



Marvair[®]
AIRXCEL[®], Inc.

ISO 9001 2000 REGISTERED COMPANY

Environmental Control Units Model ECUA11

General Description

The Marvair[®] Environmental Control Units are used primarily to cool electronic and communication equipment shelters. Due to the high internal heat load, these shelters require cooling even when outside temperatures drop below 60°F (15°C). The Environmental Control Units have the necessary controls and components for operation during these (less than 60°F [15°C]) temperatures.

There are two configurations of the ECUA11- one with a factory installed economizer and a second that does not allow any outside air into the enclosure. When cool and dry, the economizer uses outside air to cool the shelter. The economizer provides temperature control, energy cost savings, and increased reliability by decreasing the operating hours of the compressor and the condenser fan. The ECUA11 Environmental Control Units are problem solvers for a wide range of conditions and applications. To insure proper operation and optimum performance, all economizers are non-removable, factory installed and tested. In addition, factory and field installed accessories can be used to meet specific requirements.

All models of the ECUA11 environmental control unit are manufactured and tested to UL Standard 1995, 2nd Ed. and CAN/CSA C22.2 No. 236-95, 2nd Ed. The ECUA11 units are commercial units and not intended for use in residential applications.



ECUA11



Standard Features

Designed for Operation in Low Ambient Conditions

- Low ambient control cycles condenser fan to maintain proper refrigerant pressures to allows cooling with the compressor down to 20°F/ -7°C. Note: low ambient operation is affected by ambient conditions, e.g., wind and humidity.
- Three minute by-pass of the low pressure switch for start-up of compressor when outdoor temperatures are below 55°F (13°C).
- Factory built-in economizer.*

High Efficiency

- High efficiency compressor.
- Lanced fins and rifled tubing on many condenser and evaporator coils.

Built-in Reliability

- High pressure switch and low pressure switch with lockout protects refrigerant circuit.

- Three minute delay on break for short cycle protection.

Remote Alarm Capability

- Dry contacts can be used for remote alarm or notification upon air conditioner lockout.

Ease of Installation

- Sloped top with flashing eliminates need of rainhood.
- Built-in mounting flanges facilitate installation and minimize chance of water leaks.
- Supply and return openings exactly match previous models.
- Outside air hood is standard. (Only available on units with the economizer.)

Rugged Construction

- Copper tube, aluminum fin evaporator and condenser coils.
- Factory installed heaters on discharge side of evaporator coil (optional)

- Baked on neutral beige finish over galvanized steel for maximum cabinet life. (Other finishes are available.)

Ease of Service

- Service access valves are standard.
- 2" (50mm) filter standard on models with the economizer. Non-economizer units do not have an internal filter and require combination supply/return filter grille.
- All major components are readily accessible.
- LEDs indicate operational status and fault conditions.

**R-410A
Refrigerant**

* ECUA11ACxxxxC models only

A Marvair® First – Factory Installed Economizer

Marvair's factory installed economizer has been the industry standard since its introduction in 1986. Tens of thousands of units are in operation from the metropolitan areas of North America to the deserts of the Mid-East to the Siberian tundra. Here's how the economizer works:

On a signal from the wall mounted indoor thermostat that cooling is required, either mechanical cooling with the compressor or free cooling with the economizer is provided. A factory installed enthalpy controller determines whether the outside air is sufficiently cool and dry to be used for cooling. If suitable, the compressor is locked out and the economizer damper opens to bring in outside air. Integral pressure relief allows the interior air to exit the shelter, permitting outside air to enter the shelter. The temperature at which the economizer opens is adjustable from 53°F (12°C) at 50% Relative Humidity to 78°F (26°C) at 50% Relative Humidity.

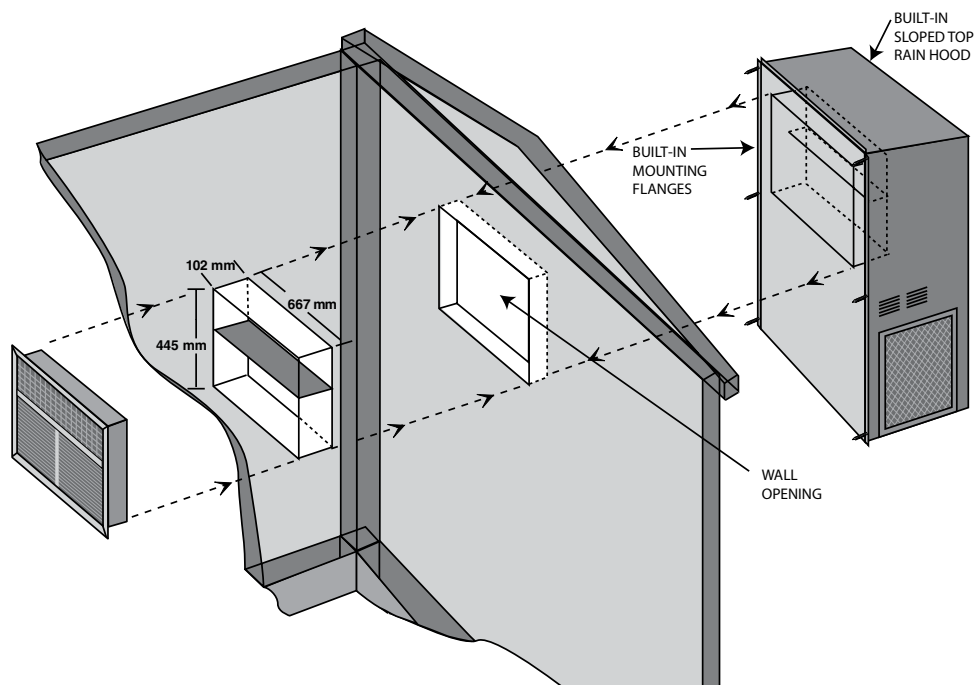
After the enthalpy control has activated and outside air is being brought into the building, the mixed air sensor measures the temperature of the air entering the indoor blower and then modulates the economizer damper to mix the right proportion of cool outside air with warm indoor air to maintain 50-56°F (10 - 13°C) air being delivered to the building. This prevents shocking the electronic components with cold outside air. The compressor is not permitted to operate when the economizer is functioning.

If the outside air becomes too hot or humid, the economizer damper closes completely, or to a minimum open position with an optional minimum position potentiometer, and mechanical cooling is activated.

Marvair's ECUA11 Environmental Control Unit – Ideal Replacement for Window Air Conditioners or New Construction

The electronic/communication shelter requires cooling virtually year-round because of the heat load generated by the internal electronic equipment (i.e., switching and transmission gear). Residential window room air conditioners are not designed to operate when outside air temperatures are moderate to cold, e.g.; below 65°F (18°C) to 0°F (-18°C). Typical problems are freezing of the coil, diminished capacity and compressor damage which all contribute to high maintenance and short operating life.

Marvair's ECUA11 environmental control units are designed exclusively for the electronic/communication shelter to provide a commercial grade air conditioner. The unit is built to operate continuously and efficiently in a variety of outside conditions. For existing shelters with window air conditioners, upgrading to the commercial grade Marvair environmental control unit is made easy by the design of the unit. The wall sleeve slides into a 26-1/2" (673 mm) x 17-3/4" (451 mm) opening, the standard opening size for many window units. With the built-in mounting flanges, the air conditioner mounts quickly and simply to the exterior of the building. The single piece supply and return grille attaches easily to the wall sleeve to complete the installation. Factory installed electric heat is available in the unit thus eliminating baseboard heat and a second power source.



Options

The ECUA11 environmental control units were designed and are built to stringent requirements of the communications/electronic shelter. Other applications have special requirements. Numerous options are available for the ECUA11 environmental control units that meet these special needs.

Hard Start Kit - Used on single phase equipment to give the compressor higher starting torque under low voltage conditions. (Field installed only)

Dehumidification – Humidity controller overrides thermostat and allows electric heat to operate simultaneously with cooling. See Dehumidification Application Bulletin for details. Note: The electrical characteristics and requirements of air conditioners with the dehumidification option are different from standard air conditioners. Refer to the appropriate Summary Rating Charts for the electrical characteristics of units with Electric Reheat.

Coastal Environment Package – Recommended for units to be installed near an ocean or on seacoast. Includes corrosion resistant fasteners, sealed condenser fan motor, sealed control box, protective coating applied to all exposed internal copper in the condenser section and an impregnated polyurethane coating on the condenser coil. See Coastal Environmental Technical Bulletin for more details.

Economizer Damper Control – Models with economizer only – A minimum position potentiometer that can be adjusted to prevent the economizer damper from closing completely. This control ensures that whenever the evaporator fan is operating, fresh air is being introduced into the building. Field or factory installed.

Color - ECUA11 environmental control units are available in five different cabinet colors -the standard Marvair® beige and white, gray, brown and dark bronze. The standard cabinet's sides, top and front panels are constructed of 20 gauge painted steel. As an option, these panels can be built of 16 gauge steel in beige & gray or .050 stucco aluminum. When the 16 gauge painted steel or the aluminum is used, only the side, top and front panels are 16 gauge or aluminum. Contact your Marvair representative for color chips. The entire cabinet can also be constructed of stainless steel. When the stainless steel cabinet is ordered, the top, sides, front panels, back panel and all internal cabinet steel are stainless.

Protective Coil Coatings - Either the condenser or evaporator coil can be coated, however, coating of the evaporator coil is not common. For harsh conditions, e.g., power plants, paper mills or sites where the unit will be exposed to salt water, the coil should be coated with either an impregnated polyurethane (trade name BlyGold®). The

impregnated polyurethane coatings is sprayed on and passes 3,000 hours of B117 salt fog test. Note: Cooling capacity may be reduced by up to 5% on units with coated coils.

Extended Warranty - A first year labor - Silver, and a two year labor - Gold, are available.

Accessories

Combination Supply/Return Grille (non-economizer units only)

26" x 17" (660 mm x 432 mm) P/N 80669

Combination Supply/Return Filter Grille (economizer units only)

26" x 17" (660 mm x 432 mm) P/N 80681

Wall Sleeve (Required for proper operation.)

26-1/4" x 17-1/2" x 4" (667 mm x 445 mm x 102 mm) P/N S/01784

Controllers

CommStat™ 3 Lead/Lag Microprocessor Controller P/N S/04581

Solid state controller designed to operate a fully or partially redundant air conditioning system. Insures equal wear on both air conditioners while allowing the lag unit to assist upon demand. Lead/lag changeover is factory set at 7 days, but is field programmable in 1/2 day increments from 1/2 to 7 days. The CommStat™ 3 Controller has LED's to indicate status & function, digital display of temperature, a comfort override button for energy savings, five alarm relays, a built in temperature sensor and is fully programmable. See CommStat™ 3 Controller Product Data Sheet for details on operation and installation.

LL357D4 Lead/Lag Controller P/N S/07529

Two stage heat and cool thermostat with solid state module for redundant operation See the LL357D4 Product Data Sheet for details.

Thermostats & Thermostat Guards

Thermostat P/N 50123

Digital thermostat. 1 stage heat, 1 stage cool. 7 day programmable. Fan switch: Auto & On. Auto-change over. Keypad lockout. Non-volatile program memory.

Thermostat P/N 50186

Digital non-programmable 1 stage heat, 1 stage cool. auto changeover.

Thermostat Guard P/N 50092

Thermostat guard for use with the 50123 and 50107 thermostats.

Control Board

The internal control board in the ECUA11 Environmental Control Units simplifies wiring, consolidates several of the electrical functions onto one device and improves the reliability of the air conditioner. In addition, the control board has LED's that indicate operational status and fault conditions.

LED Indicator Lights

COLOR	TYPE	STATUS	DESCRIPTION
Green	Power	Constant On	24 VAC power has been applied
Red	Status	Constant On	Normal operation
		1 Blink	High pressure switch has opened twice
		2 Blinks	Low pressure switch has opened twice
		3 Blinks	Freeze stat (optional) - indoor coil temperature is below 35°F (1°C)

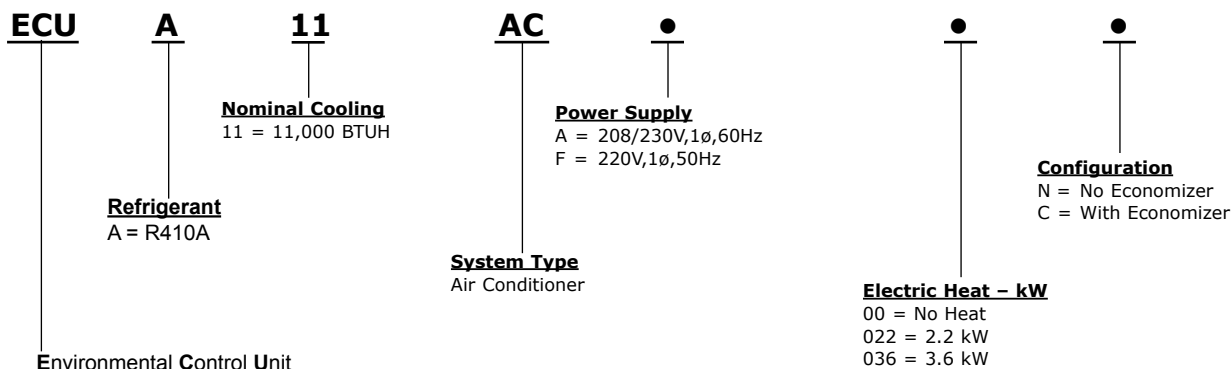
Modes of Operation

Normal Start-up: On a call for cooling, and the with the high pressure switch closed, the cooling system (compressor, indoor blower motor and outdoor fan motor) will be energized. (Note: See the Delay on Make feature). The cooling system will remain energized during the three minute low pressure switch bypass cycle. If the low pressure is closed, the cooling system will continue to operate after the three-minute bypass. If the low pressure switch is open after the three-minute bypass, the cooling system will be de-energized.

Lockout Mode: If either the high or low pressure switch opens twice, the control board enters into the lockout mode. In the lockout mode, the compressor is turned off, the alarm output is energized and the status LED's will blink to indicate which fault has occurred. If there is a call for air flow, the indoor blower will remain energized. When the lockout condition has cleared, the unit will reset if the demand of the thermostat is removed or when power is reset. The ComPac® air conditioners are factory wired for normally open contacts. The user can now have normally closed contacts by moving a wire on the control board.

Delay on Make: On initial power up or on resumption of power, the air conditioner will wait .03 to 10 minutes from a call for cooling before allowing the contactor to energize.

Model Identification



Summary Ratings (Wire Sizing)

BASIC MODEL	ELECT. HEAT		000 = None		022 = 2.2 kW		036 = 3.6 kW	
	VOLTAGE	PHASE / HZ	CKT #1		CKT #1		CKT #1	
			MCA	MFS	MCA	MFS	MCA	MFS
ECUA11ACA (N, C)	208-230/1/60		7.9	15	12.4	15	19.6	20

MCA = Minimum Circuit Ampacity (Wire Sizing Amps) MFS = Max. Fuse Size or HACR circuit breaker

Electrical Characteristics

BASIC MODEL	COMPRESSOR						OUTDOOR MOTOR				INDOOR MOTOR			
	TYPE	VOLTS-HZ-PH	RLA	LRA	MCC		VOLTS-HZ-PH	RPM	FLA	HP	VOLTS-HZ-PH	RPM	FLA	HP
ECUA11ACA (N, C)	Rotary	208/230-60-1	5.1	32.5	7.9		208/230-60-1	1630	0.65	1/6	208/230-60-1	1650	0.85	1/5

RLA = Rated Load Amps LRA = Locked Rotor Amps MCC = Maximum Continuous Current RPM = Revolutions per Minute
FLA = Full Load Amps HP = Horsepower

Unit Load Amps

BASIC MODEL NUMBER	VOLTAGE HERTZ PHASE	CURRENT AMPS		LOAD OF RESISTIVE HEATING ELEMENTS ONLY (AMPS)		TOTAL MAXIMUM HEATING AMPS	
		AC UNIT	IBM	2.2 kW	3.6 kW	2.2 kW	3.6 kW
ECUA11ACA (N, C)	208/230-60-1	6.60	0.85	9.20	15.00	10.05	15.85

IBM = Indoor Blower Motor

ECUA11 Total & Sensible Cooling Capacity

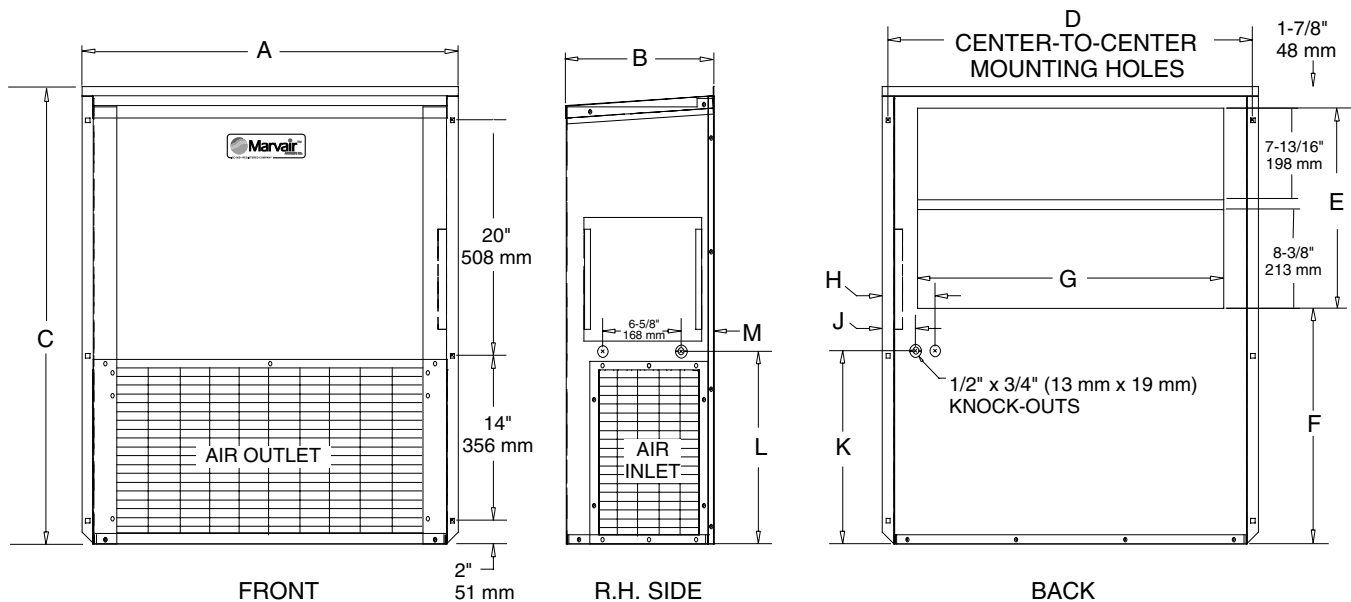
<i>Data based upon 80°F Dry Bulb/ 67°F wet bulb return air temperature at Various Outdoor Temperatures. Airflow at 475 CFM</i>									
Outdoor Temperature	75°F	80°F	85°F	90°F	95°F	100°F	105°F	110°F	115°
Total Cooling (BTUH)	12,760	12,320	11,880	11,440	11,000	10,560	10,120	9,680	9,460
Sensible Cooling (BTUH)	9,155	9,995	8,840	8,680	8,525	8,370	8,215	8,060	7,985

<i>Data based upon 26.5°C Dry Bulb/ 19.5°C wet bulb return air temperature at Various Outdoor Temperatures. Airflow at 805 m3/hr.</i>									
Outdoor Temperature	24°C	26.5°C	29°C	32°C	35°C	38°C	40.5°C	43.3°C	46°
Total Cooling (kW)	3.74	3.61	3.48	3.35	3.22	3.09	2.97	2.84	2.77
Sensible Cooling (kW)	2.68	2.93	2.59	2.54	2.50	2.45	2.41	2.36	2.34

Dimensional Data - ECUA11 Environmental Control Unit without Economizer

MODEL	A	B	C	D	E	F	G	H	J	K	L	M
ECUA11 (inches)	32	12-5/8	38-7/8	31	17	20	26	4-1/2	2-7/8	16-3/8	16-3/8	2-13/16
ECUA11 (mm)	813	321	987	787	432	508	660	114	73	417	416	71

Note: Dimensional tolerance ± 1/16" (2 mm)



MODEL - ECUA11	Non-Economizer Unit
SHIP WEIGHT - LBS/KG	160/75

MODEL	FILTER SIZE (inches)	FILTER SIZE (mm)
FILTER SIZE	9-3/4 x 25 5/8 x 1"*	248 x 651 x 25mm*

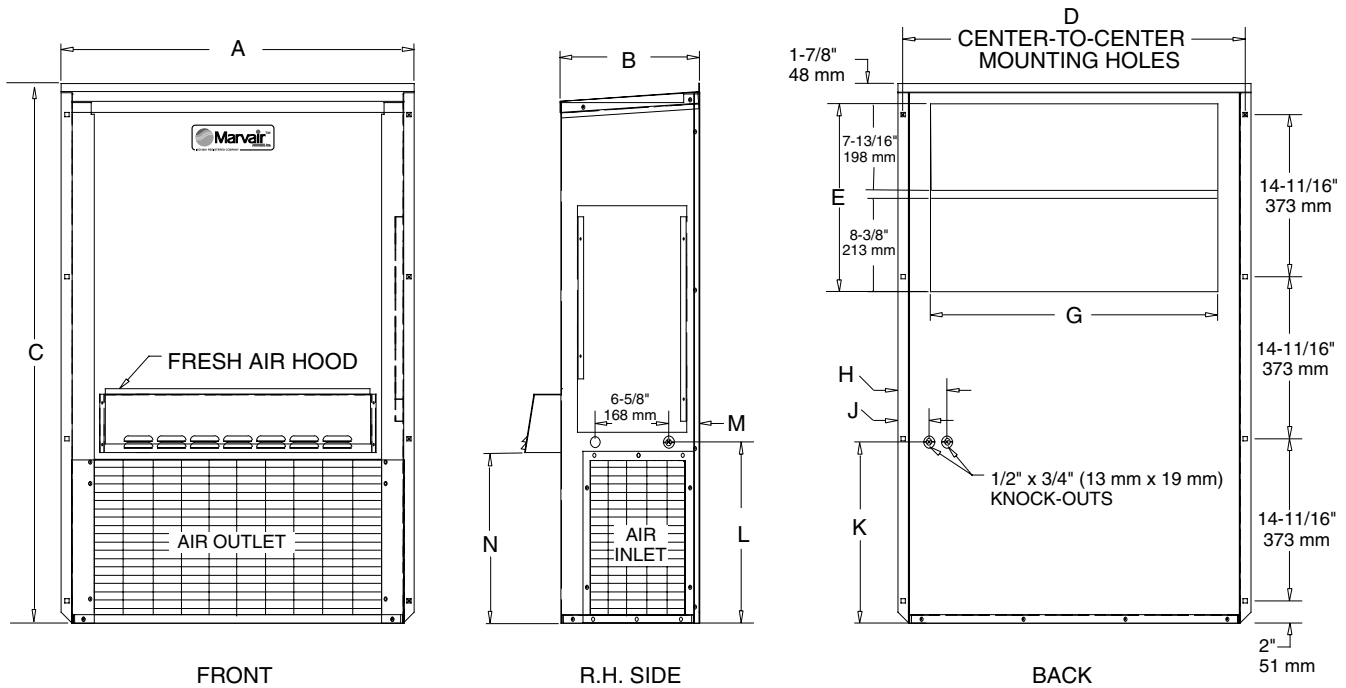
* The ECU11A non-economizer unit does not have an internal filter and requires a one piece combination supply and return filter grille, part number 80669.



Dimensional Data - ECUA11 Environmental Control Unit with Economizer

MODEL	A	B	C	D	E	G	H	J	K	L	M	N
ECUA11 (inches)	32	12-5/8	48-7/8	31	17	26	4-1/2	2-7/8	16-3/8	16-3/8	2-13/16	15-7/16
ECUA11 (mm)	813	321	1240	787	432	660	114	73	417	416	71	392

Note: Dimensional tolerance $\pm 1/16''$ (2 mm)



MODEL - ECUA11	Economizer Unit
SHIP WEIGHT - LBS/KG	170/80

MODEL	FILTER SIZE (inches)	FILTER SIZE (mm)
FILTER SIZE	6-1/4 x 22-1/4 x 2*	159 x 565 x 51*

* The ECU11A with economizer has an internal filter and uses a one piece combination and supply grille, part number 80681.

Please consult the Marvair® website at www.marvair.com for the latest product literature. Complete installation instructions are in the ECUA11 I&O Manual. Detailed dimensional data is available upon request. A complete warranty statement can be found in each product's Installation/Operation Manual, on our website or by contacting Marvair at 229-273-3636. As part of the Marvair continuous improvement program, specifications are subject to change without notice.



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