Wire the control per the appropriate Wiring configuration for the type of external potentiometer being used.
- 3. Based on which model used, route the pot cable accordingly. Make sure to keep the cable away from components which may get hot during operation or points where the cable may become pinched. Refer to the wiring diagrams for the proper connection.
- 4. After the pot(s) have been wired to the appropriate terminal blocks, mount the PCB and bracket assembly and attach to the mounting surface with the four screws provided.

CBC-200-C1 External current limit adjustment

- 1. Wire the external current limit potentiometer to Terminal Block TB-3 for Channel 1 as shown in the diagram. (See Figure 6)
- 2. If the accessory pot kit is used, wire per the colors as shown in the diagram.
- 3. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.

CBC-200-C2

External Level Adjust with Internal Current Limit Adjust

- 1. Wire the external level adjust potentiometer on Terminal Block TB-2 as shown in the diagram. (See Figure 5)
- 2. If the accessory pot kit is used, then wire according to the colors as shown in the diagram
- 3. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.

Note: The level adjustment controls both the current adjustable output, channel 1 as well as the steady state output, channel 2.

CBC-200-3

External Current Limit and Level Adjust

- 1. Wire the external current limit adjust potentiometer to Terminal Block TB-3 for Channel 1 as shown in the diagram. (See Figure 7)
- 2. If the accessory pot kit is used, wire per the color codes as shown.
- 3. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out of the terminals.
- 4. Wire the external level adjust potentiometer to Terminal Block TB-2 as shown in the diagram. (See Figure 7)
- 5. If the accessory pot kit is used, wire per the color codes as shown.
- 6. Make sure all terminals are securely fastened and the wiring cable is secured so that it can't pull out.

Note: The level adjustment controls both the current adjustable output, channel 1 as well as the steady state output, channel 2.

Internal Adjustments

The internal DIP Switch on the control circuit board adjusts the control for the proper current range to the clutch and/or brake coil being used. The chart below indicates the proper setting based on coil resistance and Warner Electric product. To adjust for products not listed, obtain coil resistance information and set switches per coil resistance.

Switch DIP No.	1	2	3	4	5
Coil Resistance at 20° C (W)	1000-1550	350-999	250-349	205-249	100-204
Current Range	0 - 60 ma	0 - 175 ma	0 - 245 ma	0 - 305 ma	0 - 533 ma
Warner Electric Clutch Models	SF-120 SF-170 SF-250 SF-400	EC-375 EC-475 EM-50 EM-100 EM-180 UM-50 UM-100 UM-180 UM-50C UM-180C EUM-50 EUM-100 EUM-180	ATC-25 PC-500 SF-825 PC-1000 SF-1225 PC-1225 PC-1525 EC-1000 EM-210 UM-210 UM-215 UM-210C EUM-210 EUM-215	SF-500 SF-650 SF-825BM PC-825 SF-1000 SF-1525 EC-650 EC-825 EC-1225 ATC-55	ATC-115 SF-1525HT
Warner Electric Brake Models	PB-120 PB-170 PB-250 PB-400	EB-375 EB-475 EM-50 EM-100 EM-180 UM-50 UM-100 UM-180 UM-50C UM-180C EUM-50 EUM-100 EUM-180	ATB-25 PB-500 PB-650 PB-1000 PB-1225 PB-1525 EB-650 EB-1000 EB-1225 EMFB-50 UMFB-50 ER/FB-375 EM-210 UM-210 UM-215 UM-210C EUM-210 EUM-215	EB-825 EMFB-180 UMFB-180 ER/FB-475 ATB-55 ER-825	EMFB-210 UMFB-210 ER/FB-650 ATB-115

Note: Only one switch number is to be set to the “on” position at any time.

System Troubleshooting

A. Symptom:

Green LED indicator marked “Power” does not come on when power is applied to the CBC-200 Controller.

Probable Cause	Solution
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No Power is applied to the Control	<ul style="list-style-type: none">• Check that AC power is applied to the control.• Incorrect wiring on AC power to the control.• Check for 120 VAC at Terminals 2 and 3 with an AC Voltmeter.
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Optional line fuse is blown	<ul style="list-style-type: none">• Check for blown fuse – replace.• Check for 120 VAC at Terminals 2 and 3 of the control.• Check for output voltage at output terminals for Channel 1 and Channel 2. If voltage is not present, replace control or board.
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Indicator LED is defective	
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B. Symptom: Red LED marked “short” illuminates

Probable Cause	Solution
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Shorted magnet coil	<ul style="list-style-type: none">• Check resistance of magnet coil used and replace if necessary.• Check for shorted conditions in wiring between the magnets and the control, and wiring to chassis ground.• Check magnet for proper coil voltage rating.• Check for source of transient noise and suppress. Wire control using shielded cables. Segregate wiring runs.
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Wiring between control and magnet shorting	
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Improper magnet coil voltage	
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Transient noise	
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C. Symptom: Magnets do not engage when power is applied.

Probable Cause	Solution
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External switching improperly wired	<ul style="list-style-type: none">• Check wiring and switch connections and rewire if necessary.• Set torque adjustment potentiometer to maximum level.• Check DIP Switch settings per chart and reset if required.• Refer to Symptom A above.• Check wiring per the wiring diagram and rewire if necessary.• Check to insure that a fail safe brake is not being used in place of a power applied brake. Replace brake with correct brake.
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Torque adjust set to zero (0)	
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Current range switch improperly set	
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No power applied to the control	
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System incorrectly wired	
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Fail Safe brake used in place of power applied brake	
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D. Symptom: Magnets do not disengage when power is removed

Probable Cause	Solution
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External switches incorrectly wired	<ul style="list-style-type: none">• Check wiring of switching circuits and rewire if necessary.• Check to see if fail safe brake is being used in place of power applied brake.• Replace control and see if problem is resolved.
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Fail Safe brake magnet being used	
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Faulty control	
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E. Symptom: Magnets do not appear to have enough torque

Probable Cause	Solution
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DIP Switch improperly set	<ul style="list-style-type: none">• Check DIP switch setting per chart and reset if necessary.• Check wiring between control and magnets and rewire if required.• Check setting of torque adjust potentiometer and set to maximum if required. Check for correct wiring if external pots are used.• Verify sizing is correct by repeating selection process.
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Magnets incorrectly wired	
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Torque adjust potentiometer set too low	
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Magnets are incorrectly sized	
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Notes:

Warranty

Warner Electric LLC warrants that it will repair or replace (whichever it deems advisable) any product manufactured and sold by it which proves to be defective in material or workmanship within a period of one (1) year from the date of original purchase for consumer, commercial or industrial use.

This warranty extends only to the original purchaser and is not transferable or assignable without Warner Electric LLC's prior consent.

Warranty service can be obtained in the U.S.A. by returning any defective product, transportation charges prepaid, to the appropriate Warner Electric LLC factory. Additional warranty information may be obtained by writing the Customer Satisfaction Department, Warner Electric LLC, 449 Gardner Street, South Beloit, Illinois 61080, or by calling 815-389-3771.

A purchase receipt or other proof of original purchase will be required before warranty service is rendered. If found defective under the terms of this warranty, repair or replacement will be made, without charge, together with a refund for transportation costs. If found not to be defective, you will be notified and, with your consent, the item will be repaired or replaced and returned to you at your expense.

This warranty covers normal use and does not cover damage or defect which results from alteration, accident, neglect, or improper installation, operation, or maintenance.

Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

Warner Electric LLC's obligation under this warranty is limited to the repair or replacement of the defective product and in no event shall Warner Electric LLC be liable for consequential, indirect, or incidental damages of any kind incurred by reason of the manufacture, sale or use of any defective product. Warner Electric LLC neither assumes nor authorizes any other person to give any other warranty or to assume any other obligation or liability on its behalf.

WITH RESPECT TO CONSUMER USE OF THE PRODUCT, ANY IMPLIED WARRANTIES WHICH THE CONSUMER MAY HAVE ARE LIMITED IN DURATION TO ONE YEAR FROM THE DATE OF ORIGINAL CONSUMER PURCHASE. WITH RESPECT TO COMMERCIAL AND INDUSTRIAL USES OF THE PRODUCT, THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

Changes in Dimensions and Specifications

All dimensions and specifications shown in Warner Electric catalogs are subject to change without notice. Weights do not include weight of boxing for shipment. Certified prints will be furnished without charge on request to Warner Electric.



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