



G.A.L. RESCUVATOR SURVEY AND DATA FORM
(Model 5)

I. RESCUVATOR DATA:

1. The Rescuator main line phase monitor is available for any one of the following main line voltages.
 - a) 120, 208 - 240/3/60 and 120, 208 - 240/1/60
 - b) 440 - 480/3/60
 - c) 575 - 600/3/6
2. The Rescuator has the following output voltages: (Total output 500 watts).
 - a) 120 volts, 1Ø (**single phase**) AC or 240 volts, 1Ø (**single phase**) AC.
 - b) 130 volts DC or 260 volts DC.
3. The Rescuator is mounted in a metal enclosure and includes a non spillable sealed maintenance free battery which never requires watering.
4. A normally open electrical interlock is to be supplied by the customer and installed in the elevator main line disconnect switch to de-activate the Rescuator when the main line disconnect switch is opened.
5. The elevator logic controller must have a low oil return feature which when activated will bring the elevator down to the lowest level and open the door.
6. The door operator voltage must be either DC or single phase AC.
The Rescuator cannot provide 3Ø (3 phase) power.

II. ENGINEERING INFORMATION REQUIRED ON EXISTING INSTALLATIONS:

Included with the Rescuator are standard wiring diagrams and instructions which explain all interconnection requirements. If desired, G.A.L. engineering can be provided at an additional cost, including marked-up wiring diagrams and any additional parts that may be required. Please include a copy of the existing controller wiring diagrams noting main line voltage and transformer secondary voltages. If the existing controller is not relay logic, customer must determine the required input points that would activate low oil return to bottom floor.

III. HOW TO ORDER A MODEL 5 RESCUVATOR:

Select Rescuator model number from table below:

MAIN LINE VOLTAGE	RESCUVATOR MODEL NUMBER
120 volt or 208 to 240 volt single or three phase	RSCV-0006N
440 to 480 volt, three phase	RSCV-0007N
575 to 600 volt, three phase	RSCV-0008N
If G.A.L. engineering is requested, send a copy of the existing controller wiring diagrams noting main line voltage and transformer secondary voltages.	



RESCUVATOR INSTRUCTIONS **REFER TO DWG. (L-10,117-45)**

When Installing This Device Check With Local Enforcing Authorities For Any Special Requirements That The Elevator Operation Must Comply With.

When a Rescuator is to be included with a hydraulic elevator, the elevator must be equipped with a low oil feature and control circuits arranged as per schematic diagram L-10,117- 45. When activated, the low oil feature should bring the elevator to the lowest landing and open and then close the doors.

The elevator disconnect switch must be in the closed position when a power failure occurs for rescue to take place (return to lowest landing) . With the disconnect switch closed, any power failure will automatically transfer the control circuits, valves and door operator circuits from their normal supplies to the Rescuator emergency supplies of the same voltage. The elevator will then be placed on low oil rescue operation, returning the car to the lowest landing and opening and closing the doors.

A normally open electrical interlock, supplied by others, is to be installed in the elevator disconnect switch to prevent rescue when the disconnect switch is opened.

WARNING!

Warning notices in this manual call attention to situations that would cause damage to the equipment.

These notices are repeated below :

The red battery cable must connect to the + battery post (See Fig. 8).

Jumper JP1 on the main board and jumpers JP1-JP2 on the battery charger board must match the position of jumpers JP2-JP3 on the main board (See Figs. 1, 2, 3). Jumpers JP4, JP5 can be in either position depending on the DC voltage required.

Never apply over 130 volts across the 120VAC terminals PF1- PF2- PF3 or over 270 volts across the 230VAC terminals PF1- PF2- PF3 (See Figs. 4, 5).

Never connect wires to terminal PF1 or PF3 when terminal SPH is used (See Figs. 4, 5).

The Rescuator must never turn on when the main line disconnect switch is open.

The Rescuator should never emit a high pitch sound. A high pitch sound is an indication of a short circuited output, damage can occur within seconds. Immediately shutdown the Rescuator by opening the main line switch or by pulling out the RT relay (See Fig. 6) and call G.A.L..

The Rescuator must be allowed to automatically shut down after lowest landing rescue has been completed. Running the Rescuator continuously for more than 10 minutes can cause it to overheat and become damaged.



I. Part numbers:

Main board	RSCV-0001N	Transistor pack assembly	RSCV-0023N
Converter board	RSCV-0002N	Battery	BAT-0002N
Battery charger board	RSCV-0003N	Solenoid assembly	RSCV-0022N
460 volt PF transformer board	RSCV-0004N	Power transformer w/connectors	RSCV-0009N
575 volt PF transformer board	RSCV-0005N	Power fuse	FUSE-0008N
Rescuator	RSCV-0006N	Power fuse block	FUSE-0009N
Rescuator w/460v PF board	RSCV-0007N		
Rescuator w/575v PF board	RSCV-0008N		

II. Initial connections:

1. Disconnect power from the main line disconnect switch.
2. Install the n.o. electrical interlock (auxiliary contact) in the main line disconnect switch. The contact must open when the main line disconnect switch is opened.
3. Install the Rescuator in a convenient location close to the elevator logic controller.
4. Make all connections to the elevator logic controller (16 wires) and to the auxiliary contact in the main line disconnect switch (2 wires) as per wiring diagram L-10117-45. Note that 2 groups of phase monitor terminals PF1, PF2/SP, PF3, SPH have been provided. One is for 120 volts and the other is for 230 volts. Connect only the group that matches the 3 phase voltage. In some rare installations the main line power is 1 phase, in that event, connect the single phase power to the matching PF2/SP, SPH terminal pair .

WARNING! Never connect wires to terminals PF1 or PF3 when terminal SPH is used (See Figs. 4, 5).

5. If the DC output connections are not used, remove fuse AC3.
6. Remove the 60 amp battery power fuse.
7. Place the battery within the enclosure with the + post on the left. Attach the battery to the back plate with the bracket provided.
8. Connect the battery cables.
WARNING! The red cable must connect to the + battery post (See Fig. 8).
9. Proceed to section III.

III. Pre-rescue checks.

It is strongly suggested that, before power is turned on, all connections and control changes are tested as follows:

1. Open the main line disconnect switch and check that the circuit to terminals DS1-DS2 is open. With the circuit to DS1-DS2 open, the elevator will not and must not operate under any mode.
2. Remove the large 60 amp power fuse.
3. Check that the voltage that will be applied to the wires connected to terminals PFI-PF2-PF3 corresponds to the voltage indicated on these terminals, otherwise the phase monitor circuits may be damaged. Where the main line voltage is 440-600 volts and 120 volts or 230 volts 3 phase power is not available, a separate high voltage PF transformer board should have been provided (refer to section **IV**).
4. Check that the power transformer secondary jumpers JP2-JP3 and JP4-JP5 on the main board are connected for the required output voltages. (120 or 240 VAC and 130 or 260 VDC) and that this is the same voltage that is present during normal power.
5. Check that the position of jumper JP1 on the main board corresponds with the position of jumpers JP2-JP3. Also, the position of jumpers JP1-JP2 on the battery charger board must correspond with the position of jumpers JP2-JP3 on the main board (See Fig.1, Fig.2, Fig.3).
6. Check that the optional door open button feature has been wired correctly to terminals DOB1-DOB2 and OAC1-CRT and that the door open button contact in the car station is isolated and has only the DOB1-DOB2 wires and no other wires connected to it.
7. With the 60 amp power fuse removed, turn main power on.
8. Place a dc voltmeter across terminals B+ and B-. It should read approx. 13.7 volts. Otherwise recheck the battery charger connections.
9. Park the car at the top floor with the door closed.
10. Simulate a low oil condition as follows (see Fig.9):
 - a) If the Rescuator terminals L02-L03 are used, remove the control wire from terminal L02.
 - b) If the Rescuator terminals LO1-L03 are used connect a jumper across LO1-L03.
11. If all wiring changes are correct, the elevator will return to the bottom floor and open and then close its doors while under normal power. The Rescuator will not turn on.
12. Once you have verified that the circuits are operating correctly under simulated low oil, then undo step 10a or 10b above and once again open the main line disconnect switch.
13. Measure the voltage at the battery posts, if the battery voltage is under 12 volts then reinsert the large 60 amp power fuse into the fuse holder and let the battery charge up for 48 hours.
14. Proceed to the section **IV**.

IV. PF transformer board (See Fig.10):

(If the main line voltage is 110-250 volts, skip this section).

1. If the main line voltage is 440 – 600 volts, a PF transformer board may have been provided. The board is used to provide 230 volts 3 phase to the PF phase monitor. There are two PF transformer boards, depending on the main line voltage. Board no. RSCV-0004N is for converting 440-480 volts 3 phase to 230 volts 3 phase. Board no. RSCV-0005N is for converting 575-600 volts 3 phase to 230 volts 3 phase.
2. Connect the 440-600 volts 3 phase power to the board terminals L1-L2-L3. Connect one end of the 3 wire plug into the PF1-PF2-PF3 socket and the other end into the 230VAC terminals (PF1-PF2/SP-PF3) on the main board as shown on diagram L-10,117-45.
3. For PF relay adjusting instructions refer to the section **VIII**.

V. Rescue test procedure:

1. It is best to let the battery charge up for 48 hours before continuing with the test procedure.
2. First open the main line disconnect switch and check that the Rescuator will not turn on. If the Rescuator does turn on, check the connections to the auxiliary contact in the main line switch. The auxiliary contact must interrupt the circuit to terminals DS1-DS2 when the main line switch is opened. **WARNING! : The Rescuator must never turn on when the main line disconnect switch is open.**
3. To test for rescue, close the main line disconnect switch and either simulate a power loss or momentarily press the white button on relay RL1. In either case, the Rescuator should turn on emitting a soft 60 cycle hum and the elevator should return to the lowest landing opening and closing its doors. Approximately 15 seconds after the elevator has stopped moving, the Rescuator should shutdown.

WARNING! : The Rescuator should never emit a high pitch sound. A high pitch sound is an indication of a short circuited output, damage can occur within seconds. Immediately shutdown the Rescuator by opening the main line switch or by pulling out the RT relay and call G.A.L..

WARNING! : The Rescuator must be allowed to automatically shut down after lowest landing rescue has been completed. Running the Rescuator continuously for more than 10 minutes can cause it to overheat and become damaged.

4. Elevators that park with the doors closed after the lowest floor return, require a door open button feature. Pressing the door open button inside the car will re-activate a timed-out Rescuator and re-open the doors. Refer to drawing L-10117-45 for circuit connections.

VI. Sequence of operation:

During normal power, relays PF and RT are energized. AC control circuit power flows in through terminals IAC1-IAC2 and flows out through terminals OAC1, OAC2. Conversely DC door operator power flows in thru terminals IDC+, IDC- and flows out thru terminals ODC+, ODC-.

When a power failure, or single phase failure, or phase reversal occurs, relay PF drops out. Relay RT is delayed dropping by means of the R-C network around the RT coil. The elevator "run" relay must energize before RT drops out.

Contacts of PF, RT and the auxiliary contact of the main line disconnect switch, energize the solenoid.

The solenoid contacts connects the battery to the electronic converter circuit and to the coils of relays RL1 and RL2. These relays pick-up to connect the Rescuator power transformer secondaries to the output terminals OAC1, OAC2 and ODC+, ODC-.

Contacts at terminals LO1—LO5 signal the elevator controller that it is now operating under Rescuator power and rescue will take place.

A n.o. contact of the existing "run" relay prevents relay RT from dropping out while the elevator is running. Relay RT will drop out a time delay after the elevator has stopped running shutting down the Rescuator.

VII. Relay energization chart

The relay energization chart can be used for testing and trouble shooting. After rescue (return to lowest landing) takes place, or if rescue doesn't occur, the RT relay will drop and turn off the Rescuator emergency power.

*To restart the Rescuator, during a power failure, push the button on the RT relay. The Rescuator will remain turned on as long as the button on RT is depressed or the "run" switch is in.

**To restart the Rescuator, while the main line switch and power is on and relay RT is energized, momentarily press the white button on relay RL1.

RELAY	PF	RT	RL1 & RL2	SOL	Rescue Occurs
Coil Voltage	110VDC	110 VDC	12VDC	12VDC	
Normal Power**	E	E	D	D	NO
Power Loss	D	ETR	E	E	YES
Open Disconnect Switch	D	ETR	D	D	NO
After Rescue, After RT Time* (Power Failure still exists)	D	D	D	D	NO

E - Energized

D - De-energized

ETR - Remains energized for a time period after the elevator "run" switch drops out.

VIII. Adjusting the PF relay

Warning! : Never apply over 130 volts across the 120VAC terminals PF1- PF2- PF3 or over 270 volts across the 230VAC terminals PF1- PF2- PF3 (See Figs. 4, 5).

To avoid rescue operation while setting the reverse phase failure relay, PF, open the emergency stop switch on the controller, also, unplug relay RT. Turn potentiometer P2 on the main board to MAX . If the phases are correct the PF relay will energize.

If the phases are incorrect and a PF transformer board has been provided, interchange wires on terminals L1 and L2 on the transformer board..

If the phases are incorrect and a PF transformer board has not been provided, interchange wires on terminals PF1 and PF2.

When PF is energized the potentiometer should be turned toward MIN until PF drops out, and then back again towards MAX until PF energizes.

CAUTION: Setting the potentiometer to close to MIN may cause unwanted rescues.

IX. Battery charger:

Battery Charging rate is fixed at the factory. The charging current with the battery connected will be approximately 0.6 AMPS and will taper down as battery reaches full charge. Battery voltage at full charge will be between 13.4 and 13.7 volts. It takes at least 48 hours to charge up a discharged battery.

To check the charger, remove the 60 amp power fuse and measure the DC voltage across terminals B+ and B-. It should read approx. 14 volts otherwise, recheck the battery charger connections.

X. The battery:

The battery supplied with the Rescuator is completely sealed maintenance free design, non spillable and never requires watering. The pressure regulated safety vents are not removable and must not be tampered with.

Specifications: Shipping weight: 35.3 Lb.

Overall dim.: 8.61"x5.29"x8.79"

Term.: stud with wing nut.

Nominal volts: 12 volts

Type: Sealed lead acid.

Operating temp.: - 10⁰F to + 160⁰F.

XI. Replacing boards:

All four circuit boards (including the optional PF transformer board) have pluggable terminals and connectors for easy board replacement. Simply unplug the terminals and/or connectors and remove the board mounting screws.

The Main circuit board (part no. RSCV-0001N) has convenient jumper plugs which simplify removing the board and allow normal elevator use.

How to remove the Main circuit board:

1. Note which PF terminals are being used, the 230VAC or the 120VAC and unplug them.
2. Note the position of jumpers JP1 to JP5.
3. Note which LO1 to LO5 terminals are being used and unplug them.
4. When terminals LO2 and LO3 are used, they must be connected together. The male JMP terminal plug has been provided as a convenient way of connecting wire LO2 to LO3. Simply unplug JMP and plug it into the LO2, LO3 female plug.
5. The 4-terminal female plug IAC1, IAC2, IDC+, IDC- and the 4-terminal male plug OAC1, OAC2, ODC+, ODC- are mates, unplug them from the circuit board and plug them into each other.
6. Unplug the remaining terminals and connectors.
7. Remove the board. When replacing the board be sure to insert the plugs into their respective terminals.

XII. TROUBLESHOOTING GUIDE:

PROBLEM	IMMEDIATE CAUSE	PRIM. FAULT
Phase monitor relay PF does not pick-up	Incorrect voltage or phases	P1
Relays RL1 and RL2 pick-up but there is no AC voltage across terminals OAC1 and OAC2	Power transistor, Conv. Board.	P2
a) Voltage across terminals OAC1 and OAC2 does not match the required voltage. b) Voltage across terminals ODC+ and ODC- does not match the required voltage	Incorrect trans. connections. Low battery Bad power transistor.	P3 P4 P2
The fully charged battery has less than 13 volts	Bad battery charger.	P4
Relays RL1 and RL2 do not pick-up	Bad solenoid	P5
The Rescuator shuts down while the car is running.	Run relay contact not wired.	P6
The Rescuator does not shut down after rescue.	Jumper across OAC1 & CRT	P7
Rescuator output voltages are ok, but controller doesn't work.	Controller does not recognize output wave form.	P8
Output voltage is too high	No load at output	P9

List of primary faults:

- P1.** Check voltage across terminals PF1-PF2-PF3. Swap wires PF1 and PF2 . See Section III line 3 and section VIII.
- P2.** For transistor testing instructions, refer to document number S10117-33.1.doc. Also, visually inspect Converter board RSCV-0002N for damaged capacitors or broken traces.
- P3.** The voltage across terminals OAC1 and OAC2 and across terminals ODC+ and ODC- should be approximately the same as during normal power. If the voltage is approximately ½ or twice the normal voltage then check that jumpers JP1---JP3 and JP4---JP5 are in the correct voltage position.
- P4.** Check that the battery voltage at the battery terminals is at least 11 volts, otherwise the battery needs to be charged. It takes at least 48 hours to charge up a discharged battery. Remove the battery fuse and check that current flow to the battery is approximately 0.6 amps DC. Battery voltage at full charge should be between 13.4 and 13.7 volts. Refer to battery charger instructions section **IX**.
- P5.** Check for battery voltage across the solenoid coil terminals SOL and B- (approx. 12 volts dc). If there is voltage there but there is no voltage across terminals SOLC and B- and the large battery power fuse is good, then the solenoid must be defective.
- P6.** Elevator "run" contact across terminals OAC1 and CRT is not wired in. See WD. L-10,117-45. The "run" contact will keep the Rescuator from shutting down while the elevator is in the run mode.
- P7.** Terminals OAC1 and CRT must not be jumped, otherwise the Rescuator will not shutdown after rescue is completed and may become damaged. A spare elevator "run" contact must be connected across terminals OAC1 and CRT. The "run" contact must close and stay closed while the elevator is in the "run" mode and open once the elevator has stopped, permitting the Rescuator to automatically shut down.
- P8.** Some logic controllers may not function properly with the Rescuator output wave form. Try adjusting potentiometer P1 on converter board to see if it will help. Otherwise call G.A.L.
- P9.** A high output voltage at no load is normal. The voltage will come down to a normal level once load has been applied. The voltage under load can be reduced somewhat by turning potentiometer P1 clockwise.

The voltage positions of these jumpers must match (except for JP4 & JP5).

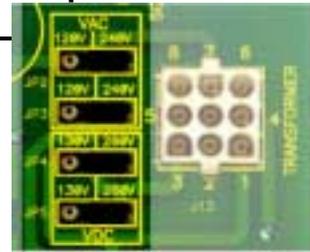
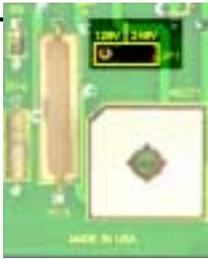


Fig. 1
JP1 Jumper
(Main Board – RSCV-0001N)

Fig. 2
JP1, JP2 Jumpers
(Charger Board – RSCV-0003N)

Fig. 3
JP2, JP3, JP4, JP5 Jumpers
(Main Board – RSCV-0001N)

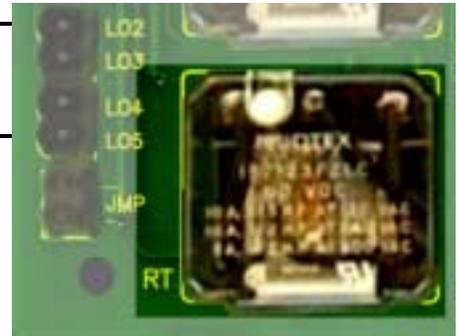


Fig. 4
120 VAC Phase Monitor
(Main Board – RSCV-0001N)

Fig. 5
230 VAC Phase Monitor
(Main Board – RSCV-0001N)

Fig. 6
RT Relay
(Main Board – RSCV-0001N)

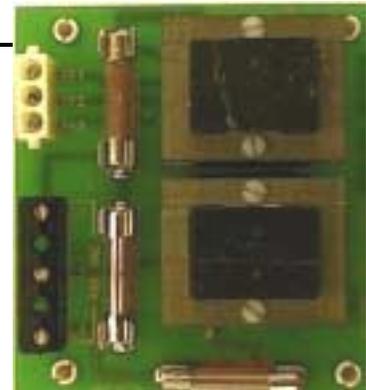
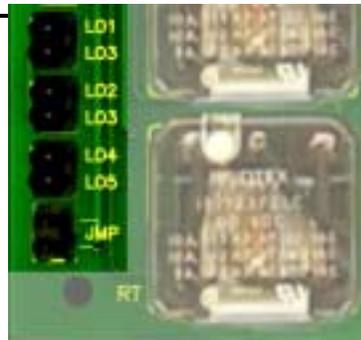
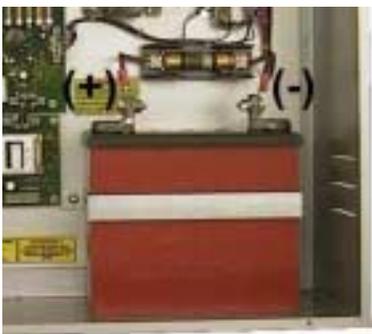


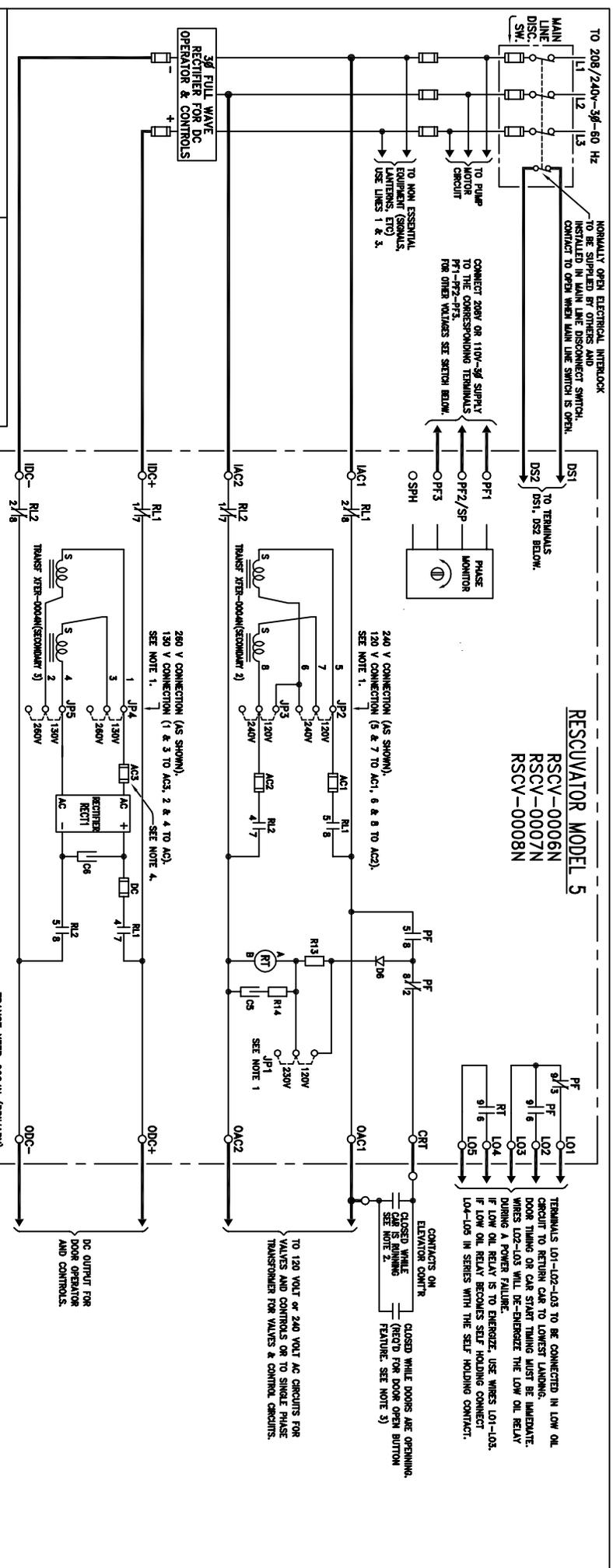
Fig. 8
Battery and 60 amp fuse

Fig. 9
LO1—LO5 Terminals
(Main Board – RSCV-0001N)

Fig. 10
PF Trans. board
(480V RSCV-0004N, 575V RSCV-0005N)

RESCUATOR MODEL 5

RSCV-0006N
RSCV-0007N
RSCV-0008N



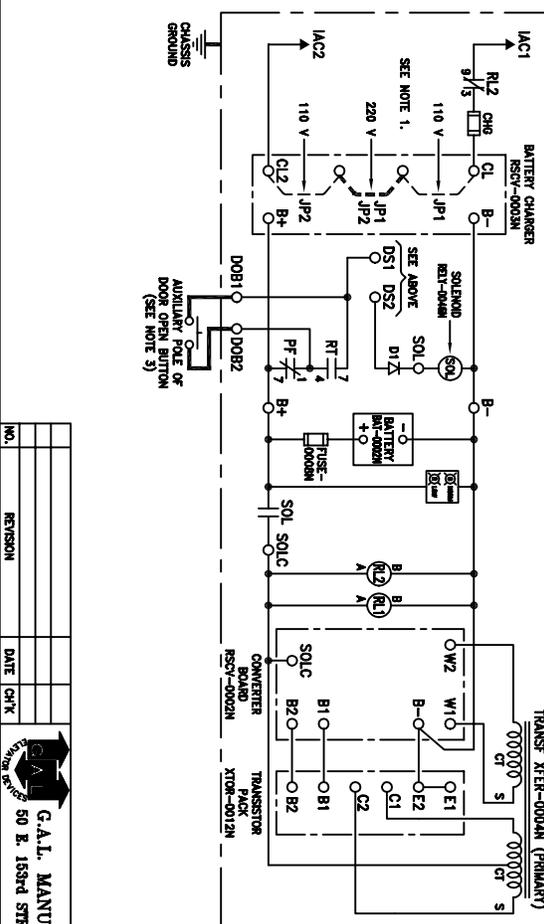
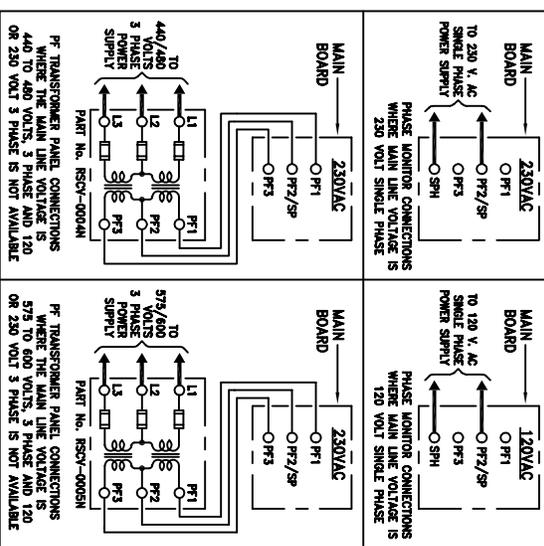
TERMINALS L01-L02-L03 TO BE CONNECTED IN LOW OIL CIRCUIT TO RETURN CAR TO LOWEST LANDING. DOOR TRIP OR CAR START TRIP MUST BE IMMEDIATE. WIRES L02-L03 WILL DE-ENERGIZE THE LOW OIL RELAY DURING A POWER FAILURE. IF LOW OIL RELAY IS TO ENERGIZE, USE WIRES L01-L03. IF LOW OIL RELAY BECOMES SELF HOLDING CONNECT L04-L05 IN SERIES WITH THE SELF HOLDING CONTACT.

CONTACTS ON ELEVATOR CONTR. CLOSED WHILE DOORS ARE OPENING, CLOSED WHILE DOORS ARE CLOSING. (REQ'D FOR DOOR OPEN BUTTON FEATURE. SEE NOTE 3)

TO 120 VOLT or 240 VOLT AC CIRCUITS FOR VALVES AND CONTROLS OR TO SINGLE PHASE TRANSFORMER FOR VALVES & CONTROL CIRCUITS.

NOTES:

- FOR INSTALLATION & ADJUSTING INSTRUCTIONS REFER TO DOC. N.S.-78-18-doe HEED THE WARNINGS.
- A N.O. CONTACT OF THE EXISTING RUN RELAY MUST BE CONNECTED ACROSS TERMINALS OAC1 AND CRT TO PREVENT RELAY RT FROM DROPPING OUT WHILE THE ELEVATOR IS RUNNING. RELAY RT MUST DROP OUT A TIME DELAY AFTER THE ELEVATOR HAS STOPPED RUNNING TO SHUTDOWN THE RESCUATOR.
- THE DOOR OPEN BUTTON FEATURE, WHEN CONNECTED, WILL RE-START THE RESCUATOR WHEN THE DOOR OPEN BUTTON IS PRESSED, ALLOWING THE DOORS TO RE-OPEN. TO ADD THIS FEATURE, MAKE THE FOLLOWING CONNECTIONS:
 - CONNECT A N.O. SPARE CONTACT OF THE IN-CAR DOOR OPEN BUTTON TO TERMINALS DDB1 & DDB2.
 - CONNECT A SPARE N.O. CONTACT OF THE ELEVATOR DOOR OPEN RELAY ACROSS THE ELEVATOR RUN CONTACT (TERMINALS OAC1 AND CRT).
 - IF THE DC OUTPUT IS NOT USED, REMOVE FUSE ACS.
 - WHEN 130 VDC IS USED, FUSE ACS MAY BE CHANGED TO 3 AMP IF NECESSARY.



NO.	REVISION	DATE	CHK

G.A.L. MANUFACTURING CORP.
50 E. 153rd STREET BRONX, N.Y. 10461
DWG. BY: T.P.
CHK BY: G.D.C.
FOR HYDRAULIC ELEVATORS
1-10,117-45
DATE: 8-31-98 / RESCUATOR\110117-45.dwg