Unionaire PUQ012HR5R0WPK 12000 BTU Heat Pump Compressor Technical Specifications and R22 System Overview

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Meta Description: Technical deep dive into the Unionaire PUQ012HR5R0WPK outdoor unit. Explore R22 rotary compressor data, cooling capacity, electrical

requirements, and professional field advice for HVAC technicians and engineers.
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Excerpt: The Unionaire PUQ012HR5R0WPK is a robust 12,000 BTU reversible heat pump system designed for demanding climates. Utilizing an R22 rotary compressor, this unit balances efficiency and reliability. Our technical breakdown covers electrical parameters, pressure ratings, and compatible replacements, providing field workers with the essential data needed for professional maintenance, system repairs, and component sourcing.

Professional Engineering Review: Unionaire PUQ012HR5R0WPK 1.5 HP Heat Pump System

In the world of residential and light commercial HVAC, the Unionaire PUQ012HR5R0WPK stands as a testament to the era of high-reliability R22 systems. Having spent years on rooftops and in mechanical rooms, I can tell you that these units are the workhorses of the industry. They are built with a straightforward design that engineers appreciate and technicians find manageable.
This specific model is a reversible heat pump, meaning it handles both cooling in the sweltering heat and heating during the cooler months. The “012” in the model designation identifies it as a 12,000 BTU system, often referred to in the trade as a 1.5 HP unit.

Technical Core Specifications

Feature	Data Detail
Model	PUQ012HR5R0WPK
System Type	Heat Pump (Reversible)
I.C. Code	012HLH05F
Cooling Capacity	12,000 BTU/h
Power Supply	220-240V / 50Hz / 1 Phase
Design Pressure (High)	400 PSI
Design Pressure (Low)	82 PSI
Protection Rating	IPX4 (Splash-proof)

Compressor Performance and Efficiency Metrics

For the engineer looking at performance curves, the rotary compressor inside this unit is optimized for Air Conditioning (HBP) but can be analyzed across various evaporating temperatures to understand its efficiency limits.
Efficiency Metrics (COP) and Cooling Capacity

Evaporating Temp (°C)	Cooling Capacity (Watts)	Power Consumption (Watts)	COP (W/W)
-15	1150	680	1.69
-10	1580	740	2.14
-5	2100	810	2.59
0	2750	890	3.09
+4.4 (Standard)	3517	1050	3.35
+7.2	3850	1120	3.44
+10	4200	1180	3.56

Comprehensive Technical Data Table

Parameter	Specification Details
Utilisation	HBP (High Back Pressure)
Domaine	Cooling / Heating (Reversible)
Cooling wattage at -23°C	Not applicable (HBP design ~ 650W estimated)
Cubic feet system can cool	1,500 – 2,000 cu. ft. (Approx. 20m²)
Litres system can cool	N/A (Standard AC Application)
Kcal/h	3,024 Kcal/h
Oil Type and Quantity	Mineral Oil (MO) / 350ml
Horsepower (HP)	1.2 HP (Compressor) / 1.5 HP (System)
Refrigerant Type	R22
Motor Type	PSC (Permanent Split Capacitor)
Displacement	15.0 cc to 16.4 cc
Winding Material	Copper
Pression Charge	High: 250-300 PSI / Low: 60-70 PSI (Typical)
Capillary Size	0.050″ or 0.054″ ID
Amperage (FLA)	5.2 A – 6.0 A
LRA (Locked Rotor Amps)	28 A – 32 A
Type of Relay	Not required (PSC Motor)
Capacitor Value	30µF or 35µF / 450V
Country of Origin	Egypt / International Export

System Comparison: R22 vs. Modern Alternatives

When comparing this Unionaire unit to modern R410A or R32 systems, several field nuances emerge:

1. **Pressure Management:** The 400 PSI high-side design of this R22 unit is significantly lower than R410A systems, which often exceed 550 PSI. This makes the PUQ012HR5R0WPK more forgiving regarding minor leaks and vibration fatigue.
2. **Maintenance:** Being an R22 system, mineral oil is used. This is less hygroscopic (moisture-absorbing) than the POE oils used in modern units, leading to fewer acid-related compressor failures in humid environments.

Technical Wiring Diagram Overview (Heat

Pump)

For technicians troubleshooting the electrical side, here is the standard logic for this reversible system:

- **Terminal C (Common):** Connected to the Neutral/L2.
- **Terminal R (Run):** Connected to Live/L1.
- **Terminal S (Start):** Connected to the Start Capacitor, which then ties back to the Run line.
- **Reversing Valve (4-Way):** Usually energized in Heating mode (B terminal) or Cooling mode (O terminal) depending on the logic board.
- **Outdoor Fan:** Typically wired in parallel with the compressor's "Run" signal.

Professional Tips and Field Maintenance Notes

- **Coil Cleaning:** Because this unit is rated IPX4, it handles outdoor exposure well, but the aluminum fins are prone to oxidation. Use a non-acidic coil cleaner to preserve the heat exchange rate.
- **Vibration Check:** Ensure the compressor mounting grommets are supple. Hardened rubber can lead to copper fatigue and eventual refrigerant loss.
- **Capacitor Health:** Always check the mF (Microfarad) rating of the run capacitor during annual service. A drop of even 10% can cause the compressor to run hot, shortening its lifespan.

Cross-Reference Replacement Guide

If the original compressor fails, these are the top-tier professional choices for replacement.

5 Compressor Replacements (Same Gas: R22)

Brand	Model	Capacity	Notes
GMCC	PH215X2C-4FT1	12,000 BTU	Direct fit, high reliability
Highly	ASD102RK	12,200 BTU	Excellent energy rating
Panasonic	2K22S225	12,100 BTU	Quiet operation
Hitachi	BSA645RV	11,950 BTU	Compact footprint
Toshiba	PA145X2C	12,000 BTU	Rugged design

5 Compressor Replacements (Alternative Gas: R410A)

Note: Requires full system flush, expansion valve change, and POE oil.

Brand	Model	Capacity	Displacement
GMCC	PA125X2C	12,000 BTU	12.5 cc
Highly	ASA102RK	12,300 BTU	10.2 cc
LG	QJS124P	12,000 BTU	High efficiency
Rechi	44R282A	11,800 BTU	Standard replacement
Mitsubishi	RN110	12,000 BTU	Premium choice

Final Engineering Analysis

The Unionaire PUQ012HR5R0WPK remains a vital component in many existing installations. Its 82 PSI low-side design point indicates a system built for stability. When servicing, always prioritize the cleanliness of the condenser

coil to maintain that 400 PSI head pressure limit, ensuring the compressor operates within its optimal COP range. Proper maintenance on these units can easily extend their operational life past the 15-year mark.



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