

CROWN II "B" SERIES MARINE CONVERTER

INSTALLATION AND MAINTENANCE INSTRUCTIONS

THE FOLLOWING ARE CAUTIONARY STATEMENTS THAT MUST BE READ AND FOLLOWED DURING BOTH INSTALLATION AND OPERATION.

WARNING: *Raritan Engineering Company, Inc. recommends that a qualified person or electrician install this product. Equipment damage, injury to personnel or death could result from improper installation. Raritan Engineering Company, Inc. accepts no responsibility or liability for damage to equipment, or injury or death to personnel that may result from improper installation or operation of this product.*



WARNING: **HAZARD OF SHOCK OR FIRE OR BATTERY DAMAGE** - Always use recommended fuse/circuit breaker wire size and wire exactly as per instructions.



IMPORTANT SAFETY INSTRUCTIONS

WARNING: Safety instructions must be followed. Failure to do so may result in damage to equipment, injury to personnel or death.

CAUTION: To reduce the possibility of injury, charge **ONLY** lead/acid type rechargeable batteries (wet or gel cell). Never charge wet and gel cell batteries simultaneously with this charger!

1. Before using or installing the converter, read all instructions and external cautionary markings on both the converter and batteries.
2. Do not expose the converter to rain, snow or spray.
3. Any modification to the converter or the use of attachments not specifically recommended by Raritan Engineering Co., Inc. may result in a risk of fire, electric shock or injury. Any auxiliary switches in the boat's low voltage system should be U/L recognized and rated for DC use.
4. Never use an extension cord with this converter.
5. Do not operate the converter if it received a sharp blow, was dropped, submerged or exposed to spray; consult a qualified service person or return it to the factory for servicing. If returning to the factory, be sure to include return address, daytime phone number where you can be contacted and a brief description of damage or problem associated with the unit.
6. Only a qualified electrician or service person

should troubleshoot or repair the converter.

7. To reduce the risk of an electric shock, disconnect the converter from the power supply before attempting any maintenance or cleaning. Turning the switch to the "off" position does not disconnect the converter from the power supply.
8. Do not connect converter to a frozen battery.
9. Do not smoke, strike a match or cause a spark in the vicinity of a battery.
10. The water in each battery cell should be at the correct level before charging.
11. Wear eye protection whenever working in the vicinity of batteries.

INTRODUCTION

All Raritan converters are fully automatic solid state units designed to convert shoreline power (50/60 HZ, 120VAC or 240VAC) to DC voltage for battery charging and to assist the batteries during peak DC loads. Input and output voltages and amperages are specified on the data label on the front of each model.

INSTALLING A RARITAN CONVERTER

Where To Mount It

1. Select a dry area as close to the batteries as possible, preferably outside a high temperature area such as the engine compartment, away from other heat sources. If the unit must be mounted in the engine compartment, be sure to provide adequate ventilation to dissipate heat

from the converter. The converter should be within 15 feet of the batteries to be charged. Note wire gauges for both AC and DC connections in Figures #2 and 3. If the converter must be mounted more than 15 feet from the batteries, DC wire gauge must be increased accordingly. Do not mount the converter where it will be exposed to corrosive battery fumes, water or spray.

2. Leave enough room on the right side of the converter for convenient wiring.
3. If a small compartment must be used, make sure ventilation is adequate via louvers, etc. and keep this area free of obstructions.

How to Mount It

4. Mount the converter securely to a bulkhead or wall using the holes provided.
5. Secure with corrosion resistant screws (nuts and bolts), using flat washers and lock washers where appropriate.

Wiring The Converter

6. **WARNING: To avoid risk of shock, the converter case must be grounded to the boat's AC ground.** Connect the DC leads and shore power line to the converter as shown on wiring diagram. Make the converter to battery (DC) connections first.
7. See Figure #1. Connect sensor wire to the most frequently used battery bank (positive).
8. See specific instructions for wiring the **Ignition Shutdown Circuit** (#11 on page 3).
9. Use Figures #2 and 3 to determine AC and DC wire gauge sizes required (derived from: Standards and Recommended Practices for Small Craft, American Boat and Yacht Council, 3069 Solomon's Island Road, Edgewater, MD 21037-1416). If Converter is installed more than 15 feet away from the batteries, increase wire size accordingly.
10. Never run accessories from the converter leads. The converter should be connected directly to the batteries being maintained, and accessories should be fed from the batteries.

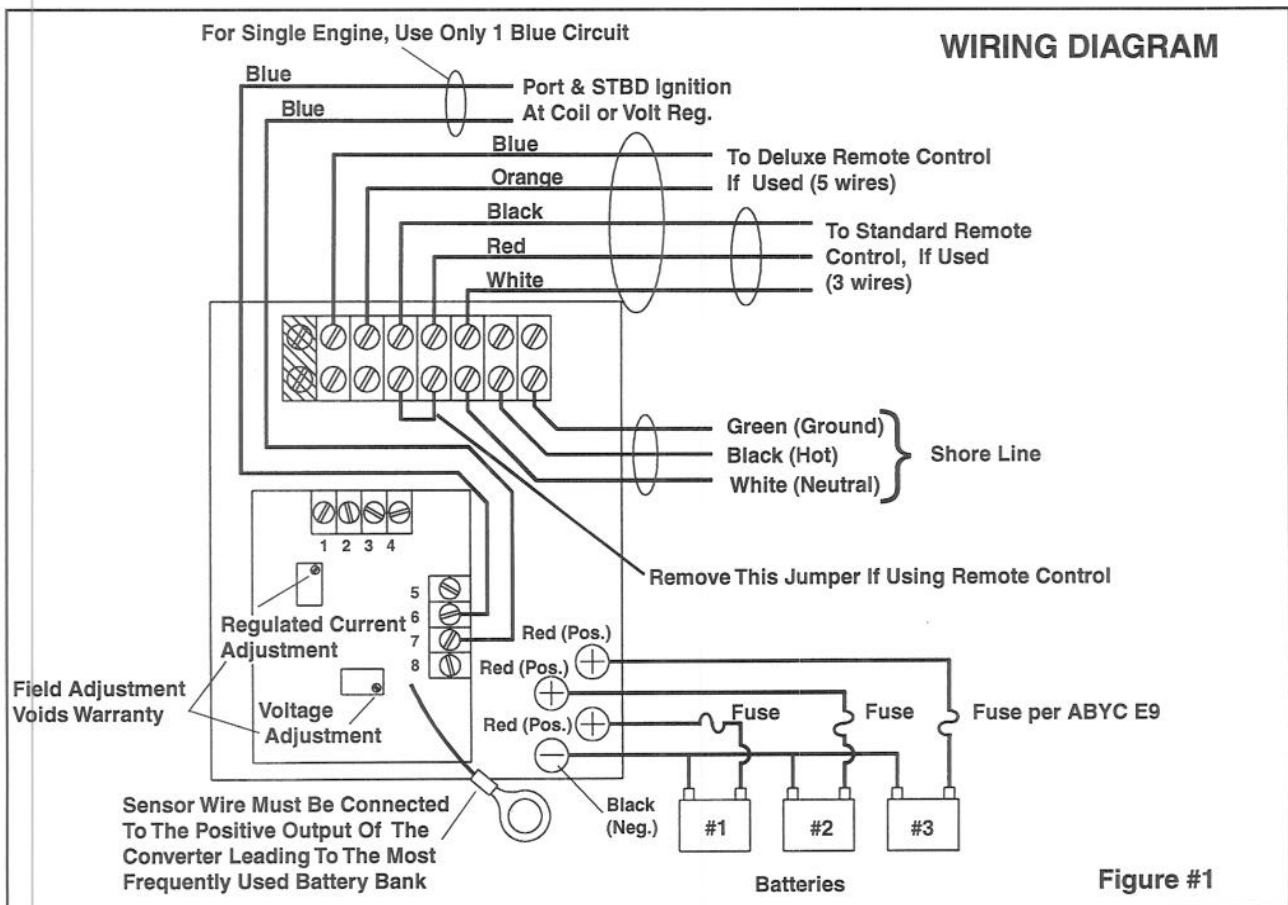


Figure #1

Fig. #2 Recommended Minimum Wire Size for 120VAC Shore Power Line NOT OVER 50 FEET LONG

Model	AC Amps Input	AC Input Wire Size
R2012B-3	6	No. 14
R3012B-3	8	No. 14
R4012B-3	10	No. 12
R6012B-3	10	No. 12
R2024B-3	10	No. 12
R3024B-3	15	No. 12
R4024B-3	20	No. 10
R2032B-3	10	No. 12
R3032B-3	18	No. 10
R4032B-3	20	No. 10

Fig. #3 Recommended Minimum Wire Sizes for DC Positive and Negative Cables, Distance Between Converter and Batteries NOT OVER 15 FEET

Amperes Output	Wire Size
20	No. 10
30	No. 8
40	No. 6
60	No. 4

Ignition Shutdown Circuit

11. If the converter is on and engine(s) are started, a heavy load from the starter may damage parts in the converter; while engine(s) are running, alternator output may buck converter output.

To protect against this, ignition shutdown circuitry is included in the converter which must be wired as follows (if being used): Find a point in the engine wiring that is "hot" when the engine is running and "dead" when it is not, such as ignition coil, ignition switch, electric fuel pump, fuel solenoid valve, alternator output, etc. Run a #16 gauge wire to the blue painted printed circuit control board terminal(s), note wiring diagram for location. "Hot" indicates full voltage; do not connect after a voltage dropping resistor in the ignition circuit. Do not connect to onboard generator as it might feed back battery voltage to keep converter off all the time. For dual engine installations, use two wires as per wiring diagram (Figure #1).

STARTUP

1. Connect shore power, turn converter "on". The red indicator lamp on the front of the unit will come on and the converter will start charging the batteries (if they need charging).
2. If shore power is not reaching the converter, or if the AC fuses are open (blown), the red indicator will not light and no reading will be seen on the ammeter. If a fuse requires replace-

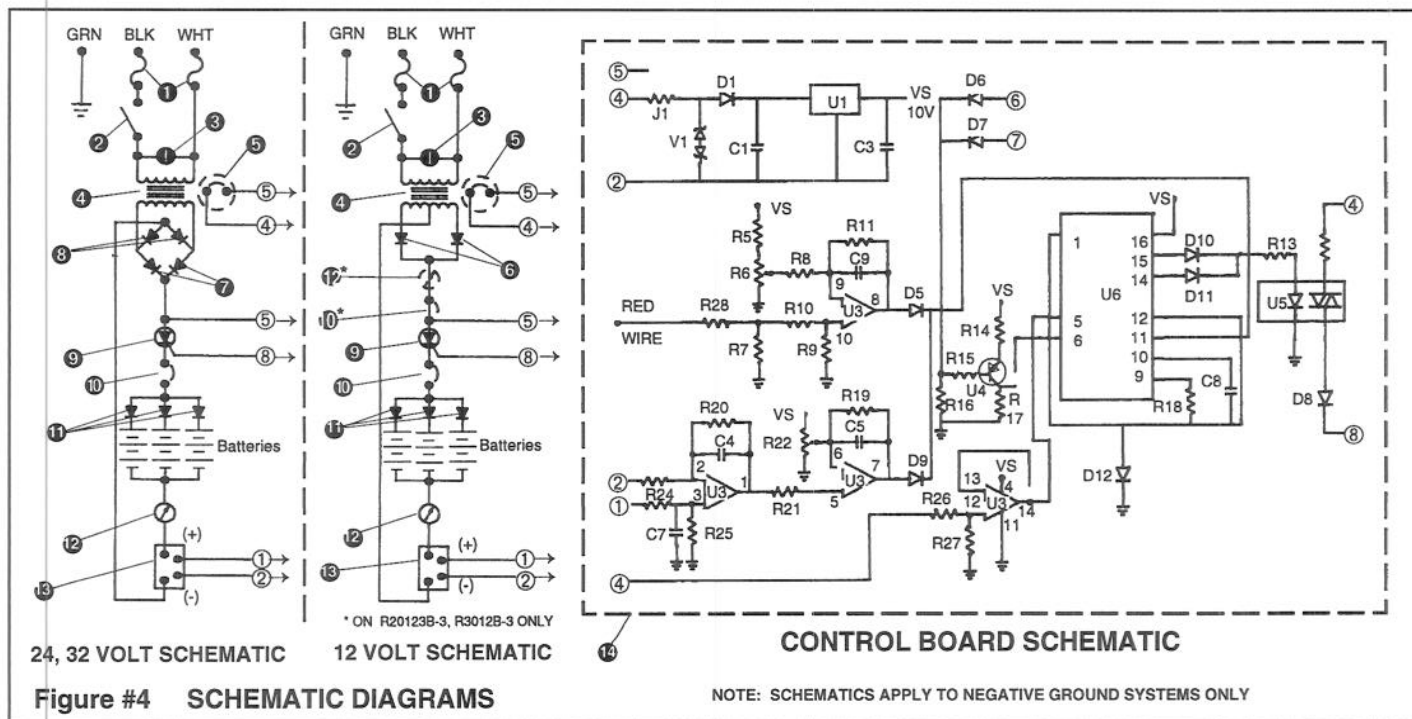
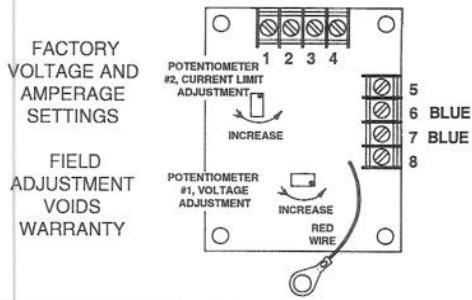


Figure #5



FACTORY
VOLTAGE AND
AMPERAGE
SETTINGS

FIELD
ADJUSTMENT
VOIDS
WARRANTY

MODEL	R2012B-3	R3012B-3	R4012B-3	R6012B-3	R2024B-3	R3024B-3	R4024B-3	R2032B-3	R3032B-3	R4032B-3
CURRENT LIMIT (AMPS)	20	30	40	60	20	30	40	20	30	40
VOLTAGE SETTING (VOLTS)	13.6	13.6	13.6	13.6	27.2	27.2	27.2	36.2	36.2	36.2

NOTE: VOLTAGE SETTINGS FOR GELL CELL BATTERIES AS SPECIFIED BY BATTERY MANUFACTURERS.

ment, use only a fuse of the correct amperage rating which is indicated next to the fuse holder. DO NOT USE FUSES WITH A HIGHER AMPERAGE RATING.

CAUTION: ALWAYS USE A BATTERY WITH THE CONVERTER, AND BE SURE TO OBSERVE CORRECT POLARITY OF THE BATTERY LINES TO PREVENT DAMAGING THE CONVERTER.

DO NOT test for converter output by momentarily flashing the positive and negative DC converter output leads. This will damage internal converter components.

MAINTENANCE

Monthly, check wire connections for looseness or corrosion and check battery water level. Check battery condition and all connections when winterizing and before recommissioning and turning on converter.

BEFORE TROUBLESHOOTING

WARNING: Working on any converter can be dangerous due to the high voltage AC and high amperage low voltage DC involved. Troubleshooting and repair should be undertaken only by those who are technically competent, understand the dangers and observe safety precautions.

- Check to see if the shoreline power is on.
- Check all converter fuses and boat circuit breakers.
- Verify that all wires are properly connected; check that input and output wiring follows the schematic provided, and that DC polarity is correct.

TROUBLESHOOTING "CIRCUIT BOARD - SCR"

NO OUTPUT: Turn on DC load, if ammeter does not show output, then jump Terminal #8 to Termi-

Figure #6

PARTS LIST (SEE SCHEMATIC DIAGRAM IN Figure #4)

ITEM	DESCRIPTION	R2012B-3	R3012B-3	R4012B-3	R6012B-3	R2024B-3	R3024B-3	R4024B-3	R2032B-3	R3032B-3	R4032B-3
1	AC FUSES (2)	RF10	RF12	RF15	RF20	RF15	RF20	RF30	RF15	RF25	RF30
2	ON-OFF SWITCH	ROOS	ROOS	ROOS	ROOS	ROOS	ROOS	ROOS	ROOS	ROOS	ROOS
3	INDICATOR LAMP	RIL	RIL	RIL	RIL	RIL	RIL	RIL	RIL	RIL	RIL
4	TRANSFORMER (INCL. ITEM #5)	RT2012D	RT3012DA	RT4012D	RT6012DA	RT4012D	RT3024D	RT4024D	RT2032D	RT3032D	RT4032D
5	THERMAL SWITCH	RTS	RTS	RTS	RTS	RTS	RTS	RTS	RTS	RTS	RTS
6	RECTIFIER DIODES (2) (12V ONLY)	RRD1	RRD2	RRD2	RRD3						
7	BRIDGE FWD DIODES (2) (24 AND 32V)					RRD2	RRD2	RRD2	RRD2	RRD2	RRD2
8	BRIDGE REV DIODES (2) (24 AND 32V)					RDD2	RDD2	RDD2	RDD2	RDD2	RDD2
9	SCR	RSCR1	RSCR2	RSCR4	RSCR3	RSCR4	RSCR4	RSCR4	RSCR4	RSCR4	RSCR4
10	CIRCUIT BREAKER	RFCB30B	RFCB40B	RKCB50	RKCB80	RKCB30	RKCB40	RKCB60	RKCB30	RKCB40	RKCB60
11	DISTRIBUTION DIODES (3)	RDD1	RDD2	RDD2	RDD3	RDD2	RDD2	RDD2	RDD2	RDD2	RDD2
12	AMMETER	R30AM	R40AM	R50AM	R60AM	R30AM	R40AM	R50AM	R30AM	R40AM	R50AM
13	SHUNT	RBS30	RBS40	RBS50	RBS70	RBS30	RBS40	RBS50	RBS30	RBS40	RBS50
14	CONTROL BOARD ASSY.	CB1S	CB1S	CB1S	CB1S	CB2S	CB2S	CB2S	CB3S	CB3S	CB3S

nal #5 (Figure #5). If ammeter shows output, problem may be in the printed circuit board; otherwise SCR (Item #9 on schematic - Figure #4) is open and should be replaced.

If the problem is in the printed circuit board, turn current limiting potentiometer clockwise; if ammeter shows output, then follow readjustment procedure. Contact your nearest Raritan Dealer or Raritan Customer Service for other problems.

READJUSTMENT PROCEDURE

UNITS ARE ADJUSTED AT THE FACTORY AND NO ADJUSTMENTS ARE NECESSARY DURING INSTALLATION. The following adjustment procedures should be used when replacing the control board or when installing gel-type batteries. Contact Raritan Customer Service when attempting this.

1. Turn Potentiometer #2 (see Figure #5) counterclockwise and Potentiometer #1 counterclockwise a few turns.
2. While charging a discharged battery or while under a heavy DC load, set the current limit by slowly turning Potentiometer #2 clockwise, refer to Figure #5.
3. When batteries are fully charged, set cutoff voltage using Potentiometer #1 (turning it clockwise decreases voltage).

CAUTION: Adjusting voltage to values other than those in Figure #5 will void the warranty. A precision voltmeter must be used for all voltage adjustments.

TROUBLESHOOTING CHECKLIST		
PROBLEM	POSSIBLE CAUSE	CORRECTION
A. Blown AC fuse(s).	A1.Rectifier diode(s) shorted. A2.Short in wiring on AC side. A3.Transformer shorted.	A1.Replace. A2.Replace short in wiring. A3.Replace transformer or return to factory.
B. Converter working properly but indicator lamp out.	B1.Faulty lamp; check for voltage at terminals.	B1.Replace lamp.
C. Indicator on but ammeter does not register when DC load is on batteries.	C1.Bad connection between converter and batteries. C2.Current overload(DC)in the unit, breaker tripped or open. C3.Thermal safety switch on transformer open. Check by jumping terminal 4&5 on control board (Fig. #5) C4.Ignition shutdown circuit has full voltage all the time. C5.Faulty control board. C6.SCR open. C7.Distribution diode(s) open. C8.Rectifer diode(s) open.	C1.Check all connections. C2.Replace breaker. Call Raritan Customer Service for assistance. C3.Allow to cool. Check ventilation.(refer to Installing #3). C4.Check & correct (refer to Installing #11). C5.Check & correct(refer to Readjustment Procedure). Replace if needed. C6.Check & correct (refer to Readjustment Procedure). C7.Check & replace. C8.Check & replace.
D. Converter output "on" continually; ammeter readings do not decrease.	D1.Bad cell in battery. D2.Shorted SCR. Check by disconnecting wire at terminal #8 on control board. If ammeter drops to zero, problem is in circuit board; if ammeter reading continues to show output, SCR is shorted. D3.Output voltage set too high. D4.Sensing lead from board connected to wrong output terminal.	D1.Check battery. D2.Replace. D3.See Readjustment Procedure. D4.Reposition to proper bank.

SPECIFICATIONS

Description	R2012B-3	R3012B-3	R4012B-3	R6012B-3	R2024B-3	R3024B-3	R4024B-3	R2032B-3	R3032B-3	R4032B-3
Nominal DC Volt	12	12	12	12	24	24	24	32	32	32
DC Amps	20	30	40	60	20	30	40	20	30	40
Finishing Volts	13.6	13.6	13.6	13.6	27.2	27.2	27.2	36.2	36.2	36.2
AC Amps	6	8	10	10	10	15	20	10	10	20
AC Fuse (Amps)	10	12	15	20	15	20	30	15	25	30
# of Lead Acid Cells	6	6	6	6	12	12	12	16	16	16

AC Input 90-130V (120VAC Units) at 50/60 HZ or 180-260V (240VAC Units) at 50/60HZ.

LIMITED WARRANTY

Raritan Engineering Company warrants to the original purchaser that this product is free of defects in materials or workmanship for a period of one year from the product's date of purchase. Should this product prove defective by reason of improper workmanship and/or materials within the warranty period, Raritan shall, at its sole option, repair or replace the product.

1. TO OBTAIN WARRANTY SERVICE, Consumer must deliver the product prepaid, together with a detailed description of the problem, to Raritan at 530 Orange St., Millville, N.J. 08332, or 3101 SW 2nd Ave. Ft. Lauderdale, FL 33315. When requesting warranty service, purchaser must present a sales slip or other document which establishes proof of purchase. THE RETURN OF THE OWNER REGISTRATION CARD IS NOT A CONDITION PRECEDENT OF WARRANTY COVERAGE. However, please complete and return the owner Registration Card so that Raritan can contact you should a question of safety arise which could affect you.

2. THIS WARRANTY DOES NOT COVER defects caused by modifications, alterations, repairs or service of this product by anyone other than Raritan; defects in materials or workmanship supplied by others in the process of installation of this product; defects caused by installation of this product other than in accordance with the manufacturer's recommended installation instructions or standard industry procedures; physical abuse to, or misuse of, this product. This warranty also does not cover damages to equipment caused by fire, flood, external water, excessive corrosion or Act of God.

3. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH BUT FOR THIS PROVISION MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, IS HEREBY EXCLUDED AND DISCLAIMED. ALL IMPLIED WARRANTIES SUCH AS THOSE OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, IF APPLICABLE, AS WELL AS ANY IMPLIED WARRANTIES WHICH MIGHT ARISE BY IMPLICATION OF LAW, ARE EXPRESSLY LIMITED TO A TERM OF ONE YEAR. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG A LIMITED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

4. UNDER NO CIRCUMSTANCES SHALL RARITAN BE LIABLE TO PURCHASER OR ANY OTHER PERSONS FOR ANY SPECIAL OR CONSEQUENTIAL DAMAGES, WHETHER ARISING OUT OF BREACH OF WARRANTY, BREACH OF CONTRACT, OR OTHERWISE. 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.

5. No other person or entity is authorized to make any express warranty, promise or affirmation of fact or to assume any other liability on behalf of Raritan in connection with its products except as specifically set forth in this warranty.

6. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

SAVE THESE INSTRUCTIONS

**To order replacement parts or to request additional
information or assistance, contact Raritan Customer**

Service at:



RARITAN
Engineering Company, Inc.

530 Orange Street, P.O. Box 1157, Millville, NJ 08332 USA
Telephone: 609-825-4900 FAX: 609-825-4409
Southern Office and Plant:
3101 SW Second Avenue, Fort Lauderdale, FL 33315 USA
Telephone: 954-525-0378 FAX: 954-764-4370