CAROTRON

Electric Brake Controller

(PROTOTYPE)

Instruction Manual
Model
EBC1000-00

CAROTRON

Driven by Excellence

D.C. DRIVES, A.C. INVERTERS,
SOLID STATE STARTERS, SYSTEM INTERFACE
CIRCUITS AND ENGINEERED SYSTEMS

General Description

The Carotron Model EBC1000-00 is a precision electric brake controller which provides two preset current levels over a wide range of input voltage. When the unit is enabled, the **MAX CUR** value provides a high current surge to energize the armature and release the brake. After an adjustable time delay (typically 0.5 to 3 seconds), the controller automatically shifts to a lower, **MIN CUR**, value of hold-in current for continuous operation at greatly reduced power dissipation. Because the output to the brake coil is current-regulated, the selected current level will not vary over the rated voltage range or operating temperature. Innovative design techniques have made the EBC1000 easily adaptable to a wide range of brake products. These rugged industrial features are combined with Carotron's traditional engineered quality, resulting in a brake controller possessing the highest level of performance.

Standard Features

- Sequenced operation controlled by a single dry-circuit contact closure.
- Adjustable "pull-in" surge or MAX current level and "hold-in" MIN current level.
- "Built in" 3 digit digital ammeter display, 0.1A resolution, for set-up ease.
- Adjustable Delay Time controlling time at the MAX level before automatic switching to the MIN current level.
- Selectable output Current Ranges, 2, 4, 6, 8 and 10 Amperes, to maximize adjustment and operating resolution.
- LED indicators for CONTROL POWER, RUN mode and TIMING circuit operation.
- 1400V rated power devices and a switching type power supply for "drop-in" operation on any single phase voltage supply between 208 and 460 VAC, $\pm$10 %.

Note: Output voltage and current maximum levels are dependent on AC Line voltage; refer to Electrical Specifications for details.

- IC regulated power supplies, metal film resistors and cermet potentiometers for stable operation under varying temperature and line voltage conditions.
- Included fuses for power section and power supply section.
- Compact design with clear dead front cover for safe operation while maintaining ammeter visibility.

Electrical Specifications

AC Power Input:

208 – 460 VAC $\pm$ 10%, 1 phase, 50/60 Hz, 15 Amperes maximum

DC Voltage Maximum (Surge) Output (with 10 ampere load):

With 208 VAC input = 176 VDC output
With 230 VAC input = 195 VDC output
With 244 VAC input = 208 VDC output
With 380 VAC input = 327 VDC output
With 460 VAC input = 397 VDC output
With 480 VAC input = 416 VDC output

Programming, Adjustments & Indicators

POWER BOARD

J1 programming jumper: Sets operating current range maximum. Place J1 in the current range position (2, 4, 6, 8 or 10 Amp) which is closest to but greater than the brake coil maximum, Surge, current rating.

NOTE:

If the brake maximum current rating is not known, it can be calculated by dividing the "VOLTAGE INTERMITTENT" value by the brake coil resistance OHMS value. Example: Intermittent voltage rating 208 VDC / 31 ohms = 6.7 amperes.

CONTROL BOARD:

P3 – MIN CUR, (MINIMUM CURRENT) sets the continuous operating current level - the level of current after the initial timed "surge" current.

P4 –, (MAXIMUM CURRENT) sets the intermittent current level reached during the timed "surge" current period.

P5 – DELAY TIME, controls the time at **MAX** CURrent before switching output to the **MIN** CURrent level. The time period is adjustable between 0.2 seconds and 3.1 seconds.

I1 – TIMING, Lights during the DELAY TIME period set by the P5, DELAY TIME pot.

I2 – CONTROL POWER, Lights to indicate the presence of internal control power.

I3 – RUN, Lights to indicate a RUN contact command.

MAX SET, Pushbutton used to adjust the MAX or Surge output level.

AMMETER DISPLAY, Displays output current in amperes to 0.1A resolution.

Adjustment Process

The EBC1000-00 has been designed to regulate output current – **not** voltage because the strength of an electromagnetic field (and the brake release force) is directly proportional to the current level. The current level is determined by the brake coil resistance and applied voltage.

When initially powered, the coil winding resistance will increase as it warms up and the voltage has to be increased to maintain or regulate the current level. For this reason, you may see the output voltage of the EBC1000-00 increase after initial powered operation until the winding temperature and resistance stabilizes.

If the brake operating voltages, INTERMITTENT and CONTINUOUS, are the only brake specifications known, a voltmeter must be used to measure the output level across terminals **F1** and **F2**. This measurement and the **MIN CUR** and **MAX CUR**

adjustments' final settings should be made only after the brake coil has been energized and reached a stable temperature. This usually takes several minutes. Now, when the brake has been unpowered long enough to cool down, a lower output voltage may be seen initially until the coil warms up.

WARNING!!! High voltage potentials are present within the EBC1000-00 unit and with respect to earth or chassis ground – even when not enabled. Exercise caution when making measurements and/or adjustments.

Adjustment Procedure – before power-up

1. Initially note the brake specifications; resistance and continuous and intermittent voltage and/or current levels.

If the brake current rating is not known, it can be calculated by dividing the **VOLTAGE INTERMITTENT** and **VOLTAGE CONTINUOUS** values by the brake coil resistance **OHMS**. Example: Intermittent voltage rating 208 VDC / 31 ohms = 6.7 amperes.
Continuous voltage rating 30 VDC / 31 ohms = 0.97 amperes.

Use the maximum, intermittent, current value to place the **J1** programming jumper position to the ampere value which is closest to but greater than the brake coil maximum current rating.

2. Turn the **P3, MIN CUR**, and **P4, MAX CUR**, all the way down, full CCW rotation.

3. Turn the **P5, DELAY TIME**, full CCW rotation, then 1/8th turn CW.

Adjustment Procedure – upon power-up

4. Apply AC power to the EBC1000-00 and close the RUN contact between terminals TB1- 4 and 5. You may notice the **I1, TIMING,** LED light for about 0.5 seconds after closing the RUN contact.

5. After the **I1, TIMING** LED has extinguished, slowly increase the **P3, MIN CUR** pot to set the **continuous** current level on the built-in ammeter or the voltage level from external measurement. The brake will not release at this level.

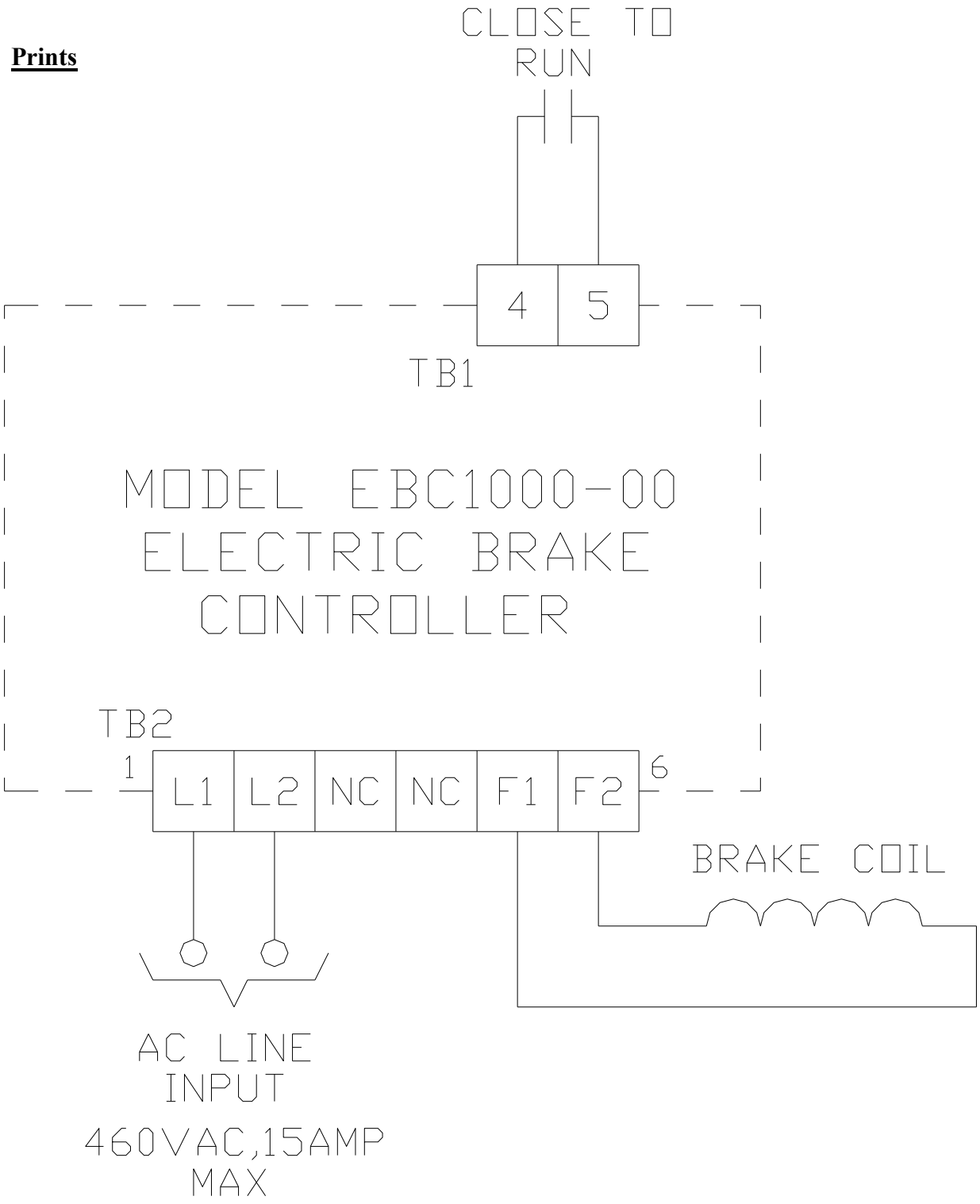
6. While observing the output current or voltage level, de-press the **MAX SET** button and adjust the **P4, MAX CUR** pot to give the desired brake release level. Do not dwell at the surge level – the brakes are rated only for intermittent operation at this level.

In normal operation, this output level will be generated by the DELAY TIME circuit.

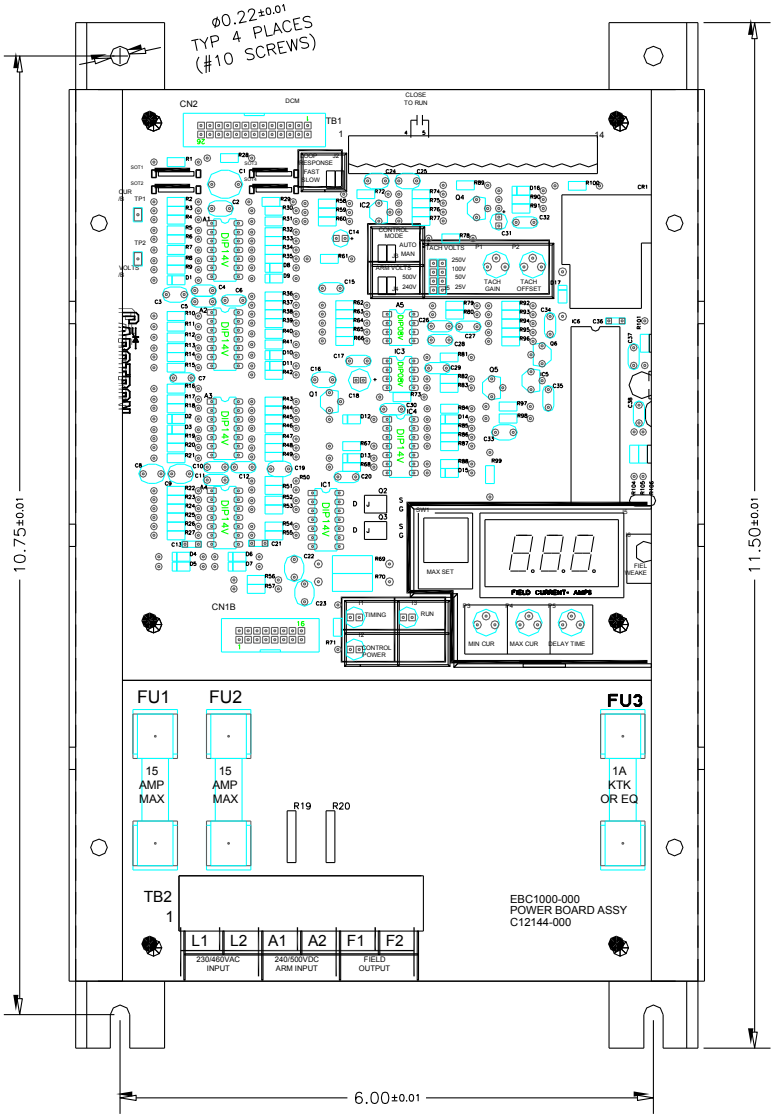
7. Open and re-close the RUN contact while observing the **I1, TIMING** LED or the output level. Use the **P5, DELAY TIME** pot to set the desired time at the Surge level. CW rotation increases the time. This time period needs to be set only long enough to assure consistent release of the brake – additional time is not necessary.

Note: If setting output by measuring voltage **Double Check** After warm up by repeating steps 2 and 6.

Prints



REFER TO INSTRUCTION MANUAL FOR INPUT AND OUTPUT RATINGS.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CN2
DCM
TB1
CLOSE
TO RUN
CN1B
FU1
FU2
FU3
15
AMP
MAX
15
AMP
MAX
1A
KTK
OR EQ
R19
R20
TB2
1
L1
L2
A1
A2
F1
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INPUT
240/500VDC
ARM INPUT
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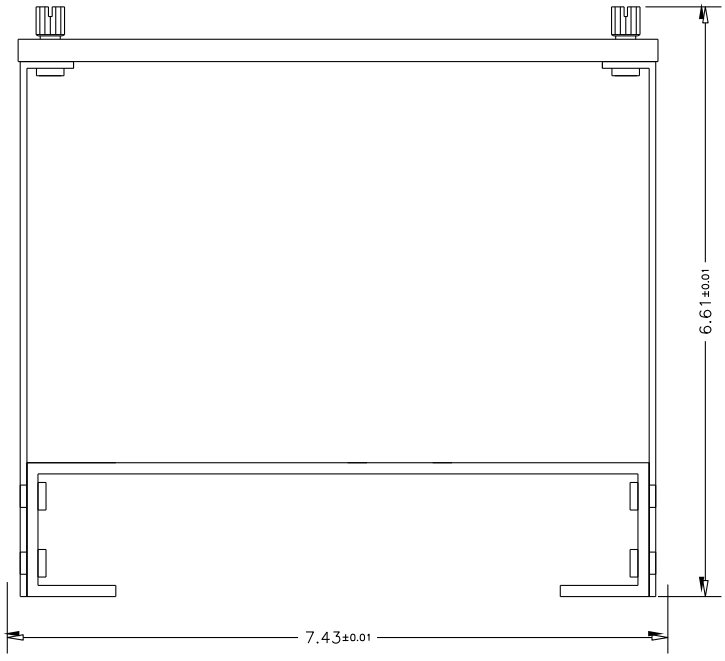
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