INSTRUMENTATION AND CONTROL SYSTEMS, INC.

Lifeline®

UNINTERRUPTIBLE POWER SYSTEM
MODEL M95-600 SERIES
PART NO. 9300057

DRAWING NO. 8060180
ISSUED: 5-21-07
REV B: RELEASED

INSTRUMENTATION AND CONTROL SYSTEMS INC.
520 WEST INTERSTATE ROAD ADDISON, ILLINOIS 60101 USA
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1. INTRODUCTION

1.1 System Description

Thank you for purchasing one of the LIFELINE series of Uninterruptible Power Systems manufactured by Instrumentation & Control Systems Inc., Electropac Division. The particular UPS described by this manual, part number 9300057, represents the latest in efficient, clean and highly reliable source of AC power. In the line regulated mode, the system provides regulated AC output with a maximum of efficiency and minimum of noise. Coupled with the battery, the UPS gives the user protection from disruption of power to the critical equipment.

1.2 Manual Description

The purpose of this manual is to provide the user with installation, operation and maintenance of the LIFELINE Uninterruptible Power System, part number 9300057. This manual should be read thoroughly to familiarize personnel before the system is operating. If any situation develops that is different from what is described herein, contact the factory for further assistance.

1.3 Proprietary Notice

This equipment was designed and manufactured under several patents owned by ICS, Inc. The user of these patented circuits or reproductions of the drawings, schematics, etc. may not occur except by written permission from ICS, Inc.

1.4 HAZARD CAUTION

The normal operating voltages contained within the cabinet are as much as 600 volts. It is extremely important that caution be exercised when working on this equipment.

When connecting DC terminals to the external batteries, it is very important that correct polarity be observed.

2. Standard Installation

2.1 Unpacking

Carefully unpack the unit and remove any packing materials. Inspect the cabinet and the front panel controls. Remove the two screws near the right edge of the front panel and open the door of the unit . Inspect the interior of the unit for possible damage or dislodging of components. Retain packing materials to return unit if operational problems occur.

2.2 Mounting

This unit is designed for either shelf or wall mounting. A minimum of 6” per side and 2” above the cabinet is necessary for the cooling and mounting purposes. Consideration should be given to the proximity of the incoming and output power.

Caution: Due to the weight of this system (up to 150 lb.) , mounting securely is extremely important. Standard drywall or bookshelf mounting is not acceptable. Mounting to the wall studs is required.

External batteries (on a rack or in a cabinet) should be located in an equipment room per local requirements.

2.3 Wiring

Open the door of the unit after removing the two fastening screws near the right edge of the door. Four dual concentric knockouts are located on the left side of the cabinet to install 1/2” or 3/4” conduit to the unit. Run 18 gauge (minimum) wires through the conduit and connect per Installation Wiring Diagram No. 8022072 at the rear of this manual. The input/output terminal strip TS3 is located on the left side of the cabinet above the knockouts.

This UPS is provided with external batteries which must be connected to the unit. Confirm that all sources of power are off and that the battery circuit breaker on the left side of the cabinet is off (handle in the down position). Loosen the outside caps on the plastic feedthroughs located on the left side of the cabinet and pass the two battery wires (marked POS+ and NEG-) through the feedthroughs. Connect the wires to the terminal board on the inside rear of the cabinet, matching the wire markings to the terminals. Close the cabinet door and replace the two screws near the right hand edge of the front panel.

With the battery system wired (four batteries in series mounted on an open rack, or in a prewired battery cabinet), connect the two battery wires from the UPS to the battery system observing the proper polarities.

WARNING: The battery system is a hazardous source of power. Make all connections first before connecting the equipment to the batteries. Connect the wires at the battery terminal last. Improper polarities will damage the UPS and/or batteries.

2.4 Startup Procedure

2.4.1 With the battery circuit breaker off (handle in the down position) and the load(s) disconnected, apply AC input power.

2.4.2 After the UPS starts up, verify that all three LED indicators on the front panel are illuminated.

2.4.3 Turn on the battery circuit breaker (handle in the up position). The characteristic sound of the main transformer in the UPS may change somewhat due to charging of the battery system.

2.4.4 Connect the load(s) to the UPS output.

2.5 Continuous Operation

It is recommended that the unit be left on all the time. This will insure that the battery remain charged to it full capacity. The unit is designed to operate 24 hours per day and is not required that it be turned off during the week-ends

2.6 Shut Down Procedure

2.6.1 Disconnect the load from the UPS.

2.6.2 Disconnect the commercial AC source from the UPS.

2.6.3 Press the BATTERY OFF push-button switch on the front panel to turn off the UPS.

2.6.4 Turn off the BATTERY CIRCUIT BREAKER (handle in the down position) to prevent further discharge of the battery.

2.6.5 If servicing of the UPS or the battery is required, disconnect the battery cable at the battery before performing any maintenance.

3. DESCRIPTION OF OPERATION

3.1 General Operation

Figures 3.1 and 3.2 illustrate the operation of this system. Please note that under normal operation (Figure 3.1), the AC input operates through the inverter and is then further regulated and filtered. The output of the unit is a very clean sinewave with an output voltage that is regulated to within + 3% with an input voltage swing of + 10% and -15%. During this operation, a special inverter circuit provides trickle charge to the battery.

During standby operation when the commercial line is not present, the inverter is switched totally to the battery which converts the battery's DC voltage to AC and supplies power to the regulator/filter. The output is then the same as if the line were present. Transfer from a charger to inverter is done within microseconds and no power interruption occurs at the output.

3.2 Operation From AC Input

When the line power is normal, the static switch connects the line to the load through an inverter which filters and regulates the power to the load. The inverter also charges the battery.

It is also possible to operate the system without the use of the battery. In this case, the unit provides excellent regulation and filtering of the incoming AC line but without battery backup capability.

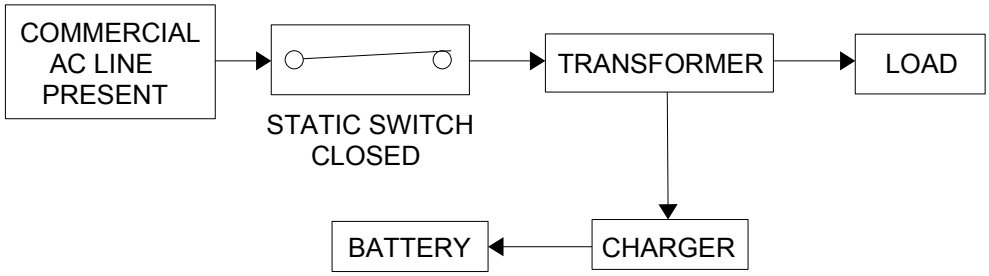


Figure 3.1 Commercial Power On

3.3 Operation From Battery

During the loss of commercial AC power, the battery provides DC current to the inverter which then converts it to reliable, accurate AC power. A precision frequency standard provides a highly stable frequency which is closely regulated to the nominal output frequency.

In the event of a power interruption, the static switch disconnects the commercial line from the inverter. The battery supplies power to the load via the inverter.

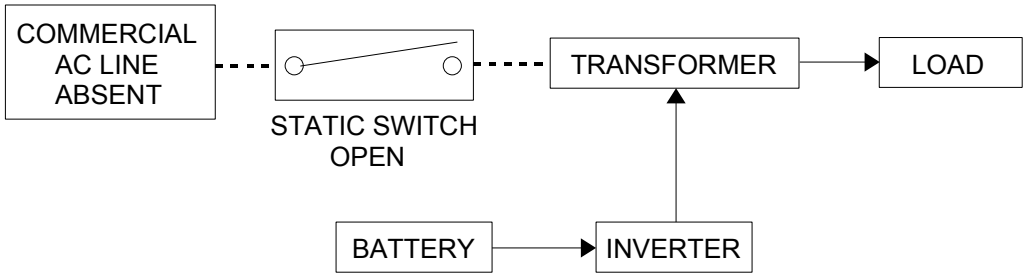


Figure 3.2 Commercial Power Off

4. Maintenance

CAUTION: Disconnect AC & DC power before performing any maintenance.

The unit is basically free from any maintenance except for keeping it clean and dirt-free. If the unit is mounted in a dirty environment it may well be necessary to vacuum it occasionally to keep it free from lint and dirt particles. The equipment is not designed to be mounted in an area of highly corrosive fumes or conductive particles. Conductive dirt particles in the atmosphere will definitely cause malfunction of the unit.

4.1 Adjustments

The equipment is properly adjusted and fully tested by the factory. However, if any adjustments need to be made, it is probably due to component changes in the field over a long period of time. Under those circumstances it is important that the user contact the factory for further instructions. The attached table can be used as a basic trouble shooting guide. It is important to note however that this equipment is fairly sophisticated and service should not be attempted by inexperienced personnel. It is important that accurate DC and AC meters be available to properly measure DC operating battery voltage and AC input and output voltage.

4.2 Troubleshooting

Table 4.1 presents a basic trouble shooting guide. Replacement of fuses must only be accomplished after removing the input power to the unit and pressing the battery OFF button.

TABLE 4.1: BASIC TROUBLESHOOTING GUIDE

PROBLEM	CHECK OR REPLACE F1	CHECK BATTERY CIRCUIT BREAKER	REPLACE PRINTED CIRCUIT BOARD	OTHER
No AC output when commercial power is present	X			
No AC output when commercial power is not present		X		Check Battery
Battery does not charge		X	X	Check Battery
Output voltage low			X	Reduce Load
Output frequency low or high			X	
“AC Input” light off	X			
“Battery” light off		X		
“AC Output” light off	X			
“Battery ON/RESET” pushbutton does not start inverter		X	X	Check Battery

5. Warranty

Except as hereinafter in this Section set forth, all new apparatus sold by ICS Inc. is warranted for a period of one year from the date of shipment to the Buyer, to be free from defect in material and workmanship. If the buyer within this period gives ICS Inc. written notice of any alleged defect in any such apparatus and provides an opportunity to perform any appropriate test thereon (the time and place to be mutually agreed upon and ICS Inc. at its option, to be present thereat) and if the apparatus is found not to be in conformity with this warranty, ICS Inc. will, at its option, and expense either repair the same or supply a replacement therefore. The Buyer will pay all return transportation charges in connection with same.

The return of equipment to ICS Inc. must be authorized in advance by ICS Customer Service personnel. Contact the Service Department for assignment of an RMA (Return Material Authorization) number which must be marked on the outside of the shipping container. Users of equipment returned to ICS Inc. which is found to be operating properly will be assessed recalibration and inspection charges as well as all shipping cost.

On repaired apparatus, the warranty shall be as for new apparatus except that it shall only apply to the parts repaired or replaced by ICS Inc. No separate warranty shall apply to repaired apparatus as a whole or to parts not repaired by ICS Inc.

ICS Inc. reserves the right to make changes, additions and / or improvements in its product previously sold.

Due to nature of certain equipment installation, it could be impractical to remove ICS Inc.'s portion of the equipment from the customer 's premises to ICS Inc.'s facility. In such case and at the request of the Buyer, ICS Inc. will perform such services as can be satisfactorily rendered at the Buyer's facility. The Buyer will be charged for travel and living expenses incidental to the service call.

However, no charges will be made for actual service time or any parts that may be required if this warranty is applicable.

The warranties of ICS Inc. on all apparatus do not cover, and ICS Inc. makes no warranty with respect to:

a) Failures not reported to ICS Ins. within the warranty period above specified.

b) Failure or damage due to misapplication, abuse, improper installation or abnormal conditions to temperature, dirt or corrosive matter.

c) Failure due to operation, either intentional or otherwise above rated capacities or in an otherwise improper matter.

d) Apparatus which has been in any way tampered with or altered by anyone other that an authorized representative of ICS, Inc..

e) Apparatus damaged in shipment or otherwise without the fault of ICS, Inc.

f) Losses, costs, expenses, liabilities and damages (including loss of use or profits, all liabilities of the Buyer to its customers or third persons and other consequential damages), whether direct or indirect, and whether or not resulting from or contributed to by the default or negligence of ICS, Inc. its agent , employees and sub-contractors, which might be claimed as a result of the use or failure of the apparatus delivered.

There is no further warranty, either express or implied, in connection with the design, sale or use of any ICS, Inc.'s products except as to title; and ICS, Inc.'s liability to its warranty shall in no event exceed the cost of correcting defects in the apparatus sold.

6. TECHNICAL INFORMATION FOR MODEL 9300057 UPS

6.1 Specifications

Input Power DC: 48VDC nominal, 55AH sealed lead-acid battery
Charging Current: 2ADC
Input Power AC: 120VAC, +10/-15%, 60Hz, 8AAC nominal, single phase
Rated Output Power: 120VAC, 60Hz, 5.0AAC (600VA/W), single phase
Load Power Factor: 0.8 to 1.0
Output Voltage Regulation: +/-3%
Output Waveform: Sinusoidal with 5% maximum total harmonic distortion
Efficiency: Up to 85% at nominal line, battery voltage and full load
Battery Backup Times:
    4 Hours at 2.5AAC Output
    2 Hours at 5.0AAC Output
Operating Temperature: 10 to 40 degrees C
Operating Humidity: 0 to 85% non-condensing
Storage Temperature: 0 to 65 degrees C
Input/Output Connections: Terminal strip with provisions for conduit entry

6.2 Controls

Battery Circuit Breaker: Connects/disconnects battery to/from UPS.
Battery On/Reset Switch: Starts UPS from battery or restarts UPS after low battery shutdown when AC input power not present.
Battery Off Switch: Shuts down UPS while operating from battery.

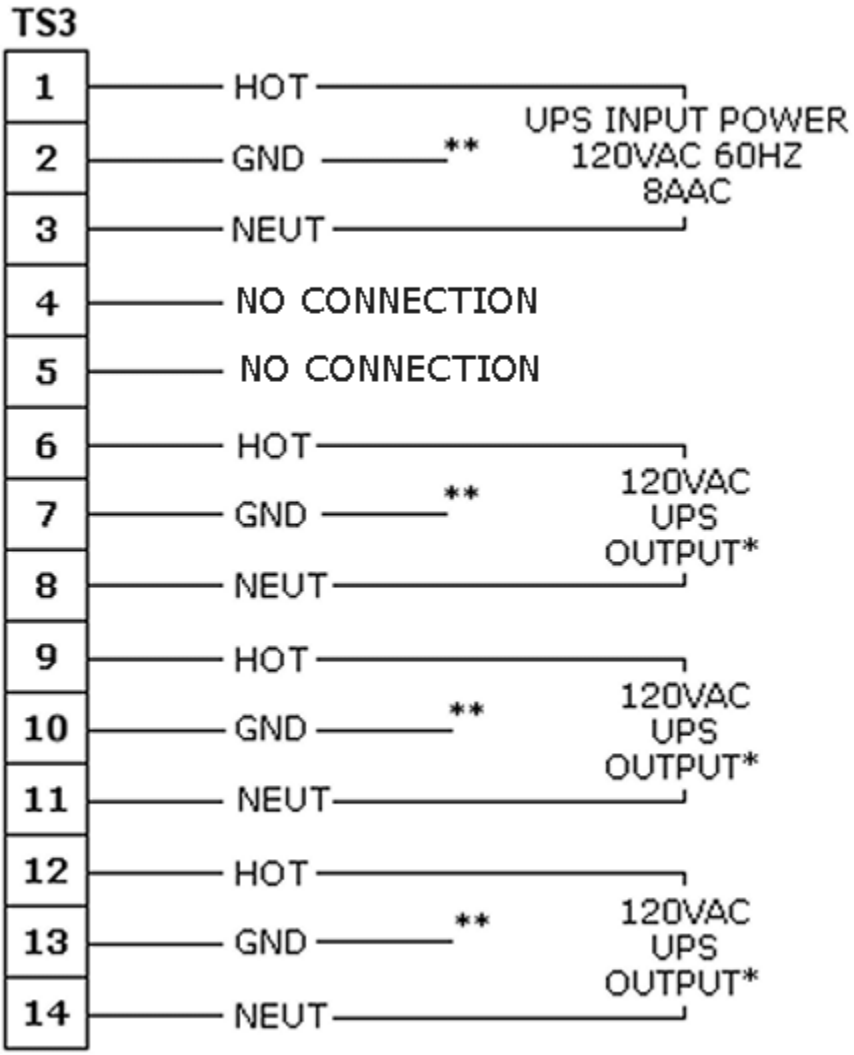
6.3 Indicators

AC Input LED: Indicates AC input power is present.
Battery LED: Indicates DC power is present.
AC Output LED: Indicates AC output power is available.

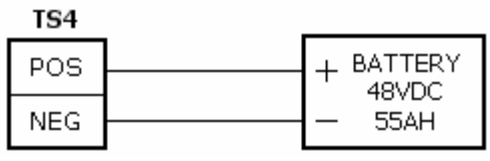
6.4 UL Certifications

Product Name: Fire Alarm Power Supply Unit
Category Control Number: UTRZ
Standard: UL1481Listing Mark Control No.: 2N09

BATTERY WIRES 8GA AWG MIN. ALL OTHER WIRES 18GA AWG MIN.

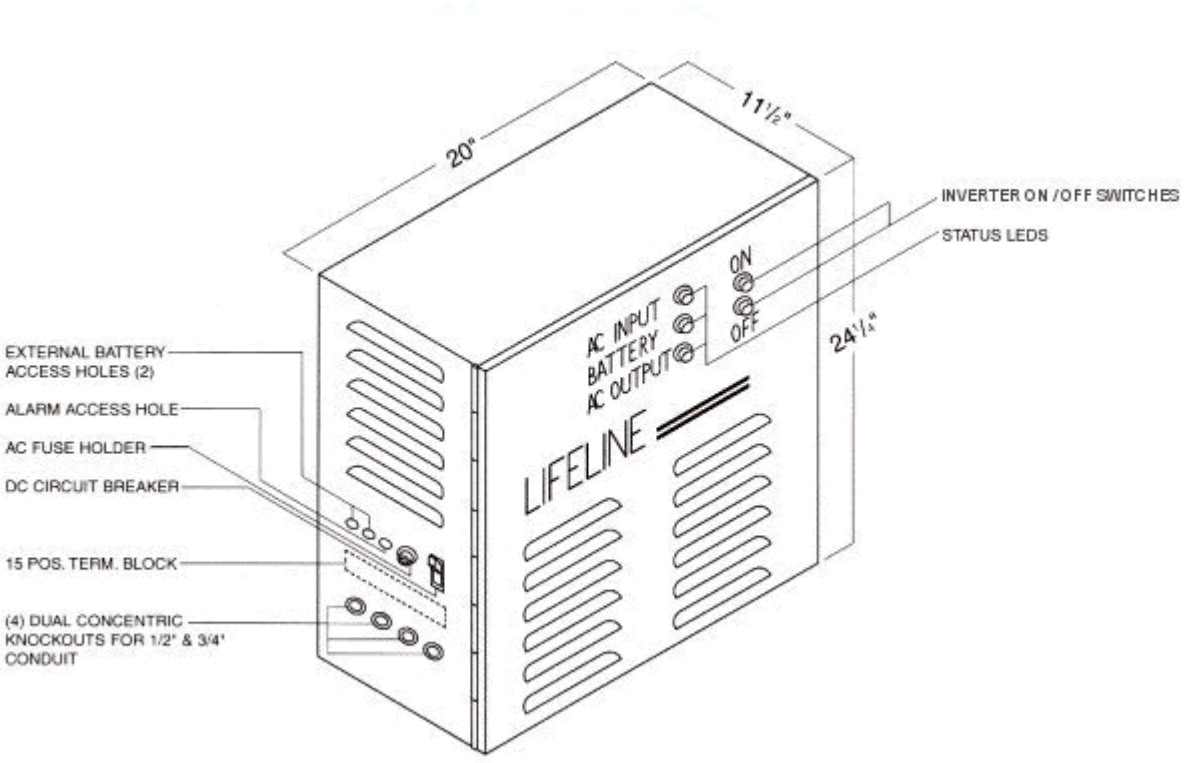


*** TOTAL UPS LOAD WITH BATTERY BACKUP: 5AAC MAX.**
2 HOURS BACKUP TIME AT 5.0 AAC OUTPUT
4 HOURS BACKUP TIME AT 2.5AAC OUTPUT
**** CONNECT TO EARTH GROUND**



Title: PART NO. 9300057 UPS INSTALLATION WIRING DIAGRAM		
Dwg NO. 8022072		Rev
Date:12-20-93	Drawn By KRH	ICS, Inc.

CABINET DIMENSIONS



SPECIFICATION FOR UPS PART NO. 9300057	
DRAWING NO. **8070589**	SHEET 1 OF 2

INSTRUMENTATION & CONTROL SYSTEMS, INC.
520 WEST INTERSTATE ROAD
ADDISON, ILLINOIS 60101

NOTES:

1. DIMENSIONS ARE FOR REFERENCE ONLY

2. DESCRIPTION: UNINTERRUPTIBLE POWER SUPPLY – LIFELINE SERIES

3. SPECIFICATIONS:
   WEIGHT: 120 LBS. PLUS EXTERNAL BATTERIES AND RACK
   INPUT POWER DC: 48VDC NOMINAL, 55AH BATTERY
   INPUT POWER AC, 60HZ, 8AAC, NOMINAL
   REGULATED OUTPUT POWER: 120VAC, 60HZ, 5.0AAC
   OUTPUT WAVE FORM: SINUSOIDAL 5% MAX TOTAL HARMONIC DISTORTION
   CHARGING CURRENT: 2ADC
   EFFICIENCY: UP TO 85% NOMINAL LINE, BATTERY VOLTAGE AND FULL LOAD
   INPUT/OUTPUT CONNECTIONS: NUMBERED 18 POSITION TERMINAL STRIP
   INPUT/OUTPUT CONNECTION ACCESS: 4 DUAL-CONCENTRIC CONDUIT HOLES
   OPERATING TEMPERATURE: 10 – 40 DEGREES C
   OPERATING HUMIDITY: 0 – 85% NON-CONDENSING
   STORAGE TEMPERATURE: 0 – 65 DEGREES C

4. CONTROLS:
   BATTERY CIRCUIT BREAKER
   INVERTER ON PUSHBUTTON SWITCH
   INVERTER OFF PUSHBUTTON SWITCH
INVERTER CAN BE SWITCHED ON AND OFF WHEN INPUT 120VAC POWER IS NOT PRESENT.
WHEN INPUT 120VAC POWER IS PRESENT, OUTPUT 120VAC POWER IS ALWAYS PRESENT.

5. INDICATORS (ALL GREEN):
   AC INPUT – INDICATES AC INPUT POWER IS PRESENT
   BATTERY – INDICATES DC POWER IS PRESENT (FROM BATTERY OR CHARGER)
   AC OUTPUT – INDICATES AC OUTPUT POWER IS AVAILABLE

6. BATTERY BACKUP TIMES:
   4 HOURS AT 2.5AAC POWER OUTPUT
   2 HOURS AT 5.AAC POWER OUTPUT

SPECIFICATION FOR UPS PART NO. 9300057	
DRAWING NO. **8070589**	SHEET 2 OF 2

INSTRUMENTATION & CONTROL SYSTEMS, INC.
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OPERATING INSTRUCTIONS FOR UPS PART NO. 9300057

DRAWING N0. 8060181
ISSUED 06/16/94
REV. A: RELEASED

Mount this sheet in a frame and locate it adjacent to the unit. Refer to Drawing/Manual No. 8060180, issued 06/16/94 for complete information.

1. Ratings:
   Input AC Power: 120VAC, 60Hz., 8AAC nominal
   Input DC Power: 48VDC, 55AH Battery
   Output AC Power:120VAC, 60Hz., 5AAC
   Charging Current: 2ADC

2. Intended Load: Fire Protection Signaling Systems

3. Startup Procedure
   3.1 With the battery circuit breaker off (handle in down position) and the load(s) disconnected, apply AC input power.
   3.2 After UPS starts up, verify that all three LED indicators on front panel are illuminated.
   3.3 Turn on battery circuit breaker (handle up). The characteristic sound of the main transformer in the UPS may change somewhat due to charging of the battery system.
   3.4 Connect the load(s) to the UPS output.

4. Shutdown Procedure
   4.1 Disconnect the load(s) from the UPS.
   4.2 Disconnect the commercial AC power source from the unit.
   4.3 Press the BATTERY OFF pushbutton switch on the front panel to turn off the UPS.
   4.4 Turn off the battery circuit breaker (handle in the down position) to prevent further discharge of the battery.
   4.5 If further servicing of the UPS or battery system is required, disconnect the battery cables at the battery before performing any maintenance.

5. Local Service Representative:

Name: _____

Address: _____

_____

_____

TEL: _____ FAX: _____

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