Pre-Installation Manual

AC Power Controller

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Brunswick®
CUSTOMER SERVICE
A tradition in excellence.

AC Power Controller Pre-Installation Manual

Reorder Part Number 10-095400-043

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U.S.A.

231-725-3300

SAFETY

Throughout this publication, "Warnings", and "Cautions" (accompanied by one of the International HAZARD Symbols) are used to alert the mechanic to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. They are defined below. **OBSERVE AND READ THEM CAREFULLY!**

These "Safety Alerts" alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing the service, plus training and "Common Sense" operation are major accident prevention measures.

NOTE or IMPORTANT!:

Will designate significant informational notes.

WARNING!

Will designate a mechanical or nonelectrical alert which could potentially cause personal injury or death.

WARNING!

Will designate electrical alerts which could potentially cause personal injury or death.

CAUTION!

Will designate an alert which could potentially cause product damage.

Will designate grounding alerts.

SAFETY NOTICE TO USERS OF THIS MANUAL

This manual has been written and published by the Service Department of Brunswick Bowling and Billiards to aid the reader when servicing or installing the products described.

It is assumed that these personnel are familiar with, and have been trained in, the servicing or installation procedures of these products, which includes the use of common mechanic's hand tools and any special Brunswick or recommended tools from other suppliers.

We could not possibly know of and advise the reader of all conceivable procedures by which a service might be performed and of the possible hazards and/or results of each method. We have not attempted any such wide evaluation. Therefore, anyone who uses a service procedure and/or tool, which is not recommended by Brunswick, must first completely satisfy himself that neither his nor the products safety will be endangered by the service procedure selected.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication.

It should be kept in mind, while working on the product, that the electrical system is capable of violent and damaging short circuits or severe electrical shocks. When performing any work where electrical terminals could possibly be grounded or touched by the mechanic, the power to the product should be disconnected prior to servicing and remain disconnected until servicing is complete.

Table of Contents

Specifications

Ratings

- Ambient Temperature Rating: 25 C
- Enclosure: Type 1
- Input: 12 Volt DC, Class 2 (0.3 AMPS)
- Output: Each of the 16 individual outputs are rated below:

Load	Rating
General Purpose	100-120/220-240 VAC, 4.0 A 50/60 Hz, 1 Phase
Resistive	100-120/220-240 VAC, 4.0 A 50/60 Hz, 1 Phase
Incandescent Lamp	100-120 VAC, 480 Watts, 50/60 Hz, 1 Phase
Incandescent Lamp	200-240 VAC, 480 Watts, 50/60 Hz, 1 Phase
Ballast	100-120 VAC, 4.0 A Ballast, 50/60 Hz, 1 Phase
Ballast	200-240 VAC, 4.0 A Ballast, 50/60 Hz, 1 Phase
Motor	100-120 CAC, 220-240 VAC, 1/8 HP 50/60Hz. 1 Phase
Motor	208 VAC, 220-240 VAC, 1/3 HP, 50/60 Hz, 1 Phase
Pilot Duty	C300

Fuse Replacement

F1-F16 fuse replacement (P/N 11-685068-000):

- 5 Amp
- 250 Volt DC
- 5 mm x 20 mm
- Medium Blow

Wiring

Terminal Strip (10 Pole):

- 10-22 AWG minimum 300 Volt Insulation
- Cu
- 60° C or 75° C
- 7.0 lb In Torque

Terminal Block (2 Pole):

- 12-22 AWG minimum 300 Volt DC Insulation
- Cu
- 60° C or 75° C
- 4.0 lb In Torque

Ground Bar (9 Pole):

- 4-14 AWG minimum 300 Volt DC Insulation
- Cu

Accessory - RS232/485 Converter Model (P/N 57-50319-000)

- Input: 12 Volt DC, 1.25 AMPS Maximum or 12 Volt DC
- Output: Each of the 16 individual outputs are rated
- Class: 2

Accessory - Power Supply (P/N 57-861905-000)

- Input: 100-240 Volt AC
- Output: 12 Volt DC, 1.25 AMPS Maximum or 12 Volt DC
- Class: 2

Accessory - Communications Cable (P/N 57-863244-000)

- 22 AWG
- 300 Volt DC
- 75 C Minimum

Canadian Requirements (CUL)

Due to ventilation openings on the bottom of the enclosure, the unit shall be marked "CAUTION" when mounting on or over a combustible surface, a plate of at least 1.43 mm galvanized or 1.6 mm uncoated steel extended at least 150 mm beyond the equipment on all sides must be installed.

Important!

This document contains information on electrical, installation, and conduit for Brunswick AC Power Controller. It also contains the information necessary for the preparation of a site conforming to Brunswick specifications. Any deviation from these specifications could cause problems to your equipment that may be difficult to detect and/or correct. If you have questions regarding this document, call the Brunswick Response Center at 1-800-323-8141, option 1, or 231-725-4966, or fax to 231-725-4667, or E-mail to *crc.support @brunbowl.com* 24 hours a day 7 days a week.

When planning to install the AC Power Controller, the customer is required to provide isolated ground (I.G.) outlets which are solely dedicated to those electronic systems with an isolated neutral and ground. These requirements are necessary to prevent electrical noise from compressors, game rooms, fluorescent lights, motors, etc. from interfering with sensitive computer operations. An improperly grounded system can also result in memory losses, erroneous signals, and/or component failures. The isolated ground outlets must be installed by a licensed electrician and must meet all local and national codes.

Power Conditioning

In some areas, additional power conditioning or uninterrupted power supply (UPS) equipment may be required to insure optimum performance of your scoring equipment. The purchase and installation of any power conditioning equipment is the responsibility of the customer, including a UPS system. If the bowling center is located in an area that has a history of frequent power failures or interruptions, the customer is advised to contact the Brunswick Electronics Service Department. The Electronics Service Department will assist the customer with any additional equipment specifications or Brunswick approved power conditioning equipment required.

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the pre-installation manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of F.C.C. Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Isolated Ground Receptacles - NEC 250-74 Exception 4

Where required, for the reduction of electrical noise (electromagnetic interference) on the grounding circuit, a receptacle in which the grounding terminal is purposely insulated from the receptacle mounting means shall be permitted. The receptacle grounding terminal shall be grounded by an insulated equipment grounding conductor run with the circuit conductors to the electronic subpanel.

Grounding Conductor - NEC 384-27

The grounding conductor shall be permitted to pass through one or more subpanels without connection to the panel board grounding terminal as permitted by Section 384-27 Exception, so as to terminate directly at the applicable derived system or service grounding terminal.

Extended Power Outage

The circuit breakers (electronic subpanel) must be clearly identified and should be left on at all times under normal operation. If power is to be out for an extended period of time, it is recommended that circuit breakers to the electronic equipment be turned off. When power is restored, transient voltages could be induced into the equipment if circuit breakers are not off.

Conduit and Low Voltage Cable Specifications

It is the customer's responsibility to provide a raceway or means to run wires from the equipment located at the Control Desk, to the Brunswick AC Power Controller. Various ways of doing this can be discussed with the Brunswick Service Representative at the time of the survey.

When routing the conduit from the Control Desk to the AC Power Controller, extra care must be exercised so as to not place them near a noisy electrical environment.

1. The cables need to be installed in conduit only when local codes require it.

2. Keep the conduit routing to a minimum, but keep in mind that routing them away from a noisy electrical environment is most important.

3. If conduit is required, only telephone or communication cables may be routed in the same conduit. Do not route them in conduit with any electrical equipment with high voltage power cables.

NOTE:

No 120 volt alternating current or higher in the same conduit as telephone or communication cables..

4. ***Do not*** lay the interconnecting cables or conduit raceways on top of, or close to fluorescent light fixtures. Route them as far from the fixtures as possible.

5. Keep cables as far away as possible from motors, compressors, and high voltage power cables. Do not lay them next to or closely parallel to existing high voltage electrical cables. When there is any doubt, contact your local representative, or contact the Brunswick Electronic Support Line at 1-800-323-8141 in the USA or Canada, or at 231-725-3300 for International.

NOTE:

Do not use plumbing PVC pipe for low voltage cable runs. ***Electrical*** *PVC must be used for all conduit runs.*

Electrical Quick Reference Checklist

- ☐ ***FAILURE** to **COMPLY** with the Electrical Quick Reference and Pre-Installation Manual specification will void **ALL** warranties. All electrical work must be completed before the engineer arrives on-site.*

- ☐ The **ISOLATED GROUND** and **NEUTRAL** buss bars **CANNOT** be **BONDED** to the electronics subpanel. Reference NEC 250-74 Exception 4.

- ☐ **EARTH GROUND** conductor **MUST BE** a minimum of **#6 AWG** wire or larger.

- ☐ The electrician **MUST** perform a **CONTINUITY** check on the electronics subpanel to ensure **NO** conduit to **ISOLATED GROUND** and/or **NEUTRAL** shorts exist.

- ☐ Greenfield or conduit **CANNOT** be used as the **EQUIPMENT GROUND** conductor for the system.

- ☐ Each **ISOLATED GROUND** circuit has a **SEPARATE** hot, neutral, and ground wire. Example: 10 circuits = 10 hots, 10 neutrals, 10 grounds.

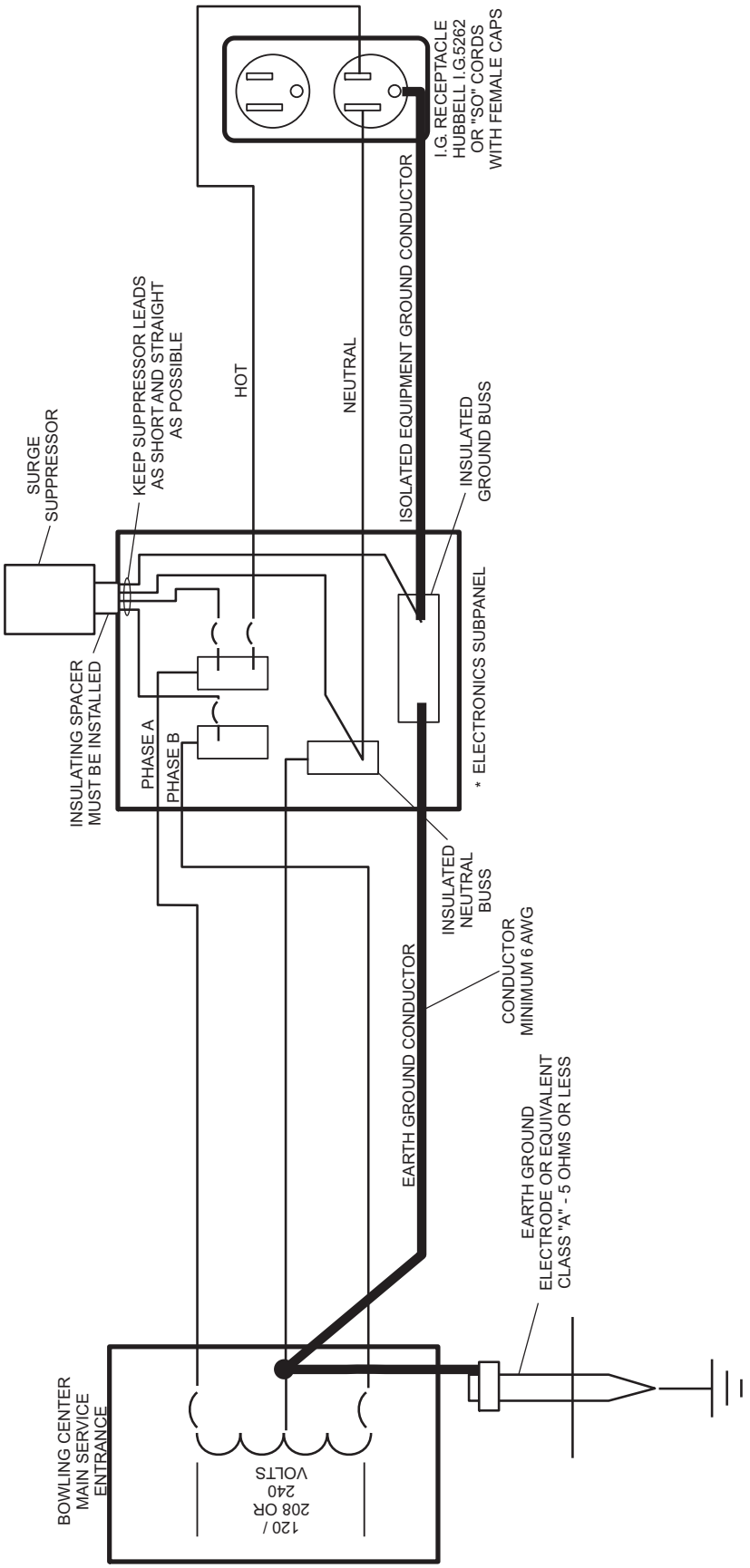
- ☐ All branch circuit runs **OVER 200 FEET** from the electronics subpanel must be **#10 AWG** wire or larger.

- ☐ Class-A **CERTIFIED** ground is recommended and should be measured at main service.

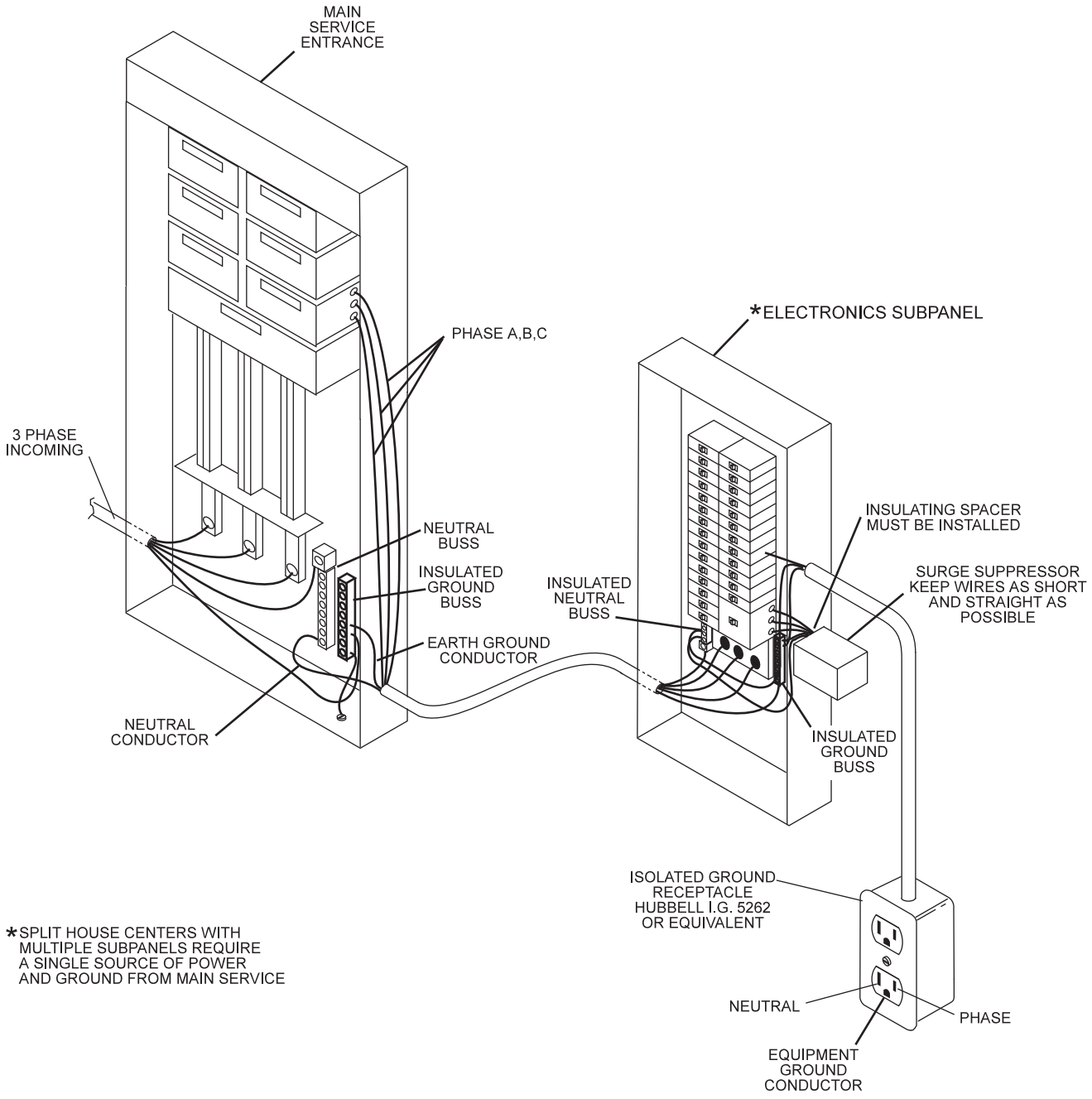
- ☐ Floating receptacles in the consoles **MUST BE** insulated. Metallic electrical boxes **CANNOT** touch console metal base. If local code permits, you may install "SO" cords with insulated female cord cap receptacle.

- ☐ AC Power Controller operates the **ALTERNATING CURRENT (AC)** to the billiards light **NOT DIRECT CURRENT (DC).**

Electrical Quick Reference Schematic



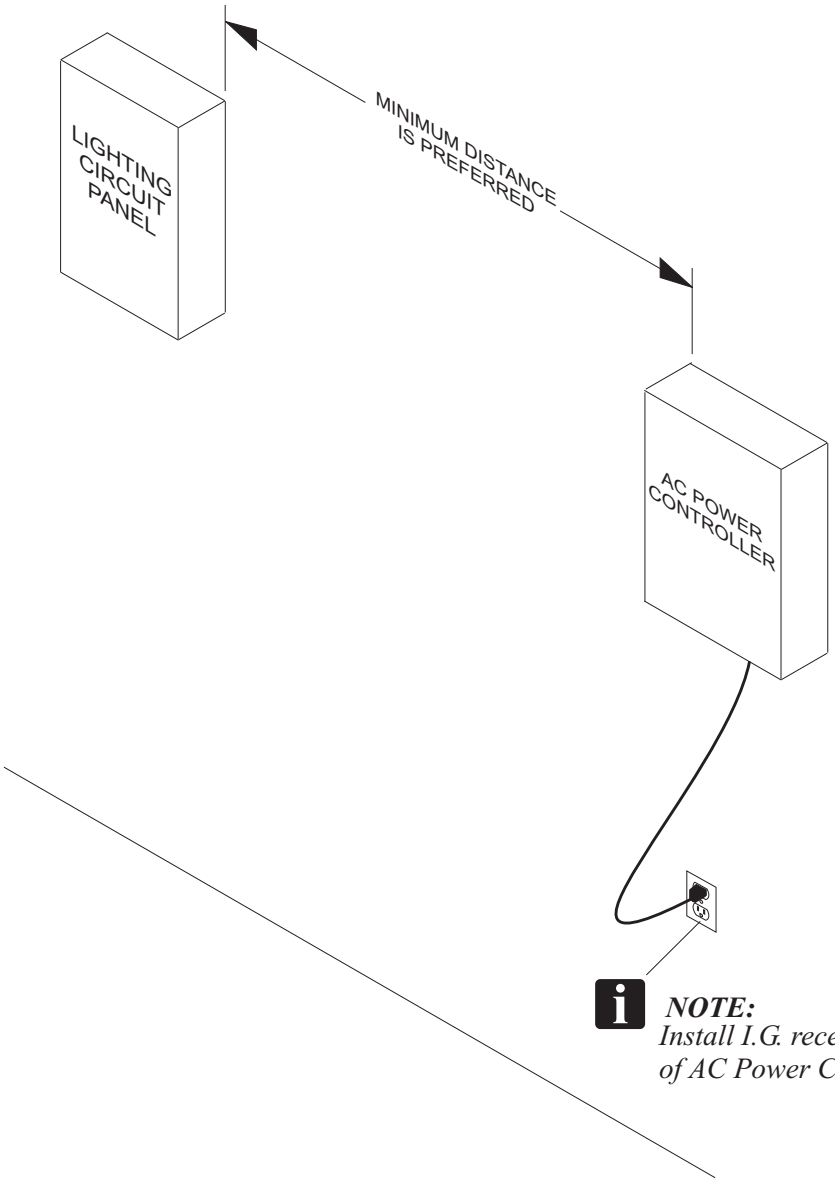
ISOLATED GROUND SYSTEM


MAIN
SERVICE
ENTRANCE
PHASE A,B,C
3 PHASE
INCOMING
NEUTRAL
BUSS
INSULATED
GROUND
BUSS
EARTH GROUND
CONDUCTOR
NEUTRAL
CONDUCTOR
*ELECTRONICS SUBPANEL
INSULATING SPACER
MUST BE INSTALLED
SURGE SUPPRESSOR
KEEP WIRES AS SHORT
AND STRAIGHT AS
POSSIBLE
INSULATED
NEUTRAL
BUSS
INSULATED
GROUND
BUSS
ISOLATED GROUND
RECEPTACLE
HUBBELL I.G. 5262
OR EQUIVALENT
NEUTRAL
PHASE
EQUIPMENT
GROUND
CONDUCTOR
*SPLIT HOUSE CENTERS WITH
MULTIPLE SUBPANELS REQUIRE
A SINGLE SOURCE OF POWER
AND GROUND FROM MAIN SERVICE

Placement of AC Power Controller

The ideal placement of the Brunswick AC Power Controller is near the lighting service panel for the billiards lights.

Electrical Information							
Volts	**Hertz**	**AC/DC**	**Phase**	**Amps Per Unit**	**Watts**	**Branch Circuit**	**Customer Responsibility**
100-130	50/60	AC	1	0.5	60	1 ea. 2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 receptacle or equivalent.
200-240	50/60	AC	1	0.25	60	1 ea. 2 Wires + Isolated Ground	Install circuit with appropriate I.G. receptacle



NOTE:
Install I.G. receptacle within 5' (1.52 M) of AC Power Controller

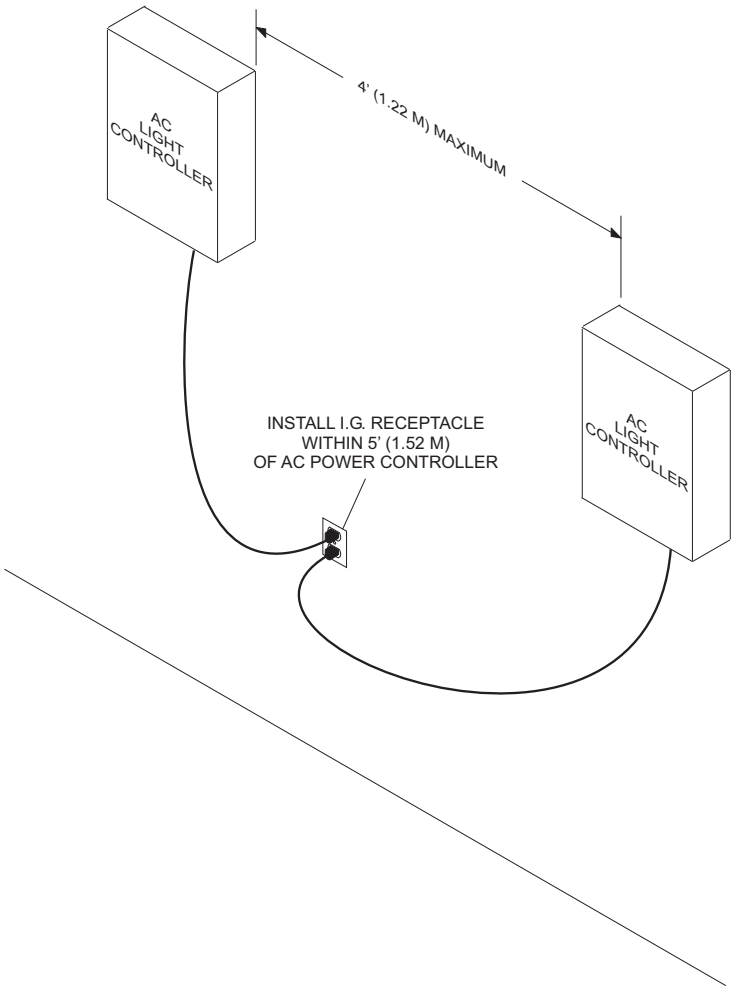
Multiple AC Power Controllers

One Brunswick AC Power Controller can operate 16 billiards lights. To operate additional billiard lights another Brunswick AC Power Controller can be used.

NOTE:

Each additional Brunswick AC Power Controller will need an I.G. receptacle.

Electrical Information							
Volts	**Hertz**	**AC/DC**	**Phase**	**Amps Per Unit**	**Watts**	**Branch Circuit**	**Customer Responsibility**
100-130	50/60	AC	1	0.5	60	1 ea. 2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 receptacle or equivalent.
200-240	50/60	AC	1	0.25	60	1 ea. 2 Wires + Isolated Ground	Install circuit with appropriate I.G. receptacle



AC Power Controller to Lighting - Wiring Diagrams

New Installation

NOTE:

Customer's responsibility.

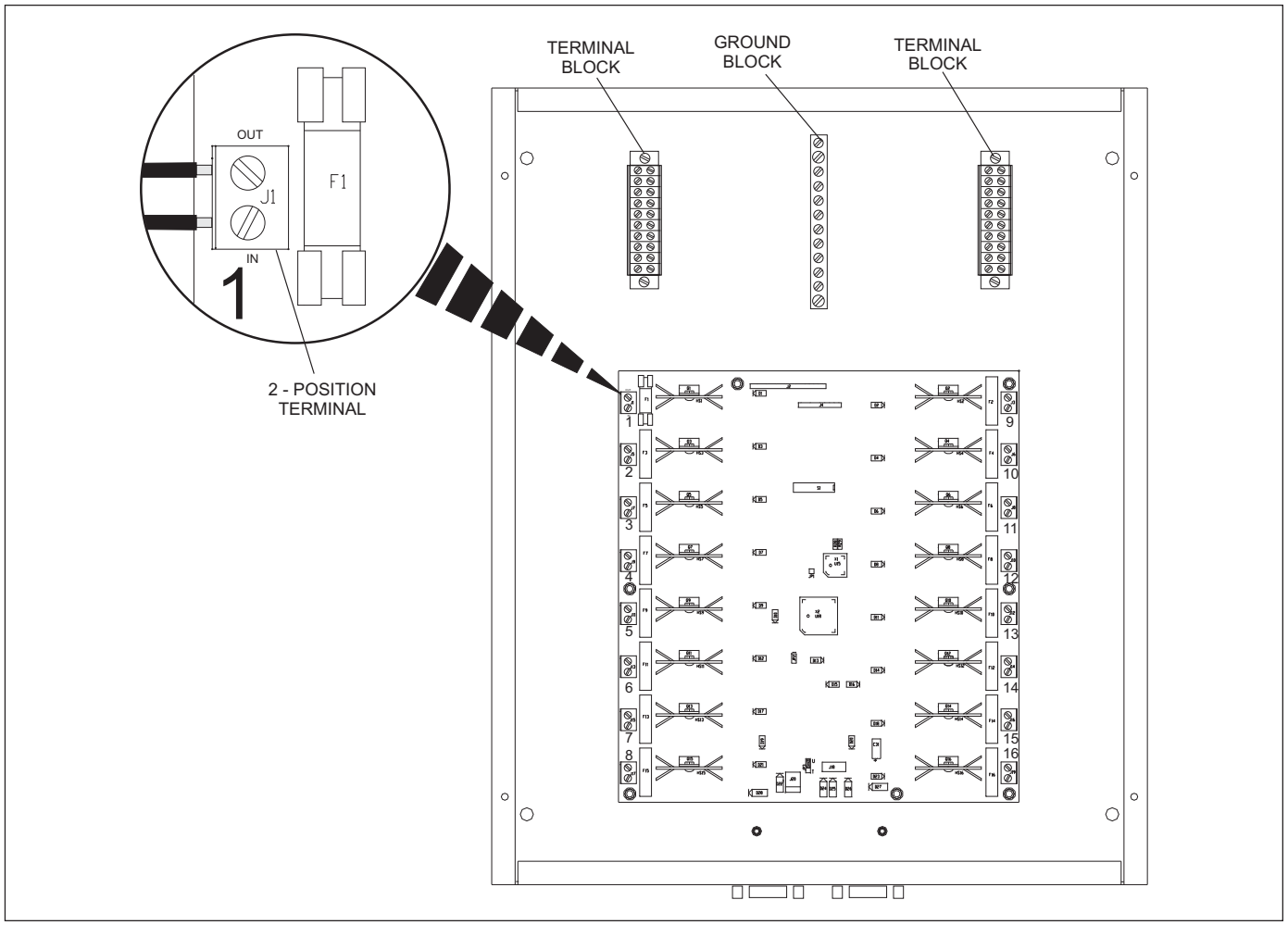


Figure 1. AC Power Controller

NOTE:

The electrician will need to provide one LINE wire for every one NEUTRAL wire when wiring the billiards lights to the AC Power Controller.

1. Route the line wire from the lighting circuit panel to the AC Power Controller. Refer to *Figure 2.*

2. Connect the line wire from the lighting circuit panel to the terminal blocks. Refer to *Figure 2.*

3. There are sixteen 2-position terminals on the AC Power Controller electronics PCB. From the terminal block connect the line wire to "IN" on the 2-position terminal, from "OUT" on the 2-position terminal, route the line wire to the billiard lights. Refer to *Figures 1* & *2.*

AC Power Controller to Lighting - Wiring Diagrams

New Installation

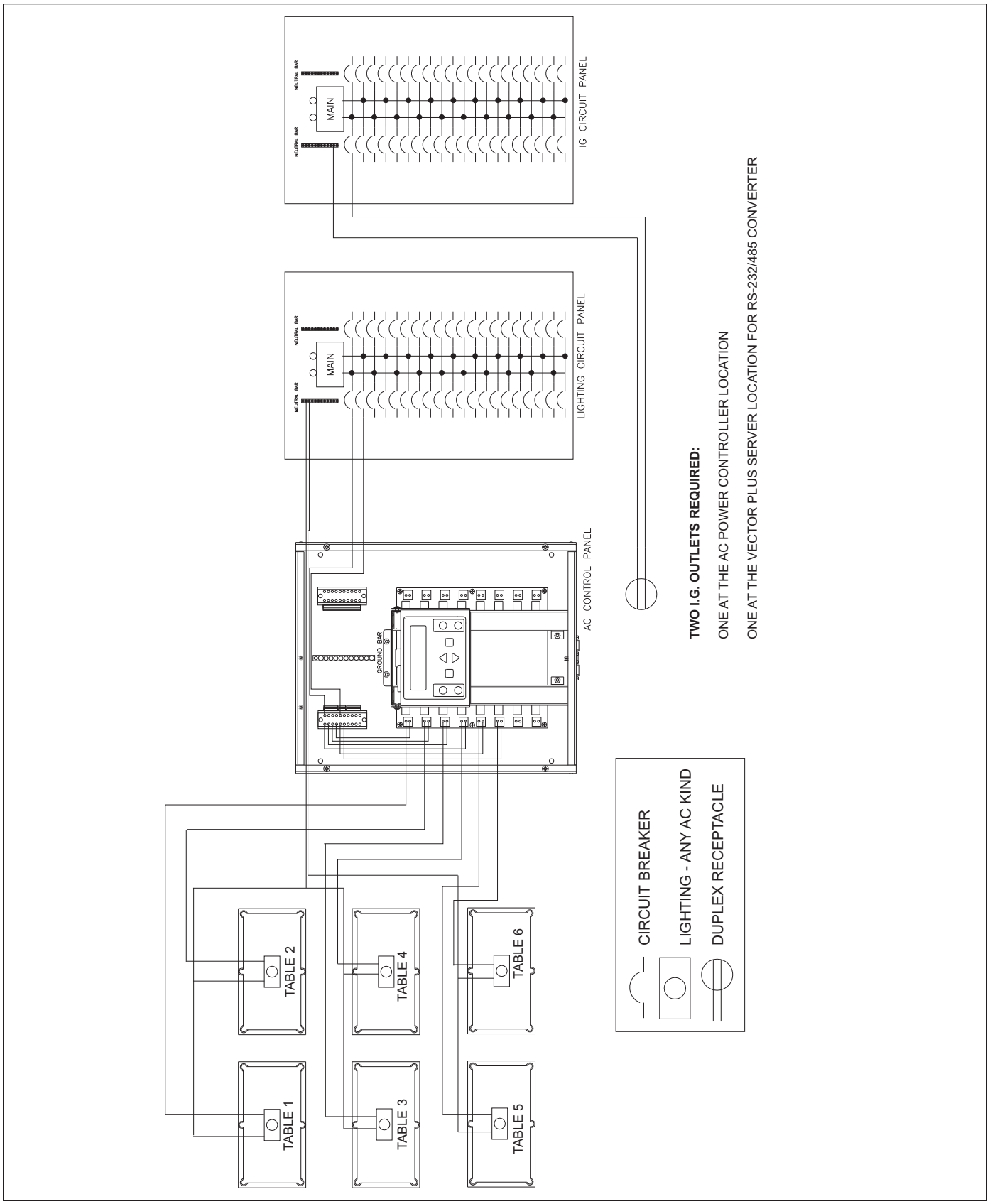


Figure 2. New Installation Schematic

Upgrade Installation

NOTE:

Customer's Responsibility.

NOTE:

The electrician will need to provide one LINE wire for every one NEUTRAL wire when wiring the billiard lights to the AC Power Controller.

1. Route the line wire from the secondary voltage side of the "Relays Transformer" to the terminal blocks in the AC Power Controller. Refer to *Figure 3.*

2. From the terminal block connect the line wire to "IN" on the 2-position terminal. From "OUT" on the 2-position terminal, route the line wire to the relay that controls the billiards light. Refer to *Figures 1* & *3*.

NOTE:

The wiring from existing controller can be removed.

Upgrade Installation

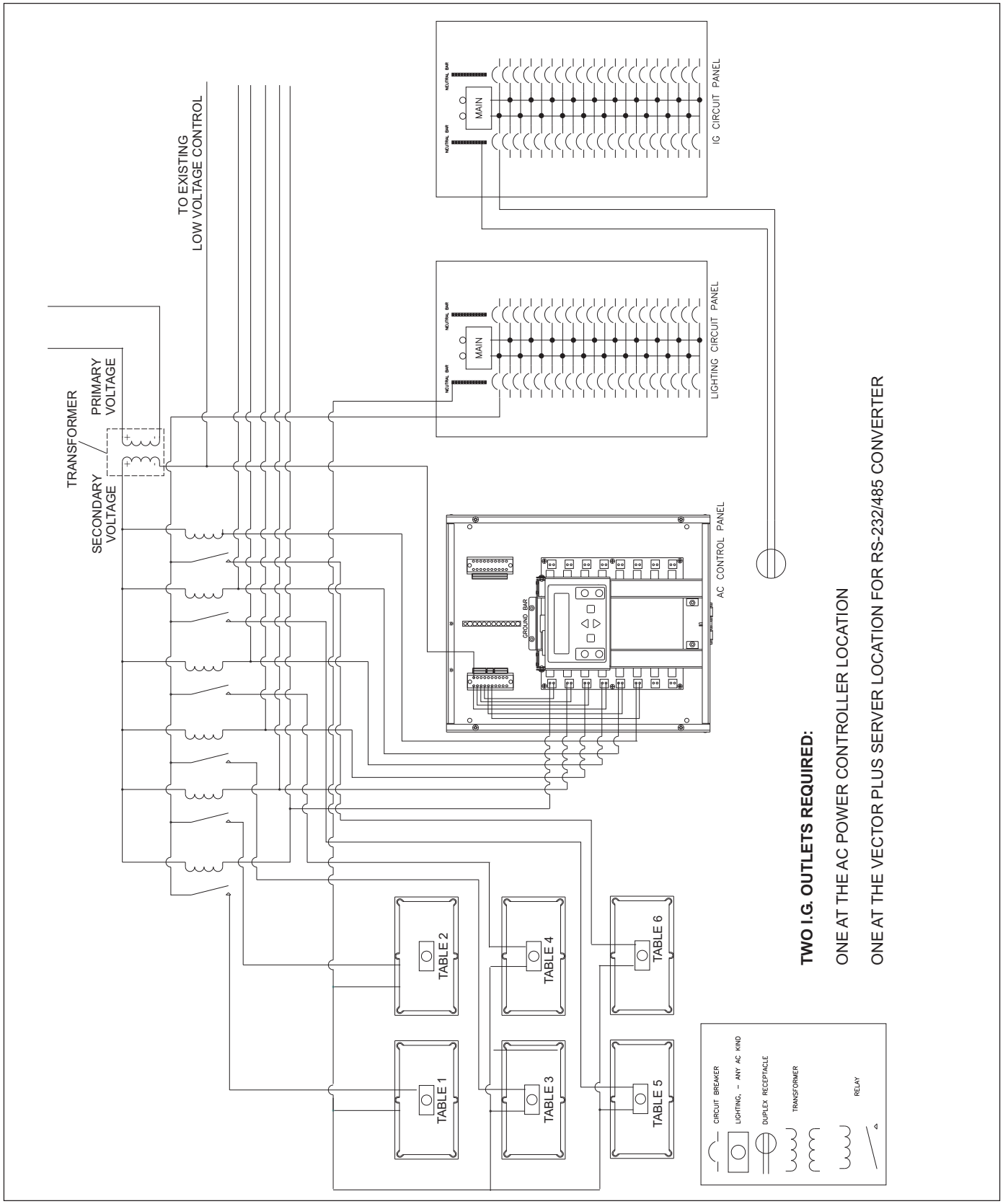


Figure 3. Upgrade Schematic

AC Power Controller to Lighting - Wiring Diagrams

Existing Installation

NOTE:

Customer's Responsibility.

NOTE:

The electrician will need to provide one LINE wire for every one NEUTRAL wire when wiring the billiard lights to the AC Power Controller.

1. Route the line wire from the primary side of the switch, "S" circuit to the terminal block in the AC Power Controller. Refer to *Figures 1 & 4.*

2. From the terminal block connect the line wire to "IN" on the 2-position terminal, from "OUT" on the 2-position terminal, route the line wire to the secondary side of the switch "S". Refer to *Figures 1 & 4.*

NOTE:

The Switch, "S" is wired in parallel with the AC Power Controller.

AC Power Controller to Lighting - Wiring Diagrams

Existing Installation

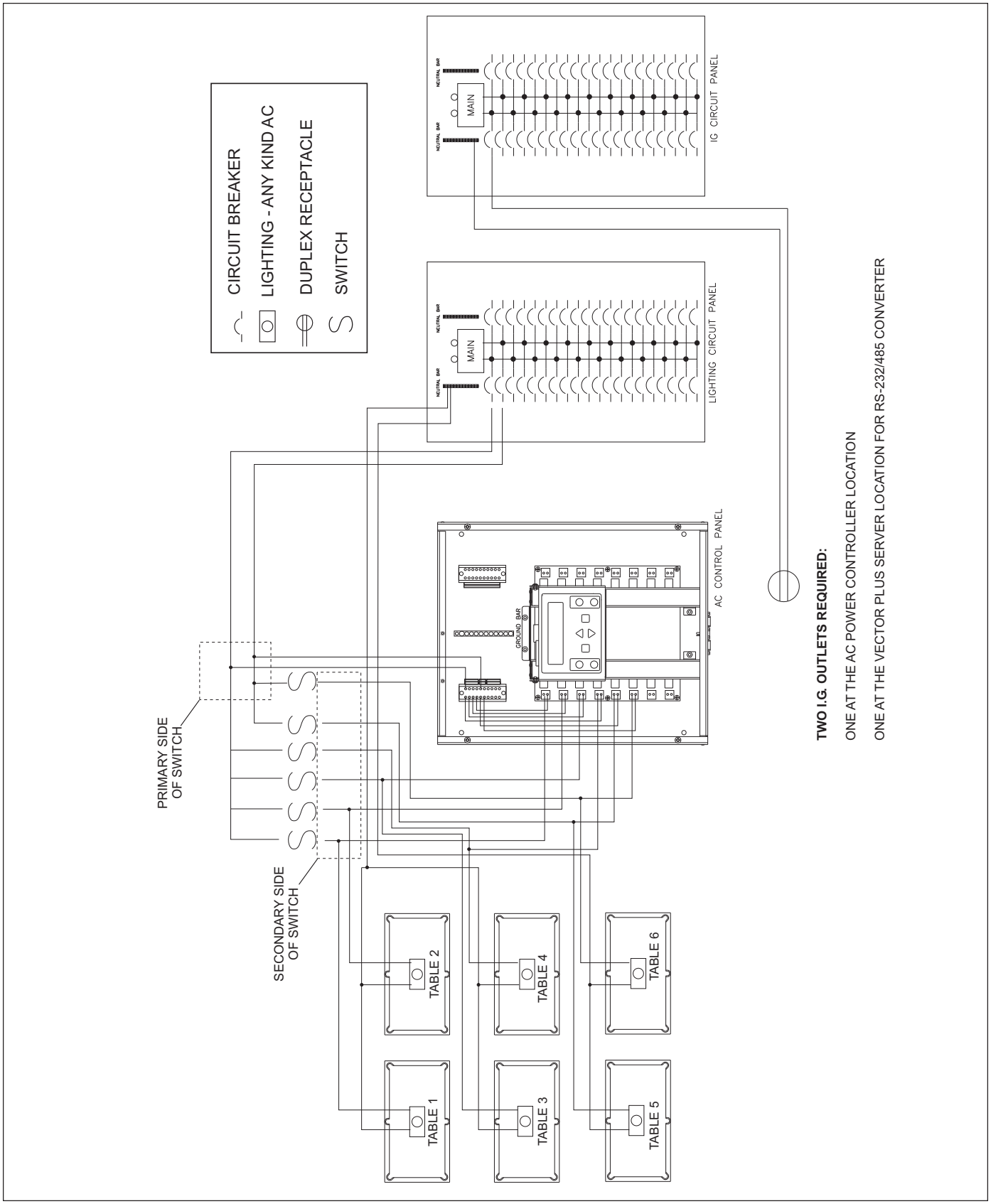
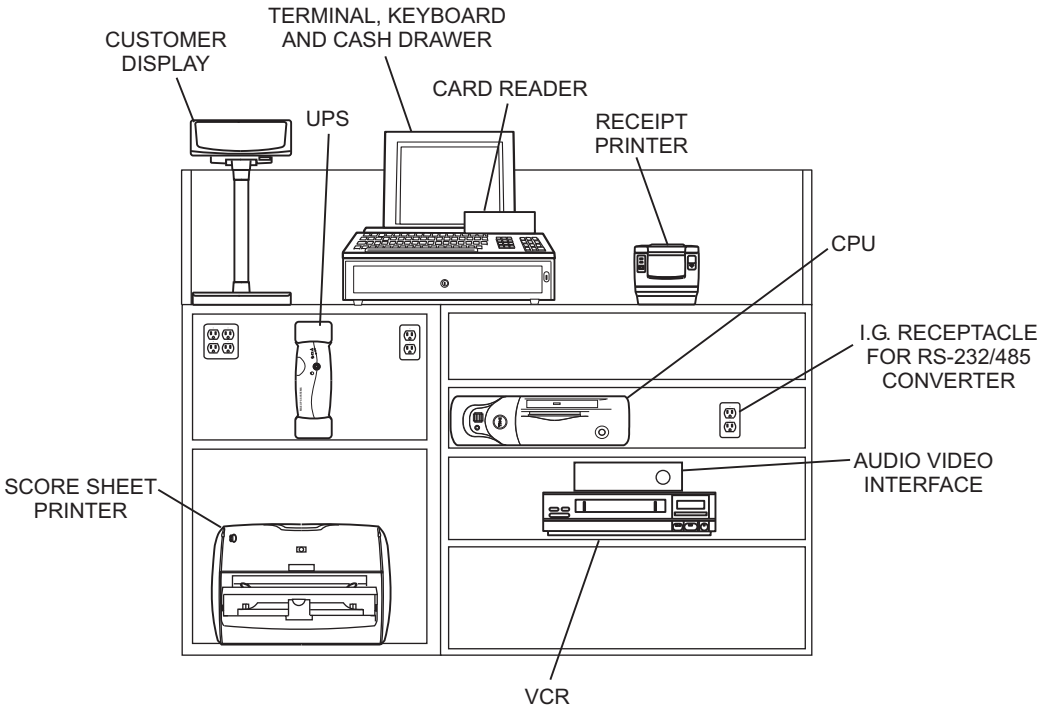


Figure 4. Existing Installation Schematic

Vector Plus Server

Electrical Information							
Volts	**Hertz**	**AC/DC**	**Phase**	**Amps Per Unit**	**Watts**	**Branch Circuit**	**Customer Responsibility**
100-130	50/60	AC	1	0.5	60	1 ea. 2 Wires + Isolated Ground	Install circuit with 120 Volt Hubbell I.G. 5262 receptacle or equivalent.
200-240	50/60	AC	1	0.25	60	1 ea. 2 Wires + Isolated Ground	Install circuit with appropriate I.G. receptacle



Installation Information

Customer Responsibility: An I.G. receptacle will need to be installed within 5' (1.52 M) of the Vector Plus server.

Communications Cable Installation

NOTE

Customer's Responsibility.

The 300' (91.44 m) bulk communications cable (part number 27-609012-000) will need to be routed from the Brunswick AC Power to the Vector Plus server.