 BY JOHNSON CONTROLS	<b>LIQUID COOLED VARIABLE SPEED DRIVE</b>	
<b>SERVICE INSTRUCTIONS</b>	Supersedes: 201.21-M2 (712)	Form 201.21-M2 (313)

**YCAV / YCIV / YVAA / YVWA TROUBLESHOOTING GUIDE FOR  
LIQUID COOLED VARIABLE SPEED DRIVES**



50056

**60 / 50 HZ (P/N 371-04178-XXX)**

Issue Date:  
March 4, 2013



# IMPORTANT!

## READ BEFORE PROCEEDING!

### GENERAL SAFETY GUIDELINES

This equipment is a relatively complicated apparatus. During installation, operation maintenance or service, individuals may be exposed to certain components or conditions including, but not limited to: refrigerants, materials under pressure, rotating components, and both high and low voltage. Each of these items has the potential, if misused or handled improperly, to cause bodily injury or death. It is the obligation and responsibility of operating/service personnel to identify and recognize these inherent hazards, protect themselves, and proceed safely in completing their tasks. Failure to comply with any of these requirements could result in serious damage to the equipment and the property in

which it is situated, as well as severe personal injury or death to themselves and people at the site.

This document is intended for use by owner-authorized operating/service personnel. It is expected that these individuals possess independent training that will enable them to perform their assigned tasks properly and safely. It is essential that, prior to performing any task on this equipment, this individual shall have read and understood this document and any referenced materials. This individual shall also be familiar with and comply with all applicable governmental standards and regulations pertaining to the task in question.

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### SAFETY SYMBOLS

The following symbols are used in this document to alert the reader to specific situations:



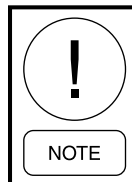
*Indicates a possible hazardous situation which will result in death or serious injury if proper care is not taken.*



*Identifies a hazard which could lead to damage to the machine, damage to other equipment and/or environmental pollution if proper care is not taken or instructions are not followed.*



*Indicates a potentially hazardous situation which will result in possible injuries or damage to equipment if proper care is not taken.*



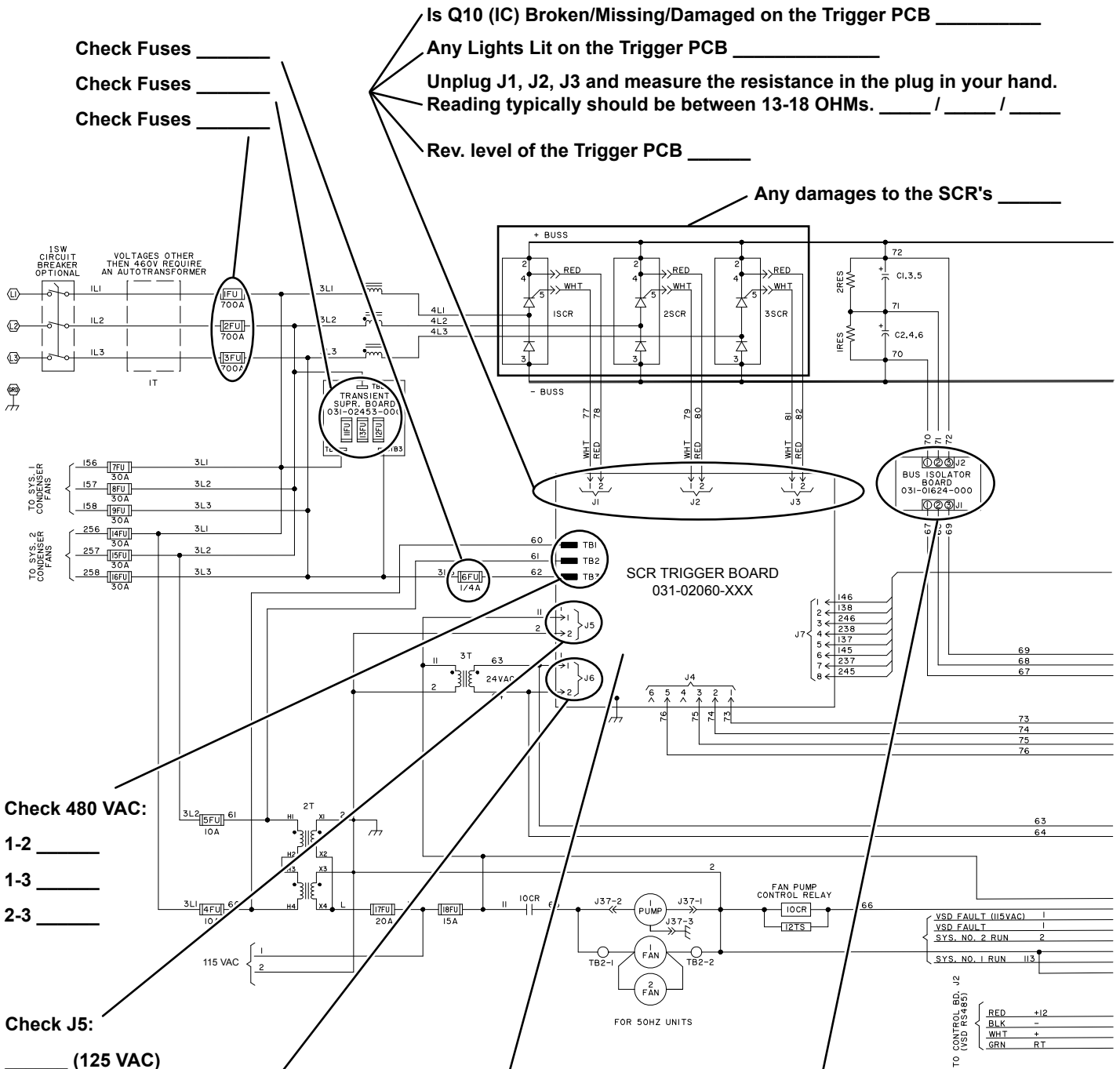
*Highlights additional information useful to the technician in completing the work being performed properly.*



*External wiring, unless specified as an optional connection in the manufacturer's product line, is not to be connected inside the control cabinet. Devices such as relays, switches, transducers and controls and any external wiring must not be installed inside the micro panel. All wiring must be in accordance with Johnson Controls' published specifications and must be performed only by a qualified electrician. Johnson Controls will NOT be responsible for damage/problems resulting from improper connections to the controls or application of improper control signals. Failure to follow this warning will void the manufacturer's warranty and cause serious damage to property or personal injury.*



# WHEN TROUBLESHOOTING THE VSD, USE FORM 201.21-M1



Check Fuses \_\_\_\_\_  
Check Fuses \_\_\_\_\_  
Check Fuses \_\_\_\_\_

Is Q10 (IC) Broken/Missing/Damaged on the Trigger PCB \_\_\_\_\_  
Any Lights Lit on the Trigger PCB \_\_\_\_\_  
Unplug J1, J2, J3 and measure the resistance in the plug in your hand.  
Reading typically should be between 13-18 OHMs. \_\_\_\_ / \_\_\_\_ / \_\_\_\_  
Rev. level of the Trigger PCB \_\_\_\_\_

Any damages to the SCR's \_\_\_\_\_

Check 480 VAC:  
1-2 \_\_\_\_\_  
1-3 \_\_\_\_\_  
2-3 \_\_\_\_\_

Check J5:  
\_\_\_\_\_ (125 VAC)

Check J6:  
\_\_\_\_\_ (24 VAC)

Check Test Points on Trigger PCB:  
TP-F \_\_\_\_\_ (12.5 VDC)  
TP-G \_\_\_\_\_ (12.8 VDC)  
TP-A \_\_\_\_\_ (23 VC)

Resistor value on the B.I. PCB  
should be 150K OHMS each:  
\_\_\_\_\_ OHMS  
\_\_\_\_\_ OHMS  
\_\_\_\_\_ OHMS

Point arrows → together

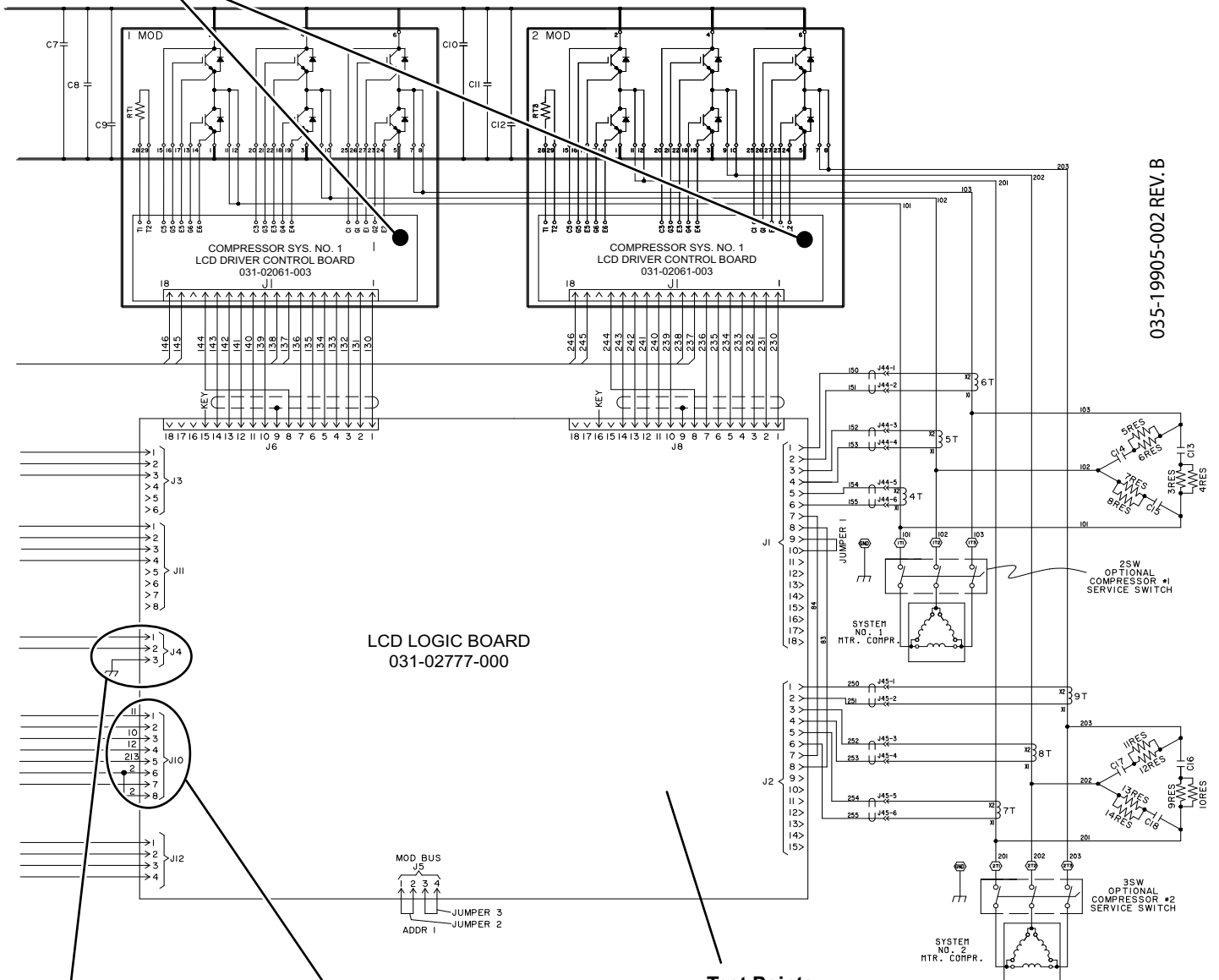
JOB NAME \_\_\_\_\_ TECHNICIAN \_\_\_\_\_ PHONE \_\_\_\_\_ DATE \_\_\_\_\_  
E-MAIL \_\_\_\_\_ FAX \_\_\_\_\_ YCIV \_\_\_\_\_ YCAV \_\_\_\_\_

**PROBLEM WITH DRIVE:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are all the 6 LED's lit on the IGBT modules:  
 SYS. 1 \_\_\_\_\_ / SYS. 2 \_\_\_\_\_ / SYS. 3 \_\_\_\_\_ / SYS. 4 \_\_\_\_\_  
 Are the IGBT modules Damaged/Broken/Burnt: \_\_\_\_\_



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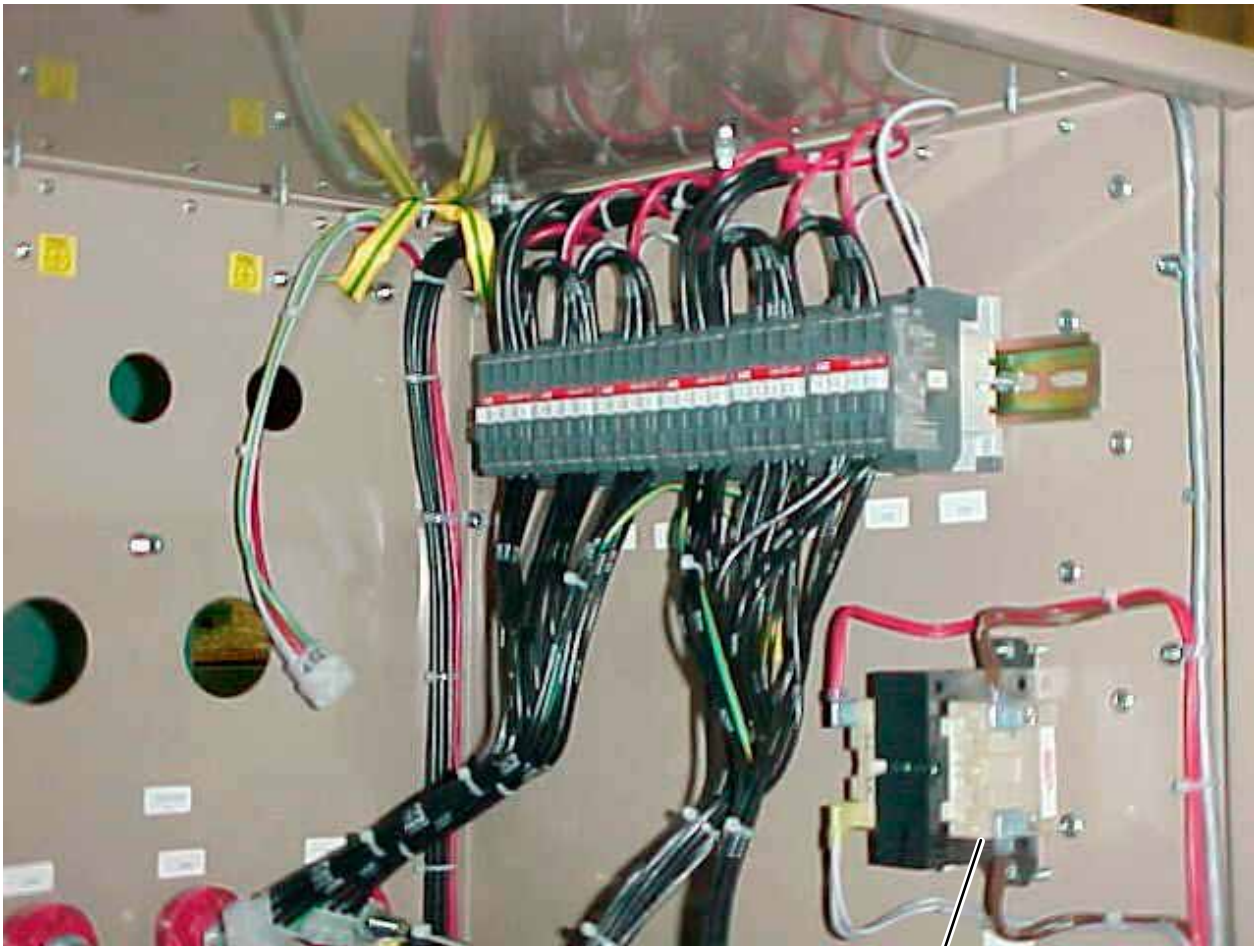
J4-1 to 2: (24 VAC) \_\_\_\_\_

Point  
 arrows  
 together

J10-1 to GND: (125 VAC) \_\_\_\_\_

- Test Points:**
- 1 (15 VDC) \_\_\_\_\_
  - 3 (5 VDC) \_\_\_\_\_
  - 4 (7.5 VDC) \_\_\_\_\_
  - 5 (-15 VDC) \_\_\_\_\_
  - 7 (-4.9 VDC) \_\_\_\_\_

Use Test Point "6" for your GND.

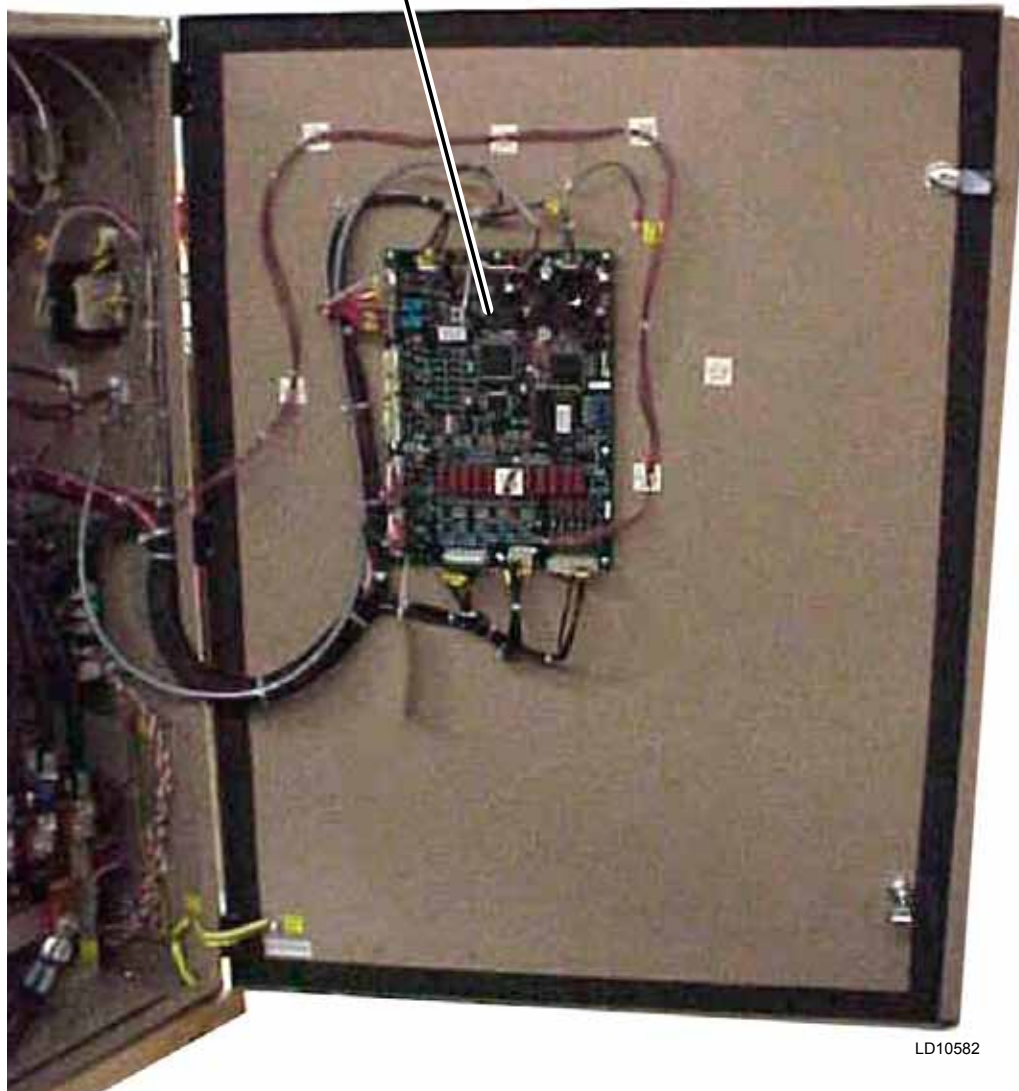


LD10584

3T TRANSFORMER  
(24VAC to SCR Gate Driver Board and VSD Logic Board)

**FIGURE 1 - FAN CONTACTORS AND 3T TRANSFORMER, 2 COMPRESSOR**

VSD  
LOGIC BOARD



LD10582

### DC Bus Voltage Isolation Board



LD10620

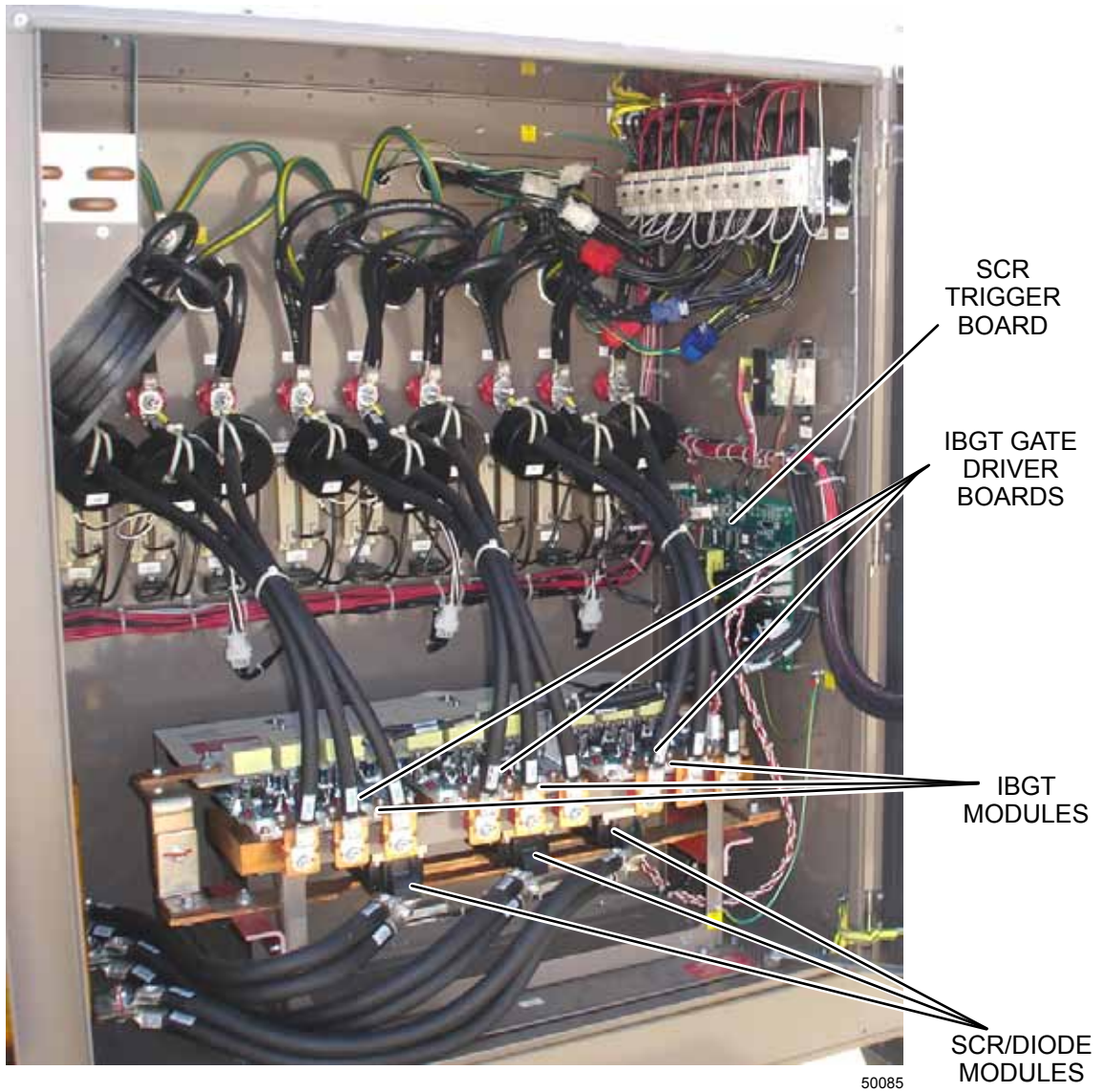
**FIGURE 2 - VSD LOGIC BOARD**

TRANSIENT  
SUPPRESSOR BOARD  
(3-Phase Input)



LD10585

**FIGURE 3 - VSD TRANSIENT SUPPRESSOR BOARD**



**FIGURE 4 - VSD COMPONENTS, 3 COMPRESSOR**



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