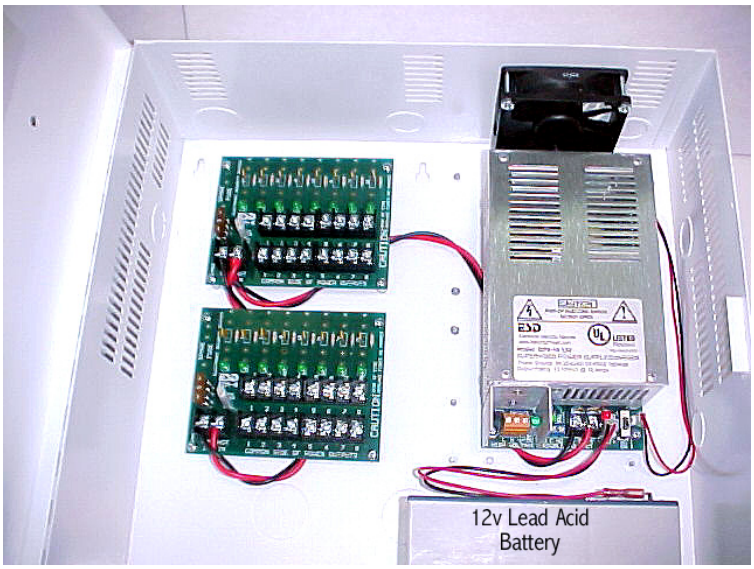
Installation Instructions

AQU244 24vdc 5A Supervised Power Supply/Charger module
AQU128 12vdc 10A Supervised Power Supply/Charger module
Both Mounted in a Large Enclosure with Smart Fan 14” x 14” x 4.75”

AQU244-8C AQU244 with 1 PDB-8C-.72A providing 8 power limited outputs mounted in enclosure
AQU244-16C AQU244 with 2 PDB-8C-.72A’s providing 16 power limited outputs mounted in enclosure
AQU128-8C AQU128 with 1 PDB-8C-1.5A providing 8 power limited outputs mounted in enclosure
AQU128-16C AQU128 with 2 PDB-8C-1.5A’s providing 16 power limited outputs mounted in enclosure

Features:

- Universal Input 90-240 vac
- UL and CUL Listed
  UL603 Burglar Alarm System Power Supply
  UL294 Access Control Accessory
  File: BP9019
- Certified Compliance with EN 55022 & FCC
- Thermal Protection
- Short Circuit Protection
- Precision Battery Charging and Output Regulation.
- Smart Fan runs as Needed for Cool Operation and Long Life
- Output ON/OFF Service Switch *(no service switch on CE marked units)*
- Outputs are Power Limited for Class II Using PTC Circuit Breakers
- Indicating LED’s for: AC Input, Power Normal, DC On, Main Power at Each PDB-8C, and Every Output
- Power Trouble Alarm (form C Contact) Indicates AC Power Fail, Low Battery or Output Voltage too High.
- Battery Cut-off Relay Prevents Deep Discharge
- Battery is Float Charged for Faster Charging with No Switch Over when AC fails.



AQU128-16C

Shows AQU128 Connected to 2 PDB-8C’s with Smart Fan and Enclosure

- 12” Plug-in Battery cable assembly is provided with series cable for the AQU244 models.
- 36” Plug-in Battery cable assembly is available (WA-36IBAT) for remote battery mounting.
- Quality Manufactured in the USA

AQU244 & AQU128 Description

The AQU244 and AQU128 are clean, efficient, heavy duty, low frequency off line switching power supplies with battery charger and power supervision. Even though the wattage is the same for the AQU244 and the AQU128, we sell them separately for optimum performance. The AQU244 and AQU128 use a very low switching frequency of 23KHz, just above our hearing range. This, coupled with extensive filtering, provides a balance of super clean power and efficiency. This low frequency also eliminates interference problems with card readers. The AQU244 and AQU128 are self-contained with a universal line input of 90 to 264vac. The AQU244 and AQU128 each weigh less than 1.5 lbs and occupy less than ½ of a cubic foot of cabinet space.

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The AQU244 and AQU128 become an uninterruptible power supply when a stand by battery(s) is connected with the supplied cable. These supplies have a special power limiting circuit that allows the batteries to be float charged across the output without lock up or chirping on and off. The battery(s) is protected with an automatic resetting circuit breaker and diode for over current and accidental reversed battery hookup. Float charging means faster recovery time for the battery(s). There is no switch over or voltage drop when power fails. Standby battery(s) can be any capacity between 4 and 40 Amp hours. The precise output voltage provides longer battery life. The AQU244 24vdc is rated for 4 Amps continuous current with 1 Amp reserved for battery charging. The AQU12812vdc is rated for 8 Amps continuous current with 2 Amps reserved for battery charging.

Power Supervision includes a battery cut off relay and a separate power trouble alarm relay. The battery cut off relay removes the battery from the load when the battery reaches its service limit. This prevents damage to the battery from going into deep discharge. The power trouble alarm relay output, form C contacts, can be used to signal a buzzer and/or other signaling device. The relay is normally energized for fail-safe operation. The relay has a green LED that is on when power is good. The relay will drop off of normal when the standby battery(s) reaches about 70% of capacity after a power a power failure. This low voltage indication represents power trouble. High voltage failure will also indicate power trouble.

A **Service Switch** is provided to disable the power output. When the switch is turned off, the power supply is electronically disabled and the battery cut off relay is de-energized to remove battery from the output terminal. The switch is marked DC ON with arrow indicating ON. *Note On AQU224E and AQU128E units with the CE Mark for Europe do not have the service switch.*

The **Smart Fan Power Header** provides power for the Smart Fan when the AQU244 or AQU128 is mounted in our "EL" large enclosure. The Smart Fan regulates the temperature in the enclosure by varying the fan speed to keep the enclosure cool.

PDB-8C Description

The PDB-8C is a power distribution board. The PDB-8C works much like the circuit breaker panel you will find most homes. There is a main power input and a main fuse then the positive side is feed to 8 circuit breakers. The circuit breakers provide class II power limited outputs with fault isolation of each output circuit. Each circuit has a green LED to indicate its status. These output wires can be run outside of the enclosure without conduit. You must keep a minimum separation of .25" between power limited and non-power limited wiring.

Explanation of Terminals and LED's

AC Input Terminals are marked High Voltage (L)ine, (N)eutral, and (G)round. The terminal block and AC LED are mounted within a high voltage barrier. The terminal block is self-clamping and can accept wires from 12awg to 18awg. The Green LED adjacent to terminals is ON Green when AC is applied.

Power Trouble Terminals are marked NO-Normally Open, C–Common, and NC–Normally Closed. The normal relay position indicates the output power is in the normal range and the relay is energized. The terminal block is self-clamping and can accept wire from 14awg to 24awg. The contacts are rated for up to 2A resistive load to 120 volts. The Green LED adjacent to the terminal block is ON Green when power is in the normal range. When the AC fails and the battery(s) drop to about 70% capacity, the power trouble relay and LED will go off normal. If an internal failure caused the output to rise above normal, this would also cause the power trouble relay and LED will go off normal.

DC Output Terminals on the AQU244 and AQU128 are marked –DC+ output. The AQU244 has a DC output of 24vdc with 4 Amps of continuous current, reserving 1 Amp for battery charging. The AQU128 has a DC output of 12vdc with 8 Amps of continuous current, reserving 2 Amps for battery charging. The terminal block is self-clamping and can accept wires from 10awg to 24awg. The Red LED adjacent to terminal block is ON when output voltage is present.

The AQU244 and AQU128 output is not class II power limited. The multi-output (-8C or -16C) models mounted in an enclosure have one or two PDB-8C distribution boards. The DC output of the AQU244 or AQU128 is fed to these distribution boards where each output has a PTC circuit breaker. The outputs from the PTC circuit breakers are class II power-limited. You must keep a .25" minimum spacing of power-limited wires to non-power limited wiring.

The input and output terminals on the PDB-8C's are self-clamping and accept wires from 10awg to 24awg. Each output has a Green LED adjacent to its output that indicates voltage present. Adjacent to the input terminals of the PDB-8C boards is main Power LED and Fuse. The fuse is an ATO automotive type. Replace with recommended size. The main power LED will be Green when main power is on. If polarity is incorrect the main LED will light RED.

Battery Connector is marked –Bat+. This is a .156" 2 position header with lock. The provided battery cable plugs in to this. The provided cable is 12" long. For remote battery mounting, part WA-36IBAT is a 36" battery cable. The battery cable wires are Red and Black. The red connects to the positive and black to the negative of the battery. The AQU24424vdc model comes with a 12" black wire with female slip on connectors on each end for connecting 2 12v batteries in series.

FAN Power is marked FAN. This is a .1" 2 position header with lock. The fan cable plugs here to provide power for fan on units mounted in enclosure.

Specifications

AC INPUT: 3 position terminal block in High Voltage barrier. Line, Neutral, and Earth Ground

AC Input ..... 90-240vac/47-63Hz/220Watts Max

Wide range AC input does not require any selection switching. Earth ground terminal must be properly connected to earth ground. Note: The Ground connection is connected to the enclosure back with a metal standoff. In the case of enclosures with a removable lid, a ground wire is used to ensure the ground continuity to the lid. If lid is removed, this ground wire must be reconnected securely.

AC Fuse Link is inside unit for catastrophic failure. This fuse is not field replaceable, unit must be returned to factory for service should this fuse blow. A blown fuse is indicated by the AC LED off with AC power applied.

DC OUTPUT(S):

AQU244, AQU244-8C and AQU244-16C Output Rating ..... 18.5-28.0vdc, 24vdc nominal, 4A

AQU128, AQU128-8C and AQU128-16C Output Rating ……9.7-14.0vdc, 12vdc nominal, 8A

Note: The AQU244 has 1 Amp in reserve for battery charging while the AQU12 8has 2 Amps in reserve for Battery Charging.

AQU244-8C (8 Outputs) & AQU244-16C (16 Outputs) Continuous current rating for each output 720ma

Note: Total Current must not exceed 4 Amps continuous.

AQU128-8C (8 Outputs) & AQU128-16C (16 Outputs) Continuous current rating for each output ..... 1.5 Amps

Note: Total current must not exceed 8 Amps continuous.

Typical Output Voltage AQU244/AQU128 ..... 27.5vdc/13.75vdc

Typical Output Ripple & Noise AQU244/AQU128 ..... 30mv/15mv

Current Overload Short Circuit Protection ..... Yes

Note: Output is short circuit protected with electronic power limiting (Not Class II) and a self-resetting circuit breaker in series with Battery.

Service Switch Disables DC power and Battery from Output ..... Yes

(Note: The service switch has been removed on European models AQU224-E & AQU128E with CE mark)

Battery PTC Circuit Breaker AQU244/AQU128 ..... Yes

Ambient Operating Temperature Range ..... 0°C to 49°C

Switching Frequency 23KHz

Battery Cutoff Voltage AQU244/AQU128 ..... 9.9vdc/19.8vdc

Battery Cutoff relay contacts ..... 20A Resistive

Note: Battery Cutoff Relay is normally energized for fail-safe operation

Power Trouble trip points AQU244 ..... <24.2vdc or >28.2vdc

Power Trouble trip points AQU128 ..... <12.1vdc or >14.1vdc

Trouble Relay Form C Contacts ..... 2A up to 120vac

Relay is normally energized for fail-safe operation.

Battery Charging: (Keyed header plug marked –Bat+)

The battery charger is precision set to float charge 12v or 24v sealed or wet lead acid batteries. Typically two 12v batteries are connected in series for 24v. The Amp hour capacity must be between 4Ah and 40Ah capacity.

Mechanical Characteristics:

Smart Fan comes with models mounted in an enclosure. The smart fan adjusts fan speed to keep power supply cool.

AQU244/AQU128 weight (in enclosure) ..... 12.8 lbs

PDB-8C weight (module only) 22lbs

AQU244/AQU128 size (module only) ..... 7.40H" x 3.94"W x 2.5"D

AQU244/AQU128 mounting holes center to center (4 holes) ..... 3.5"H x 6.8"W

Enclosure size ..... 14" x 14" x 4.75"

Note: For knock out and mounting locations, see graphic drawing of AQU244-16C example

Approvals:

EMI Conducted and Radiated EN5022 CISPR-22 A, FCC A&B

UL and CUL Listed UL603, C603-M1988 UL294, C294

Specifications are subject to Change without notice.

Battery Selection

The table below shows typical standby time in hours for various loads and batteries. The table works for either AQU244 24v, or AQU128 12v.

Approximate Battery Standby Time Table with a reserve of 3 Amps for 5 minutes for Alarm

Total Output Amps	4Ah Battery Standby	7Ah Battery Standby	12Ah Battery Standby	24Ah Standby	40Ah Standby
.5A	6.5 Hrs	13.2 Hrs	23.5 Hrs	47.5 Hrs	79.5 Hrs
1A	3 Hrs	6.3 Hrs	11.7 Hrs	23.7 Hrs	39.7 Hrs
2A	1.3 Hrs	2.5 Hrs	5.5 Hrs	11.2 Hrs	19.7 Hrs
3A	.7 Hrs	1.5 Hrs	3.6 Hrs	7.2 Hrs	13 Hrs
4A	.5 Hrs	1 Hrs	2.3 Hrs	5 Hrs	9.6 Hrs
5A	NA	.8 Hrs	1.7 Hrs	3.7 Hrs	7.4 Hrs
6A	NA	.6 Hrs	1.3 Hrs	3. Hrs	5.5 Hrs
7A	NA	NA	1.1 Hrs	2.2 Hrs	4.4 Hrs
8A	NA	NA	.8 Hrs	1.8 Hrs	3.4 Hrs

The recharge table below gives approximate recharge times for different loads and battery sizes. The table is based on batteries depleted to battery cut-off and recharged back to approximately 90% capacity.

Approximate Battery Recharge Times in Hours

Total Output Amps	4Ah Battery 12/24	7Ah Battery 12/24	12Ah Bat 12/24	24Ah Bat 12/24	40Ah Bat 12/24
.5A	8/8	10/10	11/11	12/12	14/14
1A	8/8	10/10	11/11	12/12	14/14
2A	8/8	10/10	11/11	12/12	14/14
3A	8/8	10/10	11/12	12/14	14/16
4A	8/10	10/12	11/14	12/16	14/20
5A	8/NA	10/NA	11/NA	12/NA	14/NA
6A	8/NA	11/NA	12/NA	14/NA	15/NA
7A	8/NA	12/NA	13/NA	15/NA	17/NA
8A	12/NA	14/NA	16/NA	18/NA	20/NA

Maintenance

The power supply and stand by battery(s) should be tested at least once a year as follows:

1. Check LED's for normal state. AC ON Green, Trouble ON Green, DC ON Red.
2. Check output voltage with normal load. The AQU128should read between 13.60 and 13.85vdc. The AQU244 should read between 27.00 and 27.8vdc. This assures proper voltage to float charge batteries.
3. Disconnect AC input. AC LED should be off, all other LED's should remain normal.
4. Check DC Output to be above 12.1vdc for AQU128 and 24.2vdc for AQU244. This checks standby batteries to be operational. Sealed lead acid batteries have a typical life of 3 to 5 years.
5. Re Apply AC and verify AC LED ON.

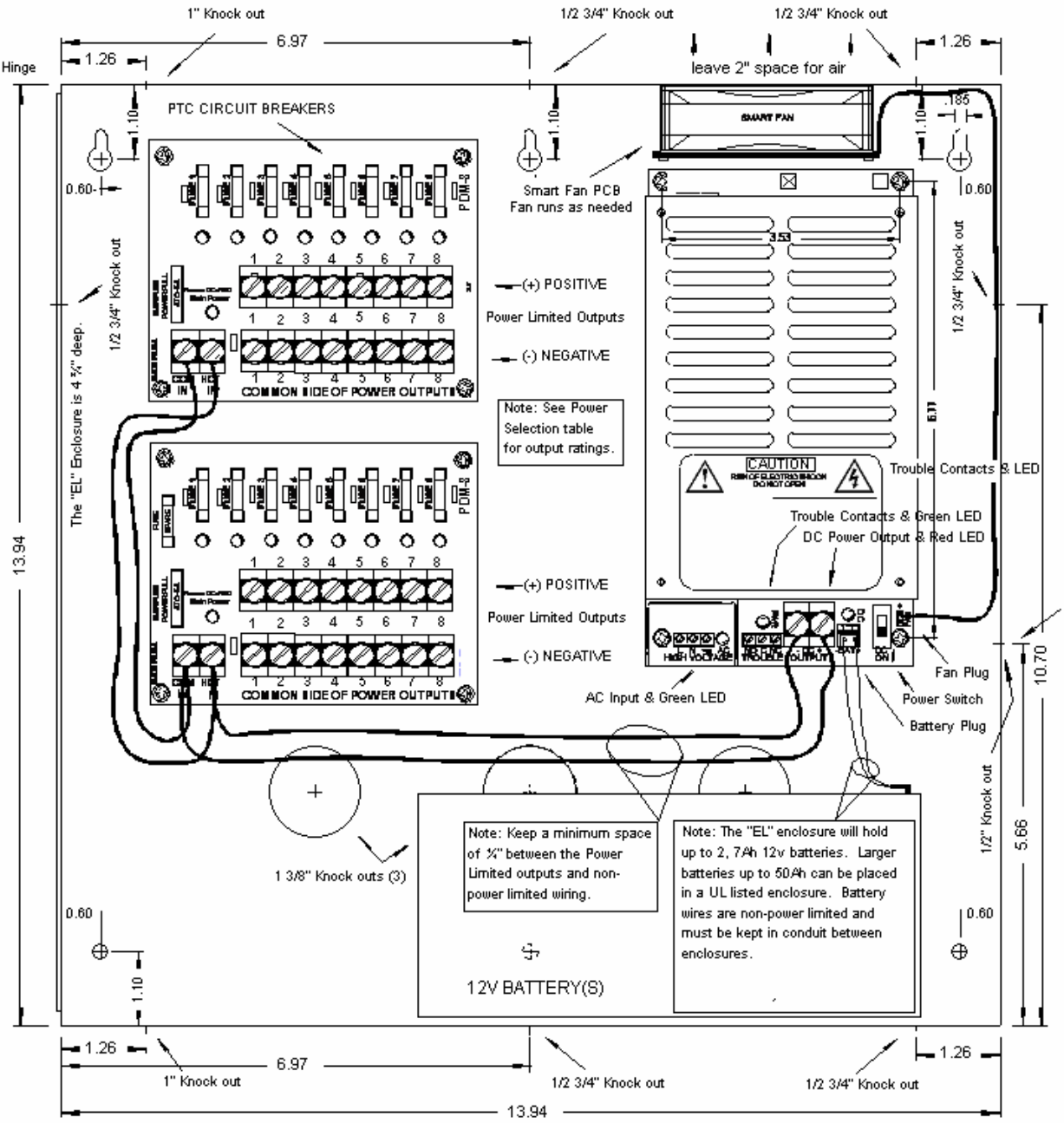
Lead acid batteries have a typical life of 3 to 5 years.

Graphic Drawing of AQU128-16C

Configuration Note:

The AQU128-16 is shown in the diagram below with 2 PDB-8C Multi-Output distribution boards. The AQU244-8C (or AQU128-8C) would have 1 PDB-8C. Part Numbers AQU244 & AQU128 do not have any Multi-Output class II PDB-8C distribution boards.

Note To improve the entry of the AC Input, some enclosures may be a mirror image of what is drawn, putting the power supply's AC input on the left side with an adjacent conduit knock out on the left



AQU244 and AQU128 Multiple Output, Off Line Supervised Power Supply/Chargers Installation Guide

The AQU244 and AQU128 Supervised Power Supply/Chargers with standby battery(s) provide an uninterruptible 24vdc or 12vdc power source. The PDB-8C Power Distribution modules provide 8 or 16 class II power limited outputs, each with circuit breaker protection.

1. This installation should be made by a qualified service person, should conform to all local codes and should comply with The National Electrical Code (or equivalent).
2. Mount the Power Supply in desired location.
3. Connect Line voltage, 90 to 240vac and Earth Ground to the 3 position terminal block marked HIGH VOLTAGE. The Earth Ground terminal is connected to the enclosure and outer heat sink case for safety and EMI filtering.
4. Use Power Service Switch to remove all output power. *(No service switch on European models)*
5. Connect DC devices to the Output Terminals (*****). (-) Negative power is the bottom row of terminals marked common 1 – 8. (+) Positive power is the top row of terminals marked 1 – 8. These terminals are just under the green status LED's. Each (+) terminal is protected with a PTC circuit breaker. Observe polarity.
6. You may connect a maximum of 2 outputs in parallel to double output current for a branch and still keep the class II power limited classification. The power table below shows the continuous current you may use for each output.
7. Be sure that the total current requirement conforms to the total available output current.
8. Connect Power Trouble alarm contacts.
9. Use Power Service Switch to restore output power.
10. Each Output Power/Fuse ready is indicated with a Green LED ON below each Circuit Breaker. See instructions for more details regarding LED indicators.
11. To reset a tripped PTC Circuit Breaker, you may have to turn power switch off, or remove faulted circuit output for up to 2 minutes. This allows the PTC re-settable fuse to cool and reset to it's normal "ON" condition.

Selection Table **Part number is shown on outside label.**

AQU244 **AQU128 Off Line Power Supplies**	Total Continuous DC Amps	Reserved for Battery(s) Charging	DCV Output	Power Limited Class II Outputs	ATO Main Fuse(s) Power Pull	Continuous current for Individual Outputs	AC Input Voltage
AQU244-8C	4 Amps	1 Amp	24vdc	8	7.5A (1) ATO	720ma	85-240vac 220watt
AQU244-16C	4 Amps	1 Amp	24vdc	16	7.5A (2) ATO	720ma	85-240vac 220watt
AQU128-8C	8 Amps	2 Amps	12vdc	8	15A (1) ATO	1.50A	85-240vac 220watt
AQU128-16C	8 Amps	2 Amps	12vdc	16	15A (2) ATO	1.50A	85-240vac 220watt

(*****) P/N's: **AQU244 & AQU128** do not have any class II Multi-output distribution boards.
Each output has a status LED.
AQU244 and AQU128 Module is not power limited to class II. Dress wires to keep a minimum space of .25" between non-power limited and power-limited circuits.

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Enclosure "EL": 14W x 14"H x 4.75"D
With Smart Fan
UL294, C294 Access Control Accessory
UL603,C603 Burglar Alarm System Power Supply