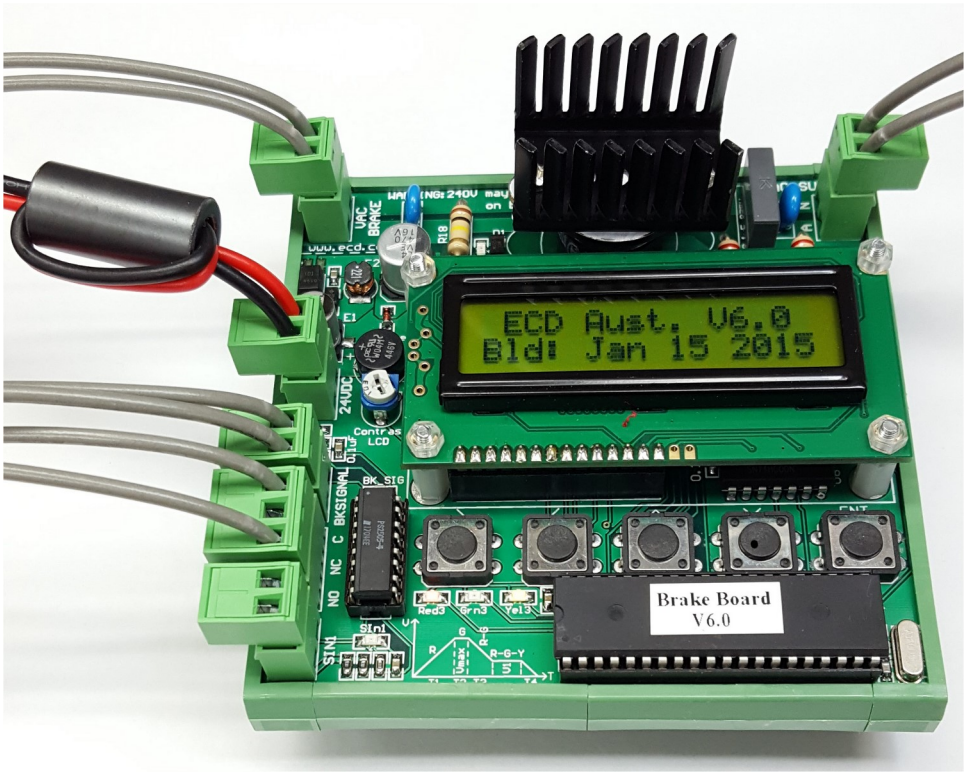
Brake Board Manual



Revision Date: Jan 19, 2018

ECD System Manual

ELECTRONIC CIRCUIT DESIGNS PTY. LTD.

Operation Guide

This manual covers all versions of Brake Board hardware and software, although some features mentioned in this manual might not be available on earlier versions

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Section 1.1 Safety Regulations

- Installation of this equipment shall be done in accordance with all applicable local codes

- Elevator controllers and other electrical components can cause serious harm or death if installation guides are not met. It is the responsibility of the installer of our equipment to ensure that once installed, the equipment does not pose any threat, danger or hazard.

Section 1.2 Obligations & Liability

1.2.1 Following operating instructions.

- In order to ensure safe handling and problem free operation of this equipment, it is absolutely essential for the relevant personal to be fully acquainted with the relevant safety regulations.
- These operating instructions contain the most important information for operating the equipment correctly and safely.
- These operating instructions, in particular the safety regulations, must be observed by all those persons who work on the equipment.
- Furthermore, all locally applicable rules and regulations relating to accident prevention and installation must be observed.

1.2.2 Obligations of operator.

The operator undertakes to allow only those persons to work on the equipment who

- Are fully acquainted with the basic regulations relating to safety in the workplace and accident prevention and to have been trained in handling the equipment.
- Have read the safety regulations and the warning notices contained in these the operating instructions.

1.2.3 Obligations of personnel.

All personnel charged with working on the machine undertake prior to starting work to

- Observe the basic regulations relating to safety in the workplace and accident prevention.
- Read the operating instructions, in particular the safety regulations, and confirm by way of their signature that they have understood them.

1.2.4 Safety during normal operation.

- Only operate the machine when all protective equipment is fully operational.
- Prior to switching on the machine, ensure that the startup can cause no harm to personnel.
- Regularly maintain and check machine for externally identifiable damage and check that all the safety devices are operational.

1.2.5 Hazards caused by electric power.

- Work on the electric power supply may only be carried out by a qualified electrician.
- Check the electrical equipment of the machine at regular intervals.
  Repair loose connections and scorched cables immediately.
- Keep the control cabinet locked at all times. Access is only permitted to authorized personnel with a key or tool.
- If work has to be carried out on live parts, do this only in the presence of a second person who can switch off the master switch in an emergency.
- The machine causes electromagnetic interference sources. For this reason, do not use any sensitive equipment in its vicinity.

2.1 Product Overview

The brake board is specifically designed to control elevator machine brakes across a wide range of voltages and loads. It may also be used to control door lock cams to ensure smooth and quiet cam operation.
The following user adjustable parameters ensures smooth and quiet brake operation and reduction of back EMF surges;

- Brake lift time and voltage
- Brake cooling time and voltage. (reduced holding voltage once brake has lifted)
- Brake drop time

2.2 Contents of the Brake Board Kit.

1 brake board
1 ferrite core for 24VDC supply
1 1000v 35A bridge rectifier
4 crimp lugs for rectifier
1 power diode for brake coil back EMF protection
1 system manual

2.3 Connection of ECD Brake Board

Below is a list of the connection terminals on the brake board.

24VDC	Brake board power supply
BKSIGNAL	Brake lift input
AC SUPPLY	Brake coil supply AC voltage only. **Min 80VAC. Max 240VAC.**
VAC BRAKE	Brake coil connection
NO NC C	Loss of AC output relay
SIN1	Spare input *(not used)*

For diagrams of the following terminals refer to see Section 4, Fig.7 & 8.

2.3.1 24VDC

The 24VDC input is the power supply to the microprocessor and as such should be as stable as possible.
Supplied in the kit is a ferrite core that is to be installed on the 24Vdc supply. The wires for this supply should be twisted together then looped once through the ferrite core (see fig.1). Note this is particularly important if the board is being supplied from a switch mode power supply.

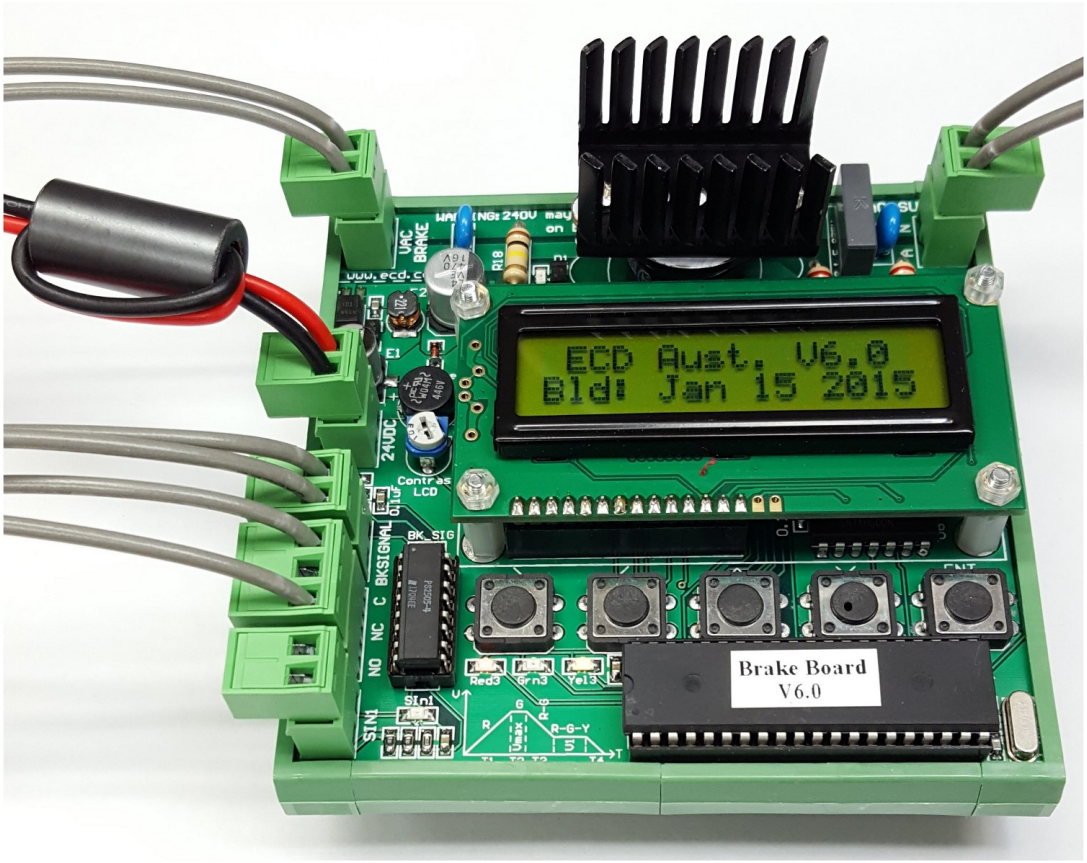


Figure 1

2.3.2 BKSIGNAL

The BKSIGNAL input is the signal from the lift controller to initiate the brake lift sequence. This input only requires a voltage free contact.

2.3.3 AC SUPPLY

The AC SUPPLY terminal is used for the AC voltage @ 50Hz for the brake board.
This voltage is regulated by the brake board and output from terminal VAC BRAKE to control the brake

Important Note: *This voltage cannot exceed 240Vac and must be @ 50Hz*

2.3.4 VAC BRAKE

The VAC BRAKE terminal is the AC output from the Brake Board to the Brake coil.
As a DC voltage is required for most brake coils, use the supplied rectifier on this output.

2.3.5 NO NC C

The NO NC C relay contacts are used to signal to the lift controller that a fault has occurred with the brake board, inhibiting any further lift operation. See example Section 4, Fig. 6 & 7, where the relay C & NO contacts are used for the controller PRV (prove) input.

When the brake board is functioning normally, the fault relay will be energized.

When any of the faults listed below are detected the fault relay will drop out:

- Loss of AC SUPPLY. "Loss of AC!" will be displayed on the LCD. (No AC voltage at AC SUPPLY, Fig. 2). Brake board will remain inoperative until AC SUPPLY restored.

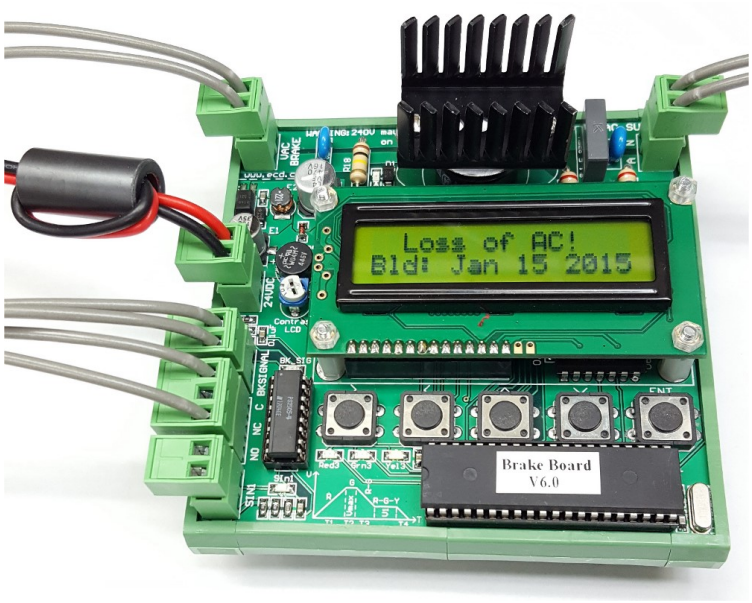


Figure 2

- Loss of 24VDC
- Triac shorted. "Triac damaged!" will be displayed on the LCD. (Fault detected with Triac, Fig. 3).
  This fault is a fatal error and requires a 24VDC reset. Note: If a triac fault is detected while the brake board is operating, the brake board will finish the run and set the Triac damaged fault when BK SIGNAL turns off.

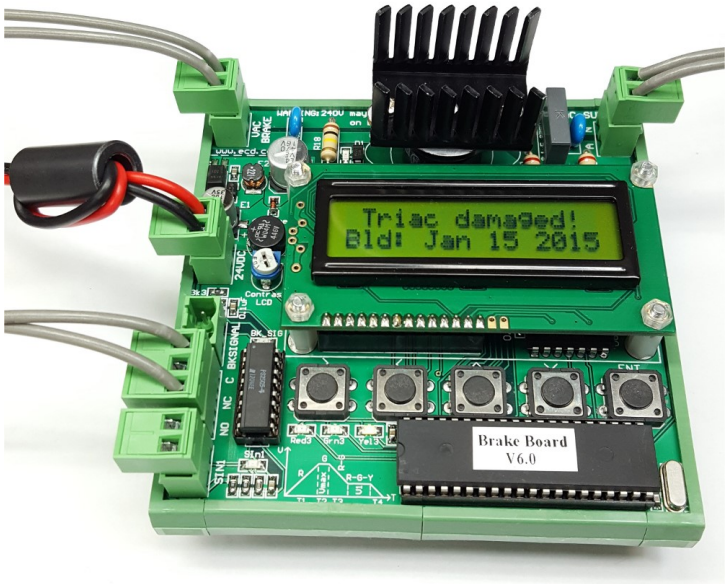


Figure 3

The relay contacts are rated as follows:
Max Voltage: 125 VAC or 60VDC
Max Current: 0.5A

Note: This relay is not rated for use in the Safety Circuit of most elevator controllers. If the intend use of relay C and NO contacts is to open the Safety Circuit then an appropriately rated slave relay must be used.

2.3.6 SIN 1

This terminal is currently not used and no wires should be connected.

2.3.7 Brake Coil and Rectifier Connections

The wiring current rating from the VAC BRAKE output to the rectifier and brake should be sized according to the load of the brake coil.

The supplied power diode shall to be connected reverse biased at the brake coil for back EMF suppression.

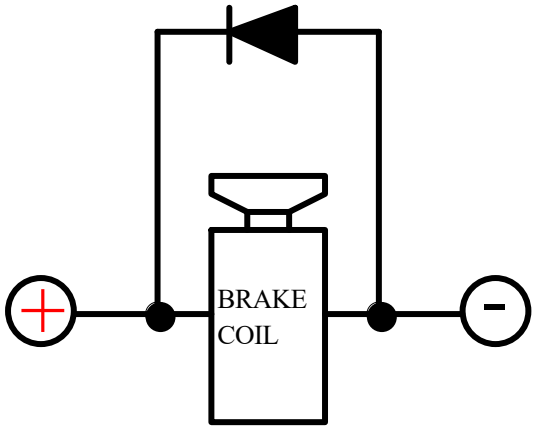
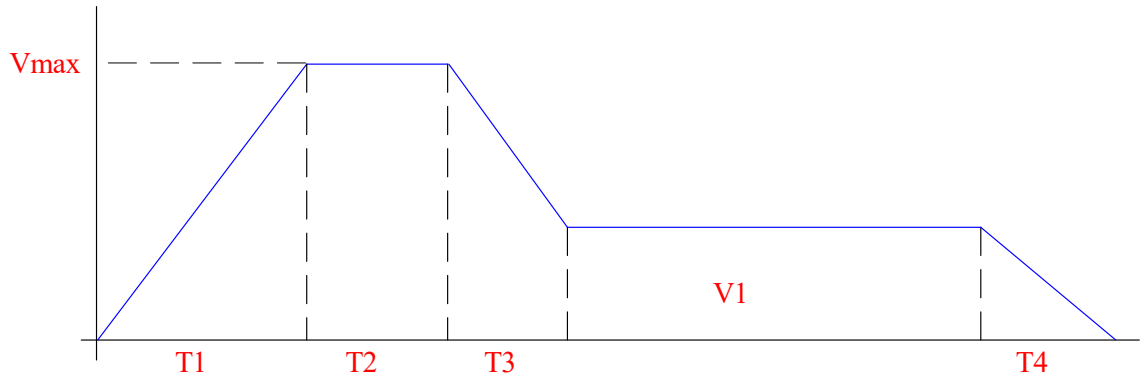


Figure 4

2.4 Setup of Brake Board

The Brake Board has 6 adjustable parameters which can be adjusted to optimize the operation of the brake:

Vmax, V1, T1, T2, T3, T4.



Note: The graph show the sequence of operation from when BK SIGNAL is triggered

Figure 5

2.4.1 Vmax Adjustment

Vmax is used to set the maximum AC voltage output (VAC BRAKE) and is expressed as a percentage value of the input voltage (AC SUPPLY)
Vmax is a code protected user adjustable setting. To adjust this setting, first go to LCK and set to 6789.

E.g.1. Set to 50% if AC SUPPLY is 240VAC and you require 120VAC at VAC BRAKE.
E.g.2. Set to 100% if AC SUPPLY is 240VAC and you require 240VAC at VAC BRAKE.

The Brake Board is shipped with Vmax set at a default value of 35%. The minimum allowed setting is 10% and the maximum setting is 100%.
After any adjustments to Vmax, it is recommended that LCK be changed to any value other than 6789, so as to prevent an accidental vmax parameter change, which may cause an over voltage supply to the brake coil.

2.4.2 V1 Adjustment

V1 is the holding voltage for the brake coil and is adjustable to a percentage of the input voltage at the AC SUPPLY terminal; it is also interlocked to the Vmax setting so that it cannot be set to a higher value than Vmax. The minimum allowed setting is 10% and the maximum setting is 100% or Vmax whichever is the lesser.

The Brake Board is shipped with V1 set at a default value of 25%.
Once the lift is running this value can be adjusted either up or down to give the desired brake hold voltage and thus cooling effect.

2.4.3 T1

This setting is used to control how fast the brake coil will get to full voltage (v max).
It is adjustable in steps of 50 ms.
The minimum allowed setting is 100ms and the maximum allowed setting is 5000 ms.
Default setting is 500ms.

2.4.4 T2

This setting is used to control how long the brake coil will stay at full voltage.
It is adjustable in steps of 50 ms.
The minimum allowed setting is 100ms and the maximum allowed setting is 5000 ms.
Default setting is 1500ms.

2.4.5 T3

This setting is used to control how fast the voltage will reduce to V1 level after the T2 time expires.
It is adjustable in steps of 50 ms.
The minimum allowed setting is 100ms and the maximum allowed setting is 5000 ms.
Default setting is 500ms.

2.4.6 T4

This setting is used to set how fast the brake voltage will reduce to 0v after the BK SIGNAL is switched off.
It is adjustable in steps of 50 ms.
The minimum allowed setting is 0ms and the maximum allowed setting is 3000 ms.
Default setting is 500ms.

2.5 LED Sequence of Operation

Fitted to the Brake Board are 3 LED's which can be used to follow the sequence of operation of the board. The LED's are red, green and yellow.
During standby state both the red and yellow LED's are illuminated.
During T1 operation only the red LED is illuminated.
During T2 operation only the green LED is illuminated.
During T3 operation the red and green LED's are illuminated.
During T4 operation no LED is illuminated.
During V1 operation all LED's are illuminated.

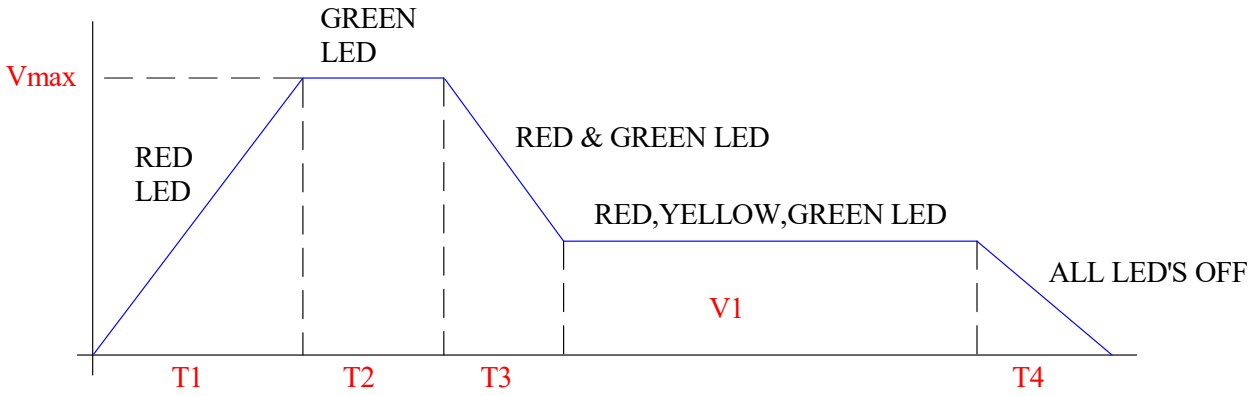


Figure 6

The graph shows the LED sequence of operation from when BK SIGNAL is triggered

Flashing yellow LED indicates the brake board is in the following fault state;

- Loss of AC SUPPLY. "Loss of AC!" will be displayed on the LCD. (No AC voltage at AC SUPPLY). Brake board will remain inoperative until AC SUPPLY restored.

Flashing red LED and illuminated yellow LED indicates the brake board is in the following fault state:

- Triac shorted. "Triac damaged!" will be displayed on the LCD. (Fault detected with Triac). This fault is a fatal error and requires a 24VDC reset. Note: If a triac fault is detected while the brake board is operating, the brake board will finish the run and set the Triac damaged fault when BK SIGNAL turns off.

3. Specifications

3.1. AC SUPPLY input voltage range

80VAC – 240VAC @50Hz

For AC SUPPLY input voltage less than 80VAC contact ECD for resistor upgrade.

3.2.1 VAC BRAKE output current *capable* ratings.

Output current ratings reduce as V Max reduces.

Eg. (with 240VAC input);
10 Amps @ 120VAC (V max = 50%)
20 Amps @ 240VAC (V max = 100%)

(with 110VAC input);
10 Amps @ 55VAC (V max = 50%)
20 Amps @ 110VAC (V max = 100%)

3.3. 24VDC brake board power supply

24 VDC

3.4. REL (NO NC C) contact ratings

0.5 @ 60VDC/125VAC

3.5. Setting Values

Default:

- Vmax 35%
- V1 25%
- T1, T3 & T4 500ms
- T2 1500ms

Minimum

- Vmax 10%
- V1 10%
- T1 to T3 100ms
- T4 0ms

Maximum

- Vmax 100%
- V1 100%
- T1 to T3 5000ms
- T4 3000ms

4. Connection Example:

The diagrams below show an example of how the Brake Board may be connected

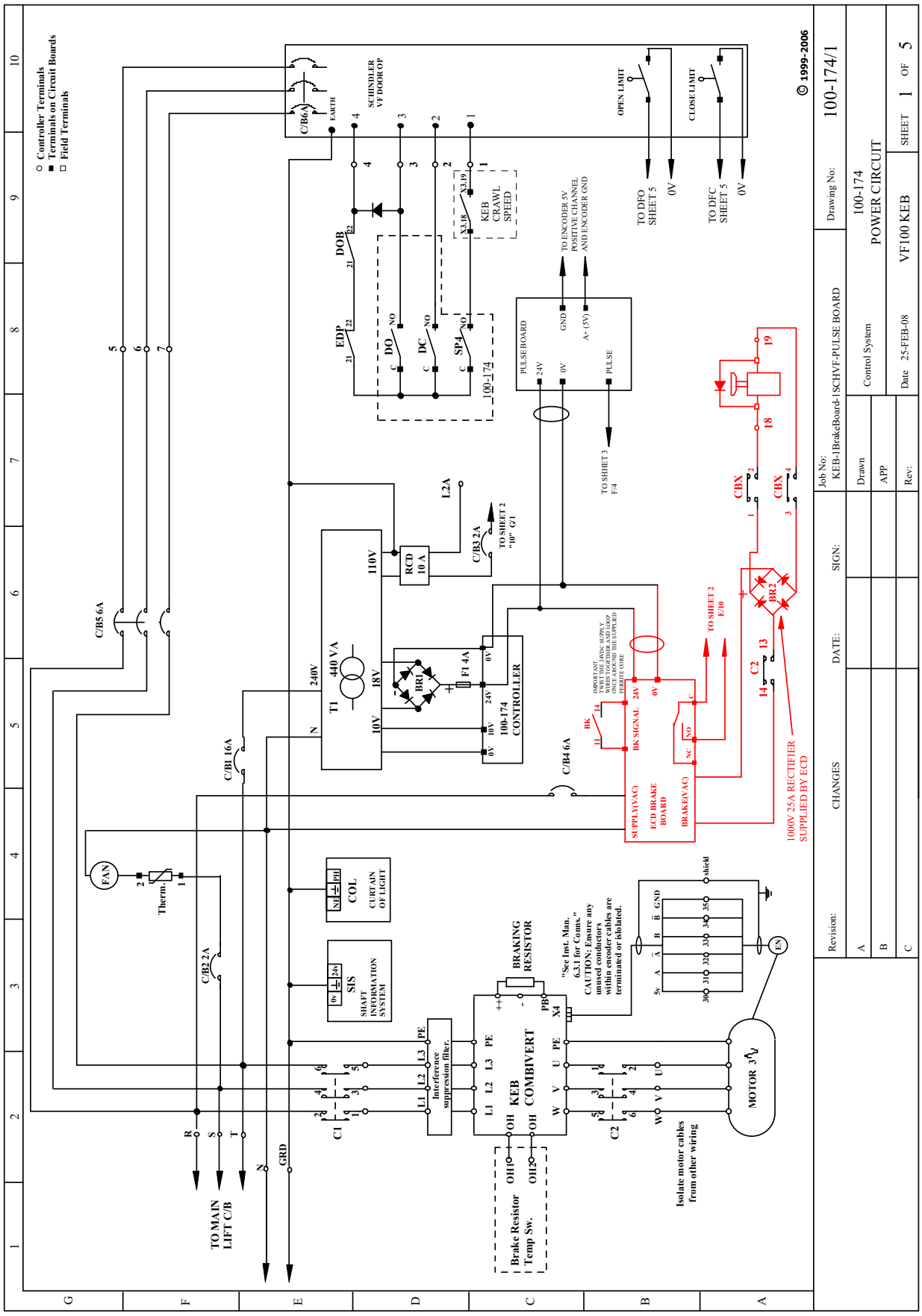


Figure 7

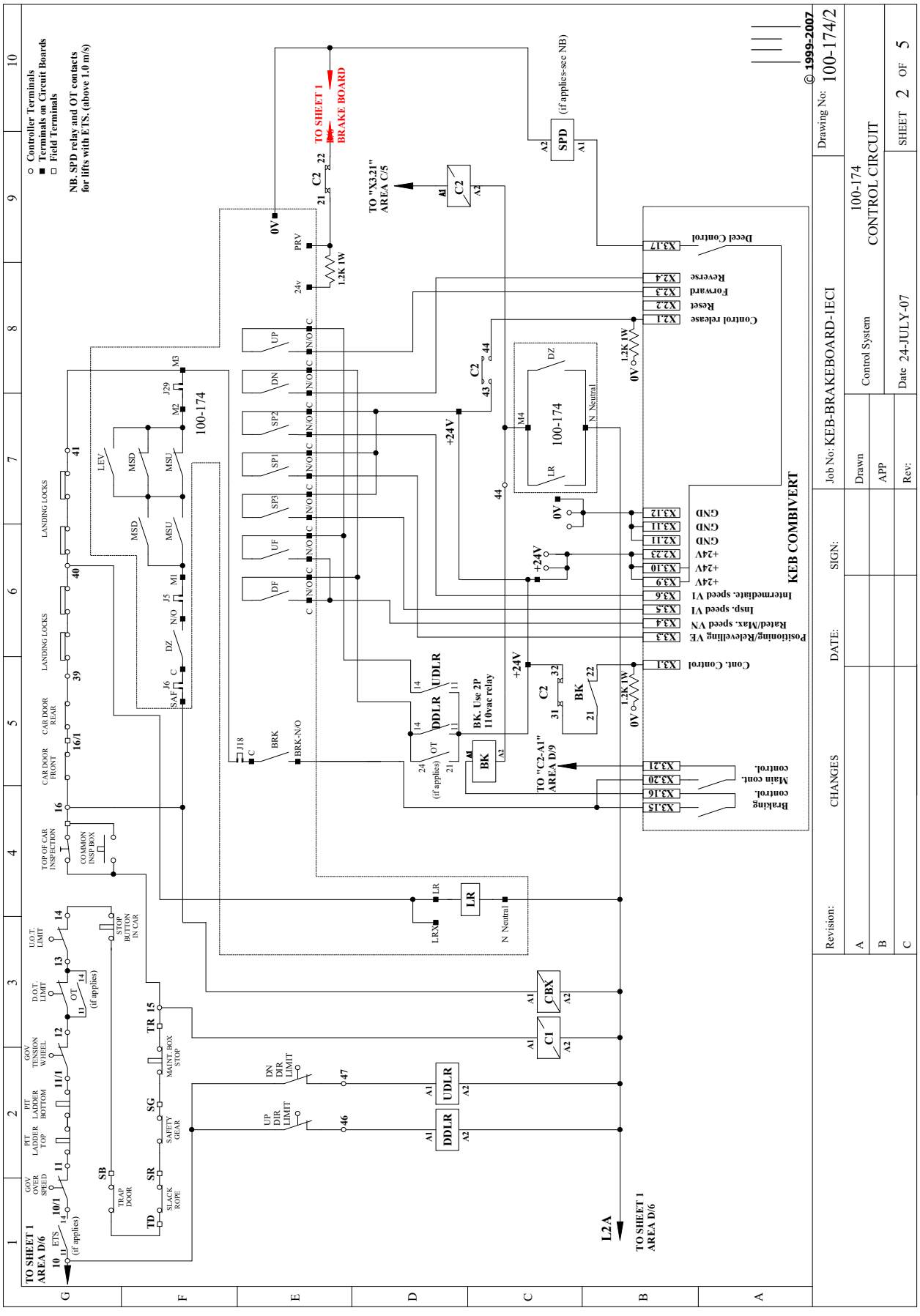

Controller Terminals
Terminals on Circuit Boards
Field Terminals
NB. SPD relay and OT contacts for lifts with ETS. (above 1.0 m/s)
TO SHEET 1 AREA D/6
TO SHEET 1 AREA D/6
TO SHEET 1 BRAKE BOARD
TO "X3.21" AREA C/5
TO "C2-A1" AREA D/9
KEB COMBIVERT
Control release
Reset
Forward
Reverse
Deed Control
Cont. Control
Positioning/Releveling VF
Rated/Max. speed VN
Insp. speed VI
Intermediate. speed VI
+24V
GND
Braking control.
Main cont.
BRAKE BOARD-1ECI
100-174/2
100-174
CONTROL CIRCUIT
Control System
Date 24-JULY-07
SHEET 2 OF 5
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Figure 8

Operation Guide

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