Engineering Overview: The S118CY1 Architecture

Category: Refrigeration
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Focus Keyphrase: Donper S118CY1 Compressor R600a 1/4 HP LBP Refrigeration Specifications and Replacement Guide for Technicians and Engineers
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Meta Description: Detailed technical analysis of the Donper S118CY1 compressor. Includes 1/4 HP power rating, R600a refrigerant specs, LBP application data, and equivalent replacement models for professional repair.

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Excerpt: The Donper S118CY1 compressor is a cornerstone of modern domestic refrigeration, engineered for high efficiency in Low Back Pressure (LBP) environments. Utilizing R600a refrigerant, this 1/4 HP unit provides reliable cooling for large household refrigerators and freezers. This guide explores its technical parameters, electrical requirements, and the best cross-reference alternatives for field technicians.

Mbsmpro.com, Donper, S118CY1, Compressor, 1/4 HP, LBP, R600a, 210 W, 1.1 A, 1Ph 220-240V 50Hz, Cooling and Freezing

In the realm of hermetic refrigeration, the Donper S series has established a reputation for balancing cost-effectiveness with thermal durability. The S118CY1 model, specifically designed for R600a (isobutane) systems, represents a shift toward environmentally friendly refrigerants with low Global Warming Potential (GWP). As an engineer working in the field, understanding the nuances of this compressor is vital for ensuring system longevity and optimal thermodynamic performance.

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The S118CY1 is a reciprocating piston compressor designed for Low Back Pressure (LBP) applications. This means it is optimized to operate at low evaporating temperatures, typically between -35°C and -15°C, making it the ideal “heart” for chest freezers and the freezer compartments of large side-by-side refrigerators. With a displacement of approximately 11.8 cm^3, it delivers a cooling capacity that sits comfortably in the 1/4 HP category.
One of the defining features of this model is its thermal protection system. In high-ambient environments, compressors often face the risk of winding burnout. The S118CY1 incorporates an internal or external thermal protector that interrupts power if the internal temperature exceeds safety thresholds, a critical fail-safe for residential appliances.

Technical Specifications Table

Feature	Specification
Model	S118CY1
Utilisation	LBP (Low Back Pressure)
Domaine	Freezing / Deep Cooling
Oil Type and Quantity	Mineral or POE (Consult label), ~180ml – 220ml
Horsepower (HP)	1/4 HP
Refrigerant Type	R600a (Isobutane)
Power Supply	220-240V ~ 50Hz, 1 Phase
Cooling Capacity BTU	Approx. 715 BTU/h (at -23.3°C)
Motor Type	RSIR (Resistance Start – Induction Run)

Displacement	11.8 cm^3
Winding Material	High-Grade Copper
Pressure Charge	Low side (suction) depends on ambient
Capillary Tube	0.031″ to 0.036″ (Internal Diameter)
Compatible Appliances	Large domestic refrigerators, display freezers
Temperature Function	-35°C to -15°C
Cooling Method	Static or Fan cooling (application dependent)
Commercial/Residential	Residential / Light Commercial
Amperage (RLA)	0.9 A – 1.2 A (running)
LRA (Locked Rotor Amps)	6.5 A – 7.5 A
Type of Relay	PTC Start Relay
Capacitor	Often not required (RSIR), optional Run Capacitor

Performance Comparison: R600a vs. R134a

When comparing the S118CY1 to its R134a counterparts (like the QD series), the thermodynamic efficiency of R600a becomes evident. R600a operates at lower pressures, which reduces the mechanical stress on the compressor valves and pistons. However, because R600a is flammable, the S118CY1 is built with "thermally protected" electrical components to prevent sparking in the event of a leak.

Cross-Reference and Replacement Guide

When a S118CY1 fails, finding an exact match is preferred, but field technicians often need equivalents based on local availability.

Top 5 Replacements (Same Refrigerant: R600a)

1. **Embraco EMX70CLC:** Known for extremely low noise levels and high COP.
2. **Secop (Danfoss) NLY9.0R:** A robust European alternative with excellent thermal management.
3. **Jiaxipera NT1114Y:** Widely used in high-end Samsung and LG units.
4. **Huayi HYE11YG:** A direct competitor with similar displacement and mounting footprints.
5. **Sikolan ADW110:** A reliable alternative for budget-friendly repairs.

Top 5 Replacements (Alternative Refrigerant: R134a)

Note: Replacing an R600a compressor with an R134a unit requires a complete system flush, oil compatibility check, and capillary tube adjustment.

1. **Donper QD110:** The R134a sibling to the S118 series.
2. **Embraco GL90AA:** A classic 1/4 HP+ LBP workhorse.
3. **Secop TLY8.7KK:** High-efficiency R134a unit.
4. **ZMC GQR12AA:** High displacement for heavy-duty cooling.
5. **Tecumseh THG1374YS:** American standard for 1/4 HP refrigeration.

Expert Field Advice and Notices

- **Notice on R600a Safety:** Always use a vacuum pump and charging station rated for flammable gases. Never use a torch (brazing) near an open R600a system; use Lokring fittings if possible or ensure the system is completely purged with Nitrogen.
- **Capillary Maintenance:** When replacing the S118CY1, always replace the filter drier. A clogged drier is the leading cause of premature compressor failure in

R600a systems due to the formation of paraffin waxes at low temperatures.
- **Winding Integrity:** If you suspect a motor failure, check the resistance between the Common, Start, and Run pins. A healthy S118CY1 should show consistent readings without a “short to ground.”
- **Mounting:** Ensure the rubber grommets are in good condition. The S118CY1’s 11.8cc displacement creates specific harmonic vibrations that must be dampened to prevent copper pipe fatigue.

Benefit for the User

Choosing or replacing the Donper S118CY1 correctly ensures that the appliance maintains its energy rating. Using an undersized compressor will lead to “short-cycling” and high energy bills, while an oversized unit can cause evaporator icing. Following the 1/4 HP LBP specification ensures the evaporator remains at the precise delta-T required for food safety.



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